Findings of Fact | Site Plan Review
City of Portsmouth Planning Board

Date: July 20, 2023
Property Address: 375 Banfield Rd
Application #: LU-20-259
Decision: ☐ Approve ☐ Deny ☐ Approve with Conditions

Findings of Fact:

Effective August 23, 2022, amended RSA 676:3, I now reads as follows: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Site Plan Regulations Section 2.9 Evaluation Criteria - in order to grant site plan review approval, the TAC and the Planning Board shall find that the application satisfies evaluation criteria pursuant to NH State Law and listed herein. In making a finding, the TAC and the Planning Board shall consider all standards provided in Articles 3 through 11 of these regulations.

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	**Finding** **(Meets Standard/Criteria)**	**Supporting Information**
1	Compliance with all City Ordinances and Codes and these regulations. Applicable standards:	**Meets** **Does Not Meet**	Applicable standards: We have been through the TAC review process as well as third party review to make sure that the proposed development complies with the Zoning Ordinance and Site Plan Review Regulations. This project received TAC approval on June 6, 2023.
2	Provision for the safe development, change or expansion of use of the site.	**Meets** **Does Not Meet**	We have designed the driveway as well as parking loading areas to safely accommodate Portsmouth's largest fire truck as well as the largest tractor-trailer anticipated to use the site; the WB-62. See sheets T1-T5 at the end of the plan set. Additionally, we made sure that there is adequate sight distance for vehicles leaving the site and driving along Banfield Road. See Sheets H1-H2. The building will be sprinklered and a new hydrant is

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
			proposed for the development. The pavement is graded to drain, which will prevent icing during the winter. We have gone through TAC and additional state permitting to ensure that the development is safe.
3	Adequate erosion control and stormwater management practices and other mitigative measures, if needed, to prevent adverse effects on downstream water quality and flooding of the property or that of another.	**Meets** **Does Not Meet**	The stormwater management is designed to the standards of the City of Portsmouth as well as the more stringent standards of the NHDES Alteration of Terrain Bureau. Runoff from all proposed impervious surfaces will be treated post-construction and peak flow rates will be reduced in the post-construction condition compared with the existing condition. The stormwater management design was reviewed extensively by TAC and CMA Engineers to make sure that it complies with Section 7.6 of the Site Plan Review Regulations. Downstream water quality will be enhanced as currently runoff from impervious surface on the subject parcel is untreated, and the potential for flooding is mitigated as peak flows are reduced in the post-construction condition. Additional erosion control features include erosion control blankets, fiber berm for perimeter control, rip rap inlet and outlet protection aprons, and a stabilized construction entrance. This project will require a SWPPP, which entails at least biweekly inspections focusing on the stormwater management and erosion and sediment control features of the site during construction.
4	Adequate protection for the quality of groundwater.	**Meets** **Does Not Meet**	Due to unique soil and groundwater conditions resultant to the historic uses of the site, the applicant hired Wilcox & Barton to perform a site investigation in order to determine the appropriate steps to make the site safe for development. Wilcox & Barton's recommendation was that all stormwater management practices need to be lined and

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
			underdrained, with one ultimate outlet point in the southern corner of the developable area of the site close to the wetland edge. We have complied with these recommendations in the design of the site. Stormwater treatment is accomplished through the use of four lined and underdrained "Focal Point" biofiltration systems and a lined and underdrained Development Area Buffer in the northeast corner. Stormwater detention is accomplished through a lined underground "R-Tank" detention system. The final stormwater outfall will be in the southern corner of the developable area with a pipe outlet leading to a lined vegetated swale that will deposit runoff directly at the edge of the wetland, where the soils and groundwater were found by Wilcox and Barton to be relatively clean. The goal is to prevent contact between surface runoff and groundwater in the historically contaminated sections of the site. The stormwater management system has been designed specifically to meet this intent. This has been reviewed by the Portsmouth Technical Advisory Committee, CMA, and the NHDES Alteration of Terrain Bureau, all of whom signed off on the project. Finally, Wilcox and Barton prepared a Remedial Action Plan which was approved by EPA on March 28, 2023 and will be implemented during construction.
5	Adequate and reliable water supply sources.	**Meets** **Does Not Meet**	The proposed industrial warehouse building will have a potable water and fire suppression line from the existing main in Banfield Road, owned by the City of Portsmouth water department.
6	Adequate and reliable sewage disposal facilities, lines, and connections.	**Meets** **Does Not Meet**	A septic system was designed for the proposed building. The septic design has been approved by NHDES (Approval for Construction #eCA2021102913). See Sheet S1 of the plan set.

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	**Finding** (Meets Standard/Criteria)	**Supporting Information**
7	Absence of undesirable and preventable elements of pollution such as smoke, soot, particulates, odor, wastewater, stormwater, sedimentation or any other discharge into the environment which might prove harmful to persons, structures, or adjacent properties.	**Meets** **Does Not Meet**	See supporting information for Criteria #4 for information relative to protection of groundwater given the historic contamination on the site. In summary, all stormwater management practices will need to be lined and underdrained, and attenuated runoff will need to be discharged in a clean area of the site. Additionally, a Remedial Action Plan was developed by Wilcox & Barton and has been approved by EPA. These features will mitigate the potential for movement of existing contaminants. Otherwise, all stormwater is being treated per the standards of the City of Portsmouth and the Alteration of Terrain Bureau, and the approved septic system includes a pre-treatment tank which helps to reduce the required size of the leach field and provides cleaner effluent.
8	Adequate provision for fire safety, prevention and control.	**Meets** **Does Not Meet**	We designed the driveway, parking area, and loading area to be able to safely accommodate the City of Portsmouth's largest fire truck. Additionally, a new fire hydrant is proposed, and the building will be sprinklered.
9	Adequate protection of natural features such as, but not limited to, wetlands.	**Meets** **Does Not Meet**	We received a permit from NHDES (#2021-00240) to fill an isolated 1,910 S.F. wetland in the northern quadrant of the property. This is not large enough to require a local permit from the City of Portsmouth. Otherwise, all runoff from proposed impervious surfaces will be treated and peak flows will be reduced in the post-construction condition. Water reaching the wetlands will be clean per the standards of the City of Portsmouth and the NHDES Alteration of Terrain Bureau. This is an improvement on the existing condition where there are impervious surfaces whose runoff reaches the wetland untreated. 9.34 acres (64.6%) of the subject parcel will remain undisturbed post-construction.
10	Adequate protection of historical features on the site.		There are no known historical features on the site. We received signoff from the New

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
		Meets Does Not Meet	Hampshire Division of Historical Resources on February 19, 2021, confirming that the proposed development will not affect any known historic properties.
11	Adequate management of the volume and flow of traffic on the site and adequate traffic controls to protect public safety and prevent traffic congestion.	Meets Does Not Meet	A Traffic Memorandum was prepared for this development by Stephen G. Pernaw & Company, Inc. After some clarification and revisions to the plans, this was approved by the Technical Advisory Committee. Our intersection sight distance profile on Sheet H1 confirms that there is at least 500' of sight distance from the driveway entrance, which exceeds the 321' for stopping sight distance and the 445' for intersection sight distance required by AASHTO. The site was designed for the largest trucks anticipated to use it and we have included textured paving in the proposed driveway to denote an area specifically for truck turning. A stop sign and stop bar will control the traffic entering Banfield Road. There is 86' of driveway from Banfield Road to the parking area, which provides adequate stacking distance for vehicles attempting to leave the site. There is more stacking room additionally available in the aisles of the parking lot.
12	Adequate traffic controls and traffic management measures to prevent an unacceptable increase in safety hazards and traffic congestion off-site.	Meets Does Not Meet	This is satisfactorily answered with our supporting information for Criteria #11.
13	Adequate insulation from external noise sources.	Meets Does Not Meet	This property is outside of the Highway Noise Overlay District and therefore no noise mitigation is required.
14	Existing municipal solid waste disposal, police, emergency medical, and other municipal services and facilities adequate to handle any new demands on infrastructure or services created by the project.	Meets Does Not Meet	For solid waste disposal, dumpsters are provided in the loading area in the rear of the building. The truck turning plans confirm that the driveway and loading area have been designed for Portsmouth's largest fire engine, and therefore they are also adequate for ambulances and police vehicles. This has been reviewed and approved by the Technical Advisory Committee.

	Site Plan Review Regulations Section 2.9 Evaluation Criteria	Finding (Meets Standard/Criteria)	Supporting Information
15	Provision of usable and functional open spaces of adequate proportions, including needed recreational facilities that can reasonably be provided on the site	**Meets** **Does Not Meet**	As stated on Sheet C2, Note 2, 524,200 S.F. (82.4%) of the subject parcel will remain as open space post-construction. This far exceeds the 20% open spaces required by the Zoning Ordinance for the industrial zone.
16	Adequate layout and coordination of on-site accessways and sidewalks in relationship to off-site existing or planned streets, accessways, bicycle paths, and sidewalks.	**Meets** **Does Not Meet**	The proposed driveway is parallel with Banfield Road and adequate sight distance is provided along Banfield Road. The driveway is located where it is partially for sight distance given the hill just to the north.
17	Demonstration that the land indicated on plans submitted with the application shall be of such character that it can be used for building purposes without danger to health.	**Meets** **Does Not Meet**	The aforementioned Remedial Action Plan prepared by Wilcox & Barton and approved by EPA will be implemented. Additionally, we are proposing to line all stormwater management practices to prevent contact between surface runoff and groundwater. Therefore, the site can be used for building purposes.
18	Adequate quantities, type or arrangement of landscaping and open space for the provision of visual, noise and air pollution buffers.	**Meets** **Does Not Meet**	As shown on Sheet L1, we are providing plantings that will aesthetically enhance the site and provide as much of a buffer as possible between the subject parcel, Banfield Road, and abutting properties. As much of the site as possible will remain wooded and we are providing new trees and shrubs where possible throughout the developed site.
19	Compliance with applicable City approved design standards.	**Meets** **Does Not Meet**	The proposed development complies with the Site Plan Review Regulations and the Zoning Ordinance of the City of Portsmouth. TAC Approval was received on June 6, 2023.
	Other Board Findings:		

Findings of Fact | Subdivision Rules and Regulations
City of Portsmouth Planning Board

Date: 9/6/2023
Property Address: 375 Banfield Road
Application #: LU-23-107
Decision: ☐ Approve ☐ Deny ☐ Approve with Conditions

Findings of Fact:
Effective August 23, 2022, amended RSA 676:3, I now reads as follows: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

	Subdivision Review Criteria	Finding (Meets Standards/ Requirements)	Supporting Information
1	Subdivision Rules and Regulations III. D. 1 The Board shall act to deny any application which is not in compliance with Section IV or V as appropriate. **SECTION IV - REQUIREMENTS FOR PRELIMINARY PLAT**	Meets Does Not Meet	All applicable standards of Section VI are met. No new streets are proposed.
2	**SECTION V - REQUIREMENTS FOR FINAL PLAT**	Meets Does Not Meet	All applicable standards of Section V are met. No new streets are proposed.
3	**SECTION VI - GENERAL REQUIREMENTS**	Meets Does Not Meet	The application has been reviewed by the Technical Advisory Committee (TAC) for conformance with the General Requirements. All applicable requirements of Section V1 are met. The application was recommended for approval on August 1, 2023 at the Technical Advisory Committee Meeting.

	Subdivision Review Criteria	Finding (Meets Standards/ Requirements)	Supporting Information
4	**SECTION VII - DESIGN STANDARDS**	**Meets** **Does Not Meet**	Section VII is not applicable. No new development is proposed as part of this subdivision application. The proposed industrial warehouse building with associated parking and loading areas is part of a separate application. All applicable sections of the Subdivision Regulations are met except for IX.1 – Improvements and Installation Bonds and IX.2 – Maintenance Bonds, where we are seeking waivers for those specific requirements.
5	**Other Board Findings:**		

Findings of Fact | Wetland Conditional Use Permit
City of Portsmouth Planning Board

Date: August 30, 2023
Property Address: 375 Banfield Road
Application #: LU-23-107
Decision: ☐ Approve ☐ Deny ☐ Approve with Conditions

Findings of Fact:

Effective August 23, 2022, amended RSA 676:3, I now reads as follows: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

In order to grant Wetland Conditional Use permit approval the Planning Board shall find the application satisfies criteria set forth in the Section 10.1017.50 (Criteria for Approval) of the Zoning Ordinance.

	Zoning Ordinance Sector 10.1017.50 Criteria for Approval	**Finding** **(Meets Criteria for Approval)**	**Supporting Information**
1	*1. The land is reasonably suited to the use activity or alteration.*	**Meets** **Does Not Meet**	This proposal is for an industrial use within the industrial zone. The site is already developed and has been used for decades, and this development replaces the existing use with a conforming industrial warehouse & office building.
2	2. *There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.*	**Meets** **Does Not Meet**	In the existing condition, there is 3,350 SF of on-site impervious surface within the wetland buffer. In the proposed condition there will only be 85 SF of impervious surface within the wetland buffer associated with the development, and it will be in the right of way for the proposed driveway. In addition to this, we are proposing 7,910 SF of temporary impact, which is unavoidable for the proposed development. The driveway needs to be on the south side of the site due to sight distance concerns, which is what causes 85 SF of it to be within the buffer. The turning radii were specifically engineered for large trucks entering and leaving the site. The section of the driveway that is proposed within the wetland

	Zoning Ordinance Sector 10.1017.50 Criteria for Approval	Finding (Meets Criteria for Approval)	Supporting Information
			buffer needs to be there due to safety concerns. This is a substantial reduction from the 3,350 SF of impervious surface within the wetland buffer in the existing condition, and runoff from impervious surfaces reaches the wetland untreated in the existing condition, In the proposed condition, runoff from all impervious surfaces associated with the development will be treated to AOT standards. Due to historic contamination in the upland areas of the site, the ultimate stormwater discharge needs to be within the buffer as well. All stormwater BMPs will be lined and a lined vegetated swale will be constructed within the buffer to deposit treated and attenuated runoff directly at the edge of the wetland. This was determined to be the ideal location from an environmental standpoint due to the above-mentioned issues. The conservation commission and technical advisory committee have accepted this proposed outfall location as it is the only place where stormwater can safely be outletted on this particular site. Finally, a vegetated buffer for stormwater treatment is proposed within the wetland buffer. This is adjacent to the driveway, which needs to be in the south side of the site due to safety issues. There is no way to treat the runoff from the driveway that will not involve placing a stormwater management device in the buffer, and only the runoff from the driveway is being treated through this device. Water will pass through this area as a sheet flow rather than an erosive concentrated flow. The disturbance for this area is to install an underdrain and liner below the vegetated buffer, but once this is constructed it will be functionally similar to a natural meadow or forest area.

	Zoning Ordinance Sector 10.1017.50 Criteria for Approval	**Finding** (Meets Criteria for Approval)	**Supporting Information**
3	*3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.*	**Meets** **Does Not Meet**	In the existing condition, the soils and groundwater on site are contaminated, and water reaches the wetlands untreated. Where the disturbance to the wetland buffer with the exception of a small corner of the driveway is for the purpose of stormwater management only, this is a unique case in which buffer disturbance will only enhance wetland functional values. Stormwater will reach the wetland treated rather than untreated, and runoff will no longer pass over contaminated areas. We are reducing the impervious surface within the wetland buffer from 3,350 SF of parking and building area to 85 SF for the corner of the driveway radius.
4	*4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.*	**Meets** **Does Not Meet**	We are proposing to disturb the buffer only to the extent that is absolutely necessary. The majority of the proposed buffer disturbance is within existing grassed area, and it is for the purpose of stormwater management.
5	*5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.*	**Meets** **Does Not Meet**	This proposal is minimally impactful to the wetland buffer and it can be argued that it will enhance the value of the wetland as the stormwater reaching it will now be treated and the possibility of it crossing over contaminated areas will be mitigated.
6	*6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.*	**Meets** **Does Not Meet**	While there will be disturbance within the 25' buffer strip, this is for the better as it enhance the quality of water reaching the wetland. The area that we are disturbing within the buffer strip for the swale is grass currently and will be returned to grass as soon as the swale is built.
7	**Other Board Findings:**		

JONES&BEACH
ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

June 21, 2023

Portsmouth Planning Board
Attn: Rick Chellman, Chairman
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Site Plan and Conditional Use Permit Application
Case # LU-20-259
375 Banfield Road, Portsmouth, NH
Tax Map 266, Lot 7
JBE Project No. 19190.2

Dear Mr. Chellman,

Jones & Beach Engineers, Inc., respectfully submits a Site Plan application on behalf of the applicant, Banfield Realty, LLC. The intent of this application is to construct an industrial warehouse and office building with associated grading, drainage, and utilities. This project is to be served by electric, gas, septic system, and municipal water. TAC approval was granted on June 6, 2023, we are requesting to be on the agenda for the July 20th Planning Board meeting.

The following items are provided in support of this Application:

1. Completed Site Plan Permit Checklist.
2. Letter of Authorization.
3. Current Deed.
4. Test Pits.
5. TAC Approval dated June 13, 2023
6. NHDES AoT Permit-2040.
7. NDES Septic Approval eCA2021102913.
8. NHDES Wetland Permit 2021-00240.
9. Traffic Memorandum.
10. Supplemental Site Investigative Report (Electronic Copy Only).
11. EPA Approval of PCB Remediation – undated.
12. Revised Work Plan for Lowland Area by Wilcox & Barton – dated 4/5/23
13. Acceptance of Remedial Action Plan by Wilcox & Barton – dated 4/7/23
14. NHDES Remedial Action Plan approval – dated 4/26/23
15. Work Plan for Lowland Area, Revision 2 – dated 5/16/23
16. Photos of Similar Style Building.
17. One (1) Full Size Plan Sets Folded.
18. One (1) Drainage Analysis.

If you have any questions or need any additional information, please feel free to contact our office. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.

Joseph A. Coronati
Vice President

cc: Rob Graham, Banfield Realty, LLC (via email)
Bill Wilcox, Wilcox & Barton (via email)
Lynn Preston, Sheehan Phinney Bass & Green (via email)

City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan review regulations for full details.

Applicant Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Owner/Applicant: Banfield Realty, LLC Date Submitted: 12/30/2020

Phone Number: (603) 479-3666 E-mail: rob@graham-consult.com

Site Address: 375 Banfield Road Map: 266 Lot: 7

Zoning District: Industrial Lot area: 651,747 sq. ft.

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
☒	Fully executed and signed Application form. **(2.5.2.3)**		N/A
☒	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF). **(2.5.2.8)**		N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Statement that lists and describes "green" building components and systems. **(2.5.3.1A)**		
☒	Gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. **(2.5.3.1B)**		N/A
☒	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1C)**	C1 & C2	N/A
☒	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. **(2.5.3.1D)**	C1 & C2	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. **(2.5.3.1E)**	COVER SHEET	N/A
☒	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1F)**	COVER SHEET	N/A
☒	List of reference plans. **(2.5.3.1G)**	C1	N/A
☒	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1H)**	COVER SHEET	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director. Submittals shall be a minimum of 11 inches by 17 inches as specified by Planning Dept. staff. **(2.5.4.1A)**	Required on all plan sheets	N/A
☒	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. **(2.5.4.1B)**	Required on all plan sheets	N/A
☒	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. **(2.5.4.1C)**		N/A
☒	Plans shall be drawn to scale. **(2.5.4.1D)**	Required on all plan sheets	N/A
☒	Plans shall be prepared and stamped by a NH licensed civil engineer. **(2.5.4.1D)**	ALL SHEETS	N/A
☒	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. **(2.5.4.1E)**	C1	N/A
☒	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	COVER SHEET	N/A
☒	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	ALL SHEETS	N/A
☒	Individual plan sheet title that clearly describes the information that is displayed. **(2.5.4.2C)**	Required on all plan sheets	N/A
☒	Source and date of data displayed on the plan. **(2.5.4.2D)**	C1	N/A

Site Plan Specifications

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	A note shall be provided on the Site Plan stating: “All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations.” **(2.5.4.2E)**	C2 NOTE #15	N/A
☒	Plan sheets submitted for recording shall include the following notes: a. “This Site Plan shall be recorded in the Rockingham County Registry of Deeds.” b. “All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director.” **(2.13.3)**	C2 NOTES #16 & 17	N/A
☒	Plan sheets showing landscaping and screening shall also include the following additional notes: a. “The property owner and all future property owners shall be responsible for the maintenance, repair and replacement of all required screening and landscape materials.” b. “All required plant materials shall be tended and maintained in a healthy growing condition, replaced when necessary, and kept free of refuse and debris. All required fences and walls shall be maintained in good repair.” c. “The property owner shall be responsible to remove and replace dead or diseased plant materials immediately with the same type, size and quantity of plant materials as originally installed, unless alternative plantings are requested, justified and approved by the Planning Board or Planning Director.” **(2.13.4)**	L1 NOTES # 19, 20, & 21	N/A

Site Plan Specifications – Required Exhibits and Data

☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
	1. Existing Conditions: (2.5.4.3A)		
☒	a. Surveyed plan of site showing existing natural and built features;	C1	
☒	b. Zoning boundaries;	C1	
☒	c. Dimensional Regulations;	C1	
☒	d. Wetland delineation, wetland function and value assessment;	C1	
☒	e. SFHA, 100-year flood elevation line and BFE data.	N/A	
	2. Buildings and Structures: (2.5.4.3B)		
☐	a. Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation;		x
☐	b. Elevations: Height, massing, placement, materials, lighting, façade treatments;		x
☒	c. Total Floor Area;	C2	
☐	d. Number of Usable Floors;		x
☐	e. Gross floor area by floor and use.		x
	3. Access and Circulation: (2.5.4.3C)		
☒	a. Location/width of access ways within site;	C2	
☒	b. Location of curbing, right of ways, edge of pavement and sidewalks;	C2	
☒	c. Location, type, size and design of traffic signing (pavement markings);	C2	
☒	d. Names/layout of existing abutting streets;	C2	
☒	e. Driveway curb cuts for abutting prop. and public roads;	C2	
☒	f. If subdivision; Names of all roads, right of way lines and easements noted;	N/A	
☒	g. AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	T1-T2	
	4. Parking and Loading: (2.5.4.3D)		
☒	a. Location of off street parking/loading areas, landscaped areas/buffers;	C2	
☒	b. Parking Calculations (# required and the # provided).	C2	
	5. Water Infrastructure: (2.5.4.3E)		
☒	a. Size, type and location of water mains, shut-offs, hydrants & Engineering data;	C2	
☒	b. Location of wells and monitoring wells (include protective radii).	C1	
	6. Sewer Infrastructure: (2.5.4.3F)		
☒	a. Size, type and location of sanitary sewage facilities & Engineering data.	S1	
	7. Utilities: (2.5.4.3G)		
☒	a. The size, type and location of all above & below ground utilities;	C2	
☒	b. Size type and location of generator pads, transformers and other fixtures.	C2	

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	**8. Solid Waste Facilities: (2.5.4.3H)**		
☒	a. The size, type and location of solid waste facilities.	C2	
	9. Storm water Management: (2.5.4.3I)		
☒	a. The location, elevation and layout of all storm-water drainage.	C3	
	10. Outdoor Lighting: (2.5.4.3J)		
☒	a. Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and; b. photometric plan.	L2	
☒	**11.** Indicate where dark sky friendly lighting measures have been implemented. **(10.1)**	L2	
	12. Landscaping: (2.5.4.3K)		
☒	a. Identify all undisturbed area, existing vegetation and that which is to be retained;	L1	
☒	**b.** Location of any irrigation system and water source.	TBD	
	13. Contours and Elevation: (2.5.4.3L)		
☒	a. Existing/Proposed contours (2 foot minimum) and finished grade elevations.	C3	
	14. Open Space: (2.5.4.3M)		
☒	a. Type, extent and location of all existing/proposed open space.	C2	
☒	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	C1	
☒	**16. Location of snow storage areas and/or off-site snow removal. (2.5.4.3O)**	C2	
☒	**17. Character/Civic District (All following information shall be included): (2.5.4.3Q)**	N/A	
	a. Applicable Building Height (10.5A21.20 & 10.5A43.30);		
	b. Applicable Special Requirements (10.5A21.30);		
	c. Proposed building form/type (10.5A43);		
	d. Proposed community space (10.5A46).		

Other Required Information

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	Traffic Impact Study or Trip Generation Report, as required. (*Four (4) hardcopies of the full study/report and Six (6) summaries to be submitted with the Site Plan Application*) **(3.2.1-2)**	Provided by Steven Pernaw	
☒	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	DRAINAGE REPORT	
☒	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. **(7.3.1)**	NOT LOCATED IN EITHER	
☒	Indicate where measures to minimize impervious surfaces have been implemented. **(7.4.3)**		
☒	Calculation of the maximum effective impervious surface as a percentage of the site. **(7.4.3.2)**		
☒	Stormwater Management and Erosion Control Plan. (*Four (4) hardcopies of the full plan/report and Six (6) summaries to be submitted with the Site Plan Application*) **(7.4.4.1)**		

Final Site Plan Approval Required Information

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	All local approvals, permits, easements and licenses required, including but not limited to: a. Waivers; b. Driveway permits; c. Special exceptions; d. Variances granted; e. Easements; f. Licenses. **(2.5.3.2A)**		
☒	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: a. Calculations relating to stormwater runoff; b. Information on composition and quantity of water demand and wastewater generated; c. Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; d. Estimates of traffic generation and counts pre- and post-construction; e. Estimates of noise generation; f. A Stormwater Management and Erosion Control Plan; g. Endangered species and archaeological / historical studies; h. Wetland and water body (coastal and inland) delineations; i. Environmental impact studies. **(2.5.3.2B)**		

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	A document from each of the required private utility service providers indicating approval of the proposed site plan and indicating an ability to provide all required private utilities to the site. **(2.5.3.2D)**	PENDING	
☒	A list of any required state and federal permit applications required for the project and the status of same. **(2.5.3.2E)**	C2 PERMITS PENDING	

Applicant's Signature: Joseph Coronati HR **Date:** 12/29/2020

Letter of Authorization

I, Banfield Realty, LLC, 304 Maplewood Avenue, Portsmouth, NH 03801, owner of property located in Portsmouth, NH, known as Tax Map 266, Lot 7, do hereby authorize Jones & Beach Engineers, Inc., PO Box 219, Stratham, NH, to act on my behalf concerning the previously-mentioned property. The parcel is located on 375 Banfield Road in Portsmouth, NH.

I hereby appoint Jones & Beach Engineers, Inc., as my agent to act on my behalf in the review process, to include any required signatures.

Cynthia Nix
Witness

Banfield Realty, LLC

7-23-20
Date

Return to:

E # 20005358 02/05/2020 12:13:02 PM
Book 6081 Page 2150 Page 1 of 6
Register of Deeds, Rockingham County

Cathy Ann Stacey

LCHIP	ROA480986	25.00
TRANSFER TAX	RO094654	18,000.00
RECORDING		30.00
SURCHARGE		2.00

WARRANTY DEED

KNOW ALL PERSONS BY THESE PRESENTS, that we, **William E. Copeland** a married man of 26 Constitution Way, Dover, NH 03820, **Jack Copeland** a single man of 245 Middle Street, Apartment #227, Portsmouth, NH 03801, **Kevin Copeland** a single man of P.O. Box 4213, Valley Village, CA 91617, **Joseph P. Copeland**, married man of 142 Dennett Road, Kittery, ME 03904, and **Roeseland Holdings 5, LLC**, a New Hampshire limited liability company with an address of 21 Moody Point Drive, Newmarket, NH 03857, grant to **Banfield Realty LLC**, a New Hampshire limited liability company with an address of 304 Maplewood Avenue, Portsmouth, NH 03801, **with warranty covenants**, all our right, title and interest in the following described premises:

A certain lot or parcel of land together with the buildings thereon situated on the Southeasterly sideline of Banfield Road in Portsmouth, County of Rockingham and State of New Hampshire, bounded and described as follows:

Commencing at a point on said Southeasterly sideline of Banfield Road at the intersection of two stone walls and at land now or formerly of one Barratt; thence running in a Southeasterly direction by and along an old stone wall and land now or formerly of said Barratt, Thompson, Pickering, Iafolla, Wood and Myers, a total distance of Two Thousand Six Hundred Sixty-Three feet (2,663') more or less to a point at the intersection of two stone walls; thence turning and running by and along a stone wall and land of Myers N 58° 22' E, a distance of One Hundred Twenty-Eight feet (128') to other land of Iafolla; thence turning and running by and along another stone wall and land of Iafolla, S 18° 21' E, a distance of Three Hundred Twenty feet (320'); thence turning and running by and along another stone wall S 54° 8' 30" W, a distance of Thirty feet (30'); thence turning and running by a stone wall S 47° 49' 30" E, a distance of One Hundred Seven feet (107') to a point adjoining land of Peverly Hill Corp., thence turning and running S 70° 15' W, a distance of Five Hundred Thirty-Three feet (533') to a point; thence turning and running N 25° 11' W, a distance of Three Hundred Twenty-Five feet (325') to a point at an old stone wall; thence turning and running in a Southwesterly direction by and along said stone wall and land of said Peverly Hill Corp. and also by land of Stef, a distance of Four Hundred Forty-Six feet (446') to a point; thence turning and running in a Northwesterly direction by a stone wall and land of Stef, a distance of One Thousand Four Hundred Ninety-Five feet (1,495') more or less to a point; thence turning and running S 65° 16' W, a distance of Ninety-Two feet (92') also by land of Stef to a point adjoining land now or formerly of Dow; thence turning and running N 25° 31' W, a distance of One Hundred Seventy-Five feet (175') to a point; thence continuing N 33° 50' W, a distance of Three Hundred and Eighteen feet (318') to a point; thence continuing N 35° 25' W, a distance of

Four Hundred Five feet (405') to a point adjoining land of Copeland; thence turning and running N 64° 17' E, a distance of Three Hundred Sixty feet (360') to a point; thence turning and running N 33° 21' W, a distance of Two Hundred feet (200'), the last two courses by land of Copeland, to a point at an old stone wall on the Southeasterly sideline of Banfield Road; thence turning and running by said stone wall N 63° 50' E, a distance of One Hundred Twenty-Nine feet (129'); thence continuing N 60° 28' E, a distance of Three Hundred Ten feet (310'); thence continuing N 61° 1' E, a distance of One Hundred Twenty-One feet (121') to the stone wall and point of beginning.

Excepting and excluding from this conveyance that portion of the above-described premises previously conveyed by warranty deed of William H. Copeland and Virginia A. Copeland to John Iafolla Co., Inc. dated September 3, 1963, recorded in Rockingham County Registry of Deeds at Book 1686, Page 133.

Subject to a right of way Fifty feet (50') in width lying along the Northeasterly sideline of the premises herein conveyed, and adjoining a stone wall designating said boundary, for access from Banfield Road to property conveyed by William H. Copeland and Virginia A. Copeland to John Iafolla Co., Inc. by warranty deed dated September 3, 1963, recorded in Rockingham County Registry of Deeds at Book 1686, Page 133.

Meaning and intending to describe and convey a portion of the same premises conveyed by Harry Zaitland and Irving Zaitland to William H. Copeland and Virginia A. Copeland by warranty deed dated September 3, 1963, recorded in Rockingham County Registry of Deeds at Book 1686, Page 128. William H. Copeland conveyed his interest in the premises to Virginia A. Copeland by quitclaim deed dated March 15, 2001, recorded in Rockingham County Registry of Deeds at Book 3555, Page 0083. Virginia A. Copeland died on September 10, 2008. See Estate of Virginia A. Copeland, 10th Circuit – Probate Division – Brentwood, Case No. 318-2008-ET-01202. Virginia A. Copeland's interest in the premises passed to the grantors William E. Copeland, Jack Copeland, Kevin Copeland and to James R. Copeland, who died on June 4, 2018. See Estate of James R. Copeland, 10th Circuit – Probate Division – Brentwood, Case No. 318-2018-ET-01138. James R. Copeland's interest in the premises passed to his sons, Joseph P. Copeland and James W. Copeland. James W. Copeland conveyed his portion of the premises to Roeseland Holdings 5, LLC, by Quitclaim Deed dated May 7, 2019, recorded in Rockingham County Registry of Deeds at Book 5998, Page 2778.

The premises conveyed hereby is not homestead property of the Grantors.

Executed this 5th day of February, 2020.

[Signature Page Attached]

[Signature Page to Warranty Deed]

William E. Copeland

Jack Copeland

Kevin Copeland

Joseph P. Copeland

Roeseland Holdings 5, LLC

By: ______________________
James W. Copeland
Its: Member

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 27 day of January 2020, by William E. Copeland.

ALEC L. McEACHERN
MY COMMISSION EXPIRES JULY 13, 2021

Notary Public
My Commission Expires:

[Signature Page to Warranty Deed]

William E. Copeland

Jack Copeland

Kevin Copeland

Joseph P. Copeland

Roeseland Holdings 5, LLC

By: ______________________
James W. Copeland
Its: Member

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this ___ day of ___________ 2020, by William E. Copeland.

See attached certificate.

Notary Public
My Commission Expires:

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 28 day of January 2020, by Jack Copeland.

ALEC L. McEACHERN
MY COMMISSION EXPIRES JULY 13, 2021

Notary Public
My Commission Expires:

STATE OF CALIFORNIA
COUNTY OF ________________

The foregoing instrument was acknowledged before me on this _____ day of __________ 2020, by Kevin Copeland.

See attached certificate.

____
Notary Public
My Commission Expires:

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 5th day of February 2020, by Joseph P. Copeland.

LEE-ANNE R. SANFACON
07-31-2024

Notary Public
My Commission Expires:

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 5th day of February 2020, by James W. Copeland in his capacity as Member of Roeseland Holdings 5, LLC.

LEE-ANNE R. SANFACON
07-31-2024

Notary Public
My Commission Expires:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Los Angeles)

On 01/27/2020 before me, Andre Smadja, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Kevin Copeland
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

ANDRE SMADJA
Notary Public - California
Los Angeles County
Commission # 2293699
My Comm. Expires Jul 3, 2023

Signature ______________________
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: Warranty Deed
Document Date: 01/27/2020 Number of Pages: 4
Signer(s) Other Than Named Above: —

Capacity(ies) Claimed by Signer(s)

Signer's Name: ____________
☐ Corporate Officer — Title(s): ____________
☐ Partner — ☐ Limited ☐ General
☒ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: ____________
Signer Is Representing: ____________

Signer's Name: ____________
☐ Corporate Officer — Title(s): ____________
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: ____________
Signer Is Representing: ____________

TEST PITS
FOR
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE
APRIL 8, 2020
JBE Project No. 19190.2

Performed by: Joseph Coronati, Jones & Beach Engineers, Inc., SSD #1716

Test Pit #1

0"- 8"		loam
8"- 18"	10YR 4/4	dark yellowish brown fine sandy loam granular, friable
18" – 90"	10YR 5/6	yellowish brown silty loam firm

SHWT = 18"
Roots = 18"
H_2O @ 32"
No Refusal observed

Test Pit #2

0"- 18"		loam/fill/junk
18" - 73"	10YR 5/6	yellowish brown silty loam firm

SHWT = 18"
Roots to 6"
H_2O @ 50"
No Refusal observed

No. 1716

Test Pit #3

0"- 3"		loam
3" - 24"	10YR 4/4	dark yellowish brown fine sandy loam sandy granular, loose, friable
24" – 72"	10YR 5/6	yellowish brown silty loam firm

SHWT = 24"
Roots to 24"
H_2O @ 48"
No Refusal observed

Test Pit #4 – no log

depth = 12' – starting to get shale or rotten ledge, digging got much harder
fine sandy loam & silty loam
firm
No H2O

Test Pit #5

depth = 12'
fine sandy loam & silty loam
firm
No H2O

Test Pit #6

big hole dug
Refusal at 5' & 6' on opposite ends of hole

Test Pit #7

Refusal at 65"

CITY OF PORTSMOUTH

Planning Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801

(603) 610-7216

TECHNICAL ADVISORY COMMITTEE

June 13, 2023

Robert Graham
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, New Hampshire 03801

RE: Site Plan Review approval for property located at 375 Banfield Road (LU-20-259)

Dear Mr. Graham:

The Technical Advisory Committee, at its regularly scheduled meeting of Tuesday, June 6, 2023, considered your application for Site Plan review approval to demolish two existing commercial buildings and an existing shed and construct a 75,000 s.f. industrial warehouse building with 75 parking spaces as well as associated paving, stormwater management, lighting, utilities and landscaping. Said property is shown on Assessor Map 266, Lot 7 and lies within the Industrial District (I). As a result of said consideration, the Committee voted to

recommend **approval** to the Planning Board with the following **conditions**:

1)Subject to written assurance and any required surety for performance provided to the Planning Board, the applicant shall conduct work in accordance with all requirements of the NHDES letter dated April 26, 2023, which includes investigation work in the proposed upland development areas, approval of an Activities and Use limitation and the completion of a remedial action implementation plan for the upland development area. In addition, as presented by the applicant, they shall continue their investigation of the lowland area, including full characterization of any reportable site contaminants in compliance with any and all remedial action plans or other permits from NHDES or the EPA.

2)Fire service shall be at least 8" in diameter to where it meets the two 6" lines.

This matter will be placed on the agenda for the Planning Board meeting scheduled for **Thursday, July 20, 2023**. One (1) hard copy of all plans and supporting reports and exhibits as well as an updated electronic file (in a PDF format) must be filed in the Planning Department and uploaded to the online permit system no later than **Wednesday, June 28, 2023**.

Per Section 2.5 of the Site Plan Regulations, a site plan review application to the Planning Board must include all applicable information and supporting materials including but not limited to the following items:

- *Full updated plan set*
- *Draft Easements*
- *Drainage Analysis*
- *Traffic Studies*
- *Etc.*

All comments, corrections, and conditions identified as “Items to be addressed before Planning Board submittal’ must be resolved/corrected for the Planning Board application submittal to be deemed complete.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

Peter Britz,
Planning and Sustainability Director

cc:

Joseph Coronati

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

October 28, 2021

Rob Graham
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, NH 03801
sent via email: (rob@graham-consult.com)

Permit: AoT-2040

RE: Industrial Warehouse
Tax Map 266, Lot 7
Portsmouth, NH

Dear Applicant:

Based upon the plans and application, approved on October 28, 2021, we are hereby issuing RSA 485-A:17 Alteration of Terrain Permit AoT-2040. The permit is subject to the following conditions:

As part of the processing of this application, DES waived specific requirements of Rule Env-Wq 1507.04 requiring the applicant to capture and infiltrate the groundwater recharge volume (GRV) in accordance with Env-Wq 1508.16 and Env-Wq 1507.05 Channel Protection Requirements. Granting these waivers will not have an adverse impact on the environment, public health, public safety, or abutting properties, and granting the request is consistent with the intent and purpose of the rules waived. Additional documentation relative to the waivers is contained within the file.

PROJECT SPECIFIC CONDITIONS:

1. The approved plans, latest revision dated October 26, 2021, and supporting documentation in the permit file are a part of this approval.

2. **This permit expires on October 28, 2026.** No earth moving activities shall occur on the project after this expiration date unless the permit has been extended by the Department. If requesting an extension, the request must be received by the department <u>before the permit expires</u>. The Amendment Request form is available at: https://www.des.nh.gov/land/land-development

3. The Permittee shall comply with all recommendations by the New Hampshire Fish and Game Department related to state or federally listed threatened or endangered species that are incorporated into the project plans.

4. A soil management plan (SMP) shall be submitted to NHDES that describes the management of soil during upcoming site redevelopment activities, to include excavation activities, any temporary onsite storage, reuse, and any offsite disposal of soil conducted in accordance with Env-Or 611. Commencement of redevelopment activities that involve disturbance of soil shall not occur until NHDES has reviewed the SMP.

GENERAL CONDITIONS:

1. Activities shall not cause or contribute to any violations of the surface water quality standards established in Administrative Rule Env-Wq 1700.

2. You must submit revised plans for permit amendment prior to any changes in construction details or sequences. You must notify the Department in writing within ten days of a change in ownership.

3. You must notify the Department in writing prior to the start of construction and upon completion of construction. Forms can be submitted electronically at:. https://www.des.nh.gov/land/land-development Paper forms are available at that same web page.

4. **All stormwater practices shall be inspected and maintained in accordance with Env-Wq 1507.07 and the project Inspection and Maintenance (I&M) Manual.** All record keeping required by the I&M Manual shall be maintained by the identified responsible party, and be made available to the department upon request. Photographs of the site and BMPs must accompany the I&M submittals.

5. This permit does not relieve the applicant from the obligation to obtain other local, state or federal permits that may be required (e.g., from US EPA, US Army Corps of Engineers, etc.). Projects disturbing over 1 acre may require a federal stormwater permit from EPA. Information regarding this permitting process can be obtained at: use https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents.

6. In accordance with Env-Wq 1503.21 (c)(1), a written notice signed by the permit holder and a qualified engineer shall be submitted to DES stating that the project was completed in accordance with the approved plans and specifications. If deviations were made, the permit holder shall review the requirements in Env-Wq 1503.21(c)(2).

7. If applicable, no activity shall occur in wetland areas until a Wetlands Permit is obtained from the Department. Issuance of this permit does not obligate the Department to approve a Wetlands Permit for this project.

8. This project has been screened for potential impact to known occurrences of protected species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or have not been surveyed in detail, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species. This permit does not authorize in any way the take of threatened or endangered species, as defined by RSA 212-A:2, or of any protected species or exemplary natural communities, as defined in RSA 217-A:3.

Sincerely,

GS Andrews

Gloria S. Andrews, PE
Alteration of Terrain Bureau

ec: Portsmouth Planning Board, (igilbo@cityofportsmouth.com &
planning@cityofportsmouth.com)
Melissa Doperalski, NHFG (Melissa.doperalski@wildlife.nh.gov)
Joseph Coronati, PE (jcoronati@jonesandbeach.com)
Daniel Meditz (dmeditz@jonesandbeach.com)
Stefanie Giallongo, NHDES Wetlands (Stefanie.M.Giallongo@des.nh.gov)
Scott Drew, NHDES Hazardous Waste (scott.t.drew@des.nh.gov)
Amy Doherty, NHDES Hazardous Waste (amy.doherty@des.nh.gov)

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

APPROVAL FOR CONSTRUCTION OF INDIVIDUAL SEWAGE DISPOSAL SYSTEM (ISDS)

AS AUTHORIZED BY THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES, WATER DIVISION PURSUANT TO RSA 485-A, WATER POLLUTION AND WASTE DISPOSAL AND ENV-WQ 1000, SUBDIVISION AND INDIVIDUAL SEWAGE DISPOSAL SYSTEM DESIGN RULES.

APPLICATION APPROVAL DATE: 10/29/2021

APPROVAL NUMBER: eCA2021102913

I. PROPERTY INFORMATION

Address: 375 BANFIELD ROAD
PORTSMOUTH NH 03801
Subdivision Approval No.: 5 PLUS ACRES
Subdivision Name:
County: ROCKINGHAM
Tax Map/Lot No.: 266/7

II. OWNER INFORMATION

Name: BANFIELD REALTY LLC
Address: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE
PORTSMOUTH NH 03801

III. APPLICANT INFORMATION

Name: JONES & BEACH ENGINEERS INC
Address: JONES & BEACH ENGINEERS INC
PO BOX 219
STRATHAM NH 03885

IV. DESIGNER INFORMATION

Name: JOSEPH A CORONATI
Address: 1 RIDGE VIEW LN
DEERFIELD NH 03037
Permit No.: 01716

V. SPECIFIC TERMS AND CONDITIONS: Applicable to this Approval for Construction

Please read **VI. General Terms and Conditions** on the reverse side of this approval.

A. TYPE OF SYSTEM: STONE AND PIPE
B. NO. OF BEDROOMS: 0
C. APPROVED FLOW: 955 GPD
D. OTHER CONDITIONS AND WAIVERS:

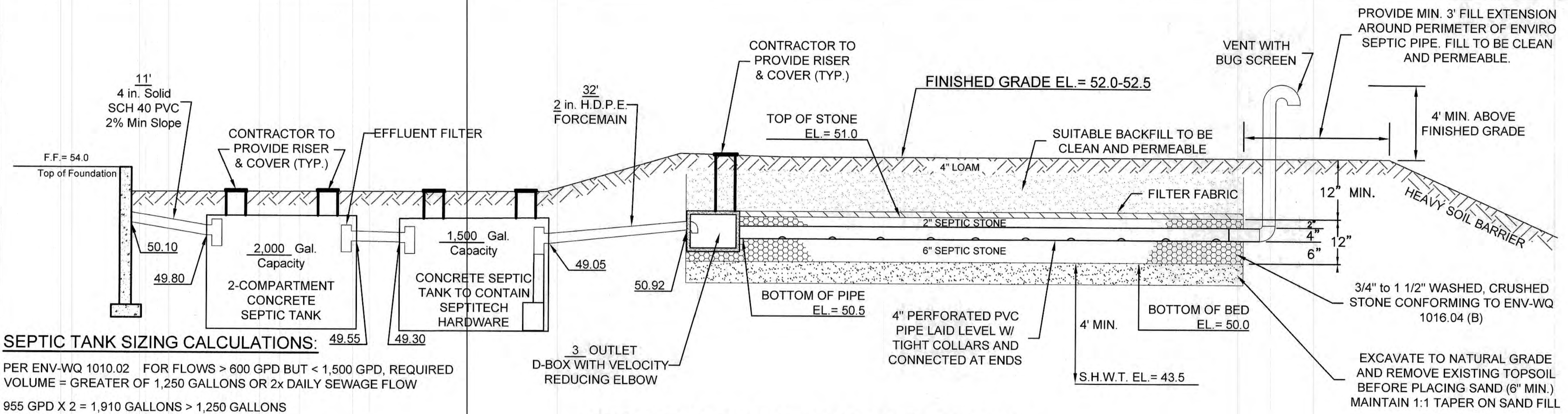
1. Approved for a warehouse with 70 employees @ 10 GPD per employee and an office with cafeteria with 17 employees @ 15 GPD per employee; total flow 955 GPD.
2. This approval is valid for 4 years from date of approval, per Env-Wq 1004.13.
3. Approved with a public water system only.
4. No waivers have been approved.

Taylor L. Walter
Subsurface Systems Bureau

VI. GENERAL TERMS AND CONDITIONS: Applicable to all Approvals for Construction

A. This Approval for Construction is issued to construct the ISDS as identified on Page 1 of this Approval.
B. This Approval is valid until 10/29/2025, unless an Approval for Operation has been granted.
C. By exercising any rights under this approval, the parties have agreed to all terms and conditions.
D. No liability is incurred by the State of New Hampshire by reason of any approval of any Approval for Construction. Approval by the Department of Environmental Services of sewage and waste disposal systems is based on plans and specifications supplied by the Applicant.
E. The system must be constructed in strict accordance with the approved plans and specifications.
F. The installed system must be left uncovered and cannot be used after construction until it is inspected and has received an Approval for Operation of Individual Sewage Disposal System (ISDS) by an authorized agent of the Department.
G. This system must be installed by an installer holding a valid permit. An owner may install the system for his or her domicile. Env-Wq 1002.18 defines "Domicile" as that place where an individual has his or her true, fixed, and permanent home and principal establishment, and to which, whenever he or she is absent, he or she has the intention of returning. An individual might have more than one residence, but has only one domicile. Accordingly, an owner may only install a replacement system and may not install the system at a property he or she intends to make their future domicile. A person's domicile is considered to be at the address listed on his or her driver's license and/or where he or she is registered to vote.
H. This Approval for Construction does not supersede any equivalent or more stringent local ordinances or regulations. State standards are minimal and must be met statewide.

WORK NUMBER: 202105398-1
APPROVAL NUMBER: eCA2021102913
RECEIVED DATE: September 7, 2021
TYPE OF SYSTEM: STONE AND PIPE
NUMBER OF BEDROOMS: 0



CROSS SECTION - DISPOSAL SYSTEM

N.T.S.

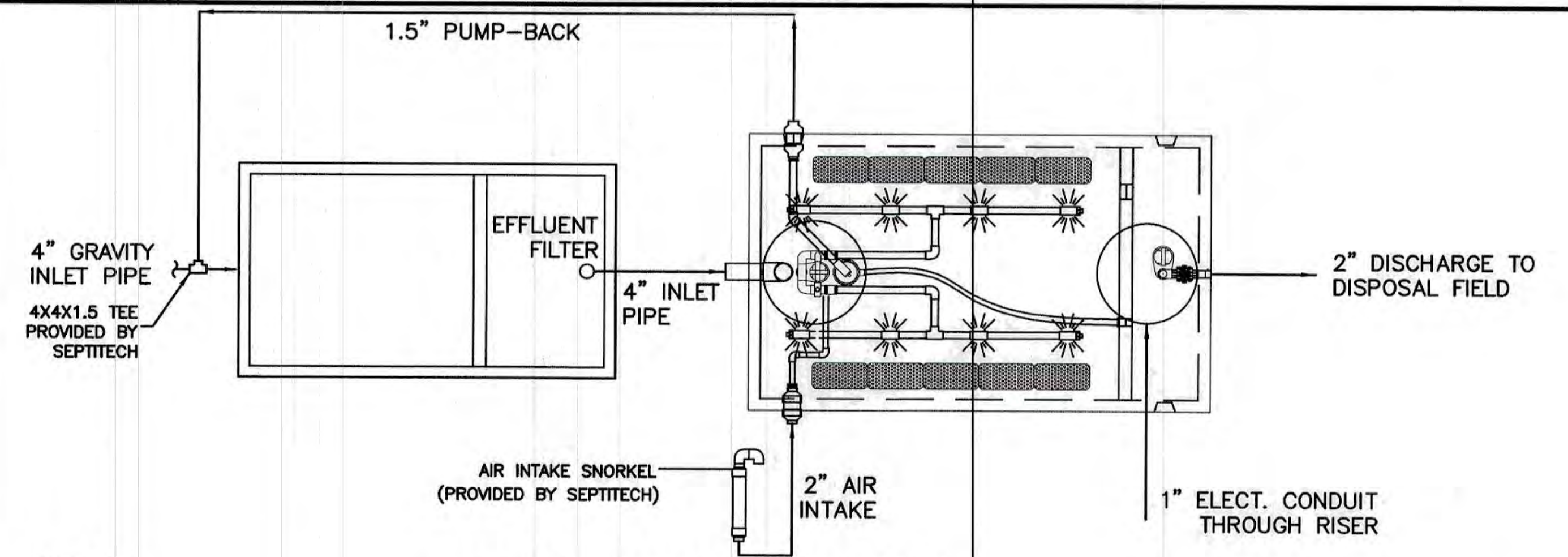
SEPTIC TANK SIZING CALCULATIONS:

PER ENV-WQ 1010.02 FOR FLOWS > 600 GPD BUT < 1,500 GPD, REQUIRED VOLUME = GREATER OF 1,250 GALLONS OR 2x DAILY SEWAGE FLOW

955 GPD X 2 = 1,910 GALLONS > 1,250 GALLONS

1,910 GALLONS REQUIRED

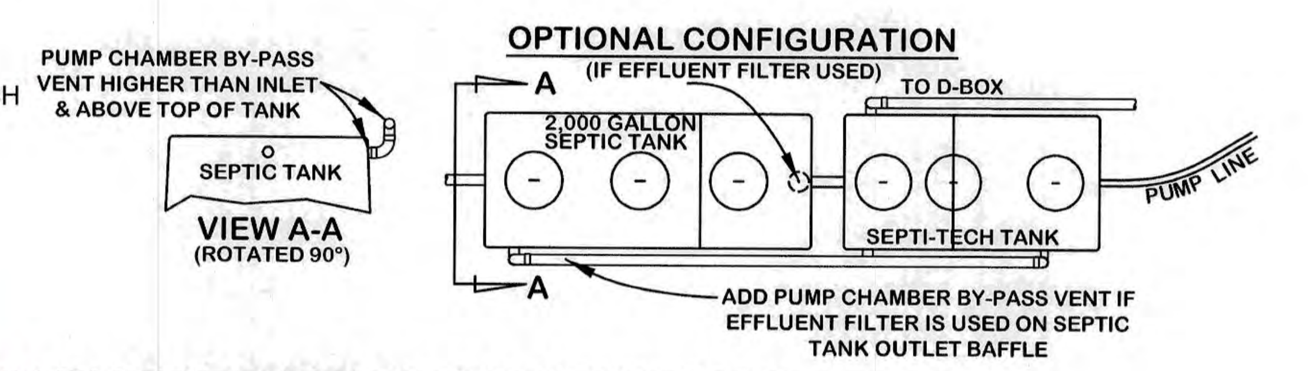
2,000 GAL. PROVIDED.



SEPTI-TECH PLAN VIEW

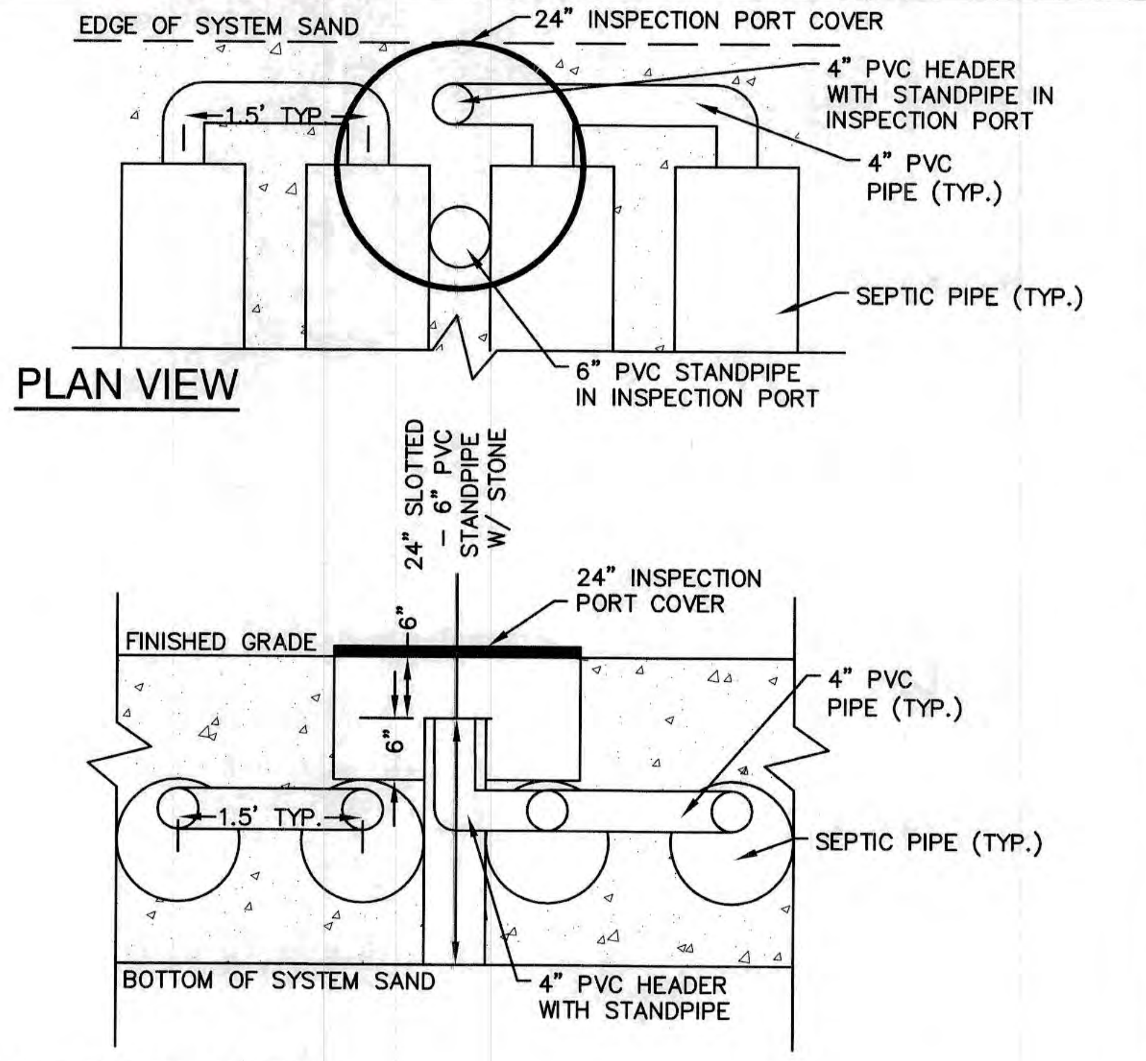
NOTE:

- CONTRACTOR IS RESPONSIBLE FOR PURCHASE AND INSTALLATION OF BOTH TANKS ON THE LOT. SEPTITECH WILL INSTALL THE EQUIPMENT AFTER THE TANK IS INSTALLED IN GROUND
- ALL PUMP SPECIFICATIONS AND MODELS TO BE SUPPLIED BY SEPTITECH
- SEPTITECH MODEL STAAR 1.0 DENITE REQUIRES A DISCHARGE PUMP UPGRADE THAT IS TO BE DETERMINED BY SEPTITECH.



BY-PASS VENTING W/ EFFLUENT FILTER

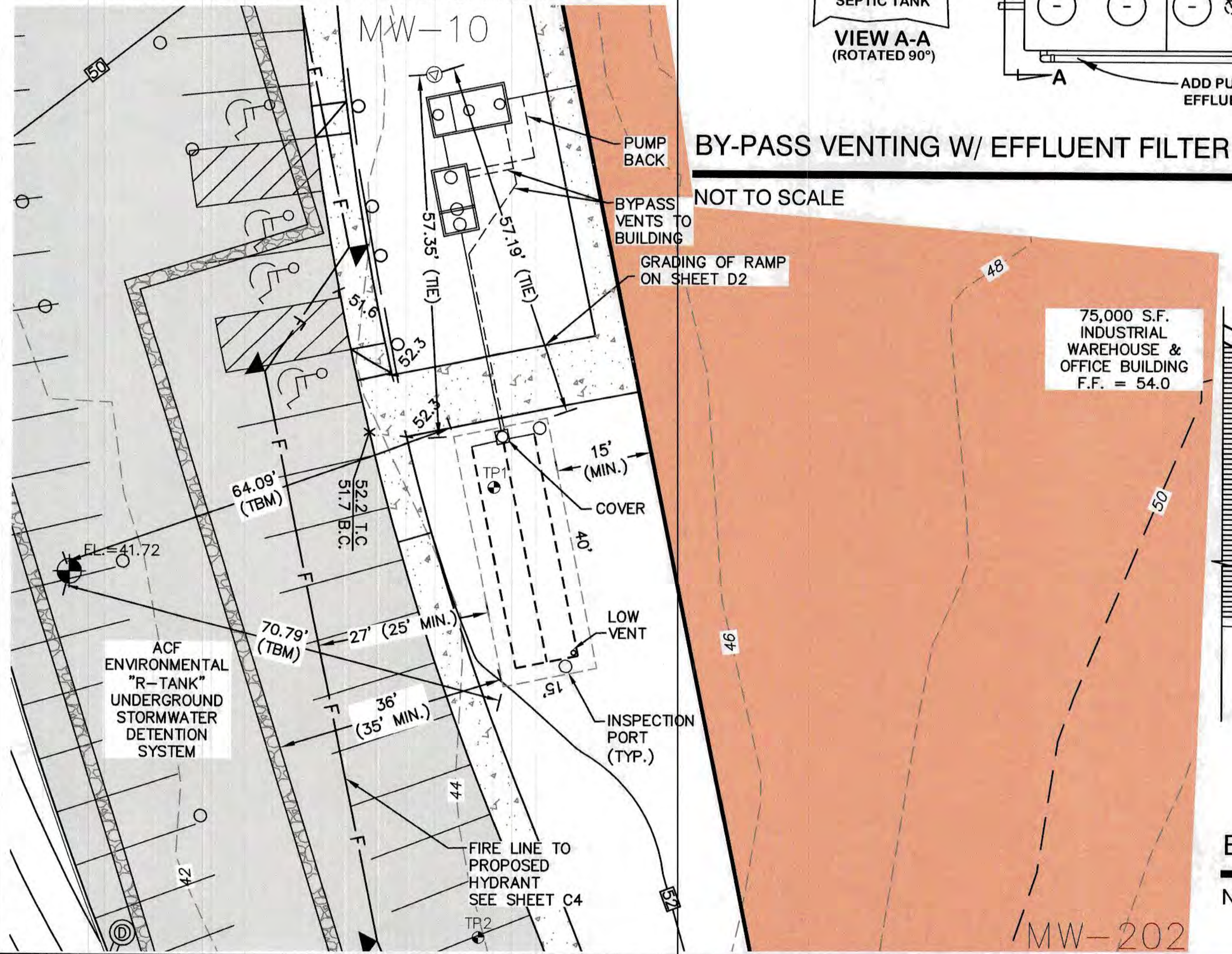
NOT TO SCALE

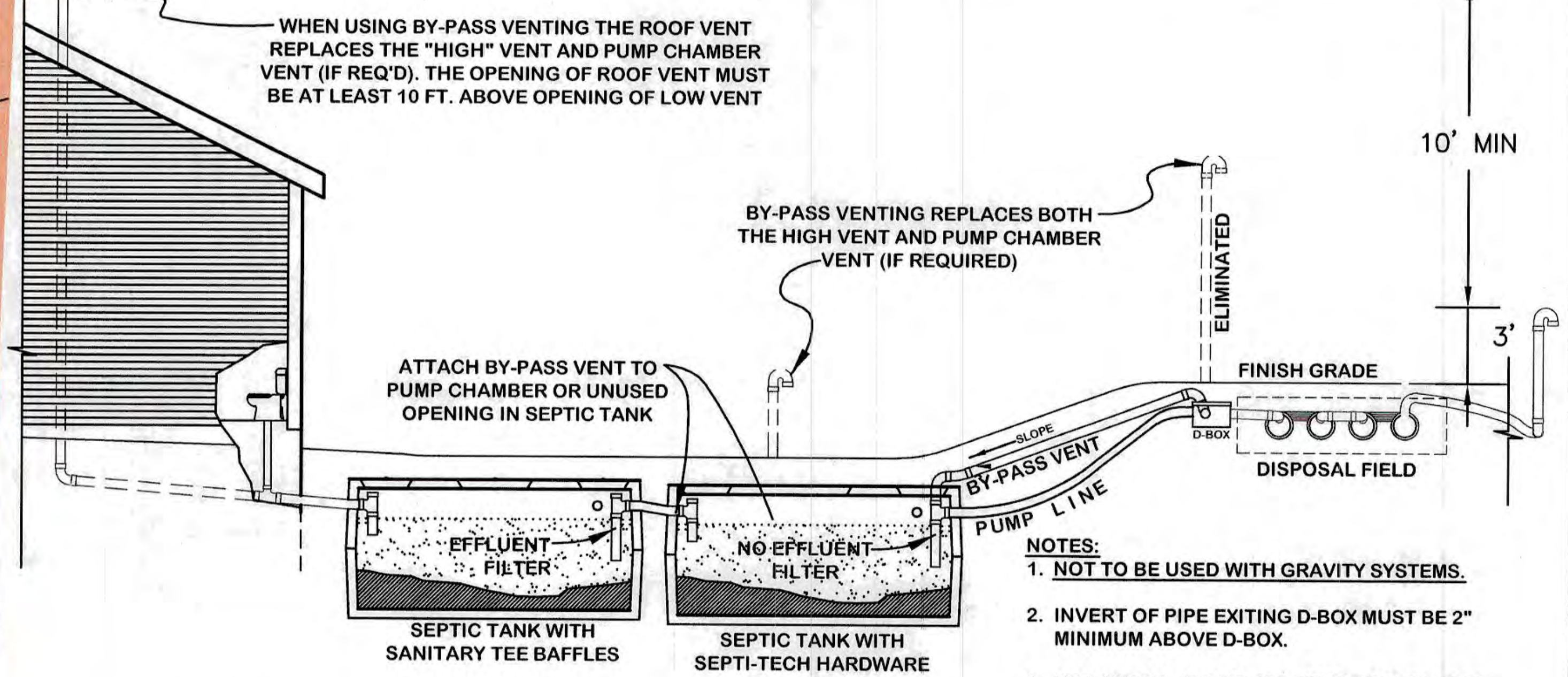


SECTION VIEW

INSPECTION PORT DETAIL

NOT TO SCALE





NOTES:

1. NOT TO BE USED WITH GRAVITY SYSTEMS.
2. INVERT OF PIPE EXITING D-BOX MUST BE 2" MINIMUM ABOVE D-BOX.
3. USE 4" SCH. 40 PVC OR EQUAL FOR BY-PASS VENTING.
4. GLUE ALL PVC JOINTS OR EQUAL.

BY-PASS VENTING

NOT TO SCALE

Dig Safe Systems, Inc.
It's Smart. It's Easy. It's the Law.
1-888-DIG-SAFE
digsafe.com

GRAPHIC SCALE

(IN FEET)
1 inch = 20 feet

PROJECT PARCEL

CITY OF PORTSMOUTH
TAX MAP 266, LOT 7
R.C.R.D. BK. 6081 PG. 2150
TOTAL LOT AREA ... ACRES

- CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING THE SEPTIC PLAN FROM THE NHDES APPROVED PLAN
- THE BUILDER/SITE CONTRACTOR IS RESPONSIBLE TO CONFIRM THE ZONING DIMENSIONAL REQUIREMENTS AND SETBACK LINE REQUIREMENTS PRIOR TO INITIATING CONSTRUCTION OF THE PROPOSED BUILDING AND SEPTIC SYSTEM. THE ZONING ORDINANCE OF THE MUNICIPALITY IS TO BE COMPLIED WITH. THE BUILDER/SITE CONTRACTOR IS ALSO RESPONSIBLE TO CONTACT THE MUNICIPALITY REGARDING INSPECTIONS PRIOR TO AND DURING CONSTRUCTION, I.E. LOCATION AND BED-BOTTOM INSPECTIONS.

REVIEWED AND APPROVED
IN ACCORDANCE WITH THE
REQUIREMENTS OF THE
NH DEPT OF ENVIRONMENTAL SERVICES
WATER DIVISION
Date: 10/29/2021
#eCA2021102913

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: 1" = 20'	Project No.: 19190.2
Drawing Name: ...W-LAYOUT.DWG		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS ... OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

NEW HAMPSHIRE
Designer
Subsurface Disposal
Joseph Coronati
No. 1716

REV.	DATE	REVISION	BY
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM
14	7/9/21	REVISED SEPTIC PLAN FOR SUBMISSION	DJM
13	6/23/21	REVISED PER CITY COMMENTS	DJM
12	5/18/21	REVISED PLANTINGS PER NHB	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

TEST PIT LOGS

PERFORMED BY: JOSEPH CORONATI, JONES & BEACH ENGINEERS, INC. SSD# 1716

TEST PIT #1

0"-8"		LOAM
8"-18"	10YR 4/4	DARK YELLOWISH BROWN FINE SANDY LOAM GRANULAR, FRIABLE
18"-90"	10YR 5/6	YELLOWISH BROWN SILTY LOAM FIRM

SHWT = 18"
ROOTS = 18"
H_2O @ 32"
NO REFUSAL OBSERVED

◕ TEST PIT, DATE: APRIL 8, 2020

◐ PERC. TEST, DATE: APRIL 8, 2020

16 MIN./INCH

STONE & PIPE DESIGN CALCULATIONS

WAREHOUSE: 70 EMPLOYEES = 700 GPD (10 GPD / PERSON, PER ENV-WQ 1008-1)

OFFICE WITH CAFETERIA: 17 EMPLOYEES = 255 GPD (15 GPD / PERSON, PER ENV-WQ 1008-1)

955 GPD @ 16 MIN./INCH = 2,148 S.F. REQUIRED PER ENV-WQ 1016-1.
2,148 S.F. x 75% PRE-TREATMENT REDUCTION = 537 S.F. REQUIRED.

600 S.F. PROVIDED (SEE DIMENSIONS BELOW)

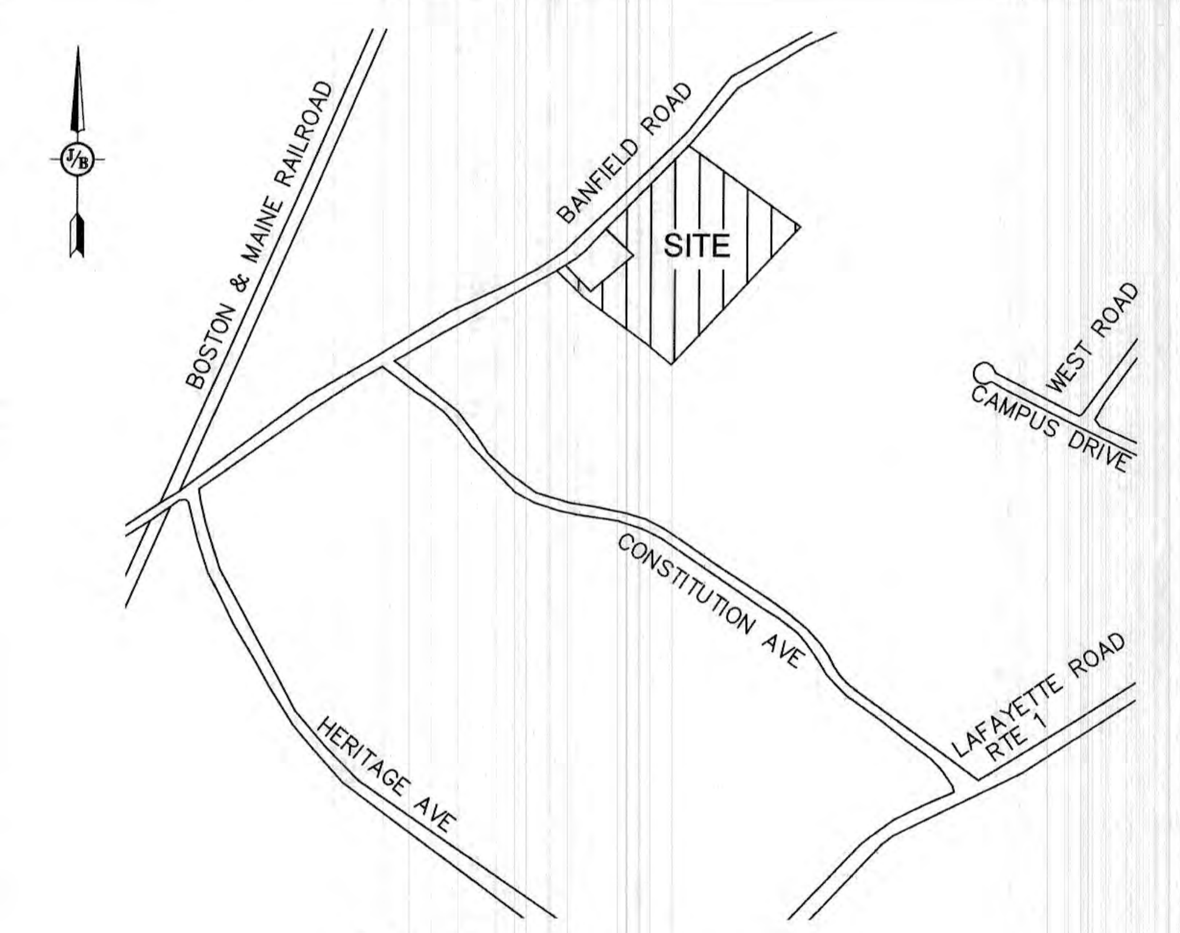
BED DIMENSIONS 40' x 15' .

DESIGN INTENT

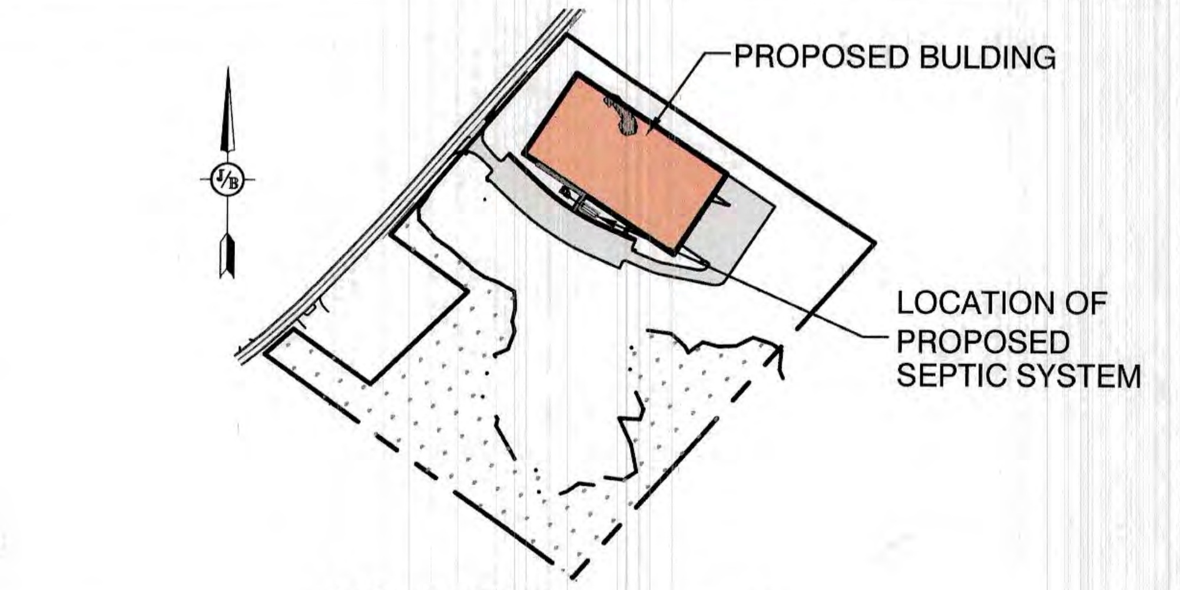
THE BOTTOM OF THE EFFLUENT DISPOSAL SYSTEM (E.D.S.) SHALL BE CONSTRUCTED AT ELEVATION 50.00 . THIS IS APPROXIMATELY 5.00 FT ABOVE ORIGINAL GROUND ON THE HIGH CONTOUR (45.00) OF THE DESIGNED E.D.S. (ENV-WQ-1003.13(aa))

GENERAL NOTES

- CONTRACTOR TO VERIFY ALL ELEVATIONS IN FIELD PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY DESIGNER OF ANY ABNORMAL CONDITIONS (HARDPAN OR SATURATED SOILS, LEDGE, ETC.) FOUND WHEN EXCAVATING PRIOR TO INSTALLATION OF THE SYSTEM.
- PER ENV-WQ 1016.03, CONTRACTOR IS TO PROTECT THE NATURAL ABSORPTION QUALITIES OF THE SOIL. DO NOT COMPACT OR DRIVE OVER THE AREA WITH EQUIPMENT AND PROTECT OPEN EXCAVATION TO PREVENT THE ENTRANCE OF SILT AND DEBRIS.
- FILL TO BE MEDIUM TO COURSE-TEXTURED SAND (0.5mm-2.0mm).
- REMOVE TOPSOIL BEFORE PLACING FILL.
- 4 INCH THICK LOAM & SEED AROUND PERIMETER OF FILL.
- CONTRACTOR TO INSTALL A VENT WHEN PROVIDING MORE THAN 18" OF COVER.
- VENTING IS REQUIRED FOR PUMP SYSTEMS
- SLOPE SYSTEM AWAY FROM BUILDING.
- SYSTEM WILL BE REPLACED IN SAME LOCATION IN CASE OF FAILURE.
- JOINTS ARE TO BE BELLED PVC OR STANDARD SLIP COLLARS.
- PER ENV-WQ 1010.11, THE FIRST COMPARTMENT IN MULTI-COMPARTMENT SEPTIC TANKS MUST EQUAL AT LEAST 2/3 OF THE REQUIRED VOLUME.
- PER ENV-WQ 1010.10, EXCEPTING LEDGE TANKS, THE LIQUID DEPTH OF THE SEPTIC TANK IS TO BE AT LEAST 40".
- THE OUTLET BAFFLE SHALL BE A VENTED TEE WHICH SHALL EXTEND TO A DISTANCE BELOW THE SURFACE EQUAL TO 40% OF THE LIQUID DEPTH AND SHALL EXTEND ABOVE THE LIQUID LINE TO NOT LESS THAN ONE INCH FROM THE TOP OF THE TANK.
- ALL CONNECTIONS BETWEEN A SEPTIC TANK AND THE PIPES LEADING TO AND EXITING FROM THE SEPTIC TANK SHALL BE SEALED WITH A WATERTIGHT, FLEXIBLE JOINT CONNECTOR THAT: (1) WILL ACCOMMODATE NORMAL MOVEMENT OF THE SEPTIC TANK WITHOUT LEAKING OR BREAKING; AND (2) HAS BEEN CERTIFIED BY ITS MANUFACTURER OR DISTRIBUTOR AS MEETING OR EXCEEDING THE APPLICABLE STANDARD IN ASTM C 1644-06, SECTION 7.
- CONTRACTOR TO PROVIDE RISERS FOR TANKS WITH MORE THAN 12" OF COVER.
- IF GARBAGE GRINDERS ARE DESIRED, SEPTIC TANK SHALL BE 50% LARGER.
- CITY OF PORTSMOUTH REQUIRES BED BOTTOM INSPECTION.
- PVC PIPING TO BE SUPPLIED BY: ELIMINATOR SYSTEMS INC. (603) 868-2242) OR EQUAL.
- 2,000 GALLON TWO-COMPARTMENT SEPTIC TANK, 1,500 GALLON SEPTIC TANK, & D-BOX TO BE SUPPLIED BY: SHEA CONCRETE. (800-696-7432) OR EQUAL.
- ADVANCED NITRATE TREATMENT SYSTEM TO BE SUPPLIED BY: SEPTITECH / BIO-MICROBICS MAINE INC., 207-333-6940. PRODUCT MAY NOT BE SUBSTITUTED WITHOUT FIRST CONTACTING THE DESIGNER.
- ROCKINGHAM COUNTY SOIL CONSERVATION SERVICE SOIL TYPE: ELDRIDGE.
- ANY CHANGES TO SEPTIC TANK, BUILDING OR WELL LOCATION/ORIENTATION WILL REQUIRE AN AS-BUILT PLAN TO BE PROVIDED BY THE DESIGNER PRIOR TO NHDES FINAL INSPECTION.
- PER ENV-WQ 1003.13(a)(3) THERE ARE NO KNOWN BURIAL SITES OR CEMETERIES ON THE LOT WITHIN 100' OF ANY COMPONENT OF THE ISDS.
- 50' SETBACK FROM POORLY DRAINED SOILS.
- DISTANCE FROM SEWER PIPE TO SURFACE WATER, OPEN DRAINAGE, VERY POORLY DRAINED SOIL, AN OPEN LOOP GEOTHERMAL WELL, OR A PRIVATE ON-SITE WELL SHALL BE 75 FT. THIS MAY BE REDUCED TO 50 FT IF SDR26 OR EQUIVALENT IS USED IN ACCORDANCE WITH ENV-WQ 1008.04(c)(1).
- DISTANCE FROM SEPTIC TANK TO SURFACE WATER, OPEN DRAINAGE, VERY POORLY DRAINED SOIL, AN OPEN LOOP GEOTHERMAL WELL, OR A PRIVATE ON-SITE WELL SHALL BE 75 FT. THIS MAY BE REDUCED TO 50 FT IF THE SEPTIC TANK IS EITHER MADE FROM PLASTIC OR COATED WITH A SEALANT TO PREVENT INFILTRATION AND EXFILTRATION IN ACCORDANCE WITH ENV-WQ 1008.04(c)(2).



LOCUS SCALE: 1"=1000'



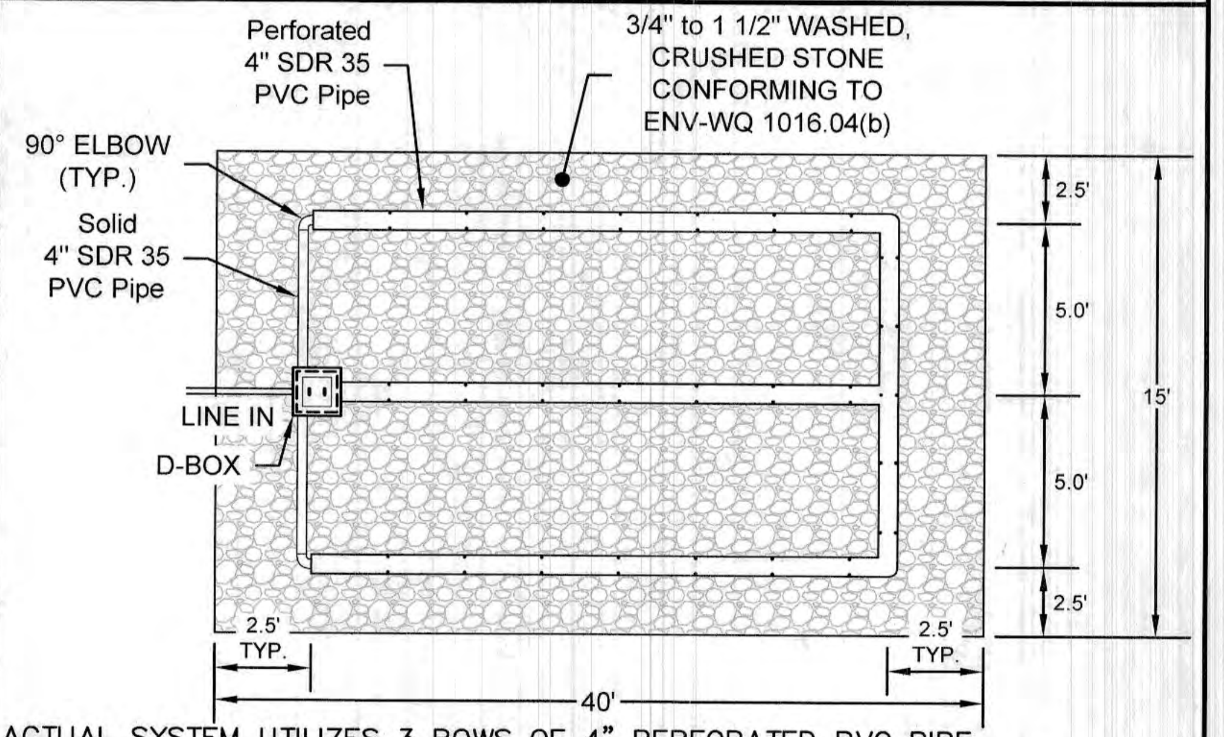
VICINITY SCALE: 1"=400'

REFERENCES

APPROVAL FOR CONSTRUCTION IS VALID FOR 4 YEARS FROM DATE OF ISSUE

- PREV. CONSTRUCTION APPROVAL #CA1998009388 ISSUED: 06/03/1998.
- SUBDIVISION APPROVAL: LARGER THAN 5 ACRES.

TYPICAL PLAN VIEW



ACTUAL SYSTEM UTILIZES 3 ROWS OF 4" PERFORATED PVC PIPE.
SEE PLAN VIEW (LEFT) FOR ACTUAL LAYOUT/CONFIGURATION OF SYSTEM.

WETLAND DELINEATION

WETLANDS ON-SITE WERE DELINEATED BY:

GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DRIVE, UNIT H
EXETER, NH 03833

DATE: SPRING, 2020

OWNER NOTES

- KNOW THE LOCATION OF YOUR SEPTIC TANK AND LEACHING AREA.
- INSPECT YOUR SEPTIC TANK YEARLY. HAVE THE SEPTIC TANK PUMPED AS NEEDED BUT AT LEAST ONCE EVERY THREE YEARS.
- DO NOT FLUSH BULKY ITEMS SUCH AS DIAPERS, SANITARY PADS OR BABY WIPES.
- DO NOT FLUSH TOXIC CHEMICALS SUCH AS PAINT THINNERS, DRANO, PESTICIDES, OR CHLORINE, AS THEY MAY KILL THE NECESSARY BACTERIA IN THE SEPTIC TANK.
- REPAIR LEAKING FIXTURES IN THE BUILDING PROMPTLY.
- BE CONSERVATIVE WITH WATER USE, SPREAD OUT USE OVER TIME, AND USE WATER-REDUCING FIXTURES WHENEVER AND WHEREVER POSSIBLE. TOO MUCH USE IN A SHORT TIME CAN OVERLOAD THE SYSTEM, WHICH MAY LEAD TO FAILURE.
- MOW YOUR LEACHING AREA REGULARLY. PREVENT DEEP-ROOTED TREES AND SHRUBS FROM GROWING ON AND ADJACENT TO YOUR LEACHING AREA.
- NO VEHICULAR TRAVEL, LIVESTOCK TRAVEL, OR SNOW REMOVAL IN AREA OF SYSTEM.

Plan Name:	EFFLUENT DISPOSAL DESIGN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
S1
SHEET 9 OF 24
JBE PROJECT NO. **19190.2**

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

WETLANDS AND NON-SITE SPECIFIC PERMIT 2021-00240

PERMITTEE:	**BANFIELD REALTY LLC** **304 MAPLEWOOD AVE** **PORTSMOUTH NH 03801**	**NOTE CONDITIONS**
PROJECT LOCATION	**375 BANFIELD RD, PORTSMOUTH** **TAX MAP #266, LOT #7**	
WATERBODY:	**UNNAMED WETLAND**	
APPROVAL DATE:	**DECEMBER 06, 2021**	**EXPIRATION DATE: DECEMBER 06, 2026**

Based upon review of permit application 2021-00240 in accordance with RSA 482-A and RSA 485-A:17, the New Hampshire Department of Environmental Services (NHDES) hereby issues this Wetlands and Non-Site Specific Permit. To validate this Permit, signatures of the Permittee and the Principal Contractor are required.

PERMIT DESCRIPTION:
Dredge and fill 1,910 square feet of palustrine scrub-shrub wetland for commercial lot development.

THIS PERMIT IS SUBJECT TO THE FOLLOWING PROJECT-SPECIFIC CONDITIONS:

1. All work shall be done in accordance with the approved plans dated April 21, 2020 and revised through October 26, 2021 by Jones & Beach Engineers, Inc., last received by the NH Department of Environmental Services (NHDES) on November 04, 2021, in accordance with Env-Wt 307.16 and Env-Wt 524.05(b).
2. The permittee shall submit a construction notice with the department at least 48 hours prior to commencing work, in accordance with Env-Wt 524.05(a).
3. Prior to the start of construction, all on-site personnel shall be made aware of the potential to encounter threatened or endangered species, per Env-Wt 311.06(g).
4. All observations of threatened or endangered species shall be reported immediately to the New Hampshire Fish and Game Department (NHFG) Nongame and Endangered Wildlife Environmental Review Program by phone at 603-271-2461 and by email at NHFGreview@wildlife.nh.gov.
1. Email subject line: NHB20-3122 Portsmouth Industrial Warehouse, Wildlife Species Observation.
2. Photographs shall be provided for verification as feasible, per Env-Wt 311.06(g).
5. Water quality control measures shall be comprised of wildlife-friendly erosion control materials, not to be composed of welded plastic, in accordance with Env-Wt 307.03(c)(2).
6. The final disposition of all dredged contaminated soil and construction related debris shall be placed outside of areas subject to RSA 482-A jurisdiction and done so in coordination with the NHDES Hazardous Waste Remediation Bureau to ensure that the contaminated soil is properly managed, in accordance with Env-Wt 307.10(l).
7. Fill shall be clean sand, gravel, rock, or other material that meets the project's specifications for its use; and does not contain any material that could contaminate surface or groundwater or otherwise adversely affect the ecosystem in which it is used, in accordance with Env-Wt 307.11(a).
8. All work, including management of soil stockpiles, shall be conducted so as to minimize erosion, minimize sediment transfer to surface waters or wetlands, and minimize turbidity in surface waters and wetlands, in accordance with Env-Wt 307.03(b).

9. Water quality control measures shall be selected and implemented based on the size and nature of the project and the physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to jurisdictional areas, in accordance with Env-Wt 307.03(c)(1).
10. Water quality control measures shall be maintained so as to ensure continued effectiveness in minimizing erosion and retaining sediment on-site during and after construction, in accordance with Env-Wt 307.03(c)(5).
11. Temporary water quality control methods shall be removed upon completion of work when compliance with Env-Wt 307.03(c)(6) is achieved, in accordance with Env-Wt 307.03(c)(7).
12. The person in charge of construction equipment shall inspect such equipment for leaking fuel, oil, and hydraulic fluid each day prior to entering surface waters or wetlands or operating in an area where such fluids could reach groundwater, surface waters, or wetlands, in accordance with Env-Wt 307.03(g)(1).
13. Equipment shall be staged and refueled outside of jurisdictional areas (unless allowed) and in accordance with Env-Wt 307.15, per Env-Wt 307.03(h).

THIS PERMIT IS SUBJECT TO THE FOLLOWING GENERAL CONDITIONS:

1. Pursuant to RSA 482-A:12, a copy of this permit shall be posted in a secure manner at the site of the project.
2. In accordance with Env-Wt 313.01(a)(5), and as required by RSA 482-A:11, II, work shall not infringe on the property rights or unreasonably affect the value or enjoyment of property of abutting owners.
3. In accordance with Env-Wt 314.01, a standard permit shall be signed by the permittee, and the principal contractor who will build or install the project prior to start of construction, and will not be valid until signed.
4. In accordance with Env-Wt 314.08(a), the permittee shall file a notice of completion of work and certificate of compliance with the department within 10 working days of completing the work authorized by this permit.
5. In accordance with Env-Wt 314.06, transfer of this permit to a new owner shall require notification to the NHDES.
6. The permit holder shall ensure that work is done in a way that protects water quality per Env-Wt 307.03; protects fisheries and breeding areas per Env-Wt 307.04; protects against invasive species per Env-Wt 307.05; meets dredging activity conditions in Env-Wt 307.10; and meets filling activity conditions in Env-Wt 307.11.
7. This project has been screened for potential impact to known occurrences of protected species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or only cursory surveys have been performed, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species. This permit does not authorize in any way the take of threatened or endangered species, as defined by RSA 212-A:2, or of any protected species or exemplary natural communities, as defined in RSA 217-A:3.
8. In accordance with Env-Wt 307.06(a) through (c), no activity shall jeopardize the continued existence of a threatened or endangered species, a species proposed for listing as threatened or endangered, or a designated or proposed critical habitat under the Federal Endangered Species Act, 16 U.S.C. §1531 et seq.; State Endangered Species Conservation Act, RSA 212-A; or New Hampshire Native Plant Protection Act, RSA 217-A.
9. In accordance with Env-Wt 307.02 and federal requirements, all work in areas under the jurisdiction of the U.S. Army Corps of Engineers (USACE) shall comply with all conditions of the applicable state general permit.

APPROVED:

Stefanie M. Tetreault

Stefanie M. Tetreault
Inland Wetland Supervisor, Wetlands Bureau
Land Resources Management, Water Division

THE SIGNATURES BELOW ARE REQUIRED TO VALIDATE THIS PERMIT (Env-Wt 314.01).

PERMITTEE SIGNATURE (required)

PRINCIPAL CONTRACTOR SIGNATURE (required)

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

December 06, 2021

BANFIELD REALTY LLC
C/O ROBERT GRAHAM
304 MAPLEWOOD AVE
PORTSMOUTH NH 03801

Re: Approved Standard Dredge and Fill Wetlands Permit Application (RSA 482-A)
NHDES File Number: 2021-00240
Subject Property: 375 Banfield Rd, Portsmouth, Tax Map #266, Lot #7

Dear Applicant:

On December 06, 2021, the New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau approved the above-referenced Standard Dredge and Fill Wetlands Permit Application. Enclosed please find Wetlands Permit # 2021-00240 to dredge and fill 1,910 square feet of palustrine scrub-shrub wetland for commercial lot development.

This approval is based on the following findings:

1. This is classified as a minimum impact project per Rule Env-Wt 524.06(a).
2. The commercial development project meets the all of the approval criteria established in Env-Wt 524.02.
3. Per Rule Env-Wt 313.01(a)(4), all project-specific and resource-specific criteria established in Env-Wt 500 have been met.
4. Per Rule Env-Wt 306.05, the applicant has addressed all of the required planning items that are used to determine the appropriate impact classification of a project and the type of approval required.
5. Per Rule Env-Wt 202.01(b) and as required by RSA 482-A:8, NHDES finds that the requirements for a public hearing do not apply as the project will not have a significant environmental impact, as defined in Env-Wt 104.19, on the resources protected by RSA 482-A, or, is not of substantial public interest, as defined in Env-Wt 104.32.
6. Per Rule Env-Wt 313.01(a)(5), and as required by RSA 482-A:11, II, this permit for work to dredge or fill will not "infringe on the property rights or unreasonably affect the value or enjoyment of property of abutting owners" based on documentation that the proposed dredge and fill activity will be located entirely within the boundary of the applicant's property interest and will not result in any observable change in off-site surface water levels or flows.
7. Per Rule Env-Wt 313.03(a), the applicant has demonstrated that potential impacts to jurisdictional areas have been avoided to the maximum extent practicable and that any unavoidable impacts have been minimized.
8. Per Rule Env-Wt 311.06(h), the municipal conservation commission recommend conditional approval of the NHDES Wetlands Permit application in correspondence dated June 24, 2021.
9. Per Rule Env-Wt 311.01(b), the applicant coordinated with the Natural Heritage Bureau (NHB) to determine how to avoid and minimize project-related impacts on protected plants or exemplary natural communities.
10. This project received conditional approval from the NHDES Alteration of Terrain Bureau on October 28, 2021 (AoT-2040) and is also subject to review and additional coordination with the NHDES Hazardous Waste Remediation Bureau (Project #40176).

11. Per Rule Env-Wt 311.06(j), as of the date of this permit, the applicant has not received comments from any federal agency.
12. Per Rule Env-Wt 311.03(b)(7), the applicant has provided an explanation as to methods, timing, and manner as to how the project will meet standard permit conditions specified in Env-Wt 307.

In accordance with RSA 482-A:10, RSA 21-O:14, and Rules Env-WtC 100-200, **any person aggrieved by this decision may file a Notice of Appeal directly with the NH Wetlands Council (Council) within 30 days of the decision date, December 06, 2021.** Every ground claiming the decision is unlawful or unreasonable must be fully set forth in the Notice of Appeal. Only the grounds set forth in the Notice of Appeal are considered by the Council. Information about the Council, including Council Rules, is available at https://nhec.nh.gov/wetlands/index.htm. For appeal related issues, contact the Council Appeals Clerk at (603) 271-6072.

If you have any questions, please contact me at Stefanie.M.Tetreault@des.nh.gov or (603) 271-0676.

Sincerely,

Stefanie M. Tetreault

Stefanie M. Tetreault
Inland Wetland Supervisor, Wetlands Bureau
Land Resources Management, Water Division

Enclosure

cc: Property Owner
Municipal Clerk/Conservation Commission
Brenden Walden, Gove Environmental Services
ec: Scott Drew, NHDES Hazardous Waste Remediation Bureau
Gloria Andrews, NHDES Alteration of Terrain Bureau
Attention Health Officer, City of Portsmouth

Stephen G. Pernaw & Company, Inc.

P.O. Box 1721 • Concord, NH 03302
tel: (603) 731-8500 • fax: (866) 929-6094 • sgp@ pernaw.com

Transportation: Engineering • Planning • Design

MEMORANDUM

Ref: 2058A

To: Robert Graham
Banfield Realty, LLC

From: Stephen G. Pernaw, P.E., PTOE

Subject: Proposed Industrial Warehouse Building - Response to Comments
Portsmouth, New Hampshire

Date: May 17, 2021

On December 28, 2020 our office published a "trip generation analysis" memorandum for the proposed industrial warehouse building that will be constructed at 375 Banfield Road in Portsmouth, New Hampshire. We are now in receipt of two City comments from a recent TAC meeting that we were asked to respond. We offer the following responses:

TAC Comment 2: *"The stopping sight distance is met at the proposed driveway location, which means that a vehicle traveling on Banfield Road will have enough time and distance to be able to come to a complete stop without colliding with a truck exiting the site. However, this is not a desirable condition, having to require vehicles to come to a complete stop to allow for entering trucks. It would be preferable if the intersection sight distance could also be provided, which is over 675 feet. Intersection sight distance provides enough time and distance for approaching vehicles to slow to 70 percent of their travel speed when a truck is exiting the driveway."*

SGP Response: Sheet H1 indicates that there is over 500+ feet of Intersection Sight Distance (ISD) available for the left-turn departure movement from the proposed site driveway. This exceeds the calculated distance required of 441.0-feet for passenger cars. This sheet also indicates that there is at least 347-feet of ISD for the right-turn departure movement (limited by extent of field survey), and that additional sight distance is available beyond the survey limit. This compares well with the calculated distance of 382.2-feet for passenger cars.

Providing sufficient stopping sight distance is essential for safety reasons; whereas the need for a major-road vehicle to slow to accommodate the occasional departure by a minor-road vehicle is an "everyday" occurrence at most intersections that is more related to driver convenience than safety. For this reason, providing ISD it is considered preferable, but not essential. Given the available sight distances at the proposed driveway, we do not expect that any vehicles on Banfield Road will need to come to a complete stop on a regular basis due to the proposed site driveway.

TAC Comment 6: *"Adding 50 truck trips a day will approximately double the amount of truck traffic currently on Banfield Rd. The current plans for the scheduled reconstruction of the roadway by the City will need to be modified at the expense of the applicant in order to accommodate this extra truck traffic. Wider shoulders, the road bed and the pavement thickness will all have to be engineered. The applicant will need to hire a third-party engineer of the City's choosing to start the design process. The applicant will be responsible for any changes necessary in the reconstruction of the road that are over and above what the City had already planned including permitting for wider shoulders if necessary."*

SGP Response: This is not correct for two reasons. First, the 50-truck estimate appears to come from Table 1B in our December memorandum. That volume represents the higher of the two truck estimates given (for warehousing; not manufacturing), and it pertains to the daily number of trucks using the site driveway. It is reasonable to expect that these trucks will travel to/from both points east and west on Banfield Road. If the truck trips were distributed equally by direction, then the net increase on Banfield Road would be +25 truck trips per day. It should also be noted that the previous businesses at this industrial site likely generated truck trips as well. This means that the net impact on truck trips on Banfield Road due to the proposed building is less than is indicated in Table 1B in our December memorandum.

Second, the City seems to infer that Banfield Road currently carries only 50 trucks per day (i.e., doubling of the truck volume). The basis for that estimate has not been provided. For illustration purposes, our office previously conducted traffic counts on Banfield Road at the Saint Patrick Academy driveway on two separate weekdays in November 2019. During the six-hour count period (7-9 AM, 2-6 PM), 38 trucks (Wednesday 6 hours) and 42 trucks (Thursday 6 hours) traveled on Banfield Road, east of the Academy. Another recent traffic count conducted by our office on Peverly Hill Road (south of NH33) in September 2020 revealed that approximately 45% of the daily truck volume occurred during those six specific hours. From this it is reasonable to conclude that Banfield Road carries approximately 90 trucks per day, and that truck traffic from the subject site increases that by +25 trucks per day (using no allowance for previous businesses on the site). Under post-development conditions, trucks from the subject site will account for approximately 22% of the total truck volume (25/[90+25]) on Banfield Road.

Attachments

Attachment 1

Stephen G. Pernaw & Company, Inc.

P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM 11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 1

Groups Printed- CARS - TRUCKS

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	21	5	0	26	1	1	0	2	3	28	0	31	59
07:15 AM	38	3	0	41	3	2	0	5	4	53	0	57	103
07:30 AM	38	15	0	53	6	2	0	8	7	64	0	71	132
07:45 AM	50	37	0	87	38	24	0	62	38	90	0	128	277
Total	147	60	0	207	48	29	0	77	52	235	0	287	571
08:00 AM	44	11	0	55	22	8	0	30	5	80	0	85	170
08:15 AM	49	2	0	51	2	2	0	4	2	56	0	58	113
08:30 AM	49	0	0	49	2	1	0	3	0	50	0	50	102
08:45 AM	38	1	0	39	0	2	0	2	2	72	0	74	115
Total	180	14	0	194	26	13	0	39	9	258	0	267	500
02:00 PM	56	1	0	57	1	0	0	1	0	45	0	45	103
02:15 PM	45	4	0	49	0	0	0	0	3	59	0	62	111
02:30 PM	54	15	0	69	16	8	0	24	13	50	0	63	156
02:45 PM	47	13	0	60	22	8	0	30	11	43	0	54	144
Total	202	33	0	235	39	16	0	55	27	197	0	224	514
03:00 PM	54	5	0	59	9	3	0	12	0	45	0	45	116
03:15 PM	67	3	0	70	1	2	0	3	2	68	0	70	143
03:30 PM	88	4	0	92	5	0	0	5	0	56	0	56	153
03:45 PM	71	11	0	82	7	3	0	10	6	54	0	60	152
Total	280	23	0	303	22	8	0	30	8	223	0	231	564
04:00 PM	81	7	0	88	15	3	0	18	2	57	0	59	165
04:15 PM	75	1	0	76	6	6	0	12	0	63	0	63	151
04:30 PM	68	2	0	70	1	3	0	4	1	84	0	85	159
04:45 PM	73	0	0	73	4	1	0	5	1	59	0	60	138
Total	297	10	0	307	26	13	0	39	4	263	0	267	613
05:00 PM	81	2	0	83	1	2	0	3	0	81	0	81	167
05:15 PM	93	0	0	93	2	3	0	5	2	60	0	62	160
05:30 PM	62	0	0	62	1	0	0	1	1	47	0	48	111
05:45 PM	47	0	0	47	2	1	0	3	1	62	0	63	113
Total	283	2	0	285	6	6	0	12	4	250	0	254	551
Grand Total	1389	142	0	1531	167	85	0	252	104	1426	0	1530	3313
Apprch %	90.7	9.3	0		66.3	33.7	0		6.8	93.2	0		
Total %	41.9	4.3	0	46.2	5	2.6	0	7.6	3.1	43	0	46.2	
CARS	1367	141	0	1508	166	85	0	251	102	1412	0	1514	3273
% CARS	98.4	99.3	0	98.5	99.4	100	0	99.6	98.1	99	0	99	98.8
TRUCKS	22	1	0	23	1	0	0	1	2	14	0	16	40
% TRUCKS	1.6	0.7	0	1.5	0.6	0	0	0.4	1.9	1	0	1	1.2

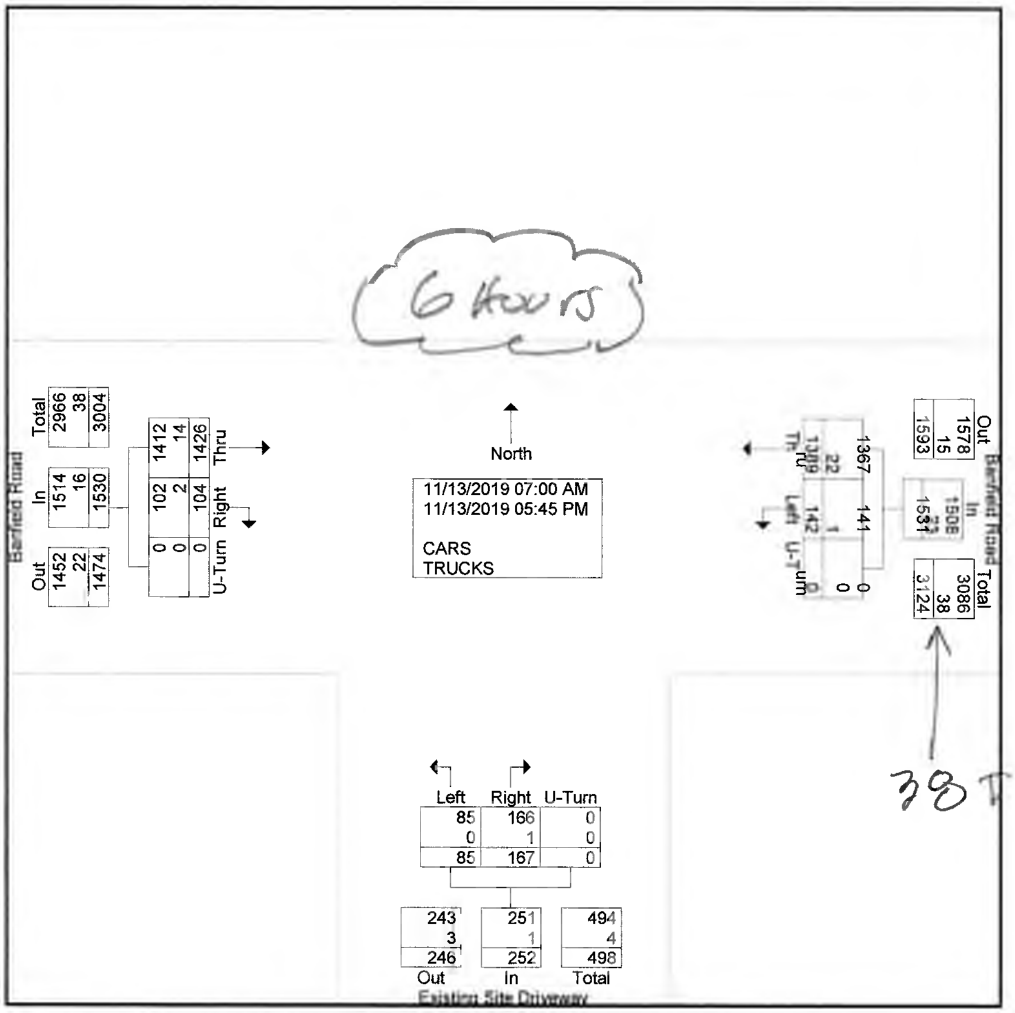
Attachment 2

Stephen G. Pernaw & Company, Inc.

P.O. Box 1721
Concord, New Hampshire 03302

Weather: Clear
Collected By: MV
Job Number: 1978A
Town/State: Portsmouth, NH

File Name : 1978A_INT_A_Wed_AM_&_PM 11-13-2019
Site Code : 1978A
Start Date : 11/13/2019
Page No : 2



6 Hours

38 Trucks

Attachment 3

Stephen G. Pernaw & Company, Inc.

P.O. Box 1721
Concord, New Hampshire 03302

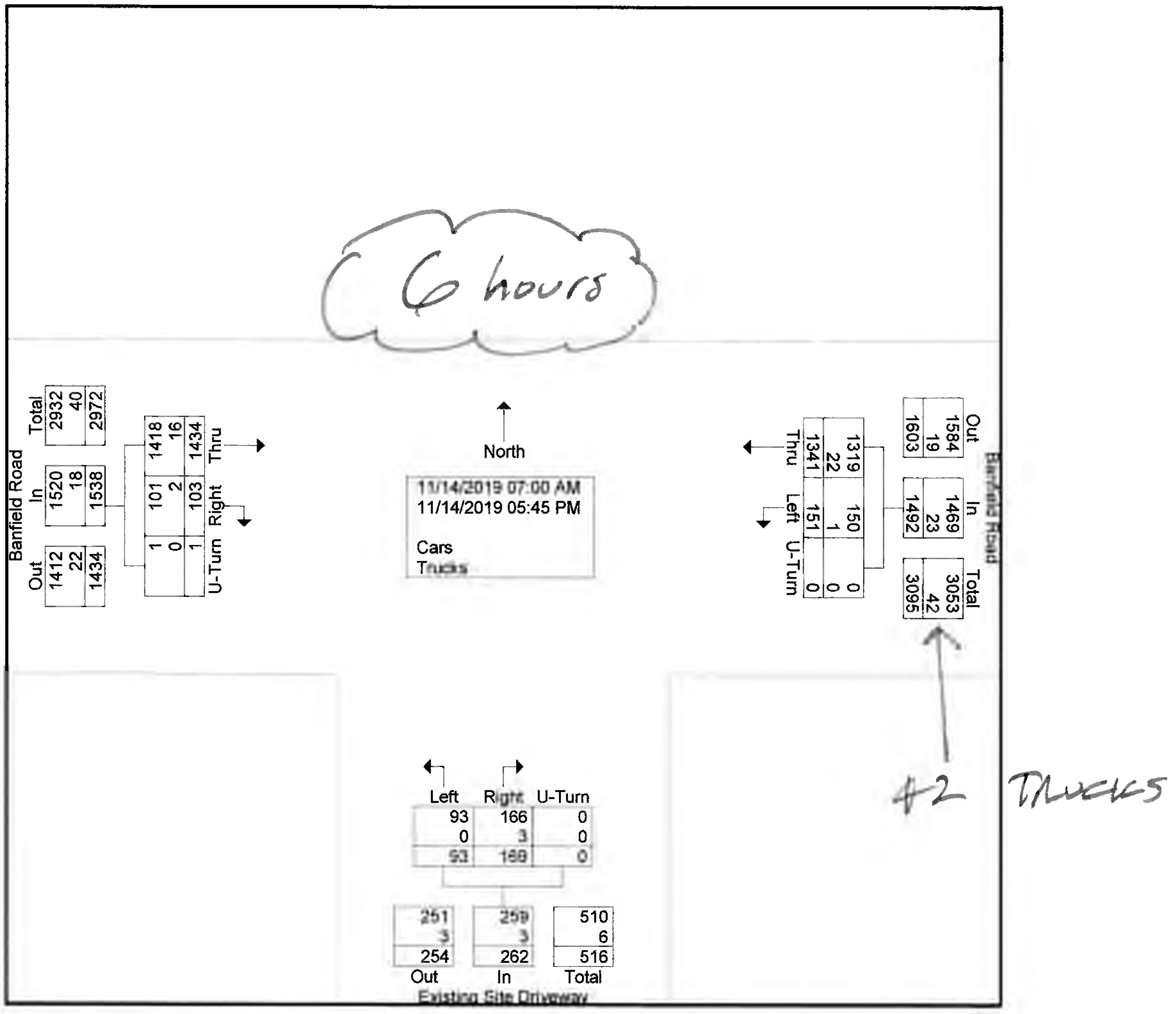
File Name : 1978A_INT_A_Thurs_AM_&_PM 11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 1

Groups Printed- Cars - Trucks

	Banfield Road From East				Existing Site Driveway From South				Banfield Road From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
07:00 AM	27	2	0	29	0	1	0	1	2	25	0	27	57
07:15 AM	33	4	0	37	1	1	0	2	3	56	0	59	98
07:30 AM	34	13	0	47	4	6	0	10	11	56	0	67	124
07:45 AM	32	45	0	77	53	22	0	75	29	103	0	132	284
Total	126	64	0	190	58	30	0	88	45	240	0	285	563
08:00 AM	40	14	0	54	18	9	0	27	7	68	0	75	156
08:15 AM	43	2	0	45	1	3	0	4	2	55	0	57	106
08:30 AM	48	1	0	49	1	1	0	2	1	65	0	66	117
08:45 AM	46	1	0	47	3	1	0	4	0	58	0	58	109
Total	177	18	0	195	23	14	0	37	10	246	0	256	488
02:00 PM	50	1	0	51	1	0	0	1	0	57	0	57	109
02:15 PM	65	9	0	74	2	0	0	2	3	50	0	53	129
02:30 PM	51	16	0	67	15	8	0	23	10	58	0	68	158
02:45 PM	48	19	0	67	25	22	0	47	27	46	0	73	187
Total	214	45	0	259	43	30	0	73	40	211	0	251	583
03:00 PM	67	4	0	71	10	4	0	14	0	54	1	55	140
03:15 PM	74	1	0	75	1	0	0	1	0	67	0	67	143
03:30 PM	98	2	0	100	8	2	0	10	1	54	0	55	165
03:45 PM	68	1	0	69	5	1	0	6	1	56	0	57	132
Total	307	8	0	315	24	7	0	31	2	231	1	234	580
04:00 PM	71	5	0	76	3	4	0	7	2	58	0	60	143
04:15 PM	72	2	0	74	7	2	0	9	2	61	0	63	146
04:30 PM	66	4	0	70	5	1	0	6	1	70	0	71	147
04:45 PM	67	2	0	69	2	0	0	2	0	68	0	68	139
Total	276	13	0	289	17	7	0	24	5	257	0	262	575
05:00 PM	77	0	0	77	0	2	0	2	1	77	0	78	157
05:15 PM	67	3	0	70	4	3	0	7	0	63	0	63	140
05:30 PM	56	0	0	56	0	0	0	0	0	55	0	55	111
05:45 PM	41	0	0	41	0	0	0	0	0	54	0	54	95
Total	241	3	0	244	4	5	0	9	1	249	0	250	503
Grand Total	1341	151	0	1492	169	93	0	262	103	1434	1	1538	3292
Apprch %	89.9	10.1	0		64.5	35.5	0		6.7	93.2	0.1		
Total %	40.7	4.6	0	45.3	5.1	2.8	0	8	3.1	43.6	0	46.7	
Cars	1319	150	0	1469	166	93	0	259	101	1418	1	1520	3248
% Cars	98.4	99.3	0	98.5	98.2	100	0	98.9	98.1	98.9	100	98.8	98.7
Trucks	22	1	0	23	3	0	0	3	2	16	0	18	44
% Trucks	1.6	0.7	0	1.5	1.8	0	0	1.1	1.9	1.1	0	1.2	1.3

Attachment 4

File Name : 1978A_INT_A_Thurs_AM_&_PM 11-14-2019
Site Code : 1978A
Start Date : 11/14/2019
Page No : 2



Stephen G Pernaw & Company, Inc

Automatic Traffic Recorder Count - Peverly Hill Road, Portsmouth NH (South of NH Route 33)

Wednesday, September 30, 2020

Period Beginning	CARS SB	CARS NB	TRUCKS SB	TRUCKS NB	TOTAL SB	TOTAL NB	TOT
12:00 AM	6	3	0	0	6	3	9
12:15 AM	5	2	0	0	5	2	7
12:30 AM	4	1	0	0	4	1	5
12:45 AM	2	2	0	0	2	2	4
1:00 AM	0	1	0	0	0	1	1
1:15 AM	2	0	0	0	2	0	2
1:30 AM	1	1	0	0	1	1	2
1:45 AM	1	1	0	1	1	2	3
2:00 AM	1	0	1	0	2	0	2
2:15 AM	1	1	0	0	1	1	2
2:30 AM	1	0	0	0	1	0	1
2:45 AM	1	1	0	0	1	1	2
3:00 AM	1	2	0	1	1	3	4
3:15 AM	0	0	0	0	0	0	0
3:30 AM	0	0	0	1	0	1	1
3:45 AM	3	0	0	0	3	0	3
4:00 AM	1	1	0	0	1	1	2
4:15 AM	1	2	0	0	1	2	3
4:30 AM	1	0	0	0	1	0	1
4:45 AM	4	4	1	0	5	4	9
5:00 AM	6	2	1	0	7	2	9
5:15 AM	17	4	0	0	17	4	21
5:30 AM	9	10	1	0	10	10	20
5:45 AM	20	3	1	1	21	4	25
6:00 AM	13	13	3	1	16	14	30
6:15 AM	17	7	0	0	17	7	24
6:30 AM	26	11	3	2	29	13	42
6:45 AM	63	22	4	1	67	23	90
7:00 AM	50	27	5	0	55	27	82
7:15 AM	76	33	4	3	80	36	116
7:30 AM	91	41	2	7	93	48	141
7:45 AM	150	73	8	6	158	79	237
8:00 AM	76	72	4	6	80	78	158
8:15 AM	69	61	4	3	73	64	137
8:30 AM	71	36	2	7	73	43	116
8:45 AM	91	72	3	7	94	79	173
9:00 AM	71	54	1	2	72	56	128
9:15 AM	68	43	7	2	75	45	120
9:30 AM	65	50	4	7	69	57	126
9:45 AM	86	45	1	2	87	47	134
10:00 AM	80	44	7	0	87	44	131
10:15 AM	79	60	8	6	87	66	153
10:30 AM	64	51	2	1	66	52	118
10:45 AM	85	53	7	3	92	56	148
11:00 AM	79	51	7	3	86	54	140
11:15 AM	77	60	7	4	84	64	148
11:30 AM	81	61	6	9	87	70	157
11:45 AM	93	71	7	9	100	80	180
	1809	1152	111	95	1920	1247	3167
7:30 - 8:30 AM Peak Hour					404	269	673

Period Beginning	CARS SB	CARS NB	TRUCKS SB	TRUCKS NB	TOTAL SB	TOTAL NB	TOT
12:00 PM	98	80	10	10	108	90	198
12:15 PM	88	86	3	2	91	88	179
12:30 PM	92	81	8	2	100	83	183
12:45 PM	88	66	2	3	90	69	159
1:00 PM	75	81	4	2	79	83	162
1:15 PM	79	74	4	3	83	77	160
1:30 PM	79	76	8	6	87	82	169
1:45 PM	100	80	3	8	103	88	191
2:00 PM	94	68	8	6	102	74	176
2:15 PM	92	79	6	6	98	85	183
2:30 PM	107	68	5	5	112	73	185
2:45 PM	110	102	3	7	113	109	222
3:00 PM	113	90	7	2	120	92	212
3:15 PM	89	81	3	5	92	86	178
3:30 PM	91	91	8	6	99	97	196
3:45 PM	94	68	3	2	97	70	167
4:00 PM	93	110	0	3	93	113	206
4:15 PM	99	111	2	1	101	112	213
4:30 PM	86	92	5	0	91	92	183
4:45 PM	110	82	4	5	114	87	201
5:00 PM	89	100	2	0	91	100	191
5:15 PM	100	71	2	0	102	71	173
5:30 PM	79	76	1	1	80	77	157
5:45 PM	76	48	0	0	76	48	124
6:00 PM	72	55	0	0	72	55	127
6:15 PM	60	40	0	0	60	40	100
6:30 PM	49	40	0	1	49	41	90
6:45 PM	58	32	0	0	58	32	90
7:00 PM	31	43	0	0	31	43	74
7:15 PM	33	25	0	0	33	25	58
7:30 PM	29	21	0	0	29	21	50
7:45 PM	20	19	0	1	20	20	40
8:00 PM	21	23	0	0	21	23	44
8:15 PM	16	19	0	0	16	19	35
8:30 PM	17	23	0	0	17	23	40
8:45 PM	20	13	0	0	20	13	33
9:00 PM	15	9	1	0	16	9	25
9:15 PM	11	6	0	0	11	6	17
9:30 PM	6	9	0	0	6	9	15
9:45 PM	12	11	2	0	14	11	25
10:00 PM	3	11	0	0	3	11	14
10:15 PM	5	7	0	0	5	7	12
10:30 PM	1	1	0	0	1	1	2
10:45 PM	2	7	0	0	2	7	9
11:00 PM	5	5	0	0	5	5	10
11:15 PM	2	5	0	0	2	5	7
11:30 PM	9	4	0	0	9	4	13
11:45 PM	2	7	0	0	2	7	9
	2720	2396	104	87	2824	2483	5307
4:00 - 5:00 PM Peak Hour					399	404	803

71 TRUCKS

108 Trucks

DAILY TRAFFIC VOLUME =	**8,474**	**vehicles per day**
DAILY TRUCK VOLUME =	**397**	**trucks per day**

$\frac{71+108}{397}$ = 45%

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Robert R. Scott, Commissioner

EMAIL ONLY

April 21, 2022

Robert Graham
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, NH 03801

Subject: Portsmouth – Former Country Motor Sales, 375 Banfield Road
DES Site #199408047, Project #40176

Supplemental Site Investigation Report, prepared by Wilcox & Barton, Inc. (Wilcox & Barton), dated November 22, 2021

Dear Robert Graham:

The New Hampshire Department of Environmental Services (NHDES) has reviewed the subject Supplemental Site Investigation (SSI) Report submitted on your behalf by Wilcox & Barton for the above-referenced site (Site). The SSI was completed to further investigate the nature and extent of various contaminants in soil, groundwater, surface water, and sediment at the Site. The investigation activities were conducted in general accordance with the plans for investigation outlined in the *Response to NHDES Comments* document submitted by Wilcox & Barton on September 8, 2021 and subsequent email correspondences, and to satisfy, in part, requests made by NHDES in a letter dated August 9, 2021. Based on review of the SSI Report and historical submittals, NHDES offers the following comments:

Upland Soil Contamination

NHDES understands the northeastern, upland portion of the Site is planned for redevelopment as a commercial warehouse. Based on the results of previous investigations, soil in this area of the Site is contaminated with lead and polychlorinated biphenyls (PCBs) at concentrations exceeding applicable Soil Remediation Standards (SRS). The lead and PCBs appear to be from releases associated with former Site activities, including automobile storage, crushing and salvage operations. As part of the SSI activities completed during September and October 2021, Wilcox & Barton collected shallow soil samples generally on a grid layout. Samples collected for analysis of lead were taken from 0-2 feet and 2-4 feet below ground surface (bgs). Samples collected for analysis of PCBs were taken from 3-6 inches, 6-18 inches, and 18-36 inches bgs. The results of the sampling and analysis have improved the understanding of the nature and extent of lead and PCB soil contamination. For the upland area, soils contaminated with lead and PCBs at concentrations exceeding applicable SRS appear to be mostly in the location of a former car crusher and an area to the southeast of the former car crusher. The vertical extent of lead and PCB soil contamination has not yet been fully delineated, and NHDES understands from communications with Wilcox & Barton that additional soil sampling to depths as great as 15 feet bgs will be completed to inform management of contaminated soil and construction activities during Site redevelopment.

Based on previous communications, including a conference call held April 11, 2022, NHDES understands that Wilcox & Barton intends to submit prior to initiation of Site redevelopment activities a soil management plan (SMP) and a Remedial Action Plan (RAP) for soil contaminated with lead and PCBs in the upland portion of the Site. The SMP shall describe the management of soil during Site redevelopment activities, to include excavations, any temporary onsite storage, reuse, and any offsite disposal of soil conducted in accordance with NH Code of Administrative Rules Chapter Env-Or 600 (*Contaminated Site Management*), Part Env-Or 611. Wilcox & Barton has indicated the RAP will include a remedy consisting of managing the contaminated soil under placement of suitable capping materials and recordation of an Activity and Use Restriction (AUR). NHDES generally concurs with this approach and notes the following: 1) Wilcox & Barton will continue to communicate with the US EPA Region 1 PCB coordinator regarding the soil analytical data for PCBs, the results of the *Human Health Risk Assessment – PCBs* that is attached to the SSI Report, and management of PCB-containing soils; 2) Soils containing PCBs at concentrations greater than 10 milligrams per kilogram (mg/kg) may warrant excavation and offsite disposal; and 3) The application for AUR shall include a requirement to prepare a separate SMP for management of any soil that may be disturbed during future Site activities.

Please submit the RAP for the upland portion of the Site, with the SMP and application for AUR included, within 120 days of receipt of this letter. Please also indicate in the RAP that, as discussed in the following sections of this letter, Site groundwater contaminated with per- and polyfluoroalkyl substances (PFAS) and metals will be managed under a Groundwater Management Permit (GMP), the application for which shall be submitted following completion of additional monitoring activities and no later than December 31, 2022.

Upland Groundwater Contamination

The results of sampling Site monitoring wells since June 2020 for analysis of PFAS shows that these contaminants are present in groundwater beneath the upland portion of the Site. Concentrations of perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), and perfluorooctanoic acid (PFOA) have been detected in samples collected from various wells at concentrations exceeding applicable Ambient Groundwater Quality Standards (AGQS). To date, the highest concentrations of PFAS have been detected in samples collected from wells MW-1, MW-7, MW-106R, MW-109, and MW-203. The source of PFAS in upland Site groundwater has not been specifically documented. NHDES suspects that former Site operations, such as automobile maintenance, salvage, and crushing as well as wastewater disposal to a septic system and leachfields may have resulted in releases of PFAS to soil and groundwater. Notably, samples collected from wells MW-101, MW-102, MW-103, MW-104, and MW-105 located hydraulically downgradient of the upland area have contained relatively low concentrations of PFAS, including PFOS, PFHxS and PFOA at concentrations less than applicable AGQS. However, only one or two rounds of sampling have been completed at these downgradient wells.

Additional sampling of groundwater for analysis of PFAS is warranted due to the continued presence of PFOS, PFHxS, and PFOA at concentrations exceeding applicable AGQS. As such, NHDES requests that two additional rounds of groundwater sampling for analysis of PFAS be completed during the year 2022, preferably during the spring and fall. Please include the following monitoring wells in the sampling program: MW-1, MW-4, MW-6, MW-7, MW-8, MW-102, MW-104, MW-105, MW-106R, MW-109, MW-203, and MW-11. Sampling of wells MW-102, MW-104, and MW-105 shall provide data to evaluate the downgradient extent of PFAS in Site groundwater. Sampling of well MW-11 shall provide data regarding upgradient, ambient groundwater quality. Sampling of the other wells is requested due to previous exceedances of applicable AGQS. Please also collect static water level measurements at all Site wells for the preparation of groundwater elevation contour figures. The results of the spring and fall 2022 groundwater monitoring activities shall be submitted by December 31, 2022 as part of the Application for GMP prepared in accordance with Env-Or 607. For the site plans required as part of the Application for GMP, please include the location of all potential sources of contaminants, such as automobile maintenance, salvage and crushing, the septic system and leachfields, and the approximate extent of waste disposal at the Site.

Please continue to analyze samples for a broad list of PFAS in accordance with NHDES' current guidelines (see Laboratory Testing Guidelines for PFAS and Waste Sites: Microsoft Word – pfoa-testing-labs_rev mar 19 waste sites only (state.nh.us)). Please also continue to upload PFAS analytical data to the NHDES Environmental Monitoring Database.

Lowland Soil Contamination and Solid Waste

Based on the results of previous investigations and review of existing Site documents, NHDES understands the lowland portion of the Site is the location of historical solid waste disposal that was previously registered with NHDES as a landfill not operated after July 9, 1981 ("Pre-1981 Landfill"; see attached registration form and associated documentation). The landfill reportedly contains construction and demolition debris resulting from urban redevelopment activities in the City of Portsmouth. During visits to the Site, Wilcox & Barton and NHDES staff also observed automobile parts and other debris in the lowland area that are likely associated with former use of the Site as an automobile salvage facility.

As part of the SSI activities, Wilcox & Barton collected shallow soil samples generally on a grid layout in the lowland portion of the Site. Samples collected for analysis of lead were taken from 0-2 feet and 2-4 feet bgs. The majority of samples contained lead at concentrations exceeding the SRS, with some detections greater than 10,000 mg/kg. Samples collected for analysis of PCBs were taken from 3-6 inches and 6-18 inches bgs. Five samples (B-11, W-13, X-10, X-14, Y-9) collected from the 3-6 inch depth interval and two samples (B-11 and X-14) collected from the 6-18 inch depth interval contained PCBs (total of all Aroclors) at concentrations greater than the SRS. Additionally, previous investigations identified asbestos in bulk waste samples and suspect asbestos-containing material in the lowland area of the Site. It appears the lead, PCBs, and asbestos in the lowland portion of the Site are associated with the Pre-1981 Landfill and perhaps disposal of waste related to former automobile salvage operations.

NHDES has concluded that additional delineation of the waste in the Pre-1981 Landfill and any waste associated with the former automobile salvage operations at the Site is warranted. Please see the below section of this letter regarding submittal of a work plan for additional investigation activities.

Lowland Groundwater Contamination

The results of sampling monitoring wells MW-101, MW-102, MW-103, and MW-104 since January 2021 for analysis of total and dissolved metals shows that lead and arsenic are present in groundwater beneath the lowland portion of the Site at concentrations exceeding applicable AGQS. These wells are located within and downgradient of the Pre-1981 Landfill and areas of waste disposal related to former automobile salvage operations. While the arsenic in groundwater may be due to naturally occurring conditions, NHDES concludes the lead at concentrations exceeding the AGQS is likely associated with the presence of high concentrations of lead in the lowland soil and solid waste.

Additional sampling of lowland groundwater for analysis of total and dissolved metals is warranted due to: 1) The continued presence of lead and arsenic in the groundwater at concentrations exceeding the AGQS; 2) The lowland soil and solid waste containing lead at concentrations exceeding the SRS currently remining in place and representing a source of metals leaching to groundwater; and 3) The potential for groundwater discharging to the abutting wetland to be a contaminant migration pathway for metals from the lowland source area to wetland surface water and sediment. As such, NHDES requests that two additional rounds of groundwater sampling at wells MW-101, MW-102, MW-103, and MW-104 be completed during the year 2022, preferably during the spring and fall. Sampling of well MW-103 may provide data regarding groundwater conditions upgradient of the Pre-1981 Landfill. Please also continue to collect field-based water quality parameters (e.g., temperature, dissolved oxygen, pH, conductivity, oxidation-reduction potential, and turbidity) during the sampling of these wells. The results of the spring and fall 2022 lowland groundwater monitoring activities shall be submitted by December 31, 2022 as part of the Application for GMP discussed above.

Wetland Surface Water and Sediment Contamination

NHDES understands that a wetland abuts the lowland portion of the Site to the southeast, south, and southwest. A branch of Pickering Brook runs through the wetland, flowing downstream beyond the Site boundary through a culvert located under Banfield Road and to Great Bog. Field observations indicate the upstream portion of the brook may contain surface water only seasonally. As part of SSI activities, Wilcox & Barton collected six onsite surface water samples (SW-201, SW-203, SW-208, SW-210, SW-211, and SW-212) in the wetland and generally along the course of the brook for analysis of total and dissolved metals, polycyclic aromatic hydrocarbons (PAHs), chloride, nitrate, sulfate, hardness, total and suspended solids, and field-based water quality parameters. The sampling expanded upon previous surface water assessment activities completed at the Site, and the results indicate that contamination associated with the Pre-1981 Landfill and perhaps waste related to former automobile salvage operations is impacting wetland surface water quality. The concentrations of various metals, particularly lead, were found to exceed NHDES water quality criteria for protection of aquatic life in a freshwater environment and human health based on potential water and fish ingestion.

Wilcox & Barton also collected 20 sediment samples (SD-201 through SD-221, excluding location SD-216) for analysis of total metals and PAHs. The sampling expanded upon previous sediment assessment activities completed at the Site. The analytical results were compared to Consensus-Based Threshold Effect Concentrations (TECs) and Consensus-Based Probable Effect Concentrations (PECs)[1], which are referenced in NHDES' *Evaluation of Sediment Quality Guidance Document* dated April 2005. The concentrations of multiple metals, particularly lead, and PAHs exceeded applicable TECs and PECs.

Sovereign Consulting, Inc., using existing Site information and the surface water and sediment data, prepared a *Focused Human Health and Ecological Risk Assessment* for Wilcox & Barton. The risk assessment is included as an attachment to the SSI Report. Sovereign Consulting concluded that: 1) Contamination, primarily that of lead, mercury and arsenic, in the wetland portion of the Site poses an unacceptable risk to human health for recreational trespassers that do and do not catch and consume

---

[1] MacDonald, D. D., C. G. Ingersoll, and T. A. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Arch. Environ. Contam. And Toxicol. 39: 20-31.

fish, and for fish consumption without trespassing; 2) Contamination, primarily that of lead, in surface water poses a potential risk to pelagic aquatic organisms; and 3) Contamination, primarily that of lead, in sediment is likely toxic to benthic organisms residing in the wetlands.

Based on the results of the lowland and wetland portions of the SSI and associated risk assessment, NHDES requests submittal of a work plan for additional investigation activities that includes: 1) Delineation of the extent of the lowland Pre-1981 Landfill waste and any waste associated with former automobile salvage operations, with the results presented on a site plan figure; 2) Delineation of the extent of contamination in Pickering Brook surface water and sediment at concentrations exceeding applicable water quality standards and TECs and PECs upstream and downstream of previously collected samples, including beyond the culvert at Banfield Road; 3) Delineation of the extent of contamination in wetland sediment at concentrations exceeding applicable TECs and PECs to the southeast, south, and southwest of previously collected samples; and 4) In accordance with recommendations made by Sovereign Consulting, completion of a survey, or inventory, of fish and other biota present in the wetland and Pickering Brook. The survey will inform the collection of samples for analysis of tissue for select contaminants, if warranted. NHDES requests submittal of the work plan within 120 days of receipt of this letter. The results of the additional investigation activities shall inform the preparation of a RAP for the lowland portion of the Site, the wetland and Pickering Brook, as appropriate. NHDES expects that completion of additional investigation activities and submittal of the RAP will occur during the years 2022 and 2023. NHDES is amenable to discussions with Wilcox & Barton regarding the work plan during its preparation, including the selection of specific contaminants for laboratory analysis.

As indicated by the timeframe of requests made in this letter, NHDES is agreeable to the remediation and redevelopment of the northeastern, upland portion of the Site while investigation and remediation planning activities continue to proceed for the lowland portion of the Site, the wetland and Pickering Brook. NHDES' rationale includes the following: 1) Soil and groundwater contamination in the lowland portion of the Site, and surface water and sediment contamination in the wetland and Pickering Brook portions of the Site, appear to be primarily associated with the Pre-1981 Landfill and perhaps the dispersive disposal of automobile parts and related wastes, whereas soil contamination in the upland portion of the Site appears to be the result of former automobile crushing and salvage operations conducted at locations separate from the lowland and wetland; 2) A remedy for the upland portion of the Site that includes managing contaminated soil under placement of suitable capping materials and an AUR will help prevent transport of contaminated surface soil via stormwater runoff to the wetland, which may have been a minor source of contamination to the wetland and Pickering Brook historically and could continue to occur without the placement of capping materials; and 3) Based on review of Alteration of Terrain Application 210601-079 and subsequent issuance of Alteration of Terrain Permit AoT-2040, NHDES understands the stormwater management features to be constructed during Site redevelopment will result in a controlled, lower rate of stormwater discharge to the wetland compared to what occurs currently, and that disturbance and mobilization downstream of contaminated wetland sediment is unlikely to occur with the expected lower rates of stormwater discharge.

NHDES notes it is imperative that best management practices for stormwater are followed during construction activities conducted as part of Site redevelopment to prevent transport of disturbed and exposed contaminated soils to the wetland and Pickering Brook.

Should you have any questions regarding this letter, please contact me at NHDES' Waste Management Division.

Sincerely,

Scott Drew, P.G.
Hazardous Waste Remediation Bureau
Tel: (603) 271-2890
Email: Scott.T.Drew@des.nh.gov

Attm: Registration Form for Landfills Not Operated After July 9, 1981

ec: William R. Wilcox, Wilcox & Barton, Inc.
Robert W. Rooks, P.E., Wilcox & Barton, Inc.
Portsmouth Health Officer
Michael McCluskey, P.E., HWRB

For Office Use Only:
WMD Log #: 200900094
Date Rec'd:
No. of Copies: 2

NEW HAMPSHIRE DEPARTMENT OF
Environmental Services

Waste Management Division

RECEIVED
JUN - 3 2009
DEPARTMENT OF ENVIRONMENTAL SERVICES
SOLID WASTE MANAGEMENT BUREAU

REGISTRATION FORM FOR LANDFILLS NOT OPERATED AFTER JULY 9, 1981

pursuant to Part Env-Sw 309 of the New Hampshire Solid Waste Rules

INSTRUCTIONS

(1) Complete this form by providing all requested information. If you need more space than provided on the form to answer a particular question, attach additional pages as necessary and mark each page clearly to indicate the section and question number being answered.

(2) Submit **TWO** copies of the completed form, **EACH bearing an ORIGINAL signature**, to the following address:

New Hampshire Department of Environmental Services (DES)
Waste Management Division
Permitting & Design Review Section (P&DRS)
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

(3) All references on this form beginning with "Env-Sw" are citations from the New Hampshire Solid Waste Rules. You may obtain a copy of the Rules from the DES Public Information and Permitting Office at (603) 271-2975 or TDD Access: Relay NH 1-800-735-2964. The Rules are also available on the Internet at http:\\www.des.nh.gov.

(4) Your registration will be processed according to Env-Sw 309.04. You will be notified in writing whether the registration is complete and accepted. If complete and accepted, the registered facility shall be deemed exempt from the Rules. However, other action to assure proper closure may be required at the facility pursuant to other provisions of law.

(5) For further assistance with completing this form, contact the DES P&DRS at (603) 271-2925, or at the above-noted mailing address or TDD Access: Relay NH 1-800-735-2964.

SECTION I. FACILITY IDENTIFICATION

(1) Facility name: NONE
(2) Location by street address and municipality: 375 BANFIELD RD PORTSMOUTH, NH
(3) Facility mailing address: 26 CONSTITUTION WAY DOVER, NH 038
(4) Local tax map and lot numbers: Map 266, LOT 7
(5) Deed reference by county, volume and page numbers: Rockingham ,, BK 3555, Pg 0083
(6) Latitude and longitude of a known fixed point on the site: N43° 02.788', W 70° 47.022'
(7) Plot the location of the facility on a United States Geological Survey (USGS) topographic map, or copy thereof, prepared at a scale of 1:24,000 or 1:25,000. Attach and mark as "Attachment I(7)."
(8) Provide written directions from a known point of reference in the vicinity of the facility site: Rt 1 LAfAyette Rd, Right onto BEVERLY Hill Rd, RIGHT onto BANFIELD RD

SECTION II. FACILITY OWNER IDENTIFICATION c/o William Copeland, executor of Trust

(1) Owner name: ESTATE of VIRGINIA COPELAND (owner deceased)
(2) Owner mailing address: 26 CONSTITUTION WAY DOVER, NH 03820
(3) Owner telephone number: (603) - 749 - 9719
(4) If different than above, identify the individual associated with and designated by the facility owner to be the contact individual for matters concerning this facility:
(a) Name: (b) Title:
(c) Mailing address:
(d) Telephone number:

(5) If the facility owner is an individual, provide date of birth and go to Section III: DECEASEd

(6) If the facility owner is a corporation, partnership or other association, provide the following information as specified:

(a) The facility is owned by a: ☐ corporation ☐ partnership ☒ other association In TRUST to The

(b) State of incorporation/formation: NH Four CopeLand BROTHERS:

(c) Principal business address: Jack Copeland, James Copeland, Kevin Copeland & William Copelan

(d) Provide, on separate paper and attach/mark as "Attachment II(6)(c)," the names and addresses of all directors, officers and shareholders(*), if for a corporation; all partners (whether general or limited), if for a partnership; or all principals, members or participants, if for another type of association.

(*) For a privately held corporation, identify all shareholders. For a publicly traded corporation, identify all shareholders owning 10% or more of the corporation's equity or debt.

SECTION III. FACILITY OPERATOR IDENTIFICATION

(1) Is the facility owner also the facility operator? ☐ NO ☒ YES [if yes, skip questions (2) - (7) and go to Section IV]

(2) Operator name: William CopEland, EXECUTOR of The TRUST

(3) Operator mailing address: 26 Constitution WAY DOVER NH 03820

(4) Operator telephone number:

(5) If different than above, identify the individual associated with and designated by the facility operator to be the contact individual for matters concerning this facility:

(a) Name: (b) Title:

(c) Mailing address:

(d) Telephone number:

(6) If the operator is an individual, provide date of birth and go to Section IV: 7-25-40 (EXECUTOR William Copeland)

(7) If the facility operator is a corporation, partnership or other association, provide the following information as specified:

(a) The facility is operated by a: ☐ corporation ☐ partnership ☒ other association (TRUST)

(b) State of incorporation/formation: NH

(c) Principal business address: 26 CONSTITUTION WAY DOVER NH 03820

(d) Provide, on separate paper and attach/mark as "Attachment III(7)(c)," the names and addresses of all directors, officers and shareholders(*), if for a corporation; all partners (whether general or limited), if for a partnership; or all principals, members or participants, if for another type of association.

(*) For a privately held corporation, identify all shareholders. For a publicly traded corporation, identify all shareholders owning 10% or more of the corporation's equity or debt.

SECTION IV. PROPERTY OWNER IDENTIFICATION

(1) Is the facility owner, as identified in Section II of this form, also the owner of the property on which the facility is situated?
☐ NO ☒ YES [If yes, skip questions (2) - (7) and go to Section V]

(2) Property owner name: TRUST of VIRGINIA COPELAND

(3) Property owner mailing address: c/o William Copeland 26 CONSTITUTION WAY DOVER, NH 03820

(4) Property owner telephone number: 603- 749- 9719

(5) If different than above, identify the individual associated with and designated by the property owner to be the contact individual for matters concerning this facility:

(a) Name: (b) Title:

(c) Mailing address:

(d) Telephone number:

(6) If the property owner is an individual, provide date of birth and go to Section V: IN TRUST

(7) If the property owner is a corporation, partnership or other association, provide the following information as specified:

(a) The property is owned by a: ☐ corporation ☐ partnership ☐ other association

(b) State of incorporation/formation:

(c) Principal business address:

(d) Provide, on separate paper and attach/mark as "Attachment IV(7)(d)," the names and addresses of all directors, officers and shareholders(*), if for a corporation; all partners (whether general or limited), if for a partnership; or all principals, members or participants, if for another type of association.

(*) For a privately held corporation, identify all shareholders. For a publicly traded corporation, identify all shareholders owning 10% or more of the corporation's equity or debt.

SECTION V. OTHER PERMITS

(1) Has the New Hampshire Department of Environmental Services issued any written permits for the facility or site?
☐ YES ☒ NO [if NO, skip question (2) and go to Section VI]

(2) Provide the following information for each permit so issued:

Type of Permit/Approval	Date Issued	Permit Number	Status/Comments

SECTION VI. STATUS OF FACILITY OPERATIONS

(1)	Date facility commenced operations (i.e., date facility began receiving waste): 1970s A one time event
(2)	Date facility ceased operations (i.e., date of last waste receipt): Approximately a 6-8 week operation

SECTION VII. TYPE OF OPERATIONS

Identify the type(s) of waste management activities that were conducted at the facility:

☐	Collection	☐	Storage	☐	Transfer
☐	Processing	☐	Treatment	* ☒	Landfilling: ☐ open burning ☐ lined ☒ unlined

* ONE TIME operation - only took in Bldg. MATerials during Portsmouth urban re-development from City of Portsmouth. only

SECTION VIII. TYPE OF SERVICE

(1)	Did this facility operate commercially? ☐ YES ☒ NO not as a landfill
(2)	Did this facility receive waste ONLY from sources within the control/jurisdiction of the facility owner? ☒ YES ☐ NO

SECTION IX. SERVICE AREA

Identify the geographic region served by this facility. If the facility received waste from any source, so state and identify area most commonly served.

City of Portsmouth -Urban Re-development

SECTION X. TYPE OF WASTE HANDLED BY FACILITY

Identify the type(s) of waste received by the facility:

☒	Asbestos IN some Bldg materials	☐	Putrescible waste	☒	Construction & demolition debris	☐	Mixed municipal solid waste
☐	Ash-household	☐	Bulky waste (furniture, stumps, etc.)	☐	Infectious waste	☐	Tires
☐	Ash-municipal solid waste	☐	Recyclable materials	☐	White goods (appliances, etc.)	☐	Yard waste
☐	Household hazardous waste	☐	Contaminated soils	☐	Hazardous waste	☐	Sludge/septage
☒	Other *(specify)*: AUTO PARTS						

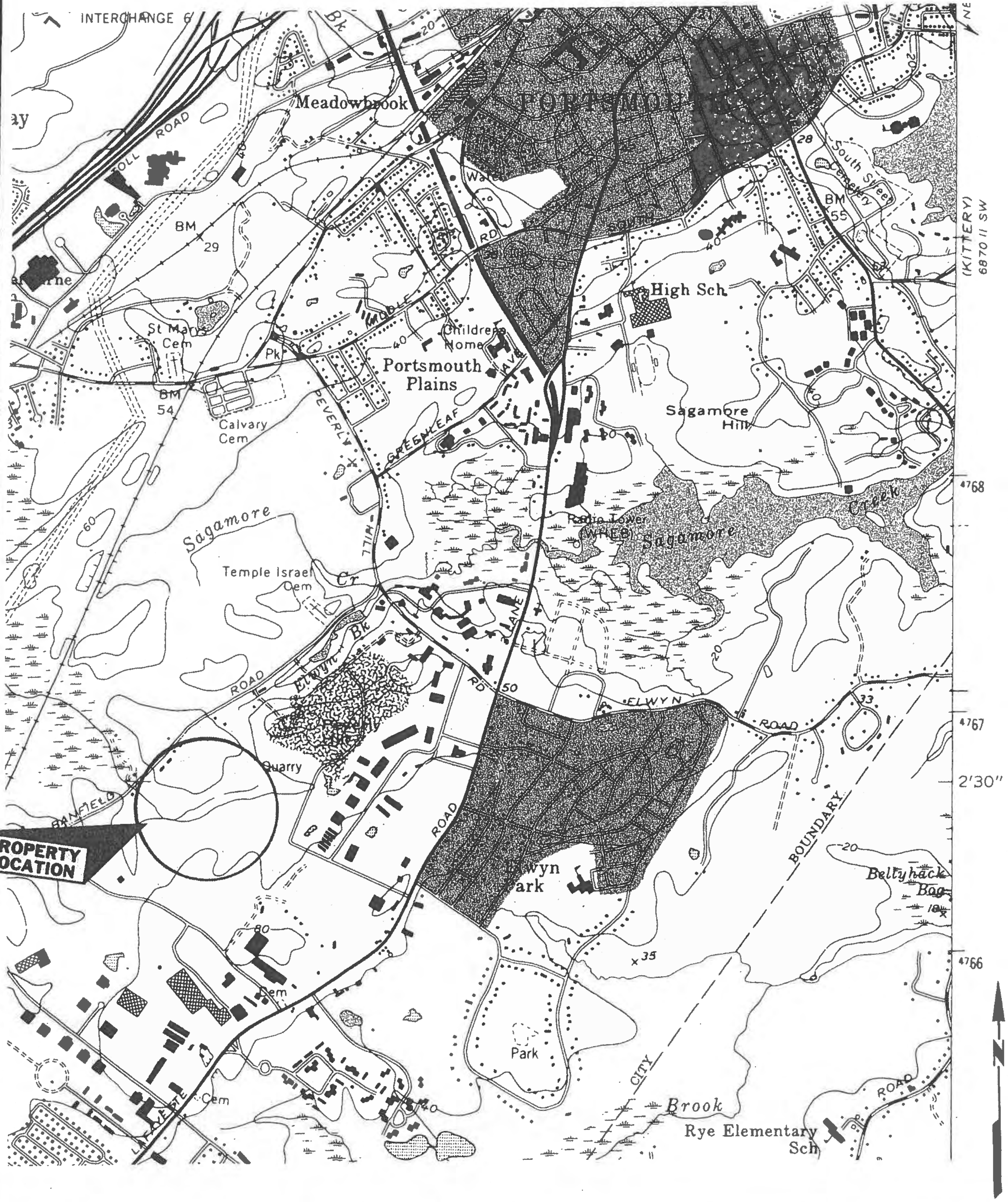
SECTION XI. FACILITY CAPACITY & COVER

(1)	Estimated volume (cubic yards) of waste landfilled at the facility: estimated Less than 1 Acre of 15A. LoT
(2)	Estimated maximum depth/height of waste (feet): have not excavated more Than 6'
(3)	Describe type of cover material placed over landfilled waste (e.g., sand, gravel, clay, till, loam; vegetated or non-vegetated; estimated depth of each, etc.): Sand, gravel with with vegetation growth. 2-6' cover
(4)	Estimated maximum depth of cover material: 0 - 6 FEET
(5)	Estimated minimum depth of cover material: 0-1' FT.
(6)	Estimated maximum slope: 3%
(7)	Estimated minimum slope: Flat 0%
(8)	Are gas vents installed? ☐ YES (how many?) ☒ NO

SECTION XII. ENVIRONMENTAL ASSESSMENT REPORTS

(1)	Have any environmental assessments been prepared for the facility or site? ☒ YES ☐ NO
(2)	If **YES**, attach a copy of each report, including groundwater-monitoring data if available. Yes

Attachment 7: USGS topo Map of Portsmouth 1:24000 scale



Revisions		Drawn By	LES A. CARTIER AND ASSOCIATES INC. P.O. Box 559 Candia, NH 03034 (603) 483-2150	TITLE 375 Banfield Road Portsmouth, NH	
DATE	BY	Scale 1:24		DATE 5/20/09	APPROVED BY: dkc
		Project No. C12025			

SECTION XIII. SIGNATURES

Note: Each copy of the form submitted to DES shall bear ORIGINAL signatures.

I hereby certify that, to the best of my knowledge and belief, the information and material submitted herewith is correct and complete. I understand that any approval granted by the New Hampshire Department of Environmental Services (DES) based on false and/or incomplete information shall be subject to revocation or suspension, and that administrative, civil or criminal penalties may also apply. I certify that this registration is submitted on a complete and accurate form, as provided by DES, without alteration of the text.

Print Clearly or Type

William E. Copeland	William E Copeland	6-2-09
Facility Owner Name	Facility Owner Signature	Date
Facility Operator Name (if different than Facility Owner)	Facility Operator Signature	Date
Property Owner Name (if different than Facility Owner)	Property Owner Signature	Date

LES A. CARTIER
AND ASSOCIATES INC.
ENVIRONMENTAL PROFESSIONALS

RECEIVED
MAY 27 2009
DEPARTMENT OF ENVIRONMENTAL SERVICES
SOLID WASTE MANAGEMENT BUREAU

May 26, 2009

Mr. Doug Kemp
NHDES –WMD
PO Box 95
Concord, NH 03302-0095

Re: 375 Banfield Rd.
Portsmouth, NH

Dear Mr. Kemp:

Enclosed please find the second draft of the Registration form for Landfills not operated after 7/6/81. As you requested I have filled out the information known at this time. Once you have agreed that the information provided is sufficient I will have the Executor of the Trust/Estate sign the form and re-submit it with all the reports prepared for the site as well.

If you have any questions, or comments regarding this form, please contact me via cell phone: 603-867-8908 as I will be out of State until June 1, 2000. Thank you for taking the time to review this.

Cordially,

Diane K Cartier

Diane K. Cartier, Project Coordinator
/dkc

enclosures

"Promoting Environmental Responsibility"

P.O. Box 559
Candia, NH 03034
(603) 483-2180

© 1996 DeLorme Street Atlas USA

LES A. CARTIER
AND ASSOCIATES INC.
ENVIRONMENTAL PROFESSIONALS

RECEIVED
DEC - 2 2008
DEPARTMENT OF ENVIRONMENTAL SERVICES

November 30, 2008

Mr. Michael Guilfoy
NHDES – Waste Mgmt. Div.
PO Box 95
Concord, NH 03301-0095

Re: 375 Banfield Rd. Portsmouth, NH
NHDES #199408047

Dear Mr. Guilfoy:

As per our recent phone conversation, LCA is making this notification to the NHDES regarding the above referenced site as a Pre-1981 Landfill outlined in Env-SW2100. During a recent site investigation for real estate purposes some evidence of asbestos containing materials (ACM's) were noted in the solid waste building materials that were previously reported on the property to NHDES in a report of 2004 and an additional site investigation in 2006. During the period of urban renewal in the City of Portsmouth (1950's – 1960's) building materials were disposed at the site. The current trustee states that there has been no disposal at the site since that time period. The main area of disposal was the low lying area southeast of the property. This area has since been designated as a non-develop zone due to a wetland buffer requirement. It has been determined that when the site is developed, the buffer zone will be capped either with loam and grass or pavement.

The 2008 report states that ACM's were noted in 3 of 17 bulk building material samples found at the site. The analytical data for the 17 analysis could not be located in the report. The analytical report indicates no asbestos in the soil samples collected at the site.

As required by NHDES, the property owner/operator will follow Env-SW 2104.08 with regards to disclosure and record keeping. Attached please find a copy of the sampling locator plan indicating where the soil samples were taken, a copy of the asbestos soil analysis and a site plan indicating the no-develop zone.

"Promoting Environmental Responsibility"

If you have any question or comments regarding this issue, please feel free to contact LCA at your convenience at 603-867-8908 or e-mail at cartiergroup@comcast.net.

Cordially,

Diane K Cartier

Diane K. Cartier, Project Coord.
/dkc

Cc: Bill Copeland, LCA file
Enclosures

ProScience Analytical Services, Inc

Client #:	1082
Client Project:	085016-05
Client Reference:	Commercial Property
Client Name:	Analytics Environmental Laboratory LLC
Method:	EPA/600/R-93/116; ENV.EVAL. and MEAS.- REGION 1 Requirements

Batch:	58873
Date Sampled:	Various
Date Received:	8/5/2008
Date Analyzed:	8/12/200
Date of Report:	8/13/2008

LAB ID	Field ID	Color	*ASBESTOS*						*NON-ASBESTOS*						
			CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NO
S639774	TP120-S1-073008	Brown	0	0	0	0	0	0	0	0	10	0	0	0	9

Description: Soil
Location: N/A
Comments:
Analyzed: Ye

LAB ID	Field ID	Color	*ASBESTOS*						*NON-ASBESTOS*						
			CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
S639775	TP123-S1-073008	Brown	0	0	0	0	0	0	0	0	5	0	0	0	95

Description: Soil
Location: N/A
Comments:
Analyzed: Yes

LAB ID	Field ID	Color	*ASBESTOS*						*NON-ASBESTOS*						
			CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NO
S639776	SS101-S1-072908	Brown	0	0	0	0	0	0	0	0	3	0	0	0	97

Description: Soil
Location: N/A
Comments:
Analyzed: Yes

LAB ID	Field ID	Color	*ASBESTOS*						*NON-ASBESTOS*						
			CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
S639777	SB108-S2-080108	Brown	0	0	0	0	0	0	0	0	10	0	0	0	90

Description: Soil
Location: N/A
Comments:
Analyzed: Yes

LAB ID	Field ID	Color	*ASBESTOS*						*NON-ASBESTOS*						
			CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
S639778	SB107B-S1-080108	Brown	0	0	0	0	0	0	0	0	5	0	0	0	95

Description: Soil
Location: N/A
Comments:
Analyzed: Yes

LAB ID	Field ID	Color	*ASBESTOS*						*NON-ASBESTOS*						
			CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
S639779	SB106-S1-073108	Brown	0	0	0	0	0	0	0	0	2	0	0	0	98

Description: Soil
Location: N/A
Comments:
Analyzed: Yes

ProScience Analytical Services, Inc

Client #: 1082
Client Project: 085016-05
Client Reference: Commercial Property
Client Name: Analytics Environmental Laboratory LLC
Method: EPA/600/R-93/116; ENV.EVAL. and MEAS.- REGION 1 Requirements

Batch: ; 58873
Date Sampled: Various
Date Received: 8/5/2008
Date Analyzed: 8/12/2008
Date of Report: 8/13/2008

Asbestos Codes: CHR = Chrysotile AMO = Amosite CRO = Crocidolite ACT = Actinolite TRE = Tremolite ANT = Anthophyllite
Non-Asbestos Codes: FBG = Fiberglass MNW = Mineral Wool CEL = Cellulose HAR = Hair SYN = Synthetic OTH = Other NON = Non-Fibrous Minerals

All results are in percentage.

Stefanie Bishop, Analyst

S58873

Chain Of Custody Form

analytics environmental laboratory LLC

195 Commerce Way Suite E
Portsmouth, NH 03801
Phone (603) 436-5111
Fax (603) 430-2151

Project#:	085016-05 Proj. Name Commercial Property
Company:	ANALYTICS Environmental Laboratory LLC
Contact:	Ms. Melissa Gulli
Address:	195 COMMERCE WAY PORTSMOUTH, NH 03801
Phone:	603-436-5111 PO#61928 Quote #
Sampler (Signature):	

Matrix Key:
C = Concrete
WP = Wipe
WW = Wastewater
SW = Surface Water
GW = Groundwater
DW = Drinking Water
S = Soil/Sludge
O = Oil
E = Extract
X = Other

For Analytics Use Only Rev. 4 03/28/08

Samples were:
1) Shipped or hand-delivered
2) Temp blank °C ____
3) Received in good condition Y or N
4) pH checked by: ____
5) Labels checked by: ____

Container Key
P=plastic G=glass

Station Identification	Sample Date	Sample Time	Analysis	Preservation: Unpres	4°C	HNO_3	H_2SO_4	HCL	Methanol	Other	Matrix	Container number/type		pH	Analytics Sample #
TP120-S1-073008	07/30/08	1500	Asbestos		x						S	1	G		61928-13
TP123-S1-073008	07/30/08	1515	Asbestos		x						S	1	G		-15
SS101-S1-072908	07/29/08	1155	Asbestos		x						S	1	G		-21
SB108-S2-080108	08/01/08	1015	Asbestos		x						S	1	G		-24
SB107B-S1-080108	08/01/08	1000	Asbestos		x						S	1	G		-25
SB106-S1-073108	07/31/08	1600	Asbestos		x						S	1	G		-26

Relinquished By	Date	Time	Received By
Relinquished By Sampler:	Date:	Time:	Received By:
Relinquished By:	Date: 8-4-08	Time: 1645	Received By: UPS
Relinquished By: UPS	Date: 8-5-08	Time: 10 AM	Received By: Kathy Arstone - Past.

Email Results to:
mgulli@analyticslab.com
sknollmeyer@analyticslab.com

Turnaround Time (TAT)

☐ 24hr* ☐ 48hr*
☐ 72hr* ☐ 5 Days
☒ ~~10 Days~~

Due: 8/16/08

*Fee may apply; lab approval required

Comments / Instructions:

Please reference Station ID number and AEL Lab number on report(s).

Method Type: RCRA NPDES DW
Metals (Aqueous) Total or Dissolved Field Filtered

6

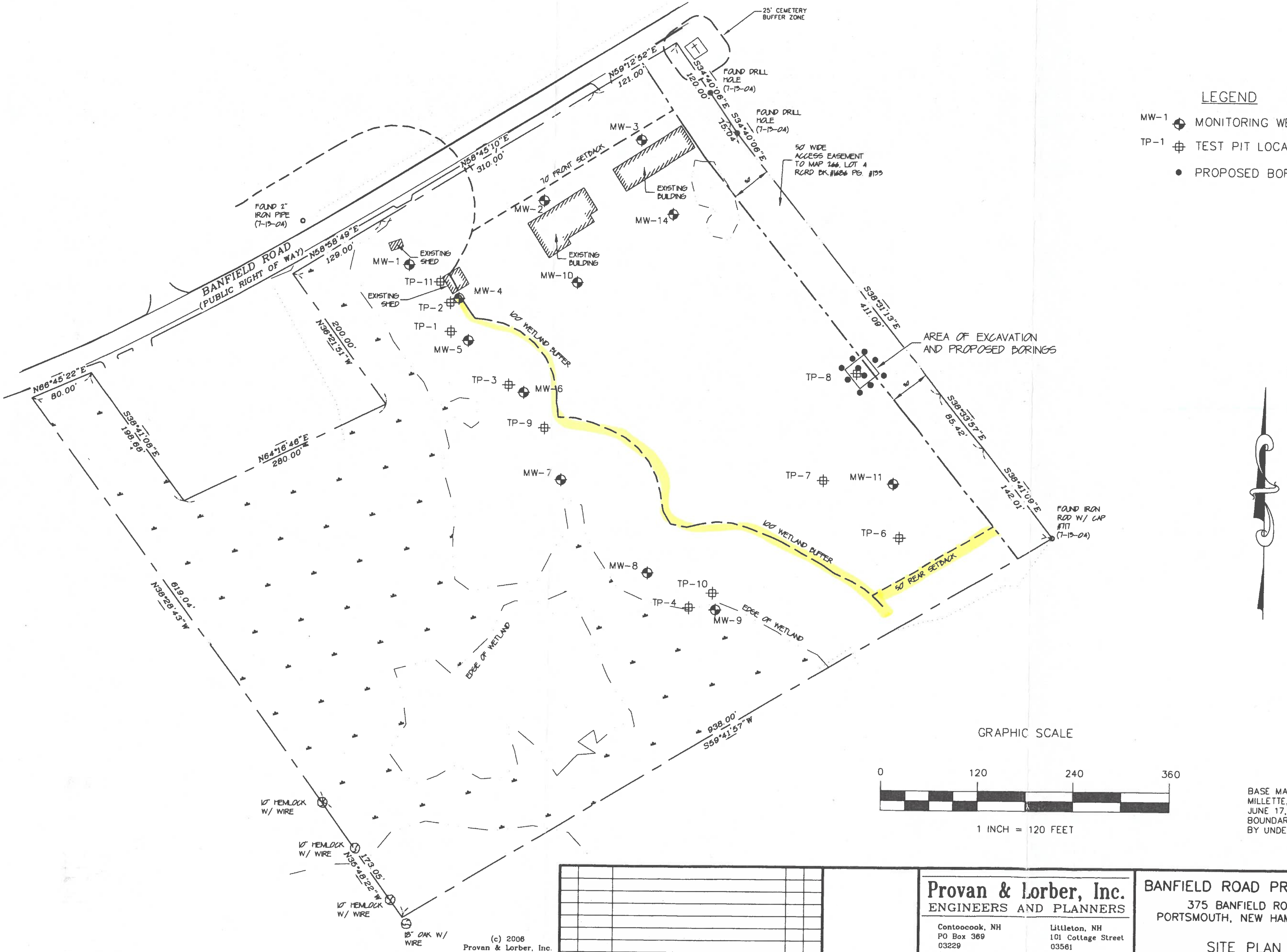
Project Requirements:
*Fee may apply

Report Type:
☐ MCP* ☐ Level II*
☐ CTRCP* ☐ Level III*
☐ DOD* ☐ Level IV*
☒ Standard

State:
☒ NH
☐ MA
☐ ME
☐ CT
☐ RI
Other: ____

State Standard: ____
(eg. S-1 or GW-1)

EDD Required: Y* [✓ N]
Type: ____



LEGEND

MW-1 ⊕ MONITORING WELL LOCATION

TP-1 ⊕ TEST PIT LOCATION

● PROPOSED BORING LOCATION

GRAPHIC SCALE

0 120 240 360

1 INCH = 120 FEET

BASE MAP PROVIDED BY:
MILLETTE, SPRAGUE & COLWELL, INC.
JUNE 17, 2004, BASED ON
BOUNDARY PLAN TAX MAP R66, LOT 4
BY UNDERWOOD ENGINEERS, INC.

NO.	DATE	REVISION	ENG	DWG

Provan & Lorber, Inc.
ENGINEERS AND PLANNERS

Contoocook, NH
PO Box 369
03229
603 746-3220

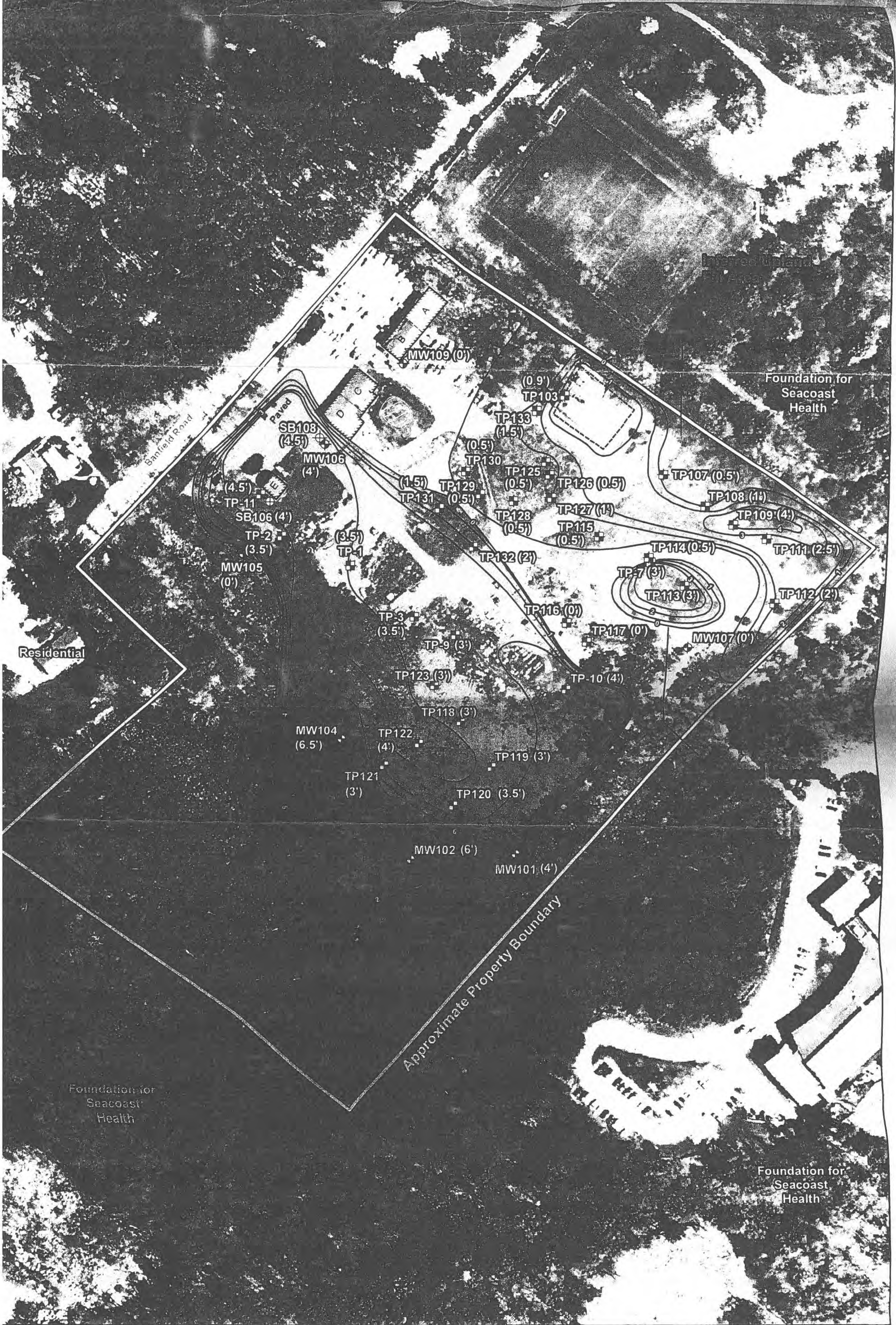
Littleton, NH
101 Cottage Street
03561
603 444-6301

BANFIELD ROAD PROPERTY
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

SITE PLAN

DATE: APRIL 2006
ENG. BY: KMM
DRWN. BY: MSC
CHKD.BY: KMM
PROJ. NO.: M6059

FIGURE 1



JECT: 085016
DATE: 09/23/2008

Figure 4
Fill Thickness

▨ Site Boundary
Leachfield
⊕ Monitoring Well
⊞ Test Pit
⊕ Soil Boring
∼ Fill Contour; Thickness in Feet

RANSOM
Environmental
Consultants, Inc.

Prepared For:
Foundation for Seacoast Health
402 State Street
Portsmouth, NH

Site Address:
Commercial Property
375 Banfield Road
Portsmouth, NH

0 60 120 240 Feet
1 inch = 120 feet
NORTH

e: USGS 2005 Ortho Photography), City of Portsmouth, NH (Tax Map)

G:\Data\ME\Project\085016\Maps\MXD\Figure_4.mxd

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

NOTICE TO RECIPIENTS OF MINIMUM IMPACT NH WETLANDS PERMITS

Your permit was approved by the New Hampshire Wetlands Bureau as a minimum impact project, and your project is automatically approved under the Army Corp's New Hampshire Programmatic General Permit.

For the purpose of the NH PGP, Minimum Impact Projects do not include new construction of:

- Dams;
- Dikes;
- Water withdrawal of diversion projects which require fill in wetlands or surface waters;
- Wetlands restoration projects, or any projects which involve work in other than low flow conditions (July 1 – September 30);
- Any projects involving more than 3,000 square feet of a water body or wetland fill and secondary impacts.

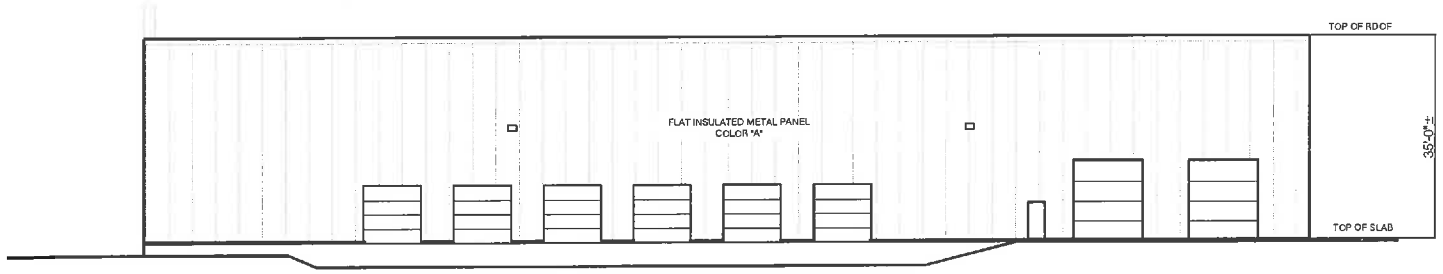
Also, not included under Minimum Impact Projects are those projects that include the reconstruction or replacement of currently unserviceable structures/fills. The projects must be reviewed through the screening procedures of minor impact projects. The activities in section 10 waters not regulated by the Wetlands Bureau formerly authorized under the Nationwide Permit Program and listed in Appendix A of this document are designated non-reporting activities.

These approvals do not relieve you from obtaining any necessary local permits that may be required by your town.

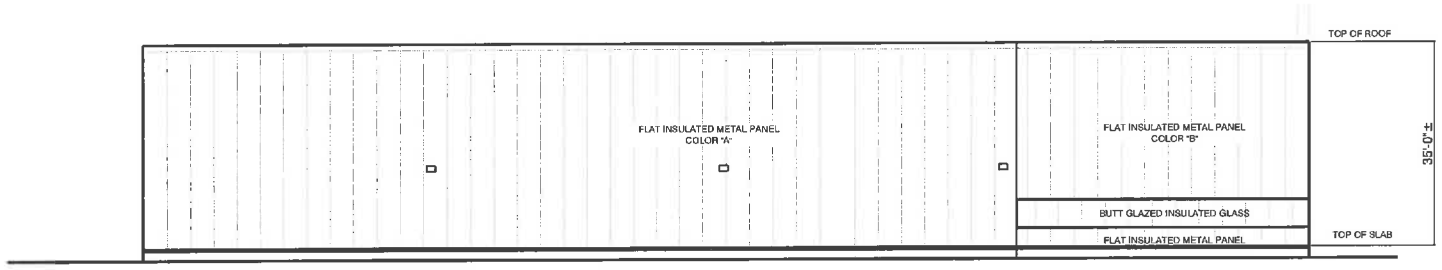
If you have any questions, feel free to give us a call at 603-271-2147.

****

This notice was sent with minimum impact permit.



EAST ELEVATION



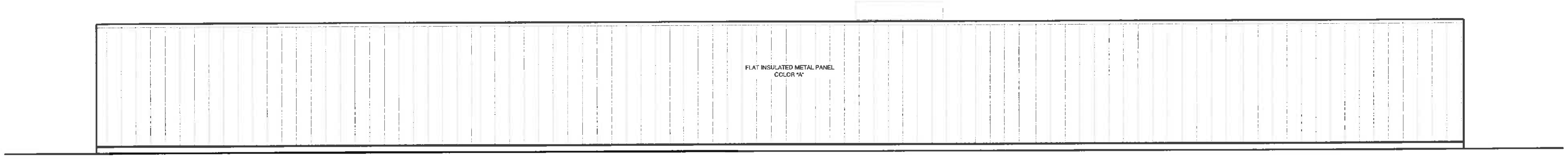
WEST ELEVATION

SIDING "A" AND "B"

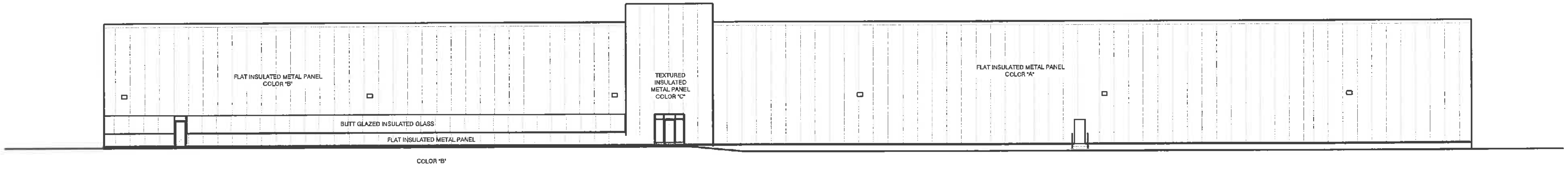
2.5" X 26/26 Ga. CF-42 METL-SPAN OR EQUAL
PANELS WITH 42" COVERAGE
EXTERIOR COLOR "A" - TO BE DETERMINED
EXTERIOR COLOR "B" - TO BE DETERMINED
INTERIOR FINISH - WHITE
PANEL PROFILE - CF42 LIGHT MESA OR EQUAL
SIDE JOINT FASTENING - CONCEALED CLIP.
2 FASTENERS PER CLIP
ALL TRIM 26 GA TO MATCH EXTERIOR PANEL FINISH

SIDING "C"
2.5" X 26/26 Ga. CF-42 METL-SPAN OR EQUAL
PANELS WITH 42" COVERAGE
EXTERIOR COLOR "C" - TO BE DETERMINED
INTERIOR FINISH - WHITE
PANEL PROFILE - CF FLUTE OR EQUAL
SIDE JOINT FASTENING - CONCEALED CLIP
2 FASTENERS PER CLIP
ALL TRIM 26 GA TO MATCH EXTERIOR PANEL FINISH

ALL SIDING IS TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND IS TO INCLUDE ALL ASSOCIATED ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND AIR AND MOISTURE SEALING.



NORTH ELEVATION



SOUTH ELEVATION

CONCEPT ELEVATIONS
SCALE: 1/16" = 1'-0"

mjk
Michael J. Keane
Architects, PLLC
ARCHITECTURE
PLANNING
DESIGN
101 Kent Place
Newmarket, NH
03857

603-292-1400
mjkarchitects.com

CONSULTANTS

REVISIONS

APPROVALS

PLANNING BOARD REVIEW
02.02.21
NOT FOR CONSTRUCTION

Accept only original stamp and signature copies may contain unauthorized modifications

PROJECT

INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD
TAX MAP 266 LOT 7,
PORTSMOUTH NH , NH

BANFIELD REALTY LLC
304 MAPLEWOOD AVE
PORTSMOUTH NH 03801,

TITLE

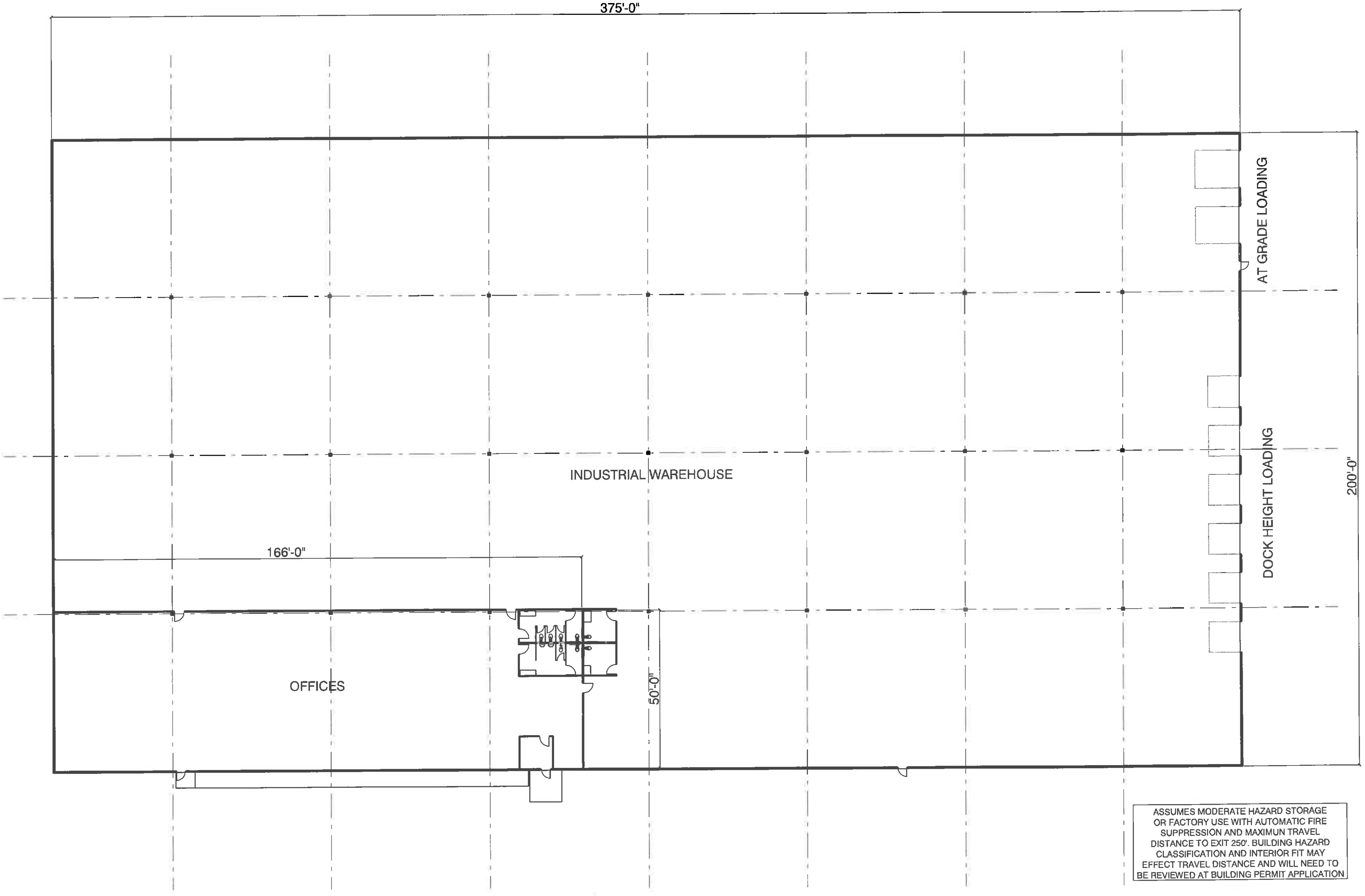
PRELIMINARY ELEVATIONS

DRAWN BY:
CHECKED BY:
DATE: 6/21/2021
SCALE: AS NOTED

DO NOT SCALE PRINTS

DRAWING NO.

A- 1



ASSUMES MODERATE HAZARD STORAGE OR FACTORY USE WITH AUTOMATIC FIRE SUPPRESSION AND MAXIMUN TRAVEL DISTANCE TO EXIT 250'. BUILDING HAZARD CLASSIFICATION AND INTERIOR FIT MAY EFFECT TRAVEL DISTANCE AND WILL NEED TO BE REVIEWED AT BUILDING PERMIT APPLICATION

CONCEPT PLAN

SCALE: 1/16" = 1'-0"

mjk
Michael J. Keane
Architects, PLLC
ARCHITECTURE
PLANNING
DESIGN
101 Kent Place
Newmarket, NH
03857
603-292-1400
mjkarchitects.com

CONSULTANTS

REVISIONS

APPROVALS

PLANNING BOARD REVIEW
02.02.21
NOT FOR CONSTRUCTION

PROJECT

INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD
TAX MAP 266 LOT 7,
PORTSMOUTH NH , NH

BANFIELD REALTY LLC
304 MAPLEWOOD AVE
PORTSMOUTH NH 03801,

TITLE

CONCEPT PLAN

DRAWN BY:
CHECKED BY:
DATE: 6/21/2021
SCALE: AS NOTED

DO NOT SCALE PRINTS

DRAWING NO.

A- 2

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

DES Waste Management Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

SUPPLEMENTAL SITE INVESTIGATION REPORT

FORMER COUNTRY MOTOR SALES
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

NHDES SITE #199408047
HAZWASTE PROJECT #40176

Prepared For:
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, New Hampshire 03801
Phone Number: (603) 479-3666
Contact Name: Mr. Robert Graham
Contact Email: Rob@graham-consult.com

Prepared By:
Wilcox & Barton, Inc.
#1B Commons Drive, Unit 12B
Londonderry, New Hampshire 03053
Phone Number: (603) 369-4190 x501
Contact Name: Mr. William Wilcox
Contact Email: wwilcox@wilcoxandbarton.com

November 22, 2021

Wilcox & Barton, Inc. Project #BANF0005

Wilcox & Barton INC.
CIVIL • ENVIRONMENTAL • GEOTECHNICAL

SUPPLEMENTAL SITE INVESTIGATION REPORT

FORMER COUNTRY MOTOR SALES
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

NHDES SITE #199408047
HAZWASTE PROJECT #40176

Prepared for:
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, New Hampshire 03801
Contact: Mr. Robert Graham, (603) 479-3666

Prepared by:
Wilcox & Barton, Inc.
#1B Commons Drive, Unit 12B
Londonderry, New Hampshire 03053
Contact: Mr. William R. Wilcox, (603) 369-4190 x501

November 22, 2021

Wilcox & Barton, Inc. Project #BANF0005

WWW.WILCOXANDBARTON.COM
1 (888) 777-5805

CERTIFICATION

The following personnel have prepared and/or reviewed this report for accuracy, content, and quality of presentation.

Document: Supplemental Site Investigation Report
Former Country Motor Sales
375 Banfield Road, Portsmouth, New Hampshire
NHDES Site #199408047, HAZWASTE PROJECT #40176

Date/Version: November 22, 2021

Madeleine Broussard

Madeleine Broussard, EIT
Project Engineer

Robert W. Rooks

Robert W. Rooks, PE
Principal Engineer

William R. Wilcox
President – Principal Geologist

ALAN J. McLEVY No. 14988

Alan J. McLevy, PE
Senior Engineer

TABLE OF CONTENTS

TABLE OF CONTENTS

Tables

Figures

Appendices

1.0 INTRODUCTION

Wilcox & Barton, Inc. was retained by Banfield Realty, LLC to perform a Supplemental Site Investigation (SI) for the Former Country Motor Sales at 375 Banfield Road in Portsmouth, New Hampshire (the site or property). The site location is presented on Figure 1 – *Site Location Map* and general site features are presented on Figure 2 – *Proposed Development Plan*.

This report was prepared following completion of a Site Investigation in 2020 pursuant to New Hampshire Department of Environmental Services (NHDES) correspondence with the prior property owner. On August 9, 2021, NHDES responded to the findings of the 2020 *Site Investigation Report* and a *Supplemental Data Transmittal* and requested:

- Preparation and submittal of a *Soil Management Plan*, subject to NHDES review and approval, to describe proper management of soil during redevelopment activities;
- Submittal of an *Application for Activity and Use Restriction*;
- Consideration of options for proper management of polychlorinated biphenyl (PCB)-containing soils, including evaluation of the applicability of the Toxic Substances Control Act regulation and, potentially, coordination with US Environmental Protection Agency (EPA) Region 1;
- Consideration of options for management of Asbestos Containing Materials;
- Preparation and submittal of a *Remedial Action Plan* in accordance with Env-Or 606.10 and Env-Or 606.12;
- Additional sampling of wells MW-101, MW-102, and MW-104 for analysis of total and dissolved metals as wells as field water quality parameters;
- Repeat sampling of well MW-101 for analysis for polycyclic aromatic hydrocarbons (PAHs);
- Additional sampling of wells MW-1, MW-4, MW-5, MW-6, MW-7, MW-8, MW-106R, MW-109, MW-204, and MW-204 for analysis for per- and polyfluoroalkyl substances (PFAS);
- Additional information concerning the nature of wetland sediments and the potential for direct-contact exposure to humans;
- Collection of additional surface water samples, with analysis for metals and hardness and comparison to criteria protective of aquatic life in freshwater as well as criteria protective of human health;
- Clarification of the wetland boundary and the relative locations of sediment and surface water samples.

On September 8, 2021, Wilcox & Barton, Inc. provided a *Response to NHDES Comments* concerning the status of the above requests and a plan to obtain the requested information. A copy of the response is provided in Appendix A. Subsequently, NHDES requested via email dated September 10, 2021, that surface water samples also be analyzed for field-based water quality parameters plus iron, manganese, ammonia, chloride, nitrate, sulfate, and total suspended and dissolved solids.

This report is submitted in partial fulfillment of these requests. The new data have added substantially to the understanding of environmental conditions at the project site.

2.0 GENERAL SITE INFORMATION

2.1 Property Description

The site is a 17.32-acre lot in an industrial and residential area of Portsmouth and identified by the City of Portsmouth Tax Assessor's records as Map 266, Lot 7. Topography across the property decreases in elevation from the northeast to the southwest. The site is zoned as industrial and is improved by two one-story commercial automotive maintenance buildings and one two-story garage building used for storage. The remainder of the subject property includes a paved parking lot abutting Banfield Road, landscaped areas, cleared undeveloped land, wooded land, and a portion of Pickering Brook and associated wetlands.

Potable water is obtained from the City of Portsmouth municipal drinking water supply. Sanitary waste is discharged to a private septic system and leachfield.

2.2 Historical Land Use

The subject property has a history of land use as an auto salvage/crushing and recycling yard dating from circa 1960 to 2006. Automotive parts have been observed both on the ground surface and partially-buried throughout much of the property, including within the surrounding wetland area. Based on mounds observed in the southern portion of the property, it is likely that automotive parts are also buried on the site. An automobile crusher was reportedly located at a relative high point on the property along the northeastern property boundary.

In addition, the property reportedly accepted building waste and construction waste for fill in the 1960s during "Portsmouth's urban revitalization." Based on aerial photographs, the limits of the filled area had reached its maximum extent as of 1974. Related debris can still be seen within the grassed, wooded, and wetland areas on the southern portion of the property.

2.3 Property Identification

NHDES Site Number:	199408047
NHDES Project Type:	HAZWASTE
NHDES Project Number:	40176
Property Name:	Former Country Motor Sales
Property Address:	375 Banfield Road Portsmouth, New Hampshire
Latitude and Longitude:	43.042° N; 70.790° W
Map and Block Number:	Portsmouth Map 266, Lot 7

Deed Reference:	Book 6081 / Page 2150, Rockingham County Registry of Deeds
Property Owner:	Banfield Realty, LLC 304 Maplewood Avenue, Portsmouth, NH 03801
Zoning:	Industrial
USGS Topographic Quad:	Portsmouth, NH (2018, 7.5 x 7.5 minute)

2.4 Surrounding Properties

The site is bound to the northwest by Banfield Road, to the northeast by a private school (St. Patrick Academy), to the southwest by commercial and residential properties, and to the southeast by a commercial property, beyond which are commercial, industrial, and residential properties. The site and surrounding properties are depicted on Figure 2.

Pickering Brook and wetlands associated with Pickering Brook are located on the southern, southeastern, and southwestern portion of the subject property and extend onto adjacent properties.

The residential properties within 1,000 feet of the site are assumed to be constructed with basements and are serviced by the City of Portsmouth public drinking water supply.

3.0 SUMMARY OF PREVIOUS INVESTIGATIONS

Several phases of work have been carried out since discovery of contaminant conditions in 2005. These efforts are summarized below.

3.1 2005 to 2007 Investigations – Cartier and Provan & Lorber

On August 17, 2005, Ransom Environmental Consultants, Inc. submitted a *Third-Party Notification* letter to NHDES regarding an October 2004 Phase II Environmental Site Assessment performed by Les A. Cartier and Associates, Inc. During that investigation, 11 test pits were completed, and 11 monitoring wells were installed to evaluate soil and groundwater contamination. Arsenic, lead, PCBs, and mercury were found at concentrations above NHDES S-1 Soil Standards in the vicinity of the former car crusher. Low levels of volatile organic compounds (VOCs) and PAHs were detected in groundwater. Recommendations included removal of the contaminated soil, asbestos-containing piping found in one of the test pits, all scrap metal waste, and excess, non-serviceable vehicles from the property.

In correspondence dated January 21, 2006, NHDES requested a Site Investigation. In response, a *Groundwater Monitoring and Soil Assessment Report* was submitted by Provan & Lorber, Inc. in August 2006. Ten soil borings were completed in the area of exceedances noted in the Phase II report. Arsenic was found at concentrations above S-1 Standards in soil and above Ambient Groundwater Quality Standards (AGQS) in groundwater but was attributed to natural conditions. Excavation of the contaminated soil at the former car crusher location was reported to have been successful, and a request for no further investigation was recommended.

In response to the SI, NHDES requested the following:

- Collection of additional information regarding arsenic in groundwater to determine whether additional groundwater monitoring for arsenic would be required; and
- Submittal of additional information to support a conclusion that arsenic is naturally occurring OR placement of an Activity and Use Restriction (AUR) on the former car crusher area OR removal and offsite disposal of soil where the arsenic standard is exceeded.

On July 10, 2007, Provan & Lorber, Inc. submitted an *Additional Assessment Report* to NHDES. Seven soil borings were advanced in the area of the former car crusher and excavation area, and groundwater samples were obtained from existing monitoring wells at the subject property. Arsenic was detected in 10 soil samples at concentrations exceeding the S-1 Standard. Provan & Lorber, Inc. recommended no further investigation or remediation be required at the site, stating that the arsenic exceedances appear to be naturally occurring, and action relating to the arsenic exceedances should be limited to placement of an AUR on the area with a 50-foot easement on the northeastern property boundary. NHDES concurred with the findings and issued a Letter of No Further Action dated August 15, 2007.

3.2 2008 Investigation – Ransom

On October 10, 2008, Ransom Environmental Consultants, Inc. submitted a *Third-Party Notification* to NHDES regarding a Limited Subsurface Investigation at the subject property. Arsenic, lead, and mercury were detected at concentrations above applicable Threshold Effect Concentrations (TECs) and Probable Effect Concentrations (PECs) in sediment samples collected from wetland areas on the property. Lead and selenium were detected in surface water samples at concentrations exceeding New Hampshire Surface Water Quality Standards. Buried solid wastes, including automotive parts and building materials, were observed in test pits excavated in the northeastern portion of the subject property. Asbestos was detected in three waste bulk building material samples collected from surface and near-surface locations in the central portions of the site. PAHs, arsenic, lead, and PCBs were detected at concentrations above NHDES Soil Remediation Standards (SRS) in soil samples taken from test pits in the northeastern portion of the site in the vicinity of the former car crusher. Three PAHs were detected in groundwater at concentrations above AGQS in a monitoring well located on the southern portion of the site, lead was detected in groundwater at a concentration above AGQS in a monitoring well located in the central portion of the site, and arsenic was detected at a concentration above AGQS in a monitoring well located on the northwestern portion of the site.

In response to the *Third-Party Notification*, NHDES requested further investigation of the former auto car crusher area, the apparent historical solid waste landfill, asbestos in bulk soil samples, and contamination in sediment. Provan & Lorber, Inc. submitted *Comments Regarding Limited Subsurface Investigation – October 2008* to NHDES on September 2, 2009. NHDES correspondence dated February 16, 2011, recommended excavating the areas with naturally occurring arsenic in exceedance of the standard or capping the material and recording an AUR, and recommended that the source and extent of lead and PCB contamination in soil be characterized. Buried asbestos on the site was required to be capped, with the owner providing recordation of an AUR. NHDES requested information on the direction and flow rate of Pickering Brook, as well as a confirmatory round of sediment and surface water samples in the wetland area. Lastly, NHDES requested two rounds of confirmatory groundwater sampling as well as the installation of a monitoring well in the former car crusher area and analyses for VOCs, metals, PAHs, and PCBs. Based on a review of available records, the then-owner did not perform the requested work.

3.3 2020 Investigations – Wilcox & Barton, Inc.

Subsequent to purchase of the property by the current owner, a Phase I Environmental Site Assessment in April 2020 confirmed the following environmental findings:

1. Documented landfill at the subject property.
2. Documented former car crusher and associated contamination at the subject property.
3. Improper storage of petroleum and/or hazardous substances, floor staining, and poor housekeeping in the northern building at the subject property.
4. Improper storage and burial of solid waste and possibly petroleum and/or hazardous substances in and around the wetland area at the subject property.
5. One floor drain in the central building garage bay at the subject property.

Follow up investigation was documented in a *Site Investigation Report* dated July 9, 2020, and a *Supplemental Data Transmittal* dated January 27, 2021. These documents are referred to herein, collectively, as the “2020 Site Investigation.” The work included advancement of 25 soil borings, five of which were completed as overburden monitoring wells, completion of 10 test pits, and collection of soil, septic tank, sediment, surface water, and groundwater samples.

Arsenic was detected in a majority of the soil samples at concentrations exceeding SRS. The detected arsenic concentrations, with one exception, were generally in the range of 12 to 20 milligrams per kilogram (mg/kg), just above SRS and not inconsistent with expected natural conditions. Lead was detected at concentrations above SRS in samples from three borings. PCBs were not detected at concentrations exceeding 1 mg/kg in any of the 100 samples that were analyzed for PCBs.

In general, test pits revealed solid waste material from ground surface to depths of 0.5 to 3.5 ft bgs in the area examined. Observed solid waste materials included bricks, tires, granite blocks, metal, car parts, wood, glass, plastic, ceramic tiles, and suspect asbestos-containing materials such as floor tiles, carpet, and mastic, and a furnace.

In groundwater, total and dissolved arsenic and lead were detected at concentrations exceeding AGQS in a limited number of monitoring wells. Similarly, one or more PFAS were detected at concentrations exceeding AGQS in a several of the wells.

In the septic tank sample, p-isopropyltoluene was detected at a concentration exceeding AGQS in the “After” sample. No PAHs were detected at concentrations above laboratory reporting limits.

In sediment, lead and arsenic were detected at concentrations exceeding SRS. No PCBs were detected at concentrations above laboratory reporting limits.

In surface water, three or more RCRA-8 metals (total) were detected at concentrations above the Water Quality Criteria (WQC) for Toxic Substances in all six surface water samples. No PCBs were detected at concentrations above laboratory reporting limits.

Based on these results, additional investigation was warranted and subsequently requested by NHDES.

4.0 SUPPLEMENTAL SITE INVESTIGATION

4.1 Groundwater Gauging

On August 26, 2021, Wilcox & Barton, Inc. gauged all available monitoring wells using a water level meter capable of measuring depth to water to the nearest 0.01 foot in accordance with Wilcox & Barton, Inc. Standard Operating Procedure (SOP) FP-11 – *Measuring Liquid Levels in Monitoring Wells*, which is presented in Appendix B. Depth to groundwater was in the range of 3.6 to 16.5 feet below ground surface. At monitoring well MW-2, which is located at the front of the property near Banfield Road, groundwater was at the top of casing, suggesting possible surface water flooding. Well gauging data are presented in Table 1 – *Well Gauging and Piezometric Head Elevation Data*.

The gauging data were coupled with the survey data to produce Figure 3 – *Piezometric Head Elevation Plan*. The piezometric data indicate a gradient to the southwest towards Pickering Brook, consistent with site topography and the observed high point near the former car crushing area.

4.2 Groundwater Sampling

On August 27 and October 1, 2021, Wilcox & Barton, Inc. collected groundwater samples in response to the NHDES request for additional data. Samples were collected using the low-flow technique described in SOP FP-07 – *Groundwater Sampling for Volatile Organic Compounds (VOCs), Volatile Petroleum Hydrocarbons (VPH), and Extractable Petroleum Hydrocarbons (EPH)*, a copy of which is provided in Appendix B. Groundwater samples were submitted to Con-Test Analytical Laboratory (Con-Test) for laboratory analysis of:

- Total and dissolved metals in wells MW-101, MW-102, and MW-104;
- PAHs in well MW-101;
- PFAS in wells MW-1, MW-4, MW-5, MW-6, MW-7, MW-8, MW-106R, MW-109, MW-203, and MW-204.

Samples for dissolved metals and PAHs were field filtered. PFAS analyses were supported by field, trip, and equipment blanks. Water quality parameters were recorded in the field during sampling and used to gauge stabilization for low-flow sampling. PFAS samples were collected in strict adherence to the additional requirements of SOP FP-17 – *Groundwater Sampling for Per- and Polyfluoroalkyl Substances (PFAS)* (Appendix B).

All samples collected under this phase of work were packaged and handled in accordance with SOP FP-04 – *Sample Custody and QA/QC Sample Collection* (Appendix B).

4.3 Soil Sampling

4.3.1 Lead

To provide comprehensive coverage of the site for characterization of the extent of lead contamination, a uniform grid with a spacing of approximately 50 feet was overlain on the site. Though not all grid intersections or cells were sampled, the grid intersections were used to ensure even distribution of samples.

Prior to sampling, a Wilcox & Barton, Inc. survey team visited the site and placed flags at the designated grid intersections. A combination of total station and measuring tape methods were necessitated by dense vegetation, resulting in an estimated placement accuracy on the order of ±5 feet for each sample. A total of 80 grid intersections were marked in the field, with emphasis on areas where no prior lead data existed. Boring locations were named using a graphic approach, with alphabetical identifiers across the x-axis (A to K from southwest to northeast, Z to V from northeast to southwest in the lowland area) and numbers (1 through 15 from northwest to southeast).

On September 9 and 10, 2021, New England Boring Contractors (NE Boring) of Derry, New Hampshire, advanced soil borings using the direct-push methodology. On September 16 and 17, 2021, Geosearch, Inc. (Geosearch) of Sterling, Massachusetts, advanced the remainder of the soil borings in areas not accessible to machinery using hand-held probe techniques.

Soil in each boring was characterized using a modified Burmister System as described in the Wilcox & Barton, Inc. standard operating procedure, *FP-14 – Soil Logging and Description* (Appendix B), and visually inspected for the presence of anthropogenic material. Soil across the site generally consists of sand with varying amounts of silt and gravel. Fragments of wood, brick, rubber, plastic, ceramics, and glass were observed in small quantities in borings across the site. Soil and fill descriptions are provided in Appendix C.

Samples were collected from the 0 to 2-foot interval at each of the 80 marked locations in accordance with SOP *FP-02 - Grab and Composite Soil Sampling* (Appendix B). Samples were also collected from the 2-foot to 4-foot interval at 35 of the marked locations for assessment of the vertical distribution of lead in soil. Samples were submitted to Con-Test for laboratory analysis for lead using EPA Method 6010. Non-disposable sampling equipment was cleaned between samples in accordance with SOP FP-06 – *Cleaning/Decontamination Procedures* (Appendix B).

4.3.2 PCBs

To provide comprehensive coverage of the site for characterization of the distribution of PCBs in soil, the same uniform grid deployed for lead sampling (50-foot spacing) was used. However, within the proposed development area, the grid density for PCB sampling was increased to 25-foot spacing for increased data frequency. As with lead, not all grid intersections or cells were sampled; sample locations were selected to ensure comprehensive coverage of the site, characterize areas where human exposures are more likely, confirm prior data, and fill in data gaps from prior work.

Within the proposed development area, a Wilcox & Barton, Inc. survey team visited the site and placed flags at the designated new grid intersections using a total station, yielding a sub-foot placement accuracy. A total of 114 grid intersections were marked in the field, with emphasis on areas where no prior data had been collected.

On September 24, 2021, Geosearch advanced soil borings using hand-held probe equipment in locations inaccessible to machinery. On September 29 and 30, 2021, NE Boring returned to the site and advanced soil borings utilizing Geoprobe direct-push methods. Finally, on October 1 and 4, 2021, Wilcox & Barton, Inc. personnel advanced soil borings in the wetland buffer with a hand auger and spade due to poor sample recovery in the acetate liners.

Samples were collected from the 3 to 6-inch and 6-inch to 18-inch intervals at each of the 114 marked locations, as recommended by EPA. Samples were also collected from the 18-inch to 36-inch interval at 27 of the marked locations for additional assessment of the vertical distribution of PCBs in soil. Samples were submitted to Con-Test for laboratory analysis for PCBs using EPA Method 8082.

4.4 Sediment Sampling

To assess the impact of surface water runoff and groundwater migration from the site, a sampling program was generated for wetland sediment. Wetlands were delineated by Jones & Beach Engineers, Inc. (Jones & Beach) and marked in the field using wetland flagging. The field-marked wetland boundary was visible during the current sampling event.

Sediment samples were collected approximately every 100 feet along Pickering Brook in general accordance with guidance described in the EPA guidance *Determination of the Biologically Relevant Sampling Depth for Terrestrial and Aquatic Ecological Risk Assessment* (2001) and/or Ohio Environmental Protection Agency *Sediment Sampling Guide and Methodologies* (2001).

Additional sediment samples were collected in the wetland area adjacent to Pickering Brook on the "site side" (east/north of Pickering Brook) and "far side" (west/south of Pickering Brook). Samples on the "far side" were limited as most proposed locations were inaccessible due to tall vegetation and/or property lines. Samples were submitted to Con-Test for laboratory analysis of:

- PAHs;
- Total metals;
- Total organic carbon; and
- Grain size distribution.

Sediment samples were located using hand-held GPS (*Gaia GPS* app on iPhone), with an estimated accuracy of ±25 feet, and by local reference to wetland flags and the streambed alignment, where visible. Collection of sediment and surface water samples is depicted in photographs presented in Appendix D.

4.5 Surface Water Sampling

Surface water samples were collected approximately every 100 feet linearly along Pickering Brook in the same location as sediment samples using a peristaltic pump. Water quality parameters were measured using a YSI water quality meter and a hand-held turbidimeter in accordance with SOPs FP-03 – *Water Quality Monitoring Using a YSI Multi-Probe System (MPS)* and FP-09 – *Field Measurement of Turbidity* (Appendix B)

Samples collected for analysis of dissolved analytes were filtered in the field using disposable 0.45 micron filters. At the direction of NHDES, work did not proceed upstream outside of the subject property boundary.

Samples were submitted to Con-Test for laboratory analysis for:

- Total and dissolved metals;
- Total and dissolved iron and manganese;
- Calcium hardness;
- PAHs;
- Chloride;
- Nitrate as N;
- Sulfate;
- Total suspended solids; and
- Total dissolved solids.

5.0 CONTAMINANT DISTRIBUTION

The distribution of soil, sediment, surface water, and groundwater contamination are discussed in the following sections.

5.1 Groundwater

5.1.1 Total and Dissolved Metals

In the additional wells sampled for total and dissolved metals, arsenic and/or lead were detected at concentrations exceeding AGQS. The current and available historical data are summarized in Table 2 – *Groundwater Samples – Summary of Analytical Results*. Both current and historical results for dissolved metals are depicted on Figure 4 – *Dissolved Metals and PAHs in Groundwater*. Analytical results are presented in Appendix E.

The most recent data indicate exceedances of AGQS for lead at the three most downgradient monitoring wells along the wetland boundary along the southern extent of the upland portion of the property and surrounding the estimated area of manmade fill and debris. Note that monitoring well MW-101, which was installed during the 2008 investigation, appears to be located within the flagged wetland boundary.

Water quality parameters were recorded in each well. The data are summarized in Table 3 – *Natural Attenuation Parameters – Summary of Field Measurements*. During sampling events in August and October 2021, groundwater was generally characterized by low dissolved oxygen concentrations, neutral pH, and slightly negative oxidation reduction potential, suggesting moderate reducing conditions.

5.1.2 Polycyclic Aromatic Hydrocarbons

Historical AGQS exceedances for PAHs have been limited to benzo(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene in monitoring well MW-101. The current and available historical data are summarized in Table 2 and results are depicted on Figure 4. PAHs were not detected at concentrations exceeding AGQS in well MW-101 during the current sampling effort. Analytical results are presented in Appendix E.

5.1.3 Per- and Polyfluoroalkyl Substances

Samples from wells MW-1, MW-4, MW-5, MW-6, MW-7, MW-8, MW-106R, MW-109, MW-203, and MW-204 were collected and submitted for PFAS analysis. One or more of the target analytes perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and/or perfluorooctanesulfonic acid (PFOS) were detected at concentrations exceeding AGQS in wells MW-1, MW-4, MW-7, MW-106R, MW-109, and MW-203. Results are summarized in Table 4 – *Groundwater Samples – Summary of PFAS Analytical Results* and are depicted on Figure 5 – *PFAS in Groundwater*. The data upload to the NHDES Environmental Monitoring Database is in process as of the date of this report. Analytical results are presented in Appendix E.

Wilcox & Barton, Inc. prepared a field blank and an equipment blank (using the water level meter) prior to sample collection using laboratory-provided, PFAS-free, deionized water. A laboratory-prepared trip blank was submitted with the samples. No PFAS were detected in the field blank or trip blank. One PFAS, 6:2 fluorotelomer sulfonic acid, was detected at an estimated concentration below the reporting limit in the equipment blank. No other PFAS were detected in the three quality control samples.

As an additional quality control measure, a duplicate sample was collected from monitoring well MW-5, noted as MW-301 on the chain of custody, and submitted blind to the laboratory. Analysis of the blind duplicate produced results similar to the primary result. The analytical results of the four quality control samples indicate adequate control of the field sampling process.

Current results suggest concentrated areas of AGQS exceedance for PFAS near the current actively used portion of the site near Banfield Road and downgradient of the former car crusher area. However, the distribution pattern does not reveal a specific source area and there is no new information concerning the origin of these compounds on the property. Notably, the majority of the wells near and within the wetland have not contained PFAS at concentrations exceeding AGQS during any sampling round in 2020 or 2021.

5.2 Soil

5.2.1 Lead in Soil

Soil data collected during this phase of investigation indicate the widespread presence of lead in soil at concentrations exceeding the SRS. Current and historical analytical results are summarized in Table 5 – *2020 Site Investigation Soil Samples – Summary of Analytical Results*, in Table 6 – *Soil Samples – Summary of Lead Analysis Results*, and in the historical data tables presented in Appendix F. Analytical results are presented in Appendix E.

Lead results collected during the 2008, 2020, and 2021 phases of investigation have been consolidated on Figure 6 - *Lead in Soil and Sediment*. On Figure 6, results are compared to the SRS of 400 mg/kg. (Note: Technically, SRS is not applicable for sediment samples; sediment results are compared to SRS here for illustration purposes only.) Of the 236 soil samples that have been analyzed for lead, the detected concentration has exceeded SRS approximately 25% of the time.

Lead was found at concentrations exceeding SRS over a significant portion of the site, with increased frequency near the former car crusher and throughout the suspected man-made fill area. Notably, there is an area near the lower (southern) extreme of the upland area where concentrations consistently exceed 4,000 mg/kg, or 10 times SRS.

Results indicate a vertical distribution at some locations, with concentrations exceeding SRS in the 2 to 4-foot and 4 to 6-foot intervals, but a discernible pattern is not evident. At some locations, the concentration at depth is greater than the concentration at the surface, and vice versa. Depth distribution was not assessed at all locations.

5.2.2 PCBs in Soil

Analytical results for PCBs in soil are summarized in Table 5, Table 7 – *Soil Samples - Summary of PCB Analysis Results*, and in the 2008 Site Investigation tables in Appendix F. The most recent result for each sampling point (boring or test pit) is depicted on Figure 7 – *PCBs in Soil*. Analytical results are presented in Appendix E.

The majority of PCB concentrations exceeding 1 mg/kg appear to be concentrated near the former car crusher area. Other occurrences are sporadic with no discernible distribution pattern. Of the 371 soil samples that have been analyzed for PCBs, the PCB concentration has exceeded 1 mg/kg in 22 of them, for an exceedance frequency of less than 6%. The total PCB concentration exceeded 10 mg/kg in three locations, with a maximum detected concentration of 17 mg/kg.

During the 2008 and 2020 investigations, assessment of vertical distribution was limited to analysis of samples composited from the 0 to 2-foot, 2 to 4-foot, and 4 to 6-foot intervals. In 2021, at the request of EPA, discrete intervals of 3 to 6 inches and 6 to 18 inches were sampled. In both cases, the shallowest interval is presumed to be representative of shallow soil where direct contact exposures are possible.

5.3 Surface Water

A total of six surface water samples were collected from Pickering Brook on a spacing of approximately 100 feet starting at the Banfield Road culvert and proceeding upstream. Due to the intermittent nature of the stream, surface water was not always present at the surface. At the direction of NHDES, sampling did not proceed upstream onto the adjacent property to the south.

Analytical results, along with historical data, are summarized in Table 8 – *Surface Water Samples – Summary of Analytical Results*. Results are compared to the WQC for protection of aquatic life (freshwater chronic) and for protection of human health (water and fish ingestion) published in Env-Wq 1703. WQC exceedances were detected for arsenic, lead, iron, and manganese in each of the six samples. Analytical results for these compounds are presented on Figure 8 – *Dissolved Metals in Surface Water* and on Figure 9 – *Total Metals in Surface Water*. Analytical results are presented in Appendix E.

Water quality parameters were recorded during sampling and are summarized in Table 3. Results were generally similar to those recorded in groundwater.

5.4 Wetland Sediments

Sediment samples were collected at locations coincident with the surface water samples and at locations representative of wetland sediments away from the stream. A total of 20 samples were collected on the subject property and within the flagged wetland boundary as observed in the field.

Current and historical wetland sediment analytical results are summarized in Table 9 – *Sediment Samples – Summary of Analytical Results*. Results are compared to Consensus-Based TECs and PECs. In the historical dataset, TEC or PEC exceedances were detected for arsenic, cadmium, lead, and mercury at various locations. In the samples from 2021, these same metals, plus chromium and one or more PAHs, were detected at concentrations exceeding screening concentrations in 19 of the 20 samples. Analytical results for sample SD-204, which is located on the opposite side of Pickering Brook near the lower end of the stream reach, did not reveal exceedance of TECs or PECs.

Analytical results are depicted graphically on Figure 10 – *Metals and PAHs in Wetland Sediments*. Analytical results are presented in Appendix E.

Each of the sediment samples was subjected to grain size analysis. Results are presented in Appendix G. Wetland sediments fell generally into three grain size distribution categories. Thirteen of eighteen samples were classified as AASHTO Silty Soils, with percentages passing the #200 sieve ranging from 35% to greater than 80%. Five samples were classified as Silty

Gravel & Sand, with two other samples classified as Gravel & Sand. Overall, the percentage of fines (% passing the #200 sieve) ranged from 17.1% to 82.6% (mean = 49.3%, standard deviation = 21.5%). There is no discernible difference in percent fines within the Pickering Brook waterway versus sediments away from the brook.

Sediment samples were also analyzed for Total Organic Carbon (TOC), with results ranging from 1,700 to 770,000 mg/kg (median = 110,000, mean = 175,135 mg/kg, standard deviation = 180,074 mg/kg). The high standard deviation indicates high variation between values and that the data are not normally distributed, further indicating variable conditions within the wetland. Both the lowest and highest TOC results were associated with samples containing a high percentage of fines. The median (central) value is likely more representative of conditions in wetland sediments and is carried into the risk calculations presented below.

6.0 SITE GEOLOGY AND HYDROLOGY

Conditions encountered during the 2021 investigation were consistent with those observed during prior investigations. Brown and gray silt and fine sand with varying amounts of gravel and some solid waste, including bricks, ceramics, nails, and glass, were observed in a large percentage of the borings. A log showing soil descriptions is presented in Appendix C.

Based on StreamStats data available from the US Geologic Survey, the drainage area contributing to the wetland area and stream outlet at the Banfield Road culvert measures approximately 0.36 square miles (230 acres). A map depicting the contributing area is included in Appendix H. A desktop review of the contribution area indicates the presence of various commercial uses, including water parks, warehouse buildings, and retail.

A branch of Pickering Brook and wetlands associated with Pickering Brook are located on the southern, southeastern, and southwestern portion of the subject property and extend onto adjacent properties. The brook originates east of the site and flows northwesterly, entering the Great Bog Wildlife Management Area on the west side of Banfield Road, with additional brook branches joining, and eventually discharges to the Great Bay National Wildlife Refuge, which then flows into Piscataqua River and eventually the Atlantic Ocean.

In the draft 2020 New Hampshire Watershed Report Card (*https://www4.des.state.nh.us/onestoppub/SWQA/010600030904_2020.pdf*), Pickering Brook was identified to have the following water quality impacts:

- Aquatic Life Integrity – Severe impact (PAHs, metals);
- Fish Consumption – Poor quality (fish consumption advisories in effect for PCBs and mercury);
- Primary Contact Recreation – Bad to poor quality (fecal coliform and enterococcus); and,
- Shellfish consumption – Poor to severe (dioxin, mercury, and PCB fish consumption advisories and fecal coliform).

These conditions were identified at the mouth of the brook into Great Bay (Station NHEST600030904-04-03), as well as just downstream from the site west of Banfield Road (Station NHRIV600030904-06). Excerpts from the Watershed Report card with data from monitoring points along Pickering Brook are also presented in Appendix H.

7.0 CONCEPTUAL SITE MODEL

The Conceptual Site Model remains substantially unchanged since submittal of the 2020 *Site Investigation Report*. There is no new information to suggest historical uses other than as a landfill and for auto salvage operations, though the understanding of contaminant distribution has been significantly enhanced. The description below has been modified accordingly. The property has most recently been used for the maintenance and repair of vehicles, though tenants have vacated the existing structures as of November 1, 2021.

Dissolved arsenic and lead were detected in groundwater at concentrations exceeding AGQS in the most downgradient wells surrounding the area of manmade fill deposition.

Arsenic is present in soil throughout the site, but concentrations are largely consistent with expected naturally occurring conditions. Lead is present in soil at elevated concentrations exceeding SRS over a majority of the property, with a significant area showing lead concentrations exceeding 10 times the SRS value.

In sediment, metals were detected at concentration exceeding screening levels in the majority of the samples. The sediment samples are located in the wetlands surrounding the former landfill, suggesting that contamination was placed in, or has reached, the wetland area.

PFAS were detected in groundwater at several monitoring wells, though a source of PFAS has not been defined.

7.1 Contaminant Source

The suspected source of contamination at the site is the historical presence of an unlined landfill, burial of demolition and automotive debris, and former automobile storage and salvage operations. The observed contaminant conditions are widespread throughout the property, extending to the wetlands associated with Pickering Brook.

7.2 Contaminant Distribution

7.2.1 Adsorbed Phase

The geology in the source area consists primarily of silt and fine sand with varying amounts gravel from ground surface to a maximum depth of 18 ft bgs. Bedrock was not encountered in any boring.

There is evidence of widespread arsenic and lead concentrations exceeding SRS in soil and sediment samples; however, the detected arsenic concentrations are generally consistent with background and are thought to be naturally occurring. Lead is present in soil and sediment, with some concentrations exceeding SRS by a significant degree over a large portion of the property.

7.2.2 Dissolved Phase

Dissolved phase contaminants are present in groundwater at concentrations exceeding AGQS at locations along the wetland boundary and in surface water in the wetland areas. Conditions appear to emanate from the area where manmade debris has been buried, which extends into the wetland.

7.2.3 Non-Aqueous Phase Liquids

No non-aqueous phase liquids have been encountered during this or prior investigations.

7.2.4 Soil Vapor

Screening for organic vapors with a photoionization detector (PID) during earlier drilling efforts did not indicate elevated concentrations of volatile compounds in soil at any location. VOCs were not detected in groundwater at concentrations exceeding GW-2 values.

7.3 Contaminant Migration

Dissolved-phase constituents are expected to continue migrating downgradient (both vertically and horizontally). Leaching of contaminants, particularly lead, from the adsorbed phase to the dissolved phase is likely an ongoing transformation and migration pathway. Based on current data, contaminants have reached the adjacent surface water via groundwater or via overland stormwater flow.

Piezometric data indicate a predominant groundwater flow direction to the southwest.

7.4 Sensitive Receptors

A sensitive receptor survey map depicting a 500- and 1,000-foot radius around the site was generated using the NHDES OneStop Data Mapper GIS system and provided in the 2020 *Site Investigation Report*. There is no new information concerning sensitive receptors aside from the human health and ecological risk assessment work presented in Section 8.0 below.

In general, potential human receptors may include residents, workers, visitors, and trespassers. Environmental receptors may include flora and fauna within and downgradient of the affected area. Potential exposure points may include wellhead protection areas, water wells, surface waters, wetlands, buildings into which vapors can migrate through basement foundations or utility connections, locations of direct soil contact (e.g., playgrounds, gardens, construction trenches), and utility corridors. Routes through which human receptors may be exposed to contaminants include ingestion, inhalation, and dermal contact.

Potential exposure pathways for receptors at the site include:

- Ingestion of Drinking Water – The site and surrounding properties are serviced by the municipal water supply. An exposure pathway via drinking water ingestion is not complete.
- Inhalation of Vapors – Basements and sub-slab utility connections represent potential pathways for vapor-borne contaminants to enter structures. The site buildings do not contain basements and no volatile contaminants have been detected in soil or groundwater at concentrations of concern; therefore, human exposure via inhalation does not appear to be a complete exposure pathway.
- Dermal Contact with Soil and Groundwater – Exposure via dermal contact for trespassers and commercial workers represents a complete pathway based on arsenic and lead contamination at concentrations above SRS from ground surface to 8 ft bgs. Dermal contact with groundwater by utility workers is a potentially complete pathway.
- Environmental Receptors (Surface Water & Sediments) – Constituent concentrations in groundwater exceed AGQS near the wetland boundary and have been detected in surface water. Impacts to surface water represent a complete exposure pathway for environmental receptors. Similarly, exposure of wetland flora and fauna as well as human trespassers to sediment contaminants is a complete exposure pathway.

8.0 RISK ASSESSMENT

8.1 Sediment and Surface Water

Wilcox & Barton, Inc. contracted Ms. Cyndee Fuller of Sovereign Consulting Inc. to perform a *Focused Human Health and Ecological Risk Assessment* of contaminant conditions found in wetland sediments and surface water. Ms. Fuller has over 30 years of direct and relevant experience in the evaluation of human health and ecological risks at contaminated sites in New England. While working at EPA, she participated in developing bilateral water quality standards for the Great Lakes System and served on the EPA Great Lakes Water Quality Initiative. Ms. Fuller was a founding member of the EPA Assessment and Remediation of Contaminated Sediments program and served on the EPA National Sediment Oversight Technical Committee.

The full report evaluating human health (recreational trespassers and fish consumers) and ecological (aquatic and benthic organisms) risks from exposure to wetland sediment and surface water is presented in Appendix I. The results of the quantitative assessment for humans accessing the site as recreational trespassers and/or consuming fish are shown below.

FOCUSED RISK ASSESSMENT SUMMARY
RECREATORS/TRESPASSERS WHO CONSUME PICKERING BROOK FISH

Exposure Pathway	**Non-Carcinogenic Hazard Index**			**Excess Lifetime Cancer Risk**
	Child	**Youth**	**Adult**	**Combined[1]**
Sediment ingestion	6.8	1.4	0.8	1 x 10^{-5}
Sediment dermal contact	0.5	0.2	0.1	8 x 10^{-6}
Inhalation of entrained (dry) sediment particles	0.02	0.02	0.02	7 x 10^{-7}
Surface water ingestion	2.7	1.1	0.3	5 x 10^{-5}
Surface water dermal contact	0.001	0.0008	0.0005	9 x 10^{-8}
Recreational fish consumption (all)	12	10	9	1.4 x 10^{-5}
All Except Fish Consumption	**10**	**3**	**1**	**7 x 10^{-5}**
Total (all pathways)	**22**	**13**	**10**	**1 x 10^{-4}**
Maximum Acceptable Level	**1**			**1 x 10^{-5}**

[1]. Age-specific cancer risks are intermediate values and are not shown; refer to risk spreadsheets.
[2]. No carcinogens in this pathway.

The total Hazard Index (HI) for each recreational trespasser age group is above the maximum acceptable HI of 1 and the excess lifetime cancer risk is above the maximum acceptable cancer risk of 1x10^{-5}. Therefore, the site poses an unacceptable risk to human health for recreational trespassers that catch and consume fish from Pickering Brook. Health risks are also at unacceptable levels for trespassing without fish consumption, and for fish consumption without trespassing.

Site sediment contains multiple constituents at concentrations above their sediment benchmarks, suggesting that sediments are likely to be toxic to benthic organisms residing in the wetlands. Total sediment HIs for individual sample locations ranged from 11 to 780.

Site surface water contains multiple constituents at concentrations above the applicable water quality criteria, both acute and chronic, and similarly poses a potential risk to pelagic (water column) aquatic organisms. Total chronic surface water HIs for individual sample locations ranged from 2 to 20.

8.2 PCBs in Upland Soil

Potential health risks associated with exposure to PCBs in site soil were quantified for recreational trespassers and for future commercial/industrial workers. The risk assessor's report evaluating human health risks from exposure to PCBs in upland soil is presented in Appendix J.

Results of the risk calculations for recreational trespassers are shown below:

RISK ASSESSMENT CALCULATIONS RECREATIONAL TRESPASSERS				
Exposure Pathway	**Non-Carcinogenic Hazard Index**			**Excess Lifetime Cancer Risk**
	Child	**Youth**	**Adult**	**Combined Ages[1]**
Soil Ingestion	0.1	0.03	.02	7×10^{-7}
Soil Dermal Contact	0.1	0.02	0.02	5×10^{-7}
Outdoor Inhalation of Volatile Soil Constituents	0.0001	0.0001	0.0001	4×10^{-10}
Inhalation of Entrained Soil Particles	0.00003	0.00003	0.00003	6×10^{-10}
Total (all Pathways)	**0.2**	**0.05**	**0.03**	**1×10^{-6}**
Maximum Acceptable Level	**1.0**			**1×10^{-5}**

[1] Age-specific cancer risks are intermediate values and are not shown; refer to appendices.

Non-carcinogenic hazard indices for each age group are below the maximum acceptable HI of 1 adopted by New Hampshire, and the total cancer risk is below the maximum acceptable cancer risk adopted by New Hampshire of 1 in 100,000, denoted as 1×10^{-5}.

Results of the risk calculations for commercial/industrial workers are shown below:

RISK ASSESSMENT CALCULATIONS COMMERCIAL/INDUSTRIAL WORKERS		
Exposure Pathway	**Non-Carcinogenic Hazard Index**	**Excess Lifetime Cancer Risk**
Soil Ingestion	0.03	4×10^{-7}
Soil Dermal Contact	0.02	4×10^{-7}
Outdoor Inhalation of Volatile Soil Constituents	0.0002	5×10^{-10}
Inhalation of Entrained Soil Particles	0.00005	8×10^{-10}
Total (all Pathways)	**0.05**	**7×10^{-7}**
Maximum Acceptable Level	**1.0**	**1×10^{-5}**

As with recreational trespassers, the non-carcinogenic HIs are below the maximum acceptable HI of 1 and the total cancer risk is below the maximum acceptable cancer risk 1×10^{-5}.

The results of the risk assessment indicate that calculated non-carcinogenic health hazards and carcinogenic health risks are below "no unacceptable risk" benchmarks accepted by NHDES. It is concluded that the presence of PCBs in upland soil poses no unacceptable health risks and, from a risk perspective, does not require removal.

9.0 SUMMARY AND CONCLUSIONS

Wilcox & Barton, Inc. completed resampling of existing monitoring wells for analysis of PAHs, metals, and PFAS. In addition, a total of 115 additional soil samples were collected for analysis of lead, and 255 soil samples were collected for analysis of PCBs. Together, the groundwater and soil data from the upland area of the site have substantially increased the understanding of environmental conditions on the property.

Dissolved lead is present in groundwater at concentrations exceeding AGQS in wells surrounding the suspected manmade fill area and along the wetland boundary. In soil, lead was found at concentrations exceeding SRS over a significant portion of the site, with increased frequency near the former car crusher and throughout the suspected man-made fill area. Proper management of worker exposure and soil handling during construction will be required. In addition, development of a remedial strategy to prevent future exposures to exposed populations and to reduce concentrations in groundwater is needed.

In upland soil, PCB concentrations exceeding 1 mg/kg were generally concentrated near the former car crusher area; other occurrences are sporadic with no discernible distribution pattern. Of the 371 soil samples that have been analyzed for PCBs, the PCB concentration has exceeded 1 mg/kg in 22 of them, for an exceedance frequency of just under 6%. The total PCB concentration exceeded 10 mg/kg in three locations, with a maximum detected concentration of 17 mg/kg. Evaluation of human health risk for recreational trespassers and commercial workers concluded that the presence of PCBs in upland soil poses no unacceptable health risk and does not require removal. Proper management of worker exposure and soil handling during construction will be required.

In wetland sediment, numerous analytes were detected at concentrations exceeding TEC and/or PEC screening levels. Similarly, in the surface water of Pickering Brook, WQC exceedances were detected for arsenic, lead, iron, and manganese. A focused human health and ecological risk assessment concluded that the site poses an unacceptable risk to human health for recreational trespassers that catch and consume fish from Pickering Brook. Health risks are also at unacceptable levels for trespassing without fish consumption, and for fish consumption without trespassing.

TABLES

TABLE 1
Well Gauging and Piezometric Head Elevation Data

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7
[see notes at end of table]

Well Identification	Gauging Date	Top of Casing Elevation (ft)	Depth to Water* (ft)	Piezometric Head Elevation (ft)
MW-1	6/8/20	202.42	6.33	196.09
	7/8/20	202.42	6.19	196.23
	1/6/21	202.42	4.78	197.64
	8/26/21	202.42	5.03	197.39
MW-2	6/8/20	203.98	0.81	203.17
	7/8/20	203.98	2.29	201.69
	1/6/21	203.98	1.38	202.60
	8/26/21	203.98	0.00	203.98
MW-3	6/8/20	209.25	6.70	202.55
	7/8/20	209.25	7.65	201.60
	1/6/21	209.25	4.41	204.84
	8/26/21	209.25	6.49	202.76
MW-4	6/10/20	202.78	NG	--
	7/8/20	202.78	6.78	196.00
	1/6/21	202.78	5.91	196.87
	8/26/21	202.78	5.91	196.87
MW-5	6/10/20	201.49	NG	--
	7/8/20	201.49	5.60	195.89
	1/6/21	201.49	3.73	197.76
	8/26/21	201.49	4.38	197.11
MW-6	6/10/20	200.74	6.59	194.15
	7/8/20	200.74	6.24	194.50
	1/6/21	200.74	5.23	195.51
	8/26/21	200.74	5.57	195.17
MW-7	6/10/20	199.85	NG	--
	7/8/20	199.85	5.25	194.60
	1/6/21	199.85	3.17	196.68
	8/27/21	199.85	4.35	195.50
MW-8	6/10/20	200.22	NG	--
	7/8/20	200.22	6.84	193.38
	1/6/21	200.22	3.41	196.81
	8/26/21	200.22	4.58	195.64
MW-10	6/10/20	205.81	8.63	197.18
	7/8/20	205.81	8.31	197.50
	1/6/21	205.81	5.82	199.99
	8/26/21	205.81	6.98	198.83
MW-11	6/8/20	221.86	10.25	211.61
	7/8/20	221.86	10.01	211.85
	1/6/21	221.86	6.07	215.79
	8/26/21	221.86	7.49	214.37
MW-101	6/8/20	197.44	4.30	193.14
	7/8/20	197.44	4.10	193.34
	1/6/21	197.44	3.52	193.92
	8/27/21	197.44	3.79	193.65
	10/1/21	197.44	4.12	193.32
MW-102	6/8/20	198.32	5.22	193.10
	7/8/20	198.32	5.05	193.27
	1/6/21	198.32	4.46	193.86
	8/27/21	198.32	4.73	193.59
	10/1/21	198.32	5.18	193.14

TABLE 1
Well Gauging and Piezometric Head Elevation Data
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7
[see notes at end of table]

Well Identification	Gauging Date	Top of Casing Elevation (ft)	Depth to Water* (ft)	Piezometric Head Elevation (ft)
MW-103	6/8/20	197.15	NG	--
	7/8/20	197.15	3.90	193.25
	1/6/21	197.15	3.22	193.93
	8/27/21	197.15	3.61	193.54
MW-104	1/6/21	NS	4.23	--
	8/27/21	NS	4.59	--
	10/1/21	NS	4.96	--
MW-105	6/10/20	200.26	7.68	192.58
	7/8/20	200.26	7.28	192.98
	1/6/21	200.26	6.18	194.08
	8/26/21	200.26	6.56	193.70
MW-106R	6/8/20	201.51	4.37	197.14
	7/8/20	201.51	4.50	197.01
	1/6/21	201.51	3.65	197.86
	8/26/21	201.51	3.59	197.92
MW-107	6/8/20	213.55	NG	--
	7/8/20	213.55	DRY	--
	1/6/21	213.55	8.41	205.14
	8/26/21	213.55	11.08	202.47
MW-108	6/8/20	219.66	NG	--
	7/8/20	219.66	12.20	207.46
	1/6/21	219.66	7.60	212.06
	8/26/21	219.66	12.08	207.58
MW-109	6/10/20	212.12	12.40	199.72
	7/8/20	212.12	12.04	200.08
	1/6/21	212.12	8.66	203.46
	8/26/21	212.12	10.14	201.98
MW-201	6/10/20	208.88	12.12	196.76
	7/8/20	208.88	12.39	196.49
	1/6/21	208.88	8.32	200.56
	8/26/21	208.88	11.20	197.68
MW-202	6/10/20	214.29	11.78	202.51
	7/8/20	214.29	12.48	201.81
	1/6/21	214.29	8.99	205.30
	8/26/21	214.29	11.49	202.80
MW-203	6/8/20	225.09	14.75	210.34
	7/8/20	225.09	16.46	208.63
	1/6/21	225.09	12.37	212.72
	8/26/21	225.09	16.52	208.57
MW-204	6/8/20	223.94	15.10	208.84
	7/8/20	223.94	17.38	206.56
	1/6/21	223.94	12.22	211.72
	8/26/21	223.94	15.64	208.30

NOTE: Well elevations surveyed on July 2, 2020. Top of casing elevations are referenced to an arbitrary benchmark set at the western corner of the garage (assumed elevation 200.01 ft).

ft	Feet.
*	Depth from top of casing or designated measuring point.
LNAPL	Light non-aqueous phase liquid.
NS/NC	Not surveyed.
--	Not calculated.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	Ambient Groundwater Quality Standards (AGQS) †	MW-1			MW-2	MW-3		
Sample Date		8/15/08*	6/10/20	1/8/21	6/8/20	8/15/08*	6/10/20	1/8/21
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270								
Acenaphthene	420	--	--	--	--	--	0.29 U	--
Acenaphthylene	420	--	--	--	--	--	0.19 U	--
Anthracene	2,100	--	--	--	--	--	0.19 U	--
Benzo(a)anthracene	0.1	ND (0.1)	--	--	--	ND (0.1)	0.048 U	--
Benzo(a)pyrene	0.2	--	--	--	--	--	0.097 U	--
Benzo(b)fluoranthene	0.1	ND (0.1)	--	--	--	ND (0.1)	0.048 U	--
Benzo(g,h,i)perylene	210	--	--	--	--	--	0.48 U	--
Benzo(k)fluoranthene	0.5	ND (0.1)	--	--	--	ND (0.1)	0.19 U	--
Chrysene	5	ND (0.1)	--	--	--	ND (0.1)	0.19 U	--
Dibenz(a,h)anthracene	0.1	ND (0.1)	--	--	--	ND (0.1)	0.097 U	--
Fluoranthene	280	ND (0.1)	--	--	--	ND (0.1)	0.48 U	--
Fluorene	280	--	--	--	--	--	0.97 U	--
Indeno(1,2,3-cd)pyrene	0.1	--	--	--	--	--	0.097 U	--
2-Methylnaphthalene	280	--	--	--	--	--	0.97 U	--
Naphthalene	100	ND (0.1)	--	--	--	ND (0.1)	0.97 U	--
Phenanthrene	210	ND (0.1)	--	--	--	ND (0.1)	0.048 U	--
Pyrene	210	ND (0.1)	--	--	--	ND (0.1)	0.97 U	--
Volatile Organic Compounds (VOCs) by EPA Method 8260								
Benzene	5	--	--	--	2.0 U	--	1.0 U	--
Ethylbenzene	700	--	--	--	2.0 U	--	1.0 U	--
Methyl tertiary-butyl ether (MTBE)	13	ND (1)	--	--	2.0 U	ND (1)	1.0 U	--
Naphthalene	100	ND (1)	--	--	10 U	ND (1)	5.0 U	--
Tetrachloroethylene (PCE)	5	ND (1)	--	--	2.0 U	1.3	1.0 U	--
Toluene	1,000	--	--	--	2.0 U	--	1.0 U	--
Total Xylenes	10,000	--	--	--	6.0 U	--	3.0 U	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082								
All Aroclors (total)	0.5	--	--	--	--	--	--	--
Total Metals by EPA Methods 6020 & 7470								
Arsenic	10	--	**120**	--	--	--	--	--
Barium	2,000	--	12	--	--	--	--	--
Cadmium	5	--	0.20 U	--	--	--	--	--
Chromium, total	100	--	1.0	--	--	--	--	--
Lead	15	--	1.8	--	--	--	--	--
Selenium	50	--	5.0 U	--	--	--	--	--
Silver	100	--	0.20 U	--	--	--	--	--
Mercury	2	--	0.10 U	--	--	--	--	--
Dissolved Metals by EPA Methods 6010 & 7470								
Arsenic	10	5	--	2.4	--	8	--	5.4
Barium	2,000	16	--	2.5 J	--	4 J	--	3.9 J
Cadmium	5	0.5 J	--	0.20 U	--	0.5 J	--	0.20 U
Chromium, total	100	4 J	--	1.0 U	--	ND (2)	--	2.2
Lead	15	ND (1)	--	0.50 U	--	ND (1)	--	0.50 U
Selenium	50	13	--	5.0 U	--	7	--	5.0 U
Silver	100	1.4	--	0.20 U	--	1.3	--	0.20 U
Mercury	2	--	--	0.10 U	--	--	--	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (µg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-4**		**MW-5**	**MW-6**			**MW-7**
Sample Date		**8/15/08***	**1/7/21**	**1/7/21**	**8/15/08***	**6/10/20**	**1/6/21**	**1/6/21**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270								
Acenaphthene	420	--	--	--	--	0.30 U	--	--
Acenaphthylene	420	--	--	--	--	0.20 U	--	--
Anthracene	2,100	--	--	--	--	0.20 U	--	--
Benzo(a)anthracene	0.1	ND (0.1)	--	--	ND (0.1)	0.050 U	--	--
Benzo(a)pyrene	0.2	--	--	--	--	0.099 U	--	--
Benzo(b)fluoranthene	0.1	ND (0.1)	--	--	ND (0.1)	0.050 U	--	--
Benzo(g,h,i)perylene	210	--	--	--	--	0.50 U	--	--
Benzo(k)fluoranthene	0.5	ND (0.1)	--	--	ND (0.1)	0.20 U	--	--
Chrysene	5	ND (0.1)	--	--	ND (0.1)	0.20 U	--	--
Dibenz(a,h)anthracene	0.1	ND (0.1)	--	--	ND (0.1)	0.099 U	--	--
Fluoranthene	280	ND (0.1)	--	--	ND (0.1)	0.50 U	--	--
Fluorene	280	--	--	--	--	0.99 U	--	--
Indeno(1,2,3-cd)pyrene	0.1	--	--	--	--	0.099 U	--	--
2-Methylnaphthalene	280	--	--	--	--	0.99 U	--	--
Naphthalene	100	ND (0.1)	--	--	ND (0.1)	0.99 U	--	--
Phenanthrene	210	ND (0.1)	--	--	ND (0.1)	0.050 U	--	--
Pyrene	210	ND (0.1)	--	--	ND (0.1)	0.99 U	--	--
Volatile Organic Compounds (VOCs) by EPA Method 8260								
Benzene	5	--	--	--	--	--	--	--
Ethylbenzene	700	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	ND (1)	--	--	ND (1)	--	--	--
Naphthalene	100	ND (1)	--	--	ND (1)	--	--	--
Tetrachloroethylene (PCE)	5	ND (1)	--	--	ND (1)	--	--	--
Toluene	1,000	--	--	--	--	--	--	--
Total Xylenes	10,000	--	--	--	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082								
All Aroclors (total)	0.5	--	--	--	--	0.20 U	--	--
Total Metals by EPA Methods 6020 & 7470								
Arsenic	10	--	--	--	--	--	--	--
Barium	2,000	--	--	--	--	--	--	--
Cadmium	5	--	--	--	--	--	--	--
Chromium, total	100	--	--	--	--	--	--	--
Lead	15	--	--	--	--	--	--	--
Selenium	50	--	--	--	--	--	--	--
Silver	100	--	--	--	--	--	--	--
Mercury	2	--	--	--	--	--	--	--
Dissolved Metals by EPA Methods 6010 & 7470								
Arsenic	10	ND (2)	0.80 U	0.80 U	ND (2)	--	1.4	0.80 U
Barium	2,000	7 J	4.7 J	12	ND (3)	--	3.6 J	3.4 J
Cadmium	5	ND (0.2)	0.20 U	0.20 U	ND (0.2)	--	0.20 U	0.20 U
Chromium, total	100	ND (2)	1.4	1.5	ND (2)	--	2.0	1.8
Lead	15	ND (1)	0.19 J	0.50 U	ND (1)	--	0.50 U	0.50 U
Selenium	50	4 J	5.0 U	5.0 U	2 J	--	5.0 U	5.0 U
Silver	100	ND (0.3)	0.20 U	0.20 U	ND (0.3)	--	0.20 U	0.20 U
Mercury	2	--	0.10 U	0.10 U	--	--	0.10 U	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (µg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	Ambient Groundwater Quality Standards (AGQS) †	MW-8	MW-9	MW-10		MW-11	
Sample Date		1/7/21	08/15/08	6/10/20	1/7/21	6/10/20	1/7/21
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270							
Acenaphthene	420	--	--	0.29 U	--	0.30 U	--
Acenaphthylene	420	--	--	0.20 U	--	0.20 U	--
Anthracene	2,100	--	--	0.20 U	--	0.20 U	--
Benzo(a)anthracene	0.1	--	ND (0.1)	0.049 U	--	0.050 U	--
Benzo(a)pyrene	0.2	--	--	0.098 U	--	0.099 U	--
Benzo(b)fluoranthene	0.1	--	ND (0.1)	0.049 U	--	0.050 U	--
Benzo(g,h,i)perylene	210	--	--	0.49 U	--	0.50 U	--
Benzo(k)fluoranthene	0.5	--	ND (0.1)	0.20 U	--	0.20 U	--
Chrysene	5	--	ND (0.1)	0.20 U	--	0.20 U	--
Dibenz(a,h)anthracene	0.1	--	ND (0.1)	0.098 U	--	0.099 U	--
Fluoranthene	280	--	ND (0.1)	0.49 U	--	0.50 U	--
Fluorene	280	--	--	0.98 U	--	0.99 U	--
Indeno(1,2,3-cd)pyrene	0.1	--	--	0.098 U	--	0.099 U	--
2-Methylnaphthalene	280	--	--	0.98 U	--	0.99 U	--
Naphthalene	100	--	ND (0.1)	0.98 U	--	0.99 U	--
Phenanthrene	210	--	ND (0.1)	0.049 U	--	0.050 U	--
Pyrene	210	--	ND (0.1)	0.98 U	--	0.99 U	--
Volatile Organic Compounds (VOCs) by EPA Method 8260							
Benzene	5	--	--	--	--	--	--
Ethylbenzene	700	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	--	ND (0.1)	--	--	--	--
Naphthalene	100	--	ND (0.1)	--	--	--	--
Tetrachloroethylene (PCE)	5	--	ND (0.1)	--	--	--	--
Toluene	1,000	--	--	--	--	--	--
Total Xylenes	10,000	--	--	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082							
All Aroclors (total)	0.5	--	--	0.20 U	--	0.21 U	--
Total Metals by EPA Methods 6020 & 7470							
Arsenic	10	--	--	--	--	--	--
Barium	2,000	--	--	--	--	--	--
Cadmium	5	--	--	--	--	--	--
Chromium, total	100	--	--	--	--	--	--
Lead	15	--	--	--	--	--	--
Selenium	50	--	--	--	--	--	--
Silver	100	--	--	--	--	--	--
Mercury	2	--	--	--	--	--	--
Dissolved Metals by EPA Methods 6010 & 7470							
Arsenic	10	0.80 U	3 J	--	0.80 U	--	0.80 U
Barium	2,000	5.2 J	97	--	4.8 J	--	11
Cadmium	5	0.20 U	ND (0.2)	--	0.20 U	--	0.20 U
Chromium, total	100	0.99 J	ND (2)	--	1.2	--	1.0
Lead	15	0.50 U	ND (1)	--	0.50 U	--	0.50 J
Selenium	50	5.0 U	10	--	5.0 U	--	5.0 U
Silver	100	0.20 U	ND (0.3)	--	0.20 U	--	0.20 U
Mercury	2	0.10 U	--	--	0.10 U	--	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (µg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-101**				
Sample Date		**8/15/08***	**6/10/20**	**1/6/21**	**8/27/21**	**10/1/21**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270						
Acenaphthene	420	--	0.15 J	--	0.037 J	--
Acenaphthylene	420	--	0.20 U	--	0.19 U	--
Anthracene	2,100	--	0.039 J	--	0.19 U	--
Benzo(a)anthracene	0.1	**0.2**	0.084	--	0.049 U	--
Benzo(a)pyrene	0.2	--	0.086 J	--	0.097 U	--
Benzo(b)fluoranthene	0.1	**0.2**	**0.11**	--	0.049 U	--
Benzo(g,h,i)perylene	210	--	0.06 J	--	0.030 J	--
Benzo(k)fluoranthene	0.5	0.2	0.041 J	--	0.19 U	--
Chrysene	5	0.2	0.082 J	--	0.19 U	--
Dibenz(a,h)anthracene	0.1	**0.2**	0.10 U	--	0.048 J	--
Fluoranthene	280	0.3	0.19 J	--	0.49 U	--
Fluorene	280	--	0.11 J	--	0.97 U	--
Indeno(1,2,3-cd)pyrene	0.1	--	0.061 J	--	0.032 J	--
2-Methylnaphthalene	280	--	1.0 U	--	0.97 U	--
Naphthalene	100	ND (0.1)	1.0 U	--	0.97 U	--
Phenanthrene	210	0.1	0.10	--	0.049 U	--
Pyrene	210	0.3	0.16 J	--	0.97 U	--
Volatile Organic Compounds (VOCs) by EPA Method 8260						
Benzene	5	--	--	--	--	--
Ethylbenzene	700	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	ND (1)	--	--	--	--
Naphthalene	100	1.2	--	--	--	--
Tetrachloroethylene (PCE)	5	ND (1)	--	--	--	--
Toluene	1,000	--	--	--	--	--
Total Xylenes	10,000	--	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082						
All Aroclors (total)	0.5	--	0.20 U	--	--	--
Total Metals by EPA Methods 6020 & 7470						
Arsenic	10	--	--	--	**30**	**38**
Barium	2,000	--	--	--	190	200
Cadmium	5	--	--	--	0.24	0.10 J
Chromium, total	100	--	--	--	2.9	1.1
Lead	15	--	--	--	**180**	**55**
Selenium	50	--	--	--	5.0 U	5.0 U
Silver	100	--	--	--	0.077 J	0.20 U
Mercury	2	--	--	--	0.0012 U	0.10 U
Dissolved Metals by EPA Methods 6010 & 7470						
Arsenic	10	6	--	2.5	**29**	**43**
Barium	2,000	101	--	190	170	220
Cadmium	5	ND (0.2)	--	0.45	0.14 J	0.039 J
Chromium, total	100	ND (2)	--	2.5	1.5	1.6
Lead	15	7	--	6.6	**65**	**35**
Selenium	50	6	--	5.0 U	1.3 J	5.0 U
Silver	100	ND (0.3)	--	0.20 U	0.20 U	0.20 U
Mercury	2	--	--	0.10 U	0.10 U	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (μg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-102**					**MW-103**	
Sample Date		**8/15/08***	**6/10/20**	**1/6/21**	**8/27/21**	**10/1/21**	**8/15/08***	**1/6/21**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270								
Acenaphthene	420	--	--	--	--	--	--	--
Acenaphthylene	420	--	--	--	--	--	--	--
Anthracene	2,100	--	--	--	--	--	--	--
Benzo(a)anthracene	0.1	ND (0.1)	--	--	--	--	ND (0.1)	--
Benzo(a)pyrene	0.2	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	ND (0.1)	--	--	--	--	ND (0.1)	--
Benzo(g,h,i)perylene	210	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.5	ND (0.1)	--	--	--	--	ND (0.1)	--
Chrysene	5	ND (0.1)	--	--	--	--	ND (0.1)	--
Dibenz(a,h)anthracene	0.1	ND (0.1)	--	--	--	--	ND (0.1)	--
Fluoranthene	280	ND (0.1)	--	--	--	--	ND (0.1)	--
Fluorene	280	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	0.1	--	--	--	--	--	--	--
2-Methylnaphthalene	280	--	--	--	--	--	--	--
Naphthalene	100	ND (0.1)	--	--	--	--	ND (0.1)	--
Phenanthrene	210	ND (0.1)	--	--	--	--	ND (0.1)	--
Pyrene	210	ND (0.1)	--	--	--	--	ND (0.1)	--
Volatile Organic Compounds (VOCs) by EPA Method 8260								
Benzene	5	--	--	--	--	--	--	--
Ethylbenzene	700	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	ND (0.1)	--	--	--	--	ND (0.1)	--
Naphthalene	100	ND (0.1)	--	--	--	--	ND (0.1)	--
Tetrachloroethylene (PCE)	5	ND (0.1)	--	--	--	--	ND (0.1)	--
Toluene	1,000	--	--	--	--	--	--	--
Total Xylenes	10,000	--	--	--	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082								
All Aroclors (total)	0.5	--	0.21 U	--	--	--	--	--
Total Metals by EPA Methods 6020 & 7470								
Arsenic	10	--	4.3	--	6.6	4.7	--	--
Barium	2,000	--	170	--	240	160	--	--
Cadmium	5	--	0.23	--	0.46	0.098 J	--	--
Chromium, total	100	--	1.3	--	7.1	0.97 J	--	--
Lead	15	--	**160**	--	**230**	**120**	--	--
Selenium	50	--	5.0 U	--	5.0 U	5.0 U	--	--
Silver	100	--	0.20 U	--	0.075 J	0.20 U	--	--
Mercury	2	--	0.10 U	--	0.0012 U	0.10 U	--	--
Dissolved Metals by EPA Methods 6010 & 7470								
Arsenic	10	8	--	1.7	4.8	5.8	2 J	1.7
Barium	2,000	85	--	120	230	210	128	68
Cadmium	5	6	--	0.044 J	0.20 U	0.088 J	ND (0.2)	0.20 U
Chromium, total	100	ND (2)	--	1.6	0.99 J	2.1	ND (2)	1.4
Lead	15	15	--	7.9	1.1	**82**	6	0.89
Selenium	50	8	--	5.0 U	1.0 J	5.0 U	9	5.0
Silver	100	ND (0.3)	--	0.20 U	0.20 U	0.20 U	ND (0.3)	0.20 U
Mercury	2	--	--	0.10 U	0.10 U	0.10 U	--	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (μg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-104**				**MW-105**		
Sample Date		**8/15/08***	**1/7/21**	**8/27/21**	**10/1/21**	**8/15/08***	**6/10/20**	**1/8/21**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270								
Acenaphthene	420	--	--	--	--	--	--	--
Acenaphthylene	420	--	--	--	--	--	--	--
Anthracene	2,100	--	--	--	--	--	--	--
Benzo(a)anthracene	0.1	ND (0.1)	--	--	--	ND (0.1)	--	--
Benzo(a)pyrene	0.2	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	ND (0.1)	--	--	--	ND (0.1)	--	--
Benzo(g,h,i)perylene	210	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.5	ND (0.1)	--	--	--	ND (0.1)	--	--
Chrysene	5	ND (0.1)	--	--	--	ND (0.1)	--	--
Dibenz(a,h)anthracene	0.1	ND (0.1)	--	--	--	ND (0.1)	--	--
Fluoranthene	280	ND (0.1)	--	--	--	ND (0.1)	--	--
Fluorene	280	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	0.1	--	--	--	--	--	--	--
2-Methylnaphthalene	280	--	--	--	--	--	--	--
Naphthalene	100	1.3	--	--	--	ND (0.1)	--	--
Phenanthrene	210	ND (0.1)	--	--	--	ND (0.1)	--	--
Pyrene	210	ND (0.1)	--	--	--	ND (0.1)	--	--
Volatile Organic Compounds (VOCs) by EPA Method 8260								
Benzene	5	--	--	--	--	--	--	--
Ethylbenzene	700	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	ND (0.1)	--	--	--	ND (0.1)	--	--
Naphthalene	100	4.5	--	--	--	ND (0.1)	--	--
Tetrachloroethylene (PCE)	5	ND (0.1)	--	--	--	0.5 J	--	--
Toluene	1,000	--	--	--	--	--	--	--
Total Xylenes	10,000	--	--	--	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082								
All Aroclors (total)	0.5	--	--	--	--	--	0.20 U	--
Total Metals by EPA Methods 6020 & 7470								
Arsenic	10	--	--	9.9	7.1	--	**25**	--
Barium	2,000	--	--	220	150	--	48	--
Cadmium	5	--	--	0.88	0.41	--	0.50	--
Chromium, total	100	--	--	5.6	3.2	--	6.1	--
Lead	15	--	--	**760**	**260**	--	4.2	--
Selenium	50	--	--	5.0 U	5.0 U	--	5.0 U	--
Silver	100	--	--	0.13 J	0.032 J	--	0.20 U	--
Mercury	2	--	--	0.0012 U	0.10 U	--	0.10 U	--
Dissolved Metals by EPA Methods 6010 & 7470								
Arsenic	10	2 J	2.9	7.8	7.2	**37**	--	5.3
Barium	2,000	128	82	210	160	47	--	49
Cadmium	5	ND (0.2)	0.20 U	0.049 J	0.077 J	0.3 J	--	0.063 J
Chromium, total	100	ND (2)	1.0 U	1.4	1.9	3 J	--	1.0 U
Lead	15	**16**	7.1	**43**	**62**	5	--	0.66
Selenium	50	4 J	5.0 U	1.1 J	5.0 U	8	--	5.0 U
Silver	100	ND (0.3)	0.20 U	0.20 U	0.20 U	0.9 J	--	0.20 U
Mercury	2	--	0.10 U	0.10 U	0.10 U	--	--	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (µg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	Ambient Groundwater Quality Standards (AGQS) †	MW-106	MW-106R		MW-107		MW-108	
Sample Date		8/15/08*	6/8/20	1/8/21	8/15/08*	1/7/21	8/15/08*	1/7/21
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270								
Acenaphthene	420	--	0.31 U	--	--	--	--	--
Acenaphthylene	420	--	0.20 U	--	--	--	--	--
Anthracene	2,100	--	0.20 U	--	--	--	--	--
Benzo(a)anthracene	0.1	ND (0.1)	0.051 U	--	ND (0.1)	--	ND (0.1)	--
Benzo(a)pyrene	0.2	--	0.10 U	--	--	--	--	--
Benzo(b)fluoranthene	0.1	ND (0.1)	0.051 U	--	ND (0.1)	--	ND (0.1)	--
Benzo(g,h,i)perylene	210	--	0.51 U	--	--	--	--	--
Benzo(k)fluoranthene	0.5	ND (0.1)	0.20 U	--	ND (0.1)	--	ND (0.1)	--
Chrysene	5	ND (0.1)	0.20 U	--	ND (0.1)	--	ND (0.1)	--
Dibenz(a,h)anthracene	0.1	ND (0.1)	0.10 U	--	ND (0.1)	--	ND (0.1)	--
Fluoranthene	280	ND (0.1)	0.51 U	--	ND (0.1)	--	ND (0.1)	--
Fluorene	280	--	1.0 U	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	0.1	--	0.10 U	--	--	--	--	--
2-Methylnaphthalene	280	--	1.0 U	--	--	--	--	--
Naphthalene	100	ND (0.1)	1.0 U	--	ND (0.1)	--	ND (0.1)	--
Phenanthrene	210	ND (0.1)	0.051 U	--	ND (0.1)	--	ND (0.1)	--
Pyrene	210	ND (0.1)	1.0 U	--	ND (0.1)	--	ND (0.1)	--
Volatile Organic Compounds (VOCs) by EPA Method 8260								
Benzene	5	--	1.0 U	--	--	--	--	--
Ethylbenzene	700	--	1.0 U	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	ND (0.1)	1.0 U	--	ND (0.1)	--	ND (0.1)	--
Naphthalene	100	ND (0.1)	5.0 U	--	ND (0.1)	--	ND (0.1)	--
Tetrachloroethylene (PCE)	5	ND (0.1)	1.0 U	--	ND (0.1)	--	ND (0.1)	--
Toluene	1,000	--	1.0 U	--	--	--	--	--
Total Xylenes	10,000	--	3.0 U	--	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082								
All Aroclors (total)	0.5	--	--	--	--	--	--	--
Total Metals by EPA Methods 6020 & 7470								
Arsenic	10	--	--	--	--	--	--	--
Barium	2,000	--	--	--	--	--	--	--
Cadmium	5	--	--	--	--	--	--	--
Chromium, total	100	--	--	--	--	--	--	--
Lead	15	--	--	--	--	--	--	--
Selenium	50	--	--	--	--	--	--	--
Silver	100	--	--	--	--	--	--	--
Mercury	2	--	--	--	--	--	--	--
Dissolved Metals by EPA Methods 6010 & 7470								
Arsenic	10	ND (2)	--	1.1	ND (2)	0.80 U	ND (2)	0.98
Barium	2,000	10	--	48	39	18	36	13
Cadmium	5	ND (0.2)	--	0.12 J	ND (0.2)	0.20 U	0.2 J	0.20 U
Chromium, total	100	ND (2)	--	1.0 U	ND (2)	1.6	ND (2)	1.2
Lead	15	ND (1)	--	4.2	1 J	0.26 J	3	0.50
Selenium	50	6	--	5.0 U	3 J	5.0 U	5	5.0 U
Silver	100	ND (0.3)	--	0.20 U	ND (0.3)	0.20 U	ND (0.3)	0.20 U
Mercury	2	--	--	0.10 U	--	0.10 U	--	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (µg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-109**			**MW-201**		**MW-202**	
Sample Date		**8/15/08***	**6/10/20**	**1/8/21**	**6/10/20**	**1/7/21**	**6/10/20**	**1/7/21**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270								
Acenaphthene	420	--	0.30 U	--	--	--	--	--
Acenaphthylene	420	--	0.20 U	--	--	--	--	--
Anthracene	2,100	--	0.20 U	--	--	--	--	--
Benzo(a)anthracene	0.1	ND (0.1)	0.050 U	--	--	--	--	--
Benzo(a)pyrene	0.2	--	0.10 U	--	--	--	--	--
Benzo(b)fluoranthene	0.1	ND (0.1)	0.050 U	--	--	--	--	--
Benzo(g,h,i)perylene	210	--	0.50 U	--	--	--	--	--
Benzo(k)fluoranthene	0.5	ND (0.1)	0.20 U	--	--	--	--	--
Chrysene	5	ND (0.1)	0.20 U	--	--	--	--	--
Dibenz(a,h)anthracene	0.1	ND (0.1)	0.10 U	--	--	--	--	--
Fluoranthene	280	ND (0.1)	0.50 U	--	--	--	--	--
Fluorene	280	--	1.0 U	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	0.1	--	0.10 U	--	--	--	--	--
2-Methylnaphthalene	280	--	1.0 U	--	--	--	--	--
Naphthalene	100	ND (0.1)	1.0 U	--	--	--	--	--
Phenanthrene	210	ND (0.1)	0.050 U	--	--	--	--	--
Pyrene	210	ND (0.1)	1.0 U	--	--	--	--	--
Volatile Organic Compounds (VOCs) by EPA Method 8260								
Benzene	5	--	--	--	--	--	--	--
Ethylbenzene	700	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	ND (0.1)	--	--	--	--	--	--
Naphthalene	100	ND (0.1)	--	--	--	--	--	--
Tetrachloroethylene (PCE)	5	ND (0.1)	--	--	--	--	--	--
Toluene	1,000	--	--	--	--	--	--	--
Total Xylenes	10,000	--	--	--	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082								
All Aroclors (total)	0.5	--	0.20 U	--	0.20 U	--	0.20 U	--
Total Metals by EPA Methods 6020 & 7470								
Arsenic	10	--	--	--	--	--	0.80 U	--
Barium	2,000	--	--	--	--	--	12	--
Cadmium	5	--	--	--	--	--	0.20 U	--
Chromium, total	100	--	--	--	--	--	1.7	--
Lead	15	--	--	--	--	--	0.11 J	--
Selenium	50	--	--	--	--	--	5.0 U	--
Silver	100	--	--	--	--	--	0.20 U	--
Mercury	2	--	--	--	--	--	0.10 U	--
Dissolved Metals by EPA Methods 6010 & 7470								
Arsenic	10	ND (2)	--	0.80 U	--	0.80 U	--	0.80 U
Barium	2,000	20	--	3.0 J	--	8.5 J	--	5.9 J
Cadmium	5	ND (0.2)	--	0.20 U	--	0.20 U	--	0.20 U
Chromium, total	100	ND (2)	--	1.0 U	--	1.0 U	--	1.3
Lead	15	ND (1)	--	0.11 J	--	0.50 U	--	0.50 U
Selenium	50	3 J	--	5.0 U	--	5.0 U	--	5.0 U
Silver	100	ND (0.3)	--	0.20 U	--	0.20 U	--	0.20 U
Mercury	2	--	--	0.10 U	--	0.10 U	--	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (µg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 2
Groundwater Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-203**		**MW-204**	
Sample Date		**6/10/20**	**1/7/21**	**6/10/20**	**1/7/21**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270					
Acenaphthene	420	--	--	0.29 U	--
Acenaphthylene	420	--	--	0.20 U	--
Anthracene	2,100	--	--	0.20 U	--
Benzo(a)anthracene	0.1	--	--	0.049 U	--
Benzo(a)pyrene	0.2	--	--	0.098 U	--
Benzo(b)fluoranthene	0.1	--	--	0.049 U	--
Benzo(g,h,i)perylene	210	--	--	0.49 U	--
Benzo(k)fluoranthene	0.5	--	--	0.20 U	--
Chrysene	5	--	--	0.20 U	--
Dibenz(a,h)anthracene	0.1	--	--	0.098 U	--
Fluoranthene	280	--	--	0.49 U	--
Fluorene	280	--	--	0.98 U	--
Indeno(1,2,3-cd)pyrene	0.1	--	--	0.098 U	--
2-Methylnaphthalene	280	--	--	0.98 U	--
Naphthalene	100	--	--	0.98 U	--
Phenanthrene	210	--	--	0.049 U	--
Pyrene	210	--	--	0.98 U	--
Volatile Organic Compounds (VOCs) by EPA Method 8260					
Benzene	5	--	--	--	--
Ethylbenzene	700	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	13	--	--	--	--
Naphthalene	100	--	--	--	--
Tetrachloroethylene (PCE)	5	--	--	--	--
Toluene	1,000	--	--	--	--
Total Xylenes	10,000	--	--	--	--
Polychlorinated Byphenyls (PCBs) by EPA Method 8082					
All Aroclors (total)	0.5	0.20 U	--	0.20 U	--
Total Metals by EPA Methods 6020 & 7470					
Arsenic	10	**20**	--	0.71 J	--
Barium	2,000	96	--	43	--
Cadmium	5	1.3	--	0.20 U	--
Chromium, total	100	43	--	1.4	--
Lead	15	14	--	0.088 J	--
Selenium	50	5.0 U	--	5.0 U	--
Silver	100	0.20 U	--	0.20 U	--
Mercury	2	0.10 U	--	0.10 U	--
Dissolved Metals by EPA Methods 6010 & 7470					
Arsenic	10	--	0.80 U	--	0.80 U
Barium	2,000	--	22	--	23
Cadmium	5	--	0.087 J	--	0.20 U
Chromium, total	100	--	1.6	--	1.2
Lead	15	--	0.50 U	--	0.50 U
Selenium	50	--	5.0 U	--	5.0 U
Silver	100	--	0.20 U	--	0.20 U
Mercury	2	--	0.10 U	--	0.10 U

Detected and selected other analytes listed; all others were not detected .

Results in micrograms per liter (µg/L) unless otherwise noted.

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
--	Sample not collected/analyzed for this constituent.
*	Results transcribed directly from Table 4, *Limited Subsurface Investigation* , Ransom Environmental Consultants, Inc., October 10, 2008
NS	No standard established.
bold	Detected concentration exceeds AGQS.
bold italics	Not detected; laboratory reporting limit exceeds AGQS.
†	Table 600-1 of Part Env-Or 603.03(c), AGQS, effective January 1, 2021.

TABLE 3
Natural Attenuation Parameters - Summary of Field Measurements
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Well ID	Date	Time	Temperature (ºC)	Specific Conductance (µS/cm)	Dissolved Oxygen (DO) (mg/L)	pH	Oxidation-Reduction Potential (ORP)	Turbidity (NTU)
MW-101	8/27/21	10:40	18.5	555.2	0.35	6.82	-10.3	--
	10/1/21	12:35	15.8	681	0.40	7.03	-72.2	--
MW-102	8/27/21	9:45	17.8	418.0	0.25	6.35	-32.2	--
	10/1/21	13:35	15.7		0.23	7.29	-120.8	--
MW-104	8/27/21	8:40	17.2	538.0	0.23	6.43	10.5	--
	10/1/21	11:25	15.7	614	0.34	7.17	-106.9	--
SW-201	9/22/21	9:15	17.9	509.0	2.57	6.89	-17.2	44.6
	10/1/21	8:55	11.4	567.5	2.69	7.67	-33.7	77.8
SW-203	9/22/21	11:20	17.9	506.0	1.52	6.82	-17.8	127
	10/1/21	11:25	13.7	525.9	1.60	6.56	-22.5	40.4
SW-208	9/23/21	8:40	17.0	386.9	1.15	6.59	-42.6	6.04
	10/1/21	10:10	13.7	395.8	1.85	6.75	-29.3	7.96
SW-210	9/23/21	9:45	18.2	543.3	0.19	4.81	64.2	404
	10/1/21	10:30	11.3	543.4	1.46	6.20	32.3	37.0
SW-211	9/23/21	11:10	23.0	780.0	2.11	6.16	-11.5	7.53
SW-212	9/23/21	12:00	20.7	145.1	0.98	5.60	57.2	8.14

NOTES:

--	Not measured.
µS/cm	Microsiemens per centimeter.
mg/L	Milligrams per liter.
mV	Millivolts.
NTU	Nephelometric Turbidity Units.

TABLE 4
Groundwater Samples - Summary of PFAS Analytical Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-1**		**DUP-1 (MW-1)**	**MW-1**	**Reanalysis (MW-1)**	**MW-3**
Sample Date		**6/10/20**	**1/8/21**	**1/8/21**	**8/26/21**	**8/26/21**	**1/8/21**
Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537							
Perfluorobutanoic acid (PFBA)	NS	2.2	2.3	2.5	1.8 J	2.0 J	2.0 U
Perfluorobutanesulfonic acid (PFBS)	NS	2.5	2.5	2.2	2.0 U	2.3	1.4 J
Perfluoropentanoic acid (PFPeA)	NS	2.0 U	5.3	5.4	2.6	2.2 J	2.0 U
Perfluorohexanoic acid (PFHxA)	NS	4.0	6.6	6.4	3.6	3.6 J	2.0 U
Perfluoroheptanesulfonic acid (PFHpS)	NS	3.9	2.2	2.4	3.3	3.7 J	2.0 U
Perfluroroctanesulfonamide (FOSA)	NS	2.0 U	2.0 U	2.0 U	0.43 J	4.1 U	2.0 U
Perfluoro-1-hexanesulfonamide (FHxSA)	NS	--	--	--	3.2	3.0 J	--
Perfluoro-1-butanesulfonamide (FBSA)	NS	--	--	--	0.74 J	0.69 J	--
Perfluorohexanesulfonic acid (PFHxS)	18	**66**	**50**	**53**	**51**	**52**	2.0 U
6:2 Fluorotelomer sulfonic acid (6:2 FTS A)	NS	430 J	26	24	44	46	15
Perfluoropetanesulfonic acid (PFPeS)	NS	--	--	--	2.6	2.3 J	--
Perfluoroheptanoic acid (PFHpA)	NS	2.0 U	3.3	3.1	1.9 J	1.9 J	2.0 U
Perfluorooctanoic acid (PFOA)	12	9.0	7.8	7.3	8.2	7.8	1.2 J
Perfluorooctanessulfonic acid (PFOS)	15	**200 J**	**200**	**180**	**270 J**	**280**	2.6
Perfluorononanoic acid (PFNA`	11	2.0 U	2.0 U	0.66 J	0.98 J	0.98 J	2.0 U

Detected and selected other PFAS listed; all others were not detected.

Results in nanograms per liter (ng/L).

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
NS	No standard established.
†	Table 600-1 of Part Env-Or 603.03(c), Ambient Groundwater Quality Standard (AGQS), effective January 1, 2021.
bold	Detected concentration exceeds effective AGQS.
bold italics	Not detected; laboratory reporting limit exceeds effective AGQS.

TABLE 4
Groundwater Samples - Summary of PFAS Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-4**		**MW-5**		**MW-5 Duplicate**	**MW-6**		
Sample Date		**1/7/21**	**8/26/21**	**1/7/21**	**8/26/21**	**8/26/21**	**6/10/20**	**1/6/21**	**8/26/21**
Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537									
Perfluorobutanoic acid (PFBA)	NS	1.0 J	1.7 J	2.0 U	0.97 J	0.93 J	2.0 U	1.0 J	0.80 J
Perfluorobutanesulfonic acid (PFBS)	NS	1.1 J	1.3 J	2.0 U	0.43 J	0.43 J	2.0 U	2.0 U	0.49 J
Perfluoropentanoic acid (PFPeA)	NS	1.1 J	1.8 J	1.3 J	2.0	2.1	2.2	2.0 U	1.8 J
Perfluorohexanoic acid (PFHxA)	NS	1.9 J	2.0	1.1 J	1.9 J	1.9	2.0 U	1.3 J	1.3 J
Perfluoroheptanesulfonic acid (PFHpS)	NS	2.0 U	1.9 U	2.0 U	2.0 U	1.9 U	2.0 U	2.0 U	1.9 U
Perfluroroctanesulfonamide (FOSA)	NS	2.0 U	1.9 U	2.0 U	2.0 U	1.9 U	2.0 U	2.0 U	1.9 U
Perfluoro-1-hexanesulfonamide (FHxSA)	NS	--	1.9 U	--	2.0 U	1.9 U	--	--	1.9 U
Perfluoro-1-butanesulfonamide (FBSA)	NS	--	1.9 U	--	2.0 U	1.9 U	--	--	1.9 U
Perfluorohexanesulfonic acid (PFHxS)	18	2.0 J	2.5	2.1	2.2	2.0	3.1	3.6	4.5
6:2 Fluorotelomer sulfonic acid (6:2 FTS A)	NS	0.52 J	1.1 J	4.5	2.0 U	1.9 U	2.0 U	2.6	0.67 J
Perfluoropetanesulfonic acid (PFPeS)	NS	--	1.9 U	--	2.0 U	1.9 U	--	--	0.35 J
Perfluoroheptanoic acid (PFHpA)	NS	1.4 J	1.7 J	1.2 J	2.2	2.6	2.0 U	1.9 J	1.9 J
Perfluorooctanoic acid (PFOA)	12	5.5	6.4	3.0	4.6	4.6	4.3	3.9	3.9
Perfluorooctanessulfonic acid (PFOS)	15	13	**16**	10	10	11	9.2	15	13
Perfluorononanoic acid (PFNA	11	2.0 U	0.85 J	2.0 U	0.52 J	0.53 J	2.0 U	2.0 U	1.9 U

Detected and selected other PFAS listed; all others were not detected.

Results in nanograms per liter (ng/L).

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
NS	No standard established.
†	Table 600-1 of Part Env-Or 603.03(c), Ambient Groundwater Quality Standard (AGQS), effective January 1, 2021.
bold	Detected concentration exceeds effective AGQS.
bold italics	Not detected; laboratory reporting limit exceeds effective AGQS.

TABLE 4
Groundwater Samples - Summary of PFAS Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	Ambient Groundwater Quality Standards (AGQS) †	MW-7		MW-8		MW-10		MW-11	
Sample Date		1/6/21	8/26/21	1/7/21	8/26/21	6/10/20	1/7/21	6/10/20	1/7/21
Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537									
Perfluorobutanoic acid (PFBA)	NS	0.85 J	0.76 J	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorobutanesulfonic acid (PFBS)	NS	1.2 J	2.2	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluoropentanoic acid (PFPeA)	NS	2.0 U	1.0 J	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorohexanoic acid (PFHxA)	NS	3.7	5.0	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluoroheptanesulfonic acid (PFHpS)	NS	1.1 J	3.3	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluroroctanesulfonamide (FOSA)	NS	2.0 U	1.9 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluoro-1-hexanesulfonamide (FHxSA)	NS	--	1.3 J	--	1.9 U	--	--	--	--
Perfluoro-1-butanesulfonamide (FBSA)	NS	--	0.49 J	--	1.9 U	--	--	--	--
Perfluorohexanesulfonic acid (PFHxS)	18	**60**	**140**	2.1	2.9	2.0 U	2.0 U	2.2	1.9 J
6:2 Fluorotelomer sulfonic acid (6:2 FTS A)	NS	8.9	1.9 U	2.0 U	1.9 U	4.6	0.68 J	2.0 U	1.4 J
Perfluoropetanesulfonic acid (PFPeS)	NS	--	7.6	--	1.9 U	--	--	--	--
Perfluoroheptanoic acid (PFHpA)	NS	1.1 J	1.4	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorooctanoic acid (PFOA)	12	4.6	4.8	2.0 U	0.85 J	3.1	0.97 J	2.0 U	1.1 J
Perfluorooctanessulfonic acid (PFOS)	15	**140**	**180**	9.1	15	6.8	4.1	2.0 U	0.73 J
Perfluorononanoic acid (PFNA`	11	2.0 U	1.9 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U

Detected and selected other PFAS listed; all others were not detected.

Results in nanograms per liter (ng/L).

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
NS	No standard established.
†	Table 600-1 of Part Env-Or 603.03(c), Ambient Groundwater Quality Standard (AGQS), effective January 1, 2021.
bold	Detected concentration exceeds effective AGQS.
bold italics	Not detected; laboratory reporting limit exceeds effective AGQS.

TABLE 4
Groundwater Samples - Summary of PFAS Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	Ambient Groundwater Quality Standards (AGQS) †	MW-101	MW-102		MW-103	MW-104	MW-105	MW-106R	
Sample Date		1/6/21	6/10/20	1/6/21	1/6/21	1/7/21	1/8/21	1/8/21	8/26/21
Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537									
Perfluorobutanoic acid (PFBA)	NS	1.9 J	2.3 J	1.8 J	1.3 J	2.4	2.0 U	1.9 J	2.8 J
Perfluorobutanesulfonic acid (PFBS)	NS	0.86 J	2.0 U	1.1 J	1.1 J	1.8 J	1.6 J	2.2	2.2 J
Perfluoropentanoic acid (PFPeA)	NS	1.4 J	3.6	0.74 J	2.0 U	0.79 J	2.0 U	3.9	6.8
Perfluorohexanoic acid (PFHxA)	NS	1.3 J	3.2	1.3 J	1.2 J	1.40 J	0.85 J	4.8	6.2
Perfluoroheptanesulfonic acid (PFHpS)	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4.1 U
Perfluroroctanesulfonamide (FOSA)	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4.1 U
Perfluoro-1-hexanesulfonamide (FHxSA)	NS	--	--	--	--	--	--	--	4.1 U
Perfluoro-1-butanesulfonamide (FBSA)	NS	--	--	--	--	--	--	--	4.1 U
Perfluorohexanesulfonic acid (PFHxS)	18	2.0 U	2.0 U	0.94 J	6.2	5.0	2.6	**24**	**32**
6:2 Fluorotelomer sulfonic acid (6:2 FTS A)	NS	2.5	2.0 U	2.0 U	6.4	4.5	2.0 U	1.1 J	4.1 U
Perfluoropetanesulfonic acid (PFPeS)	NS	--	--	--	--	--	--	--	0.71 J
Perfluoroheptanoic acid (PFHpA)	NS	1.0 J	2.0 U	1.2 J	0.98 J	0.85 J	1.0 J	3.2	4.9
Perfluorooctanoic acid (PFOA)	12	1.8 J	4.5	2.3	2.0 J	2.1	3.9	12	**20**
Perfluorooctanessulfonic acid (PFOS)	15	1.6 J	3.9	3.0	2.9	3.5	4.6	8.8	15
Perfluorononanoic acid (PFNA`	11	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.70 J	1.7 J

Detected and selected other PFAS listed; all others were not detected.

Results in nanograms per liter (ng/L).

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
NS	No standard established.
†	Table 600-1 of Part Env-Or 603.03(c), Ambient Groundwater Quality Standard (AGQS), effective January 1, 2021.
bold	Detected concentration exceeds effective AGQS.
bold italics	Not detected; laboratory reporting limit exceeds effective AGQS.

TABLE 4
Groundwater Samples - Summary of PFAS Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-107**	**MW-108**	**MW-109**		**MW-201**	**MW-202**	**MW-203**	
Sample Date		**1/7/21**	**1/7/21**	**1/8/21**	**8/26/21**	**1/7/21**	**1/7/21**	**1/7/21**	**8/26/21**
Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537									
Perfluorobutanoic acid (PFBA)	NS	0.66 J	2.0 U	0.95 J	0.92 J	2.0 U	2.0 U	5.6	13
Perfluorobutanesulfonic acid (PFBS)	NS	0.82 J	0.76 J	0.73 J	1.0 J	2.0 U	2.0 U	1.4 J	1.1 J
Perfluoropentanoic acid (PFPeA)	NS	2.0 U	2.0 U	2.0 U	1.9 U	2.0 U	2.0 U	8.0	19
Perfluorohexanoic acid (PFHxA)	NS	0.58 J	0.51 J	0.64 J	0.51 J	2.0 U	2.0 U	7.9	15
Perfluoroheptanesulfonic acid (PFHpS)	NS	2.0 U	2.0 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	1.9 U
Perfluroroctanesulfonamide (FOSA)	NS	2.0 U	2.0 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	1.9 U
Perfluoro-1-hexanesulfonamide (FHxSA)	NS	--	--	--	1.9 U	--	--	--	1.0 J
Perfluoro-1-butanesulfonamide (FBSA)	NS	--	--	--	1.9 U	--	--	--	0.36 J
Perfluorohexanesulfonic acid (PFHxS)	18	2.0 U	2.0 U	0.89 J	1.0 J	0.85 J	2.0 U	12	16
6:2 Fluorotelomer sulfonic acid (6:2 FTS A)	NS	2.0 U	0.80 J	2.0 U	1.9 U	0.41 J	0.79 J	8.3	0.36 J
Perfluoropetanesulfonic acid (PFPeS)	NS	--	--	--	1.9 U	--	--	--	1.1 J
Perfluoroheptanoic acid (PFHpA)	NS	1.1 J	2.0 U	1.5 J	1.3 J	2.0 U	2.0 U	8.4	14
Perfluorooctanoic acid (PFOA)	12	3.9	1.5 J	7.1	5.7	2.4	2.3	6.6	11
Perfluorooctanessulfonic acid (PFOS)	15	2.2	2.1	**51**	**74**	2.4	3.9	**170**	**140**
Perfluorononanoic acid (PFNA`	11	2.0 U	2.0 U	1.6 J	1.9	2.0 U	2.0 U	4.3	4.4

Detected and selected other PFAS listed; all others were not detected.
Results in nanograms per liter (ng/L).

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
NS	No standard established.
†	Table 600-1 of Part Env-Or 603.03(c), Ambient Groundwater Quality Standard (AGQS), effective January 1, 2021.
bold	Detected concentration exceeds effective AGQS.
bold italics	Not detected; laboratory reporting limit exceeds effective AGQS.

TABLE 4
Groundwater Samples - Summary of PFAS Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date	**Ambient Groundwater Quality Standards (AGQS) †**	**MW-204**		
		6/10/20	**1/7/21**	**8/26/21**
Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537				
Perfluorobutanoic acid (PFBA)	NS	4.4	2.0 U	1.9 U
Perfluorobutanesulfonic acid (PFBS)	NS	2.0 U	2.0 U	0.38 J
Perfluoropentanoic acid (PFPeA)	NS	2.1	2.0 U	1.9 U
Perfluorohexanoic acid (PFHxA)	NS	2.4	2.0 U	1.9 U
Perfluoroheptanesulfonic acid (PFHpS)	NS	2.0 U	2.0 U	1.9 U
Perflurooctanesulfonamide (FOSA)	NS	2.0 U	2.0 U	1.9 U
Perfluoro-1-hexanesulfonamide (FHxSA)	NS	--	--	1.9 U
Perfluoro-1-butanesulfonamide (FBSA)	NS	--	--	1.9 U
Perfluorohexanesulfonic acid (PFHxS)	18	2.0 U	2.0 U	1.9 U
6:2 Fluorotelomer sulfonic acid (6:2 FTS A)	NS	2.0 U	6.9	0.46 J
Perfluoropetanesulfonic acid (PFPeS)	NS	--	--	1.9 U
Perfluoroheptanoic acid (PFHpA)	NS	3.0	2.0 U	1.9 U
Perfluorooctanoic acid (PFOA)	12	**15**	1.5 J	2.0
Perfluorooctanessulfonic acid (PFOS)	15	2.0 U	2.2	1.3 J
Perfluorononanoic acid (PFNA`	11	2.0 U	2.0 U	1.9 U

Detected and selected other PFAS listed; all others were not detected.
Results in nanograms per liter (ng/L).

U	Not detected at or above the listed laboratory reporting limit.
J	Estimated concentration.
NS	No standard established.
†	Table 600-1 of Part Env-Or 603.03(c), Ambient Groundwater Quality Standard (AGQS), effective January 1, 2021.
bold	Detected concentration exceeds effective AGQS.
bold italics	Not detected; laboratory reporting limit exceeds effective AGQS.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet) / PID (ppmv)	NHDES Soil Remediation Standards (SRS) *	SB-1 5/19/2020 0-2 / 0.0	SB-1 5/19/2020 2-4 / 0.0	SB-1 5/19/2020 4-6 / 0.0	SB-1 5/19/2020 6-8 / 0.0	SB-2 5/19/2020 0-2 / 0.0	SB-2 5/19/2020 2-4 / 0.0
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1221	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1232	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1242	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1248	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1254	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1260	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1262	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Aroclor-1268	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
All Aroclors	1	0.088 U	0.088 U	0.087 U	0.086 U	0.087 U	0.086 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	**14**	**12**	**12**	**12**	**13**	11
Barium	1,000	83	71	44	36	44	71
Cadmium	33	0.41	0.35 J	0.34 J	0.36 J	0.36	0.28 J
Chromium	1,000/130 ‡	44	34	30	23	29	64
Lead	400	7.3	5.8	5.7	4.1	5.6	6.1
Mercury	7	0.0086 J	0.027 U	0.029 U	0.026 U	0.011 J	0.027 U
Selenium	180	3.6 U	3.6 U	3.7 U	3.6 U	3.5 U	3.7 U
Silver	89	0.36 U	0.36 U	0.37 U	0.36 U	0.35 U	0.37 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv).
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standards (SRS) ***	**SB-2**		**SB-2**		**SB-3**		**SB-3**		**SB-3**		**SB-3**	
Sample Date		**5/19/2020**		**5/19/2020**		**5/19/2020**		**5/19/2020**		**5/19/2020**		**5/19/2020**	
Depth (feet) / PID (ppmv)		**4-6 / 0.0**		**6-8 / 0.0**		**0-2 / 0.0**		**2-4 / 0.0**		**4-6 / 0.0**		**6-8 / 0.0**	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082													
Aroclor-1016	1	0.086	U	0.087	U	0.088	U	0.088	U	0.087	U	0.089	U
Aroclor-1221	1	0.086	U	0.087	U	0.088	U	0.088	U	0.087	U	0.089	U
Aroclor-1232	1	0.086	U	0.087	U	0.088	U	0.088	U	0.087	U	0.089	U
Aroclor-1242	1	0.086	U	0.087	U	0.088	U	0.088	U	0.087	U	0.089	U
Aroclor-1248	1	0.086	U	0.087	U	0.088	U	0.088	U	0.087	U	0.089	U
Aroclor-1254	1	0.086	U	0.087	U	0.088	U	0.088	U	0.31		0.089	U
Aroclor-1260	1	0.086	U	0.087	U	0.088	U	0.088	U	0.091		0.089	U
Aroclor-1262	1	0.086	U	0.087	U	0.088	U	0.088	U	0.087	U	0.089	U
Aroclor-1268	1	0.086	U	0.087	U	0.088	U	0.088	U	0.087	U	0.089	U
All Aroclors	1	0.086	U	0.087	U	0.088	U	0.088	U	0.401		0.089	U
Total Metals by EPA Methods 6010 or 7471													
Arsenic	11	**12**		9.3		**13**		**13**		**13**		11	
Barium	1,000	66		35		63		71		71		47	
Cadmium	33	0.35	J	0.28	J	0.36	J	0.31	J	0.60		0.32	J
Chromium	1,000/130 ‡	57		24		35		40		37		32	
Lead	400	8.2		4.0		6.2		6.7		49		5.5	
Mercury	7	0.026	U	0.027	U	0.010	J	0.026	U	0.027	J	0.028	U
Selenium	180	3.6	U	3.5	U	3.6	U	3.6	U	3.7	U	3.5	U
Silver	89	0.36	U	0.35	U	0.36	U	0.36	U	0.37	U	0.35	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet) / PID (ppmv)	NHDES Soil Remediation Standards (SRS) *	SB-4 5/19/2020 0-2 / 0.0	SB-4 5/19/2020 2-4 / 0.0	SB-4 5/19/2020 4-6 / 0.0	SB-4 5/19/2020 6-8 / 0.0	SB-5 5/19/2020 0-2 / 0.0	SB-5 5/19/2020 2-4 / 0.0
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1221	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1232	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1242	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1248	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1254	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1260	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1262	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Aroclor-1268	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
All Aroclors	1	0.090 U	0.088 U	0.087 U	0.086 U	0.090 U	0.079 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	**12**	11	**12**	**13**	10	**15**
Barium	1,000	39	65	53	45	45	39
Cadmium	33	0.32 J	0.27 J	0.32 J	0.36 J	0.40 U	0.34 U
Chromium	1,000/130 ‡	39	32	28	26	47	36
Lead	400	5.5	5.9	5.7	5.6	14	7.5
Mercury	7	0.024 J	0.027 U	0.027 U	0.026 U	0.065	0.025 U
Selenium	180	3.8 U	3.6 U	3.6 U	3.6 U	4.0 U	3.4 U
Silver	89	0.38 U	0.36 U	0.36 U	0.36 U	0.40 U	0.34 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppm
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5

2020 Site Investigation Soil Samples - Summary of Analytical Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-5** **5/19/2020** **4-6 / 0.0**		**SB-5** **5/19/2020** **6-8 / 0.0**		**SB-6** **5/19/2020** **0-2 / 0.0**		**SB-6** **5/19/2020** **2-4 / 0.0**		**SB-6** **5/19/2020** **4-6 / 0.0**		**SB-6** **5/19/2020** **6-8 / 0.0**	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082													
Aroclor-1016	1	0.080	U	0.089	U	0.093	U	0.095	U	0.082	U	0.082	U
Aroclor-1221	1	0.080	U	0.089	U	0.093	U	0.095	U	0.082	U	0.082	U
Aroclor-1232	1	0.080	U	0.089	U	0.093	U	0.095	U	0.082	U	0.082	U
Aroclor-1242	1	0.080	U	0.089	U	0.093	U	0.095	U	0.082	U	0.082	U
Aroclor-1248	1	0.080	U	0.089	U	0.093	U	0.095	U	0.082	U	0.082	U
Aroclor-1254	1	0.080	U	0.089	U	0.41		0.095	U	0.082	U	0.082	U
Aroclor-1260	1	0.080	U	0.089	U	0.22		0.095	U	0.082	U	0.082	U
Aroclor-1262	1	0.080	U	0.089	U	0.093	U	0.095	U	0.082	U	0.082	U
Aroclor-1268	1	0.080	U	0.089	U	0.093	U	0.095	U	0.082	U	0.082	U
All Aroclors	1	0.080	U	0.089	U	0.63		0.095	U	0.082	U	0.082	U
Total Metals by EPA Methods 6010 or 7471													
Arsenic	11	**13**		11		**19**		9.2		**18**		**250**	
Barium	1,000	53		43		150		89		81		45	
Cadmium	33	0.13	J	0.36	U	2.30		0.14	J	0.37	U	4.2	
Chromium	1,000/130 ‡	27		27		47		76		55		46	
Lead	400	5.7		5.1		**950**		19		9.5		7.6	
Mercury	7	0.027	U	0.027	U	0.13		0.043		0.015	J	0.026	U
Selenium	180	3.6	U	3.6	U	3.7	U	3.8	U	3.7	U	3.6	U
Silver	89	0.36	U	0.36	U	0.37	U	0.38	U	0.37	U	0.36	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-7** **5/19/2020** **0-2 / 0.0**	**SB-7** **5/19/2020** **2-4 / 0.0**	**SB-7** **5/19/2020** **4-6 / 0.0**	**SB-7** **5/19/2020** **6-8 / 0.0**	**SB-8** **5/20/2020** **0-2 / 0.0**	**SB-8** **5/20/2020** **2-4 / 0.0**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1221	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1232	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1242	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1248	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1254	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1260	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1262	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Aroclor-1268	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
All Aroclors	1	0.083 U	0.085 U	0.083 U	0.086 U	0.084 U	0.076 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	**14**	**12**	**17**	**13**	**13**	**27**
Barium	1,000	45	31	34	41	63	39
Cadmium	33	0.26 J	0.11 J	0.21 J	0.36 U	0.31 J	0.62
Chromium	1,000/130 ‡	52	26	34	27	81	33
Lead	400	8.8	5.3	7.8	6.0	10	6.0
Mercury	7	0.035	0.026 U	0.025 U	0.027 U	0.015 J	0.025 U
Selenium	180	3.7 U	3.4 U	3.5 U	3.6 U	3.5 U	3.4 U
Silver	89	0.37 U	0.34 U	0.35 U	0.36 U	0.35 U	0.22 J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet) / PID (ppmv)	NHDES Soil Remediation Standards (SRS) *	SB-8 5/20/2020 4-6 / 0.0	SB-8 5/20/2020 6-8 / 0.0	SB-9 5/20/2020 0-2 / 0.0	SB-9 5/20/2020 2-4 / 0.0	SB-9 5/20/2020 4-6 / 0.0	SB-9 5/20/2020 6-8 / 0.0
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1221	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1232	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1242	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1248	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1254	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1260	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1262	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Aroclor-1268	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
All Aroclors	1	0.080 U	0.086 U	0.088 U	0.086 U	0.081 U	0.081 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	**19**	**12**	10	9.5	**13**	**13**
Barium	1,000	45	41	52	43	62	63
Cadmium	33	0.44	0.28 J	0.36 J	0.20 J	0.29 J	0.29 J
Chromium	1,000/130 ‡	36	29	64	55	39	42
Lead	400	8.3	4.9	37	9.9	6.4	6.6
Mercury	7	0.027 U	0.027 U	0.059	0.035	0.027 U	0.028 U
Selenium	180	3.6 U	3.4 U	3.6 U	3.6 U	3.5 U	3.5 U
Silver	89	0.23 J	0.34 U	0.36 U	0.36 U	0.35 U	0.35 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppm
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-10** **5/20/2020** **0-2 / 0.0**		**SB-10** **5/20/2020** **2-4 / 0.0**		**SB-10** **5/20/2020** **4-6 / 0.0**		**SB-10** **5/20/2020** **6-8 / 0.0**		**SB-11** **5/20/2020** **0-2 / 0.0**		**SB-11** **5/20/2020** **2-4 / 0.0**	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082													
Aroclor-1016	1	0.085	U	0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1221	1	0.085	U	0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1232	1	0.085	U	0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1242	1	0.085	U	0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1248	1	0.085	U	0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1254	1	0.22		0.099		0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1260	1	0.10		0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1262	1	0.085	U	0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
Aroclor-1268	1	0.085	U	0.098	U	0.086	U	0.086	U	0.091	U	0.088	U
All Aroclors	1	0.32		0.099		0.086	U	0.086	U	0.091	U	0.088	U
Total Metals by EPA Methods 6010 or 7471													
Arsenic	11	**13**		**14**		**18**		**14**		10		**13**	
Barium	1,000	96		150		110		40		48		34	
Cadmium	33	2.2		2.4		0.97		0.29	J	0.38	U	0.38	U
Chromium	1,000/130 ‡	47		56		130		38		58		51	
Lead	400	230	J	**700**		**800**		7.0		16.0		7.8	
Mercury	7	0.11		0.44		0.22		0.027	U	0.056		0.018	J
Selenium	180	3.6	U	4.0	U	3.6	U	3.4	U	3.8	U	3.8	U
Silver	89	0.31	J	0.75		0.72		0.34	U	0.38	U	0.38	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5

2020 Site Investigation Soil Samples - Summary of Analytical Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-11** **5/20/2020** **4-6 / 0.0**	**SB-11** **5/20/2020** **6-8 / 0.0**	**SB-12** **5/20/2020** **0-2 / 0.1**	**SB-12** **5/20/2020** **2-3 / 0.0**	**SB-13** **5/20/2020** **0-2 / 0.0**	**SB-13** **5/20/2020** **2-4 / 0.0**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.088 U	0.086 U	0.084 U	0.087 U	0.088 U	0.089 U
Aroclor-1221	1	0.088 U	0.086 U	0.084 U	0.087 U	0.088 U	0.089 U
Aroclor-1232	1	0.088 U	0.086 U	0.084 U	0.087 U	0.088 U	0.089 U
Aroclor-1242	1	0.088 U	0.086 U	0.084 U	0.087 U	0.088 U	0.089 U
Aroclor-1248	1	0.088 U	0.086 U	0.084 U	0.087 U	0.088 U	0.089 U
Aroclor-1254	1	0.088 U	0.086 U	0.084 U	0.087 U	0.49	0.089 U
Aroclor-1260	1	0.088 U	0.086 U	0.084 U	0.087 U	0.098	0.089 U
Aroclor-1262	1	0.088 U	0.086 U	0.084 U	0.087 U	0.088 U	0.089 U
Aroclor-1268	1	0.088 U	0.086 U	0.084 U	0.087 U	0.088 U	0.089 U
All Aroclors	1	0.088 U	0.086 U	0.084 U	0.087 U	0.588	0.089 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	9.3	**15**	11	**15**	**12**	11
Barium	1,000	74	69	33	32	63	51
Cadmium	33	0.37 U	0.36	0.36 U	0.18 J	0.72	0.37 U
Chromium	1,000/130 ‡	49	36	32	22	48	53
Lead	400	5.9	6.1	5.6	4.6	120	8.8
Mercury	7	0.027 U	0.026 U	0.026 U	0.028 U	0.060	0.030
Selenium	180	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U
Silver	89	0.37 U	0.36 U	0.36 U	0.37 U	0.36 U	0.37 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5

2020 Site Investigation Soil Samples - Summary of Analytical Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-13** **5/20/2020** **4-6 / 0.0**	**SB-13** **5/20/2020** **6-7.5 / 0.0**	**SB-14** **5/20/2020** **0-2 / 0.0**	**SB-14** **5/20/2020** **2-4 / 0.0**	**SB-14** **5/20/2020** **4-6 / 0.0**	**SB-14** **5/20/2020** **6-8 / 0.0**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
Aroclor-1221	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
Aroclor-1232	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
Aroclor-1242	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
Aroclor-1248	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
Aroclor-1254	1	0.085 U	0.088 U	0.066	0.084 U	0.089 U	0.080 U
Aroclor-1260	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
Aroclor-1262	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
Aroclor-1268	1	0.085 U	0.088 U	0.093 U	0.084 U	0.089 U	0.080 U
All Aroclors	1	0.085 U	0.088 U	0.066	0.084 U	0.089 U	0.080 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	9.5	**13**	**12**	**12**	**14**	**14**
Barium	1,000	79	55	180	110	210	59
Cadmium	33	0.35 U	0.36 U	5.1	0.67	2.0	0.48
Chromium	1,000/130 ‡	77	48	49	34	59	45
Lead	400	8.5	6.6	**850**	290	**1,200**	48
Mercury	7	0.015 J	0.028 U	0.18	0.052	0.19	0.027 U
Selenium	180	3.5 U	3.6 U	3.9 U	3.6 U	3.9 U	3.3 U
Silver	89	0.35 U	0.36 U	0.48	0.29 J	0.48	0.33 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5

2020 Site Investigation Soil Samples - Summary of Analytical Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standards (SRS) ***	**SB-15**	**SB-15**	**SB-15**	**SB-15**	**SB-16**	**SB-16**
Sample Date		**5/20/2020**	**5/20/2020**	**5/20/2020**	**5/20/2020**	**5/20/2020**	**5/20/2020**
Depth (feet) / PID (ppmv)		**0-2 / 0.0**	**2-4 / 0.0**	**4-6 / 0.1**	**6-8 / 0.1**	**0-2 / 0.0**	**2-4 / 0.0**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
Aroclor-1221	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
Aroclor-1232	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
Aroclor-1242	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
Aroclor-1248	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
Aroclor-1254	1	0.091 U	0.082 U	0.087 U	0.086 U	0.24	0.086 U
Aroclor-1260	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
Aroclor-1262	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
Aroclor-1268	1	0.091 U	0.082 U	0.087 U	0.086 U	0.090 U	0.086 U
All Aroclors	1	0.091 U	0.082 U	0.087 U	0.086 U	0.24	0.086 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	**13**	**17**	**22**	**14**	**14**	**16**
Barium	1,000	60	40	49	67	78	37
Cadmium	33	0.38 U	0.19 J	0.29 J	0.13 J	1.7	0.23 J
Chromium	1,000/130 ‡	91	35	41	39	52	41
Lead	400	19	6.4	8.1	6.9	81	8.7
Mercury	7	0.046	0.0081 J	0.026 U	0.028 U	0.095	0.025 J
Selenium	180	3.8 U	3.6 U	3.6 U	3.7 U	3.8 U	3.7 U
Silver	89	0.38 U	0.36 U	0.36 U	0.37 U	0.38 U	0.37 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppm
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-16** **5/20/2020** **4-6 / 0.0**		**SB-16** **5/20/2020** **6-7.5 / 0.0**		**SB-17** **5/19/2020** **0-2 / 0.7**		**SB-17** **5/19/2020** **2-4 / 0.0**		**SB-17** **5/19/2020** **4-6 / 0.0**		**SB-17** **5/19/2020** **6-8 / 0.0**	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082													
Aroclor-1016	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
Aroclor-1221	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
Aroclor-1232	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
Aroclor-1242	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
Aroclor-1248	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
Aroclor-1254	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
Aroclor-1260	1	0.092	U	0.089	U	0.11		0.087	U	0.083	U	0.081	U
Aroclor-1262	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
Aroclor-1268	1	0.092	U	0.089	U	0.088	U	0.087	U	0.083	U	0.081	U
All Aroclors	1	0.092	U	0.089	U	0.11		0.087	U	0.083	U	0.081	U
Total Metals by EPA Methods 6010 or 7471													
Arsenic	11	11		9.4		**12**		10		**15**		**12**	
Barium	1,000	43		33		140		51		41		45	
Cadmium	33	0.38	U	0.16	J	3.1		0.38	U	0.20	J	0.36	U
Chromium	1,000/130 ‡	28		34		62		27		22		30	
Lead	400	4.6		5.4		140		7.0		6.2		5.5	
Mercury	7	0.029	U	0.026	U	0.083		0.013	J	0.027	U	0.027	U
Selenium	180	3.8	U	3.6	U	3.8	U	3.8	U	3.7	U	3.6	U
Silver	89	0.38	U	0.36	U	0.38	U	0.38	U	0.37	U	0.36	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet) / PID (ppmv)	**NHDES Soil Remediation Standards (SRS) ***	**SB-18 5/19/2020 0-2 / 0.0**	**SB-18 5/19/2020 2-4 / 0.0**	**SB-18 5/19/2020 4-6 / 0.0**	**SB-18 5/19/2020 6-8 / 0.0**	**SB-19 5/20/2020 0-2 / 0.1**	**SB-19 5/20/2020 2-4 / 0.3**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.086 U	0.095 U	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1221	1	0.086 U	0.095 U	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1232	1	0.086 U	0.095 U	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1242	1	0.086 U	0.095 U	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1248	1	0.086 U	0.095 U	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1254	1	0.086 U	0.18	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1260	1	0.086 U	0.17	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1262	1	0.086 U	0.095 U	0.084 U	0.084 U	0.085 U	0.084 U
Aroclor-1268	1	0.086 U	0.095 U	0.084 U	0.084 U	0.085 U	0.084 U
All Aroclors	1	0.086 U	0.35	0.084 U	0.084 U	0.085 U	0.084 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	10	**14**	**13**	11	**12**	11
Barium	1,000	43	120	27	32	44	35
Cadmium	33	0.16 J	3.4	0.11 J	0.35 U	0.35 J	0.11 J
Chromium	1,000/130 ‡	41	68	30	30	29	26
Lead	400	38	370	7.0	5.0	30	5.9
Mercury	7	0.065	0.19	0.016 J	0.027 U	0.0090 J	0.027 U
Selenium	180	3.6 U	3.8 U	3.6 U	3.5 U	3.6 U	3.6 U
Silver	89	0.36 U	0.38 U	0.36 U	0.35 U	0.36 U	0.36 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standards (SRS) ***	**SB-19**		**SB-19**		**SB-20**		**SB-20**		**SB-20**		**SB-20**	
Sample Date		**5/20/2020**		**5/20/2020**		**5/19/2020**		**5/19/2020**		**5/19/2020**		**5/19/2020**	
Depth (feet) / PID (ppmv)		**4-6 / 0.0**		**6-8 / 0.0**		**0-2 / 0.0**		**2-4 / 0.0**		**4-6 / 0.0**		**6-8 / 0.0**	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082													
Aroclor-1016	1	0.087	U	0.087	U	0.089	U	0.091	U	0.095	U	0.092	U
Aroclor-1221	1	0.087	U	0.087	U	0.089	U	0.091	U	0.095	U	0.092	U
Aroclor-1232	1	0.087	U	0.087	U	0.089	U	0.091	U	0.095	U	0.092	U
Aroclor-1242	1	0.087	U	0.087	U	0.089	U	0.091	U	0.095	U	0.092	U
Aroclor-1248	1	0.087	U	0.087	U	0.089	U	0.091	U	0.095	U	0.092	U
Aroclor-1254	1	0.087	U	0.087	U	0.19		0.64		0.37		0.092	U
Aroclor-1260	1	0.087	U	0.087	U	0.089	U	0.16		0.095	U	0.092	U
Aroclor-1262	1	0.087	U	0.087	U	0.089	U	0.091	U	0.095	U	0.092	U
Aroclor-1268	1	0.087	U	0.087	U	0.089	U	0.091	U	0.095	U	0.092	U
All Aroclors	1	0.087	U	0.087	U	0.19		0.80		0.37		0.092	U
Total Metals by EPA Methods 6010 or 7471													
Arsenic	11	**13**		**15**		10		**14**		**15**		**13**	
Barium	1,000	48		39		93		110		99		35	
Cadmium	33	0.11	J	0.15	J	1.0		1.6		0.96		0.35	J
Chromium	1,000/130 ‡	57		31		51		37		0.80		38	
Lead	400	7.8		6.7		100		160		95		6.4	
Mercury	7	0.026	U	0.026	U	0.051		0.16		0.16		0.019	J
Selenium	180	3.6	U	3.5	U	3.6	U	3.8	U	3.9	U	3.8	U
Silver	89	0.36	U	0.35	U	0.36	U	0.38	U	0.39	U	0.38	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-21** **5/20/2020** **0-2 / 0.0**		**SB-21** **5/20/2020** **2-4 / 0.0**		**SB-21** **5/20/2020** **4-6 / 0.0**		**SB-21** **5/20/2020** **6-8 / 0.0**		**SB-22** **5/20/2020** **0-2 / 0.1**		**SB-22** **5/20/2020** **2-4 / 0.1**	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082													
Aroclor-1016	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1221	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1232	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1242	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1248	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1254	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1260	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1262	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Aroclor-1268	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
All Aroclors	1	0.084	U	0.085	U	0.085	U	0.085	U	0.087	U	0.084	U
Total Metals by EPA Methods 6010 or 7471													
Arsenic	11	10		**15**		11		**15**		**13**		**12**	
Barium	1,000	41		30		28		37		31		29	
Cadmium	33	0.36	U	0.17	J	0.11	J	0.16	J	0.18	J	0.11	J
Chromium	1,000/130 ‡	40		29		26		22		32		25	
Lead	400	6.4		6.3		5.1		5.5		21		6.1	
Mercury	7	0.013	J	0.027	U	0.025	U	0.026	U	0.060		0.027	U
Selenium	180	3.6	U	3.5	U	3.6	U	3.5	U	3.6	U	3.5	U
Silver	89	0.36	U	0.35	U	0.36	U	0.35	U	0.36	U	0.35	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppm
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5

2020 Site Investigation Soil Samples - Summary of Analytical Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet) / PID (ppmv)**	**NHDES Soil Remediation Standards (SRS) ***	**SB-22** **5/20/2020** **4-6 / 0.0**	**SB-22** **5/20/2020** **6-8 / 0.0**	**SB-24** **5/20/2020** **0-2 / 0.1**	**SB-24** **5/20/2020** **2-4 / 0.0**	**SB-24** **5/20/2020** **4-6 / 0.1**	**SB-24** **5/20/2020** **6-8 / 0.1**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1221	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1232	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1242	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1248	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1254	1	0.11	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1260	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1262	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Aroclor-1268	1	0.084 U	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
All Aroclors	1	0.11	0.083 U	0.094 U	0.093 U	0.10 U	0.086 U
Total Metals by EPA Methods 6010 or 7471							
Arsenic	11	**12**	**13**	**12**	**17**	**16**	**13**
Barium	1,000	60	57	65	80	84	45
Cadmium	33	0.22 J	0.14 J	0.39 U	0.11 J	0.41 U	0.13 J
Chromium	1,000/130 ‡	40	34	56	39	30	33
Lead	400	65	5.8	11	13	11	6.1
Mercury	7	0.021 J	0.026 U	0.021 J	0.029 U	0.030 U	0.027 U
Selenium	180	3.7 U	3.5 U	3.9 U	3.9 U	4.1 U	3.6 U
Silver	89	0.37 U	0.35 U	0.39 U	0.39 U	0.41 U	0.36 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 5
2020 Site Investigation Soil Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet) / PID (ppmv)	NHDES Soil Remediation Standards (SRS) *	SB-25 5/20/2020 0-2 / 0.0		SB-25 5/20/2020 2-4 / 0.0		SB-25 5/20/2020 4-6 / 0.0		SB-25 5/20/2020 6-8 / 0.0	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082									
Aroclor-1016	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1221	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1232	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1242	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1248	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1254	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1260	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1262	1	0.085	U	0.083	U	0.091	U	0.088	U
Aroclor-1268	1	0.085	U	0.083	U	0.091	U	0.088	U
All Aroclors	1	0.085	U	0.083	U	0.091	U	0.088	U
Total Metals by EPA Methods 6010 or 7471									
Arsenic	11	**13**		**16**		11		**16**	
Barium	1,000	26		46		40		44	
Cadmium	33	0.26	J	0.17	J	0.12	J	0.18	J
Chromium	1,000/130 ‡	28		36		22		28	
Lead	400	18		6.4		4.6		7.4	
Mercury	7	0.029		0.027	U	0.028	U	0.027	U
Selenium	180	3.5	U	3.4	U	3.7	U	3.6	U
Silver	89	0.35	U	0.34	U	0.37	U	0.36	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

PID	Photoionization Detector. Results in parts per million by volume (ppmv
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
‡	Standards for trivalent and hexavalent chromium, respectively.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 6
Soil Samples - Summary of Lead Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7
[see notes at end of table]

Lead Analysis by EPA Method 6010			**Lead Concentration (mg/kg)**
Sample Identification	**Depth (feet)**	**Date**	
C-1	0-2	9/9/2021	**860 J**
B-2	0-2	9/9/2021	42
A-1	0-2	9/9/2021	33
B-4	0-2	9/9/2021	130
C-3	0-2	9/9/2021	59
C-3	2-4	9/9/2021	180
D-2	0-2	9/9/2021	69
D-2	2-4	9/9/2021	35
E-1	0-2	9/9/2021	230
F-2	0-2	9/9/2021	220
F-2	2-4	9/9/2021	8.6
G-1	0-2	9/9/2021	160
G-1	2-4	9/9/2021	9.5
H-2	0-2	9/9/2021	53
H-2	2-4	9/9/2021	7.0
I-1	0-2	9/9/2021	6.9
I-1	2-4	9/9/2021	3.8
G-3	0-2	9/9/2021	16
G-3	2-4	9/9/2021	42
D-4	0-2	9/9/2021	250
D-4	2-4	9/9/2021	**2,100**
C-5	0-2	9/9/2021	270
C-5	2-4	9/9/2021	**3,600**
B-6	0-2	9/9/2021	**500**
E-5	0-2	9/9/2021	49
E-5	2-4	9/9/2021	10
G-5	0-2	9/9/2021	9.6
G-5	2-4	9/9/2021	9.3
C-7	0-2	9/9/2021	140
C-7	2-4	9/9/2021	98
D-6	0-2	9/9/2021	97
D-6	2-4	9/9/2021	82
E-7	0-2	9/9/2021	400
E-7	2-4	9/9/2021	59
D-8	0-2	9/9/2021	43
D-8	2-4	9/9/2021	40
D-9	0-2	9/9/2021	300 J
D-9	2-4	9/9/2021	56
D-10	0-2	9/9/2021	17
D-11	0-2	9/9/2021	160
F-9	0-2	9/9/2021	5.5

TABLE 6
Soil Samples - Summary of Lead Analysis Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7
[see notes at end of table]

Lead Analysis by EPA Method 6010			Lead Concentration (mg/kg)
Sample Identification	**Depth (feet)**	**Date**	
F-9	2-4	9/9/2021	17
E-10	0-2	9/10/2021	79
E-10	2-4	9/10/2021	27
H-6	0-2	9/10/2021	13
H-6	2-4	9/10/2021	4.4
F-6	0-2	9/10/2021	7.8
F-6	2-4	9/10/2021	7.7
J-6	0-2	9/10/2021	7.2
J-6	2-4	9/10/2021	4.7
F-4	0-2	9/10/2021	7.2
F-4	2-4	9/10/2021	2.8
H-4	0-2	9/10/2021	6.4
H-4	2-4	9/10/2021	5.0
I-3	0-2	9/10/2021	9.1
I-3	2-4	9/10/2021	5.2
J-10	0-2	9/10/2021	52
J-10	2-4	9/10/2021	6.1
J-11	0-2	9/10/2021	12
J-11	2-4	9/10/2021	7.2
K-11	0-2	9/10/2021	200
K-12	0-2	9/10/2021	**420**
J-13	0-2	9/10/2021	**420**
H-14	0-2	9/10/2021	7.4
H-13	0-2	9/10/2021	16
F-11	0-2	9/10/2021	5.7
F-11	2-4	9/10/2021	7.2
F-12	0-2	9/10/2021	320
F-12	2-4	9/10/2021	7.8
B-9	0-2	9/16/2021	**2,400**
B-9	2-4	9/16/2021	9.2
B-8	0-2	9/16/2021	**850**
B-11	0-2	9/16/2021	**2,500**
B-11	2-4	9/16/2021	**7,600**
C-10	0-2	9/16/2021	**670**
C-11	0-2	9/16/2021	**1,000**
Y-9	0-2	9/16/2021	**880**
X-8	0-2	9/16/2021	**1,800**
X-12	0-2	9/16/2021	**4,500**
W-9	0-2	9/16/2021	**3,200**
W-10	0-2	9/16/2021	**9,100**
W-10	2-4	9/16/2021	**2,700**
V-8	0-2	9/16/2021	**1,500**

TABLE 6
Soil Samples - Summary of Lead Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7
[see notes at end of table]

Lead Analysis by EPA Method 6010			Lead Concentration (mg/kg)
Sample Identification	**Depth (feet)**	**Date**	
V-11	0-2	9/16/2021	**4,300**
V-11	2-4	9/16/2021	**680**
A-10	0-2	9/16/2021	**2,400**
A-10	2-3	9/16/2021	**2,100**
W-12	0-2	9/16/2021	**2,700**
W-12	2-4	9/16/2021	340
E-11	0-2	9/16/2021	5.1
V-12	0-2	9/16/2021	**2,800**
X-10	0-2	9/16/2021	**3,900**
F-13	0-2	9/16/2021	150
D-13	0-2	9/16/2021	**2,200**
E-12	0-2	9/16/2021	27
E-13	0-2	9/16/2021	36
G-14	0-2	9/16/2021	18
H-15	0-2	9/16/2021	150
K-14	0-2	9/16/2021	130
A-5	0-2	9/17/2021	180
A-3	0-2	9/17/2021	52
A-7	0-2	9/17/2021	**2,500**
V-10	0-2	9/17/2021	**2,900**
W-13	0-2	9/17/2021	**3,500**
W-11	0-2	9/17/2021	**2,600**
X-14	0-2	9/17/2021	**3,800**
Y-13	0-2	9/17/2021	**12,000**
Z-12	0-2	9/17/2021	**3,200**
Z-10	0-2	9/17/2021	**20,000**
I-5	0-2	9/17/2021	97
I-5	2-4	9/17/2021	5.6
E-14	0-2	9/17/2021	8.6
F-15	0-2	9/17/2021	**480**
K-15	0-2	9/17/2021	180
Y-11	0-2	9/17/2021	**26,000**

Lead concentrations in milligrams per kilogram (mg/kg).

Lead concentrations compared to the New Hampshire Department of Environmental Services Soil Remediation Standard (SRS) for lead (400 mg/kg) per Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

Photoionization Detector. Results in parts per million by volume (ppmv).
Not detected at or above the indicated laboratory reporting limit.
J Estimated concentration.
Constituent detected in method blank; sample result >5x
Constituent detected in method blank; sample result <5x blank (<10x for common laboratory contaminants); result changed to non-detection.
No standard established.
Sample not collected/analyzed for this compound.
bold Detected concentration exceeds SRS.
Not detected; laboratory reporting limit exceeds SRS.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	NHDES Soil Remediation Standard (SRS) *	A-7	A-7	B-6	B-6	A-5	A-5	A-1	A-1	A-3
Sample Date		**9/24/2021**	**9/24/2021**	**9/24/2021**	**9/24/2021**	**9/24/2021**	**9/24/2021**	**9/24/2021**	**9/24/2021**	**9/24/2021**
Depth (feet)		**0.25-0.5**	**0.5-1.5**	**0.25-0.5**	**0.5-1.5**	**0.25-0.5**	**0.5-1.5**	**0.25-0.5**	**0.5-1.5**	**0.25-0.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.11 U	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
Aroclor-1221	1	0.11 U	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
Aroclor-1232	1	0.11 U	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
Aroclor-1242	1	0.11 U	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
Aroclor-1248	1	0.11 U	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
Aroclor-1254	1	0.086	0.18	0.098 U	0.094 U	0.085	0.090	0.091 U	0.092 U	0.093 U
Aroclor-1260	1	0.084	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
Aroclor-1262	1	0.11 U	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
Aroclor-1268	1	0.11 U	0.17 U	0.098 U	0.094 U	0.089 U	0.087 U	0.091 U	0.092 U	0.093 U
All Aroclors	1	0.17	0.18	0.098 U	0.094 U	0.085	0.090	0.091 U	0.092 U	0.093 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	A-3 9/24/2021 0.5-1.5	H-15 9/24/2021 0.25-0.5	H-15 9/24/2021 0.5-1.5	F-15 9/24/2021 0.25-0.5	F-15 9/24/2021 0.5-1.5	D-12 9/24/2021 0.25-0.5	D-12 9/24/2021 0.5-1.5	D-13 9/24/2021 0.25-0.5	D-13 9/24/2021 0.5-1.5
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.092 U	0.096 U	0.095 U	0.096 U	0.090 U	0.090 U	0.090 U	0.10 U	0.089 U
Aroclor-1221	1	0.092 U	0.096 U	0.095 U	0.096 U	0.090 U	0.090 U	0.090 U	0.10 U	0.089 U
Aroclor-1232	1	0.092 U	0.096 U	0.095 U	0.096 U	0.090 U	0.090 U	0.090 U	0.10 U	0.089 U
Aroclor-1242	1	0.092 U	0.096 U	0.095 U	0.096 U	0.090 U	0.090 U	0.090 U	0.10 U	0.089 U
Aroclor-1248	1	0.092 U	0.096 U	0.095 U	0.096 U	0.090 U	0.090 U	0.041	0.055	0.089 U
Aroclor-1254	1	0.092 U	0.13	0.095 U	0.19	0.20	0.069	0.063	0.16	0.089 U
Aroclor-1260	1	0.092 U	0.096 U	0.095 U	0.097	0.10	0.083	0.084	0.12	0.089 U
Aroclor-1262	1	0.092 U	0.096 U	0.095 U	0.096 U	0.090 U	0.090 U	0.090 U	0.10 U	0.089 U
Aroclor-1268	1	0.092 U	0.096 U	0.095 U	0.096 U	0.090 U	0.11	0.12	0.10 U	0.089 U
All Aroclors	1	0.092 U	0.13	0.095 U	0.29	0.30	0.26	0.31	0.34	0.089 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	**NHDES Soil Remediation Standard (SRS) ***	**E-12 9/24/2021 0.25-0.5**	**E-12 9/24/2021 0.5-1.5**	**E-13 9/24/2021 0.25-0.5**	**E-13 9/24/2021 0.5-1.5**	**E-14 9/24/2021 0.25-0.5**	**E-14 9/24/2021 0.5-1.5**	**F-13 9/24/2021 0.25-0.5**	**F-13 9/24/2021 0.5-1.5**	**B-11 9/24/2021 0.25-0.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.088 U	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.16 U
Aroclor-1221	1	0.088 U	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.16 U
Aroclor-1232	1	0.088 U	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.16 U
Aroclor-1242	1	0.088 U	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.16 U
Aroclor-1248	1	0.088 U	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	**1.6**
Aroclor-1254	1	0.043	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.68
Aroclor-1260	1	0.088 U	0.090 U	0.061	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.20
Aroclor-1262	1	0.088 U	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.16 U
Aroclor-1268	1	0.088 U	0.090 U	0.086 U	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	0.16 U
All Aroclors	1	0.043	0.090 U	0.061	0.084 U	0.089 U	0.090 U	0.098 U	0.095 U	**2.5**

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	B-11 9/24/2021 0.5-1.5	C-10 9/24/2021 0.25-0.5	C-10 9/24/2021 0.5-1.5	C-11 9/24/2021 0.25-0.5	C-11 9/24/2021 0.5-1.5	D-11 9/24/2021 0.25-0.5	D-11 9/24/2021 0.5-1.5	E-11 9/24/2021 0.25-0.5	E-11 9/24/2021 0.5-1.5
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.18 U	0.095 U	1.0 UJ	0.087 U	0.10 U	0.090 U	0.087 U	0.088 U	0.082 U
Aroclor-1221	1	0.18 U	0.095 U	1.0 UJ	0.087 U	0.10 U	0.090 U	0.087 U	0.088 U	0.082 U
Aroclor-1232	1	0.18 U	0.095 U	1.0 UJ	0.087 U	0.10 U	0.090 U	0.087 U	0.088 U	0.082 U
Aroclor-1242	1	0.18 U	0.095 U	1.0 UJ	0.087 U	0.10 U	0.090 U	0.087 U	0.088 U	0.082 U
Aroclor-1248	1	**2.1**	0.13	**7.8 J**	0.20	0.70	0.090 U	0.10	0.088 U	0.082 U
Aroclor-1254	1	0.48	0.24	**1.8 J**	0.087 U	0.10 U	0.090 U	0.087 U	0.088 U	0.082 U
Aroclor-1260	1	0.14	0.095 U	1.0 UJ	0.087 U	0.22	0.090 U	0.098	0.088 U	0.082 U
Aroclor-1262	1	0.18 U	0.095 U	1.0 UJ	0.087 U	0.10 U	0.090 U	0.087 U	0.088 U	0.082 U
Aroclor-1268	1	0.18 U	0.095 U	1.0 UJ	0.087 U	0.10 U	0.090 U	0.087 U	0.088 U	0.082 U
All Aroclors	1	**2.7**	0.37	**9.6 J**	0.20	0.92	0.090 U	0.20	0.088 U	0.082 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7

Soil Samples - Summary of PCB Analysis Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	V-12 9/24/2021 0.25-0.5	V-12 9/24/2021 0.5-1.5	W-12 9/24/2021 0.25-0.5	W-12 9/24/2021 0.5-1.5	W-13 9/24/2021 0.25-0.5	W-13 9/24/2021 0.5-1.5	A-10 9/24/2021 0.25-0.5	A-10 9/24/2021 0.5-1.5	V-11 9/24/2021 0.25-0.5
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.099 U	0.10 U	0.13 U	0.15 U	***1.1 U***	0.10 U	0.10 U	0.11 U	0.12 U
Aroclor-1221	1	0.099 U	0.10 U	0.13 U	0.15 U	***1.1 U***	0.10 U	0.10 U	0.11 U	0.12 U
Aroclor-1232	1	0.099 U	0.10 U	0.13 U	0.15 U	***1.1 U***	0.10 U	0.10 U	0.11 U	0.12 U
Aroclor-1242	1	0.099 U	0.10 U	0.13 U	0.15 U	***1.1 U***	0.10 U	0.10 U	0.11 U	0.12 U
Aroclor-1248	1	0.099 U	0.048	0.13 U	0.15 U	***1.1 U***	0.10 U	0.10 U	0.11 U	0.12 U
Aroclor-1254	1	0.099 U	0.10 U	0.35	0.24	**6.6**	0.24	0.35	0.13	0.25
Aroclor-1260	1	0.099 U	0.10 U	0.082	0.15 U	***1.1 U***	0.10 U	0.17	0.11 U	0.094
Aroclor-1262	1	0.099 U	0.10 U	0.13 U	0.15 U	***1.1 U***	0.10 U	0.10 U	0.11 U	0.12 U
Aroclor-1268	1	0.099 U	0.10 U	0.13 U	0.15 U	***1.1 U***	0.10 U	0.14	0.13	0.14
All Aroclors	1	0.099 U	0.048	0.43	0.24	**6.6**	0.24	0.66	0.26	0.48

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	**NHDES Soil Remediation Standard (SRS) ***	**V-11 9/24/2021 0.5-1.5**		**W-10 9/24/2021 0.25-0.5**		**W-10 9/24/2021 0.5-1.5**		**Y-9 9/24/2021 0.25-0.5**		**Y-9 9/24/2021 0.5-1.5**		**G-6 9/30/2021 0.25-0.5**		**G-6 9/30/2021 0.5-1.5**		**G-7 9/30/2021 0.25-0.5**		**G-7 9/30/2021 0.5-1.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.14	U	0.12	U	0.14	U	0.53	U	0.11	U	0.085	U	0.089	U	0.093	U	0.091	U
Aroclor-1221	1	0.14	U	0.12	U	0.14	U	0.53	U	0.11	U	0.085	U	0.089	U	0.093	U	0.091	U
Aroclor-1232	1	0.14	U	0.12	U	0.14	U	0.53	U	0.11	U	0.085	U	0.089	U	0.093	U	0.091	U
Aroclor-1242	1	0.14	U	0.12	U	0.14	U	0.53	U	0.11	U	0.085	U	0.089	U	0.093	U	0.091	U
Aroclor-1248	1	0.14	U	0.12	U	0.14	U	0.53	U	0.11	U	0.085	U	0.089	U	0.093	U	0.091	U
Aroclor-1254	1	0.16		0.26		0.087		0.53	U	0.14	J	0.30	J	0.067	J	0.21		0.095	
Aroclor-1260	1	0.14	U	0.076		0.14	U	**1.7**		0.082		0.21		0.069	J	0.28		0.11	
Aroclor-1262	1	0.14	U	0.12	U	0.14	U	0.53	U	0.11	U	0.085	U	0.089	U	0.093	U	0.091	U
Aroclor-1268	1	0.13		0.12	U	0.14	U	0.53	U	0.11	U	0.085	U	0.089	U	0.093	U	0.091	U
All Aroclors	1	0.29		0.34		0.087		**1.7**		0.22	J	0.51	J	0.136	J	0.49		0.21	

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standard (SRS) ***	**G-7**	**F-8**	**F-8**	**B-2**	**B-2**	**C-1**	**C-1**	**C-3**	**C-3**
Sample Date		**9/30/2021**	**9/30/2021**	**9/30/2021**	**9/29/2021**	**9/29/2021**	**9/29/2021**	**9/29/2021**	**9/29/2021**	**9/29/2021**
Depth (feet)		**1.5-3**	**0.25-0.5**	**0.5-1.5**	**0.25-0.5**	**0.5-1.5**	**0.25-0.5**	**0.5-1.5**	**0.25-0.5**	**0.5-1.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.087 U	0.094 U	0.092 U	0.090 U
Aroclor-1221	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.087 U	0.094 U	0.092 U	0.090 U
Aroclor-1232	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.087 U	0.094 U	0.092 U	0.090 U
Aroclor-1242	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.087 U	0.094 U	0.092 U	0.090 U
Aroclor-1248	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.14	0.094 U	0.092 U	0.090 U
Aroclor-1254	1	0.086 U	0.071 J	0.096 U	0.092 U	0.098 U	0.18	0.060	0.092 U	0.090 U
Aroclor-1260	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.048	0.094 U	0.092 U	0.090 U
Aroclor-1262	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.087 U	0.094 U	0.092 U	0.090 U
Aroclor-1268	1	0.086 U	0.10 U	0.096 U	0.092 U	0.098 U	0.087 U	0.094 U	0.092 U	0.090 U
All Aroclors	1	0.086 U	0.071 J	0.096 U	0.092 U	0.098 U	0.32	0.060	0.092 U	0.090 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	B-4 9/29/2021 0.25-0.5	B-4 9/29/2021 0.5-1.5	D-2 9/29/2021 0.25-0.5	D-2 9/29/2021 0.5-1.5	D-2 9/29/2021 1.5-3	D-3 9/29/2021 0.25-0.5	D-3 9/29/2021 0.5-1.5	D-4 9/29/2021 0.25-0.5	D-4 9/29/2021 0.5-1.5
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.094 U	0.092 U	0.083 U	0.092 U	0.097 U	0.086 U	0.088 U	0.091 U	0.089 U
Aroclor-1221	1	0.094 U	0.092 U	0.083 U	0.092 U	0.097 U	0.086 U	0.088 U	0.091 U	0.089 U
Aroclor-1232	1	0.094 U	0.092 U	0.083 U	0.092 U	0.097 U	0.086 U	0.088 U	0.091 U	0.089 U
Aroclor-1242	1	0.094 U	0.092 U	0.083 U	0.092 U	0.097 U	0.42 O-04	0.088 U	0.091 U	0.089 U
Aroclor-1248	1	0.094 U	0.092 U	0.083 U	0.044	0.097 U	0.086 U	0.088 U	0.091 U	0.049
Aroclor-1254	1	0.094 U	0.037	0.083 U	0.23	0.097 U	0.086 U	0.088 U	0.042	0.14
Aroclor-1260	1	0.094 U	0.092 U	0.083 U	0.16	0.097 U	0.086 U	0.088 U	0.091 U	0.056
Aroclor-1262	1	0.094 U	0.092 U	0.083 U	0.092 U	0.097 U	0.086 U	0.088 U	0.091 U	0.089 U
Aroclor-1268	1	0.094 U	0.092 U	0.083 U	0.092 U	0.097 U	0.086 U	0.088 U	0.091 U	0.089 U
All Aroclors	1	0.094 U	0.037	0.083 U	0.43	0.097 U	0.42 O-04	0.088 U	0.042	0.25

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	NHDES Soil Remediation Standard (SRS) *	D-4		E-1		E-1		E-1		E-2		E-2		H-13		H-13		HH-12	
Sample Date		9/29/2021		9/29/2021		9/29/2021		9/29/2021		9/29/2021		9/29/2021		9/29/2021		9/29/2021		9/30/2021	
Depth (feet)		1.5-3		0.25-0.5		0.5-1.5		1.5-3		0.25-0.5		0.5-1.5		0.25-0.5		0.5-1.5		0.25-0.5	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1221	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1232	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1242	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1248	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1254	1	0.17		0.097	U	0.091	U	0.091	U	0.062		0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1260	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1262	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
Aroclor-1268	1	0.10	U	0.097	U	0.091	U	0.091	U	0.090	U	0.089	U	0.096	U	0.092	U	0.091	U
All Aroclors	1	0.17		0.097	U	0.091	U	0.091	U	0.062		0.089	U	0.096	U	0.092	U	0.091	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	HH-12 9/30/2021 0.5-1.5		HH-11 9/30/2021 0.25-0.5		HH-11 9/30/2021 0.5-1.5		HH-11-Mid 9/30/2021 0.25-0.5		HH-11-Mid 9/30/2021 0.5-1.5		G-11-Mid 9/30/2021 0.25-0.5		G-11-Mid 9/30/2021 0.5-1.5		G-11-Mid 9/30/2021 1.5-3		F-11 9/30/2021 0.25-0.5	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.086	U	0.090	U	0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
Aroclor-1221	1	0.086	U	0.090	U	0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
Aroclor-1232	1	0.086	U	0.090	U	0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
Aroclor-1242	1	0.086	U	0.090	U	0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
Aroclor-1248	1	0.086	U	0.090	U	0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
Aroclor-1254	1	0.27		0.17		0.072	J	0.088	U	0.087	U	0.048	J	0.087	U	0.085	U	0.093	U
Aroclor-1260	1	0.17		0.10		0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
Aroclor-1262	1	0.086	U	0.090	U	0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
Aroclor-1268	1	0.086	U	0.090	U	0.087	U	0.088	U	0.087	U	0.088	U	0.087	U	0.085	U	0.093	U
All Aroclors	1	0.44		0.27		0.072	J	0.088	U	0.087	U	0.048	J	0.087	U	0.085	U	0.093	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	F-11 9/30/2021 0.5-1.5		F-12 9/30/2021 0.25-0.5		F-12 9/30/2021 0.5-1.5		H-14 9/30/2021 0.25-0.5		H-14 9/30/2021 0.5-1.5		HH-8-Mid 9/30/2021 0.25-0.5		HH-8-Mid 9/30/2021 0.5-1.5		HH-8-Mid 9/30/2021 1.5-3		F-2 9/29/2021 0.25-0.5	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.092	U	0.090	U	0.087	U	0.090	U	0.087	U	0.089	U	0.090	U	0.084	U	0.086	U
Aroclor-1221	1	0.092	U	0.090	U	0.087	U	0.090	U	0.087	U	0.089	U	0.090	U	0.084	U	0.086	U
Aroclor-1232	1	0.092	U	0.090	U	0.087	U	0.090	U	0.087	U	0.089	U	0.090	U	0.084	U	0.086	U
Aroclor-1242	1	0.092	U	0.090	U	0.087	U	0.090	U	0.087	U	0.089	U	0.090	U	0.084	U	0.086	U
Aroclor-1248	1	0.092	U	0.090	U	0.087	U	0.090	U	0.087	U	0.089	U	0.090	U	0.084	U	0.086	U
Aroclor-1254	1	0.092	U	0.21		0.087	U	0.090	U	0.087	U	0.40		0.14	O-04	0.084	U	0.036	J
Aroclor-1260	1	0.092	U	0.22		0.087	U	0.090	U	0.087	U	0.13		0.090	U	0.084	U	0.055	J
Aroclor-1262	1	0.092	U	0.090	U	0.087	U	0.090	U	0.087	U	0.089	U	0.090	U	0.084	U	0.086	U
Aroclor-1268	1	0.092	U	0.090	U	0.087	U	0.090	U	0.087	U	0.089	U	0.090	U	0.084	U	0.086	U
All Aroclors	1	0.092	U	0.43		0.087	U	0.090	U	0.087	U	0.53		0.14	O-04	0.084	U	0.091	J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standard (SRS) ***	**F-2**		**F-2**		**FF-1-Mid**		**FF-1-Mid**		**G-1**		**G-1**		**GG-1-Mid**		**GG-1-Mid**		**H-2**	
Sample Date		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**	
Depth (feet)		**0.5-1.5**		**1.5-3**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.086	U	0.086	U
Aroclor-1221	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.086	U	0.086	U
Aroclor-1232	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.086	U	0.086	U
Aroclor-1242	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.086	U	0.086	U
Aroclor-1248	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.086	U	0.086	U
Aroclor-1254	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.091		0.093	
Aroclor-1260	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.082	J	0.086	U
Aroclor-1262	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.086	U	0.086	U
Aroclor-1268	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.086	U	0.086	U
All Aroclors	1	0.087	U	0.097	U	0.090	U	0.089	U	0.092	U	0.091	U	0.086	U	0.17	J	0.093	

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	**NHDES Soil Remediation Standard (SRS) ***	**H-2 9/29/2021 0.5-1.5**	**H-2 9/29/2021 1.5-3**	**HH-1-Mid 9/29/2021 0.25-0.5**	**HH-1-Mid 9/29/2021 0.5-1.5**	**HH-1-Mid 9/29/2021 1.5-3**	**I-1 9/29/2021 0.25-0.5**	**I-1 9/29/2021 0.5-1.5**	**G-3 9/29/2021 0.25-0.5**	**G-3 9/29/2021 0.5-1.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.087 U	0.086 U	0.088 U	0.088 U
Aroclor-1221	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.087 U	0.086 U	0.088 U	0.088 U
Aroclor-1232	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.087 U	0.086 U	0.088 U	0.088 U
Aroclor-1242	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.087 U	0.086 U	0.088 U	0.088 U
Aroclor-1248	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.087 U	0.086 U	0.088 U	0.088 U
Aroclor-1254	1	0.057 J	0.093 U	0.038 J	0.12 U	0.095 U	0.074 J	0.086 U	0.088 U	0.088 U
Aroclor-1260	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.067 J	0.086 U	0.088 U	0.088 U
Aroclor-1262	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.087 U	0.086 U	0.088 U	0.088 U
Aroclor-1268	1	0.088 U	0.093 U	0.086 U	0.12 U	0.095 U	0.087 U	0.086 U	0.088 U	0.088 U
All Aroclors	1	0.057 J	0.093 U	0.038 J	0.12 U	0.095 U	0.14 J	0.086 U	0.088 U	0.088 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet)**	**NHDES Soil Remediation Standard (SRS) ***	**B-8** **9/30/2021** **0.25-0.5**		**B-8** **9/30/2021** **0.5-1.5**		**B-9** **9/30/2021** **0.25-0.5**		**B-9** **9/30/2021** **0.5-1.5**		**C-7** **9/30/2021** **0.25-0.5**		**C-7** **9/30/2021** **0.5-1.5**		**C-5** **9/30/2021** **0.25-0.5**		**C-5** **9/30/2021** **0.5-1.5**		**D-6** **9/30/2021** **0.25-0.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.099	U	0.096	U	0.12	U	0.12	U	0.088	U	0.089	U	0.086	U	0.090	U	0.086	U
Aroclor-1221	1	0.099	U	0.096	U	0.12	U	0.12	U	0.088	U	0.089	U	0.086	U	0.090	U	0.086	U
Aroclor-1232	1	0.099	U	0.096	U	0.12	U	0.12	U	0.088	U	0.089	U	0.086	U	0.090	U	0.086	U
Aroclor-1242	1	0.099	U	0.096	U	0.12	U	0.12	U	0.088	U	0.089	U	0.086	U	0.090	U	0.086	U
Aroclor-1248	1	0.099	U	0.096	U	0.12	U	0.12	U	0.088	U	0.089	U	0.086	U	0.090	U	0.086	U
Aroclor-1254	1	0.099	U	0.48		0.13		0.15		0.088	U	0.092		0.086	U	0.076	J	0.055	J
Aroclor-1260	1	0.099	U	0.13		0.12	U	0.12	U	0.088	U	0.068	J	0.086	U	0.090	U	0.086	U
Aroclor-1262	1	0.099	U	0.096	U	0.12	U	0.12	U	0.088	U	0.089	U	0.086	U	0.090	U	0.086	U
Aroclor-1268	1	0.099	U	0.096	U	0.12	U	0.12	U	0.088	U	0.089	U	0.086	U	0.090	U	0.086	U
All Aroclors	1	0.099	U	0.61		0.13		0.15		0.088	U	0.160	J	0.086	U	0.076	J	0.055	J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	D-6 9/30/2021 0.5-1.5		D-6 9/30/2021 1.5-3		E-7 9/30/2021 0.25-0.5		E-7 9/30/2021 0.5-1.5		E-7 9/30/2021 1.5-3		F-6 9/30/2021 0.25-0.5		F-6 9/30/2021 0.5-1.5		E-5 9/30/2021 0.25-0.5		E-5 9/30/2021 0.5-1.5	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.090	U	0.10	U	0.093	U	0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	***1.9***	***U***
Aroclor-1221	1	0.090	U	0.10	U	0.093	U	0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	***1.9***	***U***
Aroclor-1232	1	0.090	U	0.10	U	0.093	U	0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	***1.9***	***U***
Aroclor-1242	1	0.090	U	0.10	U	0.093	U	0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	***1.9***	***U***
Aroclor-1248	1	0.090	U	0.10	U	0.093	U	0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	**13**	**J**
Aroclor-1254	1	0.60		0.14		0.22		0.097	U	0.092	U	0.10		0.098	U	0.087	U	***1.9***	***U***
Aroclor-1260	1	0.20		0.23		0.22		0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	***1.9***	***U***
Aroclor-1262	1	0.090	U	0.10	U	0.093	U	0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	***1.9***	***U***
Aroclor-1268	1	0.090	U	0.10	U	0.093	U	0.097	U	0.092	U	0.096	U	0.098	U	0.087	U	***1.9***	***U***
All Aroclors	1	0.80		0.37		0.44		0.097	U	0.092	U	0.10		0.098	U	0.087	U	**13**	**J**

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet)**	**NHDES Soil Remediation Standard (SRS) ***	**F-5** **9/30/2021** **0.25-0.5**	**F-5** **9/30/2021** **0.5-1.5**	**F-5** **9/30/2021** **1.5-3**	**GG-2-Mid** **9/29/2021** **0.25-0.5**	**GG-2-Mid** **9/29/2021** **0.5-1.5**	**II-6-Mid** **9/29/2021** **0.25-0.5**	**II-6-Mid** **9/29/2021** **0.5-1.5**	**II-6-Mid** **9/29/2021** **1.5-3**	**H-6** **9/29/2021** **0.25-0.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.086 U	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
Aroclor-1221	1	0.086 U	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
Aroclor-1232	1	0.086 U	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
Aroclor-1242	1	0.086 U	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
Aroclor-1248	1	0.086 U	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
Aroclor-1254	1	0.060 J	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 J
Aroclor-1260	1	0.088	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
Aroclor-1262	1	0.086 U	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
Aroclor-1268	1	0.086 U	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 U
All Aroclors	1	0.148 J	0.089 U	0.085 U	0.086 U	0.089 U	0.087 U	0.089 U	0.088 U	0.087 J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet)**	**NHDES Soil Remediation Standard (SRS) ***	**H-6** **9/29/2021** **0.5-1.5**		**H-6** **9/29/2021** **1.5-3**		**I-5-Mid** **9/29/2021** **0.25-0.5**		**I-5-Mid** **9/29/2021** **0.5-1.5**		**J-5** **9/29/2021** **0.25-0.5**		**J-5** **9/29/2021** **0.5-1.5**		**JJ-6-Mid** **9/29/2021** **0.25-0.5**		**JJ-6-Mid** **9/29/2021** **0.5-1.5**		**JJ-8** **9/29/2021** **0.25-0.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.089	U	0.090	U	0.86	U	0.085	U	0.10	U	0.088	U	0.45	U	0.087	U	0.097	U
Aroclor-1221	1	0.089	U	0.090	U	0.86	U	0.085	U	0.10	U	0.088	U	0.45	U	0.087	U	0.097	U
Aroclor-1232	1	0.089	U	0.090	U	0.86	U	0.085	U	0.10	U	0.088	U	0.45	U	0.087	U	0.097	U
Aroclor-1242	1	0.089	U	0.090	U	0.86	U	0.085	U	0.10	U	0.088	U	0.45	U	0.087	U	0.097	U
Aroclor-1248	1	0.089	U	0.090	U	**2.7**	**J**	0.085	U	0.10	U	0.088	U	0.45	U	0.087	U	0.097	U
Aroclor-1254	1	0.089	U	0.090	U	**1.4**	**J**	0.085	U	0.10	U	0.088	U	**2.9**		0.087	U	0.77	
Aroclor-1260	1	0.089	U	0.090	U	0.50	J	0.085	U	0.10	U	0.088	U	0.55		0.087	U	0.15	
Aroclor-1262	1	0.089	U	0.090	U	0.86	U	0.085	U	0.10	U	0.088	U	0.45	U	0.087	U	0.097	U
Aroclor-1268	1	0.089	U	0.090	U	0.86	U	0.085	U	0.10	U	0.088	U	0.45	U	0.087	U	0.097	U
All Aroclors	1	0.089	U	0.090	U	**4.6**	**J**	0.085	U	0.10	U	0.088	U	**3.5**		0.087	U	0.92	

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	JJ-8 9/29/2021 0.5-1.5	JJ-8 9/29/2021 1.5-3	JJ-9 9/29/2021 0.25-0.5	JJ-9 9/29/2021 0.5-1.5	JJ-7 9/29/2021 0.25-0.5	HH-7-Mid 9/30/2021 0.25-0.5	HH-7-Mid 9/30/2021 0.5-1.5	HH-7-Mid 9/30/2021 1.5-3	GG-8-Mid 9/30/2021 0.25-0.5
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
Aroclor-1221	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
Aroclor-1232	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
Aroclor-1242	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
Aroclor-1248	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
Aroclor-1254	1	0.086 U	0.089 U	**17 J**	**3.8 J**	0.23	0.037 J	0.054 J	0.086 U	0.084 U
Aroclor-1260	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
Aroclor-1262	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
Aroclor-1268	1	0.086 U	0.089 U	***1.8 U***	0.89 U	0.088 U	0.081 U	0.088 U	0.086 U	0.084 U
All Aroclors	1	0.086 U	0.089 U	**17 J**	**3.8 J**	0.23	0.037 J	0.054 J	0.086 U	0.084 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7

Soil Samples - Summary of PCB Analysis Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	NHDES Soil Remediation Standard (SRS) *	GG-8-Mid 9/30/2021 0.5-1.5	GG-8-Mid 9/30/2021 1.5-3	GG-9-Mid 9/30/2021 0.25-0.5	GG-9-Mid 9/30/2021 0.5-1.5	GG-9-Mid 9/30/2021 1.5-3	FF-9-Mid 9/30/2021 0.25-0.5	FF-9-Mid 9/30/2021 0.5-1.5	F-9 9/30/2021 0.25-0.5	F-9 9/30/2021 0.5-1.5
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
Aroclor-1221	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
Aroclor-1232	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
Aroclor-1242	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
Aroclor-1248	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
Aroclor-1254	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.037 J	0.084 U	0.082 U
Aroclor-1260	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
Aroclor-1262	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
Aroclor-1268	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.086 U	0.084 U	0.082 U
All Aroclors	1	0.084 U	0.086 U	0.083 U	0.081 U	0.081 U	0.090 U	0.037 J	0.084 U	0.082 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standard (SRS) ***	**F-9**		**E-10**		**E-10**		**E-9**		**E-9**		**D-9**		**D-9**		**G-14**		**G-14**	
Sample Date		**9/30/2021**		**9/30/2021**		**9/30/2021**		**9/30/2021**		**9/30/2021**		**9/30/2021**		**9/30/2021**		**10/1/2021**		**10/1/2021**	
Depth (feet)		**1.5-3**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**		**0.5-1.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
Aroclor-1221	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
Aroclor-1232	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
Aroclor-1242	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
Aroclor-1248	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
Aroclor-1254	1	0.087	U	0.097	UJ	0.087	J	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
Aroclor-1260	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.051	J	0.087	U	0.088	U
Aroclor-1262	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
Aroclor-1268	1	0.087	U	0.097	U	0.093	U	0.089	U	0.087	U	0.088	U	0.089	U	0.087	U	0.088	U
All Aroclors	1	0.087	U	0.097	UJ	0.087	J	0.089	U	0.087	U	0.088	U	0.051	J	0.087	U	0.088	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standard (SRS) ***	**H-5**	**H-5**	**H-5**	**II-4**	**II-4**	**II-4**	**I-5**	**I-5**	**JJ-7**
Sample Date		**10/1/2021**	**10/1/2021**	**10/1/2021**	**10/1/2021**	**10/1/2021**	**10/1/2021**	**10/1/2021**	**10/1/2021**	**9/29/2021**
Depth (feet)		**0.25-0.5**	**0.5-1.5**	**1.5-3**	**0.25-0.5**	**0.5-1.5**	**1.5-3**	**0.25-0.5**	**0.5-1.5**	**0.5-1.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.090 U	0.085 U
Aroclor-1221	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.090 U	0.085 U
Aroclor-1232	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.090 U	0.085 U
Aroclor-1242	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.090 U	0.085 U
Aroclor-1248	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.090 U	0.085 U
Aroclor-1254	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.038 J	0.085 U
Aroclor-1260	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.057 J	0.085 U
Aroclor-1262	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.090 U	0.085 U
Aroclor-1268	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.090 U	0.085 U
All Aroclors	1	0.095 U	0.085 U	0.086 U	0.082 U	0.084 U	0.085 U	0.091 U	0.095 J	0.085 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7

Soil Samples - Summary of PCB Analysis Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**NHDES Soil Remediation Standard (SRS) ***	**JJ-7**		**I-9-Mid**		**I-9-Mid**		**II-9**		**II-9**		**J-10**		**J-10**		**J-10**		**J-11**	
Sample Date		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**		**9/29/2021**	
Depth (feet)		**1.5-3**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**		**0.5-1.5**		**0.25-0.5**		**0.5-1.5**		**1.5-3**		**0.25-0.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.086	U	0.089	U	0.092	U	0.84	U	0.086	U	0.89	U	0.091	U	0.089	U	0.093	U
Aroclor-1221	1	0.086	U	0.089	U	0.092	U	0.84	U	0.086	U	0.89	U	0.091	U	0.089	U	0.093	U
Aroclor-1232	1	0.086	U	0.089	U	0.092	U	0.84	U	0.086	U	0.89	U	0.091	U	0.089	U	0.093	U
Aroclor-1242	1	0.086	U	0.089	U	0.092	U	0.84	U	0.086	U	0.89	U	0.091	U	0.089	U	0.093	U
Aroclor-1248	1	0.086	U	0.089	U	0.092	U	0.84	U	0.086	U	0.89	U	0.091	U	0.089	U	0.093	U
Aroclor-1254	1	0.086	U	0.089	U	0.15		**2.9**		0.086	U	**2.5**		0.091	U	0.089	U	0.093	U
Aroclor-1260	1	0.086	U	0.089	U	0.092	U	0.96		0.086	U	0.63	J	0.091	U	0.089	U	0.087	J
Aroclor-1262	1	0.086	U	0.089	U	0.092	U	0.84	U	0.086	U	0.89	U	0.091	U	0.089	U	0.093	U
Aroclor-1268	1	0.086	U	0.089	U	0.092	U	0.84	U	0.086	U	0.89	U	0.091	U	0.089	U	0.093	U
All Aroclors	1	0.086	U	0.089	U	0.15		**3.9**		0.086	U	**3.13**	**J**	0.091	U	0.089	U	0.087	J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	**NHDES Soil Remediation Standard (SRS) ***	**J-11 9/29/2021 0.5-1.5**	**K-11 9/29/2021 0.25-0.5**	**K-11 9/29/2021 0.5-1.5**	**K-12 9/29/2021 0.25-0.5**	**K-12 9/29/2021 0.5-1.5**	**II-11-Mid 9/29/2021 0.25-0.5**	**II-11-Mid 9/29/2021 0.5-1.5**	**II-11-Mid 9/29/2021 1.5-3**	**J-13 9/29/2021 0.25-0.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.095 U	0.099 U	0.097 U	0.096 U	0.10 U	0.089 U	0.11 U	0.087 U	0.10 U
Aroclor-1221	1	0.095 U	0.099 U	0.097 U	0.096 U	0.10 U	0.089 U	0.11 U	0.087 U	0.10 U
Aroclor-1232	1	0.095 U	0.099 U	0.097 U	0.096 U	0.10 U	0.089 U	0.11 U	0.087 U	0.10 U
Aroclor-1242	1	0.095 U	0.099 U	0.097 U	0.096 U	0.10 U	0.089 U	0.11 U	0.087 U	0.10 U
Aroclor-1248	1	0.095 U	0.099 U	0.097 U	0.096 U	0.10 U	0.089 U	0.11 U	0.087 U	0.10 U
Aroclor-1254	1	0.095 U	0.17	0.17	0.15	0.25	0.14	0.11 U	0.087 U	0.11
Aroclor-1260	1	0.095 U	0.23	0.26	0.16	0.44	0.16	0.11 U	0.087 U	0.11
Aroclor-1262	1	0.095 U	0.099 U	0.097 U	0.096 U	0.10 U	0.089 U	0.11 U	0.087 U	0.10 U
Aroclor-1268	1	0.095 U	0.099 U	0.097 U	0.096 U	0.10 U	0.089 U	0.11 U	0.087 U	0.10 U
All Aroclors	1	0.095 U	0.40	0.43	0.31	0.69	0.30	0.11 U	0.087 U	0.22

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	NHDES Soil Remediation Standard (SRS) *	J-13	G-5	G-5	F-4	F-4	G-4	G-4	G-4	H-4
Sample Date		9/29/2021	9/30/2021	9/30/2021	9/30/2021	9/30/2021	9/30/2021	9/30/2021	9/30/2021	9/30/2021
Depth (feet)		0.5-1.5	0.25-0.5	0.5-1.5	0.25-0.5	0.5-1.5	0.25-0.5	0.5-1.5	1.5-3	0.25-0.5
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.10 U	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1221	1	0.10 U	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1232	1	0.10 U	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1242	1	0.10 U	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1248	1	0.10 U	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1254	1	0.20	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1260	1	0.14	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1262	1	0.10 U	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
Aroclor-1268	1	0.10 U	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U
All Aroclors	1	0.34	0.089 U	0.089 U	0.087 U	0.079 U	0.086 U	0.088 U	0.083 U	0.087 U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet)**	**NHDES Soil Remediation Standard (SRS) ***	**H-4** **9/30/2021** **0.5-1.5**		**I-3** **9/30/2021** **0.25-0.5**		**I-3** **9/30/2021** **0.5-1.5**		**H-3** **9/30/2021** **0.25-0.5**		**H-3** **9/30/2021** **0.5-1.5**		**H-3** **9/30/2021** **1.5-3**		**F-3** **9/30/2021** **0.25-0.5**		**F-3** **9/30/2021** **0.5-1.5**		**F-3** **9/30/2021** **1.5-3**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1221	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1232	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1242	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1248	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1254	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1260	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1262	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
Aroclor-1268	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U
All Aroclors	1	0.088	U	0.090	U	0.083	U	0.084	U	0.083	U	0.081	U	0.088	U	0.090	U	0.092	U

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7

Soil Samples - Summary of PCB Analysis Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet)**	**NHDES Soil Remediation Standard (SRS) ***	**E-3** **9/30/2021** **0.25-0.5**	**E-3** **9/30/2021** **0.5-1.5**	**W-9** **10/4/2021** **0.25-0.5**	**W-9** **10/4/2021** **0.5-1.5**	**V-8** **10/4/2021** **0.25-0.5**	**V-8** **10/4/2021** **0.5-1.5**	**K-15** **10/4/2021** **0.25-0.5**	**K-15** **10/4/2021** **0.5-1.5**	**K-14** **10/4/2021** **0.25-0.5**
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082										
Aroclor-1016	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.099 U
Aroclor-1221	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.099 U
Aroclor-1232	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.099 U
Aroclor-1242	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.099 U
Aroclor-1248	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.099 U
Aroclor-1254	1	0.092 U	0.093 U	0.37	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.20
Aroclor-1260	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.33
Aroclor-1262	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.099 U
Aroclor-1268	1	0.092 U	0.093 U	0.11 U	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.099 U
All Aroclors	1	0.092 U	0.093 U	0.37	0.098 U	0.097 U	0.10 U	0.11 U	0.093 U	0.53

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	**NHDES Soil Remediation Standard (SRS) ***	**K-14 10/4/2021 0.5-1.5**		**X-14 10/4/2021 0.25-0.5**		**X-14 10/4/2021 0.5-1.5**		**Y-13 10/4/2021 0.25-0.5**		**Y-13 10/4/2021 0.5-1.5**		**Z-10 10/4/2021 0.25-0.5**		**Z-10 10/4/2021 0.5-1.5**		**Y-11 10/4/2021 0.25-0.5**		**Y-11 10/4/2021 0.5-1.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.099	U	0.22	U	0.13	U	0.23	U	0.29	U	0.12	U	0.13	U	0.12	U	0.14	U
Aroclor-1221	1	0.099	U	0.22	U	0.13	U	0.23	U	0.29	U	0.12	U	0.13	U	0.12	U	0.14	U
Aroclor-1232	1	0.099	U	0.22	U	0.13	U	0.23	U	0.29	U	0.12	U	0.13	U	0.12	U	0.14	U
Aroclor-1242	1	0.099	U	0.22	U	0.13	U	0.23	U	0.29	U	0.12	U	0.13	U	0.12	U	0.14	U
Aroclor-1248	1	0.099	U	0.19	J	0.20		0.10	J	0.29	U	0.090	J	0.053	J	0.12	U	0.14	U
Aroclor-1254	1	0.099	U	**1.8**		**2.0**		0.25		0.48		0.36		0.21		0.21		0.10	J
Aroclor-1260	1	0.099	U	0.36		0.24		0.15	J	0.16	J	0.15		0.13	U	0.20		0.090	J
Aroclor-1262	1	0.099	U	0.22	U	0.13	U	0.23	U	0.29	U	0.12	U	0.13	U	0.12	U	0.14	U
Aroclor-1268	1	0.099	U	0.34		0.13	U	0.23	U	0.29	U	0.11	J	0.13	U	0.48		0.13	J
All Aroclors	1	0.099	U	**2.69**	**J**	**2.44**		0.50	J	0.64	J	0.710	J	0.263	J	0.89		0.32	J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.	
J	Estimated concentration.	X
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.	X
bold	Detected concentration exceeds SRS.	
bold italics	Not detected; laboratory reporting limit exceeds SRS.	
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.	

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date** **Depth (feet)**	**NHDES Soil Remediation Standard (SRS) ***	**X-12** **10/4/2021** **0.25-0.5**		**X-12** **10/4/2021** **0.5-1.5**		**Z-12** **10/4/2021** **0.25-0.5**		**Z-12** **10/4/2021** **0.5-1.5**		**II-2** **10/4/2021** **0.25-0.5**		**II-2** **10/4/2021** **0.5-1.5**		**D-10** **10/4/2021** **0.25-0.5**		**D-10** **10/4/2021** **0.5-1.5**		**X-10** **10/4/2021** **0.25-0.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082																			
Aroclor-1016	1	0.11	U	0.12	U	0.14	U	0.19	U	0.087	U	0.082	U	0.091	U	0.088	U	0.14	U
Aroclor-1221	1	0.11	U	0.12	U	0.14	U	0.19	U	0.087	U	0.082	U	0.091	U	0.088	U	0.14	U
Aroclor-1232	1	0.11	U	0.12	U	0.14	U	0.19	U	0.087	U	0.082	U	0.091	U	0.088	U	0.14	U
Aroclor-1242	1	0.11	U	0.12	U	0.14	U	0.19	U	0.087	U	0.082	U	0.091	U	0.088	U	0.14	U
Aroclor-1248	1	0.065	J	0.063	J	0.14	U	0.19	U	0.087	U	0.082	U	0.091	U	0.22		0.14	U
Aroclor-1254	1	0.13		0.12		0.25		0.35		0.087	U	0.082	U	0.052	J	0.088	U	0.45	
Aroclor-1260	1	0.071	J	0.12	U	0.21		0.19		0.059	J	0.082	U	0.091	U	0.088	U	0.21	
Aroclor-1262	1	0.11	U	0.12	U	0.14	U	0.19	U	0.087	U	0.082	U	0.091	U	0.088	U	0.14	U
Aroclor-1268	1	0.11	J	0.12	U	0.19		0.17	J	0.087	U	0.082	U	0.091	U	0.088	U	0.61	
All Aroclors	1	0.376	J	0.183	J	0.65		0.71	J	0.059	J	0.082	U	0.052	J	0.22		**1.27**	

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 7
Soil Samples - Summary of PCB Analysis Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date Depth (feet)	**NHDES Soil Remediation Standard (SRS) ***	**X-10 10/4/2021 0.5-1.5**		**X-8 10/4/2021 0.25-0.5**		**X-8 10/4/2021 0.5-1.5**	
Poluchlorinated Biphenyls (PCBs) by EPA Method 8082							
Aroclor-1016	1	0.13	U	0.12	U	0.13	U
Aroclor-1221	1	0.13	U	0.12	U	0.13	U
Aroclor-1232	1	0.13	U	0.12	U	0.13	U
Aroclor-1242	1	0.13	U	0.12	U	0.13	U
Aroclor-1248	1	0.052	J	0.12	U	0.13	U
Aroclor-1254	1	0.16		0.34		0.22	
Aroclor-1260	1	0.13	U	0.15		0.13	U
Aroclor-1262	1	0.13	U	0.12	U	0.13	U
Aroclor-1268	1	0.13	U	0.12	J	0.14	
All Aroclors	1	0.212	J	0.61	J	0.36	

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
bold	Detected concentration exceeds SRS.
bold italics	Not detected; laboratory reporting limit exceeds SRS.
*	Env-Or 606.19, Table 600-2, SRS, effective June 1, 2015.

TABLE 8
Surface Water Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Water Quality Criteria (WQC) for Toxic Substances ***		**SW101†**	**SW102†**	**SW103†**	**SW-101**	
Sample Date	**Protection of Aquatic Life Freshwater Chronic**	**Protection of Human Health Water & Fish Ingestion**	**08/06/08**	**08/06/08**	**08/06/08**	**05/22/20**	**06/10/20**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082							
All Aroclors	0.014 (e,n)	0.000064 (c,n)	--	--	--	***0.19 U***	--
Total Metals by EPA Methods 6010, 7471, or 200.7							
Arsenic	150 (d,i)	0.018 (b,c)	**5**	**6**	**7**	**9.0**	--
Barium	NS	1,000	45	40	22	40	--
Cadmium	0.21 (f,d)	5	ND (0.2)	ND (0.2)	0.2 J	0.20 U	--
Cadmium (dissolved**)	0.21 (f,d)	5	--	--	--	0.18 U	--
Chromium, total	11 (d,i)	100	ND (2)	ND (2)	3 J	1.1	--
Lead	0.41 (f,d)	NS	**1 J**	ND (1)	**20**	**11**	--
Lead (dissolved**)	0.41 (f,d)	NS	--	--	--	**7.0**	--
Mercury	0.77 (d,i)	0.05	ND (0.2)	ND (0.2)	ND (0.2)	***0.10 U***	--
Selenium	5	170	**10**	**10**	**6**	5.0 U	--
Silver	NS	105 (p)	--	--	--	0.20 U	--
Iron	1,000	300 (j)	--	--	--	--	--
Manganese	NS	50 (j)	--	--	--	--	--
Calcium Hardness	NS	NS	97200	96500	32300	--	290,000
Dissolved Metals by EPA Methods 6010 or 7471							
Arsenic	150 (d,i)	0.018 (b,c)	--	--	--	--	--
Barium	NS	1,000	--	--	--	--	--
Cadmium	0.21 (f,d)	5	--	--	--	--	--
Chromium, total	11 (d,i)	100	--	--	--	--	--
Lead	0.41 (f,d)	NS	--	--	--	--	--
Mercury	0.77 (d,i)	0.05	--	--	--	--	--
Selenium	5	170	--	--	--	--	--
Silver	NS	105 (p)	--	--	--	--	--
Iron	1,000	300 (j)	--	--	--	--	--
Manganese	NS	50 (j)	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270							
Acenaphthene (SIM)	520	20 (j)	--	--	--	--	--
Acenaphthylene (SIM)	NS	NS	--	--	--	--	--
Anthracene (SIM)	NS	8,300	--	--	--	--	--
Benzo(a)anthracene (SIM)	NS	0.0038 (c)	--	--	--	--	--
Benzo(a)pyrene (SIM)	NS	0.0038 (c)	--	--	--	--	--
Benzo(b)fluoranthene (SIM)	NS	0.0038 (c)	--	--	--	--	--
Benzo(g,h,i)perylene (SIM)	NS	NS	--	--	--	--	--
Benzo(k)fluoranthene (SIM)	NS	0.012 (c)	--	--	--	--	--
Chrysene (SIM)	NS	0.12 (c)	--	--	--	--	--
Dibenz(a,h)anthracene (SIM)	NS	0.0038 (c)	--	--	--	--	--
Fluoranthene (SIM)	NS	130	--	--	--	--	--
Fluorene (SIM)	NS	1,100	--	--	--	--	--
Indeno(1,2,3-cd)pyrene (SIM)	NS	0.0038 (c)	--	--	--	--	--
2-Methylnaphthalene (SIM)	NS	NS	--	--	--	--	--
Naphthalene (SIM)	620	NS	--	--	--	--	--
Phenanthrene (SIM)	NS	NS	--	--	--	--	--
Pyrene (SIM)	NS	830	--	--	--	--	--
Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)							
Chloride	230,000	NS	--	--	--	--	--
Nitrate as N	NS	10,000	--	--	--	--	--
Sulfate	NS	NS	--	--	--	--	--
Total Suspended Solids	NS	NS	--	--	--	--	--
Total Dissolved Solids	NS	NS	--	--	--	--	--

All results are in micrograms per liter (µg/L).

Detected and other selected compounds listed; all other analytes were not detected.

U	Not detected at or above the listed laboratory reporting limi
B	Constituent detected in blank; sample result is >5x blank (>10x for common laboratory contaminants); result valid.
UB	Constituent detected in blank; sample result is <5x blank (<10x for common laboratory contaminants); sample result changed to non-detection.
J	Estimated concentration
NS	No WQC established.
bold	Detected concentration meets or exceeds one or more WQC
bold italics	Not detected; laboratory reporting limit exceeds one or more WQC
*	Table 1703-1 of Env-Wq 1703.21, WQC for Toxic Substances, adopted 12/01/16
**	Calculated using Table 1703-2 of Env-Wq 1703.23, WQC for Toxic Substances, adopted 12/01/1(
(b)	Criterion refers to the inorganic form only
(c)	Criterion expressed as a function of the water effect ratio (see Env-WQ 1703.22 (d)
(e)	Criterion applies to the sum of the concentrations of 2 or more isomer
(f)	Criterion expressed as a function of total hardness (see Env-WQ 1703.22 (f)
(i)	Criterion is dissolved metal and hardness dependent (see Env-WQ 1703.22 (i)
(n)	Criterion applies to the sum of all PCBs
(a)	Acute aquatic criterion; no chronic criterion available.
(b)	Criterion for total halomethanes.
(c)	Criterion for total chlorinated benzenes.
(d)	Criterion for total dichlorobenzenes.
(e)	Criterion for total dichloroethenes.
(f)	Criterion for total dichloropropanes
(g)	Criterion for total dichloropropenes.
(p)	Criterion for silver shall be for the protection of humans from argyria (1703.22 (p)

TABLE 8

Surface Water Samples - Summary of Analytical Results

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Water Quality Criteria (WQC) for Toxic Substances ***		**SW-102**		**SW-103**		**SW-104**		**SW-105**	
Sample Date	**Protection of Aquatic Life Freshwater Chronic**	**Protection of Human Health Water & Fish Ingestion**	**05/22/20**	**06/10/20**	**05/22/20**	**06/10/20**	**05/22/20**	**06/10/20**	**05/22/20**	**06/10/20**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082										
All Aroclors	0.014 (e,n)	0.000064 (c,n)	***0.21 U***	--	***0.20 U***	--	***0.22 U***	--	***0.19 U***	--
Total Metals by EPA Methods 6010, 7471, or 200.7										
Arsenic	150 (d,i)	0.018 (b,c)	**2.5**	--	**2.1**	--	**26**	--	**230**	--
Barium	NS	1,000	47	--	94	--	510	--	**4,200**	--
Cadmium	0.21 (f,d)	5	0.098 J	--	**1.1**	--	**4.6**	--	**8.5**	--
Cadmium (dissolved**)	0.21 (f,d)	5	0.087 J	--	**1.0**	--	**4.3**	--	**7.4**	--
Chromium, total	11 (d,i)	100	1.0 U	--	1.8	--	**62**	--	**35**	--
Lead	0.41 (f,d)	NS	**5.8**	--	**130**	--	**210**	--	**3,100**	--
Lead (dissolved**)	0.41 (f,d)	NS	**3.4**	--	**83**	--	**154**	--	**1,674**	--
Mercury	0.77 (d,i)	0.05	***0.10 U***	--	***0.10 U***	--	**0.20**	--	**0.46**	--
Selenium	5	170	5.0 U	--	5.0 U	--	5.0 U	--	3.7 J	--
Silver	NS	105 (p)	0.20 U	--	0.20 U	--	0.22	--	1.0	--
Iron	1,000	300 (j)	--	--	--	--	--	--	--	--
Manganese	NS	50 (j)	--	--	--	--	--	--	--	--
Calcium Hardness	NS	NS	--	390,000	--	280,000	--	150,000	--	560,000
Dissolved Metals by EPA Methods 6010 or 7471										
Arsenic	150 (d,i)	0.018 (b,c)	--	--	--	--	--	--	--	--
Barium	NS	1,000	--	--	--	--	--	--	--	--
Cadmium	0.21 (f,d)	5	--	--	--	--	--	--	--	--
Chromium, total	11 (d,i)	100	--	--	--	--	--	--	--	--
Lead	0.41 (f,d)	NS	--	--	--	--	--	--	--	--
Mercury	0.77 (d,i)	0.05	--	--	--	--	--	--	--	--
Selenium	5	170	--	--	--	--	--	--	--	--
Silver	NS	105 (p)	--	--	--	--	--	--	--	--
Iron	1,000	300 (j)	--	--	--	--	--	--	--	--
Manganese	NS	50 (j)	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270										
Acenaphthene (SIM)	520	20 (j)	--	--	--	--	--	--	--	--
Acenaphthylene (SIM)	NS	NS	--	--	--	--	--	--	--	--
Anthracene (SIM)	NS	8,300	--	--	--	--	--	--	--	--
Benzo(a)anthracene (SIM)	NS	0.0038 (c)	--	--	--	--	--	--	--	--
Benzo(a)pyrene (SIM)	NS	0.0038 (c)	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene (SIM)	NS	0.0038 (c)	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene (SIM)	NS	NS	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene (SIM)	NS	0.012 (c)	--	--	--	--	--	--	--	--
Chrysene (SIM)	NS	0.12 (c)	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene (SIM)	NS	0.0038 (c)	--	--	--	--	--	--	--	--
Fluoranthene (SIM)	NS	130	--	--	--	--	--	--	--	--
Fluorene (SIM)	NS	1,100	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene (SIM)	NS	0.0038 (c)	--	--	--	--	--	--	--	--
2-Methylnaphthalene (SIM)	NS	NS	--	--	--	--	--	--	--	--
Naphthalene (SIM)	620	NS	--	--	--	--	--	--	--	--
Phenanthrene (SIM)	NS	NS	--	--	--	--	--	--	--	--
Pyrene (SIM)	NS	830	--	--	--	--	--	--	--	--
Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)										
Chloride	230,000	NS	--	--	--	--	--	--	--	--
Nitrate as N	NS	10,000	--	--	--	--	--	--	--	--
Sulfate	NS	NS	--	--	--	--	--	--	--	--
Total Suspended Solids	NS	NS	--	--	--	--	--	--	--	--
Total Dissolved Solids	NS	NS	--	--	--	--	--	--	--	--

All results are in micrograms per liter (µg/L).

Detected and other selected compounds listed; all other analytes were not detected.

U	Not detected at or above the listed laboratory reporting limi
B	Constituent detected in blank; sample result is >5x blank (>10x for common laboratory contaminants); result valid.
UB	Constituent detected in blank; sample result is <5x blank (<10x for common laboratory contaminants); sample result changed to non-detection.
J	Estimated concentration
NS	No WQC established.
bold	Detected concentration meets or exceeds one or more WQC
bold italics	Not detected; laboratory reporting limit exceeds one or more WQC
*	Table 1703-1 of Env-Wq 1703.21, WQC for Toxic Substances, adopted 12/01/16
**	Calculated using Table 1703-2 of Env-Wq 1703.23, WQC for Toxic Substances, adopted 12/01/16
(b)	Criterion refers to the inorganic form only
(c)	Criterion expressed as a function of the water effect ratio (see Env-WQ 1703.22 (d))
(e)	Criterion applies to the sum of the concentrations of 2 or more isomer
(f)	Criterion expressed as a function of total hardness (see Env-WQ 1703.22 (f))
(i)	Criterion is dissolved metal and hardness dependent (see Env-WQ 1703.22 (i))
(n)	Criterion applies to the sum of all PCBs
(a)	Acute aquatic criterion; no chronic criterion available.
(b)	Criterion for total halomethanes.
(c)	Criterion for total chlorinated benzenes.
(d)	Criterion for total dichlorobenzenes.
(e)	Criterion for total dichloroethenes.
(f)	Criterion for total dichloropropanes
(g)	Criterion for total dichloropropenes.
(p)	Criterion for silver shall be for the protection of humans from argyria (1703.22 (p)

TABLE 8
Surface Water Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Water Quality Criteria (WQC) for Toxic Substances ***		**SW-106**		**SW-201**		**SW-203**		**SW-208**	
Sample Date	**Protection of Aquatic Life Freshwater Chronic**	**Protection of Human Health Water & Fish Ingestion**	**05/22/20**	**06/10/20**	**09/22/21**	**10/01/21**	**09/22/21**	**10/01/21**	**09/23/21**	**10/01/21**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082										
All Aroclors	0.014 (e,n)	0.000064 (c,n)	***0.21 U***	--	--	--	--	--	--	--
Total Metals by EPA Methods 6010, 7471, or 200.7										
Arsenic	150 (d,i)	0.018 (b,c)	**12**	--	**2.3**	--	**2.8**	--	**2.1**	--
Barium	NS	1,000	110	--	250	--	280	--	37	--
Cadmium	0.21 (f,d)	5	**11**	--	0.084 J	--	0.11 J	--	0.20 U	--
Cadmium (dissolved**)	0.21 (f,d)	5	--	--	--	--	--	--	--	--
Chromium, total	11 (d,i)	100	**11**	--	1.0	--	0.96 J	--	1.1	--
Lead	0.41 (f,d)	NS	**38**	--	**49 B**	--	**77 B**	--	**21**	--
Lead (dissolved**)	0.41 (f,d)	NS	--	--	--	--	--	--	--	--
Mercury	0.77 (d,i)	0.05	0.040	--	***0.10 U***	--	***0.10 U***	--	***0.10 U***	--
Selenium	5	170	5.0 U	--	5.0 U	--	5.0 U	--	5.0 U	--
Silver	NS	105 (p)	0.20 U	--	0.20 U	--	0.20 U	--	0.20 U	--
Iron	1,000	300 (j)	--	--	--	**8,200**	--	**14,000**	--	**7,100**
Manganese	NS	50 (j)	--	--	--	**380**	--	**390**	--	**230**
Calcium Hardness	NS	NS	--	--	130,000 B	--	130,000 B	--	48,000	--
Dissolved Metals by EPA Methods 6010 or 7471										
Arsenic	150 (d,i)	0.018 (b,c)	--	--	**1.1**	--	**2.1**	--	**1.9**	--
Barium	NS	1,000	--	--	240	--	280	--	29	--
Cadmium	0.21 (f,d)	5	--	--	0.20 U	--	0.20 U	--	0.20 U	--
Chromium, total	11 (d,i)	100	--	--	1.0 U	--	1.0 U	--	1.0 U	--
Lead	0.41 (f,d)	NS	--	--	**2.9**	--	**11**	--	**4.3**	--
Mercury	0.77 (d,i)	0.05	--	--	***0.066 UB***	--	***0.061 UB***	--	***0.065 UB***	--
Selenium	5	170	--	--	5.0 U	--	5.0 U	--	5.0 U	--
Silver	NS	105 (p)	--	--	0.20 U	--	0.20 U	--	0.20 U	--
Iron	1,000	300 (j)	--	--	--	**4,900**	--	**6,400**	--	**4,900**
Manganese	NS	50 (j)	--	--	--	**370**	--	**370**	--	**200**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270										
Acenaphthene (SIM)	520	20 (j)	--	--	0.29 U	--	0.29 U	--	0.30 U	--
Acenaphthylene (SIM)	NS	NS	--	--	0.20 U	--	0.20 U	--	0.20 U	--
Anthracene (SIM)	NS	8,300	--	--	0.20 U	--	0.20 U	--	0.20 U	--
Benzo(a)anthracene (SIM)	NS	0.0038 (c)	--	--	***0.049 U***	--	***0.049 U***	--	***0.050 U***	--
Benzo(a)pyrene (SIM)	NS	0.0038 (c)	--	--	***0.098 U***	--	***0.098 U***	--	***0.10 U***	--
Benzo(b)fluoranthene (SIM)	NS	0.0038 (c)	--	--	***0.049 U***	--	***0.049 U***	--	***0.050 U***	--
Benzo(g,h,i)perylene (SIM)	NS	NS	--	--	0.49 U	--	0.49 U	--	0.50 U	--
Benzo(k)fluoranthene (SIM)	NS	0.012 (c)	--	--	***0.20 U***	--	***0.20 U***	--	***0.20 U***	--
Chrysene (SIM)	NS	0.12 (c)	--	--	***0.20 U***	--	***0.20 U***	--	***0.20 U***	--
Dibenz(a,h)anthracene (SIM)	NS	0.0038 (c)	--	--	***0.098 U***	--	***0.098 U***	--	***0.10 U***	--
Fluoranthene (SIM)	NS	130	--	--	0.49 U	--	0.49 U	--	0.50 U	--
Fluorene (SIM)	NS	1,100	--	--	0.98 U	--	0.98 U	--	1.0 U	--
Indeno(1,2,3-cd)pyrene (SIM)	NS	0.0038 (c)	--	--	***0.098 U***	--	***0.098 U***	--	***0.10 U***	--
2-Methylnaphthalene (SIM)	NS	NS	--	--	0.98 U	--	0.98 U	--	1.0 U	--
Naphthalene (SIM)	620	NS	--	--	0.98 U	--	0.98 U	--	1.0 U	--
Phenanthrene (SIM)	NS	NS	--	--	0.049 U	--	0.049 U	--	0.050 U	--
Pyrene (SIM)	NS	830	--	--	0.98 U	--	0.98 U	--	1.0 U	--
Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)										
Chloride	230,000	NS	--	--	--	110,000	--	110,000	--	42,000
Nitrate as N	NS	10,000	--	--	--	100 U	--	270	--	100
Sulfate	NS	NS	--	--	--	1,000 U	--	1,000 U	--	6,100
Total Suspended Solids	NS	NS	--	--	--	10,000	--	15,000 J	--	6,800
Total Dissolved Solids	NS	NS	--	--	--	320,000 J	--	300,000	--	140,000

All results are in micrograms per liter (µg/L).

Detected and other selected compounds listed; all other analytes were not detected.

U	Not detected at or above the listed laboratory reporting limi
B	Constituent detected in blank; sample result is >5x blank (>10x for common laboratory contaminants); result valid.
UB	Constituent detected in blank; sample result is <5x blank (<10x for common laboratory contaminants); sample result changed to non-detection.
J	Estimated concentration
NS	No WQC established.
bold	Detected concentration meets or exceeds one or more WQC
bold italics	Not detected; laboratory reporting limit exceeds one or more WQC
*	Table 1703-1 of Env-Wq 1703.21, WQC for Toxic Substances, adopted 12/01/16
**	Calculated using Table 1703-2 of Env-Wq 1703.23, WQC for Toxic Substances, adopted 12/01/1
(b)	Criterion refers to the inorganic form only
(c)	Criterion expressed as a function of the water effect ratio (see Env-WQ 1703.22 (d)
(e)	Criterion applies to the sum of the concentrations of 2 or more isomer
(f)	Criterion expressed as a function of total hardness (see Env-WQ 1703.22 (f)
(i)	Criterion is dissolved metal and hardness dependent (see Env-WQ 1703.22 (i)
(n)	Criterion applies to the sum of all PCBs
(a)	Acute aquatic criterion; no chronic criterion available.
(b)	Criterion for total halomethanes.
(c)	Criterion for total chlorinated benzenes.
(d)	Criterion for total dichlorobenzenes.
(e)	Criterion for total dichloroethenes.
(f)	Criterion for total dichloropropanes
(g)	Criterion for total dichloropropenes.
(p)	Criterion for silver shall be for the protection of humans from argyria (1703.22 (p)

TABLE 8
Surface Water Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	Water Quality Criteria (WQC) for Toxic Substances *		SW-210		SW-211	SW-212
	Protection of Aquatic Life Freshwater Chronic	**Protection of Human Health Water & Fish Ingestion**				
Sample Date			**09/23/21**	**10/01/21**	**09/23/21**	**09/23/21**
Polychlorinated Biphenyls (PCBs) by EPA Method 8082						
All Aroclors	0.014 (e,n)	0.000064 (c,n)	--	--	--	--
Total Metals by EPA Methods 6010, 7471, or 200.7						
Arsenic	150 (d,i)	0.018 (b,c)	**5.2**	--	**0.49 J**	**3.7**
Barium	NS	1,000	100	--	51	35
Cadmium	0.21 (f,d)	5	1.0	--	0.039 J	0.17 J
Cadmium (dissolved**)	0.21 (f,d)	5	--	--	--	--
Chromium, total	11 (d,i)	100	3.0	--	1.0 U	3.1
Lead	0.41 (f,d)	NS	**340**	--	**8.9**	**21**
Lead (dissolved**)	0.41 (f,d)	NS	--	--	--	--
Mercury	0.77 (d,i)	0.05	**0.061 J**	--	***0.10 U***	***0.10 U***
Selenium	5	170	5.0 U	--	5.0 U	5.0 U
Silver	NS	105 (p)	0.079 J	--	0.20 U	0.20 U
Iron	1,000	300 (j)	--	**10,000**	**4,100**	**6,900**
Manganese	NS	50 (j)	--	**370**	**480**	**89**
Calcium Hardness	NS	NS	72,000	--	65,000	41,000
Dissolved Metals by EPA Methods 6010 or 7471						
Arsenic	150 (d,i)	0.018 (b,c)	**1.1**	--	**1.0**	**3.1**
Barium	NS	1,000	64	--	51	35
Cadmium	0.21 (f,d)	5	0.20 U	--	0.20 U	0.032 J
Chromium, total	11 (d,i)	100	1.0 U	--	1.0 U	3.0
Lead	0.41 (f,d)	NS	**5.0**	--	**1.3**	**3.1**
Mercury	0.77 (d,i)	0.05	***0.063 UB***	--	***0.061 UB***	***0.071 UB***
Selenium	5	170	5.0 U	--	5.0 U	5.0 U
Silver	NS	105 (p)	0.20 U	--	0.20 U	0.20 U
Iron	1,000	300 (j)	--	**9,300**	**2,900**	**5,900**
Manganese	NS	50 (j)	--	**350**	**460**	**86**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270						
Acenaphthene (SIM)	520	20 (j)	0.29 U	--	0.29 U	0.29 U
Acenaphthylene (SIM)	NS	NS	0.19 U	--	0.20 U	0.19 U
Anthracene (SIM)	NS	8,300	0.19 U	--	0.20 U	0.19 U
Benzo(a)anthracene (SIM)	NS	0.0038 (c)	***0.049 U***	--	***0.049 U***	***0.048 U***
Benzo(a)pyrene (SIM)	NS	0.0038 (c)	***0.097 U***	--	***0.098 U***	***0.096 U***
Benzo(b)fluoranthene (SIM)	NS	0.0038 (c)	***0.049 U***	--	***0.049 U***	***0.048 U***
Benzo(g,h,i)perylene (SIM)	NS	NS	0.49 U	--	0.49 U	0.48 U
Benzo(k)fluoranthene (SIM)	NS	0.012 (c)	***0.19 U***	--	***0.20 U***	***0.19 U***
Chrysene (SIM)	NS	0.12 (c)	***0.19 U***	--	***0.20 U***	***0.19 U***
Dibenz(a,h)anthracene (SIM)	NS	0.0038 (c)	***0.097 U***	--	***0.098 U***	***0.096 U***
Fluoranthene (SIM)	NS	130	0.49 U	--	0.49 U	0.48 U
Fluorene (SIM)	NS	1,100	0.97 U	--	0.98 U	0.96 U
Indeno(1,2,3-cd)pyrene (SIM)	NS	0.0038 (c)	***0.097 U***	--	***0.098 U***	***0.096 U***
2-Methylnaphthalene (SIM)	NS	NS	0.97 U	--	0.98 U	0.96 U
Naphthalene (SIM)	620	NS	0.97 U	--	0.98 U	0.96 U
Phenanthrene (SIM)	NS	NS	0.049 U	--	0.049 U	0.048 U
Pyrene (SIM)	NS	830	0.97 U	--	0.98 U	0.96 U
Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)						
Chloride	230,000	NS	--	160,000	190,000	13,000
Nitrate as N	NS	10,000	--	150	100 U	100 U
Sulfate	NS	NS	--	970	1,400	1,400
Total Suspended Solids	NS	NS	--	15,000	4,600	100,000
Total Dissolved Solids	NS	NS	--	330,000	290,000	48,000

All results are in micrograms per liter (µg/L).

Detected and other selected compounds listed; all other analytes were not detected.

U	Not detected at or above the listed laboratory reporting limi
B	Constituent detected in blank; sample result is >5x blank (>10x for common laboratory contaminants); result valid.
UB	Constituent detected in blank; sample result is <5x blank (<10x for common laboratory contaminants); sample result changed to non-detection.
J	Estimated concentration
NS	No WQC established.
bold	Detected concentration meets or exceeds one or more WQC
bold italics	Not detected; laboratory reporting limit exceeds one or more WQC
*	Table 1703-1 of Env-Wq 1703.21, WQC for Toxic Substances, adopted 12/01/16
**	Calculated using Table 1703-2 of Env-Wq 1703.23, WQC for Toxic Substances, adopted 12/01/1(
(b)	Criterion refers to the inorganic form only
(c)	Criterion expressed as a function of the water effect ratio (see Env-WQ 1703.22 (d)
(e)	Criterion applies to the sum of the concentrations of 2 or more isomer
(f)	Criterion expressed as a function of total hardness (see Env-WQ 1703.22 (f)
(i)	Criterion is dissolved metal and hardness dependent (see Env-WQ 1703.22 (i)
(n)	Criterion applies to the sum of all PCBs
(a)	Acute aquatic criterion; no chronic criterion available.
(b)	Criterion for total halomethanes.
(c)	Criterion for total chlorinated benzenes.
(d)	Criterion for total dichlorobenzenes.
(e)	Criterion for total dichloroethenes.
(f)	Criterion for total dichloropropanes
(g)	Criterion for total dichloropropenes.
(p)	Criterion for silver shall be for the protection of humans from argyria (1703.22 (p)

TABLE 9
Sediment Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification **Sample Date**	**Consensus-Based Threshold Effect Concentration†**	**Consensus-Based Probable Effect Concentration†**	**SD-101**** **7/28/2008**	**SD-102**** **7/28/2008**	**SD-103**** **7/28/2008**	**SD-101** **5/22/2020**	**SD-102** **5/22/2020**	**SD-103** **5/22/2020**	**SD-104** **5/22/2020**	**SD-105** **5/22/2020**	**SD-106** **5/22/2020**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270											
Acenaphthene	NSL	NSL	ND (1.400)	ND (0.640)	ND (1.400)	--	--	--	--	--	--
Acenaphthylene	NSL	NSL	ND (1.400)	ND (0.640)	ND (1.400)	--	--	--	--	--	--
Anthracene	0.0572	0.845	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Benzo(a)anthracene	0.108	1.050	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Benzo(a)pyrene	0.150	1.450	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Benzo(b)fluoranthene	NSL	NSL	***ND (1.400)***	ND (0.640)	***ND (1.400)***	--	--	--	--	--	--
Benzo(g,h,i)perylene	NSL	NSL	ND (1.400)	ND (0.640)	ND (1.400)	--	--	--	--	--	--
Benzo(k)fluoranthene	NSL	NSL	ND (1.400)	ND (0.640)	ND (1.400)	--	--	--	--	--	--
Chrysene	0.166	1.290	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Dibenz(a,h)anthracene	0.033	NSL	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Fluoranthene	0.423	2.230	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Fluorene	0.0774	0.536	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NSL	NSL	ND (1.400)	ND (0.640)	ND (1.400)	--	--	--	--	--	--
2-Methylnaphthalene	NSL	NSL	ND (1.400)	ND (0.640)	ND (1.400)	--	--	--	--	--	--
Naphthalene	0.176	0.561	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Phenanthrene	0.204	1.170	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Pyrene	0.195	1.520	***ND (1.400)***	***ND (0.640)***	***ND (1.400)***	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs) by EPA Method 8082											
Aroclor-1016	NSL	NSL	--	ND (0.079)	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1221	NSL	NSL	--	ND (0.079)	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1232	NSL	NSL	--	ND (0.079)	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1242	NSL	NSL	--	ND (0.079)	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1248	NSL	NSL	--	ND (0.079)	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1254	NSL	NSL	--	ND (0.079)	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1260	NSL	NSL	--	ND (0.079)	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1262	NSL	NSL	--	--	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
Aroclor-1268	NSL	NSL	--	--	--	0.56 U	0.89 U	0.48 U	0.37 U	0.97 U	0.40 U
All Aroclors	0.0598	0.676	--	***ND (0.079)***	--	***0.56 U***	***0.89 U***	***0.48 U***	***0.37 U***	***0.97 U***	***0.40 U***
Total Metals by EPA Methods 6010 or 7471											
Arsenic	9.79	33.0	**15.9**	9.5	**15.4**	**24**	9.5 J	**21 U**	6.0 J	**80**	5.0 J
Barium	NSL	NSL	160 J	80 J	170 J	140	110	230	99	830	120
Cadmium	0.99	4.98	***ND (2.7)***	***ND (1.3)***	***ND (2.8)***	**1.6 J**	**3.6 J**	**2.1**	0.99 J	**2.3 J**	**18**
Chromium	43.4	111	32	38	39	17	9.5	7.4	27	9.7	32
Lead	35.8	128	**154**	**87**	**77**	**480**	**330**	**840**	**65**	**940**	**64**
Mercury	0.18	1.06	**0.27**	0.13	0.17	0.11 J	**0.31**	**0.20**	0.089 J	**0.27 J**	0.068 J
Selenium	NSL	NSL	3.2	1.8	3.3	23 U	39 U	21 U	16 U	39 U	17 U
Silver	NSL	NSL	ND (37)	ND (18)	ND (39)	2.3 U	3.9 U	2.1 U	1.6 U	3.9 U	1.7 U
Total Organic Carbon by EPA Method 9060A											
Total Organic Carbon	NSL	NSL	--	--	--	--	--	--	--	--	--

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
I	Infaunal community impacts.
H	*Hyalella azteca (H. azteca)* bioassay.
M	Microtox bioassay.
NSL	No screening level established.
--	Sample not collected/analyzed for this compound.
**	Results transcribed from Limited Subsurface Investigation, Ransom Environmental Consultants, Inc., October 10, 2008.
bold	Detected concentration exceeds the lowest screening level value.
bold italics	Not detected; laboratory reporting limit exceeds the lowest screening level value.
†	Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems, MacDonald et al. Archives of Environmental Contamination and Toxicology, January 13, 2000.

TABLE 9
Sediment Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification	**Consensus-Based Threshold Effect Concentration†**	**Consensus-Based Probable Effect Concentration†**	**SD-201**	**SD-202**	**SD-203**	**SD-204**	**SD-205**	**SD-206**	**SD-207**	**SD-208**	**SD-209**
Sample Date			**9/22/2021**	**9/22/2021**	**9/22/2021**	**9/22/2021**	**9/22/2021**	**9/22/2021**	**9/22/2021**	**9/23/2021**	**9/23/2021**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270											
Acenaphthene	NSL	NSL	1.9 U	0.34 U	0.029 J	0.029 U	0.0063 J	0.014 J	0.98	0.21 U	0.13 U
Acenaphthylene	NSL	NSL	1.9 U	0.34 U	0.026 J	0.0041 J	0.0045 J	0.013 J	0.33 J	0.21 U	0.13 U
Anthracene	0.0572	0.845	***1.9 U***	***0.34 U***	**0.11 J**	0.0037 J	**0.017 J**	0.038 J	**2.7**	**0.22**	0.011 J
Benzo(a)anthracene	0.108	1.050	**0.72 J**	**0.16 J**	**0.38**	0.014	0.054	**0.15**	**7.9**	**0.71**	0.042
Benzo(a)pyrene	0.150	1.450	**0.84 J**	**0.23 J**	**0.31**	0.015	0.046	0.13	**7.3**	**0.69**	0.044
Benzo(b)fluoranthene	NSL	NSL	0.98 J	0.37	0.39	0.024	0.059	0.18	10	0.81	0.067
Benzo(g,h,i)perylene	NSL	NSL	1.9 U	0.16 J	0.20 J	0.013 J	0.032 J	0.088 J	3.4	0.37	0.033 J
Benzo(k)fluoranthene	NSL	NSL	1.9 U	0.12 J	0.14	0.0074 J	0.025 J	0.062 J	3.7	0.35	0.021 J
Chrysene	0.166	1.290	**0.77 J**	**0.19 J**	**0.39**	0.021 J	0.059	0.16	**7.4**	**0.66**	0.057 J
Dibenz(a,h)anthracene	0.033	NSL	***1.9 U***	***0.34 U***	**0.048**	0.0028 J	0.0082	**0.022 J**	**0.95**	***0.21 U***	0.025 U
Fluoranthene	0.423	2.230	**1.1 J**	0.30 J	**0.76**	0.036 J	0.12	0.31	**17**	**1.4**	0.096 J
Fluorene	0.0774	0.536	***1.9 U***	***0.34 U***	0.037 J	***0.11 U***	0.0064 J	0.011 J	**1.1**	***0.21 U***	***0.50 U***
Indeno(1,2,3-cd)pyrene	NSL	NSL	1.9 U	0.22 J	0.22	0.015 J	0.038	0.10	4.0	0.42	0.039 J
2-Methylnaphthalene	NSL	NSL	43	0.34 U	0.55 U	0.11 U	0.16 U	0.46 U	0.43 J	0.21 U	0.50 U
Naphthalene	0.176	0.561	**19**	***0.34 U***	***0.55 U***	0.11 U	0.16 U	***0.46 U***	**0.82**	***0.21 U***	***0.50 U***
Phenanthrene	0.204	1.170	**1.2 J**	0.11 J	**0.44**	0.020 J	0.081	0.16	**14**	**1.0**	0.060 J
Pyrene	0.195	1.520	**1.3 J**	**0.32 J**	**0.66**	0.031 J	0.092 J	**0.24 J**	**18**	**1.4**	0.083 J
Polychlorinated Biphenyls (PCBs) by EPA Method 8082											
Aroclor-1016	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1221	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1232	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1242	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1248	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1254	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1260	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1262	NSL	NSL	--	--	--	--	--	--	--	--	--
Aroclor-1268	NSL	NSL	--	--	--	--	--	--	--	--	--
All Aroclors	0.0598	0.676	--	--	--	--	--	--	--	--	--
Total Metals by EPA Methods 6010 or 7471											
Arsenic	9.79	33.0	**69**	**11**	**21 J**	7.3	**21**	**18 J**	**24**	5.2 J	**20**
Barium	NSL	NSL	580	89	260	36	95	260	440	98	57
Cadmium	0.99	4.98	**7.5**	**1.7**	**5.6**	0.35 J	**1.6**	**7.3**	**2.3**	0.91 J	**1.1 J**
Chromium	43.4	111	31	**58**	35	30	30	22	32	32	32
Lead	35.8	128	**1,600**	**160**	**2,200**	33	**150**	**880**	**3,500**	**660**	**44**
Mercury	0.18	1.06	**0.31**	0.16	**0.65**	0.059	0.087	**0.40**	**0.42**	0.13	0.12
Selenium	NSL	NSL	36 U	6.6 U	27 U	5.7 U	7.8 U	23 U	12 U	10 U	13 U
Silver	NSL	NSL	3.6 U	0.66 U	2.7 U	0.57 U	0.78 U	2.3 U	2.3 U	1.0 U	1.3 U
Total Organic Carbon by EPA Method 9060A											
Total Organic Carbon	NSL	NSL	200,000 J	1,700	480,000 J	140,000 J	110,000 J	200,000 J	210,000 J	220,000 J	160,000 J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
I	Infaunal community impacts.
H	*Hyalella azteca (H. azteca)* bioassay.
M	Microtox bioassay.
NSL	No screening level established.
--	Sample not collected/analyzed for this compound.
**	Results transcribed from Limited Subsurface Investigation, Ransom Environmental Consultants, Inc., October 10, 2008.
bold	Detected concentration exceeds the lowest screening level value.
bold italics	Not detected; laboratory reporting limit exceeds the lowest screening level value.
†	Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems, MacDonald et al. Archives of Environmental Contamination and Toxicology, January 13, 2000.

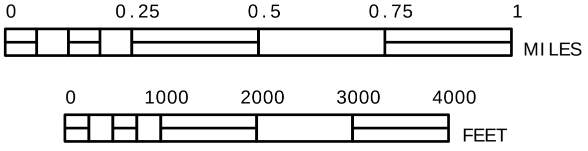
TABLE 9
Sediment Samples - Summary of Analytical Results
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

Sample Identification Sample Date	Consensus-Based Threshold Effect Concentration†	Consensus-Based Probable Effect Concentration†	SD-210 9/23/2021	SD-211 9/23/2021	SD-212 9/23/2021	SD-213 9/23/2021	SD-214 9/23/2021	SD-215 9/23/2021	SD-217 9/23/2021	SD-218 10/1/2021	SD-219 10/1/2021	SD-220 10/1/2021	SD-221 10/1/2021
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270													
Acenaphthene	NSL	NSL	0.34 U	0.12 U	0.33 U	0.0063 J	0.26 U	0.22 U	0.95	0.041 J	0.0094 J	0.036 J	0.099 U
Acenaphthylene	NSL	NSL	0.34 U	0.12 U	0.33 U	0.076 U	0.26 U	0.22 U	0.11 J	0.023 J	0.040 J	0.038 J	0.012 J
Anthracene	0.0572	0.845	***0.27 U***	0.013 J	0.016 J	0.018 J	***0.26 U***	***0.22 U***	**2.0**	**0.12**	0.056 J	**0.11**	0.014 J
Benzo(a)anthracene	0.108	1.050	0.048 J	0.053	0.052 J	0.057	***0.26 U***	**0.22**	**8.5**	**0.40**	**0.14**	**0.35**	**0.066**
Benzo(a)pyrene	0.150	1.450	0.041 J	0.045	0.046 J	0.051	***0.26 U***	**0.24**	**8.6**	**0.37**	0.14	**0.31**	0.049
Benzo(b)fluoranthene	NSL	NSL	0.064 J	0.059	0.064 J	0.070	0.26 U	0.25	9.9	0.46	0.23	0.40	0.089
Benzo(g,h,i)perylene	NSL	NSL	0.031 J	0.025 J	0.030 J	0.031 J	0.27 U	0.22 U	3.1	0.28	0.20 J	0.25	0.050 J
Benzo(k)fluoranthene	NSL	NSL	0.022 J	0.021 J	0.022 J	0.024 J	0.26 U	0.15 J	2.9	0.19	0.074 J	0.14	0.031 J
Chrysene	0.166	1.290	0.059 J	0.051 J	0.062 J	0.066	***0.26 U***	**0.21 J**	**7.7**	**0.42**	**0.17**	**0.36**	0.078 J
Dibenz(a,h)anthracene	0.033	NSL	***0.069 U***	0.024 U	***0.066 U***	0.0079 J	***0.26 U***	***0.22 U***	**0.92**	**0.061**	**0.034**	**0.054**	0.011 J
Fluoranthene	0.423	2.230	0.10 J	0.099 J	0.11 J	0.12 J	***0.26 U***	**0.43**	**18**	**0.77**	0.23 J	**0.63**	0.13 J
Fluorene	0.0774	0.536	***1.4 U***	***0.49 U***	***1.3 U***	0.0063 J	***0.26 U***	***0.22 U***	**0.83**	0.041 J	0.010 J	0.040 J	***0.40 U***
Indeno(1,2,3-cd)pyrene	NSL	NSL	0.037 J	0.032 J	0.039 J	0.038 J	0.29 U	0.24 U	3.8	0.28	0.18	0.25	0.045 J
2-Methylnaphthalene	NSL	NSL	1.4 U	0.49 U	1.3 U	0.30 U	0.26 U	0.22 U	0.15	0.54 U	0.33 J	0.15 J	0.40 U
Naphthalene	0.176	0.561	***1.4 U***	***0.49 U***	***1.3 U***	***0.30 U***	***0.26 U***	***0.22 U***	**0.24**	***0.54 U***	**0.22 J**	***0.43 U***	***0.40 U***
Phenanthrene	0.204	1.170	***0.34 U***	0.051 J	0.063 J	0.079	***0.26 U***	**0.32**	**11**	**0.43**	0.14	**0.43**	**0.043 J**
Pyrene	0.195	1.520	0.079 J	0.080 J	0.090 J	0.10 J	***0.26 U***	**0.45**	**18**	**0.65**	**0.21 J**	**0.53**	0.12 J
Polychlorinated Biphenyls (PCBs) by EPA Method 8082													
Aroclor-1016	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1221	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1232	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1242	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1248	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1254	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1260	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
Aroclor-1268	NSL	NSL	--	--	--	--	--	--	--	--	--	--	--
All Aroclors	0.0598	0.676	--	--	--	--	--	--	--	--	--	--	--
Total Metals by EPA Methods 6010 or 7471													
Arsenic	9.79	33.0	***33 U***	9.3 J	***33 U***	**27**	5.8 J	**110**	**14**	**13**	**13**	**15**	**12**
Barium	NSL	NSL	140	36	120	67	66	160	500	1,100	500	400	120
Cadmium	0.99	4.98	**4.7**	**2.8**	**3.0 J**	**1.3**	***1.2 U***	**7.2**	**1.8**	**4.7**	**4.4**	**3.6**	**3.7**
Chromium	43.4	111	23	22	16	39	39	**64**	28	**53**	**48**	**51**	**55**
Lead	35.8	128	**1,500**	**510**	**510**	**58**	**93**	**510**	**2,800**	**4,600**	**1,900**	**1,900**	**360**
Mercury	0.18	1.06	**0.40**	**0.20**	**0.20 J**	0.089	**0.27**	0.17 J	**13**	**0.43**	**0.34**	**0.26**	0.051
Selenium	NSL	NSL	33 U	12 U	33 U	7.1 U	12 U	10 U	6.3	5.3 U	5.1 U	4.1 U	3.9 U
Silver	NSL	NSL	3.3 U	1.2 U	3.3 U	0.71 U	1.2 U	1.0 U	0.50 U	0.53 U	3.5	0.41 U	0.39 U
Total Organic Carbon by EPA Method 9060A													
Total Organic Carbon	NSL	NSL	770,000	60,000 J	310,000	92,000 J	77,000 J	220,000 J	49,000 J	69,000 J	66,000	42,000	26,000 J

All detected and selected other analytes listed; all others were not detected.
Results in milligrams per kilogram (mg/kg) unless otherwise noted.

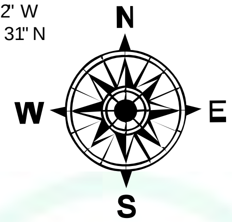
U	Not detected at or above the indicated laboratory reporting limit.
J	Estimated concentration.
I	Infaunal community impacts.
H	*Hyalella azteca (H. azteca)* bioassay.
M	Microtox bioassay.
NSL	No screening level established.
--	Sample not collected/analyzed for this compound.
**	Results transcribed from Limited Subsurface Investigation, Ransom Environmental Consultants, Inc., October 10, 2008.
bold	Detected concentration exceeds the lowest screening level value.
bold italics	Not detected; laboratory reporting limit exceeds the lowest screening level value.
†	Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems, MacDonald et al. Archives of Environmental Contamination and Toxicology, January 13, 2000.

FIGURES



CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

LAT: 70° 47' 22' W
LONG 43° 2' 31" N

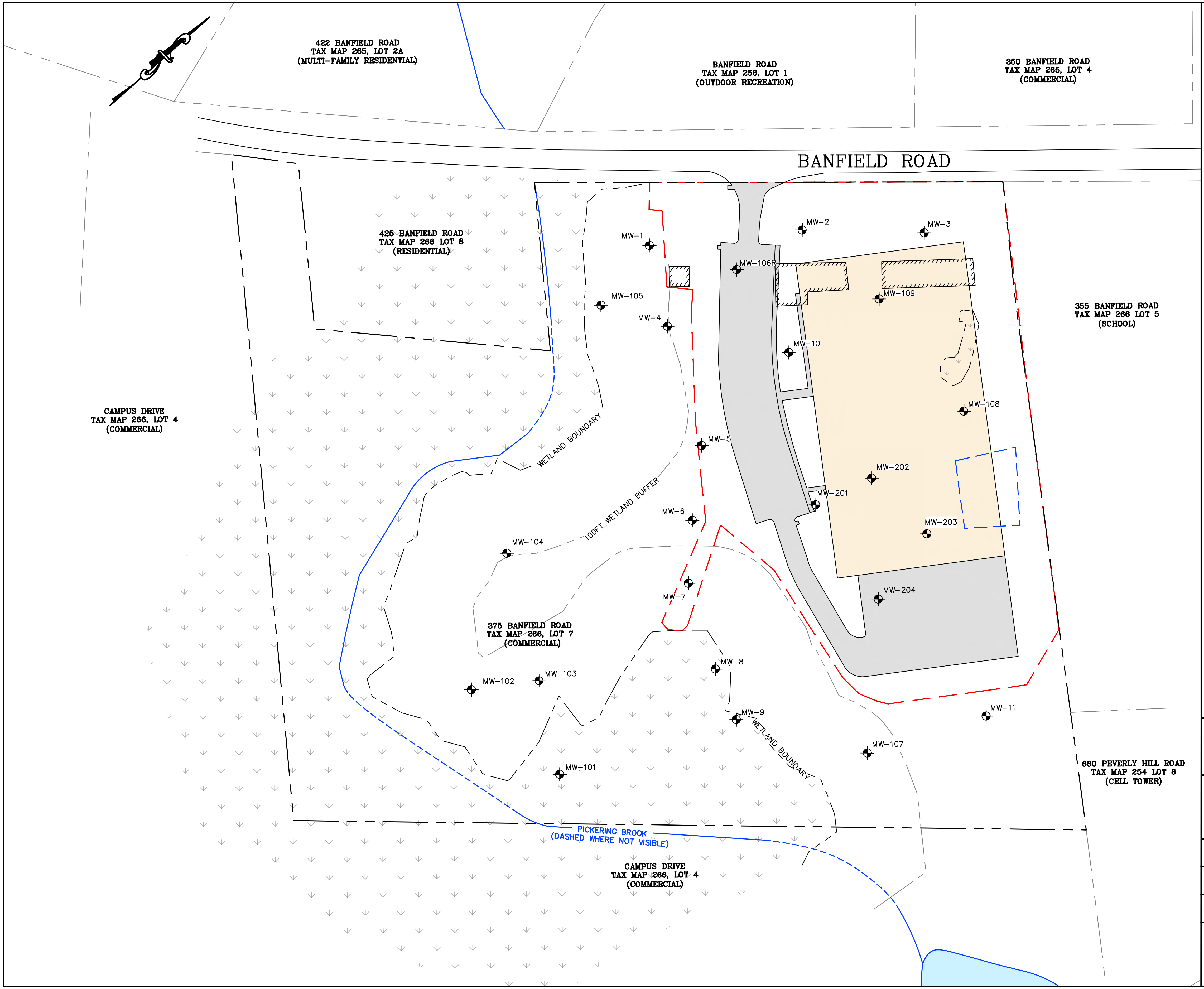


DATE April 20, 2020	SCALE Scale: 1:24,000	FILE
APPROVED BY JPR	DRAWN BY MJM	REVISED
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0002
LOCATION Banfield Realty, LLC 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		MAP SOURCE Copyright: © 2013 National Geographic Society, i-cubed

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

SITE LOCATION MAP

Figure 1



LEGEND

- APPROXIMATE SUBJECT PROPERTY BOUNDARY
- APPROXIMATE ABUTTER PROPERTY BOUNDARY
- WETLAND BOUNDARY
- WETLAND BUFFER
- APPROXIMATE CENTER OF BROOK
- LIMITS OF DISTURBANCE
- MW-1 MONITORING WELL
- ▨ EXISTING STRUCTURE
- PROPOSED PAVED AREA
- PROPOSED BUILDING
- LOCATION OF FORMER CAR CRUSHER

NOTES

1. EXISTING AND PROPOSED SITE FEATURES BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

GRAPHIC SCALE

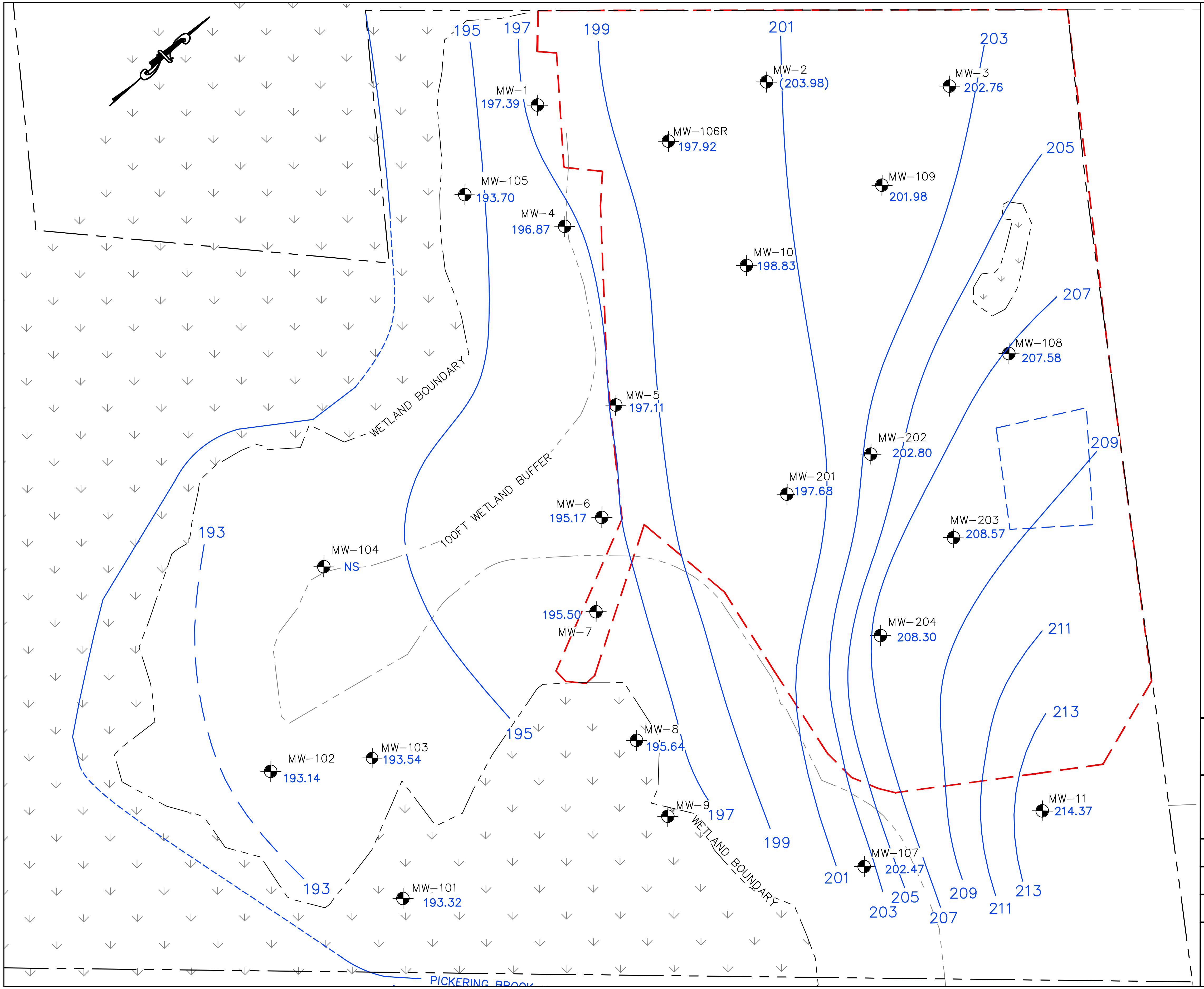
120 0 60 120 240

(IN FEET)
1 inch = 120 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
PROPOSED DEVELOPMENT PLAN

DATE October 21, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 2



LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

APPROXIMATE ABUTTER PROPERTY BOUNDARY

WETLAND BOUNDARY

WETLAND BUFFER

APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)

LIMITS OF DISTURBANCE FOR PROPOSED DEVELOPMENT

MW-1 197.39 MONITORING WELL WITH PIEZOMETRIC HEAD ELEVATION

205 PIEZOMETRIC HEAD ELEVATION CONTOUR

APPROXIMATE LOCATION OF FORMER CAR CRUSHER

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
PIEZOMETRIC HEAD ELEVATION PLAN (8/26/21)

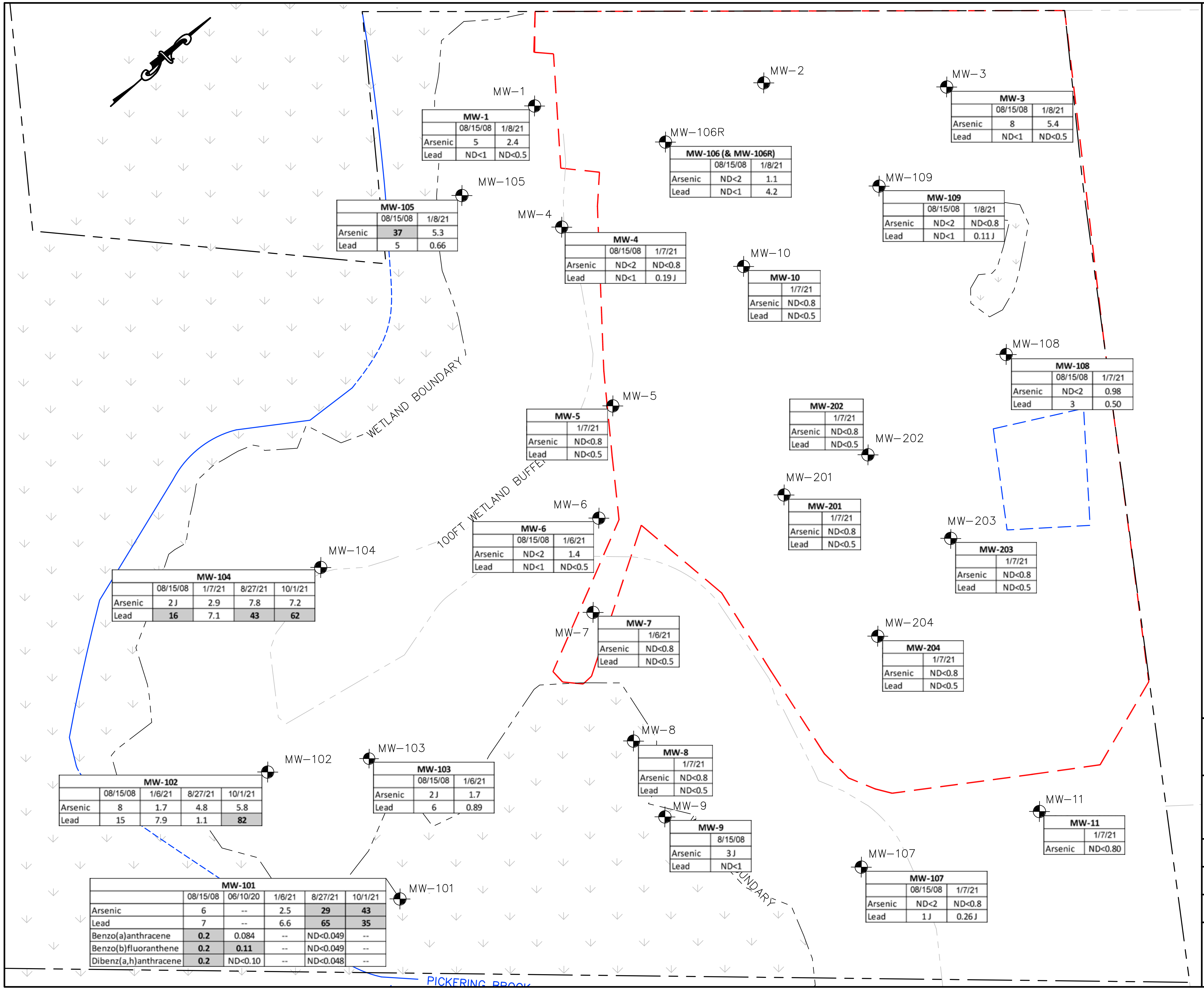
DATE	SCALE	FILE
October 21, 2021	GRAPHIC	Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –

CLIENT
Banfield Realty, LLC

JOB NUMBER
BANF0005

LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire

DRAWING NUMBER
FIGURE 3



MW-1		
	08/15/08	1/8/21
Arsenic	5	2.4
Lead	ND<1	ND<0.5

MW-3		
	08/15/08	1/8/21
Arsenic	8	5.4
Lead	ND<1	ND<0.5

MW-106 (& MW-106R)		
	08/15/08	1/8/21
Arsenic	ND<2	1.1
Lead	ND<1	4.2

MW-105		
	08/15/08	1/8/21
Arsenic	**37**	5.3
Lead	5	0.66

MW-4		
	08/15/08	1/7/21
Arsenic	ND<2	ND<0.8
Lead	ND<1	0.19 J

MW-109		
	08/15/08	1/8/21
Arsenic	ND<2	ND<0.8
Lead	ND<1	0.11 J

MW-10	
	1/7/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-108		
	08/15/08	1/7/21
Arsenic	ND<2	0.98
Lead	3	0.50

MW-5	
	1/7/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-202	
	1/7/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-201	
	1/7/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-6		
	08/15/08	1/6/21
Arsenic	ND<2	1.4
Lead	ND<1	ND<0.5

MW-203	
	1/7/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-104				
	08/15/08	1/7/21	8/27/21	10/1/21
Arsenic	2 J	2.9	7.8	7.2
Lead	**16**	7.1	**43**	**62**

MW-7	
	1/6/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-204	
	1/7/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-8	
	1/7/21
Arsenic	ND<0.8
Lead	ND<0.5

MW-102				
	08/15/08	1/6/21	8/27/21	10/1/21
Arsenic	8	1.7	4.8	5.8
Lead	15	7.9	1.1	**82**

MW-103		
	08/15/08	1/6/21
Arsenic	2 J	1.7
Lead	6	0.89

MW-9	
	8/15/08
Arsenic	3 J
Lead	ND<1

MW-11	
	1/7/21
Arsenic	ND<0.80

MW-107		
	08/15/08	1/7/21
Arsenic	ND<2	ND<0.8
Lead	1 J	0.26 J

MW-101					
	08/15/08	06/10/20	1/6/21	8/27/21	10/1/21
Arsenic	6	--	2.5	**29**	**43**
Lead	7	--	6.6	**65**	**35**
Benzo(a)anthracene	**0.2**	0.084	--	ND<0.049	--
Benzo(b)fluoranthene	**0.2**	**0.11**	--	ND<0.049	--
Dibenz(a,h)anthracene	**0.2**	ND<0.10	--	ND<0.048	--

LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

APPROXIMATE ABUTTER PROPERTY BOUNDARY

WETLAND BOUNDARY

WETLAND BUFFER

APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)

MW-1 MONITORING WELL

LIMITS OF DISTURBANCE FOR PROPOSED DEVELOPMENT

LOCATION OF FORMER CAR CRUSHER

MW-105			
	08/15/08	1/8/21	Monitoring Well ID Sampling Date
Arsenic	**37**	5.3	Analyte Concentration in micrograms per liter
Lead	5	0.66	Bold/Shaded Value Exceeds Ambient Groundwater Quality Standard

J Indicates an estimated value

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. VALUES DATED 8/15/08 TRANSCRIBED FROM TABLE 4 OF LIMITED SITE INVESTIGATION, RANSOM ENVIRONMENTAL CONSULTANTS, INC., OCTOBER 10, 2008.

GRAPHIC SCALE

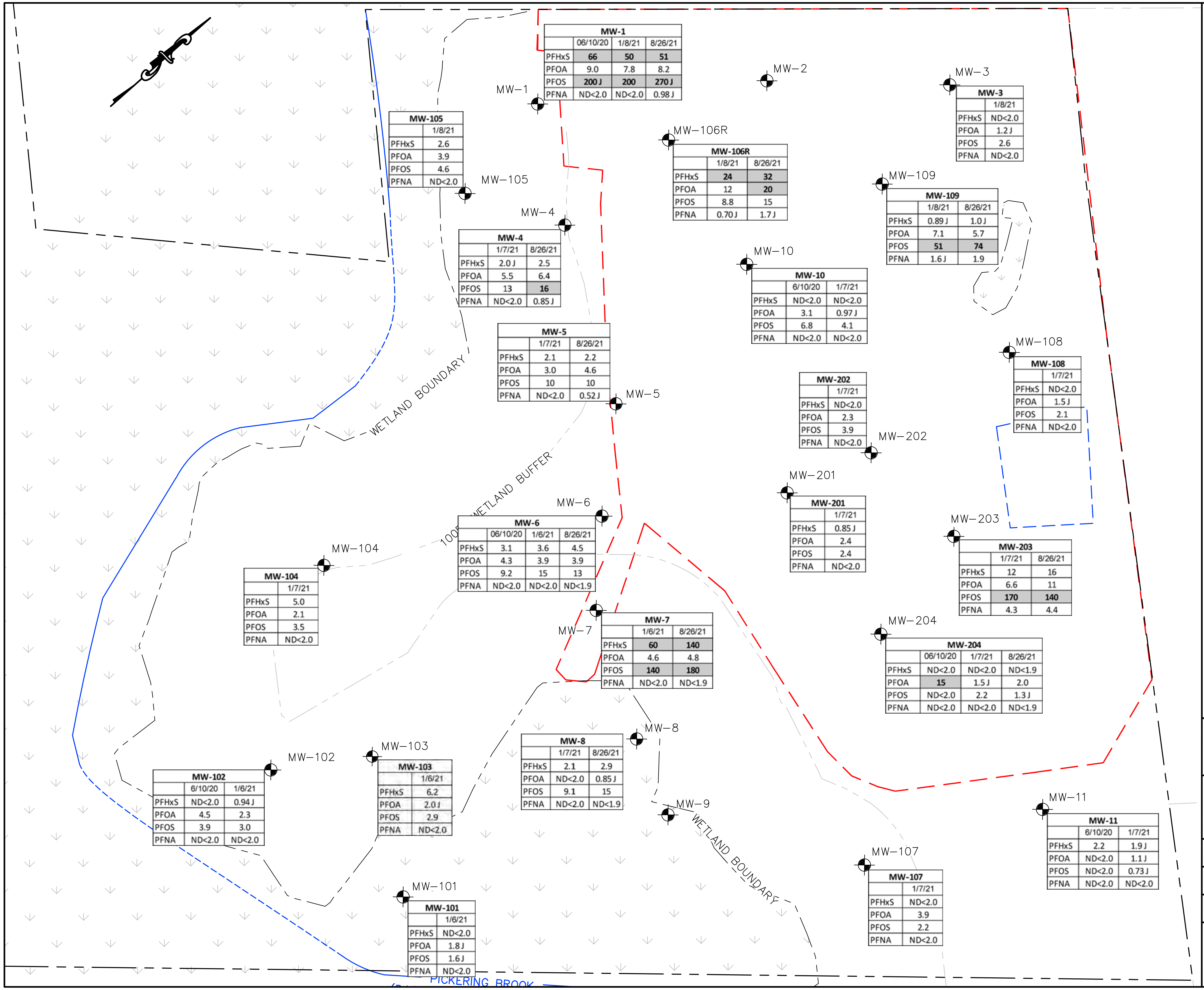
80 0 40 80 160

(IN FEET)
1 inch = 80feet

Wilcox&Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
DISSOLVED METALS & PAHs IN GROUNDWATER

DATE October 21, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 4



MW-1	06/10/20	1/8/21	8/26/21
PFHxS	**66**	**50**	**51**
PFOA	9.0	7.8	8.2
PFOS	**200 J**	**200**	**270 J**
PFNA	ND<2.0	ND<2.0	0.98 J

MW-105	1/8/21
PFHxS	2.6
PFOA	3.9
PFOS	4.6
PFNA	ND<2.0

MW-106R	1/8/21	8/26/21
PFHxS	**24**	**32**
PFOA	12	**20**
PFOS	8.8	15
PFNA	0.70 J	1.7 J

MW-3	1/8/21
PFHxS	ND<2.0
PFOA	1.2 J
PFOS	2.6
PFNA	ND<2.0

MW-109	1/8/21	8/26/21
PFHxS	0.89 J	1.0 J
PFOA	7.1	5.7
PFOS	**51**	**74**
PFNA	1.6 J	1.9

MW-4	1/7/21	8/26/21
PFHxS	2.0 J	2.5
PFOA	5.5	6.4
PFOS	13	**16**
PFNA	ND<2.0	0.85 J

MW-10	6/10/20	1/7/21
PFHxS	ND<2.0	ND<2.0
PFOA	3.1	0.97 J
PFOS	6.8	4.1
PFNA	ND<2.0	ND<2.0

MW-5	1/7/21	8/26/21
PFHxS	2.1	2.2
PFOA	3.0	4.6
PFOS	10	10
PFNA	ND<2.0	0.52 J

MW-108	1/7/21
PFHxS	ND<2.0
PFOA	1.5 J
PFOS	2.1
PFNA	ND<2.0

MW-202	1/7/21
PFHxS	ND<2.0
PFOA	2.3
PFOS	3.9
PFNA	ND<2.0

MW-201	1/7/21
PFHxS	0.85 J
PFOA	2.4
PFOS	2.4
PFNA	ND<2.0

MW-6	06/10/20	1/6/21	8/26/21
PFHxS	3.1	3.6	4.5
PFOA	4.3	3.9	3.9
PFOS	9.2	15	13
PFNA	ND<2.0	ND<2.0	ND<1.9

MW-104	1/7/21
PFHxS	5.0
PFOA	2.1
PFOS	3.5
PFNA	ND<2.0

MW-203	1/7/21	8/26/21
PFHxS	12	16
PFOA	6.6	11
PFOS	**170**	**140**
PFNA	4.3	4.4

MW-7	1/6/21	8/26/21
PFHxS	**60**	**140**
PFOA	4.6	4.8
PFOS	**140**	**180**
PFNA	ND<2.0	ND<1.9

MW-204	06/10/20	1/7/21	8/26/21
PFHxS	ND<2.0	ND<2.0	ND<1.9
PFOA	**15**	1.5 J	2.0
PFOS	ND<2.0	2.2	1.3 J
PFNA	ND<2.0	ND<2.0	ND<1.9

MW-8	1/7/21	8/26/21
PFHxS	2.1	2.9
PFOA	ND<2.0	0.85 J
PFOS	9.1	15
PFNA	ND<2.0	ND<1.9

MW-102	6/10/20	1/6/21
PFHxS	ND<2.0	0.94 J
PFOA	4.5	2.3
PFOS	3.9	3.0
PFNA	ND<2.0	ND<2.0

MW-103	1/6/21
PFHxS	6.2
PFOA	2.0 J
PFOS	2.9
PFNA	ND<2.0

MW-11	6/10/20	1/7/21
PFHxS	2.2	1.9 J
PFOA	ND<2.0	1.1 J
PFOS	ND<2.0	0.73 J
PFNA	ND<2.0	ND<2.0

MW-107	1/7/21
PFHxS	ND<2.0
PFOA	3.9
PFOS	2.2
PFNA	ND<2.0

MW-101	1/6/21
PFHxS	ND<2.0
PFOA	1.8 J
PFOS	1.6 J
PFNA	ND<2.0

LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY
APPROXIMATE ABUTTER PROPERTY BOUNDARY
WETLAND BOUNDARY
WETLAND BUFFER
APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)
MW–1 MONITORING WELL
LIMITS OF DISTURBANCE
LOCATION OF FORMER CAR CRUSHER

MW-4	1/7/21	8/26/21
PFHxS	2.0 J	2.5
PFOA	5.5	6.4
PFOS	13	**16**
PFNA	ND<2.0	0.85 J

Monitoring Well ID
Sampling Date
Analyte Concentration in nanograms per liter
Bold/Shaded Value Exceeds Ambient Groundwater Quality Standard
J Indicates an estimated value
ND Not detected at indicated reporting limit

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C–2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

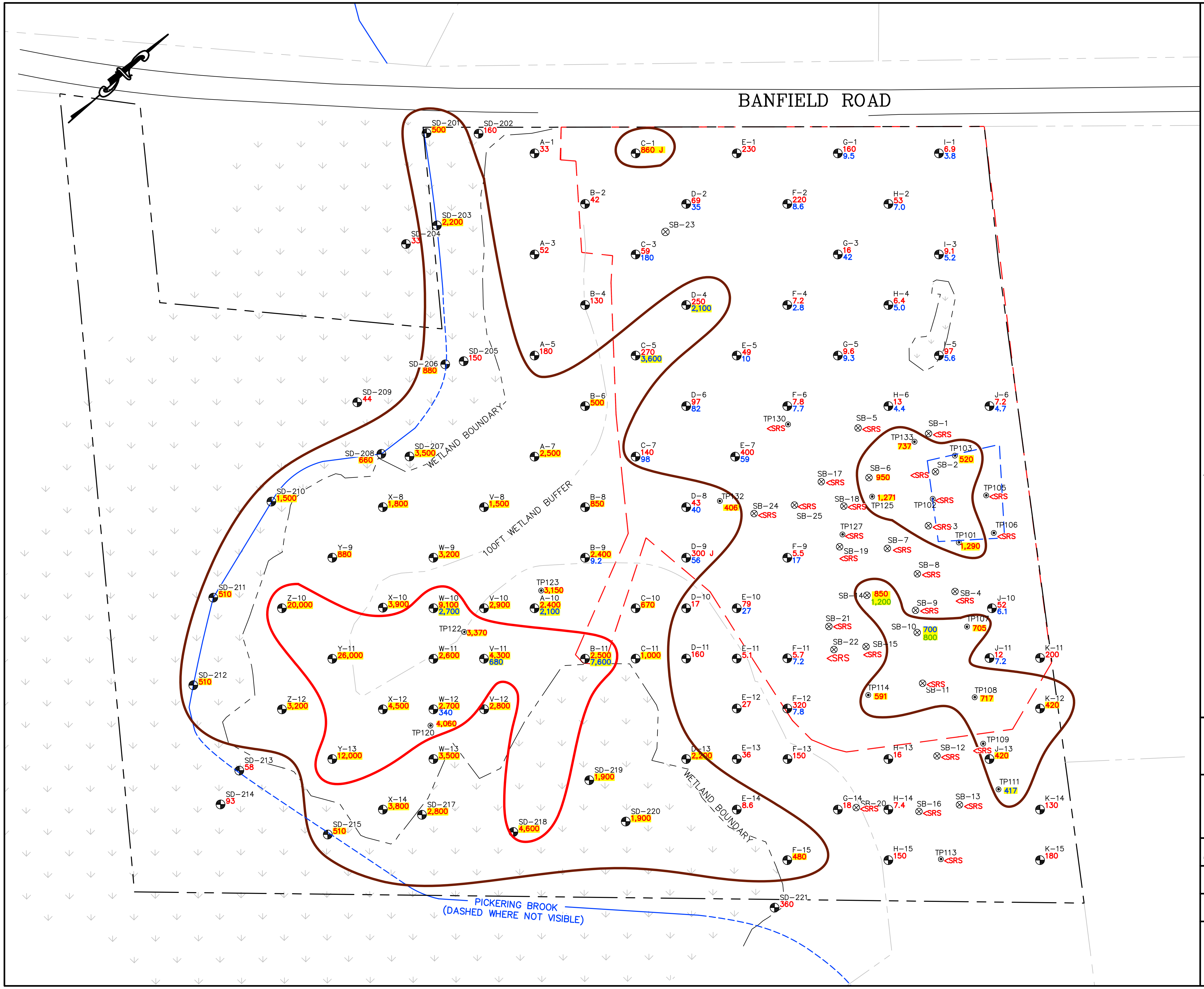
GRAPHIC SCALE
80 0 40 80 160
(IN FEET)
1 inch = 80 feet

Wilcox&Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
PFAS IN GROUNDWATER

DATE	SCALE	FILE
October 21, 2021	GRAPHIC	Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –

CLIENT
Banfield Realty, LLC
JOB NUMBER
BANF0005
LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire
DRAWING NUMBER
FIGURE 5



LEGEND

- – – — APPROXIMATE SUBJECT PROPERTY BOUNDARY
- – – — LIMITS OF DISTURBANCE FOR PROPOSED DEVELOPMENT PROJECT
- B-6 500 SOIL BORING LOCATION (WILCOX & BARTON, INC. 2021) WITH LEAD CONCENTRATION IN MILLIGRAMS PER KILOGRAM (mg/kg)
- SD-209 44 SEDIMENT SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)
- ⊗ SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)
- ⊙ TEST PIT LOCATION (RANSOM 2008)
- J ESTIMATED CONCENTRATION
- LEAD CONCENTRATIONS > 400 mg/kg
- LEAD CONCENTRATIONS > 4,000 mg/kg
- 1,271 YELLOW HIGHLIGHT INDICATES VALUE EXCEEDS SOIL REMEDIATION STANDARD (400 mg/kg)

APPROX SAMPLE DEPTH INTERVAL	CONCENTRATION SHOWN IN:
0–2 FT BGS	RED
2–4 FT BGS	BLUE
4–6 FT BGS	GREEN

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C–2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. SEDIMENT LEAD CONCENTRATIONS SHOWN FOR ILLUSTRATION ONLY. RESULTS NOT TECHNICALLY COMPARABLE TO SOIL REMEDIATION STANDARD.

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
LEAD IN SOIL AND SEDIMENT

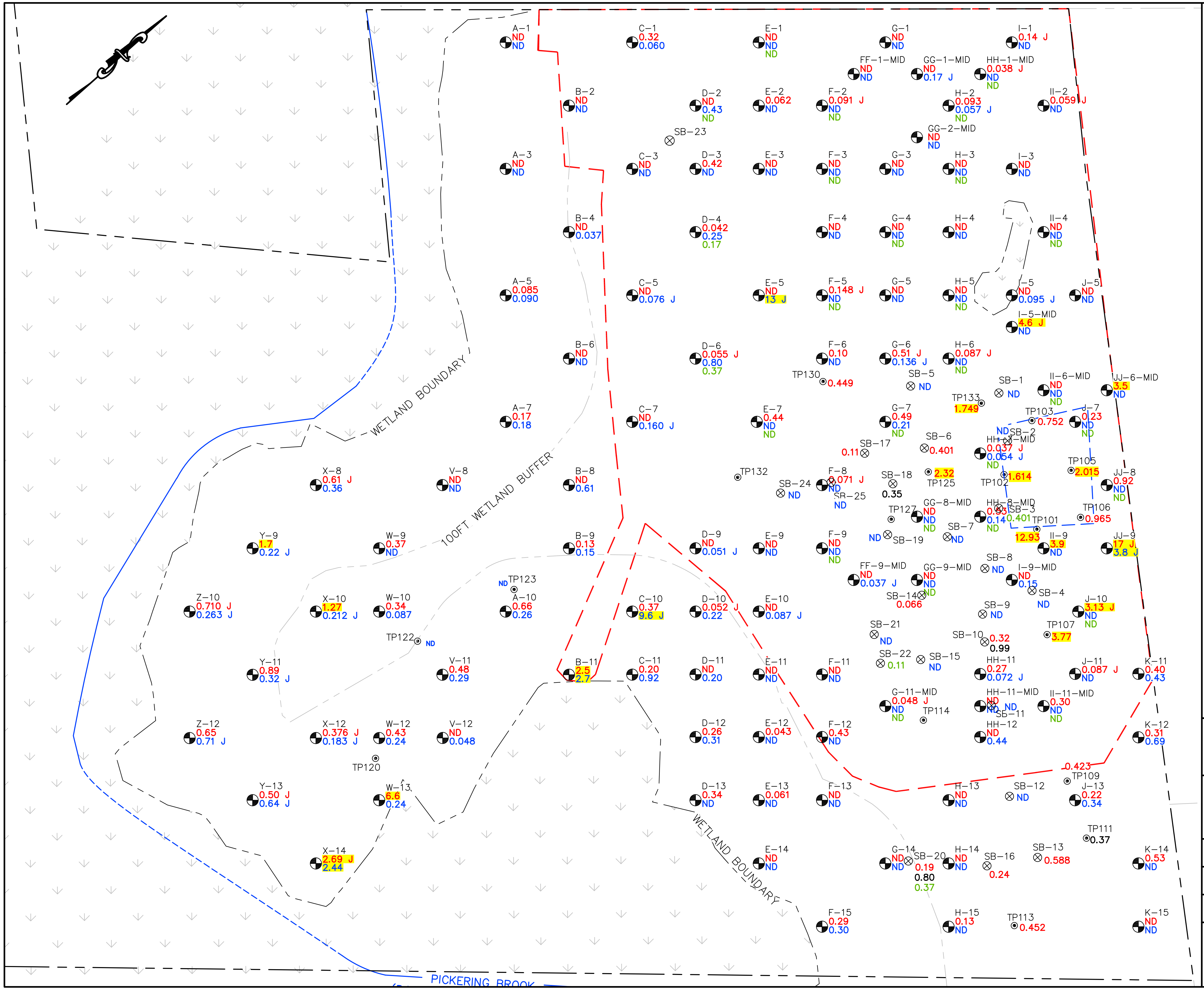
DATE	SCALE	FILE
October 1, 2021	GRAPHIC	Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED October 21, 2021

CLIENT
Banfield Realty, LLC

JOB NUMBER
BANF0005

LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire

DRAWING NUMBER
FIGURE 6



LEGEND

— — — APPROXIMATE SUBJECT PROPERTY BOUNDARY

— — — LIMITS OF DISTURBANCE

2020 AND 2008 PCB DATA

⊗ SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)

⊙ TEST PIT LOCATION (RANSOM 2008)

SAMPLE DEPTH INTERVAL (FEET)	PCB CONCENTRATION SHOWN IN:
0–2	RED
2–4	PURPLE
4–6	GREEN

ND TOTAL PCB CONCENTRATION< REPORTING LIMIT FOR ALL DEPTHS. REPORTING LIMITS ALL <1.0 mg/kg.

2021 PCB DATA

Y–9
1.7
0.22 J

PCB SAMPLE LOCATION, GRID IDENTIFIER, AND RESULTS IN MG/KG.
J indicates an estimated value.

SAMPLE DEPTH INTERVAL	PCB CONCENTRATION SHOWN IN:
3"–6"	RED
6"–18"	BLUE
18"–36"	GREEN

2.015 YELLOW HIGHLIGHT INDICATES VALUE EXCEEDS 1 mg/kg

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C–2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
PCBS IN SOIL

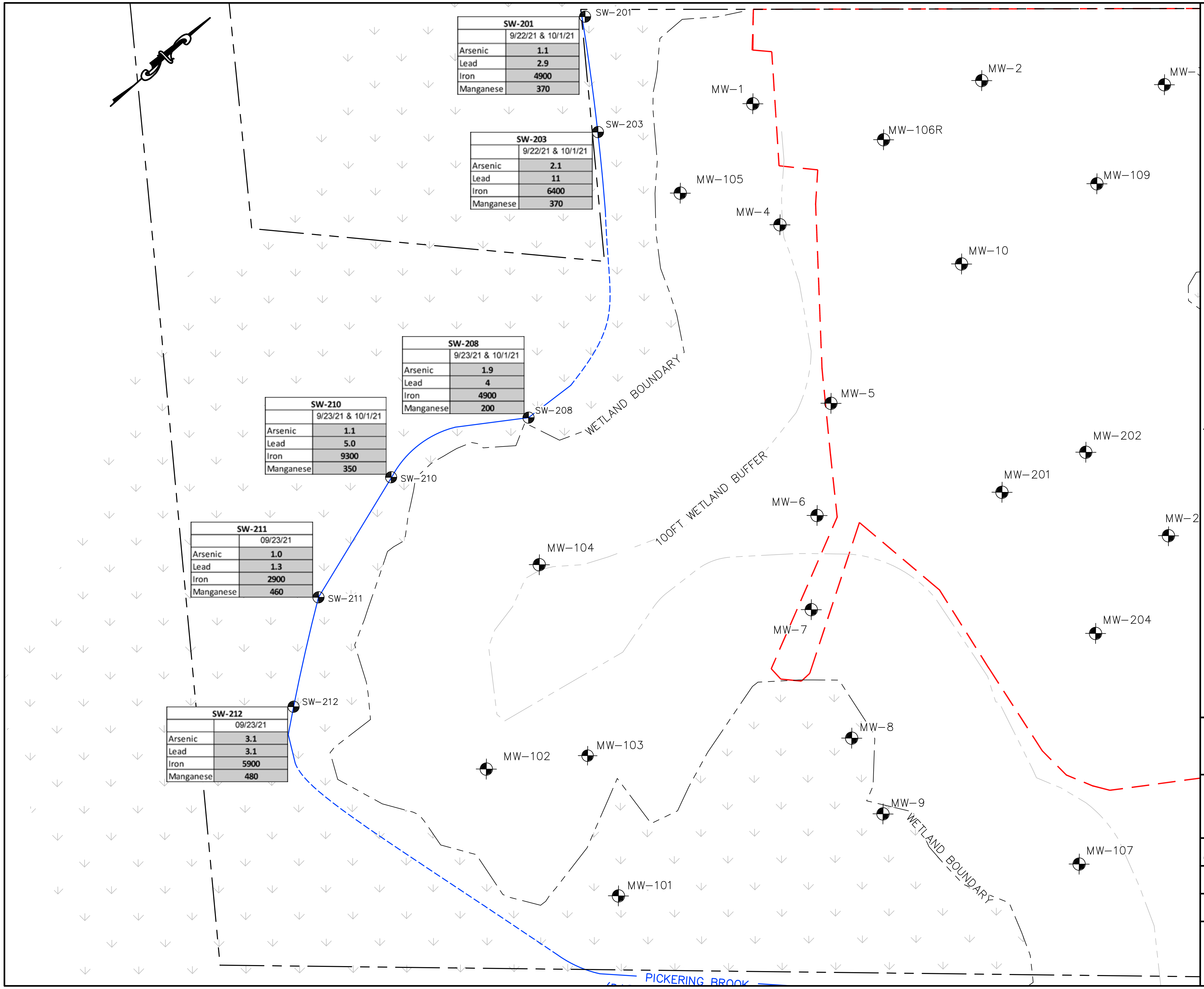
DATE	SCALE	FILE
October 1, 2021	GRAPHIC	Data Plan
APPROVED BY	DRAWN BY	REVISED
WRW	GAG	October 21, 2021

CLIENT
Banfield Realty, LLC

JOB NUMBER
BANF0005

LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire

DRAWING NUMBER
FIGURE 7



SW-201	
	9/22/21 & 10/1/21
Arsenic	**1.1**
Lead	**2.9**
Iron	**4900**
Manganese	**370**

SW-203	
	9/22/21 & 10/1/21
Arsenic	**2.1**
Lead	**11**
Iron	**6400**
Manganese	**370**

SW-208	
	9/23/21 & 10/1/21
Arsenic	**1.9**
Lead	**4**
Iron	**4900**
Manganese	**200**

SW-210	
	9/23/21 & 10/1/21
Arsenic	**1.1**
Lead	**5.0**
Iron	**9300**
Manganese	**350**

SW-211	
	09/23/21
Arsenic	**1.0**
Lead	**1.3**
Iron	**2900**
Manganese	**460**

SW-212	
	09/23/21
Arsenic	**3.1**
Lead	**3.1**
Iron	**5900**
Manganese	**480**

LEGEND

— — —	APPROXIMATE SUBJECT PROPERTY BOUNDARY
— — —	LIMITS OF DISTURBANCE
——— — —	APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)
⊕ SW–201	SURFACE WATER SAMPLE LOCATION

SW-201		
	9/22/21 & 10/1/21	Sample Point ID Sampling Date
Arsenic	**1.1**	Analyte Concentration in micrograms per liter
Lead	**2.9**	
Iron	**4900**	Bold/Shaded Value Exceeds Water Quality Criteria (see Note 3)
Manganese	**370**	

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C–2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. DISSOLVED METAL CONCENTRATIONS ARE COMPARED TO WQCs FOR THE PROTECTION OF AQUATIC LIFE (FRESHWATER, CHRONIC) AND PROTECTION OF HUMAN HEALTH (WATER & FISH INGESTION).

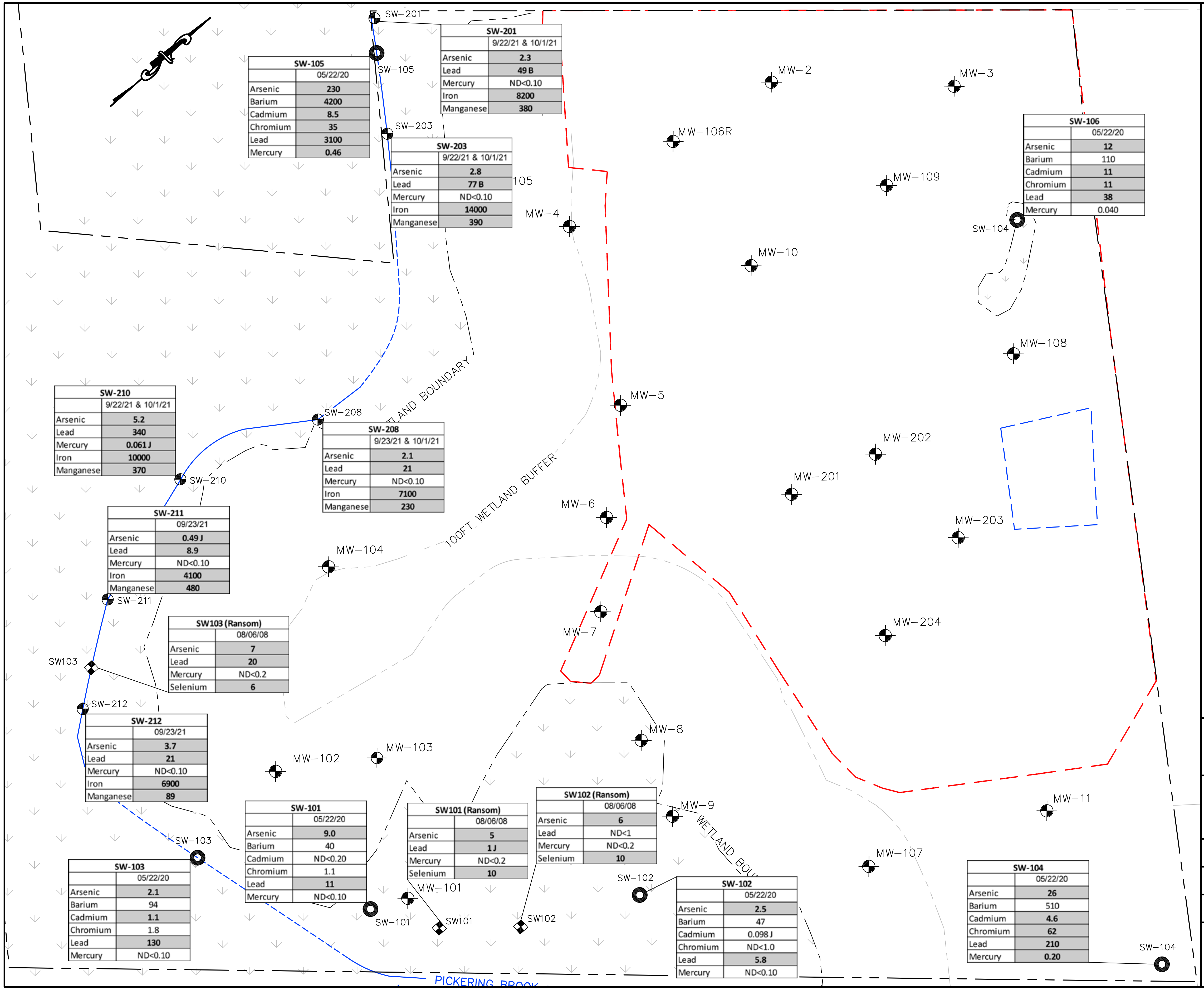
GRAPHIC SCALE

80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE *DISSOLVED METALS IN SURFACE WATER*		
DATE October 1, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED October 21, 2021
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 8



SW-105	
	05/22/20
Arsenic	**230**
Barium	**4200**
Cadmium	**8.5**
Chromium	**35**
Lead	**3100**
Mercury	**0.46**

SW-201	
	9/22/21 & 10/1/21
Arsenic	**2.3**
Lead	**49 B**
Mercury	ND<0.10
Iron	**8200**
Manganese	**380**

SW-203	
	9/22/21 & 10/1/21
Arsenic	**2.8**
Lead	**77 B**
Mercury	ND<0.10
Iron	**14000**
Manganese	**390**

SW-106	
	05/22/20
Arsenic	**12**
Barium	110
Cadmium	**11**
Chromium	**11**
Lead	**38**
Mercury	0.040

SW-210	
	9/22/21 & 10/1/21
Arsenic	**5.2**
Lead	**340**
Mercury	**0.061 J**
Iron	**10000**
Manganese	**370**

SW-208	
	9/23/21 & 10/1/21
Arsenic	**2.1**
Lead	**21**
Mercury	ND<0.10
Iron	**7100**
Manganese	**230**

SW-211	
	09/23/21
Arsenic	**0.49 J**
Lead	**8.9**
Mercury	ND<0.10
Iron	**4100**
Manganese	**480**

SW103 (Ransom)	
	08/06/08
Arsenic	**7**
Lead	**20**
Mercury	ND<0.2
Selenium	**6**

SW-212	
	09/23/21
Arsenic	**3.7**
Lead	**21**
Mercury	ND<0.10
Iron	**6900**
Manganese	**89**

SW-101	
	05/22/20
Arsenic	**9.0**
Barium	40
Cadmium	ND<0.20
Chromium	1.1
Lead	**11**
Mercury	ND<0.10

SW101 (Ransom)	
	08/06/08
Arsenic	**5**
Lead	**1 J**
Mercury	ND<0.2
Selenium	**10**

SW102 (Ransom)	
	08/06/08
Arsenic	**6**
Lead	ND<1
Mercury	ND<0.2
Selenium	**10**

SW-103	
	05/22/20
Arsenic	**2.1**
Barium	94
Cadmium	**1.1**
Chromium	1.8
Lead	**130**
Mercury	ND<0.10

SW-102	
	05/22/20
Arsenic	**2.5**
Barium	47
Cadmium	0.098 J
Chromium	ND<1.0
Lead	**5.8**
Mercury	ND<0.10

SW-104	
	05/22/20
Arsenic	**26**
Barium	510
Cadmium	**4.6**
Chromium	**62**
Lead	**210**
Mercury	**0.20**

LEGEND

— — — — APPROXIMATE SUBJECT PROPERTY BOUNDARY

— — — LIMITS OF DISTURBANCE

——— — — APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)

⊕ SW-201 SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, 2021

◉ SW-104 APPROXIMATE SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, 202)1

◆ SW103 APPROXIMATE SURFACE WATER SAMPLE LOCATION (RANSOM, 2008)

SW-201		
	9/22/21 & 10/1/21	
Arsenic	**1.1**	Sample Point ID Sampling Date Analyte Concentration in micrograms per liter
Lead	**2.9**	
Iron	**4900**	Bold/Shaded Value Exceeds Water Quality Criteria (see Note 3)
Manganese	**370**	

J indicates an estimated value
ND Non-detect at indicated reporting limit

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. DISSOLVED METAL CONCENTRATIONS ARE COMPARED TO WQCs FOR THE PROTECTION OF AQUATIC LIFE (FRESHWATER, CHRONIC) AND PROTECTION OF HUMAN HEALTH (WATER & FISH INGESTION).

GRAPHIC SCALE

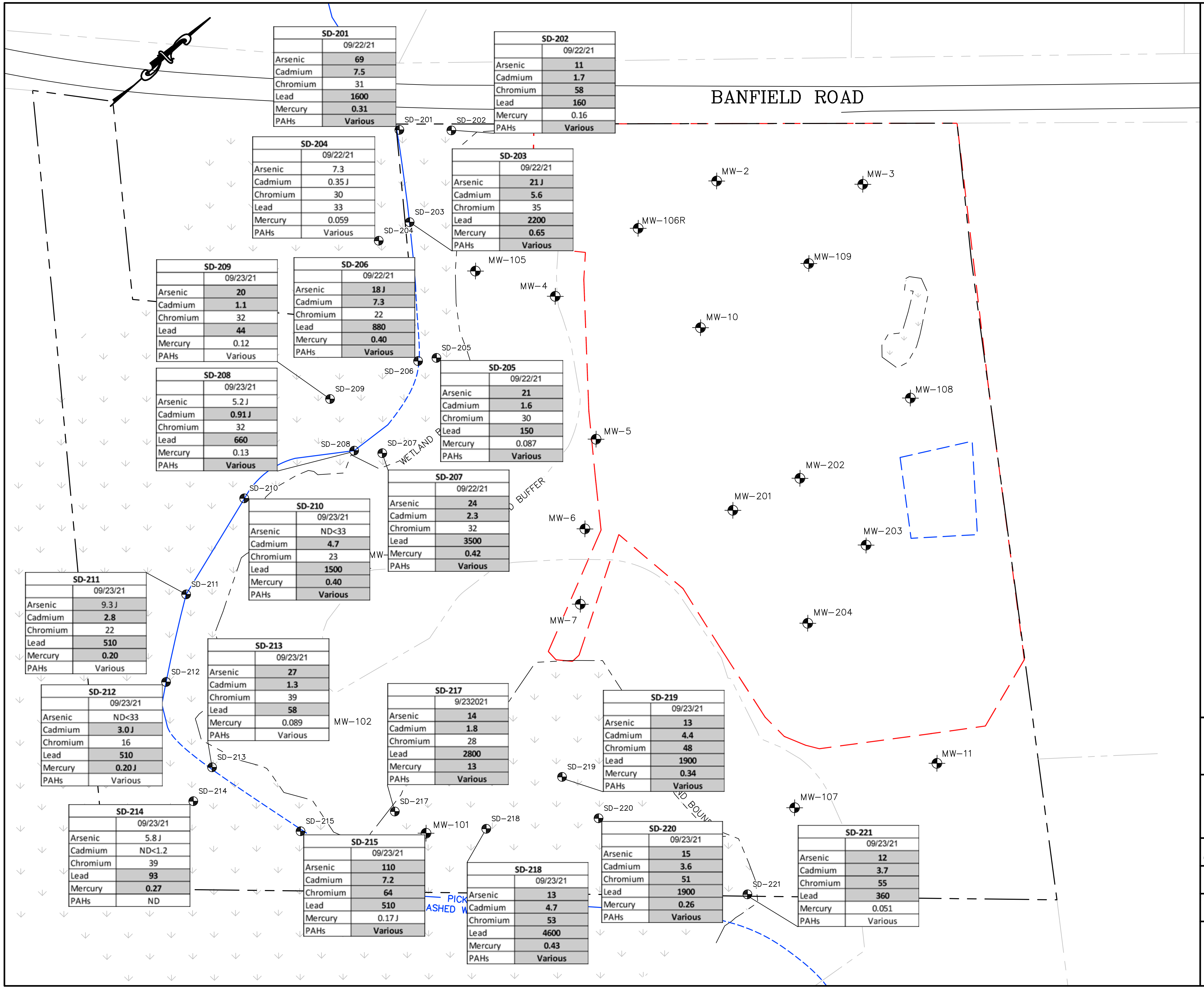
80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
TOTAL METALS IN SURFACE WATER

DATE	SCALE	FILE
October 1, 2021	GRAPHIC	Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED October 21, 2021
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 9



	SD-201
	09/22/21
Arsenic	**69**
Cadmium	**7.5**
Chromium	31
Lead	**1600**
Mercury	**0.31**
PAHs	**Various**

	SD-202
	09/22/21
Arsenic	**11**
Cadmium	**1.7**
Chromium	**58**
Lead	**160**
Mercury	0.16
PAHs	**Various**

	SD-204
	09/22/21
Arsenic	7.3
Cadmium	0.35 J
Chromium	30
Lead	33
Mercury	0.059
PAHs	Various

	SD-203
	09/22/21
Arsenic	**21 J**
Cadmium	**5.6**
Chromium	35
Lead	**2200**
Mercury	**0.65**
PAHs	**Various**

	SD-209
	09/23/21
Arsenic	**20**
Cadmium	**1.1**
Chromium	32
Lead	**44**
Mercury	0.12
PAHs	Various

	SD-206
	09/22/21
Arsenic	**18 J**
Cadmium	**7.3**
Chromium	22
Lead	**880**
Mercury	**0.40**
PAHs	**Various**

	SD-208
	09/23/21
Arsenic	5.2 J
Cadmium	**0.91 J**
Chromium	32
Lead	**660**
Mercury	0.13
PAHs	**Various**

	SD-205
	09/22/21
Arsenic	**21**
Cadmium	**1.6**
Chromium	30
Lead	**150**
Mercury	0.087
PAHs	**Various**

	SD-207
	09/22/21
Arsenic	**24**
Cadmium	**2.3**
Chromium	32
Lead	**3500**
Mercury	**0.42**
PAHs	**Various**

	SD-210
	09/23/21
Arsenic	ND<33
Cadmium	**4.7**
Chromium	23
Lead	**1500**
Mercury	**0.40**
PAHs	**Various**

	SD-211
	09/23/21
Arsenic	9.3 J
Cadmium	**2.8**
Chromium	22
Lead	**510**
Mercury	**0.20**
PAHs	Various

	SD-213
	09/23/21
Arsenic	**27**
Cadmium	**1.3**
Chromium	39
Lead	**58**
Mercury	0.089
PAHs	Various

	SD-212
	09/23/21
Arsenic	ND<33
Cadmium	**3.0 J**
Chromium	16
Lead	**510**
Mercury	**0.20 J**
PAHs	Various

	SD-217
	9/232021
Arsenic	**14**
Cadmium	**1.8**
Chromium	28
Lead	**2800**
Mercury	**13**
PAHs	**Various**

	SD-219
	09/23/21
Arsenic	**13**
Cadmium	**4.4**
Chromium	**48**
Lead	**1900**
Mercury	**0.34**
PAHs	**Various**

	SD-214
	09/23/21
Arsenic	5.8 J
Cadmium	ND<1.2
Chromium	39
Lead	**93**
Mercury	**0.27**
PAHs	ND

	SD-215
	09/23/21
Arsenic	**110**
Cadmium	**7.2**
Chromium	**64**
Lead	**510**
Mercury	0.17 J
PAHs	**Various**

	SD-218
	09/23/21
Arsenic	**13**
Cadmium	**4.7**
Chromium	**53**
Lead	**4600**
Mercury	**0.43**
PAHs	**Various**

	SD-220
	09/23/21
Arsenic	**15**
Cadmium	**3.6**
Chromium	**51**
Lead	**1900**
Mercury	**0.26**
PAHs	**Various**

	SD-221
	09/23/21
Arsenic	**12**
Cadmium	**3.7**
Chromium	**55**
Lead	**360**
Mercury	0.051
PAHs	Various

LEGEND

— — — —	APPROXIMATE SUBJECT PROPERTY BOUNDARY
🟥 — — —	LIMITS OF DISTURBANCE
— — — —	APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)
⊕ SD–202	WETLAND SEDIMENT SAMPLE LOCATION

	SD-219
	09/23/21
Arsenic	**13**
Cadmium	**4.4**
Chromium	**48**
Lead	**1900**
Mercury	**0.34**
PAHs	**Various**

Sample Point ID
Sampling Date
Analyte Concentration in milligrams per kilogram

Bold/Shaded Value Exceeds Water Quality Criteria (see Note 3)

J indicates an estimated value
ND Non-detect at indicated reporting limit

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C–2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. DISSOLVED METAL CONCENTRATIONS ARE COMPARED TO WQCs FOR THE PROTECTION OF AQUATIC LIFE (FRESHWATER, CHRONIC) AND PROTECTION OF HUMAN HEALTH (WATER & FISH INGESTION).

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE METALS & PAHs IN WETLAND SEDIMENTS		
DATE October 21, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 10

APPENDIX A

NHDES Correspondence

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

February 16, 2011

William Copeland
190 Meadow Road
Portsmouth, NH 03801

SUBJECT: **Portsmouth** – Country Motor Sales, 375 Banfield Road,
DES Site# 199408047, Project # 20515

Comments Regarding Limited Subsurface Investigation-October 2008, prepared by Provan and Lorber, Inc., and dated September 2, 2009.

Dear Mr. Copeland:

The New Hampshire Department of Environmental Services (Department) has completed a review of the above referenced document and other site related documents contained in our files and we provide the following comments:

SOIL QUALITY

Naturally Occurring Arsenic in Site Soils

The Department issued a *Certificate of No Further Action* on August 15, 2007 regarding this issue. The *Certificate of No Further Action* indicated that the arsenic concentrations in soils and sediment were due to naturally occurring conditions at the site. Please be advised that although the Department does not regulate naturally occurring arsenic, appropriate care should be taken to prevent or limit site visitors/workers exposure to these soils as arsenic is present at a concentration above an established direct contact risk-based level. In similar situations the Department has recommended, but cannot require, that the exposure hazard be managed via one of the following:

1. Excavation and off-site disposal of the material at an appropriately permitted facility; or
2. Capping of the material with 24 inches of clean cover material and recordation of a Notice of Activity and Use Restriction.

If work is planned in areas where people may be exposed to arsenic a Site Health and Safety Plan should be prepared to prevent exposure to arsenic that may be present above the Department's soil standard. Residential development with these soils present would not be appropriate.

SOLID WASTE LANDFILL

Based on test pit data, the central portion of the site contains a solid waste landfill. Buried debris includes auto parts, brick, burned wood, concrete, ceramic/porcelain, painted wood, asphalt, roofing, crushed 55 gallon drums, sheet metal, linoleum and a house radiator. In a letter dated June 24, 2009, NHDES approved the application for registration as a pre-1981 landfill.

Lead Contaminated Soils

Soil lead detections above the S-1 soil standard were observed in twelve test pits TP-101, TP-103, TP-107, TP-108, TP-111, TP-114, TP-120, TP-122, TP-123, TP-125, TP-132, and TP-133. TP-120 also contained concentrations of barium at the NH S-1 standard. Lead concentrations detected in on-site soils ranged from 4,060 mg/kg to 24 mg/kg relative to the Soil Remediation Standard of 400 mg/kg. The presence of lead above established standards requires additional characterization and/or remediation.

Based on the available data it appears likely that lead above regulatory standards exists beyond the area of previous testing. The extent of contamination must be determined by analyses demonstrating a clean edge to the impacted areas (i.e. laboratory results below regulatory standards).

PCB Contaminated Soils

Surface soil in the northern portion of the property where auto crushing activities previously occurred contains polychlorinated biphenyls (PCBs), arsenic and lead in excess of the New Hampshire Soil Remediation Standards (NH S-1) (Env-Or 602). As previously indicated, the elevated soil arsenic concentrations were determined to be related to natural conditions. PCB concentrations detected in the soils in this area of the site ranged from non-detect at TP-122 to 8.630 mg/kg PCB-1254 and 4.300 mg/kg PCB-1.260 in TP101.

The presence of PCBs and lead above established standards requires additional characterization to determine:

1. Whether the PCB-containing soils are regulated under the Toxic Substances Control Act (TSCA). Note that the requirement for further review by the EPA Region 1 PCB Coordinator is a function of: (a) source; (b) concentration; and (c) date of release);
2. The source and full nature and extent of the lead and PCB contamination; and
3. Appropriate remedial actions/exposure risk management strategies.

If sufficient information to address these three requirements is not provided, the Department will need to confer with the EPA Region 1 PCB Coordinator for a determination of TSCA applicability to the site.

BURRIED ASBESTOS

The central portion of the site reportedly contains buried asbestos which may be managed by removal in accordance with Env-Sw 2100. If buried asbestos that was placed prior to 1981 is left in place, the affected areas must be properly capped, and the site managed by an Activity/Use Restriction (AUR) attached to the deed. The following link provides additional guidance: http://des.nh.gov/organization/commissioner/legal/rules/documents/env-sw2100.pdf

SEDIMENT IMPACTS

Analyses of sediment samples collected from wetland areas located along the southeastern and southern portions of the site indicated exceedances of the threshold effects concentration for arsenic, lead, and mercury. Apparently, no upstream/background sediment or surface water samples were collected to confirm that the contamination is due to site related activities and not the result of upstream conditions.

The Department requests that the direction and rate of flow in the wetland area be determined and a confirmatory round of analyses at SD-101, SD-102, and SD-103 be conducted and compared to data from upstream sample locations to be selected outside of the area impacted by the site (i.e. at the upstream property boundary).

GROUNDWATER QUALITY

Groundwater at MW-101 in the central portion of the site contained the polycyclic aromatic hydrocarbons (PAH) benzo[a]anthracene, benzo[b]fluoranthene, benzo[a]pyrene at concentrations at or above their AGQS standard. The Department agrees that based on specific PAH compounds present in soils at the site, the presence of burned wood in soils, and the chromatographic fingerprint of TPH-DRO in the sample collected from TP-122 that the concentrations of soil PAH detected are likely due to the presence of partially burned wood in the soil samples. Although soils containing contaminants solely due to the presence of wood ash or coal ash are usually exempt from regulation under Env-Or 600 (Contaminated Site Management), these soils would be regulated under Env-Or 600 if the contaminants are present in groundwater at concentrations above the corresponding Ambient Groundwater Quality Standards (AGQS). **The Department requests two rounds of confirmatory analyses from MW-101 for dissolved lead, barium and PAH.** The Department recommends the use of the EPA Low Flow sampling methodology during collection of groundwater samples for PAH analysis. If the low flow sampling method is used, the Department requires submittal of all related field notes, equipment calibration logs, and documentation of aquifer stabilization parameters with the summary report**.** Groundwater lead analyses from MW-102 (15 ug/l) & MW-104 (16 ug/l) documented detections at or above AGQS. Therefore, continued monitoring of groundwater at this location for dissolved metals is required to assess the significance and validity of these reported AGQS violations and to determine the extent of the dissolved metals plume in the vicinity. Based on the detections of PCBs in soils at the car crusher area **we request installation of a monitoring well in the former car crusher area to determine if groundwater is impacted.** Groundwater analyses should be for VOCs, metals, PAHs, and PCBs.

SURFACE WATER QUALITY

Selenium was detected in all three surface water samples at concentrations above Surface Water Quality Criteria. Lead was detected in SW-103 at a concentration of 19.11 ug/l exceeding Surface Water Quality Criteria. To confirm that the contamination is due to site related activities and not the result of upstream conditions the Department requests that the direction and rate of flow in the wetland area be determined and a confirmatory round of analyses at SW-101, SW-102, and SW-103 and selected upstream “background” locations be conducted and the data from SW-101, SW-102 and SW-103 be compared to data from upstream sample locations to be selected outside of the area impacted by the site.

REQUESTED ACTIONS

Submit a work scope to the Department before April 15, 2011 which fully assess site conditions and at a minimum includes the following:

- Two rounds of confirmatory groundwater monitoring for dissolved metals at well locations MW-102 and MW-104 (field filtered using a 0.45 micron filter prior to acidification).

- Two rounds of confirmatory groundwater monitoring at MW-101 for PAHs using EPA low flow sampling method (not filtered). PAHs can migrate in groundwater on colloids and filtering removes the colloids.
- Sediment and surface water sampling with added emphasis on determining contaminant concentrations at the upstream property boundary. Collect new sediment and surface water samples from both upstream "Background" and downstream "same locations previously sampled" and compare the analytical results to determine if the samples previously shown to be impacted are due to site activities or from an off-site source.
- Fully characterize the source and extent of the lead and PCB contamination in soil, sediment and surface water.
- Fully characterize the PCB impacted areas (i.e. assess the source, nature and extent of PCB contamination in soils and groundwater).
- Submit a report that **fully** complies with the requirements of Env-Or 606.03 (Site Investigation Report) and includes a preliminary technical and financial evaluation of three remedial alternatives to address each impacted media

We thank you for your continued cooperation. Should you have any questions, please contact me at the NH-DES Waste Management Division at the letterhead address, by E-mail or by phone.

Sincerely,

Joseph Donovan

Joseph Donovan, P.G.
Hazardous Waste Remediation Bureau
Tel: (603) 271 - 6811
Fax: (603) 271 - 2181
E-mail: joseph.donovan@des.nh.gov

cc: Dan Hoefle, Esq., Chairman Board of Trustees, Foundation for Seacoast Health,
c/o Hoefle, Phoenix, and Gormley, PA, PO Box 4480, Portsmouth, NH 03802

ec: Kenneth N. Kettenring, Ph.D., P.G., HWRB
Kevin Mckibben, P.G., Provan & Lorber, Inc.
City of Portsmouth Health Officer

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Robert R. Scott, Commissioner

EMAIL ONLY

August 9, 2021

Robert Graham
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, NH 03801

Subject: **Portsmouth** – Former Country Motor Sales, 375 Banfield Road
DES Site #**199408047**, Project #40176

Supplemental Data Transmittal, prepared by Wilcox & Barton, Inc. (W&B), dated January 27, 2021

Site Investigation Report, prepared by W&B, dated July 9, 2020

Dear Mr. Graham:

The New Hampshire Department of Environmental Services (NHDES) has reviewed the Supplemental Data Transmittal and Site Investigation (SI) Report submitted for the above-referenced site (Site). NHDES understands that some SI activities were completed in response to our letter dated February 16, 2011. Based on review of the SI Report, data transmittal and historical submittals, NHDES offers the following comments:

Soil

- During May 2020, 25 soil borings were advanced in the northeastern portion of the Site and 94 soil samples were collected for laboratory analysis of metals and polychlorinated biphenyls (PCBs). Arsenic was detected in all samples, including at concentrations exceeding the Soil Remediation Standard (SRS) in 70 of the samples. The concentrations were generally in the range reported previously for soil samples collected at the Site, which NHDES concluded in a letter dated August 8, 2007 were due to naturally occurring conditions. As such, the arsenic present in Site soil appears to be a background condition as defined in NH Code of Administrative Rules Chapter Env-Or 600 (*Contaminated Site Management*), Part Env-Or 602.03. In these cases, per Env-Or 606.19(f), NHDES does not require further investigation or remediation of the arsenic.

- Lead was detected at concentrations exceeding the SRS in samples collected from boreholes SB-6, SB-10 and SB-14 advanced in the northeast portion of the Site during May 2020. Lead was also detected in soil samples collected from this portion of the Site during previous assessment work (e.g. Limited Subsurface Investigation report prepared by Ransom Environmental Consulting, Inc. [Ransom] dated October 10, 2008) at concentrations exceeding the SRS. It appears the lead is the result of releases associated with former Site activities, including automobile storage, crushing and salvage operations. NHDES generally concurs with W&B's recommendation to manage lead-impacted soil in this area of the Site via placement of a suitable cap or cover and recordation of an Activity and Use Restriction (AUR). ***A soil management plan (SMP) shall be submitted to NHDES that describes the management of soil during upcoming Site redevelopment activities, to include excavation activities, any temporary onsite storage, reuse, and any offsite disposal of soil conducted in accordance with Env-Or 611. Commencement of redevelopment activities that involve disturbance of soil shall not occur until NHDES has reviewed the SMP*.** Submittal of the Application for AUR shall include a requirement to prepare a separate SMP for management of any soil that may be disturbed during future Site activities. The plans for capping or covering lead-impacted soil and the SMPs must incorporate the results of historical investigations including pertinent analytical data for all soil samples.

Soil samples were collected from test pits completed in the central, lowland portion of the Site by Ransom during October 2008 as part of the investigation referenced above and analyzed for metals. Lead was detected at concentrations exceeding the SRS in the samples collected from test pits TP120, TP122 and TP123. Some detected concentrations (e.g. 4,060 milligrams per kilogram [mg/kg] at TP120) indicate a gross level of contamination. We understand this portion of the Site is the location of a pre-1981 landfill and the waste is the source of the lead in soil. NHDES is concerned the waste and impacted soil may: 1) be a source of metals contamination identified in Site surface water and sediment; and 2) pose a direct-contact exposure risk to humans. The Remedial Action Plan (RAP) discussed below shall include evaluation of remedies for the waste and contaminated soil in the area of the landfill.

- PCBs were detected at concentrations up to 0.80 mg/kg (total of all Aroclors) in 13 of the samples collected from the soil borings advanced in the northeast portion of the Site during May 2020. PCBs were also detected at concentrations up to 12.93 mg/kg (total of all Aroclors) in samples from this portion of the Site during previous assessment work (e.g. Ransom, 2008). It appears the PCBs are the result of releases associated with former Site activities, including automobile storage, crushing and salvage operations. In accordance with our letter dated February 16, 2011, options for management of PCB-containing soils must be considered. Such consideration should include whether the PCB-containing soils are regulated under the Toxic Substances Control Act (TSCA), which includes assessment of their source, date of release, and concentrations. Please note that United States Environmental Protection Agency Region 1 PCB coordinator Kimberly Tisa is an available resource regarding TSCA applicability.

- Asbestos was identified via laboratory analysis in bulk waste samples collected from test pits excavated in the area of the landfill during previous assessment work (Ransom, 2008). W&B identified suspect asbestos-containing material (ACM) in test pits advanced in the area of the landfill during May 2020. Options for management of ACM must be considered.

NHDES requests that a Remedial Action Plan (RAP) be prepared in accordance with Env-Or 606.10 and Env-Or 606.12 for the contaminated soils and waste including metals, PCBs, and asbestos. We are amenable to discussions with W&B regarding the due date for submittal of the RAP. Figures presented in the RAP should show key site features such as areas of former automobile storage, crushing and salvage operations, the landfill, septic systems and leach fields (both historical and current). We understand the evaluation of remedial alternatives will include capping or cover of contaminated soil and waste and recordation of an AUR.

Groundwater

- Relatively elevated concentrations of lead and other metals including arsenic, barium and cadmium were detected in samples collected during June 2020 and January 2021 from wells MW-101, MW-102 and MW-104. These wells appear to be located within or hydraulically downgradient of the landfill. To assess the potential for groundwater to be a contaminant migration pathway from the landfill to surface water and sediment, we request that additional sampling be completed of wells MW-101, MW-102 and MW-104 for analysis of total and dissolved metals. Field-based water quality parameters (e.g. temperature, dissolved oxygen, pH, conductivity, oxidation-reduction potential, and turbidity) should also be collected during the sampling.

- The PAH benzo(b)fluoranthene was detected at a concentration slightly exceeding the AGQS in the sample collected from monitoring well MW-101 during June 2020. We request that an additional sample be collected from this well for analysis of PAHs. We recommend the sample be filtered in the field.

- Various per- and polyfluoroalkyl substances (PFAS) were detected in samples collected from Site monitoring wells during June 2020 and/or January 2021. Perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), and perfluorooctanoic acid (PFOA) were detected at concentrations exceeding applicable AGQS. Based on these results, we request that additional sampling of wells MW-1, MW-4, MW-5, MW-6, MW-7, MW-8, MW-106R, MW-109, MW-203 and MW-204 be completed for analysis of PFAS. Please continue to analyze samples for a broad list of PFAS to aid in understanding potential sources, nature and extent of PFAS at the Site. We recommend that Quality Assurance/Quality Control samples (e.g. field blank, equipment rinsate blank, and trip blank) be analyzed for PFAS and the results considered when evaluating data quality/usability. All potential sources of PFAS and contaminant migration pathways should be considered when developing the conceptual site model (CSM), to include the storage and use of PFAS-containing products, knowledge of any releases of such products, and any application of fire suppressing foam.

  We request upload of all PFAS data to the NHDES Environmental Monitoring Database (EMD). Instructions for EMD upload can be found at the following link: https://www4.des.state.nh.us/nh-pfas-investigation/wp-content/uploads/pfas-emd-guidance.pdf

Please submit results of the additional groundwater monitoring with the RAP. Pending our review, an Application for Groundwater Management Permit may be requested for the Site.

Sediment and Surface Water

- W&B collected sediment samples during May 2020 from locations identified as SD-101 through SD-106 for analysis of PCBs and metals. PCBs were not detected at concentrations above the laboratory reporting limit. Various metals were detected including lead at concentrations up to 940 mg/kg. The nature of these sediment samples is not fully explained in the SI Report. Based on Figure 3, it appears some of the samples were collected from areas identified as wetland and some were not. It's not clear if any of the samples were collected from Pickering Brook. We request that more information be provided, including sediment descriptions/classification and photographs of representative sediment and the sampling locations. An evaluation of the potential for direct-contact exposure to humans should also be provided.

- Surface water samples were collected during May 2020 from locations identified as SW-101 through SW-106 for analysis of PCBs and total metals. The samples were apparently collocated with the sediment samples. PCBs were not detected at concentrations above the laboratory reporting limit. The metals data provided in the SI Report needs to be supported by the following:

  1. For comparison of cadmium, chromium, lead and silver data to the protection of aquatic life freshwater criteria presented in Table 1703-1 of Env-Wq 1703.21, hardness data must be collected concurrently and used to calculate appropriate criteria values. The water effect ratio should be considered when determining appropriate criteria values for arsenic, cadmium, chromium, lead, mercury and silver (see Env-Wq 1703.22[d]). Additionally, the total concentrations must be converted to dissolved concentrations for arsenic, cadmium, chromium, lead, mercury and silver, with the results for silver compared to the acute exposure criteria. Results of the other metals may be compared to chronic criteria. Refer to equations and tables in Env-Wq 1703.23 and Env-Wq 1703.24 to calculate applicable criteria.

  2. Information regarding whether comparison of the metals data to the protection of human health criteria presented in Table 1703-1 is applicable. Specifically, please assess whether water and fish from Pickering Brook and the wetland system are consumed by humans.

  3. Information regarding the hydrology of Pickering Brook and the wetland system to improve the CSM. Specifically, prepare a figure that shows the direction of surface water flow and the location and interconnectedness of specific streams. The figure would benefit from inclusion of ground surface topography, showing locations of drainages and swales at the Site. Sample locations SW-101 though SW-106 should be depicted on the figure.

- Some details (e.g. property boundaries and location of wetlands) of the Site Plan presented in the SI Report do not correspond with that presented in the set of plans titled Commercial Site Plan “Industrial Warehouse” prepared by Jones & Beach Engineers, Inc.

and submitted to NHDES' Wetlands Bureau and Alteration of Terrain Bureau to facilitate review of applicable permits. Please ensure Site features are accurately depicted on figures included in the RAP and any future submittals.

- The lead analytical results presented in Table 3 of the SI Report for sample SW-101 differ from that in the laboratory analytical report. Please address such discrepancies for future submittals.

Additional surface water sampling at locations SW-101 through SW-106 for analysis of metals and hardness is warranted. Field-based water quality parameters should be collected during the sampling. Please submit results of the additional surface water sampling and the information requested above for sediment and surface water with the RAP. Submittal of an addendum to the RAP for these media may be requested at a later date.

Please note, the contamination at the Site will be managed under HAZWASTE Project #40176. This project number should be identified on all future submittals.

Should you have any questions regarding this letter, please contact me at NHDES' Waste Management Division.

Sincerely,

Scott Drew, P.G.
Hazardous Waste Remediation Bureau
Tel: (603) 271-2890
Email: Scott.T.Drew@des.nh.gov

ec: Michael McCluskey, P.E., HWRB
Gloria Andrews, P.E., Alteration of Terrain Bureau
Stefanie Giallongo, Wetlands Bureau
William R. Wilcox, Wilcox & Barton, Inc.
Robert W. Rooks, P.E., Wilcox & Barton, Inc.
Attention Health Officer, City of Portsmouth

Wilcox & Barton INC.
CIVIL • ENVIRONMENTAL • GEOTECHNICAL

September 8, 2021

Mr. Scott Drew
NH Department of Environmental Services
Hazardous Waste Remediation Bureau
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

**RE: Former Country Motor Sales, 375 Banfield Road, Portsmouth
Response to NHDES Comments**

Dear Mr. Drew:

Thank you for your timely review and August 9, 2021, comments concerning the recent site characterization efforts at the reference site. Pursuant to our teleconference on August 20, 2021, we have prepared the following response to lay out our plans for collection of the requested data.

To facilitate discussion, we have separated the issues at the site into five categories:

1. Groundwater quality
2. Lead in soil
3. PCBs in soil
4. Asbestos in fill materials
5. Wetland sediment and surface water quality

Groundwater Quality

As noted in prior reports, elevated concentrations of lead and/or arsenic were detected in unfiltered samples collected from wells MW-1, MW-102, MW-105, and MW-203 in June of 2020. Subsequent analysis of samples from these wells for dissolved metals (field filtered) did not produce exceedances of Ambient Groundwater Quality Standards (AGQS). Analysis of unfiltered samples for polycyclic aromatic hydrocarbons (PAHs) revealed an AGQS exceedance for benzo(b)fluoranthene in well MW-101. The measured concentration was 0.11 micrograms per liter (ug/L) vs. an AGQS of 0.1 ug/L.

Based on these results, it is our position that groundwater quality in upland areas of the site is not a significant concern and that migration via groundwater is unlikely to be the predominant pathway for impacts to wetland sediments and surface water. Rather, overland flow from former active operational areas is a more likely pathway.

Historical research by our firm and by others has not revealed a likely source for the per- and polyfluoroalkyl substances (PFAS) that have been detected in groundwater. With submittal of a Remedial Action Plan, we will consider the potential sources and migration pathways for PFAS.

On August 26, 2021, Wilcox & Barton, Inc. gauged all accessible monitoring wells and collected the following samples:

1. Filtered and unfiltered samples for analysis for metals (both total and dissolved) in wells MW-101, MW-102, and MW-104. Temperature, dissolved oxygen, pH, conductivity, oxidation-reduction potential, and turbidity were also recorded in the field.
2. One filtered sample for analysis for PAHs in well MW-101.
3. Samples for analysis for PFAS (21 compound list) in wells MW-1, MW-4, MW-5, MW-6, MW-7, MW-8, MW-106R, MW-109, MW-203 and MW-204.

Analytical results will be reviewed upon receipt and presented in the Remedial Action Plan. PFAS data will be uploaded to the NHDES Environmental Monitoring Database upon receipt.

Lead in Soil

As discussed during our call, we have consolidated all the available lead data onto a site figure, which is attached as Figure 1. The data show exceedances of the Soil Remediation Standard (SRS) for lead at sporadic locations across the site. The data do not show a consistent pattern of distribution. To facilitate evaluation of future risk, we've also shown the proposed development areas (areas to be capped by building or pavement).

To complement the dataset, we are proposing to cover the rest of the non-wetland area of the site with lead samples. In "undisturbed" areas, we propose to sample the top 2 feet in order to assess future direct contact risks, but will also collect some deeper samples in the areas where Ransom found higher concentrations during test pit sampling. In the cut/fill/building cap areas, we propose to sample from 0-2' and 2'-4' for use in soil management during construction. The proposed sample locations are shown on the figure, as are the areas that will be capped by asphalt or building. Please note that the site is heavily overgrown and some modification of the proposed sample distribution may be required.

The long-term plan to address lead in soil includes capping of the former active areas of the site (via building or pavement) and application of a land use restriction over other areas to prevent future disturbance and land uses that are inconsistent with the presence of contaminants in surface soil.

PCBs in Soil

As for lead, we have consolidated the available PCB data onto a single figure, which is attached as Figure 2. The distribution of PCBs at concentrations exceeding 1 milligram per kilogram (mg/kg) appears to be limited to the area around the former car crusher. The frequency of detection is relatively low when viewed within the entire dataset.

We have initiated a discussion with Kimberly Tisa at EPA Region 1, who has requested that NHDES be brought into the conversation going forward. We will copy NHDES on all future correspondence. In her most recent email, Ms. Tisa was non-committal about future plans, but seemed to express confidence that the PCB issue would fall under the Toxic Substances Control Act (TSCA) and that additional data would be needed to support a cleanup/closure decision.

We have reviewed the relevant guidance (*PCB Site Revitalization Guidance Under TSCA*) and are confident that the area can be characterized as a Low Occupancy Area, where the applicable cleanup level is 25 mg/kg. Material characterized as "bulk PCB remediation waste" would be consolidated under the building or paved areas, and otherwise subject to a land use restriction as required by TSCA.

It is our intention to submit a proposal for collection of additional samples, with the aim of gaining EPA approval for a Self-Implementing Cleanup. When development work is complete, confirmation sampling will be required in accordance with the requirements of Subpart O of 40 CFR Part 761 or a risk-based sampling plan approved by EPA. Ideally, the confirmation work can be limited to areas outside the building and pavement cap, reducing the area to be confirmed.

Asbestos in Fill Materials

Figure 3 presents a consolidation of all asbestos observations during prior work. Both suspect and lab-verified materials are included. As we discussed, we are proposing no further action for these landfill materials other than implementation of a land use restriction to prevent future disturbance.

Wetland Sediment and Surface Water Quality

We have engaged the services of a risk assessor with expertise in sediment quality. Together, we have developed and are proposing the following program of investigation. Approximate sample locations are depicted on the attached Figure 4.

1. Sediment samples will be collected as vertical, discrete grab samples from a depth of 0 to 6 inches in accordance with generally recognized guidance for sediment sample collection, such as US EPA (2001) *Determination of the Biologically Relevant Sampling Depth for Terrestrial and Aquatic Ecological Risk Assessment* or OhioEPA (2001) *Sediment Sampling Guide and Methodologies*.
2. Surface water samples will be collected at each sediment sampling location where standing water is present.
3. At least three sediment and surface water samples will be collected from the stream only (not wetlands) upgradient of the pond to show the range of background coming into the study area.
4. Site characterization samples will be collected as follows:
    - One sample at the upstream entrance to the pond.
    - One sample midstream of the pond, nearer to site.
    - One sample at the exit of the pond.
    - Samples mid-stream every ~100 feet laterally down the stream to Banfield Avenue (~14 samples).

   - Samples along the nearest (site side) wetland edge (where water is present) every 100 feet laterally down the stream to Banfield Avenue (perpendicular to flow into stream, where possible) (~9 samples).
   - Samples along the far side of the stream in wetland areas along just the eastern side of property to identify off-site influences, if any, as well as the extent of impacts to the wetland (~10 samples)
5. Sediment samples will be analyzed as follows. All reporting limits must be low enough for comparison to the relevant benchmarks, where they exist.
   - Total organic carbon
   - Grain size
   - Extractable petroleum hydrocarbons
   - PAHs with low reporting limits
   - PCBs (if required by NHDES, not detected in sediment to date)
   - RCRA-8 metals
   - Any other constituents of concern including PFAS as requested by NHDES
6. Surface water samples will be analyzed as follows. All reporting limits must be low enough for comparison to the relevant benchmarks, where they exist.
   - Calcium carbonate hardness (in mg/L)
   - RCRA-8 metals (total and dissolved/filtered)
   - PAHs (dissolved/filtered)
   - PCBs (if requested by NHDES)

This program is designed to create a sample set suitable for characterization of human health and ecological risks associated with wetland and surface water quality and to better characterize impacts to the wetland from historical site operations.

After the data collection efforts described herein have been completed, we will notify you and present concepts to be included in a Remedial Action Plan. We look forward to your continued input and to reaching a mutual agreement and site condition that can allow this property to be put back into productive use. If you have any questions, or require additional information, please do not hesitate to contact me.

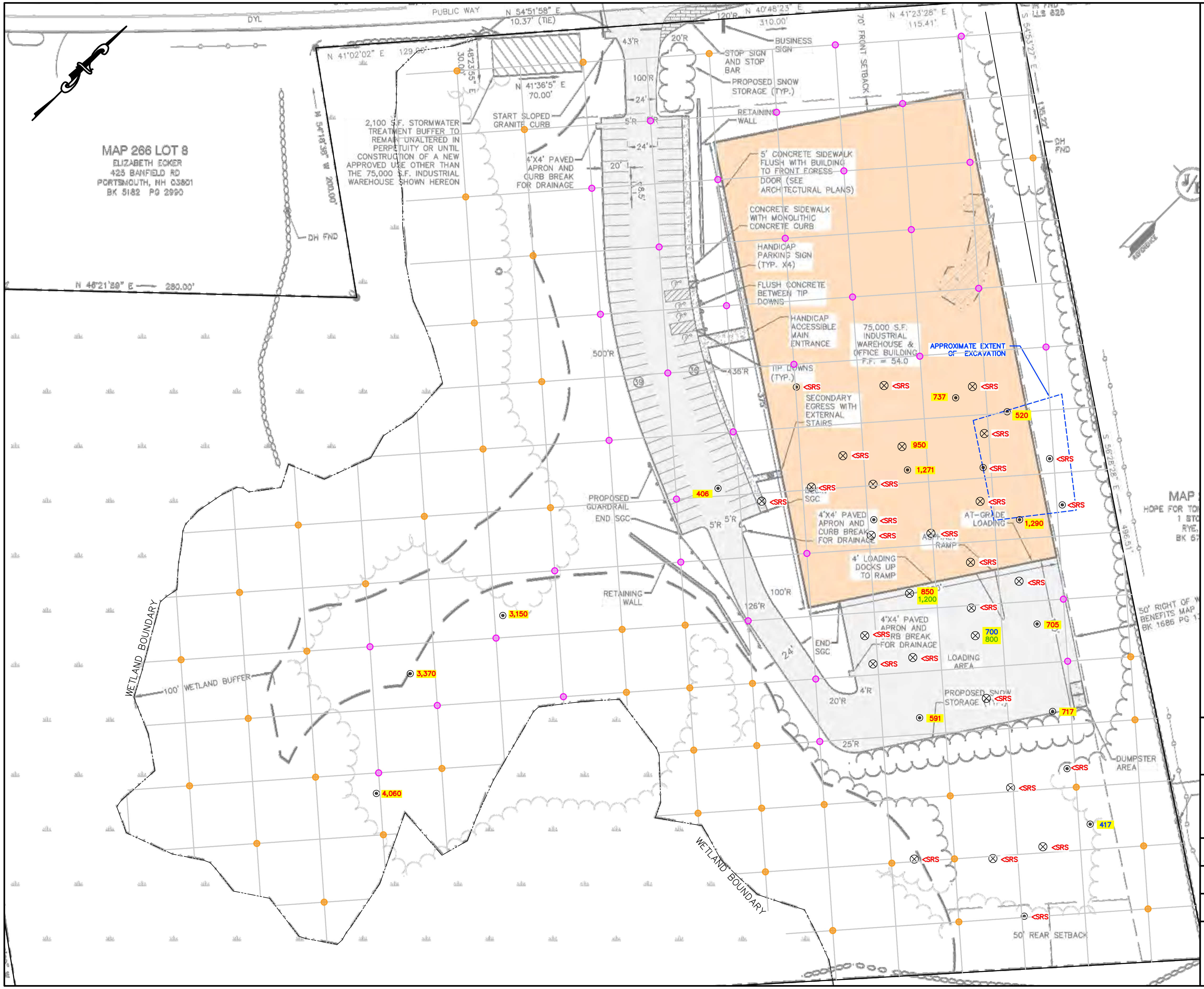
Very truly yours,

WILCOX & BARTON, INC.

William R. Wilcox Jr.
President – Principal Geologist

Attachments	Figure 1 - Lead in Soil
Figure 2 - PCBs in Soil
Figure 3 – Asbestos in Fill
Figure 4 – Wetland Sampling Locations

FIGURES



LEGEND

— — — — APPROXIMATE SUBJECT PROPERTY BOUNDARY

⊗ SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)

⊙ TEST PIT LOCATION (RANSOM 2008)

520 LEAD CONCENTRATION IN SAMPLE EXCEEDS SOIL REMEDIATION STANDARD (SRS) OF 400 mg/kg.

<SRS LEAD CONCENTRATION LESS THAN SRS FOR ALL SAMPLE DEPTHS COLLECTED.

LEAD CONCENTRATION ABOVE SRS IN MILLIGRAMS PER KILOGRAMS (mg/kg)	
SAMPLE DEPTH INTERVAL (FEET)	LEAD CONCENTRATION
0–2	1,290
2–4	700
4–6	800

🟧 IMPERVIOUS CAP AREA (BUILDING)

⬜ IMPERVIOUS CAP AREA (PAVEMENT)

● PROPOSED SAMPLE LOCATION (0–2') IN UNDISTURBED AREAS

● PROPOSED SAMPLE LOCATION (0– 2' & 2'–4') IN CAPPED/DISTURBED AREAS

NOTES

1. DATA SUPERIMPOSED ON GRADING AND DRAINAGE PLAN, SHEET C-3 DATED 4/21/20, REVISED 8/18/21, BY JONES & BEACH ENGINEERS, INC.
2. SAMPLE DEPTH INTERVALS DISPLAYED FOR RANSOM 2008 DATA ARE APPROXIMATE.

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
LEAD IN SOIL

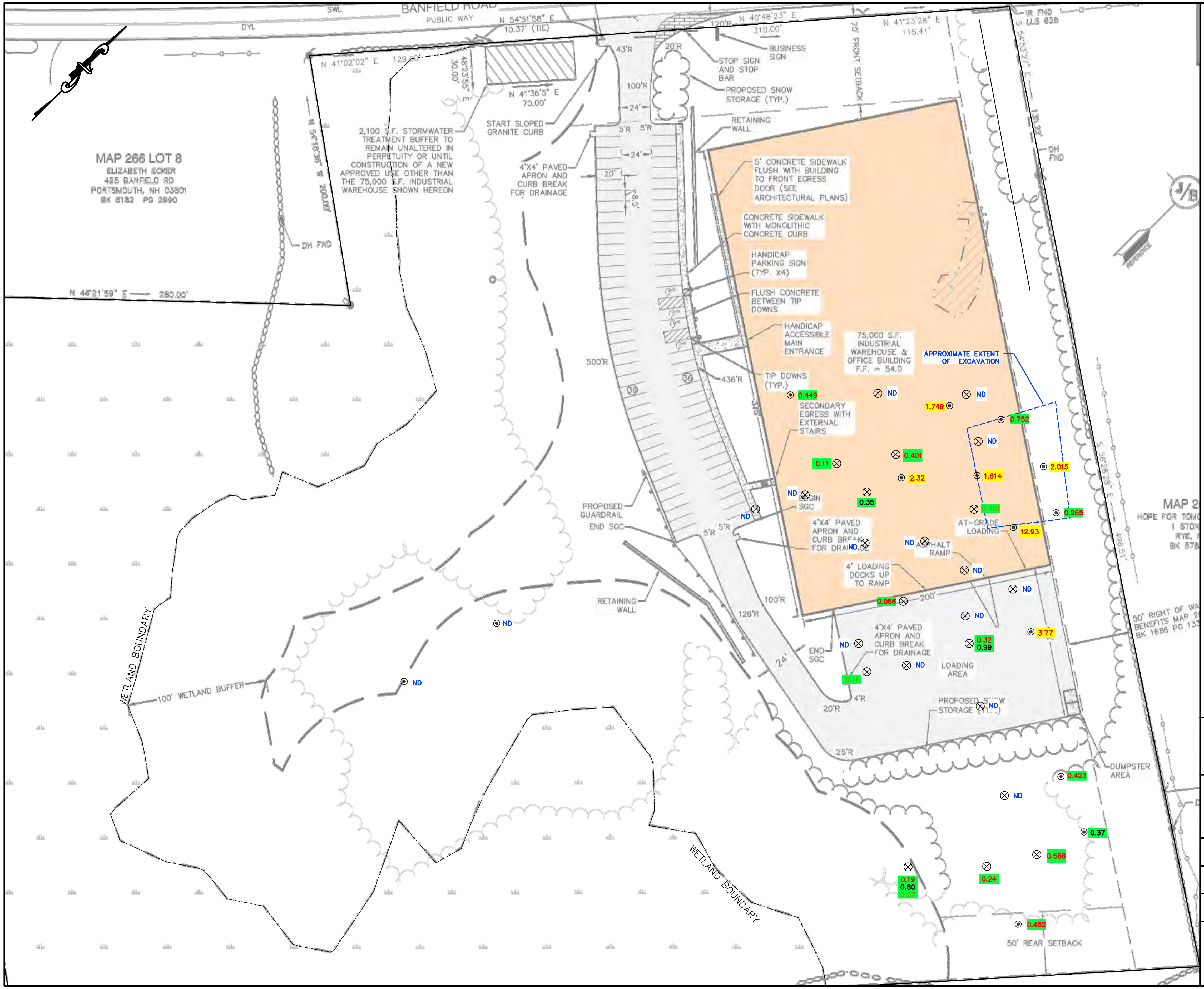
DATE	SCALE	FILE
April 16, 2020	GRAPHIC	Master Plan
APPROVED BY WRW	DRAWN BY MSB	REVISED August 30, 2021

CLIENT
Banfield Realty, LLC

JOB NUMBER
BANF0004

LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire

DRAWING NUMBER
1



LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

⊗ SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)

◉ TEST PIT LOCATION (RANSOM 2008)

TOTAL POLYCHLORINATED BIPHENYLS (PCBS) CONCENTRATION IN MILLIGRAMS PER KILOGRAMS (mg/kg)	
SAMPLE DEPTH INTERVAL (FEET)	PCB CONCENTRATION
0–2	0.19
2–4	0.80
4–6	0.37

ND TOTAL PCB CONCENTRATION LESS THAN REPORTING LIMIT FOR ALL SAMPLE DEPTHS COLLECTED. REPORTING LIMITS ALL <1.0 mg/kg.

3.77 TOTAL PCB CONCENTRATION IN SAMPLE EXCEEDS SOIL REMEDIATION STANDARD OF 1.0 mg/kg.

🟧 IMPERVIOUS CAP AREA (BUILDING)

⬜ IMPERVIOUS CAP AREA (PAVEMENT)

NOTES

1. DATA SUPERIMPOSED ON GRADING AND DRAINAGE PLAN, SHEET C-3 DATED 4/21/20, REVISED 8/18/21, BY JONES & BEACH ENGINEERS, INC.
2. ANALYTICAL DATA FOR WILCOX & BARTON, INC. SOIL SAMPLES COLLECTED AT DEPTHS OF 6–8 FEET BELOW GROUND SURFACE NOT SHOWN. TOTAL PCB CONCENTRATIONS IN SAMPLES AT THIS DEPTH INTERVAL WERE BELOW REPORTING LIMITS IN ALL INSTANCES.
3. SAMPLE DEPTH INTERVALS DISPLAYED FOR RANSOM 2008 DATA ARE APPROXIMATE.

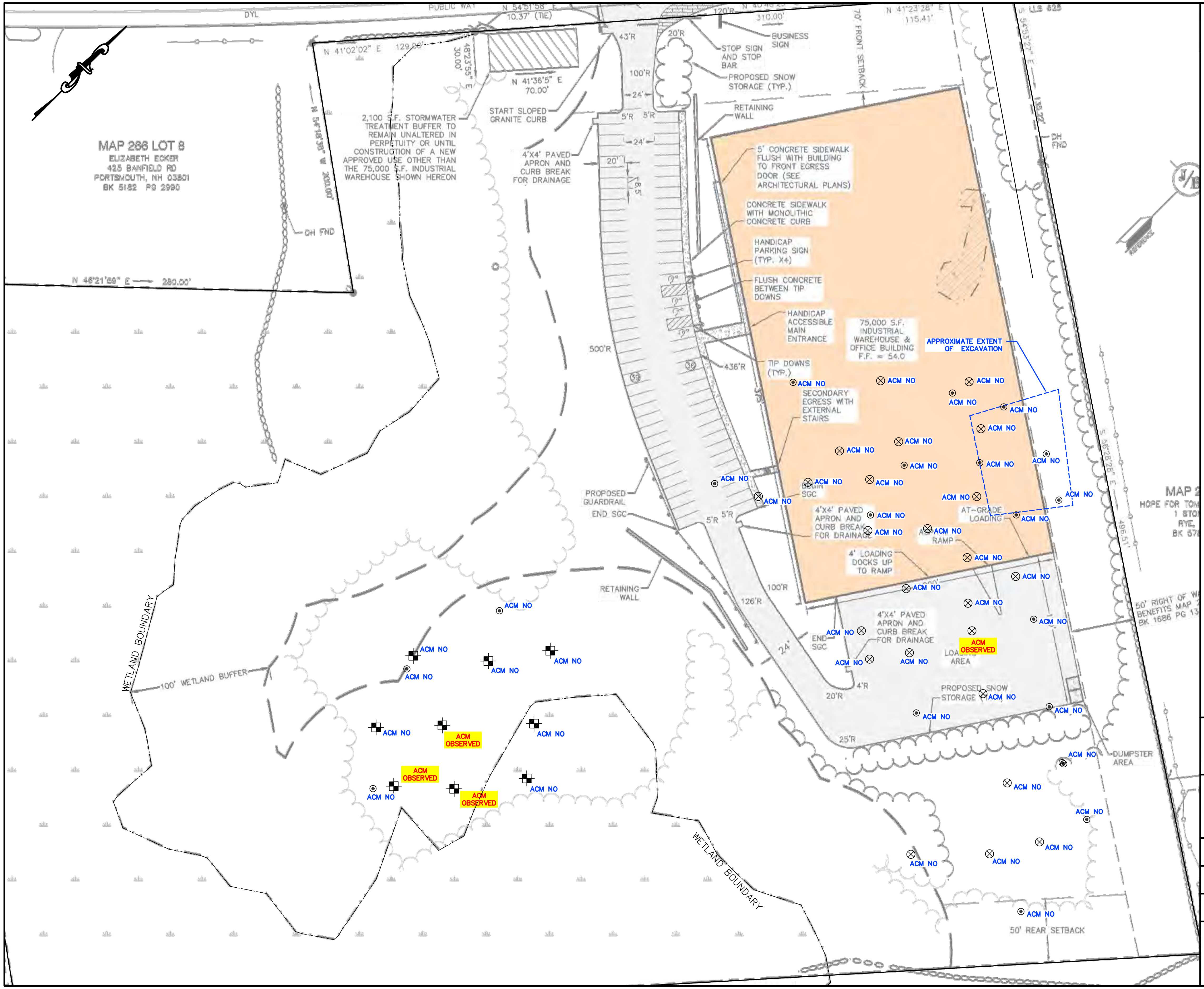
GRAPHIC SCALE

80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE TOTAL PCBS IN SOIL		
DATE April 16, 2020	SCALE GRAPHIC	FILE Master Plan
APPROVED BY WRW	DRAWN BY MSB	REVISED August 30, 2021
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0004
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER 2



LEGEND

— — — —	APPROXIMATE SUBJECT PROPERTY BOUNDARY
⊗	SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)
✚	TEST PIT LOCATION (WILCOX & BARTON, INC. 2020)
⊙	TEST PIT LOCATION (RANSOM 2008)
ACM OBSERVED	SUSPECT ASBESTOS CONTAINING MATERIALS (ACM) OBSERVED.
ACM NO	SUSPECT ACM NOT OBSERVED (NO).

NOTES

1. DATA SUPERIMPOSED ON GRADING AND DRAINAGE PLAN, SHEET C-3 DATED 4/21/20, REVISED 8/18/21, BY JONES & BEACH ENGINEERS, INC.

GRAPHIC SCALE

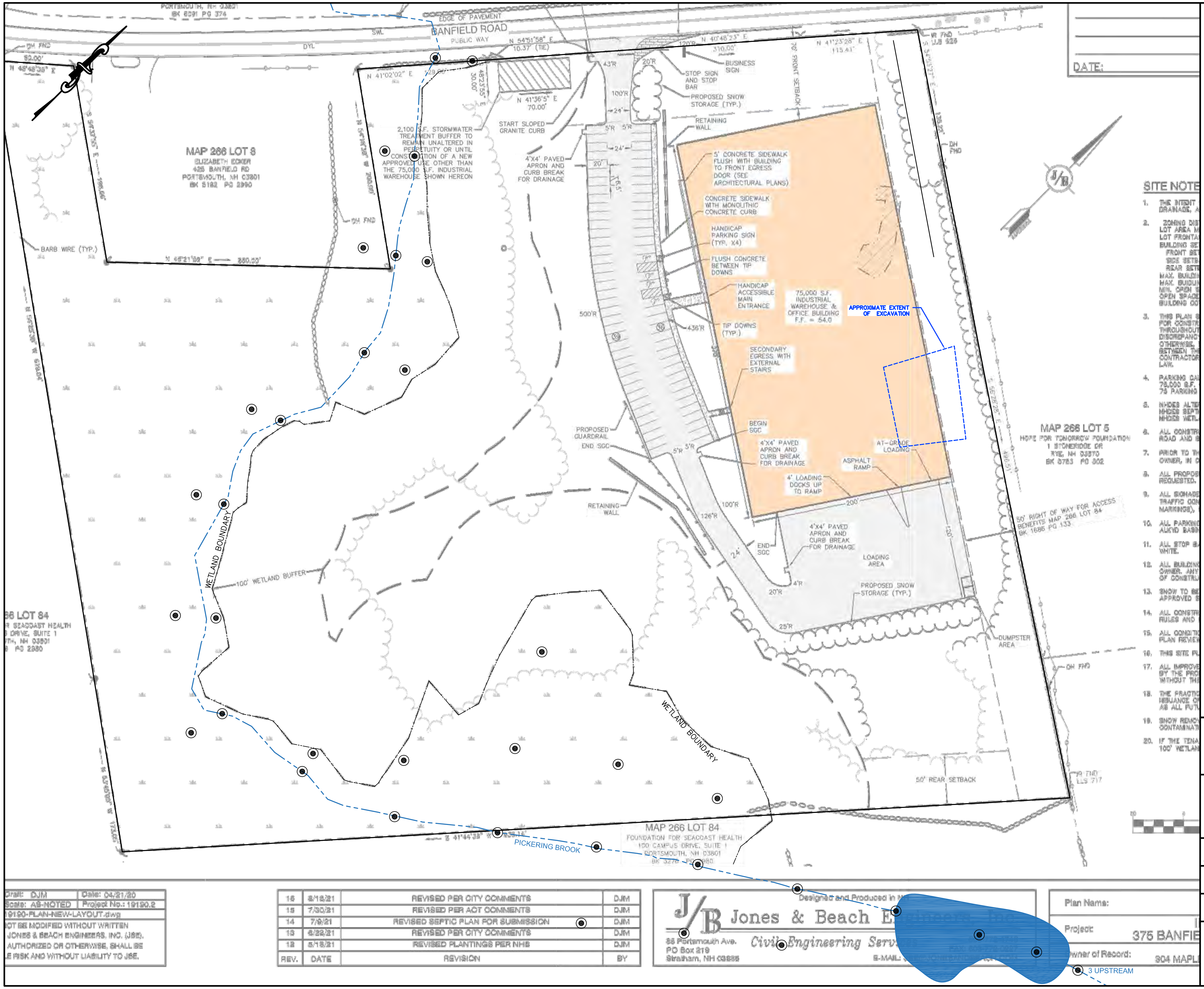
80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
ASBESTOS IN FILL

DATE April 16, 2020	SCALE GRAPHIC	FILE Master Plan
APPROVED BY WRW	DRAWN BY MSB	REVISED August 30, 2021
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0004
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER 3



LEGEND

— — — — APPROXIMATE SUBJECT PROPERTY BOUNDARY

◉ SEDIMENT/SURFACE WATER SAMPLE

NOTES

1. DATA SUPERIMPOSED ON GRADING AND DRAINAGE PLAN, SHEET C–3 DATED 4/21/20, REVISED 8/18/21, BY JONES & BEACH ENGINEERS, INC.
2. DEPICTED ROUTING OF PICKERING BROOK IS APPROXIMATE AS ADAPTED FROM AERIAL IMAGERY. SAMPLE LOCATIONS WILL BE ADJUSTED IN THE FIELD.

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE		
WETLAND SAMPLING		
DATE April 16, 2020	SCALE GRAPHIC	FILE Master Plan
APPROVED BY WRW	DRAWN BY MSB	REVISED August 30, 2021
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0004
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER 4

From:	Drew, Scott
To:	Bob Rooks; McCluskey, Mike
Cc:	Bill Wilcox; Madeleine Broussard; Alan McLevy
Subject:	RE: Response to NHDES Comments - Former Country Motor Sales, Portsmouth
Date:	Friday, September 10, 2021 4:01:31 AM
Attachments:	image002.png image003.png image004.png

Hi Bob,

Thank you for the update. Please upload the response to comments (RTC) document to OneStop (NHDES #199408047, Project #40176).

In regard to the wetland sediment and surface water quality assessment described in the RTC document, we offer the following comments:

- Please collect field-based water quality parameters (temperature, dissolved oxygen, pH, conductivity, ORP, and turbidity). Based on the results of previous sampling and analysis, we do not request additional sediment or surface water sample collection for analysis of PCBs. While we are not opposed to collection of samples for analysis of PFAS, we are not requesting it at this time.
- We understand that waste disposed in the pre-1981 landfill is either in direct contact with wetland surface water and sediment and/or is located immediately upgradient of the wetland. As such, we are concerned the waste and associated impacted soil may be a source of contamination detected in the wetland system. In this regard, please consider analyzing select surface water samples (proximate to and downstream of the landfill, along with at least one sample from upstream) for the following constituents: iron, manganese, ammonia, chloride, nitrate, sulfate, total suspended solids, and total dissolved solids. A package of major ions/wet chemistry may be appropriate for a few samples to better understand water chemistry. We are of the opinion that analyzing select samples for these additional constituents will aid in understanding the connection, if any, between the landfill materials and the wetland system. The density of proposed collocated sediment/surface water samples appears more than adequate. We are amenable to a reduction in samples in order to fit the above-mentioned analyzes into the scope of work/budget, if needed.

- The scope of work described in the RTC document is focused on sample collection and analysis. Please proceed with collecting the additional information requested in our letter dated August 9, 2021, or reach out to discuss why any items are planned for omission from the assessment work.

We have no comments regarding the scope of work for additional groundwater and soil assessment. The work described appears to be in line with our previous communications. Please includes us on correspondences with EPA regarding the PCBs. It’s our understanding that Ms. Tisa has requested our attendance on conference calls regarding this issue.

Best,

Scott Drew, P.G.
NH Department of Environmental Services
Hazardous Waste Remediation Bureau
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
Phone: (603) 271-2890
Email: Scott.T.Drew@des.nh.gov

From: Bob Rooks <RRooks@wilcoxandbarton.com>
Sent: Wednesday, September 8, 2021 5:49 PM
To: Drew, Scott <scott.t.drew@des.nh.gov>; McCluskey, Mike <michael.g.mccluskey@des.nh.gov>
Cc: Bill Wilcox <wWilcox@wilcoxandbarton.com>; Madeleine Broussard <mbroussard@wilcoxandbarton.com>; Alan McLevy <AMcLevy@wilcoxandbarton.com>
Subject: Response to NHDES Comments - Former Country Motor Sales, Portsmouth

Hi Scott-

We have prepared the attached as a formal response to you comments concerning data collection efforts at the subject site.

To date, the groundwater sampling has been completed and lab results are pending. Today, we began laying out the sample points for lead, but found much of the site to be heavily overgrown and completely inaccessible without extensive clearing inside the wetland buffer. We will proceed with lead sample collection and see what sort of coverage we are able to obtain.

For PCBs, our next steps will include a call with Kimberly Tisa, which we are working to coordinate.

Best regards—

Bob

PS Please let me know if this submittal should be uploaded to OneStop. Thx.

Robert W. Rooks, PE
Principal Engineer

WILCOX & BARTON, INC.
Civil * Environmental * Geotechnical

Office: (603) 369-4190 x503
Cell: (808) 620-0800
Fax: (603) 369-6639
Toll Free: (888) 777-5805

rrooks@wilcoxandbarton.com
www.wilcoxandbarton.com

APPENDIX B

Wilcox & Barton, Inc. Standard Operating Procedures

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

STANDARD OPERATING PROCEDURE

Title:	Grab and Composite Soil Sampling			**No:**	**FP-02**
Approved:	R. Rooks	**Original Date:**	3/30/2017	**Revised:**	

Purpose:

To ensure data quality by collecting representative soil samples for laboratory analysis.

Equipment/Materials:

1. Sample containers, preserved and handled as required for the specific media and analyses
2. Analytical chain-of-custody form(s), sample label(s), and sample custody seal
3. Coolers or other containers for transporting samples
4. Packing materials and ice
5. Appropriate clothing/PPE as specified in the health and safety plan
6. Site plan
7. Field log book or field data form
8. Stainless steel or polyethylene scoop/trowel
9. Stainless steel or polyethylene mixing bowl (for composites)
10. Sample collection equipment (hand auger, split-spoon, shovel, etc.)

Procedure:

1. Before sampling, confer with the laboratory performing the analyses to make sure the required data quality objectives and reporting requirements will be met.
2. Obtain appropriate sample containers from the laboratory.
3. Wear dedicated nitrile gloves for each discrete sample collected. Change gloves between sample locations.

Grab Samples – Grab samples are samples collected from a discrete location. Soil samples may be collected using dedicated or reusable equipment. All reusable sample equipment must be decontaminated between sample locations in accordance with ***SOP# FP-06***.

1. Using the appropriate soil collection method and equipment based on site conditions and the contaminants of concern, collect the appropriate volume of soil.
2. Carefully place the appropriate volume of soil into the appropriate sample container in accordance with the laboratory quality systems manual and/or laboratory method SOPs. Clean threads of sample container before placing lid back on sample container to ensure tight seal. Secure lid tightly and complete sample label with ID, date, time, required analysis, etc.
3. Record the location, depth, and characteristics of the grab soil sample in the log book. Soil characteristics should be classified in accordance with ***W&B SOP# FP-14***.
4. Complete the chain-of-custody record in accordance with ***W&B SOP# FP-04***, ensuring that holding time and temperature preservation requirements are maintained.

Composite Samples – Composite samples are grab samples collected from pre-determined locations that are mixed in a container until uniform and placed into containers for submittal to the laboratory. The number of subsamples used to create a composite will be determined during work planning and based upon the volume of soil to be represented and the data quality objectives of the project; values can range from a minimum of 8 for small stockpile characterization up to 50 subsamples when a multi-increment sampling approach is employed.

Due to potential contaminant volatilization during mixing, this method is appropriate ONLY for samples submitted for non-volatile analyses. Soil samples may be collected using dedicated or reusable equipment. All reusable sample equipment must be decontaminated between sample locations in accordance with ***W&B SOP# FP-06***.

1. Using the appropriate soil collection method and equipment based on the contaminants of concern, collect an equal grab sample from each area to be composited. Place each grab sample into a mixing container that is appropriate based on the contaminants of concern.
2. Gently mix the sample using a cone-and-quartering method until thoroughly homogenized. Multiple iterations should be performed until homogeneity can be visualized by grain size, color, moisture content, and cohesiveness.
3. Carefully place the appropriate volume of homogenized soil into the appropriate sample container in accordance with the laboratory quality systems manual and/or laboratory method SOPs. Clean the threads of the sample container before placing lid back on sample container to ensure tight seal. Secure lid tightly and complete sample label with ID, date, time, required analysis, etc.
4. Record the number, locations, and depths of the composited grab samples in the log book. Include a sketch of the sample area and location of the grab samples that comprise the composite.
5. Complete the chain-of-custody record in accordance with ***W&B SOP# FP-04***, ensuring and that holding time and temperature preservation requirements are maintained.

Wilcox & Barton Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING

STANDARD OPERATING PROCEDURE

Title:	Water Quality Monitoring Using a YSI Multi-Probe System (MPS)	**No:**	**FP-03**
Approved: R. Rooks	**Original Date:** 3/30/2017	**Revised:**	

Purpose:

To monitor basic water quality parameters including temperature, pH, oxidation-reduction potential (ORP), specific conductance, total dissolved solids (TDS), and dissolved oxygen (DO) in a uniform, efficient, and defensible manner using a YSI MPS.

Equipment/Materials:

1. YSI MPS water quality meter with the necessary sensors installed
2. Specialized flow-through cell
3. Probe sensor guard
4. Peristaltic pump and power source
5. Dedicated polyethylene and silicon tubing

Procedure:

All measurements (temperature, DO, pH, specific conductance, TDS, and ORP) can be taken simultaneously in the field by using the probe sensor guard and immersing the probe down-well or in a surface water body or by using the flow-through cell in conjunction with a peristaltic pump and required tubing.

Direct Data Collection

1. Ensure the probe is properly decontaminated prior to immersing it in a dedicated monitoring point such as a monitoring well.
2. Attach the probe sensor guard.
3. Attach the probe cable to the YSI MPS display at the cable connector.
4. Turn on the instrument.
5. Locate the sampling point.
6. Carefully immerse the probe, with probe sensor guard attached, directly into the body of water that you wish to test.
7. Ensure that there are no air bubbles trapped in the sensors by gently rotating and/or moving the probe up and down. This is very important for accurate DO readings.
8. Keep the sensors in the water until the readings on the YSI MPS screen have stabilized.
9. Record the results on the field form or in the field log book.
10. Properly decontaminate the probe and return it to its protective case and secure it for transport to the next sampling site.

Data Collection Using the Flow-Through Cell

1. Screw the probes into the top of the flow through cell.
2. Attach the probe cable to the YSI MPS at the cable connector.
3. Turn on the instrument.
4. Locate the sampling point.

5. Begin pumping water through the bottom entry port and into the flow-through cell using a peristaltic pump and appropriate tubing.
6. Insure that there are no air bubbles trapped in the sensors by rotating and/or moving the flow-through cell up and down. This is very important for accurate DO readings.
7. Allow the flow through cell to fill as slowly as possible. Once the cell is full and water begins exiting the top exit port, allow time for the readings on the YSI MPS display to stabilize.
8. Record the results on the field form or in the field log book.
9. Rinse the probes and return the meter to its protective case and secure it for transport to the next sampling site. Discard the sample water.

<u>Additional considerations:</u>

Samples for laboratory analysis should not be collected from the flow-through cell exit port unless the flow-through cell is dedicated to the sampling point. Effective decontamination of the flow-through cell in the field is not considered practical. When using the flow-through cell to assess stability of groundwater chemistry parameters during low-flow sampling, simply remove the cell prior to collecting samples from the pump tubing.

Wilcox & Barton INC.
ENVIRONMENTAL AND CIVIL ENGINEERING

STANDARD OPERATING PROCEDURE

Title:	Sample Custody and QA/QC Sample Collection		**No:**	**FP-04**
Approved:	R. Rooks	**Original Date:** 3/30/2017	**Revised:**	

Purpose:

To ensure data quality by providing a clear record of sample custody from the sampling event through laboratory analysis, and by collecting appropriate QA/QC samples during the sampling event.

Equipment/Materials:

1. Sample containers obtained, preserved, and handled as required for the specific media and analyses.
2. Analytical request/chain-of-custody form(s), sample label(s) and sample custody seal (if applicable).
3. Coolers or other container for transporting samples.
4. Writing implement - pen or marker only.

Procedure:

Sample Custody

1. Before sampling, confer with the laboratory performing the analysis and review the chain-of-custody requirements as outlined in this SOP.
2. Obtain, preserve, and handle samples in accordance with laboratory method SOPs.
3. Sample containers may be pre-labeled or labeled immediately after collection.
4. Sample container labels must include:

   - Sample ID number/name. Sample identification names/numbers must be unique.
   - Site/project name.
   - Analysis required (EPA method number or laboratory analysis reference).
   - Sample type: composite or grab.
   - Date of sample collection.
   - Time of collection. Sample collection time(s) must be in 24-hour notation.
   - Sample preservation (if applicable).
   - Sampler names or initials.

5. Immediately before or after obtaining an individual sample set, begin filling out the analytical request/chain-of-custody record.
6. Fill out the sections on the chain-of-custody record regarding sample identification; sample collection time and date; analysis requested; comments; container/preservation; matrix; and other field measurements by checking the boxes and adding any comments as

appropriate. It is not necessary to include sample collection time on the field duplicate sample.

7. Verify that the chain-of-custody is complete with all samples accounted for and properly identified before finalizing the sampling event. Samples must be accompanied by the completed chain-of-custody at all times during transport.
8. Sample custody seals are required when specified in the work plan or Quality Assurance Project Plan (QAPP). The level of control can vary; seals can be placed on each individual sample or on the sample cooler/other container used for transporting samples. Verify with the project manager prior to sample collection.
9. Sample custody seals are to be placed over the cap and container of an individual sample or over the lid and body of the container/cooler so that a broken seal provides evidence of tampering. Custody seals must be signed and dated.
10. As required by analytical method SOPs specified in laboratory requirements, the samples should be placed in a cooler with enough ice to maintain the required temperature preservation. Samples should not be submersed in water and should be kept from freezing.
11. Samples should be packed in the cooler/container in a way that prevents breakage or the leaking of melted ice water or the leaking of damages containers.
12. The chain-of-custody document is two pages of carbonless copy paper. The yellow copy (bottom) should be retained by the sampler and the white copy (top) should be retained by the laboratory. When shipping samples via courier, the laboratory copy of the chain-of-custody should be transported with the samples in the cooler/container (within a plastic protective cover/bag) or secured to the exterior of the cooler/container in a packing slip pocket.
13. Upon completion of the sampling event, transport the samples to the laboratory for analysis. If the samples are delivered to the lab by the same individual(s) who performed the sampling, the sampler is responsible for maintaining the record until the samples are delivered to the lab. If transferring the samples to a different individual for delivery, the sampler must sign on the lower block on the second page under “Samples Relinquished By.” The person transporting the samples to the lab must sign on the lower block under “Samples Received By,” and fill in the correct date and time in the spaces provided. If the samples are shipped via commercial carrier to the lab, the sampler must sign in the lower block on the second page under “Samples Relinquished By,” and fill in the date and time in the space provided. The sampler also places the name of the commercial carrier under “Samples Received By” and retains the carrier’s shipping receipt as evidence. The sampler then places the chain-of-custody record within or secured to the sample carrier (usually a cooler).
14. Upon arrival at the laboratory, deliver the samples to the individual responsible for sample receipt.
15. Sign the chain-of-custody record on the lower block on the second page under “Samples Relinquished By.”
16. Ensure that the laboratory representative signs the record on the lower block on the second page under “Samples Received By,” and places the correct date and time in the spaces provided.

17. If the samples must be transferred for any reason (e.g., to another laboratory or section for specialized analyses, etc.), instruct the laboratory representative to follow the above procedure to fill out additional custody documentation.
18. Ensure that the laboratory returns the properly completed chain-of-custody record and file it with the laboratory results.

Common QA/QC Sample Types and Collection

QA/QC requirements will vary and will be detailed in the work plan, site-specific QAPP, or other documents.

1. **Field Duplicate -** Two sets of samples are obtained from the same media and sampling location and are analyzed using the same laboratory method. The location of the field duplicate sample will not be identified on the chain-of-custody record. Field duplicates should be collected from a location immediately adjacent to (spatial), immediately in succession to (temporal), or as a homogenized split of the true sample. The duplicate sample tests the precision of the laboratory analytical method, as well as the quality of the field sampling methods.
2. **Equipment Blank-** An aqueous sample is collected from deionized water that is rinsed over or throughout the equipment after decontamination and before sampling. This sample documents proper decontamination procedures. An equipment blank is not necessary when dedicated sample equipment is utilized.
3. **Field Blank/Trip Blank-** Aqueous trip blanks will consist of deionized water collected in the same lot of containers used in the sampling event, and will be preserved in the same manner. Soil/solid trip blanks will consist of a methanol-preserved (same as sample event) VOA. The trip blank samples will travel with the other sample containers from that sample event. Generally, one trip blank is required per sample event; however, scope and work plans may vary. This sample documents proper transport, handling and storage procedures and verifies container cleanliness.
4. **Bottle Blank-** Deionized water is added to an empty container from the same lot of containers as the sampling event. A bottle blank is not usually necessary when using containers that were pre-cleaned at the laboratory or factory prior to shipment. This blank may also be combined with a trip blank analysis.
5. **Temperature Blank-** Deionized water is collected at the laboratory or prior to the initiation of field work, and is transported with the other samples to the sampling site and back to the laboratory to document the temperature (preservation) of the samples in the container/cooler.

Sample collection and documentation will conform to the following standard(s) as applicable:

ASTM D4840 - 99(2010) Standard Guide for Sampling Chain-of-Custody Procedures.

STANDARD OPERATING PROCEDURE

Title:	Cleaning/Decontamination Procedures			**No:** FP-06
Approved:	R. Rooks	**Original Date:**	4/5/2017	**Revised:**

Purpose:

To minimize the spread of contamination within a specific study area as well as from site to site, to reduce the potential for worker exposure through contact with potentially contaminated equipment and, to improve data quality and reliability.

Equipment/Materials:

1. Detergent – non-phosphate detergent solution (Alconox® or Liquinox®)
2. Clean control rinse water – preferably from a water system of known chemical composition
3. Deionized water – organic-free reagent grade
4. Appropriate clothing, gloves, eye protection
5. Field log book or project check list

Procedure:

Depending on site conditions, it may be desirable to perform all equipment decontamination at a centralized location on site. If this is the case, care must be taken to transport the equipment to the decontamination area such that the spread of contamination is minimized. During decontamination activities, appropriate clothing, gloves and eye protection should be worn at all times.

For Equipment in Contact with Environmental Media

Before and after sample collection, decontaminate any reusable equipment that has contacted or will contact the environmental media to be sampled. More rigorous or alternate decontamination procedures may be employed if necessary to meet specific sampling or QA/QC objectives.

1. Rinse the equipment thoroughly with clean water. Brush to remove all visible material.
2. Wash the equipment with a solution of Alconox® or Liquinox® and clean control water. A brush should be used to remove inert substances from equipment. For equipment that, because of its internal mechanism, cannot be adequately cleaned with a brush, ensure that the decontamination solutions are adequately flushed or circulated through the equipment.
3. Rinse the equipment thoroughly with clean control water.
4. Rinse the equipment with deionized water.
5. Place on a clean surface to air dry or wrap in aluminum foil to preserve cleanliness before next use.

STANDARD OPERATING PROCEDURE

Title:	Sampling Groundwater for Volatile Organic Compounds (VOCs), Volatile Petroleum Hydrocarbons (VPH), and Extractable Petroleum Hydrocarbons (EPH)		**No:** **FP-07**
Approved: R. Rooks	**Original Date:** 7/6/2010	**Revised:** 3/30/2017	

Purpose:

To ensure that accurate, legally defensible, and representative data is collected when collecting groundwater samples for VOC, VPH, and EPH analyses.

Equipment/Materials:

1. Water-level indicator or oil/water interface probe
2. Peristaltic pump and power source
3. YSI Multi-Probe System
4. Bailers (based on project and site conditions)
5. Sample tubing (based on project, site conditions, and contaminants of concern)
6. Pre-cleaned, laboratory-supplied sampling containers
7. Coolers/packing materials/wet ice
8. Field log book or project check list

Procedure:

Groundwater samples may be collected using conventional (standard) techniques or via low-flow techniques depending upon project objectives and data needs. Users are responsible for selecting the appropriate technique and adhering to the protocols outlined below.

STANDARD PURGING AND SAMPLE COLLECTION:

1. Measure depth to static water level and depth to bottom of well.
2. Calculate standing water volume in the well.
3. Using a new or decontaminated bailer, purge either: (1) five well volumes of water from the well, (2) until the well is dry, or (3) until pH, specific conductance and temperature readings stabilize.
4. Transfer the sample directly from the bailer into the appropriate sample container(s).
    a) VPH and VOC samples – <u>three</u> pre-cleaned, pre-preserved 40-milliliter VOA vials with Teflon septa caps.
    b) EPH samples - <u>two</u> pre-cleaned 1-liter amber bottles equipped with Teflon-lined screw caps.
5. Pre-preserved sample containers provided by the laboratory are to be used whenever possible. Care must be taken to ensure that the preservative (hydrochloric acid) is not

spilled during filling of containers. Sample pH of <2 must be maintained, and can be accomplished by adding 3 to 4 drops of HCl to a 40-ml VOA vial when needed.

6. After filling vials for VOC or VPH samples, invert each vial and tap to liberate potential air bubbles. Inspect to ensure no air bubbles are in the vial.
7. Place samples on ice immediately. Keep refrigerated until delivery to laboratory under chain-of-custody. Samples must be maintained at a temperature of less than 6°C but not frozen.

LOW FLOW PURGING AND SAMPLE COLLECTION (Less than 25 ft to water):

1. Measure depth to static water level and depth to bottom of well.
2. Determine desired sample intake depth based on well construction log and carefully install decontaminated or new/unused sampling tubing and foot valve assembly, minimizing disturbance of the water column:
    a) Set the intake near the top of the well screen for surficial groundwater monitoring wells; or
    b) Set the intake at the center of the screened interval for vertical delineation groundwater monitoring wells.
3. Attach the sampling tubing to clean, unused peristaltic pump tubing using appropriately sized vacuum fittings (male-male hose barb connection or similar fitting).
4. Attach the discharge of the pump to a calibrated flow-through meter capable of measuring, at a minimum, pH, temperature, and specific conductance, and at least one additional parameter such as oxidation-reduction potential, dissolved oxygen, and/or turbidity.
5. Initiate pumping at the lowest possible flow rate and monitor water level drawdown in the well while gradually increasing flow rate. Set the flow rate at the point just before water level drawdown occurs (generally less than 0.5 liter per minute or 0.12 gallons per minute).
6. Observe and record field parameters and water level drawdown initially at 5 to 15 minute intervals. Once stabilization appears to be approaching, increase the observation frequency to every 3 to 5 minutes. Purging is complete when three successive measurements meet the following minimum criteria:
    - pH ± 0.1
    - Specific Conductivity ± 0.3%
    - Dissolved Oxygen ± 10%

    If additional parameters are considered, recommended stabilized tolerances are:

    - Reduction-Oxidation Potential ± 10 mV
    - Turbidity ± 10%
7. Disconnect the flow-through field parameter meter and collect the sample from the pump discharge tubing.

8. Fill the sample containers directly from the pump discharge tubing, following the same procedures outline in steps 4 through 7 of Standard Purging and Sample Collection above.

DECONTAMINATION:

Use of disposable sampling equipment is preferred. However, if any item of equipment will be introduced into more than one well in a sampling round, the wells should be gauged and/or sampled in order of increasing contamination (*i.e.* wells anticipated to be less contaminated will be sampled first). After use in each well, the equipment will be decontaminated using, at a minimum, the following sequence:

1. Rinse with clean water
2. Wash with Alconox (laboratory detergent) and clean water solution
3. Three rinses with clean water
4. Rinse with distilled water

Similar decontamination procedures should be followed for all equipment introduced into the well, including water level meters, interface probes, and intake tubing. Bailers exposed to free product will not be re-used to sample for dissolved volatile constituents.

Wilcox & Barton INC.
ENVIRONMENTAL AND CIVIL ENGINEERING

STANDARD OPERATING PROCEDURE

Title:	Field Measurement of Turbidity			**No:**	**FP-09**
Approved:	R. Rooks	**Original Date:**	4/6/2017	**Revised:**	

Purpose:

To provide guidance on measuring turbidity in aqueous samples in the field.

Introduction:

The turbidity meter measures the scattering effect that suspended solids have on the propagation of light through a body of water (surface or ground waters). The higher the effect (i.e., intensity of scattered light), the higher the turbidity value. Suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, and plankton and other microscopic organisms cause turbidity in water.

Equipment/Materials:

1. Turbidimeter (nephelometer) or a spectrophotometer consisting of a light source and one or more photoelectric detectors with a readout device to indicate the intensity of light.
2. Clean sample cells or tubes of clear glass or plastic

Procedure:

1. Properly calibrate the instrument prior to use using the manufacturer’s instructions, or document that the instrument has been calibrated.
2. Collect an aqueous sample in an intermediate container.
3. Gently agitate the sample and wait until air bubbles disappear.
4. Double-rinse the sample cell with a small amount of the sample. Discard rise water and pour an aliquot into the sample cell.
5. Gently dry its external surface with lint-free paper.
6. Insert the cell in the instrument and read the turbidity directly from the meter display.
7. Do not use vacuum degassing, ultrasonic bath, or other devices to remove bubbles from the sample. If the sample contains visible bubbles or if it effervesces (as in groundwater, with changes in pressure and temperature), make a note of this in the field records and collect a sample for laboratory measurement.
8. If effervescing samples are collected for laboratory analysis collect the sample in a 250mL polyethylene bottle without leaving headspace in the container, and ship it as soon as possible to the laboratory (the holding time for this measurement is only 48 hours). Ship this sample in wet ice at 6 degrees Celsius.
9. Pour out the sample, double-rinse the sample cell with de-ionized water prior to the next sample.
10. Record results and observations in the field log book.

STANDARD OPERATING PROCEDURE

Title:	Measuring Liquid Levels in Monitoring Wells			**No:**	**FP-11**
Approved:	R. Rooks	**Original Date:**	4/5/2017	**Revised:**	10/13/2017

Purpose:

To ensure representative well gauging data are uniformly collected and can be used to determine depth to light non-aqueous phase liquid (LNAPL) and/or water within a monitoring well, apparent LNAPL thickness, and/or groundwater elevations.

Equipment/Materials:

1. Water level indicator (WLI) or interface probe (I-probe)
2. Spray bottle with deionized (DI) water
3. Spray bottle with non-phosphate detergent solution
4. Paper towels
5. Field log book or project check list

Procedure:

1. Locate wells. Begin measurements at the least contaminated well (if known), progressing to the most contaminated well.
2. Before opening the well, note and record the condition of well casing & protective cover.
3. Open well cap, turn on the WLI/I-Probe, and slowly lower the probe down the well until the WLI/I-Probe probe is activated. Find the liquid surface using the signals listed below.
    a. WLI – water level is signaled by a solid steady tone and green light.
    b. I-Probe – LNAPL level is signaled by a solid steady tone and steady light, and water level is signaled by an intermittent tone and flashing light
4. Make a depth-to-LNAPL and/or water measurement from the top of the well casing (a measuring point on the well casing may be pre-marked). Measurements should be taken using the measuring tape attached to the probe. Note any visual observations or odors associated with the groundwater. Record results in field notes.
5. For LNAPL, take the air/product interface measurement on the way into the liquid, and the water/product interface on the way up. When passing through the product into water, some product may adhere to the probe sensor due to surface tension. Therefore, when water is detected below product, the probe should be raised and lowered rapidly in a short vertical motion to remove any product that may have been carried down with the probe.
6. If not already known, make a depth-to-bottom measurement (to the nearest 0.01 foot ±) of the well from the same location on the top of the well casing. Record results in field notes.
7. If necessary, calculate apparent LNAPL thickness, which is the difference between the LNAPL level measurement and the water level measurement. Record results in field notes.
8. Replace well cover/cap.
9. Properly decontaminate the probe between well locations in accordance with ***W&B SOP# FP-06***.

Additional Considerations:

1. Use a dedicated WLI to gauge water supply wells, and do not use this WLI in known contaminated or potentially contaminated monitoring wells.
2. Refer to product owner’s manual for troubleshooting and maintenance procedures.

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

STANDARD OPERATING PROCEDURE

Title:	Soil Logging and Description			**No:**	**FP-14**
Approved:	R. Rooks	**Original Date:**	9/7/12	**Revised:**	4/1/17

Purpose:

To ensure that soils observed during field work are classified in a uniform, accurate, and legally-defensible manner using a modified form of the Burmister System of soil classification.

Introduction:

Soil classification is based upon visual observation and simple manual tests that can be conducted in the field. Wilcox & Barton, Inc. uses a modified form of the Burmister System of soil classification to describe soil samples during surface and subsurface investigation activities. The modified system allows for rapid evaluation of soil type in the field to produce a description that is easy to understand and reproduce for both geological and engineering applications. A proper modified Burmister soil description includes the following eight components, listed in this exact order:

1	2	3	4	5	6	7	8
Density or consistency	Apparent color	MAJOR component	Proportional adjective	Minor Component	Other adjective	Apparent moisture	Origin

Observations are recorded in a bound field notebook or on a soil logging template created specifically for this purpose. Soil should be described to a level of detail that matches the use and intent of the data. For example, if one-inch layers within a stratified deposit are repeated, then the entire unit can be described as alternating layers of material. If, however, a small layer is significant in terms of site hydrogeology, such as a potential contaminant pathway or confining layer, it must be described as such on the appropriate scale.

The Burmister classification was developed based on gradational characteristics of cohesionless soils and the plasticity behavior characteristics for cohesive soils. The term "cohesionless" normally applies to materials larger than and including silt-sized particles; however, some silt materials exhibit “apparent cohesion” and may therefore be described as cohesive. For samples in which both cohesionless and cohesive soils are present, the density or consistency descriptor should apply to the major soil component.

Equipment/Materials:

1. Equipment typically used during subsurface investigations that allow for visual inspection of the soil (excavator or backhoe; drill rig; hand auger; shovel).
2. Field log or field data sheet

Procedure:

Soil classification is based upon visual observation and simple manual tests that can be conducted in the field. Wilcox & Barton, Inc. uses a modified form of the Burmister System of soil classification to describe soil samples during surface and subsurface investigation activities. The modified system allows for rapid evaluation of soil type in the field to produce a description that is easy to understand and reproduce for both geological and engineering applications. A proper modified Burmister soil description includes the following eight components, listed in this exact order:

1	2	3	4	5	6	7	8
Density or consistency	Apparent color	MAJOR component	Proportional adjective	Minor Component	Other adjective	Apparent moisture	Origin

Observations are recorded in a bound field notebook or on a soil logging template created specifically for this purpose. Soil should be described to a level of detail that matches the use and intent of the data. For example, if one-inch layers within a stratified deposit are repeated, then the entire unit can be described as alternating layers of material. If, however, a small layer is significant in terms of site hydrogeology, such as a potential contaminant pathway or confining layer, it must be described as such on the appropriate scale.

The Burmister classification was developed based on gradational characteristics of cohesionless soils and the plasticity behavior characteristics for cohesive soils. The term "cohesionless" normally applies to materials larger than and including silt-sized particles; however, some silt materials exhibit “apparent cohesion” and may therefore be described as cohesive. For samples in which both cohesionless and cohesive soils are present, the density or consistency descriptor should apply to the major soil component.

1. Density or Consistency

The density or consistency of a soil material always refers to its in-place, undisturbed condition. This terminology is a measure of soil density or strength and can be evaluated for both cohesive and cohesionless soils.

Density or consistency is typically based on the number of blows required to advance a split spoon sampler in accordance with ASTM D-1586 specifications for the Standard Penetration Test. The summation of the blows necessary to drive the second and third 6-inch increments of penetration during sample recovery is called the Standard Penetration Number (N-value). The N-value is then compared to the ranges below to determine the density or consistency:

Non-Cohesive Soils	
N-value	Density Description
0-4	Very loose
4-10	Loose
10-30	Medium dense
30-50	Dense
>50	Very dense

Cohesive Soils	
N-value	Density Description
0-2	Very soft
2-4	Soft
4-8	Medium stiff
8-15	Stiff
15-30	Very stiff
>30	Hard

When collecting samples by hand or by Direct Push methods without N-value information, an estimate of density may be made based on the judgment of the individual collecting the sample. A note should be included on the sample log indicating that the recorded density is estimated.

2. Apparent Color

Colors are described using basic colors or combinations of colors such as “dark gray”, “gray-brown”, “reddish-brown” or “brown and tan”. Since color interpretation is subjective, the intent is to note the general identifying color of the major constituent to best designate a particular stratum or soil condition. Color charts may be used if necessary to better judge subtle changes in color. The color should be described shortly after collection while the material is still in its natural field moisture condition because color shade is subject to change during drying.

3. MAJOR Component

The first step in soil type classification is to identify the major constituent of the soil and to estimate, on a visual basis, the relative percent of its composition. The major component is recorded in capital letters. An estimate of the relative percent composition should be made, and should generally be greater than 30 to 50 % in order for the component to be predominant (see also Field References at the end of the document). Identification of the MAJOR (and minor) components is made according to particle size in accordance with the Unified Soil Classification System (USCS) classifications:

Particle Size			
	millimeters	inches	Sieve size
Boulder	>300	>12	--
Cobble	75 to 300	3 to 12	--
Gravel	4.75 to 75	3/16 to 3	No. 4 to No. 3
Coarse SAND	2.0 to 4.75	0.08 to 3/16	No. 10 to No. 4
Medium SAND	0.43 to 2.0	0.02 to 0.08	No. 40 to No. 10
Fine SAND	0.08 to 0.43	0.003 to 0.02	No. 200 to No. 40
SILT and CLAY	<0.075	<0.003	< No. 200

Because boulders, cobbles and some gravel are not recovered in a split spoon, percentages cannot be accurately determined from the standard penetration test. Instead, the possible presence of these constituents may be evaluated based on drilling behavior (*i.e.*, grinding or “jumping” of the drill bit or refusal of the split-spoon) or by observation of soil cuttings and noted on the boring log. The possible presence of these larger particles should be included under the sample description portion of the log. A description of the manner in which large particle presence was identified (*e.g.*, based on drill stem behavior) should be included in the general notes. If gravel, cobbles and boulders are observed during other investigations such as test pit excavation, the proportions may be listed in percentages or, because of potential difficulty in estimating volumetric proportions of larger particles based on visual examination, it is acceptable to simply reference their presence. When boulders are observed, a note should be made regarding their relative size.

For cohesive soil, a second descriptive adjective should be used that further defines the character of the fine particles (those passing a No. 200 sieve). These descriptions are based upon simple field tests conducted on representative samples of the material. The most effective field test is for plasticity, which is the resistance of the soil to crumbling at decreasing water contents. Soil is rolled between the hands into the smallest possible thread until the thread breaks apart. At the point where the thread breaks, the diameter is noted and compared to the associated descriptions below.

Description	Smallest Rolled Diameter (inches)	Overall Plasticity
SILT	based on texture, not roll diameter	Nonplastic
Clayey SILT	1/4	Slight
SILT & CLAY	1/8	Low
CLAY & SILT	1/16	Medium
Silty CLAY	1/32	High
CLAY	1/64	Very high

4. Proportional Adjective

The minor soil constituent types are identified along with the corresponding percent composition of the sample. The soil type is identified based upon particle size as described above. The proportions of the minor components are described with an adjective based upon the visually estimated percentage (see Field References) of the minor components as presented below:

Percent Composition	Descriptive Adjective
1-10	Trace
10-20	Little
20-35	Some
35-50	And

Minor constituents are recorded following the major constituent in order of decreasing proportion and the first letter in each minor constituent is capitalized. For example:

- A sample consisting of 40% fine sand, 25% medium sand, 20% coarse sand and 15% gravel would be described as **fine SAND, some medium to coarse Sand, little Gravel.**
- A sample consisting of 50% fine sand, 30% medium sand and 20% clayey silt would be described as **fine SAND, some medium Sand, some Clayey Silt.**
- A sample consisting of 60% clay and silt, 30% coarse sand and 10% gravel could be described as **CLAY & SILT, some coarse Sand, trace Gravel.**

5. Minor Component

The minor component is identified in the same manner as the MAJOR component based on particle size.

6. Other Adjective(s) and Descriptions

Following the description of the minor components, other useful information can be reported such as descriptions of soil structure (*e.g.*, angular grains, cemented, blocky), formation characteristics (*e.g.*, stratified, mottled, lenses, clasts), and other characteristics observed (*e.g.*, organic matter, debris, cobbles and boulders). The descriptions should be brief and pertinent to the investigation. Odors and visible staining should be noted. Whenever an odor is noted, a description of the strength and type should be provided (*e.g.*, strong, mild, gasoline-like, diesel-like, sewage, sulfur).

7. Apparent Moisture

Following the soil description, an estimate of the moisture content should be selected based on the following conditions. When saturated soil is noted, the logs should reflect that the apparent depth of the water table has been reached.

Description	**Condition**
Dry	No apparent moisture, soil can be blown away (no adhesion).
Damp	Color change noted, soil cannot be blown away (some adhesion).
Moist	Moisture apparent, soil can be packed.
Wet	Free moisture apparent, water can be squeezed or shaken from the sample, water observed in the sample container.

8. Soil Origin

As a final, general description of the soil, a note may be added that indicates a known geologic soil formation. This may include referencing the material as Fill, Glacial Till, Glacial Outwash, Peat, Lacustrine Deposit, etc.

In addition to the general geologic description, the USCS symbol may also be required for certain projects. The USCS symbol should be capitalized and correspond to the Modified Burmister description given to the soil. A USCS Classification Chart is provided in the Field References below.

STANDARD OPERATING PROCEDURE

Title:	Groundwater Sampling for Per- and Polyfluoroalkyl Substances (PFAS)			**No:**	**FP-17**
Approved:	R. Rooks	**Original Date:**	4/14/17	**Revised:**	

Purpose:

To provide guidance on proper collection of groundwater samples that will be analyzed for Per- and Polyfluoroalkyl substances (PFAS).

Introduction:

PFAS are a large group of man-made fluorine-containing chemicals with unique properties to make materials to which they are applied stain and stick-resistant. Chemicals in this group have been used in many industries, including aerospace, automotive, construction, manufacturing, electronic, and textile. PFAS have been used since the 1940s as manufacturer-applied oil and water repellants on products such as clothing, upholstery, paper, and carpets, and were also used in making fluoropolymers for non-stick cookware. PFAS have also been used as mist suppressants that can be added to metal plating baths, to prevent air releases, and to firefighting foams used on fires involving flammable liquids.

EPA has established a Drinking Water Health Advisory Level of 70 parts per trillion (ppt, or 0.070 ppb), which is an order of magnitude lower than typical analytes at typical release sites. State-specific limits can be lower. Therefore, preparation and sampling technique are of critical importance to avoid cross- and background contamination. Further, much of our normal sampling equipment contains Teflon and other fluoropolymer materials (e.g., Teflon tubing, Teflon-lined container caps). Tyvek contains PFAS, as do Sharpies, waterproof field logbooks, cosmetics, moisturizers and sunscreens, fabric softener, aluminum foil, Post-it notes, and fast food wrappers. Such materials should not be present at the project site or contacted on the day of the planned sampling event, as discussed further below. Maintain separate coolers for PFAS sampling and do not store PFAS sample containers with other typical containers/glassware.

The mechanical process of groundwater sample collection is the same as sampling groundwater for volatile organics. The key and most important distinction is an ultra-high level of diligence to prevent cross-contamination and background contamination. Read this protocol in its entirety before preparing for a sampling event.

Equipment/Materials*:

1. Water-level indicator or oil/water interface probe.
2. Peristaltic pump and power source.
3. YSI Multi-Probe System.
4. High density polyethylene or silicone tubing (no Teflon) – shall be dedicated for each sampling event and disposable.
5. Bailers (HDPE, no Teflon) – shall be dedicated for each sampling event and disposable
6. Pre-cleaned, laboratory-supplied sampling containers in individual Ziploc bags. The laboratory will send multiple 250-mL polypropylene bottles with wide-mouth screw caps

for each sample location. If sampling groundwater or non-potable water, the bottles will be unpreserved.

7. Loose-leaf note paper for field notes (e.g., project checklist). Waterproof field books shall not be used.
8. Coolers/packing materials/wet ice (no Blu-Ice or chemical packs of any kind).
9. Ball point pen or pencil and metal or Masonite clipboard.

* Materials that are not allowed, per the above, shall not be present on the project site. Where prohibited items are part of routine sampling gear, they should be left inside the field vehicle and not contacted or handled by the field sampler prior to PFAS sample collection.

Sample Collection:

Actual collection of samples in the field shall be performed using low-flow techniques in accordance with *SOP# FP-07* or via bailer in accordance with *SOP# FP-08.* Analytical method SW-846 Method 537 should be specified on the chain of custody.

Duplicates and Blanks:

- Trip Blanks: At least one laboratory-prepared trip blank shall accompany each cooler of samples submitted for PFAS analysis.
- Equipment Blanks: At least one equipment blank shall be collected for each type of equipment for which decontamination is performed. In addition, one equipment blank shall be collected from a representative item of new (unused) equipment (e.g., sample tubing, bailer). Laboratory-supplied reagent-free water shall be used for development of all equipment blanks.
- Field Blanks: At least one field blank shall be collected during each sampling event. The field blank should be prepared by the sampler at the time and site of sample collection using the procedure below, **prior to** collecting any field samples.
    - Open the bottle labeled “reagent free water.” Transfer the reagent free water by pouring it into the bottle labeled “Field Blank,” then seal it. This is to assess whether contamination occurs during sample collection. The field blank and the empty bottle should be shipped back to the laboratory with the field samples.
- Duplicates: At least one blind replicate or field split shall be collected for each environmental medium sampled. Duplicates should be collected for each drinking water sample submitted, but held at the laboratory for analysis only if PFAS are detected in the original sample. Sample HOLD must be clearly indicated on the chain of custody.

Field Clothing and Personal Protective Equipment:

1. Do not wear water resistant, waterproof, or stain-treated clothing. Synthetic and natural fibers are acceptable. Field clothing must be laundered without the use of fabric softener, and washed at least six times from the time of purchase before use in the field. Do not wear new clothing while sampling.
2. Do not wear clothing or boots containing Gore-Tex or treated with DWR (Durable Water Resistant) coating. All safety footwear shall consist of steel-toed boots made with polyurethane or PVC.

3. Do not wear Tyvek clothing.
4. Disposable nitrile gloves must we worn at all times. Gloves should be changed frequently throughout the sampling operation. Anytime a distinct operation changes, such as between well purging and sample collection, and new pair of gloves should be donned.

Sample Containers:

1. Groundwater samples shall be collected in 250 mL polypropylene or HDPE bottles fitted with an unlined (no Teflon), polypropylene, or HDPE, wide-mouth screw cap. This requirement MUST be specified when ordering sampling supplies from the laboratory.
2. Container labels shall be completed using pen (no markers) after the caps have been placed back on each bottle.
3. Each sample should be placed into an individual, fully-sealed, Ziploc bag and placed in a cooler packed only with ice (wet ice only, no chemical packs).
4. PFAS samples should be placed in a dedicated cooler separate from all other non-PFAS samples.
5. Glass containers shall not be used due to potential loss of analyte through adsorption.

Wet Weather:

Field sampling during wet weather should be conducted while wearing appropriate clothing that will not pose a risk for cross contamination. Rain gear shall be made from polyurethane and wax-coated or oil-cloth materials. Treated textiles shall not be used.

Decontamination:

1. Re-usable equipment, including depth-to-water and oil/water interface meters, shall be decontaminated between measurement points (*i.e.*, wells).
2. Alconox and Liquinox soaps are acceptable. Decon-90 must not be used.
3. Water used for decontamination shall be laboratory-certified PFC-free. Standard de-ionized water shall not be used.
4. Decontamination shall follow the steps outlined in *SOP# FP-06*.

Personal Hygiene:

1. Field personnel may not use cosmetics, moisturizers, hand cream, or other related products as part of their personal cleaning/showering routine on the morning of the sampling event.
2. Sunblock and insect repellants, if used, should consist of 100% natural ingredients. Many manufactured products contain PFAS and are not to be brought to the project site.
3. No food or drink shall be brought on site, with the exception of bottled water and hydration drinks. Food for lunch, preferably from home, can be left in the field vehicle and consumed outside the work area.
4. Field personnel shall not have physical contact with fast food containers or wrappers on the day of the sampling event prior to sampling.

Sampling of Other Media:

When project plans require analysis of soil, sediment, or other non-aqueous media for PFAS, project teams should be aware that there are no established laboratory protocols at this time. However, it is possible that extraction techniques will be developed so that these matrices can be analyzed using EPA Method 537. The Project Manager shall contact the laboratory during the planning stage for sampling all environmental media for PFAS. In general, sample collection will be like normal, subject to the cross-contamination and sample container requirements outline above.

Documentation and Communication

Please note that you have followed PFAS sampling protocols in your field notes along with the weather. If a possible source of cross-contamination is discovered or recalled during or following sampling, please advise the Project Manager so that samples can be re-collected and/or data can be properly evaluated. Reference adherence to standard operating procedure FP-17 in the field notes.

APPENDIX C

Soil Descriptions

Summary of Soil Descriptions

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
C-1	2/2	0-2	0-2 ft bgs: Brown, FM SAND, some Gravel, some crushed rock 0.75-1.5', some Asphalt, some Brick, dry.
B-2	1.6/2	0-2	0-0.5 ft bgs: Asphalt/aggregate. 0.5-2 ft bgs: Brown, FM SAND and SILT, little Gravel, damp.
A-1	2/2	0-2	0-2 ft bgs: Brown, FM SAND and SILT, little Gravel, damp, dense.
B-4	2/2	0-2	0-2 ft bgs: Brown, FM SAND and SILT, little Gravel and Rock Fill
C-3	1.5/2	0-2	0-2 ft bgs: Brown, FM SAND, some Gravel, some Silt. Dry.
	1.5/2	2-4	0-2 ft bgs: Brown/dark brown, FM SAND and SILT, some Fill (Brick), damp.
D-2	1.6/2	0-2	0-0.5 ft bgs: ASPHALT/(??). 0.5-2 ft bgs: Brown/grey, FM SAND, some Gravel and Crushed Rock
	1/2	2-4	2-4 ft bgs: Grey/brown, FM SAND and SILT, little Gravel, trace Brick, dry.
E-1	2/2	0-2	0-0.5 ft bgs: ASPHALT/(??). 0.5-2 ft bgs: Brown, FM SAND, little Silt, little Gravel, dry
F-2	2/2	0-2	0-2 ft bgs: Brown, FM SAND, some Gravel, some Silt, dry, dense.
	2/2	2-4	2-4 ft bgs: Brown, FM SAND and SILT, little Gravel, damp.
G-1	2/2	0-2	0-0.5 ft bgs: ASPHAULT and GRAVEL. 0.5-2 ft bgs: Brown FM SAND and SILT, little gravel, trace Brick, dry.
	2/2	2-4	2-4 ft bgs: Tan/brown, FM SAND and SILT, little Gravel, damp.
H-2	1.5/2	0-2	0-0.5 ft bgs: ASPHALT and GRAVEL. 0.5-2 ft bgs: Brown FM, some Silt, little gravel, dry.
	2/2	2-4	2-4 ft bgs:Tan, FM SAND, trace Gravel and Silt, dry.
I-1	2/2	0-2	0-2 ft bgs:Brown, FM SAND, little Gravel.
	2/2	2-4	2-4 ft bgs: Tan, FM SAND, some Silt, little Gravel.
G-3	2/2	0-2	0-2 ft bgs:Brown, FM SAND, little Gravel, little Silt, trace Organics.
	2/2	2-4	2-4 ft bgs: Brown, FM SAND, some Silt, little Gravel.
D-4	1.5/2	0-2	0-0.25 ft bgs:TOP SOIL and ORGANICS. 0.25-2 ft bgs: Brown, FM SAND, some Silt, little Gravel, trace Wood, Trace Coal, dry
	0.5/2	2-4	2-4 ft bgs: Brown, FM SAND, some Gravel, trace Wood, dry.
C-5	1/2	0-2	0-2 ft bgs: Brown/tan, FM SAND, some Brick, some Coal.
	1.9/2	2-4	2-4 ft bgs: Brown, FM SAND, some Silt, some Brick.
B-6	2/2	0-2	0-2 ft bgs: Brown, FM SAND, trace Silt, trace Brick, trace Coal.
E-5	2/2	0-2	0-2 ft bgs: Brown, FM SAND, little Gravel, damp.
	2/2	2-4	2-4 ft bgs: Black/brown, SILT, some FM Sand, damp.
G-5	2/2	0-2	0-2 ft bgs: Brown, FM SAND, little Silt, little Gravel.
	1/2	2-4	2-4 ft bgs: Brown, FM SAND, little Silt, little Gravel, little Crushed Rock.
C-7	2/2	0-2	0-1 ft bgs: Brown, FM SAND, little Brick(??), little Rubble(?). DRY 1-2 ft bgs: Grey, CRUSHED ROCK
	1.25/2	2-4	2-3.5 ft bgs: Brown, FM SAND, some Gravel, little Silt, little Brick, little rubble. 3.5-4 ft bgs: Grey, SILT, little Sand, damp.
D-6	1.5/2	0-2	0-2 ft bgs: Brown, FM SAND, some Gravel, some Crushed Rock, little Silt, little Organics, dry.
	0.5/2	2-4	2-4 ft bgs: Brown, FM SAND, little Gravel, dry.

Summary of Soil Descriptions
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
E-7	2/2	0-2	0-1 ft bgs: Brown, FM SAND, some Fill, some Gravel.
			1-2 ft bgs: Brown, FM SAND and SILT, little Gravel, dry.
	2/2	2-4	2-4 ft bgs: Brown, FM SAND and SILT, damp.
D-8	1.5/2	0-2	0-2 ft bgs: Brown, FM SAND, little Gravel, dry.
	1.5/2	2-4	2-4 ft bgs: Brown/grey, FM SAND, some Silt, little Gravel, dry.
D-9	1.5/2	0-2	0-2 ft bgs: Brown, FM SAND, some Gravel, little Silt, trace Fill (plastic,brick).
	1/2	2-4	2-4 ft bgs: Brown, FM SAND and SILT, some Gravel, little cobble, damp.
D-10	2/2	0-2	0-2 ft bgs: Tan/brown, FM SAND and SILT, little Gravel, damp, dense.
D-11	1.5/2	0-2	0-2 ft bgs: Brown/tan, FM SAND, some Silt, some Gravel, dry.
F-9	2/2	0-2	0-2 ft bgs: Brown, FM SAND, some Gravel, trace Fill (brick), dry.
	0.75/2	2-4	2-4 ft bgs: Brown, FM SAND, little Gravel, dry.
E-10	1.5/2	0-2	0-0.5 ft bgs: TOPSOIL. 0.5-0.75 ft bgs: CRUSHED ROCK.
			0.75-2 ft bgs: Brown,FM SAND, little Gravel, damp.
	0.75/2	2-4	2-4 ft bgs: Reddish brown, FM SAND, little Gravel, little Silt, damp.
H-6	3/4	0-2	0-2 ft bgs: Orange/brown,FM SAND, little Gravel, dry.
		2-4	2-4 ft bgs: Tan/brown, FM SAND, some Silt, little Gravel, damp.
J-6	3.2/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-2 ft bgs: Tan, FM SAND, some Gravel, dry.
		2-4	2-4 ft bgs: Tan, FM SAND, some Gravel, dry.
F-6	3/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-3 ft bgs: Brown/tan, FM SAND, some Silt, little Gravel, dry.
		2-4	3-4 ft bgs: Brown/reddish brown, FM SAND, little Gravel, little, Silt, dry.
F-4	2.75/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-2 ft bgs: Tan, Medium/coarse SAND, little gravel dry. Fill.
		2-4	2-4 ft bgs: Tan, Medium/coarse SAND, little gravel dry. Fill.
H-4	3/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-2 ft bgs: Brown, FM SAND, some Silt, little Gravel, little Crushed Rock, moist, dense.
		2-4	2-4 ft bgs: Brown, FM SAND, some Silt, little Gravel, little Crushed Rock, moist, dense.
I-3	4/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-1.5 ft bgs: Brown, FM SAND, some Silt, little Gravel, damp.
		2-4	1.5-4 ft bgs: Brown, FM SAND, some Silt, little Gravel, damp.
J-10	4/4	0-2	0-0.25 ft bgs: TOPSOIL.
			0.25-1.25 ft bgs: Orange, CRUSHED ROCK.
			1.25-2 ft bgs: Reddish brown, FM SAND, some Silt, some Gravel, dry.
		2-4	2-4 ft bgs: Tan/brown, Fine/coarse SAND, some Gravel, little Silt, dry.
J-11	4/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-1.25 ft bgs: Brown, FM SAND, some Gravel.
			1.25-2 ft bgs: Brown, Fine/coarse SAND, some Gravel, little Silt, little Fractured Rock, dry.
		2-4	2-4 ft bgs: Brown, Fine/coarse SAND, some Gravel, little Silt, little Fractured Rock, dry.
K-11	1.5/2	0-2	0-1 ft bgs: Dark brown TOPSOIL, some Fill (glass).
			1-2 ft bgs: Brown, FM SAND, little Silt, little Gravel.
K-12	2/2	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-2 ft bgs: Dark brown, FM SAND, some Silt, little Gravel, mosit.
J-13	2/2	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-2 ft bgs: Dark brown/brown, FM SAND, some Silt, little Gravel, little Fill (glass), dry.
H-14	2/2	0-2	0-0.25 ft bgs: TOPSOIL.
			0.25-2 ft bgs: Tan/brown, FM SAND, little Gravel, little Silt, moist.

Summary of Soil Descriptions
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
H-15	1.75/2	0-2	0-0.25 ft bgs: TOPSOIL.
			0.25-2 ft bgs: Brown, FM SAND, some Silt, little Gravel, moist.
F-11	4/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-1 ft bgs: Reddish brown, FM SAND, little Gravel.
			1-2 ft bgs:Tan/brown, Fine/coarse, little Silt, little Gravel.
		2-4	2-4 ft bgs:Tan/brown, Fine/coarse, little Silt, little Gravel.
F-12	4/4	0-2	0-0.5 ft bgs: TOPSOIL.
			0.5-2 ft bgs: Brown, FM SAND, some Gravel, little Crushed Rock, trace Fill (glass), dry.
		2-4	2-4 ft bgs: Brown/grey, FM SAND, some Gravel, some Crushed Rock, little Silt, dry.
A-1	1.5/2	0.25-0.5	0-0.5 ft bgs: Brown/dark brown, FM SAND and SILT, some Fill (glass, rubber).
	1.8/2	0.5-2	0.5-2 ft bgs: Brown/dark brown, FM SAND and SILT, some Fill (glass, rubber).
A-3	0.8/2	0.25-0.5	0-0.5 ft bgs: Dark brown, Fine/coarse SAND and SILT, some Gravel, some Fill (brick, rubber), dense.
	0.8/2	0.5-2	0.5-2 ft bgs: Dark brown, Fine/coarse SAND and SILT, some Gravel, some Fill (brick, rubber), dense.
A-5	0.25/2 0.9/2	0.25-0.5	0-0.5 ft bgs: Brown/dark brown, FM SAND and SILT, some Gravel, some Fill (brick, coal, concrete).
	1/2	0.5-2	0.5-2 ft bgs: Brown/dark brown, FM SAND and SILT, some Gravel, some Fill (brick, coal, concrete).
A-10	1/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Fill (glass, paper, plastic), little Gravel.
	1.2/2	0.5-2	0.5-2 ft bgs: Dark brown, FM SAND and SILT, some Fill (glass, paper, plastic), little Gravel.
B-2	1.3/2	0.25-0.5	0-0.5 ft bgs: Brown to dark brown, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel.
B-4	1.5/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, trace Organic.
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Gravel, some Fill (brick).
B-6	1/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Gravel, some Fill (brick, concrete).
	0.8/1.5	0.5-2	0.5-2 ft bgs: Dark brown, FM SAND and SILT, some Gravel, some Fill (brick, concrete).
B-8	1.3/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Gravel, some Fill (brick, concrete).
	0.7/2	0.5-2	0.5-2 ft bgs: Dark brown, FM SAND and SILT, some Gravel, some Fill (brick, concrete).
B-9	1.4/2	0.25-0.5	0-0.5 ft bgs: Brown, FM SAND and SILT, some Gravel, some Fill (rubber, glass, plastic), some Clay.
	0.9/2	0.5-2	0.5-2 ft bgs: Brown, FM SAND and SILT, some Gravel, some Fill (rubber, glass, plastic), some Clay, Woodchips & fragments, Tree/plant roots. ~ 3-inch layer Brick, rusty/orange SAND and SILT.
B-11	NS	0.25-0.5	0-0.5 ft bgs: Brown, FM SAND and SILT, some Gravel, some Fill (glass, brick, rubber).
		0.5-2	0.5-2 ft bgs: Brown, FM SAND and SILT, some Fill (brick, glass, rubber), little organics, wet.
C-1	1/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, ~ 3 inches Fractured Rock.
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Fill (brick, glass).
C-3	1.4/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, trace Organics, piece of wire with rubber covering.
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Gravel, ~1.5-inch layer of Fractured Rock.
C-5	1.7/2	0.25-0.5	0-0.5 ft bgs: Tan to dark brown, SAND, some Silt, some Gravel, some Fill (glass, brick).
		0.5-2	0.5-2 ft bgs: Dark brown, SAND, some Silt, some gravel, some Fill (glass, brick), some Fractured Rock, some Cobble.
C-10	1.5/2	0.25-0.5	0-0.5 ft bgs: Brown, FC SAND and SILT, some organics, some Fill (glass, brick, rubber, plastic).
	0.8/2	0.5-2	0.-2 ft bgs: Brown, FM SAND and SILT, some organics, some Fill (brick, glass), ~ 6 inches of Brick.

Summary of Soil Descriptions
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
C-11	1/2 0.75/2 0.67/2	0.25-0.5	0-0.5 ft bgs: Brown, FC SAND and SILT, some Fill (glass, brick, rubber, plastic), little Organics.
		0.5-2	0.5-2 ft bgs: Brown, FC SAND and SILT, some organics, some Fill (glass, brick, rubber, plastic), some Gravel.
D-2	3/3	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, some Fill (glass, brick, plastic).
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some organics, some Fill (glass, brick, rubber, plastic), some Gravel. One whole sheet Plastic Wrap.
		2-3	2-3 ft bgs: Dark brown, SAND and SILT, some Fill (glass, brick, plastic).
D-3	1.8/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND, SILT, and GRAVEL.
		0.5-2	0.5-2 ft bgs: Dark brown, SAND, SILT, and GRAVEL, some Fill (brick, glass), trace Metallic Pieces.
D-4	1.9/3	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, some Gravel, some Organics.
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Gravel, some Fill (brick, glass, coal).
		2-3	2-3 ft bgs: Dark brown, SAND and SILT, some Gravel, some Fill (brick, glass, coal).
D-6	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Fill (rubber, glass, plastic), little Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Fill (rubber, glass, plastic), some Roots, little Gravel.
		2-3	2-3 ft bgs: Brown, SAND and SILT, some Fill (rubber, glass, plastic), little Gravel.
D-9	1.8/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Gravel, trace brown Porcelain (same material as J-10).
D-10			Not recorded
			Not recorded
D-11	1.3/2	0.25-0.5	0-0.5 ft bgs: Brown, FC SAND and SILT, some Gravel, trace Fill (brick),
	1/2	0.5-2	0.5-2 ft bgs: Brown, FM SAND and SILT, some Gravel, little red FM Sand, little red Silt.
D-12	1.5/2	0.25-0.5	0-0.5 ft bgs: Brown, FM SAND and SILT, some Gravel.
	1.5/2	0.5-2	0.5-2 ft bgs: Brown, FM SAND and SILT, trace Gravel.
D-13	1.75/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FC SAND and SILT, some Fill (fabric, glass, plastic), some gravel.
		0.5-2	0.5-2 ft bgs: Dark brown, FC SAND and SILT, some Fill (fabric, brick), some Gravel.
E-1	3/3	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT.
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Clay, some Fill (brick, coal, glass), dense.
		2-3	2-3 ft bgs: Dark brown, SAND and SILT, some Clay, some Fill (brick, coal, glass), dense.
E-2	1.1/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (glass, brick).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (glass, brick).
E-3	2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, little Organics, ~4-inch layer Brick.
	1/2	0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, little Organics, ~4-inch layer Brick, ~4-inch layer Fractured Rock.
E-5	2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Fill (brick).
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Fill (brick), some Fractured Rock.
E-7	2.5/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, some Cobble, some Fill (brick).
		2-3	2-3 ft bgs: Tan, SAND and SILT, some Clay, dense.

Summary of Soil Descriptions
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
E-9	1.7/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Gravel, some Fractured Rock.
E-10	1.6/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, little Gravel, little Organics.
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, little Gravel, little Organics.
E-11	1/2	0.25-0.5	0-0.5 ft bgs: Brown, FC SAND and SILT, some Gravel, some Organics.
	0.8/2	0.5-2	0.5-2 ft bgs: Brown, FM SAND and SILT, some Gravel, some Fill(brick, glass, concrete).
E-12	NS	0.25-0.5	0-0.5 ft bgs: Brown, FM SAND and SILT, little Gravel, little Fill (glass, brick).
		0.5-2	0.5-2 ft bgs: Brown, FM SAND and SILT, little Gravel, little Fill (glass, brick, plastic).
E-13	1.2/2	0.25-0.5	0-0.5 ft bgs: Brown, FC SAND and SILT, some Gravel.
	1/2	0.5-2	0.5-2 ft bgs: Brown, FC SAND and SILT, some Gravel.
E-14	1.75/2	0.25-0.5	0-0.5 ft bgs: Brown, FM SAND and SILT, dense.
		0.5-2	0.5-2 ft bgs: Brown, FC SAND and SILT, trace Gravel, dense.
F-2	2.8/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (glass).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (glass), some Clay.
		2-3	2-3 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (glass), some Clay.
F-3	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Grass, little Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, trace Fill (rubber).
		2-3	2-3 ft bgs: Brown, SAND and SILT, some Gravel, trace fill (rubber).
F-4	2/2	0.25-0.5	0-0.5 ft bgs: TOPSOIL.
		0.5-2	0.5-2 ft bgs: Brown, MC SAND, some Gravel.
F-5	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Fractured Rock, little Gravel, dense.
		2-3	2-3 ft bgs: Brown, SAND and SILT, little Gravel.
F-6	2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, little Organics, little Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, little Organics, little Gravel.
F-8	1.8/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel, little Organics.
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Gravel, some Fractured Rock.
F-9	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Gravel, ~2-inch layer white Fractured Rock, ~1/4-inch layer brown Fractured Rock.
		2-3	2-3 ft bgs: Brown, SAND, some Silt, some Gravel, ~2-inch layer white Fractured Rock.
F-11	1.2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel.
F-12	1.2/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, some Organics, some Fill (glass, metal).
		0.5-2	0.5-2 ft bgs: Tan, SAND and SILT, some Fill (glass, metal), some Fractured Rock, some Cobble.

Summary of Soil Descriptions
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
F-13	1.2/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, some Organics, some Fill (glass, metal).
		0.5-2	0.5-2 ft bgs: Tan, SAND and SILT, some Fill (glass, metal), some Fractured Rock, some Cobble.
F-15	0.75/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FC SAND and SILT, some Fill (paper, plastic, rubber).
	0.75/2	0.5-2	0.5-2 ft bgs: Dark brown, FC SAND and SILT, some Gravel, layer of grey/white Rock.
FF-1 mid	1.5/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and GRAVEL.
		0.5-2	0.5-2 ft bgs: Brown, SAND and GRAVEL, some Silt.
FF-9 mid	1.4/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, little Gravel, trace Fill (glass).
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, little Gravel, trace Fill (glass).
G-1	1.8/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (brick, glass).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (brick, glass).
G-3	1.8/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Gravel.
G-4	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel, trace Glass.
		0.5-2	0.5-2 ft bgs: Brown/tan, SAND and SILT, some Gravel, some Fractured Rock.
		2-3	2-3 ft bgs: Brown/tan, SAND and SILT, some Gravel, some Fractured Rock.
G-5	2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown SAND and SILT, some Gravel, some Fractured Cobbles.
G-6	2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, little Organics.
		0.5-2	0.5-2 ft bgs: Brown SAND, some Silt, some Fill (glass).
G-7	2.6/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Glass, little Organics.
		0.5-2	0.5-2 ft bgs: Brown to tan, SAND, some Silt, some Gravel, some Fractured Cobble.
		3-Feb	2-3 ft bgs: Tan, SAND, some Silt, some Gravel.
G-11 mid	2.9/3	0.25-0.5	0-0.5 ft bgs: Dark brown to brown/tan, SAND, some Silt, some Glass, some Organics, little Gravel.
		0.5-2	0.5-2 ft bgs: Brown/tan, SAND and SILT, little Gravel.
		2-3	2-3 ft bgs: Brown/tan/rusty, SAND and SILT, some Fractured Rock, little Gravel.
G-14	HAND AUGER	0.25-0.5	0-0.5 ft bgs: Brown, SILT, some Organics, some Gravel.
		0.5-1.5	0.5-1.5 ft bgs: Brown, SILT, some Organics, some Gravel, Cobble at 1.5 ft bgs.
GG-1 mid	1/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt.
	1.6/2	0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, Fractured Rock layer.
GG-2 mid	1.2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and Silt, some Gravel.
GG-8 mid	2.8/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel, little Organics.
		0.5-2	0.5-2 ft bgs: Brown to grey, SAND and COBBLE, some Fractured Rock, little Silt.
		2-3	2-3 ft bgs: Brown to orange/brown, SAND, some SILT, some Cobble, Some Fractured Rock.

Summary of Soil Descriptions
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
GG-9 mid	3/3	0.25-0.5	0-0.5 ft bgs: Brown/tan, SAND, some Silt, some Gravel, some Fractured Rock, little Organics.
		0.5-2	0.5-2 ft bgs: Brown/tan, SAND, some Silt, some Gravel, some Fractured Rock, trace Brick.
		2-3	2-3 ft bgs: Brown/tan, SAND, some Silt, some Gravel, some Fractured Rock.
H-2	2/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Fill (glass, brick).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Fill (glass, brick), layer of Fractured Rock.
		2-3	2-3 ft bgs: Brown, SAND and SILT, some Fill (glass, brick).
H-3	3/3	0.25-0.5	0-1.5 ft bgs: Brown, FM SAND, some Gravel.
		0.5-2	1.5-3 ft bgs: Tannish brown, F SAND some Silt, trace Fragmented Cobble, trace Gravel.
		2-3	
H-4	1.2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel, little Organics.
		0.5-2	0.5-2 ft bgs: F SAND, some Silt, some Gravel, trace Fractured Gravel.
H-6	2.1/3	0.25-0.5	0-0.5 ft bgs: Brown/tan, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown/tan, SAND and SILT, some Gravel.
			2-3 ft bgs: Brown/tan, SAND and SILT, some Gravel.
H-11 mid	1/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel.
	0.8/2	0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Gravel, ~4-inch Fractured Rock layer.
H-13	1/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, ~6 inches Fragmented Rock, some Organics, trace Glass.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, little Gravel.
H-14	1.4/2	0.25-0.5	0-0.5 ft bgs: Brown/tan, SAND and SILT, some gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, some Fractured Rock.
H-15	1.5/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Fill (glass, brick), trace gravel.
		0.5-2	0.5-2 ft bgs: Light brown, FM SAND and SILT, trace Gravel, trace Fill (brick, rubber, plastic).
HH-1 mid	2.6/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and FRACTURED ROCK.
		0.5-2	0.5-2 ft bgs: Brown, SAND and GRAVEL, some Silt, some Fill (glass, brick).
		2-3	2-3 ft bgs: Brown, SAND and GRAVEL, some Silt, some Fill (glass, brick).
HH-7 mid	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel and Gravel Pieces, little Fill (glass, metal), little Fractured Rock.
		0.5-2	0.5-2 ft bgs: Brown to orangey brown, SAND, some Silt, some Gravel, little Fill (glass).
		2-3	2-3 ft bgs: Tan, SAND, some Silt, some Gravel, little Cobble, little Fill (glass), trace Organics.
HH-8 mid	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Orangey brown, SAND and SILT, some Gravel, trace Fill (glass, bolts).
		2-3	2-3 ft bgs: Tan/light brown, SAND, some Silt, some Gravel and Gravel Pieces.
HH-11 mid	1.1/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel, trace Organics.
		0.5-2	0.5-2 ft bgs: Brown, SAND, some Silt, some Gravel, some Fractured Rock, large Piece of Metal.

Summary of Soil Descriptions
375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
HH-12 mid	1.4/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, some Gravel, trace Fill (glass).
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Gravel, trace Fill (glass).
I-1	1.4/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and GRAVEL.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel.
I-3	2/2	0.25-0.5	0-0.5 ft bgs: Brown, SILT, some Gravel, trace Organics.
		0.5-2	0.5-2 ft bgs: Brown, FM SAND, trace Gravel.
I-5 mid	1.2/2	0.25-0.5	0-0.5 ft bgs: Tan to brown, SAND and SILT, little Gravel, little Organics.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, little Gravel, little Organics.
I-9 mid	2/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, little Gravel, little Organics.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, little Gravel, some Fill (brick, glass).
II-6 mid	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (brick).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (brick).
		2-3	2-3 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (brick).
II-9 mid	1.6/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND some Silt, little Gravel, trace Fill (glass).
		0.5-2	0.5-2 ft bgs: Brown, SAND some Silt, little Gravel, trace Fill (glass).
II-11 mid	2.6/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Fill (glass), some Gravel.
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Fill (glass, brick), some Gravel, some Fractured Rock.
		2-3	2-3 ft bgs: Brown, SAND and SILT, some Fill (glass, brick), some Gravel, some Fractured Rock.
J-5	0.9/2	0.25-0.5	0-0.5 ft bgs: Brown to dark brown, SAND and SILT, some Gravel, some Organics.
	1/2	0.5-2	0.5-2 ft bgs: Brown to dark brown, SAND and SILT, some Gravel, some Organics.
J-7	2.6/3	0.25-0.5	0-0.5 ft bgs: Brown/tan, SAND and SILT, some Gravel.
		0.5-2	0.5-2 ft bgs: Brown/tan, SAND and SILT, some Gravel, some Fractured Rock, trace Fill (brick).
		2-3	2-3 ft bgs: Brown/tan, SAND and SILT, some Gravel, some Fractured Rock, trace Fill (brick).
J-10	2.4/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Fill (porcelain).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel.
		2-3	2-3 ft bgs: Brown, SAND and SILT, some Gravel, ~5-inch layer of Fractured Rock.
J-11	2/2	0.25-0.5	0-0.5 ft bgs: Tan/brown, SAND and SILT, some Fill (glass), some Gravel.
		0.5-2	0.5-2 ft bgs: Tan/brown, SAND and SILT, some Gravel.
J-13	0.8/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, trace Gravel.
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, trace Gravel, trace Wire.
K-11	1.2/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, some Gravel, little Fill (glass).
		0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Gravel, little Fill (glass).
K-12	0.9/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Organics, trace Fill (glass).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, trace Fill (glass).

Summary of Soil Descriptions

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
V-12	NS	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Fill (brick, glass, rubber).
		0.5-2	0.5-2 ft bgs: Dark brown/black, FM SAND and SILT, some Fill (brick, glass, rubber), wet.
V-11	1/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, little Organics, wet.
	1.3/2	0.5-2	0.5-2 ft bgs: Dark brown, FM SAND and SILT, little Organics, wet.
W-10	0.8/2	0.25-0.5	0-0.5 ft bgs: Dark brown, SAND and SILT, some Organics, little Fill (brick).
	1.1/2	0.5-2	0.5-2 ft bgs: Dark brown, SAND and SILT, some Organics, little Fill (brick).
W-12	1.2/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Fill (rubber, glass).
	1.5/2	0.5-2	0.5-2 ft bgs: Dark brown, FM SAND and SILT, some Fill (rubber, glass), little Gravel, damp.
W-13	0.7/2 0.6/2 0.6/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Fill (brick), some Organics, ~4-inch layer of grey Rock.
		0.5-2	0.5-2 ft bgs: Dark brown, FM SAND and SILT, some Fill (brick, glass, rubber, concrete), little Gravel.
Y-9	0.8/2 0.8/2 0.5/2	0.25-0.5	0-0.5 ft bgs: Dark brown, FM SAND and SILT, some Fill (brick, glass), little Organics.
		0.5-2	0.5-2 ft bgs: Dark brown, FM SAND and SILT, some Fill (brick, glass), little Organics.
JJ-6 mid	1.5/2	0.25-0.5	0-0.5 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (glass).
		0.5-2	0.5-2 ft bgs: Brown, SAND and SILT, some Gravel, some Fill (glass).
JJ-8	3/3	0.25-0.5	0-0.5 ft bgs: Brown, SAND, some Silt, some Gravel, ~2-inch layer Fractured Rock.
		0.5-2	0.5-2 ft bgs: Brown/tan, SAND and SILT, some Gravel.
		2-3	2-3 ft bgs: Brown/tan, SAND and SILT, some Gravel.
JJ-9	1.5/2	0.25-0.5	0-0.5 ft bgs: Dark brown to tan, SAND and SILT, some Gravel, some Fill (glass, brick).
		0.5-2	0.5-2 ft bgs: Dark brown to tan, SAND and SILT, some Gravel, some Fill (glass, brick).
H-5	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Brown, SAND, and SILT, some Gravel, dry, no odor.
		0.5-1.5	0.5-1.5 ft bgs: Brown, SAND and SILT, some Gravel, some Roots, dry, no odor.
		1.5-3	1.5-2.5 ft bgs: Brown, SAND and SILT, some Gravel, some Roots, dry, no odor. Refusal at 2.5 ft bgs.
I-5	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Tan, F SAND and SILT, trace Gravel.
		0.5-1.5	0.5-1.5 ft bgs: Brown/tan, SAND and SILT, trace Gravel.
II-4	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Tan, SAND, and SILT.
		0.5-1.5	0.5-1.5 ft bgs: Tan, SAND, and SILT.
		1.5-3	1.5-2.8 ft bgs: Tan, SAND, and SILT, some Gravel. Refusal at 2.8 ft bgs.
X-14	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown, SILT and ORGANICS, moist.
		0.5-1.5	0.5-1.5 ft bgs: Dark brown, SILT and ORGANICS, trace Fill (brick, tile).
Y-13	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown, ORGANICS and SILT, some Woodchips, trace Fill (glass).
		0.5-1.5	0.5-1.5 ft bgs: Dark brown, ORGANICS and SILT, some Woodchips, trace Fill (glass, metal).
Z-10	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown/grey, SILT, some Organics.
		0.5-1.5	0.5-1.5 ft bgs: Dark brown/grey, SILT, some Organics, some SAND, some Woodchips.

Summary of Soil Descriptions

375 Banfield Road, Portsmouth, New Hampshire
Tax Map 266, Lot 7

BORING	PEN/REC (feet)	DEPTH (feet)	DESCRIPTION
Y-11	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown/grey, SILT, some Organics.
		0.5-1.5	0.5-1.5 ft bgs: Dark brown/grey, SILT and ORGANICS, trace Fill (plastic, Styrofoam).
X-12	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown/grey, SILT, some Organics, some Fill (brick).
		0.5-1.5	0.5-1.5 ft bgs: Dark brown/grey, SILT and ORGANICS, some F Sand, trace Fill (plastic, brick).
Z-12	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown/grey, SILT and ORGANICS, some woodchips, some Fill (Styrofoam).
		0.5-1.5	0.5-1.5 ft bgs: Dark brown/grey, SILT and ORGANICS, some woodchips, some Fill (Styrofoam).
II-2	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Brown, F SAND and SILT, trace Wood.
		0.5-1.5	0.5-1.5 ft bgs: Tan, F SAND, some Silt, some Gravel.
D-10	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Brown, SILT, some Sand, some Gravel, trace Fill (brick, plastic)
		0.5-1.5	0.5-1.5 ft bgs: Brown, SILT, some Sand, some Gravel, trace Fill (brick, plastic)
X-10	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Brown, SILT and ORGANICS, trace Fill (plastic).
		0.5-1.5	0.5-1.5 ft bgs: Brown, SILT and ORGANICS, trace Fill (plastic, Styrofoam, brick).
X-8	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Brown, SILT and ORGANICS, trace Fill (metal).
		0.5-1.5	0.5-1.5 ft bgs: Brown, SILT and ORGANICS, trace Fill (metal).
W-9	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown, SILT, some Fill (brick, glass), some Organics.
		0.5-1.5	0.5-1.5 ft bgs: Dark brown, SILT, some Fill (brick, glass, porcelain), some Organics.
V-8	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown, SILT, some Organics, trace Fill (brick, glass).
		0.5-1.5	0.5-1.5 ft bgs: Dark brown, SILT, some Organics, trace Fill (fabric, brick).
K-15	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown, SILT and ORGANICS. Note: Large amount of worm activity.
		0.5-1.5	0.5-1.5 ft bgs: Dark brown, SILT and ORGANICS.
K-14	HAND AUGER	0.25-0.5	0.25-0.5 ft bgs: Dark brown, SILT and F SAND, some Organics, some Gravel.
		0.5-1.5	0.5-1.5 ft bgs: Dark brown, SILT and F SAND, trace Fill (glass).

APPENDIX D

Photo Log

Photographs

Wetland Sampling Locations

375 Banfield Road, Portsmouth, New Hampshire

Photo 1: The location of sample SD/SW-201. (09/22/2021)

Photo 2: The location of sample SD/SW-203. (09/22/2021)

Photo 3: The location of sample SD-204. (09/22/2021)

Photo 4: The location of sample SD-207. (09/22/2021)

Photographs

Wetland Sampling Locations
375 Banfield Road, Portsmouth, New Hampshire

Photo 5: The location of sample SD/SW-208. (09/23/2021)

Photo 6: The location of sample SD-209. (09/23/2021)

Photo 7: The location of sample SD/SW-210. (09/23/2021)

Photo 8: The location of sample SD/SW-211. (09/23/2021)

Photographs
Wetland Sampling Locations
375 Banfield Road, Portsmouth, New Hampshire


Photo 9: The location of sample SD/SW-212. (09/23/2021)


Photo 10: The location of sample SD-213. (09/23/2021)


Photo 11: The location of sample SD-214. (09/23/2021)

APPENDIX E

Laboratory Analytical Reports

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

September 22, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21H1431

Enclosed are results of analyses for samples received by the laboratory on August 26, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/22/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21H1431

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-1	21H1431-01	Ground Water		SOP-454 PFAS	
MW-4	21H1431-02	Ground Water		SOP-454 PFAS	
MW-5	21H1431-03	Ground Water		SOP-454 PFAS	
MW-6	21H1431-04	Ground Water		SOP-454 PFAS	
MW-7	21H1431-05	Ground Water		SOP-454 PFAS	
MW-8	21H1431-06	Ground Water		SOP-454 PFAS	
MW-106R	21H1431-07	Ground Water		SOP-454 PFAS	
MW-109	21H1431-08	Ground Water		SOP-454 PFAS	
MW-203	21H1431-09	Ground Water		SOP-454 PFAS	
MW-204	21H1431-10	Ground Water		SOP-454 PFAS	
MW-301	21H1431-11	Ground Water		SOP-454 PFAS	
Field Blank	21H1431-12	Ground Water		SOP-454 PFAS	
Trip Blank	21H1431-13	Ground Water		SOP-454 PFAS	
Equipment Blank	21H1431-14	Ground Water		SOP-454 PFAS	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

REVISION: 9/22/2021 client would like J flags added

SOP-454 PFAS

Qualifications:

E

Reported result is estimated. Value reported over verified calibration range.

Analyte & Samples(s) Qualified:

Perfluorooctanesulfonic acid (PFO
21H1431-01[MW-1]

PF-17

Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.

Analyte & Samples(s) Qualified:

M2-6:2FTS
21H1431-09[MW-203]

M2-8:2FTS
21H1431-09[MW-203]

PF-18

Duplicate analysis confirmed Extracted Internal Standard failure due to matrix effects.

Analyte & Samples(s) Qualified:

M2-6:2FTS
21H1431-01[MW-1], 21H1431-01RE1[MW-1]

M2-8:2FTS
21H1431-01[MW-1], 21H1431-01RE1[MW-1]

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:

M2-4:2FTS
21H1431-01[MW-1]

MPFBA
21H1431-01[MW-1]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Scott C. Basal
Supervisor, Business Development

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-1   Sampled: 8/26/2021 15:35

Sample ID: 21H1431-01

Sample Matrix: Ground Water

Sample Flags: D

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	2.0	4.1	1.5	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorobutanoic acid (PFBA)	1.8	2.0	0.75	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorobutanesulfonic acid (PFBS)	2.3	4.1	0.58	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	0.28	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoropentanoic acid (PFPeA)	2.6	2.0	0.39	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoropentanoic acid (PFPeA)	2.2	4.1	0.81	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorohexanoic acid (PFHxA)	3.6	2.0	0.39	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorohexanoic acid (PFHxA)	3.6	4.1	0.79	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
11Cl-PF3OUdS (F53B Minor)	ND	4.1	1.3	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
11Cl-PF3OUdS (F53B Minor)	ND	2.0	0.64	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
9Cl-PF3ONS (F53B Major)	ND	2.0	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
9Cl-PF3ONS (F53B Major)	ND	4.1	0.80	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	4.1	0.72	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	4.1	0.49	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	0.61	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	4.1	1.2	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorodecanoic acid (PFDA)	ND	2.0	0.49	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorodecanoic acid (PFDA)	ND	4.1	1.0	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorododecanoic acid (PFDoA)	ND	2.0	0.44	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorododecanoic acid (PFDoA)	ND	4.1	0.91	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.0	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	4.1	0.48	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoroheptanesulfonic acid (PFHpS)	3.3	2.0	0.94	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoroheptanesulfonic acid (PFHpS)	3.7	4.1	1.9	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
N-EtFOSAA	ND	2.0	0.63	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
N-EtFOSAA	ND	4.1	1.3	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
N-MeFOSAA	ND	4.1	1.6	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
N-MeFOSAA	ND	2.0	0.76	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorotetradecanoic acid (PFTA)	ND	2.0	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorotetradecanoic acid (PFTA)	ND	4.1	0.75	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	0.28	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	4.1	0.57	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	0.28	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	4.1	0.58	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	4.1	0.67	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorooctanesulfonamide (FOSA)	0.43	2.0	0.42	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorooctanesulfonamide (FOSA)	ND	4.1	0.86	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorononanesulfonic acid (PFNS)	ND	2.0	0.17	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-1 Sampled: 8/26/2021 15:35

Sample ID: 21H1431-01

Sample Matrix: Ground Water

Sample Flags: D

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorononanesulfonic acid (PFNS)	ND	4.1	0.34	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	3.0	4.1	0.64	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	3.2	2.0	0.31	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoro-1-butanesulfonamide (FBSA)	0.69	4.1	0.39	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoro-1-butanesulfonamide (FBSA)	0.74	2.0	0.19	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorohexanesulfonic acid (PFHxS)	51	2.0	0.34	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorohexanesulfonic acid (PFHxS)	52	4.1	0.69	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	4.1	0.85	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	0.42	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	4.1	0.70	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	44	2.0	0.37	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	46	4.1	0.75	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoropetanesulfonic acid (PFPeS)	2.6	2.0	0.26	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoropetanesulfonic acid (PFPeS)	2.3	4.1	0.53	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoroundecanoic acid (PFUnA)	ND	2.0	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoroundecanoic acid (PFUnA)	ND	4.1	0.76	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	0.28	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	4.1	0.57	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluoroheptanoic acid (PFHpA)	1.9	2.0	0.35	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluoroheptanoic acid (PFHpA)	1.9	4.1	0.71	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorooctanoic acid (PFOA)	8.2	2.0	0.68	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorooctanoic acid (PFOA)	7.8	4.1	1.4	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorooctanesulfonic acid (PFOS)	270	2.0	0.60	ng/L	1	E	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorooctanesulfonic acid (PFOS)	280	4.1	1.2	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC
Perfluorononanoic acid (PFNA)	0.98	2.0	0.35	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:48	JFC
Perfluorononanoic acid (PFNA)	0.98	4.1	0.71	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:17	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-4 Sampled: 8/26/2021 10:25

Sample ID: 21H1431-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	1.7	1.9	0.70	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorobutanesulfonic acid (PFBS)	1.3	1.9	0.26	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoropentanoic acid (PFPeA)	1.8	1.9	0.37	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorohexanoic acid (PFHxA)	2.0	1.9	0.36	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.57	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.46	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.41	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.88	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
N-EtFOSAA	ND	1.9	0.59	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
N-MeFOSAA	ND	1.9	0.71	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.30	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.29	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorohexanesulfonic acid (PFHxS)	2.5	1.9	0.32	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	1.1	1.9	0.34	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	1.9	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluoroheptanoic acid (PFHpA)	1.7	1.9	0.32	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorooctanoic acid (PFOA)	6.4	1.9	0.64	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorooctanesulfonic acid (PFOS)	16	1.9	0.56	ng/L	1		SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC
Perfluorononanoic acid (PFNA)	0.85	1.9	0.32	ng/L	1	J	SOP-454 PFAS	9/7/21	9/15/21 23:55	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-5 Sampled: 8/26/2021 09:58

Sample ID: 21H1431-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	0.97	2.0	0.73	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorobutanesulfonic acid (PFBS)	0.43	2.0	0.28	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoropentanoic acid (PFPeA)	2.0	2.0	0.39	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorohexanoic acid (PFHxA)	1.9	2.0	0.38	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
11Cl-PF3OUdS (F53B Minor)	ND	2.0	0.63	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
9Cl-PF3ONS (F53B Major)	ND	2.0	0.38	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorodecanoic acid (PFDA)	ND	2.0	0.48	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorododecanoic acid (PFDoA)	ND	2.0	0.44	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.0	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	0.93	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
N-EtFOSAA	ND	2.0	0.62	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
N-MeFOSAA	ND	2.0	0.75	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorotetradecanoic acid (PFTA)	ND	2.0	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	0.28	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorooctanesulfonamide (FOSA)	ND	2.0	0.41	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorononanesulfonic acid (PFNS)	ND	2.0	0.17	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	0.31	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.0	0.19	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorohexanesulfonic acid (PFHxS)	2.2	2.0	0.33	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	0.41	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	2.0	0.25	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoroundecanoic acid (PFUnA)	ND	2.0	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluoroheptanoic acid (PFHpA)	2.2	2.0	0.34	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorooctanoic acid (PFOA)	4.6	2.0	0.67	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorooctanesulfonic acid (PFOS)	10	2.0	0.59	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC
Perfluorononanoic acid (PFNA)	0.52	2.0	0.34	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:24	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-6 Sampled: 8/26/2021 11:25

Sample ID: 21H1431-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	0.80	1.9	0.71	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorobutanesulfonic acid (PFBS)	0.49	1.9	0.27	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoropentanoic acid (PFPeA)	1.8	1.9	0.38	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorohexanoic acid (PFHxA)	1.3	1.9	0.37	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.61	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.58	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.47	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.42	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.90	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
N-EtFOSAA	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
N-MeFOSAA	ND	1.9	0.73	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.31	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.30	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorohexanesulfonic acid (PFHxS)	4.5	1.9	0.32	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	0.67	1.9	0.35	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoropetanesulfonic acid (PFPeS)	0.35	1.9	0.25	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluoroheptanoic acid (PFHpA)	1.9	1.9	0.33	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorooctanoic acid (PFOA)	3.9	1.9	0.65	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorooctanesulfonic acid (PFOS)	13	1.9	0.57	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC
Perfluorononanoic acid (PFNA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:31	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-7　Sampled: 8/26/2021 12:40

Sample ID: 21H1431-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	0.76	1.9	0.71	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorobutanesulfonic acid (PFBS)	2.2	1.9	0.27	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoropentanoic acid (PFPeA)	1.0	1.9	0.38	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorohexanoic acid (PFHxA)	5.0	1.9	0.37	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.62	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.58	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.47	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.42	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoroheptanesulfonic acid (PFHpS)	3.3	1.9	0.90	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
N-EtFOSAA	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
N-MeFOSAA	ND	1.9	0.73	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.31	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	1.3	1.9	0.30	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoro-1-butanesulfonamide (FBSA)	0.49	1.9	0.18	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorohexanesulfonic acid (PFHxS)	140	1.9	0.32	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoropetanesulfonic acid (PFPeS)	7.6	1.9	0.25	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluoroheptanoic acid (PFHpA)	1.4	1.9	0.33	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorooctanoic acid (PFOA)	4.8	1.9	0.65	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC
Perfluorooctanesulfonic acid (PFOS)	180	4.1	1.2	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:24	JFC
Perfluorononanoic acid (PFNA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:38	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-8   Sampled: 8/26/2021 13:45

Sample ID: 21H1431-06

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.9	0.69	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoropentanoic acid (PFPeA)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorohexanoic acid (PFHxA)	ND	1.9	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.57	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.46	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.41	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.88	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
N-EtFOSAA	ND	1.9	0.59	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
N-MeFOSAA	ND	1.9	0.71	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.30	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.29	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorohexanesulfonic acid (PFHxS)	2.9	1.9	0.32	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	1.9	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluoroheptanoic acid (PFHpA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorooctanoic acid (PFOA)	0.85	1.9	0.63	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorooctanesulfonic acid (PFOS)	15	1.9	0.56	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC
Perfluorononanoic acid (PFNA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:45	JFC

Table of Contents

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-106R Sampled: 8/26/2021 11:08

Sample ID: 21H1431-07

Sample Matrix: Ground Water

Sample Flags: D

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	2.8	4.1	1.5	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorobutanesulfonic acid (PFBS)	2.2	4.1	0.58	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoropentanoic acid (PFPeA)	6.8	4.1	0.80	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorohexanoic acid (PFHxA)	6.2	4.1	0.79	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
11Cl-PF3OUdS (F53B Minor)	ND	4.1	1.3	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
9Cl-PF3ONS (F53B Major)	ND	4.1	0.80	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	4.1	0.71	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	4.1	0.49	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	4.1	1.2	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorodecanoic acid (PFDA)	ND	4.1	1.0	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorododecanoic acid (PFDoA)	ND	4.1	0.90	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	4.1	0.47	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	4.1	1.9	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
N-EtFOSAA	ND	4.1	1.3	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
N-MeFOSAA	ND	4.1	1.6	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorotetradecanoic acid (PFTA)	ND	4.1	0.75	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	4.1	0.57	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	4.1	0.58	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	4.1	0.67	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorooctanesulfonamide (FOSA)	ND	4.1	0.86	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorononanesulfonic acid (PFNS)	ND	4.1	0.34	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	4.1	0.64	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	4.1	0.39	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorohexanesulfonic acid (PFHxS)	32	4.1	0.69	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	4.1	0.85	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	4.1	0.70	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	4.1	0.75	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoropetanesulfonic acid (PFPeS)	0.71	4.1	0.53	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoroundecanoic acid (PFUnA)	ND	4.1	0.75	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	4.1	0.56	ng/L	1	U	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluoroheptanoic acid (PFHpA)	4.9	4.1	0.71	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorooctanoic acid (PFOA)	20	4.1	1.4	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorooctanesulfonic acid (PFOS)	15	4.1	1.2	ng/L	1		SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC
Perfluorononanoic acid (PFNA)	1.7	4.1	0.71	ng/L	1	J	SOP-454 PFAS	9/16/21	9/17/21 20:31	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-109 Sampled: 8/26/2021 14:55

Sample ID: 21H1431-08

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	0.92	1.9	0.69	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorobutanesulfonic acid (PFBS)	1.0	1.9	0.26	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoropentanoic acid (PFPeA)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorohexanoic acid (PFHxA)	0.51	1.9	0.36	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.57	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.46	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.41	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.88	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
N-EtFOSAA	ND	1.9	0.59	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
N-MeFOSAA	ND	1.9	0.71	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.30	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.29	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorohexanesulfonic acid (PFHxS)	1.0	1.9	0.32	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	1.9	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluoroheptanoic acid (PFHpA)	1.3	1.9	0.32	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorooctanoic acid (PFOA)	5.7	1.9	0.64	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorooctanesulfonic acid (PFOS)	74	1.9	0.56	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC
Perfluorononanoic acid (PFNA)	1.9	1.9	0.32	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 0:59	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-203   Sampled: 8/26/2021 14:25

Sample ID: 21H1431-09

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	13	1.9	0.71	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorobutanesulfonic acid (PFBS)	1.1	1.9	0.27	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoropentanoic acid (PFPeA)	19	1.9	0.37	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorohexanoic acid (PFHxA)	15	1.9	0.37	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.61	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.58	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.46	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.42	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.89	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
N-EtFOSAA	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
N-MeFOSAA	ND	1.9	0.72	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.31	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	1.0	1.9	0.29	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoro-1-butanesulfonamide (FBSA)	0.36	1.9	0.18	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorohexanesulfonic acid (PFHxS)	16	1.9	0.32	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	0.36	1.9	0.35	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoropetanesulfonic acid (PFPeS)	1.1	1.9	0.24	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluoroheptanoic acid (PFHpA)	14	1.9	0.33	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorooctanoic acid (PFOA)	11	1.9	0.65	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorooctanesulfonic acid (PFOS)	140	1.9	0.57	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC
Perfluorononanoic acid (PFNA)	4.4	1.9	0.33	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:07	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-204   Sampled: 8/26/2021 14:45

Sample ID: 21H1431-10

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.9	0.70	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorobutanesulfonic acid (PFBS)	0.38	1.9	0.26	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoropentanoic acid (PFPeA)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorohexanoic acid (PFHxA)	ND	1.9	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.57	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.46	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.42	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.88	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
N-EtFOSAA	ND	1.9	0.59	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
N-MeFOSAA	ND	1.9	0.71	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.31	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.29	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	0.46	1.9	0.34	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	1.9	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluoroheptanoic acid (PFHpA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorooctanoic acid (PFOA)	2.0	1.9	0.64	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorooctanesulfonic acid (PFOS)	1.3	1.9	0.57	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC
Perfluorononanoic acid (PFNA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:14	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: MW-301 Sampled: 8/26/2021 09:00

Sample ID: 21H1431-11

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	0.93	1.9	0.71	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorobutanesulfonic acid (PFBS)	0.43	1.9	0.27	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoropentanoic acid (PFPeA)	2.1	1.9	0.37	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorohexanoic acid (PFHxA)	1.9	1.9	0.37	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.61	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.58	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.46	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.42	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.89	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
N-EtFOSAA	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
N-MeFOSAA	ND	1.9	0.72	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.31	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.29	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorohexanesulfonic acid (PFHxS)	2.0	1.9	0.32	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.39	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	1.9	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluoroheptanoic acid (PFHpA)	2.6	1.9	0.33	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorooctanoic acid (PFOA)	4.6	1.9	0.65	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorooctanesulfonic acid (PFOS)	11	1.9	0.57	ng/L	1		SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC
Perfluorononanoic acid (PFNA)	0.53	1.9	0.33	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 1:21	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: Field Blank Sampled: 8/26/2021 09:05

Sample ID: 21H1431-12

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.9	0.72	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoropentanoic acid (PFPeA)	ND	1.9	0.38	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorohexanoic acid (PFHxA)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.62	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.38	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.34	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.59	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.47	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.43	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.91	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
N-EtFOSAA	ND	1.9	0.61	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
N-MeFOSAA	ND	1.9	0.74	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.41	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.30	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	1.9	0.25	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluoroheptanoic acid (PFHpA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorooctanoic acid (PFOA)	ND	1.9	0.66	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	0.58	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC
Perfluorononanoic acid (PFNA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:29	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH　　Sample Description:　　Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: Trip Blank　　Sampled: 8/26/2021 00:00

Sample ID: 21H1431-13

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.9	0.71	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoropentanoic acid (PFPeA)	ND	1.9	0.38	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorohexanoic acid (PFHxA)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.61	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
9Cl-PF3ONS (F53B Major)	ND	1.9	0.37	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.23	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.58	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorodecanoic acid (PFDA)	ND	1.9	0.47	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.42	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.90	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
N-EtFOSAA	ND	1.9	0.60	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
N-MeFOSAA	ND	1.9	0.73	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.27	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.31	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.30	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.18	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	1.9	0.25	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluoroheptanoic acid (PFHpA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorooctanoic acid (PFOA)	ND	1.9	0.65	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	0.58	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC
Perfluorononanoic acid (PFNA)	ND	1.9	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 1:57	JFC

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21H1431

Date Received: 8/26/2021

Field Sample #: Equipment Blank Sampled: 8/26/2021 09:10

Sample ID: 21H1431-14

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	2.1	0.76	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	0.29	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoropentanoic acid (PFPeA)	ND	2.1	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorohexanoic acid (PFHxA)	ND	2.1	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
11Cl-PF3OUdS (F53B Minor)	ND	2.1	0.66	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
9Cl-PF3ONS (F53B Major)	ND	2.1	0.40	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	0.36	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	0.25	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	0.62	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorodecanoic acid (PFDA)	ND	2.1	0.50	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorododecanoic acid (PFDoA)	ND	2.1	0.45	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.1	0.24	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.1	0.96	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
N-EtFOSAA	ND	2.1	0.65	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
N-MeFOSAA	ND	2.1	0.78	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorotetradecanoic acid (PFTA)	ND	2.1	0.38	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorotridecanoic acid (PFTrDA)	ND	2.1	0.28	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	0.29	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	0.33	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorooctanesulfonamide (FOSA)	ND	2.1	0.43	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorononanesulfonic acid (PFNS)	ND	2.1	0.17	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	0.32	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.1	0.20	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorohexanesulfonic acid (PFHxS)	ND	2.1	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	0.43	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
6:2 Fluorotelomersulfonic acid (6:2FTS A)	0.79	2.1	0.38	ng/L	1	J	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoropetanesulfonic acid (PFPeS)	ND	2.1	0.26	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoroundecanoic acid (PFUnA)	ND	2.1	0.38	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	0.28	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluoroheptanoic acid (PFHpA)	ND	2.1	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorooctanoic acid (PFOA)	ND	2.1	0.70	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorooctanesulfonic acid (PFOS)	ND	2.1	0.62	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC
Perfluorononanoic acid (PFNA)	ND	2.1	0.35	ng/L	1	U	SOP-454 PFAS	9/7/21	9/16/21 2:04	JFC

Sample Extraction Data

Prep Method: SOP 454-PFAAS **Analytical Method: SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1431-01 [MW-1]	B289457	249	1.00	09/07/21
21H1431-02 [MW-4]	B289457	268	1.00	09/07/21
21H1431-03 [MW-5]	B289457	254	1.00	09/07/21
21H1431-04 [MW-6]	B289457	262	1.00	09/07/21
21H1431-05 [MW-7]	B289457	261	1.00	09/07/21
21H1431-06 [MW-8]	B289457	269	1.00	09/07/21
21H1431-08 [MW-109]	B289457	268	1.00	09/07/21
21H1431-09 [MW-203]	B289457	264	1.00	09/07/21
21H1431-10 [MW-204]	B289457	266	1.00	09/07/21
21H1431-11 [MW-301]	B289457	264	1.00	09/07/21
21H1431-12 [Field Blank]	B289457	259	1.00	09/07/21
21H1431-13 [Trip Blank]	B289457	261	1.00	09/07/21
21H1431-14 [Equipment Blank]	B289457	244	1.00	09/07/21

Prep Method: SOP 454-PFAAS **Analytical Method: SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1431-01RE1 [MW-1]	B290193	122	1.00	09/16/21
21H1431-05RE1 [MW-7]	B290193	122	1.00	09/16/21
21H1431-07RE1 [MW-106R]	B290193	122	1.00	09/16/21

QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289457 - SOP 454-PFAAS										
Blank (B289457-BLK1)				Prepared: 09/07/21 Analyzed: 09/15/21						
Perfluorobutanoic acid (PFBA)	ND	2.0	ng/L							U
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	ng/L							U
Perfluoropentanoic acid (PFPeA)	ND	2.0	ng/L							U
Perfluorohexanoic acid (PFHxA)	ND	2.0	ng/L							U
11Cl-PF3OUdS (F53B Minor)	ND	2.0	ng/L							U
9Cl-PF3ONS (F53B Major)	ND	2.0	ng/L							U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L							U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L							U
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	ng/L							U
Perfluorodecanoic acid (PFDA)	ND	2.0	ng/L							U
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L							U
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.0	ng/L							U
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	ng/L							U
N-EtFOSAA	ND	2.0	ng/L							U
N-MeFOSAA	ND	2.0	ng/L							U
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L							U
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	ng/L							U
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L							U
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L							U
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L							U
Perfluorononanesulfonic acid (PFNS)	ND	2.0	ng/L							U
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	ng/L							U
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.0	ng/L							U
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	ng/L							U
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L							U
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L							U
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	ng/L							U
Perfluoropetanesulfonic acid (PFPeS)	ND	2.0	ng/L							U
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ng/L							U
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L							U
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ng/L							U
Perfluorooctanoic acid (PFOA)	ND	2.0	ng/L							U
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	ng/L							U
Perfluorononanoic acid (PFNA)	ND	2.0	ng/L							U
LCS (B289457-BS1)				Prepared: 09/07/21 Analyzed: 09/15/21						
Perfluorobutanoic acid (PFBA)	7.97	2.0	ng/L	9.82		81.1	73-129			
Perfluorobutanesulfonic acid (PFBS)	6.79	2.0	ng/L	8.69		78.2	72-130			
Perfluoropentanoic acid (PFPeA)	7.56	2.0	ng/L	9.82		77.0	72-129			
Perfluorohexanoic acid (PFHxA)	7.51	2.0	ng/L	9.82		76.4	72-129			
11Cl-PF3OUdS (F53B Minor)	6.99	2.0	ng/L	9.25		75.5	50-150			
9Cl-PF3ONS (F53B Major)	8.17	2.0	ng/L	9.16		89.2	50-150			
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	7.27	2.0	ng/L	9.25		78.6	50-150			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	6.28	2.0	ng/L	9.82		64.0	50-150			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	7.85	2.0	ng/L	9.43		83.2	67-138			
Perfluorodecanoic acid (PFDA)	7.75	2.0	ng/L	9.82		78.9	71-129			
Perfluorododecanoic acid (PFDoA)	7.42	2.0	ng/L	9.82		75.5	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	12.5	2.0	ng/L	8.74		143	50-150			

QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Batch B289457 - SOP 454-PFAAS

LCS (B289457-BS1) Prepared: 09/07/21 Analyzed: 09/15/21

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Perfluoroheptanesulfonic acid (PFHpS)	7.52	2.0	ng/L	9.38		80.1	69-134			
N-EtFOSAA	7.99	2.0	ng/L	9.82		81.4	61-135			
N-MeFOSAA	9.92	2.0	ng/L	9.82		101	65-136			
Perfluorotetradecanoic acid (PFTA)	7.25	2.0	ng/L	9.82		73.8	71-132			
Perfluorotridecanoic acid (PFTrDA)	7.44	2.0	ng/L	9.82		75.7	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.48	2.0	ng/L	9.19		81.5	63-143			
Perfluorodecanesulfonic acid (PFDS)	7.08	2.0	ng/L	9.48		74.7	53-142			
Perfluorooctanesulfonamide (FOSA)	7.55	2.0	ng/L	9.82		76.9	67-137			
Perfluorononanesulfonic acid (PFNS)	7.97	2.0	ng/L	9.43		84.5	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	7.41	2.0	ng/L	9.82		75.4	50-150			
Perfluoro-1-butanesulfonamide (FBSA)	8.55	2.0	ng/L	9.82		87.1	50-150			
Perfluorohexanesulfonic acid (PFHxS)	6.84	2.0	ng/L	8.94		76.5	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	10.2	2.0	ng/L	9.82		104	50-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	13.8	2.0	ng/L	9.82		140	50-150			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	7.73	2.0	ng/L	9.33		82.9	64-140			
Perfluoropetanesulfonic acid (PFPeS)	6.77	2.0	ng/L	9.23		73.3	71-127			
Perfluoroundecanoic acid (PFUnA)	7.98	2.0	ng/L	9.82		81.3	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	11.2	2.0	ng/L	9.82		114	50-150			
Perfluoroheptanoic acid (PFHpA)	8.17	2.0	ng/L	9.82		83.2	72-130			
Perfluorooctanoic acid (PFOA)	7.18	2.0	ng/L	9.82		73.1	71-133			
Perfluorooctanesulfonic acid (PFOS)	6.96	2.0	ng/L	9.09		76.6	65-140			
Perfluorononanoic acid (PFNA)	9.03	2.0	ng/L	9.82		91.9	69-130			

Batch B290193 - SOP 454-PFAAS

Blank (B290193-BLK1) Prepared: 09/16/21 Analyzed: 09/17/21

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Perfluorobutanoic acid (PFBA)	ND	2.1	ng/L							U
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	ng/L							U
Perfluoropentanoic acid (PFPeA)	ND	2.1	ng/L							U
Perfluorohexanoic acid (PFHxA)	ND	2.1	ng/L							U
11Cl-PF3OUdS (F53B Minor)	ND	2.1	ng/L							U
9Cl-PF3ONS (F53B Major)	ND	2.1	ng/L							U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	ng/L							U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	ng/L							U
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	ng/L							U
Perfluorodecanoic acid (PFDA)	ND	2.1	ng/L							U
Perfluorododecanoic acid (PFDoA)	ND	2.1	ng/L							U
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.1	ng/L							U
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.1	ng/L							U
N-EtFOSAA	ND	2.1	ng/L							U
N-MeFOSAA	ND	2.1	ng/L							U
Perfluorotetradecanoic acid (PFTA)	ND	2.1	ng/L							U
Perfluorotridecanoic acid (PFTrDA)	ND	2.1	ng/L							U
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	ng/L							U
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	ng/L							U
Perfluorooctanesulfonamide (FOSA)	ND	2.1	ng/L							U
Perfluorononanesulfonic acid (PFNS)	ND	2.1	ng/L							U
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	ng/L							U
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.1	ng/L							U
Perfluorohexanesulfonic acid (PFHxS)	ND	2.1	ng/L							U

QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290193 - SOP 454-PFAAS										
Blank (B290193-BLK1)				Prepared: 09/16/21 Analyzed: 09/17/21						
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	ng/L							U
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	ng/L							U
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.1	ng/L							U
Perfluoropetanesulfonic acid (PFPeS)	ND	2.1	ng/L							U
Perfluoroundecanoic acid (PFUnA)	ND	2.1	ng/L							U
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	ng/L							U
Perfluoroheptanoic acid (PFHpA)	ND	2.1	ng/L							U
Perfluorooctanoic acid (PFOA)	ND	2.1	ng/L							U
Perfluorooctanesulfonic acid (PFOS)	ND	2.1	ng/L							U
Perfluorononanoic acid (PFNA)	ND	2.1	ng/L							U
LCS (B290193-BS1)				Prepared: 09/16/21 Analyzed: 09/17/21						
Perfluorobutanoic acid (PFBA)	9.12	2.0	ng/L	9.88		92.3	73-129			
Perfluorobutanesulfonic acid (PFBS)	8.08	2.0	ng/L	8.74		92.4	72-130			
Perfluoropentanoic acid (PFPeA)	8.84	2.0	ng/L	9.88		89.5	72-129			
Perfluorohexanoic acid (PFHxA)	8.73	2.0	ng/L	9.88		88.4	72-129			
11Cl-PF3OUdS (F53B Minor)	8.28	2.0	ng/L	9.31		88.9	50-150			
9Cl-PF3ONS (F53B Major)	8.28	2.0	ng/L	9.21		89.9	50-150			
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	8.15	2.0	ng/L	9.31		87.5	50-150			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	7.44	2.0	ng/L	9.88		75.3	50-150			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	10.3	2.0	ng/L	9.49		109	67-138			
Perfluorodecanoic acid (PFDA)	8.05	2.0	ng/L	9.88		81.5	71-129			
Perfluorododecanoic acid (PFDoA)	9.34	2.0	ng/L	9.88		94.5	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	10.1	2.0	ng/L	8.79		115	50-150			
Perfluoroheptanesulfonic acid (PFHpS)	8.62	2.0	ng/L	9.44		91.4	69-134			
N-EtFOSAA	11.2	2.0	ng/L	9.88		113	61-135			
N-MeFOSAA	10.4	2.0	ng/L	9.88		105	65-136			
Perfluorotetradecanoic acid (PFTA)	8.09	2.0	ng/L	9.88		81.9	71-132			
Perfluorotridecanoic acid (PFTrDA)	9.73	2.0	ng/L	9.88		98.4	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	8.76	2.0	ng/L	9.24		94.8	63-143			
Perfluorodecanesulfonic acid (PFDS)	8.71	2.0	ng/L	9.53		91.4	53-142			
Perfluorooctanesulfonamide (FOSA)	9.40	2.0	ng/L	9.88		95.1	67-137			
Perfluorononanesulfonic acid (PFNS)	9.74	2.0	ng/L	9.49		103	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	8.23	2.0	ng/L	9.88		83.3	50-150			
Perfluoro-1-butanesulfonamide (FBSA)	9.48	2.0	ng/L	9.88		95.9	50-150			
Perfluorohexanesulfonic acid (PFHxS)	8.34	2.0	ng/L	8.99		92.8	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	10.4	2.0	ng/L	9.88		106	50-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	11.1	2.0	ng/L	9.88		112	50-150			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	8.69	2.0	ng/L	9.39		92.6	64-140			
Perfluoropetanesulfonic acid (PFPeS)	8.18	2.0	ng/L	9.29		88.1	71-127			
Perfluoroundecanoic acid (PFUnA)	7.60	2.0	ng/L	9.88		76.9	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	9.32	2.0	ng/L	9.88		94.4	50-150			
Perfluoroheptanoic acid (PFHpA)	9.23	2.0	ng/L	9.88		93.4	72-130			
Perfluorooctanoic acid (PFOA)	8.53	2.0	ng/L	9.88		86.3	71-133			
Perfluorooctanesulfonic acid (PFOS)	8.35	2.0	ng/L	9.14		91.4	65-140			
Perfluorononanoic acid (PFNA)	9.09	2.0	ng/L	9.88		92.0	69-130			

QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Batch B290193 - SOP 454-PFAAS

LCS Dup (B290193-BSD1) Prepared: 09/16/21 Analyzed: 09/17/21

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Perfluorobutanoic acid (PFBA)	8.44	2.0	ng/L	9.87		85.5	73-129	7.72	30	
Perfluorobutanesulfonic acid (PFBS)	7.38	2.0	ng/L	8.73		84.5	72-130	9.10	30	
Perfluoropentanoic acid (PFPeA)	8.18	2.0	ng/L	9.87		82.9	72-129	7.71	30	
Perfluorohexanoic acid (PFHxA)	8.11	2.0	ng/L	9.87		82.2	72-129	7.40	30	
11Cl-PF3OUdS (F53B Minor)	7.84	2.0	ng/L	9.30		84.4	50-150	5.39	30	
9Cl-PF3ONS (F53B Major)	7.37	2.0	ng/L	9.20		80.2	50-150	11.6	30	
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	7.75	2.0	ng/L	9.30		83.4	50-150	4.95	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	8.40	2.0	ng/L	9.87		85.2	50-150	12.1	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.27	2.0	ng/L	9.47		97.9	67-138	10.5	30	
Perfluorodecanoic acid (PFDA)	8.71	2.0	ng/L	9.87		88.2	71-129	7.84	30	
Perfluorododecanoic acid (PFDoA)	7.65	2.0	ng/L	9.87		77.6	72-134	19.8	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	9.53	2.0	ng/L	8.78		108	50-150	5.66	30	
Perfluoroheptanesulfonic acid (PFHpS)	7.86	2.0	ng/L	9.42		83.4	69-134	9.26	30	
N-EtFOSAA	9.11	2.0	ng/L	9.87		92.3	61-135	20.5	30	
N-MeFOSAA	10.8	2.0	ng/L	9.87		109	65-136	3.33	30	
Perfluorotetradecanoic acid (PFTA)	7.80	2.0	ng/L	9.87		79.0	71-132	3.64	30	
Perfluorotridecanoic acid (PFTrDA)	8.28	2.0	ng/L	9.87		83.9	65-144	16.1	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.98	2.0	ng/L	9.23		86.5	63-143	9.32	30	
Perfluorodecanesulfonic acid (PFDS)	8.60	2.0	ng/L	9.52		90.3	53-142	1.29	30	
Perfluorooctanesulfonamide (FOSA)	8.10	2.0	ng/L	9.87		82.0	67-137	14.9	30	
Perfluorononanesulfonic acid (PFNS)	8.32	2.0	ng/L	9.47		87.9	69-127	15.7	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	7.13	2.0	ng/L	9.87		72.2	50-150	14.4	30	
Perfluoro-1-butanesulfonamide (FBSA)	8.85	2.0	ng/L	9.87		89.7	50-150	6.87	30	
Perfluorohexanesulfonic acid (PFHxS)	7.40	2.0	ng/L	8.98		82.4	68-131	12.0	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	9.75	2.0	ng/L	9.87		98.8	50-150	6.83	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	10.2	2.0	ng/L	9.87		103	50-150	8.13	30	
6:2 Fluorotelomersulfonic acid (6:2FTS A)	8.87	2.0	ng/L	9.37		94.6	64-140	2.05	30	
Perfluoropetanesulfonic acid (PFPeS)	7.62	2.0	ng/L	9.28		82.2	71-127	7.07	30	
Perfluoroundecanoic acid (PFUnA)	8.49	2.0	ng/L	9.87		86.0	69-133	11.0	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	8.75	2.0	ng/L	9.87		88.7	50-150	6.35	30	
Perfluoroheptanoic acid (PFHpA)	8.69	2.0	ng/L	9.87		88.0	72-130	6.09	30	
Perfluorooctanoic acid (PFOA)	7.14	2.0	ng/L	9.87		72.4	71-133	17.7	30	
Perfluorooctanesulfonic acid (PFOS)	7.89	2.0	ng/L	9.13		86.5	65-140	5.66	30	
Perfluorononanoic acid (PFNA)	9.27	2.0	ng/L	9.87		93.9	69-130	1.98	30	

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

D	Sample analyzed at a dilution.
E	Reported result is estimated. Value reported over verified calibration range.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
PF-17	Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.
PF-18	Duplicate analysis confirmed Extracted Internal Standard failure due to matrix effects.
S-29	Extracted Internal Standard is outside of control limits.
U	Analyte included in the analysis, but not detected

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-1 (21H1431-01)			Lab File ID: 21H1431-01.d			Analyzed: 09/15/21 23:48			
M8FOSA	276239.6	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	163504.1	2.496817				50 - 150	2.4968	+/-0.50	
M2PFTA	1061211	4.321567				50 - 150	4.3216	+/-0.50	
M2-8:2FTS	143879.6	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	229619.8	1.0834				50 - 150	1.0834	+/-0.50	
M3HFPO-DA	159945	2.831117				50 - 150	2.8311	+/-0.50	
M6PFDA	619789.1	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	124116.5	1.90325				50 - 150	1.9033	+/-0.50	
M7PFUnA	851093.1	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	132516.4	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	429627.3	1.731383				50 - 150	1.7314	+/-0.50	
M5PFHxA	761675.3	2.58055				50 - 150	2.5806	+/-0.50	
M3PFHxS	88729.88	3.218333				50 - 150	3.2183	+/-0.50	
M4PFHpA	718724.8	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	653331.4	3.461933				50 - 150	3.4619	+/-0.50	
M8PFOS	91562.08	3.65215				50 - 150	3.6522	+/-0.50	
M9PFNA	510099.8	3.6532				50 - 150	3.6532	+/-0.50	
MPFDoA	834471.7	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	199191.3	3.9535				50 - 150	3.9535	+/-0.50	
d3-NMeFOSAA	222908.9	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-1 (21H1431-01RE1)			Lab File ID: 21H1431-01RE1.d			Analyzed: 09/17/21 20:17			
M8FOSA	365500	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	197097.4	2.4886				50 - 150	2.4886	+/-0.50	
M2PFTA	1547304	4.32155				50 - 150	4.3216	+/-0.50	
M2-8:2FTS	176578.2	3.8028				50 - 150	3.8028	+/-0.50	
MPFBA	481097	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	276198.3	2.831117				50 - 150	2.8311	+/-0.50	
M6PFDA	867269.3	3.803317				50 - 150	3.8033	+/-0.50	
M3PFBS	176982.8	1.894967				50 - 150	1.8950	+/-0.50	
M7PFUnA	1275793	3.946033				50 - 150	3.9460	+/-0.50	
M2-6:2FTS	150170.9	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	633390.9	1.7231				50 - 150	1.7231	+/-0.50	
M5PFHxA	1048271	2.572333				50 - 150	2.5723	+/-0.50	
M3PFHxS	120842.2	3.218333				50 - 150	3.2183	+/-0.50	
M4PFHpA	996003.3	3.178867				50 - 150	3.1789	+/-0.50	
M8PFOA	924729.5	3.461933				50 - 150	3.4619	+/-0.50	
M8PFOS	128335.2	3.65215				50 - 150	3.6522	+/-0.50	
M9PFNA	761114.4	3.6532				50 - 150	3.6532	+/-0.50	
MPFDoA	1172003	4.08065				50 - 150	4.0807	+/-0.50	
d5-NEtFOSAA	273648.4	3.9535				50 - 150	3.9535	+/-0.50	
d3-NMeFOSAA	338676.1	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-4 (21H1431-02)			Lab File ID: 21H1431-02.d			Analyzed: 09/15/21 23:55			
M8FOSA	273734.8	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	76068.42	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	1018984	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	67775.49	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	470208.4	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	189956.3	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	565154.8	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	131309.3	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	758989.8	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	57495.88	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	478539.6	1.731383				50 - 150	1.7314	+/-0.50	
M5PFHxA	745457.9	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	89185.31	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	708300.6	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	634622.5	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	98630.8	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	517852.8	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	812746.5	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	162144.8	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	188704.3	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-5 (21H1431-03)			Lab File ID: 21H1431-03.d			Analyzed: 09/16/21 00:24			
M8FOSA	234791.5	4.01255				50 - 150	4.0126	+/-0.50	
M2-4:2FTS	86493.92	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	908913.7	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	68150.52	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	402927.5	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	174205.7	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	515609.5	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	116498.2	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	713967.6	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	62714.52	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	428079.5	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	668334.2	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	81236.32	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	642425.3	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	551681.9	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	86165.58	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	462815.7	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	699099.1	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	140864.8	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	178623.8	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-6 (21H1431-04)			Lab File ID: 21H1431-04.d			Analyzed: 09/16/21 00:31			
M8FOSA	235246.8	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	73441.41	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	883715.7	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	60978.46	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	428334.6	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	192440.6	2.847483				50 - 150	2.8475	+/-0.50	
M6PFDA	506681.5	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	114810	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	690422.6	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	49518.27	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	441502.2	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	673097.1	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	78814.84	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	648200.6	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	628261.8	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	91052.7	3.66015				50 - 150	3.6602	+/-0.50	
M9PFNA	462845.5	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	670864.9	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	145377.2	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	174955.1	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-7 (21H1431-05)			Lab File ID: 21H1431-05.d			Analyzed: 09/16/21 00:38			
M8FOSA	256999.3	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	94810.15	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	1038635	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	78443.66	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	435552	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	197911.6	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	618122.2	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	120376	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	803361	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	69377.78	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	470201.9	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	732906.6	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	83114.91	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	702781.5	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	618202.1	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	95275.95	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	533225.3	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	783595.8	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	163501.6	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	212093.8	3.88175				50 - 150	3.8818	+/-0.50	
MW-7 (21H1431-05RE1)			Lab File ID: 21H1431-05RE1.d			Analyzed: 09/17/21 20:24			
M8PFOS	116896.2	3.65215				50 - 150	3.6522	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-8 (21H1431-06)			Lab File ID: 21H1431-06.d			Analyzed: 09/16/21 00:45			
M8FOSA	262665.4	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	99187.91	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	1119420	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	84696.8	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	429542.1	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	204394.3	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	595424.6	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	125952.1	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	830441.6	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	73704.63	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	462096.2	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	735930.9	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	91810.09	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	700217.2	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	629543.9	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	89661.07	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	492458.6	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	806823.8	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	173331.2	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	197226.4	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-106R (21H1431-07RE1)			Lab File ID: 21H1431-07RE1.d			Analyzed: 09/17/21 20:31			
M8FOSA	325866.4	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	164835.5	2.496817				50 - 150	2.4968	+/-0.50	
M2PFTA	1301291	4.32155				50 - 150	4.3216	+/-0.50	
M2-8:2FTS	138247.3	3.8028				50 - 150	3.8028	+/-0.50	
MPFBA	435680.1	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	217539.4	2.831117				50 - 150	2.8311	+/-0.50	
M6PFDA	753078.9	3.803317				50 - 150	3.8033	+/-0.50	
M3PFBS	154271.9	1.90325				50 - 150	1.9033	+/-0.50	
M7PFUnA	960078.4	3.946033				50 - 150	3.9460	+/-0.50	
M2-6:2FTS	112467.1	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	544267.7	1.731383				50 - 150	1.7314	+/-0.50	
M5PFHxA	911704.8	2.58055				50 - 150	2.5806	+/-0.50	
M3PFHxS	108222.2	3.218333				50 - 150	3.2183	+/-0.50	
M4PFHpA	878288.3	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	813449.1	3.461933				50 - 150	3.4619	+/-0.50	
M8PFOS	110074.6	3.65215				50 - 150	3.6522	+/-0.50	
M9PFNA	658620.2	3.6532				50 - 150	3.6532	+/-0.50	
MPFDoA	1021956	4.08065				50 - 150	4.0807	+/-0.50	
d5-NEtFOSAA	234869	3.9535				50 - 150	3.9535	+/-0.50	
d3-NMeFOSAA	273115.9	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-109 (21H1431-08)			Lab File ID: 21H1431-08.d			Analyzed: 09/16/21 00:59			
M8FOSA	233789.8	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	81581.72	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	961642.1	4.32155				50 - 150	4.3216	+/-0.50	
M2-8:2FTS	84827.93	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	412895.1	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	188846.3	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	571678.1	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	116222	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	771661.5	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	66673.95	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	437011.6	1.731383				50 - 150	1.7314	+/-0.50	
M5PFHxA	696075.1	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	82402.93	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	663147.1	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	621735.2	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	91154.02	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	490317.4	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	741418.7	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	151970.5	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	188169.8	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-203 (21H1431-09)			Lab File ID: 21H1431-09.d			Analyzed: 09/16/21 01:07			
M8FOSA	284137.9	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	120341.4	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	908450.4	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	109595.6	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	401400.1	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	207602.2	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	607458.8	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	127357.6	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	827768.9	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	93643.06	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	463341	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	745779.7	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	90467.34	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	725171.4	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	626676.4	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	90565.13	3.66015				50 - 150	3.6602	+/-0.50	
M9PFNA	522378.6	3.6532				50 - 150	3.6532	+/-0.50	
MPFDoA	738920.8	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	175079.5	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	203797.1	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-204 (21H1431-10)			Lab File ID: 21H1431-10.d			Analyzed: 09/16/21 01:14			
M8FOSA	241805.5	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	75613.92	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	962914.4	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	56862.05	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	352317.4	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	184057.9	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	513500.3	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	117795.4	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	735068.2	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	47859.5	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	440359	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	678445.4	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	79403.66	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	652204.7	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	596527.8	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	89631.84	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	478715.2	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	732109.7	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	142486	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	185496.1	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-301 (21H1431-11)			Lab File ID: 21H1431-11.d			Analyzed: 09/16/21 01:21			
M8FOSA	257449	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	95386.64	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	905224.9	4.329683				50 - 150	4.3297	+/-0.50	
M2-8:2FTS	80984.37	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	411191.6	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	202423.9	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	567841.3	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	118741	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	796988.1	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	74200.05	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	443428.2	1.731383				50 - 150	1.7314	+/-0.50	
M5PFHxA	697243.7	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	85289.45	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	686426.8	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	605689.6	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	85323.41	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	502542.8	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	680846.4	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	147746.1	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	191078.2	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Field Blank (21H1431-12)			Lab File ID: 21H1431-12.d			Analyzed: 09/16/21 01:29			
M8FOSA	227414.3	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	89060.98	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	895672.4	4.32155				50 - 150	4.3216	+/-0.50	
M2-8:2FTS	57929.76	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	495353.6	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	201558.6	2.847483				50 - 150	2.8475	+/-0.50	
M6PFDA	549331.4	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	119632.5	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	711283.2	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	47559.41	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	464809	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	689803.3	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	84457.7	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	659136.8	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	642343	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	88973.91	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	486487.5	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	627471.7	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	129623.9	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	178925	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Trip Blank (21H1431-13)			Lab File ID: 21H1431-13.d			Analyzed: 09/16/21 01:57			
M8FOSA	210065.2	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	83784.55	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	778281.8	4.32155				50 - 150	4.3216	+/-0.50	
M2-8:2FTS	57103.81	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	430465.6	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	185835.8	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	455377.9	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	101570.8	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	621437.1	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	43397.55	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	397241	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	596066.3	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	72208.6	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	549255.7	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	512095.5	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	73125.13	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	398680.6	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	615038.9	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	120910	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	156287	3.88175				50 - 150	3.8818	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Equipment Blank (21H1431-14)			Lab File ID: 21H1431-14.d			Analyzed: 09/16/21 02:04			
M8FOSA	267215.6	4.00455				50 - 150	4.0046	+/-0.50	
M2-4:2FTS	110826.1	2.505033				50 - 150	2.5050	+/-0.50	
M2PFTA	1055578	4.32155				50 - 150	4.3216	+/-0.50	
M2-8:2FTS	74471.35	3.810767				50 - 150	3.8108	+/-0.50	
MPFBA	555166	1.0917				50 - 150	1.0917	+/-0.50	
M3HFPO-DA	205300.9	2.8393				50 - 150	2.8393	+/-0.50	
M6PFDA	600840.8	3.811283				50 - 150	3.8113	+/-0.50	
M3PFBS	132831.7	1.911533				50 - 150	1.9115	+/-0.50	
M7PFUnA	845120.8	3.954033				50 - 150	3.9540	+/-0.50	
M2-6:2FTS	59490.54	3.453267				50 - 150	3.4533	+/-0.50	
M5PFPeA	522082.9	1.741117				50 - 150	1.7411	+/-0.50	
M5PFHxA	772171.1	2.588767				50 - 150	2.5888	+/-0.50	
M3PFHxS	93689.27	3.226417				50 - 150	3.2264	+/-0.50	
M4PFHpA	728903.1	3.186933				50 - 150	3.1869	+/-0.50	
M8PFOA	670529.3	3.469917				50 - 150	3.4699	+/-0.50	
M8PFOS	97628.05	3.660133				50 - 150	3.6601	+/-0.50	
M9PFNA	536302.4	3.661183				50 - 150	3.6612	+/-0.50	
MPFDoA	885907.3	4.08865				50 - 150	4.0887	+/-0.50	
d5-NEtFOSAA	189719.9	3.9615				50 - 150	3.9615	+/-0.50	
d3-NMeFOSAA	220588.6	3.88175				50 - 150	3.8818	+/-0.50	

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SOP-454 PFAS in Water	
Perfluorobutanoic acid (PFBA)	NH-P
Perfluorobutanesulfonic acid (PFBS)	NH-P
Perfluoropentanoic acid (PFPeA)	NH-P
Perfluorohexanoic acid (PFHxA)	NH-P
11Cl-PF3OUdS (F53B Minor)	NH-P
9Cl-PF3ONS (F53B Major)	NH-P
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NH-P
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P
Perfluorodecanoic acid (PFDA)	NH-P
Perfluorododecanoic acid (PFDoA)	NH-P
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P
Perfluoroheptanesulfonic acid (PFHpS)	NH-P
N-EtFOSAA	NH-P
N-MeFOSAA	NH-P
Perfluorotetradecanoic acid (PFTA)	NH-P
Perfluorotridecanoic acid (PFTrDA)	NH-P
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P
Perfluorodecanesulfonic acid (PFDS)	NH-P
Perfluorooctanesulfonamide (FOSA)	NH-P
Perfluorononanesulfonic acid (PFNS)	NH-P
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P
Perfluoro-1-butanesulfonamide (FBSA)	NH-P
Perfluorohexanesulfonic acid (PFHxS)	NH-P
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P
Perfluoropetanesulfonic acid (PFPeS)	NH-P
Perfluoroundecanoic acid (PFUnA)	NH-P
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P
Perfluoroheptanoic acid (PFHpA)	NH-P
Perfluorooctanoic acid (PFOA)	NH-P
Perfluorooctanesulfonic acid (PFOS)	NH-P
Perfluorononanoic acid (PFNA)	NH-P

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2021

2141431

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 2

Company Name: Wilcox & Barton, Inc.
Address: 18 Commons Dr. Unit 12B, Londonderry, NH
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth, NH
Project Number: BANFOODS
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard, D. Reid

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: bwilcox, mbroussard, mnucci
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	Matrix Code[1]	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PFAS
1	MW-1	8/26/21		GRAB	GW	U			2			X
2	MW-4		1025		GW	U			2			X
3	MW-5		0958		GW	U			2			X
4	MW-6		1125		GW	U			2			X
5	MW-7		1240		GW	U			2			X
6	MW-8		1345		GW	U			2			X
7	MW-106R		1108		GW	U			2			X
8	MW-109		1455		GW	U			2			X
9	MW-203		1425		GW	U			2			X
10	MW-204		1445		GW	U			2			X

[2] Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) MSB	Date/Time: 8/26/21 16:30
Received by: (signature)	Date/Time: 8/26/21 1630
Relinquished by: (signature)	Date/Time: 8/26/21 1850
Received by: (signature) 4.2	Date/Time: 8/26/21 1850
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ pricing

Detection Limit Requirements
MA
CT
Other: NHDES AGQS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Comments:

Table of Contents

2141431

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 2 of 2

Company Name: Wilcox & Barton, Inc.
Address: 1B Commons Dr, Unit 12B, Londonderry, NH
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Road, Portsmouth, NH
Project Number: BANF0005
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard, D. Reid

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☒ Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: bwilcox, mbroussard, mnucci
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PFAS
11	MW-301	8/26/21	0900	GRAB	GW	U			2			X
12	Field Blank	8/26/21	0905	GRAB	GW	U			1			X
13	Trip Blank				GW	U			1			X
14	Equipment Blank	8/26/21	0910	GRAB	GW	U			1			X

²Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepackaged coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) WSB	Date/Time: 8/26/21 16:30
Received by: (signature)	Date/Time: 8/26/21 1630
Relinquished by: (signature)	Date/Time: 8/26/21 1850
Received by: (signature) 4.2	Date/Time: 8/26/21 1850
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ pricing

Detection Limit Requirements
MA
CT
Other: NHDES AGQS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W & B

Received By ______ Date 8/26/21 Time 1850

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___

Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 4.2

By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ___

Are there Rushes? F Who was notified? ___

Are there Short Holds? F Who was notified? ___

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? NA Acid ___ Base ___

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	26	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

September 3, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd, Portsmouth, NH
Client Job Number:
Project Number: BANF0004
Laboratory Work Order Number: 21H1487

Enclosed are results of analyses for samples received by the laboratory on August 27, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/3/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0004

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21H1487

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-101	21H1487-01	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8270D-E	
MW-102	21H1487-02	Ground Water		SW-846 6020B	
				SW-846 7470A	
MW-104	21H1487-03	Ground Water		SW-846 6020B	
				SW-846 7470A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8270E, only PAHs were requested and reported.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21H1487

Date Received: 8/27/2021

Field Sample #: MW-101 Sampled: 8/27/2021 10:40

Sample ID: 21H1487-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.037	0.29	0.027	µg/L	1	J	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Acenaphthylene (SIM)	ND	0.19	0.025	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Anthracene (SIM)	ND	0.19	0.019	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Benzo(a)anthracene (SIM)	ND	0.049	0.034	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Benzo(a)pyrene (SIM)	ND	0.097	0.021	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Benzo(b)fluoranthene (SIM)	ND	0.049	0.027	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Benzo(g,h,i)perylene (SIM)	0.030	0.49	0.027	µg/L	1	J	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Benzo(k)fluoranthene (SIM)	ND	0.19	0.017	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Chrysene (SIM)	ND	0.19	0.021	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Dibenz(a,h)anthracene (SIM)	0.048	0.097	0.028	µg/L	1	J	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Fluoranthene (SIM)	ND	0.49	0.021	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Fluorene (SIM)	ND	0.97	0.026	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.032	0.097	0.027	µg/L	1	J	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
2-Methylnaphthalene (SIM)	ND	0.97	0.11	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Naphthalene (SIM)	ND	0.97	0.35	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Phenanthrene (SIM)	ND	0.049	0.029	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR
Pyrene (SIM)	ND	0.97	0.019	µg/L	1	U	SW-846 8270D-E	8/31/21	9/1/21 12:06	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	68.8	30-130		9/1/21 12:06
2-Fluorobiphenyl	63.6	30-130		9/1/21 12:06
p-Terphenyl-d14	71.2	30-130		9/1/21 12:06

Table of Contents

Project Location: 375 Banfield Rd, Portsmouth, NH

Sample Description:

Work Order: 21H1487

Date Received: 8/27/2021

Field Sample #: MW-101

Sampled: 8/27/2021 10:40

Sample ID: 21H1487-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	30	0.80	0.46	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:10	QNW
Barium	190	10	1.2	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:10	QNW
Cadmium	0.24	0.20	0.027	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:10	QNW
Chromium	2.9	1.0	0.92	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:10	QNW
Lead	180	0.50	0.14	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:10	QNW
Mercury	ND	0.0000012	.0000006	mg/L	1	U	SW-846 7470A	9/2/21	9/3/21 8:50	DRL
Selenium	ND	5.0	0.78	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:10	QNW
Silver	0.077	0.20	0.026	µg/L	1	J	SW-846 6020B	8/30/21	8/30/21 16:10	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21H1487

Date Received: 8/27/2021

Field Sample #: MW-101 Sampled: 8/27/2021 10:40

Sample ID: 21H1487-01

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	29	0.80	0.46	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:21	QNW
Barium	170	10	1.2	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:21	QNW
Cadmium	0.14	0.20	0.027	µg/L	1	J	SW-846 6020B	8/30/21	8/31/21 13:21	QNW
Chromium	1.5	1.0	0.92	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:21	QNW
Lead	65	0.50	0.14	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:21	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/1/21	9/1/21 11:58	CJV
Selenium	1.3	5.0	0.78	µg/L	1	J	SW-846 6020B	8/30/21	8/31/21 13:21	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	8/30/21	8/31/21 13:21	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21H1487

Date Received: 8/27/2021

Field Sample #: MW-102   Sampled: 8/27/2021 09:45

Sample ID: 21H1487-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	6.6	0.80	0.46	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:13	QNW
Barium	240	10	1.2	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:13	QNW
Cadmium	0.46	0.20	0.027	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:13	QNW
Chromium	7.1	1.0	0.92	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:13	QNW
Lead	230	0.50	0.14	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:13	QNW
Mercury	ND	0.0000012	).0000006(	mg/L	1	U	SW-846 7470A	9/2/21	9/3/21 8:55	DRL
Selenium	ND	5.0	0.78	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:13	QNW
Silver	0.075	0.20	0.026	µg/L	1	J	SW-846 6020B	8/30/21	8/30/21 16:13	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21H1487

Date Received: 8/27/2021

Field Sample #: MW-102   Sampled: 8/27/2021 09:45

Sample ID: 21H1487-02

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	4.8	0.80	0.46	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:25	QNW
Barium	230	10	1.2	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:25	QNW
Cadmium	ND	0.20	0.027	µg/L	1	U	SW-846 6020B	8/30/21	8/31/21 13:25	QNW
Chromium	0.99	1.0	0.92	µg/L	1	J	SW-846 6020B	8/30/21	8/31/21 13:25	QNW
Lead	1.1	0.50	0.14	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:25	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/1/21	9/1/21 12:20	CJV
Selenium	1.0	5.0	0.78	µg/L	1	J	SW-846 6020B	8/30/21	8/31/21 13:25	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	8/30/21	8/31/21 13:25	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21H1487

Date Received: 8/27/2021

Field Sample #: MW-104
Sampled: 8/27/2021 08:40

Sample ID: 21H1487-03

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	9.9	0.80	0.46	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:17	QNW
Barium	220	10	1.2	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:17	QNW
Cadmium	0.88	0.20	0.027	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:17	QNW
Chromium	5.6	1.0	0.92	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:17	QNW
Lead	760	5.0	1.4	µg/L	10		SW-846 6020B	8/30/21	9/3/21 14:01	QNW
Mercury	ND	0.0000012	.0000006	mg/L	1	U	SW-846 7470A	9/2/21	9/3/21 8:57	DRL
Selenium	ND	5.0	0.78	µg/L	1		SW-846 6020B	8/30/21	8/30/21 16:17	QNW
Silver	0.13	0.20	0.026	µg/L	1	J	SW-846 6020B	8/30/21	8/30/21 16:17	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21H1487

Date Received: 8/27/2021

Field Sample #: MW-104 Sampled: 8/27/2021 08:40

Sample ID: 21H1487-03

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	7.8	0.80	0.46	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:28	QNW
Barium	210	10	1.2	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:28	QNW
Cadmium	0.049	0.20	0.027	µg/L	1	J	SW-846 6020B	8/30/21	8/31/21 13:28	QNW
Chromium	1.4	1.0	0.92	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:28	QNW
Lead	43	0.50	0.14	µg/L	1		SW-846 6020B	8/30/21	8/31/21 13:28	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/1/21	9/1/21 12:22	CJV
Selenium	1.1	5.0	0.78	µg/L	1	J	SW-846 6020B	8/30/21	8/31/21 13:28	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	8/30/21	8/31/21 13:28	QNW

Sample Extraction Data

Prep Method: SW-846 3005A **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1487-01 [MW-101]	B289223	50.0	50.0	08/30/21
21H1487-02 [MW-102]	B289223	50.0	50.0	08/30/21
21H1487-03 [MW-104]	B289223	50.0	50.0	08/30/21

Prep Method: SW-846 3005A Dissolved **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1487-01 [MW-101]	B289259	50.0	50.0	08/30/21
21H1487-02 [MW-102]	B289259	50.0	50.0	08/30/21
21H1487-03 [MW-104]	B289259	50.0	50.0	08/30/21

Prep Method: SW-846 7470A Dissolved **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1487-01RE1 [MW-101]	B289392	6.00	6.00	09/01/21
21H1487-02RE1 [MW-102]	B289392	6.00	6.00	09/01/21
21H1487-03RE1 [MW-104]	B289392	6.00	6.00	09/01/21

Prep Method: SW-846 7470A Prep **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1487-01 [MW-101]	B289545	6.00	6.00	09/02/21
21H1487-02 [MW-102]	B289545	6.00	6.00	09/02/21
21H1487-03 [MW-104]	B289545	6.00	6.00	09/02/21

Prep Method: SW-846 3510C **Analytical Method: SW-846 8270D-E**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1487-01 [MW-101]	B289391	1030	1.00	08/31/21

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289391 - SW-846 3510C										
Blank (B289391-BLK1)				Prepared & Analyzed: 09/01/21						
Acenaphthene (SIM)	ND	0.30	µg/L							U
Acenaphthylene (SIM)	ND	0.20	µg/L							U
Anthracene (SIM)	ND	0.20	µg/L							U
Benzo(a)anthracene (SIM)	ND	0.050	µg/L							U
Benzo(a)pyrene (SIM)	ND	0.10	µg/L							U
Benzo(b)fluoranthene (SIM)	ND	0.050	µg/L							U
Benzo(g,h,i)perylene (SIM)	ND	0.50	µg/L							U
Benzo(k)fluoranthene (SIM)	ND	0.20	µg/L							U
Chrysene (SIM)	ND	0.20	µg/L							U
Dibenz(a,h)anthracene (SIM)	ND	0.10	µg/L							U
Fluoranthene (SIM)	ND	0.50	µg/L							U
Fluorene (SIM)	ND	1.0	µg/L							U
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.10	µg/L							U
2-Methylnaphthalene (SIM)	ND	1.0	µg/L							U
Naphthalene (SIM)	ND	1.0	µg/L							U
Phenanthrene (SIM)	ND	0.050	µg/L							U
Pyrene (SIM)	ND	1.0	µg/L							U
Surrogate: Nitrobenzene-d5	*55.1*		µg/L	100		55.1	30-130			
Surrogate: 2-Fluorobiphenyl	*49.6*		µg/L	100		49.6	30-130			
Surrogate: p-Terphenyl-d14	*60.5*		µg/L	100		60.5	30-130			
LCS (B289391-BS1)				Prepared & Analyzed: 09/01/21						
Acenaphthene (SIM)	29.9	7.5	µg/L	50.0		59.8	40-140			
Acenaphthylene (SIM)	31.2	5.0	µg/L	50.0		62.4	40-140			
Anthracene (SIM)	36.4	5.0	µg/L	50.0		72.7	40-140			
Benzo(a)anthracene (SIM)	34.2	1.2	µg/L	50.0		68.3	40-140			
Benzo(a)pyrene (SIM)	38.5	2.5	µg/L	50.0		77.0	40-140			
Benzo(b)fluoranthene (SIM)	39.4	1.2	µg/L	50.0		78.9	40-140			
Benzo(g,h,i)perylene (SIM)	37.7	12	µg/L	50.0		75.4	40-140			
Benzo(k)fluoranthene (SIM)	38.5	5.0	µg/L	50.0		77.0	40-140			
Chrysene (SIM)	35.1	5.0	µg/L	50.0		70.2	40-140			
Dibenz(a,h)anthracene (SIM)	37.5	2.5	µg/L	50.0		75.0	40-140			
Fluoranthene (SIM)	35.1	12	µg/L	50.0		70.2	40-140			
Fluorene (SIM)	34.0	25	µg/L	50.0		68.0	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	38.6	2.5	µg/L	50.0		77.1	40-140			
2-Methylnaphthalene (SIM)	30.0	25	µg/L	50.0		60.0	40-140			
Naphthalene (SIM)	26.8	25	µg/L	50.0		53.6	40-140			
Phenanthrene (SIM)	34.0	1.2	µg/L	50.0		68.1	40-140			
Pyrene (SIM)	34.4	25	µg/L	50.0		68.8	40-140			
Surrogate: Nitrobenzene-d5	*62.6*		µg/L	100		62.6	30-130			
Surrogate: 2-Fluorobiphenyl	*60.8*		µg/L	100		60.8	30-130			
Surrogate: p-Terphenyl-d14	*65.6*		µg/L	100		65.6	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289391 - SW-846 3510C										
LCS Dup (B289391-BSD1)				Prepared & Analyzed: 09/01/21						
Acenaphthene (SIM)	30.8	7.5	µg/L	50.0		61.6	40-140	2.97	20	
Acenaphthylene (SIM)	32.4	5.0	µg/L	50.0		64.7	40-140	3.54	20	
Anthracene (SIM)	38.9	5.0	µg/L	50.0		77.8	40-140	6.71	20	
Benzo(a)anthracene (SIM)	36.6	1.2	µg/L	50.0		73.2	40-140	6.93	20	
Benzo(a)pyrene (SIM)	41.8	2.5	µg/L	50.0		83.5	40-140	8.03	20	
Benzo(b)fluoranthene (SIM)	42.2	1.2	µg/L	50.0		84.4	40-140	6.74	20	
Benzo(g,h,i)perylene (SIM)	40.4	12	µg/L	50.0		80.8	40-140	6.98	20	
Benzo(k)fluoranthene (SIM)	41.4	5.0	µg/L	50.0		82.8	40-140	7.32	20	
Chrysene (SIM)	37.6	5.0	µg/L	50.0		75.2	40-140	6.81	20	
Dibenz(a,h)anthracene (SIM)	40.3	2.5	µg/L	50.0		80.6	40-140	7.20	20	
Fluoranthene (SIM)	37.8	12	µg/L	50.0		75.7	40-140	7.47	20	
Fluorene (SIM)	36.0	25	µg/L	50.0		72.0	40-140	5.64	20	
Indeno(1,2,3-cd)pyrene (SIM)	41.5	2.5	µg/L	50.0		83.0	40-140	7.43	20	
2-Methylnaphthalene (SIM)	30.9	25	µg/L	50.0		61.8	40-140	3.04	20	
Naphthalene (SIM)	27.2	25	µg/L	50.0		54.4	40-140	1.39	20	
Phenanthrene (SIM)	36.6	1.2	µg/L	50.0		73.2	40-140	7.22	20	
Pyrene (SIM)	36.6	25	µg/L	50.0		73.2	40-140	6.20	20	
Surrogate: Nitrobenzene-d5	*58.7*		µg/L	100		58.7	30-130			
Surrogate: 2-Fluorobiphenyl	*62.6*		µg/L	100		62.6	30-130			
Surrogate: p-Terphenyl-d14	*69.8*		µg/L	100		69.8	30-130			

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289223 - SW-846 3005A										
Blank (B289223-BLK1)				Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Selenium	ND	5.0	µg/L							
Silver	ND	0.20	µg/L							
LCS (B289223-BS1)				Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	574	8.0	µg/L	500		115	80-120			
Barium	507	100	µg/L	500		101	80-120			
Cadmium	513	2.0	µg/L	500		103	80-120			
Chromium	506	10	µg/L	500		101	80-120			
Lead	511	5.0	µg/L	500		102	80-120			
Selenium	491	50	µg/L	500		98.3	80-120			
Silver	498	2.0	µg/L	500		99.6	80-120			
LCS Dup (B289223-BSD1)				Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	518	8.0	µg/L	500		104	80-120	10.3	20	
Barium	502	100	µg/L	500		100	80-120	1.03	20	
Cadmium	506	2.0	µg/L	500		101	80-120	1.31	20	
Chromium	499	10	µg/L	500		99.8	80-120	1.33	20	
Lead	500	5.0	µg/L	500		100	80-120	2.03	20	
Selenium	494	50	µg/L	500		98.8	80-120	0.550	20	
Silver	494	2.0	µg/L	500		98.8	80-120	0.779	20	
Batch B289545 - SW-846 7470A Prep										
Blank (B289545-BLK1)				Prepared: 09/02/21 Analyzed: 09/03/21						
Mercury	ND	0.0000012	mg/L							U
LCS (B289545-BS1)				Prepared: 09/02/21 Analyzed: 09/03/21						
Mercury	0.00391	0.0000012	mg/L	0.00400		97.6	80-120			
LCS Dup (B289545-BSD1)				Prepared: 09/02/21 Analyzed: 09/03/21						
Mercury	0.00389	0.0000012	mg/L	0.00400		97.2	80-120	0.424	20	

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289259 - SW-846 3005A Dissolved										
Blank (B289259-BLK1)				Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							U
Cadmium	ND	0.20	µg/L							U
Chromium	ND	1.0	µg/L							U
Lead	ND	0.50	µg/L							U
Selenium	ND	5.0	µg/L							U
Silver	ND	0.20	µg/L							U
LCS (B289259-BS1)				Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	518	8.0	µg/L	500		104	80-120			
Barium	509	100	µg/L	500		102	80-120			
Cadmium	513	2.0	µg/L	500		103	80-120			
Chromium	499	10	µg/L	500		99.7	80-120			
Lead	506	5.0	µg/L	500		101	80-120			
Selenium	483	50	µg/L	500		96.6	80-120			
Silver	501	2.0	µg/L	500		100	80-120			
LCS Dup (B289259-BSD1)				Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	523	8.0	µg/L	500		105	80-120	1.01	20	
Barium	511	100	µg/L	500		102	80-120	0.469	20	
Cadmium	512	2.0	µg/L	500		102	80-120	0.0562	20	
Chromium	501	10	µg/L	500		100	80-120	0.544	20	
Lead	511	5.0	µg/L	500		102	80-120	1.02	20	
Selenium	500	50	µg/L	500		100	80-120	3.40	20	
Silver	505	2.0	µg/L	500		101	80-120	0.715	20	
Duplicate (B289259-DUP1)	**Source: 21H1487-01**			Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	28.2	0.80	µg/L		28.7			1.59	20	
Barium	171	10	µg/L		173			0.746	20	
Cadmium	0.137	0.20	µg/L		0.140			1.78	20	J
Chromium	1.40	1.0	µg/L		1.49			6.27	20	
Lead	64.2	0.50	µg/L		65.5			1.95	20	
Selenium	2.10	5.0	µg/L		1.34			**44.0** *	20	J
Silver	ND	0.20	µg/L		ND			NC	20	U
Matrix Spike (B289259-MS1)	**Source: 21H1487-01**			Prepared: 08/30/21 Analyzed: 08/31/21						
Arsenic	533	8.0	µg/L	500	28.7	101	75-125			
Barium	665	100	µg/L	500	173	98.4	75-125			
Cadmium	507	2.0	µg/L	500	ND	101	75-125			
Chromium	495	10	µg/L	500	ND	99.1	75-125			
Lead	567	5.0	µg/L	500	65.5	100	75-125			
Selenium	488	50	µg/L	500	ND	97.6	75-125			
Silver	492	2.0	µg/L	500	ND	98.3	75-125			

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289392 - SW-846 7470A Dissolved										
Blank (B289392-BLK1)				Prepared & Analyzed: 09/01/21						
Mercury	ND	0.00010	mg/L							U
LCS (B289392-BS1)				Prepared & Analyzed: 09/01/21						
Mercury	0.00424	0.00010	mg/L	0.00400		106	80-120			
LCS Dup (B289392-BSD1)				Prepared & Analyzed: 09/01/21						
Mercury	0.00427	0.00010	mg/L	0.00400		107	80-120	0.885	20	
Duplicate (B289392-DUP1)	**Source: 21H1487-01RE1**			Prepared & Analyzed: 09/01/21						
Mercury	ND	0.00010	mg/L		ND			NC	20	U
Matrix Spike (B289392-MS1)	**Source: 21H1487-01RE1**			Prepared & Analyzed: 09/01/21						
Mercury	0.00463	0.00010	mg/L	0.00400	ND	116	75-125			

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6020B in Water	
Arsenic	CT,NH,NY,ME,VA,NC
Arsenic	CT,NH,NY,NC,ME,VA
Barium	MA,NY,CT,NC,NH,ME,VA
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,NC,ME,VA
Cadmium	CT,NH,NY,RI,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,NC,ME,VA
Lead	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,NC,ME,VA
Selenium	CT,NH,NY,NC,ME,VA
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NH,NY,ME,VA,NC
Silver	CT,NC,NH,NY,ME,VA
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
Mercury	CT,NH,NY,NC,ME,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2021
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2021

21H1487

Pace Analytical®
Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name: Wilcox & Barton, Inc.
Address: #1B Commons Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANF0004
Project Location: 375 Banfield Road, Portsmouth NH
Project Number: BANF0004
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Montgu

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
☒ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: bwilcox@wilcoxandbarton.com
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PAHs (I)	Total RCRA 8 metals (N)	Dissolved RCRA 8 metals (N)
1	MW-101	8/27/21	10:40	Grab	GW	U		2	2			X	X	X
2	MW-102	8/27/21	9:45	Grab	GW	U			2				X	X
3	MW-104	8/27/21	8:40	Grab	GW	U			2				X	X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature) 8/27/2021	Date/Time: 12:00
Received by: (signature)	Date/Time: 8/27/21 1200
Relinquished by: (signature)	Date/Time: 8/27/21 1645
Received by: (signature) 4.0	Date/Time: 8/27/21 1045
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA: AGQS
CT:
Other:

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples____________

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W+B

Received By Date 8/27/21 Time 1645

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 4.0
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? n/a MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid T Base n/a

Vials	**#**	**Containers:**	**#**		**#**		**#**
Unp-		1 Liter Amb.	2	1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	10	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	**#**	**Containers:**	**#**		**#**		**#**
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

September 17, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Branfield Rd, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I0542

Enclosed are results of analyses for samples received by the laboratory on September 10, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/17/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0542

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Branfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
C-1 (0'-2')	21I0542-01	Soil		SM 2540G SW-846 6010D	
B-2 (0'-2')	21I0542-02	Soil		SM 2540G SW-846 6010D	
A-1 (0'-2)	21I0542-03	Soil		SM 2540G SW-846 6010D	
B-4 (0'-2')	21I0542-04	Soil		SM 2540G SW-846 6010D	
C-3 (0'-2')	21I0542-05	Soil		SM 2540G SW-846 6010D	
C-3 (2'-4')	21I0542-06	Soil		SM 2540G SW-846 6010D	
D-2 (0'-2')	21I0542-07	Soil		SM 2540G SW-846 6010D	
D-2 (2'-4')	21I0542-08	Soil		SM 2540G SW-846 6010D	
E-1 (0'-2')	21I0542-09	Soil		SM 2540G SW-846 6010D	
F-2 (0'-2')	21I0542-10	Soil		SM 2540G SW-846 6010D	
F-2 (2'-4')	21I0542-11	Soil		SM 2540G SW-846 6010D	
G-1 (1'-2')	21I0542-12	Soil		SM 2540G SW-846 6010D	
G-1 (2'-4')	21I0542-13	Soil		SM 2540G SW-846 6010D	
H-2 (0'-2')	21I0542-14	Soil		SM 2540G SW-846 6010D	
H-2 (2'-4')	21I0542-15	Soil		SM 2540G SW-846 6010D	
I-1 (0'-2')	21I0542-16	Soil		SM 2540G SW-846 6010D	
I-1 (2'-4')	21I0542-17	Soil		SM 2540G SW-846 6010D	
G-3 (0-2')	21I0542-18	Soil		SM 2540G SW-846 6010D	
G-3 (2-4')	21I0542-19	Soil		SM 2540G SW-846 6010D	
D-4 (0-2')	21I0542-20	Soil		SM 2540G SW-846 6010D	

con-test
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/17/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0542

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Branfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
D-4 (2-4')	21I0542-21	Soil		SM 2540G SW-846 6010D	
C-5 (0-2')	21I0542-22	Soil		SM 2540G SW-846 6010D	
C-5 (2-4')	21I0542-23	Soil		SM 2540G SW-846 6010D	
B-6 (0-2')	21I0542-24	Soil		SM 2540G SW-846 6010D	
E-5 (0-2')	21I0542-25	Soil		SM 2540G SW-846 6010D	
E-5 (2-4')	21I0542-26	Soil		SM 2540G SW-846 6010D	
G-5 (0-2')	21I0542-27	Soil		SM 2540G SW-846 6010D	
G-5 (2-4')	21I0542-28	Soil		SM 2540G SW-846 6010D	
C-7 (0-2')	21I0542-29	Soil		SM 2540G SW-846 6010D	
C-7 (2-4')	21I0542-30	Soil		SM 2540G SW-846 6010D	
D-6 (0-2')	21I0542-31	Soil		SM 2540G SW-846 6010D	
D-6 (2-4')	21I0542-32	Soil		SM 2540G SW-846 6010D	
E-7 (0-2')	21I0542-33	Soil		SM 2540G SW-846 6010D	
E-7 (2-4')	21I0542-34	Soil		SM 2540G SW-846 6010D	
D-8 (0-2')	21I0542-35	Soil		SM 2540G SW-846 6010D	
D-8 (2-4')	21I0542-36	Soil		SM 2540G SW-846 6010D	
D-9 (0-2')	21I0542-37	Soil		SM 2540G SW-846 6010D	
D-9 (2-4)	21I0542-38	Soil		SM 2540G SW-846 6010D	
D-10 (0-2')	21I0542-39	Soil		SM 2540G SW-846 6010D	
D-11 (0-2')	21I0542-40	Soil		SM 2540G SW-846 6010D	

con-test
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/17/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0542

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Branfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
F-9 (0-2')	21I0542-41	Soil		SM 2540G SW-846 6010D	
F-9 (2-4')	21I0542-42	Soil		SM 2540G SW-846 6010D	
E-10 (0-2')	21I0542-43	Soil		SM 2540G SW-846 6010D	
E-10 (2-4')	21I0542-44	Soil		SM 2540G SW-846 6010D	
H-6 (0-2')	21I0542-45	Soil		SM 2540G SW-846 6010D	
H-6 (2-4')	21I0542-46	Soil		SM 2540G SW-846 6010D	
F-6 (0-2')	21I0542-47	Soil		SM 2540G SW-846 6010D	
F-6 (2-4')	21I0542-48	Soil		SM 2540G SW-846 6010D	
J-6 (0-2')	21I0542-49	Soil		SM 2540G SW-846 6010D	
J-6 (2-4')	21I0542-50	Soil		SM 2540G SW-846 6010D	
F-4 (0-2')	21I0542-51	Soil		SM 2540G SW-846 6010D	
F-4 (2-4')	21I0542-52	Soil		SM 2540G SW-846 6010D	
H-4 (0-2')	21I0542-53	Soil		SM 2540G SW-846 6010D	
H-4 (2-4')	21I0542-54	Soil		SM 2540G SW-846 6010D	
I-3 (0-2')	21I0542-55	Soil		SM 2540G SW-846 6010D	
I-3 (2-4')	21I0542-56	Soil		SM 2540G SW-846 6010D	
J-10 (0-2')	21I0542-57	Soil		SM 2540G SW-846 6010D	
J-10 (2-4')	21I0542-58	Soil		SM 2540G SW-846 6010D	
J-11 (0-2')	21I0542-59	Soil		SM 2540G SW-846 6010D	
J-11 (2-4')	21I0542-60	Soil		SM 2540G SW-846 6010D	

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/17/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0542

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Branfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
K-11 (0-2')	21I0542-61	Soil		SM 2540G SW-846 6010D	
K-12 (0-2')	21I0542-62	Soil		SM 2540G SW-846 6010D	
J-13 (0-2')	21I0542-63	Soil		SM 2540G SW-846 6010D	
H-14 (0-2')	21I0542-64	Soil		SM 2540G SW-846 6010D	
H-13 (0-2')	21I0542-65	Soil		SM 2540G SW-846 6010D	
F-11 (0-2')	21I0542-66	Soil		SM 2540G SW-846 6010D	
F-11 (2-4')	21I0542-67	Soil		SM 2540G SW-846 6010D	
F-12 (0-2')	21I0542-68	Soil		SM 2540G SW-846 6010D	
F-12 (2-4')	21I0542-69	Soil		SM 2540G SW-846 6010D	

Table of Contents

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 6010D

Qualifications:

MS-19

Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.

Analyte & Samples(s) Qualified:

Lead

21I0542-01[C-1 (0'-2')], 21I0542-37[D-9 (0-2')], B290266-MS1, B290267-MS1

R-02

Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.

Analyte & Samples(s) Qualified:

Lead

21I0542-37[D-9 (0-2')], B290266-DUP1

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-1 (0'-2') Sampled: 9/9/2021 08:10

Sample ID: 21I0542-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	860	0.56	0.27	mg/Kg dry	1	MS-19	SW-846 6010D	9/15/21	9/16/21 14:02	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: C-1 (0'-2')
Sampled: 9/9/2021 08:10
Sample ID: 21I0542-01
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:43	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: B-2 (0'-2') Sampled: 9/9/2021 08:22

Sample ID: 21I0542-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	42	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 14:08	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: B-2 (0'-2') Sampled: 9/9/2021 08:22

Sample ID: 21I0542-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.5		% Wt	1		SM 2540G	9/14/21	9/15/21 16:44	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: A-1 (0'-2)   Sampled: 9/9/2021 08:40

Sample ID: 21I0542-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	33	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 14:27	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: A-1 (0'-2)
Sampled: 9/9/2021 08:40

Sample ID: 21I0542-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:44	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: B-4 (0'-2')   Sampled: 9/9/2021 08:52

Sample ID: 21I0542-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	130	0.56	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 14:34	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: B-4 (0'-2')
Sampled: 9/9/2021 08:52

Sample ID: 21I0542-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.9		% Wt	1		SM 2540G	9/14/21	9/15/21 16:44	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-3 (0'-2')
Sampled: 9/9/2021 08:55

Sample ID: 21I0542-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	59	0.60	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 14:40	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-3 (0'-2') Sampled: 9/9/2021 08:55

Sample ID: 21I0542-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:44	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-3 (2'-4') Sampled: 9/9/2021 09:05

Sample ID: 21I0542-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	180	0.60	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 14:47	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: C-3 (2'-4')
Sampled: 9/9/2021 09:05
Sample ID: 21I0542-06
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:44	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: D-2 (0'-2')
Sampled: 9/9/2021 09:12
Sample ID: 21I0542-07
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	69	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 14:54	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-2 (0'-2')
Sampled: 9/9/2021 09:12

Sample ID: 21I0542-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.3		% Wt	1		SM 2540G	9/14/21	9/15/21 16:44	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-2 (2'-4') Sampled: 9/9/2021 09:25

Sample ID: 21I0542-08

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	35	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 15:01	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-2 (2'-4')　Sampled: 9/9/2021 09:25

Sample ID: 21I0542-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.4		% Wt	1		SM 2540G	9/14/21	9/15/21 16:44	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: E-1 (0'-2')
Sampled: 9/9/2021 09:40
Sample ID: 21I0542-09
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	230	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 15:08	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-1 (0'-2') Sampled: 9/9/2021 09:40

Sample ID: 21I0542-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:45	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-2 (0'-2') Sampled: 9/9/2021 09:50

Sample ID: 21I0542-10

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	220	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 15:14	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-2 (0'-2') Sampled: 9/9/2021 09:50

Sample ID: 21I0542-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:45	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: F-2 (2'-4')
Sampled: 9/9/2021 09:58
Sample ID: 21I0542-11
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	8.6	0.62	0.30	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 15:21	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-2 (2'-4') Sampled: 9/9/2021 09:58

Sample ID: 21I0542-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.1		% Wt	1		SM 2540G	9/14/21	9/15/21 16:45	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-1 (1'-2')　Sampled: 9/9/2021 10:05

Sample ID: 21I0542-12

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	160	0.63	0.30	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 15:28	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-1 (1'-2') Sampled: 9/9/2021 10:05

Sample ID: 21I0542-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	79.1		% Wt	1		SM 2540G	9/14/21	9/15/21 16:45	GLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-1 (2'-4') Sampled: 9/9/2021 10:15

Sample ID: 21I0542-13

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	9.5	0.62	0.30	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 15:46	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-1 (2'-4') Sampled: 9/9/2021 10:15

Sample ID: 21I0542-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	79.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:45	GLH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-2 (0'-2')   Sampled: 9/9/2021 10:25

Sample ID: 21I0542-14

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	53	0.60	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 15:53	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-2 (0'-2') Sampled: 9/9/2021 10:25

Sample ID: 21I0542-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:10	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-2 (2'-4') Sampled: 9/9/2021 10:30

Sample ID: 21I0542-15

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.0	0.56	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 16:00	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-2 (2'-4')   Sampled: 9/9/2021 10:30

Sample ID: 21I0542-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:10	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-1 (0'-2')   Sampled: 9/9/2021 10:33

Sample ID: 21I0542-16

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	6.9	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 16:07	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-1 (0'-2')   Sampled: 9/9/2021 10:33

Sample ID: 21I0542-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:10	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-1 (2'-4') Sampled: 9/9/2021 10:37

Sample ID: 21I0542-17

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	3.8	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 16:13	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-1 (2'-4')   Sampled: 9/9/2021 10:37

Sample ID: 21I0542-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-3 (0-2')   Sampled: 9/9/2021 10:55

Sample ID: 21I0542-18

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	16	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 16:20	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-3 (0-2')　Sampled: 9/9/2021 10:55

Sample ID: 21I0542-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: G-3 (2-4')
Sampled: 9/9/2021 10:59
Sample ID: 21I0542-19
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	42	0.63	0.30	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:49	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-3 (2-4')   Sampled: 9/9/2021 10:59

Sample ID: 21I0542-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.5		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-4 (0-2')   Sampled: 9/9/2021 11:25

Sample ID: 21I0542-20

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	250	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:55	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-4 (0-2') Sampled: 9/9/2021 11:25

Sample ID: 21I0542-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.5		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-4 (2-4') Sampled: 9/9/2021 11:30

Sample ID: 21I0542-21

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2100	0.65	0.32	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:12	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021

Field Sample #: D-4 (2-4')
Sampled: 9/9/2021 11:30

Sample ID: 21I0542-21

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-5 (0-2')
Sampled: 9/9/2021 11:35

Sample ID: 21I0542-22

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	270	0.56	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:18	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-5 (0-2') Sampled: 9/9/2021 11:35

Sample ID: 21I0542-22

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.5		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: C-5 (2-4')
Sampled: 9/9/2021 11:38
Sample ID: 21I0542-23
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	3600	0.76	0.37	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:23	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-5 (2-4') Sampled: 9/9/2021 11:38

Sample ID: 21I0542-23

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	65.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH

Sample Description:

Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: B-6 (0-2')

Sampled: 9/9/2021 11:49

Sample ID: 21I0542-24

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	500	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:29	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: B-6 (0-2') Sampled: 9/9/2021 11:49

Sample ID: 21I0542-24

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-5 (0-2') Sampled: 9/9/2021 12:06

Sample ID: 21I0542-25

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	49	0.62	0.30	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:35	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-5 (0-2')   Sampled: 9/9/2021 12:06

Sample ID: 21I0542-25

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	78.4		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: E-5 (2-4')
Sampled: 9/9/2021 12:15
Sample ID: 21I0542-26
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	10	0.63	0.31	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:40	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-5 (2-4')
Sampled: 9/9/2021 12:15

Sample ID: 21I0542-26

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	78.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH	Sample Description:	Work Order: 21I0542
Date Received: 9/10/2021		
Field Sample #: G-5 (0-2')	Sampled: 9/9/2021 12:24	
Sample ID: 21I0542-27		
Sample Matrix: Soil		

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	9.6	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:46	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-5 (0-2')　Sampled: 9/9/2021 12:24

Sample ID: 21I0542-27

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.4		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-5 (2-4') Sampled: 9/9/2021 00:00

Sample ID: 21I0542-28

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	9.3	0.53	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:52	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: G-5 (2-4') Sampled: 9/9/2021 00:00

Sample ID: 21I0542-28

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-7 (0-2')
Sampled: 9/9/2021 13:22

Sample ID: 21I0542-29

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	140	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:58	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-7 (0-2') Sampled: 9/9/2021 13:22

Sample ID: 21I0542-29

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.4		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-7 (2-4') Sampled: 9/9/2021 13:26

Sample ID: 21I0542-30

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	98	0.61	0.30	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:03	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: C-7 (2-4')
Sampled: 9/9/2021 13:26

Sample ID: 21I0542-30

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:11	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-6 (0-2') Sampled: 9/9/2021 13:36

Sample ID: 21I0542-31

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	97	0.53	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:21	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH | Sample Description: | Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-6 (0-2') | Sampled: 9/9/2021 13:36

Sample ID: 21I0542-31

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-6 (2-4')
Sampled: 9/9/2021 13:40

Sample ID: 21I0542-32

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	82	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:27	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-6 (2-4') Sampled: 9/9/2021 13:40

Sample ID: 21I0542-32

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: E-7 (0-2')
Sampled: 9/9/2021 13:44
Sample ID: 21I0542-33
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	400	0.61	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:34	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: E-7 (0-2')
Sampled: 9/9/2021 13:44
Sample ID: 21I0542-33
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-7 (2-4')
Sampled: 9/9/2021 13:48

Sample ID: 21I0542-34

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	59	0.64	0.31	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:40	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-7 (2-4') Sampled: 9/9/2021 13:48

Sample ID: 21I0542-34

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	78.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: D-8 (0-2')
Sampled: 9/9/2021 13:53
Sample ID: 21I0542-35
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	43	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:45	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: D-8 (0-2')
Sampled: 9/9/2021 13:53
Sample ID: 21I0542-35
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.3		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-8 (2-4') Sampled: 9/9/2021 13:58

Sample ID: 21I0542-36

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	40	0.52	0.25	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:51	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-8 (2-4') Sampled: 9/9/2021 13:58

Sample ID: 21I0542-36

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.5		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-9 (0-2')   Sampled: 9/9/2021 14:05

Sample ID: 21I0542-37

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	300	0.58	0.28	mg/Kg dry	1	MS-19, R-02	SW-846 6010D	9/15/21	9/16/21 21:15	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-9 (0-2')   Sampled: 9/9/2021 14:05

Sample ID: 21I0542-37

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH

Sample Description:

Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-9 (2-4)

Sampled: 9/9/2021 14:09

Sample ID: 21I0542-38

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	56	0.60	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:22	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-9 (2-4)
Sampled: 9/9/2021 14:09

Sample ID: 21I0542-38

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-10 (0-2')   Sampled: 9/9/2021 14:15

Sample ID: 21I0542-39

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	17	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:28	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-10 (0-2') Sampled: 9/9/2021 14:15

Sample ID: 21I0542-39

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-11 (0-2') Sampled: 9/9/2021 14:30

Sample ID: 21I0542-40

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	160	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:35	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH		Sample Description:		Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: D-11 (0-2')		Sampled: 9/9/2021 14:30

Sample ID: 21I0542-40

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.4		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: F-9 (0-2')
Sampled: 9/9/2021 15:04
Sample ID: 21I0542-41
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	5.5	0.52	0.25	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:42	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-9 (0-2')   Sampled: 9/9/2021 15:04

Sample ID: 21I0542-41

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	95.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: F-9 (2-4')
Sampled: 9/9/2021 15:10
Sample ID: 21I0542-42
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	17	0.50	0.25	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:49	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-9 (2-4') Sampled: 9/9/2021 15:10

Sample ID: 21I0542-42

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.3		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-10 (0-2') Sampled: 9/10/2021 07:32

Sample ID: 21I0542-43

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	79	0.59	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 21:55	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-10 (0-2')   Sampled: 9/10/2021 07:32

Sample ID: 21I0542-43

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	**Results**	**RL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
% Solids	81.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:12	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: E-10 (2-4')
Sampled: 9/10/2021 07:35
Sample ID: 21I0542-44
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	27	0.62	0.30	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:02	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: E-10 (2-4') Sampled: 9/10/2021 07:35

Sample ID: 21I0542-44

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	79.5		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH

Sample Description:

Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-6 (0-2')

Sampled: 9/10/2021 08:14

Sample ID: 21I0542-45

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	13	0.59	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:09	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: H-6 (0-2')
Sampled: 9/10/2021 08:14
Sample ID: 21I0542-45
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.5		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-6 (2-4') Sampled: 9/10/2021 08:17

Sample ID: 21I0542-46

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	4.4	0.51	0.25	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:16	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-6 (2-4') Sampled: 9/10/2021 08:17

Sample ID: 21I0542-46

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-6 (0-2') Sampled: 9/10/2021 09:30

Sample ID: 21I0542-47

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.8	0.60	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:34	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: F-6 (0-2')
Sampled: 9/10/2021 09:30
Sample ID: 21I0542-47
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-6 (2-4') Sampled: 9/10/2021 09:34

Sample ID: 21I0542-48

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.7	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:41	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-6 (2-4') Sampled: 9/10/2021 09:34

Sample ID: 21I0542-48

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-6 (0-2') Sampled: 9/10/2021 08:55

Sample ID: 21I0542-49

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.2	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:48	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-6 (0-2') Sampled: 9/10/2021 08:55

Sample ID: 21I0542-49

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-6 (2-4') Sampled: 9/10/2021 09:00

Sample ID: 21I0542-50

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	4.7	0.53	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 22:55	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-6 (2-4')   Sampled: 9/10/2021 09:00

Sample ID: 21I0542-50

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.8		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-4 (0-2') Sampled: 9/10/2021 09:38

Sample ID: 21I0542-51

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.2	0.53	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:02	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: F-4 (0-2')
Sampled: 9/10/2021 09:38
Sample ID: 21I0542-51
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-4 (2-4') Sampled: 9/10/2021 09:42

Sample ID: 21I0542-52

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2.8	0.51	0.25	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:08	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-4 (2-4') Sampled: 9/10/2021 09:42

Sample ID: 21I0542-52

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	95.9		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-4 (0-2')　Sampled: 9/10/2021 09:50

Sample ID: 21I0542-53

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	6.4	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:15	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-4 (0-2')   Sampled: 9/10/2021 09:50

Sample ID: 21I0542-53

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.9		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: H-4 (2-4')
Sampled: 9/10/2021 09:54
Sample ID: 21I0542-54
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	5.0	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 23:22	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-4 (2-4')   Sampled: 9/10/2021 09:54

Sample ID: 21I0542-54

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-3 (0-2') Sampled: 9/10/2021 10:10

Sample ID: 21I0542-55

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	9.1	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 11:14	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-3 (0-2')   Sampled: 9/10/2021 10:10

Sample ID: 21I0542-55

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-3 (2-4')   Sampled: 9/10/2021 10:14

Sample ID: 21I0542-56

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	5.2	0.56	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 11:21	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: I-3 (2-4')　Sampled: 9/10/2021 10:14

Sample ID: 21I0542-56

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:13	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: J-10 (0-2')
Sampled: 9/10/2021 10:26
Sample ID: 21I0542-57
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	52	0.56	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 11:08	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-10 (0-2')   Sampled: 9/10/2021 10:26

Sample ID: 21I0542-57

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-10 (2-4') Sampled: 9/10/2021 10:30

Sample ID: 21I0542-58

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	6.1	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 11:28	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-10 (2-4') Sampled: 9/10/2021 10:30

Sample ID: 21I0542-58

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: J-11 (0-2')
Sampled: 9/10/2021 10:38
Sample ID: 21I0542-59
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	12	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 11:35	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-11 (0-2')   Sampled: 9/10/2021 10:38

Sample ID: 21I0542-59

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.3		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-11 (2-4')　Sampled: 9/10/2021 10:42

Sample ID: 21I0542-60

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.2	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 11:41	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-11 (2-4') Sampled: 9/10/2021 10:42

Sample ID: 21I0542-60

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.3		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH　　Sample Description:　　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: K-11 (0-2')　　Sampled: 9/10/2021 11:00

Sample ID: 21I0542-61

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	200	0.59	0.29	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:00	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: K-11 (0-2') Sampled: 9/10/2021 11:00

Sample ID: 21I0542-61

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: K-12 (0-2')   Sampled: 9/10/2021 11:26

Sample ID: 21I0542-62

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	420	0.64	0.31	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:07	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: K-12 (0-2')   Sampled: 9/10/2021 11:26

Sample ID: 21I0542-62

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: J-13 (0-2')
Sampled: 9/10/2021 11:32
Sample ID: 21I0542-63
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	420	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:13	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: J-13 (0-2')   Sampled: 9/10/2021 11:32

Sample ID: 21I0542-63

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.4		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-14 (0-2')   Sampled: 9/10/2021 12:27

Sample ID: 21I0542-64

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.4	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:20	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-14 (0-2')
Sampled: 9/10/2021 12:27

Sample ID: 21I0542-64

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.6		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-13 (0-2') Sampled: 9/10/2021 13:20

Sample ID: 21I0542-65

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	16	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:27	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: H-13 (0-2')   Sampled: 9/10/2021 13:20

Sample ID: 21I0542-65

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542
Date Received: 9/10/2021
Field Sample #: F-11 (0-2')
Sampled: 9/10/2021 14:24
Sample ID: 21I0542-66
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	5.7	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:34	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-11 (0-2')   Sampled: 9/10/2021 14:24

Sample ID: 21I0542-66

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.0		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-11 (2-4') Sampled: 9/10/2021 14:28

Sample ID: 21I0542-67

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.2	0.52	0.25	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:40	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-11 (2-4')
Sampled: 9/10/2021 14:28

Sample ID: 21I0542-67

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.9		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-12 (0-2')   Sampled: 9/10/2021 13:45

Sample ID: 21I0542-68

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	320	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:47	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-12 (0-2')　Sampled: 9/10/2021 13:45

Sample ID: 21I0542-68

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.7		% Wt	1		SM 2540G	9/14/21	9/15/21 16:14	CV

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-12 (2-4') Sampled: 9/10/2021 13:52

Sample ID: 21I0542-69

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.8	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/15/21	9/16/21 12:54	MJH

Project Location: 375 Branfield Rd, Portsmouth, NH Sample Description: Work Order: 21I0542

Date Received: 9/10/2021

Field Sample #: F-12 (2-4') Sampled: 9/10/2021 13:52

Sample ID: 21I0542-69

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.2		% Wt	1		SM 2540G	9/14/21	9/15/21 16:15	CV

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I0542-14 [H-2 (0'-2')]	B290171	09/14/21
21I0542-15 [H-2 (2'-4')]	B290171	09/14/21
21I0542-16 [I-1 (0'-2')]	B290171	09/14/21
21I0542-17 [I-1 (2'-4')]	B290171	09/14/21
21I0542-18 [G-3 (0-2')]	B290171	09/14/21
21I0542-19 [G-3 (2-4')]	B290171	09/14/21
21I0542-20 [D-4 (0-2')]	B290171	09/14/21
21I0542-21 [D-4 (2-4')]	B290171	09/14/21
21I0542-22 [C-5 (0-2')]	B290171	09/14/21
21I0542-23 [C-5 (2-4')]	B290171	09/14/21
21I0542-24 [B-6 (0-2')]	B290171	09/14/21
21I0542-25 [E-5 (0-2')]	B290171	09/14/21
21I0542-26 [E-5 (2-4')]	B290171	09/14/21
21I0542-27 [G-5 (0-2')]	B290171	09/14/21
21I0542-28 [G-5 (2-4')]	B290171	09/14/21
21I0542-29 [C-7 (0-2')]	B290171	09/14/21
21I0542-30 [C-7 (2-4')]	B290171	09/14/21
21I0542-31 [D-6 (0-2')]	B290171	09/14/21
21I0542-32 [D-6 (2-4')]	B290171	09/14/21
21I0542-33 [E-7 (0-2')]	B290171	09/14/21
21I0542-34 [E-7 (2-4')]	B290171	09/14/21
21I0542-35 [D-8 (0-2')]	B290171	09/14/21
21I0542-36 [D-8 (2-4')]	B290171	09/14/21
21I0542-37 [D-9 (0-2')]	B290171	09/14/21
21I0542-38 [D-9 (2-4)]	B290171	09/14/21
21I0542-39 [D-10 (0-2')]	B290171	09/14/21
21I0542-40 [D-11 (0-2')]	B290171	09/14/21
21I0542-41 [F-9 (0-2')]	B290171	09/14/21
21I0542-42 [F-9 (2-4')]	B290171	09/14/21
21I0542-43 [E-10 (0-2')]	B290171	09/14/21
21I0542-44 [E-10 (2-4')]	B290171	09/14/21
21I0542-45 [H-6 (0-2')]	B290171	09/14/21
21I0542-46 [H-6 (2-4')]	B290171	09/14/21
21I0542-47 [F-6 (0-2')]	B290171	09/14/21
21I0542-48 [F-6 (2-4')]	B290171	09/14/21
21I0542-49 [J-6 (0-2')]	B290171	09/14/21
21I0542-50 [J-6 (2-4')]	B290171	09/14/21
21I0542-51 [F-4 (0-2')]	B290171	09/14/21
21I0542-52 [F-4 (2-4')]	B290171	09/14/21
21I0542-53 [H-4 (0-2')]	B290171	09/14/21
21I0542-54 [H-4 (2-4')]	B290171	09/14/21
21I0542-55 [I-3 (0-2')]	B290171	09/14/21
21I0542-56 [I-3 (2-4')]	B290171	09/14/21
21I0542-57 [J-10 (0-2')]	B290171	09/14/21
21I0542-58 [J-10 (2-4')]	B290171	09/14/21
21I0542-59 [J-11 (0-2')]	B290171	09/14/21
21I0542-60 [J-11 (2-4')]	B290171	09/14/21
21I0542-61 [K-11 (0-2')]	B290171	09/14/21
21I0542-62 [K-12 (0-2')]	B290171	09/14/21
21I0542-63 [J-13 (0-2')]	B290171	09/14/21
21I0542-64 [H-14 (0-2')]	B290171	09/14/21
21I0542-65 [H-13 (0-2')]	B290171	09/14/21
21I0542-66 [F-11 (0-2')]	B290171	09/14/21
21I0542-67 [F-11 (2-4')]	B290171	09/14/21
21I0542-68 [F-12 (0-2')]	B290171	09/14/21

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I0542-69 [F-12 (2-4')]	B290171	09/14/21

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I0542-01 [C-1 (0'-2')]	B290185	09/14/21
21I0542-02 [B-2 (0'-2')]	B290185	09/14/21
21I0542-03 [A-1 (0'-2)]	B290185	09/14/21
21I0542-04 [B-4 (0'-2')]	B290185	09/14/21
21I0542-05 [C-3 (0'-2')]	B290185	09/14/21
21I0542-06 [C-3 (2'-4')]	B290185	09/14/21
21I0542-07 [D-2 (0'-2')]	B290185	09/14/21
21I0542-08 [D-2 (2'-4')]	B290185	09/14/21
21I0542-09 [E-1 (0'-2')]	B290185	09/14/21
21I0542-10 [F-2 (0'-2')]	B290185	09/14/21
21I0542-11 [F-2 (2'-4')]	B290185	09/14/21
21I0542-12 [G-1 (1'-2')]	B290185	09/14/21
21I0542-13 [G-1 (2'-4')]	B290185	09/14/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0542-55 [I-3 (0-2')]	B290264	1.55	50.0	09/15/21
21I0542-56 [I-3 (2-4')]	B290264	1.52	50.0	09/15/21
21I0542-57 [J-10 (0-2')]	B290264	1.55	50.0	09/15/21
21I0542-58 [J-10 (2-4')]	B290264	1.51	50.0	09/15/21
21I0542-59 [J-11 (0-2')]	B290264	1.52	50.0	09/15/21
21I0542-60 [J-11 (2-4')]	B290264	1.58	50.0	09/15/21
21I0542-61 [K-11 (0-2')]	B290264	1.52	50.0	09/15/21
21I0542-62 [K-12 (0-2')]	B290264	1.52	50.0	09/15/21
21I0542-63 [J-13 (0-2')]	B290264	1.54	50.0	09/15/21
21I0542-64 [H-14 (0-2')]	B290264	1.54	50.0	09/15/21
21I0542-65 [H-13 (0-2')]	B290264	1.53	50.0	09/15/21
21I0542-66 [F-11 (0-2')]	B290264	1.50	50.0	09/15/21
21I0542-67 [F-11 (2-4')]	B290264	1.56	50.0	09/15/21
21I0542-68 [F-12 (0-2')]	B290264	1.55	50.0	09/15/21
21I0542-69 [F-12 (2-4')]	B290264	1.51	50.0	09/15/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0542-19 [G-3 (2-4')]	B290265	1.49	50.0	09/15/21
21I0542-20 [D-4 (0-2')]	B290265	1.53	50.0	09/15/21
21I0542-21 [D-4 (2-4')]	B290265	1.51	50.0	09/15/21
21I0542-22 [C-5 (0-2')]	B290265	1.49	50.0	09/15/21
21I0542-23 [C-5 (2-4')]	B290265	1.50	50.0	09/15/21
21I0542-24 [B-6 (0-2')]	B290265	1.55	50.0	09/15/21
21I0542-25 [E-5 (0-2')]	B290265	1.54	50.0	09/15/21
21I0542-26 [E-5 (2-4')]	B290265	1.51	50.0	09/15/21
21I0542-27 [G-5 (0-2')]	B290265	1.49	50.0	09/15/21
21I0542-28 [G-5 (2-4')]	B290265	1.57	50.0	09/15/21

Sample Extraction Data

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0542-29 [C-7 (0-2')]	B290265	1.53	50.0	09/15/21
21I0542-30 [C-7 (2-4')]	B290265	1.52	50.0	09/15/21
21I0542-31 [D-6 (0-2')]	B290265	1.54	50.0	09/15/21
21I0542-32 [D-6 (2-4')]	B290265	1.48	50.0	09/15/21
21I0542-33 [E-7 (0-2')]	B290265	1.50	50.0	09/15/21
21I0542-34 [E-7 (2-4')]	B290265	1.49	50.0	09/15/21
21I0542-35 [D-8 (0-2')]	B290265	1.54	50.0	09/15/21
21I0542-36 [D-8 (2-4')]	B290265	1.58	50.0	09/15/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0542-37 [D-9 (0-2')]	B290266	1.50	50.0	09/15/21
21I0542-38 [D-9 (2-4)]	B290266	1.52	50.0	09/15/21
21I0542-39 [D-10 (0-2')]	B290266	1.49	50.0	09/15/21
21I0542-40 [D-11 (0-2')]	B290266	1.55	50.0	09/15/21
21I0542-41 [F-9 (0-2')]	B290266	1.52	50.0	09/15/21
21I0542-42 [F-9 (2-4')]	B290266	1.58	50.0	09/15/21
21I0542-43 [E-10 (0-2')]	B290266	1.55	50.0	09/15/21
21I0542-44 [E-10 (2-4')]	B290266	1.52	50.0	09/15/21
21I0542-45 [H-6 (0-2')]	B290266	1.51	50.0	09/15/21
21I0542-46 [H-6 (2-4')]	B290266	1.57	50.0	09/15/21
21I0542-47 [F-6 (0-2')]	B290266	1.51	50.0	09/15/21
21I0542-48 [F-6 (2-4')]	B290266	1.51	50.0	09/15/21
21I0542-49 [J-6 (0-2')]	B290266	1.52	50.0	09/15/21
21I0542-50 [J-6 (2-4')]	B290266	1.51	50.0	09/15/21
21I0542-51 [F-4 (0-2')]	B290266	1.52	50.0	09/15/21
21I0542-52 [F-4 (2-4')]	B290266	1.53	50.0	09/15/21
21I0542-53 [H-4 (0-2')]	B290266	1.53	50.0	09/15/21
21I0542-54 [H-4 (2-4')]	B290266	1.54	50.0	09/15/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0542-01 [C-1 (0'-2')]	B290267	1.53	50.0	09/15/21
21I0542-02 [B-2 (0'-2')]	B290267	1.60	50.0	09/15/21
21I0542-03 [A-1 (0'-2)]	B290267	1.59	50.0	09/15/21
21I0542-04 [B-4 (0'-2')]	B290267	1.54	50.0	09/15/21
21I0542-05 [C-3 (0'-2')]	B290267	1.51	50.0	09/15/21
21I0542-06 [C-3 (2'-4')]	B290267	1.53	50.0	09/15/21
21I0542-07 [D-2 (0'-2')]	B290267	1.54	50.0	09/15/21
21I0542-08 [D-2 (2'-4')]	B290267	1.58	50.0	09/15/21
21I0542-09 [E-1 (0'-2')]	B290267	1.50	50.0	09/15/21
21I0542-10 [F-2 (0'-2')]	B290267	1.49	50.0	09/15/21
21I0542-11 [F-2 (2'-4')]	B290267	1.60	50.0	09/15/21
21I0542-12 [G-1 (1'-2')]	B290267	1.51	50.0	09/15/21
21I0542-13 [G-1 (2'-4')]	B290267	1.52	50.0	09/15/21
21I0542-14 [H-2 (0'-2')]	B290267	1.52	50.0	09/15/21
21I0542-15 [H-2 (2'-4')]	B290267	1.53	50.0	09/15/21
21I0542-16 [I-1 (0'-2')]	B290267	1.50	50.0	09/15/21
21I0542-17 [I-1 (2'-4')]	B290267	1.54	50.0	09/15/21
21I0542-18 [G-3 (0-2')]	B290267	1.50	50.0	09/15/21

Sample Extraction Data

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290264 - SW-846 3050B										
Blank (B290264-BLK1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	ND	0.50	mg/Kg wet							U
LCS (B290264-BS1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	125	1.5	mg/Kg wet	140		89.1	82.9-117.1			
LCS Dup (B290264-BSD1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	122	1.5	mg/Kg wet	140		87.2	82.9-117.1	2.21	30	
Duplicate (B290264-DUP1)	**Source: 21I0542-57**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	65.4	0.57	mg/Kg dry		52.1			22.7	35	
Matrix Spike (B290264-MS1)	**Source: 21I0542-57**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	68.2	0.54	mg/Kg dry	18.0	52.1	89.5	75-125			
Reference (B290264-SRM1) MRL Check				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	0.538	0.50	mg/Kg wet	0.500		108	80-120			
Batch B290265 - SW-846 3050B										
Blank (B290265-BLK1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	ND	0.50	mg/Kg wet							U
LCS (B290265-BS1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	136	1.4	mg/Kg wet	140		96.9	82.9-117.1			
LCS Dup (B290265-BSD1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	133	1.5	mg/Kg wet	140		95.3	82.9-117.1	1.73	30	
Duplicate (B290265-DUP1)	**Source: 21I0542-19**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	40.7	0.62	mg/Kg dry		42.3			3.88	35	
Matrix Spike (B290265-MS1)	**Source: 21I0542-19**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	60.9	0.62	mg/Kg dry	20.6	42.3	90.1	75-125			
Reference (B290265-SRM1) MRL Check				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	0.454	0.50	mg/Kg wet	0.499		91.0	80-120			J
Batch B290266 - SW-846 3050B										
Blank (B290266-BLK1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	ND	0.50	mg/Kg wet							U

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290266 - SW-846 3050B										
LCS (B290266-BS1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	133	1.5	mg/Kg wet	140		95.2	82.9-117.1			
LCS Dup (B290266-BSD1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	128	1.4	mg/Kg wet	140		91.8	82.9-117.1	3.71	30	
Duplicate (B290266-DUP1)	**Source: 21I0542-37**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	428	0.57	mg/Kg dry		296			**36.5** *	35	R-02
Matrix Spike (B290266-MS1)	**Source: 21I0542-37**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	412	0.57	mg/Kg dry	19.0	296	**610** *	75-125			MS-19
Reference (B290266-SRM1) MRL Check				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	0.501	0.49	mg/Kg wet	0.488		103	80-120			
Batch B290267 - SW-846 3050B										
Blank (B290267-BLK1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	ND	0.50	mg/Kg wet							U
LCS (B290267-BS1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	130	1.5	mg/Kg wet	140		93.2	82.9-117.1			
LCS Dup (B290267-BSD1)				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	127	1.5	mg/Kg wet	140		91.0	82.9-117.1	2.36	30	
Duplicate (B290267-DUP1)	**Source: 21I0542-01**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	918	0.55	mg/Kg dry		859			6.70	35	
Matrix Spike (B290267-MS1)	**Source: 21I0542-01**			Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	872	0.56	mg/Kg dry	18.8	859	**69.8** *	75-125			MS-19
Reference (B290267-SRM1) MRL Check				Prepared: 09/15/21 Analyzed: 09/16/21						
Lead	0.461	0.50	mg/Kg wet	0.498		92.7	80-120			J

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290171 - % Solids										
Duplicate (B290171-DUP1)	**Source: 21I0542-25**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	81.0		% Wt		78.4			3.26	5	
Duplicate (B290171-DUP2)	**Source: 21I0542-30**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	81.7		% Wt		81.0			0.857	5	
Duplicate (B290171-DUP3)	**Source: 21I0542-39**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	87.7		% Wt		86.0			2.01	5	
Duplicate (B290171-DUP4)	**Source: 21I0542-38**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	84.1		% Wt		81.8			2.83	5	
Duplicate (B290171-DUP5)	**Source: 21I0542-43**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	82.5		% Wt		81.6			1.19	5	
Duplicate (B290171-DUP6)	**Source: 21I0542-47**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	84.4		% Wt		83.6			1.00	5	
Duplicate (B290171-DUP7)	**Source: 21I0542-48**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	88.8		% Wt		85.6			3.59	5	
Duplicate (B290171-DUP8)	**Source: 21I0542-56**			Prepared: 09/14/21 Analyzed: 09/15/21						
% Solids	88.9		% Wt		88.6			0.349	5	

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
MS-19	Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.
R-02	Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	**Certifications**
SW-846 6010D in Soil	
Lead	CT,NH,NY,AIHA,ME,VA,NC

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2021

21I0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 8

Company Name: Wilcox & Barton, Inc.
Address: 15 Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Rd, Portsmouth, NH
Project Number: BANF0005
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Brussard, C. Montoya

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbrussard, cmontoya
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010 (I)
1	C-1 (0'-2')	9/9/21	8:10	Grab	S	U		1X				X
2	B-2 (0'-2')		8:22	Grab		U		1X				X
3	A-1 (0'-2')		8:40	Grab		U		1X				X
	~~A-3 (0'-2')~~		~~8:52~~	~~Grab~~		~~U~~		~~1X~~				~~X~~
4	B-4 (0'-2')		8:52	Grab		U		1X				X
5	C-3 (0'-2')		8:55	Grab		U		1X				X
6	C-3 (2'-4')		9:05	Grab		U		1X				X
7	D-2 (0'-2')		9:12	Grab		U		1X				X
8	D-2 (2'-4')		9:25	Grab		U		1X				X
9	E-1 (0'-2')	↓	9:40	Grab	↓	U		1X				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS 69
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / [✓ N]
Glassware in freezer? Y / [✓ N]
Prepackaged Cooler? [✓ Y] / N

*Pace Analytical is not responsible for missing samples from prepackaged coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) 9/10/21	Date/Time: 17:00
Received by: (signature) Jon Crothers 9.10.21	Date/Time: 5:00
Relinquished by: (signature) Jon Crothers 9.10.21	Date/Time: 8:00
Received by: (signature) 2.4	Date/Time: 9/10/21 2000
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: (A)

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Lab Comments:
Samples mixed in one cooler put total bottle count (69) on each chain.

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 2 of 8

Company Name: Wilcox & Barton Inc
Address: 1B Commons Dr, Unit 12B, Londonderry, NH
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Rd, Portsmouth, NH
Project Number: BANF0005
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard, C. Montoya

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard, cmontoya
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
												F
10	F-2 (0'-2')	9/9/21	9:50	Grab	S	U		1				X
11 ~~12~~	F-2 (2'-4')		9:58					1				X
12 ~~13~~	G-1 (0'-2')		10:05					1				X
~~13~~	~~G-1 (2'-4')~~		~~10:15~~					~~1~~				~~X~~
13 ~~14~~	G-1 (2'-4')		10:15					1				X
14 ~~15~~	H-2 (0'-2')		10:25					1				X
15 ~~16~~	H-2 (2'-4')		10:30					1				X
16 ~~17~~	I-1 (0'-2')		10:33					1				X
17 ~~18~~	I-1 (2'-4')		10:37					1				X
18 ~~19~~	G-3 (0-2')		10:55					1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS 69
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / [✓ N]
Glassware in freezer? Y / [✓ N]
Prepackaged Cooler? [✓ Y] N
*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature) MSB 9/10/21	Date/Time: 17:00
Received by: (signature) Jon Crofters 9.10.21	Date/Time: 5:00
Relinquished by: (signature) Jon Crofters 9.10.21	Date/Time: 8:00
Received by: (signature) 24 9/10/21	Date/Time: 2000
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NH DES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:
See pg. 1

Table of Contents

21I0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com
CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 3 of 8

Company Name: Wilcox & Barton, Inc
Address: 1B Commons Dr Unit 12B Londonderry
Phone: 603 369 4190
Project Name: BANF0005
Project Location: 375 Banfield Rd, Portsmouth
Project Number: BANF0005
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Montoya, M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard, cmontoya
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010 (² I)
19	G-3 (2-4')	9/9/21	10:59	Grab	S	U		1				X
20	D-4 (0-2')		11:25			U		1				X
21	D-4 (2-4')		11:30			U		1				X
22	C-5 (0-2')		11:35			U		1				X
23	C-5 (2-4')		11:38			U		1				X
24	B-6 (0-2')		11:49			U		1				X
25	E-5 (0-2')		12:06			U		1				X
26	E-5 (2-4')		12:15			U		1				X
27	G-5 (0-2')		12:24			U		1				X
28	G-5 (2-4')			↓	↓	U		1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS 64
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / [✓ N]
Glassware in freezer? Y / [✓ N]
Prepackaged Cooler? [✓ Y] / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) MB 9/10/21	Date/Time: 17:00
Received by: (signature) Jon Crosten 9/10/21	Date/Time: 5:00
Relinquished by: (signature) Jon Crosten 9.10.21	Date/Time: 8:00
Received by: (signature) 2.4 9/10/21	Date/Time: 2000
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: (A)

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:
See pg. 1

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

21I0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 4 of 8

Company Name: Wilcox & Barton, Inc
Address: 1B Commons Dr. unit 12B Londonderry
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Rd Portsmouth
Project Number: BANF0005
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Montoya M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: Wilcox, mbroussard, cmontoya
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
29	C-7 (0-2')	9/9/21	13:22	Grab	S	U		1				X
30	C-7 (2-4')	9/9/21	13:26					1				X
31	D-6 (0-2')	9/9/21	13:36					1				X
32	D-6 (2-4')	9/9/21	13:40					1				X
33	E-7 (0-2')	9/9/21	13:44					1				X
34	E-7 (2-4')	9/9/21	13:48									X
35	D-8 (0-2')	9/9/21	13:53					1				X
36	D-8 (2-4')	9/9/21	13:58					1				X
37	D-9 (0-2')	9/9/21	14:05					1				X
38	D-9 (2-4')	9/9/21	14:09					1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS 69
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / [✓ N]
Glassware in freezer? Y / [✓ N]
Prepackaged Cooler? [✓ Y] / N
*Pace Analytical is not responsible for missing samples from prepackaged coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) MB 9/10/21	Date/Time: 17:00
Received by: (signature) Jon Crofers 9.10.21	Date/Time: 5:00
Relinquished by: (signature) Jon Crofers 9.10.21	Date/Time: 8:00
Received by: (signature) 9/10/21	Date/Time: 2000
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
(A)

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:
See pg. 1

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

2II0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 5 of 8

Company Name: Wilcox & Barton, Inc.
Address: #1B Commons Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth NH
Project Number: BANFOODS
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Marga / M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
												I
39	D-10 (0-2')	9/9/21	14:15	Grab	S	U		1				X
40	D-11 (0-2')	9/9/21	14:30	Grab	S	U		1				X
41	F-9 (0-2')	9/9/21	15:04	Grab	S	U		1				X
42	F-9 (2-4')	9/9/21	15:10	Grab	S	U		1				X
43	E-10 (0-2')	9/10/21	7:32	Grab	S	U		1				X
44	E-10 (2-4')	9/10/21	7:35	Grab	S	U		1				X
45	H-6 (0-2')	9/10/21	8:14	Grab	S	U		1				X
46	H-6 (2-4')	9/10/21	8:17	Grab	S	U		1				X
47	F-6 (0-2')	9/10/21	9:30	Grab	S	U						X
48	F-6 (2-4')	9/10/21	9:34	Grab	S	U		1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS 6 4
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y [✓ N]
Glassware in freezer? Y [✓ N]
Prepackaged Cooler? [✓ Y] N

*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time:
9/10/21	17:00
Received by: (signature) Jon Crofton 9.10.21	5:00
Relinquished by: (signature) Jon Crofters 9.10.21	8:00
Received by: (signature) 24 9/10/21	2000
Relinquished by: (signature)	
Received by: (signature)	
Relinquished by: (signature)	
Received by: (signature)	

Client Comments:

Ⓐ

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:
See page 1

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

21I0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com
CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 6 of 8

Company Name: Wilcox & Barton, Inc.
Address: 418 Commerce Drive, Unit 12B, Londonderry NH
Phone: 603-364-4190
Project Name: BANF0005
Project Location: 375 Banfield Road, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Moreyra / M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED
1 Lead 6010

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
49	J-6 (0-2')	9/10/21	8:55	Grab	S	U		1				X
50	J-6 (2-4')	9/10/21	9:00	Grab	S	U		1				X
51	F-4 (0-2')	9/10/21	9:38	Grab	S	U		1				X
52	F-4 (2-4')	9/10/21	9:42	Grab	S	U		1				X
53	H-4 (0-2')	9/10/21	9:50	Grab	S	U		1				X
54	H-4 (2-4')	9/10/21	9:54	Grab	S	U		1				X
55	I-3 (0-2')	9/10/21	10:10	Grab	S	U		1				X
56	I-3 (2-4')	9/10/21	10:14	Grab	S	U		1				X
57	J-10 (0-2')	9/10/21	10:20	Grab	S	U		1				X
58	J-10 (2-4')	9/10/21	10:30	Grab	S	U		1				X

Relinquished by: (signature) 9/10/21	Date/Time: 17:00
Received by: (signature) Jon Crotters 9.10.21	Date/Time: 5:00
Relinquished by: (signature) Jon Crotters 9.10.21	Date/Time: 8:00
Received by: (signature) 2.4 9/10/21	Date/Time: 2000
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Federal ☐ City ☐
Municipality ☐ 21 J ☐ Brownfield ☐
MWRA ☐ School ☐ MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

² Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS 69
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / [✓ N]
Glassware in freezer? Y / [✓ N]
Prepackaged Cooler? [✓ Y] / N

*Pace Analytical is not responsible for missing samples from prepackaged coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:
See page 1

2I0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 2 of 8

Company Name: Wilcox & Barton, Inc.
Address: #1B Commons Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANFOOOS
Project Location: 375 Banfield Road, Portsmouth NH
Project Number: BANFOOOS
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Mayea / M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
² Preservation Code												I
59	J-11 (0-2')	9/10/21	10:38	Grab	S	U		1				X
60	J-11 (2-4')	9/10/21	10:42	Grab	S	U		1				X
61	K-11 (0-2')	9/10/21	11:00	Grab	S	U		1				X
62	K-12 (0-2')	9/10/21	11:20	Grab	S	U		1				X
63	J-13 (0-2')	9/10/21	11:52	Grab	S	U		1				X
64	H-14 (0-2')	9/10/21	12:27	Grab	S	U		1				X
65	H-13 (0-2')	9/10/21	13:20	Grab	S	U		1				X
66	F-11 (0-2')	9/10/21	14:24	Grab	S	U		1				X
67	F-11 (2-4')	9/10/21	14:28	Grab	S	U		1				X
68	F-12 (0-2')	9/10/21	13:45	Grab	S	U		1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS 65
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / [✓ N]
Glassware in freezer? Y / [✓ N]
Prepackaged Cooler? [✓ Y] / N

*Pace Analytical is not responsible for missing samples from prepackaged coolers

Relinquished by: (signature)	Date/Time:
MGB 9/10/21	17:00
Received by: (signature)	**Date/Time:**
Jon Crotters 9.10.21	5:00
Relinquished by: (signature)	**Date/Time:**
Jon Crotters 8:00	9.10.21
Received by: (signature)	**Date/Time:**
2-4 9/10/21 2000	
Relinquished by: (signature)	**Date/Time:**
Received by: (signature)	**Date/Time:**
Relinquished by: (signature)	**Date/Time:**
Received by: (signature)	**Date/Time:**

Client Comments:
A

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:
See page 1

21I0542

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 8 of 8

Company Name: Wilcox & Barton, Inc.
Address: #1B Commons Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Road, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Margo / M. Brassard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: ~~emons@~~ wwilcox@mbeussad
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	I Lead 6010
69	F-12 (2-4')	9/10/21	13:52	Grab	S	U		1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS 61
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / [✓ N]
Glassware in freezer? Y / [✓ N]
Prepackaged Cooler? [✓ Y] / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) 9/10/21	Date/Time: 17:00
Received by: (signature) Jon Crotteau 9.10.21	Date/Time: 5:00
Relinquished by: (signature) Jon Crotteau 8:00	Date/Time: 91021
Received by: (signature) 2.4	Date/Time: 9/10/21 2000
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:
See page 1

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W+B

Received By Date 9/10/21 Time 2000

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T
By Gun # 3 Actual Temp - 2.4
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? n/a MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid n/a Base n/a

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	64
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

September 24, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Road, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I0945

Enclosed are results of analyses for samples received by the laboratory on September 17, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/24/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0945

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Road, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
B-9 (0-2')	21I0945-01	Soil		SM 2540G SW-846 6010D	
B-9 (2-4')	21I0945-02	Soil		SM 2540G SW-846 6010D	
B-8 (0-2')	21I0945-03	Soil		SM 2540G SW-846 6010D	
B-11 (0-2')	21I0945-04	Soil		SM 2540G SW-846 6010D	
B-11 (2-4')	21I0945-05	Soil		SM 2540G SW-846 6010D	
C-10 (0-2')	21I0945-06	Soil		SM 2540G SW-846 6010D	
C-11 (0-2')	21I0945-07	Soil		SM 2540G SW-846 6010D	
Y-9 (0-2')	21I0945-08	Soil		SM 2540G SW-846 6010D	
X-8 (0-2')	21I0945-09	Soil		SM 2540G SW-846 6010D	
X-12 (0-2')	21I0945-10	Soil		SM 2540G SW-846 6010D	
W-9 (0-2')	21I0945-11	Soil		SM 2540G SW-846 6010D	
W-10 (0-2')	21I0945-12	Soil		SM 2540G SW-846 6010D	
V-8 (0-2')	21I0945-13	Soil		SM 2540G SW-846 6010D	
V-11 (0-2')	21I0945-14	Soil		SM 2540G SW-846 6010D	
V-11 (2'-4')	21I0945-15	Soil		SM 2540G SW-846 6010D	
A-10 (0-2')	21I0945-16	Soil		SM 2540G SW-846 6010D	
A-10 (2'-3')	21I0945-17	Soil		SM 2540G SW-846 6010D	
W-12 (0-2)	21I0945-18	Soil		SM 2540G SW-846 6010D	
W-12 (2-4)	21I0945-19	Soil		SM 2540G SW-846 6010D	
W-10 (2-4')	21I0945-20	Soil		SM 2540G SW-846 6010D	

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/24/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0945

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Road, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
E-11 (0-2')	21I0945-21	Soil		SM 2540G SW-846 6010D	
V-12 (0-2')	21I0945-22	Soil		SM 2540G SW-846 6010D	
X-10 (0-2')	21I0945-23	Soil		SM 2540G SW-846 6010D	
F-13 (0-2')	21I0945-24	Soil		SM 2540G SW-846 6010D	
D-13 (0-2')	21I0945-25	Soil		SM 2540G SW-846 6010D	
E-12 (0-2')	21I0945-26	Soil		SM 2540G SW-846 6010D	
E-13 (0-2')	21I0945-27	Soil		SM 2540G SW-846 6010D	
G-14 (0-2)	21I0945-28	Soil		SM 2540G SW-846 6010D	
H-15 (0-2)	21I0945-29	Soil		SM 2540G SW-846 6010D	
J-14 (0-2')	21I0945-30	Soil		SM 2540G SW-846 6010D	
A-5 (0-2')	21I0945-31	Soil		SM 2540G SW-846 6010D	
A-3 (0-2')	21I0945-32	Soil		SM 2540G SW-846 6010D	
A-7 (0-2')	21I0945-33	Soil		SM 2540G SW-846 6010D	
V-10 (0-2')	21I0945-34	Soil		SM 2540G SW-846 6010D	
W-13 (0-2')	21I0945-35	Soil		SM 2540G SW-846 6010D	
W-11 (0-2')	21I0945-36	Soil		SM 2540G SW-846 6010D	
X-14 (0-2')	21I0945-37	Soil		SM 2540G SW-846 6010D	
Y-13 (0-2')	21I0945-38	Soil		SM 2540G SW-846 6010D	
Z-12 (0-2')	21I0945-39	Soil		SM 2540G SW-846 6010D	
Z-10 (0-2')	21I0945-40	Soil		SM 2540G SW-846 6010D	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/24/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0945

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Road, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
I-5 (0-2')	21I0945-41	Soil		SM 2540G SW-846 6010D	
I-5 (2-4')	21I0945-42	Soil		SM 2540G SW-846 6010D	
E-14 (0-2')	21I0945-43	Soil		SM 2540G SW-846 6010D	
F-15 (0-2')	21I0945-44	Soil		SM 2540G SW-846 6010D	
K-15 (0-2')	21I0945-45	Soil		SM 2540G SW-846 6010D	
Y-11 (0-2)	21I0945-46	Soil		SM 2540G SW-846 6010D	

Table of Contents

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SM 2540G

Qualifications:

R-02

Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.

Analyte & Samples(s) Qualified:

% Solids
21I0945-46[Y-11 (0-2)], B290609-DUP2

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-9 (0-2') Sampled: 9/16/2021 08:15

Sample ID: 21I0945-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2400	0.81	0.39	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 22:17	QNW

Project Location: 375 Banfield Road, Portsmouth, N　Sample Description:　Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-9 (0-2')　Sampled: 9/16/2021 08:15

Sample ID: 21I0945-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	58.5		% Wt	1		SM 2540G	9/20/21	9/22/21 13:23	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-9 (2-4') Sampled: 9/16/2021 08:30

Sample ID: 21I0945-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	9.2	0.60	0.29	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 22:22	QNW

Project Location: 375 Banfield Road, Portsmouth, N　　Sample Description:　　Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-9 (2-4')　　Sampled: 9/16/2021 08:30

Sample ID: 21I0945-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.9		% Wt	1		SM 2540G	9/20/21	9/22/21 13:23	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-8 (0-2') Sampled: 9/16/2021 08:35

Sample ID: 21I0945-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	850	0.68	0.33	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 22:40	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-8 (0-2') Sampled: 9/16/2021 08:35

Sample ID: 21I0945-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	73.3		% Wt	1		SM 2540G	9/20/21	9/22/21 13:23	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-11 (0-2') Sampled: 9/16/2021 08:55

Sample ID: 21I0945-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2500	0.92	0.45	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 22:45	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-11 (0-2') Sampled: 9/16/2021 08:55

Sample ID: 21I0945-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	51.9		% Wt	1		SM 2540G	9/20/21	9/22/21 13:23	CV

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-11 (2-4')
Sampled: 9/16/2021 09:00

Sample ID: 21I0945-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7600	7.1	3.4	mg/Kg dry	10		SW-846 6010D	9/21/21	9/24/21 14:39	MJH

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: B-11 (2-4') Sampled: 9/16/2021 09:00

Sample ID: 21I0945-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	67.4		% Wt	1		SM 2540G	9/20/21	9/22/21 13:23	CV

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: C-10 (0-2')
Sampled: 9/16/2021 08:50

Sample ID: 21I0945-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	670	0.67	0.33	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 22:57	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: C-10 (0-2') Sampled: 9/16/2021 08:50

Sample ID: 21I0945-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	73.8		% Wt	1		SM 2540G	9/20/21	9/22/21 13:23	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: C-11 (0-2')   Sampled: 9/16/2021 08:48

Sample ID: 21I0945-07

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	1000	0.63	0.31	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 23:03	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: C-11 (0-2') Sampled: 9/16/2021 08:48

Sample ID: 21I0945-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.5		% Wt	1		SM 2540G	9/20/21	9/22/21 13:23	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Y-9 (0-2') Sampled: 9/16/2021 10:35

Sample ID: 21I0945-08

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	880	1.0	0.50	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 23:09	QNW

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Y-9 (0-2')
Sampled: 9/16/2021 10:35

Sample ID: 21I0945-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	48.3		% Wt	1		SM 2540G	9/20/21	9/22/21 13:24	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-8 (0-2') Sampled: 9/16/2021 10:10

Sample ID: 21I0945-09

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	1800	0.83	0.40	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 23:14	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-8 (0-2')   Sampled: 9/16/2021 10:10

Sample ID: 21I0945-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	58.3		% Wt	1		SM 2540G	9/20/21	9/22/21 13:24	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-12 (0-2') Sampled: 9/16/2021 10:38

Sample ID: 21I0945-10

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Lead	4500	0.76	0.37	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 23:20	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-12 (0-2') Sampled: 9/16/2021 10:38

Sample ID: 21I0945-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	63.9		% Wt	1		SM 2540G	9/20/21	9/22/21 13:24	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-9 (0-2') Sampled: 9/16/2021 09:58

Sample ID: 21I0945-11

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	3200	0.64	0.31	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 17:07	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-9 (0-2')   Sampled: 9/16/2021 09:58

Sample ID: 21I0945-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.3		% Wt	1		SM 2540G	9/20/21	9/22/21 13:24	CV

Project Location: 375 Banfield Road, Portsmouth, N　Sample Description:　Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-10 (0-2')　Sampled: 9/16/2021 09:40

Sample ID: 21I0945-12

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	9100	8.0	3.9	mg/Kg dry	10		SW-846 6010D	9/21/21	9/24/21 12:17	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-10 (0-2') Sampled: 9/16/2021 09:40

Sample ID: 21I0945-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	59.5		% Wt	1		SM 2540G	9/20/21	9/22/21 13:24	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-8 (0-2')   Sampled: 9/16/2021 09:55

Sample ID: 21I0945-13

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	1500	0.64	0.31	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 17:32	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-8 (0-2')   Sampled: 9/16/2021 09:55

Sample ID: 21I0945-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.4		% Wt	1		SM 2540G	9/20/21	9/22/21 13:24	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-11 (0-2') Sampled: 9/16/2021 09:30

Sample ID: 21I0945-14

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	4300	0.83	0.40	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 17:39	QNW

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945
Date Received: 9/17/2021
Field Sample #: V-11 (0-2')
Sampled: 9/16/2021 09:30
Sample ID: 21I0945-14
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	58.1		% Wt	1		SM 2540G	9/20/21	9/22/21 13:24	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-11 (2'-4') Sampled: 9/16/2021 09:32

Sample ID: 21I0945-15

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	680	0.69	0.34	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 17:46	QNW

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-11 (2'-4')
Sampled: 9/16/2021 09:32

Sample ID: 21I0945-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	72.0		% Wt	1		SM 2540G	9/20/21	9/22/21 13:25	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-10 (0-2')   Sampled: 9/16/2021 09:05

Sample ID: 21I0945-16

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2400	0.73	0.36	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 17:53	QNW

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945
Date Received: 9/17/2021
Field Sample #: A-10 (0-2')
Sampled: 9/16/2021 09:05
Sample ID: 21I0945-16
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	64.2		% Wt	1		SM 2540G	9/20/21	9/22/21 13:25	CV

Project Location: 375 Banfield Road, Portsmouth, N	Sample Description:	Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-10 (2'-3')	Sampled: 9/16/2021 09:10

Sample ID: 21I0945-17

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2100	0.78	0.38	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 17:59	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-10 (2'-3') Sampled: 9/16/2021 09:10

Sample ID: 21I0945-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	61.1		% Wt	1		SM 2540G	9/20/21	9/22/21 13:25	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-12 (0-2) Sampled: 9/16/2021 11:39

Sample ID: 21I0945-18

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2700	0.72	0.35	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 18:06	QNW

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945
Date Received: 9/17/2021
Field Sample #: W-12 (0-2)
Sampled: 9/16/2021 11:39
Sample ID: 21I0945-18
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	65.7		% Wt	1		SM 2540G	9/20/21	9/22/21 13:25	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-12 (2-4) Sampled: 9/16/2021 11:41

Sample ID: 21I0945-19

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	340	0.72	0.35	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 18:13	QNW

Project Location: 375 Banfield Road, Portsmouth, N	Sample Description:	Work Order: 21I0945
Date Received: 9/17/2021		
Field Sample #: W-12 (2-4)	Sampled: 9/16/2021 11:41	
Sample ID: 21I0945-19		
Sample Matrix: Soil		

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	65.9		% Wt	1		SM 2540G	9/20/21	9/22/21 13:25	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-10 (2-4') Sampled: 9/16/2021 11:50

Sample ID: 21I0945-20

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2700	0.71	0.35	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 18:20	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-10 (2-4')   Sampled: 9/16/2021 11:50

Sample ID: 21I0945-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	66.5		% Wt	1		SM 2540G	9/20/21	9/22/21 13:25	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-11 (0-2') Sampled: 9/16/2021 13:08

Sample ID: 21I0945-21

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	5.1	0.53	0.26	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 17:00	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-11 (0-2') Sampled: 9/16/2021 13:08

Sample ID: 21I0945-21

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.7		% Wt	1		SM 2540G	9/20/21	9/22/21 13:26	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-12 (0-2')   Sampled: 9/16/2021 12:50

Sample ID: 21I0945-22

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Lead	2800	0.66	0.32	mg/Kg dry	1		SW-846 6010D	9/21/21	9/24/21 12:22	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-12 (0-2')   Sampled: 9/16/2021 12:50

Sample ID: 21I0945-22

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	74.1		% Wt	1		SM 2540G	9/20/21	9/22/21 13:26	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-10 (0-2') Sampled: 9/16/2021 12:48

Sample ID: 21I0945-23

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	3900	0.92	0.45	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 18:33	QNW

Project Location: 375 Banfield Road, Portsmouth, N	Sample Description:	Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-10 (0-2')	Sampled: 9/16/2021 12:48

Sample ID: 21I0945-23

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	53.0		% Wt	1		SM 2540G	9/20/21	9/22/21 13:26	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: F-13 (0-2') Sampled: 9/16/2021 13:36

Sample ID: 21I0945-24

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	150	0.67	0.32	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 18:51	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: F-13 (0-2') Sampled: 9/16/2021 13:36

Sample ID: 21I0945-24

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	74.5		% Wt	1		SM 2540G	9/20/21	9/22/21 13:26	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: D-13 (0-2') Sampled: 9/16/2021 13:58

Sample ID: 21I0945-25

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2200	0.56	0.27	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 18:58	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: D-13 (0-2') Sampled: 9/16/2021 13:58

Sample ID: 21I0945-25

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.1		% Wt	1		SM 2540G	9/20/21	9/22/21 13:26	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-12 (0-2')   Sampled: 9/16/2021 13:55

Sample ID: 21I0945-26

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	27	0.61	0.30	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 19:05	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-12 (0-2') Sampled: 9/16/2021 13:55

Sample ID: 21I0945-26

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.9		% Wt	1		SM 2540G	9/20/21	9/22/21 13:27	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-13 (0-2') Sampled: 9/16/2021 13:49

Sample ID: 21I0945-27

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	36	0.56	0.27	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 19:12	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-13 (0-2') Sampled: 9/16/2021 13:49

Sample ID: 21I0945-27

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.5		% Wt	1		SM 2540G	9/20/21	9/22/21 13:27	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: G-14 (0-2) Sampled: 9/16/2021 14:25

Sample ID: 21I0945-28

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	18	0.57	0.28	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 19:18	QNW

Project Location: 375 Banfield Road, Portsmouth, N　Sample Description:　Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: G-14 (0-2)　Sampled: 9/16/2021 14:25

Sample ID: 21I0945-28

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.3		% Wt	1		SM 2540G	9/20/21	9/22/21 13:27	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: H-15 (0-2) Sampled: 9/16/2021 14:28

Sample ID: 21I0945-29

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	150	0.61	0.30	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 14:03	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: H-15 (0-2)   Sampled: 9/16/2021 14:28

Sample ID: 21I0945-29

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	79.6		% Wt	1		SM 2540G	9/20/21	9/22/21 13:27	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: J-14 (0-2') Sampled: 9/16/2021 14:40

Sample ID: 21I0945-30

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	130	0.66	0.32	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 14:10	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: J-14 (0-2')   Sampled: 9/16/2021 14:40

Sample ID: 21I0945-30

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	75.4		% Wt	1		SM 2540G	9/20/21	9/22/21 13:28	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-5 (0-2') Sampled: 9/17/2021 08:20

Sample ID: 21I0945-31

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Lead	180	0.57	0.27	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 13:56	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-5 (0-2') Sampled: 9/17/2021 08:20

Sample ID: 21I0945-31

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.9		% Wt	1		SM 2540G	9/20/21	9/22/21 13:28	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-3 (0-2')   Sampled: 9/17/2021 08:10

Sample ID: 21I0945-32

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	52	0.58	0.28	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 14:17	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-3 (0-2') Sampled: 9/17/2021 08:10

Sample ID: 21I0945-32

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.4		% Wt	1		SM 2540G	9/20/21	9/22/21 13:29	CV

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-7 (0-2')
Sampled: 9/17/2021 08:30

Sample ID: 21I0945-33

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	2500	0.66	0.32	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 14:24	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: A-7 (0-2') Sampled: 9/17/2021 08:30

Sample ID: 21I0945-33

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	71.7		% Wt	1		SM 2540G	9/20/21	9/22/21 13:29	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-10 (0-2') Sampled: 9/17/2021 08:50

Sample ID: 21I0945-34

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Lead	2900	0.70	0.34	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 14:30	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: V-10 (0-2') Sampled: 9/17/2021 08:50

Sample ID: 21I0945-34

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	68.0		% Wt	1		SM 2540G	9/20/21	9/22/21 13:29	CV

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-13 (0-2')
Sampled: 9/17/2021 09:20

Sample ID: 21I0945-35

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	3500	0.74	0.36	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 14:37	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-13 (0-2') Sampled: 9/17/2021 09:20

Sample ID: 21I0945-35

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	67.3		% Wt	1		SM 2540G	9/20/21	9/22/21 13:29	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-11 (0-2') Sampled: 9/17/2021 09:10

Sample ID: 21I0945-36

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Lead	2600	0.73	0.36	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 14:44	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: W-11 (0-2') Sampled: 9/17/2021 09:10

Sample ID: 21I0945-36

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	67.5		% Wt	1		SM 2540G	9/20/21	9/22/21 13:29	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-14 (0-2')   Sampled: 9/17/2021 09:28

Sample ID: 21I0945-37

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	3800	0.99	0.48	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 15:02	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: X-14 (0-2') Sampled: 9/17/2021 09:28

Sample ID: 21I0945-37

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	50.0		% Wt	1		SM 2540G	9/20/21	9/22/21 13:29	CV

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945
Date Received: 9/17/2021
Field Sample #: Y-13 (0-2')
Sampled: 9/17/2021 09:45
Sample ID: 21I0945-38
Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	12000	12	5.9	mg/Kg dry	10		SW-846 6010D	9/21/21	9/24/21 12:34	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Y-13 (0-2')   Sampled: 9/17/2021 09:45

Sample ID: 21I0945-38

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	40.4		% Wt	1		SM 2540G	9/20/21	9/22/21 13:30	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Z-12 (0-2') Sampled: 9/17/2021 10:00

Sample ID: 21I0945-39

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	3200	1.4	0.70	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 15:16	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Z-12 (0-2') Sampled: 9/17/2021 10:00

Sample ID: 21I0945-39

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	33.7		% Wt	1		SM 2540G	9/20/21	9/22/21 13:30	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Z-10 (0-2') Sampled: 9/17/2021 10:20

Sample ID: 21I0945-40

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	20000	16	7.6	mg/Kg dry	10		SW-846 6010D	9/21/21	9/24/21 12:38	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Z-10 (0-2') Sampled: 9/17/2021 10:20

Sample ID: 21I0945-40

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	30.9		% Wt	1		SM 2540G	9/20/21	9/22/21 13:30	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: I-5 (0-2') Sampled: 9/17/2021 11:20

Sample ID: 21I0945-41

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	97	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 15:30	QNW

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: I-5 (0-2')
Sampled: 9/17/2021 11:20

Sample ID: 21I0945-41

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.7		% Wt	1		SM 2540G	9/20/21	9/22/21 13:30	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: I-5 (2-4') Sampled: 9/17/2021 11:30

Sample ID: 21I0945-42

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	5.6	0.54	0.26	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 15:36	QNW

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: I-5 (2-4')   Sampled: 9/17/2021 11:30

Sample ID: 21I0945-42

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.7		% Wt	1		SM 2540G	9/20/21	9/22/21 13:30	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-14 (0-2') Sampled: 9/17/2021 12:45

Sample ID: 21I0945-43

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Lead	8.6	0.55	0.27	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 15:43	QNW

Project Location: 375 Banfield Road, Portsmouth, N	Sample Description:	Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: E-14 (0-2')	Sampled: 9/17/2021 12:45

Sample ID: 21I0945-43

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.4		% Wt	1		SM 2540G	9/20/21	9/22/21 13:30	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: F-15 (0-2') Sampled: 9/17/2021 13:00

Sample ID: 21I0945-44

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	480	0.63	0.30	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 15:50	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: F-15 (0-2') Sampled: 9/17/2021 13:00

Sample ID: 21I0945-44

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.0		% Wt	1		SM 2540G	9/20/21	9/22/21 13:31	CV

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: K-15 (0-2') Sampled: 9/17/2021 13:10

Sample ID: 21I0945-45

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	180	0.67	0.33	mg/Kg dry	1		SW-846 6010D	9/21/21	9/23/21 15:57	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: K-15 (0-2') Sampled: 9/17/2021 13:10

Sample ID: 21I0945-45

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	71.6		% Wt	1		SM 2540G	9/20/21	9/22/21 13:31	CV

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Y-11 (0-2)   Sampled: 9/17/2021 10:35

Sample ID: 21I0945-46

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	26000	8.1	4.0	mg/Kg dry	10		SW-846 6010D	9/21/21	9/24/21 12:43	QNW

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21I0945

Date Received: 9/17/2021

Field Sample #: Y-11 (0-2) Sampled: 9/17/2021 10:35

Sample ID: 21I0945-46

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	59.9		% Wt	1	R-02	SM 2540G	9/20/21	9/22/21 13:31	CV

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I0945-01 [B-9 (0-2')]	B290609	09/20/21
21I0945-02 [B-9 (2-4')]	B290609	09/20/21
21I0945-03 [B-8 (0-2')]	B290609	09/20/21
21I0945-04 [B-11 (0-2')]	B290609	09/20/21
21I0945-05 [B-11 (2-4')]	B290609	09/20/21
21I0945-06 [C-10 (0-2')]	B290609	09/20/21
21I0945-07 [C-11 (0-2')]	B290609	09/20/21
21I0945-08 [Y-9 (0-2')]	B290609	09/20/21
21I0945-09 [X-8 (0-2')]	B290609	09/20/21
21I0945-10 [X-12 (0-2')]	B290609	09/20/21
21I0945-11 [W-9 (0-2')]	B290609	09/20/21
21I0945-12 [W-10 (0-2')]	B290609	09/20/21
21I0945-13 [V-8 (0-2')]	B290609	09/20/21
21I0945-14 [V-11 (0-2')]	B290609	09/20/21
21I0945-15 [V-11 (2'-4')]	B290609	09/20/21
21I0945-16 [A-10 (0-2')]	B290609	09/20/21
21I0945-17 [A-10 (2'-3')]	B290609	09/20/21
21I0945-18 [W-12 (0-2)]	B290609	09/20/21
21I0945-19 [W-12 (2-4)]	B290609	09/20/21
21I0945-20 [W-10 (2-4')]	B290609	09/20/21
21I0945-21 [E-11 (0-2')]	B290609	09/20/21
21I0945-22 [V-12 (0-2')]	B290609	09/20/21
21I0945-23 [X-10 (0-2')]	B290609	09/20/21
21I0945-24 [F-13 (0-2')]	B290609	09/20/21
21I0945-25 [D-13 (0-2')]	B290609	09/20/21
21I0945-26 [E-12 (0-2')]	B290609	09/20/21
21I0945-27 [E-13 (0-2')]	B290609	09/20/21
21I0945-28 [G-14 (0-2)]	B290609	09/20/21
21I0945-29 [H-15 (0-2)]	B290609	09/20/21
21I0945-30 [J-14 (0-2')]	B290609	09/20/21
21I0945-31 [A-5 (0-2')]	B290609	09/20/21
21I0945-32 [A-3 (0-2')]	B290609	09/20/21
21I0945-33 [A-7 (0-2')]	B290609	09/20/21
21I0945-34 [V-10 (0-2')]	B290609	09/20/21
21I0945-35 [W-13 (0-2')]	B290609	09/20/21
21I0945-36 [W-11 (0-2')]	B290609	09/20/21
21I0945-37 [X-14 (0-2')]	B290609	09/20/21
21I0945-38 [Y-13 (0-2')]	B290609	09/20/21
21I0945-39 [Z-12 (0-2')]	B290609	09/20/21
21I0945-40 [Z-10 (0-2')]	B290609	09/20/21
21I0945-41 [I-5 (0-2')]	B290609	09/20/21
21I0945-42 [I-5 (2-4')]	B290609	09/20/21
21I0945-43 [E-14 (0-2')]	B290609	09/20/21
21I0945-44 [F-15 (0-2')]	B290609	09/20/21
21I0945-45 [K-15 (0-2')]	B290609	09/20/21
21I0945-46 [Y-11 (0-2)]	B290609	09/20/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0945-29 [H-15 (0-2)]	B290706	1.55	50.0	09/21/21
21I0945-30 [J-14 (0-2')]	B290706	1.50	50.0	09/21/21
21I0945-31 [A-5 (0-2')]	B290706	1.53	50.0	09/21/21
21I0945-32 [A-3 (0-2')]	B290706	1.50	50.0	09/21/21

Sample Extraction Data

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0945-33 [A-7 (0-2')]	B290706	1.58	50.0	09/21/21
21I0945-34 [V-10 (0-2')]	B290706	1.58	50.0	09/21/21
21I0945-35 [W-13 (0-2')]	B290706	1.51	50.0	09/21/21
21I0945-36 [W-11 (0-2')]	B290706	1.52	50.0	09/21/21
21I0945-37 [X-14 (0-2')]	B290706	1.51	50.0	09/21/21
21I0945-38 [Y-13 (0-2')]	B290706	1.53	50.0	09/21/21
21I0945-39 [Z-12 (0-2')]	B290706	1.54	50.0	09/21/21
21I0945-40 [Z-10 (0-2')]	B290706	1.55	50.0	09/21/21
21I0945-41 [I-5 (0-2')]	B290706	1.60	50.0	09/21/21
21I0945-42 [I-5 (2-4')]	B290706	1.57	50.0	09/21/21
21I0945-43 [E-14 (0-2')]	B290706	1.54	50.0	09/21/21
21I0945-44 [F-15 (0-2')]	B290706	1.58	50.0	09/21/21
21I0945-45 [K-15 (0-2')]	B290706	1.56	50.0	09/21/21
21I0945-46 [Y-11 (0-2)]	B290706	1.54	50.0	09/21/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0945-11 [W-9 (0-2')]	B290707	1.53	50.0	09/21/21
21I0945-12 [W-10 (0-2')]	B290707	1.58	50.0	09/21/21
21I0945-13 [V-8 (0-2')]	B290707	1.50	50.0	09/21/21
21I0945-14 [V-11 (0-2')]	B290707	1.56	50.0	09/21/21
21I0945-15 [V-11 (2'-4')]	B290707	1.50	50.0	09/21/21
21I0945-16 [A-10 (0-2')]	B290707	1.60	50.0	09/21/21
21I0945-17 [A-10 (2'-3')]	B290707	1.58	50.0	09/21/21
21I0945-18 [W-12 (0-2)]	B290707	1.59	50.0	09/21/21
21I0945-19 [W-12 (2-4)]	B290707	1.57	50.0	09/21/21
21I0945-20 [W-10 (2-4')]	B290707	1.58	50.0	09/21/21
21I0945-21 [E-11 (0-2')]	B290707	1.54	50.0	09/21/21
21I0945-22 [V-12 (0-2')]	B290707	1.54	50.0	09/21/21
21I0945-23 [X-10 (0-2')]	B290707	1.53	50.0	09/21/21
21I0945-24 [F-13 (0-2')]	B290707	1.51	50.0	09/21/21
21I0945-25 [D-13 (0-2')]	B290707	1.54	50.0	09/21/21
21I0945-26 [E-12 (0-2')]	B290707	1.51	50.0	09/21/21
21I0945-27 [E-13 (0-2')]	B290707	1.54	50.0	09/21/21
21I0945-28 [G-14 (0-2)]	B290707	1.52	50.0	09/21/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0945-01 [B-9 (0-2')]	B290732	1.59	50.0	09/21/21
21I0945-02 [B-9 (2-4')]	B290732	1.51	50.0	09/21/21
21I0945-03 [B-8 (0-2')]	B290732	1.51	50.0	09/21/21
21I0945-04 [B-11 (0-2')]	B290732	1.56	50.0	09/21/21
21I0945-05 [B-11 (2-4')]	B290732	1.57	50.0	09/21/21
21I0945-06 [C-10 (0-2')]	B290732	1.52	50.0	09/21/21
21I0945-07 [C-11 (0-2')]	B290732	1.54	50.0	09/21/21
21I0945-08 [Y-9 (0-2')]	B290732	1.52	50.0	09/21/21
21I0945-09 [X-8 (0-2')]	B290732	1.55	50.0	09/21/21
21I0945-10 [X-12 (0-2')]	B290732	1.55	50.0	09/21/21

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290706 - SW-846 3050B										
Blank (B290706-BLK1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	ND	0.50	mg/Kg wet							U
LCS (B290706-BS1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	121	1.3	mg/Kg wet	140		86.7	82.9-117.1			
LCS Dup (B290706-BSD1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	128	1.4	mg/Kg wet	140		91.1	82.9-117.1	4.94	30	
Duplicate (B290706-DUP1)	**Source: 21I0945-31**			Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	188	0.55	mg/Kg dry		184			2.12	35	
Matrix Spike (B290706-MS1)	**Source: 21I0945-31**			Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	202	0.55	mg/Kg dry	18.4	184	98.8	75-125			
Reference (B290706-SRM1) MRL Check				Prepared: 09/21/21 Analyzed: 09/24/21						
Lead	0.540	0.49	mg/Kg wet	0.487		111	80-120			
Batch B290707 - SW-846 3050B										
Blank (B290707-BLK1)				Prepared: 09/21/21 Analyzed: 09/24/21						
Lead	ND	0.50	mg/Kg wet							U
LCS (B290707-BS1)				Prepared: 09/21/21 Analyzed: 09/24/21						
Lead	127	1.5	mg/Kg wet	140		91.0	82.9-117.1			
LCS Dup (B290707-BSD1)				Prepared: 09/21/21 Analyzed: 09/24/21						
Lead	129	1.5	mg/Kg wet	140		92.1	82.9-117.1	1.18	30	
Duplicate (B290707-DUP1)	**Source: 21I0945-21**			Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	6.00	0.54	mg/Kg dry		5.09			16.4	35	
Matrix Spike (B290707-MS1)	**Source: 21I0945-21**			Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	20.9	0.54	mg/Kg dry	18.1	5.09	87.2	75-125			
Reference (B290707-SRM1) MRL Check				Prepared: 09/21/21 Analyzed: 09/24/21						
Lead	0.438	0.50	mg/Kg wet	0.497		88.0	80-120			J
Batch B290732 - SW-846 3050B										
Blank (B290732-BLK1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	ND	0.49	mg/Kg wet							U

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290732 - SW-846 3050B										
LCS (B290732-BS1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	121	1.5	mg/Kg wet	140		86.4	82.9-117.1			
LCS Dup (B290732-BSD1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	120	1.5	mg/Kg wet	140		85.5	82.9-117.1	1.08	30	
Reference (B290732-SRM1) MRL Check				Prepared: 09/21/21 Analyzed: 09/23/21						
Lead	0.436	0.50	mg/Kg wet	0.495		88.0	80-120			J

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290609 - % Solids										
Duplicate (B290609-DUP1)	**Source: 21I0945-45**			Prepared: 09/20/21 Analyzed: 09/22/21						
% Solids	69.6		% Wt		71.6			2.77	5	
Duplicate (B290609-DUP2)	**Source: 21I0945-46**			Prepared: 09/20/21 Analyzed: 09/22/21						
% Solids	65.3		% Wt		59.9			**8.60** *	5	R-02

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
R-02	Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010D in Soil	
Lead	CT,NH,NY,AIHA,ME,VA,NC

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2021

21I0945

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 5

Company Name: Wilcox & Barton, Inc.
Address: #1B Commons Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Road, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Montage

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

² Preservation Code: I

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
1	B-9 (0-2')	9/16/21	8:15	Grab	S	U		1				X
2	B-9 (2-4')	9/16/21	8:30	Grab	S	U		1				X
3	B-8 (0-2')	9/16/21	8:35	Grab	S	U		1				X
4	B-11 (0-2')	9/16/21	8:55	Grab	S	U		1				X
5	B-11 (2-4')	9/16/21	9:00	Grab	S	U		1				X
6	C-10 (0-2')	9/16/21	8:50	Grab	S	U		1				X
7	C-9 (0-2')	9/16/21	8:48	Grab	S	U		1				X
8	Y-9 (0-2')	9/16/21	10:35	Grab	S	U		1				X
9	X-8 (0-2')	9/16/21	10:10	Grab	S	U		1				X
10	X-12 (0-2')	9/16/21	10:38	Grab	S	U		1				X

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepackaged coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) 9/17/21	Date/Time: 14:15
Received by: (signature) 9/17/21	Date/Time: 1415
Relinquished by: (signature) 9/17/21	Date/Time: 1745
Received by: (signature) 2.9, 59 9/17/21	Date/Time: 1745
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I0945

Pace Analytical®

http://www.pacelabs.com

Doc # 381 Rev 5_07/13/2021

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Page 2 of 5

Company Name: Wilcox & Barton, Inc.
Address: #1B Commerce Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth NH
Project Number: BANFoods
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Montage

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
												I
11	W-~~8~~9 (0-2')	9:58		Grab	S	U		1				X
12	W-10 (0-2')	9:40		Grab	S	U		1				X
13	V-8 (0-2')	9:55		Grab	S	U		1				X
14	V-11 (0-2')	9:30		Grab	S	U		1				X
15	V-11 (2'-4')	9:32		Grab	S	U		1				X
16	A-10 (0-2')	9:05		Grab	S	U		1				X
17	A-10 (2'-3')	9:10		Grab	S	U		1				X
18	~~B-8 (0-2')~~ W-12 (0-2)	11:39		Grab	S	U		1				X
19	W-12 (2-4)	11:41		Grab	S	U		1				X
20	W-10 (2-4')	11:50		Grab	S	U		1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature) 9/17/21	Date/Time: 14:15
Received by: (signature) 9/17/21	Date/Time: 1415
Relinquished by: (signature) 9/17/21	Date/Time: 1745
Received by: (signature) 2.9, 5.9 9/17/21	Date/Time: 1745
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I0945

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 3 of 5

Company Name: Wilcox & Barton, Inc.
Address: #1B Commons Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Road, Portsmouth NH
Project Number:
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Montgo

Requested Turnaround Time

7-Day ☐	10-Day ☐	PFAS 10-Day (std) ☐	Due Date: 5 day

Rush-Approval Required

1-Day ☐	3-Day ☐
2-Day ☐	4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010 (I)
21	E-11 (0-2')	13:08		Grab	S	U		1				X
	~~W-12 (0-2')~~	~~11:39~~		~~Grab~~	~~S~~	~~U~~		~~1~~				~~X~~
	~~W-12 (2-4')~~	~~11:41~~		~~Grab~~	~~S~~	~~U~~		~~1~~				~~X~~
22	V-12 (0-2')	12:50		Grab	S	U		1				X
23	X-10 (0-2')	12:48		Grab	S	U		1				X
24	F-13 (0-2')	13:36		Grab	S	U		1				X
25	D-13 (0-2')	13:58		Grab	S	U		1				X
26	E-11 (0-2')	13:08		Grab	S	U		1				X
26 Ⓐ 27	E-12 (0-2')	13:55		Grab	S	U		1				X
27 28	E-13 (0-2')	13:49		Grab	S	U		1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) 9/17/21	Date/Time: 14:15
Received by: (signature) 9/17/21	Date/Time: 1415
Relinquished by: (signature) 9/17/21	Date/Time: 1745
Received by: (signature) 2.9, 5.9	Date/Time: 9/17/21 1745
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity

Government ☐	Municipality ☐	MWRA ☐	WRTA ☐
Federal ☐	21 J ☐	School ☐	
City ☐	Brownfield ☐	MBTA ☐	

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Comments:

21I0945

Pace Analytical® Phone: 413-525-2332 Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 4 of 5

Company Name: Wilcox & Barton
Address: #1B commons Drive, unit 12B
Phone: 603 369 4190 Londonderry NH
Project Name: BANF0005
Project Location: 375 Banfield Rd Portsmouth
Project Number:
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Montoya

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: NWilcox, CMontoya, mbroussard
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

² Preservation Code: I

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010
28 29	G-14 (0-2)	14:25	9/16/21	Grab	S	U		1				X
29 30	H-15 (0-2)	14:28	↓	↓	↓	↓		1				X
30 31	J-14 (0-2')	14:40	↓					1				X
31 32	A-5 (0-2')	8:20	9/17/21					1				X
32 33	A-3 (0-2')	8:10	9/17/21					1				X
33 34	A-7 (0-2')	8:30	9/17/21					1				X
34 35	V-10 (0-2')	8:50	9/17/21					1				X
35 36	W-13 (0-2')	9:20	9/17/21					1				X
36 37	W-11 (0-2')	9:10	9/17/21					1				X
37 38	X-14 (0-2')	9:24	9/17/21	↓	↓	↓		1				

Relinquished / Received	Date/Time
Relinquished by: (signature) 9/17/21	14:15
Received by: (signature)	9/17/21 1415
Relinquished by: (signature)	9/17/21 1715
Received by: (signature) 2.9, 5.9	9/17/21 1715
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Table of Contents

2110945

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 5 of 5

Company Name: Wilcox & Barton, Inc.
Address: #1B Commons Drive, Unit 12B, Londonderry NH
Phone: 603-369-4190
Project Name: BANFoods
Project Location: 325 Banfield Road, Portsmouth NH
Project Number: BANFOODS
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: C. Monge

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox@wilcoxandbarton
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Lead 6010 (I)
38 39	Y-13 (0-2')	9/17/21	9:45	Grab	S	U		1				X
39 40	Z-12 (0-2')	9/17/21	10:00	Grab	S	U		1				X
40 41	Z-10 (0-2')	9/17/21	10:20	Grab	S	U		1				X
41 42	I-5 (0-2')	9/17/21	11:30	Grab	S	U		1				X
42 43	I-5 (2-4')	9/17/21	11:30	Grab	S	U		1				X
43 44	E-14 (0-2')	9/17/21	12:45	Grab	S	U		1				X
44 45	F-15 (0-2')	9/17/21	13:00	Grab	S	U		1				X
45 46	K-15 (0-2')	9/17/21	13:10	Grab	S	U		1				X

² Preservation Code
Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) 9/17/21	Date/Time: 14:15
Received by: (signature)	Date/Time: 9/17/21 1416
Relinquished by: (signature)	Date/Time: 9/17/21 1745
Received by: (signature) 29.5.9	Date/Time: 9/17/21 1745
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
(A)

Detection Limit Requirements
MA
CT
Other: NHDES SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples____________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W & B

Received By CA Date 9/17/21 Time 1745

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___

Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 2.9, 5.9

By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ___

Are there Rushes? F Who was notified? ___

Are there Short Holds? F Who was notified? ___

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? NA Acid ___ Base ___

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz [✓ Amb]/Clear	8
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	38
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

Sample E-11 (0-2') on chain twice

Recieved sample Y-11 (0-2') @ 10:35 9/16/21 not on COC

Archived: Monday, September 20, 2021 10:24:01 AM
From: Christopher Montoya
Sent: Mon, 20 Sep 2021 13:05:50
To: Scott Basal
Subject: Re: sample ID discrepancy
Sensitivity: Normal

Yes please. Thank you!

Chris Montoya
Wilcox & Barton, Inc.
Project Geologist
Office 603-369-4190 x528
Cell 781-223-2891

Sent from my iPhone

> On Sep 20, 2021, at 8:59 AM, Scott Basal <Scott.Basal@pacelabs.com> wrote:
>
> Good morning Chris,
>
> Can you confirm the sample IDs for the attached please?
>
> According to our receiving department: sample E-11 (0-2) @13:08 was listed on the COC twice and we received a Y-11 (0-2) @ 10:35 (9:16 was written on cap) that is not on the COC
>
> Would you like us to add the sample Y-11 (0-2) to the end of the COC?
>
> <image001.jpg>
>
> **Scott Basal**
> Project Coordinator II
> 39 Spruce Street, East Longmeadow, MA 01028
> Cell: 413.427.4513 | Lab: 413.525.2332 contestlabs.com
> <image002.jpg>
>
>
>
>
>
> <21I0945.pdf>

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

September 30, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 475 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1417

Enclosed are results of analyses for samples received by the laboratory on September 24, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 9/30/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1417

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 475 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
H-15 (0.25-0.5)	21I1417-01	Soil		SM 2540G SW-846 8082A	
H-15 (0.5-1.5)	21I1417-02	Soil		SM 2540G SW-846 8082A	
F-15 (0.25-0.5)	21I1417-03	Soil		SM 2540G SW-846 8082A	
F-15 (0.5-1.5)	21I1417-04	Soil		SM 2540G SW-846 8082A	
D-12 (0.25-0.5)	21I1417-05	Soil		SM 2540G SW-846 8082A	
D-12 (0.5-1.5)	21I1417-06	Soil		SM 2540G SW-846 8082A	
D-13 (0.25-0.5)	21I1417-07	Soil		SM 2540G SW-846 8082A	
D-13 (0.5-1.5)	21I1417-08	Soil		SM 2540G SW-846 8082A	
E-12 (0.25-0.5)	21I1417-09	Soil		SM 2540G SW-846 8082A	
E-12 (0.5-1.5)	21I1417-10	Soil		SM 2540G SW-846 8082A	
E-13 (0.25-0.5)	21I1417-11	Soil		SM 2540G SW-846 8082A	
E-13 (0.5-1.5)	21I1417-12	Soil		SM 2540G SW-846 8082A	
E-14 (0.25-0.5)	21I1417-13	Soil		SM 2540G SW-846 8082A	
E-14 (0.5-1.5)	21I1417-14	Soil		SM 2540G SW-846 8082A	
F-13 (0.25-0.5)	21I1417-15	Soil		SM 2540G SW-846 8082A	
F-13 (0.5-1.5)	21I1417-16	Soil		SM 2540G SW-846 8082A	
B-11 (0.25-0.5)	21I1417-17	Soil		SM 2540G SW-846 8082A	
B-11 (0.5-1.5)	21I1417-18	Soil		SM 2540G SW-846 8082A	
C-10 (0.25-0.5)	21I1417-19	Soil		SM 2540G SW-846 8082A	
C-10 (0.5-1.5)	21I1417-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl

21I1417-20[C-10 (0.5-1.5)]

Decachlorobiphenyl [2C]

21I1417-20[C-10 (0.5-1.5)]

Tetrachloro-m-xylene

21I1417-20[C-10 (0.5-1.5)]

Tetrachloro-m-xylene [2C]

21I1417-20[C-10 (0.5-1.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: H-15 (0.25-0.5) Sampled: 9/24/2021 08:10

Sample ID: 21I1417-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1221 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1232 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1242 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1248 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1254 [1]	0.13	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1260 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1262 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG
Aroclor-1268 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:13	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	38.9	30-150		9/28/21 17:13
Decachlorobiphenyl [2]	38.7	30-150		9/28/21 17:13
Tetrachloro-m-xylene [1]	40.1	30-150		9/28/21 17:13
Tetrachloro-m-xylene [2]	38.0	30-150		9/28/21 17:13

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: H-15 (0.25-0.5) Sampled: 9/24/2021 08:10

Sample ID: 21I1417-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.1		% Wt	1		SM 2540G	9/29/21	9/30/21 11:07	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: H-15 (0.5-1.5)   Sampled: 9/24/2021 08:05

Sample ID: 21I1417-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1221 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1232 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1242 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1248 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1254 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1260 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1262 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG
Aroclor-1268 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:31	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	68.0	30-150		9/28/21 17:31
Decachlorobiphenyl [2]	68.4	30-150		9/28/21 17:31
Tetrachloro-m-xylene [1]	63.1	30-150		9/28/21 17:31
Tetrachloro-m-xylene [2]	61.0	30-150		9/28/21 17:31

Project Location: 475 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: H-15 (0.5-1.5)
Sampled: 9/24/2021 08:05

Sample ID: 21I1417-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.4		% Wt	1		SM 2540G	9/29/21	9/30/21 11:07	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-15 (0.25-0.5) Sampled: 9/24/2021 08:25

Sample ID: 21I1417-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1221 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1232 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1242 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1248 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1254 [2]	0.19	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1260 [1]	0.097	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1262 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG
Aroclor-1268 [1]	ND	0.096	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 17:48	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	66.5	30-150		9/28/21 17:48
Decachlorobiphenyl [2]	67.3	30-150		9/28/21 17:48
Tetrachloro-m-xylene [1]	57.9	30-150		9/28/21 17:48
Tetrachloro-m-xylene [2]	53.4	30-150		9/28/21 17:48

Project Location: 475 Banfield Rd., Portsmouth, NH

Sample Description:

Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-15 (0.25-0.5)

Sampled: 9/24/2021 08:25

Sample ID: 21I1417-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.0		% Wt	1		SM 2540G	9/29/21	9/30/21 11:07	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-15 (0.5-1.5) Sampled: 9/24/2021 08:28

Sample ID: 21I1417-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1248 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1254 [2]	0.20	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1260 [1]	0.10	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG
Aroclor-1268 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:06	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	85.3	30-150		9/28/21 18:06
Decachlorobiphenyl [2]	88.1	30-150		9/28/21 18:06
Tetrachloro-m-xylene [1]	74.6	30-150		9/28/21 18:06
Tetrachloro-m-xylene [2]	68.8	30-150		9/28/21 18:06

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-15 (0.5-1.5) Sampled: 9/24/2021 08:28

Sample ID: 21I1417-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.2		% Wt	1		SM 2540G	9/29/21	9/30/21 11:07	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-12 (0.25-0.5)   Sampled: 9/24/2021 09:35

Sample ID: 21I1417-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1248 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1254 [1]	0.069	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1260 [1]	0.083	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG
Aroclor-1268 [2]	0.11	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:23	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	77.0	30-150		9/28/21 18:23
Decachlorobiphenyl [2]	75.6	30-150		9/28/21 18:23
Tetrachloro-m-xylene [1]	62.7	30-150		9/28/21 18:23
Tetrachloro-m-xylene [2]	59.4	30-150		9/28/21 18:23

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-12 (0.25-0.5)   Sampled: 9/24/2021 09:35

Sample ID: 21I1417-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.5		% Wt	1		SM 2540G	9/29/21	9/30/21 11:07	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-12 (0.5-1.5) Sampled: 9/24/2021 09:40

Sample ID: 21I1417-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1248 [2]	0.041	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1254 [2]	0.063	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1260 [1]	0.084	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG
Aroclor-1268 [1]	0.12	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 18:41	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	80.4	30-150		9/28/21 18:41
Decachlorobiphenyl [2]	79.4	30-150		9/28/21 18:41
Tetrachloro-m-xylene [1]	69.6	30-150		9/28/21 18:41
Tetrachloro-m-xylene [2]	66.0	30-150		9/28/21 18:41

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-12 (0.5-1.5)   Sampled: 9/24/2021 09:40

Sample ID: 21I1417-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.5		% Wt	1		SM 2540G	9/29/21	9/30/21 11:08	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-13 (0.25-0.5)　Sampled: 9/24/2021 09:20

Sample ID: 21I1417-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1221 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1232 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1242 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1248 [1]	0.055	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1254 [2]	0.16	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1260 [1]	0.12	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1262 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG
Aroclor-1268 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:41	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	88.5	30-150		9/28/21 21:41
Decachlorobiphenyl [2]	90.2	30-150		9/28/21 21:41
Tetrachloro-m-xylene [1]	76.0	30-150		9/28/21 21:41
Tetrachloro-m-xylene [2]	70.2	30-150		9/28/21 21:41

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-13 (0.25-0.5)   Sampled: 9/24/2021 09:20

Sample ID: 21I1417-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	75.7		% Wt	1		SM 2540G	9/29/21	9/30/21 13:38	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-13 (0.5-1.5) Sampled: 9/24/2021 09:25

Sample ID: 21I1417-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1221 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1232 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1242 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1248 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1254 [2]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1260 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1262 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG
Aroclor-1268 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 21:59	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	79.5	30-150		9/28/21 21:59
Decachlorobiphenyl [2]	79.7	30-150		9/28/21 21:59
Tetrachloro-m-xylene [1]	66.8	30-150		9/28/21 21:59
Tetrachloro-m-xylene [2]	62.8	30-150		9/28/21 21:59

Project Location: 475 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: D-13 (0.5-1.5)　Sampled: 9/24/2021 09:25

Sample ID: 21I1417-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.7		% Wt	1		SM 2540G	9/29/21	9/30/21 13:39	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-12 (0.25-0.5) Sampled: 9/24/2021 09:45

Sample ID: 21I1417-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1221 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1232 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1242 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1248 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1254 [2]	0.043	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1260 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1262 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG
Aroclor-1268 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:17	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	77.3	30-150		9/28/21 22:17
Decachlorobiphenyl [2]	77.8	30-150		9/28/21 22:17
Tetrachloro-m-xylene [1]	65.7	30-150		9/28/21 22:17
Tetrachloro-m-xylene [2]	61.2	30-150		9/28/21 22:17

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-12 (0.25-0.5)   Sampled: 9/24/2021 09:45

Sample ID: 21I1417-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.4		% Wt	1		SM 2540G	9/29/21	9/30/21 13:39	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-12 (0.5-1.5) Sampled: 9/24/2021 09:50

Sample ID: 21I1417-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1248 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1254 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1260 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG
Aroclor-1268 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:34	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.4	30-150		9/28/21 22:34
Decachlorobiphenyl [2]	97.3	30-150		9/28/21 22:34
Tetrachloro-m-xylene [1]	74.3	30-150		9/28/21 22:34
Tetrachloro-m-xylene [2]	71.0	30-150		9/28/21 22:34

Project Location: 475 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-12 (0.5-1.5)
Sampled: 9/24/2021 09:50

Sample ID: 21I1417-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.7		% Wt	1		SM 2540G	9/29/21	9/30/21 13:39	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-13 (0.25-0.5)
Sampled: 9/24/2021 09:00

Sample ID: 21I1417-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1221 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1232 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1242 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1248 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1254 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1260 [1]	0.061	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1262 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG
Aroclor-1268 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 22:52	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	84.1	30-150		9/28/21 22:52
Decachlorobiphenyl [2]	84.1	30-150		9/28/21 22:52
Tetrachloro-m-xylene [1]	71.4	30-150		9/28/21 22:52
Tetrachloro-m-xylene [2]	67.5	30-150		9/28/21 22:52

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-13 (0.25-0.5) Sampled: 9/24/2021 09:00

Sample ID: 21I1417-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.3		% Wt	1		SM 2540G	9/29/21	9/30/21 13:39	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH　　Sample Description:　　Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-13 (0.5-1.5)　　Sampled: 9/24/2021 09:05

Sample ID: 21I1417-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1221 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1232 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1242 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1248 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1254 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1260 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1262 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG
Aroclor-1268 [1]	ND	0.084	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:09	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	74.0	30-150		9/28/21 23:09
Decachlorobiphenyl [2]	74.6	30-150		9/28/21 23:09
Tetrachloro-m-xylene [1]	68.8	30-150		9/28/21 23:09
Tetrachloro-m-xylene [2]	64.9	30-150		9/28/21 23:09

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-13 (0.5-1.5) Sampled: 9/24/2021 09:05

Sample ID: 21I1417-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.0		% Wt	1		SM 2540G	9/29/21	9/30/21 13:39	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH　　Sample Description:　　Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-14 (0.25-0.5)　　Sampled: 9/24/2021 09:10

Sample ID: 21I1417-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1221 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1232 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1242 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1248 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1254 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1260 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1262 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG
Aroclor-1268 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:27	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	87.3	30-150		9/28/21 23:27
Decachlorobiphenyl [2]	89.1	30-150		9/28/21 23:27
Tetrachloro-m-xylene [1]	74.0	30-150		9/28/21 23:27
Tetrachloro-m-xylene [2]	70.4	30-150		9/28/21 23:27

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-14 (0.25-0.5) Sampled: 9/24/2021 09:10

Sample ID: 21I1417-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.0		% Wt	1		SM 2540G	9/29/21	9/30/21 13:40	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-14 (0.5-1.5) Sampled: 9/24/2021 09:15

Sample ID: 21I1417-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1248 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1254 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1260 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG
Aroclor-1268 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/25/21	9/28/21 23:44	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	91.2	30-150		9/28/21 23:44
Decachlorobiphenyl [2]	92.7	30-150		9/28/21 23:44
Tetrachloro-m-xylene [1]	68.8	30-150		9/28/21 23:44
Tetrachloro-m-xylene [2]	65.7	30-150		9/28/21 23:44

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: E-14 (0.5-1.5) Sampled: 9/24/2021 09:15

Sample ID: 21I1417-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.0		% Wt	1		SM 2540G	9/29/21	9/30/21 13:40	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-13 (0.25-0.5)　Sampled: 9/24/2021 08:50

Sample ID: 21I1417-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1221 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1232 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1242 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1248 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1254 [2]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1260 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1262 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG
Aroclor-1268 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:02	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	84.4	30-150		9/29/21 0:02
Decachlorobiphenyl [2]	85.0	30-150		9/29/21 0:02
Tetrachloro-m-xylene [1]	74.1	30-150		9/29/21 0:02
Tetrachloro-m-xylene [2]	69.9	30-150		9/29/21 0:02

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-13 (0.25-0.5) Sampled: 9/24/2021 08:50

Sample ID: 21I1417-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.6		% Wt	1		SM 2540G	9/29/21	9/30/21 13:41	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-13 (0.5-1.5) Sampled: 9/24/2021 08:55

Sample ID: 21I1417-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1221 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1232 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1242 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1248 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1254 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1260 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1262 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG
Aroclor-1268 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:20	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	90.0	30-150		9/29/21 0:20
Decachlorobiphenyl [2]	91.2	30-150		9/29/21 0:20
Tetrachloro-m-xylene [1]	80.3	30-150		9/29/21 0:20
Tetrachloro-m-xylene [2]	76.2	30-150		9/29/21 0:20

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: F-13 (0.5-1.5) Sampled: 9/24/2021 08:55

Sample ID: 21I1417-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.9		% Wt	1		SM 2540G	9/29/21	9/30/21 13:42	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: B-11 (0.25-0.5) Sampled: 9/24/2021 11:20

Sample ID: 21I1417-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1221 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1232 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1242 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1248 [1]	1.6	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1254 [2]	0.68	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1260 [1]	0.20	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1262 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG
Aroclor-1268 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:37	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.0	30-150		9/29/21 0:37
Decachlorobiphenyl [2]	98.8	30-150		9/29/21 0:37
Tetrachloro-m-xylene [1]	81.3	30-150		9/29/21 0:37
Tetrachloro-m-xylene [2]	74.2	30-150		9/29/21 0:37

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: B-11 (0.25-0.5) Sampled: 9/24/2021 11:20

Sample ID: 21I1417-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	50.0		% Wt	1		SM 2540G	9/29/21	9/30/21 13:42	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: B-11 (0.5-1.5) Sampled: 9/24/2021 11:25

Sample ID: 21I1417-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1221 [1]	ND	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1232 [1]	ND	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1242 [1]	ND	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1248 [1]	2.1	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1254 [2]	0.48	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1260 [1]	0.14	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1262 [1]	ND	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG
Aroclor-1268 [1]	ND	0.18	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 0:55	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	48.2	30-150		9/29/21 0:55
Decachlorobiphenyl [2]	49.6	30-150		9/29/21 0:55
Tetrachloro-m-xylene [1]	46.2	30-150		9/29/21 0:55
Tetrachloro-m-xylene [2]	43.0	30-150		9/29/21 0:55

Project Location: 475 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: B-11 (0.5-1.5)
Sampled: 9/24/2021 11:25

Sample ID: 21I1417-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	42.0		% Wt	1		SM 2540G	9/29/21	9/30/21 13:42	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: C-10 (0.25-0.5) Sampled: 9/24/2021 11:00

Sample ID: 21I1417-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1221 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1232 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1242 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1248 [2]	0.13	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1254 [2]	0.24	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1260 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1262 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG
Aroclor-1268 [1]	ND	0.095	mg/Kg dry	4		SW-846 8082A	9/25/21	9/29/21 1:12	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	84.3	30-150		9/29/21 1:12
Decachlorobiphenyl [2]	80.5	30-150		9/29/21 1:12
Tetrachloro-m-xylene [1]	77.2	30-150		9/29/21 1:12
Tetrachloro-m-xylene [2]	72.9	30-150		9/29/21 1:12

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: C-10 (0.25-0.5) Sampled: 9/24/2021 11:00

Sample ID: 21I1417-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.7		% Wt	1		SM 2540G	9/29/21	9/30/21 13:42	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: C-10 (0.5-1.5)   Sampled: 9/24/2021 11:05

Sample ID: 21I1417-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1221 [1]	ND	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1232 [1]	ND	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1242 [1]	ND	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1248 [2]	7.8	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1254 [2]	1.8	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1260 [1]	ND	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1262 [1]	ND	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG
Aroclor-1268 [1]	ND	1.0	mg/Kg dry	40		SW-846 8082A	9/25/21	9/29/21 10:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	*	30-150	S-01	9/29/21 10:43
Decachlorobiphenyl [2]	*	30-150	S-01	9/29/21 10:43
Tetrachloro-m-xylene [1]	*	30-150	S-01	9/29/21 10:43
Tetrachloro-m-xylene [2]	*	30-150	S-01	9/29/21 10:43

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1417

Date Received: 9/24/2021

Field Sample #: C-10 (0.5-1.5) Sampled: 9/24/2021 11:05

Sample ID: 21I1417-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	75.6		% Wt	1		SM 2540G	9/29/21	9/30/21 13:42	MJH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1417-01 [H-15 (0.25-0.5)]	B291264	09/29/21
21I1417-02 [H-15 (0.5-1.5)]	B291264	09/29/21
21I1417-03 [F-15 (0.25-0.5)]	B291264	09/29/21
21I1417-04 [F-15 (0.5-1.5)]	B291264	09/29/21
21I1417-05 [D-12 (0.25-0.5)]	B291264	09/29/21
21I1417-06 [D-12 (0.5-1.5)]	B291264	09/29/21
21I1417-07 [D-13 (0.25-0.5)]	B291264	09/29/21
21I1417-08 [D-13 (0.5-1.5)]	B291264	09/29/21
21I1417-09 [E-12 (0.25-0.5)]	B291264	09/29/21
21I1417-10 [E-12 (0.5-1.5)]	B291264	09/29/21
21I1417-11 [E-13 (0.25-0.5)]	B291264	09/29/21
21I1417-12 [E-13 (0.5-1.5)]	B291264	09/29/21
21I1417-13 [E-14 (0.25-0.5)]	B291264	09/29/21
21I1417-14 [E-14 (0.5-1.5)]	B291264	09/29/21
21I1417-15 [F-13 (0.25-0.5)]	B291264	09/29/21
21I1417-16 [F-13 (0.5-1.5)]	B291264	09/29/21
21I1417-17 [B-11 (0.25-0.5)]	B291264	09/29/21
21I1417-18 [B-11 (0.5-1.5)]	B291264	09/29/21
21I1417-19 [C-10 (0.25-0.5)]	B291264	09/29/21
21I1417-20 [C-10 (0.5-1.5)]	B291264	09/29/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1417-01 [H-15 (0.25-0.5)]	B291008	10.1	10.0	09/25/21
21I1417-02 [H-15 (0.5-1.5)]	B291008	10.0	10.0	09/25/21
21I1417-03 [F-15 (0.25-0.5)]	B291008	10.3	10.0	09/25/21
21I1417-04 [F-15 (0.5-1.5)]	B291008	10.4	10.0	09/25/21
21I1417-05 [D-12 (0.25-0.5)]	B291008	10.0	10.0	09/25/21
21I1417-06 [D-12 (0.5-1.5)]	B291008	10.4	10.0	09/25/21
21I1417-07 [D-13 (0.25-0.5)]	B291008	10.1	10.0	09/25/21
21I1417-08 [D-13 (0.5-1.5)]	B291008	10.4	10.0	09/25/21
21I1417-09 [E-12 (0.25-0.5)]	B291008	10.1	10.0	09/25/21
21I1417-10 [E-12 (0.5-1.5)]	B291008	10.0	10.0	09/25/21
21I1417-11 [E-13 (0.25-0.5)]	B291008	10.3	10.0	09/25/21
21I1417-12 [E-13 (0.5-1.5)]	B291008	10.4	10.0	09/25/21
21I1417-13 [E-14 (0.25-0.5)]	B291008	10.4	10.0	09/25/21
21I1417-14 [E-14 (0.5-1.5)]	B291008	10.1	10.0	09/25/21
21I1417-15 [F-13 (0.25-0.5)]	B291008	10.0	10.0	09/25/21
21I1417-16 [F-13 (0.5-1.5)]	B291008	10.2	10.0	09/25/21
21I1417-17 [B-11 (0.25-0.5)]	B291008	10.0	10.0	09/25/21
21I1417-18 [B-11 (0.5-1.5)]	B291008	10.4	10.0	09/25/21
21I1417-19 [C-10 (0.25-0.5)]	B291008	10.3	10.0	09/25/21
21I1417-20 [C-10 (0.5-1.5)]	B291008	10.3	10.0	09/25/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291008 - SW-846 3540C										
Blank (B291008-BLK1)				Prepared: 09/25/21 Analyzed: 09/28/21						
Aroclor-1016	ND	0.020	mg/Kg wet							
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1221	ND	0.020	mg/Kg wet							
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1232	ND	0.020	mg/Kg wet							
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1242	ND	0.020	mg/Kg wet							
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1248	ND	0.020	mg/Kg wet							
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1254	ND	0.020	mg/Kg wet							
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1260	ND	0.020	mg/Kg wet							
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1262	ND	0.020	mg/Kg wet							
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1268	ND	0.020	mg/Kg wet							
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.188*		mg/Kg wet	0.200		94.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.172*		mg/Kg wet	0.200		86.2	30-150			
Surrogate: Tetrachloro-m-xylene	*0.132*		mg/Kg wet	0.200		65.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.120*		mg/Kg wet	0.200		60.2	30-150			
LCS (B291008-BS1)				Prepared: 09/25/21 Analyzed: 09/28/21						
Aroclor-1016	0.15	0.020	mg/Kg wet	0.200		76.0	40-140			
Aroclor-1016 [2C]	0.13	0.020	mg/Kg wet	0.200		67.1	40-140			
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		83.1	40-140			
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		76.6	40-140			
Surrogate: Decachlorobiphenyl	*0.207*		mg/Kg wet	0.200		103	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.182*		mg/Kg wet	0.200		90.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.145*		mg/Kg wet	0.200		72.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.128*		mg/Kg wet	0.200		64.2	30-150			
LCS Dup (B291008-BSD1)				Prepared: 09/25/21 Analyzed: 09/28/21						
Aroclor-1016	0.15	0.020	mg/Kg wet	0.200		76.7	40-140	0.922	30	
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		68.7	40-140	2.36	30	
Aroclor-1260	0.16	0.020	mg/Kg wet	0.200		82.1	40-140	1.19	30	
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		76.2	40-140	0.477	30	
Surrogate: Decachlorobiphenyl	*0.203*		mg/Kg wet	0.200		101	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.180*		mg/Kg wet	0.200		89.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.153*		mg/Kg wet	0.200		76.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.134*		mg/Kg wet	0.200		67.0	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291008 - SW-846 3540C										
Matrix Spike (B291008-MS1)	**Source: 21I1417-01**			Prepared: 09/25/21 Analyzed: 09/28/21						
Aroclor-1016	0.18	0.095	mg/Kg dry	0.237	ND	75.6	40-140			
Aroclor-1016 [2C]	0.15	0.095	mg/Kg dry	0.237	ND	64.2	40-140			
Aroclor-1260	0.31	0.095	mg/Kg dry	0.237	ND	131	40-140			
Aroclor-1260 [2C]	0.29	0.095	mg/Kg dry	0.237	ND	121	40-140			
Surrogate: Decachlorobiphenyl	*0.205*		mg/Kg dry	0.237		86.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.198*		mg/Kg dry	0.237		83.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.173*		mg/Kg dry	0.237		73.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.159*		mg/Kg dry	0.237		67.3	30-150			
Matrix Spike Dup (B291008-MSD1)	**Source: 21I1417-01**			Prepared: 09/25/21 Analyzed: 09/28/21						
Aroclor-1016	0.11	0.097	mg/Kg dry	0.244	ND	46.0	40-140	46.0	50	
Aroclor-1016 [2C]	0.10	0.097	mg/Kg dry	0.244	ND	42.0	40-140	39.0	50	
Aroclor-1260	0.19	0.097	mg/Kg dry	0.244	ND	77.2	40-140	48.7	50	
Aroclor-1260 [2C]	0.17	0.097	mg/Kg dry	0.244	ND	71.2	40-140	48.7	50	
Surrogate: Decachlorobiphenyl	*0.120*		mg/Kg dry	0.244		49.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.116*		mg/Kg dry	0.244		47.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.111*		mg/Kg dry	0.244		45.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.104*		mg/Kg dry	0.244		42.9	30-150			

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

H-15 (0.25-0.5)

Lab Sample ID: 21I1417-01

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.12	8.0

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

F-15 (0.25-0.5)

Lab Sample ID: 21I1417-03

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.19	11.1
Aroclor-1260	1	0.000	-0.030	0.030	0.097	
	2	0.000	-0.030	0.030	0.093	4.2

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

F-15 (0.5-1.5)

Lab Sample ID: 21I1417-04

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.20	5.1
Aroclor-1260	1	0.000	-0.030	0.030	0.10	
	2	0.000	-0.030	0.030	0.086	24.5

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-12 (0.25-0.5)

Lab Sample ID:	21I1417-05	Date(s) Analyzed:	09/28/2021 09/28/2021
Instrument ID (1):	ECD 9	Instrument ID (2):	ECD 9
GC Column (1):	ID: (mm)	GC Column (2):	ID: (mm)

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%RPD
Aroclor-1254	1	0.000	-0.030	0.030	0.069	
	2	0.000	-0.030	0.030	0.046	40.0
Aroclor-1260	1	0.000	-0.030	0.030	0.083	
	2	0.000	-0.030	0.030	0.075	10.1
Aroclor-1268	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.11	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-12 (0.5-1.5)

Lab Sample ID: 21I1417-06

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.039	
	2	0.000	-0.030	0.030	0.041	5.0
Aroclor-1254	1	0.000	-0.030	0.030	0.057	
	2	0.000	-0.030	0.030	0.063	10.0
Aroclor-1260	1	0.000	-0.030	0.030	0.084	
	2	0.000	-0.030	0.030	0.076	10.0
Aroclor-1268	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.12	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-13 (0.25-0.5)

Lab Sample ID: 21I1417-07

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.055	
	2	0.000	-0.030	0.030	0.049	11.5
Aroclor-1254	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.16	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.11	8.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

E-13 (0.25-0.5)

Lab Sample ID: 21I1417-11

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.061	
	2	0.000	-0.030	0.030	0.055	10.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

B-11 (0.25-0.5)

Lab Sample ID: 21I1417-17

Date(s) Analyzed: 09/29/2021 09/29/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	1.6	
	2	0.000	-0.030	0.030	1.5	6.5
Aroclor-1254	1	0.000	-0.030	0.030	0.48	
	2	0.000	-0.030	0.030	0.68	34.5
Aroclor-1260	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.17	16.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

B-11 (0.5-1.5)

Lab Sample ID: 21I1417-18

Date(s) Analyzed: 09/29/2021 09/29/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	2.1	
	2	0.000	-0.030	0.030	1.9	10.0
Aroclor-1254	1	0.000	-0.030	0.030	0.36	
	2	0.000	-0.030	0.030	0.48	28.6
Aroclor-1260	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.11	24.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-10 (0.25-0.5)

Lab Sample ID: 21I1417-19

Date(s) Analyzed: 09/29/2021 09/29/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.10	
	2	0.000	-0.030	0.030	0.13	26.1
Aroclor-1254	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.24	18.2

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-10 (0.5-1.5)

Lab Sample ID: 21I1417-20

Date(s) Analyzed: 09/29/2021 09/29/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	6.6	
	2	0.000	-0.030	0.030	7.8	15.2
Aroclor-1254	1	0.000	-0.030	0.030	1.7	
	2	0.000	-0.030	0.030	1.8	5.7

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291008-BS1

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.15	12.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291008-BSD1

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.14	6.9
Aroclor-1260	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.15	6.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291008-MS1

Date(s) Analyzed: 09/28/2021 09/28/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.15	18.2
Aroclor-1260	1	0.000	-0.030	0.030	0.31	
	2	0.000	-0.030	0.030	0.29	6.7

con-test
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID:	B291008-MSD1	Date(s) Analyzed:	09/28/2021	09/28/2021
Instrument ID (1):	ECD 9	Instrument ID (2):	ECD 9	

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.10	9.5
Aroclor-1260	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.17	11.1

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1417

con-test A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 1 of

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	H-15 (0.25-0.5)	9/24	8:10	Grab	S	U		1				X
2	H-15 (0.5-1.5)	9/24	8:05	Grab	S	U		1				X
3	F-15 (0.25-0.5)	9/24	8:25	Grab	S	U		1				X
4	F-15 (0.5-1.5)	9/24	8:28	Grab	S	U		1				X
5	D-12 (0.25-0.5)	9/24	9:35	Grab	S	U		1				X
6	D-12 (0.5-1.5)	9/24	9:40	Grab	S	U		1				X
7	D-13 (0.25-0.5)	9/24	9:20	Grab	S	U		1				X
8	D-13 (0.5-1.5)	9/24	9:25	Grab	S	U		1				X
9	E-12 (0.25-0.5)	9/24	9:45	Grab	S	U		1				X
10	E-12 (0.5-1.5)	9/24	9:50	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/24 1520
Received by: (signature)	Date/Time: 9/24/21 1520
Relinquished by: (signature)	Date/Time: 9/24/21 1845
Received by: (signature) SS	Date/Time: 9/24/21 1845
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

NELAC and AIHA-LAP, LLC Accredited
Other
☐ Chromatogram
☐ AIHA-LAP,LLC

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes**:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes**:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

21I1417

con-test
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 2 of 6

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	E-13 (0.25-0.5)	9/24	9:00	Grab	S	U		1				X
12	E-13 (0.5-1.5)		9:05	Grab	S	U		1				X
13	E-14 (0.25-0.5)		9.10	Grab	S	U		1				X
14	E-14 (0.5-~~0~~.5)		9:15	Grab	S	U		1				X
15	F-13 (0.25-0.5)		8:50	Grab	S	U		1				X
16	F-13 (0.5-1.5)		8:55	Grab	S	U		1				X
17	B-11 (0.25-0.5)		11:20	Grab	S	U		1				X
18	B-11 (0.5-1.5)		11:25	Grab	S	U		1				X
19	C-10 (0.25-0.5)		11:00	Grab	S	U		1				X
20	C-10 (0.5-1.5)	↓	11:05	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/24 15:20
Received by: (signature)	Date/Time: 9/24/21 1520
Relinquished by: (signature)	Date/Time: 9/24/21 1845
Received by: (signature)	Date/Time: 9/24/21 1845
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other SKS

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity

Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples____________

con-test
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W & B

Received By ak Date 9/24/21 Time 1845

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 5.5
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? NA Acid ___ Base ___

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	10
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 7, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 475 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1418

Enclosed are results of analyses for samples as received by the laboratory on September 24, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/7/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1418

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 475 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
C-11 (0.25-0.5)	21I1418-01	Soil		SM 2540G SW-846 8082A	
C-11 (0.5-1.5)	21I1418-02	Soil		SM 2540G SW-846 8082A	
D-11 (0.25-0.5)	21I1418-03	Soil		SM 2540G SW-846 8082A	
D-11 (0.5-1.5)	21I1418-04	Soil		SM 2540G SW-846 8082A	
E-11 (0.25-0.5)	21I1418-05	Soil		SM 2540G SW-846 8082A	
E-11 (0.5-1.5)	21I1418-06	Soil		SM 2540G SW-846 8082A	
V-12 (0.25-0.5)	21I1418-07	Soil		SM 2540G SW-846 8082A	
V-12 (0.5-1.5)	21I1418-08	Soil		SM 2540G SW-846 8082A	
W-12 (0.25-0.5)	21I1418-09	Soil		SM 2540G SW-846 8082A	
W-12 (0.5-1.5)	21I1418-10	Soil		SM 2540G SW-846 8082A	
W-13 (0.25-0.5)	21I1418-11	Soil		SM 2540G SW-846 8082A	
W-13 (0.5-1.5)	21I1418-12	Soil		SM 2540G SW-846 8082A	
A-10 (0.25-0.5)	21I1418-13	Soil		SM 2540G SW-846 8082A	
A-10 (0.5-1.5)	21I1418-14	Soil		SM 2540G SW-846 8082A	
V-11 (0.25-0.5)	21I1418-15	Soil		SM 2540G SW-846 8082A	
V-11 (0.5-1.5)	21I1418-16	Soil		SM 2540G SW-846 8082A	
W-10 (0.25-0.5)	21I1418-17	Soil		SM 2540G SW-846 8082A	
W-10 (0.5-1.5)	21I1418-18	Soil		SM 2540G SW-846 8082A	
Y-9 (0.25-0.5)	21I1418-19	Soil		SM 2540G SW-846 8082A	
Y-9 (0.5-1.5)	21I1418-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

P-02

Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.

Analyte & Samples(s) Qualified:

Aroclor-1254
21I1418-20[Y-9 (0.5-1.5)]

R-06

Matrix spike duplicate RPD is outside of control limits. Reduced precision is anticipated for reported result for this compound in this sample.

Analyte & Samples(s) Qualified:

Aroclor-1260 [2C]
21I1418-07[V-12 (0.25-0.5)], B291149-MS1, B291149-MSD1

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl
21I1418-11[W-13 (0.25-0.5)]

Decachlorobiphenyl [2C]
21I1418-11[W-13 (0.25-0.5)]

Tetrachloro-m-xylene
21I1418-11[W-13 (0.25-0.5)]

Tetrachloro-m-xylene [2C]
21I1418-11[W-13 (0.25-0.5)]

S-24

Surrogate recovery is biased high due to the presence of Aroclor 1268 in the sample. Aroclor 1268 contains decachlorobiphenyl.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl
21I1418-15[V-11 (0.25-0.5)]

Decachlorobiphenyl [2C]
21I1418-15[V-11 (0.25-0.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 475 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: C-11 (0.25-0.5)　Sampled: 9/24/2021 11:10

Sample ID: 21I1418-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1221 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1232 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1242 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1248 [2]	0.20	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1254 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1260 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1262 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM
Aroclor-1268 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 17:47	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	88.3	30-150		9/30/21 17:47
Decachlorobiphenyl [2]	90.0	30-150		9/30/21 17:47
Tetrachloro-m-xylene [1]	77.6	30-150		9/30/21 17:47
Tetrachloro-m-xylene [2]	74.8	30-150		9/30/21 17:47

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: C-11 (0.25-0.5) Sampled: 9/24/2021 11:10

Sample ID: 21I1418-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.9		% Wt	1		SM 2540G	9/29/21	9/30/21 13:42	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: C-11 (0.5-1.5)   Sampled: 9/24/2021 11:15

Sample ID: 21I1418-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1221 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1232 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1242 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1248 [2]	0.70	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1254 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1260 [1]	0.22	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1262 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM
Aroclor-1268 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:04	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	74.0	30-150		9/30/21 18:04
Decachlorobiphenyl [2]	75.8	30-150		9/30/21 18:04
Tetrachloro-m-xylene [1]	65.3	30-150		9/30/21 18:04
Tetrachloro-m-xylene [2]	62.7	30-150		9/30/21 18:04

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: C-11 (0.5-1.5) Sampled: 9/24/2021 11:15

Sample ID: 21I1418-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.6		% Wt	1		SM 2540G	9/29/21	9/30/21 13:43	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: D-11 (0.25-0.5) Sampled: 9/24/2021 10:10

Sample ID: 21I1418-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1248 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1254 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1260 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM
Aroclor-1268 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:22	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	78.0	30-150		9/30/21 18:22
Decachlorobiphenyl [2]	80.3	30-150		9/30/21 18:22
Tetrachloro-m-xylene [1]	62.2	30-150		9/30/21 18:22
Tetrachloro-m-xylene [2]	60.6	30-150		9/30/21 18:22

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: D-11 (0.25-0.5) Sampled: 9/24/2021 10:10

Sample ID: 21I1418-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.7		% Wt	1		SM 2540G	9/29/21	9/30/21 13:43	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: D-11 (0.5-1.5) Sampled: 9/24/2021 10:15

Sample ID: 21I1418-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1221 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1232 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1242 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1248 [1]	0.10	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1254 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1260 [1]	0.098	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1262 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM
Aroclor-1268 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:39	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	84.2	30-150		9/30/21 18:39
Decachlorobiphenyl [2]	86.8	30-150		9/30/21 18:39
Tetrachloro-m-xylene [1]	73.7	30-150		9/30/21 18:39
Tetrachloro-m-xylene [2]	70.4	30-150		9/30/21 18:39

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: D-11 (0.5-1.5)   Sampled: 9/24/2021 10:15

Sample ID: 21I1418-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.8		% Wt	1		SM 2540G	9/29/21	9/30/21 13:43	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: E-11 (0.25-0.5)	Sampled: 9/24/2021 10:25

Sample ID: 21I1418-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1221 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1232 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1242 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1248 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1254 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1260 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1262 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM
Aroclor-1268 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 18:57	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	88.0	30-150		9/30/21 18:57
Decachlorobiphenyl [2]	90.4	30-150		9/30/21 18:57
Tetrachloro-m-xylene [1]	76.2	30-150		9/30/21 18:57
Tetrachloro-m-xylene [2]	73.2	30-150		9/30/21 18:57

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: E-11 (0.25-0.5)   Sampled: 9/24/2021 10:25

Sample ID: 21I1418-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.3		% Wt	1		SM 2540G	9/29/21	9/30/21 13:43	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: E-11 (0.5-1.5) Sampled: 9/24/2021 10:30

Sample ID: 21I1418-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1221 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1232 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1242 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1248 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1254 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1260 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1262 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM
Aroclor-1268 [1]	ND	0.082	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:14	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	98.9	30-150		9/30/21 19:14
Decachlorobiphenyl [2]	102	30-150		9/30/21 19:14
Tetrachloro-m-xylene [1]	78.6	30-150		9/30/21 19:14
Tetrachloro-m-xylene [2]	75.6	30-150		9/30/21 19:14

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: E-11 (0.5-1.5) Sampled: 9/24/2021 10:30

Sample ID: 21I1418-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.3		% Wt	1		SM 2540G	9/29/21	9/30/21 13:43	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-12 (0.25-0.5)   Sampled: 9/24/2021 11:30

Sample ID: 21I1418-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1221 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1232 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1242 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1248 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1254 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1260 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1262 [1]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM
Aroclor-1268 [2]	ND	0.099	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:32	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	46.9	30-150		9/30/21 19:32
Decachlorobiphenyl [2]	54.2	30-150		9/30/21 19:32
Tetrachloro-m-xylene [1]	34.5	30-150		9/30/21 19:32
Tetrachloro-m-xylene [2]	32.3	30-150		9/30/21 19:32

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-12 (0.25-0.5) Sampled: 9/24/2021 11:30

Sample ID: 21I1418-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	79.2		% Wt	1		SM 2540G	9/29/21	9/30/21 13:43	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-12 (0.5-1.5) Sampled: 9/24/2021 11:35

Sample ID: 21I1418-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1221 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1232 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1242 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1248 [2]	0.048	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1254 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1260 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1262 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM
Aroclor-1268 [2]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 19:49	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	91.5	30-150		9/30/21 19:49
Decachlorobiphenyl [2]	102	30-150		9/30/21 19:49
Tetrachloro-m-xylene [1]	74.6	30-150		9/30/21 19:49
Tetrachloro-m-xylene [2]	69.6	30-150		9/30/21 19:49

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-12 (0.5-1.5)   Sampled: 9/24/2021 11:35

Sample ID: 21I1418-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.2		% Wt	1		SM 2540G	9/29/21	9/30/21 13:43	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-12 (0.25-0.5)　Sampled: 9/24/2021 11:40

Sample ID: 21I1418-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1221 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1232 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1242 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1248 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1254 [2]	0.35	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1260 [1]	0.082	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1262 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM
Aroclor-1268 [2]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:07	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	70.2	30-150		9/30/21 20:07
Decachlorobiphenyl [2]	75.1	30-150		9/30/21 20:07
Tetrachloro-m-xylene [1]	58.0	30-150		9/30/21 20:07
Tetrachloro-m-xylene [2]	54.9	30-150		9/30/21 20:07

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-12 (0.25-0.5) Sampled: 9/24/2021 11:40

Sample ID: 21I1418-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	60.7		% Wt	1		SM 2540G	9/29/21	9/30/21 13:44	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-12 (0.5-1.5)　Sampled: 9/24/2021 11:45

Sample ID: 21I1418-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	**Results**	**RL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Aroclor-1016 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1221 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1232 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1242 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1248 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1254 [2]	0.24	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1260 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1262 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM
Aroclor-1268 [2]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 20:25	SFM

Surrogates	**% Recovery**	**Recovery Limits**	**Flag/Qual**	
Decachlorobiphenyl [1]	80.8	30-150		9/30/21 20:25
Decachlorobiphenyl [2]	82.9	30-150		9/30/21 20:25
Tetrachloro-m-xylene [1]	71.9	30-150		9/30/21 20:25
Tetrachloro-m-xylene [2]	67.9	30-150		9/30/21 20:25

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-12 (0.5-1.5)   Sampled: 9/24/2021 11:45

Sample ID: 21I1418-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	54.8		% Wt	1		SM 2540G	9/29/21	9/30/21 13:44	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-13 (0.25-0.5) Sampled: 9/24/2021 12:50

Sample ID: 21I1418-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1221 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1232 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1242 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1248 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1254 [1]	6.6	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1260 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1262 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG
Aroclor-1268 [1]	ND	1.1	mg/Kg dry	40		SW-846 8082A	9/28/21	10/1/21 10:22	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	*	30-150	S-01	10/1/21 10:22
Decachlorobiphenyl [2]	*	30-150	S-01	10/1/21 10:22
Tetrachloro-m-xylene [1]	*	30-150	S-01	10/1/21 10:22
Tetrachloro-m-xylene [2]	*	30-150	S-01	10/1/21 10:22

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-13 (0.25-0.5) Sampled: 9/24/2021 12:50

Sample ID: 21I1418-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	74.8		% Wt	1		SM 2540G	9/29/21	9/30/21 13:44	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-13 (0.5-1.5) Sampled: 9/24/2021 12:55

Sample ID: 21I1418-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1221 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1232 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1242 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1248 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1254 [2]	0.24	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1260 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1262 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM
Aroclor-1268 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:40	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	78.0	30-150		9/30/21 22:40
Decachlorobiphenyl [2]	86.2	30-150		9/30/21 22:40
Tetrachloro-m-xylene [1]	69.2	30-150		9/30/21 22:40
Tetrachloro-m-xylene [2]	62.7	30-150		9/30/21 22:40

Project Location: 475 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-13 (0.5-1.5)　Sampled: 9/24/2021 12:55

Sample ID: 21I1418-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	75.9		% Wt	1		SM 2540G	9/29/21	9/30/21 13:44	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: A-10 (0.25-0.5)   Sampled: 9/24/2021 13:10

Sample ID: 21I1418-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1221 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1232 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1242 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1248 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1254 [2]	0.35	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1260 [1]	0.17	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1262 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM
Aroclor-1268 [2]	0.14	0.10	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 22:57	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	88.3	30-150		9/30/21 22:57
Decachlorobiphenyl [2]	109	30-150		9/30/21 22:57
Tetrachloro-m-xylene [1]	69.8	30-150		9/30/21 22:57
Tetrachloro-m-xylene [2]	62.9	30-150		9/30/21 22:57

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: A-10 (0.25-0.5) Sampled: 9/24/2021 13:10

Sample ID: 21I1418-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.3		% Wt	1		SM 2540G	9/29/21	9/30/21 13:44	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: A-10 (0.5-1.5)   Sampled: 9/24/2021 13:15

Sample ID: 21I1418-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1221 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1232 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1242 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1248 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1254 [1]	0.13	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1260 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1262 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM
Aroclor-1268 [1]	0.13	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:15	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	81.7	30-150		9/30/21 23:15
Decachlorobiphenyl [2]	96.6	30-150		9/30/21 23:15
Tetrachloro-m-xylene [1]	72.3	30-150		9/30/21 23:15
Tetrachloro-m-xylene [2]	64.7	30-150		9/30/21 23:15

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: A-10 (0.5-1.5)   Sampled: 9/24/2021 13:15

Sample ID: 21I1418-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	72.3		% Wt	1		SM 2540G	9/29/21	9/30/21 13:44	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-11 (0.25-0.5)   Sampled: 9/24/2021 13:20

Sample ID: 21I1418-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1221 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1232 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1242 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1248 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1254 [2]	0.25	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1260 [1]	0.094	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1262 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM
Aroclor-1268 [2]	0.14	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:32	SFM

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	**153**	*	30-150	S-24	9/30/21 23:32
Decachlorobiphenyl [2]	**164**	*	30-150	S-24	9/30/21 23:32
Tetrachloro-m-xylene [1]	78.3		30-150		9/30/21 23:32
Tetrachloro-m-xylene [2]	71.1		30-150		9/30/21 23:32

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-11 (0.25-0.5)   Sampled: 9/24/2021 13:20

Sample ID: 21I1418-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	67.4		% Wt	1		SM 2540G	9/29/21	9/30/21 13:45	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-11 (0.5-1.5)   Sampled: 9/24/2021 13:25

Sample ID: 21I1418-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1221 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1232 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1242 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1248 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1254 [2]	0.16	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1260 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1262 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM
Aroclor-1268 [1]	0.13	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 23:50	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	90.1	30-150		9/30/21 23:50
Decachlorobiphenyl [2]	121	30-150		9/30/21 23:50
Tetrachloro-m-xylene [1]	72.8	30-150		9/30/21 23:50
Tetrachloro-m-xylene [2]	67.0	30-150		9/30/21 23:50

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: V-11 (0.5-1.5) Sampled: 9/24/2021 13:25

Sample ID: 21I1418-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	53.8		% Wt	1		SM 2540G	9/29/21	9/30/21 13:45	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-10 (0.25-0.5) Sampled: 9/24/2021 13:30

Sample ID: 21I1418-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1221 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1232 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1242 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1248 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1254 [2]	0.26	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1260 [1]	0.076	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1262 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM
Aroclor-1268 [2]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:08	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	73.8	30-150		10/1/21 0:08
Decachlorobiphenyl [2]	76.5	30-150		10/1/21 0:08
Tetrachloro-m-xylene [1]	62.8	30-150		10/1/21 0:08
Tetrachloro-m-xylene [2]	57.8	30-150		10/1/21 0:08

Project Location: 475 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1418
Date Received: 9/24/2021
Field Sample #: W-10 (0.25-0.5)
Sampled: 9/24/2021 13:30
Sample ID: 21I1418-17
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	65.1		% Wt	1		SM 2540G	9/29/21	9/30/21 13:45	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-10 (0.5-1.5) Sampled: 9/24/2021 13:35

Sample ID: 21I1418-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1221 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1232 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1242 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1248 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1254 [2]	0.087	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1260 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1262 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM
Aroclor-1268 [2]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 0:25	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	58.0	30-150		10/1/21 0:25
Decachlorobiphenyl [2]	54.1	30-150		10/1/21 0:25
Tetrachloro-m-xylene [1]	51.2	30-150		10/1/21 0:25
Tetrachloro-m-xylene [2]	46.9	30-150		10/1/21 0:25

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: W-10 (0.5-1.5) Sampled: 9/24/2021 13:35

Sample ID: 21I1418-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	58.3		% Wt	1		SM 2540G	9/29/21	9/30/21 13:45	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: Y-9 (0.25-0.5) Sampled: 9/24/2021 13:40

Sample ID: 21I1418-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1221 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1232 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1242 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1248 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1254 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1260 [1]	1.7	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1262 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG
Aroclor-1268 [1]	ND	0.53	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:54	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	67.6	30-150		10/6/21 13:54
Decachlorobiphenyl [2]	61.9	30-150		10/6/21 13:54
Tetrachloro-m-xylene [1]	66.9	30-150		10/6/21 13:54
Tetrachloro-m-xylene [2]	61.6	30-150		10/6/21 13:54

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: Y-9 (0.25-0.5)   Sampled: 9/24/2021 13:40

Sample ID: 21I1418-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	43.2		% Wt	1		SM 2540G	9/29/21	9/30/21 13:45	MJH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: Y-9 (0.5-1.5)   Sampled: 9/24/2021 13:45

Sample ID: 21I1418-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1221 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1232 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1242 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1248 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1254 [1]	0.14	0.11	mg/Kg dry	4	P-02	SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1260 [1]	0.082	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1262 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM
Aroclor-1268 [2]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	10/1/21 1:00	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	71.6	30-150		10/1/21 1:00
Decachlorobiphenyl [2]	72.4	30-150		10/1/21 1:00
Tetrachloro-m-xylene [1]	65.9	30-150		10/1/21 1:00
Tetrachloro-m-xylene [2]	61.9	30-150		10/1/21 1:00

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1418

Date Received: 9/24/2021

Field Sample #: Y-9 (0.5-1.5)   Sampled: 9/24/2021 13:45

Sample ID: 21I1418-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	71.4		% Wt	1		SM 2540G	9/29/21	9/30/21 13:45	MJH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1418-01 [C-11 (0.25-0.5)]	B291264	09/29/21
21I1418-02 [C-11 (0.5-1.5)]	B291264	09/29/21
21I1418-03 [D-11 (0.25-0.5)]	B291264	09/29/21
21I1418-04 [D-11 (0.5-1.5)]	B291264	09/29/21
21I1418-05 [E-11 (0.25-0.5)]	B291264	09/29/21
21I1418-06 [E-11 (0.5-1.5)]	B291264	09/29/21
21I1418-07 [V-12 (0.25-0.5)]	B291264	09/29/21
21I1418-08 [V-12 (0.5-1.5)]	B291264	09/29/21
21I1418-09 [W-12 (0.25-0.5)]	B291264	09/29/21
21I1418-10 [W-12 (0.5-1.5)]	B291264	09/29/21
21I1418-11 [W-13 (0.25-0.5)]	B291264	09/29/21
21I1418-12 [W-13 (0.5-1.5)]	B291264	09/29/21
21I1418-13 [A-10 (0.25-0.5)]	B291264	09/29/21
21I1418-14 [A-10 (0.5-1.5)]	B291264	09/29/21
21I1418-15 [V-11 (0.25-0.5)]	B291264	09/29/21
21I1418-16 [V-11 (0.5-1.5)]	B291264	09/29/21
21I1418-17 [W-10 (0.25-0.5)]	B291264	09/29/21
21I1418-18 [W-10 (0.5-1.5)]	B291264	09/29/21
21I1418-19 [Y-9 (0.25-0.5)]	B291264	09/29/21
21I1418-20 [Y-9 (0.5-1.5)]	B291264	09/29/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1418-01 [C-11 (0.25-0.5)]	B291149	10.4	10.0	09/28/21
21I1418-02 [C-11 (0.5-1.5)]	B291149	10.3	10.0	09/28/21
21I1418-03 [D-11 (0.25-0.5)]	B291149	10.0	10.0	09/28/21
21I1418-04 [D-11 (0.5-1.5)]	B291149	10.4	10.0	09/28/21
21I1418-05 [E-11 (0.25-0.5)]	B291149	10.0	10.0	09/28/21
21I1418-06 [E-11 (0.5-1.5)]	B291149	10.4	10.0	09/28/21
21I1418-07 [V-12 (0.25-0.5)]	B291149	10.2	10.0	09/28/21
21I1418-08 [V-12 (0.5-1.5)]	B291149	10.2	10.0	09/28/21
21I1418-09 [W-12 (0.25-0.5)]	B291149	10.2	10.0	09/28/21
21I1418-10 [W-12 (0.5-1.5)]	B291149	10.0	10.0	09/28/21
21I1418-11 [W-13 (0.25-0.5)]	B291149	10.0	10.0	09/28/21
21I1418-12 [W-13 (0.5-1.5)]	B291149	10.2	10.0	09/28/21
21I1418-13 [A-10 (0.25-0.5)]	B291149	10.1	10.0	09/28/21
21I1418-14 [A-10 (0.5-1.5)]	B291149	10.4	10.0	09/28/21
21I1418-15 [V-11 (0.25-0.5)]	B291149	10.2	10.0	09/28/21
21I1418-16 [V-11 (0.5-1.5)]	B291149	10.4	10.0	09/28/21
21I1418-17 [W-10 (0.25-0.5)]	B291149	10.0	10.0	09/28/21
21I1418-18 [W-10 (0.5-1.5)]	B291149	10.1	10.0	09/28/21
21I1418-20 [Y-9 (0.5-1.5)]	B291149	10.1	10.0	09/28/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1418-19RE1 [Y-9 (0.25-0.5)]	B291624	3.50	10.0	10/04/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291149 - SW-846 3540C										
Blank (B291149-BLK1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	ND	0.020	mg/Kg wet							
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1221	ND	0.020	mg/Kg wet							
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1232	ND	0.020	mg/Kg wet							
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1242	ND	0.020	mg/Kg wet							
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1248	ND	0.020	mg/Kg wet							
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1254	ND	0.020	mg/Kg wet							
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1260	ND	0.020	mg/Kg wet							
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1262	ND	0.020	mg/Kg wet							
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1268	ND	0.020	mg/Kg wet							
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.181*		mg/Kg wet	0.200		90.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.171*		mg/Kg wet	0.200		85.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.151*		mg/Kg wet	0.200		75.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.133*		mg/Kg wet	0.200		66.5	30-150			
LCS (B291149-BS1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	0.14	0.020	mg/Kg wet	0.200		69.7	40-140			
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		61.1	40-140			
Aroclor-1260	0.14	0.020	mg/Kg wet	0.200		72.3	40-140			
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		67.1	40-140			
Surrogate: Decachlorobiphenyl	*0.188*		mg/Kg wet	0.200		93.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.175*		mg/Kg wet	0.200		87.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.154*		mg/Kg wet	0.200		77.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.134*		mg/Kg wet	0.200		67.2	30-150			
LCS Dup (B291149-BSD1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	0.14	0.020	mg/Kg wet	0.200		70.6	40-140	1.29	30	
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		61.3	40-140	0.407	30	
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		72.8	40-140	0.712	30	
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		66.6	40-140	0.750	30	
Surrogate: Decachlorobiphenyl	*0.187*		mg/Kg wet	0.200		93.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.173*		mg/Kg wet	0.200		86.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.151*		mg/Kg wet	0.200		75.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.131*		mg/Kg wet	0.200		65.4	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291149 - SW-846 3540C										
Matrix Spike (B291149-MS1)	**Source: 21I1418-07**			Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	0.18	0.10	mg/Kg dry	0.250	ND	71.9	40-140			
Aroclor-1016 [2C]	0.17	0.10	mg/Kg dry	0.250	ND	66.4	40-140			
Aroclor-1260	0.20	0.10	mg/Kg dry	0.250	ND	80.6	40-140			
Aroclor-1260 [2C]	0.18	0.10	mg/Kg dry	0.250	ND	72.0	40-140			R-06
Surrogate: Decachlorobiphenyl	*0.225*		mg/Kg dry	0.250		90.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.258*		mg/Kg dry	0.250		103	30-150			
Surrogate: Tetrachloro-m-xylene	*0.160*		mg/Kg dry	0.250		63.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.144*		mg/Kg dry	0.250		57.5	30-150			
Matrix Spike Dup (B291149-MSD1)	**Source: 21I1418-07**			Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	0.11	0.10	mg/Kg dry	0.253	ND	44.8	40-140	45.5	50	
Aroclor-1016 [2C]	0.12	0.10	mg/Kg dry	0.253	ND	49.2	40-140	28.9	50	
Aroclor-1260	0.12	0.10	mg/Kg dry	0.253	ND	48.9	40-140	48.1	50	
Aroclor-1260 [2C]	0.12	0.10	mg/Kg dry	0.253	ND	48.0	40-140	39.0	50	R-06
Surrogate: Decachlorobiphenyl	*0.138*		mg/Kg dry	0.253		54.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.168*		mg/Kg dry	0.253		66.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.0932*		mg/Kg dry	0.253		36.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0840*		mg/Kg dry	0.253		33.3	30-150			
Batch B291624 - SW-846 3540C										
Blank (B291624-BLK1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	ND	0.020	mg/Kg wet							
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1221	ND	0.020	mg/Kg wet							
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1232	ND	0.020	mg/Kg wet							
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1242	ND	0.020	mg/Kg wet							
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1248	ND	0.020	mg/Kg wet							
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1254	ND	0.020	mg/Kg wet							
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1260	ND	0.020	mg/Kg wet							
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1262	ND	0.020	mg/Kg wet							
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1268	ND	0.020	mg/Kg wet							
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.165*		mg/Kg wet	0.200		82.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.158*		mg/Kg wet	0.200		79.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.140*		mg/Kg wet	0.200		70.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.120*		mg/Kg wet	0.200		60.1	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291624 - SW-846 3540C										
LCS (B291624-BS1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.12	0.020	mg/Kg wet	0.200		59.6	40-140			
Aroclor-1016 [2C]	0.10	0.020	mg/Kg wet	0.200		51.3	40-140			
Aroclor-1260	0.12	0.020	mg/Kg wet	0.200		58.8	40-140			
Aroclor-1260 [2C]	0.11	0.020	mg/Kg wet	0.200		55.4	40-140			
Surrogate: Decachlorobiphenyl	*0.143*		mg/Kg wet	0.200		71.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.139*		mg/Kg wet	0.200		69.3	30-150			
Surrogate: Tetrachloro-m-xylene	*0.123*		mg/Kg wet	0.200		61.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.107*		mg/Kg wet	0.200		53.6	30-150			
LCS Dup (B291624-BSD1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.12	0.020	mg/Kg wet	0.200		58.5	40-140	1.95	30	
Aroclor-1016 [2C]	0.11	0.020	mg/Kg wet	0.200		52.6	40-140	2.47	30	
Aroclor-1260	0.11	0.020	mg/Kg wet	0.200		54.5	40-140	7.45	30	
Aroclor-1260 [2C]	0.11	0.020	mg/Kg wet	0.200		52.6	40-140	5.18	30	
Surrogate: Decachlorobiphenyl	*0.128*		mg/Kg wet	0.200		64.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.127*		mg/Kg wet	0.200		63.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.124*		mg/Kg wet	0.200		62.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.113*		mg/Kg wet	0.200		56.5	30-150			

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-11 (0.25-0.5)

Lab Sample ID: 21I1418-01

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.20	0.0

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-11 (0.5-1.5)

Lab Sample ID: 21I1418-02

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.68	
	2	0.000	-0.030	0.030	0.70	2.9
Aroclor-1260	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.20	9.5

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-11 (0.5-1.5)

Lab Sample ID: 21I1418-04

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.10	
	2	0.000	-0.030	0.030	0.10	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.098	
	2	0.000	-0.030	0.030	0.083	16.6

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

V-12 (0.5-1.5)

Lab Sample ID: 21I1418-08

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.047	
	2	0.000	-0.030	0.030	0.048	2.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

W-12 (0.25-0.5)

Lab Sample ID: 21I1418-09

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.35	
	2	0.000	-0.030	0.030	0.35	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

W-12 (0.5-1.5)

Lab Sample ID: 21I1418-10

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.24	28.6

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

W-13 (0.25-0.5)

Lab Sample ID: 21I1418-11

Date(s) Analyzed: 10/01/2021 10/01/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	6.6	
	2	0.000	-0.030	0.030	6.2	6.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

W-13 (0.5-1.5)

Lab Sample ID: 21I1418-12

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.23	
	2	0.000	-0.030	0.030	0.24	4.3

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

A-10 (0.25-0.5)

Lab Sample ID: 21I1418-13

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.31	
	2	0.000	-0.030	0.030	0.35	12.1
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.12	34.5
Aroclor-1268	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.14	7.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

A-10 (0.5-1.5)

Lab Sample ID: 21I1418-14

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.12	8.0
Aroclor-1268	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.12	8.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

V-11 (0.25-0.5)

Lab Sample ID: 21I1418-15

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.25	22.2
Aroclor-1260	1	0.000	-0.030	0.030	0.094	
	2	0.000	-0.030	0.030	0.067	33.5
Aroclor-1268	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.14	7.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

V-11 (0.5-1.5)

Lab Sample ID: 21I1418-16

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.16	6.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

W-10 (0.25-0.5)

Lab Sample ID: 21I1418-17

Date(s) Analyzed: 10/01/2021 10/01/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.26	16.7

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

W-10 (0.5-1.5)

Lab Sample ID: 21I1418-18

Date(s) Analyzed: 10/01/2021 10/01/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.074	
	2	0.000	-0.030	0.030	0.087	16.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Y-9 (0.25-0.5)

Lab Sample ID: 21I1418-19RE1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	1.7	
	2	0.000	-0.030	0.030	1.4	19.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Y-9 (0.5-1.5)

Lab Sample ID: 21I1418-20

Date(s) Analyzed: 10/01/2021 10/01/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.22	44.4
Aroclor-1260	1	0.000	-0.030	0.030	0.082	
	2	0.000	-0.030	0.030	0.069	17.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291149-BS1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.13	14.3

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291149-BSD1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291149-MS1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.17	5.7
Aroclor-1260	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.18	10.5

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291149-MSD1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD 9

Instrument ID (2): ECD 9

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.12	8.7
Aroclor-1260	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.12	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291624-BS1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.10	18.2
Aroclor-1260	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.11	8.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291624-BSD1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.11	8.7
Aroclor-1260	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.11	0.0

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

P-02	Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.
R-06	Matrix spike duplicate RPD is outside of control limits. Reduced precision is anticipated for reported result for this compound in this sample.
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.
S-24	Surrogate recovery is biased high due to the presence of Aroclor 1268 in the sample. Aroclor 1268 contains decachlorobiphenyl.

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Product/Solid	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1418

con-test A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 3 of 6

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 369 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	C-11 (0.25-0.5)	9/24	11:10	Grab	S	U		1				X
2	C-11 (0.5-1.5)		11:15	Grab	S	U		1				X
3	D-11 (0.25-0.5)		10:10	Grab	S	U		1				X
4	D-11 (0.~~35~~-~~4~~.5)		10:15	Grab	S	U		1				X
5	E-11 (0.25-0.5)		10:25	Grab	S	U		1				X
6	E-11 (0.5-1.5)		10:30	Grab	S	U		1				X
7	V-12 (0.25-0.5)		11:30	Grab	S	U		1				X
8	V-12 (0.5-1.5)		11:35	Grab	S	U		1				X
9	W-12 (0.25-0.5)		11:40	Grab	S	U		1				X
10	W-12 (0.5-1.5)	↓	11:45	Grab	S	U		1				X

Relinquished by: (signature) B Dutra	Date/Time: 9/24 15:20
Received by: (signature)	Date/Time: 9/24/21 1520
Relinquished by: (signature)	Date/Time: 9/24/21 1845
Received by: (signature) 5.5	Date/Time: 9/24/21 1845
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SES

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

NELAC and AIHA-LAP, LLC Accredited

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Lab Comments:

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes**:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes**:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

211418

con-test
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 4 of 6

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 369 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	W-13 (0.25-0.5)	9:24	12:50	Grab	S	U		1				✓
12	W-13 (0.5-1.5)		12:55	Grab	S	U		1				✓
13	A-10 (0.25-0.5)		13:10	Grab	S	U		1				✓
14	A-10 (0.5-1.5)		13:15	Grab	S	U		1				✓
15	V-11 (0.25-0.5)		13:20	Grab	S	U		1				✓
16	V-11 (0.5-1.5)		13:25	Grab	S	U		1				✓
17	W-10 (0.25-0.5)		13:30	Grab	S	U		1				✓
18	W-10 (0.5-1.5)		13:35	Grab	S	U		1				✓
19	Y-9 (0.25-0.5)		13:40	Grab	S	U		1				✓
20	Y-9 (0.5-1.5)		13:45	Grab	S	U		1				✓

Relinquished by: (signature)	Date/Time: 9/24 15:20
Received by: (signature)	Date/Time: 9/24/21 1540
Relinquished by: (signature)	Date/Time: 9/24/21 1845
Received by: (signature) 55	Date/Time: 9/24/21 1845
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W&B

Received By ak Date 9/24/21 Time 1845

How were the samples received?
In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 5.5
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information?
Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? NA Acid ___ Base ___

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 1, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 475 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1420

Enclosed are results of analyses for samples received by the laboratory on September 24, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/1/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1420

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 475 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
A-7 (0.25-0.5)	21I1420-01	Soil		SM 2540G SW-846 8082A	
A-7 (0.5-1.5)	21I1420-02	Soil		SM 2540G SW-846 8082A	
B-6 (0.25-0.5)	21I1420-03	Soil		SM 2540G SW-846 8082A	
B-6 (0.5-1.5)	21I1420-04	Soil		SM 2540G SW-846 8082A	
A-5 (0.25-0.5)	21I1420-05	Soil		SM 2540G SW-846 8082A	
A-5 (0.5-1.5)	21I1420-06	Soil		SM 2540G SW-846 8082A	
A-1 (0.25-0.5)	21I1420-07	Soil		SM 2540G SW-846 8082A	
A-1 (0.5-1.5)	21I1420-08	Soil		SM 2540G SW-846 8082A	
A-3 (0.25-0.5)	21I1420-09	Soil		SM 2540G SW-846 8082A	
A-3 (0.5-1.5)	21I1420-10	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-7 (0.25-0.5) Sampled: 9/24/2021 14:20

Sample ID: 21I1420-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1221 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1232 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1242 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1248 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1254 [1]	0.086	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1260 [2]	0.084	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1262 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG
Aroclor-1268 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:01	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	103	30-150		9/30/21 11:01
Decachlorobiphenyl [2]	99.7	30-150		9/30/21 11:01
Tetrachloro-m-xylene [1]	101	30-150		9/30/21 11:01
Tetrachloro-m-xylene [2]	99.9	30-150		9/30/21 11:01

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-7 (0.25-0.5)   Sampled: 9/24/2021 14:20

Sample ID: 21I1420-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	74.8		% Wt	1		SM 2540G	9/28/21	9/29/21 14:25	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH　　Sample Description:　　Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-7 (0.5-1.5)　　Sampled: 9/24/2021 14:25

Sample ID: 21I1420-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1221 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1232 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1242 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1248 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1254 [2]	0.18	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1260 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1262 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG
Aroclor-1268 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:19	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	117	30-150		9/30/21 11:19
Decachlorobiphenyl [2]	118	30-150		9/30/21 11:19
Tetrachloro-m-xylene [1]	99.9	30-150		9/30/21 11:19
Tetrachloro-m-xylene [2]	101	30-150		9/30/21 11:19

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-7 (0.5-1.5) Sampled: 9/24/2021 14:25

Sample ID: 21I1420-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	46.7		% Wt	1		SM 2540G	9/28/21	9/29/21 14:25	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: B-6 (0.25-0.5)
Sampled: 9/24/2021 14:35

Sample ID: 21I1420-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1221 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1232 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1242 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1248 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1254 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1260 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1262 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG
Aroclor-1268 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:37	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	93.4	30-150		9/30/21 11:37
Decachlorobiphenyl [2]	95.4	30-150		9/30/21 11:37
Tetrachloro-m-xylene [1]	97.7	30-150		9/30/21 11:37
Tetrachloro-m-xylene [2]	100	30-150		9/30/21 11:37

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: B-6 (0.25-0.5) Sampled: 9/24/2021 14:35

Sample ID: 21I1420-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.6		% Wt	1		SM 2540G	9/28/21	9/29/21 14:25	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: B-6 (0.5-1.5)   Sampled: 9/24/2021 14:40

Sample ID: 21I1420-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1221 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1232 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1242 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1248 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1254 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1260 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1262 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG
Aroclor-1268 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 11:55	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	98.3	30-150		9/30/21 11:55
Decachlorobiphenyl [2]	98.1	30-150		9/30/21 11:55
Tetrachloro-m-xylene [1]	94.1	30-150		9/30/21 11:55
Tetrachloro-m-xylene [2]	93.8	30-150		9/30/21 11:55

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: B-6 (0.5-1.5) Sampled: 9/24/2021 14:40

Sample ID: 21I1420-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.7		% Wt	1		SM 2540G	9/28/21	9/29/21 14:25	GLH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-5 (0.25-0.5)   Sampled: 9/24/2021 14:40

Sample ID: 21I1420-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1221 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1232 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1242 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1248 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1254 [2]	0.085	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1260 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1262 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG
Aroclor-1268 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:13	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Analyzed
Decachlorobiphenyl [1]	77.8	30-150		9/30/21 12:13
Decachlorobiphenyl [2]	78.6	30-150		9/30/21 12:13
Tetrachloro-m-xylene [1]	90.4	30-150		9/30/21 12:13
Tetrachloro-m-xylene [2]	90.3	30-150		9/30/21 12:13

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-5 (0.25-0.5) Sampled: 9/24/2021 14:40

Sample ID: 21I1420-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.6		% Wt	1		SM 2540G	9/28/21	9/29/21 14:25	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-5 (0.5-1.5) Sampled: 9/24/2021 14:45

Sample ID: 21I1420-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1221 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1232 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1242 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1248 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1254 [2]	0.090	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1260 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1262 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG
Aroclor-1268 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:31	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	82.3	30-150		9/30/21 12:31
Decachlorobiphenyl [2]	81.7	30-150		9/30/21 12:31
Tetrachloro-m-xylene [1]	90.0	30-150		9/30/21 12:31
Tetrachloro-m-xylene [2]	89.0	30-150		9/30/21 12:31

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-5 (0.5-1.5)   Sampled: 9/24/2021 14:45

Sample ID: 21I1420-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.7		% Wt	1		SM 2540G	9/28/21	9/29/21 14:25	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-1 (0.25-0.5) Sampled: 9/24/2021 15:10

Sample ID: 21I1420-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1221 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1232 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1242 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1248 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1254 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1260 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1262 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG
Aroclor-1268 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 12:49	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	98.6	30-150		9/30/21 12:49
Decachlorobiphenyl [2]	98.1	30-150		9/30/21 12:49
Tetrachloro-m-xylene [1]	94.5	30-150		9/30/21 12:49
Tetrachloro-m-xylene [2]	96.1	30-150		9/30/21 12:49

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-1 (0.25-0.5) Sampled: 9/24/2021 15:10

Sample ID: 21I1420-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.8		% Wt	1		SM 2540G	9/28/21	9/29/21 14:25	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-1 (0.5-1.5)   Sampled: 9/24/2021 15:15

Sample ID: 21I1420-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1221 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1232 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1242 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1248 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1254 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1260 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1262 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG
Aroclor-1268 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:07	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	90.2	30-150		9/30/21 13:07
Decachlorobiphenyl [2]	90.8	30-150		9/30/21 13:07
Tetrachloro-m-xylene [1]	84.5	30-150		9/30/21 13:07
Tetrachloro-m-xylene [2]	85.4	30-150		9/30/21 13:07

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-1 (0.5-1.5) Sampled: 9/24/2021 15:15

Sample ID: 21I1420-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.3		% Wt	1		SM 2540G	9/28/21	9/29/21 14:26	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-3 (0.25-0.5) Sampled: 9/24/2021 15:00

Sample ID: 21I1420-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1221 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1232 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1242 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1248 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1254 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1260 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1262 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG
Aroclor-1268 [1]	ND	0.093	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:25	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.5	30-150		9/30/21 13:25
Decachlorobiphenyl [2]	96.9	30-150		9/30/21 13:25
Tetrachloro-m-xylene [1]	86.8	30-150		9/30/21 13:25
Tetrachloro-m-xylene [2]	87.6	30-150		9/30/21 13:25

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-3 (0.25-0.5) Sampled: 9/24/2021 15:00

Sample ID: 21I1420-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.8		% Wt	1		SM 2540G	9/28/21	9/29/21 14:26	GLH

Project Location: 475 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-3 (0.5-1.5)	Sampled: 9/24/2021 15:05

Sample ID: 21I1420-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1221 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1232 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1242 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1248 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1254 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1260 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1262 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG
Aroclor-1268 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	9/28/21	9/30/21 13:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	88.1	30-150		9/30/21 13:43
Decachlorobiphenyl [2]	88.7	30-150		9/30/21 13:43
Tetrachloro-m-xylene [1]	80.9	30-150		9/30/21 13:43
Tetrachloro-m-xylene [2]	82.8	30-150		9/30/21 13:43

Project Location: 475 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1420

Date Received: 9/24/2021

Field Sample #: A-3 (0.5-1.5) Sampled: 9/24/2021 15:05

Sample ID: 21I1420-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.6		% Wt	1		SM 2540G	9/28/21	9/29/21 14:26	GLH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1420-01 [A-7 (0.25-0.5)]	B291236	09/28/21
21I1420-02 [A-7 (0.5-1.5)]	B291236	09/28/21
21I1420-03 [B-6 (0.25-0.5)]	B291236	09/28/21
21I1420-04 [B-6 (0.5-1.5)]	B291236	09/28/21
21I1420-05 [A-5 (0.25-0.5)]	B291236	09/28/21
21I1420-06 [A-5 (0.5-1.5)]	B291236	09/28/21
21I1420-07 [A-1 (0.25-0.5)]	B291236	09/28/21
21I1420-08 [A-1 (0.5-1.5)]	B291236	09/28/21
21I1420-09 [A-3 (0.25-0.5)]	B291236	09/28/21
21I1420-10 [A-3 (0.5-1.5)]	B291236	09/28/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1420-01 [A-7 (0.25-0.5)]	B291180	10.0	10.0	09/28/21
21I1420-02 [A-7 (0.5-1.5)]	B291180	10.0	10.0	09/28/21
21I1420-03 [B-6 (0.25-0.5)]	B291180	10.0	10.0	09/28/21
21I1420-04 [B-6 (0.5-1.5)]	B291180	10.0	10.0	09/28/21
21I1420-05 [A-5 (0.25-0.5)]	B291180	10.0	10.0	09/28/21
21I1420-06 [A-5 (0.5-1.5)]	B291180	10.0	10.0	09/28/21
21I1420-07 [A-1 (0.25-0.5)]	B291180	10.0	10.0	09/28/21
21I1420-08 [A-1 (0.5-1.5)]	B291180	10.0	10.0	09/28/21
21I1420-09 [A-3 (0.25-0.5)]	B291180	10.0	10.0	09/28/21
21I1420-10 [A-3 (0.5-1.5)]	B291180	10.0	10.0	09/28/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291180 - SW-846 3540C										
Blank (B291180-BLK1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	ND	0.020	mg/Kg wet							
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1221	ND	0.020	mg/Kg wet							
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1232	ND	0.020	mg/Kg wet							
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1242	ND	0.020	mg/Kg wet							
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1248	ND	0.020	mg/Kg wet							
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1254	ND	0.020	mg/Kg wet							
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1260	ND	0.020	mg/Kg wet							
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1262	ND	0.020	mg/Kg wet							
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1268	ND	0.020	mg/Kg wet							
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.190*		mg/Kg wet	0.200		95.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.212*		mg/Kg wet	0.200		106	30-150			
Surrogate: Tetrachloro-m-xylene	*0.185*		mg/Kg wet	0.200		92.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.179*		mg/Kg wet	0.200		89.6	30-150			
LCS (B291180-BS1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	0.18	0.020	mg/Kg wet	0.200		90.0	40-140			
Aroclor-1016 [2C]	0.18	0.020	mg/Kg wet	0.200		90.7	40-140			
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		83.7	40-140			
Aroclor-1260 [2C]	0.17	0.020	mg/Kg wet	0.200		83.1	40-140			
Surrogate: Decachlorobiphenyl	*0.198*		mg/Kg wet	0.200		99.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.194*		mg/Kg wet	0.200		97.2	30-150			
Surrogate: Tetrachloro-m-xylene	*0.184*		mg/Kg wet	0.200		92.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.177*		mg/Kg wet	0.200		88.6	30-150			
LCS Dup (B291180-BSD1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Aroclor-1016	0.17	0.020	mg/Kg wet	0.200		87.3	40-140	2.97	30	
Aroclor-1016 [2C]	0.17	0.020	mg/Kg wet	0.200		86.0	40-140	5.32	30	
Aroclor-1260	0.16	0.020	mg/Kg wet	0.200		80.7	40-140	3.62	30	
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		79.3	40-140	4.69	30	
Surrogate: Decachlorobiphenyl	*0.183*		mg/Kg wet	0.200		91.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.184*		mg/Kg wet	0.200		91.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.186*		mg/Kg wet	0.200		93.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.179*		mg/Kg wet	0.200		89.5	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291180 - SW-846 3540C										
Matrix Spike (B291180-MS1)	**Source: 21I1420-08**		Prepared: 09/28/21 Analyzed: 09/30/21							
Aroclor-1016	0.23	0.092	mg/Kg dry	0.229	ND	102	40-140			
Aroclor-1016 [2C]	0.23	0.092	mg/Kg dry	0.229	ND	102	40-140			
Aroclor-1260	0.20	0.092	mg/Kg dry	0.229	ND	87.6	40-140			
Aroclor-1260 [2C]	0.20	0.092	mg/Kg dry	0.229	ND	88.4	40-140			
Surrogate: Decachlorobiphenyl	*0.219*		mg/Kg dry	0.229		95.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.224*		mg/Kg dry	0.229		97.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.205*		mg/Kg dry	0.229		89.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.205*		mg/Kg dry	0.229		89.6	30-150			
Matrix Spike Dup (B291180-MSD1)	**Source: 21I1420-08**		Prepared: 09/28/21 Analyzed: 09/30/21							
Aroclor-1016	0.24	0.092	mg/Kg dry	0.229	ND	106	40-140	4.30	50	
Aroclor-1016 [2C]	0.24	0.092	mg/Kg dry	0.229	ND	103	40-140	0.803	50	
Aroclor-1260	0.21	0.092	mg/Kg dry	0.229	ND	90.1	40-140	2.73	50	
Aroclor-1260 [2C]	0.20	0.092	mg/Kg dry	0.229	ND	88.7	40-140	0.429	50	
Surrogate: Decachlorobiphenyl	*0.216*		mg/Kg dry	0.229		94.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.220*		mg/Kg dry	0.229		95.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.202*		mg/Kg dry	0.229		88.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.205*		mg/Kg dry	0.229		89.6	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

A-7 (0.25-0.5)

Lab Sample ID: 21I1420-01

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.086	
	2	0.000	-0.030	0.030	0.19	75.4
Aroclor-1260	1	0.000	-0.030	0.030	0.073	
	2	0.000	-0.030	0.030	0.084	14.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

A-7 (0.5-1.5)

Lab Sample ID: 21I1420-02

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.18	25.0

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

A-5 (0.25-0.5)

Lab Sample ID: 21I1420-05

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.083	
	2	0.000	-0.030	0.030	0.085	2.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

A-5 (0.5-1.5)

Lab Sample ID: 21I1420-06

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.085	
	2	0.000	-0.030	0.030	0.090	5.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291180-BS1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.18	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.17	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291180-BSD1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.17	5.7
Aroclor-1260	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.16	0.0

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291180-MS1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.23	
	2	0.000	-0.030	0.030	0.23	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.20	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291180-MSD1

Date(s) Analyzed: 09/30/2021 09/30/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.24	
	2	0.000	-0.030	0.030	0.24	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.20	4.9

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1420

con-test
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 5 of 6

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	A-7 (0.25-0.5)	9/24	14:20	Grab	S	U		1	[illegible]			✓
2	A-7 (0.5-1.5		14:25	Grab	S	U		1				✓
3	B-6 (0.25-0.5)		14:35	Grab	S	U		1				✓
4	B-6 (0.5-1.5)		14:40	Grab	S	U		1				✓
	~~A-5 (0.25-0.5)~~		~~14:20~~	~~Grab~~	~~S~~	~~U~~						
	~~A-5 (0.5-1.5)~~		~~14:25~~	~~Grab~~	~~S~~	~~U~~						
5	A-5(0.25-0.5)		14:40	Grab	S	U		1				✓
6	A-5(0.5-1.5)		14:48	Grab	S	U		1				✓
7	A-1 (0.25-0.5)		15:10	Grab	S	U		1				✓
8	A-1 (0.5-1.5)		15:15	Grab	S	U		1				✓

Relinquished by: (signature)	Date/Time: 9/24 1520
Received by: (signature)	Date/Time: 9/24/21 1520
Relinquished by: (signature)	Date/Time: 9/24/21 1845
Received by: (signature) 5.5	Date/Time: 9/24/21 1845
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other SRS

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Project Entity

Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

HELAC and AIHA-LAP, LLC Accredited

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

²Preservation Code

Total Number Of:

VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

21I1420

con-test®
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.conte

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 6 of 6

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 369 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Req
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
9	A-3 (0.25-0.5)	9/24	15:00	Grab	S	U		1				X
10	A-3 (0.5-1.5)	9/24	15:05	Grab	S	U		1				X
				Grab	S	U						
				Grab	S	U						
				Grab	S	U						
				Grab	S	U						
				Grab	S	U						
				Grab	S	U						
				Grab	S	U						
				Grab	S	U						

² Preservation Code

Total Number Of:
VIALS___
GLASS___
PLASTIC___
BACTERIA___
ENCORE___

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes**:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes**:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 9/24/21 13:20
Received by: (signature)	Date/Time: 9/24/21 1540
Relinquished by: (signature)	Date/Time: 9/24/21 1845
Received by: (signature) 5.5	Date/Time: 9/24/21 1845
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W & B

Received By ak Date 9/24/21 Time 1845

How were the samples received? In Cooler T No Cooler ____ On Ice T No Ice ____

Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 5.5

By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ____

Are there Rushes? F Who was notified? ____

Are there Short Holds? F Who was notified? ____

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? NA Acid ____ Base ____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	10
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 8, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1825

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/8/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1825

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
G-6 (0.25-0.5)	21I1825-01	Soil		SM 2540G SW-846 8082A	
G-6 (0.5-1.5)	21I1825-02	Soil		SM 2540G SW-846 8082A	
G-7 (0.25-1.5)	21I1825-03	Soil		SM 2540G SW-846 8082A	
G-7 (0.5-1.5)	21I1825-04	Soil		SM 2540G SW-846 8082A	
G-7 (1.5-3)	21I1825-05	Soil		SM 2540G SW-846 8082A	
F-8 (0.25-0.5)	21I1825-06	Soil		SM 2540G SW-846 8082A	
F-8 (0.5-1.5)	21I1825-07	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

P-02

Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.

Analyte & Samples(s) Qualified:

Aroclor-1254
21I1825-01[G-6 (0.25-0.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-6 (0.25-0.5)   Sampled: 9/30/2021 14:10

Sample ID: 21I1825-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.085	0.038	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1221 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1232 [1]	ND	0.085	0.077	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1242 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1248 [1]	ND	0.085	0.030	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1254 [1]	0.30	0.085	0.034	mg/Kg dry	4	P-02	SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1260 [1]	0.21	0.085	0.047	mg/Kg dry	4		SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1262 [1]	ND	0.085	0.043	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:22	SFM
Aroclor-1268 [1]	ND	0.085	0.068	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:22	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	101	30-150		10/7/21 12:22
Decachlorobiphenyl [2]	93.7	30-150		10/7/21 12:22
Tetrachloro-m-xylene [1]	91.7	30-150		10/7/21 12:22
Tetrachloro-m-xylene [2]	78.5	30-150		10/7/21 12:22

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-6 (0.25-0.5) Sampled: 9/30/2021 14:10

Sample ID: 21I1825-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.0		% Wt	1		SM 2540G	10/6/21	10/7/21 15:23	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-6 (0.5-1.5) Sampled: 9/30/2021 14:12

Sample ID: 21I1825-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1254 [2]	0.067	0.089	0.036	mg/Kg dry	4	J	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1260 [1]	0.069	0.089	0.049	mg/Kg dry	4	J	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1262 [1]	ND	0.089	0.045	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:39	SFM
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:39	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	93.7	30-150		10/7/21 12:39
Decachlorobiphenyl [2]	86.2	30-150		10/7/21 12:39
Tetrachloro-m-xylene [1]	87.9	30-150		10/7/21 12:39
Tetrachloro-m-xylene [2]	75.2	30-150		10/7/21 12:39

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-6 (0.5-1.5) Sampled: 9/30/2021 14:12

Sample ID: 21I1825-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.1		% Wt	1		SM 2540G	10/6/21	10/7/21 15:23	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-7 (0.25-1.5) Sampled: 9/30/2021 14:15

Sample ID: 21I1825-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1221 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1232 [1]	ND	0.093	0.083	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1242 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1248 [1]	ND	0.093	0.032	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1254 [1]	0.21	0.093	0.037	mg/Kg dry	4		SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1260 [1]	0.28	0.093	0.051	mg/Kg dry	4		SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1262 [1]	ND	0.093	0.046	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:57	SFM
Aroclor-1268 [1]	ND	0.093	0.074	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 12:57	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Analyzed
Decachlorobiphenyl [1]	101	30-150		10/7/21 12:57
Decachlorobiphenyl [2]	93.8	30-150		10/7/21 12:57
Tetrachloro-m-xylene [1]	101	30-150		10/7/21 12:57
Tetrachloro-m-xylene [2]	84.7	30-150		10/7/21 12:57

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-7 (0.25-1.5)　Sampled: 9/30/2021 14:15

Sample ID: 21I1825-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.7		% Wt	1		SM 2540G	10/6/21	10/7/21 15:23	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-7 (0.5-1.5) Sampled: 9/30/2021 14:17

Sample ID: 21I1825-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	0.041	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1221 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1232 [1]	ND	0.091	0.082	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1242 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1248 [1]	ND	0.091	0.032	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1254 [1]	0.095	0.091	0.037	mg/Kg dry	4		SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1260 [1]	0.11	0.091	0.050	mg/Kg dry	4		SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1262 [1]	ND	0.091	0.046	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:14	SFM
Aroclor-1268 [1]	ND	0.091	0.073	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:14	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	99.4	30-150		10/7/21 13:14
Decachlorobiphenyl [2]	91.2	30-150		10/7/21 13:14
Tetrachloro-m-xylene [1]	96.1	30-150		10/7/21 13:14
Tetrachloro-m-xylene [2]	80.5	30-150		10/7/21 13:14

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-7 (0.5-1.5) Sampled: 9/30/2021 14:17

Sample ID: 21I1825-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:24	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-7 (1.5-3) Sampled: 9/30/2021 14:20

Sample ID: 21I1825-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1254 [1]	ND	0.086	0.035	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:32	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	107	30-150		10/7/21 13:32
Decachlorobiphenyl [2]	96.4	30-150		10/7/21 13:32
Tetrachloro-m-xylene [1]	102	30-150		10/7/21 13:32
Tetrachloro-m-xylene [2]	85.6	30-150		10/7/21 13:32

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: G-7 (1.5-3) Sampled: 9/30/2021 14:20

Sample ID: 21I1825-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.7		% Wt	1		SM 2540G	10/6/21	10/7/21 15:24	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH　　Sample Description:　　Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: F-8 (0.25-0.5)　　Sampled: 9/30/2021 14:25

Sample ID: 21I1825-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.047	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1221 [1]	ND	0.10	0.078	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1232 [1]	ND	0.10	0.094	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1242 [1]	ND	0.10	0.078	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1248 [1]	ND	0.10	0.037	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1254 [1]	0.071	0.10	0.042	mg/Kg dry	4	J	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1260 [2]	ND	0.10	0.058	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1262 [1]	ND	0.10	0.052	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM
Aroclor-1268 [1]	ND	0.10	0.084	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 13:49	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	94.6	30-150		10/7/21 13:49
Decachlorobiphenyl [2]	86.1	30-150		10/7/21 13:49
Tetrachloro-m-xylene [1]	96.0	30-150		10/7/21 13:49
Tetrachloro-m-xylene [2]	80.0	30-150		10/7/21 13:49

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: F-8 (0.25-0.5)   Sampled: 9/30/2021 14:25

Sample ID: 21I1825-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	74.9		% Wt	1		SM 2540G	10/6/21	10/7/21 15:24	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: F-8 (0.5-1.5)   Sampled: 9/30/2021 14:28

Sample ID: 21I1825-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.096	0.043	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1221 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1232 [1]	ND	0.096	0.087	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1242 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1248 [1]	ND	0.096	0.034	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1254 [1]	ND	0.096	0.039	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1260 [1]	ND	0.096	0.053	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1262 [1]	ND	0.096	0.048	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM
Aroclor-1268 [1]	ND	0.096	0.077	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:07	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	92.3	30-150		10/7/21 14:07
Decachlorobiphenyl [2]	82.1	30-150		10/7/21 14:07
Tetrachloro-m-xylene [1]	77.4	30-150		10/7/21 14:07
Tetrachloro-m-xylene [2]	64.9	30-150		10/7/21 14:07

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1825

Date Received: 9/30/2021

Field Sample #: F-8 (0.5-1.5) Sampled: 9/30/2021 14:28

Sample ID: 21I1825-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.1		% Wt	1		SM 2540G	10/6/21	10/7/21 15:24	TDK

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1825-01 [G-6 (0.25-0.5)]	B291896	10/06/21
21I1825-02 [G-6 (0.5-1.5)]	B291896	10/06/21
21I1825-03 [G-7 (0.25-1.5)]	B291896	10/06/21
21I1825-04 [G-7 (0.5-1.5)]	B291896	10/06/21
21I1825-05 [G-7 (1.5-3)]	B291896	10/06/21
21I1825-06 [F-8 (0.25-0.5)]	B291896	10/06/21
21I1825-07 [F-8 (0.5-1.5)]	B291896	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1825-01 [G-6 (0.25-0.5)]	B291790	10.1	10.0	10/05/21
21I1825-02 [G-6 (0.5-1.5)]	B291790	10.2	10.0	10/05/21
21I1825-03 [G-7 (0.25-1.5)]	B291790	10.3	10.0	10/05/21
21I1825-04 [G-7 (0.5-1.5)]	B291790	10.1	10.0	10/05/21
21I1825-05 [G-7 (1.5-3)]	B291790	10.0	10.0	10/05/21
21I1825-06 [F-8 (0.25-0.5)]	B291790	10.2	10.0	10/05/21
21I1825-07 [F-8 (0.5-1.5)]	B291790	10.1	10.0	10/05/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291790 - SW-846 3540C										
Blank (B291790-BLK1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.212*		mg/Kg wet	0.200		106	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.200*		mg/Kg wet	0.200		100	30-150			
Surrogate: Tetrachloro-m-xylene	*0.198*		mg/Kg wet	0.200		98.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.171*		mg/Kg wet	0.200		85.3	30-150			
LCS (B291790-BS1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	0.19	0.020	mg/Kg wet	0.200		92.5	40-140			
Aroclor-1016 [2C]	0.16	0.020	mg/Kg wet	0.200		78.0	40-140			
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		86.4	40-140			
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		78.4	40-140			
Surrogate: Decachlorobiphenyl	*0.210*		mg/Kg wet	0.200		105	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.197*		mg/Kg wet	0.200		98.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.200*		mg/Kg wet	0.200		99.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.169*		mg/Kg wet	0.200		84.7	30-150			
LCS Dup (B291790-BSD1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	0.18	0.020	mg/Kg wet	0.200		90.5	40-140	2.18	30	
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		86.3	40-140	0.0324	30	
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		77.8	40-140	0.702	30	
Surrogate: Decachlorobiphenyl	*0.207*		mg/Kg wet	0.200		103	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.193*		mg/Kg wet	0.200		96.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.178*		mg/Kg wet	0.200		89.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.152*		mg/Kg wet	0.200		75.9	30-150			
Matrix Spike (B291790-MS1)	**Source: 21I1825-05**			Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	0.24	0.086	mg/Kg dry	0.216	ND	111	40-140			
Aroclor-1016 [2C]	0.21	0.086	mg/Kg dry	0.216	ND	97.8	40-140			
Aroclor-1260	0.22	0.086	mg/Kg dry	0.216	ND	102	40-140			
Aroclor-1260 [2C]	0.19	0.086	mg/Kg dry	0.216	ND	89.3	40-140			
Surrogate: Decachlorobiphenyl	*0.234*		mg/Kg dry	0.216		108	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.211*		mg/Kg dry	0.216		97.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.221*		mg/Kg dry	0.216		102	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.183*		mg/Kg dry	0.216		85.0	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291790 - SW-846 3540C										
Matrix Spike Dup (B291790-MSD1)	**Source: 21I1825-05**		Prepared: 10/05/21 Analyzed: 10/07/21							
Aroclor-1016	0.23	0.086	mg/Kg dry	0.216	ND	107	40-140	3.48	50	
Aroclor-1016 [2C]	0.20	0.086	mg/Kg dry	0.216	ND	93.4	40-140	4.63	50	
Aroclor-1260	0.22	0.086	mg/Kg dry	0.216	ND	101	40-140	1.14	50	
Aroclor-1260 [2C]	0.19	0.086	mg/Kg dry	0.216	ND	89.0	40-140	0.437	50	
Surrogate: Decachlorobiphenyl	*0.227*		mg/Kg dry	0.216		105	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.206*		mg/Kg dry	0.216		95.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.206*		mg/Kg dry	0.216		95.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.172*		mg/Kg dry	0.216		79.6	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

G-6 (0.25-0.5)

Lab Sample ID: 21I1825-01

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.30	
	2	0.000	-0.030	0.030	0.50	50.0
Aroclor-1260	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.19	10.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

G-6 (0.5-1.5)

Lab Sample ID: 21I1825-02

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.060	
	2	0.000	-0.030	0.030	0.067	11.0
Aroclor-1260	1	0.000	-0.030	0.030	0.069	
	2	0.000	-0.030	0.030	0.062	10.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

G-7 (0.25-1.5)

Lab Sample ID: 21I1825-03

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.21	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.28	
	2	0.000	-0.030	0.030	0.24	15.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

G-7 (0.5-1.5)

Lab Sample ID: 21I1825-04

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.095	
	2	0.000	-0.030	0.030	0.089	7.6
Aroclor-1260	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.095	14.6

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

F-8 (0.25-0.5)

Lab Sample ID: 21I1825-06

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.071	
	2	0.000	-0.030	0.030	0.049	36.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291790-BS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.16	17.1
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291790-BSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291790-MS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.24	
	2	0.000	-0.030	0.030	0.21	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.19	14.6

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291790-MSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.23	
	2	0.000	-0.030	0.030	0.20	14.0
Aroclor-1260	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.19	14.6

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
P-02	Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1825

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 17 of 17

Company Name: Wilcox & Barton, Inc.
Address: 16 Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth, NH
Project Number: BANFOODS
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dunn & M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCBs
1	G-6 (0.25-0.5)	9/30	14:10	GRAB	S	U		1				X
2	G-6 (0.5-1.5)		14:12					1				X
3	G-7 (0.25-0.5)		14:15					1				X
4	G-7 (0.5-1.5)		14:17					1				X
5	G-7 (1.5-3)		14:20					1				X
6	F-8 (0.25-0.5)		14:25					1				X
7	F-8 (0.5-1.5)		14:28					1				X

² Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1800
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature) 23.9°	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: (A)

Detection Limit Requirements
MA
CT
Other: SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ____ On Ice T No Ice ____
Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 2.3, 4.8°C
By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ____
Are there Rushes? F Who was notified? ____
Are there Short Holds? F Who was notified? ____
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	7
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 13, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1826

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/13/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1826

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
F-5 (1.5-3)	21I1826-01	Soil		SM 2540G SW-846 8082A	
G-5 (0.25-0.5)	21I1826-02	Soil		SM 2540G SW-846 8082A	
G-5 (0.5-1.5)	21I1826-03	Soil		SM 2540G SW-846 8082A	
F-4 (0.25-0.5)	21I1826-04	Soil		SM 2540G SW-846 8082A	
F-4 (0.5-1.5)	21I1826-05	Soil		SM 2540G SW-846 8082A	
G-4 (0.25-0.5)	21I1826-06	Soil		SM 2540G SW-846 8082A	
G-4 (0.5-1.5)	21I1826-07	Soil		SM 2540G SW-846 8082A	
G-4 (1.5-3)	21I1826-08	Soil		SM 2540G SW-846 8082A	
H-4 (0.25-0.5)	21I1826-09	Soil		SM 2540G SW-846 8082A	
H-4 (0.5-1.5)	21I1826-10	Soil		SM 2540G SW-846 8082A	
I-3 (0.25-0.5)	21I1826-11	Soil		SM 2540G SW-846 8082A	
I-3 (0.5-1.5)	21I1826-12	Soil		SM 2540G SW-846 8082A	
H-3 (0.25-0.5)	21I1826-13	Soil		SM 2540G SW-846 8082A	
H-3 (0.5-1.5)	21I1826-14	Soil		SM 2540G SW-846 8082A	
H-3 (1.5-3)	21I1826-15	Soil		SM 2540G SW-846 8082A	
F-3 (0.25-0.5)	21I1826-16	Soil		SM 2540G SW-846 8082A	
F-3 (0.5-1.5)	21I1826-17	Soil		SM 2540G SW-846 8082A	
F-3 (1.5-3)	21I1826-18	Soil		SM 2540G SW-846 8082A	
E-3 (0.25-0.5)	21I1826-19	Soil		SM 2540G SW-846 8082A	
E-3 (0.5-1.5)	21I1826-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-5 (1.5-3) Sampled: 9/30/2021 12:35

Sample ID: 21I1826-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.085	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1221 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1232 [1]	ND	0.085	0.076	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1242 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1248 [1]	ND	0.085	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1254 [1]	ND	0.085	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1260 [1]	ND	0.085	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1262 [1]	ND	0.085	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG
Aroclor-1268 [1]	ND	0.085	0.068	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:38	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	72.1	30-150		10/7/21 17:38
Decachlorobiphenyl [2]	73.9	30-150		10/7/21 17:38
Tetrachloro-m-xylene [1]	82.4	30-150		10/7/21 17:38
Tetrachloro-m-xylene [2]	78.7	30-150		10/7/21 17:38

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-5 (1.5-3)   Sampled: 9/30/2021 12:35

Sample ID: 21I1826-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.4		% Wt	1		SM 2540G	10/6/21	10/7/21 15:28	TDK

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-5 (0.25-0.5)   Sampled: 9/30/2021 12:38

Sample ID: 21I1826-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1221 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1242 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1254 [1]	ND	0.089	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:55	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.8	30-150		10/7/21 17:55
Decachlorobiphenyl [2]	71.2	30-150		10/7/21 17:55
Tetrachloro-m-xylene [1]	78.0	30-150		10/7/21 17:55
Tetrachloro-m-xylene [2]	74.7	30-150		10/7/21 17:55

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-5 (0.25-0.5) Sampled: 9/30/2021 12:38

Sample ID: 21I1826-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.7		% Wt	1		SM 2540G	10/6/21	10/7/21 15:29	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-5 (0.5-1.5)   Sampled: 9/30/2021 12:40

Sample ID: 21I1826-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1221 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1242 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1254 [1]	ND	0.089	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:13	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	72.5	30-150		10/7/21 18:13
Decachlorobiphenyl [2]	74.6	30-150		10/7/21 18:13
Tetrachloro-m-xylene [1]	77.4	30-150		10/7/21 18:13
Tetrachloro-m-xylene [2]	74.3	30-150		10/7/21 18:13

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-5 (0.5-1.5)　Sampled: 9/30/2021 12:40

Sample ID: 21I1826-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.3		% Wt	1		SM 2540G	10/6/21	10/7/21 15:29	TDK

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-4 (0.25-0.5) Sampled: 9/30/2021 12:43

Sample ID: 21I1826-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1262 [1]	ND	0.087	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG
Aroclor-1268 [1]	ND	0.087	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:30	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	74.9	30-150		10/7/21 18:30
Decachlorobiphenyl [2]	77.0	30-150		10/7/21 18:30
Tetrachloro-m-xylene [1]	81.0	30-150		10/7/21 18:30
Tetrachloro-m-xylene [2]	77.5	30-150		10/7/21 18:30

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1826
Date Received: 9/30/2021
Field Sample #: F-4 (0.25-0.5)
Sampled: 9/30/2021 12:43
Sample ID: 21I1826-04
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.2		% Wt	1		SM 2540G	10/6/21	10/7/21 15:30	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-4 (0.5-1.5)　Sampled: 9/30/2021 12:46

Sample ID: 21I1826-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.079	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1221 [1]	ND	0.079	0.059	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1232 [1]	ND	0.079	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1242 [1]	ND	0.079	0.059	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1248 [1]	ND	0.079	0.028	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1254 [1]	ND	0.079	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1260 [1]	ND	0.079	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1262 [1]	ND	0.079	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG
Aroclor-1268 [1]	ND	0.079	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 18:48	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	71.5	30-150		10/7/21 18:48
Decachlorobiphenyl [2]	73.8	30-150		10/7/21 18:48
Tetrachloro-m-xylene [1]	76.4	30-150		10/7/21 18:48
Tetrachloro-m-xylene [2]	73.5	30-150		10/7/21 18:48

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-4 (0.5-1.5) Sampled: 9/30/2021 12:46

Sample ID: 21I1826-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	97.9		% Wt	1		SM 2540G	10/6/21	10/7/21 15:30	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-4 (0.25-0.5) Sampled: 9/30/2021 12:50

Sample ID: 21I1826-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:06	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	61.2	30-150		10/7/21 19:06
Decachlorobiphenyl [2]	63.1	30-150		10/7/21 19:06
Tetrachloro-m-xylene [1]	66.5	30-150		10/7/21 19:06
Tetrachloro-m-xylene [2]	64.0	30-150		10/7/21 19:06

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1826
Date Received: 9/30/2021
Field Sample #: G-4 (0.25-0.5)
Sampled: 9/30/2021 12:50
Sample ID: 21I1826-06
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:30	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-4 (0.5-1.5) Sampled: 9/30/2021 12:52

Sample ID: 21I1826-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1260 [2]	ND	0.088	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM
Aroclor-1268 [1]	ND	0.088	0.071	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:34	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	84.7	30-150		10/9/21 16:34
Decachlorobiphenyl [2]	89.1	30-150		10/9/21 16:34
Tetrachloro-m-xylene [1]	68.4	30-150		10/9/21 16:34
Tetrachloro-m-xylene [2]	63.4	30-150		10/9/21 16:34

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-4 (0.5-1.5) Sampled: 9/30/2021 12:52

Sample ID: 21I1826-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:31	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-4 (1.5-3)　Sampled: 9/30/2021 12:55

Sample ID: 21I1826-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.083	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1221 [1]	ND	0.083	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1232 [1]	ND	0.083	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1242 [1]	ND	0.083	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1248 [1]	ND	0.083	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1254 [1]	ND	0.083	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1260 [1]	ND	0.083	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1262 [1]	ND	0.083	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG
Aroclor-1268 [1]	ND	0.083	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 19:41	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	67.5	30-150		10/7/21 19:41
Decachlorobiphenyl [2]	69.8	30-150		10/7/21 19:41
Tetrachloro-m-xylene [1]	70.9	30-150		10/7/21 19:41
Tetrachloro-m-xylene [2]	68.1	30-150		10/7/21 19:41

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: G-4 (1.5-3)   Sampled: 9/30/2021 12:55

Sample ID: 21I1826-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.1		% Wt	1		SM 2540G	10/6/21	10/7/21 15:31	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-4 (0.25-0.5)   Sampled: 9/30/2021 13:05

Sample ID: 21I1826-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1262 [1]	ND	0.087	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG
Aroclor-1268 [1]	ND	0.087	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:42	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	71.9	30-150		10/7/21 22:42
Decachlorobiphenyl [2]	73.0	30-150		10/7/21 22:42
Tetrachloro-m-xylene [1]	75.6	30-150		10/7/21 22:42
Tetrachloro-m-xylene [2]	72.1	30-150		10/7/21 22:42

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1826
Date Received: 9/30/2021
Field Sample #: H-4 (0.25-0.5)
Sampled: 9/30/2021 13:05
Sample ID: 21I1826-09
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.4		% Wt	1		SM 2540G	10/6/21	10/7/21 15:32	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-4 (0.5-1.5) Sampled: 9/30/2021 13:08

Sample ID: 21I1826-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:00	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.7	30-150		10/7/21 23:00
Decachlorobiphenyl [2]	78.5	30-150		10/7/21 23:00
Tetrachloro-m-xylene [1]	75.0	30-150		10/7/21 23:00
Tetrachloro-m-xylene [2]	71.7	30-150		10/7/21 23:00

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-4 (0.5-1.5) Sampled: 9/30/2021 13:08

Sample ID: 21I1826-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.3		% Wt	1		SM 2540G	10/6/21	10/7/21 15:32	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: I-3 (0.25-0.5) Sampled: 9/30/2021 13:25

Sample ID: 21I1826-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.041	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1221 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1242 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1248 [1]	ND	0.090	0.032	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1254 [1]	ND	0.090	0.036	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1260 [2]	ND	0.090	0.050	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 16:52	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.7	30-150		10/9/21 16:52
Decachlorobiphenyl [2]	104	30-150		10/9/21 16:52
Tetrachloro-m-xylene [1]	77.4	30-150		10/9/21 16:52
Tetrachloro-m-xylene [2]	74.3	30-150		10/9/21 16:52

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: I-3 (0.25-0.5) Sampled: 9/30/2021 13:25

Sample ID: 21I1826-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.5		% Wt	1		SM 2540G	10/6/21	10/7/21 15:32	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: I-3 (0.5-1.5)　Sampled: 9/30/2021 13:27

Sample ID: 21I1826-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.083	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1221 [1]	ND	0.083	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1232 [1]	ND	0.083	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1242 [1]	ND	0.083	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1248 [1]	ND	0.083	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1254 [1]	ND	0.083	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1260 [1]	ND	0.083	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1262 [1]	ND	0.083	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG
Aroclor-1268 [1]	ND	0.083	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:35	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	78.9	30-150		10/7/21 23:35
Decachlorobiphenyl [2]	81.9	30-150		10/7/21 23:35
Tetrachloro-m-xylene [1]	85.0	30-150		10/7/21 23:35
Tetrachloro-m-xylene [2]	80.8	30-150		10/7/21 23:35

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: I-3 (0.5-1.5) Sampled: 9/30/2021 13:27

Sample ID: 21I1826-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.5		% Wt	1		SM 2540G	10/6/21	10/7/21 15:32	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-3 (0.25-0.5) Sampled: 9/30/2021 13:30

Sample ID: 21I1826-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.084	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1221 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1232 [1]	ND	0.084	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1242 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1248 [1]	ND	0.084	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1254 [1]	ND	0.084	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1260 [1]	ND	0.084	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1262 [1]	ND	0.084	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG
Aroclor-1268 [1]	ND	0.084	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:52	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	68.6	30-150		10/7/21 23:52
Decachlorobiphenyl [2]	71.0	30-150		10/7/21 23:52
Tetrachloro-m-xylene [1]	70.8	30-150		10/7/21 23:52
Tetrachloro-m-xylene [2]	67.8	30-150		10/7/21 23:52

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-3 (0.25-0.5) Sampled: 9/30/2021 13:30

Sample ID: 21I1826-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.8		% Wt	1		SM 2540G	10/6/21	10/7/21 15:33	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-3 (0.5-1.5) Sampled: 9/30/2021 13:33

Sample ID: 21I1826-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.083	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1221 [1]	ND	0.083	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1232 [1]	ND	0.083	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1242 [1]	ND	0.083	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1248 [1]	ND	0.083	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1254 [1]	ND	0.083	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1260 [1]	ND	0.083	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1262 [1]	ND	0.083	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG
Aroclor-1268 [1]	ND	0.083	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:10	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	67.3	30-150		10/8/21 0:10
Decachlorobiphenyl [2]	69.6	30-150		10/8/21 0:10
Tetrachloro-m-xylene [1]	71.1	30-150		10/8/21 0:10
Tetrachloro-m-xylene [2]	68.1	30-150		10/8/21 0:10

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-3 (0.5-1.5)
Sampled: 9/30/2021 13:33

Sample ID: 21I1826-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.9		% Wt	1		SM 2540G	10/6/21	10/7/21 15:33	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-3 (1.5-3)   Sampled: 9/30/2021 13:36

Sample ID: 21I1826-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.081	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1221 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1232 [1]	ND	0.081	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1242 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1248 [1]	ND	0.081	0.028	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1254 [1]	ND	0.081	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1260 [1]	ND	0.081	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1262 [1]	ND	0.081	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG
Aroclor-1268 [1]	ND	0.081	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:27	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	80.7	30-150		10/8/21 0:27
Decachlorobiphenyl [2]	83.8	30-150		10/8/21 0:27
Tetrachloro-m-xylene [1]	83.2	30-150		10/8/21 0:27
Tetrachloro-m-xylene [2]	79.6	30-150		10/8/21 0:27

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: H-3 (1.5-3)   Sampled: 9/30/2021 13:36

Sample ID: 21I1826-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.7		% Wt	1		SM 2540G	10/6/21	10/7/21 15:33	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-3 (0.25-0.5)   Sampled: 9/30/2021 13:45

Sample ID: 21I1826-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1232 [1]	ND	0.088	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1260 [1]	ND	0.088	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG
Aroclor-1268 [1]	ND	0.088	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:45	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	49.6	30-150		10/8/21 0:45
Decachlorobiphenyl [2]	50.7	30-150		10/8/21 0:45
Tetrachloro-m-xylene [1]	57.6	30-150		10/8/21 0:45
Tetrachloro-m-xylene [2]	55.4	30-150		10/8/21 0:45

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-3 (0.25-0.5)　Sampled: 9/30/2021 13:45

Sample ID: 21I1826-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.0		% Wt	1		SM 2540G	10/6/21	10/7/21 15:34	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-3 (0.5-1.5) Sampled: 9/30/2021 13:47

Sample ID: 21I1826-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1221 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1242 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1248 [1]	ND	0.090	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1254 [1]	ND	0.090	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1260 [1]	ND	0.090	0.050	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:03	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Analyzed
Decachlorobiphenyl [1]	58.7	30-150		10/8/21 1:03
Decachlorobiphenyl [2]	60.4	30-150		10/8/21 1:03
Tetrachloro-m-xylene [1]	66.7	30-150		10/8/21 1:03
Tetrachloro-m-xylene [2]	63.9	30-150		10/8/21 1:03

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-3 (0.5-1.5)
Sampled: 9/30/2021 13:47

Sample ID: 21I1826-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.1		% Wt	1		SM 2540G	10/6/21	10/7/21 15:34	TDK

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-3 (1.5-3) Sampled: 9/30/2021 13:50

Sample ID: 21I1826-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1221 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1232 [1]	ND	0.092	0.083	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1242 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1248 [1]	ND	0.092	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1254 [1]	ND	0.092	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1260 [1]	ND	0.092	0.051	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1262 [1]	ND	0.092	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG
Aroclor-1268 [1]	ND	0.092	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:21	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	86.0	30-150		10/8/21 1:21
Decachlorobiphenyl [2]	89.1	30-150		10/8/21 1:21
Tetrachloro-m-xylene [1]	95.4	30-150		10/8/21 1:21
Tetrachloro-m-xylene [2]	92.1	30-150		10/8/21 1:21

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: F-3 (1.5-3) Sampled: 9/30/2021 13:50

Sample ID: 21I1826-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.5		% Wt	1		SM 2540G	10/6/21	10/7/21 15:34	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: E-3 (0.25-0.5) Sampled: 9/30/2021 14:00

Sample ID: 21I1826-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1221 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1232 [1]	ND	0.092	0.083	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1242 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1248 [1]	ND	0.092	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1254 [1]	ND	0.092	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1260 [1]	ND	0.092	0.051	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1262 [1]	ND	0.092	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG
Aroclor-1268 [1]	ND	0.092	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:38	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	73.9	30-150		10/8/21 1:38
Decachlorobiphenyl [2]	75.4	30-150		10/8/21 1:38
Tetrachloro-m-xylene [1]	88.5	30-150		10/8/21 1:38
Tetrachloro-m-xylene [2]	84.8	30-150		10/8/21 1:38

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: E-3 (0.25-0.5)
Sampled: 9/30/2021 14:00

Sample ID: 21I1826-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.9		% Wt	1		SM 2540G	10/6/21	10/7/21 15:34	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: E-3 (0.5-1.5) Sampled: 9/30/2021 14:05

Sample ID: 21I1826-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1221 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1232 [1]	ND	0.093	0.084	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1242 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1248 [1]	ND	0.093	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1254 [1]	ND	0.093	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1260 [1]	ND	0.093	0.051	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1262 [1]	ND	0.093	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG
Aroclor-1268 [1]	ND	0.093	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 1:56	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.0	30-150		10/8/21 1:56
Decachlorobiphenyl [2]	77.8	30-150		10/8/21 1:56
Tetrachloro-m-xylene [1]	95.5	30-150		10/8/21 1:56
Tetrachloro-m-xylene [2]	91.2	30-150		10/8/21 1:56

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1826

Date Received: 9/30/2021

Field Sample #: E-3 (0.5-1.5) Sampled: 9/30/2021 14:05

Sample ID: 21I1826-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:35	TDK

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1826-01 [F-5 (1.5-3)]	B291896	10/06/21
21I1826-02 [G-5 (0.25-0.5)]	B291896	10/06/21
21I1826-03 [G-5 (0.5-1.5)]	B291896	10/06/21
21I1826-04 [F-4 (0.25-0.5)]	B291896	10/06/21
21I1826-05 [F-4 (0.5-1.5)]	B291896	10/06/21
21I1826-06 [G-4 (0.25-0.5)]	B291896	10/06/21
21I1826-07 [G-4 (0.5-1.5)]	B291896	10/06/21
21I1826-08 [G-4 (1.5-3)]	B291896	10/06/21
21I1826-09 [H-4 (0.25-0.5)]	B291896	10/06/21
21I1826-10 [H-4 (0.5-1.5)]	B291896	10/06/21
21I1826-11 [I-3 (0.25-0.5)]	B291896	10/06/21
21I1826-12 [I-3 (0.5-1.5)]	B291896	10/06/21
21I1826-13 [H-3 (0.25-0.5)]	B291896	10/06/21
21I1826-14 [H-3 (0.5-1.5)]	B291896	10/06/21
21I1826-15 [H-3 (1.5-3)]	B291896	10/06/21
21I1826-16 [F-3 (0.25-0.5)]	B291896	10/06/21
21I1826-17 [F-3 (0.5-1.5)]	B291896	10/06/21
21I1826-18 [F-3 (1.5-3)]	B291896	10/06/21
21I1826-19 [E-3 (0.25-0.5)]	B291896	10/06/21
21I1826-20 [E-3 (0.5-1.5)]	B291896	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1826-01 [F-5 (1.5-3)]	B291819	10.9	10.0	10/06/21
21I1826-02 [G-5 (0.25-0.5)]	B291819	10.3	10.0	10/06/21
21I1826-03 [G-5 (0.5-1.5)]	B291819	10.1	10.0	10/06/21
21I1826-04 [F-4 (0.25-0.5)]	B291819	10.6	10.0	10/06/21
21I1826-05 [F-4 (0.5-1.5)]	B291819	10.3	10.0	10/06/21
21I1826-06 [G-4 (0.25-0.5)]	B291819	10.5	10.0	10/06/21
21I1826-08 [G-4 (1.5-3)]	B291819	10.5	10.0	10/06/21
21I1826-09 [H-4 (0.25-0.5)]	B291819	10.2	10.0	10/06/21
21I1826-10 [H-4 (0.5-1.5)]	B291819	10.0	10.0	10/06/21
21I1826-12 [I-3 (0.5-1.5)]	B291819	10.6	10.0	10/06/21
21I1826-13 [H-3 (0.25-0.5)]	B291819	10.2	10.0	10/06/21
21I1826-14 [H-3 (0.5-1.5)]	B291819	10.4	10.0	10/06/21
21I1826-15 [H-3 (1.5-3)]	B291819	10.9	10.0	10/06/21
21I1826-16 [F-3 (0.25-0.5)]	B291819	10.4	10.0	10/06/21
21I1826-17 [F-3 (0.5-1.5)]	B291819	10.3	10.0	10/06/21
21I1826-18 [F-3 (1.5-3)]	B291819	10.3	10.0	10/06/21
21I1826-19 [E-3 (0.25-0.5)]	B291819	10.0	10.0	10/06/21
21I1826-20 [E-3 (0.5-1.5)]	B291819	10.0	10.0	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1826-07RE1 [G-4 (0.5-1.5)]	B292026	10.0	10.0	10/08/21
21I1826-11RE1 [I-3 (0.25-0.5)]	B292026	10.0	10.0	10/08/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291819 - SW-846 3540C										
Blank (B291819-BLK1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	ND	0.019	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1221	ND	0.019	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1232	ND	0.019	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1242	ND	0.019	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1248	ND	0.019	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1254	ND	0.019	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1260	ND	0.019	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1262	ND	0.019	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.019	mg/Kg wet							U
Aroclor-1268	ND	0.019	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.019	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.155*		mg/Kg wet	0.194		79.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.160*		mg/Kg wet	0.194		82.3	30-150			
Surrogate: Tetrachloro-m-xylene	*0.172*		mg/Kg wet	0.194		88.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.162*		mg/Kg wet	0.194		83.6	30-150			
LCS (B291819-BS1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.17	0.020	mg/Kg wet	0.196		86.8	40-140			
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.196		73.9	40-140			
Aroclor-1260	0.13	0.020	mg/Kg wet	0.196		65.9	40-140			
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.196		64.8	40-140			
Surrogate: Decachlorobiphenyl	*0.153*		mg/Kg wet	0.196		77.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.159*		mg/Kg wet	0.196		81.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.170*		mg/Kg wet	0.196		86.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.159*		mg/Kg wet	0.196		81.0	30-150			
LCS Dup (B291819-BSD1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.16	0.018	mg/Kg wet	0.183		88.0	40-140	5.27	30	
Aroclor-1016 [2C]	0.14	0.018	mg/Kg wet	0.183		75.7	40-140	4.20	30	
Aroclor-1260	0.12	0.018	mg/Kg wet	0.183		68.0	40-140	3.38	30	
Aroclor-1260 [2C]	0.12	0.018	mg/Kg wet	0.183		67.0	40-140	3.39	30	
Surrogate: Decachlorobiphenyl	*0.150*		mg/Kg wet	0.183		81.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.154*		mg/Kg wet	0.183		84.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.150*		mg/Kg wet	0.183		81.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.140*		mg/Kg wet	0.183		76.6	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291819 - SW-846 3540C										
Matrix Spike (B291819-MS1)	**Source: 21I1826-02**			Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.19	0.087	mg/Kg dry	0.217	ND	88.3	40-140			
Aroclor-1016 [2C]	0.18	0.087	mg/Kg dry	0.217	ND	80.6	40-140			
Aroclor-1260	0.14	0.087	mg/Kg dry	0.217	ND	64.3	40-140			
Aroclor-1260 [2C]	0.15	0.087	mg/Kg dry	0.217	ND	67.6	40-140			
Surrogate: Decachlorobiphenyl	*0.160*		mg/Kg dry	0.217		73.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.165*		mg/Kg dry	0.217		75.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.158*		mg/Kg dry	0.217		72.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.151*		mg/Kg dry	0.217		69.4	30-150			
Matrix Spike Dup (B291819-MSD1)	**Source: 21I1826-02**			Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.19	0.091	mg/Kg dry	0.228	ND	85.2	40-140	1.28	50	
Aroclor-1016 [2C]	0.18	0.091	mg/Kg dry	0.228	ND	77.8	40-140	1.33	50	
Aroclor-1260	0.15	0.091	mg/Kg dry	0.228	ND	63.8	40-140	4.05	50	
Aroclor-1260 [2C]	0.15	0.091	mg/Kg dry	0.228	ND	65.1	40-140	1.18	50	
Surrogate: Decachlorobiphenyl	*0.155*		mg/Kg dry	0.228		67.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.159*		mg/Kg dry	0.228		69.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.158*		mg/Kg dry	0.228		69.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.151*		mg/Kg dry	0.228		66.4	30-150			
Batch B292026 - SW-846 3540C										
Blank (B292026-BLK1)				Prepared: 10/08/21 Analyzed: 10/09/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.160*		mg/Kg wet	0.200		79.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.152*		mg/Kg wet	0.200		76.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.118*		mg/Kg wet	0.200		59.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.102*		mg/Kg wet	0.200		51.1	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292026 - SW-846 3540C										
LCS (B292026-BS1)				Prepared: 10/08/21 Analyzed: 10/09/21						
Aroclor-1016	0.14	0.020	mg/Kg wet	0.200		69.4	40-140			
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		57.9	40-140			
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		74.9	40-140			
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		67.5	40-140			
Surrogate: Decachlorobiphenyl	*0.180*		mg/Kg wet	0.200		90.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.172*		mg/Kg wet	0.200		85.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.140*		mg/Kg wet	0.200		70.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.120*		mg/Kg wet	0.200		60.0	30-150			
LCS Dup (B292026-BSD1)				Prepared: 10/08/21 Analyzed: 10/09/21						
Aroclor-1016	0.14	0.020	mg/Kg wet	0.200		70.2	40-140	1.17	30	
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		60.2	40-140	3.89	30	
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		76.7	40-140	2.35	30	
Aroclor-1260 [2C]	0.14	0.020	mg/Kg wet	0.200		70.7	40-140	4.61	30	
Surrogate: Decachlorobiphenyl	*0.179*		mg/Kg wet	0.200		89.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.174*		mg/Kg wet	0.200		86.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.136*		mg/Kg wet	0.200		68.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.120*		mg/Kg wet	0.200		60.2	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291819-BS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.14	19.4
Aroclor-1260	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.13	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291819-BSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.14	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.12	8.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291819-MS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.18	5.4
Aroclor-1260	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.15	6.9

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291819-MSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.18	5.4
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.15	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B292026-BS1

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B292026-BSD1

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.14	6.9

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1826

con-test® A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 15 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

PCB 8082 with soxhlet extraction (3540)

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	F-5 (1.5-3)	9/30	12:35	Grab	S	U						
2	G-5 (0.25-0.5)		12:38	Grab	S	U						
3	G-5 (0.5-1.5)		12:40	Grab	S	U						
4	F-4 (0.25-0.5)		12:43	Grab	S	U						
5	F-4 (0.5-1.5)		12:46	Grab	S	U						
6	G-4 (0.25-0.5)		12:50	Grab	S	U						
7	G-4 (0.5-1.5)		12:52	Grab	S	U						
8	G-4 (1.5-3.0)		12:55	Grab	S	U						
9	H-4 (0.25-0.5)		13:05	Grab	S	U						
10	H-4 (0.5-1.5)	↓	13:08	Grab	S	U						

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 170
Relinquished by: (signature)	Date/Time: 9/30/21 185
Received by: (signature) 23,48	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other SES

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Project Entity

Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

NELAC and AIHA-LAP, LLC Accredited

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

21I1826

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 14 of 17

Company Name: Willcox & Barton, Inc.
Address: 113 Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth, NH
Project Number: BANFOODS
Project Manager: B. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra & M. Broussard

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCBS
²Preservation Code												—
11	I-3 (0.25-0.5)	9/30	13:25	GRAB	S	U		1				X
12	I-3 (0.5-1.5)	↓	13:27	↓	↓	↓		1				X
13	H-3 (0.25-0.5)	↓	13:30	↓	↓	↓		1				X
14	H-3 (0.5-1.5)	↓	13:33	↓	↓	↓		1				X
15	H-3 (1.5-3)	↓	13:36	↓	↓	↓		1				X
16	F-3 (0.25-0.5)	13:45	~~14:45~~	↓	↓	↓		1				X
17	F-3 (0.5-1.5)	13:47	~~14:47~~	↓	↓	↓		1				X
18	F-3 (1.5-3)	13:50	~~14:50~~	↓	↓	↓		1				X
19	E-3 (0.25-0.5)	↓	14:00	↓	↓	↓		1				X
20	E-3 (0.5-1.5)	↓	14:05	↓	↓	↓		1				X

Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by / Received by: (signature)	Date/Time:
Relinquished by: (signature)	9/30 1700
Received by: (signature)	9/30/21 1700
Relinquished by: (signature)	9/30/21 1800
Received by: (signature)	9/30/21 1855
Relinquished by: (signature)	
Received by: (signature)	
Relinquished by: (signature)	
Received by: (signature)	

Client Comments:
Ⓐ

Detection Limit Requirements

MA
CT
Other: SRS

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ______ On Ice T No Ice ______
Direct from Sampling ______ Ambient ______ Melted Ice ______

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 2.3, 4.8°C
By Blank # ______ Actual Temp - ______

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ______
Are there Rushes? F Who was notified? ______
Are there Short Holds? F Who was notified? ______
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 11, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1827

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/11/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1827

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
HH-7-Mid (0.25-0.5)	21I1827-01	Soil		SM 2540G SW-846 8082A	
HH-7-Mid (0.5-1.5)	21I1827-02	Soil		SM 2540G SW-846 8082A	
HH-7-Mid (1.5-3)	21I1827-03	Soil		SM 2540G SW-846 8082A	
GG-8-Mid (0.25-0.5)	21I1827-04	Soil		SM 2540G SW-846 8082A	
GG-8-Mid (0.5-1.5)	21I1827-05	Soil		SM 2540G SW-846 8082A	
GG-8-Mid (1.5-3)	21I1827-06	Soil		SM 2540G SW-846 8082A	
GG-9-Mid (0.25-0.5)	21I1827-07	Soil		SM 2540G SW-846 8082A	
GG-9-Mid (0.5-1.5)	21I1827-08	Soil		SM 2540G SW-846 8082A	
GG-9-Mid (1.5-3)	21I1827-09	Soil		SM 2540G SW-846 8082A	
FF-9-Mid (0.25-0.5)	21I1827-10	Soil		SM 2540G SW-846 8082A	
FF-9-Mid (0.5-1.5)	21I1827-11	Soil		SM 2540G SW-846 8082A	
F-9 (0.25-0.5)	21I1827-12	Soil		SM 2540G SW-846 8082A	
F-9 (0.5-1.5)	21I1827-13	Soil		SM 2540G SW-846 8082A	
F-9 (1.5-3)	21I1827-14	Soil		SM 2540G SW-846 8082A	
E-10 (0.25-0.5)	21I1827-15	Soil		SM 2540G SW-846 8082A	
E-10 (0.5-1.5)	21I1827-16	Soil		SM 2540G SW-846 8082A	
E-9 (0.25-0.5)	21I1827-17	Soil		SM 2540G SW-846 8082A	
E-9 (0.5-1.5)	21I1827-18	Soil		SM 2540G SW-846 8082A	
D-9 (0.25-0.5)	21I1827-19	Soil		SM 2540G SW-846 8082A	
D-9 (0.5-1.5)	21I1827-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

P-02

Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.

Analyte & Samples(s) Qualified:

Aroclor-1254
21I1827-01[HH-7-Mid (0.25-0.5)], 21I1827-15[E-10 (0.25-0.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Daren J. Damboragian
Director of Operations

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: HH-7-Mid (0.25-0.5) Sampled: 9/30/2021 09:23

Sample ID: 21I1827-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.081	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1221 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1232 [1]	ND	0.081	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1242 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1248 [1]	ND	0.081	0.028	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1254 [1]	0.037	0.081	0.032	mg/Kg dry	4	P-02, J	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1260 [1]	ND	0.081	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1262 [1]	ND	0.081	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM
Aroclor-1268 [1]	ND	0.081	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	75.6	30-150		10/7/21 22:15
Decachlorobiphenyl [2]	68.8	30-150		10/7/21 22:15
Tetrachloro-m-xylene [1]	67.5	30-150		10/7/21 22:15
Tetrachloro-m-xylene [2]	55.6	30-150		10/7/21 22:15

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: HH-7-Mid (0.25-0.5) Sampled: 9/30/2021 09:23

Sample ID: 21I1827-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.7		% Wt	1		SM 2540G	10/6/21	10/7/21 15:35	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: HH-7-Mid (0.5-1.5)   Sampled: 9/30/2021 09:26

Sample ID: 21I1827-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1254 [2]	0.054	0.088	0.035	mg/Kg dry	4	J	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1260 [2]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	52.2	30-150		10/7/21 22:33
Decachlorobiphenyl [2]	47.5	30-150		10/7/21 22:33
Tetrachloro-m-xylene [1]	51.0	30-150		10/7/21 22:33
Tetrachloro-m-xylene [2]	42.3	30-150		10/7/21 22:33

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: HH-7-Mid (0.5-1.5) Sampled: 9/30/2021 09:26

Sample ID: 21I1827-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.9		% Wt	1		SM 2540G	10/6/21	10/7/21 15:35	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: HH-7-Mid (1.5-3)　Sampled: 9/30/2021 09:29

Sample ID: 21I1827-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:50	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	78.9	30-150		10/7/21 22:50
Decachlorobiphenyl [2]	71.2	30-150		10/7/21 22:50
Tetrachloro-m-xylene [1]	62.7	30-150		10/7/21 22:50
Tetrachloro-m-xylene [2]	52.2	30-150		10/7/21 22:50

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: HH-7-Mid (1.5-3)	Sampled: 9/30/2021 09:29

Sample ID: 21I1827-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.2		% Wt	1		SM 2540G	10/6/21	10/7/21 15:35	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-8-Mid (0.25-0.5)   Sampled: 9/30/2021 09:32

Sample ID: 21I1827-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.084	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1221 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1232 [1]	ND	0.084	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1242 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1248 [1]	ND	0.084	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1254 [1]	ND	0.084	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1260 [1]	ND	0.084	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1262 [1]	ND	0.084	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM
Aroclor-1268 [1]	ND	0.084	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:08	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	52.0	30-150		10/7/21 23:08
Decachlorobiphenyl [2]	46.9	30-150		10/7/21 23:08
Tetrachloro-m-xylene [1]	45.0	30-150		10/7/21 23:08
Tetrachloro-m-xylene [2]	37.0	30-150		10/7/21 23:08

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-8-Mid (0.25-0.5) Sampled: 9/30/2021 09:32

Sample ID: 21I1827-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.5		% Wt	1		SM 2540G	10/6/21	10/7/21 15:35	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-8-Mid (0.5-1.5) Sampled: 9/30/2021 09:36

Sample ID: 21I1827-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.084	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1221 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1232 [1]	ND	0.084	0.076	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1242 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1248 [1]	ND	0.084	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1254 [1]	ND	0.084	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1260 [1]	ND	0.084	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1262 [1]	ND	0.084	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM
Aroclor-1268 [1]	ND	0.084	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:25	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	87.9	30-150		10/7/21 23:25
Decachlorobiphenyl [2]	79.0	30-150		10/7/21 23:25
Tetrachloro-m-xylene [1]	73.6	30-150		10/7/21 23:25
Tetrachloro-m-xylene [2]	60.9	30-150		10/7/21 23:25

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1827
Date Received: 9/30/2021
Field Sample #: GG-8-Mid (0.5-1.5)
Sampled: 9/30/2021 09:36
Sample ID: 21I1827-05
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	95.3		% Wt	1		SM 2540G	10/6/21	10/7/21 15:36	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-8-Mid (1.5-3) Sampled: 9/30/2021 09:40

Sample ID: 21I1827-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:43	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	83.3	30-150		10/7/21 23:43
Decachlorobiphenyl [2]	74.5	30-150		10/7/21 23:43
Tetrachloro-m-xylene [1]	73.0	30-150		10/7/21 23:43
Tetrachloro-m-xylene [2]	60.3	30-150		10/7/21 23:43

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-8-Mid (1.5-3)
Sampled: 9/30/2021 09:40

Sample ID: 21I1827-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	10/6/21	10/7/21 15:36	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-9-Mid (0.25-0.5)   Sampled: 9/30/2021 09:45

Sample ID: 21I1827-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.083	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1221 [1]	ND	0.083	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1232 [1]	ND	0.083	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1242 [1]	ND	0.083	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1248 [1]	ND	0.083	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1254 [1]	ND	0.083	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1260 [1]	ND	0.083	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1262 [1]	ND	0.083	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM
Aroclor-1268 [1]	ND	0.083	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:00	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	86.7	30-150		10/8/21 0:00
Decachlorobiphenyl [2]	77.4	30-150		10/8/21 0:00
Tetrachloro-m-xylene [1]	74.9	30-150		10/8/21 0:00
Tetrachloro-m-xylene [2]	61.9	30-150		10/8/21 0:00

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-9-Mid (0.25-0.5)   Sampled: 9/30/2021 09:45

Sample ID: 21I1827-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	10/6/21	10/7/21 15:36	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-9-Mid (0.5-1.5)   Sampled: 9/30/2021 09:48

Sample ID: 21I1827-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.081	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1221 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1232 [1]	ND	0.081	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1242 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1248 [1]	ND	0.081	0.028	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1254 [1]	ND	0.081	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1260 [1]	ND	0.081	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1262 [1]	ND	0.081	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM
Aroclor-1268 [1]	ND	0.081	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:18	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	87.5	30-150		10/8/21 0:18
Decachlorobiphenyl [2]	78.4	30-150		10/8/21 0:18
Tetrachloro-m-xylene [1]	65.8	30-150		10/8/21 0:18
Tetrachloro-m-xylene [2]	54.3	30-150		10/8/21 0:18

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-9-Mid (0.5-1.5)   Sampled: 9/30/2021 09:48

Sample ID: 21I1827-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.8		% Wt	1		SM 2540G	10/6/21	10/7/21 15:37	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-9-Mid (1.5-3) Sampled: 9/30/2021 09:50

Sample ID: 21I1827-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.081	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1221 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1232 [1]	ND	0.081	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1242 [1]	ND	0.081	0.061	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1248 [1]	ND	0.081	0.028	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1254 [1]	ND	0.081	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1260 [1]	ND	0.081	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1262 [1]	ND	0.081	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM
Aroclor-1268 [1]	ND	0.081	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:35	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	85.7	30-150		10/8/21 0:35
Decachlorobiphenyl [2]	77.0	30-150		10/8/21 0:35
Tetrachloro-m-xylene [1]	74.7	30-150		10/8/21 0:35
Tetrachloro-m-xylene [2]	61.6	30-150		10/8/21 0:35

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: GG-9-Mid (1.5-3)
Sampled: 9/30/2021 09:50

Sample ID: 21I1827-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.2		% Wt	1		SM 2540G	10/6/21	10/7/21 15:37	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: FF-9-Mid (0.25-0.5) Sampled: 9/30/2021 09:55

Sample ID: 21I1827-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1254 [1]	ND	0.090	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1260 [1]	ND	0.090	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:53	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	64.7	30-150		10/8/21 0:53
Decachlorobiphenyl [2]	58.5	30-150		10/8/21 0:53
Tetrachloro-m-xylene [1]	58.9	30-150		10/8/21 0:53
Tetrachloro-m-xylene [2]	48.7	30-150		10/8/21 0:53

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: FF-9-Mid (0.25-0.5) Sampled: 9/30/2021 09:55

Sample ID: 21I1827-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.2		% Wt	1		SM 2540G	10/6/21	10/7/21 15:37	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: FF-9-Mid (0.5-1.5) Sampled: 9/30/2021 09:58

Sample ID: 21I1827-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1254 [1]	0.037	0.086	0.034	mg/Kg dry	4	J	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:15	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	59.0	30-150		10/8/21 2:15
Decachlorobiphenyl [2]	53.6	30-150		10/8/21 2:15
Tetrachloro-m-xylene [1]	50.9	30-150		10/8/21 2:15
Tetrachloro-m-xylene [2]	42.5	30-150		10/8/21 2:15

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: FF-9-Mid (0.5-1.5)   Sampled: 9/30/2021 09:58

Sample ID: 21I1827-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.1		% Wt	1		SM 2540G	10/6/21	10/7/21 15:38	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: F-9 (0.25-0.5) Sampled: 9/30/2021 10:00

Sample ID: 21I1827-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.084	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1221 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1232 [1]	ND	0.084	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1242 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1248 [1]	ND	0.084	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1254 [1]	ND	0.084	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1260 [1]	ND	0.084	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1262 [1]	ND	0.084	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM
Aroclor-1268 [1]	ND	0.084	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:32	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	79.3	30-150		10/8/21 2:32
Decachlorobiphenyl [2]	71.6	30-150		10/8/21 2:32
Tetrachloro-m-xylene [1]	68.3	30-150		10/8/21 2:32
Tetrachloro-m-xylene [2]	56.6	30-150		10/8/21 2:32

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: F-9 (0.25-0.5)   Sampled: 9/30/2021 10:00

Sample ID: 21I1827-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:38	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1827
Date Received: 9/30/2021
Field Sample #: F-9 (0.5-1.5)
Sampled: 9/30/2021 10:03
Sample ID: 21I1827-13
Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.082	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1221 [1]	ND	0.082	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1232 [1]	ND	0.082	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1242 [1]	ND	0.082	0.062	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1248 [1]	ND	0.082	0.029	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1254 [1]	ND	0.082	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1260 [1]	ND	0.082	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1262 [1]	ND	0.082	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM
Aroclor-1268 [1]	ND	0.082	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 2:50	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	80.7	30-150		10/8/21 2:50
Decachlorobiphenyl [2]	73.3	30-150		10/8/21 2:50
Tetrachloro-m-xylene [1]	71.5	30-150		10/8/21 2:50
Tetrachloro-m-xylene [2]	59.4	30-150		10/8/21 2:50

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: F-9 (0.5-1.5)   Sampled: 9/30/2021 10:03

Sample ID: 21I1827-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:38	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: F-9 (1.5-3) Sampled: 9/30/2021 10:05

Sample ID: 21I1827-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1262 [1]	ND	0.087	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM
Aroclor-1268 [1]	ND	0.087	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:07	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	84.7	30-150		10/8/21 3:07
Decachlorobiphenyl [2]	76.6	30-150		10/8/21 3:07
Tetrachloro-m-xylene [1]	73.3	30-150		10/8/21 3:07
Tetrachloro-m-xylene [2]	60.7	30-150		10/8/21 3:07

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: F-9 (1.5-3)   Sampled: 9/30/2021 10:05

Sample ID: 21I1827-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	10/6/21	10/7/21 15:38	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-10 (0.25-0.5)   Sampled: 9/30/2021 10:10

Sample ID: 21I1827-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1221 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1232 [1]	ND	0.097	0.087	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1242 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1248 [1]	ND	0.097	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1254 [1]	ND	0.097	0.039	mg/Kg dry	4	P-02, U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1260 [2]	ND	0.097	0.053	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1262 [1]	ND	0.097	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM
Aroclor-1268 [1]	ND	0.097	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:25	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	72.1	30-150		10/8/21 3:25
Decachlorobiphenyl [2]	65.2	30-150		10/8/21 3:25
Tetrachloro-m-xylene [1]	63.0	30-150		10/8/21 3:25
Tetrachloro-m-xylene [2]	52.4	30-150		10/8/21 3:25

Project Location: 375 Banfield Rd., Portsmouth, NH

Sample Description:

Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-10 (0.25-0.5)

Sampled: 9/30/2021 10:10

Sample ID: 21I1827-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.3		% Wt	1		SM 2540G	10/6/21	10/7/21 15:38	TDK

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-10 (0.5-1.5) Sampled: 9/30/2021 10:13

Sample ID: 21I1827-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1221 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1232 [1]	ND	0.093	0.084	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1242 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1248 [1]	ND	0.093	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1254 [2]	0.087	0.093	0.037	mg/Kg dry	4	J	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1260 [2]	ND	0.093	0.051	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1262 [1]	ND	0.093	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM
Aroclor-1268 [1]	ND	0.093	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 3:42	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.1	30-150		10/8/21 3:42
Decachlorobiphenyl [2]	69.0	30-150		10/8/21 3:42
Tetrachloro-m-xylene [1]	68.1	30-150		10/8/21 3:42
Tetrachloro-m-xylene [2]	56.1	30-150		10/8/21 3:42

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-10 (0.5-1.5)   Sampled: 9/30/2021 10:13

Sample ID: 21I1827-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.6		% Wt	1		SM 2540G	10/8/21	10/8/21 16:52	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-9 (0.25-0.5)   Sampled: 9/30/2021 10:25

Sample ID: 21I1827-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1221 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1242 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1254 [2]	ND	0.089	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1260 [2]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:00	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	80.3	30-150		10/8/21 4:00
Decachlorobiphenyl [2]	72.5	30-150		10/8/21 4:00
Tetrachloro-m-xylene [1]	69.8	30-150		10/8/21 4:00
Tetrachloro-m-xylene [2]	57.5	30-150		10/8/21 4:00

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-9 (0.25-0.5) Sampled: 9/30/2021 10:25

Sample ID: 21I1827-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.3		% Wt	1		SM 2540G	10/8/21	10/8/21 16:52	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-9 (0.5-1.5) Sampled: 9/30/2021 10:30

Sample ID: 21I1827-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:17	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	86.8	30-150		10/8/21 4:17
Decachlorobiphenyl [2]	78.3	30-150		10/8/21 4:17
Tetrachloro-m-xylene [1]	74.8	30-150		10/8/21 4:17
Tetrachloro-m-xylene [2]	61.7	30-150		10/8/21 4:17

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: E-9 (0.5-1.5)
Sampled: 9/30/2021 10:30

Sample ID: 21I1827-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.0		% Wt	1		SM 2540G	10/8/21	10/8/21 16:52	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: D-9 (0.25-0.5)   Sampled: 9/30/2021 10:35

Sample ID: 21I1827-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1254 [2]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:35	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	85.2	30-150		10/8/21 4:35
Decachlorobiphenyl [2]	76.7	30-150		10/8/21 4:35
Tetrachloro-m-xylene [1]	76.3	30-150		10/8/21 4:35
Tetrachloro-m-xylene [2]	62.7	30-150		10/8/21 4:35

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: D-9 (0.25-0.5) Sampled: 9/30/2021 10:35

Sample ID: 21I1827-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.6		% Wt	1		SM 2540G	10/8/21	10/8/21 16:52	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1827

Date Received: 9/30/2021

Field Sample #: D-9 (0.5-1.5) Sampled: 9/30/2021 10:40

Sample ID: 21I1827-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1254 [1]	ND	0.089	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1260 [1]	0.051	0.089	0.049	mg/Kg dry	4	J	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 4:52	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	89.5	30-150		10/8/21 4:52
Decachlorobiphenyl [2]	80.7	30-150		10/8/21 4:52
Tetrachloro-m-xylene [1]	83.7	30-150		10/8/21 4:52
Tetrachloro-m-xylene [2]	69.0	30-150		10/8/21 4:52

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1827
Date Received: 9/30/2021
Field Sample #: D-9 (0.5-1.5)
Sampled: 9/30/2021 10:40
Sample ID: 21I1827-20
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.1		% Wt	1		SM 2540G	10/8/21	10/8/21 16:52	JLH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1827-16 [E-10 (0.5-1.5)]	B291884	10/08/21
21I1827-17 [E-9 (0.25-0.5)]	B291884	10/08/21
21I1827-18 [E-9 (0.5-1.5)]	B291884	10/08/21
21I1827-19 [D-9 (0.25-0.5)]	B291884	10/08/21
21I1827-20 [D-9 (0.5-1.5)]	B291884	10/08/21

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1827-01 [HH-7-Mid (0.25-0.5)]	B291896	10/06/21
21I1827-02 [HH-7-Mid (0.5-1.5)]	B291896	10/06/21
21I1827-03 [HH-7-Mid (1.5-3)]	B291896	10/06/21
21I1827-04 [GG-8-Mid (0.25-0.5)]	B291896	10/06/21
21I1827-05 [GG-8-Mid (0.5-1.5)]	B291896	10/06/21
21I1827-06 [GG-8-Mid (1.5-3)]	B291896	10/06/21
21I1827-07 [GG-9-Mid (0.25-0.5)]	B291896	10/06/21
21I1827-08 [GG-9-Mid (0.5-1.5)]	B291896	10/06/21
21I1827-09 [GG-9-Mid (1.5-3)]	B291896	10/06/21
21I1827-10 [FF-9-Mid (0.25-0.5)]	B291896	10/06/21
21I1827-11 [FF-9-Mid (0.5-1.5)]	B291896	10/06/21
21I1827-12 [F-9 (0.25-0.5)]	B291896	10/06/21
21I1827-13 [F-9 (0.5-1.5)]	B291896	10/06/21
21I1827-14 [F-9 (1.5-3)]	B291896	10/06/21
21I1827-15 [E-10 (0.25-0.5)]	B291896	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1827-01 [HH-7-Mid (0.25-0.5)]	B291820	10.8	10.0	10/06/21
21I1827-02 [HH-7-Mid (0.5-1.5)]	B291820	10.0	10.0	10/06/21
21I1827-03 [HH-7-Mid (1.5-3)]	B291820	10.1	10.0	10/06/21
21I1827-04 [GG-8-Mid (0.25-0.5)]	B291820	10.7	10.0	10/06/21
21I1827-05 [GG-8-Mid (0.5-1.5)]	B291820	10.0	10.0	10/06/21
21I1827-06 [GG-8-Mid (1.5-3)]	B291820	10.2	10.0	10/06/21
21I1827-07 [GG-9-Mid (0.25-0.5)]	B291820	10.6	10.0	10/06/21
21I1827-08 [GG-9-Mid (0.5-1.5)]	B291820	10.4	10.0	10/06/21
21I1827-09 [GG-9-Mid (1.5-3)]	B291820	10.5	10.0	10/06/21
21I1827-10 [FF-9-Mid (0.25-0.5)]	B291820	10.1	10.0	10/06/21
21I1827-11 [FF-9-Mid (0.5-1.5)]	B291820	10.1	10.0	10/06/21
21I1827-12 [F-9 (0.25-0.5)]	B291820	10.1	10.0	10/06/21
21I1827-13 [F-9 (0.5-1.5)]	B291820	10.3	10.0	10/06/21
21I1827-14 [F-9 (1.5-3)]	B291820	10.1	10.0	10/06/21
21I1827-15 [E-10 (0.25-0.5)]	B291820	10.3	10.0	10/06/21
21I1827-16 [E-10 (0.5-1.5)]	B291820	10.0	10.0	10/06/21
21I1827-17 [E-9 (0.25-0.5)]	B291820	10.1	10.0	10/06/21
21I1827-18 [E-9 (0.5-1.5)]	B291820	10.1	10.0	10/06/21
21I1827-19 [D-9 (0.25-0.5)]	B291820	10.4	10.0	10/06/21
21I1827-20 [D-9 (0.5-1.5)]	B291820	10.0	10.0	10/06/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291820 - SW-846 3540C										
Blank (B291820-BLK1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.162*		mg/Kg wet	0.196		82.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.149*		mg/Kg wet	0.196		76.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.107*		mg/Kg wet	0.196		54.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0894*		mg/Kg wet	0.196		45.6	30-150			
LCS (B291820-BS1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.15	0.019	mg/Kg wet	0.185		79.3	40-140			
Aroclor-1016 [2C]	0.12	0.019	mg/Kg wet	0.185		64.1	40-140			
Aroclor-1260	0.15	0.019	mg/Kg wet	0.185		78.8	40-140			
Aroclor-1260 [2C]	0.13	0.019	mg/Kg wet	0.185		68.3	40-140			
Surrogate: Decachlorobiphenyl	*0.174*		mg/Kg wet	0.185		94.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.160*		mg/Kg wet	0.185		86.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.142*		mg/Kg wet	0.185		76.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.117*		mg/Kg wet	0.185		63.3	30-150			
LCS Dup (B291820-BSD1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.15	0.018	mg/Kg wet	0.183		80.8	40-140	0.909	30	
Aroclor-1016 [2C]	0.12	0.018	mg/Kg wet	0.183		65.3	40-140	0.917	30	
Aroclor-1260	0.15	0.018	mg/Kg wet	0.183		81.5	40-140	2.38	30	
Aroclor-1260 [2C]	0.13	0.018	mg/Kg wet	0.183		70.7	40-140	2.50	30	
Surrogate: Decachlorobiphenyl	*0.177*		mg/Kg wet	0.183		96.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.163*		mg/Kg wet	0.183		88.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.142*		mg/Kg wet	0.183		77.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.118*		mg/Kg wet	0.183		64.1	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291820 - SW-846 3540C										
Matrix Spike (B291820-MS1)	**Source: 21I1827-16**			Prepared: 10/06/21 Analyzed: 10/08/21						
Aroclor-1016	0.16	0.088	mg/Kg dry	0.220	ND	70.6	40-140			
Aroclor-1016 [2C]	0.15	0.088	mg/Kg dry	0.220	ND	69.0	40-140			
Aroclor-1260	0.23	0.088	mg/Kg dry	0.220	ND	104	40-140			
Aroclor-1260 [2C]	0.18	0.088	mg/Kg dry	0.220	ND	82.6	40-140			
Surrogate: Decachlorobiphenyl	*0.183*		mg/Kg dry	0.220		83.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.165*		mg/Kg dry	0.220		74.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.151*		mg/Kg dry	0.220		68.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.124*		mg/Kg dry	0.220		56.2	30-150			
Matrix Spike Dup (B291820-MSD1)	**Source: 21I1827-16**			Prepared: 10/06/21 Analyzed: 10/08/21						
Aroclor-1016	0.18	0.091	mg/Kg dry	0.227	ND	80.3	40-140	15.6	50	
Aroclor-1016 [2C]	0.19	0.091	mg/Kg dry	0.227	ND	85.9	40-140	24.7	50	
Aroclor-1260	0.23	0.091	mg/Kg dry	0.227	ND	102	40-140	1.10	50	
Aroclor-1260 [2C]	0.19	0.091	mg/Kg dry	0.227	ND	82.5	40-140	2.77	50	
Surrogate: Decachlorobiphenyl	*0.164*		mg/Kg dry	0.227		72.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.148*		mg/Kg dry	0.227		65.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.143*		mg/Kg dry	0.227		63.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.118*		mg/Kg dry	0.227		51.8	30-150			

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

HH-7-Mid (0.25-0.5)

Lab Sample ID:	21I1827-01	Date(s) Analyzed:	10/07/2021	10/07/2021
Instrument ID (1):	ECD10	Instrument ID (2):	ECD10	

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.037	
	2	0.000	-0.030	0.030	0.071	63.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

HH-7-Mid (0.5-1.5)

Lab Sample ID: 21I1827-02

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.042	
	2	0.000	-0.030	0.030	0.054	25.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

FF-9-Mid (0.5-1.5)

Lab Sample ID: 21I1827-11

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.037	
	2	0.000	-0.030	0.030	0.035	5.6

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

E-10 (0.5-1.5)

Lab Sample ID: 21I1827-16

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.077	
	2	0.000	-0.030	0.030	0.087	12.2

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291820-BS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.12	22.2
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291820-BSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.12	22.2
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291820-MS1

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.15	6.5
Aroclor-1260	1	0.000	-0.030	0.030	0.23	
	2	0.000	-0.030	0.030	0.18	24.4

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291820-MSD1

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.19	5.4
Aroclor-1260	1	0.000	-0.030	0.030	0.23	
	2	0.000	-0.030	0.030	0.19	19.0

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
P-02	Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	**Certifications**
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1827

con-test
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 11 of 17

Company Name	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	HH-7-mid (0.25-0.5)	9/30	9:23	Grab	S	U		1				X
2	HH-7mid (0.5-1.5)		9:26	Grab	S	U		1				X
3	HH-7-mid (1.5-3)		9:29	Grab	S	U		1				X
4	GG-8-mid (0.25-0.5)		9:32	Grab	S	U		1				X
5	GG-8-mid (0.5-1.5)		9:36	Grab	S	U		1				X
6	GG-8-mid (1.5-3)		9:40	Grab	S	U		1				X
7	GG-9-mid (0.25-0.5)		9:45	Grab	S	U		1				X
8	GG-9-mid (0.5-1.5)		9:48	Grab	S	U		1				X
9	GG-9-mid (1.5-3)		9:50	Grab	S	U		1				X
10	FF-9-mid (0.25-0.5)		09:55	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature) 23,48	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

²Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes**:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes**:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I1827

con-test® A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 12 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 309 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

PCB ONLY
SOXHLET ☑
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	FF-9-mid (0.5-1.5)	9/30	09:58	Grab	S	U		1				X
12	F-9 (0.25-0.5)	↓	10:00	Grab	S	U		1				X
13	F-9 (0.5-1.5)		10:03	Grab	S	U		1				X
14	F-9 (1.5-3)		10:05	Grab	S	U		1				X
15	E-10 (0.25-0.5)		10:10	Grab	S	U		1				X
16	E-10 (0.5-1.5)		10:13	Grab	S	U		1				X
17	E-9 (0.25-0.5)		10:25	Grab	S	U		1				X
18	E-9 (0.5-1.5)		10:30	Grab	S	U		1				X
19	D-9 (0.25-0.5)		10:35	Grab	S	U		1				X
20	D-9 (0.5-1.5)	↓	10:40	Grab	S	U		1				X

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature)	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other: SPS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ____ On Ice T No Ice ____

Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T

By Gun # 3 Actual Temp - 2.3, 4.8c

By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ____

Are there Rushes? F Who was notified? ____

Are there Short Holds? F Who was notified? ____

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 11, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1828

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/11/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1828

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
B-8 (0.25-0.5)	21I1828-01	Soil		SM 2540G SW-846 8082A	
B-8 (0.5-1.5)	21I1828-02	Soil		SM 2540G SW-846 8082A	
B-9 (0.25-0.5)	21I1828-03	Soil		SM 2540G SW-846 8082A	
B-9 (0.5-1.5)	21I1828-04	Soil		SM 2540G SW-846 8082A	
C-7 (0.25-0.5)	21I1828-05	Soil		SM 2540G SW-846 8082A	
C-7 (0.5-1.5)	21I1828-06	Soil		SM 2540G SW-846 8082A	
C-5 (0.25-0.5)	21I1828-07	Soil		SM 2540G SW-846 8082A	
C-5 (0.5-1.5)	21I1828-08	Soil		SM 2540G SW-846 8082A	
D-6 (0.25-0.5)	21I1828-09	Soil		SM 2540G SW-846 8082A	
D-6 (0.5-1.5)	21I1828-10	Soil		SM 2540G SW-846 8082A	
D-6 (1.5-3)	21I1828-11	Soil		SM 2540G SW-846 8082A	
E-7 (0.25-0.5)	21I1828-12	Soil		SM 2540G SW-846 8082A	
E-7 (0.5-1.5)	21I1828-13	Soil		SM 2540G SW-846 8082A	
E-7 (1.5-3)	21I1828-14	Soil		SM 2540G SW-846 8082A	
F-6 (0.25-0.5)	21I1828-15	Soil		SM 2540G SW-846 8082A	
F-6 (0.5-1.5)	21I1828-16	Soil		SM 2540G SW-846 8082A	
E-5 (0.25-0.5)	21I1828-17	Soil		SM 2540G SW-846 8082A	
E-5 (0.5-1.5)	21I1828-18	Soil		SM 2540G SW-846 8082A	
F-5 (0.25-0.5)	21I1828-19	Soil		SM 2540G SW-846 8082A	
F-5 (0.5-1.5)	21I1828-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl

21I1828-18[E-5 (0.5-1.5)]

Decachlorobiphenyl [2C]

21I1828-18[E-5 (0.5-1.5)]

Tetrachloro-m-xylene

21I1828-18[E-5 (0.5-1.5)]

Tetrachloro-m-xylene [2C]

21I1828-18[E-5 (0.5-1.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Daren J. Damboragian
Director of Operations

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-8 (0.25-0.5) Sampled: 9/30/2021 10:50

Sample ID: 21I1828-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.099	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1221 [1]	ND	0.099	0.074	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1232 [1]	ND	0.099	0.089	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1242 [1]	ND	0.099	0.074	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1248 [1]	ND	0.099	0.035	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1254 [1]	ND	0.099	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1260 [1]	ND	0.099	0.054	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1262 [1]	ND	0.099	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM
Aroclor-1268 [1]	ND	0.099	0.079	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:33	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	68.5	30-150		10/8/21 23:33
Decachlorobiphenyl [2]	67.0	30-150		10/8/21 23:33
Tetrachloro-m-xylene [1]	81.7	30-150		10/8/21 23:33
Tetrachloro-m-xylene [2]	77.8	30-150		10/8/21 23:33

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-8 (0.25-0.5)   Sampled: 9/30/2021 10:50

Sample ID: 21I1828-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.9		% Wt	1		SM 2540G	10/8/21	10/8/21 16:52	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-8 (0.5-1.5) Sampled: 9/30/2021 10:52

Sample ID: 21I1828-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.096	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1221 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1232 [1]	ND	0.096	0.086	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1242 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1248 [1]	ND	0.096	0.033	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1254 [2]	0.48	0.096	0.038	mg/Kg dry	4		SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1260 [2]	0.13	0.096	0.053	mg/Kg dry	4		SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1262 [1]	ND	0.096	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:50	SFM
Aroclor-1268 [1]	ND	0.096	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:50	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	109	30-150		10/8/21 23:50
Decachlorobiphenyl [2]	110	30-150		10/8/21 23:50
Tetrachloro-m-xylene [1]	85.3	30-150		10/8/21 23:50
Tetrachloro-m-xylene [2]	80.5	30-150		10/8/21 23:50

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-8 (0.5-1.5)
Sampled: 9/30/2021 10:52

Sample ID: 21I1828-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.6		% Wt	1		SM 2540G	10/8/21	10/8/21 16:53	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-9 (0.25-0.5)
Sampled: 9/30/2021 11:00

Sample ID: 21I1828-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	0.053	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1221 [1]	ND	0.12	0.088	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1232 [1]	ND	0.12	0.11	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1242 [1]	ND	0.12	0.088	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1248 [1]	ND	0.12	0.041	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1254 [2]	0.13	0.12	0.047	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1260 [1]	ND	0.12	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1262 [1]	ND	0.12	0.059	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM
Aroclor-1268 [1]	ND	0.12	0.094	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:08	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.4	30-150		10/9/21 0:08
Decachlorobiphenyl [2]	81.5	30-150		10/9/21 0:08
Tetrachloro-m-xylene [1]	82.0	30-150		10/9/21 0:08
Tetrachloro-m-xylene [2]	76.2	30-150		10/9/21 0:08

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-9 (0.25-0.5) Sampled: 9/30/2021 11:00

Sample ID: 21I1828-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	68.2		% Wt	1		SM 2540G	10/8/21	10/8/21 16:53	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-9 (0.5-1.5) Sampled: 9/30/2021 11:03

Sample ID: 21I1828-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	0.054	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1221 [1]	ND	0.12	0.091	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1232 [1]	ND	0.12	0.11	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1242 [1]	ND	0.12	0.091	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1248 [1]	ND	0.12	0.042	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1254 [2]	0.15	0.12	0.048	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1260 [1]	ND	0.12	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1262 [1]	ND	0.12	0.060	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM
Aroclor-1268 [1]	ND	0.12	0.097	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:25	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	66.8	30-150		10/9/21 0:25
Decachlorobiphenyl [2]	76.6	30-150		10/9/21 0:25
Tetrachloro-m-xylene [1]	79.7	30-150		10/9/21 0:25
Tetrachloro-m-xylene [2]	73.7	30-150		10/9/21 0:25

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: B-9 (0.5-1.5) Sampled: 9/30/2021 11:03

Sample ID: 21I1828-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	66.2		% Wt	1		SM 2540G	10/8/21	10/8/21 16:53	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: C-7 (0.25-0.5)   Sampled: 9/30/2021 11:20

Sample ID: 21I1828-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1232 [1]	ND	0.088	0.080	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1260 [1]	ND	0.088	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM
Aroclor-1268 [1]	ND	0.088	0.071	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 0:43	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	79.0	30-150		10/9/21 0:43
Decachlorobiphenyl [2]	78.1	30-150		10/9/21 0:43
Tetrachloro-m-xylene [1]	90.5	30-150		10/9/21 0:43
Tetrachloro-m-xylene [2]	86.1	30-150		10/9/21 0:43

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: C-7 (0.25-0.5)   Sampled: 9/30/2021 11:20

Sample ID: 21I1828-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.5		% Wt	1		SM 2540G	10/8/21	10/8/21 16:53	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: C-7 (0.5-1.5) Sampled: 9/30/2021 11:25

Sample ID: 21I1828-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1221 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1242 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1254 [1]	0.092	0.089	0.035	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1260 [2]	0.068	0.089	0.049	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:00	SFM
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:00	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	71.3	30-150		10/9/21 1:00
Decachlorobiphenyl [2]	71.7	30-150		10/9/21 1:00
Tetrachloro-m-xylene [1]	79.1	30-150		10/9/21 1:00
Tetrachloro-m-xylene [2]	74.4	30-150		10/9/21 1:00

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: C-7 (0.5-1.5) Sampled: 9/30/2021 11:25

Sample ID: 21I1828-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.4		% Wt	1		SM 2540G	10/8/21	10/8/21 16:53	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: C-5 (0.25-0.5) Sampled: 9/30/2021 11:43

Sample ID: 21I1828-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:18	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	66.8	30-150		10/9/21 1:18
Decachlorobiphenyl [2]	65.8	30-150		10/9/21 1:18
Tetrachloro-m-xylene [1]	82.7	30-150		10/9/21 1:18
Tetrachloro-m-xylene [2]	78.5	30-150		10/9/21 1:18

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: C-5 (0.25-0.5) Sampled: 9/30/2021 11:43

Sample ID: 21I1828-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.4		% Wt	1		SM 2540G	10/8/21	10/8/21 16:54	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: C-5 (0.5-1.5) Sampled: 9/30/2021 11:45

Sample ID: 21I1828-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1254 [2]	0.076	0.090	0.036	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1260 [1]	ND	0.090	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:35	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	73.6	30-150		10/9/21 1:35
Decachlorobiphenyl [2]	76.7	30-150		10/9/21 1:35
Tetrachloro-m-xylene [1]	85.2	30-150		10/9/21 1:35
Tetrachloro-m-xylene [2]	80.2	30-150		10/9/21 1:35

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1828
Date Received: 9/30/2021
Field Sample #: C-5 (0.5-1.5)
Sampled: 9/30/2021 11:45
Sample ID: 21I1828-08
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.1		% Wt	1		SM 2540G	10/8/21	10/8/21 16:54	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: D-6 (0.25-0.5)   Sampled: 9/30/2021 11:50

Sample ID: 21I1828-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1254 [2]	0.055	0.086	0.034	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1260 [2]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 1:53	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	71.7	30-150		10/9/21 1:53
Decachlorobiphenyl [2]	71.5	30-150		10/9/21 1:53
Tetrachloro-m-xylene [1]	78.8	30-150		10/9/21 1:53
Tetrachloro-m-xylene [2]	74.2	30-150		10/9/21 1:53

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: D-6 (0.25-0.5) Sampled: 9/30/2021 11:50

Sample ID: 21I1828-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.4		% Wt	1		SM 2540G	10/8/21	10/8/21 16:54	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: D-6 (0.5-1.5)   Sampled: 9/30/2021 11:53

Sample ID: 21I1828-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1254 [2]	0.60	0.090	0.036	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1260 [2]	0.20	0.090	0.049	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 2:10	SFM
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 2:10	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.0	30-150		10/9/21 2:10
Decachlorobiphenyl [2]	70.1	30-150		10/9/21 2:10
Tetrachloro-m-xylene [1]	82.0	30-150		10/9/21 2:10
Tetrachloro-m-xylene [2]	77.9	30-150		10/9/21 2:10

Project Location: 375 Banfield Rd., Portsmouth, NH

Sample Description:

Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: D-6 (0.5-1.5)

Sampled: 9/30/2021 11:53

Sample ID: 21I1828-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.2		% Wt	1		SM 2540G	10/8/21	10/8/21 16:54	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: D-6 (1.5-3) Sampled: 9/30/2021 11:55

Sample ID: 21I1828-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.047	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1221 [1]	ND	0.10	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1232 [1]	ND	0.10	0.093	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1242 [1]	ND	0.10	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1248 [1]	ND	0.10	0.036	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1254 [1]	0.14	0.10	0.041	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1260 [2]	0.23	0.10	0.057	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1262 [1]	ND	0.10	0.052	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:33	SFM
Aroclor-1268 [1]	ND	0.10	0.083	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:33	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	79.5	30-150		10/9/21 3:33
Decachlorobiphenyl [2]	79.9	30-150		10/9/21 3:33
Tetrachloro-m-xylene [1]	84.1	30-150		10/9/21 3:33
Tetrachloro-m-xylene [2]	79.3	30-150		10/9/21 3:33

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: D-6 (1.5-3)   Sampled: 9/30/2021 11:55

Sample ID: 21I1828-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.2		% Wt	1		SM 2540G	10/8/21	10/8/21 16:54	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-7 (0.25-0.5)   Sampled: 9/30/2021 12:05

Sample ID: 21I1828-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1221 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1232 [1]	ND	0.093	0.084	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1242 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1248 [1]	ND	0.093	0.033	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1254 [1]	0.22	0.093	0.037	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1260 [2]	0.22	0.093	0.051	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1262 [1]	ND	0.093	0.046	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:50	SFM
Aroclor-1268 [1]	ND	0.093	0.074	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 3:50	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	74.3	30-150		10/9/21 3:50
Decachlorobiphenyl [2]	75.4	30-150		10/9/21 3:50
Tetrachloro-m-xylene [1]	83.6	30-150		10/9/21 3:50
Tetrachloro-m-xylene [2]	79.5	30-150		10/9/21 3:50

Project Location: 375 Banfield Rd., Portsmouth, NH

Sample Description:

Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-7 (0.25-0.5)

Sampled: 9/30/2021 12:05

Sample ID: 21I1828-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.1		% Wt	1		SM 2540G	10/8/21	10/8/21 16:54	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-7 (0.5-1.5)   Sampled: 9/30/2021 12:07

Sample ID: 21I1828-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1221 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1232 [1]	ND	0.097	0.088	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1242 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1248 [1]	ND	0.097	0.034	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1254 [1]	ND	0.097	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1260 [1]	ND	0.097	0.054	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1262 [1]	ND	0.097	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM
Aroclor-1268 [1]	ND	0.097	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:08	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	75.2	30-150		10/9/21 4:08
Decachlorobiphenyl [2]	76.2	30-150		10/9/21 4:08
Tetrachloro-m-xylene [1]	74.4	30-150		10/9/21 4:08
Tetrachloro-m-xylene [2]	70.8	30-150		10/9/21 4:08

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-7 (0.5-1.5) Sampled: 9/30/2021 12:07

Sample ID: 21I1828-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.1		% Wt	1		SM 2540G	10/8/21	10/8/21 16:54	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-7 (1.5-3)	Sampled: 9/30/2021 12:09

Sample ID: 21I1828-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	0.042	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1221 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1232 [1]	ND	0.092	0.083	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1242 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1248 [1]	ND	0.092	0.032	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1254 [1]	ND	0.092	0.037	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1260 [1]	ND	0.092	0.051	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1262 [1]	ND	0.092	0.046	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM
Aroclor-1268 [1]	ND	0.092	0.074	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:25	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	77.3	30-150		10/9/21 4:25
Decachlorobiphenyl [2]	78.5	30-150		10/9/21 4:25
Tetrachloro-m-xylene [1]	83.9	30-150		10/9/21 4:25
Tetrachloro-m-xylene [2]	80.0	30-150		10/9/21 4:25

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-7 (1.5-3)   Sampled: 9/30/2021 12:09

Sample ID: 21I1828-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.7		% Wt	1		SM 2540G	10/8/21	10/8/21 16:55	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: F-6 (0.25-0.5) Sampled: 9/30/2021 12:15

Sample ID: 21I1828-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.096	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1221 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1232 [1]	ND	0.096	0.087	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1242 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1248 [1]	ND	0.096	0.034	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1254 [2]	0.10	0.096	0.039	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1260 [2]	ND	0.096	0.053	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1262 [1]	ND	0.096	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM
Aroclor-1268 [1]	ND	0.096	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 4:42	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	59.5	30-150		10/9/21 4:42
Decachlorobiphenyl [2]	59.4	30-150		10/9/21 4:42
Tetrachloro-m-xylene [1]	68.5	30-150		10/9/21 4:42
Tetrachloro-m-xylene [2]	65.4	30-150		10/9/21 4:42

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: F-6 (0.25-0.5)
Sampled: 9/30/2021 12:15

Sample ID: 21I1828-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.0		% Wt	1		SM 2540G	10/8/21	10/8/21 16:55	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: F-6 (0.5-1.5) Sampled: 9/30/2021 12:20

Sample ID: 21I1828-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.098	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1221 [1]	ND	0.098	0.073	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1232 [1]	ND	0.098	0.088	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1242 [1]	ND	0.098	0.073	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1248 [1]	ND	0.098	0.034	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1254 [1]	ND	0.098	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1260 [1]	ND	0.098	0.054	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1262 [1]	ND	0.098	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM
Aroclor-1268 [1]	ND	0.098	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:00	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	77.6	30-150		10/9/21 5:00
Decachlorobiphenyl [2]	78.8	30-150		10/9/21 5:00
Tetrachloro-m-xylene [1]	79.1	30-150		10/9/21 5:00
Tetrachloro-m-xylene [2]	76.0	30-150		10/9/21 5:00

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1828
Date Received: 9/30/2021
Field Sample #: F-6 (0.5-1.5)
Sampled: 9/30/2021 12:20
Sample ID: 21I1828-16
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.8		% Wt	1		SM 2540G	10/8/21	10/8/21 16:55	JLH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-5 (0.25-0.5)	Sampled: 9/30/2021 12:23

Sample ID: 21I1828-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1262 [1]	ND	0.087	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM
Aroclor-1268 [1]	ND	0.087	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:17	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	81.1	30-150		10/9/21 5:17
Decachlorobiphenyl [2]	80.3	30-150		10/9/21 5:17
Tetrachloro-m-xylene [1]	87.6	30-150		10/9/21 5:17
Tetrachloro-m-xylene [2]	82.7	30-150		10/9/21 5:17

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-5 (0.25-0.5)　Sampled: 9/30/2021 12:23

Sample ID: 21I1828-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.3		% Wt	1		SM 2540G	10/8/21	10/8/21 16:57	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: E-5 (0.5-1.5)   Sampled: 9/30/2021 12:26

Sample ID: 21I1828-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	1.9	0.85	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1221 [1]	ND	1.9	1.4	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1232 [1]	ND	1.9	1.7	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1242 [1]	ND	1.9	1.4	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1248 [1]	13	1.9	0.66	mg/Kg dry	80		SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1254 [1]	ND	1.9	0.75	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1260 [1]	ND	1.9	1.0	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1262 [1]	ND	1.9	0.94	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG
Aroclor-1268 [1]	ND	1.9	1.5	mg/Kg dry	80	U	SW-846 8082A	10/7/21	10/11/21 5:42	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	*	30-150	S-01, U	10/11/21 5:42
Decachlorobiphenyl [2]	*	30-150	S-01, U	10/11/21 5:42
Tetrachloro-m-xylene [1]	*	30-150	S-01, U	10/11/21 5:42
Tetrachloro-m-xylene [2]	*	30-150	S-01, U	10/11/21 5:42

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1828
Date Received: 9/30/2021
Field Sample #: E-5 (0.5-1.5)
Sampled: 9/30/2021 12:26
Sample ID: 21I1828-18
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.9		% Wt	1		SM 2540G	10/8/21	10/8/21 16:57	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: F-5 (0.25-0.5) Sampled: 9/30/2021 12:30

Sample ID: 21I1828-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1254 [1]	0.060	0.086	0.034	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1260 [2]	0.088	0.086	0.047	mg/Kg dry	4		SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:52	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 5:52	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.0	30-150		10/9/21 5:52
Decachlorobiphenyl [2]	76.2	30-150		10/9/21 5:52
Tetrachloro-m-xylene [1]	84.2	30-150		10/9/21 5:52
Tetrachloro-m-xylene [2]	79.4	30-150		10/9/21 5:52

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1828
Date Received: 9/30/2021
Field Sample #: F-5 (0.25-0.5)
Sampled: 9/30/2021 12:30
Sample ID: 21I1828-19
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.0		% Wt	1		SM 2540G	10/8/21	10/8/21 16:57	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: F-5 (0.5-1.5) Sampled: 9/30/2021 12:33

Sample ID: 21I1828-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1254 [1]	ND	0.089	0.036	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1262 [1]	ND	0.089	0.045	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/9/21 6:10	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	69.9	30-150		10/9/21 6:10
Decachlorobiphenyl [2]	70.4	30-150		10/9/21 6:10
Tetrachloro-m-xylene [1]	76.5	30-150		10/9/21 6:10
Tetrachloro-m-xylene [2]	73.0	30-150		10/9/21 6:10

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1828

Date Received: 9/30/2021

Field Sample #: F-5 (0.5-1.5) Sampled: 9/30/2021 12:33

Sample ID: 21I1828-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.6		% Wt	1		SM 2540G	10/8/21	10/8/21 16:58	JLH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1828-01 [B-8 (0.25-0.5)]	B291884	10/08/21
21I1828-02 [B-8 (0.5-1.5)]	B291884	10/08/21
21I1828-03 [B-9 (0.25-0.5)]	B291884	10/08/21
21I1828-04 [B-9 (0.5-1.5)]	B291884	10/08/21
21I1828-05 [C-7 (0.25-0.5)]	B291884	10/08/21
21I1828-06 [C-7 (0.5-1.5)]	B291884	10/08/21
21I1828-07 [C-5 (0.25-0.5)]	B291884	10/08/21
21I1828-08 [C-5 (0.5-1.5)]	B291884	10/08/21
21I1828-09 [D-6 (0.25-0.5)]	B291884	10/08/21
21I1828-10 [D-6 (0.5-1.5)]	B291884	10/08/21
21I1828-11 [D-6 (1.5-3)]	B291884	10/08/21
21I1828-12 [E-7 (0.25-0.5)]	B291884	10/08/21
21I1828-13 [E-7 (0.5-1.5)]	B291884	10/08/21
21I1828-14 [E-7 (1.5-3)]	B291884	10/08/21
21I1828-15 [F-6 (0.25-0.5)]	B291884	10/08/21
21I1828-16 [F-6 (0.5-1.5)]	B291884	10/08/21
21I1828-17 [E-5 (0.25-0.5)]	B291884	10/08/21
21I1828-18 [E-5 (0.5-1.5)]	B291884	10/08/21
21I1828-19 [F-5 (0.25-0.5)]	B291884	10/08/21
21I1828-20 [F-5 (0.5-1.5)]	B291884	10/08/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1828-01 [B-8 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-02 [B-8 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-03 [B-9 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-04 [B-9 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-05 [C-7 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-06 [C-7 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-07 [C-5 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-08 [C-5 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-09 [D-6 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-10 [D-6 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-11 [D-6 (1.5-3)]	B291929	10.0	10.0	10/07/21
21I1828-12 [E-7 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-13 [E-7 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-14 [E-7 (1.5-3)]	B291929	10.0	10.0	10/07/21
21I1828-15 [F-6 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-16 [F-6 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-17 [E-5 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-18 [E-5 (0.5-1.5)]	B291929	10.0	10.0	10/07/21
21I1828-19 [F-5 (0.25-0.5)]	B291929	10.0	10.0	10/07/21
21I1828-20 [F-5 (0.5-1.5)]	B291929	10.0	10.0	10/07/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291929 - SW-846 3540C										
Blank (B291929-BLK1)				Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.148*		mg/Kg wet	0.200		73.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.146*		mg/Kg wet	0.200		73.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.158*		mg/Kg wet	0.200		78.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.148*		mg/Kg wet	0.200		73.8	30-150			
LCS (B291929-BS1)				Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	0.16	0.020	mg/Kg wet	0.200		81.9	40-140			
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		70.4	40-140			
Aroclor-1260	0.14	0.020	mg/Kg wet	0.200		67.9	40-140			
Aroclor-1260 [2C]	0.14	0.020	mg/Kg wet	0.200		69.2	40-140			
Surrogate: Decachlorobiphenyl	*0.155*		mg/Kg wet	0.200		77.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.154*		mg/Kg wet	0.200		76.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.173*		mg/Kg wet	0.200		86.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.161*		mg/Kg wet	0.200		80.5	30-150			
LCS Dup (B291929-BSD1)				Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	0.17	0.020	mg/Kg wet	0.200		84.0	40-140	2.50	30	
Aroclor-1016 [2C]	0.15	0.020	mg/Kg wet	0.200		72.5	40-140	2.97	30	
Aroclor-1260	0.14	0.020	mg/Kg wet	0.200		68.6	40-140	0.995	30	
Aroclor-1260 [2C]	0.14	0.020	mg/Kg wet	0.200		68.1	40-140	1.49	30	
Surrogate: Decachlorobiphenyl	*0.154*		mg/Kg wet	0.200		77.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.153*		mg/Kg wet	0.200		76.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.172*		mg/Kg wet	0.200		86.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.160*		mg/Kg wet	0.200		80.2	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291929 - SW-846 3540C										
Matrix Spike (B291929-MS1)	**Source: 21I1828-02**		Prepared: 10/07/21 Analyzed: 10/09/21							
Aroclor-1016	0.24	0.096	mg/Kg dry	0.239	ND	98.8	40-140			
Aroclor-1016 [2C]	0.21	0.096	mg/Kg dry	0.239	ND	86.9	40-140			
Aroclor-1260	0.36	0.096	mg/Kg dry	0.239	0.11	103	40-140			
Aroclor-1260 [2C]	0.36	0.096	mg/Kg dry	0.239	0.13	93.5	40-140			
Surrogate: Decachlorobiphenyl	*0.191*		mg/Kg dry	0.239		79.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.199*		mg/Kg dry	0.239		83.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.196*		mg/Kg dry	0.239		82.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.185*		mg/Kg dry	0.239		77.3	30-150			
Matrix Spike Dup (B291929-MSD1)	**Source: 21I1828-02**		Prepared: 10/07/21 Analyzed: 10/09/21							
Aroclor-1016	0.26	0.096	mg/Kg dry	0.239	ND	109	40-140	9.66	50	
Aroclor-1016 [2C]	0.24	0.096	mg/Kg dry	0.239	ND	98.4	40-140	12.4	50	
Aroclor-1260	0.33	0.096	mg/Kg dry	0.239	0.11	90.6	40-140	8.71	50	
Aroclor-1260 [2C]	0.36	0.096	mg/Kg dry	0.239	0.13	94.0	40-140	0.316	50	
Surrogate: Decachlorobiphenyl	*0.240*		mg/Kg dry	0.239		100	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.247*		mg/Kg dry	0.239		103	30-150			
Surrogate: Tetrachloro-m-xylene	*0.219*		mg/Kg dry	0.239		91.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.205*		mg/Kg dry	0.239		85.8	30-150			

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

B-8 (0.5-1.5)

Lab Sample ID: 21I1828-02

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.43	
	2	0.000	-0.030	0.030	0.48	11.0
Aroclor-1260	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.13	16.7

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

B-9 (0.25-0.5)

Lab Sample ID: 21I1828-03

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.13	16.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

B-9 (0.5-1.5)

Lab Sample ID: 21I1828-04

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.15	22.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-7 (0.5-1.5)

Lab Sample ID: 21I1828-06

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.092	
	2	0.000	-0.030	0.030	0.090	2.2
Aroclor-1260	1	0.000	-0.030	0.030	0.066	
	2	0.000	-0.030	0.030	0.068	3.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-5 (0.5-1.5)

Lab Sample ID: 21I1828-08

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.068	
	2	0.000	-0.030	0.030	0.076	11.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-6 (0.25-0.5)

Lab Sample ID: 21I1828-09

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.053	
	2	0.000	-0.030	0.030	0.055	3.7

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-6 (0.5-1.5)

Lab Sample ID: 21I1828-10

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.55	
	2	0.000	-0.030	0.030	0.60	8.7
Aroclor-1260	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.20	10.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-6 (1.5-3)

Lab Sample ID: 21I1828-11

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.11	24.0
Aroclor-1260	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.23	4.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

E-7 (0.25-0.5)

Lab Sample ID: 21I1828-12

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.20	9.5
Aroclor-1260	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.22	9.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

F-6 (0.25-0.5)

Lab Sample ID:	21I1828-15	Date(s) Analyzed:	10/09/2021	10/09/2021	
Instrument ID (1):	ECD5	Instrument ID (2):	ECD5		
GC Column (1):	ID: (mm)	GC Column (2):	ID: (mm)		

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.087	
	2	0.000	-0.030	0.030	0.10	13.9

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

E-5 (0.5-1.5)

Lab Sample ID: 21I1828-18

Date(s) Analyzed: 10/11/2021 10/11/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	13	
	2	0.000	-0.030	0.030	13	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

F-5 (0.25-0.5)

Lab Sample ID: 21I1828-19

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.060	
	2	0.000	-0.030	0.030	0.055	8.7
Aroclor-1260	1	0.000	-0.030	0.030	0.084	
	2	0.000	-0.030	0.030	0.088	4.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291929-BS1

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.14	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.14	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291929-BSD1

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.15	12.5
Aroclor-1260	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.14	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291929-MS1

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.24	
	2	0.000	-0.030	0.030	0.21	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.36	
	2	0.000	-0.030	0.030	0.36	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291929-MSD1

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.26	
	2	0.000	-0.030	0.030	0.24	8.0
Aroclor-1260	1	0.000	-0.030	0.030	0.33	
	2	0.000	-0.030	0.030	0.36	8.7

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1828

con-test®
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 13 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	B-8 (0.25-0.5)	9/30	10:50	Grab	S	U		1				X
2	B-8 (0.5-1.5)		10:52	Grab	S	U		1				X
3	B-9 (0.25-0.5)		11:00	Grab	S	U		1				X
4	B-9 (0.5-1.5)		11:03	Grab	S	U		1				X
5	C-7 (0.25-0.5)		11:20	Grab	S	U		1				X
6	C-7 (0.5-1.5)		11:25	Grab	S	U		1				X
7	C-5 (0.25-0.5)		11:43	Grab	S	U		1				X
8	C-5 (0.5-1.5)		11:45	Grab	S	U		1				X
9	D-6 (0.25-0.5)		11:50	Grab	S	U		1				X
10	D-6 (0.5-1.5)		11:53	Grab	S	U		1				X

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature) 23,4.8	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other: SES

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity

Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP, LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I1828

con-test® A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 14 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	605 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	D-6 (1.5-3.0)	9/30	11:55	Grab	S	U		1				X
12	E-7 (0.25-0.5)	12:05	~~11:43~~	Grab	S	U		1				X
13	E-7 (0.5-1.5)	12:07	~~11:45~~	Grab	S	U		1				X
14	E-7 (1.5-3)		12:09	Grab	S	U		1				X
15	F-6 (0.25-0.5)		12:15	Grab	S	U		1				X
16	F-6 (0.5-1.5)		12:20	Grab	S	U		1				X
17	E-5 (0.25-0.5)		12:23	Grab	S	U		1				X
18	E-5 (0.5-1.5)		12:26	Grab	S	U		1				X
19	F-5 (0.25-0.5)		12:30	Grab	S	U		1				X
20	F-5 (0.5-1.5)	↓	12:33	Grab	S	U		1				X

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature)	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ____ On Ice T No Ice ____
Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T
By Gun # 3 Actual Temp - 2.3, 4.8°C
By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ____
Are there Rushes? F Who was notified? ____
Are there Short Holds? F Who was notified? ____
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 13, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1829

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/13/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1829

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
JJ-7 (0.5-1.5)	21I1829-01	Soil		SM 2540G SW-846 8082A	
JJ-7 (1.5-3)	21I1829-02	Soil		SM 2540G SW-846 8082A	
I-9-Mid (0.25-0.5)	21I1829-03	Soil		SM 2540G SW-846 8082A	
I-9-Mid (0.5-1.5)	21I1829-04	Soil		SM 2540G SW-846 8082A	
II-9 (0.25-0.5)	21I1829-05	Soil		SM 2540G SW-846 8082A	
II-9 (0.5-1.5)	21I1829-06	Soil		SM 2540G SW-846 8082A	
J-10 (0.25-0.5)	21I1829-07	Soil		SM 2540G SW-846 8082A	
J-10 (0.5-1.5)	21I1829-08	Soil		SM 2540G SW-846 8082A	
J-10 (1.5-3)	21I1829-09	Soil		SM 2540G SW-846 8082A	
J-11 (0.25-0.5)	21I1829-10	Soil		SM 2540G SW-846 8082A	
J-11 (0.5-1.5)	21I1829-11	Soil		SM 2540G SW-846 8082A	
K-11 (0.25-0.5)	21I1829-12	Soil		SM 2540G SW-846 8082A	
K-11 (0.5-1.5)	21I1829-13	Soil		SM 2540G SW-846 8082A	
K-12 (0.25-0.5)	21I1829-14	Soil		SM 2540G SW-846 8082A	
K-12 (0.5-1.5)	21I1829-15	Soil		SM 2540G SW-846 8082A	
II-11-Mid (0.25-0.5)	21I1829-16	Soil		SM 2540G SW-846 8082A	
II-11-Mid (0.5-1.5)	21I1829-17	Soil		SM 2540G SW-846 8082A	
II-11-Mid (1.5-3)	21I1829-18	Soil		SM 2540G SW-846 8082A	
J-13 (0.25-0.5)	21I1829-19	Soil		SM 2540G SW-846 8082A	
J-13 (0.5-1.5)	21I1829-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl

21I1829-05[II-9 (0.25-0.5)], 21I1829-07[J-10 (0.25-0.5)]

Decachlorobiphenyl [2C]

21I1829-05[II-9 (0.25-0.5)], 21I1829-07[J-10 (0.25-0.5)]

Tetrachloro-m-xylene

21I1829-05[II-9 (0.25-0.5)], 21I1829-07[J-10 (0.25-0.5)]

Tetrachloro-m-xylene [2C]

21I1829-05[II-9 (0.25-0.5)], 21I1829-07[J-10 (0.25-0.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: JJ-7 (0.5-1.5) Sampled: 9/29/2021 13:53

Sample ID: 21I1829-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.085	0.038	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1221 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1232 [1]	ND	0.085	0.076	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1242 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1248 [1]	ND	0.085	0.030	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1254 [1]	ND	0.085	0.034	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1260 [1]	ND	0.085	0.047	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1262 [1]	ND	0.085	0.042	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM
Aroclor-1268 [1]	ND	0.085	0.068	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/9/21 17:11	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	82.0	30-150		10/9/21 17:11
Decachlorobiphenyl [2]	88.4	30-150		10/9/21 17:11
Tetrachloro-m-xylene [1]	66.4	30-150		10/9/21 17:11
Tetrachloro-m-xylene [2]	63.0	30-150		10/9/21 17:11

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: JJ-7 (0.5-1.5)
Sampled: 9/29/2021 13:53

Sample ID: 21I1829-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.4		% Wt	1		SM 2540G	10/8/21	10/8/21 16:58	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: JJ-7 (1.5-3)   Sampled: 9/29/2021 13:56

Sample ID: 21I1829-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG
Aroclor-1268 [1]	ND	0.086	0.068	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:01	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	77.5	30-150		10/7/21 16:01
Decachlorobiphenyl [2]	84.7	30-150		10/7/21 16:01
Tetrachloro-m-xylene [1]	73.3	30-150		10/7/21 16:01
Tetrachloro-m-xylene [2]	71.7	30-150		10/7/21 16:01

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: JJ-7 (1.5-3) Sampled: 9/29/2021 13:56

Sample ID: 21I1829-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.5		% Wt	1		SM 2540G	10/8/21	10/8/21 16:59	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: I-9-Mid (0.25-0.5) Sampled: 9/29/2021 14:10

Sample ID: 21I1829-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1254 [1]	ND	0.089	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:20	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	60.8	30-150		10/7/21 16:20
Decachlorobiphenyl [2]	63.4	30-150		10/7/21 16:20
Tetrachloro-m-xylene [1]	62.8	30-150		10/7/21 16:20
Tetrachloro-m-xylene [2]	60.7	30-150		10/7/21 16:20

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: I-9-Mid (0.25-0.5)   Sampled: 9/29/2021 14:10

Sample ID: 21I1829-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.9		% Wt	1		SM 2540G	10/8/21	10/8/21 16:59	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: I-9-Mid (0.5-1.5) Sampled: 9/29/2021 14:12

Sample ID: 21I1829-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1221 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1232 [1]	ND	0.092	0.082	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1242 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1248 [1]	ND	0.092	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1254 [2]	0.15	0.092	0.037	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1260 [1]	ND	0.092	0.050	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1262 [1]	ND	0.092	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG
Aroclor-1268 [1]	ND	0.092	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 16:38	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	71.3	30-150		10/7/21 16:38
Decachlorobiphenyl [2]	73.7	30-150		10/7/21 16:38
Tetrachloro-m-xylene [1]	68.3	30-150		10/7/21 16:38
Tetrachloro-m-xylene [2]	65.6	30-150		10/7/21 16:38

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: I-9-Mid (0.5-1.5)	Sampled: 9/29/2021 14:12

Sample ID: 21I1829-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.4		% Wt	1		SM 2540G	10/8/21	10/8/21 16:59	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-9 (0.25-0.5)   Sampled: 9/29/2021 14:00

Sample ID: 21I1829-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.84	0.38	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1221 [1]	ND	0.84	0.63	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1232 [1]	ND	0.84	0.76	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1242 [1]	ND	0.84	0.63	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1248 [1]	ND	0.84	0.30	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1254 [1]	2.9	0.84	0.34	mg/Kg dry	40		SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1260 [2]	0.96	0.84	0.46	mg/Kg dry	40		SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1262 [1]	ND	0.84	0.42	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:14	TG
Aroclor-1268 [1]	ND	0.84	0.67	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:14	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	*	30-150	S-01, U	10/8/21 8:14
Decachlorobiphenyl [2]	*	30-150	S-01, U	10/8/21 8:14
Tetrachloro-m-xylene [1]	*	30-150	S-01, U	10/8/21 8:14
Tetrachloro-m-xylene [2]	*	30-150	S-01, U	10/8/21 8:14

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-9 (0.25-0.5) Sampled: 9/29/2021 14:00

Sample ID: 21I1829-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.8		% Wt	1		SM 2540G	10/8/21	10/8/21 16:59	JLH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1829
Date Received: 9/30/2021
Field Sample #: II-9 (0.5-1.5)
Sampled: 9/29/2021 14:05
Sample ID: 21I1829-06
Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:15	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	80.2	30-150		10/7/21 17:15
Decachlorobiphenyl [2]	86.6	30-150		10/7/21 17:15
Tetrachloro-m-xylene [1]	70.9	30-150		10/7/21 17:15
Tetrachloro-m-xylene [2]	69.3	30-150		10/7/21 17:15

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-9 (0.5-1.5)
Sampled: 9/29/2021 14:05

Sample ID: 21I1829-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.8		% Wt	1		SM 2540G	10/8/21	10/8/21 16:59	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-10 (0.25-0.5) Sampled: 9/29/2021 14:22

Sample ID: 21I1829-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.89	0.40	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1221 [1]	ND	0.89	0.67	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1232 [1]	ND	0.89	0.80	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1242 [1]	ND	0.89	0.67	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1248 [1]	ND	0.89	0.31	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1254 [1]	2.5	0.89	0.36	mg/Kg dry	40		SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1260 [2]	0.63	0.89	0.49	mg/Kg dry	40	J	SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1262 [1]	ND	0.89	0.45	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:33	TG
Aroclor-1268 [1]	ND	0.89	0.71	mg/Kg dry	40	U	SW-846 8082A	10/6/21	10/8/21 8:33	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	*	30-150	S-01, U	10/8/21 8:33
Decachlorobiphenyl [2]	*	30-150	S-01, U	10/8/21 8:33
Tetrachloro-m-xylene [1]	*	30-150	S-01, U	10/8/21 8:33
Tetrachloro-m-xylene [2]	*	30-150	S-01, U	10/8/21 8:33

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-10 (0.25-0.5)   Sampled: 9/29/2021 14:22

Sample ID: 21I1829-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.6		% Wt	1		SM 2540G	10/8/21	10/8/21 17:00	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-10 (0.5-1.5) Sampled: 9/29/2021 14:24

Sample ID: 21I1829-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	0.041	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1221 [1]	ND	0.091	0.068	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1232 [1]	ND	0.091	0.082	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1242 [1]	ND	0.091	0.068	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1248 [1]	ND	0.091	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1254 [1]	ND	0.091	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1260 [1]	ND	0.091	0.050	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1262 [1]	ND	0.091	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG
Aroclor-1268 [1]	ND	0.091	0.072	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 17:52	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	61.6	30-150		10/7/21 17:52
Decachlorobiphenyl [2]	65.8	30-150		10/7/21 17:52
Tetrachloro-m-xylene [1]	62.0	30-150		10/7/21 17:52
Tetrachloro-m-xylene [2]	60.6	30-150		10/7/21 17:52

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-10 (0.5-1.5) Sampled: 9/29/2021 14:24

Sample ID: 21I1829-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:00	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-10 (1.5-3)   Sampled: 9/29/2021 14:26

Sample ID: 21I1829-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1221 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1242 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1254 [1]	ND	0.089	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:01	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	81.0	30-150		10/7/21 21:01
Decachlorobiphenyl [2]	85.9	30-150		10/7/21 21:01
Tetrachloro-m-xylene [1]	73.8	30-150		10/7/21 21:01
Tetrachloro-m-xylene [2]	70.2	30-150		10/7/21 21:01

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1829
Date Received: 9/30/2021
Field Sample #: J-10 (1.5-3)
Sampled: 9/29/2021 14:26
Sample ID: 21I1829-09
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:00	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-11 (0.25-0.5) Sampled: 9/29/2021 14:30

Sample ID: 21I1829-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1221 [1]	ND	0.093	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1232 [1]	ND	0.093	0.083	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1242 [1]	ND	0.093	0.069	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1248 [1]	ND	0.093	0.032	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1254 [1]	ND	0.093	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1260 [2]	0.087	0.093	0.051	mg/Kg dry	4	J	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1262 [1]	ND	0.093	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG
Aroclor-1268 [1]	ND	0.093	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:20	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	73.1	30-150		10/7/21 21:20
Decachlorobiphenyl [2]	75.7	30-150		10/7/21 21:20
Tetrachloro-m-xylene [1]	70.9	30-150		10/7/21 21:20
Tetrachloro-m-xylene [2]	68.4	30-150		10/7/21 21:20

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-11 (0.25-0.5) Sampled: 9/29/2021 14:30

Sample ID: 21I1829-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:00	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-11 (0.5-1.5)   Sampled: 9/29/2021 14:35

Sample ID: 21I1829-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.095	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1221 [1]	ND	0.095	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1232 [1]	ND	0.095	0.085	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1242 [1]	ND	0.095	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1248 [1]	ND	0.095	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1254 [1]	ND	0.095	0.038	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1260 [1]	ND	0.095	0.052	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1262 [1]	ND	0.095	0.047	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG
Aroclor-1268 [1]	ND	0.095	0.076	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:38	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	64.2	30-150		10/7/21 21:38
Decachlorobiphenyl [2]	69.8	30-150		10/7/21 21:38
Tetrachloro-m-xylene [1]	56.5	30-150		10/7/21 21:38
Tetrachloro-m-xylene [2]	53.9	30-150		10/7/21 21:38

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-11 (0.5-1.5)   Sampled: 9/29/2021 14:35

Sample ID: 21I1829-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:00	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-11 (0.25-0.5) Sampled: 9/29/2021 14:38

Sample ID: 21I1829-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.099	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1221 [1]	ND	0.099	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1232 [1]	ND	0.099	0.089	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1242 [1]	ND	0.099	0.074	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1248 [1]	ND	0.099	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1254 [2]	0.17	0.099	0.040	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1260 [1]	0.23	0.099	0.054	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1262 [1]	ND	0.099	0.050	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:56	TG
Aroclor-1268 [1]	ND	0.099	0.079	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 21:56	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	60.7	30-150		10/7/21 21:56
Decachlorobiphenyl [2]	62.5	30-150		10/7/21 21:56
Tetrachloro-m-xylene [1]	61.0	30-150		10/7/21 21:56
Tetrachloro-m-xylene [2]	57.7	30-150		10/7/21 21:56

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-11 (0.25-0.5)   Sampled: 9/29/2021 14:38

Sample ID: 21I1829-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.8		% Wt	1		SM 2540G	10/8/21	10/8/21 17:00	JLH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-11 (0.5-1.5)   Sampled: 9/29/2021 14:40

Sample ID: 21I1829-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1221 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1232 [1]	ND	0.097	0.087	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1242 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1248 [1]	ND	0.097	0.034	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1254 [1]	0.17	0.097	0.039	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1260 [2]	0.26	0.097	0.053	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1262 [1]	ND	0.097	0.049	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	TG
Aroclor-1268 [1]	ND	0.097	0.078	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:15	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	59.1	30-150		10/7/21 22:15
Decachlorobiphenyl [2]	58.7	30-150		10/7/21 22:15
Tetrachloro-m-xylene [1]	57.1	30-150		10/7/21 22:15
Tetrachloro-m-xylene [2]	52.3	30-150		10/7/21 22:15

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-11 (0.5-1.5)   Sampled: 9/29/2021 14:40

Sample ID: 21I1829-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:01	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-12 (0.25-0.5) Sampled: 9/29/2021 15:00

Sample ID: 21I1829-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.096	0.043	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1221 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1232 [1]	ND	0.096	0.086	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1242 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1248 [1]	ND	0.096	0.033	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1254 [1]	0.15	0.096	0.038	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1260 [1]	0.16	0.096	0.053	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1262 [1]	ND	0.096	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	TG
Aroclor-1268 [1]	ND	0.096	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:33	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	47.3	30-150		10/7/21 22:33
Decachlorobiphenyl [2]	48.2	30-150		10/7/21 22:33
Tetrachloro-m-xylene [1]	44.9	30-150		10/7/21 22:33
Tetrachloro-m-xylene [2]	42.5	30-150		10/7/21 22:33

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-12 (0.25-0.5)   Sampled: 9/29/2021 15:00

Sample ID: 21I1829-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.6		% Wt	1		SM 2540G	10/8/21	10/8/21 17:01	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-12 (0.5-1.5) Sampled: 9/29/2021 15:02

Sample ID: 21I1829-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1221 [1]	ND	0.10	0.076	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1232 [1]	ND	0.10	0.091	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1242 [1]	ND	0.10	0.076	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1248 [1]	ND	0.10	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1254 [2]	0.25	0.10	0.040	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1260 [1]	0.44	0.10	0.055	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1262 [1]	ND	0.10	0.050	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:52	TG
Aroclor-1268 [1]	ND	0.10	0.081	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 22:52	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	64.5	30-150		10/7/21 22:52
Decachlorobiphenyl [2]	61.2	30-150		10/7/21 22:52
Tetrachloro-m-xylene [1]	68.3	30-150		10/7/21 22:52
Tetrachloro-m-xylene [2]	66.0	30-150		10/7/21 22:52

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: K-12 (0.5-1.5) Sampled: 9/29/2021 15:02

Sample ID: 21I1829-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	79.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:01	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-11-Mid (0.25-0.5)   Sampled: 9/29/2021 15:10

Sample ID: 21I1829-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1254 [2]	0.14	0.089	0.036	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1260 [2]	0.16	0.089	0.049	mg/Kg dry	4		SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:10	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:10	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	57.6	30-150		10/7/21 23:10
Decachlorobiphenyl [2]	60.2	30-150		10/7/21 23:10
Tetrachloro-m-xylene [1]	52.3	30-150		10/7/21 23:10
Tetrachloro-m-xylene [2]	49.6	30-150		10/7/21 23:10

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-11-Mid (0.25-0.5) Sampled: 9/29/2021 15:10

Sample ID: 21I1829-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.1		% Wt	1		SM 2540G	10/8/21	10/8/21 17:01	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-11-Mid (0.5-1.5) Sampled: 9/29/2021 15:13

Sample ID: 21I1829-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1221 [1]	ND	0.11	0.079	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1232 [1]	ND	0.11	0.095	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1242 [1]	ND	0.11	0.079	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1248 [1]	ND	0.11	0.037	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1254 [1]	ND	0.11	0.042	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1260 [1]	ND	0.11	0.058	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1262 [1]	ND	0.11	0.053	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG
Aroclor-1268 [1]	ND	0.11	0.085	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:29	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	62.8	30-150		10/7/21 23:29
Decachlorobiphenyl [2]	67.0	30-150		10/7/21 23:29
Tetrachloro-m-xylene [1]	61.7	30-150		10/7/21 23:29
Tetrachloro-m-xylene [2]	60.3	30-150		10/7/21 23:29

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-11-Mid (0.5-1.5)   Sampled: 9/29/2021 15:13

Sample ID: 21I1829-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	75.5		% Wt	1		SM 2540G	10/8/21	10/8/21 17:01	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-11-Mid (1.5-3)　Sampled: 9/29/2021 15:16

Sample ID: 21I1829-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1221 [1]	ND	0.087	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1232 [1]	ND	0.087	0.079	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1242 [1]	ND	0.087	0.066	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1248 [1]	ND	0.087	0.031	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/7/21 23:47	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	67.3	30-150		10/7/21 23:47
Decachlorobiphenyl [2]	72.5	30-150		10/7/21 23:47
Tetrachloro-m-xylene [1]	61.4	30-150		10/7/21 23:47
Tetrachloro-m-xylene [2]	60.5	30-150		10/7/21 23:47

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: II-11-Mid (1.5-3)
Sampled: 9/29/2021 15:16

Sample ID: 21I1829-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.6		% Wt	1		SM 2540G	10/8/21	10/8/21 17:01	JLH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-13 (0.25-0.5)	Sampled: 9/29/2021 15:20

Sample ID: 21I1829-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.046	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1221 [1]	ND	0.10	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1232 [1]	ND	0.10	0.092	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1242 [1]	ND	0.10	0.077	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1248 [1]	ND	0.10	0.036	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1254 [2]	0.11	0.10	0.041	mg/Kg dry	4		SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1260 [2]	0.11	0.10	0.056	mg/Kg dry	4		SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1262 [1]	ND	0.10	0.051	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:05	TG
Aroclor-1268 [1]	ND	0.10	0.082	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:05	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	69.0	30-150		10/8/21 0:05
Decachlorobiphenyl [2]	70.1	30-150		10/8/21 0:05
Tetrachloro-m-xylene [1]	63.9	30-150		10/8/21 0:05
Tetrachloro-m-xylene [2]	59.1	30-150		10/8/21 0:05

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-13 (0.25-0.5) Sampled: 9/29/2021 15:20

Sample ID: 21I1829-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	78.0		% Wt	1		SM 2540G	10/8/21	10/8/21 17:02	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-13 (0.5-1.5) Sampled: 9/29/2021 15:22

Sample ID: 21I1829-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.045	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1221 [1]	ND	0.10	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1232 [1]	ND	0.10	0.090	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1242 [1]	ND	0.10	0.075	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1248 [1]	ND	0.10	0.035	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1254 [1]	0.20	0.10	0.040	mg/Kg dry	4		SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1260 [1]	0.14	0.10	0.055	mg/Kg dry	4		SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1262 [1]	ND	0.10	0.050	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:24	TG
Aroclor-1268 [1]	ND	0.10	0.080	mg/Kg dry	4	U	SW-846 8082A	10/6/21	10/8/21 0:24	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	59.2	30-150		10/8/21 0:24
Decachlorobiphenyl [2]	60.2	30-150		10/8/21 0:24
Tetrachloro-m-xylene [1]	57.7	30-150		10/8/21 0:24
Tetrachloro-m-xylene [2]	55.7	30-150		10/8/21 0:24

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1829

Date Received: 9/30/2021

Field Sample #: J-13 (0.5-1.5) Sampled: 9/29/2021 15:22

Sample ID: 21I1829-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.2		% Wt	1		SM 2540G	10/8/21	10/8/21 17:02	JLH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1829-01 [JJ-7 (0.5-1.5)]	B291884	10/08/21
21I1829-02 [JJ-7 (1.5-3)]	B291884	10/08/21
21I1829-03 [I-9-Mid (0.25-0.5)]	B291884	10/08/21
21I1829-04 [I-9-Mid (0.5-1.5)]	B291884	10/08/21
21I1829-05 [II-9 (0.25-0.5)]	B291884	10/08/21
21I1829-06 [II-9 (0.5-1.5)]	B291884	10/08/21
21I1829-07 [J-10 (0.25-0.5)]	B291884	10/08/21
21I1829-08 [J-10 (0.5-1.5)]	B291884	10/08/21
21I1829-09 [J-10 (1.5-3)]	B291884	10/08/21
21I1829-10 [J-11 (0.25-0.5)]	B291884	10/08/21
21I1829-11 [J-11 (0.5-1.5)]	B291884	10/08/21
21I1829-12 [K-11 (0.25-0.5)]	B291884	10/08/21
21I1829-13 [K-11 (0.5-1.5)]	B291884	10/08/21
21I1829-14 [K-12 (0.25-0.5)]	B291884	10/08/21
21I1829-15 [K-12 (0.5-1.5)]	B291884	10/08/21
21I1829-16 [II-11-Mid (0.25-0.5)]	B291884	10/08/21
21I1829-17 [II-11-Mid (0.5-1.5)]	B291884	10/08/21
21I1829-18 [II-11-Mid (1.5-3)]	B291884	10/08/21
21I1829-19 [J-13 (0.25-0.5)]	B291884	10/08/21
21I1829-20 [J-13 (0.5-1.5)]	B291884	10/08/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1829-02 [JJ-7 (1.5-3)]	B291822	10.0	10.0	10/06/21
21I1829-03 [I-9-Mid (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-04 [I-9-Mid (0.5-1.5)]	B291822	10.0	10.0	10/06/21
21I1829-05 [II-9 (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-06 [II-9 (0.5-1.5)]	B291822	10.0	10.0	10/06/21
21I1829-07 [J-10 (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-08 [J-10 (0.5-1.5)]	B291822	10.0	10.0	10/06/21
21I1829-09 [J-10 (1.5-3)]	B291822	10.0	10.0	10/06/21
21I1829-10 [J-11 (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-11 [J-11 (0.5-1.5)]	B291822	10.0	10.0	10/06/21
21I1829-12 [K-11 (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-13 [K-11 (0.5-1.5)]	B291822	10.0	10.0	10/06/21
21I1829-14 [K-12 (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-15 [K-12 (0.5-1.5)]	B291822	10.0	10.0	10/06/21
21I1829-16 [II-11-Mid (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-17 [II-11-Mid (0.5-1.5)]	B291822	10.0	10.0	10/06/21
21I1829-18 [II-11-Mid (1.5-3)]	B291822	10.0	10.0	10/06/21
21I1829-19 [J-13 (0.25-0.5)]	B291822	10.0	10.0	10/06/21
21I1829-20 [J-13 (0.5-1.5)]	B291822	10.0	10.0	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1829-01RE1 [JJ-7 (0.5-1.5)]	B292026	10.0	10.0	10/08/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291822 - SW-846 3540C										
Blank (B291822-BLK1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.150*		mg/Kg wet	0.200		75.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.149*		mg/Kg wet	0.200		74.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.137*		mg/Kg wet	0.200		68.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.123*		mg/Kg wet	0.200		61.7	30-150			
LCS (B291822-BS1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.16	0.020	mg/Kg wet	0.200		77.8	40-140			
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		67.8	40-140			
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		75.0	40-140			
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		73.4	40-140			
Surrogate: Decachlorobiphenyl	*0.188*		mg/Kg wet	0.200		93.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.182*		mg/Kg wet	0.200		90.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.163*		mg/Kg wet	0.200		81.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.142*		mg/Kg wet	0.200		70.8	30-150			
LCS Dup (B291822-BSD1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Aroclor-1016	0.14	0.020	mg/Kg wet	0.200		71.2	40-140	8.87	30	
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		61.6	40-140	9.46	30	
Aroclor-1260	0.14	0.020	mg/Kg wet	0.200		68.0	40-140	9.77	30	
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		64.8	40-140	12.4	30	
Surrogate: Decachlorobiphenyl	*0.158*		mg/Kg wet	0.200		78.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.154*		mg/Kg wet	0.200		77.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.144*		mg/Kg wet	0.200		71.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.127*		mg/Kg wet	0.200		63.5	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292026 - SW-846 3540C										
Blank (B292026-BLK1)				Prepared: 10/08/21 Analyzed: 10/09/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.160*		mg/Kg wet	0.200		79.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.152*		mg/Kg wet	0.200		76.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.118*		mg/Kg wet	0.200		59.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.102*		mg/Kg wet	0.200		51.1	30-150			
LCS (B292026-BS1)				Prepared: 10/08/21 Analyzed: 10/09/21						
Aroclor-1016	0.14	0.020	mg/Kg wet	0.200		69.4	40-140			
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		57.9	40-140			
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		74.9	40-140			
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		67.5	40-140			
Surrogate: Decachlorobiphenyl	*0.180*		mg/Kg wet	0.200		90.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.172*		mg/Kg wet	0.200		85.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.140*		mg/Kg wet	0.200		70.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.120*		mg/Kg wet	0.200		60.0	30-150			
LCS Dup (B292026-BSD1)				Prepared: 10/08/21 Analyzed: 10/09/21						
Aroclor-1016	0.14	0.020	mg/Kg wet	0.200		70.2	40-140	1.17	30	
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		60.2	40-140	3.89	30	
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		76.7	40-140	2.35	30	
Aroclor-1260 [2C]	0.14	0.020	mg/Kg wet	0.200		70.7	40-140	4.61	30	
Surrogate: Decachlorobiphenyl	*0.179*		mg/Kg wet	0.200		89.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.174*		mg/Kg wet	0.200		86.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.136*		mg/Kg wet	0.200		68.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.120*		mg/Kg wet	0.200		60.2	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

I-9-Mid (0.5-1.5)

Lab Sample ID: 21I1829-04

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.15	22.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

II-9 (0.25-0.5)

Lab Sample ID:	21I1829-05	Date(s) Analyzed:	10/08/2021	10/08/2021
Instrument ID (1):	ECD1	Instrument ID (2):	ECD1	

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	2.9	
	2	0.000	-0.030	0.030	2.7	7.1
Aroclor-1260	1	0.000	-0.030	0.030	0.81	
	2	0.000	-0.030	0.030	0.96	16.9

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

J-10 (0.25-0.5)

Lab Sample ID: 21I1829-07

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	2.5	
	2	0.000	-0.030	0.030	2.3	8.3

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

J-11 (0.25-0.5)

Lab Sample ID: 21I1829-10

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.083	
	2	0.000	-0.030	0.030	0.087	4.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

K-11 (0.25-0.5)

Lab Sample ID: 21I1829-12

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.17	6.1
Aroclor-1260	1	0.000	-0.030	0.030	0.23	
	2	0.000	-0.030	0.030	0.22	4.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

K-11 (0.5-1.5)

Lab Sample ID:	21I1829-13	Date(s) Analyzed:	10/07/2021	10/07/2021	
Instrument ID (1):	ECD1	Instrument ID (2):	ECD1		
GC Column (1):	ID: (mm)	GC Column (2):	ID: (mm)		

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.17	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.25	
	2	0.000	-0.030	0.030	0.26	3.9

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

K-12 (0.25-0.5)

Lab Sample ID: 21I1829-14

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.14	6.9
Aroclor-1260	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.15	6.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

K-12 (0.5-1.5)

Lab Sample ID: 21I1829-15

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.25	17.4
Aroclor-1260	1	0.000	-0.030	0.030	0.44	
	2	0.000	-0.030	0.030	0.40	11.8

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

II-11-Mid (0.25-0.5)

Lab Sample ID: 21I1829-16

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.14	24.0
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.16	6.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

J-13 (0.25-0.5)

Lab Sample ID:	21I1829-19	Date(s) Analyzed:	10/08/2021	10/08/2021
Instrument ID (1):	ECD1	Instrument ID (2):	ECD1	

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.083	
	2	0.000	-0.030	0.030	0.11	28.0
Aroclor-1260	1	0.000	-0.030	0.030	0.10	
	2	0.000	-0.030	0.030	0.11	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

J-13 (0.5-1.5)

Lab Sample ID: 21I1829-20

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.17	16.2
Aroclor-1260	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.14	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291822-BS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.14	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.15	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291822-BSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.13	7.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B292026-BS1

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B292026-BSD1

Date(s) Analyzed: 10/09/2021 10/09/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.14	6.9

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1829

con-test® A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 7 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	JJ-7 (0.5-1.5)	9/29	13:53	Grab	S	U		1				X
2	JJ-7 (1.5-3)		13:56	Grab	S	U		1				X
3	I-9 mid (0.25-0.5)		14:10	Grab	S	U		1				X
4	I-9 mid (0.5-1.5)		14:12	Grab	S	U		1				X
5	II-9 (0.25-0.5)		14:00	Grab	S	U		1				X
6	II-9 (0.5-1.5)		14:05	Grab	S	U		1				X
7	J-10 (0.25-0.5)		14:22	Grab	S	U		1				X
8	J-10 (0.5-1.5)		14:24	Grab	S	U		1				X
9	J-10 (1.5-3)		14:26	Grab	S	U		1				X
10	J-11 (0.25-0.5		14:30	Grab	S	U		1				X

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 9/30 17:00
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature) 2348	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other: SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I1829

con-test A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 8 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	J-11 (0.5-1.5)	9/29	14:35	Grab	S	U		1				X
12	K-11 (0.25-0.5)		14:38	Grab	S	U		1				X
13	K-11 (0.5-1.5)		14:40	Grab	S	U		1				X
14	K-12 (0.25-0.5)		15:00	Grab	S	U		1				X
15	K-12 (0.5-1.5)		15:02	Grab	S	U		1				X
16	II-11-mid (0.25-0.5)		15:10	Grab	S	U		1				X
17	II-11-mid (0.5-1.5)		15:13	Grab	S	U		1				X
18	II-11-mid (1.5-3)		15:16	Grab	S	U		1				X
19	J-13 (0.25-0.5)		15:20	Grab	S	U		1				X
20	J-13 (0.5-1.5)	↓	15:22	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature)	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other: SKS

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Project Entity

Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

NELAC and AIHA-LAP, LLC Accredited

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

²Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___

Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T

By Gun # 3 Actual Temp - 2.3, 4.8c

By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ___

Are there Rushes? F Who was notified? ___

Are there Short Holds? F Who was notified? ___

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 8, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1830

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/8/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1830

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
H-13 (0.25-0.5)	21I1830-01	Soil		SM 2540G SW-846 8082A	
H-13 (0.5-1.5)	21I1830-02	Soil		SM 2540G SW-846 8082A	
HH-12 (0.25-0.5)	21I1830-03	Soil		SM 2540G SW-846 8082A	
HH-12 (0.5-1.5)	21I1830-04	Soil		SM 2540G SW-846 8082A	
HH-11 (0.25-0.5)	21I1830-05	Soil		SM 2540G SW-846 8082A	
HH-11 (0.5-1.5)	21I1830-06	Soil		SM 2540G SW-846 8082A	
HH-11-Mid (0.25-0.5)	21I1830-07	Soil		SM 2540G SW-846 8082A	
HH-11-Mid (0.5-1.5)	21I1830-08	Soil		SM 2540G SW-846 8082A	
G-11-Mid (0.25-0.5)	21I1830-09	Soil		SM 2540G SW-846 8082A	
G-11-Mid (0.5-1.5)	21I1830-10	Soil		SM 2540G SW-846 8082A	
G-11-Mid (1.5-3)	21I1830-11	Soil		SM 2540G SW-846 8082A	
F-11 (0.25-0.5)	21I1830-12	Soil		SM 2540G SW-846 8082A	
F-11 (0.5-1.5)	21I1830-13	Soil		SM 2540G SW-846 8082A	
F-12 (0.25-0.5)	21I1830-14	Soil		SM 2540G SW-846 8082A	
F-12 (0.5-1.5)	21I1830-15	Soil		SM 2540G SW-846 8082A	
H-14 (0.25-0.5)	21I1830-16	Soil		SM 2540G SW-846 8082A	
H-14 (0.5-1.5)	21I1830-17	Soil		SM 2540G SW-846 8082A	
HH-8-Mid (0.25-0.5)	21I1830-18	Soil		SM 2540G SW-846 8082A	
HH-8-Mid (0.5-1.5)	21I1830-19	Soil		SM 2540G SW-846 8082A	
HH-8-Mid (1.5-3)	21I1830-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

O-04

Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.

Analyte & Samples(s) Qualified:

Aroclor-1254
21I1830-19[HH-8-Mid (0.5-1.5)]

Aroclor-1254 [2C]
21I1830-19[HH-8-Mid (0.5-1.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-13 (0.25-0.5) Sampled: 9/29/2021 15:35

Sample ID: 21I1830-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.096	0.043	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1221 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1232 [1]	ND	0.096	0.087	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1242 [1]	ND	0.096	0.072	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1248 [1]	ND	0.096	0.034	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1254 [1]	ND	0.096	0.039	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1260 [1]	ND	0.096	0.053	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1262 [1]	ND	0.096	0.048	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG
Aroclor-1268 [1]	ND	0.096	0.077	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:12	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	86.9	30-150		10/6/21 14:12
Decachlorobiphenyl [2]	86.3	30-150		10/6/21 14:12
Tetrachloro-m-xylene [1]	80.2	30-150		10/6/21 14:12
Tetrachloro-m-xylene [2]	75.5	30-150		10/6/21 14:12

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-13 (0.25-0.5)   Sampled: 9/29/2021 15:35

Sample ID: 21I1830-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.0		% Wt	1		SM 2540G	10/8/21	10/8/21 17:02	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-13 (0.5-1.5)　Sampled: 9/29/2021 15:40

Sample ID: 21I1830-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	0.041	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1221 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1232 [1]	ND	0.092	0.083	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1242 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1248 [1]	ND	0.092	0.032	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1254 [1]	ND	0.092	0.037	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1260 [1]	ND	0.092	0.051	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1262 [1]	ND	0.092	0.046	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG
Aroclor-1268 [1]	ND	0.092	0.074	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:31	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	57.5	30-150		10/6/21 14:31
Decachlorobiphenyl [2]	62.1	30-150		10/6/21 14:31
Tetrachloro-m-xylene [1]	59.1	30-150		10/6/21 14:31
Tetrachloro-m-xylene [2]	56.8	30-150		10/6/21 14:31

Project Location: 375 Banfield Rd., Portsmouth, NH　　Sample Description:　　Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-13 (0.5-1.5)　　Sampled: 9/29/2021 15:40

Sample ID: 21I1830-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.0		% Wt	1		SM 2540G	10/8/21	10/8/21 17:02	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-12 (0.25-0.5)   Sampled: 9/30/2021 07:50

Sample ID: 21I1830-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	0.041	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1221 [1]	ND	0.091	0.068	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1232 [1]	ND	0.091	0.082	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1242 [1]	ND	0.091	0.068	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1248 [1]	ND	0.091	0.032	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1254 [1]	ND	0.091	0.036	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1260 [1]	ND	0.091	0.050	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1262 [1]	ND	0.091	0.046	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG
Aroclor-1268 [1]	ND	0.091	0.073	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 14:49	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	69.6	30-150		10/6/21 14:49
Decachlorobiphenyl [2]	73.2	30-150		10/6/21 14:49
Tetrachloro-m-xylene [1]	65.2	30-150		10/6/21 14:49
Tetrachloro-m-xylene [2]	61.2	30-150		10/6/21 14:49

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-12 (0.25-0.5)
Sampled: 9/30/2021 07:50

Sample ID: 21I1830-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.8		% Wt	1		SM 2540G	10/8/21	10/8/21 17:03	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-12 (0.5-1.5)	Sampled: 9/30/2021 07:55

Sample ID: 21I1830-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1254 [1]	0.27	0.086	0.034	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1260 [1]	0.17	0.086	0.047	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:08	TG
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:08	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.1	30-150		10/6/21 15:08
Decachlorobiphenyl [2]	70.6	30-150		10/6/21 15:08
Tetrachloro-m-xylene [1]	73.5	30-150		10/6/21 15:08
Tetrachloro-m-xylene [2]	67.3	30-150		10/6/21 15:08

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-12 (0.5-1.5)   Sampled: 9/30/2021 07:55

Sample ID: 21I1830-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:03	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-11 (0.25-0.5) Sampled: 9/30/2021 07:57

Sample ID: 21I1830-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.041	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1221 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1242 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1248 [1]	ND	0.090	0.032	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1254 [1]	0.17	0.090	0.036	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1260 [2]	0.10	0.090	0.050	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:26	TG
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:26	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	61.1	30-150		10/6/21 15:26
Decachlorobiphenyl [2]	57.7	30-150		10/6/21 15:26
Tetrachloro-m-xylene [1]	62.8	30-150		10/6/21 15:26
Tetrachloro-m-xylene [2]	57.7	30-150		10/6/21 15:26

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-11 (0.25-0.5)   Sampled: 9/30/2021 07:57

Sample ID: 21I1830-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.7		% Wt	1		SM 2540G	10/8/21	10/8/21 17:03	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-11 (0.5-1.5) Sampled: 9/30/2021 07:59

Sample ID: 21I1830-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1254 [2]	0.072	0.087	0.035	mg/Kg dry	4	J	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1260 [2]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 15:44	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	83.6	30-150		10/6/21 15:44
Decachlorobiphenyl [2]	83.9	30-150		10/6/21 15:44
Tetrachloro-m-xylene [1]	71.0	30-150		10/6/21 15:44
Tetrachloro-m-xylene [2]	65.8	30-150		10/6/21 15:44

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-11 (0.5-1.5) Sampled: 9/30/2021 07:59

Sample ID: 21I1830-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.8		% Wt	1		SM 2540G	10/8/21	10/8/21 17:03	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-11-Mid (0.25-0.5) Sampled: 9/30/2021 08:05

Sample ID: 21I1830-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:03	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	72.2	30-150		10/6/21 16:03
Decachlorobiphenyl [2]	72.7	30-150		10/6/21 16:03
Tetrachloro-m-xylene [1]	65.4	30-150		10/6/21 16:03
Tetrachloro-m-xylene [2]	61.5	30-150		10/6/21 16:03

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1830
Date Received: 9/30/2021

Field Sample #: HH-11-Mid (0.25-0.5)
Sampled: 9/30/2021 08:05

Sample ID: 21I1830-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.8		% Wt	1		SM 2540G	10/8/21	10/8/21 17:03	JLH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-11-Mid (0.5-1.5)   Sampled: 9/30/2021 08:07

Sample ID: 21I1830-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1262 [1]	ND	0.087	0.043	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG
Aroclor-1268 [1]	ND	0.087	0.069	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:21	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	81.3	30-150		10/6/21 16:21
Decachlorobiphenyl [2]	86.3	30-150		10/6/21 16:21
Tetrachloro-m-xylene [1]	59.5	30-150		10/6/21 16:21
Tetrachloro-m-xylene [2]	55.9	30-150		10/6/21 16:21

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-11-Mid (0.5-1.5)
Sampled: 9/30/2021 08:07

Sample ID: 21I1830-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.1		% Wt	1		SM 2540G	10/8/21	10/8/21 17:03	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: G-11-Mid (0.25-0.5) Sampled: 9/30/2021 08:15

Sample ID: 21I1830-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1232 [1]	ND	0.088	0.080	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1254 [1]	0.048	0.088	0.035	mg/Kg dry	4	J	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1260 [1]	ND	0.088	0.049	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG
Aroclor-1268 [1]	ND	0.088	0.071	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 16:39	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	90.6	30-150		10/6/21 16:39
Decachlorobiphenyl [2]	94.7	30-150		10/6/21 16:39
Tetrachloro-m-xylene [1]	74.0	30-150		10/6/21 16:39
Tetrachloro-m-xylene [2]	69.6	30-150		10/6/21 16:39

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1830
Date Received: 9/30/2021
Field Sample #: G-11-Mid (0.25-0.5)
Sampled: 9/30/2021 08:15
Sample ID: 21I1830-09
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.4		% Wt	1		SM 2540G	10/8/21	10/8/21 17:04	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: G-11-Mid (0.5-1.5) Sampled: 9/30/2021 08:18

Sample ID: 21I1830-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1232 [1]	ND	0.087	0.079	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1248 [1]	ND	0.087	0.031	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:06	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	65.5	30-150		10/6/21 18:06
Decachlorobiphenyl [2]	71.3	30-150		10/6/21 18:06
Tetrachloro-m-xylene [1]	55.5	30-150		10/6/21 18:06
Tetrachloro-m-xylene [2]	52.6	30-150		10/6/21 18:06

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: G-11-Mid (0.5-1.5)   Sampled: 9/30/2021 08:18

Sample ID: 21I1830-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.7		% Wt	1		SM 2540G	10/8/21	10/8/21 17:04	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: G-11-Mid (1.5-3) Sampled: 9/30/2021 08:21

Sample ID: 21I1830-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.085	0.038	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1221 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1232 [1]	ND	0.085	0.076	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1242 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1248 [1]	ND	0.085	0.030	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1254 [1]	ND	0.085	0.034	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1260 [1]	ND	0.085	0.047	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1262 [1]	ND	0.085	0.042	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG
Aroclor-1268 [1]	ND	0.085	0.068	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:25	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	85.1	30-150		10/6/21 18:25
Decachlorobiphenyl [2]	91.5	30-150		10/6/21 18:25
Tetrachloro-m-xylene [1]	56.5	30-150		10/6/21 18:25
Tetrachloro-m-xylene [2]	53.5	30-150		10/6/21 18:25

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: G-11-Mid (1.5-3) Sampled: 9/30/2021 08:21

Sample ID: 21I1830-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:04	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-11 (0.25-0.5) Sampled: 9/30/2021 08:27

Sample ID: 21I1830-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1221 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1232 [1]	ND	0.093	0.084	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1242 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1248 [1]	ND	0.093	0.033	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1254 [1]	ND	0.093	0.037	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1260 [1]	ND	0.093	0.051	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1262 [1]	ND	0.093	0.047	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG
Aroclor-1268 [1]	ND	0.093	0.075	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 18:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	77.4	30-150		10/6/21 18:43
Decachlorobiphenyl [2]	82.0	30-150		10/6/21 18:43
Tetrachloro-m-xylene [1]	57.6	30-150		10/6/21 18:43
Tetrachloro-m-xylene [2]	54.0	30-150		10/6/21 18:43

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-11 (0.25-0.5) Sampled: 9/30/2021 08:27

Sample ID: 21I1830-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.7		% Wt	1		SM 2540G	10/8/21	10/8/21 17:04	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-11 (0.5-1.5)   Sampled: 9/30/2021 08:30

Sample ID: 21I1830-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	0.041	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1221 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1232 [1]	ND	0.092	0.082	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1242 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1248 [1]	ND	0.092	0.032	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1254 [1]	ND	0.092	0.037	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1260 [1]	ND	0.092	0.050	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1262 [1]	ND	0.092	0.046	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG
Aroclor-1268 [1]	ND	0.092	0.073	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:01	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	79.0	30-150		10/6/21 19:01
Decachlorobiphenyl [2]	84.3	30-150		10/6/21 19:01
Tetrachloro-m-xylene [1]	60.9	30-150		10/6/21 19:01
Tetrachloro-m-xylene [2]	57.5	30-150		10/6/21 19:01

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-11 (0.5-1.5) Sampled: 9/30/2021 08:30

Sample ID: 21I1830-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.3		% Wt	1		SM 2540G	10/8/21	10/8/21 17:04	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-12 (0.25-0.5)
Sampled: 9/30/2021 08:40

Sample ID: 21I1830-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1254 [1]	0.21	0.090	0.036	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1260 [1]	0.22	0.090	0.049	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:20	TG
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:20	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	79.2	30-150		10/6/21 19:20
Decachlorobiphenyl [2]	70.6	30-150		10/6/21 19:20
Tetrachloro-m-xylene [1]	86.6	30-150		10/6/21 19:20
Tetrachloro-m-xylene [2]	80.6	30-150		10/6/21 19:20

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-12 (0.25-0.5)   Sampled: 9/30/2021 08:40

Sample ID: 21I1830-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.0		% Wt	1		SM 2540G	10/8/21	10/8/21 17:04	JLH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-12 (0.5-1.5) Sampled: 9/30/2021 08:43

Sample ID: 21I1830-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1262 [1]	ND	0.087	0.043	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG
Aroclor-1268 [1]	ND	0.087	0.069	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:38	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	82.2	30-150		10/6/21 19:38
Decachlorobiphenyl [2]	86.9	30-150		10/6/21 19:38
Tetrachloro-m-xylene [1]	65.0	30-150		10/6/21 19:38
Tetrachloro-m-xylene [2]	61.1	30-150		10/6/21 19:38

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: F-12 (0.5-1.5)
Sampled: 9/30/2021 08:43

Sample ID: 21I1830-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.1		% Wt	1		SM 2540G	10/8/21	10/8/21 17:05	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-14 (0.25-0.5)   Sampled: 9/30/2021 08:57

Sample ID: 21I1830-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.041	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1221 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1242 [1]	ND	0.090	0.068	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1248 [1]	ND	0.090	0.032	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1254 [1]	ND	0.090	0.036	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1260 [1]	ND	0.090	0.050	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 19:56	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	73.3	30-150		10/6/21 19:56
Decachlorobiphenyl [2]	78.1	30-150		10/6/21 19:56
Tetrachloro-m-xylene [1]	60.1	30-150		10/6/21 19:56
Tetrachloro-m-xylene [2]	56.3	30-150		10/6/21 19:56

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-14 (0.25-0.5)
Sampled: 9/30/2021 08:57

Sample ID: 21I1830-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.5		% Wt	1		SM 2540G	10/8/21	10/8/21 17:05	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-14 (0.5-1.5)   Sampled: 9/30/2021 09:00

Sample ID: 21I1830-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:15	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	86.2	30-150		10/6/21 20:15
Decachlorobiphenyl [2]	92.6	30-150		10/6/21 20:15
Tetrachloro-m-xylene [1]	62.5	30-150		10/6/21 20:15
Tetrachloro-m-xylene [2]	58.8	30-150		10/6/21 20:15

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: H-14 (0.5-1.5)   Sampled: 9/30/2021 09:00

Sample ID: 21I1830-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.9		% Wt	1		SM 2540G	10/8/21	10/8/21 17:05	JLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-8-Mid (0.25-0.5)   Sampled: 9/30/2021 09:05

Sample ID: 21I1830-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1254 [1]	0.40	0.089	0.036	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1260 [1]	0.13	0.089	0.049	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1262 [1]	ND	0.089	0.045	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:33	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:33	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	62.0	30-150		10/6/21 20:33
Decachlorobiphenyl [2]	53.3	30-150		10/6/21 20:33
Tetrachloro-m-xylene [1]	71.4	30-150		10/6/21 20:33
Tetrachloro-m-xylene [2]	66.0	30-150		10/6/21 20:33

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-8-Mid (0.25-0.5) Sampled: 9/30/2021 09:05

Sample ID: 21I1830-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.7		% Wt	1		SM 2540G	10/8/21	10/8/21 17:05	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-8-Mid (0.5-1.5) Sampled: 9/30/2021 09:08

Sample ID: 21I1830-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1254 [1]	0.14	0.090	0.036	mg/Kg dry	4	O-04	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1260 [1]	ND	0.090	0.049	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/4/21	10/6/21 20:52	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.9	30-150		10/6/21 20:52
Decachlorobiphenyl [2]	61.6	30-150		10/6/21 20:52
Tetrachloro-m-xylene [1]	79.6	30-150		10/6/21 20:52
Tetrachloro-m-xylene [2]	72.5	30-150		10/6/21 20:52

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-8-Mid (0.5-1.5) Sampled: 9/30/2021 09:08

Sample ID: 21I1830-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.0		% Wt	1		SM 2540G	10/8/21	10/8/21 17:05	JLH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-8-Mid (1.5-3) Sampled: 9/30/2021 09:11

Sample ID: 21I1830-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.084	0.038	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1221 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1232 [1]	ND	0.084	0.075	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1242 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1248 [1]	ND	0.084	0.029	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1254 [1]	ND	0.084	0.034	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1260 [1]	ND	0.084	0.046	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1262 [1]	ND	0.084	0.042	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM
Aroclor-1268 [1]	ND	0.084	0.067	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 14:24	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	105	30-150		10/7/21 14:24
Decachlorobiphenyl [2]	93.8	30-150		10/7/21 14:24
Tetrachloro-m-xylene [1]	94.9	30-150		10/7/21 14:24
Tetrachloro-m-xylene [2]	79.4	30-150		10/7/21 14:24

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1830

Date Received: 9/30/2021

Field Sample #: HH-8-Mid (1.5-3)   Sampled: 9/30/2021 09:11

Sample ID: 21I1830-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.4		% Wt	1		SM 2540G	10/8/21	10/8/21 17:05	JLH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1830-01 [H-13 (0.25-0.5)]	B291884	10/08/21
21I1830-02 [H-13 (0.5-1.5)]	B291884	10/08/21
21I1830-03 [HH-12 (0.25-0.5)]	B291884	10/08/21
21I1830-04 [HH-12 (0.5-1.5)]	B291884	10/08/21
21I1830-05 [HH-11 (0.25-0.5)]	B291884	10/08/21
21I1830-06 [HH-11 (0.5-1.5)]	B291884	10/08/21
21I1830-07 [HH-11-Mid (0.25-0.5)]	B291884	10/08/21
21I1830-08 [HH-11-Mid (0.5-1.5)]	B291884	10/08/21
21I1830-09 [G-11-Mid (0.25-0.5)]	B291884	10/08/21
21I1830-10 [G-11-Mid (0.5-1.5)]	B291884	10/08/21
21I1830-11 [G-11-Mid (1.5-3)]	B291884	10/08/21
21I1830-12 [F-11 (0.25-0.5)]	B291884	10/08/21
21I1830-13 [F-11 (0.5-1.5)]	B291884	10/08/21
21I1830-14 [F-12 (0.25-0.5)]	B291884	10/08/21
21I1830-15 [F-12 (0.5-1.5)]	B291884	10/08/21
21I1830-16 [H-14 (0.25-0.5)]	B291884	10/08/21
21I1830-17 [H-14 (0.5-1.5)]	B291884	10/08/21
21I1830-18 [HH-8-Mid (0.25-0.5)]	B291884	10/08/21
21I1830-19 [HH-8-Mid (0.5-1.5)]	B291884	10/08/21
21I1830-20 [HH-8-Mid (1.5-3)]	B291884	10/08/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1830-01 [H-13 (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-02 [H-13 (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-03 [HH-12 (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-04 [HH-12 (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-05 [HH-11 (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-06 [HH-11 (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-07 [HH-11-Mid (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-08 [HH-11-Mid (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-09 [G-11-Mid (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-10 [G-11-Mid (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-11 [G-11-Mid (1.5-3)]	B291624	10.0	10.0	10/04/21
21I1830-12 [F-11 (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-13 [F-11 (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-14 [F-12 (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-15 [F-12 (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-16 [H-14 (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-17 [H-14 (0.5-1.5)]	B291624	10.0	10.0	10/04/21
21I1830-18 [HH-8-Mid (0.25-0.5)]	B291624	10.0	10.0	10/04/21
21I1830-19 [HH-8-Mid (0.5-1.5)]	B291624	10.0	10.0	10/04/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1830-20 [HH-8-Mid (1.5-3)]	B291790	10.1	10.0	10/05/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291624 - SW-846 3540C										
Blank (B291624-BLK1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.165*		mg/Kg wet	0.200		82.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.158*		mg/Kg wet	0.200		79.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.140*		mg/Kg wet	0.200		70.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.120*		mg/Kg wet	0.200		60.1	30-150			
LCS (B291624-BS1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.12	0.020	mg/Kg wet	0.200		59.6	40-140			
Aroclor-1016 [2C]	0.10	0.020	mg/Kg wet	0.200		51.3	40-140			
Aroclor-1260	0.12	0.020	mg/Kg wet	0.200		58.8	40-140			
Aroclor-1260 [2C]	0.11	0.020	mg/Kg wet	0.200		55.4	40-140			
Surrogate: Decachlorobiphenyl	*0.143*		mg/Kg wet	0.200		71.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.139*		mg/Kg wet	0.200		69.3	30-150			
Surrogate: Tetrachloro-m-xylene	*0.123*		mg/Kg wet	0.200		61.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.107*		mg/Kg wet	0.200		53.6	30-150			
LCS Dup (B291624-BSD1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.12	0.020	mg/Kg wet	0.200		58.5	40-140	1.95	30	
Aroclor-1016 [2C]	0.11	0.020	mg/Kg wet	0.200		52.6	40-140	2.47	30	
Aroclor-1260	0.11	0.020	mg/Kg wet	0.200		54.5	40-140	7.45	30	
Aroclor-1260 [2C]	0.11	0.020	mg/Kg wet	0.200		52.6	40-140	5.18	30	
Surrogate: Decachlorobiphenyl	*0.128*		mg/Kg wet	0.200		64.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.127*		mg/Kg wet	0.200		63.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.124*		mg/Kg wet	0.200		62.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.113*		mg/Kg wet	0.200		56.5	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291624 - SW-846 3540C										
Matrix Spike (B291624-MS1)	**Source: 21I1830-10**			Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.19	0.087	mg/Kg dry	0.218	ND	86.2	40-140			
Aroclor-1016 [2C]	0.17	0.087	mg/Kg dry	0.218	ND	76.3	40-140			
Aroclor-1260	0.17	0.087	mg/Kg dry	0.218	ND	79.8	40-140			
Aroclor-1260 [2C]	0.17	0.087	mg/Kg dry	0.218	ND	77.0	40-140			
Surrogate: Decachlorobiphenyl	*0.187*		mg/Kg dry	0.218		85.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.193*		mg/Kg dry	0.218		88.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.160*		mg/Kg dry	0.218		73.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.147*		mg/Kg dry	0.218		67.5	30-150			
Matrix Spike Dup (B291624-MSD1)	**Source: 21I1830-10**			Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.18	0.087	mg/Kg dry	0.218	ND	84.5	40-140	2.01	50	
Aroclor-1016 [2C]	0.16	0.087	mg/Kg dry	0.218	ND	75.3	40-140	1.21	50	
Aroclor-1260	0.17	0.087	mg/Kg dry	0.218	ND	78.6	40-140	1.47	50	
Aroclor-1260 [2C]	0.17	0.087	mg/Kg dry	0.218	ND	76.7	40-140	0.398	50	
Surrogate: Decachlorobiphenyl	*0.182*		mg/Kg dry	0.218		83.4	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.193*		mg/Kg dry	0.218		88.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.156*		mg/Kg dry	0.218		71.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.147*		mg/Kg dry	0.218		67.4	30-150			
Batch B291790 - SW-846 3540C										
Blank (B291790-BLK1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.212*		mg/Kg wet	0.200		106	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.200*		mg/Kg wet	0.200		100	30-150			
Surrogate: Tetrachloro-m-xylene	*0.198*		mg/Kg wet	0.200		98.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.171*		mg/Kg wet	0.200		85.3	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291790 - SW-846 3540C										
LCS (B291790-BS1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	0.19	0.020	mg/Kg wet	0.200		92.5	40-140			
Aroclor-1016 [2C]	0.16	0.020	mg/Kg wet	0.200		78.0	40-140			
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		86.4	40-140			
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		78.4	40-140			
Surrogate: Decachlorobiphenyl	*0.210*		mg/Kg wet	0.200		105	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.197*		mg/Kg wet	0.200		98.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.200*		mg/Kg wet	0.200		99.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.169*		mg/Kg wet	0.200		84.7	30-150			
LCS Dup (B291790-BSD1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	0.18	0.020	mg/Kg wet	0.200		90.5	40-140	2.18	30	
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		86.3	40-140	0.0324	30	
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		77.8	40-140	0.702	30	
Surrogate: Decachlorobiphenyl	*0.207*		mg/Kg wet	0.200		103	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.193*		mg/Kg wet	0.200		96.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.178*		mg/Kg wet	0.200		89.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.152*		mg/Kg wet	0.200		75.9	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

HH-12 (0.5-1.5)

Lab Sample ID:	21I1830-04	Date(s) Analyzed:	10/06/2021 10/06/2021
Instrument ID (1):	ECD1	Instrument ID (2):	ECD1
GC Column (1):	ID: (mm)	GC Column (2):	ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.27	
	2	0.000	-0.030	0.030	0.24	11.8
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

HH-11 (0.25-0.5)

Lab Sample ID: 21I1830-05

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1
Aroclor-1260	1	0.000	-0.030	0.030	0.073	
	2	0.000	-0.030	0.030	0.10	31.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

HH-11 (0.5-1.5)

Lab Sample ID: 21I1830-06

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.055	
	2	0.000	-0.030	0.030	0.072	26.8

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

G-11-Mid (0.25-0.5)

Lab Sample ID: 21I1830-09

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.048	
	2	0.000	-0.030	0.030	0.054	11.8

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

F-12 (0.25-0.5)

Lab Sample ID: 21I1830-14

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.18	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.21	4.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

HH-8-Mid (0.25-0.5)

Lab Sample ID: 21I1830-18

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.40	
	2	0.000	-0.030	0.030	0.35	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.10	26.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

HH-8-Mid (0.5-1.5)

Lab Sample ID: 21I1830-19

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.12	15.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291624-BS1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.10	18.2
Aroclor-1260	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.11	8.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291624-BSD1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.11	8.7
Aroclor-1260	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.11	0.0

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291624-MS1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.17	11.1
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.17	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291624-MSD1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD1

Instrument ID (2): ECD1

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.16	11.8
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.17	0.0

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291790-BS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%RPD
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.16	17.1
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291790-BSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1830

http://www.contestlabs.com

Doc # 381 Rev 4_01/08/2020

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Page 9 of 17

con-test
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	H-13 (0.25-0.5)	9/29	15:35	Grab	S	U		1				X
2	H-13 (0.5-1.5)	9/29	15:40	Grab	S	U		1				X
3	HH-12 (0.25-0.5)	9/30	7:50	Grab	S	U		1				X
4	HH-12 (0.5-1.5)		7:55	Grab	S	U		1				X
5	HH-11 (0.25-0.5)		7:57	Grab	S	U		1				X
6	HH-11 (0.5-1.5)		7:59	Grab	S	U		1				X
7	H-11 mid (0.25-0.5)		8:05	Grab	S	U		1				X
8	H-11 mid (0.5-1.5)		8:07	Grab	S	U		1				X
9	G-11 mid (0.25-0.5)		8:15	Grab	S	U		1				X
10	G-11 mid (0.5-1.5)	↓	8:18	Grab	S	U		1				X

² Preservation Code

Total Number Of:
VIALS ______
GLASS ______
PLASTIC ______
BACTERIA ______
ENCORE ______

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature) 2.3;48	Date/Time: 9/30/21 1755
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I1830

con-test® A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 10 of 17

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 309 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	G-11 mid (1.5-3)	9/30	8:21	Grab	S	U		1				X
12	F-11 (0.25-0.5)		8:27	Grab	S	U		1				X
13	F-11 (0.5-1.5)		8:30	Grab	S	U		1				X
14	F-12 (0.25-0.5)		8:40	Grab	S	U		1				X
15	F-12 (0.5-1.5)		8:43	Grab	S	U		1				X
16	H-14 (0.25-0.5)		8:57	Grab	S	U		1				X
17	H-14 (0.5-1.5)		9:00	Grab	S	U		1				X
18	HH-8 mid (0.25-0.5)		9:05	Grab	S	U		1				X
19	HH-8 mid (0.5-1.5)		9:08	Grab	S	U		1				X
20	HH-8 mid (1.5-3.0)		9:11	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature)	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SES

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes**:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes**:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___

Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T

By Gun # 3 Actual Temp - 2.3, 4.8c

By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA

Were Samples Tampered with? NA

Was COC Relinquished ? T

Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T

Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ___

Are there Rushes? F Who was notified? ___

Are there Short Holds? F Who was notified? ___

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/~~Clear~~	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 11, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1833

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/11/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1833

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
E-2 (0.5-1.5)	21I1833-01	Soil		SM 2540G SW-846 8082A	
F-2 (0.25-0.5)	21I1833-02	Soil		SM 2540G SW-846 8082A	
F-2 (0.5-1.5)	21I1833-03	Soil		SM 2540G SW-846 8082A	
F-2 (1.5-3)	21I1833-04	Soil		SM 2540G SW-846 8082A	
FF-1-Mid (0.25-0.5)	21I1833-05	Soil		SM 2540G SW-846 8082A	
FF-1-Mid (0.5-1.5)	21I1833-06	Soil		SM 2540G SW-846 8082A	
G-1 (0.25-0.5)	21I1833-07	Soil		SM 2540G SW-846 8082A	
G-1 (0.5-1.5)	21I1833-08	Soil		SM 2540G SW-846 8082A	
GG-1-Mid (0.25-0.5)	21I1833-09	Soil		SM 2540G SW-846 8082A	
GG-1-Mid (0.5-1.5)	21I1833-10	Soil		SM 2540G SW-846 8082A	
H-2 (0.25-0.5)	21I1833-11	Soil		SM 2540G SW-846 8082A	
H-2 (0.5-1.5)	21I1833-12	Soil		SM 2540G SW-846 8082A	
H-2 (1.5-3)	21I1833-13	Soil		SM 2540G SW-846 8082A	
HH-1-Mid (0.25-0.5)	21I1833-14	Soil		SM 2540G SW-846 8082A	
HH-1-Mid (0.5-1.5)	21I1833-15	Soil		SM 2540G SW-846 8082A	
HH-1-Mid (1.5-3)	21I1833-16	Soil		SM 2540G SW-846 8082A	
I-1 (0.25-0.5)	21I1833-17	Soil		SM 2540G SW-846 8082A	
I-1 (0.5-1.5)	21I1833-18	Soil		SM 2540G SW-846 8082A	
G-3 (0.25-0.5)	21I1833-19	Soil		SM 2540G SW-846 8082A	
G-3 (0.5-1.5)	21I1833-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Daren J. Damboragian
Director of Operations

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: E-2 (0.5-1.5) Sampled: 9/29/2021 09:15

Sample ID: 21I1833-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1254 [1]	ND	0.089	0.036	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1262 [1]	ND	0.089	0.045	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM
Aroclor-1268 [1]	ND	0.089	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:36	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	85.2	30-150		10/8/21 16:36
Decachlorobiphenyl [2]	73.2	30-150		10/8/21 16:36
Tetrachloro-m-xylene [1]	87.1	30-150		10/8/21 16:36
Tetrachloro-m-xylene [2]	81.6	30-150		10/8/21 16:36

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: E-2 (0.5-1.5)
Sampled: 9/29/2021 09:15

Sample ID: 21I1833-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.5		% Wt	1		SM 2540G	10/6/21	10/7/21 12:56	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: F-2 (0.25-0.5) Sampled: 9/29/2021 09:20

Sample ID: 21I1833-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1254 [1]	0.036	0.086	0.034	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1260 [1]	0.055	0.086	0.047	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:54	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 16:54	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	89.1	30-150		10/8/21 16:54
Decachlorobiphenyl [2]	72.5	30-150		10/8/21 16:54
Tetrachloro-m-xylene [1]	79.1	30-150		10/8/21 16:54
Tetrachloro-m-xylene [2]	74.2	30-150		10/8/21 16:54

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: F-2 (0.25-0.5)	Sampled: 9/29/2021 09:20

Sample ID: 21I1833-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.2		% Wt	1		SM 2540G	10/6/21	10/7/21 12:57	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: F-2 (0.5-1.5)
Sampled: 9/29/2021 09:22

Sample ID: 21I1833-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1221 [1]	ND	0.087	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1232 [1]	ND	0.087	0.079	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1242 [1]	ND	0.087	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1248 [1]	ND	0.087	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:12	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	76.6	30-150		10/8/21 17:12
Decachlorobiphenyl [2]	58.7	30-150		10/8/21 17:12
Tetrachloro-m-xylene [1]	72.8	30-150		10/8/21 17:12
Tetrachloro-m-xylene [2]	67.6	30-150		10/8/21 17:12

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: F-2 (0.5-1.5)   Sampled: 9/29/2021 09:22

Sample ID: 21I1833-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	10/6/21	10/7/21 12:57	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: F-2 (1.5-3)   Sampled: 9/29/2021 09:25

Sample ID: 21I1833-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1221 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1232 [1]	ND	0.097	0.087	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1242 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1248 [1]	ND	0.097	0.034	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1254 [1]	ND	0.097	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1260 [2]	ND	0.097	0.053	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1262 [1]	ND	0.097	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM
Aroclor-1268 [1]	ND	0.097	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:30	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	88.7	30-150		10/8/21 17:30
Decachlorobiphenyl [2]	63.7	30-150		10/8/21 17:30
Tetrachloro-m-xylene [1]	82.5	30-150		10/8/21 17:30
Tetrachloro-m-xylene [2]	76.7	30-150		10/8/21 17:30

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833
Date Received: 9/30/2021
Field Sample #: F-2 (1.5-3)
Sampled: 9/29/2021 09:25
Sample ID: 21I1833-04
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.4		% Wt	1		SM 2540G	10/6/21	10/7/21 12:57	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: FF-1-Mid (0.25-0.5)   Sampled: 9/29/2021 09:30

Sample ID: 21I1833-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1254 [1]	ND	0.090	0.036	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1260 [1]	ND	0.090	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 17:48	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	86.2	30-150		10/8/21 17:48
Decachlorobiphenyl [2]	69.4	30-150		10/8/21 17:48
Tetrachloro-m-xylene [1]	83.9	30-150		10/8/21 17:48
Tetrachloro-m-xylene [2]	78.6	30-150		10/8/21 17:48

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: FF-1-Mid (0.25-0.5) Sampled: 9/29/2021 09:30

Sample ID: 21I1833-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.9		% Wt	1		SM 2540G	10/6/21	10/7/21 12:57	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: FF-1-Mid (0.5-1.5) Sampled: 9/29/2021 09:32

Sample ID: 21I1833-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1254 [1]	ND	0.089	0.036	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1262 [1]	ND	0.089	0.045	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:06	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	94.0	30-150		10/8/21 18:06
Decachlorobiphenyl [2]	67.1	30-150		10/8/21 18:06
Tetrachloro-m-xylene [1]	86.4	30-150		10/8/21 18:06
Tetrachloro-m-xylene [2]	80.3	30-150		10/8/21 18:06

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: FF-1-Mid (0.5-1.5) Sampled: 9/29/2021 09:32

Sample ID: 21I1833-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.8		% Wt	1		SM 2540G	10/6/21	10/7/21 12:57	MJH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-1 (0.25-0.5)　Sampled: 9/29/2021 09:35

Sample ID: 21I1833-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	0.042	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1221 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1232 [1]	ND	0.092	0.083	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1242 [1]	ND	0.092	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1248 [1]	ND	0.092	0.032	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1254 [1]	ND	0.092	0.037	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1260 [1]	ND	0.092	0.051	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1262 [1]	ND	0.092	0.046	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM
Aroclor-1268 [1]	ND	0.092	0.074	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:24	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	91.6	30-150		10/8/21 18:24
Decachlorobiphenyl [2]	70.0	30-150		10/8/21 18:24
Tetrachloro-m-xylene [1]	82.1	30-150		10/8/21 18:24
Tetrachloro-m-xylene [2]	76.5	30-150		10/8/21 18:24

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-1 (0.25-0.5) Sampled: 9/29/2021 09:35

Sample ID: 21I1833-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.5		% Wt	1		SM 2540G	10/6/21	10/7/21 12:57	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-1 (0.5-1.5)   Sampled: 9/29/2021 09:37

Sample ID: 21I1833-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	0.041	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1221 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1232 [1]	ND	0.091	0.082	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1242 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1248 [1]	ND	0.091	0.032	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1254 [1]	ND	0.091	0.037	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1260 [1]	ND	0.091	0.050	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1262 [1]	ND	0.091	0.046	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM
Aroclor-1268 [1]	ND	0.091	0.073	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 18:42	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	88.8	30-150		10/8/21 18:42
Decachlorobiphenyl [2]	65.2	30-150		10/8/21 18:42
Tetrachloro-m-xylene [1]	81.6	30-150		10/8/21 18:42
Tetrachloro-m-xylene [2]	76.0	30-150		10/8/21 18:42

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-1 (0.5-1.5)   Sampled: 9/29/2021 09:37

Sample ID: 21I1833-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	87.5		% Wt	1		SM 2540G	10/6/21	10/7/21 12:58	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: GG-1-Mid (0.25-0.5)   Sampled: 9/29/2021 09:40

Sample ID: 21I1833-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:00	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	93.0	30-150		10/8/21 19:00
Decachlorobiphenyl [2]	68.1	30-150		10/8/21 19:00
Tetrachloro-m-xylene [1]	80.9	30-150		10/8/21 19:00
Tetrachloro-m-xylene [2]	76.1	30-150		10/8/21 19:00

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833
Date Received: 9/30/2021
Field Sample #: GG-1-Mid (0.25-0.5)
Sampled: 9/29/2021 09:40
Sample ID: 21I1833-09
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.0		% Wt	1		SM 2540G	10/6/21	10/7/21 12:58	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: GG-1-Mid (0.5-1.5)   Sampled: 9/29/2021 09:45

Sample ID: 21I1833-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1254 [1]	0.091	0.086	0.034	mg/Kg dry	4		SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1260 [1]	0.082	0.086	0.047	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:18	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 19:18	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	85.7	30-150		10/8/21 19:18
Decachlorobiphenyl [2]	70.8	30-150		10/8/21 19:18
Tetrachloro-m-xylene [1]	81.7	30-150		10/8/21 19:18
Tetrachloro-m-xylene [2]	76.6	30-150		10/8/21 19:18

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: GG-1-Mid (0.5-1.5) Sampled: 9/29/2021 09:45

Sample ID: 21I1833-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.8		% Wt	1		SM 2540G	10/6/21	10/7/21 12:58	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: H-2 (0.25-0.5) Sampled: 9/29/2021 09:58

Sample ID: 21I1833-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1221 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1232 [1]	ND	0.086	0.077	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1242 [1]	ND	0.086	0.064	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1254 [2]	0.093	0.086	0.034	mg/Kg dry	4		SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 20:42	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	81.3	30-150		10/8/21 20:42
Decachlorobiphenyl [2]	64.5	30-150		10/8/21 20:42
Tetrachloro-m-xylene [1]	83.6	30-150		10/8/21 20:42
Tetrachloro-m-xylene [2]	78.9	30-150		10/8/21 20:42

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: H-2 (0.25-0.5)
Sampled: 9/29/2021 09:58

Sample ID: 21I1833-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.3		% Wt	1		SM 2540G	10/6/21	10/7/21 12:58	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: H-2 (0.5-1.5) Sampled: 9/29/2021 10:00

Sample ID: 21I1833-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1232 [1]	ND	0.088	0.080	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1254 [2]	0.057	0.088	0.035	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1260 [1]	ND	0.088	0.049	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM
Aroclor-1268 [1]	ND	0.088	0.071	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:00	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	82.6	30-150		10/8/21 21:00
Decachlorobiphenyl [2]	60.1	30-150		10/8/21 21:00
Tetrachloro-m-xylene [1]	77.4	30-150		10/8/21 21:00
Tetrachloro-m-xylene [2]	73.0	30-150		10/8/21 21:00

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: H-2 (0.5-1.5)   Sampled: 9/29/2021 10:00

Sample ID: 21I1833-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.5		% Wt	1		SM 2540G	10/6/21	10/7/21 12:58	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: H-2 (1.5-3) Sampled: 9/29/2021 10:02

Sample ID: 21I1833-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1221 [1]	ND	0.093	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1232 [1]	ND	0.093	0.083	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1242 [1]	ND	0.093	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1248 [1]	ND	0.093	0.032	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1254 [1]	ND	0.093	0.037	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1260 [1]	ND	0.093	0.051	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1262 [1]	ND	0.093	0.046	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM
Aroclor-1268 [1]	ND	0.093	0.074	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:18	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	84.1	30-150		10/8/21 21:18
Decachlorobiphenyl [2]	66.3	30-150		10/8/21 21:18
Tetrachloro-m-xylene [1]	78.8	30-150		10/8/21 21:18
Tetrachloro-m-xylene [2]	74.3	30-150		10/8/21 21:18

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833
Date Received: 9/30/2021
Field Sample #: H-2 (1.5-3)
Sampled: 9/29/2021 10:02
Sample ID: 21I1833-13
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.4		% Wt	1		SM 2540G	10/6/21	10/7/21 12:59	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: HH-1-Mid (0.25-0.5)	Sampled: 9/29/2021 10:09

Sample ID: 21I1833-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1254 [2]	0.038	0.086	0.035	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1260 [2]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:36	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.4	30-150		10/8/21 21:36
Decachlorobiphenyl [2]	48.9	30-150		10/8/21 21:36
Tetrachloro-m-xylene [1]	60.5	30-150		10/8/21 21:36
Tetrachloro-m-xylene [2]	57.1	30-150		10/8/21 21:36

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: HH-1-Mid (0.25-0.5)   Sampled: 9/29/2021 10:09

Sample ID: 21I1833-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.7		% Wt	1		SM 2540G	10/6/21	10/7/21 12:59	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: HH-1-Mid (0.5-1.5)   Sampled: 9/29/2021 10:12

Sample ID: 21I1833-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	0.054	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1221 [1]	ND	0.12	0.090	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1232 [1]	ND	0.12	0.11	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1242 [1]	ND	0.12	0.090	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1248 [1]	ND	0.12	0.042	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1254 [1]	ND	0.12	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1260 [1]	ND	0.12	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1262 [1]	ND	0.12	0.060	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM
Aroclor-1268 [1]	ND	0.12	0.096	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 21:54	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	91.0	30-150		10/8/21 21:54
Decachlorobiphenyl [2]	67.3	30-150		10/8/21 21:54
Tetrachloro-m-xylene [1]	82.3	30-150		10/8/21 21:54
Tetrachloro-m-xylene [2]	77.9	30-150		10/8/21 21:54

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: HH-1-Mid (0.5-1.5)   Sampled: 9/29/2021 10:12

Sample ID: 21I1833-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	66.4		% Wt	1		SM 2540G	10/6/21	10/7/21 12:59	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: HH-1-Mid (1.5-3) Sampled: 9/29/2021 10:15

Sample ID: 21I1833-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.095	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1221 [1]	ND	0.095	0.071	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1232 [1]	ND	0.095	0.085	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1242 [1]	ND	0.095	0.071	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1248 [1]	ND	0.095	0.033	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1254 [1]	ND	0.095	0.038	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1260 [1]	ND	0.095	0.052	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1262 [1]	ND	0.095	0.047	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM
Aroclor-1268 [1]	ND	0.095	0.076	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:12	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	86.7	30-150		10/8/21 22:12
Decachlorobiphenyl [2]	72.1	30-150		10/8/21 22:12
Tetrachloro-m-xylene [1]	84.8	30-150		10/8/21 22:12
Tetrachloro-m-xylene [2]	80.4	30-150		10/8/21 22:12

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: HH-1-Mid (1.5-3)
Sampled: 9/29/2021 10:15

Sample ID: 21I1833-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.4		% Wt	1		SM 2540G	10/6/21	10/7/21 12:59	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: I-1 (0.25-0.5) Sampled: 9/29/2021 10:20

Sample ID: 21I1833-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1254 [1]	0.074	0.087	0.035	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1260 [1]	0.067	0.087	0.048	mg/Kg dry	4	J	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:29	SFM
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:29	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	92.0	30-150		10/8/21 22:29
Decachlorobiphenyl [2]	67.2	30-150		10/8/21 22:29
Tetrachloro-m-xylene [1]	83.0	30-150		10/8/21 22:29
Tetrachloro-m-xylene [2]	78.1	30-150		10/8/21 22:29

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: I-1 (0.25-0.5)   Sampled: 9/29/2021 10:20

Sample ID: 21I1833-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.9		% Wt	1		SM 2540G	10/6/21	10/7/21 12:59	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: I-1 (0.5-1.5)   Sampled: 9/29/2021 10:22

Sample ID: 21I1833-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1254 [1]	ND	0.086	0.035	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1260 [1]	ND	0.086	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 22:47	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.4	30-150		10/8/21 22:47
Decachlorobiphenyl [2]	66.7	30-150		10/8/21 22:47
Tetrachloro-m-xylene [1]	81.4	30-150		10/8/21 22:47
Tetrachloro-m-xylene [2]	77.1	30-150		10/8/21 22:47

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: I-1 (0.5-1.5)
Sampled: 9/29/2021 10:22

Sample ID: 21I1833-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.5		% Wt	1		SM 2540G	10/6/21	10/7/21 12:59	MJH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-3 (0.25-0.5)	Sampled: 9/29/2021 10:38

Sample ID: 21I1833-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:05	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	94.7	30-150		10/8/21 23:05
Decachlorobiphenyl [2]	71.4	30-150		10/8/21 23:05
Tetrachloro-m-xylene [1]	84.1	30-150		10/8/21 23:05
Tetrachloro-m-xylene [2]	80.1	30-150		10/8/21 23:05

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-3 (0.25-0.5) Sampled: 9/29/2021 10:38

Sample ID: 21I1833-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.1		% Wt	1		SM 2540G	10/6/21	10/7/21 12:59	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-3 (0.5-1.5) Sampled: 9/29/2021 10:40

Sample ID: 21I1833-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/7/21	10/8/21 23:23	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	84.1	30-150		10/8/21 23:23
Decachlorobiphenyl [2]	67.9	30-150		10/8/21 23:23
Tetrachloro-m-xylene [1]	83.0	30-150		10/8/21 23:23
Tetrachloro-m-xylene [2]	78.7	30-150		10/8/21 23:23

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1833

Date Received: 9/30/2021

Field Sample #: G-3 (0.5-1.5) Sampled: 9/29/2021 10:40

Sample ID: 21I1833-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.1		% Wt	1		SM 2540G	10/6/21	10/7/21 13:00	MJH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1833-01 [E-2 (0.5-1.5)]	B291800	10/06/21
21I1833-02 [F-2 (0.25-0.5)]	B291800	10/06/21
21I1833-03 [F-2 (0.5-1.5)]	B291800	10/06/21
21I1833-04 [F-2 (1.5-3)]	B291800	10/06/21
21I1833-05 [FF-1-Mid (0.25-0.5)]	B291800	10/06/21
21I1833-06 [FF-1-Mid (0.5-1.5)]	B291800	10/06/21
21I1833-07 [G-1 (0.25-0.5)]	B291800	10/06/21
21I1833-08 [G-1 (0.5-1.5)]	B291800	10/06/21
21I1833-09 [GG-1-Mid (0.25-0.5)]	B291800	10/06/21
21I1833-10 [GG-1-Mid (0.5-1.5)]	B291800	10/06/21
21I1833-11 [H-2 (0.25-0.5)]	B291800	10/06/21
21I1833-12 [H-2 (0.5-1.5)]	B291800	10/06/21
21I1833-13 [H-2 (1.5-3)]	B291800	10/06/21
21I1833-14 [HH-1-Mid (0.25-0.5)]	B291800	10/06/21
21I1833-15 [HH-1-Mid (0.5-1.5)]	B291800	10/06/21
21I1833-16 [HH-1-Mid (1.5-3)]	B291800	10/06/21
21I1833-17 [I-1 (0.25-0.5)]	B291800	10/06/21
21I1833-18 [I-1 (0.5-1.5)]	B291800	10/06/21
21I1833-19 [G-3 (0.25-0.5)]	B291800	10/06/21
21I1833-20 [G-3 (0.5-1.5)]	B291800	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1833-01 [E-2 (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-02 [F-2 (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-03 [F-2 (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-04 [F-2 (1.5-3)]	B291930	10.0	10.0	10/07/21
21I1833-05 [FF-1-Mid (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-06 [FF-1-Mid (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-07 [G-1 (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-08 [G-1 (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-09 [GG-1-Mid (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-10 [GG-1-Mid (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-11 [H-2 (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-12 [H-2 (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-13 [H-2 (1.5-3)]	B291930	10.0	10.0	10/07/21
21I1833-14 [HH-1-Mid (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-15 [HH-1-Mid (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-16 [HH-1-Mid (1.5-3)]	B291930	10.0	10.0	10/07/21
21I1833-17 [I-1 (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-18 [I-1 (0.5-1.5)]	B291930	10.0	10.0	10/07/21
21I1833-19 [G-3 (0.25-0.5)]	B291930	10.0	10.0	10/07/21
21I1833-20 [G-3 (0.5-1.5)]	B291930	10.0	10.0	10/07/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291930 - SW-846 3540C										
Blank (B291930-BLK1)				Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.156*		mg/Kg wet	0.200		78.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.131*		mg/Kg wet	0.200		65.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.156*		mg/Kg wet	0.200		78.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.144*		mg/Kg wet	0.200		72.2	30-150			
LCS (B291930-BS1)				Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	0.16	0.020	mg/Kg wet	0.200		80.0	40-140			
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		68.6	40-140			
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		74.9	40-140			
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		64.8	40-140			
Surrogate: Decachlorobiphenyl	*0.164*		mg/Kg wet	0.200		82.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.137*		mg/Kg wet	0.200		68.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.155*		mg/Kg wet	0.200		77.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.143*		mg/Kg wet	0.200		71.3	30-150			
LCS Dup (B291930-BSD1)				Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	0.16	0.020	mg/Kg wet	0.200		79.1	40-140	1.06	30	
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		71.3	40-140	3.91	30	
Aroclor-1260	0.16	0.020	mg/Kg wet	0.200		79.1	40-140	5.49	30	
Aroclor-1260 [2C]	0.14	0.020	mg/Kg wet	0.200		69.1	40-140	6.47	30	
Surrogate: Decachlorobiphenyl	*0.174*		mg/Kg wet	0.200		86.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.147*		mg/Kg wet	0.200		73.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.175*		mg/Kg wet	0.200		87.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.160*		mg/Kg wet	0.200		79.9	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291930 - SW-846 3540C										
Matrix Spike (B291930-MS1)	**Source: 21I1833-20**			Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	0.21	0.088	mg/Kg dry	0.219	ND	95.2	40-140			
Aroclor-1016 [2C]	0.19	0.088	mg/Kg dry	0.219	ND	85.8	40-140			
Aroclor-1260	0.19	0.088	mg/Kg dry	0.219	ND	88.5	40-140			
Aroclor-1260 [2C]	0.18	0.088	mg/Kg dry	0.219	ND	83.3	40-140			
Surrogate: Decachlorobiphenyl	*0.215*		mg/Kg dry	0.219		98.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.160*		mg/Kg dry	0.219		72.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.183*		mg/Kg dry	0.219		83.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.172*		mg/Kg dry	0.219		78.6	30-150			
Matrix Spike Dup (B291930-MSD1)	**Source: 21I1833-20**			Prepared: 10/07/21 Analyzed: 10/08/21						
Aroclor-1016	0.19	0.088	mg/Kg dry	0.219	ND	84.9	40-140	11.4	50	
Aroclor-1016 [2C]	0.18	0.088	mg/Kg dry	0.219	ND	80.4	40-140	6.59	50	
Aroclor-1260	0.18	0.088	mg/Kg dry	0.219	ND	79.8	40-140	10.3	50	
Aroclor-1260 [2C]	0.17	0.088	mg/Kg dry	0.219	ND	77.1	40-140	7.66	50	
Surrogate: Decachlorobiphenyl	*0.172*		mg/Kg dry	0.219		78.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.143*		mg/Kg dry	0.219		65.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.171*		mg/Kg dry	0.219		77.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.164*		mg/Kg dry	0.219		74.6	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

F-2 (0.25-0.5)

Lab Sample ID:	21I1833-02	Date(s) Analyzed:	10/08/2021	10/08/2021
Instrument ID (1):	ECD10	Instrument ID (2):	ECD10	

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.055	
	2	0.000	-0.030	0.030	0.050	9.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

GG-1-Mid (0.5-1.5)

Lab Sample ID: 21I1833-10

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.091	
	2	0.000	-0.030	0.030	0.065	33.3
Aroclor-1260	1	0.000	-0.030	0.030	0.082	
	2	0.000	-0.030	0.030	0.076	7.6

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

H-2 (0.25-0.5)

Lab Sample ID: 21I1833-11

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.075	
	2	0.000	-0.030	0.030	0.093	21.4

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

H-2 (0.5-1.5)

Lab Sample ID: 21I1833-12

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.046	
	2	0.000	-0.030	0.030	0.057	21.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

I-1 (0.25-0.5)

Lab Sample ID: 21I1833-17

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.074	
	2	0.000	-0.030	0.030	0.064	14.5
Aroclor-1260	1	0.000	-0.030	0.030	0.067	
	2	0.000	-0.030	0.030	0.065	3.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291930-BS1

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.14	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID:	B291930-BSD1	Date(s) Analyzed:	10/08/2021	10/08/2021
Instrument ID (1):	ECD10	Instrument ID (2):	ECD10	

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.14	13.3
Aroclor-1260	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.14	13.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291930-MS1

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.19	10.0
Aroclor-1260	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.18	5.4

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291930-MSD1

Date(s) Analyzed: 10/08/2021 10/08/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.18	5.4
Aroclor-1260	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.17	5.7

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1833

con-test®
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 3 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 369 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	E-2 (0.5-1.5)	9/29/21	9:15	Grab	S	U		1				X
2	F-2 (0.25-0.5)		9:20	Grab	S	U		1				X
3	F-2 (0.5-1.5)		9:22	Grab	S	U		1				X
4	F-2 (1.5-3)		9:25	Grab	S	U		1				X
5	FF-1-mid (0.25-0.5)		9:30	Grab	S	U		1				X
6	FF-1-mid (0.5-1.5)		9:32	Grab	S	U		1				X
7	G-1 (0.25-0.5)		9:35	Grab	S	U		1				X
8	G-1 (0.5-1.5)		9:37	Grab	S	U		1				X
9	GG-1mid (0.25-0.5)		9:40	Grab	S	U		1				X
10	GG-1mid (0.5-1.5)	↓	9:45	Grab	S	U		1				X

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 9/30 17:00
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature) 2.3, 4.8	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other SF-5

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity

Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

2171833

con-test®
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 4 of 17

Company Name:	Wilcox and Barton, Inc.
Address:	#1B Commons Drive Unit 12B Londonderry, NH
Phone:	603 309 4190 [redacted]
Project Name:	
Project Location:	375 Banfield Rd, Portsmouth NH
Project Number:	BANF0005
Project Manager:	Bill Wilcox
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	B. Dutra

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	H-2 (0.25-0.5)	9/29/21	9:58	Grab	S	U		1				X
12	H-2 (0.5-1.5)	↓	10:00	Grab	S	U		1				X
13	H-2 (1.5-3)		10:02	Grab	S	U		1				X
14	HH-1-mid (0.25-0.5)		10:09	Grab	S	U		1				X
15	HH-1-mid (0.5-1.5)		10:12	Grab	S	U		1				X
16	HH-1-mid (1.5-3)		10:15	Grab	S	U		1				X
17	I-1 (0.25-0.5)		10:20	Grab	S	U		1				X
18	I-1 (0.5-1.5)		10:22	Grab	S	U		1				X
19	G-3 (0.25-0.5)		10:38	Grab	S	U		1				X
20	G-3 (0.5-1.5)		10:40	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/30 17:00
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature)	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other: SRS

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Project Entity

Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

NELAC and AIHA-LAP, LLC Accredited

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples____________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received?
In Cooler T No Cooler ____ On Ice T No Ice ____
Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T
By Gun # 3 Actual Temp - 2.3, 4.8c
By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA
Were Samples Tampered with? NA
Was COC Relinquished ? T
Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T
Were samples received within holding time? T

Did COC include all pertinent Information?
Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ____
Are there Rushes? F Who was notified? ____
Are there Short Holds? F Who was notified? ____
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 11, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1836

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

Table of Contents

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/11/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1836

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
GG-2-Mid (0.25-0.5)	21I1836-01	Soil		SM 2540G SW-846 8082A	
GG-2-Mid (0.5-1.5)	21I1836-02	Soil		SM 2540G SW-846 8082A	
II-6-Mid (0.25-0.5)	21I1836-03	Soil		SM 2540G SW-846 8082A	
II-6-Mid (0.5-1.5)	21I1836-04	Soil		SM 2540G SW-846 8082A	
II-6-Mid (1.5-3)	21I1836-05	Soil		SM 2540G SW-846 8082A	
H-6 (0.25-0.5)	21I1836-06	Soil		SM 2540G SW-846 8082A	
H-6 (0.5-1.5)	21I1836-07	Soil		SM 2540G SW-846 8082A	
H-6 (1.5-3)	21I1836-08	Soil		SM 2540G SW-846 8082A	
I-5-Mid (0.25-0.5)	21I1836-09	Soil		SM 2540G SW-846 8082A	
I-5-Mid (0.5-1.5)	21I1836-10	Soil		SM 2540G SW-846 8082A	
J-5 (0.25-0.5)	21I1836-11	Soil		SM 2540G SW-846 8082A	
J-5 (0.5-1.5)	21I1836-12	Soil		SM 2540G SW-846 8082A	
JJ-6-Mid (0.25-0.5)	21I1836-13	Soil		SM 2540G SW-846 8082A	
JJ-6-Mid (0.5-1.5)	21I1836-14	Soil		SM 2540G SW-846 8082A	
JJ-8 (0.25-0.5)	21I1836-15	Soil		SM 2540G SW-846 8082A	
JJ-8 (0.5-1.5)	21I1836-16	Soil		SM 2540G SW-846 8082A	
JJ-8 (1.5-3)	21I1836-17	Soil		SM 2540G SW-846 8082A	
JJ-9 (0.25-0.5)	21I1836-18	Soil		SM 2540G SW-846 8082A	
JJ-9 (0.5-1.5)	21I1836-19	Soil		SM 2540G SW-846 8082A	
JJ-7 (0.25-0.5)	21I1836-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl
21I1836-09[I-5-Mid (0.25-0.5)], 21I1836-18[JJ-9 (0.25-0.5)], 21I1836-19[JJ-9 (0.5-1.5)]

Decachlorobiphenyl [2C]
21I1836-09[I-5-Mid (0.25-0.5)], 21I1836-18[JJ-9 (0.25-0.5)], 21I1836-19[JJ-9 (0.5-1.5)]

Tetrachloro-m-xylene
21I1836-09[I-5-Mid (0.25-0.5)], 21I1836-18[JJ-9 (0.25-0.5)], 21I1836-19[JJ-9 (0.5-1.5)]

Tetrachloro-m-xylene [2C]
21I1836-09[I-5-Mid (0.25-0.5)], 21I1836-18[JJ-9 (0.25-0.5)], 21I1836-19[JJ-9 (0.5-1.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Daren J. Damboragian
Director of Operations

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: GG-2-Mid (0.25-0.5) Sampled: 9/29/2021 10:45

Sample ID: 21I1836-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 4:42	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	71.6	30-150		10/10/21 4:42
Decachlorobiphenyl [2]	62.8	30-150		10/10/21 4:42
Tetrachloro-m-xylene [1]	71.0	30-150		10/10/21 4:42
Tetrachloro-m-xylene [2]	66.9	30-150		10/10/21 4:42

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: GG-2-Mid (0.25-0.5) Sampled: 9/29/2021 10:45

Sample ID: 21I1836-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.8		% Wt	1		SM 2540G	10/6/21	10/7/21 13:01	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: GG-2-Mid (0.5-1.5) Sampled: 9/29/2021 10:47

Sample ID: 21I1836-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1254 [1]	ND	0.089	0.036	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1262 [1]	ND	0.089	0.045	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:00	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	77.7	30-150		10/10/21 5:00
Decachlorobiphenyl [2]	68.4	30-150		10/10/21 5:00
Tetrachloro-m-xylene [1]	79.1	30-150		10/10/21 5:00
Tetrachloro-m-xylene [2]	74.6	30-150		10/10/21 5:00

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: GG-2-Mid (0.5-1.5) Sampled: 9/29/2021 10:47

Sample ID: 21I1836-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.7		% Wt	1		SM 2540G	10/6/21	10/7/21 13:01	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: II-6-Mid (0.25-0.5) Sampled: 9/29/2021 11:40

Sample ID: 21I1836-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:18	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.6	30-150		10/10/21 5:18
Decachlorobiphenyl [2]	67.0	30-150		10/10/21 5:18
Tetrachloro-m-xylene [1]	76.0	30-150		10/10/21 5:18
Tetrachloro-m-xylene [2]	71.7	30-150		10/10/21 5:18

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1836
Date Received: 9/30/2021
Field Sample #: II-6-Mid (0.25-0.5)
Sampled: 9/29/2021 11:40
Sample ID: 21I1836-03
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.9		% Wt	1		SM 2540G	10/6/21	10/7/21 13:01	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: II-6-Mid (0.5-1.5)   Sampled: 9/29/2021 11:43

Sample ID: 21I1836-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1221 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1242 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1254 [1]	ND	0.089	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:36	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.8	30-150		10/10/21 5:36
Decachlorobiphenyl [2]	67.6	30-150		10/10/21 5:36
Tetrachloro-m-xylene [1]	77.3	30-150		10/10/21 5:36
Tetrachloro-m-xylene [2]	73.7	30-150		10/10/21 5:36

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: II-6-Mid (0.5-1.5)   Sampled: 9/29/2021 11:43

Sample ID: 21I1836-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.3		% Wt	1		SM 2540G	10/6/21	10/7/21 13:02	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: II-6-Mid (1.5-3) Sampled: 9/29/2021 11:46

Sample ID: 21I1836-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.039	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 5:54	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	76.2	30-150		10/10/21 5:54
Decachlorobiphenyl [2]	67.0	30-150		10/10/21 5:54
Tetrachloro-m-xylene [1]	77.0	30-150		10/10/21 5:54
Tetrachloro-m-xylene [2]	72.4	30-150		10/10/21 5:54

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: II-6-Mid (1.5-3) Sampled: 9/29/2021 11:46

Sample ID: 21I1836-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	10/6/21	10/7/21 13:02	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: H-6 (0.25-0.5) Sampled: 9/29/2021 11:58

Sample ID: 21I1836-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1254 [2]	0.087	0.087	0.035	mg/Kg dry	4	J	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:12	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	73.5	30-150		10/10/21 6:12
Decachlorobiphenyl [2]	63.6	30-150		10/10/21 6:12
Tetrachloro-m-xylene [1]	70.7	30-150		10/10/21 6:12
Tetrachloro-m-xylene [2]	67.1	30-150		10/10/21 6:12

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: H-6 (0.25-0.5)
Sampled: 9/29/2021 11:58

Sample ID: 21I1836-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.9		% Wt	1		SM 2540G	10/6/21	10/7/21 13:02	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1836
Date Received: 9/30/2021		
Field Sample #: H-6 (0.5-1.5)	Sampled: 9/29/2021 12:00	
Sample ID: 21I1836-07		
Sample Matrix: Soil		

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1221 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1242 [1]	ND	0.089	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1254 [1]	ND	0.089	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:30	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	50.4	30-150		10/10/21 6:30
Decachlorobiphenyl [2]	44.6	30-150		10/10/21 6:30
Tetrachloro-m-xylene [1]	56.0	30-150		10/10/21 6:30
Tetrachloro-m-xylene [2]	53.0	30-150		10/10/21 6:30

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1836
Date Received: 9/30/2021
Field Sample #: H-6 (0.5-1.5)
Sampled: 9/29/2021 12:00
Sample ID: 21I1836-07
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.3		% Wt	1		SM 2540G	10/6/21	10/7/21 13:02	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: H-6 (1.5-3) Sampled: 9/29/2021 12:03

Sample ID: 21I1836-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1254 [1]	ND	0.090	0.036	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1260 [1]	ND	0.090	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 6:48	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	73.8	30-150		10/10/21 6:48
Decachlorobiphenyl [2]	64.6	30-150		10/10/21 6:48
Tetrachloro-m-xylene [1]	69.0	30-150		10/10/21 6:48
Tetrachloro-m-xylene [2]	65.4	30-150		10/10/21 6:48

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: H-6 (1.5-3)   Sampled: 9/29/2021 12:03

Sample ID: 21I1836-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.3		% Wt	1		SM 2540G	10/6/21	10/7/21 13:02	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: I-5-Mid (0.25-0.5)   Sampled: 9/29/2021 12:10

Sample ID: 21I1836-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.86	0.39	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1221 [1]	ND	0.86	0.65	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1232 [1]	ND	0.86	0.77	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1242 [1]	ND	0.86	0.65	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1248 [1]	2.7	0.86	0.30	mg/Kg dry	40		SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1254 [2]	1.4	0.86	0.34	mg/Kg dry	40		SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1260 [1]	0.50	0.86	0.47	mg/Kg dry	40	J	SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1262 [1]	ND	0.86	0.43	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 13:44	TG
Aroclor-1268 [1]	ND	0.86	0.69	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 13:44	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	*	30-150	S-01, U	10/11/21 13:44
Decachlorobiphenyl [2]	*	30-150	S-01, U	10/11/21 13:44
Tetrachloro-m-xylene [1]	*	30-150	S-01, U	10/11/21 13:44
Tetrachloro-m-xylene [2]	*	30-150	S-01, U	10/11/21 13:44

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: I-5-Mid (0.25-0.5)   Sampled: 9/29/2021 12:10

Sample ID: 21I1836-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.0		% Wt	1		SM 2540G	10/6/21	10/7/21 13:02	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: I-5-Mid (0.5-1.5) Sampled: 9/29/2021 12:15

Sample ID: 21I1836-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.085	0.038	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1221 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1232 [1]	ND	0.085	0.077	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1242 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1248 [1]	ND	0.085	0.030	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1254 [1]	ND	0.085	0.034	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1260 [1]	ND	0.085	0.047	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1262 [1]	ND	0.085	0.043	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG
Aroclor-1268 [1]	ND	0.085	0.068	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:07	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	74.2	30-150		10/10/21 9:07
Decachlorobiphenyl [2]	65.1	30-150		10/10/21 9:07
Tetrachloro-m-xylene [1]	72.8	30-150		10/10/21 9:07
Tetrachloro-m-xylene [2]	68.8	30-150		10/10/21 9:07

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: I-5-Mid (0.5-1.5) Sampled: 9/29/2021 12:15

Sample ID: 21I1836-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.7		% Wt	1		SM 2540G	10/6/21	10/7/21 13:03	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: J-5 (0.25-0.5) Sampled: 9/29/2021 13:20

Sample ID: 21I1836-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.047	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1221 [1]	ND	0.10	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1232 [1]	ND	0.10	0.094	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1242 [1]	ND	0.10	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1248 [1]	ND	0.10	0.037	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1254 [1]	ND	0.10	0.042	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1260 [1]	ND	0.10	0.057	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1262 [1]	ND	0.10	0.052	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG
Aroclor-1268 [1]	ND	0.10	0.084	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:25	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	60.6	30-150		10/10/21 9:25
Decachlorobiphenyl [2]	53.6	30-150		10/10/21 9:25
Tetrachloro-m-xylene [1]	62.2	30-150		10/10/21 9:25
Tetrachloro-m-xylene [2]	58.5	30-150		10/10/21 9:25

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1836
Date Received: 9/30/2021
Field Sample #: J-5 (0.25-0.5)
Sampled: 9/29/2021 13:20
Sample ID: 21I1836-11
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.5		% Wt	1		SM 2540G	10/6/21	10/7/21 13:03	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: J-5 (0.5-1.5) Sampled: 9/29/2021 13:23

Sample ID: 21I1836-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1260 [1]	ND	0.088	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG
Aroclor-1268 [1]	ND	0.088	0.071	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 9:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	70.5	30-150		10/10/21 9:43
Decachlorobiphenyl [2]	62.0	30-150		10/10/21 9:43
Tetrachloro-m-xylene [1]	69.7	30-150		10/10/21 9:43
Tetrachloro-m-xylene [2]	65.7	30-150		10/10/21 9:43

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: J-5 (0.5-1.5) Sampled: 9/29/2021 13:23

Sample ID: 21I1836-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.7		% Wt	1		SM 2540G	10/6/21	10/7/21 13:03	MJH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-6-Mid (0.25-0.5) Sampled: 9/29/2021 13:30

Sample ID: 21I1836-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.45	0.20	mg/Kg dry	20	U	SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1221 [1]	ND	0.45	0.34	mg/Kg dry	20	U	SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1232 [1]	ND	0.45	0.40	mg/Kg dry	20	U	SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1242 [1]	ND	0.45	0.34	mg/Kg dry	20	U	SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1248 [1]	ND	0.45	0.16	mg/Kg dry	20	U	SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1254 [2]	2.9	0.45	0.18	mg/Kg dry	20		SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1260 [1]	0.55	0.45	0.25	mg/Kg dry	20		SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1262 [1]	ND	0.45	0.22	mg/Kg dry	20	U	SW-846 8082A	10/8/21	10/11/21 14:02	TG
Aroclor-1268 [1]	ND	0.45	0.36	mg/Kg dry	20	U	SW-846 8082A	10/8/21	10/11/21 14:02	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	82.2	30-150		10/11/21 14:02
Decachlorobiphenyl [2]	75.9	30-150		10/11/21 14:02
Tetrachloro-m-xylene [1]	77.9	30-150		10/11/21 14:02
Tetrachloro-m-xylene [2]	74.0	30-150		10/11/21 14:02

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-6-Mid (0.25-0.5)   Sampled: 9/29/2021 13:30

Sample ID: 21I1836-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.2		% Wt	1		SM 2540G	10/6/21	10/7/21 13:03	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-6-Mid (0.5-1.5)	Sampled: 9/29/2021 13:32

Sample ID: 21I1836-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1262 [1]	ND	0.087	0.043	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:19	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	80.3	30-150		10/10/21 10:19
Decachlorobiphenyl [2]	70.8	30-150		10/10/21 10:19
Tetrachloro-m-xylene [1]	82.4	30-150		10/10/21 10:19
Tetrachloro-m-xylene [2]	77.5	30-150		10/10/21 10:19

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-6-Mid (0.5-1.5)   Sampled: 9/29/2021 13:32

Sample ID: 21I1836-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.0		% Wt	1		SM 2540G	10/6/21	10/7/21 13:03	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-8 (0.25-0.5) Sampled: 9/29/2021 13:35

Sample ID: 21I1836-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1221 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1232 [1]	ND	0.097	0.088	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1242 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1248 [1]	ND	0.097	0.034	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1254 [1]	0.77	0.097	0.039	mg/Kg dry	4		SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1260 [1]	0.15	0.097	0.054	mg/Kg dry	4		SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1262 [1]	ND	0.097	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:37	TG
Aroclor-1268 [1]	ND	0.097	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:37	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	79.8	30-150		10/10/21 10:37
Decachlorobiphenyl [2]	70.8	30-150		10/10/21 10:37
Tetrachloro-m-xylene [1]	84.9	30-150		10/10/21 10:37
Tetrachloro-m-xylene [2]	80.1	30-150		10/10/21 10:37

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-8 (0.25-0.5)
Sampled: 9/29/2021 13:35

Sample ID: 21I1836-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.1		% Wt	1		SM 2540G	10/6/21	10/7/21 13:03	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-8 (0.5-1.5) Sampled: 9/29/2021 13:37

Sample ID: 21I1836-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 10:55	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	83.6	30-150		10/10/21 10:55
Decachlorobiphenyl [2]	73.7	30-150		10/10/21 10:55
Tetrachloro-m-xylene [1]	85.9	30-150		10/10/21 10:55
Tetrachloro-m-xylene [2]	81.2	30-150		10/10/21 10:55

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-8 (0.5-1.5) Sampled: 9/29/2021 13:37

Sample ID: 21I1836-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.8		% Wt	1		SM 2540G	10/7/21	10/9/21 12:24	TDK

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-8 (1.5-3)	Sampled: 9/29/2021 13:39

Sample ID: 21I1836-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1221 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1232 [1]	ND	0.089	0.080	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1242 [1]	ND	0.089	0.067	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1248 [1]	ND	0.089	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1254 [1]	ND	0.089	0.035	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1260 [1]	ND	0.089	0.049	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1262 [1]	ND	0.089	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG
Aroclor-1268 [1]	ND	0.089	0.071	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 11:13	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	70.8	30-150		10/10/21 11:13
Decachlorobiphenyl [2]	62.6	30-150		10/10/21 11:13
Tetrachloro-m-xylene [1]	65.5	30-150		10/10/21 11:13
Tetrachloro-m-xylene [2]	62.3	30-150		10/10/21 11:13

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-8 (1.5-3)   Sampled: 9/29/2021 13:39

Sample ID: 21I1836-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.2		% Wt	1		SM 2540G	10/6/21	10/7/21 13:04	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-9 (0.25-0.5) Sampled: 9/29/2021 13:40

Sample ID: 21I1836-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	1.8	0.80	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1221 [1]	ND	1.8	1.3	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1232 [1]	ND	1.8	1.6	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1242 [1]	ND	1.8	1.3	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1248 [1]	ND	1.8	0.63	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1254 [1]	17	1.8	0.71	mg/Kg dry	80		SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1260 [1]	ND	1.8	0.98	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1262 [1]	ND	1.8	0.89	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG
Aroclor-1268 [1]	ND	1.8	1.4	mg/Kg dry	80	U	SW-846 8082A	10/8/21	10/11/21 14:20	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	*	30-150	S-01, U	10/11/21 14:20
Decachlorobiphenyl [2]	*	30-150	S-01, U	10/11/21 14:20
Tetrachloro-m-xylene [1]	*	30-150	S-01, U	10/11/21 14:20
Tetrachloro-m-xylene [2]	*	30-150	S-01, U	10/11/21 14:20

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-9 (0.25-0.5)
Sampled: 9/29/2021 13:40

Sample ID: 21I1836-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.6		% Wt	1		SM 2540G	10/6/21	10/7/21 13:04	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-9 (0.5-1.5)   Sampled: 9/29/2021 13:45

Sample ID: 21I1836-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.89	0.40	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1221 [1]	ND	0.89	0.67	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1232 [1]	ND	0.89	0.80	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1242 [1]	ND	0.89	0.67	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1248 [1]	ND	0.89	0.31	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1254 [1]	3.8	0.89	0.36	mg/Kg dry	40		SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1260 [1]	ND	0.89	0.49	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1262 [1]	ND	0.89	0.44	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG
Aroclor-1268 [1]	ND	0.89	0.71	mg/Kg dry	40	U	SW-846 8082A	10/8/21	10/11/21 14:38	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	*	30-150	S-01, U	10/11/21 14:38
Decachlorobiphenyl [2]	*	30-150	S-01, U	10/11/21 14:38
Tetrachloro-m-xylene [1]	*	30-150	S-01, U	10/11/21 14:38
Tetrachloro-m-xylene [2]	*	30-150	S-01, U	10/11/21 14:38

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-9 (0.5-1.5)　Sampled: 9/29/2021 13:45

Sample ID: 21I1836-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.0		% Wt	1		SM 2540G	10/6/21	10/7/21 13:04	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1836
Date Received: 9/30/2021		
Field Sample #: JJ-7 (0.25-0.5)	Sampled: 9/29/2021 13:50	
Sample ID: 21I1836-20		
Sample Matrix: Soil		

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1254 [1]	0.23	0.088	0.035	mg/Kg dry	4		SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/8/21	10/10/21 12:07	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	73.3	30-150		10/10/21 12:07
Decachlorobiphenyl [2]	64.7	30-150		10/10/21 12:07
Tetrachloro-m-xylene [1]	72.6	30-150		10/10/21 12:07
Tetrachloro-m-xylene [2]	68.9	30-150		10/10/21 12:07

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1836

Date Received: 9/30/2021

Field Sample #: JJ-7 (0.25-0.5) Sampled: 9/29/2021 13:50

Sample ID: 21I1836-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.8		% Wt	1		SM 2540G	10/6/21	10/7/21 13:04	MJH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1836-01 [GG-2-Mid (0.25-0.5)]	B291800	10/06/21
21I1836-02 [GG-2-Mid (0.5-1.5)]	B291800	10/06/21
21I1836-03 [II-6-Mid (0.25-0.5)]	B291800	10/06/21
21I1836-04 [II-6-Mid (0.5-1.5)]	B291800	10/06/21
21I1836-05 [II-6-Mid (1.5-3)]	B291800	10/06/21
21I1836-06 [H-6 (0.25-0.5)]	B291800	10/06/21
21I1836-07 [H-6 (0.5-1.5)]	B291800	10/06/21
21I1836-08 [H-6 (1.5-3)]	B291800	10/06/21
21I1836-09 [I-5-Mid (0.25-0.5)]	B291800	10/06/21
21I1836-10 [I-5-Mid (0.5-1.5)]	B291800	10/06/21
21I1836-11 [J-5 (0.25-0.5)]	B291800	10/06/21
21I1836-12 [J-5 (0.5-1.5)]	B291800	10/06/21
21I1836-13 [JJ-6-Mid (0.25-0.5)]	B291800	10/06/21
21I1836-14 [JJ-6-Mid (0.5-1.5)]	B291800	10/06/21
21I1836-15 [JJ-8 (0.25-0.5)]	B291800	10/06/21
21I1836-17 [JJ-8 (1.5-3)]	B291800	10/06/21
21I1836-18 [JJ-9 (0.25-0.5)]	B291800	10/06/21
21I1836-19 [JJ-9 (0.5-1.5)]	B291800	10/06/21
21I1836-20 [JJ-7 (0.25-0.5)]	B291800	10/06/21

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1836-16 [JJ-8 (0.5-1.5)]	B291984	10/07/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1836-01 [GG-2-Mid (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-02 [GG-2-Mid (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-03 [II-6-Mid (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-04 [II-6-Mid (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-05 [II-6-Mid (1.5-3)]	B292025	10.0	10.0	10/08/21
21I1836-06 [H-6 (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-07 [H-6 (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-08 [H-6 (1.5-3)]	B292025	10.0	10.0	10/08/21
21I1836-09 [I-5-Mid (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-10 [I-5-Mid (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-11 [J-5 (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-12 [J-5 (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-13 [JJ-6-Mid (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-14 [JJ-6-Mid (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-15 [JJ-8 (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-16 [JJ-8 (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-17 [JJ-8 (1.5-3)]	B292025	10.0	10.0	10/08/21
21I1836-18 [JJ-9 (0.25-0.5)]	B292025	10.0	10.0	10/08/21
21I1836-19 [JJ-9 (0.5-1.5)]	B292025	10.0	10.0	10/08/21
21I1836-20 [JJ-7 (0.25-0.5)]	B292025	10.0	10.0	10/08/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292025 - SW-846 3540C										
Blank (B292025-BLK1)				Prepared: 10/08/21 Analyzed: 10/10/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.154*		mg/Kg wet	0.200		76.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.132*		mg/Kg wet	0.200		66.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.149*		mg/Kg wet	0.200		74.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.136*		mg/Kg wet	0.200		68.2	30-150			
LCS (B292025-BS1)				Prepared: 10/08/21 Analyzed: 10/10/21						
Aroclor-1016	0.13	0.020	mg/Kg wet	0.200		66.6	40-140			
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		61.3	40-140			
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		74.8	40-140			
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		63.9	40-140			
Surrogate: Decachlorobiphenyl	*0.148*		mg/Kg wet	0.200		74.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.128*		mg/Kg wet	0.200		64.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.132*		mg/Kg wet	0.200		66.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.121*		mg/Kg wet	0.200		60.4	30-150			
LCS Dup (B292025-BSD1)				Prepared: 10/08/21 Analyzed: 10/10/21						
Aroclor-1016	0.13	0.020	mg/Kg wet	0.200		66.7	40-140	0.184	30	
Aroclor-1016 [2C]	0.12	0.020	mg/Kg wet	0.200		61.0	40-140	0.539	30	
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		76.1	40-140	1.82	30	
Aroclor-1260 [2C]	0.13	0.020	mg/Kg wet	0.200		66.2	40-140	3.63	30	
Surrogate: Decachlorobiphenyl	*0.157*		mg/Kg wet	0.200		78.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.135*		mg/Kg wet	0.200		67.3	30-150			
Surrogate: Tetrachloro-m-xylene	*0.135*		mg/Kg wet	0.200		67.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.123*		mg/Kg wet	0.200		61.3	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292025 - SW-846 3540C										
Matrix Spike (B292025-MS1)	**Source: 21I1836-01**		Prepared: 10/08/21 Analyzed: 10/10/21							
Aroclor-1016	0.18	0.086	mg/Kg dry	0.215	ND	82.2	40-140			
Aroclor-1016 [2C]	0.16	0.086	mg/Kg dry	0.215	ND	73.9	40-140			
Aroclor-1260	0.19	0.086	mg/Kg dry	0.215	ND	86.6	40-140			
Aroclor-1260 [2C]	0.17	0.086	mg/Kg dry	0.215	ND	76.7	40-140			
Surrogate: Decachlorobiphenyl	*0.165*		mg/Kg dry	0.215		76.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.146*		mg/Kg dry	0.215		67.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.158*		mg/Kg dry	0.215		73.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.149*		mg/Kg dry	0.215		69.0	30-150			
Matrix Spike Dup (B292025-MSD1)	**Source: 21I1836-01**		Prepared: 10/08/21 Analyzed: 10/10/21							
Aroclor-1016	0.17	0.086	mg/Kg dry	0.215	ND	80.0	40-140	2.74	50	
Aroclor-1016 [2C]	0.15	0.086	mg/Kg dry	0.215	ND	72.0	40-140	2.71	50	
Aroclor-1260	0.17	0.086	mg/Kg dry	0.215	ND	80.2	40-140	7.63	50	
Aroclor-1260 [2C]	0.16	0.086	mg/Kg dry	0.215	ND	72.2	40-140	6.07	50	
Surrogate: Decachlorobiphenyl	*0.157*		mg/Kg dry	0.215		72.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.138*		mg/Kg dry	0.215		64.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.158*		mg/Kg dry	0.215		73.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.147*		mg/Kg dry	0.215		68.4	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

H-6 (0.25-0.5)

Lab Sample ID: 21I1836-06

Date(s) Analyzed: 10/10/2021 10/10/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.066	
	2	0.000	-0.030	0.030	0.087	27.5

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

I-5-Mid (0.25-0.5)

Lab Sample ID: 21I1836-09

Date(s) Analyzed: 10/11/2021 10/11/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	2.7	
	2	0.000	-0.030	0.030	2.5	7.7
Aroclor-1254	1	0.000	-0.030	0.030	1.3	
	2	0.000	-0.030	0.030	1.4	7.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

JJ-6-Mid (0.25-0.5)

Lab Sample ID: 21I1836-13

Date(s) Analyzed: 10/11/2021 10/11/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	2.7	
	2	0.000	-0.030	0.030	2.9	7.1
Aroclor-1260	1	0.000	-0.030	0.030	0.55	
	2	0.000	-0.030	0.030	0.50	9.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

JJ-8 (0.25-0.5)

Lab Sample ID: 21I1836-15

Date(s) Analyzed: 10/10/2021 10/10/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.77	
	2	0.000	-0.030	0.030	0.67	13.9
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

JJ-9 (0.25-0.5)

Lab Sample ID: 21I1836-18

Date(s) Analyzed: 10/11/2021 10/11/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	17	
	2	0.000	-0.030	0.030	17	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

JJ-9 (0.5-1.5)

Lab Sample ID: 21I1836-19

Date(s) Analyzed: 10/11/2021 10/11/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	3.8	
	2	0.000	-0.030	0.030	3.7	2.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

JJ-7 (0.25-0.5)

Lab Sample ID: 21I1836-20

Date(s) Analyzed: 10/10/2021 10/10/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.23	
	2	0.000	-0.030	0.030	0.22	4.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B292025-BS1

Date(s) Analyzed: 10/10/2021 10/10/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.12	8.0
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B292025-BSD1

Date(s) Analyzed: 10/10/2021 10/10/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.12	8.0
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.13	14.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B292025-MS1

Date(s) Analyzed: 10/10/2021 10/10/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.16	11.8
Aroclor-1260	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.17	11.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B292025-MSD1

Date(s) Analyzed: 10/10/2021 10/10/2021

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.15	12.5
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1836

con-test®
A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 5 of 17

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 369 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	GG-2mid (0.25-0.5)	9/29	10:45	Grab	S	U		1				X
2	GG-2mid (0.5-1.5)		10:47	Grab	S	U		1				X
3	II-6-mid (0.25-0.5)		11:40	Grab	S	U		1				X
4	II-6-mid (0.5-1.5)		11:43	Grab	S	U		1				X
5	II-6-mid (1.5-3)		11:40	Grab	S	U		1				X
6	H-6 (0.25-0.5)		11:58	Grab	S	U		1				X
7	H-6 (0.5-1.5)		12:00	Grab	S	U		1				X
8	H-6 (1.5-3)		12:03	Grab	S	U		1				X
9	I-5-mid (0.25-0.5)		12:10	Grab	S	U		1				X
10	I-5-mid (0.5-1.5)		12:15	Grab	S	U		1				X

Relinquished/Received	Date/Time
Relinquished by: (signature)	9/30 17:00
Received by: (signature)	9/30/21 1720
Relinquished by: (signature)	9/30/21 1855
Received by: (signature) 23,4,8	9/30/21 1022
Relinquished by: (signature)	
Received by: (signature)	
Relinquished by: (signature)	
Received by: (signature)	

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other: SFS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

NELAC and AIHA-LAP, LLC Accredited

[2] Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Table of Contents

21I1836

con-test® A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 6 of 17

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 369 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	J-5 (0.25-0.5)	9/29/21	15:20	Grab	S	U		1				X
12	J-5 (0.5-1.5)	↓	15:23	Grab	S	U		1				X
13	JJ-6-mid (0.25-0.5)		13:30	Grab	S	U		1				X
14	JJ-6-mid (0.5-1.5)		13:32	Grab	S	U		1				X
15	JJ-8 (0.25-0.5)		13:35	Grab	S	U		1				X
16	JJ-8 (0.5-1.5)		13:37	Grab	S	U		1				X
17	JJ-8 (1.5-3)		13:39	Grab	S	U		1				X
18	JJ-9 (0.25-0.5)		13:40	Grab	S	U		1				X
19	JJ-9 (0.5-1.5)		13:45	Grab	S	U		1				X
20	JJ-7 (0.25-0.5)	↓	13:50	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/30 1700
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21, 1855
Received by: (signature)	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements

MA
CT
Other SRS

Special Requirements

☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity

Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes**:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes**:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton
Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T
By Gun # 3 Actual Temp - 2.3, 4.8°C
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 7, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd., Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1839

Enclosed are results of analyses for samples as received by the laboratory on September 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/7/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1839

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd., Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
B-2 (0.25-0.5)	21I1839-01	Soil		SM 2540G SW-846 8082A	
B-2 (0.5-1.5)	21I1839-02	Soil		SM 2540G SW-846 8082A	
C-1 (0.25-0.5)	21I1839-03	Soil		SM 2540G SW-846 8082A	
C-1 (0.5-1.5)	21I1839-04	Soil		SM 2540G SW-846 8082A	
C-3 (0.25-0.5)	21I1839-05	Soil		SM 2540G SW-846 8082A	
C-3 (0.5-1.5)	21I1839-06	Soil		SM 2540G SW-846 8082A	
B-4 (0.25-0.5)	21I1839-07	Soil		SM 2540G SW-846 8082A	
B-4 (0.5-1.5)	21I1839-08	Soil		SM 2540G SW-846 8082A	
D-2 (0.25-0.5)	21I1839-09	Soil		SM 2540G SW-846 8082A	
D-2 (0.5-1.5)	21I1839-10	Soil		SM 2540G SW-846 8082A	
D-2 (1.5-3.0)	21I1839-11	Soil		SM 2540G SW-846 8082A	
D-3 (0.25-0.5)	21I1839-12	Soil		SM 2540G SW-846 8082A	
D-3 (0.5-1.5)	21I1839-13	Soil		SM 2540G SW-846 8082A	
D-4 (0.25-0.5)	21I1839-14	Soil		SM 2540G SW-846 8082A	
D-4 (0.5-1.5)	21I1839-15	Soil		SM 2540G SW-846 8082A	
D-4 (1.5-3)	21I1839-16	Soil		SM 2540G SW-846 8082A	
E-1 (0.25-0.5)	21I1839-17	Soil		SM 2540G SW-846 8082A	
E-1 (0.5-1.5)	21I1839-18	Soil		SM 2540G SW-846 8082A	
E-1 (1.5-3)	21I1839-19	Soil		SM 2540G SW-846 8082A	
E-2 (0.25-0.5)	21I1839-20	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

O-04

Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.

Analyte & Samples(s) Qualified:

Aroclor-1242
21I1839-12[D-3 (0.25-0.5)]

Aroclor-1242 [2C]
21I1839-12[D-3 (0.25-0.5)]

S-02

The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl [2C]
21I1839-20[E-2 (0.25-0.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: B-2 (0.25-0.5)   Sampled: 9/29/2021 08:05

Sample ID: 21I1839-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1221 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1232 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1242 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1248 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1254 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1260 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1262 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG
Aroclor-1268 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 12:54	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	92.4	30-150		10/6/21 12:54
Decachlorobiphenyl [2]	93.4	30-150		10/6/21 12:54
Tetrachloro-m-xylene [1]	96.8	30-150		10/6/21 12:54
Tetrachloro-m-xylene [2]	90.3	30-150		10/6/21 12:54

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: B-2 (0.25-0.5)　Sampled: 9/29/2021 08:05

Sample ID: 21I1839-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.6		% Wt	1		SM 2540G	10/6/21	10/7/21 13:06	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: B-2 (0.5-1.5)   Sampled: 9/29/2021 08:08

Sample ID: 21I1839-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1221 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1232 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1242 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1248 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1254 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1260 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1262 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG
Aroclor-1268 [1]	ND	0.098	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:12	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	88.6	30-150		10/6/21 13:12
Decachlorobiphenyl [2]	89.1	30-150		10/6/21 13:12
Tetrachloro-m-xylene [1]	95.9	30-150		10/6/21 13:12
Tetrachloro-m-xylene [2]	91.7	30-150		10/6/21 13:12

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1839
Date Received: 9/30/2021
Field Sample #: B-2 (0.5-1.5)
Sampled: 9/29/2021 08:08
Sample ID: 21I1839-02
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	81.6		% Wt	1		SM 2540G	10/6/21	10/7/21 13:06	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: C-1 (0.25-0.5) Sampled: 9/29/2021 08:10

Sample ID: 21I1839-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1221 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1232 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1242 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1248 [1]	0.14	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1254 [2]	0.18	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1260 [2]	0.048	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1262 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG
Aroclor-1268 [1]	ND	0.087	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:30	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	81.4	30-150		10/6/21 13:30
Decachlorobiphenyl [2]	79.6	30-150		10/6/21 13:30
Tetrachloro-m-xylene [1]	100	30-150		10/6/21 13:30
Tetrachloro-m-xylene [2]	92.6	30-150		10/6/21 13:30

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: C-1 (0.25-0.5) Sampled: 9/29/2021 08:10

Sample ID: 21I1839-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.3		% Wt	1		SM 2540G	10/6/21	10/7/21 13:06	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: C-1 (0.5-1.5)   Sampled: 9/29/2021 08:15

Sample ID: 21I1839-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1221 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1232 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1242 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1248 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1254 [2]	0.060	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1260 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1262 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG
Aroclor-1268 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 13:48	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	81.4	30-150		10/6/21 13:48
Decachlorobiphenyl [2]	97.4	30-150		10/6/21 13:48
Tetrachloro-m-xylene [1]	97.4	30-150		10/6/21 13:48
Tetrachloro-m-xylene [2]	90.6	30-150		10/6/21 13:48

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: C-1 (0.5-1.5) Sampled: 9/29/2021 08:15

Sample ID: 21I1839-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.3		% Wt	1		SM 2540G	10/6/21	10/7/21 13:06	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: C-3 (0.25-0.5) Sampled: 9/29/2021 08:20

Sample ID: 21I1839-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1221 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1232 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1242 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1248 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1254 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1260 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1262 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG
Aroclor-1268 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:05	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	86.6	30-150		10/6/21 14:05
Decachlorobiphenyl [2]	85.2	30-150		10/6/21 14:05
Tetrachloro-m-xylene [1]	95.9	30-150		10/6/21 14:05
Tetrachloro-m-xylene [2]	91.2	30-150		10/6/21 14:05

Project Location: 375 Banfield Rd., Portsmouth, NH　Sample Description:　Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: C-3 (0.25-0.5)　Sampled: 9/29/2021 08:20

Sample ID: 21I1839-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.8		% Wt	1		SM 2540G	10/6/21	10/7/21 13:06	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: C-3 (0.5-1.5)   Sampled: 9/29/2021 08:25

Sample ID: 21I1839-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1248 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1254 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1260 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG
Aroclor-1268 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:23	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	84.6	30-150		10/6/21 14:23
Decachlorobiphenyl [2]	83.4	30-150		10/6/21 14:23
Tetrachloro-m-xylene [1]	96.7	30-150		10/6/21 14:23
Tetrachloro-m-xylene [2]	91.3	30-150		10/6/21 14:23

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1839
Date Received: 9/30/2021		
Field Sample #: C-3 (0.5-1.5)	Sampled: 9/29/2021 08:25	
Sample ID: 21I1839-06		
Sample Matrix: Soil		

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.0		% Wt	1		SM 2540G	10/6/21	10/7/21 13:06	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: B-4 (0.25-0.5) Sampled: 9/29/2021 08:28

Sample ID: 21I1839-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1221 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1232 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1242 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1248 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1254 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1260 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1262 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG
Aroclor-1268 [1]	ND	0.094	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:40	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	90.0	30-150		10/6/21 14:40
Decachlorobiphenyl [2]	89.6	30-150		10/6/21 14:40
Tetrachloro-m-xylene [1]	97.5	30-150		10/6/21 14:40
Tetrachloro-m-xylene [2]	93.3	30-150		10/6/21 14:40

Project Location: 375 Banfield Rd., Portsmouth, NH	Sample Description:	Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: B-4 (0.25-0.5)	Sampled: 9/29/2021 08:28

Sample ID: 21I1839-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.1		% Wt	1		SM 2540G	10/6/21	10/7/21 13:07	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: B-4 (0.5-1.5)   Sampled: 9/29/2021 08:30

Sample ID: 21I1839-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1221 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1232 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1242 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1248 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1254 [2]	0.037	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1260 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1262 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG
Aroclor-1268 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 14:57	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	85.2	30-150		10/6/21 14:57
Decachlorobiphenyl [2]	83.9	30-150		10/6/21 14:57
Tetrachloro-m-xylene [1]	96.1	30-150		10/6/21 14:57
Tetrachloro-m-xylene [2]	91.0	30-150		10/6/21 14:57

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: B-4 (0.5-1.5) Sampled: 9/29/2021 08:30

Sample ID: 21I1839-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.5		% Wt	1		SM 2540G	10/6/21	10/7/21 13:07	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-2 (0.25-0.5) Sampled: 9/29/2021 08:35

Sample ID: 21I1839-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1221 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1232 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1242 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1248 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1254 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1260 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1262 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG
Aroclor-1268 [1]	ND	0.083	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 16:56	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	85.3	30-150		10/6/21 16:56
Decachlorobiphenyl [2]	83.3	30-150		10/6/21 16:56
Tetrachloro-m-xylene [1]	109	30-150		10/6/21 16:56
Tetrachloro-m-xylene [2]	102	30-150		10/6/21 16:56

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-2 (0.25-0.5) Sampled: 9/29/2021 08:35

Sample ID: 21I1839-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	96.5		% Wt	1		SM 2540G	10/6/21	10/7/21 13:07	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-2 (0.5-1.5)
Sampled: 9/29/2021 08:38

Sample ID: 21I1839-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1221 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1232 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1242 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1248 [1]	0.044	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1254 [2]	0.23	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1260 [1]	0.16	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1262 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG
Aroclor-1268 [1]	ND	0.092	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:13	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	79.1	30-150		10/6/21 17:13
Decachlorobiphenyl [2]	95.3	30-150		10/6/21 17:13
Tetrachloro-m-xylene [1]	99.3	30-150		10/6/21 17:13
Tetrachloro-m-xylene [2]	92.0	30-150		10/6/21 17:13

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-2 (0.5-1.5) Sampled: 9/29/2021 08:38

Sample ID: 21I1839-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.9		% Wt	1		SM 2540G	10/6/21	10/7/21 13:07	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-2 (1.5-3.0) Sampled: 9/29/2021 08:40

Sample ID: 21I1839-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1221 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1232 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1242 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1248 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1254 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1260 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1262 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG
Aroclor-1268 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:31	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	82.2	30-150		10/6/21 17:31
Decachlorobiphenyl [2]	81.8	30-150		10/6/21 17:31
Tetrachloro-m-xylene [1]	93.7	30-150		10/6/21 17:31
Tetrachloro-m-xylene [2]	89.2	30-150		10/6/21 17:31

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-2 (1.5-3.0)   Sampled: 9/29/2021 08:40

Sample ID: 21I1839-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.4		% Wt	1		SM 2540G	10/6/21	10/7/21 13:07	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-3 (0.25-0.5)   Sampled: 9/29/2021 08:45

Sample ID: 21I1839-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1221 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1232 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1242 [1]	0.42	0.086	mg/Kg dry	4	O-04	SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1248 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1254 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1260 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1262 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG
Aroclor-1268 [1]	ND	0.086	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 17:49	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.2	30-150		10/6/21 17:49
Decachlorobiphenyl [2]	74.9	30-150		10/6/21 17:49
Tetrachloro-m-xylene [1]	98.1	30-150		10/6/21 17:49
Tetrachloro-m-xylene [2]	93.0	30-150		10/6/21 17:49

Project Location: 375 Banfield Rd., Portsmouth, NH		Sample Description:		Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-3 (0.25-0.5)		Sampled: 9/29/2021 08:45

Sample ID: 21I1839-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.7		% Wt	1		SM 2540G	10/6/21	10/7/21 13:07	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-3 (0.5-1.5)   Sampled: 9/29/2021 08:47

Sample ID: 21I1839-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1221 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1232 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1242 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1248 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1254 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1260 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1262 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG
Aroclor-1268 [1]	ND	0.088	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:06	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	83.4	30-150		10/6/21 18:06
Decachlorobiphenyl [2]	83.2	30-150		10/6/21 18:06
Tetrachloro-m-xylene [1]	96.4	30-150		10/6/21 18:06
Tetrachloro-m-xylene [2]	91.6	30-150		10/6/21 18:06

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-3 (0.5-1.5) Sampled: 9/29/2021 08:47

Sample ID: 21I1839-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.4		% Wt	1		SM 2540G	10/6/21	10/7/21 13:08	MJH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1839
Date Received: 9/30/2021
Field Sample #: D-4 (0.25-0.5)
Sampled: 9/29/2021 08:51
Sample ID: 21I1839-14
Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1221 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1232 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1242 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1248 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1254 [2]	0.042	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1260 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1262 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG
Aroclor-1268 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:24	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	81.2	30-150		10/6/21 18:24
Decachlorobiphenyl [2]	80.9	30-150		10/6/21 18:24
Tetrachloro-m-xylene [1]	100	30-150		10/6/21 18:24
Tetrachloro-m-xylene [2]	94.7	30-150		10/6/21 18:24

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-4 (0.25-0.5) Sampled: 9/29/2021 08:51

Sample ID: 21I1839-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.2		% Wt	1		SM 2540G	10/6/21	10/7/21 13:08	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-4 (0.5-1.5) Sampled: 9/29/2021 08:54

Sample ID: 21I1839-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1221 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1232 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1242 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1248 [1]	0.049	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1254 [2]	0.14	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1260 [2]	0.056	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1262 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG
Aroclor-1268 [1]	ND	0.089	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:41	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	83.7	30-150		10/6/21 18:41
Decachlorobiphenyl [2]	93.7	30-150		10/6/21 18:41
Tetrachloro-m-xylene [1]	102	30-150		10/6/21 18:41
Tetrachloro-m-xylene [2]	93.7	30-150		10/6/21 18:41

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-4 (0.5-1.5)   Sampled: 9/29/2021 08:54

Sample ID: 21I1839-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.2		% Wt	1		SM 2540G	10/6/21	10/7/21 13:08	MJH

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-4 (1.5-3) Sampled: 9/29/2021 08:57

Sample ID: 21I1839-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1221 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1232 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1242 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1248 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1254 [2]	0.17	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1260 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1262 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG
Aroclor-1268 [1]	ND	0.10	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 18:59	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Analyzed
Decachlorobiphenyl [1]	108	30-150		10/6/21 18:59
Decachlorobiphenyl [2]	116	30-150		10/6/21 18:59
Tetrachloro-m-xylene [1]	95.2	30-150		10/6/21 18:59
Tetrachloro-m-xylene [2]	86.9	30-150		10/6/21 18:59

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: D-4 (1.5-3) Sampled: 9/29/2021 08:57

Sample ID: 21I1839-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	76.9		% Wt	1		SM 2540G	10/6/21	10/7/21 13:08	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH
Sample Description:
Work Order: 21I1839
Date Received: 9/30/2021
Field Sample #: E-1 (0.25-0.5)
Sampled: 9/29/2021 09:00
Sample ID: 21I1839-17
Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1221 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1232 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1242 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1248 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1254 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1260 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1262 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG
Aroclor-1268 [1]	ND	0.097	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:17	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	83.5	30-150		10/6/21 19:17
Decachlorobiphenyl [2]	83.3	30-150		10/6/21 19:17
Tetrachloro-m-xylene [1]	101	30-150		10/6/21 19:17
Tetrachloro-m-xylene [2]	96.1	30-150		10/6/21 19:17

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: E-1 (0.25-0.5) Sampled: 9/29/2021 09:00

Sample ID: 21I1839-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.7		% Wt	1		SM 2540G	10/6/21	10/7/21 13:08	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: E-1 (0.5-1.5)   Sampled: 9/29/2021 09:03

Sample ID: 21I1839-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1221 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1232 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1242 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1248 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1254 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1260 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1262 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG
Aroclor-1268 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:34	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	88.1	30-150		10/6/21 19:34
Decachlorobiphenyl [2]	88.8	30-150		10/6/21 19:34
Tetrachloro-m-xylene [1]	104	30-150		10/6/21 19:34
Tetrachloro-m-xylene [2]	99.5	30-150		10/6/21 19:34

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: E-1 (0.5-1.5) Sampled: 9/29/2021 09:03

Sample ID: 21I1839-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.0		% Wt	1		SM 2540G	10/6/21	10/7/21 13:09	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: E-1 (1.5-3) Sampled: 9/29/2021 09:06

Sample ID: 21I1839-19

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1221 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1232 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1242 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1248 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1254 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1260 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1262 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG
Aroclor-1268 [1]	ND	0.091	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 19:51	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	87.7	30-150		10/6/21 19:51
Decachlorobiphenyl [2]	89.0	30-150		10/6/21 19:51
Tetrachloro-m-xylene [1]	102	30-150		10/6/21 19:51
Tetrachloro-m-xylene [2]	96.9	30-150		10/6/21 19:51

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: E-1 (1.5-3)   Sampled: 9/29/2021 09:06

Sample ID: 21I1839-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.2		% Wt	1		SM 2540G	10/6/21	10/7/21 13:09	MJH

Project Location: 375 Banfield Rd., Portsmouth, NH Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: E-2 (0.25-0.5) Sampled: 9/29/2021 09:10

Sample ID: 21I1839-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1221 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1232 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1242 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1248 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1254 [2]	0.062	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1260 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1262 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG
Aroclor-1268 [1]	ND	0.090	mg/Kg dry	4		SW-846 8082A	10/4/21	10/6/21 20:09	TG

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.6		30-150		10/6/21 20:09
Decachlorobiphenyl [2]	**163**	*	30-150	S-02	10/6/21 20:09
Tetrachloro-m-xylene [1]	87.6		30-150		10/6/21 20:09
Tetrachloro-m-xylene [2]	80.9		30-150		10/6/21 20:09

Project Location: 375 Banfield Rd., Portsmouth, NH   Sample Description: Work Order: 21I1839

Date Received: 9/30/2021

Field Sample #: E-2 (0.25-0.5)   Sampled: 9/29/2021 09:10

Sample ID: 21I1839-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.1		% Wt	1		SM 2540G	10/6/21	10/7/21 13:09	MJH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1839-01 [B-2 (0.25-0.5)]	B291800	10/06/21
21I1839-02 [B-2 (0.5-1.5)]	B291800	10/06/21
21I1839-03 [C-1 (0.25-0.5)]	B291800	10/06/21
21I1839-04 [C-1 (0.5-1.5)]	B291800	10/06/21
21I1839-05 [C-3 (0.25-0.5)]	B291800	10/06/21
21I1839-06 [C-3 (0.5-1.5)]	B291800	10/06/21
21I1839-07 [B-4 (0.25-0.5)]	B291800	10/06/21
21I1839-08 [B-4 (0.5-1.5)]	B291800	10/06/21
21I1839-09 [D-2 (0.25-0.5)]	B291800	10/06/21
21I1839-10 [D-2 (0.5-1.5)]	B291800	10/06/21
21I1839-11 [D-2 (1.5-3.0)]	B291800	10/06/21
21I1839-12 [D-3 (0.25-0.5)]	B291800	10/06/21
21I1839-13 [D-3 (0.5-1.5)]	B291800	10/06/21
21I1839-14 [D-4 (0.25-0.5)]	B291800	10/06/21
21I1839-15 [D-4 (0.5-1.5)]	B291800	10/06/21
21I1839-16 [D-4 (1.5-3)]	B291800	10/06/21
21I1839-17 [E-1 (0.25-0.5)]	B291800	10/06/21
21I1839-18 [E-1 (0.5-1.5)]	B291800	10/06/21
21I1839-19 [E-1 (1.5-3)]	B291800	10/06/21
21I1839-20 [E-2 (0.25-0.5)]	B291800	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1839-01 [B-2 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-02 [B-2 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-03 [C-1 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-04 [C-1 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-05 [C-3 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-06 [C-3 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-07 [B-4 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-08 [B-4 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-09 [D-2 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-10 [D-2 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-11 [D-2 (1.5-3.0)]	B291625	10.0	10.0	10/04/21
21I1839-12 [D-3 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-13 [D-3 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-14 [D-4 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-15 [D-4 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-16 [D-4 (1.5-3)]	B291625	10.0	10.0	10/04/21
21I1839-17 [E-1 (0.25-0.5)]	B291625	10.0	10.0	10/04/21
21I1839-18 [E-1 (0.5-1.5)]	B291625	10.0	10.0	10/04/21
21I1839-19 [E-1 (1.5-3)]	B291625	10.0	10.0	10/04/21
21I1839-20 [E-2 (0.25-0.5)]	B291625	10.0	10.0	10/04/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291625 - SW-846 3540C										
Blank (B291625-BLK1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	ND	0.020	mg/Kg wet							
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1221	ND	0.020	mg/Kg wet							
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1232	ND	0.020	mg/Kg wet							
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1242	ND	0.020	mg/Kg wet							
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1248	ND	0.020	mg/Kg wet							
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1254	ND	0.020	mg/Kg wet							
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1260	ND	0.020	mg/Kg wet							
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1262	ND	0.020	mg/Kg wet							
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1268	ND	0.020	mg/Kg wet							
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.184*		mg/Kg wet	0.200		91.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.191*		mg/Kg wet	0.200		95.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.191*		mg/Kg wet	0.200		95.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.177*		mg/Kg wet	0.200		88.4	30-150			
LCS (B291625-BS1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.21	0.020	mg/Kg wet	0.200		104	40-140			
Aroclor-1016 [2C]	0.17	0.020	mg/Kg wet	0.200		86.6	40-140			
Aroclor-1260	0.16	0.020	mg/Kg wet	0.200		79.8	40-140			
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		78.9	40-140			
Surrogate: Decachlorobiphenyl	*0.182*		mg/Kg wet	0.200		90.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.188*		mg/Kg wet	0.200		94.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.194*		mg/Kg wet	0.200		96.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.178*		mg/Kg wet	0.200		89.1	30-150			
LCS Dup (B291625-BSD1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.21	0.020	mg/Kg wet	0.200		107	40-140	2.84	30	
Aroclor-1016 [2C]	0.18	0.020	mg/Kg wet	0.200		89.5	40-140	3.30	30	
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		82.7	40-140	3.62	30	
Aroclor-1260 [2C]	0.17	0.020	mg/Kg wet	0.200		83.4	40-140	5.51	30	
Surrogate: Decachlorobiphenyl	*0.193*		mg/Kg wet	0.200		96.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.196*		mg/Kg wet	0.200		98.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.206*		mg/Kg wet	0.200		103	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.190*		mg/Kg wet	0.200		95.0	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291625 - SW-846 3540C										
Matrix Spike (B291625-MS1)	**Source: 21I1839-06**			Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.27	0.090	mg/Kg dry	0.225	ND	122	40-140			
Aroclor-1016 [2C]	0.22	0.090	mg/Kg dry	0.225	ND	97.2	40-140			
Aroclor-1260	0.20	0.090	mg/Kg dry	0.225	ND	87.2	40-140			
Aroclor-1260 [2C]	0.19	0.090	mg/Kg dry	0.225	ND	84.9	40-140			
Surrogate: Decachlorobiphenyl	*0.201*		mg/Kg dry	0.225		89.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.198*		mg/Kg dry	0.225		87.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.223*		mg/Kg dry	0.225		99.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.211*		mg/Kg dry	0.225		94.0	30-150			
Matrix Spike Dup (B291625-MSD1)	**Source: 21I1839-06**			Prepared: 10/04/21 Analyzed: 10/06/21						
Aroclor-1016	0.26	0.090	mg/Kg dry	0.225	ND	116	40-140	4.65	50	
Aroclor-1016 [2C]	0.22	0.090	mg/Kg dry	0.225	ND	99.0	40-140	1.83	50	
Aroclor-1260	0.21	0.090	mg/Kg dry	0.225	ND	94.8	40-140	8.32	50	
Aroclor-1260 [2C]	0.20	0.090	mg/Kg dry	0.225	ND	91.1	40-140	7.14	50	
Surrogate: Decachlorobiphenyl	*0.193*		mg/Kg dry	0.225		85.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.191*		mg/Kg dry	0.225		85.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.222*		mg/Kg dry	0.225		98.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.209*		mg/Kg dry	0.225		93.2	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-1 (0.25-0.5)

Lab Sample ID: 21I1839-03

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.10	33.3
Aroclor-1254	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.18	40.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

C-1 (0.5-1.5)

Lab Sample ID: 21I1839-04

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.055	
	2	0.000	-0.030	0.030	0.060	6.9

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-2 (0.5-1.5)

Lab Sample ID: 21I1839-10

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.23	24.4
Aroclor-1260	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.15	6.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-3 (0.25-0.5)

Lab Sample ID: 21I1839-12

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1242	1	0.000	-0.030	0.030	0.42	
	2	0.000	-0.030	0.030	0.30	33.3

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-4 (0.25-0.5)

Lab Sample ID: 21I1839-14

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.037	
	2	0.000	-0.030	0.030	0.042	12.7

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-4 (0.5-1.5)

Lab Sample ID: 21I1839-15

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.049	
	2	0.000	-0.030	0.030	0.043	13.0
Aroclor-1254	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.14	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.052	
	2	0.000	-0.030	0.030	0.056	7.4

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-4 (1.5-3)

Lab Sample ID: 21I1839-16

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.17	26.7

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

E-2 (0.25-0.5)

Lab Sample ID: 21I1839-20

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.049	
	2	0.000	-0.030	0.030	0.062	21.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291625-BS1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.17	21.1
Aroclor-1260	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.16	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291625-BSD1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.18	15.4
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.17	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B291625-MS1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.27	
	2	0.000	-0.030	0.030	0.22	20.4
Aroclor-1260	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.19	5.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B291625-MSD1

Date(s) Analyzed: 10/06/2021 10/06/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.26	
	2	0.000	-0.030	0.030	0.22	16.7
Aroclor-1260	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.20	4.9

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

O-04	Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1839

con-test A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 1 of 17

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 369 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
1	B-2 (0.25-0.5)	9/29	8:05	Grab	S	U		1				X
2	B-2 (0.5-1.5)	↓	8:08	Grab	S	U		1				X
3	C-1 (0.25-0.5)	↓	8:10	Grab	S	U		1				X
4	C-1 (0.5-1.5)	↓	8:15	Grab	S	U		1				X
5	C-3 (0.25-0.5)	↓	8:20	Grab	S	U		1				X
6	C-3 (0.5-1.5)	↓	8:25	Grab	S	U		1				X
7	B-4 (0.25-0.5)	↓	8:28	Grab	S	U		1				X
8	B-4 (0.5-1.5)	↓	8:30	Grab	S	U		1				X
9	D-2 (0.25-0.5)	↓	8:35	Grab	S	U		1				X
10	D-2 (0.5-1.5)	↓	8:39	Grab	S	U		1				X

Relinquished by: (signature)	Date/Time: 9/30 17:00
Received by: (signature)	Date/Time: 9/30/21 1200
Relinquished by: (signature)	Date/Time: 9/30/21 1855
Received by: (signature) 2,3,4,8	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SPS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

²Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

21I1839

con-test® A Pace Analytical® Laboratory

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 4_01/08/2020

Page 2 of 17

Company Name: Wilcox and Barton, Inc.
Address: #1B Commons Drive Unit 12B Londonderry, NH
Phone: 603 369 4190 [redacted]
Project Name:
Project Location: 375 Banfield Rd, Portsmouth NH
Project Number: BANF0005
Project Manager: Bill Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: B. Dutra

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCB 8082 with soxhlet extraction (3540)
11	D-2 (1.5-3.0)	9/29	8:40	Grab	S	U		1				X
12	D-3 (0.25-0.5)		8:45	Grab	S	U		1				X
13	D-3 (0.5-1.5)		8:47	Grab	S	U		1				X
14	D-4 (0.25-0.5)		8:51	Grab	S	U		1				X
15	D-4 (0.5-1.5)		8:54	Grab	S	U		1				X
16	D-4 (1.5-3)		8:57	Grab	S	U		1				X
17	E-1 (0.25-0.5)		9:00	Grab	S	U		1				X
18	E-1 (0.5-1.5)		9:03	Grab	S	U		1				X
19	E-1 (1.5-3)		9:06	Grab	S	U		1				X
20	E-2 (0.25-0.5)		9:10	Grab	S	U		1				X

² Preservation Code

Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time:
	9/30 17:00
Received by: (signature)	Date/Time: 9/30/21 1700
Relinquished by: (signature)	Date/Time: 9/30/21 1815
Received by: (signature)	Date/Time: 9/30/21 1855
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: A pricing

Detection Limit Requirements
MA
CT
Other SFS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples____________

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Wilcox & Barton

Received By RLF Date 9/30/21 Time 1855

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___

Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T

By Gun # 3 Actual Temp - 2.3, 4.8°C

By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ___

Are there Rushes? F Who was notified? ___

Are there Short Holds? F Who was notified? ___

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? Acid NA Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		[✓ 4oz] Amb/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 11, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21J0086

Enclosed are results of analyses for samples as received by the laboratory on October 1, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/11/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J0086

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
G-14 (0.25-0.5)	21J0086-01	Soil		SM 2540G SW-846 8082A	
G-14 (0.5-1.5)	21J0086-02	Soil		SM 2540G SW-846 8082A	
H-5 (0.25-0.5)	21J0086-03	Soil		SM 2540G SW-846 8082A	
H-5 (0.5-1.5)	21J0086-04	Soil		SM 2540G SW-846 8082A	
H-5 (1.5-3)	21J0086-05	Soil		SM 2540G SW-846 8082A	
II-4 (0.25-0.5)	21J0086-06	Soil		SM 2540G SW-846 8082A	
II-4 (0.5-1.5)	21J0086-07	Soil		SM 2540G SW-846 8082A	
II-4 (1.5-3)	21J0086-08	Soil		SM 2540G SW-846 8082A	
I-5 (0.25-0.5)	21J0086-09	Soil		SM 2540G SW-846 8082A	
I-5 (0.5-1.5)	21J0086-10	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Daren J. Damboragian
Director of Operations

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: G-14 (0.25-0.5) Sampled: 10/1/2021 15:10

Sample ID: 21J0086-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1221 [1]	ND	0.087	0.066	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1232 [1]	ND	0.087	0.079	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1242 [1]	ND	0.087	0.066	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1248 [1]	ND	0.087	0.031	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1260 [1]	ND	0.087	0.048	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:22	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	103	30-150		10/7/21 16:22
Decachlorobiphenyl [2]	93.0	30-150		10/7/21 16:22
Tetrachloro-m-xylene [1]	96.9	30-150		10/7/21 16:22
Tetrachloro-m-xylene [2]	82.1	30-150		10/7/21 16:22

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: G-14 (0.25-0.5)   Sampled: 10/1/2021 15:10

Sample ID: 21J0086-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.5		% Wt	1		SM 2540G	10/6/21	10/7/21 15:41	TDK

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0086
Date Received: 10/1/2021
Field Sample #: G-14 (0.5-1.5)
Sampled: 10/1/2021 15:15
Sample ID: 21J0086-02
Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1232 [1]	ND	0.088	0.079	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1248 [1]	ND	0.088	0.031	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1260 [1]	ND	0.088	0.048	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM
Aroclor-1268 [1]	ND	0.088	0.070	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:39	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	107	30-150		10/7/21 16:39
Decachlorobiphenyl [2]	96.6	30-150		10/7/21 16:39
Tetrachloro-m-xylene [1]	102	30-150		10/7/21 16:39
Tetrachloro-m-xylene [2]	86.6	30-150		10/7/21 16:39

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: G-14 (0.5-1.5)
Sampled: 10/1/2021 15:15

Sample ID: 21J0086-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.2		% Wt	1		SM 2540G	10/6/21	10/7/21 15:41	TDK

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: H-5 (0.25-0.5) Sampled: 10/1/2021 14:20

Sample ID: 21J0086-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.095	0.043	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1221 [1]	ND	0.095	0.071	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1232 [1]	ND	0.095	0.085	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1242 [1]	ND	0.095	0.071	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1248 [1]	ND	0.095	0.033	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1254 [1]	ND	0.095	0.038	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1260 [1]	ND	0.095	0.052	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1262 [1]	ND	0.095	0.047	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM
Aroclor-1268 [1]	ND	0.095	0.076	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 16:56	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	107	30-150		10/7/21 16:56
Decachlorobiphenyl [2]	97.5	30-150		10/7/21 16:56
Tetrachloro-m-xylene [1]	102	30-150		10/7/21 16:56
Tetrachloro-m-xylene [2]	86.3	30-150		10/7/21 16:56

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: H-5 (0.25-0.5) Sampled: 10/1/2021 14:20

Sample ID: 21J0086-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:41	TDK

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: H-5 (0.5-1.5) Sampled: 10/1/2021 14:30

Sample ID: 21J0086-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.085	0.038	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1221 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1232 [1]	ND	0.085	0.077	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1242 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1248 [1]	ND	0.085	0.030	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1254 [1]	ND	0.085	0.034	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1260 [1]	ND	0.085	0.047	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1262 [1]	ND	0.085	0.043	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM
Aroclor-1268 [1]	ND	0.085	0.068	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:14	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	102	30-150		10/7/21 17:14
Decachlorobiphenyl [2]	92.8	30-150		10/7/21 17:14
Tetrachloro-m-xylene [1]	97.7	30-150		10/7/21 17:14
Tetrachloro-m-xylene [2]	82.2	30-150		10/7/21 17:14

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: H-5 (0.5-1.5)   Sampled: 10/1/2021 14:30

Sample ID: 21J0086-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.1		% Wt	1		SM 2540G	10/6/21	10/7/21 15:42	TDK

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: H-5 (1.5-3)　Sampled: 10/1/2021 14:40

Sample ID: 21J0086-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.086	0.039	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1221 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1232 [1]	ND	0.086	0.078	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1242 [1]	ND	0.086	0.065	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1248 [1]	ND	0.086	0.030	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1254 [1]	ND	0.086	0.034	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1260 [1]	ND	0.086	0.047	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1262 [1]	ND	0.086	0.043	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM
Aroclor-1268 [1]	ND	0.086	0.069	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:31	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	97.8	30-150		10/7/21 17:31
Decachlorobiphenyl [2]	89.0	30-150		10/7/21 17:31
Tetrachloro-m-xylene [1]	89.0	30-150		10/7/21 17:31
Tetrachloro-m-xylene [2]	74.8	30-150		10/7/21 17:31

Project Location: 375 Banfield Rd, Portsmouth, NH　　Sample Description:　　Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: H-5 (1.5-3)　　Sampled: 10/1/2021 14:40

Sample ID: 21J0086-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.8		% Wt	1		SM 2540G	10/6/21	10/7/21 15:42	TDK

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: II-4 (0.25-0.5) Sampled: 10/1/2021 15:10

Sample ID: 21J0086-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.082	0.037	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1221 [1]	ND	0.082	0.061	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1232 [1]	ND	0.082	0.074	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1242 [1]	ND	0.082	0.061	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1248 [1]	ND	0.082	0.029	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1254 [1]	ND	0.082	0.033	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1260 [1]	ND	0.082	0.045	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1262 [1]	ND	0.082	0.041	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM
Aroclor-1268 [1]	ND	0.082	0.065	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 17:49	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	99.6	30-150		10/7/21 17:49
Decachlorobiphenyl [2]	89.9	30-150		10/7/21 17:49
Tetrachloro-m-xylene [1]	84.4	30-150		10/7/21 17:49
Tetrachloro-m-xylene [2]	71.0	30-150		10/7/21 17:49

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: II-4 (0.25-0.5)
Sampled: 10/1/2021 15:10

Sample ID: 21J0086-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.2		% Wt	1		SM 2540G	10/6/21	10/7/21 15:43	TDK

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: II-4 (0.5-1.5)　Sampled: 10/1/2021 15:20

Sample ID: 21J0086-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.084	0.038	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1221 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1232 [1]	ND	0.084	0.076	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1242 [1]	ND	0.084	0.063	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1248 [1]	ND	0.084	0.029	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1254 [1]	ND	0.084	0.034	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1260 [1]	ND	0.084	0.046	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1262 [1]	ND	0.084	0.042	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM
Aroclor-1268 [1]	ND	0.084	0.067	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:06	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	106	30-150		10/7/21 18:06
Decachlorobiphenyl [2]	95.4	30-150		10/7/21 18:06
Tetrachloro-m-xylene [1]	97.3	30-150		10/7/21 18:06
Tetrachloro-m-xylene [2]	82.1	30-150		10/7/21 18:06

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: II-4 (0.5-1.5)   Sampled: 10/1/2021 15:20

Sample ID: 21J0086-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.3		% Wt	1		SM 2540G	10/6/21	10/7/21 15:43	TDK

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: II-4 (1.5-3) Sampled: 10/1/2021 15:30

Sample ID: 21J0086-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.085	0.038	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1221 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1232 [1]	ND	0.085	0.077	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1242 [1]	ND	0.085	0.064	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1248 [1]	ND	0.085	0.030	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1254 [1]	ND	0.085	0.034	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1260 [1]	ND	0.085	0.047	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1262 [1]	ND	0.085	0.043	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM
Aroclor-1268 [1]	ND	0.085	0.068	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:24	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Analyzed
Decachlorobiphenyl [1]	100	30-150		10/7/21 18:24
Decachlorobiphenyl [2]	90.8	30-150		10/7/21 18:24
Tetrachloro-m-xylene [1]	94.5	30-150		10/7/21 18:24
Tetrachloro-m-xylene [2]	79.6	30-150		10/7/21 18:24

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: II-4 (1.5-3)   Sampled: 10/1/2021 15:30

Sample ID: 21J0086-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	93.8		% Wt	1		SM 2540G	10/6/21	10/7/21 15:43	TDK

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: I-5 (0.25-0.5)   Sampled: 10/1/2021 14:55

Sample ID: 21J0086-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	0.041	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1221 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1232 [1]	ND	0.091	0.082	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1242 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1248 [1]	ND	0.091	0.032	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1254 [1]	ND	0.091	0.037	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1260 [1]	ND	0.091	0.050	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1262 [1]	ND	0.091	0.046	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM
Aroclor-1268 [1]	ND	0.091	0.073	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:41	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	100	30-150		10/7/21 18:41
Decachlorobiphenyl [2]	90.9	30-150		10/7/21 18:41
Tetrachloro-m-xylene [1]	93.3	30-150		10/7/21 18:41
Tetrachloro-m-xylene [2]	78.8	30-150		10/7/21 18:41

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0086
Date Received: 10/1/2021
Field Sample #: I-5 (0.25-0.5)
Sampled: 10/1/2021 14:55
Sample ID: 21J0086-09
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.6		% Wt	1		SM 2540G	10/6/21	10/7/21 15:44	TDK

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: I-5 (0.5-1.5)　Sampled: 10/1/2021 15:00

Sample ID: 21J0086-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.090	0.040	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1221 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1232 [1]	ND	0.090	0.081	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1242 [1]	ND	0.090	0.067	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1248 [1]	ND	0.090	0.031	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1254 [2]	0.038	0.090	0.036	mg/Kg dry	4	J	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1260 [1]	0.057	0.090	0.049	mg/Kg dry	4	J	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1262 [1]	ND	0.090	0.045	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:59	SFM
Aroclor-1268 [1]	ND	0.090	0.072	mg/Kg dry	4	U	SW-846 8082A	10/5/21	10/7/21 18:59	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	101	30-150		10/7/21 18:59
Decachlorobiphenyl [2]	91.9	30-150		10/7/21 18:59
Tetrachloro-m-xylene [1]	101	30-150		10/7/21 18:59
Tetrachloro-m-xylene [2]	84.8	30-150		10/7/21 18:59

Project Location: 375 Banfield Rd, Portsmouth, NH　　Sample Description:　　Work Order: 21J0086

Date Received: 10/1/2021

Field Sample #: I-5 (0.5-1.5)　　Sampled: 10/1/2021 15:00

Sample ID: 21J0086-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.1		% Wt	1		SM 2540G	10/6/21	10/7/21 15:44	TDK

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21J0086-01 [G-14 (0.25-0.5)]	B291896	10/06/21
21J0086-02 [G-14 (0.5-1.5)]	B291896	10/06/21
21J0086-03 [H-5 (0.25-0.5)]	B291896	10/06/21
21J0086-04 [H-5 (0.5-1.5)]	B291896	10/06/21
21J0086-05 [H-5 (1.5-3)]	B291896	10/06/21
21J0086-06 [II-4 (0.25-0.5)]	B291896	10/06/21
21J0086-07 [II-4 (0.5-1.5)]	B291896	10/06/21
21J0086-08 [II-4 (1.5-3)]	B291896	10/06/21
21J0086-09 [I-5 (0.25-0.5)]	B291896	10/06/21
21J0086-10 [I-5 (0.5-1.5)]	B291896	10/06/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0086-01 [G-14 (0.25-0.5)]	B291790	10.1	10.0	10/05/21
21J0086-02 [G-14 (0.5-1.5)]	B291790	10.1	10.0	10/05/21
21J0086-03 [H-5 (0.25-0.5)]	B291790	10.0	10.0	10/05/21
21J0086-04 [H-5 (0.5-1.5)]	B291790	10.2	10.0	10/05/21
21J0086-05 [H-5 (1.5-3)]	B291790	10.0	10.0	10/05/21
21J0086-06 [II-4 (0.25-0.5)]	B291790	10.4	10.0	10/05/21
21J0086-07 [II-4 (0.5-1.5)]	B291790	10.1	10.0	10/05/21
21J0086-08 [II-4 (1.5-3)]	B291790	10.0	10.0	10/05/21
21J0086-09 [I-5 (0.25-0.5)]	B291790	10.1	10.0	10/05/21
21J0086-10 [I-5 (0.5-1.5)]	B291790	10.0	10.0	10/05/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291790 - SW-846 3540C										
Blank (B291790-BLK1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.212*		mg/Kg wet	0.200		106	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.200*		mg/Kg wet	0.200		100	30-150			
Surrogate: Tetrachloro-m-xylene	*0.198*		mg/Kg wet	0.200		98.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.171*		mg/Kg wet	0.200		85.3	30-150			
LCS (B291790-BS1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	0.19	0.020	mg/Kg wet	0.200		92.5	40-140			
Aroclor-1016 [2C]	0.16	0.020	mg/Kg wet	0.200		78.0	40-140			
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		86.4	40-140			
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		78.4	40-140			
Surrogate: Decachlorobiphenyl	*0.210*		mg/Kg wet	0.200		105	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.197*		mg/Kg wet	0.200		98.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.200*		mg/Kg wet	0.200		99.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.169*		mg/Kg wet	0.200		84.7	30-150			
LCS Dup (B291790-BSD1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Aroclor-1016	0.18	0.020	mg/Kg wet	0.200		90.5	40-140	2.18	30	
Aroclor-1260	0.17	0.020	mg/Kg wet	0.200		86.3	40-140	0.0324	30	
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		77.8	40-140	0.702	30	
Surrogate: Decachlorobiphenyl	*0.207*		mg/Kg wet	0.200		103	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.193*		mg/Kg wet	0.200		96.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.178*		mg/Kg wet	0.200		89.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.152*		mg/Kg wet	0.200		75.9	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

I-5 (0.5-1.5)

Lab Sample ID: 21J0086-10

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.057	
	2	0.000	-0.030	0.030	0.057	0.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B291790-BS1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.16	17.1
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B291790-BSD1

Date(s) Analyzed: 10/07/2021 10/07/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	**Certifications**
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

con-test® ANALYTICAL LABORATORY

2150086

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

Doc # 381 Rev 1_03242017

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: Wilcox & Barton Inc.
Address: 1B Commerce Dr, Unit 12B, Londonderry, NH
Phone: 603-569-4190
Project Name: BANF0005
Project Location: 375 Banfield Rd, Portsmouth, NH
Project Number: BANF0005
Project Manager: B. Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard@
Fax To #: wilcoxandbarton.com

# of Containers	1
² Preservation Code	I
³ Container Code	G

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	¹Matrix Code	Conc Code	PCBS (Soxhlet ext.)
1	G-14 (0.25-0.5)	10/1	15:10		X	S	U	X
2	G-14 (0.5-1.5)		15:15		X	S	U	X
3	H-5 (0.25-0.5)		14:20		X	S	U	X
4	H-5 (0.5-1.5)		14:30		X	S	U	X
5	H-5 (1.5-3)		14:40		X	S	U	X
6	II-4 (0.25-0.5)		15:10		X	S	U	X
7	II-4 (0.5-1.5)		15:20		X	S	U	X
8	II-4 (1.5-3)		15:30		X	S	U	X
9	I-5 (0.25-0.5)		14:55		X	S	U	X
10	I-5 (0.5-1.5)		15:00		X	S	U	X

Comments:
Ⓐ

Please use the following codes to indicate possible sample concentration within the **Conc Code** column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

³ **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Relinquished by: (signature)	Date/Time: 10/1/21 15:45
Received by: (signature) Lacey Volk	Date/Time: 10/1/21 1550
Relinquished by: (signature) Lacey Volk	Date/Time: 10/1/21 1925
eived by: (signature) 23	Date/Time: 10/1/21 1925
nquished by: (signature)	Date/Time:
eived by: (signature)	Date/Time:

Detection Limit Requirements
MA
CT
Other: SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

con-test® ANALYTICAL LABORATORY
www.contestlabs.com

NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ *AIHA-LAP, LLC*

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W&B
Received By ar Date 10/1/21 Time 1925

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T
By Gun # 2 Actual Temp - 2.3
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? NA Acid ___ Base ___

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	10
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 12, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21J0208

Enclosed are results of analyses for samples as received by the laboratory on October 5, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/12/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J0208

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
W-9 (0.25-0.5)	21J0208-01	Soil		SM 2540G SW-846 8082A	
W-9 (0.5-1.5)	21J0208-02	Soil		SM 2540G SW-846 8082A	
V-8 (0.25-0.5)	21J0208-03	Soil		SM 2540G SW-846 8082A	
V-8 (0.5-1.5)	21J0208-04	Soil		SM 2540G SW-846 8082A	
K-15 (0.25-0.5)	21J0208-05	Soil		SM 2540G SW-846 8082A	
K-15 (0.5-1.5)	21J0208-06	Soil		SM 2540G SW-846 8082A	
K-14 (0.25-0.5)	21J0208-07	Soil		SM 2540G SW-846 8082A	
K-14 (0.5-1.5)	21J0208-08	Soil		SM 2540G SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: W-9 (0.25-0.5)   Sampled: 10/4/2021 11:10

Sample ID: 21J0208-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	0.048	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1221 [1]	ND	0.11	0.081	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1232 [1]	ND	0.11	0.097	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1242 [1]	ND	0.11	0.081	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1248 [1]	ND	0.11	0.038	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1254 [2]	0.37	0.11	0.043	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1260 [1]	ND	0.11	0.059	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1262 [1]	ND	0.11	0.054	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG
Aroclor-1268 [1]	ND	0.11	0.086	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 12:42	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	133	30-150		10/12/21 12:42
Decachlorobiphenyl [2]	101	30-150		10/12/21 12:42
Tetrachloro-m-xylene [1]	98.4	30-150		10/12/21 12:42
Tetrachloro-m-xylene [2]	91.4	30-150		10/12/21 12:42

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: W-9 (0.25-0.5)
Sampled: 10/4/2021 11:10

Sample ID: 21J0208-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	72.9		% Wt	1		SM 2540G	10/8/21	10/9/21 11:58	BMB

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: W-9 (0.5-1.5)   Sampled: 10/4/2021 11:15

Sample ID: 21J0208-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.098	0.044	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1221 [1]	ND	0.098	0.074	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1232 [1]	ND	0.098	0.088	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1242 [1]	ND	0.098	0.074	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1248 [1]	ND	0.098	0.034	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1254 [1]	ND	0.098	0.039	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1260 [1]	ND	0.098	0.054	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1262 [1]	ND	0.098	0.049	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG
Aroclor-1268 [1]	ND	0.098	0.078	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:00	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	118	30-150		10/12/21 13:00
Decachlorobiphenyl [2]	114	30-150		10/12/21 13:00
Tetrachloro-m-xylene [1]	91.7	30-150		10/12/21 13:00
Tetrachloro-m-xylene [2]	85.0	30-150		10/12/21 13:00

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: W-9 (0.5-1.5)
Sampled: 10/4/2021 11:15

Sample ID: 21J0208-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.0		% Wt	1		SM 2540G	10/8/21	10/9/21 11:58	BMB

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: V-8 (0.25-0.5)   Sampled: 10/4/2021 11:20

Sample ID: 21J0208-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	0.044	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1221 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1232 [1]	ND	0.097	0.087	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1242 [1]	ND	0.097	0.073	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1248 [1]	ND	0.097	0.034	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1254 [1]	ND	0.097	0.039	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1260 [1]	ND	0.097	0.053	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1262 [1]	ND	0.097	0.048	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG
Aroclor-1268 [1]	ND	0.097	0.077	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:13	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	104	30-150		10/12/21 13:13
Decachlorobiphenyl [2]	111	30-150		10/12/21 13:13
Tetrachloro-m-xylene [1]	93.2	30-150		10/12/21 13:13
Tetrachloro-m-xylene [2]	84.5	30-150		10/12/21 13:13

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: V-8 (0.25-0.5)　Sampled: 10/4/2021 11:20

Sample ID: 21J0208-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.3		% Wt	1		SM 2540G	10/8/21	10/9/21 11:58	BMB

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: V-8 (0.5-1.5)   Sampled: 10/4/2021 11:25

Sample ID: 21J0208-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.046	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1221 [1]	ND	0.10	0.077	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1232 [1]	ND	0.10	0.093	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1242 [1]	ND	0.10	0.077	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1248 [1]	ND	0.10	0.036	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1254 [1]	ND	0.10	0.041	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1260 [1]	ND	0.10	0.057	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1262 [1]	ND	0.10	0.052	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG
Aroclor-1268 [1]	ND	0.10	0.082	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:25	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	107	30-150		10/12/21 13:25
Decachlorobiphenyl [2]	108	30-150		10/12/21 13:25
Tetrachloro-m-xylene [1]	90.5	30-150		10/12/21 13:25
Tetrachloro-m-xylene [2]	82.2	30-150		10/12/21 13:25

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: V-8 (0.5-1.5)
Sampled: 10/4/2021 11:25

Sample ID: 21J0208-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	75.4		% Wt	1		SM 2540G	10/8/21	10/9/21 11:58	BMB

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-15 (0.25-0.5) Sampled: 10/4/2021 11:55

Sample ID: 21J0208-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	0.049	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1221 [1]	ND	0.11	0.082	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1232 [1]	ND	0.11	0.099	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1242 [1]	ND	0.11	0.082	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1248 [1]	ND	0.11	0.038	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1254 [1]	ND	0.11	0.044	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1260 [1]	ND	0.11	0.060	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1262 [1]	ND	0.11	0.055	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG
Aroclor-1268 [1]	ND	0.11	0.088	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:38	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	74.0	30-150		10/12/21 13:38
Decachlorobiphenyl [2]	66.7	30-150		10/12/21 13:38
Tetrachloro-m-xylene [1]	88.8	30-150		10/12/21 13:38
Tetrachloro-m-xylene [2]	83.8	30-150		10/12/21 13:38

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-15 (0.25-0.5)   Sampled: 10/4/2021 11:55

Sample ID: 21J0208-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	72.9		% Wt	1		SM 2540G	10/8/21	10/9/21 11:58	BMB

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-15 (0.5-1.5) Sampled: 10/4/2021 12:00

Sample ID: 21J0208-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.093	0.042	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1221 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1232 [1]	ND	0.093	0.084	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1242 [1]	ND	0.093	0.070	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1248 [1]	ND	0.093	0.033	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1254 [1]	ND	0.093	0.037	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1260 [1]	ND	0.093	0.051	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1262 [1]	ND	0.093	0.047	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG
Aroclor-1268 [1]	ND	0.093	0.075	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 13:56	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	74.9	30-150		10/12/21 13:56
Decachlorobiphenyl [2]	68.7	30-150		10/12/21 13:56
Tetrachloro-m-xylene [1]	90.0	30-150		10/12/21 13:56
Tetrachloro-m-xylene [2]	83.5	30-150		10/12/21 13:56

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-15 (0.5-1.5) Sampled: 10/4/2021 12:00

Sample ID: 21J0208-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	82.3		% Wt	1		SM 2540G	10/8/21	10/9/21 11:58	BMB

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-14 (0.25-0.5) Sampled: 10/4/2021 12:05

Sample ID: 21J0208-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.099	0.045	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1221 [1]	ND	0.099	0.075	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1232 [1]	ND	0.099	0.089	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1242 [1]	ND	0.099	0.075	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1248 [1]	ND	0.099	0.035	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1254 [1]	0.20	0.099	0.040	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1260 [1]	0.33	0.099	0.055	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1262 [1]	ND	0.099	0.050	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:14	TG
Aroclor-1268 [1]	ND	0.099	0.080	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:14	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	86.4	30-150		10/12/21 14:14
Decachlorobiphenyl [2]	73.7	30-150		10/12/21 14:14
Tetrachloro-m-xylene [1]	92.3	30-150		10/12/21 14:14
Tetrachloro-m-xylene [2]	86.0	30-150		10/12/21 14:14

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-14 (0.25-0.5)
Sampled: 10/4/2021 12:05

Sample ID: 21J0208-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.4		% Wt	1		SM 2540G	10/8/21	10/9/21 12:01	BMB

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-14 (0.5-1.5) Sampled: 10/4/2021 12:10

Sample ID: 21J0208-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.099	0.045	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1221 [1]	ND	0.099	0.074	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1232 [1]	ND	0.099	0.089	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1242 [1]	ND	0.099	0.074	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1248 [1]	ND	0.099	0.035	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1254 [1]	ND	0.099	0.040	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1260 [1]	ND	0.099	0.055	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1262 [1]	ND	0.099	0.050	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG
Aroclor-1268 [1]	ND	0.099	0.079	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 14:32	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	70.6	30-150		10/12/21 14:32
Decachlorobiphenyl [2]	63.7	30-150		10/12/21 14:32
Tetrachloro-m-xylene [1]	84.5	30-150		10/12/21 14:32
Tetrachloro-m-xylene [2]	79.2	30-150		10/12/21 14:32

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0208

Date Received: 10/5/2021

Field Sample #: K-14 (0.5-1.5)
Sampled: 10/4/2021 12:10

Sample ID: 21J0208-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.7		% Wt	1		SM 2540G	10/8/21	10/9/21 12:01	BMB

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21J0208-01 [W-9 (0.25-0.5)]	B292079	10/08/21
21J0208-02 [W-9 (0.5-1.5)]	B292079	10/08/21
21J0208-03 [V-8 (0.25-0.5)]	B292079	10/08/21
21J0208-04 [V-8 (0.5-1.5)]	B292079	10/08/21
21J0208-05 [K-15 (0.25-0.5)]	B292079	10/08/21
21J0208-06 [K-15 (0.5-1.5)]	B292079	10/08/21
21J0208-07 [K-14 (0.25-0.5)]	B292079	10/08/21
21J0208-08 [K-14 (0.5-1.5)]	B292079	10/08/21

Prep Method: SW-846 3540C **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0208-01 [W-9 (0.25-0.5)]	B292098	10.2	10.0	10/09/21
21J0208-02 [W-9 (0.5-1.5)]	B292098	10.2	10.0	10/09/21
21J0208-03 [V-8 (0.25-0.5)]	B292098	10.3	10.0	10/09/21
21J0208-04 [V-8 (0.5-1.5)]	B292098	10.3	10.0	10/09/21
21J0208-05 [K-15 (0.25-0.5)]	B292098	10.0	10.0	10/09/21
21J0208-06 [K-15 (0.5-1.5)]	B292098	10.4	10.0	10/09/21
21J0208-07 [K-14 (0.25-0.5)]	B292098	10.4	10.0	10/09/21
21J0208-08 [K-14 (0.5-1.5)]	B292098	10.0	10.0	10/09/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292098 - SW-846 3540C										
Blank (B292098-BLK1)				Prepared: 10/09/21 Analyzed: 10/12/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.170*		mg/Kg wet	0.200		85.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.148*		mg/Kg wet	0.200		73.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.170*		mg/Kg wet	0.200		84.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.150*		mg/Kg wet	0.200		75.2	30-150			
LCS (B292098-BS1)				Prepared: 10/09/21 Analyzed: 10/12/21						
Aroclor-1016	0.16	0.020	mg/Kg wet	0.200		81.9	40-140			
Aroclor-1016 [2C]	0.15	0.020	mg/Kg wet	0.200		73.3	40-140			
Aroclor-1260	0.18	0.020	mg/Kg wet	0.200		89.4	40-140			
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		75.7	40-140			
Surrogate: Decachlorobiphenyl	*0.171*		mg/Kg wet	0.200		85.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.150*		mg/Kg wet	0.200		74.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.174*		mg/Kg wet	0.200		86.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.157*		mg/Kg wet	0.200		78.5	30-150			
LCS Dup (B292098-BSD1)				Prepared: 10/09/21 Analyzed: 10/12/21						
Aroclor-1016	0.17	0.020	mg/Kg wet	0.200		87.2	40-140	6.27	30	
Aroclor-1016 [2C]	0.15	0.020	mg/Kg wet	0.200		77.2	40-140	5.15	30	
Aroclor-1260	0.19	0.020	mg/Kg wet	0.200		93.8	40-140	4.84	30	
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		80.5	40-140	6.13	30	
Surrogate: Decachlorobiphenyl	*0.186*		mg/Kg wet	0.200		93.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.162*		mg/Kg wet	0.200		80.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.191*		mg/Kg wet	0.200		95.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.173*		mg/Kg wet	0.200		86.3	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292098 - SW-846 3540C										
Matrix Spike (B292098-MS1)	**Source: 21J0208-01**		Prepared: 10/09/21 Analyzed: 10/12/21							
Aroclor-1016	0.36	0.11	mg/Kg dry	0.269	ND	134	40-140			
Aroclor-1016 [2C]	0.32	0.11	mg/Kg dry	0.269	ND	120	40-140			
Aroclor-1260	0.34	0.11	mg/Kg dry	0.269	ND	128	40-140			
Aroclor-1260 [2C]	0.33	0.11	mg/Kg dry	0.269	ND	122	40-140			
Surrogate: Decachlorobiphenyl	*0.269*		mg/Kg dry	0.269		100	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.248*		mg/Kg dry	0.269		92.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.270*		mg/Kg dry	0.269		100	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.247*		mg/Kg dry	0.269		91.8	30-150			
Matrix Spike Dup (B292098-MSD1)	**Source: 21J0208-01**		Prepared: 10/09/21 Analyzed: 10/12/21							
Aroclor-1016	0.36	0.11	mg/Kg dry	0.272	ND	134	40-140	1.10	50	
Aroclor-1016 [2C]	0.31	0.11	mg/Kg dry	0.272	ND	115	40-140	3.60	50	
Aroclor-1260	0.35	0.11	mg/Kg dry	0.272	ND	128	40-140	1.27	50	
Aroclor-1260 [2C]	0.33	0.11	mg/Kg dry	0.272	ND	122	40-140	0.900	50	
Surrogate: Decachlorobiphenyl	*0.289*		mg/Kg dry	0.272		106	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.268*		mg/Kg dry	0.272		98.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.274*		mg/Kg dry	0.272		101	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.253*		mg/Kg dry	0.272		93.0	30-150			

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

W-9 (0.25-0.5)

Lab Sample ID:	21J0208-01	Date(s) Analyzed:	10/12/2021	10/12/2021
Instrument ID (1):		Instrument ID (2):		
GC Column (1):	ID: (mm)	GC Column (2):	ID: (mm)	

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.32	
	2	0.000	-0.030	0.030	0.37	14.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

K-14 (0.25-0.5)

Lab Sample ID: 21J0208-07

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.17	16.2
Aroclor-1260	1	0.000	-0.030	0.030	0.33	
	2	0.000	-0.030	0.030	0.29	12.9

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B292098-BS1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.15	6.5
Aroclor-1260	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.15	18.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B292098-BSD1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.15	12.5
Aroclor-1260	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.16	17.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B292098-MS1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.36	
	2	0.000	-0.030	0.030	0.32	11.8
Aroclor-1260	1	0.000	-0.030	0.030	0.34	
	2	0.000	-0.030	0.030	0.33	5.9

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B292098-MSD1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.36	
	2	0.000	-0.030	0.030	0.31	14.9
Aroclor-1260	1	0.000	-0.030	0.030	0.35	
	2	0.000	-0.030	0.030	0.33	5.9

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	**Certifications**
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21JC208

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 3 of 3

Company Name: Wilcox & Barton, Inc.
Address: 18 Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Road, Portsmouth, NH
Project Number: BANF0005
Project Manager: W. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard & A. Leich

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCBs
1	W-9 (0.25-0.5)	10/4/21	11:10	GRAB	S	V		1				X
2	W-9 (0.5-1.5)	↓	11:15	↓	↓	↓		1				X
3	V-8 (0.25-0.5)	↓	11:20	↓	↓	↓		1				X
4	V-8 (0.5-1.5)	↓	11:25	↓	↓	↓		1				X
5	K-15 (0.25-0.5)	↓	11:55	↓	↓	↓		1				X
6	K-15 (0.5-1.5)	↓	12:00	↓	↓	↓		1				X
7	K-14 (0.25-0.5)	↓	12:05	↓	↓	↓		1				X
8	K-14 (0.5-1.5)	↓	12:10	↓	↓	↓		1				X

² Preservation Code

Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time: 10/5/21 11:40
Received by: (signature)	Date/Time: 10/5/21 1140
Relinquished by: (signature)	Date/Time: 10/5/21 1735
Received by: (signature) 53	Date/Time: 10/5/21 1735
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W+B

Received By Date 10/5/21 Time 1735

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T
By Gun # 5 Actual Temp - 5.3
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? n/a MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid n/a Base n/a

Vials	**#**	**Containers:**	**#**		**#**		**#**
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz [✓ Amb]/Clear	8
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	**#**	**Containers:**	**#**		**#**		**#**
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 14, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Road, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21J0244

Enclosed are results of analyses for samples as received by the laboratory on October 5, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/14/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J0244

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Road, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
X-14 (0.25-0.5)	21J0244-01	Soil		SM 2540G SW-846 8082A	
X-14 (0.5-1.5)	21J0244-02	Soil		SM 2540G SW-846 8082A	
Y-13 (0.25-0.5)	21J0244-03	Soil		SM 2540G SW-846 8082A	
Y-13 (0.5-1.5)	21J0244-04	Soil		SM 2540G SW-846 8082A	
Z-10 (0.25-0.5)	21J0244-05	Soil		SM 2540G SW-846 8082A	
Z-10 (0.5-1.5)	21J0244-06	Soil		SM 2540G SW-846 8082A	
Y-11 (0.25-0.5)	21J0244-07	Soil		SM 2540G SW-846 8082A	
Y-11 (0.5-1.5)	21J0244-08	Soil		SM 2540G SW-846 8082A	
X-12 (0.25-0.5)	21J0244-09	Soil		SM 2540G SW-846 8082A	
X-12 (0.5-1.5)	21J0244-10	Soil		SM 2540G SW-846 8082A	
Z-12 (0.25-0.5)	21J0244-11	Soil		SM 2540G SW-846 8082A	
Z-12 (0.5-1.5)	21J0244-12	Soil		SM 2540G SW-846 8082A	
II-2 (0.25-0.5)	21J0244-13	Soil		SM 2540G SW-846 8082A	
II-2 (0.5-1.5)	21J0244-14	Soil		SM 2540G SW-846 8082A	
D-10 (0.25-0.5)	21J0244-15	Soil		SM 2540G SW-846 8082A	
D-10 (0.5-1.5)	21J0244-16	Soil		SM 2540G SW-846 8082A	
X-10 (0.25-0.5)	21J0244-17	Soil		SM 2540G SW-846 8082A	
X-10 (0.5-1.5)	21J0244-18	Soil		SM 2540G SW-846 8082A	
X-8 (0.25-0.5)	21J0244-19	Soil		SM 2540G SW-846 8082A	
X-8 (0.5-1.5)	21J0244-20	Soil		SM 2540G SW-846 8082A	

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A

Qualifications:

S-24

Surrogate recovery is biased high due to the presence of Aroclor 1268 in the sample. Aroclor 1268 contains decachlorobiphenyl.

Analyte & Samples(s) Qualified:

Decachlorobiphenyl
21J0244-07RE1[Y-11 (0.25-0.5)], 21J0244-17RE1[X-10 (0.25-0.5)]

Decachlorobiphenyl [2C]
21J0244-11RE1[Z-12 (0.25-0.5)], 21J0244-12RE1[Z-12 (0.5-1.5)], 21J0244-17RE1[X-10 (0.25-0.5)]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-14 (0.25-0.5) Sampled: 10/4/2021 08:15

Sample ID: 21J0244-01

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.22	0.099	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1221 [1]	ND	0.22	0.16	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1232 [1]	ND	0.22	0.20	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1242 [1]	ND	0.22	0.16	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1248 [2]	0.19	0.22	0.077	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1254 [2]	1.8	0.22	0.088	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1260 [2]	0.36	0.22	0.12	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1262 [1]	ND	0.22	0.11	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 0:47	JMB
Aroclor-1268 [1]	0.34	0.22	0.18	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 0:47	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	94.5	30-150		10/12/21 0:47
Decachlorobiphenyl [2]	87.7	30-150		10/12/21 0:47
Tetrachloro-m-xylene [1]	91.2	30-150		10/12/21 0:47
Tetrachloro-m-xylene [2]	84.2	30-150		10/12/21 0:47

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-14 (0.25-0.5)
Sampled: 10/4/2021 08:15

Sample ID: 21J0244-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	36.1		% Wt	1		SM 2540G	10/8/21	10/9/21 12:11	BMB

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-14 (0.5-1.5)   Sampled: 10/4/2021 08:25

Sample ID: 21J0244-02

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.13	0.059	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1221 [1]	ND	0.13	0.099	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1232 [1]	ND	0.13	0.12	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1242 [1]	ND	0.13	0.099	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1248 [2]	0.20	0.13	0.046	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1254 [1]	2.0	0.13	0.053	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1260 [1]	0.24	0.13	0.073	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1262 [1]	ND	0.13	0.066	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:05	JMB
Aroclor-1268 [2]	ND	0.13	0.11	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:05	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	91.0	30-150		10/12/21 1:05
Decachlorobiphenyl [2]	85.0	30-150		10/12/21 1:05
Tetrachloro-m-xylene [1]	97.1	30-150		10/12/21 1:05
Tetrachloro-m-xylene [2]	89.0	30-150		10/12/21 1:05

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-14 (0.5-1.5)
Sampled: 10/4/2021 08:25

Sample ID: 21J0244-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	60.0		% Wt	1		SM 2540G	10/8/21	10/9/21 12:11	BMB

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-13 (0.25-0.5) Sampled: 10/4/2021 08:30

Sample ID: 21J0244-03

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.23	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1221 [1]	ND	0.23	0.17	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1232 [1]	ND	0.23	0.21	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1242 [1]	ND	0.23	0.17	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1248 [2]	0.10	0.23	0.080	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1254 [1]	0.25	0.23	0.091	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1260 [1]	0.15	0.23	0.13	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1262 [1]	ND	0.23	0.11	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:23	JMB
Aroclor-1268 [2]	ND	0.23	0.18	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:23	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	80.1	30-150		10/12/21 1:23
Decachlorobiphenyl [2]	105	30-150		10/12/21 1:23
Tetrachloro-m-xylene [1]	72.9	30-150		10/12/21 1:23
Tetrachloro-m-xylene [2]	66.1	30-150		10/12/21 1:23

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-13 (0.25-0.5)   Sampled: 10/4/2021 08:30

Sample ID: 21J0244-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	35.0		% Wt	1		SM 2540G	10/8/21	10/9/21 12:11	BMB

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-13 (0.5-1.5)
Sampled: 10/4/2021 08:35

Sample ID: 21J0244-04

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.29	0.13	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1221 [1]	ND	0.29	0.22	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1232 [1]	ND	0.29	0.26	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1242 [1]	ND	0.29	0.22	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1248 [1]	ND	0.29	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1254 [1]	0.48	0.29	0.12	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1260 [1]	0.16	0.29	0.16	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1262 [1]	ND	0.29	0.15	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:41	JMB
Aroclor-1268 [1]	ND	0.29	0.23	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:41	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	73.4	30-150		10/12/21 1:41
Decachlorobiphenyl [2]	68.9	30-150		10/12/21 1:41
Tetrachloro-m-xylene [1]	83.8	30-150		10/12/21 1:41
Tetrachloro-m-xylene [2]	75.6	30-150		10/12/21 1:41

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-13 (0.5-1.5) Sampled: 10/4/2021 08:35

Sample ID: 21J0244-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	27.1		% Wt	1		SM 2540G	10/8/21	10/9/21 12:11	BMB

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-10 (0.25-0.5) Sampled: 10/4/2021 08:45

Sample ID: 21J0244-05

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	0.053	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1221 [1]	ND	0.12	0.088	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1232 [1]	ND	0.12	0.11	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1242 [1]	ND	0.12	0.088	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1248 [1]	0.090	0.12	0.041	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1254 [1]	0.36	0.12	0.047	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1260 [1]	0.15	0.12	0.064	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1262 [1]	ND	0.12	0.059	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 1:59	JMB
Aroclor-1268 [1]	0.11	0.12	0.094	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 1:59	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	108	30-150		10/12/21 1:59
Decachlorobiphenyl [2]	101	30-150		10/12/21 1:59
Tetrachloro-m-xylene [1]	92.8	30-150		10/12/21 1:59
Tetrachloro-m-xylene [2]	84.9	30-150		10/12/21 1:59

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-10 (0.25-0.5)   Sampled: 10/4/2021 08:45

Sample ID: 21J0244-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	68.3		% Wt	1		SM 2540G	10/8/21	10/9/21 12:11	BMB

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-10 (0.5-1.5)   Sampled: 10/4/2021 08:55

Sample ID: 21J0244-06

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.13	0.057	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1221 [1]	ND	0.13	0.094	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1232 [1]	ND	0.13	0.11	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1242 [1]	ND	0.13	0.094	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1248 [1]	0.053	0.13	0.044	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1254 [1]	0.21	0.13	0.050	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1260 [1]	ND	0.13	0.069	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1262 [1]	ND	0.13	0.063	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:17	JMB
Aroclor-1268 [1]	ND	0.13	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:17	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	41.1	30-150		10/12/21 2:17
Decachlorobiphenyl [2]	40.0	30-150		10/12/21 2:17
Tetrachloro-m-xylene [1]	38.5	30-150		10/12/21 2:17
Tetrachloro-m-xylene [2]	36.0	30-150		10/12/21 2:17

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-10 (0.5-1.5) Sampled: 10/4/2021 08:55

Sample ID: 21J0244-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	61.1		% Wt	1		SM 2540G	10/8/21	10/9/21 12:12	BMB

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-11 (0.25-0.5) Sampled: 10/4/2021 09:00

Sample ID: 21J0244-07

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	0.053	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1221 [1]	ND	0.12	0.089	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1232 [1]	ND	0.12	0.11	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1242 [1]	ND	0.12	0.089	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1248 [1]	ND	0.12	0.041	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1254 [2]	0.21	0.12	0.047	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1260 [1]	0.20	0.12	0.065	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1262 [1]	ND	0.12	0.059	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:28	SFM
Aroclor-1268 [1]	0.48	0.12	0.095	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 12:28	SFM

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	**151**	*	30-150	S-24	10/13/21 12:28
Decachlorobiphenyl [2]	149		30-150		10/13/21 12:28
Tetrachloro-m-xylene [1]	60.1		30-150		10/13/21 12:28
Tetrachloro-m-xylene [2]	47.9		30-150		10/13/21 12:28

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-11 (0.25-0.5) Sampled: 10/4/2021 09:00

Sample ID: 21J0244-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	67.6		% Wt	1		SM 2540G	10/8/21	10/9/21 12:12	BMB

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-11 (0.5-1.5) Sampled: 10/4/2021 09:05

Sample ID: 21J0244-08

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	0.062	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1221 [1]	ND	0.14	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1232 [1]	ND	0.14	0.12	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1242 [1]	ND	0.14	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1248 [1]	ND	0.14	0.048	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1254 [2]	0.10	0.14	0.055	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1260 [1]	0.090	0.14	0.076	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1262 [1]	ND	0.14	0.069	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 2:52	JMB
Aroclor-1268 [2]	0.13	0.14	0.11	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 2:52	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	54.3	30-150		10/12/21 2:52
Decachlorobiphenyl [2]	50.9	30-150		10/12/21 2:52
Tetrachloro-m-xylene [1]	37.1	30-150		10/12/21 2:52
Tetrachloro-m-xylene [2]	34.3	30-150		10/12/21 2:52

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Y-11 (0.5-1.5)   Sampled: 10/4/2021 09:05

Sample ID: 21J0244-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	57.0		% Wt	1		SM 2540G	10/8/21	10/9/21 12:12	BMB

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-12 (0.25-0.5)   Sampled: 10/4/2021 09:10

Sample ID: 21J0244-09

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	0.050	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1221 [1]	ND	0.11	0.084	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1232 [1]	ND	0.11	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1242 [1]	ND	0.11	0.084	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1248 [2]	0.065	0.11	0.039	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1254 [1]	0.13	0.11	0.045	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1260 [1]	0.071	0.11	0.061	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1262 [1]	ND	0.11	0.056	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 4:52	JMB
Aroclor-1268 [1]	0.11	0.11	0.089	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 4:52	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Analyzed
Decachlorobiphenyl [1]	66.9	30-150		10/12/21 4:52
Decachlorobiphenyl [2]	73.5	30-150		10/12/21 4:52
Tetrachloro-m-xylene [1]	53.8	30-150		10/12/21 4:52
Tetrachloro-m-xylene [2]	49.4	30-150		10/12/21 4:52

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-12 (0.25-0.5) Sampled: 10/4/2021 09:10

Sample ID: 21J0244-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	70.3		% Wt	1		SM 2540G	10/8/21	10/9/21 12:12	BMB

Project Location: 375 Banfield Road, Portsmouth, N　Sample Description:　Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-12 (0.5-1.5)　Sampled: 10/4/2021 09:15

Sample ID: 21J0244-10

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	0.052	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1221 [1]	ND	0.12	0.086	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1232 [1]	ND	0.12	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1242 [1]	ND	0.12	0.086	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1248 [2]	0.063	0.12	0.040	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1254 [1]	0.12	0.12	0.046	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1260 [1]	ND	0.12	0.063	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1262 [1]	ND	0.12	0.058	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 5:10	JMB
Aroclor-1268 [1]	ND	0.12	0.092	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 5:10	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	50.3	30-150		10/12/21 5:10
Decachlorobiphenyl [2]	58.1	30-150		10/12/21 5:10
Tetrachloro-m-xylene [1]	48.0	30-150		10/12/21 5:10
Tetrachloro-m-xylene [2]	44.9	30-150		10/12/21 5:10

Project Location: 375 Banfield Road, Portsmouth, N　Sample Description:　Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-12 (0.5-1.5)　Sampled: 10/4/2021 09:15

Sample ID: 21J0244-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	69.5		% Wt	1		SM 2540G	10/8/21	10/9/21 12:12	BMB

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-12 (0.25-0.5)   Sampled: 10/4/2021 09:20

Sample ID: 21J0244-11

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	0.064	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1221 [1]	ND	0.14	0.11	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1232 [1]	ND	0.14	0.13	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1242 [1]	ND	0.14	0.11	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1248 [1]	ND	0.14	0.050	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1254 [2]	0.25	0.14	0.057	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1260 [1]	0.21	0.14	0.078	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1262 [1]	ND	0.14	0.071	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 12:46	SFM
Aroclor-1268 [1]	0.19	0.14	0.11	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 12:46	SFM

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	91.9		30-150		10/13/21 12:46
Decachlorobiphenyl [2]	**200**	*	30-150	S-24	10/13/21 12:46
Tetrachloro-m-xylene [1]	64.2		30-150		10/13/21 12:46
Tetrachloro-m-xylene [2]	47.4		30-150		10/13/21 12:46

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-12 (0.25-0.5)
Sampled: 10/4/2021 09:20

Sample ID: 21J0244-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	56.5		% Wt	1		SM 2540G	10/8/21	10/9/21 12:12	BMB

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-12 (0.5-1.5)   Sampled: 10/4/2021 09:30

Sample ID: 21J0244-12

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.19	0.086	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1221 [1]	ND	0.19	0.14	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1232 [1]	ND	0.19	0.17	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1242 [1]	ND	0.19	0.14	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1248 [1]	ND	0.19	0.067	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1254 [2]	0.35	0.19	0.077	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1260 [1]	0.19	0.19	0.11	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1262 [1]	ND	0.19	0.096	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:03	SFM
Aroclor-1268 [1]	0.17	0.19	0.15	mg/Kg dry	4	J	SW-846 8082A	10/12/21	10/13/21 13:03	SFM

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	100		30-150		10/13/21 13:03
Decachlorobiphenyl [2]	**190**	*	30-150	S-24	10/13/21 13:03
Tetrachloro-m-xylene [1]	81.5		30-150		10/13/21 13:03
Tetrachloro-m-xylene [2]	59.9		30-150		10/13/21 13:03

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: Z-12 (0.5-1.5) Sampled: 10/4/2021 09:30

Sample ID: 21J0244-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	41.8		% Wt	1		SM 2540G	10/8/21	10/9/21 12:12	BMB

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: II-2 (0.25-0.5) Sampled: 10/4/2021 09:50

Sample ID: 21J0244-13

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.087	0.039	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1221 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1232 [1]	ND	0.087	0.078	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1242 [1]	ND	0.087	0.065	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1248 [1]	ND	0.087	0.030	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1254 [1]	ND	0.087	0.035	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1260 [1]	0.059	0.087	0.048	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1262 [1]	ND	0.087	0.044	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB
Aroclor-1268 [1]	ND	0.087	0.070	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:04	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	59.9	30-150		10/12/21 6:04
Decachlorobiphenyl [2]	52.1	30-150		10/12/21 6:04
Tetrachloro-m-xylene [1]	66.9	30-150		10/12/21 6:04
Tetrachloro-m-xylene [2]	62.5	30-150		10/12/21 6:04

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: II-2 (0.25-0.5) Sampled: 10/4/2021 09:50

Sample ID: 21J0244-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.2		% Wt	1		SM 2540G	10/8/21	10/9/21 12:13	BMB

con-test
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: II-2 (0.5-1.5) Sampled: 10/4/2021 10:10

Sample ID: 21J0244-14

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.082	0.037	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1221 [1]	ND	0.082	0.062	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1232 [1]	ND	0.082	0.074	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1242 [1]	ND	0.082	0.062	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1248 [1]	ND	0.082	0.029	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1254 [1]	ND	0.082	0.033	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1260 [1]	ND	0.082	0.045	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1262 [1]	ND	0.082	0.041	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB
Aroclor-1268 [1]	ND	0.082	0.066	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:22	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	74.3	30-150		10/12/21 6:22
Decachlorobiphenyl [2]	66.7	30-150		10/12/21 6:22
Tetrachloro-m-xylene [1]	79.2	30-150		10/12/21 6:22
Tetrachloro-m-xylene [2]	73.7	30-150		10/12/21 6:22

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: II-2 (0.5-1.5)   Sampled: 10/4/2021 10:10

Sample ID: 21J0244-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.5		% Wt	1		SM 2540G	10/8/21	10/9/21 12:13	BMB

Project Location: 375 Banfield Road, Portsmouth, N　Sample Description:　Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: D-10 (0.25-0.5)　Sampled: 10/4/2021 10:35

Sample ID: 21J0244-15

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.091	0.041	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1221 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1232 [1]	ND	0.091	0.082	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1242 [1]	ND	0.091	0.069	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1248 [1]	ND	0.091	0.032	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1254 [2]	0.052	0.091	0.037	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1260 [1]	ND	0.091	0.050	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1262 [1]	ND	0.091	0.046	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB
Aroclor-1268 [1]	ND	0.091	0.073	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:40	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	67.6	30-150		10/12/21 6:40
Decachlorobiphenyl [2]	59.4	30-150		10/12/21 6:40
Tetrachloro-m-xylene [1]	70.6	30-150		10/12/21 6:40
Tetrachloro-m-xylene [2]	65.7	30-150		10/12/21 6:40

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: D-10 (0.25-0.5)
Sampled: 10/4/2021 10:35

Sample ID: 21J0244-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	85.8		% Wt	1		SM 2540G	10/8/21	10/9/21 12:13	BMB

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: D-10 (0.5-1.5) Sampled: 10/4/2021 10:40

Sample ID: 21J0244-16

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.088	0.040	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1221 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1232 [1]	ND	0.088	0.080	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1242 [1]	ND	0.088	0.066	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1248 [2]	0.22	0.088	0.031	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1254 [1]	ND	0.088	0.035	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1260 [1]	ND	0.088	0.049	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1262 [1]	ND	0.088	0.044	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB
Aroclor-1268 [1]	ND	0.088	0.071	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 6:58	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	79.7	30-150		10/12/21 6:58
Decachlorobiphenyl [2]	70.4	30-150		10/12/21 6:58
Tetrachloro-m-xylene [1]	81.1	30-150		10/12/21 6:58
Tetrachloro-m-xylene [2]	75.6	30-150		10/12/21 6:58

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: D-10 (0.5-1.5) Sampled: 10/4/2021 10:40

Sample ID: 21J0244-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.7		% Wt	1		SM 2540G	10/8/21	10/9/21 12:13	BMB

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-10 (0.25-0.5)   Sampled: 10/4/2021 10:45

Sample ID: 21J0244-17

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	0.063	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1221 [1]	ND	0.14	0.11	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1232 [1]	ND	0.14	0.13	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1242 [1]	ND	0.14	0.11	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1248 [1]	ND	0.14	0.049	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1254 [1]	0.45	0.14	0.056	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1260 [1]	0.21	0.14	0.077	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1262 [1]	ND	0.14	0.070	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:21	SFM
Aroclor-1268 [1]	0.61	0.14	0.11	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:21	SFM

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	**205**	*	30-150	S-24	10/13/21 13:21
Decachlorobiphenyl [2]	**199**	*	30-150	S-24	10/13/21 13:21
Tetrachloro-m-xylene [1]	72.3		30-150		10/13/21 13:21
Tetrachloro-m-xylene [2]	55.8		30-150		10/13/21 13:21

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Road, Portsmouth, N
Sample Description:
Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-10 (0.25-0.5)
Sampled: 10/4/2021 10:45

Sample ID: 21J0244-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	57.1		% Wt	1		SM 2540G	10/8/21	10/9/21 12:13	BMB

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-10 (0.5-1.5) Sampled: 10/4/2021 10:50

Sample ID: 21J0244-18

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.13	0.061	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1221 [1]	ND	0.13	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1232 [1]	ND	0.13	0.12	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1242 [1]	ND	0.13	0.10	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1248 [1]	0.052	0.13	0.047	mg/Kg dry	4	J	SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1254 [2]	0.16	0.13	0.054	mg/Kg dry	4		SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1260 [1]	ND	0.13	0.074	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1262 [1]	ND	0.13	0.067	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 7:34	JMB
Aroclor-1268 [1]	ND	0.13	0.11	mg/Kg dry	4	U	SW-846 8082A	10/9/21	10/12/21 7:34	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	46.5	30-150		10/12/21 7:34
Decachlorobiphenyl [2]	43.1	30-150		10/12/21 7:34
Tetrachloro-m-xylene [1]	46.4	30-150		10/12/21 7:34
Tetrachloro-m-xylene [2]	44.1	30-150		10/12/21 7:34

Project Location: 375 Banfield Road, Portsmouth, N   Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-10 (0.5-1.5)   Sampled: 10/4/2021 10:50

Sample ID: 21J0244-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	57.1		% Wt	1		SM 2540G	10/8/21	10/9/21 12:13	BMB

Project Location: 375 Banfield Road, Portsmouth, N	Sample Description:	Work Order: 21J0244
Date Received: 10/5/2021		
Field Sample #: X-8 (0.25-0.5)	Sampled: 10/4/2021 10:55	
Sample ID: 21J0244-19		
Sample Matrix: Soil		

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	0.054	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1221 [1]	ND	0.12	0.091	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1232 [1]	ND	0.12	0.11	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1242 [1]	ND	0.12	0.091	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1248 [1]	ND	0.12	0.042	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1254 [2]	0.34	0.12	0.048	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1260 [2]	0.15	0.12	0.067	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1262 [1]	ND	0.12	0.061	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:38	SFM
Aroclor-1268 [1]	0.12	0.12	0.097	mg/Kg dry	4	J	SW-846 8082A	10/12/21	10/13/21 13:38	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	96.1	30-150		10/13/21 13:38
Decachlorobiphenyl [2]	119	30-150		10/13/21 13:38
Tetrachloro-m-xylene [1]	69.6	30-150		10/13/21 13:38
Tetrachloro-m-xylene [2]	53.7	30-150		10/13/21 13:38

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-8 (0.25-0.5) Sampled: 10/4/2021 10:55

Sample ID: 21J0244-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	66.1		% Wt	1		SM 2540G	10/8/21	10/9/21 12:14	BMB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-8 (0.5-1.5) Sampled: 10/4/2021 11:00

Sample ID: 21J0244-20

Sample Matrix: Soil

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.13	0.057	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1221 [1]	ND	0.13	0.095	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1232 [1]	ND	0.13	0.11	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1242 [1]	ND	0.13	0.095	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1248 [1]	ND	0.13	0.044	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1254 [1]	0.22	0.13	0.051	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1260 [1]	ND	0.13	0.070	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1262 [1]	ND	0.13	0.063	mg/Kg dry	4	U	SW-846 8082A	10/12/21	10/13/21 13:56	SFM
Aroclor-1268 [1]	0.14	0.13	0.10	mg/Kg dry	4		SW-846 8082A	10/12/21	10/13/21 13:56	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Decachlorobiphenyl [1]	118	30-150		10/13/21 13:56
Decachlorobiphenyl [2]	122	30-150		10/13/21 13:56
Tetrachloro-m-xylene [1]	77.3	30-150		10/13/21 13:56
Tetrachloro-m-xylene [2]	58.1	30-150		10/13/21 13:56

Project Location: 375 Banfield Road, Portsmouth, N Sample Description: Work Order: 21J0244

Date Received: 10/5/2021

Field Sample #: X-8 (0.5-1.5) Sampled: 10/4/2021 11:00

Sample ID: 21J0244-20

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	63.1		% Wt	1		SM 2540G	10/8/21	10/9/21 12:14	BMB

Sample Extraction Data

Prep Method: % Solids   **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21J0244-01 [X-14 (0.25-0.5)]	B292079	10/08/21
21J0244-02 [X-14 (0.5-1.5)]	B292079	10/08/21
21J0244-03 [Y-13 (0.25-0.5)]	B292079	10/08/21
21J0244-04 [Y-13 (0.5-1.5)]	B292079	10/08/21
21J0244-05 [Z-10 (0.25-0.5)]	B292079	10/08/21
21J0244-06 [Z-10 (0.5-1.5)]	B292079	10/08/21
21J0244-07 [Y-11 (0.25-0.5)]	B292079	10/08/21
21J0244-08 [Y-11 (0.5-1.5)]	B292079	10/08/21
21J0244-09 [X-12 (0.25-0.5)]	B292079	10/08/21
21J0244-10 [X-12 (0.5-1.5)]	B292079	10/08/21
21J0244-11 [Z-12 (0.25-0.5)]	B292079	10/08/21
21J0244-12 [Z-12 (0.5-1.5)]	B292079	10/08/21
21J0244-13 [II-2 (0.25-0.5)]	B292079	10/08/21
21J0244-14 [II-2 (0.5-1.5)]	B292079	10/08/21
21J0244-15 [D-10 (0.25-0.5)]	B292079	10/08/21
21J0244-16 [D-10 (0.5-1.5)]	B292079	10/08/21
21J0244-17 [X-10 (0.25-0.5)]	B292079	10/08/21
21J0244-18 [X-10 (0.5-1.5)]	B292079	10/08/21
21J0244-19 [X-8 (0.25-0.5)]	B292079	10/08/21
21J0244-20 [X-8 (0.5-1.5)]	B292079	10/08/21

Prep Method: SW-846 3540C   **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0244-01 [X-14 (0.25-0.5)]	B292091	10.1	10.0	10/09/21
21J0244-02 [X-14 (0.5-1.5)]	B292091	10.1	10.0	10/09/21
21J0244-03 [Y-13 (0.25-0.5)]	B292091	10.0	10.0	10/09/21
21J0244-04 [Y-13 (0.5-1.5)]	B292091	10.1	10.0	10/09/21
21J0244-05 [Z-10 (0.25-0.5)]	B292091	10.0	10.0	10/09/21
21J0244-06 [Z-10 (0.5-1.5)]	B292091	10.4	10.0	10/09/21
21J0244-08 [Y-11 (0.5-1.5)]	B292091	10.2	10.0	10/09/21
21J0244-09 [X-12 (0.25-0.5)]	B292091	10.2	10.0	10/09/21
21J0244-10 [X-12 (0.5-1.5)]	B292091	10.0	10.0	10/09/21
21J0244-13 [II-2 (0.25-0.5)]	B292091	10.3	10.0	10/09/21
21J0244-14 [II-2 (0.5-1.5)]	B292091	10.3	10.0	10/09/21
21J0244-15 [D-10 (0.25-0.5)]	B292091	10.2	10.0	10/09/21
21J0244-16 [D-10 (0.5-1.5)]	B292091	10.2	10.0	10/09/21
21J0244-18 [X-10 (0.5-1.5)]	B292091	10.4	10.0	10/09/21

Prep Method: SW-846 3540C   **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0244-07RE1 [Y-11 (0.25-0.5)]	B292257	10.0	10.0	10/12/21
21J0244-11RE1 [Z-12 (0.25-0.5)]	B292257	10.0	10.0	10/12/21
21J0244-12RE1 [Z-12 (0.5-1.5)]	B292257	10.0	10.0	10/12/21
21J0244-17RE1 [X-10 (0.25-0.5)]	B292257	10.0	10.0	10/12/21
21J0244-19RE1 [X-8 (0.25-0.5)]	B292257	10.0	10.0	10/12/21
21J0244-20RE1 [X-8 (0.5-1.5)]	B292257	10.0	10.0	10/12/21

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292091 - SW-846 3540C										
Blank (B292091-BLK1)				Prepared: 10/09/21 Analyzed: 10/12/21						
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.164*		mg/Kg wet	0.200		82.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.142*		mg/Kg wet	0.200		71.1	30-150			
Surrogate: Tetrachloro-m-xylene	*0.174*		mg/Kg wet	0.200		86.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.157*		mg/Kg wet	0.200		78.7	30-150			
LCS (B292091-BS1)				Prepared: 10/09/21 Analyzed: 10/12/21						
Aroclor-1016	0.18	0.020	mg/Kg wet	0.200		89.1	40-140			
Aroclor-1016 [2C]	0.16	0.020	mg/Kg wet	0.200		77.8	40-140			
Aroclor-1260	0.19	0.020	mg/Kg wet	0.200		92.8	40-140			
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		81.3	40-140			
Surrogate: Decachlorobiphenyl	*0.193*		mg/Kg wet	0.200		96.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.169*		mg/Kg wet	0.200		84.3	30-150			
Surrogate: Tetrachloro-m-xylene	*0.198*		mg/Kg wet	0.200		98.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.179*		mg/Kg wet	0.200		89.7	30-150			
LCS Dup (B292091-BSD1)				Prepared: 10/09/21 Analyzed: 10/12/21						
Aroclor-1016	0.18	0.020	mg/Kg wet	0.200		87.9	40-140	1.43	30	
Aroclor-1016 [2C]	0.15	0.020	mg/Kg wet	0.200		77.0	40-140	1.09	30	
Aroclor-1260	0.18	0.020	mg/Kg wet	0.200		91.2	40-140	1.71	30	
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		78.6	40-140	3.39	30	
Surrogate: Decachlorobiphenyl	*0.186*		mg/Kg wet	0.200		92.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.161*		mg/Kg wet	0.200		80.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.189*		mg/Kg wet	0.200		94.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.171*		mg/Kg wet	0.200		85.4	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292091 - SW-846 3540C										
Matrix Spike (B292091-MS1)	**Source: 21J0244-01**		Prepared: 10/09/21 Analyzed: 10/12/21							
Aroclor-1016	0.63	0.22	mg/Kg dry	0.544	ND	116	40-140			
Aroclor-1016 [2C]	0.62	0.22	mg/Kg dry	0.544	ND	114	40-140			
Aroclor-1260	1.0	0.22	mg/Kg dry	0.544	0.35	125	40-140			
Aroclor-1260 [2C]	0.95	0.22	mg/Kg dry	0.544	0.36	107	40-140			
Surrogate: Decachlorobiphenyl	*0.518*		mg/Kg dry	0.544		95.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.486*		mg/Kg dry	0.544		89.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.495*		mg/Kg dry	0.544		91.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.454*		mg/Kg dry	0.544		83.5	30-150			
Matrix Spike Dup (B292091-MSD1)	**Source: 21J0244-01**		Prepared: 10/09/21 Analyzed: 10/12/21							
Aroclor-1016	0.64	0.22	mg/Kg dry	0.549	ND	116	40-140	0.801	50	
Aroclor-1016 [2C]	0.50	0.22	mg/Kg dry	0.549	ND	90.3	40-140	22.2	50	
Aroclor-1260	0.95	0.22	mg/Kg dry	0.549	0.35	109	40-140	8.26	50	
Aroclor-1260 [2C]	0.92	0.22	mg/Kg dry	0.549	0.36	102	40-140	2.41	50	
Surrogate: Decachlorobiphenyl	*0.526*		mg/Kg dry	0.549		95.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.562*		mg/Kg dry	0.549		102	30-150			
Surrogate: Tetrachloro-m-xylene	*0.473*		mg/Kg dry	0.549		86.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.426*		mg/Kg dry	0.549		77.7	30-150			
Batch B292257 - SW-846 3540C										
Blank (B292257-BLK1)			Prepared: 10/12/21 Analyzed: 10/13/21							
Aroclor-1016	ND	0.020	mg/Kg wet							U
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1221	ND	0.020	mg/Kg wet							U
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1232	ND	0.020	mg/Kg wet							U
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1242	ND	0.020	mg/Kg wet							U
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1248	ND	0.020	mg/Kg wet							U
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1254	ND	0.020	mg/Kg wet							U
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1260	ND	0.020	mg/Kg wet							U
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1262	ND	0.020	mg/Kg wet							U
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							U
Aroclor-1268	ND	0.020	mg/Kg wet							U
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							U
Surrogate: Decachlorobiphenyl	*0.197*		mg/Kg wet	0.196		100	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.184*		mg/Kg wet	0.196		93.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.183*		mg/Kg wet	0.196		93.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.148*		mg/Kg wet	0.196		75.7	30-150			

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292257 - SW-846 3540C										
LCS (B292257-BS1)				Prepared: 10/12/21 Analyzed: 10/13/21						
Aroclor-1016	0.18	0.020	mg/Kg wet	0.200		87.9	40-140			
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		68.6	40-140			
Aroclor-1260	0.18	0.020	mg/Kg wet	0.200		88.3	40-140			
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		76.1	40-140			
Surrogate: Decachlorobiphenyl	*0.199*		mg/Kg wet	0.200		99.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.186*		mg/Kg wet	0.200		92.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.171*		mg/Kg wet	0.200		85.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.138*		mg/Kg wet	0.200		68.9	30-150			
LCS Dup (B292257-BSD1)				Prepared: 10/12/21 Analyzed: 10/13/21						
Aroclor-1016	0.19	0.020	mg/Kg wet	0.200		93.1	40-140	5.71	30	
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		72.2	40-140	5.11	30	
Aroclor-1260	0.18	0.020	mg/Kg wet	0.200		88.9	40-140	0.699	30	
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		76.9	40-140	1.16	30	
Surrogate: Decachlorobiphenyl	*0.201*		mg/Kg wet	0.200		101	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.186*		mg/Kg wet	0.200		93.0	30-150			
Surrogate: Tetrachloro-m-xylene	*0.188*		mg/Kg wet	0.200		94.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.151*		mg/Kg wet	0.200		75.7	30-150			

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-14 (0.25-0.5)

Lab Sample ID: 21J0244-01

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.19	17.1
Aroclor-1254	1	0.000	-0.030	0.030	1.7	
	2	0.000	-0.030	0.030	1.8	5.7
Aroclor-1260	1	0.000	-0.030	0.030	0.35	
	2	0.000	-0.030	0.030	0.36	2.8
Aroclor-1268	1	0.000	-0.030	0.030	0.34	
	2	0.000	-0.030	0.030	0.24	34.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-14 (0.5-1.5)

Lab Sample ID: 21J0244-02

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.20	16.2
Aroclor-1254	1	0.000	-0.030	0.030	2.0	
	2	0.000	-0.030	0.030	2.0	0.0
Aroclor-1260	1	0.000	-0.030	0.030	0.24	
	2	0.000	-0.030	0.030	0.18	28.6

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Y-13 (0.25-0.5)

Lab Sample ID: 21J0244-03

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.098	
	2	0.000	-0.030	0.030	0.10	2.0
Aroclor-1254	1	0.000	-0.030	0.030	0.25	
	2	0.000	-0.030	0.030	0.22	12.8
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.14	6.9

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Y-13 (0.5-1.5)

Lab Sample ID: 21J0244-04

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.48	
	2	0.000	-0.030	0.030	0.42	13.3

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Z-10 (0.25-0.5)

Lab Sample ID: 21J0244-05

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.090	
	2	0.000	-0.030	0.030	0.086	4.6
Aroclor-1254	1	0.000	-0.030	0.030	0.36	
	2	0.000	-0.030	0.030	0.29	21.5
Aroclor-1260	1	0.000	-0.030	0.030	0.15	
	2	0.000	-0.030	0.030	0.15	0.0
Aroclor-1268	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.10	9.5

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Z-10 (0.5-1.5)

Lab Sample ID: 21J0244-06

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.18	15.4

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Y-11 (0.25-0.5)

Lab Sample ID: 21J0244-07RE1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.21	10.0
Aroclor-1260	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.18	15.4
Aroclor-1268	1	0.000	-0.030	0.030	0.48	
	2	0.000	-0.030	0.030	0.44	8.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Y-11 (0.5-1.5)

Lab Sample ID: 21J0244-08

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.096	
	2	0.000	-0.030	0.030	0.10	4.1
Aroclor-1260	1	0.000	-0.030	0.030	0.090	
	2	0.000	-0.030	0.030	0.087	4.5
Aroclor-1268	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.13	0.0

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-12 (0.25-0.5)

Lab Sample ID: 21J0244-09

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.064	
	2	0.000	-0.030	0.030	0.065	1.6
Aroclor-1254	1	0.000	-0.030	0.030	0.13	
	2	0.000	-0.030	0.030	0.099	27.1
Aroclor-1268	1	0.000	-0.030	0.030	0.11	
	2	0.000	-0.030	0.030	0.096	13.6

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-12 (0.5-1.5)

Lab Sample ID: 21J0244-10

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.059	
	2	0.000	-0.030	0.030	0.063	6.6
Aroclor-1254	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.092	26.4

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Z-12 (0.25-0.5)

Lab Sample ID: 21J0244-11RE1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.20	
	2	0.000	-0.030	0.030	0.25	22.2
Aroclor-1260	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.14	40.0
Aroclor-1268	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.17	16.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Z-12 (0.5-1.5)

Lab Sample ID: 21J0244-12RE1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.27	
	2	0.000	-0.030	0.030	0.35	25.8
Aroclor-1260	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.16	17.1
Aroclor-1268	1	0.000	-0.030	0.030	0.17	
	2	0.000	-0.030	0.030	0.16	6.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

II-2 (0.25-0.5)

Lab Sample ID: 21J0244-13

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1260	1	0.000	-0.030	0.030	0.059	
	2	0.000	-0.030	0.030	0.054	8.9

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-10 (0.25-0.5)

Lab Sample ID: 21J0244-15

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.040	
	2	0.000	-0.030	0.030	0.052	26.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

D-10 (0.5-1.5)

Lab Sample ID: 21J0244-16

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	-0.030	0.030	0.16	
	2	0.000	-0.030	0.030	0.22	31.6

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-10 (0.25-0.5)

Lab Sample ID: 21J0244-17RE1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.45	
	2	0.000	-0.030	0.030	0.43	6.7
Aroclor-1260	1	0.000	-0.030	0.030	0.21	
	2	0.000	-0.030	0.030	0.19	10.0
Aroclor-1268	1	0.000	-0.030	0.030	0.61	
	2	0.000	-0.030	0.030	0.53	15.7

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-10 (0.5-1.5)

Lab Sample ID:	21J0244-18	Date(s) Analyzed:	10/12/2021	10/12/2021
Instrument ID (1):		Instrument ID (2):		

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.16	13.3

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-8 (0.25-0.5)

Lab Sample ID: 21J0244-19RE1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.33	
	2	0.000	-0.030	0.030	0.34	3.0
Aroclor-1260	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.15	22.2
Aroclor-1268	1	0.000	-0.030	0.030	0.12	
	2	0.000	-0.030	0.030	0.10	18.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

X-8 (0.5-1.5)

Lab Sample ID: 21J0244-20RE1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	-0.030	0.030	0.22	
	2	0.000	-0.030	0.030	0.21	4.7
Aroclor-1268	1	0.000	-0.030	0.030	0.14	
	2	0.000	-0.030	0.030	0.11	24.0

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B292091-BS1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.16	11.8
Aroclor-1260	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.16	17.1

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B292091-BSD1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.15	18.2
Aroclor-1260	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.16	11.8

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B292091-MS1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.63	
	2	0.000	-0.030	0.030	0.62	1.6
Aroclor-1260	1	0.000	-0.030	0.030	1.0	
	2	0.000	-0.030	0.030	0.95	5.1

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B292091-MSD1

Date(s) Analyzed: 10/12/2021 10/12/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.64	
	2	0.000	-0.030	0.030	0.50	24.6
Aroclor-1260	1	0.000	-0.030	0.030	0.95	
	2	0.000	-0.030	0.030	0.92	3.2

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B292257-BS1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.14	25.0
Aroclor-1260	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.15	18.2

IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B292257-BSD1

Date(s) Analyzed: 10/13/2021 10/13/2021

Instrument ID (1): ECD10

Instrument ID (2): ECD10

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	-0.030	0.030	0.19	
	2	0.000	-0.030	0.030	0.14	30.3
Aroclor-1260	1	0.000	-0.030	0.030	0.18	
	2	0.000	-0.030	0.030	0.15	18.2

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
S-24	Surrogate recovery is biased high due to the presence of Aroclor 1268 in the sample. Aroclor 1268 contains decachlorobiphenyl.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,ME,NC,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221	CT,NH,NY,ME,NC,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232	CT,NH,NY,ME,NC,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242	CT,NH,NY,ME,NC,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248	CT,NH,NY,ME,NC,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254	CT,NH,NY,ME,NC,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260	CT,NH,NY,ME,NC,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,ME,NC,VA,PA
Aroclor-1262	NY,NC,VA,PA
Aroclor-1262 [2C]	NY,NC,VA,PA
Aroclor-1268	NY,NC,VA,PA
Aroclor-1268 [2C]	NY,NC,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21J0244

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 3

Company Name: Wilcox & Barton, Inc.
Address: 13 Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth
Project Number: BANFOODS
Project Manager: W. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard & A. Leith

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: WWilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCBs
1	X-14 (0.25 -0.5)	10/4/21	08:15	GRAB	S	U		1				X
2	X-14 (0.5-1.5)		08:25					1				X
3	Y-13 (0.25-0.5)		08:30					1				X
4	Y-13 (0.5-1.5)		08:35					1				X
5	Z-10 (0.25-0.5)		08:45					1				X
6	Z-10 (0.5-1.5)		08:55					1				X
7	Y-11 (0.25-0.5)		09:00					1				X
8	Y-11 (0.5-1.5)		09:05					1				X
9	X-12 (0.25-0.5)		09:10					1				X
10	X-12 (0.5-1.5)		09:15					1				X

² Preservation Code -

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature)	Date/Time: 10/5/21 11:40
Received by: (signature)	Date/Time: 10/5/21 1140
Relinquished by: (signature)	Date/Time: 10/5/21 1735
Received by: (signature) SB	Date/Time: 10/5/21 1735
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: Ⓐ

Detection Limit Requirements
MA
CT
Other: SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

2150244

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 2 of 3

Company Name: Wilcox & Barton, Inc.
Address: 1B Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth
Project Number: BANFOODS
Project Manager: W. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard & A. Leich

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☐ EXCEL ☐
Other:
CLP Like Data Pkg Required: ☐
Email To: WWilcox, mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☒
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PCBS
11	Z-12 (0.25-0.5)	10/4/21	09:20	GRAB	S	V		1				X
12	Z-12 (0.5-1.5)	↓	09:30	↓	↓	↓		1				X
13	II-2 (0.25-0.5)	↓	09:50	↓	↓	↓		1				X
14	II-2 (0.5-1.5)	↓	10:100	↓	↓	↓		1				X
15	D-10 (0.25-0.5)	↓	10:35	↓	↓	↓		1				X
16	D-10 (0.5-1.5)	↓	10:40	↓	↓	↓		1				X
17	X-10 (0.25-0.5)	↓	10:45	↓	↓	↓		1				X
18	X-10 (0.5-1.5)	↓	10:50	↓	↓	↓		1				X
19	X-8 (0.25-0.5)	↓	10:55	↓	↓	↓		1				X
20	X-8 (0.5-1.5)	↓	11:00	↓	↓	↓		1				X

²Preservation Code: I

Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature) MSB	Date/Time: 10/5/21 11:40
Received by: (signature)	Date/Time: 10/5/21 1140
Relinquished by: (signature)	Date/Time: 10/5/21 1720
Received by: (signature) 5.3	Date/Time: 10/5/21 1735
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: (A)

Detection Limit Requirements
MA
CT
Other: SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐
Federal ☐
City ☐
Municipality ☐
21 J ☐
Brownfield ☐
MWRA ☐
School ☐
MBTA ☐
WRTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W+B

Received By Date 10/5/21 Time 1735

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___

Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T By Gun # 5 Actual Temp - 5.3

By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ___

Are there Rushes? F Who was notified? ___

Are there Short Holds? F Who was notified? ___

Is there enough Volume? T

Is there Headspace where applicable? n/a MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? Acid n/a Base n/a

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz [✓ Amb]/Clear	20
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 27, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21J1183

Enclosed are results of analyses for samples as received by the laboratory on October 20, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/27/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J1183

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
B-1 0-1.0 FT	21J1183-01	Soil		SM 2540G SW-846 8100 Modified	
B-1 1.0-2.0 FT	21J1183-02	Soil		SM 2540G SW-846 8100 Modified	
B-2 0.5-1.5 FT	21J1183-03	Soil		SM 2540G SW-846 8100 Modified	
B-3 0.5-1.5 FT	21J1183-04	Soil		SM 2540G SW-846 8100 Modified	
B-4 1.0-2.0 FT	21J1183-05	Soil		SM 2540G SW-846 8100 Modified	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8100 Modified

Qualifications:

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

2-Fluorobiphenyl

21J1183-03[B-2 0.5-1.5 FT]

SW-846 8100 Modified

TPH (C9-C36) is quantitated against a calibration made with a diesel standard.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington

Technical Representative

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183
Date Received: 10/20/2021
Field Sample #: B-1 0-1.0 FT
Sampled: 10/19/2021 10:30
Sample ID: 21J1183-01
Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	300	48	38	mg/Kg dry	5		SW-846 8100 Modified	10/22/21	10/27/21 13:04	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	72.9	40-140		10/27/21 13:04

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183

Date Received: 10/20/2021

Field Sample #: B-1 0-1.0 FT
Sampled: 10/19/2021 10:30

Sample ID: 21J1183-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.9		% Wt	1		SM 2540G	10/20/21	10/22/21 13:59	GLH

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183

Date Received: 10/20/2021

Field Sample #: B-1 1.0-2.0 FT
Sampled: 10/19/2021 10:45

Sample ID: 21J1183-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	62	10	7.9	mg/Kg dry	1		SW-846 8100 Modified	10/22/21	10/25/21 20:20	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	46.9	40-140		10/25/21 20:20

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183

Date Received: 10/20/2021

Field Sample #: B-1 1.0-2.0 FT
Sampled: 10/19/2021 10:45

Sample ID: 21J1183-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.4		% Wt	1		SM 2540G	10/20/21	10/22/21 13:59	GLH

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183
Date Received: 10/20/2021

Field Sample #: B-2 0.5-1.5 FT
Sampled: 10/19/2021 11:00

Sample ID: 21J1183-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	2100	460	370	mg/Kg dry	50		SW-846 8100 Modified	10/22/21	10/27/21 12:44	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	*	40-140	S-01, U	10/27/21 12:44

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183

Date Received: 10/20/2021

Field Sample #: B-2 0.5-1.5 FT
Sampled: 10/19/2021 11:00

Sample ID: 21J1183-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.7		% Wt	1		SM 2540G	10/20/21	10/22/21 13:59	GLH

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183
Date Received: 10/20/2021
Field Sample #: B-3 0.5-1.5 FT
Sampled: 10/19/2021 11:30
Sample ID: 21J1183-04
Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	65	9.6	7.6	mg/Kg dry	1		SW-846 8100 Modified	10/22/21	10/25/21 20:40	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	68.1	40-140		10/25/21 20:40

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183

Date Received: 10/20/2021

Field Sample #: B-3 0.5-1.5 FT
Sampled: 10/19/2021 11:30

Sample ID: 21J1183-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.1		% Wt	1		SM 2540G	10/20/21	10/22/21 13:59	GLH

Project Location: 375 Banfield Rd
Sample Description:
Work Order: 21J1183

Date Received: 10/20/2021

Field Sample #: B-4 1.0-2.0 FT
Sampled: 10/19/2021 12:15

Sample ID: 21J1183-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	660	94	74	mg/Kg dry	10		SW-846 8100 Modified	10/22/21	10/27/21 12:23	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	72.7	40-140		10/27/21 12:23

Project Location: 375 Banfield Rd

Sample Description:

Work Order: 21J1183

Date Received: 10/20/2021

Field Sample #: B-4 1.0-2.0 FT

Sampled: 10/19/2021 12:15

Sample ID: 21J1183-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.9		% Wt	1		SM 2540G	10/20/21	10/22/21 13:59	GLH

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21J1183-01 [B-1 0-1.0 FT]	B292891	10/20/21
21J1183-02 [B-1 1.0-2.0 FT]	B292891	10/20/21
21J1183-03 [B-2 0.5-1.5 FT]	B292891	10/20/21
21J1183-04 [B-3 0.5-1.5 FT]	B292891	10/20/21
21J1183-05 [B-4 1.0-2.0 FT]	B292891	10/20/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8100 Modified**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J1183-01 [B-1 0-1.0 FT]	B292994	30.2	1.00	10/22/21
21J1183-02 [B-1 1.0-2.0 FT]	B292994	30.1	1.00	10/22/21
21J1183-03 [B-2 0.5-1.5 FT]	B292994	30.3	1.00	10/22/21
21J1183-04 [B-3 0.5-1.5 FT]	B292994	30.4	1.00	10/22/21
21J1183-05 [B-4 1.0-2.0 FT]	B292994	30.0	1.00	10/22/21

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292994 - SW-846 3546										
Blank (B292994-BLK1)				Prepared: 10/22/21 Analyzed: 10/24/21						
TPH (C9-C36)	ND	8.3	mg/Kg wet							U
Surrogate: 2-Fluorobiphenyl	*1.84*		mg/Kg wet	3.33		55.3	40-140			
LCS (B292994-BS1)				Prepared: 10/22/21 Analyzed: 10/24/21						
TPH (C9-C36)	22.5	8.3	mg/Kg wet	33.3		67.5	40-140			
Surrogate: 2-Fluorobiphenyl	*2.08*		mg/Kg wet	3.33		62.5	40-140			
LCS Dup (B292994-BSD1)				Prepared: 10/22/21 Analyzed: 10/24/21						
TPH (C9-C36)	23.0	8.3	mg/Kg wet	33.3		68.9	40-140	2.11	30	
Surrogate: 2-Fluorobiphenyl	*2.07*		mg/Kg wet	3.33		62.1	40-140			

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.
U	Analyte included in the analysis, but not detected

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	**Certifications**

No certified Analyses included in this Report

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21J1183

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name: Wilcox + Barton
Address:
Phone: 603-369-4190
Project Name: Banfield
Project Location: 375 Banfield rd.
Project Number: BANF0005
Project Manager: B. Wilcox / M. Broussard
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: AL

Requested Turnaround Time
~~7-Day~~ 5-Day ☑ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: mbroussard@wilcoxandbarton.com
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	TPH
1	B-1 0.0-1.0'	10/19	10:30	g	S	U		1				✓
2	B-1 1.0-2.0'	10/19	10:45	g	S	U		1				✓
3	B-2 0.5-1.5	10/19	11:00	g	S	U		1				✓
4	B-3 0.5-1.5'	10/19	11:30	g	S	U		1				✓
5	B-4 1.0-2.0'	10/19	12:15	g	S	U		1				✓

² Preservation Code: I

Courier Use Only
Total Number Of:
VIALS
GLASS 5
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by / Received by (signature)	Date/Time:
Relinquished by: (signature)	10/20/21 10:27
Received by: (signature)	10/20/21 1027
Relinquished by: (signature)	10/20/21 15^{00}
Received by: (signature) 5.4	10/20/21 1500
Relinquished by: (signature)	
Received by: (signature)	
Relinquished by: (signature)	
Received by: (signature)	

Client Comments:
NH A pricing

Detection Limit Requirements
MA
CT
Other: SRS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited
Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples__________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W+B

Received By Date 10/20/21 Time 1500

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T
By Gun # 3 Actual Temp - 5.4
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? n/a MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid n/a Base n/a

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	1
HCL-		500 mL Amb.		500 mL Plastic		8oz [✓ Amb]/Clear	4
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 7, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield road, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1172

Enclosed are results of analyses for samples as received by the laboratory on September 22, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

Table of Contents

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/7/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1172

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield road, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SW-201	21I1172-01	Ground Water		EPA 200.7	
				SW-846 6020B	
				SW-846 7470A	
				SW-846 8270E	
SD-201	21I1172-02	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-202	21I1172-03	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SW-203	21I1172-04	Ground Water		EPA 200.7	
				SW-846 6020B	
				SW-846 7470A	
				SW-846 8270E	
SD-203	21I1172-05	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-204	21I1172-06	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/7/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1172

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield road, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SD-205	21I1172-07	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-206	21I1172-08	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-207	21I1172-09	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8270E, only PAHs were requested and reported.

MADEP EPH rev 2.1

Qualifications:

S-19

Surrogate recovery is outside of control limits, matrix interference suspected. Reanalysis yielded similar surrogate non-conformance.

Analyte & Samples(s) Qualified:

Chlorooctadecane (COD)

21I1172-06[SD-204], 21I1172-06RE1[SD-204], 21I1172-07[SD-205], 21I1172-07RE1[SD-205], 21I1172-08[SD-206], 21I1172-08RE1[SD-206], 21I1172-09[SD-207], 21I1172-09RE1[SD-207]

o-Terphenyl (OTP)

21I1172-06[SD-204], 21I1172-07[SD-205], 21I1172-08[SD-206], 21I1172-08RE1[SD-206], 21I1172-09[SD-207]

SW 846 9060A

Qualifications:

MS-11

Matrix spike recovery outside of control limits. Possibility of sample matrix effects that lead to a high bias for reported result or non-homogeneous sample aliquots cannot be eliminated.

Analyte & Samples(s) Qualified:

Total Organic Carbon

21I1172-02[SD-201], B291136-MS1

Z-01

Results over calibration curve. Results are estimitated due to method limitations.

Analyte & Samples(s) Qualified:

Total Organic Carbon

21I1172-02[SD-201], 21I1172-05[SD-203], 21I1172-06[SD-204], 21I1172-07[SD-205], 21I1172-08[SD-206], 21I1172-09[SD-207], B291136-DUP1, B291136-MS1

SW-846 7470A

Qualifications:

B

Analyte is found in the associated laboratory blank as well as in the sample.

Analyte & Samples(s) Qualified:

Mercury

21I1172-01[SW-201], 21I1172-04[SW-203], B290978-BLK1, B290978-DUP1

SW-846 8270E

Qualifications:

RL-12

Elevated reporting limit due to matrix interference.

Analyte & Samples(s) Qualified:

21I1172-05[SD-203], 21I1172-06[SD-204], 21I1172-07[SD-205], 21I1172-08[SD-206]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SW-201   Sampled: 9/22/2021 09:15

Sample ID: 21I1172-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.29	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Acenaphthylene (SIM)	ND	0.20	0.025	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Anthracene (SIM)	ND	0.20	0.020	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Benzo(a)anthracene (SIM)	ND	0.049	0.034	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Benzo(a)pyrene (SIM)	ND	0.098	0.022	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Benzo(b)fluoranthene (SIM)	ND	0.049	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Benzo(g,h,i)perylene (SIM)	ND	0.49	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Benzo(k)fluoranthene (SIM)	ND	0.20	0.018	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Chrysene (SIM)	ND	0.20	0.022	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.098	0.028	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Fluoranthene (SIM)	ND	0.49	0.022	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Fluorene (SIM)	ND	0.98	0.026	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.098	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
2-Methylnaphthalene (SIM)	ND	0.98	0.11	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Naphthalene (SIM)	ND	0.98	0.35	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Phenanthrene (SIM)	ND	0.049	0.029	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR
Pyrene (SIM)	ND	0.98	0.020	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:18	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	70.3	30-130		9/28/21 10:18
2-Fluorobiphenyl	57.1	30-130		9/28/21 10:18
p-Terphenyl-d14	77.9	30-130		9/28/21 10:18

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SW-201 Sampled: 9/22/2021 09:15

Sample ID: 21I1172-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Arsenic	2.3	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:19	QNW
Barium	250	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:19	QNW
Cadmium	0.084	0.20	0.027	µg/L	1	J	SW-846 6020B	9/27/21	9/28/21 14:19	QNW
Chromium	1.0	1.0	0.92	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:19	QNW
Lead	49	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:19	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/28/21	9/28/21 14:27	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 14:19	QNW
Silver	ND	0.20	0.026	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:19	QNW
Calcium Hardness	130	1.2		mg/L	1		EPA 200.7	9/27/21	9/28/21 20:16	QNW

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SW-201 Sampled: 9/22/2021 09:15

Sample ID: 21I1172-01

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	1.1	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/28/21 19:17	QNW
Barium	240	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/28/21 19:17	QNW
Cadmium	ND	0.20	0.027	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 19:17	QNW
Chromium	ND	1.0	0.92	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 19:17	QNW
Lead	2.9	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/28/21 19:17	QNW
Mercury	0.000066	0.00010	0.000050	mg/L	1	B, J	SW-846 7470A	9/24/21	9/25/21 12:54	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/29/21 13:07	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 19:17	QNW

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-201   Sampled: 9/22/2021 09:15

Sample ID: 21I1172-02

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	1.9	0.58	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Acenaphthylene	ND	1.9	0.57	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Anthracene	ND	1.9	0.61	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Benzo(a)anthracene	0.72	1.9	0.52	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Benzo(a)pyrene	0.84	1.9	0.57	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Benzo(b)fluoranthene	0.98	1.9	0.56	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Benzo(g,h,i)perylene	ND	1.9	0.78	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Benzo(k)fluoranthene	ND	1.9	0.50	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Chrysene	0.77	1.9	0.54	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Dibenz(a,h)anthracene	ND	1.9	0.75	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Fluoranthene	1.1	1.9	0.59	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Fluorene	ND	1.9	0.63	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Indeno(1,2,3-cd)pyrene	ND	1.9	0.84	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
2-Methylnaphthalene	43	3.7	1.2	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 19:15	BGL
Naphthalene	19	1.9	0.51	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Phenanthrene	1.2	1.9	0.59	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 17:33	BGL
Pyrene	1.3	1.9	0.59	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 17:33	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	67.6	30-130		9/27/21 17:33
Nitrobenzene-d5	59.8	30-130		9/28/21 19:15
2-Fluorobiphenyl	75.6	30-130		9/27/21 17:33
2-Fluorobiphenyl	66.8	30-130		9/28/21 19:15
p-Terphenyl-d14	81.1	30-130		9/27/21 17:33
p-Terphenyl-d14	80.8	30-130		9/28/21 19:15

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-201   Sampled: 9/22/2021 09:15

Sample ID: 21I1172-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	110	110	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
C19-C36 Aliphatics	280	110	110	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Unadjusted C11-C22 Aromatics	380	110	110	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
C11-C22 Aromatics	360	110	110	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Acenaphthene	ND	1.1	0.47	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Acenaphthylene	ND	1.1	0.39	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Anthracene	ND	1.1	0.45	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Benzo(a)anthracene	ND	1.1	0.40	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Benzo(a)pyrene	22	1.1	0.37	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Benzo(b)fluoranthene	ND	1.1	0.44	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Benzo(g,h,i)perylene	ND	1.1	0.45	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Benzo(k)fluoranthene	ND	1.1	0.58	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Chrysene	ND	1.1	0.46	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Dibenz(a,h)anthracene	ND	1.1	0.45	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Fluoranthene	ND	1.1	0.46	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Fluorene	ND	1.1	0.45	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Indeno(1,2,3-cd)pyrene	ND	1.1	0.48	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
2-Methylnaphthalene	ND	1.1	0.43	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Naphthalene	ND	1.1	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Phenanthrene	ND	1.1	0.52	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD
Pyrene	ND	1.1	0.46	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 22:24	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	43.4	40-140		9/24/21 22:24
o-Terphenyl (OTP)	45.6	40-140		9/24/21 22:24
2-Bromonaphthalene	82.7	40-140		9/24/21 22:24
2-Fluorobiphenyl	83.9	40-140		9/24/21 22:24

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-201 Sampled: 9/22/2021 09:15

Sample ID: 21I1172-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	69	36	13	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:26	QNW
Barium	580	18	6.9	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:26	QNW
Cadmium	7.5	3.6	1.9	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:26	QNW
Chromium	31	7.3	4.1	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:26	QNW
Lead	1600	5.4	2.6	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:26	QNW
Mercury	0.31	0.30	0.10	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:12	DRL
Selenium	ND	36	13	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 12:26	QNW
Silver	ND	3.6	1.7	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 12:26	QNW

Project Location: 375 Banfield road, Portsmouth, N

Sample Description:

Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-201

Sampled: 9/22/2021 09:15

Sample ID: 21I1172-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	9.15		% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	200000	100	mg/Kg	1	MS-11, Z-01	SW 846 9060A	9/28/21	9/28/21 16:29	DJM

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-201 Sampled: 9/22/2021 09:15

Sample ID: 21I1172-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Grain Size	see attached		%	1		SM D 422-63		10/6/21 0:00	GEOTL

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-202 Sampled: 9/22/2021 10:05

Sample ID: 21I1172-03

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.34	0.11	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Acenaphthylene	ND	0.34	0.10	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Anthracene	ND	0.34	0.11	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Benzo(a)anthracene	0.16	0.34	0.094	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Benzo(a)pyrene	0.23	0.34	0.10	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Benzo(b)fluoranthene	0.37	0.34	0.10	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Benzo(g,h,i)perylene	0.16	0.34	0.14	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Benzo(k)fluoranthene	0.12	0.34	0.091	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Chrysene	0.19	0.34	0.098	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Dibenz(a,h)anthracene	ND	0.34	0.14	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Fluoranthene	0.30	0.34	0.11	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Fluorene	ND	0.34	0.11	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Indeno(1,2,3-cd)pyrene	0.22	0.34	0.15	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
2-Methylnaphthalene	ND	0.34	0.11	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Naphthalene	ND	0.34	0.092	mg/Kg dry	1	U	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Phenanthrene	0.11	0.34	0.11	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL
Pyrene	0.32	0.34	0.11	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 18:00	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Nitrobenzene-d5	63.0	30-130		9/27/21 18:00
2-Fluorobiphenyl	67.7	30-130		9/27/21 18:00
p-Terphenyl-d14	69.5	30-130		9/27/21 18:00

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-202   Sampled: 9/22/2021 10:05

Sample ID: 21I1172-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	20	20	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
C19-C36 Aliphatics	76	20	20	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Unadjusted C11-C22 Aromatics	25	20	20	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
C11-C22 Aromatics	25	20	20	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Acenaphthene	ND	0.20	0.085	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Acenaphthylene	ND	0.20	0.071	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Anthracene	ND	0.20	0.082	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Benzo(a)anthracene	ND	0.20	0.072	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Benzo(a)pyrene	0.43	0.20	0.067	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Benzo(b)fluoranthene	ND	0.20	0.080	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Benzo(g,h,i)perylene	ND	0.20	0.082	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Benzo(k)fluoranthene	ND	0.20	0.11	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Chrysene	ND	0.20	0.083	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Dibenz(a,h)anthracene	ND	0.20	0.082	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Fluoranthene	ND	0.20	0.084	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Fluorene	ND	0.20	0.082	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Indeno(1,2,3-cd)pyrene	ND	0.20	0.087	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
2-Methylnaphthalene	ND	0.20	0.079	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Naphthalene	ND	0.20	0.051	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Phenanthrene	ND	0.20	0.095	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD
Pyrene	ND	0.20	0.084	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:03	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	40.3	40-140		9/24/21 23:03
o-Terphenyl (OTP)	43.1	40-140		9/24/21 23:03
2-Bromonaphthalene	87.8	40-140		9/24/21 23:03
2-Fluorobiphenyl	87.4	40-140		9/24/21 23:03

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-202 Sampled: 9/22/2021 10:05

Sample ID: 21I1172-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	11	6.6	2.4	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:32	QNW
Barium	89	3.3	1.3	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:32	QNW
Cadmium	1.7	0.66	0.34	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:32	QNW
Chromium	58	1.3	0.75	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:32	QNW
Lead	160	0.99	0.48	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:32	QNW
Mercury	0.16	0.058	0.020	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:18	DRL
Selenium	ND	6.6	2.4	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 12:32	QNW
Silver	ND	0.66	0.30	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 12:32	QNW

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-202 Sampled: 9/22/2021 10:05

Sample ID: 21I1172-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	50.3		% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	1700	100	mg/Kg	1		SW 846 9060A	9/28/21	9/28/21 17:43	DJM

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield road, Portsmouth, N
Sample Description:
Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-202
Sampled: 9/22/2021 10:05

Sample ID: 21I1172-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Grain Size	see attached		%	1		SM D 422-63		10/6/21 0:00	GEOTL

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SW-203   Sampled: 9/22/2021 11:30

Sample ID: 21I1172-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.29	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Acenaphthylene (SIM)	ND	0.20	0.025	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Anthracene (SIM)	ND	0.20	0.020	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Benzo(a)anthracene (SIM)	ND	0.049	0.034	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Benzo(a)pyrene (SIM)	ND	0.098	0.022	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Benzo(b)fluoranthene (SIM)	ND	0.049	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Benzo(g,h,i)perylene (SIM)	ND	0.49	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Benzo(k)fluoranthene (SIM)	ND	0.20	0.018	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Chrysene (SIM)	ND	0.20	0.022	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.098	0.028	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Fluoranthene (SIM)	ND	0.49	0.022	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Fluorene (SIM)	ND	0.98	0.026	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.098	0.027	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
2-Methylnaphthalene (SIM)	ND	0.98	0.11	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Naphthalene (SIM)	ND	0.98	0.35	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Phenanthrene (SIM)	ND	0.049	0.029	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR
Pyrene (SIM)	ND	0.98	0.020	µg/L	1	U	SW-846 8270E	9/23/21	9/28/21 10:41	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	45.8	30-130		9/28/21 10:41
2-Fluorobiphenyl	39.8	30-130		9/28/21 10:41
p-Terphenyl-d14	79.4	30-130		9/28/21 10:41

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SW-203 Sampled: 9/22/2021 11:30

Sample ID: 21I1172-04

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	2.8	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:22	QNW
Barium	280	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:22	QNW
Cadmium	0.11	0.20	0.027	µg/L	1	J	SW-846 6020B	9/27/21	9/28/21 14:22	QNW
Chromium	0.96	1.0	0.92	µg/L	1	J	SW-846 6020B	9/27/21	9/28/21 14:22	QNW
Lead	77	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:22	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/28/21	9/28/21 14:29	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 14:22	QNW
Silver	ND	0.20	0.026	µg/L	1		SW-846 6020B	9/27/21	9/28/21 14:22	QNW
Calcium Hardness	130	1.2		mg/L	1		EPA 200.7	9/27/21	9/28/21 20:21	QNW

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SW-203 Sampled: 9/22/2021 11:30

Sample ID: 21I1172-04

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	2.1	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/28/21 19:20	QNW
Barium	280	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/28/21 19:20	QNW
Cadmium	ND	0.20	0.027	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 19:20	QNW
Chromium	ND	1.0	0.92	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 19:20	QNW
Lead	11	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/28/21 19:20	QNW
Mercury	0.000061	0.00010	0.000050	mg/L	1	B, J	SW-846 7470A	9/24/21	9/25/21 12:56	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/29/21 13:09	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 19:20	QNW

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-203 Sampled: 9/22/2021 11:30

Sample ID: 21I1172-05

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.029	0.14	0.0067	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Acenaphthylene (SIM)	0.026	0.14	0.0083	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Anthracene (SIM)	0.11	0.11	0.0067	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Benzo(a)anthracene (SIM)	0.38	0.028	0.015	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Benzo(a)pyrene (SIM)	0.31	0.028	0.0083	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Benzo(b)fluoranthene (SIM)	0.39	0.028	0.013	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Benzo(g,h,i)perylene (SIM)	0.20	0.28	0.010	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Benzo(k)fluoranthene (SIM)	0.14	0.11	0.0067	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Chrysene (SIM)	0.39	0.11	0.018	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Dibenz(a,h)anthracene (SIM)	0.048	0.028	0.010	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Fluoranthene (SIM)	0.76	0.28	0.028	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Fluorene (SIM)	0.037	0.55	0.0063	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.22	0.11	0.010	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
2-Methylnaphthalene (SIM)	ND	0.55	0.062	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Naphthalene (SIM)	ND	0.55	0.20	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Phenanthrene (SIM)	0.44	0.14	0.025	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR
Pyrene (SIM)	0.66	0.55	0.022	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 12:35	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	51.5	30-130		9/28/21 12:35
2-Fluorobiphenyl	37.0	30-130		9/28/21 12:35
p-Terphenyl-d14	36.5	30-130		9/28/21 12:35

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-203 Sampled: 9/22/2021 11:30

Sample ID: 21I1172-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	83	83	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
C19-C36 Aliphatics	270	83	83	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Unadjusted C11-C22 Aromatics	490	83	83	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
C11-C22 Aromatics	490	83	83	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Acenaphthene	ND	0.83	0.36	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Acenaphthylene	ND	0.83	0.30	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Anthracene	ND	0.83	0.34	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Benzo(a)anthracene	ND	0.83	0.30	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Benzo(a)pyrene	ND	0.83	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Benzo(b)fluoranthene	ND	0.83	0.33	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Benzo(g,h,i)perylene	ND	0.83	0.34	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Benzo(k)fluoranthene	ND	0.83	0.44	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Chrysene	ND	0.83	0.35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Dibenz(a,h)anthracene	ND	0.83	0.35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Fluoranthene	ND	0.83	0.35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Fluorene	ND	0.83	0.35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Indeno(1,2,3-cd)pyrene	ND	0.83	0.37	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
2-Methylnaphthalene	ND	0.83	0.33	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Naphthalene	ND	0.83	0.21	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Phenanthrene	ND	0.83	0.40	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG
Pyrene	ND	0.83	0.35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 21:39	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	48.7	40-140		9/28/21 21:39
o-Terphenyl (OTP)	67.4	40-140		9/28/21 21:39
2-Bromonaphthalene	88.8	40-140		9/28/21 21:39
2-Fluorobiphenyl	89.9	40-140		9/28/21 21:39

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-203 Sampled: 9/22/2021 11:30

Sample ID: 21I1172-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	21	27	10	mg/Kg dry	1	J	SW-846 6010D	9/28/21	9/29/21 12:57	QNW
Barium	260	14	5.2	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:57	QNW
Cadmium	5.6	2.7	1.4	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:57	QNW
Chromium	35	5.5	3.1	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:57	QNW
Lead	2200	4.1	2.0	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 12:57	QNW
Mercury	0.65	0.24	0.081	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:20	DRL
Selenium	ND	27	9.7	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 12:57	QNW
Silver	ND	2.7	1.2	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 12:57	QNW

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-203   Sampled: 9/22/2021 11:30

Sample ID: 21I1172-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	12.0		% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	480000	100	mg/Kg	1	Z-01	SW 846 9060A	9/28/21	9/28/21 19:41	DJM

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-203   Sampled: 9/22/2021 11:30

Sample ID: 21I1172-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Grain Size	see attached		%	1		SM D 422-63		10/6/21 0:00	GEOTL

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-204 Sampled: 9/22/2021 11:05

Sample ID: 21I1172-06

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.029	0.0014	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Acenaphthylene (SIM)	0.0041	0.029	0.0017	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Anthracene (SIM)	0.0037	0.023	0.0014	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Benzo(a)anthracene (SIM)	0.014	0.0058	0.0031	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Benzo(a)pyrene (SIM)	0.015	0.0058	0.0017	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Benzo(b)fluoranthene (SIM)	0.024	0.0058	0.0028	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Benzo(g,h,i)perylene (SIM)	0.013	0.058	0.0021	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Benzo(k)fluoranthene (SIM)	0.0074	0.023	0.0014	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Chrysene (SIM)	0.021	0.023	0.0038	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Dibenz(a,h)anthracene (SIM)	0.0028	0.0058	0.0021	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Fluoranthene (SIM)	0.036	0.058	0.0059	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Fluorene (SIM)	ND	0.11	0.0013	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.015	0.023	0.0022	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
2-Methylnaphthalene (SIM)	ND	0.11	0.013	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Naphthalene (SIM)	ND	0.11	0.041	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Phenanthrene (SIM)	0.020	0.029	0.0052	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR
Pyrene (SIM)	0.031	0.11	0.0045	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:22	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	55.6	30-130		9/28/21 13:22
2-Fluorobiphenyl	45.0	30-130		9/28/21 13:22
p-Terphenyl-d14	50.1	30-130		9/28/21 13:22

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-204 Sampled: 9/22/2021 11:05

Sample ID: 21I1172-06

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	17	17	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
C9-C18 Aliphatics	ND	17	17	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
C19-C36 Aliphatics	22	17	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
C19-C36 Aliphatics	ND	17	17	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Unadjusted C11-C22 Aromatics	22	17	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Unadjusted C11-C22 Aromatics	18	17	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
C11-C22 Aromatics	21	17	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
C11-C22 Aromatics	ND	17	17	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Acenaphthene	ND	0.17	0.074	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Acenaphthene	ND	0.17	0.074	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Acenaphthylene	ND	0.17	0.061	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Acenaphthylene	ND	0.17	0.061	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Anthracene	ND	0.17	0.071	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Anthracene	ND	0.17	0.071	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Benzo(a)anthracene	ND	0.17	0.063	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Benzo(a)anthracene	ND	0.17	0.063	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Benzo(a)pyrene	1.0	0.17	0.058	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Benzo(a)pyrene	1.2	0.17	0.058	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Benzo(b)fluoranthene	ND	0.17	0.069	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Benzo(b)fluoranthene	ND	0.17	0.069	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Benzo(g,h,i)perylene	ND	0.17	0.071	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Benzo(g,h,i)perylene	ND	0.17	0.071	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Benzo(k)fluoranthene	ND	0.17	0.091	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Benzo(k)fluoranthene	ND	0.17	0.091	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Chrysene	ND	0.17	0.072	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Chrysene	ND	0.17	0.072	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Dibenz(a,h)anthracene	ND	0.17	0.072	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Dibenz(a,h)anthracene	ND	0.17	0.072	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Fluoranthene	ND	0.17	0.072	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Fluoranthene	ND	0.17	0.072	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Fluorene	ND	0.17	0.071	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Fluorene	ND	0.17	0.071	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Indeno(1,2,3-cd)pyrene	ND	0.17	0.076	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Indeno(1,2,3-cd)pyrene	ND	0.17	0.076	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
2-Methylnaphthalene	ND	0.17	0.068	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
2-Methylnaphthalene	ND	0.17	0.068	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Naphthalene	ND	0.17	0.044	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Naphthalene	ND	0.17	0.044	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Phenanthrene	ND	0.17	0.082	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Phenanthrene	ND	0.17	0.082	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG
Pyrene	ND	0.17	0.073	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:10	AYH
Pyrene	ND	0.17	0.073	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:00	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	**39.4** *	40-140	S-19	9/25/21 18:10

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-204 Sampled: 9/22/2021 11:05

Sample ID: 21I1172-06

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	**37.1**	*	40-140	S-19	9/28/21 22:00
o-Terphenyl (OTP)	**39.2**	*	40-140	S-19	9/25/21 18:10
o-Terphenyl (OTP)	49.1		40-140		9/28/21 22:00
2-Bromonaphthalene	88.0		40-140		9/28/21 22:00
2-Bromonaphthalene	75.0		40-140		9/25/21 18:10
2-Fluorobiphenyl	79.1		40-140		9/25/21 18:10
2-Fluorobiphenyl	89.6		40-140		9/28/21 22:00

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-204   Sampled: 9/22/2021 11:05

Sample ID: 21I1172-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	7.3	5.7	2.1	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:04	QNW
Barium	36	2.8	1.1	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:04	QNW
Cadmium	0.35	0.57	0.29	mg/Kg dry	1	J	SW-846 6010D	9/28/21	9/29/21 13:04	QNW
Chromium	30	1.1	0.65	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:04	QNW
Lead	33	0.85	0.42	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:04	QNW
Mercury	0.059	0.047	0.016	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:21	DRL
Selenium	ND	5.7	2.0	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 13:04	QNW
Silver	ND	0.57	0.26	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 13:04	QNW

Project Location: 375 Banfield road, Portsmouth, N
Sample Description:
Work Order: 21I1172
Date Received: 9/22/2021
Field Sample #: SD-204
Sampled: 9/22/2021 11:05
Sample ID: 21I1172-06
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	58.0		% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	140000	100	mg/Kg	1	Z-01	SW 846 9060A	9/28/21	9/28/21 20:11	DJM

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-204 Sampled: 9/22/2021 11:05

Sample ID: 21I1172-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Grain Size	see attached		%	1		SM D 422-63		10/6/21 0:00	GEOTL

Project Location: 375 Banfield road, Portsmouth, N
Sample Description:
Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-205
Sampled: 9/22/2021 13:20

Sample ID: 21I1172-07

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.0063	0.040	0.0019	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Acenaphthylene (SIM)	0.0045	0.040	0.0024	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Anthracene (SIM)	0.017	0.032	0.0019	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Benzo(a)anthracene (SIM)	0.054	0.0080	0.0043	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Benzo(a)pyrene (SIM)	0.046	0.0080	0.0024	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Benzo(b)fluoranthene (SIM)	0.059	0.0080	0.0039	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Benzo(g,h,i)perylene (SIM)	0.032	0.080	0.0029	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Benzo(k)fluoranthene (SIM)	0.025	0.032	0.0019	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Chrysene (SIM)	0.059	0.032	0.0053	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Dibenz(a,h)anthracene (SIM)	0.0082	0.0080	0.0029	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Fluoranthene (SIM)	0.12	0.080	0.0082	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Fluorene (SIM)	0.0064	0.16	0.0018	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.038	0.032	0.0030	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
2-Methylnaphthalene (SIM)	ND	0.16	0.018	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Naphthalene (SIM)	ND	0.16	0.058	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Phenanthrene (SIM)	0.081	0.040	0.0072	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 13:50	IMR
Pyrene (SIM)	0.092	0.16	0.0063	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 13:50	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	56.5	30-130		9/28/21 13:50
2-Fluorobiphenyl	47.5	30-130		9/28/21 13:50
p-Terphenyl-d14	52.9	30-130		9/28/21 13:50

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-205 Sampled: 9/22/2021 13:20

Sample ID: 21I1172-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	24	24	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
C9-C18 Aliphatics	ND	24	24	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
C19-C36 Aliphatics	24	24	24	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
C19-C36 Aliphatics	ND	24	24	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Unadjusted C11-C22 Aromatics	37	24	24	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Unadjusted C11-C22 Aromatics	ND	24	24	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
C11-C22 Aromatics	37	24	24	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
C11-C22 Aromatics	ND	24	24	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Acenaphthene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Acenaphthene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Acenaphthylene	ND	0.24	0.086	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Acenaphthylene	ND	0.24	0.086	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Anthracene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Anthracene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Benzo(a)anthracene	ND	0.24	0.088	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Benzo(a)anthracene	ND	0.24	0.088	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Benzo(a)pyrene	ND	0.24	0.082	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Benzo(a)pyrene	0.60	0.24	0.082	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Benzo(b)fluoranthene	ND	0.24	0.097	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Benzo(b)fluoranthene	ND	0.24	0.097	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Benzo(g,h,i)perylene	ND	0.24	0.099	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Benzo(g,h,i)perylene	ND	0.24	0.099	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Benzo(k)fluoranthene	ND	0.24	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Benzo(k)fluoranthene	ND	0.24	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Chrysene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Chrysene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Dibenz(a,h)anthracene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Dibenz(a,h)anthracene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Fluoranthene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Fluoranthene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Fluorene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Fluorene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Indeno(1,2,3-cd)pyrene	ND	0.24	0.11	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Indeno(1,2,3-cd)pyrene	ND	0.24	0.11	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
2-Methylnaphthalene	ND	0.24	0.096	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
2-Methylnaphthalene	ND	0.24	0.096	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Naphthalene	ND	0.24	0.061	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Naphthalene	ND	0.24	0.061	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Phenanthrene	ND	0.24	0.11	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Phenanthrene	ND	0.24	0.11	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH
Pyrene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:21	PJG
Pyrene	ND	0.24	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 18:31	AYH

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	**38.4**	*	40-140	S-19	9/28/21 22:21

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-205 Sampled: 9/22/2021 13:20

Sample ID: 21I1172-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	**20.0**	*	40-140	S-19	9/25/21 18:31
o-Terphenyl (OTP)	48.4		40-140		9/28/21 22:21
o-Terphenyl (OTP)	40.0		40-140	S-19	9/25/21 18:31
2-Bromonaphthalene	84.2		40-140		9/28/21 22:21
2-Bromonaphthalene	85.3		40-140		9/25/21 18:31
2-Fluorobiphenyl	87.4		40-140		9/28/21 22:21
2-Fluorobiphenyl	88.9		40-140		9/25/21 18:31

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-205 Sampled: 9/22/2021 13:20

Sample ID: 21I1172-07

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	21	7.8	2.9	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:11	QNW
Barium	95	3.9	1.5	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:11	QNW
Cadmium	1.6	0.78	0.40	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:11	QNW
Chromium	30	1.6	0.89	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:11	QNW
Lead	150	1.2	0.57	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:11	QNW
Mercury	0.087	0.064	0.022	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:23	DRL
Selenium	ND	7.8	2.8	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 13:11	QNW
Silver	ND	0.78	0.36	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 13:11	QNW

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-205 Sampled: 9/22/2021 13:20

Sample ID: 21I1172-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	41.5		% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	110000	100	mg/Kg	1	Z-01	SW 846 9060A	9/28/21	9/28/21 23:35	DJM

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-205   Sampled: 9/22/2021 13:20

Sample ID: 21I1172-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Grain Size	see attached		%	1		SM D 422-63		10/6/21 0:00	GEOTL

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-206   Sampled: 9/22/2021 13:30

Sample ID: 21I1172-08

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.014	0.11	0.0055	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Acenaphthylene (SIM)	0.013	0.11	0.0069	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Anthracene (SIM)	0.038	0.092	0.0055	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Benzo(a)anthracene (SIM)	0.15	0.023	0.012	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Benzo(a)pyrene (SIM)	0.13	0.023	0.0069	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Benzo(b)fluoranthene (SIM)	0.18	0.023	0.011	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Benzo(g,h,i)perylene (SIM)	0.088	0.23	0.0083	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Benzo(k)fluoranthene (SIM)	0.062	0.092	0.0055	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Chrysene (SIM)	0.16	0.092	0.015	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Dibenz(a,h)anthracene (SIM)	0.022	0.023	0.0083	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Fluoranthene (SIM)	0.31	0.23	0.023	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Fluorene (SIM)	0.011	0.46	0.0052	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.10	0.092	0.0087	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 14:12	IMR
2-Methylnaphthalene (SIM)	ND	0.46	0.051	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Naphthalene (SIM)	ND	0.46	0.17	mg/Kg dry	2	U	SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Phenanthrene (SIM)	0.16	0.11	0.021	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 14:12	IMR
Pyrene (SIM)	0.24	0.46	0.018	mg/Kg dry	2	J	SW-846 8270E	9/23/21	9/28/21 14:12	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	64.6	30-130		9/28/21 14:12
2-Fluorobiphenyl	40.5	30-130		9/28/21 14:12
p-Terphenyl-d14	45.6	30-130		9/28/21 14:12

Project Location: 375 Banfield road, Portsmouth, N	Sample Description:	Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-206	Sampled: 9/22/2021 13:30

Sample ID: 21I1172-08

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	69	69	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
C9-C18 Aliphatics	ND	69	69	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
C19-C36 Aliphatics	73	69	69	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
C19-C36 Aliphatics	72	69	69	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Unadjusted C11-C22 Aromatics	85	69	69	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Unadjusted C11-C22 Aromatics	80	69	69	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
C11-C22 Aromatics	85	69	69	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
C11-C22 Aromatics	78	69	69	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Acenaphthene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Acenaphthene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Acenaphthylene	ND	0.69	0.24	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Acenaphthylene	ND	0.69	0.24	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Anthracene	ND	0.69	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Anthracene	ND	0.69	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Benzo(a)anthracene	ND	0.69	0.25	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Benzo(a)anthracene	ND	0.69	0.25	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Benzo(a)pyrene	2.6	0.69	0.23	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Benzo(a)pyrene	ND	0.69	0.23	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Benzo(b)fluoranthene	ND	0.69	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Benzo(b)fluoranthene	ND	0.69	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Benzo(g,h,i)perylene	ND	0.69	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Benzo(g,h,i)perylene	ND	0.69	0.28	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Benzo(k)fluoranthene	ND	0.69	0.36	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Benzo(k)fluoranthene	ND	0.69	0.36	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Chrysene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Chrysene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Dibenz(a,h)anthracene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Dibenz(a,h)anthracene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Fluoranthene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Fluoranthene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Fluorene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Fluorene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Indeno(1,2,3-cd)pyrene	ND	0.69	0.30	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Indeno(1,2,3-cd)pyrene	ND	0.69	0.30	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
2-Methylnaphthalene	ND	0.69	0.27	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
2-Methylnaphthalene	ND	0.69	0.27	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Naphthalene	ND	0.69	0.17	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Naphthalene	ND	0.69	0.17	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Phenanthrene	ND	0.69	0.33	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Phenanthrene	ND	0.69	0.33	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH
Pyrene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 22:42	PJG
Pyrene	ND	0.69	0.29	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/25/21 19:13	AYH

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	**31.2**	*	40-140	S-19	9/28/21 22:42

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-206   Sampled: 9/22/2021 13:30

Sample ID: 21I1172-08

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	**36.3**	*	40-140	S-19	9/25/21 19:13
o-Terphenyl (OTP)	**33.2**	*	40-140	S-19	9/28/21 22:42
o-Terphenyl (OTP)	**35.5**	*	40-140	S-19	9/25/21 19:13
2-Bromonaphthalene	81.9		40-140		9/25/21 19:13
2-Bromonaphthalene	81.6		40-140		9/28/21 22:42
2-Fluorobiphenyl	85.1		40-140		9/25/21 19:13
2-Fluorobiphenyl	85.1		40-140		9/28/21 22:42

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-206 Sampled: 9/22/2021 13:30

Sample ID: 21I1172-08

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Arsenic	18	23	8.3	mg/Kg dry	1	J	SW-846 6010D	9/28/21	9/29/21 13:17	QNW
Barium	260	11	4.3	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:17	QNW
Cadmium	7.3	2.3	1.2	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:17	QNW
Chromium	22	4.6	2.6	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:17	QNW
Lead	880	3.4	1.7	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:17	QNW
Mercury	0.40	0.19	0.065	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:25	DRL
Selenium	ND	23	8.1	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 13:17	QNW
Silver	ND	2.3	1.0	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 13:17	QNW

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-206 Sampled: 9/22/2021 13:30

Sample ID: 21I1172-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	14.5		% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	200000	100	mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 0:25	DJM

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-206 Sampled: 9/22/2021 13:30

Sample ID: 21I1172-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Grain Size	see attached		%	1		SM D 422-63		10/6/21 0:00	GEOTL

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-207   Sampled: 9/22/2021 14:35

Sample ID: 21I1172-09

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	0.98	0.59	0.19	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Acenaphthylene	0.33	0.59	0.18	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Anthracene	2.7	0.59	0.19	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Benzo(a)anthracene	7.9	0.59	0.16	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Benzo(a)pyrene	7.3	0.59	0.18	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Benzo(b)fluoranthene	10	0.59	0.18	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Benzo(g,h,i)perylene	3.4	0.59	0.25	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Benzo(k)fluoranthene	3.7	0.59	0.16	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Chrysene	7.4	0.59	0.17	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Dibenz(a,h)anthracene	0.95	0.59	0.24	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Fluoranthene	17	1.2	0.38	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 19:42	BGL
Fluorene	1.1	0.59	0.20	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Indeno(1,2,3-cd)pyrene	4.0	0.59	0.27	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
2-Methylnaphthalene	0.43	0.59	0.19	mg/Kg dry	1	J	SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Naphthalene	0.82	0.59	0.16	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Phenanthrene	14	0.59	0.19	mg/Kg dry	1		SW-846 8270E	9/23/21	9/27/21 20:16	BGL
Pyrene	18	1.2	0.38	mg/Kg dry	2		SW-846 8270E	9/23/21	9/28/21 19:42	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Nitrobenzene-d5	49.4	30-130		9/27/21 20:16
Nitrobenzene-d5	48.0	30-130		9/28/21 19:42
2-Fluorobiphenyl	56.0	30-130		9/27/21 20:16
2-Fluorobiphenyl	54.3	30-130		9/28/21 19:42
p-Terphenyl-d14	57.4	30-130		9/27/21 20:16
p-Terphenyl-d14	65.7	30-130		9/28/21 19:42

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-207   Sampled: 9/22/2021 14:35

Sample ID: 21I1172-09

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	35	35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
C9-C18 Aliphatics	ND	35	35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
C19-C36 Aliphatics	96	35	35	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
C19-C36 Aliphatics	75	35	35	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Unadjusted C11-C22 Aromatics	480	35	35	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Unadjusted C11-C22 Aromatics	220	35	35	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
C11-C22 Aromatics	350	35	35	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
C11-C22 Aromatics	170	35	35	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Acenaphthene	1.2	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Acenaphthene	0.59	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Acenaphthylene	ND	0.35	0.12	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Acenaphthylene	ND	0.35	0.12	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Anthracene	3.1	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Anthracene	1.2	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Benzo(a)anthracene	11	0.35	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Benzo(a)anthracene	3.6	0.35	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Benzo(a)pyrene	9.8	0.35	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Benzo(a)pyrene	6.8	0.35	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Benzo(b)fluoranthene	12	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Benzo(b)fluoranthene	4.0	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Benzo(g,h,i)perylene	4.6	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Benzo(g,h,i)perylene	1.7	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Benzo(k)fluoranthene	4.7	0.35	0.18	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Benzo(k)fluoranthene	1.5	0.35	0.18	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Chrysene	11	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Chrysene	3.7	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Dibenz(a,h)anthracene	1.5	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Dibenz(a,h)anthracene	ND	0.35	0.14	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Fluoranthene	23	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Fluoranthene	8.1	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Fluorene	1.5	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Fluorene	0.49	0.35	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Indeno(1,2,3-cd)pyrene	5.5	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Indeno(1,2,3-cd)pyrene	1.8	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
2-Methylnaphthalene	ND	0.35	0.14	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
2-Methylnaphthalene	ND	0.35	0.14	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Naphthalene	ND	0.35	0.088	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Naphthalene	ND	0.35	0.088	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Phenanthrene	14	0.35	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Phenanthrene	5.5	0.35	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG
Pyrene	23	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/27/21	9/28/21 23:03	PJG
Pyrene	8.1	0.35	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/23/21	9/24/21 23:22	PJG

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	**31.1**	*	40-140	S-19	9/28/21 23:03

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-207 Sampled: 9/22/2021 14:35

Sample ID: 21I1172-09

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	**25.6**	*	40-140	S-19	9/24/21 23:22
o-Terphenyl (OTP)	41.6		40-140		9/28/21 23:03
o-Terphenyl (OTP)	**28.2**	*	40-140	S-19	9/24/21 23:22
2-Bromonaphthalene	116		40-140		9/28/21 23:03
2-Bromonaphthalene	92.7		40-140		9/24/21 23:22
2-Fluorobiphenyl	120		40-140		9/28/21 23:03
2-Fluorobiphenyl	95.9		40-140		9/24/21 23:22

Project Location: 375 Banfield road, Portsmouth, N Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-207 Sampled: 9/22/2021 14:35

Sample ID: 21I1172-09

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	24	12	4.3	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:24	QNW
Barium	440	5.8	2.2	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:24	QNW
Cadmium	2.3	1.2	0.60	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:24	QNW
Chromium	32	2.3	1.3	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:24	QNW
Lead	3500	1.8	0.85	mg/Kg dry	1		SW-846 6010D	9/28/21	9/29/21 13:24	QNW
Mercury	0.42	0.092	0.031	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:27	DRL
Selenium	ND	12	4.2	mg/Kg dry	1	U	SW-846 6010D	9/28/21	9/29/21 13:24	QNW
Silver	ND	2.3	1.1	mg/Kg dry	2	U	SW-846 6010D	9/28/21	9/29/21 15:24	ICP

Project Location: 375 Banfield road, Portsmouth, N   Sample Description: Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-207   Sampled: 9/22/2021 14:35

Sample ID: 21I1172-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	28.7		% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	210000	100	mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 1:06	DJM

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield road, Portsmouth, N
Sample Description:
Work Order: 21I1172

Date Received: 9/22/2021

Field Sample #: SD-207
Sampled: 9/22/2021 14:35

Sample ID: 21I1172-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Grain Size	see attached		%	1		SM D 422-63		10/6/21 0:00	GEOTL

Sample Extraction Data

Prep Method: SW-846 3005A   Analytical Method: EPA 200.7

Lab Number [Field ID]	Batch	Initial [mL]	Date
21I1172-01 [SW-201]	B291070	50.0	09/27/21
21I1172-04 [SW-203]	B291070	50.0	09/27/21

Prep Method: SW-846 3546   Analytical Method: MADEP EPH rev 2.1

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-02 [SD-201]	B290854	20.0	2.00	09/23/21
21I1172-03 [SD-202]	B290854	20.0	2.00	09/23/21
21I1172-06 [SD-204]	B290854	20.0	2.00	09/23/21
21I1172-07 [SD-205]	B290854	20.0	2.00	09/23/21
21I1172-08 [SD-206]	B290854	20.0	2.00	09/23/21
21I1172-09 [SD-207]	B290854	20.0	2.00	09/23/21

Prep Method: SW-846 3546   Analytical Method: MADEP EPH rev 2.1

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-05RE1 [SD-203]	B291117	20.0	2.00	09/27/21
21I1172-06RE1 [SD-204]	B291117	20.0	2.00	09/27/21
21I1172-07RE1 [SD-205]	B291117	20.0	2.00	09/27/21
21I1172-08RE1 [SD-206]	B291117	20.0	2.00	09/27/21
21I1172-09RE1 [SD-207]	B291117	20.0	2.00	09/27/21

Prep Method: % Solids   Analytical Method: SM 2540G

Lab Number [Field ID]	Batch	Date
21I1172-02 [SD-201]	B291142	09/28/21
21I1172-03 [SD-202]	B291142	09/28/21
21I1172-05 [SD-203]	B291142	09/28/21
21I1172-06 [SD-204]	B291142	09/28/21
21I1172-07 [SD-205]	B291142	09/28/21
21I1172-08 [SD-206]	B291142	09/28/21
21I1172-09 [SD-207]	B291142	09/28/21

SW 846 9060A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-02 [SD-201]	B291136	1.00	1.00	09/28/21
21I1172-03 [SD-202]	B291136	1.00	1.00	09/28/21
21I1172-05 [SD-203]	B291136	1.00	1.00	09/28/21
21I1172-06 [SD-204]	B291136	1.00	1.00	09/28/21
21I1172-07 [SD-205]	B291136	1.00	1.00	09/28/21
21I1172-08 [SD-206]	B291136	1.00	1.00	09/29/21
21I1172-09 [SD-207]	B291136	1.00	1.00	09/29/21

Prep Method: SW-846 3050B   Analytical Method: SW-846 6010D

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-02 [SD-201]	B291177	1.51	50.0	09/28/21
21I1172-03 [SD-202]	B291177	1.50	50.0	09/28/21

Sample Extraction Data

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-05 [SD-203]	B291177	1.53	50.0	09/28/21
21I1172-06 [SD-204]	B291177	1.52	50.0	09/28/21
21I1172-07 [SD-205]	B291177	1.54	50.0	09/28/21
21I1172-08 [SD-206]	B291177	1.51	50.0	09/28/21
21I1172-09 [SD-207]	B291177	1.49	50.0	09/28/21

Prep Method: SW-846 3005A **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1172-01 [SW-201]	B291069	50.0	50.0	09/27/21
21I1172-04 [SW-203]	B291069	50.0	50.0	09/27/21

Prep Method: SW-846 3005A Dissolved **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1172-01 [SW-201]	B291129	50.0	50.0	09/27/21
21I1172-04 [SW-203]	B291129	50.0	50.0	09/27/21

Prep Method: SW-846 7470A Dissolved **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1172-01 [SW-201]	B290978	6.00	6.00	09/24/21
21I1172-04 [SW-203]	B290978	6.00	6.00	09/24/21

Prep Method: SW-846 7470A Prep **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1172-01 [SW-201]	B291183	6.00	6.00	09/28/21
21I1172-04 [SW-203]	B291183	6.00	6.00	09/28/21

Prep Method: SW-846 7471 **Analytical Method: SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-02 [SD-201]	B291002	0.539	50.0	09/25/21
21I1172-03 [SD-202]	B291002	0.512	50.0	09/25/21
21I1172-05 [SD-203]	B291002	0.523	50.0	09/25/21
21I1172-06 [SD-204]	B291002	0.549	50.0	09/25/21
21I1172-07 [SD-205]	B291002	0.562	50.0	09/25/21
21I1172-08 [SD-206]	B291002	0.538	50.0	09/25/21
21I1172-09 [SD-207]	B291002	0.565	50.0	09/25/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-02 [SD-201]	B290907	30.0	1.00	09/23/21
21I1172-02RE1 [SD-201]	B290907	30.0	1.00	09/23/21
21I1172-03 [SD-202]	B290907	30.0	1.00	09/23/21

Sample Extraction Data

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-09 [SD-207]	B290907	30.0	1.00	09/23/21
21I1172-09RE1 [SD-207]	B290907	30.0	1.00	09/23/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1172-05 [SD-203]	B291031	30.0	1.00	09/23/21
21I1172-06 [SD-204]	B291031	30.0	1.00	09/23/21
21I1172-07 [SD-205]	B291031	30.0	1.00	09/23/21
21I1172-08 [SD-206]	B291031	30.0	1.00	09/23/21

Prep Method: SW-846 3510C **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1172-01 [SW-201]	B291030	1020	1.00	09/23/21
21I1172-04 [SW-203]	B291030	1020	1.00	09/23/21

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290907 - SW-846 3546										
Blank (B290907-BLK1)				Prepared: 09/23/21 Analyzed: 09/25/21						
Acenaphthene	ND	0.17	mg/Kg wet							U
Acenaphthylene	ND	0.17	mg/Kg wet							U
Anthracene	ND	0.17	mg/Kg wet							U
Benzo(a)anthracene	ND	0.17	mg/Kg wet							U
Benzo(a)pyrene	ND	0.17	mg/Kg wet							U
Benzo(b)fluoranthene	ND	0.17	mg/Kg wet							U
Benzo(g,h,i)perylene	ND	0.17	mg/Kg wet							U
Benzo(k)fluoranthene	ND	0.17	mg/Kg wet							U
Chrysene	ND	0.17	mg/Kg wet							U
Dibenz(a,h)anthracene	ND	0.17	mg/Kg wet							U
Fluoranthene	ND	0.17	mg/Kg wet							U
Fluorene	ND	0.17	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene	ND	0.17	mg/Kg wet							U
2-Methylnaphthalene	ND	0.17	mg/Kg wet							U
Naphthalene	ND	0.17	mg/Kg wet							U
Phenanthrene	ND	0.17	mg/Kg wet							U
Pyrene	ND	0.17	mg/Kg wet							U
Surrogate: Nitrobenzene-d5	*3.09*		mg/Kg wet	3.33		92.6	30-130			
Surrogate: 2-Fluorobiphenyl	*3.12*		mg/Kg wet	3.33		93.7	30-130			
Surrogate: p-Terphenyl-d14	*3.28*		mg/Kg wet	3.33		98.4	30-130			
LCS (B290907-BS1)				Prepared: 09/23/21 Analyzed: 09/25/21						
Acenaphthene	1.32	0.17	mg/Kg wet	1.67		79.2	40-140			
Acenaphthylene	1.33	0.17	mg/Kg wet	1.67		79.7	40-140			
Anthracene	1.40	0.17	mg/Kg wet	1.67		84.0	40-140			
Benzo(a)anthracene	1.30	0.17	mg/Kg wet	1.67		78.0	40-140			
Benzo(a)pyrene	1.47	0.17	mg/Kg wet	1.67		88.2	40-140			
Benzo(b)fluoranthene	1.44	0.17	mg/Kg wet	1.67		86.7	40-140			
Benzo(g,h,i)perylene	1.21	0.17	mg/Kg wet	1.67		72.4	40-140			
Benzo(k)fluoranthene	1.38	0.17	mg/Kg wet	1.67		83.1	40-140			
Chrysene	1.25	0.17	mg/Kg wet	1.67		75.3	40-140			
Dibenz(a,h)anthracene	1.32	0.17	mg/Kg wet	1.67		79.4	40-140			
Fluoranthene	1.43	0.17	mg/Kg wet	1.67		85.9	40-140			
Fluorene	1.37	0.17	mg/Kg wet	1.67		82.3	40-140			
Indeno(1,2,3-cd)pyrene	1.40	0.17	mg/Kg wet	1.67		84.2	40-140			
2-Methylnaphthalene	1.50	0.17	mg/Kg wet	1.67		89.9	40-140			
Naphthalene	1.27	0.17	mg/Kg wet	1.67		76.3	40-140			
Phenanthrene	1.40	0.17	mg/Kg wet	1.67		84.0	40-140			
Pyrene	1.32	0.17	mg/Kg wet	1.67		79.1	40-140			
Surrogate: Nitrobenzene-d5	*3.01*		mg/Kg wet	3.33		90.3	30-130			
Surrogate: 2-Fluorobiphenyl	*3.05*		mg/Kg wet	3.33		91.5	30-130			
Surrogate: p-Terphenyl-d14	*3.24*		mg/Kg wet	3.33		97.3	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290907 - SW-846 3546										
LCS Dup (B290907-BSD1)				Prepared: 09/23/21 Analyzed: 09/25/21						
Acenaphthene	1.29	0.17	mg/Kg wet	1.67		77.3	40-140	2.45	30	
Acenaphthylene	1.29	0.17	mg/Kg wet	1.67		77.6	40-140	2.70	30	
Anthracene	1.37	0.17	mg/Kg wet	1.67		82.2	40-140	2.17	30	
Benzo(a)anthracene	1.27	0.17	mg/Kg wet	1.67		76.0	40-140	2.62	30	
Benzo(a)pyrene	1.45	0.17	mg/Kg wet	1.67		87.2	40-140	1.21	30	
Benzo(b)fluoranthene	1.40	0.17	mg/Kg wet	1.67		83.8	40-140	3.43	30	
Benzo(g,h,i)perylene	1.17	0.17	mg/Kg wet	1.67		70.3	40-140	2.97	30	
Benzo(k)fluoranthene	1.41	0.17	mg/Kg wet	1.67		84.6	40-140	1.81	30	
Chrysene	1.23	0.17	mg/Kg wet	1.67		74.0	40-140	1.69	30	
Dibenz(a,h)anthracene	1.31	0.17	mg/Kg wet	1.67		78.5	40-140	1.11	30	
Fluoranthene	1.42	0.17	mg/Kg wet	1.67		85.2	40-140	0.889	30	
Fluorene	1.37	0.17	mg/Kg wet	1.67		82.0	40-140	0.317	30	
Indeno(1,2,3-cd)pyrene	1.37	0.17	mg/Kg wet	1.67		82.0	40-140	2.62	30	
2-Methylnaphthalene	1.39	0.17	mg/Kg wet	1.67		83.5	40-140	7.43	30	
Naphthalene	1.20	0.17	mg/Kg wet	1.67		71.8	40-140	6.05	30	
Phenanthrene	1.36	0.17	mg/Kg wet	1.67		81.3	40-140	3.27	30	
Pyrene	1.31	0.17	mg/Kg wet	1.67		78.5	40-140	0.761	30	
Surrogate: Nitrobenzene-d5	*2.77*		mg/Kg wet	3.33		83.0	30-130			
Surrogate: 2-Fluorobiphenyl	*2.86*		mg/Kg wet	3.33		85.8	30-130			
Surrogate: p-Terphenyl-d14	*3.10*		mg/Kg wet	3.33		93.1	30-130			
Batch B291030 - SW-846 3510C										
Blank (B291030-BLK1)				Prepared: 09/23/21 Analyzed: 09/27/21						
Acenaphthene (SIM)	ND	0.30	µg/L							U
Acenaphthylene (SIM)	ND	0.20	µg/L							U
Anthracene (SIM)	ND	0.20	µg/L							U
Benzo(a)anthracene (SIM)	ND	0.050	µg/L							U
Benzo(a)pyrene (SIM)	ND	0.10	µg/L							U
Benzo(b)fluoranthene (SIM)	ND	0.050	µg/L							U
Benzo(g,h,i)perylene (SIM)	ND	0.50	µg/L							U
Benzo(k)fluoranthene (SIM)	ND	0.20	µg/L							U
Chrysene (SIM)	ND	0.20	µg/L							U
Dibenz(a,h)anthracene (SIM)	ND	0.10	µg/L							U
Fluoranthene (SIM)	ND	0.50	µg/L							U
Fluorene (SIM)	ND	1.0	µg/L							U
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.10	µg/L							U
2-Methylnaphthalene (SIM)	ND	1.0	µg/L							U
Naphthalene (SIM)	ND	1.0	µg/L							U
Phenanthrene (SIM)	ND	0.050	µg/L							U
Pyrene (SIM)	ND	1.0	µg/L							U
Surrogate: Nitrobenzene-d5	*61.9*		µg/L	100		61.9	30-130			
Surrogate: 2-Fluorobiphenyl	*56.6*		µg/L	100		56.6	30-130			
Surrogate: p-Terphenyl-d14	*73.0*		µg/L	100		73.0	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291030 - SW-846 3510C										
LCS (B291030-BS1)				Prepared: 09/23/21 Analyzed: 09/27/21						
Acenaphthene (SIM)	35.2	6.0	µg/L	50.0		70.3	40-140			
Acenaphthylene (SIM)	36.9	4.0	µg/L	50.0		73.8	40-140			
Anthracene (SIM)	41.8	4.0	µg/L	50.0		83.6	40-140			
Benzo(a)anthracene (SIM)	40.3	1.0	µg/L	50.0		80.5	40-140			
Benzo(a)pyrene (SIM)	45.0	2.0	µg/L	50.0		90.0	40-140			
Benzo(b)fluoranthene (SIM)	45.6	1.0	µg/L	50.0		91.3	40-140			
Benzo(g,h,i)perylene (SIM)	44.0	10	µg/L	50.0		88.0	40-140			
Benzo(k)fluoranthene (SIM)	44.2	4.0	µg/L	50.0		88.4	40-140			
Chrysene (SIM)	39.6	4.0	µg/L	50.0		79.2	40-140			
Dibenz(a,h)anthracene (SIM)	43.8	2.0	µg/L	50.0		87.6	40-140			
Fluoranthene (SIM)	39.3	10	µg/L	50.0		78.7	40-140			
Fluorene (SIM)	38.6	20	µg/L	50.0		77.2	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	46.4	2.0	µg/L	50.0		92.8	40-140			
2-Methylnaphthalene (SIM)	36.2	20	µg/L	50.0		72.5	40-140			
Naphthalene (SIM)	30.8	20	µg/L	50.0		61.7	40-140			
Phenanthrene (SIM)	39.3	1.0	µg/L	50.0		78.6	40-140			
Pyrene (SIM)	39.8	20	µg/L	50.0		79.6	40-140			
Surrogate: Nitrobenzene-d5	*69.9*		µg/L	100		69.9	30-130			
Surrogate: 2-Fluorobiphenyl	*72.1*		µg/L	100		72.1	30-130			
Surrogate: p-Terphenyl-d14	*75.6*		µg/L	100		75.6	30-130			
LCS Dup (B291030-BSD1)				Prepared: 09/23/21 Analyzed: 09/27/21						
Acenaphthene (SIM)	33.1	6.0	µg/L	50.0		66.1	40-140	6.16	20	
Acenaphthylene (SIM)	34.8	4.0	µg/L	50.0		69.6	40-140	5.86	20	
Anthracene (SIM)	38.0	4.0	µg/L	50.0		76.0	40-140	9.58	20	
Benzo(a)anthracene (SIM)	36.4	1.0	µg/L	50.0		72.7	40-140	10.2	20	
Benzo(a)pyrene (SIM)	40.6	2.0	µg/L	50.0		81.1	40-140	10.3	20	
Benzo(b)fluoranthene (SIM)	40.9	1.0	µg/L	50.0		81.8	40-140	11.0	20	
Benzo(g,h,i)perylene (SIM)	39.4	10	µg/L	50.0		78.8	40-140	11.0	20	
Benzo(k)fluoranthene (SIM)	39.9	4.0	µg/L	50.0		79.8	40-140	10.2	20	
Chrysene (SIM)	36.0	4.0	µg/L	50.0		72.0	40-140	9.63	20	
Dibenz(a,h)anthracene (SIM)	39.4	2.0	µg/L	50.0		78.9	40-140	10.5	20	
Fluoranthene (SIM)	35.7	10	µg/L	50.0		71.4	40-140	9.65	20	
Fluorene (SIM)	36.0	20	µg/L	50.0		72.0	40-140	6.86	20	
Indeno(1,2,3-cd)pyrene (SIM)	41.6	2.0	µg/L	50.0		83.1	40-140	11.0	20	
2-Methylnaphthalene (SIM)	35.3	20	µg/L	50.0		70.6	40-140	2.68	20	
Naphthalene (SIM)	29.5	20	µg/L	50.0		59.0	40-140	4.44	20	
Phenanthrene (SIM)	35.8	1.0	µg/L	50.0		71.6	40-140	9.32	20	
Pyrene (SIM)	35.9	20	µg/L	50.0		71.8	40-140	10.4	20	
Surrogate: Nitrobenzene-d5	*68.1*		µg/L	100		68.1	30-130			
Surrogate: 2-Fluorobiphenyl	*66.7*		µg/L	100		66.7	30-130			
Surrogate: p-Terphenyl-d14	*69.4*		µg/L	100		69.4	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291031 - SW-846 3546										
Blank (B291031-BLK1)				Prepared: 09/23/21 Analyzed: 09/27/21						
Acenaphthene (SIM)	ND	0.0083	mg/Kg wet							U
Acenaphthylene (SIM)	ND	0.0083	mg/Kg wet							U
Anthracene (SIM)	ND	0.0067	mg/Kg wet							U
Benzo(a)anthracene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(a)pyrene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(b)fluoranthene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(g,h,i)perylene (SIM)	ND	0.017	mg/Kg wet							U
Benzo(k)fluoranthene (SIM)	ND	0.0067	mg/Kg wet							U
Chrysene (SIM)	ND	0.0067	mg/Kg wet							U
Dibenz(a,h)anthracene (SIM)	ND	0.0017	mg/Kg wet							U
Fluoranthene (SIM)	ND	0.017	mg/Kg wet							U
Fluorene (SIM)	ND	0.033	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.0067	mg/Kg wet							U
2-Methylnaphthalene (SIM)	ND	0.033	mg/Kg wet							U
Naphthalene (SIM)	ND	0.033	mg/Kg wet							U
Phenanthrene (SIM)	ND	0.0083	mg/Kg wet							U
Pyrene (SIM)	ND	0.033	mg/Kg wet							U
Surrogate: Nitrobenzene-d5	*2.76*		mg/Kg wet	3.33		82.8	30-130			
Surrogate: 2-Fluorobiphenyl	*2.35*		mg/Kg wet	3.33		70.6	30-130			
Surrogate: p-Terphenyl-d14	*2.69*		mg/Kg wet	3.33		80.8	30-130			
LCS (B291031-BS1)				Prepared: 09/23/21 Analyzed: 09/27/21						
Acenaphthene (SIM)	1.35	0.17	mg/Kg wet	1.67		81.0	40-140			
Acenaphthylene (SIM)	1.43	0.17	mg/Kg wet	1.67		85.9	40-140			
Anthracene (SIM)	1.52	0.13	mg/Kg wet	1.67		91.3	40-140			
Benzo(a)anthracene (SIM)	1.43	0.033	mg/Kg wet	1.67		86.1	40-140			
Benzo(a)pyrene (SIM)	1.62	0.033	mg/Kg wet	1.67		96.9	40-140			
Benzo(b)fluoranthene (SIM)	1.63	0.033	mg/Kg wet	1.67		98.0	40-140			
Benzo(g,h,i)perylene (SIM)	1.57	0.33	mg/Kg wet	1.67		94.3	40-140			
Benzo(k)fluoranthene (SIM)	1.58	0.13	mg/Kg wet	1.67		95.0	40-140			
Chrysene (SIM)	1.42	0.13	mg/Kg wet	1.67		85.4	40-140			
Dibenz(a,h)anthracene (SIM)	1.56	0.033	mg/Kg wet	1.67		93.6	40-140			
Fluoranthene (SIM)	1.42	0.33	mg/Kg wet	1.67		85.0	40-140			
Fluorene (SIM)	1.44	0.67	mg/Kg wet	1.67		86.2	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	1.65	0.13	mg/Kg wet	1.67		98.9	40-140			
2-Methylnaphthalene (SIM)	1.50	0.67	mg/Kg wet	1.67		90.0	40-140			
Naphthalene (SIM)	1.34	0.67	mg/Kg wet	1.67		80.2	40-140			
Phenanthrene (SIM)	1.44	0.17	mg/Kg wet	1.67		86.2	40-140			
Pyrene (SIM)	1.43	0.67	mg/Kg wet	1.67		85.7	40-140			
Surrogate: Nitrobenzene-d5	*2.88*		mg/Kg wet	3.33		86.5	30-130			
Surrogate: 2-Fluorobiphenyl	*2.79*		mg/Kg wet	3.33		83.7	30-130			
Surrogate: p-Terphenyl-d14	*2.72*		mg/Kg wet	3.33		81.7	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291031 - SW-846 3546										
LCS Dup (B291031-BSD1)				Prepared: 09/23/21 Analyzed: 09/27/21						
Acenaphthene (SIM)	1.14	0.17	mg/Kg wet	1.67		68.4	40-140	17.0	20	
Acenaphthylene (SIM)	1.20	0.17	mg/Kg wet	1.67		71.7	40-140	18.0	20	
Anthracene (SIM)	1.29	0.13	mg/Kg wet	1.67		77.2	40-140	16.7	20	
Benzo(a)anthracene (SIM)	1.21	0.033	mg/Kg wet	1.67		72.6	40-140	17.0	20	
Benzo(a)pyrene (SIM)	1.35	0.033	mg/Kg wet	1.67		81.1	40-140	17.7	20	
Benzo(b)fluoranthene (SIM)	1.36	0.033	mg/Kg wet	1.67		81.6	40-140	18.2	20	
Benzo(g,h,i)perylene (SIM)	1.30	0.33	mg/Kg wet	1.67		77.9	40-140	19.0	20	
Benzo(k)fluoranthene (SIM)	1.32	0.13	mg/Kg wet	1.67		79.1	40-140	18.3	20	
Chrysene (SIM)	1.18	0.13	mg/Kg wet	1.67		71.0	40-140	18.4	20	
Dibenz(a,h)anthracene (SIM)	1.30	0.033	mg/Kg wet	1.67		78.2	40-140	18.0	20	
Fluoranthene (SIM)	1.20	0.33	mg/Kg wet	1.67		72.1	40-140	16.5	20	
Fluorene (SIM)	1.22	0.67	mg/Kg wet	1.67		73.0	40-140	16.6	20	
Indeno(1,2,3-cd)pyrene (SIM)	1.38	0.13	mg/Kg wet	1.67		82.6	40-140	17.9	20	
2-Methylnaphthalene (SIM)	1.26	0.67	mg/Kg wet	1.67		75.7	40-140	17.3	20	
Naphthalene (SIM)	1.11	0.67	mg/Kg wet	1.67		66.6	40-140	18.5	20	
Phenanthrene (SIM)	1.22	0.17	mg/Kg wet	1.67		73.0	40-140	16.6	20	
Pyrene (SIM)	1.22	0.67	mg/Kg wet	1.67		73.3	40-140	15.6	20	
Surrogate: Nitrobenzene-d5	*2.44*		mg/Kg wet	3.33		73.3	30-130			
Surrogate: 2-Fluorobiphenyl	*2.29*		mg/Kg wet	3.33		68.8	30-130			
Surrogate: p-Terphenyl-d14	*2.47*		mg/Kg wet	3.33		74.1	30-130			

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290854 - SW-846 3546										
Blank (B290854-BLK1)				Prepared: 09/23/21 Analyzed: 09/24/21						
C9-C18 Aliphatics	ND	10	mg/Kg wet							U
C19-C36 Aliphatics	ND	10	mg/Kg wet							U
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							U
C11-C22 Aromatics	ND	10	mg/Kg wet							U
Acenaphthene	ND	0.10	mg/Kg wet							U
Acenaphthylene	ND	0.10	mg/Kg wet							U
Anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)pyrene	ND	0.10	mg/Kg wet							U
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							U
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							U
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							U
Chrysene	ND	0.10	mg/Kg wet							U
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							U
Fluoranthene	ND	0.10	mg/Kg wet							U
Fluorene	ND	0.10	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene	ND	0.10	mg/Kg wet							U
Naphthalene	ND	0.10	mg/Kg wet							U
Phenanthrene	ND	0.10	mg/Kg wet							U
Pyrene	ND	0.10	mg/Kg wet							U
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
Surrogate: Chlorooctadecane (COD)	*2.80*		mg/Kg wet	5.00		56.1	40-140			
Surrogate: o-Terphenyl (OTP)	*3.20*		mg/Kg wet	5.00		63.9	40-140			
Surrogate: 2-Bromonaphthalene	*3.97*		mg/Kg wet	5.00		79.5	40-140			
Surrogate: 2-Fluorobiphenyl	*4.10*		mg/Kg wet	5.00		82.0	40-140			
LCS (B290854-BS1)				Prepared: 09/23/21 Analyzed: 09/24/21						
C9-C18 Aliphatics	20.1	10	mg/Kg wet	30.0		66.9	40-140			
C19-C36 Aliphatics	29.4	10	mg/Kg wet	40.0		73.4	40-140			
Unadjusted C11-C22 Aromatics	63.8	10	mg/Kg wet	85.0		75.1	40-140			
Acenaphthene	3.26	0.10	mg/Kg wet	5.00		65.2	40-140			
Acenaphthylene	3.11	0.10	mg/Kg wet	5.00		62.1	40-140			
Anthracene	3.57	0.10	mg/Kg wet	5.00		71.4	40-140			
Benzo(a)anthracene	3.78	0.10	mg/Kg wet	5.00		75.5	40-140			
Benzo(a)pyrene	3.83	0.10	mg/Kg wet	5.00		76.6	40-140			
Benzo(b)fluoranthene	4.19	0.10	mg/Kg wet	5.00		83.8	40-140			
Benzo(g,h,i)perylene	3.35	0.10	mg/Kg wet	5.00		66.9	40-140			
Benzo(k)fluoranthene	3.06	0.10	mg/Kg wet	5.00		61.2	40-140			
Chrysene	3.44	0.10	mg/Kg wet	5.00		68.8	40-140			
Dibenz(a,h)anthracene	3.46	0.10	mg/Kg wet	5.00		69.2	40-140			
Fluoranthene	3.53	0.10	mg/Kg wet	5.00		70.7	40-140			
Fluorene	3.34	0.10	mg/Kg wet	5.00		66.9	40-140			
Indeno(1,2,3-cd)pyrene	3.51	0.10	mg/Kg wet	5.00		70.1	40-140			
2-Methylnaphthalene	3.25	0.10	mg/Kg wet	5.00		64.9	40-140			
Naphthalene	3.27	0.10	mg/Kg wet	5.00		65.5	40-140			
Phenanthrene	3.60	0.10	mg/Kg wet	5.00		72.0	40-140			
Pyrene	3.63	0.10	mg/Kg wet	5.00		72.6	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.05*		mg/Kg wet	5.00		61.0	40-140			

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290854 - SW-846 3546										
LCS (B290854-BS1)				Prepared: 09/23/21 Analyzed: 09/24/21						
Surrogate: o-Terphenyl (OTP)	*3.22*		mg/Kg wet	5.00		64.3	40-140			
Surrogate: 2-Bromonaphthalene	*4.42*		mg/Kg wet	5.00		88.5	40-140			
Surrogate: 2-Fluorobiphenyl	*4.52*		mg/Kg wet	5.00		90.5	40-140			
LCS Dup (B290854-BSD1)				Prepared: 09/23/21 Analyzed: 09/24/21						
C9-C18 Aliphatics	21.7	10	mg/Kg wet	30.0		72.4	40-140	7.80	25	
C19-C36 Aliphatics	31.9	10	mg/Kg wet	40.0		79.8	40-140	8.38	25	
Unadjusted C11-C22 Aromatics	65.4	10	mg/Kg wet	85.0		76.9	40-140	2.38	25	
Acenaphthene	3.47	0.10	mg/Kg wet	5.00		69.5	40-140	6.32	25	
Acenaphthylene	3.32	0.10	mg/Kg wet	5.00		66.3	40-140	6.51	25	
Anthracene	3.62	0.10	mg/Kg wet	5.00		72.4	40-140	1.33	25	
Benzo(a)anthracene	3.83	0.10	mg/Kg wet	5.00		76.7	40-140	1.46	25	
Benzo(a)pyrene	3.82	0.10	mg/Kg wet	5.00		76.5	40-140	0.102	25	
Benzo(b)fluoranthene	4.14	0.10	mg/Kg wet	5.00		82.8	40-140	1.18	25	
Benzo(g,h,i)perylene	3.50	0.10	mg/Kg wet	5.00		70.1	40-140	4.66	25	
Benzo(k)fluoranthene	3.10	0.10	mg/Kg wet	5.00		62.1	40-140	1.46	25	
Chrysene	3.58	0.10	mg/Kg wet	5.00		71.6	40-140	3.97	25	
Dibenz(a,h)anthracene	3.70	0.10	mg/Kg wet	5.00		74.1	40-140	6.76	25	
Fluoranthene	3.55	0.10	mg/Kg wet	5.00		70.9	40-140	0.381	25	
Fluorene	3.49	0.10	mg/Kg wet	5.00		69.9	40-140	4.41	25	
Indeno(1,2,3-cd)pyrene	3.50	0.10	mg/Kg wet	5.00		70.0	40-140	0.208	25	
2-Methylnaphthalene	3.38	0.10	mg/Kg wet	5.00		67.7	40-140	4.19	25	
Naphthalene	3.33	0.10	mg/Kg wet	5.00		66.6	40-140	1.71	25	
Phenanthrene	3.66	0.10	mg/Kg wet	5.00		73.2	40-140	1.60	25	
Pyrene	3.65	0.10	mg/Kg wet	5.00		73.0	40-140	0.547	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.22*		mg/Kg wet	5.00		64.4	40-140			
Surrogate: o-Terphenyl (OTP)	*3.15*		mg/Kg wet	5.00		63.1	40-140			
Surrogate: 2-Bromonaphthalene	*4.47*		mg/Kg wet	5.00		89.5	40-140			
Surrogate: 2-Fluorobiphenyl	*4.53*		mg/Kg wet	5.00		90.6	40-140			
Matrix Spike (B290854-MS1)	**Source: 21I1172-09**			Prepared: 09/23/21 Analyzed: 09/24/21						
C9-C18 Aliphatics	77.5	35	mg/Kg dry	104	ND	74.3	40-140			
C19-C36 Aliphatics	239	35	mg/Kg dry	139	74.9	118	40-140			
Unadjusted C11-C22 Aromatics	538	35	mg/Kg dry	296	220	108	40-140			
Acenaphthene	12.6	0.35	mg/Kg dry	17.4	0.592	69.3	40-140			
Acenaphthylene	11.9	0.35	mg/Kg dry	17.4	ND	68.4	40-140			
Anthracene	13.9	0.35	mg/Kg dry	17.4	1.16	73.2	40-140			
Benzo(a)anthracene	18.4	0.35	mg/Kg dry	17.4	3.64	84.9	40-140			
Benzo(a)pyrene	22.1	0.35	mg/Kg dry	17.4	6.79	87.9	40-140			
Benzo(b)fluoranthene	19.4	0.35	mg/Kg dry	17.4	4.00	88.4	40-140			
Benzo(g,h,i)perylene	13.4	0.35	mg/Kg dry	17.4	1.74	66.8	40-140			
Benzo(k)fluoranthene	12.7	0.35	mg/Kg dry	17.4	1.53	64.0	40-140			
Chrysene	17.4	0.35	mg/Kg dry	17.4	3.70	78.9	40-140			
Dibenz(a,h)anthracene	12.4	0.35	mg/Kg dry	17.4	ND	71.2	40-140			
Fluoranthene	23.2	0.35	mg/Kg dry	17.4	8.12	86.9	40-140			
Fluorene	12.7	0.35	mg/Kg dry	17.4	0.491	70.0	40-140			
Indeno(1,2,3-cd)pyrene	14.7	0.35	mg/Kg dry	17.4	1.78	74.5	40-140			
2-Methylnaphthalene	12.0	0.35	mg/Kg dry	17.4	ND	69.0	40-140			
Naphthalene	11.4	0.35	mg/Kg dry	17.4	ND	65.6	40-140			
Phenanthrene	19.1	0.35	mg/Kg dry	17.4	5.54	78.0	40-140			

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290854 - SW-846 3546										
Matrix Spike (B290854-MS1)	**Source: 21I1172-09**			Prepared: 09/23/21 Analyzed: 09/24/21						
Pyrene	23.6	0.35	mg/Kg dry	17.4	8.10	89.2	40-140			
Surrogate: Chlorooctadecane (COD)	*10.9*		mg/Kg dry	17.4		62.8	40-140			
Surrogate: o-Terphenyl (OTP)	*10.0*		mg/Kg dry	17.4		57.7	40-140			
Surrogate: 2-Bromonaphthalene	*14.8*		mg/Kg dry	17.4		85.3	40-140			
Surrogate: 2-Fluorobiphenyl	*14.9*		mg/Kg dry	17.4		85.5	40-140			
Matrix Spike Dup (B290854-MSD1)	**Source: 21I1172-09**			Prepared: 09/23/21 Analyzed: 09/25/21						
C9-C18 Aliphatics	54.6	35	mg/Kg dry	104	ND	52.3	40-140	34.6	50	
C19-C36 Aliphatics	200	35	mg/Kg dry	139	74.9	89.8	40-140	17.8	50	
Unadjusted C11-C22 Aromatics	506	35	mg/Kg dry	296	220	96.8	40-140	6.15	50	
Acenaphthene	11.2	0.35	mg/Kg dry	17.4	0.592	61.0	40-140	12.1	50	
Acenaphthylene	10.3	0.35	mg/Kg dry	17.4	ND	59.3	40-140	14.3	50	
Anthracene	12.9	0.35	mg/Kg dry	17.4	1.16	67.8	40-140	7.01	50	
Benzo(a)anthracene	17.3	0.35	mg/Kg dry	17.4	3.64	78.8	40-140	5.90	50	
Benzo(a)pyrene	17.6	0.35	mg/Kg dry	17.4	6.79	62.3	40-140	22.4	50	
Benzo(b)fluoranthene	17.9	0.35	mg/Kg dry	17.4	4.00	79.8	40-140	8.01	50	
Benzo(g,h,i)perylene	11.9	0.35	mg/Kg dry	17.4	1.74	58.4	40-140	11.5	50	
Benzo(k)fluoranthene	11.7	0.35	mg/Kg dry	17.4	1.53	58.5	40-140	7.84	50	
Chrysene	16.4	0.35	mg/Kg dry	17.4	3.70	73.1	40-140	5.87	50	
Dibenz(a,h)anthracene	11.0	0.35	mg/Kg dry	17.4	ND	63.2	40-140	11.9	50	
Fluoranthene	22.6	0.35	mg/Kg dry	17.4	8.12	83.5	40-140	2.58	50	
Fluorene	11.4	0.35	mg/Kg dry	17.4	0.491	62.9	40-140	10.2	50	
Indeno(1,2,3-cd)pyrene	12.8	0.35	mg/Kg dry	17.4	1.78	63.4	40-140	14.1	50	
2-Methylnaphthalene	9.65	0.35	mg/Kg dry	17.4	ND	55.5	40-140	21.6	50	
Naphthalene	8.56	0.35	mg/Kg dry	17.4	ND	49.2	40-140	28.4	50	
Phenanthrene	18.7	0.35	mg/Kg dry	17.4	5.54	75.4	40-140	2.40	50	
Pyrene	22.9	0.35	mg/Kg dry	17.4	8.10	85.0	40-140	3.11	50	
Surrogate: Chlorooctadecane (COD)	*8.79*		mg/Kg dry	17.4		50.5	40-140			
Surrogate: o-Terphenyl (OTP)	*9.51*		mg/Kg dry	17.4		54.7	40-140			
Surrogate: 2-Bromonaphthalene	*16.3*		mg/Kg dry	17.4		93.5	40-140			
Surrogate: 2-Fluorobiphenyl	*16.1*		mg/Kg dry	17.4		92.4	40-140			
Batch B291117 - SW-846 3546										
Blank (B291117-BLK1)				Prepared: 09/27/21 Analyzed: 09/28/21						
C9-C18 Aliphatics	ND	10	mg/Kg wet							U
C19-C36 Aliphatics	ND	10	mg/Kg wet							U
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							U
C11-C22 Aromatics	ND	10	mg/Kg wet							U
Acenaphthene	ND	0.10	mg/Kg wet							U
Acenaphthylene	ND	0.10	mg/Kg wet							U
Anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)pyrene	ND	0.10	mg/Kg wet							U
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							U
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							U
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							U
Chrysene	ND	0.10	mg/Kg wet							U
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							U
Fluoranthene	ND	0.10	mg/Kg wet							U
Fluorene	ND	0.10	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene	ND	0.10	mg/Kg wet							U

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291117 - SW-846 3546										
Blank (B291117-BLK1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Naphthalene	ND	0.10	mg/Kg wet							U
Phenanthrene	ND	0.10	mg/Kg wet							U
Pyrene	ND	0.10	mg/Kg wet							U
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
Surrogate: Chlorooctadecane (COD)	*3.09*		mg/Kg wet	5.00		61.8	40-140			
Surrogate: o-Terphenyl (OTP)	*4.01*		mg/Kg wet	5.00		80.2	40-140			
Surrogate: 2-Bromonaphthalene	*4.38*		mg/Kg wet	5.00		87.5	40-140			
Surrogate: 2-Fluorobiphenyl	*4.51*		mg/Kg wet	5.00		90.2	40-140			
LCS (B291117-BS1)				Prepared: 09/27/21 Analyzed: 09/28/21						
C9-C18 Aliphatics	23.2	10	mg/Kg wet	30.0		77.3	40-140			
C19-C36 Aliphatics	32.2	10	mg/Kg wet	40.0		80.6	40-140			
Unadjusted C11-C22 Aromatics	73.5	10	mg/Kg wet	85.0		86.4	40-140			
Acenaphthene	3.71	0.10	mg/Kg wet	5.00		74.1	40-140			
Acenaphthylene	3.49	0.10	mg/Kg wet	5.00		69.8	40-140			
Anthracene	3.97	0.10	mg/Kg wet	5.00		79.4	40-140			
Benzo(a)anthracene	4.56	0.10	mg/Kg wet	5.00		91.2	40-140			
Benzo(a)pyrene	4.44	0.10	mg/Kg wet	5.00		88.9	40-140			
Benzo(b)fluoranthene	4.92	0.10	mg/Kg wet	5.00		98.5	40-140			
Benzo(g,h,i)perylene	4.03	0.10	mg/Kg wet	5.00		80.6	40-140			
Benzo(k)fluoranthene	3.73	0.10	mg/Kg wet	5.00		74.7	40-140			
Chrysene	4.42	0.10	mg/Kg wet	5.00		88.4	40-140			
Dibenz(a,h)anthracene	4.40	0.10	mg/Kg wet	5.00		88.0	40-140			
Fluoranthene	4.18	0.10	mg/Kg wet	5.00		83.6	40-140			
Fluorene	3.82	0.10	mg/Kg wet	5.00		76.5	40-140			
Indeno(1,2,3-cd)pyrene	4.13	0.10	mg/Kg wet	5.00		82.5	40-140			
2-Methylnaphthalene	3.45	0.10	mg/Kg wet	5.00		69.1	40-140			
Naphthalene	3.22	0.10	mg/Kg wet	5.00		64.3	40-140			
Phenanthrene	4.07	0.10	mg/Kg wet	5.00		81.3	40-140			
Pyrene	4.25	0.10	mg/Kg wet	5.00		84.9	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.63*		mg/Kg wet	5.00		72.6	40-140			
Surrogate: o-Terphenyl (OTP)	*4.16*		mg/Kg wet	5.00		83.3	40-140			
Surrogate: 2-Bromonaphthalene	*4.76*		mg/Kg wet	5.00		95.3	40-140			
Surrogate: 2-Fluorobiphenyl	*4.92*		mg/Kg wet	5.00		98.4	40-140			
LCS Dup (B291117-BSD1)				Prepared: 09/27/21 Analyzed: 09/28/21						
C9-C18 Aliphatics	21.8	10	mg/Kg wet	30.0		72.8	40-140	6.02	25	
C19-C36 Aliphatics	31.0	10	mg/Kg wet	40.0		77.6	40-140	3.86	25	
Unadjusted C11-C22 Aromatics	69.7	10	mg/Kg wet	85.0		82.0	40-140	5.24	25	
Acenaphthene	3.21	0.10	mg/Kg wet	5.00		64.1	40-140	14.5	25	
Acenaphthylene	3.00	0.10	mg/Kg wet	5.00		59.9	40-140	15.3	25	
Anthracene	3.55	0.10	mg/Kg wet	5.00		71.1	40-140	11.1	25	
Benzo(a)anthracene	4.38	0.10	mg/Kg wet	5.00		87.6	40-140	4.09	25	
Benzo(a)pyrene	4.56	0.10	mg/Kg wet	5.00		91.3	40-140	2.66	25	
Benzo(b)fluoranthene	4.99	0.10	mg/Kg wet	5.00		99.9	40-140	1.42	25	
Benzo(g,h,i)perylene	4.24	0.10	mg/Kg wet	5.00		84.9	40-140	5.11	25	
Benzo(k)fluoranthene	3.77	0.10	mg/Kg wet	5.00		75.4	40-140	0.967	25	
Chrysene	4.25	0.10	mg/Kg wet	5.00		85.0	40-140	3.91	25	
Dibenz(a,h)anthracene	4.60	0.10	mg/Kg wet	5.00		92.0	40-140	4.51	25	

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291117 - SW-846 3546										
LCS Dup (B291117-BSD1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Fluoranthene	3.78	0.10	mg/Kg wet	5.00		75.6	40-140	9.95	25	
Fluorene	3.34	0.10	mg/Kg wet	5.00		66.9	40-140	13.4	25	
Indeno(1,2,3-cd)pyrene	4.33	0.10	mg/Kg wet	5.00		86.5	40-140	4.78	25	
2-Methylnaphthalene	2.90	0.10	mg/Kg wet	5.00		58.1	40-140	17.3	25	
Naphthalene	2.70	0.10	mg/Kg wet	5.00		54.0	40-140	17.4	25	
Phenanthrene	3.61	0.10	mg/Kg wet	5.00		72.1	40-140	12.0	25	
Pyrene	3.87	0.10	mg/Kg wet	5.00		77.4	40-140	9.26	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.43*		mg/Kg wet	5.00		68.6	40-140			
Surrogate: o-Terphenyl (OTP)	*3.73*		mg/Kg wet	5.00		74.7	40-140			
Surrogate: 2-Bromonaphthalene	*4.27*		mg/Kg wet	5.00		85.3	40-140			
Surrogate: 2-Fluorobiphenyl	*4.43*		mg/Kg wet	5.00		88.6	40-140			

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291002 - SW-846 7471										
Blank (B291002-BLK1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	ND	0.025	mg/Kg wet							U
LCS (B291002-BS1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	15.2	0.76	mg/Kg wet	15.6		97.6	59.3-140.4			
LCS Dup (B291002-BSD1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	14.1	0.75	mg/Kg wet	15.6		90.2	59.3-140.4	7.87	20	
Batch B291069 - SW-846 3005A										
Blank (B291069-BLK1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Lead	0.26	0.50	µg/L							J
Selenium	ND	5.0	µg/L							U
Silver	ND	0.20	µg/L							
LCS (B291069-BS1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	467	8.0	µg/L	500		93.3	80-120			
Barium	461	100	µg/L	500		92.2	80-120			
Cadmium	477	2.0	µg/L	500		95.5	80-120			
Chromium	462	10	µg/L	500		92.4	80-120			
Lead	461	5.0	µg/L	500		92.2	80-120			
Selenium	487	50	µg/L	500		97.4	80-120			
Silver	472	2.0	µg/L	500		94.4	80-120			
LCS Dup (B291069-BSD1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	494	8.0	µg/L	500		98.8	80-120	5.74	20	
Barium	484	100	µg/L	500		96.7	80-120	4.76	20	
Cadmium	506	2.0	µg/L	500		101	80-120	5.78	20	
Chromium	500	10	µg/L	500		100	80-120	7.87	20	
Lead	491	5.0	µg/L	500		98.2	80-120	6.25	20	
Selenium	522	50	µg/L	500		104	80-120	6.90	20	
Silver	503	2.0	µg/L	500		101	80-120	6.32	20	
Batch B291070 - SW-846 3005A										
Blank (B291070-BLK1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Calcium Hardness	0.031	1.2	mg/L							

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291070 - SW-846 3005A										
LCS (B291070-BS1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Calcium Hardness	9.6	1.2	mg/L	10.0		96.0	0-200			
LCS Dup (B291070-BSD1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Calcium Hardness	10	1.2	mg/L	10.0		102	0-200	5.94		
Batch B291177 - SW-846 3050B										
Blank (B291177-BLK1)				Prepared: 09/28/21 Analyzed: 09/29/21						
Arsenic	ND	3.3	mg/Kg wet							U
Barium	ND	1.6	mg/Kg wet							U
Cadmium	ND	0.33	mg/Kg wet							U
Chromium	ND	0.66	mg/Kg wet							U
Lead	ND	0.49	mg/Kg wet							U
Selenium	ND	3.3	mg/Kg wet							U
Silver	ND	0.33	mg/Kg wet							U
LCS (B291177-BS1)				Prepared: 09/28/21 Analyzed: 09/29/21						
Arsenic	146	9.7	mg/Kg wet	170		85.7	82.9-117.6			
Barium	173	4.9	mg/Kg wet	183		94.6	82.5-117.5			
Cadmium	86.6	0.97	mg/Kg wet	89.5		96.8	82.8-117.3			
Chromium	90.9	1.9	mg/Kg wet	101		90.0	82.1-117.8			
Lead	126	1.5	mg/Kg wet	140		90.3	82.9-117.1			
Selenium	165	9.7	mg/Kg wet	182		90.4	79.7-120.3			
Silver	44.0	0.97	mg/Kg wet	50.1		87.8	80.2-120			
LCS Dup (B291177-BSD1)				Prepared: 09/28/21 Analyzed: 09/29/21						
Arsenic	148	9.9	mg/Kg wet	170		87.3	82.9-117.6	1.76	30	
Barium	179	5.0	mg/Kg wet	183		97.6	82.5-117.5	3.10	20	
Cadmium	84.8	0.99	mg/Kg wet	89.5		94.7	82.8-117.3	2.14	20	
Chromium	91.1	2.0	mg/Kg wet	101		90.2	82.1-117.8	0.200	30	
Lead	128	1.5	mg/Kg wet	140		91.4	82.9-117.1	1.31	30	
Selenium	162	9.9	mg/Kg wet	182		89.1	79.7-120.3	1.49	30	
Silver	46.0	0.99	mg/Kg wet	50.1		91.8	80.2-120	4.42	30	
Reference (B291177-SRM1) MRL Check				Prepared: 09/28/21 Analyzed: 09/29/21						
Lead	0.442	0.50	mg/Kg wet	0.497		89.0	80-120			J
Batch B291183 - SW-846 7470A Prep										
Blank (B291183-BLK1)				Prepared & Analyzed: 09/28/21						
Mercury	ND	0.00010	mg/L							U

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291183 - SW-846 7470A Prep										
LCS (B291183-BS1)				Prepared & Analyzed: 09/28/21						
Mercury	0.00385	0.00010	mg/L	0.00400		96.2	80-120			
LCS Dup (B291183-BSD1)				Prepared & Analyzed: 09/28/21						
Mercury	0.00415	0.00010	mg/L	0.00400		104	80-120	7.54	20	

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290978 - SW-846 7470A Dissolved										
Blank (B290978-BLK1)				Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.000061	0.00010	mg/L							B, J
LCS (B290978-BS1)				Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.00425	0.00010	mg/L	0.00400		106	80-120			
LCS Dup (B290978-BSD1)				Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.00410	0.00010	mg/L	0.00400		103	80-120	3.40	20	
Duplicate (B290978-DUP1)	**Source: 21I1172-01**			Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.0000585	0.00010	mg/L		0.0000658			11.7	20	B, J
Matrix Spike (B290978-MS1)	**Source: 21I1172-01**			Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.00412	0.00010	mg/L	0.00400	0.0000658	101	75-125			
Batch B291129 - SW-846 3005A Dissolved										
Blank (B291129-BLK1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							U
Cadmium	ND	0.20	µg/L							U
Chromium	ND	1.0	µg/L							U
Lead	ND	0.50	µg/L							U
Selenium	ND	5.0	µg/L							U
Silver	ND	0.20	µg/L							U
LCS (B291129-BS1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	514	8.0	µg/L	500		103	80-120			
Barium	516	100	µg/L	500		103	80-120			
Cadmium	505	2.0	µg/L	500		101	80-120			
Chromium	477	10	µg/L	500		95.5	80-120			
Lead	502	5.0	µg/L	500		100	80-120			
Selenium	487	50	µg/L	500		97.5	80-120			
Silver	497	2.0	µg/L	500		99.3	80-120			
LCS Dup (B291129-BSD1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	518	8.0	µg/L	500		104	80-120	0.681	20	
Barium	521	100	µg/L	500		104	80-120	0.955	20	
Cadmium	509	2.0	µg/L	500		102	80-120	0.764	20	
Chromium	477	10	µg/L	500		95.5	80-120	0.0164	20	
Lead	502	5.0	µg/L	500		100	80-120	0.0834	20	
Selenium	509	50	µg/L	500		102	80-120	4.35	20	
Silver	500	2.0	µg/L	500		100	80-120	0.734	20	

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291136 - SW 846 9060A										
Blank (B291136-BLK1)				Prepared & Analyzed: 09/28/21						
Total Organic Carbon	ND	100	mg/Kg							
LCS (B291136-BS1)				Prepared & Analyzed: 09/28/21						
Total Organic Carbon	843	100	mg/Kg	750		112	64.9-118			
LCS Dup (B291136-BSD1)				Prepared & Analyzed: 09/28/21						
Total Organic Carbon	766	100	mg/Kg	750		102	64.9-118	9.56	16.9	
Duplicate (B291136-DUP1)	**Source: 2111172-02**			Prepared & Analyzed: 09/28/21						
Total Organic Carbon	207000	100	mg/Kg		202000			2.44	49.1	Z-01
Matrix Spike (B291136-MS1)	**Source: 2111172-02**			Prepared & Analyzed: 09/28/21						
Total Organic Carbon	1290000	100	mg/Kg	750	202000	**145000** *	85-115			MS-11, Z-01

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
B	Analyte is found in the associated laboratory blank as well as in the sample.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
MS-11	Matrix spike recovery outside of control limits. Possibility of sample matrix effects that lead to a high bias for reported result or non-homogeneous sample aliquots cannot be eliminated.
RL-12	Elevated reporting limit due to matrix interference.
S-19	Surrogate recovery is outside of control limits, matrix interference suspected. Reanalysis yielded similar surrogate non-conformance.
U	Analyte included in the analysis, but not detected
Z-01	Results over calibration curve. Results are estimitated due to method limitations.

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
SW 846 9060A in Soil	
Total Organic Carbon	NY,CT,ME,VA,NH
SW-846 6010D in Soil	

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010D in Soil	
Arsenic	CT,NH,NY,ME,VA,NC
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,AIHA,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NH,NY,ME,VA,NC
SW-846 6020B in Water	
Arsenic	CT,NH,NY,ME,VA,NC
Arsenic	CT,NH,NY,NC,ME,VA
Barium	MA,NY,CT,NC,NH,ME,VA
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,NC,ME,VA
Cadmium	CT,NH,NY,RI,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,NC,ME,VA
Lead	CT,NH,NY,NC,ME,VA
Lead	CT,NH,NY,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Selenium	CT,NH,NY,NC,ME,VA
Silver	CT,NH,NY,ME,VA,NC
Silver	CT,NC,NH,NY,ME,VA
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
Mercury	CT,NH,NY,NC,ME,VA
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8270E in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	**Certifications**
SW-846 8270E in Water	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1122

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name: Wilcox & Barton, Inc.
Address: 18 Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Road, Portsmouth
Project Number: BANFOODS
Project Manager: W. Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard & P. Perry

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: mbroussard@wilcoxandbarton.com
Fax To #:

Dissolved Metals Samples
☒ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	total RCRA-8 metals	dissolved RCRA-8 metals	CaCO3 hardness	PAHs	TOC ~~[illegible]~~	EPH	PAHs w/ SIM	RCRA-8 metals	Grain Size		
² Preservation Code												N	N	N	—	—	—	—	—	—		
1	SW-201	9/22/21	0915	GRAB	GW	U		2	2			X	X	X	X							
2	SD-201	↓	0915	↓	O	↓		2	1							X	X	X	X	X		
3	SD-202		1005		O			2	1							X	X	X	X	X		
4	SW-203		1130		GW			2	2			X	X	X	X							
5	SD-203		1130		O			2	1							X	X	X	X	X		
6	SD-204		11:05		O			2	1							X	X	X	X	X		
7	SD-205		1320		0			2	1							X	X	X	X	X		
8	SD-206		1330		0			2	1							X	X	X	X	X		
9	SD-207		14:35		0			2	1							X	X	X	X	X		

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepackaged coolers

Relinquished by: (signature)	Date/Time:
9/22/21	15:20
Received by: (signature)	Date/Time:
	9/22/21 1520
Relinquished by: (signature)	Date/Time:
	9/22/21 1920
Received by: (signature)	Date/Time:
3.4	9/22/21 1920
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: diss. metals & PAH samples field filtered

Ⓐ

Detection Limit Requirements
MA
CT
Other: WQCs, NOAA SQuiRTs

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) Sediment

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples____________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W+B

Received By Date 9/22/21 Time 1420

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T
By Gun # 3 Actual Temp - 3.4
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? F Who was notified? ___
Is there enough Volume? T
Is there Headspace where applicable? n/a MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid n/a Base n/a

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	4	1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz [✓ Amb]/Clear	9
Meoh-		250 mL Amb.		250 mL Plastic	4	4oz [✓ Amb]/Clear	5
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag	2	Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

Plastic bag w/ sample SD-201 very watery.

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 12, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21I1325

Enclosed are results of analyses for samples as received by the laboratory on September 23, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/12/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1325

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SD-208	21I1325-01	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-209	21I1325-02	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-210	21I1325-03	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-211	21I1325-04	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-212	21I1325-05	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/12/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1325

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SD-213	21I1325-06	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-214	21I1325-07	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-215	21I1325-08	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-217	21I1325-09	Sediment		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SW-208	21I1325-10	Surface Water		EPA 200.7	
				SW-846 6020B	
				SW-846 7470A	
				SW-846 8270E	
SW-210	21I1325-11	Surface Water		EPA 200.7	
				SW-846 6020B	
				SW-846 7470A	
				SW-846 8270E	

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/12/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I1325

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SW-211	21I1325-12	Surface Water		EPA 200.7	
				EPA 300.0	
				SM21-23 2540C	
				SM21-23 2540D	
				SW-846 6010D	
				SW-846 6020B	
				SW-846 7470A	
				SW-846 8270E	
SW-212	21I1325-13	Surface Water		EPA 200.7	
				EPA 300.0	
				SM21-23 2540C	
				SM21-23 2540D	
				SW-846 6010D	
				SW-846 6020B	
				SW-846 7470A	
				SW-846 8270E	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8270E, only PAHs were requested and reported.

MADEP EPH rev 2.1

Qualifications:

MS-22

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

Analyte & Samples(s) Qualified:

Naphthalene

B290945-MSD1

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Acenaphthene

21I1325-01[SD-208], 21I1325-02[SD-209], B290945-BLK1, B290945-BS1, B290945-BSD1, B290945-MS1, B290945-MSD1

Acenaphthylene

21I1325-01[SD-208], 21I1325-02[SD-209], B290945-BLK1, B290945-BS1, B290945-BSD1, B290945-MS1, B290945-MSD1

S-26

Surrogate outside of control limits.

Analyte & Samples(s) Qualified:

2-Bromonaphthalene

B290945-MS1

2-Fluorobiphenyl

B290945-MS1

SM 2540G

Qualifications:

R-02

Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.

Analyte & Samples(s) Qualified:

% Solids

21I1325-05[SD-212], 21I1325-09[SD-217], B291142-DUP3, B291142-DUP7

SW 846 9060A

Qualifications:

MS-11

Matrix spike recovery outside of control limits. Possibility of sample matrix effects that lead to a high bias for reported result or non-homogeneous sample aliquots cannot be eliminated.

Analyte & Samples(s) Qualified:

Total Organic Carbon

21I1325-04[SD-211], B291244-MS1

Z-01

Results over calibration curve. Results are estimitated due to method limitations.

Analyte & Samples(s) Qualified:

Total Organic Carbon

21I1325-01[SD-208], 21I1325-02[SD-209], 21I1325-06[SD-213], 21I1325-07[SD-214], 21I1325-08[SD-215], 21I1325-09[SD-217]

SW-846 7470A

Qualifications:

B

Analyte is found in the associated laboratory blank as well as in the sample.

Analyte & Samples(s) Qualified:

Mercury

21I1325-10[SW-208], 21I1325-11[SW-210], 21I1325-12[SW-211], 21I1325-13[SW-212], B290978-BLK1

SW-846 7471B

Qualifications:

R-02

Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.

Analyte & Samples(s) Qualified:

Mercury
21I1325-08[SD-215], B291002-DUP1

SW-846 8270E

Qualifications:

RL-12

Elevated reporting limit due to matrix interference.

Analyte & Samples(s) Qualified:

21I1325-02[SD-209], 21I1325-03[SD-210], 21I1325-04[SD-211], 21I1325-05[SD-212], 21I1325-06[SD-213]

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Bis(2-ethylhexyl)phthalate (SIM)
S063774-CCV1

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-208   Sampled: 9/23/2021 09:00

Sample ID: 21I1325-01

Sample Matrix: Sediment

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.21	0.16	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Acenaphthylene	ND	0.21	0.16	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Anthracene	0.22	0.21	0.17	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Benzo(a)anthracene	0.71	0.21	0.14	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Benzo(a)pyrene	0.69	0.21	0.16	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Benzo(b)fluoranthene	0.81	0.21	0.16	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Benzo(g,h,i)perylene	0.37	0.22	0.22	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Benzo(k)fluoranthene	0.35	0.21	0.14	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Chrysene	0.66	0.21	0.15	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Dibenz(a,h)anthracene	ND	0.21	0.21	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Fluoranthene	1.4	0.21	0.17	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Fluorene	ND	0.21	0.18	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Indeno(1,2,3-cd)pyrene	0.42	0.24	0.24	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
2-Methylnaphthalene	ND	0.21	0.16	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Naphthalene	ND	0.21	0.14	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Phenanthrene	1.0	0.21	0.16	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL
Pyrene	1.4	0.21	0.17	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 11:57	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Nitrobenzene-d5	76.7	30-130		9/29/21 11:57
2-Fluorobiphenyl	86.6	30-130		9/29/21 11:57
p-Terphenyl-d14	86.4	30-130		9/29/21 11:57

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-208   Sampled: 9/23/2021 09:00

Sample ID: 21I1325-01

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	31	31	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
C19-C36 Aliphatics	68	31	31	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Unadjusted C11-C22 Aromatics	150	31	31	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
C11-C22 Aromatics	130	31	31	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Acenaphthene	ND	0.31	0.13	mg/Kg dry	1	R-05, U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Acenaphthylene	ND	0.31	0.11	mg/Kg dry	1	R-05, U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Anthracene	0.42	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Benzo(a)anthracene	1.2	0.31	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Benzo(a)pyrene	1.2	0.31	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Benzo(b)fluoranthene	1.3	0.31	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Benzo(g,h,i)perylene	0.88	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Benzo(k)fluoranthene	0.47	0.31	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Chrysene	1.3	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Dibenz(a,h)anthracene	ND	0.31	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Fluoranthene	2.5	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Fluorene	ND	0.31	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Indeno(1,2,3-cd)pyrene	0.56	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
2-Methylnaphthalene	ND	0.31	0.12	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Naphthalene	ND	0.31	0.078	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Phenanthrene	2.4	0.31	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG
Pyrene	2.7	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:54	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	59.8	40-140		9/29/21 3:54
o-Terphenyl (OTP)	57.1	40-140		9/29/21 3:54
2-Bromonaphthalene	75.8	40-140		9/29/21 3:54
2-Fluorobiphenyl	79.6	40-140		9/29/21 3:54

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-208   Sampled: 9/23/2021 09:00

Sample ID: 21I1325-01

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	5.2	10	3.7	mg/Kg dry	1	J	SW-846 6010D	9/29/21	9/30/21 12:38	QNW
Barium	98	5.0	1.9	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:38	QNW
Cadmium	0.91	1.0	0.51	mg/Kg dry	1	J	SW-846 6010D	9/29/21	9/30/21 12:38	QNW
Chromium	32	2.0	1.1	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:38	QNW
Lead	660	1.5	0.73	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:38	QNW
Mercury	0.13	0.085	0.029	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:30	DRL
Selenium	ND	10	3.6	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:38	QNW
Silver	ND	1.0	0.46	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:38	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-208 Sampled: 9/23/2021 09:00

Sample ID: 21I1325-01

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	32.7			% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	220000	100		mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 16:36	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-208 Sampled: 9/23/2021 09:00

Sample ID: 21I1325-01

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/12/21 0:00	GEOTE

Project Location: 375 Banfield Rd, Portsmouth, NH　　Sample Description:　　Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-209　　Sampled: 9/23/2021 09:10

Sample ID: 21I1325-02

Sample Matrix: Sediment

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.13	0.0060	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Acenaphthylene (SIM)	ND	0.13	0.0075	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Anthracene (SIM)	0.011	0.10	0.0060	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Benzo(a)anthracene (SIM)	0.042	0.025	0.014	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Benzo(a)pyrene (SIM)	0.044	0.025	0.0075	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Benzo(b)fluoranthene (SIM)	0.067	0.025	0.012	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Benzo(g,h,i)perylene (SIM)	0.033	0.25	0.0090	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Benzo(k)fluoranthene (SIM)	0.021	0.10	0.0060	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Chrysene (SIM)	0.057	0.10	0.017	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.025	0.0090	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Fluoranthene (SIM)	0.096	0.25	0.026	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Fluorene (SIM)	ND	0.50	0.0057	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.039	0.10	0.0095	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
2-Methylnaphthalene (SIM)	ND	0.50	0.056	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Naphthalene (SIM)	ND	0.50	0.18	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Phenanthrene (SIM)	0.060	0.13	0.023	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR
Pyrene (SIM)	0.083	0.50	0.020	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:27	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	66.9	30-130		9/29/21 9:27
2-Fluorobiphenyl	54.1	30-130		9/29/21 9:27
p-Terphenyl-d14	59.6	30-130		9/29/21 9:27

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-209 Sampled: 9/23/2021 09:10

Sample ID: 21I1325-02

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	38	38	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
C19-C36 Aliphatics	53	38	38	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Unadjusted C11-C22 Aromatics	87	38	38	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
C11-C22 Aromatics	87	38	38	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Acenaphthene	ND	0.38	0.16	mg/Kg dry	1	R-05, U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Acenaphthylene	ND	0.38	0.13	mg/Kg dry	1	R-05, U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Anthracene	ND	0.38	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Benzo(a)anthracene	ND	0.38	0.14	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Benzo(a)pyrene	ND	0.38	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Benzo(b)fluoranthene	ND	0.38	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Benzo(g,h,i)perylene	ND	0.38	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Benzo(k)fluoranthene	ND	0.38	0.20	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Chrysene	ND	0.38	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Dibenz(a,h)anthracene	ND	0.38	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Fluoranthene	ND	0.38	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Fluorene	ND	0.38	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Indeno(1,2,3-cd)pyrene	ND	0.38	0.17	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
2-Methylnaphthalene	ND	0.38	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Naphthalene	ND	0.38	0.096	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Phenanthrene	ND	0.38	0.18	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG
Pyrene	ND	0.38	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/29/21 3:33	PJG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	46.4	40-140		9/29/21 3:33
o-Terphenyl (OTP)	52.2	40-140		9/29/21 3:33
2-Bromonaphthalene	81.1	40-140		9/29/21 3:33
2-Fluorobiphenyl	82.7	40-140		9/29/21 3:33

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-209 Sampled: 9/23/2021 09:10

Sample ID: 21I1325-02

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	20	13	4.6	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:44	QNW
Barium	57	6.3	2.4	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:44	QNW
Cadmium	1.1	1.3	0.64	mg/Kg dry	1	J	SW-846 6010D	9/29/21	9/30/21 12:44	QNW
Chromium	32	2.5	1.4	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:44	QNW
Lead	44	1.9	0.92	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:44	QNW
Mercury	0.12	0.098	0.033	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:32	DRL
Selenium	ND	13	4.5	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:44	QNW
Silver	ND	1.3	0.58	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:44	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-209   Sampled: 9/23/2021 09:10

Sample ID: 21I1325-02

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	26.4			% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	160000	100		mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 17:01	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-209　Sampled: 9/23/2021 09:10

Sample ID: 21I1325-02

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/10/21 0:00	GEOTE

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-210   Sampled: 9/23/2021 09:57

Sample ID: 21I1325-03

Sample Matrix: Sediment

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.34	0.016	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Acenaphthylene (SIM)	ND	0.34	0.021	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Anthracene (SIM)	ND	0.27	0.016	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Benzo(a)anthracene (SIM)	0.048	0.069	0.037	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Benzo(a)pyrene (SIM)	0.041	0.069	0.021	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Benzo(b)fluoranthene (SIM)	0.064	0.069	0.033	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Benzo(g,h,i)perylene (SIM)	0.031	0.69	0.025	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Benzo(k)fluoranthene (SIM)	0.022	0.27	0.016	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Chrysene (SIM)	0.059	0.27	0.045	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.069	0.025	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Fluoranthene (SIM)	0.10	0.69	0.070	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Fluorene (SIM)	ND	1.4	0.016	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.037	0.27	0.026	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
2-Methylnaphthalene (SIM)	ND	1.4	0.15	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Naphthalene (SIM)	ND	1.4	0.49	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Phenanthrene (SIM)	ND	0.34	0.062	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 9:49	IMR
Pyrene (SIM)	0.079	1.4	0.053	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 9:49	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Nitrobenzene-d5	50.5	30-130		9/29/21 9:49
2-Fluorobiphenyl	43.2	30-130		9/29/21 9:49
p-Terphenyl-d14	47.2	30-130		9/29/21 9:49

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-210 Sampled: 9/23/2021 09:57

Sample ID: 21I1325-03

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	100	100	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
C19-C36 Aliphatics	140	100	100	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Unadjusted C11-C22 Aromatics	260	100	100	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
C11-C22 Aromatics	260	100	100	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Acenaphthene	ND	1.0	0.44	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Acenaphthylene	ND	1.0	0.37	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Anthracene	ND	1.0	0.43	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Benzo(a)anthracene	ND	1.0	0.37	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Benzo(a)pyrene	ND	1.0	0.35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Benzo(b)fluoranthene	ND	1.0	0.41	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Benzo(g,h,i)perylene	ND	1.0	0.42	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Benzo(k)fluoranthene	ND	1.0	0.55	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Chrysene	ND	1.0	0.43	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Dibenz(a,h)anthracene	ND	1.0	0.43	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Fluoranthene	ND	1.0	0.43	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Fluorene	ND	1.0	0.43	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Indeno(1,2,3-cd)pyrene	ND	1.0	0.45	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
2-Methylnaphthalene	ND	1.0	0.41	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Naphthalene	ND	1.0	0.26	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Phenanthrene	ND	1.0	0.49	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH
Pyrene	ND	1.0	0.44	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:53	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	59.3	40-140		9/30/21 0:53
o-Terphenyl (OTP)	63.5	40-140		9/30/21 0:53
2-Bromonaphthalene	91.9	40-140		9/30/21 0:53
2-Fluorobiphenyl	96.7	40-140		9/30/21 0:53

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-210 Sampled: 9/23/2021 09:57

Sample ID: 21I1325-03

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	33	12	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:51	QNW
Barium	140	17	6.3	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:51	QNW
Cadmium	4.7	3.3	1.7	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:51	QNW
Chromium	23	6.7	3.8	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:51	QNW
Lead	1500	5.0	2.4	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:51	QNW
Mercury	0.40	0.28	0.095	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:34	DRL
Selenium	ND	33	12	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:51	QNW
Silver	ND	3.3	1.5	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:51	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-210   Sampled: 9/23/2021 09:57

Sample ID: 21I1325-03

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	9.71			% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	770000	100		mg/Kg	1		SW 846 9060A	9/29/21	9/29/21 17:44	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-210
Sampled: 9/23/2021 09:57

Sample ID: 21I1325-03

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/10/21 0:00	GEOTE

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-211   Sampled: 9/23/2021 11:10

Sample ID: 21I1325-04

Sample Matrix: Sediment

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.12	0.0058	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Acenaphthylene (SIM)	ND	0.12	0.0073	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Anthracene (SIM)	0.013	0.097	0.0058	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Benzo(a)anthracene (SIM)	0.053	0.024	0.013	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Benzo(a)pyrene (SIM)	0.045	0.024	0.0073	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Benzo(b)fluoranthene (SIM)	0.059	0.024	0.012	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Benzo(g,h,i)perylene (SIM)	0.025	0.24	0.0087	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Benzo(k)fluoranthene (SIM)	0.021	0.097	0.0058	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Chrysene (SIM)	0.051	0.097	0.016	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.024	0.0087	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Fluoranthene (SIM)	0.099	0.24	0.025	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Fluorene (SIM)	ND	0.49	0.0055	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.032	0.097	0.0092	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
2-Methylnaphthalene (SIM)	ND	0.49	0.054	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Naphthalene (SIM)	ND	0.49	0.17	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Phenanthrene (SIM)	0.051	0.12	0.022	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR
Pyrene (SIM)	0.080	0.49	0.019	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:12	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Nitrobenzene-d5	60.3	30-130		9/29/21 10:12
2-Fluorobiphenyl	50.3	30-130		9/29/21 10:12
p-Terphenyl-d14	55.4	30-130		9/29/21 10:12

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-211 Sampled: 9/23/2021 11:10

Sample ID: 21I1325-04

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	37	37	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
C19-C36 Aliphatics	50	37	37	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Unadjusted C11-C22 Aromatics	88	37	37	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
C11-C22 Aromatics	86	37	37	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Acenaphthene	ND	0.37	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Acenaphthylene	ND	0.37	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Anthracene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Benzo(a)anthracene	ND	0.37	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Benzo(a)pyrene	ND	0.37	0.12	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Benzo(b)fluoranthene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Benzo(g,h,i)perylene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Benzo(k)fluoranthene	ND	0.37	0.19	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Chrysene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Dibenz(a,h)anthracene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Fluoranthene	0.54	0.37	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Fluorene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Indeno(1,2,3-cd)pyrene	ND	0.37	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
2-Methylnaphthalene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Naphthalene	ND	0.37	0.093	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Phenanthrene	0.32	0.37	0.17	mg/Kg dry	1	J	MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH
Pyrene	0.57	0.37	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:34	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	55.2	40-140		9/30/21 1:34
o-Terphenyl (OTP)	64.4	40-140		9/30/21 1:34
2-Bromonaphthalene	87.3	40-140		9/30/21 1:34
2-Fluorobiphenyl	89.6	40-140		9/30/21 1:34

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-211 Sampled: 9/23/2021 11:10

Sample ID: 21I1325-04

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	9.3	12	4.5	mg/Kg dry	1	J	SW-846 6010D	9/29/21	9/30/21 12:56	QNW
Barium	36	6.2	2.3	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:56	QNW
Cadmium	2.8	1.2	0.63	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:56	QNW
Chromium	22	2.5	1.4	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:56	QNW
Lead	510	1.8	0.90	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 12:56	QNW
Mercury	0.20	0.096	0.032	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:40	DRL
Selenium	ND	12	4.4	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:56	QNW
Silver	ND	1.2	0.56	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 12:56	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-211
Sampled: 9/23/2021 11:10

Sample ID: 21I1325-04

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	27.3			% Wt	1		SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	60000	100		mg/Kg	1	MS-11	SW 846 9060A	9/29/21	9/29/21 18:40	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-211 Sampled: 9/23/2021 11:10

Sample ID: 21I1325-04

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/12/21 0:00	GEOTE

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-212　Sampled: 9/23/2021 12:07

Sample ID: 21I1325-05

Sample Matrix: Sediment

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.33	0.016	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Acenaphthylene (SIM)	ND	0.33	0.020	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Anthracene (SIM)	0.016	0.26	0.016	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Benzo(a)anthracene (SIM)	0.052	0.066	0.035	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Benzo(a)pyrene (SIM)	0.046	0.066	0.020	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Benzo(b)fluoranthene (SIM)	0.064	0.066	0.031	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Benzo(g,h,i)perylene (SIM)	0.030	0.66	0.024	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Benzo(k)fluoranthene (SIM)	0.022	0.26	0.016	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Chrysene (SIM)	0.062	0.26	0.043	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.066	0.024	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Fluoranthene (SIM)	0.11	0.66	0.067	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Fluorene (SIM)	ND	1.3	0.015	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.039	0.26	0.025	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
2-Methylnaphthalene (SIM)	ND	1.3	0.15	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Naphthalene (SIM)	ND	1.3	0.47	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Phenanthrene (SIM)	0.063	0.33	0.059	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR
Pyrene (SIM)	0.090	1.3	0.051	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:35	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	63.3	30-130		9/29/21 10:35
2-Fluorobiphenyl	51.9	30-130		9/29/21 10:35
p-Terphenyl-d14	54.9	30-130		9/29/21 10:35

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-212 Sampled: 9/23/2021 12:07

Sample ID: 21I1325-05

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	99	99	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
C19-C36 Aliphatics	130	99	99	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Unadjusted C11-C22 Aromatics	160	99	99	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
C11-C22 Aromatics	160	99	99	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Acenaphthene	ND	0.99	0.42	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Acenaphthylene	ND	0.99	0.35	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Anthracene	ND	0.99	0.41	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Benzo(a)anthracene	ND	0.99	0.36	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Benzo(a)pyrene	ND	0.99	0.34	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Benzo(b)fluoranthene	ND	0.99	0.40	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Benzo(g,h,i)perylene	ND	0.99	0.41	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Benzo(k)fluoranthene	ND	0.99	0.52	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Chrysene	ND	0.99	0.41	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Dibenz(a,h)anthracene	ND	0.99	0.41	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Fluoranthene	ND	0.99	0.42	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Fluorene	ND	0.99	0.41	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Indeno(1,2,3-cd)pyrene	ND	0.99	0.43	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
2-Methylnaphthalene	ND	0.99	0.39	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Naphthalene	ND	0.99	0.25	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Phenanthrene	ND	0.99	0.47	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH
Pyrene	ND	0.99	0.42	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 0:32	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	48.6	40-140		9/30/21 0:32
o-Terphenyl (OTP)	51.8	40-140		9/30/21 0:32
2-Bromonaphthalene	86.2	40-140		9/30/21 0:32
2-Fluorobiphenyl	88.0	40-140		9/30/21 0:32

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-212   Sampled: 9/23/2021 12:07

Sample ID: 21I1325-05

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	33	12	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:03	QNW
Barium	120	17	6.3	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:03	QNW
Cadmium	3.0	3.3	1.7	mg/Kg dry	1	J	SW-846 6010D	9/29/21	9/30/21 13:03	QNW
Chromium	16	6.6	3.8	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:03	QNW
Lead	510	5.0	2.4	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:03	QNW
Mercury	0.20	0.25	0.085	mg/Kg dry	1	J	SW-846 7471B	9/25/21	9/27/21 14:42	DRL
Selenium	ND	33	12	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:03	QNW
Silver	ND	3.3	1.5	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:03	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-212 Sampled: 9/23/2021 12:07

Sample ID: 21I1325-05

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	10.1			% Wt	1	R-02	SM 2540G	9/28/21	9/29/21 8:45	CV
Total Organic Carbon	310000	100		mg/Kg	1		SW 846 9060A	9/29/21	9/29/21 21:29	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-212   Sampled: 9/23/2021 12:07

Sample ID: 21I1325-05

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/10/21 0:00	GEOTE

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-213 Sampled: 9/23/2021 12:25

Sample ID: 21I1325-06

Sample Matrix: Sediment

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.0063	0.076	0.0036	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Acenaphthylene (SIM)	ND	0.076	0.0045	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Anthracene (SIM)	0.018	0.060	0.0036	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Benzo(a)anthracene (SIM)	0.057	0.015	0.0082	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Benzo(a)pyrene (SIM)	0.051	0.015	0.0045	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Benzo(b)fluoranthene (SIM)	0.070	0.015	0.0073	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Benzo(g,h,i)perylene (SIM)	0.031	0.15	0.0054	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Benzo(k)fluoranthene (SIM)	0.024	0.060	0.0036	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Chrysene (SIM)	0.066	0.060	0.010	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Dibenz(a,h)anthracene (SIM)	0.0079	0.015	0.0054	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Fluoranthene (SIM)	0.12	0.15	0.015	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Fluorene (SIM)	0.0063	0.30	0.0034	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.038	0.060	0.0057	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
2-Methylnaphthalene (SIM)	ND	0.30	0.034	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Naphthalene (SIM)	ND	0.30	0.11	mg/Kg dry	4	U	SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Phenanthrene (SIM)	0.079	0.076	0.014	mg/Kg dry	4		SW-846 8270E	9/25/21	9/29/21 10:58	IMR
Pyrene (SIM)	0.10	0.30	0.012	mg/Kg dry	4	J	SW-846 8270E	9/25/21	9/29/21 10:58	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	63.0	30-130		9/29/21 10:58
2-Fluorobiphenyl	47.5	30-130		9/29/21 10:58
p-Terphenyl-d14	50.6	30-130		9/29/21 10:58

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-213   Sampled: 9/23/2021 12:25

Sample ID: 21I1325-06

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	23	23	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
C19-C36 Aliphatics	ND	23	23	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Unadjusted C11-C22 Aromatics	32	23	23	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
C11-C22 Aromatics	32	23	23	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Acenaphthene	ND	0.23	0.097	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Acenaphthylene	ND	0.23	0.081	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Anthracene	ND	0.23	0.094	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Benzo(a)anthracene	ND	0.23	0.083	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Benzo(a)pyrene	ND	0.23	0.077	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Benzo(b)fluoranthene	ND	0.23	0.091	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Benzo(g,h,i)perylene	ND	0.23	0.093	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Benzo(k)fluoranthene	ND	0.23	0.12	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Chrysene	ND	0.23	0.095	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Dibenz(a,h)anthracene	ND	0.23	0.094	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Fluoranthene	ND	0.23	0.096	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Fluorene	ND	0.23	0.094	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Indeno(1,2,3-cd)pyrene	ND	0.23	0.10	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
2-Methylnaphthalene	ND	0.23	0.090	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Naphthalene	ND	0.23	0.058	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Phenanthrene	ND	0.23	0.11	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH
Pyrene	ND	0.23	0.097	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:13	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	44.8	40-140		9/30/21 1:13
o-Terphenyl (OTP)	49.8	40-140		9/30/21 1:13
2-Bromonaphthalene	91.3	40-140		9/30/21 1:13
2-Fluorobiphenyl	95.2	40-140		9/30/21 1:13

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-213 Sampled: 9/23/2021 12:25

Sample ID: 21I1325-06

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	27	7.1	2.6	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:08	QNW
Barium	67	3.6	1.4	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:08	QNW
Cadmium	1.3	0.71	0.36	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:08	QNW
Chromium	39	1.4	0.81	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:08	QNW
Lead	58	1.1	0.52	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:08	QNW
Mercury	0.089	0.063	0.022	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:44	DRL
Selenium	ND	7.1	2.5	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:08	QNW
Silver	ND	0.71	0.33	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:08	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I1325
Date Received: 9/23/2021
Field Sample #: SD-213
Sampled: 9/23/2021 12:25
Sample ID: 21I1325-06
Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	44.0			% Wt	1		SM 2540G	9/28/21	9/29/21 8:46	CV
Total Organic Carbon	92000	100		mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 22:06	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-213 Sampled: 9/23/2021 12:25

Sample ID: 21I1325-06

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/10/21 0:00	GEOTE

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-214   Sampled: 9/23/2021 13:36

Sample ID: 21I1325-07

Sample Matrix: Sediment

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.26	0.20	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Acenaphthylene	ND	0.26	0.19	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Anthracene	ND	0.26	0.21	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Benzo(a)anthracene	ND	0.26	0.18	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Benzo(a)pyrene	ND	0.26	0.19	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Benzo(b)fluoranthene	ND	0.26	0.19	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Benzo(g,h,i)perylene	ND	0.27	0.27	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Benzo(k)fluoranthene	ND	0.26	0.17	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Chrysene	ND	0.26	0.18	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Dibenz(a,h)anthracene	ND	0.26	0.26	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Fluoranthene	ND	0.26	0.20	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Fluorene	ND	0.26	0.21	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Indeno(1,2,3-cd)pyrene	ND	0.29	0.29	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
2-Methylnaphthalene	ND	0.26	0.20	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Naphthalene	ND	0.26	0.17	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Phenanthrene	ND	0.26	0.20	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL
Pyrene	ND	0.26	0.20	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:29	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	49.7	30-130		9/29/21 12:29
2-Fluorobiphenyl	46.2	30-130		9/29/21 12:29
p-Terphenyl-d14	44.5	30-130		9/29/21 12:29

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-214   Sampled: 9/23/2021 13:36

Sample ID: 21I1325-07

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	37	37	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
C19-C36 Aliphatics	38	37	37	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Unadjusted C11-C22 Aromatics	73	37	37	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
C11-C22 Aromatics	73	37	37	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Acenaphthene	ND	0.37	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Acenaphthylene	ND	0.37	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Anthracene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Benzo(a)anthracene	ND	0.37	0.14	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Benzo(a)pyrene	ND	0.37	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Benzo(b)fluoranthene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Benzo(g,h,i)perylene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Benzo(k)fluoranthene	ND	0.37	0.20	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Chrysene	ND	0.37	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Dibenz(a,h)anthracene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Fluoranthene	ND	0.37	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Fluorene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Indeno(1,2,3-cd)pyrene	ND	0.37	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
2-Methylnaphthalene	ND	0.37	0.15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Naphthalene	ND	0.37	0.095	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Phenanthrene	ND	0.37	0.18	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH
Pyrene	ND	0.37	0.16	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 1:55	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	44.4	40-140		9/30/21 1:55
o-Terphenyl (OTP)	50.4	40-140		9/30/21 1:55
2-Bromonaphthalene	81.2	40-140		9/30/21 1:55
2-Fluorobiphenyl	87.9	40-140		9/30/21 1:55

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-214 Sampled: 9/23/2021 13:36

Sample ID: 21I1325-07

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	5.8	12	4.5	mg/Kg dry	1	J	SW-846 6010D	9/29/21	9/30/21 13:26	QNW
Barium	66	6.1	2.3	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:26	QNW
Cadmium	ND	1.2	0.62	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:26	QNW
Chromium	39	2.4	1.4	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:26	QNW
Lead	93	1.8	0.89	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:26	QNW
Mercury	0.27	0.11	0.037	mg/Kg dry	1		SW-846 7471B	9/25/21	9/27/21 14:46	DRL
Selenium	ND	12	4.3	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:26	QNW
Silver	ND	1.2	0.56	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:26	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-214   Sampled: 9/23/2021 13:36

Sample ID: 21I1325-07

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	26.9			% Wt	1		SM 2540G	9/28/21	9/29/21 8:46	CV
Total Organic Carbon	77000	100		mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 22:31	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-214   Sampled: 9/23/2021 13:36

Sample ID: 21I1325-07

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/12/21 0:00	GEOTE

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-215 Sampled: 9/23/2021 14:25

Sample ID: 21I1325-08

Sample Matrix: Sediment

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.22	0.16	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Acenaphthylene	ND	0.22	0.16	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Anthracene	ND	0.22	0.17	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Benzo(a)anthracene	0.22	0.22	0.15	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Benzo(a)pyrene	0.24	0.22	0.16	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Benzo(b)fluoranthene	0.25	0.22	0.16	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Benzo(g,h,i)perylene	ND	0.22	0.22	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Benzo(k)fluoranthene	0.15	0.22	0.14	mg/Kg dry	1	J	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Chrysene	0.21	0.22	0.15	mg/Kg dry	1	J	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Dibenz(a,h)anthracene	ND	0.22	0.21	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Fluoranthene	0.43	0.22	0.17	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Fluorene	ND	0.22	0.18	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Indeno(1,2,3-cd)pyrene	ND	0.24	0.24	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
2-Methylnaphthalene	ND	0.22	0.17	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Naphthalene	ND	0.22	0.14	mg/Kg dry	1	U	SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Phenanthrene	0.32	0.22	0.17	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 12:56	BGL
Pyrene	0.45	0.22	0.17	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 12:56	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	57.8	30-130		9/29/21 12:56
2-Fluorobiphenyl	53.0	30-130		9/29/21 12:56
p-Terphenyl-d14	53.4	30-130		9/29/21 12:56

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I1325
Date Received: 9/23/2021
Field Sample #: SD-215
Sampled: 9/23/2021 14:25
Sample ID: 21I1325-08
Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	31	31	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
C19-C36 Aliphatics	60	31	31	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Unadjusted C11-C22 Aromatics	86	31	31	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
C11-C22 Aromatics	75	31	31	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Acenaphthene	ND	0.31	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Acenaphthylene	ND	0.31	0.11	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Anthracene	0.28	0.31	0.13	mg/Kg dry	1	J	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Benzo(a)anthracene	0.89	0.31	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Benzo(a)pyrene	0.85	0.31	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Benzo(b)fluoranthene	1.1	0.31	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Benzo(g,h,i)perylene	0.61	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Benzo(k)fluoranthene	0.41	0.31	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Chrysene	1.0	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Dibenz(a,h)anthracene	ND	0.31	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Fluoranthene	2.1	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Fluorene	ND	0.31	0.13	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Indeno(1,2,3-cd)pyrene	0.57	0.31	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
2-Methylnaphthalene	ND	0.31	0.12	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Naphthalene	ND	0.31	0.078	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Phenanthrene	1.6	0.31	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH
Pyrene	2.1	0.31	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	9/30/21	10/2/21 21:44	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	47.8	40-140		10/2/21 21:44
o-Terphenyl (OTP)	52.7	40-140		10/2/21 21:44
2-Bromonaphthalene	86.6	40-140		10/2/21 21:44
2-Fluorobiphenyl	90.9	40-140		10/2/21 21:44

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-215 Sampled: 9/23/2021 14:25

Sample ID: 21I1325-08

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	110	10	3.8	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:31	QNW
Barium	160	5.1	2.0	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:31	QNW
Cadmium	7.2	1.0	0.52	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:31	QNW
Chromium	64	2.1	1.2	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:31	QNW
Lead	510	1.5	0.75	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:31	QNW
Mercury	0.17	0.085	0.029	mg/Kg dry	1	R-02	SW-846 7471B	9/25/21	9/27/21 14:04	DRL
Selenium	ND	10	3.7	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:31	QNW
Silver	ND	1.0	0.47	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:31	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-215
Sampled: 9/23/2021 14:25

Sample ID: 21I1325-08

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	32.4			% Wt	1		SM 2540G	9/28/21	9/29/21 8:46	CV
Total Organic Carbon	220000	100		mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 23:01	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-215
Sampled: 9/23/2021 14:25

Sample ID: 21I1325-08

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/10/21 0:00	GEOTE

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-217 Sampled: 9/23/2021 15:00

Sample ID: 21I1325-09

Sample Matrix: Sediment

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	0.95	0.11	0.082	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Acenaphthylene	0.11	0.11	0.080	mg/Kg dry	1	J	SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Anthracene	2.0	0.11	0.085	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Benzo(a)anthracene	8.5	0.54	0.36	mg/Kg dry	5		SW-846 8270E	9/25/21	9/29/21 13:49	BGL
Benzo(a)pyrene	8.6	0.54	0.40	mg/Kg dry	5		SW-846 8270E	9/25/21	9/29/21 13:49	BGL
Benzo(b)fluoranthene	9.9	0.54	0.40	mg/Kg dry	5		SW-846 8270E	9/25/21	9/29/21 13:49	BGL
Benzo(g,h,i)perylene	3.1	0.11	0.11	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Benzo(k)fluoranthene	2.9	0.11	0.071	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Chrysene	5.9	0.11	0.076	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Chrysene	7.7	0.54	0.38	mg/Kg dry	5		SW-846 8270E	9/25/21	9/29/21 13:49	BGL
Dibenz(a,h)anthracene	0.92	0.11	0.11	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Fluoranthene	18	0.54	0.42	mg/Kg dry	5		SW-846 8270E	9/25/21	9/29/21 13:49	BGL
Fluorene	0.83	0.11	0.088	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Indeno(1,2,3-cd)pyrene	3.8	0.12	0.12	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
2-Methylnaphthalene	0.15	0.11	0.083	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Naphthalene	0.24	0.11	0.072	mg/Kg dry	1		SW-846 8270E	9/25/21	9/29/21 13:22	BGL
Phenanthrene	11	0.54	0.41	mg/Kg dry	5		SW-846 8270E	9/25/21	9/29/21 13:49	BGL
Pyrene	18	0.54	0.42	mg/Kg dry	5		SW-846 8270E	9/25/21	9/29/21 13:49	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	60.7	30-130		9/29/21 13:22
Nitrobenzene-d5	82.4	30-130		9/29/21 13:49
2-Fluorobiphenyl	69.4	30-130		9/29/21 13:22
2-Fluorobiphenyl	92.3	30-130		9/29/21 13:49
p-Terphenyl-d14	82.1	30-130		9/29/21 13:22
p-Terphenyl-d14	106	30-130		9/29/21 13:49

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-217 Sampled: 9/23/2021 15:00

Sample ID: 21I1325-09

Sample Matrix: Sediment

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	15	15	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
C19-C36 Aliphatics	29	15	15	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Unadjusted C11-C22 Aromatics	330	15	15	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
C11-C22 Aromatics	190	15	15	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Acenaphthene	2.4	0.15	0.066	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Acenaphthylene	ND	0.15	0.055	mg/Kg dry	1	U	MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Anthracene	3.4	0.15	0.064	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Benzo(a)anthracene	11	0.15	0.056	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Benzo(a)pyrene	9.8	0.15	0.052	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Benzo(b)fluoranthene	12	0.15	0.062	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Benzo(g,h,i)perylene	5.6	0.15	0.063	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Benzo(k)fluoranthene	4.9	0.15	0.082	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Chrysene	11	0.15	0.064	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Dibenz(a,h)anthracene	1.8	0.15	0.064	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Fluoranthene	22	0.15	0.065	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Fluorene	2.1	0.15	0.064	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Indeno(1,2,3-cd)pyrene	6.8	0.15	0.068	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
2-Methylnaphthalene	0.36	0.15	0.061	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Naphthalene	0.58	0.15	0.039	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Phenanthrene	17	0.15	0.073	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH
Pyrene	22	0.15	0.065	mg/Kg dry	1		MADEP EPH rev 2.1	9/24/21	9/30/21 2:37	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	51.6	40-140		9/30/21 2:37
o-Terphenyl (OTP)	59.1	40-140		9/30/21 2:37
2-Bromonaphthalene	90.4	40-140		9/30/21 2:37
2-Fluorobiphenyl	93.3	40-140		9/30/21 2:37

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-217 Sampled: 9/23/2021 15:00

Sample ID: 21I1325-09

Sample Matrix: Sediment

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	14	5.0	1.8	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:37	QNW
Barium	500	2.5	0.96	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:37	QNW
Cadmium	1.8	0.50	0.26	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:37	QNW
Chromium	28	1.0	0.57	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:37	QNW
Lead	2800	0.76	0.37	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:37	QNW
Mercury	13	0.79	0.27	mg/Kg dry	20		SW-846 7471B	9/25/21	9/27/21 15:42	DRL
Selenium	6.3	5.0	1.8	mg/Kg dry	1		SW-846 6010D	9/29/21	9/30/21 13:37	QNW
Silver	ND	0.50	0.23	mg/Kg dry	1	U	SW-846 6010D	9/29/21	9/30/21 13:37	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-217   Sampled: 9/23/2021 15:00

Sample ID: 21I1325-09

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	64.9			% Wt	1	R-02	SM 2540G	9/28/21	9/29/21 8:46	CV
Total Organic Carbon	49000	100		mg/Kg	1	Z-01	SW 846 9060A	9/29/21	9/29/21 23:27	DJM

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SD-217 Sampled: 9/23/2021 15:00

Sample ID: 21I1325-09

Sample Matrix: Sediment

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	see attached			%	1		SM D 422-63		10/10/21 0:00	GEOTE

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-208 Sampled: 9/23/2021 08:40

Sample ID: 21I1325-10

Sample Matrix: Surface Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.30	0.028	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Acenaphthylene (SIM)	ND	0.20	0.026	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Anthracene (SIM)	ND	0.20	0.020	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Benzo(a)anthracene (SIM)	ND	0.050	0.035	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Benzo(a)pyrene (SIM)	ND	0.10	0.022	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Benzo(b)fluoranthene (SIM)	ND	0.050	0.028	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Benzo(g,h,i)perylene (SIM)	ND	0.50	0.028	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Benzo(k)fluoranthene (SIM)	ND	0.20	0.018	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Chrysene (SIM)	ND	0.20	0.022	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.10	0.029	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Fluoranthene (SIM)	ND	0.50	0.022	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Fluorene (SIM)	ND	1.0	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.10	0.028	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
2-Methylnaphthalene (SIM)	ND	1.0	0.11	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Naphthalene (SIM)	ND	1.0	0.36	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Phenanthrene (SIM)	ND	0.050	0.030	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR
Pyrene (SIM)	ND	1.0	0.020	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 11:56	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Nitrobenzene-d5	74.7	30-130		9/30/21 11:56
2-Fluorobiphenyl	62.6	30-130		9/30/21 11:56
p-Terphenyl-d14	86.7	30-130		9/30/21 11:56

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-208 Sampled: 9/23/2021 08:40

Sample ID: 21I1325-10

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	2.1	0.80	0.46	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:07	QNW
Barium	37	10	1.2	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:07	QNW
Cadmium	ND	0.20	0.027	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:07	QNW
Chromium	1.1	1.0	0.92	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:07	QNW
Lead	21	0.50	0.14	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:07	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/28/21	9/28/21 18:00	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/28/21	9/30/21 13:07	QNW
Silver	ND	0.20	0.026	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:07	QNW
Calcium Hardness	48	1.2		mg/L	1		EPA 200.7	9/28/21	9/30/21 15:16	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-208 Sampled: 9/23/2021 08:40

Sample ID: 21I1325-10

Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	1.9	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:00	QNW
Barium	29	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:00	QNW
Cadmium	ND	0.20	0.027	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:00	QNW
Chromium	ND	1.0	0.92	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:00	QNW
Lead	4.3	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:00	QNW
Mercury	0.000065	0.00010	0.000050	mg/L	1	B, J	SW-846 7470A	9/24/21	9/25/21 13:05	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/29/21 13:25	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:00	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-210 Sampled: 9/23/2021 09:45

Sample ID: 21I1325-11

Sample Matrix: Surface Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.29	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Acenaphthylene (SIM)	ND	0.19	0.025	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Anthracene (SIM)	ND	0.19	0.019	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Benzo(a)anthracene (SIM)	ND	0.049	0.034	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Benzo(a)pyrene (SIM)	ND	0.097	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Benzo(b)fluoranthene (SIM)	ND	0.049	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Benzo(g,h,i)perylene (SIM)	ND	0.49	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Benzo(k)fluoranthene (SIM)	ND	0.19	0.017	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Chrysene (SIM)	ND	0.19	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.097	0.028	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Fluoranthene (SIM)	ND	0.49	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Fluorene (SIM)	ND	0.97	0.026	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.097	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
2-Methylnaphthalene (SIM)	ND	0.97	0.11	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Naphthalene (SIM)	ND	0.97	0.35	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Phenanthrene (SIM)	ND	0.049	0.029	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR
Pyrene (SIM)	ND	0.97	0.019	µg/L	1	U	SW-846 8270E	9/28/21	9/30/21 12:18	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Nitrobenzene-d5	55.4	30-130		9/30/21 12:18
2-Fluorobiphenyl	56.7	30-130		9/30/21 12:18
p-Terphenyl-d14	82.3	30-130		9/30/21 12:18

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-210   Sampled: 9/23/2021 09:45

Sample ID: 21I1325-11

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	5.2	0.80	0.46	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:42	QNW
Barium	100	10	1.2	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:42	QNW
Cadmium	1.0	0.20	0.027	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:42	QNW
Chromium	3.0	1.0	0.92	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:42	QNW
Lead	340	0.50	0.14	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:42	QNW
Mercury	0.000061	0.00010	0.000050	mg/L	1	J	SW-846 7470A	9/28/21	9/28/21 18:02	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/28/21	9/30/21 13:42	QNW
Silver	0.079	0.20	0.026	µg/L	1	J	SW-846 6020B	9/28/21	9/30/21 13:42	QNW
Calcium Hardness	72	1.2		mg/L	1		EPA 200.7	9/28/21	9/30/21 15:27	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-210   Sampled: 9/23/2021 09:45

Sample ID: 21I1325-11

Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	1.1	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:03	QNW
Barium	64	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:03	QNW
Cadmium	ND	0.20	0.027	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:03	QNW
Chromium	ND	1.0	0.92	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:03	QNW
Lead	5.0	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:03	QNW
Mercury	0.000063	0.00010	0.000050	mg/L	1	B, J	SW-846 7470A	9/24/21	9/25/21 13:07	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/29/21 13:26	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:03	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-211 Sampled: 9/23/2021 11:10

Sample ID: 21I1325-12

Sample Matrix: Surface Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.29	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Acenaphthylene (SIM)	ND	0.20	0.025	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Anthracene (SIM)	ND	0.20	0.020	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Benzo(a)anthracene (SIM)	ND	0.049	0.034	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Benzo(a)pyrene (SIM)	ND	0.098	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Benzo(b)fluoranthene (SIM)	ND	0.049	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Benzo(g,h,i)perylene (SIM)	ND	0.49	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Benzo(k)fluoranthene (SIM)	ND	0.20	0.018	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Chrysene (SIM)	ND	0.20	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.098	0.028	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Fluoranthene (SIM)	ND	0.49	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Fluorene (SIM)	ND	0.98	0.026	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.098	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
2-Methylnaphthalene (SIM)	ND	0.98	0.11	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Naphthalene (SIM)	ND	0.98	0.35	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Phenanthrene (SIM)	ND	0.049	0.029	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR
Pyrene (SIM)	ND	0.98	0.020	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:01	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	89.4	30-130		9/29/21 17:01
2-Fluorobiphenyl	76.9	30-130		9/29/21 17:01
p-Terphenyl-d14	94.7	30-130		9/29/21 17:01

Project Location: 375 Banfield Rd, Portsmouth, NH	Sample Description:	Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-211	Sampled: 9/23/2021 11:10

Sample ID: 21I1325-12

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	0.49	0.80	0.46	µg/L	1	J	SW-846 6020B	9/28/21	9/30/21 13:45	QNW
Barium	51	10	1.2	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:45	QNW
Cadmium	0.039	0.20	0.027	µg/L	1	J	SW-846 6020B	9/28/21	9/30/21 13:45	QNW
Chromium	ND	1.0	0.92	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:45	QNW
Iron	4.1	0.050	0.032	mg/L	1		SW-846 6010D	9/28/21	9/30/21 15:35	MJH
Lead	8.9	0.50	0.14	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:45	QNW
Manganese	0.48	0.010	0.0020	mg/L	1		SW-846 6010D	9/28/21	9/30/21 15:35	MJH
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/28/21	9/28/21 18:08	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/28/21	9/30/21 13:45	QNW
Silver	ND	0.20	0.026	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:45	QNW
Calcium Hardness	65	1.2		mg/L	1		EPA 200.7	9/28/21	9/30/21 15:35	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-211 Sampled: 9/23/2021 11:10

Sample ID: 21I1325-12

Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	1.0	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:06	QNW
Barium	51	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:06	QNW
Cadmium	ND	0.20	0.027	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:06	QNW
Chromium	ND	1.0	0.92	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:06	QNW
Iron	2.9	0.050	0.032	mg/L	1		SW-846 6010D	9/29/21	9/30/21 13:52	MJH
Lead	1.3	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/28/21 20:06	QNW
Manganese	0.46	0.010	0.0020	mg/L	1		SW-846 6010D	9/29/21	9/30/21 13:52	MJH
Mercury	0.000061	0.00010	0.000050	mg/L	1	B, J	SW-846 7470A	9/24/21	9/25/21 13:09	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/29/21 13:28	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	9/27/21	9/28/21 20:06	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-211 Sampled: 9/23/2021 11:10

Sample ID: 21I1325-12

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	190	5.0	1.8	mg/L	5		EPA 300.0	9/24/21	9/24/21 21:02	IS
Nitrate as N	ND	0.10	0.090	mg/L	1		EPA 300.0	9/24/21	9/24/21 21:02	is
Sulfate	1.4	1.0		mg/L	1		EPA 300.0	9/24/21	9/24/21 21:02	IS
Total Suspended Solids	4.6	1.0		mg/L	1		SM21-23 2540D	9/24/21	9/24/21 11:28	LL

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-211 Sampled: 9/23/2021 11:10

Sample ID: 21I1325-12

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	290	10	mg/L	1		SM21-23 2540C	9/24/21	9/24/21 13:32	LL

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-212 Sampled: 9/23/2021 12:00

Sample ID: 21I1325-13

Sample Matrix: Surface Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.29	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Acenaphthylene (SIM)	ND	0.19	0.025	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Anthracene (SIM)	ND	0.19	0.019	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Benzo(a)anthracene (SIM)	ND	0.048	0.034	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Benzo(a)pyrene (SIM)	ND	0.096	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Benzo(b)fluoranthene (SIM)	ND	0.048	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Benzo(g,h,i)perylene (SIM)	ND	0.48	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Benzo(k)fluoranthene (SIM)	ND	0.19	0.017	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Chrysene (SIM)	ND	0.19	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.096	0.028	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Fluoranthene (SIM)	ND	0.48	0.021	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Fluorene (SIM)	ND	0.96	0.026	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.096	0.027	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
2-Methylnaphthalene (SIM)	ND	0.96	0.11	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Naphthalene (SIM)	ND	0.96	0.35	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Phenanthrene (SIM)	ND	0.048	0.029	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR
Pyrene (SIM)	ND	0.96	0.019	µg/L	1	U	SW-846 8270E	9/28/21	9/29/21 17:24	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	79.8	30-130		9/29/21 17:24
2-Fluorobiphenyl	68.4	30-130		9/29/21 17:24
p-Terphenyl-d14	84.8	30-130		9/29/21 17:24

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-212　Sampled: 9/23/2021 12:00

Sample ID: 21I1325-13

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	3.7	0.80	0.46	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:47	QNW
Barium	35	10	1.2	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:47	QNW
Cadmium	0.17	0.20	0.027	µg/L	1	J	SW-846 6020B	9/28/21	9/30/21 13:47	QNW
Chromium	3.1	1.0	0.92	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:47	QNW
Iron	6.9	0.050	0.032	mg/L	1		SW-846 6010D	9/28/21	9/30/21 15:41	MJH
Lead	21	0.50	0.14	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:47	QNW
Manganese	0.089	0.010	0.0020	mg/L	1		SW-846 6010D	9/28/21	9/30/21 15:41	MJH
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	9/28/21	9/28/21 18:10	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/28/21	9/30/21 13:47	QNW
Silver	ND	0.20	0.026	µg/L	1		SW-846 6020B	9/28/21	9/30/21 13:47	QNW
Calcium Hardness	41	1.2		mg/L	1		EPA 200.7	9/28/21	9/30/21 15:41	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH

Sample Description:

Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-212

Sampled: 9/23/2021 12:00

Sample ID: 21I1325-13

Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	3.1	0.80	0.46	µg/L	1		SW-846 6020B	9/27/21	9/29/21 14:00	QNW
Barium	35	10	1.2	µg/L	1		SW-846 6020B	9/27/21	9/29/21 14:00	QNW
Cadmium	0.032	0.20	0.027	µg/L	1	J	SW-846 6020B	9/27/21	9/29/21 14:00	QNW
Chromium	3.0	1.0	0.92	µg/L	1		SW-846 6020B	9/27/21	9/29/21 14:00	QNW
Iron	5.9	0.050	0.032	mg/L	1		SW-846 6010D	9/29/21	9/30/21 13:58	MJH
Lead	3.1	0.50	0.14	µg/L	1		SW-846 6020B	9/27/21	9/29/21 14:00	QNW
Manganese	0.086	0.010	0.0020	mg/L	1		SW-846 6010D	9/29/21	9/30/21 13:58	MJH
Mercury	0.000071	0.00010	0.000050	mg/L	1	B, J	SW-846 7470A	9/24/21	9/25/21 13:11	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	9/27/21	9/29/21 14:00	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	9/27/21	9/29/21 14:00	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-212   Sampled: 9/23/2021 12:00

Sample ID: 21I1325-13

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	13	1.0	0.37	mg/L	1		EPA 300.0	9/24/21	9/24/21 21:46	IS
Nitrate as N	ND	0.10	0.090	mg/L	1		EPA 300.0	9/24/21	9/24/21 21:46	is
Sulfate	1.4	1.0		mg/L	1		EPA 300.0	9/24/21	9/24/21 21:46	IS
Total Suspended Solids	100	6.7		mg/L	1		SM21-23 2540D	9/24/21	9/24/21 11:28	LL

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21I1325

Date Received: 9/23/2021

Field Sample #: SW-212
Sampled: 9/23/2021 12:00

Sample ID: 21I1325-13

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	48	10	mg/L	1		SM21-23 2540C	9/24/21	9/24/21 13:32	LL

Sample Extraction Data

Prep Method: SW-846 3005A **Analytical Method: EPA 200.7**

Lab Number [Field ID]	Batch	Initial [mL]	Date
21I1325-10 [SW-208]	B291179	50.0	09/28/21
21I1325-11 [SW-210]	B291179	50.0	09/28/21
21I1325-12 [SW-211]	B291179	50.0	09/28/21
21I1325-13 [SW-212]	B291179	50.0	09/28/21

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-12 [SW-211]	B290966	10.0	10.0	09/24/21
21I1325-13 [SW-212]	B290966	10.0	10.0	09/24/21

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-12 [SW-211]	B291009	10.0	10.0	09/24/21
21I1325-13 [SW-212]	B291009	10.0	10.0	09/24/21

Prep Method: SW-846 3546 **Analytical Method: MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-01 [SD-208]	B290945	20.0	2.00	09/24/21
21I1325-02 [SD-209]	B290945	20.0	2.00	09/24/21
21I1325-03 [SD-210]	B290945	20.0	2.00	09/24/21
21I1325-04 [SD-211]	B290945	20.0	2.00	09/24/21
21I1325-05 [SD-212]	B290945	20.0	2.00	09/24/21
21I1325-06 [SD-213]	B290945	20.0	2.00	09/24/21
21I1325-07 [SD-214]	B290945	20.0	2.00	09/24/21
21I1325-09 [SD-217]	B290945	20.0	2.00	09/24/21

Prep Method: SW-846 3546 **Analytical Method: MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-08RE1 [SD-215]	B291420	20.0	2.00	09/30/21

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I1325-01 [SD-208]	B291142	09/28/21
21I1325-02 [SD-209]	B291142	09/28/21
21I1325-03 [SD-210]	B291142	09/28/21
21I1325-04 [SD-211]	B291142	09/28/21
21I1325-05 [SD-212]	B291142	09/28/21
21I1325-06 [SD-213]	B291142	09/28/21
21I1325-07 [SD-214]	B291142	09/28/21
21I1325-08 [SD-215]	B291142	09/28/21
21I1325-09 [SD-217]	B291142	09/28/21

Sample Extraction Data

SM21-23 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
21I1325-12 [SW-211]	B290928	50.0	09/24/21
21I1325-13 [SW-212]	B290928	50.0	09/24/21

SM21-23 2540D

Lab Number [Field ID]	Batch	Initial [mL]	Date
21I1325-12 [SW-211]	B290929	500	09/24/21
21I1325-13 [SW-212]	B290929	75.0	09/24/21

SW 846 9060A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-01 [SD-208]	B291244	1.00	1.00	09/29/21
21I1325-02 [SD-209]	B291244	1.00	1.00	09/29/21
21I1325-03 [SD-210]	B291244	1.00	1.00	09/29/21
21I1325-04 [SD-211]	B291244	1.00	1.00	09/29/21
21I1325-05 [SD-212]	B291244	1.00	1.00	09/29/21
21I1325-06 [SD-213]	B291244	1.00	1.00	09/29/21
21I1325-07 [SD-214]	B291244	1.00	1.00	09/29/21
21I1325-08 [SD-215]	B291244	1.00	1.00	09/29/21
21I1325-09 [SD-217]	B291244	1.00	1.00	09/29/21

Prep Method: SW-846 3050B Analytical Method: SW-846 6010D

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-01 [SD-208]	B291270	1.52	50.0	09/29/21
21I1325-02 [SD-209]	B291270	1.50	50.0	09/29/21
21I1325-03 [SD-210]	B291270	1.55	50.0	09/29/21
21I1325-04 [SD-211]	B291270	1.49	50.0	09/29/21
21I1325-05 [SD-212]	B291270	1.49	50.0	09/29/21
21I1325-06 [SD-213]	B291270	1.60	50.0	09/29/21
21I1325-07 [SD-214]	B291270	1.53	50.0	09/29/21
21I1325-08 [SD-215]	B291270	1.50	50.0	09/29/21
21I1325-09 [SD-217]	B291270	1.53	50.0	09/29/21

Prep Method: SW-846 3005A Analytical Method: SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-12 [SW-211]	B291179	50.0	50.0	09/28/21
21I1325-13 [SW-212]	B291179	50.0	50.0	09/28/21

Prep Method: SW-846 3005A Dissolved Analytical Method: SW-846 6010D

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-12 [SW-211]	B291316	50.0	50.0	09/29/21
21I1325-13 [SW-212]	B291316	50.0	50.0	09/29/21

Sample Extraction Data

Prep Method: SW-846 3005A Dissolved **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-10 [SW-208]	B291129	50.0	50.0	09/27/21
21I1325-11 [SW-210]	B291129	50.0	50.0	09/27/21
21I1325-12 [SW-211]	B291129	50.0	50.0	09/27/21
21I1325-13 [SW-212]	B291129	50.0	50.0	09/27/21

Prep Method: SW-846 3005A **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-10 [SW-208]	B291178	50.0	50.0	09/28/21
21I1325-11 [SW-210]	B291178	50.0	50.0	09/28/21
21I1325-12 [SW-211]	B291178	50.0	50.0	09/28/21
21I1325-13 [SW-212]	B291178	50.0	50.0	09/28/21

Prep Method: SW-846 7470A Dissolved **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-10 [SW-208]	B290978	6.00	6.00	09/24/21
21I1325-11 [SW-210]	B290978	6.00	6.00	09/24/21
21I1325-12 [SW-211]	B290978	6.00	6.00	09/24/21
21I1325-13 [SW-212]	B290978	6.00	6.00	09/24/21

Prep Method: SW-846 7470A Prep **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-10 [SW-208]	B291185	6.00	6.00	09/28/21
21I1325-11 [SW-210]	B291185	6.00	6.00	09/28/21
21I1325-12 [SW-211]	B291185	6.00	6.00	09/28/21
21I1325-13 [SW-212]	B291185	6.00	6.00	09/28/21

Prep Method: SW-846 7471 **Analytical Method: SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-01 [SD-208]	B291002	0.543	50.0	09/25/21
21I1325-02 [SD-209]	B291002	0.581	50.0	09/25/21
21I1325-03 [SD-210]	B291002	0.550	50.0	09/25/21
21I1325-04 [SD-211]	B291002	0.576	50.0	09/25/21
21I1325-05 [SD-212]	B291002	0.590	50.0	09/25/21
21I1325-06 [SD-213]	B291002	0.538	50.0	09/25/21
21I1325-07 [SD-214]	B291002	0.511	50.0	09/25/21
21I1325-08 [SD-215]	B291002	0.548	50.0	09/25/21
21I1325-09 [SD-217]	B291002	0.587	50.0	09/25/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-01 [SD-208]	B291007	30.0	1.00	09/25/21
21I1325-07 [SD-214]	B291007	30.0	1.00	09/25/21
21I1325-08 [SD-215]	B291007	30.1	1.00	09/25/21
21I1325-09 [SD-217]	B291007	30.0	1.00	09/25/21

Sample Extraction Data

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-09RE1 [SD-217]	B291007	30.0	1.00	09/25/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I1325-02 [SD-209]	B291210	30.1	1.00	09/25/21
21I1325-03 [SD-210]	B291210	30.1	1.00	09/25/21
21I1325-04 [SD-211]	B291210	30.2	1.00	09/25/21
21I1325-05 [SD-212]	B291210	30.2	1.00	09/25/21
21I1325-06 [SD-213]	B291210	30.1	1.00	09/25/21

Prep Method: SW-846 3510C **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21I1325-10 [SW-208]	B291325	1000	1.00	09/28/21
21I1325-11 [SW-210]	B291325	1030	1.00	09/28/21
21I1325-12 [SW-211]	B291325	1020	1.00	09/28/21
21I1325-13 [SW-212]	B291325	1040	1.00	09/28/21

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291007 - SW-846 3546										
Blank (B291007-BLK1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Acenaphthene	ND	0.070	mg/Kg wet							U
Acenaphthylene	ND	0.070	mg/Kg wet							U
Anthracene	ND	0.070	mg/Kg wet							U
Benzo(a)anthracene	ND	0.070	mg/Kg wet							U
Benzo(a)pyrene	ND	0.070	mg/Kg wet							U
Benzo(b)fluoranthene	ND	0.070	mg/Kg wet							U
Benzo(g,h,i)perylene	ND	0.72	mg/Kg wet							U
Benzo(k)fluoranthene	ND	0.070	mg/Kg wet							U
Chrysene	ND	0.070	mg/Kg wet							U
Dibenz(a,h)anthracene	ND	0.070	mg/Kg wet							U
Fluoranthene	ND	0.070	mg/Kg wet							U
Fluorene	ND	0.070	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene	ND	0.077	mg/Kg wet							U
2-Methylnaphthalene	ND	0.070	mg/Kg wet							U
Naphthalene	ND	0.070	mg/Kg wet							U
Phenanthrene	ND	0.070	mg/Kg wet							U
Pyrene	ND	0.070	mg/Kg wet							U
Surrogate: Nitrobenzene-d5	*2.48*		mg/Kg wet	3.33		74.2	30-130			
Surrogate: 2-Fluorobiphenyl	*2.50*		mg/Kg wet	3.33		75.0	30-130			
Surrogate: p-Terphenyl-d14	*2.93*		mg/Kg wet	3.33		87.8	30-130			
LCS (B291007-BS1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Acenaphthene	1.21	0.17	mg/Kg wet	1.66		73.0	40-140			
Acenaphthylene	1.24	0.17	mg/Kg wet	1.66		74.7	40-140			
Anthracene	1.37	0.17	mg/Kg wet	1.66		82.5	40-140			
Benzo(a)anthracene	1.34	0.17	mg/Kg wet	1.66		80.6	40-140			
Benzo(a)pyrene	1.48	0.17	mg/Kg wet	1.66		88.8	40-140			
Benzo(b)fluoranthene	1.38	0.17	mg/Kg wet	1.66		82.8	40-140			
Benzo(g,h,i)perylene	1.35	0.17	mg/Kg wet	1.66		81.5	40-140			
Benzo(k)fluoranthene	1.48	0.17	mg/Kg wet	1.66		88.8	40-140			
Chrysene	1.39	0.17	mg/Kg wet	1.66		83.8	40-140			
Dibenz(a,h)anthracene	1.36	0.17	mg/Kg wet	1.66		82.1	40-140			
Fluoranthene	1.38	0.17	mg/Kg wet	1.66		82.8	40-140			
Fluorene	1.33	0.17	mg/Kg wet	1.66		80.0	40-140			
Indeno(1,2,3-cd)pyrene	1.37	0.17	mg/Kg wet	1.66		82.4	40-140			
2-Methylnaphthalene	1.35	0.17	mg/Kg wet	1.66		81.4	40-140			
Naphthalene	1.23	0.17	mg/Kg wet	1.66		74.1	40-140			
Phenanthrene	1.36	0.17	mg/Kg wet	1.66		81.8	40-140			
Pyrene	1.36	0.17	mg/Kg wet	1.66		81.9	40-140			
Surrogate: Nitrobenzene-d5	*2.55*		mg/Kg wet	3.32		76.8	30-130			
Surrogate: 2-Fluorobiphenyl	*2.70*		mg/Kg wet	3.32		81.3	30-130			
Surrogate: p-Terphenyl-d14	*2.94*		mg/Kg wet	3.32		88.6	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291007 - SW-846 3546										
LCS Dup (B291007-BSD1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Acenaphthene	1.21	0.17	mg/Kg wet	1.67		72.5	40-140	0.272	30	
Acenaphthylene	1.24	0.17	mg/Kg wet	1.67		74.7	40-140	0.253	30	
Anthracene	1.36	0.17	mg/Kg wet	1.67		81.8	40-140	0.495	30	
Benzo(a)anthracene	1.32	0.17	mg/Kg wet	1.67		79.5	40-140	1.07	30	
Benzo(a)pyrene	1.48	0.17	mg/Kg wet	1.67		88.7	40-140	0.243	30	
Benzo(b)fluoranthene	1.36	0.17	mg/Kg wet	1.67		81.8	40-140	0.907	30	
Benzo(g,h,i)perylene	1.45	0.17	mg/Kg wet	1.67		86.8	40-140	6.58	30	
Benzo(k)fluoranthene	1.46	0.17	mg/Kg wet	1.67		87.4	40-140	1.30	30	
Chrysene	1.39	0.17	mg/Kg wet	1.67		83.5	40-140	0.0497	30	
Dibenz(a,h)anthracene	1.43	0.17	mg/Kg wet	1.67		85.8	40-140	4.81	30	
Fluoranthene	1.35	0.17	mg/Kg wet	1.67		80.8	40-140	2.11	30	
Fluorene	1.34	0.17	mg/Kg wet	1.67		80.4	40-140	0.881	30	
Indeno(1,2,3-cd)pyrene	1.48	0.17	mg/Kg wet	1.67		88.7	40-140	7.74	30	
2-Methylnaphthalene	1.32	0.17	mg/Kg wet	1.67		79.3	40-140	2.23	30	
Naphthalene	1.18	0.17	mg/Kg wet	1.67		70.9	40-140	4.08	30	
Phenanthrene	1.36	0.17	mg/Kg wet	1.67		81.6	40-140	0.00993	30	
Pyrene	1.39	0.17	mg/Kg wet	1.67		83.6	40-140	2.31	30	
Surrogate: Nitrobenzene-d5	*2.47*		mg/Kg wet	3.33		74.0	30-130			
Surrogate: 2-Fluorobiphenyl	*2.62*		mg/Kg wet	3.33		78.6	30-130			
Surrogate: p-Terphenyl-d14	*2.94*		mg/Kg wet	3.33		88.1	30-130			
Batch B291210 - SW-846 3546										
Blank (B291210-BLK1)				Prepared: 09/25/21 Analyzed: 09/29/21						
Acenaphthene (SIM)	ND	0.0083	mg/Kg wet							U
Acenaphthylene (SIM)	ND	0.0083	mg/Kg wet							U
Anthracene (SIM)	ND	0.0067	mg/Kg wet							U
Benzo(a)anthracene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(a)pyrene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(b)fluoranthene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(g,h,i)perylene (SIM)	ND	0.017	mg/Kg wet							U
Benzo(k)fluoranthene (SIM)	ND	0.0067	mg/Kg wet							U
Chrysene (SIM)	ND	0.0067	mg/Kg wet							U
Dibenz(a,h)anthracene (SIM)	ND	0.0017	mg/Kg wet							U
Fluoranthene (SIM)	ND	0.017	mg/Kg wet							U
Fluorene (SIM)	ND	0.033	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.0067	mg/Kg wet							U
2-Methylnaphthalene (SIM)	ND	0.033	mg/Kg wet							U
Naphthalene (SIM)	ND	0.033	mg/Kg wet							U
Phenanthrene (SIM)	ND	0.0083	mg/Kg wet							U
Pyrene (SIM)	ND	0.033	mg/Kg wet							U
Surrogate: Nitrobenzene-d5	*2.47*		mg/Kg wet	3.33		74.1	30-130			
Surrogate: 2-Fluorobiphenyl	*2.13*		mg/Kg wet	3.33		64.0	30-130			
Surrogate: p-Terphenyl-d14	*3.10*		mg/Kg wet	3.33		92.9	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291210 - SW-846 3546										
LCS (B291210-BS1)				Prepared: 09/25/21 Analyzed: 09/29/21						
Acenaphthene (SIM)	1.21	0.17	mg/Kg wet	1.67		72.6	40-140			
Acenaphthylene (SIM)	1.28	0.17	mg/Kg wet	1.67		76.8	40-140			
Anthracene (SIM)	1.64	0.13	mg/Kg wet	1.67		98.5	40-140			
Benzo(a)anthracene (SIM)	1.72	0.033	mg/Kg wet	1.67		103	40-140			
Benzo(a)pyrene (SIM)	1.66	0.033	mg/Kg wet	1.67		99.3	40-140			
Benzo(b)fluoranthene (SIM)	1.70	0.033	mg/Kg wet	1.67		102	40-140			
Benzo(g,h,i)perylene (SIM)	1.58	0.33	mg/Kg wet	1.67		94.8	40-140			
Benzo(k)fluoranthene (SIM)	1.72	0.13	mg/Kg wet	1.67		103	40-140			
Chrysene (SIM)	1.74	0.13	mg/Kg wet	1.67		105	40-140			
Dibenz(a,h)anthracene (SIM)	1.66	0.033	mg/Kg wet	1.67		99.6	40-140			
Fluoranthene (SIM)	1.47	0.33	mg/Kg wet	1.67		88.5	40-140			
Fluorene (SIM)	1.33	0.67	mg/Kg wet	1.67		79.9	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	1.73	0.13	mg/Kg wet	1.67		104	40-140			
2-Methylnaphthalene (SIM)	1.51	0.67	mg/Kg wet	1.67		90.5	40-140			
Naphthalene (SIM)	1.33	0.67	mg/Kg wet	1.67		79.8	40-140			
Phenanthrene (SIM)	1.53	0.17	mg/Kg wet	1.67		91.6	40-140			
Pyrene (SIM)	1.60	0.67	mg/Kg wet	1.67		96.2	40-140			
Surrogate: Nitrobenzene-d5	*2.67*		mg/Kg wet	3.33		80.0	30-130			
Surrogate: 2-Fluorobiphenyl	*2.52*		mg/Kg wet	3.33		75.7	30-130			
Surrogate: p-Terphenyl-d14	*3.08*		mg/Kg wet	3.33		92.5	30-130			
LCS Dup (B291210-BSD1)				Prepared: 09/25/21 Analyzed: 09/29/21						
Acenaphthene (SIM)	1.22	0.17	mg/Kg wet	1.67		73.2	40-140	0.713	20	
Acenaphthylene (SIM)	1.29	0.17	mg/Kg wet	1.67		77.4	40-140	0.882	20	
Anthracene (SIM)	1.62	0.13	mg/Kg wet	1.67		97.1	40-140	1.43	20	
Benzo(a)anthracene (SIM)	1.72	0.033	mg/Kg wet	1.67		103	40-140	0.194	20	
Benzo(a)pyrene (SIM)	1.65	0.033	mg/Kg wet	1.67		99.2	40-140	0.0806	20	
Benzo(b)fluoranthene (SIM)	1.70	0.033	mg/Kg wet	1.67		102	40-140	0.0784	20	
Benzo(g,h,i)perylene (SIM)	1.63	0.33	mg/Kg wet	1.67		97.6	40-140	2.95	20	
Benzo(k)fluoranthene (SIM)	1.72	0.13	mg/Kg wet	1.67		103	40-140	0.155	20	
Chrysene (SIM)	1.75	0.13	mg/Kg wet	1.67		105	40-140	0.420	20	
Dibenz(a,h)anthracene (SIM)	1.69	0.033	mg/Kg wet	1.67		102	40-140	1.95	20	
Fluoranthene (SIM)	1.47	0.33	mg/Kg wet	1.67		88.5	40-140	0.00	20	
Fluorene (SIM)	1.33	0.67	mg/Kg wet	1.67		79.7	40-140	0.200	20	
Indeno(1,2,3-cd)pyrene (SIM)	1.78	0.13	mg/Kg wet	1.67		107	40-140	2.54	20	
2-Methylnaphthalene (SIM)	1.49	0.67	mg/Kg wet	1.67		89.6	40-140	1.07	20	
Naphthalene (SIM)	1.32	0.67	mg/Kg wet	1.67		79.4	40-140	0.502	20	
Phenanthrene (SIM)	1.53	0.17	mg/Kg wet	1.67		91.8	40-140	0.305	20	
Pyrene (SIM)	1.57	0.67	mg/Kg wet	1.67		93.9	40-140	2.40	20	
Surrogate: Nitrobenzene-d5	*2.67*		mg/Kg wet	3.33		80.1	30-130			
Surrogate: 2-Fluorobiphenyl	*2.50*		mg/Kg wet	3.33		75.1	30-130			
Surrogate: p-Terphenyl-d14	*3.25*		mg/Kg wet	3.33		97.4	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291325 - SW-846 3510C										
Blank (B291325-BLK1)				Prepared: 09/28/21 Analyzed: 09/29/21						
Acenaphthene (SIM)	ND	0.30	µg/L							U
Acenaphthylene (SIM)	ND	0.20	µg/L							U
Anthracene (SIM)	ND	0.20	µg/L							U
Benzo(a)anthracene (SIM)	ND	0.050	µg/L							U
Benzo(a)pyrene (SIM)	ND	0.10	µg/L							U
Benzo(b)fluoranthene (SIM)	ND	0.050	µg/L							U
Benzo(g,h,i)perylene (SIM)	ND	0.50	µg/L							U
Benzo(k)fluoranthene (SIM)	ND	0.20	µg/L							U
Chrysene (SIM)	ND	0.20	µg/L							U
Dibenz(a,h)anthracene (SIM)	ND	0.10	µg/L							U
Fluoranthene (SIM)	ND	0.50	µg/L							U
Fluorene (SIM)	ND	1.0	µg/L							U
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.10	µg/L							U
2-Methylnaphthalene (SIM)	ND	1.0	µg/L							U
Naphthalene (SIM)	ND	1.0	µg/L							U
Phenanthrene (SIM)	ND	0.050	µg/L							U
Pyrene (SIM)	ND	1.0	µg/L							U
Surrogate: Nitrobenzene-d5	*72.0*		µg/L	100		72.0	30-130			
Surrogate: 2-Fluorobiphenyl	*65.6*		µg/L	100		65.6	30-130			
Surrogate: p-Terphenyl-d14	*83.5*		µg/L	100		83.5	30-130			
LCS (B291325-BS1)				Prepared: 09/28/21 Analyzed: 09/29/21						
Acenaphthene (SIM)	26.3	6.0	µg/L	50.0		52.6	40-140			
Acenaphthylene (SIM)	27.6	4.0	µg/L	50.0		55.2	40-140			
Anthracene (SIM)	34.6	4.0	µg/L	50.0		69.1	40-140			
Benzo(a)anthracene (SIM)	36.8	1.0	µg/L	50.0		73.5	40-140			
Benzo(a)pyrene (SIM)	34.9	2.0	µg/L	50.0		69.7	40-140			
Benzo(b)fluoranthene (SIM)	33.4	1.0	µg/L	50.0		66.8	40-140			
Benzo(g,h,i)perylene (SIM)	33.6	10	µg/L	50.0		67.2	40-140			
Benzo(k)fluoranthene (SIM)	34.3	4.0	µg/L	50.0		68.6	40-140			
Chrysene (SIM)	35.2	4.0	µg/L	50.0		70.4	40-140			
Dibenz(a,h)anthracene (SIM)	34.5	2.0	µg/L	50.0		68.9	40-140			
Fluoranthene (SIM)	33.3	10	µg/L	50.0		66.6	40-140			
Fluorene (SIM)	28.2	20	µg/L	50.0		56.4	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	37.2	2.0	µg/L	50.0		74.3	40-140			
2-Methylnaphthalene (SIM)	30.6	20	µg/L	50.0		61.2	40-140			
Naphthalene (SIM)	26.1	20	µg/L	50.0		52.3	40-140			
Phenanthrene (SIM)	32.0	1.0	µg/L	50.0		64.0	40-140			
Pyrene (SIM)	32.0	20	µg/L	50.0		64.1	40-140			
Surrogate: Nitrobenzene-d5	*63.7*		µg/L	100		63.7	30-130			
Surrogate: 2-Fluorobiphenyl	*56.2*		µg/L	100		56.2	30-130			
Surrogate: p-Terphenyl-d14	*60.4*		µg/L	100		60.4	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Batch B291325 - SW-846 3510C

LCS Dup (B291325-BSD1) Prepared: 09/28/21 Analyzed: 09/29/21

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Acenaphthene (SIM)	24.9	6.0	µg/L	50.0		49.8	40-140	5.47	20	
Acenaphthylene (SIM)	26.3	4.0	µg/L	50.0		52.6	40-140	4.97	20	
Anthracene (SIM)	34.2	4.0	µg/L	50.0		68.4	40-140	0.989	20	
Benzo(a)anthracene (SIM)	36.5	1.0	µg/L	50.0		72.9	40-140	0.819	20	
Benzo(a)pyrene (SIM)	34.6	2.0	µg/L	50.0		69.2	40-140	0.806	20	
Benzo(b)fluoranthene (SIM)	34.9	1.0	µg/L	50.0		69.8	40-140	4.34	20	
Benzo(g,h,i)perylene (SIM)	33.4	10	µg/L	50.0		66.8	40-140	0.657	20	
Benzo(k)fluoranthene (SIM)	34.5	4.0	µg/L	50.0		69.1	40-140	0.639	20	
Chrysene (SIM)	36.0	4.0	µg/L	50.0		72.0	40-140	2.25	20	
Dibenz(a,h)anthracene (SIM)	34.6	2.0	µg/L	50.0		69.2	40-140	0.348	20	
Fluoranthene (SIM)	32.4	10	µg/L	50.0		64.7	40-140	2.86	20	
Fluorene (SIM)	27.4	20	µg/L	50.0		54.8	40-140	2.88	20	
Indeno(1,2,3-cd)pyrene (SIM)	37.0	2.0	µg/L	50.0		74.1	40-140	0.323	20	
2-Methylnaphthalene (SIM)	28.1	20	µg/L	50.0		56.2	40-140	8.52	20	
Naphthalene (SIM)	23.1	20	µg/L	50.0		46.3	40-140	12.2	20	
Phenanthrene (SIM)	31.7	1.0	µg/L	50.0		63.4	40-140	1.07	20	
Pyrene (SIM)	31.8	20	µg/L	50.0		63.5	40-140	0.878	20	
Surrogate: Nitrobenzene-d5	*57.5*		µg/L	100		57.5	30-130			
Surrogate: 2-Fluorobiphenyl	*50.5*		µg/L	100		50.5	30-130			
Surrogate: p-Terphenyl-d14	*57.4*		µg/L	100		57.4	30-130			

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290945 - SW-846 3546										
Blank (B290945-BLK1)				Prepared: 09/24/21 Analyzed: 09/25/21						
C9-C18 Aliphatics	ND	10	mg/Kg wet							U
C19-C36 Aliphatics	ND	10	mg/Kg wet							U
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							U
C11-C22 Aromatics	ND	10	mg/Kg wet							U
Acenaphthene	ND	0.10	mg/Kg wet							R-05, U
Acenaphthylene	ND	0.10	mg/Kg wet							R-05, U
Anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)pyrene	ND	0.10	mg/Kg wet							U
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							U
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							U
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							U
Chrysene	ND	0.10	mg/Kg wet							U
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							U
Fluoranthene	ND	0.10	mg/Kg wet							U
Fluorene	ND	0.10	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene	ND	0.10	mg/Kg wet							U
Naphthalene	ND	0.10	mg/Kg wet							U
Phenanthrene	ND	0.10	mg/Kg wet							U
Pyrene	ND	0.10	mg/Kg wet							U
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
Surrogate: Chlorooctadecane (COD)	*2.93*		mg/Kg wet	5.00		58.6	40-140			
Surrogate: o-Terphenyl (OTP)	*3.86*		mg/Kg wet	5.00		77.3	40-140			
Surrogate: 2-Bromonaphthalene	*3.46*		mg/Kg wet	5.00		69.1	40-140			
Surrogate: 2-Fluorobiphenyl	*3.51*		mg/Kg wet	5.00		70.2	40-140			
LCS (B290945-BS1)				Prepared: 09/24/21 Analyzed: 09/25/21						
C9-C18 Aliphatics	22.0	10	mg/Kg wet	30.0		73.3	40-140			
C19-C36 Aliphatics	29.1	10	mg/Kg wet	40.0		72.7	40-140			
Unadjusted C11-C22 Aromatics	67.6	10	mg/Kg wet	85.0		79.5	40-140			
Acenaphthene	3.29	0.10	mg/Kg wet	5.00		65.8	40-140			R-05
Acenaphthylene	3.12	0.10	mg/Kg wet	5.00		62.5	40-140			R-05
Anthracene	3.41	0.10	mg/Kg wet	5.00		68.1	40-140			
Benzo(a)anthracene	4.10	0.10	mg/Kg wet	5.00		82.0	40-140			
Benzo(a)pyrene	4.13	0.10	mg/Kg wet	5.00		82.6	40-140			
Benzo(b)fluoranthene	4.55	0.10	mg/Kg wet	5.00		91.0	40-140			
Benzo(g,h,i)perylene	3.80	0.10	mg/Kg wet	5.00		76.1	40-140			
Benzo(k)fluoranthene	3.42	0.10	mg/Kg wet	5.00		68.4	40-140			
Chrysene	3.97	0.10	mg/Kg wet	5.00		79.4	40-140			
Dibenz(a,h)anthracene	4.05	0.10	mg/Kg wet	5.00		81.0	40-140			
Fluoranthene	3.63	0.10	mg/Kg wet	5.00		72.6	40-140			
Fluorene	3.33	0.10	mg/Kg wet	5.00		66.6	40-140			
Indeno(1,2,3-cd)pyrene	3.85	0.10	mg/Kg wet	5.00		77.1	40-140			
2-Methylnaphthalene	3.14	0.10	mg/Kg wet	5.00		62.9	40-140			
Naphthalene	3.00	0.10	mg/Kg wet	5.00		59.9	40-140			
Phenanthrene	3.50	0.10	mg/Kg wet	5.00		70.1	40-140			
Pyrene	3.74	0.10	mg/Kg wet	5.00		74.8	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.13*		mg/Kg wet	5.00		62.6	40-140			

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes
Batch B290945 - SW-846 3546											
LCS (B290945-BS1)				Prepared: 09/24/21 Analyzed: 09/25/21							
Surrogate: o-Terphenyl (OTP)	*3.40*		mg/Kg wet	5.00		68.1	40-140				
Surrogate: 2-Bromonaphthalene	*3.86*		mg/Kg wet	5.00		77.2	40-140				
Surrogate: 2-Fluorobiphenyl	*4.02*		mg/Kg wet	5.00		80.3	40-140				
LCS Dup (B290945-BSD1)				Prepared: 09/24/21 Analyzed: 09/25/21							
C9-C18 Aliphatics	20.2	10	mg/Kg wet	30.0		67.5	40-140	8.26		25	
C19-C36 Aliphatics	26.6	10	mg/Kg wet	40.0		66.5	40-140	8.94		25	
Unadjusted C11-C22 Aromatics	81.1	10	mg/Kg wet	85.0		95.4	40-140	18.2		25	
Acenaphthene	4.25	0.10	mg/Kg wet	5.00		85.1	40-140	**25.5**	*	25	R-05
Acenaphthylene	4.04	0.10	mg/Kg wet	5.00		80.8	40-140	**25.5**	*	25	R-05
Anthracene	4.30	0.10	mg/Kg wet	5.00		86.1	40-140	23.3		25	
Benzo(a)anthracene	4.90	0.10	mg/Kg wet	5.00		98.0	40-140	17.8		25	
Benzo(a)pyrene	4.85	0.10	mg/Kg wet	5.00		97.1	40-140	16.1		25	
Benzo(b)fluoranthene	5.38	0.10	mg/Kg wet	5.00		108	40-140	16.6		25	
Benzo(g,h,i)perylene	4.49	0.10	mg/Kg wet	5.00		89.8	40-140	16.5		25	
Benzo(k)fluoranthene	4.02	0.10	mg/Kg wet	5.00		80.4	40-140	16.2		25	
Chrysene	4.73	0.10	mg/Kg wet	5.00		94.6	40-140	17.4		25	
Dibenz(a,h)anthracene	4.79	0.10	mg/Kg wet	5.00		95.9	40-140	16.8		25	
Fluoranthene	4.49	0.10	mg/Kg wet	5.00		89.8	40-140	21.2		25	
Fluorene	4.16	0.10	mg/Kg wet	5.00		83.2	40-140	22.1		25	
Indeno(1,2,3-cd)pyrene	4.54	0.10	mg/Kg wet	5.00		90.8	40-140	16.4		25	
2-Methylnaphthalene	4.04	0.10	mg/Kg wet	5.00		80.8	40-140	25.0		25	
Naphthalene	3.78	0.10	mg/Kg wet	5.00		75.7	40-140	23.2		25	
Phenanthrene	4.44	0.10	mg/Kg wet	5.00		88.9	40-140	23.7		25	
Pyrene	4.59	0.10	mg/Kg wet	5.00		91.7	40-140	20.3		25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5				U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5				U
Surrogate: Chlorooctadecane (COD)	*2.67*		mg/Kg wet	5.00		53.4	40-140				
Surrogate: o-Terphenyl (OTP)	*4.47*		mg/Kg wet	5.00		89.4	40-140				
Surrogate: 2-Bromonaphthalene	*5.03*		mg/Kg wet	5.00		101	40-140				
Surrogate: 2-Fluorobiphenyl	*5.26*		mg/Kg wet	5.00		105	40-140				
Matrix Spike (B290945-MS1)	**Source: 21I1325-01**			Prepared: 09/24/21 Analyzed: 09/29/21							
C9-C18 Aliphatics	58.3	31	mg/Kg dry	91.9	ND	63.5	40-140				
C19-C36 Aliphatics	120	31	mg/Kg dry	122	68.0	42.3	40-140				
Unadjusted C11-C22 Aromatics	279	31	mg/Kg dry	260	146	51.0	40-140				
Acenaphthene	9.22	0.31	mg/Kg dry	15.3	ND	60.2	40-140				R-05
Acenaphthylene	8.58	0.31	mg/Kg dry	15.3	ND	56.1	40-140				R-05
Anthracene	9.55	0.31	mg/Kg dry	15.3	0.416	59.7	40-140				
Benzo(a)anthracene	12.0	0.31	mg/Kg dry	15.3	1.15	70.8	40-140				
Benzo(a)pyrene	12.6	0.31	mg/Kg dry	15.3	1.18	74.8	40-140				
Benzo(b)fluoranthene	12.8	0.31	mg/Kg dry	15.3	1.33	74.7	40-140				
Benzo(g,h,i)perylene	9.53	0.31	mg/Kg dry	15.3	0.879	56.5	40-140				
Benzo(k)fluoranthene	9.20	0.31	mg/Kg dry	15.3	0.468	57.0	40-140				
Chrysene	11.7	0.31	mg/Kg dry	15.3	1.31	67.7	40-140				
Dibenz(a,h)anthracene	9.98	0.31	mg/Kg dry	15.3	ND	65.2	40-140				
Fluoranthene	13.1	0.31	mg/Kg dry	15.3	2.46	69.8	40-140				
Fluorene	9.65	0.31	mg/Kg dry	15.3	ND	63.0	40-140				
Indeno(1,2,3-cd)pyrene	10.0	0.31	mg/Kg dry	15.3	0.565	61.8	40-140				
2-Methylnaphthalene	8.14	0.31	mg/Kg dry	15.3	ND	53.1	40-140				
Naphthalene	6.93	0.31	mg/Kg dry	15.3	ND	45.2	40-140				
Phenanthrene	13.2	0.31	mg/Kg dry	15.3	2.41	70.5	40-140				

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290945 - SW-846 3546										
Matrix Spike (B290945-MS1)	**Source: 21I1325-01**			Prepared: 09/24/21 Analyzed: 09/29/21						
Pyrene	13.2	0.31	mg/Kg dry	15.3	2.66	69.0	40-140			
Surrogate: Chlorooctadecane (COD)	*8.68*		mg/Kg dry	15.3		56.7	40-140			
Surrogate: o-Terphenyl (OTP)	*9.29*		mg/Kg dry	15.3		60.7	40-140			
Surrogate: 2-Bromonaphthalene	*25.6*		mg/Kg dry	15.3		**167** *	40-140			S-26
Surrogate: 2-Fluorobiphenyl	*26.5*		mg/Kg dry	15.3		**173** *	40-140			S-26
Matrix Spike Dup (B290945-MSD1)	**Source: 21I1325-01**			Prepared: 09/24/21 Analyzed: 09/29/21						
C9-C18 Aliphatics	69.9	31	mg/Kg dry	91.9	ND	76.1	40-140	18.1	50	
C19-C36 Aliphatics	144	31	mg/Kg dry	122	68.0	62.0	40-140	18.3	50	
Unadjusted C11-C22 Aromatics	253	31	mg/Kg dry	260	146	41.0	40-140	9.87	50	
Acenaphthene	8.07	0.31	mg/Kg dry	15.3	ND	52.7	40-140	13.3	50	R-05
Acenaphthylene	7.33	0.31	mg/Kg dry	15.3	ND	47.9	40-140	15.8	50	R-05
Anthracene	8.38	0.31	mg/Kg dry	15.3	0.416	52.0	40-140	13.0	50	
Benzo(a)anthracene	10.3	0.31	mg/Kg dry	15.3	1.15	59.9	40-140	14.9	50	
Benzo(a)pyrene	10.1	0.31	mg/Kg dry	15.3	1.18	58.5	40-140	21.8	50	
Benzo(b)fluoranthene	11.3	0.31	mg/Kg dry	15.3	1.33	65.2	40-140	12.1	50	
Benzo(g,h,i)perylene	8.93	0.31	mg/Kg dry	15.3	0.879	52.6	40-140	6.55	50	
Benzo(k)fluoranthene	8.37	0.31	mg/Kg dry	15.3	0.468	51.6	40-140	9.44	50	
Chrysene	10.1	0.31	mg/Kg dry	15.3	1.31	57.1	40-140	14.9	50	
Dibenz(a,h)anthracene	9.61	0.31	mg/Kg dry	15.3	ND	62.7	40-140	3.77	50	
Fluoranthene	10.1	0.31	mg/Kg dry	15.3	2.46	49.6	40-140	26.7	50	
Fluorene	8.38	0.31	mg/Kg dry	15.3	ND	54.7	40-140	14.1	50	
Indeno(1,2,3-cd)pyrene	9.20	0.31	mg/Kg dry	15.3	0.565	56.4	40-140	8.54	50	
2-Methylnaphthalene	6.93	0.31	mg/Kg dry	15.3	ND	45.3	40-140	16.0	50	
Naphthalene	5.81	0.31	mg/Kg dry	15.3	ND	**37.9** *	40-140	17.5	50	MS-22
Phenanthrene	9.88	0.31	mg/Kg dry	15.3	2.41	48.8	40-140	28.8	50	
Pyrene	10.3	0.31	mg/Kg dry	15.3	2.66	50.0	40-140	24.7	50	
Surrogate: Chlorooctadecane (COD)	*11.2*		mg/Kg dry	15.3		73.0	40-140			
Surrogate: o-Terphenyl (OTP)	*8.36*		mg/Kg dry	15.3		54.6	40-140			
Surrogate: 2-Bromonaphthalene	*11.5*		mg/Kg dry	15.3		75.1	40-140			
Surrogate: 2-Fluorobiphenyl	*11.9*		mg/Kg dry	15.3		77.4	40-140			
Batch B291420 - SW-846 3546										
Blank (B291420-BLK1)				Prepared: 09/30/21 Analyzed: 10/02/21						
C9-C18 Aliphatics	ND	10	mg/Kg wet							U
C19-C36 Aliphatics	ND	10	mg/Kg wet							U
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							U
C11-C22 Aromatics	ND	10	mg/Kg wet							U
Acenaphthene	ND	0.10	mg/Kg wet							U
Acenaphthylene	ND	0.10	mg/Kg wet							U
Anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)pyrene	ND	0.10	mg/Kg wet							U
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							U
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							U
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							U
Chrysene	ND	0.10	mg/Kg wet							U
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							U
Fluoranthene	ND	0.10	mg/Kg wet							U
Fluorene	ND	0.10	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene	ND	0.10	mg/Kg wet							U

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291420 - SW-846 3546										
Blank (B291420-BLK1)				Prepared: 09/30/21 Analyzed: 10/02/21						
Naphthalene	ND	0.10	mg/Kg wet							U
Phenanthrene	ND	0.10	mg/Kg wet							U
Pyrene	ND	0.10	mg/Kg wet							U
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
Surrogate: Chlorooctadecane (COD)	*3.35*		mg/Kg wet	5.00		67.0	40-140			
Surrogate: o-Terphenyl (OTP)	*3.77*		mg/Kg wet	5.00		75.3	40-140			
Surrogate: 2-Bromonaphthalene	*5.50*		mg/Kg wet	5.00		110	40-140			
Surrogate: 2-Fluorobiphenyl	*5.57*		mg/Kg wet	5.00		111	40-140			
LCS (B291420-BS1)				Prepared: 09/30/21 Analyzed: 10/02/21						
C9-C18 Aliphatics	21.7	10	mg/Kg wet	30.0		72.4	40-140			
C19-C36 Aliphatics	29.1	10	mg/Kg wet	40.0		72.8	40-140			
Unadjusted C11-C22 Aromatics	61.9	10	mg/Kg wet	85.0		72.8	40-140			
Acenaphthene	3.02	0.10	mg/Kg wet	5.00		60.4	40-140			
Acenaphthylene	2.85	0.10	mg/Kg wet	5.00		57.0	40-140			
Anthracene	3.13	0.10	mg/Kg wet	5.00		62.7	40-140			
Benzo(a)anthracene	3.73	0.10	mg/Kg wet	5.00		74.5	40-140			
Benzo(a)pyrene	3.77	0.10	mg/Kg wet	5.00		75.5	40-140			
Benzo(b)fluoranthene	4.16	0.10	mg/Kg wet	5.00		83.2	40-140			
Benzo(g,h,i)perylene	3.47	0.10	mg/Kg wet	5.00		69.4	40-140			
Benzo(k)fluoranthene	3.14	0.10	mg/Kg wet	5.00		62.8	40-140			
Chrysene	3.62	0.10	mg/Kg wet	5.00		72.5	40-140			
Dibenz(a,h)anthracene	3.74	0.10	mg/Kg wet	5.00		74.7	40-140			
Fluoranthene	3.30	0.10	mg/Kg wet	5.00		65.9	40-140			
Fluorene	3.08	0.10	mg/Kg wet	5.00		61.6	40-140			
Indeno(1,2,3-cd)pyrene	3.52	0.10	mg/Kg wet	5.00		70.3	40-140			
2-Methylnaphthalene	2.86	0.10	mg/Kg wet	5.00		57.2	40-140			
Naphthalene	2.71	0.10	mg/Kg wet	5.00		54.2	40-140			
Phenanthrene	3.22	0.10	mg/Kg wet	5.00		64.5	40-140			
Pyrene	3.38	0.10	mg/Kg wet	5.00		67.7	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.19*		mg/Kg wet	5.00		63.8	40-140			
Surrogate: o-Terphenyl (OTP)	*3.16*		mg/Kg wet	5.00		63.2	40-140			
Surrogate: 2-Bromonaphthalene	*4.46*		mg/Kg wet	5.00		89.1	40-140			
Surrogate: 2-Fluorobiphenyl	*4.57*		mg/Kg wet	5.00		91.4	40-140			
LCS Dup (B291420-BSD1)				Prepared: 09/30/21 Analyzed: 10/02/21						
C9-C18 Aliphatics	22.3	10	mg/Kg wet	30.0		74.2	40-140	2.43	25	
C19-C36 Aliphatics	31.2	10	mg/Kg wet	40.0		78.0	40-140	6.93	25	
Unadjusted C11-C22 Aromatics	68.9	10	mg/Kg wet	85.0		81.1	40-140	10.8	25	
Acenaphthene	3.51	0.10	mg/Kg wet	5.00		70.3	40-140	15.1	25	
Acenaphthylene	3.28	0.10	mg/Kg wet	5.00		65.6	40-140	14.0	25	
Anthracene	3.82	0.10	mg/Kg wet	5.00		76.3	40-140	19.6	25	
Benzo(a)anthracene	4.25	0.10	mg/Kg wet	5.00		85.1	40-140	13.2	25	
Benzo(a)pyrene	4.15	0.10	mg/Kg wet	5.00		83.0	40-140	9.49	25	
Benzo(b)fluoranthene	4.61	0.10	mg/Kg wet	5.00		92.2	40-140	10.3	25	
Benzo(g,h,i)perylene	3.80	0.10	mg/Kg wet	5.00		76.0	40-140	9.16	25	
Benzo(k)fluoranthene	3.48	0.10	mg/Kg wet	5.00		69.6	40-140	10.3	25	
Chrysene	4.12	0.10	mg/Kg wet	5.00		82.3	40-140	12.7	25	
Dibenz(a,h)anthracene	4.10	0.10	mg/Kg wet	5.00		82.0	40-140	9.27	25	

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291420 - SW-846 3546										
LCS Dup (B291420-BSD1)				Prepared: 09/30/21 Analyzed: 10/02/21						
Fluoranthene	3.97	0.10	mg/Kg wet	5.00		79.5	40-140	18.6	25	
Fluorene	3.65	0.10	mg/Kg wet	5.00		73.1	40-140	17.1	25	
Indeno(1,2,3-cd)pyrene	3.86	0.10	mg/Kg wet	5.00		77.2	40-140	9.25	25	
2-Methylnaphthalene	3.18	0.10	mg/Kg wet	5.00		63.6	40-140	10.7	25	
Naphthalene	2.94	0.10	mg/Kg wet	5.00		58.9	40-140	8.18	25	
Phenanthrene	3.92	0.10	mg/Kg wet	5.00		78.4	40-140	19.5	25	
Pyrene	4.05	0.10	mg/Kg wet	5.00		81.0	40-140	17.8	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.48*		mg/Kg wet	5.00		69.6	40-140			
Surrogate: o-Terphenyl (OTP)	*3.91*		mg/Kg wet	5.00		78.2	40-140			
Surrogate: 2-Bromonaphthalene	*5.34*		mg/Kg wet	5.00		107	40-140			
Surrogate: 2-Fluorobiphenyl	*5.41*		mg/Kg wet	5.00		108	40-140			

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291002 - SW-846 7471										
Blank (B291002-BLK1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	ND	0.025	mg/Kg wet							U
LCS (B291002-BS1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	15.2	0.76	mg/Kg wet	15.6		97.6	59.3-140.4			
LCS Dup (B291002-BSD1)				Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	14.1	0.75	mg/Kg wet	15.6		90.2	59.3-140.4	7.87	20	
Duplicate (B291002-DUP1)	**Source: 2111325-08**			Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	0.215	0.089	mg/Kg dry		0.174			**21.3** *	20	R-02
Matrix Spike (B291002-MS1)	**Source: 2111325-08**			Prepared: 09/25/21 Analyzed: 09/27/21						
Mercury	1.26	0.088	mg/Kg dry	1.18	0.174	92.7	80-120			
Batch B291178 - SW-846 3005A										
Blank (B291178-BLK1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Selenium	ND	5.0	µg/L							U
Silver	ND	0.20	µg/L							
LCS (B291178-BS1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Arsenic	518	8.0	µg/L	500		104	80-120			
Barium	496	100	µg/L	500		99.2	80-120			
Cadmium	495	2.0	µg/L	500		99.0	80-120			
Chromium	496	10	µg/L	500		99.2	80-120			
Lead	476	5.0	µg/L	500		95.3	80-120			
Selenium	508	50	µg/L	500		102	80-120			
Silver	458	2.0	µg/L	500		91.6	80-120			
LCS Dup (B291178-BSD1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Arsenic	518	8.0	µg/L	500		104	80-120	0.0408	20	
Barium	495	100	µg/L	500		99.0	80-120	0.239	20	
Cadmium	502	2.0	µg/L	500		100	80-120	1.37	20	
Chromium	494	10	µg/L	500		98.8	80-120	0.430	20	
Lead	480	5.0	µg/L	500		96.0	80-120	0.690	20	
Selenium	484	50	µg/L	500		96.8	80-120	4.83	20	
Silver	467	2.0	µg/L	500		93.3	80-120	1.83	20	

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291178 - SW-846 3005A										
Duplicate (B291178-DUP1)	**Source: 21I1325-10**			Prepared: 09/28/21 Analyzed: 09/30/21						
Arsenic	2.33	0.80	µg/L		2.06			12.2	20	
Barium	36.2	10	µg/L		37.3			2.88	20	
Cadmium	0.0602	0.20	µg/L		ND			NC	20	J
Chromium	1.07	1.0	µg/L		1.06			0.758	20	
Lead	20.3	0.50	µg/L		20.8			2.66	20	
Selenium	ND	5.0	µg/L		ND			NC	20	U
Silver	0.0597	0.20	µg/L		ND			NC	20	J
Matrix Spike (B291178-MS1)	**Source: 21I1325-10**			Prepared: 09/28/21 Analyzed: 09/30/21						
Arsenic	525	8.0	µg/L	500	ND	105	75-125			
Barium	548	100	µg/L	500	37.3	102	75-125			
Cadmium	520	2.0	µg/L	500	ND	104	75-125			
Chromium	511	10	µg/L	500	ND	102	75-125			
Lead	511	5.0	µg/L	500	20.8	98.0	75-125			
Selenium	485	50	µg/L	500	ND	96.9	75-125			
Silver	509	2.0	µg/L	500	ND	102	75-125			
Batch B291179 - SW-846 3005A										
Blank (B291179-BLK1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Iron	ND	0.050	mg/L							
Manganese	ND	0.010	mg/L							
Calcium Hardness	0.011	1.2	mg/L							
LCS (B291179-BS1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Iron	4.08	0.050	mg/L	4.00		102	80-120			
Manganese	0.511	0.010	mg/L	0.500		102	80-120			
Calcium Hardness	10	1.2	mg/L	10.0		101	0-200			
LCS Dup (B291179-BSD1)				Prepared: 09/28/21 Analyzed: 09/30/21						
Iron	4.20	0.050	mg/L	4.00		105	80-120	3.05	20	
Manganese	0.526	0.010	mg/L	0.500		105	80-120	2.82	20	
Calcium Hardness	10	1.2	mg/L	10.0		105	0-200	3.25		
Duplicate (B291179-DUP1)	**Source: 21I1325-10**			Prepared: 09/28/21 Analyzed: 09/30/21						
Iron	4.09	0.050	mg/L		4.19			2.31	20	
Manganese	0.219	0.010	mg/L		0.225			2.38	20	
Calcium Hardness	47	1.2	mg/L		48			1.24		
Matrix Spike (B291179-MS1)	**Source: 21I1325-10**			Prepared: 09/28/21 Analyzed: 09/30/21						
Iron	8.04	0.050	mg/L	4.00	4.19	96.3	75-125			
Manganese	0.725	0.010	mg/L	0.500	0.225	100	75-125			
Calcium Hardness	57	1.2	mg/L	10.0	48	90.9	0-200			

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291185 - SW-846 7470A Prep										
Blank (B291185-BLK1)				Prepared & Analyzed: 09/28/21						
Mercury	ND	0.00010	mg/L							U
LCS (B291185-BS1)				Prepared & Analyzed: 09/28/21						
Mercury	0.00395	0.00010	mg/L	0.00400		98.8	80-120			
LCS Dup (B291185-BSD1)				Prepared & Analyzed: 09/28/21						
Mercury	0.00391	0.00010	mg/L	0.00400		97.6	80-120	1.23	20	
Batch B291270 - SW-846 3050B										
Blank (B291270-BLK1)				Prepared: 09/29/21 Analyzed: 09/30/21						
Arsenic	ND	3.3	mg/Kg wet							U
Barium	ND	1.7	mg/Kg wet							U
Cadmium	ND	0.33	mg/Kg wet							U
Chromium	ND	0.67	mg/Kg wet							U
Lead	ND	0.50	mg/Kg wet							U
Selenium	ND	3.3	mg/Kg wet							U
Silver	ND	0.33	mg/Kg wet							U
LCS (B291270-BS1)				Prepared: 09/29/21 Analyzed: 09/30/21						
Arsenic	157	9.7	mg/Kg wet	170		92.2	82.9-117.6			
Barium	175	4.9	mg/Kg wet	183		95.7	82.5-117.5			
Cadmium	88.0	0.97	mg/Kg wet	89.5		98.3	82.8-117.3			
Chromium	97.3	1.9	mg/Kg wet	101		96.4	82.1-117.8			
Lead	134	1.5	mg/Kg wet	140		95.9	82.9-117.1			
Selenium	175	9.7	mg/Kg wet	182		96.0	79.7-120.3			
Silver	47.7	0.97	mg/Kg wet	50.1		95.3	80.2-120			
LCS Dup (B291270-BSD1)				Prepared: 09/29/21 Analyzed: 09/30/21						
Arsenic	155	10	mg/Kg wet	170		91.2	82.9-117.6	1.14	30	
Barium	177	5.0	mg/Kg wet	183		97.0	82.5-117.5	1.28	20	
Cadmium	91.1	1.0	mg/Kg wet	89.5		102	82.8-117.3	3.45	20	
Chromium	99.2	2.0	mg/Kg wet	101		98.3	82.1-117.8	1.96	30	
Lead	131	1.5	mg/Kg wet	140		93.7	82.9-117.1	2.27	30	
Selenium	175	10	mg/Kg wet	182		96.3	79.7-120.3	0.350	30	
Silver	47.1	1.0	mg/Kg wet	50.1		93.9	80.2-120	1.43	30	
Reference (B291270-SRM1) MRL Check				Prepared: 09/29/21 Analyzed: 09/30/21						
Lead	0.497	0.50	mg/Kg wet	0.495		100	80-120			

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290978 - SW-846 7470A Dissolved										
Blank (B290978-BLK1)				Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.000061	0.00010	mg/L							B, J
LCS (B290978-BS1)				Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.00425	0.00010	mg/L	0.00400		106	80-120			
LCS Dup (B290978-BSD1)				Prepared: 09/24/21 Analyzed: 09/25/21						
Mercury	0.00410	0.00010	mg/L	0.00400		103	80-120	3.40	20	
Batch B291129 - SW-846 3005A Dissolved										
Blank (B291129-BLK1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							U
Cadmium	ND	0.20	µg/L							U
Chromium	ND	1.0	µg/L							U
Lead	ND	0.50	µg/L							U
Selenium	ND	5.0	µg/L							U
Silver	ND	0.20	µg/L							U
LCS (B291129-BS1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	514	8.0	µg/L	500		103	80-120			
Barium	516	100	µg/L	500		103	80-120			
Cadmium	505	2.0	µg/L	500		101	80-120			
Chromium	477	10	µg/L	500		95.5	80-120			
Lead	502	5.0	µg/L	500		100	80-120			
Selenium	487	50	µg/L	500		97.5	80-120			
Silver	497	2.0	µg/L	500		99.3	80-120			
LCS Dup (B291129-BSD1)				Prepared: 09/27/21 Analyzed: 09/28/21						
Arsenic	518	8.0	µg/L	500		104	80-120	0.681	20	
Barium	521	100	µg/L	500		104	80-120	0.955	20	
Cadmium	509	2.0	µg/L	500		102	80-120	0.764	20	
Chromium	477	10	µg/L	500		95.5	80-120	0.0164	20	
Lead	502	5.0	µg/L	500		100	80-120	0.0834	20	
Selenium	509	50	µg/L	500		102	80-120	4.35	20	
Silver	500	2.0	µg/L	500		100	80-120	0.734	20	
Batch B291316 - SW-846 3005A Dissolved										
Blank (B291316-BLK1)				Prepared: 09/29/21 Analyzed: 09/30/21						
Iron	ND	0.050	mg/L							
Manganese	ND	0.010	mg/L							

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291316 - SW-846 3005A Dissolved										
LCS (B291316-BS1)				Prepared: 09/29/21 Analyzed: 09/30/21						
Iron	4.04	0.050	mg/L	4.00		101	80-120			
Manganese	0.505	0.010	mg/L	0.500		101	80-120			
LCS Dup (B291316-BSD1)				Prepared: 09/29/21 Analyzed: 09/30/21						
Iron	4.06	0.050	mg/L	4.00		102	80-120	0.662	20	
Manganese	0.512	0.010	mg/L	0.500		102	80-120	1.38	20	

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290929 - SM21-23 2540D										
Blank (B290929-BLK1)				Prepared & Analyzed: 09/24/21						
Total Suspended Solids	1.5	2.5	mg/L							
LCS (B290929-BS1)				Prepared & Analyzed: 09/24/21						
Total Suspended Solids	191	5.0	mg/L	200		95.5	53.8-124			
Batch B290966 - EPA 300.0										
Blank (B290966-BLK1)				Prepared & Analyzed: 09/24/21						
Nitrate as N	ND	0.10	mg/L							
LCS (B290966-BS1)				Prepared & Analyzed: 09/24/21						
Nitrate as N	1.0	0.10	mg/L	1.00		101	90-110			
LCS Dup (B290966-BSD1)				Prepared & Analyzed: 09/24/21						
Nitrate as N	1.0	0.10	mg/L	1.00		101	90-110	0.129	20	
Batch B291009 - EPA 300.0										
Blank (B291009-BLK1)				Prepared & Analyzed: 09/24/21						
Chloride	ND	1.0	mg/L							
Sulfate	ND	1.0	mg/L							
LCS (B291009-BS1)				Prepared & Analyzed: 09/24/21						
Chloride	11	1.0	mg/L	10.0		106	90-110			
Sulfate	11	1.0	mg/L	10.0		106	90-110			
LCS Dup (B291009-BSD1)				Prepared & Analyzed: 09/24/21						
Chloride	11	1.0	mg/L	10.0		106	90-110	0.0312	20	
Sulfate	11	1.0	mg/L	10.0		106	90-110	0.201	20	
Batch B291142 - % Solids										
Duplicate (B291142-DUP1)		**Source: 21I1325-03**		Prepared: 09/28/21 Analyzed: 09/29/21						
% Solids	10.1		% Wt		9.71			3.64	5	
Duplicate (B291142-DUP3)		**Source: 21I1325-05**		Prepared: 09/28/21 Analyzed: 09/29/21						
% Solids	10.9		% Wt		10.1			**7.62** *	5	R-02
Duplicate (B291142-DUP4)		**Source: 21I1325-06**		Prepared: 09/28/21 Analyzed: 09/29/21						
% Solids	42.1		% Wt		44.0			4.35	5	

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291142 - % Solids										
Duplicate (B291142-DUP6)	**Source: 21I1325-08**			Prepared: 09/28/21 Analyzed: 09/29/21						
% Solids	33.5		% Wt		32.4			3.53	5	
Duplicate (B291142-DUP7)	**Source: 21I1325-09**			Prepared: 09/28/21 Analyzed: 09/29/21						
% Solids	61.2		% Wt		64.9			**5.86** *	5	R-02
Batch B291244 - SW 846 9060A										
Blank (B291244-BLK1)				Prepared & Analyzed: 09/29/21						
Total Organic Carbon	ND	100	mg/Kg							
LCS (B291244-BS1)				Prepared & Analyzed: 09/29/21						
Total Organic Carbon	813	100	mg/Kg	750		108	64.9-118			
LCS Dup (B291244-BSD1)				Prepared & Analyzed: 09/29/21						
Total Organic Carbon	802	100	mg/Kg	750		107	64.9-118	1.41	16.9	
Duplicate (B291244-DUP1)	**Source: 21I1325-04**			Prepared & Analyzed: 09/29/21						
Total Organic Carbon	75900	100	mg/Kg		59600			24.0	49.1	
Matrix Spike (B291244-MS1)	**Source: 21I1325-04**			Prepared & Analyzed: 09/29/21						
Total Organic Carbon	441000	100	mg/Kg	750	59600	**50800** *	85-115			MS-11

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290928 - SM21-23 2540C										
Blank (B290928-BLK1)				Prepared & Analyzed: 09/24/21						
Total Dissolved Solids	ND	10	mg/L							
LCS (B290928-BS1)				Prepared & Analyzed: 09/24/21						
Total Dissolved Solids	280	10	mg/L	293		94.5	64.9-119			

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
B	Analyte is found in the associated laboratory blank as well as in the sample.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
MS-11	Matrix spike recovery outside of control limits. Possibility of sample matrix effects that lead to a high bias for reported result or non-homogeneous sample aliquots cannot be eliminated.
MS-22	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.
R-02	Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
RL-12	Elevated reporting limit due to matrix interference.
S-26	Surrogate outside of control limits.
U	Analyte included in the analysis, but not detected
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
Z-01	Results over calibration curve. Results are estimitated due to method limitations.

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA 300.0 in Water	
Chloride	NC,NY,MA,VA,ME,NH,CT,RI
Nitrate as N	NC,NY,MA,VA,ME,NH,CT,RI
Sulfate	NC,NY,MA,VA,ME,NH,CT,RI
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Water	
Pyrene	CT,NC,ME,NH-P
SM21-23 2540C in Water	
Total Dissolved Solids	CT,MA,NH,NY,RI,NC,ME,VA
SM21-23 2540D in Water	
Total Suspended Solids	CT,MA,NH,NY,RI,NC,ME,VA
SW 846 9060A in Soil	
Total Organic Carbon	NY,CT,ME,VA,NH
SW-846 6010D in Soil	
Arsenic	CT,NH,NY,ME,VA,NC
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,AIHA,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NH,NY,ME,VA,NC
SW-846 6010D in Water	
Iron	CT,NH,NY,ME,NC,VA
Iron	CT,NH,NY,ME,VA,NC
Manganese	CT,NH,NY,ME,NC,VA
Manganese	CT,NH,NY,ME,VA,NC
SW-846 6020B in Water	
Arsenic	CT,NH,NY,NC,ME,VA
Arsenic	CT,NH,NY,ME,VA,NC
Barium	CT,NH,NY,ME,VA,NC
Barium	MA,NY,CT,NC,NH,ME,VA
Cadmium	CT,NH,NY,NC,ME,VA
Cadmium	CT,NH,NY,RI,ME,VA,NC
Chromium	CT,NH,NY,NC,ME,VA
Chromium	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,NC,ME,VA
Lead	CT,NH,NY,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Selenium	CT,NH,NY,NC,ME,VA
Silver	CT,NC,NH,NY,ME,VA
Silver	CT,NH,NY,ME,VA,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
Mercury	CT,NH,NY,NC,ME,VA
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8270E in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Soil	
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA
SW-846 8270E in Water	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21I1325

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 2

Company Name: Wilcox and Barton
Address: #1B Commons Dr Londonderry
Phone: 603 369 4190
Project Name: BANF0005
Project Location: 275 Banfield Rd Portsmouth
Project Number: BANF0005
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: WWilcox
mbroussard
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	total organic carbon	grain size	EPH	PAHs w/ SIM	RCRA-8 metals
²Preservation Code												–	–	–	–	–
1	SD-208	9/23/21	09:00	GRAB	O	U		2	1			X	X	X	X	X
2	SD-209	↓	09:10	↓	O	↓		2	1			X	X	X	X	X
3	SD-210		09:57		O			2	1			X	X	X	X	X
4	SD-211		11:10		O			2	1			X	X	X	X	X
5	SD-212		12:07		O			2	1			X	X	X	X	X
6	SD-213		12:25		O			2	1			X	X	X	X	X
7	SD-214		13:36		O			2	1			X	X	X	X	X
8	SD-215		14:25		O			2	1			X	X	X	X	X
9	SD-217		15:00		O			2	1			X	X	X	X	X

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepackaged coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) Sediment

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:
MB	9/23/21 16:40
Received by: (signature)	Date/Time:
	9/23/21 1645
Relinquished by: (signature)	Date/Time:
	9/23/21 1933
Received by: (signature)	Date/Time:
2.4, 4.9, 2.0	9/23/21 1935
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Ⓐ

Detection Limit Requirements
MA
CT
Other: NOAA SQuiRTs

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

Table of Contents

21I1325

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 2 of 2

Company Name: Wilcox and Barton
Address: #1B Commons Dr unit 12B
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 375 Banfield Rd Portsmouth
Project Number: BANF0005
Project Manager: Bill Wilcox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard
Fax To #:

Dissolved Metals Samples
☒ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	CaCO3 hardness	total RCRA-8 metals	dissolved RCRA-8 metals	PAHs	total Fe + Mn	dissolved Fe+Mn	chloride	nitrate	sulfate	total dissolved solids	total suspended solids
²Preservation Code												N	N	N	—	N	N	—	—	—	—	—
10	SW-208	9/23/21	08:40	GRAB	SW	U		2	2			X	X	X	X							
11	SW-210	↓	09:45	↓	↓	↓		2	2			X	X	X	X							
12	SW-211		11:10					2	5			X	X	X	X	X	X	X	X	X	X	X
13	SW-212		12:00					2	5			X	X	X	X	X	X	X	X	X	X	X

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) surface water

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature) MRB	Date/Time: 9/23/21 16:40
Received by: (signature)	Date/Time: 9/23/21 1645
Relinquished by: (signature)	Date/Time: 9/23/21 1935
Received by: (signature) 24,4.9,20	Date/Time: 9/23/21 1935
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: (A) samples for PAHs, and dissolved RCRA-8 / Fe+Mn all field filtered
total dissolved solids

Detection Limit Requirements
MA
CT
Other: WQC

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W & B

Received By al Date 9/23/21 Time 1935

How were the samples received? In Cooler T No Cooler ____ On Ice T No Ice ____

Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 2.4, 4.9, 2.0

By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ____

Are there Rushes? F Who was notified? ____

Are there Short Holds? T Who was notified? Cassie

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? Acid T Base ____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	8	1 Liter Plastic	2	16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic	4	8oz [✓ Amb]/Clear	9
Meoh-		250 mL Amb.		250 mL Plastic	8	4oz [✓ Amb]/Clear	4
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag	9	Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 13, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banford Rd, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21J0069

Enclosed are results of analyses for samples as received by the laboratory on October 1, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Table of Contents (continued)

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/13/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J0069

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banford Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-101	21J0069-01	Ground Water		SW-846 6020B	
				SW-846 7470A	
MW-102	21J0069-02	Ground Water		SW-846 6020B	
				SW-846 7470A	
MW-104	21J0069-03	Ground Water		SW-846 6020B	
				SW-846 7470A	
SD-218	21J0069-04	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-219	21J0069-05	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-220	21J0069-06	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	
SD-221	21J0069-07	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8270E	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

MADEP EPH rev 2.1

Qualifications:

S-02

The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.

Analyte & Samples(s) Qualified:

Chlorooctadecane (COD)
21J0069-06RE1[SD-220]

SW 846 9060A

Qualifications:

MS-07

Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

Total Organic Carbon
21J0069-07[SD-221], B291903-MS1

Z-01

Sample results were outside of the curve and could not be obtained within the curve due to method limitations. Results are estimated.

Analyte & Samples(s) Qualified:

Total Organic Carbon
21J0069-04[SD-218]

SW-846 8270E

Qualifications:

RL-12

Elevated reporting limit due to matrix interference.

Analyte & Samples(s) Qualified:

21J0069-04[SD-218], 21J0069-05[SD-219], 21J0069-06[SD-220], 21J0069-07[SD-221]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: MW-101 Sampled: 10/1/2021 12:35

Sample ID: 21J0069-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	38	0.80	0.46	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:17	QNW
Barium	200	10	1.2	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:17	QNW
Cadmium	0.10	0.20	0.027	µg/L	1	J	SW-846 6020B	10/2/21	10/4/21 14:17	QNW
Chromium	1.1	1.0	0.92	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:17	QNW
Lead	55	0.50	0.14	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:17	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	10/4/21	10/5/21 10:09	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	10/2/21	10/4/21 14:17	QNW
Silver	ND	0.20	0.026	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:17	QNW

Project Location: 375 Banford Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: MW-101
Sampled: 10/1/2021 12:35

Sample ID: 21J0069-01

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	43	0.80	0.46	µg/L	1		SW-846 6020B	10/5/21	10/6/21 13:13	QNW
Barium	220	10	1.2	µg/L	1		SW-846 6020B	10/5/21	10/6/21 13:13	QNW
Cadmium	0.039	0.20	0.027	µg/L	1	J	SW-846 6020B	10/5/21	10/6/21 13:13	QNW
Chromium	1.6	1.0	0.92	µg/L	1		SW-846 6020B	10/5/21	10/6/21 13:13	QNW
Lead	35	0.50	0.14	µg/L	1		SW-846 6020B	10/5/21	10/6/21 13:13	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	10/4/21	10/5/21 9:43	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	10/5/21	10/6/21 13:13	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	10/5/21	10/6/21 13:13	QNW

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: MW-102 Sampled: 10/1/2021 13:35

Sample ID: 21J0069-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	4.7	0.80	0.46	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:20	QNW
Barium	160	10	1.2	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:20	QNW
Cadmium	0.098	0.20	0.027	µg/L	1	J	SW-846 6020B	10/2/21	10/4/21 14:20	QNW
Chromium	0.97	1.0	0.92	µg/L	1	J	SW-846 6020B	10/2/21	10/4/21 14:20	QNW
Lead	120	0.50	0.14	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:20	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	10/4/21	10/5/21 10:11	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	10/2/21	10/4/21 14:20	QNW
Silver	ND	0.20	0.026	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:20	QNW

Project Location: 375 Banford Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0069
Date Received: 10/1/2021
Field Sample #: MW-102
Sampled: 10/1/2021 13:35
Sample ID: 21J0069-02
Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	5.8	0.80	0.46	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:07	QNW
Barium	210	10	1.2	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:07	QNW
Cadmium	0.088	0.20	0.027	µg/L	1	J	SW-846 6020B	10/5/21	10/6/21 15:07	QNW
Chromium	2.1	1.0	0.92	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:07	QNW
Lead	82	0.50	0.14	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:07	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	10/4/21	10/5/21 9:45	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	10/5/21	10/6/21 15:07	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	10/5/21	10/6/21 15:07	QNW

Project Location: 375 Banford Rd, Portsmouth, NH   Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: MW-104   Sampled: 10/1/2021 11:25

Sample ID: 21J0069-03

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	7.1	0.80	0.46	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:23	QNW
Barium	150	10	1.2	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:23	QNW
Cadmium	0.41	0.20	0.027	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:23	QNW
Chromium	3.2	1.0	0.92	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:23	QNW
Lead	260	0.50	0.14	µg/L	1		SW-846 6020B	10/2/21	10/4/21 14:23	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	10/4/21	10/5/21 10:13	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	10/2/21	10/4/21 14:23	QNW
Silver	0.032	0.20	0.026	µg/L	1	J	SW-846 6020B	10/2/21	10/4/21 14:23	QNW

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: MW-104 Sampled: 10/1/2021 11:25

Sample ID: 21J0069-03

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	7.2	0.80	0.46	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:10	QNW
Barium	160	10	1.2	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:10	QNW
Cadmium	0.077	0.20	0.027	µg/L	1	J	SW-846 6020B	10/5/21	10/6/21 15:10	QNW
Chromium	1.9	1.0	0.92	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:10	QNW
Lead	62	0.50	0.14	µg/L	1		SW-846 6020B	10/5/21	10/6/21 15:10	QNW
Mercury	ND	0.00010	0.000050	mg/L	1	U	SW-846 7470A	10/4/21	10/5/21 9:47	DRL
Selenium	ND	5.0	0.78	µg/L	1	U	SW-846 6020B	10/5/21	10/6/21 15:10	QNW
Silver	ND	0.20	0.026	µg/L	1	U	SW-846 6020B	10/5/21	10/6/21 15:10	QNW

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-218 Sampled: 10/1/2021 12:40

Sample ID: 21J0069-04

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.041	0.14	0.0065	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Acenaphthylene (SIM)	0.023	0.14	0.0082	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Anthracene (SIM)	0.12	0.11	0.0065	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Benzo(a)anthracene (SIM)	0.40	0.027	0.015	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Benzo(a)pyrene (SIM)	0.37	0.027	0.0082	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Benzo(b)fluoranthene (SIM)	0.46	0.027	0.013	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Benzo(g,h,i)perylene (SIM)	0.28	0.27	0.0098	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Benzo(k)fluoranthene (SIM)	0.19	0.11	0.0065	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Chrysene (SIM)	0.42	0.11	0.018	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Dibenz(a,h)anthracene (SIM)	0.061	0.027	0.0098	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Fluoranthene (SIM)	0.77	0.27	0.028	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Fluorene (SIM)	0.041	0.54	0.0062	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.28	0.11	0.010	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
2-Methylnaphthalene (SIM)	ND	0.54	0.061	mg/Kg dry	10	U	SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Naphthalene (SIM)	ND	0.54	0.20	mg/Kg dry	10	U	SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Phenanthrene (SIM)	0.43	0.14	0.025	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR
Pyrene (SIM)	0.65	0.54	0.021	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:23	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	48.8	30-130		10/7/21 17:23
2-Fluorobiphenyl	49.9	30-130		10/7/21 17:23
p-Terphenyl-d14	53.8	30-130		10/7/21 17:23

Project Location: 375 Banford Rd, Portsmouth, NH　Sample Description:　Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-218　Sampled: 10/1/2021 12:40

Sample ID: 21J0069-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	33	33	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
C19-C36 Aliphatics	180	33	33	mg/Kg dry	2		MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Unadjusted C11-C22 Aromatics	150	33	33	mg/Kg dry	2		MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
C11-C22 Aromatics	150	33	33	mg/Kg dry	2		MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Acenaphthene	ND	0.33	0.14	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Acenaphthylene	ND	0.33	0.12	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Anthracene	ND	0.33	0.14	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Benzo(a)anthracene	ND	0.33	0.12	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Benzo(a)pyrene	ND	0.33	0.11	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Benzo(b)fluoranthene	ND	0.33	0.13	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Benzo(g,h,i)perylene	ND	0.33	0.13	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Benzo(k)fluoranthene	ND	0.33	0.17	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Chrysene	ND	0.33	0.14	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Dibenz(a,h)anthracene	ND	0.33	0.14	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Fluoranthene	0.70	0.33	0.14	mg/Kg dry	2		MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Fluorene	ND	0.33	0.14	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Indeno(1,2,3-cd)pyrene	ND	0.33	0.14	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
2-Methylnaphthalene	ND	0.33	0.13	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Naphthalene	ND	0.33	0.083	mg/Kg dry	2	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Phenanthrene	0.38	0.33	0.16	mg/Kg dry	2		MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM
Pyrene	0.74	0.33	0.14	mg/Kg dry	2		MADEP EPH rev 2.1	10/5/21	10/8/21 11:36	CJM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	58.4	40-140		10/8/21 11:36
o-Terphenyl (OTP)	72.7	40-140		10/8/21 11:36
2-Bromonaphthalene	112	40-140		10/8/21 11:36
2-Fluorobiphenyl	113	40-140		10/8/21 11:36

Project Location: 375 Banford Rd, Portsmouth, NH   Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-218   Sampled: 10/1/2021 12:40

Sample ID: 21J0069-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	13	5.3	1.9	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:02	MJH
Barium	1100	2.7	1.0	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:02	MJH
Cadmium	4.7	0.53	0.27	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:02	MJH
Chromium	53	1.1	0.60	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:02	MJH
Lead	4600	0.80	0.39	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:02	MJH
Mercury	0.43	0.044	0.015	mg/Kg dry	1		SW-846 7471B	10/4/21	10/6/21 8:47	DRL
Selenium	ND	5.3	1.9	mg/Kg dry	1	U	SW-846 6010D	10/4/21	10/7/21 15:02	MJH
Silver	ND	0.53	0.24	mg/Kg dry	1	U	SW-846 6010D	10/4/21	10/7/21 15:02	MJH

Project Location: 375 Banford Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0069
Date Received: 10/1/2021
Field Sample #: SD-218
Sampled: 10/1/2021 12:40
Sample ID: 21J0069-04
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	61.1		% Wt	1		SM 2540G	10/7/21	10/8/21 12:31	BMB
Total Organic Carbon	69000	100	mg/Kg	1	Z-01	SW 846 9060A	10/7/21	10/7/21 16:40	DJM

Project Location: 375 Banford Rd, Portsmouth, NH   Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-218   Sampled: 10/1/2021 12:40

Sample ID: 21J0069-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached	see attached		%	1		SM D 422-63		10/13/21 0:00	GEOTE

Project Location: 375 Banford Rd, Portsmouth, NH　Sample Description:　Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-219　Sampled: 10/1/2021 13:10

Sample ID: 21J0069-05

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.0094	0.13	0.0063	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Acenaphthylene (SIM)	0.040	0.13	0.0078	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Anthracene (SIM)	0.056	0.10	0.0063	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Benzo(a)anthracene (SIM)	0.14	0.026	0.014	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Benzo(a)pyrene (SIM)	0.14	0.026	0.0078	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Benzo(b)fluoranthene (SIM)	0.23	0.026	0.013	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Benzo(g,h,i)perylene (SIM)	0.20	0.26	0.0094	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Benzo(k)fluoranthene (SIM)	0.074	0.10	0.0063	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Chrysene (SIM)	0.17	0.10	0.017	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Dibenz(a,h)anthracene (SIM)	0.034	0.026	0.0094	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Fluoranthene (SIM)	0.23	0.26	0.027	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Fluorene (SIM)	0.010	0.52	0.0059	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.18	0.10	0.0099	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:46	IMR
2-Methylnaphthalene (SIM)	0.33	0.52	0.058	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Naphthalene (SIM)	0.22	0.52	0.19	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Phenanthrene (SIM)	0.14	0.13	0.023	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 17:46	IMR
Pyrene (SIM)	0.21	0.52	0.020	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 17:46	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	54.8	30-130		10/7/21 17:46
2-Fluorobiphenyl	51.3	30-130		10/7/21 17:46
p-Terphenyl-d14	49.6	30-130		10/7/21 17:46

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-219 Sampled: 10/1/2021 13:10

Sample ID: 21J0069-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	18	16	16	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
C19-C36 Aliphatics	780	94	94	mg/Kg dry	6		MADEP EPH rev 2.1	10/5/21	10/8/21 14:30	CJM
Unadjusted C11-C22 Aromatics	250	16	16	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
C11-C22 Aromatics	240	16	16	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Acenaphthene	ND	0.16	0.067	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Acenaphthylene	ND	0.16	0.056	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Anthracene	ND	0.16	0.065	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Benzo(a)anthracene	ND	0.16	0.057	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Benzo(a)pyrene	7.5	0.16	0.053	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Benzo(b)fluoranthene	ND	0.16	0.063	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Benzo(g,h,i)perylene	ND	0.16	0.064	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Benzo(k)fluoranthene	ND	0.16	0.083	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Chrysene	ND	0.16	0.065	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Dibenz(a,h)anthracene	ND	0.16	0.065	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Fluoranthene	0.39	0.16	0.066	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Fluorene	ND	0.16	0.065	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Indeno(1,2,3-cd)pyrene	ND	0.16	0.069	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
2-Methylnaphthalene	0.40	0.16	0.062	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Naphthalene	0.35	0.16	0.040	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Phenanthrene	0.29	0.16	0.074	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM
Pyrene	0.44	0.16	0.066	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 11:55	CJM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	47.8	40-140		10/8/21 11:55
Chlorooctadecane (COD)	40.9	40-140		10/8/21 14:30
o-Terphenyl (OTP)	54.8	40-140		10/8/21 11:55
2-Bromonaphthalene	102	40-140		10/8/21 11:55
2-Fluorobiphenyl	106	40-140		10/8/21 11:55

Project Location: 375 Banford Rd, Portsmouth, NH   Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-219   Sampled: 10/1/2021 13:10

Sample ID: 21J0069-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	13	5.1	1.9	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:20	MJH
Barium	500	2.6	0.98	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:20	MJH
Cadmium	4.4	0.51	0.26	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:20	MJH
Chromium	48	1.0	0.58	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:20	MJH
Lead	1900	0.77	0.37	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:20	MJH
Mercury	0.34	0.042	0.014	mg/Kg dry	1		SW-846 7471B	10/4/21	10/6/21 8:49	DRL
Selenium	ND	5.1	1.8	mg/Kg dry	1	U	SW-846 6010D	10/4/21	10/7/21 15:20	MJH
Silver	3.5	0.51	0.24	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:20	MJH

Project Location: 375 Banford Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-219
Sampled: 10/1/2021 13:10

Sample ID: 21J0069-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	63.9		% Wt	1		SM 2540G	10/7/21	10/8/21 12:31	BMB
Total Organic Carbon	66000	100	mg/Kg	1		SW 846 9060A	10/7/21	10/7/21 18:11	DJM

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-219 Sampled: 10/1/2021 13:10

Sample ID: 21J0069-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached	see attached		%	1		SM D 422-63		10/13/21 0:00	GEOTE

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-220 Sampled: 10/1/2021 13:40

Sample ID: 21J0069-06

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.036	0.11	0.0051	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Acenaphthylene (SIM)	0.038	0.11	0.0064	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Anthracene (SIM)	0.11	0.085	0.0051	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Benzo(a)anthracene (SIM)	0.35	0.021	0.012	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Benzo(a)pyrene (SIM)	0.31	0.021	0.0064	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Benzo(b)fluoranthene (SIM)	0.40	0.021	0.010	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Benzo(g,h,i)perylene (SIM)	0.25	0.21	0.0077	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Benzo(k)fluoranthene (SIM)	0.14	0.085	0.0051	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Chrysene (SIM)	0.36	0.085	0.014	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Dibenz(a,h)anthracene (SIM)	0.054	0.021	0.0077	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Fluoranthene (SIM)	0.63	0.21	0.022	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Fluorene (SIM)	0.040	0.43	0.0049	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.25	0.085	0.0081	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
2-Methylnaphthalene (SIM)	0.15	0.43	0.047	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Naphthalene (SIM)	ND	0.43	0.15	mg/Kg dry	10	U	SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Phenanthrene (SIM)	0.43	0.11	0.019	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR
Pyrene (SIM)	0.53	0.43	0.017	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:08	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	57.2	30-130		10/7/21 18:08
2-Fluorobiphenyl	57.0	30-130		10/7/21 18:08
p-Terphenyl-d14	57.4	30-130		10/7/21 18:08

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-220 Sampled: 10/1/2021 13:40

Sample ID: 21J0069-06

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	13	13	13	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
C19-C36 Aliphatics	240	51	51	mg/Kg dry	4		MADEP EPH rev 2.1	10/5/21	10/8/21 14:49	CJM
Unadjusted C11-C22 Aromatics	350	13	13	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
C11-C22 Aromatics	350	13	13	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Acenaphthene	ND	0.13	0.055	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Acenaphthylene	ND	0.13	0.046	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Anthracene	ND	0.13	0.053	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Benzo(a)anthracene	ND	0.13	0.047	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Benzo(a)pyrene	1.8	0.13	0.044	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Benzo(b)fluoranthene	ND	0.13	0.051	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Benzo(g,h,i)perylene	ND	0.13	0.053	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Benzo(k)fluoranthene	ND	0.13	0.068	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Chrysene	ND	0.13	0.054	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Dibenz(a,h)anthracene	ND	0.13	0.053	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Fluoranthene	0.27	0.13	0.054	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Fluorene	ND	0.13	0.053	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Indeno(1,2,3-cd)pyrene	ND	0.13	0.056	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
2-Methylnaphthalene	0.36	0.13	0.051	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Naphthalene	0.33	0.13	0.033	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Phenanthrene	0.16	0.13	0.061	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM
Pyrene	0.22	0.13	0.054	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:15	CJM

Surrogates	% Recovery		Recovery Limits	Flag/Qual	Analyzed
Chlorooctadecane (COD)	40.3		40-140		10/8/21 12:15
Chlorooctadecane (COD)	**37.8**	*	40-140	S-02	10/8/21 14:49
o-Terphenyl (OTP)	48.1		40-140		10/8/21 12:15
2-Bromonaphthalene	99.9		40-140		10/8/21 12:15
2-Fluorobiphenyl	101		40-140		10/8/21 12:15

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-220 Sampled: 10/1/2021 13:40

Sample ID: 21J0069-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	15	4.1	1.5	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:25	MJH
Barium	400	2.0	0.78	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:25	MJH
Cadmium	3.6	0.41	0.21	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:25	MJH
Chromium	51	0.82	0.47	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:25	MJH
Lead	1900	0.61	0.30	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:25	MJH
Mercury	0.26	0.035	0.012	mg/Kg dry	1		SW-846 7471B	10/4/21	10/6/21 8:51	DRL
Selenium	ND	4.1	1.5	mg/Kg dry	1	U	SW-846 6010D	10/4/21	10/7/21 15:25	MJH
Silver	ND	0.41	0.19	mg/Kg dry	1	U	SW-846 6010D	10/4/21	10/7/21 15:25	MJH

Project Location: 375 Banford Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0069
Date Received: 10/1/2021
Field Sample #: SD-220
Sampled: 10/1/2021 13:40
Sample ID: 21J0069-06
Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.9		% Wt	1		SM 2540G	10/7/21	10/8/21 12:31	BMB
Total Organic Carbon	42000	100	mg/Kg	1		SW 846 9060A	10/7/21	10/7/21 18:28	DJM

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-220 Sampled: 10/1/2021 13:40

Sample ID: 21J0069-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached	see attached		%	1		SM D 422-63		10/13/21 0:00	GEOTE

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-221 Sampled: 10/1/2021 14:45

Sample ID: 21J0069-07

Sample Matrix: Soil

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	ND	0.099	0.0048	mg/Kg dry	10	U	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Acenaphthylene (SIM)	0.012	0.099	0.0059	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Anthracene (SIM)	0.014	0.079	0.0048	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Benzo(a)anthracene (SIM)	0.066	0.020	0.011	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Benzo(a)pyrene (SIM)	0.049	0.020	0.0059	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Benzo(b)fluoranthene (SIM)	0.089	0.020	0.0095	mg/Kg dry	10		SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Benzo(g,h,i)perylene (SIM)	0.050	0.20	0.0071	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Benzo(k)fluoranthene (SIM)	0.031	0.079	0.0048	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Chrysene (SIM)	0.078	0.079	0.013	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Dibenz(a,h)anthracene (SIM)	0.011	0.020	0.0071	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Fluoranthene (SIM)	0.13	0.20	0.020	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Fluorene (SIM)	ND	0.40	0.0045	mg/Kg dry	10	U	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.045	0.079	0.0075	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
2-Methylnaphthalene (SIM)	ND	0.40	0.044	mg/Kg dry	10	U	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Naphthalene (SIM)	ND	0.40	0.14	mg/Kg dry	10	U	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Phenanthrene (SIM)	0.043	0.099	0.018	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR
Pyrene (SIM)	0.12	0.40	0.015	mg/Kg dry	10	J	SW-846 8270E	10/6/21	10/7/21 18:31	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	58.9	30-130		10/7/21 18:31
2-Fluorobiphenyl	57.4	30-130		10/7/21 18:31
p-Terphenyl-d14	62.8	30-130		10/7/21 18:31

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-221 Sampled: 10/1/2021 14:45

Sample ID: 21J0069-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	12	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
C19-C36 Aliphatics	31	12	12	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Unadjusted C11-C22 Aromatics	37	12	12	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
C11-C22 Aromatics	37	12	12	mg/Kg dry	1		MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Acenaphthene	ND	0.12	0.051	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Acenaphthylene	ND	0.12	0.042	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Anthracene	ND	0.12	0.049	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Benzo(a)anthracene	ND	0.12	0.043	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Benzo(a)pyrene	ND	0.12	0.040	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Benzo(b)fluoranthene	ND	0.12	0.048	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Benzo(g,h,i)perylene	ND	0.12	0.049	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Benzo(k)fluoranthene	ND	0.12	0.063	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Chrysene	ND	0.12	0.050	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Dibenz(a,h)anthracene	ND	0.12	0.049	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Fluoranthene	ND	0.12	0.050	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Fluorene	ND	0.12	0.049	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Indeno(1,2,3-cd)pyrene	ND	0.12	0.052	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
2-Methylnaphthalene	ND	0.12	0.047	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Naphthalene	ND	0.12	0.030	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Phenanthrene	ND	0.12	0.057	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM
Pyrene	ND	0.12	0.050	mg/Kg dry	1	U	MADEP EPH rev 2.1	10/5/21	10/8/21 12:34	CJM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	Date/Time Analyzed
Chlorooctadecane (COD)	52.8	40-140		10/8/21 12:34
o-Terphenyl (OTP)	63.9	40-140		10/8/21 12:34
2-Bromonaphthalene	110	40-140		10/8/21 12:34
2-Fluorobiphenyl	109	40-140		10/8/21 12:34

Project Location: 375 Banford Rd, Portsmouth, NH Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-221 Sampled: 10/1/2021 14:45

Sample ID: 21J0069-07

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	12	3.9	1.4	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:35	MJH
Barium	120	1.9	0.74	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:35	MJH
Cadmium	3.7	0.39	0.20	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:35	MJH
Chromium	55	0.78	0.44	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:35	MJH
Lead	360	0.58	0.28	mg/Kg dry	1		SW-846 6010D	10/4/21	10/7/21 15:35	MJH
Mercury	0.051	0.030	0.010	mg/Kg dry	1		SW-846 7471B	10/4/21	10/6/21 8:53	DRL
Selenium	ND	3.9	1.4	mg/Kg dry	1	U	SW-846 6010D	10/4/21	10/7/21 15:35	MJH
Silver	ND	0.39	0.18	mg/Kg dry	1	U	SW-846 6010D	10/4/21	10/7/21 15:35	MJH

Project Location: 375 Banford Rd, Portsmouth, NH | Sample Description: | Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-221 | Sampled: 10/1/2021 14:45

Sample ID: 21J0069-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.2		% Wt	1		SM 2540G	10/7/21	10/8/21 12:32	BMB
Total Organic Carbon	26000	100	mg/Kg	1	MS-07	SW 846 9060A	10/7/21	10/7/21 18:52	DJM

Project Location: 375 Banford Rd, Portsmouth, NH   Sample Description: Work Order: 21J0069

Date Received: 10/1/2021

Field Sample #: SD-221   Sampled: 10/1/2021 14:45

Sample ID: 21J0069-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached	see attached		%	1		SM D 422-63		10/13/21 0:00	GEOTE

Sample Extraction Data

Prep Method: SW-846 3546 **Analytical Method: MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0069-04 [SD-218]	B291735	20.0	2.00	10/05/21
21J0069-05 [SD-219]	B291735	20.0	2.00	10/05/21
21J0069-05RE1 [SD-219]	B291735	20.0	2.00	10/05/21
21J0069-06 [SD-220]	B291735	20.0	2.00	10/05/21
21J0069-06RE1 [SD-220]	B291735	20.0	2.00	10/05/21
21J0069-07 [SD-221]	B291735	20.0	2.00	10/05/21

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21J0069-04 [SD-218]	B291961	10/07/21
21J0069-05 [SD-219]	B291961	10/07/21
21J0069-06 [SD-220]	B291961	10/07/21
21J0069-07 [SD-221]	B291961	10/07/21

SW 846 9060A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0069-04 [SD-218]	B291903	1.00	1.00	10/07/21
21J0069-05 [SD-219]	B291903	1.00	1.00	10/07/21
21J0069-06 [SD-220]	B291903	1.00	1.00	10/07/21
21J0069-07 [SD-221]	B291903	1.00	1.00	10/07/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0069-04 [SD-218]	B291685	1.54	50.0	10/04/21
21J0069-05 [SD-219]	B291685	1.52	50.0	10/04/21
21J0069-06 [SD-220]	B291685	1.57	50.0	10/04/21
21J0069-07 [SD-221]	B291685	1.53	50.0	10/04/21

Prep Method: SW-846 3005A **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0069-01 [MW-101]	B291586	50.0	50.0	10/02/21
21J0069-02 [MW-102]	B291586	50.0	50.0	10/02/21
21J0069-03 [MW-104]	B291586	50.0	50.0	10/02/21

Prep Method: SW-846 3005A Dissolved **Analytical Method: SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0069-01 [MW-101]	B291773	50.0	50.0	10/05/21
21J0069-02 [MW-102]	B291773	50.0	50.0	10/05/21
21J0069-03 [MW-104]	B291773	50.0	50.0	10/05/21

Sample Extraction Data

Prep Method: SW-846 7470A Dissolved   **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0069-01 [MW-101]	B291634	6.00	6.00	10/04/21
21J0069-02 [MW-102]	B291634	6.00	6.00	10/04/21
21J0069-03 [MW-104]	B291634	6.00	6.00	10/04/21

Prep Method: SW-846 7470A Prep   **Analytical Method: SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0069-01 [MW-101]	B291635	6.00	6.00	10/04/21
21J0069-02 [MW-102]	B291635	6.00	6.00	10/04/21
21J0069-03 [MW-104]	B291635	6.00	6.00	10/04/21

Prep Method: SW-846 7471   **Analytical Method: SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0069-04 [SD-218]	B291689	0.554	50.0	10/04/21
21J0069-05 [SD-219]	B291689	0.562	50.0	10/04/21
21J0069-06 [SD-220]	B291689	0.552	50.0	10/04/21
21J0069-07 [SD-221]	B291689	0.597	50.0	10/04/21

Prep Method: SW-846 3546   **Analytical Method: SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21J0069-04 [SD-218]	B291980	30.0	1.00	10/06/21
21J0069-05 [SD-219]	B291980	30.0	1.00	10/06/21
21J0069-06 [SD-220]	B291980	30.0	1.00	10/06/21
21J0069-07 [SD-221]	B291980	30.0	1.00	10/06/21

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291980 - SW-846 3546										
Blank (B291980-BLK1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Acenaphthene (SIM)	ND	0.0083	mg/Kg wet							U
Acenaphthylene (SIM)	ND	0.0083	mg/Kg wet							U
Anthracene (SIM)	ND	0.0067	mg/Kg wet							U
Benzo(a)anthracene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(a)pyrene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(b)fluoranthene (SIM)	ND	0.0017	mg/Kg wet							U
Benzo(g,h,i)perylene (SIM)	ND	0.017	mg/Kg wet							U
Benzo(k)fluoranthene (SIM)	ND	0.0067	mg/Kg wet							U
Chrysene (SIM)	ND	0.0067	mg/Kg wet							U
Dibenz(a,h)anthracene (SIM)	ND	0.0017	mg/Kg wet							U
Fluoranthene (SIM)	ND	0.017	mg/Kg wet							U
Fluorene (SIM)	ND	0.033	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.0067	mg/Kg wet							U
2-Methylnaphthalene (SIM)	ND	0.033	mg/Kg wet							U
Naphthalene (SIM)	ND	0.033	mg/Kg wet							U
Phenanthrene (SIM)	ND	0.0083	mg/Kg wet							U
Pyrene (SIM)	ND	0.033	mg/Kg wet							U
Surrogate: Nitrobenzene-d5	*2.08*		mg/Kg wet	3.33		62.3	30-130			
Surrogate: 2-Fluorobiphenyl	*1.81*		mg/Kg wet	3.33		54.2	30-130			
Surrogate: p-Terphenyl-d14	*3.06*		mg/Kg wet	3.33		91.9	30-130			
LCS (B291980-BS1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Acenaphthene (SIM)	0.969	0.17	mg/Kg wet	1.67		58.2	40-140			
Acenaphthylene (SIM)	1.06	0.17	mg/Kg wet	1.67		63.7	40-140			
Anthracene (SIM)	1.32	0.13	mg/Kg wet	1.67		79.0	40-140			
Benzo(a)anthracene (SIM)	1.41	0.033	mg/Kg wet	1.67		84.4	40-140			
Benzo(a)pyrene (SIM)	1.34	0.033	mg/Kg wet	1.67		80.3	40-140			
Benzo(b)fluoranthene (SIM)	1.39	0.033	mg/Kg wet	1.67		83.6	40-140			
Benzo(g,h,i)perylene (SIM)	1.25	0.33	mg/Kg wet	1.67		75.0	40-140			
Benzo(k)fluoranthene (SIM)	1.43	0.13	mg/Kg wet	1.67		85.5	40-140			
Chrysene (SIM)	1.43	0.13	mg/Kg wet	1.67		85.6	40-140			
Dibenz(a,h)anthracene (SIM)	1.29	0.033	mg/Kg wet	1.67		77.2	40-140			
Fluoranthene (SIM)	1.24	0.33	mg/Kg wet	1.67		74.5	40-140			
Fluorene (SIM)	1.09	0.67	mg/Kg wet	1.67		65.5	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	1.34	0.13	mg/Kg wet	1.67		80.6	40-140			
2-Methylnaphthalene (SIM)	1.18	0.67	mg/Kg wet	1.67		71.0	40-140			
Naphthalene (SIM)	1.02	0.67	mg/Kg wet	1.67		61.2	40-140			
Phenanthrene (SIM)	1.25	0.17	mg/Kg wet	1.67		75.0	40-140			
Pyrene (SIM)	1.30	0.67	mg/Kg wet	1.67		78.0	40-140			
Surrogate: Nitrobenzene-d5	*2.13*		mg/Kg wet	3.33		63.9	30-130			
Surrogate: 2-Fluorobiphenyl	*2.08*		mg/Kg wet	3.33		62.4	30-130			
Surrogate: p-Terphenyl-d14	*2.47*		mg/Kg wet	3.33		74.1	30-130			

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291980 - SW-846 3546										
LCS Dup (B291980-BSD1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Acenaphthene (SIM)	0.998	0.17	mg/Kg wet	1.67		59.9	40-140	2.91	20	
Acenaphthylene (SIM)	1.09	0.17	mg/Kg wet	1.67		65.6	40-140	2.91	20	
Anthracene (SIM)	1.35	0.13	mg/Kg wet	1.67		81.3	40-140	2.90	20	
Benzo(a)anthracene (SIM)	1.44	0.033	mg/Kg wet	1.67		86.3	40-140	2.30	20	
Benzo(a)pyrene (SIM)	1.38	0.033	mg/Kg wet	1.67		82.7	40-140	2.90	20	
Benzo(b)fluoranthene (SIM)	1.43	0.033	mg/Kg wet	1.67		85.6	40-140	2.36	20	
Benzo(g,h,i)perylene (SIM)	1.32	0.33	mg/Kg wet	1.67		79.2	40-140	5.40	20	
Benzo(k)fluoranthene (SIM)	1.46	0.13	mg/Kg wet	1.67		87.7	40-140	2.49	20	
Chrysene (SIM)	1.45	0.13	mg/Kg wet	1.67		87.0	40-140	1.62	20	
Dibenz(a,h)anthracene (SIM)	1.35	0.033	mg/Kg wet	1.67		81.2	40-140	5.05	20	
Fluoranthene (SIM)	1.26	0.33	mg/Kg wet	1.67		75.7	40-140	1.60	20	
Fluorene (SIM)	1.12	0.67	mg/Kg wet	1.67		67.4	40-140	2.83	20	
Indeno(1,2,3-cd)pyrene (SIM)	1.41	0.13	mg/Kg wet	1.67		84.5	40-140	4.70	20	
2-Methylnaphthalene (SIM)	1.23	0.67	mg/Kg wet	1.67		73.5	40-140	3.49	20	
Naphthalene (SIM)	1.03	0.67	mg/Kg wet	1.67		62.0	40-140	1.30	20	
Phenanthrene (SIM)	1.28	0.17	mg/Kg wet	1.67		76.8	40-140	2.37	20	
Pyrene (SIM)	1.34	0.67	mg/Kg wet	1.67		80.4	40-140	3.08	20	
Surrogate: Nitrobenzene-d5	*2.21*		mg/Kg wet	3.33		66.2	30-130			
Surrogate: 2-Fluorobiphenyl	*2.03*		mg/Kg wet	3.33		60.8	30-130			
Surrogate: p-Terphenyl-d14	*2.68*		mg/Kg wet	3.33		80.4	30-130			

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291735 - SW-846 3546										
Blank (B291735-BLK1)				Prepared: 10/05/21 Analyzed: 10/07/21						
C9-C18 Aliphatics	ND	10	mg/Kg wet							U
C19-C36 Aliphatics	ND	10	mg/Kg wet							U
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							U
C11-C22 Aromatics	ND	10	mg/Kg wet							U
Acenaphthene	ND	0.10	mg/Kg wet							U
Acenaphthylene	ND	0.10	mg/Kg wet							U
Anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)anthracene	ND	0.10	mg/Kg wet							U
Benzo(a)pyrene	ND	0.10	mg/Kg wet							U
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							U
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							U
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							U
Chrysene	ND	0.10	mg/Kg wet							U
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							U
Fluoranthene	ND	0.10	mg/Kg wet							U
Fluorene	ND	0.10	mg/Kg wet							U
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene	ND	0.10	mg/Kg wet							U
Naphthalene	ND	0.10	mg/Kg wet							U
Phenanthrene	ND	0.10	mg/Kg wet							U
Pyrene	ND	0.10	mg/Kg wet							U
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							U
Surrogate: Chlorooctadecane (COD)	*3.33*		mg/Kg wet	5.00		66.5	40-140			
Surrogate: o-Terphenyl (OTP)	*3.85*		mg/Kg wet	5.00		77.1	40-140			
Surrogate: 2-Bromonaphthalene	*4.62*		mg/Kg wet	5.00		92.4	40-140			
Surrogate: 2-Fluorobiphenyl	*4.67*		mg/Kg wet	5.00		93.4	40-140			
LCS (B291735-BS1)				Prepared: 10/05/21 Analyzed: 10/07/21						
C9-C18 Aliphatics	22.6	10	mg/Kg wet	30.0		75.3	40-140			
C19-C36 Aliphatics	36.5	10	mg/Kg wet	40.0		91.2	40-140			
Unadjusted C11-C22 Aromatics	75.4	10	mg/Kg wet	85.0		88.7	40-140			
Acenaphthene	3.37	0.10	mg/Kg wet	5.00		67.4	40-140			
Acenaphthylene	3.18	0.10	mg/Kg wet	5.00		63.7	40-140			
Anthracene	3.86	0.10	mg/Kg wet	5.00		77.3	40-140			
Benzo(a)anthracene	4.39	0.10	mg/Kg wet	5.00		87.8	40-140			
Benzo(a)pyrene	4.34	0.10	mg/Kg wet	5.00		86.8	40-140			
Benzo(b)fluoranthene	4.71	0.10	mg/Kg wet	5.00		94.2	40-140			
Benzo(g,h,i)perylene	3.95	0.10	mg/Kg wet	5.00		78.9	40-140			
Benzo(k)fluoranthene	3.54	0.10	mg/Kg wet	5.00		70.8	40-140			
Chrysene	4.11	0.10	mg/Kg wet	5.00		82.2	40-140			
Dibenz(a,h)anthracene	4.22	0.10	mg/Kg wet	5.00		84.4	40-140			
Fluoranthene	3.92	0.10	mg/Kg wet	5.00		78.4	40-140			
Fluorene	3.49	0.10	mg/Kg wet	5.00		69.8	40-140			
Indeno(1,2,3-cd)pyrene	3.96	0.10	mg/Kg wet	5.00		79.3	40-140			
2-Methylnaphthalene	3.13	0.10	mg/Kg wet	5.00		62.7	40-140			
Naphthalene	2.97	0.10	mg/Kg wet	5.00		59.4	40-140			
Phenanthrene	3.86	0.10	mg/Kg wet	5.00		77.2	40-140			
Pyrene	4.07	0.10	mg/Kg wet	5.00		81.3	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.58*		mg/Kg wet	5.00		71.6	40-140			

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291735 - SW-846 3546										
LCS (B291735-BS1)				Prepared: 10/05/21 Analyzed: 10/07/21						
Surrogate: o-Terphenyl (OTP)	*3.42*		mg/Kg wet	5.00		68.4	40-140			
Surrogate: 2-Bromonaphthalene	*4.23*		mg/Kg wet	5.00		84.7	40-140			
Surrogate: 2-Fluorobiphenyl	*4.24*		mg/Kg wet	5.00		84.9	40-140			
LCS Dup (B291735-BSD1)				Prepared: 10/05/21 Analyzed: 10/07/21						
C9-C18 Aliphatics	22.5	10	mg/Kg wet	30.0		74.9	40-140	0.529	25	
C19-C36 Aliphatics	34.9	10	mg/Kg wet	40.0		87.2	40-140	4.47	25	
Unadjusted C11-C22 Aromatics	81.2	10	mg/Kg wet	85.0		95.5	40-140	7.42	25	
Acenaphthene	3.78	0.10	mg/Kg wet	5.00		75.6	40-140	11.4	25	
Acenaphthylene	3.59	0.10	mg/Kg wet	5.00		71.8	40-140	12.0	25	
Anthracene	4.26	0.10	mg/Kg wet	5.00		85.2	40-140	9.76	25	
Benzo(a)anthracene	4.67	0.10	mg/Kg wet	5.00		93.4	40-140	6.19	25	
Benzo(a)pyrene	4.60	0.10	mg/Kg wet	5.00		92.1	40-140	5.92	25	
Benzo(b)fluoranthene	4.99	0.10	mg/Kg wet	5.00		99.8	40-140	5.70	25	
Benzo(g,h,i)perylene	4.19	0.10	mg/Kg wet	5.00		83.8	40-140	6.02	25	
Benzo(k)fluoranthene	3.76	0.10	mg/Kg wet	5.00		75.1	40-140	5.88	25	
Chrysene	4.38	0.10	mg/Kg wet	5.00		87.6	40-140	6.26	25	
Dibenz(a,h)anthracene	4.48	0.10	mg/Kg wet	5.00		89.6	40-140	5.96	25	
Fluoranthene	4.25	0.10	mg/Kg wet	5.00		85.1	40-140	8.12	25	
Fluorene	3.87	0.10	mg/Kg wet	5.00		77.4	40-140	10.3	25	
Indeno(1,2,3-cd)pyrene	4.20	0.10	mg/Kg wet	5.00		84.0	40-140	5.77	25	
2-Methylnaphthalene	3.61	0.10	mg/Kg wet	5.00		72.2	40-140	14.2	25	
Naphthalene	3.46	0.10	mg/Kg wet	5.00		69.2	40-140	15.4	25	
Phenanthrene	4.26	0.10	mg/Kg wet	5.00		85.3	40-140	9.93	25	
Pyrene	4.37	0.10	mg/Kg wet	5.00		87.5	40-140	7.31	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			U
Surrogate: Chlorooctadecane (COD)	*3.45*		mg/Kg wet	5.00		68.9	40-140			
Surrogate: o-Terphenyl (OTP)	*3.80*		mg/Kg wet	5.00		75.9	40-140			
Surrogate: 2-Bromonaphthalene	*4.71*		mg/Kg wet	5.00		94.3	40-140			
Surrogate: 2-Fluorobiphenyl	*4.74*		mg/Kg wet	5.00		94.7	40-140			

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291586 - SW-846 3005A										
Blank (B291586-BLK1)				Prepared: 10/02/21 Analyzed: 10/04/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Selenium	ND	5.0	µg/L							U
Silver	ND	0.20	µg/L							
LCS (B291586-BS1)				Prepared: 10/02/21 Analyzed: 10/04/21						
Arsenic	500	8.0	µg/L	500		99.9	80-120			
Barium	511	100	µg/L	500		102	80-120			
Cadmium	500	2.0	µg/L	500		100	80-120			
Chromium	502	10	µg/L	500		100	80-120			
Lead	508	5.0	µg/L	500		102	80-120			
Selenium	476	50	µg/L	500		95.1	80-120			
Silver	497	2.0	µg/L	500		99.4	80-120			
LCS Dup (B291586-BSD1)				Prepared: 10/02/21 Analyzed: 10/04/21						
Arsenic	523	8.0	µg/L	500		105	80-120	4.52	20	
Barium	529	100	µg/L	500		106	80-120	3.47	20	
Cadmium	524	2.0	µg/L	500		105	80-120	4.60	20	
Chromium	528	10	µg/L	500		106	80-120	4.99	20	
Lead	525	5.0	µg/L	500		105	80-120	3.34	20	
Selenium	497	50	µg/L	500		99.4	80-120	4.40	20	
Silver	507	2.0	µg/L	500		101	80-120	2.03	20	
Batch B291635 - SW-846 7470A Prep										
Blank (B291635-BLK1)				Prepared: 10/04/21 Analyzed: 10/05/21						
Mercury	ND	0.00010	mg/L							U
LCS (B291635-BS1)				Prepared: 10/04/21 Analyzed: 10/05/21						
Mercury	0.00400	0.00010	mg/L	0.00400		100	80-120			
LCS Dup (B291635-BSD1)				Prepared: 10/04/21 Analyzed: 10/05/21						
Mercury	0.00402	0.00010	mg/L	0.00400		100	80-120	0.452	20	
Batch B291685 - SW-846 3050B										
Blank (B291685-BLK1)				Prepared: 10/04/21 Analyzed: 10/07/21						
Arsenic	ND	3.2	mg/Kg wet							U
Barium	ND	1.6	mg/Kg wet							U
Cadmium	ND	0.32	mg/Kg wet							U
Chromium	ND	0.65	mg/Kg wet							U
Lead	ND	0.48	mg/Kg wet							U
Selenium	ND	3.2	mg/Kg wet							U
Silver	ND	0.32	mg/Kg wet							U

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291685 - SW-846 3050B										
LCS (B291685-BS1)				Prepared: 10/04/21 Analyzed: 10/07/21						
Arsenic	156	9.9	mg/Kg wet	170		92.0	82.9-117.6			
Barium	177	4.9	mg/Kg wet	183		97.0	82.5-117.5			
Cadmium	84.0	0.99	mg/Kg wet	89.5		93.9	82.8-117.3			
Chromium	95.1	2.0	mg/Kg wet	101		94.2	82.1-117.8			
Lead	134	1.5	mg/Kg wet	140		96.1	82.9-117.1			
Selenium	169	9.9	mg/Kg wet	182		92.8	79.7-120.3			
Silver	48.3	0.99	mg/Kg wet	50.1		96.3	80.2-120			
LCS Dup (B291685-BSD1)				Prepared: 10/04/21 Analyzed: 10/07/21						
Arsenic	155	9.9	mg/Kg wet	170		91.0	82.9-117.6	1.02	30	
Barium	176	4.9	mg/Kg wet	183		95.9	82.5-117.5	1.12	20	
Cadmium	88.5	0.99	mg/Kg wet	89.5		98.9	82.8-117.3	5.21	20	
Chromium	95.5	2.0	mg/Kg wet	101		94.5	82.1-117.8	0.364	30	
Lead	132	1.5	mg/Kg wet	140		94.1	82.9-117.1	2.09	30	
Selenium	170	9.9	mg/Kg wet	182		93.7	79.7-120.3	0.878	30	
Silver	47.8	0.99	mg/Kg wet	50.1		95.4	80.2-120	0.992	30	
Reference (B291685-SRM1) MRL CHECK				Prepared: 10/04/21 Analyzed: 10/07/21						
Lead	0.409	0.49	mg/Kg wet	0.492		83.2	80-120			J
Batch B291689 - SW-846 7471										
Blank (B291689-BLK1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Mercury	ND	0.025	mg/Kg wet							U
LCS (B291689-BS1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Mercury	21.5	0.75	mg/Kg wet	15.6		138	59.3-140.4			
LCS Dup (B291689-BSD1)				Prepared: 10/04/21 Analyzed: 10/06/21						
Mercury	18.9	0.76	mg/Kg wet	15.6		121	59.3-140.4	13.1	20	

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291634 - SW-846 7470A Dissolved										
Blank (B291634-BLK1)				Prepared: 10/04/21 Analyzed: 10/05/21						
Mercury	ND	0.00010	mg/L							U
LCS (B291634-BS1)				Prepared: 10/04/21 Analyzed: 10/05/21						
Mercury	0.00417	0.00010	mg/L	0.00400		104	80-120			
LCS Dup (B291634-BSD1)				Prepared: 10/04/21 Analyzed: 10/05/21						
Mercury	0.00415	0.00010	mg/L	0.00400		104	80-120	0.513	20	
Batch B291773 - SW-846 3005A Dissolved										
Blank (B291773-BLK1)				Prepared: 10/05/21 Analyzed: 10/06/21						
Arsenic	ND	0.80	µg/L							
Barium	ND	10	µg/L							U
Cadmium	ND	0.20	µg/L							U
Chromium	ND	1.0	µg/L							U
Lead	ND	0.50	µg/L							U
Selenium	ND	5.0	µg/L							U
Silver	ND	0.20	µg/L							U
LCS (B291773-BS1)				Prepared: 10/05/21 Analyzed: 10/06/21						
Arsenic	510	8.0	µg/L	500		102	80-120			
Barium	523	100	µg/L	500		105	80-120			
Cadmium	511	2.0	µg/L	500		102	80-120			
Chromium	498	10	µg/L	500		99.6	80-120			
Lead	517	5.0	µg/L	500		103	80-120			
Selenium	496	50	µg/L	500		99.2	80-120			
Silver	478	2.0	µg/L	500		95.7	80-120			
LCS Dup (B291773-BSD1)				Prepared: 10/05/21 Analyzed: 10/06/21						
Arsenic	519	8.0	µg/L	500		104	80-120	1.68	20	
Barium	535	100	µg/L	500		107	80-120	2.34	20	
Cadmium	521	2.0	µg/L	500		104	80-120	1.99	20	
Chromium	506	10	µg/L	500		101	80-120	1.61	20	
Lead	518	5.0	µg/L	500		104	80-120	0.140	20	
Selenium	501	50	µg/L	500		100	80-120	1.08	20	
Silver	500	2.0	µg/L	500		99.9	80-120	4.36	20	
Duplicate (B291773-DUP1)	**Source: 21J0069-01**			Prepared: 10/05/21 Analyzed: 10/06/21						
Arsenic	42.6	0.80	µg/L		42.6			0.0150	20	
Barium	223	10	µg/L		221			1.05	20	
Cadmium	0.0477	0.20	µg/L		0.0394			19.1	20	J
Chromium	1.61	1.0	µg/L		1.57			2.77	20	
Lead	35.7	0.50	µg/L		35.4			0.854	20	
Selenium	ND	5.0	µg/L		ND			NC	20	U
Silver	ND	0.20	µg/L		ND			NC	20	U

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291773 - SW-846 3005A Dissolved										
Matrix Spike (B291773-MS1)	**Source: 21J0069-01**			Prepared: 10/05/21 Analyzed: 10/06/21						
Arsenic	569	8.0	µg/L	500	42.6	105	75-125			
Barium	761	100	µg/L	500	221	108	75-125			
Cadmium	526	2.0	µg/L	500	ND	105	75-125			
Chromium	511	10	µg/L	500	ND	102	75-125			
Lead	563	5.0	µg/L	500	35.4	105	75-125			
Selenium	514	50	µg/L	500	ND	103	75-125			
Silver	502	2.0	µg/L	500	ND	100	75-125			

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B291903 - SW 846 9060A											
Blank (B291903-BLK1)				Prepared & Analyzed: 10/07/21							
Total Organic Carbon	ND	100	mg/Kg								
LCS (B291903-BS1)				Prepared & Analyzed: 10/07/21							
Total Organic Carbon	815	100	mg/Kg	750		109		64.9-118			
LCS Dup (B291903-BSD1)				Prepared & Analyzed: 10/07/21							
Total Organic Carbon	796	100	mg/Kg	750		106		64.9-118	2.24	16.9	
Duplicate (B291903-DUP1)	**Source: 21J0069-07**			Prepared & Analyzed: 10/07/21							
Total Organic Carbon	27200	100	mg/Kg		26000				4.43	49.1	
MRL Check (B291903-MRL1)				Prepared & Analyzed: 10/07/21							
Total Organic Carbon	97.8	100	mg/Kg	100		97.8		0-200			
MRL Check (B291903-MRL2)				Prepared & Analyzed: 10/07/21							
Total Organic Carbon	74.0	100	mg/Kg	100		74.0		0-200			
Matrix Spike (B291903-MS1)	**Source: 21J0069-07**			Prepared & Analyzed: 10/07/21							
Total Organic Carbon	21000	100	mg/Kg	750	26000	**-677**	*	85-115			MS-07

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
MS-07	Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.
RL-12	Elevated reporting limit due to matrix interference.
S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
U	Analyte included in the analysis, but not detected
Z-01	Sample results were outside of the curve and could not be obtained within the curve due to method limitations. Results are estimated.

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
SW 846 9060A in Soil	
Total Organic Carbon	NY,CT,ME,VA,NH
SW-846 6010D in Soil	

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010D in Soil	
Arsenic	CT,NH,NY,ME,VA,NC
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,AIHA,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NH,NY,ME,VA,NC
SW-846 6020B in Water	
Arsenic	CT,NH,NY,ME,VA,NC
Arsenic	CT,NH,NY,NC,ME,VA
Barium	CT,NH,NY,ME,VA,NC
Barium	MA,NY,CT,NC,NH,ME,VA
Cadmium	CT,NH,NY,RI,ME,VA,NC
Cadmium	CT,NH,NY,NC,ME,VA
Chromium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,NC,ME,VA
Lead	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,NC,ME,VA
Selenium	CT,NH,NY,NC,ME,VA
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NC,NH,NY,ME,VA
Silver	CT,NH,NY,ME,VA,NC
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
Mercury	CT,NH,NY,NC,ME,VA
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21J0069

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name: Willox & Barton, Inc
Address: 1B Commons Dr, Unit 12B, Londonderry
Phone: 603-369-4190
Project Name: BANFOODS
Project Location: 375 Banfield Rd, Portsmouth, NH
Project Number: BANFOODS
Project Manager: N. Willox
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard & D. Perry

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: nwillox, mbroussard
Fax To #:

Dissolved Metals Samples
☑ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	¹Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	total RCRA - 8 metals	dissolved RCRA - 8 metals	total organic carbon	grain size	EPH	PAHs w/ SIM	RCRA - 8 metals				
² Preservation Code												N	N	-	-	-	-	-				
1	MW-101	10/1	1235	GRAB	GW	U			2			X	X									
2	MW-102		1335		GW	U			2			X	X									
3	MW-104		1125		GW	U			2			X	X									
4	SD-218		1240		O	U		2	1					X	X	X	X	X				
5	SD-219		1310		O	U		2	1					X	X	X	X	X				
6	SD-220		1340		O	U		2	1					X	X	X	X	X				
7	SD-221		1445		O	U		2	1					X	X	X	X	X				

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepackaged coolers

Relinquished by: (signature)	Date/Time:
Relinquished by: (signature)	10/1/21 1545
Received by: (signature)	10/1/21 1550
Relinquished by: (signature)	10/1/21 1925
Received by: (signature) 23, 24, 29	10/1/21 1925
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: Ⓐ dissolved metals field filtered

Detection Limit Requirements
MA
CT
Other: NOAA SQuiRTs, AGQS

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) Sediment

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples______________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W&B

Received By ____ Date 10/1/21 Time 1925

How were the samples received? In Cooler T No Cooler ____ On Ice T No Ice ____

Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 2.3, 2.4, 2.9

By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ____

Are there Rushes? F Who was notified? ____

Are there Short Holds? F Who was notified? ____

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? Acid T Base ____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz [✓ Amb]/Clear	4
Meoh-		250 mL Amb.		250 mL Plastic	6	4oz [✓ Amb]/[✓ Clear]	4
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag	4	Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 8, 2021

William Wilcox
Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660

Project Location: 375 Banfield Rd, Portsmouth, NH
Client Job Number:
Project Number: BANF0005
Laboratory Work Order Number: 21J0081

Enclosed are results of analyses for samples as received by the laboratory on October 1, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott C. Basal
Project Manager

Table of Contents

Wilcox & Barton
1115 Route 100B, Suite 200
Moretown, VT 05660
ATTN: William Wilcox

REPORT DATE: 10/8/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: BANF0005

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J0081

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: 375 Banfield Rd, Portsmouth, NH

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SW-208	21J0081-01	Surface Water		EPA 300.0	
				SM21-23 2540C	
				SM21-23 2540D	
				SW-846 6010D	
SW-210	21J0081-02	Surface Water		EPA 300.0	
				SM21-23 2540C	
				SM21-23 2540D	
				SW-846 6010D	
SW-203	21J0081-03	Surface Water		EPA 300.0	
				SM21-23 2540C	
				SM21-23 2540D	
				SW-846 6010D	
SW-201	21J0081-04	Surface Water		EPA 300.0	
				SM21-23 2540C	
				SM21-23 2540D	
				SW-846 6010D	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SM21-23 2540C

Qualifications:

R-02

Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.

Analyte & Samples(s) Qualified:

Total Dissolved Solids
21J0081-04[SW-201], B291804-DUP1

SM21-23 2540D

Qualifications:

R-04

Duplicate relative percent difference (RPD) is a less useful indicator of sample precision for sample results that are <5 times the reporting limit (RL).

Analyte & Samples(s) Qualified:

Total Suspended Solids
21J0081-03[SW-203], B291606-DUP2

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa Worthington

Lisa A. Worthington
Technical Representative

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-208 Sampled: 10/1/2021 10:10

Sample ID: 21J0081-01

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Iron	7.1	0.050	0.032	mg/L	1		SW-846 6010D	10/2/21	10/3/21 8:53	QNW
Manganese	0.23	0.010	0.0020	mg/L	1		SW-846 6010D	10/2/21	10/3/21 8:53	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-208 Sampled: 10/1/2021 10:10

Sample ID: 21J0081-01

Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Iron	4.9	0.050	0.032	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:25	MJH
Manganese	0.20	0.010	0.0020	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:25	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH　Sample Description:　Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-208　Sampled: 10/1/2021 10:10

Sample ID: 21J0081-01

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	42	1.0	0.37	mg/L	1		EPA 300.0	10/2/21	10/2/21 2:55	CB2
Nitrate as N	0.10	0.10	0.090	mg/L	1		EPA 300.0	10/2/21	10/2/21 2:55	CB2
Sulfate	6.1	1.0		mg/L	1		EPA 300.0	10/2/21	10/2/21 2:55	CB2
Total Suspended Solids	6.8	2.0		mg/L	1		SM21-23 2540D	10/4/21	10/4/21 13:20	LL

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-208   Sampled: 10/1/2021 10:10

Sample ID: 21J0081-01

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	140	10	mg/L	1		SM21-23 2540C	10/6/21	10/6/21 12:35	LL

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-210 Sampled: 10/1/2021 10:30

Sample ID: 21J0081-02

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Iron	10	0.050	0.032	mg/L	1		SW-846 6010D	10/2/21	10/3/21 8:59	QNW
Manganese	0.37	0.010	0.0020	mg/L	1		SW-846 6010D	10/2/21	10/3/21 8:59	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0081
Date Received: 10/1/2021
Field Sample #: SW-210
Sampled: 10/1/2021 10:30
Sample ID: 21J0081-02
Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Iron	9.3	0.050	0.032	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:31	MJH
Manganese	0.35	0.010	0.0020	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:31	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-210 Sampled: 10/1/2021 10:30

Sample ID: 21J0081-02

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	160	5.0	1.8	mg/L	5		EPA 300.0	10/2/21	10/2/21 18:45	EC
Nitrate as N	0.15	0.10	0.090	mg/L	1		EPA 300.0	10/2/21	10/2/21 3:17	CB2
Sulfate	0.97	1.0		mg/L	1		EPA 300.0	10/2/21	10/2/21 3:17	CB2
Total Suspended Solids	15	2.0		mg/L	1		SM21-23 2540D	10/4/21	10/4/21 13:20	LL

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-210 Sampled: 10/1/2021 10:30

Sample ID: 21J0081-02

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	330	10	mg/L	1		SM21-23 2540C	10/6/21	10/6/21 12:35	LL

Project Location: 375 Banfield Rd, Portsmouth, NH   Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-203   Sampled: 10/1/2021 11:25

Sample ID: 21J0081-03

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	**Results**	**RL**	**DL**	**Units**	**Dilution**	**Flag/Qual**	**Method**	**Date Prepared**	**Date/Time Analyzed**	**Analyst**
Iron	14	0.050	0.032	mg/L	1		SW-846 6010D	10/2/21	10/3/21 9:18	QNW
Manganese	0.39	0.010	0.0020	mg/L	1		SW-846 6010D	10/2/21	10/3/21 9:18	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0081
Date Received: 10/1/2021
Field Sample #: SW-203
Sampled: 10/1/2021 11:25
Sample ID: 21J0081-03
Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Iron	6.4	0.050	0.032	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:37	MJH
Manganese	0.37	0.010	0.0020	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:37	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-203 Sampled: 10/1/2021 11:25

Sample ID: 21J0081-03

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	110	5.0	1.8	mg/L	5		EPA 300.0	10/2/21	10/2/21 19:08	EC
Nitrate as N	0.27	0.10	0.090	mg/L	1		EPA 300.0	10/2/21	10/2/21 3:40	CB2
Sulfate	ND	1.0		mg/L	1		EPA 300.0	10/2/21	10/2/21 3:40	CB2
Total Suspended Solids	15	2.0		mg/L	1	R-04	SM21-23 2540D	10/4/21	10/4/21 13:20	LL

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-203 Sampled: 10/1/2021 11:25

Sample ID: 21J0081-03

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	300	10	mg/L	1		SM21-23 2540C	10/6/21	10/6/21 12:35	LL

Project Location: 375 Banfield Rd, Portsmouth, NH
Sample Description:
Work Order: 21J0081
Date Received: 10/1/2021
Field Sample #: SW-201
Sampled: 10/1/2021 08:55
Sample ID: 21J0081-04
Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Iron	8.2	0.050	0.032	mg/L	1		SW-846 6010D	10/2/21	10/3/21 9:24	QNW
Manganese	0.38	0.010	0.0020	mg/L	1		SW-846 6010D	10/2/21	10/3/21 9:24	QNW

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-201 Sampled: 10/1/2021 08:55

Sample ID: 21J0081-04

Sample Matrix: Surface Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Iron	4.9	0.050	0.032	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:43	MJH
Manganese	0.37	0.010	0.0020	mg/L	1		SW-846 6010D	10/6/21	10/7/21 16:43	MJH

Project Location: 375 Banfield Rd, Portsmouth, NH Sample Description: Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-201 Sampled: 10/1/2021 08:55

Sample ID: 21J0081-04

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	110	5.0	1.8	mg/L	5		EPA 300.0	10/2/21	10/2/21 19:30	EC
Nitrate as N	ND	0.10	0.090	mg/L	1		EPA 300.0	10/2/21	10/2/21 4:02	CB2
Sulfate	ND	1.0		mg/L	1		EPA 300.0	10/2/21	10/2/21 4:02	CB2
Total Suspended Solids	10	2.0		mg/L	1		SM21-23 2540D	10/4/21	10/4/21 13:20	LL

Project Location: 375 Banfield Rd, Portsmouth, NH

Sample Description:

Work Order: 21J0081

Date Received: 10/1/2021

Field Sample #: SW-201

Sampled: 10/1/2021 08:55

Sample ID: 21J0081-04

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Total Dissolved Solids	320	10	mg/L	1	R-02	SM21-23 2540C	10/6/21	10/6/21 12:35	LL

Sample Extraction Data

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0081-01 [SW-208]	B291545	10.0	10.0	10/02/21
21J0081-02 [SW-210]	B291545	10.0	10.0	10/02/21
21J0081-03 [SW-203]	B291545	10.0	10.0	10/02/21

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0081-01 [SW-208]	B291568	10.0	10.0	10/02/21
21J0081-02 [SW-210]	B291568	10.0	10.0	10/02/21
21J0081-03 [SW-203]	B291568	10.0	10.0	10/02/21

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0081-02 [SW-210]	B291582	10.0	10.0	10/02/21
21J0081-03 [SW-203]	B291582	10.0	10.0	10/02/21
21J0081-04 [SW-201]	B291582	10.0	10.0	10/02/21

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0081-04 [SW-201]	B291678	10.0	10.0	10/02/21

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0081-04 [SW-201]	B291679	10.0	10.0	10/02/21

SM21-23 2540C

Lab Number [Field ID]	Batch	Initial [mL]	Date
21J0081-01 [SW-208]	B291804	50.0	10/06/21
21J0081-02 [SW-210]	B291804	50.0	10/06/21
21J0081-03 [SW-203]	B291804	50.0	10/06/21
21J0081-04 [SW-201]	B291804	50.0	10/06/21

SM21-23 2540D

Lab Number [Field ID]	Batch	Initial [mL]	Date
21J0081-01 [SW-208]	B291606	250	10/04/21
21J0081-02 [SW-210]	B291606	250	10/04/21
21J0081-03 [SW-203]	B291606	250	10/04/21
21J0081-04 [SW-201]	B291606	250	10/04/21

Sample Extraction Data

Prep Method: SW-846 3005A **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0081-01 [SW-208]	B291587	50.0	50.0	10/02/21
21J0081-02 [SW-210]	B291587	50.0	50.0	10/02/21
21J0081-03 [SW-203]	B291587	50.0	50.0	10/02/21
21J0081-04 [SW-201]	B291587	50.0	50.0	10/02/21

Prep Method: SW-846 3005A Dissolved **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0081-01 [SW-208]	B291909	5.00	5.00	10/06/21
21J0081-02 [SW-210]	B291909	5.00	5.00	10/06/21
21J0081-03 [SW-203]	B291909	5.00	5.00	10/06/21
21J0081-04 [SW-201]	B291909	5.00	5.00	10/06/21

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291587 - SW-846 3005A										
Blank (B291587-BLK1)				Prepared: 10/02/21 Analyzed: 10/03/21						
Iron	ND	0.050	mg/L							
Manganese	ND	0.010	mg/L							
LCS (B291587-BS1)				Prepared: 10/02/21 Analyzed: 10/03/21						
Iron	4.05	0.050	mg/L	4.00		101	80-120			
Manganese	0.505	0.010	mg/L	0.500		101	80-120			
LCS Dup (B291587-BSD1)				Prepared: 10/02/21 Analyzed: 10/03/21						
Iron	4.06	0.050	mg/L	4.00		101	80-120	0.198	20	
Manganese	0.508	0.010	mg/L	0.500		102	80-120	0.593	20	

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291909 - SW-846 3005A Dissolved										
Blank (B291909-BLK1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Iron	ND	0.050	mg/L							
Manganese	ND	0.010	mg/L							
LCS (B291909-BS1)				Prepared: 10/06/21 Analyzed: 10/07/21						
Iron	2.01	0.050	mg/L	2.00		100	80-120			
Manganese	1.98	0.010	mg/L	2.00		99.1	80-120			
Duplicate (B291909-DUP1)	**Source: 21J0081-01**			Prepared: 10/06/21 Analyzed: 10/07/21						
Iron	5.02	0.050	mg/L		4.93			1.89	20	
Manganese	0.202	0.010	mg/L		0.198			2.09	20	
Matrix Spike (B291909-MS1)	**Source: 21J0081-01**			Prepared: 10/06/21 Analyzed: 10/07/21						
Iron	21.5	0.051	mg/L	16.3	4.93	101	75-125			
Manganese	2.21	0.010	mg/L	2.04	0.198	98.8	75-125			

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291545 - EPA 300.0										
Blank (B291545-BLK1)				Prepared & Analyzed: 10/01/21						
Nitrate as N	ND	0.10	mg/L							
LCS (B291545-BS1)				Prepared & Analyzed: 10/01/21						
Nitrate as N	0.95	0.10	mg/L	1.00		95.2	90-110			
LCS Dup (B291545-BSD1)				Prepared & Analyzed: 10/01/21						
Nitrate as N	0.95	0.10	mg/L	1.00		95.2	90-110	0.0735	20	
Batch B291568 - EPA 300.0										
Blank (B291568-BLK1)				Prepared & Analyzed: 10/01/21						
Chloride	ND	1.0	mg/L							
Sulfate	ND	1.0	mg/L							
LCS (B291568-BS1)				Prepared & Analyzed: 10/01/21						
Chloride	10	1.0	mg/L	10.0		103	90-110			
Sulfate	10	1.0	mg/L	10.0		101	90-110			
LCS Dup (B291568-BSD1)				Prepared & Analyzed: 10/01/21						
Chloride	10	1.0	mg/L	10.0		103	90-110	0.108	20	
Sulfate	10	1.0	mg/L	10.0		101	90-110	0.104	20	
Batch B291582 - EPA 300.0										
Blank (B291582-BLK1)				Prepared & Analyzed: 10/02/21						
Chloride	ND	1.0	mg/L							
LCS (B291582-BS1)				Prepared & Analyzed: 10/02/21						
Chloride	10	1.0	mg/L	10.0		99.7	90-110			
LCS Dup (B291582-BSD1)				Prepared & Analyzed: 10/02/21						
Chloride	9.8	1.0	mg/L	10.0		97.7	90-110	2.03	20	
Batch B291606 - SM21-23 2540D										
Blank (B291606-BLK1)				Prepared & Analyzed: 10/04/21						
Total Suspended Solids	ND	2.5	mg/L							
LCS (B291606-BS1)				Prepared & Analyzed: 10/04/21						
Total Suspended Solids	213	5.0	mg/L	200		106	53.8-124			

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291606 - SM21-23 2540D										
Duplicate (B291606-DUP2)	**Source: 21J0081-03**			Prepared & Analyzed: 10/04/21						
Total Suspended Solids	14	2.0	mg/L		15			**11.1** *	5	R-04
Batch B291678 - EPA 300.0										
Blank (B291678-BLK1)				Prepared & Analyzed: 10/01/21						
Sulfate	ND	1.0	mg/L							
LCS (B291678-BS1)				Prepared & Analyzed: 10/01/21						
Sulfate	10	1.0	mg/L	10.0		101	90-110			
LCS Dup (B291678-BSD1)				Prepared & Analyzed: 10/01/21						
Sulfate	10	1.0	mg/L	10.0		101	90-110	0.104	20	
Duplicate (B291678-DUP2)	**Source: 21J0081-04**			Prepared & Analyzed: 10/02/21						
Sulfate	ND	1.0	mg/L		ND			NC	20	
Matrix Spike (B291678-MS2)	**Source: 21J0081-04**			Prepared & Analyzed: 10/02/21						
Sulfate	11	1.0	mg/L	10.0	ND	113	80-120			
Batch B291679 - EPA 300.0										
Blank (B291679-BLK1)				Prepared & Analyzed: 10/01/21						
Nitrate as N	ND	0.10	mg/L							
LCS (B291679-BS1)				Prepared & Analyzed: 10/01/21						
Nitrate as N	0.95	0.10	mg/L	1.00		95.2	90-110			
LCS Dup (B291679-BSD1)				Prepared & Analyzed: 10/01/21						
Nitrate as N	0.95	0.10	mg/L	1.00		95.2	90-110	0.0735	20	
Duplicate (B291679-DUP1)	**Source: 21J0081-04**			Prepared & Analyzed: 10/02/21						
Nitrate as N	ND	0.10	mg/L		ND			NC	20	
Matrix Spike (B291679-MS1)	**Source: 21J0081-04**			Prepared & Analyzed: 10/02/21						
Nitrate as N	0.96	0.10	mg/L	1.00	ND	95.6	80-120			

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B291804 - SM21-23 2540C										
Blank (B291804-BLK1)				Prepared & Analyzed: 10/06/21						
Total Dissolved Solids	ND	10	mg/L							
LCS (B291804-BS1)				Prepared & Analyzed: 10/06/21						
Total Dissolved Solids	260	10	mg/L	293		88.7	64.9-119			
Duplicate (B291804-DUP1)	**Source: 21J0081-04**			Prepared & Analyzed: 10/06/21						
Total Dissolved Solids	270	10	mg/L		320			**14.2** *	5	R-02

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.

R-02	Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.
R-04	Duplicate relative percent difference (RPD) is a less useful indicator of sample precision for sample results that are <5 times the reporting limit (RL).

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA 300.0 in Water	
Chloride	NC,NY,MA,VA,ME,NH,CT,RI
Nitrate as N	NC,NY,MA,VA,ME,NH,CT,RI
Sulfate	NC,NY,MA,VA,ME,NH,CT,RI
SM21-23 2540C in Water	
Total Dissolved Solids	CT,MA,NH,NY,RI,NC,ME,VA
SM21-23 2540D in Water	
Total Suspended Solids	CT,MA,NH,NY,RI,NC,ME,VA
SW-846 6010D in Water	
Iron	CT,NH,NY,ME,VA,NC
Iron	CT,NH,NY,ME,NC,VA
Manganese	CT,NH,NY,ME,VA,NC
Manganese	CT,NH,NY,ME,NC,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

con-test ANALYTICAL LABORATORY

21J0081

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

Doc # 381 Rev 1_03242017

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: Wilcox & Barton, Inc.
Address: 1B Commons Dr, Unit 12B, Londonderry, NH
Phone: 603-369-4190
Project Name: BANF0005
Project Location: 575 Banfield Rd, Portsmouth, NH
Project Number: BANF0005
Project Manager: B. Wilcox
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: M. Broussard

Requested Turnaround Time
7-Day ☐ 10-Day ☐
Due Date: 5-day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: wwilcox, mbroussard@
Fax To #: wilcoxandbarton.com

	total Fe and Mn	dissolved Fe and Mn	chloride	nitrate	sulfate	TSS	TDS				
# of Containers	1	1	1	1	1	1					
² Preservation Code	N	N	–	–	–	–					
³ Container Code	P	P	P	P	P	P	P				

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	¹Matrix Code	Conc Code	total Fe and Mn	dissolved Fe and Mn	chloride	nitrate	sulfate	TSS	TDS				
1	SW-208	10/1	10:10		X	SW		X	X	X	X	X	X	X				
2	SW-210	↓	10:30		X	↓		X	X	X	X	X	X	X				
3	SW-203		11:25		X			X	X	X	X	X	X	X				
4	SW-201		08:55		X			X	X	X	X	X	X	X				

Dissolved Metals Samples
☒ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

¹ **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)
SW = Surface Water

² **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

³ **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Comments:
Ⓐ TDS jars also field filtered

Please use the following codes to indicate possible sample concentration within the **Conc Code** column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)
Date/Time: 15:45 10/1/21 ~~13:45~~

Received by: (signature)
Date/Time: 10/1/21 1550

Relinquished by: (signature)
Date/Time: 10/1/21 1925

Received by: (signature) 24
Date/Time: 10/1/21 1925

Relinquished by: (signature)
Date/Time:

Received by: (signature)
Date/Time:

Detection Limit Requirements
MA
CT
Other: WQC

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

con-test ANALYTICAL LABORATORY
www.contestlabs.com

NELAC and AIHA-LAP, LLC Accredited

Project Entity
☐ Government ☐ Municipality ☐ MWRA ☐ WRTA
☐ Federal ☐ 21 J ☐ School
☐ City ☐ Brownfield ☐ MBTA

Other
☐ Chromatogram
☐ *AIHA-LAP, LLC*

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples____________

con-test®
ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client W+B

Received By Date 10/1/21 Time 1425

How were the samples received? In Cooler T No Cooler ___ On Ice T No Ice ___
Direct from Sampling ___ Ambient ___ Melted Ice ___

Were samples within Temperature? 2-6°C T By Gun # 5 Actual Temp - 2.4
By Blank # ___ Actual Temp - ___

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ___
Are there Rushes? F Who was notified? ___
Are there Short Holds? T Who was notified? Cassie
Is there enough Volume? T
Is there Headspace where applicable? n/a MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid T Base n/a

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic	4	16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic	8	8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	8	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

APPENDIX F

Data Tables from 2008 Investigation

TABLE 1A. SUMMARY OF SEDIMENT LABORATORY ANALYTICAL RESULTS - THRESHOLD EFFECTS CONCENTRATION (TEC) HAZARD QUOTIENTS

Commercial Property
375 Banfield Road
Portsmouth, New Hampshire

CHEMICAL PARAMETER	Consensus-Based TEC Concentration (mg/kg)				HAZARD QUOTIENTS - TEC		
		7/28/2008 SD101	7/28/2008 SD102	7/28/2008 SD103	7/28/2008 SD101	7/28/2008 SD102	7/28/2008 SD103
Volatile Organic Compounds (EPA Method 8260B):	Various	nd (0.226 to 6.01)	na	nd (0.395 to 10.5)	---	na	---
Polynuclear Aromatic Hydrocarbons (EPA Method 8270C):							
Acenaphthene	Various	nd (1.4)	nd (0.64)	nd (1.4)	---	---	---
RCRA Metals:							
Arsenic	9.79	15.9	9.5	15.4	1.62	0.97	1.57
Barium	NG	160J	80J	170J	---	---	---
Cadmium	0.99	nd (2.7)	nd (1.3)	nd (2.8)	---	---	---
Chromium	43.4	32	38	39	0.74	0.88	0.90
Lead	35.8	154	87	77	4.30	2.43	2.15
Mercury	0.18	0.27	0.13	0.17	1.50	0.72	0.94
Selenium	NG	3.2	1.8	3.3	---	---	---
PCBs (total):	0.0598	na	nd (0.079)	na	---	---	---

Legend:
J = estimated concentration.
(mg/kg) = milligrams per kilogram.
na = not analysed for
nd = parameter not detected above method detection limit. Quantitation limit is provided in parentheses.
NG = No guideline.

Notes:

1. Threshold Effects Concentration (TEC) taken from NOAA SQuiRTS Tables for fresh water as Threshold Effects Level (TEL), except where noted.
2. Consensus-Based Threshold Effect Concentrations (TECs) are from MacDonald et.al., 2000 - Arch. Env. Contam. And Toxicology v. 39.
3. Measured concentrations that exceed the applicable TEL sediment standard are surrounded by a box.
4. Hazard Quotients >1 are shaded.

TABLE 1B. SUMMARY OF SEDIMENT LABORATORY ANALYTICAL RESULTS - PROBABLE EFFECTS CONCENTRATION (PEC) HAZARD QUOTIENTS

Commercial Property
375 Banfield Road
Portsmouth, New Hampshire

CHEMICAL PARAMETER	Consensus-Based PEC Concentration (mg/kg)	7/28/2008 SD101	7/28/2008 SD102	7/28/2008 SD103	HAZARD QUOTIENTS - PEC 7/28/2008 SD101	HAZARD QUOTIENTS - PEC 7/28/2008 SD102	HAZARD QUOTIENTS - PEC 7/28/2008 SD103
Volatile Organic Compounds (EPA Method 8260B):	Various	nd (0.226 to 6.01)	na	nd (0.395 to 10.5)	---	na	---
Polynuclear Aromatic Hydrocarbons (EPA Method 8270C):							
Acenaphthene	Various	nd (1.4)	nd (0.64)	nd (1.4)	---	---	---
RCRA Metals:							
Arsenic	33	15.9	9.5	15.4	0.48	0.29	0.47
Barium	NG	160J	80J	170J	---	---	---
Cadmium	4.98	nd (2.7)	nd (1.3)	nd (2.8)	---	---	---
Chromium	111	32	38	39	0.29	0.34	0.35
Lead	128	154	87	77	1.20	0.68	0.60
Mercury	1.06	0.27	0.13	0.17	0.25	0.12	0.16
Selenium	NG	3.2	1.8	3.3	---	---	---
PCBs (total):	0.0598	na	nd (0.079)	na	---	---	---

Legend:
J = estimated concentration.
(mg/kg) = milligrams per kilogram.
na = not analysed for
nd = parameter not detected above method detection limit. Quantitation limit is provided in parentheses.
NG = No guideline.

Notes:

1. Probable Effects Concentration (PEC) taken from NOAA SQuiRTS Tables for fresh water as Probable Effects Level (PEL), except where noted.
2. Consensus-Based Probable Effect Concentrations (PECs) are from MacDonald et.al., 2000 - Arch. Env. Contam. And Toxicology v. 39.
3. Measured concentrations that exceed the applicable sediment standard are surrounded by a box.
4. Hazard Quotients >1 are shaded.

TABLE 2. SUMMARY OF SURFACE WATER LABORATORY ANALYTICAL RESULTS
Commercial Property
375 Banfield Road
Portsmouth, New Hampshire

Chemical Parameter	Surface Water	Sample Date	SW101	SW102	SW103
VOLATILE ORGANIC COMPOUNDS (ug/L):					
All VOCs	Various	6-Aug-08	nd (2 to 20)	na	nd (2 to 20)
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/L):					
All PAHs	Various	6-Aug-08	nd (0.2)	nd (0.2)	nd (0.2)
RCRA Metals (ug/L):					
Arsenic (total)	150	6-Aug-08	5	6	7
Barium (total)	NS	6-Aug-08	45	40	22
Cadmium (total)	0.8	6-Aug-08	nd (0.2)	nd (0.2)	0.2J
Cadmium -Adjusted for hardness - 97.2 ("SW101")	na	6-Aug-08	na	---	---
Cadmium -Adjusted for hardness - 96.5 ("SW102")	na	6-Aug-08	---	na	---
Cadmium -Adjusted for hardness - 32.3 ("SW103")	1.01	6-Aug-08	---	---	0.2J
Chromium	34.15	6-Aug-08	nd (2)	nd (2)	3J
Lead (total)	0.54	6-Aug-08	1J	nd (1)	20
Lead -Adjusted for hardness - 97.2 ("SW101")	3.07	6-Aug-08	0.79514	---	---
Lead -Adjusted for hardness - 96.5 ("SW102")	na	6-Aug-08	---	na	---
Lead -Adjusted for hardness - 32.3 ("SW103")	0.76	6-Aug-08	---	---	19.11
Mercury (total)	0.77	6-Aug-08	nd (0.2)	nd (0.2)	nd (0.2)
Selenium (total)	5	6-Aug-08	10	10	6
Hardness (mg/lCaCO$_{3}$)	NS	6-Aug-08	97.2	96.5	32.3

Legend:

(μg/L) = micrograms per liter.	na = not applicable
J = estimated concentration.	NS = none set

nd = parameter not detected above method detection limit. Quantitation limit is provided in parentheses.

NOTES:
1. Standards shown are from NH Code of Administrative Rules Env-Wq 1700 Surface Water Quality Criteria.

TABLE 3. SUMMARY OF SOIL LABORATORY ANALYTICAL RESULTS
Commercial Property
375 Banfield Road
Portsmouth, N.H.

						SAMPLING LOCATION (concentrations in mg/kg)												
CHEMICAL PARAMETER	Env-Or 600 S-1 Soil Standard (mg/kg)	RCMP Method 1 NH S-1 Soil Standard (mg/kg)	RCMP Method 1 NH S-2 Soil Standard (mg/kg)	RCMP Method 1 NH S-3 Soil Standard (mg/kg)		7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008
					Boring/MW	TP101	TP103	TP104	TP105	TP106	TP107	TP108	TP109	TP111	TP112	TP114	TP120	TP122
					Sample #	S1	S1	S1	S1	S1	S1	S1	S2	S3	S2	S1	S1	S1
					Depth (ft.)	0 - 1.5	0 - 1.5	0.-0.8	0.-0.5	0 -0.5	0 -0.5	0 - 1	0.5 -4	2 -2.5	1 - 2	0 - 1.5	0 - 3.5	0 - 4
Volatile Organic Compounds:																		
Toluene	100	100	100	100		na	na	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	140	140	140	140		na	na	na	na	na	na	na	na	na	na	na	na	na
Total Xylenes	500	500	1,000	1,500		na	na	na	na	na	na	na	na	na	na	na	na	na
Naphthalene	5	5	5	5		na	na	na	na	na	na	na	na	na	na	na	na	na
1,3,5-Trimethylbenzene	96	96	96	96		na	na	na	na	na	na	na	na	na	na	na	na	na
1,2,4-Trimethylbenzene	130	130	130	130		na	na	na	na	na	na	na	na	na	na	na	na	na
Polynuclear Aromatic Hydrocarbons:																		
Naphthalene	5	5	5	5		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.563	nd(0.32)	nd(8.2)
Acenaphthylene	490	490	490	490		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.736	nd(0.32)	nd(8.2)
Acenaphthene	340	340	340	340		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.383	nd(0.32)	8.81
Fluorene	77	77	77	77		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.525	nd(0.32)	9.7
Phenanthrene	960	960	2,500	5,000		nd(0.28)	nd(0.28)	nd(0.29)	0.177J	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	5.29	0.25J	84.4
Anthracene	1,000	1,000	2,500	5,000		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.917	nd(0.32)	22.7
Fluoranthene	960	960	2,500	5,000		nd(0.28)	nd(0.28)	0.308	0.216J	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	6.3	0.284J	123
Pyrene	720	720	2,500	5,000		nd(0.28)	nd(0.28)	0.306	0.183J	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	6.18	0.251J	97.4
Benzo[a]anthracene	1	1	4	52		nd(0.28)	nd(0.28)	0.232J	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	$\boxed{2.81}$	nd(0.32)	$\boxed{57.2}$
Chrysene	120	120	360	2,200		nd(0.28)	nd(0.28)	0.230J	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	3.17	nd(0.32)	53.3
Benzo[b]fluoranthene	1	1	4	52		0.173J	nd(0.28)	0.272J	nd(0.31)	nd(0.31)	0.176J	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	5.35	0.198J	$\boxed{63.1}$
Benzo[k]fluoranthene	12	12	36	520		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	1.7	nd(0.32)	$\boxed{21.5}$
Benzo[a]pyrene	0.7	0.7	0.7	5		nd(0.28)	nd(0.28)	0.178J	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	$\boxed{2.82}$	nd(0.32)	$\boxed{44.6}$
Dibenz[a,h]anthracene	0.7	0.7	0.7	5		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.189J	nd(0.32)	$\boxed{4.670J}$
Benzo(g,h,i)perylene	960	960	2,500	5,000		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.723	nd(0.32)	12.4
Indeno[1,2,3-cd]pyrene	1	1	4	52		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.815	nd(0.32)	$\boxed{17}$
2-Methylnaphthalene	96	96	100	100		nd(0.28)	nd(0.28)	nd(0.29)	nd(0.31)	nd(0.31)	nd(0.3)	nd(0.3)	nd(0.33)	nd(0.33)	nd(0.33)	0.199J	nd(0.32)	nd(8.2)
Total Petroleum Hydrocarbons-DRO:	10,000	10,000	10,000	10,000		na	na	na	na	na	na	na	na	na	na	na	164	2,750
RCRA Metals:																		
Arsenic	11	11	11	29		$\boxed{11.9}$	10.5	$\boxed{12.4}$	8.8	$\boxed{11.5}$	$\boxed{13.5}$	$\boxed{14.5}$	$\boxed{13.7}$	$\boxed{13.3}$	$\boxed{14.9}$	$\boxed{11.1}$	$\boxed{12}$	$\boxed{11.1}$
Barium	1,000	1,000	2,500	5,000		410	90	130	80	50	260	210	100	100	110	160	1,000	890
Cadmium	33	33	280	280		17.1	1.9J	2.3	1.2J	nd(0.6)	5.7	4.6	1.9J	2.6	0.9J	1.1j	1.9J	2.5
Chromium (VI)	130	130	990	990		90	46	45	50	43	51	48	45	43	35	42	29	31
Lead	400	400	400	400		$\boxed{1,290}$	$\boxed{520}$	192	127	25	$\boxed{705}$	$\boxed{717}$	250	$\boxed{417}$	196	$\boxed{591}$	$\boxed{4,060}$	$\boxed{3,370}$
Mercury	6	6	52	52		0.67	0.11	0.15	0.24	0.06	0.61	0.46	0.19	0.1	0.5	0.68	1.51	1.11
Selenium	180	180	1,600	1,600		0.7	0.3J	0.7	0.3J	0.7	0.8	0.4J	0.2J	0.3J	0.4J	0.3J	0.6	0.5
PCBs (total):	1	1	10	25		$\boxed{12.93}$	0.752	$\boxed{1.614}$	$\boxed{2.015}$	0.965	$\boxed{3.77}$	na	0.423	0.37	0.452	na	na	nd(0.036)
PCB-1254	NS	NS	NS	NS		8.63	0.446	1.04	1.34	0.965	2.37	na	0.27	0.236	0.292	na	na	nd(0.036)
PCB-1260	NS	NS	NS	NS		4.3	0.306	0.574	0.675	nd(0.090)	1.4	na	0.153	0.134	0.16	na	na	nd(0.036)
Asbestos (%):	NS	NS	NS	NS		na	na	na	na	na	na	na	na	na	na	na	0%	na

Legend:
J = estimated concentration. D = Sample did not meet NA = not analyzed for. NS = None set.
nd = parameter not detected above method detection limit. Quantitation limit is provided in parentheses. (mg/kg) = milligrams per kilogram.

Notes:
1. Soil standard as referenced from Env-Or 600 or NH DES Risk Characterization Management Policy (RCMP).
2. Measured concentrations that exceed the applicable soil standard are surrounded by a box.
3. *Standard is for the total of benzo[g,h,i]perylene, phenanthrene, and pyrene.

TABLE 3. SUMMARY OF SOIL LABORATORY ANALYTICAL RESULTS
Commercial Property
375 Banfield Road
Portsmouth, N.H.

CHEMICAL PARAMETER	Env-Or 600 Soil Standard (mg/kg)	RCMP Method 1 NH S-1 Soil Standard (mg/kg)	RCMP Method 1 NH S-2 Soil Standard (mg/kg)	RCMP Method 1 NH S-3 Soil Standard (mg/kg)		SAMPLING LOCATION (concentrations in mg/kg)											
						7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008	7/29/2008
					Boring/MW	**TP123**	**TP125**	**TP127**	**TP130**	**TP132**	**TP133**	**SS101**	**SB104**	**SB106**	**SB107**	**SB107**	**SB108**
					Sample #	**S1**	**S1**	**S1**	**S1**	**S2**	**S1**	**S1**	**S2**	**S1, S2, S3**	**S3**	**S3**	**S2**
					Depth (ft.)	**0 - 3**	**0 - 0.5**	**0 - 1**	**0 - 0.5**	**1 - 2**	**0 - 1.5**	**0 - 0.5**	**2 - 4**	**0 - 6**	**4 - 6**	**4 - 6**	**2 - 4**
VOCs (EPA Method 8260B):	Various	Various	Various	Various		na	na	na	na	na	na	na	nd(0.187 to 4.98)	na	na	na	na
Polynuclear Aromatic Hydrocarbons (EPA Method 8270C):																	
Naphthalene	5	5	5	5		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	nd(0.29)	nd(0.3)	na	na	na	nd(0.33)	na
Acenaphthylene	490	490	490	490		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	0.185J	nd(0.3)	na	na	na	nd(0.33)	na
Acenaphthene	340	340	340	340		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	nd(0.29)	nd(0.3)	na	na	na	nd(0.33)	na
Fluorene	77	77	77	77		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	nd(0.29)	nd(0.3)	na	na	na	nd(0.33)	na
Phenanthrene	960	960	2,500	5,000		2.63	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	nd(0.29)	0.221J	na	na	na	nd(0.33)	na
Anthracene	1,000	1,000	2,500	5,000		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	nd(0.29)	nd(0.3)	na	na	na	nd(0.33)	na
Fluoranthene	960	960	2,500	5,000		3.32	0.302J	0.162J	0.170J	nd(0.33)	0.737	0.463	na	na	na	nd(0.33)	na
Pyrene	720	720	2,500	5,000		2.93	0.724	0.165J	0.163J	nd(0.33)	0.928	0.493	na	na	na	nd(0.33)	na
Benzo[a]anthracene	1	1	4	52		1.46	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	0.476	0.262J	na	na	na	nd(0.33)	na
Chrysene	120	120	360	2,200		1.59	0.453J	nd(0.31)	nd(0.32)	nd(0.33)	0.461	0.275J	na	na	na	nd(0.33)	na
Benzo[b]fluoranthene	1	1	4	52		1.98	nd(0.59)	0.181J	nd(0.32)	nd(0.33)	1.03	0.516	na	na	na	nd(0.33)	na
Benzo[k]fluoranthene	12	12	36	520		0.640J	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	0.261J	nd(0.3)	na	na	na	nd(0.33)	na
Benzo[a]pyrene	0.7	0.7	0.7	5		1.29	0.565J	nd(0.31)	nd(0.32)	nd(0.33)	0.438	0.264J	na	na	na	nd(0.33)	na
Dibenz[a,h]anthracene	0.7	0.7	0.7	5		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	nd(0.29)	nd(0.3)	na	na	na	nd(0.33)	na
Benzo(g,h,i)perylene	960	960	2,500	5,000		nd(1.1)	0.553J	nd(0.31)	nd(0.32)	nd(0.33)	0.191J	nd(0.3)	na	na	na	nd(0.33)	na
Indeno[1,2,3-cd]pyrene	1	1	4	52		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	0.218J	nd(0.3)	na	na	na	nd(0.33)	na
2-Methylnaphthalene	96	96	100	100		nd(1.1)	nd(0.59)	nd(0.31)	nd(0.32)	nd(0.33)	nd(0.29)	nd(0.3)	na	na	na	nd(0.33)	na
Total Petroleum Hydrocarbons-DRO:	10,000	10,000	10,000	10,000		239	na	na	na	na	na	189	na	na	na	7	na
RCRA Metals:																	
Arsenic	11	11	11	29		12.5	10	16.8	8.9	12	15.6	13.4	na	na	na	9.5	na
Barium	1,000	1,000	2,500	5,000		610	290	140	90	310	320	250	na	na	na	80	na
Cadmium	33	33	280	280		2.7J	5.3	4.3	1.5J	4.8	9.6	6.6	na	na	na	nd(0.6)	na
Chromium	130	130	990	990		37	54	62	53	48	46	50	na	na	na	31	na
Lead	400	400	400	400		3,150	1,271	338	225	406	737	427	na	na	na	24	na
Mercury	6	6	52	52		1.15	0.14	0.41	0.13	0.15	0.2	1	na	na	na	0.06	na
Selenium	180	180	1,600	1,600		0.4J	0.2J	0.2J	0.4J	0.3J	0.4	0.3J	na	na	na	0.2J	na
PCBs:	1	1	10	25		nd(0.06)	2.32	na	0.449	na	1.749	3.06	na	na	na	nd(0.018)	na
PCB-1254	NS	NS	NS	NS		nd(0.06)	1.16	na	0.279	na	1.06	1.99	na	na	na	nd(0.018)	na
PCB-1260	NS	NS	NS	NS		nd(0.06)	1.16	na	0.17	na	0.689	1.07	na	na	na	nd(0.018)	na
Asbestos (%):	NS	NS	NS	NS		0%	na	na	na	na	na	0%	na	0%	0%	na	0%

Legend:
J = estimated concentration. D = Sample did not meet NA = not analyzed for. NS = None set.
nd = parameter not detected above method detection limit. Quantitation limit is provided in parentheses. (mg/kg) = milligrams per kilogram.

Notes:
1. Soil standard as referenced from Env-Or 600 or NH DES Risk Characterization Management Policy (RCMP).
2. Measured concentrations that exceed the applicable soil standard are surrounded by a box.
3. *Standard is for the total of benzo[g,h,i]perylene, phenanthrene, and pyrene.

TABLE 4. SUMMARY OF GROUNDWATER LABORATORY ANALYTICAL RESULTS
Commercial Property
375 Banfield Road
Portsmouth, New Hampshire

Chemical Parameter	AGQS	Sample Date	MW101	MW102	MW103	MW104	MW105	MW106	MW107	MW108	MW109	MW-1	MW-3	MW-4	MW-6	MW-9
VOLATILE ORGANIC COMPOUNDS (ug/L):																
Tetrachloroethene	2	15-Aug-08	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	1.3	nd (1)	nd (1)	nd (1)
Naphthalene	20	15-Aug-08	1.2	nd (1)	nd (1)	4.5	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)
Methyl *tertiary* -butyl ether (MTBE)	13	15-Aug-08	nd (1)	nd (1)	nd (1)	nd (1)	0.5J	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/L):																
Naphthalene	20	15-Aug-08	nd (0.1)	nd (0.1)	nd (0.1)	1.3	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Phenanthrene	210	15-Aug-08	0.1	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Fluoranthene	280	15-Aug-08	0.3	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Pyrene	210	15-Aug-08	0.3	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Benzo(a)anthracene	0.1	15-Aug-08	$\boxed{0.2}$	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Chrysene	5	15-Aug-08	0.2	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Benzo(b)fluoranthene	0.1	15-Aug-08	$\boxed{0.2}$	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Benzo(k)fluoranthene	0.5	15-Aug-08	0.2	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
Dibenz(a,h)anthracene	0.1	15-Aug-08	$\boxed{0.2}$	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)	nd (0.1)
RCRA Metals (ug/L):																
Arsenic	10	15-Aug-08	6	8	2J	2J	$\boxed{37}$	nd (2)	nd (2)	nd (2)	nd (2)	5	8	nd (2)	nd (2)	3J
Barium	2,000	15-Aug-08	101	85	128	128	47	10	39	36	20	16	4J	7J	nd (3)	97
Cadmium	5	15-Aug-08	nd (0.2)	6	nd (0.2)	nd (0.2)	0.3J	nd (0.2)	nd (0.2)	0.2J	nd (0.2)	0.5J	0.5J	nd (0.2)	nd (0.2)	nd (0.2)
Chromium (total)	100	15-Aug-08	nd (2)	nd (2)	nd (2)	nd (2)	3J	nd (2)	nd (2)	nd (2)	nd (2)	4J	nd (2)	nd (2)	nd (2)	nd (2)
Lead	15	15-Aug-08	7	15	6	$\boxed{16}$	5	nd (1)	1J	3	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)	nd (1)
Selenium	50	15-Aug-08	6	8	9	4J	8	6	3J	5	3J	13	7	4J	2J	10
Silver	100	15-Aug-08	nd (0.3)	nd (0.3)	nd (0.3)	nd (0.3)	0.9J	nd (0.3)	nd (0.3)	nd (0.3)	nd (0.3)	1.4	1.3	nd (0.3)	nd (0.3)	nd (0.3)

Legend:
(µg/L) = micrograms per liter.
ni = monitoring well not installed. ns = no sample collected. na = not analyzed for. J = estimated concentration.
nd = parameter not detected above method detection limit. Quantitation limit is provided in parentheses.

NOTES:
1. AGQS = Ambient Ground Water Quality Standards from NH Code of Administrative Rules Env-Or 600.
2. Measured concentrations that exceed the applicable ground water standard are surrounded by a box.
3. Samples for PAH and RCRA metals analyses were field-filtered using a 0.45um filter.

APPENDIX G

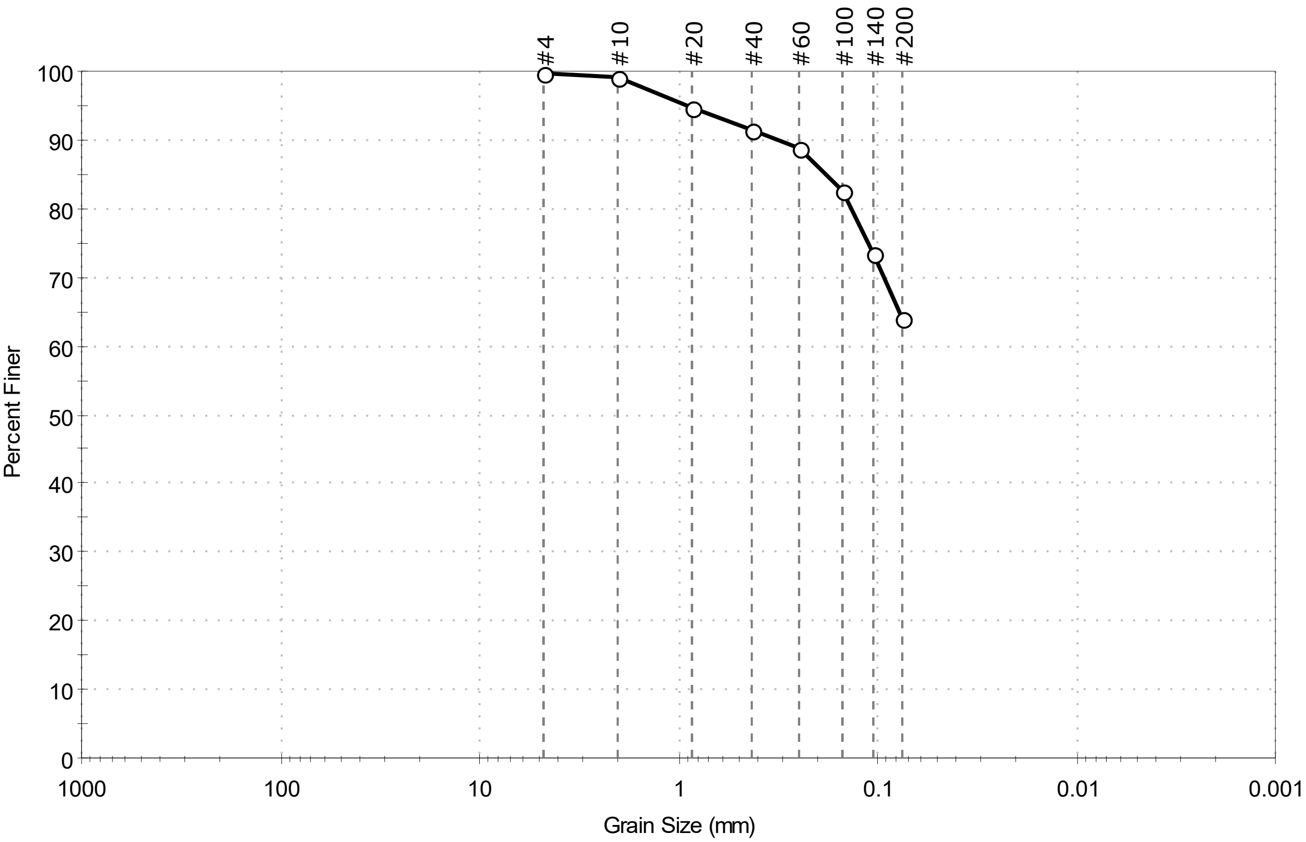
Grain Size Analysis

Client:	Con-Test Analytical Lab		
Project:	21I1172		
Location:		Project No:	GTX-314359
Boring ID: ---	Sample Type: bag	Tested By:	ckg
Sample ID: 21I1172-02	Test Date: 10/06/21	Checked By:	jdt
Depth : ---	Test Id: 632351		

Test Comment: ---
Visual Description: Wet, dark grayish brown sandy silt
Sample Comment: ---

SD-201

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.2	35.7	64.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	95		
#40	0.42	92		
#60	0.25	89		
#100	0.15	83		
#140	0.11	74		
#200	0.075	64		

Coefficients

D_{85} = 0.1826 mm
D_{30} = N/A
D_{60} = N/A
D_{15} = N/A
D_{50} = N/A
D_{10} = N/A
C_u = N/A
C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

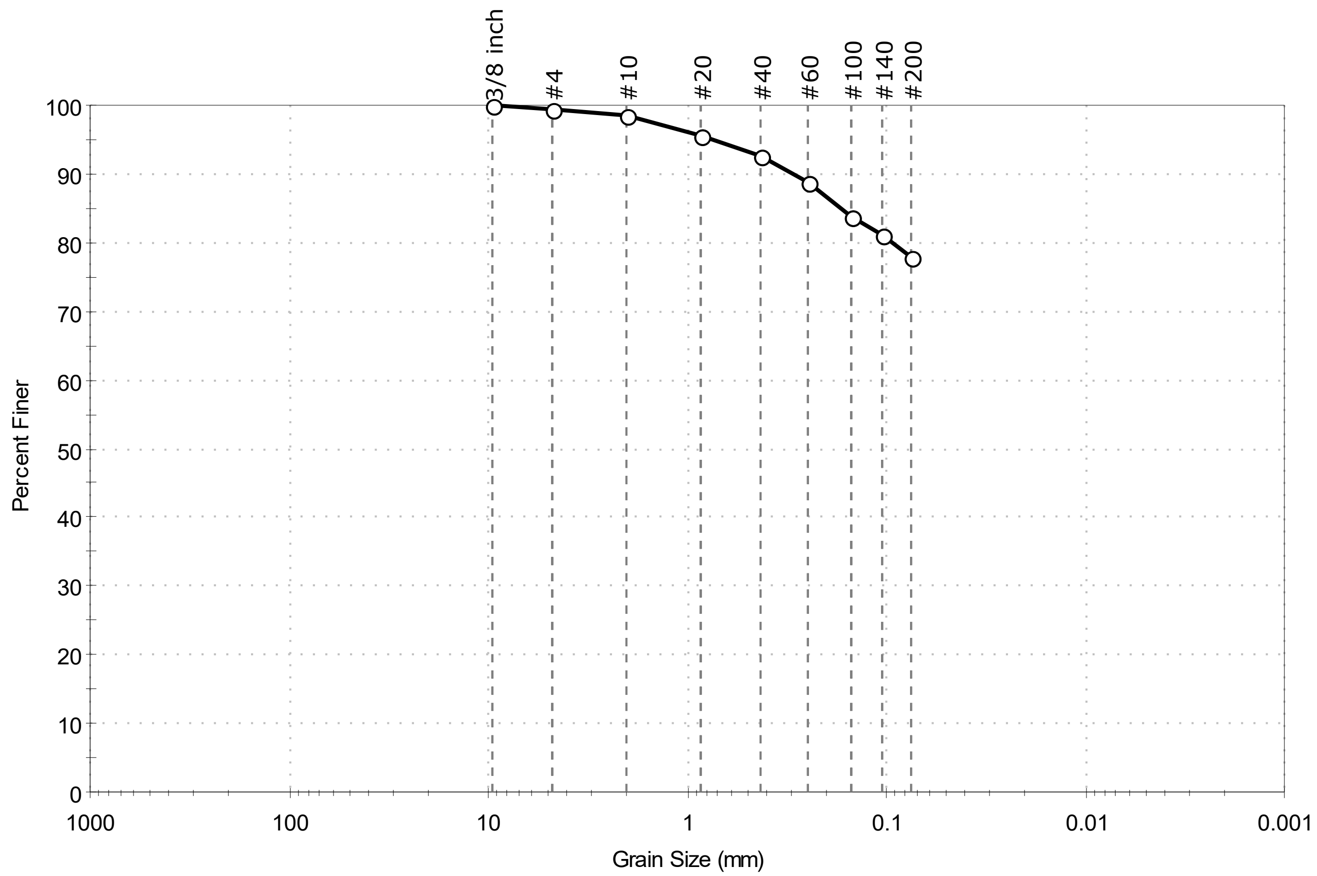
printed 10/7/2021 12:14:28 PM

Table of Contents

Client: Con-Test Analytical Lab
Project: 21I1172
Location:
Project No: GTX-314359
Boring ID: ---
Sample Type: bag
Tested By: ckg
Sample ID: 21I1172-03
Test Date: 10/06/21
Checked By: jdt
Depth : ---
Test Id: 632352
Test Comment: ---
Visual Description: Moist, very dark grayish brown clay with sand
Sample Comment: ---

SD-202

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.4	21.6	78.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	96		
#40	0.42	93		
#60	0.25	89		
#100	0.15	84		
#140	0.11	81		
#200	0.075	78		

Coefficients

D_{85} = 0.1684 mm	D_{30} = N/A
D_{60} = N/A	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

printed 10/7/2021 12:14:38 PM

Table of Contents

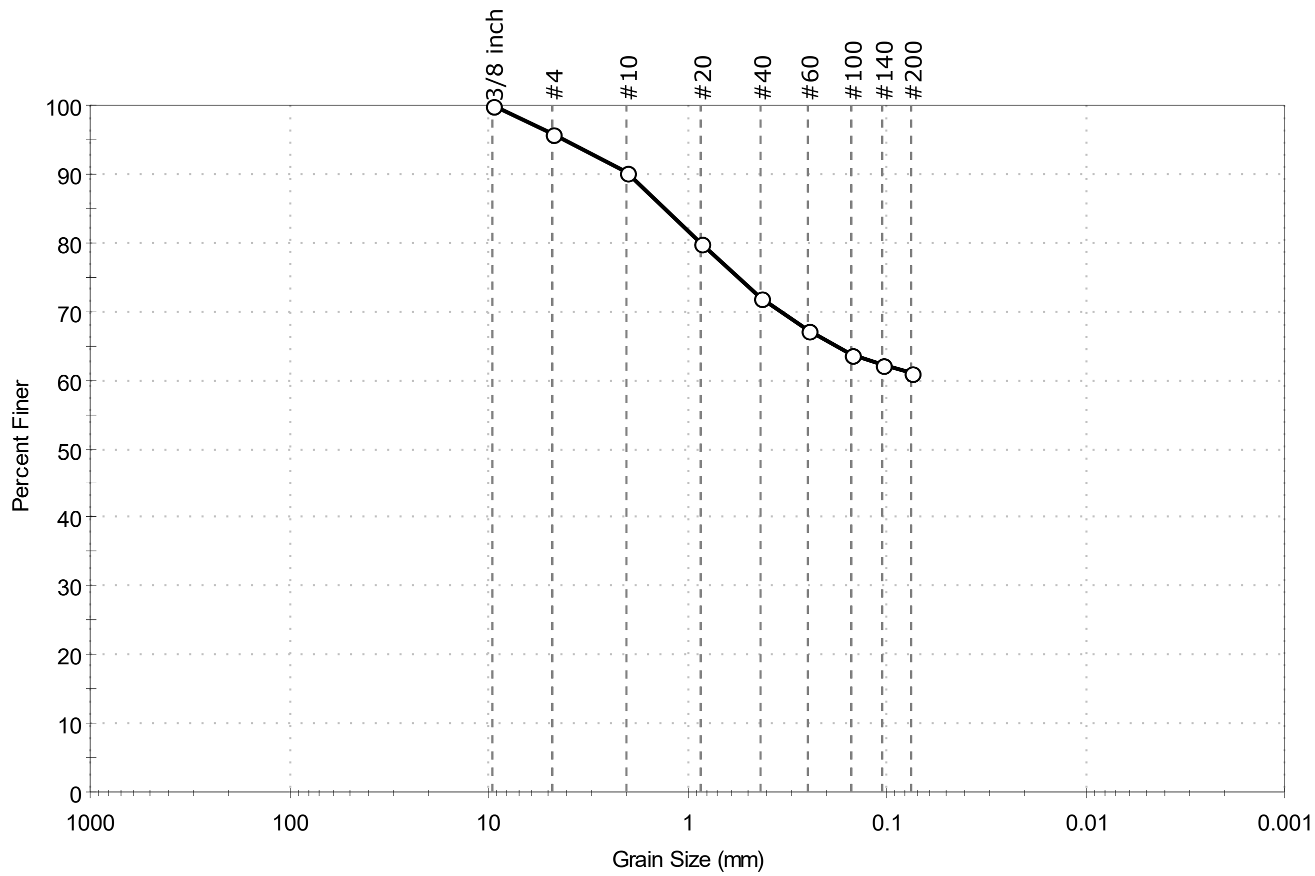
GeoTesting EXPRESS

Client:	Con-Test Analytical Lab				
Project:	21I1172				
Location:				Project No:	GTX-314359
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	21I1172-05	Test Date:	10/06/21	Checked By:	jdt
Depth :	---	Test Id:	632353		

Test Comment: ---
Visual Description: Moist, dark grayish brown sandy silt
Sample Comment: ---

SD-203

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.1	35.0	60.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	96		
#10	2.00	90		
#20	0.85	80		
#40	0.42	72		
#60	0.25	67		
#100	0.15	64		
#140	0.11	62		
#200	0.075	61		

Coefficients

D_{85} =1.2911 mm	D_{30} =N/A
D_{60} =N/A	D_{15} =N/A
D_{50} =N/A	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

printed 10/7/2021 12:14:58 PM

Table of Contents

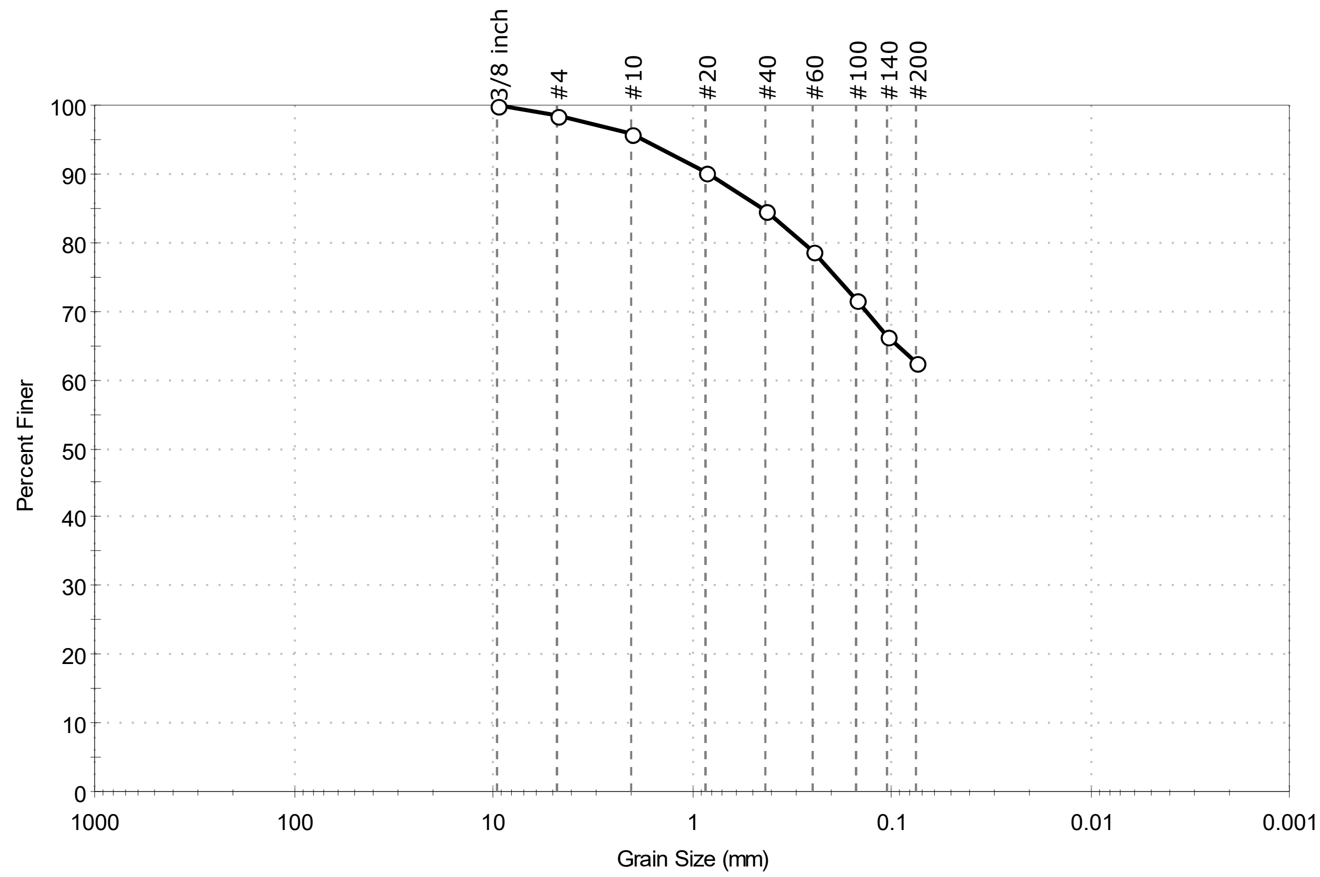
Client: Con-Test Analytical Lab
Project: 21I1172
Location:
Project No: GTX-314359

Boring ID: ---
Sample Type: bag
Tested By: ckg
Sample ID: 21I1172-06
Test Date: 10/06/21
Checked By: jdt
Depth : ---
Test Id: 632354

Test Comment: ---
Visual Description: Moist, dark grayish brown sandy silt
Sample Comment: ---

SD-204

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.4	36.0	62.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	99		
#10	2.00	96		
#20	0.85	90		
#40	0.42	85		
#60	0.25	79		
#100	0.15	72		
#140	0.11	66		
#200	0.075	63		

Coefficients

D_{85} =0.4419 mm
D_{30} =N/A
D_{60} =N/A
D_{15} =N/A
D_{50} =N/A
D_{10} =N/A
C_u =N/A
C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Con-Test Analytical Lab		
Project:	21I1172		
Location:		Project No:	GTX-314359
Boring ID: ---	Sample Type: bag	Tested By:	ckg
Sample ID: 21I1172-07	Test Date: 10/06/21	Checked By:	jdt
Depth : ---	Test Id: 632355		

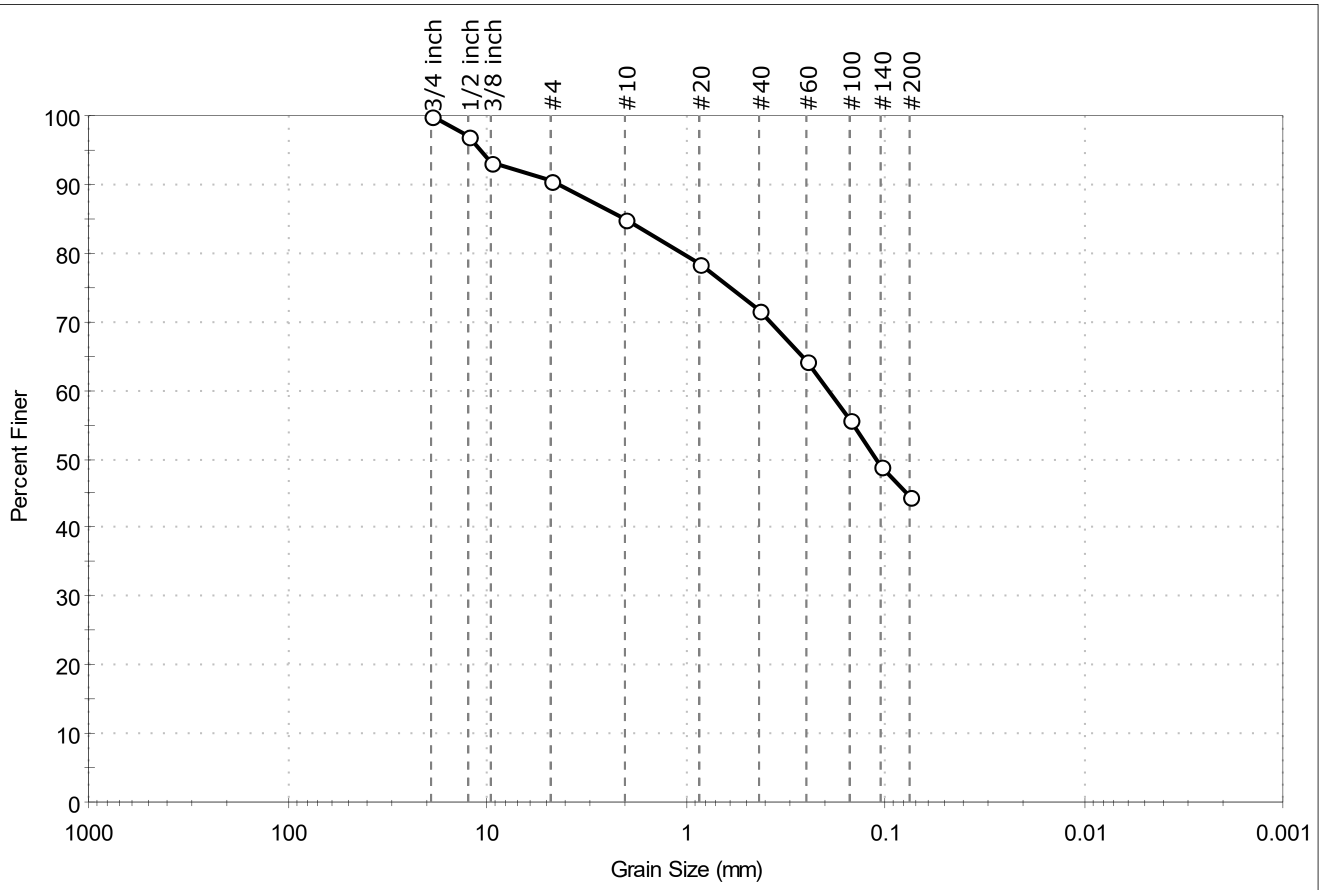
Test Comment: ---

Visual Description: Moist, dark grayish brown silty sand

Sample Comment: ---

SD-205

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	9.5	45.8	44.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/4 inch	19.00	100		
1/2 inch	12.50	97		
3/8 inch	9.50	93		
#4	4.75	90		
#10	2.00	85		
#20	0.85	78		
#40	0.42	72		
#60	0.25	64		
#100	0.15	56		
#140	0.11	49		
#200	0.075	45		

Coefficients

D_{85} =1.9970 mm

D_{30} =N/A

D_{60} =0.1926 mm

D_{15} =N/A

D_{50} =0.1117 mm

D_{10} =N/A

C_u =N/A

C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

printed 10/7/2021 12:15:37 PM

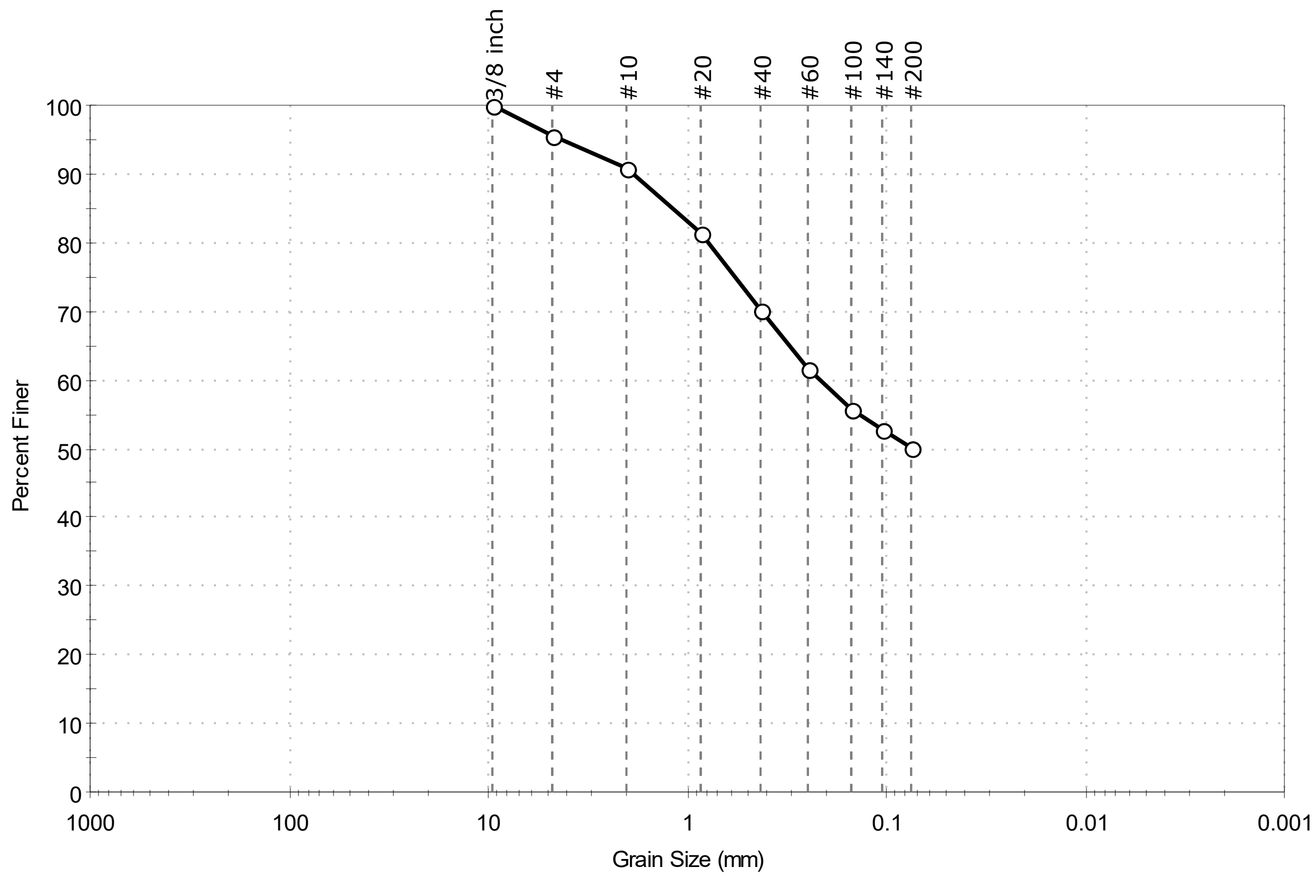
Table of Contents

Client:	Con-Test Analytical Lab				
Project:	21I1172				
Location:				Project No:	GTX-314359
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	21I1172-08	Test Date:	10/06/21	Checked By:	jdt
Depth :	---	Test Id:	632356		

Test Comment: ---
Visual Description: Moist, very dark grayish brown sandy silt
Sample Comment: ---

SD-206

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.3	45.5	50.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	96		
#10	2.00	91		
#20	0.85	81		
#40	0.42	70		
#60	0.25	62		
#100	0.15	56		
#140	0.11	53		
#200	0.075	50		

Coefficients

D_{85} =1.1825 mm
D_{30} =N/A
D_{60} =0.2157 mm
D_{15} =N/A
D_{50} =N/A
D_{10} =N/A
C_u =N/A
C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Con-Test Analytical Lab				
Project:	21I1172				
Location:				Project No:	GTX-314359
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	21I1172-09	Test Date:	10/06/21	Checked By:	jdt
Depth :	---	Test Id:	632357		

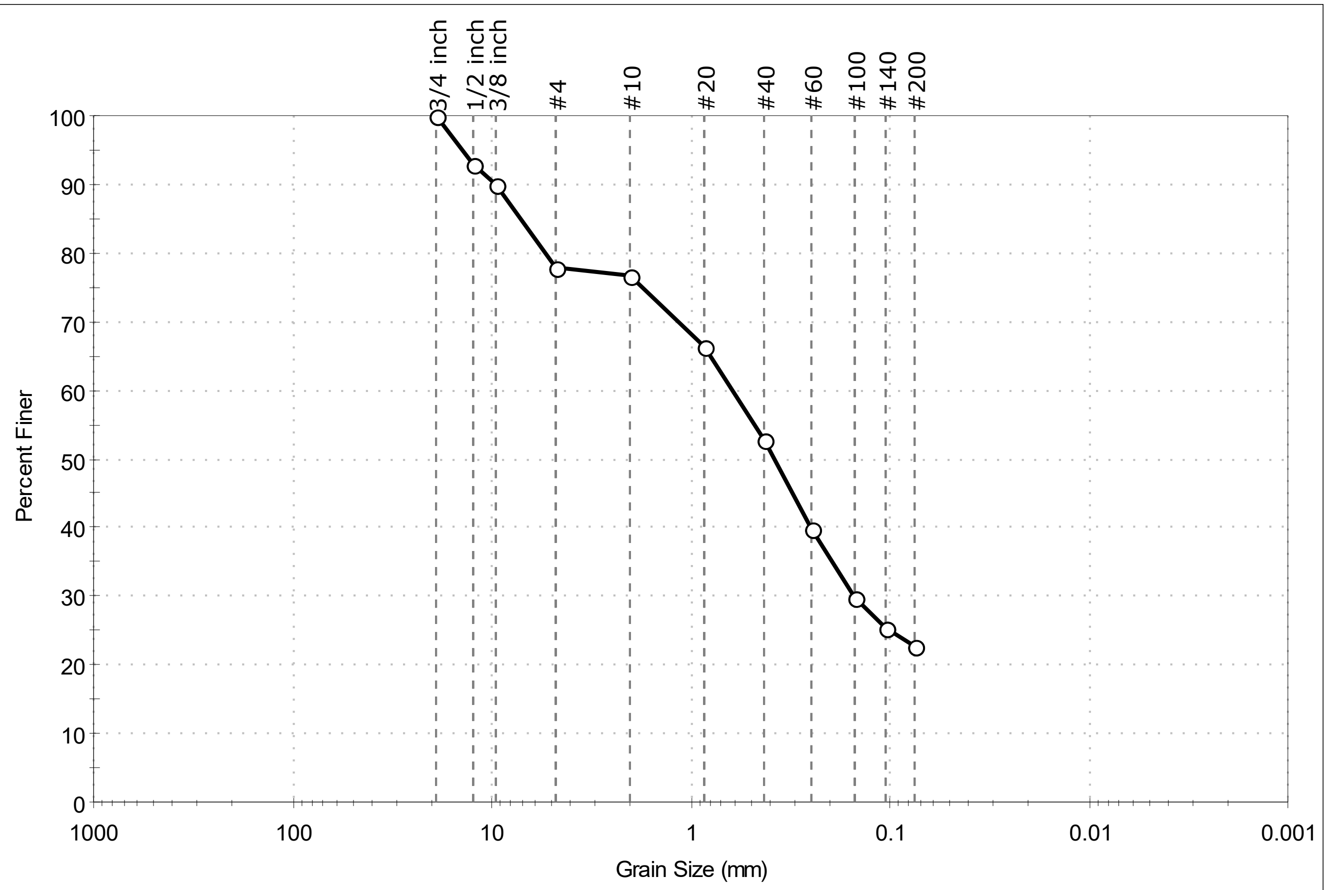
Test Comment: ---

Visual Description: Moist, very dark grayish brown silty sand with gravel

Sample Comment: ---

SD-207

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	22.1	55.1	22.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/4 inch	19.00	100		
1/2 inch	12.50	93		
3/8 inch	9.50	90		
#4	4.75	78		
#10	2.00	77		
#20	0.85	66		
#40	0.42	53		
#60	0.25	40		
#100	0.15	30		
#140	0.11	25		
#200	0.075	23		

Coefficients

D_{85} =7.1712 mm

D_{30} =0.1507 mm

D_{60} =0.6132 mm

D_{15} =N/A

D_{50} =0.3789 mm

D_{10} =N/A

C_u =N/A

C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

printed 10/7/2021 12:15:44 PM

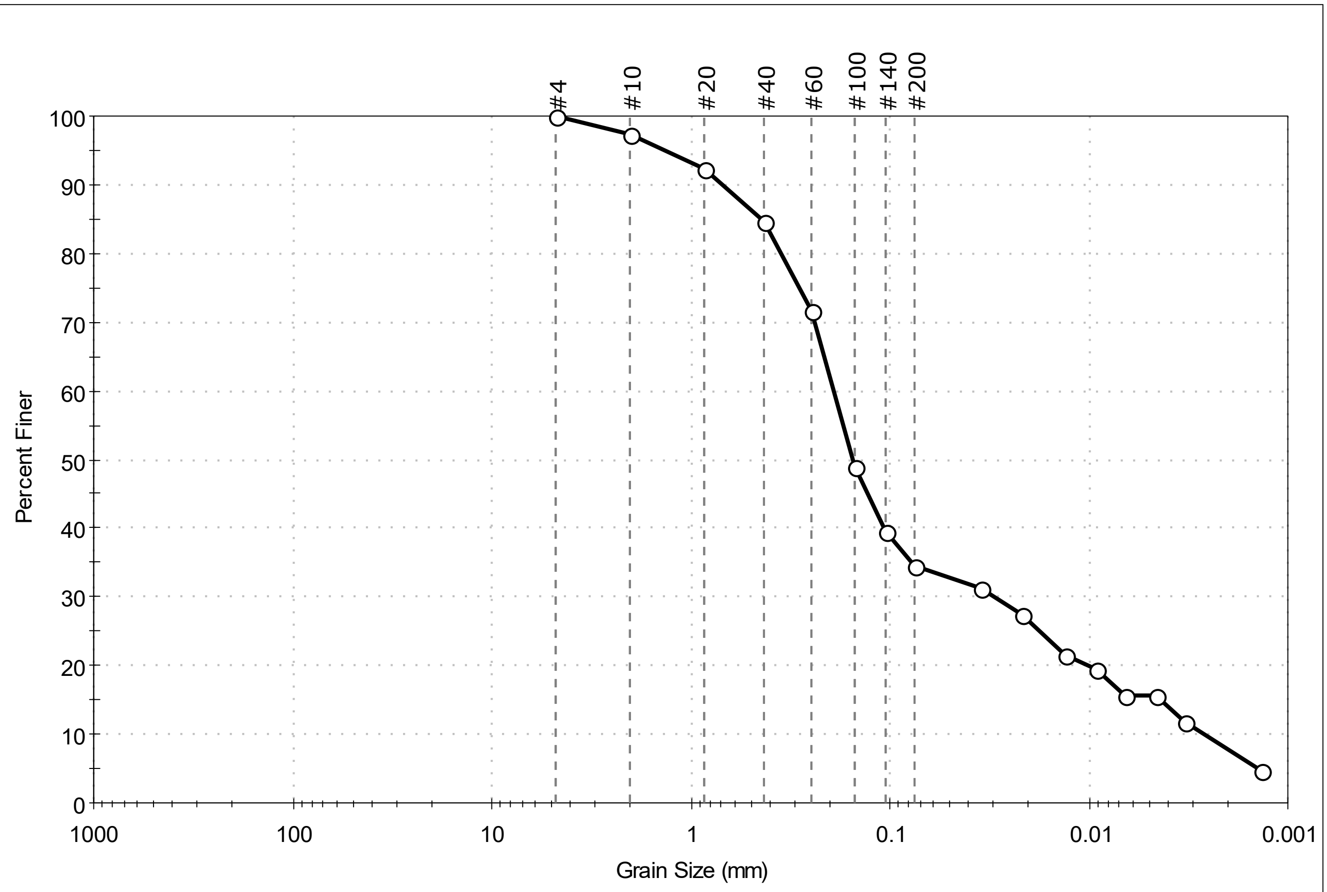
GeoTesting EXPRESS

Client:	Con-Test Analytical Lab				
Project:	21I1325				
Location:				Project No:	GTX-314368
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	2111325-01	Test Date:	10/12/21	Checked By:	bfs
Depth :	---	Test Id:	632382		

Test Comment: ---
Visual Description: Wet, very dark brown clayey sand
Sample Comment: Sample contains organics

SD-208

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	65.5	34.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	97		
#20	0.85	92		
#40	0.42	85		
#60	0.25	72		
#100	0.15	49		
#140	0.11	39		
#200	0.075	35		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0346	31		
---	0.0219	27		
---	0.0130	22		
---	0.0092	20		
---	0.0066	16		
---	0.0046	16		
---	0.0033	12		
---	0.0013	5		

Coefficients

D_{85} =0.4337 mm	D_{30} =0.0297 mm
D_{60} =0.1924 mm	D_{15} =0.0044 mm
D_{50} =0.1536 mm	D_{10} =0.0026 mm
C_u =74.000	C_c =1.763

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

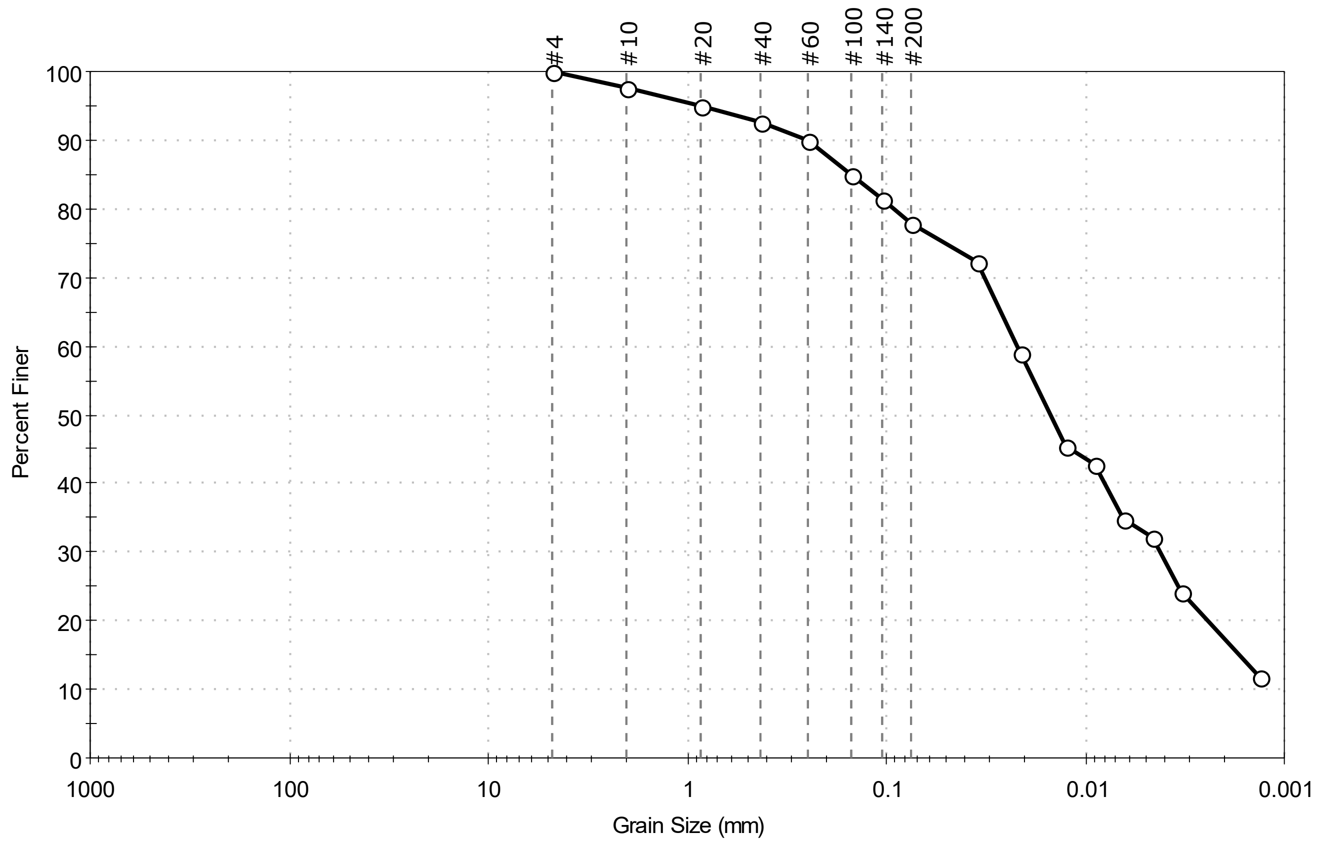
printed 10/12/2021 10:29:21 AM

GeoTesting EXPRESS

Client: Con-Test Analytical Lab
Project: 21I1325
Location:
Project No: GTX-314368
Boring ID: ---
Sample Type: bag
Tested By: ckg
Sample ID: 2111325-02
Test Date: 10/10/21
Checked By: bfs
Depth : ---
Test Id: 632383
Test Comment: ---
Visual Description: Wet, very dark brown clay with sand
Sample Comment: Sample contains organics

SD-209

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	22.0	78.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	98		
#20	0.85	95		
#40	0.42	93		
#60	0.25	90		
#100	0.15	85		
#140	0.11	81		
#200	0.075	78		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0353	72		
---	0.0212	59		
---	0.0127	46		
---	0.0091	43		
---	0.0065	35		
---	0.0046	32		
---	0.0033	24		
---	0.0013	12		

Coefficients

D_{85} =0.1515 mm
D_{30} =0.0042 mm
D_{60} =0.0220 mm
D_{15} =0.0017 mm
D_{50} =0.0150 mm
D_{10} =N/A
C_u =N/A
C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

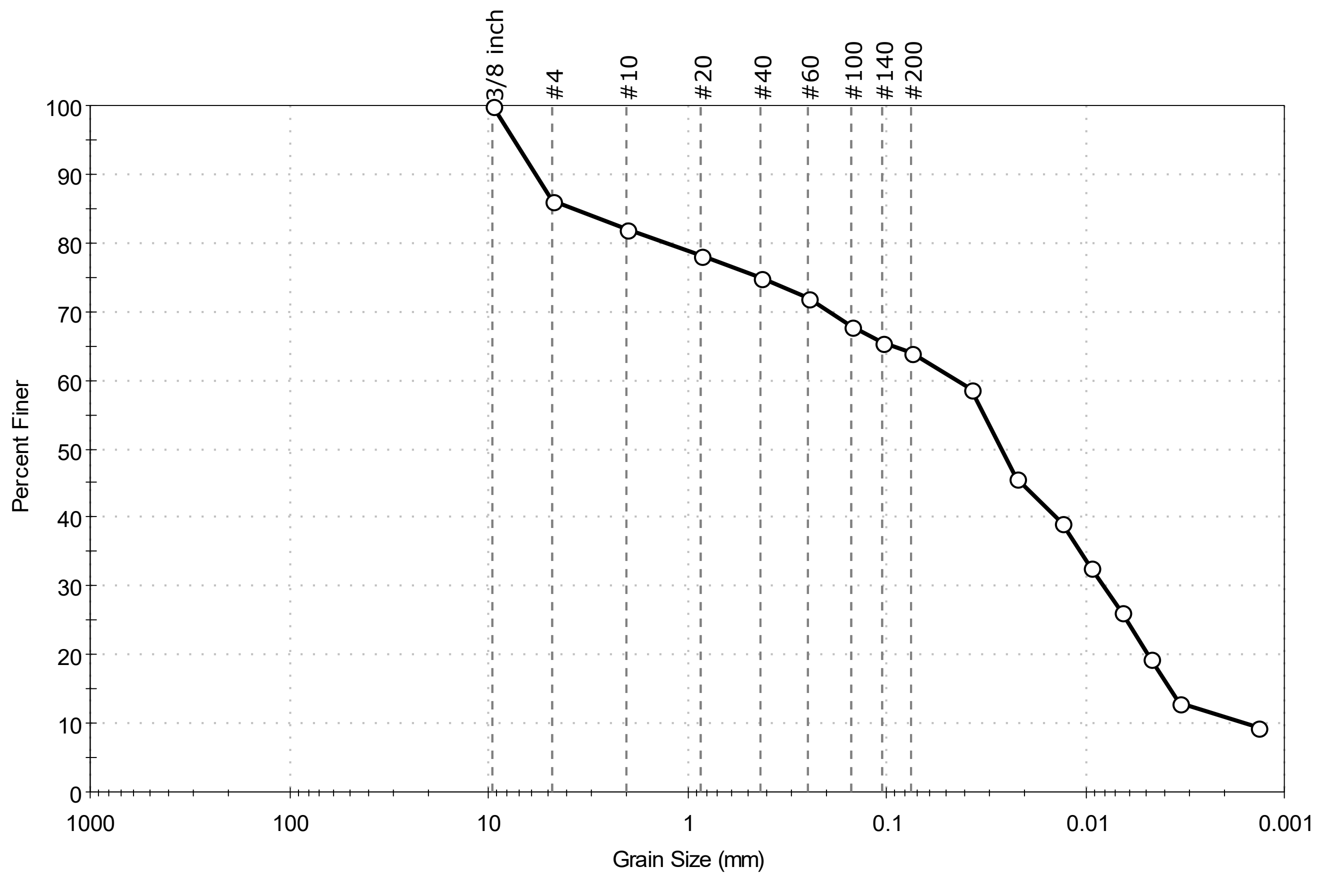
Table of Contents

Client:	Con-Test Analytical Lab				
Project:	21I1325				
Location:				Project No:	GTX-314368
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	2111325-03	Test Date:	10/10/21	Checked By:	bfs
Depth :	---	Test Id:	632384		

Test Comment: ---
Visual Description: Wet, very dark brown sandy clay
Sample Comment: Sample contains organics

SD-210

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	13.8	22.2	64.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	86		
#10	2.00	82		
#20	0.85	78		
#40	0.42	75		
#60	0.25	72		
#100	0.15	68		
#140	0.11	66		
#200	0.075	64		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0372	59		
---	0.0221	46		
---	0.0132	39		
---	0.0093	33		
---	0.0066	26		
---	0.0047	20		
---	0.0033	13		
---	0.0014	9		

Coefficients

D_{85} =3.7092 mm	D_{30} =0.0081 mm
D_{60} =0.0436 mm	D_{15} =0.0037 mm
D_{50} =0.0262 mm	D_{10} =0.0016 mm
C_u =27.250	C_c =0.941

Classification

ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

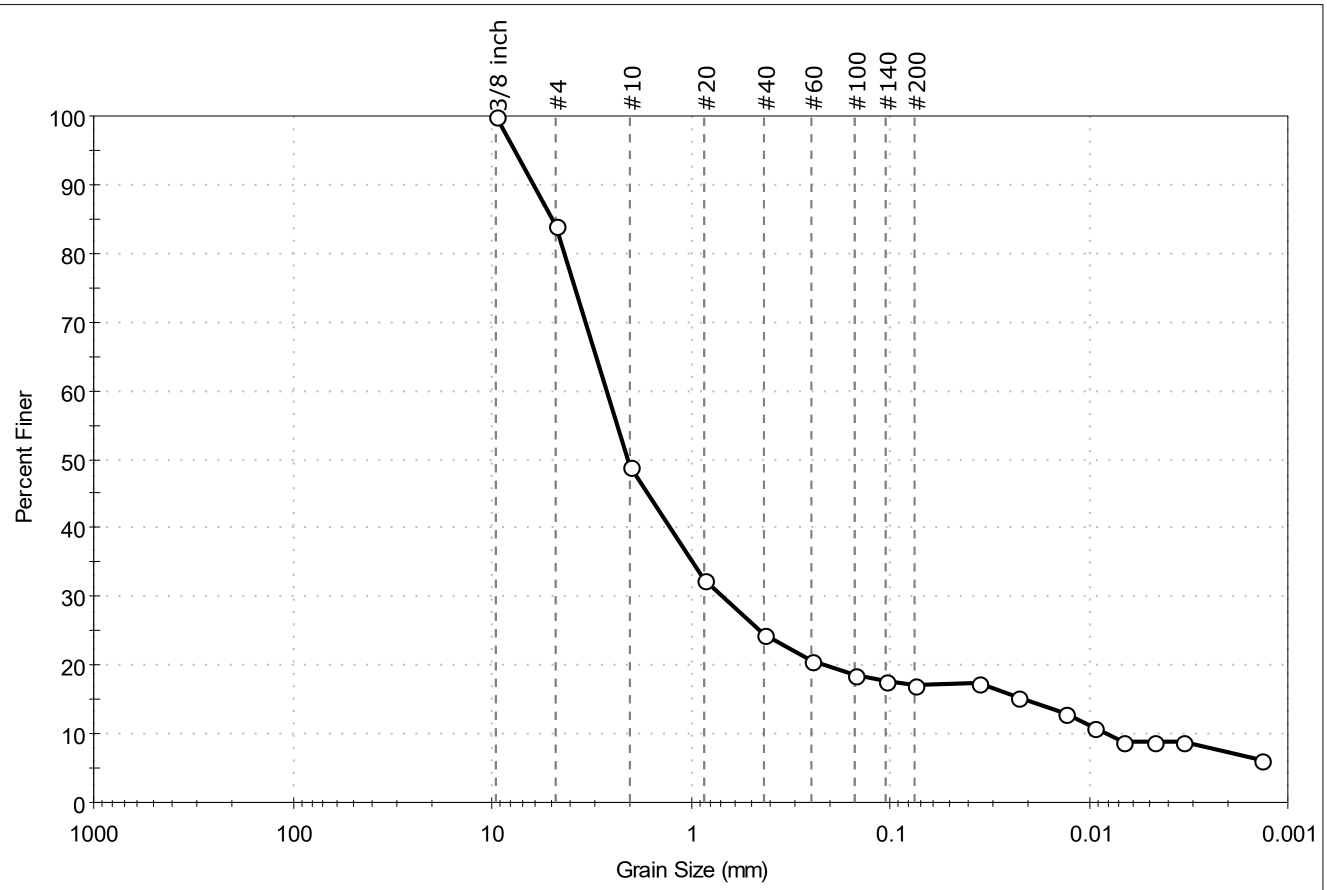
Table of Contents

Client:	Con-Test Analytical Lab		
Project:	21I1325		
Location:		Project No:	GTX-314368
Boring ID: ---	Sample Type: bag	Tested By:	ckg
Sample ID: 2111325-04	Test Date: 10/12/21	Checked By:	bfs
Depth : ---	Test Id: 632385		

Test Comment: ---
Visual Description: Wet, very dark brown silty, clayey sand with gravel
Sample Comment: Sample contains organics

SD-211

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	15.9	67.0	17.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	84		
#10	2.00	49		
#20	0.85	32		
#40	0.42	25		
#60	0.25	21		
#100	0.15	19		
#140	0.11	18		
#200	0.075	17		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0357	17		
---	0.0230	15		
---	0.0132	13		
---	0.0094	11		
---	0.0067	9		
---	0.0047	9		
---	0.0033	9		
---	0.0014	6		

Coefficients

D_{85} =4.9295 mm
D_{30} =0.6837 mm
D_{60} =2.6230 mm
D_{15} =0.0214 mm
D_{50} =2.0513 mm
D_{10} =0.0082 mm
C_u =319.878
C_c =21.733

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

Table of Contents

GeoTesting EXPRESS

Client:	Con-Test Analytical Lab		
Project:	21I1325		
Location:		Project No:	GTX-314368
Boring ID: ---	Sample Type: bag	Tested By:	ckg
Sample ID: 2111325-05	Test Date: 10/10/21	Checked By:	bfs
Depth : ---	Test Id: 632386		

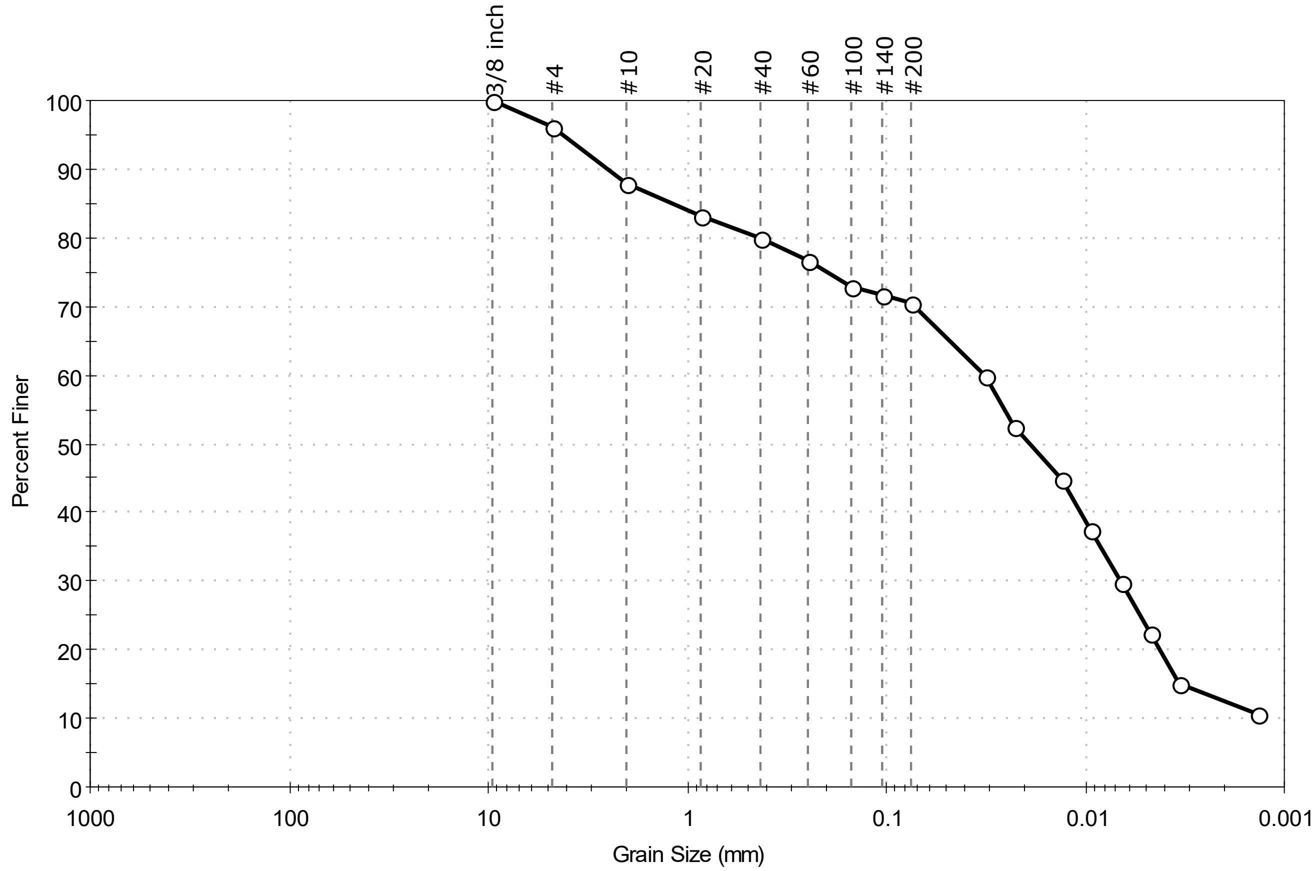
Test Comment: ---

Visual Description: Wet, very dark brown clay with sand

Sample Comment: Sample contains organics

SD-212

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	3.9	25.5	70.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	96		
#10	2.00	88		
#20	0.85	83		
#40	0.42	80		
#60	0.25	77		
#100	0.15	73		
#140	0.11	72		
#200	0.075	71		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0316	60		
---	0.0230	52		
---	0.0131	45		
---	0.0094	37		
---	0.0067	30		
---	0.0047	22		
---	0.0033	15		
---	0.0014	11		

Coefficients

D_{85} =1.1675 mm	D_{30} =0.0067 mm
D_{60} =0.0320 mm	D_{15} =0.0033 mm
D_{50} =0.0193 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

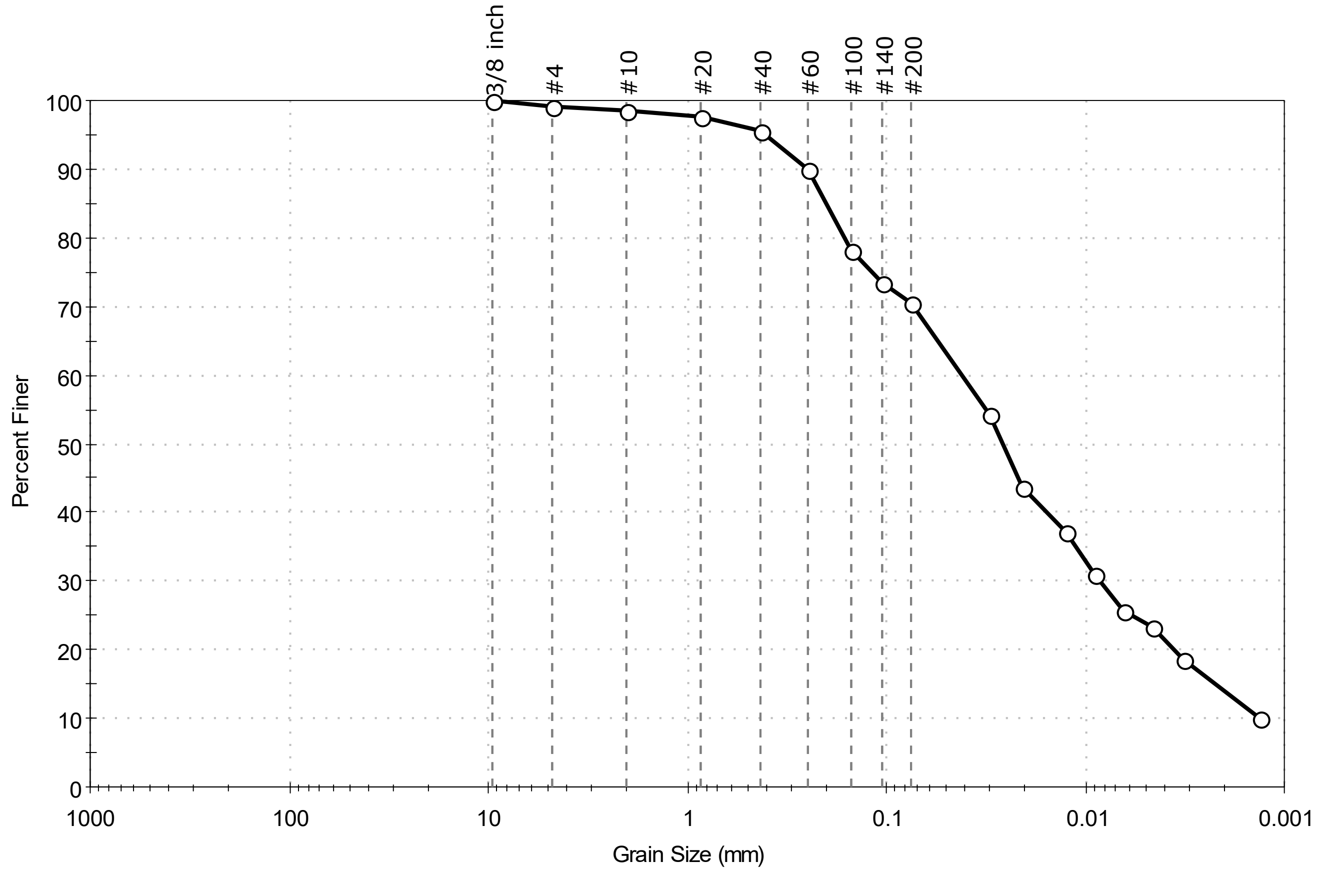
GeoTesting EXPRESS

Client:	Con-Test Analytical Lab				
Project:	21I1325				
Location:				Project No:	GTX-314368
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	2111325-06	Test Date:	10/10/21	Checked By:	bfs
Depth :	---	Test Id:	632387		

Test Comment: ---
Visual Description: Moist, very dark brown clay with sand
Sample Comment: Sample contains organics

SD-213

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.8	28.7	70.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	99		
#10	2.00	99		
#20	0.85	98		
#40	0.42	96		
#60	0.25	90		
#100	0.15	78		
#140	0.11	74		
#200	0.075	71		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0302	54		
---	0.0207	44		
---	0.0126	37		
---	0.0090	31		
---	0.0064	26		
---	0.0046	23		
---	0.0033	19		
---	0.0013	10		

Coefficients

D_{85} =0.2017 mm	D_{30} =0.0084 mm
D_{60} =0.0414 mm	D_{15} =0.0022 mm
D_{50} =0.0260 mm	D_{10} =0.0013 mm
C_u =31.846	C_c =1.311

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

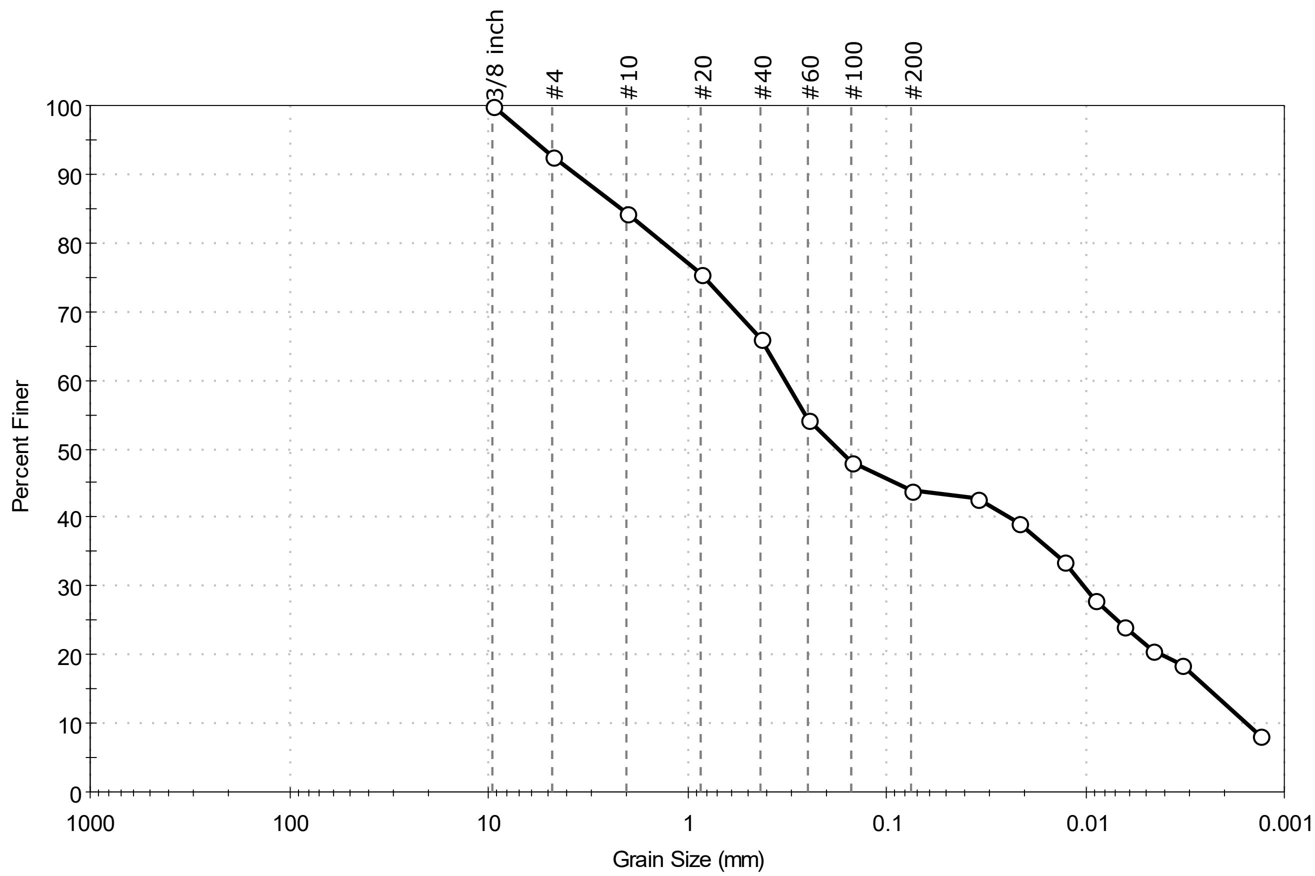
printed 10/12/2021 10:29:40 AM

Client:	Con-Test Analytical Lab				
Project:	21I1325				
Location:				Project No:	GTX-314368
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	2111325-07	Test Date:	10/12/21	Checked By:	bfs
Depth :	---	Test Id:	632388		

Test Comment: ---
Visual Description: Moist, black clayey sand
Sample Comment: Sample contains organics

SD-214

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	7.5	48.5	44.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	93		
#10	2.00	84		
#20	0.85	76		
#40	0.42	66		
#60	0.25	54		
#100	0.15	48		
#200	0.075	44		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0354	43		
---	0.0218	39		
---	0.0127	34		
---	0.0091	28		
---	0.0065	24		
---	0.0046	21		
---	0.0033	19		
---	0.0013	8		

Coefficients

D_{85} =2.1198 mm
D_{30} =0.0102 mm
D_{60} =0.3227 mm
D_{15} =0.0024 mm
D_{50} =0.1761 mm
D_{10} =0.0016 mm
C_u =201.687
C_c =0.202

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

Table of Contents

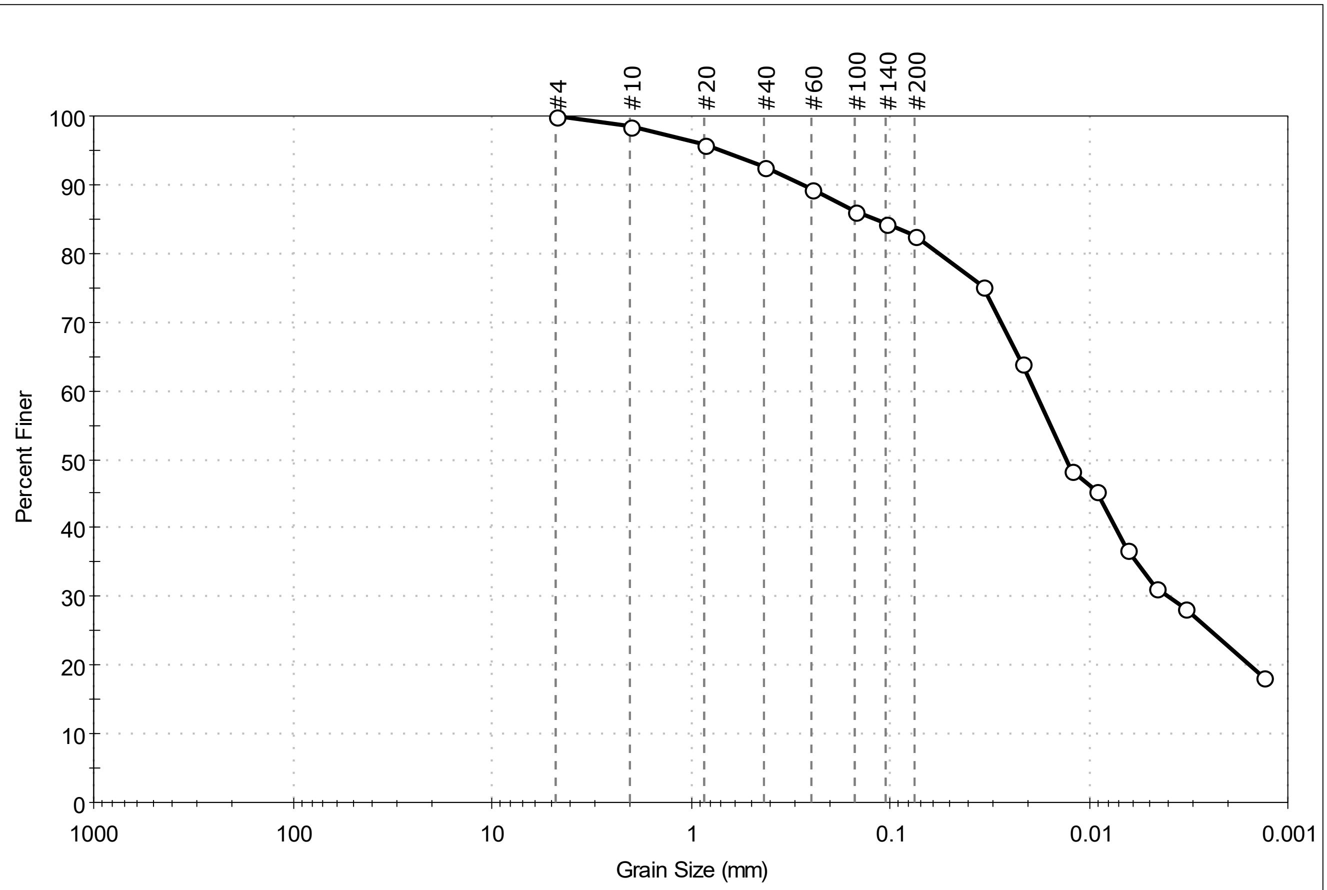
GeoTesting EXPRESS

Client:	Con-Test Analytical Lab				
Project:	21I1325				
Location:				Project No:	GTX-314368
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	2111325-08	Test Date:	10/10/21	Checked By:	bfs
Depth :	---	Test Id:	632389		

Test Comment: ---
Visual Description: Moist, very dark brown clay with sand
Sample Comment: Sample contains organics

SD-215

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	0.0	17.4	82.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	96		
#40	0.42	93		
#60	0.25	89		
#100	0.15	86		
#140	0.11	84		
#200	0.075	83		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0341	75		
---	0.0215	64		
---	0.0122	48		
---	0.0091	45		
---	0.0065	37		
---	0.0046	31		
---	0.0033	28		
---	0.0013	18		

Coefficients

D_{85} =0.1197 mm	D_{30} =0.0040 mm
D_{60} =0.0186 mm	D_{15} =N/A
D_{50} =0.0129 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

Client:	Con-Test Analytical Lab		
Project:	21I1325		
Location:		Project No:	GTX-314368
Boring ID: ---	Sample Type: bag	Tested By:	ckg
Sample ID: 2111325-09	Test Date: 10/10/21	Checked By:	bfs
Depth : ---	Test Id: 632390		

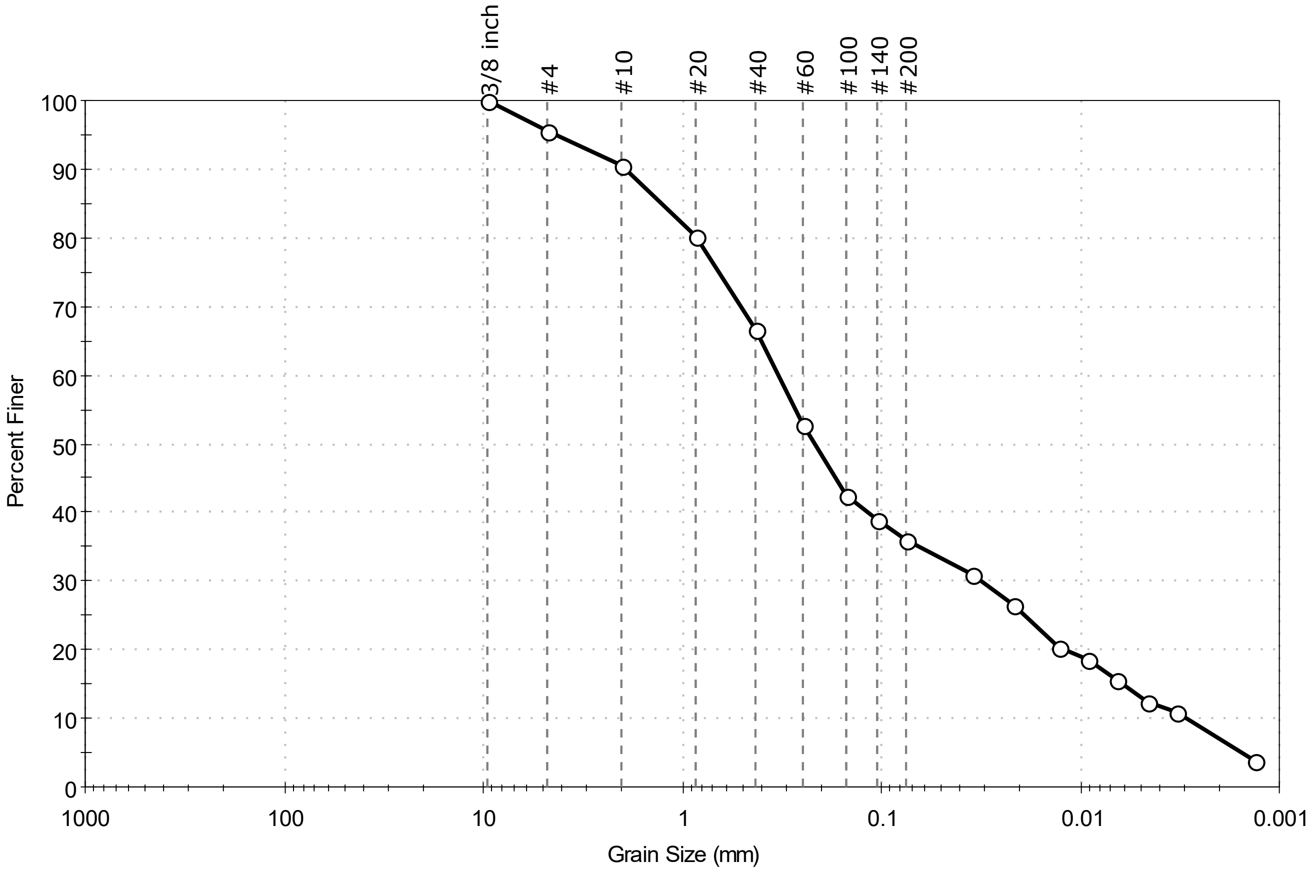
Test Comment: ---

Visual Description: Moist, very dark brown clayey sand

Sample Comment: Sample contains organics

SD-217

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.4	59.5	36.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/8 inch	9.50	100		
#4	4.75	96		
#10	2.00	90		
#20	0.85	80		
#40	0.42	67		
#60	0.25	53		
#100	0.15	43		
#140	0.11	39		
#200	0.075	36		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0353	31		
---	0.0217	26		
---	0.0130	20		
---	0.0092	19		
---	0.0065	16		
---	0.0046	12		
---	0.0033	11		
---	0.0013	4		

Coefficients

D_{85} =1.2681 mm	D_{30} =0.0315 mm
D_{60} =0.3292 mm	D_{15} =0.0062 mm
D_{50} =0.2168 mm	D_{10} =0.0030 mm
C_u =109.733	C_c =1.005

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

printed 10/12/2021 10:29:49 AM

Table of Contents

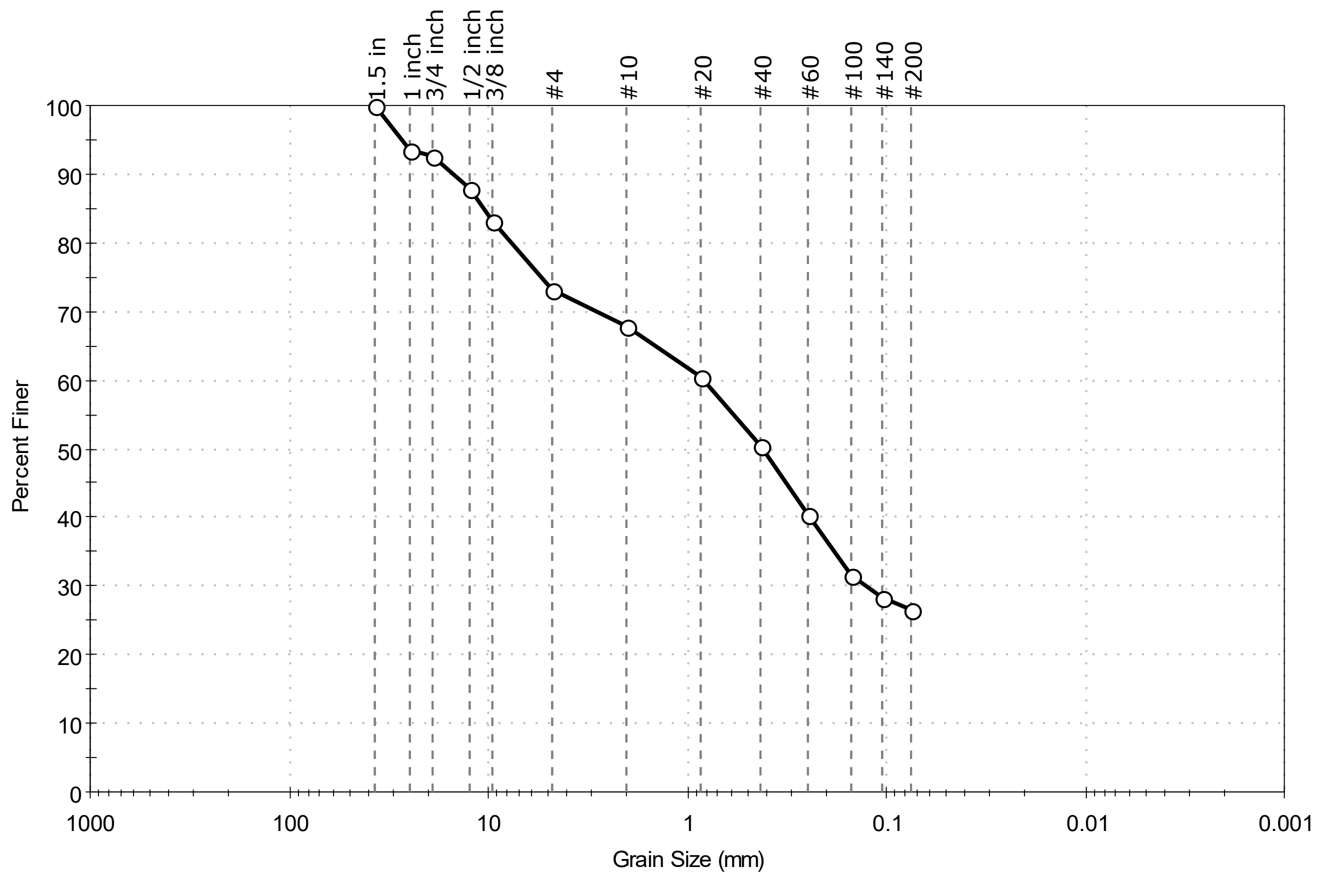
GeoTesting EXPRESS

Client:	Con-Test Analytical Lab		
Project:	21J0069		
Location:		Project No:	GTX-314374
Boring ID: ---	Sample Type: jar	Tested By:	ckg
Sample ID: 21J0069-04	Test Date: 10/13/21	Checked By:	bfs
Depth : ---	Test Id: 632779		

Test Comment: ---
Visual Description: Moist, very dark gray silty sand with gravel
Sample Comment: ---

SD-218

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	26.8	46.7	26.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 inch	25.00	94		
3/4 inch	19.00	93		
1/2 inch	12.50	88		
3/8 inch	9.50	83		
#4	4.75	73		
#10	2.00	68		
#20	0.85	60		
#40	0.42	50		
#60	0.25	40		
#100	0.15	31		
#140	0.11	28		
#200	0.075	27		

Coefficients

D_{85} =10.6030 mm	D_{30} =0.1282 mm
D_{60} =0.8288 mm	D_{15} =N/A
D_{50} =0.4163 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

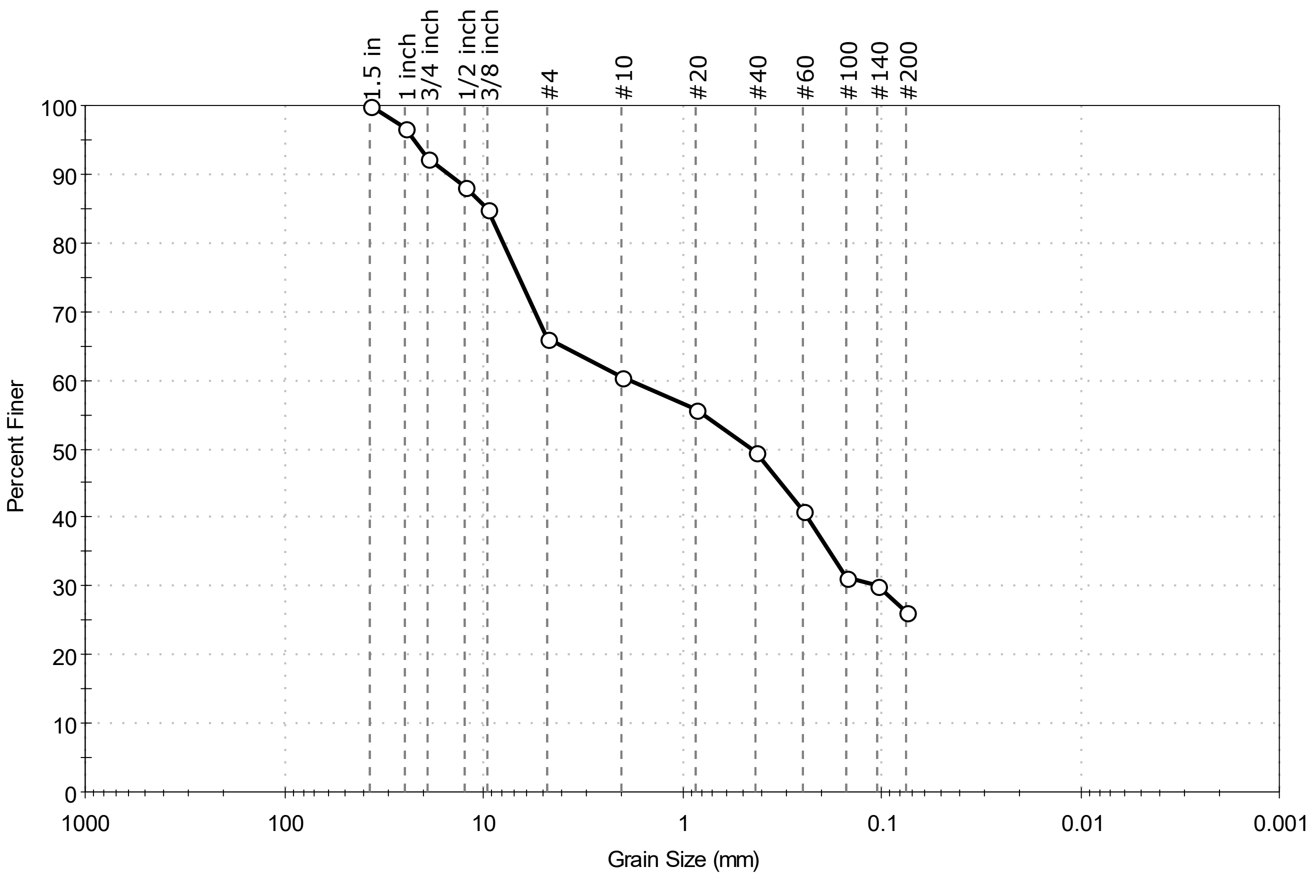
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client: Con-Test Analytical Lab
Project: 21J0069
Location:
Project No: GTX-314374
Boring ID: ---
Sample Type: jar
Tested By: ckg
Sample ID: 21J0069-05
Test Date: 10/13/21
Checked By: bfs
Depth : ---
Test Id: 632780
Test Comment: ---
Visual Description: Moist, very dark gray silty sand with gravel
SD-219
Sample Comment: ---

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	34.1	39.7	26.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 inch	25.00	97		
3/4 inch	19.00	92		
1/2 inch	12.50	88		
3/8 inch	9.50	85		
#4	4.75	66		
#10	2.00	61		
#20	0.85	56		
#40	0.42	50		
#60	0.25	41		
#100	0.15	31		
#140	0.11	30		
#200	0.075	26		

Coefficients

D_{85} =9.4751 mm
D_{30} =0.1068 mm
D_{60} =1.8296 mm
D_{15} =N/A
D_{50} =0.4476 mm
D_{10} =N/A
C_u =N/A
C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Con-Test Analytical Lab				
Project:	21J0069				
Location:				Project No:	GTX-314374
Boring ID:	---	Sample Type:	jar	Tested By:	ckg
Sample ID:	21J0069-06	Test Date:	10/13/21	Checked By:	bfs
Depth :	---	Test Id:	632781		

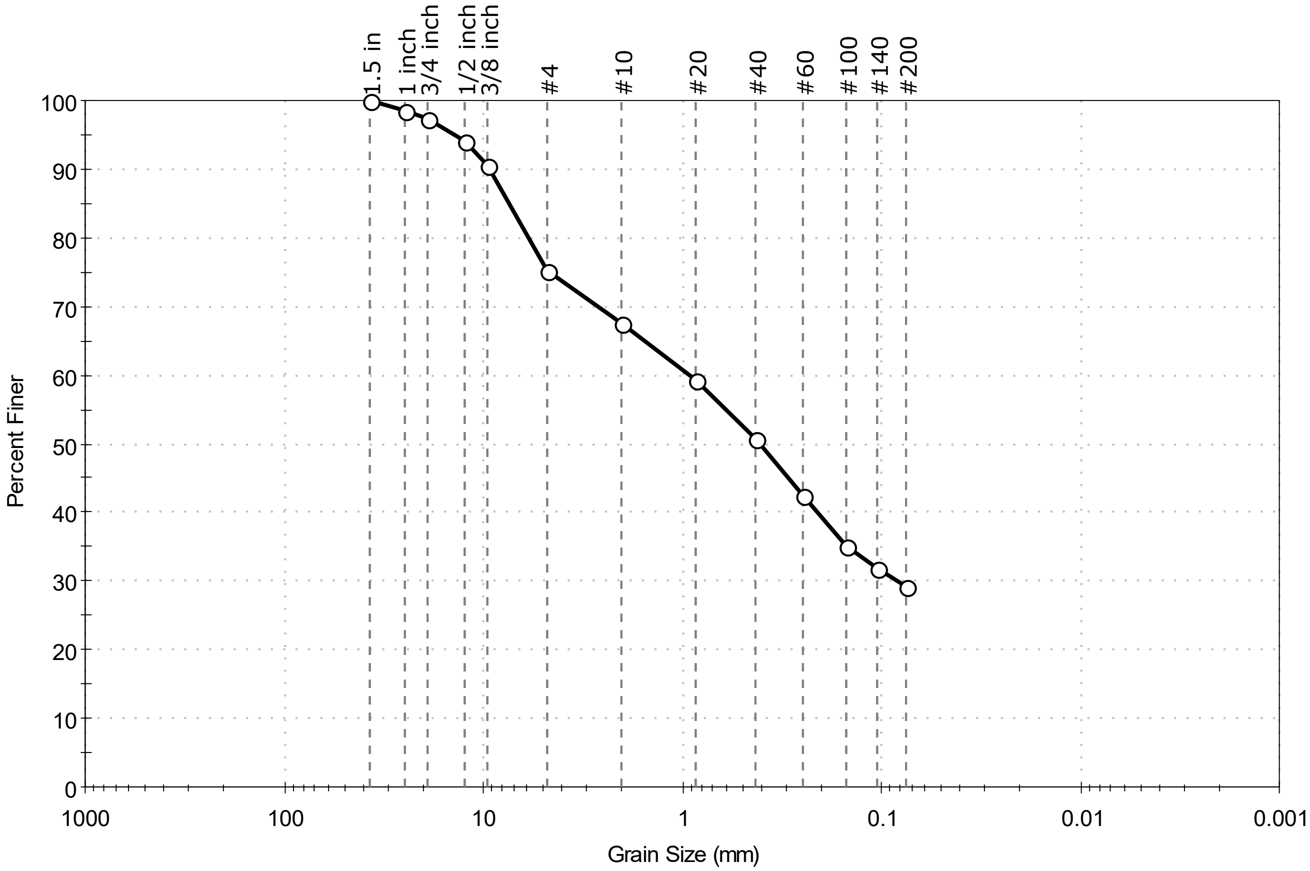
Test Comment: ---

Visual Description: Moist, very dark gray silty sand with gravel

Sample Comment: ---

SD-220

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	24.8	46.0	29.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 inch	25.00	99		
3/4 inch	19.00	97		
1/2 inch	12.50	94		
3/8 inch	9.50	91		
#4	4.75	75		
#10	2.00	68		
#20	0.85	59		
#40	0.42	51		
#60	0.25	43		
#100	0.15	35		
#140	0.11	32		
#200	0.075	29		

Coefficients

D_{85} =7.3761 mm	D_{30} =0.0832 mm
D_{60} =0.9033 mm	D_{15} =N/A
D_{50} =0.4022 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

printed 10/13/2021 3:03:23 PM

Table of Contents

GeoTesting EXPRESS

Client:	Con-Test Analytical Lab				
Project:	21J0069				
Location:				Project No:	GTX-314374
Boring ID:	---	Sample Type:	jar	Tested By:	ckg
Sample ID:	21J0069-07	Test Date:	10/13/21	Checked By:	bfs
Depth :	---	Test Id:	632782		

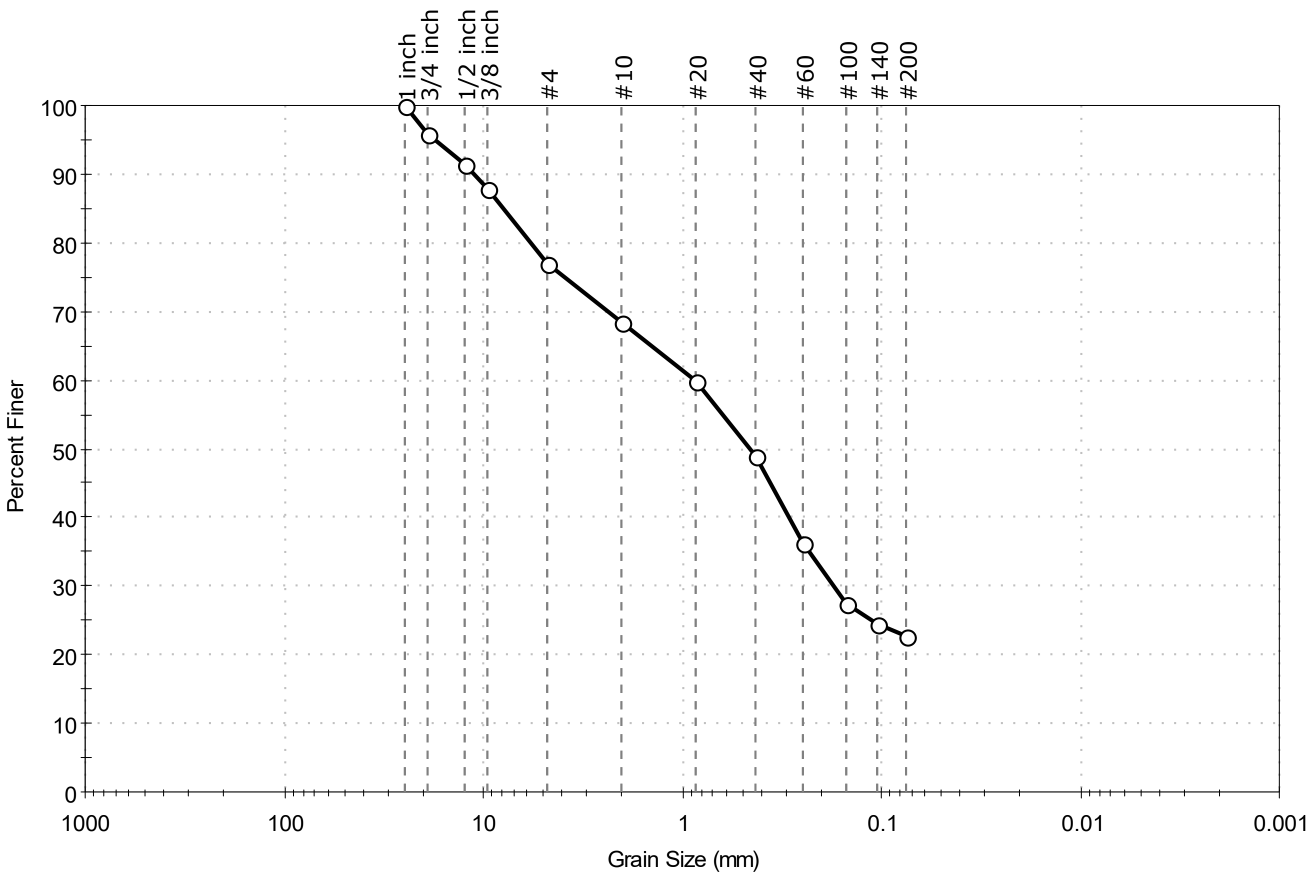
Test Comment: ---

Visual Description: Moist, very dark brown silty sand with gravel

Sample Comment: ---

SD-221

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	23.1	54.3	22.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 inch	25.00	100		
3/4 inch	19.00	96		
1/2 inch	12.50	91		
3/8 inch	9.50	88		
#4	4.75	77		
#10	2.00	68		
#20	0.85	60		
#40	0.42	49		
#60	0.25	36		
#100	0.15	28		
#140	0.11	25		
#200	0.075	23		

Coefficients

D_{85} =7.8476 mm

D_{30} =0.1734 mm

D_{60} =0.8629 mm

D_{15} =N/A

D_{50} =0.4563 mm

D_{10} =N/A

C_u =N/A

C_c =N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

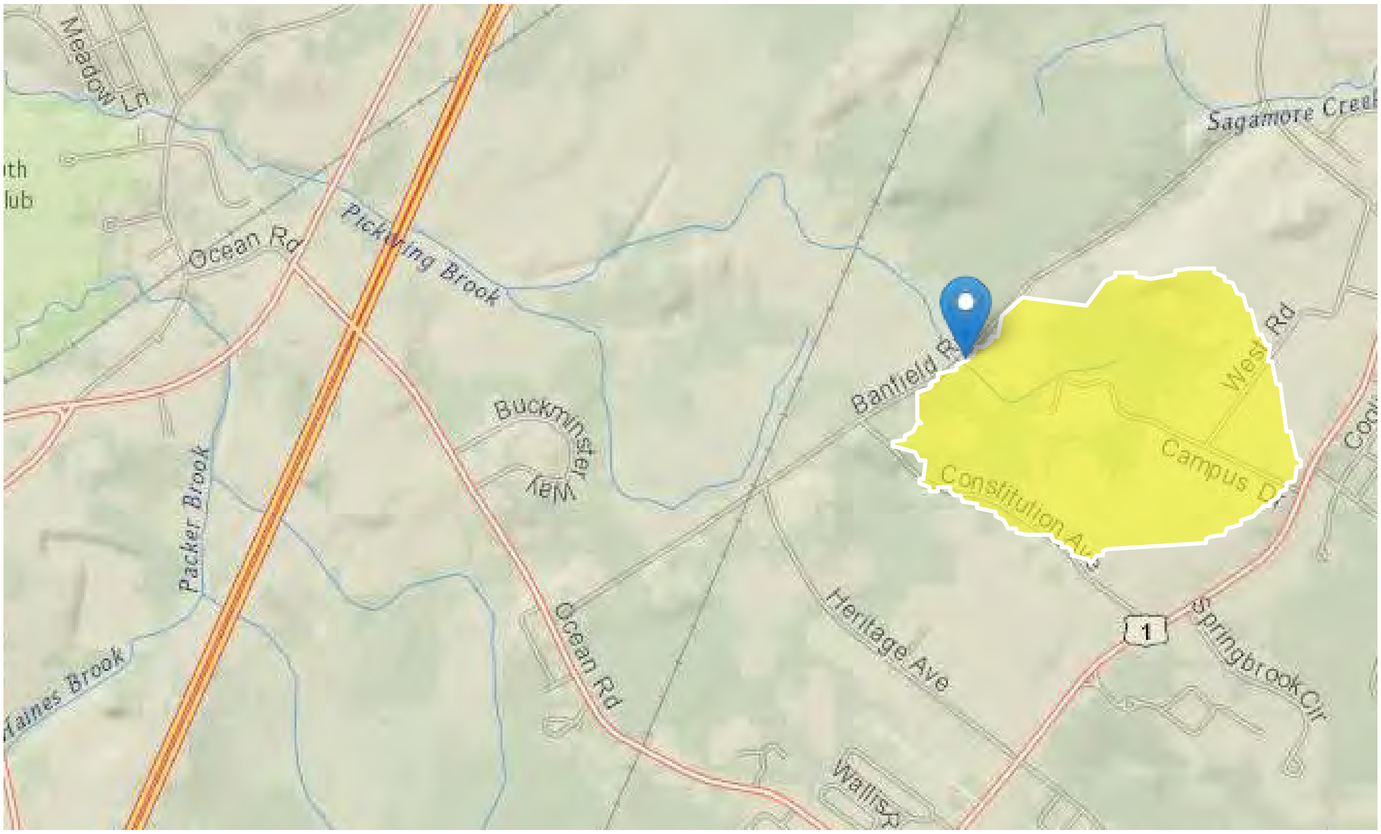
Sand/Gravel Hardness : HARD

APPENDIX H

Pickering Brook Catchment Area and Water Quality Data

Contributing Drainage Area

Region ID: NH
Workspace ID: NH20211104220136672000
Clicked Point (Latitude, Longitude): 43.04145, -70.79123
Time: 2021-11-04 12:01:54 -1000



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.36	square miles

General Disclaimers

This watershed has been edited, computed flows and basin characteristics may not apply. For more information, submit a support request from the 'Help' button in the upper-right of the screen, attach a pdf of this report and request assistance from your local streamstats regional representative.

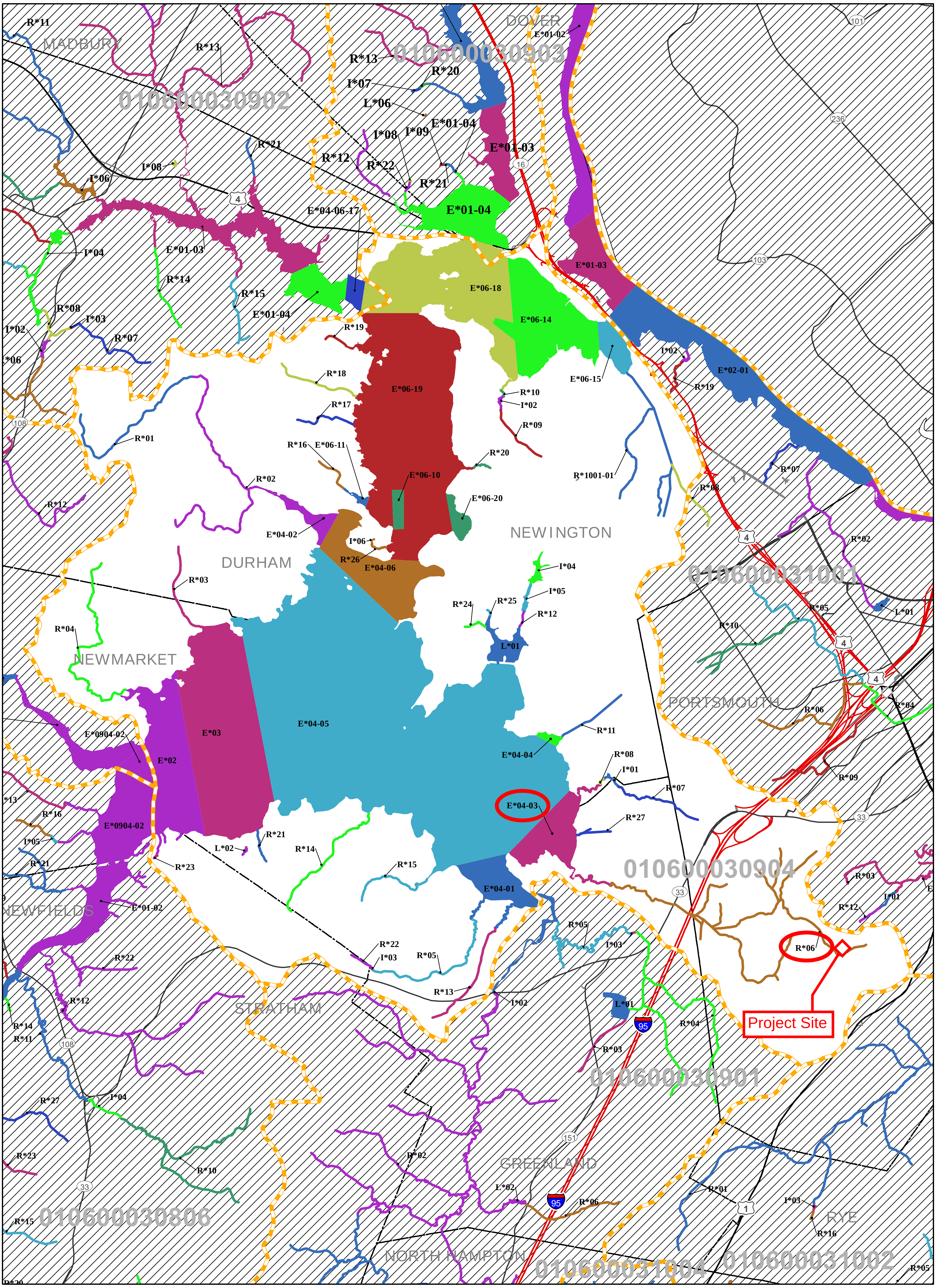
USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

USGS Software Disclaimer: This software has been approved for release by the U.S. Geological Survey (USGS). Although the software has been subjected to rigorous review, the USGS reserves the right to update the software as needed pursuant to further analysis and review. No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the software and related material nor shall the fact of release constitute any such warranty. Furthermore, the software is released on condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from its authorized or unauthorized use.

USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.6.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

AUIDs For HUC12: 010600030904 - Great Bay



- HUC12 Boundaries
- Town Boundaries

Major Roads
- Interstate Highway
- US Highway
- State Highway

Assessment Unit Coloring

AUs Ending with:
- 0 = ●
- 1 = ●
- 2 = ●
- 3 = ●
- 4 = ●
- 5 = ●
- 6 = ●
- 7 = ●
- 8 = ●
- 9 = ●

N
W E
S

Abbrv. Label	HUC 12
L* 03	010 700060201

AUID = NH LAK700060201-03

Assessment Unit IDs are derived from the HUC12 they reside within. The labels have been shortened on this map for presentation purposes.
Example: the Label "L*03" in HUC12 = 010700060201 represents AUID = "NHLAK700060201-03"
In rare cases where an AUID extends beyond the boundary of a single HUC12, additional portions of the end of the HUC 12 number have also been replaced.

0 0.5 1 1.5 2 Miles

Scale:1:50,530

S:\WD-Watershed\WQ_Planning\305b_303d\2020\Report_Cards\HUC12_maps

Assessment Unit ID: NHEST600030904-04-03
Assessment Unit Name: Pickering Brook
Town(s) Primary Town is Listed First: Greenland, Newington

Size: 0.206982 SQUARE MILES
Assessment Unit Category: 5-P
Beach: N

Designated Use Description	Desig. Use Category	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category	TMDL Priority
Aquatic Life Integrity	5-P	.ALPHA.-ENDOSULFAN(ENDOSULFAN 1)	N	2006	N/A	3-ND	
		.BETA.-ENDOSULFAN (ENDOSULFAN 2)	N	2006	N/A	3-ND	
		2-METHYLNAPHTHALENE	N	2006	N/A	3-ND	
		ACENAPHTHENE	N	2006	N/A	3-ND	
		ACENAPHTHYLENE	N	2006	2006	3-ND	
		ALUMINUM	N	2006	2006	3-ND	
		AMMONIA (TOTAL)	N	2008	N/A	3-ND	
		ANTHRACENE	N	2006	N/A	3-ND	
		ANTIMONY	N	2006	N/A	3-ND	
		ARSENIC	N	2006	2006	3-ND	
		BENZO(A)PYRENE (PAHS)	N	2006	2001	3-ND	
		BENZO[A]ANTHRACENE	N	2006	2001	3-ND	
		BENZO[B]FLUORANTHENE	N	2006	N/A	3-ND	
		BENZO[G,H,I]PERYLENE	N	2006	N/A	3-ND	
		BENZO[K]FLUORANTHENE	N	2006	N/A	3-ND	
		BIPHENYL	N	2006	N/A	3-ND	

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

Aquatic Life Integrity	5-P	CADMIUM	N	2006	2006	3-ND	
		CHRYSENE (C1-C4)	N	2006	2001	3-ND	
		COLORED DISSOLVED ORGANIC MATTER (CDOM)	N	2008	N/A	3-ND	
		COPPER	N	2006	2002	3-ND	
		Chlorophyll-a		2018	MED.	5-M	LOW
		DDD	N	2006	N/A	3-ND	
		DDE	N	2006	2001	3-ND	
		DDT	N	2006	N/A	3-ND	
		DIBENZ[A,H]ANTHRACENE	N	2006	2003	3-ND	
		DIELDRIN	N	2006	N/A	3-ND	
		DISSOLVED ORGANIC CARBON (DOC)	N	2008	N/A	3-ND	
		Dissolved oxygen saturation		2018	2018	2-M	
		ENDOSULFAN SULFATE	N	2006	N/A	3-ND	
		ENDRIN	N	2006	N/A	3-ND	
		Estuarine Bioassessments	N	2018	MED.	5-P	LOW
		FLUORANTHENE	N	2006	2006	3-ND	
		FLUORENE	N	2006	N/A	3-ND	
		HEXACHLOROBENZENE	N	2006	N/A	3-ND	
		INDENO[1,2,3-CD]PYRENE	N	2006	N/A	3-ND	
		IRON	N	2006	N/A	3-ND	
		LEAD	N	2006	2006	3-ND	
		LIGHT ATTENUATION COEFFICIENT	N	2018	MED.	5-M	LOW

Good	**Marginal**	**Likely Good**	**No Current Data**	**Likely Bad**	**Poor**	**Severe**
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

Aquatic Life Integrity	5-P	LINDANE	N	2006	N/A	3-ND	
		MERCURY	N	2006	2003	3-ND	
		NAPHTHALENE	N	2006	N/A	3-ND	
		NICKEL	N	2006	2003	3-ND	
		Nitrogen (Total)	N	2018	MED.	5-M	LOW
		OXYGEN, DISSOLVED	N	2018	2018	3-PNS	
		PH	N	2008	2001	3-ND	
		PHENANTHRENE	N	2006	N/A	3-ND	
		POLYCHLORINATED BIPHENYLS	N	2003	N/A	3-ND	
		PYRENE	N	2006	2001	3-ND	
		SALINITY	N	2016	N/A	3-ND	
		SILVER	N	2006	2001	3-ND	
		TEMPERATURE, WATER	N	2016	N/A	3-ND	
		TOTAL SUSPENDED SOLIDS (TSS)	N	2008	N/A	3-ND	
		TOXAPHENE	N	2006	N/A	3-ND	
		TRANS-NONACHLOR	N	2006	N/A	3-ND	
		ZINC	N	2006	2001	3-ND	
Fish Consumption	5-M	MERCURY - FISH CONSUMPTION ADVISORY	N			5-M	LOW
		PCBS - FISH CONSUMPTION ADVISORY	N			5-M	LOW
Potential Drinking Water Supply	2-G	ESCHERICHIA COLI	N	2008	2008	3-ND	
		FECAL COLIFORM	N	2016	2016	3-PNS	
Primary Contact Recreation	4A-M	CHLOROPHYLL-A	N	2008	2003	3-ND	

Good	**Marginal**	**Likely Good**	**No Current Data**	**Likely Bad**	**Poor**	**Severe**
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

Primary Contact Recreation	4A-M	ENTEROCOCCUS	N	2008	2004	4A-M	
Secondary Contact Recreation	3-ND	ENTEROCOCCUS	N	2008	2004	3-ND	
Shellfish Consumption	5-M	DIOXIN - FISH CONSUMPTION ADVISORY	N			5-M	LOW
		Fecal Coliform	N			4A-P	
		MERCURY - FISH CONSUMPTION ADVISORY	N			5-M	LOW
		PCBS - FISH CONSUMPTION ADVISORY	N			5-M	LOW
Wildlife	3-ND						

Good	**Marginal**	**Likely Good**	**No Current Data**	**Likely Bad**	**Poor**	**Severe**
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

Assessment Unit ID: NHRIV600030904-06
Assessment Unit Name: Pickering Brook
Town(s) Primary Town is Listed First: Greenland, Portsmouth

Size: 6.4320 MILES
Assessment Unit Category: 5-P
Beach: N

Draft 2020, 305(b)/303(d) - All Reviewed Parameters by Assessment Unit

Designated Use Description	Desig. Use Category	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category	TMDL Priority
Aquatic Life Integrity	5-P	AMMONIA (TOTAL)	N	2009	N/A	3-ND	
		Benthic-Macroinvertebrate Bioassessments (Streams)	N			3-ND	
		CHLORIDE	N	2005	2005	5-M	LOW
		Copper	N	1992	1992	5-P	LOW
		DISSOLVED OXYGEN SATURATION	N	2005	2005	5-M	LOW
		Fishes Bioassessments (Streams)	N			3-ND	
		Iron	N	1992	1992	5-P	LOW
		OXYGEN, DISSOLVED	N	2005	2005	5-P	LOW
		PH	N	2005	2005	5-M	LOW
		PHOSPHORUS (TOTAL)		2009	NLV	3-ND	
		TURBIDITY	N	2005	2005	3-ND	
		ZINC	N	2009	N/A	3-ND	
Fish Consumption	4A-M	MERCURY - FISH CONSUMPTION ADVISORY	N			4A-M	
		ZINC	N	2009	N/A	3-ND	
Potential Drinking Water Supply	2-G	ESCHERICHIA COLI	N	2008	2008	3-ND	

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

Potential Drinking Water Supply	2-G	FECAL COLIFORM	N	2007	2007	3-ND	
		ZINC	N	2009	N/A	3-ND	
Primary Contact Recreation	4A-P	ESCHERICHIA COLI	N	2008	2008	4A-P	
Secondary Contact Recreation	3-ND	ESCHERICHIA COLI	N	2008	N/A	3-ND	
Wildlife	3-ND						

Good	**Marginal**	**Likely Good**	**No Current Data**	**Likely Bad**	**Poor**	**Severe**
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

APPENDIX I

Focused Human Health and Ecological Risk Assessment – Wetlands

SOVEREIGN CONSULTING INC.
Science. Service. Solutions.

FOCUSED HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

375 Banfield Road
Portsmouth, New Hampshire

Prepared for:

Wilcox & Barton, Inc.
#1B Commons Drive, Unit 12B
Londonderry, New Hampshire 03053

Prepared by:

Sovereign Consulting Inc.
19 Payson Road, Suite 120
Foxborough, MA 02035

November 15, 2021

Project Number: ME268.001

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report presents a focused human health/ecological risk assessment (focused HHRA/ERA) for a release of oil or hazardous material that occurred at the property located at 375 Banfield Road, Portsmouth, New Hampshire. The focused HHRA/ERA contains an evaluation of the potential risk of harm to human health and the environment associated with the release as present in sediment and surface water within wetland areas on the site property. The focused HHRA/ERA is based on information and data provided by Wilcox & Barton, Inc., as summarized in this report.

2.0 SITE BACKGROUND

2.1 Site and Vicinity Location and Use

The site property is a 17.32-acre lot located in an industrial and residential area of Portsmouth. The site is zoned industrial and is improved by two one-story commercial automotive maintenance buildings and one two-story garage building used for storage. The remainder of the subject property includes a paved parking lot adjoining Banfield Road, landscaped areas, cleared undeveloped land, wooded land, and a portion of Pickering Brook and associated wetlands. The Great Bay National Wildlife Refuge is located about 2.4 miles west/northwest of the site. The Great Bog Wildlife Management Area is located on the western side of Banfield Road.

The site is bound to the north by Banfield Road, to the east by a private school (St. Patrick Academy), to the west by commercial and residential properties, and to the south by a commercial property, beyond which are commercial, industrial, and residential properties. The site and surrounding properties are depicted on **Figure 1** – *Site Aerial View*.

Drinking water for the site is obtained from the City of Portsmouth municipal drinking water supply, which obtains its water supply from the Bellamy Reservoir in Madbury and Dover (more than 8 miles northwest of Portsmouth) as well as from groundwater supply wells located in Portsmouth. While the exact location of these wells could not be determined, based on a discussion with the GIS contact at NHDES, the closest well appears to be located at the street address of 147 Post Road, which is located about one-half mile south/southeast of the site (this is to the water tower; it is unclear where the well is). How site groundwater relates to this well is currently unclear, but the site groundwater flow direction has been identified to the southwest and is expected to move westward towards the Great Bog Wildlife Management Area.

2.2 Site Physical and Hydrological Setting

Topography across the property decreases in elevation from the northeast to the southwest. Observed soil/fill material is composed of brown and gray silt and fine sand with varying amounts of gravel and some solid waste, including bricks, ceramics, nails, and glass, from ground surface to around 10 feet below the ground surface (bgs). Tan silt and fine sand with some gravel was observed from 10 feet bgs to the maximum depth of exploration at 18 feet bgs.

The measured depth to groundwater in site monitoring wells ranged from 3.6 to 16.5 feet bgs during the July 2021 gauging event. Piezometric data indicate groundwater flow to be in a general southwesterly direction across the site.

A branch of Pickering Brook and wetlands associated with Pickering Brook are located on the southern, southeastern, and southwestern portion of the subject property and extend onto adjacent properties. The brook originates east of the site and flows northwestward, entering the Great Bog Wildlife Management Area on the west site on Banfield Road, with additional brook branches joining, and eventually discharges to the Great Bay National Wildlife Refuge, which then flows into Piscataqua River and eventually the Atlantic Ocean.

In the draft 2020 New Hampshire Watershed Report Card (*https://www4.des.state.nh.us/onestoppub/SWQA/010600030904_2020.pdf*), Pickering Brook was identified to have the following water quality impacts:

- Aquatic Life Integrity – Severe impact (PAHs, metals);
- Fish Consumption – Poor quality (fish consumption advisories in effect for PCBs and mercury);
- Primary Contact Recreation – Bad to poor quality (fecal coliform and enterococcus); and,
- Shellfish consumption – Poor to severe (dioxin, mercury, and PCB fish consumption advisories and fecal coliform).

These conditions were identified at the mouth of the brook into Great Bay, as well as just past the site, just west of Interstate 95.

The State of New Hampshire has issued fish consumption advisories statewide for all fresh lakes ponds, rivers, and streams for various fish species including rainbow and brown trout, large- and small-mouthed bass, pickerel, white and yellow perch) (*https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/ard-ehp-25.pdf*). No specific or alternate fish consumption advisories were identified for Pickering Brook itself.

3.0 SITE ENVIRONMENTAL CONDITIONS

3.1 History of Releases

In October 2004, a Phase II Environmental Site Assessment (ESA) was performed by Les A. Cartier and Associates, Inc., in which eleven test pits were completed and eleven monitoring wells were installed to evaluate soil and groundwater contamination. Arsenic, lead, polychlorinated biphenyls (PCBs), and mercury were found at concentrations above the New Hampshire Department of Environmental Services (NHDES) soil remediation standards (SRS; or preceding criteria) in the vicinity of the former car crusher. Low concentrations of volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) were also detected in groundwater. Recommendations included removal of the contaminated soil, asbestos-containing piping found in one of the test pits, all scrap metal waste, and excess, non-serviceable vehicles from the property. A summary of the work that was conducted was either not documented or is unavailable.

In January 2006, NHDES requested the performance of a Site Investigation (SI). In response, a *Groundwater Monitoring and Soil Assessment Report* was submitted by Provan & Lorber, Inc. in August 2006. Ten soil borings were completed in the area of exceedances noted in the 2004 Phase II report. Arsenic was found at concentrations above SRS in soil and above NHDES ambient groundwater quality standards (AGQS) in groundwater, but was attributed to natural conditions.

Excavation of the contaminated soil at the former car crusher location was reported to have been successful, and a request for no further investigation was recommended. In response, NHDES requested additional information regarding arsenic in groundwater to support a conclusion that arsenic is naturally-occurring, with options for control.

On July 10, 2007, Provan & Lorber, Inc. submitted an *Additional Assessment Report* to NHDES. Seven soil borings were advanced in the area of the former car crusher and excavation area, and groundwater samples were obtained from existing monitoring wells at the subject property. Arsenic was detected in ten soil samples at concentrations exceeding SRS. Provan & Lorber, Inc. recommended no further investigation or remediation be required at the site, limiting any response to the presence of arsenic to placement of an activity and use restriction (AUR) on the impacted area. NHDES concurred with the findings and issued a Letter of No Further Action dated August 15, 2007.

On October 10, 2008, Ransom Environmental Consultants, Inc. submitted a *Third-Party Notification* to NHDES regarding a Limited Subsurface Investigation (LSI) conducted at the subject property. Arsenic, lead, and mercury were detected in sediment samples at concentrations above applicable Threshold Effect Concentrations (TECs; MacDonald et al., 2000) in sediment samples collected from wetland areas along the southeastern and southern portions of the subject property. Lead and selenium were detected at concentrations exceeding New Hampshire Surface Water Quality Standards (WQS). Buried solid wastes, including automotive parts and building materials, were observed in test pits excavated in the northeastern portion of the subject property. Asbestos was detected in three waste bulk building material samples collected from surface and near-surface locations in the central portions of the site. PAHs, arsenic, lead, and PCBs were detected at concentrations above NHDES SRS in soil samples taken from test pits in the northern portion of the site in the vicinity of the former car crusher. Three PAHs were detected in groundwater at concentrations above AGQS in a monitoring well located on the southern portion of the site, lead was detected in groundwater at a concentration above AGQS in a monitoring well located in the central portion of the site, and arsenic was detected at a concentration above AGQS in a monitoring well located on the northwestern portion of the site.

In response to the *Third-Party Notification*, NHDES requested further investigation of the former auto car crusher area, the apparent historical solid waste landfill, asbestos in bulk soil samples, and contamination in sediment. Provan & Lorber, Inc. submitted *Comments Regarding Limited Subsurface Investigation–October 2008* to NHDES on September 2, 2009. NHDES correspondence, dated February 16, 2011, recommended excavating the areas with naturally-occurring arsenic in exceedance of its SRS or capping the material and recording an AUR, and recommended that the source and extent of lead and PCB contamination in soil be characterized. Buried asbestos on the site was required to be capped, with the owner providing recordation of an AUR. NHDES requested information on the direction and flow rate of Pickering Brook, as well as a confirmatory round of sediment and surface water samples in the wetland area. Lastly, NHDES requested two rounds of confirmatory groundwater sampling as well as the installation of a monitoring well in the former car crusher area and analyses for VOCs, metals, PAHs, and PCBs.

A Phase I Environmental Site Assessment (ESA) was subsequently performed by Wilcox & Barton, Inc. (W&B) in May 2020 on behalf of the new owner and developer. Twenty-five soil borings were advanced, five of which were completed as overburden monitoring wells. Ten test pits were completed, and soil, septic tank, sediment, surface water, and groundwater samples were collected. Widespread arsenic and lead contamination was identified at concentrations above SRS in soil and sediment on the property. Solid waste from the historical unlined landfill was identified from ground surface to 3 feet bgs in the southern portion of the site. Other materials that appear to be related to automobile salvage operations can be seen on the ground surface in other areas of the site. Metals and per- and polyfluorinated alkyl substances (PFAS) were detected in groundwater at concentrations above AGQS, with the metal exceedances extending to the wetlands along the downgradient edge of the property along Pickering Brook.

3.2 Summary of Current Site Conditions

This focused HHRA/ERA addresses conditions within the wetland areas in sediment and surface water. Environmental conditions in these media are discussed in this section.

3.2.1 Sediment

Table 1 - *Summary of Sediment Analytical Data* summarizes analytical results for samples collected from the site between July 2008 and September 2021. There are no human health-based criteria against which to compare detected concentrations; health risks from exposure to sediments are quantitatively estimated in Section 4.0.

Alternately, these results are compared with consensus-based threshold effect concentrations (TECs) and probable effect concentrations (PECs) developed by MacDonald et. al (2000). TECs are sediment concentrations below which harmful effects on sediment-dwelling organisms are not expected, and PECs are sediment concentrations above which harmful effects on sediment-dwelling organisms are expected to occur frequently. TECs and PECs are based on an evaluation of other available sediment benchmarks available and selected percentages of the data were adopted as TECs and PECs. Since the criteria originate from different studies, they are applied "as is", without organic carbon normalization.

Of the constituents detected in sediment, the following exceeded either their TEC or PEC, as shown below:

COMPARISON OF MAXIMUM SEDIMENT DETECTIONS WITH TECS AND PECS

Constituent	Maximum Detected Concentration mg/kg	Threshold Effect Concentration Exceeded (TEC) mg/kg	Probable Effect Concentration Exceeded (PEC) mg/kg
Anthracene	3.4	0.0572	0.845
Benzo(a)anthracene	11	0.108	1.05
Benzo(a)pyrene	9.8	0.15	1.45

- continued -

COMPARISON OF MAXIMUM SEDIMENT DETECTIONS WITH TECS AND PECS			
Constituent	**Maximum Detected Concentration mg/kg**	**Threshold Effect Concentration Exceeded (TEC) mg/kg**	**Probable Effect Concentration Exceeded (PEC) mg/kg**
Chrysene	11	0.166	1.29
Dibenzo(a,h)anthracene	1.8	0.033	NE
Fluoranthene	23	0.423	2.23
Fluorene	2.1	0.0774	0.536
Naphthalene	19	0.176	0.561
Phenanthrene	17	0.204	1.17
Pyrene	23	0.195	1.52
Arsenic	110	9.79	33
Cadmium	7.5	0.99	4.98
Chromium	64	43.4	--
Lead	4,600	35.8	128
Mercury	13	0.18	1.06

mg/kg Milligrams per kilogram (dry weight).
NE Not established
"—" Comparison value not exceeded.

These data are later assessed in the focused ERA. Note that not all commonly analyzed PAHs have TEC or PEC values.

3.2.2 *Surface Water*

Table 2 - *Summary of Surface Water Analytical Data* summarizes analytical results for surface water samples collected from Pickering Brook or its wetlands between July 2008 and September 2021. Surface water samples were analyzed for PCBs (not detected) and metals only; no data on other analytes are available.

CONSTITUENTS DETECTED IN SURFACE WATER ABOVE WATER QUALITY STANDARDS				
Constituent	**Number of Locations with Exceedances**	**Maximum Detected Concentration µg/L**	**NH Freshwater Aquatic Water Quality Standards Exceeded (µg/L) [1]**	
			Acute	**Chronic**
Arsenic (total)	1/13	250	150	-- [2]
Cadmium (total)	3/13	8.5	0.88	1.01
Chromium (total)	1/13	35	11.4	16.3
Lead (total)	12/13	3,100	0.68	17.7
Lead (dissolved)	6/6	11	0.54	--
Selenium (total)	3/13	10	5	NE
Silver (total)	1/13	1.0	NE	0.38

µg/L Micrograms per liter.
NE Not established.
[1]. Either as listed in regulations or modified from total metals.
[2]. "--" indicates standard is not exceeded.

Concentrations of dissolved arsenic, cadmium, chromium, selenium and silver were either below WQC or were not detected. NH Standards for arsenic, cadmium, chromium, lead, mercury, and silver are based on the dissolved fraction, so standards for *total* metals were calculated from the dissolved standard using conversion factors listed in Env-Wq 1703.23, Table 1703.2.

4.0 FOCUSED HUMAN HEALTH RISK ASSESSMENT

This section assesses the potential health risks posed to humans that access the site and are exposed to sediment and surface water on the property.

4.1 Hazard Identification

Constituents that are quantitatively assessed in the focused HHRA are identified in this section. This section also discusses the environmental fate and transport potential of the constituents, and identifies toxicity values applied to the HHRA.

4.1.1 Constituents of Concern

Constituents of concern (COCs) for the focused HHRA are the following:

- C_9-C_{18} Aliphatic Hydrocarbons
- C_{19}-C_{36} Aliphatic Hydrocarbons
- C_{11}-C_{22} Aromatic Hydrocarbons
- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo(a)anthracene *
- Benzo(a)pyrene *
- Benzo(b)fluoranthene *
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene *
- Chrysene *
- Dibenzo(a,h)anthracene *
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene *
- 2-Methylnaphthalene
- Naphthalene
- Phenanthrene
- Pyrene
- Arsenic *
- Barium
- Cadmium *
- Chromium *
- Lead
- Mercury
- Selenium
- Silver

COCs are heavier extractable petroleum hydrocarbons (EPH fractions), PAHs, and metals. COCs denoted by an asterisk (*) are known or probable human carcinogens and are assessed for the carcinogenic endpoint. All COCs are assessed for the non-carcinogenic endpoint. While lead is classified as a B-2 carcinogen, it is assessed as a non-carcinogenic chemical because the non-carcinogenic effects of lead occur at lower exposure levels than do its carcinogenic effects. These COCs are all constituents that were detected in sediment and surface water.

4.1.2 Environmental Fate and Transport Characteristics

This section discusses environmental fate and transport characteristics of the COCs.

Mobility

Mobility describes the movement of a constituent in the environment. Volatilization, leaching, and advection are three primary mobility mechanisms.

EPH fractions and PAHs are slightly volatile to non-volatile and are not likely to volatilize from soil and groundwater to any appreciable degree. Metals are considered non-volatile at ambient conditions.

EPH fractions and PAHs moderately to strongly bind to soil/sediment but may leach (partition) somewhat into groundwater/surface water. The ability of metals to bind to soil or sediment varies with the metal and its form, pH, and other factors.

Persistence

EPH fractions and PAHs are slowly or only partially degraded by soil organisms and chemical processes, so these COCs show a high persistence in the environment. Metals do not degrade, although they may change form, and are considered persistent.

Bioaccumulation

EPH fractions possess a low propensity to bioaccumulate into animal or plant tissue and are not typically considered to be bioaccumulative. PAHs can accumulate in various tissue types, but vertebrates have the capacity to metabolize PAHs, limiting their accumulation. Metals vary in their ability to bioaccumulate; mercury and cadmium are two metals with a high bioaccumulative potential.

4.1.3 Toxicity Values

Toxicity values used to quantify the potential carcinogenic risks and non-carcinogenic health hazards of the COCs were obtained from NHDES (2013) or U.S. Environmental Protection Agency (US EPA; 2021, 2021a). Toxicity values used to assess excess lifetime cancer risks are oral cancer slope factors (OSFs) for ingestion and dermal exposures and inhalation unit risk (IUR) values for inhalation exposures. Toxicity values used to assess non-carcinogenic health hazards are reference doses (RfDs) for ingestion and dermal exposures and reference concentrations (RfCs) for inhalation exposures. All exposures assessed herein are considered long-term.

Brief toxicity profiles for the COCs are presented in **Appendix A**. Toxicity values applied to the focused HHRA are summarized and referenced in the attached risk calculation spreadsheets (**Appendices C and D**).

4.2 Exposure Assessment

This section identifies human receptor groups potentially exposed to COCs, identifies pathways and routes by which these receptor groups may be exposed, calculates exposure point concentrations (EPCs) for each COC, and quantifies potential exposure of each receptor group.

4.2.1 Identification of Human Receptor Groups

Based on current and anticipated future site uses and direction from NHDES, the following human receptor groups are quantitatively assessed in the focused HHRA:

Recreational Trespassers. The site wetlands and surface water contain features that are a recreational or trespassing attractant. Therefore, recreational trespassers are assessed for intermittent exposure to wetland sediment and surface water.

Fish Consumers. Capture of fish for consumption may intermittently occur from Pickering Brook. Fish consumers are assessed separately from the recreational/trespassing activities to segregate out risks.

The following receptor groups are not quantitatively assessed for the reasons provided:

Residents. The property is not used for residential purposes and such use is not anticipated in the future without significant modifications to the site (and such use may be prohibited by wetland regulations). Residential receptors are not assessed.

Commercial/Industrial Workers. While the property is currently used for commercial/ industrial purposes, these uses do not apply to the wetland areas, so commercial/industrial workers are not assessed.

Construction/Utility Workers. The potential for construction or utility worker exposure does not currently exist and is not expected in the wetland areas (except for potential future remediation workers, who would be covered by a health and safety plan). Adult construction/ utility workers are not quantitatively assessed.

Customers/Pedestrians. Customers, pedestrians, or other intermittently exposed receptors are not expected to be exposed to the wetlands or brook during visitation. For this reason, customers and pedestrians are not assessed.

Landscape workers. There are no landscaped areas in the wetlands and none are expected.

4.2.2 Exposure Scenarios

Human receptor groups were assessed for exposure to COCs through the following pathways:

ASSESSED HUMAN RECEPTOR GROUPS		
Exposure Pathway	**Recreational/Trespassing Receptors**	**Fish Consumers**
Sediment ingestion	✓	
Sediment dermal contact	✓	
Inhalation of entrained sediment particles (when dry)	✓	
Surface water ingestion	✓	
Surface water dermal contact	✓	
Fish Consumption		✓

✓ Assessed.

4.2.3 Exposure Point Concentrations

4.2.3.1 Sediment Exposure Point Concentrations

With one exception, sediment EPCs were the 95th percentile upper confidence limit of the mean concentration of each COC, calculated using data on **Table 1** and US EPA's ProUCL program (version 5.1). ProUCL output is presented in **Appendix B**. The EPC for silver was the sole detected concentration in sediment.

4.2.3.2 Surface Water Exposure Point Concentrations

Surface water EPCs were the maximum detected COC concentration in surface water samples on **Table 2**. Analytical results for dissolved metals are applied to the surface water dermal exposure pathway, since that is the "available" portion of the metals to be absorbed dermally. Analytical results for total metals are applied to the surface water ingestion exposure pathway, since all forms of the metal in the water will be consumed.

4.2.3.3 Air Exposure Point Concentrations

Air EPCs for the entrained soil particle pathway were estimated by a screening level approach developed by the Massachusetts Department of Environmental Protection (MassDEP 2014). For exposed receptors, an air PM_{10} concentration (particles with an aerodynamic diameter of ≤10 microns) of 32 micrograms per cubic meter ($\mu g/m^3$) was combined with the soil EPC to derive an air EPC. This PM_{10} concentration represents conditions under a non-excavation scenario. Calculations of air EPCs are presented in the risk assessment spreadsheets **(Appendices C and D).**

4.2.3.4 Fish Exposure Point Concentrations

No biota tissue was sampled for COC presence in any of the site's investigations. However, the potential for exposure to people to fish in, or consume fish from, Pickering Brook, exists. The website "Fishbrain.com" lists rainbow trout as one type of fish caught in this brook. The 263-acre Great Bog Wildlife Management Area (GBWMA), into which Pickering Brook runs before emptying into Great Bay is also expected to contain fish; however, neither Pickering Brook nor the GBWMA is listed by NHDES as being stocked with trout (*https://www.wildlife.state.nh.us/fishing/trout-stocking.html*).

Three different approaches were used to estimate whole fish tissue concentrations for the COC data available. For organic constituents, fish tissue concentrations were conservatively estimated by the following equation:

$$\mathbf{C_{\mathit{fish}} = C\mathit{sed} \times BSAF \times [\%\ _{lipid/\ \%\ OC}]}$$

Where:		
	C_{fish} =	Fish tissue COC concentration (mg/kg)
	C_{sed} =	Sediment COC concentration (mg/kg)
	BSAF =	Constituent-specific biota-sediment accumulation factor (unitless)
	% lipids in fish =	Percent lipids in fish tissue (percent)
	% OC in sediment =	Percent total organic carbon in sediment (percent)

BSAF values were obtained from US EPA's BSAF Dataset database and were the average of values reported for multiple locations (US EPA undated). Because the percent lipids varies from around 2 percent for small, young, and lower trophic level fish and up to 20 percent or more in larger, older, and higher trophic level fish, a 10.6 percent lipids in fish was generically applied [US Fish and Wildlife Service, Technical Paper 108, *Proximate Composition and Caloric Content of Eight Lake Michigan Fishes* (Dec 28, 1982)].[1] An 11 percent total organic carbon in sediment was applied; this latter value is the median TOC concentration in sampled sediments.

For most metals, analytical results for dissolved metals were applied along with a constituent-specific bioconcentration factor (BCF_{fish}, L/kg) to estimate fish tissue concentrations:

$$C_{fish} = C_{sw\text{-}diss} \times BCF_{fish}$$

BCF_{fish} values for COCs were obtained from US EPA (2005) *Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (EPA530-R-05-005).

For mercury, which was not detected in dissolved surface water samples, potential fish tissue concentrations were estimated from sediment concentrations as follows:

$$C_{fish} = C_{sed} \times BSAF_{fish}$$

No mercury BSAF could be identified for fish, so the 90th percentile BSAF value for aquatic invertebrates was applied [US Department of Energy (1998) *Biota Sediment Accumulation Factors for Invertebrates: Review and Recommendations for the Oak Ridge Reservation*]. Note that adjustment for TOC and percent lipids is not part of this equation.

4.2.4 Quantitation of Exposure

COC intake was quantified by combining exposure factors with EPCs to derive an average daily exposure (ADE) or average daily dose (ADD). Exposure factors used to quantify the magnitude, frequency, and duration of exposure for each receptor group are summarized in **Table 3** - *Summary of Exposure Factors*. Exposure factors were generally values used in NHDES Risk Characterization Policy [NHDES (2013) *Methodology for Calculating Direct Contact Risk-based Soil Concentrations*] or from other, generally recognized guidance. In the absence of specific guidance, assumptions were made regarding the degree of exposure.

Conventional risk assessment equations were used to quantify exposures and are presented in **Appendices C and D** for recreational trespassers and fish consumers, respectively.

---

[1] Based on the average of lipid content measurements for alewife (3 samples), lake trout (3 samples), coho salmon (3 samples), and one sample each for rainbow smelt, lake whitefish, bloater, slimy sculpin, and deep-water sculpin. While these represent fish from Lake Michigan, they are all freshwater fish and are judged to be adequately representative of fish that *may* exist in Pickering Brook.

4.3 Quantitative Risk Assessment

Potential cancer risks and non-carcinogenic health hazards were quantified for each receptor group by combining estimated COC intakes with the appropriate toxicity value.

The risk assessment procedure for carcinogenic COCs derives an excess lifetime cancer risk, which is the extra lifetime risk (over background risk levels) of incurring cancer from exposure to carcinogenic COCs. For each receptor group, cancer risks for each carcinogenic COC within and between pathways are summed to derive a total excess lifetime cancer risk. Additionally, total cancer risks for each age group within a receptor group are summed to derive a 30-year combined-age cancer risk, which is used to assess overall cancer risks to recreational trespassers. Total excess lifetime cancer risks are compared with the maximum acceptable cancer risk adopted by NHDES: an excess lifetime cancer risk of 1 in 100,000, denoted as $1x10^{-5}$ [Env-Or 606.19(d)(3)]. A total excess lifetime cancer risk at or below $1x10^{-5}$ represents no unacceptable risk of harm to human health.

The risk assessment procedure for non-carcinogenic COCs derives a Hazard Quotient (HQ), which is the ratio of an estimated exposure or intake to a maximum exposure or intake that is believed to pose no health hazard (e.g., the RfD or RfC). For each receptor and age group, HQs for each COC within and between exposure pathways are summed to derive a total Hazard Index (HI), which is compared with the maximum acceptable HI adopted by NHDES: 1 [Env-Or 606.19(d)(3)]. A total HI equal to or below 1 represents no unacceptable risk of harm to human health.

4.3.1 Risk Assessment for Recreational Trespassers

Risk assessment calculations for a recreational trespassers contacting wetland sediments and surface water at the site are presented in **Appendix C** and summarized below:

FOCUSED RISK ASSESSMENT SUMMARY
RECREATIONAL TRESPASSERS

Exposure Pathway	Non-Carcinogenic Hazard Index			Excess Lifetime Cancer Risk
	Child	Youth	Adult	Combined Ages [1]
Sediment ingestion	6.8	1.4	0.8	1×10^{-5}
Sediment dermal contact	0.5	0.2	0.1	8×10^{-6}
Inhalation of entrained (dry) sediment particles	0.02	0.02	0.02	7×10^{-7}
Surface water ingestion	2.7	1.1	0.3	3×10^{-5}
Surface water dermal contact	0.001	0.0008	0.0005	9×10^{-8}
Total (all pathways)	**10**	**3**	**1**	$\mathbf{5 \times 10^{-5}}$
Maximum Acceptable Level	**1**			$\mathbf{1 \times 10^{-5}}$

1. Age-specific cancer risks are intermediate values and are not shown; refer to risk spreadsheets.

Total HIs for each age group are above the maximum acceptable HI of 1 and the combined-age excess lifetime cancer risk is above the maximum acceptable risk level of $1x10^{-5}$. Therefore, conditions in the wetlands pose an unacceptable risk of harm to human health for recreational trespassers.

The primary non-carcinogenic health hazard is associated with ingestion of sediment containing lead (chemical- and pathway-specific HQ of 6.4), which was 64 percent of the total HI for children. The next contributing pathway was ingestion of surface water containing lead (chemical- and pathway-specific HQ of 3), which was 22 percent of the total HI of children. These two pathways for lead constitute 87 percent of the total HI for children. While lower HIs were calculated for youth and adults, the total HIs are still over 1.

4.3.2 Risk Assessment for Fish Consumers

Risk assessment calculations for fish consumers at the site are presented in **Appendix D** and summarized below:

RISK ASSESSMENT SUMMARY
FISH CONSUMERS

Exposure Pathway	Non-carcinogenic Hazard Index			Excess Lifetime Cancer Risk
	Child	**Youth**	**Adult**	**Combined Ages**
Recreational fish consumption – Dissolved metals	0.6	0.5	0.4	7 x 10^{-5}
Recreational fish consumption – Total metals (mercury only)	10	9	7.6	-- [1]
Recreational fish consumption – All Organic COCs	0.7	0.6	0.5	1 x 10^{-6}
Total (all pathways)	**12**	**10**	**9**	**7 x 10^{-5}**
Maximum Acceptable Level	**1**			**1 x 10^{-5}**

[1] No carcinogens in this pathway.

Fish consumers were assumed to consume fish from the site 20 times per year. The total HI for each age group is above the maximum acceptable HI of 1 and the excess lifetime cancer risk is above the maximum acceptable cancer risk of 1x10^{-5}.

Total HIs were primarily a result of ingestion of fish containing mercury bioaccumulated from sediment, which constituted 89 percent of the total HI for each age group. Note that fish tissue mercury concentrations were estimated from total mercury in sediment, rather than dissolved concentration in surface water, because mercury was not detected in surface water.

The total excess lifetime cancer risk was primarily a result of ingestion of fish containing arsenic bioaccumulated from surface water (dissolved), which constituted 98 percent of the total cancer risk for combined age groups. This is likely an overestimate of cancer risk, since fish tend to accumulate an organic form of arsenic, arsenobetaine (AsB) which is believed formed by microorganisms and organisms in lower trophic positions, and which is considerable less toxic than inorganic arsenic. This is discussed further in **Section 4.4**.

4.3.3 Combined Risk Assessment

Combining the two assessed scenarios identifies the risk posed to receptors that both recreationally trespass and catch and eat fish from the brook.

FOCUSED RISK ASSESSMENT SUMMARY RECREATIONAL TRESPASSERS WHO CONSUME PICKERING BROOK FISH				
Exposure Pathway	**Non-Carcinogenic Hazard Index**			**Excess Lifetime Cancer Risk**
	Child	**Youth**	**Adult**	**Combined[1]**
Sediment ingestion	6.8	1.4	0.8	1×10^{-5}
Sediment dermal contact	0.5	0.2	0.1	8×10^{-6}
Inhalation of entrained (dry) sediment particles	0.02	0.02	0.02	7×10^{-7}
Surface water ingestion	2.7	1.1	0.3	3×10^{-5}
Surface water dermal contact	0.001	0.0008	0.0005	9×10^{-8}
Recreational fish consumption (all)	12	10	9	7×10^{-5}
Total (all pathways)	**22**	**13**	**10**	$\mathbf{1 \times 10^{-4}}$
Maximum Acceptable Level	**1**			$\mathbf{1 \times 10^{-5}}$

[1]. Age-specific cancer risks are intermediate values and are not shown; refer to risk spreadsheets.

[2]. No carcinogens in this pathway.

The total HI for each age group is above the maximum acceptable HI of 1 and the excess lifetime cancer risk is above the maximum acceptable cancer risk of 1×10^{-5}. Therefore, the site poses an unacceptable risk of harm to human health for recreational trespassers that catch and consume fish from Pickering Brook.

4.4 Uncertainty Assessment

The focused HHRA applied site-specific data, risk assessment approaches recommended by NHDES, and reasonable assumptions to assess site risks. Nonetheless, uncertainties in these factors can contribute to uncertainty in the overall quantitative risk estimates. This section identifies some uncertainties in the quantitative risk assessment and discusses the impact of these uncertainties.

4.4.1 Uncertainties Associated with Site Data

Up to 25 sediment samples were applied to the HHRA. Sediment samples were analyzed for EPH fractions, EPH target PAHs, PCBs (not detected), and RCRA-8 metals, although each sample was not necessarily analyzed for all constituents. Sediment samples were collected both from the Pickering Brook channel and its wetlands, so may represent different environmental conditions, as shown by variations in total organic carbon content of the samples [ranging from 4,200 mg/kg (0.4%) to 770,000 mg/kg (77%)]. The depths of the sediment samples ranged from 0-1 ft bgs.

Per-and polyfluorinated-alkyl substances (PFAS compounds) were analyzed in groundwater and found to be present at concentrations above NHDES ambient groundwater quality standards (AGQS) for four PFAS compounds (PFHxS, PFOA, PFOS, and PFNA); however, PFAS compounds were not analyzed in sediment. PFAS compounds are believed to be highly bioaccumulative in aquatic organisms and could add to the risks of fish consumption. Generally, sediment data are judged to contribute a low to moderate degree of uncertainty to the risk assessment.

Up to 13 surface water samples were applied to the HHRA and were analyzed for PCBs (not detected), and total and dissolved RCRA-8 metals, although each sample was not necessarily analyzed for all constituents. Surface water samples were collected both from the Pickering Brook channel and its wetlands, so may represent different environmental conditions, as shown by variations in calcium carbonate hardness of the samples [ranging from 32.3 milligrams per liter (mg/L) to 390 mg/L]. Although four PFAS compounds were detected in groundwater above NHDES AGQS, PFAS compounds were not analyzed in surface water. As stated above, PFAS compounds are believed to be highly bioaccumulative in aquatic organisms and could add to the risks of fish consumption. Surface water data are judged to contribute a low to moderate degree of uncertainty to the risk assessment.

4.4.2 Uncertainties Associated with the Toxicity Assessment

Toxicity values were obtained from US EPA sources (US EPA 2021, 2021a). These toxicity values are typically derived from human studies or from animal studies conducted at high dose levels, from which potential human health effects at low doses are extrapolated and to which conservative uncertainty factors are applied. Therefore, these values provide a conservative estimate of potential human health impacts and are not likely to underestimate health risks.

Toxicity values for hydrocarbon fractions are based on one representative constituent in the hydrocarbon fraction or a similar petroleum mixture. The toxicity value may not, however, accurately represent the toxicity of the petroleum release as found on site.

Overall, the uncertainty associated with toxicity values is low.

4.4.3 Uncertainties Associated with Exposure Point Concentrations

Sediment EPCs were the 95% percentile upper confidence limit of the mean concentration for all but one COC, as shown on **Table 1**. The maximum detected concentration of silver was applied as its sediment EPC because it was the sole detection of silver. Sediment EPCs are associated with a low degree of uncertainty.

The maximum detected concentration of each COC in surface water (total or dissolved) was applied as its surface water EPC. This approach was applied because of fewer surface water samples being available (6 samples only for dissolved metals). Surface water EPCs contribute a low to moderate degree of uncertainty to the risk assessment.

A screening level approach was used to estimate outdoor air EPCs from entrained (dry) sediment, assuming an inhalable air particle concentration of 32 $\mu g/m^3$, obtained from MassDEP (2014). The value of 32 $\mu g/m^3$ represents inhalable particles in air under non-excavation conditions. The accuracy of the approach is unknown and may have resulted in an overestimate or underestimate of potential COC outdoor air concentrations of sediment particles. This exposure pathway was not a main driver of the HHRA.

EPCs for fish tissue were estimated by using bioconcentration factors (BCF, from water to fish) or biota-sediment accumulation factors (BSAF; weighted, for organic COCs, for percent lipids in fish and percent organic carbon in sediments). These values were obtained from the open literature and may not be fully descriptive of site conditions. Many factors influence the uptake of chemicals from surface water and sediment systems into fish, including the fish species, age, and lipid content, sediment organic carbon content, and sediment pH, and even season. Because of variations in sediment and surface water COC concentrations and associated factors (TOC) at the site and little information on fish species present in the brook, fixed values for fish lipids (10.6 percent) and percent sediment TOC (11 percent) were applied to conservatively estimate bioaccumulation at the site.

Collectively, fish tissue EPCs contribute a moderate degree of uncertainty to the risk assessment.

Because of the number of variables affecting the uptake of COCs into fish tissue, screening level models probably overestimate COC fish tissue concentrations. It is recommended that actual samples of biota be collected from areas of the site to provide a more representative assessment of health risks due to fish consumption. An inventory of biota present in the brook and wetlands is also recommended.

4.4.4 Uncertainties in Receptors, Exposure Scenarios, and Exposure Factors

Two human receptor groups were assessed for exposure to COCs in sediment and surface water of the wetlands area: recreational trespassers and fish consumers. Other receptor groups may potentially be exposed, but their exposure will be similar to or less than the receptors assessed. The uncertainty associated with the scope of receptors assessed is low and, if anything, results in an overestimate of the potential current exposure.

Exposure factors used to quantify exposures were generally obtained from NHDES guidance and are anticipated to conservatively estimate COC intake and risk. The uncertainty associated with exposure factors is low.

4.4.5 Uncertainties Associated with the Risk Assessment Approach

By combining conservative estimates of exposure and toxicity, results of the risk assessment reflect conservative conditions that may not represent typical exposures. Therefore, health risks, particularly to an average individual who may be exposed, are likely to be overestimated.

5.0 FOCUSED ENVIRONMENTAL RISK ASSESSMENT

A focused ERA is performed in this section for contaminants identified in sediment and surface water of the site. The focused ERA is performed by comparing sediment and surface water concentrations with established effects-based benchmarks to determine potential risks to aquatic and benthic organisms.

5.1 Sediment Assessment

Table 1 presented a summary of sediment data collected from the site. These results are compared with the following ecological benchmarks:

- Threshold Effects Concentration (TEC) [MacDonald et al.(2000)]
- Probable Effects Concentration (PEC) [MacDonald et al.(2000)]

The basis and use of these values were discussed in Section 3.3.1. As shown earlier, numerous chemicals were detected in sediment at concentrations above both TEC and PEC values.

Hazard Index (HI) equivalents for combined exceedances for TEC and PEC values at each sediment sampling location for each COC are summarized on **Table 4** – *Calculation of Sediment Environmental Hazard Indices*, in which the sediment EPC for each COC is divided by its TEC or PEC to derive a hazard quotient, and all hazard quotients for the COC are summed together for the total HI. Total TEC HIs range from 11 to 780; total PEC HIs range from 3 to 106, as summarized below. Note that samples are arranged approximately from upstream to downstream, although many of the samples are located outside of the brook proper and in adjoining wetland areas:

LOCATION-SPECIFIC TEC AND PEC HAZARD INDICES FOR SEDIMENT DETECTIONS

Sample ID (Upstream to Downstream)	Brook (B) or Wetland (W)	TEC HI	PEC HI
SD-221	W	21	5
SD-102 (2020)	W	16	4
SD-220	W	91	20
SD-219	W	123	24
SD-102 (2008)	W	38	4
SD-218	W	160	41
SD-101 2008)	W	80	9
SD-101 (2020)	W	18	5
SD-217	W	780	106
SD-215	B	83	15
SD-103 (2020)	B	28	8
SD-214	W	19	3
SD-213	B	11	3
SD-212	B	33	8
SD-103 (2008)	B	77	8
SD-211	B	31	7
SD-210	B	66	16
SD-208	B	92	14
SD-207	W	704	97
SD-206	B	62	12
SD-205	B	13	3
SD-203	B	94	22
SD-105 (2020)	B	38	11
SD-202	W	25	4
SD-201	B	235	56

0-10x TEC or PEC
10-19x TEC or PEC
20-29 x TEC or PEC
>30x PEC or TEC

There was no sediment sample that did not have at least one TEC exceedance among its detections, nor was there any sediment sample that did not have at least one PEC exceedance. Areas of higher concentration can be inferred from the shading in the table, and two potential source or depositional areas are shown: between SD-212 and SD-213 and another at SD-207.

On **Table 4**, the percentage of the calculated TEC HI or PEC HI for each sample location that is associated with exposure to lead was calculated. For the TEC HI, the contribution from lead at any sample location ranged from 3 percent to 84 percent (average 38 percent), and the PEC HI percentage attributable to lead ranged from 7 percent to 88 percent (average 47 percent). So, while not the only contributor to higher-than-acceptable sediment HIs, lead plays a major role in the toxicity of the sediment.

Arsenic in sediments was considered in the above calculations with sediment arsenic concentrations ranging from 5.2 mg/kg to 110 mg/kg. In previous site reports, arsenic has been identified as "naturally-occurring", originating from minerals within the rocks of the region. Arsenic does occur naturally in New Hampshire, and may be found in metal arsenide and sulfide minerals, or as native arsenic as an accessory element in sulfide ore deposits. Widespread high arsenic concentrations in ground water within New Hampshire are most commonly caused by release from phyllosilicate, iron oxide, and sulfide minerals. Anaerobic conditions, which can be associated with landfill leachates, tend to increase the solubility and mobility of arsenic in ground water (*https://pubs.usgs.gov/sir/2004/5093/#N10121*).

Since the sediment assessment included arsenic, TEC and PEC HI calculations were re-run omitting arsenic from the calculations. This is presented in Table 5 - *Calculation of Sediment Environmental Hazard Indices Excluding Arsenic*. Whereas lead contributed between 3 to 84 percent of the total TEC HI with arsenic included, lead contributes 3 to 87 percent when arsenic is eliminated. Similarly, the PEC HI percentage attributable to lead ranged from 7 to 88 percent when arsenic was included, but changes to 8 to 91 percent when arsenic is removed. This indicates that arsenic is not a main driver of the sediment assessment; rather, lead is.

The conclusion of the sediment assessment is that sediment contains multiple constituents above their sediment benchmarks, most notably lead, suggesting that sediments are likely to be toxic to benthic organisms residing in the wetlands. Sediments of the site pose an unacceptable risk to the environment.

5.2 Surface Water Assessment

Table 2 summarized surface water analytical data from samples collected from Pickering Brook and its wetlands. These samples were analyzed for PCBs (not detected) and metals only, in both total and dissolved form. Sample results were compared with chronic and acute water quality standards (NHDES Env-Wq 1703.21, Table 1703.1) on **Table 2**. Some of the detected metals are regulated by the metal concentration in total form; some in dissolved form. In some cases, criteria for total metals were calculated by methods identified by NHDES to provide a comparison value; these are noted on Table 2.

As with sediment, detected COC concentrations at each location are compared with their benchmarks and a hazard quotient equivalent calculated for each metal at each location. HQs from all detections for a specific COC are added to derive a total HI. These comparison are shown on **Table 6** –*Total Surface Water Environmental Hazard Indices* and **Table 7** - *Dissolved Surface Water Environmental Hazard Indices* and summarized below:

LOCATION-SPECIFIC TEC AND PEC HAZARD INDICES FOR SURFACE WATER DETECTIONS

Sample ID (Upstream to Downstream)	Brook (B) or Wetland (W)	Total Metals		Dissolved Metals	
		Chronic Criterion HI	Acute Criterion HI	Chronic Criterion HI	Acute Criterion HI
SW-102 (2020)	W	9	0.8	--	--
SW-102 (2008)	W	3	2	--	--
SW-101 2008)	W	4	2	--	--
SW-101 (2020)	W	2	0.5	--	--
SW-103 (2020)	B	**193**	9	--	--
SW-212	B	**32**	2	6	0.5
SW-103 (2008)	B	**31**	3	--	--
SW-211	B	14	0.9	2	0.1
SW-210	B	**502**	21	9	0.4
SW-208	B	**32**	2	8	0.3
SW-203	B	**114**	5	20	0.8
SW-105 (2020)	B	**4,574**	189	--	--
SW-201	B	**73**	3	5	0.2

"—" Not sampled
0-10x criterion
10-19x criterion
20-29x criterion
>30x criterion

As with sediments, several constituents exceeded both their chronic freshwater aquatic criteria as well as acute freshwater aquatic criteria, as shown in Section 3.3.2. Above, a pattern of higher water quality exceedances appears at location SD-103 at the southwest corner of the site and continues to the end of the site (with one exception); all of these samples were collected from the brook proper, while wetland surface water samples have a lower degree of surface water standard exceedances. The percentage of the total chronic HI that is attributable to lead, except for the first four upstream samples, is between 94 and 99.7 percent. The percentage of the dissolved chronic HI that is attributable to lead is between 94.5 and 99.79 percent.

Note the following qualifications to this evaluation:

- Most detected metals are regulated in their dissolved, not total, form. Because the majority of analyses were performed for total metals, surrogate water quality criteria were calculated for the total form of these metals, using conversion factors identified by NHDES. More credence should be given to the dissolved analyses;
- Criteria for chemicals that are expressed as a function of a water-effect ratio (WER; arsenic, cadmium, chromium, lead, and mercury) assumed a WER of 1, as is used in the regulations;
- In the regulations, criteria for chemicals that are expressed as a function of total water calcium carbonate hardness are based on a hardness of 25 mg/L and were not modified

when in the correct form to compare with analyses. When surrogate criteria were calculated, a hardness of 100 mg/L was applied [the site specific hardness in water samples ranged from 32.3 mg/L to 390 mg/L (average is 178 mg/L)].

Based on the above focused assessment, total metals in surface water are present in water of Pickering Brook proper with HIs above one in all locations. Most total metals acute criteria were exceeded, as well. When dissolved metals data are assessed, chronic criteria exceedances exist at all locations, while dissolved metal acute criteria were not exceeded. The conclusion of this assessment is that surface water is adversely impacted and may pose an unacceptable risk to aquatic and benthic organisms, particularly in the brook proper.

5.3 Summary

Site sediment contains multiple constituents above their sediment benchmarks, suggesting that sediments are likely to be toxic to benthic organisms residing in the wetlands. Site surface water contains multiple constituents above their water quality criteria, both acute and chronic, and similarly poses a potential risk to pelagic (water column) aquatic organisms.

6.0 SUMMARY AND CONCLUSIONS

A focused HHRA/ERA was conducted for the property at 375 Banfield Road in Portsmouth, New Hampshire. The assessment addressed the risk of harm to human health and the environment posed by the presence of petroleum hydrocarbons, PAHs, and metals in site wetlands and sediments, using site-specific data, current and reasonable foreseeable future uses of the site, screening level fate and transport models, and recommended NHDES risk assessment guidance.

The results of the quantitative assessment for humans accessing the site as recreational trespassers are shown below:

FOCUSED RISK ASSESSMENT SUMMARY
RECREATORS/TRESPASSERS WHO CONSUME PICKERING BROOK FISH

Exposure Pathway	Non-Carcinogenic Hazard Index			Excess Lifetime Cancer Risk
	Child	Youth	Adult	Combined[1]
Sediment ingestion	6.8	1.4	0.8	1×10^{-5}
Sediment dermal contact	0.5	0.2	0.1	8×10^{-6}
Inhalation of entrained (dry) sediment particles	0.02	0.02	0.02	7×10^{-7}
Surface water ingestion	2.7	1.1	0.3	5×10^{-5}
Surface water dermal contact	0.001	0.0008	0.0005	9×10^{-8}
Recreational fish consumption (all)	12	10	9	1.4×10^{-5}
All Except Fish Consumption	**10**	**3**	**1**	$\mathbf{7 \times 10^{-5}}$
Total (all pathways)	**22**	**13**	**10**	$\mathbf{1 \times 10^{-4}}$
Maximum Acceptable Level	**1**			$\mathbf{1 \times 10^{-5}}$

[1]. Age-specific cancer risks are intermediate values and are not shown; refer to risk spreadsheets.

[2]. No carcinogens in this pathway.

The total HI for each recreational trespasser age group is above the maximum acceptable HI of 1 and the excess lifetime cancer risk is above the maximum acceptable cancer risk of $1x10^{-5}$. Therefore, the site poses an unacceptable risk to human health for recreational trespassers that catch and consume fish from Pickering Brook. Health risks are also at unacceptable levels for trespassing without fish consumption, and for fish consumption without trespassing.

Site sediment contains multiple constituents above their sediment benchmarks, suggesting that sediments are likely to be toxic to benthic organisms residing in the wetlands. Total sediment TEC HIs for individual sample locations ranged from 11 to 780.

Site surface water contains multiple constituents above their water quality criteria, both acute and chronic, and similarly poses a potential risk to pelagic (water column) aquatic organisms. Total chronic surface water HIs for individual sample locations ranged from 2 to 20.

Because of the number of variables affecting the uptake of COCs into fish tissue, screening level models applied in the focused ERA probably overestimate COC fish tissue concentrations. It is recommended that actual samples of biota be collected from areas of the site to provide a more representative assessment of health risks due to fish consumption. An inventory of biota present in the brook and wetlands is also recommended.

It is also recommended that consideration be given to analyzing PFAS compounds in surface water and, potentially, sediment. This focused HHRA/ERA does not address the presence of PFAS compounds in any media.

The conclusions of this focused HHRA/ERA are based upon the data provided to or obtained by Sovereign, which is accepted as valid unless otherwise noted herein, as well as the assumptions and approaches presented in this assessment, and assume that conditions at the site described by the available data represent potential site conditions over the period of time assessed.

7.0 REFERENCES

American Society for Testing and Materials (ASTM) (2015). Standard Guide for Risk-Based

Massachusetts Contingency Plan, 310 CMR 40.0000.

MassDEP (2002a). Characterization of Risks Due to Inhalation of Particulates by Construction Workers (April).

MassDEP (1995). Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan. Interim Final Policy (July).

National Climatic and Data Center (NCDC) (1998). Climatic Wind Data for the United States.

New Hampshire Department of Environmental Services (NHDES 2013). Risk Characterization and Management Policy, Appendix A – Methodology for Calculating Direct Contact Risk-Based Soil Concentrations.

NHDES (2005) Evaluation of Sediment Quality Guidance Document.

Ransom Environmental Consultants (2008) Third Party Notification, Commercial Property DES #199408047, 375 Banfield Road, Portsmouth, New Hampshire.

US Environmental Protection Agency (EPA) (2017). Integrated Risk Information System.

US EPA (2004). User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings (February).

US EPA (2004a). Risk Assessment Guidance for Superfund – Volume I: Human Health Evaluation Manual (Part E: Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005.

US EPA (1994). DNAPL Site Characterization (EPA/540/F-94/049).

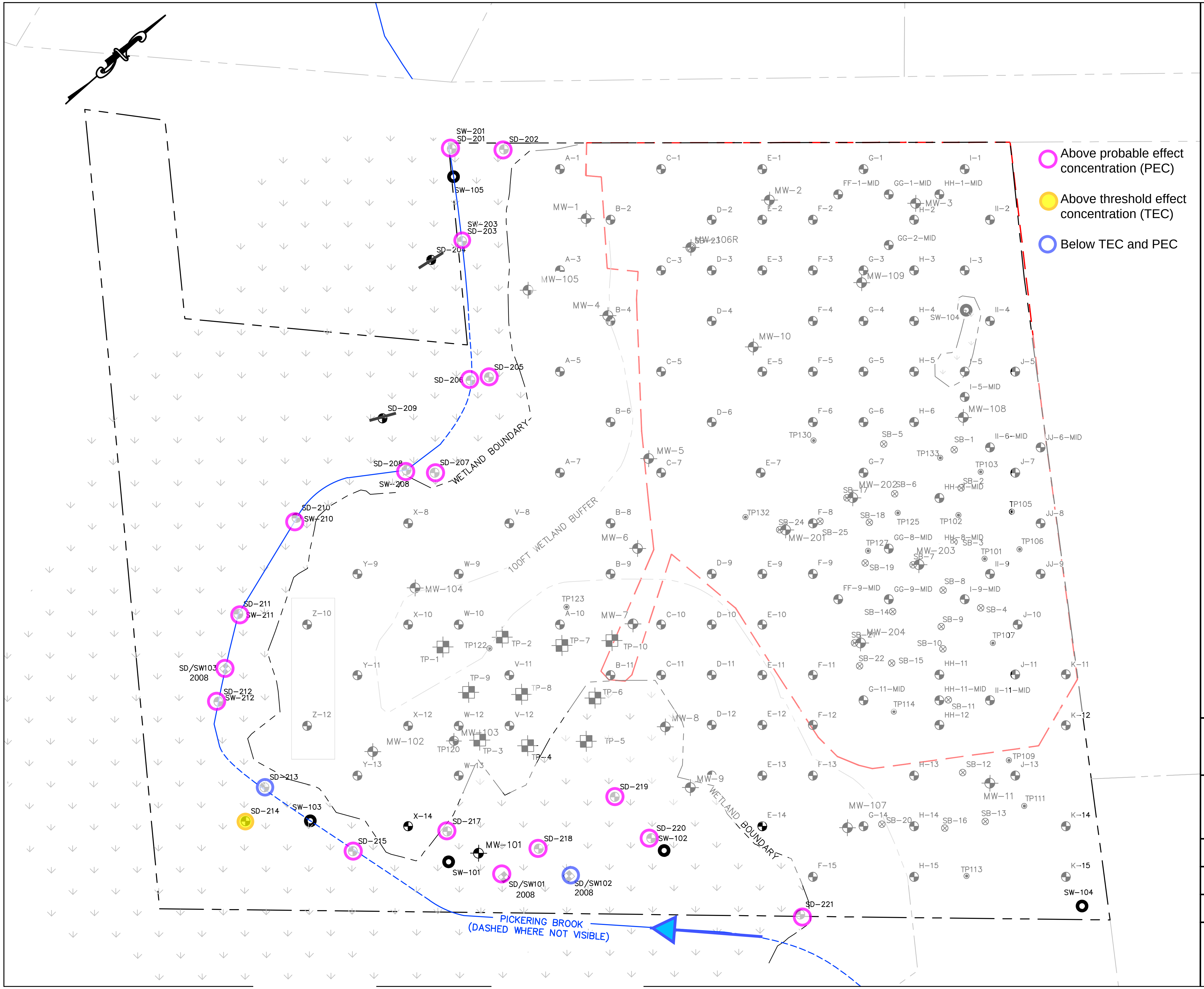
US EPA (1991) Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03 (March).

US EPA (1989). Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002 (December).

Wilcox & Barton (2020) Site Investigation Report, Former Country Motor Sales, 375 Banfield Road, Portsmouth, New Hampshire.

FIGURES

FIGURE 1
SITE AERIAL VIEW
375 Banfield Road,
Portsmouth, New Hampshire



LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

LIMITS OF DISTURBANCE

WETLAND BOUNDARY

WETLAND BUFFER

APPROXIMATE CENTER OF BROOK

MW-1 MONITORING WELL

SB-5 SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)

TEST PIT LOCATION (RANSOM 2008)

TEST PIT LOCATION

Y-9 SOIL SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)

SW-201 SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)

SW-104 APPROXIMATE SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)

SD/SW103 APPROXIMATE SURFACE WATER AND SEDIMENT SAMPLE LOCATION (RANSOM 2008)

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

GRAPHIC SCALE

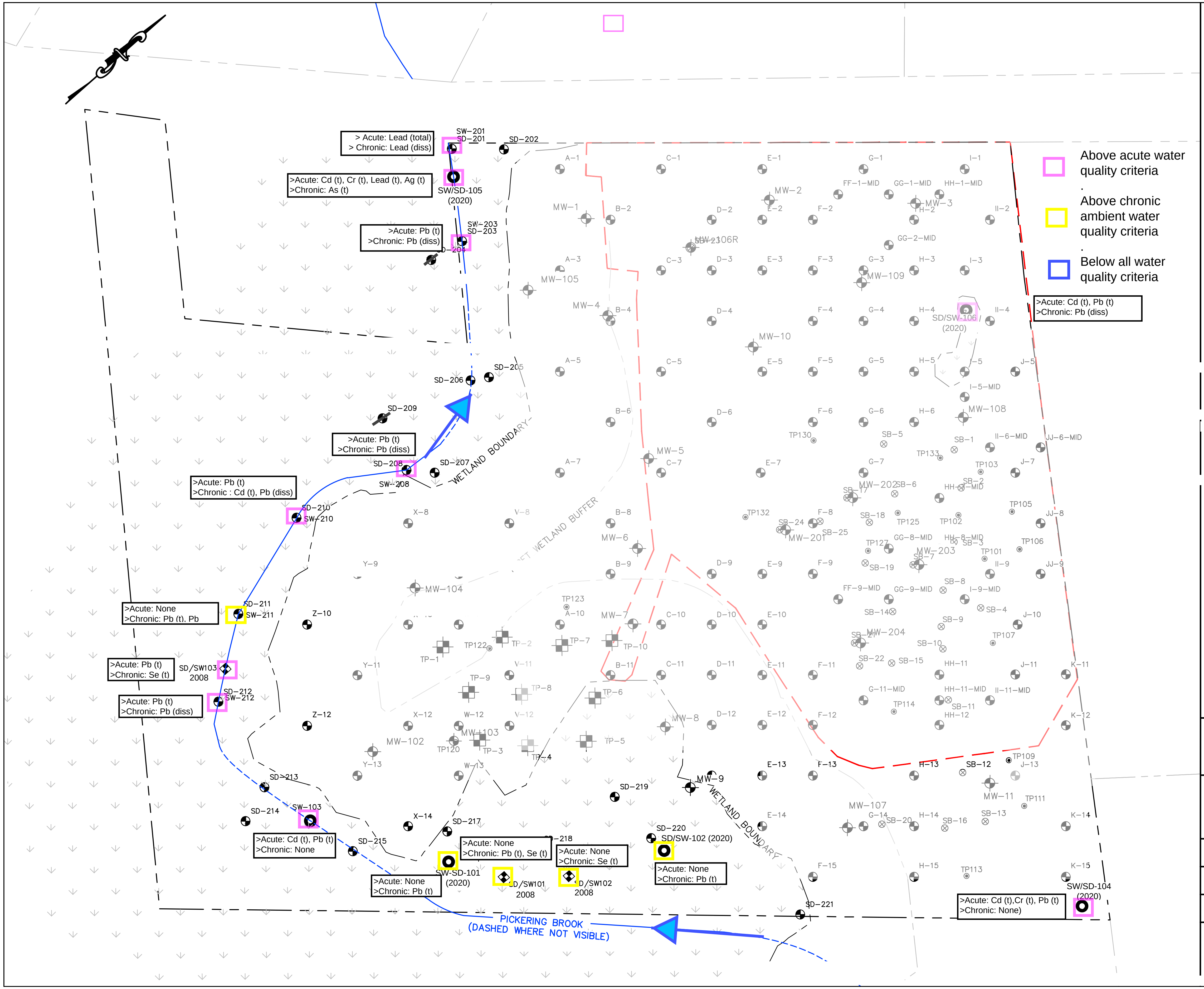
100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
FIGURE 1
SEDIMENT SAMPLE LOCATIONS

DATE	SCALE	FILE
October 27, 2021	GRAPHIC	Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER –



LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

LIMITS OF DISTURBANCE

WETLAND BOUNDARY

WETLAND BUFFER

APPROXIMATE CENTER OF BROOK

MW-1 MONITORING WELL

SB-5 SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)

TEST PIT LOCATION (RANSOM 2008)

TEST PIT LOCATION

Y-9 SOIL SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)

SW-201 SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)

SW-104 APPROXIMATE SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)

XIMATE SURFACE WATER AND SEDIMENT SAMPLE LOCATION (RANSOM 2008)

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

FIGURE 3
Surface Water Sample Locations

DATE October 27, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER –

TABLES

TABLE 1
Summary of Sediment Analytical Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID (Upgradient to Downgradient)	**Sample Date**	**Total Organic Carbon mg/kg**		**C9-C18 Aliphatic Hydrocarbons mg/kg**		**C19-C36 Aliphatic Hydrocarbons mg/kg**		**C11-C22 Aromatic Hydrocarbons (adjusted) mg/kg**	**Acenaphthene (SVOC/EPH) mg/kg**		**Acenaph-thylene (SVOC/EPH) mg/kg**		**Anthracene (SVOC/EPH) mg/kg**	
SD-221	10/1/21	**26,000**		12	U	**31**		**37**	0.099	U	**0.012**	**J**	**0.014**	**J**
SD-102 (2020)	5/22/20	-		-		-		-	-		-		-	
SD-220	10/1/21	**4,200**		**13**		**240**		**350**	**0.036**	**J**	**0.038**	**J**	**0.11**	
SD-219	10/1/21	**66,000**		**18**		**780**		**240**	**0.0094**	**J**	**0.040**	**J**	**0.056**	**J**
SD-102 (2008) [1]	7/28/08	-		-		-		-	0.64	U	0.64	U	*0.64*	*U*
SD-218	10/1/21	**69,000**	**J**	33	U	**180**		**150**	**0.041**	**J**	**0.023**	**J**	**0.12**	
SD-101 2008)	7/28/08	-		-		-		-	1.4	U	1.4	U	*1.4*	*U*
SD-101 (2020)	5/22/20	-		-		-		-	-		-		-	
SD-217	9/23/21	**49,000**	**J**	15	U	**29**		**190**	**2.4**		**0.11**	**J**	**3.4**	
SD-215	9/23/21	**220,000**	**J**	31	U	**60**		**75**	0.22	U	0.22	U	**0.28**	**J**
SD-103 (2020)	5/22/20	-		-		-		-	-		-		-	
SD-214	9/23/21	**77,000**	**J**	37	U	**38**		**73**	0.26	U	0.26	U	*0.26*	*U*
SD-213	9/23/21	**92,000**	**J**	23	U	23	U	**32**	**0.0063**	**J**	0.076	U	**0.018**	**J**
SD-212	9/23/21	**310,000**		99	U	**130**		**160**	0.33	U	0.33	U	**0.016**	**J**
SD-103 (2008) [1]	7/28/08	-		-		-		-	1.4	U	1.4	U	*1.4*	*U*
SD-211	9/23/21	**600,000**		37	U	**50**		**86**	0.12	U	0.12	U	**0.013**	**J**
SD-210	9/23/21	**770,000**		100	U	**140**		**260**	0.34	U	0.34	U	*0.27*	*U*
SD-208	9/23/21	**220,000**	**J**	31	U	**68**		**130**	0.21	U	0.21	U	**0.42**	
SD-207	9/22/21	**210,000**	**J**	35	U	**96**		**350**	**1.2**		**0.33**	**J**	**3.1**	
SD-206	9/22/21	**200,000**	**J**	69	U	**73**		**85**	**0.014**	**J**	**0.013**	**J**	**0.038**	**J**
SD-205	9/22/21	**110,000**	**J**	24	U	**24**		**37**	**0.0063**	**J**	**0.0045**	**J**	**0.017**	**J**
SD-203	9/22/21	**480,000**	**J**	83	U	**270**		**490**	**0.029**	**J**	**0.026**	**J**	**0.11**	**J**
SD-105 (2020)	5/22/20	-		-		-		-	-		-		-	
SD-202	9/22/21	**1,700**		20	U	**76**		**25**	0.2	U	0.2	U	0.2	U
SD-201	9/22/21	**200,000**	**J**	110	U	**280**		**360**	1.1	U	1.1	U	*1.1*	*U*
Arithmetic Mean Concentration		**205,828**		**23**		**143**		**174**	**0.33**		**0.18**		**0.49**	
Maximum Detected Concentration		**770,000**		**110**		**780**		**490**	**2.4**		**0.33**	**J**	**3.4**	
95th Percentile Upper Confidence Limit of Mean [2]		**NC**		**16.9**		**273**		**231**	**1.0**		**0.11**		**1.32**	
Threshold Effect Concentration (TEC)[3]		NE							NE		NE		0.0572	
Probable Effect Concentration (PEC [3]		NE							NE		NE		0.845	

All analytes are shown (is this true?)

Value	Above TEC.
Value	Above PEC.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
ND	Not detected (collective).
0.56 U	(Italics) Not detected at reporting limit above TEC.
D	Dissolved analyses.
SVOC/EPH	Highest detected/lowest reporting limit from semi-volatile organic compound analysis and extractable petroleum hydrocarbon analysis.
[1]	Analyzed for VOCs; none detected.
[2].	Calculated by ProUCL; see appendix. Applied as exposure point concentration (EPC) for human health assessment.
[3].	MacDonald, Ingersoll, & Berger (2000) Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Envir. Contam. Toxicol. 39, 20-31.
[4].	Maximum concentration applied; too few detections to calculate 95% UCL.
Excluded:	SD-204, SD-209, SD-106, SD-104

TABLE 1
Summary of Sediment Analytical Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID (Upgradient to Downgradient)	Sample Date	Total Organic Carbon mg/kg	Benzo(a)-anthracene (SVOC/EPH) mg/kg	Benzo(a)-pyrene (SVOC/EPH) mg/kg	Benzo(b)-fluoranthene (SVOC/EPH) mg/kg	Benzo(g,h,i)-perylene (SVOC/EPH) mg/kg	Benzo(k)-fluoranthene (SVOC/EPH) mg/kg	Chrysene (SVOC/EPH) mg/kg
SD-221	10/1/21	**26,000**	**0.066**	**0.049**	**0.089**	**0.050 J**	**0.031 J**	**0.078 J**
SD-102 (2020)	5/22/20	-	-	-	-	-	-	-
SD-220	10/1/21	**4,200**	**0.35**	**1.8**	**0.40**	**0.25**	**0.14**	**0.36**
SD-219	10/1/21	**66,000**	**0.14**	**7.5**	**0.23**	**0.20 J**	**0.074 J**	***0.17***
SD-102 (2008) [1]	7/28/08	-	*0.64 U*	*0.64 U*	0.64 U	0.64 U	0.64 U	*0.64 U*
SD-218	10/1/21	**69,000 J**	**0.40**	**0.37**	**0.46**	**0.28**	**0.19**	***0.42***
SD-101 2008)	7/28/08	-	*1.4 U*	*1.4 U*	1.4 U	1.4 U	1.4 U	*1.4 U*
SD-101 (2020)	5/22/20	-	-	-	-	-	-	-
SD-217	9/23/21	**49,000 J**	**11**	**9.8**	**12**	**5.6**	**4.9**	**11**
SD-215	9/23/21	**220,000 J**	**0.89**	**0.85**	**1.1**	**0.61**	**0.41**	**1.0**
SD-103 (2020)	5/22/20	-	-	-	-	-	-	-
SD-214	9/23/21	**77,000 J**	*0.26 U*	*0.26 U*	0.26 U	0.26 U	0.26 U	*0.26 U*
SD-213	9/23/21	**92,000 J**	**0.057**	**0.051**	**0.070**	**0.031 J**	**0.024 J**	**0.066**
SD-212	9/23/21	**310,000**	**0.052 J**	**0.046 J**	**0.064 J**	**0.030 J**	**0.022 J**	**0.062 J**
SD-103 (2008) [1]	7/28/08	-	*1.4 U*	*1.4 U*	1.4 U	1.4 U	1.4 U	*1.4 U*
SD-211	9/23/21	**600,000**	**0.053**	**0.045**	**0.059**	**0.025 J**	**0.021 J**	**0.051 J**
SD-210	9/23/21	**770,000**	**0.048 J**	**0.041 J**	**0.064 J**	**0.031 J**	**0.022 J**	**0.059 J**
SD-208	9/23/21	**220,000 J**	**1.2**	**1.2**	**1.3**	**0.88**	**0.47**	**1.3**
SD-207	9/22/21	**210,000 J**	**11**	**9.8**	**12**	**4.6**	**4.6**	**11**
SD-206	9/22/21	**200,000 J**	**0.15**	**2.6**	**0.18**	**0.088 J**	**0.062 J**	**0.16**
SD-205	9/22/21	**110,000 J**	**0.054**	**0.046**	**0.059**	**0.032 J**	**0.025 J**	**0.059**
SD-203	9/22/21	**480,000 J**	**0.38**	**0.31**	**0.39**	**0.20 J**	**0.14**	**0.39**
SD-105 (2020)	5/22/20	-	-	-	-	-	-	-
SD-202	9/22/21	**1,700**	**0.16 J**	**0.43**	**0.37**	**0.16 J**	**0.12 J**	**0.19 J**
SD-201	9/22/21	**200,000 J**	**0.72 J**	**0.84 J**	**0.98 J**	1.10 U	1.10 U	**0.77 J**
Arithmetic Mean Concentration		**205,828**	**1.36**	**1.79**	**1.51**	**0.74**	**0.65**	**1.38**
Maximum Detected Concentration		**770,000**	**11**	**9.8**	**12**	**5.6**	**4.9**	**11**
95th Percentile Upper Confidence Limit of Mean [2]		**NC**	**4.41**	**4.11**	**4.84**	**2.11**	**1.91**	**4.43**
Threshold Effect Concentration (TEC)[3]		NE	0.108	0.15	NE	NE	NE	0.166
Probable Effect Concentration (PEC [3]		NE	1.05	1.45	NE	NE	NE	1.29

All analytes are shown (is this true?)

Value	Above TEC.
Value	Above PEC.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
ND	Not detected (collective).
0.56 U	(Italics) Not detected at reporting limit above TEC.
D	Dissolved analyses.
SVOC/EPH	Highest detected/lowest reporting limit from semi-volatile organic compound analysis and extractable petroleum hydrocarbon analysis.
[1]	Analyzed for VOCs; none detected.
[2].	Calculated by ProUCL; see appendix. Applied as exposure point concentration (EPC) for human health assessment.
[3].	MacDonald, Ingersoll, & Berger (2000) Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Envir. Contam. Toxicol. 39, 20-31.
[4].	Maximum concentration applied; too few detections to calculate 95% UCL.
Excluded:	SD-204, SD-209, SD-106, SD-104

TABLE 1
Summary of Sediment Analytical Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID (Upgradient to Downgradient)	Sample Date	Total Organic Carbon mg/kg		Dibenzo(a,h)-anthracene (SVOC/EPH) mg/kg		Fluoranthene (SVOC/EPH) mg/kg		Fluorene (SVOC/EPH) mg/kg		Indeno(1,2,3-cd)-pyrene (SVOC/EPH) mg/kg		2-Methyl-naphthalene (SVOC/EPH) mg/kg		Naphthalene (SVOC/EPH) mg/kg	
SD-221	10/1/21	**26,000**		**0.011**	**J**	**0.13**	**J**	*0.12*	*U*	**0.045**	**J**	0.12	U	0.12	U
SD-102 (2020)	5/22/20	-		-		-		-		-		-		-	
SD-220	10/1/21	**4,200**		**0.054**		**0.63**		**0.040**	**J**	**0.25**		**0.36**		**0.33**	
SD-219	10/1/21	**66,000**		***0.034***		**0.39**		**0.010**	**J**	**0.18**		**0.40**		**0.35**	
SD-102 (2008) [1]	7/28/08	-		*0.64*	*U*	*0.64*	*U*	*0.64*	*U*	0.64	U	0.64	U	*0.64*	*U*
SD-218	10/1/21	**69,000**	**J**	**0.061**		**0.77**		**0.041**	**J**	**0.28**		0.33	U	0.33	U
SD-101 2008)	7/28/08	-		*1.4*	*U*	*1.4*	*U*	*1.4*	*U*	1.4	U	1.4	U	*1.4*	*U*
SD-101 (2020)	5/22/20	-		-		-		-		-		-		-	
SD-217	9/23/21	**49,000**	**J**	**1.8**		**22**		**2.1**		**6.8**		**0.36**		**0.58**	
SD-215	9/23/21	**220,000**	**J**	*0.22*	*U*	**2.1**		*0.22*	*U*	**0.57**		0.22	U	*0.22*	*U*
SD-103 (2020)	5/22/20	-		-		-		-		-		-		-	
SD-214	9/23/21	**77,000**	**J**	*0.26*	*U*	0.26	U	*0.26*	*U*	0.26	U	0.26	U	*0.26*	*U*
SD-213	9/23/21	**92,000**	**J**	**0.0079**	**J**	**0.12**	**J**	**0.0063**	**J**	**0.038**	**J**	0.23	U	*0.23*	*U*
SD-212	9/23/21	**310,000**		*0.066*	*U*	**0.11**	**J**	*0.99*	*U*	**0.039**	**J**	0.99	U	*0.99*	*U*
SD-103 (2008) [1]	7/28/08	-		*1.4*	*U*	*1.4*	*U*	*1.4*	*U*	1.4	U	1.4	U	*1.4*	*U*
SD-211	9/23/21	**600,000**		0.024	U	**0.54**		*0.37*	*U*	**0.032**	**J**	0.37	U	*0.37*	*U*
SD-210	9/23/21	**770,000**		*0.069*	*U*	**0.10**	**J**	*1.0*	*U*	**0.037**	**J**	1.0	U	*1.0*	*U*
SD-208	9/23/21	**220,000**	**J**	*0.21*	*U*	**2.5**		*0.21*	*U*	**0.56**		0.21	U	*0.21*	*U*
SD-207	9/22/21	**210,000**	**J**	**1.5**		**23**		**1.5**		**5.5**		**0.43**	**J**	**0.82**	
SD-206	9/22/21	**200,000**	**J**	**0.022**	**J**	**0.31**		**0.011**	**J**	**0.10**		0.46	U	*0.46*	*U*
SD-205	9/22/21	**110,000**	**J**	**0.0082**		**0.12**		**0.0064**	**J**	**0.038**		0.16	U	0.16	U
SD-203	9/22/21	**480,000**	**J**	**0.048**		**0.76**		**0.037**	**J**	**0.22**		0.55	U	*0.55*	*U*
SD-105 (2020)	5/22/20	-		-		-		-		-		-		-	
SD-202	9/22/21	**1,700**		*0.2*	*U*	**0.3**	**J**	*0.2*	*U*	**0.22**	**J**	0.2	U	*0.2*	*U*
SD-201	9/22/21	**200,000**	**J**	*1.1*	*U*	**1.1**	**J**	*1.1*	*U*	1.1	U	**43**		**19**	
Arithmetic Mean Concentration		**205,828**		**0.30**		**2.71**		**0.37**		**0.8**		**2.32**		**1.21**	
Maximum Detected Concentration		**770,000**		**1.8**		**23**		**2.1**		**6.8**		**43**		**19**	
95th Percentile Upper Confidence Limit of Mean [2]		**NC**		**0.66**		**9.01**		**0.96**		**2.49**		**16.1**		**5.38**	
Threshold Effect Concentration (TEC)[3]		NE		0.033		0.423		0.0774		NE		NE		0.176	
Probable Effect Concentration (PEC [3]		NE		NE		2.23		0.536		NE		NE		0.166	

All analytes are shown (is this true?)

Value	Above TEC.
Value	Above PEC.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
ND	Not detected (collective).
0.56 U	(Italics) Not detected at reporting limit above TEC.
D	Dissolved analyses.
SVOC/EPH	Highest detected/lowest reporting limit from semi-volatile organic compound analysis and extractable petroleum hydrocarbon analysis.
[1]	Analyzed for VOCs; none detected.
[2].	Calculated by ProUCL; see appendix. Applied as exposure point concentration (EPC) for human health assessment.
[3].	MacDonald, Ingersoll, & Berger (2000) Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Envir. Contam. Toxicol. 39, 20-31.
[4].	Maximum concentration applied; too few detections to calculate 95% UCL.
Excluded:	SD-204, SD-209, SD-106, SD-104

TABLE 1
Summary of Sediment Analytical Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID (Upgradient to Downgradient)	Sample Date	Total Organic Carbon mg/kg	Phenanthrene (SVOC/EPH) mg/kg	Pyrene (SVOC/EPH) mg/kg	Total PCBs mg/kg	Arsenic mg/kg	Barium mg/kg	Cadmium mg/kg
SD-221	10/1/21	**26,000**	**0.043 J**	**0.12 J**	--	**12**	**120**	**3.7**
SD-102 (2020)	5/22/20	-	-	-	*0.89 U*	**9.5 J**	**110**	**3.6 J**
SD-220	10/1/21	**4,200**	**0.43**	**0.53**	--	**15**	**400**	**3.6**
SD-219	10/1/21	**66,000**	**0.29**	**0.44**	--	**13**	**500**	**4.4**
SD-102 (2008) [1]	7/28/08	-	*0.64 U*	0.64 U	-	**9.5**	**80** J	**1.3 U**
SD-218	10/1/21	**69,000 J**	**0.43**	**0.74**	--	**13**	**1100**	**4.7**
SD-101 2008)	7/28/08	-	*1.4 U*	1.4 U	-	**15.9**	**160** J	**2.7 U**
SD-101 (2020)	5/22/20	-	-	-	*0.56 U*	**24**	**140**	**1.6 J**
SD-217	9/23/21	**49,000 J**	**17**	**22**	--	**14**	**500**	**1.8**
SD-215	9/23/21	**220,000 J**	**0.32**	**2.1**	--	**110**	**160**	**7.2**
SD-103 (2020)	5/22/20	-	-	-	*0.48 U*	*21 U*	**230**	**2.1**
SD-214	9/23/21	**77,000 J**	*0.26 U*	0.26 U	--	**5.8 J**	**66**	1.2 U
SD-213	9/23/21	**92,000 J**	**0.079**	**0.10 J**	--	**27**	**67**	**1.3**
SD-212	9/23/21	**310,000**	**0.063 J**	**0.090 J**	--	*33 U*	**120**	**3.0 J**
SD-103 (2008) [1]	7/28/08	-	*1.4 U*	1.4 U	-	**15.4**	**170** J	2.8 U
SD-211	9/23/21	**600,000**	**0.32**	**0.57**	--	**9.3 J**	**36**	**2.8**
SD-210	9/23/21	**770,000**	*0.34 U*	**0.079 J**	--	*33 U*	**140**	**4.7**
SD-208	9/23/21	**220,000 J**	**2.4**	**2.7**	--	**5.2 J**	**98**	**0.91 J**
SD-207	9/22/21	**210,000 J**	**14**	**23**	--	**24.0 D**	**440** D	**2.3 D**
SD-206	9/22/21	**200,000 J**	**0.16**	**0.24 J**	--	**18.0 JD**	**260** D	**7.3 D**
SD-205	9/22/21	**110,000 J**	**0.081**	**0.092 J**	--	**21.0 D**	**95** D	**1.6 D**
SD-203	9/22/21	**480,000 J**	**0.44**	**0.66**	--	**21.0 D**	**260** D	**5.6 D**
SD-105 (2020)	5/22/20	-	-	-	*0.97 U*	**80**	**830**	**2.3 J**
SD-202	9/22/21	**1,700**	**0.11 J**	**0.32 J**	--	**11.0 D**	**89** D	**1.7 D**
SD-201	9/22/21	**200,000 J**	**1.2 J**	**1.3 J**	--	**69.0 D**	**580** D	**7.5 D**
Arithmetic Mean Concentration		**205,828**	**1.88**	**2.71**	**ND**	**23**	**270**	**3.1**
Maximum Detected Concentration		**770,000**	**17**	**23**	**--**	**110**	**1,100**	**7.5**
95th Percentile Upper Confidence Limit of Mean [2]		**NC**	**6.24**	**9.02**	**NC**	**30**	**408**	**3.86**
Threshold Effect Concentration (TEC)[3]		NE	0.204	0.195	0.0598	9.79	NE	0.99
Probable Effect Concentration (PEC [3]		NE	1.17	1.52	0.676	33	NE	4.98

All analytes are shown (is this true?)

Value	Above TEC.
Value	Above PEC.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
ND	Not detected (collective).
0.56 U	(Italics) Not detected at reporting limit above TEC.
D	Dissolved analyses.
SVOC/EPH	Highest detected/lowest reporting limit from semi-volatile organic compound analysis and extractable petroleum hydrocarbon analysis.
[1]	Analyzed for VOCs; none detected.
[2].	Calculated by ProUCL; see appendix. Applied as exposure point concentration (EPC) for human health assessment.
[3].	MacDonald, Ingersoll, & Berger (2000) Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Envir. Contam. Toxicol. 39, 20-31.
[4].	Maximum concentration applied; too few detections to calculate 95% UCL.
Excluded:	SD-204, SD-209, SD-106, SD-104

TABLE 1
Summary of Sediment Analytical Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID (Upgradient to Downgradient)	Sample Date	Total Organic Carbon mg/kg		Chromium (total) mg/kg		Lead mg/kg		Mercury mg/kg		Selenium mg/kg		Silver mg/kg	
SD-221	10/1/21	**26,000**		**55**		**360**		**0.051**		3.9	U	0.39	U
SD-102 (2020)	5/22/20	-		**9.5**		**330**		**0.31**		39	U	3.9	U
SD-220	10/1/21	**4,200**		**51**		**1,900**		**0.26**		4.1	U	0.41	U
SD-219	10/1/21	**66,000**		**48**		**1,900**		**0.34**		5.1	U	**3.5**	
SD-102 (2008) [1]	7/28/08	-		**38**		**87**		**0.13**		**1.8**		5	U
SD-218	10/1/21	**69,000**	J	**53**		**4,600**		**0.43**		5.3	U	0.53	U
SD-101 2008)	7/28/08	-		**32**	J	**154**		**0.27**		**3.2**		11	U
SD-101 (2020)	5/22/20	-		**17**		**480**		**0.11**	J	23	U	2.3	U
SD-217	9/23/21	**49,000**	J	**28**		**2,800**		**13**		**6.3**		0.5	U
SD-215	9/23/21	**220,000**	J	**64**		**510**		**0.17**	J	10	U	1.00	U
SD-103 (2020)	5/22/20	-		**7.4**		**840**		**0.20**		21	U	2.1	U
SD-214	9/23/21	**77,000**	J	**39**		**93**		**0.27**		12	U	1.2	U
SD-213	9/23/21	**92,000**	J	**39**		**58**		**0.089**		7.1	U	0.71	U
SD-212	9/23/21	**310,000**		**16**		**510**		**0.20**	J	33	U	3.3	U
SD-103 (2008) [1]	7/28/08	-		**39**		**77**		**0.17**	J	**3.3**		11	U
SD-211	9/23/21	**600,000**		**22**		**510**		**0.20**		12	U	1.2	U
SD-210	9/23/21	**770,000**		**23**		**1,500**		**0.40**		33	U	3.3	U
SD-208	9/23/21	**220,000**	J	**32**		**660**		**0.13**		10	U	1.0	U
SD-207	9/22/21	**210,000**	J	**32**	D	**3,500**	D	**0.42**	D	12	UD	2.3	UD
SD-206	9/22/21	**200,000**	J	**22**	D	**880**	D	**0.4**	D	23	UD	2.3	UD
SD-205	9/22/21	**110,000**	J	**30**	D	**150**	D	**0.087**	D	7.8	UD	0.78	UD
SD-203	9/22/21	**480,000**	J	**35**	D	**2,200**	D	**0.65**	D	27	UD	2.7	UD
SD-105 (2020)	5/22/20	-		**9.7**		**940**		**0.27**	J	39	U	3.9	U
SD-202	9/22/21	**1,700**		**58**	D	**160**	D	**0.16**	D	6.6	UD	0.66	UD
SD-201	9/22/21	**200,000**	J	**31**	D	**1,600**	D	**0.31**	D	36	UD	3.6	UD
Arithmetic Mean Concentration		**205,828**		**33**		**1,072**		**0.76**		**10**		**1.7**	
Maximum Detected Concentration		**770,000**		**64**		**4,600**		**13.0**		**6.3**		**3.5**	
95th Percentile Upper Confidence Limit of Mean [2]		**NC**		**39**		**1,660**		**3.0**		**4.3**		**3.5**	**[4]**
Threshold Effect Concentration (TEC)[3]		NE		43.4		35.8		0.18		NE		NE	
Probable Effect Concentration (PEC [3]		NE		111		128		1.06		NE		NE	

All analytes are shown (is this true?)

Value	Above TEC.
Value	Above PEC.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
ND	Not detected (collective).
0.56 U	(Italics) Not detected at reporting limit above TEC.
D	Dissolved analyses.
SVOC/EPH	Highest detected/lowest reporting limit from semi-volatile organic compound analysis and extractable petroleum hydrocarbon analysis.
[1]	Analyzed for VOCs; none detected.
[2].	Calculated by ProUCL; see appendix. Applied as exposure point concentration (EPC) for human health assessment.
[3].	MacDonald, Ingersoll, & Berger (2000) Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Envir. Contam. Toxicol. 39, 20-31.
[4].	Maximum concentration applied; too few detections to calculate 95% UCL.
Excluded:	SD-204, SD-209, SD-106, SD-104

TABLE 2
Summary of Surface Water Analytical Data
375 Banfield Road, Portsmouth, NH

Sample ID (Upstream to downstream)	Sampling Date	Calcium Carbonate Hardness (total)[1] mg/L	Aroclors (Total) (Sum of detected Aroclors) µg/L	Arsenic (total) µg/L	Arsenic (dissolved) µg/L	Barium (total) µg/L	Barium (dissolved) µg/L	Cadmium* (total) µg/L	Cadmium* (dissolved) µg/L	Chromium (total) µg/L	Chromium (dissolved) µg/L
SW-102 (2020) [2,5]	05/22/20	390 [3]	0.21 U	**2.5**	--	**47**	--	**0.098** J	--	1.0 U	--
SW-102 (2008)	07/27/08	96.5	--	**6.0**	--	**40**	--	0.20 U	--	2.0 U	--
SW-101 (2008)	07/28/08	--	--	**5.0**	--	**45**	--	0.20 U	--	2.0 U	--
SW-101 (2020) [2]	05/22/20	290 [3]	0.19 U	**9.0**	--	**40**	--	0.20 U	--	**1.1**	--
SW-103 (2020) [2,5]	05/22/20	280 [3]	0.20 U	**2.1**	--	**94**	--	**1.1**	--	**1.8**	--
SW-212 [2]	09/23/21	41	--	**3.7**	**3.1**	**35**	**35**	**0.17** J	**0.032** J	**3.1**	**3.0**
SW-103 (2008)	07/28/08	32.3	--	**7.0**	--	**22**	--	**0.2** J	--	**3.0** J	--
SW-211 [2]	09/23/21	65	--	**0.49** J	**1.0**	**51**	**51**	**0.039** J	0.20 U	1.0 U	1.0 U
SW-210 [2]	09/23/21	72	--	**5.2**	**1.1**	**100**	**64**	**1.0**	0.20 U	**3.0**	1.0 U
SW-208 [2]	09/23/21	48	--	**2.1**	**1.9**	**37**	**29**	0.20 U	0.20 U	**1.1**	1.0 U
SW-203 [2]	09/22/21	130	--	**2.8**	**2.1**	**280**	**280**	**0.11** J	0.20 U	**1.0** J	1.0 U
SW-105 (2020)	05/22/20	560 [3]	0.19 U	**230**	--	**4,200**	--	**8.5**	--	**35**	--
SW-201 [2]	09/22/21	130	--	**2.3**	**1.1**	**250**	**240**	**0.084**	0.20 U	**1.0**	1.0 U
Maximum Detected Concentration			**ND**	**230**	**3.1**	**4,200**	**280**	**8.5**	**0.032** J	**35**	**3.0**
Water Quality Criteria[8]	Freshwater Chronic		0.014	150 [7]	150	NE	NE	0.88 [7]	0.8	11.4 [7]	24/11 [4]
	Freshwater Acute		2.0	340 [7]	340	NE	NE	1.01 [7]	0.95	16.3 [7]	183/16 [4]

Not applied - Isolated

Sample ID (Upstream to downstream)	Sampling Date	Calcium Carbonate Hardness (total)[1] mg/L	Aroclors (Total) (Sum of detected Aroclors) µg/L	Arsenic (total) µg/L	Arsenic (dissolved) µg/L	Barium (total) µg/L	Barium (dissolved) µg/L	Cadmium* (total) µg/L	Cadmium* (dissolved) µg/L	Chromium (total) µg/L	Chromium (dissolved) µg/L
SW-104 (2020)	05/22/20	150 [3]	0.22 U	**26**	--	**510**	--	**4.6**	--	**62**	--
SW-106 (2020)	05/22/20	--	0.21 U	**12**	--	**110**	--	**11**	--	**11**	--

Value	Above Chronic Criterion
Value	Above Acute Criterion
µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
J	Estimated cocnentration.
NE	Not established.
[1]	Hardness data collected on 6/10/2020
[2].	Also analyzed for PAHs; none detected.
[3].	Hardness analyzed on 6/20/2021.
[4].	Hardness analyzed on 10/1/2021.
[5].	Also analyzed for VOCs; none detcted.
[6].	First value for hexavalent chromium, second value for trivalent chromium
[7].	Using conversion factor for metals in Env-Wq 1703.23; Table 1703.2. Regulated as dissolved.
[8].	Env-Wq 1703.21, Table 1703.1.

TABLE 2
Summary of Surface Water Analytical Data
375 Banfield Road, Portsmouth, NH

Sample ID (Upstream to downstream)	Sampling Date	Calcium Carbonate Hardness (total)[1] mg/L	Lead * (total) µg/L	Lead * (dissolved) µg/L	Mercury (total) µg/L	Mercury (dissolved) µg/L	Selenium (total) µg/L	Selenium (dissolved) µg/L	Silver (total) µg/L	Silver (dissolved) µg/L
SW-102 (2020) [2,5]	05/22/20	390 [3]	**5.8**	--	0.10 U	--	5.0 U	--	0.20 U	--
SW-102 (2008)	07/27/08	96.5	1.0 U	--	0.20 U	--	**10.0**	--	1.0 U	--
SW-101 (2008)	07/28/08	--	**1.0 J**	--	0.20 U	--	**10.0**	--	1.0 U	--
SW-101 (2020) [2]	05/22/20	290 [3]	**1.1**	--	0.10 U	--	5.0 U	--	0.20 U	--
SW-103 (2020) [2,5]	05/22/20	280 [3]	**130**	--	0.10 U	--	5.0 U	--	0.20 U	--
SW-212 [2]	09/23/21	41	**21**	**3.1**	0.10 U	0.071 UB	5.0 U	5.0 U	0.20 **U**	0.2 U
SW-103 (2008)	07/28/08	32.3	**20**	--	0.20 U	--	**6.0**	--	1.0 U	--
SW-211 [2]	09/23/21	65	**8.9**	**1.3**	0.10 U	0.061 UB	5.0 U	5.0 U	0.20 U	0.2 U
SW-210 [2]	09/23/21	72	**340**	**5.0**	**0.061 J**	0.063 UB	5.0 U	5.0 U	**0.079 J**	0.2 U
SW-208 [2]	09/23/21	48	**21**	**4.3**	0.10 U	0.065 UB	5.0 U	5.0 U	0.20 U	0.2 U
SW-203 [2]	09/22/21	130	**77**	**11**	0.10 U	0.061 UB	5.0 U	5.0 U	0.20 U	0.2 U
SW-105 (2020)	05/22/20	560 [3]	**3,100**	--	**0.46**	--	**3.7 J**	--	**1.0**	--
SW-201 [2]	09/22/21	130	**49**	**2.9**	0.10 U	*5.0 U*	5.0 U	5.0 U	0.20 U	0.2 U
Maximum Detected Concentration			**3,100**	**11.0**	**0.46**	**ND**	**10.0**	**ND**	**1.0**	**ND**
Water Quality Criteria[8]	Freshwater Chronic		0.68 [7]	0.54	0.91 [7]	0.77	5	NE	NE	NE
	Freshwater Acute		17.7 [7]	14	1.6 [7]	1.4	NE	NE	0.38 [7]	0.32

Not applied - Isolated

Sample ID (Upstream to downstream)	Sampling Date	Calcium Carbonate Hardness (total)[1] mg/L	Lead * (total) µg/L	Lead * (dissolved) µg/L	Mercury (total) µg/L	Mercury (dissolved) µg/L	Selenium (total) µg/L	Selenium (dissolved) µg/L	Silver (total) µg/L	Silver (dissolved) µg/L
SW-104 (2020)	05/22/20	150 [3]	**210**	--	**0.20**	--	5.0 U	--	**0.22**	--
SW-106 (2020)	05/22/20	--	**38**	--	**0.040**	--	5.0 U	--	0.20 U	--

Value	Above Chronic Criterion
Value	Above Acute Criterion
µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
J	Estimated cocnentration.
NE	Not established.
[1]	Hardness data collected on 6/10/2020
[2].	Also analyzed for PAHs; none detected.
[3].	Hardness analyzed on 6/20/2021.
[4].	Hardness analyzed on 10/1/2021.
[5].	Also analyzed for VOCs; none detcted.
[6].	First value for hexavalent chromium, second value for trivalent chromium
[7].	Using conversion factor for metals in Env-Wq 1703.23; Table 1703.2. Regulated as dissolved.
[8].	Env-Wq 1703.21, Table 1703.1.

TABLE 3
Summary of Exposure Factors
375 Banfield Road, Portsmouth, New Hampshire

PARAMETER	VALUE	REFERENCE
Sediment exposure point concentration (C_{sedl})	Constituent -specific	Sediment exposure point concentrations (EPCs) were generally the 95th percentile upper confidence limit of the mean concentration, except for silver for which the maximum detected concentration was applied. Non-detected results were included in the mean concentrations as determined by ProUCL.
Surface water exposure point concentration (C_{SW})	Constituent-specific	Surface water EPCs were the maximum detected concentration of each COC.
Outdoor air exposure point concentration (C_{air})	Constituent-specific	Modeled from sediment using a MassDEP screening level model.
Fish tissue concentration (C_{fish})	Constituent-specific	Modeled from sediment or surface water using fish bioconcentration factors (BCF) and biota-sediment accumulation factors (BSAF). Value for mercury is based on a BSAF for sediment invertebrates.
Surface water ingestion rate (IR)	37 mL/event (child and youth) 16 mL/event (adults)	Mean values from US EPA (2011); Table 3-5.
Sediment ingestion rate (IR)	0.0002 kg/day (child) 0.0001 kg/day (youth and adult)	Recommended values (NHDES 2013).
Relative sediment oral absorption factor (RAFo)	Constituent-specific	Values obtained from NHDES (2013); MassDEP (2014).
Exposed skin surface area (SA) (surface water and sediment)	4,487 cm^2/day (child) 8,232 cm^2/day (youth) 9,290 cm^2/day (adult)	Values from US EPA (2011); assumes exposure of feet, legs, arms, and hands.
Sediment-skin adherence factor (AF)	0.36 mg/cm^2 (child) 0.14 mg/cm^2 (youth) 0.13 mg/cm^2 (adult)	Recommended values by US EPA (2011).
Relative sediment absorption factor, dermal (RAFd)	Constituent-specific	Values adopted from US EPA (2021a), MassDEP (2014).
Constituent absorption from surface water dermal contact (DA_{event})	Constituent-specific; calculated	Derived by methods described in US EPA (2004a); presented in risk characterization spreadsheets.

TABLE 3
Summary of Exposure Factors
375 Banfield Road, Portsmouth, New Hampshire

PARAMETER	VALUE	REFERENCE
Fish consumption rate (IR)	0.113 kg/meal (child) 0.227 kg/meal (youth) 0.340 kg/meal (adults)	Assumes quarter-half pound (4 ounces) per meal for a child, one-half pound (8 ounces) per meal for youth, and three-quarters of a pound (12 ounces) per meal for adults.
Fish consumer exposure frequency (EF)	20 meals/year	Assumption.
Relative inhalation absorption factor (RAFi)	1	No recommended value available, a value of 1 assumed.
Recreational trespasser exposure frequency (EF)	90 events/year (sediment, air, surface water) 20 events/year (fish consumption)	EFs are assumed values.
Recreational trespasser exposure duration (ED)	1 day/event (sediment/surface water/fish consumption exposure) 8 hours/event (outdoor air exposure)	Sediment/surface/water/fish ED is conventional value for single events per day. Outdoor inhalation ED value is assumed.
Recreational trespasser exposure period (EP)	5 years (child) 10 years youth) 15 years (adult)	Recommended values (NHDES 2013).
Recreational trespasser period (AP)	Non-carcinogens: 5 years (child) 10 years (youth) 15 years (adult) Carcinogens: 70 years (all ages)	Conventional averaging times (EP for non-carcinogens, a 70-year lifetime for carcinogens).
Body weight (BW)	17 kg (children) 40 kg (youth) 70 kg (adults)	Recommended values (NHDES 2013).

MassDEP (2014) Method 1 Numerical Standards and supporting documentation (April).
US EPA (2021a) Regional Screening Level Tables (May 2021).
US EPA (2011). Exposure Factors Handbook.
US EPA(2004a) Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual (Part E Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005 (January).

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment - TEC

Sample ID (Upgradient to Downgradient)	Sample Date	Anthracene mg/kg	TEC mg/kg	HQ	Benzo(a)-anthracene mg/kg	TEC mg/kg	HQ	Benzo(a)-pyrene mg/kg	TEC mg/kg	HQ	Chrysene mg/kg	TEC mg/kg	HQ
SD-221	10/1/21	0.014	0.0572	**0.2**	0.066	0.108	**0.6**	0.049	0.15	**0.3**	0.078	0.166	**0.5**
SD-102 (2020)	5/22/20	-	-	**-**	-	-	-	-			-	-	**-**
SD-220	10/1/21	0.11	0.0572	**2**	0.35	0.108	**3**	1.8	0.15	**12**	0.36	0.166	**2**
SD-219	10/1/21	0.056	0.0572	**1.0**	0.14	0.108	**1.3**	7.5	0.15	**50**	0.17	0.166	**1.0**
SD-102 (2008) [2]	7/28/08	0.32	0.0572	**6**	0.32	0.108	**3**	0.32	0.15	**2**	0.32	0.166	**2**
SD-218	10/1/21	0.12	0.0572	**2**	0.4	0.108	**4**	0.37	0.15	**2**	0.42	0.166	**3**
SD-101 2008)	7/28/08	0.7	0.0572	**12**	0.7	0.108	**6**	0.7	0.15	**5**	0.7	0.166	**4**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-217	9/23/21	3.4	0.0572	**59**	11	0.108	**102**	9.8	0.15	**65**	11	0.166	**66**
SD-215	9/23/21	0.28	0.0572	**5**	0.89	0.108	**8**	0.85	0.15	**6**	1	0.166	**6**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-214	9/23/21	0.13	0.0572	**2**	0.13	0.108	**1.2**	0.13	0.15	**0.9**	0.13	0.166	**0.8**
SD-213	9/23/21	0.018	0.0572	**0.3**	0.057	0.108	**0.5**	0.051	0.15	**0.3**	0.066	0.166	**0.4**
SD-212	9/23/21	0.016	0.0572	**0.3**	0.052	0.108	**0.5**	0.046	0.15	**0.3**	0.062	0.166	**0.4**
SD-103 (2008) [2]	7/28/08	0.7	0.0572	**12**	0.7	0.108	**6**	0.7	0.15	**5**	0.7	0.166	**4**
SD-211	9/23/21	0.013	0.0572	**0.2**	0.053	0.108	**0.5**	0.045	0.15	**0.3**	0.051	0.166	**0.3**
SD-210	9/23/21	0.135	0.0572	**2**	0.048	0.108	**0.4**	0.041	0.15	**0.3**	0.059	0.166	**0.4**
SD-208	9/23/21	0.42	0.0572	**7**	1.2	0.108	**11**	1.2	0.15	**8**	1.3	0.166	**8**
SD-207	9/22/21	3.1	0.0572	**54**	11	0.108	**102**	9.8	0.15	**65**	11	0.166	**66**
SD-206	9/22/21	0.038	0.0572	**0.7**	0.15	0.108	**1.4**	2.6	0.15	**17**	0.16	0.166	**1.0**
SD-205	9/22/21	0.017	0.0572	**0.3**	0.054	0.108	**0.5**	0.046	0.15	**0.3**	0.059	0.166	**0.4**
SD-203	9/22/21	0.11	0.0572	**2**	0.38	0.108	**4**	0.31	0.15	**2.1**	0.39	0.166	**2**
SD-105 (2020)	5/22/20	-	0.0572	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-202	9/22/21	0.1	0.0572	**2**	0.16	0.108	**1.5**	0.43	0.15	**3**	0.19	0.166	**1.1**
SD-201	9/22/21	0.55	0.0572	**10**	0.72	0.108	**7**	0.84	0.15	**6**	0.77	0.166	**5**

Non-detections were included at one-half reporting limit (value shown)'

Footnotes at end of table.

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC

Sample ID (Upgradient to Downgradient)	**Sample Date**	**Anthracene mg/kg**	**PEC mg/kg**	**HQ**	**Benzo(a)-anthracene mg/kg**	**PEC mg/kg**	**HQ**	**Benzo(a)-pyrene mg/kg**	**PEC mg/kg**	**HQ**	**Chrysene mg/kg**	**PEC mg/kg**	**HQ**
SD-221	10/1/21	0.014	0.845	**0.02**	0.066	1.45	**0.05**	0.049	1.45	**0.03**	0.078	1.29	**0.06**
SD-102 (2020)	5/22/20	-	-	**-**	-	-	-	-			-	-	**-**
SD-220	10/1/21	0.11	0.845	**0.1**	0.35	1.45	**0.2**	1.8	1.45	**1.2**	0.36	1.29	**0.3**
SD-219	10/1/21	0.056	0.845	**0.07**	0.14	1.45	**0.1**	7.5	1.45	**5**	0.17	1.29	**0.1**
SD-102 (2008) [2]	7/28/08	0.32	0.845	**0.4**	0.32	1.45	**0.2**	0.32	1.45	**0.2**	0.32	1.29	**0.2**
SD-218	10/1/21	0.12	0.845	**0.1**	0.4	1.45	**0.3**	0.37	1.45	**0.3**	0.42	1.29	**0.3**
SD-101 2008)	7/28/08	0.7	0.845	**0.8**	0.7	1.45	**0.5**	0.7	1.45	**0.5**	0.7	1.29	**0.5**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	1.45	**-**	-	1.29	**-**
SD-217	9/23/21	3.4	0.845	**4**	11	1.45	8	9.8	1.45	**7**	11	1.29	**9**
SD-215	9/23/21	0.28	0.845	**0.3**	0.89	1.45	**0.6**	0.85	1.45	**0.6**	1	1.29	**0.8**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	1.45	**-**	-	1.29	**-**
SD-214	9/23/21	0.13	0.845	**0.2**	0.13	1.45	**0.09**	0.13	1.45	**0.09**	0.13	1.29	**0.1**
SD-213	9/23/21	0.018	0.845	**0.02**	0.057	1.45	**0.04**	0.051	1.45	**0.04**	0.066	1.29	**0.05**
SD-212	9/23/21	0.016	0.845	**0.02**	0.052	1.45	**0.04**	0.046	1.45	**0.03**	0.062	1.29	**0.05**
SD-103 (2008) [2]	7/28/08	0.7	0.845	**0.8**	0.7	1.45	**0.5**	0.7	1.45	**0.5**	0.7	1.29	**0.5**
SD-211	9/23/21	0.013	0.845	**0.02**	0.053	1.45	**0.04**	0.045	1.45	**0.03**	0.051	1.29	**0.04**
SD-210	9/23/21	0.135	0.845	**0.2**	0.048	1.45	**0.03**	0.041	1.45	**0.03**	0.059	1.29	**0.05**
SD-208	9/23/21	0.42	0.845	**0.5**	1.2	1.45	**0.8**	1.2	1.45	**0.8**	1.3	1.29	**1.0**
SD-207	9/22/21	3.1	0.845	**4**	11	1.45	**8**	9.8	1.45	**7**	11	1.29	**9**
SD-206	9/22/21	0.038	0.845	**0.04**	0.15	1.45	**0.10**	2.6	1.45	**2**	0.16	1.29	**0.1**
SD-205	9/22/21	0.017	0.845	**0.02**	0.054	1.45	**0.04**	0.046	1.45	**0.03**	0.059	1.29	**0.05**
SD-203	9/22/21	0.11	0.845	**0.1**	0.38	1.45	**0.3**	0.31	1.45	**0.2**	0.39	1.29	**0.3**
SD-105 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-202	9/22/21	0.1	0.845	**0.1**	0.16	1.45	**0.11**	0.43	1.45	**0.3**	0.19	1.29	**0.1**
SD-201	9/22/21	0.55	0.845	**0.7**	0.72	1.45	**0.5**	0.84	1.45	**0.6**	0.77	1.29	**0.6**

Non-detections were included at one-half reporting limit (value shown)'

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentraions.
HQ	Hazard quotient.
HI	Hazard Index (total)
NE	Not established.
"-"	Not needed or not applicable.

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment - TEC

Sample ID (Upgradient to Downgradient)	Sample Date	Dibenzo(a,h)-anthracene mg/kg	TEC mg/kg	HQ	Fluoran-thene mg/kg	TEC mg/kg	HQ	Fluorene mg/kg	TEC mg/kg	HQ	Naph-thalene mg/kg	TEC mg/kg	HQ
SD-221	10/1/21	0.011	0.033	0.3	0.13	0.423	0.3	0.06	0.0774	0.8	0.06	0.176	0.3
SD-102 (2020)	5/22/20	-	-	-	-	-	-	-	-	-	-	-	-
SD-220	10/1/21	0.054	0.033	2	0.63	0.423	1.5	0.04	0.0774	0.5	0.33	0.176	2
SD-219	10/1/21	0.034	0.033	1.0	0.39	0.423	0.9	0.01	0.0774	0.1	0.35	0.176	2
SD-102 (2008) [2]	7/28/08	0.32	0.033	10	0.32	0.423	0.8	0.32	0.0774	4	0.32	0.176	2
SD-218	10/1/21	0.061	0.033	2	0.77	0.423	2	0.041	0.0774	0.5	0.165	0.176	0.9
SD-101 2008)	7/28/08	0.7	0.033	21	0.7	0.423	2	0.7	0.0774	9	0.7	0.176	4
SD-101 (2020)	5/22/20	-	-	-	-	-	-	-	-	-	-	-	-
SD-217	9/23/21	1.8	0.033	55	22	0.423	52	2.1	0.0774	27	0.58	0.176	3
SD-215	9/23/21	0.11	0.033	3	2.1	0.423	5	0.11	0.0774	1.4	0.11	0.176	0.6
SD-103 (2020)	5/22/20	-	-	-	-	-	-	-	-	-	-	-	-
SD-214	9/23/21	0.13	0.033	4	0.13	0.423	0.3	0.13	0.0774	2	0.13	0.176	0.7
SD-213	9/23/21	0.0079	0.033	0.2	0.12	0.423	0.3	0.0063	0.0774	0.1	0.115	0.176	0.7
SD-212	9/23/21	0.033	0.033	1.0	0.11	0.423	0.3	0.495	0.0774	6	0.495	0.176	3
SD-103 (2008) [2]	7/28/08	0.7	0.033	21	0.7	0.423	2	0.7	0.0774	9	0.7	0.176	4
SD-211	9/23/21	0.012	0.033	0.4	0.54	0.423	1.3	0.185	0.0774	2	0.185	0.176	1.1
SD-210	9/23/21	0.0345	0.033	1.0	0.1	0.423	0.2	0.5	0.0774	6	0.5	0.176	3
SD-208	9/23/21	0.105	0.033	3	2.5	0.423	6	0.105	0.0774	1.4	0.105	0.176	0.6
SD-207	9/22/21	1.5	0.033	45	23	0.423	54	1.5	0.0774	19	0.82	0.176	5
SD-206	9/22/21	0.022	0.033	0.7	0.31	0.423	0.7	0.011	0.0774	0.14	0.23	0.176	1.3
SD-205	9/22/21	0.0082	0.033	0.2	0.12	0.423	0.3	0.0064	0.0774	0.08	0.08	0.176	0.5
SD-203	9/22/21	0.048	0.033	1.5	0.76	0.423	2	0.037	0.0774	0.5	0.275	0.176	2
SD-105 (2020)	5/22/20	-	-	-	-	-	-	-	-	-	-	-	-
SD-202	9/22/21	0.1	0.033	3	0.3	0.423	0.7	0.1	0.0774	1.3	0.1	0.176	0.6
SD-201	9/22/21	0.55	0.033	17	1.1	0.423	3	0.55	0.0774	7	19	0.176	108

Non-detections were included at one-half reporting limit (valu

Footnotes at end of table.

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC

Sample ID (Upgradient to Downgradient)	Sample Date	Dibenzo-(a,h)-ant-hracene mg/kg	PEC mg/kg	HQ	Fluoran-thene mg/kg	PEC mg/kg	HQ	Fluorene mg/kg	PEC mg/kg	HQ	Naph-thalene mg/kg	PEC mg/kg	HQ
SD-221	10/1/21	0.011	NE	**--**	0.13	2.23	**0.06**	0.06	0.536	**0.1**	0.06	0.561	**0.1**
SD-102 (2020)	5/22/20	-	-	-	-	-	-	-	-	-	-	-	-
SD-220	10/1/21	0.054	NE	**--**	0.63	2.23	**0.3**	0.04	0.536	**0.1**	0.33	0.561	**0.6**
SD-219	10/1/21	0.034	NE	**--**	0.39	2.23	**0.2**	0.01	0.536	**0.02**	0.35	0.561	**0.6**
SD-102 (2008) [2]	7/28/08	0.32	NE	**--**	0.32	2.23	**0.1**	0.32	0.536	**0.6**	0.32	0.561	**0.6**
SD-218	10/1/21	0.061	NE	**--**	0.77	2.23	**0.3**	0.041	0.536	**0.08**	0.165	0.561	**0.3**
SD-101 2008)	7/28/08	0.7	NE	**--**	0.7	2.23	**0.3**	0.7	0.536	**1.3**	0.7	0.561	**1.2**
SD-101 (2020)	5/22/20	-	--	**--**	-	-	**-**	-	-	**-**	-	-	**-**
SD-217	9/23/21	1.8	NE	**--**	22	2.23	**10**	2.1	0.536	**4**	0.58	0.561	**1.0**
SD-215	9/23/21	0.11	NE	**--**	2.1	2.23	**0.9**	0.11	0.536	**0.2**	0.11	0.561	**0.2**
SD-103 (2020)	5/22/20	-	--	**--**	-	-	**-**	-	-	**-**	-	-	**-**
SD-214	9/23/21	0.13	NE	**--**	0.13	2.23	**0.06**	0.13	0.536	**0.2**	0.13	0.561	**0.2**
SD-213	9/23/21	0.0079	NE	**--**	0.12	2.23	**0.05**	0.0063	0.536	**0.01**	0.115	0.561	**0.2**
SD-212	9/23/21	0.033	NE	**--**	0.11	2.23	**0.05**	0.495	0.536	**0.9**	0.495	0.561	**0.9**
SD-103 (2008) [2]	7/28/08	0.7	NE	**--**	0.7	2.23	**0.3**	0.7	0.536	**1.3**	0.7	0.561	**1.2**
SD-211	9/23/21	0.012	NE	**--**	0.54	2.23	**0.2**	0.185	0.536	**0.3**	0.185	0.561	**0.3**
SD-210	9/23/21	0.0345	NE	**--**	0.1	2.23	**0.04**	0.5	0.536	**0.9**	0.5	0.561	**0.9**
SD-208	9/23/21	0.105	NE	**--**	2.5	2.23	**1.1**	0.105	0.536	**0.2**	0.105	0.561	**0.2**
SD-207	9/22/21	1.5	NE	**--**	23	2.23	**10**	1.5	0.536	**3**	0.82	0.561	**1.5**
SD-206	9/22/21	0.022	NE	**--**	0.31	2.23	**0.1**	0.011	0.536	**0.02**	0.23	0.561	**0.4**
SD-205	9/22/21	0.0082	NE	**--**	0.12	2.23	**0.05**	0.0064	0.536	**0.01**	0.08	0.561	**0.1**
SD-203	9/22/21	0.048	NE	**--**	0.76	2.23	**0.3**	0.037	0.536	**0.07**	0.275	0.561	**0.5**
SD-105 (2020)	5/22/20	-	--	**--**	-	-	**-**	-	-	**-**	-	-	**-**
SD-202	9/22/21	0.1	NE	**--**	0.3	2.23	**0.1**	0.1	0.536	**0.2**	0.1	0.561	**0.2**
SD-201	9/22/21	0.55	NE	**--**	1.1	2.23	**0.5**	0.55	0.536	**1.0**	19	0.561	**34**

Non-detections were included at one-half reporting limit (valu

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentraions.
HQ	Hazard quotient.
HI	Hazard Index (total)
NE	Not established.
"-"	Not needed or not applicable.

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment - TEC

Sample ID (Upgradient to Downgradient)	Sample Date	Phenan-threne mg/kg	TEC mg/kg	HQ	Pyrene mg/kg	TEC mg/kg	HQ	Arsenic mg/kg	TEC mg/kg	HQ	Cadmium mg/kg	TEC mg/kg	HQ
SD-221	10/1/21	0.043	0.204	**0.2**	0.12	0.195	**0.6**	12	9.79	**1.2**	3.7	0.99	**4**
SD-102 (2020)	5/22/20	-	-	-	-	-	-	9.5	9.79	**1.0**	3.6	0.99	**4**
SD-220	10/1/21	0.43	0.204	**2**	0.53	0.195	**3**	15	9.79	**2**	3.6	0.99	**4**
SD-219	10/1/21	0.29	0.204	**1.4**	0.44	0.195	**2**	13	9.79	**1.3**	4.4	0.99	**4**
SD-102 (2008) [2]	7/28/08	0.32	0.204	**2**	0.32	0.195	**2**	9.5	9.79	**1.0**	0.65	0.99	**0.7**
SD-218	10/1/21	0.43	0.204	**2**	0.74	0.195	**4**	13	9.79	**1.3**	4.7	0.99	**5**
SD-101 2008)	7/28/08	0.7	0.204	**3**	0.7	0.195	**4**	15.9	9.79	**2**	1.35	0.99	**1.4**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	24	9.79	**2**	1.6	0.99	**2**
SD-217	9/23/21	17	0.204	**83**	22	0.195	**113**	14	9.79	**1.4**	1.8	0.99	**2**
SD-215	9/23/21	0.32	0.204	**2**	2.1	0.195	**11**	110	9.79	**11**	7.2	0.99	**7**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	10.5	9.79	**1.1**	2.1	0.99	**2**
SD-214	9/23/21	0.13	0.204	**0.6**	0.13	0.195	**0.7**	5.8	9.79	**0.6**	0.6	0.99	**0.6**
SD-213	9/23/21	0.079	0.204	**0.4**	0.1	0.195	**0.5**	27	9.79	**3**	1.3	0.99	**1.3**
SD-212	9/23/21	0.063	0.204	**0.3**	0.09	0.195	**0.5**	16.5	9.79	**2**	3	0.99	**3**
SD-103 (2008) [2]	7/28/08	0.7	0.204	**3**	0.7	0.195	**4**	15.4	9.79	**2**	1.4	0.99	**1.4**
SD-211	9/23/21	0.32	0.204	**2**	0.57	0.195	**3**	9.3	9.79	**0.9**	2.8	0.99	**3**
SD-210	9/23/21	0.17	0.204	**0.8**	0.079	0.195	**0.4**	16.5	9.79	**2**	4.7	0.99	**5**
SD-208	9/23/21	2.4	0.204	**12**	2.7	0.195	**14**	5.2	9.79	**0.5**	0.91	0.99	**0.9**
SD-207	9/22/21	14	0.204	**69**	23	0.195	**118**	24	9.79	**2**	2.3	0.99	**2**
SD-206	9/22/21	0.16	0.204	**0.8**	0.24	0.195	**1.2**	18	9.79	**2**	7.3	0.99	**7**
SD-205	9/22/21	0.081	0.204	**0.4**	0.092	0.195	**0.5**	21	9.79	**2**	1.6	0.99	**2**
SD-203	9/22/21	0.44	0.204	**2**	0.66	0.195	**3**	21	9.79	**2**	5.6	0.99	**6**
SD-105 (2020)	5/22/20	-	-	**-**	-	-	**-**	80	9.79	**8**	2.3	0.99	**2**
SD-202	9/22/21	0.11	0.204	**0.5**	0.32	0.195	**2**	11	9.79	**1.1**	1.7	0.99	**2**
SD-201	9/22/21	1.2	0.204	**6**	1.3	0.195	**7**	69	9.79	**7**	7.5	0.99	**8**

Non-detections were included at one-half reporting limit (valu

Footnotes at end of table.

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC

Sample ID (Upgradient to Downgradient)	Sample Date	Phenan-threne mg/kg	PEC mg/kg	HQ	Pyrene mg/kg	PEC mg/kg	HQ	Arsenic mg/kg	PEC mg/kg	HQ	Cadmium mg/kg	PEC mg/kg	HQ
SD-221	10/1/21	0.043	1.17	**0.04**	0.12	1.52	**0.08**	12	33	**0.4**	3.7	4.98	**0.7**
SD-102 (2020)	5/22/20	-			-			9.5	33	**0.3**	3.6	4.98	**0.7**
SD-220	10/1/21	0.43	1.17	**0.4**	0.53	1.52	**0.3**	15	33	**0.5**	3.6	4.98	**0.7**
SD-219	10/1/21	0.29	1.17	**0.2**	0.44	1.52	**0.3**	13	33	**0.4**	4.4	4.98	**0.9**
SD-102 (2008) [2]	7/28/08	0.32	1.17	**0.3**	0.32	1.52	**0.2**	9.5	33	**0.3**	0.65	4.98	**0.1**
SD-218	10/1/21	0.43	1.17	**0.4**	0.74	1.52	**0.5**	13	33	**0.4**	4.7	4.98	**0.9**
SD-101 2008)	7/28/08	0.7	1.17	**0.6**	0.7	1.52	**0.5**	15.9	33	**0.5**	1.35	4.98	**0.3**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	24	33	**0.7**	1.6	4.98	**0.3**
SD-217	9/23/21	17	1.17	**15**	22	1.52	**14**	14	33	**0.4**	1.8	4.98	**0.4**
SD-215	9/23/21	0.32	1.17	**0.3**	2.1	1.52	**1.4**	110	33	**3**	7.2	4.98	**1.4**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	10.5	33	**0.3**	2.1	4.98	**0.4**
SD-214	9/23/21	0.13	1.17	**0.1**	0.13	1.52	**0.09**	5.8	33	**0.2**	0.6	4.98	**0.1**
SD-213	9/23/21	0.079	1.17	**0.07**	0.1	1.52	**0.07**	27	33	**0.8**	1.3	4.98	**0.3**
SD-212	9/23/21	0.063	1.17	**0.05**	0.09	1.52	**0.06**	16.5	33	**0.5**	3	4.98	**0.6**
SD-103 (2008) [2]	7/28/08	0.7	1.17	**0.6**	0.7	1.52	**0.5**	15.4	33	**0.5**	1.4	4.98	**0.3**
SD-211	9/23/21	0.32	1.17	**0.3**	0.57	1.52	**0.4**	9.3	33	**0.3**	2.8	4.98	**0.6**
SD-210	9/23/21	0.17	1.17	**0.1**	0.079	1.52	**0.05**	16.5	33	**0.5**	4.7	4.98	**0.9**
SD-208	9/23/21	2.4	1.17	**2**	2.7	1.52	**2**	5.2	33	**0.2**	0.91	4.98	**0.2**
SD-207	9/22/21	14	1.17	**12**	23	1.52	**15**	24	33	**0.7**	2.3	4.98	**0.5**
SD-206	9/22/21	0.16	1.17	**0.1**	0.24	1.52	**0.2**	18	33	**0.5**	7.3	4.98	**1.5**
SD-205	9/22/21	0.081	1.17	**0.07**	0.092	1.52	**0.06**	21	33	**0.6**	1.6	4.98	**0.3**
SD-203	9/22/21	0.44	1.17	**0.4**	0.66	1.52	**0.4**	21	33	**0.6**	5.6	4.98	**1.1**
SD-105 (2020)	5/22/20	-	-	**-**	-	-	**-**	80	33	**2.4**	2.3	4.98	**0.5**
SD-202	9/22/21	0.11	1.17	**0.09**	0.32	1.52	**0.2**	11	33	**0.3**	1.7	4.98	**0.3**
SD-201	9/22/21	1.2	1.17	**1.0**	1.3	1.52	**0.9**	69	33	**2.1**	7.5	4.98	**1.5**

Non-detections were included at one-half reporting limit (valu

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentraions.
HQ	Hazard quotient.
HI	Hazard Index (total)
NE	Not established.
"-"	Not needed or not applicable.

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment - TEC

Sample ID (Upgradient to Downgradient)	Sample Date	Chromium (total) mg/kg	TEC mg/kg	HQ	Lead mg/kg	TEC mg/kg	HQ	Mercury mg/kg	TEC mg/kg	HQ	Total HI	Percent Lead HQ of Total HI
SD-221	10/1/21	55	43.4	**1.3**	360	35.8	**10**	0.051	0.18	**0.3**	**21**	**48%**
SD-102 (2020)	5/22/20	9.5	43.4	**0.2**	330	35.8	**9**	0.31	0.18	**2**	**16**	**58%**
SD-220	10/1/21	51	43.4	**1.2**	1,900	35.8	**53**	0.26	0.18	**1.4**	**91**	**59%**
SD-219	10/1/21	48	43.4	**1.1**	1,900	35.8	**53**	0.34	0.18	**2**	**123**	**43%**
SD-102 (2008) [2]	7/28/08	38	43.4	**0.9**	87	35.8	**2**	0.13	0.18	**0.7**	**38**	**6%**
SD-218	10/1/21	53	43.4	**1.2**	4,600	35.8	**128**	0.43	0.18	**2**	**160**	**80%**
SD-101 2008)	7/28/08	32	43.4	**0.7**	154	35.8	**4**	0.27	0.18	**2**	**80**	**5%**
SD-101 (2020)	5/22/20	17	43.4	**0.4**	480	35.8	**13**	0.11	0.18	**0.6**	**18**	**73%**
SD-217	9/23/21	28	43.4	**0.6**	2,800	35.8	**78**	13	0.18	**72**	**780**	**10%**
SD-215	9/23/21	64	43.4	**1.5**	510	35.8	**14**	0.17	0.18	**0.9**	**83**	**17%**
SD-103 (2020)	5/22/20	7.4	43.4	**0.2**	840	35.8	**23**	0.2	0.18	**1.1**	**28**	**84%**
SD-214	9/23/21	39	43.4	**0.9**	93	35.8	**3**	0.27	0.18	**2**	**19**	**13%**
SD-213	9/23/21	39	43.4	**0.9**	58	35.8	**2**	0.089	0.18	**0.5**	**11**	**15%**
SD-212	9/23/21	16	43.4	**0.4**	510	35.8	**14**	0.2	0.18	**1.1**	**33**	**43%**
SD-103 (2008) [2]	7/28/08	39	43.4	**0.9**	77	35.8	**2**	0.17	0.18	**0.9**	**77**	**3%**
SD-211	9/23/21	22	43.4	**0.5**	510	35.8	**14**	0.2	0.18	**1.1**	**31**	**47%**
SD-210	9/23/21	23	43.4	**0.5**	1,500	35.8	**42**	0.4	0.18	**2**	**66**	**63%**
SD-208	9/23/21	32	43.4	**0.7**	660	35.8	**18**	0.13	0.18	**0.7**	**92**	**20%**
SD-207	9/22/21	32	43.4	**0.7**	3,500	35.8	**98**	0.42	0.18	**2**	**704**	**14%**
SD-206	9/22/21	22	43.4	**0.5**	880	35.8	**25**	0.4	0.18	**2**	**62**	**40%**
SD-205	9/22/21	30	43.4	**0.7**	150	35.8	**4**	0.087	0.18	**0.5**	**13**	**33%**
SD-203	9/22/21	35	43.4	**0.8**	2,200	35.8	**61**	0.65	0.18	**4**	**94**	**65%**
SD-105 (2020)	5/22/20	9.7	43.4	**0.2**	940	35.8	**26**	0.27	0.18	**2**	**38**	**68%**
SD-202	9/22/21	58	43.4	**1.3**	160	35.8	**4**	0.16	0.18	**0.9**	**25**	**18%**
SD-201	9/22/21	31	43.4	**0.7**	1,600	35.8	**45**	0.31	0.18	**2**	**235**	**19%**

Non-detections were included at one-half reporting limit (valu

38%

Footnotes at end of table.

TABLE 4
Calculation of Sediment Environmental Hazard Indices
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC

Sample ID (Upgradient to Downgradient)	Sample Date	Chromium (total) mg/kg	PEC mg/kg	HQ	Lead mg/kg	PEC mg/kg	HQ	Mercury mg/kg	PEC mg/kg	HQ	Total HI	Percent Lead HQ of Total HI
SD-221	10/1/21	55	111	**0.5**	360	128	**3**	0.051	1.06	**0.05**	**5**	**56%**
SD-102 (2020)	5/22/20	9.5	111	**0.09**	330	128	**3**	0.31	1.06	**0.3**	**4**	**65%**
SD-220	10/1/21	51	111	**0.5**	1,900	128	**15**	0.26	1.06	**0.2**	**20**	**73%**
SD-219	10/1/21	48	111	**0.4**	1,900	128	**15**	0.34	1.06	**0.3**	**24**	**63%**
SD-102 (2008) [2]	7/28/08	38	111	**0.3**	87	128	**0.7**	0.13	1.06	**0.1**	**4**	**15%**
SD-218	10/1/21	53	111	**0.5**	4,600	128	**36**	0.43	1.06	**0.4**	**41**	**88%**
SD-101 2008)	7/28/08	32	111	**0.3**	154	128	**1.2**	0.27	1.06	**0.3**	**9**	**14%**
SD-101 (2020)	5/22/20	17	111	**0.2**	480	128	**4**	0.11	1.06	**0.1**	**5**	**74%**
SD-217	9/23/21	28	111	**0.3**	2,800	128	**22**	13	1.06	**12**	**106**	**21%**
SD-215	9/23/21	64	111	**0.6**	510	128	**4**	0.17	1.06	**0.2**	**15**	**27%**
SD-103 (2020)	5/22/20	7.4	111	**0.07**	840	128	**7**	0.2	1.06	**0.2**	**8**	**87%**
SD-214	9/23/21	39	111	**0.4**	93	128	**0.7**	0.27	1.06	**0.3**	**3**	**26%**
SD-213	9/23/21	39	111	**0.4**	58	128	**0.5**	0.089	1.06	**0.08**	**3**	**18%**
SD-212	9/23/21	16	111	**0.1**	510	128	**4**	0.2	1.06	**0.2**	**8**	**53%**
SD-103 (2008) [2]	7/28/08	39	111	**0.4**	77	128	**0.6**	0.17	1.06	**0.2**	**8**	**7%**
SD-211	9/23/21	22	111	**0.2**	510	128	**4**	0.2	1.06	**0.2**	**7**	**58%**
SD-210	9/23/21	23	111	**0.2**	1,500	128	**12**	0.4	1.06	**0.4**	**16**	**73%**
SD-208	9/23/21	32	111	**0.3**	660	128	**5**	0.13	1.06	**0.1**	**14**	**36%**
SD-207	9/22/21	32	111	**0.3**	3,500	128	**27**	0.42	1.06	**0.4**	**97**	**28%**
SD-206	9/22/21	22	111	**0.2**	880	128	**7**	0.4	1.06	**0.4**	**12**	**55%**
SD-205	9/22/21	30	111	**0.3**	150	128	**1.2**	0.087	1.06	**0.08**	**3**	**40%**
SD-203	9/22/21	35	111	**0.3**	2,200	128	**17**	0.65	1.06	**0.6**	**22**	**76%**
SD-105 (2020)	5/22/20	9.7	111	**0.09**	940	128	**7**	0.27	1.06	**0.3**	**11**	**69%**
SD-202	9/22/21	58	111	**0.5**	160	128	**1.3**	0.16	1.06	**0.2**	**4**	**31%**
SD-201	9/22/21	31	111	**0.3**	1,600	128	**13**	0.31	1.06	**0.3**	**56**	**22%**

Non-detections were included at one-half reporting limit (valu

47%

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentraions.
HQ	Hazard quotient.
HI	Hazard Index (total)
NE	Not established.
"-"	Not needed or not applicable.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment TEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Anthracene mg/kg	TEC mg/kg	HQ	Benzo(a)-anthracene mg/kg	TEC mg/kg	HQ	Benzo(a)-pyrene mg/kg	TEC mg/kg	HQ	Chrysene mg/kg	TEC mg/kg	HQ
SD-221	10/1/21	0.014	0.0572	**0.2**	0.066	0.108	**0.6**	0.049	0.15	**0.3**	0.078	0.166	**0.5**
SD-102 (2020)	5/22/20	-	-	**-**	-	-	**-**	-			-	-	**-**
SD-220	10/1/21	0.11	0.0572	**2**	0.35	0.108	**3**	1.8	0.15	**12**	0.36	0.166	**2**
SD-219	10/1/21	0.056	0.0572	**1.0**	0.14	0.108	**1.3**	7.5	0.15	**50**	0.17	0.166	**1.0**
SD-102 (2008) [2]	7/28/08	0.32	0.0572	**6**	0.32	0.108	**3**	0.32	0.15	**2**	0.32	0.166	**2**
SD-218	10/1/21	0.12	0.0572	**2**	0.4	0.108	**4**	0.37	0.15	**2**	0.42	0.166	**3**
SD-101 2008)	7/28/08	0.7	0.0572	**12**	0.7	0.108	**6**	0.7	0.15	**5**	0.7	0.166	**4**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-217	9/23/21	3.4	0.0572	**59**	11	0.108	**102**	9.8	0.15	**65**	11	0.166	**66**
SD-215	9/23/21	0.28	0.0572	**5**	0.89	0.108	**8**	0.85	0.15	**6**	1	0.166	**6**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-214	9/23/21	0.13	0.0572	**2**	0.13	0.108	**1.2**	0.13	0.15	**0.9**	0.13	0.166	**0.8**
SD-213	9/23/21	0.018	0.0572	**0.3**	0.057	0.108	**0.5**	0.051	0.15	**0.3**	0.066	0.166	**0.4**
SD-212	9/23/21	0.016	0.0572	**0.3**	0.052	0.108	**0.5**	0.046	0.15	**0.3**	0.062	0.166	**0.4**
SD-103 (2008) [2]	7/28/08	0.7	0.0572	**12**	0.7	0.108	**6**	0.7	0.15	**5**	0.7	0.166	**4**
SD-211	9/23/21	0.013	0.0572	**0.2**	0.053	0.108	**0.5**	0.045	0.15	**0.3**	0.051	0.166	**0.3**
SD-210	9/23/21	0.135	0.0572	**2**	0.048	0.108	**0.4**	0.041	0.15	**0.3**	0.059	0.166	**0.4**
SD-208	9/23/21	0.42	0.0572	**7**	1.2	0.108	**11**	1.2	0.15	**8**	1.3	0.166	**8**
SD-207	9/22/21	3.1	0.0572	**54**	11	0.108	**102**	9.8	0.15	**65**	11	0.166	**66**
SD-206	9/22/21	0.038	0.0572	**0.7**	0.15	0.108	**1.4**	2.6	0.15	**17**	0.16	0.166	**1.0**
SD-205	9/22/21	0.017	0.0572	**0.3**	0.054	0.108	**0.5**	0.046	0.15	**0.3**	0.059	0.166	**0.4**
SD-203	9/22/21	0.11	0.0572	**2**	0.38	0.108	**4**	0.31	0.15	**2.1**	0.39	0.166	**2**
SD-105 (2020)	5/22/20	-	0.0572	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-202	9/22/21	0.1	0.0572	**2**	0.16	0.108	**1.5**	0.43	0.15	**3**	0.19	0.166	**1.1**
SD-201	9/22/21	0.55	0.0572	**10**	0.72	0.108	**7**	0.84	0.15	**6**	0.77	0.166	**5**

Non-detections were included at one-half reporting limit (value shown)'

Footnotes at end of table.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Anthracene mg/kg	PEC mg/kg	HQ	Benzo(a)-anthracene mg/kg	PEC mg/kg	HQ	Benzo(a)-pyrene mg/kg	PEC mg/kg	HQ	Chrysene mg/kg	PEC mg/kg	HQ
SD-221	10/1/21	0.014	0.845	**0.02**	0.066	1.45	**0.05**	0.049	1.45	**0.03**	0.078	1.29	**0.06**
SD-102 (2020)	5/22/20	-	-	**-**	-	-	-	-			-	-	**-**
SD-220	10/1/21	0.11	0.845	**0.1**	0.35	1.45	**0.2**	1.8	1.45	**1.2**	0.36	1.29	**0.3**
SD-219	10/1/21	0.056	0.845	**0.07**	0.14	1.45	**0.1**	7.5	1.45	**5**	0.17	1.29	**0.1**
SD-102 (2008) [2]	7/28/08	0.32	0.845	**0.4**	0.32	1.45	**0.2**	0.32	1.45	**0.2**	0.32	1.29	**0.2**
SD-218	10/1/21	0.12	0.845	**0.1**	0.4	1.45	**0.3**	0.37	1.45	**0.3**	0.42	1.29	**0.3**
SD-101 2008)	7/28/08	0.7	0.845	**0.8**	0.7	1.45	**0.5**	0.7	1.45	**0.5**	0.7	1.29	**0.5**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	1.45	**-**	-	1.29	**-**
SD-217	9/23/21	3.4	0.845	**4**	11	1.45	8	9.8	1.45	**7**	11	1.29	**9**
SD-215	9/23/21	0.28	0.845	**0.3**	0.89	1.45	**0.6**	0.85	1.45	**0.6**	1	1.29	**0.8**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	1.45	**-**	-	1.29	**-**
SD-214	9/23/21	0.13	0.845	**0.2**	0.13	1.45	**0.09**	0.13	1.45	**0.09**	0.13	1.29	**0.1**
SD-213	9/23/21	0.018	0.845	**0.02**	0.057	1.45	**0.04**	0.051	1.45	**0.04**	0.066	1.29	**0.05**
SD-212	9/23/21	0.016	0.845	**0.02**	0.052	1.45	**0.04**	0.046	1.45	**0.03**	0.062	1.29	**0.05**
SD-103 (2008) [2]	7/28/08	0.7	0.845	**0.8**	0.7	1.45	**0.5**	0.7	1.45	**0.5**	0.7	1.29	**0.5**
SD-211	9/23/21	0.013	0.845	**0.02**	0.053	1.45	**0.04**	0.045	1.45	**0.03**	0.051	1.29	**0.04**
SD-210	9/23/21	0.135	0.845	**0.2**	0.048	1.45	**0.03**	0.041	1.45	**0.03**	0.059	1.29	**0.05**
SD-208	9/23/21	0.42	0.845	**0.5**	1.2	1.45	**0.8**	1.2	1.45	**0.8**	1.3	1.29	**1.0**
SD-207	9/22/21	3.1	0.845	**4**	11	1.45	**8**	9.8	1.45	**7**	11	1.29	**9**
SD-206	9/22/21	0.038	0.845	**0.04**	0.15	1.45	**0.10**	2.6	1.45	**2**	0.16	1.29	**0.1**
SD-205	9/22/21	0.017	0.845	**0.02**	0.054	1.45	**0.04**	0.046	1.45	**0.03**	0.059	1.29	**0.05**
SD-203	9/22/21	0.11	0.845	**0.1**	0.38	1.45	**0.3**	0.31	1.45	**0.2**	0.39	1.29	**0.3**
SD-105 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-202	9/22/21	0.1	0.845	**0.1**	0.16	1.45	**0.11**	0.43	1.45	**0.3**	0.19	1.29	**0.1**
SD-201	9/22/21	0.55	0.845	**0.7**	0.72	1.45	**0.5**	0.84	1.45	**0.6**	0.77	1.29	**0.6**

Non-detections were included at one-half reporting limit (value shown)'

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentration.
HQ	Hazard quotient.
HI	Hazard Index (total).
NE	Not established.
"-"	Not needed or not applicable.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment TEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Dibenzo(a,h)-anthracene mg/kg	TEC mg/kg	HQ	Fluoran-thene mg/kg	TEC mg/kg	HQ	Fluorene mg/kg	TEC mg/kg	HQ	Naph-thalene mg/kg	TEC mg/kg	HQ
SD-221	10/1/21	0.011	0.033	**0.3**	0.13	0.423	**0.3**	0.06	0.0774	**0.8**	0.06	0.176	**0.3**
SD-102 (2020)	5/22/20	-	-	-	-	-	-	-	-	-	-	-	-
SD-220	10/1/21	0.054	0.033	**2**	0.63	0.423	**1.5**	0.04	0.0774	**0.5**	0.33	0.176	**2**
SD-219	10/1/21	0.034	0.033	**1.0**	0.39	0.423	**0.9**	0.01	0.0774	**0.1**	0.35	0.176	**2**
SD-102 (2008) [2]	7/28/08	0.32	0.033	**10**	0.32	0.423	**0.8**	0.32	0.0774	**4**	0.32	0.176	**2**
SD-218	10/1/21	0.061	0.033	**2**	0.77	0.423	**2**	0.041	0.0774	**0.5**	0.165	0.176	**0.9**
SD-101 2008)	7/28/08	0.7	0.033	**21**	0.7	0.423	**2**	0.7	0.0774	**9**	0.7	0.176	**4**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-217	9/23/21	1.8	0.033	**55**	22	0.423	**52**	2.1	0.0774	**27**	0.58	0.176	**3**
SD-215	9/23/21	0.11	0.033	**3**	2.1	0.423	**5**	0.11	0.0774	**1.4**	0.11	0.176	**0.6**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-214	9/23/21	0.13	0.033	**4**	0.13	0.423	**0.3**	0.13	0.0774	**2**	0.13	0.176	**0.7**
SD-213	9/23/21	0.0079	0.033	**0.2**	0.12	0.423	**0.3**	0.0063	0.0774	**0.1**	0.115	0.176	**0.7**
SD-212	9/23/21	0.033	0.033	**1.0**	0.11	0.423	**0.3**	0.495	0.0774	**6**	0.495	0.176	**3**
SD-103 (2008) [2]	7/28/08	0.7	0.033	**21**	0.7	0.423	**2**	0.7	0.0774	**9**	0.7	0.176	**4**
SD-211	9/23/21	0.012	0.033	**0.4**	0.54	0.423	**1.3**	0.185	0.0774	**2**	0.185	0.176	**1.1**
SD-210	9/23/21	0.0345	0.033	**1.0**	0.1	0.423	**0.2**	0.5	0.0774	**6**	0.5	0.176	**3**
SD-208	9/23/21	0.105	0.033	**3**	2.5	0.423	**6**	0.105	0.0774	**1.4**	0.105	0.176	**0.6**
SD-207	9/22/21	1.5	0.033	**45**	23	0.423	**54**	1.5	0.0774	**19**	0.82	0.176	**5**
SD-206	9/22/21	0.022	0.033	**0.7**	0.31	0.423	**0.7**	0.011	0.0774	**0.14**	0.23	0.176	**1.3**
SD-205	9/22/21	0.0082	0.033	**0.2**	0.12	0.423	**0.3**	0.0064	0.0774	**0.08**	0.08	0.176	**0.5**
SD-203	9/22/21	0.048	0.033	**1.5**	0.76	0.423	**2**	0.037	0.0774	**0.5**	0.275	0.176	**2**
SD-105 (2020)	5/22/20	-	-	**-**	-	-	**-**	-	-	**-**	-	-	**-**
SD-202	9/22/21	0.1	0.033	**3**	0.3	0.423	**0.7**	0.1	0.0774	**1.3**	0.1	0.176	**0.6**
SD-201	9/22/21	0.55	0.033	**17**	1.1	0.423	**3**	0.55	0.0774	**7**	19	0.176	**108**

Non-detections were included at one-half reporting limit (

Footnotes at end of table.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Dibenzo(a,h)-anthracene mg/kg	PEC mg/kg	HQ	Fluoranthene mg/kg	PEC mg/kg	HQ	Fluorene mg/kg	PEC mg/kg	HQ	Naphthalene mg/kg	PEC mg/kg	HQ
SD-221	10/1/21	0.011	NE	**--**	0.13	2.23	**0.06**	0.06	0.536	**0.1**	0.06	0.561	**0.1**
SD-102 (2020)	5/22/20	-	-	-	-	-	-	-	-	-	-	-	-
SD-220	10/1/21	0.054	NE	**--**	0.63	2.23	**0.3**	0.04	0.536	**0.1**	0.33	0.561	**0.6**
SD-219	10/1/21	0.034	NE	**--**	0.39	2.23	**0.2**	0.01	0.536	**0.02**	0.35	0.561	**0.6**
SD-102 (2008) [2]	7/28/08	0.32	NE	**--**	0.32	2.23	**0.1**	0.32	0.536	**0.6**	0.32	0.561	**0.6**
SD-218	10/1/21	0.061	NE	**--**	0.77	2.23	**0.3**	0.041	0.536	**0.08**	0.165	0.561	**0.3**
SD-101 2008)	7/28/08	0.7	NE	**--**	0.7	2.23	**0.3**	0.7	0.536	**1.3**	0.7	0.561	**1.2**
SD-101 (2020)	5/22/20	-	--	**--**	-	-	**-**	-	-	**-**	-	-	**-**
SD-217	9/23/21	1.8	NE	**--**	22	2.23	**10**	2.1	0.536	**4**	0.58	0.561	**1.0**
SD-215	9/23/21	0.11	NE	**--**	2.1	2.23	**0.9**	0.11	0.536	**0.2**	0.11	0.561	**0.2**
SD-103 (2020)	5/22/20	-	--	**--**	-	-	**-**	-	-	**-**	-	-	**-**
SD-214	9/23/21	0.13	NE	**--**	0.13	2.23	**0.06**	0.13	0.536	**0.2**	0.13	0.561	**0.2**
SD-213	9/23/21	0.0079	NE	**--**	0.12	2.23	**0.05**	0.0063	0.536	**0.01**	0.115	0.561	**0.2**
SD-212	9/23/21	0.033	NE	**--**	0.11	2.23	**0.05**	0.495	0.536	**0.9**	0.495	0.561	**0.9**
SD-103 (2008) [2]	7/28/08	0.7	NE	**--**	0.7	2.23	**0.3**	0.7	0.536	**1.3**	0.7	0.561	**1.2**
SD-211	9/23/21	0.012	NE	**--**	0.54	2.23	**0.2**	0.185	0.536	**0.3**	0.185	0.561	**0.3**
SD-210	9/23/21	0.0345	NE	**--**	0.1	2.23	**0.04**	0.5	0.536	**0.9**	0.5	0.561	**0.9**
SD-208	9/23/21	0.105	NE	**--**	2.5	2.23	**1.1**	0.105	0.536	**0.2**	0.105	0.561	**0.2**
SD-207	9/22/21	1.5	NE	**--**	23	2.23	**10**	1.5	0.536	**3**	0.82	0.561	**1.5**
SD-206	9/22/21	0.022	NE	**--**	0.31	2.23	**0.1**	0.011	0.536	**0.02**	0.23	0.561	**0.4**
SD-205	9/22/21	0.0082	NE	**--**	0.12	2.23	**0.05**	0.0064	0.536	**0.01**	0.08	0.561	**0.1**
SD-203	9/22/21	0.048	NE	**--**	0.76	2.23	**0.3**	0.037	0.536	**0.07**	0.275	0.561	**0.5**
SD-105 (2020)	5/22/20	-	--	**--**	-	-	**-**	-	-	**-**	-	-	**-**
SD-202	9/22/21	0.1	NE	**--**	0.3	2.23	**0.1**	0.1	0.536	**0.2**	0.1	0.561	**0.2**
SD-201	9/22/21	0.55	NE	**--**	1.1	2.23	**0.5**	0.55	0.536	**1.0**	19	0.561	**34**

Non-detections were included at one-half reporting limit (

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentration.
HQ	Hazard quotient.
HI	Hazard Index (total).
NE	Not established.
"-"	Not needed or not applicable.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment TEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Phenanthrene mg/kg	TEC mg/kg	HQ	Pyrene mg/kg	TEC mg/kg	HQ	Cadmium mg/kg	TEC mg/kg	HQ	Chromium (total) mg/kg	TEC mg/kg	HQ
SD-221	10/1/21	0.043	0.204	**0.2**	0.12	0.195	**0.6**	3.7	0.99	**4**	55	43.4	**1.3**
SD-102 (2020)	5/22/20	-			-			3.6	0.99	**4**	9.5	43.4	**0.2**
SD-220	10/1/21	0.43	0.204	**2**	0.53	0.195	**3**	3.6	0.99	**4**	51	43.4	**1.2**
SD-219	10/1/21	0.29	0.204	**1.4**	0.44	0.195	**2**	4.4	0.99	**4**	48	43.4	**1.1**
SD-102 (2008) [2]	7/28/08	0.32	0.204	**2**	0.32	0.195	**2**	0.65	0.99	**0.7**	38	43.4	**0.9**
SD-218	10/1/21	0.43	0.204	**2**	0.74	0.195	**4**	4.7	0.99	**5**	53	43.4	**1.2**
SD-101 2008)	7/28/08	0.7	0.204	**3**	0.7	0.195	**4**	1.35	0.99	**1.4**	32	43.4	**0.7**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	1.6	0.99	**2**	17	43.4	**0.4**
SD-217	9/23/21	17	0.204	**83**	22	0.195	**113**	1.8	0.99	**2**	28	43.4	**0.6**
SD-215	9/23/21	0.32	0.204	**2**	2.1	0.195	**11**	7.2	0.99	**7**	64	43.4	**1.5**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	2.1	0.99	**2**	7.4	43.4	**0.2**
SD-214	9/23/21	0.13	0.204	**0.6**	0.13	0.195	**0.7**	0.6	0.99	**0.6**	39	43.4	**0.9**
SD-213	9/23/21	0.079	0.204	**0.4**	0.1	0.195	**0.5**	1.3	0.99	**1.3**	39	43.4	**0.9**
SD-212	9/23/21	0.063	0.204	**0.3**	0.09	0.195	**0.5**	3	0.99	**3**	16	43.4	**0.4**
SD-103 (2008) [2]	7/28/08	0.7	0.204	**3**	0.7	0.195	**4**	1.4	0.99	**1.4**	39	43.4	**0.9**
SD-211	9/23/21	0.32	0.204	**2**	0.57	0.195	**3**	2.8	0.99	**3**	22	43.4	**0.5**
SD-210	9/23/21	0.17	0.204	**0.8**	0.079	0.195	**0.4**	4.7	0.99	**5**	23	43.4	**0.5**
SD-208	9/23/21	2.4	0.204	**12**	2.7	0.195	**14**	0.91	0.99	**0.9**	32	43.4	**0.7**
SD-207	9/22/21	14	0.204	**69**	23	0.195	**118**	2.3	0.99	**2**	32	43.4	**0.7**
SD-206	9/22/21	0.16	0.204	**0.8**	0.24	0.195	**1.2**	7.3	0.99	**7**	22	43.4	**0.5**
SD-205	9/22/21	0.081	0.204	**0.4**	0.092	0.195	**0.5**	1.6	0.99	**2**	30	43.4	**0.7**
SD-203	9/22/21	0.44	0.204	**2**	0.66	0.195	**3**	5.6	0.99	**6**	35	43.4	**0.8**
SD-105 (2020)	5/22/20	-	-	**-**	-	-	**-**	2.3	0.99	**2**	9.7	43.4	**0.2**
SD-202	9/22/21	0.11	0.204	**0.5**	0.32	0.195	**2**	1.7	0.99	**2**	58	43.4	**1.3**
SD-201	9/22/21	1.2	0.204	**6**	1.3	0.195	**7**	7.5	0.99	**8**	31	43.4	**0.7**

Non-detections were included at one-half reporting limit (

Footnotes at end of table.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Phenanthrene mg/kg	PEC mg/kg	HQ	Pyrene mg/kg	PEC mg/kg	HQ	Cadmium mg/kg	PEC mg/kg	HQ	Chromium (total) mg/kg	PEC mg/kg	HQ
SD-221	10/1/21	0.043	1.17	**0.04**	0.12	1.52	**0.08**	3.7	4.98	**0.7**	55	111	**0.5**
SD-102 (2020)	5/22/20	-			-			3.6	4.98	**0.7**	9.5	111	**0.09**
SD-220	10/1/21	0.43	1.17	**0.4**	0.53	1.52	**0.3**	3.6	4.98	**0.7**	51	111	**0.5**
SD-219	10/1/21	0.29	1.17	**0.2**	0.44	1.52	**0.3**	4.4	4.98	**0.9**	48	111	**0.4**
SD-102 (2008) [2]	7/28/08	0.32	1.17	**0.3**	0.32	1.52	**0.2**	0.65	4.98	**0.1**	38	111	**0.3**
SD-218	10/1/21	0.43	1.17	**0.4**	0.74	1.52	**0.5**	4.7	4.98	**0.9**	53	111	**0.5**
SD-101 2008)	7/28/08	0.7	1.17	**0.6**	0.7	1.52	**0.5**	1.35	4.98	**0.3**	32	111	**0.3**
SD-101 (2020)	5/22/20	-	-	**-**	-	-	**-**	1.6	4.98	**0.3**	17	111	**0.2**
SD-217	9/23/21	17	1.17	**15**	22	1.52	**14**	1.8	4.98	**0.4**	28	111	**0.3**
SD-215	9/23/21	0.32	1.17	**0.3**	2.1	1.52	**1.4**	7.2	4.98	**1.4**	64	111	**0.6**
SD-103 (2020)	5/22/20	-	-	**-**	-	-	**-**	2.1	4.98	**0.4**	7.4	111	**0.07**
SD-214	9/23/21	0.13	1.17	**0.1**	0.13	1.52	**0.09**	0.6	4.98	**0.1**	39	111	**0.4**
SD-213	9/23/21	0.079	1.17	**0.07**	0.1	1.52	**0.07**	1.3	4.98	**0.3**	39	111	**0.4**
SD-212	9/23/21	0.063	1.17	**0.05**	0.09	1.52	**0.06**	3	4.98	**0.6**	16	111	**0.1**
SD-103 (2008) [2]	7/28/08	0.7	1.17	**0.6**	0.7	1.52	**0.5**	1.4	4.98	**0.3**	39	111	**0.4**
SD-211	9/23/21	0.32	1.17	**0.3**	0.57	1.52	**0.4**	2.8	4.98	**0.6**	22	111	**0.2**
SD-210	9/23/21	0.17	1.17	**0.1**	0.079	1.52	**0.05**	4.7	4.98	**0.9**	23	111	**0.2**
SD-208	9/23/21	2.4	1.17	**2**	2.7	1.52	**2**	0.91	4.98	**0.2**	32	111	**0.3**
SD-207	9/22/21	14	1.17	**12**	23	1.52	**15**	2.3	4.98	**0.5**	32	111	**0.3**
SD-206	9/22/21	0.16	1.17	**0.1**	0.24	1.52	**0.2**	7.3	4.98	**1.5**	22	111	**0.2**
SD-205	9/22/21	0.081	1.17	**0.07**	0.092	1.52	**0.06**	1.6	4.98	**0.3**	30	111	**0.3**
SD-203	9/22/21	0.44	1.17	**0.4**	0.66	1.52	**0.4**	5.6	4.98	**1.1**	35	111	**0.3**
SD-105 (2020)	5/22/20	-	--	**-**	-	-	**-**	2.3	4.98	**0.5**	9.7	111	**0.09**
SD-202	9/22/21	0.11	1.17	**0.09**	0.32	1.52	**0.2**	1.7	4.98	**0.3**	58	111	**0.5**
SD-201	9/22/21	1.2	1.17	**1.0**	1.3	1.52	**0.9**	7.5	4.98	**1.5**	31	111	**0.3**

Non-detections were included at one-half reporting limit (

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentration.
HQ	Hazard quotient.
HI	Hazard Index (total).
NE	Not established.
"-"	Not needed or not applicable.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment TEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Lead mg/kg	TEC mg/kg	HQ	Mercury mg/kg	TEC mg/kg	HQ	Total HI	Percent Lead HQ of Total HI
SD-221	10/1/21	360	35.8	**10**	0.051	0.18	**0.3**	**20**	**51%**
SD-102 (2020)	5/22/20	330	35.8	**9**	0.31	0.18	**2**	**15**	**62%**
SD-220	10/1/21	1,900	35.8	**53**	0.26	0.18	**1.4**	**89**	**60%**
SD-219	10/1/21	1,900	35.8	**53**	0.34	0.18	**2**	**122**	**44%**
SD-102 (2008) [2]	7/28/08	87	35.8	**2**	0.13	0.18	**0.7**	**37**	**7%**
SD-218	10/1/21	4,600	35.8	**128**	0.43	0.18	**2**	**159**	**81%**
SD-101 2008)	7/28/08	154	35.8	**4**	0.27	0.18	**2**	**78**	**5%**
SD-101 (2020)	5/22/20	480	35.8	**13**	0.11	0.18	**0.6**	**16**	**84%**
SD-217	9/23/21	2,800	35.8	**78**	13	0.18	**72**	**779**	**10%**
SD-215	9/23/21	510	35.8	**14**	0.17	0.18	**0.9**	**71**	**20%**
SD-103 (2020)	5/22/20	840	35.8	**23**	0.2	0.18	**1.1**	**27**	**87%**
SD-214	9/23/21	93	35.8	**3**	0.27	0.18	**2**	**19**	**14%**
SD-213	9/23/21	58	35.8	**2**	0.089	0.18	**0.5**	**8**	**20%**
SD-212	9/23/21	510	35.8	**14**	0.2	0.18	**1.1**	**31**	**45%**
SD-103 (2008) [2]	7/28/08	77	35.8	**2**	0.17	0.18	**0.9**	**76**	**3%**
SD-211	9/23/21	510	35.8	**14**	0.2	0.18	**1.1**	**30**	**48%**
SD-210	9/23/21	1,500	35.8	**42**	0.4	0.18	**2**	**65**	**65%**
SD-208	9/23/21	660	35.8	**18**	0.13	0.18	**0.7**	**92**	**20%**
SD-207	9/22/21	3,500	35.8	**98**	0.42	0.18	**2**	**701**	**14%**
SD-206	9/22/21	880	35.8	**25**	0.4	0.18	**2**	**60**	**41%**
SD-205	9/22/21	150	35.8	**4**	0.087	0.18	**0.5**	**10**	**40%**
SD-203	9/22/21	2,200	35.8	**61**	0.65	0.18	**4**	**92**	**67%**
SD-105 (2020)	5/22/20	940	35.8	**26**	0.27	0.18	**2**	**30**	**87%**
SD-202	9/22/21	160	35.8	**4**	0.16	0.18	**0.9**	**23**	**19%**
SD-201	9/22/21	1,600	35.8	**45**	0.31	0.18	**2**	**228**	**20%**

Non-detections were included at one-half reporting limit (41%

Footnotes at end of table.

TABLE 5
Calculation of Sediment Environmental Hazard Indices (excluding Arsenic)
375 Banfield Road, Portsmouth, New Hampshire

Sediment PEC (excluding Arsenic)

Sample ID (Upgradient to Downgradient)	Sample Date	Lead mg/kg	PEC mg/kg	HQ	Mercury mg/kg	PEC mg/kg	HQ	Total HI	Percent Lead HQ of Total HI
SD-221	10/1/21	360	128	**3**	0.051	1.06	**0.05**	**5**	**61%**
SD-102 (2020)	5/22/20	330	128	**3**	0.31	1.06	**0.3**	**4**	**70%**
SD-220	10/1/21	1,900	128	**15**	0.26	1.06	**0.2**	**20**	**75%**
SD-219	10/1/21	1,900	128	**15**	0.34	1.06	**0.3**	**23**	**64%**
SD-102 (2008) [2]	7/28/08	87	128	**0.7**	0.13	1.06	**0.1**	**4**	**16%**
SD-218	10/1/21	4,600	128	**36**	0.43	1.06	**0.4**	**40**	**89%**
SD-101 2008)	7/28/08	154	128	**1.2**	0.27	1.06	**0.3**	**8**	**15%**
SD-101 (2020)	5/22/20	480	128	**4**	0.11	1.06	**0.1**	**4**	**87%**
SD-217	9/23/21	2,800	128	**22**	13	1.06	**12**	**105**	**21%**
SD-215	9/23/21	510	128	**4**	0.17	1.06	**0.2**	**11**	**35%**
SD-103 (2020)	5/22/20	840	128	**7**	0.2	1.06	**0.2**	**7**	**91%**
SD-214	9/23/21	93	128	**0.7**	0.27	1.06	**0.3**	**3**	**28%**
SD-213	9/23/21	58	128	**0.5**	0.089	1.06	**0.08**	**2**	**27%**
SD-212	9/23/21	510	128	**4**	0.2	1.06	**0.2**	**7**	**57%**
SD-103 (2008) [2]	7/28/08	77	128	**0.6**	0.17	1.06	**0.2**	**8**	**8%**
SD-211	9/23/21	510	128	**4**	0.2	1.06	**0.2**	**7**	**60%**
SD-210	9/23/21	1,500	128	**12**	0.4	1.06	**0.4**	**16**	**75%**
SD-208	9/23/21	660	128	**5**	0.13	1.06	**0.1**	**14**	**36%**
SD-207	9/22/21	3,500	128	**27**	0.42	1.06	**0.4**	**97**	**28%**
SD-206	9/22/21	880	128	**7**	0.4	1.06	**0.4**	**12**	**58%**
SD-205	9/22/21	150	128	**1.2**	0.087	1.06	**0.08**	**2**	**51%**
SD-203	9/22/21	2,200	128	**17**	0.65	1.06	**0.6**	**22**	**79%**
SD-105 (2020)	5/22/20	940	128	**7**	0.27	1.06	**0.3**	**8**	**90%**
SD-202	9/22/21	160	128	**1.3**	0.16	1.06	**0.2**	**4**	**33%**
SD-201	9/22/21	1,600	128	**13**	0.31	1.06	**0.3**	**54**	**23%**
Non-detections were included at one-half reporting limit (									51%

Value	HQ exceeds a value of one (1).
mg/kg	Milligram sper kilogram.
TEC	Threshold effect concentration.
PEC	Probable effect concentration.
HQ	Hazard quotient.
HI	Hazard Index (total).
NE	Not established.
"-"	Not needed or not applicable.

TABLE 6
Total Surface Water Environmental Hazard Indices
375 Banfield Road, Portsmouth, NH

Total Metals - Chronic Criteria

Sample ID (Upstream to downstream)	Sampling Date	Arsenic [1] (total) µg/L	Chronic Criterion µg/L	HQ	Cadmium[1] (total) µg/L	Chronic Criterion µg/L	HQ	Chromium [1] (total) µg/L	Chronic Criterion µg/L	HQ	Lead [1] (total) µg/L	Chronic Criterion µg/L	HQ
SW-102 (2020)	05/22/20	**2.5**	150	0.02	**0.098** J	0.88	0.1	1.0 U	11.4	0.04	**5.8**	0.68	9
SW-102 (2008)	07/27/08	**6.0**	150	0.04	0.20 U	0.88	0.1	2.0 U	11.4	0.09	1.0 U	0.68	0.7
SW-101 (2008)	07/28/08	**5.0**	150	0.03	0.20 U	0.88	0.1	2.0 U	11.4	0.09	**1.0** J	0.68	1.5
SW-101 (2020)	05/22/20	**9.0**	150	0.06	0.20 U	0.88	0.1	**1.1**	11.4	0.1	**1.1**	0.68	1.6
SW-103 (2020)	05/22/20	**2.1**	150	0.01	**1.1**	0.88	1.3	**1.8**	11.4	0.2	**130**	0.68	191
SW-212	09/23/21	**3.7**	150	0.02	**0.17** J	0.88	0.2	**3.1**	11.4	0.3	**21**	0.68	31
SW-103 (2008)	07/28/08	**7.0**	150	0.05	**0.2** J	0.88	0.2	**3.0** J	11.4	0.3	**20**	0.68	29
SW-211	09/23/21	**0.49** J	150	0.003	**0.039** J	0.88	0.04	1.0 U	11.4	0.04	**8.9**	0.68	13
SW-210	09/23/21	**5.2**	150	0.03	**1.0**	0.88	1.1	**3.0**	11.4	0.3	**340**	0.68	500
SW-208	09/23/21	**2.1**	150	0.01	0.20 U	0.88	0.1	**1.1**	11.4	0.1	**21**	0.68	31
SW-203	09/22/21	**2.8**	150	0.02	**0.11** J	0.88	0.1	**1.0** J	11.4	0.08	**77**	0.68	113
SW-105 (2020)	05/22/20	**230**	150	1.5	**8.5**	0.88	9.7	**35**	11.4	3.1	**3,100**	0.68	4559
SW-201	09/22/21	**2.3**	150	0.02	**0.084**	0.88	0.10	**1.0**	11.4	0.09	**49**	0.68	72

Total Metals - Acute Criteria

Sample ID (Upstream to downstream)	Sampling Date	Arsenic [1] (total) µg/L	Acute Criterion µg/L	HQ	Cadmium[1] (total) µg/L	Acute Criterion µg/L	HQ	Chromium [1] (total) µg/L	Acute Criterion µg/L	HQ	Lead [1] (total) µg/L	Acute Criterion µg/L	HQ
SW-102 (2020)	05/22/20	**2.5**	340	0.007	**0.098** J	1.01	0.1	1.0 U	16.3	0.03	**5.8**	17.70	0.3
SW-102 (2008)	07/27/08	**6.0**	340	0.02	0.20 U	1.01	0.1	2.0 U	16.3	0.06	1.0 U	17.70	0.03
SW-101 (2008)	07/28/08	**5.0**	340	0.01	0.20 U	1.01	0.1	2.0 U	16.3	0.06	**1.0** J	17.70	0.06
SW-101 (2020)	05/22/20	**9.0**	340	0.03	0.20 U	1.01	0.1	**1.1**	16.3	0.07	**1.1**	17.70	0.06
SW-103 (2020)	05/22/20	**2.1**	340	0.006	**1.1**	1.01	1.1	**1.8**	16.3	0.1	**130**	17.70	7
SW-212	09/23/21	**3.7**	340	0.01	**0.17** J	1.01	0.2	**3.1**	16.3	0.2	**21**	17.70	1.2
SW-103 (2008)	07/28/08	**7.0**	340	0.02	**0.2** J	1.01	0.2	**3.0** J	16.3	0.2	**20**	17.70	1.1
SW-211	09/23/21	**0.49** J	340	0.001	**0.039** J	1.01	0.04	1.0 U	16.3	0.06	**8.9**	17.70	0.5
SW-210	09/23/21	**5.2**	340	0.02	**1.0**	1.01	1.0	**3.0**	16.3	0.2	**340**	17.70	19
SW-208	09/23/21	**2.1**	340	0.006	0.20 U	1.01	0.1	**1.1**	16.3	0.07	**21**	17.70	1.2
SW-203	09/22/21	**2.8**	340	0.008	**0.11** J	1.01	0.11	**1.0** J	16.3	0.06	**77**	17.70	4
SW-105 (2020)	05/22/20	**230**	340	0.7	**8.5**	1.01	8.4	**35**	16.3	2	**3,100**	17.70	175
SW-201	09/22/21	**2.3**	340	0.007	**0.084**	1.01	0.08	**1.0**	16.3	0.06	**49**	17.70	3

µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
J	Estimated concentration.
NE	Not established.
HQ	Hazard quotient (unitless)
HI	Hazard Index (unitless)
"--"	Not applicable.
[1].	Regulated as dissolved cocnentration.

TABLE 6
Total Surface Water Environmental Hazard Indices
375 Banfield Road, Portsmouth, NH

Total Metals - Chronic Criteria

Sample ID (Upstream to downstream)	Sampling Date	Mercury [1] (total) µg/L		Chronic Criterion µg/L	HQ	Selenium (total) µg/L		Chronic Criterion µg/L	HQ	Silver [1] (total) µg/L		Chronic Criterion µg/L	HQ	Total Chronic HI (total metals)	Percent HI Attributable to Lead
SW-102 (2020)	05/22/20	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	U	NE	--	9	92%
SW-102 (2008)	07/27/08	0.20	U	0.91	0.1	**10.0**		5.0	2	1.0	U	NE	--	3	24%
SW-101 (2008)	07/28/08	0.20	U	0.91	0.1	**10.0**		5.0	2	1.0	U	NE	--	4	39%
SW-101 (2020)	05/22/20	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	U	NE	--	2	66%
SW-103 (2020)	05/22/20	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	U	NE	--	193	99%
SW-212	09/23/21	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	**U**	NE	--	32	97%
SW-103 (2008)	07/28/08	0.20	U	0.91	0.1	**6.0**		5.0	1.2	1.0	U	NE	--	31	94%
SW-211	09/23/21	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	U	NE	--	14	95%
SW-210	09/23/21	**0.061**	**J**	0.91	0.07	5.0	U	5.0	0.5	**0.079**	**J**	NE	--	502	99.6%
SW-208	09/23/21	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	U	NE	--	32	98%
SW-203	09/22/21	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	U	NE	--	114	99%
SW-105 (2020)	05/22/20	**0.46**		0.91	0.5	**3.7**	**J**	5.0	0.7	**1.0**		NE	--	4574	99.7%
SW-201	09/22/21	0.10	U	0.91	0.05	5.0	U	5.0	0.5	0.20	U	NE	--	73	99%

Total Metals - Acute Criteria

Sample ID (Upstream to downstream)	Sampling Date	Mercury [1] (total) µg/L		Acute Criterion µg/L	HQ	Selenium (total) µg/L		Acute Criterion µg/L	HQ	Silver [1] (total) µg/L		Acute Criterion µg/L	HQ	Total Acute HI (total metals)	Percent HI Attributable to Lead
SW-102 (2020)	05/22/20	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	U	0.38	0.3	0.8	43%
SW-102 (2008)	07/27/08	0.20	U	1.6	0.06	**10.0**		NE	--	1.0	U	0.38	1.3	2	2%
SW-101 (2008)	07/28/08	0.20	U	1.6	0.06	**10.0**		NE	--	1.0	U	0.38	1.3	2	4%
SW-101 (2020)	05/22/20	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	U	0.38	0.3	0.5	11%
SW-103 (2020)	05/22/20	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	U	0.38	0.3	9	83%
SW-212	09/23/21	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	**U**	0.38	0.3	2	64%
SW-103 (2008)	07/28/08	0.20	U	1.6	0.06	**6.0**		NE	--	1.0	U	0.38	1.3	3	39%
SW-211	09/23/21	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	U	0.38	0.3	0.9	56%
SW-210	09/23/21	**0.061**	**J**	**1.6**	0.02	5.0	U	NE	--	**0.079**	**J**	0.38	0.2	21	93%
SW-208	09/23/21	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	U	0.38	0.3	2	72%
SW-203	09/22/21	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	U	0.38	0.3	5	90%
SW-105 (2020)	05/22/20	**0.46**		**1.6**	0.1	**3.7**	**J**	NE	--	**1.0**		0.38	3	189	93%
SW-201	09/22/21	0.10	U	1.6	0.03	5.0	U	NE	--	0.20	U	0.38	0.3	3	86%

µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
J	Estimated concentration.
NE	Not established.
HQ	Hazard quotient (unitless)
HI	Hazard Index (unitless)
"--"	Not applicable.
[1].	Regulated as dissolved cocnentration.

TABLE 7
Dissolved Surface Water Hazard Indices
375 Banfield Road, Portsmouth, NH

Dissolved Metals - Chronic Criteria

Sample ID (Upstream to downstream)	**Sampling Date**	**Arsenic * (dissolved) µg/L**	**Chronic Criteriuon**	**HQ**	**Barium (dissolved) µg/L**	**Chronic Chriterion**	**HQ**	**Cadmium* (dissolved) µg/L**	**Chronic Criterion**	**HQ**	**Chromium * (dissolved) µg/L**	**Chronic Criterion**	**HQ**
SW-212	09/23/21	**3.1**	150	0.02	**35**	NE	--	**0.032 J**	0.8	0.04	**3**	11	0.3
SW-211	09/23/21	**1.0**	150	0.007	**51.0**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-210	09/23/21	**1.1**	150	0.007	**64**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-208	09/23/21	**1.9**	150	0.01	**29**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-203	09/22/21	**2.1**	150	0.01	**280**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-201	09/22/21	**1.1**	150	0.007	**240**	NE	--	0.2 U	--	--	1.0 U	--	--

Dissolved Metals - Acute Criteria

Sample ID (Upstream to downstream)	**Sampling Date**	**Arsenic * (dissolved) µg/L**	**Acute Criterion**	**HQ**	**Barium (dissolved) µg/L**	**Acute Criterion**	**HQ**	**Cadmium* (dissolved) µg/L**	**Acute Criterion**	**HQ**	**Chromium * (dissolved) µg/L**	**Acute Criterion**	**HQ**
SW-212	09/23/21	**3.1**	340	0.01	**35**	NE	--	**0.032 J**	0.95	0.03	**3**	16	0.2
SW-211	09/23/21	**1.0**	340	0.003	**51.0**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-210	09/23/21	**1.1**	340	0.003	**64**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-208	09/23/21	**1.9**	340	0.01	**29**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-203	09/22/21	**2.1**	340	0.01	**280**	NE	--	0.2 U	--	--	1.0 U	--	--
SW-201	09/22/21	**1.1**	340	0.003	**240**	NE	--	0.2 U	--	--	1.0 U	--	--

µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
UB	Not deetected; present in blank sample.
NE	Not established.
HQ	Hazard quotient (unitless)
HI	Hazard Index (unitless)
"--"	Not applicable.
*	Regulated as dissolved concentration.

TABLE 7
Dissolved Surface Water Hazard Indices
375 Banfield Road, Portsmouth, NH

Dissolved Metals - Chronic Criteria

Sample ID (Upstream to downstream)	Sampling Date	Lead * (dissolved) µg/L	Chronic Criterion	HQ	Mercury * (dissolved) µg/L	Chronic Criterion	HQ	Selenium (dissolved) µg/L	Chronic Criterion	HQ	Silver (dissolved) µg/L	Chronic Criterion	HQ	Total HI (chronic, dissolved)	Percentage of Total HI Attributable to Lead
SW-212	09/23/21	**3.1**	0.54	5.7	0.071 UB	0.77	--	5.0 U	NE	--	0.2 U	NE	--	6	94.5%
SW-211	09/23/21	**1.3**	0.54	2.4	0.061 UB	0.77	--	5.0 U	NE	--	0.2 U	NE	--	2	99.7%
SW-210	09/23/21	**5**	0.54	9.3	0.063 UB	0.77	--	5.0 U	NE	--	0.2 U	NE	--	9	99.9%
SW-208	09/23/21	**4.3**	0.54	8.0	0.065 UB	0.77	--	5.0 U	NE	--	0.2 U	NE	--	8	99.8%
SW-203	09/22/21	**11**	0.54	20.4	0.061 UB	0.77	--	5.0 U	NE	--	0.2 U	NE	--	20	99.9%
SW-201	09/22/21	**2.9**	0.54	5.4	5 U	0.77	--	5.0 U	NE	--	0.2 U	NE	--	5	99.9%

Dissolved Metals - Acute Criteria

Sample ID (Upstream to downstream)	Sampling Date	Lead * (dissolved) µg/L	Acute Criterion	HQ	Mercury * (dissolved) µg/L	Acute Criterion	HQ	Selenium (dissolved) µg/L	Acute Criterion	HQ	Silver (dissolved) µg/L	Acute Criterion	HQ	Total HI (acute, dissolved)	Percentage of Dissolved HI Attributable to Lead
SW-212	09/23/21	**3.1**	14	0.2	0.071 UB	1.40	--	5.0 U	NE	--	0.2 U	0.32	--	0.5	49.0%
SW-211	09/23/21	**1.3**	14	0.1	0.061 UB	1.40	--	5.0 U	NE	--	0.2 U	0.32	--	0.1	96.9%
SW-210	09/23/21	**5**	14	0.4	0.063 UB	1.40	--	5.0 U	NE	--	0.2 U	0.32	--	0.4	99.1%
SW-208	09/23/21	**4.3**	14	0.3	0.065 UB	1.40	--	5.0 U	NE	--	0.2 U	0.32	--	0.3	98.2%
SW-203	09/22/21	**11**	14	0.8	0.061 UB	1.40	--	5.0 U	NE	--	0.2 U	0.32	--	0.8	99.2%
SW-201	09/22/21	**2.9**	14	0.2	5 U	1.40	--	5.0 U	NE	--	0.2 U	0.32	--	0.2	98.5%

µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
UB	Not deetected; present in blank sample.
NE	Not established.
HQ	Hazard quotient (unitless)
HI	Hazard Index (unitless)
"--"	Not applicable.
*	Regulated as dissolved concentration.

APPENDIX A

Toxicity Profiles

Toxicological Profiles for Petroleum Hydrocarbons

Petroleum is a mixture of hundreds of hydrocarbon compounds. Industry specifications for refined products, such as gasoline and diesel fuel, are based upon physical and performance-based criteria, not upon a specific chemical formulation. As such, the composition of petroleum products released to the environment are complex and variable, and are a function of (1) the origin and chemistry of the parent crude oil, (2) refining and blending processes, and (3) the use of performance enhancing additives. Once released to the environment, the chemistry of a petroleum product is further altered by contaminant fate and transport processes, such as leaching, volatilization, and biodegradation.

There are few toxicological data available for the vast majority of petroleum constituents. Based upon the available information, however, it is possible to make some broad observations and conclusions:

- petroleum products are comprised mainly of aliphatic/alicyclic and aromatic hydrocarbon compounds;
- aromatic hydrocarbons appear to be more toxic than aliphatic compounds; and
- the toxicity of aliphatic compounds appears to be related to their carbon number/molecular weights.

In the MassDEP approach, the non-cancer toxicity of petroleum-contaminated media is established by segregating the petroleum hydrocarbon compounds present in mixtures into broad chemical classes (alkane/cycloalkane, alkene and aromatics) and further into subgroups or fractions based upon their size (defined by number of carbons atoms in the compounds). For each subgroup of compounds, a "reference compound" was initially identified to represent the toxicity of all compounds in the range. It was usually chosen because its toxicity was relatively well characterized. For each reference compound, a US EPA published oral reference dose value (RfD) was identified or, for those "reference compounds" without US EPA published values, an oral dose-response value was identified based on available toxicity information. These values are shown below:

Carbon Range	2002 MassDEP Recommended Values (mg/kg-dy)	Critical Effect
Aliphatic		
C_5 - C_8	0.04	Neurotoxicity
C_9 - C_{12}	0.1	Hepatic and hematological
C_9 - C_{18}	0.1	Hepatic and hematological
C_{19} - C_{36}	2.0	Liver granuloma
Aromatic		
C_9 – C_{10}	0.03	Nephrotoxicity
C_{11}-C_{22}	0.03	Nephrotoxicity

Carbon Range	2002 MassDEP Recommended Values (mg/m^3)	Critical Effect
Aliphatic		
C_5 - C_8	0.2	Neurotoxicity
C_9 - C_{12}	0.2	Neurotoxicity
C_9 - C_{18}	0.2	Neurotoxicity
C_{19} - C_{36}	NA	NA
Aromatic		
C_9-C_{10}	0.05	Body weight reduction, hepatic renal, and developmental effects
C_{11}-C_{22}	0.05	Body weight reduction, hepatic renal, and developmental effects

From: MassDEP (2002). Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach. October 31, 2002, Policy #WSC-02-411. Final policy.

Toxicity Profile for Acenaphthylene

Acenaphthylene, also known as cyclopenta[*de*]naphthalene, is a polycyclic aromatic hydrocarbon (PAH) with three aromatic rings. No information was available concerning the commercial production or use of this compound. As a class, PAHs are widely distributed in the environment from natural sources such as forest fires and volcanoes and from man-made sources including burning of wood in homes, automobile and truck emissions, tobacco smoke, and production of coal tar and coal tar products (ATSDR, 1990). Emissions from residential wood combustion have been shown to contain more acenaphthylene than other PAHs (Perwack et al., 1982).

No absorption data are available for acenaphthylene. However, toxicity data indicate absorption, and data from structurally-related PAHs, primarily benzo[*a*]pyrene, suggest that the compound would be absorbed from the gastrointestinal tract, lungs, and skin (U.S. EPA, 1991a). Acenaphthylene is metabolically converted to 1,8-naphthalic acid by scission of the 5-membered ring (Parke, 1968). No human data were available to evaluate the toxicity of acenaphthylene. Acute oral toxicity data include LD50s of 3 g/kg for rats and 1.76-2.2 g/kg for mice (Knobloch et al., 1969; Rotenberg and Mashbits, 1965). Effects on the kidneys, liver, blood, reproductive system, and lungs were reported in subchronic oral studies with experimental animals. Daily doses of 0.6 g acenaphthylene for 40 days produced peripheral blood changes and affected the kidney function in rats (Knobloch et al., 1969).

Liver degeneration and severe pulmonary effects were seen in mice administered 176 mg/kg every other day for 2 months (Rotenberg and Mashbits, 1965). In a 90-day gavage study, administration of 100, 200, or 400 mg/kg/day acenaphthylene to male and female mice produced a dose-related increased mortality in females. Other effects included decreased red blood cell, hemoglobin, and hematocrit values and decreased platelet (males) and leukocyte counts (females); increased liver weights and hepatocellular hypertrophy; nephropathy and related kidney lesions; decreased ovary weights, decreased ovarian and uterine activity, and smaller and fewer corpora lutea (U.S. EPA, 1989). Most of these effects were seen at $200 mg/kg/day. Increased red blood cell counts in males, increased liver weights, hepatocellular hypertrophy, and kidney lesions in females were seen at all dose levels. Pulmonary effects such as bronchitis, pneumonia, and desquamation of the bronchial and alveolar epithelium were reported in subchronic inhalation studies with rats exposed to concentrations ranging from 0.5 to 18 mg/m3 for 4-5 months (Reshetyuk et al., 1970; Rotenberg and Mahbits, 1965). Acenaphthylene is irritating to the skin and mucous membranes of rabbits (Knobloch et al., 1969).

Two limited inhalation studies provide equivocal evidence of carcinogenicity for acenaphthylene. No signs of malignancy were reported in rats exposed to 12 mg/m3 acenaphthylene for 5 months (Reshetyuk et al., 1970), whereas exposure to a lower concentration (0.5-1.25 mg/m3) for 4 months produced various degrees of lung malignancy (Rotenberg and Mashbits (1965). EPA has classified acenaphthylene in weight-of-evidence Group D, not classifiable as to human carcinogenicity (U.S. EPA, 1991b).

May 1994

Prepared by: Rosmarie A. Faust, Ph.D. Chemical Hazard Evaluation Group Biomedical and Environmental Information Analysis Section Health Sciences Research Division

Oak Ridge National Laboratory* Oak Ridge, Tennessee

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under

Contract No. DE-AC05-84OR21400

Toxicity Profile for Acenaphthene

Acenaphthene, also known as 1,2-dihydroacenaphthylene or 1,8-ethylenenaphthalene, is a tricyclic aromatic hydrocarbon that occurs in coal tar. It is used as a dye intermediate, in the manufacture of some plastics, and as an insecticide and fungicide (EPA, 1980). Acenaphthene has been detected in cigarette smoke, automobile exhausts, and urban air; in effluents from petrochemical, pesticide, and wood preservative industries (EPA, 1980); and in soils, groundwater, and surface waters at hazardous waste sites (ATSDR, 1990).

No absorption data are available for acenaphthene; however, by analogy to structurally-related polycyclic aromatic hydrocarbons (PAHs), it would be expected to be absorbed from the gastrointestinal tract and lungs (EPA, 1988). The anhydride of naphthalic acid was identified as a urinary metabolite in rats treated orally with acenaphthene (Chang and Young, 1943).

Although a large body of literature exists on the toxicity and carcinogenicity of PAHs, primarily benzo[a]pyrene, toxicity data for acenaphthene are limited. Acenaphthene is irritating to the skin and mucous membranes of humans and animals (Sandmeyer, 1981; Knobloch et al., 1969). Acute toxicity data for animals include oral LD_{50}s of 10 g/kg for rats and 2.1 g/kg for mice (Knobloch et al., 1969) and an intraperitoneal LD_{50} of 600 mg/kg for rats (Reshetyuk et al., 1970). Oral exposure of rats to daily 2-g doses of acenaphthene for 32 days produced peripheral blood changes, mild liver and kidney damage, and pulmonary effects (Knobloch et al., 1969). Subchronic oral exposure to acenaphthene at doses of $\geq$ 350 mg/kg for 90 days produced increased liver weights, hepatocellular hypertrophy, and increased cholesterol levels in mice. Reproductive effects included decreased ovary weights at doses of $\geq$ 350 mg/kg and decreased ovarian and uterine activity as well as smaller and fewer corpora lutea at 700 mg/kg/day (EPA, 1989). Adverse effects on the blood, lungs, and glandular tissues were reported in rats exposed daily to 12 mg/m^3 of acenaphthene for 5 months (Reshetyuk et al., 1970).

No oral bioassays were available to assess the carcinogenicity of acenaphthene. A limited inhalation study in which rats were exposed to 12 mg/m^3 acenaphthene for 5 months and observed an additional 8 months provided no evidence of carcinogenicity (Reshetyuk et al., 1970). The EPA has not assigned a weight-of-evidence classification for carcinogenicity to acenaphthene (EPA, 1993a,b).

January 1994

Prepared by Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation Group, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, [*], Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400

Toxicity Profile for Anthracene

Anthracene, also referred to as paranaphthalene or green oil, is a polycyclic aromatic hydrocarbon (PAH) derived from coal tar and is primarily used as an intermediate in the production of dyes. It has also been used in the production of smoke screens. Anthracene is ubiquitous in the environment as a product of incomplete combustion of fossil fuels. Although a large body of literature exists on the toxicity and carcinogenicity of a number of PAHs, toxicity data for anthracene are limited.

Evidence indicates that anthracene is absorbed following oral and dermal exposure. Targets for anthracene toxicity are the skin, hematopoietic system, lymphoid system, and gastrointestinal tract. Adverse dermatologic effects have been observed in humans and animals in conjunction with acute and subchronic exposure to anthracene. In humans, anthracene may cause acute dermatitis with symptoms of burning, itching, and edema. Prolonged dermal exposure produces pigmentation, cornification of skin surface layers, and telangiectasis (Volkova, 1983). Anthracene is photosensitizing, potentiating skin damage elicited by exposure to ultraviolet (UV) radiation (U.S. EPA, 1987; Dayhaw-Barker et al., 1985; Forbes et al., 1976). Hematologic toxicity was observed in patients receiving intraperitoneal injections of anthracene-containing chemotherapeutic agents (Falkson et al., 1985) and in rats exposed to anthracene by oral gavage and by inhalation (Volkova, 1983). Mice receiving subcutaneous injections of anthracene exhibited adverse lymphoid effects (Hoch-Ligeti, 1941). Long-term use of anthracene-containing laxatives produced melanosis of the colon and rectum (Badiali et al., 1985). Human exposure to anthracene has also been associated with headache, nausea, loss of appetite, inflammation of the gastrointestinal tract, slow reactions, and weakness (Volkova, 1983).

Carcinogenicity bioassays with anthracene generally gave negative results. Studies involving oral administration (Druckrey and Schmahl, 1955; Schmahl, 1955) or intrapulmonary implantation in rats (Stanton et al., 1972) or implantation into the brain of rabbits (Russell, 1947) provided no evidence of carcinogenicity. Negative results were also obtained when anthracene was tested in mice by skin application (Wynder and Hoffman, 1959; Pollia, 1939; Kennaway, 1924a,b) and in mouse-skin initiation assays (LaVoie et al., 1979; Scribner, 1973). However, skin application of anthracene followed by exposure to UV radiation or visible light induced a high incidence of skin tumors in mice (Heller, 1950).

Based on no human data and inadequate data from animal bioassays, U.S. EPA (1991a,b) has placed anthracene in weight-of-evidence group D, not classifiable as to human carcinogenicity.

November 1991

Prepared by Rosmarie A. Faust, Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Benzo(a)anthracene

Benz[*a*]anthracene, also known as benzo(a)anthracene, along with a number of other polycyclic aromatic hydrocarbons, are natural products produced by the incomplete combustion of organic material. The arrangement of the aromatic rings in the benz[*a*]anthracene molecule gives it a "bay region" often correlated with carcinogenic properties. In general, the bay-region polycyclic aromatic hydrocarbons and some of their metabolites are known to react with cellular macromolecules, including DNA, which may account for both their toxicity and carcinogenicity. The inducible mixed-function oxidase enzymes oxidize benz[*a*]anthracene to form metabolites with increased water solubility that can be efficiently excreted in the urine. A minor product of this oxidation, a bay-region diol epoxide, reacts readily with DNA and has been shown to be highly carcinogenic (U.S. EPA, 1980; 1984; Jerina, et al., 1977).

The toxic effects of benz[*a*]anthracene and similar polycyclic aromatic hydrocarbons are primarily directed toward tissues that contain proliferating cells. Animal studies indicate that exposure to bay-region polycyclic aromatic hydrocarbons can damage the hematopoietic system leading to progressive anemia as well as agranulocytosis (Robinson, et al., 1975; Cawein and Sydnor, 1968). The lymphoid system can also be affected resulting in lymphopenia. Toxic effects have been observed in the rapidly dividing cells of the intestinal epithelium, spermatogonia and resting spermatocytes in the testis and primary oocytes of the ovary (Philips et al., 1973; Mackinzie and Angevine, 1981; Kraup, 1970; Ford and Huggins, 1963; Mattison and Thorgeirsson, 1977; U.S. EPA, 1980; 1984). Most of these effects have occurred following both oral and parenteral exposure. Epithelial proliferation and cell hyperplasia in the respiratory tract have been reported following subchronic inhalation exposure (Reznik-Schuller and Mohr, 1974; Saffiotti et al., 1968). However, because of the lack of quantitative data, neither a reference dose nor a reference concentration have been derived (U.S. EPA, 1991).

The primary concern with benz[*a*]anthracene exposure is its potential carcinogenicity. There is no unequivocal, direct evidence of the carcinogenicity of the compound to humans, however, benz[*a*]anthracene and other known carcinogenic polycyclic aromatic hydrocarbons are components of coal tar, soot, coke oven emissions and tobacco smoke. There is adequate evidence of its carcinogenic properties in animals. Oral exposures of mice to benz[*a*]anthracene have resulted in hepatomas, pulmonary adenomas and forestomach papillomas (Klein, 1963; Bock and King, 1959; U.S. EPA, 1991). The EPA weight-of-evidence classification is: B2, probable human carcinogen, for both oral and inhalation exposure based on adequate animal evidence and no human evidence (U.S. EPA, 1991). A slope factor has not been derived specifically for benz[*a*]anthracene by the EPA (U.S. EPA, 1991).

September 1992

Prepared by: Andrew Francis, Chemical Hazard Evaluation Group, Biomedical Environmental Information Analysis Section, Health and Safety Research Division, *, Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Benzo(a)pyrene

Benzo[*a*]pyrene is a polycyclic aromatic hydrocarbon (PAH) that can be derived from coal tar. Benzo[*a*]pyrene occurs ubiquitously in products of incomplete combustion of fossil fuels and has been identified in ambient air, surface water, drinking water, waste water, and char-broiled foods (IARC, 1983). Benzo[*a*]pyrene is primarily released to the air and removed from the atmosphere by photochemical oxidation and dry deposition to land or water. Biodegradation is the most important transformation process in soil or sediment (ATSDR, 1990).

Benzo[*a*]pyrene is readily absorbed following inhalation, oral, and dermal routes of administration (ATSDR, 1990). Following inhalation exposure, benzo[*a*]pyrene is rapidly distributed to several tissues in rats (Sun et al., 1982; Weyand and Bevan, 1986). The metabolism of benzo[*a*]pyrene is complex and includes the formation of a proposed ultimate carcinogen, benzo[*a*]pyrene 7,8 diol-9,10-epoxide (IARC, 1983). The major route of excretion is hepatobiliary followed by elimination in the feces (EPA, 1991).

No data are available on the systemic (non-carcinogenic) effects of benzo[*a*]pyrene in humans. In mice, genetic differences appear to influence the toxicity of benzo[*a*]pyrene. Subchronic dietary administration of 120 mg/kg benzo[*a*]pyrene for up to 180 days resulted in decreased survival due to hematopoietic effects (bone narrow depression) in a "nonresponsive" strain of mice (i.e., a strain whose cytochrome P-450 mediated enzyme activity is not induced as a consequence of PAH exposure). No adverse effects were noted in "responsive" mice (i.e., a strain capable of inducing increased cytochrome P-450 mediated enzyme activity as a consequence of PAH exposure) (Robinson et al., 1975). Immunosuppression has been reported in mice administered daily intraperitoneal injections of 40 or 160 mg/kg of benzo[*a*]pyrene for 2 weeks, with more pronounced effects apparent in "nonresponsive" mice (Blanton et al., 1986; White et al., 1985). In utero exposure to benzo[*a*]pyrene has produced adverse developmental/reproductive effects in mice. Dietary administration of doses as low as 10 mg/kg during gestation caused reduced fertility and reproductive capacity in offspring (Mackenzie and Angevine, 1981), and treatment by gavage with 120 mg/kg/day during gestation caused stillbirths, resorptions, and malformations (Legraverend et al., 1984). Similar effects have been reported in intraperitoneal injection studies (ATSDR, 1990).

Numerous epidemiologic studies have shown a clear association between exposure to various mixtures of PAHs containing benzo[*a*]pyrene (e.g., coke oven emissions, roofing tar emissions, and cigarette smoke) and increased risk of lung cancer and other tumors. However, each of the mixtures also contained other potentially carcinogenic PAHs; therefore, it is not possible to evaluate the contribution of benzo[*a*]pyrene to the carcinogenicity of these mixtures (IARC, 1983; EPA, 1991). An extensive data base is available for the carcinogenicity of benzo[*a*]pyrene in experimental animals. Dietary administration of benzo[*a*]pyrene has produced papillomas and carcinomas of the forestomach in mice (Neal and Rigdon, 1967), and treatment by gavage has produced mammary tumors in rats (McCormick et al., 1981) and pulmonary adenomas in mice (Wattenberg and Leong, 1970). Exposure by inhalation and intratracheal instillation has resulted in benign and malignant tumors of the respiratory and upper digestive tracts of hamsters (Ketkar et al., 1978; Thyssen et al., 1981). Numerous topical application studies have shown that benzo[*a*]pyrene induces skin tumors in several species, although mice appear to be the most sensitive species. Benzo[*a*]pyrene is a complete carcinogen and also an initiator of skin tumors (IARC, 1973; EPA, 1991). Benzo[*a*]pyrene has also been reported to induce tumors in animals when administered by other routes, such as intravenous, intraperitoneal, subcutaneous, intrapulmonary, and transplacental.

Based on United States Environmental Protection Agency (EPA) guidelines, benzo[*a*]pyrene was assigned to weight-of-evidence group B2, probable human carcinogen.

December 1994

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation Group, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, *, Oak Ridge, Tennessee.

Prepared for: OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Benzo(b)fluoranthene

Benzo[*b*]fluoranthene, a crystalline solid with a chemical formula of $C_{20}H_{12}$ and a molecular weight of 252.32 (Lide, 1991), is a polycyclic aromatic hydrocarbon (PAH) with one five-membered ring and four six-membered rings. There is no commercial production or known use of this compound (IARC, 1983). Benzo[*b*]fluoranthene is found in fossil fuels and occurs ubiquitously in products of incomplete combustion. It has been detected in mainstream cigarette smoke; urban air; gasoline engine exhaust; emissions from burning coal and from oil-fired heating; broiled and smoked food; oils and margarine (IARC, 1983); and in soils, groundwater, and surface waters at hazardous waste sites (ATSDR, 1990).

No absorption data were available for benzo[*b*]fluoranthene; however, by analogy to structurally-related PAHs, primarily benzo[*a*]pyrene, it would be expected to be absorbed from the gastrointestinal tract, lungs, and skin (EPA, 1991). Major metabolites of benzo[*b*]fluoranthene formed in vitro in rat liver include dihydrodiols and monohydroxy derivatives (Amin et al., 1982) and monohydroxy derivatives in mouse epidermis (Geddie et al., 1987).

No data were found concerning the acute, subchronic, chronic, developmental, or reproductive toxicity of benzo[*b*]fluoranthene. No long-term oral or inhalation bioassays were available to assess the carcinogenicity of benzo[*b*]fluoranthene. Benzo[*b*]fluoranthene was tested for carcinogenicity in dermal application, lung implantation, subcutaneous (s.c.) injection, and intraperitoneal (i.p.) injection studies. Dermal applications of 0.01-0.5% solutions of benzo[*b*]fluoranthene for life produced a high incidence of skin papillomas and carcinomas in mice (Wynder and Hoffmann, 1959). In initiation-promotion assays, the compound was active as an initiator of skin carcinogenesis in mice (LaVoie et al., 1982; Amin et al., 1985). Sarcomas and carcinomas of the lungs and thorax were seen in rats receiving single lung implants of 0.1-1 mg benzo[*b*]fluoranthene (Deutsch-Wenzel et al., 1983). Newborn mice receiving 0.5 umol benzo[*b*]fluoranthene via i.p. injection developed liver and lung tumors (LaVoie et al., 1987), and mice administered three s.c. injections of 0.6 mg benzo[*b*]fluoranthene developed injection site sarcomas (IARC, 1993).

Based on no human data and sufficient evidence for carcinogenicity in animals, EPA has assigned a weight-of-evidence classification of B2, probable human carcinogen, to benzo[*b*]fluoranthene (EPA, 1994).

May 1994

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *, Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Benzo(g,h,i)perylene

Benzo[*g,h,i*]perylene, also known as 1,12-benzoperylene, is a polycyclic aromatic hydrocarbon (PAH) with six aromatic rings. There is no known commercial production or use of benzo[*g,h,i*]perylene. It occurs naturally in crude oils and is present ubiquitously in products of incomplete combustion and in coal tar (EPA, 1987).

No absorption data were available for benzo[*g,h,i*]perylene; however, by analogy to other PAHs, primarily benzo[*a*]pyrene, it would be expected to be absorbed from the gastrointestinal tract, lungs, and skin (EPA, 1991).

No human or animal data were available to evaluate the toxicity of benzo[*g,h,i*]perylene.

No oral or inhalation bioassays were available to assess the carcinogenicity of benzo[*g,h,i*]perylene. Negative results were reported in dermal application studies (Hoffmann and Wynder, 1966; Van Duuren and Goldschmidt, 1976) and in initiation-promotion assays for skin tumorigenesis in mice (Hoffmann and Wynder, 1966; Van Duuren et al., 1970). However, when benzo[*g,h,i*]perylene was administered simultaneously with benzo[*a*]pyrene to the skin of mice, an increased incidence of skin tumors was observed compared to the tumor incidence in mice treated with benzo[*a*]pyrene alone, indicating possible cocarcinogenic activity of benzo[*g,h,i*]perylene (Van Duuren et al., 1973). Although a few pulmonary tumors were observed in Osborne-Mendel rats when benzo[*g,h,i*]perylene was administered as single lung implants of >=83 mg (Deutsch-Wenzel et al., 1983), the tumors may have been caused by impurities in the test compound (IARC, 1983). In subcutaneous injection studies, benzo[*g,h,i*]perylene did not produce injection site tumors in mice (Muller, 1968).

Based on no human data and inadequate data with experimental animals, the United States Environmental Protection Agency (EPA) has classified benzo[*g,h,i*]perylene in weight-of-evidence Group D, not classifiable as to human carcinogenicity (EPA, 1992).

May 1994

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *, Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Benzo(k)fluoranthene

Benzo[*k*]fluoranthene, a crystalline solid with a chemical formula of $C_{20}H_{12}$ and a molecular weight of 252.32 (Lide, 1991), is a polycyclic aromatic hydrocarbon (PAH) with one five-membered and four six-membered rings. There is no commercial production or known use of this compound (IARC, 1983). Benzo[*k*]fluoranthene is found in fossil fuels and occurs ubiquitously in products of incomplete combustion (IARC, 1983) and in soils, groundwater, and surface waters at hazardous waste sites (ATSDR, 1990).

No absorption or excretion data were available for benzo[*k*]fluoranthene; however, by analogy to structurally-related PAHs, primarily benzo[*a*]pyrene, it would be expected to be absorbed from the gastrointestinal tract, lungs, and skin (EPA, 1991). Rat liver microsomes have been shown to metabolize benzo[*k*]fluoranthene to the dihydrodiol, 8,9-dihydro-8,9-dihydroxy benzo[*k*]fluoranthene (LaVoie et al., 1980).

No data were found concerning the acute, subchronic, chronic, developmental, or reproductive toxicity of benzo[*k*]fluoranthene. No long-term oral or inhalation bioassays were available to assess the carcinogenicity of benzo[*k*]fluoranthene. Benzo[*k*]fluoranthene was tested for carcinogenicity in dermal application, subcutaneous (s.c.) injection, lung implantation, and intraperitoneal (i.p.) injection studies. Dermal applications of 0.5% solutions of benzo[*k*]fluoranthene for life produced only a few skin papillomas in mice (Wynder and Hoffmann, 1959), but in initiation-promotion assays, benzo[*k*]fluoranthene was active as an initiator of skin carcinogenesis (LaVoie et al., 1982; Amin et al., 1985). Injection site sarcomas developed in mice given three s.c. injections of 0.6 mg benzo[*k*]fluoranthene (Lacassagne et al., 1963) and dose-related increases of epidermoid carcinomas of the lungs were reported in rats receiving single lung implants of 0.16-4.15 mg benzo[*k*]fluoranthene (Deutsch-Wenzel et al., 1983). In a short-term assay, hepatic and lung tumors occurred in newborn mice receiving 2.1 umol benzo[*k*]fluoranthene via i.p. injection (LaVoie et al., 1987).

Based on no human data and sufficient evidence for carcinogenicity in animals, EPA has assigned a weight-of-evidence classification of B2, probable human carcinogen, to benzo[*k*]fluoranthene (EPA, 1994).

May 1994

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *, Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Chrysene

Chrysene, a polycyclic aromatic hydrocarbon, is a ubiquitous environmental contaminant formed primarily by the incomplete combustion of organic compounds. Although present in coal and oil, the presence of chrysene in the environment is the result of anthropogenic activities such as coal combustion and gasification; gasoline exhaust; diesel and aircraft exhaust; and emissions from coke ovens, wood burning stoves, and waste incineration (IARC, 1983; ATSDR, 1990). Chrysene is not produced or used commercially, and its use is limited strictly to research applications.

Little information on the absorption, distribution, metabolism and excretion of chrysene in humans is available. Animal studies have shown that approximately 75% of the administered chrysene may be absorbed by oral, dermal, or inhalation routes (Grimmer et al., 1988; Modica et al., 1983; Chang, 1943). Following its absorption, chrysene is preferentially distributed to highly lipophilic regions of the body, most notably adipose and mammary tissue (Bartosek et al., 1984; Modica et al., 1983). Phase I metabolism of chrysene, whether in the lung, skin, or liver, is mediated by the mixed function oxidases. The metabolism results in the formation of 1,2-, 3,4-, and 5,6-dihydrodiols as well as the formation of 1-, 3-, and 4-phenol metabolites (Sims, 1970; Nordquist et al., 1981; Jacob et al., 1982, 1987). Additional Phase I metabolism of chrysene 1,2-dihydrodiol forms chrysene 1,2-dihydrodiol-3,4-epoxide and 9-hydroxychrysene 1,2-diol-3,4-oxide. These metabolites were shown to have mutagenic and alkylating activity (Hodgson et al., 1983; Wood et al., 1977; Wood et al., 1979). Phase II metabolism of chrysene results in the formation of glucuronide and sulfate ester conjugates; however, glutathione conjugates of diol- and triol-epoxides are also formed (Sims and Grover, 1974, 1981; Hodgson et al., 1986; Robertson and Jernström, 1986). Hepatobiliary secretion with elimination in the feces is the predominant route of excretion (Schlede et al., 1970; Grimmer et al., 1988).

Human or animal systemic, developmental, and reproductive health effects following exposure to chrysene were not identified. Target organs have not been described, although chrysene may induce immunosuppression similar to certain other PAHs. Oral and inhalation carcinogenic bioassays were not identified. In mouse skin painting studies, chrysene was an initiator of papillomas and carcinomas. In addition, intraperitoneal injections of chrysene have induced liver adenomas and carcinomas in male CD-1 and BLU/Ha Swiss mice. EPA (1994a,b) has classified chrysene in weight-of-evidence Group B2, probable human carcinogen, based on the induction of liver tumors and skin papillomas and carcinomas following treatment and the mutagenicity and chromosomal abnormalities induced in in vitro tests.

December 1994

Prepared by: H. T. Borges, Ph.D., MT(ASCP), D.A.B.T., Chemical Hazard Evaluation Group, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, *, Oak Ridge, Tennessee.

Prepared for: OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Dibenzo(a,h)anthracene

Dibenz[*a*,*h*]anthracene is a polycyclic aromatic hydrocarbon (PAH) with five aromatic rings. No commercial production or use of dibenz[*a*,*h*]anthracene is known. It occurs as a component of coal tars, shale oils, and soots (IARC, 1985) and has been detected in gasoline engine exhaust, coke oven emissions, cigarette smoke, charcoal broiled meats, vegetation near heavily traveled roads, and surface water and soils near hazardous waste sites (ATSDR, 1993; IARC, 1983).

Dibenz[*a*,*h*]anthracene is poorly absorbed from the gastrointestinal tract and is primarily excreted via feces (Chang, 1943). Following absorption, dibenz[*a*,*h*]anthracene is distributed to various tissues, with highest accumulation in the liver and kidneys (Daniel et al., 1967). Dibenz[*a*,*h*]anthracene is metabolized by mixed function oxidases to dihydrodiols. Epoxidation of the 3,4-dihydrodiol may lead to the formation of a diol-epoxide, the putative ultimate carcinogenic metabolite of dibenz[*a*,*h*]anthracene (Buening et al., 1979).

No human studies were available to evaluate the toxicity of dibenz[*a*,*h*]anthracene. In animals, depressed immune responses were observed in mice following single or multiple subcutaneous injections of dibenz[*a*,*h*]anthracene (White et al., 1985). Weekly subcutaneous. injections of 0.05% dibenz[*a*,*h*]anthracene for 40 weeks produced lymphoid tissue changes, decreased spleen weights, and liver and kidney lesions in mice (Hoch-Ligeti, 1941). Weekly intramuscular injections of 20 mg/kg promoted the development of arteriosclerotic plaques in chickens (Penn and Snyder, 1988).

No epidemiologic studies or case reports addressing the carcinogenicity of dibenz[*a*,*h*]anthracene in humans were available. In animals, dibenz[*a*,*h*]anthracene has produced tumors by different routes of administration, having both local and systemic carcinogenic effects.

After oral administration, dibenz[*a*,*h*]anthracene produced tumors at several sites. Male and female mice fed dibenz[*a*,*h*]anthracene (0.85 mg/day for males, 0.76 mg/day for females) in an aqueous olive oil emulsion developed pulmonary adenomatosis, alveologenic carcinomas of the lung, hemangio-endotheliomas of the pancreas and mesentery/abdominal lymph nodes, and mammary carcinomas (females) after 200 days (Snell and Stewart, 1962). A single oral dose of 1.5 mg dibenz[*a*,*h*]anthracene in polyethylene glycol produced a low incidence of forestomach papillomas in mice (Berenblum and Haran, 1955). Mammary carcinomas developed in mice treated by gavage with a total dose of 15 mg over a 15-week period (Biancifiori and Caschera, 1962).

Carcinogenic as well as tumor-initiating activity of dibenz[*a*,*h*]anthracene has been demonstrated in topical application studies with mice. Repeated dermal application of 0.001 to 0.01% solutions produced a high incidence of skin papillomas and carcinomas in mice (Wynder and Hoffmann, 1959; Van Duuren et al., 1967). In initiation-promotion assays, the compound was active as an initiator of skin carcinogenesis in mice (Buening et al., 1979; Platt et al., 1990). However, no skin tumors were observed in Syrian golden hamsters that received topical dibenz[*a*,*h*]anthracene applications over a 10-week period (Shubik et al., 1960).Injection site sarcomas developed in mice injected subcutaneously with dibenz[*a*,*h*]anthracene (Pfeiffer, 1977). In newborn mice, a single subcutaneous injection of dibenz[*a*,*h*]anthracene induced local sarcomas and lung adenomas (Platt et al., 1990) and three intraperitoneal injections induced a high incidence of pulmonary tumors (Buening et al., 1979). A number of earlier studies have also demonstrated the carcinogenicity of dibenz[*a*,*h*]anthracene when administered by various parenteral routes in several animal species (IARC, 1973).

Based on no human data and sufficient evidence for carcinogenicity in animals, EPA has assigned dibenz[*a*,*h*]anthracene a weight-of-evidence classification of B2, probable human carcinogen (EPA, 1995).

October 1997

Prepared by Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation Group, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, [*], Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM

*Managed by Lockheed Martin Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400

Toxicity Profile for Fluoranthene

Fluoranthene is a polycyclic aromatic hydrocarbon (PAH) that can be derived from coal tar. Occurring ubiquitously in products of incomplete combustion of fossil fuels, fluoranthene has been identified in ambient air, surface, drinking, and waste water, and in char-broiled foods. Currently, there is no commercial production or use of this compound (IARC, 1983).

Fluoranthene can be absorbed through the skin following dermal exposure (Storer et al., 1984) and, by analogy to structurally-related PAHs, would be expected to be absorbed from the gastrointestinal tract and lungs (U.S. EPA, 1988). An *in vitro* study identified 2-methylfluoranthene and 3-methylfluoranthene and their dihydrodiols as metabolites of fluoranthene (La Voie et al., 1982).

Although a large body of literature exists on the toxicity and carcinogenicity of PAHs, primarily benzo[*a*]pyrene, toxicity data for phenanthrene are very limited. No human data were available that addressed the toxicity of fluoranthene. Acute toxicity data for animals include an oral LD_{50} of 2000 mg/kg for rats; a dermal LD_{50} of 3180 mg/kg for rabbits (Smyth et al., 1962); and an intravenous LD_{50} of 100 mg/kg for mice (RTECS, 1993). Subchronic oral exposure to fluoranthene at doses of greater than or equal to 250 mg/kg produced nephropathy, increased liver weights, and increased liver enzyme levels in rats (U.S. EPA, 1988). A single intraperitoneal injection of fluoranthene to pregnant rats caused an increased rate of embryo resorptions (Irvin and Martin, 1987). Fluoranthene was photosensitizing, enhancing erythema elicited by ultraviolet radiation in guinea pig skin (Kochevar et al., 1982) and was irritating to the eyes of rabbits (Grant, 1986).

No oral or inhalation bioassays were available to assess the carcinogenicity of fluoranthene. Bioassays by other exposure routes generally gave negative results. Studies involving topical application to the skin of mice (Horton and Christian, 1974; Hoffmann, 1972; Wynder and Hoffmann, 1959; Suntzeff et al., 1957) and subcutaneous injection in mice (Shear, 1938) provided no evidence of carcinogenicity. Fluoranthene was also inactive in mouse skin initiation and promotion assays (Van Duuren and Goldschmidt, 1976; Hoffmann, et al., 1972). However, fluoranthene has been shown to be active as a cocarcinogen when applied with benzo[*a*]pyrene to mice by skin application (Van Duuren and Goldschmidt, 1976) and was active as a complete carcinogen in a short-term lung tumor assay with newborn mice (Busby et al., 1984).

Based on no human data and inadequate data from animal bioassays, U.S. EPA (1993a,b) has placed fluoranthene in weight-of-evidence group D, not classifiable as to human carcinogenicity.

August 1993

Prepared by Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation and Communication Program, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, *, Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under contract No. DE-AC05-84OR21400.

Toxicity Profile for Fluorene

Fluorene, also known as 9*H*-fluorene, *o*-biphenylenemethane, diphenylenemethane, and 2,2'- methylenebiphenyl, is a tricyclic aromatic hydrocarbon. Fluorene occurs naturally in fossil fuels and is found in coal tars, products of incomplete combustion, and mainstream cigarette smoke (IARC, 1983). It is used as a chemical intermediate in various applications, in the formation of polyradicals for resins (HSDB, 1993), and in dye stuffs (Sax and Lewis, 1987).

No absorption data are available for fluorene; however, oral toxicity studies with animals indicate that fluorene is absorbed from the gastrointestinal tract. Data from structurally-related PAHs, primarily benzo[*a*]pyrene, suggest that fluorene would also be absorbed from the lungs and skin (U.S. EPA, 1991). *In vitro* and *in vivo* metabolism studies have shown that fluorene is converted by hydroxylation to various hydoxyfluorene compounds and excreted as glucuronides and sulfates (Chen and Lin, 1969; LaVoie et al., 1980).

No human data were available to evaluate the toxicity of fluorene. In a 90-day gavage study, administration of 125, 250, or 500 mg/kg/day of fluorene to male and female mice caused clinical signs of toxicity at the highest dose; dose-related decreased erythrocyte, hematocrit, and hemoglobin values with increased amounts of pigment (hemosiderin) in the spleen and liver in both sexes; increased liver and spleen weights in both sexes at the mid and high dose and increased kidney weights in high dose males; dose-related increased total cholesterol and total bilirubin and decreased blood urea nitrogen levels in both sexes; and decreases in spermatozoa in high dose males (U.S. EPA, 1989). Rats fed a diet containing 0.5 or 1% fluorene for 104 days exhibited significant growth depression, increased liver weights, and decreased testes and spleen weights (Wilson et al., 1947).

Oral carcinogenicity studies with rats fed diets containing up to 1% fluorene for 104 days or 0.05% for 18 months gave negative or inconclusive results (Morris et al., 1960; Wilson et al., 1947). Fluorene was found to be inactive as a complete carcinogen (Riegel et al., 1951; Kennaway, 1924) and as a tumorinitiator in dermal application studies with mice (La Voie et al., 1980). No injection site tumors were observed in mice administered subcutaneous injections of fluorene (Shear, 1938). Based on no human data and inadequate data from animal bioassays, EPA has classified fluorene in weight-of-evidence Group D, not classifiable as to human carcinogenicity (U.S. EPA, 1992).

April 1994

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation Group, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division

Oak Ridge National Laboratory*, Oak Ridge, Tennessee

Prepared for: OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400

Toxicity Profile for Indeno(1,2,3-cd)pyrene

Indeno[1,2,3-*cd*]pyrene, a crystalline solid with a chemical formula of $C_{22}H_{12}$ and a molecular weight of 276.3, is a polycyclic aromatic hydrocarbon (PAH). There is no commercial production or known use of this compound (IARC, 1983). Indeno[1,2,3-*cd*]pyrene is found in fossil fuels and occurs ubiquitously in products of incomplete combustion (IARC, 1983) and has been identified in soils, groundwater, and surface waters at hazardous waste sites (ATSDR, 1990).

No absorption data were available for indeno[1,2,3-*cd*]pyrene; however, by analogy to structurally-related PAHs, primarily benzo[*a*]pyrene, it would be expected to be absorbed from the gastrointestinal tract, lungs, and skin (EPA, 1991). In vivo metabolites identified in mouse skin include the *trans*-1,2-dihydrodiol and 8- and 9-hydroxy forms of indeno[1,2,3-*cd*]pyrene (Rice et al., 1986). Similar metabolites were formed in vitro in rat liver microsomes (Rice et al., 1985).

No long-term oral or inhalation bioassays were available to assess the carcinogenicity of indeno[1,2,3-*cd*]pyrene. The compound was tested for carcinogenicity in dermal application, lung implant, subcutaneous (s.c.) injection, and intraperitoneal (i.p.) injection studies. Dermal application of 0.1-0.5% solutions of indeno[1,2,3-*cd*]pyrene in acetone produced skin papillomas and carcinomas in mice (Hoffmann and Wynder, 1966). In initiation-promotion assays, indeno[1,2,3-*cd*]pyrene was active as an initiator of skin carcinogenesis (Hoffmann and Wynder, 1966; Rice et al., 1986). Dose-related increases of epidermoid carcinomas of the lungs were reported in rats receiving single lung implants of 0.16-4.15 mg indeno[1,2,3-*cd*]pyrene (Deutsch-Wenzel et al., 1983). Injection site sarcomas developed in mice given three s.c. injections of 0.6 mg indeno[1,2,3-*cd*]pyrene (Lacassagne et al., 1963). The compound was not tumorigenic when newborn mice received 2.1 mol indeno[1,2,3-*cd*]pyrene via i.p. injection (LaVoie et al., 1987).

Based on no human data and sufficient evidence for carcinogenicity in animals, the United Stated Environmental Protection Agency (EPA) has assigned a weight-of-evidence classification of B2, probable human carcinogen, to indeno[1,2,3-*cd*]pyrene (EPA, 1994).

MAY 1994

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation and Communication Group Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *.Oak Ridge, Tennessee

Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicological Profile for 2-Methylnaphthalene

2-Methylnaphthalene is a natural component of crude oil and coal and is found as a pyrolytic byproduct from the combustion of tobacco, wood, petroleum-based fuels and coal. It is also used as a chemical intermediate in the synthesis of vitamin K. No data are available regarding the potential toxicity of 2-methylnaphthalene in exposed humans via the oral route. However, the available animal data indicate that the lung is a sensitive target organ. The critical effect observed in mice following chronic oral exposure to 2-methylnaphthalene (Murata et al., 1997) and chronic dermal exposure to methylnaphthalene mixtures (Emi and Konishi, 1985; Murata et al., 1992) was pulmonary alveolar proteinosis. This effect was characterized by accumulation of foamy cells, cholesterol crystals, and proteinaceous materials rich in lipids in the lumen of the pulmonary alveoli (Murata et al., 1997). Since the effect is similar to a disorder of unknown etiology that has been observed in humans, it is anticipated that humans exposed to 2-methylnaphthalene may develop pulmonary alveolar proteinosis. In humans, pulmonary alveolar proteinosis is characterized by symptoms such as dyspnea and cough with possible decreased pulmonary function, identified by decreased functional lung volume and reduced diffusing capacity. It has not been associated with airflow obstruction (Lee et al., 1997; Mazzone et al., 2001; Wang et al., 1997). Cases of pulmonary alveolar proteinosis in humans have not been directly associated with exposure to 2-methylnaphthalene.

The effects of prechronic or chronic inhalation exposure to 2-methylnaphthalene have not been studied in humans or animals. No suitable toxicokinetic models are available to extrapolate between routes of exposure. Since chronic exposure to 2-methylnaphthalene by oral and dermal routes targets the lung causing pulmonary alveolar proteinosis, it is plausible that similar adverse effects may be seen after chronic inhalation exposure to 2-methylnaphthalene. However, no conclusions can be drawn from the current data regarding potential exposure-response relationships for chronic inhalation exposure.

Under the Draft Revised Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1999), the available data for 2-methylnaphthalene *are inadequate to assess human carcinogenic potential*. There are no studies of the potential carcinogenicity of 2-methylnaphthalene in humans, and only one adequate cancer animal bioassay is available (Murata et al., 1997). While the study found an increased incidence of total lung tumors and adenomas in male mice, but not female mice, exposed to 2-methylnaphthalene in the diet for 81 weeks, the incidence was only increased at the lower of two exposure levels. The relevance of these observations to humans is uncertain. Other animal species have not been tested and results from short-term genotoxicity tests provide no supporting evidence for the carcinogenicity of 2-methylnaphthalene. As such, the available evidence of 2-methylnaphthalene carcinogenicity is limited and insufficient to determine that 2-methylnaphthalene is carcinogenic to humans.

From: US EPA (2003). Toxicological Review of 2-Methylnaphthalene (CAS No. 91-57-6) In Support of Summary Information on the Integrated Risk Information System (IRIS). EPA 635/R-03/010. December. (http://www.epa.gov/ttn/atw/hlthef/methylte.html).

Toxicological Profile for Naphthalene

Naphthalene (CAS Reg. No. 91-20-3), a white solid with a characteristic odor of mothballs, is a polycyclic aromatic hydrocarbon composed of two fused benzene rings. The principal end use of naphthalene is as a raw material for the production of phthalic anhydride. It is also used as an intermediate for synthetic resins, celluloid, lampblack, smokeless powder, solvents, and lubricants. Naphthalene is used directly as a moth repellant, insecticide, anthelmintic, and intestinal antiseptic (ATSDR, 1990; U.S. EPA, 1986).

Naphthalene can be absorbed by the oral, inhalation, and dermal routes of exposure and can cross the placenta in amounts sufficient to cause fetal toxicity. The most commonly observed effect of naphthalene toxicity following acute oral or inhalation exposure in humans is hemolytic anemia associated with decreased hemoglobin and hematocrit values, increased reticulocyte counts, presence of Heinz bodies, and increased serum bilirubin levels (ATSDR, 1990). Hemolytic anemia has been observed in an infant dermally exposed to naphthalene (Schafer, 1951) and in infants whose mothers were exposed to naphthalene during pregnancy (Anziulewicz et al., 1959; Zinkham and Childs, 1958). Infants and individuals having a congenital deficiency of erythrocyte glucose-6-phosphate dehydrogenase are especially susceptible to naphthalene-induced hemolytic anemia (Wintrobe et al., 1974).

Acute oral and subchronic inhalation exposure of humans to naphthalene has resulted in neurotoxic effects (confusion, lethargy, listlessness, vertigo), gastrointestinal distress, hepatic effects (jaundice, hepatomegaly, elevated serum enzyme levels), renal effects, and ocular effects (cataracts, optical atrophy). Cataracts have been reported in individuals occupationally exposed to naphthalene (Ghetti and Mariani, 1956) and in rabbits and rats exposed orally to naphthalene (Van Heyningen and Pirie, 1976; Fitzhugh and Buschke, 1949). A number of deaths have been reported following intentional ingestion of naphthalene-containing mothballs (ATSDR, 1990). The estimated lethal dose of naphthalene is 5-15 g for adults and 2-3 g for children. Naphthalene is a primary skin irritant and is acutely irritating to the eyes of humans (Sandmeyer, 1981).

Increased mortality, clinical signs of toxicity, kidney and thymus lesions, and signs of anemia were observed in rats treated by gavage with 400 mg/kg of naphthalene for 13 weeks (NTP, 1980a). No adverse effects occurred at 50 mg/kg. Transient clinical signs of toxicity were seen in mice exposed by gavage to 53 mg/kg for 13 weeks (NTP, 1980b). Subchronic oral exposure to 133 mg/kg/day for 90 days produced decreased spleen weights in female mice (Shopp et al., 1984). Reduced numbers of pups/litter were observed when naphthalene was administered orally to pregnant mice (Pflasterer et al., 1985). Negative results in a two-year feeding study with rats receiving 10-20 mg naphthalene/kg/day (Schmahl, 1955) and equivocal results in a mouse lung tumor bioassay (Adkins et al., 1986) suggest that naphthalene is not a potential carcinogen.

U.S. EPA has placed naphthalene in weight-of-evidence group C, possible human carcinogenicity.

JANUARY 1993

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation Group Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *, Oak Ridge, Tennessee.

Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Phenanthrene

Phenanthrene is a polycyclic aromatic hydrocarbon (PAH) that can be derived from coal tar. Currently, there is no commercial production or use of this compound (U.S. EPA, 1987). Phenanthrene is ubiquitous in the environment as a product of incomplete combustion of fossil fuels and wood and has been identified in ambient air, surface and drinking water, and in foods (U.S. EPA, 1988; IARC, 1983).

Phenanthrene is absorbed following oral and dermal exposure (Storer et al., 1984; Chang, 1943). Data from structurally related PAHs suggest that phenanthrene would be absorbed from the lungs (U.S. EPA, 1987). Metabolites of phenanthrene identified in *in vivo* and *in vitro* studies indicate that metabolism proceeds by epoxidation at the 1-2, 3-4, and 9-10 carbons, with dihydrodiols as the primary metabolites (Nordqvist et al., 1981; Chaturapit and Holder, 1978; Sims, 1970; Boyland and Sims, 1962; Boyland and Wolf, 1950).

Although a large body of literature exists on the toxicity and carcinogenicity of PAHs, primarily benzo[*a*]pyrene, toxicity data for phenanthrene are very limited. No human data were available that addressed the toxicity of phenanthrene. Single intraperitoneal injections of phenanthrene produced slight hepatotoxicity in rats (Yoshikawa et al., 1985). Data regarding the subchronic, chronic, developmental, or reproductive toxicity in experimental animals by any route of exposure could not be located in the available literature.

No inhalation bioassays were available to assess the carcinogenicity of phenanthrene. A single oral dose of phenanthrene did not induce mammary tumors in rats (Huggins and Yang, 1962) and a single subcutaneous injection did not result in treatment-related increases in tumor incidence in mice (Steiner, 1955). Neonate mice administered intraperitoneal or subcutaneous injections of phenanthrene also did not develop tumors (Buening et al., 1979). No skin tumors were reported in two skin painting assays with mice (Roe and Grant, 1964; Kennaway, 1924). Phenanthrene was also tested in several mouse skin initiation-promotion assays. It was active as an initiator in one study (Scribner, 1973), inactive as an initiator in four others (LaVoie et al., 1981; Wood et al., 1979; Roe, 1962; Salaman and Roe, 1956), and inactive as a promoter in one study (Roe and Grant, 1964).

Based on no human data and inadequate data from animal bioassays, U.S. EPA (1993a, 1987) has placed phenanthrene in weight-of-evidence group D, not classifiable as to human carcinogenicity.

AUGUST 1993

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation Group, Biomedical and Environmental, Information Analysis Section, Health Sciences Research Division, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Pyrene

Pyrene, also referred to as benzo(def)phenanthrene and -pyrene, is a polycyclic aromatic hydrocarbon (PAH) that can be derived from coal tar. Currently, there is no commercial production or use of this compound. Pyrene is ubiquitous in the environment as a product of incomplete combustion of fossil fuels and has been identified in surface and drinking water, numerous foods, and in ambient air (U.S. EPA, 1988, 1987; IARC, 1983).

Although a large body of literature exists on the toxicity and carcinogenicity of PAHs, toxicity data for pyrene are limited. No human data were available that addressed the toxicity of pyrene. Subchronic oral exposure to pyrene produced nephropathy, decreased kidney weights, increased liver weights, and slight hematological changes in mice (TRL, 1989) and produced fatty livers in rats (White and White, 1939). A single intraperitoneal injection of pyrene produced swelling and congestion of the liver and increased serum aspartate amino transferase (AST) and bilirubin levels in rats (Yoshikawa et al., 1985). No data were available concerning the toxic effects of inhalation exposure to pyrene or data regarding teratogenicity or other reproductive effects by any route of exposure.

No oral or inhalation bioassays were available to assess the carcinogenicity of pyrene. Studies involving other routes of exposure (intratracheal, dermal, and subcutaneous) generally gave negative results. Intratracheal administration of pyrene in combination with Fe_2O_3 particles did not induce tumors in hamsters (Sellakumar and Shubik, 1974). Skin painting assays evaluating complete carcinogenesis in mice (Van Duuren and Goldschmidt, 1976; Horton and Christian, 1974; Roe and Grant, 1964; Wynder and Hoffman, 1959); or initiating (Roe and Grant, 1964); or promoting capacity (Wood et al., 1980; Scribner, 1973; Salaman and Roe, 1956) have been negative or inconclusive. Mice injected subcutaneously with pyrene did not develop tumors (Shear and Leiter, 1941), but there is evidence that pyrene enhances the tumorigenicity of topically applied benzo[*a*]pyrene (Slaga et al., 1979; Van Duuren and Goldschmidt, 1976; Goldschmidt et al., 1973).

Based on no human data and inadequate data from animal bioassays, U.S. EPA (1993a,b) has placed pyrene in weight-of-evidence group D, not classifiable as to human carcinogenicity.

AUGUST 1993

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation Group, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Arsenic

The toxicity of inorganic arsenic (As) depends on its valence state (-3, +3, or +5), and also on the physical and chemical properties of the compound in which it occurs. Trivalent (As^{+3}) compounds are generally more toxic than pentavalent (As^{+5}) compounds, and the more water soluble compounds are usually more toxic and more likely to have systemic effects than the less soluble compounds, which are more likely to cause chronic pulmonary effects if inhaled. One of the most toxic inorganic arsenic compounds is arsine gas (AsH_3). It should be noted that laboratory animals are generally less sensitive than humans to the toxic effects of inorganic arsenic. In addition, in rodents the critical effects appear to be immunosuppression and hepato-renal dysfunction, whereas in humans the skin, vascular system, and peripheral nervous system are the primary target organs.

Water soluble inorganic arsenic compounds are absorbed through the G.I. tract (>90%) and lungs; distributed primarily to the liver, kidney, lung, spleen, aorta, and skin; and excreted mainly in the urine at rates as high as 80% in 61 hr following oral dosing (U.S. EPA, 1984; ATSDR, 1989; Crecelius, 1977). Pentavalent arsenic is reduced to the trivalent form and then methylated in the liver to less toxic methylarsinic acids (ATSDR, 1989).

Symptoms of acute inorganic arsenic poisoning in humans are nausea, anorexia, vomiting, epigastric and abdominal pain, and diarrhea. Dermatitis (exfoliative erythroderma), muscle cramps, cardiac abnormalities, hepatotoxicity, bone marrow suppression and hematologic abnormalities (anemia), vascular lesions, and peripheral neuropathy (motor dysfunction, paresthesia) have also been reported (U.S. Air Force, 1990; ATSDR, 1989; Franzblau and Lilis, 1989; U.S. EPA, 1984; Armstrong et al., 1984; Hayes, 1982; Mizuta et al., 1956). Oral doses as low as 20-60 g/kg/day have been reported to cause toxic effects in some individuals (ATSDR, 1989). Severe exposures can result in acute encephalopathy, congestive heart failure, stupor, convulsions, paralysis, coma, and death. The acute lethal dose to humans has been estimated to be about 0.6 mg/kg/day (ATSDR, 1989). General symptoms of chronic arsenic poisoning in humans are weakness, general debility and lassitude, loss of appetite and energy, loss of hair, hoarseness of voice, loss of weight, and mental disorders (Hindmarsh and McCurdy, 1986). Primary target organs are the skin (hyperpigmentation and hyperkeratosis) [Terada et al. 1960; Tseng et al., 1968; Zaldivar 1974; Cebrian et al., 1983; Huang et al., 1985], nervous system (peripheral neuropathy) [Hindmarsh et al., 1977, 1986; Valentine et al., 1982; Heyman et al., 1956; Mizuta et al., 1956; Tay and Seah, 1975], and vascular system [Tseng et al., 1968; Borgano and Greiber, 1972; Salcedo et al., 1984; Wu et al., 1989; Hansen, 1990]. Anemia, leukopenia, hepatomegaly, and portal hypertension have also been reported (Terada et al., 1960; Viallet et al., 1972; Morris et al., 1974; Datta, 1976). In addition, possible reproductive effects include a high male to female birth ratio (Lyster, 1977).

In animals, acute oral exposures can cause gastrointestinal and neurological effects (Heywood and Sortwell, 1979). Oral LD_{50} values range from about 10 to 300 mg/kg (ASTDR, 1989; U.S. Air Force, 1990). Low subchronic doses can result in immunosuppression, (Blakely et al., 1980) and hepato-renal effects (Mahaffey et al., 1981; Brown et al., 1976; Woods and Fowler, 1977, 1978; Fowler and Woods, 1979; Fowler et al., 1979). Chronic exposures have also resulted in mild hyperkeratosis and bile duct enlargement with hyperplasia, focal necrosis, and fibrosis (Baroni et al., 1963; Byron et al., 1967). Reduction in litter size, high male/female birth ratios, and fetotoxicity without significant fetal abnormalities occur following oral exposures (Schroeder and Mitchener, 1971; Hood et al., 1977; Baxley et al., 1981); however, parenteral dosing has resulted in exencephaly, encephaloceles, skeletal defects, and urogenital system abnormalities (Ferm and Carpenter, 1968; Hood and Bishop, 1972; Beaudoin, 1974; Burk and Beandoin, 1977).

Acute inhalation exposures to inorganic arsenic can damage mucous membranes, cause rhinitis, pharyngitis and laryngitis, and result in nasal septum perforation (U.S. EPA, 1984). Chronic inhalation exposures, as occurring in the workplace, can lead to rhino-pharyno-laryngitis, tracheobronchitis, (Lundgren, 1954); dermatitis, hyperpigmentation, and hyperkeratosis (Perry et al., 1948; Pinto and McGill, 1955); leukopenia (Kyle and Pease, 1965; Hine et al., 1977); peripheral nerve dysfunction as indicated by abnormal nerve conduction velocities (Feldman et al., 1979; Blom et al., 1985; Landau et al., 1977); and peripheral vascular disorders as indicated by Raynaud's syndrome and increased vasospastic reactivity in fingers exposed to low temperatures (Lagerkvist et al., 1986). Higher rates of cardiovascular disease have also been reported in some arsenic-exposed workers (Lee and Fraumeni, 1969; Axelson et al., 1978; Wingren and Axelson, 1985). Possible reproductive effects include a high frequency of spontaneous abortions and reduced birth weights (Nordström et al., 1978a,b). Arsine gas (AsH_3), at concentrations as low as 3-10 ppm for several hours, can cause toxic effects. Hemolysis, hemoglobinuria, jaundice, hemolytic anemia, and necrosis of the renal tubules have been reported in exposed workers (ACGIH, 1986; Fowler and Weissberg, 1974).

Animal studies have shown that inorganic arsenic, by intratracheal instillation, can cause pulmonary inflammation and hyperplasia (Webb et al., 1986, 1987), lung lesions (Pershagen et al., 1982), and immunosuppression (Hatch et al. (1985). Long-term inhalation exposures have resulted in altered conditioned reflexes and CNS damage (Rozenshstein, 1970). Reductions in fetal weight and in the number of live fetuses, and increases in fetal abnormalities due to retarded osteogenesis have been observed following inhalation exposures (Nagymajtenyi et al., 1985).

Epidemiological studies have revealed an association between arsenic concentrations in drinking water and increased incidences of skin cancers (including squamous cell carcinomas and multiple basal cell carcinomas), as well as cancers of the liver, bladder, respiratory and gastrointestinal tracts (U.S. EPA, 1987; IARC, 1987; Sommers et al., 1953; Reymann et al., 1978; Dobson et al., 1965; Chen et al., 1985, 1986). Occupational exposure studies have shown a clear correlation between exposure to arsenic and lung cancer mortality (IARC, 1987; U.S. EPA, 1991a). U.S. EPA (1991a) has placed inorganic arsenic in weight-of-evidence group A, human carcinogen.

Toxicity Profile for Barium

The soluble salts of barium, an alkaline earth metal, are toxic in mammalian systems. They are absorbed rapidly from the gastrointestinal tract and are deposited in the muscles, lungs, and bone. Barium is excreted primarily in the feces.

At low doses, barium acts as a muscle stimulant and at higher doses affects the nervous system eventually leading to paralysis. Acute and subchronic oral doses of barium cause vomiting and diarrhea, followed by decreased heart rate and elevated blood pressure. Higher doses result in cardiac irregularities, weakness, tremors, anxiety, and dyspnea. A drop in serum potassium may account for some of the symptoms. Death can occur from cardiac and respiratory failure. Acute doses around 0.8 grams can be fatal to humans.

Subchronic and chronic oral or inhalation exposure primarily affects the cardiovascular system resulting in elevated blood pressure. A lowest-observed-adverse-effect level (LOAEL) of 0.51 mg barium/kg/day based on increased blood pressure was observed in chronic oral rat studies (Perry et al. 1983), whereas human studies identified a no-observed-adverse-effect level (NOAEL) of 0.21 mg barium/kg/day (Wones et al. 1990, Brenniman and Levy 1984). In the Wones et al. study, human volunteers were given barium up to 10 mg/L in drinking water for 10 weeks. No clinically significant effects were observed. An epidemiological study was conducted by Brenniman and Levy in which human populations ingesting 2 to 10 mg/L of barium in drinking water were compared to a population ingesting 0 to 0.2 mg/L. No significant individual differences were seen; however, a significantly higher mortality rate from all combined cardiovascular diseases was observed with the higher barium level in the 65+ age group. The average barium concentration was 7.3 mg/L, which corresponds to a dose of 0.20 mg/kg/day.

Subchronic and chronic inhalation exposure of human populations to barium-containing dust can result in a benign pneumoconiosis called "baritosis." This condition is often accompanied by an elevated blood pressure but does not result in a change in pulmonary function. Exposure to an air concentration of 5.2 mg barium carbonate/m^3 for 4 hours/day for 6 months has been reported to result in elevated blood pressure and decreased body weight gain in rats (Tarasenko et al. 1977). Reproduction and developmental effects were also observed. Increased fetal mortality was seen after untreated females were mated with males exposed to 5.2 mg/m^3 of barium carbonate. Similar results were obtained with female rats treated with 13.4 mg barium carbonate/m^3. The NOAEL for developmental effects was 1.15 mg/m^3 (equivalent to 0.8 mg barium/m^3).

Barium has not been evaluated by the EPA for evidence of human carcinogenic potential (EPA 1995b).

October 1997

Prepared by A. A. Francis, M.S., D.A.B.T., and Carol S. Forsyth, Ph.D., Chemical Hazard Evaluation Group in the Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, *.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400

Toxicity Profile for Cadmium

Cadmium is a naturally occurring metal that is used in various chemical forms in metallurgical and other industrial processes, and in the production of pigments. Environmental exposure can occur via the diet and drinking water (ATSDR, 1989).

Cadmium is absorbed more efficiently by the lungs (30 to 60%) than by the gastrointestinal tract, the latter being a saturable process (Nordberg et al., 1985). Cadmium is transported in the blood and widely distributed in the body but accumulates primarily in the liver and kidneys (Goyer, 1991). Cadmium burden (especially in the kidneys and liver) tends to increase in a linear fashion up to about 50 or 60 years of age after which the body burden remains somewhat constant. Metabolic transformations of cadmium are limited to its binding to protein and nonprotein sulfhydryl groups, and various macromolecules, such as metallothionein, which is especially important in the kidneys and liver (ATSDR, 1989). Cadmium is excreted primarily in the urine.

Acute oral exposure to 20-30 g have caused fatalities in humans. Exposure to lower amounts may cause gastrointestinal irritation, vomiting, abdominal pain, and diarrhea (ATSDR, 1989). An asymptomatic period of one-half to one hour may precede the onset of clinical signs. Oral LD_{50} values in animals range from 63 to 1125 mg/kg, depending on the cadmium compound (USAF, 1990). Longer term exposure to cadmium primarily affects the kidneys, resulting in tubular proteinosis although other conditions such as "itai-itai" disease may involve the skeletal system. Cadmium involvement in hypertension is not fully understood (Goyer, 1991).

Inhalation exposure to cadmium and cadmium compounds may result in effects including headache, chest pains, muscular weakness, pulmonary edema, and death (USAF, 1990). The 1-minute and 10-minute lethal concentration of cadmium for humans has been estimated to be about 2,500 and 250 mg/m^3, respectively (Barrett et al., 1947; Beton et al., 1966). An 8-hour TWA (time-weighted-average) exposure level of 5 mg/m^3 has been estimated for lethal effects of inhalation exposure to cadmium, and exposure to 1 mg/m^3 is considered to be immediately dangerous to human health (Friberg, 1950). Renal toxicity (tubular proteinosis) may also result from inhalation exposure to cadmium (Goyer, 1991).

The target organ for cadmium toxicity via oral exposure is the kidney (Goyer, 1991). For inhalation exposure, both the lungs and kidneys are target organs for cadmium-induced toxicity (ATSDR, 1989; Goyer, 1991).

There is limited evidence from epidemiologic studies for cadmium-related respiratory tract cancer (ATSDR, 1989). Based on limited evidence from multiple occupational exposure studies and adequate animal data, cadmium is placed in weight-of-evidence group B1 - probable human carcinogen.

November 1991

Prepared by: Robert A. Young, Ph.D., D.A.B.T., Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Chromium

Elemental chromium (Cr) does not occur in nature, but is present in ores, primarily chromite ($FeOCr_2O_3$) (Hamilton and Wetterhahn, 1988). Only two of the several oxidation states of chromium, Cr(III) and Cr(VI), are reviewed in this report based on their predominance and stability in the ambient environment and their toxicity in humans and animals.

Chromium plays a role in glucose and cholesterol metabolism and is thus an essential element to man and animals (Schroeder et al., 1962). Non-occupational exposure to the metal occurs via the ingestion of chromium-containing food and water, whereas occupational exposure occurs via inhalation (Langard, 1982; Pedersen, 1982). Workers in the chromate industry have been exposed to estimated chromium levels of 10-50 $\mu g/m^3$ for Cr(III) and 5-1000 $\mu g/m^3$ for Cr(VI); however, improvements in the newer chrome-plating plants have reduced the Cr(VI) concentrations 10- to 40-fold (Stern, 1982).

Chromium(III) is poorly absorbed, regardless of the route of exposure, whereas chromium(VI) is more readily absorbed (Hamilton and Wetterhahn, 1988). Humans and animals localize chromium in the lung, liver, kidney, spleen, adrenals, plasma, bone marrow, and red blood cells (RBC) (Langard, 1982; ATSDR, 1989; Bragt and van Dura, 1983; Hamilton and Wetterhahn, 1988). There is no evidence that chromium is biotransformed, but Cr(VI) does undergo enzymatic reduction, resulting in the formation of reactive intermediates and Cr(III) (Hamilton and Wetterhahn, 1988). The main routes for the excretion of chromium are via the kidneys/urine and the bile/feces (Guthrie, 1982; Langard, 1982).

Animal studies show that Cr(VI) is generally more toxic than Cr(III), but neither oxidation state is very toxic by the oral route. In long-term studies, rats were not adversely affected by ~1.9 g/kg/day of chromic oxide [Cr(III)] (diet), 2.4 mg/kg/day of Cr(III) as chromic chloride (drinking water), or 2.4 mg/kg/day of Cr(VI) as potassium dichromate (drinking water) (Ivankovic and Preussmann, 1975; MacKenzie et al., 1958).

The respiratory and dermal toxicity of chromium are well-documented. Workers exposed to chromium have developed nasal irritation (at <0.01 mg/m^3, acute exposure), nasal ulcers, perforation of the nasal septum (at ~2 $\mu g/m^3$, subchronic or chronic exposure) (Hamilton and Wetterhahn, 1988; ATSDR, 1989; Lindberg and Hedenstierna, 1983) and hypersensitivity reactions and "chrome holes" of the skin (Pedersen, 1982; Burrows, 1983; U.S Air Force, 1990). Among the general population, contact dermatitis has been associated with the use of bleaches and detergents (Love, 1983).

Compounds of both Cr(VI) and Cr(III) have induced developmental effects in experimental animals that include neural tube defects, malformations, and fetal deaths (Iijima et al., 1983; Danielsson et al., 1982; Matsumoto et al., 1976).

The inhalation of chromium compounds has been associated with the development of cancer in workers in the chromate industry. The relative risk for developing lung cancer has been calculated to be as much as 30 times that of controls (Hayes, 1982; Leonard and Lauwerys, 1980; Langard, 1983). There is also evidence for an increased risk of developing nasal, pharyngeal, and gastrointestinal carcinomas (Hamilton and Wetterhahn, 1988). Quantitative epidemiological data were obtained by Mancuso and Hueper (1951), who observed an increase in deaths (18.2%; $p<0.01$) from respiratory cancer among chromate workers compared with 1.2% deaths among controls. In a follow-up study, conducted when more than 50% of the cohort had died, the observed incidence for lung cancer deaths had increased to approximately 60% (Mancuso, 1975). The workers were exposed to 1-8 mg/m^3/year total chromium. Mancuso (1975) observed a dose response for total chromium exposure and attributed the lung cancer deaths to exposure to insoluble [Cr(III)], soluble [Cr(VI)], and total chromium. The results of inhalation studies in animals have been equivocal or negative (Nettesheim et al., 1971; Glaser et al, 1986; Baetjer et al., 1959; Steffee and Baetjer, 1965).

Based on sufficient evidence for humans and animals, Cr(VI) has been placed in the EPA weight-of-evidence classification A, human carcinogen (U.S. EPA, 1991a).

September 1992

Prepared by: Mary Lou Daugherty, M.S., Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division*, , Oak Ridge, Tennessee.

Prepared for: OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Lead

Lead occurs naturally as a sulfide in galena. It is a soft, bluish-white, silvery gray, malleable metal with a melting point of 327.5C. Elemental lead reacts with hot boiling acids and is attacked by pure water. The solubility of lead salts in water varies from insoluble to soluble depending on the type of salt (IARC, 1980; Goyer, 1988; Budavari et al., 1989).

Lead is a natural element that is persistent in water and soil. Most of the lead in environmental media is of anthropogenic sources. The mean concentration is 3.9 ug/L in surface water and 0.005 ug/L in sea water. River sediments contain about 20,000 ug/g and coastal sediments about 100,000 ug/g. Soil content varies with the location, ranging up to 30 ug/g in rural areas, 3000 ug/g in urban areas, and 20,000 ug/g near point sources. Human exposure occurs primarily through diet, air, drinking water, and ingestion of dirt and paint chips (EPA, 1989; ATSDR, 1993).

The efficiency of lead absorption depends on the route of exposure, age, and nutritional status. Adult humans absorb about 10-15% of ingested lead, whereas children may absorb up to 50%, depending on whether lead is in the diet, dirt, or paint chips. More than 90% of lead particles deposited in the respiratory tract are absorbed into systemic circulation. Inorganic lead is not efficiently absorbed through the skin; consequently, this route does not contribute considerably to the total body lead burden (EPA, 1986a).

Lead absorbed into the body is distributed to three major compartments: blood, soft tissue, and bone. The largest compartment is the bone, which contains about 95% of the total body lead burden in adults and about 73% in children. The half-life of bone lead is more than 20 years. The concentration of blood lead changes rapidly with exposure, and its half-life of only 25-28 days is considerably shorter than that of bone lead. Blood lead is in equilibrium with lead in bone and soft tissue. The soft tissues that take up lead are liver, kidneys, brain, and muscle. Lead is not metabolized in the body, but it may be conjugated with glutathione and excreted primarily in the urine (EPA, 1986a,c; ATSDR, 1993). Exposure to lead is evidenced by elevated blood lead levels.

The systemic toxic effects of lead in humans have been well-documented by the EPA (EPA, 1986a-e, 1989a, 1990) and ATSDR (1993), who extensively reviewed and evaluated data reported in the literature up to 1991. The evidence shows that lead is a multitargeted toxicant, causing effects in the gastrointestinal tract, hematopoietic system, cardiovascular system, central and peripheral nervous systems, kidneys, immune system, and reproductive system. Overt symptoms of subencephalopathic central nervous system (CNS) effects and peripheral nerve damage occur at blood lead levels of 40-60 ug/dL, and nonovert symptoms, such as peripheral nerve dysfunction, occur at levels of 30-50 ug/dL in adults; no clear threshold is evident. Cognitive and neuropsychological deficits are not usually the focus of studies in adults, but there is some evidence of neuropsychological impairment (Ehle and McKee, 1990) and cognitive deficits in lead workers with blood levels of 41-80 ug/dL (Stollery et al., 1993).

Although similar effects occur in adults and children, children are more sensitive to lead exposure than are adults. Irreversible brain damage occurs at blood lead levels greater than or equal to 100 ug/dL in adults and at 80-100 ug/dL in children; death can occur at the same blood levels in children. Children who survive these high levels of exposure suffer permanent severe mental retardation.

As discussed previously, neuropsychological impairment and cognitive (IQ) deficits are sensitive indicators of lead exposure; both neuropsychological impairment and IQ deficits have been the subject of cross-sectional and longitudinal studies in children. One of the early studies reported IQ score deficits of four points at blood lead levels of 30-50 ug/dL and one to two points at levels of 15-30 ug/dL among 75 black children of low socioeconomic status (Schroeder and Hawk, 1986).

Very detailed longitudinal studies have been conducted on children (starting at the time of birth) living in Port Pirie, Australia (Vimpani et al., 1985, 1989; McMichael et al., 1988; Wigg et al., 1988; Baghurst et al., 1992a,b), Cincinnati, Ohio (Dietrich et al., 1986, 1991, 1992, 1993), and Boston, Massachusetts (Bellinger et al., 1984, 1987, 1990, 1992; Stiles and Bellinger 1993). Various measures of cognitive performance have been assessed in these children. Studies of the Port Pirie children up to 7 years of age revealed IQ deficits in 2-year-old children of 1.6 points for each 10-ug/dL increase in blood lead, deficits of 7.2 points in 4-year-old children, and deficits of 4.4 to 5.3 points in 7-year-old children as blood lead increased from 10-30 ug/dL. No significant neurobehavioral deficits were noted for children, 5 years or younger, who lived in the Cincinnati, Ohio, area. In 6.5-year-old children, performance IQ was reduced by 7 points in children whose lifetime blood level exceeded 20 ug/dL.

Children living in the Boston, Massachusetts, area have been studied up to the age of 10 years. Cognitive performance scores were negatively correlated with blood lead in the younger children in the high lead group (greater than or equal to 10 ug/dL), and improvements were noted in some children at 57 months as their blood lead levels became lower.

However, measures of IQ and academic performance in 10-year-old children showed a 5.8-point deficit in IQ and an 8.9-point deficit in academic performance as blood lead increased by 10 ug/dL within the range of 1-25 ug/dL. Because of the large database on subclinical neurotoxic effects of lead in children, only a few of the studies have been included. However, EPA (EPA, 1986a, 1990) concluded that there is no clear threshold for neurotoxic effects of lead in children.

In adults, the cardiovascular system is a very sensitive target for lead. Hypertension (elevated blood pressure) is linked to lead exposure in occupationally exposed subjects and in the general population. Three large population-based studies have been conducted to study the relationship between blood lead levels and high blood pressure. The British Regional Heart Study (BRHS) (Popcock et al., 1984), the NHANES II study (Harlan et al., 1985; Pirkle et al., 1985; Landis and Flegal, 1988; Schwartz, 1990; EPA, 1990), and Welsh Heart Programme (Ellwood et al., 1988a,b) comprise the major studies for the general population. The BRHS study showed that systolic pressure greater than 160 mm Hg and diastolic pressure greater than 100 mm Hg were associated with blood lead levels greater than 37 ug/dL (Popcock et al., 1984). An analysis of 9933 subjects in the NHANES study showed positive correlations between blood pressure and blood lead among 12-74-year-old males but not females (Harlan et al., 1985; Landis and Flegal et al., 1988), 40-59-year-old white males with blood levels ranging from 7-34 ug/dL (Pirkle et al., 1985), and males and females greater than 20 years old (Schwartz, 1991). In addition, left ventricular hypertrophy was also positively associated with blood lead (Schwartz, 1991). The Welsh study did not show an association among men and women with blood lead of 12.4 and 9.6 ug/dL, respectively (Ellwood et al., 1988a,b). Other smaller studies showed both positive and negative results. The EPA (EPA, 1990) concluded that increased blood pressure is positively correlated with blood lead levels in middle-aged men, possibly at concentrations as low as 7 ug/dL. In addition, the EPA estimated that systolic pressure is increased by 1.5-3.0 mm Hg in males and 1.0-2.0 mm Hg in females for every doubling of blood lead concentration.

The hematopoietic system is a target for lead as evidenced by frank anemia occurring at blood lead levels of 80 ug/dL in adults and 70 ug/dL in children. The anemia is due primarily to reduced heme synthesis, which is observed in adults having blood levels of 50 ug/dL and in children having blood levels of 40 ug/dL. Reduced heme synthesis is caused by inhibition of key enzymes involved in the synthesis of heme. Inhibition of erythrocyte -aminolevulinic acid dehydrase (ALAD) activity (catalyzes formation of porphobilinogen from -aminolevulinic acid) has been detected in adults and children having blood levels of less than 10 ug/dL. ALAD activity is the most sensitive measure of lead exposure, but erythrocyte zinc protoporphyrin is the most reliable indicator of lead exposure because it is a measure of the toxicologically active fraction of bone lead. The activity of another erythrocyte enzyme, pyrimidine-5-nucleotidase, is also inhibited by lead exposure. Inhibition has been observed at levels below 5 ug/dL; no clear threshold is evident.

Other organs or systems affected by exposure to lead are the kidneys, immune system, reproductive system, gastrointestinal tract, and liver. These effects usually occur at high blood levels, or the blood levels at which they occur have not been sufficiently documented.

The EPA has not developed an RfD for lead because it appears that lead is a nonthreshold toxicant, and it is not appropriate to develop RfDs for these types of toxicants. Instead the EPA has developed the Integrated Exposure Uptake Biokenetic Model to estimate the percentage of the population of children up to 6 years of age with blood lead levels above a critical value, 10 ug/dL. The model determines the contribution of lead intake from multimedia sources (diet, soil and dirt, air, and drinking water) on the concentration of lead in the blood. Site-specific concentrations of lead in various media are used when available; otherwise default values are assumed. The EPA has established a screening level of 400 ppm (ug/g) for lead in soil (EPA, 1994a).

Inorganic lead and lead compounds have been evaluated for carcinogenicity by the EPA (EPA, 1989, 1993). The data from human studies are inadequate for evaluating the potential carcinogenicity of lead. Data from animal studies, however, are sufficient based on numerous studies showing that lead induces renal tumors in experimental animals. A few studies have shown evidence for induction of tumors at other sites (cerebral gliomas; testicular, adrenal, prostate, pituitary, and thyroid tumors).

December 1994

Prepared by Kowetha A. Davidson, Ph.D., Chemical Hazard Evaluation and Communication Program, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, *, Oak Ridge, Tennessee.

Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under contract No. DE-AC05-84OR21400.

Toxicity Profile for Mercury

Mercury is a naturally occurring element existing in multiple forms and in various oxidation states. It is used in a wide variety of products and processes. In the environment, mercury may undergo transformations among its various forms and among its oxidation states. Exposure to mercury may occur in both occupational and environmental settings, the latter primarily involving dietary exposure (ATSDR 1989).

Absorption, distribution, metabolism, and excretion of mercury is dependent upon its form and oxidation state (ATSDR 1989, Goyer 1991). Organic mercurials are more readily absorbed than are inorganic forms. An oxidation-reduction cycle is involved in the metabolism of mercury and mercury compounds by both animals and humans (ATSDR 1989). The urine and feces are primary excretory routes. The elimination half-life is 35 to 90 days for elemental mercury and mercury vapor and about 40 days for inorganic salts (Goyer 1991).

Ingestion of mercury metal is usually without effect (Goldwater 1972). Ingestion of inorganic salts may cause severe gastrointestinal irritation, renal failure, and death with acute lethal doses in humans ranging from 1 to 4 g (ATSDR 1989). Mercuric (divalent) salts are usually more toxic than are mercurous (monovalent) salts (Goyer 1991). Mercury is also known to induce hypersensitivity reactions such as contact dermatitis and acrodynia (pink disease) (Mathesson et al. 1980). Inhalation of mercury vapor may cause irritation of the respiratory tract, renal disorders, central nervous system effects characterized by neurobehavioral changes, peripheral nervous system toxicity, renal toxicity (immunologic glomerular disease), and death (ATSDR 1989).

Toxicity resulting from subchronic and chronic exposure to mercury and mercury compounds usually involves the kidneys and/or nervous system, the specific target and effect being dependent on the form of mercury (ATSDR 1989). Organic mercury, especially methyl mercury, rapidly enters the central nervous system resulting in behavioral and neuromotor disorders (ATSDR 1989, Goyer 1991). The developing central nervous system is especially sensitive to this effect, as documented by the epidemiologic studies in Japan and Iraq where ingestion of methyl mercury-contaminated food resulted in severe toxicity and death in adults and severe central nervous system effects in infants (Bakir et al. 1973, Amin-Zaki et al. 1974, Harada 1978, Marsh et al. 1987). Blood mercury levels of <10 µg/dL and 300 µg/dL corresponded to mild effects and death, respectively (Bakir et al. 1973). Teratogenic effects due to organic or inorganic mercury exposure do not appear to be well documented for humans or animals, although some evidence exists for mercury-induced menstrual cycle disturbances and spontaneous abortions (Derobert and Tara 1950, Amin-Zaki et al. 1974, ATSDR 1989).

No data were available regarding the carcinogenicity of mercury in humans or animals. EPA has placed inorganic mercury in weight-of-evidence classification D, not classifiable as to human carcinogenicity (EPA 1996). Weight-of-evidence classifications of C (possible human carcinogen) have been assigned to mercuric chloride and methyl mercury by EPA (1996) based upon limited evidence of carcinogenicity in rodents.

February 1998

Prepared by: Robert Young, Ph.D., Chemical Hazard Evaluation Group in the Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, Oak Ridge National Laboratory*.

Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Selenium

Selenium is an essential trace element important in many biochemical and physiological processes including the biosynthesis of coenzyme Q (a component of mitochondrial electron transport systems), regulation of ion fluxes across membranes, maintenance of the integrity of keratins, stimulation of antibody synthesis, and activation of glutathione peroxidase (an enzyme involved in preventing oxidative damage to cells). Recommended human dietary allowances (average daily intake) for selenium are as follows: infants up to 1 year, 10-15 µg; children 1-10 years, 20-30 µg; adult males 11-51+ years, 40-70 µg; adult females 11-51+ years, 45-55 µg; pregnant or lactating women, 65-75 µg. There appears to be a relatively narrow range between levels of selenium intake resulting in deficiency and those causing toxicity.

Selenium occurs in several valence states: -2 (hydrogen selenide, sodium selenide, dimethyl selenium, trimethyl selenium, and selenoamino acids such as selenomethionine; 0 (elemental selenium); +4 (selenium dioxide, selenious acid, and sodium selenite); and +6 (selenic acid and sodium selenate). Toxicity of selenium varies with valence state and water solubility of the compound in which it occurs. The latter can affect gastrointestinal absorption rates.

Gastrointestinal absorption in animals and humans for various selenium compounds ranges from about 44% to 95% of the ingested dose (Thomson and Stewart, 1974; Bopp et al., 1982; Thomson, 1974). Respiratory tract absorption rates of 97% and 94% for aerosols of selenious acid have been reported for dogs and rats, respectively (Weissman et al., 1983; Medinsky et al., 1981). Selenium is found in all tissues of the body; highest concentrations occur in the kidney, liver, spleen, and pancreas (Schroeder and Mitchener, 1971a; Schroeder and Mitchener, 1972; Jacobs and Forst, 1981a; Julius et al., 1983; Shamberger, 1984; Echevarria et al., 1988). Excretion is primarily via the urine (0-15 g/L); however, excretory products can also be found in the feces, sweat, and in expired air.

In humans, acute oral exposures can result in excessive salivation, garlic odor to the breath, shallow breathing, diarrhea, pulmonary edema, and death (Civil and McDonald, 1978; Carter, 1966; Koppel et al., 1986). Other reported signs and symptoms of acute selenosis include tachycardia, nausea, vomiting, abdominal pain, abnormal liver function, muscle aches and pains, irritability, chills, and tremors. Acute toxic effects observed in animals include pulmonary congestion, hemorrhages and edema, convulsions, altered blood chemistry (increased hemoglobin and hematocrit); liver congestion; and congestion and hemorrhage of the kidneys (Smith et al., 1937; Anderson and Moxon, 1942; Hopper et al., 1985).

General signs and symptoms of chronic selenosis in humans include loss of hair and nails, acropachia (clubbing of the fingers), skin lesions (redness, swelling, blistering, and ulcerations), tooth decay (mottling, erosion and pitting), and nervous system abnormalities attributed to polyneuritis (peripheral anesthesia, acroparaethesia, pain in the extremities, hyperreflexia of the tendon, numbness, convulsions, paralysis, motor disturbances, and hemiplegia). In domesticated animals, subchronic and chronic oral exposures can result in loss of hair, malformed hooves, rough hair coat, and nervous system abnormalities (impaired vision and paralysis). Damage to the liver and kidneys and impaired immune responses have been reported to occur in rodents following subchronic and/or chronic oral exposures (Ganther and Baumann, 1962; Beems and van Beek, 1985; NCI, 1980a; Tinsley et al., 1967; Harr et al., 1967; Schroeder, 1967).

Selenium is teratogenic in birds and possibly also in domesticated animals (pigs, sheep, and cattle), but evidence of teratogenicity in humans and laboratory animals is lacking (ASTDR, 1989). However, adverse reproductive and developmental effects (decreased rates of conception, increased rates of fetal resorption, and reduced fetal body weights) have been reported for domesticated and laboratory animals (Harr and Muth, 1972: Wahlstrom and Olson, 1959; Schroeder and Mitchener, 1971b).

In humans, inhalation of selenium or selenium compounds primarily affects the respiratory system. Dusts of elemental selenium and selenium dioxide can cause irritation of the skin and mucous membranes of the nose and throat, coughing, nosebleed, loss of sense of smell, dyspnea, bronchial spasms, bronchitis, and chemical pneumonia (Clinton, 1947; Hamilton, 1949). Other signs and symptoms following acute inhalation exposures include lacrimation, irritation and redness of the eyes, gastrointestinal distress (nausea and vomiting), depressed blood pressure, elevated pulse rate, headaches, dizziness, and malaise (ATSDR, 1989). In animals, acute inhalation exposures also result in severe respiratory effects including edema, hemorrhage, and interstitial pneumonitis (Hall et al., 1951; Dudley and Miller, 1937) as well as in splenic damage (congestion, fissuring red pulp, and increased polymorphonuclear leukocytes) and liver congestion and mild central atrophy (Hall et al., 1951). Information on toxicity of selenium in humans and animals following chronic inhalation exposures is not available.

Epidemiologic studies in humans havation between chronic oral exposures to selenium and an increased incidence of death due to neoplasms. Some studies have indicated that selenium may have anti-neoplastic properties (see Whanger, 1983; Hocman, 1988). In studies on laboratory animals, selenites or selenates have not been found to be carcinogenic; however, selenium sulfide produced a significant increase in the incidence of hepatocellular carcinomas in male and female rats and in female mice and a significant increase in alveolar/bronchiolar carcinomas and adenomas in female mice following chronic oral exposures (NCI, 1980c). EPA has placed selenium and selenious acid in Group D, not classifiable as to carcinogenicity in humans (U.S. EPA, 1992a and 1992b), while selenium sulfide is placed in Group B2, probable human carcinogen (U.S. EPA, 1992d). Quantitative data are, however, insufficient to derive a slope factor for selenium sulfide. Pertinent data regarding the potential carcinogenicity of selenium by the inhalation route in humans or animals were not located in the available literature.

MARCH 1993

Prepared by: Dennis M. Opresko, Ph.D, Chemical Hazard Evaluation Group, Biomedical Environmental Information Analysis Section, Health and Safety Research Division, Oak Ridge National Laboratory*, Oak Ridge, Tennessee.

Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Silver

Silver is a relatively rare metal that occurs naturally in the earth's crust and is released to the environment from various industrial sources. Human exposure to silver and silver compounds can occur orally, dermally, or by inhalation. Silver is found in most tissues, but has no known physiologic function.

In humans, accidental or intentional ingestion of large doses of silver nitrate has produced corrosive damage of the gastrointestinal tract, abdominal pain, diarrhea, vomiting, shock, convulsions, and death (U.S. EPA, 1985). Respiratory irritation was noted following acute inhalation exposure to silver or silver compounds. Silver nitrate solutions are highly irritating to the skin, mucous membranes, and eyes (Stokinger, 1981).

Ingestion, inhalation, or dermal absorption of silver may cause argyria, the most common indicator of long-term exposure to silver or silver compounds in humans. Argyria is a gray or blue-gray, permanent discoloration of the skin and mucous membranes that is not a toxic effect per se, but is considered cosmetically disfiguring. Chronic inhalation exposure of workers to silver oxide and silver nitrate dusts resulted in upper and lower respiratory irritation, deposition of granular silver-containing deposits in the eyes, impaired night vision, and abdominal pain (Rosenman et al., 1979). Mild allergic responses have been attributed to dermal contact with silver (ATSDR, 1990).

In long-term oral studies with experimental animals, silver compounds have produced slight thickening of the basement membranes of the renal glomeruli, growth depression, shortened lifespan, and granular silver-containing deposits in skin, eyes, and internal organs (Matuk et al., 1981; Olcott, 1948, 1950). Hypoactivity was seen in rats subchronically exposed to silver nitrate in drinking water (Rungby and Danscher, 1984).

Data adequate for evaluating the carcinogenicity of silver to humans or animals by ingestion, inhalation, or other routes of exposure were not found. Based on U.S. EPA guidelines, silver is placed in weight-of-evidence group D, not classifiable as to human carcinogenicity (U.S. EPA, 1992a).

DECEMBER 1992

Prepared by: Rosmarie A. Faust, Ph.D., Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, *, Oak Ridge, Tennessee.

Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

APPENDIX B

ProUCL Output Files

ProUCL Output Files
375 Banfield Road, Portsmouth, New Hampshire

```
UCL Statistics for Data Sets with Non-Detects

User Selected Options
Date/Time of Computation                      ProUCL 5.111/3/2021 10:52:30 AM
From File                                     ME268 TX sediment data.xls
Full Precision                                OFF
Confidence Coefficient                        95%
Number of Bootstrap Operations                2000

C9-C18 Aliphatic Hydrocarbons

General Statistics
Total Number of Observations                  18       Number of Distinct Observations          16
Number of Detects                             2        Number of Non-Detects                    16
Number of Distinct Detects                    2        Number of Distinct Non-Detects           14
Minimum Detect                                13       Minimum Non-Detect                       12
Maximum Detect                                18       Maximum Non-Detect                       110
Variance Detects                              12.5     Percent Non-Detects                      88.89%
Mean Detects                                  15.5     SD Detects                               3.536
Median Detects                                15.5     CV Detects                               0.228
Skewness Detects                                N/A    Kurtosis Detects                           N/A
Mean of Logged Detects                        2.728    SD of Logged Detects                     0.23

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                       13.88    KM Standard Error of Mean                1.725
KM SD                                         2.421      95% KM (BCA) UCL                         N/A
95% KM (t) UCL                                16.88    95% KM (Percentile Bootstrap) UCL          N/A
  95% KM (z) UCL                              16.71      95% KM Bootstrap t UCL                   N/A
90% KM Chebyshev UCL                          19.05    95% KM Chebyshev UCL                     21.4
97.5% KM Chebyshev UCL                        24.65    99% KM Chebyshev UCL                     31.04

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only
k hat (MLE)                                   38.1     k star (bias corrected MLE)                N/A
Theta hat (MLE)                               0.407    Theta star (bias corrected MLE)            N/A
nu hat (MLE)                                  152.4    nu star (bias corrected)                   N/A
Mean (detects)                                15.5

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                     13.88    SD (KM)                                  2.421
Variance (KM)                                 5.859    SE of Mean (KM)                          1.725
k hat (KM)                                    32.86    k star (KM)                              27.42
nu hat (KM)                                   1183     nu star (KM)                             987
theta hat (KM)                                0.422    theta star (KM)                          0.506
80% gamma percentile (KM)                     16.04    90% gamma percentile (KM)                17.36
95% gamma percentile (KM)                     18.5     99% gamma percentile (KM)                20.77

Gamma Kaplan-Meier (KM) Statistics
                                                       Adjusted Level of Significance (β)       0.0357
Approximate Chi Square Value (987.01, α)      915.1    Adjusted Chi Square Value (987.01, β)    908.4
  95% Gamma Approximate KM-UCL (use when n>=50) 14.97    95% Gamma Adjusted KM-UCL (use when n<50) 15.07

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                        12.48    Mean in Log Scale                        2.515
SD in Original Scale                          1.808    SD in Log Scale                          0.137
  95% t UCL (assumes normality of ROS data)   13.22      95% Percentile Bootstrap UCL           13.25
  95% BCA Bootstrap UCL                       13.26      95% Bootstrap t UCL                    13.5
  95% H-UCL (Log ROS)                         13.24
```

```
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                  2.616      KM Geo Mean                                   13.68
KM SD (logged)                                    0.162        95% Critical H Value (KM-Log)               1.765
KM Standard Error of Mean (logged)                0.116      95% H-UCL (KM -Log)                           14.86
KM SD (logged)                                    0.162        95% Critical H Value (KM-Log)               1.765
KM Standard Error of Mean (logged)                0.116

DL/2 Statistics
DL/2 Normal                                                  DL/2 Log-Transformed
Mean in Original Scale                            22.81      Mean in Log Scale                             2.92
SD in Original Scale                              15.78      SD in Log Scale                               0.654
  95% t UCL (Assumes normality)                   29.27        95% H-Stat UCL                              32.46
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use
95% KM (t) UCL                                    16.88      KM H-UCL                                      14.86
95% KM (BCA) UCL                                    N/A
Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

C19-C36 Aliphatic Hydrocarbons

```
General Statistics
Total Number of Observations                      18         Number of Distinct Observations               18
Number of Detects                                 17         Number of Non-Detects                         1
Number of Distinct Detects                        17         Number of Distinct Non-Detects                1
Minimum Detect                                    24         Minimum Non-Detect                            23
Maximum Detect                                    780        Maximum Non-Detect                            23
Variance Detects                                  33378      Percent Non-Detects                           5.56%
Mean Detects                                      150.9      SD Detects                                    182.7
Median Detects                                    76         CV Detects                                    1.211
Skewness Detects                                  2.824      Kurtosis Detects                              9.286
Mean of Logged Detects                            4.553      SD of Logged Detects                          0.951

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                       0.658      Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                    0.892      Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                         0.244      Lilliefors GOF Test
5% Lilliefors Critical Value                      0.207      Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                           143.8      KM Standard Error of Mean                     42.45
KM SD                                             174.7        95% KM (BCA) UCL                            222.5
  95% KM (t) UCL                                  217.6        95% KM (Percentile Bootstrap) UCL           217.3
  95% KM (z) UCL                                  213.6        95% KM Bootstrap t UCL                      296.4
90% KM Chebyshev UCL                              271.1      95% KM Chebyshev UCL                          328.8
97.5% KM Chebyshev UCL                            408.9      99% KM Chebyshev UCL                          566.1

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                0.536      Anderson-Darling GOF Test
5% A-D Critical Value                             0.761      Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic                                0.17       Kolmogorov-Smirnov GOF
5% K-S Critical Value                             0.214      Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                       1.219      k star (bias corrected MLE)                   1.043
Theta hat (MLE)                                   123.8      Theta star (bias corrected MLE)               144.7
nu hat (MLE)                                      41.44      nu star (bias corrected)                      35.46
Mean (detects)                                    150.9
```

```
Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                         0.01      Mean                                       142.5
Maximum                                         780       Median                                     74.5
SD                                              180.8     CV                                         1.269
k hat (MLE)                                     0.665     k star (bias corrected MLE)                0.591
Theta hat (MLE)                                 214.2     Theta star (bias corrected MLE)            240.9
nu hat (MLE)                                    23.95     nu star (bias corrected)                   21.29
Adjusted Level of Significance (β)              0.0357
Approximate Chi Square Value (21.29, α)         11.81     Adjusted Chi Square Value (21.29, β)       11.13
95% Gamma Approximate UCL (use when n>=50)      256.9     95% Gamma Adjusted UCL (use when n<50)     272.5

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                       143.8     SD (KM)                                    174.7
Variance (KM)                                   30528     SE of Mean (KM)                            42.45
k hat (KM)                                      0.677     k star (KM)                                0.601
nu hat (KM)                                     24.38     nu star (KM)                               21.65
theta hat (KM)                                  212.3     theta star (KM)                            239.1
80% gamma percentile (KM)                       237       90% gamma percentile (KM)                  373.8
95% gamma percentile (KM)                       516.9     99% gamma percentile (KM)                  863.2

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (21.65, α)         12.07     Adjusted Chi Square Value (21.65, β)       11.39
95% Gamma Approximate KM-UCL (use when n>=50)   257.8     95% Gamma Adjusted KM-UCL (use when n<50)  273.2

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                     0.964     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                  0.892     Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic                       0.122     Lilliefors GOF Test
5% Lilliefors Critical Value                    0.207     Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                          143       Mean in Log Scale                          4.423
SD in Original Scale                            180.4     SD in Log Scale                            1.076
  95% t UCL (assumes normality of ROS data)     217         95% Percentile Bootstrap UCL             216.8
  95% BCA Bootstrap UCL                         244.6       95% Bootstrap t UCL                      291.9
  95% H-UCL (Log ROS)                           304.5

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                4.474     KM Geo Mean                                87.74
KM SD (logged)                                  0.953       95% Critical H Value (KM-Log)            2.571
KM Standard Error of Mean (logged)              0.232       95% H-UCL (KM -Log)                      250.4
KM SD (logged)                                  0.953       95% Critical H Value (KM-Log)            2.571
KM Standard Error of Mean (logged)              0.232

DL/2 Statistics
DL/2 Normal                                               DL/2 Log-Transformed
Mean in Original Scale                          143.1     Mean in Log Scale                          4.436
SD in Original Scale                            180.3     SD in Log Scale                            1.048
  95% t UCL (Assumes normality)                 217.1       95% H-Stat UCL                           290.9
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use
95% KM Adjusted Gamma UCL                       273.2     95% GROS Adjusted Gamma UCL                272.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

ProUCL Output Files
375 Banfield Road, Portsmouth, New Hampshire

C11-C22 Aromatic Hydrocarbons (adjusted)

```
General Statistics
Total Number of Observations                      18       Number of Distinct Observations    16
                                                           Number of Missing Observations     0
Minimum                                           25       Mean                               173.9
Maximum                                           490      Median                             140
SD                                                138.6    Std. Error of Mean                 32.67
Coefficient of Variation                          0.797    Skewness                           0.873

Normal GOF Test
Shapiro Wilk Test Statistic                       0.891    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                    0.897    Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                         0.181    Lilliefors GOF Test
5% Lilliefors Critical Value                      0.202    Data appear Normal at 5% Significance Level
Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution
  95% Normal UCL                                             95% UCLs (Adjusted for Skewness)
  95% Student's-t UCL                             230.7      95% Adjusted-CLT UCL (Chen-1995)     234.8
                                                             95% Modified-t UCL (Johnson-1978)    231.8
Gamma GOF Test
A-D Test Statistic                                0.335    Anderson-Darling Gamma GOF Test
5% A-D Critical Value                             0.756    Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic                                0.137    Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value                             0.207    Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics
k hat (MLE)                                       1.551    k star (bias corrected MLE)        1.33
Theta hat (MLE)                                   112.1    Theta star (bias corrected MLE)    130.8
nu hat (MLE)                                      55.85    nu star (bias corrected)           47.88
MLE Mean (bias corrected)                         173.9    MLE Sd (bias corrected)            150.8
                                                           Approximate Chi Square Value (0.05) 33
Adjusted Level of Significance                    0.0357   Adjusted Chi Square Value          31.81

Assuming Gamma Distribution
  95% Approximate Gamma UCL (use when n>=50))     252.3      95% Adjusted Gamma UCL (use when n<50)   261.7

Lognormal GOF Test
Shapiro Wilk Test Statistic                       0.945    Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value                    0.897    Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic                         0.123    Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value                      0.202    Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level

Lognormal Statistics
Minimum of Logged Data                            3.219    Mean of logged Data                4.803
Maximum of Logged Data                            6.194    SD of logged Data                  0.926

Assuming Lognormal Distribution
  95% H-UCL                                       330.3      90% Chebyshev (MVUE) UCL         311.4
  95% Chebyshev (MVUE) UCL                        370.4     97.5% Chebyshev (MVUE) UCL        452.3
  99% Chebyshev (MVUE) UCL                        613.2

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs
  95% CLT UCL                                     227.6      95% Jackknife UCL                230.7
  95% Standard Bootstrap UCL                      226        95% Bootstrap-t UCL              242
  95% Hall's Bootstrap UCL                        237.4      95% Percentile Bootstrap UCL     221.9
  95% BCA Bootstrap UCL                           229.9
  90% Chebyshev(Mean, Sd) UCL                     271.9      95% Chebyshev(Mean, Sd) UCL      316.3
 97.5% Chebyshev(Mean, Sd) UCL                    377.9      99% Chebyshev(Mean, Sd) UCL      499

Suggested UCL to Use
95% Student's-t UCL                               230.7

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Acenaphthene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
Number of Detects	9	Number of Non-Detects	12
Number of Distinct Detects	8	Number of Distinct Non-Detects	11
Minimum Detect	0.0063	Minimum Non-Detect	0.099
Maximum Detect	2.4	Maximum Non-Detect	1.4
Variance Detects	0.706	Percent Non-Detects	57.14%
Mean Detects	0.416	SD Detects	0.84
Median Detects	0.029	CV Detects	2.021
Skewness Detects	2.129	Kurtosis Detects	4.054
Mean of Logged Detects	-3.119	SD of Logged Detects	2.191

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.577	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.45	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.196	KM Standard Error of Mean	0.131
KM SD	0.559	95% KM (BCA) UCL	0.445
95% KM (t) UCL	0.422	95% KM (Percentile Bootstrap) UCL	0.417
95% KM (z) UCL	0.412	95% KM Bootstrap t UCL	5.285
90% KM Chebyshev UCL	0.589	95% KM Chebyshev UCL	0.767
97.5% KM Chebyshev UCL	1.014	99% KM Chebyshev UCL	1.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.26	Anderson-Darling GOF Test	
5% A-D Critical Value	0.806	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.399	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.301	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.307	k star (bias corrected MLE)	0.278
Theta hat (MLE)	1.356	Theta star (bias corrected MLE)	1.493
nu hat (MLE)	5.518	nu star (bias corrected)	5.012
Mean (detects)	0.416		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0063	Mean	0.188
Maximum	2.4	Median	0.01
SD	0.569	CV	3.02
k hat (MLE)	0.313	k star (bias corrected MLE)	0.3
Theta hat (MLE)	0.602	Theta star (bias corrected MLE)	0.628
nu hat (MLE)	13.15	nu star (bias corrected)	12.6
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (12.60, α)	5.627	Adjusted Chi Square Value (12.60, β)	5.271
95% Gamma Approximate UCL (use when n>=50)	0.422	95% Gamma Adjusted UCL (use when n<50)	0.45

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.196	SD (KM)	0.559
Variance (KM)	0.313	SE of Mean (KM)	0.131
k hat (KM)	0.123	k star (KM)	0.137
nu hat (KM)	5.163	nu star (KM)	5.759
theta hat (KM)	1.595	theta star (KM)	1.43
80% gamma percentile (KM)	0.197	90% gamma percentile (KM)	0.573
95% gamma percentile (KM)	1.097	99% gamma percentile (KM)	2.646

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.76, α)	1.518	Adjusted Chi Square Value (5.76, β)	1.358
95% Gamma Approximate KM-UCL (use when n>=50)	0.744	95% Gamma Adjusted KM-UCL (use when n<50)	0.831

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.812	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.291	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.274	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.191	Mean in Log Scale	-3.547
SD in Original Scale	0.568	SD in Log Scale	1.46
95% t UCL (assumes normality of ROS data)	0.405	95% Percentile Bootstrap UCL	0.416
95% BCA Bootstrap UCL	0.533	95% Bootstrap t UCL	9.236
95% H-UCL (Log ROS)	0.242		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.692	KM Geo Mean	0.0249
KM SD (logged)	1.578	95% Critical H Value (KM-Log)	3.436
KM Standard Error of Mean (logged)	0.43	95% H-UCL (KM -Log)	0.291
KM SD (logged)	1.578	95% Critical H Value (KM-Log)	3.436
KM Standard Error of Mean (logged)	0.43		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.329	Mean in Log Scale	-2.32
SD in Original Scale	0.567	SD in Log Scale	1.697
95% t UCL (Assumes normality)	0.542	95% H-Stat UCL	1.644

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	**1.014**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acenaphthylene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
Number of Detects	9	Number of Non-Detects	12
Number of Distinct Detects	9	Number of Distinct Non-Detects	11
Minimum Detect	0.0045	Minimum Non-Detect	0.076
Maximum Detect	0.33	Maximum Non-Detect	1.4
Variance Detects	0.0108	Percent Non-Detects	57.14%
Mean Detects	0.0663	SD Detects	0.104
Median Detects	0.026	CV Detects	1.565
Skewness Detects	2.549	Kurtosis Detects	6.726
Mean of Logged Detects	-3.488	SD of Logged Detects	1.265

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.616	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.378	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0507	KM Standard Error of Mean	0.0216
KM SD	0.0777	95% KM (BCA) UCL	0.0904
95% KM (t) UCL	0.088	95% KM (Percentile Bootstrap) UCL	0.0897
95% KM (z) UCL	0.0862	95% KM Bootstrap t UCL	0.19
90% KM Chebyshev UCL	0.115	95% KM Chebyshev UCL	0.145
97.5% KM Chebyshev UCL	0.186	99% KM Chebyshev UCL	0.266

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.584	Anderson-Darling GOF Test	
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.283	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.289	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.77	k star (bias corrected MLE)	0.587
Theta hat (MLE)	0.0861	Theta star (bias corrected MLE)	0.113
nu hat (MLE)	13.86	nu star (bias corrected)	10.57
Mean (detects)	0.0663		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0045	Mean	0.0424
Maximum	0.33	Median	0.0215
SD	0.0696	CV	1.639
k hat (MLE)	1.126	k star (bias corrected MLE)	0.997
Theta hat (MLE)	0.0377	Theta star (bias corrected MLE)	0.0426
nu hat (MLE)	47.31	nu star (bias corrected)	41.88
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (41.88, α)	28.05	Adjusted Chi Square Value (41.88, β)	27.18
95% Gamma Approximate UCL (use when n>=50)	0.0634	95% Gamma Adjusted UCL (use when n<50)	0.0654

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0507	SD (KM)	0.0777
Variance (KM)	0.00604	SE of Mean (KM)	0.0216
k hat (KM)	0.426	k star (KM)	0.397
nu hat (KM)	17.88	nu star (KM)	16.66
theta hat (KM)	0.119	theta star (KM)	0.128
80% gamma percentile (KM)	0.0818	90% gamma percentile (KM)	0.143
95% gamma percentile (KM)	0.211	99% gamma percentile (KM)	0.382

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.66, α)	8.431	Adjusted Chi Square Value (16.66, β)	7.983
95% Gamma Approximate KM-UCL (use when n>=50)	0.1	**95% Gamma Adjusted KM-UCL (use when n<50)**	**0.106**

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.966	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.193	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0424	Mean in Log Scale	-3.633
SD in Original Scale	0.0691	SD in Log Scale	0.831
95% t UCL (assumes normality of ROS data)	0.0684	95% Percentile Bootstrap UCL	0.069
95% BCA Bootstrap UCL	0.0854	95% Bootstrap t UCL	0.187
95% H-UCL (Log ROS)	0.0577		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.642	KM Geo Mean	0.0262
KM SD (logged)	1.075	95% Critical H Value (KM-Log)	2.667
KM Standard Error of Mean (logged)	0.35	95% H-UCL (KM -Log)	0.0887
KM SD (logged)	1.075	95% Critical H Value (KM-Log)	2.667
KM Standard Error of Mean (logged)	0.35		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.178	Mean in Log Scale	-2.491
SD in Original Scale	0.218	SD in Log Scale	1.385
95% t UCL (Assumes normality)	0.261	95% H-Stat UCL	0.569

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	**0.106**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Anthracene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
Number of Detects	14	Number of Non-Detects	7
Number of Distinct Detects	13	Number of Distinct Non-Detects	6
Minimum Detect	0.013	Minimum Non-Detect	0.2
Maximum Detect	3.4	Maximum Non-Detect	1.4
Variance Detects	1.325	Percent Non-Detects	33.33%
Mean Detects	0.551	SD Detects	1.151
Median Detects	0.083	CV Detects	2.089
Skewness Detects	2.26	Kurtosis Detects	3.745
Mean of Logged Detects	-2.379	SD of Logged Detects	1.882

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.512	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.402	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.226	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.392	KM Standard Error of Mean	0.212
KM SD	0.935	95% KM (BCA) UCL	0.717
95% KM (t) UCL	0.758	95% KM (Percentile Bootstrap) UCL	0.726
95% KM (z) UCL	0.741	95% KM Bootstrap t UCL	2.906
90% KM Chebyshev UCL	1.028	95% KM Chebyshev UCL	1.316
97.5% KM Chebyshev UCL	1.716	99% KM Chebyshev UCL	2.502

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.419	Anderson-Darling GOF Test	
5% A-D Critical Value	0.818	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.283	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.246	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.373	k star (bias corrected MLE)	0.341
Theta hat (MLE)	1.476	Theta star (bias corrected MLE)	1.616
nu hat (MLE)	10.45	nu star (bias corrected)	9.544
Mean (detects)	0.551		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.378
Maximum	3.4	Median	0.018
SD	0.962	CV	2.541
k hat (MLE)	0.336	k star (bias corrected MLE)	0.32
Theta hat (MLE)	1.126	Theta star (bias corrected MLE)	1.183
nu hat (MLE)	14.12	nu star (bias corrected)	13.44
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (13.44, α)	6.188	Adjusted Chi Square Value (13.44, β)	5.812
95% Gamma Approximate UCL (use when n>=50)	0.822	95% Gamma Adjusted UCL (use when n<50)	0.875

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.392	SD (KM)	0.935
Variance (KM)	0.873	SE of Mean (KM)	0.212
k hat (KM)	0.176	k star (KM)	0.182
nu hat (KM)	7.386	nu star (KM)	7.664
theta hat (KM)	2.229	theta star (KM)	2.148
80% gamma percentile (KM)	0.49	90% gamma percentile (KM)	1.183
95% gamma percentile (KM)	2.066	99% gamma percentile (KM)	4.537

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.66, α)	2.542	Adjusted Chi Square Value (7.66, β)	2.321
95% Gamma Approximate KM-UCL (use when n>=50)	1.182	95% Gamma Adjusted KM-UCL (use when n<50)	1.294

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.876	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.165	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

```
Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                                  0.385    Mean in Log Scale                        -2.587
SD in Original Scale                                    0.959    SD in Log Scale                          1.566
  95% t UCL (assumes normality of ROS data)             0.746      95% Percentile Bootstrap UCL           0.721
  95% BCA Bootstrap UCL                                 0.955      95% Bootstrap t UCL                    3.752
  95% H-UCL (Log ROS)                                   0.848

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                        -2.646   KM Geo Mean                              0.0709
KM SD (logged)                                          1.642      95% Critical H Value (KM-Log)          3.541
KM Standard Error of Mean (logged)                      0.407      95% H-UCL (KM -Log)                    1.003
KM SD (logged)                                          1.642      95% Critical H Value (KM-Log)          3.541
KM Standard Error of Mean (logged)                      0.407

DL/2 Statistics
DL/2 Normal                                                      DL/2 Log-Transformed
Mean in Original Scale                                  0.493    Mean in Log Scale                        -2.005
SD in Original Scale                                    0.943    SD in Log Scale                          1.677
  95% t UCL (Assumes normality)                         0.848      95% H-Stat UCL                         2.12
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level
```

Suggested UCL to Use
95% KM (Chebyshev) UCL 1.316

```
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Benzo(a)anthracene

```
General Statistics
Total Number of Observations                            21       Number of Distinct Observations          19
Number of Detects                                       17       Number of Non-Detects                    4
Number of Distinct Detects                              16       Number of Distinct Non-Detects           3
Minimum Detect                                          0.048    Minimum Non-Detect                       0.26
Maximum Detect                                          11       Maximum Non-Detect                       1.4
Variance Detects                                        12.7     Percent Non-Detects                      19.05%
Mean Detects                                            1.572    SD Detects                               3.564
Median Detects                                          0.16     CV Detects                               2.268
Skewness Detects                                        2.566    Kurtosis Detects                         5.289
Mean of Logged Detects                                  -1.266   SD of Logged Detects                     1.746

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                             0.458    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                          0.892    Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                               0.424    Lilliefors GOF Test
5% Lilliefors Critical Value                            0.207    Detected Data Not Normal at 5% Significance Level
```

Detected Data Not Normal at 5% Significance Level

```
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                                 1.312    KM Standard Error of Mean                0.711
KM SD                                                   3.159      95% KM (BCA) UCL                       2.397
  95% KM (t) UCL                                        2.538      95% KM (Percentile Bootstrap) UCL      2.686
  95% KM (z) UCL                                        2.481      95% KM Bootstrap t UCL                 11.13
90% KM Chebyshev UCL                                    3.445    95% KM Chebyshev UCL                     4.411
97.5% KM Chebyshev UCL                                  5.752    99% KM Chebyshev UCL                     8.386

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                      1.905    Anderson-Darling GOF Test
5% A-D Critical Value                                   0.823    Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                      0.258    Kolmogorov-Smirnov GOF
5% K-S Critical Value                                   0.224    Detected Data Not Gamma Distributed at 5% Significance Level
```

Detected Data Not Gamma Distributed at 5% Significance Level

```
Gamma Statistics on Detected Data Only
k hat (MLE)                                             0.385    k star (bias corrected MLE)              0.356
Theta hat (MLE)                                         4.08     Theta star (bias corrected MLE)          4.409
nu hat (MLE)                                            13.1     nu star (bias corrected)                 12.12
Mean (detects)                                          1.572
```

```
Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                               0.01     Mean                                          1.301
Maximum                                               11       Median                                        0.15
SD                                                    3.241    CV                                            2.491
k hat (MLE)                                           0.342    k star (bias corrected MLE)                   0.325
Theta hat (MLE)                                       3.803    Theta star (bias corrected MLE)               4.003
nu hat (MLE)                                          14.37    nu star (bias corrected)                      13.65
Adjusted Level of Significance (β)                    0.0383
Approximate Chi Square Value (13.65, α)               6.331    Adjusted Chi Square Value (13.65, β)          5.951
95% Gamma Approximate UCL (use when n>=50)            2.804    95% Gamma Adjusted UCL (use when n<50)        2.983

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                             1.312    SD (KM)                                       3.159
Variance (KM)                                         9.98     SE of Mean (KM)                               0.711
k hat (KM)                                            0.172    k star (KM)                                   0.18
nu hat (KM)                                           7.24     nu star (KM)                                  7.539
theta hat (KM)                                        7.609    theta star (KM)                               7.307
80% gamma percentile (KM)                             1.624    90% gamma percentile (KM)                     3.955
95% gamma percentile (KM)                             6.943    99% gamma percentile (KM)                     15.32

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (7.54, α)                2.471    Adjusted Chi Square Value (7.54, β)           2.254
  95% Gamma Approximate KM-UCL (use when n>=50)       4.002      95% Gamma Adjusted KM-UCL (use when n<50)   4.388

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                           0.863    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                        0.892    Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic                             0.157    Lilliefors GOF Test
5% Lilliefors Critical Value                          0.207    Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                                1.305    Mean in Log Scale                             -1.393
SD in Original Scale                                  3.238    SD in Log Scale                               1.605
  95% t UCL (assumes normality of ROS data)           2.524      95% Percentile Bootstrap UCL                2.459
  95% BCA Bootstrap UCL                               3.259      95% Bootstrap t UCL                         13.02
  95% H-UCL (Log ROS)                                 3.138

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                      -1.427   KM Geo Mean                                   0.24
KM SD (logged)                                        1.614      95% Critical H Value (KM-Log)               3.494
KM Standard Error of Mean (logged)                    0.376      95% H-UCL (KM -Log)                         3.114
KM SD (logged)                                        1.614      95% Critical H Value (KM-Log)               3.494
KM Standard Error of Mean (logged)                    0.376

DL/2 Statistics
DL/2 Normal                                                    DL/2 Log-Transformed
Mean in Original Scale                                1.36     Mean in Log Scale                             -1.211
SD in Original Scale                                  3.221    SD in Log Scale                               1.597
  95% t UCL (Assumes normality)                       2.573      95% H-Stat UCL                              3.678
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
95% KM (Chebyshev) UCL                                4.411

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

ProUCL Output Files

375 Banfield Road, Portsmouth, New Hampshire

Benzo(a)pyrene

```
General Statistics
Total Number of Observations                              21        Number of Distinct Observations                     18
Number of Detects                                         17        Number of Non-Detects                               4
Number of Distinct Detects                                15        Number of Distinct Non-Detects                      3
Minimum Detect                                            0.041     Minimum Non-Detect                                  0.26
Maximum Detect                                            9.8       Maximum Non-Detect                                  1.4
Variance Detects                                          11.65     Percent Non-Detects                                 19.05%
Mean Detects                                              2.105     SD Detects                                          3.413
Median Detects                                            0.43      CV Detects                                          1.621
Skewness Detects                                          1.775     Kurtosis Detects                                    1.716
Mean of Logged Detects                                    -0.793    SD of Logged Detects                                2.015

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                               0.637     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                            0.892     Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                                 0.31      Lilliefors GOF Test
5% Lilliefors Critical Value                              0.207     Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                                   1.743     KM Standard Error of Mean                           0.692
KM SD                                                     3.073       95% KM (BCA) UCL                                  3.141
  95% KM (t) UCL                                          2.936       95% KM (Percentile Bootstrap) UCL                 2.957
  95% KM (z) UCL                                          2.881       95% KM Bootstrap t UCL                            3.668
90% KM Chebyshev UCL                                      3.819     95% KM Chebyshev UCL                                4.759
97.5% KM Chebyshev UCL                                    6.064     99% KM Chebyshev UCL                                8.627

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                        0.854     Anderson-Darling GOF Test
5% A-D Critical Value                                     0.815     Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                        0.191     Kolmogorov-Smirnov GOF
5% K-S Critical Value                                     0.223     Detected data appear Gamma Distributed at 5% Significance Level
Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                               0.424     k star (bias corrected MLE)                         0.388
Theta hat (MLE)                                           4.963     Theta star (bias corrected MLE)                     5.418
nu hat (MLE)                                              14.42     nu star (bias corrected)                            13.21
Mean (detects)                                            2.105

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                                   0.01      Mean                                                1.726
Maximum                                                   9.8       Median                                              0.37
SD                                                        3.156     CV                                                  1.829
k hat (MLE)                                               0.356     k star (bias corrected MLE)                         0.337
Theta hat (MLE)                                           4.852     Theta star (bias corrected MLE)                     5.127
nu hat (MLE)                                              14.94     nu star (bias corrected)                            14.14
Adjusted Level of Significance (β)                        0.0383
Approximate Chi Square Value (14.14, α)                   6.668     Adjusted Chi Square Value (14.14, β)                6.276
95% Gamma Approximate UCL (use when n>=50)                3.661     95% Gamma Adjusted UCL (use when n<50)              3.889

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                                 1.743     SD (KM)                                             3.073
Variance (KM)                                             9.445     SE of Mean (KM)                                     0.692
k hat (KM)                                                0.322     k star (KM)                                         0.308
nu hat (KM)                                               13.51     nu star (KM)                                        12.92
theta hat (KM)                                            5.418     theta star (KM)                                     5.669
80% gamma percentile (KM)                                 2.689     90% gamma percentile (KM)                           5.126
95% gamma percentile (KM)                                 7.911     99% gamma percentile (KM)                           15.13

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (12.92, α)                   5.836     Adjusted Chi Square Value (12.92, β)                5.473
95% Gamma Approximate KM-UCL (use when n>=50)             3.858     95% Gamma Adjusted KM-UCL (use when n<50)           4.114

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                               0.885     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                            0.892     Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic                                 0.214     Lilliefors GOF Test
5% Lilliefors Critical Value                              0.207     Detected Data Not Lognormal at 5% Significance Level
Detected Data Not Lognormal at 5% Significance Level
```

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.733	Mean in Log Scale	-1.044
SD in Original Scale	3.152	SD in Log Scale	1.901
95% t UCL (assumes normality of ROS data)	2.919	95% Percentile Bootstrap UCL	2.927
95% BCA Bootstrap UCL	3.09	95% Bootstrap t UCL	3.677
95% H-UCL (Log ROS)	11.58		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.09	KM Geo Mean	0.336
KM SD (logged)	1.927	95% Critical H Value (KM-Log)	4.016
KM Standard Error of Mean (logged)	0.448	95% H-UCL (KM -Log)	12.14
KM SD (logged)	1.927	95% Critical H Value (KM-Log)	4.016
KM Standard Error of Mean (logged)	0.448		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.792	Mean in Log Scale	-0.828
SD in Original Scale	3.125	SD in Log Scale	1.83
95% t UCL (Assumes normality)	2.968	95% H-Stat UCL	11.28

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) 4.114

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	17
Number of Detects	17	Number of Non-Detects	4
Number of Distinct Detects	14	Number of Distinct Non-Detects	3
Minimum Detect	0.059	Minimum Non-Detect	0.26
Maximum Detect	12	Maximum Non-Detect	1.4
Variance Detects	15.02	Percent Non-Detects	19.05%
Mean Detects	1.754	SD Detects	3.876
Median Detects	0.37	CV Detects	2.21
Skewness Detects	2.56	Kurtosis Detects	5.269
Mean of Logged Detects	-1.044	SD of Logged Detects	1.703

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.464	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.429	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.207	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.468	KM Standard Error of Mean	0.774
KM SD	3.436	95% KM (BCA) UCL	2.797
95% KM (t) UCL	2.802	95% KM (Percentile Bootstrap) UCL	2.689
95% KM (z) UCL	2.741	95% KM Bootstrap t UCL	11.8
90% KM Chebyshev UCL	3.789	95% KM Chebyshev UCL	4.84
97.5% KM Chebyshev UCL	6.299	99% KM Chebyshev UCL	9.165

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.779	Anderson-Darling GOF Test	
5% A-D Critical Value	0.818	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.267	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.224	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.408	k star (bias corrected MLE)	0.376
Theta hat (MLE)	4.293	Theta star (bias corrected MLE)	4.669
nu hat (MLE)	13.89	nu star (bias corrected)	12.77
Mean (detects)	1.754		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.454
Maximum	12	Median	0.23
SD	3.526	CV	2.425
k hat (MLE)	0.354	k star (bias corrected MLE)	0.335
Theta hat (MLE)	4.105	Theta star (bias corrected MLE)	4.336
nu hat (MLE)	14.88	nu star (bias corrected)	14.09
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (14.09, α)	6.63	Adjusted Chi Square Value (14.09, β)	6.239
95% Gamma Approximate UCL (use when n>=50)	3.09	95% Gamma Adjusted UCL (use when n<50)	3.283

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.468	SD (KM)	3.436
Variance (KM)	11.81	SE of Mean (KM)	0.774
k hat (KM)	0.183	k star (KM)	0.188
nu hat (KM)	7.666	nu star (KM)	7.904
theta hat (KM)	8.044	theta star (KM)	7.801
80% gamma percentile (KM)	1.871	90% gamma percentile (KM)	4.436
95% gamma percentile (KM)	7.683	99% gamma percentile (KM)	16.71

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.90, α)	2.68	Adjusted Chi Square Value (7.90, β)	2.451
95% Gamma Approximate KM-UCL (use when n>=50)	4.331	95% Gamma Adjusted KM-UCL (use when n<50)	4.734

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.875	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	Lilliefors GOF Test
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.46	Mean in Log Scale	-1.177
SD in Original Scale	3.522	SD in Log Scale	1.571
95% t UCL (assumes normality of ROS data)	2.786	95% Percentile Bootstrap UCL	2.644
95% BCA Bootstrap UCL	3.615	95% Bootstrap t UCL	13.14
95% H-UCL (Log ROS)	3.527		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.206	KM Geo Mean	0.3
KM SD (logged)	1.581	95% Critical H Value (KM-Log)	3.44
KM Standard Error of Mean (logged)	0.369	95% H-UCL (KM -Log)	3.524
KM SD (logged)	1.581	95% Critical H Value (KM-Log)	3.44
KM Standard Error of Mean (logged)	0.369		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.508	Mean in Log Scale	-1.03
SD in Original Scale	3.507	SD in Log Scale	1.554
95% t UCL (Assumes normality)	2.828	95% H-Stat UCL	3.893

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	**4.84**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL Output Files
375 Banfield Road, Portsmouth, New Hampshire

Benzo(g,h,i)perylene

```
General Statistics
Total Number of Observations                          21         Number of Distinct Observations               18
Number of Detects                                     16         Number of Non-Detects                         5
Number of Distinct Detects                            14         Number of Distinct Non-Detects                4
Minimum Detect                                        0.025      Minimum Non-Detect                            0.26
Maximum Detect                                        5.6        Maximum Non-Detect                            1.4
Variance Detects                                      2.884      Percent Non-Detects                           23.81%
Mean Detects                                          0.817      SD Detects                                    1.698
Median Detects                                        0.18       CV Detects                                    2.079
Skewness Detects                                      2.477      Kurtosis Detects                              5.056
Mean of Logged Detects                                -1.756     SD of Logged Detects                          1.733

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                           0.513      Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                        0.887      Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                             0.374      Lilliefors GOF Test
5% Lilliefors Critical Value                          0.213      Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                               0.662      KM Standard Error of Mean                     0.331
KM SD                                                 1.465        95% KM (BCA) UCL                            1.328
  95% KM (t) UCL                                      1.233        95% KM (Percentile Bootstrap) UCL           1.227
  95% KM (z) UCL                                      1.206        95% KM Bootstrap t UCL                      3.697
90% KM Chebyshev UCL                                  1.655      95% KM Chebyshev UCL                          2.105
97.5% KM Chebyshev UCL                                2.729      99% KM Chebyshev UCL                          3.956

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                    1.432      Anderson-Darling GOF Test
5% A-D Critical Value                                 0.813      Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                    0.271      Kolmogorov-Smirnov GOF
5% K-S Critical Value                                 0.229      Detected Data Not Gamma Distributed at 5% Significance Level
Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                           0.42       k star (bias corrected MLE)                   0.383
Theta hat (MLE)                                       1.943      Theta star (bias corrected MLE)               2.132
nu hat (MLE)                                          13.45      nu star (bias corrected)                      12.26
Mean (detects)                                        0.817

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                               0.01       Mean                                          0.641
Maximum                                               5.6        Median                                        0.088
SD                                                    1.507      CV                                            2.351
k hat (MLE)                                           0.367      k star (bias corrected MLE)                   0.346
Theta hat (MLE)                                       1.748      Theta star (bias corrected MLE)               1.852
nu hat (MLE)                                          15.4       nu star (bias corrected)                      14.54
Adjusted Level of Significance (β)                    0.0383
Approximate Chi Square Value (14.54, α)               6.94       Adjusted Chi Square Value (14.54, β)          6.539
95% Gamma Approximate UCL (use when n>=50)            1.343      95% Gamma Adjusted UCL (use when n<50)        1.425

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                             0.662      SD (KM)                                       1.465
Variance (KM)                                         2.146      SE of Mean (KM)                               0.331
k hat (KM)                                            0.204      k star (KM)                                   0.207
nu hat (KM)                                           8.575      nu star (KM)                                  8.683
theta hat (KM)                                        3.242      theta star (KM)                               3.202
80% gamma percentile (KM)                             0.887      90% gamma percentile (KM)                     2.002
95% gamma percentile (KM)                             3.381      99% gamma percentile (KM)                     7.157

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (8.68, α)                3.137      Adjusted Chi Square Value (8.68, β)           2.885
  95% Gamma Approximate KM-UCL (use when n>=50)       1.832        95% Gamma Adjusted KM-UCL (use when n<50)   1.992

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                           0.892      Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                        0.887      Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic                             0.147      Lilliefors GOF Test
5% Lilliefors Critical Value                          0.213      Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level
```

```
Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                                   0.651    Mean in Log Scale                          -1.871
SD in Original Scale                                     1.502    SD in Log Scale                            1.533
  95% t UCL (assumes normality of ROS data)              1.216      95% Percentile Bootstrap UCL             1.287
  95% BCA Bootstrap UCL                                  1.422      95% Bootstrap t UCL                      4.137
  95% H-UCL (Log ROS)                                    1.578

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                         -1.906   KM Geo Mean                                0.149
KM SD (logged)                                           1.581      95% Critical H Value (KM-Log)            3.44
KM Standard Error of Mean (logged)                       0.381      95% H-UCL (KM -Log)                      1.749
KM SD (logged)                                           1.581      95% Critical H Value (KM-Log)            3.44
KM Standard Error of Mean (logged)                       0.381

DL/2 Statistics
DL/2 Normal                                                       DL/2 Log-Transformed
Mean in Original Scale                                   0.737    Mean in Log Scale                          -1.552
SD in Original Scale                                     1.482    SD in Log Scale                            1.58
  95% t UCL (Assumes normality)                          1.294      95% H-Stat UCL                           2.487
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
95% KM (Chebyshev) UCL                                   2.105

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(k)fluoranthene

General Statistics
Total Number of Observations                             21       Number of Distinct Observations            18
Number of Detects                                        16       Number of Non-Detects                      5
Number of Distinct Detects                               14       Number of Distinct Non-Detects             4
Minimum Detect                                           0.021    Minimum Non-Detect                         0.26
Maximum Detect                                           4.9      Maximum Non-Detect                         1.4
Variance Detects                                         2.517    Percent Non-Detects                        23.81%
Mean Detects                                             0.703    SD Detects                                 1.586
Median Detects                                           0.097    CV Detects                                 2.256
Skewness Detects                                         2.48     Kurtosis Detects                           4.83
Mean of Logged Detects                                   -2.126   SD of Logged Detects                       1.771

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                              0.468    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                           0.887    Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                                0.433    Lilliefors GOF Test
5% Lilliefors Critical Value                             0.213    Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                                  0.562    KM Standard Error of Mean                  0.308
KM SD                                                    1.366      95% KM (BCA) UCL                         1.2
  95% KM (t) UCL                                         1.094      95% KM (Percentile Bootstrap) UCL        1.039
  95% KM (z) UCL                                         1.069      95% KM Bootstrap t UCL                   5.133
90% KM Chebyshev UCL                                     1.487    95% KM Chebyshev UCL                       1.906
97.5% KM Chebyshev UCL                                   2.487    99% KM Chebyshev UCL                       3.629

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                       1.903    Anderson-Darling GOF Test
5% A-D Critical Value                                    0.822    Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                       0.286    Kolmogorov-Smirnov GOF
5% K-S Critical Value                                    0.231    Detected Data Not Gamma Distributed at 5% Significance Level
Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                              0.375    k star (bias corrected MLE)                0.346
Theta hat (MLE)                                          1.876    Theta star (bias corrected MLE)            2.031
nu hat (MLE)                                             12       nu star (bias corrected)                   11.08
Mean (detects)                                           0.703
```

```
Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                              0.01     Mean                                          0.55
Maximum                                              4.9      Median                                        0.062
SD                                                   1.403    CV                                            2.55
k hat (MLE)                                          0.344    k star (bias corrected MLE)                   0.326
Theta hat (MLE)                                      1.601    Theta star (bias corrected MLE)               1.687
nu hat (MLE)                                         14.43    nu star (bias corrected)                      13.7
Adjusted Level of Significance (β)                   0.0383
Approximate Chi Square Value (13.70, α)              6.368    Adjusted Chi Square Value (13.70, β)          5.986
95% Gamma Approximate UCL (use when n>=50)           1.184    95% Gamma Adjusted UCL (use when n<50)        1.259

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                            0.562    SD (KM)                                       1.366
Variance (KM)                                        1.865    SE of Mean (KM)                               0.308
k hat (KM)                                           0.17     k star (KM)                                   0.177
nu hat (KM)                                          7.123    nu star (KM)                                  7.439
theta hat (KM)                                       3.316    theta star (KM)                               3.175
80% gamma percentile (KM)                            0.691    90% gamma percentile (KM)                     1.695
95% gamma percentile (KM)                            2.986    99% gamma percentile (KM)                     6.618

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (7.44, α)               2.414    Adjusted Chi Square Value (7.44, β)           2.2
  95% Gamma Approximate KM-UCL (use when n>=50)      1.733      95% Gamma Adjusted KM-UCL (use when n<50)   1.901

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                          0.854    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                       0.887    Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic                            0.163    Lilliefors GOF Test
5% Lilliefors Critical Value                         0.213    Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                               0.556    Mean in Log Scale                             -2.225
SD in Original Scale                                 1.4      SD in Log Scale                               1.56
  95% t UCL (assumes normality of ROS data)          1.083      95% Percentile Bootstrap UCL                1.038
  95% BCA Bootstrap UCL                              1.269      95% Bootstrap t UCL                         5.742
  95% H-UCL (Log ROS)                                1.198

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                     -2.27    KM Geo Mean                                   0.103
KM SD (logged)                                       1.598      95% Critical H Value (KM-Log)               3.469
KM Standard Error of Mean (logged)                   0.383      95% H-UCL (KM -Log)                         1.281
KM SD (logged)                                       1.598      95% Critical H Value (KM-Log)               3.469
KM Standard Error of Mean (logged)                   0.383

DL/2 Statistics
DL/2 Normal                                                   DL/2 Log-Transformed
Mean in Original Scale                               0.65     Mean in Log Scale                             -1.834
SD in Original Scale                                 1.382    SD in Log Scale                               1.656
  95% t UCL (Assumes normality)                      1.17       95% H-Stat UCL                              2.353
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
95% KM (Chebyshev) UCL                               1.906

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Chrysene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	18
Number of Detects	17	Number of Non-Detects	4
Number of Distinct Detects	15	Number of Distinct Non-Detects	3
Minimum Detect	0.051	Minimum Non-Detect	0.26
Maximum Detect	11	Maximum Non-Detect	1.4
Variance Detects	12.66	Percent Non-Detects	19.05%
Mean Detects	1.596	SD Detects	3.558
Median Detects	0.19	CV Detects	2.229
Skewness Detects	2.558	Kurtosis Detects	5.261
Mean of Logged Detects	-1.176	SD of Logged Detects	1.706

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.464	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.416	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.207	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.335	KM Standard Error of Mean	0.71
KM SD	3.154	95% KM (BCA) UCL	2.81
95% KM (t) UCL	2.56	95% KM (Percentile Bootstrap) UCL	2.456
95% KM (z) UCL	2.503	95% KM Bootstrap t UCL	11.09
90% KM Chebyshev UCL	3.465	95% KM Chebyshev UCL	4.43
97.5% KM Chebyshev UCL	5.769	99% KM Chebyshev UCL	8.4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.85	Anderson-Darling GOF Test	
5% A-D Critical Value	0.82	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.261	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.224	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.4	k star (bias corrected MLE)	0.369
Theta hat (MLE)	3.987	Theta star (bias corrected MLE)	4.326
nu hat (MLE)	13.61	nu star (bias corrected)	12.54
Mean (detects)	1.596		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.323
Maximum	11	Median	0.17
SD	3.236	CV	2.446
k hat (MLE)	0.351	k star (bias corrected MLE)	0.333
Theta hat (MLE)	3.765	Theta star (bias corrected MLE)	3.974
nu hat (MLE)	14.76	nu star (bias corrected)	13.98
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (13.98, α)	6.56	Adjusted Chi Square Value (13.98, β)	6.171
95% Gamma Approximate UCL (use when n>=50)	2.82	95% Gamma Adjusted UCL (use when n<50)	2.997

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.335	SD (KM)	3.154
Variance (KM)	9.95	SE of Mean (KM)	0.71
k hat (KM)	0.179	k star (KM)	0.185
nu hat (KM)	7.524	nu star (KM)	7.782
theta hat (KM)	7.453	theta star (KM)	7.205
80% gamma percentile (KM)	1.686	90% gamma percentile (KM)	4.031
95% gamma percentile (KM)	7.013	99% gamma percentile (KM)	15.33

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.78, α)	2.61	Adjusted Chi Square Value (7.78, β)	2.385
95% Gamma Approximate KM-UCL (use when n>=50)	3.981	95% Gamma Adjusted KM-UCL (use when n<50)	4.357

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.872	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.146	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.329	Mean in Log Scale	-1.3
SD in Original Scale	3.233	SD in Log Scale	1.569
95% t UCL (assumes normality of ROS data)	2.545	95% Percentile Bootstrap UCL	2.461
95% BCA Bootstrap UCL	3.284	95% Bootstrap t UCL	11.79
95% H-UCL (Log ROS)	3.095		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.332	KM Geo Mean	0.264
KM SD (logged)	1.577	95% Critical H Value (KM-Log)	3.434
KM Standard Error of Mean (logged)	0.367	95% H-UCL (KM -Log)	3.071
KM SD (logged)	1.577	95% Critical H Value (KM-Log)	3.434
KM Standard Error of Mean (logged)	0.367		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.38	Mean in Log Scale	-1.137
SD in Original Scale	3.217	SD in Log Scale	1.56
95% t UCL (Assumes normality)	2.591	95% H-Stat UCL	3.55

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use	
95% KM (Chebyshev) UCL	**4.43**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	20
Number of Detects	10	Number of Non-Detects	11
Number of Distinct Detects	10	Number of Distinct Non-Detects	10
Minimum Detect	0.0079	Minimum Non-Detect	0.024
Maximum Detect	1.8	Maximum Non-Detect	1.4
Variance Detects	0.471	Percent Non-Detects	52.38%
Mean Detects	0.355	SD Detects	0.687
Median Detects	0.041	CV Detects	1.936
Skewness Detects	1.822	Kurtosis Detects	1.724
Mean of Logged Detects	-2.911	SD of Logged Detects	1.949

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.555	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.466	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.262	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.183	KM Standard Error of Mean	0.11
KM SD	0.479	95% KM (BCA) UCL	0.406
95% KM (t) UCL	0.373	95% KM (Percentile Bootstrap) UCL	0.359
95% KM (z) UCL	0.364	95% KM Bootstrap t UCL	2.974
90% KM Chebyshev UCL	0.514	95% KM Chebyshev UCL	0.663
97.5% KM Chebyshev UCL	0.871	99% KM Chebyshev UCL	1.279

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.38	Anderson-Darling GOF Test	
5% A-D Critical Value	0.803	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.392	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.286	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.358	k star (bias corrected MLE)	0.317
Theta hat (MLE)	0.992	Theta star (bias corrected MLE)	1.119
nu hat (MLE)	7.15	nu star (bias corrected)	6.338
Mean (detects)	0.355		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0079	Mean	0.177
Maximum	1.8	Median	0.01
SD	0.492	CV	2.785
k hat (MLE)	0.342	k star (bias corrected MLE)	0.325
Theta hat (MLE)	0.517	Theta star (bias corrected MLE)	0.545
nu hat (MLE)	14.35	nu star (bias corrected)	13.64
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (13.64, α)	6.323	Adjusted Chi Square Value (13.64, β)	5.943
95% Gamma Approximate UCL (use when n>=50)	0.381	95% Gamma Adjusted UCL (use when n<50)	0.406

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.183	SD (KM)	0.479
Variance (KM)	0.229	SE of Mean (KM)	0.11
k hat (KM)	0.146	k star (KM)	0.157
nu hat (KM)	6.15	nu star (KM)	6.605
theta hat (KM)	1.251	theta star (KM)	1.164
80% gamma percentile (KM)	0.207	90% gamma percentile (KM)	0.546
95% gamma percentile (KM)	0.998	99% gamma percentile (KM)	2.298

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.60, α)	1.956	Adjusted Chi Square Value (6.60, β)	1.768
95% Gamma Approximate KM-UCL (use when n>=50)	0.618	95% Gamma Adjusted KM-UCL (use when n<50)	0.684

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.828	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.277	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.262	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.183	Mean in Log Scale	-3.329
SD in Original Scale	0.49	SD in Log Scale	1.403
95% t UCL (assumes normality of ROS data)	0.367	95% Percentile Bootstrap UCL	0.359
95% BCA Bootstrap UCL	0.433	95% Bootstrap t UCL	5.319
95% H-UCL (Log ROS)	0.258		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.431	KM Geo Mean	0.0324
KM SD (logged)	1.485	95% Critical H Value (KM-Log)	3.286
KM Standard Error of Mean (logged)	0.391	95% H-UCL (KM -Log)	0.29
KM SD (logged)	1.485	95% Critical H Value (KM-Log)	3.286
KM Standard Error of Mean (logged)	0.391		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.302	Mean in Log Scale	-2.456
SD in Original Scale	0.501	SD in Log Scale	1.676
95% t UCL (Assumes normality)	0.491	95% H-Stat UCL	1.344

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	**0.663**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Fluoranthene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
Number of Detects	17	Number of Non-Detects	4
Number of Distinct Detects	16	Number of Distinct Non-Detects	3
Minimum Detect	0.1	Minimum Non-Detect	0.26
Maximum Detect	23	Maximum Non-Detect	1.4
Variance Detects	53.08	Percent Non-Detects	19.05%
Mean Detects	3.234	SD Detects	7.286
Median Detects	0.54	CV Detects	2.253
Skewness Detects	2.569	Kurtosis Detects	5.313
Mean of Logged Detects	-0.455	SD of Logged Detects	1.678

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.461	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.422	Lilliefors GOF Test
5% Lilliefors Critical Value	0.207	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.673	KM Standard Error of Mean	1.454
KM SD	6.465	95% KM (BCA) UCL	5.567
95% KM (t) UCL	5.181	95% KM (Percentile Bootstrap) UCL	4.996
95% KM (z) UCL	5.065	95% KM Bootstrap t UCL	25.11
90% KM Chebyshev UCL	7.036	95% KM Chebyshev UCL	9.012
97.5% KM Chebyshev UCL	11.76	99% KM Chebyshev UCL	17.14

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.926	Anderson-Darling GOF Test
5% A-D Critical Value	0.819	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.28	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.224	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.403	k star (bias corrected MLE)	0.371
Theta hat (MLE)	8.018	Theta star (bias corrected MLE)	8.708
nu hat (MLE)	13.71	nu star (bias corrected)	12.63
Mean (detects)	3.234		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.636
Maximum	23	Median	0.343
SD	6.638	CV	2.518
k hat (MLE)	0.331	k star (bias corrected MLE)	0.316
Theta hat (MLE)	7.952	Theta star (bias corrected MLE)	8.345
nu hat (MLE)	13.92	nu star (bias corrected)	13.27
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (13.27, α)	6.072	Adjusted Chi Square Value (13.27, β)	5.701
95% Gamma Approximate UCL (use when n>=50)	5.759	95% Gamma Adjusted UCL (use when n<50)	6.134

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.673	SD (KM)	6.465
Variance (KM)	41.8	SE of Mean (KM)	1.454
k hat (KM)	0.171	k star (KM)	0.178
nu hat (KM)	7.177	nu star (KM)	7.485
theta hat (KM)	15.64	theta star (KM)	15
80% gamma percentile (KM)	3.295	90% gamma percentile (KM)	8.056
95% gamma percentile (KM)	14.17	99% gamma percentile (KM)	31.34

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.49, α)	2.441	Adjusted Chi Square Value (7.49, β)	2.225
95% Gamma Approximate KM-UCL (use when n>=50)	8.196	95% Gamma Adjusted KM-UCL (use when n<50)	8.991

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.878	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.16	Lilliefors GOF Test
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.671	Mean in Log Scale	-0.65
SD in Original Scale	6.625	SD in Log Scale	1.581
95% t UCL (assumes normality of ROS data)	5.165	95% Percentile Bootstrap UCL	4.988
95% BCA Bootstrap UCL	6.16	95% Bootstrap t UCL	25.67
95% H-UCL (Log ROS)	6.142		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.669	KM Geo Mean	0.512
KM SD (logged)	1.565	95% Critical H Value (KM-Log)	3.416
KM Standard Error of Mean (logged)	0.36	95% H-UCL (KM -Log)	5.765
KM SD (logged)	1.565	95% Critical H Value (KM-Log)	3.416
KM Standard Error of Mean (logged)	0.36		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.706	Mean in Log Scale	-0.554
SD in Original Scale	6.612	SD in Log Scale	1.546
95% t UCL (Assumes normality)	5.195	95% H-Stat UCL	6.124

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use	
95% KM (Chebyshev) UCL	**9.012**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

<u>Fluorene</u>

General Statistics

Total Number of Observations	21	Number of Distinct Observations	20
Number of Detects	9	Number of Non-Detects	12
Number of Distinct Detects	9	Number of Distinct Non-Detects	11
Minimum Detect	0.0063	Minimum Non-Detect	0.12
Maximum Detect	2.1	Maximum Non-Detect	1.4
Variance Detects	0.638	Percent Non-Detects	57.14%
Mean Detects	0.417	SD Detects	0.799
Median Detects	0.037	CV Detects	1.916
Skewness Detects	1.769	Kurtosis Detects	1.736
Mean of Logged Detects	-3.088	SD of Logged Detects	2.209

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.584	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.459	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.191	KM Standard Error of Mean	0.123
KM SD	0.53	95% KM (BCA) UCL	0.43
95% KM (t) UCL	0.403	95% KM (Percentile Bootstrap) UCL	0.415
95% KM (z) UCL	0.393	95% KM Bootstrap t UCL	4.058
90% KM Chebyshev UCL	0.56	95% KM Chebyshev UCL	0.726
97.5% KM Chebyshev UCL	0.958	99% KM Chebyshev UCL	1.413

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.289	Anderson-Darling GOF Test	
5% A-D Critical Value	0.805	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.402	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.301	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.31	k star (bias corrected MLE)	0.281
Theta hat (MLE)	1.345	Theta star (bias corrected MLE)	1.485
nu hat (MLE)	5.578	nu star (bias corrected)	5.052
Mean (detects)	0.417		

```
Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                          0.0063    Mean                                      0.187
Maximum                                          2.1       Median                                    0.01
SD                                               0.545     CV                                        2.906
k hat (MLE)                                      0.313     k star (bias corrected MLE)               0.3
Theta hat (MLE)                                  0.598     Theta star (bias corrected MLE)           0.624
nu hat (MLE)                                     13.16     nu star (bias corrected)                  12.61
Adjusted Level of Significance (β)               0.0383
Approximate Chi Square Value (12.61, α)          5.633     Adjusted Chi Square Value (12.61, β)      5.278
95% Gamma Approximate UCL (use when n>=50)       0.42      95% Gamma Adjusted UCL (use when n<50)    0.448

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                        0.191     SD (KM)                                   0.53
Variance (KM)                                    0.281     SE of Mean (KM)                           0.123
k hat (KM)                                       0.13      k star (KM)                               0.143
nu hat (KM)                                      5.449     nu star (KM)                              6.004
theta hat (KM)                                   1.472     theta star (KM)                           1.336
80% gamma percentile (KM)                        0.2       90% gamma percentile (KM)                 0.562
95% gamma percentile (KM)                        1.061     99% gamma percentile (KM)                 2.523

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (6.00, α)           1.642     Adjusted Chi Square Value (6.00, β)       1.474
  95% Gamma Approximate KM-UCL (use when n>=50)  0.699       95% Gamma Adjusted KM-UCL (use when n<50) 0.778

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                      0.801     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                   0.829     Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic                        0.297     Lilliefors GOF Test
5% Lilliefors Critical Value                     0.274     Detected Data Not Lognormal at 5% Significance Level
Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                           0.191     Mean in Log Scale                         -3.532
SD in Original Scale                             0.543     SD in Log Scale                           1.473
  95% t UCL (assumes normality of ROS data)      0.396       95% Percentile Bootstrap UCL            0.401
  95% BCA Bootstrap UCL                          0.486       95% Bootstrap t UCL                     8.97
  95% H-UCL (Log ROS)                            0.254

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                 -3.686    KM Geo Mean                               0.0251
KM SD (logged)                                   1.579       95% Critical H Value (KM-Log)           3.438
KM Standard Error of Mean (logged)               0.432       95% H-UCL (KM -Log)                     0.294
KM SD (logged)                                   1.579       95% Critical H Value (KM-Log)           3.438
KM Standard Error of Mean (logged)               0.432

DL/2 Statistics
DL/2 Normal                                                DL/2 Log-Transformed
Mean in Original Scale                           0.367     Mean in Log Scale                         -2.14
SD in Original Scale                             0.539     SD in Log Scale                           1.757
  95% t UCL (Assumes normality)                  0.57        95% H-Stat UCL                          2.385
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use
97.5% KM (Chebyshev) UCL                         0.958

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Indeno(1,2,3-cd)pyrene

```
General Statistics
Total Number of Observations                          21        Number of Distinct Observations                 18
Number of Detects                                     16        Number of Non-Detects                           5
Number of Distinct Detects                            14        Number of Distinct Non-Detects                  4
Minimum Detect                                        0.032     Minimum Non-Detect                              0.26
Maximum Detect                                        6.8       Maximum Non-Detect                              1.4
Variance Detects                                      4.235     Percent Non-Detects                             23.81%
Mean Detects                                          0.932     SD Detects                                      2.058
Median Detects                                        0.2       CV Detects                                      2.209
Skewness Detects                                      2.541     Kurtosis Detects                                5.329
Mean of Logged Detects                                -1.678    SD of Logged Detects                            1.689

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                           0.479     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                        0.887     Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                             0.445     Lilliefors GOF Test
5% Lilliefors Critical Value                          0.213     Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                               0.75      KM Standard Error of Mean                       0.4
KM SD                                                 1.771       95% KM (BCA) UCL                              1.493
  95% KM (t) UCL                                      1.439       95% KM (Percentile Bootstrap) UCL             1.429
  95% KM (z) UCL                                      1.407       95% KM Bootstrap t UCL                        6.351
90% KM Chebyshev UCL                                  1.949     95% KM Chebyshev UCL                            2.492
97.5% KM Chebyshev UCL                                3.246     99% KM Chebyshev UCL                            4.727

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                    1.816     Anderson-Darling GOF Test
5% A-D Critical Value                                 0.815     Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                    0.288     Kolmogorov-Smirnov GOF
5% K-S Critical Value                                 0.23      Detected Data Not Gamma Distributed at 5% Significance Level
Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                           0.408     k star (bias corrected MLE)                     0.373
Theta hat (MLE)                                       2.284     Theta star (bias corrected MLE)                 2.497
nu hat (MLE)                                          13.06     nu star (bias corrected)                        11.94
Mean (detects)                                        0.932

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                               0.01      Mean                                            0.73
Maximum                                               6.8       Median                                          0.1
SD                                                    1.822     CV                                              2.496
k hat (MLE)                                           0.355     k star (bias corrected MLE)                     0.336
Theta hat (MLE)                                       2.054     Theta star (bias corrected MLE)                 2.17
nu hat (MLE)                                          14.93     nu star (bias corrected)                        14.13
Adjusted Level of Significance (β)                    0.0383
Approximate Chi Square Value (14.13, α)               6.66      Adjusted Chi Square Value (14.13, β)            6.269
95% Gamma Approximate UCL (use when n>=50)            1.549     95% Gamma Adjusted UCL (use when n<50)          1.645

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                             0.75      SD (KM)                                         1.771
Variance (KM)                                         3.137     SE of Mean (KM)                                 0.4
k hat (KM)                                            0.179     k star (KM)                                     0.185
nu hat (KM)                                           7.523     nu star (KM)                                    7.782
theta hat (KM)                                        4.185     theta star (KM)                                 4.046
80% gamma percentile (KM)                             0.947     90% gamma percentile (KM)                       2.264
95% gamma percentile (KM)                             3.938     99% gamma percentile (KM)                       8.608

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (7.78, α)                2.609     Adjusted Chi Square Value (7.78, β)             2.384
  95% Gamma Approximate KM-UCL (use when n>=50)       2.236       95% Gamma Adjusted KM-UCL (use when n<50)     2.446

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                           0.86      Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                        0.887     Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic                             0.175     Lilliefors GOF Test
5% Lilliefors Critical Value                          0.213     Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Approximate Lognormal at 5% Significance Level
```

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.742	Mean in Log Scale	-1.781
SD in Original Scale	1.816	SD in Log Scale	1.491
95% t UCL (assumes normality of ROS data)	1.425	95% Percentile Bootstrap UCL	1.42
95% BCA Bootstrap UCL	1.685	95% Bootstrap t UCL	7.59
95% H-UCL (Log ROS)	1.537		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.819	KM Geo Mean	0.162
KM SD (logged)	1.529	95% Critical H Value (KM-Log)	3.358
KM Standard Error of Mean (logged)	0.367	95% H-UCL (KM -Log)	1.645
KM SD (logged)	1.529	95% Critical H Value (KM-Log)	3.358
KM Standard Error of Mean (logged)	0.367		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.824	Mean in Log Scale	-1.492
SD in Original Scale	1.797	SD in Log Scale	1.535
95% t UCL (Assumes normality)	1.5	95% H-Stat UCL	2.322

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	**2.492**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Methylnaphthalene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
Number of Detects	5	Number of Non-Detects	16
Number of Distinct Detects	4	Number of Distinct Non-Detects	15
Minimum Detect	0.36	Minimum Non-Detect	0.12
Maximum Detect	43	Maximum Non-Detect	1.4
Variance Detects	363.2	Percent Non-Detects	76.19%
Mean Detects	8.91	SD Detects	19.06
Median Detects	0.4	CV Detects	2.139
Skewness Detects	2.236	Kurtosis Detects	5
Mean of Logged Detects	-0.00847	SD of Logged Detects	2.109

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.553	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.472	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.244	KM Standard Error of Mean	2.224
KM SD	9.114	95% KM (BCA) UCL	N/A
95% KM (t) UCL	6.079	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	5.902	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	8.915	95% KM Chebyshev UCL	11.94
97.5% KM Chebyshev UCL	16.13	99% KM Chebyshev UCL	24.37

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.253	Anderson-Darling GOF Test	
5% A-D Critical Value	0.737	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.5	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.379	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.312	k star (bias corrected MLE)	0.258
Theta hat (MLE)	28.55	Theta star (bias corrected MLE)	34.51
nu hat (MLE)	3.12	nu star (bias corrected)	2.582
Mean (detects)	8.91		

```
Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                          0.01      Mean                                      2.129
Maximum                                          43        Median                                    0.01
SD                                               9.366     CV                                        4.399
k hat (MLE)                                      0.176     k star (bias corrected MLE)               0.183
Theta hat (MLE)                                  12.1      Theta star (bias corrected MLE)           11.66
nu hat (MLE)                                     7.389     nu star (bias corrected)                  7.667
Adjusted Level of Significance (β)               0.0383
Approximate Chi Square Value (7.67, α)           2.544     Adjusted Chi Square Value (7.67, β)       2.322
95% Gamma Approximate UCL (use when n>=50)       6.417     95% Gamma Adjusted UCL (use when n<50)    7.029

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                        2.244     SD (KM)                                   9.114
Variance (KM)                                    83.07     SE of Mean (KM)                           2.224
k hat (KM)                                       0.0606    k star (KM)                               0.0837
nu hat (KM)                                      2.546     nu star (KM)                              3.515
theta hat (KM)                                   37.02     theta star (KM)                           26.81
80% gamma percentile (KM)                        1.163     90% gamma percentile (KM)                 5.468
95% gamma percentile (KM)                        13.07     99% gamma percentile (KM)                 38.89

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (3.52, α)           0.54      Adjusted Chi Square Value (3.52, β)       0.463
  95% Gamma Approximate KM-UCL (use when n>=50)  14.6        95% Gamma Adjusted KM-UCL (use when n<50) 17.04
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                      0.584     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                   0.762     Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic                        0.454     Lilliefors GOF Test
5% Lilliefors Critical Value                     0.343     Detected Data Not Lognormal at 5% Significance Level
Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                           2.135     Mean in Log Scale                         -3.333
SD in Original Scale                             9.364     SD in Log Scale                           2.232
  95% t UCL (assumes normality of ROS data)      5.66        95% Percentile Bootstrap UCL            6.213
  95% BCA Bootstrap UCL                          8.29        95% Bootstrap t UCL                     170.4
  95% H-UCL (Log ROS)                            4.156

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                 -1.481    KM Geo Mean                               0.227
KM SD (logged)                                   1.288       95% Critical H Value (KM-Log)           2.98
KM Standard Error of Mean (logged)               0.331       95% H-UCL (KM -Log)                     1.229
KM SD (logged)                                   1.288       95% Critical H Value (KM-Log)           2.98
KM Standard Error of Mean (logged)               0.331

DL/2 Statistics
DL/2 Normal                                                DL/2 Log-Transformed
Mean in Original Scale                           2.325     Mean in Log Scale                         -1.231
SD in Original Scale                             9.322     SD in Log Scale                           1.357
  95% t UCL (Assumes normality)                  5.833       95% H-Stat UCL                          1.869
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use
97.5% KM (Chebyshev) UCL                         16.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

<u>Naphthalene</u>

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
Number of Detects	5	Number of Non-Detects	16
Number of Distinct Detects	5	Number of Distinct Non-Detects	15
Minimum Detect	0.33	Minimum Non-Detect	0.12
Maximum Detect	19	Maximum Non-Detect	1.4
Variance Detects	68.34	Percent Non-Detects	76.19%
Mean Detects	4.216	SD Detects	8.267
Median Detects	0.58	CV Detects	1.961
Skewness Detects	2.233	Kurtosis Detects	4.988
Mean of Logged Detects	0.00856	SD of Logged Detects	1.684

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.574	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.459	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.127	KM Standard Error of Mean	0.977
KM SD	4.001	95% KM (BCA) UCL	2.959
95% KM (t) UCL	2.811	95% KM (Percentile Bootstrap) UCL	2.932
95% KM (z) UCL	2.733	95% KM Bootstrap t UCL	20.02
90% KM Chebyshev UCL	4.057	95% KM Chebyshev UCL	5.384
97.5% KM Chebyshev UCL	7.226	99% KM Chebyshev UCL	10.84

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.959	Anderson-Darling GOF Test	
5% A-D Critical Value	0.718	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.433	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.374	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.451	k star (bias corrected MLE)	0.314
Theta hat (MLE)	9.342	Theta star (bias corrected MLE)	13.43
nu hat (MLE)	4.513	nu star (bias corrected)	3.138
Mean (detects)	4.216		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.011
Maximum	19	Median	0.01
SD	4.128	CV	4.081
k hat (MLE)	0.208	k star (bias corrected MLE)	0.21
Theta hat (MLE)	4.865	Theta star (bias corrected MLE)	4.817
nu hat (MLE)	8.733	nu star (bias corrected)	8.818
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (8.82, α)	3.218	Adjusted Chi Square Value (8.82, β)	2.962
95% Gamma Approximate UCL (use when n>=50)	2.772	95% Gamma Adjusted UCL (use when n<50)	3.011

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.127	SD (KM)	4.001
Variance (KM)	16.01	SE of Mean (KM)	0.977
k hat (KM)	0.0793	k star (KM)	0.0997
nu hat (KM)	3.329	nu star (KM)	4.187
theta hat (KM)	14.21	theta star (KM)	11.3
80% gamma percentile (KM)	0.778	90% gamma percentile (KM)	2.994
95% gamma percentile (KM)	6.54	99% gamma percentile (KM)	17.92

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.19, α)	0.797	Adjusted Chi Square Value (4.19, β)	0.694
95% Gamma Approximate KM-UCL (use when n>=50)	5.919	95% Gamma Adjusted KM-UCL (use when n<50)	6.8
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.741	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.349	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.343	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

```
Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                                        1.021      Mean in Log Scale                              -3.049
SD in Original Scale                                          4.125      SD in Log Scale                                1.981
  95% t UCL (assumes normality of ROS data)                   2.574        95% Percentile Bootstrap UCL                 2.821
  95% BCA Bootstrap UCL                                       3.738        95% Bootstrap t UCL                          26.89
  95% H-UCL (Log ROS)                                         2.081

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                              -1.492     KM Geo Mean                                    0.225
KM SD (logged)                                                1.177        95% Critical H Value (KM-Log)                2.813
KM Standard Error of Mean (logged)                            0.305        95% H-UCL (KM -Log)                          0.942
KM SD (logged)                                                1.177        95% Critical H Value (KM-Log)                2.813
KM Standard Error of Mean (logged)                            0.305

DL/2 Statistics
DL/2 Normal                                                              DL/2 Log-Transformed
Mean in Original Scale                                        1.207      Mean in Log Scale                              -1.227
SD in Original Scale                                          4.083      SD in Log Scale                                1.236
  95% t UCL (Assumes normality)                               2.744        95% H-Stat UCL                               1.405
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use
95% KM (Chebyshev) UCL                                        5.384

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Phenanthrene

```
General Statistics
Total Number of Observations                                  21         Number of Distinct Observations                18
Number of Detects                                             16         Number of Non-Detects                          5
Number of Distinct Detects                                    14         Number of Distinct Non-Detects                 4
Minimum Detect                                                0.043      Minimum Non-Detect                             0.26
Maximum Detect                                                17         Maximum Non-Detect                             1.4
Variance Detects                                              27.06      Percent Non-Detects                            23.81%
Mean Detects                                                  2.335      SD Detects                                     5.202
Median Detects                                                0.32       CV Detects                                     2.227
Skewness Detects                                              2.504      Kurtosis Detects                               5.139
Mean of Logged Detects                                        -0.906     SD of Logged Detects                           1.778

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                                   0.486      Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                                0.887      Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                                     0.399      Lilliefors GOF Test
5% Lilliefors Critical Value                                  0.213      Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                                       1.828      KM Standard Error of Mean                      1.012
KM SD                                                         4.49         95% KM (BCA) UCL                             3.644
  95% KM (t) UCL                                              3.573        95% KM (Percentile Bootstrap) UCL            3.506
  95% KM (z) UCL                                              3.493        95% KM Bootstrap t UCL                       14.48
90% KM Chebyshev UCL                                          4.864      95% KM Chebyshev UCL                           6.24
97.5% KM Chebyshev UCL                                        8.149      99% KM Chebyshev UCL                           11.9

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                            1.807      Anderson-Darling GOF Test
5% A-D Critical Value                                         0.822      Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                            0.344      Kolmogorov-Smirnov GOF
5% K-S Critical Value                                         0.231      Detected Data Not Gamma Distributed at 5% Significance Level
Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                                   0.378      k star (bias corrected MLE)                    0.349
Theta hat (MLE)                                               6.171      Theta star (bias corrected MLE)                6.688
nu hat (MLE)                                                  12.11      nu star (bias corrected)                       11.17
Mean (detects)                                                2.335
```

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.799
Maximum	17	Median	0.29
SD	4.611	CV	2.563
k hat (MLE)	0.311	k star (bias corrected MLE)	0.299
Theta hat (MLE)	5.779	Theta star (bias corrected MLE)	6.025
nu hat (MLE)	13.07	nu star (bias corrected)	12.54
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (12.54, α)	5.584	Adjusted Chi Square Value (12.54, β)	5.231
95% Gamma Approximate UCL (use when n>=50)	4.039	95% Gamma Adjusted UCL (use when n<50)	4.313

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.828	SD (KM)	4.49
Variance (KM)	20.16	SE of Mean (KM)	1.012
k hat (KM)	0.166	k star (KM)	0.174
nu hat (KM)	6.958	nu star (KM)	7.297
theta hat (KM)	11.03	theta star (KM)	10.52
80% gamma percentile (KM)	2.217	90% gamma percentile (KM)	5.5
95% gamma percentile (KM)	9.749	99% gamma percentile (KM)	21.73

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.30, α)	2.335	Adjusted Chi Square Value (7.30, β)	2.125
95% Gamma Approximate KM-UCL (use when n>=50)	5.711	95% Gamma Adjusted KM-UCL (use when n<50)	6.275

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.893	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.231	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.213	Detected Data Not Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.824	Mean in Log Scale	-1.129
SD in Original Scale	4.601	SD in Log Scale	1.618
95% t UCL (assumes normality of ROS data)	3.556	95% Percentile Bootstrap UCL	3.619
95% BCA Bootstrap UCL	4.192	95% Bootstrap t UCL	15.75
95% H-UCL (Log ROS)	4.254		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.159	KM Geo Mean	0.314
KM SD (logged)	1.621	95% Critical H Value (KM-Log)	3.506
KM Standard Error of Mean (logged)	0.378	95% H-UCL (KM -Log)	4.162
KM SD (logged)	1.621	95% Critical H Value (KM-Log)	3.506
KM Standard Error of Mean (logged)	0.378		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.876	Mean in Log Scale	-0.96
SD in Original Scale	4.585	SD in Log Scale	1.582
95% t UCL (Assumes normality)	3.601	95% H-Stat UCL	4.521

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	**6.24**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Pyrene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	20
Number of Detects	17	Number of Non-Detects	4
Number of Distinct Detects	17	Number of Distinct Non-Detects	3
Minimum Detect	0.079	Minimum Non-Detect	0.26
Maximum Detect	23	Maximum Non-Detect	1.4
Variance Detects	53.12	Percent Non-Detects	19.05%
Mean Detects	3.24	SD Detects	7.288
Median Detects	0.53	CV Detects	2.249
Skewness Detects	2.563	Kurtosis Detects	5.29
Mean of Logged Detects	-0.52	SD of Logged Detects	1.752

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.465	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.412	Lilliefors GOF Test
5% Lilliefors Critical Value	0.207	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.676	KM Standard Error of Mean	1.455
KM SD	6.468	95% KM (BCA) UCL	5.276
95% KM (t) UCL	5.186	95% KM (Percentile Bootstrap) UCL	4.998
95% KM (z) UCL	5.07	95% KM Bootstrap t UCL	22.83
90% KM Chebyshev UCL	7.042	95% KM Chebyshev UCL	9.019
97.5% KM Chebyshev UCL	11.76	99% KM Chebyshev UCL	17.15

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.766	Anderson-Darling GOF Test
5% A-D Critical Value	0.822	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.278	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.224	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.39	k star (bias corrected MLE)	0.36
Theta hat (MLE)	8.312	Theta star (bias corrected MLE)	8.994
nu hat (MLE)	13.25	nu star (bias corrected)	12.25
Mean (detects)	3.24		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.639
Maximum	23	Median	0.32
SD	6.642	CV	2.517
k hat (MLE)	0.324	k star (bias corrected MLE)	0.309
Theta hat (MLE)	8.155	Theta star (bias corrected MLE)	8.537
nu hat (MLE)	13.59	nu star (bias corrected)	12.98
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (12.98, α)	5.881	Adjusted Chi Square Value (12.98, β)	5.517
95% Gamma Approximate UCL (use when n>=50)	5.826	95% Gamma Adjusted UCL (use when n<50)	6.211

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.676	SD (KM)	6.468
Variance (KM)	41.84	SE of Mean (KM)	1.455
k hat (KM)	0.171	k star (KM)	0.178
nu hat (KM)	7.19	nu star (KM)	7.496
theta hat (KM)	15.63	theta star (KM)	14.99
80% gamma percentile (KM)	3.303	90% gamma percentile (KM)	8.067
95% gamma percentile (KM)	14.19	99% gamma percentile (KM)	31.36

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.50, α)	2.447	Adjusted Chi Square Value (7.50, β)	2.231
95% Gamma Approximate KM-UCL (use when n>=50)	8.199	95% Gamma Adjusted KM-UCL (use when n<50)	8.993

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.895	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	Lilliefors GOF Test
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

```
Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                              2.673    Mean in Log Scale                        -0.714
SD in Original Scale                                6.629    SD in Log Scale                          1.642
  95% t UCL (assumes normality of ROS data)         5.167      95% Percentile Bootstrap UCL           4.943
  95% BCA Bootstrap UCL                             6.761      95% Bootstrap t UCL                    24.53
  95% H-UCL (Log ROS)                               6.923

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                    -0.737   KM Geo Mean                              0.479
KM SD (logged)                                      1.635      95% Critical H Value (KM-Log)          3.53
KM Standard Error of Mean (logged)                  0.377      95% H-UCL (KM -Log)                    6.628
KM SD (logged)                                      1.635      95% Critical H Value (KM-Log)          3.53
KM Standard Error of Mean (logged)                  0.377

DL/2 Statistics
DL/2 Normal                                                  DL/2 Log-Transformed
Mean in Original Scale                              2.711    Mean in Log Scale                        -0.606
SD in Original Scale                                6.615    SD in Log Scale                          1.608
  95% t UCL (Assumes normality)                     5.201      95% H-Stat UCL                         6.96
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
95% KM (Chebyshev) UCL                              9.019

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Arsenic

```
General Statistics
Total Number of Observations                        25       Number of Distinct Observations          19
Number of Detects                                   21       Number of Non-Detects                    4
Number of Distinct Detects                          17       Number of Distinct Non-Detects           3
Minimum Detect                                      5.2      Minimum Non-Detect                       18
Maximum Detect                                      110      Maximum Non-Detect                       33
Variance Detects                                    738      Percent Non-Detects                      16%
Mean Detects                                        24.98    SD Detects                               27.17
Median Detects                                      15       CV Detects                               1.087
Skewness Detects                                    2.282    Kurtosis Detects                         4.648
Mean of Logged Detects                              2.86     SD of Logged Detects                     0.79

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                         0.645    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                      0.908    Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                           0.328    Lilliefors GOF Test
5% Lilliefors Critical Value                        0.188    Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                             23.05    KM Standard Error of Mean                5.097
KM SD                                               24.78      95% KM (BCA) UCL                       32.54
  95% KM (t) UCL                                    31.77      95% KM (Percentile Bootstrap) UCL      32.28
  95% KM (z) UCL                                    31.44      95% KM Bootstrap t UCL                 38.41
90% KM Chebyshev UCL                                38.34    95% KM Chebyshev UCL                     45.27
97.5% KM Chebyshev UCL                              54.88    99% KM Chebyshev UCL                     73.77

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                  1.493    Anderson-Darling GOF Test
5% A-D Critical Value                               0.758    Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                  0.221    Kolmogorov-Smirnov GOF
5% K-S Critical Value                               0.193    Detected Data Not Gamma Distributed at 5% Significance Level
Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                         1.541    k star (bias corrected MLE)              1.353
Theta hat (MLE)                                     16.21    Theta star (bias corrected MLE)          18.47
nu hat (MLE)                                        64.73    nu star (bias corrected)                 56.82
Mean (detects)                                      24.98
```

```
Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                          5.2       Mean                                         22.83
Maximum                                          110       Median                                       14
SD                                               25.44     CV                                           1.114
k hat (MLE)                                      1.559     k star (bias corrected MLE)                  1.399
Theta hat (MLE)                                  14.64     Theta star (bias corrected MLE)              16.32
nu hat (MLE)                                     77.96     nu star (bias corrected)                     69.94
Adjusted Level of Significance (β)               0.0395
Approximate Chi Square Value (69.94, α)          51.69     Adjusted Chi Square Value (69.94, β)         50.62
95% Gamma Approximate UCL (use when n>=50)       30.89     95% Gamma Adjusted UCL (use when n<50)       31.54

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                        23.05     SD (KM)                                      24.78
Variance (KM)                                    614.1     SE of Mean (KM)                              5.097
k hat (KM)                                       0.865     k star (KM)                                  0.788
nu hat (KM)                                      43.27     nu star (KM)                                 39.41
theta hat (KM)                                   26.64     theta star (KM)                              29.25
80% gamma percentile (KM)                        37.7      90% gamma percentile (KM)                    56.25
95% gamma percentile (KM)                        75.18     99% gamma percentile (KM)                    119.9

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (39.41, α)          26.03     Adjusted Chi Square Value (39.41, β)         25.29
  95% Gamma Approximate KM-UCL (use when n>=50)  34.9        95% Gamma Adjusted KM-UCL (use when n<50)  35.93

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                      0.911     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                   0.908     Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic                        0.166     Lilliefors GOF Test
5% Lilliefors Critical Value                     0.188     Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                           23.11     Mean in Log Scale                            2.811
SD in Original Scale                             25.23     SD in Log Scale                              0.737
  95% t UCL (assumes normality of ROS data)      31.74       95% Percentile Bootstrap UCL               31.84
  95% BCA Bootstrap UCL                          35.35       95% Bootstrap t UCL                        39.03
  95% H-UCL (Log ROS)                            30.31

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                 2.799     KM Geo Mean                                  16.43
KM SD (logged)                                   0.739       95% Critical H Value (KM-Log)              2.186
KM Standard Error of Mean (logged)               0.156     95% H-UCL (KM -Log)                          30.02
KM SD (logged)                                   0.739       95% Critical H Value (KM-Log)              2.186
KM Standard Error of Mean (logged)               0.156

DL/2 Statistics
DL/2 Normal                                                DL/2 Log-Transformed
Mean in Original Scale                           23.08     Mean in Log Scale                            2.809
SD in Original Scale                             25.23     SD in Log Scale                              0.74
  95% t UCL (Assumes normality)                  31.72       95% H-Stat UCL                             30.34
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
KM H-UCL                                         30.02

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

ProUCL Output Files
375 Banfield Road, Portsmouth, New Hampshire

Barium

```
General Statistics
Total Number of Observations                          25        Number of Distinct Observations                    20
                                                                Number of Missing Observations                     0
Minimum                                               36        Mean                                               270
Maximum                                               1100      Median                                             160
SD                                                    262.8     Std. Error of Mean                                 52.56
Coefficient of Variation                              0.973     Skewness                                           1.838

Normal GOF Test
Shapiro Wilk Test Statistic                           0.772     Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                        0.918     Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                             0.248     Lilliefors GOF Test
5% Lilliefors Critical Value                          0.173     Data Not Normal at 5% Significance Level
Data Not Normal at 5% Significance Level

Assuming Normal Distribution
  95% Normal UCL                                                  95% UCLs (Adjusted for Skewness)
  95% Student's-t UCL                                 360         95% Adjusted-CLT UCL (Chen-1995)                 377.1
                                                                  95% Modified-t UCL (Johnson-1978)                363.2
Gamma GOF Test
A-D Test Statistic                                    0.806     Anderson-Darling Gamma GOF Test
5% A-D Critical Value                                 0.762     Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                    0.193     Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value                                 0.178     Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics
k hat (MLE)                                           1.478     k star (bias corrected MLE)                        1.327
Theta hat (MLE)                                       182.8     Theta star (bias corrected MLE)                    203.5
nu hat (MLE)                                          73.88     nu star (bias corrected)                           66.34
MLE Mean (bias corrected)                             270       MLE Sd (bias corrected)                            234.4
                                                                Approximate Chi Square Value (0.05)                48.6
Adjusted Level of Significance                        0.0395    Adjusted Chi Square Value                          47.56

Assuming Gamma Distribution
  95% Approximate Gamma UCL (use when n>=50))         368.6       95% Adjusted Gamma UCL (use when n<50)           376.7

Lognormal GOF Test
Shapiro Wilk Test Statistic                           0.966     Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value                        0.918     Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic                             0.14      Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value                          0.173     Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level

Lognormal Statistics
Minimum of Logged Data                                3.584     Mean of logged Data                                5.223
Maximum of Logged Data                                7.003     SD of logged Data                                  0.867

Assuming Lognormal Distribution
  95% H-UCL                                           408.4       90% Chebyshev (MVUE) UCL                         417.8
  95% Chebyshev (MVUE) UCL                            487        97.5% Chebyshev (MVUE) UCL                        583.1
  99% Chebyshev (MVUE) UCL                            771.9

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs
  95% CLT UCL                                         356.5       95% Jackknife UCL                                360
  95% Standard Bootstrap UCL                          354.6       95% Bootstrap-t UCL                              400.8
  95% Hall's Bootstrap UCL                            404         95% Percentile Bootstrap UCL                     359.6
  95% BCA Bootstrap UCL                               383
  90% Chebyshev(Mean, Sd) UCL                         427.7       95% Chebyshev(Mean, Sd) UCL                      499.1
 97.5% Chebyshev(Mean, Sd) UCL                        598.2       99% Chebyshev(Mean, Sd) UCL                      793

Suggested UCL to Use
95% H-UCL                                             408.4
```

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Cadmium

```
General Statistics
Total Number of Observations                    25       Number of Distinct Observations          19
Number of Detects                               21       Number of Non-Detects                    4
Number of Distinct Detects                      17       Number of Distinct Non-Detects           4
Minimum Detect                                  0.91     Minimum Non-Detect                       1.2
Maximum Detect                                  7.5      Maximum Non-Detect                       2.8
Variance Detects                                4.138    Percent Non-Detects                      16%
Mean Detects                                    3.51     SD Detects                               2.034
Median Detects                                  3        CV Detects                               0.58
Skewness Detects                                0.797    Kurtosis Detects                         -0.382
Mean of Logged Detects                          1.091    SD of Logged Detects                     0.601

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                     0.902    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                  0.908    Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                       0.153    Lilliefors GOF Test
5% Lilliefors Critical Value                    0.188    Detected Data appear Normal at 5% Significance Level
Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                         3.148    KM Standard Error of Mean                0.413
KM SD                                           2.009      95% KM (BCA) UCL                       3.878
95% KM (t) UCL                                  3.855    95% KM (Percentile Bootstrap) UCL        3.849
  95% KM (z) UCL                                3.827      95% KM Bootstrap t UCL                 3.951
90% KM Chebyshev UCL                            4.387    95% KM Chebyshev UCL                     4.948
97.5% KM Chebyshev UCL                          5.727    99% KM Chebyshev UCL                     7.257

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                              0.311    Anderson-Darling GOF Test
5% A-D Critical Value                           0.749    Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic                              0.124    Kolmogorov-Smirnov GOF
5% K-S Critical Value                           0.191    Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                     3.193    k star (bias corrected MLE)              2.768
Theta hat (MLE)                                 1.099    Theta star (bias corrected MLE)          1.268
nu hat (MLE)                                    134.1    nu star (bias corrected)                 116.3
Mean (detects)                                  3.51

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                         0.419    Mean                                     3.104
Maximum                                         7.5      Median                                   2.3
SD                                              2.098    CV                                       0.676
k hat (MLE)                                     2.136    k star (bias corrected MLE)              1.906
Theta hat (MLE)                                 1.453    Theta star (bias corrected MLE)          1.629
nu hat (MLE)                                    106.8    nu star (bias corrected)                 95.31
Adjusted Level of Significance (β)              0.0395
Approximate Chi Square Value (95.31, α)         73.79    Adjusted Chi Square Value (95.31, β)     72.5
95% Gamma Approximate UCL (use when n>=50)      4.01     95% Gamma Adjusted UCL (use when n<50)   4.081

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                       3.148    SD (KM)                                  2.009
Variance (KM)                                   4.037    SE of Mean (KM)                          0.413
k hat (KM)                                      2.455    k star (KM)                              2.187
nu hat (KM)                                     122.7    nu star (KM)                             109.3
theta hat (KM)                                  1.283    theta star (KM)                          1.44
80% gamma percentile (KM)                       4.663    90% gamma percentile (KM)                5.996
95% gamma percentile (KM)                       7.261    99% gamma percentile (KM)                10.05

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (109.33, α)        86.2     Adjusted Chi Square Value (109.33, β)    84.8
  95% Gamma Approximate KM-UCL (use when n>=50)  3.993      95% Gamma Adjusted KM-UCL (use when n<50)  4.059

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Test Statistic                     0.968    Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                  0.908    Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic                       0.1      Lilliefors GOF Test
5% Lilliefors Critical Value                    0.188    Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level
```

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.149	Mean in Log Scale	0.946
SD in Original Scale	2.045	SD in Log Scale	0.656
95% t UCL (assumes normality of ROS data)	3.849	95% Percentile Bootstrap UCL	3.79
95% BCA Bootstrap UCL	3.876	95% Bootstrap t UCL	3.885
95% H-UCL (Log ROS)	4.23		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.941	KM Geo Mean	2.563
KM SD (logged)	0.653	95% Critical H Value (KM-Log)	2.098
KM Standard Error of Mean (logged)	0.135	95% H-UCL (KM -Log)	4.193
KM SD (logged)	0.653	95% Critical H Value (KM-Log)	2.098
KM Standard Error of Mean (logged)	0.135		

DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.108	Mean in Log Scale	0.904
SD in Original Scale	2.087	SD in Log Scale	0.719
95% t UCL (Assumes normality)	3.822	95% H-Stat UCL	4.397

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use	
95% KM (t) UCL	**3.855**

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chromium (total)

General Statistics			
Total Number of Observations	25	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	7.4	Mean	33.22
Maximum	64	Median	32
SD	15.59	Std. Error of Mean	3.118
Coefficient of Variation	0.469	Skewness	0.178

Normal GOF Test			
Shapiro Wilk Test Statistic	0.968	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.116	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.173	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	38.56	95% Adjusted-CLT UCL (Chen-1995)	38.47
		95% Modified-t UCL (Johnson-1978)	38.58

Gamma GOF Test			
A-D Test Statistic	0.426	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.13	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.175	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	3.851	k star (bias corrected MLE)	3.416
Theta hat (MLE)	8.627	Theta star (bias corrected MLE)	9.727
nu hat (MLE)	192.6	nu star (bias corrected)	170.8
MLE Mean (bias corrected)	33.22	MLE Sd (bias corrected)	17.98
		Approximate Chi Square Value (0.05)	141.6
Adjusted Level of Significance	0.0395	Adjusted Chi Square Value	139.8

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	40.08	95% Adjusted Gamma UCL (use when n<50)	40.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.916	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.163	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.173	Data appear Lognormal at 5% Significance Level	

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.001	Mean of logged Data	3.368
Maximum of Logged Data	4.159	SD of logged Data	0.578

Assuming Lognormal Distribution

95% H-UCL	43.56	90% Chebyshev (MVUE) UCL	46.46
95% Chebyshev (MVUE) UCL	52.09	97.5% Chebyshev (MVUE) UCL	59.91
99% Chebyshev (MVUE) UCL	75.26		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	38.35	95% Jackknife UCL	38.56
95% Standard Bootstrap UCL	38.26	95% Bootstrap-t UCL	38.96
95% Hall's Bootstrap UCL	38.49	95% Percentile Bootstrap UCL	38.22
95% BCA Bootstrap UCL	38.01		
90% Chebyshev(Mean, Sd) UCL	42.58	95% Chebyshev(Mean, Sd) UCL	46.82
97.5% Chebyshev(Mean, Sd) UCL	52.7	99% Chebyshev(Mean, Sd) UCL	64.25

Suggested UCL to Use	
95% Student's-t UCL	**38.56**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

<u>Lead</u>

General Statistics

Total Number of Observations	25	Number of Distinct Observations	22
		Number of Missing Observations	0
Minimum	58	Mean	1072
Maximum	4600	Median	510
SD	1182	Std. Error of Mean	236.4
Coefficient of Variation	1.103	Skewness	1.6

Normal GOF Test

Shapiro Wilk Test Statistic	0.805	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.224	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.173	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1476	95% Adjusted-CLT UCL (Chen-1995)	1542
		95% Modified-t UCL (Johnson-1978)	1489

Gamma GOF Test

A-D Test Statistic	0.354	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.778	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.119	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.18	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.889	k star (bias corrected MLE)	0.809
Theta hat (MLE)	1206	Theta star (bias corrected MLE)	1326
nu hat (MLE)	44.43	nu star (bias corrected)	40.43
MLE Mean (bias corrected)	1072	MLE Sd (bias corrected)	1192
		Approximate Chi Square Value (0.05)	26.86
Adjusted Level of Significance	0.0395	Adjusted Chi Square Value	26.11

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1614	95% Adjusted Gamma UCL (use when n<50)	1660

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.115	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.173	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.06	Mean of logged Data	6.318
Maximum of Logged Data	8.434	SD of logged Data	1.279

Assuming Lognormal Distribution

95% H-UCL	2657	90% Chebyshev (MVUE) UCL	2278
95% Chebyshev (MVUE) UCL	2771	97.5% Chebyshev (MVUE) UCL	3456
99% Chebyshev (MVUE) UCL	4800		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1461	95% Jackknife UCL	1476
95% Standard Bootstrap UCL	1449	95% Bootstrap-t UCL	1575
95% Hall's Bootstrap UCL	1569	95% Percentile Bootstrap UCL	1487
95% BCA Bootstrap UCL	1537		
90% Chebyshev(Mean, Sd) UCL	1781	95% Chebyshev(Mean, Sd) UCL	2103
97.5% Chebyshev(Mean, Sd) UCL	2548	99% Chebyshev(Mean, Sd) UCL	3424

Suggested UCL to Use

95% Adjusted Gamma UCL	**1660**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Mercury

General Statistics

Total Number of Observations	25	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	0.051	Mean	0.761
Maximum	13	Median	0.26
SD	2.553	Std. Error of Mean	0.511
Coefficient of Variation	3.355	Skewness	4.977

Normal GOF Test

Shapiro Wilk Test Statistic	0.249	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.477	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.173	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.635	95% Adjusted-CLT UCL (Chen-1995)	2.144
		95% Modified-t UCL (Johnson-1978)	1.72

Gamma GOF Test

A-D Test Statistic	4.626	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.801	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.392	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.184	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.565	k star (bias corrected MLE)	0.523
Theta hat (MLE)	1.348	Theta star (bias corrected MLE)	1.454
nu hat (MLE)	28.23	nu star (bias corrected)	26.17
MLE Mean (bias corrected)	0.761	MLE Sd (bias corrected)	1.052
		Approximate Chi Square Value (0.05)	15.51
Adjusted Level of Significance	0.0395	Adjusted Chi Square Value	14.95

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.284	95% Adjusted Gamma UCL (use when n<50)	1.332

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.784	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.219	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.173	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	-2.976	Mean of logged Data	-1.377
Maximum of Logged Data	2.565	SD of logged Data	1.013

Assuming Lognormal Distribution			
95% H-UCL	0.708	90% Chebyshev (MVUE) UCL	0.692
95% Chebyshev (MVUE) UCL	0.82	97.5% Chebyshev (MVUE) UCL	0.998
99% Chebyshev (MVUE) UCL	1.348		

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs			
95% CLT UCL	1.601	95% Jackknife UCL	1.635
95% Standard Bootstrap UCL	1.593	95% Bootstrap-t UCL	13.14
95% Hall's Bootstrap UCL	6.302	95% Percentile Bootstrap UCL	1.787
95% BCA Bootstrap UCL	2.328		
90% Chebyshev(Mean, Sd) UCL	2.293	95% Chebyshev(Mean, Sd) UCL	2.987
97.5% Chebyshev(Mean, Sd) UCL	3.95	99% Chebyshev(Mean, Sd) UCL	5.842

Suggested UCL to Use	
95% Chebyshev (Mean, Sd) UCL	**2.987**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Selenium

General Statistics			
Total Number of Observations	25	Number of Distinct Observations	19
Number of Detects	4	Number of Non-Detects	21
Number of Distinct Detects	4	Number of Distinct Non-Detects	15
Minimum Detect	1.8	Minimum Non-Detect	3.9
Maximum Detect	6.3	Maximum Non-Detect	39
Variance Detects	3.59	Percent Non-Detects	84%
Mean Detects	3.65	SD Detects	1.895
Median Detects	3.25	CV Detects	0.519
Skewness Detects	1.19	Kurtosis Detects	2.299
Mean of Logged Detects	1.196	SD of Logged Detects	0.512

Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.898	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.323	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	3.208	KM Standard Error of Mean	0.622
KM SD	1.333	95% KM (BCA) UCL	N/A
95% KM (t) UCL	4.273	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	4.232	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	5.075	95% KM Chebyshev UCL	5.92
97.5% KM Chebyshev UCL	7.094	99% KM Chebyshev UCL	9.399

Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.326	Anderson-Darling GOF Test	
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.282	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.396	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only			
k hat (MLE)	5.244	k star (bias corrected MLE)	1.478
Theta hat (MLE)	0.696	Theta star (bias corrected MLE)	2.47
nu hat (MLE)	41.95	nu star (bias corrected)	11.82
Mean (detects)	3.65		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.8	Mean	3.113
Maximum	6.3	Median	3.03
SD	0.891	CV	0.286
k hat (MLE)	15.13	k star (bias corrected MLE)	13.35
Theta hat (MLE)	0.206	Theta star (bias corrected MLE)	0.233
nu hat (MLE)	756.7	nu star (bias corrected)	667.3
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (667.26, α)	608.3	Adjusted Chi Square Value (667.26, β)	604.5
95% Gamma Approximate UCL (use when n>=50)	3.414	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.208	SD (KM)	1.333
Variance (KM)	1.776	SE of Mean (KM)	0.622
k hat (KM)	5.797	k star (KM)	5.128
nu hat (KM)	289.8	nu star (KM)	256.4
theta hat (KM)	0.553	theta star (KM)	0.626
80% gamma percentile (KM)	4.301	90% gamma percentile (KM)	5.105
95% gamma percentile (KM)	5.837	99% gamma percentile (KM)	7.383

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (256.38, α)	220.3	Adjusted Chi Square Value (256.38, β)	218
95% Gamma Approximate KM-UCL (use when n>=50)	3.734	95% Gamma Adjusted KM-UCL (use when n<50)	3.773

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.954	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.252	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.032	Mean in Log Scale	1.077
SD in Original Scale	0.872	SD in Log Scale	0.249
95% t UCL (assumes normality of ROS data)	3.33	95% Percentile Bootstrap UCL	3.338
95% BCA Bootstrap UCL	3.423	95% Bootstrap t UCL	3.455
95% H-UCL (Log ROS)	3.315		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.089	KM Geo Mean	2.971
KM SD (logged)	0.386	95% Critical H Value (KM-Log)	1.871
KM Standard Error of Mean (logged)	0.2	95% H-UCL (KM -Log)	3.708
KM SD (logged)	0.386	95% Critical H Value (KM-Log)	1.871
KM Standard Error of Mean (logged)	0.2		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	7.982	Mean in Log Scale	1.791
SD in Original Scale	6.04	SD in Log Scale	0.784
95% t UCL (Assumes normality)	10.05	95% H-Stat UCL	11.66

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	**4.273**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Silver

General Statistics

Total Number of Observations	25	Number of Distinct Observations	18
Number of Detects	1	Number of Non-Detects	24
Number of Distinct Detects	1	Number of Distinct Non-Detects	17

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Silver was not processed!

APPENDIX C

Risk Assessment Calculations
Recreational Trespassers

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Summary

Exposure Pathway	Non-Carcinogenic Hazard Index			Excess Lifetime Cancer Risk			
	Child	Youth	Adult	Child	Youth	Adult	Combined Ages
Sediment Ingestion	6.8	1.4	0.8	7E-06	3E-06	2E-06	1E-05
Sediment Dermal Contact	0.5	0.2	0.1	4E-06	2E-06	2E-06	8E-06
Inhalation of Entrained Dry Sediment Particles	0.02	0.02	0.02	1E-07	2E-07	3E-07	7E-07
Surface Water Ingestion	2.7	1.1	0.3	1E-05	1E-05	4E-06	3E-05
Surface Water Dermal Contact	0.001	0.0008	0.0005	2E-08	3E-08	3E-08	9E-08
Total (All Pathways)	**10**	**3**	**1**	**2E-05**	**2E-05**	**9E-06**	**5E-05**
Maximum Acceptable Level	**1**			**1E-05**			

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Sediment Ingestion

ADD = [C_{SED} x IR x RAFo x EF x ED x EP x CF] / [BW x AP]

ADD = Average daily dose (mg/kg-dy) (nc = non-carcinogen; ca = carcinogen)
C_{SED} = Constituent concentration in sediment (mg/kg)
IR = Sediment ingestion rate (kg/day)
RAFo = Oral Relative Absorption Factor (unitless)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = ADD(nc)/RfD
HI = Sum [HQ]
Risk = ADD(ca) x OSF

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Child

Constituent	C_{SED} (mg/kg)	IR (kg/day)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (nc) (yr)	ADD (nc) (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-1}$]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	16.9	0.0002	1	90	1	5	2.74E-03	17	5	4.90E-05	0.1	0.0005	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	0.0002	1	90	1	5	2.74E-03	17	5	7.92E-04	2	0.0004	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	0.0002	0.3	90	1	5	2.74E-03	17	5	2.01E-04	0.03	0.007	-	-	-	-
Acenaphthene	1	0.0002	1	90	1	5	2.74E-03	17	5	2.90E-06	0.06	0.00005	-	-	-	-
Acenaphthylene	0.11	0.0002	1	90	1	5	2.74E-03	17	5	3.19E-07	0.03	0.00001	-	-	-	-
Anthracene	1.32	0.0002	1	90	1	5	2.74E-03	17	5	3.83E-06	0.3	0.00001	-	-	-	-
Benzo(a)anthracene	4.41	0.0002	0.91	90	1	5	2.74E-03	17	5	1.16E-05	0.03	0.0004	70	8.32E-07	0.1	8E-08
Benzo(a)pyrene	4.11	0.0002	0.91	90	1	5	2.74E-03	17	5	1.08E-05	0.0003	0.04	70	7.75E-07	1	8E-07
Benzo(b)fluoranthene	4.84	0.0002	0.91	90	1	5	2.74E-03	17	5	1.28E-05	0.03	0.0004	70	9.13E-07	0.1	9E-08
Benzo(g,h,i)perylene	2.11	0.0002	1	90	1	5	2.74E-03	17	5	6.12E-06	0.03	0.0002	-	-	-	-
Benzo(k)fluoranthene	1.91	0.0002	0.91	90	1	5	2.74E-03	17	5	5.04E-06	0.03	0.0002	70	3.60E-07	0.01	4E-09
Chrysene	4.43	0.0002	0.91	90	1	5	2.74E-03	17	5	1.17E-05	0.03	0.00039	70	8.35E-07	0.001	8E-10
Dibenzo(a,h)anthracene	0.66	0.0002	0.91	90	1	5	2.74E-03	17	5	1.74E-06	0.03	0.00006	70	1.24E-07	1	1E-07
Fluoranthene	9.01	0.0002	1	90	1	5	2.74E-03	17	5	2.61E-05	0.04	0.0007	-	-	-	-
Fluorene	0.96	0.0002	1	90	1	5	2.74E-03	17	5	2.78E-06	0.04	0.00007	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	0.0002	0.91	90	1	5	2.74E-03	17	5	6.57E-06	0.03	0.0002	70	4.70E-07	0.1	5E-08
2-Methylnaphthalene	16.1	0.0002	1	90	1	5	2.74E-03	17	5	4.67E-05	0.004	0.012	-	-	-	-
Naphthalene	5.38	0.0002	1	90	1	5	2.74E-03	17	5	1.56E-05	0.02	0.0008	-	-	-	-
Phenanthrene	6.24	0.0002	1	90	1	5	2.74E-03	17	5	1.81E-05	0.03	0.0006	-	-	-	-
Pyrene	9.02	0.0002	1	90	1	5	2.74E-03	17	5	2.62E-05	0.03	0.0009	-	-	-	-
Arsenic	30	0.0002	0.6	90	1	5	2.74E-03	17	5	5.22E-05	0.0003	0.2	70	3.73E-06	1.5	6E-06
Barium	408	0.0002	1	90	1	5	2.74E-03	17	5	1.18E-03	0.2	0.006	-	-	-	-
Cadmium	3.86	0.0002	1	90	1	5	2.74E-03	17	5	1.12E-05	0.0005	0.02	-	-	-	-
Chromium	39	0.0002	1	90	1	5	2.74E-03	17	5	1.13E-04	0.003	0.04	-	-	-	-
Lead	1660	0.0002	1	90	1	5	2.74E-03	17	5	4.82E-03	0.00075	6.4	-	-	-	-
Mercury	3	0.0002	1	90	1	5	2.74E-03	17	5	8.70E-06	0.0003	0.03	-	-	-	-
Selenium	4.3	0.0002	1	90	1	5	2.74E-03	17	5	1.25E-05	0.005	0.002	-	-	-	-
Silver	3.5	0.0002	1	90	1	5	2.74E-03	17	5	1.02E-05	0.005	0.002	-	-	-	-
Total									**HI =**			**6.8**	**Risk =**			**7E-06**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Sediment Ingestion

Youth

Constituent	**C_{SED} (mg/kg)**	**IR (kg/day)**	**RAFo (unitless)**	**EF (events/yr)**	**ED (dy/event)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (nc) (yr)**	**ADD (nc) (mg/kg-dy)**	**RfD (mg/kg-dy)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF $[(mg/kg\text{-}dy)^{-1}]$**	**Risk (unitless)**
C9-C18 Aliphatic Hydrocarbons	16.9	0.0001	1	90	1	10	2.74E-03	40	10	1.04E-05	0.1	0.0001	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	0.0001	1	90	1	10	2.74E-03	40	10	1.68E-04	2	0.00008	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	0.0001	0.3	90	1	10	2.74E-03	40	10	4.27E-05	0.03	0.001	-	-	-	-
Acenaphthene	1	0.0001	1	90	1	10	2.74E-03	40	10	6.16E-07	0.06	0.00001	-	-	-	-
Acenaphthylene	0.11	0.0001	1	90	1	10	2.74E-03	40	10	6.78E-08	0.03	0.000002	-	-	-	-
Anthracene	1.32	0.0001	1	90	1	10	2.74E-03	40	10	8.14E-07	0.3	0.000003	-	-	-	-
Benzo(a)anthracene	4.41	0.0001	0.91	90	1	10	2.74E-03	40	10	2.47E-06	0.03	0.00008	70	3.53E-07	0.1	4E-08
Benzo(a)pyrene	4.11	0.0001	0.91	90	1	10	2.74E-03	40	10	2.31E-06	0.0003	0.008	70	3.29E-07	1	3E-07
Benzo(b)fluoranthene	4.84	0.0001	0.91	90	1	10	2.74E-03	40	10	2.72E-06	0.03	0.00009	70	3.88E-07	0.1	4E-08
Benzo(g,h,i)perylene	2.11	0.0001	1	90	1	10	2.74E-03	40	10	1.30E-06	0.03	0.00004	-	-	-	-
Benzo(k)fluoranthene	1.91	0.0001	0.91	90	1	10	2.74E-03	40	10	1.07E-06	0.03	0.00004	70	1.53E-07	0.01	2E-09
Chrysene	4.43	0.0001	0.91	90	1	10	2.74E-03	40	10	2.49E-06	0.03	0.00008	70	3.55E-07	0.001	4E-10
Dibenzo(a,h)anthracene	0.66	0.0001	0.91	90	1	10	2.74E-03	40	10	3.70E-07	0.03	0.00001	70	5.29E-08	1	5E-08
Fluoranthene	9.01	0.0001	1	90	1	10	2.74E-03	40	10	5.55E-06	0.04	0.0001	-	-	-	-
Fluorene	0.96	0.0001	1	90	1	10	2.74E-03	40	10	5.92E-07	0.04	0.00001	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	0.0001	0.91	90	1	10	2.74E-03	40	10	1.40E-06	0.03	0.00005	70	2.00E-07	0.1	2E-08
2-Methylnaphthalene	16.1	0.0001	1	90	1	10	2.74E-03	40	10	9.92E-06	0.004	0.002	-	-	-	-
Naphthalene	5.38	0.0001	1	90	1	10	2.74E-03	40	10	3.32E-06	0.02	0.0002	-	-	-	-
Phenanthrene	6.24	0.0001	1	90	1	10	2.74E-03	40	10	3.85E-06	0.03	0.0001	-	-	-	-
Pyrene	9.02	0.0001	1	90	1	10	2.74E-03	40	10	5.56E-06	0.03	0.0002	-	-	-	-
Arsenic	30	0.0001	0.6	90	1	10	2.74E-03	40	10	1.11E-05	0.0003	0.04	70	1.59E-06	1.5	2E-06
Barium	408	0.0001	1	90	1	10	2.74E-03	40	10	2.52E-04	0.2	0.001	-	-	-	-
Cadmium	3.86	0.0001	1	90	1	10	2.74E-03	40	10	2.38E-06	0.0005	0.005	-	-	-	-
Chromium	39	0.0001	1	90	1	10	2.74E-03	40	10	2.40E-05	0.003	0.008	-	-	-	-
Lead	1660	0.0001	1	90	1	10	2.74E-03	40	10	1.02E-03	0.00075	1.4	-	-	-	-
Mercury	3	0.0001	1	90	1	10	2.74E-03	40	10	1.85E-06	0.0003	0.006	-	-	-	-
Selenium	4.3	0.0001	1	90	1	10	2.74E-03	40	10	2.65E-06	0.005	0.0005	-	-	-	-
Silver	3.5	0.0001	1	90	1	10	2.74E-03	40	10	2.16E-06	0.005	0.0004	-	-	-	-
Total									**HI =**			**1.4**	**Risk =**			**3E-06**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Sediment Ingestion

Adult

Constituent	C_{SED} (mg/kg)	IR (kg/day)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (nc) (yr)	ADD (nc) (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF $[(mg/kg\text{-}dy)^{-1}]$	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	16.9	0.0001	1	90	1	15	2.74E-03	70	15	5.95E-06	0.1	0.00006	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	0.0001	1	90	1	15	2.74E-03	70	15	9.62E-05	2	0.00005	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	0.0001	0.3	90	1	15	2.74E-03	70	15	2.44E-05	0.03	0.0008	-	-	-	-
Acenaphthene	1	0.0001	1	90	1	15	2.74E-03	70	15	3.52E-07	0.06	0.000006	-	-	-	-
Acenaphthylene	0.11	0.0001	1	90	1	15	2.74E-03	70	15	3.87E-08	0.03	0.000001	-	-	-	-
Anthracene	1.32	0.0001	1	90	1	15	2.74E-03	70	15	4.65E-07	0.3	0.000002	-	-	-	-
Benzo(a)anthracene	4.41	0.0001	0.91	90	1	15	2.74E-03	70	15	1.41E-06	0.03	0.00005	70	3.03E-07	0.1	3E-08
Benzo(a)pyrene	4.11	0.0001	0.91	90	1	15	2.74E-03	70	15	1.32E-06	0.0003	0.004	70	2.82E-07	1	3E-07
Benzo(b)fluoranthene	4.84	0.0001	0.91	90	1	15	2.74E-03	70	15	1.55E-06	0.03	0.00005	70	3.32E-07	0.1	3E-08
Benzo(g,h,i)perylene	2.11	0.0001	1	90	1	15	2.74E-03	70	15	7.43E-07	0.03	0.00002	-	-	-	-
Benzo(k)fluoranthene	1.91	0.0001	0.91	90	1	15	2.74E-03	70	15	6.12E-07	0.03	0.00002	70	1.31E-07	0.01	1E-09
Chrysene	4.43	0.0001	0.91	90	1	15	2.74E-03	70	15	1.42E-06	0.03	0.00005	70	3.04E-07	0.001	3E-10
Dibenzo(a,h)anthracene	0.66	0.0001	0.91	90	1	15	2.74E-03	70	15	2.12E-07	0.03	0.000007	70	4.53E-08	1	5E-08
Fluoranthene	9.01	0.0001	1	90	1	15	2.74E-03	70	15	3.17E-06	0.04	0.00008	-	-	-	-
Fluorene	0.96	0.0001	1	90	1	15	2.74E-03	70	15	3.38E-07	0.04	0.000008	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	0.0001	0.91	90	1	15	2.74E-03	70	15	7.98E-07	0.03	0.00003	70	1.71E-07	0.1	2E-08
2-Methylnaphthalene	16.1	0.0001	1	90	1	15	2.74E-03	70	15	5.67E-06	0.004	0.001	-	-	-	-
Naphthalene	5.38	0.0001	1	90	1	15	2.74E-03	70	15	1.90E-06	0.02	0.00009	-	-	-	-
Phenanthrene	6.24	0.0001	1	90	1	15	2.74E-03	70	15	2.20E-06	0.03	0.00007	-	-	-	-
Pyrene	9.02	0.0001	1	90	1	15	2.74E-03	70	15	3.18E-06	0.03	0.0001	-	-	-	-
Arsenic	30	0.0001	0.6	90	1	15	2.74E-03	70	15	6.34E-06	0.0003	0.02	70	1.36E-06	1.5	2E-06
Barium	408	0.0001	1	90	1	15	2.74E-03	70	15	1.44E-04	0.2	0.0007	-	-	-	-
Cadmium	3.86	0.0001	1	90	1	15	2.74E-03	70	15	1.36E-06	0.0005	0.003	-	-	-	-
Chromium	39	0.0001	1	90	1	15	2.74E-03	70	15	1.37E-05	0.003	0.005	-	-	-	-
Lead	1660	0.0001	1	90	1	15	2.74E-03	70	15	5.85E-04	0.00075	0.8	-	-	-	-
Mercury	3	0.0001	1	90	1	15	2.74E-03	70	15	1.06E-06	0.0003	0.004	-	-	-	-
Selenium	4.3	0.0001	1	90	1	15	2.74E-03	70	15	1.51E-06	0.005	0.0003	-	-	-	-
Silver	3.5	0.0001	1	90	1	15	2.74E-03	70	15	1.23E-06	0.005	0.0002	-	-	-	-
Total									**HI =**			**0.8**	**Risk =**			**2E-06**

Combined Ages

Total Risk =	**1E-05**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Sediment Dermal Contact

ADD = **[C$_{SED}$ x SA x AF x RAFd x EF x ED x EP x CF] / [BW x AP]**

ADD = Average daily dose (mg/kg-dy) (ca = carcinogens, nc = non-carcinogen
C$_{SED}$ = Constituent concentration in sediment (mg/kg)
SA = Exposed skin surface area (cm^2/day)
AF = Soil/sediment adherence factor (kg/cm^2)
RAFd = Dermal Relative Absorption Factor (unitless)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = **ADD(nc)/RfD**
HI = **Sum [HQ]**
Risk = **ADD(ca) x OSF**

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Child

Constituent	**C$_{SED}$ (mg/kg)**	**SA (cm^2/dy)**	**AF (kg/cm^2)**	**RAFd (unitless)**	**EF (events/yr)**	**ED (dy/event)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (yr)**	**ADD (mg/kg-dy)**	**RfD (mg/kg-**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF [(mg/kg-dy)$^{-1}$]**	**Risk (unitless)**
C9-C18 Aliphatic Hydrocarbons	16.9	4,487	3.60E-07	0.2	90	1	5	2.74E-03	17	5	7.92E-05	0.1	0.0008	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	4,487	3.60E-07	0.2	90	1	5	2.74E-03	17	5	1.28E-03	2	0.0006	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	4,487	3.60E-07	0.1	90	1	5	2.74E-03	17	5	5.41E-04	0.03	0.02	-	-	-	-
Acenaphthene	1	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	3.05E-06	0.06	0.00005	-	-	-	-
Acenaphthylene	0.11	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	3.35E-07	0.03	0.00001	-	-	-	-
Anthracene	1.32	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	4.02E-06	0.3	0.00001	-	-	-	-
Benzo(a)anthracene	4.41	4,487	3.60E-07	0.143	90	1	5	2.74E-03	17	5	1.48E-05	0.03	0.0005	70	1.06E-06	0.1	1E-07
Benzo(a)pyrene	4.11	4,487	3.60E-07	0.143	90	1	5	2.74E-03	17	5	1.38E-05	0.0003	0.05	70	9.84E-07	1	1E-06
Benzo(b)fluoranthene	4.84	4,487	3.60E-07	0.143	90	1	5	2.74E-03	17	5	1.62E-05	0.03	0.0005	70	1.16E-06	0.1	1E-07
Benzo(g,h,i)perylene	2.11	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	6.43E-06	0.03	0.0002	-	-	-	-
Benzo(k)fluoranthene	1.91	4,487	3.60E-07	0.143	90	1	5	2.74E-03	17	5	6.40E-06	0.03	0.0002	70	4.57E-07	0.01	5E-09
Chrysene	4.43	4,487	3.60E-07	0.143	90	1	5	2.74E-03	17	5	1.48E-05	0.03	0.0005	70	1.06E-06	0.001	1E-09
Dibenzo(a,h)anthracene	0.66	4,487	3.60E-07	0.143	90	1	5	2.74E-03	17	5	2.21E-06	0.03	0.00007	70	1.58E-07	1	2E-07
Fluoranthene	9.01	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	2.74E-05	0.04	0.0007	-	-	-	-
Fluorene	0.96	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	2.92E-06	0.04	0.00007	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	4,487	3.60E-07	0.143	90	1	5	2.74E-03	17	5	8.34E-06	0.03	0.0003	70	5.96E-07	0.1	6E-08
2-Methylnaphthalene	16.1	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	4.90E-05	0.004	0.01	-	-	-	-
Naphthalene	5.38	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	1.64E-05	0.02	0.0008	-	-	-	-
Phenanthrene	6.24	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	1.90E-05	0.03	0.0006	-	-	-	-
Pyrene	9.02	4,487	3.60E-07	0.13	90	1	5	2.74E-03	17	5	2.75E-05	0.03	0.0009	-	-	-	-
Arsenic	30	4,487	3.60E-07	0.03	90	1	5	2.74E-03	17	5	2.11E-05	0.0003	0.07	70	1.51E-06	1.5	2E-06
Barium	408	4,487	3.60E-07	0.2	90	1	5	2.74E-03	17	5	1.91E-03	0.2	0.010	-	-	-	-
Cadmium	3.86	4,487	3.60E-07	0.04	90	1	5	2.74E-03	17	5	3.62E-06	0.0005	0.007	-	-	-	-
Chromium	39	4,487	3.60E-07	0.01	90	1	5	2.74E-03	17	5	9.14E-06	0.003	0.003	-	-	-	-
Lead	1660	4,487	3.60E-07	0.006	90	1	5	2.74E-03	17	5	2.33E-04	0.00075	0.3	-	-	-	-
Mercury	3	4,487	3.60E-07	0.17	90	1	5	2.74E-03	17	5	1.19E-05	0.0003	0.04	-	-	-	-
Selenium	4.3	4,487	3.60E-07	0.01	90	1	5	2.74E-03	17	5	1.01E-06	0.005	0.0002	-	-	-	-
Silver	3.5	4,487	3.60E-07	0.25	90	1	5	2.74E-03	17	5	2.05E-05	0.005	0.004	-	-	-	-
Total										**HI =**			**0.5**	**Risk =**			**4E-06**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Sediment Dermal Contact

Youth

Constituent	**C_{SED} (mg/kg)**	**SA (cm^2/dy)**	**AF (kg/cm^2)**	**RAFd (unitless)**	**EF (events/yr)**	**ED (dy/event)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (yr)**	**ADD (mg/kg-dy)**	**RfD (mg/kg-**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF [(mg/kg-dy)$^{-1}$]**	**Risk (unitless)**
C9-C18 Aliphatic Hydrocarbons	16.9	8,323	1.40E-07	0.2	90	1	10	2.74E-03	40	10	2.43E-05	0.1	0.0002	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	8,323	1.40E-07	0.2	90	1	10	2.74E-03	40	10	3.92E-04	2	0.0002	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	8,323	1.40E-07	0.1	90	1	10	2.74E-03	40	10	1.66E-04	0.03	0.006	-	-	-	-
Acenaphthene	1	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	9.34E-07	0.06	0.00002	-	-	-	-
Acenaphthylene	0.11	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	1.03E-07	0.03	0.000003	-	-	-	-
Anthracene	1.32	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	1.23E-06	0.3	0.000004	-	-	-	-
Benzo(a)anthracene	4.41	8,323	1.40E-07	0.143	90	1	10	2.74E-03	40	10	4.53E-06	0.03	0.0002	70	6.47E-07	0.1	6E-08
Benzo(a)pyrene	4.11	8,323	1.40E-07	0.143	90	1	10	2.74E-03	40	10	4.22E-06	0.0003	0.01	70	6.03E-07	1	6E-07
Benzo(b)fluoranthene	4.84	8,323	1.40E-07	0.143	90	1	10	2.74E-03	40	10	4.97E-06	0.03	0.0002	70	7.10E-07	0.1	7E-08
Benzo(g,h,i)perylene	2.11	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	1.97E-06	0.03	0.00007	-	-	-	-
Benzo(k)fluoranthene	1.91	8,323	1.40E-07	0.143	90	1	10	2.74E-03	40	10	1.96E-06	0.03	0.00007	70	2.80E-07	0.01	3E-09
Chrysene	4.43	8,323	1.40E-07	0.143	90	1	10	2.74E-03	40	10	4.55E-06	0.03	0.0002	70	6.50E-07	0.001	7E-10
Dibenzo(a,h)anthracene	0.66	8,323	1.40E-07	0.143	90	1	10	2.74E-03	40	10	6.78E-07	0.03	0.00002	70	9.68E-08	1	1E-07
Fluoranthene	9.01	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	8.41E-06	0.04	0.0002	-	-	-	-
Fluorene	0.96	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	8.96E-07	0.04	0.00002	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	8,323	1.40E-07	0.143	90	1	10	2.74E-03	40	10	2.56E-06	0.03	0.00009	70	3.65E-07	0.1	4E-08
2-Methylnaphthalene	16.1	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	1.50E-05	0.004	0.004	-	-	-	-
Naphthalene	5.38	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	5.02E-06	0.02	0.0003	-	-	-	-
Phenanthrene	6.24	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	5.83E-06	0.03	0.0002	-	-	-	-
Pyrene	9.02	8,323	1.40E-07	0.13	90	1	10	2.74E-03	40	10	8.42E-06	0.03	0.0003	-	-	-	-
Arsenic	30	8,323	1.40E-07	0.03	90	1	10	2.74E-03	40	10	6.46E-06	0.0003	0.02	70	9.24E-07	1.5	1E-06
Barium	408	8,323	1.40E-07	0.2	90	1	10	2.74E-03	40	10	5.86E-04	0.2	0.003	-	-	-	-
Cadmium	3.86	8,323	1.40E-07	0.04	90	1	10	2.74E-03	40	10	1.11E-06	0.0005	0.002	-	-	-	-
Chromium	39	8,323	1.40E-07	0.01	90	1	10	2.74E-03	40	10	2.80E-06	0.003	0.0009	-	-	-	-
Lead	1660	8,323	1.40E-07	0.006	90	1	10	2.74E-03	40	10	7.15E-05	0.00075	0.1	-	-	-	-
Mercury	3	8,323	1.40E-07	0.17	90	1	10	2.74E-03	40	10	3.66E-06	0.0003	0.01	-	-	-	-
Selenium	4.3	8,323	1.40E-07	0.01	90	1	10	2.74E-03	40	10	3.09E-07	0.005	0.00006	-	-	-	-
Silver	3.5	8,323	1.40E-07	0.25	90	1	10	2.74E-03	40	10	6.29E-06	0.005	0.001	-	-	-	-
Total										**HI =**			**0.2**	**Risk =**			**2E-06**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Sediment Dermal Contact

Adult

Constituent	C_{SED} (mg/kg)	SA (cm^2/dy)	AF (kg/cm^2)	RAFd (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-1}$]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	16.9	9,290	1.30E-07	0.2	90	1	15	2.74E-03	70	15	1.44E-05	0.1	0.0001	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	9,290	1.30E-07	0.2	90	1	15	2.74E-03	70	15	2.32E-04	2	0.0001	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	9,290	1.30E-07	0.1	90	1	15	2.74E-03	70	15	9.83E-05	0.03	0.003	-	-	-	-
Acenaphthene	1	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	5.53E-07	0.06	0.000009	-	-	-	-
Acenaphthylene	0.11	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	6.08E-08	0.03	0.000002	-	-	-	-
Anthracene	1.32	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	7.30E-07	0.3	0.000002	-	-	-	-
Benzo(a)anthracene	4.41	9,290	1.30E-07	0.143	90	1	15	2.74E-03	70	15	2.68E-06	0.03	0.00009	70	5.75E-07	0.1	6E-08
Benzo(a)pyrene	4.11	9,290	1.30E-07	0.143	90	1	15	2.74E-03	70	15	2.50E-06	0.0003	0.008	70	5.36E-07	1	5E-07
Benzo(b)fluoranthene	4.84	9,290	1.30E-07	0.143	90	1	15	2.74E-03	70	15	2.94E-06	0.03	0.0001	70	6.31E-07	0.1	6E-08
Benzo(g,h,i)perylene	2.11	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	1.17E-06	0.03	0.00004	-	-	-	-
Benzo(k)fluoranthene	1.91	9,290	1.30E-07	0.143	90	1	15	2.74E-03	70	15	1.16E-06	0.03	0.00004	70	2.49E-07	0.01	2E-09
Chrysene	4.43	9,290	1.30E-07	0.143	90	1	15	2.74E-03	70	15	2.69E-06	0.03	0.00009	70	5.77E-07	0.001	6E-10
Dibenzo(a,h)anthracene	0.66	9,290	1.30E-07	0.143	90	1	15	2.74E-03	70	15	4.02E-07	0.03	0.00001	70	8.60E-08	1	9E-08
Fluoranthene	9.01	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	4.98E-06	0.04	0.0001	-	-	-	-
Fluorene	0.96	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	5.31E-07	0.04	0.00001	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	9,290	1.30E-07	0.143	90	1	15	2.74E-03	70	15	1.51E-06	0.03	0.00005	70	3.25E-07	0.1	3E-08
2-Methylnaphthalene	16.1	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	8.90E-06	0.004	0.002	-	-	-	-
Naphthalene	5.38	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	2.98E-06	0.02	0.0001	-	-	-	-
Phenanthrene	6.24	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	3.45E-06	0.03	0.0001	-	-	-	-
Pyrene	9.02	9,290	1.30E-07	0.13	90	1	15	2.74E-03	70	15	4.99E-06	0.03	0.0002	-	-	-	-
Arsenic	30	9,290	1.30E-07	0.03	90	1	15	2.74E-03	70	15	3.83E-06	0.0003	0.01	70	8.20E-07	1.5	1E-06
Barium	408	9,290	1.30E-07	0.2	90	1	15	2.74E-03	70	15	3.47E-04	0.2	0.002	-	-	-	-
Cadmium	3.86	9,290	1.30E-07	0.04	90	1	15	2.74E-03	70	15	6.57E-07	0.0005	0.001	-	-	-	-
Chromium	39	9,290	1.30E-07	0.01	90	1	15	2.74E-03	70	15	1.66E-06	0.003	0.0006	-	-	-	-
Lead	1660	9,290	1.30E-07	0.006	90	1	15	2.74E-03	70	15	4.24E-05	0.00075	0.06	-	-	-	-
Mercury	3	9,290	1.30E-07	0.17	90	1	15	2.74E-03	70	15	2.17E-06	0.0003	0.007	-	-	-	-
Selenium	4.3	9,290	1.30E-07	0.01	90	1	15	2.74E-03	70	15	1.83E-07	0.005	0.00004	-	-	-	-
Silver	3.5	9,290	1.30E-07	0.25	90	1	15	2.74E-03	70	15	3.72E-06	0.005	0.0007	-	-	-	-
Total										**HI =**			**0.1**	**Risk =**			**2E-06**

Combined ages

Total Risk	**8E-06**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Inhalation of Entrained Sediment Particles (assuming exposed and dry)

C_{air} = **C_{SEDI} x PM_{10} x CF**
ADE = **C_{air} x EF x ED x EP x CF / AP**

C_{air} = Constituent concentration in ambient air (mg/m^3)
C_{SED} = Constituent concentration in dry sediment (mg/kg)
PM_{10} = Particulate matter concentration in air (</= 10 microns) (ug/m^3)
CF = Unit conversion factor (kg/ug)
ADE = Average daily exposure (mg/m^3) (nc = non-carcinogen; ca = carcinogen)
EF = Exposure frequency (events/yr)
ED = Exposure duration (hr/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/hr)
AP = Averaging period (yr)

HQ = **ADE (nc)/ RfC**
HI = **Sum [HQ]**
Risk = **ADE(ca) x IUR**

HQ = Non-carcinogenic hazard quotient (unitless)
HI = Total hazard index (unitless)
RfC = Reference concentration (mg/m^3)
Risk = Excess lifetime cancer risk (unitless)
IUR = Unit risk value [$(mg/m^3)^{-1}$]

Child

Constituent	**C_{soil} (mg/kg)**	**PM_{10} (ug/m^3)**	**CF (kg/ug)**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfC (mg/m^3)**	**HQ (unitless)**	**AP [ca] (yr)**	**ADE [ca] (mg/m^3)**	**IUR [$(mg/m^3)^{-1}$]**	**Risk (unitless)**
C9-C18 Aliphatic Hydrocarbons	16.9	32	1.00E-09	5.41E-07	90	8	5	1.14E-04	5	4.44E-08	0.2	0.0000002	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	32	1.00E-09	8.74E-06	90	8	5	1.14E-04	5	7.18E-07	7	0.0000001	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	32	1.00E-09	7.39E-06	90	8	5	1.14E-04	5	6.08E-07	0.05	0.00001	-	-	-	-
Acenaphthene	1	32	1.00E-09	3.20E-08	90	8	5	1.14E-04	5	2.63E-09	0.05	0.00000005	-	-	-	-
Acenaphthylene	0.11	32	1.00E-09	3.52E-09	90	8	5	1.14E-04	5	2.89E-10	0.05	0.000000006	-	-	-	-
Anthracene	1.32	32	1.00E-09	4.22E-08	90	8	5	1.14E-04	5	3.47E-09	0.05	0.00000007	-	-	-	-
Benzo(a)anthracene	4.41	32	1.00E-09	1.41E-07	90	8	5	1.14E-04	5	1.16E-08	0.05	0.0000002	70	8.28E-10	0.06	5E-11
Benzo(a)pyrene	4.11	32	1.00E-09	1.32E-07	90	8	5	1.14E-04	5	1.08E-08	0.000002	0.005	70	7.72E-10	0.6	5E-10
Benzo(b)fluoranthene	4.84	32	1.00E-09	1.55E-07	90	8	5	1.14E-04	5	1.27E-08	0.05	0.0000003	70	9.09E-10	0.06	5E-11
Benzo(g,h,i)perylene	2.11	32	1.00E-09	6.75E-08	90	8	5	1.14E-04	5	5.55E-09	0.05	0.0000001	-	-	-	-
Benzo(k)fluoranthene	1.91	32	1.00E-09	6.11E-08	90	8	5	1.14E-04	5	5.02E-09	0.05	0.0000001	70	3.59E-10	0.006	2E-12
Chrysene	4.43	32	1.00E-09	1.42E-07	90	8	5	1.14E-04	5	1.17E-08	0.05	0.0000002	70	8.32E-10	0.0006	5E-13
Dibenzo(a,h)anthracene	0.66	32	1.00E-09	2.11E-08	90	8	5	1.14E-04	5	1.74E-09	0.05	0.00000003	70	1.24E-10	0.6	7E-11
Fluoranthene	9.01	32	1.00E-09	2.88E-07	90	8	5	1.14E-04	5	2.37E-08	0.05	0.0000005	-	-	-	-
Fluorene	0.96	32	1.00E-09	3.07E-08	90	8	5	1.14E-04	5	2.52E-09	0.05	0.00000005	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	32	1.00E-09	7.97E-08	90	8	5	1.14E-04	5	6.55E-09	0.05	0.0000001	70	4.68E-10	0.06	3E-11
2-Methylnaphthalene	16.1	32	1.00E-09	5.15E-07	90	8	5	1.14E-04	5	4.23E-08	0.05	0.0000008	-	-	-	-
Naphthalene	5.38	32	1.00E-09	1.72E-07	90	8	5	1.14E-04	5	1.42E-08	0.003	0.000005	-	-	-	-
Phenanthrene	6.24	32	1.00E-09	2.00E-07	90	8	5	1.14E-04	5	1.64E-08	0.05	0.0000003	-	-	-	-
Pyrene	9.02	32	1.00E-09	2.89E-07	90	8	5	1.14E-04	5	2.37E-08	0.05	0.0000005	-	-	-	-
Arsenic	30	32	1.00E-09	9.60E-07	90	8	5	1.14E-04	5	7.89E-08	0.000015	0.005	70	5.64E-09	4.3	2E-08
Barium	408	32	1.00E-09	1.31E-05	90	8	5	1.14E-04	5	1.07E-06	0.0005	0.002	-	-	-	-
Cadmium	3.86	32	1.00E-09	1.24E-07	90	8	5	1.14E-04	5	1.02E-08	0.00001	0.001	70	7.25E-10	1.8	1E-09
Chromium	39	32	1.00E-09	1.25E-06	90	8	5	1.14E-04	5	1.03E-07	0.0001	0.001	70	7.33E-09	12	9E-08
Lead	1660	32	1.00E-09	5.31E-05	90	8	5	1.14E-04	5	4.37E-06	0.001	0.004	-	-	-	-
Mercury	3	32	1.00E-09	9.60E-08	90	8	5	1.14E-04	5	7.89E-09	0.0003	0.00003	-	-	-	-
Selenium	4.3	32	1.00E-09	1.38E-07	90	8	5	1.14E-04	5	1.13E-08	0.02	0.000001	-	-	-	-
Silver	3.5	32	1.00E-09	1.12E-07	90	8	5	1.14E-04	5	9.21E-09	0.00014	0.00007	-	-	-	-
Total									**HI =**			**0.02**	**Risk =**			**1E-07**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Inhalation of Entrained Sediment Particles (assuming exposed and dry)

Youth

Constituent	C_{soil} (mg/kg)	PM_{10} (ug/m^3)	CF (kg/ug)	C_{air} (mg/m^3)	EF (events/yr)	ED (hr/event)	EP (yr)	CF (yr/hr)	AP (nc) (yr)	ADE (nc) (mg/m^3)	RfC (mg/m^3)	HQ (unitless)	AP [ca] (yr)	ADE [ca] (mg/m^3)	IUR [(mg/m^3)$^{-1}$]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	16.9	32	1.00E-09	5.41E-07	90	8	10	1.14E-04	10	4.44E-08	0.2	0.0000002	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	32	1.00E-09	8.74E-06	90	8	10	1.14E-04	10	7.18E-07	7	0.0000001	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	32	1.00E-09	7.39E-06	90	8	10	1.14E-04	10	6.08E-07	0.05	0.00001	-	-	-	-
Acenaphthene	1	32	1.00E-09	3.20E-08	90	8	10	1.14E-04	10	2.63E-09	0.05	0.00000005	-	-	-	-
Acenaphthylene	0.11	32	1.00E-09	3.52E-09	90	8	10	1.14E-04	10	2.89E-10	0.05	0.000000006	-	-	-	-
Anthracene	1.32	32	1.00E-09	4.22E-08	90	8	10	1.14E-04	10	3.47E-09	0.05	0.00000007	-	-	-	-
Benzo(a)anthracene	4.41	32	1.00E-09	1.41E-07	90	8	10	1.14E-04	10	1.16E-08	0.05	0.0000002	70	1.66E-09	0.06	1E-10
Benzo(a)pyrene	4.11	32	1.00E-09	1.32E-07	90	8	10	1.14E-04	10	1.08E-08	0.000002	0.005	70	1.54E-09	0.6	9E-10
Benzo(b)fluoranthene	4.84	32	1.00E-09	1.55E-07	90	8	10	1.14E-04	10	1.27E-08	0.05	0.0000003	70	1.82E-09	0.06	1E-10
Benzo(g,h,i)perylene	2.11	32	1.00E-09	6.75E-08	90	8	10	1.14E-04	10	5.55E-09	0.05	0.0000001	-	-	-	-
Benzo(k)fluoranthene	1.91	32	1.00E-09	6.11E-08	90	8	10	1.14E-04	10	5.02E-09	0.05	0.0000001	70	7.18E-10	0.006	4E-12
Chrysene	4.43	32	1.00E-09	1.42E-07	90	8	10	1.14E-04	10	1.17E-08	0.05	0.0000002	70	1.66E-09	0.0006	1E-12
Dibenzo(a,h)anthracene	0.66	32	1.00E-09	2.11E-08	90	8	10	1.14E-04	10	1.74E-09	0.05	0.00000003	70	2.48E-10	0.6	1E-10
Fluoranthene	9.01	32	1.00E-09	2.88E-07	90	8	10	1.14E-04	10	2.37E-08	0.05	0.0000005	-	-	-	-
Fluorene	0.96	32	1.00E-09	3.07E-08	90	8	10	1.14E-04	10	2.52E-09	0.05	0.00000005	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	32	1.00E-09	7.97E-08	90	8	10	1.14E-04	10	6.55E-09	0.05	0.0000001	70	9.36E-10	0.06	6E-11
2-Methylnaphthalene	16.1	32	1.00E-09	5.15E-07	90	8	10	1.14E-04	10	4.23E-08	0.05	0.0000008	-	-	-	-
Naphthalene	5.38	32	1.00E-09	1.72E-07	90	8	10	1.14E-04	10	1.42E-08	0.003	0.000005	-	-	-	-
Phenanthrene	6.24	32	1.00E-09	2.00E-07	90	8	10	1.14E-04	10	1.64E-08	0.05	0.0000003	-	-	-	-
Pyrene	9.02	32	1.00E-09	2.89E-07	90	8	10	1.14E-04	10	2.37E-08	0.05	0.0000005	-	-	-	-
Arsenic	30	32	1.00E-09	9.60E-07	90	8	10	1.14E-04	10	7.89E-08	0.000015	0.005	70	1.13E-08	4.3	5E-08
Barium	408	32	1.00E-09	1.31E-05	90	8	10	1.14E-04	10	1.07E-06	0.0005	0.002	-	-	-	-
Cadmium	3.86	32	1.00E-09	1.24E-07	90	8	10	1.14E-04	10	1.02E-08	0.00001	0.001	70	1.45E-09	1.8	3E-09
Chromium	39	32	1.00E-09	1.25E-06	90	8	10	1.14E-04	10	1.03E-07	0.0001	0.001	70	1.47E-08	12	2E-07
Lead	1660	32	1.00E-09	5.31E-05	90	8	10	1.14E-04	10	4.37E-06	0.001	0.004	-	-	-	-
Mercury	3	32	1.00E-09	9.60E-08	90	8	10	1.14E-04	10	7.89E-09	0.0003	0.00003	-	-	-	-
Selenium	4.3	32	1.00E-09	1.38E-07	90	8	10	1.14E-04	10	1.13E-08	0.02	0.000001	-	-	-	-
Silver	3.5	32	1.00E-09	1.12E-07	90	8	10	1.14E-04	10	9.21E-09	0.00014	0.00007	-	-	-	-
Total									**HI =**			**0.02**	**Risk =**			**2E-07**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Inhalation of Entrained Sediment Particles (assuming exposed and dry)

Adult

Constituent	**C_{soil} (mg/kg)**	**PM_{10} (ug/m^3)**	**CF (kg/ug)**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfC (mg/m^3)**	**HQ (unitless)**	**AP [ca] (yr)**	**ADE [ca] (mg/m^3)**	**IUR [$(mg/m^3)^{-1}$]**	**Risk (unitless)**
C9-C18 Aliphatic Hydrocarbons	16.9	32	1.00E-09	5.41E-07	90	8	15	1.14E-04	15	4.44E-08	0.2	0.0000002	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	32	1.00E-09	8.74E-06	90	8	15	1.14E-04	15	7.18E-07	7	0.0000001	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	32	1.00E-09	7.39E-06	90	8	15	1.14E-04	15	6.08E-07	0.05	0.00001	-	-	-	-
Acenaphthene	1	32	1.00E-09	3.20E-08	90	8	15	1.14E-04	15	2.63E-09	0.05	0.00000005	-	-	-	-
Acenaphthylene	0.11	32	1.00E-09	3.52E-09	90	8	15	1.14E-04	15	2.89E-10	0.05	0.000000006	-	-	-	-
Anthracene	1.32	32	1.00E-09	4.22E-08	90	8	15	1.14E-04	15	3.47E-09	0.05	0.00000007	-	-	-	-
Benzo(a)anthracene	4.41	32	1.00E-09	1.41E-07	90	8	15	1.14E-04	15	1.16E-08	0.05	0.0000002	70	2.49E-09	0.06	1E-10
Benzo(a)pyrene	4.11	32	1.00E-09	1.32E-07	90	8	15	1.14E-04	15	1.08E-08	0.000002	0.005	70	2.32E-09	0.6	1E-09
Benzo(b)fluoranthene	4.84	32	1.00E-09	1.55E-07	90	8	15	1.14E-04	15	1.27E-08	0.05	0.0000003	70	2.73E-09	0.06	2E-10
Benzo(g,h,i)perylene	2.11	32	1.00E-09	6.75E-08	90	8	15	1.14E-04	15	5.55E-09	0.05	0.0000001	-	-	-	-
Benzo(k)fluoranthene	1.91	32	1.00E-09	6.11E-08	90	8	15	1.14E-04	15	5.02E-09	0.05	0.0000001	70	1.08E-09	0.006	6E-12
Chrysene	4.43	32	1.00E-09	1.42E-07	90	8	15	1.14E-04	15	1.17E-08	0.05	0.0000002	70	2.50E-09	0.0006	1E-12
Dibenzo(a,h)anthracene	0.66	32	1.00E-09	2.11E-08	90	8	15	1.14E-04	15	1.74E-09	0.05	0.00000003	70	3.72E-10	0.6	2E-10
Fluoranthene	9.01	32	1.00E-09	2.88E-07	90	8	15	1.14E-04	15	2.37E-08	0.05	0.0000005	-	-	-	-
Fluorene	0.96	32	1.00E-09	3.07E-08	90	8	15	1.14E-04	15	2.52E-09	0.05	0.00000005	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	32	1.00E-09	7.97E-08	90	8	15	1.14E-04	15	6.55E-09	0.05	0.0000001	70	1.40E-09	0.06	8E-11
2-Methylnaphthalene	16.1	32	1.00E-09	5.15E-07	90	8	15	1.14E-04	15	4.23E-08	0.05	0.0000008	-	-	-	-
Naphthalene	5.38	32	1.00E-09	1.72E-07	90	8	15	1.14E-04	15	1.42E-08	0.003	0.000005	-	-	-	-
Phenanthrene	6.24	32	1.00E-09	2.00E-07	90	8	15	1.14E-04	15	1.64E-08	0.05	0.0000003	-	-	-	-
Pyrene	9.02	32	1.00E-09	2.89E-07	90	8	15	1.14E-04	15	2.37E-08	0.05	0.0000005	-	-	-	-
Arsenic	30	32	1.00E-09	9.60E-07	90	8	15	1.14E-04	15	7.89E-08	0.000015	0.005	70	1.69E-08	4.3	7E-08
Barium	408	32	1.00E-09	1.31E-05	90	8	15	1.14E-04	15	1.07E-06	0.0005	0.002	-	-	-	-
Cadmium	3.86	32	1.00E-09	1.24E-07	90	8	15	1.14E-04	15	1.02E-08	0.00001	0.001	70	2.18E-09	1.8	4E-09
Chromium	39	32	1.00E-09	1.25E-06	90	8	15	1.14E-04	15	1.03E-07	0.0001	0.001	70	2.20E-08	12	3E-07
Lead	1660	32	1.00E-09	5.31E-05	90	8	15	1.14E-04	15	4.37E-06	0.001	0.004	-	-	-	-
Mercury	3	32	1.00E-09	9.60E-08	90	8	15	1.14E-04	15	7.89E-09	0.0003	0.00003	-	-	-	-
Selenium	4.3	32	1.00E-09	1.38E-07	90	8	15	1.14E-04	15	1.13E-08	0.02	0.000001	-	-	-	-
Silver	3.5	32	1.00E-09	1.12E-07	90	8	15	1.14E-04	15	9.21E-09	0.00014	0.00007	-	-	-	-
Total									**HI =**			**0.02**	**Risk =**			**3E-07**

Combined Ages

Total Risk =	**7E-07**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Incidental Ingestion of Surface Water

ADD = **.Fo x EF x EP x CF]/[BW x AP]**

ADD = ;-dy) (nc = non-carcinogen; ca = carcinogen)
C_{SW} = ɔncentration in surface water (mg/L)
IR = er ingestion rate (L/event).
EF = e frequency (events/yr)
EP = posure period (yr)
CF = nversion factor (yr/dy)
BW = ɜody weight (kg)
AP = eraging period (yr)

HQ = **ADD(nc)/RfD**
HI = **Sum [HQ]**
Risk = **.DD(ca) x OSF**

HQ = ıic hazard quotient (unitless)
HI = ızard index (unitless)
RfD = 'erence dose (mg/kg-dy)
Risk = ime cancer risk (unitless)
OSF = lope factor [$(mg/kg\text{-}dy)^{-1}$]

Child

Constituent	C_{SW} (mg/L)	IR (L/event)	RAFo (unitless)	EF (events/yr)	EP (yr)	CF (yr/dy)	BW (kg)	AP (nc) (yr)	ADD (nc) (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF $(mg/kg\text{-}dy)^{-1}$	Risk (unitless)
Arsenic	0.23	0.037	0.6	90	5	2.74E-03	17	5	1.23E-04	0.0003	0.4	70	8.82E-06	1.5	1E-05
Barium	4.2	0.037	1	90	5	2.74E-03	17	5	2.25E-03	0.2	0.01	-	-	-	-
Cadmium	0.0085	0.037	1	90	5	2.74E-03	17	5	4.56E-06	0.0005	0.009	-	-	-	-
Chromium	0.035	0.037	1	90	5	2.74E-03	17	5	1.88E-05	0.003	0.006	-	-	-	-
Lead	3.1	0.037	1	90	5	2.74E-03	17	5	1.66E-03	0.00075	2.2	-	-	-	-
Mercury	0.00046	0.037	1	90	5	2.74E-03	17	5	2.47E-07	0.0003	0.0008	-	-	-	-
Selenium	0.01	0.037	1	90	5	2.74E-03	17	5	5.37E-06	0.005	0.001	-	-	-	-
Silver	0.001	0.037	1	90	5	2.74E-03	17	5	5.37E-07	0.005	0.0001	-	-	-	-
Total								**HI =**			**3**	**Risk =**			**1E-05**

Youth

Constituent	C_{SW} (mg/L)	IR L/event)	RAFo (unitless)	EF (events/yr)	EP (yr)	CF (yr/dy)	BW (kg)	AP (nc) (yr)	ADD (nc) (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF $(mg/kg\text{-}dy)^{-1}$	Risk (unitless)
Arsenic	0.23	0.037	0.6	90	10	2.74E-03	40	10	5.25E-05	0.0003	0.2	70	7.49E-06	1.5	1E-05
Barium	4.2	0.037	1	90	10	2.74E-03	40	10	9.58E-04	0.2	0.005	-	-	-	-
Cadmium	0.0085	0.037	1	90	10	2.74E-03	40	10	1.94E-06	0.0005	0.004	-	-	-	-
Chromium	0.035	0.037	1	90	10	2.74E-03	40	10	7.98E-06	0.003	0.003	-	-	-	-
Lead	3.1	0.037	1	90	10	2.74E-03	40	10	7.07E-04	0.00075	0.9	-	-	-	-
Mercury	0.00046	0.037	1	90	10	2.74E-03	40	10	1.05E-07	0.0003	0.0003	-	-	-	-
Selenium	0.01	0.037	1	90	10	2.74E-03	40	10	2.28E-06	0.005	0.0005	-	-	-	-
Silver	0.001	0.037	1	90	10	2.74E-03	40	10	2.28E-07	0.005	0.0000	-	-	-	-
Total								**HI =**			**1**	**Risk =**			**1E-05**

Adult

Constituent	C_{SW} (mg/L)	IR L/event)	RAFo (unitless)	EF (events/yr)	EP (yr)	CF (yr/dy)	BW (kg)	AP (nc) (yr)	ADD (nc) (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF $(mg/kg\text{-}dy)^{-1}$	Risk (unitless)
Arsenic	0.23	0.016	0.6	90	15	2.74E-03	70	15	1.30E-05	0.0003	0.04	70	2.78E-06	1.5	4E-06
Barium	4.2	0.016	1	90	15	2.74E-03	70	15	2.37E-04	0.2	0.001	-	-	-	-
Cadmium	0.0085	0.016	1	90	15	2.74E-03	70	15	4.79E-07	0.0005	0.001	-	-	-	-
Chromium	0.035	0.016	1	90	15	2.74E-03	70	15	1.97E-06	0.003	0.0007	-	-	-	-
Lead	3.1	0.016	1	90	15	2.74E-03	70	15	1.75E-04	0.00075	0.2	-	-	-	-
Mercury	0.00046	0.016	1	90	15	2.74E-03	70	15	2.59E-08	0.0003	0.00009	-	-	-	-
Selenium	0.01	0.016	1	90	15	2.74E-03	70	15	5.64E-07	0.005	0.0001	-	-	-	-
Silver	0.001	0.016	1	90	15	2.74E-03	70	15	5.64E-08	0.005	0.00001	-	-	-	-
Total								**HI =**			**0.3**	**Risk =**			**4E-06**

Combined Ages

Total Risk =	**3E-05**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Dermal Contact with Surface Water

ADD = **[$C_{SW\text{-}diss}$ x DA_{event} x SA x EF x EP x CF]/[BW x AP]**

ADD = Average daily dose (mg/kg-dy) (nc = non-carcinogen)
C_{SW} = DISSOLVED Constituent concentration in surface water (mg/L)
DA_{event} = Dermal absorbed dose per event per unit water concentration [(mg/cm^2-event)/mg/L]
SA = Exposed skin surface area (cm^2)
EF = Exposure frequency (events/yr)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = **ADD(nc)/RfD**
HI = **Sum [HQ]**
Risk = **ADD(ca) x OSF**

HQ = Non-carcinogenic hazard quotient (unitless)
HI = Total hazard index (unitless)
RfD = Chronic reference dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Cancer oral slope factor [(mg/kg-dy)$^{-1}$]

Child

Constituent	**$C_{SW\text{-}diss}$ (mg/L)**	**DA_{event} (mg/cm^2-event)/(mg/L)**	**SA (cm^2)**	**EF (events/yr)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (nc) (yr)**	**ADD (nc) (mg/kg-dy)**	**RfD (mg/kg-dy)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF (mg/kg-dy)$^{-1}$**	**Risk (unitless)**
Arsenic	0.0031	1.00E-06	4,487	90	5	2.74E-03	17	5	2.02E-07	0.0003	0.0007	70	1.44E-08	1.5	2E-08
Barium	0.28	1.00E-06	4,487	90	5	2.74E-03	17	5	1.82E-05	0.2	0.00009	-	-	-	-
Cadmium	0.000032	1.00E-06	4,487	90	5	2.74E-03	17	5	2.08E-09	0.0005	0.000004	-	-	-	-
Chromium	0.003	2.00E-06	4,487	90	5	2.74E-03	17	5	3.91E-07	0.003	0.0001	-	-	-	-
Lead	0.011	1.00E-07	4,487	90	5	2.74E-03	17	5	7.16E-08	0.00075	0.0001	-	-	-	-
Total								**HI =**			**0.001**	**Risk =**			**2E-08**

Youth

Constituent	**$C_{SW\text{-}diss}$ (mg/L)**	**DA_{event} (mg/cm^2-event)/(mg/L)**	**SA (cm^2)**	**EF (events/yr)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (nc) (yr)**	**ADD (nc) (mg/kg-dy)**	**RfD (mg/kg-dy)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF (mg/kg-dy)$^{-1}$**	**Risk (unitless)**
Arsenic	0.0031	1.00E-06	8,323	90	10	2.74E-03	40	10	1.59E-07	0.0003	0.0005	70	2.27E-08	1.5	3E-08
Barium	0.28	1.00E-06	8,323	90	10	2.74E-03	40	10	1.44E-05	0.2	0.00007	-	-	-	-
Cadmium	0.000032	1.00E-06	8,323	90	10	2.74E-03	40	10	1.64E-09	0.0005	0.000003	-	-	-	-
Chromium	0.003	2.00E-06	8,323	90	10	2.74E-03	40	10	3.08E-07	0.003	0.0001	-	-	-	-
Lead	0.011	1.00E-07	8,323	90	10	2.74E-03	40	10	5.64E-08	0.00075	0.00008	-	-	-	-
Total								**HI =**			**0.0008**	**Risk =**			**3E-08**

Adult

Constituent	**$C_{SW\text{-}diss}$ (mg/L)**	**DA_{event} (mg/cm^2-event)/(mg/L)**	**SA (cm^2)**	**EF (events/yr)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (nc) (yr)**	**ADD (nc) (mg/kg-dy)**	**RfD (mg/kg-dy)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF (mg/kg-dy)$^{-1}$**	**Risk (unitless)**
Arsenic	0.0031	1.00E-06	9,290	90	15	2.74E-03	70	15	1.01E-07	0.0003	0.0003	70	2.17E-08	1.5	3E-08
Barium	0.28	1.00E-06	9,290	90	15	2.74E-03	70	15	9.16E-06	0.2	0.00005	-	-	-	-
Cadmium	0.000032	1.00E-06	9,290	90	15	2.74E-03	70	15	1.05E-09	0.0005	0.000002	-	-	-	-
Chromium	0.003	2.00E-06	9,290	90	15	2.74E-03	70	15	1.96E-07	0.003	0.00007	-	-	-	-
Lead	0.011	1.00E-07	9,290	90	15	2.74E-03	70	15	3.60E-08	0.00075	0.00005	-	-	-	-
Total								**HI =**			**0.0005**	**Risk =**			**3E-08**

Combined Ages

Total Risk =	**9E-08**

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Dermal Contact with Surface Water

Calculation of DA_{event}

For metals: $\boxed{DA_{event} = K_p \cdot C_w \cdot t_{event}}$ for $t_{event} < t^*$

DA_{event} = Dermal absorption per event per mg/cm^3 [(mg/cm^2-event)/(mg/cm^3)]

K_p = Dermal permeability constant (cm/hr)

C_w = Chemical concentration in water (1 mg/cm^3 assumed)

t_{event} = Event duration (hr/event)

Constituent	K_p (cm/hr)	t_{event} [1] (hr/event)	Cw mg/cm^3	DA_{event} [mg/cm^2-event]/[mg/cm^3]	DA_{event} [mg/cm^2-event]/[mg/L]
Arsenic	0.001	1.00	1	1.00E-03	1.00E-06
Barium	0.001	1.00	1	1.00E-03	1.00E-06
Cadmium	0.001	1.00	1	1.00E-03	1.00E-06
Chromium	0.002	1.00	1	2.00E-03	2.00E-06
Lead	0.0001	1.00	1	1.00E-04	1.00E-07

Equations from: US EPA (2004a). Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual (Part E: Supplemental Guidance for Dermal Risk Assessment). (EPA/540/R/99/005, July).

[1]. Assumed one hour cumulative exposure to surface water per event.

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Constituent Factors

Constituent	Sediment Exposure Point Concentrations C_S (mg/kg)	Dissolved Surface Water Exposure Point Concentrations C_{SW} (mg/L)	Total Surface Water Exposure Point Concentrations C_{SW} (mg/L)	Fish Bioconcentration Factor [1] (BCF_{fish}) (L/kg)
C9-C18 Aliphatic Hydrocarbons	16.9	--	--	--
C19-C36 Aliphatic Hydrocarbons	273	--	--	--
C11-C22 Aromatic Hydrocarbons	231	--	--	--
Acenaphthene	1	--	--	201
Acenaphthylene	0.11	--	--	--
Anthracene	1.32	--	--	582
Benzo(a)anthracene	4.41	--	--	4,886
Benzo(a)pyrene	4.11	--	--	8,318
Benzo(b)fluoranthene	4.84	--	--	10,400
Benzo(g,h,i)perylene	2.11	--	--	--
Benzo(k)fluoranthene	1.91	--	--	9,930
Chrysene	4.43	--	--	4,890
Dibenzo(a,h)anthracene	0.66	--	--	20,183
Fluoranthene	9.01	--	--	1,410
Fluorene	0.96	--	--	342
Indeno(1,2,3-cd)pyrene	2.49	--	--	24,100
2-Methylnaphthalene	16.1	--	--	--
Naphthalene	5.38	--	--	69.3
Phenanthrene	6.24	--	--	582
Pyrene	9.02	--	--	1,180
Arsenic	30	0.0031	0.23	114
Barium	408	0.28	4.2	633
Cadmium	3.86	0.000032	0.0085	907
Chromium	39	0.003	0.035	19
Lead	1660	0.011	3.1	0.09
Mercury	3	--	0.00046	NE
Selenium	4.3	--	0.01	129
Silver	3.5	--	0.001	87.7

1. From various sources; refer to text.
"--" Not detected or not needed.
NE Not established.

Risk Assessment Calculations
Recreational Trespassers
375 Banfield Road, Portsmouth, New Hampshire

Toxicity Values and Relative Absorption Factors

Constituent	Carcinogenic Weight of Evidence Category [1]	Chronic Oral Reference Dose (RfD) (mg/kg-dy)	Chronic Inhalation Reference Concentration (RfC) (mg/m^3)	Oral Cancer Slope Factor (OSF) $[(mg/kg\text{-}dy)^{-1}]$	Inhalation Cancer Unit Risk (IUR) $[(mg/m^3)^{-1}]$	Soil Relative Absorption Factors (RAF) [7] (unitless)	
						Oral	Dermal
C9-C18 Aliphatic Hydrocarbons	Not evaluated	0.1 [5]	0.2 [2]	-	-	1 [5]	0.2 [5]
C19-C36 Aliphatic Hydrocarbons	Not evaluated	2 [5]	7 [3]	-	-	1 [5]	0.2 [5]
C11-C22 Aromatic Hydrocarbons	Not evaluated	0.03 [5]	0.05 [2]	-	-	0.3 [5]	0.1 [5]
Acenaphthene	Not evaluated	6.0E-02 [2]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Acenaphthylene	D	3.0E-02 [5]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Anthracene	D	3.0E-01 [2]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Benzo(a)anthracene	B2	3.0E-02 [5]	5.0E-02 [5]	0.1 [2]	0.06 **[2]**	0.91 [6]	0.143 [6]
Benzo(a)pyrene	B2	3.0E-04 [2]	2.0E-06 [2]	1 [2]	0.6 [2]	0.91 [6]	0.143 [6]
Benzo(b)fluoranthene	B2	3.0E-02 [5]	5.0E-02 [5]	0.1 [2]	0.06 [2]	0.91 [6]	0.143 [6]
Benzo(g,h,i)perylene	Not evaluated	3.0E-02 [5]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Benzo(k)fluoranthene	B2	3.0E-02 [5]	5.0E-02 [5]	0.01 [2]	0.006 [2]	0.91 [6]	0.143 [6]
Chrysene	B2	3.0E-02 [5]	5.0E-02 [5]	0.001 [2]	0.0006 [2]	0.91 [6]	0.143 [6]
Dibenzo(a,h)anthracene	D	3.0E-02 [5]	5.0E-02 [5]	1 [2]	0.6 [2]	0.91 [6]	0.143 [6]
Fluoranthene	D	4.0E-02 [2]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Fluorene	d	4.0E-02 [2]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Indeno(1,2,3-cd)pyrene	B2	3.0E-02 [5]	5.0E-02 [5]	0.1 [2]	0.06 [2]	0.91 [6]	0.143 [6]
2-Methylnaphthalene	C	4.0E-03 [2]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Naphthalene	C	2.0E-02 [2]	3.0E-03 [2]	-	-	1 [6]	0.13 [6]
Phenanthrene	D	3.0E-02 [5]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Pyrene	D	3.0E-02 [2]	5.0E-02 [5]	-	-	1 [6]	0.13 [6]
Arsenic	A	3.0E-04 [2]	1.5E-05 [6]	1.5 [2]	4.3 [2]	0.6 [6]	0.03 [6]
Barium	Not evaluated	2.0E-01 [2]	5.0E-04 [2]	-	-	1 [6]	0.2 [6]
Cadmium	B1	5.0E-04 [2]	1.0E-05 [2]	- [2]	1.8 [2]	1 [6]	0.04 [6]
Chromium	B2 as hexavalent	3.0E-03 [2]	1.0E-04 [2]	-	12 [2]	1 [6]	0.01 [6]
Lead	B2	7.5E-04 [5]	1.0E-03 [2]	-	-	1 [5]	0.006 [4]
Mercury	D	3.0E-04 [2]	3.0E-04 [2]	-	-	1 [6]	0.17 [6]
Selenium	D	5.0E-03 [2]	2.0E-02 [6]	-	-	1 [6]	0.01 [6]
Silver	D	5.0E-03 [2]	1.4E-04 [2]	-	-	1 [6]	0.25 [6]

[1]. U.S. EPA's Weight of Evidence Category with respect to human carcinogenicity:
A = known human carcinogen
B1/B2 = probable human carcinogen
C = possible human carcinogen
D = not classifiable as to human carcinogenicity.

[2] Integrated Risk Information System (IRIS) (EPA 2021).

[3]. Calculated from oral toxicity value assuming 70 kg body weight and 20 m^3/day inh

[4]. Lead dermal absorption factor from MassDEP (2014).

[5].From MassDEP (2014).

[6]. US EPA Regional Screening Level Table (May 2021).

"-" Not applicable or available.

APPENDIX D

Risk Assessment Calculations
Fish Consumers

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Summary

Exposure Pathway	Non-Carcinogenic Hazard Index			Excess Lifetime Cancer Risk			
	Child	Youth	Adult	Child	Youth	Adult	Combined Ages
Recreational Fish Consumption - Dissolved Metals	0.6	0.5	0.4	1E-05	2E-05	3E-05	7E-05
Recreational Fish Consumption - Total Metals (Hg only)	10	9	7.6	--	--	--	--
Recreational Fish Consumption - Organics	0.7	0.6	0.5	3E-07	5E-07	6E-07	1E-06
Total (All Pathways)	**12**	**10**	**9**	**1E-05**	**2E-05**	**3E-05**	**7E-05**
Maximum Acceptable Level	**1**			**1E-05**			

Cancer risks are driven by arsenic accumulation in fish; probably in less toxic organic form.

"-" indicates that there were no carcinogens in this category.

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Fish Consumption (Estimated from Dissolved Surface Water Concentrations)

C_{fish} = $C_{sw\text{-}diss}$ x BCF_{fish}

C_{fish} = Constituent concentration in fish tissue (mg/kg)
$C_{sw\text{-}diss}$ = Constituent concentraion in dissolved surface water (mg/L)
BCFfish = Fish Bioconcentration Factor (L/kg)

ADD = [C_{fish} x IR x RAFo x EF x ED x EP x CF] / [BW x AP]

ADD = Average daily dose (mg/kg-dy) (ca = carcinogens, nc = non-carcinogens)
C_{fish} = Constituent concentration in fish (mg/kg)
IR = Fish ingestion rate (kg/day)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = ADD(nc)/RfD
HI = Sum [HQ]
Risk = ADD(ca) x OSF

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Child

Constituent	$C_{sw\text{-}diss}$ (mg/L)	BCF_{fish} (L/kg)	C_{fish} (mg/kg)	IR (kg/dy)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-1}$]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11-C22 Aromatic Hydrocarbons	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.0031	114	0.35	0.113	0.6	20	1	5	2.74E-03	17	5	7.72E-05	0.0003	0.3	70	9.19E-06	1.5	1E-05
Barium	0.28	633	177	0.113	1.0	20	1	5	2.74E-03	17	5	6.46E-02	0.2	0.3	-	-	-	-
Cadmium	0.000032	907	0.03	0.113	1.0	20	1	5	2.74E-03	17	5	1.06E-05	0.0005	0.02	-	-	-	-
Chromium	0.003	19	0.06	0.113	1.0	20	1	5	2.74E-03	17	5	2.08E-05	0.003	0.007	-	-	-	-
Lead	0.011	0.09	0.001	0.113	1.0	20	1	5	2.74E-03	17	5	3.61E-07	0.00075	0.0005	-	-	-	-
Mercury	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total											**HI =**			**0.6**	**Risk =**			**1E-05**

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Fish Consumption (Estimated from Dissolved Surface Water Concentrations)

Youth

Constituent	$C_{sw-diss}$ (mg/L)	BCF_{fish} (L/kg)	C_{fish} (mg/kg)	IR (kg/dy)	RAFo (unitless)	EF (events/year)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF $[(mg/kg\text{-}dy)^{-1}]$	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11-C22 Aromatic Hydrocarbons	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.0031	114	0.35	0.227	0.6	20	1	10	2.74E-03	40	10	6.59E-05	0.0003	0.2	70	1.57E-05	1.5	2E-05
Barium	0.28	633	177	0.227	1.0	20	1	10	2.74E-03	40	10	5.51E-02	0.2	0.3	-	-	-	-
Cadmium	0.000032	907	0.03	0.227	1.0	20	1	10	2.74E-03	40	10	9.03E-06	0.0005	0.02	-	-	-	-
Chromium	0.003	19	0.06	0.227	1.0	20	1	10	2.74E-03	40	10	1.77E-05	0.003	0.006	-	-	-	-
Lead	0.011	0.09	0.001	0.227	1.0	20	1	10	2.74E-03	40	10	3.08E-07	0.00075	0.0004	-	-	-	-
Mercury	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total											**HI =**			**0.5**	**Risk =**			**2E-05**

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Fish Consumption (Estimated from Dissolved Surface Water Concentrations)

Adult

Constituent	$C_{sw\text{-}diss}$ (mg/L)	BCF_{fish} (L/kg)	C_{fish} (mg/kg)	IR (kg/dy)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-1}$]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11-C22 Aromatic Hydrocarbons	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.0031	114	0.35	0.34	0.6	20	1	15	2.74E-03	70	15	5.64E-05	0.0003	0.2	70	2.02E-05	1.5	3E-05
Barium	0.28	633	177	0.34	1.0	20	1	15	2.74E-03	70	15	4.72E-02	0.2	0.2	-	-	-	-
Cadmium	0.000032	907	0.03	0.34	1.0	20	1	15	2.74E-03	70	15	7.72E-06	0.0005	0.02	-	-	-	-
Chromium	0.003	19	0.06	0.34	1.0	20	1	15	2.74E-03	70	15	1.52E-05	0.003	0.005	-	-	-	-
Lead	0.011	0.09	0.001	0.34	1.0	20	1	15	2.74E-03	70	15	2.63E-07	0.00075	0.0004	-	-	-	-
Mercury	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total											**HI =**			**0.4**	**Risk =**			**3E-05**

Combined ages

Total Risk	**7E-05**

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Fish Consumption (Estimated from Sediment Concentrations)

C_{fish} = C_{sed} x BCF_{fish}

C_{fish} = Constituent concentration in fish tissue (mg/kg)
C_{sed} = Constituent concentration in sediment (mg/kg)
BCFfish = Fish Bioconcentration Factor (L/kg)

ADD = [C_{fish} x IR x RAFo x EF x ED x EP x CF] / [BW x AP]

ADD = Average daily dose (mg/kg-dy) (nc = non-carcinogens)
C_{fish} = Constituent concentration in fish (mg/kg)
IR = Fish ingestion rate (kg/day)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = ADD(nc)/RfD
HI = Sum [HQ]

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)

No carcinogens assessed.

Child

Constituent	C_{sed} (mg/kg)	BSAF (unitless)	C_{fish} (mg/kg)	IR (kg/dy)	RAFo	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)
Mercury	3	2.868	8.604	0.113	1.0	20	1	5	2.74E-03	17	5	3.13E-03	0.0003	10
Selenium	4.3	na	-	-	-	-	-	-	-	-	-	-	-	-
Silver	3.5	na	-	-	-	-	-	-	-	-	-	-	-	-
Total											**HI =**			**10**

Youth

Constituent	C_{sed} (mg/kg)	BSAF (unitless)	C_{fish} (mg/kg)	IR (kg/dy)	RAFo	EF (events/year)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)
Mercury	3	2.868	8.604	0.227	1.0	20	1	10	2.74E-03	40	10	2.68E-03	0.0003	9
Selenium	4.3	na			-		-	-	-	-	-	-	-	-
Silver	3.5	na			-		-	-	-	-	-	-	-	-
Total											**HI =**			**9**

Adult

Constituent	C_{sed} (mg/kg)	BSAF (unitless)	C_{fish} (mg/kg)	IR (kg/dy)	RAFo	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)
Mercury	3	2.868	8.604	0.34	1.0	20	1	15	2.74E-03	70	15	2.29E-03	0.0003	8
Selenium	4.3	NA	-	-	-	-	-	-	-	-	-	-	-	-
Silver	3.5	NA	-	-	-	-	-	-	-	-	-	-	-	-
Total											**HI =**			**8**

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Fish Consumption (Estimated from Sediment Concentrations)

C_{fish} = BSAF x Csed x [% $_{lipid/\ \%\ OC}$]

C_{fish} = Constituent concentration in fish tissue (mg/kg)
BSAF = Biota-Sediment Accumulation Factor (mg lipids/mg sediment organic carbon)
C_{sed} = Constituent concentration in sediment (mg/kg)
% lipids = Assumed lipid content of fish (percent)
% OC = Averaged total organic carbon in sediment (percent)

ADD = [$C_{fish\ x}$ IR x RAFo x EF x ED x EP x CF] / [BW x AP]

ADD = Average daily dose (mg/kg-dy) (ca = carcinogens, nc = non-carcinogens)
C_{fish} = Constituent concentration in fish (mg/kg)
IR = Fish ingestion rate (kg/day)
RAFo = Oral absorption factor (unitless)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = ADD(nc)/RfD
HI = Sum [HQ]
Risk = ADD(ca) x OSF

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Child

Constituent	C_{sed} (mg chem/ kg sed)	Sediment Total Organic Carbon (percent)	BSAF (mg lipids/ mg OC)	Assumed Fish Lipid Fraction (percent)	C_{fish} (mg chem/kg fish, ww)	IR (kg/dy)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-1}$]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	16.9	11	4.60E-01	10.6	7.49E+00	0.113	1.00	20	1	5	2.74E-03	17	5	2.73E-03	0.1	0.03	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	11	4.60E-01	10.6	1.21E+02	0.113	1.00	20	1	5	2.74E-03	17	5	4.41E-02	2	0.02	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	11	4.60E-01	10.6	1.02E+02	0.113	0.30	20	1	5	2.74E-03	17	5	1.12E-02	0.03	0.4	-	-	-	-
Acenaphthene	1.0	11	2.17E-01	10.6	2.09E-01	0.113	1.00	20	1	5	2.74E-03	17	5	7.62E-05	0.06	0.001	-	-	-	-
Acenaphthylene	0.11	11	1.08E-01	10.6	1.14E-02	0.113	1.00	20	1	5	2.74E-03	17	5	4.17E-06	0.03	0.0001	-	-	-	-
Anthracene	1.32	11	5.99E-02	10.6	7.62E-02	0.113	1.00	20	1	5	2.74E-03	17	5	2.78E-05	0.3	0.00009	-	-	-	-
Benzo(a)anthracene	4.41	11	5.61E-03	10.6	2.38E-02	0.113	0.91	20	1	5	2.74E-03	17	5	7.90E-06	0.03	0.0003	70	6.20E-07	0.1	6E-08
Benzo(a)pyrene	4.11	11	1.25E-03	10.6	4.95E-03	0.113	0.91	20	1	5	2.74E-03	17	5	1.64E-06	0.0003	0.005	70	1.29E-07	1	1E-07
Benzo(b)fluoranthene	4.84	11	1.56E-03	10.6	7.28E-03	0.113	0.91	20	1	5	2.74E-03	17	5	2.41E-06	0.03	0.00008	70	1.89E-07	0.1	2E-08
Benzo(g,h,i)perylene	2.11	11	6.36E-03	10.6	1.29E-02	0.113	1.00	20	1	5	2.74E-03	17	5	4.71E-06	0.03	0.0002	-	-	-	-
Benzo(k)fluoranthene	1.91	11	1.86E-02	10.6	3.42E-02	0.113	0.91	20	1	5	2.74E-03	17	5	1.13E-05	0.03	0.0004	70	8.91E-07	0.01	9E-09
Chrysene	4.43	11	4.23E-03	10.6	1.81E-02	0.113	0.91	20	1	5	2.74E-03	17	5	5.99E-06	0.03	0.0002	70	4.70E-07	0.001	5E-10
Dibenzo(a,h)anthracene	0.66	11	1.17E-03	10.6	7.44E-04	0.113	0.91	20	1	5	2.74E-03	17	5	2.47E-07	0.03	0.000008	70	1.94E-08	1	2E-08
Fluoranthene	9.01	11	1.26E-02	10.6	1.09E-01	0.113	1.00	20	1	5	2.74E-03	17	5	3.98E-05	0.04	0.001	-	-	-	-
Fluorene	0.96	11	4.02E-03	10.6	3.72E-03	0.113	1.00	20	1	5	2.74E-03	17	5	1.35E-06	0.04	0.00003	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	11	5.34E-03	10.6	1.28E-02	0.113	0.91	20	1	5	2.74E-03	17	5	4.25E-06	0.03	0.0001	70	3.33E-07	0.1	3E-08
2-Methylnaphthalene	16.1	11	1.60E-01	10.6	2.48E+00	0.113	1.00	20	1	5	2.74E-03	17	5	9.04E-04	0.004	0.2	-	-	-	-
Naphthalene	5.38	11	3.98E-01	10.6	2.06E+00	0.113	1.00	20	1	5	2.74E-03	17	5	7.52E-04	0.02	0.04	-	-	-	-
Phenanthrene	6.24	11	3.95E-02	10.6	2.38E-01	0.113	1.00	20	1	5	2.74E-03	17	5	8.65E-05	0.03	0.003	-	-	-	-
Pyrene	9.02	11	1.25E-03	10.6	1.09E-02	0.113	1.00	20	1	5	2.74E-03	17	5	3.96E-06	0.03	0.0001	-	-	-	-
Arsenic	30	-	--	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	408	-	--	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	3.86	-	--	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	39	-	--	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	1660	-	--	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	3	-	--	-	nc		-	-	-	-	-	-	-		-	-	-	-	-	-
Selenium	4.3	-	--	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	3.5	-	--	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total													**HI =**			**0.7**	**Risk =**			**3E-07**

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Fish Consumption (Estimated from Sediment Concentrations)

Youth

Constituent	C_{sed} (mg chem/ kg sed)	Sediment Total Organic Carbon (percent)	BSAF (mg lipids/ mg OC	Assumed Fish Lipid Fraction (percent)	C_{fish} (mg chem/kg fish, ww)	IR (kg/dy)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)-1]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	16.9	11	4.60E-01	10.6	7.49E+00	0.227	1.00	20	1	10	2.74E-03	40	10	2.33E-03	0.1	0.02	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	11	4.60E-01	10.6	1.21E+02	0.227	1.00	20	1	10	2.74E-03	40	10	3.76E-02	2	0.02	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	11	4.60E-01	10.6	1.02E+02	0.227	0.30	20	1	10	2.74E-03	40	10	9.55E-03	0.03	0.3	-	-	-	-
Acenaphthene	1	11	2.17E-01	10.6	2.09E-01	0.227	1.00	20	1	10	2.74E-03	40	10	6.50E-05	0.06	0.001	-	-	-	-
Acenaphthylene	0.11	11	1.08E-01	10.6	1.14E-02	0.227	1.00	20	1	10	2.74E-03	40	10	3.56E-06	0.03	0.0001	-	-	-	-
Anthracene	1.32	11	5.99E-02	10.6	7.62E-02	0.227	1.00	20	1	10	2.74E-03	40	10	2.37E-05	0.3	0.00008	-	-	-	-
Benzo(a)anthracene	4.41	11	5.61E-03	10.6	2.38E-02	0.227	0.91	20	1	10	2.74E-03	40	10	6.75E-06	0.03	0.0002	70	1.06E-06	0.1	1E-07
Benzo(a)pyrene	4.11	11	1.25E-03	10.6	4.95E-03	0.227	0.91	20	1	10	2.74E-03	40	10	1.40E-06	0.0003	0.005	70	2.20E-07	1	2E-07
Benzo(b)fluoranthene	4.84	11	1.56E-03	10.6	7.28E-03	0.227	0.91	20	1	10	2.74E-03	40	10	2.06E-06	0.03	0.00007	70	3.23E-07	0.1	3E-08
Benzo(g,h,i)perylene	2.11	11	6.36E-03	10.6	1.29E-02	0.227	1.00	20	1	10	2.74E-03	40	10	4.02E-06	0.03	0.0001	-	-	-	-
Benzo(k)fluoranthene	1.91	11	1.86E-02	10.6	3.42E-02	0.227	0.91	20	1	10	2.74E-03	40	10	9.69E-06	0.03	0.0003	70	1.52E-06	0.01	2E-08
Chrysene	4.43	11	4.23E-03	10.6	1.81E-02	0.227	0.91	20	1	10	2.74E-03	40	10	5.11E-06	0.03	0.0002	70	8.02E-07	0.001	8E-10
Dibenzo(a,h)anthracene	0.66	11	1.17E-03	10.6	7.44E-04	0.227	0.91	20	1	10	2.74E-03	40	10	2.11E-07	0.03	0.000007	70	3.31E-08	1	3E-08
Fluoranthene	9.01	11	1.26E-02	10.6	1.09E-01	0.227	1.00	20	1	10	2.74E-03	40	10	3.40E-05	0.04	0.0009	-	-	-	-
Fluorene	0.96	11	4.02E-03	10.6	3.72E-03	0.227	1.00	20	1	10	2.74E-03	40	10	1.16E-06	0.04	0.00003	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	11	5.34E-03	10.6	1.28E-02	0.227	0.91	20	1	10	2.74E-03	40	10	3.63E-06	0.03	0.0001	70	5.69E-07	0.1	6E-08
2-Methylnaphthalene	16.1	11	1.60E-01	10.6	2.48E+00	0.227	1.00	20	1	10	2.74E-03	40	10	7.72E-04	0.004	0.2	-	-	-	-
Naphthalene	5.38	11	3.98E-01	10.6	2.06E+00	0.227	1.00	20	1	10	2.74E-03	40	10	6.42E-04	0.02	0.03	-	-	-	-
Phenanthrene	6.24	11	3.95E-02	10.6	2.38E-01	0.227	1.00	20	1	10	2.74E-03	40	10	7.39E-05	0.03	0.002	-	-	-	-
Pyrene	9.02	11	1.25E-03	10.6	1.09E-02	0.227	1.00	20	1	10	2.74E-03	40	10	3.38E-06	0.03	0.0001	-	-	-	-
Arsenic	30	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	408	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	3.86	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	39	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	1660	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	3	-	-	-	nc		-	-	-	-	-	-	-		-	-	-	-	-	-
Selenium	4.3	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	3.5	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total													**HI =**			**0.6**	**Risk =**			**5E-07**

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Fish Consumption (Estimated from Sediment Concentrations)

Adult

Constituent	C_{sed} (mg chem/ kg sed)	Sediment Total Organic Carbon (percent)	BSAF (mg lipids/ mg	Assumed Fish Lipid Fraction (percent)	C_{fish} (mg chem/kg	IR (kg/dy)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-1}$]	Risk (unitless)
C9-C18 Aliphatic Hydrocarbons	16.9	11	4.60E-01	10.6	7.49E+00	0.34	1.00	20	1	15	2.74E-03	70	15	1.99E-03	0.1	0.02	-	-	-	-
C19-C36 Aliphatic Hydrocarbons	273	11	4.60E-01	10.6	1.21E+02	0.34	1.00	20	1	15	2.74E-03	70	15	3.22E-02	2	0.02	-	-	-	-
C11-C22 Aromatic Hydrocarbons	231	11	4.60E-01	10.6	1.02E+02	0.34	0.30	20	1	15	2.74E-03	70	15	8.18E-03	0.03	0.3	-	-	-	-
Acenaphthene	1	11	2.17E-01	10.6	2.09E-01	0.34	1.00	20	1	15	2.74E-03	70	15	5.57E-05	0.06	0.0009	-	-	-	-
Acenaphthylene	0.11	11	1.08E-01	10.6	1.14E-02	0.34	1.00	20	1	15	2.74E-03	70	15	3.05E-06	0.03	0.0001	-	-	-	-
Anthracene	1.32	11	5.99E-02	10.6	7.62E-02	0.34	1.00	20	1	15	2.74E-03	70	15	2.03E-05	0.3	0.00007	-	-	-	-
Benzo(a)anthracene	4.41	11	5.61E-03	10.6	2.38E-02	0.34	0.91	20	1	15	2.74E-03	70	15	5.77E-06	0.03	0.0002	70	1.36E-06	0.1	1E-07
Benzo(a)pyrene	4.11	11	1.25E-03	10.6	4.95E-03	0.34	0.91	20	1	15	2.74E-03	70	15	1.20E-06	0.0003	0.004	70	2.82E-07	1	3E-07
Benzo(b)fluoranthene	4.84	11	1.56E-03	10.6	7.28E-03	0.34	0.91	20	1	15	2.74E-03	70	15	1.76E-06	0.03	0.00006	70	4.15E-07	0.1	4E-08
Benzo(g,h,i)perylene	2.11	11	6.36E-03	10.6	1.29E-02	0.34	1.00	20	1	15	2.74E-03	70	15	3.44E-06	0.03	0.0001	-	-	-	-
Benzo(k)fluoranthene	1.91	11	1.86E-02	10.6	3.42E-02	0.34	0.91	20	1	15	2.74E-03	70	15	8.29E-06	0.03	0.0003	70	1.95E-06	0.01	2E-08
Chrysene	4.43	11	4.23E-03	10.6	1.81E-02	0.34	0.91	20	1	15	2.74E-03	70	15	4.37E-06	0.03	0.0001	70	1.03E-06	0.001	1E-09
Dibenzo(a,h)anthracene	0.66	11	1.17E-03	10.6	7.44E-04	0.34	0.91	20	1	15	2.74E-03	70	15	1.80E-07	0.03	0.000006	70	4.24E-08	1	4E-08
Fluoranthene	9.01	11	1.26E-02	10.6	1.09E-01	0.34	1.00	20	1	15	2.74E-03	70	15	2.91E-05	0.04	0.0007	-	-	-	-
Fluorene	0.96	11	4.02E-03	10.6	3.72E-03	0.34	1.00	20	1	15	2.74E-03	70	15	9.90E-07	0.04	0.00002	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.49	11	5.34E-03	10.6	1.28E-02	0.34	0.91	20	1	15	2.74E-03	70	15	3.10E-06	0.03	0.0001	70	7.31E-07	0.1	7E-08
2-Methylnaphthalene	16.1	11	1.60E-01	10.6	2.48E+00	0.34	1.00	20	1	15	2.74E-03	70	15	6.61E-04	0.004	0.2	-	-	-	-
Naphthalene	5.38	11	3.98E-01	10.6	2.06E+00	0.34	1.00	20	1	15	2.74E-03	70	15	5.49E-04	0.02	0.03	-	-	-	-
Phenanthrene	6.24	11	3.95E-02	10.6	2.38E-01	0.34	1.00	20	1	15	2.74E-03	70	15	6.32E-05	0.03	0.002	-	-	-	-
Pyrene	9.02	11	1.25E-03	10.6	1.09E-02	0.34	1.00	20	1	15	2.74E-03	70	15	2.89E-06	0.03	0.0001	-	-	-	-
Arsenic	30	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	408	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	3.86	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	39	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	1660	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	3	-	-	-	nc		-	-	-	-	-	-	-		-	-	-	-	-	-
Selenium	4.3	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	3.5	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total													**HI =**			**0.5**	**Risk =**			**6E-07**

Combined Ages

Total Risk =	**1E-06**

NC = Not calculated; another method used.

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Constituent Factors

Constituent	Sediment Exposure Point Concentrations C_S (mg/kg)	Dissolved Surface Water Exposure Point Concentrations C_{SW} (mg/L)	Fish Bioconcentration Factor [1] (BCF_{fish}) (L/kg)	Biota-Sediment Accumulation Factor [2] BSAF (kg organic carbon/ kg lipid)
C9-C18 Aliphatic Hydrocarbons	16.9	--	--	0.46
C19-C36 Aliphatic Hydrocarbons	273	--	--	0.46
C11-C22 Aromatic Hydrocarbons	231	--	--	0.46
Acenaphthene	1	--	201	0.217
Acenaphthylene	0.11	--	--	0.108
Anthracene	1.32	--	582	0.0599
Benzo(a)anthracene	4.41	--	4886	0.0056
Benzo(a)pyrene	4.11	--	8318	0.00125
Benzo(b)fluoranthene	4.84	--	10400	0.00156
Benzo(g,h,i)perylene	2.11	--	--	0.00636
Benzo(k)fluoranthene	1.91	--	9930	0.0186
Chrysene	4.43	--	4890	0.00423
Dibenzo(a,h)anthracene	0.66	--	20183	0.00117
Fluoranthene	9.01	--	1410	0.0126
Fluorene	0.96	--	342	0.00402
Indeno(1,2,3-cd)pyrene	2.49	--	24100	0.00534
2-Methylnaphthalene	16.1	--	--	0.16
Naphthalene	5.38	--	69.3	0.398
Phenanthrene	6.24	--	582	0.0395
Pyrene	9.02	--	1180	0.00125
Arsenic	30	0.0031	114	--
Barium	408	0.28	633	--
Cadmium	3.86	0.000032	907	--
Chromium	39	0.003	19	--
Lead	1660	0.011	0.09	--
Mercury	3	--	NE	2.868 (inverts)
Selenium	4.3	--	129	--
Silver	3.5	--	87.7	--

1. US EPA (2005). Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA530-R-05-005); accompanying database.
2. US EPA ORD BSAF DataSet.
3. US DOE Oak Ridge.

"--" Not detected or not needed.

Risk Assessment Calculations
Fish Consumers
375 Banfield Road, Portsmouth, New Hampshire

Toxicity Values and Relative Absorption Factors

Constituent	Carcinogenic Weight of Evidence Category [1]	Chronic Oral Reference Dose (RfD) (mg/kg-dy)		Chronic Inhalation Reference Concentration (RfC) (mg/m^3)		Oral Cancer Slope Factor (OSF) [(mg/kg-dy)$^{-1}$]		Inhalation Cancer Unit Risk (IUR) [(mg/m^3)$^{-1}$]		Soil Relative Absorption Factors (RAF) [2] (unitless)			
										Oral		Dermal	
C9-C18 Aliphatic Hydrocarbons	Not evaluated	0.1	[5]	0.2	[2]	-		-		1	[5]	0.2	[5]
C19-C36 Aliphatic Hydrocarbons	Not evaluated	2	[5]	7	[3]	-		-		1	[5]	0.2	[5]
C11-C22 Aromatic Hydrocarbons	Not evaluated	0.03	[5]	0.05	[2]	-		-		0.3	[5]	0.1	[5]
Acenaphthene	Not evaluated	6.0E-02	[2]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Acenaphthylene	D	3.0E-02	[5]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Anthracene	D	3.0E-01	[2]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Benzo(a)anthracene	B2	3.0E-02	[5]	5.0E-02	[5]	0.1	[2]	0.06	**[2]**	0.91	[6]	0.143	[6]
Benzo(a)pyrene	B2	3.0E-04	[2]	2.0E-06	[2]	1	[2]	0.6	[2]	0.91	[6]	0.143	[6]
Benzo(b)fluoranthene	B2	3.0E-02	[5]	5.0E-02	[5]	0.1	[2]	0.06	[2]	0.91	[6]	0.143	[6]
Benzo(g,h,i)perylene	Not evaluated	3.0E-02	[5]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Benzo(k)fluoranthene	B2	3.0E-02	[5]	5.0E-02	[5]	0.01	[2]	0.006	[2]	0.91	[6]	0.143	[6]
Chrysene	B2	3.0E-02	[5]	5.0E-02	[5]	0.001	[2]	0.0006	[2]	0.91	[6]	0.143	[6]
Dibenzo(a,h)anthracene	D	3.0E-02	[5]	5.0E-02	[5]	1	[2]	0.6	[2]	0.91	[6]	0.143	[6]
Fluoranthene	D	4.0E-02	[2]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Fluorene	d	4.0E-02	[2]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Indeno(1,2,3-cd)pyrene	B2	3.0E-02	[5]	5.0E-02	[5]	0.1	[2]	0.06	[2]	0.91	[6]	0.143	[6]
2-Methylnaphthalene	C	4.0E-03	[2]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Naphthalene	C	2.0E-02	[2]	3.0E-03	[2]	-		-		1	[6]	0.13	[6]
Phenanthrene	D	3.0E-02	[5]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Pyrene	D	3.0E-02	[2]	5.0E-02	[5]	-		-		1	[6]	0.13	[6]
Arsenic	A	3.0E-04	[2]	1.5E-05	[6]	1.5	[2]	4.3	[2]	0.6	[6]	0.03	[6]
Barium	Not evaluated	2.0E-01	[2]	5.0E-04	[2]	-		-		1	[6]	0.2	[6]
Cadmium	B1	5.0E-04	[2]	1.0E-05	[2]	-	[2]	1.8	[2]	1	[6]	0.04	[6]
Chromium	B2 as hexavalent	3.0E-03	[2]	1.0E-04	[2]	-		12	[2]	1	[6]	0.01	[6]
Lead	B2	7.5E-04	[5]	1.0E-03	[2]	-		-		1	[5]	0.006	[4]
Mercury	D	3.0E-04	[2]	3.0E-04	[2]	-		-		1	[6]	0.17	[6]
Selenium	D	5.0E-03	[2]	2.0E-02	[6]	-		-		1	[6]	0.01	[6]
Silver	D	5.0E-03	[2]	1.4E-04	[2]	-		-		1	[6]	0.25	[6]

[1]. U.S. EPA's Weight of Evidence Category with respect to human carcinogenicity:
A = known human carcinogen
B1/B2 = probable human carcinogen
C = possible human carcinogen
D = not classifiable as to human carcinogenicity.

[2] Integrated Risk Information System (IRIS) (EPA 2021).

[3]. Calculated from oral toxicity value assuming 70 kg body weight and 20 m^3/day inha

[4]. Lead dermal absorption factor from MassDEP (2014).

[5].From MassDEP (2014).

[6]. US EPA Regional Screening Level Table (May 2021).

[7]. NHDES (2013) Methodology for Calculating Direct Contact Risk-based Soil Concentrations.

"-" Not applicable or available.

APPENDIX J

Human Health Risk Assessment - PCBs

SOVEREIGN CONSULTING INC.

November 15, 2021

Robert Rooks, P.E.
Wilcox & Barton, Inc.
#1B Commons Drive, Unit 12B
Londonderry, New Hampshire 03053

Re: PCB Risk Calculations
375 Banfield Road
Portsmouth, New Hampshire

Dear Mr. Rooks,

Sovereign Consulting Inc. is pleased to provide you with a risk-based assessment of the presence of polychlorinated biphenyls (PCBs) in surface soil of the above-referenced site. This assessment is prepared to evaluate the acceptability of PCB soil concentrations in upland areas of the site, considering future development of the site.

Summary of Site Data

Table 1 – *Summary of PCB Analytical Soil Data* summarizes PCB analytical results for shallow soil samples [0-3 feet below ground surface (bgs)] collected from the site. **Figure 1** – *Total PCBs in Soil* shows locations and results of the analyses. **Figure 2** – *Proposed Development Plan* show the current development plans for the site. Of the Aroclor types analyzed, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260, and Aroclor 1268 were detected. In each sample, the detected Aroclors were summed to derive a total PCB concentration.

Total PCBs were detected in 115 of the 255 samples collected, or in 45 percent of site samples. Detected concentrations ranged from 0.037 milligrams per kilogram (mg/kg) to 17 mg/kg (both estimated concentrations). Fifteen samples (or 5.9 percent of samples) exceeded a concentration of ≤1 mg/kg, which is the U.S. Environmental Protection Agency (US EPA) bulk PCB remediation waste cleanup level for high occupancy areas, without further conditions (e.g., a cap); for low occupancy areas, the cleanup level is ≤25 mg/kg [40 CFR 761.61 (a)(4)]. The latter standard is not exceeded anywhere on site.

Site soil PCB concentrations were entered into the US EPA ProUCL (v.5.1) program to calculate a 95 percentile upper confidence limit of the mean PCB concentration (95% UCL), the output for which is shown in Appendix A. The 95% UCL concentration is conventionally used as an "exposure point concentration" when assessing the risk of exposure to constituents. The ProUCL-recommended 95% UCL concentration for the site's PCB data set is 0.889 mg/kg. This concentration is below the high occupancy/no control cleanup level of ≤1 mg/kg.

Risk Assessment Calculations

Potential health risks associated with exposure to PCBs in site soil were quantified for two human receptor groups, as shown below:

ASSESSED HUMAN RECEPTOR GROUPS		
Exposure Pathway	**Recreational Trespassers**	**Future Commercial/ Industrial Workers**
Soil ingestion	✓	✓
Soil dermal contact	✓	✓
Outdoor Inhalation of entrained soil particles	✓	✓
Outdoor Inhalation of PCBs volatilized from soil	✓	✓

✓ Assessed.

Recreational trespassers were assessed because they were identified as a plausible exposed receptor group due to the presence of wetlands and a stream on undeveloped portions of the property. Commercial/industrial workers are the main expected receptor group after future development. Exposure assumptions used in the risk characterization are shown on **Table 2** – *Exposure Parameters* and are generally values recommended by NHDES (2013).

Toxicity values applied to the risk assessment were obtained from US EPA and are presented within each set of risk calculation spreadsheets in **Appendix B** for recreational trespassers and **Appendix C** for commercial/industrial workers. Toxicity values for both the non-carcinogenic and cancer endpoints were obtained and applied.

Results of the risk calculations for recreational trespassers are shown below:

RISK ASSESSMENT CALCULATIONS RECREATIONAL TRESPASSERS				
Exposure Pathway	**Non-carcinogenic Hazard Index**			**Excess Lifetime Cancer Risk**
	Child	**Youth**	**Adult**	**Combined Ages [1]**
Soil Ingestion	0.1	0.03	0.02	7E-07
Soil Dermal Contact	0.1	0.02	0.02	5E-07
Outdoor Inhalation of Volatile Soil Constituents	0.0001	0.0001	0.0001	4E-10
Inhalation of Entrained Soil Particles	0.00003	0.00003	0.00003	6E-10
Total (All Pathways)	**0.2**	**0.05**	**0.03**	**1E-06**
Maximum Acceptable Level	**1.0**			**1E-05**

[1] Age-specific cancer risks are intermediate values and are not shown; refer to appendices.

Non-carcinogenic hazard indices (HIs) for each age group are below the maximum acceptable HI of 1 adopted by New Hampshire, and the total cancer risk is below the maximum acceptable cancer risk adopted by New Hampshire of 1 in 100,000, denoted as $1x10^{-5}$.

Results of the risk calculations for commercial/industrial workers are shown below:

Exposure Pathway	Non-carcinogenic Hazard Index	Excess Lifetime Cancer Risk
Soil Ingestion	0.03	4E-07
Soil Dermal Contact	0.02	4E-07
Outdoor Inhalation of Volatile Soil Constituents	0.0002	5E-10
Inhalation of Entrained Soil Particles	0.00005	8E-10
Total (All Pathways)	**0.05**	**7E-07**
Maximum Acceptable Level	**1.0**	**1E-05**

As with recreational trespassers, the non-carcinogenic HIs is below the maximum acceptable HI of 1 adopted by New Hampshire, and the total cancer risk is below the maximum acceptable cancer risk adopted by New Hampshire of $1x10^{-5}$.

Miscellaneous Issues

Site media addressed in overall site activities include surface water, sediment, and groundwater, in addition to soil. Data collected from the site and analyzed for a variety of constituents identified limited presence of PCBs in these media:

- Of the four sediment samples analyzed for PCBs, none were detected (<1 mg/kg).
- Of the four surface water samples analyzed for PCBs, none were detected, although the reporting limit was elevated above PCB's freshwater chronic surface water criterion of 0.014 micrograms per liter (µg/L); and,
- Of the eleven groundwater samples analyzed for PCBs, none were detected (< 0.2 µg/L).

Summary and Conclusion

Site-specific risk calculations were performed for two human receptor groups potentially having access to PCBs in soil in the upland portion of the site: recreational trespassers and commercial/industrial workers. Each receptor group was assessed for exposure by four exposure pathways: soil ingestion, soil dermal contact, outdoor inhalation of entrained soil particles containing PCBs, and outdoor inhalation of volatilized PCBs into outdoor air. The results of the risk assessment indicate that calculated non-carcinogenic health hazards and carcinogenic health risks are below "no unacceptable risk" benchmarks accepted by NHDES. It is concluded that the presence of PCBs in upland soil, as presented in this letter, pose no unacceptable health risks and, from a risk perspective, do not require removal.

If you have any questions regarding this letter, please contact the undersigned at (401) 323-9571.

Regards,

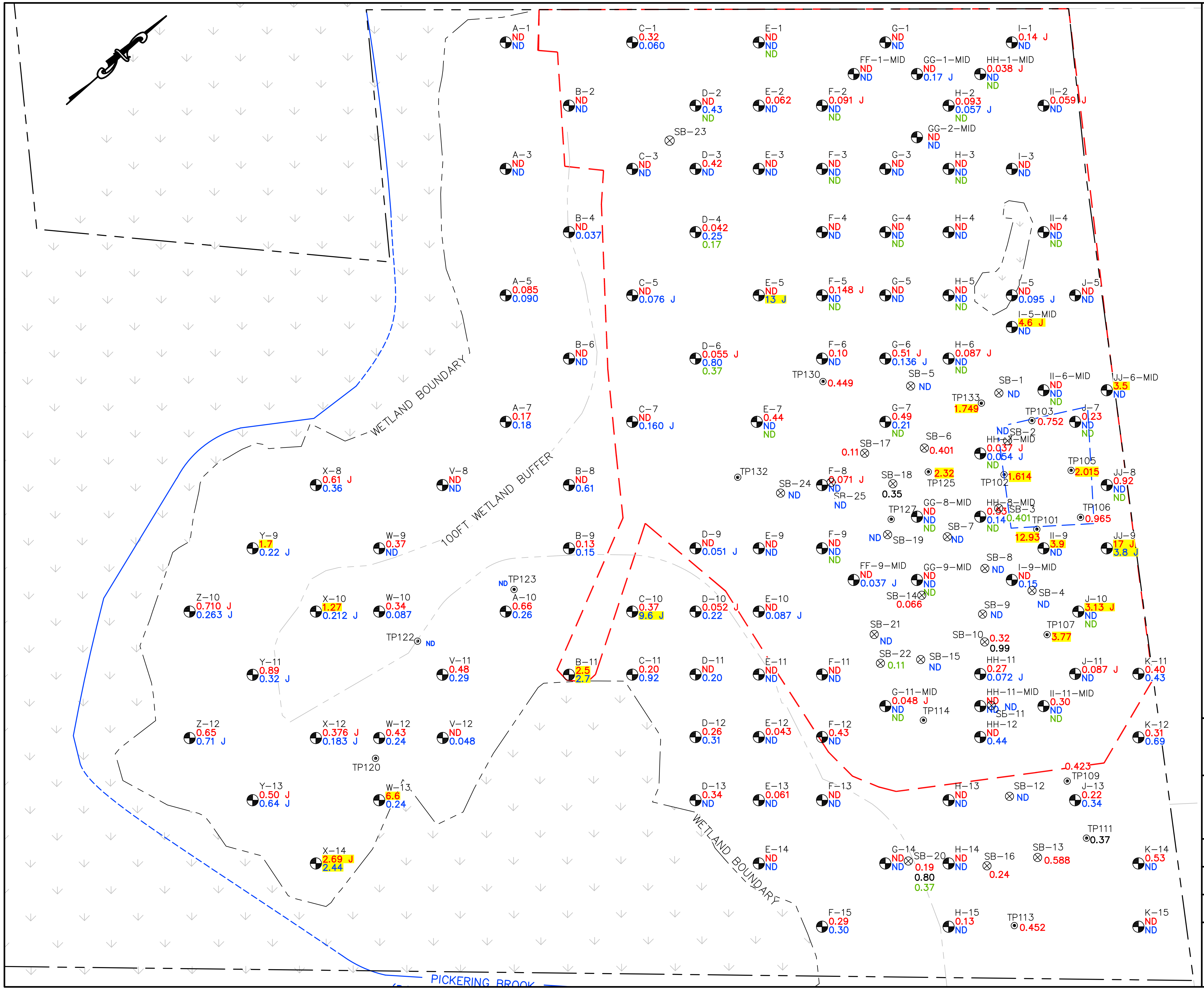
SOVEREIGN CONSULTING INC.

CFuller

Cynthia Fuller, MPH
Health Risk Assessor

<u>Attachments</u>

FIGURES



LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

LIMITS OF DISTURBANCE

2020 AND 2008 PCB DATA

⊗ SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)

◉ TEST PIT LOCATION (RANSOM 2008)

SAMPLE DEPTH INTERVAL (FEET)	PCB CONCENTRATION SHOWN IN:
0–2	RED
2–4	PURPLE
4–6	GREEN

ND TOTAL PCB CONCENTRATION< REPORTING LIMIT FOR ALL DEPTHS. REPORTING LIMITS ALL <1.0 mg/kg.

2021 PCB DATA

Y–9 1.7 0.22 J — PCB SAMPLE LOCATION, GRID IDENTIFIER, AND RESULTS IN MG/KG.
J indicates an estimated value.

SAMPLE DEPTH INTERVAL	PCB CONCENTRATION SHOWN IN:
3”–6”	RED
6”–18”	BLUE
18”–36”	GREEN

2.015 YELLOW HIGHLIGHT INDICATES VALUE EXCEEDS 1 mg/kg

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C–2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

GRAPHIC SCALE

80 0 40 80 160

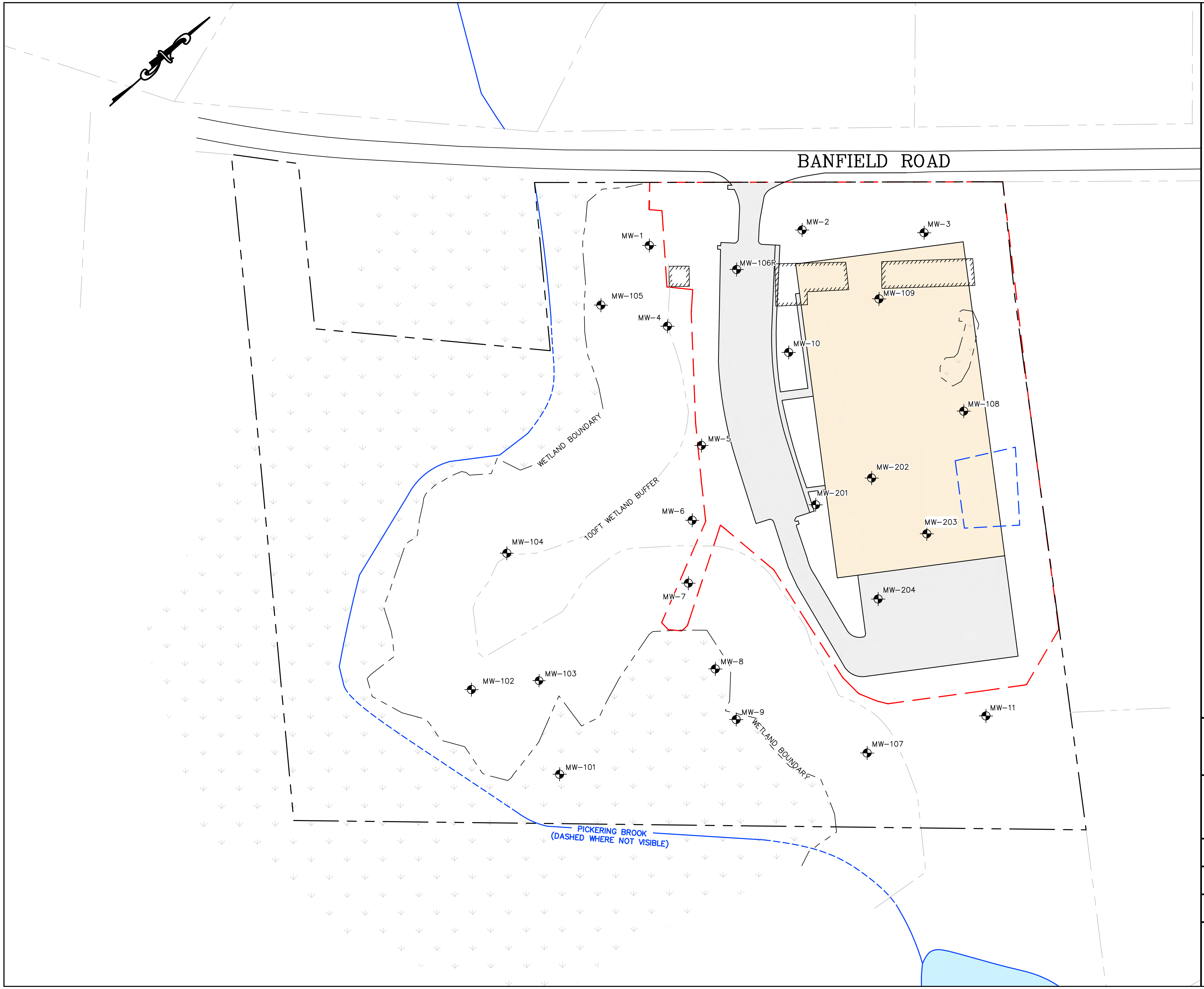
(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE

PCBS IN SOIL

DATE October 1, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED October 21, 2021
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER Figure 1



LEGEND

- APPROXIMATE SUBJECT PROPERTY BOUNDARY
- APPROXIMATE ABUTTER PROPERTY BOUNDARY
- WETLAND BOUNDARY
- WETLAND BUFFER
- APPROXIMATE CENTER OF BROOK
- LIMITS OF DISTURBANCE
- MW-1 MONITORING WELL
- ▨ EXISTING STRUCTURE
- PROPOSED PAVED AREA
- PROPOSED BUILDING
- LOCATION OF FORMER CAR CRUSHER

NOTES

1. EXISTING AND PROPOSED SITE FEATURES BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.

GRAPHIC SCALE

120 0 60 120 240

(IN FEET)
1 inch = 120 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
PROPOSED DEVELOPMENT PLAN

DATE October 21, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED –
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 2

TABLES

TABLE 1
Summary of Polychlorinated Biphenyls (PCBs) Soil Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID	Sample Depth (ft bgs)	Sampling Date	Aroclor-1016 mg/kg	Aroclor-1221 mg/kg	Aroclor-1232 mg/kg	Aroclor-1242 mg/kg	Aroclor-1248 mg/kg	Aroclor-1254 mg/kg	Aroclor-1260 mg/kg	Aroclor-1262 mg/kg	Aroclor-1268 mg/kg	Total Aroclors (sum of detections) mg/kg
A-1	0.25-0.5	9/24/2021	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U
A-1	0.5-1.5	9/24/2021	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U
A-3	0.25-0.5	9/24/2021	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U
A-3	0.5-1.5	9/24/2021	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U
A-5	0.25-0.5	9/24/2021	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.085 U	0.089 U	0.089 U	0.089 U	0.085 U
A-5	0.5-1.5	9/24/2021	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	**0.09**	0.087 U	0.087 U	0.087 U	**0.09**
A-7	0.25-0.5	9/24/2021	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.086**	**0.084**	0.11 U	0.11 U	**0.17**
A-7	0.5-1.5	9/24/2021	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	**0.18**	0.17 U	0.17 U	0.17 U	**0.18**
A-10	0.25-0.5	9/24/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.35**	**0.17**	0.1 U	**0.14**	**0.66**
A-10	0.5-1.5	9/24/2021	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.13**	0.11 U	0.11 U	**0.13**	**0.26**
B-2	0.25-0.5	9/29/2021	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U
B-2	0.5-1.5	9/29/2021	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U
B-4	0.25-0.5	9/29/2021	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U
B-4	0.5-1.5	9/29/2021	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	**0.037**	0.092 U	0.092 U	0.092 U	**0.037**
B-6	0.25-0.5	9/24/2021	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U
B-6	0.5-1.5	9/24/2021	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U
B-8	0.25-0.5	9/30/2021	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U
B-8	0.5-1.5	9/30/2021	0.096 U	0.096 U	0.096 U	0.096 U	0.096 U	**0.48**	**0.13**	0.096 U	0.096 U	**0.61**
B-9	0.25-0.5	9/30/2021	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	**0.13**	0.12 U	0.12 U	0.12 U	**0.13**
B-9	0.5-1.5	9/30/2021	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	**0.15**	0.12 U	0.12 U	0.12 U	**0.15**
B-11	0.25-0.5	9/24/2021	0.16 U	0.16 U	0.16 U	0.16 U	**1.6**	**0.68**	**0.2**	0.16 U	0.16 U	**2.5**
B-11	0.5-1.5	9/24/2021	0.18 U	0.18 U	0.18 U	0.18 U	**2.1**	**0.48**	**0.14**	0.18 U	0.18 U	**2.7**
C-1	0.25-0.5	9/29/2021	0.087 U	0.087 U	0.087 U	0.087 U	**0.14**	**0.18**	**0.048**	0.087 U	0.087 U	**0.32**
C-1	0.5-1.5	9/29/2021	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	**0.06**	0.094 U	0.094 U	0.094 U	**0.06**
C-3	0.25-0.5	9/29/2021	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U	0.092 U
C-3	0.5-1.5	9/29/2021	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U
C-5	0.25-0.5	9/30/2021	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U
C-5	0.5-1.5	9/30/2021	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	**0.076 J**	0.09 U	0.09 U	0.09 U	**0.076 J**
C-7	0.25-0.5	9/30/2021	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U
C-7	0.5-1.5	9/30/2021	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	**0.092**	**0.068 J**	0.089 U	0.089 U	**0.16 J**
C-10	0.25-0.5	9/24/2021	0.095 U	0.095 U	0.095 U	0.095 U	**0.13**	**0.24**	0.095 U	0.095 U	0.095 U	**0.37**
C-10	0.5-1.5	9/24/2021	1 UJ	1 UJ	1 UJ	1 UJ	**7.8 J**	**1.8 J**	1 UJ	1 UJ	1 UJ	**9.6 J**
C-11	0.25-0.5	9/24/2021	0.087 U	0.087 U	0.087 U	0.087 U	**0.2**	0.087 U	0.087 U	0.087 U	0.087 U	**0.2**
C-11	0.5-1.5	9/24/2021	0.1 U	0.1 U	0.1 U	0.1 U	**0.7**	0.1 U	**0.22**	0.1 U	0.1 U	**0.92**
D-2	0.25-0.5	9/29/2021	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
D-2	0.5-1.5	9/29/2021	0.092 U	0.092 U	0.092 U	0.092 U	**0.044**	**0.23**	**0.16**	0.092 U	0.092 U	**0.43**
D-2	1.5-3	9/29/2021	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U
D-3	0.25-0.5	9/29/2021	0.086 U	0.086 U	0.086 U	**0.42 J**	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	**0.42 J**
D-3	0.5-1.5	9/29/2021	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U
D-4	0.25-0.5	9/29/2021	0.091 U	0.091 U	0.091 U	0.091 U	0.091	**0.042**	0.091 U	0.091 U	0.091 U	**0.042**
D-4	0.5-1.5	9/29/2021	0.089 U	0.089 U	0.089 U	0.089 U	**0.049**	**0.14**	**0.056**	0.089 U	0.089 U	**0.25**
D-4	1.5-3	9/29/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.17**	0.1 U	0.1 U	0.1 U	**0.17**
D-6	0.25-0.5	9/30/2021	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	**0.055 J**	0.086 U	0.086 U	0.086 U	**0.055 J**
D-6	0.5-1.5	9/30/2021	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	**0.6**	**0.2**	0.09 U	0.09 U	**0.8**
D-6	1.5-3	9/30/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.14**	**0.23**	0.1 U	0.1 U	**0.37**
D-9	0.25-0.5	9/30/2021	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U
D-9	0.5-1.5	9/30/2021	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	**0.051 J**	0.089 U	0.089 U	**0.051 J**

TABLE 1
Summary of Polychlorinated Biphenyls (PCBs) Soil Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID	Sample Depth (ft bgs)	Sampling Date	Aroclor-1016 mg/kg		Aroclor-1221 mg/kg		Aroclor-1232 mg/kg		Aroclor-1242 mg/kg		Aroclor-1248 mg/kg		Aroclor-1254 mg/kg		Aroclor-1260 mg/kg		Aroclor-1262 mg/kg		Aroclor-1268 mg/kg		Total Aroclors (sum of detections) mg/kg	
D-10	0.25-0.5	10/4/2021	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	**0.052**	**J**	0.091	U	0.091	U	0.091	U	**0.052**	**J**
D-10	0.5-1.5	10/4/2021	0.088	U	0.088	U	0.088	U	0.088	U	**0.22**		0.088	U	0.088	U	0.088	U	0.088	U	**0.22**	
D-11	0.25-0.5	9/24/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
D-11	0.5-1.5	9/24/2021	0.087	U	0.087	U	0.087	U	0.087	U	**0.1**		0.087	U	**0.098**		0.087	U	0.087	U	**0.2**	
D-12	0.25-0.5	9/24/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	**0.069**		**0.083**		0.09	U	**0.11**		**0.26**	
D-12	0.5-1.5	9/24/2021	0.09	U	0.09	U	0.09	U	0.09	U	**0.041**		**0.063**		**0.084**		0.09	U	**0.12**		**0.31**	
D-13	0.25-0.5	9/24/2021	0.1	U	0.1	U	0.1	U	0.1	U	**0.055**		**0.16**		**0.12**		0.1	U	0.1	U	**0.34**	
D-13	0.5-1.5	9/24/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
E-1	0.25-0.5	9/29/2021	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U
E-1	0.5-1.5	9/29/2021	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U
E-1	1.5-3	9/29/2021	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U
E-2	0.25-0.5	9/29/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	**0.062**		0.09	U	0.09	U	0.09	U	**0.062**	
E-2	0.5-1.5	9/29/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
E-3	0.25-0.5	9/30/2021	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U
E-3	0.5-1.5	9/30/2021	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U
E-5	0.25-0.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
E-5	0.5-1.5	9/30/2021	1.9	U	1.9	U	1.9	U	1.9	U	**13**	**J**	1.9	U	1.9	U	1.9	U	1.9	U	**13**	**J**
E-7	0.25-0.5	9/30/2021	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	**0.22**		**0.22**		0.093	U	0.093	U	**0.44**	
E-7	0.5-1.5	9/30/2021	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U
E-7	1.5-3	9/30/2021	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U
E-9	0.25-0.5	9/30/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
E-9	0.5-1.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
E-10	0.25-0.5	9/30/2021	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	UJ	0.097	U	0.097	U	0.097	U	0.097	UJ
E-10	0.5-1.5	9/30/2021	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	**0.087**	**J**	0.093	U	0.093	U	0.093	U	**0.087**	**J**
E-11	0.25-0.5	9/24/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
E-11	0.5-1.5	9/24/2021	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U
E-12	0.25-0.5	9/24/2021	0.088	U	0.088	U	0.088	U	0.088	U	**0.088**		**0.043**		0.088	U	0.088	U	0.088	U	**0.043**	
E-12	0.5-1.5	9/24/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
E-13	0.25-0.5	9/24/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.061**		0.086	U	0.086	U	**0.061**	
E-13	0.5-1.5	9/24/2021	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U
E-14	0.25-0.5	9/24/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
E-14	0.5-1.5	9/24/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
F-2	0.25-0.5	9/29/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.036**	**J**	**0.055**	**J**	0.086	U	0.086	U	**0.091**	**J**
F-2	0.5-1.5	9/29/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
F-2	1.5-3	9/29/2021	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U	0.097	U
F-3	0.25-0.5	9/30/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
F-3	0.5-1.5	9/30/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
F-3	1.5-3	9/30/2021	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U
F-4	0.25-0.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
F-4	0.5-1.5	9/30/2021	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U
F-5	0.25-0.5	9/30/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.06**	**J**	**0.088**		0.086	U	0.086	U	**0.148**	**J**
F-5	0.5-1.5	9/30/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
F-5	1.5-3	9/30/2021	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U
F-6	0.25-0.5	9/30/2021	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	**0.1**		0.096	U	0.096	U	0.096	U	**0.1**	
F-6	0.5-1.5	9/30/2021	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U
F-8	0.25-0.5	9/30/2021	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	**0.071**	**J**	0.1	U	0.1	U	0.1	U	**0.071**	**J**
F-8	0.5-1.5	9/30/2021	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U

TABLE 1
Summary of Polychlorinated Biphenyls (PCBs) Soil Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID	Sample Depth (ft bgs)	Sampling Date	Aroclor-1016 mg/kg		Aroclor-1221 mg/kg		Aroclor-1232 mg/kg		Aroclor-1242 mg/kg		Aroclor-1248 mg/kg		Aroclor-1254 mg/kg		Aroclor-1260 mg/kg		Aroclor-1262 mg/kg		Aroclor-1268 mg/kg		Total Aroclors (sum of detections) mg/kg	
F-9	0.25-0.5	9/30/2021	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U
F-9	0.5-1.5	9/30/2021	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U	0.082	U
F-9	1.5-3	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
F-11	0.25-0.5	9/30/2021	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U
F-11	0.5-1.5	9/30/2021	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U
F-12	0.25-0.5	9/30/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	**0.21**		**0.22**		0.09	U	0.09	U	**0.43**	
F-12	0.5-1.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
F-13	0.25-0.5	9/24/2021	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U	0.098	U
F-13	0.5-1.5	9/24/2021	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U
F-15	0.25-0.5	9/24/2021	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	**0.19**		**0.097**		0.096	U	0.096	U	**0.29**	
F-15	0.5-1.5	9/24/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	**0.2**		**0.1**		0.09	U	0.09	U	**0.3**	
FF-1-Mid	0.25-0.5	9/29/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
FF-1-Mid	0.5-1.5	9/29/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
FF-9-Mid	0.25-0.5	9/30/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
FF-9-Mid	0.5-1.5	9/30/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.037**	**J**	0.086	U	0.086	U	0.086	U	**0.037**	**J**
G-1	0.25-0.5	9/29/2021	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U
G-1	0.5-1.5	9/29/2021	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U
G-3	0.25-0.5	9/29/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
G-3	0.5-1.5	9/29/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
G-4	0.25-0.5	9/30/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
G-4	0.5-1.5	9/30/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
G-4	1.5-3	9/30/2021	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
G-5	0.25-0.5	9/30/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
G-5	0.5-1.5	9/30/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
G-6	0.25-0.5	9/30/2021	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	**0.3**	**J**	**0.21**		0.085	U	0.085	U	**0.51**	**J**
G-6	0.5-1.5	9/30/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	**0.067**	J	**0.069**	**J**	0.089	U	0.089	U	**0.136**	**J**
G-7	0.25-0.5	9/30/2021	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	**0.21**		**0.28**		0.093	U	0.093	U	**0.49**	
G-7	0.5-1.5	9/30/2021	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	**0.095**		**0.11**		0.091	U	0.091	U	**0.21**	
G-7	1.5-3	9/30/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
G-11-Mid	0.25-0.5	9/30/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	**0.048**	**J**	0.088	U	0.088	U	0.088	U	**0.048**	**J**
G-11-Mid	0.5-1.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
G-11-Mid	1.5-3	9/30/2021	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U
G-14	0.25-0.5	10/1/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
G-14	0.5-1.5	10/1/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
GG-1-Mid	0.25-0.5	9/29/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
GG-1-Mid	0.5-1.5	9/29/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.091**		**0.082**	**J**	0.086	U	0.086	U	**0.17**	**J**
GG-2-Mid	0.25-0.5	9/29/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
GG-2-Mid	0.5-1.5	9/29/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
GG-8-Mid	0.25-0.5	9/30/2021	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U
GG-8-Mid	0.5-1.5	9/30/2021	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U
GG-8-Mid	1.5-3	9/30/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
GG-9-Mid	0.25-0.5	9/30/2021	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
GG-9-Mid	0.5-1.5	9/30/2021	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U
GG-9-Mid	1.5-3	9/30/2021	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U

TABLE 1
Summary of Polychlorinated Biphenyls (PCBs) Soil Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID	Sample Depth (ft bgs)	Sampling Date	Aroclor-1016 mg/kg		Aroclor-1221 mg/kg		Aroclor-1232 mg/kg		Aroclor-1242 mg/kg		Aroclor-1248 mg/kg		Aroclor-1254 mg/kg		Aroclor-1260 mg/kg		Aroclor-1262 mg/kg		Aroclor-1268 mg/kg		Total Aroclors (sum of detections) mg/kg	
H-2	0.25-0.5	9/29/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.093**		0.086	U	0.086	U	0.086	U	**0.093**	
H-2	0.5-1.5	9/29/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	**0.057**	**J**	0.088	U	0.088	U	0.088	U	**0.057**	
H-2	1.5-3	9/29/2021	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U	0.093	U
H-3	0.25-0.5	9/30/2021	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U
H-3	0.5-1.5	9/30/2021	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
H-3	1.5-3	9/30/2021	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U
H-4	0.25-0.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
H-4	0.5-1.5	9/30/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
H-5	0.25-0.5	10/1/2021	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U
H-5	0.5-1.5	10/1/2021	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U
H-5	1.5-3	10/1/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
H-6	0.25-0.5	9/29/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	**0.087**	**J**	0.087	U	0.087	U	0.087	U	**0.087**	**J**
H-6	0.5-1.5	9/29/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
H-6	1.5-3	9/29/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
H-13	0.25-0.5	9/29/2021	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U
H-13	0.5-1.5	9/29/2021	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U
H-14	0.25-0.5	9/30/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
H-14	0.5-1.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
H-15	0.25-0.5	9/24/2021	0.096	U	0.096	U	0.096	U	0.096	U	0.096	U	**0.13**		0.096	U	0.096	U	0.096	U	**0.13**	
H-15	0.5-1.5	9/24/2021	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U
HH-1-Mid	0.25-0.5	9/29/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.038**	**J**	0.086	U	0.086	U	0.086	U	**0.038**	**J**
HH-1-Mid	0.5-1.5	9/29/2021	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
HH-1-Mid	1.5-3	9/29/2021	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U	0.095	U
HH-7-Mid	0.25-0.5	9/30/2021	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	**0.037**	**J**	0.081	U	0.081	U	0.081	U	**0.037**	**J**
HH-7-Mid	0.5-1.5	9/30/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	**0.054**	**J**	0.088	U	0.088	U	0.088	U	**0.054**	**J**
HH-7-Mid	1.5-3	9/30/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
HH-8-Mid	0.25-0.5	9/30/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	**0.4**		**0.13**		0.089	U	0.089	U	**0.53**	
HH-8-Mid	0.5-1.5	9/30/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	**0.14**	**J**	0.09	U	0.09	U	0.09	U	**0.14**	**J**
HH-8-Mid	1.5-3	9/30/2021	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U	0.084	U
HH-11-Mid	0.25-0.5	9/30/2021	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U	0.088	U
HH-11-Mid	0.5-1.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U
HH-11	0.25-0.5	9/30/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	**0.17**		**0.1**		0.09	U	0.09	U	**0.27**	
HH-11	0.5-1.5	9/30/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	**0.072**	**J**	0.087	U	0.087	U	0.087	U	**0.072**	**J**
HH-12	0.25-0.5	9/30/2021	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U
HH-12	0.5-1.5	9/30/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	**0.27**		**0.17**		0.086	U	0.086	U	**0.44**	
I-1	0.25-0.5	9/29/2021	0.087	U	0.087	U	0.087	U	0.087	U	0.087	U	**0.074**	**J**	**0.067**	**J**	0.087	U	0.087	U	**0.14**	**J**
I-1	0.5-1.5	9/29/2021	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U	0.086	U
I-3	0.25-0.5	9/30/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U
I-3	0.5-1.5	9/30/2021	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U	0.083	U
I-5	0.25-0.5	10/1/2021	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U	0.091	U
I-5	0.5-1.5	10/1/2021	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	**0.038**	**J**	**0.057**	**J**	0.09	U	0.09	U	**0.095**	**J**
I-5-Mid	0.25-0.5	9/29/2021	0.86	U	0.86	U	0.86	U	0.86	U	**2.7**		**1.4**		**0.5**	**J**	0.86	U	0.86	U	**4.6**	**J**
I-5-Mid	0.5-1.5	9/29/2021	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U	0.085	U
I-9-Mid	0.25-0.5	9/29/2021	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U	0.089	U
I-9-Mid	0.5-1.5	9/29/2021	0.092	U	0.092	U	0.092	U	0.092	U	0.092	U	**0.15**		0.092	U	0.092	U	0.092	U	**0.15**	

TABLE 1
Summary of Polychlorinated Biphenyls (PCBs) Soil Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID	Sample Depth (ft bgs)	Sampling Date	Aroclor-1016 mg/kg	Aroclor-1221 mg/kg	Aroclor-1232 mg/kg	Aroclor-1242 mg/kg	Aroclor-1248 mg/kg	Aroclor-1254 mg/kg	Aroclor-1260 mg/kg	Aroclor-1262 mg/kg	Aroclor-1268 mg/kg	Total Aroclors (sum of detections) mg/kg
II-2	0.25-0.5	10/4/2021	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	**0.059 J**	0.087 U	0.087 U	**0.059 J**
II-2	0.5-1.5	10/4/2021	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U
II-4	0.25-0.5	10/1/2021	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U	0.082 U
II-4	0.5-1.5	10/1/2021	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U	0.084 U
II-4	1.5-3	10/1/2021	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U
II-6-Mid	0.25-0.5	9/29/2021	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U
II-6-Mid	0.5-1.5	9/29/2021	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U
II-6-Mid	1.5-3	9/29/2021	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U
II-9	0.25-0.5	9/29/2021	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U	**2.9**	**0.96**	0.84 U	0.84 U	**3.9**
II-9	0.5-1.5	9/29/2021	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U
II-11-Mid	0.25-0.5	9/29/2021	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	**0.14**	**0.16**	0.089 U	0.089 U	**0.3**
II-11-Mid	0.5-1.5	9/29/2021	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
II-11-Mid	1.5-3	9/29/2021	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U
J-5	0.25-0.5	9/29/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
J-5	0.5-1.5	9/29/2021	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U
J-10	0.25-0.5	9/29/2021	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	**2.5**	**0.63 J**	0.89 U	0.89 U	**3.13 J**
J-10	0.5-1.5	9/29/2021	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U
J-10	1.5-3	9/29/2021	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U
J-11	0.25-0.5	9/29/2021	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	**0.087 J**	0.093 U	0.093 U	**0.087 J**
J-11	0.5-1.5	9/29/2021	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U
J-13	0.25-0.5	9/29/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.11**	**0.11**	0.1 U	0.1 U	**0.22**
J-13	0.5-1.5	9/29/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.2**	**0.14**	0.1 U	0.1 U	**0.34**
JJ-6-Mid	0.25-0.5	9/29/2021	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	**2.9**	**0.55**	0.45 U	0.45 U	**3.5**
JJ-6-Mid	0.5-1.5	9/29/2021	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U	0.087 U
JJ-7	0.25-0.5	9/29/2021	0.088 U	0.088 U	0.088 U	0.088 U	0.088 U	**0.23**	0.088 U	0.088 U	0.088 U	**0.23**
JJ-7	0.5-1.5	9/29/2021	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U	0.085 U
JJ-7	1.5-3	9/29/2021	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U
JJ-8	0.25-0.5	9/29/2021	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	**0.77**	**0.15**	0.097 U	0.097 U	**0.92**
JJ-8	0.5-1.5	9/29/2021	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U	0.086 U
JJ-8	1.5-3	9/29/2021	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U	0.089 U
JJ-9	0.25-0.5	9/29/2021	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	**17 J**	1.8 U	1.8 U	1.8 U	**17 J**
JJ-9	0.5-1.5	9/29/2021	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	**3.8 J**	0.89 U	0.89 U	0.89 U	**3.8 J**
K-11	0.25-0.5	9/29/2021	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	**0.17**	**0.23**	0.099 U	0.099 U	**0.4**
K-11	0.5-1.5	9/29/2021	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	**0.17**	**0.26**	0.097 U	0.097 U	**0.43**
K-12	0.25-0.5	9/29/2021	0.096 U	0.096 U	0.096 U	0.096 U	0.096 U	**0.15**	**0.16**	0.096 U	0.096 U	**0.31**
K-12	0.5-1.5	9/29/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.25**	**0.44**	0.1 U	0.1 U	**0.69**
K-14	0.25-0.5	10/4/2021	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	**0.2**	**0.33**	0.099 U	0.099 U	**0.53**
K-14	0.5-1.5	10/4/2021	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U
K-15	0.25-0.5	10/4/2021	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
K-15	0.5-1.5	10/4/2021	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U
V-8	0.25-0.5	10/4/2021	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U
V-8	0.5-1.5	10/4/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
V-11	0.25-0.5	9/24/2021	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	**0.25**	**0.094**	0.12 U	**0.14**	**0.48**
V-11	0.5-1.5	9/24/2021	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	**0.16**	0.14 U	0.14 U	**0.13**	**0.29**
V-12	0.25-0.5	9/24/2021	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U
V-12	0.5-1.5	9/24/2021	0.1 U	0.1 U	0.1 U	0.1 U	**0.048**	0.1 U	0.1 U	0.1 U	0.1 U	**0.048**
W-9	0.25-0.5	10/4/2021	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.37**	0.11 U	0.11 U	0.11 U	**0.37**
W-9	0.5-1.5	10/4/2021	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U	0.098 U

TABLE 1
Summary of Polychlorinated Biphenyls (PCBs) Soil Data
375 Banfield Road, Portsmouth, New Hampshire

Sample ID	Sample Depth (ft bgs)	Sampling Date	Aroclor-1016 mg/kg	Aroclor-1221 mg/kg	Aroclor-1232 mg/kg	Aroclor-1242 mg/kg	Aroclor-1248 mg/kg	Aroclor-1254 mg/kg	Aroclor-1260 mg/kg	Aroclor-1262 mg/kg	Aroclor-1268 mg/kg	Total Aroclors (sum of detections) mg/kg
W-10	0.25-0.5	9/24/2021	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	**0.26**	**0.076**	0.12 U	0.12 U	**0.34**
W-10	0.5-1.5	9/24/2021	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	**0.087**	0.14 U	0.14 U	0.14 U	**0.087**
W-12	0.25-0.5	9/24/2021	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	**0.35**	**0.082**	0.13 U	0.13 U	**0.43**
W-12	0.5-1.5	9/24/2021	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	**0.24**	0.15 U	0.15 U	0.15 U	**0.24**
W-13	0.25-0.5	9/24/2021	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	**6.6**	1.1 U	1.1 U	1.1 U	**6.6**
W-13	0.5-1.5	9/24/2021	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.24**	0.1 U	0.1 U	0.1 U	**0.24**
X-8	0.25-0.5	10/4/2021	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	**0.34**	**0.15**	0.12 U	**0.12 J**	**0.61 J**
X-8	0.5-1.5	10/4/2021	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	**0.22**	0.13 U	0.13 U	**0.14**	**0.36**
X-10	0.25-0.5	10/4/2021	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	**0.45**	**0.21**	0.14 U	**0.61**	**1.27**
X-10	0.5-1.5	10/4/2021	0.13 U	0.13 U	0.13 U	0.13 U	**0.052 J**	**0.16**	0.13 U	0.13 U	0.13 U	**0.212 J**
X-12	0.25-0.5	10/4/2021	0.11 U	0.11 U	0.11 U	0.11 U	**0.065 J**	**0.13**	**0.071 J**	0.11 U	**0.11 J**	**0.376 J**
X-12	0.5-1.5	10/4/2021	0.12 U	0.12 U	0.12 U	0.12 U	**0.063 J**	**0.12**	0.12 U	0.12 U	0.12 U	**0.183 J**
X-14	0.25-0.5	10/4/2021	0.22 U	0.22 U	0.22 U	0.22 U	**0.19 J**	**1.8**	**0.36**	0.22 U	0.34	**2.69 J**
X-14	0.5-1.5	10/4/2021	0.13 U	0.13 U	0.13 U	0.13 U	**0.2**	**2**	**0.24**	0.13 U	0.13 U	**2.44**
Y-9	0.25-0.5	9/24/2021	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	**1.7**	0.53 U	0.53 U	**1.7**
Y-9	0.5-1.5	9/24/2021	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.14 J**	**0.082**	0.11 U	0.11 U	**0.22 J**
Y-11	0.25-0.5	10/4/2021	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	**0.21**	**0.2**	0.12 U	**0.48**	**0.89**
Y-11	0.5-1.5	10/4/2021	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	**0.1 J**	**0.09 J**	0.14 U	**0.13 J**	**0.32 J**
Y-13	0.25-0.5	10/4/2021	0.23 U	0.23 U	0.23 U	0.23 U	**0.1 J**	**0.25**	**0.15 J**	0.23 U	0.23 U	**0.5 J**
Y-13	0.5-1.5	10/4/2021	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	**0.48**	**0.16 J**	0.29 U	0.29 U	**0.64 J**
Z-10	0.25-0.5	10/4/2021	0.12 U	0.12 U	0.12 U	0.12 U	**0.09 J**	**0.36**	**0.15**	0.12 U	**0.11 J**	**0.71 J**
Z-10	0.5-1.5	10/4/2021	0.13 U	0.13 U	0.13 U	0.13 U	**0.053 J**	**0.21**	0.13 U	0.13 U	0.13 U	**0.263** J
Z-12	0.25-0.5	10/4/2021	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	**0.25**	**0.21**	0.14 U	**0.19**	**0.65**
Z-12	0.5-1.5	10/4/2021	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.35**	**0.19**	0.19 U	**0.17 J**	**0.71 J**
Number of Samples			255	255	255	255	255	255	255	255	255	255
Number of Detections			0	0	0	1	26	103	66	0	16	115
Arithmetic Mean Concentration [1]			**ND**	**ND**	**ND**	**0.068**	**0.171**	**0.266**	**0.098**	**ND**	**0.075**	**0.44**
Maximum Detected Concentration.			**--**	**--**	**--**	**0.42 J**	**13**	**17 J**	**1.7**	**--**	**0.61**	**17 J**
95th Percentile Upper Confidence Limit of Mean [2]			NC	NC	NC	NC	NC	NC	NC	NC	NC	0.889
Soil Remediation Standard			1	1	1	1	1	1	1	1	1	1.00

Value	Exceeds Soil Remediation Standard of 1 mg/kg.
mg/kg	Milligrams per kilogram.
ft bgs	Feet below ground surface.
U	Not detected at reporting limit shown.
ND	Not detected.
J	Estimated concentration, typically below reporting limit.
NC	Not calculated.
[1]	Arithmetic mean includes non-detections at one-half reporting limit.
[2]	Calculated by ProUCL, v.5.1. Refer to Appendix A.

TABLE 2
Summary of Exposure Assumptions
375 Banfield Road, Portsmouth, New Hampshire

PARAMETER	VALUE	REFERENCE
PCB soil exposure point concentration (C_s)	Constituent -specific	The PCB soil exposure point concentration (EPC) was the 95th percentile upper confidence limit of the mean PCB concentration, calculated by ProUCL.
Outdoor air exposure point concentration (C_{air})	Constituent-specific	Particle: Modeled from soil assuming an ambient air concentration of inhalable particles of 32 micrograms per cubic meter (MassDEP 2014). Volatile: Estimated from soil EPC using screening levels models for from ASTM (2005).
Soil ingestion rate (IR)	0.0002 kg/day (child) 0.0001 kg/day (youth and all adults)	Recommended values (NHDES 2013).
Relative soil oral absorption factor (RAFo)	1	Assumed fully absorbed orally.
Exposed skin surface area (SA)	2,632 cm^2/day (child) 3,432 cm^2/day (youth) 5,044 cm^2/day (adult) 3,104 cm^2/day (commercial workers)	Recommended values for residents (NHDES 2013).
Sediment-skin adherence factor (AF)	0.36 mg/cm^2 (child) 0.14 mg/cm^2 (youth) 0.13 mg/cm^2 (adult)	Recommended values for residents (NHDES 2013).
Relative soil absorption factor, dermal (RAFd)	0.157	Recommended value (NHDES 2013).
Recreational trespasser exposure frequency (EF)	90 events/year (soil, air)	Assumed access frequency.
Recreational trespasser exposure duration (ED)	1 day/event (soil exposure) 8 hours/event (outdoor air exposure)	Soil ED is conventional value for soil exposures. Outdoor inhalation ED value is assumed.
Recreational trespasser exposure period (EP)	5 years (child) 10 years youth) 15 years (adult)	Recommended values (NHDES 2013).
Recreational trespasser averaging time (AT)	Non-carcinogens: 5 years (child) 10 years (youth) 15 years (adult) Carcinogens: 70 years (all ages)	Conventional averaging times (EP for non-carcinogens, a 70-year lifetime for carcinogens).

TABLE 2
Summary of Exposure Assumptions
375 Banfield Road, Portsmouth, New Hampshire

PARAMETER	VALUE	REFERENCE
Commercial/industrial worker exposure frequency (EF)	146 events/year	Recommended value (NHDES 2013).
Commercial/industrial workers exposure duration (ED)	1 day/event (soil exposure) 8 hours/event (outdoor air exposure)	Soil ED is conventional value for soil exposures. Outdoor inhalation ED value is assumed.
Commercial/industrial workers exposure period (EP)	25 years	Recommended value (NHDES 2013).
Commercial/industrial workers averaging time (AT)	Non-carcinogens: 25 years Carcinogens: 70 years	Conventional averaging times (EP for non-carcinogens, a 70-year lifetime for carcinogens).
Body weight (BW)	17 kg (children) 40 kg (youth) 70 kg (adults)	Recommended values (NHDES 2013).

ASTM (2005) Standard Guide for Risk-Based Corrective Action E2081-00.
NHDES (2013) Risk Characterization Management Policy, Appendix A.

APPENDIX A

ProUCL Output

ProUCL Output Files
375 Banfield Road, Portsmouth, NH

```
UCL Statistics for Data Sets with Non-Detects

User Selected Options
Date/Time of Computation                              ProUCL 5.111/12/2021 12:58:32 PM
From File                                             Soil PCBs.xls
Full Precision                                        OFF
Confidence Coefficient                                95%
Number of Bootstrap Operations                        2000

PCB (Soil)

General Statistics
Total Number of Observations                          255       Number of Distinct Observations               100
Number of Detects                                     115       Number of Non-Detects                         140
Number of Distinct Detects                            83        Number of Distinct Non-Detects                23
Minimum Detect                                        0.037     Minimum Non-Detect                            0.079
Maximum Detect                                        17        Maximum Non-Detect                            0.12
Variance Detects                                      5.367     Percent Non-Detects                           54.90%
Mean Detects                                          0.926     SD Detects                                    2.317
Median Detects                                        0.27      CV Detects                                    2.501
Skewness Detects                                      4.925     Kurtosis Detects                              27.46
Mean of Logged Detects                                -1.224    SD of Logged Detects                          1.336

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                           0.405     Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value                               0         Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                             0.372     Lilliefors GOF Test
5% Lilliefors Critical Value                          0.0829    Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                               0.448     KM Standard Error of Mean                     0.101
KM SD                                                 1.609       95% KM (BCA) UCL                            0.62
  95% KM (t) UCL                                      0.615       95% KM (Percentile Bootstrap) UCL           0.632
  95% KM (z) UCL                                      0.614       95% KM Bootstrap t UCL                      0.709
90% KM Chebyshev UCL                                  0.751     95% KM Chebyshev UCL                          0.889
97.5% KM Chebyshev UCL                                1.08      99% KM Chebyshev UCL                          1.454

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                    8.526     Anderson-Darling GOF Test
5% A-D Critical Value                                 0.814     Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic                                    0.229     Kolmogorov-Smirnov GOF
5% K-S Critical Value                                 0.0902    Detected Data Not Gamma Distributed at 5% Significance Level
Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                           0.546     k star (bias corrected MLE)                   0.538
Theta hat (MLE)                                       1.697     Theta star (bias corrected MLE)               1.723
nu hat (MLE)                                          125.6     nu star (bias corrected)                      123.6
Mean (detects)                                        0.926

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                               0.01      Mean                                          0.423
Maximum                                               17        Median                                        0.01
SD                                                    1.618     CV                                            3.822
k hat (MLE)                                           0.309     k star (bias corrected MLE)                   0.308
Theta hat (MLE)                                       1.37      Theta star (bias corrected MLE)               1.374
nu hat (MLE)                                          157.6     nu star (bias corrected)                      157.1
Adjusted Level of Significance (β)                    0.0491
Approximate Chi Square Value (157.08, α)              129.1     Adjusted Chi Square Value (157.08, β)         129
95% Gamma Approximate UCL (use when n>=50)            0.515     95% Gamma Adjusted UCL (use when n<50)        0.516

Estimates of Gamma Parameters using KM Estimates
Mean (KM)                                             0.448     SD (KM)                                       1.609
Variance (KM)                                         2.588     SE of Mean (KM)                               0.101
k hat (KM)                                            0.0774    k star (KM)                                   0.0791
nu hat (KM)                                           39.5      nu star (KM)                                  40.36
theta hat (KM)                                        5.78      theta star (KM)                               5.656
80% gamma percentile (KM)                             0.209     90% gamma percentile (KM)                     1.054
95% gamma percentile (KM)                             2.602     99% gamma percentile (KM)                     7.969

Gamma Kaplan-Meier (KM) Statistics
Approximate Chi Square Value (40.36, α)               26.81     Adjusted Chi Square Value (40.36, β)          26.74
  95% Gamma Approximate KM-UCL (use when n>=50)       0.674       95% Gamma Adjusted KM-UCL (use when n<50)   0.676

Lognormal GOF Test on Detected Observations Only
Shapiro Wilk Approximate Test Statistic               0.935     Shapiro Wilk GOF Test
5% Shapiro Wilk P Value                               1.33E-05  Detected Data Not Lognormal at 5% Significance Level
```

```
Lilliefors Test Statistic                                   0.0949   Lilliefors GOF Test
5% Lilliefors Critical Value                                0.0829   Detected Data Not Lognormal at 5% Significance Level
Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects
Mean in Original Scale                                      0.448    Mean in Log Scale                             -2.293
SD in Original Scale                                        1.612    SD in Log Scale                               1.44
  95% t UCL (assumes normality of ROS data)                 0.614      95% Percentile Bootstrap UCL                0.632
  95% BCA Bootstrap UCL                                     0.665      95% Bootstrap t UCL                         0.707
  95% H-UCL (Log ROS)                                       0.358

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution
KM Mean (logged)                                            -2.167   KM Geo Mean                                   0.115
KM SD (logged)                                              1.249      95% Critical H Value (KM-Log)               2.344
KM Standard Error of Mean (logged)                          0.0838     95% H-UCL (KM -Log)                         0.3
KM SD (logged)                                              1.249      95% Critical H Value (KM-Log)               2.344
KM Standard Error of Mean (logged)                          0.0838

DL/2 Statistics
DL/2 Normal                                                          DL/2 Log-Transformed
Mean in Original Scale                                      0.442    Mean in Log Scale                             -2.257
SD in Original Scale                                        1.613    SD in Log Scale                               1.297
  95% t UCL (Assumes normality)                             0.609      95% H-Stat UCL                              0.295
DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use
95% KM (Chebyshev) UCL                                      0.889

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

APPENDIX B

Risk Assessment Calculations
Recreational Trespassers

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Risk Assessment Summary

Exposure Pathway	Non-carcinogenic Hazard Index			Excess Lifetime Cancer Risk			
	Child	Youth	Adult	Child	Youth	Adult	Combined Ages
Soil Ingestion	0.1	0.03	0.02	4E-07	2E-07	1E-07	7E-07
Soil Dermal Contact	0.1	0.02	0.02	3E-07	1E-07	1E-07	5E-07
Outdoor Inhalation of Volatile Soil Constituents	0.0001	0.0001	0.0001	7E-11	1E-10	2E-10	4E-10
Inhalation of Entrained Soil Particles	0.00003	0.00003	0.00003	1E-10	2E-10	3E-10	6E-10
Total (All Pathways)	**0.2**	**0.05**	**0.03**	**6E-07**	**3E-07**	**3E-07**	**1E-06**
Maximum Acceptable Level	**1.0**			**1E-05**			

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Soil Ingestion

ADD = [C_S x IR x RAFo x EF x ED x EP x CF] / [BW x AP]

ADD = Average daily dose (mg/kg-dy) (nc = non-carcinogen; ca = carcinogen)
C_S = Constituent concentration in soil (mg/kg)
IR = Soil ingestion rate (kg/day)
RAFo = Oral Relative Absorption Factor (unitless)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = ADD(nc)/RfD
HI = Sum [HQ]
Risk = ADD(ca) x OSF

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Child

Constituent	**C_S (mg/kg)**	**IR (kg/day)**	**RAFo (unitless)**	**EF (events/yr)**	**ED (dy/event)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (nc) (yr)**	**ADD (nc) (mg/kg-dy)**	**RfD (mg/kg-dy)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF [(mg/kg-dy)$^{-}$**	**Risk (unitless)**
Total PCBs	0.889	0.0002	1	90	1	5	2.74E-03	17	5	2.58E-06	0.00002	0.1	70	1.84E-07	2	4E-07

Youth

Constituent	**C_S (mg/kg)**	**IR (kg/day)**	**RAFo (unitless)**	**EF (events/yr)**	**ED (dy/event)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (nc) (yr)**	**ADD (nc) (mg/kg-dy)**	**RfD (mg/kg-dy)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF [(mg/kg-dy)$^{-}$**	**Risk (unitless)**
Total PCBs	0.889	0.0001	1	90	1	10	2.74E-03	40	10	5.48E-07	0.00002	0.03	70	7.83E-08	2	2E-07

Adult

Constituent	**C_S (mg/kg)**	**IR (kg/day)**	**RAFo (unitless)**	**EF (events/yr)**	**ED (dy/event)**	**EP (yr)**	**CF (yr/dy)**	**BW (kg)**	**AP (nc) (yr)**	**ADD (nc) (mg/kg-dy)**	**RfD (mg/kg-dy)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADD (ca) (mg/kg-dy)**	**OSF [(mg/kg-dy)$^{-}$**	**Risk (unitless)**
Total PCBs	0.889	0.0001	1	90	1	15	2.74E-03	70	15	3.13E-07	0.00002	0.02	70	6.71E-08	2	1E-07

Combined Ages

Total Risk =	**7E-07**

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Soil Dermal Contact

ADD = **[C_S x SA x AF x RAFd x EF x ED x EP x CF] / [BW x AP]**

ADD = Average daily dose (mg/kg-dy) (ca = carcinogens, nc = non-carcinogens)
C_S = Constituent concentration in soil (mg/kg)
SA = Exposed skin surface area (cm^2/day)
AF = Soil adherence factor (kg/cm^2)
RAFd = Dermal Relative Absorption Factor (unitless)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = **ADD(nc)/RfD**
HI = **Sum [HQ]**
Risk = **ADD(ca) x OSF**

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Child

Constituent	C_S (mg/kg)	SA (cm^2/dy)	AF (kg/cm^2)	RAFd (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)-	Risk (unitless)
Total PCBs	0.889	2,632	3.60E-07	0.157	90	1	5	2.74E-03	17	5	1.92E-06	0.00002	0.1	70	1.37E-07	2	3E-07

Youth

Constituent	C_S (mg/kg)	SA (cm^2/dy)	AF (kg/cm^2)	RAFd (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)-	Risk (unitless)
Total PCBs	0.889	3,432	1.40E-07	0.157	90	1	10	2.74E-03	40	10	4.13E-07	0.00002	0.02	70	5.91E-08	2	1E-07

Adult

Constituent	C_S (mg/kg)	SA (cm^2/dy)	AF (kg/cm^2)	RAFd (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)-	Risk (unitless)
Total PCBs	0.889	5,044	1.30E-07	0.157	90	1	15	2.74E-03	70	15	3.22E-07	0.00002	0.02	70	6.91E-08	2	1E-07

Combined ages

Total Risk	**5E-07**

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Outdoor Inhalation of Volatile Soil Constituents

C_{air} = **C_{soil} x VF_{ss}**

C_{air} = Constituent concentration in ambient air (mg/m^{-3})
C_{soil} = Constituent concentration in soil (mg/kg)
VF_{ss} = Volatilization Factor, surface soil to ambient air [(mg/m^{-3})/(mg/kg)]

ADE = **C_{air} x EF x ED x EP x CF/ AP**

ADE = Average daily exposure (mg/m^3) (nc = non-carcinogen; ca = carcinogen)
EF = Exposure frequency (events/yr)
ED = Exposure duration (hr/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/hr)
AP = Averaging period (yr)

HQ = **ADE(nc)/ RfCs**
HI = **Sum [HQ]**
Risk = **ADE (ca) x IUR**

HQ = Non-carcinogenic hazard quotient (unitless)
HI = Total hazard index (unitless)
RfCs = Subchronic reference concentration (mg/m^{-3})
Risk = Excess lifetime cancer risk (unitless)
IUR = Cancer inhalation unit risk value [(mg/m^3)$^{-1}$]

Child

Constituent	**C_{soil} (mg/kg)**	**VF_{ss} [(mg/m^3)/(mg/kg)]**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfCs (mg/m^3)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADE (ca) (mg/m^3)**	**IUR [(mg/m^3)$^{-1}$]**	**Risk (unitless)**
Total PCBs	0.889	1.25E-07	1.11E-07	90	8	5	1.14E-04	5	9.14E-09	0.00007	0.0001	70	6.53E-10	0.1	6.5E-11

Youth

Constituent	**C_{soil} (mg/kg)**	**VF_{ss} [(mg/m^3)/(mg/kg)]**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfCs (mg/m^3)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADE (ca) (mg/m^3)**	**IUR [(mg/m^3)$^{-1}$]**	**Risk (unitless)**
Total PCBs	0.889	1.25E-07	1.11E-07	90	8	10	1.14E-04	10	9.14E-09	0.00007	0.0001	70	1.31E-09	0.1	1.3E-10

Adult

Constituent	**C_{soil} (mg/kg)**	**VF_{ss} [(mg/m^3)/(mg/kg)]**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfCs (mg/m^3)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADE (ca) (mg/m^3)**	**IUR [(mg/m^3)$^{-1}$]**	**Risk (unitless)**
Total PCBs	0.889	1.25E-07	1.11E-07	90	8	15	1.14E-04	15	9.14E-09	0.00007	0.0001	70	1.96E-09	0.1	2.0E-10

Combined Ages

Total Cancer Risk =	**4E-10**

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Inhalation of Entrained Soil Particles

C_{air} = C_{soil} x PM_{10} x CF_1
ADE = C_{air} x EF x ED x EP x CF / AP

C_{air} = Constituent concentration in ambient air (mg/m^3)
C_{soil} = Constituent concentration in soil (mg/kg)
PM_{10} = Particulate matter concentration in air (</= 10 microns) (ug/m^3)
CF = Unit conversion factor (kg/ug)
ADE = Average daily exposure (mg/m^3) (nc = non-carcinogen; ca = carcinogen)
EF = Exposure frequency (events/yr)
ED = Exposure duration (hr/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/hr)
AP = Averaging period (yr)

HQ = ADE (nc)/ RfC
HI = Sum [HQ]
Risk = ADE(ca) x IUR

HQ = Non-carcinogenic hazard quotient (unitless)
HI = Total hazard index (unitless)
RfC= Chronic reference concentration (mg/m^3)
Risk = Excess lifetime cancer risk (unitless)
IUR = Inhalation unit risk value [$(mg/m^3)^{-1}$]

Child

Constituent	**C_{soil} (mg/kg)**	**Assumed PM_{10} ($\mu g/m^3$)**	**CF_1 (kg/ug)**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF2 (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfC (mg/m^3)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADE (ca) (mg/m^3)**	**IUR ($(mg/m^3)^{-1}$)**	**Risk (unitless)**
Total PCBs	0.889	32	1.00E-09	2.84E-08	90	8	5	1.14E-04	5	2.34E-09	0.00007	0.00003	70	1.67E-10	0.57	1E-10

Youth

Constituent	**C_{soil} (mg/kg)**	**Assumed PM_{10} ($\mu g/m^3$)**	**CF_1 (kg/ug)**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF2 (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfC (mg/m^3)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADE (ca) (mg/m^3)**	**IUR ($(mg/m^3)^{-1}$)**	**Risk (unitless)**
Total PCBs	0.889	32	1.00E-09	2.84E-08	90	8	10	1.14E-04	10	2.34E-09	0.00007	0.00003	70	3.34E-10	0.57	2E-10

Adult

Constituent	**C_{soil} (mg/kg)**	**Assumed PM_{10} ($\mu g/m^3$)**	**CF_1 (kg/ug)**	**C_{air} (mg/m^3)**	**EF (events/yr)**	**ED (hr/event)**	**EP (yr)**	**CF2 (yr/hr)**	**AP (nc) (yr)**	**ADE (nc) (mg/m^3)**	**RfC (mg/m^3)**	**HQ (unitless)**	**AP (ca) (yr)**	**ADE (ca) (mg/m^3)**	**IUR ($(mg/m^3)^{-1}$)**	**Risk (unitless)**
Total PCBs	0.889	32	1.00E-09	2.84E-08	90	8	15	1.14E-04	15	2.34E-09	0.00007	0.00003	70	5.01E-10	0.57	3E-10

Combined Ages

Total Cancer Risk =	**6E-10**

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Volatilization Factor - Surface Soil to Ambient Air

$$VF_{ss} = \frac{2 \cdot W_s \cdot \rho_s}{U_{air} \cdot \delta_{air}} \cdot \sqrt{\frac{D^{eff}_s \cdot H}{\pi \cdot \left(\theta_{ws} + K_s \cdot \rho_s + H \cdot \theta_{as}\right) \cdot \tau}} \cdot CF$$

VF_{ss} = Volatilization factor, surface soil to ambient air [(mg/m^3)/(mg/kg)]
W_s = Width of soil source (cm)
ρ_s = Bulk soil density (g/cm^3)
U_{air} = Ambient air wind speed (cm/s)
δ_{air} = Ambient air mixing zone height (cm)
D^{eff}_s = Effective diffusivity in vadose zone soil (cm^2/s)
H = Henry's Law Constant (cm^3/cm^3)
π= Pi (3.14)
θ_{ws} = Water content in vadose zone soil (cm^3/cm^3)
K_s = Soil sorption coefficient (cm^3/g) (= Koc x foc)
K_{oc} = Organic carbon water partition coefficient (cm^3/g)
f_{oc} = Fraction of soil organic carbon (g/g)
θ_{as} = Air content in vadose zone soil (cm^3/cm^3)
τ = Averaging time for vapor flux (s)
CF = Unit conversion factor [(cm^3-kg)/(m^3-g)]

Constituent	**W_s (cm)**	**ρ_s (g/cm^3)**	**U_{air} (cm/s)**	**δ_{air} (cm)**	**D^{eff}_s (cm^2/s)**	**H (cm^3/cm^3)**	**π (unitless)**	**θ_{ws} (cm^3/cm^3)**	**K_{oc} (cm^3/g)**	**f_{oc} (g/g)**	**θ_{as} (cm^3/cm^3)**	**τ (s)**	**CF [cm^3-kg)/(m^3-g)]**	**VF_{ss} [(mg/m^3)/(mg/kg)]**
Total PCBs	22,860	1.5	313	305	8.65E-05	1.15E-02	3.14	0.15	2.45E+06	0.006	0.28	4.73E+08	1000	1.25E-07

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Effective Diffusivity through Vadose Zone Soil

$$D^{eff}_s = D_{air} \cdot \left(\frac{\theta_{as}^{3.33}}{\theta_T^{\;2}} \right) + D_{wat} \cdot \left(\frac{1}{H} \right) \cdot \left(\frac{\theta_{ws}^{3.33}}{\theta_T^{\;2}} \right)$$

$D^{eff}s$ =	Effective diffusivity through vadose zone soil (cm^2/s)
D_{air} =	Diffusion coefficient in air (cm^2/s)
D_{wat} =	Diffusion coefficient in water (cm^2/s)
H =	Henry's Law Constant (cm^3/cm^3)
θ_{as} =	Air content in vadose zone soil (cm^3/cm^3)
θ_{ws} =	Water content in vadose zone soil (cm^3/cm^3)
θ_T =	Total soil porosity (cm^3/cm^3)

Constituent	**D_{air} (cm^2/s)**	**D_{wat} (cm^2/s)**	**θ_{as} (cm^3/cm^3)**	**θ_{ws} (cm^3/cm^3)**	**θ_T (cm^3/cm^3)**	**H (cm^3/cm^3)**	**D^{eff}_s (cm^2/s)**
Total PCBs	1.00E-03	1.00E-05	0.28	0.15	0.43	1.15E-02	8.65E-05

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire
Constituent Factors

Constituent	Soil Exposure Point Concentration C_S (mg/kg)	Henry's Law Constant H (cm^3/cm^3)	Organic Carbon/Water Partition Coefficient K_{oc} (cm^3/g)	Diffusion Coefficient in Air D_{air} (cm^2/s)	Diffusion Coefficient in Water D_{wat} (cm^2/s)
Total PCBs	0.889	1.15E-02 [1]	2.45E+06 [1]	1.00E-03 [1]	1.00E-05 [1]

1. U.S. EPA (2005) Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA530-R-05-006); accompanying chemical and physical properties database . Values are for Aroclor 1254 (H in atm-m^3/mole x 40.5 = unitless H).

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Site Factors

Notation	Definition	Value	Units	Reference
θ_T	Total soil porosity	0.43	cm^3/cm^3	US EPA (1996) default value.
ρ_s	Bulk soil density	1.5	g/cm^3	US EPA (1996) default value.
f_{oc}	Soil organic carbon content	0.006	g/g	US EPA (1996) default value.
θ_{ws}	Water content in vadose zone soil	0.15	cm^3/cm^3	US EPA (1996) default value.
θ_{as}	Air content in vadose zone soil	0.28	cm^3/cm^3	US EPA (1996) default value.
U_{air}	Wind speed	313	cm/s	Annual average wind speed of Portsmouth AFB, NH (7 mph) NCDC (1998)
δ_{air}	Mixing zone of ambient air	305	cm	10 feet assumed value.
W_S	Width of soil source area	22,860	cm	750 feet; approximate length of site.
t	Averaging time for vapor flux (child)	1.58E+08	s	5 years
t	Averaging time for vapor flux (youth)	3.15E+08	s	10 years
t	Averaging time for vapor flux (adult)	4.73E+08	s	15 years

ASTM (2004) Standard Guide for Risk-Based Corrective Action.

NCDC (1998). Climatic Wind Data for the United States.

US EPA (1996) Soil Screening Guidance: Technical Background Document. EPA/540/R95/128.

PCB Risk Calculations
Recreational Trespassers
375 Banfield Street, Portsmouth, New Hampshire

Toxicity Values and Relative Absorption Factors

Constituent	Carcinogenic Weight of Evidence Category	Chronic Oral Reference Dose (RfD) (mg/kg-dy)		Subchronic Oral Reference Dose (RfDs) (mg/kg-dy)		Chronic Inhalation Reference Concentration (RfC) (mg/m^3)		Subchronic Inhalation Reference Concentration (RfCs) (mg/m^3)		Oral Cancer Slope Factor (OSF) [$(mg/kg\text{-}dy)^{-1}$]		Inhalation Cancer Unit Risk (IUR) [$(mg/m^3)^{-1}$]	
Total PCBs	B2 - Probable Human Carcinogen	0.00002	[1]	0.00002	[2]	0.00007	[3]	0.00007	[3]	2	[2]	0.1	[2]
										For PCB soil particle exposure:		0.57	[4]

1. US EPA (2016) Integrated Risk Information System (accessed 11/12/2021). Value for Aroclor 1254.
2. Chronic value applied.
3. Extrapolated from RfD assuming a 20 cubic meter daily inhalation rate for a 70 kilogram adult.
4. IRIS value of 0.1 is based on lighter, more volatile PCBs; suitable for vapor phase. Value applied for particle-bound PCBs extrapolated from oral cancer slope factor.

APPENDIX C

Risk Assessment Calculations
Commercial/Industrial Workers

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Soil Ingestion

ADD = [C_S x IR x RAFo x EF x ED x EP x CF] / [BW x AP]

ADD = Average daily dose (mg/kg-dy) (nc = non-carcinogen; ca = carcinogen)
C_S = Constituent concentration in soil (mg/kg)
IR = Soil ingestion rate (kg/day)
RAFo = Oral Relative Absorption Factor (unitless)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = ADD(nc)/RfD
HI = Sum [HQ]
Risk = ADD(ca) x OSF

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Constituent	C_S (mg/kg)	IR (kg/day)	RAFo (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (nc) (yr)	ADD (nc) (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-}$	Risk (unitless)
Total PCBs	0.889	0.0001	1	146	1	25	2.74E-03	70	25	5.08E-07	0.00002	0.03	70	1.81E-07	2	4E-07

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Soil Dermal Contact

ADD = **[C_S x SA x AF x RAFd x EF x ED x EP x CF] / [BW x AP]**

ADD = Average daily dose (mg/kg-dy) (ca = carcinogens, nc = non-carcinogens)
C_S = Constituent concentration in soil (mg/kg)
SA = Exposed skin surface area (cm^2/day)
AF = Soil adherence factor (kg/cm^2)
RAFd = Dermal Relative Absorption Factor (unitless)
EF = Exposure frequency (events/yr)
ED = Exposure duration (day/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/dy)
BW = Body weight (kg)
AP = Averaging period (yr)

HQ = **ADD(nc)/RfD**
HI = **Sum [HQ]**
Risk = **ADD(ca) x OSF**

HQ = Non-carcinogenic Hazard Quotient (unitless)
HI = Total Hazard Index (unitless)
RfD = Reference Dose (mg/kg-dy)
Risk = Excess lifetime cancer risk (unitless)
OSF = Oral cancer slope factor [(mg/kg-dy)$^{-1}$]

Constituent	C_S (mg/kg)	SA (cm^2/dy)	AF (kg/cm^2)	RAFd (unitless)	EF (events/yr)	ED (dy/event)	EP (yr)	CF (yr/dy)	BW (kg)	AP (yr)	ADD (mg/kg-dy)	RfD (mg/kg-dy)	HQ (unitless)	AP (ca) (yr)	ADD (ca) (mg/kg-dy)	OSF [(mg/kg-dy)$^{-}$	Risk (unitless)
Total PCBs	0.889	3,104	2.00E-07	0.157	146	1	25	2.74E-03	70	25	4.95E-07	0.00002	0.02	70	1.77E-07	2	4E-07

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Outdoor Inhalation of Volatile Soil Constituents

C_{air} = **$C_{soil} \times VF_{ss}$**

C_{air} = Constituent concentration in ambient air (mg/m^3)
C_{soil} = Constituent concentration in soil (mg/kg)
VF_{ss} = Volatilization Factor, surface soil to ambient air [(mg/m^3)/(mg/kg)]

ADE = **C_{air} x EF x ED x EP x CF/ AP**

ADE = Average daily exposure (mg/m^3) (nc = non-carcinogen; ca = carcinogen)
EF = Exposure frequency (events/yr)
ED = Exposure duration (hr/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/hr)
AP = Averaging period (yr)

HQ = **ADE(nc)/ RfCs**
HI = **Sum [HQ]**
Risk = **ADE (ca) x IUR**

HQ = Non-carcinogenic hazard quotient (unitless)
HI = Total hazard index (unitless)
RfCs = Subchronic reference concentration (mg/m^3)
Risk = Excess lifetime cancer risk (unitless)
IUR = Cancer inhalation unit risk value [(mg/m^3)$^{-1}$]

Constituent	C_{soil} (mg/kg)	VF_{ss} [(mg/m^3)/(mg/kg)]	C_{air} (mg/m^3)	EF (events/yr)	ED (hr/event)	EP (yr)	CF (yr/hr)	AP (nc) (yr)	ADE (nc) (mg/m^3)	RfCs (mg/m^3)	HQ (unitless)	AP (ca) (yr)	ADE (ca) (mg/m^3)	IUR [(mg/m^3)$^{-1}$]	Risk (unitless)
Total PCBs	0.889	1.25E-07	1.11E-07	146	8	25	1.14E-04	25	1.48E-08	0.00007	0.0002	70	5.29E-09	0.1	5.3E-10

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Inhalation of Entrained Soil Particles

C_{air} = **C_{soil} x PM_{10} x CF_1**
ADE = **C_{air} x EF x ED x EP x CF / AP**

HQ = **ADE (nc)/ RfC**
HI = **Sum [HQ]**
Risk = **ADE(ca) x IUR**

C_{air} = Constituent concentration in ambient air (mg/m^3)
C_{soil} = Constituent concentration in soil (mg/kg)
PM_{10} = Particulate matter concentration in air (</= 10 microns) (ug/m^3)
CF = Unit conversion factor (kg/ug)
ADE = Average daily exposure (mg/m^3) (nc = non-carcinogen; ca = carcinogen)
EF = Exposure frequency (events/yr)
ED = Exposure duration (hr/event)
EP = Exposure period (yr)
CF = Unit conversion factor (yr/hr)
AP = Averaging period (yr)

HQ = Non-carcinogenic hazard quotient (unitless)
HI = Total hazard index (unitless)
RfC= Chronic reference concentration (mg/m^3)
Risk = Excess lifetime cancer risk (unitless)
IUR = Inhalation unit risk value [$(mg/m^3)^{-1}$]

Constituent	C_{soil} (mg/kg)	Assumed PM_{10} ($\mu g/m^3$)	CF_1 (kg/ug)	C_{air} (mg/m^3)	EF (events/yr)	ED (hr/event)	EP (yr)	CF2 (yr/hr)	AP (nc) (yr)	ADE (nc) (mg/m^3)	RfC (mg/m^3)	HQ (unitless)	AP (ca) (yr)	ADE (ca) (mg/m^3)	IUR $(mg/m^3)^{-1}$	Risk (unitless)
Total PCBs	0.889	32	1.00E-09	2.84E-08	146	8	25	1.14E-04	25	3.79E-09	0.00007	0.00005	70	1.35E-09	0.57	8E-10

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Volatilization Factor - Surface Soil to Ambient Air

Eq 1

$$VF_{ss} = \frac{2 \cdot W_s \cdot \rho_s}{U_{air} \cdot \delta_{air}} \cdot \sqrt{\frac{D^{eff}_s \cdot H}{\pi \cdot \left(\theta_{ws} + K_s \cdot \rho_s + H \cdot \theta_{as}\right) \cdot \tau}} \cdot CF$$

VF_{ss} = Volatilization factor, surface soil to ambient air [(mg/m^3)/(mg/kg)]
W_s = Width of soil source (cm)
ρ_s = Bulk soil density (g/cm^3)
U_{air} = Ambient air wind speed (cm/s)
δ_{air} = Ambient air mixing zone height (cm)
D^{eff}_s = Effective diffusivity in vadose zone soil (cm^2/s)
H = Henry's Law Constant (cm^3/cm^3)
π= Pi (3.14)

θ_{ws} = Water content in vadose zone soil (cm^3/cm^3)
K_s = Soil sorption coefficient (cm^3/g) (= Koc x foc)
K_{oc} = Organic carbon water partition coefficient (cm^3/g)
f_{oc} = Fraction of soil organic carbon (g/g)
θ_{as} = Air content in vadose zone soil (cm^3/cm^3)
τ = Averaging time for vapor flux (s)
CF = Unit conversion factor [(cm^3-kg)/(m^3-g)]

Constituent	W_s (cm)	ρ_s (g/cm^3)	U_{air} (cm/s)	δ_{air} (cm)	D^{eff}_s (cm^2/s)	H (cm^3/cm^3)	π (unitless)	θ_{ws} (cm^3/cm^3)	K_{oc} (cm^3/g)	f_{oc} (g/g)	θ_{as} (cm^3/cm^3)	τ (s)	CF [cm^3-kg)/(m^3-g)]	VF_{ss} [(mg/m^3)/(mg/kg)]
Total PCBs	22,860	1.5	313	305	8.65E-05	1.15E-02	3.14	0.15	2.45E+06	0.006	0.28	4.73E+08	1000	1.25E-07

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Effective Diffusivity through Vadose Zone Soil

$$D^{eff}{}_{s} = D_{air} \cdot \left(\frac{\theta_{as}^{3.33}}{\theta_T^{2}}\right) + D_{wat} \cdot \left(\frac{1}{H}\right) \cdot \left(\frac{\theta_{ws}^{3.33}}{\theta_T^{2}}\right)$$

$D^{eff}s$ =	Effective diffusivity through vadose zone soil (cm^2/s)
D_{air} =	Diffusion coefficient in air (cm^2/s)
D_{wat} =	Diffusion coefficient in water (cm^2/s)
H =	Henry's Law Constant (cm^3/cm^3)
θ_{as} =	Air content in vadose zone soil (cm^3/cm^3)
θ_{ws} =	Water content in vadose zone soil (cm^3/cm^3)
θ_T =	Total soil porosity (cm^3/cm^3)

Constituent	**D_{air} (cm^2/s)**	**D_{wat} (cm^2/s)**	**θ_{as} (cm^3/cm^3)**	**θ_{ws} (cm^3/cm^3)**	**θ_T (cm^3/cm^3)**	**H (cm^3/cm^3)**	**$D^{eff}{}_s$ (cm^2/s)**
Total PCBs	1.00E-03	1.00E-05	0.28	0.15	0.43	1.15E-02	8.65E-05

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Constituent Factors

Constituent	Soil Exposure Point Concentration C_S (mg/kg)	Henry's Law Constant H (cm^3/cm^3)	Organic Carbon/Water Partition Coefficient K_{oc} (cm^3/g)	Diffusion Coefficient in Air D_{air} (cm^2/s)	Diffusion Coefficient in Water D_{wat} (cm^2/s)
Total PCBs	0.889	1.15E-02 [1]	2.45E+06 [1]	1.00E-03 [1]	1.00E-05 [1]

1. U.S. EPA (2005) Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA530-R-05-006); accompanying chemical and physical properties database . Values are for Aroclor 1254 (H in atm-m^3/mole x 40.5 = unitless H).

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Site Factors

Notation	Definition	Value	Units	Reference
θ_T	Total soil porosity	0.43	cm^3/cm^3	US EPA (1996) default value.
ρ_s	Bulk soil density	1.5	g/cm^3	US EPA (1996) default value.
f_{oc}	Soil organic carbon content	0.006	g/g	US EPA (1996) default value.
θ_{ws}	Water content in vadose zone soil	0.15	cm^3/cm^3	US EPA (1996) default value.
θ_{as}	Air content in vadose zone soil	0.28	cm^3/cm^3	US EPA (1996) default value.
U_{air}	Wind speed	313	cm/s	Annual average wind speed of Portsmouth AFB, NH (7 mph) NCDC (1998).
δ_{air}	Mixing zone of ambient air	305	cm	10 feet assumed value.
W_S	Width of soil source area	22,860	cm	750 feet; approximate length of site.
t	Averaging time for vapor flux (adult)	4.73E+08	s	30 years

ASTM (2004) Standard Guide for Risk-Based Corrective Action.

NCDC (1998). Climatic Wind Data for the United States.

US EPA (1996) Soil Screening Guidance: Technical Background Document. EPA/540/R95/128.

PCB Risk Calculations
Commercial/Industrial Workers
375 Banfield Road, Portsmouth, New Hampshire

Toxicity Values and Relative Absorption Factors

Constituent	Carcinogenic Weight of Evidence Category	Chronic Oral Reference Dose (RfD) (mg/kg-dy)	Subchronic Oral Reference Dose (RfDs) (mg/kg-dy)	Chronic Inhalation Reference Concentration (RfC) (mg/m^3)	Subchronic Inhalation Reference Concentration (RfCs) (mg/m^3)	Oral Cancer Slope Factor (OSF) [(mg/kg-dy)$^{-1}$]	Inhalation Cancer Unit Risk (IUR) [(mg/m^3)$^{-1}$]
Total PCBs	B2 - Probable Human Carcinogen	0.00002 [1]	0.00002 [2]	0.00007 [3]	0.00007 [3]	2 [2]	0.1 [2]
						For PCB soil particle exposure:	0.57 [4]

1. US EPA (2021) Integrated Risk Information System (accessed 11/12/2021). Value for Aroclor 1254.
2. Chronic value applied.
3. Extrapolated from RfD assuming a 20 cubic meter daily inhalation rate for a 70 kilogram adult.
4. IRIS value of 0.1 is based on lighter, more volatile PCBs; suitable for vapor phase. Value applied for particle-bound PCBs extrapolated from oral cancer slope factor.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

TRANSMITTED BY ELECTRONIC MAIL

Banfield, LLC
Attn: Mr. Robert Graham
304 Maplewood Avenue
Portsmouth, New Hampshire 03801
Rob@graham-consult.com

Re: Former Country Motors Sales
Portsmouth, New Hampshire

Dear Mr. Graham:

This is in response to the Banfield Realty, LLC (Banfield) Notification[1] to address *PCB remediation waste* on the upland portion of the property (hereinafter "the Site") located at 375 Banfield Road, Portsmouth, New Hampshire (also known as Former Country Motors) (**Attachment 2**). Specifically, soils located on the Site were identified to contain PCBs at concentrations that exceed the allowable PCB level of 1 part per million (ppm) for unrestricted use under the federal PCB regulations at 40 CFR § 761.61(a)(4).

Banfield is proposing the following PCB activities:

- Remove *PCB remediation waste* (i.e., soil) with greater than or equal to (≥) 50 ppm and dispose off-site in accordance with § 761.61(a)(5)(i)(B)(*2*)(*iii*)
- Collect verification samples in accordance with 40 CFR Part 761 Subpart O to confirm that the ≥ 50 ppm PCBs have been removed
- Remove *PCB remediation waste* (i.e., soil) with greater than (>) 10 ppm and dispose off-site as a less than (<) 50 ppm PCB waste in accordance with § 761.61(a)(5)(i)(B)(*2*)(*ii*)

---

[1] Information was submitted on behalf of Banfield Realty, LLC by Wilcox & Barton. The information was provided to satisfy the notification requirements under 40 CFR § 761.61(a). Information was provided dated May 31, 2022 (Remedial Action Plan Proposed Upland Development Area), February 24, 2023 (Revised Remedial Action Plan Proposed Upland Development Area); and March 28, 2023 (Email response to questions on the excavation and car crusher). These submittals will be referred to as the "Notification."

- Collect verification samples in accordance with 40 CFR Part 761 Subpart O to confirm that the less than or equal to (≤) 10 ppm standard has been met

- Construct compliant caps comprised of structures, soil, and asphalt pavement over the locations where PCBs concentrations > 1 ppm remain in accordance with 40 CFR § 761.61(a)(7)

- Record a notice on the deed in the form of an AUR in accordance with 40 CFR § 761.61(a)(8), to document PCB concentrations and any use restrictions

The information provided in the Notification meets the requirements under 40 CFR § 761.61(a)(3).

Banfield may proceed with its project in accordance with 40 CFR § 761.61(a), its Notification, and this Approval subject to the condition of Attachment 1.

This Approval does not release Banfield from any applicable requirements of federal, state or local law, including the requirements related to cleanup and disposal of PCBs or other contaminants under the New Hampshire Department of Environmental Services (NHDES) regulations.

EPA encourages the compliance with greener cleanup practices for all cleanup projects and recommends adherence to the ASTM Standard Guide to Greener Cleanups E2893-16 (Guide) for work conducted under this Approval and the Notification. Greener Cleanups is the practice of integrating options that minimize the environmental impacts of cleanup actions in order to incorporate practices that maximize environmental and human benefit. Please see Section 6 of the Guide for the Best Management Practices (BMP) Process dated May 2016 (*See* www.astm.org/Standards/E2893.htm *for additional information*). EPA encourages you to review the Guide and implement any practices that are feasible. If implemented, the PCB completion report (see Attachment 1, Condition 24) should include a section on BMP Documentation, as described in Section 6.6.5 of the Guide.

Questions and correspondence regarding this Approval should be directed to:

Katherine Woodward, PE, PhD, Project Manager
United States Environmental Protection Agency
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912
Telephone: (617) 918-1353
Woodward.katherine@epa.gov

EPA shall consider this project to be complete when it has received all submittals required under this Approval, including documents evidencing construction of the physical control (e.g., cap) and adoption of the notice on the deed. Please be aware that upon EPA receipt and review of the submittals, EPA may request any additional information necessary to establish that the work has been completed in accordance with 40 CFR Part 761, the Notification, and this Approval.

Sincerely,

Daniel Wainberg, Manager
RCRA Corrective Action/TSCA Branch
Land, Chemicals and Redevelopment Division

Attachment 1: PCB Approval Conditions
Attachment 2: Site Plan

cc: Robert Rooks, Wilcox & Barton *RRooks@wilcoxandbarton.com*
Scott Drew, NHDES *scott.t.drew@des.nh.gov*
File

ATTACHMENT 1

PCB SELF-IMPLEMENTING CLEANUP AND DISPOSAL APPROVAL CONDITIONS UPLAND PORTION OF PROPERTY LOCATED AT 375 BANFIELD ROAD (the "SITE") PORTSMOUTH, NEW HAMPSHIRE

GENERAL CONDITIONS

1. This Approval is granted under the authority of Section 6(e) of the Toxic Substances Control Act (TSCA), 15 U.S.C. § 2605(e), and the PCB regulations at 40 CFR Part 761, and applies solely to the *PCB remediation waste* located at the Site as identified in the Notification.

    a. In the event that Banfield Realty, LLC (Banfield) identifies other PCB-contaminated wastes (i.e., PCBs not identified in the Notification) subject to cleanup and disposal under the PCB regulations, Banfield shall be required to notify EPA and to clean up the PCB-contaminated wastes in accordance with 40 CFR Part 761.

    b. Banfield shall submit a separate plan to address the PCB contamination or may propose to modify the Notification to incorporate cleanup of the PCBs under this Approval in accordance with Condition 18.

2. Banfield shall conduct on-site activities in accordance with the conditions of this Approval and with the Notification.

3. In the event that the risk-based plan described in the Notification differs from the conditions specified in this Approval, the conditions of this Approval shall govern.

4. The terms and abbreviations used herein shall have the meanings as defined in 40 CFR § 761.3 unless otherwise defined within this Approval.

5. Banfield must comply with all applicable federal, state and local regulations in the storage, handling, and disposal of all PCB wastes, including PCBs, PCB Items and decontamination wastes generated under this Approval. In the event of a new spill during response actions, Banfield shall contact EPA within 24 hours for direction on sampling and cleanup requirements.

6. Banfield is responsible for the actions of all officers, employees, agents, contractors, subcontractors, and others who are involved in activities conducted under this Approval. If at any time Banfield has or receives information indicating that Banfield or any other person has failed, or may have failed, to comply with any provision of this Approval, it must report the information to EPA in writing within 24 hours of having or receiving the information.

7. This Approval does not constitute a determination by EPA that the transporters or disposal facilities selected by Banfield are authorized to conduct the activities set forth in the Notification. Banfield is responsible for ensuring that its selected transporters and disposal facilities are authorized to conduct these activities in accordance with all applicable federal, state and local statutes and regulations.

8. This Approval does not: 1) waive or compromise EPA's enforcement and regulatory authority; 2) release Banfield from compliance with TSCA or any applicable requirements of federal, state or local law; or 3) release Banfield from liability for, or otherwise resolve, any violations of TSCA or other federal, state or local law.

9. Failure to comply with the Approval conditions specified herein shall constitute a violation of the requirement in 40 CFR § 761.50(a) to store or dispose of PCB waste in accordance with 40 CFR Part 761 Subpart D.

NOTIFICATION AND CERTIFICATION CONDITIONS

10. This Approval may be revoked if the EPA does not receive written notification from Banfield of its acceptance of the conditions of this Approval within 10 business days of receipt.

11. Banfield shall notify EPA at least 3 business days before conducting removal of PCB remediation waste under this Approval and shall provide its schedule to implement and complete the activities described in the Notification and authorized by this Approval.

12. Prior to initiating onsite work under this Approval, Banfield shall submit the following information:

    a. a certification signed by its selected remediation contractor, stating that the contractor has read and understands the Notification, and agrees to abide by the conditions specified in this Approval; and,

    b. a certification signed by the selected analytical laboratory, stating that the laboratory has read and understands the sample preparation, extraction, analytical and quality assurance requirements specified in the Notification and in this Approval.

CLEANUP AND DISPOSAL CONDITIONS

13. The cleanup level for *PCB remediation waste* (i.e., soil) to remain at the Site shall be less than or equal to (≤) 10 parts per million (ppm).

    a. Post-excavation verification soil samples shall be collected on a bulk basis (i.e., mg/kg) and reported on a dry weight basis. Samples shall be collected from both excavation bottoms and sidewalls at the frequency found in 40 CFR Part 761 Subpart O.

    b. Chemical extraction for PCBs shall be conducted using Methods 3500B/3540C of SW-846 for solid matrices and Method 3500B/3510C of SW-846 for aqueous matrices; and, chemical analysis for PCBs shall be conducted using Method 8082 of SW-846, unless another extraction or analytical method(s) is validated according to Subpart Q.

c. PCB concentrations ≤ 10 ppm remaining in the soil shall be covered with a compliant cap(s), composed of buildings, soil and asphalt.

14. All PCB waste (regardless of concentration) generated as a result of the activities described in the Notification, excluding any decontaminated materials, shall be marked in accordance with § 761.40; stored in a manner prescribed in § 761.65; and, disposed of in accordance with 40 CFR § 761.61(a)(5), unless otherwise specified below:

    a. Decontamination wastes and residues shall be disposed of in accordance with 40 CFR § 761.79(g).

    b. Moveable equipment, tools, and sampling equipment shall be decontaminated in accordance with either 40 CFR § 761.79(b)(3)(i)(A), § 761.79(b)(3)(ii)(A), or § 761.79(c)(2).

    c. PCB-contaminated water generated during decontamination or dewatering shall be decontaminated in accordance with 40 CFR § 761.79(b)(1) or disposed of under § 761.60.

DEED NOTICE AND USE CONDITIONS

15. Within ten (10) business days of recording the deed notice, the Site Owner shall submit to EPA a certification as required under 40 CFR § 761.61(a)(8)(i)(B), that it has recorded the notation on the deed with a copy of the executed deed notice.

INSPECTION, MODIFICATION AND REVOCATION CONDITIONS

16. Within 30 days of completion of the work authorized under this Approval, Banfield shall submit for EPA's review and concurrence, a detailed monitoring and maintenance plan (MMP) for the cap(s). Banfield shall incorporate any changes to the MMP required by EPA.

    a. The MMP shall include: a description of the activities that will be conducted, including inspection criteria, frequency, and routine maintenance activities; sampling protocols, sampling frequency, and analytical criteria, as applicable; and reporting requirements.

    b. The MMP shall include a communications component which details how the maintenance and monitoring results will be communicated to the Site users, including building users, other on-site workers, and interested stakeholders, if requested.

c. The MMP also shall include a worker training component for maintenance workers or for any person that will be conducting work that could impact the cap(s).

d. Banfield shall submit the results of these long-term monitoring and maintenance activities to EPA. Based on its review of the results, EPA may determine that modification to the MMP is necessary in order to monitor and/or evaluate the long-term effectiveness of the cap(s).

e. Activities required under the MMP shall be conducted until such time that EPA determines, in writing, that such activities are no longer necessary.

f. A copy of the MMP shall be attached to the deed restriction, see Condition 15.

17. Banfield shall allow any authorized representative of the Administrator of the EPA to inspect the Site, to inspect records, and to take samples as may be necessary to determine compliance with the PCB regulations and this Approval. Any refusal by Banfield to allow such an inspection (as authorized by Section 11 of TSCA) shall be grounds for revocation of this Approval.

18. Any proposed modification(s) in the plan, specifications, or information in the Notification must be submitted to EPA no less than 14 calendar days prior to the proposed implementation of the change. Such proposed modifications will be subject to the procedures of 40 CFR § 761.61(a)(3)(ii).

19. Any proposed modification(s) in the plan or specifications contained in the Notification or any departure from the conditions of this Approval without prior, written authorization from the EPA may result in the revocation, suspension and/or modification of the Approval, in addition to any other legal or equitable relief or remedy the EPA may choose to pursue.

20. Any departure from the conditions of this Approval without prior, written authorization from the EPA may result in the revocation, suspension and/or modification of the Approval, in addition to any other legal or equitable relief or remedy the EPA may choose to pursue.

21. Any misrepresentation or omission of any material fact in the Notification or in any records or reports may result in the EPA’s revocation, suspension and/or modification of the Approval, in addition to any other legal or equitable relief or remedy the EPA may choose to pursue.

22. Approval for these activities may be revoked, modified or otherwise altered: if EPA finds a violation of the conditions of this Approval or of 40 CFR Part 761, including EPA's PCB Spill Cleanup Policy, or other applicable rules and regulations; if EPA determines that this PCB risk-based disposal action poses an unreasonable risk of injury to health or the environment; or, if EPA finds that PCBs are migrating from the Site.

RECORDKEEPING AND REPORTING CONDITIONS

23. Banfield shall prepare and maintain all records and documents required by 40 CFR Part 761, including but not limited to the records required under Subparts J and K. A written record of the cleanup and the analytical sampling shall be established and maintained by Banfield in one centralized location until such time as EPA authorizes, in writing, an alternative disposition for such records. All records shall be made available for inspection by authorized representatives of EPA.

24. Banfield shall submit a Final Completion Report (Report) to EPA using a file sharing platform (e.g., SharePoint™), within 60 days of completion of the activities authorized under this Approval. At a minimum, this final report shall include: a short narrative of the risk-based disposal activities, with photo documentation of the activities, including construction of the cap, and Greener Cleanups BMP documentation, if implemented; characterization and confirmation sampling analytical results (as applicable); copies of the accompanying analytical chains of custody; field and laboratory quality control/quality assurance checks; an estimate of the quantity of PCB waste disposed of and the size of the remediated area(s); copies of manifests and/or bills of lading; copies of certificates of disposal or similar certifications issued by the disposer; and the estimated cost of the PCB remediation work.

25. Required submittals shall be mailed in electronic copy to:

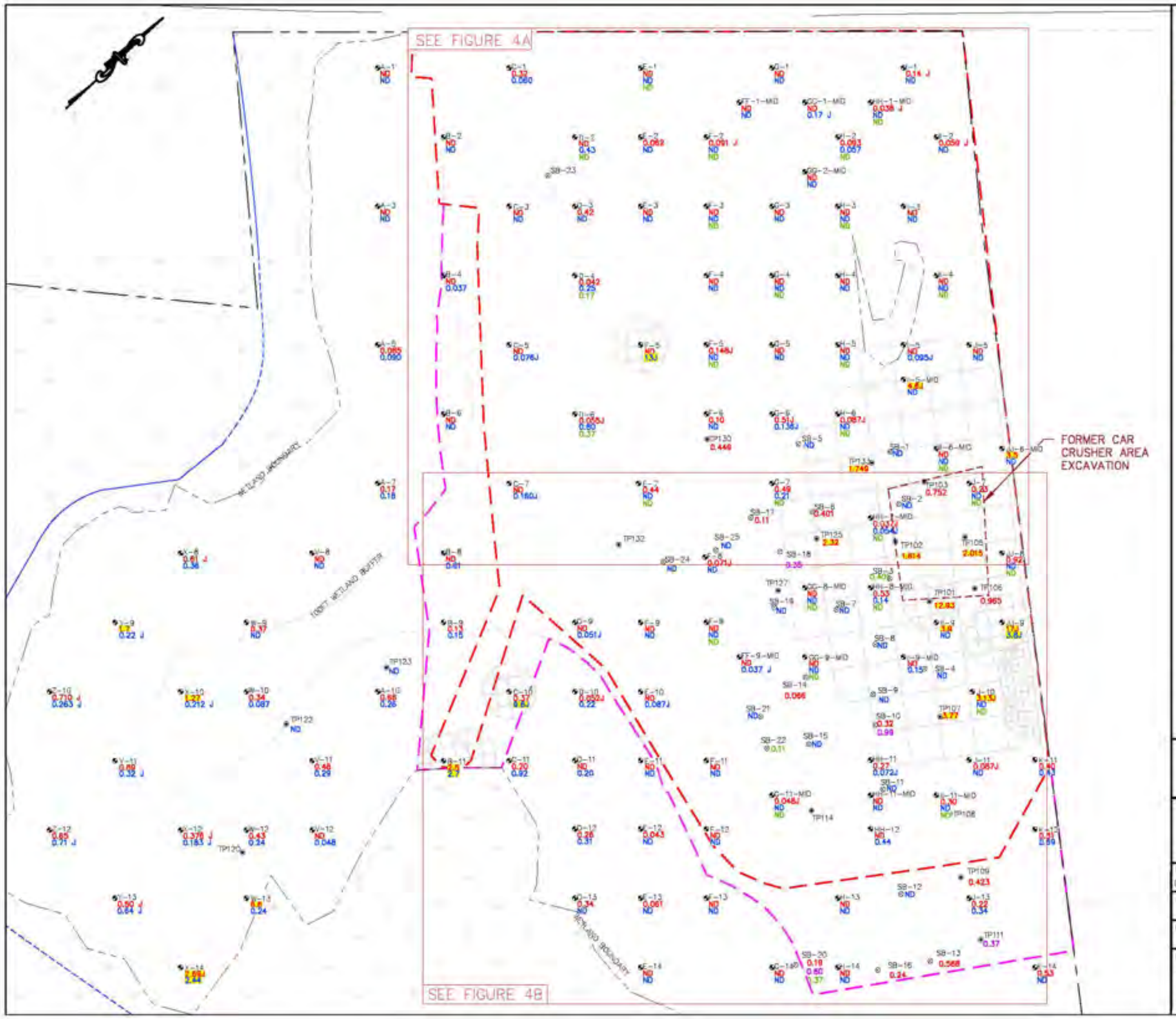
Katherine Woodward, PE, PhD, Project Manager
United States Environmental Protection Agency
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912
Telephone: (617) 918-1353
woodward.katherine@epa.gov

26. No record, report or communication required under this Approval shall qualify as a self-audit or voluntary disclosure under EPA audit, self-disclosure or penalty policies.

****

END OF ATTACHMENT 1

Attachment 2. Site Plan



LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

LIMITS OF DISTURBANCE

LIMITS OF WORK

2020 AND 2008 PCB DATA

⊗ SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)

● TEST PIT LOCATION (RANSOM 2008)

SAMPLE DEPTH INTERVAL (FEET)	PCB CONCENTRATION SHOWN IN:
0–2	RED
2–4	PURPLE
4–6	GREEN

ND TOTAL PCB CONCENTRATION< REPORTING LIMIT FOR ALL DEPTHS. REPORTING LIMITS ALL <1.0 mg/kg.

2021 PCB DATA

Y-9 1.7 0.22J PCB SAMPLE LOCATION, GRID IDENTIFIER, AND RESULTS IN MG/KG.
J indicates an estimated value.

SAMPLE DEPTH INTERVAL	PCB CONCENTRATION SHOWN IN:
3"–6"	RED
6"–18"	BLUE
18"–36"	GREEN

2.015 YELLOW HIGHLIGHT INDICATES VALUE EXCEEDS 1 mg/kg

STEP-OUT SAMPLING GRIDS
25' X 25' IN AND NEAR CAR CRUSHER AREA. SAMPLE FROM 3" TO 12" FOR TOPSOIL CHARACTERIZATION.
10' X 10' AND 5' X 5' WHERE CONCENTRATIONS EXCEED 10 MG/KG, SAMPLE FROM 3" TO 12", 12" TO 24", AND 24" TO 36"

GRAPHIC SCALE
75 0 37.5 75 150
(IN FEET)
1 inch = 75 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE PCBS IN SOIL (THRU 2021)		
DATE October 1, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY RWR	REVISED February 8, 2023
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 4

DES Waste Management Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

REVISED
WORK PLAN FOR LOWLAND AREA

Former Country Motor Sales
375 Banfield Road
Portsmouth, New Hampshire

NHDES Site #199408047
Project Type: HAZWASTE
Project #40176

Prepared For:
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, New Hampshire 03801
Phone Number: (603) 479-3666
Contact Name: Mr. Robert Graham
Contact Email: Rob@graham-consult.com

Prepared By:
Wilcox & Barton, Inc.
#1B Commons Drive, Unit 12B
Londonderry, New Hampshire 03053
Phone Number: (603) 369-4190 x501
Contact Name: Mr. William R. Wilcox
Contact Email: wwilcox@wilcoxandbarton.com

Report Date: September 30, 2022
Revised April 5, 2023

Wilcox & Barton, Inc. Project #BANF0005

Wilcox & Barton INC.
CIVIL • ENVIRONMENTAL • GEOTECHNICAL

April 5, 2023

Mr. Scott Drew, P.G.
Hazardous Waste Remediation Bureau
New Hampshire Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, New Hampshire 03302-0095

RE: Revised Work Plan for Lowland Area
Former Country Motor Sales, 375 Banfield Road, Portsmouth, New Hampshire
NHDES Site #199408047, HAZWASTE Project #40176

Dear Mr. Drew:

On behalf of Banfield Realty, LLC, Wilcox & Barton, Inc. is pleased to submit the attached Revised Work Plan prepared by TRC Environmental Corporation (TRC). The Revised Work Plan was prepared to address New Hampshire Department of Environmental Services (NHDES) comments provided by email correspondence dated December 14, 2022, and February 15, 2023, and follow up conference calls.

Wilcox & Barton, Inc. is also providing the attached Figures 4 through 7 to supplement those provided in the Revised Work Plan. These figures depict the proposed TRC sampling locations relative to existing analytical data, as was requested in the NHDES comments.

Please call me at (603) 369-4190 x501 if you have any questions or require additional information.

Very truly yours,

WILCOX & BARTON, INC.

Mr. William R. Wilcox
President – Principal Geologist

cc: Mr. Robert Graham

Attachment

WWW.WILCOXANDBARTON.COM
#1B Commons Drive, Unit 12B, Londonderry, NH 03053 • **Ph:** (603) 369-4190 | (888) 777-5805 • **Fax:** (603) 369-6639
Offices In: New Hampshire • Vermont • Massachusetts • Connecticut • Hawaii

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

This work plan has been prepared by TRC Environmental (TRC) on behalf of Wilcox & Barton, Inc. (W&B) to partially address additional investigation activities requested by the New Hampshire Department of Environmental Services (NHDES; correspondence dated April 21, 2022) and addresses field data collection and monitoring requests of Pickering Brook adjacent to, and downgradient of, the Former Country Motors site located at 375 Banfield Road in Portsmouth, New Hampshire (the "Site"; DES Site #199408047).

The Site was previously used for automobile storage, crushing, and salvage and is the location of a historical solid waste disposal area used for the disposal of construction and demolition debris. Due to these operations, previous Site investigations have found concentrations of lead and polychlorinated biphenyls (PCBS) in soil that exceed applicable Soil Remediation Standards (SRS) within upland soils. Additionally, groundwater samples collected from the site indicate concentrations of perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), and perfluorooctanoic acid (PFOA) that exceed applicable Ambient Groundwater Quality Standards (AGQS) within the upland area of the Site.

Within the wetland areas and sections of Pickering Brook adjacent to historical operations on the Site, recent investigations have identified elevated concentrations of select PAHs and metals, in particular, lead that exceed applicable regulatory thresholds, including Threshold Effect Concentrations (TECs), Probable Effect Concentrations (PECs), as well as NHDES water quality criteria.

The purpose of this Work Plan is to present additional activities, which are necessary to determine the extent of potential impacts on Pickering Brook due to historical operations at the Site from historic waste disposal practices as well as impacted groundwater and sediments on the Site. Proposed assessment activities are detailed in Section 2 below.

2.0 PROPOSED SUBSURFACE ASSESSMENT ACTIVITIES

TRC proposes to conduct additional focused assessment activities to assess the presence and/or extent of impacts on Pickering Brook and wetlands in the vicinity of the site that may have been impacted due to conditions at the Site.

Based on information provided by W&B, and a brief field reconnaissance conducted by TRC, Pickering Brook appears to be a seasonal waterbody that runs through the downgradient wetland (**Figure 2**). Due to the seasonality of the flowage, free moving water within Pickering Brook, is not always present, particularly in the upstream reach of the stream. Additionally, numerous groundwater, surface water, and sediment samples have been previously collected from the Site, therefore the intent of this Work Plan is not to repeat these assessments, but to add to our understanding of how the brook may be impacted by the contaminants within the Lower Wetland Area on Site.

Proposed assessment activities are described in the following subsections.

2.1 Preparation of a Site-Specific Health and Safety Plan

Prior to initiating subsurface assessment fieldwork, TRC will prepare a Site-specific Health and Safety Plan (HASP) to ensure the safety of TRC employees performing environmental investigation activities on Site. The HASP will be developed in accordance with the requirements set forth in 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response. Specifically, the HASP will identify and detail potential Site hazards, appropriate action limits for each hazard, required task-specific personal protective equipment, decontamination procedures, and proper protocols for emergency events if encountered. The HASP will be provided to project personnel and will be adhered to during on-Site investigation activities. A copy of the HASP will be kept on Site during investigation activities.

2.2 Metals Sampling

Three sediment and water quality samples will be collected on Site from within Pickering Brooks drainage. Sample locations were selected such that the brook is sampled where flow would enter the Site (Sampling Station #1), travel through the Site (Sampling Station #2) and where it would leave the Site (Sampling Station #3). The proposed sample locations are depicted on **Figure 3**. The staff conducting the field work for this effort will notify Scott Drew, NHDES, in advance of the effort.

The expectation is that work will occur during spring of 2023 to maximize the potential to document higher seasonal spring flows in the drainage. If flowing water is present at the time of the investigation, stream water quality samples (SW-1 thru SW-3) will be collected, and flow measurements obtained. Given the very shallow nature of the stream, any flow measurements would be completed using the U.S. Environmental Protection Agency (USEPA) Time-of-Travel method (EPA, 2012). Any water samples obtained will be grab samples taken from just below the stream surface with care will be taken to avoid disturbance and collection of sediment. Samples will be field filtered, preserved as appropriate, and sent to a NELAP- or NHDES-certified lab for the analysis of PCBs, total and dissolved RCRA 8 metals (includes lead), iron, and manganese based on the previously assessed risk and/or the CSM.

Sediment samples (SS-1 thru SS-3) will each be obtained using a decontaminated hand coring device to sample the surficial layer of soft sediments from the stream channel within depositional areas in the upgradient portion of the stream. Samples will be obtained to a depth of 6-inches. Sediment will be tested for PCBs, RCRA 8 metals, total organic carbon (TOC) and total lead.

The goal for these assessments would be to determine whether any off-Site water quality impairments are contributing to the impacts observed in Pickering Brook and to determine whether shallow sediments moving via the brook onto the Site are potentially contaminated.

GPS coordinates will be obtained for each sample location.

2.3 Fish Habitat and Fish Community Assessment

Stream habitat will be assessed using the NHDES Habitat Assessment procedures (a modified version of the US EPA's Rapid Bioassessment Protocols by Barbour, et al., 1999) during our spring, 2023 field effort. Parameters such as field-measured water quality, stream flow, sediment composition, fish habitat structure, cover, riparian growth, and other variables will be documented with field notes and photos at each sampling location.

A quantitative sediment grain size assessment (pebble count method) will also be conducted in the field along the length of each of the three tributary locations identified as SG-1 thru SG-3 on **Figure 3.** Sample locations within Pickering Brook were selected to reflect the areas where water enters the Site, crosses through the Site, and leaves the Site. Samples will be obtained from three locations along the length of the flowage; SG-1 located at the upstream end of the Site, SG-2 located within the Site, and SG-3 located at the most downstream end of the Site. This procedure will assess grain size for the surficial sediments at each meter along a 100-meter stretch at the centerline of each stream segment.

Flow along with water quality parameters including temperature, salinity, dissolved oxygen, and pH will be measured in the field using a multi-parameter sonde at each site. Field data entry will be performed using a tablet with custom-designed forms and GPS location capability.

During the initial field reconnaissance, no evidence of fish was observed, and it appears that there is not sufficient water permanence or depth to support recreational fishing or sport fish species. We will seek to assess the brook during the spring period to further understand the Site's potential for use by fish. No fish or fish tissue sampling is proposed.

2.4 Macroinvertebrate Community Assessment

Based on our discussion with NHDES on February 6th, 2023, it was agreed that evaluation of the benthic community would not require additional bioassays (sediment toxicity tests) as described in Part B of the NHDES Sediment Quality Guidance Document. Therefore, to assess the macroinvertebrate community in Pickering Brook, a kick-net will be used and the jab-sweep method employed. This approach is preferable to rock basket deployment at this Site since the stream is known to be intermittent/ephemeral. Collection of three macroinvertebrate samples will be attempted from each of the three stream reaches identified in Section 2.3.

Macroinvertebrate samples will be processed and analyzed in accordance with NHDES biomonitoring protocols. In general, most organisms will be identified to genus; however, midges will be identified to sub-family, and Oligochaetes identified only as Oligochaetes.

Summary statistics will be calculated to assess each site. These metrics, including EPT taxa richness, Shannon Weiner Diversity, number of intolerant taxa, percent contribution of dominant taxa, and ratio of EPT to Chironomid abundance represent a subset of the metrics presented in the United States Environmental Protection Agency (USEPA) Rapid Bioassessment Protocols for Use in Streams and Rivers (Barbour et al., 1999). This approach has been acceptable to NHDES when performed in similar studies in New Hampshire.

In order to complete the Community Assessment (Part C of the NHDES Sediment Quality Guidance Document), the macroinvertebrate samples collected and analyzed from the Site will be statistically compared to one or more reference locations selected for southeast NH. We understand, based on our discussion with NHDES on February 6, 2023, that we will be able to use existing and readily available macroinvertebrate data provided by NHDES to perform this desktop analysis. We will obtain data provided to us by NHDES and tabulate those data similarly to the data analysis described above. From this, we will perform statistical analysis to compare differences in metrics between the samples collected from the Site vs. the reference locations(s).

If the brook crossing the Site does not have water (it is dry) during our proposed spring 2023 assessment period, we understand that we would be required to complete sediment toxicity testing in accordance with Part B of the NHDES Sediment Quality Guidance Document in order to adequately assess the impairment at the Site.

2.5 Groundwater Impact Assessment

To assess groundwater contributions to the stream from the Site, a sampling and measurement round will be performed focusing on determining PAH and lead concentrations within the groundwater underlying the streambed using an Interstitial Porewater Sampler. Three (3) sampling stations, identified as PW-1 thru PW-3, have been co-located with the stations discussed below. Sampling will include both groundwater and surface water samples (if present) at each station. Groundwater and surface water samples will be submitted for laboratory analysis of total and dissolved RCRA 8 metals, iron, manganese, PCBs and PAHs.

To assess groundwater conditions relative to the surface water in the stream, temporary piezometers will be installed in three (3) locations within the subsurface materials underlying the streambed to allow for the measurement of hydraulic head in the stream versus the hydraulic head in the underlying groundwater (USGS, 2008). Given the nature of the stream in this area, it is anticipated that the piezometers will be driven to depth of approximately two feet beneath the stream which should allow for the measurement of the hydraulic head within the underlying groundwater relative to the surface water level. These measurements will support a determination of whether groundwater is flowing into the stream (gaining stream) or flowing out of the stream (losing stream). Sediment cores will be collected at each location to allow for logging of the stratigraphy beneath the stream and submittal of up to 6 samples for grain size analysis (sieve and hydrometer). This will allow for an estimation of the hydraulic conductivity of the sediments underlying the stream.

To estimate groundwater flux, conditions observed at each sampling station will be considered representative of that stretch of the stream. The hydraulic head measurements and the estimates of hydraulic conductivity will be used to estimate the flux using Darcy's Equation ($Q=K*i*A$). The results of the proposed groundwater sampling will be used to support an estimate of contaminant flux into the stream from groundwater at each location.

To further assess groundwater conditions within the associated wetlands, up to four (4) shallow piezometers will be installed at depths up to four (4) feet beneath the wetland surface using hand augers and 2-inch PVC well materials. It is anticipated that three of these piezometers will be located proximal to the three sampling stations noted above. These piezometers will be used to assess the depth to groundwater within the wetlands.

In addition, based on the recommendations of NHDES, we will concurrently assess groundwater within the existing wells on Site identified as MW-101 through MW-104 to help evaluate the connection, both hydraulically and in terms of contaminant transport between the pre-1981 landfill area and the wetland and Pickering Brook.

2.6 Solid Waste Mapping

To assess and document the presence of exposed solid waste, which may impact surface water runoff, TRC will conduct an inspection of the Site and note locations of visible debris. The site will be walked in a 30-foot grid pattern and exposed waste, greater than 6 feet in any direction, will be photographed and geolocated using a GPS unit with sub-meter accuracy.

Although no subsurface investigation will be completed as part of our efforts, field investigation will also include mapping of any larger and obvious soil discolorations, seepage, or other solid waste that may not be greater than 6 feet in diameter, but could, in aggregate, represent significant areas of debris, or indicate more significant impacts beneath the surface. The goal of this effort is to understand the extent and location of the solid waste in the Lowland Area and Pickering Brook on Site that may be impacting the brook through stormwater runoff.

An inspection report with photolog and map as a GIS data layer will be prepared to inform the assessment activities.

3.0 DOCUMENTATION

TRC will produce a deliverable summarizing the results of the proposed activities presented in Section 2 above. The report will include site plans, laboratory analytical results, soil sample logs, photolog, waste GIS data layer, other relevant documentation, and associated findings as well as any recommendations for additional future assessments, if warranted.

4.0 SCHEDULE

The proposed assessment schedule is as follows and is based upon contractor availability and an assumption on the timeframe for obtaining NHDES work plan approval:

Proposed Activities	**Proposed Dates**
Final Work Plan Submission	3/31/2023
Metals Sampling	May 2023*
Fish Habitat and Fish Community Assessment	May 2023*
Macroinvertebrate Community Assessment	May 2023*
Groundwater Impact Assessment	May 2023*
Assessment Report Submission	8/31/2023**

*Dependent upon schedule and access – specific dates will be conveyed to NHDES prior to start of work.

**This date is approximate. The report will be submitted to Wilcox & Barton for internal review within 28 days of the receipt of the last round of laboratory analytical data associated with the above-described sampling activities. Delivery to NHDES will follow internal QA/QC review.

Schedule will be dependent upon appropriate site and weather conditions. Sampling during a period of no, low or moderate flow is acceptable; however, sampling during a rising hydrograph or extremely high flows would not allow for representative data to be obtained.

5.0 REFERENCES

EPA, 2012. Water: Monitoring and Assessment. 5.1 Stream Flow. United States Environmental Protection Agency. Office of Water. EPA 841-B-97-003. Accessed January 27, 2020 at https://archive.epa.gov/water/archive/web/html/vms51.html

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

NHDES, 2013. New Hampshire Department of Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes. NHDES Water Division- Watershed Management Bureau, Revision No. 1

Rosenberry, D.O., and LaBaugh, J.W. 2008. Use of Monitoring Wells, Portable Piezometers, and Seepage Meters to Quantify Flow Between Surface Water and Ground Water. U.S. Geological Survey Techniques and Methods Chapter 4-D2.

TABLES

Table 1: Proposed Sampling Program

Country Motors, 375 Banfield Road, Portsmouth, NH

Sample ID[1]	Description	Target Sample Depth Intervals[2]	Analyses	Rationale/Notes
Proposed Stream Sampling Locations				
SW-1	Proposed Stream Surface Water Sample	One sample from just below the surface of the flowing stream (upgradient)	(LAB) RCRA 8, PCBs, iron, manganese (Field) flow, temperature, dissolved oxygen, and pH	Evaluate potential impacts to stream water from historical Site activity.
SW-2	Proposed Stream Surface Water Sample	One sample from just below the surface of the flowing stream (adjacent)	(LAB) RCRA 8, PCBs, iron, manganese (Field) flow, temperature, dissolved oxygen, and pH	Evaluate potential impacts to stream water from historical Site activity.
SW-3	Proposed Stream Surface Water Sample	One sample from just below the surface of the flowing stream (downgradient)	(LAB) RCRA 8, PCBs, iron, manganese (Field) flow, temperature, dissolved oxygen, and pH	Evaluate potential impacts to stream water from historical Site activity.
Proposed Soil Sediment Samples				
SS-1	Proposed Soil Sediment Location	Surficial layer of soft sediments from the stream channel (upgradient)	RCRA 8, iron, manganese, PCBs, TOC	Evaluate potential impacts to stream soils from historical Site activity.
SS-2	Proposed Soil Sediment Location	Surficial layer of soft sediments from the stream channel (adjacent)	RCRA 8, iron, manganese, PCBs, TOC	Evaluate potential impacts to stream soils from historical Site activity.
SS-3	Proposed Soil Sediment Location	Surficial layer of soft sediments from the stream channel (downgradient)	RCRA 8, iron, manganese, PCBs, TOC	Evaluate potential impacts to stream soils from historical Site activity.
Proposed Sediment Grain Size Samples				
SG-1 thru SG-3	Proposed Sediment Grain Size Sample	Approximately 0.5 to 2 feet beneath streambed	Grain size	To be used to calculate hydraulic conductivity

Notes:

[1] – Actual sampling locations may be adjusted based upon field conditions.

[2] – Target depth intervals are to be used as a field guide; actual sample depths may vary based on field screening, visual observations, and/or physical constraints at each location.

Table 2: Sampling and QA Summary

Country Motors, 375 Banfield Road, Portsmouth, NH

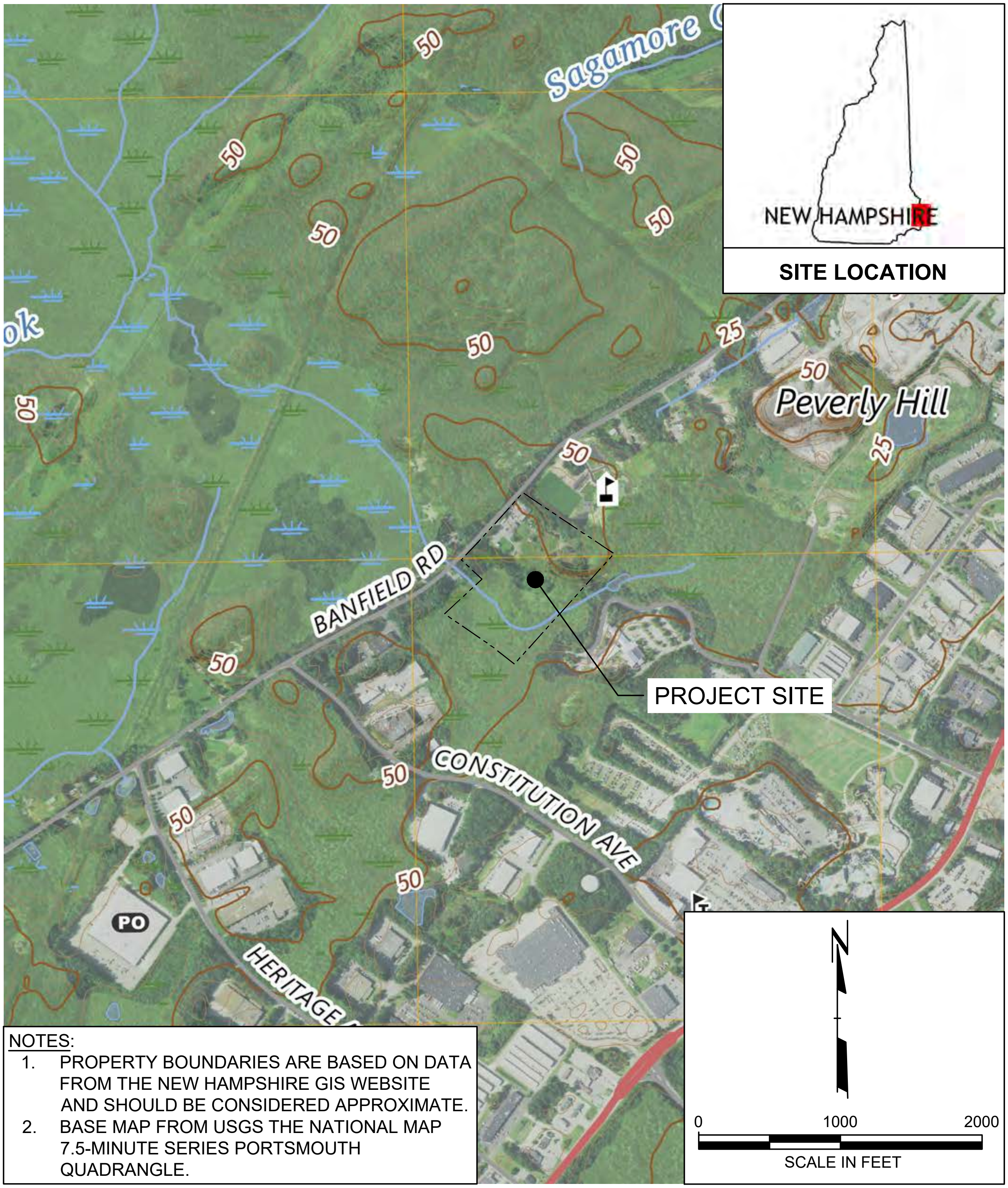
Field Sample Matrix	Parameter	Sample Type	Estimated Number of Samples	Preparation/ Analytical Method References	Sample Preservation	Holding Time from Collection	Container
Sediment	RCRA 8	Soil	3	EPA 3050B			Glass Jar
	TOC	Soil	3	SW-846 Method 9060	Cool to 4C	28 Days	Glass Jar
	PCBs		3	Method 8082A			Glass Jar
Surface Water	Total and Dissolved RCRA 8	Water	3	SW-846 Method 3005A	Preserved in HNO3		Glass Jar
	Dissolved Lead	Water	3	SW-846 Method 3005A	Filtered and preserved in HNO3		Glass Jar
	PCBs	Water	3	Method 8082A			Glass Jar
Groundwater	Total RCRA 8	Water	7	SW-846 Method 3005A	Preserved in HNO3		Glass Jar
	Dissolved RCRA 8	Water	7	SW-846 Method 3005A	Filtered and preserved in HNO3		Glass Jar
	PAHs	Water	7	SW-846 Method 8310	Refrigeration	40 days	Glass Jar
	PCBs	Water	7	Method 8082A			Glass Jar
Sediment/Soil	Grain Size	Soil	6	ASTM D6913			Glass Jar

(A) A separate 4-oz. glass jar will also be collected for percent solids.
FD – Field Duplicate

Table 3: Field SOPs
Country Motors, 375 Banfield Road, Portsmouth, NH

SOP #	SOP Title	Revision #	Date of SOP
ESS	Surface Water Sampling Guidelines		
ESS	Sediment Collection		
ESS	Measurement of Dissolved Oxygen		
ESS	Measurement of pH		
ECR 008 (TRC SOP)	Surface Water and Sediment Sampling	2	August 2020
ECR 004 (TRC SOP)	Water Level and Product Measurements	3	February 2022
ECR 023 (TRC SOP)	Packaging and Shipping of Non-Hazardous Environmental Samples	1	January 2020
ECR 002 (TRC SOP)	Chain of Custody Protocol	2	February 2021
ECR 001 (TRC SOP)	Field Activity Documentation for Environmental Investigations	3	November 2020
ECR 005 (TRC SOP)	Visual-Manual Procedure for Soil Description and Identification	1	January 2020
ECR 011 (TRC SOP)	Calibration of Field Instruments for Water Quality Parameters	1	January 2020
ECR 010 (TRC SOP)	Equipment Decontamination Protocol	3	April 2021
West Virginia DEP	Wolman Pebble Count Procedure		
NHDES	NHDES Protocols for Collection, Identification, and Enumeration of Freshwater Fishes	1	November 2013
ESS	Freshwater Macroinvertebrate Sampling and Analysis		
ESS	Seepage Survey Guidelines		
ESS	Streamflow Measurement Guidelines		

FIGURES



NOTES:

1. PROPERTY BOUNDARIES ARE BASED ON DATA FROM THE NEW HAMPSHIRE GIS WEBSITE AND SHOULD BE CONSIDERED APPROXIMATE.
2. BASE MAP FROM USGS THE NATIONAL MAP 7.5-MINUTE SERIES PORTSMOUTH QUADRANGLE.

TRC

650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

PROJECT:
WILCOX & BARTON, INC.
FORMER COUNTRY MOTORS SITE WORK PLAN
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

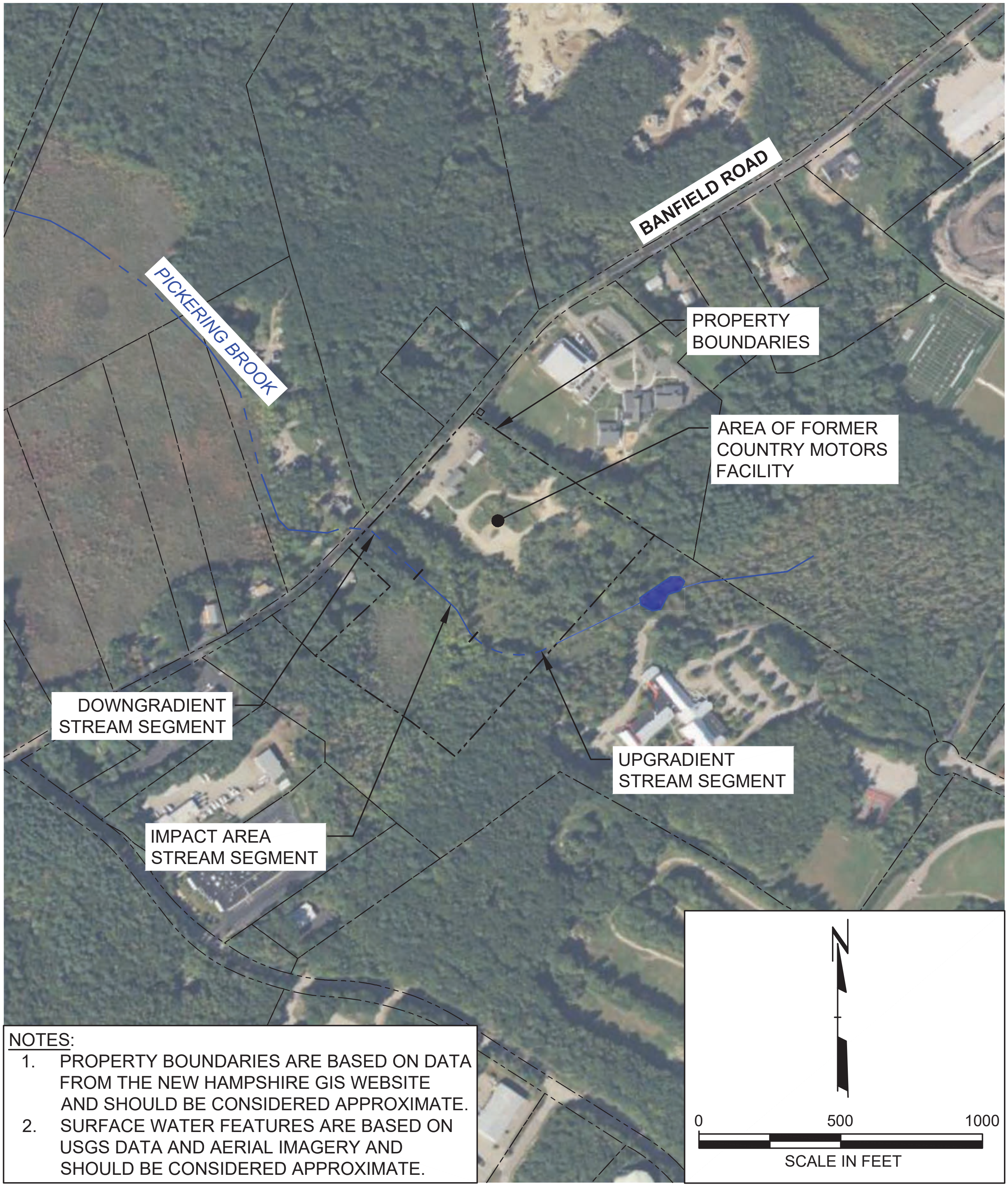
TITLE:
SITE LOCATION MAP

DRAWN BY:	ARD
CHECKED BY:	ASW
APPROVED BY:	ASW
DATE:	SEPTEMBER 2022
PROJ. NO.:	489599
FILE:	Country Motors Site Figures.dwg

FIGURE 1

8.5x11 --- USER: ADavidson --- ATTACHED XREFS: --- ATTACHED IMAGES:
DRAWING NAME: \\augusta-fp1\Environmental\RMD\ENV RMD Projects\Wilcox & Barton\489599-Country Motors- Portsmouth\10-DWG\ Country Motors Site Figures.dwg --- PLOT DATE: September 07, 2022 - 2:58PM --- LAYOUT: FIGURE 1

Version: 2017-10-21



NOTES:

1. PROPERTY BOUNDARIES ARE BASED ON DATA FROM THE NEW HAMPSHIRE GIS WEBSITE AND SHOULD BE CONSIDERED APPROXIMATE.
2. SURFACE WATER FEATURES ARE BASED ON USGS DATA AND AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.

TRC
650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

PROJECT:
WILCOX & BARTON, INC.
FORMER COUNTRY MOTORS SITE WORK PLAN
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

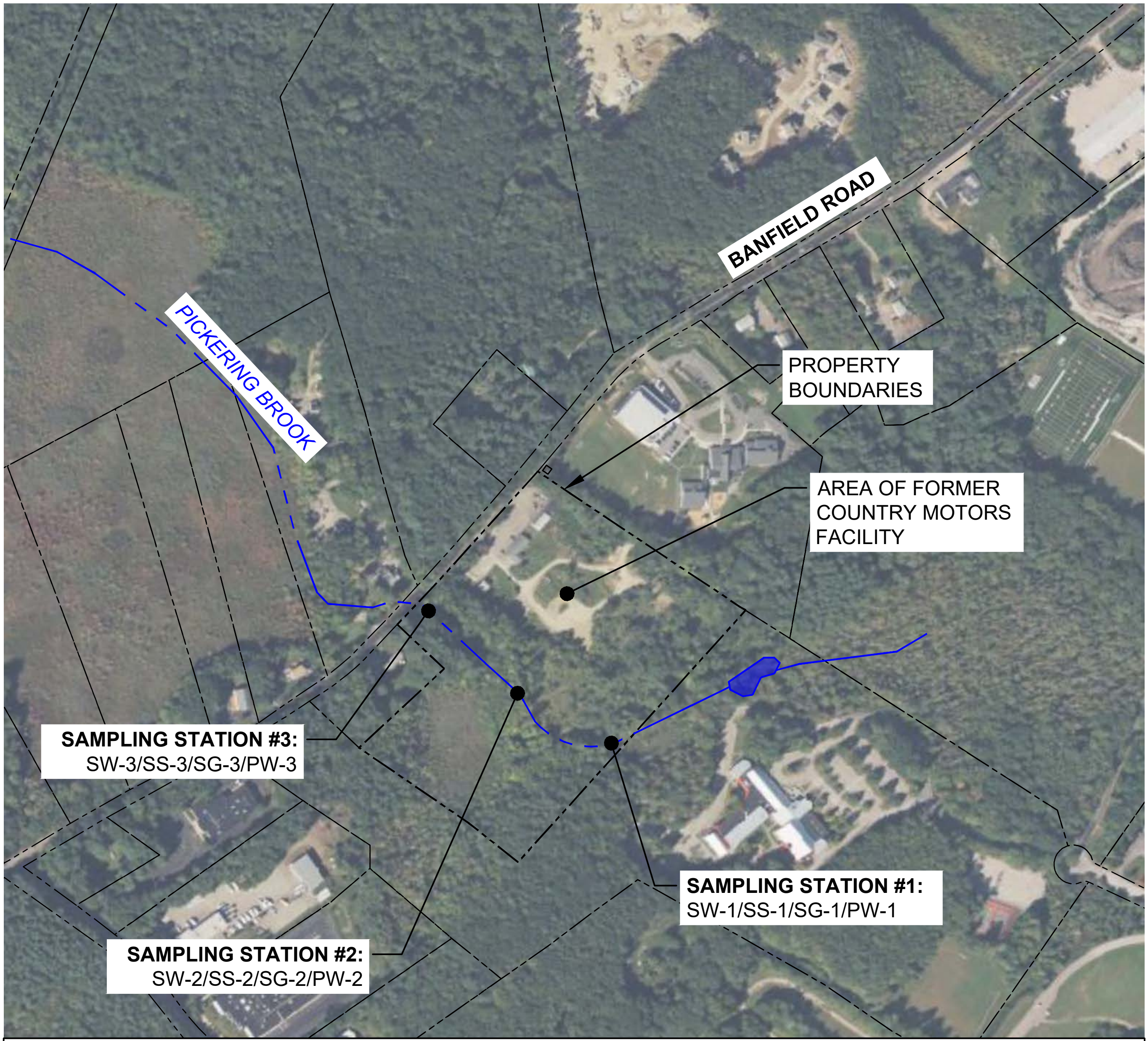
TITLE:
SITE PLAN

DRAWN BY:	ARD
CHECKED BY:	CDN
APPROVED BY:	CDN
DATE:	MARCH 2023
PROJ. NO.:	489599
FILE:	Country Motors Site Figures_REV01.dwg

FIGURE 2

8.5x11 --- USER: ADavidson --- ATTACHED XREF'S: --- ATTACHED IMAGES:
DRAWING NAME: \\augusta-fp1\Environmental\RMD\ENV RMD Projects\Wilcox & Barton\489599-Country Motors- Portsmouth\10-DWG\ Country Motors Site Figures_REV01.dwg --- PLOT DATE: March 28, 2023 - 9:38AM --- LAYOUT: FIGURE 2

Version: 2017-10-21



NOTES:

1. PROPERTY BOUNDARIES ARE BASED ON DATA FROM THE NEW HAMPSHIRE GIS WEBSITE AND SHOULD BE CONSIDERED APPROXIMATE.
2. SURFACE WATER FEATURES ARE BASED ON USGS DATA AND AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
3. EACH PROPOSED SAMPLING STATION LOCATION WILL HAVE STREAM SURFACE WATER (SW), SOIL SEDIMENT (SS), SEDIMENT GRAIN SIZE ANALYSIS (SG), AND GROUNDWATER POREWATER (PW) SAMPLES COLLECTED (IF PRESENT). ACTUAL LOCATIONS MAY BE ADJUSTED BASED ON CONDITIONS ENCOUNTERED IN THE FIELD.

N

0 500 1000
SCALE IN FEET

650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

PROJECT:
WILCOX & BARTON, INC.
FORMER COUNTRY MOTORS SITE WORK PLAN
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

TITLE:

PROPOSED SAMPLING PLAN

DRAWN BY:	ARD
CHECKED BY:	CDN
APPROVED BY:	CDN
DATE:	MARCH 2023
PROJ. NO.:	489599
FILE:	Country Motors Site Figures_REV01.dwg

FIGURE 3

DRAWING NAME: \\augusta-fp1\Environmental\RMD\ENV RMD Projects\Wilcox & Barton\489599-Country Motors- Portsmouth\10-DWG\ Country Motors Site Figures_REV01.dwg --- PLOT DATE: March 28, 2023 - 9:36AM --- LAYOUT: FIGURE 3
8.5x11 --- USER: ADavidson --- ATTACHED XREFS: --- ATTACHED IMAGES:

Version: 2017-10-21

ATTACHMENT A

STANDARD OPERATING PROCEDURES (SOPs & SOGs)

GUIDELINES FOR COLLECTION OF SURFACE WATER SAMPLES

1.0 INTRODUCTION

These guidelines provide basic instructions for the routine acquisition of surface water from lakes, ponds, and streams. The methods outlined below are intended to (1) standardize water sample collection methods; (2) ensure that samples delivered to the laboratory represent field conditions as accurately as possible; (3) assure proper documentation of sample collection; and (4) minimize cross contamination between sampling sites.

2.0 REQUIRED MATERIALS

The following materials are necessary for the acquisition of surface water samples:

- Nitrile gloves
- Labeled sample bottles provided by contracted laboratory (appropriately sanitized and containing the necessary preservative for desired analyses, see Table 2.0 for examples)
- Field data sheets or logbooks, including list of sites or locations to be sampled, and pencil
- Cooler with ice packs for sample storage
- Integrated depth sampler (if collecting algae sample)
- Secchi disk (if collecting algae samples)
- Laboratory Chain of Custody

Table 2.0 Example Container Types, Preservative Requirements, and Hold Times for Water Quality Samples.

Analysis	Bottle Type	Preservative	Hold Time
Total Phosphorus	plastic	H_2SO_4	28 days
Dissolved Phosphorus	plastic	As Is	analyze immediately*
Total Suspended Solids (TSS)	plastic	As Is	7 days
Nitrate/Nitrite	plastic	As Is	48 hrs
Total Kjeldahl Nitrogen (TKN)	plastic	H_2SO_4	28 days
Metals - Total	plastic	HNO_3	6 months**
Metals - Dissolved	plastic	As Is	6 months**
Algae	opaque plastic	Lugol's iodine	>1 year
Chlorophyll-a	opaque plastic	As Is	analyze immediately
Bacteria	sterile plastic	As Is	6 hrs

* = 24 hrs with field filtration, ** = 28 days for mercury

3.0 METHODS

3.1 General Sampling Instructions

Using a pre-cleaned (as is) bottle to fill a sample bottle containing preservative.

- Testing methods, sample containers, preservation techniques, and sample volumes should be selected in consultation with the laboratory to ensure that samples obtained will provide the desired results.

- Hold times vary considerably between different analytes and must be taken into consideration when planning field sampling efforts and lab courier pickups to assure the validity of analytical results.

- Field filtration of certain samples (dissolved phosphorus) is recommended. The laboratory can supply syringes and filters for use in the field.

- In general, surface water samples should be collected via direct grab methods.

- Sample collection should precede the measurement of physical field parameters (including pH, apparent color, turbidity, conductivity, and dissolved oxygen) in order to minimize the risk of sediment disturbance and/or sample contamination.

- Clean rubber gloves should be worn at each sampling location. When sampling multiple sites on the same day, gloves may be rinsed in the immediate area of the waterbody to be sampled (downstream at flowing sites).

- Approximately 1-inch of air space should be left when filling sample bottles (except for dissolved oxygen, alkalinity, and BOD samples), so that bottles may be shaken (if needed) before analyses (EPA, 1997; Simpson 1991).

- Sample containers with preservatives should not be used to collect water samples. If using containers with preservatives, a pre-cleaned container of similar type (an as is bottle) should be used to collect and subsequently transfer the sample to the preserved container.

- Ensure that all sample bottles are correctly and completely labeled before storage. Sample bottles should be stored in a cooler with ice packs (it is best to avoid ice, as meltwater could potentially contaminate samples) or in a refrigerator until they are submitted to a lab courier.

3.1.1. Lake and Pond Sampling

- Grab samples from lakes and ponds should be collected at approximately 8 to 12 inches beneath the water surface or mid-way between the surface and the bottom if the waterbody is shallow (EPA 1997). Samples should not be collected in close proximity to the lake shoreline or submerged obstacles

- To collect water samples, hold an as is bottle near the base, remove the lid, and plunge it into the water with the opening facing downward. Invert the bottle and allow it to fill before bringing it to the surface. Decant sufficient water from the bottle to allow for the required headspace and replace the cover, or carefully pour the contents into a bottle containing preservative. Repeat the above process to refill the as is bottle as many times as necessary.

Algae Samples

- Algae samples should be stored in opaque bottles with a small amount of Lugol's iodine for preservative (~1-2 drops in a 250 mL bottle). Algal taxonomy labs can provide opaque plastic bottles, but standard plastic as is bottles covered in aluminum foil can also be used.

- Algae samples should be collected using an integrated depth sampler. An integrated depth sampler consists of a length of tubing (~1in diameter, at least 2 m long) with a weight attached to one end. Sample collection procedures using the depth sampler should proceeds as follows (procedure adapted from EPA 2012):
    - Determine the euphotic zone:
        - Lower the secchi disk over the shaded side of the boat until it disappears. Lower the disk a bit further, then slowly raise the disk until it reappears. Record the reappearance depth. The euphotic zone is calculated by multiplying the reappearance depth by 2.
    - Holding onto the non-weighted end of the sampler, lower the tube into the water column. Rinse the sampler by submerging it three times.
    - Lower the sampler so that it is submerged to the depth of the euphotic zone, or fully submerged if the euphotic zone is deeper than the length of the sampler. Cover the opening at the non-weighted end with a gloved thumb.

Integrated depth sampler for collection of algae samples.

  - Lift the sampler completely out of the water and cover the opening at the weighted end with a gloved thumb (both ends should be covered). Repeatedly lift each end of the sampler to mix the water sample within the tube.
  - Fill the algae sample bottle with the required volume of water from the sampler (the bottle will contain Lugol's solution as preservative so be careful not to over-fill).
  - Unlike samples for most other analytes, preserved algae samples can be stored at room temperature before submission to a lab.

3.1.2. Stream Sampling

- Samples should be collected from the center of small streams (i.e., 10-20 feet wide with a maximum depth of less than 2 feet), and at a location where water depth is 2-3 feet in larger streams.
- Always approach a sampling location from downstream, traveling so as to minimize the disturbance of bottom sediments and upstream waters.
- Stand downstream of the desired sampling location, hold the sample bottle near its base and plunge it below the water surface with the opening (mouth) downward. The opening of sample bottles should always be directed away from the sampler in an upstream direction.
- To inform investigations about nutrient inputs, stream flow should be measured whenever water quality samples are collected (see Guidelines for Measuring Stream Flow)

4.0 DOCUMENTATION

Report surface water field data on sheets or in notebooks. Any unanticipated site-specific information, which requires deviation from the above guidelines, should be recorded. Field notes for surface water sampling should include a minimum of the following:

- Name or initials of person collecting the samples
- Sample identification/station location
- Date and time of sample collection
- Environmental conditions (e.g. wind, weather)
- Other comments or observations about water quality and site conditions (e.g. visible algae bloom, dead fish nearby, sample has noticeable odor or color, etc.)

Photographic evidence of any notable conditions is also desirable.

5.0 REFERENCES

EPA, 2012. 2012 National Lakes Assessment Field Operations Manual. Version 1.0, May 15, 2012. United States Environmental Protection Agency. Office of Water. EPA-841-B-11-003. Accessed January 22, 2020 at https://www.epa.gov/sites/production/files/2013-11/documents/nla2012_fieldoperationsmanual_120517_final_combinedqrg.pdf

STANDARD OPERATING GUIDELINES FOR COLLECTION OF SEDIMENTS FROM FRESHWATER ENVIRONMENTS

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOGs) provide basic instructions for the collection of bottom sediments from freshwater environments. Collections are to be performed in accordance with methodologies generally accepted by the Massachusetts Department of Environmental Protection (MADEP), Rhode Island Department of Environmental Management (RIDEM), or other agency, as applicable. In some cases, deviation from these SOGs may be necessary to comply with particular local, state, or federal program requirements.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements may be defined in a site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) and may include duplicate or replicate measurements or confirmatory measurements.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- Field personnel are responsible for verifying that all sampling equipment is in proper operating condition prior to use and for implementing the sampling procedures in accordance with this SOG and any specific project plan.

3.0 REQUIRED MATERIALS

The following materials may be necessary for this procedure:

- Sediment coring or grab sampling device
- Stainless steel or Teflon mixing bowl
- Stainless steel or Teflon mixing spoon or tool
- Nitrile gloves
- Decontamination agents (e.g., Alconox, isopropyl alcohol, distilled/deionized water)
- Scrub brush (to remove sediment and debris)
- Paper towels
- Pre-cleaned sample jars provided by laboratory
- Pencil and indelible marker
- Field data sheets or logbooks
- Digital camera
- GPS receiver
- Field map (optional)

4.0 METHOD

Samples should be collected at locations specified in the project plan. A GPS may be used to navigate to planned locations, as well as to record the final sampling location. Field personnel should collect sediment cores or grabs in accordance with the instructions provided with each specific sampling device deployed. At a minimum, nitrile gloves should be worn at all times during these procedures to prevent direct contact with sampled sediments.

At each sampling location, a pre-cleaned grab sample dredge or corer should be deployed from a stable platform, typically an anchored vessel or ice cover. Sampling equipment should be decontaminated using alconox, isopropyl alcohol, and distilled or deionized water before the collection of each discrete sample. A scrub brush and paper towels may be used to loosen or remove sediments that are stuck to the equipment.

Upon retrieval, the core or grab should be checked to ensure a complete, representative sample has been collected. Each sample should be photographed to document physical characteristics such as sediment color, moisture, and grain size. Grab samples may be photographed from above with the sampler flaps open. Core samples may be photographed with the core laid down and a measuring tape fastened parallel to the core. This will allow physical characteristics to be documented over the full profile of the core, with identification of any discrete vertical layers.

Advanced core logging may be required for certain projects. Requirements relevant to core logging are not included in this SOG. Typically, these are provided in a separate document, such as a project-specific sampling and analysis plan.

If specified by the project plan, multiple samples may be composited in a pre-cleaned mixing bowl and mixed thoroughly with a pre-cleaned spoon before being transferred to the glass sampling jars provided by the laboratory. However, volatile organic compound (VOC) samples should be collected from individual, undisturbed samples (i.e., prior to compositing).

Samples should be collected in accordance with the specific sample volumes and holding times required by each laboratory analytical method, unless the project plan has outlined other project-specific requirements.

The sample jar should be labeled with project name or number, sample identification, date, time, and any other project-specific requirements. This information should also be recorded in a field book or GPS data dictionary at the time of sampling along with other essential information such as water depth, sample coordinates, and notes on the physical nature of the sediment collected.

5.0 QUALITY CONTROL

Duplicate field samples or split samples may be collected if specified by the project plan. Once samples have been retrieved and placed into jars, the samples should be kept on ice or refrigerated until the laboratory can analyze them.

6.0 DOCUMENTATION

Documentation for recorded data must include a minimum of the following:

- Date and time of collection and analysis
- Signature or initials of person performing the collection or measurement
- Sample identification/station location
- Sample digital photographs
- Pertinent comments

7.0 TRAINING/QUALIFICATIONS

To properly perform sediment collections, the field personnel must be familiar with the techniques stated in this SOG and experienced in the operation of the sampling equipment.

STANDARD OPERATING GUIDELINES FOR MEASUREMENT OF DISSOLVED OXYGEN

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine measurement of dissolved oxygen using a polarographic sensor-equipped dissolved oxygen meter with a digital read-out (e.g., YSI Model 55 Dissolved Oxygen Unit or Pro2030 Dissolved Oxygen, Conductivity, Salinity Instrument). Measurements are made in accordance with methods that address dissolved oxygen measurement of drinking, surface, and saline waters, and domestic and industrial wastes.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory measurements.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- The analyst is responsible for verifying that the dissolved oxygen measuring device is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.

3.0 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- Dissolved oxygen meter with digital read-out device
- Manufacturer's instruction manual for the instrument
- Manufacturer’s recommended operating solution and replacement membranes
- NIST-traceable thermometer
- Laboratory or field data sheets or logbooks

4.0 METHOD

4.1 Sample Handling, Preservation, and General Measurement Procedures

To achieve accurate dissolved oxygen measurements, samples should be analyzed *in situ*. Measurements in flowing waters should be made in relatively turbulent free areas. Measurements in standing waters may require gentle probe agitation to create water movement around the probe (check instrument manual to confirm).

4.2 Calibration and Measurement Procedures

To accurately calibrate some dissolved oxygen meters, it may be necessary to know the altitude of the region in which you are located and the approximate salinity of the water you will be analyzing. Fresh water has a salinity of approximately zero. Seawater has an approximate salinity of 35 practical salinity units (psu). If uncertain, measure salinity first with an appropriate device. The instructions below are applicable to the YSI Model 55; for other instruments, consult the instruction manual.

- Ensure that the sponge inside the instrument's calibration chamber is wet then insert the probe into the chamber. Turn the instrument on and wait for readings to stabilize (as long as 15 minutes, depending on the model).
- To calibrate, enter the calibration menu by pressing and releasing both the up and down arrow keys at the same time. Enter the altitude (in hundreds of feet) at the prompt by using the arrow keys to increase or decrease the altitude (example: 12 = 1,200 feet). Press enter when correct altitude is shown.
- The meter should display CAL in the lower left of the display with the calibration value in the lower right of the display and the current D.O. reading (before calibration) should be on the main display. Once the D.O. reading is stable, press ENTER. Enter the salinity at the prompt by using the arrow keys. Press ENTER when finished and the instrument will return to normal operation.
- Calibration should be performed at a temperature within ± 10°C of the sample temperature. Recalibrate every 15 samples and whenever the unit is turned on.
- If calibration is out of range, erratic readings occur, bubbles appear, or if the membrane becomes damaged, wrinkled, or fouled refill the membrane solution and/or replace the membrane, per the manufacturer's manual.
- Avoid contact with environments containing substances that may attack the probe materials (e.g. acids, caustics, and strong solvents).

4.3 Troubleshooting Information

If there are any performance problems with the dissolved oxygen-measuring device, consult the appropriate section of the instruction manual for the checkout and self-test procedures. If the problem persists, consult the manufacturer's customer service department immediately for further instructions.

4.4 Maintenance

Instrument maintenance for meter-type dissolved oxygen measuring devices should be performed according to the procedures and frequencies required by the manufacturer. Rinsing the probe with distilled or deionized water and preventing exposure of the membrane to drying is typically all that is required on a day-to-day basis.

5.0 QUALITY CONTROL

Duplicate measurements of a single sample should be performed at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within ± 0.2 mg/L.

The temperature readout of the meter should be checked annually against a NIST-traceable thermometer. If the difference is greater than 0.5°C, the instrument manufacturer should be consulted for guidance. Temperature measurements should be compensated for any difference with the reference thermometer.

6.0 DOCUMENTATION

All dissolved oxygen meter calibration, checks, and maintenance information will be recorded in a calibration logbook. Dissolved oxygen data may be recorded on the appropriate field data sheets or field books.

- Calibration documentation must be maintained in a thorough and consistent manner. At a minimum, the following information must be recorded:
    - Date and time of calibration
    - Signature or initials of person performing the measurement

  - Instrument identification number/model
  - Readings for all continuing calibration checks
  - Comments
- Documentation for recorded data must include a minimum of the following:
  - Date and time of analysis
  - Signature or initials of person performing the measurement
  - Instrument identification number/model
  - Sample identification/station location
  - Dissolved oxygen, both in mg/L and percent saturation (corrected for any difference with reference thermometer) and temperature of sample (including units and duplicate measurements)
  - Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform dissolved oxygen measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

Certain state certification programs require that dissolved oxygen measurements in the field be taken by, or in the presence of, personnel that are qualified under the certification program.

8.0 REFERENCES

Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.

Methods for the Chemical Analysis of Water and Wastes, EPA 600/4-79-020, Revised 1983.

STANDARD OPERATING GUIDELINES FOR MEASUREMENT OF PH

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine calibration and operation of a variety of pH meters, including the Hanna pHep5 pH/Temperature Testers. Although these meters may measure additional parameters (e.g., temperature, specific conductivity, etc.), this SOG addresses pH measurement only (other capabilities are outlined in the appropriate SOG and manufacturer's individual instrument manuals). This SOG is designed specifically for the measurement of pH in accordance with EPA Method 150.1 and Standard Method 4500-H B which address electrometric pH measurements of drinking, surface, and saline waters, domestic and industrial wastes, and acid rain.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory analyses.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- The analyst is responsible for verifying that the pH meter is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.

3.0 REQUIRED MATERIALS

The following materials may be necessary for this procedure:

- pH meter
- pH meter manufacturer's instruction manual
- Deionized or distilled water
- 4.0, 7.0, and 10.0 buffer solutions
- Lint-free tissues
- Mild detergent
- Manufacturer’s recommended storage solution
- Manufacturer’s recommended cleaning solution
- National Institute of Standards and Technology (NIST)-traceable thermometer
- Field data sheet or logbook
- Calibration sheet or logbook

4.0 METHOD

4.1 Sample Handling, Preservation, and General Measurement Procedures

- To achieve accurate pH measurements, samples should be analyzed immediately in the field, or as soon as possible after collection. Sample should be measured *in situ* or collected in plastic or glass containers.
- As temperature can affect the pH measurements obtained, both the pH and the temperature of the sample must be recorded, unless the meter is capable of automatic temperature correction (ATC).
- Primary standard buffer salts available from NIST can be purchased and are necessary for situations where extreme accuracy is required. Secondary standard buffers may be purchased as a solution from commercial vendors and are recommended for routine use. Buffers should not be used after their expiration dates as provided by the manufacturer. An expiration date of one year should be used if the manufacturer does not supply an expiration date or if the buffers are prepared from pH powder pillows, etc.
- When using the meter in the laboratory, always place the buffer/sample beaker on the magnetic stirrer, and make sure the stirring bar is rotating during measurements. Rinse the stirring bar as well as the beaker between buffers/samples.

  EXCEPTION: Do not use the magnetic stirrer for acid rain samples. It is crucial not to induce dissolved gases into the sample to be absorbed or desorbed, as this will alter the pH. Stir the sample gently for a few seconds after introducing the electrode, then allow the electrode to equilibrate prior to recording temperature and pH readings.
- When the meter is being used in the field, keep the probe elevated off the bottom to avoid disturbing sediments. Allow readings to fully stabilize before recording the pH measurement. This may take several minutes, especially if the pH is drastically different from the last reading or the bulb has been allowed to dry out between readings.
- Rinse the electrode with deionized or distilled water between samples and wipe gently, if needed, with a lint-free tissue. If a more thorough cleaning is required, use a mild detergent (e.g., dish soap) or the manufacturer’s recommended cleaning solution.
- Store the probe in the manufacturer’s recommended storage solution or, if this is not available, tap water. Do not use distilled or deionized water for storage purposes.

4.2 Calibration and Measurement Procedures

- The pH meter should be calibrated daily before any analyses are performed. The meter should be re-calibrated every 12 hours, if used continuously, or at the frequency specified in the project plan.
- Calibration should include a minimum of one point but ideally, a two point calibration that brackets the expected pH of the samples to be measured is desirable. Calibration measurements should be recorded in the calibration logbook.
- Choose either 7.0 and 10.0 (high range) or 4.0 and 7.0 (low range) buffers, whichever will bracket the expected sample range. Pour each buffer into a clean glass beaker. The volume should be sufficient to fully submerse the pH bulb and thermistor. If the pH is being measured in a laboratory, place the beaker on the magnetic stirrer and place the stirring bar in the beaker. Measure and record the temperatures of the buffers using a calibrated thermometer or automatic temperature compensation (ATC).

- Follow the manufacturer’s calibration instructions.
- Once calibration is complete, discard the buffer and rinse the beaker (and stirring bar, if used) thoroughly with distilled or deionized water.
- An additional check may be performed, if required by the project plan, by placing the electrode into an additional buffer solution. This buffer should be from a different source than the buffers used for the initial calibration. This buffer should read within +0.2 pH units of the buffer's true pH value.
- Verify the calibration every 15 samples and at the end of the day.
- Recalibrate the instrument if any of the following apply:
  - the check value varies more than 0.2 pH units from the true value
  - the expected pH of the sampled water body is outside the current calibration range
  - readings are erratic or do not stabilize
  - the instrument has just been cleaned or otherwise disturbed for maintenance

4.3 Troubleshooting Information

If there are any instrument performance problems that result in the inability to achieve the acceptance criteria presented in Section 5.0, consult the appropriate section of the meter instruction manual for troubleshooting procedures. If the problem persists, consult the manufacturer's customer service department immediately for further guidance.

4.4 Maintenance

- Instrument maintenance should be performed according to the procedures and frequencies required by the manufacturer.
- The electrode should be stored and maintained according to the manufacturer's instructions.
- If an instrument with ATC is being used, the device should be checked on an annual basis for accuracy with an NIST-traceable thermometer.

5.0 QUALITY CONTROL

- Duplicate measurements of a single sample will be performed at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within ±0.2 pH units.
- The temperature readout of the meter will be checked annually against an NIST-traceable thermometer. If the difference is greater than 0.2°C, the instrument manufacturer will be consulted for guidance. Temperature measurements will be compensated for any difference with the reference thermometer.
- Some regulatory agencies may require the analysis of USEPA Water Supply (WS) or Water Pollution (WP) performance evaluation samples. These performance evaluation samples will be analyzed as required.

6.0 DOCUMENTATION

- All pH meter calibration, temperature check, and maintenance information will be recorded in a calibration logbook.
- pH data may be recorded on the appropriate laboratory or field data sheets or logbooks.

- Calibration documentation must be maintained in a thorough and consistent manner. At a minimum, the following information must be recorded:
  - Date and time of calibration
  - Signature or initials of person performing the measurement
  - Instrument identification number/model
  - Expiration dates and batch numbers for all buffer solutions
  - Reading for pH 7.0 buffer before and after meter adjustment
  - Reading for pH 4.0 or 10.0 buffer before and after meter adjustment
  - Readings for all continuing calibration checks
  - Temperature of buffers (corrected for any difference with reference thermometer), including units
  - Comments
- Documentation for recorded data must include a minimum of the following:
  - Date and time of analysis
  - Signature or initials of person performing the measurement
  - Instrument identification number/model
  - Sample identification/station location
  - Temperature (corrected for any difference with reference thermometer) and pH of sample (including units and duplicate measurements)
  - Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform pH measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

Certain state certification programs require that pH measurements in the field be taken by, or in the presence of, personnel that are qualified under the certification program.

8.0 REFERENCES

Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.

Methods for the Chemical Analysis of Water and Wastes, EPA 600/4-79-020, Revised 1983.

Title:	Procedure Number:
Surface Water and Sediment Sampling	**ECR 008**
	Revision Number: **2**
	Effective Date: **August 2020**

Authorization Signatures

		Elizabeth Denly	
Technical Reviewer Kenneth Cormier	Date 8/3/20	Environmental Sector Quality Director Elizabeth Denly	Date 8/3/20

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	Procedure for Collection of Sediment Samples for VOCs, VPH or GRO (SW-846 Method 5035A)
Attachment B	Example Surface Water/Sediment Sample Log
Attachment C	Shipping Methanol-preserved Samples
Attachment D	SOP Fact Sheet
Attachment E	SOP Modifications for PFAS

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the logistics, collection techniques, and documentation requirements for collecting representative surface water and sediment samples. This SOP is applicable to the sampling of surface water and sediment in both flowing and standing water in marine, estuarine or freshwater environments. These are standard (i.e., typically applicable) operating procedures that may be changed, as required, dependent upon site conditions, equipment limitations, or limitations imposed by the procedure. In addition, other state or federal requirements may be above and beyond the scope of this SOP and will be followed, if applicable. In all instances, the actual procedures used should be documented and described in the field book.

1.2 Summary of Method

The objective of surface water and sediment sampling is to obtain a representative sample of these media for analysis of physical and/or chemical parameters, as necessary, at a given site. This objective requires that the sample be both free of unsuitable material and be of sufficient quantity and quality for analysis by the selected analytical method. Sediment and surface water samples are collected either directly using a hand-held device or indirectly using a remotely activated device. In some instances, direct push drilling equipment may be appropriate for sediment sampling and the procedures in TRC's ECR SOP 003, Soil Sampling, would be applicable. For specialized sampling programs involving per- and polyfluoroalkyl substances (PFAS), refer to Attachment E for further details. Information on applicability of sampling methods can be found on Interstate Technology & Regulatory Council (ITRC) and United States Environmental Protection Agency (EPA) websites.

1.3 Equipment

The following equipment may be utilized when collecting surface water and sediment samples. Project-specific conditions or requirements may warrant the use of additional equipment or deletion of items from this list.

1.3.1 General Equipment

- Appropriate level of personal protective equipment (PPE), as specified in the site-specific Health and Safety Plan (HASP) including additional safety gear for working in or near water (e.g., harness, life jacket, tether, flotation device, etc.)
- Photoionization detector (PID) or flame ionization detector (FID)
- Wooden stakes and spray paint, plastic flagging (highly visible), or steel pin flags
- Tape measure, folding ruler
- Boat (if needed) with anchor
- Indelible marking pens or markers
- Field book and/or Sample Log Form
- Buoys
- Camera
- Compass
- 5-gallon bucket

- Sample container labels
- Chain-of-custody (COC) forms (TRC or laboratory, as appropriate)
- Organic absorbent (e.g., Slickwick, ground corn cob, sawdust)
- Equipment decontamination supplies
- Sample coolers
- Bubble wrap
- Ice (for sample storage/preservation)
- Zip-loc® plastic bags (for ice and COCs)
- Thermometer
- Barometer
- Lint-free, non-abrasive, disposable towels (e.g., Kimwipes®)
- Survey equipment and/or global positioning system (GPS) and/or other means of establishing sample locations
- Wire/rope
- Calibrated staff
- Maps/site plan
- Hip/chest waders
- Rubber boots

1.3.2 Surface Water Sampling Equipment

- Multi-parameter instrument and flow-through cell (typically should include: pH, temperature, conductivity, oxidation-reduction potential, and dissolved oxygen [DO]). Note: Salinity probe may be needed depending on project requirements.
- Turbidity meter
- Sample collection tool options**
    - Dip sampler
    - Kemmerer bottle
    - Peristaltic pump
    - Van Doren sampler

    **The deployable samplers will typically be manufactured of stainless steel, Teflon®, or glass.

- Teflon®, Teflon®-lined polyethylene, or high density polyethylene (HDPE) tubing, dependent upon project objectives
- Filtration equipment, if required (peristaltic pump and 0.45 micron [μm] filters, or as otherwise required for the project)
- Graduated cylinder or five-gallon bucket
- Stop watch
- <u>Sample containers</u> (may be supplied by the laboratory, depending upon the regulatory program): The proper containers should be determined in conjunction with the analytical laboratory in the planning stages of the project.

1.3.3 Sediment Sampling Equipment

- Sample collection tool options
    - Spade or shovel (stainless steel or plastic)
    - Scoop (stainless steel or plastic)
    - Trowel (stainless steel or plastic)

  - Hand auger
  - Bucket auger
  - Tube auger head (core sampler with removable liner)
  - Sand auger head
  - Mud auger head
  - Acetate liners
  - Extension rods
  - Sediment coring device (i.e., vibracore, gravity core, etc.)
  - Ponar or equivalent grab sampler
  - Eckman dredge
  - Nylon rope or stainless-steel cable
  - Two adjustable wrenches and a slip wrench
  - Nylon tube brush
  - Wire brush for thread cleaning
- Stainless-steel mixing bowl or disposable aluminum tray
- Stainless-steel spatulas or spoons
- Small scale to measure sample mass
- Dedicated Teflon® spoons (if required)
- <u>Sample containers</u> (may be supplied by the laboratory, depending upon the regulatory program): The proper containers should be determined in conjunction with the analytical laboratory in the planning stages of the project.

  For non-volatile organic compound (VOC) parameters, glass containers with Teflon®-lined caps are typically utilized. Typical containers used for VOC parameters are provided in Attachment A. However, one of the following samplers is typically used based on sample consistency (e.g., fluidity, coarse fraction).
  - En-Core® samplers.
  - Disposable plastic syringes or Terra Core™ samplers.

1.4 Definitions

En-Core® sampler	A disposable volumetric sampling device with an airtight sealing cap.
High-level VOC analysis	VOC sediment analysis that yields high reporting limits (approximately 50-200 µg/kg depending on the laboratory). Samples are typically preserved in methanol and cooled to 4°C. High-level VOC analyses are used for samples that are expected to contain elevated concentrations of VOCs (>200 µg/kg).
Low-level VOC analysis	VOC sediment analysis that yields low reporting limits (approximately 5 µg/kg depending on the laboratory). Samples are typically preserved in water, cooled to 4°C, and frozen within 48 hours of collection. Low-level VOC analyses are used for samples that are expected to contain lower concentrations of VOCs (<200 µg/kg).

Sediment	Mineral and organic materials situated beneath an aqueous layer.
Terra Core™ sampler	A disposable volumetric sampling device used to transfer soil samples to the appropriate sample containers.

1.5 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific HASP. TRC personnel will use the appropriate level of PPE, as defined in the HASP.

Sediment or surface water samples containing chemical contaminants may be handled during implementation of this SOP. Additionally, sample preservatives including caustics and/or acids may be considered hazardous materials and TRC employees will appropriately handle and store them at all times. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate. Hazardous substances may be incompatible or may react to produce heat, chemical reactions, or toxic products. Hazardous substances may be incompatible with clothing or equipment; some substances can permeate or degrade protective clothing or equipment. Also, hazardous substances may pose a direct health hazard to workers through inhalation or skin contact or if exposed to heat/flame and they combust. Material safety data sheets for chemicals handled by TRC should be maintained in the field.

A hazard analysis specifically addressing the project-specific water hazards must be included in the HASP.

1.6 Cautions and Potential Problems

1.6.1 Surface Water Sampling

- When collecting surface water using the direct-fill method:
    - the sample container should generally be held below the surface to avoid collection of floating debris.
    - if pre-preserved sample bottles are used, care must be taken to avoid loss of preservative.
- Make sure monitoring instruments (e.g., multi-parameter meter) are maintained and calibrated to ensure accurate readings.
- Clear tape should not be used to cover labels on certain analyses (e.g., 40-mL vials for VOC analysis) due to potential interference with analytical equipment.
- Surface water sampling should proceed from the downstream locations to the upstream locations.
- Be sure to obtain all necessary permits prior to sampling in water bodies, if applicable.
- Where metals constituents are to be analyzed, filtration in the field may be required. Extra bottles may be necessary depending on sampling technique (e.g., dip sample collection; field filtering to a second bottle onshore). Samples should also be collected for hardness analysis to allow for direct comparison of data to ambient water quality criteria.

1.6.2 Sediment Sampling

- Clear tape should not be used to cover labels on certain analyses (e.g., 40-mL vials for VOC analysis) due to potential interference with analytical equipment or the ability to obtain accurate post-sampling weights.
- Decanting the overlying water should be done carefully to minimize any loss of fine-grained sediment and organic matter.
- Homogenization should be performed quickly and efficiently in order to avoid altering the particle-size distribution of a sample and to avoid oxidation of the sediments. Homogenization should not be performed for VOC analysis.
- If free product is encountered in sediment, consult with the Project Manager prior to shipping the sample to the laboratory.
- Sediment sampling should proceed from the downstream locations to the upstream locations.
- Samples collected for low-level VOC analysis must be shipped to the laboratory as soon as possible due to the fact that these samples must be frozen by the laboratory within 48 hours of collection.
- Sediment sampling often presents challenges due to working near/within water stream flow conditions, working in a boat, etc. along with often difficult substrate (cobbly river bottom, mucky conditions, etc.). Sampling surface sediment beneath a shallow aqueous layer with spades, shovels, trowels, and scoops may not be an accurate or feasible method with deep and rapidly flowing water. It is recommended to have multiple methods of sampling equipment on-hand to improve chances of obtaining appropriate/representative samples of sufficient volume.
- Headspace readings of sediment samples using a PID may be unreliable due to the high moisture content of the samples.

1.7 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER) workers
- 8-hour annual HAZWOPER refresher training.

2.0 PROCEDURES

Always refer to the site-specific work plan and/or scope of work for any site-specific sampling procedures.

2.1 Order of Sample Collection

If both sediment and water samples are to be collected concurrently, each water sample should be taken prior to the corresponding sediment sample in order to avoid introducing sediment into the water column from sediment collection activities. Depth to the bottom must be accurately known in order not to disturb sediment during surface water collection. If water depth is unknown or not observed, use a calibrated rod, tape, or line to measure the depth to the bottom or refer to a known bathymetric survey if possible.

In flowing streams or runoff channels, water and sediment samples should be collected first from the furthest point downstream (with each water sample collected before the sediment sample). The remaining samples will be taken while proceeding upstream. In tidal situations, prior to mobilization, determine the tidal sequence and monitor the direction of tidal flow in order to determine the proper sampling sequence.

2.2 Surface Water Sampling Procedures

Samples should be taken without disturbing the sediments, which would include the results of actions such as entering the surface water body. This may be accomplished by the use of a remote sampler (e.g., a sample bottle held on a long pole with a gimballed yoke).

Prior to collecting surface water, calibrate the water quality parameter instrument and turbidity meter in accordance with the site-specific work plan.

2.2.1 Sampling Surface Water at a Discrete Depth

- The Kemmerer sampler is a brass cylinder with rubber stoppers that leave the ends of the sampler open while being lowered in a vertical position, thus allowing free passage of water through the cylinder. This sampler is recommended when the sampling location is accessed from a boat or structure, such as a bridge, and where samples at specific depths are required.
- The Van Dorn sampler is plastic and is lowered in a horizontal position. This sampler is recommended when collecting surface water from a very specific sampling depth or from a shallow water body.

In each case, a messenger is sent down a rope when the sampler is at the designated depth, causing the stoppers to close the cylinder. The sampler is then raised to the surface.

1. Set the decontaminated Kemmerer bottle or Van Dorn sampler so that the upper and lower stoppers are pulled away from the body.

2. Lower the sampler to the predetermined depth. Avoid disturbance of the bottom.

3. When the sampler is at the required depth, send the weighted messenger down the suspension line to close the sampler.

4. Retrieve the sampler and discharge the first 20 mL from the drain.

5. Proceed to Section 2.2.5 for filling of sample containers and/or if filtering is required.

6. Repeat steps 1-4 if additional sample volume is needed to fulfill analytical requirements.

2.2.2 Sampling Surface Water with a Dip Sampler

A dip sampler is useful for situations where a sample is to be recovered from an outfall pipe or along a bank where direct access is limited. The long handle on such a device allows access from a discrete location.

1. Assemble the device in accordance with the manufacturer's instructions.

2. Extend the device to the sample location and collect the sample.

3. Retrieve the sampler and transfer the sample to the appropriate container.

4. Proceed to Section 2.2.5 for filling of sample containers and/or if filtering is required.

2.2.3 Sampling Surface Water Using the Direct Fill Method

This sampling method is recommended for streams, rivers, lakes and other surface waters.

1. For shallow streams, collect the sample under the water surface while pointing the sample container upstream. The container must be upstream of the collector. Avoid disturbing the substrate. A clean intermediate collection container may be necessary to fill bottles to the top since this technique is limited by the depth of the waterbody. If pre-preserved containers are used for direct filling of the bottle, care must be taken to avoid the loss of preservative into the surface water body.

2. For lakes, collect the sample under the water surface while avoiding surface debris.

3. Proceed to Section 2.2.5 for filling of sample containers and/or if filtering is required.

2.2.4 Sampling Surface Water with a Peristaltic Pump

This sampling method is recommended when collecting samples from a boat.

1. Connect Teflon®, Teflon®–lined polyethylene, or HDPE tubing (dependent upon project objectives) to the peristaltic pump.
2. Lower tubing to the predetermined depth. Avoid disturbance of the bottom.
3. When the tubing is at the required depth, start the pump. Measure the flow rate of the pump with a graduated cylinder and stop watch. Record the volume of water collected for a period of one minute and calculate the flow rate as follows.

$$Flowrate\,(L/min) = \frac{volume\ collected\ (mL)}{1\,minute} \ x\ \frac{1\ L}{1000\ mL}$$

4. When the flow rate is set, start filling the containers. Refer to Section 2.2.5 for filling of sample containers and/or if filtering is required.

5. If collecting samples at the same location at different depths, tubing must be purged for a minimum of one tubing volume, to ensure water from previous depths is no longer in the tubing.

6. When collecting samples for chemical contaminants, the tubing must be changed between sample locations. If only sampling for water quality measurements (e.g., pH, conductivity, DO, total suspended solids [TSS], etc.), tubing does not have to be changed; however, step 5 must be followed between locations.

2.2.5 Sample Collection for Laboratory Analyses

1. Surface water samples for specific analytical fractions should be collected in the following order:

   a. VOCs;
   b. Semivolatile organic compounds (SVOCs);
   c. Other organic parameters;
   d. Unfiltered inorganic constituents (e.g., total metals);
   e. Filtered inorganic constituents (e.g., dissolved metals); and
   f. Other constituents

   Refer to the site-specific work plan for other parameters.

   During sample collection, allow the water to flow directly down the side of the sample container without allowing the tubing to touch the inside of the sample container or lid in order to minimize aeration and turbulence and to maintain sample integrity.

2. VOC Sample Collection

   a. Samples for VOCs, volatile petroleum hydrocarbons (VPH) or gasoline range organics (GRO) will be collected first, and the sample vial must be filled so a meniscus forms over the mouth of the vial. This ensures no air bubbles or headspace will be formed after it has been capped. Ensure the lack of air bubbles and headspace by turning the vial upside down and tapping it lightly. If any bubbles are observed, the vial should be topped off using a minimal amount of sample to re-establish the meniscus. Care should be taken to not flush any preservative out of the vial when topping off. If after topping off and capping the vial, bubbles are still present, a new vial should be obtained and the sample re-collected. Note: Extra VOC vials should be obtained prior to the sampling event in case this situation occurs.

   b. When acid preservation is used for the collection of VOCs, the acid must be added to the vials before sample collection. However, in most cases, 40-ml VOA vials come pre-preserved. If a pre-preserved vial effervesces upon the addition of sample, the acid preservative can be rinsed out of the vial with sample water and then used to collect the sample. The laboratory should be made aware that the affected sample will not be acid-preserved as this may affect the sample holding time. Make a note of effervescence in the field book for future reference.

3. Non-VOC Sample Collection

   a. Completely fill the remaining sample containers for all non-VOC analyses.

   b. Preserve the non-VOC samples in accordance with method and project-specific requirements following sample collection if the sample containers are not pre-preserved. (NOTE: Pre-preserved vials may also be supplied by the laboratory depending on the program).

4. Filtering of Samples

   a. Depending upon project requirements, filtering may be performed using a portable peristaltic pump. See Section 2.2.4, step 3 for setting the flow rate of the pump.

      Samples may be filtered direct at the point of collection or collected into an intermediate sampling container and filtered on-shore.

   b. For direct collection and filtering, place the intake end of the tubing directly into the intermediate or temporary sample container (must be unpreserved) or directly into the body of water. The discharge end of the tubing is attached to the filtration unit.

      For filtering on-shore, collect the sample into the same sample container type to be used for the final sample bottle. Use a large volume size container or multiple sample containers for the pre-filter rinse.

   c. An in-line filter should be fitted at the end of the discharge tubing and the sample should be collected after the filter. Pre-rinse the dedicated, disposable filter by allowing a minimum of 0.5 to 1 liter of surface water to pass through the filter prior to sampling and discard the pre-rinse liquid. Ensure the filter is free of air bubbles prior to collecting samples.

   d. Collect the filtered water directly from the tubing into an appropriately preserved container. Clearly note “filtered” or “dissolved” on the sample label and COC document.

   e. Change the tubing and filter after the collection of each sample.

2.3 Sediment Sampling Procedures

1. Determine the sampling device to be used from the site-specific work plan, the depth of water at the sampling location, and/or the physical characteristics of the sediment to be sampled.

2. Select a sample location that is representative of sediment depositional areas or in accordance with the site-specific work plan and sampling objectives. Examples include: a sandbar in the middle of a stream; the inside curve of a meandering stream; the down-flow side of a boulder; a deep pool where water velocities are reduced; directly upstream and downstream of an outfall; or a stream delta where the stream carrying the sediment reaches a body of standing water (i.e., pond, lake, ocean cove or bay) or another stream with lower flow velocity.

3. For sampling sediment using direct push procedures, refer to TRC's ECR SOP 003, Soil Sampling.

4. The following steps are generally employed for all sediment samples, regardless of the sampling device used:

    a. Collect a sample for VOCs, VPH, GRO and/or acid volatile sulfide (AVS)/simultaneously extracted metals (SEM) analysis, if required. If VOC, VPH or GRO analyses are required, collect the sample in accordance with the procedures in Attachment A or the site-specific work plan. For AVS/SEM analysis, immediately fill a sample container leaving no headspace.
    b. Unrepresentative materials (e.g., leaves, stones) should be removed as much as practicable from the sample.
    c. Transfer the sample into a homogenization bowl that has been decontaminated.
    d. Decant the aqueous layer from the homogenization bowl prior to homogenization. Extra care should be taken to retain the fine-sediment fraction during the decanting process.
    e. Homogenize the sample as quickly as possible prior to filling the sample containers by mixing the sample within the bowl using a stainless-steel spoon. The following order of collection should be followed for non-VOC parameters: SVOCs, extractable petroleum hydrocarbons (EPH), pesticides, polychlorinated biphenyls (PCBs), inorganics, geotechnical parameters, and biological parameters.
    f. If samples will not be frozen by the laboratory, fill sample containers to the brim to reduce oxygen exposure.

2.3.1 Sampling Surface Sediment (i.e., 0-6" below ground surface [bgs]) with a Spade, Shovel, Trowel, or Scoop from Beneath a Shallow Aqueous Layer (i.e., 0-12" bgs)

This sample method is recommended only when in shallow slow-moving waters.

1. Using a decontaminated spade, shovel, trowel, or scoop, remove the sediment from the sampling area.
2. Proceed to Section 2.3, steps 4a through 4f.

2.3.2 Sampling Surface Sediment (i.e., 0-6” bgs) with a Bucket Auger or Tube Auger From Beneath a Shallow or Deep Aqueous Layer

Due to the small volume of many core samplers, multiple recoveries may be required to obtain the necessary volume.

1. If warranted due to project needs (i.e., maintain integrity of the intact sediment core), insert an acetate core into the bucket auger or tube auger prior to sampling.
2. Attach the auger head to the required length of extensions and attach a “T” handle to the upper extension.
3. Gently remove any visible surface debris from the area to be sampled once brought to the surface.
4. Insert the auger into the sediment at a 0º to 20º angle from vertical. The angle minimizes spillage of the sample from the auger upon extraction from the sediment and water.
5. Rotate the auger to cut a core of sediment.
6. Withdraw the auger slowly. If using a tube auger, be sure the slot is facing upward.
7. Proceed to Section 2.3, steps 4a through 4f.

2.3.3 Sampling Surface Sediment (i.e., 0-6” bgs) with an Eckman Dredge or Ponar Grab from Beneath a Shallow or Deep Aqueous Layer

2.3.3.1 Use of the Eckman Dredge (Preferred with Moderately Consolidated, Fine-Textured Sediment)

The Eckman dredge is not usable in sandy or rocky sediments of high velocity streams. If sampling from heights greater than 5 feet above the water table surface (i.e., bridge sampling), the spring mechanism may be damaged by the speed/impact of the messenger during the triggering of the trap doors.

1. Measure the depth of the water body using a decontaminated measuring tape, staff, or rod.
2. Attach the appropriate length of nylon rope or stainless-steel cable through the hole on the top of the dredge sampler bracket. Mark the distance to the bottom of the rope or cable.
3. Carefully attach springs to both sides of the jaws. Fix jaws so they are in the open position. Ensure the hinged doors on the dredge top are free to open.
4. Lower the sampler to within about 1 foot above the sediment surface.
5. Drop the sampler to the sediment.
6. Trigger the jaw release mechanism by sending the messenger down the rope or cable.
7. Raise the sampler and open top doors. Inspect the sample for acceptability as follows:
    - Ensure the sediment surface is not touching the top of the sampler. If it is, the sampler may be overfilled.
    - Ensure that overlying water is present. This indicates minimal leakage.

- Ensure the desired depth of penetration has been achieved.
- Ensure there are no signs of sediment loss via incomplete closure of the sampler, penetration at an angle, or tilting upon retrieval.
- If these inspections indicate an unacceptable sample, repeat procedures.

8. Proceed to Section 2.3, steps 4a through 4f.

2.3.3.2 Use of Ponar Grab (Preferred with Consolidated Fine-to-Coarse-Textured Sediment)

1. Measure the depth of the water body using a decontaminated measuring tape or staff.
2. Attach the appropriate length of nylon rope or stainless-steel cable to the ring on the top of the dredge. Mark the distance to the bottom of the rope or cable.
3. Fix jaws so they are in the open position.
4. Slowly lower sampler to within several feet above sediment.
5. Drop the sampler to the sediment. Pull up sharply on the line to close the dredge.
6. Raise the sampler and open dredge jaws. Inspect the sample for acceptability as follows:
   - Ensure the sediment surface is not touching the top of the sampler. If it is, the sampler may be overfilled.
   - Ensure that overlying water is present. This indicates minimal leakage.
   - Ensure the sediment-water interface is intact and relatively flat with no sign of channeling or sample washout.
   - Ensure the desired depth of penetration has been achieved.
   - Ensure there are no signs of sediment loss via incomplete closure of the sampler, penetration at an angle, or tilting upon retrieval.
   - If these inspections indicate an unacceptable sample, repeat procedures.
7. Proceed to Section 2.3, steps 4a through 4f.

2.3.4 Sampling Sediment in Deep Water

2.3.4.1 Use of Vibracore

The vibracore is a long continuous tube that is driven into the sediment using vibrating action, typically with a pneumatic impactor. The entire core is withdrawn, at which point the entire sample can be extruded and subdivided, or the tube may be cut into segments for sample extraction later. The vibracore can be operated from a small floating plant or barge with a tripod or small derrick and winch to assist in raising and lowering. Vibracores are typically 2-4 inches in diameter and vary in lengths typically in 5-foot increments up to 20 feet long.

The vibracore is only suitable for unconsolidated sediments and cannot penetrate most coarse or consolidated materials. Cores can be equipped with a catcher or the tube can be driven into a layer of compacted material, which forms a "cap" at the bottom. The vibration of the tube has been known to consolidate the sample. The vertical integrity of vibracore samples may be disturbed. As a result, vibracores are well suited for the collection of samples to be vertically composited.

The sediment cores for environmental analysis are typically contained in the vibracore sections within clear, chemically-inert liners that can be cut into project-specified lengths, capped for transport, labeled for identification, and stored on ice until delivered to a shoreline work station for logging and sample collection; or shipped to a laboratory directly for logging and testing.

Proceed to Section 2.3, steps 4a through 4f.

2.3.4.2 Use of Split-Spoon Sampler

The split-spoon sampler is used for subsurface sampling of unconsolidated materials that are both saturated and unsaturated, and can be used for sediment sampling.

The sampler is a metal cylinder which is divided in half, lengthwise. The two halves of the spoon are held together by small pieces of threaded pipe at each end. An open cap, with a catcher is screwed on the tip. The sampler is attached to lengths of steel rod and driven into the sediments with a hammer or weight. After the sampler is withdrawn, the front and rear end pieces are unscrewed, the sampler opened, and the sample removed with a spoon. Be sure to record the recovered sediment in inches into the field book and collect any chemical and biological samples prior to logging the physical characteristics of the recovered sediment.

Split-spoon samplers can be used for most types of sediments, including consolidated sand and clay. Recovery is variable, sometimes poorer with soft, fine-grained sediments. Split-spoon samplers are typically 2-3 inches in diameter, and available in lengths from 2-5 feet. Successive vertical samples can be taken by driving casing (typically a 5-inch pipe) and cleaning out the drill hole between samples. The vertical integrity of an individual split-spoon sample is variable, but a vertically composited sample can be obtained between two elevations with accuracy.

Proceed to Section 2.3, steps 4a through 4f.

2.4 Post-sampling Activities

1. After the samples have been collected, it is preferable to record the sampling location with a GPS device. Alternatively, the in-water sampling location and/or adjacent shoreline location may be marked with wooden stakes colored with highly visible spray paint or flagging in order to identify the sample location for surveying purposes, and/or buoys with unique sample identification numbers (for deeper water locations). The sample and/or location identification should be written on the stake in indelible ink or marking pen. The fixed sampling point should be located with a measuring tape relative to three nearby fixed reference points.

   Record this information on the field map and field book (with sketch) in addition to collecting the GPS or triangulation data. A photograph of the sample location and a field record of water conditions at the time of sampling is also recommended.

2. If required, the temperature, pH, DO, oxidation-reduction potential, conductivity, and/or turbidity of the surface water should be determined immediately after sample collection. Where possible, field measurements of these parameters should be measured in-situ, rather

than from a sample container. These measurements should not be taken from any sample bottles being sent to the analytical laboratory for chemical analysis.

3. Label each sample. If the labels are covered with clear tape, ensure this is not performed for VOC vials.
4. Package the samples with bubble wrap and/or organic absorbent, as necessary.
5. Place the samples into a shipping container and cool to 4ºC. If wet ice is used to cool the samples, place the ice in double Zip-loc® bags to prevent water from the melting ice from damaging the samples during shipment.
6. Complete the COC form.
7. Decontaminate non-disposable sampling equipment between uses.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

The collection of specific field quality control (QC) samples will be specified in the project-specific planning documents and may include one or more of the following samples: equipment blank, trip blank, field duplicate, and matrix spike/matrix spike duplicates.

4.1 Field Duplicates

The following procedures should be used for collecting field duplicates of surface water and sediment samples:

a. For QC purposes, each duplicate sample will be submitted to the laboratory as a “blind” duplicate sample, in that a unique sample identification not tied to the primary sample identification will be assigned to the duplicate (e.g., DUP-01). Standard labeling procedures used for sediment and surface water sampling will be employed. However, a sample collection time will not be included on the sample label or the COC form. The actual source of the duplicate sample will be recorded in the field book.

b. Each duplicate sample will be collected simultaneously with the actual sample. At the coincident step in the sampling procedures that the VOC, VPH and/or GRO containers are filled and sealed, the duplicate sample VOC, VPH and/or GRO containers will also be filled and sealed. For sediment samples, duplicates for all parameters other than VOCs, VPH and GRO should be filled from the homogenized sample to ensure consistency between the sample and the duplicate. Following the order of collection specified for each set of containers (i.e., VOCs, VPH, GRO, SVOCs, other organics and then inorganic constituents), the duplicate sample containers will be filled simultaneously with the actual sample for each parameter.

c. All collection and preservation procedures outlined for surface water and sediment sampling will be followed for each duplicate sample.

4.2 Equipment Blanks

Equipment blanks include reagent water that is poured over the decontaminated equipment (if applicable) and collected and preserved in the same sample containers as surface water samples. Note: Equipment blanks associated with sediment samples are collected and preserved in the same sample containers as surface water samples. If sampling surface water using the direct-fill method, equipment blanks are not required. However, if filtering is performed, an equipment blank could be performed to demonstrate the filtration equipment is clean.

Ideally, the reagent water should come from the laboratory and be certified clean. If not certified and/or if not from the laboratory performing the analyses, a separate water blank that has not run through the sampling equipment should be sent to the laboratory for analysis.

4.3 Trip Blanks

Trip blanks will check for potential contamination of samples by VOCs via migration during storage and shipping. For surface water samples, trip blanks consist of two to three 40-mL VOA vials filled with analyte-free water and preserved with hydrochloric acid to pH <2 SU. For sediment samples, trip blanks consist of the same number of water-preserved and/or methanol-preserved vials as used for field samples. Trip blanks are submitted to the laboratory at a frequency of one per cooler for coolers that contain samples for VOC and/or VPH analysis. Trip blanks are analyzed by the laboratory for VOCs and/or VPH, depending on field sample analyses.

4.4 Matrix Spikes/Matrix Spike Duplicates (MS/MSDs) and MS/Duplicates

Matrix spikes (MSs) are an additional analysis of a sample spiked by the laboratory with a subset or all of the target analytes and are used to demonstrate the accuracy of analytical methods for a given matrix. Matrix spike duplicates (MSDs) are an additional analysis of a sample spiked by the laboratory with a subset or all of the target analytes and are also used to demonstrate the accuracy of analytical methods for a given matrix. MS/MSDs also provide a measure of analytical precision for a given matrix. Duplicates are an additional analysis of a sample and are used to demonstrate the precision of analytical methods for a given matrix.

For surface water samples, triplicate volume of a field sample must be collected in order for the laboratory to have enough volume to perform the MS/MSD analyses for organic parameters. An additional volume of a field sample must be collected in order for the laboratory to have enough volume to perform MS/Duplicate analyses for inorganic parameters. Generally, extra volume will not be required to be collected for sediment MS/MSD or MS/Duplicate analyses. The sample designated for MS/MSD or MS/Duplicate analyses should be noted in the comments column of the COC document.

4.5 Temperature Blanks

Temperature blanks consist of a sample container filled with unpreserved water (potable or distilled) and are sometimes included in all coolers which contain samples that require temperature preservation. These may be added to the coolers by the field team if not provided by the laboratory. Temperature blanks must remain inside the coolers on ice during the sampling process. The container for the temperature blank must be clearly labeled “Temperature Blank.”

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

Record the general sample collection information such as location, identification, and date/time in the field book or on a sample log sheet. Unless not prescribed in the site-specific work plan or if different from the site-specific work plan, typical field documentation recorded in a field book includes the following information:

- Sample identification number
- Sample location (description or sketch of the sample point)
- Sample depth interval
- GPS coordinates and coordinate system
- Time and date sample was collected
- Type of sampling equipment used
- Personnel performing the task
- Water depth and depth of sample penetration
- Water descriptions (e.g., clarity, flow, foam, debris)
- Visual or other sensory description of the sample (e.g., odors, staining)
- Sediment descriptions (e.g., color, texture, appearance)
- Estimate of sediment quantity recovered by grab sampler
- Weather conditions during sampling (e.g., temperature, wind)
- Other pertinent observations, including whether photographs were taken
- Sample collection equipment used
- Water field parameters such as pH, temperature, conductivity, turbidity, oxidation-reduction potential, and DO
- Decontamination procedure
- Analytical parameters
- Preservation method
- Water quality monitoring equipment calibration information
- Field duplicate location

Affix a properly completed label to each sample container.

All sample numbers must be documented on the COC form that accompanies the samples during shipment. Any deviations from the record management procedures specified in the site-specific work plan must be approved by the Project Manager and documented in the field book.

6.0 REFERENCES

Great Lakes Dredged Material Testing and Evaluation Manual, Appendix D, Sediment Sampling & Handling Guidance, EPA Region 5, September 30, 1998.

Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. EPA-823-B-01-002. Office of Water. October 2001.

Method for the Determination of Volatile Petroleum Hydrocarbons (VPH). MassDEP. May 2004.

SW-846 Method 5035A, *Closed-system Purge-and-trap and Extraction for Volatile Organics in Soil and Waste Samples.* USEPA. Draft Revision 1, July 2002.

40 CFR Part 136. Guidelines Establishing Test Procedures for the Analysis of Pollutants. USEPA.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	APRIL 2014	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING
2	AUGUST 2020	MODIFICATIONS FOR PFAS SAMPLING

Attachment A:

Procedure for Collection of Sediment Samples for VOCs, VPH or GRO (SW-846 Method 5035A)

1.0 SAMPLING FOR VOLATILE ORGANIC COMPOUNDS IN SEDIMENT BY EPA METHOD 5035/5035A

The following sampling protocol is recommended for site investigations assessing the extent of VOCs (including VPH and GRO) in sediment at a project site. Because of the large number of options available, careful coordination between field and laboratory personnel is needed. The specific sampling containers and sampling tools required will depend upon the required detection levels and intended data use. Once this information has been established, selection of the appropriate sampling procedure and preservation method best applicable to the investigation can be made.

SW-846 Method 5035 provides instructions and options on the preservation of sediment samples for low-level and high-level VOC analyses:

- Low-level ($\leq$ 200 µg/kg) and
- High-level (> 200 µg/kg).

The choice of low-level or high-level analysis is determined by the requirements of the project. However, since the low-level method is only valid for a certain concentration range, a sample for analysis by the high-level method must also be collected to ensure quantification of all target analytes is possible, if needed.

The low-level method uses one or more of the following options for the sampling/preservation of sediment:

- Sediment sampled into a vial with a sodium bisulfate ($NaHSO_4$) solution.
- Sediment collected in an En-Core® sampler and immediately shipped to the laboratory for further preservation (within 48 hours).
- Sediment collected in a vial with organic-free water, sealed in the field, and shipped to the laboratory immediately in order to meet the method preservation requirement to freeze within 48 hours of collection.

Based on project-specific requirements, trip blanks may be recommended. Refer to the site-specific work plan for quality assurance (QA)/QC requirements.

1.1 Low-level Method (VOCs)

Option A - Direct sampling into En-Core® samplers

- Three 5 gram size En-Core® samplers for each sample.
- One non-preserved container for moisture determination.

Option B - Direct sampling into vial with chemical preservative

- Two 5 gram size cores are added to volatile organic analysis (VOA) vials (one core is added to each of two VOA vials with sodium bisulfate solution) for each sample using a Terra Core™ or other coring sampler (e.g., disposable syringe). Once the vials are sealed in the field, these are not opened again.
- One non-preserved container for moisture determination.

Option C - Direct sampling into vial with water (to be frozen at the laboratory)

- Two 5 gram size cores are added to VOA vials (one core is added to each of two VOA vials with water) for each sample using a Terra Core™ or other coring sampler (e.g., disposable syringe). Once the vials are sealed in the field, these are not opened again.
- One non-preserved container for moisture determination.

1.2 High-level Method (VOC, VPH, GRO)

Option D - Direct sampling into En-Core® samplers

- One 5 gram size En-Core® sampler for each sample.
- One non-preserved container for moisture determination.

Option E - Direct sampling into a methanol-preserved vial

- For VOCs: 5 or 10 grams of sediment is added to a VOA vial (with 5 or 10 grams of methanol, respectively) for each sample using a Terra Core™ or other coring sampler (e.g., disposable syringe). This may also depend upon the regulatory agency (e.g., New Jersey Department of Environmental Protection requires 8 to 12 grams in 25 mL methanol or 5 grams in 10 mL methanol).
- For VPH or GRO: The coring device will be filled with 25 grams of undisturbed sediment if 60-ml vials with 25 ml of methanol are used, or 15 grams of undisturbed sediment if 40-ml vials with 15 ml of methanol are used. The goal is to have a 1:1 ratio of sediment-to-methanol.
- One non-preserved container for moisture determination.

1.3 Cautions and Potential Problems

1. <u>Potential leaking sample containers for VOC, VPH and GRO analyses:</u>

   Options for evaluating containers for leaking preservatives:

   a. When ordering pre-preserved sample containers, laboratories should be encouraged to mark the meniscus of the preservative on all sample containers. The preservative level should be checked before sampling as a quick check that there has not been any loss of liquid.
   b. Compare preservative level in multiple bottles and select one for comparison purposes to subsequent sample bottles.
   c. Weigh methanol-preserved sample containers prior to sampling. Sample containers found to have lost greater than 0.2 grams of methanol compared to their initial weight should not be used. In order to perform this option, initial container weights must be provided by the laboratory.

2. <u>Potential methanol absorption:</u>

   Sediment may be encountered that absorbs all of the methanol preservative (e.g., organic-rich sediment, fine-grain sediment). These sediments can absorb the methanol leaving no methanol extract for the laboratory to analyze. In these instances, the use of additional methanol is required. The laboratory must be contacted for sample containers with an increased volume of methanol. Using a 1:2 ratio of sediment-to-methanol will help to ensure that there will be adequate volume of methanol remaining for analysis. **NOTE: Additional methanol should not be added to the sample container by the sampler in the field. Containers with additional methanol must be obtained from the laboratory.**

3. Collection of samples with high moisture content:

   Sediment samples with high (>50%) moisture content may prevent the attainment of the ideal 1:1 sediment-to-preservative ratio. In these instances, depending on the data quality objectives, it may be necessary to evaluate the sediment to determine what level in the disposable syringe corresponds to the required weight (typically 5 grams for VOCs and 15 or 25 grams for VPH). This can be performed by collecting several trial samples with disposable syringes. Weigh each trial sample and note the length of the sediment in the syringe. These measurements would be used to determine how much sediment in the syringe corresponds to 5 ± 0.5 grams (or the desired weight ± 0.5). All trial samples should be discarded and not used for analysis.

4. En-Core® sampler cautions:

   a. En-Core® samplers, or equivalent, should only be used on fine-grain or cohesive sediments (sediments that stay together in the En-Core® sampler and do not fall apart). En-Core® samplers should not be used to collect sediment samples with high moisture (e.g., sediments below the water table). In the case of sediment samples with high moisture (e.g., sediments below the water table), a stainless steel spatula or scoop should be used with field preservation techniques.
   b. The En-Core® sampler is a single-use device and cannot be decontaminated and reused.
   c. The volume of material collected in an En-Core® sampler should not cause excessive stress on the coring tool.
   d. The volume of material collected should not be so large that the sample easily falls apart during extrusion.
   e. The En-Core® sampler should not be used if any of the components are damaged as the seals may be compromised. Under no circumstances should any components be removed or disturbed.
   f. It is important to make sure air is not trapped behind the sample, as this could cause air to pass through the sample, resulting in a loss of VOCs, or it could cause the sample to be pushed prematurely from the coring tool.

5. Potential effervescence with use of sodium bisulfate as a preservative for low-level VOC analysis of sediments.

   This method of preservation is not preferred and, therefore, is not outlined below. If it is used, the following cautions exist:

   a. Carbonaceous or strongly alkaline sediments may cause potential effervescence when reacting with the sodium bisulfate and may result in a loss of VOCs and a shattered vial. If effervescence occurs, sodium bisulfate should not be used. The laboratory must be contacted and low-level preservation techniques, using water only, should be followed.

b. Loamy materials or materials containing decayed material may result in false positive results for acetone due to the interaction with the sodium bisulfate.

c. Some VOCs may be lost due to the resulting acidification when sodium bisulfate is used (e.g., styrene, 2-chloroethyl vinyl ether, acrylonitrile).

d. Some VOCs may be lost if the laboratory is using a heated purge in combination with the sodium bisulfate preservative (e.g., methyl tert butyl ether [MTBE] and other fuel oxygenates).

1.4 Sample Containers and VOC Sampling Equipment

- Method 5035A-compatible containers or kits (for VOCs, VPH and GRO). Preservatives may be required for some samples with certain variations of SW-846 method 5035A – consult the governing regulatory agency or principal analytical chemist to determine which preservatives are necessary.
  - Low-level VOCs: two 40-mL VOA vials pre-preserved with 5 mL organic-free water and also containing a magnetic stir bar.
  - High-level (or medium-level) VOCs: one 40-mL VOA vial pre-preserved with 5 or 10 mL of purge-and-trap-grade methanol. Volume will be dependent upon laboratory's preference or regulatory agency requirements (e.g., New Jersey Department of Environmental Protection prefers vials with 10 or 25 mL of purge-and-trap-grade methanol).
  - VPH and GRO: One 60-mL vial pre-preserved with 25 mL of purge-and-trap-grade methanol **or** One 40-mL VOA vial pre-preserved with 15 mL of purge-and-trap-grade methanol

  and

  - One glass container (or other appropriate container) with no preservative to allow the laboratory to perform the percent solids measurement. NOTE: The laboratory typically requires a minimum of 20 grams to perform this test. Therefore, submitting a sample size less than 4 ounces may be acceptable. This additional container will not be required if the sample is also being submitted for other non-VOC parameters.

- En-Core® samplers, or equivalent, for VOC, VPH and/or GRO analysis:
  - High-level VOC or GRO analysis: one 5-gram En-Core® sampler.
  - Low-level VOC analysis: two 5-gram En-Core® samplers.
  - VPH, GRO or toxicity characteristic leaching procedure (TCLP) VOC analysis: one 25-gram En-Core® sampler.

- Disposable plastic syringes or Terra Core™ samplers.

- Foam VOC vial holders.

- Portable digital scale (accurate to ± 0.01 grams) with calibration weights.

2.0 COLLECTION OF SAMPLES USING EN-CORE® SAMPLERS, OR EQUIVALENT

- The sample will be collected using an En-Core® sampler, or equivalent, as soon as possible after the sediment has been exposed to the atmosphere.
- Check that the En-Core® sampler, or equivalent, is full using both of the following procedures:
    a. Be sure that the back o-ring on the plunger can be seen when looking through the viewing hole on the handle. This will mean that the sediment has pushed the plunger fully to the back.
    b. The plunger can only be rotated when it is fully pushed to the back of the body. Therefore, it is important to twist the plunger to guarantee that the sediment has filled the sampler and the back o-rings have sealed.
- Immediately seal the En-Core® sampler, or equivalent. Be sure to twist the cap as it is pushed on. The cap is properly sealed when the two locking arms are completely and symmetrically over the body ridge.
- The samples must be shipped to a laboratory within 24 hours of sampling to ensure the 48-hour hold time for preservation will be met.
- In the event that a field screening technique (instrument reading or visual staining of the sediment) indicates the possible presence of VOCs or hydrocarbons, note the observations or instrument readings in the field book. If the field screening technique does not indicate the presence of VOCs, this should also be noted.
- If samples are collected for only VOC and VPH analyses, a separate aliquot must be collected in an unpreserved container in order for the laboratory to perform a dry weight determination.

3.0 COLLECTION OF SAMPLES USING FIELD PRESERVATION

- Samples for VOCs will be collected as soon as possible after the sediment has been exposed to the atmosphere.
- Samples for VOCs will be collected first (prior to collection of samples for other parameters) using an open-barrel disposable syringe, Terra Core™ sampler, or equivalent. In the case of samples with high moisture (e.g., sediments below the water table), an open-barrel disposable syringe may not be practical; a stainless steel spatula or scoop can be used with field preservation techniques.
- Sediment samples for VOC analyses should **never** be homogenized.
- Each pre-preserved sample container will be weighed prior to sample collection, and the container/preservative weight will be recorded. This procedure will generally be performed by the laboratory prior to shipping the containers to the field.
- Depending upon project requirements, samples for VOC analysis will be collected as low-level, high-level, or both.

- **<u>Low-level VOCs</u>**
  1. The syringe will be filled with undisturbed sediment of the following volume: 5 grams of sediment.

     As an option to the syringes, 5-gram Terra Core™ samplers, or equivalent, can be used. The goal is to have a 1:1 ratio of sediment-to-preservative.
  2. The sediment will be extruded into a pre-preserved VOA vial containing a magnetic stir bar and 5 mL reagent-grade water. This will be done in replicate.
  3. Any sand grains present on the container rim or cap must be removed to ensure an air-tight seal of the vial. The VOA vial will be capped quickly and labeled with the sample ID, date, and time of collection. Labels should not be written on the cap of the vial.
  4. Gently swirl sample to break up the sediment aggregate, if necessary, until the sediment is covered with preservative. It is imperative that the sediment sample be completely immersed in the preservative solution.
  5. In the event that a field screening technique (instrument reading or visual staining of the sediment) indicates the possible presence of VOCs or hydrocarbons, note the observations or instrument readings in the field book. If the field screening technique does not indicate the presence of VOCs, this should also be noted.
  6. If samples are collected for only VOC analysis, a separate aliquot must be collected in an unpreserved container in order for the laboratory to perform a dry weight determination.
- **<u>High-level VOCs, VPH, or GRO</u>**
  1. High-level VOCs: The syringe will be filled with undisturbed sediment of the following volume: 5 or 10 grams of sediment for high-level analysis (added to the 5 or 10 ml of methanol, respectively). This may also depend upon the regulatory agency (e.g., New Jersey Department of Environmental Protection requires 8 to 12 grams in 25 mL methanol or 5 grams in 10 mL methanol).

     VPH or GRO: The syringe will be filled with 25 grams of undisturbed sediment if 60-ml vials with 25 ml of methanol are used, or 15 grams of undisturbed sediment if 40-ml vials with 15 ml of methanol are used. The goal is to have a 1:1 ratio of sediment-to-methanol.

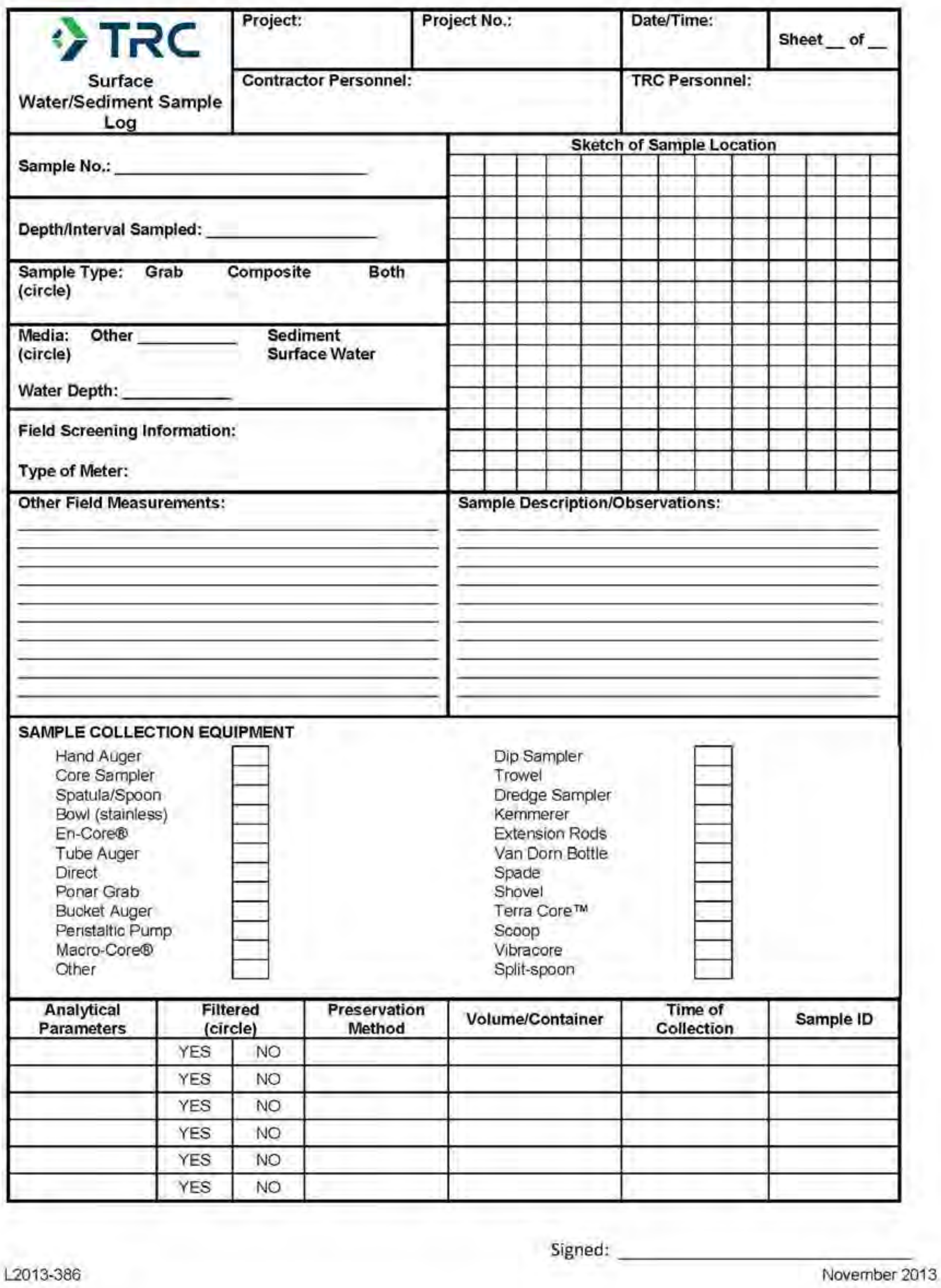
     As an option to the syringes, 5-gram Terra Core™ samplers, or equivalent, can be used. Typically, the goal is to have a 1:1 ratio of sediment-to-preservative.
  2. The sample will be extruded into a VOA vial containing purge-and-trap grade methanol
  3. Any sand grains present on the container rim or cap must be removed to ensure an air-tight seal of the vial. The VOA vial will be capped quickly and labeled with the sample ID, date, and time of collection. Labels should not be written on the cap of the vial.
  4. Gently swirl sample to break up the sediment aggregate, if necessary, until the sediment is covered with preservative. It is imperative that the sediment sample be completely immersed in the preservative solution.
  5. In the event that a field screening technique (instrument reading or visual staining of the sediment) indicates the possible presence of VOCs or hydrocarbons, note the

observations or instrument readings in the field book. If the field screening technique does not indicate the presence of VOCs, this should also be noted.

6. Methanol is considered to be a hazardous material by the US Department of Transportation (DOT) and the International Air Transportation Association (IATA). Shipments containing methanol between the field and the laboratory must conform to the rules established in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179) and the most current edition of the IATA Dangerous Goods Regulations. The volumes of methanol recommended in the VOC method fall under the small quantity exemption of 49 CFR section 173.4. Refer to Attachment C for further details.
7. If samples are collected for only VOC analysis, a separate aliquot must be collected in an unpreserved container in order for the laboratory to perform a dry weight determination.

Attachment B:

Example Surface Water/Sediment Sample Log



Surface Water/Sediment Sample Log

Project:	**Project No.:**	**Date/Time:**	**Sheet __ of __**
Contractor Personnel:		**TRC Personnel:**	

Sample No.: ____________________________

Depth/Interval Sampled: ___________________

Sample Type: (circle) **Grab** **Composite** **Both**

Media: (circle) **Other** ___________ **Sediment** **Surface Water**

Water Depth: ____________

Field Screening Information:

Type of Meter:

Sketch of Sample Location

Other Field Measurements:

Sample Description/Observations:

SAMPLE COLLECTION EQUIPMENT

- Hand Auger ☐
- Core Sampler ☐
- Spatula/Spoon ☐
- Bowl (stainless) ☐
- En-Core® ☐
- Tube Auger ☐
- Direct ☐
- Ponar Grab ☐
- Bucket Auger ☐
- Peristaltic Pump ☐
- Macro-Core® ☐
- Other ☐
- Dip Sampler ☐
- Trowel ☐
- Dredge Sampler ☐
- Kemmerer ☐
- Extension Rods ☐
- Van Dorn Bottle ☐
- Spade ☐
- Shovel ☐
- Terra Core™ ☐
- Scoop ☐
- Vibracore ☐
- Split-spoon ☐

Analytical Parameters	Filtered (circle)		Preservation Method	Volume/Container	Time of Collection	Sample ID
	YES	NO				
	YES	NO				
	YES	NO				
	YES	NO				
	YES	NO				
	YES	NO				

Signed: ______________________________

L2013-386

November 2013

Attachment C:

Shipping Methanol-preserved Samples

Shipping of Hazardous Materials

Methanol is considered a hazardous material by the US Department of Transportation (DOT) and the International Air Transport Association (IATA). Shipments of methanol between the field and the laboratory must conform to the rules established in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179) and the most current edition of the IATA Dangerous Goods Regulations. Consult these documents or your shipping company for complete details.

Small Quantity Exemption

The volumes of methanol recommended in the high-level VOC, VPH and GRO methods fall under the small quantity exemption of 49 CFR section 173.4. To qualify for this exemption, all of the following conditions must be met:

- the maximum volume of methanol in each sample container must not exceed 30 mL
- the sample container must not be full of methanol
- the sample container must be securely packed and cushioned in an upright position and be surrounded by a sorbent material capable of absorbing spills from leaks or breakage of sample containers
- the package weight must not exceed 64 pounds
- the volume of methanol per shipping container must not exceed 500 mL
- the packaging and shipping container must be strong enough to hold up to the intended use
- the package must not be opened or altered while in transit
- the shipper must mark the shipping container as follows:

“This package conforms to 49 CFR 173.4”

When shipping domestically by Federal Express via ground or air, the following rules apply:

- follow the inner packaging requirements of 49 CFR 173.4
- no labels, placards, up arrows, or dangerous goods shipping papers are required
- if the Federal Express airbill has a shipper’s declaration for hazardous goods on it, check the Yes box under *Shipper’s Declaration not Required*

When shipping internationally by Federal Express, the following rules apply*:*

- follow the inner packaging requirements of 49 CFR 173.4
- use dangerous goods shipping papers
- apply orientation arrows on opposite vertical sides on the exterior of the package

Shipping Papers for International Shipments

International shipments must be accompanied by dangerous goods shipping papers that include the following:

Proper Shipping Name:	Methyl Alcohol
Hazardous Class:	Flammable Liquid
Identification Number:	UN1230
Total Quantity:	*(mL methanol/container x the number of containers)*
Emergency Response Info:	Methanol MSDS attached
Emergency Response Phone:	1-800-424-9300

Attachment D:

SOP Fact Sheet

SURFACE WATER AND SEDIMENT SAMPLING

PURPOSE AND OBJECTIVE

The objective of surface water and sediment sampling is to obtain a representative sample for analysis of physical and/or chemical parameters, as necessary, at a given site. This objective requires that the sample be both free of unsuitable material and be of sufficient quantity and quality for analysis by the selected analytical method. Surface water and sediment samples are collected either directly using a hand-held device or indirectly using a remotely activated device.

WHAT TO BRING: GENERAL EQUIPMENT

- Site-specific HASP
- Appropriate PPE
- Rubber boots and/or hip/chest waders
- Figure showing sample locations
- Field book and/or Sample Log Form
- Indelible marking pens or markers
- Tape measure, folding ruler and or calibrated staff
- Camera
- Compass
- Boat (if needed) with anchor
- Buoys
- Thermometer and/or Barometer
- Zip-loc® plastic bags
- Organic absorbent (e.g., Slickwick, sawdust)
- Bubble wrap
- 5-gallon bucket(s)
- Lint-free, non-abrasive, disposable towels
- Calibrated PID or FID
- Wooden stakes and spray paint, plastic flagging (highly visible), or steel pin flags
- Survey equipment and/or GPS and/or other means of establishing sample locations
- Equipment decontamination supplies
- Sample bottleware, labels, coolers, ice, and blank COC forms; may also need field blank bottles and reagent-grade water

WHAT TO BRING: SURFACE WATER SAMPLING EQUIPMENT

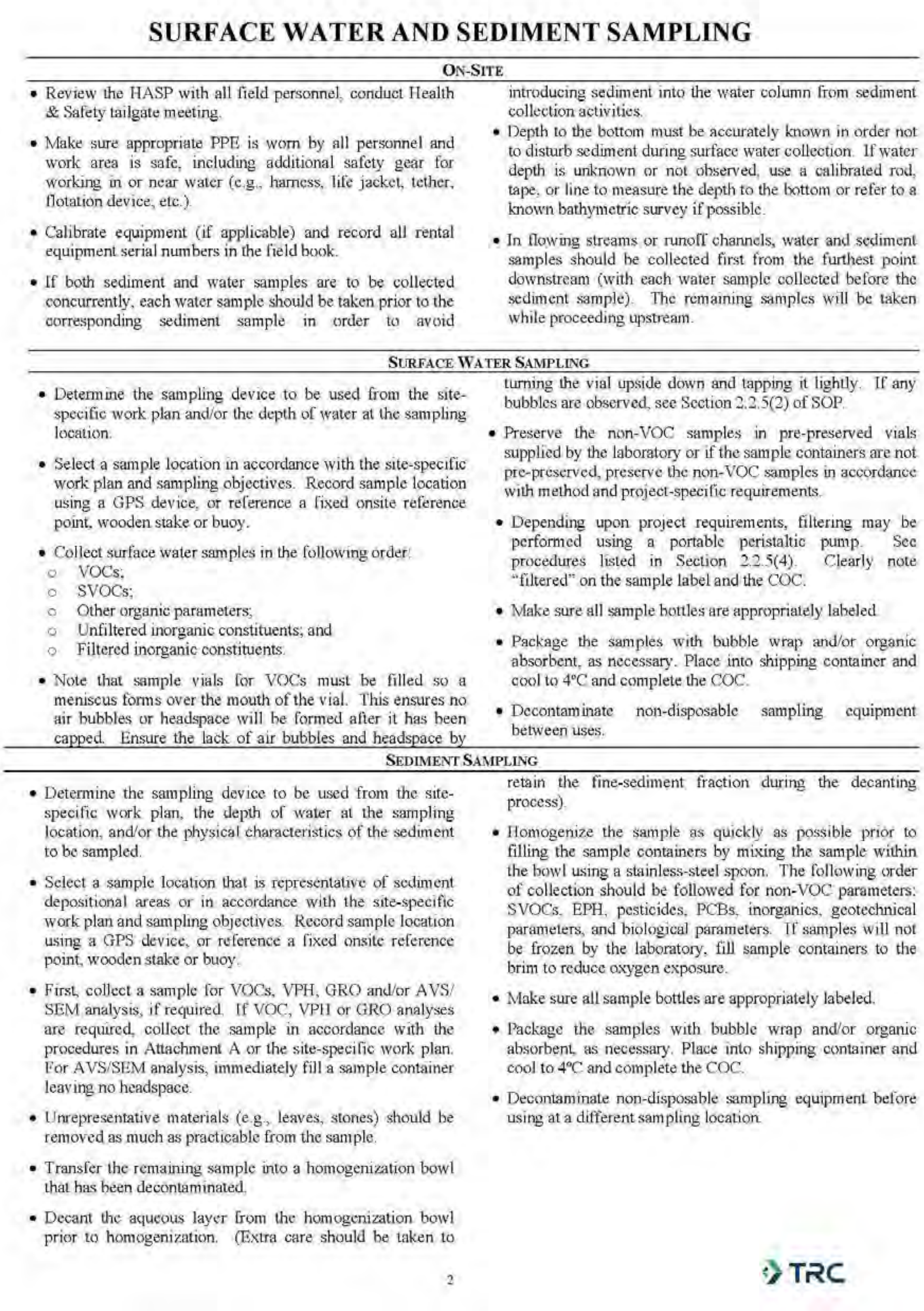
- Multi-parameter instrument and flow-through cell (typically should include: pH, temperature, conductivity, oxidation-reduction potential, and DO). Note: Salinity probe may be needed depending on project requirements
- Turbidity meter
- Sample collection tools (e.g., Dip sampler, Kemmerer bottle, Van Doren sampler, peristaltic pump)
- Teflon, Teflon–lined polyethylene, or HDPE tubing, dependent upon project objectives
- Filtration equipment, if required (peristaltic pump and 0.45 micron filters, or as otherwise required for the project)
- Graduated cylinder or five-gallon bucket
- Stop watch

WHAT TO BRING: SEDIMENT SAMPLING EQUIPMENT

- Sample collection tools (e.g., stainless steel or plastic spade, shovel, scoop, or trowel; hand or bucket auger with appropriate head and extension rods; sediment coring device [e.g., vibracore, gravity core, etc.]; ponar or equivalent grab samplers, eckman dredge)
- Nylon rope or stainless-steel cable (for dredges)
- Nylon tube brush
- Wire brush for thread cleaning
- Stainless-steel mixing bowl or disposable aluminum tray
- Stainless-steel spatulas or spoons
- Small scale to measure sample mass
- Dedicated Teflon® spoons (if required)
- En-Core® samplers, Terra Core™ samplers, or disposable plastic syringes

OFFICE

- Prepare/update the site-specific HASP; make sure the field team is familiar with the latest version.
- Discuss the objective for the sediment sampling program with the Project Manager and/or the field team leader. Discuss sample order, collection method, designation, analytical parameters, turn-around times, laboratory, etc.
  - ☐ Are sediment/purge water to be containerized or returned to source?
  - ☐ Volume requirements for each sample?
  - ☐ QC sample collection?
  - ☐ Field decontamination required?
- Discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager
- Confirm that all necessary equipment is available in-house or has been ordered. Rental equipment is typically delivered the day before fieldwork is scheduled. Prior to departure, test equipment and make sure it is in proper working order.
- Review sample bottle order for accuracy and completeness.



SURFACE WATER AND SEDIMENT SAMPLING

ON-SITE

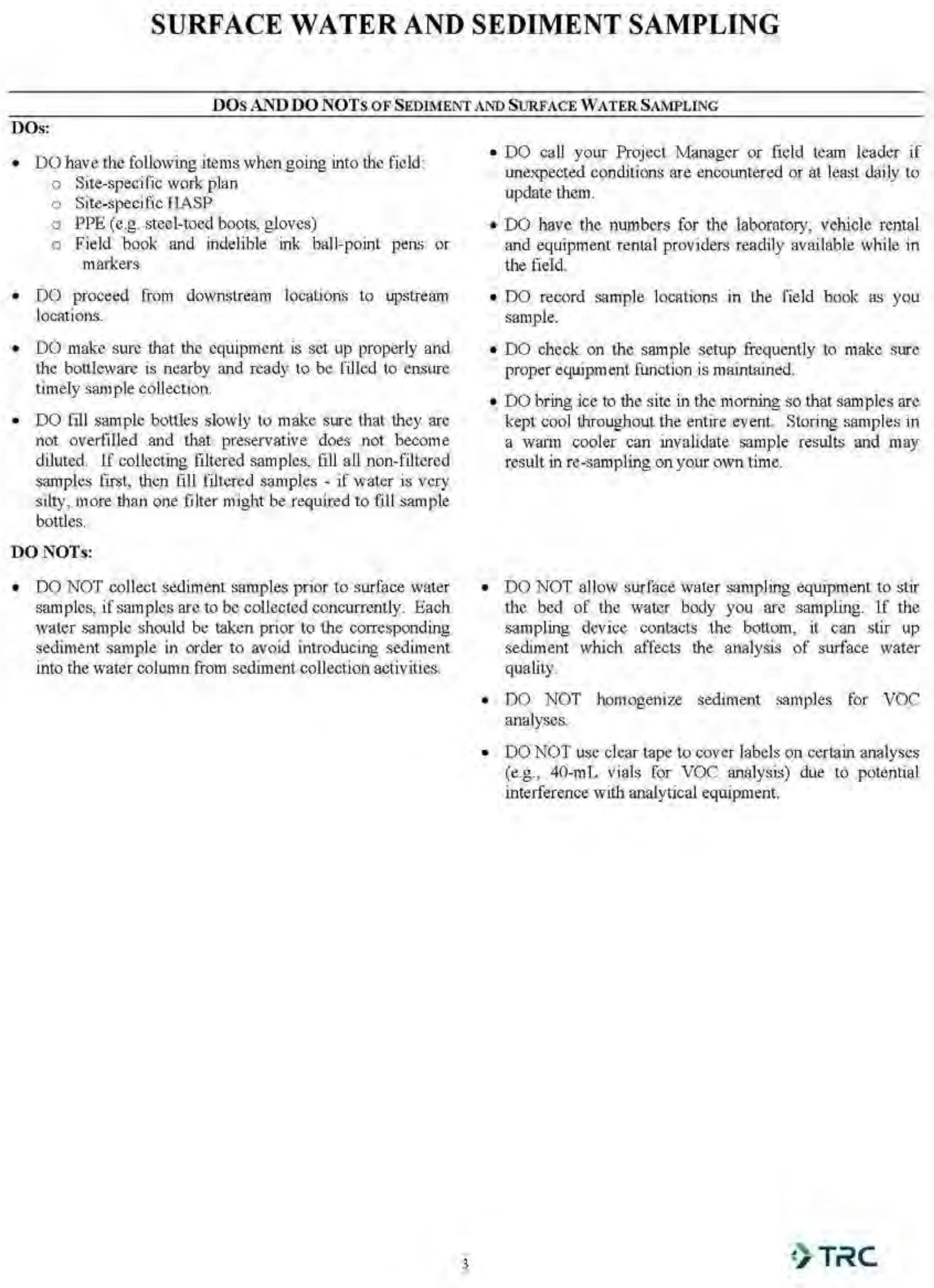
- Review the HASP with all field personnel, conduct Health & Safety tailgate meeting.
- Make sure appropriate PPE is worn by all personnel and work area is safe, including additional safety gear for working in or near water (e.g., harness, life jacket, tether, flotation device, etc.).
- Calibrate equipment (if applicable) and record all rental equipment serial numbers in the field book.
- If both sediment and water samples are to be collected concurrently, each water sample should be taken prior to the corresponding sediment sample in order to avoid introducing sediment into the water column from sediment collection activities.
- Depth to the bottom must be accurately known in order not to disturb sediment during surface water collection. If water depth is unknown or not observed, use a calibrated rod, tape, or line to measure the depth to the bottom or refer to a known bathymetric survey if possible.
- In flowing streams or runoff channels, water and sediment samples should be collected first from the furthest point downstream (with each water sample collected before the sediment sample). The remaining samples will be taken while proceeding upstream.

SURFACE WATER SAMPLING

- Determine the sampling device to be used from the site-specific work plan and/or the depth of water at the sampling location.
- Select a sample location in accordance with the site-specific work plan and sampling objectives. Record sample location using a GPS device, or reference a fixed onsite reference point, wooden stake or buoy.
- Collect surface water samples in the following order:
  - VOCs;
  - SVOCs;
  - Other organic parameters;
  - Unfiltered inorganic constituents; and
  - Filtered inorganic constituents.
- Note that sample vials for VOCs must be filled so a meniscus forms over the mouth of the vial. This ensures no air bubbles or headspace will be formed after it has been capped. Ensure the lack of air bubbles and headspace by turning the vial upside down and tapping it lightly. If any bubbles are observed, see Section 2.2.5(2) of SOP.
- Preserve the non-VOC samples in pre-preserved vials supplied by the laboratory or if the sample containers are not pre-preserved, preserve the non-VOC samples in accordance with method and project-specific requirements.
- Depending upon project requirements, filtering may be performed using a portable peristaltic pump. See procedures listed in Section 2.2.5(4). Clearly note "filtered" on the sample label and the COC.
- Make sure all sample bottles are appropriately labeled.
- Package the samples with bubble wrap and/or organic absorbent, as necessary. Place into shipping container and cool to 4°C and complete the COC.
- Decontaminate non-disposable sampling equipment between uses.

SEDIMENT SAMPLING

- Determine the sampling device to be used from the site-specific work plan, the depth of water at the sampling location, and/or the physical characteristics of the sediment to be sampled.
- Select a sample location that is representative of sediment depositional areas or in accordance with the site-specific work plan and sampling objectives. Record sample location using a GPS device, or reference a fixed onsite reference point, wooden stake or buoy.
- First, collect a sample for VOCs, VPH, GRO and/or AVS/SEM analysis, if required. If VOC, VPH or GRO analyses are required, collect the sample in accordance with the procedures in Attachment A or the site-specific work plan. For AVS/SEM analysis, immediately fill a sample container leaving no headspace.
- Unrepresentative materials (e.g., leaves, stones) should be removed as much as practicable from the sample.
- Transfer the remaining sample into a homogenization bowl that has been decontaminated.
- Decant the aqueous layer from the homogenization bowl prior to homogenization. (Extra care should be taken to retain the fine-sediment fraction during the decanting process).
- Homogenize the sample as quickly as possible prior to filling the sample containers by mixing the sample within the bowl using a stainless-steel spoon. The following order of collection should be followed for non-VOC parameters: SVOCs, EPH, pesticides, PCBs, inorganics, geotechnical parameters, and biological parameters. If samples will not be frozen by the laboratory, fill sample containers to the brim to reduce oxygen exposure.
- Make sure all sample bottles are appropriately labeled.
- Package the samples with bubble wrap and/or organic absorbent, as necessary. Place into shipping container and cool to 4°C and complete the COC.
- Decontaminate non-disposable sampling equipment before using at a different sampling location.



SURFACE WATER AND SEDIMENT SAMPLING

DOs AND DO NOTs OF SEDIMENT AND SURFACE WATER SAMPLING

DOs:

- DO have the following items when going into the field:
  - Site-specific work plan
  - Site-specific HASP
  - PPE (e.g. steel-toed boots, gloves)
  - Field book and indelible ink ball-point pens or markers
- DO proceed from downstream locations to upstream locations.
- DO make sure that the equipment is set up properly and the bottleware is nearby and ready to be filled to ensure timely sample collection.
- DO fill sample bottles slowly to make sure that they are not overfilled and that preservative does not become diluted. If collecting filtered samples, fill all non-filtered samples first, then fill filtered samples - if water is very silty, more than one filter might be required to fill sample bottles.
- DO call your Project Manager or field team leader if unexpected conditions are encountered or at least daily to update them.
- DO have the numbers for the laboratory, vehicle rental and equipment rental providers readily available while in the field.
- DO record sample locations in the field book as you sample.
- DO check on the sample setup frequently to make sure proper equipment function is maintained.
- DO bring ice to the site in the morning so that samples are kept cool throughout the entire event. Storing samples in a warm cooler can invalidate sample results and may result in re-sampling on your own time.

DO NOTs:

- DO NOT collect sediment samples prior to surface water samples, if samples are to be collected concurrently. Each water sample should be taken prior to the corresponding sediment sample in order to avoid introducing sediment into the water column from sediment collection activities.
- DO NOT allow surface water sampling equipment to stir the bed of the water body you are sampling. If the sampling device contacts the bottom, it can stir up sediment which affects the analysis of surface water quality.
- DO NOT homogenize sediment samples for VOC analyses.
- DO NOT use clear tape to cover labels on certain analyses (e.g., 40-mL vials for VOC analysis) due to potential interference with analytical equipment.

Attachment E: SOP Modifications for PFAS

Due to the pervasive nature of PFAS in various substances routinely used during sampling and the need to mitigate potential cross-contamination or sampling bias to ensure representative data are collected, special care should be taken when sampling for PFAS. The following table highlights the required modifications to this SOP when sampling for PFAS.

PFAS Sampling Protocols	
SOP Section Number	**Modifications to SOP**
1.3	• Do not use equipment utilizing Teflon® or low density polyethylene (LDPE)[1] during sample handling or mobilization/demobilization. This includes bailers, tubing, bladders, bailer cord/wire, waterproof/resistant paper products, certain personal protective equipment (PPE) (see below), and Teflon® tape. High density polyethylene (HDPE) or silicone tubing should be used in lieu of Teflon® or Teflon®-lined tubing. • Blue Ice® (chemical ice packs) must not be used to cool samples or be used in sample coolers. Regular ice in Ziploc® bags can be used. • Do not use LDPE or glass sample containers or containers with Teflon-lined lids. HDPE or polypropylene containers are acceptable for sample storage. HDPE or polypropylene caps are acceptable. • Do not use aluminum foil. • Field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards and spiral bound notebooks should not be used. • Do not use Post-It Notes during sample handling or mobilization/demobilization. • Refer to TRC's SOP ECR-010 Equipment Decontamination for PFAS-specific decontamination protocols. Ensure that PFAS-free water is used during the decontamination procedure.
1.5	Always consult the Site Specific Health and Safety Plan prior to conducting field work. The following considerations should be made with regards to field preparation during PFAS sampling: • Tyvek® suits should not be worn during PFAS sampling events. Cotton coveralls may be worn. • Boots and other field clothing containing Gore-Tex™ or other waterproof/resistant material should not be worn. This includes rain gear. Boots made with polyurethane and polyvinyl chloride (PVC) are acceptable. • Stain resistant clothing should not be worn. • Food and drink should not be allowed within the exclusion area. Pre-wrapped food or snacks should not be in the possession of sampling personnel during sampling. Bottled water and hydration drinks (e.g., Gatorade®) may be consumed in the staging area only. • Personnel involved with sample collection and handling should wear nitrile gloves at all times while collecting and handling samples or

PFAS Sampling Protocols	
SOP Section Number	**Modifications to SOP**
	sampling equipment. Avoid handling unnecessary items with nitrile gloves. A new pair of gloves must be donned prior to collecting each sample. • Wash hands with Alconox or Liquinox and deionized water after leaving vehicle before setting up to sample a well.
1.6.1 & 1.6.2	• Avoid wearing clothing laundered with fabric softeners. • Avoid wearing new clothing (recommended 6 washings since purchase). Clothing made of cotton is preferred. • Avoid using cosmetics, moisturizers, hand creams, or other related products as part of cleaning/showering on the day of sampling. • Avoid using sunscreens or insect repellants that are not natural or chemical free.
1.6.1	• Consider collecting samples for total suspended solids which will become important for fate and transport and treatment considerations. Floc accumulates high concentrations of PFAS and specifically some of the longer-chain PFAS; when this floc settles out, concentrations can decrease by an order of magnitude. • If sampling for parameters other than PFAS, perform PFAS sampling first. Schedule PFAS sampling at the beginning of the work day to avoid other sources of contamination.
1.6.2	• Efficient and consistent homogenization procedures must be performed on sediment samples; this is critical due to the small mass used by the laboratory and the need to be able to generate meaningful data. Do not homogenize sediment in aluminum pie pans; use a decontaminated stainless steel bowl.

2.2	• Avoid collecting an unrepresentative portion of air interface surface water in a sample Since PFAS can accumulate at the air/water interface, the following sample depths are recommended for PFAS sampling of surface water bodies to avoid the air/water interface:
	  • Lake or pond: 1-2 feet below the surface
	  • Catch basin or shallow outfall: 6 inches below the surface
	• Note foam accumulation and/or any dusty or soapy looking sheens. Document with photographs and use stakes/flags for marking location of foam on stream or lake banks.

2.2.4	• Tubing used to sample surface water for PFAS must not be LDPE or Teflon®. HDPE and silicone are acceptable.
2.4	• Avoid using waterproof labels for sample bottles. The use of paper labels covered with clear tape or placed in Ziploc® bags to avoid moisture on the sample label is acceptable.
2.4 (5)	• Samples for PFAS analysis must be shipped at <10°C. Standard coolers are acceptable. Keep high-concentration PFAS samples in separate coolers from low-concentration PFAS samples.

Notes:

[1] – PFAS have been used as an additive in the manufacturing of LDPE to smooth rough surfaces and, in the case of LDPE tubing, to allow for less turbulent flow along the surface of the tubing.

Title: **Water Level and Product Measurements**	Procedure Number: **ECR 004**
	Revision Number: **3**
	Effective Date: **February 2022**

Authorization Signatures

Technical Reviewer	Date	SOP Work Group Co-Lead	Date
Ryan Jorrey	12/10/2021	Chelsea Wenhardt	2/21/2022

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	Example Water and Product Level Monitoring Form
Attachment B	Example Field Book Documentation for Water Levels
Attachment C	SOP Fact Sheet
Attachment D	SOP Modifications for PFAS

1.0 INTRODUCTION

1.1 Scope and Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the methods for conducting water level, separate-phase product, and/or total well depth measurements in monitoring wells, piezometers, and boreholes during field investigations.

1.2 Summary of Method

Depth-to-water (DTW) measurements are used to evaluate pressure and/or elevation changes within the aquifer. The procedure involves using a water level indicator capable of an accuracy of ±0.01 feet, or a similar piece of equipment, to measure the DTW in a monitoring well, piezometer, or borehole from a set reference point. When used in conjunction with an accurate site elevation survey, DTW data can be converted to potentiometric surface elevations to support groundwater flow direction analysis, as well as other aquifer characteristics. In addition, pressure changes recorded in a well during a slug, pumping, or packer test can be used to determine aquifer characteristics, such as hydraulic conductivity and storage parameters.

It is also a good practice to gauge the total depth of a monitoring well while taking water levels. This practice can help confirm: 1) the correct well in a cluster of wells screened at different depths; 2) that the well is clear of obstructions; 3) whether the well may be silting up and need further development; and 4) the correct purge volume for a well when sampling. Total depth measurements in a well may be necessary when TRC is taking over project work at a site with existing monitoring wells or the site wells have not been accessed for a significant amount of time.

The objective of separate-phase product measurements is to obtain measurements of the thickness of separate-phase product in the water column. The thickness of both dense non-aqueous phase liquid (DNAPL) and light non-aqueous phase liquid (LNAPL) can be determined using an oil/water interface probe. It should be noted that the thickness of LNAPL or DNAPL in a well (“apparent thickness”) most likely differs from the thickness in the formation (“actual thickness”).

- For LNAPL, the procedure involves measuring the depth to the separate-phase product and the depth to the underlying groundwater from a set reference point. The difference between these two measurements is the thickness of the LNAPL in the well.

- For DNAPL, the procedure involves measuring the depth to the separate-phase product and the depth to the bottom of the well, borehole, etc. The difference between these two measurements is the thickness of the DNAPL in the well.

1.3 Equipment

The following list of equipment may be utilized when conducting water level and separate-phase product measurements. Site-specific conditions may warrant the use of additional items or deletion of items from this list. For specialized sampling programs involving per- and polyfluorinated alkyl substances (PFAS), refer to Attachment D for further details.

- Appropriate level of personal protective equipment (PPE)
- Electronic water level indicator
- Oil/water interface probe
- Extra batteries for water level indicator/interface probe
- Field book and/or monitoring form
- Well keys
- Socket-wrench
- Containers to hold water and isopropanol for calibration
- Decontamination water and appropriate solution
- Decontamination supplies
- Previous measurement data (if available)
- Precision ruler or measuring tape
- Permanent marker (e.g., Sharpie®)
- Spool of cotton string and stainless steel nuts/weights for NAPL string test (for measuring DNAPL thickness)

1.4 Definitions

Borehole	A hole drilled into the soil or bedrock using a drill rig or similar equipment.
Dense Non-aqueous Phase Liquid (DNAPL)	Separate-phase product that is denser than water and, therefore, sinks to the bottom of the water column.
Depth To Water (DTW)	The distance to the groundwater surface from an established measuring point.
Light Non-aqueous Phase Liquid (LNAPL)	Separate-phase product that is less dense than water and, therefore, floats on the surface of the water.
Low-permeability Formation	A geologic formation that has very slow recharge and discharge rates due to small pore spaces in the formation material. A clay formation is considered to have low permeability and has a very slow recharge rate compared to a more permeable formation, such as sand or gravel.
Monitoring Well	A well typically made from a polyvinyl chloride (PVC) pipe, or other appropriate material (e.g., stainless steel), with slotted screen installed across or within a saturated zone. Monitoring wells are primarily used for groundwater quality monitoring and sample collection.
Non-aqueous Phase Liquid (NAPL)	Petroleum or other fluid that is immiscible in water and tends to remain as a separate liquid in the subsurface.

Piezometer	A well typically made from PVC or metal with a slotted screen installed across or within a saturated zone. Piezometers are primarily installed to monitor changes in the potentiometric surface elevation.
Potentiometric Surface	A surface representing the hydraulic head of groundwater.
Separate-phase Product	A liquid that does not easily dissolve in water. Separate-phase product can be more dense (i.e., DNAPL) or less dense (i.e., LNAPL) than water and, therefore, can be found at different depths in the water column, depending on the liquid's specific density (i.e., lighter or heavier than water).
Total Depth of Well	Distance from the measuring point to the bottom of the well.
Well Casing	An impervious, durable pipe placed in a borehole to prevent the walls of the borehole from caving, and to seal off surface drainage or undesirable water, gas, or other fluid and prevent their entrance into the well.
Well Riser	A casing (usually steel or PVC) that extends from the well screen or open section of the well to above the ground surface.

1.5 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific health and safety plan (HASP). TRC personnel will use the appropriate level of personal protective equipment (PPE) as defined in the HASP.

When present, special care should be taken to avoid contact with LNAPL or DNAPL. The use of an air monitoring program, as well as the proper PPE designated by the site-specific HASP, can identify and/or mitigate potential health hazards.

1.6 Cautions and Potential Problems

Special care should be taken when using equipment if PFAS are known or suspected to be present. Please refer to Attachment D for details.

- DTW measurements of all wells in a water level survey should be collected within the shortest amount of time possible but, at a minimum, within a 24-hour period to ensure near contemporaneous data collection during a groundwater elevation recording event. However, note that certain conditions may produce relatively rapid changes in groundwater elevations, which might necessitate collecting readings over a shorter time period. Such conditions should be noted in the field book. Rapid groundwater elevation changes may occur due to:
    - Rapid changes in atmospheric pressure

  - Variable pumping of nearby wells
  - Precipitation events
  - Tidal influences
  - Rapid changes in nearby surface water levels (e.g., dam release, upstream thunderstorm)

- Allow water levels in newly installed wells to stabilize for approximately 24 hours before taking measurements for the purpose of a water level survey. Recharge might take longer in wells installed in low permeability formations.

- Because the tops of monitoring wells and piezometers are often cut unevenly, be sure to take DTW measurements from a pre-marked or notched spot on the well to ensure consistent data collection over time. If the tops of the monitoring wells and piezometers are not marked, the DTW measurement should be taken from the high point of the well riser/casing or the north side of the riser/casing. The measurement location should then be marked to maintain consistency.

- To limit the possibility of cross contamination, DTW measurements should be collected in order from the least to the most contaminated wells and piezometers when contamination is known or suspected. Be sure to decontaminate the entire length of tape lowered into the well between well measurements to reduce the potential for cross contamination. Refer to Attachment D and ECR SOP 010 for decontamination for PFAS. Some wells with NAPL or excessive condensation may have residues on the side of the riser that may also contaminate the tape.

- If the presence of NAPL is suspected at a site, an oil/water interface probe should be used to conduct water level measurements. When DNAPL is a suspected contaminant characteristic at a site, the interface probe should be lowered to the bottom of the well slowly, until DNAPL is encountered, if present.

- NAPL may foul the probe and could cause a delayed response when going from NAPL to water. Resolution may require taking repeated measurements by raising and/or lowering the probe through the interface.

- Note: Some NAPL may not be measurable with a conventional interface probe. Very old fuel oil, creosote, tar and manufactured gas plant (MGP) waste may require estimates of thickness using a steel tape and chalk method.

- If NAPL is present, a string test can be performed. Tie a weighted object (e.g., stainless steel nut) to the end of a cotton string and gently lower to the bottom of the well. Mark the top of riser on the string, gently remove the string, and measure the thickness of NAPL coating the string.

- Most water level meters have a “sensitivity” setting (e.g., gain), which is often located on the on/off dial. The sensitivity setting may need adjustment depending on the site water chemistry.

- Excessive condensation on the inside well materials may cause the tape to stick on the well riser/casing and/or cause a false reading above the water level. This is especially true of deeper wells. Previous elevation data (depth to water) should be consulted to determine if a reading is consistent and plausible for that well. The above-mentioned sensitivity adjustment can be used to compensate. In some cases, the water level tape may have to be weighted to remedy the line sticking to the well riser/casing.

- Tight well caps and low permeability formations may not have allowed the potentiometric surface to equilibrate in the well after seasonal, tidal, or other area groundwater level fluctuations. If this is the case, allow the wells to equilibrate before collecting measurements by taking readings several minutes after removing the well plug; in addition, re-measure the first well after the last well to verify that the water level is not fluctuating. Another round of water levels may need to be collected if a significant discrepancy from the first set of measurements is observed; this should be discussed with the Project Manager. If this is a concern, vented well caps or plugs may need to be used.

- In some instances, artesian well conditions (flowing wells) may exist, where the potentiometric surface is higher in elevation than the top of the well casing (TOC). In these situations, it is pertinent to note the water level elevation as above the TOC or add a known length of riser pipe in order to measure an actual elevation. Once the water level has equilibrated in the riser pipe, the same procedures can be followed for measuring water level when separate-phase product is not suspected. Note that when converting the DTW measurement to an elevation, the riser pipe length needs to be added to the surveyed TOC.

- Groundwater gradients at some sites can be very shallow and if gradient and groundwater flow pattern (gradient direction) determination are part of the project objectives, it is critical that groundwater level measurements obtained from wells are as accurate as possible. Special care should be taken to allow the water level to equilibrate after removing sealing caps, and the same water level indicator should be used for all measurements if possible. All wells should be measured within the minimum possible tim. This is particularly important in areas with potential tidal influences.

- If more than one measuring device must be used for multiple wells across an area with a shallow groundwater gradient, the “zero calibration check” (see Section 2.1.2) becomes especially important.

- If the monitoring well or piezometer is secured with an air- and water-tight lockable cap, caution should be taken when removing the cap due to the possible buildup of pressure in the well riser. Try to ease the cap off and relieve the pressure slowly in order to prevent injury. Do not stand or lean over top of well when releasing cap.

- Flush-mounted wells may be subject to water collection in the well can around the top of the riser pipe. In such instances, sufficient water should be evacuated from the well can prior to removing the well cap to ensure that ambient water does not enter the riser. The condition should be documented and the potential need for repair discussed with the Project Manager.

1.7 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Workers (HAZWOPER)
- 8-hour annual refresher training

2.0 PROCEDURES

To be useful for establishing groundwater gradient, the reference point should be tied with a known vertical datum, such as the National Geodetic Vertical Datum (NGVD), or a local datum (e.g., site-specific arbitrary datum such as concrete foundation or top of a well).

Water levels should be allowed to equilibrate prior to measurement after removing sealing well caps. There are no set guidelines, and appropriate equilibration times can range from minutes to hours depending on well recharge, local geology, and project objectives.

If available, prior site water and product level measurement data should be reviewed and available to field personnel during the collection of new data for direct comparison to aid in identifying and resolving potential measurement errors while in the field.

When measuring well depths with an electronic water level indicator, measure and add the length of the probe beneath the circuit closing electrodes (i.e., a tape correction factor) to the depth measured to obtain the true depth. Depth measurements should be recorded in the field notes as the tape reading + the tape correction factor (e.g., “105.69 + 0.21”).

The following procedures should be followed during the collection of water level and product measurements. Procedures may vary depending on the equipment used and contaminants present at the site. Special care should be taken when using measurement equipment if PFAS are known or suspected to be present. Please refer to Attachment D for details.

2.1 Calibration and Operational Checks

Refer to the project’s Quality Assurance Project Plan (QAPP) or other planning documents for calibration frequency and any site-specific calibration procedures for water and separate-phase product level meters. The need for calibration and the frequency of calibration will be dependent upon the meter used and project-specific data quality objectives. Operational checks of meters will be performed prior to use in the field at the start of each day and several times throughout the day, as appropriate.

2.1.1 Operational Check of Water Level Meters

1. Push the Start or Test button (typically provided) on the meter to test the battery and circuitry on the water level indicator. The meter audible indicator should sound, and test light illuminate (if equipped).

2. Release the start/test button and lower the water level probe into a container filled with tap water until the meter audible indicator sounds or visual indicator light turns on. During this check, set sensitivity adjustment (if provided) to highest setting, then decrease if necessary (e.g., saline water).

Inspect the measuring tape and water level probe connection for any signs of visible damage (e.g., cuts, kinks, separating splices). If the tape appears damaged at the connection to the probe, while the meter is sounding, perform the procedure in Section 2.1.2. If necessary, repair and/or replace the water level meter.

2.1.2 Calibration Check of Water Level Meters

1. While the meter is sounding from the procedure used in Section 2.1.1, use a ruler or measuring tape to measure the distance between the water surface and the 1-foot increment mark on the water level tape.

2. Check that the 1-foot increment is actually 1 foot from the water surface. Note any discrepancy in the field book and discuss with the Project Manager. If necessary, repair and/or replace the water level meter.

2.1.3 Calibration and Operational Check of Oil/Water Interface Meters

1. Oil/water interface meters will have one distinguishing sound and/or colored light to represent detection of water and a separate distinguishing sound to represent detection of separate-phase product. Read the instrument manufacturer’s operations manual to determine the instrument’s audible sound or light differentiation for water and separate-phase product (e.g., continuous tone for product and intermittent beep for water).

2. Push the Start or Test button (typically provided) on the meter to test the battery and circuitry on the water level indicator. The meter audible indicator should sound and test light illuminate (if equipped).

3. Water Level Sensor Operational and Calibration Checks

   a. Lower the water level probe into a container filled with tap water until the appropriate sound for water is heard as determined in Step 1.
   b. While the meter is sounding, use a ruler or measuring tape to measure the distance between the water surface and the 1-foot increment mark on the water level tape.
   c. Check that the 1-foot increment is actually 1 foot from the water surface. Note any discrepancy in the field book and discuss with the Project Manager.

4. Oil Level Sensor Operational and Calibration Checks

   a. If the operation or calibration of the oil level probe is suspected to be faulty, consult with the meter manufacturer for additional troubleshooting.

2.2 Procedures for Measuring Depth to Water When Separate-phase Product is Not Suspected

If possible, and when applicable, start at wells that are least contaminated and proceed to those wells that are most contaminated. Additionally, allow sufficient time for each monitoring well or piezometer to equilibrate after removing the protective cap prior to taking readings.

1. Record the condition of the well (e.g., protective casing, concrete collar, lock in place, etc.), equipment being used, and the current weather conditions in the field book or on the water level monitoring form or well inspection report.

2. Use HASP-specified gloves. Stand upwind of the well and remove the well lid. Unlock and remove the well cap slowly to relieve pressure build up that may have occurred in the well casing/riser. Follow HASP requirements for well head and breathing zone air monitoring.

3. Identify the previous measuring point marking or notch on the well riser or casing (if present). If the tops of the monitoring wells and piezometers are not marked, the DTW measurement should be taken from the high point of the well riser/casing or the north side of the riser/casing. and the measurement location should then be marked on the casing top edge to maintain consistency

4. Using a previously decontaminated water level meter, turn on the meter, check the audible/visual indicator (push the "Test" button), reel the electronic probe into the well riser (with the increments visible) slowly until the meter sounds.

5. Grasp the tape with hand, withdraw the tape, and lower it again slowly until the sound is again audible. Check the DTW on the tape and make a mental note of the depth to within 0.01 feet.

6. Lower the probe again slowly and repeat the measurement for precision. In the field book or on the water level monitoring form, record the DTW from the measuring point noted in Step #3 to the nearest 0.01 feet. If measuring the total depth of the well, proceed to Section 2.4).

7. Decontaminate the probe and the entire length of the submerged tape in accordance with the manufacturer specifications. Refer to Attachment D and ECR SOP 010, Equipment Decontamination, for decontamination procedures for sites with known or suspected PFAS contamination.

2.3 Procedure for Measuring Depth to Water and Product Levels When Separate-phase Product is Suspected

If possible, and when applicable, start at wells that are least contaminated and proceed to those wells that are most contaminated. Additionally, allow sufficient time for each monitoring well or piezometer to equilibrate after removing the protective cap prior to taking readings.

1. Record the condition of the well (e.g., protective casing, concrete collar, lock in place, etc.), equipment being used, and the current weather conditions in the field book, water level monitoring form, or well inspection report.

2. Use HASP-specified gloves. Stand upwind of the well and remove the well lid. Unlock and remove the well cap slowly to relieve pressure build up that may have occurred in the well casing/riser. Follow HASP requirements for well head and breathing zone air monitoring.

3. Identify the previous measuring point marking or notch on the riser or casing (if present). If the tops of the monitoring wells and piezometers are not marked, the DTW measurement

should be taken from the high point of the well riser/casing or the north side of the riser/casing. and the measurement location should then be marked on the casing top edge to maintain consistency.

4. Using a previously decontaminated oil/water interface probe, turn on the meter, check the audible indicator, and slowly reel the electronic probe into the well riser (with the increments visible) until the appropriate sound for water or separate-phase product is heard as determined in Section 2.1.3.

5. If water is encountered first (as determined by the audible sound on the meter, which represents water), follow steps 5 and 6 from Section 2.2. In the field book or on the water level monitoring form, record the DTW from the measuring point noted in Step 3 to the nearest 0.01 feet.

6. If water is encountered first and DNAPL is suspected, continue lowering the probe slowly until product is encountered (as determined by the audible sound on the meter which represents product). Since some product may adhere to the probe sensors, the probe should be raised, lightly shaken, and slowly lowered again to confirm measurement. In the field book or on the water level monitoring form, record the depth to product from the measuring point noted in Step 3.

7. If DNAPL is present, measure the total depth of the well (Section 2.4), or determine the total depth of the well from historical records.

8. Calculate the thickness of the DNAPL in the well using the following equation:

   (Total depth of well) - (Depth to product) = DNAPL thickness

9. If LNAPL is encountered before water, record the depth to product from the measuring point noted in Step 3 in the field book and continue lowering the probe until water is encountered.

   NOTE: For LNAPL, it is necessary to take both the air/product interface measurement on the way down into the product and the water/product interface measurement on the way back up. This is required when passing through product into water, since some product may adhere to the probe sensors due to surface tension and, as a result, a greater product thickness measurement may be erroneously obtained. Therefore, when LNAPL is detected, the probe should be lightly shaken or raised and lowered rapidly in a short vertical motion while the probe is within the water column to remove any product that may have been carried down with the probe. After passing through the product, the water/product interface should then be measured as the probe is raised very slowly back up from the underlying water into the product. Once the interface is detected, the probe can be raised and lowered in small increments to precisely determine the interface and obtain accurate measurements. Repeat these measurements as needed to confirm water/product interfaces and product thickness on multiple measurements.

10. In the field book or on the water level monitoring form, record the DTW from the measuring point noted in Step 3. If measuring the total depth of the well, proceed to Section 2.4.

11. Calculate the thickness of the LNAPL in the well using the following equation:

    (DTW) - (Depth to product) = LNAPL thickness

12. Decontaminate the probe and the entire length of the submerged tape in accordance with the manufacturer specifications. Refer to Attachment D for measurement equipment used at sites with known or suspected PFAS contamination and ECR SOP 010, Equipment Decontamination, for PFAS decontamination procedures.

2.4 Procedure for Measuring Total Well Depth

When measuring the total depth of a well, the water level and separate-phase product level, if present, should be determined first (see Section 2.2 or 2.3). It is recommended that the tone function of the instrument remain engaged during the total depth measurement.

1. After the water level and product level, if present, have been determined, continue reeling the electronic probe into the well riser (with the increments visible) until the probe encounters resistance. Resistance may be inferred when the probe appears to stop descending and the tape slackens against the side of the riser.

2. Determine whether the observed resistance likely represents the total depth of the well by raising and then lowering the probe to the level of the previously encountered resistance several times at different positions in the well. Then compare the observed level of resistance to available information about the total depth of the well, such as well log data or previous total depth measurements.

3. Measure the total depth of the well by 1) noting the depth (to the nearest 0.01 feet) at which the probe first touches bottom before the tape begins to slacken; 2) adding the measured length from the bottom of the probe to the fluid level sensor in the probe (i.e. tape correction factor); and 3) recording the combined lengths as the total depth (e.g., “105.69 + 0.21”).

4. In the field book or on the water level monitoring form, record the total depth of the well from the measuring point.

5. Also, note any observations about the conditions encountered in the well during the total depth measurement. A clear and distinct bottom reading would indicate little or no sediment in the bottom of the well. A soft and indistinct probe landing would indicate the presence of silt or sediment in the bottom of the well. A total depth measurement inconsistent with the well log or previous total depth measurements may indicate an obstruction in the well or significant sedimentation at the bottom of the well.

6. Decontaminate the probe and the portion of the tape inserted in the riser in accordance with the manufacturer specifications. Refer to Attachment D for measurement equipment used at sites with known or suspected PFAS contamination and ECR SOP 010, Equipment Decontamination, for PFAS decontamination procedures.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

The following Quality Assurance/Quality Control procedures apply:

- Operate field instruments according to the manufacturers' manuals.
- Calibrate field instruments at the proper frequency.
- Check the DTW at least two times in order to compare results. If results do not agree to within 0.02 feet, take a third measurement. If results still do not agree, check for possible equipment failure or review the cautions and potential problems listed in Section 1.6. Repeat the measurement when the cause of the precision nonconformance has been discovered and corrected.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

- Record water and separate-phase product level measurements on field forms or in a field book. See Attachment A for an example of a Water and Product Level Monitoring Form and Attachment B for an example of field book documentation.
- The following additional information may be recorded in the field book:
    - Well/piezometer or monitoring point identification number
    - Well/piezometer or monitoring point location (sketch of the sample point or reference to a location figure)
    - Visual or sensory description (e.g., odors, product, etc.)
    - Time and date measurements were taken
    - Personnel performing the task
    - Weather conditions during task
    - Other pertinent observations
    - Measurement equipment used
    - Calibration procedures used
    - Decontamination procedures used

  - Fixed measuring point used for DTW measurements
  - Well head and breathing zone air monitoring readings

- For projects using TRC's Environmental Data Management System (EDMS), an approved electronic mobile field data collection system (e.g., EQuIS Collect, Fulcrum, or esri Collector) can be configured to record water and separate-phase product level measurements as well as the additional information listed above. A TRC Data Manager must be assigned for coordination and setup of the respective application to be used by the project team. The details and specifications of the event should be discussed with the TRC Data Manager during the project kickoff meeting. The TRC Data Manager will work with TRC project team and field personnel on configuring the system for efficient use in the field with pre-populated, project-specific menus.
- For projects that do not use electronic mobile field data collection systems, field notes containing the information described in Section 5.0 above, along with global positioning system (GPS) coordinates for each location ID should be transcribed into TRC's standard Location and Water Level EDDs for import into TRC's EDMS as soon as the event is completed, preferably the same day in order to get data into the EDMS for use in as near real time as possible.

6.0 REFERENCES

Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

U.S. EPA Environmental Response Team, Standard Operating Procedures, *Manual Water Level Measurements*, SOP 2043. February 11, 2000.

U.S. EPA Region 4. Science and Ecosystem Support Division (SESD) Operating Procedure, *Groundwater Level and Well Depth Measurement*, SESDPROC-105-R2. January 29, 2013.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
1	DECEMBER 2016	ADDED ATTACHMENT D TO ACCOMMODATE SOP MODIFICATIONS REQUIRED WHEN SAMPLING FOR PFAS; CHANGED NAMING CONVENTION FOR SOP FROM RMD TO ECR.
2	JANUARY 2020	TRC RE-BRANDING
3	FEBRUARY 2022	SOP UPDATE

ATTACHMENT A

EXAMPLE WATER AND PRODUCT LEVEL MONITORING FORM

WATER AND PRODUCT LEVEL MONITORING FORM

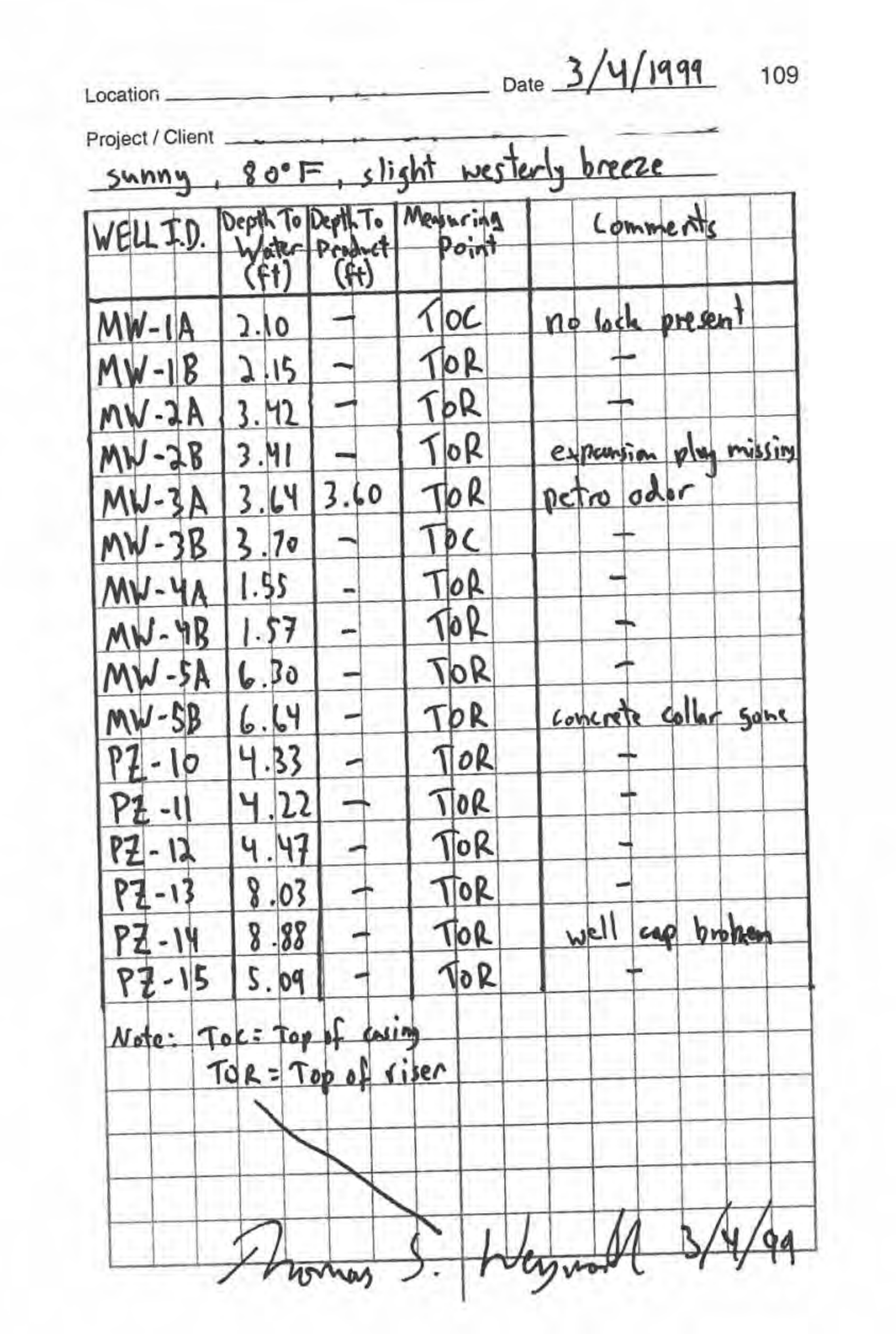
Client: ____________________
Technician Name: ____________________
Project Name: ____________________
Project Manager: ____________________
Date: __________
City/State: ____________________
Project Number: ____________________
Page ____ of ____
Elevation Datum:

Well ID	Measuring Point	Measuring Point Reference Elevation	Time Gauged	PID Wellhead[1] (ppm)	Depth to Water[2] (feet)	Depth to Product[2] (feet)	Product Thickness (feet)	Total Depth[2] (feet)	Correction Factor[3]	Water Level Elevation[4]	Misc. Well Notes
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	

Notes:
[1] If required by Site Specific HASP
[2] Depth from Measuring Point.
[3] Measured length of the probe beneath the circuit closing electrodes.
[4] Water Level Elevation = (Measurement Point Reference Elevation) - (Depth to Water + Correction Factor)
PID - Photoionization Detector.

ATTACHMENT B

EXAMPLE FIELD BOOK DOCUMENTATION FOR WATER LEVELS



Location ____________ Date 3/4/1999 109

Project / Client ____________

sunny, 80°F, slight westerly breeze

WELL I.D.	Depth To Water (ft)	Depth To Product (ft)	Measuring Point	Comments
MW-1A	2.10	–	TOC	no lock present
MW-1B	2.15	–	TOR	–
MW-2A	3.42	–	TOR	–
MW-2B	3.41	–	TOR	expansion plug missing
MW-3A	3.64	3.60	TOR	petro odor
MW-3B	3.70	–	TOC	–
MW-4A	1.55	–	TOR	–
MW-4B	1.57	–	TOR	–
MW-5A	6.30	–	TOR	–
MW-5B	6.64	–	TOR	concrete collar gone
PZ-10	4.33	–	TOR	–
PZ-11	4.22	–	TOR	–
PZ-12	4.47	–	TOR	–
PZ-13	8.03	–	TOR	–
PZ-14	8.88	–	TOR	well cap broken
PZ-15	5.09	–	TOR	–

Note: TOC = Top of casing
TOR = Top of riser

Thomas S. [illegible] 3/4/99

ATTACHMENT C

SOP FACT SHEET

WATER LEVEL AND PRODUCT MEASUREMENT PROCEDURES

PURPOSE AND OBJECTIVE

The following procedures have been developed to direct TRC personnel in the methods of collecting water level, separate-phase product, and/or total well depth measurements in the field. Other state or federal requirements may be above and beyond the scope of this SOP and should be followed, if applicable. Depth-to-water (DTW) measurements are used to evaluate pressure and/or elevation changes within the aquifer. The objective of separate-phase product measurements is to obtain measurements of the thickness of separate-phase product in the water column. Both of these measurements are very important as they drive remediation decisions. Total well depth measurements can provide vital information to a project, such as confirmation of the correct well being screened, the well being free of obstructions, whether the well needs further development, and the correct purge volume for a well when sampling.

WHAT TO USE

- Appropriate PPE
- Water level meter/indicator
- Oil/Water interface probe
- Extra batteries
- Well keys
- Previous measurement data
- Precision ruler or measuring tape
- Spool of cotton string for NAPL string test
- Stainless steel nuts to weigh down string
- Socket-wrench set
- Containers to hold water and isopropanol for calibration
- Decontamination supplies, water, & solution
- Field book & monitoring form
- Indelible/waterproof ink

ON-SITE WELL GAUGING

- Prior to well gauging, site water level measurement data should be reviewed for direct comparison to aid in identifying and resolving potential measurement errors while in the field.
- Conduct an operational check of the water level meter by pushing the Start or Test button on the meter to test the battery and circuitry on the water level indicator. The meter audible indicator should sound and test light illuminate (if equipped).
- Inspect the measuring tape and water level probe connection for any signs of visible damage. Repair or replace if necessary.
- Calibrate the meter per the project's Quality Assurance Project Plan (QAPP) or other planning documents.
- If possible and when applicable, start at wells that are least contaminated and proceed to those wells that are most contaminated.
- Prior to collecting a water level, record the condition of the well (e.g., protective casing, concrete collar, lock in place, etc.).
- Stand upwind of the well and remove the well lid. Unlock and remove the well cap slowly to relieve pressure buildup that may have occurred in the well casing. Allow the well time to equilibrate.
- Identify the previous measuring point marking or notch on the riser or casing (if present). If no previous measuring point exists, use a permanent marker to mark a location on the rim of the riser or casing (typically the highest point). Record this location in the field book.
- Grasp the tape with hand, withdraw the tape, and lower it slowly until the sound is audible. Check the DTW on the tape and make a mental note of the depth to within 0.01 feet. Lower the probe again slowly and repeat the measurement for precision. Record the DTW from the measuring point in the field book or on the water level monitoring form.
- If total depth measurements were not recorded recently, advance the tape to the bottom of the well to record a total depth.
- Decontaminate the probe and tape between each well.
- If PFAS is a concern, refer to the full SOP for additional details on monitoring and decontamination.

ON-SITE PRODUCT MONITORING

- Follow the first 8 steps outlined in the section above, from conducting a direct comparison of water level measurement data to identifying the previous measuring point marking (or creating a new one if necessary).Using a previously decontaminated oil/water interface probe, turn on the meter, check the audible indicator, and slowly reel the electronic probe into the well riser (with the increments visible) until the appropriate sound for water or separate-phase product is heard (intermittent tone for water; steady tone for product).
- If water is encountered first (as determined by the audible sound on the meter), record the DTW from the measuring point to the nearest 0.01 feet.
- If water is encountered first and dense non-aqueous phase liquid (DNAPL) is suspected, continue lowering the probe until product is encountered (as determined by a different audible sound on the meter). In the field book or on the water level monitoring form, record the depth to product from the measuring point.
- If light non-aqueous phase liquid (LNAPL) is encountered before water, record the depth to product from the measuring point and continue lowering the probe until water is encountered and record the depth to water.
- After the water level and product level, if present, have been determined, continue reeling the electronic probe into the well riser until the probe encounters resistance in order to determine Total Well Depth.
- Decontaminate the probe and tape between each well. If PFAS is a concern, refer to the full SOP for additional details.

WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

ATTACHMENT D

SOP MODIFICATIONS FOR PFAS

Due to the pervasive nature of PFAS in various substances routinely used during sampling and the need to mitigate potential cross-contamination or sampling bias to ensure representative data are collected, special care should be taken when sampling for PFAS. The following table highlights the required modifications to this SOP when sampling for PFAS.

Water Level and Product Measurement Protocols for PFAS	
SOP Section Number	**Modifications to SOP**
1.3	• Field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards and spiral bound notebooks should not be used. • Do not use Post-it® Notes. • Use new plastic buckets for wash and rinse water. • Do not use "tap" water for operational check of the water level sensor of the oil/water interface meter. • Ensure that PFAS-free water is used during the decontamination procedure. • Do not use a plastic ruler to check measurements. • Refer to SOP 010, Equipment Decontamination, for decontamination supplies.
1.5	Always consult the Site-specific Health and Safety Plan prior to conducting field work. The following considerations should be made with regards to procedures: • Tyvek® suits should not be worn. Cotton coveralls may be worn. • Boots and other field clothing containing Gore-Tex™ or other waterproof/resistant material should not be worn. This includes rain gear. Boots made with polyurethane and polyvinyl chloride (PVC) are acceptable. • Food and drink should not be allowed within the data measurement collection area. Bottled water and hydration drinks (e.g., Gatorade®) may be consumed in the staging area only. • Personnel involved with measurement data collection should wear a new pair of nitrile gloves between each well measurement. Avoid handling unnecessary items with nitrile gloves. • Avoid wearing clothing laundered with fabric softeners. • Avoid wearing new clothing (recommended six washings since purchase). Clothing made of cotton is preferred. • Avoid using cosmetics, moisturizers, hand creams, or other related products as part of cleaning/showering the morning of sampling and decontamination field work.
2.1.1	• Do not use potable "tap" water for operational check of the water level meter. Use deionized, distilled, or organic-free water.
2.1.2 and 2.1.3	• Do not use potable "tap" water for operational check of the water level sensor of the oil/water interface meter. Use deionized, distilled, or organic-free water. • Do not use a plastic ruler to check measurements.
2.2 (7) ; 2.3 (11); and 2.4 (6)	• Use only Alconox® or Liquinox® soap; do not use Decon 90. • Ensure that PFAS-free water is used during the decontamination procedure.
5.0	• Field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards, and spiral bound notebooks should not be used.

Title: **Packaging and Shipping of Non-Hazardous Environmental Samples**	Procedure Number: **SOP Fact Sheet ECR 023**
	Revision Number: **1**
	Effective Date: **January 2020**

Darby Litz		Elizabeth Denly	
Technical Reviewer	Date	Environmental Sector Quality Director	Date
Darby Litz	1/1/20	Elizabeth Denly	1/1/20

SOP FACT SHEET

PACKAGING AND SHIPPING OF NON-HAZARDOUS ENVIRONMENTAL SAMPLES

Purpose and Objective

This fact sheet has been developed to guide TRC personnel in the methods for proper packaging and shipping of non-hazardous environmental samples. In general, non-hazardous environmental samples include drinking water, groundwater, ambient surface water, soil, sediment, treated municipal and industrial wastewater effluent, biological specimens, or any samples not expected to be contaminated with regulated levels of hazardous materials (dangerous goods). Samples collected from process wastewater streams, drums, bulk storage tanks, soil, sediment, or water samples from areas suspected of being highly contaminated may require shipment as hazardous materials (see below). Please note that packaging of vapor and air samples is not included in this SOP Fact Sheet. Proper packaging and shipping of samples is important for maintaining sample integrity and ensuring prompt and reliable shipment of the samples to the analytical laboratory, as well as protecting the health and safety of the field, shipping, and laboratory personnel.

This Fact Sheet **does not address the shipment of hazardous materials**, as the shipping of hazardous materials requires specialized packaging, labeling, shipping, and training/certification. **Note**: According to the United States Department of Transportation, “the Secretary shall designate material (including an explosive, radioactive material, infectious substance, flammable or combustible liquid, solid, or gas, toxic, oxidizing, or corrosive material, and compressed gas) or a group or class of material as hazardous when the Secretary determines that transporting the material in commerce in a particular amount and form may pose an unreasonable risk to health and safety or property” 49 U.S.C 5103(a). If the composition and properties of a waste sample or highly contaminated soil, sediment, or water sample are unknown, or only partially known, the sample may not be offered for air transport. In addition, the shipment of pre-preserved sample containers or bottles of preservatives (e.g., nitric acid [HNO_3], sodium hydroxide [NaOH] pellets, hydrochloric acid [HCl], Methanol, etc.), which are designated as dangerous goods by the International Air Transport Association (IATA), is regulated. Shipment of nitric acid is strictly regulated. Consult the IATA Dangerous Goods Regulations for guidance. Dangerous goods must not be offered for air transport by any personnel except personnel trained and certified by IATA in dangerous goods shipment. Contact the laboratory if you are unsure if your material is regulated or need assistance in shipping or transporting samples**.**

What to Bring (some or all of these may apply)

- Appropriate level of personal protection in accordance with the Site Health and Safety Plan
- Coolers with return address of TRC office written on inside of lid or coolers provided by laboratory
- Heavy-duty plastic bags and/or trash bags
- Plastic Ziploc® bags, small and large

- Fiberglass-reinforced packing tape or strapping tape is preferred, or clear packing tape or duct tape
- Packing materials, such as foam peanuts and/or Bubble Wrap®
- Ice (Blue ice not recommended)
- Custody seals
- Chain-of-custody forms
- Landing pad (can be purchased from Federal Express; see Attachment)
- Tie-on tags (can be purchased from Federal Express; see Attachment)
- Shipping labels and documents (*e.g.*, air bill)
- Pens and markers, preferably waterproof
- Zip ties
- Clear tape
- Cooler labels ("Keep Refrigerated/Cool", "THIS END UP", "FRAGILE", "Saturday delivery", arrow labels, etc.)
- Laboratory-prepared temperature blank

<u>On-site Procedures</u>

- Use a sturdy cooler in good condition. Secure and tape drain plug (inside and outside), if present, with fiberglass-reinforced packing tape or duct tape.
- Line the cooler with a large heavy-duty plastic/trash bag.
- Verify that all caps on bottles are tight (will not leak).
- Verify sample labels and chain-of-custody records are completed properly.
- Pack samples with sufficient padding and ice to remain intact during shipment and at proper preservation temperature.
- If glass bottles are being shipped, place a layer of shock-absorbent material, such as Bubble Wrap®, on the base of the cooler to protect against breakage during shipping. Additionally, considered placing shock-absorbent material between the sample containers and the cooler sidewalls.
- Consider placing all bottles in separate and appropriately sized plastic Ziploc® bags or Bubble Wrap® bags provided by the laboratory. Up to three volatile organic analysis (VOA) vials may be packed in one Bubble Wrap® bag (from the same sample point). All glass bottles should be wrapped in Bubble Wrap®; all sample bottles should be placed in the cooler in a vertical position to minimize potential leaks and cross-contamination.
- Verify appropriate trip blanks (for volatile organic compound [VOC] analyses) and temperature blanks are included in the sample cooler in accordance with project-specific requirements. If multiple coolers prepared for one project, keep VOC samples in the same cooler to minimize the number of trip blanks submitted for analysis.
- Place ice in cooler. A plastic bag should be used as a moisture barrier between the ice and sample bottle labels to protect label integrity. This can be accomplished by placing loose ice around sealed Ziploc® bags containing sample bottles or by sealing ice in large plastic Ziploc® bags or trash

bags and placing around the sample containers. Ice should be below, in between, and on top of samples within the large heavy-duty plastic/trash bag. **NOTE:** It is recommended that at least one-third of the cooler volume should be filled with ice.

- Fill the remaining space in cooler with shock-absorbent material, such as sheets of Bubble Wrap®. Keep in mind that the sample containers are less likely to break if their movement is minimized during shipment.
- Place the completed chain-of-custody record for the laboratory in a plastic Ziploc® bag. Tape the bag to the inner side of the cooler's lid. **NOTE:** If laboratory courier service is used, the chain-of-custody record may be handed to the courier and not be put inside the cooler; the courier must sign the record upon receiving the samples. Alternately, you can treat the laboratory courier just as you would a common carrier like Federal Express. In this situation, the chain-of-custody gets signed at the laboratory upon receipt.
- The sampler should keep a copy of the completed and signed chain-of-custody record.
- Wrap cooler at least two times with fiberglass-reinforced packing tape (preferred) or duct tape at each end of the cooler.
- Custody seals should be placed on the opening of the cooler. **NOTE:** Custody seals are not required when laboratory courier service is used, as long as the courier signs the chain-of-custody document as noted above. Consider applying custody seals even on hand-delivered or couriered coolers to avoid potential confusion. Cover the custody seal with clear packing tape that extends around the entire cooler and overlaps itself so that it cannot be easily removed without breaking the seal. In some situations, it may be appropriate to install two (or more) custody seals, one at each end, placed diagonally opposite from one another. The custody seals should be placed such that the cooler cannot be opened without destroying at least one of the labels.
- Use a "THIS END UP" label or arrow labels to indicate proper upward position of the container.
- Add a label containing name and address of both the shipper and the recipient on the outside of the container. Use Federal Express tie-on tags, if applicable, attached with zip ties to affix the label to the cooler handle if possible.

Shipping

- Consider using prepaid shipping labels supplied by the laboratory, if possible.
- Determine ahead of time the location and deadline for when samples must be available for courier pickup or at the shipper to ensure the samples go out on time.
- Ship the sample using an appropriate method, typically overnight or same day, to arrive by the required time. Samples shipped on Friday for Saturday delivery must be coordinated ahead of time to verify laboratory staff are available to receive the samples on weekends. Liberally apply "Saturday Delivery" stickers to the outside of the cooler. Verify that the common carrier marks the cooler and shipping documents appropriately for Saturday or Sunday delivery.
- Check the laboratory sample tracking for acknowledgment of receipt of container and arrival of shipment.

Additional Guidelines when Using Federal Express

A. Shipping Coolers with Environmental Samples by Federal Express (FedEx)

TRC has experienced some issues with coolers not getting to their destination because of lost labels and this has resulted in the recollection of samples. Shipping of coolers presents a unique problem. It is important that the contents of coolers arrive at the laboratory in a timely manner, but sometimes, despite best efforts, the shipping labels come off of the coolers because they do not adhere well. This may cause delays and/or non-delivery of the coolers, resulting in samples that are no longer available or not appropriate for analysis because of temperature and/or holding time requirements.

At the advice of FedEx, it is strongly recommended that every time a cooler is shipped, that **two** different types of labels be used on the cooler:

1. A “landing pad” (FedEx #156841): A “landing pad” is a super sticky label that is adhered directly to the top of the cooler. The barcode label then gets put on top of the landing pad. These landing pads are designed specifically for use with odd-shaped or non-smooth surfaces.
2. A “tie-on tag” (FedEx #150454 large tag, or #149849 for small tag): Along with the landing pad and label, it was recommended to also use a tie-on tag if there is a handle on the cooler. The tie-on tag wraps around the handle of the cooler and then sticks to itself. The barcode label then gets adhered to the longer side of the tie-on tag. For added strength, a zip-tie should also be used to secure the tie-on tag to the handle.

Both the landing pads and the tie-on tags can be ordered by calling 800.GoFedEx and referring to the FedEx #s above. In addition:

1. TRC staff should place these labels on the coolers, rather than having FedEx place them.
2. TRC staff should place a “Keep Refrigerated/Cool” label on the cooler, which may be helpful to keep the shipment moving.
3. The use of laboratory courier service, when available, rather than FedEx, is suggested.

B. Insuring Sample Shipments

FedEx does NOT insure sample shipments; meaning if the shipment is lost or delayed, FedEx will not pay for the cost to recollect the samples.

What FedEx does offer is a Declared Value; however, again this does not cover the cost to recollect the samples. Therefore, do **NOT** pay the extra fee for a Declared Value when shipping a cooler of samples; it is a waste of money.

What may be available is that TRC’s insurance program may cover losses in excess of $10,000. If you have an incident that meets these criteria, you should notify your manager, Greg Hobbs and Andrew Johnson/TRC legal for any loss you believe exceeds $10,000. TRC legal can address the merits of an insurance claim at that point in time.

C. Insuring Equipment Shipments

When shipping equipment (e.g., a GPS unit), the following is suggested:

1. Using FedEx’s Declared Value option **DOES** make sense when shipping valuable equipment. Currently FedEx’s cost for this option is $3 for shipments valued between $100 to

$300, and $1 per $100 of declared value for shipments in excess of $300. The cost of insuring equipment should be factored into the cost of the project.

2. If the equipment does not have its own specialized shipping container (e.g., pelican case), then request that FedEx package the equipment for shipment. If FedEx provides the packaging, and the equipment is damaged, then FedEx is responsible. If TRC packages the equipment, then experience has shown that FedEx will deny the claim, even if a Declared Value was used, because FedEx will claim that it was improperly packaged.

Title: **Chain-of-Custody Procedures**	Procedure Number: **ECR 002**
	Revision Number: **2**
	Effective Date: **February 2021**

Authorization Signatures

		Elizabeth Denly	
Technical Review	Date	Environmental Sector Quality Director	Date
Amanda Smith	2/24/21	Elizabeth Denly	2/24/21

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) guides TRC personnel in proper Chain-of-Custody (COC) practices.

This SOP was prepared to direct TRC personnel in the sample custody procedure requirements associated with field sample collection. Other state or federal requirements may be above and beyond the scope of this SOP and will be followed, if applicable. Sample custody procedures are an important part of the field investigation program in order to maintain data quality and to be able to document proof of proper handling. Sample custody begins at the time of sample collection and continues until the samples have been analyzed. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law or other evidentiary venue. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. An overriding consideration essential for the validation of environmental measurement data is the necessity to demonstrate that samples have been obtained from the locations stated and that they have reached the laboratory without alteration (i.e., representative of the identified sample media).

1.2 Summary of Method

Evidence of the sample tracking from collection to shipment, laboratory receipt, and laboratory custody must be properly documented.

A sample or evidence file is considered to be in a person's custody if the item is:

- In a person's possession;
- Within sight of the person after they have taken possession;
- Secured and preserved so that no one can tamper with it after having been in a person’s possession; and/or
- In a secured area where access is restricted to authorized personnel.

The Field Team Leader or designee is responsible for overseeing and supervising the implementation of proper sample custody procedures in the field and ensuring sample custody until samples have been transferred to a courier or directly to the laboratory. Once received by the laboratory, the samples proceed through an orderly processing sequence specifically designed to ensure continuous integrity of both the sample and its documentation.

1.3 Equipment

The following list is an example of items that may be utilized when implementing sample custody procedures in the field. Project-specific conditions or requirements may warrant the use of additional items or deletion of items from this list. Many of these items may be provided by the selected analytical laboratory for a given project.

- Chain-of-Custody forms
- Sample labels
- Sample tags
- Custody seals
- Computer, tablet or smart device
- Indelible/waterproof ink
- Printer
- Ziploc® bags, or equivalent

2.0 PROCEDURES

Sample custody and transfer procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the COC intact. The COC procedures are initiated in the field immediately following sample collection. The procedures consist of four main components: (1) preparing and attaching a unique sample label to each sample collected, (2) completing the COC form, (3) reviewing the COC form for accuracy, and (4) preparing the samples for shipment and custody transfer. For projects using TRC's Environmental Data Management System (EDMS) the project team's Data Manager can assist in planning sampling events to prepopulate bottle labels and COC forms and log all COC forms generated for the project.

2.1 Specific Chain-of-Custody Procedures

2.1.1 Sample Labels

Field personnel are responsible for uniquely identifying and labeling all samples collected during a field investigation program. All labeling must be completed in indelible/waterproof ink and securely affixed to the sample container. Individual sample containers may be pre-labeled or labeled in the field at the time of collection. Sufficient sample information should be cross-referenced in the field documentation for tracking purposes. A unique sample location may contain multiple sample containers with the same sample identification for the purposes of separate analyses or additional sample volume as required by the laboratory.

Sample labels may contain the following information:

- **Unique sample identification per ECR's Best Practices Document: Environmental Sample Identification and Naming or per a project-specific document (e.g., Quality Assurance Project Plan, Sampling & Analysis Plan)
- Sample location and/or depth/description number, if different from above
- Sample matrix

- Sample container volume
- **Type of analysis to be performed
- **Type of chemical preservation used
- Grab or composite designation
- **Filtered or unfiltered (if submitting both)
- **Sampling date and time using military format (unless blank)
- Sampler's affiliation and initials
- **Site and/or client name

**required

An example of a sample label is provided in Figure 1. TRC's EDMS can produce pre-printed sample labels for regularly scheduled sampling events.

2.1.2 Custody Seals

Custody seals should be secured across the shipping container to ensure content integrity and should be affixed such that the cooler cannot be opened without breaking the seals. The seals contain both the date and the signature of the person affixing them and must be completed in black or blue/black indelible/waterproof ink. Custody seals are attached to the cover seal of the cooler (front and back if cooler opens on both sides) and can be covered with clear plastic tape after being signed and dated by field personnel. An example of a custody seal is shown in Figure 1. The use of custody seals will be determined on a project-specific basis by the Project Manager.

2.1.3 Chain-of-Custody Form

For all analyses, COC forms must be completed and included with each sample set submitted. COC forms are initiated by the samplers in the field. If multiple laboratories are being used, a separate set of COC forms must be completed for each laboratory receiving samples to ensure proper transfer of custody from the time of sample collection to analysis. These forms serve as a record of sample collection, transfer, shipment, and receipt by the laboratory. These forms may contain the following pertinent information:

- Project/site name and/or project number
- Courier or shipping company name, if applicable
- Air bill tracking numbers(s), if known and applicable
- Laboratory name and address
- Sample identifications
- Sample matrices (e.g., soil, water, air, etc.)
- Type of sample (e.g., grab or composite)
- Date/time (military format) sample collected, unless sample is being submitted as a blind duplicate
- Size, type, and number of containers for each sample set
- Preservative(s) used (if any)
- Required analysis or method for each sample set
- Filtered or unfiltered
- Requested turnaround time for sample results
- Names of individuals responsible for sample custody
- Type of deliverables required
- Date shipped or otherwise transferred
- Number of coolers being submitted

Figure 2 provides an example COC form. It should be noted that this is an example format only. Laboratories typically provide their own laboratory-specific COC form. Other COC formats may be used as long as all of the applicable information is included. COC forms will be initiated in the field. TRC's EDMS can produce pre-printed COC forms for regularly scheduled sampling events.

All entries on the COC form must be legible and must be made in blue or black permanent ink. No erasures or obliterations can be made. If an incorrect entry is made, the information must be crossed out with a single strike mark which is signed or initialed and dated by the person recording the information. The correction must be written adjacent to the error. The original entry should still be legible even though crossed out.

2.1.4 Transfer of Custody

Samples will be accompanied by a properly completed COC form during each step of custody transfer and shipment. When physical possession of samples is transferred, both the individual relinquishing the samples and the individual receiving them will sign, date, and record the time of transfer on the COC form.

If at the completion of sampling the samples are not shipped directly from the field or point of collection to the analytical laboratory, the samples will be temporarily stored in an iced cooler at a secure location (e.g., locked vehicle, residence, office). Access to the secure location and transfer of the sample containers for laboratory delivery shall only be provided by a TRC employee and such sample transfer shall be recorded on the COC form.

All samples will be shipped directly to the laboratories by a TRC employee, an overnight commercial courier, or a laboratory-supplied courier service. Occasionally, samples may be relinquished directly to a client for subsequent transfer to the laboratory with proper COC procedures being followed.

In the case of sample shipment by an overnight commercial courier, a package tracking number will serve as an extension of the COC form while the samples are in transit. The COC forms will be sealed inside the sample cooler within a clear plastic bag taped to the inner top of the cooler and the custody seals, if used, will be completed on the outside of the cooler prior to shipment. Commercial couriers are not required to sign off on the custody forms since the forms are sealed inside the cooler prior to shipment; this allows the custody seal to remain intact.

The original COC form will accompany the samples at all times. A copy of all COC forms submitted to the laboratory will be retained by the sampler along with field records/logbooks documenting sample collection and will be placed in the project files. In the case of multiple sample coolers associated with one COC, a copy of the COC should be placed in each cooler and the total number of coolers should be recorded on the COC.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

Following sample collection, all samples will be brought to a location for batching and paperwork checks. At this location, labels and logbook information are cross-checked to ensure there is no error in sample identification or sample collection time and that all samples are accounted for.

The sample information is transferred to the COC form. The samples are packaged to prevent breakage and/or leakage, and the shipping containers are labeled for transport.

The Field Team Leader has the responsibility of maintaining the COC and air bill documentation (if applicable). Individual responsibilities may be delegated to other field staff, as appropriate. Quality control procedures will place emphasis on ensuring that appropriate samples were collected and submitted to the laboratory for the correct analyses. The COC forms will also be reviewed by the Field Team Leader or designee to ensure that all required information is clearly presented.

Many laboratories will provide a sample receipt confirmation via electronic mail upon request. COC forms should be cross-checked with laboratory sample receipt confirmations, if applicable, to ensure that all samples were received and logged in correctly by the laboratory.

4.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Not applicable.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

The Project Manager or Field Team Leader will maintain an inventory of all COC forms completed during the program and will be responsible for ensuring that they are archived in the project files following the completion of the field work.

It is good practice to scan all completed COC forms at the conclusion of field activities and store the resulting electronic PDF files in the project directory.

For projects using TRC's EDMS, the project team's Data Manager can assist in planning sampling events to prepopulate bottle labels and chain of custody forms and log all COC forms generated for the project. The TRC EDMS system has a completeness report that can track the samples collected and the analyses performed as data are received from the laboratory.

6.0 REFERENCES

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001. December 1987.

U.S. Environmental Protection Agency (EPA) Office of Enforcement and Compliance Monitoring – National Enforcement Investigations Center (NEIC) requirements (NEIC, 1986)

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	MARCH 2013	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING AND SOP RE-NUMBERING
2	FEBRUARY 2021	GENERAL UPDATES; MOBILE DATA APPLICATIONS ADDED

Figure 1 Example Sample Label and Custody Seal

QEC
Quality Environmental Containers

P.O. Box 1160
Beaver, WV 25813
800-255-3950 • 304-255-3900

PROJECT NAME

SAMPLE ID
SAMPLE DATE
SAMPLE TIME

SAMPLED BY
PRESERVATIVE

ANALYSIS REQUESTED
____ GRAB
____ COMPOSITE

Example Sample Label

CUSTODY SEAL
DATE ____
SIGNATURE ____

QEC
Quality Environmental Containers
800-255-3950 • 304-255-3900

Example Custody Seal

Figure 2 Example Chain-of-Custody Form

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Site Name	Missouri City Oil Well Response			Lab Name	ALS Houston			Email Invoice To	A/P
Project Number	123987.0001.0000			Lab Contact	Corey Grandits			Invoice Reports	
TRC Office	TRC Houston			Email	Corey.Grandits@alsglobal.com			Email Report To	Bbillings@trccompanies.com
Address	16350 Park Ten Place			Address	10450 Stancliff Rd			Email Reports	
	Suite 101				#210			Shipping Company	
City	Houston	State	TX	City	Houston	State	TX	Tracking Number	
Postal Code	77084	Country	Harris	Postal Code	77099	Country	Harris	Cooler Count	
Phone Number	(713) 224 -1000			Phone Number	(555) 555-5656			Cooler Description	
Project Manager	Clayton Andrew			Quote Number				Sampler 2	
Email Address	Aclayton@trccompanies.com			PO Number	C123987			Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED				Filtered - F: Field, L: Lab, FL: Field & Lab, N: None							
									Filt.	N	N	N								
									PRESERV.	Methanol	NA	NA								
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	Total # Of Cont.	ANALYSIS	BTEX (5035/8260)	TPH (TX1005)	Chloride (EPA 300)								
SS-1	0	1	ft bgs	SS	2/2/21	1120	G	1		X	X	X								
SS-2	0	1	ft bgs	SS	2/2/21	1140	G	1		X	X	X								
SS-3	0	1	ft bgs	SS	2/2/21	1210	G	1		X	X	X								
DUP-1	0	1	ft bgs	SS	2/2/21	1200	G	1		X	X	X								
SED-1	0	0.5	ft bgs	SS	2/2/21	1250	G	1				X								
SED-2	0	0.5	ft bgs	SS	2/2/21	1235	G	1				X								
SED-3	0	0.5	ft bgs	SS	2/2/21	1215	G	1				X								
DUP-2	0	0.5	ft bgs	SS	2/2/21	1300	G	1				X								
Trip Blank - SS Cooler	--	--	--	W	2/2/21	--	G	2		X										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Perform MS/MSD analyses on sample SS-1 for BTEX, TPH, and chloride.	Braedon Billings, TRC	2/2/21 / 17:00		

NO OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Braedon Billings	Mobile #	(555) 555-1758
	Sampler's Signature			

Page 1 of

Attachment A: SOP Fact Sheet

PURPOSE AND OBJECTIVE

Chain-of-Custody procedures have been developed to direct TRC personnel in the sample custody procedure requirements associated with field sample collection. Other state or federal requirements may be above and beyond the scope of this SOP and should be followed, if applicable. Sample custody procedures are an important part of the field investigation program to maintain data quality and to be able to document proof of proper handling. Sample custody begins at the collection of the samples and continues until the samples have been analyzed. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

WHAT TO BRING

- Chain-of-Custody (COC) forms
- Sample Labels
- Custody Seals (if required)
- Indelible/waterproof ink

ON-SITE

- Complete all sample labels with indelible/waterproof ink.
- At a minimum, sample labels should include: site name; unique sample identification; analysis to be performed; preservation method; indication of filtering, if performed; sample date and time.
- COC forms must be completed for each sample set and must be initiated in the field by the sampler.
- COC forms must be completed in blue or black permanent ink.
- At a minimum, the COC forms should include: site name; sample identification; sample matrix; type of preservative; type of analysis; sampling date; and sampler's name.
- Once sampling activity is completed and the COC form is filled out, place samples in sample coolers.
- Package samples to prevent breakage and/or leakage.
- The COC forms will be reviewed by the Field Team Leader or designee prior to relinquishing the samples.
- The original COC form must accompany samples to the laboratory.
- When samples are transferred from one person to another, both the relinquisher and the person receiving the samples should sign, date and record the date of transfer on the COC form.
- If samples are not sent directly to laboratory, samples need to remain on ice and be stored in a secure location.

Title: **Field Activity Documentation for Environmental Investigations**	Procedure Number: **ECR 001**
	Revision Number: **3**
	Effective Date: **November 2020**

Authorization Signatures	
Brandi Hart	Elizabeth Denly
Technical Reviewer Date Brandi Hart 11/30/20	Environmental Sector Quality Director Date Elizabeth Denly 11/30/20

TABLE OF CONTENTS

Page No.

ATTACHMENTS

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) is intended to guide TRC personnel in the documentation of field activities for environmental investigations.

Field activity documentation is one of the most important activities that occur during field work. It is critical that sufficient detail be documented during field work as it happens to allow others not present during the field activities to fully comprehend the field procedures and conditions at the time of the field work.

The objectives of documenting field activities are to ensure a collection of facts is recorded, the activities can be reconstructed from the documentation, and the field activities are adequately logged in a manner that will be acceptable if the record is required as evidence in legal proceedings. An additional objective of adequately documenting field activities is to provide complete information that is useful and understandable to someone other than the note taker. Because the field books and field data forms provide the basis for future reports and analysis, facts and observations must be accurately recorded. Some regulatory agencies require that a copy of the field notes be included as part of the report submittal.

1.2 Equipment

The following list is an example of items that may be utilized for field activity documentation. Project-specific conditions or requirements may warrant the use of additional items or deletion of items from this list.

- Field book(s) – bound book with water-resistant pages
  If per- and polyfluoroalkyl substances (PFAS) sampling is being performed, field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards, and spiral bound notebooks should not be used during PFAS sampling.
- Indelible (i.e., permanent) marking pens
- Field data forms – generic or project-specific
- Digital camera (or phone, if allowed)
- Pocket ruler
- Global positioning system (GPS) device
- Apple IOS or Android compatible devices with cellular data capabilities
- Extra power source (i.e. car charger) for electronic/digital device(s)
- Data Collection Apps that will be used during the sampling/measuring/observation event

2.0 PROCEDURES

Paper Notes

All entries in field books or non-electronic field data forms must be legible, made in blue or black permanent ink, and signed/initialed and dated. No erasures or obliterations can be made. If an incorrect entry is made, the information must be crossed out with a single strike mark that is signed or initialed and dated by the person recording the information. The correction must be written adjacent to the error. The original entry should still be legible even though crossed out. Pages should never be removed from a field book.

Electronic Notes

When collecting data electronically, be sure to use dedicated login credentials. Information should be recorded in project specific Data Collection Apps or modules, and records should be saved/synced after each entry is made. No sharing of login credentials is permitted, and Data Collection Apps should be project specific (i.e., data from one project should not be stored with data from another project). Ensure the software platform has an audit trail to identify changes made, and ensure an approved software platform (e.g., Fulcrum, EQuiS) as identified by TRC's Digital and CORE Data Management and Assessment Teams is being used.

For projects that utilize TRC's approved electronic mobile field data collection systems (e.g., Fulcrum, EQuIS Collect, or esri Collector), a TRC Data Manager is responsible for coordination and setup of the respective application with the project team. The details and specifications of the system setup should be discussed with the TRC Data Manager during the project kickoff meeting. The TRC Data Manager will work with TRC field personnel on configuring the system for efficient use in the field with pre-populated, project-specific menus and naming conventions compatible with TRC's environmental data management systems.

Documentation requirements discussed below pertain to both paper and electronic notes, as applicable.

2.1 Setup of Field Book and Logs

When multiple field personnel are on site, the Field Team Leader should decide the appropriate distribution of field books, field logs, or project-specific forms necessary to document field activities. It is not necessary for each participant to take field notes.

1. Each field book assigned to a project should have the following information on the title page (the inside cover of the field book):

    - Project name
    - Site address (physical address, GPS location)
    - Site contact, if available
    - Project number(s)
    - TRC's name, address and phone number
    - Field Team Leader's name
    - Start and end dates of field book entries

2. Each field book may have a designated number (i.e., Book #1, Book #2, etc.) listed on the outside front cover.

3. Each field book will be a bound field survey book or notebook, water-resistant, and have sequentially numbered pages. Refer to Section 1.2 if PFAS sampling is being performed.

4. Other field books may or may not be required, dependent on the project needs, at the discretion of the Project Manager.

5. A field book may only be used for one project; details for multiple projects should not be recorded in the same field book.

2.2 Documentation Requirements for Field Books or Daily Field Report Logs

Data collection activities performed during the field effort will be recorded in field books or on Daily Field Report Logs. Entries will be of adequate detail so that others will be able to comprehend a situation in the field and so it will be possible to reconstruct each activity without reliance on memory.

Entries into the field book or Daily Field Report Log may contain a variety of information. The terminology used in recording all field data should be objective, factual, and free of personal interpretation that may prove inappropriate. At the beginning of each daily entry, the date, start time, weather, and names of all field team members present will be entered. It is good practice to record the date on every page. The start and end of each day’s entries in the field book or Daily Field Report Log will be signed or initialed and dated by the person(s) making the entry.

In general, it is expected that field notes will be collected every 15 minutes, or as appropriate. Information included in the field book or Daily Field Report Log may include, but need not be limited to, the following:

General Information:
- Chronology of activities, including entry and exit times from job site;
- Names of all people involved in field activities and organizational affiliations;
- Level of personal protection used (if different from site-specific protocol/plan);
- Names of visitors to the site during field work and reason for their visit (unless in Daily Personnel Log);
- Weather conditions, including temperature, wind, and any precipitation;
- Day’s objective(s)/scope of work;
- Vehicle used (personal, rental) with travel time to site and mileage;
- Site observations;
- Record of photographs (unless in Photograph Log);
- Sketches or diagrams; and/or
- Signature or initials of person recording the information.

Equipment Information:
- Measurement equipment identification (model/manufacturer) and calibration record;
- Summary of equipment brought by subcontractor including support vehicles; and/or
- Sample collection equipment.

Sample-specific Information:

- Sample location and identification;
- Field screening results;
- Sample collection methods;
- Sample collection date (month/day/year) and time (military);
- Sample depths;
- Whether in-situ, grab, or composite sample collected and how sample was composited (if applicable);
- Sample description (color, odor, texture, foaming, etc.);
- Tests or analyses to be performed;
- Sample preservation and storage conditions; and/or
- Quality control (QC) sample collection.

Other Procedural Information:

- Communications while on site impacting site-specific protocol/plan;
- Any changes made to site-specific protocol/plan;
- Equipment decontamination procedures;
- Sample shipping methods, including tracking numbers, if applicable;
- Unusual events or observations;
- Changes in weather that lead to stop work (note time work stopped and time work resumed);
- Volume and type of investigation-derived waste generated.
- If a release has occurred, photographs should be taken, attempt to determine the source of the release and the extent of the release, and document any response efforts (e.g., terminating the release, excavation, etc.).
- If a release of aqueous film forming foam (AFFF) has occurred, photographs should be taken and stakes/flags should be inserted in the ground to properly document/delineate the location of the foam. Note that foams associated with AFFF are typically white in color as opposed to soap/surfactant or biological foams which are typically brown or gray in color.

Field data forms or Data Collection Apps may be used to document sampling information for routine activities that have an associated form. A stockpile of blank forms will be kept in the field trailer/office or with the Field Team Leader. The field book or Daily Field Report Log should reference the form used during that event. Examples of TRC field data forms or Data Collection Apps include:

- Sample log sheets (e.g., groundwater, sediment, soil gas, indoor air)
- Groundwater static water level data sheet
- Slug test data sheet
- Monitoring well construction summary/well development
- Monitoring well decommissioning
- Photograph log
- Soil boring/Rock core log
- Equipment log
- Calibration log

For Paper Notes only:

Upon receipt of the field book or Daily Field Report Log for a particular activity, the designated person recording the notes will begin recording notes on a new page. The person(s) recording the notes will sign/initial the new page and indicate the date, time, and weather conditions, prior to recording information about the field activity. The field book or Daily Field Report Log should indicate whether any field data forms are being used. When the designated person recording the notes either relinquishes the field book or Daily Field Report Log to another team member or turns the book or log in at the end of the day, the person relinquishing the field book or Daily Field Report Log will affix a signature and date to the bottom of the last page used. If the page is not full, a diagonal line should be struck across the blank portion of the page. If not already present, it is good practice to write the page number on each page of the field book. If field data forms are used, it is good practice to write the page number if more than one form is used for the same sample/day (e.g., page 1 of 2, page 2 of 2). An example field book page is provided in Attachment A. An example Daily Field Report Log is provided in Attachment B.

2.3 Documentation Requirements for Daily Personnel Logs

If applicable, the Daily Personnel Log will be maintained in the field trailer/office or by the Field Team Leader for the duration of the project to record the identities of all personnel who are on site. The following information will be recorded on Daily Personnel Logs:

- Names of field personnel
- Names of subcontractor personnel
- Names of visitors (Refer to TRC's policy on communication with media)
- Affiliation of each person on site
- Date/time of entry and exit

2.4 Documentation Requirements for Photograph Logs

A field book/Daily Field Report Log entry or Photograph Log will be used to record the date and time of photographs taken at the project site. Digital cameras or mobile devices that imprint the date and time of the photograph may also be used to document conditions; however, prior to taking any site photographs with a digital camera or mobile device, the photographer must verify the correct clock and calendar settings in the camera or mobile device. An appropriate site figure may be used to note the location and direction of photographic documentation and should be referenced and attached to the log, if used. Examples of items that warrant photographic documentation include:

- General site topography
- Sampling and/or drilling locations
- Existing monitoring well locations
- Pre-existing property conditions and conditions following restoration
- Physical appearance of environmental samples
- Evidence of possible contamination
- Well casing or pad damage
- Rock cores
- Releases

Note: Cellular phones, even personal, may be subpoenaed during litigation for extended periods of time. Use of company mobile devices is preferred.

Check with your project requirements if geo-referenced photograph files are required. There are some digital tools that can be used to capture higher resolution coordinates than the native mobile device might be able to provide.

Note: Some clients require the use of intrinsically safe equipment when taking photographs or using other electronic equipment in the field, either due to the nature of their operations or due to the hazards present with the situation/job site. Please ensure this requirement is followed if applicable.

2.5 Documentation Requirements for Calibration Logs

A field book/Daily Field Report Log entry or Equipment Calibration Log will be completed to record appropriate information for the instruments calibrated each day. This information may include:

- Equipment manufacturer, model number and serial number
- Dates and times of calibration
- Supplies used (e.g., calibration gas)
- Individual who performed the calibration
- Adjustments made to the instrument during calibration
- Notes regarding the maintenance of the instrument

2.6 Documentation Requirements for Health and Safety Logs

A field book/Daily Field Report Log entry or Health and Safety Log will be completed to record Health and Safety issues during field activities. Entries may include:

- Daily health and safety meeting prior to performing work with an overview of topics discussed
- Any injuries, illnesses, near-misses, or the use of first aid supplies
- Activity under Level D conditions or the use of specific personal protective equipment (for Levels A, B, or C only if needed)
- Occurrence of possible work-related symptoms
- The date, name(s) of affected individuals, and a description of the issue or incident and response
- A record of air monitoring results, any action level exceedances, and actions taken as the result of any action level exceedances

2.7 Documentation Requirements for Air Monitoring Logs

A field book/Daily Field Report Log entry or Air Monitoring Log will be completed to record monitoring results from real-time air monitoring instruments during field activities. The air monitoring devices will be located and operated in accordance with the air monitoring plan. For hand-held instruments without data logging capabilities, readings will be recorded in the field book/Daily Field Report Log or on the Air Monitoring Log. For instruments with data logging capabilities, the instruments will be periodically checked, with results recorded in the field book/Daily Field Report Log or on the Air Monitoring Log. Data will be downloaded at the end of each workday and maintained in the project files.

2.8 Documentation Requirements for Waste Management Logs

A field book/Daily Field Report Log entry or Waste Management Log will be completed to record waste tracking information during field activities. Entries may include:

- Transporter
- Date waste is transported off site
- Type of container/volume of container
- Estimated volume of material placed into the container
- Waste media characteristics (e.g., moisture content, non-aqueous phase liquid content, photoionization detector measurements)
- Documentation of container seal/physical condition
- Labeling or placarding required on container
- Container identification
- Manifest number(s)
- Vehicle identification/license plate
- Disposal facility
- Waste stream
- Generator identification

Project-specific requirements may dictate the need for further information.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

The Field Team Leader has the responsibility to maintain the various logs, forms, books, and Data Collection Apps that document daily field activities. Individual responsibilities may be delegated to other field staff, as appropriate.

QC procedures will place emphasis on the completeness and accuracy of all information recorded in the field and will be used to confirm that field notes contain statements that are legible, accurate, and comprehensive documentation of project activities. Field books/Daily Field Report Logs and/or Data Collection Apps should be reviewed on a frequent basis by the Field Team Leader to confirm that:

- Field books/Daily Field Report Logs, standardized forms, and Data Collection Apps have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good record-keeping procedures (i.e., entries are signed or initialed and dated, data are not obliterated, and changes are initialed, dated, and explained).
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the project plans, and that any deviations were documented and approved by the appropriate personnel.
- Instruments were calibrated and operated in accordance with the procedures specified in the project plans.

4.0 INVESTIGATION-DERIVED WASTE DISPOSAL

The Project Manager should discuss client- and/or project-specific investigation-derived waste disposal documentation requirements with field personnel.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

The Project Manager or Field Team Leader will maintain an inventory of all field books/Daily Field Report Logs used during the program and will be responsible for ensuring that they are archived in the project files following the completion of the field work.

Completed standardized forms will be maintained by the Project Manager or Field Team Leader during the duration of the program and will be archived in the project files following completion of the field effort.

It is good practice to scan field notes and logs at the conclusion of field activities and store the resulting pdf files in the electronic project directory, along with any digital photographs taken.

For projects that utilized TRC's approved electronic mobile field data collection systems (e.g., Fulcrum, EQuIS Collect, or esri Collector) field teams should coordinate with their TRC Data Manager who will assist with managing the data depending on the mobile application used.

6.0 SUSTAINABLE RECOMMENDATIONS

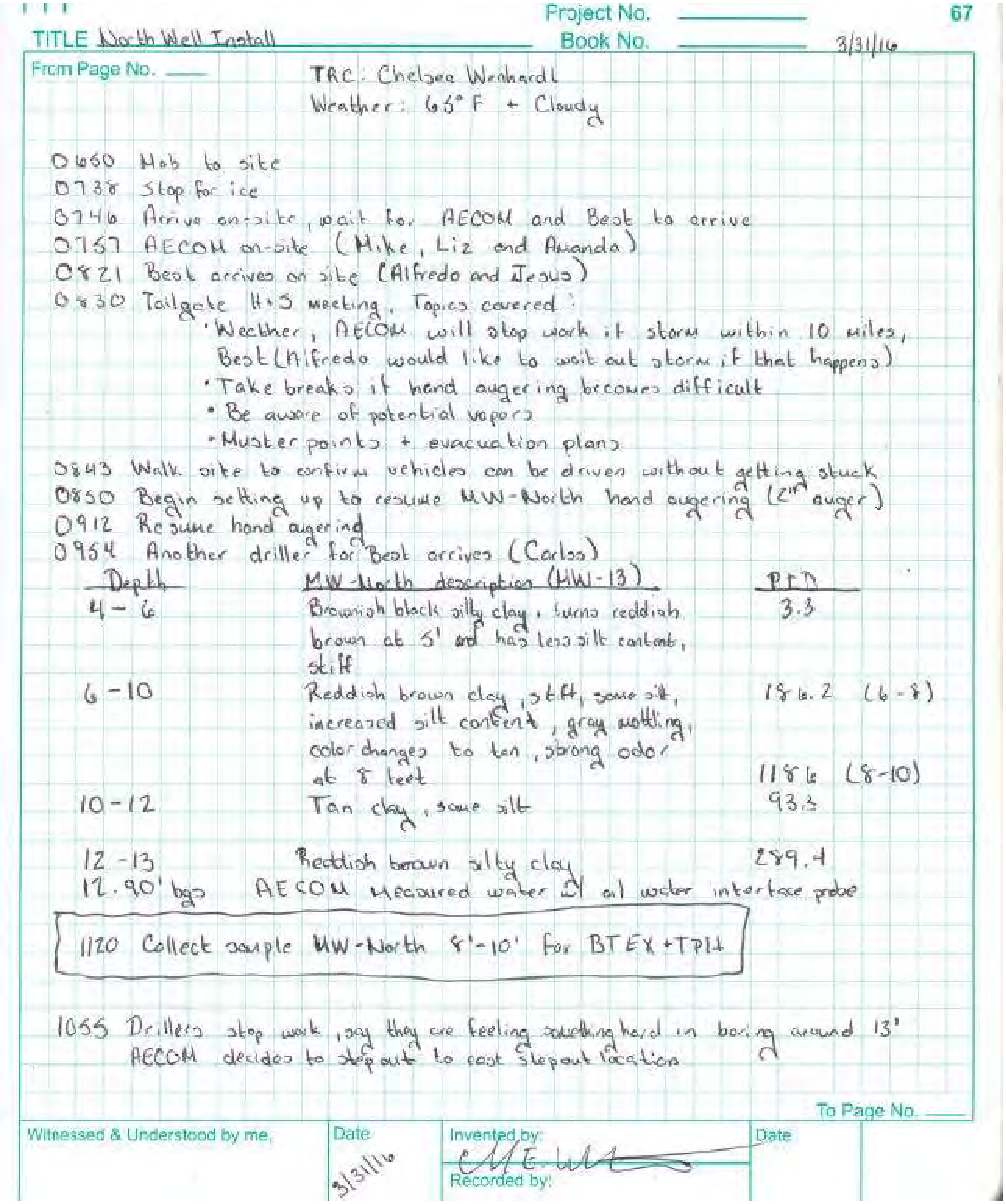
Sustainable practices should be incorporated wherever practical. Items to consider for field documentation are as follows:

- Opt for electronic data collection when the project allows for it;
- Consider using TRC Daily Field Report Logs instead of a field book for one-off and/or short duration projects; and,
- Consider sustainable or reusable materials when binding field sheets.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	JANUARY 2013	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING AND SOP RE-NUMBERING
2	AUGUST 2020	PFAS-SPECIFIC PROCEDURES ADDED
3	NOVEMBER 2020	GENERAL UPDATES; MOBILE DATA APPLICATIONS ADDED

Attachment A: Example Page from Field Book



Project No. ______ 67

TITLE North Well Install Book No. ______ 3/31/16

From Page No. ____

TRC: Chelsea Wenhardt
Weather: 65° F + Cloudy

0650 Mob to site
0738 Stop for ice
0746 Arrive on-site, wait for AECOM and Best to arrive
0757 AECOM on-site (Mike, Liz and Amanda)
0821 Best arrives on site (Alfredo and Jesus)
0830 Tailgate H+S meeting. Topics covered:

- Weather, AECOM will stop work if storm within 10 miles, Best (Alfredo would like to wait out storm if that happens)
- Take breaks if hand augering becomes difficult
- Be aware of potential vapors
- Muster points + evacuation plans

0843 Walk site to confirm vehicles can be driven without getting stuck
0850 Begin setting up to resume MW-North hand augering (2nd auger)
0912 Resume hand augering
0954 Another driller for Best arrives (Carlos)

Depth	MW-North description (MW-13)	PID
4 – 6	Brownish black silty clay, turns reddish brown at 5' and has less silt content, stiff	3.3
6 – 10	Reddish brown clay, stiff, some silt, increased silt content, gray mottling, color changes to tan, strong odor at 8 feet	186.2 (6-8) 1186 (8-10)
10 – 12	Tan clay, some silt	93.3
12 – 13	Reddish brown silty clay	289.4

12.90' bgs AECOM measured water w/ oil water interface probe

1120 Collect sample MW-North 8'-10' for BTEX + TPH

1055 Drillers stop work, say they are feeling something hard in boring around 13'
AECOM decides to step out to east stepout location

To Page No. ____

Witnessed & Understood by me, | Date 3/31/16 | Invented by: CME Wh | Date
Recorded by:

Attachment B: Example Daily Field Report Log

PAGE ______ OF ______

GENERAL NOTES

PROJECT NAME:	DATE:	TIME ARRIVED:
PROJECT NUMBER:	AUTHOR:	TIME LEFT:

WEATHER

TEMPERATURE: ____________ °F WIND: ____________ MPH VISIBILITY: ____________

WORK / SAMPLING PERFORMED

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

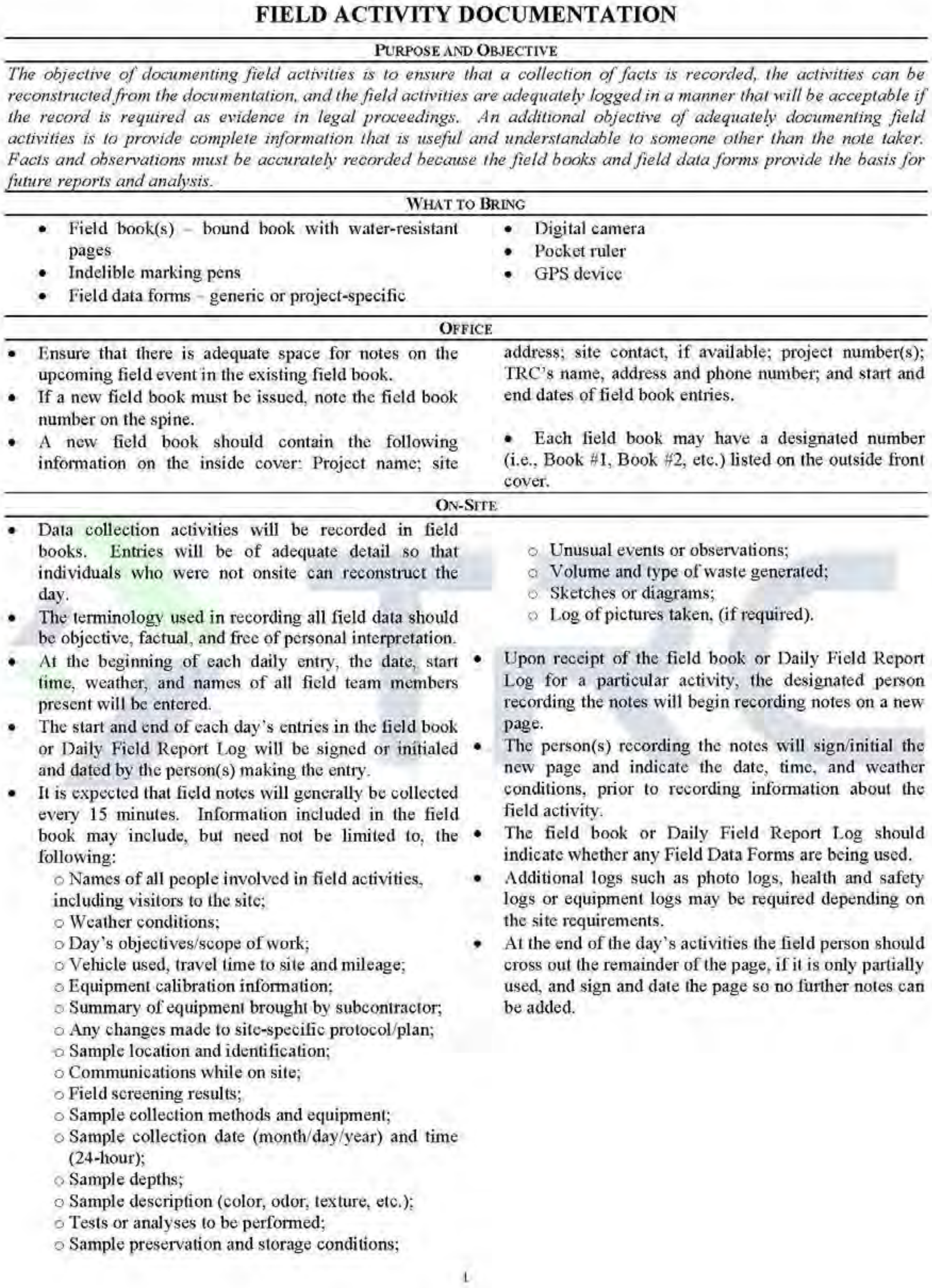
COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS

SIGNED DATE CHECKED BY DATE

REVISED 03/2008

Attachment C: SOP Fact Sheet



FIELD ACTIVITY DOCUMENTATION

PURPOSE AND OBJECTIVE

The objective of documenting field activities is to ensure that a collection of facts is recorded, the activities can be reconstructed from the documentation, and the field activities are adequately logged in a manner that will be acceptable if the record is required as evidence in legal proceedings. An additional objective of adequately documenting field activities is to provide complete information that is useful and understandable to someone other than the note taker. Facts and observations must be accurately recorded because the field books and field data forms provide the basis for future reports and analysis.

WHAT TO BRING

- Field book(s) – bound book with water-resistant pages
- Indelible marking pens
- Field data forms – generic or project-specific
- Digital camera
- Pocket ruler
- GPS device

OFFICE

- Ensure that there is adequate space for notes on the upcoming field event in the existing field book.
- If a new field book must be issued, note the field book number on the spine.
- A new field book should contain the following information on the inside cover: Project name; site address; site contact, if available; project number(s); TRC's name, address and phone number; and start and end dates of field book entries.
- Each field book may have a designated number (i.e., Book #1, Book #2, etc.) listed on the outside front cover.

ON-SITE

- Data collection activities will be recorded in field books. Entries will be of adequate detail so that individuals who were not onsite can reconstruct the day.
- The terminology used in recording all field data should be objective, factual, and free of personal interpretation.
- At the beginning of each daily entry, the date, start time, weather, and names of all field team members present will be entered.
- The start and end of each day's entries in the field book or Daily Field Report Log will be signed or initialed and dated by the person(s) making the entry.
- It is expected that field notes will generally be collected every 15 minutes. Information included in the field book may include, but need not be limited to, the following:
    - Names of all people involved in field activities, including visitors to the site;
    - Weather conditions;
    - Day's objectives/scope of work;
    - Vehicle used, travel time to site and mileage;
    - Equipment calibration information;
    - Summary of equipment brought by subcontractor;
    - Any changes made to site-specific protocol/plan;
    - Sample location and identification;
    - Communications while on site;
    - Field screening results;
    - Sample collection methods and equipment;
    - Sample collection date (month/day/year) and time (24-hour);
    - Sample depths;
    - Sample description (color, odor, texture, etc.);
    - Tests or analyses to be performed;
    - Sample preservation and storage conditions;
    - Unusual events or observations;
    - Volume and type of waste generated;
    - Sketches or diagrams;
    - Log of pictures taken, (if required).
- Upon receipt of the field book or Daily Field Report Log for a particular activity, the designated person recording the notes will begin recording notes on a new page.
- The person(s) recording the notes will sign/initial the new page and indicate the date, time, and weather conditions, prior to recording information about the field activity.
- The field book or Daily Field Report Log should indicate whether any Field Data Forms are being used.
- Additional logs such as photo logs, health and safety logs or equipment logs may be required depending on the site requirements.
- At the end of the day's activities the field person should cross out the remainder of the page, if it is only partially used, and sign and date the page so no further notes can be added.

FIELD ACTIVITY DOCUMENTATION

DOS AND DO NOTS OF FIELD ACTIVITY DOCUMENTATION

DOs:

- DO have the following items when going into the field: Field Book and an indelible marking pen (i.e. ball-point pen) ONLY; field forms; contact phone numbers; business cards.
- DO review all available figures and workplans.
- DO take note of any atypical conditions at the site.
- DO call the Project Manager or Field Team Leader if unexpected conditions are encountered or at least twice during the work day to update them. It is also recommended to call when activities are winding down for the day to make sure that the workplan has been fully implemented and there are no additional tasks to complete.
- DO have the numbers for contractors, vehicle and equipment rental providers and utility companies readily available while in the field.

DO NOTs:

- DO NOT sign anything in the field. This includes disposal documentation, statements, etc.; call the Project Manager if there are any concerns.
- DO NOT use markers to label samples or record field notes.

Title: **Visual-Manual Procedure for Soil Description and Identification**	Procedure Number: **ECR 005**
	Revision Number: **1**
	Effective Date: **January 2020**

Authorization Signatures

Jamie Stapleton		Elizabeth Denly	
Technical Reviewer Jamie Stapleton	Date 1/1/20	Environmental Sector Quality Director Elizabeth Denly	Date 1/1/20

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	Field Forms
Attachment B	USCS Field Reference Sheets
Attachment C	SOP Fact Sheet

1.0 INTRODUCTION

1.1 Scope and Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the method for identifying and describing soil samples in soil borings, test pits, and soil grab samples. The SOP was prepared in general conformance with American Society for Testing and Materials (ASTM) Standard D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)* and other pertinent technical publications.

1.2 Summary of Method

The objective of this method is to standardize the collection and documentation of information on soil that is useful for the purpose of hydrogeological or geotechnical evaluation of a site. The use of standardized visual examination and manual test methods by all field personnel results in standardized data that can be evaluated later for geologic and engineering uses. Consistent soil description is important because during many projects multiple employees may be involved at different times. Hence, being able to compare or correlate soil classification logs that were created by different geologists is essential for creating consistent subsurface interpretations. The methods outlined in this SOP can be utilized for the characterization of soils in the field, field office, or other setting. Characterization of the soils in a relatively undisturbed state is preferred, but is subject to the limitations of the collection methods utilized.

Soil samples may be collected by various means, as discussed in TRC’s Soil Sampling SOP. Regardless of the sample collection method, the resulting soil sample should be visually described and characterized. Visual examination of the sample will result in identifying grain size, particle size percentages, geologic and geotechnical modifiers and/or classifications, and a host of secondary characteristics. Manual and laboratory test methods also may be utilized to provide additional characteristics of the material, aiding in the description of fine-grained soils and providing more detailed geotechnical characterization.

The data gathered from the visual observations and manual test results are then recorded following an industry recognized classification system in a field log.

1.3 Equipment

The following list of equipment may be utilized when identifying and describing soil samples. Site-specific conditions may warrant the use of additional items or deletion of items from this list.

- Appropriate level of personal protection
- Field book, boring logs, test pit logs (as applicable)
- A copy of boring logs or field notes from previous work performed at or near the site
- Pocket penetrometer or miniature vane shear device
- Munsell Soil Color Chart
- Burmister and/or Unified Soil Classification System (USCS) classification chart/reference sheets
- Sand grading chart
- Appropriate knife

- Spoon and/or small spatula
- Tape measure, folding ruler or yard stick
- Portable table
- Polyethylene sheeting
- Hand lens
- Deionized water in squeeze bottle
- Small squirt bottle with dilute hydrochloric acid (1 part 10N HC1 to 3 parts water)

1.4 Definitions

Not Applicable; terms defined throughout SOP.

1.5 Health & Safety Considerations

TRC personnel may be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific health and safety plan (HASP). TRC personnel will use the appropriate level of personal protective equipment (PPE) as defined in the HASP.

1.6 Cautions and Potential Problems

- Samples collected for identification and description may contain hazardous substances or petroleum hydrocarbons. Consult the site-specific HASP for air monitoring and PPE requirements.

- One of the most common problems encountered when identifying soil types is the misidentification of fine-grained soils. If new to the identification process, take time to perform the manual field tests presented herein and/or consult with an experienced geologist or engineer.

- Geologic and engineering principles are both utilized in this method. Remember a well or widely graded soil (engineering term) is a poorly sorted soil (geologic term).

1.7 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Workers (HAZWOPER)
- 8-hour annual refresher training

2.0 PROCEDURES

This SOP includes procedures for both the modified Burmister and USCS soil classification systems. Consult the Project Manager and site work plan for guidance on the appropriate system. Several components of the soil description overlap between the two methods; however, there are some slight differences, such as the descriptors for percent composition (e.g., Burmister: “some” means 20-35% and USCS: “some” means 30-45%). Again, consistent soil description is important because during many projects multiple employees may be involved in performing field work. Hence, being able to compare between logs that were created by different geologists is essential for creating subsurface interpretations.

2.1 Modified Burmister Soil Classification System

The general description of a soil sample should be in the following order:

1. Color
2. Major Constituent – capitalized
3. Minor Constituent(s)
4. Geologic modifiers or classifications (e.g., glacial deposit, fill material) in parentheses
5. Density
6. Moisture content
7. Modifiers for fine fraction of sample (plasticity, dilatancy and toughness)
8. Other significant observations (e.g., odors, staining, sheen, petroleum product, debris)

Use the following guidelines when recording soil descriptions:

- If the major constituent comprises more than 50% of the soil, then fully capitalize the major component descriptor (e.g., SAND);
- If the major constituent comprises less than 50% of the soil, capitalize the descriptor (e.g., Sand);
- Place a comma after the major and minor constituent descriptors;
- Place size qualifiers such as coarse, medium, or fine before the major constituent descriptors (see Section 2.7);
- Use the appropriate adjectives for proportions in Section 2.3.2 (e.g., and, some, little, trace) when describing the minor fraction(s); and
- Use the modifiers for fine grained soils described in Section 2.8.

EXAMPLES:
Tan, medium SAND, little fine sand, trace coarse sand, trace silt, statified (Outwash), loose, wet.

Or

Gray, CLAY, soft, wet, medium plasticity, no dilatancy and low toughness.

When logging a soil sample collected from a boring (e.g., split spoon or acetate liner) where more than one soil type is present, describe each one separately, using additional line(s) on the boring log form. Start the description from the top and log each change in stratigraphy in sequence to the bottom. Record the length (e.g., 0-0.5 ft.) at the beginning of each separate sequence description, followed by a colon. Draw a line below the bottom of the complete sample description.

2.2 USCS Soil Classification System

The USCS is based on grain size and response to physical manipulation at various water contents. This system is often used for classifying soils encountered in boreholes, test pits, and surface sampling. The following properties form the basis of USCS soil classification:

- Percentage of gravel, sand, and fines;
- Shape of the grain size distribution curve; and
- Plasticity and compressibility characteristics.

Four soil fractions are recognized: cobbles, gravel, sand, and fines (silt or clay). The soils are divided as coarse-grained soils, fine-grained soils, and highly organic soils. The coarse grained soils contain 50 percent of grains coarser than a number 200 sieve (approximately 0.08 mm). Fine grained soils contain more than 50 percent of material smaller than the number 200 sieve. Organic soils contain a significant percentage of organic material (leaves, roots, peat, *etc*. in various stages of decomposition). Soil description should be concise and stress major constituents and characteristics for fine-grained, organic, or coarse-grained soils.

The general description of a soil sample should be in the following order:

1. Group Name (Group Symbol)
2. Percent and Range of Particle Sizes
3. Plasticity
4. Color (Munsell Color Chart)
5. Odor
6. Moisture
7. Density
8. Additional Comments
9. Geological Origin (Stratigraphic Unit)

EXAMPLES:
Well Graded Gravel with Sand (GW): mostly fine to coarse subangular gravel, little fine to coarse subangular sand, yellowish brown (10YR 5/4), no odor, moist, loose, few small cinders, fill.

Or

Silt (ML): mostly silt, nonplastic, gray (7.5YR 5/1), slight hydrocarbon odor, moist, medium dense, lacustrine.

2.2.1 Group Name (Group Symbol)

The USCS recognizes 15 soil groups and uses names and letter symbols to distinguish between these groups. The coarse grained soils are subdivided into gravels (G) and sands (S). Both the gravel and sand groups are divided into four secondary groups. Fine grained soils are subdivided into silts (M) and clays (C). Soils are also classified according to their plasticity and grading. Plastic soils are able to change shape under the influence of applied stress and to retain the shape once the stress is removed. Soils are referred to either low (L) or high (H) plasticity. The grading of a soil sample refers to the particle size distribution of the sample. A well graded (W) sand or gravel has a wide range of particle sizes and substantial amounts of particles sized between the coarsest and finest grains. A poorly graded (P) sand or gravel consists predominately of one size or has a wide range of sizes with some intermediate sizes missing.

The flow charts included in Attachment B: USCS Field Reference Sheets, for fine- and coarse-grained soils, can be used to assign the appropriate group symbol(s) and name and are replicated from ASTM Standard D2488. If the soil has properties which do not distinctly place it into a specific group, borderline symbols (e.g., SP-SM, GP-GC, etc.) may be used.

Soils which have characteristics of two groups are given boundary classifications using the names that most nearly describe the soil. The two groups are separated by a slash. The same is true when a soil could be well or poorly graded. Again the two groups are separated by a slash.

2.3 *Soil Identification Based on Grain Size*

2.3.1 Grain-Size Scales

Determination of grain size can be difficult, especially for the fine grained particles. Identification of coarse grained particles can be aided by grain size particle charts with actual samples affixed to the card. In general, fine grained particles are not visible with the naked eye or a hand lens and require manual field tests to differentiate between silts and clays.

Peat, organic material in various stages of decomposition, usually appears dark brown to black, has a fibrous to amorphous texture, with an organic odor. This material should be classified as highly organic soil (Peat; Hummus; or Swamp/bog deposit). This material is not subject to grain size classification described herein.

Grain size classification should be based on the following method.

COARSE GRAINED PARTICLES

Boulder:	> 300 mm (>12 in.)
Cobble:	75 - 300 mm (3 in. – 12 in.)
Coarse Gravel:	19 - 75 mm (¾ in. – 3 in.)
Fine Gravel:	4.75 - 19 mm (No. 4 sieve – ¾ in.)
Coarse Sand:	2.0 - 4.75 mm (No. 10 sieve – No. 4 sieve)
Medium Sand:	0.425 - 2.0 mm (No. 40 sieve – No. 10 sieve)
Fine Sand:	0.075 - 0.425 mm (No. 200 sieve – No. 40 sieve)

FINE GRAINED PARTICLES

Note that these particle sizes cannot be visually differentiated with standard field equipment.
Silts and clays are distinguished in the field by cohesion and plasticity.

Burmister:

Silt:	0.002 - 0.075 mm
Clay:	<0.002 mm

USCS:

Silt & Clay:	<0.075 mm (< No. 200 sieve)

2.3.2 Proportions

Proportions of grain sizes need to be described in accordance with one of the two following classification systems. Note that in either system minor constituents also include ancillary materials such as mica flakes, dark minerals, naturally occurring organic matter, or anthropogenic material (e.g., fill, brick, concrete).

Modified Burmister:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

Trace:	0-10%
Little:	10-20%
Some:	20-35%
And:	35-50%

The major soil sample constituent is always capitalized and listed first.

USCS:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

Trace:	< 5%
Few:	5-10%
Little:	15-25%
Some:	30-45%
Mostly:	> 50%

The soil is *fine grained* if it contains 50% or more fines (<0.075 mm or passes #200 sieve)

The soil is *coarse grained* if it contains less than 50% fines.

2.4 Color

The main color value should be stated, along with a modifier, if appropriate. For example:

- light brown
- dark brown
- reddish brown
- brown

The presence of mottling (patches or spots of differing colors) should be included in the description, where present. For example:

Gray, poorly sorted angular fine to medium SAND, some silt, trace angular coarse sand, trace clay (lodgement glacial till), slightly mottled, dense, moist (Modified Burmister description)

Or

Well Graded Sand (SW), mostly angular fine to medium sand, little to some silt, few angular coarse sand, few clay, gray, no odor, moist, dense, lodgement glacial till. (USCS description)

As with other components of soil classification, consistent soil color descriptions can be very helpful when preparing subsurface interpretations from soil data collected by different personnel. To that end, the use of Munsell Soil Color charts may be implemented to standardize color nomenclature. Just as paint stores have pages of color chips, soil scientists use a book of color chips that follow the Munsell System of Color Notation. The system has three components: Hue (a specific color), Value (lightness and darkness) and Chroma (color intensity). For example, a brown soil may be noted as: hue value/chroma (10YR 5/3).

2.5 Relative Density

The modifiers used to describe soil relative density depend on whether the soil is cohesive (e.g., clay) or granular/non-cohesive (gravel, sand or silt). Field evaluation of the density of non-cohesive soils is based the ease of penetration by the sampling equipment used. The density of cohesive soils is based the compressive soil strength of soil or soil stiffness (i.e., how much the soil compresses under a given pressure). Density can be directly measured in the field, such as with the ASTM Standard D1586: Standard Penetration Test during split spoon sample collection or with a pocket penetrometer. Alternatively, the density can be measured qualitatively, such as the ease of thumb penetration. Methods of determining density and the appropriate density modifiers are discussed in the following sections.

2.5.1 Soil Samples Collected with Split Spoons

During soil sample collection using split spoons, the density can be based on the N-Value, which is the sum of the middle two 6-inch blow counts of a two foot split spoon or the last two 6-inch blow counts of an 18-inch split spoon (ASTM Standard D1586: Standard Penetration Test). Professional judgment should be used when applying the density modifier. If high blow counts are due to the presence of a cobble, boulder or large piece of gravel that impedes forward progress of the split spoon, density should be based upon the character of the material in the split spoon, if any, or omitted from the description. A notation should be made in the sample description when this situation occurs. Appropriate modifiers are described in the following table:

Non-Cohesive (Granular Soils)		**Cohesive Soils**	
N-Value (Blows/ft)	**Density**	**N-Value (Blows/ft)**	**Density**
0-4	very loose	<2	very soft
4-10	loose	2-4	soft
10-30	medium dense	4-8	medium
30-50	dense	8-15	stiff
>50	very dense	15-30	very stiff
		>30	hard

2.5.2 Test Pit Samples

In test pits, density is subjective and should be based upon the ease of excavation. The above modifiers in Section 2.5.1 for granular and cohesive soils should be used in the description. The following should be used as a guide for test pits:

- **Very Loose/Very Soft –** The bucket of the excavating equipment easily penetrates the soil and fills in one pass.

- **Medium Dense/Medium –** Several passes are required to fill the bucket.

- **Very Dense/Very Stiff –** The bucket has difficulty penetrating the soil.

2.5.3 Soil Samples Collected Via Direct Push Technology

In borings advanced by direct push methods, field evaluation of density is more subjective. Blow counts along with visible qualifiers such as number of passes to fill an excavation bucket are not applicable to direct push methods. Samplers therefore need to pay attention to the progress of the sampling tool being advanced, as well as gather information from the driller advancing the tool. Driller's input is very valuable as the macro core might be advanced at varying speeds to best achieve the goal of the boring. Below are approximations for estimating soil densities while utilizing direct push methods:

- **Very Loose/Very Soft** – Macro core advances easily, penetrates within a few seconds.
- **Medium Dense/Medium** – Macro core advances slowly but steadily, penetrates within a minute or two.
- **Very Dense/Very Stiff** – Macro core advances very slowly if at all, penetration may take several minutes.

Granular Soils	Cohesive Soils	Thumb Penetration Key
very loose	very soft	very easily – inches
loose	soft	easily – inches
medium dense	medium	moderate effort – inches
dense	stiff	indented easily
very dense	very stiff	indented by nail
	hard	difficult by nail

Similar to above, if drilling progress is slowed due to the presence of a cobble, boulder or large piece of gravel that impedes forward progress of the direct push sampler, density should be based upon the character of the material in the sampler, if any, or omitted from the description. A notation should be made in the sample description when this situation occurs.

2.5.4 Pocket Penetrometer

A pocket penetrometer is a field tool which can be implemented to directly measure compressive soil strength. The unit is spring-operated, and it is measures strength in tons/sq. ft. (tsf) or kg/sq. cm by pushing a loading piston into soil until the calibration mark is level with soil. Compressive load is indicated by reading a scale on the piston barrel. A friction ring indicates maximum reading. The reading correlates to the density description as follows:

Cohesive Soils	Compressive Strength (tsf)
very soft	< 0.25
soft	0.25 – 0.50
medium	0.50 – 1.0
stiff	1.0 – 2.0
very stiff	2.0 – 4.0
hard	> 4.0

The user should refer to the pocket penetrometer instruction manual for specifics on operation. It is recommended that several pocket penetrometer readings be collected for each soil horizon and averaged to determine the density, as opposed to one single reading.

A miniature vane shear device can also be used to directly measure compressive soil strength of cohesive soils. The device is a spring-operated torsional test that provides shear strength by measuring the resistance of turning a vane inserted into the sample.

2.6 Moisture Content

Moisture content should be described using the following modifiers:

- **Dry** – no apparent moisture, dusty.
- **Moist** – slight moisture content but no visible water, soils may stick together.
- **Wet** – water dripping from sample; usually soil is below the water table.

2.7 Geologic Modifiers or Classifications

Sedimentological descriptions aid in the geologic classification of a soil material. Only insert geologic modifiers when present.

2.7.1 Stratification

The presence of alternating layers of non-cohesive materials of different grain sizes or color with layers ***at least 6 mm*** thick. Note thickness of layers.

2.7.2 Lamination or Varves

The presence of alternating very thin layers of fine materials or color, such as silt and clay, with layers ***less than 6 mm*** thick. Note thickness of layers.

2.7.3 Sorting

A geological term used to describe how close in size the grains in a sample are to each other. For example, a *well sorted* sample contains grains of similar size; a *poorly sorted* sample contains grains of many sizes. **Caution:** Sorting and grading both describe grain size distribution and can easily be confused (e.g., well sorted is the opposite of well graded). If possible, either sorting or grading terminology, NOT both, should be used for a given project.

2.7.4 Grading

An engineering term used to describe the range in grain sizes present in a sample. For example, a *narrowly graded* or *poorly graded* sample contains grains of similar size; a *widely graded* or *well graded* sample contains grains of many different sizes. **Caution:** Sorting and grading both describe grain size distribution and can easily be confused (e.g., well sorted is the opposite of well graded). If possible, either sorting or grading terminology, NOT both, should be used for a given project.

2.7.5 Angularity or Rounding

Geological terms that are used to describe the general appearance of visible grains in the soil sample. This term is useful in determining the origin and depositional environment of a material. Water transported materials may be rounded. Glacial tills will be more angular.

- **Angular** – Particles have sharp edges and relatively plane sides with unpolished surfaces.
- **Subangular** – Particles are similar to angular description but have rounded edges.
- **Subrounded** – Particles have nearly plane sides but have well-rounded corners and edges.
- **Rounded** – Particles have smoothly curved sides and no edges.

2.7.6 Shape

A term used to describe the shape of gravel, cobbles, and boulders. Terms are as follows where the particle shape shall be described based on the ratio of the dimensions where the length, width, and thickness refer to the greatest, intermediate, and least dimensions of a particle.

- **Flat** – Particles with width:thickness > 3.
- **Elongated –** Particles with length:width > 3.
- **Flat and Elongated –** Particles meet criteria for both flat and elongated.

2.7.7 Odor

Soils containing a significant amount of organic material may have a distinct odor of decaying vegetation. Soils may also have a petroleum, sewage or chemical type odor. Note the type of odor but avoid trying to identify the specific chemical; any contaminants in the soil should be identified only by chemical analysis. **Caution - Safety Note**: Odors should be noted if observed. However soil samples may contain contaminants that are harmful if inhaled. Field personnel should NOT inhale deeply near the sample in an attempt to better determine if an odor is present.

Olfactory characteristics are subject to field conditions such as temperature and wind, as well as individual nasal sensitivities. The strength of the odor may also be noted (e.g., strong or slight).

2.7.8 Cementation

Describe the cementation of intact coarse-grained soils as follows.

- **Weak** – Crumbles or breaks with handling or little finger pressure.

- **Moderate** – Crumbles or breaks with considerable finger pressure.
- **Strong** – Will not crumble or break with finger pressure.

2.7.9 Hydrochloric Acid Reaction (HCl)

As appropriate for the geologic environment, describe the reaction with HCl as none, weak, or strong. As calcium carbonate is a common cementing agent, a report of its presence on the basis of the reaction with dilute hydrochloric acid (1 part 10N HCl to 3 parts water) is appropriate for certain projects.

- **None** – No visible reaction.
- **Weak** – Some reaction, with bubbles forming slowly.
- **Strong** – Violent reaction, with bubbles forming immediately.

2.8 Fine Grained Soils

Fine grained soils can be identified based on several manual field tests described below.

2.8.1 Dilatancy

Dilatancy is the appearance/disappearance of surface water during shaking, indicating a change in the pore volume of the material during deformation. Of the fine grained soils, silts are more likely to exhibit dilatancy. In order to test for dilatancy, obtain a small sample of soil and mold into a ½-inch diameter ball adding water as needed until the sample is soft but not sticky. Flatten the ball with the blade of a knife or spatula and shake the sample horizontally striking the side of the hand with the other hand. Note the rate at which water appears on the surface of the sample, if any. Squeeze the sample and note the reaction of the water, if any. Describe the dilatancy of the sample as follows:

Description	Criteria
None	No visible water at surface
Slow	Water appears slowly on shaking, does not disappear or disappears slowly on squeezing
Rapid	Water appears quickly on shaking, disappears quickly on squeezing

2.8.2 Toughness and Plasticity

Toughness is a measure of the amount of effort required to roll a 1/8-inch thick thread of soil at the plastic limit. Plasticity is a property of the soil that is exhibited when the soil is at a specific water content known as the plastic limit; that is, the degree at which soil is permanently deformed without rupturing by force applied in any direction.

2.8.2.1 Toughness Procedure

Roll a sample of the soil against a flat surface or between the palms of the hand to a thickness of 1/8-inch. If the thread crumbles and breaks prior to reaching the 1/8-inch thickness, add water and repeat. If the sample is too wet to roll easily, dry the sample by spreading into a thin layer or re-rolling repeatedly. The sample is at the plastic limit when the soil breaks apart and crumbles just when the thread reaches the 1/8-inch thickness. Note the pressure required to roll the thread at the plastic limit, the strength of the thread, and the pressure required to mold the sample back into a lump.

Describe the toughness of the sample as follows:

Description	Criteria
Low	Slight pressure required to roll the thread and the thread and lump are soft and weak
Medium	Moderate pressure required to roll the thread and the thread and lump have medium stiffness
High	Considerable pressure required to roll the thread and the thread and lump have very high stiffness

2.8.2.2 Plasticity Procedure

Soil plasticity is a measure of the soil's ability to be molded into a shape, and is the primary mechanism for distinguishing between silt and clay in the field. Silts are non-plastic; they are non-cohesive and cannot be molded and shaped. Clays exhibit varying degrees of plasticity. The plasticity of the soil can be determined using the observations made during the toughness test. Based on those observations, the plasticity of the soil can be described as follows:

Description	Criteria
Nonplastic	The soil cannot be molded at any water content
Low	When moistened the soil can be molded into a ball or cylinder. A 1/8-inch diameter thread may be formed if kept very moist, but crumbles easily if dried slightly.
Medium	When moistened a 1/8-inch thread of soil is easy to roll. Crumbles if manipulated.
High	When moistened a 1/8-inch thread of soil is easy to roll. Thread does not crumble easily even if bent and manipulated.

2.8.3 Identification of Fine Grained Soils

Fine grained soils can be identified using the dilatancy, toughness and plasticity tests and the criteria identified in the following table. These criteria should only be used for inorganic soils.

Soil Type	Dilatancy	Toughness	Plasticity
Silt	Slow to Rapid	Low	Nonplastic to Low
Elastic Silt	None to Slow	Low to Medium	Low to Medium
Lean Clay	None to Slow	Medium	Medium
Fat Clay	None	High	High

2.8.4 Identification of Organic Soils

Organic soils contain enough organic particles to influence the soil properties and usually have a dark brown to black color and often have an organic odor. Organic soils are typically fine grained and are identified as either organic silts or clays. Peat is a particular type of organic soil composed primarily of vegetable tissue in various stages of decomposition that has a fibrous to amorphous texture, usually a dark brown to black color, and an organic odor. When present the sample shall be designated as highly organic soil or peat. Laboratory tests are usually required to differentiate between organic silts and clays.

2.9 Fill Soils

Frequently soils are encountered that have been placed in an area for the purpose of changing or modifying the surface elevation. These fill soils can be reworked native soils or soils imported from another location. Indications that a soil is a non-native fill material include the following:

- The presence of anthropogenic materials (e.g., bricks, concrete, plastic);
- A heterogeneous mixture of soils with a random or unnatural distribution;
- Soils with an unnatural particle size distribution (e.g., clean pea stone).

Environmental and geotechnical projects often require that the extent and depth of fill soils be characterized. Fill soils are usually considered unsuitable for geotechnical uses due to the potential variation of soil types and engineering properties, and the uncertain compaction history of the material.

Fill soils can also contain anthropogenic materials that can be sources of contamination. Examples of anthropogenic materials that can be sources of contamination include the following:

- Construction and demolition debris especially with coatings or materials that contain tar or asphalt;
- Ash;
- Slag;
- Coal; and
- Asphalt pavement.

Regardless of the potential for contamination, all anthropogenic materials should be listed in the soil description. Contact the Project Manager immediately if any of these materials are unexpectedly encountered. This is especially important if environmental samples are being collected for site characterization.

2.10 Geologic Origin

Where possible based on existing site data, local research, or geologic understanding of the local region, include the apparent geologic origin of the material, such as glacial deposit (e.g., till, outwash), aeolian deposit, residual soil, colluvium, alluvium, regolith, residuum, saprolite, or fill material. Do not utilize geologic origin if not certain.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pick-up and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Other than having another person peer review and duplicate the visual identification, samples of identified soils can be submitted to a geotechnical laboratory for classification in accordance with *ASTM D 2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).* The laboratory classification can then be compared to the visual identification which can be changed as needed. It is recommended that Project Managers include laboratory classification of site soils in work plans for environmental projects. Laboratory classification should always be included for geotechnical projects. TRC field staff shall consult the site-specific work plan to determine laboratory soil classification requirements, if any.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

All soil identification information must be documented in the field book and/or on an appropriate field form (TRC Sample Log Sheet, Boring Logs, Test Pit Logs or gINT). Example field forms are included in Attachment A. Field notes should neatly convey the soil descriptions. Providing soil classifications following this SOP will allow for consistent data interpretation and increase project efficiency when soil descriptions are taken from field logs and converted to electronic report logs (e.g., gINT). Record the following information in the field book:

- Sample identification number
- Sample location (sketch of the sample point)
- Time and date sample was taken
- Personnel performing the task
- Visual description of the sample
- Weather conditions during sampling
- Other pertinent observations as prescribed in TRC's SOP for field activity documentation

6.0 REFERENCES

ASTM D2487 *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System),* Annual Book of ASTM Standards, Vol. 04.08, Current edition.

ASTM D2488 *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure),* Annual Book of ASTM Standards, Vol. 04.08, Current edition.

ASTM D1586-11 *Standard Test Method for Standard Penetration Test (SPT) and Split Barrel-Sampling of Soils,* Annual Book of ASTM Standards, Vol. 04.08, Current edition.

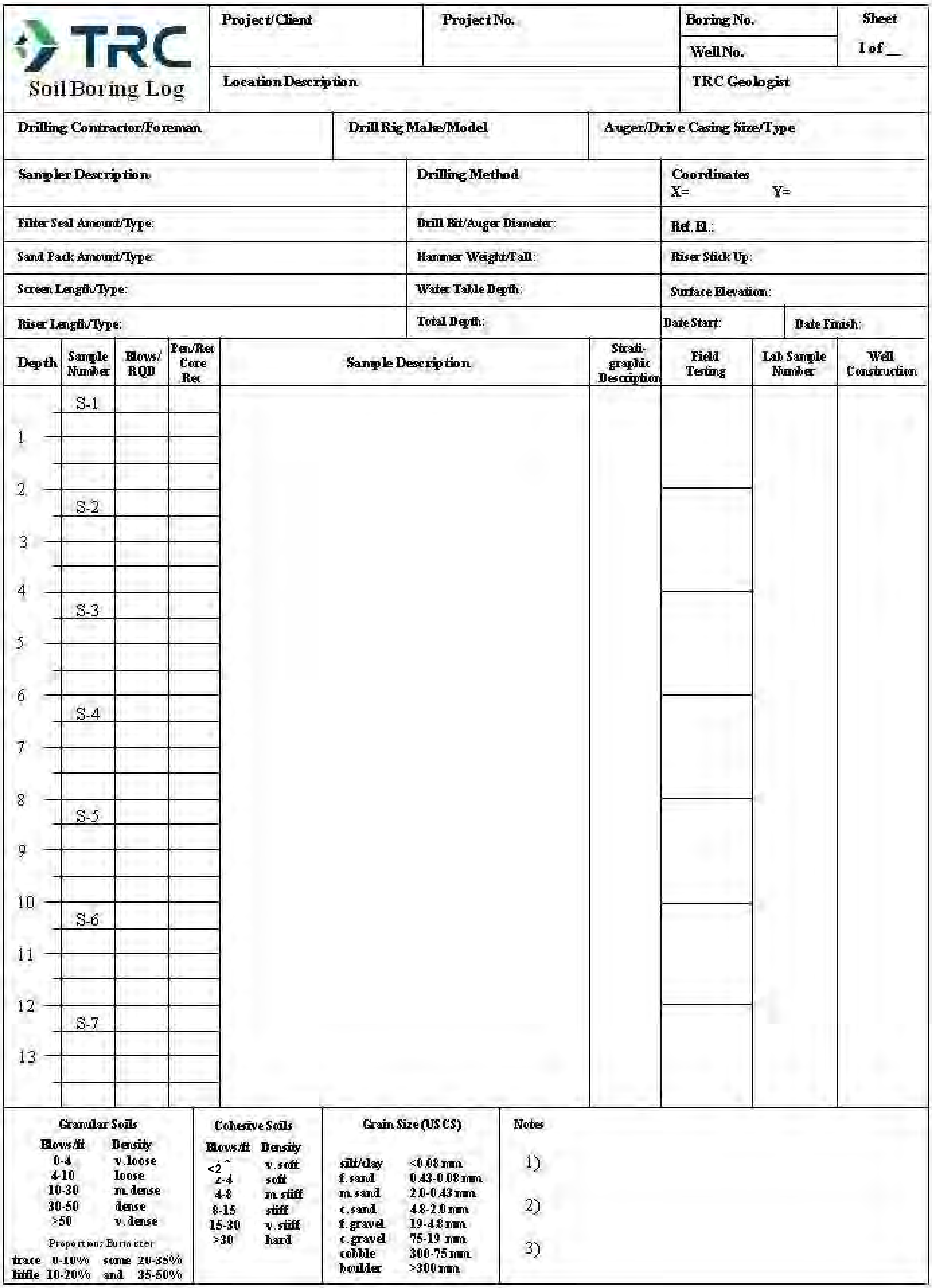
Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Procedures for Testing Soils. Burmister, D.M., 1958. Suggested Methods of Test for Identification of Soils.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	SEPTEMBER 2013	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING

ATTACHMENT A
FIELD FORMS



Soil Boring Log

Project/Client	**Project No.**	**Boring No.**	**Sheet**	
		Well No.	1 of __	
Location Description		**TRC Geologist**		
Drilling Contractor/Foreman	**Drill Rig Make/Model**	**Auger/Drive Casing Size/Type**		
Sampler Description	**Drilling Method**	**Coordinates** X= Y=		
Filter Seal Amount/Type:	**Drill Bit/Auger Diameter:**	**Ref. El.:**		
Sand Pack Amount/Type:	**Hammer Weight/Fall:**	**Riser Stick Up:**		
Screen Length/Type:	**Water Table Depth:**	**Surface Elevation:**		
Riser Length/Type:	**Total Depth:**	**Date Start:**	**Date Finish:**	

Depth	Sample Number	Blows/ RQD	Pen/Rec Core Rec	Sample Description	Strati-graphic Description	Field Testing	Lab Sample Number	Well Construction
	S-1							
1								
2								
	S-2							
3								
4								
	S-3							
5								
6								
	S-4							
7								
8								
	S-5							
9								
10								
	S-6							
11								
12								
	S-7							
13								

Granular Soils

Blows/ft	Density
0-4	v. loose
4-10	loose
10-30	m. dense
30-50	dense
>50	v. dense

Proportions Burmister

trace	0-10%	some	20-35%
little	10-20%	and	35-50%

Cohesive Soils

Blows/ft	Density
<2	v. soft
2-4	soft
4-8	m. stiff
8-15	stiff
15-30	v. stiff
>30	hard

Grain Size (USCS)

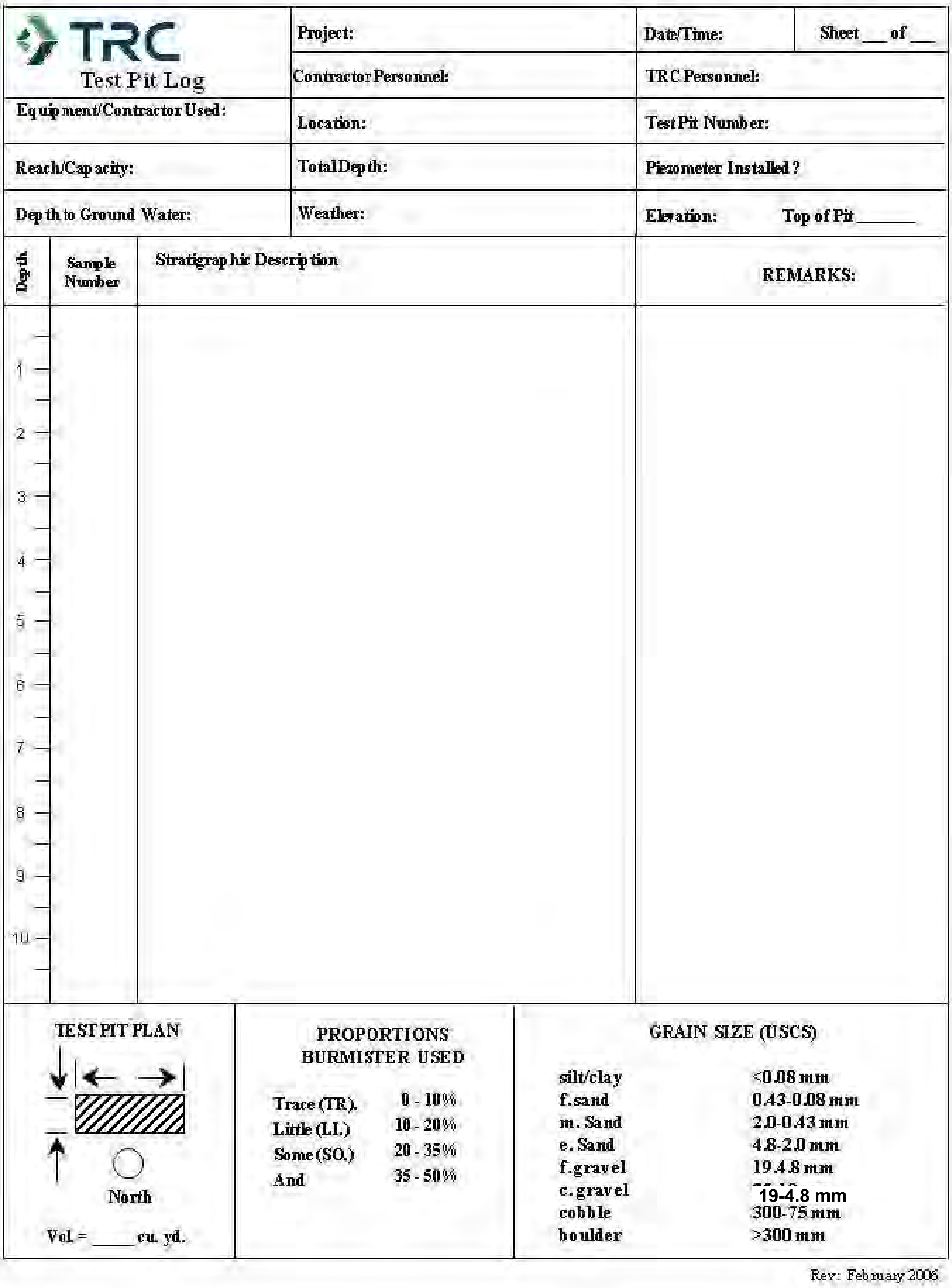
silt/clay	<0.08 mm
f. sand	0.43-0.08 mm
m. sand	2.0-0.43 mm
c. sand	4.8-2.0 mm
f. gravel	19-4.8 mm
c. gravel	75-19 mm
cobble	300-75 mm
boulder	>300 mm

Notes

1)

2)

3)



Test Pit Log

Equipment/Contractor Used:	**Project:**	**Date/Time:**	**Sheet __ of __**
	Contractor Personnel:	**TRC Personnel:**	
	Location:	**Test Pit Number:**	
Reach/Capacity:	**Total Depth:**	**Piezometer Installed?**	
Depth to Ground Water:	**Weather:**	**Elevation:**	**Top of Pit ______**

Depth	Sample Number	Stratigraphic Description	REMARKS:
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

TEST PIT PLAN

North

Vol. = _____ cu. yd.

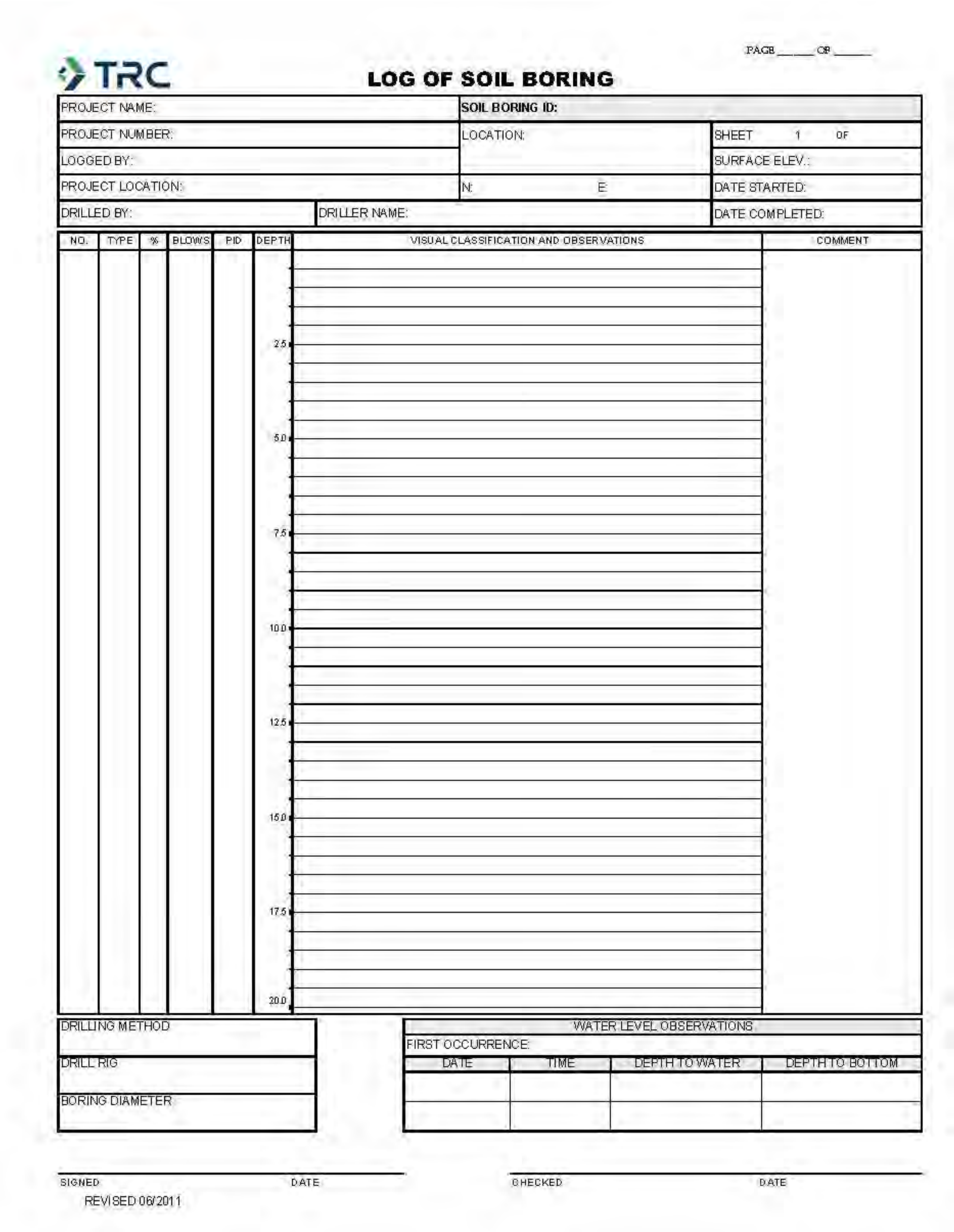
PROPORTIONS BURMISTER USED

Trace (TR).	0 - 10%
Little (LI.)	10 - 20%
Some (SO.)	20 - 35%
And	35 - 50%

GRAIN SIZE (USCS)

silt/clay	<0.08 mm
f.sand	0.43-0.08 mm
m. Sand	2.0-0.43 mm
e. Sand	4.8-2.0 mm
f.gravel	19.4.8 mm
c.gravel	19-4.8 mm
cobble	300-75 mm
boulder	>300 mm

Rev: February 2006



PAGE ____ OF ____

TRC

LOG OF SOIL BORING

PROJECT NAME:	**SOIL BORING ID:**	
PROJECT NUMBER:	LOCATION:	SHEET 1 OF
LOGGED BY:		SURFACE ELEV.:
PROJECT LOCATION:	N: E:	DATE STARTED:
DRILLED BY:	DRILLER NAME:	DATE COMPLETED:

NO.	TYPE	%	BLOWS	PID	DEPTH	VISUAL CLASSIFICATION AND OBSERVATIONS	COMMENT
					2.5		
					5.0		
					7.5		
					10.0		
					12.5		
					15.0		
					17.5		
					20.0		

DRILLING METHOD

DRILL RIG

BORING DIAMETER

WATER LEVEL OBSERVATIONS			
FIRST OCCURRENCE:			
DATE	TIME	DEPTH TO WATER	DEPTH TO BOTTOM

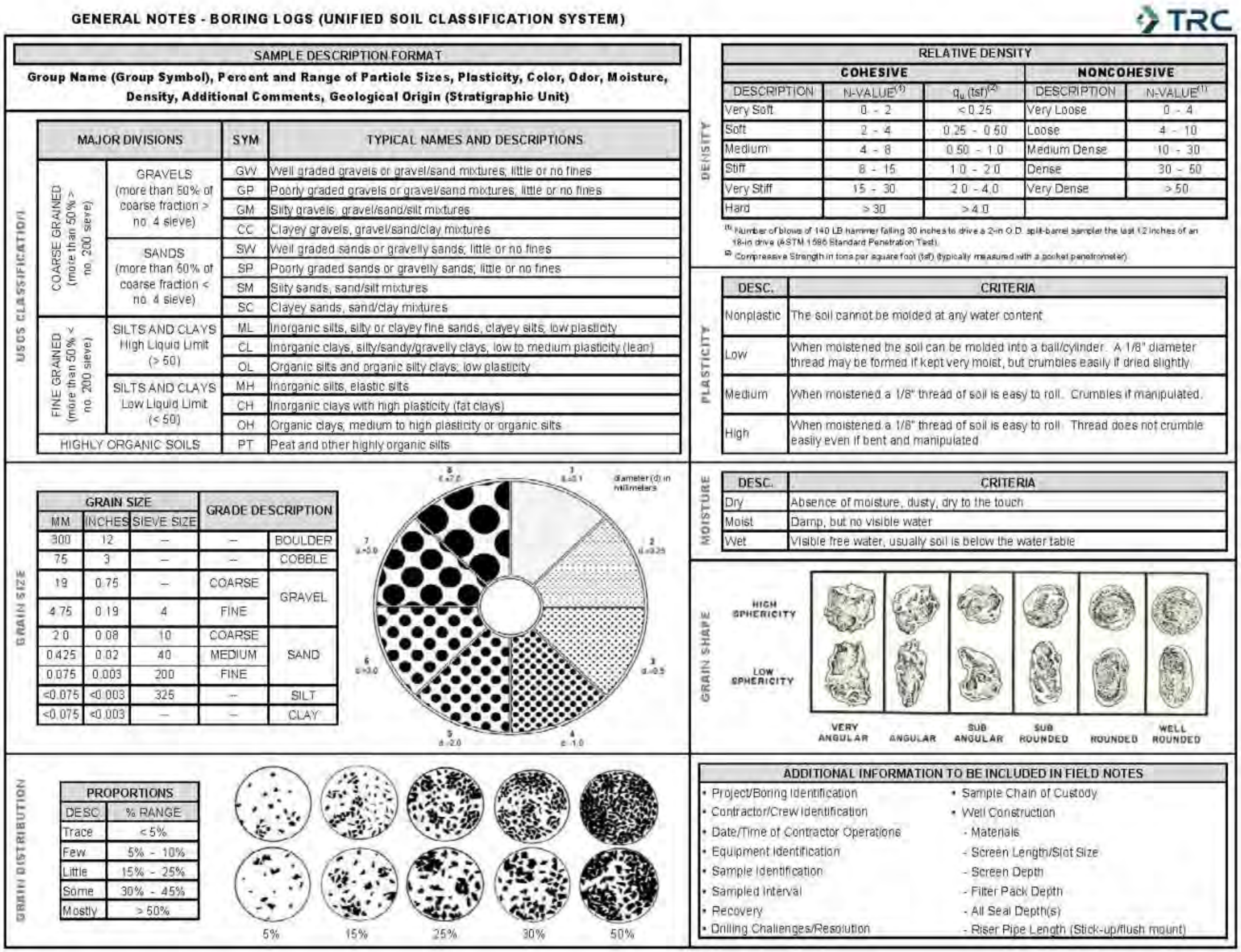
SIGNED ____________ DATE

CHECKED ____________ DATE

REVISED 06/2011

ATTACHMENT B

USCS FIELD REFERENCE SHEETS



GENERAL NOTES - BORING LOGS (UNIFIED SOIL CLASSIFICATION SYSTEM)

SAMPLE DESCRIPTION FORMAT

Group Name (Group Symbol), Percent and Range of Particle Sizes, Plasticity, Color, Odor, Moisture, Density, Additional Comments, Geological Origin (Stratigraphic Unit)

USCS CLASSIFICATION

MAJOR DIVISIONS		SYM	TYPICAL NAMES AND DESCRIPTIONS
COARSE GRAINED (more than 50% > no. 200 sieve)	GRAVELS (more than 50% of coarse fraction > no. 4 sieve)	GW	Well graded gravels or gravel/sand mixtures; little or no fines
		GP	Poorly graded gravels or gravel/sand mixtures, little or no fines
		GM	Silty gravels; gravel/sand/silt mixtures
		CC	Clayey gravels, gravel/sand/clay mixtures
	SANDS (more than 50% of coarse fraction < no. 4 sieve)	SW	Well graded sands or gravelly sands; little or no fines
		SP	Poorly graded sands or gravelly sands; little or no fines
		SM	Silty sands, sand/silt mixtures
		SC	Clayey sands, sand/clay mixtures
FINE GRAINED (more than 50% < no. 200 sieve)	SILTS AND CLAYS High Liquid Limit (> 50)	ML	Inorganic silts, silty or clayey fine sands, clayey silts, low plasticity
		CL	Inorganic clays, silty/sandy/gravelly clays, low to medium plasticity (lean)
		OL	Organic silts and organic silty clays; low plasticity
	SILTS AND CLAYS Low Liquid Limit (< 50)	MH	Inorganic silts, elastic silts
		CH	Inorganic clays with high plasticity (fat clays)
		OH	Organic clays; medium to high plasticity or organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic silts

DENSITY

RELATIVE DENSITY				
COHESIVE			NONCOHESIVE	
DESCRIPTION	N-VALUE[1]	q_u (tsf)[2]	DESCRIPTION	N-VALUE[1]
Very Soft	0 - 2	< 0.25	Very Loose	0 - 4
Soft	2 - 4	0.25 - 0.50	Loose	4 - 10
Medium	4 - 8	0.50 - 1.0	Medium Dense	10 - 30
Stiff	8 - 15	1.0 - 2.0	Dense	30 - 50
Very Stiff	15 - 30	2.0 - 4.0	Very Dense	> 50
Hard	> 30	> 4.0		

[1] Number of blows of 140 LB hammer falling 30 inches to drive a 2-in O.D. split-barrel sampler the last 12 inches of an 18-in drive (ASTM 1586 Standard Penetration Test).

[2] Compressive Strength in tons per square foot (tsf) (typically measured with a pocket penetrometer)

PLASTICITY

DESC.	CRITERIA
Nonplastic	The soil cannot be molded at any water content
Low	When moistened the soil can be molded into a ball/cylinder. A 1/8" diameter thread may be formed if kept very moist, but crumbles easily if dried slightly
Medium	When moistened a 1/8" thread of soil is easy to roll. Crumbles if manipulated.
High	When moistened a 1/8" thread of soil is easy to roll. Thread does not crumble easily even if bent and manipulated

GRAIN SIZE

GRAIN SIZE			GRADE DESCRIPTION	
MM	INCHES	SIEVE SIZE		
300	12	–	–	BOULDER
75	3	–	–	COBBLE
19	0.75	–	COARSE	GRAVEL
4.75	0.19	4	FINE	
2.0	0.08	10	COARSE	SAND
0.425	0.02	40	MEDIUM	
0.075	0.003	200	FINE	
<0.075	<0.003	325	–	SILT
<0.075	<0.003	–	–	CLAY

MOISTURE

DESC.	CRITERIA
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below the water table

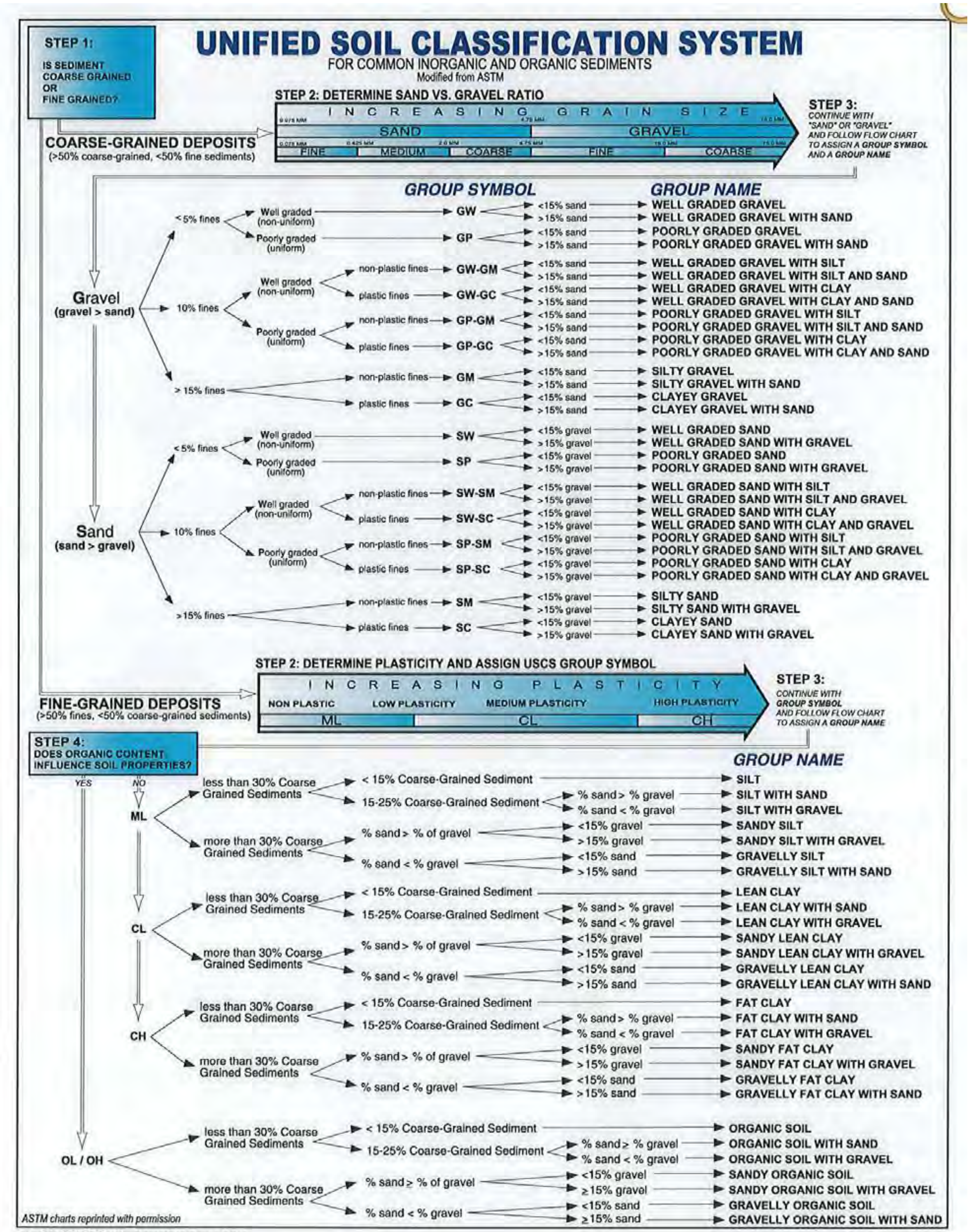
GRAIN SHAPE

GRAIN DISTRIBUTION

PROPORTIONS	
DESC.	% RANGE
Trace	< 5%
Few	5% - 10%
Little	15% - 25%
Some	30% - 45%
Mostly	> 50%

ADDITIONAL INFORMATION TO BE INCLUDED IN FIELD NOTES

- Project/Boring Identification
- Contractor/Crew Identification
- Date/Time of Contractor Operations
- Equipment Identification
- Sample Identification
- Sampled Interval
- Recovery
- Drilling Challenges/Resolution
- Sample Chain of Custody
- Well Construction
  - Materials
  - Screen Length/Slot Size
  - Screen Depth
  - Filter Pack Depth
  - All Seal Depth(s)
  - Riser Pipe Length (Stick-up/flush mount)



copyright 2001-2006 midwest geosciences group press

ATTACHMENT C

SOP FACT SHEET

SOIL CLASSIFICATION PROCEDURES

PURPOSE AND OBJECTIVE

The objective of this method is to standardize the collection and documentation of information on soil that is useful for the purpose of hydrogeological or geotechnical evaluation of a site. The use of standardized visual examination and manual test methods by all field personnel results in standardized data that can be evaluated later for geologic and engineering uses.

Soil samples may be collected by various means, as discussed in TRC's Soil Sampling SOP. Regardless of the sample collection method, the resulting soil sample should be visually described and characterized. Visual examination of the sample will result in identifying grain size, particle size percentages, geologic and geotechnical modifiers and/or classifications, and a host of secondary characteristics.

WHAT TO BRING

- Field book, boring logs, test pit logs (as applicable)
- A copy of boring logs or field notes from previous work performed at or near the site
- Pocket penetrometer or miniature vane shear device
- Munsell Soil Color Chart
- Burmister and/or Unified Soil Classification System (USCS) classification chart/reference sheets
- Sand grading chart
- Camera
- Appropriate knife
- Spoon and/or small spatula
- Tape measure, folding ruler or yard stick
- Portable table
- Polyethylene sheeting
- Hand lens
- Equipment decontamination supplies
- Deionized water in squeeze bottle
- Small squirt bottle with dilute hydrochloric acid (1 part 10N HCl to 3 parts water)PID
- Garbage bags

OFFICE

- Prepare/update the HASP; make sure the field team is familiar with the latest version.
- Discuss the objective for the soil sampling program with the project manager and/or the field lead. Discuss sample order, collection method, designation, analytical parameters, turn-around times, laboratory, etc.
  - Are the soil cuttings to be containerized in drums or returned to borehole?
  - Field decontamination required?
- Confirm that all necessary equipment is available in-house or has been ordered. Rental equipment is typically delivered the day before fieldwork is scheduled. Prior to departure, test equipment and make sure it is in proper working order.
- Verify that a utility survey/mark-out has been performed to ensure that sample locations are clear of overhead and buried utilities. Obtain a copy of the markout ticket or confirmation number. Additionally, a private geophysical sub-surface survey may be necessary.

ON-SITE

- Verify that underground utilities have been marked out and that the markouts are clear. Stay at least two feet away from any marked utility. Identify if any overhead obstructions or limited access areas exist near proposed borings and contact the Project Manager if any proposed locations need to be moved. Sketch/photograph markout locations.
- Review the HASP with all field personnel, conduct Health & Safety tailgate meeting.
- Make sure appropriate PPE is worn by all personnel and work area is safe (i.e., utilize traffic cones; minimize interference with on-site activities and pedestrian traffic, etc.).
- Calibrate equipment (if applicable) and record all rental equipment serial numbers in the field book.

MODIFIED BURMISTER SOIL CLASSIFICATION SYSTEM

The general description of a soil sample should be in the following order:

1. Color
2. Major Constituent – capitalized
3. Minor Constituent(s)
4. Geologic modifiers or classifications (e.g., glacial deposit, fill material) in parentheses
5. Density
6. Moisture content
7. Modifiers for fine fraction of sample (plasticity, dilatancy and toughness)
8. Other significant observations (e.g., odors, staining, sheen, petroleum product, debris)

SOIL CLASSIFICATION PROCEDURES

Use the following guidelines when recording soil descriptions:

-If the major constituent comprises more than 50% of the soil, then fully capitalize the major component descriptor (e.g., SAND);
-If the major constituent comprises less than 50% of the soil, capitalize the descriptor (e.g., Sand);
-Place a comma after the major and minor constituent descriptors;
-Place size qualifiers such as coarse, medium, or fine before the major constituent descriptors;
-Use the appropriate adjectives for proportions (e.g., and, some, little, trace) when describing the minor fraction(s); and
-Use the modifiers for fine grained soils described (plasticity, dilatancy and toughness).

EXAMPLE 1: Tan, medium SAND, little fine sand, trace coarse sand, trace silt, stratified (Outwash), loose, wet.

EXAMPLE 2: Gray, CLAY, soft, wet, medium plasticity, no dilatancy and low toughness.

When logging a soil sample collected from a boring (e.g., split spoon or acetate liner) where more than one soil type is present, describe each one separately, using additional line(s) on the boring log form. Start the description from the top and log each change in stratigraphy in sequence to the bottom. Record the length (e.g., 0-0.5 ft.) at the beginning of each separate sequence description, followed by a colon. Draw a line below the bottom of the complete sample description.

USCS CLASSIFICATION SYSTEM

The USCS is based on grain size and response to physical manipulation at various water contents. This system is often used for classifying soils encountered in boreholes, test pits, and surface sampling. The following properties form the basis of USCS soil classification:

- Percentage of gravel, sand, and fines;
- Shape of the grain size distribution curve; and
- Plasticity and compressibility characteristics.

Four soil fractions are recognized: cobbles, gravel, sand, and fines (silt or clay). The soils are divided as coarse grained soils, fine grained soils, and highly organic soils. Soil description should be concise and stress major constituents and characteristics for fine-grained, organic, or coarse-grained soils.

The general description of a soil sample should be in the following order:

1. Group Name (Group Symbol)
2. Percent and Range of Particle Sizes
3. Plasticity
4. Color (Munsell Color Chart)
5. Odor
6. Moisture
7. Density
8. Additional Comments
9. Geological Origin (Stratigraphic Unit)

EXAMPLE 1: Well Graded Gravel with Sand (GW): mostly fine to coarse subangular gravel, little fine to coarse subangular sand, yellowish brown (10YR 5/4), no odor, moist, loose, few small cinders, fill.

EXAMPLE 2: Silt (ML): mostly silt, non-plastic, gray (7.5YR 5/1), slight hydrocarbon odor, moist, medium dense, lacustrine.

The USCS recognizes 15 soil groups and uses names and letters to distinguish between these groups. The flow charts included in Attachment B: USCS Field Reference Guide, for fine- and coarse-grained soils, can be used to assign the appropriate group symbol(s) and name and are replicated from ASTM D2488. If the soil has properties which do not distinctly place it into a specific group, borderline symbols (example SP-SM, GP-GC, etc.) may be used.

GRAIN SIZE

Grain size classification should be based on the following method.

COARSE GRAINED PARTICLES

Boulder: > 300 mm (>12 in.)
Cobble: 75 - 300 mm (3 in. – 12 in.)
Coarse Gravel: 19 - 75 mm (¾ in. - 3 in.)
Fine Gravel: 4.75 - 19 mm (No. 4 sieve – ¾ in.)
Coarse Sand: 2.0 - 4.75 mm (No. 10 sieve – No. 4 sieve)
Medium Sand: 0.425 - 2.0 mm (No. 40 sieve – No. 10 sieve)
Fine Sand: 0.075 - 0.425 mm (No. 200 sieve – No. 40 sieve)

FINE GRAINED PARTICLES

Note that these particle sizes cannot be visually differentiated with standard field equipment. Silts and clays are distinguished in the field by cohesion and plasticity.

SOIL CLASSIFICATION PROCEDURES

PROPORTIONS

Proportions of grain sizes need to be described in accordance with one of the two following classification systems. Note that in either system minor constituents also include ancillary materials such as mica flakes, dark minerals, naturally occurring organic matter, or anthropogenic material (e.g., fill, brick, concrete).

Modified Burmister:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

Trace:	0-10%
Little:	10-20%
Some:	20-35%
And:	35-50%

The major soil sample constituent is always capitalized and listed first.

USCS:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

Trace:	< 5%
Few:	5-10%
Little:	15-25%
Some:	30-45%
Mostly:	> 50%

COLOR

The main color value should be stated, along with a modifier, if appropriate. For example *light brown* or *reddish brown*

EXAMPLE 1: Gray, poorly sorted angular fine to medium SAND, some silt, trace angular coarse sand, trace clay (lodgement glacial till), slightly mottled, dense, moist *(Modified Burmister description)*

EXAMPLE 2: Well Graded Sand (SW), mostly angular fine to medium sand, little to some silt, few angular coarse sand, few clay, gray, no odor, moist, dense, lodgement glacial till. *(USCS description)*

As with other components of soil classification, consistent soil color descriptions can be very helpful when preparing subsurface interpretations from soil data collected by different personnel. To that end, the use of Munsell Soil Color charts may be implemented to standardize color nomenclature. Just as paint stores have pages of color chips, soil scientists use a book of color chips that follow the Munsell System of Color Notation. The system has three components: Hue (a specific color), Value (lightness and darkness) and Chroma (color intensity). For example, a brown soil may be noted as: hue value/chroma (10YR 5/3).

RELATIVE DENSITY

The modifiers used to describe soil relative density depend on whether the soil is cohesive (i.e. clay) or granular/non-cohesive (gravel, sand or silt). Field evaluation of the density of non-cohesive soils is based the ease of penetration by the sampling equipment used. The density of cohesive soils is based the compressive soil strength of soil or soil stiffness (i.e. how much the soil compresses under a given pressure).

Density can be directly measured in the field, such as with the ASTM 1586: Standard Penetration Test during split spoon sample collection or with a pocket penetrometer. Alternatively, the density can be measured qualitatively, such as the ease of thumb penetration.

MOISTURE CONTENT

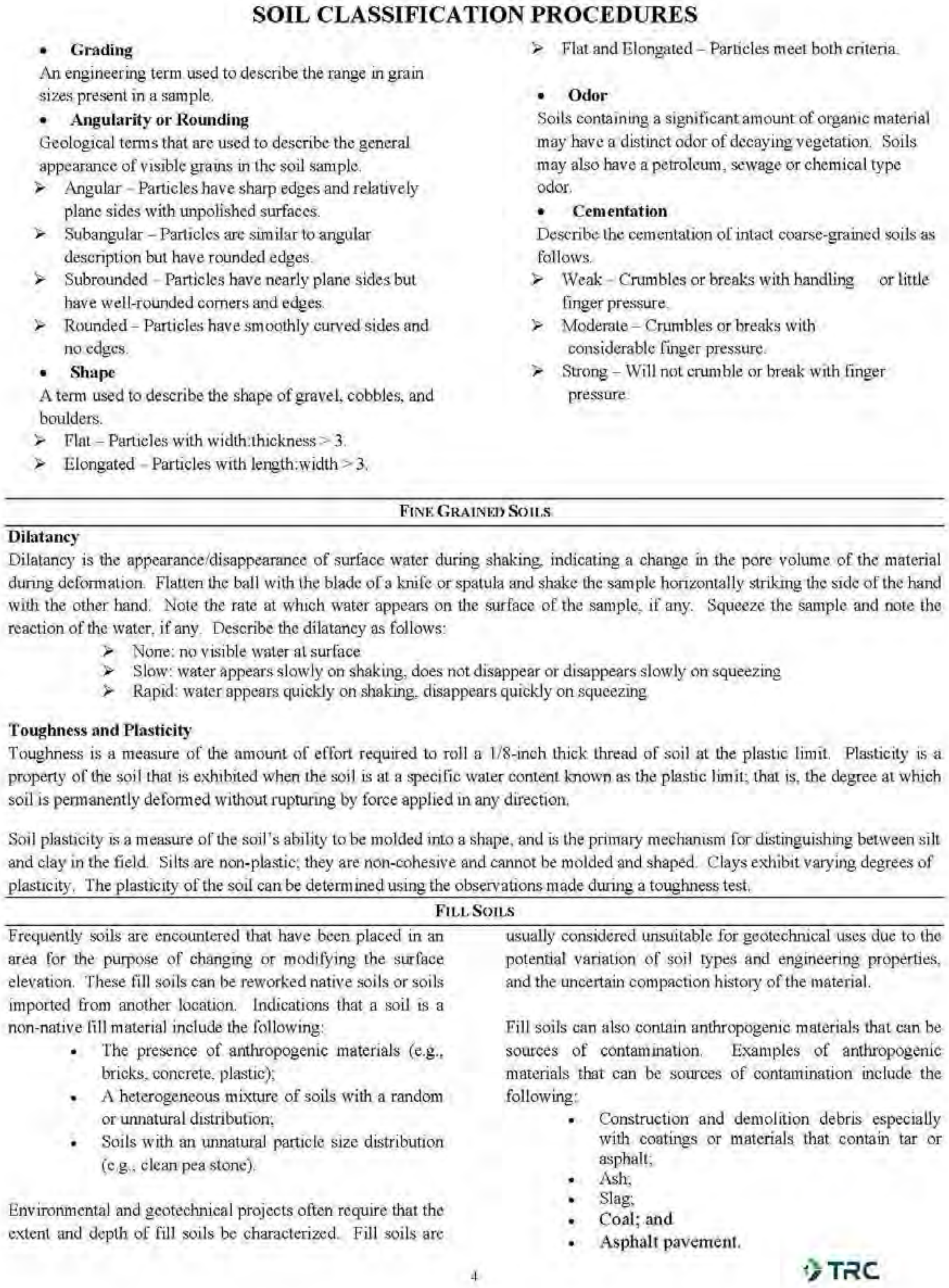
Moisture content should be described using the following modifiers:

- Dry – no apparent moisture, dusty.
- Moist – slight moisture content but no visible water, soils may stick together.
- Wet – water dripping from sample; usually soil is below the water table

GEOLOGIC MODIFIERS

Sedimentological descriptions aid in the geologic classification of a soil material. Only insert geologic modifiers when present.

- **Stratification**
  The presence of alternating layers of non-cohesive materials of different grain sizes or color with layers at least 6 mm thick. Note thickness of layers.
- **Lamination or Varves**
  The presence of alternating very thin layers of fine materials or color, such as silt and clay, with layers less than 6 mm thick. Note thickness of layers.
- **Sorting**
  A geological term used to describe how close in size the grains in a sample are to each other.



SOIL CLASSIFICATION PROCEDURES

- **Grading**

An engineering term used to describe the range in grain sizes present in a sample.

- **Angularity or Rounding**

Geological terms that are used to describe the general appearance of visible grains in the soil sample.

- ➢ Angular – Particles have sharp edges and relatively plane sides with unpolished surfaces.
- ➢ Subangular – Particles are similar to angular description but have rounded edges.
- ➢ Subrounded – Particles have nearly plane sides but have well-rounded corners and edges.
- ➢ Rounded – Particles have smoothly curved sides and no edges.

- **Shape**

A term used to describe the shape of gravel, cobbles, and boulders.

- ➢ Flat – Particles with width:thickness > 3.
- ➢ Elongated – Particles with length:width > 3.
- ➢ Flat and Elongated – Particles meet both criteria.

- **Odor**

Soils containing a significant amount of organic material may have a distinct odor of decaying vegetation. Soils may also have a petroleum, sewage or chemical type odor.

- **Cementation**

Describe the cementation of intact coarse-grained soils as follows.

- ➢ Weak – Crumbles or breaks with handling or little finger pressure.
- ➢ Moderate – Crumbles or breaks with considerable finger pressure.
- ➢ Strong – Will not crumble or break with finger pressure.

FINE GRAINED SOILS

Dilatancy

Dilatancy is the appearance/disappearance of surface water during shaking, indicating a change in the pore volume of the material during deformation. Flatten the ball with the blade of a knife or spatula and shake the sample horizontally striking the side of the hand with the other hand. Note the rate at which water appears on the surface of the sample, if any. Squeeze the sample and note the reaction of the water, if any. Describe the dilatancy as follows:

- ➢ None: no visible water at surface
- ➢ Slow: water appears slowly on shaking, does not disappear or disappears slowly on squeezing
- ➢ Rapid: water appears quickly on shaking, disappears quickly on squeezing

Toughness and Plasticity

Toughness is a measure of the amount of effort required to roll a 1/8-inch thick thread of soil at the plastic limit. Plasticity is a property of the soil that is exhibited when the soil is at a specific water content known as the plastic limit; that is, the degree at which soil is permanently deformed without rupturing by force applied in any direction.

Soil plasticity is a measure of the soil's ability to be molded into a shape, and is the primary mechanism for distinguishing between silt and clay in the field. Silts are non-plastic; they are non-cohesive and cannot be molded and shaped. Clays exhibit varying degrees of plasticity. The plasticity of the soil can be determined using the observations made during a toughness test.

FILL SOILS

Frequently soils are encountered that have been placed in an area for the purpose of changing or modifying the surface elevation. These fill soils can be reworked native soils or soils imported from another location. Indications that a soil is a non-native fill material include the following:

- The presence of anthropogenic materials (e.g., bricks, concrete, plastic);
- A heterogeneous mixture of soils with a random or unnatural distribution;
- Soils with an unnatural particle size distribution (e.g., clean pea stone).

Environmental and geotechnical projects often require that the extent and depth of fill soils be characterized. Fill soils are usually considered unsuitable for geotechnical uses due to the potential variation of soil types and engineering properties, and the uncertain compaction history of the material.

Fill soils can also contain anthropogenic materials that can be sources of contamination. Examples of anthropogenic materials that can be sources of contamination include the following:

- Construction and demolition debris especially with coatings or materials that contain tar or asphalt;
- Ash;
- Slag;
- Coal; and
- Asphalt pavement.

Title: **Calibration of Field Instruments for Water Quality Parameters**	Procedure Number: **ECR 011**
	Revision Number: **1**
	Effective Date: **January 2020**

Authorization Signatures

Darby Litz		Elizabeth Denly	
Technical Review Darby Litz	Date 1/1/20	Environmental Sector Quality Director Elizabeth Denly	Date 1/1/20

This document is proprietary property of TRC. It is to be used only by the person(s) to whom it has been provided and solely for the express purpose intended. Any reproduction or distribution, for purposes other than the intended, is forbidden without the express written consent of TRC.

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 Scope and Applicability

The purpose of this standard operating procedure (SOP) is to provide a framework for calibrating field instruments used to measure water quality parameters for ground water and surface water. Water quality instruments addressed in this SOP include those that measure temperature, pH, dissolved oxygen (DO), conductivity/specific conductance, oxidation-reduction potential (ORP), and turbidity.

1.2 Summary of Method

All monitoring instruments must be calibrated before they are used to measure environmental samples. This SOP outlines the general methods for field instrument calibration, calibration documentation requirements, and corrective action procedures that will be implemented during field activities. Calibration procedures are different for each field instrument used and these procedures should be provided by the instrument manufacturer. The manufacturer's instruction manual (including the instrument specifications) should accompany the instrument into the field.

At a minimum, calibration and/or a calibration check must be performed at the beginning of each day prior to use. Site-specific work plans should be consulted for required calibration frequency. Note: The initial calibration may be performed in the office prior to the field event or by the equipment supplier; however, calibration checks should be performed on site prior to use on the day of the fieldwork.

1.3 Equipment

The following equipment may be utilized when calibrating water quality parameter measuring equipment. Project-specific conditions or laboratory requirements may warrant the addition or deletion of items from this list.

- Appropriate level of personal protective equipment (PPE), as specified in the site-specific Health and Safety Plan (HASP).
- Water quality meter capable of measuring one or more of the following based on project scope: pH, temperature, DO, specific conductivity, and ORP (e.g., YSI 600XL, Horiba U-50, Hydrolab Quanta/QED MP-20, or equivalent)
- Turbidity meter (e.g., LaMotte Model 2020e, Hach 2100P, or equivalent)
- Deionized water
- Flow-through cell
- Ring stand with clamp
- Paper towels
- Soft tissue (e.g., Kimwipes®)
- Cuvettes

- Buffer solutions at pH 4, 7 and 10 standard units (SU)*. Commercially available solutions that have been validated by comparison to National Institute of Standards and Technology (NIST) standards are recommended for routine use.
- Conductivity solution (potassium chloride, typically 1,413 micromhos/centimeter [µmhos/cm])*
- ORP calibration solution (e.g., Zobell)*
- Turbidity standards (0, 1, 10 nephelometric turbidity units [NTUs] or StablCal Kit)*
- Zero DO solution (0.0 milligrams per liter [mg/L])*
- DO membrane kit (electrolyte solution, membranes)
- NIST thermometer (0.2ºC accuracy)*
- Small glass or polyethylene jars to hold the calibration standards (4-8 oz.)
- Field book
- Field instrument calibration logs
- Cup or spray bottle for the deionized water

*Dependent on the project-specific requirements and the instrument manufacturer

1.4 Definitions

Not applicable

1.5 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific HASP. TRC personnel will use the appropriate level of PPE as defined in the HASP.

Implementing this SOP will require the use of calibration solutions. The following health and safety precautions must be taken with the pH, conductivity, turbidity, zero DO and ORP solutions: Avoid inhalation, skin and eye contact, and ingestion.

Maintenance of the instruments will require the use of liquid cleaners. Although these substances are not hazardous materials, TRC will appropriately handle and store them at all times in accordance with manufacturer’s instructions.

1.6 Cautions and Potential Problems

General cautions and potential problems are discussed below. Specific issues for individual parameters are discussed in Section 2.

- Prior to calibration, all instrument probes must be cleaned according to the manufacturer’s instructions. Failure to perform this step (proper maintenance) can lead to erroneous measurements. Rental instruments are routinely maintained by the vendor but should be checked for residues upon receipt.

- Prior to using calibration standards, check and record all expiration dates and lot numbers for the solutions on the field instrument calibration log. Discard any calibration standards that are past their expiration date.
- Avoid storing calibration solutions in extremely hot or cold temperatures to maintain solution integrity and prevent calibration errors.
- The volume of the calibration solutions must be sufficient to cover both the probe being calibrated and the temperature sensor (see manufacturer's instructions for additional information).
- Pre-rinse the sensor and calibration cup with a small amount of calibration solution to minimize dilution or cross-contamination.
- If desired, use a ring stand and clamp to secure the sonde in an upright position. This will prevent the sonde from falling over and damaging the probes.
- While calibrating or performing sample measurements, make sure there are no air bubbles lodged between the probe and the probe guard.
- Do not immerse the sensors in sea water or other highly saline water, alcohol or organic solvents.
- Problems during calibration may indicate the need to clean or replace sensors, electrodes or membranes or replace the calibration solutions.
- Have several clean absorbent paper towels or cotton cloths available to dry the probe between rinses and calibration solutions. Shake excess water off of the probes and dry off the outside of the probe sensors.
- All meters may have different relative accuracy, which will be specified in the instrument manual. Confirm that the meter being used meets the project's accuracy requirements.

1.7 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project- and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER) workers
- 8-hour annual HAZWOPER refresher training

2.0 PROCEDURES

Prior to use, instruments that will be used during field activities will be inspected to ensure they are clean, checked for possible malfunctions, and calibrated in accordance with manufacturer's procedures. Often, equipment provided by a rental company is calibrated prior to shipment, and a calibration certificate is provided with the equipment. Review the calibration certificate provided by the equipment supplier.

Calibration checks (or verifying that instrument readings fall within an acceptable range of a standard without running through the full instrument calibration steps) will be performed on field instruments prior to their initial use, at least once daily, or whenever indications of faulty readings or instrument malfunction occurs. Some instruments or certain project scopes may require more frequent calibration checks depending on project quality objectives. In general, instrument selection and calibration will include the following steps:

- Determine which instruments are needed for the specific field tasks. Record the make, model number, and serial number of the instrument on the field instrument calibration log or in the field book.
- Obtain the necessary instruments and standard solutions for calibration. Check expiration dates on standard solutions and replace if out of date. Record the manufacturer, true value, lot number and expiration date of the standard solutions on the field instrument calibration log or in the field book.
- Assemble the instrument and turn it on allowing the instrument to warm up.
- Check battery charge, and charge or replace if necessary.
- Clean instrument (if necessary).
- If applicable, program the multi-probe instrument so that the applicable parameters to be measured will be displayed.
- Calibrate the instrument prior to field use in accordance with manufacturer’s procedures. (Note: If applicable, calibrate DO and conductivity first, because these parameters may affect the other calibrations).
- Document all calibration activities and results on the field instrument calibration log or in the field book.
- If the instrument malfunctions and cannot be corrected, obtain a replacement.
- Clean and decontaminate the instrument after use and before storage.
- Conduct calibration checks at least once per day or as needed.

The subsections that follow provide additional details and guidance regarding calibration for specific parameters; however, since every field instrument is different, refer to the specific instrument’s manual for appropriate operating and calibration procedures.

2.1 Temperature

Most instrument manuals state that calibration of the temperature sensor is not required, but this SOP recommends that the temperature sensor be checked to verify its accuracy. This accuracy check should be performed at least once per year and the accuracy check date/information should be kept with the instrument. If the accuracy check date/information is not included with the instrument or the last check was performed over a year prior to the date of use, it is recommended that the temperature sensor accuracy be checked at the beginning of the sampling event. If the instrument contains multiple temperature sensors, each sensor should be checked. Accuracy checks may be performed by the manufacturer/equipment supplier or in the field. Review the calibration certificate provided by the equipment supplier.

In the event of suspect temperature readings, the following verification procedure can be performed.

FIELD VERIFICATION PROCEDURE

1. Record the manufacturer, model number, and the certification number of the NIST thermometer being used to check the instrument's temperature sensor on the field instrument calibration log or in the field book. Allow a container filled with water to equilibrate to ambient temperature.

2. Place an NIST thermometer and the instrument's temperature sensor into the water, and wait approximately 2 to 3 minutes for both temperature readings to stabilize.

3. Record the temperature displayed by the thermometer and the temperature sensor on the field instrument calibration log or in the field book.

4. Compare the two measurements. The instrument's temperature sensor must agree with the NIST thermometer measurement within the accuracy of the sensor (typically ±0.15ºC). If the measurements do not agree, determine the correction factor to be applied to any subsequent temperature measurements made with this instrument. This correction factor must be applied to all readings made with the temperature sensor of this instrument.

   Correction Factor = NIST thermometer value – temperature sensor value

5. Record the date the temperature sensor check was performed and the correction factor that was determined, if applicable, on the field instrument calibration log or in the field book.

2.2 Dissolved Oxygen

DO is the volume of oxygen that is dissolved in water and is typically measured using an electrochemical membrane sensor.

CAUTIONS AND POTENTIAL PROBLEMS WITH DO MEASUREMENTS

- The DO probe's membrane and electrolyte solution should be checked prior to the sampling period and replaced if needed. If wrinkles or air bubbles are present under the membrane, if the membrane is torn or dirty, or if the electrolyte solution looks contaminated, replace both the membrane and electrolyte solution prior to calibration. Failure to perform this step may lead to erratic or erroneous measurements.
- Rental instruments are routinely maintained by the vendor, but the membrane should be checked for signs of wear upon receipt.
- If the probe reading shows the error message, "value out of range", the instrument probe must be recalibrated at a minimum. If the error persists, replace the sensor membrane and recalibrate.
- Most meters will allow you to calibrate the meter in air or against a wet sponge, which gives a "saturated air" calibration. Like pH, conductivity, and ORP, DO is heavily dependent on temperature. DO is also dependent upon barometric pressure. Typically DO is calibrated by entering the barometric pressure (usually in mm of mercury). Barometric pressure is dependent upon elevation, so be aware of substantial differences in elevation between your sampling location and the location from which you are

obtaining the barometric pressure reading. Use the Oxygen Solubility at Indicated Pressure chart in Attachment A for comparison to your calibrated reading.

- Barometric pressure should be corrected to local altitude for DO calibration:

  True BP (mm Hg) = [Corrected BP (mm Hg)] – [2.5 * Local Altitude (ft. above sea level)/100]

- If the calibration cup is used for DO, ensure the cup is loose to allow for pressure equilibration.
- Wait 3 to 5 minutes for the air in the cup to saturate with water during DO calibration.
- If calibrating in air, remove water droplets from the membrane by shaking the probe prior to inserting it into the calibration environment.
- Allow the temperature to stabilize completely in the calibration environment.
- Always keep the sensor clean of biofouling, such as bacteria or algae growth which may generate or consume oxygen resulting in erroneous readings.
- Keep the sensor free of oil, which could clog the membrane and prevent oxygen from diffusing to the sensor.
- Store the probe in a moist environment to keep the membrane from drying out, but do not store it in water which could encourage algae growth on the probe.

CALIBRATION PROCEDURE

1. Gently dry the temperature sensor according to manufacturer's instructions.

2. Place a wet sponge, a wet paper towel, or 1/8 inch of water on the bottom of the DO calibration container that comes with the instrument. (The protective cover of the probe assembly also serves as the container used for the DO calibration.)

3. Place the DO probe in the container without the probe coming in contact with the wet sponge or paper towel. The probe must fit loosely in the container to ensure it is vented to the atmosphere.

4. Allow the confined air to become saturated with water vapor (saturation occurs in approximately 3 to 5 minutes as temperature becomes stable). During this time, turn on the instrument to allow the DO probe to warm up (may require at least 10-20 minutes warm-up time).

5. Record the barometric pressure (usually in mm of mercury) from the instrument's onboard sensor, if available. If the instrument does not have an onboard barometer, this measurement can also be determined from an on-site barometer if a weather station is on site and manually entered into the meter. It is recommended that the barometric pressure not be obtained from the local weather service unless the pressure is corrected for the elevation of the sampling location and this is the only source of barometric data. [**Note:** inches of mercury times 25.4 mm/inch mercury equals mm of mercury].

6. Record the DO reading in mg/L and percent and compare this reading to the Oxygen Solubility at Indicated Pressure chart in Attachment A. For example, if the barometric

pressure is 750 mm Hg and the temperature inside the calibration cup is 25°C, the DO in mg/L reading should be 8.13 mg/L. Record this value on the field instrument calibration log.

7. If the values recorded on the field instrument calibration log for DO in mg/L do not agree with the published values from Attachment A and are not within the accuracy of the instrument (such as ± 0.2 mg/L and ± 2%, depending on the reading), repeat calibration. If this does not work, change the membrane and electrolyte solution and repeat calibration.

8. Remove the probe from the container, rinse it with deionized water, pat it dry with a towel, and place it into a zero (0.0 mg/L) DO standard if being used as part of the calibration. Fill the protective cup with the fresh zero DO standard. Pour the zero DO standard into the protective cup; the standard should be close enough to the top, so that the DO probe fits tightly into the container (no headspace). Check and record the unit's temperature reading.

9. Wait until the "mg/L DO" readings have stabilized. The instrument should read between -0.5 and +0.5 mg/L or to the accuracy of the instrument (usually ± 0.2 mg/L) within 3 minutes. Record this value on the field instrument calibration log. If the instrument does not reach this value, it may be necessary to clean the probe and change the membrane and electrolyte solution. Repeat the zero DO step if the value obtained is not acceptable. If this does not work, prepare a new 0.0 mg/L standard. If these procedures do not work, consult the equipment vendor for troubleshooting or equipment replacement.

   NOTE: For Zero DO checks: The solution used for this check contains sodium meta-bisulfite or sodium sulfite, which are harmful to the sensor and membrane. It is common practice to recalibrate the meter to 100% saturation after conducting a zero DO check to confirm that the sensor is still operating correctly. A zero DO check is not performed every day the instrument is in use for this reason, but a check should be performed at a minimum of once per sampling event. If conducting this check, be sure to record the manufacturer, true value, lot number, and expiration date of the solution on the field instrument calibration log.

2.3 pH

The pH is the measure of the degree of the acidity or alkalinity of a solution as measured on a scale of 0 to 14 SU. The pH of a sample is determined electrometrically using a glass electrode. All pH measurements are in SU.

CAUTIONS AND POTENTIAL PROBLEMS WITH PH MEASUREMENTS

- Choose the appropriate buffered standards that will bracket the expected values at the sampling locations. For ground water, the pH will usually be close to 7 SU. A minimum of two standards are typically needed for the calibration: one close to 7 SU, one at least two pH units below 7 SU or at least two pH units above 7 SU. The instrument will need to be re-calibrated if the water sample's pH is outside the range defined by the two standards used in the initial calibration, either by adding a third calibration point (if the meter will allow) or by selecting two new pH standards that bracket the water sample's pH.
- Regardless if performing a two- or three-point calibration, always calibrate with pH 7 buffer first.

CALIBRATION PROCEDURE

1. Allow the buffered standards to equilibrate to the ambient temperature.

2. Fill calibration containers with the buffered standards to ensure the pH probe and temperature sensor are completely submerged.

3. Remove the cover of the probe, rinse the probe in a cup filled with deionized water or use a spray bottle, and blot the probe dry with a soft tissue.

4. Enter the value of the first pH buffer solution (e.g., pH 7), immerse the probe in the standard, and allow at least 1 minute for temperature equilibration before proceeding. Record the temperature on the field instrument calibration log.

5. Enter the buffered solution value (7) into the pH calibration menu of the instrument. Allow the pH reading to stabilize for approximately 30 seconds, and if the reading does not change, finish the calibration and record the calibrated value on the field instrument calibration log. The calibration values after adjustment shall be within the accuracy of the instrument, or as required by the project. For example, if the accuracy of the meter is ±0.1 SU, then the calibration values after adjustment shall be between 6.9 and 7.1 SU. If the calibration values after adjustment are outside of this range, recalibrate. If readings continue to fluctuate or readings do not stabilize after recalibration, consult the equipment vendor for troubleshooting or equipment replacement (e.g., may need a new pH electrode).

6. Remove probe from the initial buffer solution, rinse in a cup filled with deionized water or use a spray bottle, and blot dry with soft tissue. Dispose of the used buffer solution.

7. Immerse probe into the second buffer solution (e.g., pH 4). Repeat step #5, substituting “4” into the pH calibration menu instead of “7”.

8. Remove probe from the second buffer solution, rinse in a cup filled with deionized water or use a spray bottle, and blot dry with soft tissue. Dispose of the used buffer solution.

9. Immerse probe in third buffer solution (e.g., pH 10) or continue to step #11 if only a two-point calibration is being performed. Repeat step #5, substituting “10” into the pH calibration menu instead of “7”.

10. Remove probe from the third buffer solution, rinse in a cup filled with deionized water or use a spray bottle, and blot dry with soft tissue. Dispose of the used buffer solution.

11. To perform the instrument pH check, select monitoring/run mode, (ensure that the initial buffer solution temperature [pH 7] has not changed), and immerse the probe into the buffer solution. Wait for the reading to stabilize. The instrument should read the initial standard value (7 SU) within the accuracy of the instrument, or as required by the project. Record the pH 7 check reading on the field instrument calibration log. If the reading is not within the acceptance criteria, then re-calibrate the instrument. If re-calibration does not correct the instrument reading, then the calibration range may be too wide. Reducing the calibration range by using standards that are closer together may improve the instrument’s accuracy.

2.4 Specific Conductance

Conductivity is used to measure the ability of an aqueous solution to conduct an electrical current. Specific conductance is the conductivity value corrected to 25ºC. Calibrating an instrument for specific conductance automatically calibrates the instrument for conductivity and vice-versa.

CAUTIONS AND POTENTIAL PROBLEMS WITH SPECIFIC CONDUCTANCE MEASUREMENTS

- Most instruments are calibrated against a single standard that is near the specific conductance of the environmental samples. A second standard that is above the environmental sample specific conductance can be used to check the linearity of the instrument in the range of measurements. However, a single-point calibration standard is adequate to assess the accuracy and operation of the sensor.
- Calibrate the conductivity with a standard near the anticipated conductivity of the water. For fresh water, a 1 mS/cm standard is appropriate.
- For some meters, it is important that the top vent hole of the conductivity sensor be immersed during the calibration. Review the instrument manual to determine if this is required.
- Specific conductance/conductivity can have different units (e.g., mmho/cm, mS/cm, µmho/cm, µS/cm), especially on auto-ranging instruments. Note: mhos/cm = Siemens/cm. Check with the Project Manager or database manager to determine if field measurements should be restricted to a consistent unit (e.g., µmhos/cm or µS/cm, not mmhos/cm or mS/cm) so that conversion is not necessary when importing data into a database.
- Be aware of meters which autocorrect for temperature and how to enter the calibration value per the procedures in the instrument's manual. To calibrate instruments that autocorrect for temperature, enter the calibration value of the solution (µmhos/cm at 25°C). For instruments without automatic temperature compensation, the solution's conductivity value must be corrected for the temperature that the sensor is reading before entering the value into the meter. In some cases, you may be able to adjust the temperature of the calibration solution to near 25°C, such that the standard calibration value is applicable; otherwise an adjustment for temperature needs to be accounted for. Additionally, if calibrating for conductivity instead of specific conductance, the solution's conductivity value must be corrected for the temperature that the sensor is reading.

CALIBRATION PROCEDURE

1. Allow the calibration standard to equilibrate to the ambient temperature.

2. Remove probe from its storage container, rinse the probe with a small amount of deionized water, and pat dry the sensor with a soft tissue.

3. Lower the sensor into the conductivity standard. Gently move the probe up and down in the solution to remove any air bubbles from the sensor if present. Allow the probe to sit in the solution for at least 30 seconds to allow values to equilibrate before proceeding.

4. Enter the calibration value of the solution (e.g., 1,413 µmhos/cm at 25°C). Record the temperature of the solution on the field instrument calibration log, and allow the specific conductance reading to stabilize for approximately 30 seconds. Record the calibrated value after stabilization on the field instrument calibration log. The reading should be within ±5% of the true value. If the reading is not within this range, recalibrate. If readings continue to fluctuate significantly after a recalibration, consult the equipment vendor for troubleshooting or equipment replacement.

5. Remove probe from the standard, rinse the probe with deionized water, and replace the protective cover over the sensors.

2.5 Oxidation-Reduction Potential (ORP)

The oxidation-reduction potential is the electrometric difference measured in a solution between an inert indicator electrode and a suitable reference electrode. The electrometric difference is measured in millivolts and is temperature dependent.

CAUTIONS AND POTENTIAL PROBLEMS WITH ORP MEASUREMENTS

- Note that ORP is not usually the same as Eh. Eh is ORP measured relative to a standard hydrogen electrode (SHE). Typical ORP reference electrodes used in the field are Ag/AgCl electrodes, not SHEs. The difference is that Eh would be approximately 200mV higher than ORP measured against a Ag/AgCl reference electrode. See Standard Methods 2580B and YSI Tech Note (2005) for more details.
- Some meters allow you to calibrate ORP, but many do not allow calibration. Testing solutions are available to verify your ORP reading but they are not accurate enough to be used as calibration standards.
- ORP is temperature dependent. Look up the millivolt (mV) calibration value at the measured temperature from the millivolt versus temperature correction table usually found on the standard bottle or on the standard instruction sheet. It may be necessary to interpolate millivolt values between temperatures.

CALIBRATION OR VERIFICATION PROCEDURE

1. Allow the calibration standard (e.g., a Zobell solution) to equilibrate to ambient temperature.

2. Remove the cover of the probe, and place it into the standard.

3. While stirring the standard, wait for the probe temperature to stabilize, and then read the temperature.

4. Look up the millivolt (mV) value at this temperature from the millivolt versus temperature correction table usually found on the standard bottle or on the standard instruction sheet. It may be necessary to interpolate millivolt values between temperatures. Enter the temperature-corrected ORP value, and calibrate the instrument. Record the values on the field instrument calibration log.

5. The reading should remain unchanged within manufacturer's specifications. If it changes, re-calibrate. If readings continue to change after calibration, consult the manufacturer.

6. If the instrument instruction manual states the instrument is factory calibrated, then verify the factory calibration against the standard. If the reading does not agree with the standard within the accuracy of the instrument, the instrument will need to be re-calibrated by the manufacturer.

2.6 Turbidity

Turbidity refers to how clear the water is and is a measure of relative sample clarity. The greater the amount of total suspended solids in the water, the higher the measured turbidity. The turbidity method is based upon a comparison of intensity of light scattered by a sample under defined conditions with the intensity of light scattered by a standard reference suspension. A turbidity meter is a nephelometer with a visible light source for illuminating the sample and one or more photo-electric detectors placed 90 degrees to the path of the light source. Turbidity values are recorded in NTUs.

CAUTIONS AND POTENTIAL PROBLEMS WITH TURBIDITY MEASUREMENTS

- Some instruments will only accept one standard. For these instruments, the standards will serve as check points.
- Some regulatory agencies will not allow turbidity measurements through a flow-through cell, and require a stand alone turbidity meter. Verify that the selected meter will meet project objectives prior to use.
- For the greatest accuracy during the calibration procedure, ensure that after the meter is blanked and the blank is scanned as a sample, the reading is 0.00 NTU. If not, re-zero the meter and scan the blank again until it reads 0.00 NTU. When scanning the calibration standards as the sample, scan the calibration standard three times removing the tube from the chamber after each scan. The readings should be consistent. Use the last consistent reading to calibrate the meter. If the readings are not consistent, avoid using an aberrant reading to calibrate the meter.
- The meter should be placed on a surface that is free from vibrations. Vibrations can cause high readings.
- Gently mix the sample by inverting before taking a reading, but avoid introducing air bubbles.
- Scratches, fingerprints, and water droplets on the outside of the cuvettes can cause additional light scatter, leading to inaccurate readings. If necessary, wipe the outside of the cuvette with a soft tissue. If the cuvette is scratched or dirty, discard.
- Ensure that the cuvette is always placed in the chamber in the same orientation, as differences in orientation can cause differences in results. Proper cuvette orientation may be indicated by a mark or arrow on both the cuvette and the instrument.

CALIBRATION PROCEDURES – STAND ALONE TURBIDITY METER

NOTE: Sometimes standards are provided in the cuvette with the meter.

1. Rinse a cuvette with deionized water. Shake the cuvette to remove as much water as possible. Do not wipe the inside of the cuvette, because lint from the wipe may remain in the cuvette. Add the standard to the cuvette.

2. Place the 0.0 NTU standard into the instrument and scan the sample (measure the standard). Record the reading on the field instrument calibration log. The 10.0 NTU standard can be measured after the 0.0 NTU standard is scanned.

3. Select the 10.0 NTU standard and scan the sample (measure the standard). The reading should be within ±10% of the true value. Record the reading on the field instrument calibration log. If the reading is within the acceptance criteria, then move on to step # 5. If not, calibrate the instrument to 10.0 NTU. Record the reading and any significant changes on the field instrument calibration log.

4. After adjusting the calibration, re-read the 10.0 NTU standard to ensure it is now meeting accuracy requirements. If not, repeat step #3. Otherwise, continue to step #5.

5. Repeat step #3, if needed, for the 1.0 NTU standard.

6. After adjusting the calibration, re-read the 1.0 NTU standard to ensure it is now meeting accuracy requirements (±10% of the true value). If not, repeat step #3. Otherwise, continue to step #7.

7. As a final check of the instrument, scan the blank (0.0 NTU standard). The unit display should read very close to zero. Record the reading on the field instrument calibration log.

   NOTE: If during the calibration procedure, you find the value of the standard is >50% from the expected value (e.g., 0.49 NTU for the 1.0 NTU standard), scrolling to the true value (e.g., 1.0 NTU) and attempting to calibrate will result in an error code, because the value to which you have changed it is >50% of the expected value of the standard. In this case, it is necessary to re-calibrate the unit from the beginning starting with a blank. If this fails to produce adjustable and reproducible values for the 1.0 and 10.0 NTU standards, re-calibrate using new standards and discard the current standards. If the meter still fails to calibrate following repeated attempts at calibration, consult the equipment vendor for troubleshooting or equipment replacement.

   NOTE: If only performing a two-point calibration (depending on project requirements), the 0.0 NTU and 10 NTU (or comparable NTU level) standards should be used.

CALIBRATION PROCEDURES – MULTI-PARAMETER METER WITH FLOW-THROUGH CELL

This is a two point calibration with a standard and turbidity free water. The standard can be formazin, polymer beads, or a meter-specific quick calibration solution. Turbidity free water can be obtained by filtering distilled or deionized water through a 0.1, 0.3, or 0.45 micron filter.

1. Rinse the calibration cup and sensors with the turbidity free water. Fill the cup with enough water so that the turbidity sensor is covered (sensors pointed down).

2. Scan the sample (measure the standard). After the reading has stabilized, enter the zero turbidity value into the meter in accordance with manufacturer directions and record the reading on the field instrument calibration log.

3. Rinse the calibration cup and sensors with the standard solution. Fill the cup with enough standard solution so that the turbidity sensor is covered (sensors pointed down).

4. Scan the sample (measure the standard). After the reading has stabilized, enter the standard solution turbidity value into the meter in accordance with manufacturer directions and record the reading on the field instrument calibration log. If the reading is within the acceptance criteria, calibration is complete. If not, recalibrate the instrument. Record the reading and any significant changes on the field instrument calibration log.

   NOTE: If during the calibration procedure, you find the value of the standard is outside of the range acceptable by the meter and attempting to calibrate results in an error code, it is necessary to re-calibrate the unit from the beginning starting with a blank/turbidity free water. If this fails to produce acceptable and reproducible values for the standards, re-calibrate using new standards and discard the current standards. If the meter still fails to calibrate following repeated attempts at calibration, consult the equipment vendor for troubleshooting or equipment replacement.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum or roll-off bin, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

In addition to checking the calibration of instruments prior to measurements, calibration checks may also be required at other times of the day. If there are significant temperature fluctuations or erroneous readings, a calibration check may be required. Some programs require a post-calibration check at the conclusion of the day to ensure that instrument drift has not occurred. Refer to the site-specific work plan for calibration frequency.

Comparing current values with historical values at the same measuring location can be helpful in assessing instrument and calibration reliability.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

All work must be dated and signed by the analyst. Any changes should be crossed out with a single line, initialed, and dated.

Prior to calibrating, the field equipment and calibration standard information should be recorded on a field instrument calibration log and/or in the field book. For field equipment, the information recorded should include the make, model number, and the serial number of the instrument. Each instrument can be assigned an identification number that can be referenced in future field notes or when filling out the field instrument calibration log.

For calibration standards, the information recorded should include the manufacturer, expiration date, true value, and any other description, such as lot number. Each calibration standard can also be assigned an identification number that can be referenced in future field notes or when filling out the field instrument calibration log. If standards are not supplied with an expiration date, the standards should be initialed and dated when received and when opened (not applicable for standards supplied with the rental equipment).

The calibration records provided by the equipment vendor and the certificates of analysis for each standard will be maintained in the project files.

All calibration measurements must be documented in the field book or on a separate field instrument calibration log. Example field instrument calibration logs are presented in Attachment B. At a minimum, the field instrument calibration log must include the instrument information described above, calibration standard information described above, calibration date, and the instrument calibration results.

6.0 REFERENCES

USEPA. January 19, 2010. *Standard Operating Procedure, Calibration of Field Instruments*, Revision No. 2. USEPA Region I.

American Public Health Association, American Water Works Association, and Water Environment Federation. January 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition.

YSI Environmental. 2005. *Measuring ORP on YSI 6-Series Sondes: Tips, Cautions and Limitations*. YSI Environmental Tech Note. http://www.ysi.com/media/pdfs/T608-Measuring-ORP-on-YSI-6-Series-Sondes-Tips-Cautions-and-Limitations.pdf.

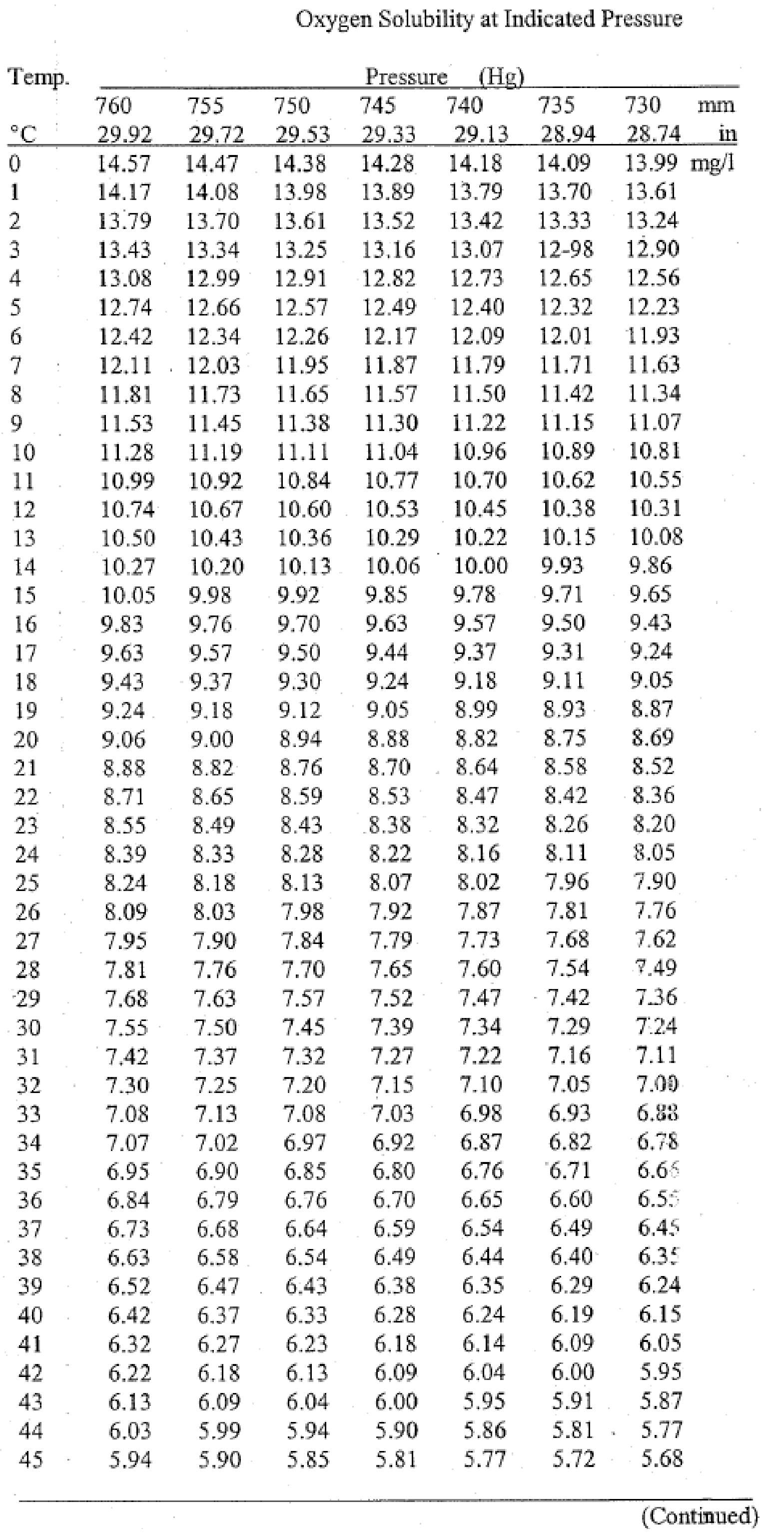
7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	NOVEMBER 2014	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING AND SOP RE-NUMBERING

Attachment A

Oxygen Solubility at Indicated Pressure

Attachment A (page 1 of 2)



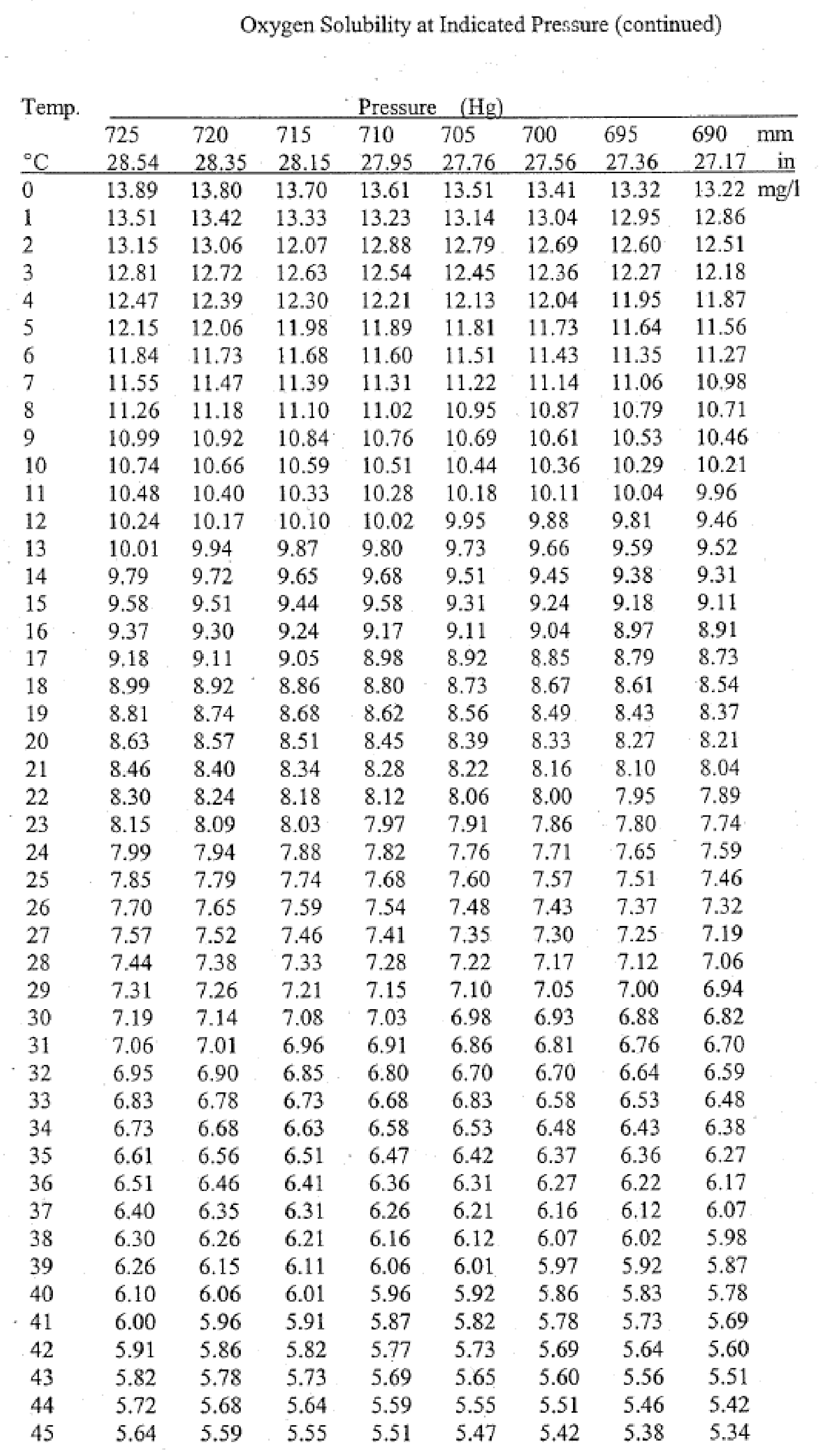
Oxygen Solubility at Indicated Pressure

Temp.	Pressure (Hg)							
	760	755	750	745	740	735	730	mm
°C	29.92	29.72	29.53	29.33	29.13	28.94	28.74	in
0	14.57	14.47	14.38	14.28	14.18	14.09	13.99	mg/l
1	14.17	14.08	13.98	13.89	13.79	13.70	13.61	
2	13.79	13.70	13.61	13.52	13.42	13.33	13.24	
3	13.43	13.34	13.25	13.16	13.07	12.98	12.90	
4	13.08	12.99	12.91	12.82	12.73	12.65	12.56	
5	12.74	12.66	12.57	12.49	12.40	12.32	12.23	
6	12.42	12.34	12.26	12.17	12.09	12.01	11.93	
7	12.11	12.03	11.95	11.87	11.79	11.71	11.63	
8	11.81	11.73	11.65	11.57	11.50	11.42	11.34	
9	11.53	11.45	11.38	11.30	11.22	11.15	11.07	
10	11.28	11.19	11.11	11.04	10.96	10.89	10.81	
11	10.99	10.92	10.84	10.77	10.70	10.62	10.55	
12	10.74	10.67	10.60	10.53	10.45	10.38	10.31	
13	10.50	10.43	10.36	10.29	10.22	10.15	10.08	
14	10.27	10.20	10.13	10.06	10.00	9.93	9.86	
15	10.05	9.98	9.92	9.85	9.78	9.71	9.65	
16	9.83	9.76	9.70	9.63	9.57	9.50	9.43	
17	9.63	9.57	9.50	9.44	9.37	9.31	9.24	
18	9.43	9.37	9.30	9.24	9.18	9.11	9.05	
19	9.24	9.18	9.12	9.05	8.99	8.93	8.87	
20	9.06	9.00	8.94	8.88	8.82	8.75	8.69	
21	8.88	8.82	8.76	8.70	8.64	8.58	8.52	
22	8.71	8.65	8.59	8.53	8.47	8.42	8.36	
23	8.55	8.49	8.43	8.38	8.32	8.26	8.20	
24	8.39	8.33	8.28	8.22	8.16	8.11	8.05	
25	8.24	8.18	8.13	8.07	8.02	7.96	7.90	
26	8.09	8.03	7.98	7.92	7.87	7.81	7.76	
27	7.95	7.90	7.84	7.79	7.73	7.68	7.62	
28	7.81	7.76	7.70	7.65	7.60	7.54	7.49	
29	7.68	7.63	7.57	7.52	7.47	7.42	7.36	
30	7.55	7.50	7.45	7.39	7.34	7.29	7.24	
31	7.42	7.37	7.32	7.27	7.22	7.16	7.11	
32	7.30	7.25	7.20	7.15	7.10	7.05	7.00	
33	7.08	7.13	7.08	7.03	6.98	6.93	6.88	
34	7.07	7.02	6.97	6.92	6.87	6.82	6.78	
35	6.95	6.90	6.85	6.80	6.76	6.71	6.66	
36	6.84	6.79	6.76	6.70	6.65	6.60	6.55	
37	6.73	6.68	6.64	6.59	6.54	6.49	6.45	
38	6.63	6.58	6.54	6.49	6.44	6.40	6.35	
39	6.52	6.47	6.43	6.38	6.35	6.29	6.24	
40	6.42	6.37	6.33	6.28	6.24	6.19	6.15	
41	6.32	6.27	6.23	6.18	6.14	6.09	6.05	
42	6.22	6.18	6.13	6.09	6.04	6.00	5.95	
43	6.13	6.09	6.04	6.00	5.95	5.91	5.87	
44	6.03	5.99	5.94	5.90	5.86	5.81	5.77	
45	5.94	5.90	5.85	5.81	5.77	5.72	5.68	

(Continued)

Table taken from EPA Region I SOP, Calibration of Field Instruments, January 10, 2010.

Attachment A (Page 2 of 2)



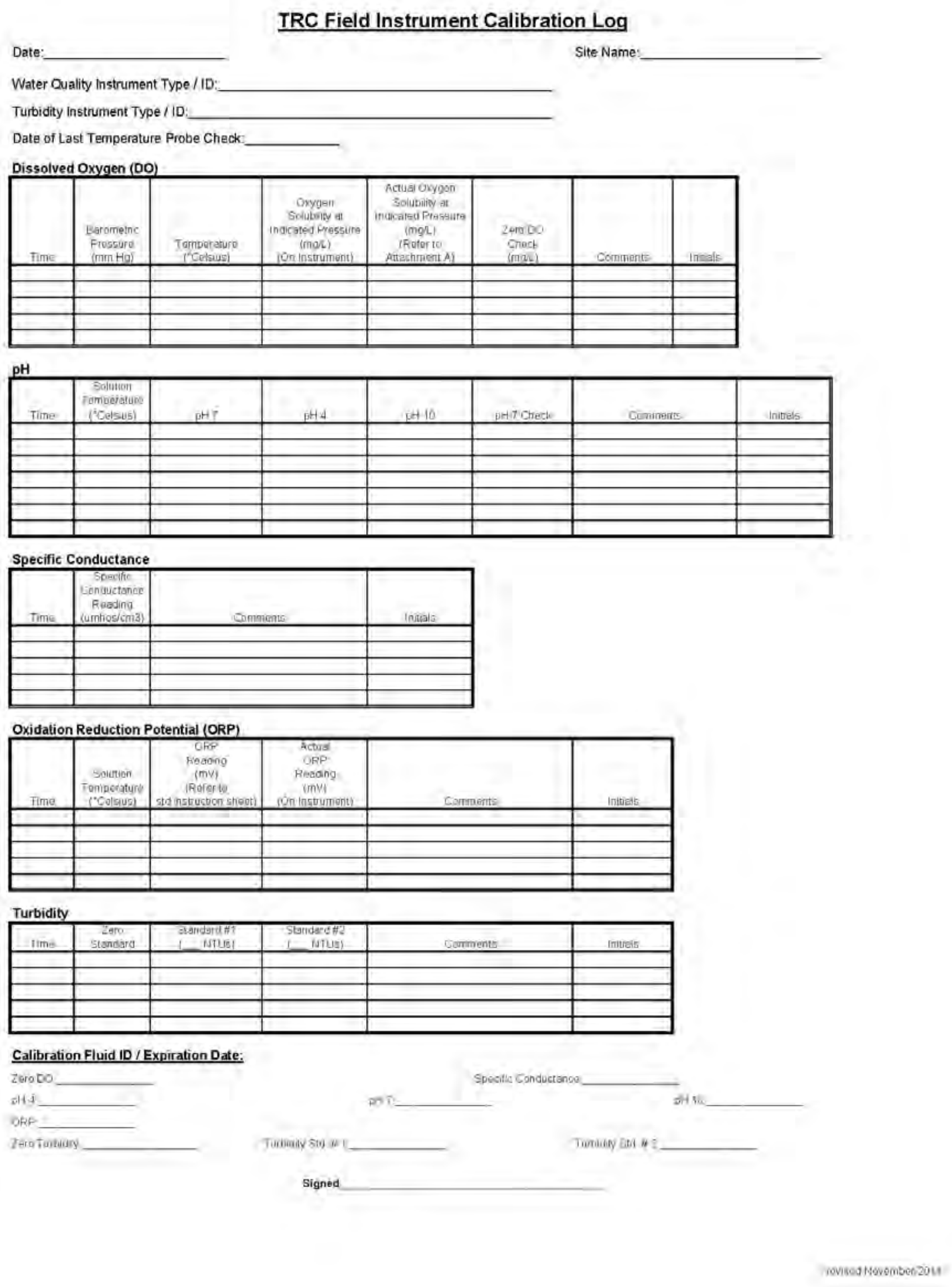
Oxygen Solubility at Indicated Pressure (continued)

Temp.	Pressure (Hg)								
	725	720	715	710	705	700	695	690	mm
°C	28.54	28.35	28.15	27.95	27.76	27.56	27.36	27.17	in
0	13.89	13.80	13.70	13.61	13.51	13.41	13.32	13.22	mg/l
1	13.51	13.42	13.33	13.23	13.14	13.04	12.95	12.86	
2	13.15	13.06	12.07	12.88	12.79	12.69	12.60	12.51	
3	12.81	12.72	12.63	12.54	12.45	12.36	12.27	12.18	
4	12.47	12.39	12.30	12.21	12.13	12.04	11.95	11.87	
5	12.15	12.06	11.98	11.89	11.81	11.73	11.64	11.56	
6	11.84	11.73	11.68	11.60	11.51	11.43	11.35	11.27	
7	11.55	11.47	11.39	11.31	11.22	11.14	11.06	10.98	
8	11.26	11.18	11.10	11.02	10.95	10.87	10.79	10.71	
9	10.99	10.92	10.84	10.76	10.69	10.61	10.53	10.46	
10	10.74	10.66	10.59	10.51	10.44	10.36	10.29	10.21	
11	10.48	10.40	10.33	10.28	10.18	10.11	10.04	9.96	
12	10.24	10.17	10.10	10.02	9.95	9.88	9.81	9.46	
13	10.01	9.94	9.87	9.80	9.73	9.66	9.59	9.52	
14	9.79	9.72	9.65	9.68	9.51	9.45	9.38	9.31	
15	9.58	9.51	9.44	9.58	9.31	9.24	9.18	9.11	
16	9.37	9.30	9.24	9.17	9.11	9.04	8.97	8.91	
17	9.18	9.11	9.05	8.98	8.92	8.85	8.79	8.73	
18	8.99	8.92	8.86	8.80	8.73	8.67	8.61	8.54	
19	8.81	8.74	8.68	8.62	8.56	8.49	8.43	8.37	
20	8.63	8.57	8.51	8.45	8.39	8.33	8.27	8.21	
21	8.46	8.40	8.34	8.28	8.22	8.16	8.10	8.04	
22	8.30	8.24	8.18	8.12	8.06	8.00	7.95	7.89	
23	8.15	8.09	8.03	7.97	7.91	7.86	7.80	7.74	
24	7.99	7.94	7.88	7.82	7.76	7.71	7.65	7.59	
25	7.85	7.79	7.74	7.68	7.60	7.57	7.51	7.46	
26	7.70	7.65	7.59	7.54	7.48	7.43	7.37	7.32	
27	7.57	7.52	7.46	7.41	7.35	7.30	7.25	7.19	
28	7.44	7.38	7.33	7.28	7.22	7.17	7.12	7.06	
29	7.31	7.26	7.21	7.15	7.10	7.05	7.00	6.94	
30	7.19	7.14	7.08	7.03	6.98	6.93	6.88	6.82	
31	7.06	7.01	6.96	6.91	6.86	6.81	6.76	6.70	
32	6.95	6.90	6.85	6.80	6.70	6.70	6.64	6.59	
33	6.83	6.78	6.73	6.68	6.83	6.58	6.53	6.48	
34	6.73	6.68	6.63	6.58	6.53	6.48	6.43	6.38	
35	6.61	6.56	6.51	6.47	6.42	6.37	6.36	6.27	
36	6.51	6.46	6.41	6.36	6.31	6.27	6.22	6.17	
37	6.40	6.35	6.31	6.26	6.21	6.16	6.12	6.07	
38	6.30	6.26	6.21	6.16	6.12	6.07	6.02	5.98	
39	6.26	6.15	6.11	6.06	6.01	5.97	5.92	5.87	
40	6.10	6.06	6.01	5.96	5.92	5.86	5.83	5.78	
41	6.00	5.96	5.91	5.87	5.82	5.78	5.73	5.69	
42	5.91	5.86	5.82	5.77	5.73	5.69	5.64	5.60	
43	5.82	5.78	5.73	5.69	5.65	5.60	5.56	5.51	
44	5.72	5.68	5.64	5.59	5.55	5.51	5.46	5.42	
45	5.64	5.59	5.55	5.51	5.47	5.42	5.38	5.34	

Table taken from EPA Region I SOP, Calibration of Field Instruments, January 10, 2010.

Attachment B

Example Field Instrument Calibration Logs



TRC Field Instrument Calibration Log

Date:____________________ Site Name:____________________

Water Quality Instrument Type / ID:____________________________________

Turbidity Instrument Type / ID:______________________________________

Date of Last Temperature Probe Check:____________

Dissolved Oxygen (DO)

Time	Barometric Pressure (mm Hg)	Temperature (°Celsius)	Oxygen Solubility at Indicated Pressure (mg/L) (On Instrument)	Actual Oxygen Solubility at Indicated Pressure (mg/L) (Refer to Attachment A)	Zero DO Check (mg/L)	Comments	Initials

pH

Time	Solution Temperature (°Celsius)	pH 7	pH 4	pH 10	pH 7 Check	Comments	Initials

Specific Conductance

Time	Specific Conductance Reading (umhos/cm3)	Comments	Initials

Oxidation Reduction Potential (ORP)

Time	Solution Temperature (°Celsius)	ORP Reading (mV) (Refer to std instruction sheet)	Actual ORP Reading (mV) (On Instrument)	Comments	Initials

Turbidity

Time	Zero Standard	Standard #1 (___ NTUs)	Standard #2 (___ NTUs)	Comments	Initials

Calibration Fluid ID / Expiration Date:

Zero DO:____________ Specific Conductance:____________

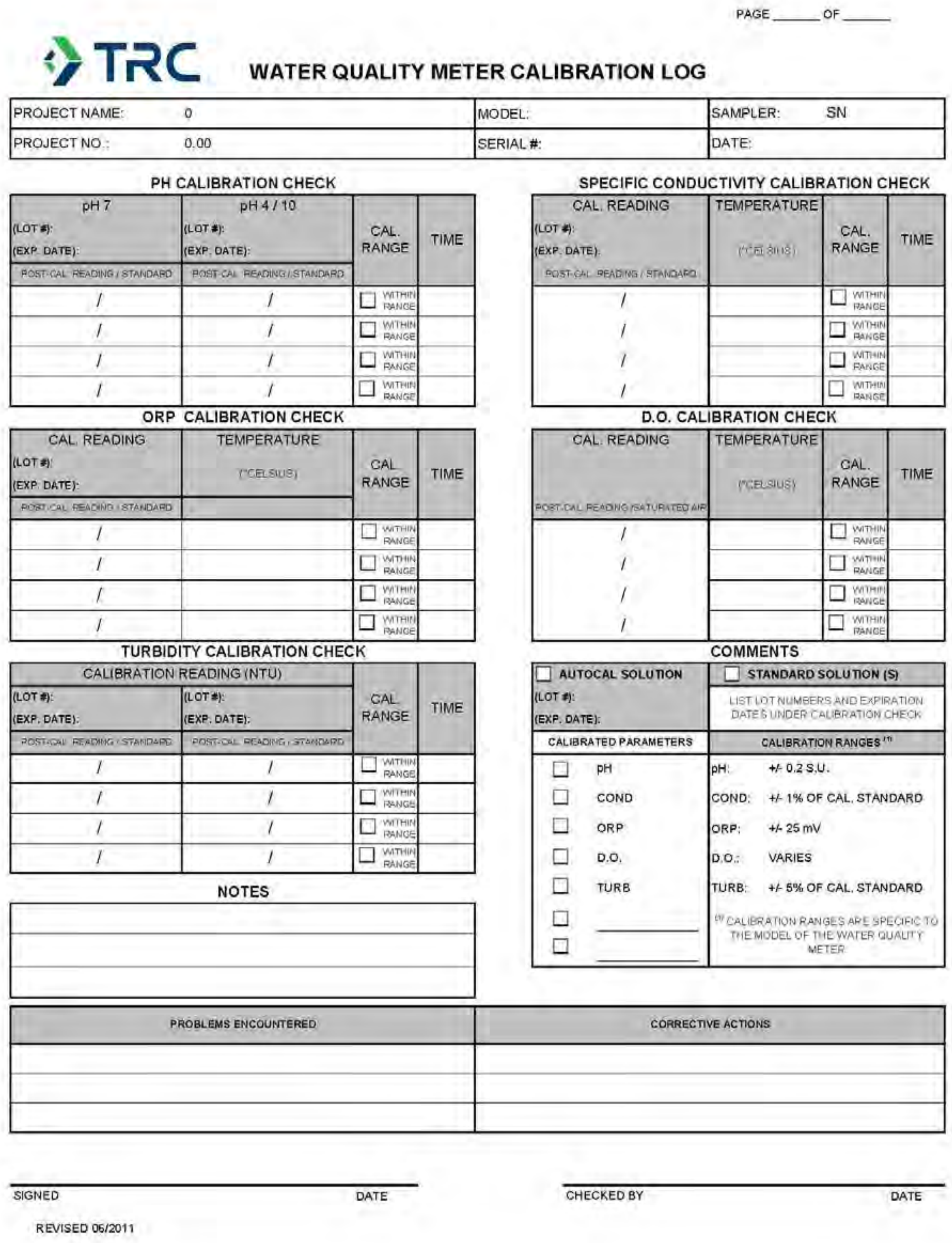
pH 4:____________ pH 7:____________ pH 10:____________

ORP:____________

Zero Turbidity:____________ Turbidity Std # 1:____________ Turbidity Std # 2:____________

Signed____________________________

revised November 2014



PAGE ______ OF ______

WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	0	MODEL:		SAMPLER:	SN
PROJECT NO.:	0.00	SERIAL #:		DATE:	

PH CALIBRATION CHECK

pH 7 (LOT #): (EXP. DATE):	pH 4 / 10 (LOT #): (EXP. DATE):	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): (EXP. DATE):	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): (EXP. DATE):	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): (EXP. DATE):	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION (LOT #): (EXP. DATE):	☐ STANDARD SOLUTION (S) LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES [1]
☐ pH	pH: +/- 0.2 S.U.
☐ COND	COND: +/- 1% OF CAL. STANDARD
☐ ORP	ORP: +/- 25 mV
☐ D.O.	D.O.: VARIES
☐ TURB	TURB: +/- 5% OF CAL. STANDARD
☐ ____________	[1] CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
☐ ____________	

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED ______________________ DATE

CHECKED BY ______________________ DATE

REVISED 06/2011

Attachment C

SOP Fact Sheet

WATER QUALITY PARAMETER INSTRUMENT CALIBRATION

PURPOSE AND OBJECTIVE

Before a meter is utilized in the field, it will be calibrated and checked in accordance with this SOP to ensure proper operation. Water quality instruments addressed in this SOP include those that measure temperature, pH, dissolved oxygen (DO), conductivity/specific conductance, oxidation-reduction potential (ORP), and turbidity for the purposes of field screening and field measurements.

WHAT TO BRING

- Appropriate Level of PPE
- Field book
- Field instrument calibration logs
- Water quality meter capable of measuring one or more of the following based on project scope: pH, temperature, DO, specific conductivity, and ORP (e.g., YSI 600XL, Horiba U-50, Hydrolab Quanta/QED MP-20, or equivalent)
- Deionized water
- Flow-through cell
- Ring stand with clamp
- Paper towels
- Soft tissue (e.g., Kimwipes®)
- Cuvettes
- Buffer solutions at pH 4, 7 and 10 standard units (SU)*
- Conductivity solution (potassium chloride, typically 1,413 µhos/cm)*
- ORP calibration solution (e.g., Zobell)*
- Turbidity standards (0, 1, 10 nephelometric turbidity units [NTUs] or StablCal Kit)*
- Zero DO solution (0.0 mg/L)*
- DO membrane kit (electrolyte solution, membranes)
- NIST thermometer (0.2°C accuracy)*
- Small glass or polyethylene jars to hold the calibration standards (4-8 oz.)
- Cup or spray bottle for the deionized water

*Dependent on the project-specific requirements and the instrument manufacturer

OFFICE

- Review project work plan and confirm what field measurements are required based on the scope of work.
- Confirm that all necessary equipment (including necessary calibration solutions) are available in-house or order if necessary.
- All meters may have different relative accuracy, which will be specified in the instrument manual. Confirm that the meter being used meets the project's accuracy requirements.
- Confirm that a copy of the manufacturer's instruction manual is available to accompany the instrument into the field.
- Properly clean/decontaminate the instrument before storage or returning equipment to rental vendor.

CALIBRATION PROCEDURES

- Prior to use, inspect instruments to ensure instruments are clean, check for possible malfunctions, and calibrate in accordance with manufacturer's procedures. Note: The initial calibration may be performed in the office prior to the field event or by the equipment supplier; however, calibration checks should be performed on site prior to use on the day of the fieldwork.
- Calibration checks (or verifying that instrument readings fall within an acceptable range of a standard without running through the full instrument calibration steps) will be performed on field instruments prior to their initial use, at least once daily, or whenever indications of faulty readings or instrument malfunction occurs. Some instruments or certain project scopes may require more frequent calibration checks depending on project quality objectives.
- In general, instrument selection and calibration will include the following steps:
    1. Determine which instruments are needed for the specific field tasks. Record the make, model number, and serial number of the instrument on the field instrument calibration log or in the field book.
    2. Obtain the necessary instruments and standard solutions for calibration. Check expiration dates on standard solutions and replace if out of date. Record the manufacturer, true value, lot number and expiration date of the standard solutions on the field instrument calibration log or in the field book.
    3. Assemble the instrument and turn it on allowing the instrument to warm up.
    4. Check battery charge, and charge or replace if necessary.
    5. Clean instrument (if necessary).
    6. If applicable, program the multi-probe instrument so that the applicable parameters to be measured will be displayed.
    7. Calibrate the instrument prior to field use in accordance with manufacturer's procedures. (Note: If applicable, calibrate DO and conductivity first, because these parameters may affect the other calibrations).
    8. Document all calibration activities and results in the field instrument calibration log or field book.
    9. If the instrument malfunctions and cannot be corrected, document the issues, qualify any erroneous data, and obtain a replacement.
    10. Clean and decontaminate the instrument after use and before storage.

11. Conduct calibration checks at least once per day or additionally as needed.

INVESTIGATION-DERIVED WASTE (IDW) DISPOSAL

Field personnel should review the project work plan and ensure project-specific IDW management documentation and containerization requirements are specified or discussed with the Project Manager before going to the project site.

DATA MANAGEMENT AND RECORDS MANAGEMENT

- Prior to calibrating, the field equipment and calibration standard information should be recorded on a field instrument calibration log and/or in a field book. For field equipment, the information recorded should include the make, model number, and the serial number of the instrument. Each instrument can be assigned an identification number that can be referenced in future field notes or when filling out the field instrument calibration log.
- For calibration standards, the information recorded should include the manufacturer, expiration date, true value, and any other description, such as lot number.
- The calibration records provided by the equipment vendor and the certificates of analysis for each standard will be maintained in the project files.
- All calibration measurements must be documented in a field logbook or on a separate field instrument calibration log. At a minimum, the field instrument calibration log must include the instrument information described above, calibration standard information described above, calibration date, and the instrument calibration results.

DOS AND DO NOTS OF WATER QUALITY PARAMETER INSTRUMENT CALIBRATION

DOs

- DO wear appropriate PPE (i.e., chemical resistant gloves and safety glasses) when cleaning and calibrating water quality instruments.
- DO confirm what field measurements are required, and what accuracy is required based on the scope of work.
- DO ensure you have the instrument instruction manual available if needed, as well as contact information for the manufacturer or rental company for troubleshooting questions.
- DO properly document calibration procedures and calibration checks performed.
- DO note when erroneous readings/equipment malfunctions are observed and any troubleshooting and/or corrective measures taken.
- DO conduct calibration checks at least once per day or additionally as needed.
- DO properly store the calibration standard solutions. Avoid extreme hot/cold temperatures. Frozen solution is useless and extreme temperatures can make calibration difficult and/or calibration may not work at all.

DO NOTs

- DO NOT use expired calibration solutions.
- DO NOT immerse the sensors in sea water or other highly saline water, alcohol, or organic solvents.
- DO NOT forget to clean and decontaminate the instrument after use and before storage.
- DO NOT store the sensors improperly (e.g., avoid storing in extreme hot or cold temperatures, make sure appropriate storage solutions are being used per manufacturer's recommendations).

Title: **Equipment Decontamination**	Procedure Number: **ECR 010**
	Revision Number: **3**
	Effective Date: **April 2021**

Authorization Signatures

		Elizabeth Denly	
Technical Reviewer Cory Yates	Date 4/29/21	Environmental Sector Quality Director Elizabeth Denly	Date 4/29/21

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	SOP Fact Sheet
Attachment B	SOP Modifications for PFAS

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the procedures needed for decontamination of equipment used in the field during environmental investigations (e.g., sediment, soil, groundwater investigations). Other state or federal requirements may be above and beyond the scope of this SOP and will be followed, if applicable. The actual procedures used should be documented and described in the field notes. Preventing or minimizing potential cross-contamination of samples is important for the collection of representative samples, avoiding the possible introduction of sampling error into sample results, and for protecting the health and safety of site personnel.

Removing or neutralizing potential contaminants that may have accumulated on equipment and vehicles ensures protection of personnel, reduces or eliminates potential transfer of contaminants to clean areas, and minimizes the likelihood of sample cross-contamination.

The use of dedicated or disposable sampling equipment (e.g., disposable liners, plastic spoons, plastic or aluminum bowls) should be considered as an alternative to equipment decontamination and the subsequent generation of decontamination fluids.

1.2 Summary of Method

Equipment decontamination is used to remove potential contaminants from a sampling device or piece of field equipment prior to and between the collection of samples. It is also used to limit personnel exposure to residual contamination that may be present on used field equipment.

Contaminants can be physically removed from equipment or deactivated by sterilization or disinfection. Gross contamination of equipment requires physical decontamination, including abrasive and nonabrasive methods. These may include the use of brushes, air and wet blasting, or high-pressure water, followed by a wash/rinse process using appropriate cleaning solutions. A solvent rinse may be required when organic contamination is present, and an acid rinse may be required when metals are parameters of interest. Equipment decontamination procedures can vary depending on the media being sampled and the type of sampling equipment being used. Disposal of decontamination fluids will be handled on a project-specific basis and will be conducted in accordance with the applicable regulations.

1.3 Equipment

The following equipment may be utilized when decontaminating equipment. Project-specific conditions or requirements may warrant the use of additional equipment or deletion of items from this list. For specialized sampling programs involving per- and polyfluoroalkyl substances (PFAS), refer to Attachment B for further details.

- Appropriate level of personal protective equipment (PPE) as specified in the site-specific Health and Safety Plan (HASP)

- Alconox®, Liquinox® or other non-phosphate, concentrated, laboratory-grade soap
- Simple Green® or other nontoxic biodegradable cleaner
- Deionized, distilled, organic-free, or potable water as appropriate as determined by the Project Manager. Water may be supplied by the laboratory or purchased from commercial vendors depending on project requirements.
- Pump sprayer
- Pressure sprayer
- Squeeze bottle filled with hexane (option for organic analyses)
- Squeeze bottle filled with methanol as appropriate (option for organic analyses)
- Squeeze bottle filled with isopropanol as appropriate (option for organic analyses)
- Squeeze bottle filled with 10 percent nitric acid (option for metals analyses and stainless-steel equipment)
- Squeeze bottle filled with 1 percent nitric acid (option for metals analyses)
- Container (squeeze bottle to 5-gallon bucket) filled with appropriate grade water and a non-phosphate, laboratory-grade soap (approximately 1 tablespoon of soap to 5 gallons of water)
- Extra quantities of above listed liquids
- Containers, such as buckets or wash basins (the type and number of containers is dependent on the procedure)
- Scrub brushes
- Small wire brush
- Aluminum foil
- Polyethylene sheeting
- A container for decontamination of pumps and associated tubing

1.4 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel and/or subcontractors shall follow the site-specific HASP. TRC personnel and/or subcontractors will use the appropriate level of PPE as defined in the HASP.

Sampling equipment or materials that have come in contact with chemical contaminants may be handled during implementation of this SOP. Certain decontamination fluids, including solvents and/or acids, are considered hazardous materials, and TRC employees will always handle and store them appropriately. Hazardous substances may be incompatible or may cause dangerous chemical reactions, including the production of heat, violent reactivity, or produce toxic vapors or other byproducts. Some hazardous substances may be incompatible with clothing or equipment and can permeate or degrade protective clothing or equipment. Also, hazardous substances may pose a direct health hazard to workers through inhalation, skin contact, or if a combustible material is exposed to heat/flame. Safety data sheets (SDS) for chemicals handled by TRC personnel should be maintained in a designated location at the project site.

1.5 Cautions and Potential Problems

Special care should be taken when decontaminating equipment used for sampling for PFAS. Please refer to Attachment B for details.

- The use of deionized, distilled, or organic-free water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment, provided that it has been certified by the vendor as analyte-free and/or meets the project-specific requirements.

- Alconox®, Liquinox®, or other non-phosphate, concentrated, laboratory-grade soap may contain trace quantities of perchlorate or 1,4-dioxane.

- Avoid using an excessive amount of soap during decontamination procedures, as this could result in difficulty rinsing the soap residue off of the equipment. Typically, the soap solution is prepared using 1 tablespoon of soap to 5 gallons of water.

- Use sufficient amounts of decontamination fluid (e.g., acid or solvent rinses) so that the fluid flows over the equipment and runs off. Spraying the equipment with a minimal amount of decontamination fluid that does not run off is ineffective.

- Spent decontamination solutions are considered investigation-derived waste (IDW) and must be managed as directed by the site-specific field program. Project and regulatory requirements, chemical compatibility, ambient conditions, and professional judgment should be used to determine the appropriate decontamination process with respect to combining and/or segregating decontamination fluids. Section 3 of this SOP provides more guidance on the disposal procedures.

- Several procedures can be established to minimize the potential for cross-contamination or analytical interference by decontamination fluids. For example:

  - The use of methanol in the decontamination procedure may not be appropriate if methanol is a contaminant of concern.

  - Isopropanol may be used as a substitute for methanol but may not be appropriate when collecting samples for volatile organic compound (VOC) analyses. Residual isopropanol on the equipment may cause substantial interferences in subsequent VOC analyses and may result in unnecessary dilutions and/or false positive results if isopropanol is not removed in subsequent decontamination steps. It should also be noted that the application of isopropanol to hot metal surfaces (e.g., a steam-cleaned split spoon) may cause oxidation of the isopropanol to acetone.

  - If hexane is used in the decontamination procedure, caution should be used to ensure that the hexane is completely volatilized and the equipment is subsequently rinsed when samples are to be analyzed for VOCs and volatile petroleum hydrocarbons (VPH).

Residual hexane on equipment could interfere with the VOC and VPH analyses and may result in unnecessary dilutions and/or false positive results.

  - Cover monitoring and sampling equipment with protective material (i.e., aluminum foil, polyethylene sheeting, or Ziploc® bags) to minimize potential re-contamination after decontamination.

  - Use dedicated or disposable sampling equipment when appropriate to minimize the need for decontamination. Although disposable sampling tools are encouraged in order to minimize the generation of decontamination fluids, it should be noted that plastic tools may not be appropriate for collection of samples to be analyzed for semi-volatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs). Potential phthalate contamination may cause significant interferences in the subsequent analyses and may result in unnecessary dilutions and/or false positive results.

- After decontamination, equipment should be handled only by personnel wearing clean disposable, powder-free, nitrile gloves to prevent recontamination.
- Following decontamination, the equipment should be moved away (preferably upwind) from the decontamination area to prevent recontamination.
- Equipment that is not decontaminated properly may result in potentially high, biased results in field samples. **Note:** Equipment blank collection may be appropriate after decontamination of equipment used to collect highly contaminated samples.

1.6 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

  - Occupational Safety and Health Administration (OSHA) 40-hour Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER) workers; and
  - 8-hour annual HAZWOPER refresher training.

2.0 PROCEDURES

Refer to the site-specific sampling plan and/or Quality Assurance Project Plan (QAPP), if applicable, for site-specific procedures. Other state or federal requirements may be above and beyond the scope of this SOP and will be followed if applicable. The actual procedures used should be documented and described in the field notes.

2.1 General

Personnel, sample containers, and equipment leaving the contaminated area of a site must be decontaminated. Various decontamination methods will either physically remove contaminants by abrasive and/or washing actions, inactivate contaminants by disinfection or sterilization, or both. Decontamination procedures should be documented in the field book.

2.2 Physical Decontamination Procedures

In many cases, gross contamination can be removed by physical means. The physical decontamination techniques appropriate for equipment decontamination can be grouped into two categories: abrasive methods and nonabrasive methods. In general, heavy equipment decontamination is conducted by drilling and construction subcontractors and not by TRC personnel. However, TRC personnel will typically need to document such decontamination efforts as part of project work. Special care should be taken during decontamination procedures following sampling for PFAS; please refer to Attachment B for details.

ABRASIVE CLEANING METHODS APPROPRIATE FOR DRILLING EQUIPMENT (DRILLING RIGS, ETC.)

Abrasive cleaning methods involve rubbing and wearing away the top layer of the surface containing the contaminant. The following abrasive methods are available but are not commonly used:

- *Mechanical:* Mechanical cleaning methods use metal or nylon brushes. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.

- *Air Blasting:* Air blasting is used for cleaning large equipment, such as bulldozers, drilling rigs, or auger bits. The equipment used in air blasting employs compressed air to force abrasive material through a nozzle at high velocities. The distance between the nozzle and the surface cleaned, as well as the pressure of air, the time of application, and the angle at which the abrasive material strikes the surface, determines cleaning efficiency. Air blasting has several disadvantages, including its inability to control the amount of materials removed, it can aerate contaminants, and it generates large amounts of waste.

- *Wet Blasting:* Wet blasting, also used to clean large equipment, involves use of a suspended fine abrasive delivered by compressed air to the contaminated area. The amount of materials removed can be carefully controlled by using very fine abrasives. One disadvantage of this method is the generation of a large amount of waste.

NONABRASIVE CLEANING METHODS APPROPRIATE FOR FIELD EQUIPMENT (DRILLING AUGERS AND RIGS, ETC.)

Nonabrasive cleaning methods involve forcing the contaminant off a surface with pressure. In general, less of the equipment surface is removed using nonabrasive methods. The following nonabrasive methods are available:

High-pressure Potable Water: This method consists of a high-pressure pump, an operator-controlled directional nozzle, and a high-pressure hose. Flow rates typically range from 20 to 140 liters per minute (approximately 5 to 37 US gallons per minute). This procedure is used the majority of the time and is more appropriate for equipment with painted surfaces.

Ultrahigh-Pressure Potable Water: This system produces a pressurized water jet. The ultrahigh-pressure spray removes tightly adhered surface film. The water velocity ranges from 500 meters per second (m/sec) to 900 m/sec (approximately 1,640 to 2,953 feet per second). Additives can enhance the method. This method is not applicable for hand-held sampling equipment. This procedure is not commonly used but would be appropriate for carbon steel drilling rods and augers.

Steam Cleaning: This method consists of a high-pressure hot water cleaner capable of generating a pressure of at least 2,500 pounds per square inch (psi) and producing hot water and/or steam (at least 200 degrees Fahrenheit), and is typically equipped with a soap compartment. Due to the high temperatures associated with this method, steam cleaning should not be used for polyvinyl chloride (PVC) or plastic equipment.

2.3 Procedure for Sampling Equipment

Sampling equipment, such as split-spoon samplers, shovels, hand augers, trowels, spoons, spatulas, bailers, tethers, dippers, and pumps, will be cleaned using the following procedure. Special care should be taken during decontamination procedures following sampling for PFAS; please refer to Attachment B for details. **Note:** The overall number of containers needed for collection of decontamination fluids may vary depending on chemical compatibilities, project and regulatory requirements, and ultimate disposal methods for these fluids.

1. Lay out sufficient polyethylene sheeting on the ground or floor to allow placement of the necessary number of containers (e.g., plastic wash basins or buckets) and an air-drying area. The number of decontamination steps and designated containers should be determined prior to field sampling based on the site-specific sampling plan. At a minimum, one container should be designated for the detergent wash. A second container should be designated for water rinsing. A third container may be designated for non-water rinsing. If more than one, the non-water rinsate fluids may need to be separated. Non-water rinsate fluids should not be combined with the detergent wash during decontamination. Place the containers on the polyethylene sheeting. The decontamination line should progress from “dirty” to “clean”.

   Note: In instances where acid or solvent rinses are required, additional containers may be needed to manage collection and subsequent disposal of the spent decontamination fluids.

2. Fill the first container with potable water. Add sufficient non-phosphate, concentrated, laboratory-grade soap to cause suds to form. Do not use an excessive amount of the soap (approximately 1 tablespoon of soap to 5 gallons of water) or rinsing the soap residue off the equipment will be difficult.

3. Disassemble the equipment, as appropriate.

4. Brush any visible dirt off sampling equipment into a designated area before getting equipment wet.

5. Using a clean, coarse scrub brush, submerge and wash the sampling equipment in the soap solution in the first container, removing all dirt and/or visible hydrocarbons. Allow excess soap to drain off the equipment into the container when finished.

6. If cleaning a pump that is not completely disassembled, run the submerged pump in the container long enough to allow sufficient contact time with the internal components of the pump.

7. Rinse the equipment with appropriate water over an appropriate container, using a coarse scrub brush or pressure sprayer to aid in the rinse if necessary. If an additional acid or solvent rinse is not required, proceed to Step 10.

8. ******If sampling for metals and if required by the project, rinse the equipment with nitric acid over an appropriate container. Consider using a container dedicated to acidic solutions to minimize the volume of liquid that needs to be neutralized later. A 10 percent nitric acid solution is used on stainless steel equipment. A 1 percent nitric acid solution is used on all other equipment. If not required, this step may be omitted.

9. ******If sampling for organic parameters and if required by the project, rinse the equipment over an appropriate container using methanol or isopropanol (see Cautions and Potential Problems). If oily, a hexane rinse should follow the methanol/isopropanol rinse, or as an alternative, Simple Green® can be used if approved by the Project Manager. Consider using an appropriate container dedicated to volatile solvents to minimize the volume of liquid that subsequently needs to be managed as IDW. If not required, this step may be omitted.

   Allow the equipment to completely air dry prior to proceeding to the next step.

   **** Steps 8 and 9 are optional and may be used on a site-specific basis. The site-specific sampling plan or QAPP, if available, should be consulted. In the absence of a sampling plan or QAPP, the Project Manager will decide upon the necessity of these steps.**

10. Rinse the equipment over an appropriate container using deionized, distilled or organic-free water after each step. If cleaning a pump that is not completely disassembled, run the submerged pump in the container long enough to allow sufficient contact time with the internal components of the pump.

11. Allow the equipment to completely air dry on a clean surface (e.g., polyethylene sheeting or a clean container) (See*NOTE).

    ***NOTE** that if temperature or humidity conditions preclude air drying equipment, sufficient spares, as applicable and if possible, should be available so that no item of sampling equipment need be used more than once. If an ample amount of spare equipment is not available and the equipment will not completely air dry, additional rinses with deionized, distilled or organic-free water should be used. The inability of equipment to air dry and the usage of additional rinses should be recorded in the field book or on the appropriate form.

12. Reassemble equipment, if necessary, and wrap completely in clean, unused, protective material. Reuse of equipment on the same day without wrapping in protective material is acceptable.

13. Spent decontamination fluids are considered IDW and must be managed as directed by the site-specific field program.

14. Record the decontamination procedure in the field book or on the appropriate form.

15. Decontamination solution and rinse water should be refreshed at regular intervals as appropriate to meet project quality objectives.

2.4 Procedure for Measuring Equipment

Measuring equipment, such as pressure transducers, water level indicators, oil/water interface probes, and soil moisture/pH meters will be cleaned using the following procedure, unless it conflicts with the manufacturer’s recommendations. Special care should be taken during decontamination procedures following sampling for PFAS; please refer to Attachment B for details.

1. Fill two clean containers (e.g., plastic wash basins or buckets) with potable water.

2. Add sufficient nonphosphate, concentrated, laboratory-grade soap to one container to form a thin layer of soap suds. If oily residues are apparent, the use of Simple Green® may be required.

3. Brush any visible dirt off measuring equipment before getting the equipment wet.

4. Either spray rinse the device with the soap solution over the first container, or for heavily soiled equipment, immerse the device in the container containing soap and gently agitate. Scrub device if it is soiled. Do not submerse any electrical controls or take-up reels. Submerse only that portion of the device that came in contact with potential contaminants.

5. Immerse the device in the container containing the potable water and gently agitate. Do not submerse any electrical connectors or take-up reels. Submerse only that portion of the device that came in contact with potential contaminants.

6. Spray rinse equipment with deionized, distilled, or organic-free water over the last container used.

7. Allow the equipment to air dry if time allows.

8. Record the decontamination procedure in the field book or on the appropriate form.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for IDW disposal with the Project Manager.

Each project must consider IDW disposal methods and have a plan in place prior to performing field work. Provisions must be in place regarding what will be done with IDW. If IDW must be removed from the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

One type of quality control sample specific to the field decontamination process is the equipment blank. The equipment blank provides information about the effectiveness of the decontamination process employed in the field. An equipment blank can detect contamination that may arise from potentially contaminated equipment or equipment that has not been decontaminated effectively.

Equipment blanks consist of a sample of analyte-free (i.e., deionized, distilled, organic-free) water that is poured over and through a decontaminated sampling device and placed in a clean sample container. Ideally, the reagent water should come from the laboratory and be certified as clean. If the blank water is not certified as clean and/or not supplied by the laboratory performing the analyses, a separate water blank that has not run through the sampling equipment should also be sent to the laboratory for analysis.

Equipment blanks are typically collected for all parameters of interest at a minimum rate of 1 per day per matrix; however, the frequency of equipment blank collection will vary from project to project, depending upon the data quality objectives and/or regulatory requirements, and will be specified in either the site-specific sampling plan or QAPP. Equipment blanks are typically not required if dedicated sampling equipment is used.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

All reagents used must be documented in the field book or on the appropriate form. Any deviations from the decontamination procedures specified in the sampling plan or QAPP must be approved by the Quality Assurance Officer and Project Manager and documented in the field book. The lot number and vendor of each reagent used should be documented in the field book. Refer to ECR SOP 001 for field documentation procedures.

Planning for the collection of equipment blank samples can be tracked in the TRC Environmental Data Management System (EDMS). This can ensure the field teams are reminded by the mobile data collection app to collect equipment blank samples per the sampling plan or QAPP. Data quality checks for equipment blank samples can be automatically run by the TRC EDMS and highlight any non-conformities to the QAPP or concentrations detected in the equipment blank samples when data are loaded. Discuss with your EDMS data manager to have this automated report configured for your project site.

6.0 REFERENCES

USEPA. December 1987. *A Compendium of Superfund Field Operations Methods*. EPA/540/P-87/001.

USEPA. January 1991. *Compendium of ERT Groundwater Sampling Procedures*. OSWER Directive 9360.4-06. PB91-9211275.

USEPA. November 1992. *RCRA Ground-Water Monitoring: Draft Technical Guidance*. EPA/530-R-93-001. USEPA Office of Solid Waste.

USEPA. January 1999. *Compendium of ERT Groundwater Sampling Procedures*. EPA/540/P-91/007. OSWER Directive 9360.4-06. PB91-921275.

USEPA. June 22, 2020. *Field Equipment Cleaning and Decontamination*. LSASDPROC-205-R4. Region 4. Laboratory Services and Applied Science Division. Athens, Georgia.

7.0 SUSTAINABLE RECOMMENDATIONS

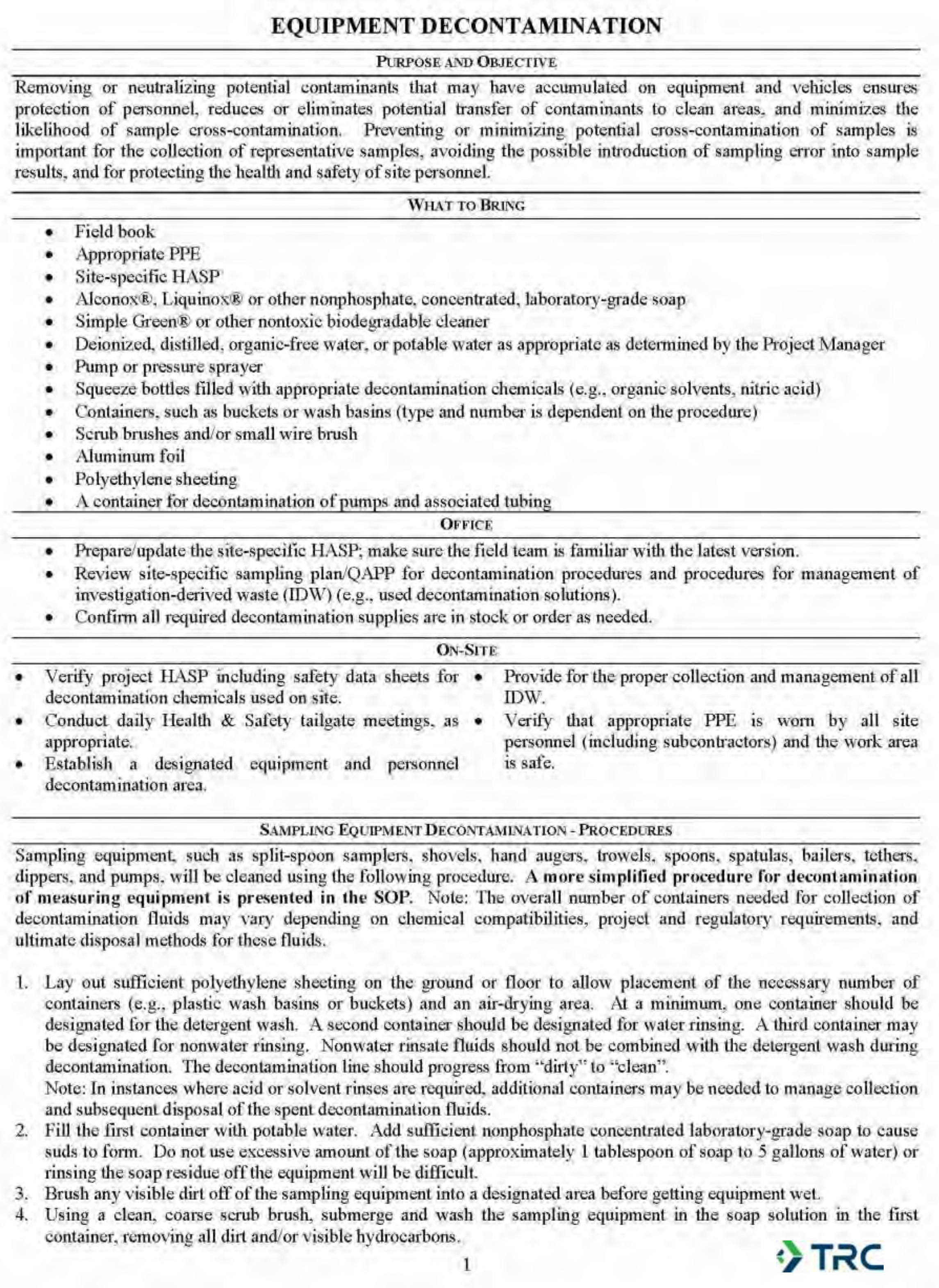
Sustainable practices should be incorporated wherever practical. Items to consider for equipment decontamination are as follows:

- Utilize Alconox® soap when appropriate due to its biodegradable nature;
- Utilize a reusable container such as a carboy for decontamination water;
- Utilize reusable decontamination equipment such as plastic spray bottles, plastic brushes, etc., when appropriate;
- Utilize recycled plastic sheeting to contain decontamination rinsate, if available; and,
- Send decontamination rinsate to a wastewater treatment facility for water reuse/recycling when practical.

8.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
1	DECEMBER 2016	ADDED ATTACHMENT B TO ACCOMMODATE SOP MODIFICATIONS REQUIRED WHEN SAMPLING FOR PFAS; CHANGED NAMING CONVENTION FOR SOP FROM RMD TO ECR.
2	JANUARY 2020	TRC RE-BRANDING
3	APRIL 2021	REVIEWED AND REVISED SOP

Attachment A: SOP Fact Sheet



EQUIPMENT DECONTAMINATION

PURPOSE AND OBJECTIVE

Removing or neutralizing potential contaminants that may have accumulated on equipment and vehicles ensures protection of personnel, reduces or eliminates potential transfer of contaminants to clean areas, and minimizes the likelihood of sample cross-contamination. Preventing or minimizing potential cross-contamination of samples is important for the collection of representative samples, avoiding the possible introduction of sampling error into sample results, and for protecting the health and safety of site personnel.

WHAT TO BRING

- Field book
- Appropriate PPE
- Site-specific HASP
- Alconox®, Liquinox® or other nonphosphate, concentrated, laboratory-grade soap
- Simple Green® or other nontoxic biodegradable cleaner
- Deionized, distilled, organic-free water, or potable water as appropriate as determined by the Project Manager
- Pump or pressure sprayer
- Squeeze bottles filled with appropriate decontamination chemicals (e.g., organic solvents, nitric acid)
- Containers, such as buckets or wash basins (type and number is dependent on the procedure)
- Scrub brushes and/or small wire brush
- Aluminum foil
- Polyethylene sheeting
- A container for decontamination of pumps and associated tubing

OFFICE

- Prepare/update the site-specific HASP; make sure the field team is familiar with the latest version.
- Review site-specific sampling plan/QAPP for decontamination procedures and procedures for management of investigation-derived waste (IDW) (e.g., used decontamination solutions).
- Confirm all required decontamination supplies are in stock or order as needed.

ON-SITE

- Verify project HASP including safety data sheets for decontamination chemicals used on site.
- Conduct daily Health & Safety tailgate meetings, as appropriate.
- Establish a designated equipment and personnel decontamination area.
- Provide for the proper collection and management of all IDW.
- Verify that appropriate PPE is worn by all site personnel (including subcontractors) and the work area is safe.

SAMPLING EQUIPMENT DECONTAMINATION - PROCEDURES

Sampling equipment, such as split-spoon samplers, shovels, hand augers, trowels, spoons, spatulas, bailers, tethers, dippers, and pumps, will be cleaned using the following procedure. **A more simplified procedure for decontamination of measuring equipment is presented in the SOP.** Note: The overall number of containers needed for collection of decontamination fluids may vary depending on chemical compatibilities, project and regulatory requirements, and ultimate disposal methods for these fluids.

1. Lay out sufficient polyethylene sheeting on the ground or floor to allow placement of the necessary number of containers (e.g., plastic wash basins or buckets) and an air-drying area. At a minimum, one container should be designated for the detergent wash. A second container should be designated for water rinsing. A third container may be designated for nonwater rinsing. Nonwater rinsate fluids should not be combined with the detergent wash during decontamination. The decontamination line should progress from "dirty" to "clean".
   Note: In instances where acid or solvent rinses are required, additional containers may be needed to manage collection and subsequent disposal of the spent decontamination fluids.
2. Fill the first container with potable water. Add sufficient nonphosphate concentrated laboratory-grade soap to cause suds to form. Do not use excessive amount of the soap (approximately 1 tablespoon of soap to 5 gallons of water) or rinsing the soap residue off the equipment will be difficult.
3. Brush any visible dirt off of the sampling equipment into a designated area before getting equipment wet.
4. Using a clean, coarse scrub brush, submerge and wash the sampling equipment in the soap solution in the first container, removing all dirt and/or visible hydrocarbons.

EQUIPMENT DECONTAMINATION

5. Rinse the equipment with appropriate water over an appropriate container, using a coarse scrub brush or pressure sprayer to aid in the rinse if necessary. If an additional acid or solvent rinse is not required, proceed to Step 8.
6. **If sampling for metals and if required by the project, rinse the equipment with nitric acid over an appropriate container. Consider using a container dedicated to acidic solutions to minimize the volume of liquid that needs to be neutralized later. A 10 percent nitric acid solution is used on stainless steel equipment. A 1 percent nitric acid solution is used on all other equipment. If not required, this step may be omitted.
7. **If sampling for organic parameters and if required by the project, rinse the equipment over an appropriate container using methanol or isopropanol (see Caution and Potential Problems). If oily, a hexane rinse should follow the methanol/isopropanol rinse, or as an alternative, Simple Green® can be used if approved by the Project Manager. Consider using an appropriate container dedicated to volatile solvents to minimize the volume of liquid that subsequently needs to be managed as IDW. If not required, this step may be omitted.
   Allow the equipment to completely air dry prior to proceeding to the next step.
   ** Steps 6 and 7 are optional and may be used on a site-specific basis. The site-specific sampling plan or QAPP, if available, should be consulted. In the absence of a sampling plan or QAPP, the Project Manager will decide upon the necessity of these steps.
8. Rinse the equipment over an appropriate container using deionized, distilled or organic-free water after each step.
9. Allow the equipment to completely air dry on a clean surface (e.g., polyethylene sheeting or a clean container).
   *NOTE that if temperature or humidity conditions preclude air drying equipment, sufficient spares, if possible, should be available so that no item of sampling equipment need be used more than once. If an ample amount of spare equipment is not available and the equipment will not completely air dry, additional rinses with deionized, distilled or organic-free water should be used. The inability of equipment to air dry and the usage of additional rinses should be recorded in the field logbook or on the appropriate form.
10. Reassemble equipment, if necessary, and wrap completely in clean, unused, protective material. Reuse of equipment on the same day without wrapping in protective material is acceptable.
11. Spent decontamination fluids are considered IDW and must be managed as directed by the site-specific field program.
12. Decontamination solution and rinse water should be refreshed at regular intervals as appropriate to meet project quality objectives.

INVESTIGATION DERIVED WASTE (IDW) DISPOSAL

Field personnel should review the project work plan and ensure project-specific IDW management documentation and containerization requirements are specified or discussed with the Project Manager before going to the project site.

DATA MANAGEMENT AND RECORDS MANAGEMENT

All reagents used must be documented in the field book or an appropriate field form. Any deviations from the decontamination procedures specified in the work plan, sampling plan or QAPP must be approved by the Quality Assurance Officer and Project Manager and documented in the field book. The lot number and vendor of each reagent used should be documented in the field logbook. Refer to ECR SOP 001 for field documentation procedures.

DOs AND DO NOTs OF EQUIPMENT DECONTAMINATION

DOs:

- DO call the Project Manager or field team leader if unexpected conditions are encountered or at least daily to update them on site work.
- DO manage and collect IDW in accordance with project requirements.
- DO use deionized, distilled or analyte free water that is provided by the laboratory, is certified analyte-free, and/or meets project requirements.
- DO use sufficient amount of decontamination fluids so that the fluid flows over the equipment and runs off.
- DO use new wrapped disposable dedicated sampling equipment when appropriate to minimize the need for decontamination.

DO NOTs:

- DO NOT use an excessive amount of soap during decontamination.
- DO NOT sign anything in the field unless authorized in writing by client. This includes waste disposal documentation, statements, etc.; call the Project Manager if this issue arises.

Attachment B: SOP Modifications for PFAS

Due to the pervasive nature of PFAS in various substances routinely used during sampling and the need to mitigate potential cross-contamination or sampling bias to ensure representative data are collected, special care should be taken when sampling for PFAS. The following table highlights the required modifications to this SOP when sampling for PFAS.

PFAS Equipment Decontamination Protocols	
SOP Section Number	**Modifications to SOP**
1.3	• Use only Alconox® or Liquinox® soap; do not use Decon 90. • Use new plastic buckets for wash and rinse water. • Ensure that PFAS-free water is used during the decontamination procedure. • Do not use aluminum foil.
1.5	Always consult the Site-specific Health and Safety Plan prior to conducting field work. The following considerations should be made with regards to decontamination procedures: • Tyvek® suits should not be worn. Cotton coveralls may be worn. • Boots and other field clothing containing Gore-Tex™ or other waterproof/resistant material should not be worn. This includes rain gear. Boots made with polyurethane and polyvinyl chloride (PVC) are acceptable. • Food and drink should not be allowed within the decontamination area. Bottled water and hydration drinks (e.g., Gatorade®) may be consumed in the staging area only. • Personnel involved with decontamination should wear a new pair of nitrile gloves after each decontamination procedure when handling equipment to avoid re-contamination. Avoid handling unnecessary items with nitrile gloves. • Do not store on or cover equipment with aluminum foil after decontamination. Use of polyethylene sheeting is acceptable. • Avoid wearing clothing laundered with fabric softeners. • Avoid wearing new clothing (recommended six washings since purchase). Clothing made of cotton is preferred. • Avoid using cosmetics, moisturizers, hand creams, or other related products as part of cleaning/showering the morning of sampling and decontamination field work.
2.2	• New nylon or metal bristle brushes should be used for mechanical cleaning methods. • If high-pressure water is used, it must be tested prior to use for the presence of PFAS.
2.3	• Ensure that PFAS-free water is used during the last step of the decontamination procedure.
2.4	• Ensure that PFAS-free water is used during the last step of the decontamination procedure.

New Hampshire Department of Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes

---

A1 Title and Signature Page

Document Title: New Hampshire Department of Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes

Lead Organization: NH Department of Environmental Services
Water Division-Watershed Management Bureau

Preparer's Name: Andrew Chapman

Preparer's Signature: ____________________

Organizational Affiliation/Address: NH Department of Environmental Services
29 Hazen Drive
P.O. Box 95
Concord, NH 03302-0095

Preparation Date: November, 2013

A2 Table of Contents

A3 Introduction (History, Justification)

The development and implementation of state-level biological assessment techniques and thresholds is directed under Sections 303 and 304 of the Clean Water Act. The US Environmental Protection Agency further clarified its position on the applicability of biological assessment programs in its 1991 statement of policy indicating that biological surveys shall be integrated into State water quality programs to help restore and maintain the biological integrity of the Nation's waters.

The primary goals of biological assessment programs are to determine "aquatic life use" status for applicable waterbodies, make decisions for specific permitting and regulatory actions, assist in setting planning and management priorities for waterbodies in need of controls, and prepare water quality reports.

Since 1997, NH DES has collected biological data from wadable streams with the goal of developing indices that can be used to estimate the overall ecological integrity of the biological community. Current New Hampshire water quality standards (Env-Wq 1700) define Biological and Aquatic Community Integrity as the ability to "maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region". The indices developed under the bioassessment program are meant to provide a numeric interpretation of the narrative standard outlined above.

The purpose of this document is to provide a detailed description of the collection and processing methods utilized for freshwater fish samples in order to compute a Indices of Biotic Integrity (IBIs) necessary for making biological assessments of wadeable streams and rivers.

A4 Definitions

Back-pack electroshocker: Backpack electrofisher generators are typically batttery powered. They employ a transformer to pulse the current before it is delivered into the water. The anode is located at the end of a long, 2 meter pole and is usually in the form of a ring. The cathode is a long, 3 meter braided steel cable that trails behind the operator. The electrofisher is operated by a deadman's switch on the anode pole.

A5 Field Procedures for Fish Collection

The Biomonitoring Program fish assessment protocol is an intensive effort and is adapted from the United States Environmental Protection Agency's Rapid Bioassessment Protocols (US EPA 1999). The methodology is designed for wadeable streams and rivers, and uses backpack electrofishing equipment to capture fish for identification and enumeration.

A5.1 Sampling Season

Surveys are conducted at a time when fish populations are most stable and variability is minimized by seasonal migration. Extremes in flow conditions can result in non-seasonal migration of certain species seeking less stressful habitat conditions. Therefore, sampling should also be avoided during periods of natural high or low flows.

Fish surveys are conducted by the biological monitoring program from the end of June through September, but may be extended into October if necessary. The sampling time frame represents a stable fish assemblage, when fish tend to remain in a particular localized area and is most likely to include the full range of resident species. If a survey is requested or required later in the fall, New Hampshire Department of Fish and Game is contacted for advice on avoiding fall spawning species.

A5.2 Fish Collection Permits

Prior to any fish surveys, a scientific collection permit must be obtained from the New Hampshire Fish and Game Department (NH F&G). A written letter to the commissioner of the NH F&G from the head of the biomonitoring program is sent out well ahead (e.g. 3 months) of the scheduled sampling period in order to obtain the necessary permit. The request must also contain the tentative sites planned for collection. Once approved, a hard copy of the permit is carried by the biomonitoring program field operations team at all times. See attachment A for an example scientific permit request letter, attachment B for an example scientific permit application and attachment C for an example scientific collection permit.

At the end of the field season, a report must be submitted to the NH F&G summarizing the results of the survey efforts. The report must include the stations sampled, including the exact location; a list of species encountered and the number of each species captured; the incidence of mortality for each species; and whether any of the species are included on state or federal threatened and endangered (T&E) species lists. Any sites known to contain T&E species must be approved for sampling prior to when the actual field work occurs.

A5.3 Training and Safety for Electrofishing

Electrofishing equipment can be hazardous if not operated competently by trained individuals. It is the policy of the biological monitoring program that any individual operating electrofishing equipment be trained by the current biological program manager before any field sampling.

As part of the training, all new field crew personnel are required to read the operation and safety manuals supplied by the manufacturer of the electrofishing equipment. A copy of the manuals for the current equipment used by the biological monitoring program is included in appendix XX. In addition, all individuals participating in electrofishing activities must have current CPR training. Opportunities to attend a CPR course will be identified and offered to all field crew personnel prior each field season.

At the completion of these activities and readings field personnel are required to sign a waiver (Appendix D-2) verifying that they have read and fully understand the hazards involved and the required safety protocols prior to any actual field survey work.

The biological program manager will also provide "hands on" training prior to "live" sampling allowing all field crew members to understand the various roles on the shocking crew team and instream safety precautions used to minimize the likelihood of injury related to electroshocking. Field crew members are required to practice these procedures and safety measures during all field operations. Failure to do so will result in their removal from the shocking crew.

In addition to above safety measures, all field crew members are required to wear protective equipment, including waders and rubber gloves at all times. If a member does not have these basic items, they will not be allowed to be in the water during the shocking. Wading belts and life jackets are also available if a crew member chooses to use them. Field crew members are also strongly urged to wear polarized sunglasses and a hat during sampling to minimize accidents and increasing sampling efficiency.

In order to ensure safety and efficiency in fish sampling efforts as well as equipment longevity, equipment must be inspected and appropriately maintained. Inspections of electrofishing equipment will be completed prior to each sampling event. Pre-operation inspections shall include: a visual check of electrical connections, wires, and shocking battery. Any loose connections, worn or frayed wires, leaking or cracked batteries will preclude any and all electroshocking activities until repairs can be made. In addition, an instream test shall be preformed prior to any sampling. The instream test is designed to check the shocker settings and performance, as well as the integrity of each field crew member's waders and gloves. The instream test will also be used to test the various built in safety mechanisms (e.g. tilt) on the electroshocker. At the end of the season a final inspection of each electroshocker will be completed so that any necessary repairs can be identified and completed.

A5.4 Equipment and Materials

The Biological Monitoring Unit utilizes two separate electroshocker models (Model 12 and LR-24) manufactured by Smith-Root, Inc. Both utilize DC (direct current) power generated from a 24 volt gel cell deep cycle battery. Each unit has a variety of waveform settings to accommodate a range of environmental conditions, specifically those related to in-stream specific conductance. Manuals for operation and care of each electroshocker are available for reference through the Biomonitoring Program or at www.smith-root.com.

Smith-Root Model 12

Smith-Root LR-24

A5.5 Rational for Stream Length to be Fished

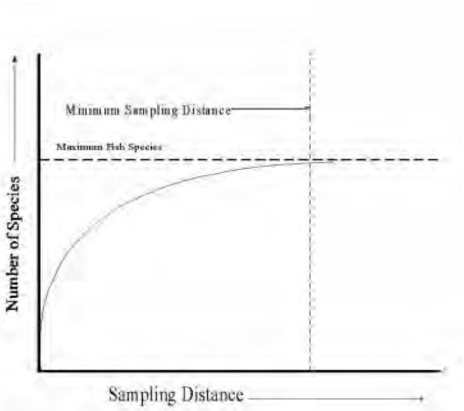


Figure 4-2. Basic relationship between the number of species vs. sampling distance

An accurate representation of the fish species present and their relative numbers at any given sample location is imperative in order to effectively assess biological condition. The first step towards this goal is the establishment of suite of standardized sampling protocols. Initially, this is accomplished by defining a representative sample reach from which a fish sample is collected. For the biological monitoring unit this means sampling a stretch of river or stream with the goal of capturing 95% of the species which are present. Figure XX demonstrates the basic relationship between number of fish species captured relative to the distance sampled; simply stated as the sampling distance increases the maximum number of species captured plateaus. Beyond this distance, additional sampling captures few new species, and thus, is unnecessary to obtain a representative sample of the resident fish community. The distance necessary to capture the majority of the species present is a function of stream order, geomorphologic characteristics, gradient, and other physical factors.

A5.6 Fish Collection Procedure

For wadeable streams in New Hampshire, a minimum distance of 150 meters is employed. This distance has been established as a reasonable minimum to optimize the representation of the resident species. For streams with wetted widths in excess of 30 feet but less than 50 feet, the wetted width is multiplied by 20 to determine the length of the stream reach. For streams over 50 feet wide, a visual survey of the habitat types is completed prior to establishing a set reach length. For these larger wadeable streams, the goal is to sample at least two of each habitat types observed. For some projects, reach lengths may not conform to these basic rules depending on the overall goals of the sampling effort.

Regardless of reach length, normal sampling will include a single pass through the study reach working in an upstream fashion. Sampling in an upstream direction eliminates problems of turbidity from the field crew and facilitates netting of fish as they drift towards the crew. Different fish species will inhabit a variety of microhabitat types and effort is made to shock all niches present in the stream reach.

The field sampling crew is comprised of one shocker, a minimum of two netters, and one person to carry a 5-gallon aerated bucket to place fish into for recovery. Netted fish are immediately transferred to the 5 gallon bucket upon capture. The individual operating the shocker serves as the point person on the field crew and dictates the pace and direction of shocking. The netters generally flank, and stay slightly behind, the shocker, while the person carrying the bucket stays behind both the netters and shocker. Communication between all crew members must be clear and continuous as to the expected direction of travel, pause intervals for fish transfer and repositioning, necessary rest periods, or emergencies. In the case of an immediate need to discontinue shocking field crew members, an "alert call" such as "out" will be utilized.

In some cases, two or more shock crews may be necessary to effectively shock a sample reach. In these cases, each shock crew proceeds in an upstream fashion at an approximately equal pace to maximize capture efficiency. The need for multiple shock crews is relatively infrequent and is dictated by stream size.

Numbers, species and shock time in seconds are recorded to determine the catch per unit of effort (CPUE), providing another level of standardization for making comparisons between sites. The programmed waveform for the pass should also be noted (i.e. Voltage setting, pulse width/pulse frequency). Initial settings should be 60Hz at 6ms which is the I5 mode setting (Figure 4-3). Initial chemical data including pH, temperature, dissolved oxygen and conductivity are made on the Biomonitoring Site Information Sheet (Appendix A-1) before electrofishing. Conductivity levels as well as the targeted species or size class to be captured, will dictate the waveform settings of the backpack shocker. Where macroinvertebrate monitoring is scheduled to take place in conjunction with fish community assessments, the kicks sites or rock basket placement should be within close proximity to the fish sampling reach.

A5.7 Fish Data Processing Procedure

Fish collected during the survey are processed and data recorded after completion of the single pass. Generally, fish are processed at the upstream end of the sample reach by recording the number of individuals for each species captured. The following reference guides are referred to for fish identification: *Freshwater Fishes of New Hampshire* (Scarola, 1987) and *Fishes of Vermont* (Langdon et al. 2006). For species in the trout family (Salmonidae), a separate tally, the number of young-of-the-year (YOY), are also recorded. The incidence of mortality in also tracked for each species with a target of less than 5% mortality for any one species. All data are recorded on a standardized fish collection data sheet (Appendix A-2). Fish less than 25mm in length are not included in the tabulation. If small fish (<25mm) are especially abundant and can be identified, then an appropriate note will be made on the field sheet. External anomalies will be noted on the field sheets as well as an estimation of the number of fish exhibiting the anomaly. After identification and enumeration, all fish are immediately released back into the stream or river. Un-identifiable fish may be photographed or retained for identification back in the laboratory. Finally, the cumulative "shock time" displayed by the electroshocker and shocker settings (e.g. waveform, frequency, voltage, duty cycle) is recorded on the data sheet. The time represents the actual duration, usually in seconds, electric current was discharged into the water. Generally, this shock time ranges from 1,000 - 2,000 seconds, but can be lower or higher depending on the level of effort needed to effectively shock the sample reach.

A6 Quality Assurance and Quality Control

Quality Assurance and Quality Control (QAQC) is performed for fish identification by having an experienced fish taxonomist identify fish species. Field identification manuals, including "Freshwater Fishes of New Hampshire," by John. F. Scarola and "Fishes of Vermont," by

Richard W. Langdon et al. are referred to in the field for less common species. When a fish can not be identified in the field, they are retained for laboratory identification. All species retained are preserved in formalin and labeled with date, site and staff responsible for collection.

A8 Data Sheets

The Fish Collection Data Sheet includes a table to record species, size, weight and number. See Attachment D.

Attachment A: Example Scientific Collection Permit Request Letter

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

April 11, 2013

Scott Decker
NH Fish and Game Department
Inland Fisheries
11 Hazen Drive
Concord, NH 03301

Subject: NH Department of Environmental Services Scientific Collection Permit Request

Dear Mr. Decker,

The NH Department of Environmental Services (NH DES) is requesting a scientific collection permit to collect fish for the year 2013. The permit will allow NH DES to participate in the U.S. Environmental Protection Agency's (EPA) National Rivers and Stream Assessment for 2013 and other NH DES Biomonitoring Program projects as needed.

There will be six EPA and DES staff assigned to one or more of the above mentioned fish collection projects. They include the following:

David Neils, NH DES
Steve Landry, NH DES
Andy Chapman, NH DES
Tom Faber, EPA
Hilary Snook, EPA
Dave McDonald, EPA

The following sites for fish collection have tentatively been identified to include:

Connecticut River (Monroe, Walpole, Lyme, Claremont, Northumberland and Columbia)
Merrimack River (Concord, Pembroke)
Androscoggin River (Errol)
Contoocook River (Concord, Greenfield)
Chocorua River (Tamworth)
Back Creek (Deerfield)

Moose River (Gorham)
Baker River (Wentworth)
Hale Brook (Nashua)
Unnamed Stream (Hinsdale) (42.7567N, -72.4633)

NH DES will notify F&G of any changes to the above plan.

The collection method will be electrofishing by boat or back-pack. In instances where boat shocking is completed, NH DES staff will accompany EPA staff on an EPA owned and operated equipment vessel. Most fish will be identified to species and then returned. A limited number of specimens of recreationally important fish species will be harvested for fish tissue analysis. In a limited number of cases, tissue plugs on separate individuals will be taken, as well as whole fish harvesting, for the purposes of tissue analysis. For fish that have plugs removed antibiotic salve will be placed over the wound and the fish released. Some voucher specimens may also be retained to confirm the species identification by laboratory inspection.

In addition, macroinvertebrate collections will be at various locations throughout the state in 2013. Individuals will be collected through the use of artificial substrates (rock baskets) that are deployed for a period of 6 - 8 weeks. Taxa collected are primarily from the Class Insecta and other arthropods. Samples will be preserved in 70% ethanol and identified by an NH DES retained contractor.

In all cases a complete account of the taxa capture and identified, including any mortality will be provided the NH F&G at the end of the field season.

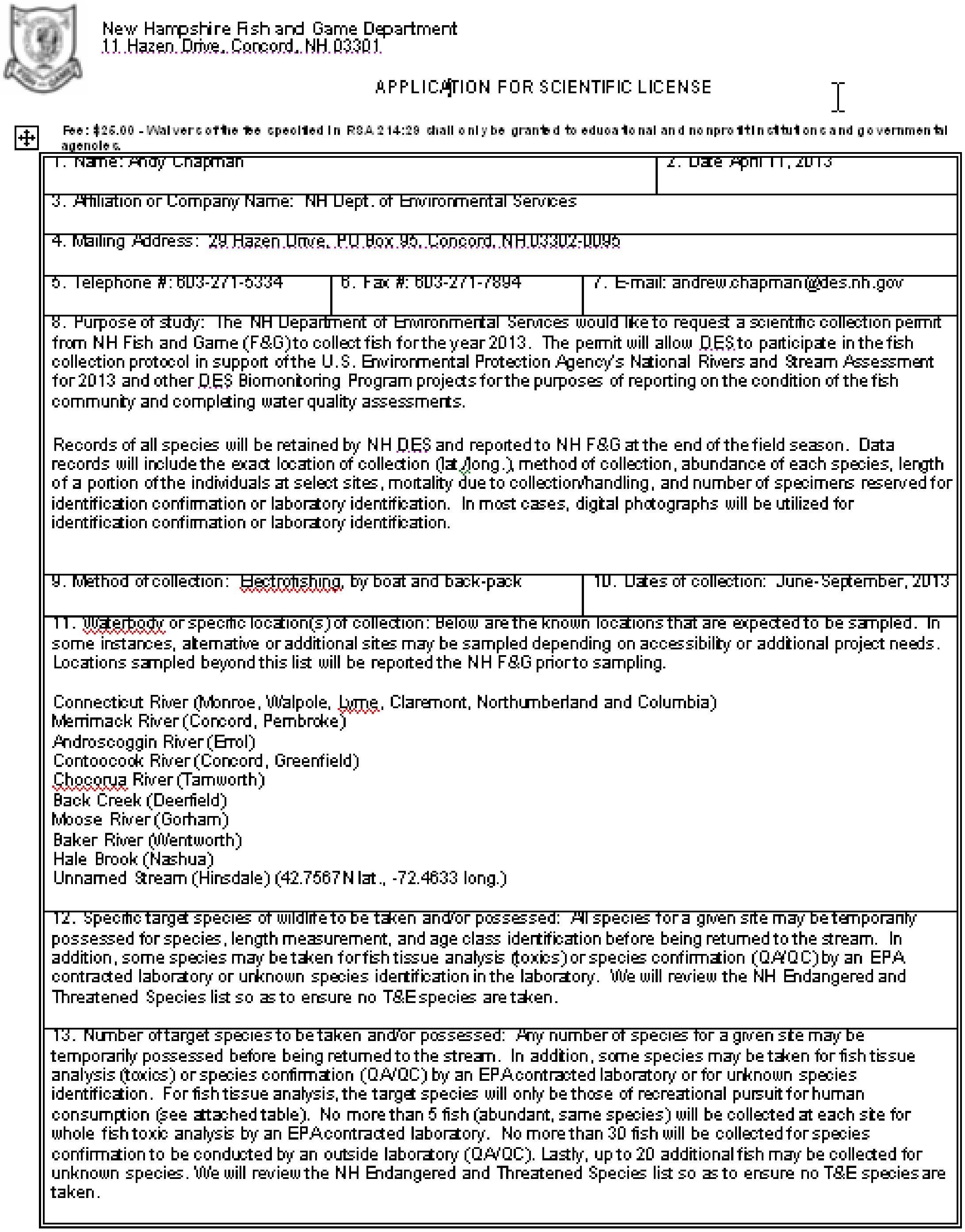
Should you have any questions, please do not hesitate to contact me directly at andrew.chapman@des.nh.gov or 603-271-5334

Thank you,

Andy Chapman
Biomonitoring Program
NH DES Watershed Management Bureau

Cc: Dave Neils (via email)

Attachment B: Example Scientific Collection Permit Application



New Hampshire Fish and Game Department
11 Hazen Drive, Concord, NH 03301

APPLICATION FOR SCIENTIFIC LICENSE

Fee: $26.00 - Waivers of the fee specified in RSA 214:28 shall only be granted to educational and nonprofit institutions and governmental agencies.

1. Name: Andy Chapman

2. Date April 11, 2013

3. Affiliation or Company Name: NH Dept. of Environmental Services

4. Mailing Address: 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

5. Telephone #: 603-271-5334

6. Fax #: 603-271-7894

7. E-mail: andrew.chapman@des.nh.gov

8. Purpose of study: The NH Department of Environmental Services would like to request a scientific collection permit from NH Fish and Game (F&G) to collect fish for the year 2013. The permit will allow DES to participate in the fish collection protocol in support of the U.S. Environmental Protection Agency's National Rivers and Stream Assessment for 2013 and other DES Biomonitoring Program projects for the purposes of reporting on the condition of the fish community and completing water quality assessments.

Records of all species will be retained by NH DES and reported to NH F&G at the end of the field season. Data records will include the exact location of collection (lat./long.), method of collection, abundance of each species, length of a portion of the individuals at select sites, mortality due to collection/handling, and number of specimens reserved for identification confirmation or laboratory identification. In most cases, digital photographs will be utilized for identification confirmation or laboratory identification.

9. Method of collection: Electrofishing, by boat and back-pack

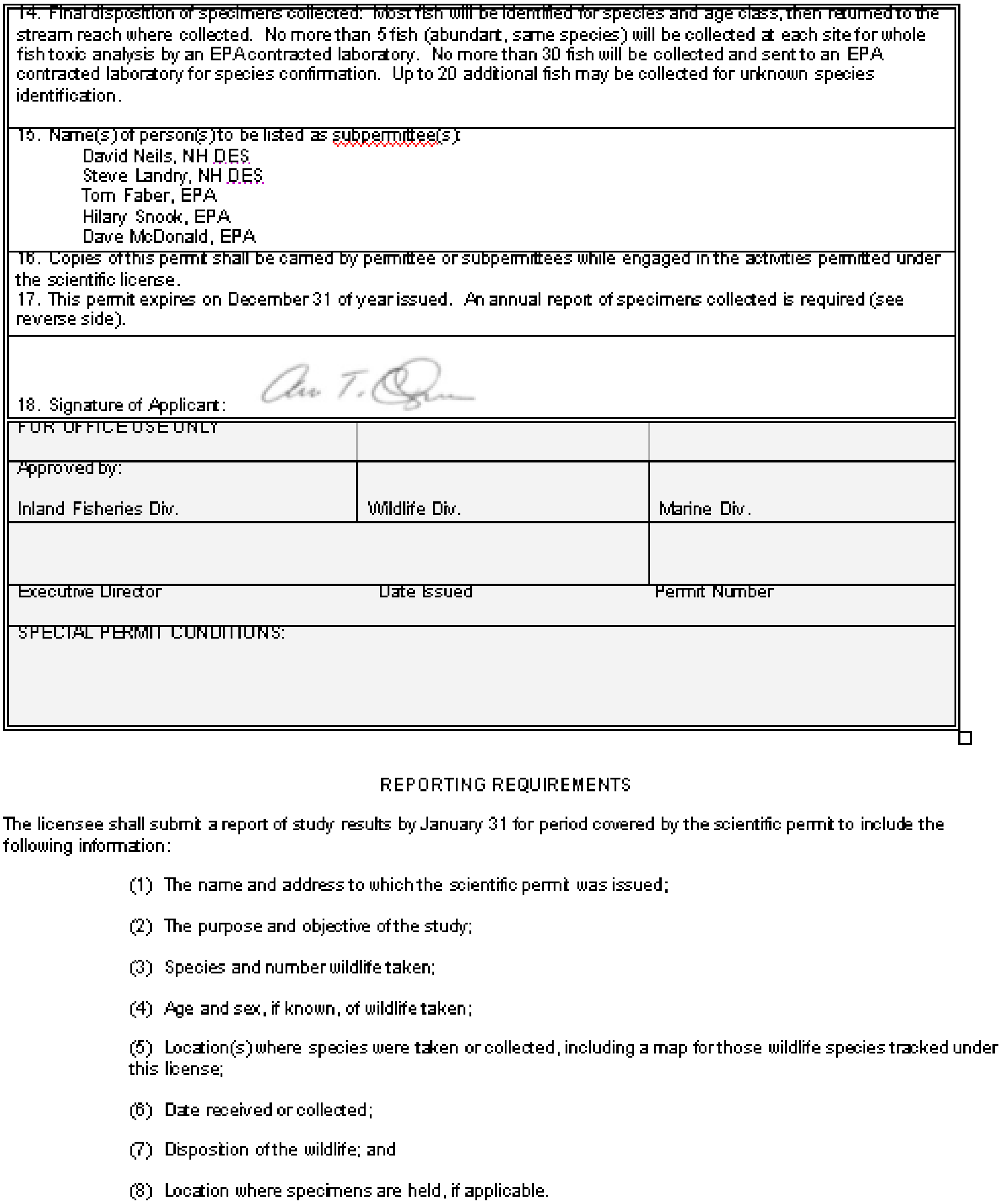
10. Dates of collection: June-September, 2013

11. Waterbody or specific location(s) of collection: Below are the known locations that are expected to be sampled. In some instances, alternative or additional sites may be sampled depending on accessibility or additional project needs. Locations sampled beyond this list will be reported the NH F&G prior to sampling.

Connecticut River (Monroe, Walpole, Lyme, Claremont, Northumberland and Columbia)
Merrimack River (Concord, Pembroke)
Androscoggin River (Errol)
Contoocook River (Concord, Greenfield)
Chocorua River (Tamworth)
Back Creek (Deerfield)
Moose River (Gorham)
Baker River (Wentworth)
Hale Brook (Nashua)
Unnamed Stream (Hinsdale) (42.7567 N lat., -72.4633 long.)

12. Specific target species of wildlife to be taken and/or possessed: All species for a given site may be temporarily possessed for species, length measurement, and age class identification before being returned to the stream. In addition, some species may be taken for fish tissue analysis (toxics) or species confirmation (QA/QC) by an EPA contracted laboratory or unknown species identification in the laboratory. We will review the NH Endangered and Threatened Species list so as to ensure no T&E species are taken.

13. Number of target species to be taken and/or possessed: Any number of species for a given site may be temporarily possessed before being returned to the stream. In addition, some species may be taken for fish tissue analysis (toxics) or species confirmation (QA/QC) by an EPA contracted laboratory or for unknown species identification. For fish tissue analysis, the target species will only be those of recreational pursuit for human consumption (see attached table). No more than 5 fish (abundant, same species) will be collected at each site for whole fish toxic analysis by an EPA contracted laboratory. No more than 30 fish will be collected for species confirmation to be conducted by an outside laboratory (QA/QC). Lastly, up to 20 additional fish may be collected for unknown species. We will review the NH Endangered and Threatened Species list so as to ensure no T&E species are taken.



14. Final disposition of specimens collected: Most fish will be identified for species and age class, then returned to the stream reach where collected. No more than 5 fish (abundant, same species) will be collected at each site for whole fish toxic analysis by an EPA contracted laboratory. No more than 30 fish will be collected and sent to an EPA contracted laboratory for species confirmation. Up to 20 additional fish may be collected for unknown species identification.

15. Name(s) of person(s) to be listed as subpermittee(s):
David Neils, NH DES
Steve Landry, NH DES
Tom Faber, EPA
Hilary Snook, EPA
Dave McDonald, EPA

16. Copies of this permit shall be carried by permittee or subpermittees while engaged in the activities permitted under the scientific license.
17. This permit expires on December 31 of year issued. An annual report of specimens collected is required (see reverse side).

18. Signature of Applicant:

FOR OFFICE USE ONLY		
Approved by: Inland Fisheries Div.	Wildlife Div.	Marine Div.
Executive Director	Date Issued	Permit Number

SPECIAL PERMIT CONDITIONS:

REPORTING REQUIREMENTS

The licensee shall submit a report of study results by January 31 for period covered by the scientific permit to include the following information:

(1) The name and address to which the scientific permit was issued;

(2) The purpose and objective of the study;

(3) Species and number wildlife taken;

(4) Age and sex, if known, of wildlife taken;

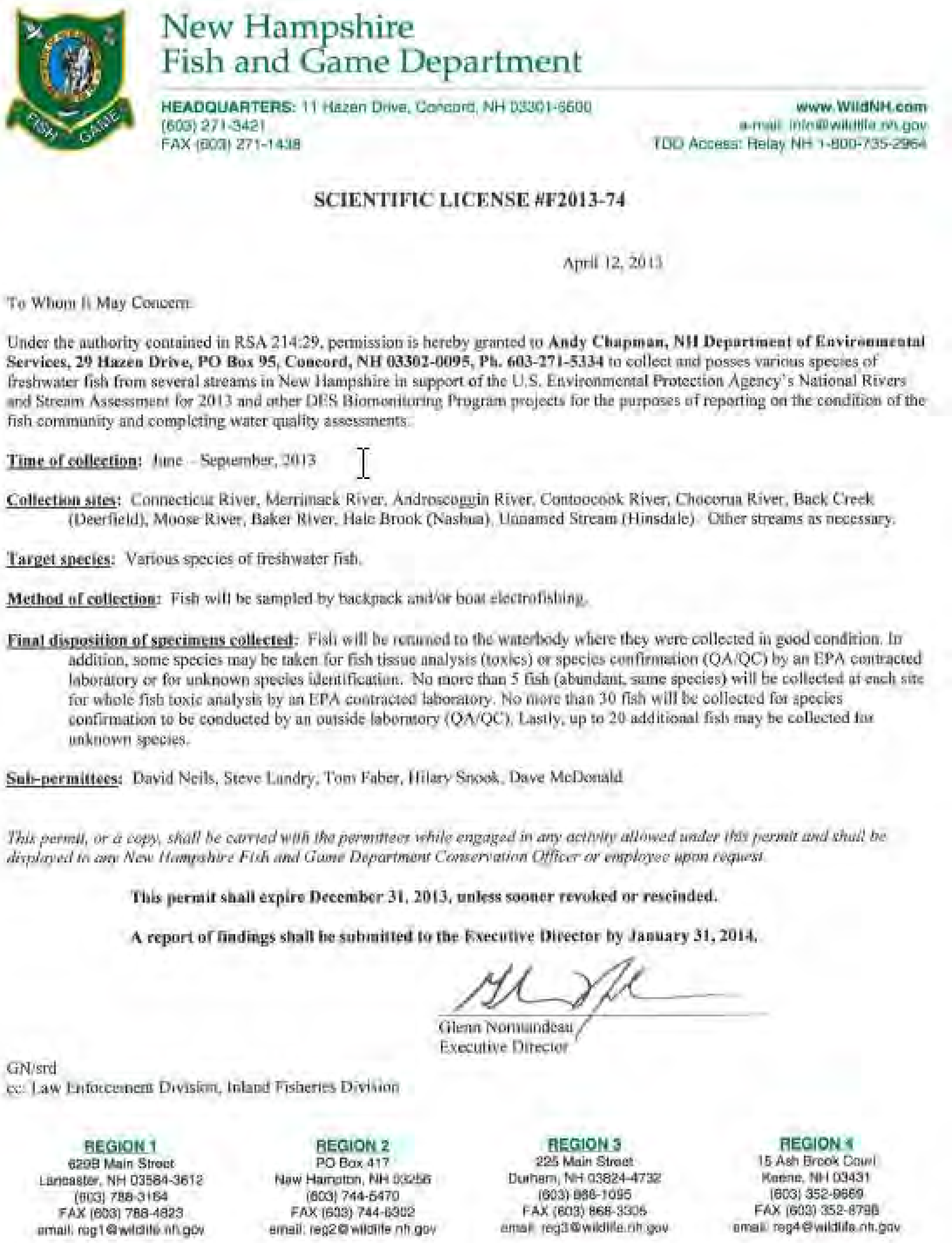
(5) Location(s) where species were taken or collected, including a map for those wildlife species tracked under this license;

(6) Date received or collected;

(7) Disposition of the wildlife; and

(8) Location where specimens are held, if applicable.

Attachment C: Example Scientific Collection Permit



New Hampshire
Fish and Game Department

HEADQUARTERS: 11 Hazen Drive, Concord, NH 03301-6500
(603) 271-3421
FAX (603) 271-1438

www.WildNH.com
e-mail: info@wildlife.nh.gov
TDD Access: Relay NH 1-800-735-2964

SCIENTIFIC LICENSE #F2013-74

April 12, 2013

To Whom It May Concern:

Under the authority contained in RSA 214:29, permission is hereby granted to **Andy Chapman, NH Department of Environmental Services, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095, Ph. 603-271-5334** to collect and posses various species of freshwater fish from several streams in New Hampshire in support of the U.S. Environmental Protection Agency's National Rivers and Stream Assessment for 2013 and other DES Biomonitoring Program projects for the purposes of reporting on the condition of the fish community and completing water quality assessments.

Time of collection: June – September, 2013

Collection sites: Connecticut River, Merrimack River, Androscoggin River, Contoocook River, Chocorua River, Back Creek (Deerfield), Moose River, Baker River, Hale Brook (Nashua), Unnamed Stream (Hinsdale). Other streams as necessary.

Target species: Various species of freshwater fish.

Method of collection: Fish will be sampled by backpack and/or boat electrofishing.

Final disposition of specimens collected: Fish will be returned to the waterbody where they were collected in good condition. In addition, some species may be taken for fish tissue analysis (toxics) or species confirmation (QA/QC) by an EPA contracted laboratory or for unknown species identification. No more than 5 fish (abundant, same species) will be collected at each site for whole fish toxic analysis by an EPA contracted laboratory. No more than 30 fish will be collected for species confirmation to be conducted by an outside laboratory (QA/QC). Lastly, up to 20 additional fish may be collected for unknown species.

Sub-permittees: David Neils, Steve Landry, Tom Faber, Hilary Snook, Dave McDonald

This permit, or a copy, shall be carried with the permittee while engaged in any activity allowed under this permit and shall be displayed to any New Hampshire Fish and Game Department Conservation Officer or employee upon request.

This permit shall expire December 31, 2013, unless sooner revoked or rescinded.

A report of findings shall be submitted to the Executive Director by January 31, 2014.

Glenn Normandeau
Executive Director

GN/srd
cc: Law Enforcement Division, Inland Fisheries Division

REGION 1	REGION 2	REGION 3	REGION 4
629B Main Street	PO Box 417	225 Main Street	15 Ash Brook Court
Lancaster, NH 03584-3612	New Hampton, NH 03256	Durham, NH 03824-4732	Keene, NH 03431
(603) 788-3164	(603) 744-5470	(603) 868-1095	(603) 352-9669
FAX (603) 788-4823	FAX (603) 744-6302	FAX (603) 868-3305	FAX (603) 352-8798
email: reg1@wildlife.nh.gov	email: reg2@wildlife.nh.gov	email: reg3@wildlife.nh.gov	email: reg4@wildlife.nh.gov

Attachment D: Fish Collection Data Sheet

Date:	**Electrofishing Info**	**Data Entry**
Site ID:	**Equipment Model:**	**Data entered into database**
Waterbody:	**Back-pack Setting:**	**Initials: Date:**
Town:	**Shock Time (s):**	**Data transcribed/ QC**
Visit #:	**Pass #:**	**Initials: Date:**
Fishing Crew/Notes:		

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

For Full Datasheet See: < "\\HAZDESFP3\wATERSHED\BIOLOGY\Biomonitoring\Sampling\Data Sheets\C-2_Fish Collection\20140508 Fish Collection Datasheet.xls"

Attachment E: Fish Collection Waiver for Electrofishing Equipment.

To assist the NHDES Biological Monitoring Program with fish collection by electrofishing methods, I ______________________, have read the New Hampshire Department of
Print Name
Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes and reviewed the appropriate SOP and safety manuals, available from the NHDES Biolomonitoring Program and or from the manufacturer which can be found on-line at www.smith-root.com.

____
Signature Date

STANDARD OPERATING GUIDELINES FOR FRESHWATER MACROINVERTEBRATE SAMPLING AND ANALYSIS

1.0 INTRODUCTION

The following guidelines are to be used by ESS Group, Inc. (ESS) for freshwater macroinvertebrate sampling within a single stream habitat type. They are appropriate for sampling wadeable rivers and streams, as outlined by US EPA (1999). The laboratory analysis procedures outlined below specify critical techniques and quality assurance and quality control procedures.

2.0 REQUIRED MATERIALS

The following materials are likely to be necessary for this procedure:

Field Equipment

- Standard D-frame kick-net, 500 μm mesh, ~0.3 meter (~1.0 ft) frame width
- Stopwatch
- ≥70% ethanol for sample preservation
- White tray for retaining or examining sample debris
- Sample containers (liter- or quart-sized jars preferred)
- Fine point permanent marker for labeling outside of sample jars
- Weatherproof paper for internal sample lables
- Wash bottle or similar container for dispensing water and ethanol
- Fine forceps for picking macroinvertebrates from net
- Pencils
- Field data sheets on weatherproof paper
- Clipboard
- Measuring tape, ruler, or stick
- Meters, probes, and other devices necessary for making field measurements (use of these is covered under separate SOGs)
- Chest or hip waders
- Arm length protective gloves
- Digital camera
- Site list
- Sieve bucket, 500 μm mesh (Optional)
- Driving directions (Optional)
- Global Positioning System (GPS) Unit (Optional)

Laboratory Equipment

- Log in sheet for samples
- 70% ethanol for storage of specimens
- Forceps – ultrafine or superfine gauge (straight or angled per staff preference)
- Gridded sorting sieve (at least 16 grid cells) with mesh size of 500 µm or less
- Sorting sieve tray (dimensions sufficient to fit sieve)
- Scoop for removing sample material
- Specimen vials with caps or stoppers
- Sample labels
- Archival pen/pencil
- Dissecting microscope for organism identification
- Compound microscope for slide-mounted organism identification
- External light source (fiber optic gooseneck lamp ideal)
- Petri dishes – sectional preferred
- Regionally appropriate macroinvertebrate taxonomic keys
- Standard laboratory bench sheets for sorting and identification
- Holding wells (Optional)
- Lab notebook (Optional)

3.0 HABITAT ASSESSMENT AND MACROINVERTEBRATE COLLECTION

The details provided below assume that the "single habitat sampling approach" will be taken, as referred to by US EPA (Barbour et al. 1999), in order to standardize assessments among streams. Sampling the riffle habitat (run habitat where riffle not available) is anticipated to provide a representative sample of the stream reach.

Summary of Requirements:

- All kick samples to be taken with a standard D-frame net, working upstream along a representative 100 meter (m) reach.
- Conduct kick sampling for a three-minute duration, removing organisms from larger substrate particles by hand.
- All samples must be preserved in the field on the day of collection with ethanol solution in a leak proof container. Samples ma be diluted with water as necessary to bring preservative level to about 70%.
- Complete physical characterization and habitat assessment field sheets, as necessary.
- Complete sample log-in sheet upon returning samples to the laboratory.

- Clearly label all sample containers with sample identification code, date, stream name, sampling location, and collector name.

Specific Requirements:

1. A 100-m reach representative of the characteristics of the stream will be selected. If not specified by the client/project, the sampling reach should be sufficiently downstream from any road crossing to minimize its effect on stream velocity, depth, and overall habitat quality, with no major tributaries discharging to the stream in the study area. If access restrictions, available habitat, or other site constraints prevent this, areas upstream of or near bridges and/or culverts may be included.
2. Before sampling, any required physical characterization field sheets should be completed to document water quality prior to disturbing stream sediments. Sheet entries will be reviewed after sampling.
3. A map of the sampling reach should be drawn to characterize key in-steam and riparian corridor attributes (e.g., riffles, falls, fallen trees, pools, bends, undercut banks, areas or erosion, vegetation, possible pollutant sources, etc.). An arrow will indicate the direction of flow. Take care not to disturb portions of the stream that will be sampled for macroinvertebrates.
4. Sampling should begin at the downstream end of the reach and proceed upstream to avoid disturbing targeted in-stream habitat. Using a D-frame kick net, sampling will be conducted at various locations in a riffle or series of riffles for a total active sampling time of three minutes. The area sampled should be representative of available habitat. Therefore, if multiple areas of riffle habitat are available, the sample should be composited from multiple riffles within the stream reach. If only one area of appropriate habitat is available, the sample should be composited from multiple locations within this area. If no riffle habitat is available, sampling should be done in the most similar habitat available (i.e., higher velocities with hard substrates).

   In general, sampling should last for no more than 30 seconds at any one net location. Cobbles should be picked up, placed at the lip of the net, and rubbed by hand to remove attached organisms. Boulders or exposed bedrock may be sampled by placing the net downstream and rocking and/or rubbing the surface of the rock to dislodge organisms into the net. Areas of gravel may be sampled by standing upstream of the net and gently disrupting the substrate with the toe and heel of wader boots. The goal of sampling is to dislodge burrowing, clinging, or attached organisms. Therefore, it is not desirable to violently disturb or kick substrate into the water column; this may result in damage to sampled organisms and excessive accumulation of sand and gravel in the net. Before moving to a new sampling location within the reach, collected material should be rinsed by splashing or running clean stream water through the net two to three times. If clogging does occur, the material in the net should be emptied into a sampling tray before returning to the stream to continue sampling.

   If field duplicate samples are required, these should be collected simultaneously by a second trained staff member. Each staff member should sample the same habitat features and switch sides of the stream halfway through the duration of the sampling event. This will help to counter potential sampling bias.
5. Once a complete sample has been collected,, larger debris (e.g., cobbles, twigs, large leaves) may be carefully rinsed with stream water to remove any macroinvertebrates and discarded. Sample material should be transferred from the net to sample container(s) and preserved in enough ethanol to cover the sample. Forceps may be needed to remove organisms from the net. Ethanol should not

be diluted below 70%. A label should be placed into the sample container indicating the sample identification code, date, stream name, sampling location, and collector name. The outside of the container will include the same information and indicate that the sample is preserved in ethanol. If more than one container is needed for a sample, each container label will contain all the information for the sample and should be numbered (e.g., 1 of 2, 2 of 2, etc.).

6. Sample container information as noted in step (5) will be recorded, on the US EPA "Sample Log-In Sheet" or comparable form.
7. Walking the reach, an assessment of the surrounding habitat will be conducted by completing a US EPA "Habitat Assessment Field Data Sheet" or comparable form. The sheet should be appropriate to the gradient of the stream being assessed (i.e., low or high).
8. Complete any other required tasks at this time.

4.0 PROTOCOL FOR LABORATORY ANALYSIS

Summary of Requirements:

- Samples will be rinsed to remove preservatives and fine sediments.
- Large, unique, or rare species will be removed prior to sub-sampling.
- Sub-samples will be taken using a grid-marked sorting sieve tray and metal frame.
- Sub-samples will be sorted under a dissecting microscope until the target number of organisms has been removed.
- Organisms will be preserved with ethanol in small, appropriately labeled, vials or jars.
- Unsorted residue and sorted residue should be preserved with ethanol in appropriately labeled jars.
- Midges and worms may be mounted on labeled slides, as necessary, for identification.
- Identification to genus/species level or the lowest practicable taxonomic level using a compound microscope for mounted slides and a dissecting microscope for other organisms.

Specific Requirements:

1. The sample log-in sheet will be reviewed and annotated, as necessary, to verify that all samples have arrived and are in proper condition for processing.
2. Sample processing begins by rinsing the sample material in a 500-μm mesh sieve to remove preservative and fine sediment. A sieve tray should be placed under the sieve to capture all rinseate. Take care to ensure that direct flow of water does not impinge and damage organisms against the mesh screen. Large organic material (whole leaves, twigs. algal or macrophyte mats, etc.) not removed in the field may be carefully rinsed, visually inspected, and discarded once organisms have been removed and placed in the sieve. If the samples have been preserved in alcohol, it may be necessary to soak the sample contents in water for about 15 minutes to hydrate the benthic organisms, which will prevent them from floating on the water surface during sorting.
3. After washing, the sub-sample will be evenly spread across the sorting sieve by immersing in water and then quickly removing from the water once organisms and debris are evenly distributed. Cover the sieve to keep sample material moist during sorting.

4. Large, rare or unique organisms should be picked out, identified and reported as supplemental information for each location prior to sub-sampling.

5. Use a random number table to select a grid cell from the tray for sub-sampling. Debris overhanging the grid may be cut with scissors. A scoop will be used to remove all debris and organisms from the grid. The sub-sample will then be transferred to a small container or Petri dish for temporary holding and sorting.

6. The sub-sample will be sorted under a dissecting microscope or other magnifying device sufficient to pick out organisms as small as 500 µm. All organisms from the sub-sampled material should be sorted from sample debris. If fewer than the target number of organisms is removed from the sub-sampled material, then another random grid from the sorting sieve must be selected and steps (4) and (5) repeated. These steps should be repeated until the whole sample has been sorted or the target number of organisms has been removed. On most projects, sorting may be stopped if the number of sub-sampled organisms is within 10% of the target value. However, this should be confirmed with the project manager on a project-by-project basis.

7. The sorted organisms should be placed into glass vials and preserved in 70% ethanol. The vials will be labeled inside and out with the sample identifier or lot number, date, stream name, sampling location and taxonomic group. If more than one vial is needed, each will be labeled separately and numbered (e.g., 1 of 2, 2 of 2). Most projects will require sorting into at least three vials, by taxonomic classification. Typically, these three vials will be labeled “Chironomidae/Oligochaeta”, “Mollusca/Crustacea” and “Others”, unless otherwise indicated by the project manager. An additional vial, called “Supplemental” may be used where supplemental organisms have been removed from the sample material.

8. The sorted debris residue will be saved in a separate container (sealable plastic bag is acceptable, as long as it is placed within a sealed jar) and labeled as “sorted residue”. The label will also include all prior sample label information and indicate preservation in 70% ethanol. The remaining unsorted sample debris residue will be saved in the original sample container when possible.

9. Oligochaete worms (Oligochaeta) and non-biting midge (Chironomidae) larvae and pupae may be mounted on slides, as necessary for identification. These should be mounted in an appropriate medium (e.g., CMC-9 or -10) using a method consistent with Epler (2001). Slides should be labeled with the project name, site identifier, and date collected. Multiple mounts may be completed on each slide but the slide label should be marked to index the location of each on the slide. As with midges, may also be mounted on slides and will be appropriately labeled.

10. The sorter will fill out the laboratory bench sheet, noting sub-sampling/sorting information, the number of grids picked, time expenditure, and number of organisms. QC checks performed on a particular sample should be indicated on the reverse of this sheet or in a QA/QC logbook. The sorter will record the date of sorting and slide monitoring, if applicable, on log-in sheet as documentation of progress and status of completion of the sample lot.

11. Identification and enumeration for sorted organisms within each sample will be determined through the use of a dissecting microscope (up to 45X magnification), a fiber optic lamp, standard dissecting tools, and using appropriate taxonomic keys. Midges and oligochaete worms mounted on slides will be identified using a compound microscope. Each taxon found in a sample will be recorded and enumerated on a lab bench sheet or be transcribed to the laboratory bench sheet from a lab notebook. Any difficulties encountered during identification (e.g.. missing anatomical features, degraded condition, early instar) should be noted on these sheets.

12. Any sample material that is released to the client or to an outside laboratory must be accompanied by a signed chain-of-custody form. Copies of all chains-of-custody should be retained on file, as needed.
13. For archiving samples, specimen vials will be placed in labeled jars with a small amount of denatured 70% ethanol and tightly capped.

5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The QA/QC protocol for the benthic monitoring program will be comparable to procedures outlined for other similar assessment programs. In the field, after sampling has been completed at a given site, all nets, pans, etc. that have come into contact with the sample will be rinsed thoroughly examined carefully and picked free of debris or organisms. Also, a duplicate sample will be taken at 10% of the sites to evaluate the precision or repeatability of the sampling technique or the collection team.

In the lab, ESS will randomly perform a quality check on a minimum of 10% of the samples analyzed. This quality check will cover both the sorting and the identification phases of the analysis.

For the sorting phase, if more than 10 % error (calculated by dividing the number found in the quality check by the total number of individuals) is found between the sorter and the quality assurance check, 4 additional samples will be reprocessed. If the percent error in those samples is more than 10% in those samples, then all samples sorted by that individual will be reprocessed.

For identification, a second ESS staff member trained in macroinvertebrate identification will randomly check a minimum of 10% of the samples analyzed. The purpose of this check will be to validate the identifications made on the individuals comprising the sample. In addition, ESS will confirm the identifications made with other regional experts as necessary.

A reference collection of samples will be maintained. These specimens will be labeled and preserved in 70% ethanol and stored for future reference and/or for study by other regional experts as necessary

Records of the results of each of the various quality assurance checks described above will be kept in a laboratory analysis log.

6.0 QUALIFICATIONS

Habitat Assessment and Physical Characterization

Staff responsible for habitat assessment and physical characterization must be familiar with the protocols and requirements necessary to complete field sheets and meet project needs. In-house training with the QA officer or field crew leader is required to minimize bias among individual staff completing the habitat assessment scoring.

Macroinverterbrate Sample Collection

Staff responsible for macroinvertebrate sample collection must be familiar with the protocols and requirements necessary to collect a representative single-habitat sample from wadeable streams. In-house training with the QA officer or field crew leader is required to ensure sampling methods and effort are consistent among individual staff. In-house training in proper sample preservation techniques is also required.

Macroinvertebrate Sorting and Identification

To properly conduct the taxonomic identification of aquatic macroinvertebrates, the taxonomist and QC officer must be familiar with the protocols stated in this SOG, have confidence in the appropriate use of aquatic macroinvertebrate keys and be familiar with the organisms from the area in question.

Staff responsible for slide mounting of Chironomidae and Oligochaeta must be familiar with the protocols stated in this SOG and be proficient in the methods outlined by Epler (2001).

In-house training with an experienced aquatic macroinvertebrate taxonomist is required for all staff responsible for entering taxonomic data into a project database. The staff member responsible for data entry must be familiar with the structure of the database and nature of the calculated metrics in order to ensure accuracy of the data and any associated calculations.

7.0 REFERENCES

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. Washington, D.C.: U.S. Environmental Protection Agency; Office of Water;

Epler, J.H. 2001. Identification Manual for the Larval Chironomidae (Diptera) of North and South Carolina. Special Publication SJ2001-SP13. North Carolina Department of Environment and Natural Resources, Raleigh, NC and St. Johns River Water Management District, Palatka FL.

GUIDELINES FOR MEASURING GROUNDWATER SEEPAGE QUANTITY AND QUALITY

1.0 INTRODUCTION

These Standard Operating Guidelines (SOG) provide basic instructions for the routine measurement of groundwater seepage quality and quantity. These standard methods describe the proper installation of seepage meters and the operation of Littoral Interstitial Porewater (LIP) samplers.

2.0 REQUIRED MATERIALS

The following materials are necessary for the seepage meter installation procedure:

- Seepage meters of known diameter
- Plastic tubing with one hole stopper
- Seepage bags with one hole stoppers and plastic clamps
- 250 mL graduated cylinder
- Field book or data sheets

The following materials are necessary for the collection of groundwater samples for analysis:

- Hand pump
- 2-1 L filter flasks with stoppers and tubing
- Littoral Interstitial Porewater (LIP) sampler
- Sample bottles with labels

3.0 METHODS

3.1 Seepage Meter Installation

- Initially, representative segments of the shoreline, where seepage meters will be positioned, are selected based on topography and housing density. Such segments may also be assigned to shoreline locations based on specific project objectives.

- ESS personnel shall estimate seepage quantity by installing two seepage meters per defined shoreline segment and measuring the change in volume in the attached seepage bag over time. Change in volume multiplied by a conversion factor relating the allotted seepage time (i.e., fraction of the day for which the seepage meter was running) and then adjusting to unit area (square meter), yields the liters of inseepage (positive value) or outseepage (negative value) per square meter per day.

- Seepage meters shall be firmly embedded in the substrate to depth of greater than 4 inches. Inserting seepage meters to this preferred depth will ensure that volumetric changes observed in the attached seepage bags are truly representative of groundwater flows and will increase the likelihood that seepage meters will not be disrupted by strong currents or wave action.

- At each designated shoreline location (segments pre-determined by project plan), one seepage meter should be placed at a relatively shallow depth and one at a deeper depth in order to capture ground water flows that may be occurring in different strata.

- Seepage meters must be allowed to equilibrate for a minimum of 5 minutes before the system is “closed” by the attachment of the seepage bags.

- The seepage bag should be filled with an appropriate pre-measured volume of water. In most instances 250 mL will be appropriate. The pre-determined volume of water is necessary since this volume is compared to the volume obtained after sufficient time has elapsed to quantify the change in volume (either positive or negative).

- Seepage bags are to be secured in place with as little disturbance of the seepage meter as possible. The best approach is to slowly twist the seepage bag's rubber stopper into the hole of the seepage meter.

- Prior to use, seepage bags must be air dried in order to ensure that all residual water is removed from bags and therefore will not confound the change in volume measurements. Additionally, each bag and associated stopper must be visually inspected and air pressure tested prior to each use to ensure that no leakage can occur.

3.2. Groundwater Sampling Using Littoral Interstitial Porewater Sampler

- Groundwater seepage quality can be collected through sampling with a Littoral Interstitial Porewater (LIP) sampler. A hand pump, attached to a 250 ml HDPE plastic flask, creates a low-pressure vacuum causing water to flow from the LIP sampler into the attached plastic flask. To avoid accidental contact of the extracted water with the hand pump, a second plastic flask should be connected in-line using additional tubing.

- Porewater should be extracted from a minimum of three locations in each segment and composited using equal volumes from each location.

- Samples collected may be tested in the field for parameters such as, temperature, conductivity, and pH, and/or transferred into labeled bottles and sent to a laboratory for the other analyses.

4.0 DOCUMENTATION

Record data on field sheets, field notebooks, or electronic tablets. Any unanticipated site-specific information, which requires deviation from the above guidelines should also be recorded. Documentation should include a minimum of the following:

- Name or initials of person conducting the measurement
- Date
- Site ID or name
- Size of seepage meter (diameter)
- Time of seepage meter installation
- Time of seepage meter retrieval
- Volume of water added to seepage meter bag at installation
- Volume of water remaining in seepage meter bag at retrieval
- Results of in-lake and extracted groundwater field parameter measurements (temperature, pH, and specific conductance at a minimum)
- Environmental conditions (wind, temperature, etc.) and other relevant observations about site conditions
- Photographic evidence of conditions

GUIDELINES FOR MEASURING STREAMFLOW

1.0 INTRODUCTION

These guidelines provide instructions for the field measurement of flow rate in bodies of running water.

Descriptions of two field techniques are provided.

The first, called the time of travel method, is simple and does not require expensive or specialized equipment. This is most appropriate for rapid streamflow assessments where order of magnitude accuracy is acceptable or water depth is too low for the accurate measurement using a velocity meter.

The second method requires the use of a current meter, which is the preferred method where discharge measurements are being used to develop at-a-station rating curves and water depth is sufficient for measurement.

Additionally, these guidelines provide This method of calculating streamflow involves determining the cross-sectional area of the stream and measuring the average time it takes for a neutrally buoyant object to travel a known distance.

2.0 REQUIRED MATERIALS

The following materials are necessary for the measuring streamflow:

- Measuring stick to measure stream depth (folding stick is recommended)
- Flexible tape measure (longer than the width of the stream)
- Field data sheet, logbook, or tablet with electronic data sheet

If using a velocity meter, the following additional materials are also required:

- Swoffer Model 2100 current velocity meter (or similar)
- Calibrated wading rod

If using the time of travel method, the following additional materials are also required.

- A neutrally buoyant float
- Stopwatch (built-in app on most smartphones)
- Net (to catch the float)

3.0 METHODS

3.1 Choosing a Cross Section

Measuring stream depth using a folding yard stick.

- Select an appropriate stream cross section. The location selected should be straight (no bends), and free of obstructions. Unobstructed runs are ideal.

- Identify the left and right banks of the stream. When working in streams, left and right are relative to the mean flow direction. Therefore, the left bank will be to one's left when facing downstream but to one's right when facing upstream.

- To assure consistency of measurements and allow for easier comparison of data across time, flow should be measured at the same cross section of the stream during all visits. Include descriptions of site landmarks in field notes, and/or take photos of measurement locations. If site conditions allow, install permanent cross section markers, such as stakes or rebar.

- If a staff gauge is present near the stream measurement location, record the staff gauge depth during each visit.

3.2. Divide the Channel into Subsections

- Establish a transect by stretching the measuring tape across the stream, perpendicular to the channel axis. Secure each end of the tape to the stream banks so that the tape is taut.

- Take a minimum of four photographs, including one each facing upstream, the left bank, downstream, and the right bank.

- Starting with the left edge of water, measure width and stream depth at no less than three locations (stations) within the steam channel. This is the minimum number of stations and most streams will require more than three measurements to accurately calculate discharge.

- The area between each vertical station represents a channel subsection.

3.3. Measuring Velocity

3.3.1 Time-of-Travel Method

- To measure travel time, time how long it takes for a neutrally buoyant object (a float) to travel a known distance. Suitable objects should float, but sit very low in the water to minimize influence from wind, and can be untethered or tethered (methods adapted from EPA, 2012a described below). Suitable floats include:

  - citrus fruits or pieces of citrus peel
  - cheese puffs
  - small sponge rubber balls
  - small sticks or bits of vegetation

- Always face upstream when taking velocity measurements. Stand far enough downstream that stream velocity is not affected in the location being measured.

- Surface velocity is generally greater than depth-averaged velocity, so a correction factor (0.8 for rocky-bottom streams, 0.9 for muddy-bottom streams) is applied to float travel times (see Section 3.3, EPA 2012b)

- Untethered floats should be biodegradable, or a second person equipped with a net should be stationed downstream of the sampling reach to retrieve the float(s).

- Hold the measuring stick above the water surface, perpendicular to the cross section. Release the untethered float somewhat upstream of the end of the measuring stick to allow the float to reach full flow velocity. Using a stopwatch, time how long it takes for the float to travel a known distance (3 ft is recommended for most streams but longer distances may be appropriate where velocity is high). Repeat this process three times to obtain an average time to travel at one station before proceeding to the next station.

  o

3.3.2 Depth-Averaged Current Meter Method

- Set the current meter to average measurements over at least a three second period. Longer periods may be used if appropriate to conditions.

- Always face upstream when taking velocity measurements. Stand far enough downstream that stream velocity is not affected in the location being measured.

- Carefully place the wading rod in the flow until the base is firmly on the stream bottom.

- Orient the current meter perpendicular to the cross section transect.

- Ensure that the wading rod is straight up and down (not angled).

- Hold the wading rod steady while adjusting the calibrated height of current meter to match the measured depth. This will allow collection of measurements that are reflective of depth-averaged velocity.

- Once at least three seconds have passed, view the reading from the current meter. Allow at least three readings to occur before recording. This will prevent erroneous data due to averaging of measurements from the set up process.

3.4. Calculating Flow

- The following equation is used to calculate flow using the time-of-travel method):

$$Q = \sum(a*l*C)/t$$

- Q = discharge
- a = cross sectional area of each stream subsection (subsection width x average depth)
- l = average distance traveled by the float for each subsection
- C = correction factor (0.8 for rough streambeds, 0.9 for smooth streambeds)
- t = average time of travel for each subsection (seconds)

The following equation is used to calculate flow using the depth-averaged current meter method:

$$Q = \sum(d*w*v)$$

- Q = stream discharge
- d = average subsection depth
- w = subsection width
- v = average subsection velocity at 60% depth

4.0 DOCUMENTATION

Record streamflow data on field sheets, field notebooks, or electronic tablets. Any unanticipated site-specific information, which requires deviation from the above guidelines should also be recorded. In addition to recording the required discharge data, field notes for streamflow measurement should include a minimum of the following:

- Name or initials of person conducting the measurement
- Discharge measurement method used
- Site ID or name
- Date and time of streamflow measurement
- Environmental conditions (wind, temperature, etc.)
- Other relevant observations about site conditions
- Photographic evidence of streamflow and site conditions is also useful for verification of relative stream stage and flow from different visits, as well as any environmental factors that may have influenced data collection.

5.0 REFERENCES

EPA, 2012a. Water: Monitoring and Assessment. 5.1 Stream Flow. United States Environmental Protection Agency. Office of Water. EPA 841-B-97-003. Accessed January 27, 2020 at https://archive.epa.gov/water/archive/web/html/vms51.html

EPA, 2012b. SESD Operating Procedure, Hydrologic Studies. Effective Date November 1, 2012. United States Environmental Protection Agency. Office of Water. SESDPROC-501-R3. Accessed

January 27, 2020 at https://www.epa.gov/sites/production/files/2015-06/documents/Hydrological-Studies.pdf www.essgroup.com

Pebble count methods

The composition of the streambed and banks are important facets of stream character, influencing channel form and hydraulics, erosion rates, sediment supply, and other parameters. Each permanent reference site includes a basic characterization of bed and bank material. For studies of fish habitat, riparian ecosystems or stream hydraulics, the characterization of substrates and bank materials may require greater detail than can be covered here.

Observations tell us that steep mountain streams with beds of boulders and cobbles act differently from low-gradient streams with beds of sand or silt. You can document this difference by collecting representative samples of the bed materials using a procedure called a pebble count.

The most efficient basic technique is the Wolman Pebble Count. This requires an observer with a metric ruler who wades through the stream and a note taker who wades along side, or remains on the bank with the field book. Particles are tallied by using size classes or categories similar to the ones shown in Table 1.

Table 1. Pebble count size classes (**modified**)

Size categories	Size ranges (**mm**)
(**BC**) Silt/clay Very small (smooth feel)	
(**BC**) Sand (Small grainy feel)	< 2
(**BC**) Gravel (Pea to tennis ball diameter)	
1. Fine gravel	2 – 8
2. Medium gravel	9 – 16
3. Coarse gravel	17 – 64
(**BC**) Cobble (Tennis ball to basket ball diameter)	
1. Small cobble	65 – 90
2. Medium cobble	91 – 128
3. Large cobble	129 – 256
(**BC**) Boulder (Basketball to car diameter)	
1. Small boulder	257 – 512
2. Medium boulder	513 – 1024
3. Large boulder	> 1024
(**BC**) Bedrock Large solid surface	
(**BC**) Woody debris Sticks, leaves etc.	
	(**BC**) – **Broad category**

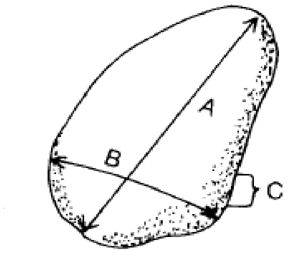
Pebble counts grids along the stream's length can be transects, zigzags, or based upon the channel habitats (i.e. percentage of riffles, runs and pools). Usually, a random step-toe procedure is used to collect the pebbles. The step-toe procedure is described below and a zigzag pattern is illustrated on page two.

Collection procedure

Select a reach and indicate it on your site map. For stream characterization, sample pools, runs and riffles in the same proportions as they occur in the study reach. For other purposes, it may be appropriate to sample these separately or sample the entire reach randomly using a zigzag pattern. In some cases only riffles are sampled. Measure a minimum of 100 particles to obtain a valid count. Usually less are collected if single channel features are sampled.

Start the collection at the lower end (downstream) of your reach at one of the bankfull elevations (not necessarily the present water level). Averting your gaze, pick up the first particle touched by the tip of your index finger at the toe of your wader.

Measure the intermediate axis (neither the longest nor shortest of the three mutually perpendicular sides of each particle picked up). Measure embedded particles or those too large to be moved in place. For these, measure the smaller of the two exposed axes.
Call out the measurement. The note taker tallies it by size class and repeats it back for confirmation.



(**A**) Long axis
(**B**) Intermediate axis
(**C**) Short axis

The intermediate axis is the pebble's diameter.

Take one step across the channel in the direction of the opposite bank and repeat the process, continuing to pickup particles until you have the requisite number (100 or more) of measurements. The note taker keeps count. Traverse across the stream perpendicular to the flow or in a zigzag pattern. Continue your traverse until you reach the opposite bank so that all areas between the bankfull elevations are representatively sampled. You may have to duck under bank top vegetation or reach down through brush to get an accurate count. Move upstream randomly or at a predetermined distance and make additional transects to sample a total of at least 100 particles.

The **red line** drawn in the image indicates the approximate path the students chose while conducting their pebble count within a 100-meter reach of Skaggs Run.

Pebble count methods

Bankfull physical features include the top (level surface) of adjacent point bars, change in slope, and change in bank composition, limit of woody vegetation and in some cases debris and scour lines. About of 10% of your pebble count should be collected from bankfull (i.e. exposed bars).

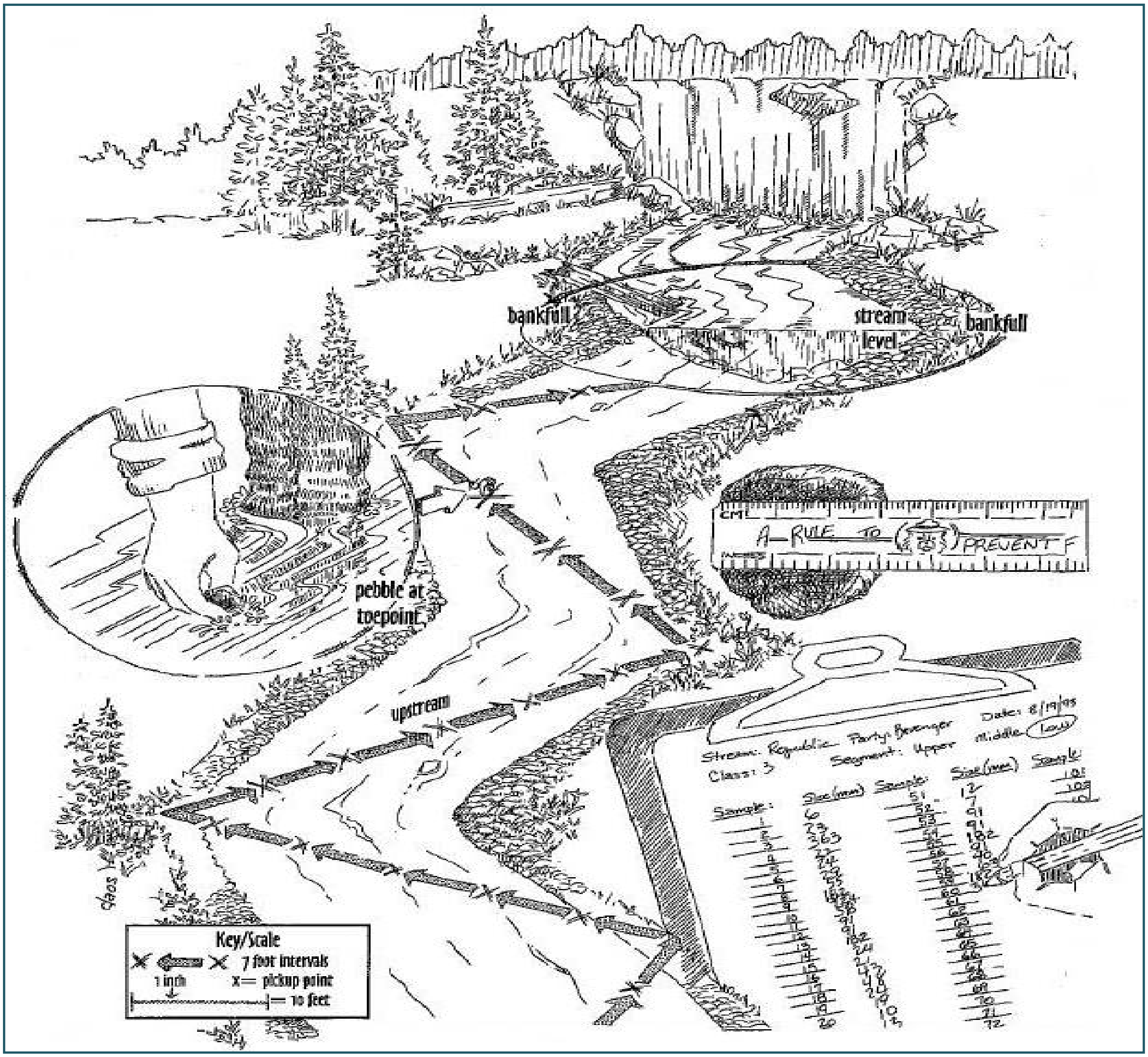
References

Harrelson, Cheryl C; Rawlins, C. L.; Potyondy, John P. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station

Leopold, L. B., M. Wolman, and J. Miller, 1964. Fluvial Processes in Geomorphology. W. H. Freeman, San Francisco, CA

G.S. Bevenger and R.M. King. 1995. A Pebble Count Procedure for Assessing Watershed Cumulative Effects. Res. Pap. RM-RP-319. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station

The zigzag pattern



Pebble Count Data Sheet

Size categories	Size ranges (mm)	Tallies (counts)
Silt/clay	< 0.06	
Very fine sand	0.06 – 0.125	
Fine sand	0.126 – 0.25	
Medium sand	0.26 – 0.5	
Coarse sand	0.5 – 1	
Very coarse sand	1 - 2	
Very fine gravel	2 - 4	
Fine gravel	5 - 8	
Medium gravel	9 - 16	
Coarse gravel	17 - 32	
Very coarse gravel	33 - 64	
Small cobble	65 - 90	
Medium cobble	91 - 128	
Large cobble	129 - 180	
Very large cobble	181 - 255	
Small boulder	256 - 512	
Medium boulder	513 - 1024	
Large boulder	1025 – 2048	
Very large boulder	> 2048	
Bedrock	Large unbroken rock surface	
Woody debris	Leaves, sticks etc.	

Stations

1
2
3
4
5
6
7
8
9
10

Enter the tape positions

Indicate the method used below

☐ Zigzag
☐ % Habitat
☐ Transects/Stations
(**Enter your tape position**)

Total count ☐

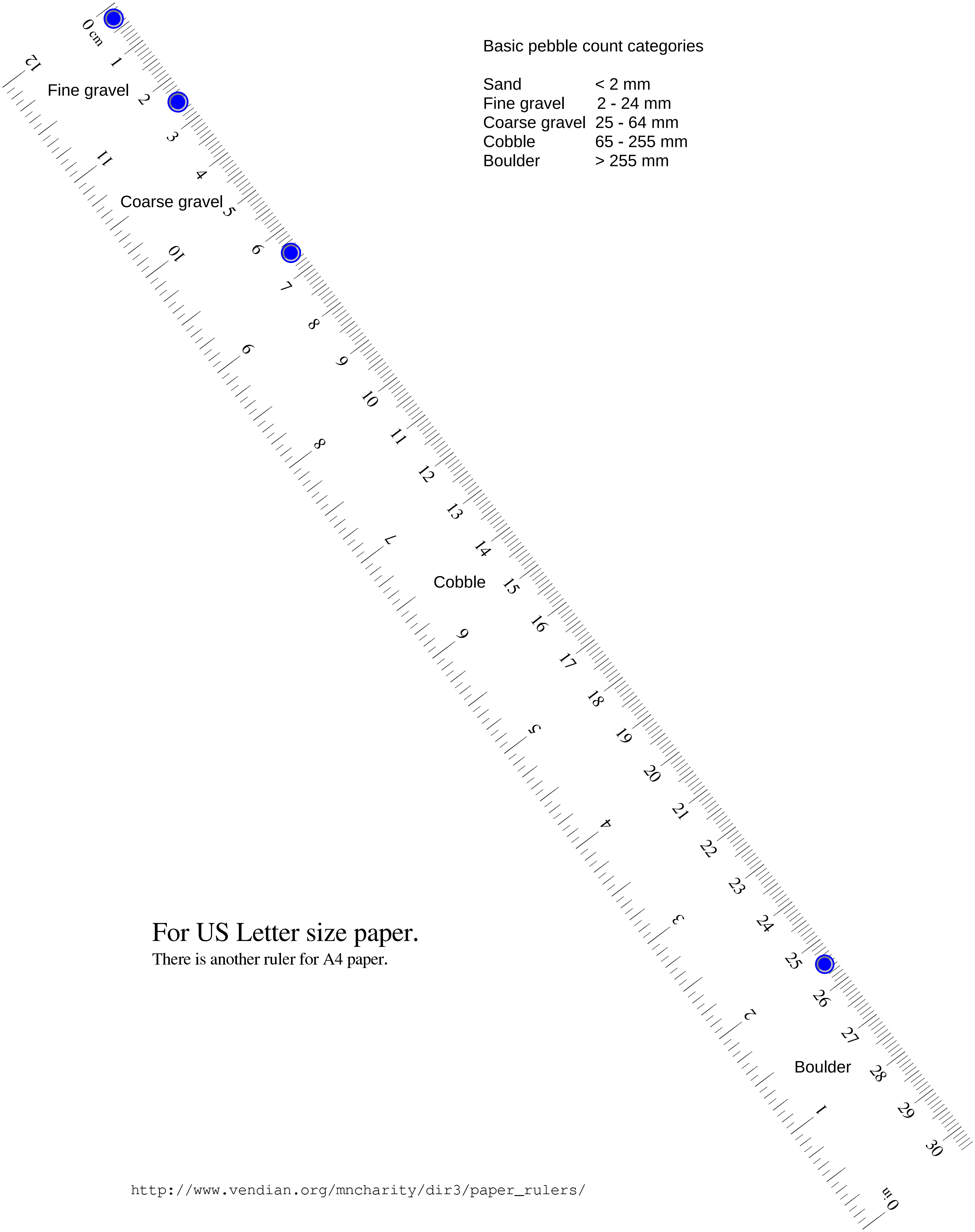
% Channel features (Estimate)

Riffles	Runs	Pools

Note: This data sheet incorporates both basic and advanced pebble count classification. Basic categories include silt, sand, fine and coarse gravel, cobble, boulder and bedrock. Pebble counts can be part of SOS levels 1-3 and should be performed at least once per year during low-water conditions. A version of the pebble count is included on all SOS biosurvey forms.

Basic pebble count categories

Sand	< 2 mm
Fine gravel	2 - 24 mm
Coarse gravel	25 - 64 mm
Cobble	65 - 255 mm
Boulder	> 255 mm

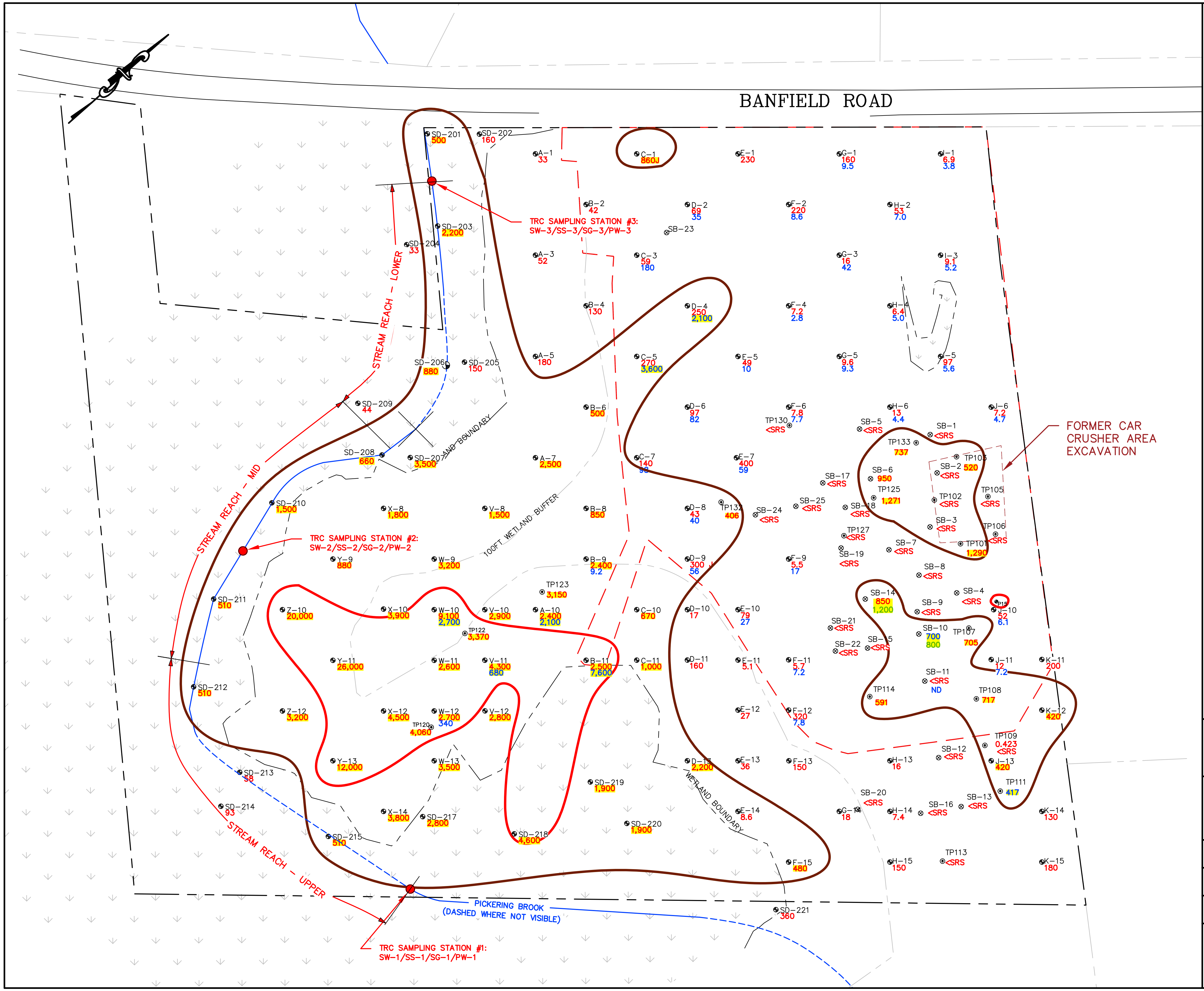


For US Letter size paper.
There is another ruler for A4 paper.

http://www.vendian.org/mncharity/dir3/paper_rulers/

http://www.dep.wv.gov/WWE/getinvolved/sos/Pages/SOPpebble.aspx

SUPPLEMENTAL FIGURES



LEGEND

- — - — APPROXIMATE SUBJECT PROPERTY BOUNDARY
- — — LIMITS OF DISTURBANCE FOR PROPOSED DEVELOPMENT PROJECT
- B-6 SOIL BORING LOCATION (WILCOX & BARTON, INC. 2021) WITH LEAD CONCENTRATION IN MILLIGRAMS PER KILOGRAM (mg/kg)
- SD-209 SEDIMENT SAMPLE LOCATION (WILCOX & BARTON, INC. 2021)
- ⊗ SB-24 SOIL BORING LOCATION (WILCOX & BARTON, INC. 2020)
- ◉ TEST PIT LOCATION (RANSOM 2008)
- J ESTIMATED CONCENTRATION
- ╱ LEAD CONCENTRATIONS > 400 mg/kg
- ╱ LEAD CONCENTRATIONS > 4,000 mg/kg
- <SRS LESS THAN SOIL REMEDIATION STANDARD
- 1,271 YELLOW HIGHLIGHT INDICATES VALUE EXCEEDS SOIL REMEDIATION STANDARD (400 mg/kg)

APPROX SAMPLE DEPTH INTERVAL	CONCENTRATION SHOWN IN:
0-2 FT BGS	RED
2-4 FT BGS	BLUE
4-6 FT BGS	GREEN

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. SEDIMENT LEAD CONCENTRATIONS SHOWN FOR ILLUSTRATION ONLY. RESULTS NOT TECHNICALLY COMPARABLE TO SOIL REMEDIATION STANDARD.

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
LEAD IN SOIL AND SEDIMENT

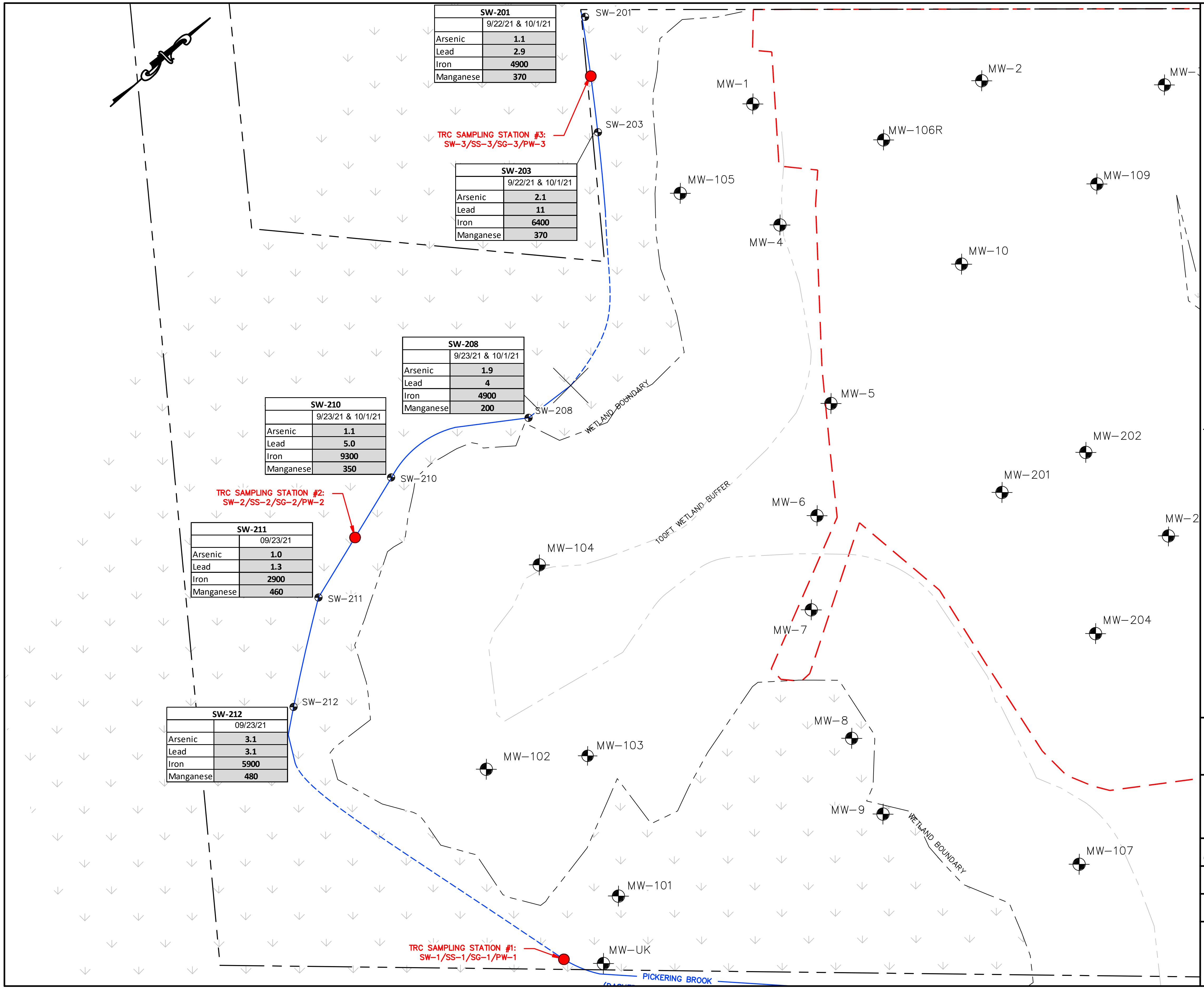
DATE	SCALE	FILE
October 1, 2021	GRAPHIC	Data Plan
APPROVED BY	DRAWN BY	REVISED
WRW	GAG	March 31, 2023

CLIENT
Banfield Realty, LLC

JOB NUMBER
BANF0005

LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire

DRAWING NUMBER
FIGURE 4



SW-201	
	9/22/21 & 10/1/21
Arsenic	**1.1**
Lead	**2.9**
Iron	**4900**
Manganese	**370**

SW-203	
	9/22/21 & 10/1/21
Arsenic	**2.1**
Lead	**11**
Iron	**6400**
Manganese	**370**

SW-208	
	9/23/21 & 10/1/21
Arsenic	**1.9**
Lead	**4**
Iron	**4900**
Manganese	**200**

SW-210	
	9/23/21 & 10/1/21
Arsenic	**1.1**
Lead	**5.0**
Iron	**9300**
Manganese	**350**

SW-211	
	09/23/21
Arsenic	**1.0**
Lead	**1.3**
Iron	**2900**
Manganese	**460**

SW-212	
	09/23/21
Arsenic	**3.1**
Lead	**3.1**
Iron	**5900**
Manganese	**480**

LEGEND

—— – – ——	APPROXIMATE SUBJECT PROPERTY BOUNDARY
— — —	LIMITS OF DISTURBANCE
——— – –	APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)
⊕ SW-201	SURFACE WATER SAMPLE LOCATION
⊕ MW-1	MONITORING WELL LOCATION

SW-201		
	9/22/21 & 10/1/21	
Arsenic	**1.1**	Sample Point ID
Lead	**2.9**	Sampling Date
Iron	**4900**	Analyte Concentration in micrograms per liter
Manganese	**370**	Bold/Shaded Value Exceeds Water Quality Criteria (see Note 3)

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. DISSOLVED METAL CONCENTRATIONS ARE COMPARED TO WQCs FOR THE PROTECTION OF AQUATIC LIFE (FRESHWATER, CHRONIC) AND PROTECTION OF HUMAN HEALTH (WATER & FISH INGESTION).

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
DISSOLVED METALS IN SURFACE WATER

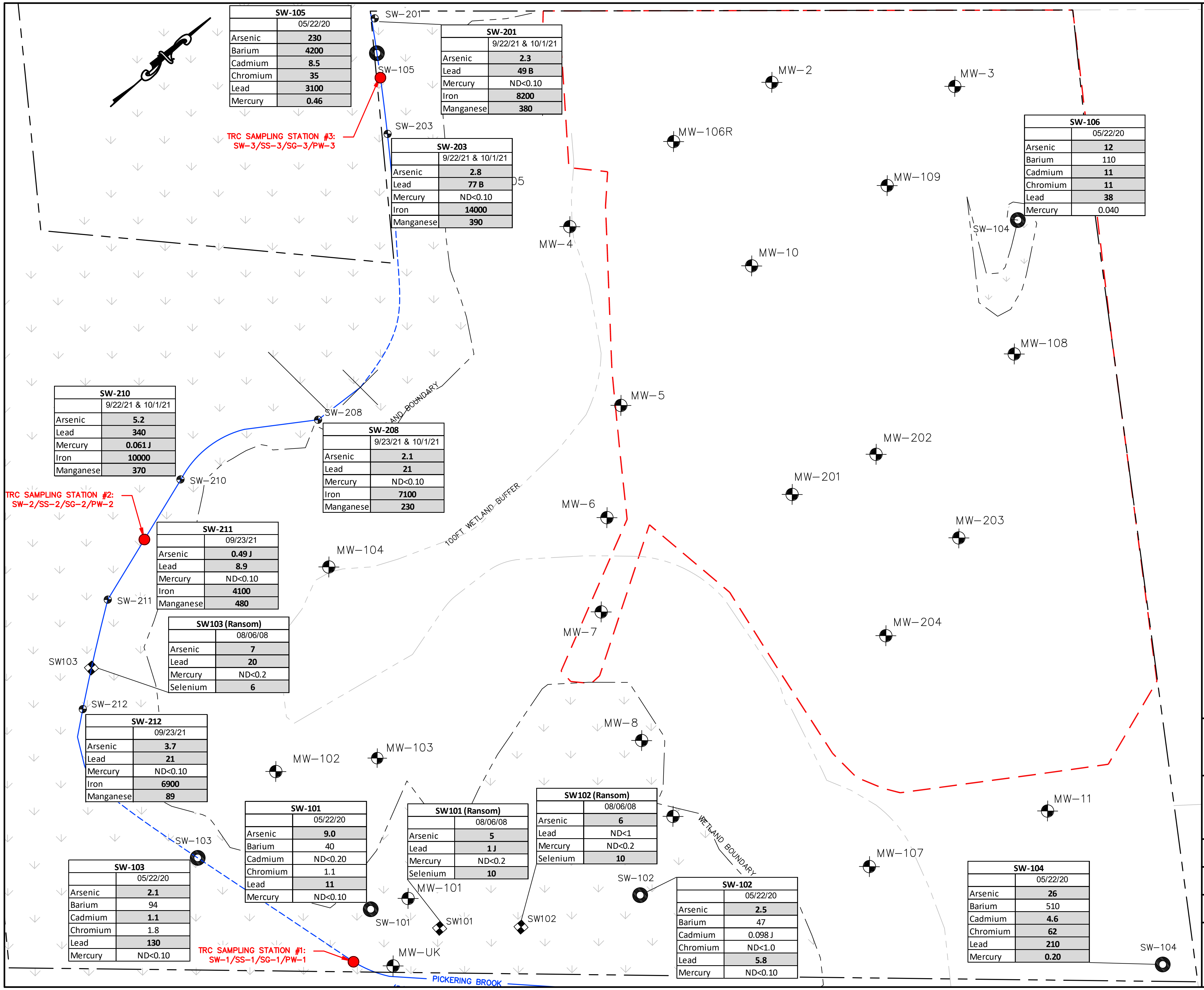
DATE	SCALE	FILE
October 1, 2021	GRAPHIC	Data Plan
APPROVED BY	DRAWN BY	REVISED
WRW	GAG	March 31, 2023

CLIENT
Banfield Realty, LLC

JOB NUMBER
BANF0005

LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire

DRAWING NUMBER
FIGURE 5



SW-105	
	05/22/20
Arsenic	**230**
Barium	**4200**
Cadmium	**8.5**
Chromium	**35**
Lead	**3100**
Mercury	**0.46**

SW-201	
	9/22/21 & 10/1/21
Arsenic	**2.3**
Lead	**49 B**
Mercury	ND<0.10
Iron	**8200**
Manganese	**380**

SW-203	
	9/22/21 & 10/1/21
Arsenic	**2.8**
Lead	**77 B**
Mercury	ND<0.10
Iron	**14000**
Manganese	**390**

SW-106	
	05/22/20
Arsenic	**12**
Barium	110
Cadmium	**11**
Chromium	**11**
Lead	**38**
Mercury	0.040

SW-210	
	9/22/21 & 10/1/21
Arsenic	**5.2**
Lead	**340**
Mercury	**0.061 J**
Iron	**10000**
Manganese	**370**

SW-208	
	9/23/21 & 10/1/21
Arsenic	**2.1**
Lead	**21**
Mercury	ND<0.10
Iron	**7100**
Manganese	**230**

SW-211	
	09/23/21
Arsenic	**0.49 J**
Lead	**8.9**
Mercury	ND<0.10
Iron	**4100**
Manganese	**480**

SW103 (Ransom)	
	08/06/08
Arsenic	**7**
Lead	**20**
Mercury	ND<0.2
Selenium	**6**

SW-212	
	09/23/21
Arsenic	**3.7**
Lead	**21**
Mercury	ND<0.10
Iron	**6900**
Manganese	**89**

SW-101	
	05/22/20
Arsenic	**9.0**
Barium	40
Cadmium	ND<0.20
Chromium	1.1
Lead	**11**
Mercury	ND<0.10

SW101 (Ransom)	
	08/06/08
Arsenic	**5**
Lead	**1 J**
Mercury	ND<0.2
Selenium	**10**

SW102 (Ransom)	
	08/06/08
Arsenic	**6**
Lead	ND<1
Mercury	ND<0.2
Selenium	**10**

SW-103	
	05/22/20
Arsenic	**2.1**
Barium	94
Cadmium	**1.1**
Chromium	1.8
Lead	**130**
Mercury	ND<0.10

SW-102	
	05/22/20
Arsenic	**2.5**
Barium	47
Cadmium	0.098 J
Chromium	ND<1.0
Lead	**5.8**
Mercury	ND<0.10

SW-104	
	05/22/20
Arsenic	**26**
Barium	510
Cadmium	**4.6**
Chromium	**62**
Lead	**210**
Mercury	**0.20**

LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

LIMITS OF DISTURBANCE

APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)

SW-201 SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, 2021)

SW-104 APPROXIMATE SURFACE WATER SAMPLE LOCATION (WILCOX & BARTON, 2021)

SW103 APPROXIMATE SURFACE WATER SAMPLE LOCATION (RANSOM, 2008)

MW-1 MONITORING WELL LOCATION

SW-201	
	9/22/21 & 10/1/21
Arsenic	**1.1**
Lead	**2.9**
Iron	**4900**
Manganese	**370**

Sample Point ID
Sampling Date
Analyte Concentration in micrograms per liter

Bold/Shaded Value Exceeds Water Quality Criteria (see Note 3)

J indicates an estimated value
ND Non-detect at indicated reporting limit

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C-2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS, INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. DISSOLVED METAL CONCENTRATIONS ARE COMPARED TO WQCs FOR THE PROTECTION OF AQUATIC LIFE (FRESHWATER, CHRONIC) AND PROTECTION OF HUMAN HEALTH (WATER & FISH INGESTION).

GRAPHIC SCALE

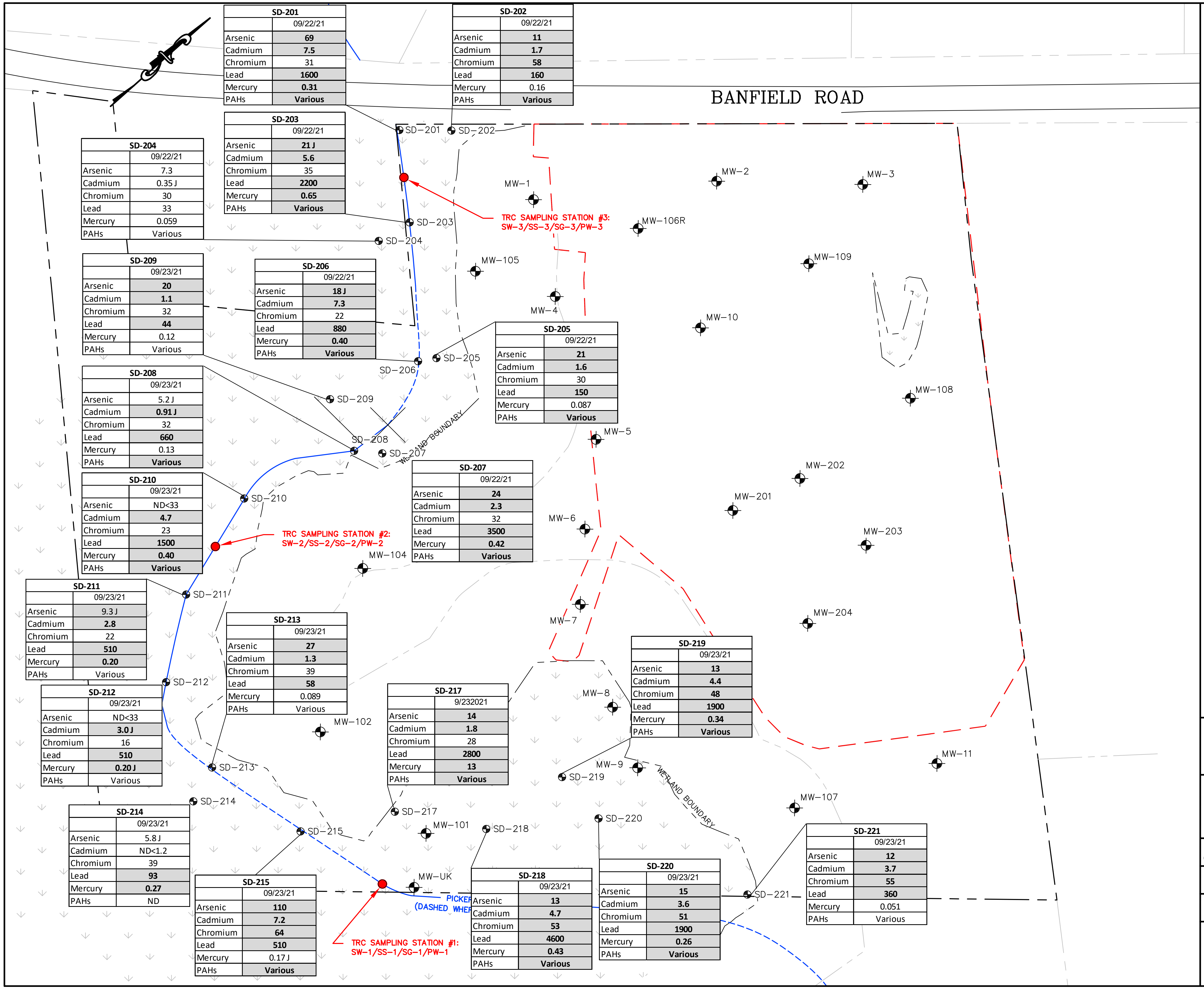
80 0 40 80 160

(IN FEET)
1 inch = 80 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
TOTAL METALS IN SURFACE WATER

DATE
October 1, 2021
SCALE
GRAPHIC
FILE
Data Plan
APPROVED BY
WRW
DRAWN BY
GAG
REVISED
March 31, 2023
CLIENT
Banfield Realty, LLC
JOB NUMBER
BANF0005
LOCATION
375 Banfield Road
Tax Map 266, Lot 7
Portsmouth, New Hampshire
DRAWING NUMBER
FIGURE 6



SD-201	
	09/22/21
Arsenic	**69**
Cadmium	**7.5**
Chromium	31
Lead	**1600**
Mercury	**0.31**
PAHs	**Various**

SD-202	
	09/22/21
Arsenic	**11**
Cadmium	**1.7**
Chromium	**58**
Lead	**160**
Mercury	0.16
PAHs	**Various**

SD-203	
	09/22/21
Arsenic	**21 J**
Cadmium	**5.6**
Chromium	35
Lead	**2200**
Mercury	**0.65**
PAHs	**Various**

SD-204	
	09/22/21
Arsenic	7.3
Cadmium	0.35 J
Chromium	30
Lead	33
Mercury	0.059
PAHs	Various

SD-205	
	09/22/21
Arsenic	**21**
Cadmium	**1.6**
Chromium	30
Lead	**150**
Mercury	0.087
PAHs	**Various**

SD-206	
	09/22/21
Arsenic	**18 J**
Cadmium	**7.3**
Chromium	22
Lead	**880**
Mercury	**0.40**
PAHs	**Various**

SD-207	
	09/22/21
Arsenic	**24**
Cadmium	**2.3**
Chromium	32
Lead	**3500**
Mercury	**0.42**
PAHs	**Various**

SD-208	
	09/23/21
Arsenic	5.2 J
Cadmium	**0.91 J**
Chromium	32
Lead	**660**
Mercury	0.13
PAHs	**Various**

SD-209	
	09/23/21
Arsenic	**20**
Cadmium	**1.1**
Chromium	32
Lead	**44**
Mercury	0.12
PAHs	Various

SD-210	
	09/23/21
Arsenic	ND<33
Cadmium	**4.7**
Chromium	23
Lead	**1500**
Mercury	**0.40**
PAHs	**Various**

SD-211	
	09/23/21
Arsenic	9.3 J
Cadmium	**2.8**
Chromium	22
Lead	**510**
Mercury	**0.20**
PAHs	Various

SD-212	
	09/23/21
Arsenic	ND<33
Cadmium	**3.0 J**
Chromium	16
Lead	**510**
Mercury	**0.20 J**
PAHs	Various

SD-213	
	09/23/21
Arsenic	**27**
Cadmium	**1.3**
Chromium	39
Lead	**58**
Mercury	0.089
PAHs	Various

SD-214	
	09/23/21
Arsenic	5.8 J
Cadmium	ND<1.2
Chromium	39
Lead	**93**
Mercury	**0.27**
PAHs	ND

SD-215	
	09/23/21
Arsenic	**110**
Cadmium	**7.2**
Chromium	**64**
Lead	**510**
Mercury	0.17 J
PAHs	**Various**

SD-217	
	9/232021
Arsenic	**14**
Cadmium	**1.8**
Chromium	28
Lead	**2800**
Mercury	**13**
PAHs	**Various**

SD-218	
	09/23/21
Arsenic	**13**
Cadmium	**4.7**
Chromium	**53**
Lead	**4600**
Mercury	**0.43**
PAHs	**Various**

SD-219	
	09/23/21
Arsenic	**13**
Cadmium	**4.4**
Chromium	**48**
Lead	**1900**
Mercury	**0.34**
PAHs	**Various**

SD-220	
	09/23/21
Arsenic	**15**
Cadmium	**3.6**
Chromium	**51**
Lead	**1900**
Mercury	**0.26**
PAHs	**Various**

SD-221	
	09/23/21
Arsenic	**12**
Cadmium	**3.7**
Chromium	**55**
Lead	**360**
Mercury	0.051
PAHs	Various

LEGEND

— — — —	APPROXIMATE SUBJECT PROPERTY BOUNDARY
— — —	LIMITS OF DISTURBANCE
— — — —	APPROXIMATE CENTER OF BROOK (DASHED WHERE NOT VISIBLE)
⊕ SD−202	WETLAND SEDIMENT SAMPLE LOCATION
⊕ MW−1	MONITORING WELL LOCATION

SD-219		
	09/23/21	
Arsenic	**13**	Sample Point ID
Cadmium	**4.4**	Sampling Date
Chromium	**48**	Analyte Concentration in milligrams per kilogram
Lead	**1900**	
Mercury	**0.34**	Bold/Shaded Value Exceeds Water Quality Criteria (see Note 3)
PAHs	**Various**	

J indicates an estimated value
ND Non-detect at indicated reporting limit

NOTES

1. LIMITS OF DISTURBANCE BASED ON THE COMMERCIAL SITE PLAN, "INDUSTRIAL WAREHOUSE," SHEET C−2, DATED 4/21/20, REVISED 8/18/21, PROVIDED TO WILCOX & BARTON, INC BY JONES & BEACH ENGINEERS INC.
2. ABUTTER PROPERTY LINES APPROXIMATED FROM THE CITY OF PORTSMOUTH GEOGRAPHIC INFORMATION SYSTEMS ONLINE DATABASE.
3. DISSOLVED METAL CONCENTRATIONS ARE COMPARED TO WQCs FOR THE PROTECTION OF AQUATIC LIFE (FRESHWATER, CHRONIC) AND PROTECTION OF HUMAN HEALTH (WATER & FISH INGESTION).

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 feet

Wilcox & Barton INC.
CIVIL · ENVIRONMENTAL · GEOTECHNICAL

TITLE
METALS & PAHs IN WETLAND SEDIMENTS

DATE October 21, 2021	SCALE GRAPHIC	FILE Data Plan
APPROVED BY WRW	DRAWN BY GAG	REVISED March 31, 2023
CLIENT Banfield Realty, LLC		JOB NUMBER BANF0005
LOCATION 375 Banfield Road Tax Map 266, Lot 7 Portsmouth, New Hampshire		DRAWING NUMBER FIGURE 7

Wilcox & Barton INC.
CIVIL • ENVIRONMENTAL • GEOTECHNICAL

April 7, 2023

Katherine Woodward, PE, PhD
US Environmental Protection Agency, Region 1
5 Post Office Square, Suite 100
Mail Code: 07-2
Boston, Massachusetts 02109-3912

RE: Acceptance of RAP Approval
Remedial Action Plan, 375 Banfield Road, Portsmouth, New Hampshire
NHDES Site# 199408047

Dear Ms. Woodward:

Thank you for your letter dated March 28, 2023, in which you indicated EPA approval of the referenced Remedial Action Plan. On behalf of the property owner, as indicated by signature below and in compliance with Condition 10 of the approval, this letter serves as written notification of acceptance of the Approval and its conditions.

Very truly yours,

WILCOX & BARTON, INC.

William R. Wilcox
President – Principal Geologist

cc: Scott Drew, New Hampshire Department of Environmental Services
Lynn Preston, Sheehan Phinney Bass & Green, PA

I hereby accept the Conditions in Attachment 1 of the letter of approval dated March 28, 2023, for the referenced remedial action.

Robert Graham
Banfield Realty, LLC
Authorized Representative of the Property Owner

Signature

4/7/2023
Date

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Robert R. Scott, Commissioner

EMAIL ONLY

April 26, 2023

Robert Graham
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, NH 03801

Subject: Portsmouth – Former Country Motor Sales, 375 Banfield Road
DES Site #199408047, Project #40176

Revised Work Plan for Lowland Area, prepared by Wilcox & Barton, Inc. (Wilcox & Barton), dated April 5, 2023

Revised Remedial Action Plan – Proposed Upland Development Area, prepared by Wilcox & Barton, dated February 24, 2023

Work Plan for Lowland Area, prepared by Wilcox & Barton, dated September 30, 2022

Remedial Action Plan – Proposed Upland Development Area, prepared by Wilcox & Barton, dated May 31, 2022

Dear Robert Graham:

The New Hampshire Department of Environmental Services (NHDES) has reviewed the subject documents submitted on your behalf by Wilcox & Barton for the above-referenced site (Site). The Revised Work Plan for Lowland Area dated April 5, 2023 incorporates comments provided by NHDES in email correspondences dated February 15, 2023 and December 14, 2022 that were based on review of the Work Plan for Lowland Area dated September 30, 2022. The Revised Remedial Action Plan – Proposed Upland Development Area dated February 24, 2023 incorporates comments provided by the US EPA Region 1 PCB coordinator in an email correspondence dated July 21, 2022 and NHDES in an email correspondence dated July 7, 2022 that were based on review of the RAP – Proposed Upland Development Area dated May 31, 2022. The aforementioned documents were submitted in response to requests made by NHDES in a letter dated April 21, 2022.

NHDES generally concurs with the plans outlined in the referenced documents. We offer the following additional comments pertaining to the planned work:

Revised Work Plan for Lowland Area

- The use of existing information and data for a reference location is permissible to support the macroinvertebrate community assessment. Please note, it is your consultant's responsibility to research and obtain the information and data, which may be publicly available and obtainable through NHDES.
- NHDES is concerned the pre-1981 landfill waste mass and associated contaminated soil is a significant source of the lead and other contaminants in the wetland and Pickering Brook. As such, we reiterate from our email correspondence dated December 14, 2022 that a greater

density of pore water and surface water sampling points within and near the stream channel between planned Sampling Station #1 and Sampling Station #2 and proximate to the waste mass should be completed as part of the Spring 2023 assessment work.

- In the letter dated April 21, 2022, NHDES requested that the work plan include activities to: 1) delineate the extent of contamination in Pickering Brook surface water and sediment at concentrations exceeding applicable water quality standards and Consensus-Based Threshold Effect Concentrations (TECs) and Consensus-Based Probable Effect Concentrations (PECs) upstream and downstream of previously collected samples, including beyond the culvert at Banfield Road; and 2) delineate the extent of contamination in wetland sediment at concentrations exceeding applicable TECs and PECs to the southeast, south, and southwest of previously collected samples. We reiterate these requests for the Spring 2023 assessment work.
- Please submit a report summarizing the results of the additional investigation activities within 120 days of receipt of this letter. The summary report should propose additional investigations, as warranted, and a preliminary screening of remedial alternatives.

Revised Remedial Action Plan – Proposed Upland Development Area

- NHDES understands that soil from the targeted excavations for lead and PCBs and all scrapped topsoil will be disposed offsite at an authorized treatment or disposal facility holding all requisite federal, state, or local permits, licenses, or approvals. The remaining soil within the Limits of Disturbance and the Limits of Work with lead and PCBs at concentrations greater than applicable Soil Remediation Standards (SRS) must be capped and subject to an Activity and Use Restriction (AUR).
- NHDES is concerned, based on the results of soil sampling completed to date at the Site (including the recent sampling for PCBs in locations southeast of the former car crusher area), that lead and PCB contamination in soil may extend on to the abutting property at 355 Banfield Road. We understand the northeastern Site boundary mostly consists of a tree line, fence line, and stonewall that may have precluded automobile crushing, salvage, and storage operations on the abutting 355 Banfield Road property. Therefore, we are primarily concerned about the possibility of windblown contaminant transport and/or contaminant migration in stormwater across the property boundary. As such, we request the evaluation of these potential contaminant transport pathways for lead and PCBs on to the abutting 355 Banfield Road property, noting that sampling of soil on the 355 Banfield Road property may be necessary for conclusive results. Please submit the results of this evaluation with the remedial action implementation report discussed below.
- Please submit a remedial action implementation report prepared in accordance with NH Code of Administrative Rules Chapter Env-Or 600, Part Env-Or 606.17, within 90 days following completion of the remedial action implementation activities. A final Application for AUR and the associated soil management plan for any future disturbance and management of contaminated soil shall be included with the remedial action implementation report.

NHDES has received the May, July, & October 2022 Data Transmittal and Groundwater Management Permit Application dated January 13, 2023. We are in the process of reviewing this submittal and will provide comments in a separate letter.

Should you have any questions regarding this letter, please contact me at NHDES' Waste Management Division.

Sincerely,

Scott Drew, P.G.
Hazardous Waste Remediation Bureau
Tel: (603) 271-2890
Email: Scott.T.Drew@des.nh.gov

ec: William Wilcox, Wilcox & Barton, Inc.
Robert Rooks, P.E., Wilcox & Barton, Inc.
Portsmouth Health Officer
Michael McCluskey, P.E., HWRB

DES Waste Management Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

WORK PLAN FOR LOWLAND AREA
REVISION 2

Former Country Motor Sales
375 Banfield Road
Portsmouth, New Hampshire

NHDES Site #199408047
Project Type: HAZWASTE
Project #40176

Prepared For:
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, New Hampshire 03801
Phone Number: (603) 479-3666
Contact Name: Mr. Robert Graham
Contact Email: Rob@graham-consult.com

Prepared By:
Wilcox & Barton, Inc.
#1B Commons Drive, Unit 12B
Londonderry, New Hampshire 03053
Phone Number: (603) 369-4190 x501
Contact Name: Mr. William R. Wilcox
Contact Email: wwilcox@wilcoxandbarton.com

Report Date: September 30, 2022
Revised May 16, 2023

Wilcox & Barton, Inc. Project #BANF0005

Wilcox & Barton INC.
CIVIL • ENVIRONMENTAL • GEOTECHNICAL

May 16, 2023

Mr. Scott Drew, P.G.
Hazardous Waste Remediation Bureau
New Hampshire Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, New Hampshire 03302-0095

RE: Work Plan for Lowland Area – Revision 2
Former Country Motor Sales, 375 Banfield Road, Portsmouth, New Hampshire
NHDES Site #199408047, HAZWASTE Project #40176

Dear Mr. Drew:

On behalf of Banfield Realty, LLC, Wilcox & Barton, Inc. is pleased to submit the attached revised Work Plan prepared by TRC Environmental Corporation (TRC). The revised Work Plan was prepared to address New Hampshire Department of Environmental Services (NHDES) comments provided by email correspondence dated December 14, 2022, and February 15, 2023, an NHDES response letter dated April 26, 2023, and conference calls.

Please call me at (603) 369-4190 x501 if you have any questions or require additional information.

Very truly yours,

WILCOX & BARTON, INC.

William Wilcox

Mr. William R. Wilcox
President – Principal Geologist

cc: Mr. Robert Graham

Attachment

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

This work plan has been prepared by TRC Environmental (TRC) on behalf of Wilcox & Barton, Inc. (W&B) to partially address additional investigation activities requested by the New Hampshire Department of Environmental Services (NHDES; correspondence dated April 21, 2022) and addresses field data collection and monitoring requests of Pickering Brook adjacent to, and downgradient of, the Former Country Motors site located at 375 Banfield Road in Portsmouth, New Hampshire (the "Site"; DES Site #199408047). Refer to **Figure 1** for the location of the Site.

The Site was previously used for automobile storage, crushing, and salvage and is the location of a historical solid waste disposal area used for the disposal of construction and demolition debris. Due to these operations, previous Site investigations have found concentrations of lead and polychlorinated biphenyls (PCBS) in soil that exceed applicable Soil Remediation Standards (SRS) within upland soils. Additionally, groundwater samples collected from the Site indicate concentrations of perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), and perfluorooctanoic acid (PFOA) that exceed applicable Ambient Groundwater Quality Standards (AGQS) within the upland area of the Site.

Within the wetland areas and sections of Pickering Brook adjacent to historical operations on the Site, recent investigations have identified elevated concentrations of select PAHs in groundwater, PCBs in soils and select metals in groundwater, soils and sediments, in particular, lead that exceeds applicable regulatory thresholds, including Threshold Effect Concentrations (TECs), Probable Effect Concentrations (PECs), as well as NHDES water quality criteria.

The purpose of this Work Plan is to present additional activities, which are necessary to determine the extent of potential impacts on Pickering Brook due to historical operations at the Site from historic waste disposal practices as well as impacted groundwater and sediments on the Site. Proposed assessment activities are detailed in Section 2 below.

2.0 PROPOSED SUBSURFACE ASSESSMENT ACTIVITIES

TRC proposes to conduct additional focused assessment activities to evaluate the presence and/or extent of impacts on Pickering Brook and wetlands in the vicinity that may have been impacted due to conditions at the Site.

Based on information provided by W&B, and a brief field reconnaissance conducted by TRC, Pickering Brook appears to be a seasonal waterbody that runs through the downgradient wetland (**Figure 2**). Due to the seasonality of the flowage, free moving water within Pickering Brook, is not always present, particularly in the upstream reach of the stream. Additionally, numerous groundwater, surface water, and sediment samples have been previously collected from the Site, therefore the intent of this Work Plan is not to repeat these assessments, but to add to our understanding of how the brook may be impacted by the contaminants within the Lower Wetland Area on Site.

Proposed assessment activities are described in the following subsections.

2.1 Preparation of a Site-Specific Health and Safety Plan

Prior to initiating subsurface assessment fieldwork, TRC will prepare a Site-specific Health and Safety Plan (HASP) to ensure the safety of TRC employees performing environmental investigation activities on Site. The HASP will be developed in accordance with the requirements set forth in 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response. Specifically, the HASP will identify and detail potential Site hazards, appropriate action limits for each hazard, required task-specific personal protective equipment, decontamination procedures, and proper protocols for emergency events if encountered. The HASP will be provided to project personnel and will be adhered to during on-Site investigation activities. A copy of the HASP will be kept on Site during investigation activities.

2.2 Surface Water and Sediment Sampling

Sediment and surface water quality samples will be collected on Site from within Pickering Brook. Sample locations were selected such that the brook is sampled where flow would enter the Property (Sampling Station #1; SS #1), travel through the Site (Sampling Station #2; SS #2) and where it would leave the Property (Sampling Station #3; SS #3). Surface water and sediment samples will be collected from these primary sample locations. Three additional sample locations (SS #1A, SS #1B, and SS #1C) were added between SS #1 and SS #2 at the request of NHDES. Surface water samples will also be collected at these three additional locations. The proposed sample locations are depicted on **Figure 3**. The staff conducting the field work for this effort will notify Scott Drew, NHDES, in advance of the effort.

The expectation is that work will occur during Spring of 2023 to maximize the potential to document higher seasonal spring flows in the drainage. If flowing water is present at the time of the investigation, surface water quality samples (SW-1 thru SW-3 and three supplemental surface water samples (SW-1A, SW-1B and SW-1C)) will be collected, and flow measurements obtained. Given the very shallow nature of the stream, any flow measurements would be completed using the U.S. Environmental Protection Agency (USEPA) Time-of-Travel method (EPA, 2012). Any water samples obtained will be grab samples taken from just below the stream surface with care will be taken to avoid disturbance and collection of sediment. Surface water samples will be field filtered as necessary, preserved as appropriate, and sent to a NELAP- or NHDES-certified lab for the following analyses based on the previously assessed risk and/or the CSM.

- PCBs by EPA Method 8082A
- Total and dissolved RCRA 8 metals (including lead) by EPA Method 6010D and 7470A
- Total and dissolved iron and manganese by EPA Method 6010D

Sediment samples (SED-1 thru SED-3) will each be obtained at the three primary sample locations using a decontaminated hand coring device to sample the surficial layer of soft sediments from the stream channel within depositional areas in the upgradient portion of the stream. Samples will be obtained to a depth of approximately 6-inches. Sediment will be preserved as appropriate and sent to a NELAP- or NHDES-certified lab for the following analyses based on the previously assessed risk and/or the CSM.

- PCBs by EPA Method 8082A
- RCRA 8 metals (including lead) by EPA Method 6010D and 7471B
- Total organic carbon (TOC) by EPA SW-846 Method 9060

As part of the sediment sampling, sediment cores will be collected by hand coring at the three primary sample locations (SS #1, SS #2 and SS #3) to allow for logging of the stratigraphy beneath the stream. Up to 6 samples for grain size analysis (sieve and hydrometer) from these three sample locations. This will allow for an estimation of the hydraulic conductivity of the sediments underlying the stream. It is anticipated that coring will be performed to approximately up to 3 feet below the streambed.

The goal for these assessments would be to determine whether any off-Site water quality impairments are contributing to the impacts observed in Pickering Brook and to determine whether shallow sediments moving via the brook onto the Site are potentially contaminated.

GPS coordinates will be obtained for each sample location.

2.3 Fish Habitat and Fish Community Assessment

Stream habitat will be assessed using the NHDES Habitat Assessment procedures (a modified version of the US EPA's Rapid Bioassessment Protocols by Barbour, et al., 1999) during our spring, 2023 field effort. Parameters such as field-measured water quality, stream flow, sediment composition, fish habitat structure, cover, riparian growth, and other variables will be documented with field notes and photos at each sampling location.

A quantitative sediment grain size assessment (pebble count method) will also be conducted in the field along the length of each of the three tributary locations identified as SS #1 thru SS #3 on **Figure 3.** Sample locations within Pickering Brook were selected to reflect the areas where water enters the Site, crosses through the Site, and leaves the Site. Grain size will be assessed in the field atthree locations along the length of the flowage; SG-1 located at the upstream end of the Site (Sampling Station #1), SG-2 located within the Site (Sampling Station SS #2), and SG-3 located at the most downstream end of the Site (Sampling Station SS #3). This procedure will assess grain size for the surficial sediments at each meter along a 100-meter stretch at the centerline of each stream segment.

Flow along with water quality parameters including temperature, salinity, dissolved oxygen, and pH will be measured in the field using a multi-parameter sonde at each site. Field data entry will be performed using a tablet with custom-designed forms and GPS location capability.

During the initial field reconnaissance, no evidence of fish was observed, and it appears that there is not sufficient water permanence or depth to support recreational fishing or sport fish species. We will seek to assess the brook during the spring period to further understand the Site's potential for use by fish. No fish or fish tissue sampling is proposed.

2.4 Macroinvertebrate Community Assessment

Based on our discussion with NHDES on February 6th, 2023, it was agreed that evaluation of the benthic community would not require additional bioassays (sediment toxicity tests) as described in Part B of the NHDES Sediment Quality Guidance Document. Therefore, to assess the macroinvertebrate community in Pickering Brook, a kick-net will be used and the jab-sweep method employed. This approach is preferable to rock basket deployment at this Site since the stream is known to be intermittent/ephemeral. Collection of three macroinvertebrate samples will be attempted from each of the three stream reaches identified in Section 2.3.

Macroinvertebrate samples will be processed and analyzed in accordance with NHDES biomonitoring protocols. In general, most organisms will be identified to genus; however, midges will be identified to sub-family, and Oligochaetes identified only as Oligochaetes.

Summary statistics will be calculated to assess each site. These metrics, including EPT taxa richness, Shannon Weiner Diversity, number of intolerant taxa, percent contribution of dominant taxa, and ratio of EPT to Chironomid abundance represent a subset of the metrics presented in the United States Environmental Protection Agency (USEPA) Rapid Bioassessment Protocols for Use in Streams and Rivers (Barbour et al., 1999). This approach has been acceptable to NHDES when performed in similar studies in New Hampshire.

In order to complete the Community Assessment (Part C of the NHDES Sediment Quality Guidance Document), the macroinvertebrate samples collected and analyzed from the Site will be statistically compared to one or more reference locations selected for southeast NH. We understand, based on our discussion with NHDES on February 6, 2023, that we will be able to use existing and readily available macroinvertebrate data provided by NHDES to perform this desktop analysis. We will obtain data provided to us by NHDES and tabulate those data similarly to the data analysis described above. From this, we will perform statistical analysis to compare differences in metrics between the samples collected from the Site vs. the reference location (s).

If the brook crossing the Site does not have water (it is dry) during our proposed spring 2023 assessment period, we understand that we would be required to complete sediment toxicity testing in accordance with Part B of the NHDES Sediment Quality Guidance Document in order to adequately assess the impairment at the Site.

2.5 Groundwater Impact Assessment

To assess groundwater contributions to the stream from the Site, a sampling and measurement round will be performed focusing on determining groundwater concentrations underlying the streambed using an Interstitial Porewater Sampler. These porewater groundwater samples will be collected at the three primary sample locations and the three additional sample locations added at the request of NHDES, presented under Task 2.2. Groundwater samples will be submitted field filtered as necessary, preserved as appropriate, and sent to a NELAP- or NHDES-certified lab for the following analyses based on the previously assessed risk and/or the CSM.

- PAHs by EPA Method 8270D
- PCBs by EPA Method 8082A
- Total and dissolved RCRA 8 metals (including lead) by EPA Method 6010D and 7470A
- Total and dissolved iron and manganese by EPA Method 6010D

To assess the relative elevations between groundwater underlying the stream and surface water in the stream, temporary piezometers (SPZ) will be installed at the three primary sample locations (SS #1, SS #2 and SS #3) within the subsurface materials underlying the streambed to allow for the measurement of hydraulic head in the stream versus the hydraulic head in the underlying groundwater (USGS, 2008). Given the nature of the stream in this area, it is anticipated that the piezometers will be driven to depth of approximately two or more feet beneath the stream which should allow for the measurement of the hydraulic head within the underlying groundwater relative to the surface water level. These measurements should be able to support a determination of whether groundwater is flowing into the stream (gaining stream) or flowing out of the stream (losing stream).

To estimate groundwater flux, conditions at each sampling station will be considered representative of that stretch of the stream. The hydraulic head measurements collected at the streambed piezometers and the estimates of hydraulic conductivity (based on the analysis of the sediment/soil grain size samples collected under Task 2.2) will be used to estimate the flux using Darcy's Equation (Q=K*i*A). The results of the proposed groundwater sampling will be used to support an estimate of contaminant flux into the stream from groundwater at each location.

To further assess groundwater conditions within the associated wetlands, up to four (4) shallow wetland piezometers (WPZ) will be installed at depths up to four (4) feet beneath the wetland surface using hand augers and 2-inch PVC well materials (WPZ-1 thru WPZ-4). It is anticipated that three of these piezometers will be located proximal to the three primary sampling stations noted above. These piezometers will be used to assess the depth to groundwater within the wetlands, in combination with the nearby existing monitoring wells.

In addition, based on the recommendations of NHDES, we will concurrently assess groundwater within the select existing wells on Site identified as MW-101 through MW-104 to help evaluate the connection, both hydraulically and in terms of contaminant transport between the pre-1981 landfill area, the wetland and Pickering Brook. Similar to the groundwater sampling discussed above, these samples will be submitted for field filtered as necessary, preserved as appropriate, and sent to a NELAP- or NHDES-certified lab for the following analyses based on the previously assessed risk and/or the CSM.

- PAHs by EPA Method 8270D
- PCBs by EPA Method 8082A
- Total and dissolved RCRA 8 metals (including lead) by EPA Method 6010D and 7470A
- Total and dissolved iron and manganese by EPA Method 6010D

Water level measurements will be collected for two rounds after installation and initial measurements to acquire additional data for the groundwater assessment at the following locations:

- SPZ-1, SPZ-2 and SPZ-3

- WPZ-1, WPZ-2, WPZ-3 and WPZ-4

- MW-101, MW-102, MW-103 and MW-104

2.6 Solid Waste Mapping

To assess and document the presence of exposed solid waste, which may impact surface water runoff, TRC will conduct an inspection of the Site and note locations of visible debris within the wetlands and the lowland area to the south. The site will be walked in a 30-foot grid pattern and exposed waste, greater than 6 feet in any direction, will be photographed and geolocated using a GPS unit with sub-meter accuracy.

Although no subsurface investigation for solid waste mapping will be completed as part of our efforts, field investigation will also include mapping of any larger and obvious soil discolorations, seepage, or other solid waste that may not be greater than 6 feet in diameter, but could, in aggregate, represent significant areas of debris, or indicate more significant impacts beneath the surface. The goal of this effort is to understand the extent and location of the solid waste in the Lowland Area and Pickering Brook on Site that may be impacting the brook through stormwater runoff.

An inspection report with photolog and map as a GIS data layer will be prepared to inform the assessment activities.

2.7 Wetland Sediment Sampling

Wetland sediment samples (WS-1 thru WS-4) will each be collected at four locations on the opposite side of Pickering Brook from the Site using a decontaminated hand coring device to sample the surficial layer of soft sediments from areas requested by NHDES to the south, southeast and southwest of previous wetland and streambed sediment samples. Samples will be obtained to a depth of approximately 6-inches. Sediment will be preserved as appropriate and sent to a NELAP- or NHDES-certified lab for the following analyses based on the results of previous sediment sampling in this area of the Site and the findings of the risk assessment.

- PCBs by EPA Method 8082A
- RCRA 8 metals (including lead) by EPA Method 6010D and 7471B
- Total organic carbon (TOC) by EPA SW-846 Method 9060

2.8 Conservation Commission Approval

TRC will contact the Portsmouth Conservation Commission to determine what approvals, if any, are needed to perform the proposed site assessment activities, including the need for a collection permit or similar for the work proposed under Task 2.4.

3.0 REPORTING

TRC will produce a deliverable summarizing the results of the proposed activities presented in Section 2 above. The report will include site plans, laboratory analytical results, soil sample logs, photologs, solid waste GIS data layer, other relevant documentation, and associated findings as well as any recommendations for additional future assessments, if warranted.

4.0 SCHEDULE

The proposed assessment schedule is as follows and is based upon contractor availability and an assumption on the timeframe for obtaining NHDES work plan approval:

Proposed Activities	**Proposed Dates**
Final Work Plan Submission	May 2023
Surface Water and Sediment Sampling	May/June 2023*
Fish Habitat and Fish Community Assessment	May/June 2023*
Macroinvertebrate Community Assessment	May/June 2023*
Groundwater Impact Assessment	May/June 2023*
Reporting	8/31/2023**

*Dependent upon schedule and access – specific dates will be conveyed to NHDES prior to start of work.

**This date is approximate. The report will be submitted to Wilcox & Barton for internal review within 28 days of the receipt of the last round of laboratory analytical data associated with the above-described sampling activities. Delivery to NHDES will follow internal QA/QC review.

Schedule will be dependent upon appropriate site and weather conditions. Sampling during a period of no, low or moderate flow is acceptable; however, sampling during a rising hydrograph or extremely high flows would not allow for representative data to be obtained.

5.0 REFERENCES

EPA, 2012. Water: Monitoring and Assessment. 5.1 Stream Flow. United States Environmental Protection Agency. Office of Water. EPA 841-B-97-003. Accessed January 27, 2020 at https://archive.epa.gov/water/archive/web/html/vms51.html

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

NHDES, 2013. New Hampshire Department of Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes. NHDES Water Division- Watershed Management Bureau, Revision No. 1

Rosenberry, D.O., and LaBaugh, J.W. 2008. Use of Monitoring Wells, Portable Piezometers, and Seepage Meters to Quantify Flow Between Surface Water and Ground Water. U.S. Geological Survey Techniques and Methods Chapter 4-D2.

TABLES

TABLE 1: PROPOSED SAMPLING PROGRAM
COUNTRY MOTORS
375 BANFIELD ROAD, PORTSMOUTH, NH

SAMPLE ID[1]	Description	Target Sample Depth Intervals[2]	Analyses	Rationale/Notes
Proposed Surface Water Sampling Locations				
SW-1 thru SW-3	Proposed Stream Surface Water Sample	One sample from just below the surface of the flowing stream (upgradient)	Laboratory Analysis - PCBs, T/D RCRA 8 Metals, T/D Fe and Mn Field Measurements - temperature, dissolved oxygen, and pH	Evaluate potential impacts to stream water from historical Site activity. SW-1 Upstream, SW-2 Mid-Stream, SW-3 Downstream.
SW-1A thru SW-1C	Proposed Stream Surface Water Sample	One sample from just below the surface of the flowing stream (adjacent)	Laboratory Analysis - PCBs, T/D RCRA 8 Metals, T/D Fe and Mn Field Measurements - temperature, dissolved oxygen, and pH	Evaluate potential impacts to stream water from historical Site activity. SW-1A thru SW-1C between SW-1 and SW-2.
Proposed Sediment Sampling Locations				
SED-1 thru SED-3	Proposed In-stream Sediment Location	Surficial layer of soft sediments from the stream channel (upgradient)	Laboratory Analysis - PCBs, RCRA 8 Metals, TOC	Evaluate potential impacts to sediments from historical Site activity. SED-1 upstream, SED-2 Mid Stream, SED-3 downstream.
WS-1 thru WS-4	Proposed Wetland Sediment Location	Surficial layer of soft sediments from the wetland area (downgradient)	Laboratory Analysis - PCBs, RCRA 8 Metals, TOC	Evaluate potential impacts to wetland sediments from historical Site activity. WS-1 thru WS-4 located on oppsoite side of brook.
Proposed Grain Size Sample Locations				
GS-1 thru GS-6	Proposed Sediment Grain Size Sample	Approximately 0.5'-3.0' below the stream bed	Grain Size	Estimate streambed conductivity. GS samples will be collected from SS#1, SS#2 and SS#3
SG-1 thru SG-3	Proposed Sediment Grain Size Assessment	Surficial Sediments	Pebble Count Method (field method)	Assess grain size for 100-meter stretch in the centerline of stream segments.
Proposed Monitoring Well Groundwater Sample Locations				
MW-101 thru MW-104	Proposed Groundwater Sample	Mid-point of saturated MW screen interval	Laboratory Analysis - PAHs, PCBs, T/D RCRA 8 Metals, T/D Fe and Mn Field Measurements - Temperature, Dissolved Oxygen, Specific Conductivity, Oxidation Reduction Potential, Turbidity and pH	Evaluate potential impacts to stream water from historical Site activity.
Proposed Porewater Groundwater Sample Locations				
PW-1 thru PW-3	Proposed In-stream Porewater Sample	One sample from just below the surface of the flowing stream (upgradient)	Laboratory Analysis - PAHs, PCBs, T/D RCRA 8 Metals, T/D Fe and Mn Field Measurements - Temperature, Dissolved Oxygen, Specific Conductivity, Oxidation Reduction Potential, Turbidity and pH	Evaluate potential impacts to stream water from historical Site activity. PW-1 Upstream, PW-2 Mid-Stream, PW-3 Downstream.
PW-1A thru PW-1C	Proposed In-stream Porewater Sample (additional)	One sample from just below the surface of the flowing stream (adjacent)	Laboratory Analysis - PAHs, PCBs, T/D RCRA 8 Metals, T/D Fe and Mn Field Measurements - Temperature, Dissolved Oxygen, Specific Conductivity, Oxidation Reduction Potential, Turbidity and pH	Evaluate potential impacts to stream water from historical Site activity. PW-1A thru PW-1C between PW-1 and PW-2.

Notes: 1 – Actual sampling locations may be adjusted based upon field conditions.
2 – Target depth intervals are to be used as a field guide; actual sample depths may vary based on field conditions
T/D - total and dissolved
Fe - iron; Mn - manganese
TOC - total organic carbon

TABLE 2: SAMPLING AND QA/QC SUMMARY
COUNTRY MOTORS
375 BANFIELD ROAD, PORTSMOUTH, NH

Field Sample Matrix	Parameter	Sample Type	Estimated Number of Samples	Preparation/Analytical Method References	Sample Preservatons	Holding Time from Collection	Container
Sediment (In-stream and Additional Wetland)							
	PCBs	Sediment	7	EPA Method 8082A	Ice, Cool to 4C or less	1 year	Glass Jar
	RCRA 8 Metals	Sediment	7	EPA Method 6010D/7471B	Ice, Cool to 4C or less	6 months	Glass Jar
	TOC	Sediment	7	SW-846 Method 9060	Ice, Cool to 4C or less	14 days	Plastic Jar
	Grain Size	Sediment	up to 6	ASTM D422	Ice, Cool to 4C or less	NA	Plastic Jar
QA/QC	All chemical parameters	Sediment	1				
Surface Water							
	PCBs	Surface Water	6	EPA Method 8082A	Ice, Cool to 4C or less	1 year	Amber Glass
	T/D RCRA 8 Metals	Surface Water	6	EPA Method 6010D/7470A	Preserved in HNO3	6 months	Poly Bottle
	T/D Fe and Mn	Surface Water	6	EPA Method 6010D/7470A	Preserved in HNO3	6 months	Poly Bottle
QA/QC	All chemical parameters	Surface Water	1				
Groundwater - Wells							
Monitoring Well	PAHs	Groundwater	4	EPA Method 8270D	HCL	14 days	Amber Glass
Monitoring Well	PCBs	Groundwater	4	EPA Method 8082A	NP	1 year	Amber Glass
Monitoring Well	T/D RCRA 8 Metals	Groundwater	4	EPA Method 6010D/7470A	Preserved in HNO3, Field Filtered	6 months	Poly Bottle
Monitoring Well	T/D Fe and Mn	Groundwater	4	EPA Method 6010D	Preserved in HNO3, Field Filtered	6 months	Poly Bottle
QA/QC (MW)	All chemical parameters	Groundwater	1				
Groundwater - Porewater							
Porewater	PAHs	Groundwater	6	EPA Method 8270D	HCL	14 days	Amber Glass
Porewater	PCBs	Groundwater	6	EPA Method 8082A	NP	1 year	Amber Glass
Porewater	T/D RCRA 8 Metals	Groundwater	6	EPA Method 6010D/7470A	Preserved in HNO3, Field Filtered	6 months	Poly Bottle
Porewater	T/D Fe and Mn	Groundwater	6	EPA Method 6010D	Preserved in HNO3, Field Filtered	6 months	Poly Bottle

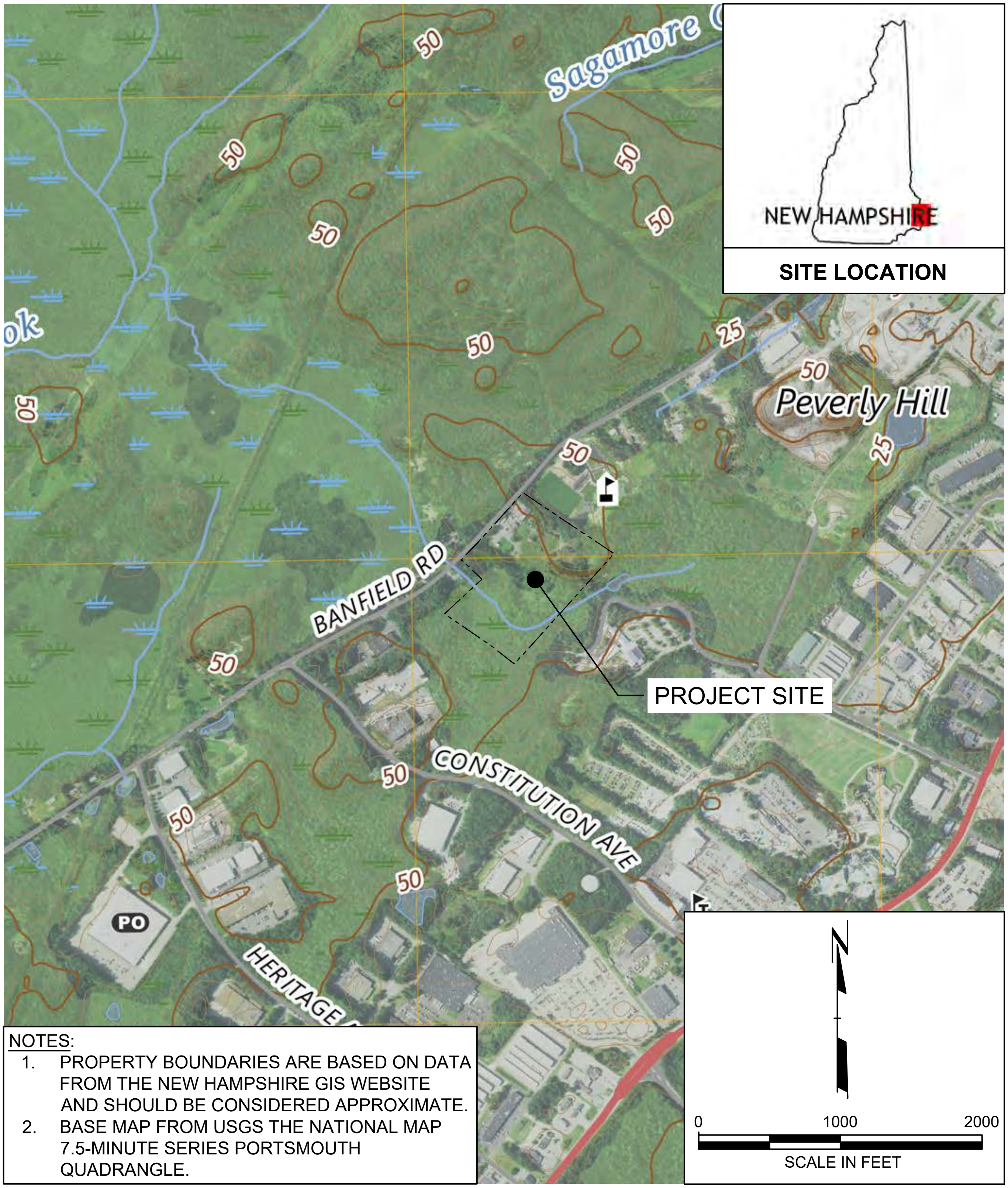
Notes: T/D - total and dissolved
Fe - iron; Mn - manganese
TOC - total organic carbon

Table 3: Field SOPs

Country Motors, 375 Banfield Road, Portsmouth, NH

SOP #	SOP Title	Revision #	Date of SOP
ESS	Surface Water Sampling Guidelines		
ESS	Sediment Collection		
ESS	Measurement of Dissolved Oxygen		
ESS	Measurement of pH		
ECR 008 (TRC SOP)	Surface Water and Sediment Sampling	2	August 2020
ECR 004 (TRC SOP)	Water Level and Product Measurements	3	February 2022
ECR 023 (TRC SOP)	Packaging and Shipping of Non-Hazardous Environmental Samples	1	January 2020
ECR 002 (TRC SOP)	Chain of Custody Protocol	2	February 2021
ECR 001 (TRC SOP)	Field Activity Documentation for Environmental Investigations	3	November 2020
ECR 005 (TRC SOP)	Visual-Manual Procedure for Soil Description and Identification	1	January 2020
ECR 011 (TRC SOP)	Calibration of Field Instruments for Water Quality Parameters	1	January 2020
ECR 010 (TRC SOP)	Equipment Decontamination Protocol	3	April 2021
West Virginia DEP	Wolman Pebble Count Procedure		
NHDES	NHDES Protocols for Collection, Identification, and Enumeration of Freshwater Fishes	1	November 2013
ESS	Freshwater Macroinvertebrate Sampling and Analysis		
ESS	Seepage Survey Guidelines		
ESS	Streamflow Measurement Guidelines		

FIGURES



NOTES:
1. PROPERTY BOUNDARIES ARE BASED ON DATA FROM THE NEW HAMPSHIRE GIS WEBSITE AND SHOULD BE CONSIDERED APPROXIMATE.
2. BASE MAP FROM USGS THE NATIONAL MAP 7.5-MINUTE SERIES PORTSMOUTH QUADRANGLE.

TRC

650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

PROJECT:
WILCOX & BARTON, INC.
FORMER COUNTRY MOTORS SITE WORK PLAN
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

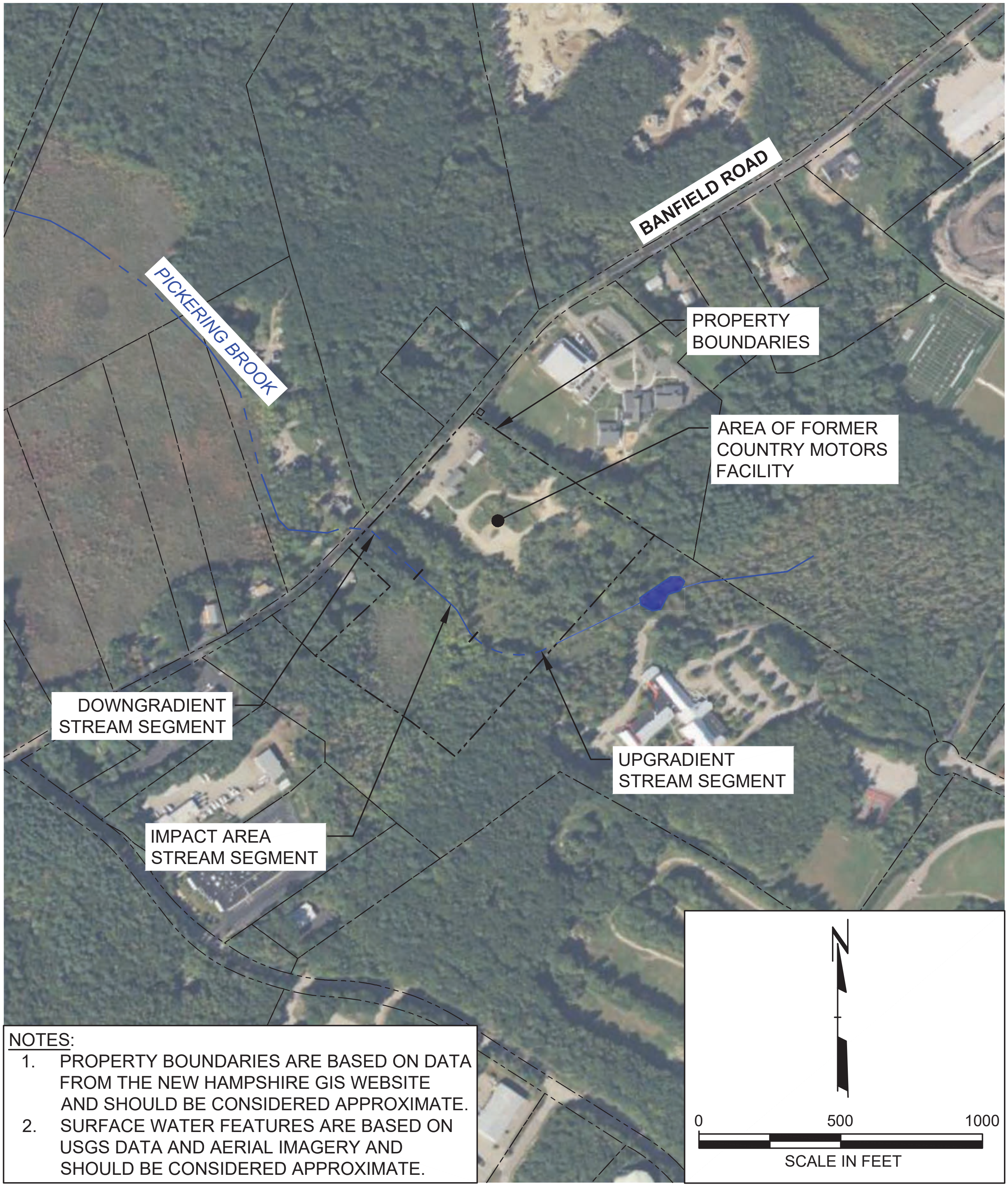
TITLE:
SITE LOCATION MAP

DRAWN BY:	ARD
CHECKED BY:	ASW
APPROVED BY:	ASW
DATE:	SEPTEMBER 2022
PROJ. NO.:	489599
FILE:	Country Motors Site Figures.dwg

FIGURE 1

8.5x11 --- USER: ADavidson --- ATTACHED XREFS: --- ATTACHED IMAGES:
DRAWING NAME: \\augusta-fp1\Environmental\RMD\ENV RMD Projects\Wilcox & Barton\489599-Country Motors- Portsmouth\10-DWG\ Country Motors Site Figures.dwg --- PLOT DATE: September 07, 2022 - 2:58PM --- LAYOUT: FIGURE 1

Version: 2017-10-21



NOTES:

1. PROPERTY BOUNDARIES ARE BASED ON DATA FROM THE NEW HAMPSHIRE GIS WEBSITE AND SHOULD BE CONSIDERED APPROXIMATE.
2. SURFACE WATER FEATURES ARE BASED ON USGS DATA AND AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.

TRC

650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

PROJECT:
WILCOX & BARTON, INC.
FORMER COUNTRY MOTORS SITE WORK PLAN
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

TITLE:
SITE PLAN

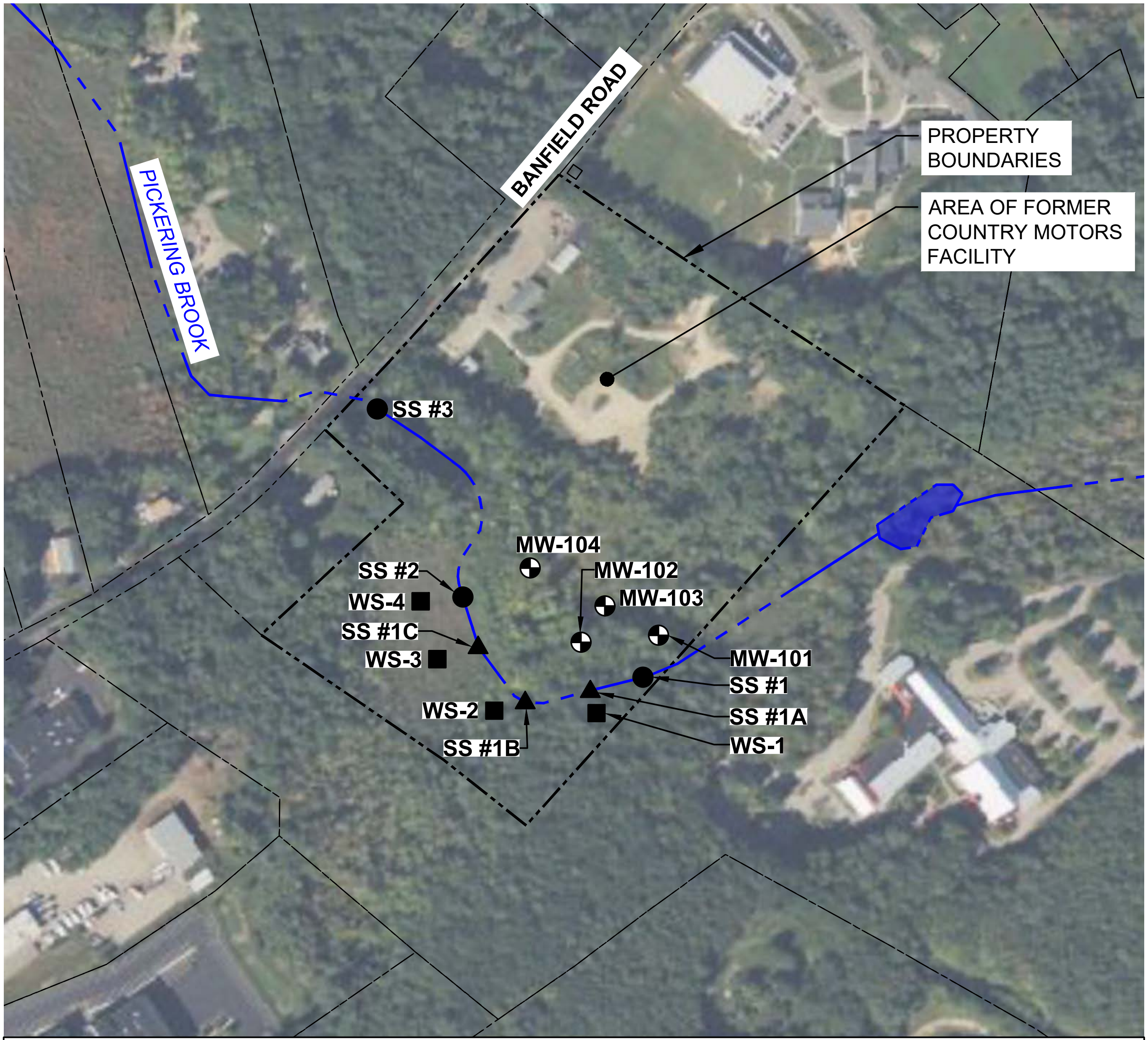
DRAWN BY:	ARD
CHECKED BY:	CDN
APPROVED BY:	CDN
DATE:	MARCH 2023
PROJ. NO.:	489599
FILE:	Country Motors Site Figures_REV01.dwg

FIGURE 2

DRAWING NAME: \\augusta-fp1\Environmental\RMD\ENV RMD Projects\Wilcox & Barton\489599-Country Motors- Portsmouth\10-DWG\ Country Motors Site Figures_REV01.dwg --- PLOT DATE: March 28, 2023 - 9:38AM --- LAYOUT: FIGURE 2

8.5x11 -- USER: ADavidson --- ATTACHED XREFS: --- ATTACHED IMAGES:

Version: 2017-10-21

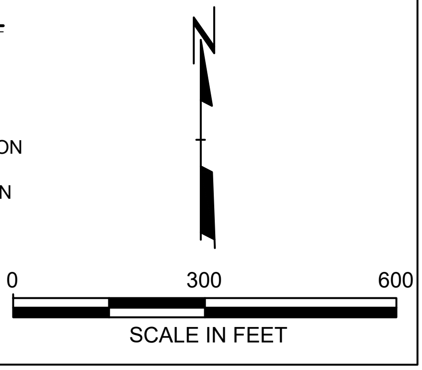


NOTES

1. PROPERTY BOUNDARIES ARE BASED ON DATA FROM THE NEW HAMPSHIRE GIS WEBSITE AND SHOULD BE CONSIDERED APPROXIMATE.
2. SURFACE WATER FEATURES ARE BASED ON USGS DATA AND AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
3. EXISTING MONITORING WELL LOCATIONS ARE APPROXIMATED BASED ON PROPERTY SITE PLANS.
4. ACTUAL SAMPLING STATIONS AND SAMPLE LOCATIONS MAY BE ADJUSTED BASED ON CONDITIONS ENCOUNTERED IN THE FIELD.

LEGEND

⊕ **MW-101**	MONITORING WELL LOCATION
● **SS #1**	PRIMARY IN-STREAM LOCATION
▲ **SS #1A**	ADDITIONAL IN-STREAM LOCATION
■ **WS-1**	ADDITIONAL WETLAND LOCATION



650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

PROJECT:
WILCOX & BARTON, INC.
FORMER COUNTRY MOTORS SITE WORK PLAN
375 BANFIELD ROAD
PORTSMOUTH, NEW HAMPSHIRE

TITLE:

PROPOSED SAMPLING PLAN

DRAWN BY:	ARD
CHECKED BY:	JGH
APPROVED BY:	JGH
DATE:	MAY 2023
PROJ. NO.:	489599
FILE:	Country Motors Site Figures_REV01.dwg

FIGURE 3

8.5x11 --- USER: ADavidson --- ATTACHED XREFS: --- ATTACHED IMAGES:
DRAWING NAME: \\augusta-fp1\Environmental\RMD\ENV RMD Projects\Wilcox & Barton\489599-Country Motors- Portsmouth\10-DWG\ Country Motors Site Figures_REV01.dwg --- PLOT DATE: May 15, 2023 - 9:31AM --- LAYOUT: FIGURE 3

Version: 2017-10-21

ATTACHMENT A

STANDARD OPERATING PROCEDURES (SOPs & SOGs)

GUIDELINES FOR COLLECTION OF SURFACE WATER SAMPLES

1.0 INTRODUCTION

These guidelines provide basic instructions for the routine acquisition of surface water from lakes, ponds, and streams. The methods outlined below are intended to (1) standardize water sample collection methods; (2) ensure that samples delivered to the laboratory represent field conditions as accurately as possible; (3) assure proper documentation of sample collection; and (4) minimize cross contamination between sampling sites.

2.0 REQUIRED MATERIALS

The following materials are necessary for the acquisition of surface water samples:

- Nitrile gloves
- Labeled sample bottles provided by contracted laboratory (appropriately sanitized and containing the necessary preservative for desired analyses, see Table 2.0 for examples)
- Field data sheets or logbooks, including list of sites or locations to be sampled, and pencil
- Cooler with ice packs for sample storage
- Integrated depth sampler (if collecting algae sample)
- Secchi disk (if collecting algae samples)
- Laboratory Chain of Custody

Table 2.0 Example Container Types, Preservative Requirements, and Hold Times for Water Quality Samples.

Analysis	Bottle Type	Preservative	Hold Time
Total Phosphorus	plastic	H_2SO_4	28 days
Dissolved Phosphorus	plastic	As Is	analyze immediately*
Total Suspended Solids (TSS)	plastic	As Is	7 days
Nitrate/Nitrite	plastic	As Is	48 hrs
Total Kjeldahl Nitrogen (TKN)	plastic	H_2SO_4	28 days
Metals - Total	plastic	HNO_3	6 months**
Metals - Dissolved	plastic	As Is	6 months**
Algae	opaque plastic	Lugol's iodine	>1 year
Chlorophyll-a	opaque plastic	As Is	analyze immediately
Bacteria	sterile plastic	As Is	6 hrs

* = 24 hrs with field filtration, ** = 28 days for mercury

3.0 METHODS

3.1 General Sampling Instructions

- Testing methods, sample containers, preservation techniques, and sample volumes should be selected in consultation with the laboratory to ensure that samples obtained will provide the desired results.

- Hold times vary considerably between different analytes and must be taken into consideration when planning field sampling efforts and lab courier pickups to assure the validity of analytical results.

- Field filtration of certain samples (dissolved phosphorus) is recommended. The laboratory can supply syringes and filters for use in the field.

Using a pre-cleaned (as is) bottle to fill a sample bottle containing preservative.

- In general, surface water samples should be collected via direct grab methods.

- Sample collection should precede the measurement of physical field parameters (including pH, apparent color, turbidity, conductivity, and dissolved oxygen) in order to minimize the risk of sediment disturbance and/or sample contamination.

- Clean rubber gloves should be worn at each sampling location. When sampling multiple sites on the same day, gloves may be rinsed in the immediate area of the waterbody to be sampled (downstream at flowing sites).

- Approximately 1-inch of air space should be left when filling sample bottles (except for dissolved oxygen, alkalinity, and BOD samples), so that bottles may be shaken (if needed) before analyses (EPA, 1997; Simpson 1991).

- Sample containers with preservatives should not be used to collect water samples. If using containers with preservatives, a pre-cleaned container of similar type (an as is bottle) should be used to collect and subsequently transfer the sample to the preserved container.

- Ensure that all sample bottles are correctly and completely labeled before storage. Sample bottles should be stored in a cooler with ice packs (it is best to avoid ice, as meltwater could potentially contaminate samples) or in a refrigerator until they are submitted to a lab courier.

3.1.1. Lake and Pond Sampling

- Grab samples from lakes and ponds should be collected at approximately 8 to 12 inches beneath the water surface or mid-way between the surface and the bottom if the waterbody is shallow (EPA 1997). Samples should not be collected in close proximity to the lake shoreline or submerged obstacles

- To collect water samples, hold an as is bottle near the base, remove the lid, and plunge it into the water with the opening facing downward. Invert the bottle and allow it to fill before bringing it to the surface. Decant sufficient water from the bottle to allow for the required headspace and replace the cover, or carefully pour the contents into a bottle containing preservative. Repeat the above process to refill the as is bottle as many times as necessary.

Algae Samples

Integrated depth sampler for collection of algae samples.

- Algae samples should be stored in opaque bottles with a small amount of Lugol's iodine for preservative (~1-2 drops in a 250 mL bottle). Algal taxonomy labs can provide opaque plastic bottles, but standard plastic as is bottles covered in aluminum foil can also be used.

- Algae samples should be collected using an integrated depth sampler. An integrated depth sampler consists of a length of tubing (~1in diameter, at least 2 m long) with a weight attached to one end. Sample collection procedures using the depth sampler should proceeds as follows (procedure adapted from EPA 2012):
    - Determine the euphotic zone:
        - Lower the secchi disk over the shaded side of the boat until it disappears. Lower the disk a bit further, then slowly raise the disk until it reappears. Record the reappearance depth. The euphotic zone is calculated by multiplying the reappearance depth by 2.
    - Holding onto the non-weighted end of the sampler, lower the tube into the water column. Rinse the sampler by submerging it three times.
    - Lower the sampler so that it is submerged to the depth of the euphotic zone, or fully submerged if the euphotic zone is deeper than the length of the sampler. Cover the opening at the non-weighted end with a gloved thumb.

- Lift the sampler completely out of the water and cover the opening at the weighted end with a gloved thumb (both ends should be covered). Repeatedly lift each end of the sampler to mix the water sample within the tube.
- Fill the algae sample bottle with the required volume of water from the sampler (the bottle will contain Lugol's solution as preservative so be careful not to over-fill).
- Unlike samples for most other analytes, preserved algae samples can be stored at room temperature before submission to a lab.

3.1.2. Stream Sampling

- Samples should be collected from the center of small streams (i.e., 10-20 feet wide with a maximum depth of less than 2 feet), and at a location where water depth is 2-3 feet in larger streams.
- Always approach a sampling location from downstream, traveling so as to minimize the disturbance of bottom sediments and upstream waters.
- Stand downstream of the desired sampling location, hold the sample bottle near its base and plunge it below the water surface with the opening (mouth) downward. The opening of sample bottles should always be directed away from the sampler in an upstream direction.
- To inform investigations about nutrient inputs, stream flow should be measured whenever water quality samples are collected (see Guidelines for Measuring Stream Flow)

4.0 DOCUMENTATION

Report surface water field data on sheets or in notebooks. Any unanticipated site-specific information, which requires deviation from the above guidelines, should be recorded. Field notes for surface water sampling should include a minimum of the following:

- Name or initials of person collecting the samples
- Sample identification/station location
- Date and time of sample collection
- Environmental conditions (e.g. wind, weather)
- Other comments or observations about water quality and site conditions (e.g. visible algae bloom, dead fish nearby, sample has noticeable odor or color, etc.)

Photographic evidence of any notable conditions is also desirable.

5.0 REFERENCES

EPA, 2012. 2012 National Lakes Assessment Field Operations Manual. Version 1.0, May 15, 2012. United States Environmental Protection Agency. Office of Water. EPA-841-B-11-003. Accessed January 22, 2020 at https://www.epa.gov/sites/production/files/2013-11/documents/nla2012_fieldoperationsmanual_120517_final_combinedqrg.pdf

www.essgroup.com

STANDARD OPERATING GUIDELINES FOR COLLECTION OF SEDIMENTS FROM FRESHWATER ENVIRONMENTS

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOGs) provide basic instructions for the collection of bottom sediments from freshwater environments. Collections are to be performed in accordance with methodologies generally accepted by the Massachusetts Department of Environmental Protection (MADEP), Rhode Island Department of Environmental Management (RIDEM), or other agency, as applicable. In some cases, deviation from these SOGs may be necessary to comply with particular local, state, or federal program requirements.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements may be defined in a site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) and may include duplicate or replicate measurements or confirmatory measurements.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- Field personnel are responsible for verifying that all sampling equipment is in proper operating condition prior to use and for implementing the sampling procedures in accordance with this SOG and any specific project plan.

3.0 REQUIRED MATERIALS

The following materials may be necessary for this procedure:

- Sediment coring or grab sampling device
- Stainless steel or Teflon mixing bowl
- Stainless steel or Teflon mixing spoon or tool
- Nitrile gloves
- Decontamination agents (e.g., Alconox, isopropyl alcohol, distilled/deionized water)
- Scrub brush (to remove sediment and debris)
- Paper towels
- Pre-cleaned sample jars provided by laboratory
- Pencil and indelible marker
- Field data sheets or logbooks
- Digital camera
- GPS receiver
- Field map (optional)

4.0 METHOD

Samples should be collected at locations specified in the project plan. A GPS may be used to navigate to planned locations, as well as to record the final sampling location. Field personnel should collect sediment cores or grabs in accordance with the instructions provided with each specific sampling device deployed. At a minimum, nitrile gloves should be worn at all times during these procedures to prevent direct contact with sampled sediments.

At each sampling location, a pre-cleaned grab sample dredge or corer should be deployed from a stable platform, typically an anchored vessel or ice cover. Sampling equipment should be decontaminated using alconox, isopropyl alcohol, and distilled or deionized water before the collection of each discrete sample. A scrub brush and paper towels may be used to loosen or remove sediments that are stuck to the equipment.

Upon retrieval, the core or grab should be checked to ensure a complete, representative sample has been collected. Each sample should be photographed to document physical characteristics such as sediment color, moisture, and grain size. Grab samples may be photographed from above with the sampler flaps open. Core samples may be photographed with the core laid down and a measuring tape fastened parallel to the core. This will allow physical characteristics to be documented over the full profile of the core, with identification of any discrete vertical layers.

Advanced core logging may be required for certain projects. Requirements relevant to core logging are not included in this SOG. Typically, these are provided in a separate document, such as a project-specific sampling and analysis plan.

If specified by the project plan, multiple samples may be composited in a pre-cleaned mixing bowl and mixed thoroughly with a pre-cleaned spoon before being transferred to the glass sampling jars provided by the laboratory. However, volatile organic compound (VOC) samples should be collected from individual, undisturbed samples (i.e., prior to compositing).

Samples should be collected in accordance with the specific sample volumes and holding times required by each laboratory analytical method, unless the project plan has outlined other project-specific requirements.

The sample jar should be labeled with project name or number, sample identification, date, time, and any other project-specific requirements. This information should also be recorded in a field book or GPS data dictionary at the time of sampling along with other essential information such as water depth, sample coordinates, and notes on the physical nature of the sediment collected.

5.0 QUALITY CONTROL

Duplicate field samples or split samples may be collected if specified by the project plan. Once samples have been retrieved and placed into jars, the samples should be kept on ice or refrigerated until the laboratory can analyze them.

6.0 DOCUMENTATION

Documentation for recorded data must include a minimum of the following:

- Date and time of collection and analysis
- Signature or initials of person performing the collection or measurement
- Sample identification/station location
- Sample digital photographs
- Pertinent comments

7.0 TRAINING/QUALIFICATIONS

To properly perform sediment collections, the field personnel must be familiar with the techniques stated in this SOG and experienced in the operation of the sampling equipment.

STANDARD OPERATING GUIDELINES FOR MEASUREMENT OF DISSOLVED OXYGEN

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine measurement of dissolved oxygen using a polarographic sensor-equipped dissolved oxygen meter with a digital read-out (e.g., YSI Model 55 Dissolved Oxygen Unit or Pro2030 Dissolved Oxygen, Conductivity, Salinity Instrument). Measurements are made in accordance with methods that address dissolved oxygen measurement of drinking, surface, and saline waters, and domestic and industrial wastes.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory measurements.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- The analyst is responsible for verifying that the dissolved oxygen measuring device is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.

3.0 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- Dissolved oxygen meter with digital read-out device
- Manufacturer's instruction manual for the instrument
- Manufacturer’s recommended operating solution and replacement membranes
- NIST-traceable thermometer
- Laboratory or field data sheets or logbooks

4.0 METHOD

4.1 Sample Handling, Preservation, and General Measurement Procedures

To achieve accurate dissolved oxygen measurements, samples should be analyzed *in situ*. Measurements in flowing waters should be made in relatively turbulent free areas. Measurements in standing waters may require gentle probe agitation to create water movement around the probe (check instrument manual to confirm).

4.2 Calibration and Measurement Procedures

To accurately calibrate some dissolved oxygen meters, it may be necessary to know the altitude of the region in which you are located and the approximate salinity of the water you will be analyzing. Fresh water has a salinity of approximately zero. Seawater has an approximate salinity of 35 practical salinity units (psu). If uncertain, measure salinity first with an appropriate device. The instructions below are applicable to the YSI Model 55; for other instruments, consult the instruction manual.

- Ensure that the sponge inside the instrument's calibration chamber is wet then insert the probe into the chamber. Turn the instrument on and wait for readings to stabilize (as long as 15 minutes, depending on the model).
- To calibrate, enter the calibration menu by pressing and releasing both the up and down arrow keys at the same time. Enter the altitude (in hundreds of feet) at the prompt by using the arrow keys to increase or decrease the altitude (example: 12 = 1,200 feet). Press enter when correct altitude is shown.
- The meter should display CAL in the lower left of the display with the calibration value in the lower right of the display and the current D.O. reading (before calibration) should be on the main display. Once the D.O. reading is stable, press ENTER. Enter the salinity at the prompt by using the arrow keys. Press ENTER when finished and the instrument will return to normal operation.
- Calibration should be performed at a temperature within ± 10°C of the sample temperature. Recalibrate every 15 samples and whenever the unit is turned on.
- If calibration is out of range, erratic readings occur, bubbles appear, or if the membrane becomes damaged, wrinkled, or fouled refill the membrane solution and/or replace the membrane, per the manufacturer's manual.
- Avoid contact with environments containing substances that may attack the probe materials (e.g. acids, caustics, and strong solvents).

4.3 Troubleshooting Information

If there are any performance problems with the dissolved oxygen-measuring device, consult the appropriate section of the instruction manual for the checkout and self-test procedures. If the problem persists, consult the manufacturer's customer service department immediately for further instructions.

4.4 Maintenance

Instrument maintenance for meter-type dissolved oxygen measuring devices should be performed according to the procedures and frequencies required by the manufacturer. Rinsing the probe with distilled or deionized water and preventing exposure of the membrane to drying is typically all that is required on a day-to-day basis.

5.0 QUALITY CONTROL

Duplicate measurements of a single sample should be performed at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within ± 0.2 mg/L.

The temperature readout of the meter should be checked annually against a NIST-traceable thermometer. If the difference is greater than 0.5°C, the instrument manufacturer should be consulted for guidance. Temperature measurements should be compensated for any difference with the reference thermometer.

6.0 DOCUMENTATION

All dissolved oxygen meter calibration, checks, and maintenance information will be recorded in a calibration logbook. Dissolved oxygen data may be recorded on the appropriate field data sheets or field books.

- Calibration documentation must be maintained in a thorough and consistent manner. At a minimum, the following information must be recorded:
    - Date and time of calibration
    - Signature or initials of person performing the measurement

  - Instrument identification number/model
  - Readings for all continuing calibration checks
  - Comments
- Documentation for recorded data must include a minimum of the following:
  - Date and time of analysis
  - Signature or initials of person performing the measurement
  - Instrument identification number/model
  - Sample identification/station location
  - Dissolved oxygen, both in mg/L and percent saturation (corrected for any difference with reference thermometer) and temperature of sample (including units and duplicate measurements)
  - Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform dissolved oxygen measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

Certain state certification programs require that dissolved oxygen measurements in the field be taken by, or in the presence of, personnel that are qualified under the certification program.

8.0 REFERENCES

Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.

Methods for the Chemical Analysis of Water and Wastes, EPA 600/4-79-020, Revised 1983.

STANDARD OPERATING GUIDELINES FOR MEASUREMENT OF PH

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine calibration and operation of a variety of pH meters, including the Hanna pHep5 pH/Temperature Testers. Although these meters may measure additional parameters (e.g., temperature, specific conductivity, etc.), this SOG addresses pH measurement only (other capabilities are outlined in the appropriate SOG and manufacturer's individual instrument manuals). This SOG is designed specifically for the measurement of pH in accordance with EPA Method 150.1 and Standard Method 4500-H B which address electrometric pH measurements of drinking, surface, and saline waters, domestic and industrial wastes, and acid rain.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory analyses.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- The analyst is responsible for verifying that the pH meter is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.

3.0 REQUIRED MATERIALS

The following materials may be necessary for this procedure:

- pH meter
- pH meter manufacturer's instruction manual
- Deionized or distilled water
- 4.0, 7.0, and 10.0 buffer solutions
- Lint-free tissues
- Mild detergent
- Manufacturer’s recommended storage solution
- Manufacturer’s recommended cleaning solution
- National Institute of Standards and Technology (NIST)-traceable thermometer
- Field data sheet or logbook
- Calibration sheet or logbook

4.0 METHOD

4.1 Sample Handling, Preservation, and General Measurement Procedures

- To achieve accurate pH measurements, samples should be analyzed immediately in the field, or as soon as possible after collection. Sample should be measured *in situ* or collected in plastic or glass containers.
- As temperature can affect the pH measurements obtained, both the pH and the temperature of the sample must be recorded, unless the meter is capable of automatic temperature correction (ATC).
- Primary standard buffer salts available from NIST can be purchased and are necessary for situations where extreme accuracy is required. Secondary standard buffers may be purchased as a solution from commercial vendors and are recommended for routine use. Buffers should not be used after their expiration dates as provided by the manufacturer. An expiration date of one year should be used if the manufacturer does not supply an expiration date or if the buffers are prepared from pH powder pillows, etc.
- When using the meter in the laboratory, always place the buffer/sample beaker on the magnetic stirrer, and make sure the stirring bar is rotating during measurements. Rinse the stirring bar as well as the beaker between buffers/samples.

  EXCEPTION: Do not use the magnetic stirrer for acid rain samples. It is crucial not to induce dissolved gases into the sample to be absorbed or desorbed, as this will alter the pH. Stir the sample gently for a few seconds after introducing the electrode, then allow the electrode to equilibrate prior to recording temperature and pH readings.
- When the meter is being used in the field, keep the probe elevated off the bottom to avoid disturbing sediments. Allow readings to fully stabilize before recording the pH measurement. This may take several minutes, especially if the pH is drastically different from the last reading or the bulb has been allowed to dry out between readings.
- Rinse the electrode with deionized or distilled water between samples and wipe gently, if needed, with a lint-free tissue. If a more thorough cleaning is required, use a mild detergent (e.g., dish soap) or the manufacturer's recommended cleaning solution.
- Store the probe in the manufacturer's recommended storage solution or, if this is not available, tap water. Do not use distilled or deionized water for storage purposes.

4.2 Calibration and Measurement Procedures

- The pH meter should be calibrated daily before any analyses are performed. The meter should be re-calibrated every 12 hours, if used continuously, or at the frequency specified in the project plan.
- Calibration should include a minimum of one point but ideally, a two point calibration that brackets the expected pH of the samples to be measured is desirable. Calibration measurements should be recorded in the calibration logbook.
- Choose either 7.0 and 10.0 (high range) or 4.0 and 7.0 (low range) buffers, whichever will bracket the expected sample range. Pour each buffer into a clean glass beaker. The volume should be sufficient to fully submerse the pH bulb and thermistor. If the pH is being measured in a laboratory, place the beaker on the magnetic stirrer and place the stirring bar in the beaker. Measure and record the temperatures of the buffers using a calibrated thermometer or automatic temperature compensation (ATC).

- Follow the manufacturer's calibration instructions.
- Once calibration is complete, discard the buffer and rinse the beaker (and stirring bar, if used) thoroughly with distilled or deionized water.
- An additional check may be performed, if required by the project plan, by placing the electrode into an additional buffer solution. This buffer should be from a different source than the buffers used for the initial calibration. This buffer should read within +0.2 pH units of the buffer's true pH value.
- Verify the calibration every 15 samples and at the end of the day.
- Recalibrate the instrument if any of the following apply:
  - the check value varies more than 0.2 pH units from the true value
  - the expected pH of the sampled water body is outside the current calibration range
  - readings are erratic or do not stabilize
  - the instrument has just been cleaned or otherwise disturbed for maintenance

4.3 Troubleshooting Information

If there are any instrument performance problems that result in the inability to achieve the acceptance criteria presented in Section 5.0, consult the appropriate section of the meter instruction manual for troubleshooting procedures. If the problem persists, consult the manufacturer's customer service department immediately for further guidance.

4.4 Maintenance

- Instrument maintenance should be performed according to the procedures and frequencies required by the manufacturer.
- The electrode should be stored and maintained according to the manufacturer's instructions.
- If an instrument with ATC is being used, the device should be checked on an annual basis for accuracy with an NIST-traceable thermometer.

5.0 QUALITY CONTROL

- Duplicate measurements of a single sample will be performed at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within ±0.2 pH units.
- The temperature readout of the meter will be checked annually against an NIST-traceable thermometer. If the difference is greater than 0.2°C, the instrument manufacturer will be consulted for guidance. Temperature measurements will be compensated for any difference with the reference thermometer.
- Some regulatory agencies may require the analysis of USEPA Water Supply (WS) or Water Pollution (WP) performance evaluation samples. These performance evaluation samples will be analyzed as required.

6.0 DOCUMENTATION

- All pH meter calibration, temperature check, and maintenance information will be recorded in a calibration logbook.
- pH data may be recorded on the appropriate laboratory or field data sheets or logbooks.

- Calibration documentation must be maintained in a thorough and consistent manner. At a minimum, the following information must be recorded:
  - Date and time of calibration
  - Signature or initials of person performing the measurement
  - Instrument identification number/model
  - Expiration dates and batch numbers for all buffer solutions
  - Reading for pH 7.0 buffer before and after meter adjustment
  - Reading for pH 4.0 or 10.0 buffer before and after meter adjustment
  - Readings for all continuing calibration checks
  - Temperature of buffers (corrected for any difference with reference thermometer), including units
  - Comments
- Documentation for recorded data must include a minimum of the following:
  - Date and time of analysis
  - Signature or initials of person performing the measurement
  - Instrument identification number/model
  - Sample identification/station location
  - Temperature (corrected for any difference with reference thermometer) and pH of sample (including units and duplicate measurements)
  - Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform pH measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

Certain state certification programs require that pH measurements in the field be taken by, or in the presence of, personnel that are qualified under the certification program.

8.0 REFERENCES

Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.

Methods for the Chemical Analysis of Water and Wastes, EPA 600/4-79-020, Revised 1983.

Title: **Surface Water and Sediment Sampling**	Procedure Number: **ECR 008**
	Revision Number: **2**
	Effective Date: **August 2020**

Authorization Signatures			
		Elizabeth Denly	
Technical Reviewer	Date	Environmental Sector Quality Director	Date
Kenneth Cormier	8/3/20	Elizabeth Denly	8/3/20

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	Procedure for Collection of Sediment Samples for VOCs, VPH or GRO (SW-846 Method 5035A)
Attachment B	Example Surface Water/Sediment Sample Log
Attachment C	Shipping Methanol-preserved Samples
Attachment D	SOP Fact Sheet
Attachment E	SOP Modifications for PFAS

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the logistics, collection techniques, and documentation requirements for collecting representative surface water and sediment samples. This SOP is applicable to the sampling of surface water and sediment in both flowing and standing water in marine, estuarine or freshwater environments. These are standard (i.e., typically applicable) operating procedures that may be changed, as required, dependent upon site conditions, equipment limitations, or limitations imposed by the procedure. In addition, other state or federal requirements may be above and beyond the scope of this SOP and will be followed, if applicable. In all instances, the actual procedures used should be documented and described in the field book.

1.2 Summary of Method

The objective of surface water and sediment sampling is to obtain a representative sample of these media for analysis of physical and/or chemical parameters, as necessary, at a given site. This objective requires that the sample be both free of unsuitable material and be of sufficient quantity and quality for analysis by the selected analytical method. Sediment and surface water samples are collected either directly using a hand-held device or indirectly using a remotely activated device. In some instances, direct push drilling equipment may be appropriate for sediment sampling and the procedures in TRC's ECR SOP 003, Soil Sampling, would be applicable. For specialized sampling programs involving per- and polyfluoroalkyl substances (PFAS), refer to Attachment E for further details. Information on applicability of sampling methods can be found on Interstate Technology & Regulatory Council (ITRC) and United States Environmental Protection Agency (EPA) websites.

1.3 Equipment

The following equipment may be utilized when collecting surface water and sediment samples. Project-specific conditions or requirements may warrant the use of additional equipment or deletion of items from this list.

1.3.1 General Equipment

- Appropriate level of personal protective equipment (PPE), as specified in the site-specific Health and Safety Plan (HASP) including additional safety gear for working in or near water (e.g., harness, life jacket, tether, flotation device, etc.)
- Photoionization detector (PID) or flame ionization detector (FID)
- Wooden stakes and spray paint, plastic flagging (highly visible), or steel pin flags
- Tape measure, folding ruler
- Boat (if needed) with anchor
- Indelible marking pens or markers
- Field book and/or Sample Log Form
- Buoys
- Camera
- Compass
- 5-gallon bucket

- Sample container labels
- Chain-of-custody (COC) forms (TRC or laboratory, as appropriate)
- Organic absorbent (e.g., Slickwick, ground corn cob, sawdust)
- Equipment decontamination supplies
- Sample coolers
- Bubble wrap
- Ice (for sample storage/preservation)
- Zip-loc® plastic bags (for ice and COCs)
- Thermometer
- Barometer
- Lint-free, non-abrasive, disposable towels (e.g., Kimwipes®)
- Survey equipment and/or global positioning system (GPS) and/or other means of establishing sample locations
- Wire/rope
- Calibrated staff
- Maps/site plan
- Hip/chest waders
- Rubber boots

1.3.2 Surface Water Sampling Equipment

- Multi-parameter instrument and flow-through cell (typically should include: pH, temperature, conductivity, oxidation-reduction potential, and dissolved oxygen [DO]). Note: Salinity probe may be needed depending on project requirements.
- Turbidity meter
- Sample collection tool options**
  - Dip sampler
  - Kemmerer bottle
  - Peristaltic pump
  - Van Doren sampler

  **The deployable samplers will typically be manufactured of stainless steel, Teflon®, or glass.

- Teflon®, Teflon®-lined polyethylene, or high density polyethylene (HDPE) tubing, dependent upon project objectives
- Filtration equipment, if required (peristaltic pump and 0.45 micron [µm] filters, or as otherwise required for the project)
- Graduated cylinder or five-gallon bucket
- Stop watch
- <u>Sample containers</u> (may be supplied by the laboratory, depending upon the regulatory program): The proper containers should be determined in conjunction with the analytical laboratory in the planning stages of the project.

1.3.3 Sediment Sampling Equipment

- Sample collection tool options
  - Spade or shovel (stainless steel or plastic)
  - Scoop (stainless steel or plastic)
  - Trowel (stainless steel or plastic)

  - Hand auger
  - Bucket auger
  - Tube auger head (core sampler with removable liner)
  - Sand auger head
  - Mud auger head
  - Acetate liners
  - Extension rods
  - Sediment coring device (i.e., vibracore, gravity core, etc.)
  - Ponar or equivalent grab sampler
  - Eckman dredge
  - Nylon rope or stainless-steel cable
  - Two adjustable wrenches and a slip wrench
  - Nylon tube brush
  - Wire brush for thread cleaning
- Stainless-steel mixing bowl or disposable aluminum tray
- Stainless-steel spatulas or spoons
- Small scale to measure sample mass
- Dedicated Teflon® spoons (if required)
- <u>Sample containers</u> (may be supplied by the laboratory, depending upon the regulatory program): The proper containers should be determined in conjunction with the analytical laboratory in the planning stages of the project.

  For non-volatile organic compound (VOC) parameters, glass containers with Teflon®-lined caps are typically utilized. Typical containers used for VOC parameters are provided in Attachment A. However, one of the following samplers is typically used based on sample consistency (e.g., fluidity, coarse fraction).
  - En-Core® samplers.
  - Disposable plastic syringes or Terra Core™ samplers.

1.4 Definitions

En-Core® sampler	A disposable volumetric sampling device with an airtight sealing cap.
High-level VOC analysis	VOC sediment analysis that yields high reporting limits (approximately 50-200 µg/kg depending on the laboratory). Samples are typically preserved in methanol and cooled to 4°C. High-level VOC analyses are used for samples that are expected to contain elevated concentrations of VOCs (>200 µg/kg).
Low-level VOC analysis	VOC sediment analysis that yields low reporting limits (approximately 5 µg/kg depending on the laboratory). Samples are typically preserved in water, cooled to 4°C, and frozen within 48 hours of collection. Low-level VOC analyses are used for samples that are expected to contain lower concentrations of VOCs (<200 µg/kg).

Sediment	Mineral and organic materials situated beneath an aqueous layer.
Terra Core™ sampler	A disposable volumetric sampling device used to transfer soil samples to the appropriate sample containers.

1.5 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific HASP. TRC personnel will use the appropriate level of PPE, as defined in the HASP.

Sediment or surface water samples containing chemical contaminants may be handled during implementation of this SOP. Additionally, sample preservatives including caustics and/or acids may be considered hazardous materials and TRC employees will appropriately handle and store them at all times. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate. Hazardous substances may be incompatible or may react to produce heat, chemical reactions, or toxic products. Hazardous substances may be incompatible with clothing or equipment; some substances can permeate or degrade protective clothing or equipment. Also, hazardous substances may pose a direct health hazard to workers through inhalation or skin contact or if exposed to heat/flame and they combust. Material safety data sheets for chemicals handled by TRC should be maintained in the field.

A hazard analysis specifically addressing the project-specific water hazards must be included in the HASP.

1.6 Cautions and Potential Problems

1.6.1 Surface Water Sampling

- When collecting surface water using the direct-fill method:
    - the sample container should generally be held below the surface to avoid collection of floating debris.
    - if pre-preserved sample bottles are used, care must be taken to avoid loss of preservative.
- Make sure monitoring instruments (e.g., multi-parameter meter) are maintained and calibrated to ensure accurate readings.
- Clear tape should not be used to cover labels on certain analyses (e.g., 40-mL vials for VOC analysis) due to potential interference with analytical equipment.
- Surface water sampling should proceed from the downstream locations to the upstream locations.
- Be sure to obtain all necessary permits prior to sampling in water bodies, if applicable.
- Where metals constituents are to be analyzed, filtration in the field may be required. Extra bottles may be necessary depending on sampling technique (e.g., dip sample collection; field filtering to a second bottle onshore). Samples should also be collected for hardness analysis to allow for direct comparison of data to ambient water quality criteria.

1.6.2 Sediment Sampling

- Clear tape should not be used to cover labels on certain analyses (e.g., 40-mL vials for VOC analysis) due to potential interference with analytical equipment or the ability to obtain accurate post-sampling weights.
- Decanting the overlying water should be done carefully to minimize any loss of fine-grained sediment and organic matter.
- Homogenization should be performed quickly and efficiently in order to avoid altering the particle-size distribution of a sample and to avoid oxidation of the sediments. Homogenization should not be performed for VOC analysis.
- If free product is encountered in sediment, consult with the Project Manager prior to shipping the sample to the laboratory.
- Sediment sampling should proceed from the downstream locations to the upstream locations.
- Samples collected for low-level VOC analysis must be shipped to the laboratory as soon as possible due to the fact that these samples must be frozen by the laboratory within 48 hours of collection.
- Sediment sampling often presents challenges due to working near/within water stream flow conditions, working in a boat, etc. along with often difficult substrate (cobbly river bottom, mucky conditions, etc.). Sampling surface sediment beneath a shallow aqueous layer with spades, shovels, trowels, and scoops may not be an accurate or feasible method with deep and rapidly flowing water. It is recommended to have multiple methods of sampling equipment on-hand to improve chances of obtaining appropriate/representative samples of sufficient volume.
- Headspace readings of sediment samples using a PID may be unreliable due to the high moisture content of the samples.

1.7 *Personnel Qualifications*

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER) workers
- 8-hour annual HAZWOPER refresher training.

2.0 PROCEDURES

Always refer to the site-specific work plan and/or scope of work for any site-specific sampling procedures.

2.1 Order of Sample Collection

If both sediment and water samples are to be collected concurrently, each water sample should be taken prior to the corresponding sediment sample in order to avoid introducing sediment into the water column from sediment collection activities. Depth to the bottom must be accurately known in order not to disturb sediment during surface water collection. If water depth is unknown or not observed, use a calibrated rod, tape, or line to measure the depth to the bottom or refer to a known bathymetric survey if possible.

In flowing streams or runoff channels, water and sediment samples should be collected first from the furthest point downstream (with each water sample collected before the sediment sample). The remaining samples will be taken while proceeding upstream. In tidal situations, prior to mobilization, determine the tidal sequence and monitor the direction of tidal flow in order to determine the proper sampling sequence.

2.2 Surface Water Sampling Procedures

Samples should be taken without disturbing the sediments, which would include the results of actions such as entering the surface water body. This may be accomplished by the use of a remote sampler (e.g., a sample bottle held on a long pole with a gimballed yoke).

Prior to collecting surface water, calibrate the water quality parameter instrument and turbidity meter in accordance with the site-specific work plan.

2.2.1 Sampling Surface Water at a Discrete Depth

- The Kemmerer sampler is a brass cylinder with rubber stoppers that leave the ends of the sampler open while being lowered in a vertical position, thus allowing free passage of water through the cylinder. This sampler is recommended when the sampling location is accessed from a boat or structure, such as a bridge, and where samples at specific depths are required.
- The Van Dorn sampler is plastic and is lowered in a horizontal position. This sampler is recommended when collecting surface water from a very specific sampling depth or from a shallow water body.

In each case, a messenger is sent down a rope when the sampler is at the designated depth, causing the stoppers to close the cylinder. The sampler is then raised to the surface.

1. Set the decontaminated Kemmerer bottle or Van Dorn sampler so that the upper and lower stoppers are pulled away from the body.

2. Lower the sampler to the predetermined depth. Avoid disturbance of the bottom.

3. When the sampler is at the required depth, send the weighted messenger down the suspension line to close the sampler.

4. Retrieve the sampler and discharge the first 20 mL from the drain.

5. Proceed to Section 2.2.5 for filling of sample containers and/or if filtering is required.

6. Repeat steps 1-4 if additional sample volume is needed to fulfill analytical requirements.

2.2.2 Sampling Surface Water with a Dip Sampler

A dip sampler is useful for situations where a sample is to be recovered from an outfall pipe or along a bank where direct access is limited. The long handle on such a device allows access from a discrete location.

1. Assemble the device in accordance with the manufacturer's instructions.

2. Extend the device to the sample location and collect the sample.

3. Retrieve the sampler and transfer the sample to the appropriate container.

4. Proceed to Section 2.2.5 for filling of sample containers and/or if filtering is required.

2.2.3 Sampling Surface Water Using the Direct Fill Method

This sampling method is recommended for streams, rivers, lakes and other surface waters.

1. For shallow streams, collect the sample under the water surface while pointing the sample container upstream. The container must be upstream of the collector. Avoid disturbing the substrate. A clean intermediate collection container may be necessary to fill bottles to the top since this technique is limited by the depth of the waterbody. If pre-preserved containers are used for direct filling of the bottle, care must be taken to avoid the loss of preservative into the surface water body.

2. For lakes, collect the sample under the water surface while avoiding surface debris.

3. Proceed to Section 2.2.5 for filling of sample containers and/or if filtering is required.

2.2.4 Sampling Surface Water with a Peristaltic Pump

This sampling method is recommended when collecting samples from a boat.

1. Connect Teflon®, Teflon®–lined polyethylene, or HDPE tubing (dependent upon project objectives) to the peristaltic pump.
2. Lower tubing to the predetermined depth. Avoid disturbance of the bottom.
3. When the tubing is at the required depth, start the pump. Measure the flow rate of the pump with a graduated cylinder and stop watch. Record the volume of water collected for a period of one minute and calculate the flow rate as follows.

$$Flowrate\,(L\,/\,min) = \frac{volume\ collected\ (mL)}{1\,minute}\ x\ \frac{1\ L}{1000\ mL}$$

4. When the flow rate is set, start filling the containers. Refer to Section 2.2.5 for filling of sample containers and/or if filtering is required.

5. If collecting samples at the same location at different depths, tubing must be purged for a minimum of one tubing volume, to ensure water from previous depths is no longer in the tubing.

6. When collecting samples for chemical contaminants, the tubing must be changed between sample locations. If only sampling for water quality measurements (e.g., pH, conductivity, DO, total suspended solids [TSS], etc.), tubing does not have to be changed; however, step 5 must be followed between locations.

2.2.5 Sample Collection for Laboratory Analyses

1. Surface water samples for specific analytical fractions should be collected in the following order:

   a. VOCs;
   b. Semivolatile organic compounds (SVOCs);
   c. Other organic parameters;
   d. Unfiltered inorganic constituents (e.g., total metals);
   e. Filtered inorganic constituents (e.g., dissolved metals); and
   f. Other constituents

   Refer to the site-specific work plan for other parameters.

   During sample collection, allow the water to flow directly down the side of the sample container without allowing the tubing to touch the inside of the sample container or lid in order to minimize aeration and turbulence and to maintain sample integrity.

2. VOC Sample Collection

   a. Samples for VOCs, volatile petroleum hydrocarbons (VPH) or gasoline range organics (GRO) will be collected first, and the sample vial must be filled so a meniscus forms over the mouth of the vial. This ensures no air bubbles or headspace will be formed after it has been capped. Ensure the lack of air bubbles and headspace by turning the vial upside down and tapping it lightly. If any bubbles are observed, the vial should be topped off using a minimal amount of sample to re-establish the meniscus. Care should be taken to not flush any preservative out of the vial when topping off. If after topping off and capping the vial, bubbles are still present, a new vial should be obtained and the sample re-collected. Note: Extra VOC vials should be obtained prior to the sampling event in case this situation occurs.

   b. When acid preservation is used for the collection of VOCs, the acid must be added to the vials before sample collection. However, in most cases, 40-ml VOA vials come pre-preserved. If a pre-preserved vial effervesces upon the addition of sample, the acid preservative can be rinsed out of the vial with sample water and then used to collect the sample. The laboratory should be made aware that the affected sample will not be acid-preserved as this may affect the sample holding time. Make a note of effervescence in the field book for future reference.

3. Non-VOC Sample Collection

    a. Completely fill the remaining sample containers for all non-VOC analyses.

    b. Preserve the non-VOC samples in accordance with method and project-specific requirements following sample collection if the sample containers are not pre-preserved. (NOTE: Pre-preserved vials may also be supplied by the laboratory depending on the program).

4. Filtering of Samples

    a. Depending upon project requirements, filtering may be performed using a portable peristaltic pump. See Section 2.2.4, step 3 for setting the flow rate of the pump.

       Samples may be filtered direct at the point of collection or collected into an intermediate sampling container and filtered on-shore.

    b. For direct collection and filtering, place the intake end of the tubing directly into the intermediate or temporary sample container (must be unpreserved) or directly into the body of water. The discharge end of the tubing is attached to the filtration unit.

       For filtering on-shore, collect the sample into the same sample container type to be used for the final sample bottle. Use a large volume size container or multiple sample containers for the pre-filter rinse.

    c. An in-line filter should be fitted at the end of the discharge tubing and the sample should be collected after the filter. Pre-rinse the dedicated, disposable filter by allowing a minimum of 0.5 to 1 liter of surface water to pass through the filter prior to sampling and discard the pre-rinse liquid. Ensure the filter is free of air bubbles prior to collecting samples.

    d. Collect the filtered water directly from the tubing into an appropriately preserved container. Clearly note “filtered” or “dissolved” on the sample label and COC document.

    e. Change the tubing and filter after the collection of each sample.

2.3 Sediment Sampling Procedures

1. Determine the sampling device to be used from the site-specific work plan, the depth of water at the sampling location, and/or the physical characteristics of the sediment to be sampled.

2. Select a sample location that is representative of sediment depositional areas or in accordance with the site-specific work plan and sampling objectives. Examples include: a sandbar in the middle of a stream; the inside curve of a meandering stream; the down-flow side of a boulder; a deep pool where water velocities are reduced; directly upstream and downstream of an outfall; or a stream delta where the stream carrying the sediment reaches a body of standing water (i.e., pond, lake, ocean cove or bay) or another stream with lower flow velocity.

3. For sampling sediment using direct push procedures, refer to TRC's ECR SOP 003, Soil Sampling.

4. The following steps are generally employed for all sediment samples, regardless of the sampling device used:

    a. Collect a sample for VOCs, VPH, GRO and/or acid volatile sulfide (AVS)/simultaneously extracted metals (SEM) analysis, if required. If VOC, VPH or GRO analyses are required, collect the sample in accordance with the procedures in Attachment A or the site-specific work plan. For AVS/SEM analysis, immediately fill a sample container leaving no headspace.
    b. Unrepresentative materials (e.g., leaves, stones) should be removed as much as practicable from the sample.
    c. Transfer the sample into a homogenization bowl that has been decontaminated.
    d. Decant the aqueous layer from the homogenization bowl prior to homogenization. Extra care should be taken to retain the fine-sediment fraction during the decanting process.
    e. Homogenize the sample as quickly as possible prior to filling the sample containers by mixing the sample within the bowl using a stainless-steel spoon. The following order of collection should be followed for non-VOC parameters: SVOCs, extractable petroleum hydrocarbons (EPH), pesticides, polychlorinated biphenyls (PCBs), inorganics, geotechnical parameters, and biological parameters.
    f. If samples will not be frozen by the laboratory, fill sample containers to the brim to reduce oxygen exposure.

2.3.1 Sampling Surface Sediment (i.e., 0-6" below ground surface [bgs]) with a Spade, Shovel, Trowel, or Scoop from Beneath a Shallow Aqueous Layer (i.e., 0-12" bgs)

This sample method is recommended only when in shallow slow-moving waters.

1. Using a decontaminated spade, shovel, trowel, or scoop, remove the sediment from the sampling area.
2. Proceed to Section 2.3, steps 4a through 4f.

2.3.2 Sampling Surface Sediment (i.e., 0-6” bgs) with a Bucket Auger or Tube Auger From Beneath a Shallow or Deep Aqueous Layer

Due to the small volume of many core samplers, multiple recoveries may be required to obtain the necessary volume.

1. If warranted due to project needs (i.e., maintain integrity of the intact sediment core), insert an acetate core into the bucket auger or tube auger prior to sampling.
2. Attach the auger head to the required length of extensions and attach a “T” handle to the upper extension.
3. Gently remove any visible surface debris from the area to be sampled once brought to the surface.
4. Insert the auger into the sediment at a 0º to 20º angle from vertical. The angle minimizes spillage of the sample from the auger upon extraction from the sediment and water.
5. Rotate the auger to cut a core of sediment.
6. Withdraw the auger slowly. If using a tube auger, be sure the slot is facing upward.
7. Proceed to Section 2.3, steps 4a through 4f.

2.3.3 Sampling Surface Sediment (i.e., 0-6” bgs) with an Eckman Dredge or Ponar Grab from Beneath a Shallow or Deep Aqueous Layer

2.3.3.1 Use of the Eckman Dredge (Preferred with Moderately Consolidated, Fine-Textured Sediment)

The Eckman dredge is not usable in sandy or rocky sediments of high velocity streams. If sampling from heights greater than 5 feet above the water table surface (i.e., bridge sampling), the spring mechanism may be damaged by the speed/impact of the messenger during the triggering of the trap doors.

1. Measure the depth of the water body using a decontaminated measuring tape, staff, or rod.
2. Attach the appropriate length of nylon rope or stainless-steel cable through the hole on the top of the dredge sampler bracket. Mark the distance to the bottom of the rope or cable.
3. Carefully attach springs to both sides of the jaws. Fix jaws so they are in the open position. Ensure the hinged doors on the dredge top are free to open.
4. Lower the sampler to within about 1 foot above the sediment surface.
5. Drop the sampler to the sediment.
6. Trigger the jaw release mechanism by sending the messenger down the rope or cable.
7. Raise the sampler and open top doors. Inspect the sample for acceptability as follows:
    - Ensure the sediment surface is not touching the top of the sampler. If it is, the sampler may be overfilled.
    - Ensure that overlying water is present. This indicates minimal leakage.

- Ensure the desired depth of penetration has been achieved.
- Ensure there are no signs of sediment loss via incomplete closure of the sampler, penetration at an angle, or tilting upon retrieval.
- If these inspections indicate an unacceptable sample, repeat procedures.

8. Proceed to Section 2.3, steps 4a through 4f.

2.3.3.2 Use of Ponar Grab (Preferred with Consolidated Fine-to-Coarse-Textured Sediment)

1. Measure the depth of the water body using a decontaminated measuring tape or staff.
2. Attach the appropriate length of nylon rope or stainless-steel cable to the ring on the top of the dredge. Mark the distance to the bottom of the rope or cable.
3. Fix jaws so they are in the open position.
4. Slowly lower sampler to within several feet above sediment.
5. Drop the sampler to the sediment. Pull up sharply on the line to close the dredge.
6. Raise the sampler and open dredge jaws. Inspect the sample for acceptability as follows:
    - Ensure the sediment surface is not touching the top of the sampler. If it is, the sampler may be overfilled.
    - Ensure that overlying water is present. This indicates minimal leakage.
    - Ensure the sediment-water interface is intact and relatively flat with no sign of channeling or sample washout.
    - Ensure the desired depth of penetration has been achieved.
    - Ensure there are no signs of sediment loss via incomplete closure of the sampler, penetration at an angle, or tilting upon retrieval.
    - If these inspections indicate an unacceptable sample, repeat procedures.
7. Proceed to Section 2.3, steps 4a through 4f.

2.3.4 Sampling Sediment in Deep Water

2.3.4.1 Use of Vibracore

The vibracore is a long continuous tube that is driven into the sediment using vibrating action, typically with a pneumatic impactor. The entire core is withdrawn, at which point the entire sample can be extruded and subdivided, or the tube may be cut into segments for sample extraction later. The vibracore can be operated from a small floating plant or barge with a tripod or small derrick and winch to assist in raising and lowering. Vibracores are typically 2-4 inches in diameter and vary in lengths typically in 5-foot increments up to 20 feet long.

The vibracore is only suitable for unconsolidated sediments and cannot penetrate most coarse or consolidated materials. Cores can be equipped with a catcher or the tube can be driven into a layer of compacted material, which forms a "cap" at the bottom. The vibration of the tube has been known to consolidate the sample. The vertical integrity of vibracore samples may be disturbed. As a result, vibracores are well suited for the collection of samples to be vertically composited.

The sediment cores for environmental analysis are typically contained in the vibracore sections within clear, chemically-inert liners that can be cut into project-specified lengths, capped for transport, labeled for identification, and stored on ice until delivered to a shoreline work station for logging and sample collection; or shipped to a laboratory directly for logging and testing.

Proceed to Section 2.3, steps 4a through 4f.

2.3.4.2 Use of Split-Spoon Sampler

The split-spoon sampler is used for subsurface sampling of unconsolidated materials that are both saturated and unsaturated, and can be used for sediment sampling.

The sampler is a metal cylinder which is divided in half, lengthwise. The two halves of the spoon are held together by small pieces of threaded pipe at each end. An open cap, with a catcher is screwed on the tip. The sampler is attached to lengths of steel rod and driven into the sediments with a hammer or weight. After the sampler is withdrawn, the front and rear end pieces are unscrewed, the sampler opened, and the sample removed with a spoon. Be sure to record the recovered sediment in inches into the field book and collect any chemical and biological samples prior to logging the physical characteristics of the recovered sediment.

Split-spoon samplers can be used for most types of sediments, including consolidated sand and clay. Recovery is variable, sometimes poorer with soft, fine-grained sediments. Split-spoon samplers are typically 2-3 inches in diameter, and available in lengths from 2-5 feet. Successive vertical samples can be taken by driving casing (typically a 5-inch pipe) and cleaning out the drill hole between samples. The vertical integrity of an individual split-spoon sample is variable, but a vertically composited sample can be obtained between two elevations with accuracy.

Proceed to Section 2.3, steps 4a through 4f.

2.4 Post-sampling Activities

1. After the samples have been collected, it is preferable to record the sampling location with a GPS device. Alternatively, the in-water sampling location and/or adjacent shoreline location may be marked with wooden stakes colored with highly visible spray paint or flagging in order to identify the sample location for surveying purposes, and/or buoys with unique sample identification numbers (for deeper water locations). The sample and/or location identification should be written on the stake in indelible ink or marking pen. The fixed sampling point should be located with a measuring tape relative to three nearby fixed reference points.

   Record this information on the field map and field book (with sketch) in addition to collecting the GPS or triangulation data. A photograph of the sample location and a field record of water conditions at the time of sampling is also recommended.

2. If required, the temperature, pH, DO, oxidation-reduction potential, conductivity, and/or turbidity of the surface water should be determined immediately after sample collection. Where possible, field measurements of these parameters should be measured in-situ, rather

than from a sample container. These measurements should not be taken from any sample bottles being sent to the analytical laboratory for chemical analysis.

3. Label each sample. If the labels are covered with clear tape, ensure this is not performed for VOC vials.

4. Package the samples with bubble wrap and/or organic absorbent, as necessary.

5. Place the samples into a shipping container and cool to 4ºC. If wet ice is used to cool the samples, place the ice in double Zip-loc® bags to prevent water from the melting ice from damaging the samples during shipment.

6. Complete the COC form.

7. Decontaminate non-disposable sampling equipment between uses.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

The collection of specific field quality control (QC) samples will be specified in the project-specific planning documents and may include one or more of the following samples: equipment blank, trip blank, field duplicate, and matrix spike/matrix spike duplicates.

4.1 Field Duplicates

The following procedures should be used for collecting field duplicates of surface water and sediment samples:

a. For QC purposes, each duplicate sample will be submitted to the laboratory as a “blind” duplicate sample, in that a unique sample identification not tied to the primary sample identification will be assigned to the duplicate (e.g., DUP-01). Standard labeling procedures used for sediment and surface water sampling will be employed. However, a sample collection time will not be included on the sample label or the COC form. The actual source of the duplicate sample will be recorded in the field book.

b. Each duplicate sample will be collected simultaneously with the actual sample. At the coincident step in the sampling procedures that the VOC, VPH and/or GRO containers are filled and sealed, the duplicate sample VOC, VPH and/or GRO containers will also be filled and sealed. For sediment samples, duplicates for all parameters other than VOCs, VPH and GRO should be filled from the homogenized sample to ensure consistency between the sample and the duplicate. Following the order of collection specified for each set of containers (i.e., VOCs, VPH, GRO, SVOCs, other organics and then inorganic constituents), the duplicate sample containers will be filled simultaneously with the actual sample for each parameter.

c. All collection and preservation procedures outlined for surface water and sediment sampling will be followed for each duplicate sample.

4.2 Equipment Blanks

Equipment blanks include reagent water that is poured over the decontaminated equipment (if applicable) and collected and preserved in the same sample containers as surface water samples. Note: Equipment blanks associated with sediment samples are collected and preserved in the same sample containers as surface water samples. If sampling surface water using the direct-fill method, equipment blanks are not required. However, if filtering is performed, an equipment blank could be performed to demonstrate the filtration equipment is clean.

Ideally, the reagent water should come from the laboratory and be certified clean. If not certified and/or if not from the laboratory performing the analyses, a separate water blank that has not run through the sampling equipment should be sent to the laboratory for analysis.

4.3 Trip Blanks

Trip blanks will check for potential contamination of samples by VOCs via migration during storage and shipping. For surface water samples, trip blanks consist of two to three 40-mL VOA vials filled with analyte-free water and preserved with hydrochloric acid to pH <2 SU. For sediment samples, trip blanks consist of the same number of water-preserved and/or methanol-preserved vials as used for field samples. Trip blanks are submitted to the laboratory at a frequency of one per cooler for coolers that contain samples for VOC and/or VPH analysis. Trip blanks are analyzed by the laboratory for VOCs and/or VPH, depending on field sample analyses.

4.4 Matrix Spikes/Matrix Spike Duplicates (MS/MSDs) and MS/Duplicates

Matrix spikes (MSs) are an additional analysis of a sample spiked by the laboratory with a subset or all of the target analytes and are used to demonstrate the accuracy of analytical methods for a given matrix. Matrix spike duplicates (MSDs) are an additional analysis of a sample spiked by the laboratory with a subset or all of the target analytes and are also used to demonstrate the accuracy of analytical methods for a given matrix. MS/MSDs also provide a measure of analytical precision for a given matrix. Duplicates are an additional analysis of a sample and are used to demonstrate the precision of analytical methods for a given matrix.

For surface water samples, triplicate volume of a field sample must be collected in order for the laboratory to have enough volume to perform the MS/MSD analyses for organic parameters. An additional volume of a field sample must be collected in order for the laboratory to have enough volume to perform MS/Duplicate analyses for inorganic parameters. Generally, extra volume will not be required to be collected for sediment MS/MSD or MS/Duplicate analyses. The sample designated for MS/MSD or MS/Duplicate analyses should be noted in the comments column of the COC document.

4.5 Temperature Blanks

Temperature blanks consist of a sample container filled with unpreserved water (potable or distilled) and are sometimes included in all coolers which contain samples that require temperature preservation. These may be added to the coolers by the field team if not provided by the laboratory. Temperature blanks must remain inside the coolers on ice during the sampling process. The container for the temperature blank must be clearly labeled “Temperature Blank.”

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

Record the general sample collection information such as location, identification, and date/time in the field book or on a sample log sheet. Unless not prescribed in the site-specific work plan or if different from the site-specific work plan, typical field documentation recorded in a field book includes the following information:

- Sample identification number
- Sample location (description or sketch of the sample point)
- Sample depth interval
- GPS coordinates and coordinate system
- Time and date sample was collected
- Type of sampling equipment used
- Personnel performing the task
- Water depth and depth of sample penetration
- Water descriptions (e.g., clarity, flow, foam, debris)
- Visual or other sensory description of the sample (e.g., odors, staining)
- Sediment descriptions (e.g., color, texture, appearance)
- Estimate of sediment quantity recovered by grab sampler
- Weather conditions during sampling (e.g., temperature, wind)
- Other pertinent observations, including whether photographs were taken
- Sample collection equipment used
- Water field parameters such as pH, temperature, conductivity, turbidity, oxidation-reduction potential, and DO
- Decontamination procedure
- Analytical parameters
- Preservation method
- Water quality monitoring equipment calibration information
- Field duplicate location

Affix a properly completed label to each sample container.

All sample numbers must be documented on the COC form that accompanies the samples during shipment. Any deviations from the record management procedures specified in the site-specific work plan must be approved by the Project Manager and documented in the field book.

6.0 REFERENCES

Great Lakes Dredged Material Testing and Evaluation Manual, Appendix D, Sediment Sampling & Handling Guidance, EPA Region 5, September 30, 1998.

Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. EPA-823-B-01-002. Office of Water. October 2001.

Method for the Determination of Volatile Petroleum Hydrocarbons (VPH). MassDEP. May 2004.

SW-846 Method 5035A, *Closed-system Purge-and-trap and Extraction for Volatile Organics in Soil and Waste Samples.* USEPA. Draft Revision 1, July 2002.

40 CFR Part 136. Guidelines Establishing Test Procedures for the Analysis of Pollutants. USEPA.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	APRIL 2014	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING
2	AUGUST 2020	MODIFICATIONS FOR PFAS SAMPLING

Attachment A:

Procedure for Collection of Sediment Samples for VOCs, VPH or GRO (SW-846 Method 5035A)

1.0 SAMPLING FOR VOLATILE ORGANIC COMPOUNDS IN SEDIMENT BY EPA METHOD 5035/5035A

The following sampling protocol is recommended for site investigations assessing the extent of VOCs (including VPH and GRO) in sediment at a project site. Because of the large number of options available, careful coordination between field and laboratory personnel is needed. The specific sampling containers and sampling tools required will depend upon the required detection levels and intended data use. Once this information has been established, selection of the appropriate sampling procedure and preservation method best applicable to the investigation can be made.

SW-846 Method 5035 provides instructions and options on the preservation of sediment samples for low-level and high-level VOC analyses:

- Low-level (≤ 200 µg/kg) and
- High-level (> 200 µg/kg).

The choice of low-level or high-level analysis is determined by the requirements of the project. However, since the low-level method is only valid for a certain concentration range, a sample for analysis by the high-level method must also be collected to ensure quantification of all target analytes is possible, if needed.

The low-level method uses one or more of the following options for the sampling/preservation of sediment:

- Sediment sampled into a vial with a sodium bisulfate ($NaHSO_4$) solution.
- Sediment collected in an En-Core® sampler and immediately shipped to the laboratory for further preservation (within 48 hours).
- Sediment collected in a vial with organic-free water, sealed in the field, and shipped to the laboratory immediately in order to meet the method preservation requirement to freeze within 48 hours of collection.

Based on project-specific requirements, trip blanks may be recommended. Refer to the site-specific work plan for quality assurance (QA)/QC requirements.

1.1 Low-level Method (VOCs)

Option A - Direct sampling into En-Core® samplers

- Three 5 gram size En-Core® samplers for each sample.
- One non-preserved container for moisture determination.

Option B - Direct sampling into vial with chemical preservative

- Two 5 gram size cores are added to volatile organic analysis (VOA) vials (one core is added to each of two VOA vials with sodium bisulfate solution) for each sample using a Terra Core™ or other coring sampler (e.g., disposable syringe). Once the vials are sealed in the field, these are not opened again.
- One non-preserved container for moisture determination.

Option C - Direct sampling into vial with water (to be frozen at the laboratory)

- Two 5 gram size cores are added to VOA vials (one core is added to each of two VOA vials with water) for each sample using a Terra Core™ or other coring sampler (e.g., disposable syringe). Once the vials are sealed in the field, these are not opened again.
- One non-preserved container for moisture determination.

1.2 High-level Method (VOC, VPH, GRO)

Option D - Direct sampling into En-Core® samplers

- One 5 gram size En-Core® sampler for each sample.
- One non-preserved container for moisture determination.

Option E - Direct sampling into a methanol-preserved vial

- For VOCs: 5 or 10 grams of sediment is added to a VOA vial (with 5 or 10 grams of methanol, respectively) for each sample using a Terra Core™ or other coring sampler (e.g., disposable syringe). This may also depend upon the regulatory agency (e.g., New Jersey Department of Environmental Protection requires 8 to 12 grams in 25 mL methanol or 5 grams in 10 mL methanol).
- For VPH or GRO: The coring device will be filled with 25 grams of undisturbed sediment if 60-ml vials with 25 ml of methanol are used, or 15 grams of undisturbed sediment if 40-ml vials with 15 ml of methanol are used. The goal is to have a 1:1 ratio of sediment-to-methanol.
- One non-preserved container for moisture determination.

1.3 Cautions and Potential Problems

1. <u>Potential leaking sample containers for VOC, VPH and GRO analyses:</u>

   Options for evaluating containers for leaking preservatives:

   a. When ordering pre-preserved sample containers, laboratories should be encouraged to mark the meniscus of the preservative on all sample containers. The preservative level should be checked before sampling as a quick check that there has not been any loss of liquid.
   b. Compare preservative level in multiple bottles and select one for comparison purposes to subsequent sample bottles.
   c. Weigh methanol-preserved sample containers prior to sampling. Sample containers found to have lost greater than 0.2 grams of methanol compared to their initial weight should not be used. In order to perform this option, initial container weights must be provided by the laboratory.

2. <u>Potential methanol absorption:</u>

   Sediment may be encountered that absorbs all of the methanol preservative (e.g., organic-rich sediment, fine-grain sediment). These sediments can absorb the methanol leaving no methanol extract for the laboratory to analyze. In these instances, the use of additional methanol is required. The laboratory must be contacted for sample containers with an increased volume of methanol. Using a 1:2 ratio of sediment-to-methanol will help to ensure that there will be adequate volume of methanol remaining for analysis. **NOTE: Additional methanol should not be added to the sample container by the sampler in the field. Containers with additional methanol must be obtained from the laboratory.**

3. Collection of samples with high moisture content:

   Sediment samples with high (>50%) moisture content may prevent the attainment of the ideal 1:1 sediment-to-preservative ratio. In these instances, depending on the data quality objectives, it may be necessary to evaluate the sediment to determine what level in the disposable syringe corresponds to the required weight (typically 5 grams for VOCs and 15 or 25 grams for VPH). This can be performed by collecting several trial samples with disposable syringes. Weigh each trial sample and note the length of the sediment in the syringe. These measurements would be used to determine how much sediment in the syringe corresponds to 5 ± 0.5 grams (or the desired weight ± 0.5). All trial samples should be discarded and not used for analysis.

4. En-Core® sampler cautions:

   a. En-Core® samplers, or equivalent, should only be used on fine-grain or cohesive sediments (sediments that stay together in the En-Core® sampler and do not fall apart). En-Core® samplers should not be used to collect sediment samples with high moisture (e.g., sediments below the water table). In the case of sediment samples with high moisture (e.g., sediments below the water table), a stainless steel spatula or scoop should be used with field preservation techniques.
   b. The En-Core® sampler is a single-use device and cannot be decontaminated and reused.
   c. The volume of material collected in an En-Core® sampler should not cause excessive stress on the coring tool.
   d. The volume of material collected should not be so large that the sample easily falls apart during extrusion.
   e. The En-Core® sampler should not be used if any of the components are damaged as the seals may be compromised. Under no circumstances should any components be removed or disturbed.
   f. It is important to make sure air is not trapped behind the sample, as this could cause air to pass through the sample, resulting in a loss of VOCs, or it could cause the sample to be pushed prematurely from the coring tool.

5. Potential effervescence with use of sodium bisulfate as a preservative for low-level VOC analysis of sediments.

   This method of preservation is not preferred and, therefore, is not outlined below. If it is used, the following cautions exist:

   a. Carbonaceous or strongly alkaline sediments may cause potential effervescence when reacting with the sodium bisulfate and may result in a loss of VOCs and a shattered vial. If effervescence occurs, sodium bisulfate should not be used. The laboratory must be contacted and low-level preservation techniques, using water only, should be followed.

b. Loamy materials or materials containing decayed material may result in false positive results for acetone due to the interaction with the sodium bisulfate.

c. Some VOCs may be lost due to the resulting acidification when sodium bisulfate is used (e.g., styrene, 2-chloroethyl vinyl ether, acrylonitrile).

d. Some VOCs may be lost if the laboratory is using a heated purge in combination with the sodium bisulfate preservative (e.g., methyl tert butyl ether [MTBE] and other fuel oxygenates).

1.4 Sample Containers and VOC Sampling Equipment

- Method 5035A-compatible containers or kits (for VOCs, VPH and GRO). Preservatives may be required for some samples with certain variations of SW-846 method 5035A – consult the governing regulatory agency or principal analytical chemist to determine which preservatives are necessary.
    - Low-level VOCs: two 40-mL VOA vials pre-preserved with 5 mL organic-free water and also containing a magnetic stir bar.
    - High-level (or medium-level) VOCs: one 40-mL VOA vial pre-preserved with 5 or 10 mL of purge-and-trap-grade methanol. Volume will be dependent upon laboratory's preference or regulatory agency requirements (e.g., New Jersey Department of Environmental Protection prefers vials with 10 or 25 mL of purge-and-trap-grade methanol).
    - VPH and GRO: One 60-mL vial pre-preserved with 25 mL of purge-and-trap-grade methanol **or** One 40-mL VOA vial pre-preserved with 15 mL of purge-and-trap-grade methanol

    and

    - One glass container (or other appropriate container) with no preservative to allow the laboratory to perform the percent solids measurement. NOTE: The laboratory typically requires a minimum of 20 grams to perform this test. Therefore, submitting a sample size less than 4 ounces may be acceptable. This additional container will not be required if the sample is also being submitted for other non-VOC parameters.

- En-Core® samplers, or equivalent, for VOC, VPH and/or GRO analysis:
    - High-level VOC or GRO analysis: one 5-gram En-Core® sampler.
    - Low-level VOC analysis: two 5-gram En-Core® samplers.
    - VPH, GRO or toxicity characteristic leaching procedure (TCLP) VOC analysis: one 25-gram En-Core® sampler.

- Disposable plastic syringes or Terra Core™ samplers.

- Foam VOC vial holders.

- Portable digital scale (accurate to ± 0.01 grams) with calibration weights.

2.0 COLLECTION OF SAMPLES USING EN-CORE® SAMPLERS, OR EQUIVALENT

- The sample will be collected using an En-Core® sampler, or equivalent, as soon as possible after the sediment has been exposed to the atmosphere.
- Check that the En-Core® sampler, or equivalent, is full using both of the following procedures:
  a. Be sure that the back o-ring on the plunger can be seen when looking through the viewing hole on the handle. This will mean that the sediment has pushed the plunger fully to the back.
  b. The plunger can only be rotated when it is fully pushed to the back of the body. Therefore, it is important to twist the plunger to guarantee that the sediment has filled the sampler and the back o-rings have sealed.
- Immediately seal the En-Core® sampler, or equivalent. Be sure to twist the cap as it is pushed on. The cap is properly sealed when the two locking arms are completely and symmetrically over the body ridge.
- The samples must be shipped to a laboratory within 24 hours of sampling to ensure the 48-hour hold time for preservation will be met.
- In the event that a field screening technique (instrument reading or visual staining of the sediment) indicates the possible presence of VOCs or hydrocarbons, note the observations or instrument readings in the field book. If the field screening technique does not indicate the presence of VOCs, this should also be noted.
- If samples are collected for only VOC and VPH analyses, a separate aliquot must be collected in an unpreserved container in order for the laboratory to perform a dry weight determination.

3.0 COLLECTION OF SAMPLES USING FIELD PRESERVATION

- Samples for VOCs will be collected as soon as possible after the sediment has been exposed to the atmosphere.
- Samples for VOCs will be collected first (prior to collection of samples for other parameters) using an open-barrel disposable syringe, Terra Core™ sampler, or equivalent. In the case of samples with high moisture (e.g., sediments below the water table), an open-barrel disposable syringe may not be practical; a stainless steel spatula or scoop can be used with field preservation techniques.
- Sediment samples for VOC analyses should **never** be homogenized.
- Each pre-preserved sample container will be weighed prior to sample collection, and the container/preservative weight will be recorded. This procedure will generally be performed by the laboratory prior to shipping the containers to the field.
- Depending upon project requirements, samples for VOC analysis will be collected as low-level, high-level, or both.

- **Low-level VOCs**

  1. The syringe will be filled with undisturbed sediment of the following volume: 5 grams of sediment.

     As an option to the syringes, 5-gram Terra Core™ samplers, or equivalent, can be used. The goal is to have a 1:1 ratio of sediment-to-preservative.

  2. The sediment will be extruded into a pre-preserved VOA vial containing a magnetic stir bar and 5 mL reagent-grade water. This will be done in replicate.
  3. Any sand grains present on the container rim or cap must be removed to ensure an air-tight seal of the vial. The VOA vial will be capped quickly and labeled with the sample ID, date, and time of collection. Labels should not be written on the cap of the vial.
  4. Gently swirl sample to break up the sediment aggregate, if necessary, until the sediment is covered with preservative. It is imperative that the sediment sample be completely immersed in the preservative solution.
  5. In the event that a field screening technique (instrument reading or visual staining of the sediment) indicates the possible presence of VOCs or hydrocarbons, note the observations or instrument readings in the field book. If the field screening technique does not indicate the presence of VOCs, this should also be noted.
  6. If samples are collected for only VOC analysis, a separate aliquot must be collected in an unpreserved container in order for the laboratory to perform a dry weight determination.

- **High-level VOCs, VPH, or GRO**

  1. High-level VOCs: The syringe will be filled with undisturbed sediment of the following volume: 5 or 10 grams of sediment for high-level analysis (added to the 5 or 10 ml of methanol, respectively). This may also depend upon the regulatory agency (e.g., New Jersey Department of Environmental Protection requires 8 to 12 grams in 25 mL methanol or 5 grams in 10 mL methanol).

     VPH or GRO: The syringe will be filled with 25 grams of undisturbed sediment if 60-ml vials with 25 ml of methanol are used, or 15 grams of undisturbed sediment if 40-ml vials with 15 ml of methanol are used. The goal is to have a 1:1 ratio of sediment-to-methanol.

     As an option to the syringes, 5-gram Terra Core™ samplers, or equivalent, can be used. Typically, the goal is to have a 1:1 ratio of sediment-to-preservative.

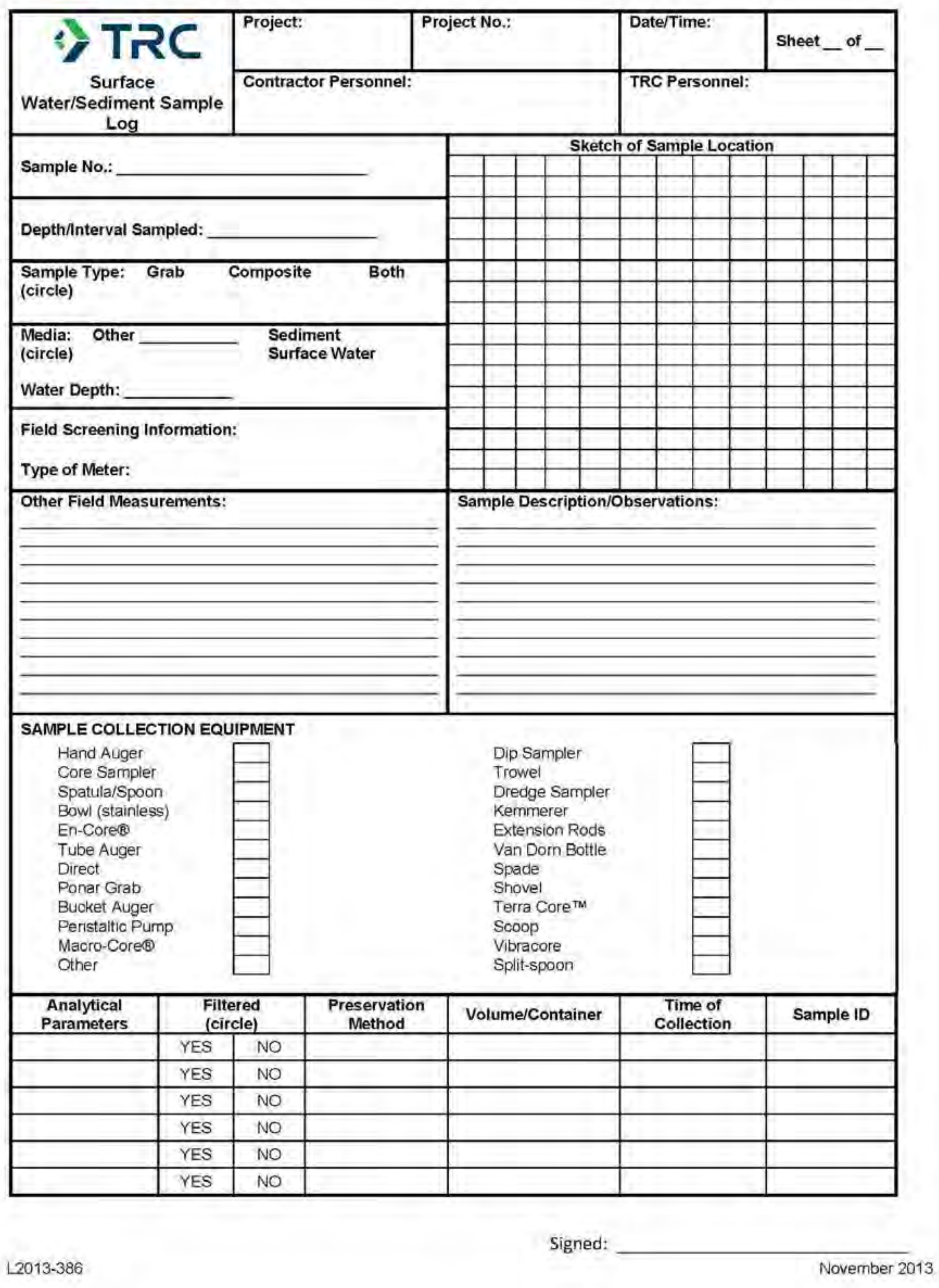
  2. The sample will be extruded into a VOA vial containing purge-and-trap grade methanol
  3. Any sand grains present on the container rim or cap must be removed to ensure an air-tight seal of the vial. The VOA vial will be capped quickly and labeled with the sample ID, date, and time of collection. Labels should not be written on the cap of the vial.
  4. Gently swirl sample to break up the sediment aggregate, if necessary, until the sediment is covered with preservative. It is imperative that the sediment sample be completely immersed in the preservative solution.
  5. In the event that a field screening technique (instrument reading or visual staining of the sediment) indicates the possible presence of VOCs or hydrocarbons, note the

observations or instrument readings in the field book. If the field screening technique does not indicate the presence of VOCs, this should also be noted.

6. Methanol is considered to be a hazardous material by the US Department of Transportation (DOT) and the International Air Transportation Association (IATA). Shipments containing methanol between the field and the laboratory must conform to the rules established in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179) and the most current edition of the IATA Dangerous Goods Regulations. The volumes of methanol recommended in the VOC method fall under the small quantity exemption of 49 CFR section 173.4. Refer to Attachment C for further details.
7. If samples are collected for only VOC analysis, a separate aliquot must be collected in an unpreserved container in order for the laboratory to perform a dry weight determination.

Attachment B:

Example Surface Water/Sediment Sample Log



TRC Surface Water/Sediment Sample Log	**Project:**	**Project No.:**	**Date/Time:**	**Sheet __ of __**
	Contractor Personnel:		**TRC Personnel:**	

Sample No.: ____________________________

Depth/Interval Sampled: ___________________

Sample Type: (circle) **Grab** **Composite** **Both**

Media: (circle) **Other** ___________ **Sediment** **Surface Water**

Water Depth: ____________

Field Screening Information:

Type of Meter:

Sketch of Sample Location

Other Field Measurements:

Sample Description/Observations:

SAMPLE COLLECTION EQUIPMENT

- Hand Auger ☐
- Core Sampler ☐
- Spatula/Spoon ☐
- Bowl (stainless) ☐
- En-Core® ☐
- Tube Auger ☐
- Direct ☐
- Ponar Grab ☐
- Bucket Auger ☐
- Peristaltic Pump ☐
- Macro-Core® ☐
- Other ☐
- Dip Sampler ☐
- Trowel ☐
- Dredge Sampler ☐
- Kemmerer ☐
- Extension Rods ☐
- Van Dorn Bottle ☐
- Spade ☐
- Shovel ☐
- Terra Core™ ☐
- Scoop ☐
- Vibracore ☐
- Split-spoon ☐

Analytical Parameters	Filtered (circle)		Preservation Method	Volume/Container	Time of Collection	Sample ID
	YES	NO				
	YES	NO				
	YES	NO				
	YES	NO				
	YES	NO				
	YES	NO				

Signed: ______________________________

L2013-386

November 2013

Attachment C:

Shipping Methanol-preserved Samples

Shipping of Hazardous Materials

Methanol is considered a hazardous material by the US Department of Transportation (DOT) and the International Air Transport Association (IATA). Shipments of methanol between the field and the laboratory must conform to the rules established in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179) and the most current edition of the IATA Dangerous Goods Regulations. Consult these documents or your shipping company for complete details.

Small Quantity Exemption

The volumes of methanol recommended in the high-level VOC, VPH and GRO methods fall under the small quantity exemption of 49 CFR section 173.4. To qualify for this exemption, all of the following conditions must be met:

- the maximum volume of methanol in each sample container must not exceed 30 mL
- the sample container must not be full of methanol
- the sample container must be securely packed and cushioned in an upright position and be surrounded by a sorbent material capable of absorbing spills from leaks or breakage of sample containers
- the package weight must not exceed 64 pounds
- the volume of methanol per shipping container must not exceed 500 mL
- the packaging and shipping container must be strong enough to hold up to the intended use
- the package must not be opened or altered while in transit
- the shipper must mark the shipping container as follows:

"This package conforms to 49 CFR 173.4"

When shipping domestically by Federal Express via ground or air, the following rules apply:

- follow the inner packaging requirements of 49 CFR 173.4
- no labels, placards, up arrows, or dangerous goods shipping papers are required
- if the Federal Express airbill has a shipper's declaration for hazardous goods on it, check the Yes box under *Shipper's Declaration not Required*

When shipping internationally by Federal Express, the following rules apply*:*

- follow the inner packaging requirements of 49 CFR 173.4
- use dangerous goods shipping papers
- apply orientation arrows on opposite vertical sides on the exterior of the package

Shipping Papers for International Shipments

International shipments must be accompanied by dangerous goods shipping papers that include the following:

Proper Shipping Name:	Methyl Alcohol
Hazardous Class:	Flammable Liquid
Identification Number:	UN1230
Total Quantity:	*(mL methanol/container x the number of containers)*
Emergency Response Info:	Methanol MSDS attached
Emergency Response Phone:	1-800-424-9300

Attachment D:

SOP Fact Sheet

SURFACE WATER AND SEDIMENT SAMPLING

PURPOSE AND OBJECTIVE

The objective of surface water and sediment sampling is to obtain a representative sample for analysis of physical and/or chemical parameters, as necessary, at a given site. This objective requires that the sample be both free of unsuitable material and be of sufficient quantity and quality for analysis by the selected analytical method. Surface water and sediment samples are collected either directly using a hand-held device or indirectly using a remotely activated device.

WHAT TO BRING: GENERAL EQUIPMENT

- Site-specific HASP
- Appropriate PPE
- Rubber boots and/or hip/chest waders
- Figure showing sample locations
- Field book and/or Sample Log Form
- Indelible marking pens or markers
- Tape measure, folding ruler and or calibrated staff
- Camera
- Compass
- Boat (if needed) with anchor
- Buoys
- Thermometer and/or Barometer
- Zip-loc® plastic bags
- Organic absorbent (e.g., Slickwick, sawdust)
- Bubble wrap
- 5-gallon bucket(s)
- Lint-free, non-abrasive, disposable towels
- Calibrated PID or FID
- Wooden stakes and spray paint, plastic flagging (highly visible), or steel pin flags
- Survey equipment and/or GPS and/or other means of establishing sample locations
- Equipment decontamination supplies
- Sample bottleware, labels, coolers, ice, and blank COC forms; may also need field blank bottles and reagent-grade water

WHAT TO BRING: SURFACE WATER SAMPLING EQUIPMENT

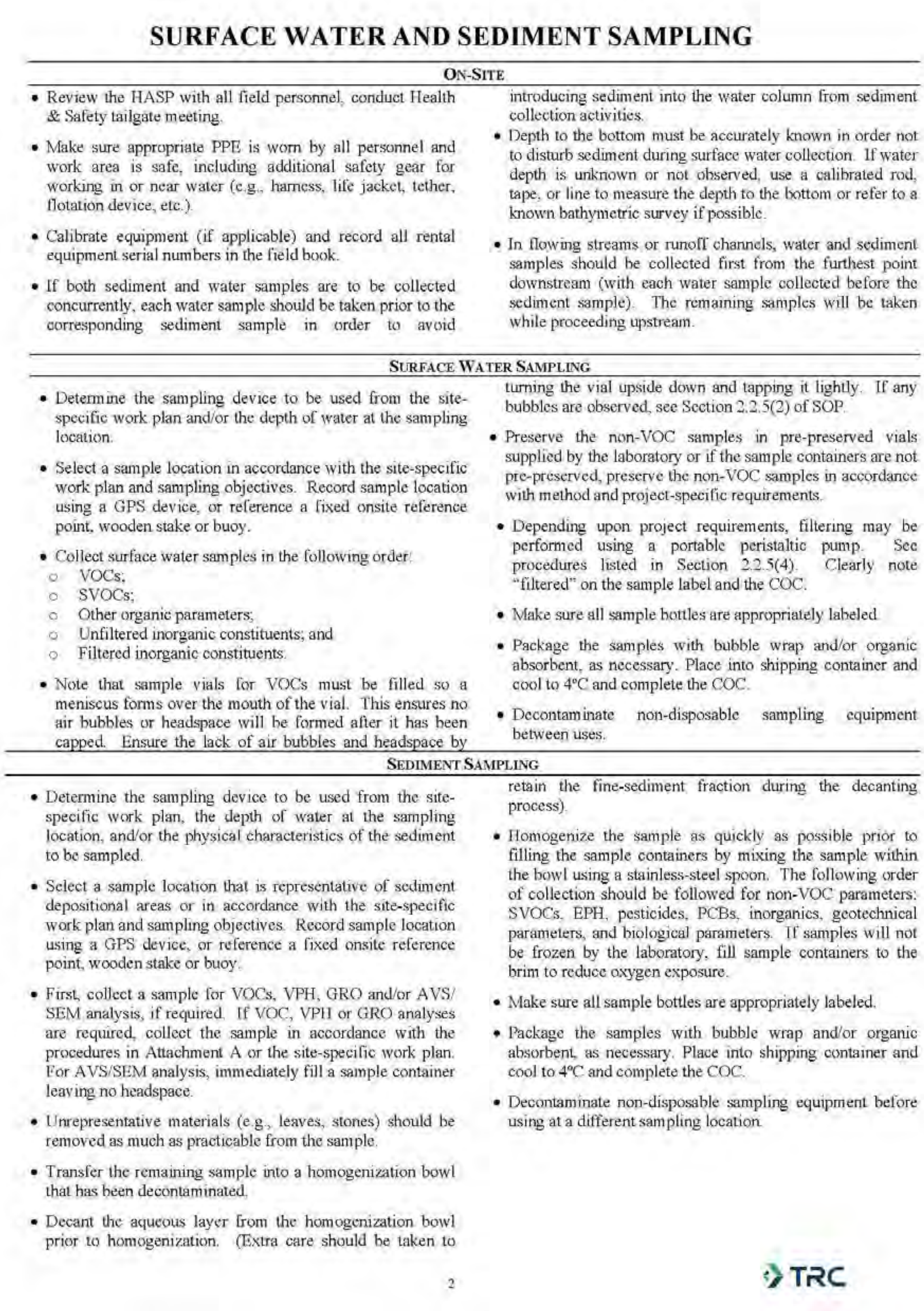
- Multi-parameter instrument and flow-through cell (typically should include: pH, temperature, conductivity, oxidation-reduction potential, and DO). Note: Salinity probe may be needed depending on project requirements
- Turbidity meter
- Sample collection tools (e.g., Dip sampler, Kemmerer bottle, Van Doren sampler, peristaltic pump)
- Teflon, Teflon–lined polyethylene, or HDPE tubing, dependent upon project objectives
- Filtration equipment, if required (peristaltic pump and 0.45 micron filters, or as otherwise required for the project)
- Graduated cylinder or five-gallon bucket
- Stop watch

WHAT TO BRING: SEDIMENT SAMPLING EQUIPMENT

- Sample collection tools (e.g., stainless steel or plastic spade, shovel, scoop, or trowel; hand or bucket auger with appropriate head and extension rods; sediment coring device [e.g., vibracore, gravity core, etc.]; ponar or equivalent grab samplers, eckman dredge)
- Nylon rope or stainless-steel cable (for dredges)
- Nylon tube brush
- Wire brush for thread cleaning
- Stainless-steel mixing bowl or disposable aluminum tray
- Stainless-steel spatulas or spoons
- Small scale to measure sample mass
- Dedicated Teflon® spoons (if required)
- En-Core® samplers, Terra Core™ samplers, or disposable plastic syringes

OFFICE

- Prepare/update the site-specific HASP; make sure the field team is familiar with the latest version.
- Discuss the objective for the sediment sampling program with the Project Manager and/or the field team leader. Discuss sample order, collection method, designation, analytical parameters, turn-around times, laboratory, etc.
  - ☐ Are sediment/purge water to be containerized or returned to source?
  - ☐ Volume requirements for each sample?
  - ☐ QC sample collection?
  - ☐ Field decontamination required?
- Discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager
- Confirm that all necessary equipment is available in-house or has been ordered. Rental equipment is typically delivered the day before fieldwork is scheduled. Prior to departure, test equipment and make sure it is in proper working order.
- Review sample bottle order for accuracy and completeness.



SURFACE WATER AND SEDIMENT SAMPLING

ON-SITE

- Review the HASP with all field personnel, conduct Health & Safety tailgate meeting.
- Make sure appropriate PPE is worn by all personnel and work area is safe, including additional safety gear for working in or near water (e.g., harness, life jacket, tether, flotation device, etc.).
- Calibrate equipment (if applicable) and record all rental equipment serial numbers in the field book.
- If both sediment and water samples are to be collected concurrently, each water sample should be taken prior to the corresponding sediment sample in order to avoid introducing sediment into the water column from sediment collection activities.
- Depth to the bottom must be accurately known in order not to disturb sediment during surface water collection. If water depth is unknown or not observed, use a calibrated rod, tape, or line to measure the depth to the bottom or refer to a known bathymetric survey if possible.
- In flowing streams or runoff channels, water and sediment samples should be collected first from the furthest point downstream (with each water sample collected before the sediment sample). The remaining samples will be taken while proceeding upstream.

SURFACE WATER SAMPLING

- Determine the sampling device to be used from the site-specific work plan and/or the depth of water at the sampling location.
- Select a sample location in accordance with the site-specific work plan and sampling objectives. Record sample location using a GPS device, or reference a fixed onsite reference point, wooden stake or buoy.
- Collect surface water samples in the following order:
  - VOCs;
  - SVOCs;
  - Other organic parameters;
  - Unfiltered inorganic constituents; and
  - Filtered inorganic constituents.
- Note that sample vials for VOCs must be filled so a meniscus forms over the mouth of the vial. This ensures no air bubbles or headspace will be formed after it has been capped. Ensure the lack of air bubbles and headspace by turning the vial upside down and tapping it lightly. If any bubbles are observed, see Section 2.2.5(2) of SOP.
- Preserve the non-VOC samples in pre-preserved vials supplied by the laboratory or if the sample containers are not pre-preserved, preserve the non-VOC samples in accordance with method and project-specific requirements.
- Depending upon project requirements, filtering may be performed using a portable peristaltic pump. See procedures listed in Section 2.2.5(4). Clearly note "filtered" on the sample label and the COC.
- Make sure all sample bottles are appropriately labeled.
- Package the samples with bubble wrap and/or organic absorbent, as necessary. Place into shipping container and cool to 4°C and complete the COC.
- Decontaminate non-disposable sampling equipment between uses.

SEDIMENT SAMPLING

- Determine the sampling device to be used from the site-specific work plan, the depth of water at the sampling location, and/or the physical characteristics of the sediment to be sampled.
- Select a sample location that is representative of sediment depositional areas or in accordance with the site-specific work plan and sampling objectives. Record sample location using a GPS device, or reference a fixed onsite reference point, wooden stake or buoy.
- First, collect a sample for VOCs, VPH, GRO and/or AVS/SEM analysis, if required. If VOC, VPH or GRO analyses are required, collect the sample in accordance with the procedures in Attachment A or the site-specific work plan. For AVS/SEM analysis, immediately fill a sample container leaving no headspace.
- Unrepresentative materials (e.g., leaves, stones) should be removed as much as practicable from the sample.
- Transfer the remaining sample into a homogenization bowl that has been decontaminated.
- Decant the aqueous layer from the homogenization bowl prior to homogenization. (Extra care should be taken to retain the fine-sediment fraction during the decanting process).
- Homogenize the sample as quickly as possible prior to filling the sample containers by mixing the sample within the bowl using a stainless-steel spoon. The following order of collection should be followed for non-VOC parameters: SVOCs, EPH, pesticides, PCBs, inorganics, geotechnical parameters, and biological parameters. If samples will not be frozen by the laboratory, fill sample containers to the brim to reduce oxygen exposure.
- Make sure all sample bottles are appropriately labeled.
- Package the samples with bubble wrap and/or organic absorbent, as necessary. Place into shipping container and cool to 4°C and complete the COC.
- Decontaminate non-disposable sampling equipment before using at a different sampling location.

SURFACE WATER AND SEDIMENT SAMPLING

DOs AND DO NOTs OF SEDIMENT AND SURFACE WATER SAMPLING

DOs:

- DO have the following items when going into the field:
  - Site-specific work plan
  - Site-specific HASP
  - PPE (e.g. steel-toed boots, gloves)
  - Field book and indelible ink ball-point pens or markers
- DO proceed from downstream locations to upstream locations.
- DO make sure that the equipment is set up properly and the bottleware is nearby and ready to be filled to ensure timely sample collection.
- DO fill sample bottles slowly to make sure that they are not overfilled and that preservative does not become diluted. If collecting filtered samples, fill all non-filtered samples first, then fill filtered samples - if water is very silty, more than one filter might be required to fill sample bottles.
- DO call your Project Manager or field team leader if unexpected conditions are encountered or at least daily to update them.
- DO have the numbers for the laboratory, vehicle rental and equipment rental providers readily available while in the field.
- DO record sample locations in the field book as you sample.
- DO check on the sample setup frequently to make sure proper equipment function is maintained.
- DO bring ice to the site in the morning so that samples are kept cool throughout the entire event. Storing samples in a warm cooler can invalidate sample results and may result in re-sampling on your own time.

DO NOTs:

- DO NOT collect sediment samples prior to surface water samples, if samples are to be collected concurrently. Each water sample should be taken prior to the corresponding sediment sample in order to avoid introducing sediment into the water column from sediment collection activities.
- DO NOT allow surface water sampling equipment to stir the bed of the water body you are sampling. If the sampling device contacts the bottom, it can stir up sediment which affects the analysis of surface water quality.
- DO NOT homogenize sediment samples for VOC analyses.
- DO NOT use clear tape to cover labels on certain analyses (e.g., 40-mL vials for VOC analysis) due to potential interference with analytical equipment.

Attachment E: SOP Modifications for PFAS

Due to the pervasive nature of PFAS in various substances routinely used during sampling and the need to mitigate potential cross-contamination or sampling bias to ensure representative data are collected, special care should be taken when sampling for PFAS. The following table highlights the required modifications to this SOP when sampling for PFAS.

PFAS Sampling Protocols	
SOP Section Number	**Modifications to SOP**
1.3	• Do not use equipment utilizing Teflon® or low density polyethylene (LDPE)[1] during sample handling or mobilization/demobilization. This includes bailers, tubing, bladders, bailer cord/wire, waterproof/resistant paper products, certain personal protective equipment (PPE) (see below), and Teflon® tape. High density polyethylene (HDPE) or silicone tubing should be used in lieu of Teflon® or Teflon®-lined tubing. • Blue Ice® (chemical ice packs) must not be used to cool samples or be used in sample coolers. Regular ice in Ziploc® bags can be used. • Do not use LDPE or glass sample containers or containers with Teflon-lined lids. HDPE or polypropylene containers are acceptable for sample storage. HDPE or polypropylene caps are acceptable. • Do not use aluminum foil. • Field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards and spiral bound notebooks should not be used. • Do not use Post-It Notes during sample handling or mobilization/demobilization. • Refer to TRC's SOP ECR-010 Equipment Decontamination for PFAS-specific decontamination protocols. Ensure that PFAS-free water is used during the decontamination procedure.
1.5	Always consult the Site Specific Health and Safety Plan prior to conducting field work. The following considerations should be made with regards to field preparation during PFAS sampling: • Tyvek® suits should not be worn during PFAS sampling events. Cotton coveralls may be worn. • Boots and other field clothing containing Gore-Tex™ or other waterproof/resistant material should not be worn. This includes rain gear. Boots made with polyurethane and polyvinyl chloride (PVC) are acceptable. • Stain resistant clothing should not be worn. • Food and drink should not be allowed within the exclusion area. Pre-wrapped food or snacks should not be in the possession of sampling personnel during sampling. Bottled water and hydration drinks (e.g., Gatorade®) may be consumed in the staging area only. • Personnel involved with sample collection and handling should wear nitrile gloves at all times while collecting and handling samples or

PFAS Sampling Protocols	
SOP Section Number	**Modifications to SOP**
	sampling equipment. Avoid handling unnecessary items with nitrile gloves. A new pair of gloves must be donned prior to collecting each sample. • Wash hands with Alconox or Liquinox and deionized water after leaving vehicle before setting up to sample a well.
1.6.1 & 1.6.2	• Avoid wearing clothing laundered with fabric softeners. • Avoid wearing new clothing (recommended 6 washings since purchase). Clothing made of cotton is preferred. • Avoid using cosmetics, moisturizers, hand creams, or other related products as part of cleaning/showering on the day of sampling. • Avoid using sunscreens or insect repellants that are not natural or chemical free.
1.6.1	• Consider collecting samples for total suspended solids which will become important for fate and transport and treatment considerations. Floc accumulates high concentrations of PFAS and specifically some of the longer-chain PFAS; when this floc settles out, concentrations can decrease by an order of magnitude. • If sampling for parameters other than PFAS, perform PFAS sampling first. Schedule PFAS sampling at the beginning of the work day to avoid other sources of contamination.
1.6.2	• Efficient and consistent homogenization procedures must be performed on sediment samples; this is critical due to the small mass used by the laboratory and the need to be able to generate meaningful data. Do not homogenize sediment in aluminum pie pans; use a decontaminated stainless steel bowl.

2.2	• Avoid collecting an unrepresentative portion of air interface surface water in a sample Since PFAS can accumulate at the air/water interface, the following sample depths are recommended for PFAS sampling of surface water bodies to avoid the air/water interface:
	  • Lake or pond: 1-2 feet below the surface
	  • Catch basin or shallow outfall: 6 inches below the surface
	• Note foam accumulation and/or any dusty or soapy looking sheens. Document with photographs and use stakes/flags for marking location of foam on stream or lake banks.

2.2.4	• Tubing used to sample surface water for PFAS must not be LDPE or Teflon®. HDPE and silicone are acceptable.
2.4	• Avoid using waterproof labels for sample bottles. The use of paper labels covered with clear tape or placed in Ziploc® bags to avoid moisture on the sample label is acceptable.
2.4 (5)	• Samples for PFAS analysis must be shipped at <10°C. Standard coolers are acceptable. Keep high-concentration PFAS samples in separate coolers from low-concentration PFAS samples.

Notes:

[1] – PFAS have been used as an additive in the manufacturing of LDPE to smooth rough surfaces and, in the case of LDPE tubing, to allow for less turbulent flow along the surface of the tubing.

Title: **Water Level and Product Measurements**	Procedure Number: **ECR 004**
	Revision Number: **3**
	Effective Date: **February 2022**

Authorization Signatures

Technical Reviewer	Date	SOP Work Group Co-Lead	Date
Ryan Jorrey	12/10/2021	Chelsea Wenhardt	2/21/2022

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	Example Water and Product Level Monitoring Form
Attachment B	Example Field Book Documentation for Water Levels
Attachment C	SOP Fact Sheet
Attachment D	SOP Modifications for PFAS

1.0 INTRODUCTION

1.1 Scope and Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the methods for conducting water level, separate-phase product, and/or total well depth measurements in monitoring wells, piezometers, and boreholes during field investigations.

1.2 Summary of Method

Depth-to-water (DTW) measurements are used to evaluate pressure and/or elevation changes within the aquifer. The procedure involves using a water level indicator capable of an accuracy of ±0.01 feet, or a similar piece of equipment, to measure the DTW in a monitoring well, piezometer, or borehole from a set reference point. When used in conjunction with an accurate site elevation survey, DTW data can be converted to potentiometric surface elevations to support groundwater flow direction analysis, as well as other aquifer characteristics. In addition, pressure changes recorded in a well during a slug, pumping, or packer test can be used to determine aquifer characteristics, such as hydraulic conductivity and storage parameters.

It is also a good practice to gauge the total depth of a monitoring well while taking water levels. This practice can help confirm: 1) the correct well in a cluster of wells screened at different depths; 2) that the well is clear of obstructions; 3) whether the well may be silting up and need further development; and 4) the correct purge volume for a well when sampling. Total depth measurements in a well may be necessary when TRC is taking over project work at a site with existing monitoring wells or the site wells have not been accessed for a significant amount of time.

The objective of separate-phase product measurements is to obtain measurements of the thickness of separate-phase product in the water column. The thickness of both dense non-aqueous phase liquid (DNAPL) and light non-aqueous phase liquid (LNAPL) can be determined using an oil/water interface probe. It should be noted that the thickness of LNAPL or DNAPL in a well (“apparent thickness”) most likely differs from the thickness in the formation (“actual thickness”).

- For LNAPL, the procedure involves measuring the depth to the separate-phase product and the depth to the underlying groundwater from a set reference point. The difference between these two measurements is the thickness of the LNAPL in the well.

- For DNAPL, the procedure involves measuring the depth to the separate-phase product and the depth to the bottom of the well, borehole, etc. The difference between these two measurements is the thickness of the DNAPL in the well.

1.3 Equipment

The following list of equipment may be utilized when conducting water level and separate-phase product measurements. Site-specific conditions may warrant the use of additional items or deletion of items from this list. For specialized sampling programs involving per- and polyfluorinated alkyl substances (PFAS), refer to Attachment D for further details.

- Appropriate level of personal protective equipment (PPE)
- Electronic water level indicator
- Oil/water interface probe
- Extra batteries for water level indicator/interface probe
- Field book and/or monitoring form
- Well keys
- Socket-wrench
- Containers to hold water and isopropanol for calibration
- Decontamination water and appropriate solution
- Decontamination supplies
- Previous measurement data (if available)
- Precision ruler or measuring tape
- Permanent marker (e.g., Sharpie®)
- Spool of cotton string and stainless steel nuts/weights for NAPL string test (for measuring DNAPL thickness)

1.4 Definitions

Borehole	A hole drilled into the soil or bedrock using a drill rig or similar equipment.
Dense Non-aqueous Phase Liquid (DNAPL)	Separate-phase product that is denser than water and, therefore, sinks to the bottom of the water column.
Depth To Water (DTW)	The distance to the groundwater surface from an established measuring point.
Light Non-aqueous Phase Liquid (LNAPL)	Separate-phase product that is less dense than water and, therefore, floats on the surface of the water.
Low-permeability Formation	A geologic formation that has very slow recharge and discharge rates due to small pore spaces in the formation material. A clay formation is considered to have low permeability and has a very slow recharge rate compared to a more permeable formation, such as sand or gravel.
Monitoring Well	A well typically made from a polyvinyl chloride (PVC) pipe, or other appropriate material (e.g., stainless steel), with slotted screen installed across or within a saturated zone. Monitoring wells are primarily used for groundwater quality monitoring and sample collection.
Non-aqueous Phase Liquid (NAPL)	Petroleum or other fluid that is immiscible in water and tends to remain as a separate liquid in the subsurface.

Piezometer	A well typically made from PVC or metal with a slotted screen installed across or within a saturated zone. Piezometers are primarily installed to monitor changes in the potentiometric surface elevation.
Potentiometric Surface	A surface representing the hydraulic head of groundwater.
Separate-phase Product	A liquid that does not easily dissolve in water. Separate-phase product can be more dense (i.e., DNAPL) or less dense (i.e., LNAPL) than water and, therefore, can be found at different depths in the water column, depending on the liquid's specific density (i.e., lighter or heavier than water).
Total Depth of Well	Distance from the measuring point to the bottom of the well.
Well Casing	An impervious, durable pipe placed in a borehole to prevent the walls of the borehole from caving, and to seal off surface drainage or undesirable water, gas, or other fluid and prevent their entrance into the well.
Well Riser	A casing (usually steel or PVC) that extends from the well screen or open section of the well to above the ground surface.

1.5 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific health and safety plan (HASP). TRC personnel will use the appropriate level of personal protective equipment (PPE) as defined in the HASP.

When present, special care should be taken to avoid contact with LNAPL or DNAPL. The use of an air monitoring program, as well as the proper PPE designated by the site-specific HASP, can identify and/or mitigate potential health hazards.

1.6 Cautions and Potential Problems

Special care should be taken when using equipment if PFAS are known or suspected to be present. Please refer to Attachment D for details.

- DTW measurements of all wells in a water level survey should be collected within the shortest amount of time possible but, at a minimum, within a 24-hour period to ensure near contemporaneous data collection during a groundwater elevation recording event. However, note that certain conditions may produce relatively rapid changes in groundwater elevations, which might necessitate collecting readings over a shorter time period. Such conditions should be noted in the field book. Rapid groundwater elevation changes may occur due to:
  - Rapid changes in atmospheric pressure

  - Variable pumping of nearby wells
  - Precipitation events
  - Tidal influences
  - Rapid changes in nearby surface water levels (e.g., dam release, upstream thunderstorm)

- Allow water levels in newly installed wells to stabilize for approximately 24 hours before taking measurements for the purpose of a water level survey. Recharge might take longer in wells installed in low permeability formations.

- Because the tops of monitoring wells and piezometers are often cut unevenly, be sure to take DTW measurements from a pre-marked or notched spot on the well to ensure consistent data collection over time. If the tops of the monitoring wells and piezometers are not marked, the DTW measurement should be taken from the high point of the well riser/casing or the north side of the riser/casing. The measurement location should then be marked to maintain consistency.

- To limit the possibility of cross contamination, DTW measurements should be collected in order from the least to the most contaminated wells and piezometers when contamination is known or suspected. Be sure to decontaminate the entire length of tape lowered into the well between well measurements to reduce the potential for cross contamination. Refer to Attachment D and ECR SOP 010 for decontamination for PFAS. Some wells with NAPL or excessive condensation may have residues on the side of the riser that may also contaminate the tape.

- If the presence of NAPL is suspected at a site, an oil/water interface probe should be used to conduct water level measurements. When DNAPL is a suspected contaminant characteristic at a site, the interface probe should be lowered to the bottom of the well slowly, until DNAPL is encountered, if present.

- NAPL may foul the probe and could cause a delayed response when going from NAPL to water. Resolution may require taking repeated measurements by raising and/or lowering the probe through the interface.

- Note: Some NAPL may not be measurable with a conventional interface probe. Very old fuel oil, creosote, tar and manufactured gas plant (MGP) waste may require estimates of thickness using a steel tape and chalk method.

- If NAPL is present, a string test can be performed. Tie a weighted object (e.g., stainless steel nut) to the end of a cotton string and gently lower to the bottom of the well. Mark the top of riser on the string, gently remove the string, and measure the thickness of NAPL coating the string.

- Most water level meters have a “sensitivity” setting (e.g., gain), which is often located on the on/off dial. The sensitivity setting may need adjustment depending on the site water chemistry.

- Excessive condensation on the inside well materials may cause the tape to stick on the well riser/casing and/or cause a false reading above the water level. This is especially true of deeper wells. Previous elevation data (depth to water) should be consulted to determine if a reading is consistent and plausible for that well. The above-mentioned sensitivity adjustment can be used to compensate. In some cases, the water level tape may have to be weighted to remedy the line sticking to the well riser/casing.

- Tight well caps and low permeability formations may not have allowed the potentiometric surface to equilibrate in the well after seasonal, tidal, or other area groundwater level fluctuations. If this is the case, allow the wells to equilibrate before collecting measurements by taking readings several minutes after removing the well plug; in addition, re-measure the first well after the last well to verify that the water level is not fluctuating. Another round of water levels may need to be collected if a significant discrepancy from the first set of measurements is observed; this should be discussed with the Project Manager. If this is a concern, vented well caps or plugs may need to be used.

- In some instances, artesian well conditions (flowing wells) may exist, where the potentiometric surface is higher in elevation than the top of the well casing (TOC). In these situations, it is pertinent to note the water level elevation as above the TOC or add a known length of riser pipe in order to measure an actual elevation. Once the water level has equilibrated in the riser pipe, the same procedures can be followed for measuring water level when separate-phase product is not suspected. Note that when converting the DTW measurement to an elevation, the riser pipe length needs to be added to the surveyed TOC.

- Groundwater gradients at some sites can be very shallow and if gradient and groundwater flow pattern (gradient direction) determination are part of the project objectives, it is critical that groundwater level measurements obtained from wells are as accurate as possible. Special care should be taken to allow the water level to equilibrate after removing sealing caps, and the same water level indicator should be used for all measurements if possible. All wells should be measured within the minimum possible tim. This is particularly important in areas with potential tidal influences.

- If more than one measuring device must be used for multiple wells across an area with a shallow groundwater gradient, the "zero calibration check" (see Section 2.1.2) becomes especially important.

- If the monitoring well or piezometer is secured with an air- and water-tight lockable cap, caution should be taken when removing the cap due to the possible buildup of pressure in the well riser. Try to ease the cap off and relieve the pressure slowly in order to prevent injury. Do not stand or lean over top of well when releasing cap.

- Flush-mounted wells may be subject to water collection in the well can around the top of the riser pipe. In such instances, sufficient water should be evacuated from the well can prior to removing the well cap to ensure that ambient water does not enter the riser. The condition should be documented and the potential need for repair discussed with the Project Manager.

1.7 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Workers (HAZWOPER)
- 8-hour annual refresher training

2.0 PROCEDURES

To be useful for establishing groundwater gradient, the reference point should be tied with a known vertical datum, such as the National Geodetic Vertical Datum (NGVD), or a local datum (e.g., site-specific arbitrary datum such as concrete foundation or top of a well).

Water levels should be allowed to equilibrate prior to measurement after removing sealing well caps. There are no set guidelines, and appropriate equilibration times can range from minutes to hours depending on well recharge, local geology, and project objectives.

If available, prior site water and product level measurement data should be reviewed and available to field personnel during the collection of new data for direct comparison to aid in identifying and resolving potential measurement errors while in the field.

When measuring well depths with an electronic water level indicator, measure and add the length of the probe beneath the circuit closing electrodes (i.e., a tape correction factor) to the depth measured to obtain the true depth. Depth measurements should be recorded in the field notes as the tape reading + the tape correction factor (e.g., “105.69 + 0.21”).

The following procedures should be followed during the collection of water level and product measurements. Procedures may vary depending on the equipment used and contaminants present at the site. Special care should be taken when using measurement equipment if PFAS are known or suspected to be present. Please refer to Attachment D for details.

2.1 Calibration and Operational Checks

Refer to the project’s Quality Assurance Project Plan (QAPP) or other planning documents for calibration frequency and any site-specific calibration procedures for water and separate-phase product level meters. The need for calibration and the frequency of calibration will be dependent upon the meter used and project-specific data quality objectives. Operational checks of meters will be performed prior to use in the field at the start of each day and several times throughout the day, as appropriate.

2.1.1 Operational Check of Water Level Meters

1. Push the Start or Test button (typically provided) on the meter to test the battery and circuitry on the water level indicator. The meter audible indicator should sound, and test light illuminate (if equipped).

2. Release the start/test button and lower the water level probe into a container filled with tap water until the meter audible indicator sounds or visual indicator light turns on. During this check, set sensitivity adjustment (if provided) to highest setting, then decrease if necessary (e.g., saline water).

Inspect the measuring tape and water level probe connection for any signs of visible damage (e.g., cuts, kinks, separating splices). If the tape appears damaged at the connection to the probe, while the meter is sounding, perform the procedure in Section 2.1.2. If necessary, repair and/or replace the water level meter.

2.1.2 Calibration Check of Water Level Meters

1. While the meter is sounding from the procedure used in Section 2.1.1, use a ruler or measuring tape to measure the distance between the water surface and the 1-foot increment mark on the water level tape.

2. Check that the 1-foot increment is actually 1 foot from the water surface. Note any discrepancy in the field book and discuss with the Project Manager. If necessary, repair and/or replace the water level meter.

2.1.3 Calibration and Operational Check of Oil/Water Interface Meters

1. Oil/water interface meters will have one distinguishing sound and/or colored light to represent detection of water and a separate distinguishing sound to represent detection of separate-phase product. Read the instrument manufacturer’s operations manual to determine the instrument’s audible sound or light differentiation for water and separate-phase product (e.g., continuous tone for product and intermittent beep for water).

2. Push the Start or Test button (typically provided) on the meter to test the battery and circuitry on the water level indicator. The meter audible indicator should sound and test light illuminate (if equipped).

3. Water Level Sensor Operational and Calibration Checks

   a. Lower the water level probe into a container filled with tap water until the appropriate sound for water is heard as determined in Step 1.
   b. While the meter is sounding, use a ruler or measuring tape to measure the distance between the water surface and the 1-foot increment mark on the water level tape.
   c. Check that the 1-foot increment is actually 1 foot from the water surface. Note any discrepancy in the field book and discuss with the Project Manager.

4. Oil Level Sensor Operational and Calibration Checks

   a. If the operation or calibration of the oil level probe is suspected to be faulty, consult with the meter manufacturer for additional troubleshooting.

2.2 Procedures for Measuring Depth to Water When Separate-phase Product is Not Suspected

If possible, and when applicable, start at wells that are least contaminated and proceed to those wells that are most contaminated. Additionally, allow sufficient time for each monitoring well or piezometer to equilibrate after removing the protective cap prior to taking readings.

1. Record the condition of the well (e.g., protective casing, concrete collar, lock in place, etc.), equipment being used, and the current weather conditions in the field book or on the water level monitoring form or well inspection report.

2. Use HASP-specified gloves. Stand upwind of the well and remove the well lid. Unlock and remove the well cap slowly to relieve pressure build up that may have occurred in the well casing/riser. Follow HASP requirements for well head and breathing zone air monitoring.

3. Identify the previous measuring point marking or notch on the well riser or casing (if present). If the tops of the monitoring wells and piezometers are not marked, the DTW measurement should be taken from the high point of the well riser/casing or the north side of the riser/casing. and the measurement location should then be marked on the casing top edge to maintain consistency

4. Using a previously decontaminated water level meter, turn on the meter, check the audible/visual indicator (push the “Test” button), reel the electronic probe into the well riser (with the increments visible) slowly until the meter sounds.

5. Grasp the tape with hand, withdraw the tape, and lower it again slowly until the sound is again audible. Check the DTW on the tape and make a mental note of the depth to within 0.01 feet.

6. Lower the probe again slowly and repeat the measurement for precision. In the field book or on the water level monitoring form, record the DTW from the measuring point noted in Step #3 to the nearest 0.01 feet. If measuring the total depth of the well, proceed to Section 2.4).

7. Decontaminate the probe and the entire length of the submerged tape in accordance with the manufacturer specifications. Refer to Attachment D and ECR SOP 010, Equipment Decontamination, for decontamination procedures for sites with known or suspected PFAS contamination.

2.3 Procedure for Measuring Depth to Water and Product Levels When Separate-phase Product is Suspected

If possible, and when applicable, start at wells that are least contaminated and proceed to those wells that are most contaminated. Additionally, allow sufficient time for each monitoring well or piezometer to equilibrate after removing the protective cap prior to taking readings.

1. Record the condition of the well (e.g., protective casing, concrete collar, lock in place, etc.), equipment being used, and the current weather conditions in the field book, water level monitoring form, or well inspection report.

2. Use HASP-specified gloves. Stand upwind of the well and remove the well lid. Unlock and remove the well cap slowly to relieve pressure build up that may have occurred in the well casing/riser. Follow HASP requirements for well head and breathing zone air monitoring.

3. Identify the previous measuring point marking or notch on the riser or casing (if present). If the tops of the monitoring wells and piezometers are not marked, the DTW measurement

should be taken from the high point of the well riser/casing or the north side of the riser/casing. and the measurement location should then be marked on the casing top edge to maintain consistency.

4. Using a previously decontaminated oil/water interface probe, turn on the meter, check the audible indicator, and slowly reel the electronic probe into the well riser (with the increments visible) until the appropriate sound for water or separate-phase product is heard as determined in Section 2.1.3.

5. If water is encountered first (as determined by the audible sound on the meter, which represents water), follow steps 5 and 6 from Section 2.2. In the field book or on the water level monitoring form, record the DTW from the measuring point noted in Step 3 to the nearest 0.01 feet.

6. If water is encountered first and DNAPL is suspected, continue lowering the probe slowly until product is encountered (as determined by the audible sound on the meter which represents product). Since some product may adhere to the probe sensors, the probe should be raised, lightly shaken, and slowly lowered again to confirm measurement. In the field book or on the water level monitoring form, record the depth to product from the measuring point noted in Step 3.

7. If DNAPL is present, measure the total depth of the well (Section 2.4), or determine the total depth of the well from historical records.

8. Calculate the thickness of the DNAPL in the well using the following equation:

   (Total depth of well) - (Depth to product) = DNAPL thickness

9. If LNAPL is encountered before water, record the depth to product from the measuring point noted in Step 3 in the field book and continue lowering the probe until water is encountered.

   NOTE: For LNAPL, it is necessary to take both the air/product interface measurement on the way down into the product and the water/product interface measurement on the way back up. This is required when passing through product into water, since some product may adhere to the probe sensors due to surface tension and, as a result, a greater product thickness measurement may be erroneously obtained. Therefore, when LNAPL is detected, the probe should be lightly shaken or raised and lowered rapidly in a short vertical motion while the probe is within the water column to remove any product that may have been carried down with the probe. After passing through the product, the water/product interface should then be measured as the probe is raised very slowly back up from the underlying water into the product. Once the interface is detected, the probe can be raised and lowered in small increments to precisely determine the interface and obtain accurate measurements. Repeat these measurements as needed to confirm water/product interfaces and product thickness on multiple measurements.

10. In the field book or on the water level monitoring form, record the DTW from the measuring point noted in Step 3. If measuring the total depth of the well, proceed to Section 2.4.

11. Calculate the thickness of the LNAPL in the well using the following equation:

    (DTW) - (Depth to product) = LNAPL thickness

12. Decontaminate the probe and the entire length of the submerged tape in accordance with the manufacturer specifications. Refer to Attachment D for measurement equipment used at sites with known or suspected PFAS contamination and ECR SOP 010, Equipment Decontamination, for PFAS decontamination procedures.

2.4 *Procedure for Measuring Total Well Depth*

When measuring the total depth of a well, the water level and separate-phase product level, if present, should be determined first (see Section 2.2 or 2.3). It is recommended that the tone function of the instrument remain engaged during the total depth measurement.

1. After the water level and product level, if present, have been determined, continue reeling the electronic probe into the well riser (with the increments visible) until the probe encounters resistance. Resistance may be inferred when the probe appears to stop descending and the tape slackens against the side of the riser.

2. Determine whether the observed resistance likely represents the total depth of the well by raising and then lowering the probe to the level of the previously encountered resistance several times at different positions in the well. Then compare the observed level of resistance to available information about the total depth of the well, such as well log data or previous total depth measurements.

3. Measure the total depth of the well by 1) noting the depth (to the nearest 0.01 feet) at which the probe first touches bottom before the tape begins to slacken; 2) adding the measured length from the bottom of the probe to the fluid level sensor in the probe (i.e. tape correction factor); and 3) recording the combined lengths as the total depth (e.g., “105.69 + 0.21”).

4. In the field book or on the water level monitoring form, record the total depth of the well from the measuring point.

5. Also, note any observations about the conditions encountered in the well during the total depth measurement. A clear and distinct bottom reading would indicate little or no sediment in the bottom of the well. A soft and indistinct probe landing would indicate the presence of silt or sediment in the bottom of the well. A total depth measurement inconsistent with the well log or previous total depth measurements may indicate an obstruction in the well or significant sedimentation at the bottom of the well.

6. Decontaminate the probe and the portion of the tape inserted in the riser in accordance with the manufacturer specifications. Refer to Attachment D for measurement equipment used at sites with known or suspected PFAS contamination and ECR SOP 010, Equipment Decontamination, for PFAS decontamination procedures.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

The following Quality Assurance/Quality Control procedures apply:

- Operate field instruments according to the manufacturers' manuals.
- Calibrate field instruments at the proper frequency.
- Check the DTW at least two times in order to compare results. If results do not agree to within 0.02 feet, take a third measurement. If results still do not agree, check for possible equipment failure or review the cautions and potential problems listed in Section 1.6. Repeat the measurement when the cause of the precision nonconformance has been discovered and corrected.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

- Record water and separate-phase product level measurements on field forms or in a field book. See Attachment A for an example of a Water and Product Level Monitoring Form and Attachment B for an example of field book documentation.
- The following additional information may be recorded in the field book:
    - Well/piezometer or monitoring point identification number
    - Well/piezometer or monitoring point location (sketch of the sample point or reference to a location figure)
    - Visual or sensory description (e.g., odors, product, etc.)
    - Time and date measurements were taken
    - Personnel performing the task
    - Weather conditions during task
    - Other pertinent observations
    - Measurement equipment used
    - Calibration procedures used
    - Decontamination procedures used

  - Fixed measuring point used for DTW measurements
  - Well head and breathing zone air monitoring readings

- For projects using TRC's Environmental Data Management System (EDMS), an approved electronic mobile field data collection system (e.g., EQuIS Collect, Fulcrum, or esri Collector) can be configured to record water and separate-phase product level measurements as well as the additional information listed above. A TRC Data Manager must be assigned for coordination and setup of the respective application to be used by the project team. The details and specifications of the event should be discussed with the TRC Data Manager during the project kickoff meeting. The TRC Data Manager will work with TRC project team and field personnel on configuring the system for efficient use in the field with pre-populated, project-specific menus.
- For projects that do not use electronic mobile field data collection systems, field notes containing the information described in Section 5.0 above, along with global positioning system (GPS) coordinates for each location ID should be transcribed into TRC's standard Location and Water Level EDDs for import into TRC's EDMS as soon as the event is completed, preferably the same day in order to get data into the EDMS for use in as near real time as possible.

6.0 REFERENCES

Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

U.S. EPA Environmental Response Team, Standard Operating Procedures, *Manual Water Level Measurements*, SOP 2043. February 11, 2000.

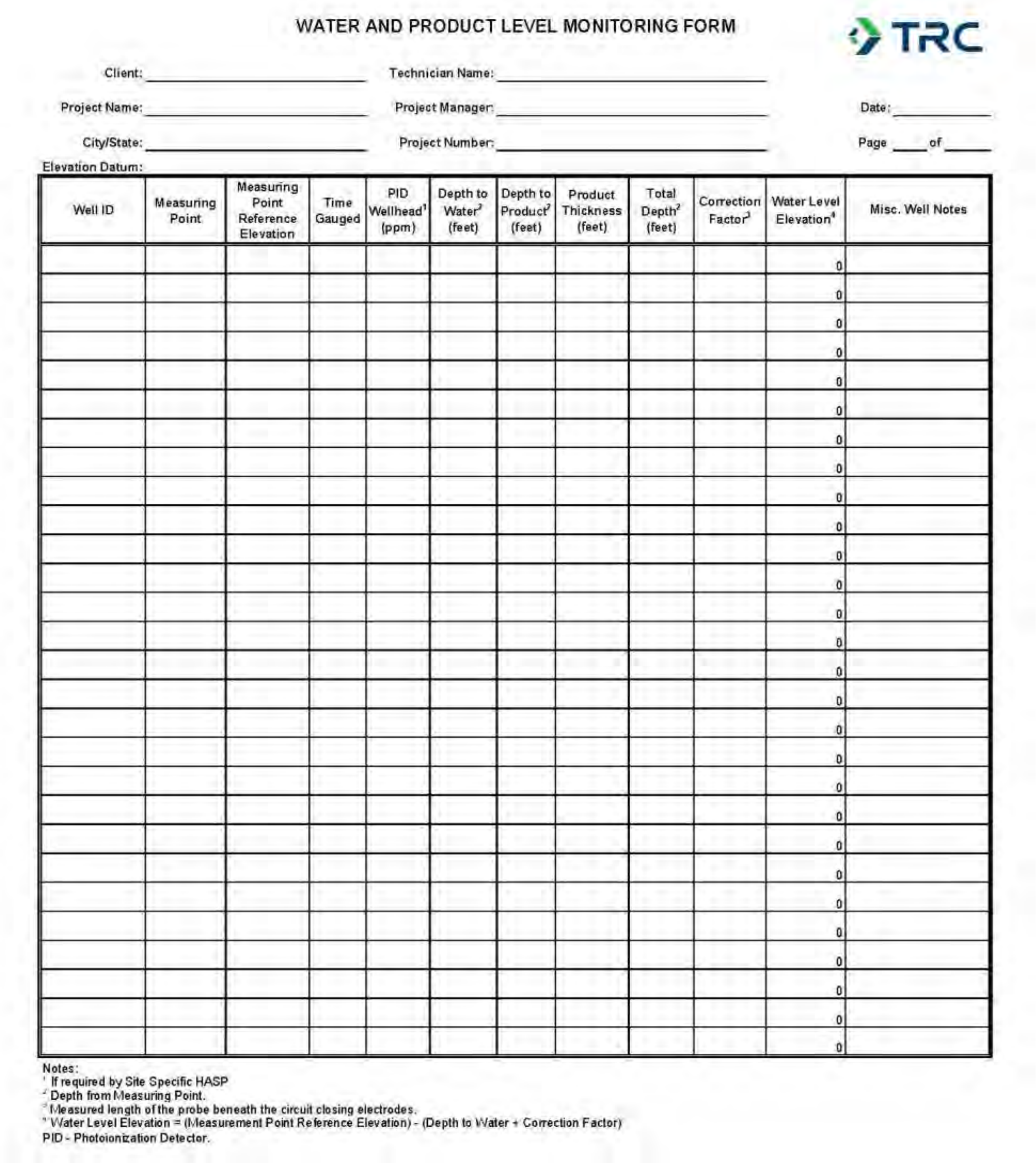
U.S. EPA Region 4. Science and Ecosystem Support Division (SESD) Operating Procedure, *Groundwater Level and Well Depth Measurement*, SESDPROC-105-R2. January 29, 2013.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
1	DECEMBER 2016	ADDED ATTACHMENT D TO ACCOMMODATE SOP MODIFICATIONS REQUIRED WHEN SAMPLING FOR PFAS; CHANGED NAMING CONVENTION FOR SOP FROM RMD TO ECR.
2	JANUARY 2020	TRC RE-BRANDING
3	FEBRUARY 2022	SOP UPDATE

ATTACHMENT A

EXAMPLE WATER AND PRODUCT LEVEL MONITORING FORM



WATER AND PRODUCT LEVEL MONITORING FORM

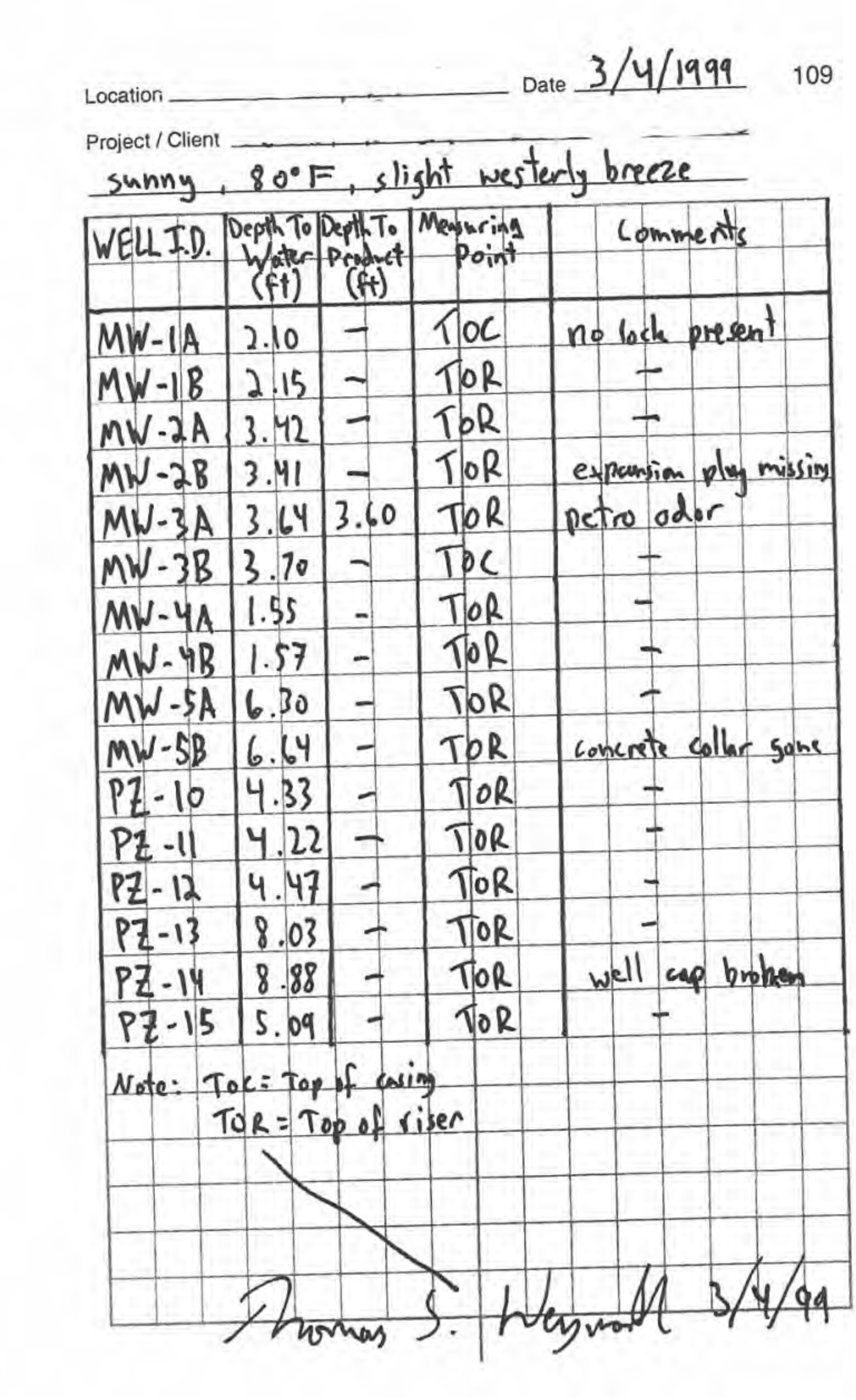
Client: ______________________
Technician Name: ______________________
Project Name: ______________________
Project Manager: ______________________
Date: ____________
City/State: ______________________
Project Number: ______________________
Page ____ of ____
Elevation Datum:

Well ID	Measuring Point	Measuring Point Reference Elevation	Time Gauged	PID Wellhead[1] (ppm)	Depth to Water[2] (feet)	Depth to Product[2] (feet)	Product Thickness (feet)	Total Depth[2] (feet)	Correction Factor[3]	Water Level Elevation[4]	Misc. Well Notes
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	
										0	

Notes:
[1] If required by Site Specific HASP
[2] Depth from Measuring Point.
[3] Measured length of the probe beneath the circuit closing electrodes.
[4] Water Level Elevation = (Measurement Point Reference Elevation) - (Depth to Water + Correction Factor)
PID - Photoionization Detector.

ATTACHMENT B

EXAMPLE FIELD BOOK DOCUMENTATION FOR WATER LEVELS



Location ______ Date 3/4/1999 109

Project / Client ______

sunny, 80°F, slight westerly breeze

WELL I.D.	Depth To Water (ft)	Depth To Product (ft)	Measuring Point	Comments
MW-1A	2.10	–	TOC	no lock present
MW-1B	2.15	–	TOR	–
MW-2A	3.42	–	TOR	–
MW-2B	3.41	–	TOR	expansion plug missing
MW-3A	3.64	3.60	TOR	petro odor
MW-3B	3.70	–	TOC	–
MW-4A	1.55	–	TOR	–
MW-4B	1.57	–	TOR	–
MW-5A	6.30	–	TOR	–
MW-5B	6.64	–	TOR	concrete collar gone
PZ-10	4.33	–	TOR	–
PZ-11	4.22	–	TOR	–
PZ-12	4.47	–	TOR	–
PZ-13	8.03	–	TOR	–
PZ-14	8.88	–	TOR	well cap broken
PZ-15	5.09	–	TOR	–

Note: TOC = Top of casing
TOR = Top of riser

Thomas S. Weymouth 3/4/99

ATTACHMENT C

SOP FACT SHEET

WATER LEVEL AND PRODUCT MEASUREMENT PROCEDURES

PURPOSE AND OBJECTIVE

The following procedures have been developed to direct TRC personnel in the methods of collecting water level, separate-phase product, and/or total well depth measurements in the field. Other state or federal requirements may be above and beyond the scope of this SOP and should be followed, if applicable. Depth-to-water (DTW) measurements are used to evaluate pressure and/or elevation changes within the aquifer. The objective of separate-phase product measurements is to obtain measurements of the thickness of separate-phase product in the water column. Both of these measurements are very important as they drive remediation decisions. Total well depth measurements can provide vital information to a project, such as confirmation of the correct well being screened, the well being free of obstructions, whether the well needs further development, and the correct purge volume for a well when sampling.

WHAT TO USE

- Appropriate PPE
- Water level meter/indicator
- Oil/Water interface probe
- Extra batteries
- Well keys
- Previous measurement data
- Precision ruler or measuring tape
- Spool of cotton string for NAPL string test
- Stainless steel nuts to weigh down string
- Socket-wrench set
- Containers to hold water and isopropanol for calibration
- Decontamination supplies, water, & solution
- Field book & monitoring form
- Indelible/waterproof ink

ON-SITE WELL GAUGING

- Prior to well gauging, site water level measurement data should be reviewed for direct comparison to aid in identifying and resolving potential measurement errors while in the field.
- Conduct an operational check of the water level meter by pushing the Start or Test button on the meter to test the battery and circuitry on the water level indicator. The meter audible indicator should sound and test light illuminate (if equipped).
- Inspect the measuring tape and water level probe connection for any signs of visible damage. Repair or replace if necessary.
- Calibrate the meter per the project's Quality Assurance Project Plan (QAPP) or other planning documents.
- If possible and when applicable, start at wells that are least contaminated and proceed to those wells that are most contaminated.
- Prior to collecting a water level, record the condition of the well (e.g., protective casing, concrete collar, lock in place, etc.).
- Stand upwind of the well and remove the well lid. Unlock and remove the well cap slowly to relieve pressure buildup that may have occurred in the well casing. Allow the well time to equilibrate.
- Identify the previous measuring point marking or notch on the riser or casing (if present). If no previous measuring point exists, use a permanent marker to mark a location on the rim of the riser or casing (typically the highest point). Record this location in the field book.
- Grasp the tape with hand, withdraw the tape, and lower it slowly until the sound is audible. Check the DTW on the tape and make a mental note of the depth to within 0.01 feet. Lower the probe again slowly and repeat the measurement for precision. Record the DTW from the measuring point in the field book or on the water level monitoring form.
- If total depth measurements were not recorded recently, advance the tape to the bottom of the well to record a total depth.
- Decontaminate the probe and tape between each well.
- If PFAS is a concern, refer to the full SOP for additional details on monitoring and decontamination.

ON-SITE PRODUCT MONITORING

- Follow the first 8 steps outlined in the section above, from conducting a direct comparison of water level measurement data to identifying the previous measuring point marking (or creating a new one if necessary).Using a previously decontaminated oil/water interface probe, turn on the meter, check the audible indicator, and slowly reel the electronic probe into the well riser (with the increments visible) until the appropriate sound for water or separate-phase product is heard (intermittent tone for water; steady tone for product).
- If water is encountered first (as determined by the audible sound on the meter), record the DTW from the measuring point to the nearest 0.01 feet.
- If water is encountered first and dense non-aqueous phase liquid (DNAPL) is suspected, continue lowering the probe until product is encountered (as determined by a different audible sound on the meter). In the field book or on the water level monitoring form, record the depth to product from the measuring point.
- If light non-aqueous phase liquid (LNAPL) is encountered before water, record the depth to product from the measuring point and continue lowering the probe until water is encountered and record the depth to water.
- After the water level and product level, if present, have been determined, continue reeling the electronic probe into the well riser until the probe encounters resistance in order to determine Total Well Depth.
- Decontaminate the probe and tape between each well. If PFAS is a concern, refer to the full SOP for additional details.

WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

ATTACHMENT D

SOP MODIFICATIONS FOR PFAS

Due to the pervasive nature of PFAS in various substances routinely used during sampling and the need to mitigate potential cross-contamination or sampling bias to ensure representative data are collected, special care should be taken when sampling for PFAS. The following table highlights the required modifications to this SOP when sampling for PFAS.

Water Level and Product Measurement Protocols for PFAS

SOP Section Number	**Modifications to SOP**
1.3	• Field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards and spiral bound notebooks should not be used. • Do not use Post-it® Notes. • Use new plastic buckets for wash and rinse water. • Do not use "tap" water for operational check of the water level sensor of the oil/water interface meter. • Ensure that PFAS-free water is used during the decontamination procedure. • Do not use a plastic ruler to check measurements. • Refer to SOP 010, Equipment Decontamination, for decontamination supplies.
1.5	Always consult the Site-specific Health and Safety Plan prior to conducting field work. The following considerations should be made with regards to procedures: • Tyvek® suits should not be worn. Cotton coveralls may be worn. • Boots and other field clothing containing Gore-Tex™ or other waterproof/resistant material should not be worn. This includes rain gear. Boots made with polyurethane and polyvinyl chloride (PVC) are acceptable. • Food and drink should not be allowed within the data measurement collection area. Bottled water and hydration drinks (e.g., Gatorade®) may be consumed in the staging area only. • Personnel involved with measurement data collection should wear a new pair of nitrile gloves between each well measurement. Avoid handling unnecessary items with nitrile gloves. • Avoid wearing clothing laundered with fabric softeners. • Avoid wearing new clothing (recommended six washings since purchase). Clothing made of cotton is preferred. • Avoid using cosmetics, moisturizers, hand creams, or other related products as part of cleaning/showering the morning of sampling and decontamination field work.
2.1.1	• Do not use potable "tap" water for operational check of the water level meter. Use deionized, distilled, or organic-free water.
2.1.2 and 2.1.3	• Do not use potable "tap" water for operational check of the water level sensor of the oil/water interface meter. Use deionized, distilled, or organic-free water. • Do not use a plastic ruler to check measurements.
2.2 (7) ; 2.3 (11); and 2.4 (6)	• Use only Alconox® or Liquinox® soap; do not use Decon 90. • Ensure that PFAS-free water is used during the decontamination procedure.
5.0	• Field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards, and spiral bound notebooks should not be used.

Title: **Packaging and Shipping of Non-Hazardous Environmental Samples**	Procedure Number: **SOP Fact Sheet ECR 023**
	Revision Number: **1**
	Effective Date: **January 2020**

Darby Litz		Elizabeth Denly	
Technical Reviewer	Date	Environmental Sector Quality Director	Date
Darby Litz	1/1/20	Elizabeth Denly	1/1/20

SOP FACT SHEET

PACKAGING AND SHIPPING OF NON-HAZARDOUS ENVIRONMENTAL SAMPLES

Purpose and Objective

This fact sheet has been developed to guide TRC personnel in the methods for proper packaging and shipping of non-hazardous environmental samples. In general, non-hazardous environmental samples include drinking water, groundwater, ambient surface water, soil, sediment, treated municipal and industrial wastewater effluent, biological specimens, or any samples not expected to be contaminated with regulated levels of hazardous materials (dangerous goods). Samples collected from process wastewater streams, drums, bulk storage tanks, soil, sediment, or water samples from areas suspected of being highly contaminated may require shipment as hazardous materials (see below). Please note that packaging of vapor and air samples is not included in this SOP Fact Sheet. Proper packaging and shipping of samples is important for maintaining sample integrity and ensuring prompt and reliable shipment of the samples to the analytical laboratory, as well as protecting the health and safety of the field, shipping, and laboratory personnel.

This Fact Sheet **does not address the shipment of hazardous materials**, as the shipping of hazardous materials requires specialized packaging, labeling, shipping, and training/certification. **Note**: According to the United States Department of Transportation, “the Secretary shall designate material (including an explosive, radioactive material, infectious substance, flammable or combustible liquid, solid, or gas, toxic, oxidizing, or corrosive material, and compressed gas) or a group or class of material as hazardous when the Secretary determines that transporting the material in commerce in a particular amount and form may pose an unreasonable risk to health and safety or property” 49 U.S.C 5103(a). If the composition and properties of a waste sample or highly contaminated soil, sediment, or water sample are unknown, or only partially known, the sample may not be offered for air transport. In addition, the shipment of pre-preserved sample containers or bottles of preservatives (e.g., nitric acid [HNO_3], sodium hydroxide [NaOH] pellets, hydrochloric acid [HCl], Methanol, etc.), which are designated as dangerous goods by the International Air Transport Association (IATA), is regulated. Shipment of nitric acid is strictly regulated. Consult the IATA Dangerous Goods Regulations for guidance. Dangerous goods must not be offered for air transport by any personnel except personnel trained and certified by IATA in dangerous goods shipment. Contact the laboratory if you are unsure if your material is regulated or need assistance in shipping or transporting samples**.**

What to Bring (some or all of these may apply)

- Appropriate level of personal protection in accordance with the Site Health and Safety Plan
- Coolers with return address of TRC office written on inside of lid or coolers provided by laboratory
- Heavy-duty plastic bags and/or trash bags
- Plastic Ziploc® bags, small and large

- Fiberglass-reinforced packing tape or strapping tape is preferred, or clear packing tape or duct tape
- Packing materials, such as foam peanuts and/or Bubble Wrap®
- Ice (Blue ice not recommended)
- Custody seals
- Chain-of-custody forms
- Landing pad (can be purchased from Federal Express; see Attachment)
- Tie-on tags (can be purchased from Federal Express; see Attachment)
- Shipping labels and documents (*e.g.*, air bill)
- Pens and markers, preferably waterproof
- Zip ties
- Clear tape
- Cooler labels ("Keep Refrigerated/Cool", "THIS END UP", "FRAGILE", "Saturday delivery", arrow labels, etc.)
- Laboratory-prepared temperature blank

On-site Procedures

- Use a sturdy cooler in good condition. Secure and tape drain plug (inside and outside), if present, with fiberglass-reinforced packing tape or duct tape.
- Line the cooler with a large heavy-duty plastic/trash bag.
- Verify that all caps on bottles are tight (will not leak).
- Verify sample labels and chain-of-custody records are completed properly.
- Pack samples with sufficient padding and ice to remain intact during shipment and at proper preservation temperature.
- If glass bottles are being shipped, place a layer of shock-absorbent material, such as Bubble Wrap®, on the base of the cooler to protect against breakage during shipping. Additionally, considered placing shock-absorbent material between the sample containers and the cooler sidewalls.
- Consider placing all bottles in separate and appropriately sized plastic Ziploc® bags or Bubble Wrap® bags provided by the laboratory. Up to three volatile organic analysis (VOA) vials may be packed in one Bubble Wrap® bag (from the same sample point). All glass bottles should be wrapped in Bubble Wrap®; all sample bottles should be placed in the cooler in a vertical position to minimize potential leaks and cross-contamination.
- Verify appropriate trip blanks (for volatile organic compound [VOC] analyses) and temperature blanks are included in the sample cooler in accordance with project-specific requirements. If multiple coolers prepared for one project, keep VOC samples in the same cooler to minimize the number of trip blanks submitted for analysis.
- Place ice in cooler. A plastic bag should be used as a moisture barrier between the ice and sample bottle labels to protect label integrity. This can be accomplished by placing loose ice around sealed Ziploc® bags containing sample bottles or by sealing ice in large plastic Ziploc® bags or trash

bags and placing around the sample containers. Ice should be below, in between, and on top of samples within the large heavy-duty plastic/trash bag. **NOTE:** It is recommended that at least one-third of the cooler volume should be filled with ice.

- Fill the remaining space in cooler with shock-absorbent material, such as sheets of Bubble Wrap®. Keep in mind that the sample containers are less likely to break if their movement is minimized during shipment.
- Place the completed chain-of-custody record for the laboratory in a plastic Ziploc® bag. Tape the bag to the inner side of the cooler's lid. **NOTE:** If laboratory courier service is used, the chain-of-custody record may be handed to the courier and not be put inside the cooler; the courier must sign the record upon receiving the samples. Alternately, you can treat the laboratory courier just as you would a common carrier like Federal Express. In this situation, the chain-of-custody gets signed at the laboratory upon receipt.
- The sampler should keep a copy of the completed and signed chain-of-custody record.
- Wrap cooler at least two times with fiberglass-reinforced packing tape (preferred) or duct tape at each end of the cooler.
- Custody seals should be placed on the opening of the cooler. **NOTE:** Custody seals are not required when laboratory courier service is used, as long as the courier signs the chain-of-custody document as noted above. Consider applying custody seals even on hand-delivered or couriered coolers to avoid potential confusion. Cover the custody seal with clear packing tape that extends around the entire cooler and overlaps itself so that it cannot be easily removed without breaking the seal. In some situations, it may be appropriate to install two (or more) custody seals, one at each end, placed diagonally opposite from one another. The custody seals should be placed such that the cooler cannot be opened without destroying at least one of the labels.
- Use a "THIS END UP" label or arrow labels to indicate proper upward position of the container.
- Add a label containing name and address of both the shipper and the recipient on the outside of the container. Use Federal Express tie-on tags, if applicable, attached with zip ties to affix the label to the cooler handle if possible.

Shipping

- Consider using prepaid shipping labels supplied by the laboratory, if possible.
- Determine ahead of time the location and deadline for when samples must be available for courier pickup or at the shipper to ensure the samples go out on time.
- Ship the sample using an appropriate method, typically overnight or same day, to arrive by the required time. Samples shipped on Friday for Saturday delivery must be coordinated ahead of time to verify laboratory staff are available to receive the samples on weekends. Liberally apply "Saturday Delivery" stickers to the outside of the cooler. Verify that the common carrier marks the cooler and shipping documents appropriately for Saturday or Sunday delivery.
- Check the laboratory sample tracking for acknowledgment of receipt of container and arrival of shipment.

Additional Guidelines when Using Federal Express

A. Shipping Coolers with Environmental Samples by Federal Express (FedEx)

TRC has experienced some issues with coolers not getting to their destination because of lost labels and this has resulted in the recollection of samples. Shipping of coolers presents a unique problem. It is important that the contents of coolers arrive at the laboratory in a timely manner, but sometimes, despite best efforts, the shipping labels come off of the coolers because they do not adhere well. This may cause delays and/or non-delivery of the coolers, resulting in samples that are no longer available or not appropriate for analysis because of temperature and/or holding time requirements.

At the advice of FedEx, it is strongly recommended that every time a cooler is shipped, that **two** different types of labels be used on the cooler:

1. A "landing pad" (FedEx #156841): A "landing pad" is a super sticky label that is adhered directly to the top of the cooler. The barcode label then gets put on top of the landing pad. These landing pads are designed specifically for use with odd-shaped or non-smooth surfaces.
2. A "tie-on tag" (FedEx #150454 large tag, or #149849 for small tag): Along with the landing pad and label, it was recommended to also use a tie-on tag if there is a handle on the cooler. The tie-on tag wraps around the handle of the cooler and then sticks to itself. The barcode label then gets adhered to the longer side of the tie-on tag. For added strength, a zip-tie should also be used to secure the tie-on tag to the handle.

Both the landing pads and the tie-on tags can be ordered by calling 800.GoFedEx and referring to the FedEx #s above. In addition:

1. TRC staff should place these labels on the coolers, rather than having FedEx place them.
2. TRC staff should place a "Keep Refrigerated/Cool" label on the cooler, which may be helpful to keep the shipment moving.
3. The use of laboratory courier service, when available, rather than FedEx, is suggested.

B. Insuring Sample Shipments

FedEx does NOT insure sample shipments; meaning if the shipment is lost or delayed, FedEx will not pay for the cost to recollect the samples.

What FedEx does offer is a Declared Value; however, again this does not cover the cost to recollect the samples. Therefore, do **NOT** pay the extra fee for a Declared Value when shipping a cooler of samples; it is a waste of money.

What may be available is that TRC's insurance program may cover losses in excess of $10,000. If you have an incident that meets these criteria, you should notify your manager, Greg Hobbs and Andrew Johnson/TRC legal for any loss you believe exceeds $10,000. TRC legal can address the merits of an insurance claim at that point in time.

C. Insuring Equipment Shipments

When shipping equipment (e.g., a GPS unit), the following is suggested:

1. Using FedEx's Declared Value option **DOES** make sense when shipping valuable equipment. Currently FedEx's cost for this option is $3 for shipments valued between $100 to

$300, and $1 per $100 of declared value for shipments in excess of $300. The cost of insuring equipment should be factored into the cost of the project.

2. If the equipment does not have its own specialized shipping container (e.g., pelican case), then request that FedEx package the equipment for shipment. If FedEx provides the packaging, and the equipment is damaged, then FedEx is responsible. If TRC packages the equipment, then experience has shown that FedEx will deny the claim, even if a Declared Value was used, because FedEx will claim that it was improperly packaged.

Title: **Chain-of-Custody Procedures**	Procedure Number: **ECR 002**
	Revision Number: **2**
	Effective Date: **February 2021**

Authorization Signatures

	Elizabeth Denly
Technical Review Date Amanda Smith 2/24/21	Environmental Sector Quality Director Date Elizabeth Denly 2/24/21

This document is proprietary property of TRC. It is to be used only by the person(s) to whom it has been provided and solely for the express purpose intended. Any reproduction or distribution, for purposes other than the intended, is forbidden without the express written consent of TRC.

TABLE OF CONTENTS

Page No.

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) guides TRC personnel in proper Chain-of-Custody (COC) practices.

This SOP was prepared to direct TRC personnel in the sample custody procedure requirements associated with field sample collection. Other state or federal requirements may be above and beyond the scope of this SOP and will be followed, if applicable. Sample custody procedures are an important part of the field investigation program in order to maintain data quality and to be able to document proof of proper handling. Sample custody begins at the time of sample collection and continues until the samples have been analyzed. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law or other evidentiary venue. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. An overriding consideration essential for the validation of environmental measurement data is the necessity to demonstrate that samples have been obtained from the locations stated and that they have reached the laboratory without alteration (i.e., representative of the identified sample media).

1.2 Summary of Method

Evidence of the sample tracking from collection to shipment, laboratory receipt, and laboratory custody must be properly documented.

A sample or evidence file is considered to be in a person's custody if the item is:

- In a person's possession;
- Within sight of the person after they have taken possession;
- Secured and preserved so that no one can tamper with it after having been in a person's possession; and/or
- In a secured area where access is restricted to authorized personnel.

The Field Team Leader or designee is responsible for overseeing and supervising the implementation of proper sample custody procedures in the field and ensuring sample custody until samples have been transferred to a courier or directly to the laboratory. Once received by the laboratory, the samples proceed through an orderly processing sequence specifically designed to ensure continuous integrity of both the sample and its documentation.

1.3 Equipment

The following list is an example of items that may be utilized when implementing sample custody procedures in the field. Project-specific conditions or requirements may warrant the use of additional items or deletion of items from this list. Many of these items may be provided by the selected analytical laboratory for a given project.

- Chain-of-Custody forms
- Sample labels
- Sample tags
- Custody seals
- Computer, tablet or smart device
- Indelible/waterproof ink
- Printer
- Ziploc® bags, or equivalent

2.0 PROCEDURES

Sample custody and transfer procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the COC intact. The COC procedures are initiated in the field immediately following sample collection. The procedures consist of four main components: (1) preparing and attaching a unique sample label to each sample collected, (2) completing the COC form, (3) reviewing the COC form for accuracy, and (4) preparing the samples for shipment and custody transfer. For projects using TRC's Environmental Data Management System (EDMS) the project team's Data Manager can assist in planning sampling events to prepopulate bottle labels and COC forms and log all COC forms generated for the project.

2.1 Specific Chain-of-Custody Procedures

2.1.1 Sample Labels

Field personnel are responsible for uniquely identifying and labeling all samples collected during a field investigation program. All labeling must be completed in indelible/waterproof ink and securely affixed to the sample container. Individual sample containers may be pre-labeled or labeled in the field at the time of collection. Sufficient sample information should be cross-referenced in the field documentation for tracking purposes. A unique sample location may contain multiple sample containers with the same sample identification for the purposes of separate analyses or additional sample volume as required by the laboratory.

Sample labels may contain the following information:

- **Unique sample identification per ECR's Best Practices Document: Environmental Sample Identification and Naming or per a project-specific document (e.g., Quality Assurance Project Plan, Sampling & Analysis Plan)
- Sample location and/or depth/description number, if different from above
- Sample matrix

- Sample container volume
- **Type of analysis to be performed
- **Type of chemical preservation used
- Grab or composite designation
- **Filtered or unfiltered (if submitting both)
- **Sampling date and time using military format (unless blank)
- Sampler's affiliation and initials
- **Site and/or client name

**required

An example of a sample label is provided in Figure 1. TRC's EDMS can produce pre-printed sample labels for regularly scheduled sampling events.

2.1.2 Custody Seals

Custody seals should be secured across the shipping container to ensure content integrity and should be affixed such that the cooler cannot be opened without breaking the seals. The seals contain both the date and the signature of the person affixing them and must be completed in black or blue/black indelible/waterproof ink. Custody seals are attached to the cover seal of the cooler (front and back if cooler opens on both sides) and can be covered with clear plastic tape after being signed and dated by field personnel. An example of a custody seal is shown in Figure 1. The use of custody seals will be determined on a project-specific basis by the Project Manager.

2.1.3 Chain-of-Custody Form

For all analyses, COC forms must be completed and included with each sample set submitted. COC forms are initiated by the samplers in the field. If multiple laboratories are being used, a separate set of COC forms must be completed for each laboratory receiving samples to ensure proper transfer of custody from the time of sample collection to analysis. These forms serve as a record of sample collection, transfer, shipment, and receipt by the laboratory. These forms may contain the following pertinent information:

- Project/site name and/or project number
- Courier or shipping company name, if applicable
- Air bill tracking numbers(s), if known and applicable
- Laboratory name and address
- Sample identifications
- Sample matrices (e.g., soil, water, air, etc.)
- Type of sample (e.g., grab or composite)
- Date/time (military format) sample collected, unless sample is being submitted as a blind duplicate
- Size, type, and number of containers for each sample set
- Preservative(s) used (if any)
- Required analysis or method for each sample set
- Filtered or unfiltered
- Requested turnaround time for sample results
- Names of individuals responsible for sample custody
- Type of deliverables required
- Date shipped or otherwise transferred
- Number of coolers being submitted

Figure 2 provides an example COC form. It should be noted that this is an example format only. Laboratories typically provide their own laboratory-specific COC form. Other COC formats may be used as long as all of the applicable information is included. COC forms will be initiated in the field. TRC's EDMS can produce pre-printed COC forms for regularly scheduled sampling events.

All entries on the COC form must be legible and must be made in blue or black permanent ink. No erasures or obliterations can be made. If an incorrect entry is made, the information must be crossed out with a single strike mark which is signed or initialed and dated by the person recording the information. The correction must be written adjacent to the error. The original entry should still be legible even though crossed out.

2.1.4 Transfer of Custody

Samples will be accompanied by a properly completed COC form during each step of custody transfer and shipment. When physical possession of samples is transferred, both the individual relinquishing the samples and the individual receiving them will sign, date, and record the time of transfer on the COC form.

If at the completion of sampling the samples are not shipped directly from the field or point of collection to the analytical laboratory, the samples will be temporarily stored in an iced cooler at a secure location (e.g., locked vehicle, residence, office). Access to the secure location and transfer of the sample containers for laboratory delivery shall only be provided by a TRC employee and such sample transfer shall be recorded on the COC form.

All samples will be shipped directly to the laboratories by a TRC employee, an overnight commercial courier, or a laboratory-supplied courier service. Occasionally, samples may be relinquished directly to a client for subsequent transfer to the laboratory with proper COC procedures being followed.

In the case of sample shipment by an overnight commercial courier, a package tracking number will serve as an extension of the COC form while the samples are in transit. The COC forms will be sealed inside the sample cooler within a clear plastic bag taped to the inner top of the cooler and the custody seals, if used, will be completed on the outside of the cooler prior to shipment. Commercial couriers are not required to sign off on the custody forms since the forms are sealed inside the cooler prior to shipment; this allows the custody seal to remain intact.

The original COC form will accompany the samples at all times. A copy of all COC forms submitted to the laboratory will be retained by the sampler along with field records/logbooks documenting sample collection and will be placed in the project files. In the case of multiple sample coolers associated with one COC, a copy of the COC should be placed in each cooler and the total number of coolers should be recorded on the COC.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

Following sample collection, all samples will be brought to a location for batching and paperwork checks. At this location, labels and logbook information are cross-checked to ensure there is no error in sample identification or sample collection time and that all samples are accounted for.

The sample information is transferred to the COC form. The samples are packaged to prevent breakage and/or leakage, and the shipping containers are labeled for transport.

The Field Team Leader has the responsibility of maintaining the COC and air bill documentation (if applicable). Individual responsibilities may be delegated to other field staff, as appropriate. Quality control procedures will place emphasis on ensuring that appropriate samples were collected and submitted to the laboratory for the correct analyses. The COC forms will also be reviewed by the Field Team Leader or designee to ensure that all required information is clearly presented.

Many laboratories will provide a sample receipt confirmation via electronic mail upon request. COC forms should be cross-checked with laboratory sample receipt confirmations, if applicable, to ensure that all samples were received and logged in correctly by the laboratory.

4.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Not applicable.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

The Project Manager or Field Team Leader will maintain an inventory of all COC forms completed during the program and will be responsible for ensuring that they are archived in the project files following the completion of the field work.

It is good practice to scan all completed COC forms at the conclusion of field activities and store the resulting electronic PDF files in the project directory.

For projects using TRC's EDMS, the project team's Data Manager can assist in planning sampling events to prepopulate bottle labels and chain of custody forms and log all COC forms generated for the project. The TRC EDMS system has a completeness report that can track the samples collected and the analyses performed as data are received from the laboratory.

6.0 REFERENCES

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001. December 1987.

U.S. Environmental Protection Agency (EPA) Office of Enforcement and Compliance Monitoring – National Enforcement Investigations Center (NEIC) requirements (NEIC, 1986)

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	MARCH 2013	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING AND SOP RE-NUMBERING
2	FEBRUARY 2021	GENERAL UPDATES; MOBILE DATA APPLICATIONS ADDED

Figure 1 Example Sample Label and Custody Seal

QEC
P.O. Box 1160
Beaver, WV 25813
800-255-3950 • 304-255-3900
Quality Environmental Containers

PROJECT NAME

SAMPLE ID
SAMPLE DATE
SAMPLE TIME

SAMPLED BY
PRESERVATIVE

ANALYSIS REQUESTED
____ GRAB
____ COMPOSITE

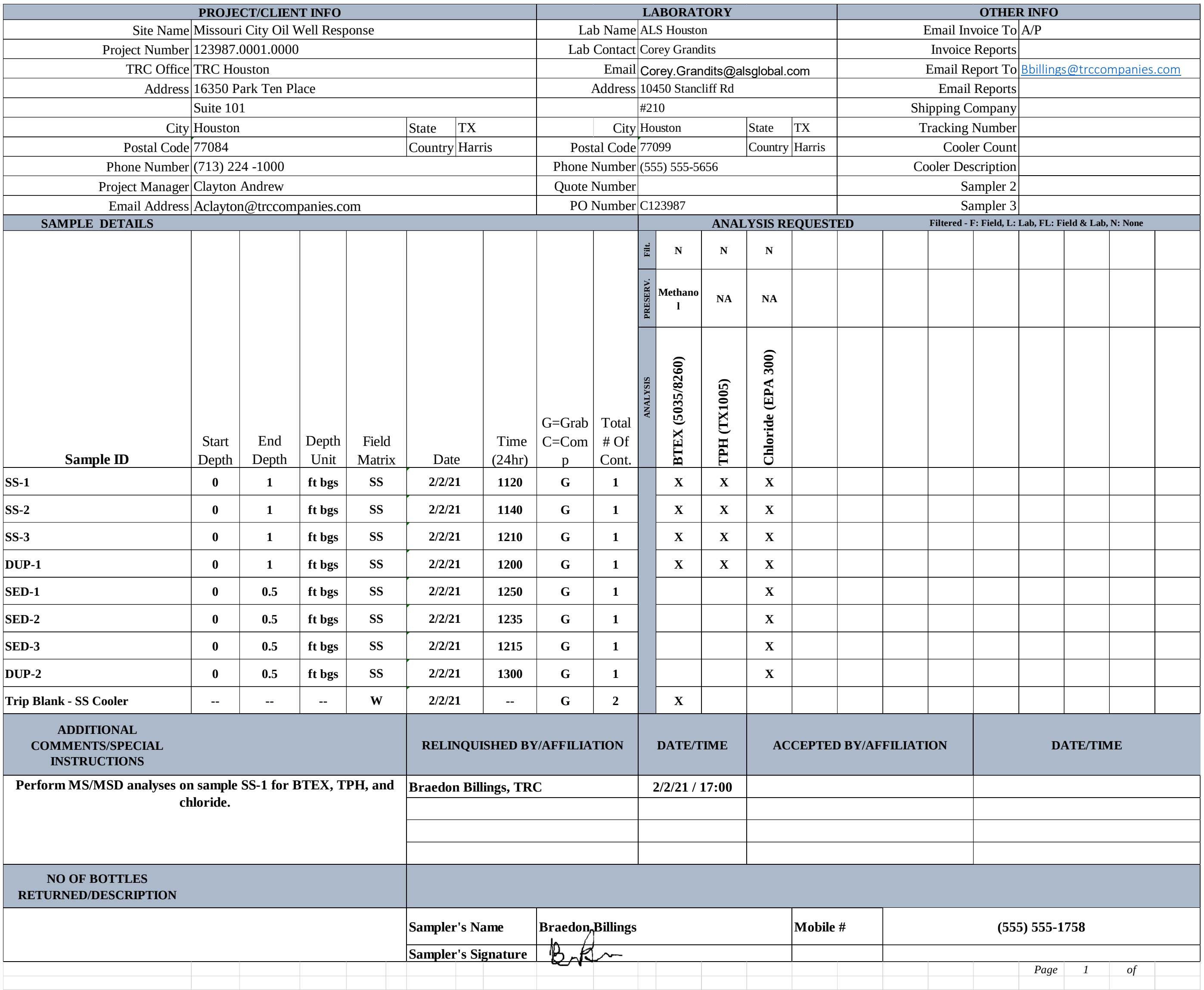
Example Sample Label

CUSTODY SEAL
DATE ____________________
SIGNATURE ____________________

QEC
Quality Environmental Containers
800-255-3950 • 304-255-3900

Example Custody Seal

Figure 2 Example Chain-of-Custody Form



PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Site Name	Missouri City Oil Well Response			Lab Name	ALS Houston			Email Invoice To	A/P
Project Number	123987.0001.0000			Lab Contact	Corey Grandits			Invoice Reports	
TRC Office	TRC Houston			Email	Corey.Grandits@alsglobal.com			Email Report To	Bbillings@trccompanies.com
Address	16350 Park Ten Place			Address	10450 Stancliff Rd			Email Reports	
	Suite 101				#210			Shipping Company	
City	Houston	State	TX	City	Houston	State	TX	Tracking Number	
Postal Code	77084	Country	Harris	Postal Code	77099	Country	Harris	Cooler Count	
Phone Number	(713) 224 -1000			Phone Number	(555) 555-5656			Cooler Description	
Project Manager	Clayton Andrew			Quote Number				Sampler 2	
Email Address	Aclayton@trccompanies.com			PO Number	C123987			Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED				Filtered - F: Field, L: Lab, FL: Field & Lab, N: None								
									Filt.	N	N	N									
									PRESERV.	Methanol	NA	NA									
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	Total # Of Cont.	ANALYSIS	BTEX (5035/8260)	TPH (TX1005)	Chloride (EPA 300)									
SS-1	0	1	ft bgs	SS	2/2/21	1120	G	1		X	X	X									
SS-2	0	1	ft bgs	SS	2/2/21	1140	G	1		X	X	X									
SS-3	0	1	ft bgs	SS	2/2/21	1210	G	1		X	X	X									
DUP-1	0	1	ft bgs	SS	2/2/21	1200	G	1		X	X	X									
SED-1	0	0.5	ft bgs	SS	2/2/21	1250	G	1				X									
SED-2	0	0.5	ft bgs	SS	2/2/21	1235	G	1				X									
SED-3	0	0.5	ft bgs	SS	2/2/21	1215	G	1				X									
DUP-2	0	0.5	ft bgs	SS	2/2/21	1300	G	1				X									
Trip Blank - SS Cooler	--	--	--	W	2/2/21	--	G	2		X											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Perform MS/MSD analyses on sample SS-1 for BTEX, TPH, and chloride.	Braedon Billings, TRC	2/2/21 / 17:00		

NO OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Braedon Billings	Mobile #	(555) 555-1758
	Sampler's Signature			

Page 1 of

Attachment A: SOP Fact Sheet

PURPOSE AND OBJECTIVE

Chain-of-Custody procedures have been developed to direct TRC personnel in the sample custody procedure requirements associated with field sample collection. Other state or federal requirements may be above and beyond the scope of this SOP and should be followed, if applicable. Sample custody procedures are an important part of the field investigation program to maintain data quality and to be able to document proof of proper handling. Sample custody begins at the collection of the samples and continues until the samples have been analyzed. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

WHAT TO BRING

- Chain-of-Custody (COC) forms
- Sample Labels
- Custody Seals (if required)
- Indelible/waterproof ink

ON-SITE

- Complete all sample labels with indelible/waterproof ink.
- At a minimum, sample labels should include: site name; unique sample identification; analysis to be performed; preservation method; indication of filtering, if performed; sample date and time.
- COC forms must be completed for each sample set and must be initiated in the field by the sampler.
- COC forms must be completed in blue or black permanent ink.
- At a minimum, the COC forms should include: site name; sample identification; sample matrix; type of preservative; type of analysis; sampling date; and sampler's name.
- Once sampling activity is completed and the COC form is filled out, place samples in sample coolers.
- Package samples to prevent breakage and/or leakage.
- The COC forms will be reviewed by the Field Team Leader or designee prior to relinquishing the samples.
- The original COC form must accompany samples to the laboratory.
- When samples are transferred from one person to another, both the relinquisher and the person receiving the samples should sign, date and record the date of transfer on the COC form.
- If samples are not sent directly to laboratory, samples need to remain on ice and be stored in a secure location.

Title: **Field Activity Documentation for Environmental Investigations**	Procedure Number: **ECR 001**
	Revision Number: **3**
	Effective Date: **November 2020**

Authorization Signatures			
Brandi Hart		Elizabeth Denly	
Technical Reviewer	Date	Environmental Sector Quality Director	Date
Brandi Hart	11/30/20	Elizabeth Denly	11/30/20

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A: Example Page from Field Book
Attachment B: Example Daily Field Report Log
Attachment C: SOP Fact Sheet

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) is intended to guide TRC personnel in the documentation of field activities for environmental investigations.

Field activity documentation is one of the most important activities that occur during field work. It is critical that sufficient detail be documented during field work as it happens to allow others not present during the field activities to fully comprehend the field procedures and conditions at the time of the field work.

The objectives of documenting field activities are to ensure a collection of facts is recorded, the activities can be reconstructed from the documentation, and the field activities are adequately logged in a manner that will be acceptable if the record is required as evidence in legal proceedings. An additional objective of adequately documenting field activities is to provide complete information that is useful and understandable to someone other than the note taker. Because the field books and field data forms provide the basis for future reports and analysis, facts and observations must be accurately recorded. Some regulatory agencies require that a copy of the field notes be included as part of the report submittal.

1.2 Equipment

The following list is an example of items that may be utilized for field activity documentation. Project-specific conditions or requirements may warrant the use of additional items or deletion of items from this list.

- Field book(s) – bound book with water-resistant pages
  If per- and polyfluoroalkyl substances (PFAS) sampling is being performed, field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Waterproof field books, plastic clipboards, and spiral bound notebooks should not be used during PFAS sampling.
- Indelible (i.e., permanent) marking pens
- Field data forms – generic or project-specific
- Digital camera (or phone, if allowed)
- Pocket ruler
- Global positioning system (GPS) device
- Apple IOS or Android compatible devices with cellular data capabilities
- Extra power source (i.e. car charger) for electronic/digital device(s)
- Data Collection Apps that will be used during the sampling/measuring/observation event

2.0 PROCEDURES

Paper Notes

All entries in field books or non-electronic field data forms must be legible, made in blue or black permanent ink, and signed/initialed and dated. No erasures or obliterations can be made. If an incorrect entry is made, the information must be crossed out with a single strike mark that is signed or initialed and dated by the person recording the information. The correction must be written adjacent to the error. The original entry should still be legible even though crossed out. Pages should never be removed from a field book.

Electronic Notes

When collecting data electronically, be sure to use dedicated login credentials. Information should be recorded in project specific Data Collection Apps or modules, and records should be saved/synced after each entry is made. No sharing of login credentials is permitted, and Data Collection Apps should be project specific (i.e., data from one project should not be stored with data from another project). Ensure the software platform has an audit trail to identify changes made, and ensure an approved software platform (e.g., Fulcrum, EQuiS) as identified by TRC's Digital and CORE Data Management and Assessment Teams is being used.

For projects that utilize TRC's approved electronic mobile field data collection systems (e.g., Fulcrum, EQuIS Collect, or esri Collector), a TRC Data Manager is responsible for coordination and setup of the respective application with the project team. The details and specifications of the system setup should be discussed with the TRC Data Manager during the project kickoff meeting. The TRC Data Manager will work with TRC field personnel on configuring the system for efficient use in the field with pre-populated, project-specific menus and naming conventions compatible with TRC's environmental data management systems.

Documentation requirements discussed below pertain to both paper and electronic notes, as applicable.

2.1 Setup of Field Book and Logs

When multiple field personnel are on site, the Field Team Leader should decide the appropriate distribution of field books, field logs, or project-specific forms necessary to document field activities. It is not necessary for each participant to take field notes.

1. Each field book assigned to a project should have the following information on the title page (the inside cover of the field book):

    - Project name
    - Site address (physical address, GPS location)
    - Site contact, if available
    - Project number(s)
    - TRC's name, address and phone number
    - Field Team Leader's name
    - Start and end dates of field book entries

2. Each field book may have a designated number (i.e., Book #1, Book #2, etc.) listed on the outside front cover.

3. Each field book will be a bound field survey book or notebook, water-resistant, and have sequentially numbered pages. Refer to Section 1.2 if PFAS sampling is being performed.

4. Other field books may or may not be required, dependent on the project needs, at the discretion of the Project Manager.

5. A field book may only be used for one project; details for multiple projects should not be recorded in the same field book.

2.2 Documentation Requirements for Field Books or Daily Field Report Logs

Data collection activities performed during the field effort will be recorded in field books or on Daily Field Report Logs. Entries will be of adequate detail so that others will be able to comprehend a situation in the field and so it will be possible to reconstruct each activity without reliance on memory.

Entries into the field book or Daily Field Report Log may contain a variety of information. The terminology used in recording all field data should be objective, factual, and free of personal interpretation that may prove inappropriate. At the beginning of each daily entry, the date, start time, weather, and names of all field team members present will be entered. It is good practice to record the date on every page. The start and end of each day's entries in the field book or Daily Field Report Log will be signed or initialed and dated by the person(s) making the entry.

In general, it is expected that field notes will be collected every 15 minutes, or as appropriate. Information included in the field book or Daily Field Report Log may include, but need not be limited to, the following:

General Information:

- Chronology of activities, including entry and exit times from job site;
- Names of all people involved in field activities and organizational affiliations;
- Level of personal protection used (if different from site-specific protocol/plan);
- Names of visitors to the site during field work and reason for their visit (unless in Daily Personnel Log);
- Weather conditions, including temperature, wind, and any precipitation;
- Day's objective(s)/scope of work;
- Vehicle used (personal, rental) with travel time to site and mileage;
- Site observations;
- Record of photographs (unless in Photograph Log);
- Sketches or diagrams; and/or
- Signature or initials of person recording the information.

Equipment Information:

- Measurement equipment identification (model/manufacturer) and calibration record;
- Summary of equipment brought by subcontractor including support vehicles; and/or
- Sample collection equipment.

Sample-specific Information:

- Sample location and identification;
- Field screening results;
- Sample collection methods;
- Sample collection date (month/day/year) and time (military);
- Sample depths;
- Whether in-situ, grab, or composite sample collected and how sample was composited (if applicable);
- Sample description (color, odor, texture, foaming, etc.);
- Tests or analyses to be performed;
- Sample preservation and storage conditions; and/or
- Quality control (QC) sample collection.

Other Procedural Information:

- Communications while on site impacting site-specific protocol/plan;
- Any changes made to site-specific protocol/plan;
- Equipment decontamination procedures;
- Sample shipping methods, including tracking numbers, if applicable;
- Unusual events or observations;
- Changes in weather that lead to stop work (note time work stopped and time work resumed);
- Volume and type of investigation-derived waste generated.
- If a release has occurred, photographs should be taken, attempt to determine the source of the release and the extent of the release, and document any response efforts (e.g., terminating the release, excavation, etc.).
- If a release of aqueous film forming foam (AFFF) has occurred, photographs should be taken and stakes/flags should be inserted in the ground to properly document/delineate the location of the foam. Note that foams associated with AFFF are typically white in color as opposed to soap/surfactant or biological foams which are typically brown or gray in color.

Field data forms or Data Collection Apps may be used to document sampling information for routine activities that have an associated form. A stockpile of blank forms will be kept in the field trailer/office or with the Field Team Leader. The field book or Daily Field Report Log should reference the form used during that event. Examples of TRC field data forms or Data Collection Apps include:

- Sample log sheets (e.g., groundwater, sediment, soil gas, indoor air)
- Groundwater static water level data sheet
- Slug test data sheet
- Monitoring well construction summary/well development
- Monitoring well decommissioning
- Photograph log
- Soil boring/Rock core log
- Equipment log
- Calibration log

For Paper Notes only:

Upon receipt of the field book or Daily Field Report Log for a particular activity, the designated person recording the notes will begin recording notes on a new page. The person(s) recording the notes will sign/initial the new page and indicate the date, time, and weather conditions, prior to recording information about the field activity. The field book or Daily Field Report Log should indicate whether any field data forms are being used. When the designated person recording the notes either relinquishes the field book or Daily Field Report Log to another team member or turns the book or log in at the end of the day, the person relinquishing the field book or Daily Field Report Log will affix a signature and date to the bottom of the last page used. If the page is not full, a diagonal line should be struck across the blank portion of the page. If not already present, it is good practice to write the page number on each page of the field book. If field data forms are used, it is good practice to write the page number if more than one form is used for the same sample/day (e.g., page 1 of 2, page 2 of 2). An example field book page is provided in Attachment A. An example Daily Field Report Log is provided in Attachment B.

2.3 Documentation Requirements for Daily Personnel Logs

If applicable, the Daily Personnel Log will be maintained in the field trailer/office or by the Field Team Leader for the duration of the project to record the identities of all personnel who are on site. The following information will be recorded on Daily Personnel Logs:

- Names of field personnel
- Names of subcontractor personnel
- Names of visitors (Refer to TRC's policy on communication with media)
- Affiliation of each person on site
- Date/time of entry and exit

2.4 Documentation Requirements for Photograph Logs

A field book/Daily Field Report Log entry or Photograph Log will be used to record the date and time of photographs taken at the project site. Digital cameras or mobile devices that imprint the date and time of the photograph may also be used to document conditions; however, prior to taking any site photographs with a digital camera or mobile device, the photographer must verify the correct clock and calendar settings in the camera or mobile device. An appropriate site figure may be used to note the location and direction of photographic documentation and should be referenced and attached to the log, if used. Examples of items that warrant photographic documentation include:

- General site topography
- Sampling and/or drilling locations
- Existing monitoring well locations
- Pre-existing property conditions and conditions following restoration
- Physical appearance of environmental samples
- Evidence of possible contamination
- Well casing or pad damage
- Rock cores
- Releases

Note: Cellular phones, even personal, may be subpoenaed during litigation for extended periods of time. Use of company mobile devices is preferred.

Check with your project requirements if geo-referenced photograph files are required. There are some digital tools that can be used to capture higher resolution coordinates than the native mobile device might be able to provide.

Note: Some clients require the use of intrinsically safe equipment when taking photographs or using other electronic equipment in the field, either due to the nature of their operations or due to the hazards present with the situation/job site. Please ensure this requirement is followed if applicable.

2.5 Documentation Requirements for Calibration Logs

A field book/Daily Field Report Log entry or Equipment Calibration Log will be completed to record appropriate information for the instruments calibrated each day. This information may include:

- Equipment manufacturer, model number and serial number
- Dates and times of calibration
- Supplies used (e.g., calibration gas)
- Individual who performed the calibration
- Adjustments made to the instrument during calibration
- Notes regarding the maintenance of the instrument

2.6 Documentation Requirements for Health and Safety Logs

A field book/Daily Field Report Log entry or Health and Safety Log will be completed to record Health and Safety issues during field activities. Entries may include:

- Daily health and safety meeting prior to performing work with an overview of topics discussed
- Any injuries, illnesses, near-misses, or the use of first aid supplies
- Activity under Level D conditions or the use of specific personal protective equipment (for Levels A, B, or C only if needed)
- Occurrence of possible work-related symptoms
- The date, name(s) of affected individuals, and a description of the issue or incident and response
- A record of air monitoring results, any action level exceedances, and actions taken as the result of any action level exceedances

2.7 Documentation Requirements for Air Monitoring Logs

A field book/Daily Field Report Log entry or Air Monitoring Log will be completed to record monitoring results from real-time air monitoring instruments during field activities. The air monitoring devices will be located and operated in accordance with the air monitoring plan. For hand-held instruments without data logging capabilities, readings will be recorded in the field book/Daily Field Report Log or on the Air Monitoring Log. For instruments with data logging capabilities, the instruments will be periodically checked, with results recorded in the field book/Daily Field Report Log or on the Air Monitoring Log. Data will be downloaded at the end of each workday and maintained in the project files.

2.8 Documentation Requirements for Waste Management Logs

A field book/Daily Field Report Log entry or Waste Management Log will be completed to record waste tracking information during field activities. Entries may include:

- Transporter
- Date waste is transported off site
- Type of container/volume of container
- Estimated volume of material placed into the container
- Waste media characteristics (e.g., moisture content, non-aqueous phase liquid content, photoionization detector measurements)
- Documentation of container seal/physical condition
- Labeling or placarding required on container
- Container identification
- Manifest number(s)
- Vehicle identification/license plate
- Disposal facility
- Waste stream
- Generator identification

Project-specific requirements may dictate the need for further information.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

The Field Team Leader has the responsibility to maintain the various logs, forms, books, and Data Collection Apps that document daily field activities. Individual responsibilities may be delegated to other field staff, as appropriate.

QC procedures will place emphasis on the completeness and accuracy of all information recorded in the field and will be used to confirm that field notes contain statements that are legible, accurate, and comprehensive documentation of project activities. Field books/Daily Field Report Logs and/or Data Collection Apps should be reviewed on a frequent basis by the Field Team Leader to confirm that:

- Field books/Daily Field Report Logs, standardized forms, and Data Collection Apps have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good record-keeping procedures (i.e., entries are signed or initialed and dated, data are not obliterated, and changes are initialed, dated, and explained).
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the project plans, and that any deviations were documented and approved by the appropriate personnel.
- Instruments were calibrated and operated in accordance with the procedures specified in the project plans.

4.0 INVESTIGATION-DERIVED WASTE DISPOSAL

The Project Manager should discuss client- and/or project-specific investigation-derived waste disposal documentation requirements with field personnel.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

The Project Manager or Field Team Leader will maintain an inventory of all field books/Daily Field Report Logs used during the program and will be responsible for ensuring that they are archived in the project files following the completion of the field work.

Completed standardized forms will be maintained by the Project Manager or Field Team Leader during the duration of the program and will be archived in the project files following completion of the field effort.

It is good practice to scan field notes and logs at the conclusion of field activities and store the resulting pdf files in the electronic project directory, along with any digital photographs taken.

For projects that utilized TRC's approved electronic mobile field data collection systems (e.g., Fulcrum, EQuIS Collect, or esri Collector) field teams should coordinate with their TRC Data Manager who will assist with managing the data depending on the mobile application used.

6.0 SUSTAINABLE RECOMMENDATIONS

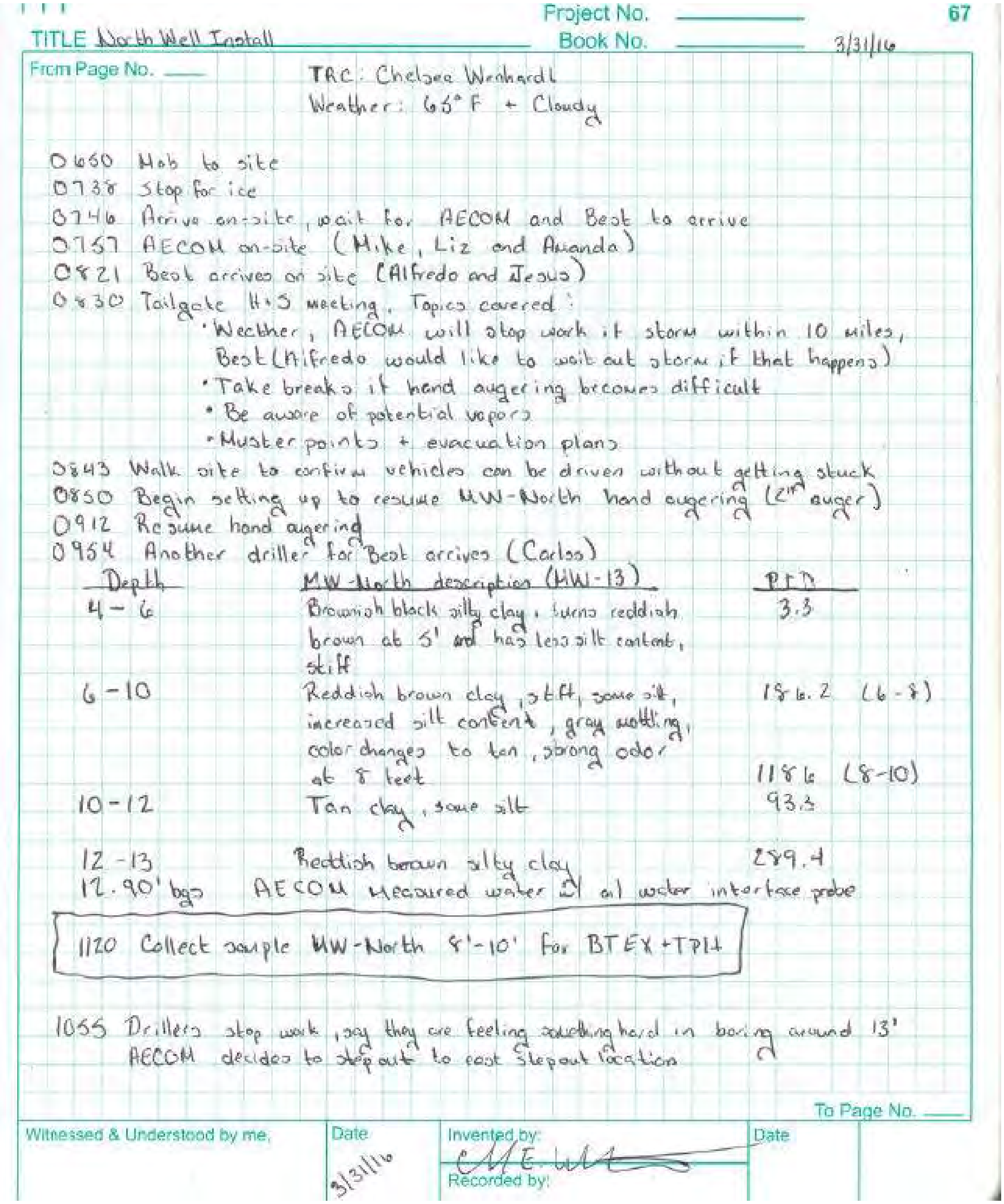
Sustainable practices should be incorporated wherever practical. Items to consider for field documentation are as follows:

- Opt for electronic data collection when the project allows for it;
- Consider using TRC Daily Field Report Logs instead of a field book for one-off and/or short duration projects; and,
- Consider sustainable or reusable materials when binding field sheets.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	JANUARY 2013	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING AND SOP RE-NUMBERING
2	AUGUST 2020	PFAS-SPECIFIC PROCEDURES ADDED
3	NOVEMBER 2020	GENERAL UPDATES; MOBILE DATA APPLICATIONS ADDED

Attachment A: Example Page from Field Book



Project No. ____ 67

TITLE North Well Install

Book No. ____ 3/31/16

From Page No. ____

TRC: Chelsea Wenhardt
Weather: 65° F + Cloudy

0650 Mob to site
0738 Stop for ice
0746 Arrive on-site, wait for AECOM and Best to arrive
0757 AECOM on-site (Mike, Liz and Amanda)
0821 Best arrives on site (Alfredo and Jesus)
0830 Tailgate H+S meeting. Topics covered:

- Weather, AECOM will stop work if storm within 10 miles, Best (Alfredo would like to wait out storm if that happens)
- Take breaks if hand augering becomes difficult
- Be aware of potential vapors
- Muster points + evacuation plans

0843 Walk site to confirm vehicles can be driven without getting stuck
0850 Begin setting up to resume MW-North hand augering (2nd auger)
0912 Resume hand augering
0954 Another driller for Best arrives (Carlos)

Depth	MW-North description (MW-13)	PID
4 – 6	Brownish black silty clay, turns reddish brown at 5' and has less silt content, stiff	3.3
6 – 10	Reddish brown clay, stiff, some silt, increased silt content, gray mottling, color changes to tan, strong odor at 8 feet	186.2 (6-8) 1186 (8-10)
10 – 12	Tan clay, some silt	93.3
12 – 13	Reddish brown silty clay	289.4

12.90' bgs AECOM measured water w/ oil water interface probe

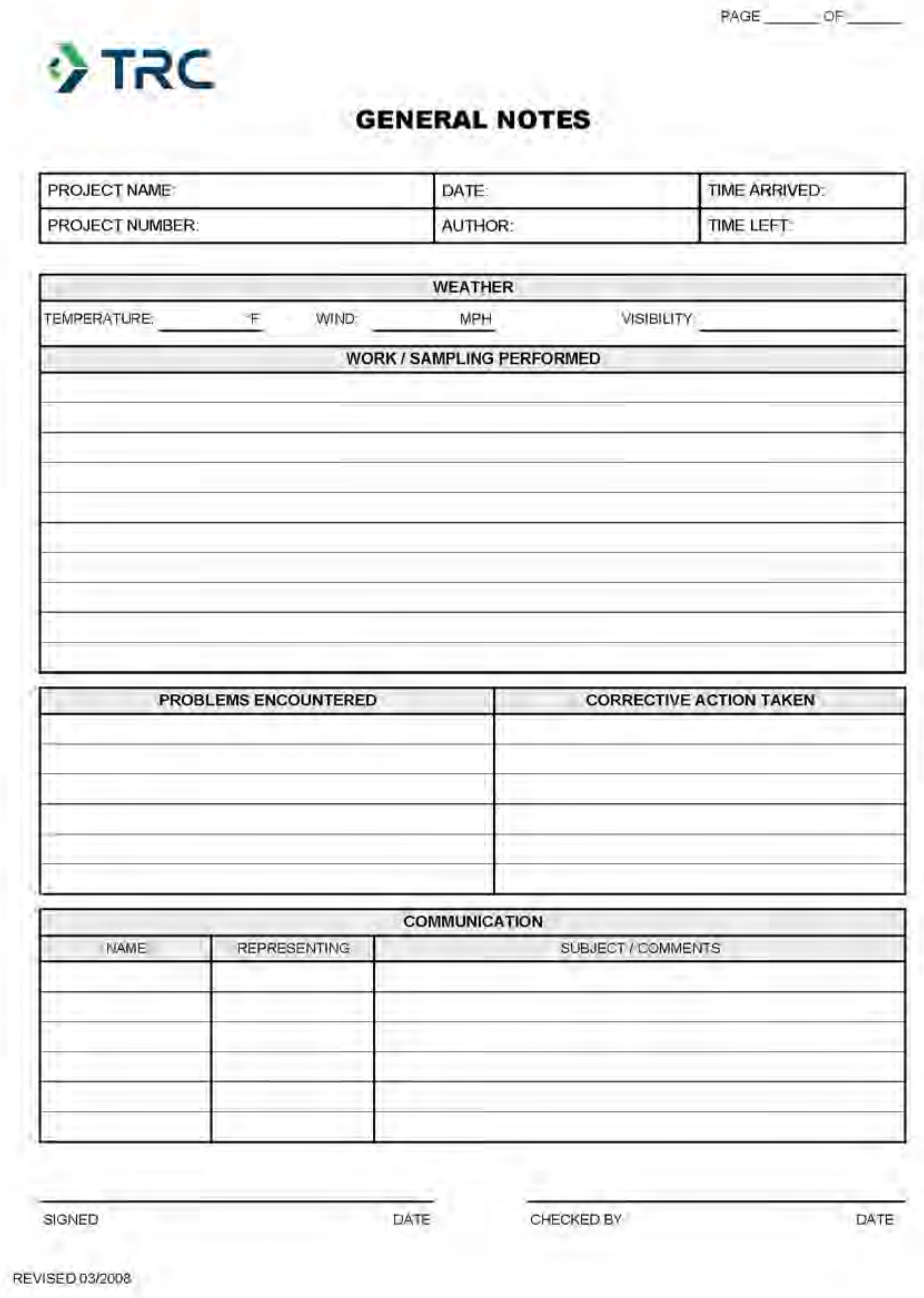
1120 Collect sample MW-North 8'-10' for BTEX + TPH

1055 Drillers stop work, say they are feeling something hard in boring around 13'
AECOM decides to step out to east stepout location

To Page No. ____

Witnessed & Understood by me,	Date	Invented by: C.E. Wenhardt	Date
	3/31/16	Recorded by:	

Attachment B: Example Daily Field Report Log



PAGE ______ OF ______

GENERAL NOTES

PROJECT NAME:	DATE:	TIME ARRIVED:
PROJECT NUMBER:	AUTHOR:	TIME LEFT:

WEATHER

TEMPERATURE: __________ °F WIND: __________ MPH VISIBILITY: __________

WORK / SAMPLING PERFORMED

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN

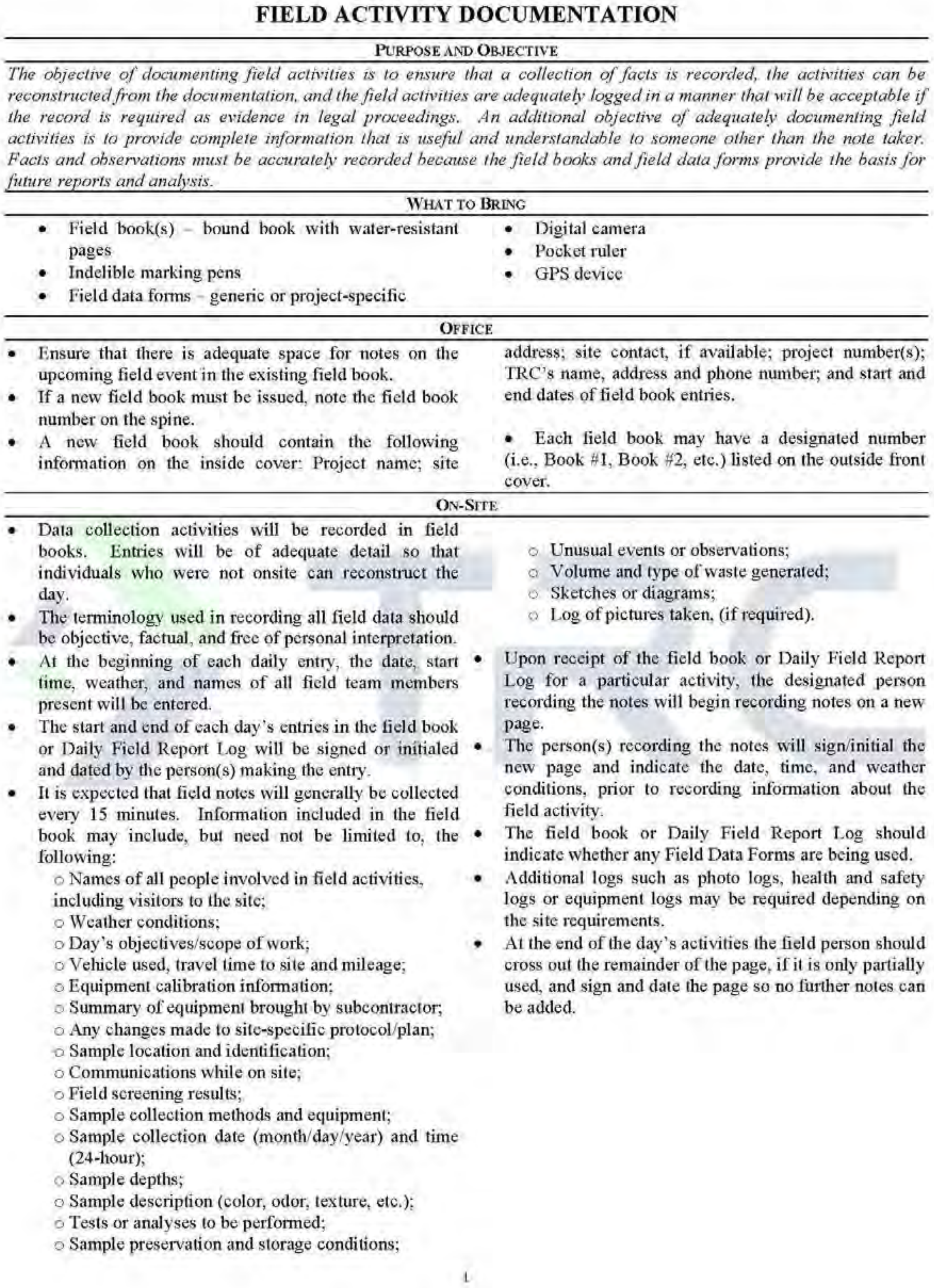
COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS

SIGNED ______ DATE ______ CHECKED BY ______ DATE ______

REVISED 03/2008

Attachment C: SOP Fact Sheet



FIELD ACTIVITY DOCUMENTATION

PURPOSE AND OBJECTIVE

The objective of documenting field activities is to ensure that a collection of facts is recorded, the activities can be reconstructed from the documentation, and the field activities are adequately logged in a manner that will be acceptable if the record is required as evidence in legal proceedings. An additional objective of adequately documenting field activities is to provide complete information that is useful and understandable to someone other than the note taker. Facts and observations must be accurately recorded because the field books and field data forms provide the basis for future reports and analysis.

WHAT TO BRING

- Field book(s) – bound book with water-resistant pages
- Indelible marking pens
- Field data forms – generic or project-specific
- Digital camera
- Pocket ruler
- GPS device

OFFICE

- Ensure that there is adequate space for notes on the upcoming field event in the existing field book.
- If a new field book must be issued, note the field book number on the spine.
- A new field book should contain the following information on the inside cover: Project name; site address; site contact, if available; project number(s); TRC's name, address and phone number; and start and end dates of field book entries.
- Each field book may have a designated number (i.e., Book #1, Book #2, etc.) listed on the outside front cover.

ON-SITE

- Data collection activities will be recorded in field books. Entries will be of adequate detail so that individuals who were not onsite can reconstruct the day.
- The terminology used in recording all field data should be objective, factual, and free of personal interpretation.
- At the beginning of each daily entry, the date, start time, weather, and names of all field team members present will be entered.
- The start and end of each day's entries in the field book or Daily Field Report Log will be signed or initialed and dated by the person(s) making the entry.
- It is expected that field notes will generally be collected every 15 minutes. Information included in the field book may include, but need not be limited to, the following:
  - Names of all people involved in field activities, including visitors to the site;
  - Weather conditions;
  - Day's objectives/scope of work;
  - Vehicle used, travel time to site and mileage;
  - Equipment calibration information;
  - Summary of equipment brought by subcontractor;
  - Any changes made to site-specific protocol/plan;
  - Sample location and identification;
  - Communications while on site;
  - Field screening results;
  - Sample collection methods and equipment;
  - Sample collection date (month/day/year) and time (24-hour);
  - Sample depths;
  - Sample description (color, odor, texture, etc.);
  - Tests or analyses to be performed;
  - Sample preservation and storage conditions;
  - Unusual events or observations;
  - Volume and type of waste generated;
  - Sketches or diagrams;
  - Log of pictures taken, (if required).
- Upon receipt of the field book or Daily Field Report Log for a particular activity, the designated person recording the notes will begin recording notes on a new page.
- The person(s) recording the notes will sign/initial the new page and indicate the date, time, and weather conditions, prior to recording information about the field activity.
- The field book or Daily Field Report Log should indicate whether any Field Data Forms are being used.
- Additional logs such as photo logs, health and safety logs or equipment logs may be required depending on the site requirements.
- At the end of the day's activities the field person should cross out the remainder of the page, if it is only partially used, and sign and date the page so no further notes can be added.

FIELD ACTIVITY DOCUMENTATION

DOS AND DO NOTS OF FIELD ACTIVITY DOCUMENTATION

DOs:

- DO have the following items when going into the field: Field Book and an indelible marking pen (i.e. ball-point pen) ONLY; field forms; contact phone numbers; business cards.
- DO review all available figures and workplans.
- DO take note of any atypical conditions at the site.
- DO call the Project Manager or Field Team Leader if unexpected conditions are encountered or at least twice during the work day to update them. It is also recommended to call when activities are winding down for the day to make sure that the workplan has been fully implemented and there are no additional tasks to complete.
- DO have the numbers for contractors, vehicle and equipment rental providers and utility companies readily available while in the field.

DO NOTs:

- DO NOT sign anything in the field. This includes disposal documentation, statements, etc.; call the Project Manager if there are any concerns.
- DO NOT use markers to label samples or record field notes.

Title: **Visual-Manual Procedure for Soil Description and Identification**	Procedure Number: **ECR 005**
	Revision Number: **1**
	Effective Date: **January 2020**

Authorization Signatures

Jamie Stapleton		Elizabeth Denly	
Technical Reviewer Jamie Stapleton	Date 1/1/20	Environmental Sector Quality Director Elizabeth Denly	Date 1/1/20

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	Field Forms
Attachment B	USCS Field Reference Sheets
Attachment C	SOP Fact Sheet

1.0 INTRODUCTION

1.1 Scope and Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the method for identifying and describing soil samples in soil borings, test pits, and soil grab samples. The SOP was prepared in general conformance with American Society for Testing and Materials (ASTM) Standard D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)* and other pertinent technical publications.

1.2 Summary of Method

The objective of this method is to standardize the collection and documentation of information on soil that is useful for the purpose of hydrogeological or geotechnical evaluation of a site. The use of standardized visual examination and manual test methods by all field personnel results in standardized data that can be evaluated later for geologic and engineering uses. Consistent soil description is important because during many projects multiple employees may be involved at different times. Hence, being able to compare or correlate soil classification logs that were created by different geologists is essential for creating consistent subsurface interpretations. The methods outlined in this SOP can be utilized for the characterization of soils in the field, field office, or other setting. Characterization of the soils in a relatively undisturbed state is preferred, but is subject to the limitations of the collection methods utilized.

Soil samples may be collected by various means, as discussed in TRC's Soil Sampling SOP. Regardless of the sample collection method, the resulting soil sample should be visually described and characterized. Visual examination of the sample will result in identifying grain size, particle size percentages, geologic and geotechnical modifiers and/or classifications, and a host of secondary characteristics. Manual and laboratory test methods also may be utilized to provide additional characteristics of the material, aiding in the description of fine-grained soils and providing more detailed geotechnical characterization.

The data gathered from the visual observations and manual test results are then recorded following an industry recognized classification system in a field log.

1.3 Equipment

The following list of equipment may be utilized when identifying and describing soil samples. Site-specific conditions may warrant the use of additional items or deletion of items from this list.

- Appropriate level of personal protection
- Field book, boring logs, test pit logs (as applicable)
- A copy of boring logs or field notes from previous work performed at or near the site
- Pocket penetrometer or miniature vane shear device
- Munsell Soil Color Chart
- Burmister and/or Unified Soil Classification System (USCS) classification chart/reference sheets
- Sand grading chart
- Appropriate knife

- Spoon and/or small spatula
- Tape measure, folding ruler or yard stick
- Portable table
- Polyethylene sheeting
- Hand lens
- Deionized water in squeeze bottle
- Small squirt bottle with dilute hydrochloric acid (1 part 10N HC1 to 3 parts water)

1.4 Definitions

Not Applicable; terms defined throughout SOP.

1.5 Health & Safety Considerations

TRC personnel may be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific health and safety plan (HASP). TRC personnel will use the appropriate level of personal protective equipment (PPE) as defined in the HASP.

1.6 Cautions and Potential Problems

- Samples collected for identification and description may contain hazardous substances or petroleum hydrocarbons. Consult the site-specific HASP for air monitoring and PPE requirements.

- One of the most common problems encountered when identifying soil types is the misidentification of fine-grained soils. If new to the identification process, take time to perform the manual field tests presented herein and/or consult with an experienced geologist or engineer.

- Geologic and engineering principles are both utilized in this method. Remember a well or widely graded soil (engineering term) is a poorly sorted soil (geologic term).

1.7 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Workers (HAZWOPER)
- 8-hour annual refresher training

2.0 PROCEDURES

This SOP includes procedures for both the modified Burmister and USCS soil classification systems. Consult the Project Manager and site work plan for guidance on the appropriate system. Several components of the soil description overlap between the two methods; however, there are some slight differences, such as the descriptors for percent composition (e.g., Burmister: “some” means 20-35% and USCS: "some" means 30-45%). Again, consistent soil description is important because during many projects multiple employees may be involved in performing field work. Hence, being able to compare between logs that were created by different geologists is essential for creating subsurface interpretations.

2.1 Modified Burmister Soil Classification System

The general description of a soil sample should be in the following order:

1. Color
2. Major Constituent – capitalized
3. Minor Constituent(s)
4. Geologic modifiers or classifications (e.g., glacial deposit, fill material) in parentheses
5. Density
6. Moisture content
7. Modifiers for fine fraction of sample (plasticity, dilatancy and toughness)
8. Other significant observations (e.g., odors, staining, sheen, petroleum product, debris)

Use the following guidelines when recording soil descriptions:

- If the major constituent comprises more than 50% of the soil, then fully capitalize the major component descriptor (e.g., SAND);
- If the major constituent comprises less than 50% of the soil, capitalize the descriptor (e.g., Sand);
- Place a comma after the major and minor constituent descriptors;
- Place size qualifiers such as coarse, medium, or fine before the major constituent descriptors (see Section 2.7);
- Use the appropriate adjectives for proportions in Section 2.3.2 (e.g., and, some, little, trace) when describing the minor fraction(s); and
- Use the modifiers for fine grained soils described in Section 2.8.

EXAMPLES:
Tan, medium SAND, little fine sand, trace coarse sand, trace silt, statified (Outwash), loose, wet.

Or

Gray, CLAY, soft, wet, medium plasticity, no dilatancy and low toughness.

When logging a soil sample collected from a boring (e.g., split spoon or acetate liner) where more than one soil type is present, describe each one separately, using additional line(s) on the boring log form. Start the description from the top and log each change in stratigraphy in sequence to the bottom. Record the length (e.g., 0-0.5 ft.) at the beginning of each separate sequence description, followed by a colon. Draw a line below the bottom of the complete sample description.

2.2 USCS Soil Classification System

The USCS is based on grain size and response to physical manipulation at various water contents. This system is often used for classifying soils encountered in boreholes, test pits, and surface sampling. The following properties form the basis of USCS soil classification:

- Percentage of gravel, sand, and fines;
- Shape of the grain size distribution curve; and
- Plasticity and compressibility characteristics.

Four soil fractions are recognized: cobbles, gravel, sand, and fines (silt or clay). The soils are divided as coarse-grained soils, fine-grained soils, and highly organic soils. The coarse grained soils contain 50 percent of grains coarser than a number 200 sieve (approximately 0.08 mm). Fine grained soils contain more than 50 percent of material smaller than the number 200 sieve. Organic soils contain a significant percentage of organic material (leaves, roots, peat, *etc*. in various stages of decomposition). Soil description should be concise and stress major constituents and characteristics for fine-grained, organic, or coarse-grained soils.

The general description of a soil sample should be in the following order:

1. Group Name (Group Symbol)
2. Percent and Range of Particle Sizes
3. Plasticity
4. Color (Munsell Color Chart)
5. Odor
6. Moisture
7. Density
8. Additional Comments
9. Geological Origin (Stratigraphic Unit)

EXAMPLES:
Well Graded Gravel with Sand (GW): mostly fine to coarse subangular gravel, little fine to coarse subangular sand, yellowish brown (10YR 5/4), no odor, moist, loose, few small cinders, fill.

Or

Silt (ML): mostly silt, nonplastic, gray (7.5YR 5/1), slight hydrocarbon odor, moist, medium dense, lacustrine.

2.2.1 Group Name (Group Symbol)

The USCS recognizes 15 soil groups and uses names and letter symbols to distinguish between these groups. The coarse grained soils are subdivided into gravels (G) and sands (S). Both the gravel and sand groups are divided into four secondary groups. Fine grained soils are subdivided into silts (M) and clays (C). Soils are also classified according to their plasticity and grading. Plastic soils are able to change shape under the influence of applied stress and to retain the shape once the stress is removed. Soils are referred to either low (L) or high (H) plasticity. The grading of a soil sample refers to the particle size distribution of the sample. A well graded (W) sand or gravel has a wide range of particle sizes and substantial amounts of particles sized between the coarsest and finest grains. A poorly graded (P) sand or gravel consists predominately of one size or has a wide range of sizes with some intermediate sizes missing.

The flow charts included in Attachment B: USCS Field Reference Sheets, for fine- and coarse-grained soils, can be used to assign the appropriate group symbol(s) and name and are replicated from ASTM Standard D2488. If the soil has properties which do not distinctly place it into a specific group, borderline symbols (e.g., SP-SM, GP-GC, etc.) may be used.

Soils which have characteristics of two groups are given boundary classifications using the names that most nearly describe the soil. The two groups are separated by a slash. The same is true when a soil could be well or poorly graded. Again the two groups are separated by a slash.

2.3 Soil Identification Based on Grain Size

2.3.1 Grain-Size Scales

Determination of grain size can be difficult, especially for the fine grained particles. Identification of coarse grained particles can be aided by grain size particle charts with actual samples affixed to the card. In general, fine grained particles are not visible with the naked eye or a hand lens and require manual field tests to differentiate between silts and clays.

Peat, organic material in various stages of decomposition, usually appears dark brown to black, has a fibrous to amorphous texture, with an organic odor. This material should be classified as highly organic soil (Peat; Hummus; or Swamp/bog deposit). This material is not subject to grain size classification described herein.

Grain size classification should be based on the following method.

COARSE GRAINED PARTICLES

• **Boulder:**	> 300 mm (>12 in.)
• **Cobble:**	75 - 300 mm (3 in. – 12 in.)
• **Coarse Gravel:**	19 - 75 mm (¾ in. – 3 in.)
• **Fine Gravel:**	4.75 - 19 mm (No. 4 sieve – ¾ in.)
• **Coarse Sand:**	2.0 - 4.75 mm (No. 10 sieve – No. 4 sieve)
• **Medium Sand:**	0.425 - 2.0 mm (No. 40 sieve – No. 10 sieve)
• **Fine Sand:**	0.075 - 0.425 mm (No. 200 sieve – No. 40 sieve)

FINE GRAINED PARTICLES

Note that these particle sizes cannot be visually differentiated with standard field equipment. Silts and clays are distinguished in the field by cohesion and plasticity.

Burmister:

• **Silt:**	0.002 - 0.075 mm
• **Clay:**	<0.002 mm

USCS:

• **Silt & Clay:**	<0.075 mm (< No. 200 sieve)

2.3.2 Proportions

Proportions of grain sizes need to be described in accordance with one of the two following classification systems. Note that in either system minor constituents also include ancillary materials such as mica flakes, dark minerals, naturally occurring organic matter, or anthropogenic material (e.g., fill, brick, concrete).

Modified Burmister:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

- **Trace:** 0-10%
- **Little:** 10-20%
- **Some:** 20-35%
- **And:** 35-50%

The major soil sample constituent is always capitalized and listed first.

USCS:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

- **Trace:** < 5%
- **Few:** 5-10%
- **Little:** 15-25%
- **Some:** 30-45%
- **Mostly:** > 50%

The soil is *fine grained* if it contains 50% or more fines (<0.075 mm or passes #200 sieve)

The soil is *coarse grained* if it contains less than 50% fines.

2.4 Color

The main color value should be stated, along with a modifier, if appropriate. For example:

- light brown
- dark brown
- reddish brown
- brown

The presence of mottling (patches or spots of differing colors) should be included in the description, where present. For example:

Gray, poorly sorted angular fine to medium SAND, some silt, trace angular coarse sand, trace clay (lodgement glacial till), slightly mottled, dense, moist (Modified Burmister description)

Or

Well Graded Sand (SW), mostly angular fine to medium sand, little to some silt, few angular coarse sand, few clay, gray, no odor, moist, dense, lodgement glacial till. (USCS description)

As with other components of soil classification, consistent soil color descriptions can be very helpful when preparing subsurface interpretations from soil data collected by different personnel. To that end, the use of Munsell Soil Color charts may be implemented to standardize color nomenclature. Just as paint stores have pages of color chips, soil scientists use a book of color chips that follow the Munsell System of Color Notation. The system has three components: Hue (a specific color), Value (lightness and darkness) and Chroma (color intensity). For example, a brown soil may be noted as: hue value/chroma (10YR 5/3).

2.5 Relative Density

The modifiers used to describe soil relative density depend on whether the soil is cohesive (e.g., clay) or granular/non-cohesive (gravel, sand or silt). Field evaluation of the density of non-cohesive soils is based the ease of penetration by the sampling equipment used. The density of cohesive soils is based the compressive soil strength of soil or soil stiffness (i.e., how much the soil compresses under a given pressure). Density can be directly measured in the field, such as with the ASTM Standard D1586: Standard Penetration Test during split spoon sample collection or with a pocket penetrometer. Alternatively, the density can be measured qualitatively, such as the ease of thumb penetration. Methods of determining density and the appropriate density modifiers are discussed in the following sections.

2.5.1 Soil Samples Collected with Split Spoons

During soil sample collection using split spoons, the density can be based on the N-Value, which is the sum of the middle two 6-inch blow counts of a two foot split spoon or the last two 6-inch blow counts of an 18-inch split spoon (ASTM Standard D1586: Standard Penetration Test). Professional judgment should be used when applying the density modifier. If high blow counts are due to the presence of a cobble, boulder or large piece of gravel that impedes forward progress of the split spoon, density should be based upon the character of the material in the split spoon, if any, or omitted from the description. A notation should be made in the sample description when this situation occurs. Appropriate modifiers are described in the following table:

Non-Cohesive (Granular Soils)		**Cohesive Soils**	
N-Value (Blows/ft)	**Density**	**N-Value (Blows/ft)**	**Density**
0-4	very loose	<2	very soft
4-10	loose	2-4	soft
10-30	medium dense	4-8	medium
30-50	dense	8-15	stiff
>50	very dense	15-30	very stiff
		>30	hard

2.5.2 Test Pit Samples

In test pits, density is subjective and should be based upon the ease of excavation. The above modifiers in Section 2.5.1 for granular and cohesive soils should be used in the description. The following should be used as a guide for test pits:

- **Very Loose/Very Soft –** The bucket of the excavating equipment easily penetrates the soil and fills in one pass.

- **Medium Dense/Medium –** Several passes are required to fill the bucket.

- **Very Dense/Very Stiff –** The bucket has difficulty penetrating the soil.

2.5.3 Soil Samples Collected Via Direct Push Technology

In borings advanced by direct push methods, field evaluation of density is more subjective. Blow counts along with visible qualifiers such as number of passes to fill an excavation bucket are not applicable to direct push methods. Samplers therefore need to pay attention to the progress of the sampling tool being advanced, as well as gather information from the driller advancing the tool. Driller's input is very valuable as the macro core might be advanced at varying speeds to best achieve the goal of the boring. Below are approximations for estimating soil densities while utilizing direct push methods:

- **Very Loose/Very Soft** – Macro core advances easily, penetrates within a few seconds.
- **Medium Dense/Medium** – Macro core advances slowly but steadily, penetrates within a minute or two.
- **Very Dense/Very Stiff** – Macro core advances very slowly if at all, penetration may take several minutes.

Granular Soils	Cohesive Soils	Thumb Penetration Key
very loose	very soft	very easily – inches
loose	soft	easily – inches
medium dense	medium	moderate effort – inches
dense	stiff	indented easily
very dense	very stiff	indented by nail
	hard	difficult by nail

Similar to above, if drilling progress is slowed due to the presence of a cobble, boulder or large piece of gravel that impedes forward progress of the direct push sampler, density should be based upon the character of the material in the sampler, if any, or omitted from the description. A notation should be made in the sample description when this situation occurs.

2.5.4 Pocket Penetrometer

A pocket penetrometer is a field tool which can be implemented to directly measure compressive soil strength. The unit is spring-operated, and it is measures strength in tons/sq. ft. (tsf) or kg/sq. cm by pushing a loading piston into soil until the calibration mark is level with soil. Compressive load is indicated by reading a scale on the piston barrel. A friction ring indicates maximum reading. The reading correlates to the density description as follows:

Cohesive Soils	Compressive Strength (tsf)
very soft	< 0.25
soft	0.25 – 0.50
medium	0.50 – 1.0
stiff	1.0 – 2.0
very stiff	2.0 – 4.0
hard	> 4.0

The user should refer to the pocket penetrometer instruction manual for specifics on operation. It is recommended that several pocket penetrometer readings be collected for each soil horizon and averaged to determine the density, as opposed to one single reading.

A miniature vane shear device can also be used to directly measure compressive soil strength of cohesive soils. The device is a spring-operated torsional test that provides shear strength by measuring the resistance of turning a vane inserted into the sample.

2.6 Moisture Content

Moisture content should be described using the following modifiers:

- **Dry** – no apparent moisture, dusty.
- **Moist** – slight moisture content but no visible water, soils may stick together.
- **Wet** – water dripping from sample; usually soil is below the water table.

2.7 Geologic Modifiers or Classifications

Sedimentological descriptions aid in the geologic classification of a soil material. Only insert geologic modifiers when present.

2.7.1 Stratification

The presence of alternating layers of non-cohesive materials of different grain sizes or color with layers ***at least 6 mm*** thick. Note thickness of layers.

2.7.2 Lamination or Varves

The presence of alternating very thin layers of fine materials or color, such as silt and clay, with layers ***less than 6 mm*** thick. Note thickness of layers.

2.7.3 Sorting

A geological term used to describe how close in size the grains in a sample are to each other. For example, a *well sorted* sample contains grains of similar size; a *poorly sorted* sample contains grains of many sizes. **Caution:** Sorting and grading both describe grain size distribution and can easily be confused (e.g., well sorted is the opposite of well graded). If possible, either sorting or grading terminology, NOT both, should be used for a given project.

2.7.4 Grading

An engineering term used to describe the range in grain sizes present in a sample. For example, a *narrowly graded* or *poorly graded* sample contains grains of similar size; a *widely graded* or *well graded* sample contains grains of many different sizes. **Caution:** Sorting and grading both describe grain size distribution and can easily be confused (e.g., well sorted is the opposite of well graded). If possible, either sorting or grading terminology, NOT both, should be used for a given project.

2.7.5 Angularity or Rounding

Geological terms that are used to describe the general appearance of visible grains in the soil sample. This term is useful in determining the origin and depositional environment of a material. Water transported materials may be rounded. Glacial tills will be more angular.

- **Angular** – Particles have sharp edges and relatively plane sides with unpolished surfaces.
- **Subangular** – Particles are similar to angular description but have rounded edges.
- **Subrounded** – Particles have nearly plane sides but have well-rounded corners and edges.
- **Rounded** – Particles have smoothly curved sides and no edges.

2.7.6 Shape

A term used to describe the shape of gravel, cobbles, and boulders. Terms are as follows where the particle shape shall be described based on the ratio of the dimensions where the length, width, and thickness refer to the greatest, intermediate, and least dimensions of a particle.

- **Flat** – Particles with width:thickness > 3.
- **Elongated –** Particles with length:width > 3.
- **Flat and Elongated –** Particles meet criteria for both flat and elongated.

2.7.7 Odor

Soils containing a significant amount of organic material may have a distinct odor of decaying vegetation. Soils may also have a petroleum, sewage or chemical type odor. Note the type of odor but avoid trying to identify the specific chemical; any contaminants in the soil should be identified only by chemical analysis. **Caution - Safety Note**: Odors should be noted if observed. However soil samples may contain contaminants that are harmful if inhaled. Field personnel should NOT inhale deeply near the sample in an attempt to better determine if an odor is present.

Olfactory characteristics are subject to field conditions such as temperature and wind, as well as individual nasal sensitivities. The strength of the odor may also be noted (e.g., strong or slight).

2.7.8 Cementation

Describe the cementation of intact coarse-grained soils as follows.

- **Weak** – Crumbles or breaks with handling or little finger pressure.

- **Moderate** – Crumbles or breaks with considerable finger pressure.
- **Strong** – Will not crumble or break with finger pressure.

2.7.9 Hydrochloric Acid Reaction (HCl)

As appropriate for the geologic environment, describe the reaction with HCl as none, weak, or strong. As calcium carbonate is a common cementing agent, a report of its presence on the basis of the reaction with dilute hydrochloric acid (1 part 10N HCl to 3 parts water) is appropriate for certain projects.

- **None** – No visible reaction.
- **Weak** – Some reaction, with bubbles forming slowly.
- **Strong** – Violent reaction, with bubbles forming immediately.

2.8 Fine Grained Soils

Fine grained soils can be identified based on several manual field tests described below.

2.8.1 Dilatancy

Dilatancy is the appearance/disappearance of surface water during shaking, indicating a change in the pore volume of the material during deformation. Of the fine grained soils, silts are more likely to exhibit dilatancy. In order to test for dilatancy, obtain a small sample of soil and mold into a ½-inch diameter ball adding water as needed until the sample is soft but not sticky. Flatten the ball with the blade of a knife or spatula and shake the sample horizontally striking the side of the hand with the other hand. Note the rate at which water appears on the surface of the sample, if any. Squeeze the sample and note the reaction of the water, if any. Describe the dilatancy of the sample as follows:

Description	Criteria
None	No visible water at surface
Slow	Water appears slowly on shaking, does not disappear or disappears slowly on squeezing
Rapid	Water appears quickly on shaking, disappears quickly on squeezing

2.8.2 Toughness and Plasticity

Toughness is a measure of the amount of effort required to roll a 1/8-inch thick thread of soil at the plastic limit. Plasticity is a property of the soil that is exhibited when the soil is at a specific water content known as the plastic limit; that is, the degree at which soil is permanently deformed without rupturing by force applied in any direction.

2.8.2.1 Toughness Procedure

Roll a sample of the soil against a flat surface or between the palms of the hand to a thickness of 1/8-inch. If the thread crumbles and breaks prior to reaching the 1/8-inch thickness, add water and repeat. If the sample is too wet to roll easily, dry the sample by spreading into a thin layer or re-rolling repeatedly. The sample is at the plastic limit when the soil breaks apart and crumbles just when the thread reaches the 1/8-inch thickness. Note the pressure required to roll the thread at the plastic limit, the strength of the thread, and the pressure required to mold the sample back into a lump.

Describe the toughness of the sample as follows:

Description	Criteria
Low	Slight pressure required to roll the thread and the thread and lump are soft and weak
Medium	Moderate pressure required to roll the thread and the thread and lump have medium stiffness
High	Considerable pressure required to roll the thread and the thread and lump have very high stiffness

2.8.2.2 Plasticity Procedure

Soil plasticity is a measure of the soil's ability to be molded into a shape, and is the primary mechanism for distinguishing between silt and clay in the field. Silts are non-plastic; they are non-cohesive and cannot be molded and shaped. Clays exhibit varying degrees of plasticity. The plasticity of the soil can be determined using the observations made during the toughness test. Based on those observations, the plasticity of the soil can be described as follows:

Description	Criteria
Nonplastic	The soil cannot be molded at any water content
Low	When moistened the soil can be molded into a ball or cylinder. A 1/8-inch diameter thread may be formed if kept very moist, but crumbles easily if dried slightly.
Medium	When moistened a 1/8-inch thread of soil is easy to roll. Crumbles if manipulated.
High	When moistened a 1/8-inch thread of soil is easy to roll. Thread does not crumble easily even if bent and manipulated.

2.8.3 Identification of Fine Grained Soils

Fine grained soils can be identified using the dilatancy, toughness and plasticity tests and the criteria identified in the following table. These criteria should only be used for inorganic soils.

Soil Type	Dilatancy	Toughness	Plasticity
Silt	Slow to Rapid	Low	Nonplastic to Low
Elastic Silt	None to Slow	Low to Medium	Low to Medium
Lean Clay	None to Slow	Medium	Medium
Fat Clay	None	High	High

2.8.4 Identification of Organic Soils

Organic soils contain enough organic particles to influence the soil properties and usually have a dark brown to black color and often have an organic odor. Organic soils are typically fine grained and are identified as either organic silts or clays. Peat is a particular type of organic soil composed primarily of vegetable tissue in various stages of decomposition that has a fibrous to amorphous texture, usually a dark brown to black color, and an organic odor. When present the sample shall be designated as highly organic soil or peat. Laboratory tests are usually required to differentiate between organic silts and clays.

2.9 Fill Soils

Frequently soils are encountered that have been placed in an area for the purpose of changing or modifying the surface elevation. These fill soils can be reworked native soils or soils imported from another location. Indications that a soil is a non-native fill material include the following:

- The presence of anthropogenic materials (e.g., bricks, concrete, plastic);
- A heterogeneous mixture of soils with a random or unnatural distribution;
- Soils with an unnatural particle size distribution (e.g., clean pea stone).

Environmental and geotechnical projects often require that the extent and depth of fill soils be characterized. Fill soils are usually considered unsuitable for geotechnical uses due to the potential variation of soil types and engineering properties, and the uncertain compaction history of the material.

Fill soils can also contain anthropogenic materials that can be sources of contamination. Examples of anthropogenic materials that can be sources of contamination include the following:

- Construction and demolition debris especially with coatings or materials that contain tar or asphalt;
- Ash;
- Slag;
- Coal; and
- Asphalt pavement.

Regardless of the potential for contamination, all anthropogenic materials should be listed in the soil description. Contact the Project Manager immediately if any of these materials are unexpectedly encountered. This is especially important if environmental samples are being collected for site characterization.

2.10 Geologic Origin

Where possible based on existing site data, local research, or geologic understanding of the local region, include the apparent geologic origin of the material, such as glacial deposit (e.g., till, outwash), aeolian deposit, residual soil, colluvium, alluvium, regolith, residuum, saprolite, or fill material. Do not utilize geologic origin if not certain.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pick-up and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Other than having another person peer review and duplicate the visual identification, samples of identified soils can be submitted to a geotechnical laboratory for classification in accordance with *ASTM D 2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).* The laboratory classification can then be compared to the visual identification which can be changed as needed. It is recommended that Project Managers include laboratory classification of site soils in work plans for environmental projects. Laboratory classification should always be included for geotechnical projects. TRC field staff shall consult the site-specific work plan to determine laboratory soil classification requirements, if any.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

All soil identification information must be documented in the field book and/or on an appropriate field form (TRC Sample Log Sheet, Boring Logs, Test Pit Logs or gINT). Example field forms are included in Attachment A. Field notes should neatly convey the soil descriptions. Providing soil classifications following this SOP will allow for consistent data interpretation and increase project efficiency when soil descriptions are taken from field logs and converted to electronic report logs (e.g., gINT). Record the following information in the field book:

- Sample identification number
- Sample location (sketch of the sample point)
- Time and date sample was taken
- Personnel performing the task
- Visual description of the sample
- Weather conditions during sampling
- Other pertinent observations as prescribed in TRC's SOP for field activity documentation

6.0 REFERENCES

ASTM D2487 *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System),* Annual Book of ASTM Standards, Vol. 04.08, Current edition.

ASTM D2488 *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure),* Annual Book of ASTM Standards, Vol. 04.08, Current edition.

ASTM D1586-11 *Standard Test Method for Standard Penetration Test (SPT) and Split Barrel-Sampling of Soils,* Annual Book of ASTM Standards, Vol. 04.08, Current edition.

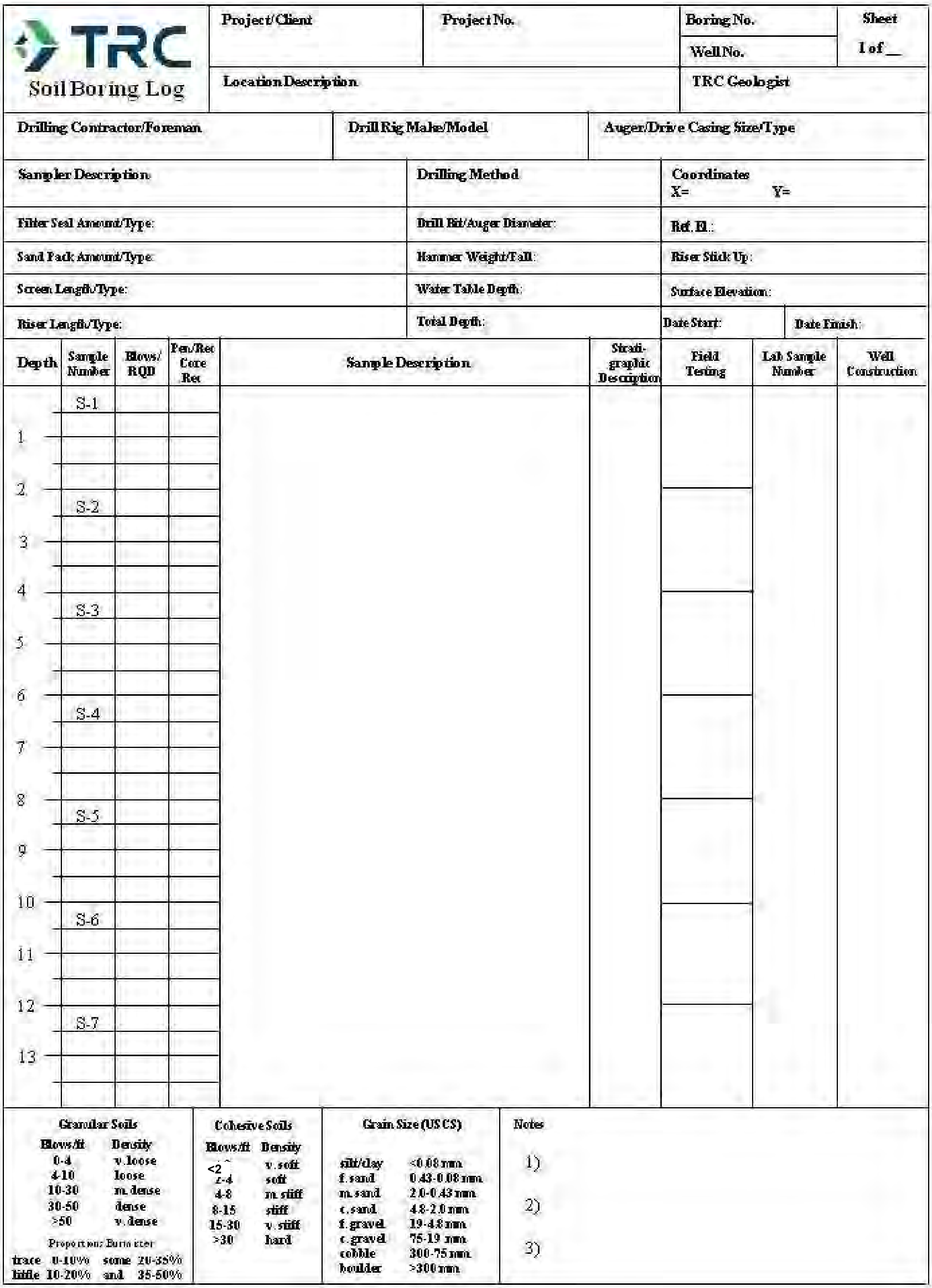
Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Procedures for Testing Soils. Burmister, D.M., 1958. Suggested Methods of Test for Identification of Soils.

7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	SEPTEMBER 2013	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING

ATTACHMENT A
FIELD FORMS



TRC
Soil Boring Log

Project/Client

Project No.

Boring No.

Well No.

Sheet
1 of __

Location Description

TRC Geologist

Drilling Contractor/Foreman

Drill Rig Make/Model

Auger/Drive Casing Size/Type

Sampler Description

Drilling Method

Coordinates
X= **Y=**

Filter Seal Amount/Type:

Drill Bit/Auger Diameter:

Ref. El.:

Sand Pack Amount/Type:

Hammer Weight/Fall:

Riser Stick Up:

Screen Length/Type:

Water Table Depth:

Surface Elevation:

Riser Length/Type:

Total Depth:

Date Start:

Date Finish:

Depth	Sample Number	Blows/ RQD	Pen/Rec Core Rec	Sample Description	Strati-graphic Description	Field Testing	Lab Sample Number	Well Construction
	S-1							
1								
2								
	S-2							
3								
4								
	S-3							
5								
6								
	S-4							
7								
8								
	S-5							
9								
10								
	S-6							
11								
12								
	S-7							
13								

Granular Soils

Blows/ft	Density
0-4	v. loose
4-10	loose
10-30	m. dense
30-50	dense
>50	v. dense

Proportions Burmister

trace	0-10%	some	20-35%
little	10-20%	and	35-50%

Cohesive Soils

Blows/ft	Density
<2	v. soft
2-4	soft
4-8	m. stiff
8-15	stiff
15-30	v. stiff
>30	hard

Grain Size (USCS)

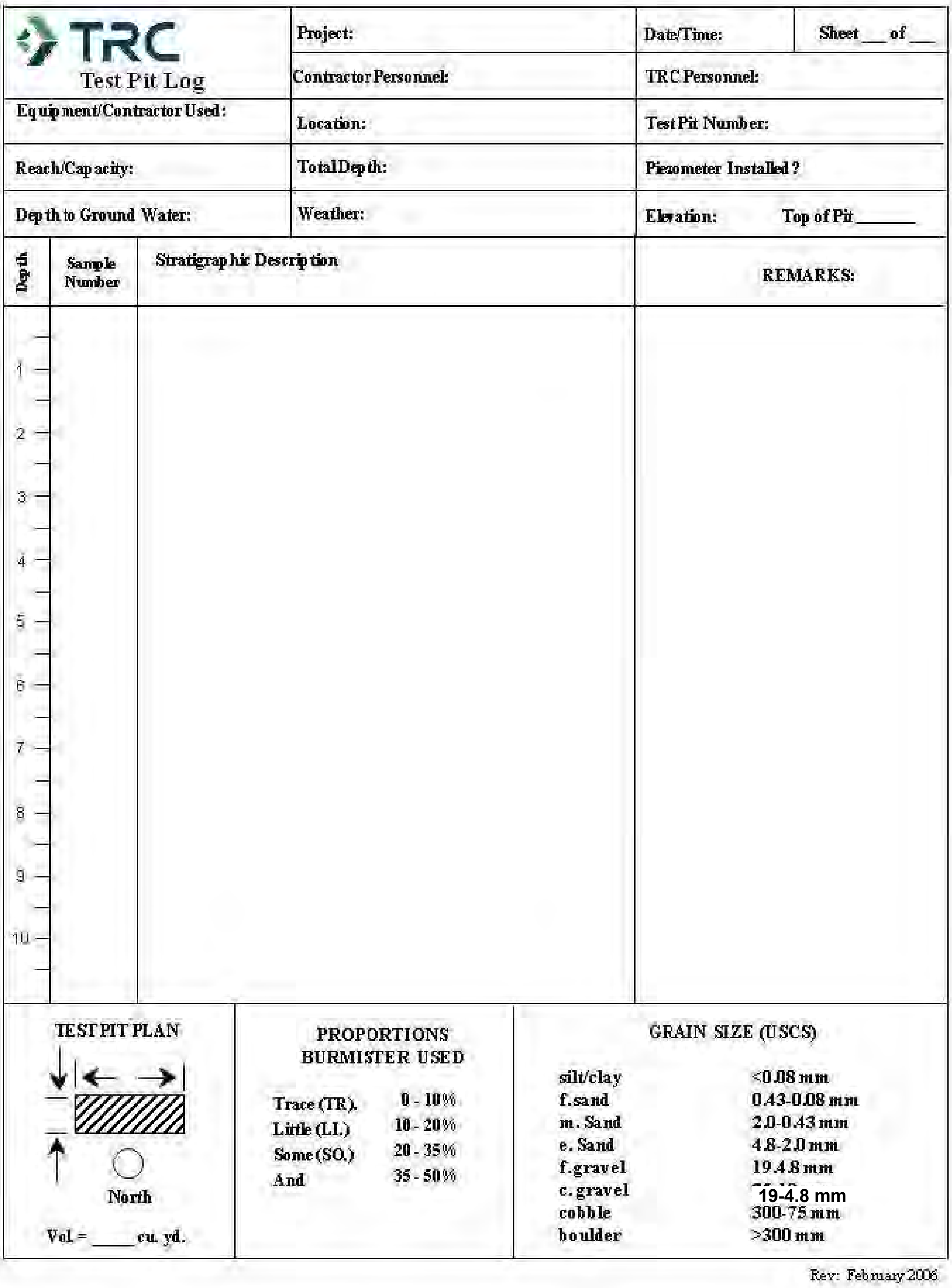
silt/clay	<0.08 mm
f. sand	0.43-0.08 mm
m. sand	2.0-0.43 mm
c. sand	4.8-2.0 mm
f. gravel	19-4.8 mm
c. gravel	75-19 mm
cobble	300-75 mm
boulder	>300 mm

Notes

1)

2)

3)



Test Pit Log

Test Pit Log	**Project:**	**Date/Time:**	**Sheet __ of __**
	Contractor Personnel:	**TRC Personnel:**	
Equipment/Contractor Used:	**Location:**	**Test Pit Number:**	
Reach/Capacity:	**Total Depth:**	**Piezometer Installed?**	
Depth to Ground Water:	**Weather:**	**Elevation:**	**Top of Pit ______**

Depth	**Sample Number**	**Stratigraphic Description**	**REMARKS:**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

TEST PIT PLAN

North

Vol. = _____ cu. yd.

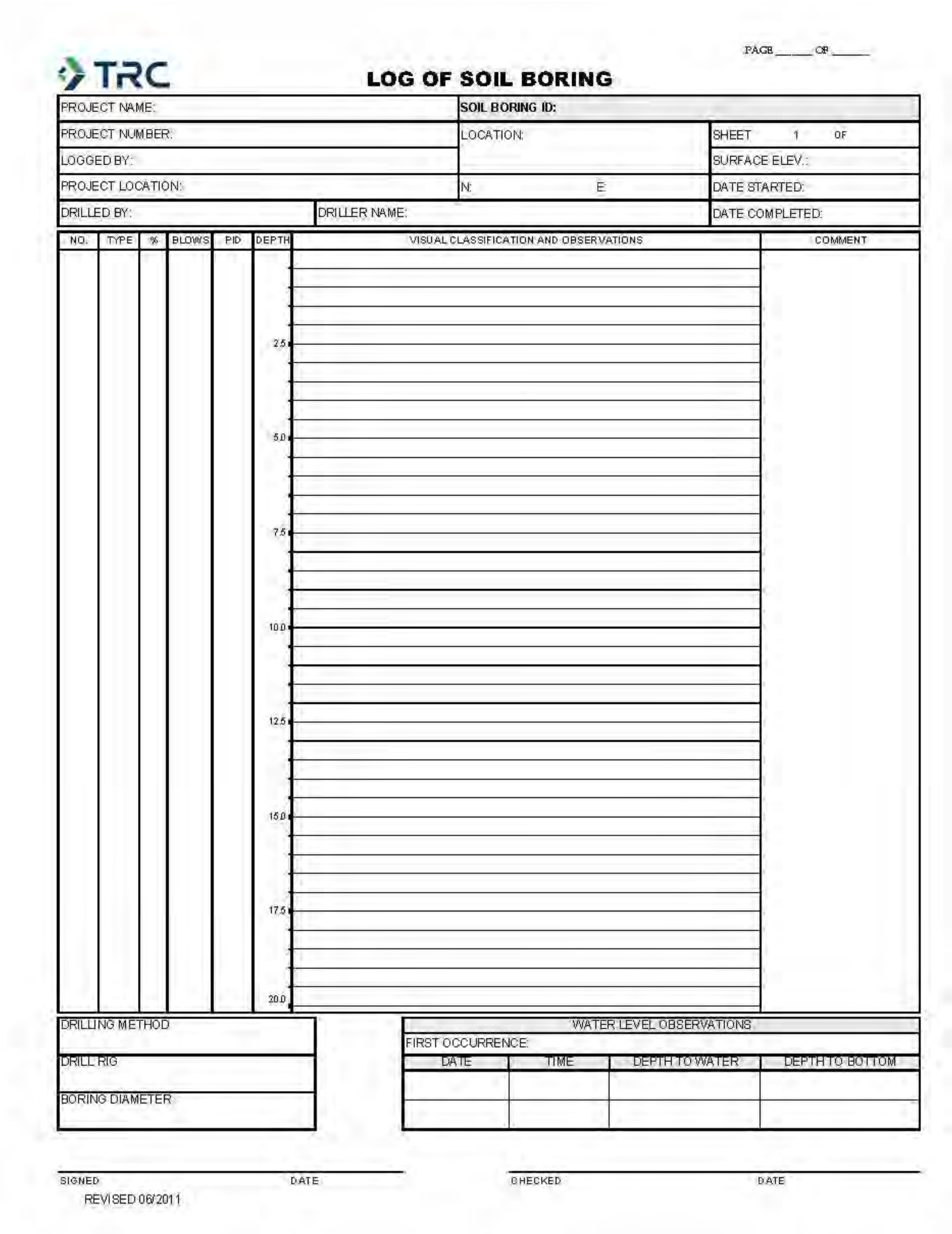
PROPORTIONS BURMISTER USED

Trace (TR).	0 - 10%
Little (LI.)	10 - 20%
Some (SO.)	20 - 35%
And	35 - 50%

GRAIN SIZE (USCS)

silt/clay	<0.08 mm
f.sand	0.43-0.08 mm
m. Sand	2.0-0.43 mm
c. Sand	4.8-2.0 mm
f.gravel	19.4.8 mm
c.gravel	19-4.8 mm
cobble	300-75 mm
boulder	>300 mm

Rev: February 2006



PAGE ____ OF ____

LOG OF SOIL BORING

PROJECT NAME:		SOIL BORING ID:	
PROJECT NUMBER:		LOCATION:	SHEET 1 OF
LOGGED BY:			SURFACE ELEV.:
PROJECT LOCATION:		N: E:	DATE STARTED:
DRILLED BY:	DRILLER NAME:		DATE COMPLETED:

NO.	TYPE	%	BLOWS	PID	DEPTH	VISUAL CLASSIFICATION AND OBSERVATIONS	COMMENT
					2.5		
					5.0		
					7.5		
					10.0		
					12.5		
					15.0		
					17.5		
					20.0		

DRILLING METHOD

DRILL RIG

BORING DIAMETER

WATER LEVEL OBSERVATIONS

FIRST OCCURRENCE:

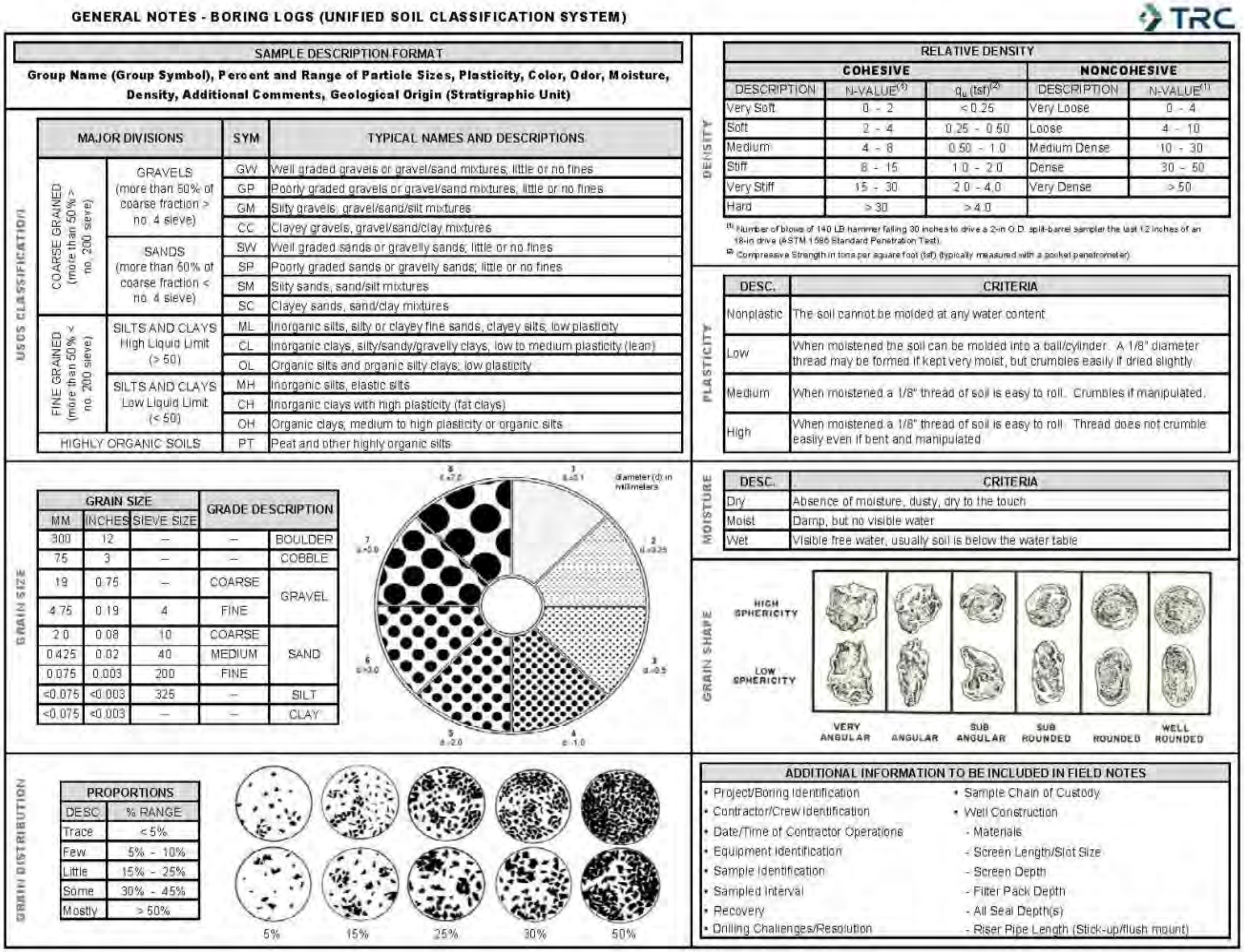
DATE	TIME	DEPTH TO WATER	DEPTH TO BOTTOM

SIGNED ____ DATE ____ CHECKED ____ DATE ____

REVISED 06/2011

ATTACHMENT B

USCS FIELD REFERENCE SHEETS



GENERAL NOTES - BORING LOGS (UNIFIED SOIL CLASSIFICATION SYSTEM)

TRC

SAMPLE DESCRIPTION FORMAT

Group Name (Group Symbol), Percent and Range of Particle Sizes, Plasticity, Color, Odor, Moisture, Density, Additional Comments, Geological Origin (Stratigraphic Unit)

USCS CLASSIFICATION

MAJOR DIVISIONS			SYM	TYPICAL NAMES AND DESCRIPTIONS
COARSE GRAINED (more than 50% > no. 200 sieve)	GRAVELS (more than 50% of coarse fraction > no. 4 sieve)		GW	Well graded gravels or gravel/sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel/sand mixtures, little or no fines
			GM	Silty gravels, gravel/sand/silt mixtures
			CC	Clayey gravels, gravel/sand/clay mixtures
	SANDS (more than 50% of coarse fraction < no. 4 sieve)		SW	Well graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand/silt mixtures
			SC	Clayey sands, sand/clay mixtures
FINE GRAINED (more than 50% < no. 200 sieve)	SILTS AND CLAYS High Liquid Limit (> 50)		ML	Inorganic silts, silty or clayey fine sands, clayey silts, low plasticity
			CL	Inorganic clays, silty/sandy/gravelly clays, low to medium plasticity (lean)
			OL	Organic silts and organic silty clays, low plasticity
	SILTS AND CLAYS Low Liquid Limit (< 50)		MH	Inorganic silts, elastic silts
			CH	Inorganic clays with high plasticity (fat clays)
			OH	Organic clays, medium to high plasticity or organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic silts

DENSITY

RELATIVE DENSITY				
COHESIVE			NONCOHESIVE	
DESCRIPTION	N-VALUE[1]	q_u (tsf)[2]	DESCRIPTION	N-VALUE[1]
Very Soft	0 - 2	< 0.25	Very Loose	0 - 4
Soft	2 - 4	0.25 - 0.50	Loose	4 - 10
Medium	4 - 8	0.50 - 1.0	Medium Dense	10 - 30
Stiff	8 - 15	1.0 - 2.0	Dense	30 - 50
Very Stiff	15 - 30	2.0 - 4.0	Very Dense	> 50
Hard	> 30	> 4.0		

[1] Number of blows of 140 LB hammer falling 30 inches to drive a 2-in O.D. split-barrel sampler the last 12 inches of an 18-in drive (ASTM 1586 Standard Penetration Test).

[2] Compressive Strength in tons per square foot (tsf) (typically measured with a pocket penetrometer)

PLASTICITY

DESC.	CRITERIA
Nonplastic	The soil cannot be molded at any water content
Low	When moistened the soil can be molded into a ball/cylinder. A 1/8" diameter thread may be formed if kept very moist, but crumbles easily if dried slightly
Medium	When moistened a 1/8" thread of soil is easy to roll. Crumbles if manipulated.
High	When moistened a 1/8" thread of soil is easy to roll. Thread does not crumble easily even if bent and manipulated

GRAIN SIZE

GRAIN SIZE			GRADE DESCRIPTION	
MM	INCHES	SIEVE SIZE		
300	12	–	–	BOULDER
75	3	–	–	COBBLE
19	0.75	–	COARSE	GRAVEL
4.75	0.19	4	FINE	
2.0	0.08	10	COARSE	SAND
0.425	0.02	40	MEDIUM	
0.075	0.003	200	FINE	
<0.075	<0.003	325	–	SILT
<0.075	<0.003	–	–	CLAY

MOISTURE

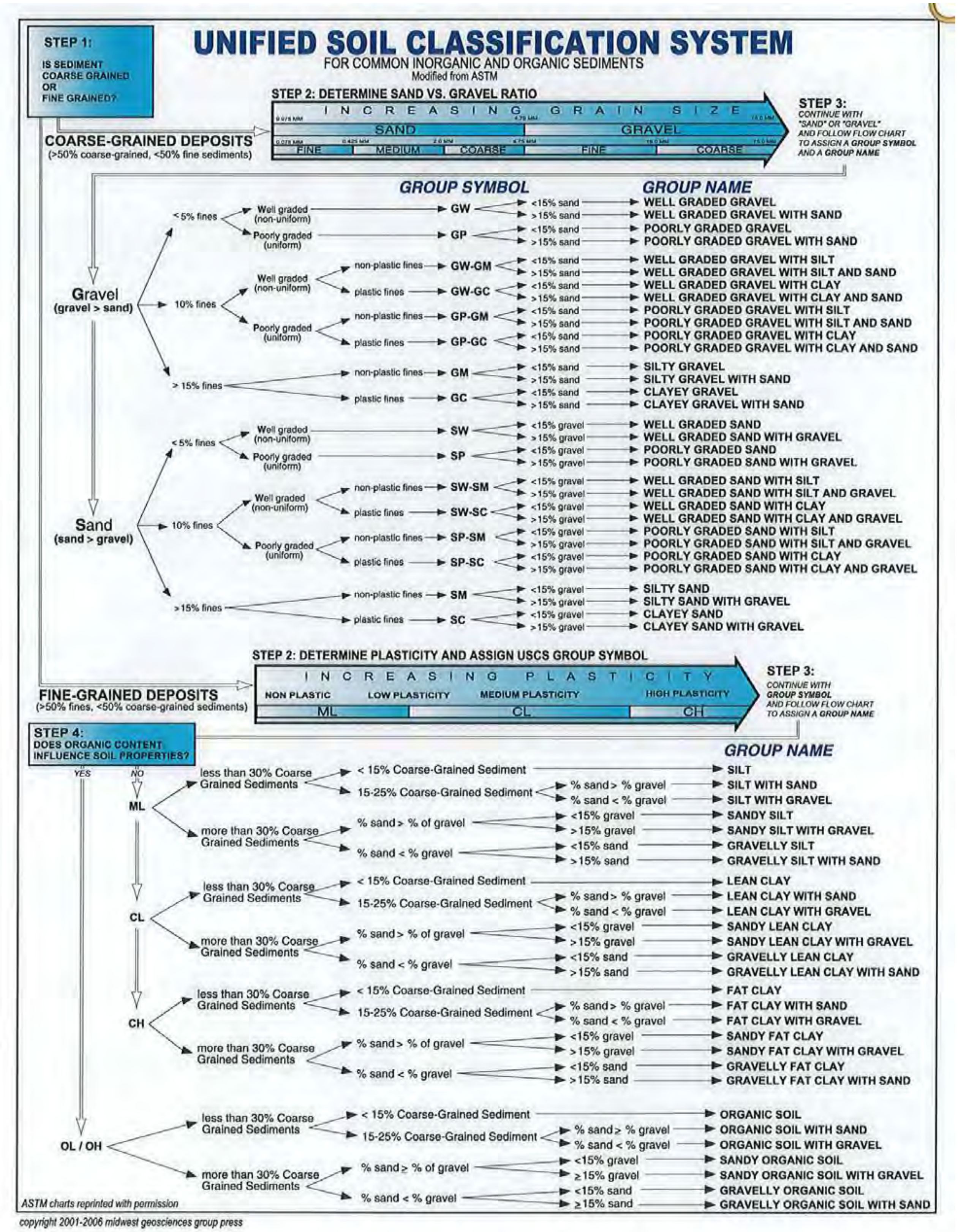
DESC.	CRITERIA
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below the water table

GRAIN DISTRIBUTION

PROPORTIONS	
DESC.	% RANGE
Trace	< 5%
Few	5% - 10%
Little	15% - 25%
Some	30% - 45%
Mostly	> 50%

ADDITIONAL INFORMATION TO BE INCLUDED IN FIELD NOTES

- Project/Boring Identification
- Contractor/Crew Identification
- Date/Time of Contractor Operations
- Equipment Identification
- Sample Identification
- Sampled Interval
- Recovery
- Drilling Challenges/Resolution
- Sample Chain of Custody
- Well Construction
  - Materials
  - Screen Length/Slot Size
  - Screen Depth
  - Filter Pack Depth
  - All Seal Depth(s)
  - Riser Pipe Length (Stick-up/flush mount)


UNIFIED SOIL CLASSIFICATION SYSTEM
FOR COMMON INORGANIC AND ORGANIC SEDIMENTS
Modified from ASTM
STEP 1: IS SEDIMENT COARSE GRAINED OR FINE GRAINED?
COARSE-GRAINED DEPOSITS
(>50% coarse-grained, <50% fine sediments)
STEP 2: DETERMINE SAND VS. GRAVEL RATIO
INCREASING GRAIN SIZE
0.075 MM
4.75 MM
75.0 MM
SAND
GRAVEL
0.075 MM
0.425 MM
2.0 MM
4.75 MM
19.0 MM
75.0 MM
FINE
MEDIUM
COARSE
FINE
COARSE
STEP 3: CONTINUE WITH "SAND" OR "GRAVEL" AND FOLLOW FLOW CHART TO ASSIGN A GROUP SYMBOL AND A GROUP NAME
GROUP SYMBOL
GROUP NAME
Gravel (gravel > sand)
<5% fines
Well graded (non-uniform)
GW
<15% sand
WELL GRADED GRAVEL
>15% sand
WELL GRADED GRAVEL WITH SAND
Poorly graded (uniform)
GP
<15% sand
POORLY GRADED GRAVEL
>15% sand
POORLY GRADED GRAVEL WITH SAND
10% fines
Well graded (non-uniform)
non-plastic fines
GW-GM
<15% sand
WELL GRADED GRAVEL WITH SILT
>15% sand
WELL GRADED GRAVEL WITH SILT AND SAND
plastic fines
GW-GC
<15% sand
WELL GRADED GRAVEL WITH CLAY
>15% sand
WELL GRADED GRAVEL WITH CLAY AND SAND
Poorly graded (uniform)
non-plastic fines
GP-GM
<15% sand
POORLY GRADED GRAVEL WITH SILT
>15% sand
POORLY GRADED GRAVEL WITH SILT AND SAND
plastic fines
GP-GC
<15% sand
POORLY GRADED GRAVEL WITH CLAY
>15% sand
POORLY GRADED GRAVEL WITH CLAY AND SAND
> 15% fines
non-plastic fines
GM
<15% sand
SILTY GRAVEL
>15% sand
SILTY GRAVEL WITH SAND
plastic fines
GC
<15% sand
CLAYEY GRAVEL
>15% sand
CLAYEY GRAVEL WITH SAND
Sand (sand > gravel)
< 5% fines
Well graded (non-uniform)
SW
<15% gravel
WELL GRADED SAND
>15% gravel
WELL GRADED SAND WITH GRAVEL
Poorly graded (uniform)
SP
<15% gravel
POORLY GRADED SAND
>15% gravel
POORLY GRADED SAND WITH GRAVEL
10% fines
Well graded (non-uniform)
non-plastic fines
SW-SM
<15% gravel
WELL GRADED SAND WITH SILT
>15% gravel
WELL GRADED SAND WITH SILT AND GRAVEL
plastic fines
SW-SC
<15% gravel
WELL GRADED SAND WITH CLAY
>15% gravel
WELL GRADED SAND WITH CLAY AND GRAVEL
Poorly graded (uniform)
non-plastic fines
SP-SM
<15% gravel
POORLY GRADED SAND WITH SILT
>15% gravel
POORLY GRADED SAND WITH SILT AND GRAVEL
plastic fines
SP-SC
<15% gravel
POORLY GRADED SAND WITH CLAY
>15% gravel
POORLY GRADED SAND WITH CLAY AND GRAVEL
>15% fines
non-plastic fines
SM
<15% gravel
SILTY SAND
>15% gravel
SILTY SAND WITH GRAVEL
plastic fines
SC
<15% gravel
CLAYEY SAND
>15% gravel
CLAYEY SAND WITH GRAVEL
STEP 2: DETERMINE PLASTICITY AND ASSIGN USCS GROUP SYMBOL
FINE-GRAINED DEPOSITS
(>50% fines, <50% coarse-grained sediments)
INCREASING PLASTICITY
NON PLASTIC
LOW PLASTICITY
MEDIUM PLASTICITY
HIGH PLASTICITY
ML
CL
CH
STEP 3: CONTINUE WITH GROUP SYMBOL AND FOLLOW FLOW CHART TO ASSIGN A GROUP NAME
STEP 4: DOES ORGANIC CONTENT INFLUENCE SOIL PROPERTIES?
YES
NO
GROUP NAME
ML
less than 30% Coarse Grained Sediments
< 15% Coarse-Grained Sediment
SILT
15-25% Coarse-Grained Sediment
% sand > % gravel
SILT WITH SAND
% sand < % gravel
SILT WITH GRAVEL
more than 30% Coarse Grained Sediments
% sand > % of gravel
<15% gravel
SANDY SILT
>15% gravel
SANDY SILT WITH GRAVEL
% sand < % gravel
<15% sand
GRAVELLY SILT
>15% sand
GRAVELLY SILT WITH SAND
CL
less than 30% Coarse Grained Sediments
< 15% Coarse-Grained Sediment
LEAN CLAY
15-25% Coarse-Grained Sediment
% sand > % gravel
LEAN CLAY WITH SAND
% sand < % gravel
LEAN CLAY WITH GRAVEL
more than 30% Coarse Grained Sediments
% sand > % of gravel
<15% gravel
SANDY LEAN CLAY
>15% gravel
SANDY LEAN CLAY WITH GRAVEL
% sand < % gravel
<15% sand
GRAVELLY LEAN CLAY
>15% sand
GRAVELLY LEAN CLAY WITH SAND
CH
less than 30% Coarse Grained Sediments
< 15% Coarse-Grained Sediment
FAT CLAY
15-25% Coarse-Grained Sediment
% sand > % gravel
FAT CLAY WITH SAND
% sand < % gravel
FAT CLAY WITH GRAVEL
more than 30% Coarse Grained Sediments
% sand > % of gravel
<15% gravel
SANDY FAT CLAY
>15% gravel
SANDY FAT CLAY WITH GRAVEL
% sand < % gravel
<15% sand
GRAVELLY FAT CLAY
>15% sand
GRAVELLY FAT CLAY WITH SAND
OL / OH
less than 30% Coarse Grained Sediments
< 15% Coarse-Grained Sediment
ORGANIC SOIL
15-25% Coarse-Grained Sediment
% sand ≥ % gravel
ORGANIC SOIL WITH SAND
% sand < % gravel
ORGANIC SOIL WITH GRAVEL
more than 30% Coarse Grained Sediments
% sand ≥ % of gravel
<15% gravel
SANDY ORGANIC SOIL
≥15% gravel
SANDY ORGANIC SOIL WITH GRAVEL
% sand < % gravel
<15% sand
GRAVELLY ORGANIC SOIL
≥15% sand
GRAVELLY ORGANIC SOIL WITH SAND
ASTM charts reprinted with permission

ATTACHMENT C

SOP FACT SHEET

SOIL CLASSIFICATION PROCEDURES

PURPOSE AND OBJECTIVE

The objective of this method is to standardize the collection and documentation of information on soil that is useful for the purpose of hydrogeological or geotechnical evaluation of a site. The use of standardized visual examination and manual test methods by all field personnel results in standardized data that can be evaluated later for geologic and engineering uses.

Soil samples may be collected by various means, as discussed in TRC's Soil Sampling SOP. Regardless of the sample collection method, the resulting soil sample should be visually described and characterized. Visual examination of the sample will result in identifying grain size, particle size percentages, geologic and geotechnical modifiers and/or classifications, and a host of secondary characteristics.

WHAT TO BRING

- Field book, boring logs, test pit logs (as applicable)
- A copy of boring logs or field notes from previous work performed at or near the site
- Pocket penetrometer or miniature vane shear device
- Munsell Soil Color Chart
- Burmister and/or Unified Soil Classification System (USCS) classification chart/reference sheets
- Sand grading chart
- Camera
- Appropriate knife
- Spoon and/or small spatula
- Tape measure, folding ruler or yard stick
- Portable table
- Polyethylene sheeting
- Hand lens
- Equipment decontamination supplies
- Deionized water in squeeze bottle
- Small squirt bottle with dilute hydrochloric acid (1 part 10N HCl to 3 parts water)PID
- Garbage bags

OFFICE

- Prepare/update the HASP; make sure the field team is familiar with the latest version.
- Discuss the objective for the soil sampling program with the project manager and/or the field lead. Discuss sample order, collection method, designation, analytical parameters, turn-around times, laboratory, etc.
  - Are the soil cuttings to be containerized in drums or returned to borehole?
  - Field decontamination required?
- Confirm that all necessary equipment is available in-house or has been ordered. Rental equipment is typically delivered the day before fieldwork is scheduled. Prior to departure, test equipment and make sure it is in proper working order.
- Verify that a utility survey/mark-out has been performed to ensure that sample locations are clear of overhead and buried utilities. Obtain a copy of the markout ticket or confirmation number. Additionally, a private geophysical sub-surface survey may be necessary.

ON-SITE

- Verify that underground utilities have been marked out and that the markouts are clear. Stay at least two feet away from any marked utility. Identify if any overhead obstructions or limited access areas exist near proposed borings and contact the Project Manager if any proposed locations need to be moved. Sketch/photograph markout locations.
- Review the HASP with all field personnel, conduct Health & Safety tailgate meeting.
- Make sure appropriate PPE is worn by all personnel and work area is safe (i.e., utilize traffic cones; minimize interference with on-site activities and pedestrian traffic, etc.).
- Calibrate equipment (if applicable) and record all rental equipment serial numbers in the field book.

MODIFIED BURMISTER SOIL CLASSIFICATION SYSTEM

The general description of a soil sample should be in the following order:

1. Color
2. Major Constituent – capitalized
3. Minor Constituent(s)
4. Geologic modifiers or classifications (e.g., glacial deposit, fill material) in parentheses
5. Density
6. Moisture content
7. Modifiers for fine fraction of sample (plasticity, dilatancy and toughness)
8. Other significant observations (e.g., odors, staining, sheen, petroleum product, debris)

SOIL CLASSIFICATION PROCEDURES

Use the following guidelines when recording soil descriptions:

-If the major constituent comprises more than 50% of the soil, then fully capitalize the major component descriptor (e.g., SAND);
-If the major constituent comprises less than 50% of the soil, capitalize the descriptor (e.g., Sand);
-Place a comma after the major and minor constituent descriptors;
-Place size qualifiers such as coarse, medium, or fine before the major constituent descriptors;
-Use the appropriate adjectives for proportions (e.g., and, some, little, trace) when describing the minor fraction(s); and
-Use the modifiers for fine grained soils described (plasticity, dilatancy and toughness).

EXAMPLE 1: Tan, medium SAND, little fine sand, trace coarse sand, trace silt, stratified (Outwash), loose, wet.

EXAMPLE 2: Gray, CLAY, soft, wet, medium plasticity, no dilatancy and low toughness.

When logging a soil sample collected from a boring (e.g., split spoon or acetate liner) where more than one soil type is present, describe each one separately, using additional line(s) on the boring log form. Start the description from the top and log each change in stratigraphy in sequence to the bottom. Record the length (e.g., 0-0.5 ft.) at the beginning of each separate sequence description, followed by a colon. Draw a line below the bottom of the complete sample description.

USCS CLASSIFICATION SYSTEM

The USCS is based on grain size and response to physical manipulation at various water contents. This system is often used for classifying soils encountered in boreholes, test pits, and surface sampling. The following properties form the basis of USCS soil classification:

- Percentage of gravel, sand, and fines;
- Shape of the grain size distribution curve; and
- Plasticity and compressibility characteristics.

Four soil fractions are recognized: cobbles, gravel, sand, and fines (silt or clay). The soils are divided as coarse grained soils, fine grained soils, and highly organic soils. Soil description should be concise and stress major constituents and characteristics for fine-grained, organic, or coarse-grained soils.

The general description of a soil sample should be in the following order:

1. Group Name (Group Symbol)
2. Percent and Range of Particle Sizes
3. Plasticity
4. Color (Munsell Color Chart)
5. Odor
6. Moisture
7. Density
8. Additional Comments
9. Geological Origin (Stratigraphic Unit)

EXAMPLE 1: Well Graded Gravel with Sand (GW): mostly fine to coarse subangular gravel, little fine to coarse subangular sand, yellowish brown (10YR 5/4), no odor, moist, loose, few small cinders, fill.

EXAMPLE 2: Silt (ML): mostly silt, non-plastic, gray (7.5YR 5/1), slight hydrocarbon odor, moist, medium dense, lacustrine.

The USCS recognizes 15 soil groups and uses names and letters to distinguish between these groups. The flow charts included in Attachment B: USCS Field Reference Guide, for fine- and coarse-grained soils, can be used to assign the appropriate group symbol(s) and name and are replicated from ASTM D2488. If the soil has properties which do not distinctly place it into a specific group, borderline symbols (example SP-SM, GP-GC, etc.) may be used.

GRAIN SIZE

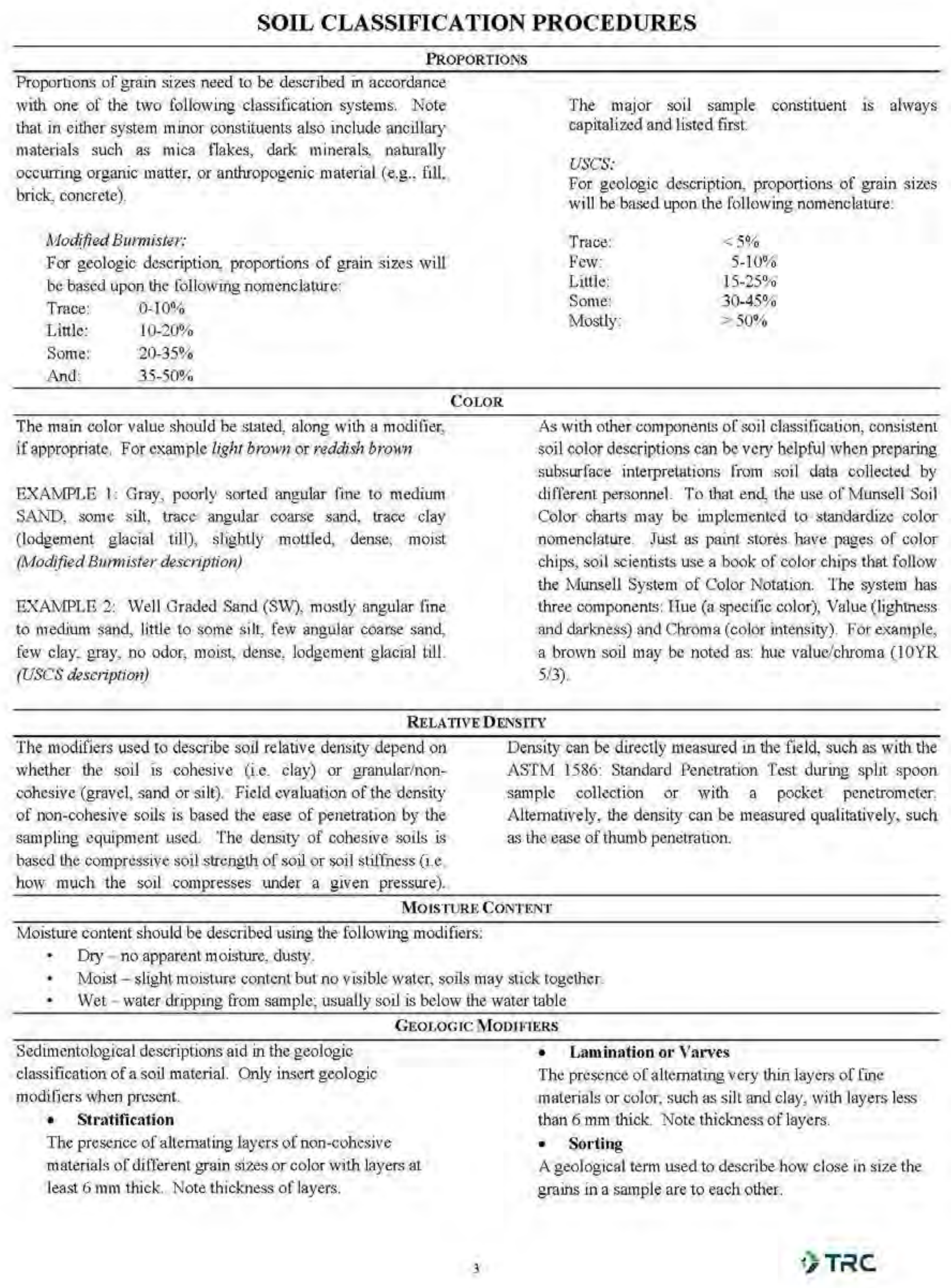
Grain size classification should be based on the following method.

COARSE GRAINED PARTICLES

Boulder:	> 300 mm (>12 in.)
Cobble:	75 - 300 mm (3 in. – 12 in.)
Coarse Gravel:	19 - 75 mm (¾ in. - 3 in.)
Fine Gravel:	4.75 - 19 mm (No. 4 sieve – ¾ in.)
Coarse Sand:	2.0 - 4.75 mm (No. 10 sieve – No. 4 sieve)
Medium Sand:	0.425 - 2.0 mm (No. 40 sieve – No. 10 sieve)
Fine Sand:	0.075 - 0.425 mm (No. 200 sieve – No. 40 sieve)

FINE GRAINED PARTICLES

Note that these particle sizes cannot be visually differentiated with standard field equipment. Silts and clays are distinguished in the field by cohesion and plasticity.



SOIL CLASSIFICATION PROCEDURES

PROPORTIONS

Proportions of grain sizes need to be described in accordance with one of the two following classification systems. Note that in either system minor constituents also include ancillary materials such as mica flakes, dark minerals, naturally occurring organic matter, or anthropogenic material (e.g., fill, brick, concrete).

Modified Burmister:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

Trace:	0-10%
Little:	10-20%
Some:	20-35%
And:	35-50%

The major soil sample constituent is always capitalized and listed first.

USCS:
For geologic description, proportions of grain sizes will be based upon the following nomenclature:

Trace:	< 5%
Few:	5-10%
Little:	15-25%
Some:	30-45%
Mostly:	> 50%

COLOR

The main color value should be stated, along with a modifier, if appropriate. For example *light brown* or *reddish brown*

EXAMPLE 1: Gray, poorly sorted angular fine to medium SAND, some silt, trace angular coarse sand, trace clay (lodgement glacial till), slightly mottled, dense, moist *(Modified Burmister description)*

EXAMPLE 2: Well Graded Sand (SW), mostly angular fine to medium sand, little to some silt, few angular coarse sand, few clay, gray, no odor, moist, dense, lodgement glacial till. *(USCS description)*

As with other components of soil classification, consistent soil color descriptions can be very helpful when preparing subsurface interpretations from soil data collected by different personnel. To that end, the use of Munsell Soil Color charts may be implemented to standardize color nomenclature. Just as paint stores have pages of color chips, soil scientists use a book of color chips that follow the Munsell System of Color Notation. The system has three components: Hue (a specific color), Value (lightness and darkness) and Chroma (color intensity). For example, a brown soil may be noted as: hue value/chroma (10YR 5/3).

RELATIVE DENSITY

The modifiers used to describe soil relative density depend on whether the soil is cohesive (i.e. clay) or granular/non-cohesive (gravel, sand or silt). Field evaluation of the density of non-cohesive soils is based the ease of penetration by the sampling equipment used. The density of cohesive soils is based the compressive soil strength of soil or soil stiffness (i.e. how much the soil compresses under a given pressure).

Density can be directly measured in the field, such as with the ASTM 1586: Standard Penetration Test during split spoon sample collection or with a pocket penetrometer. Alternatively, the density can be measured qualitatively, such as the ease of thumb penetration.

MOISTURE CONTENT

Moisture content should be described using the following modifiers:

- Dry – no apparent moisture, dusty.
- Moist – slight moisture content but no visible water, soils may stick together.
- Wet – water dripping from sample; usually soil is below the water table

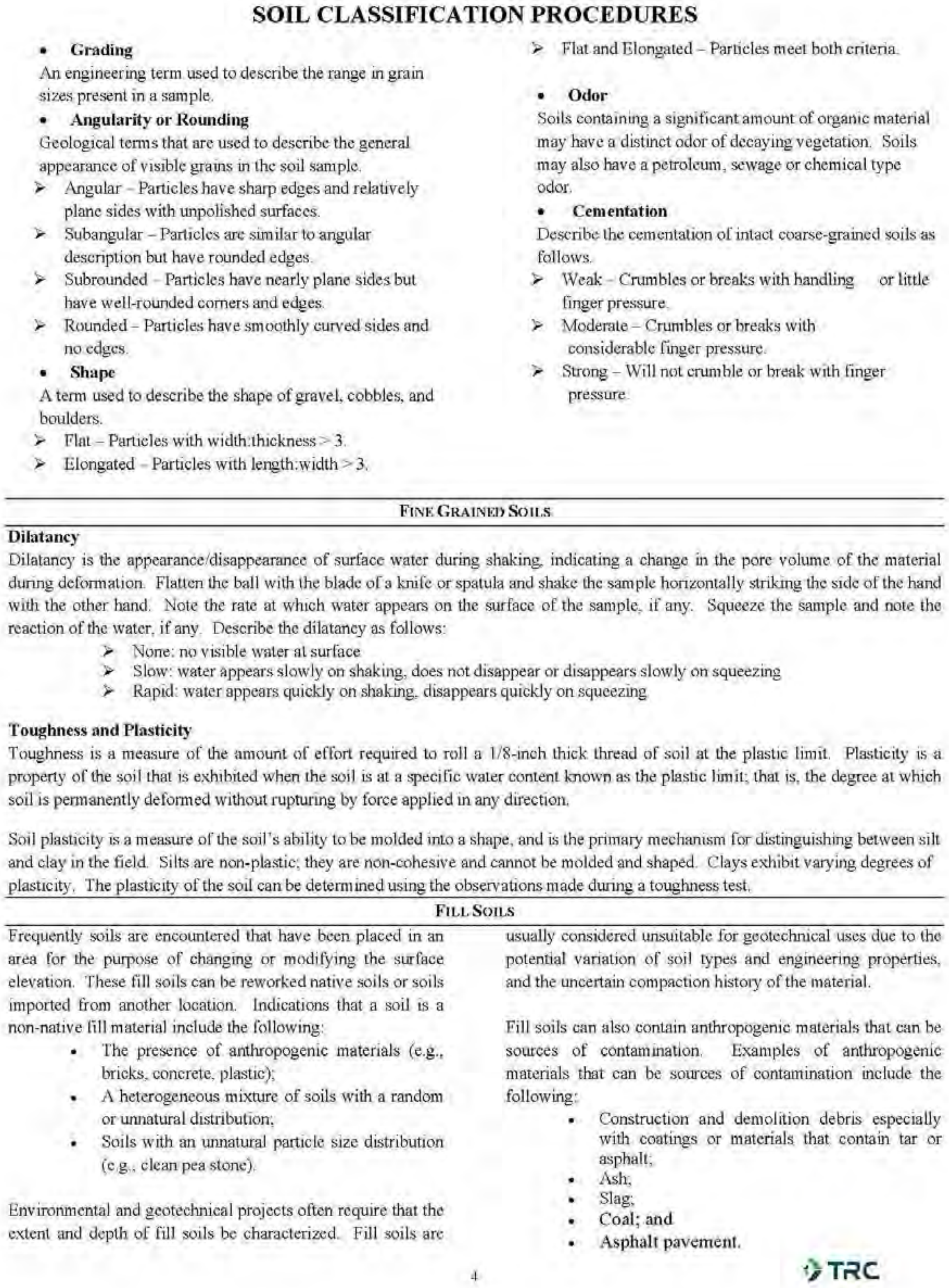
GEOLOGIC MODIFIERS

Sedimentological descriptions aid in the geologic classification of a soil material. Only insert geologic modifiers when present.

- **Stratification**
  The presence of alternating layers of non-cohesive materials of different grain sizes or color with layers at least 6 mm thick. Note thickness of layers.
- **Lamination or Varves**
  The presence of alternating very thin layers of fine materials or color, such as silt and clay, with layers less than 6 mm thick. Note thickness of layers.
- **Sorting**
  A geological term used to describe how close in size the grains in a sample are to each other.

3

TRC



SOIL CLASSIFICATION PROCEDURES

- **Grading**

An engineering term used to describe the range in grain sizes present in a sample.

- **Angularity or Rounding**

Geological terms that are used to describe the general appearance of visible grains in the soil sample.

- Angular – Particles have sharp edges and relatively plane sides with unpolished surfaces.
- Subangular – Particles are similar to angular description but have rounded edges.
- Subrounded – Particles have nearly plane sides but have well-rounded corners and edges.
- Rounded – Particles have smoothly curved sides and no edges.

- **Shape**

A term used to describe the shape of gravel, cobbles, and boulders.

- Flat – Particles with width:thickness > 3.
- Elongated – Particles with length:width > 3.
- Flat and Elongated – Particles meet both criteria.

- **Odor**

Soils containing a significant amount of organic material may have a distinct odor of decaying vegetation. Soils may also have a petroleum, sewage or chemical type odor.

- **Cementation**

Describe the cementation of intact coarse-grained soils as follows.

- Weak – Crumbles or breaks with handling or little finger pressure.
- Moderate – Crumbles or breaks with considerable finger pressure.
- Strong – Will not crumble or break with finger pressure.

FINE GRAINED SOILS

Dilatancy

Dilatancy is the appearance/disappearance of surface water during shaking, indicating a change in the pore volume of the material during deformation. Flatten the ball with the blade of a knife or spatula and shake the sample horizontally striking the side of the hand with the other hand. Note the rate at which water appears on the surface of the sample, if any. Squeeze the sample and note the reaction of the water, if any. Describe the dilatancy as follows:

- None: no visible water at surface
- Slow: water appears slowly on shaking, does not disappear or disappears slowly on squeezing
- Rapid: water appears quickly on shaking, disappears quickly on squeezing

Toughness and Plasticity

Toughness is a measure of the amount of effort required to roll a 1/8-inch thick thread of soil at the plastic limit. Plasticity is a property of the soil that is exhibited when the soil is at a specific water content known as the plastic limit; that is, the degree at which soil is permanently deformed without rupturing by force applied in any direction.

Soil plasticity is a measure of the soil's ability to be molded into a shape, and is the primary mechanism for distinguishing between silt and clay in the field. Silts are non-plastic; they are non-cohesive and cannot be molded and shaped. Clays exhibit varying degrees of plasticity. The plasticity of the soil can be determined using the observations made during a toughness test.

FILL SOILS

Frequently soils are encountered that have been placed in an area for the purpose of changing or modifying the surface elevation. These fill soils can be reworked native soils or soils imported from another location. Indications that a soil is a non-native fill material include the following:

- The presence of anthropogenic materials (e.g., bricks, concrete, plastic);
- A heterogeneous mixture of soils with a random or unnatural distribution;
- Soils with an unnatural particle size distribution (e.g., clean pea stone).

Environmental and geotechnical projects often require that the extent and depth of fill soils be characterized. Fill soils are usually considered unsuitable for geotechnical uses due to the potential variation of soil types and engineering properties, and the uncertain compaction history of the material.

Fill soils can also contain anthropogenic materials that can be sources of contamination. Examples of anthropogenic materials that can be sources of contamination include the following:

- Construction and demolition debris especially with coatings or materials that contain tar or asphalt;
- Ash;
- Slag;
- Coal; and
- Asphalt pavement.

Title: **Calibration of Field Instruments for Water Quality Parameters**	Procedure Number: **ECR 011**
	Revision Number: **1**
	Effective Date: **January 2020**

Authorization Signatures

Darby Litz		Elizabeth Denly	
Technical Review Darby Litz	Date 1/1/20	Environmental Sector Quality Director Elizabeth Denly	Date 1/1/20

This document is proprietary property of TRC. It is to be used only by the person(s) to whom it has been provided and solely for the express purpose intended. Any reproduction or distribution, for purposes other than the intended, is forbidden without the express written consent of TRC.

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 Scope and Applicability

The purpose of this standard operating procedure (SOP) is to provide a framework for calibrating field instruments used to measure water quality parameters for ground water and surface water. Water quality instruments addressed in this SOP include those that measure temperature, pH, dissolved oxygen (DO), conductivity/specific conductance, oxidation-reduction potential (ORP), and turbidity.

1.2 Summary of Method

All monitoring instruments must be calibrated before they are used to measure environmental samples. This SOP outlines the general methods for field instrument calibration, calibration documentation requirements, and corrective action procedures that will be implemented during field activities. Calibration procedures are different for each field instrument used and these procedures should be provided by the instrument manufacturer. The manufacturer’s instruction manual (including the instrument specifications) should accompany the instrument into the field.

At a minimum, calibration and/or a calibration check must be performed at the beginning of each day prior to use. Site-specific work plans should be consulted for required calibration frequency. Note: The initial calibration may be performed in the office prior to the field event or by the equipment supplier; however, calibration checks should be performed on site prior to use on the day of the fieldwork.

1.3 Equipment

The following equipment may be utilized when calibrating water quality parameter measuring equipment. Project-specific conditions or laboratory requirements may warrant the addition or deletion of items from this list.

- Appropriate level of personal protective equipment (PPE), as specified in the site-specific Health and Safety Plan (HASP).
- Water quality meter capable of measuring one or more of the following based on project scope: pH, temperature, DO, specific conductivity, and ORP (e.g., YSI 600XL, Horiba U-50, Hydrolab Quanta/QED MP-20, or equivalent)
- Turbidity meter (e.g., LaMotte Model 2020e, Hach 2100P, or equivalent)
- Deionized water
- Flow-through cell
- Ring stand with clamp
- Paper towels
- Soft tissue (e.g., Kimwipes®)
- Cuvettes

- Buffer solutions at pH 4, 7 and 10 standard units (SU)*. Commercially available solutions that have been validated by comparison to National Institute of Standards and Technology (NIST) standards are recommended for routine use.
- Conductivity solution (potassium chloride, typically 1,413 micromhos/centimeter [μmhos/cm])*
- ORP calibration solution (e.g., Zobell)*
- Turbidity standards (0, 1, 10 nephelometric turbidity units [NTUs] or StablCal Kit)*
- Zero DO solution (0.0 milligrams per liter [mg/L])*
- DO membrane kit (electrolyte solution, membranes)
- NIST thermometer (0.2ºC accuracy)*
- Small glass or polyethylene jars to hold the calibration standards (4-8 oz.)
- Field book
- Field instrument calibration logs
- Cup or spray bottle for the deionized water

*Dependent on the project-specific requirements and the instrument manufacturer

1.4 Definitions

Not applicable

1.5 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel shall follow the site-specific HASP. TRC personnel will use the appropriate level of PPE as defined in the HASP.

Implementing this SOP will require the use of calibration solutions. The following health and safety precautions must be taken with the pH, conductivity, turbidity, zero DO and ORP solutions: Avoid inhalation, skin and eye contact, and ingestion.

Maintenance of the instruments will require the use of liquid cleaners. Although these substances are not hazardous materials, TRC will appropriately handle and store them at all times in accordance with manufacturer’s instructions.

1.6 Cautions and Potential Problems

General cautions and potential problems are discussed below. Specific issues for individual parameters are discussed in Section 2.

- Prior to calibration, all instrument probes must be cleaned according to the manufacturer’s instructions. Failure to perform this step (proper maintenance) can lead to erroneous measurements. Rental instruments are routinely maintained by the vendor but should be checked for residues upon receipt.

- Prior to using calibration standards, check and record all expiration dates and lot numbers for the solutions on the field instrument calibration log. Discard any calibration standards that are past their expiration date.

- Avoid storing calibration solutions in extremely hot or cold temperatures to maintain solution integrity and prevent calibration errors.

- The volume of the calibration solutions must be sufficient to cover both the probe being calibrated and the temperature sensor (see manufacturer's instructions for additional information).

- Pre-rinse the sensor and calibration cup with a small amount of calibration solution to minimize dilution or cross-contamination.

- If desired, use a ring stand and clamp to secure the sonde in an upright position. This will prevent the sonde from falling over and damaging the probes.

- While calibrating or performing sample measurements, make sure there are no air bubbles lodged between the probe and the probe guard.

- Do not immerse the sensors in sea water or other highly saline water, alcohol or organic solvents.

- Problems during calibration may indicate the need to clean or replace sensors, electrodes or membranes or replace the calibration solutions.

- Have several clean absorbent paper towels or cotton cloths available to dry the probe between rinses and calibration solutions. Shake excess water off of the probes and dry off the outside of the probe sensors.

- All meters may have different relative accuracy, which will be specified in the instrument manual. Confirm that the meter being used meets the project's accuracy requirements.

1.7 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project- and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- OSHA 40-hour Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER) workers
- 8-hour annual HAZWOPER refresher training

2.0 PROCEDURES

Prior to use, instruments that will be used during field activities will be inspected to ensure they are clean, checked for possible malfunctions, and calibrated in accordance with manufacturer's procedures. Often, equipment provided by a rental company is calibrated prior to shipment, and a calibration certificate is provided with the equipment. Review the calibration certificate provided by the equipment supplier.

Calibration checks (or verifying that instrument readings fall within an acceptable range of a standard without running through the full instrument calibration steps) will be performed on field instruments prior to their initial use, at least once daily, or whenever indications of faulty readings or instrument malfunction occurs. Some instruments or certain project scopes may require more frequent calibration checks depending on project quality objectives. In general, instrument selection and calibration will include the following steps:

- Determine which instruments are needed for the specific field tasks. Record the make, model number, and serial number of the instrument on the field instrument calibration log or in the field book.
- Obtain the necessary instruments and standard solutions for calibration. Check expiration dates on standard solutions and replace if out of date. Record the manufacturer, true value, lot number and expiration date of the standard solutions on the field instrument calibration log or in the field book.
- Assemble the instrument and turn it on allowing the instrument to warm up.
- Check battery charge, and charge or replace if necessary.
- Clean instrument (if necessary).
- If applicable, program the multi-probe instrument so that the applicable parameters to be measured will be displayed.
- Calibrate the instrument prior to field use in accordance with manufacturer’s procedures. (Note: If applicable, calibrate DO and conductivity first, because these parameters may affect the other calibrations).
- Document all calibration activities and results on the field instrument calibration log or in the field book.
- If the instrument malfunctions and cannot be corrected, obtain a replacement.
- Clean and decontaminate the instrument after use and before storage.
- Conduct calibration checks at least once per day or as needed.

The subsections that follow provide additional details and guidance regarding calibration for specific parameters; however, since every field instrument is different, refer to the specific instrument’s manual for appropriate operating and calibration procedures.

2.1 Temperature

Most instrument manuals state that calibration of the temperature sensor is not required, but this SOP recommends that the temperature sensor be checked to verify its accuracy. This accuracy check should be performed at least once per year and the accuracy check date/information should be kept with the instrument. If the accuracy check date/information is not included with the instrument or the last check was performed over a year prior to the date of use, it is recommended that the temperature sensor accuracy be checked at the beginning of the sampling event. If the instrument contains multiple temperature sensors, each sensor should be checked. Accuracy checks may be performed by the manufacturer/equipment supplier or in the field. Review the calibration certificate provided by the equipment supplier.

In the event of suspect temperature readings, the following verification procedure can be performed.

FIELD VERIFICATION PROCEDURE

1. Record the manufacturer, model number, and the certification number of the NIST thermometer being used to check the instrument's temperature sensor on the field instrument calibration log or in the field book. Allow a container filled with water to equilibrate to ambient temperature.

2. Place an NIST thermometer and the instrument's temperature sensor into the water, and wait approximately 2 to 3 minutes for both temperature readings to stabilize.

3. Record the temperature displayed by the thermometer and the temperature sensor on the field instrument calibration log or in the field book.

4. Compare the two measurements. The instrument's temperature sensor must agree with the NIST thermometer measurement within the accuracy of the sensor (typically ±0.15ºC). If the measurements do not agree, determine the correction factor to be applied to any subsequent temperature measurements made with this instrument. This correction factor must be applied to all readings made with the temperature sensor of this instrument.

   Correction Factor = NIST thermometer value – temperature sensor value

5. Record the date the temperature sensor check was performed and the correction factor that was determined, if applicable, on the field instrument calibration log or in the field book.

2.2 Dissolved Oxygen

DO is the volume of oxygen that is dissolved in water and is typically measured using an electrochemical membrane sensor.

CAUTIONS AND POTENTIAL PROBLEMS WITH DO MEASUREMENTS

- The DO probe's membrane and electrolyte solution should be checked prior to the sampling period and replaced if needed. If wrinkles or air bubbles are present under the membrane, if the membrane is torn or dirty, or if the electrolyte solution looks contaminated, replace both the membrane and electrolyte solution prior to calibration. Failure to perform this step may lead to erratic or erroneous measurements.
- Rental instruments are routinely maintained by the vendor, but the membrane should be checked for signs of wear upon receipt.
- If the probe reading shows the error message, "value out of range", the instrument probe must be recalibrated at a minimum. If the error persists, replace the sensor membrane and recalibrate.
- Most meters will allow you to calibrate the meter in air or against a wet sponge, which gives a "saturated air" calibration. Like pH, conductivity, and ORP, DO is heavily dependent on temperature. DO is also dependent upon barometric pressure. Typically DO is calibrated by entering the barometric pressure (usually in mm of mercury). Barometric pressure is dependent upon elevation, so be aware of substantial differences in elevation between your sampling location and the location from which you are

obtaining the barometric pressure reading. Use the Oxygen Solubility at Indicated Pressure chart in Attachment A for comparison to your calibrated reading.

- Barometric pressure should be corrected to local altitude for DO calibration:

  True BP (mm Hg) = [Corrected BP (mm Hg)] – [2.5 * Local Altitude (ft. above sea level)/100]

- If the calibration cup is used for DO, ensure the cup is loose to allow for pressure equilibration.
- Wait 3 to 5 minutes for the air in the cup to saturate with water during DO calibration.
- If calibrating in air, remove water droplets from the membrane by shaking the probe prior to inserting it into the calibration environment.
- Allow the temperature to stabilize completely in the calibration environment.
- Always keep the sensor clean of biofouling, such as bacteria or algae growth which may generate or consume oxygen resulting in erroneous readings.
- Keep the sensor free of oil, which could clog the membrane and prevent oxygen from diffusing to the sensor.
- Store the probe in a moist environment to keep the membrane from drying out, but do not store it in water which could encourage algae growth on the probe.

CALIBRATION PROCEDURE

1. Gently dry the temperature sensor according to manufacturer’s instructions.

2. Place a wet sponge, a wet paper towel, or 1/8 inch of water on the bottom of the DO calibration container that comes with the instrument. (The protective cover of the probe assembly also serves as the container used for the DO calibration.)

3. Place the DO probe in the container without the probe coming in contact with the wet sponge or paper towel. The probe must fit loosely in the container to ensure it is vented to the atmosphere.

4. Allow the confined air to become saturated with water vapor (saturation occurs in approximately 3 to 5 minutes as temperature becomes stable). During this time, turn on the instrument to allow the DO probe to warm up (may require at least 10-20 minutes warm-up time).

5. Record the barometric pressure (usually in mm of mercury) from the instrument’s onboard sensor, if available. If the instrument does not have an onboard barometer, this measurement can also be determined from an on-site barometer if a weather station is on site and manually entered into the meter. It is recommended that the barometric pressure not be obtained from the local weather service unless the pressure is corrected for the elevation of the sampling location and this is the only source of barometric data. [**Note:** inches of mercury times 25.4 mm/inch mercury equals mm of mercury].

6. Record the DO reading in mg/L and percent and compare this reading to the Oxygen Solubility at Indicated Pressure chart in Attachment A. For example, if the barometric

pressure is 750 mm Hg and the temperature inside the calibration cup is 25°C, the DO in mg/L reading should be 8.13 mg/L. Record this value on the field instrument calibration log.

7. If the values recorded on the field instrument calibration log for DO in mg/L do not agree with the published values from Attachment A and are not within the accuracy of the instrument (such as ± 0.2 mg/L and ± 2%, depending on the reading), repeat calibration. If this does not work, change the membrane and electrolyte solution and repeat calibration.

8. Remove the probe from the container, rinse it with deionized water, pat it dry with a towel, and place it into a zero (0.0 mg/L) DO standard if being used as part of the calibration. Fill the protective cup with the fresh zero DO standard. Pour the zero DO standard into the protective cup; the standard should be close enough to the top, so that the DO probe fits tightly into the container (no headspace). Check and record the unit's temperature reading.

9. Wait until the "mg/L DO" readings have stabilized. The instrument should read between -0.5 and +0.5 mg/L or to the accuracy of the instrument (usually ± 0.2 mg/L) within 3 minutes. Record this value on the field instrument calibration log. If the instrument does not reach this value, it may be necessary to clean the probe and change the membrane and electrolyte solution. Repeat the zero DO step if the value obtained is not acceptable. If this does not work, prepare a new 0.0 mg/L standard. If these procedures do not work, consult the equipment vendor for troubleshooting or equipment replacement.

   NOTE: For Zero DO checks: The solution used for this check contains sodium meta-bisulfite or sodium sulfite, which are harmful to the sensor and membrane. It is common practice to recalibrate the meter to 100% saturation after conducting a zero DO check to confirm that the sensor is still operating correctly. A zero DO check is not performed every day the instrument is in use for this reason, but a check should be performed at a minimum of once per sampling event. If conducting this check, be sure to record the manufacturer, true value, lot number, and expiration date of the solution on the field instrument calibration log.

2.3 pH

The pH is the measure of the degree of the acidity or alkalinity of a solution as measured on a scale of 0 to 14 SU. The pH of a sample is determined electrometrically using a glass electrode. All pH measurements are in SU.

CAUTIONS AND POTENTIAL PROBLEMS WITH PH MEASUREMENTS

- Choose the appropriate buffered standards that will bracket the expected values at the sampling locations. For ground water, the pH will usually be close to 7 SU. A minimum of two standards are typically needed for the calibration: one close to 7 SU, one at least two pH units below 7 SU or at least two pH units above 7 SU. The instrument will need to be re-calibrated if the water sample's pH is outside the range defined by the two standards used in the initial calibration, either by adding a third calibration point (if the meter will allow) or by selecting two new pH standards that bracket the water sample's pH.
- Regardless if performing a two- or three-point calibration, always calibrate with pH 7 buffer first.

CALIBRATION PROCEDURE

1. Allow the buffered standards to equilibrate to the ambient temperature.

2. Fill calibration containers with the buffered standards to ensure the pH probe and temperature sensor are completely submerged.

3. Remove the cover of the probe, rinse the probe in a cup filled with deionized water or use a spray bottle, and blot the probe dry with a soft tissue.

4. Enter the value of the first pH buffer solution (e.g., pH 7), immerse the probe in the standard, and allow at least 1 minute for temperature equilibration before proceeding. Record the temperature on the field instrument calibration log.

5. Enter the buffered solution value (7) into the pH calibration menu of the instrument. Allow the pH reading to stabilize for approximately 30 seconds, and if the reading does not change, finish the calibration and record the calibrated value on the field instrument calibration log. The calibration values after adjustment shall be within the accuracy of the instrument, or as required by the project. For example, if the accuracy of the meter is ±0.1 SU, then the calibration values after adjustment shall be between 6.9 and 7.1 SU. If the calibration values after adjustment are outside of this range, recalibrate. If readings continue to fluctuate or readings do not stabilize after recalibration, consult the equipment vendor for troubleshooting or equipment replacement (e.g., may need a new pH electrode).

6. Remove probe from the initial buffer solution, rinse in a cup filled with deionized water or use a spray bottle, and blot dry with soft tissue. Dispose of the used buffer solution.

7. Immerse probe into the second buffer solution (e.g., pH 4). Repeat step #5, substituting “4” into the pH calibration menu instead of “7”.

8. Remove probe from the second buffer solution, rinse in a cup filled with deionized water or use a spray bottle, and blot dry with soft tissue. Dispose of the used buffer solution.

9. Immerse probe in third buffer solution (e.g., pH 10) or continue to step #11 if only a two-point calibration is being performed. Repeat step #5, substituting “10” into the pH calibration menu instead of “7”.

10. Remove probe from the third buffer solution, rinse in a cup filled with deionized water or use a spray bottle, and blot dry with soft tissue. Dispose of the used buffer solution.

11. To perform the instrument pH check, select monitoring/run mode, (ensure that the initial buffer solution temperature [pH 7] has not changed), and immerse the probe into the buffer solution. Wait for the reading to stabilize. The instrument should read the initial standard value (7 SU) within the accuracy of the instrument, or as required by the project. Record the pH 7 check reading on the field instrument calibration log. If the reading is not within the acceptance criteria, then re-calibrate the instrument. If re-calibration does not correct the instrument reading, then the calibration range may be too wide. Reducing the calibration range by using standards that are closer together may improve the instrument’s accuracy.

2.4 Specific Conductance

Conductivity is used to measure the ability of an aqueous solution to conduct an electrical current. Specific conductance is the conductivity value corrected to 25ºC. Calibrating an instrument for specific conductance automatically calibrates the instrument for conductivity and vice-versa.

CAUTIONS AND POTENTIAL PROBLEMS WITH SPECIFIC CONDUCTANCE MEASUREMENTS

- Most instruments are calibrated against a single standard that is near the specific conductance of the environmental samples. A second standard that is above the environmental sample specific conductance can be used to check the linearity of the instrument in the range of measurements. However, a single-point calibration standard is adequate to assess the accuracy and operation of the sensor.
- Calibrate the conductivity with a standard near the anticipated conductivity of the water. For fresh water, a 1 mS/cm standard is appropriate.
- For some meters, it is important that the top vent hole of the conductivity sensor be immersed during the calibration. Review the instrument manual to determine if this is required.
- Specific conductance/conductivity can have different units (e.g., mmho/cm, mS/cm, µmho/cm, µS/cm), especially on auto-ranging instruments. Note: mhos/cm = Siemens/cm. Check with the Project Manager or database manager to determine if field measurements should be restricted to a consistent unit (e.g., µmhos/cm or µS/cm, not mmhos/cm or mS/cm) so that conversion is not necessary when importing data into a database.
- Be aware of meters which autocorrect for temperature and how to enter the calibration value per the procedures in the instrument's manual. To calibrate instruments that autocorrect for temperature, enter the calibration value of the solution (µmhos/cm at 25°C). For instruments without automatic temperature compensation, the solution's conductivity value must be corrected for the temperature that the sensor is reading before entering the value into the meter. In some cases, you may be able to adjust the temperature of the calibration solution to near 25°C, such that the standard calibration value is applicable; otherwise an adjustment for temperature needs to be accounted for. Additionally, if calibrating for conductivity instead of specific conductance, the solution's conductivity value must be corrected for the temperature that the sensor is reading.

CALIBRATION PROCEDURE

1. Allow the calibration standard to equilibrate to the ambient temperature.

2. Remove probe from its storage container, rinse the probe with a small amount of deionized water, and pat dry the sensor with a soft tissue.

3. Lower the sensor into the conductivity standard. Gently move the probe up and down in the solution to remove any air bubbles from the sensor if present. Allow the probe to sit in the solution for at least 30 seconds to allow values to equilibrate before proceeding.

4. Enter the calibration value of the solution (e.g., 1,413 µmhos/cm at 25°C). Record the temperature of the solution on the field instrument calibration log, and allow the specific conductance reading to stabilize for approximately 30 seconds. Record the calibrated value after stabilization on the field instrument calibration log. The reading should be within ±5% of the true value. If the reading is not within this range, recalibrate. If readings continue to fluctuate significantly after a recalibration, consult the equipment vendor for troubleshooting or equipment replacement.

5. Remove probe from the standard, rinse the probe with deionized water, and replace the protective cover over the sensors.

2.5 Oxidation-Reduction Potential (ORP)

The oxidation-reduction potential is the electrometric difference measured in a solution between an inert indicator electrode and a suitable reference electrode. The electrometric difference is measured in millivolts and is temperature dependent.

CAUTIONS AND POTENTIAL PROBLEMS WITH ORP MEASUREMENTS

- Note that ORP is not usually the same as Eh. Eh is ORP measured relative to a standard hydrogen electrode (SHE). Typical ORP reference electrodes used in the field are Ag/AgCl electrodes, not SHEs. The difference is that Eh would be approximately 200mV higher than ORP measured against a Ag/AgCl reference electrode. See Standard Methods 2580B and YSI Tech Note (2005) for more details.
- Some meters allow you to calibrate ORP, but many do not allow calibration. Testing solutions are available to verify your ORP reading but they are not accurate enough to be used as calibration standards.
- ORP is temperature dependent. Look up the millivolt (mV) calibration value at the measured temperature from the millivolt versus temperature correction table usually found on the standard bottle or on the standard instruction sheet. It may be necessary to interpolate millivolt values between temperatures.

CALIBRATION OR VERIFICATION PROCEDURE

1. Allow the calibration standard (e.g., a Zobell solution) to equilibrate to ambient temperature.

2. Remove the cover of the probe, and place it into the standard.

3. While stirring the standard, wait for the probe temperature to stabilize, and then read the temperature.

4. Look up the millivolt (mV) value at this temperature from the millivolt versus temperature correction table usually found on the standard bottle or on the standard instruction sheet. It may be necessary to interpolate millivolt values between temperatures. Enter the temperature-corrected ORP value, and calibrate the instrument. Record the values on the field instrument calibration log.

5. The reading should remain unchanged within manufacturer’s specifications. If it changes, re-calibrate. If readings continue to change after calibration, consult the manufacturer.

6. If the instrument instruction manual states the instrument is factory calibrated, then verify the factory calibration against the standard. If the reading does not agree with the standard within the accuracy of the instrument, the instrument will need to be re-calibrated by the manufacturer.

2.6 Turbidity

Turbidity refers to how clear the water is and is a measure of relative sample clarity. The greater the amount of total suspended solids in the water, the higher the measured turbidity. The turbidity method is based upon a comparison of intensity of light scattered by a sample under defined conditions with the intensity of light scattered by a standard reference suspension. A turbidity meter is a nephelometer with a visible light source for illuminating the sample and one or more photo-electric detectors placed 90 degrees to the path of the light source. Turbidity values are recorded in NTUs.

CAUTIONS AND POTENTIAL PROBLEMS WITH TURBIDITY MEASUREMENTS

- Some instruments will only accept one standard. For these instruments, the standards will serve as check points.
- Some regulatory agencies will not allow turbidity measurements through a flow-through cell, and require a stand alone turbidity meter. Verify that the selected meter will meet project objectives prior to use.
- For the greatest accuracy during the calibration procedure, ensure that after the meter is blanked and the blank is scanned as a sample, the reading is 0.00 NTU. If not, re-zero the meter and scan the blank again until it reads 0.00 NTU. When scanning the calibration standards as the sample, scan the calibration standard three times removing the tube from the chamber after each scan. The readings should be consistent. Use the last consistent reading to calibrate the meter. If the readings are not consistent, avoid using an aberrant reading to calibrate the meter.
- The meter should be placed on a surface that is free from vibrations. Vibrations can cause high readings.
- Gently mix the sample by inverting before taking a reading, but avoid introducing air bubbles.
- Scratches, fingerprints, and water droplets on the outside of the cuvettes can cause additional light scatter, leading to inaccurate readings. If necessary, wipe the outside of the cuvette with a soft tissue. If the cuvette is scratched or dirty, discard.
- Ensure that the cuvette is always placed in the chamber in the same orientation, as differences in orientation can cause differences in results. Proper cuvette orientation may be indicated by a mark or arrow on both the cuvette and the instrument.

CALIBRATION PROCEDURES – STAND ALONE TURBIDITY METER

NOTE: Sometimes standards are provided in the cuvette with the meter.

1. Rinse a cuvette with deionized water. Shake the cuvette to remove as much water as possible. Do not wipe the inside of the cuvette, because lint from the wipe may remain in the cuvette. Add the standard to the cuvette.

2. Place the 0.0 NTU standard into the instrument and scan the sample (measure the standard). Record the reading on the field instrument calibration log. The 10.0 NTU standard can be measured after the 0.0 NTU standard is scanned.

3. Select the 10.0 NTU standard and scan the sample (measure the standard). The reading should be within ±10% of the true value. Record the reading on the field instrument calibration log. If the reading is within the acceptance criteria, then move on to step # 5. If not, calibrate the instrument to 10.0 NTU. Record the reading and any significant changes on the field instrument calibration log.

4. After adjusting the calibration, re-read the 10.0 NTU standard to ensure it is now meeting accuracy requirements. If not, repeat step #3. Otherwise, continue to step #5.

5. Repeat step #3, if needed, for the 1.0 NTU standard.

6. After adjusting the calibration, re-read the 1.0 NTU standard to ensure it is now meeting accuracy requirements (±10% of the true value). If not, repeat step #3. Otherwise, continue to step #7.

7. As a final check of the instrument, scan the blank (0.0 NTU standard). The unit display should read very close to zero. Record the reading on the field instrument calibration log.

   NOTE: If during the calibration procedure, you find the value of the standard is >50% from the expected value (e.g., 0.49 NTU for the 1.0 NTU standard), scrolling to the true value (e.g., 1.0 NTU) and attempting to calibrate will result in an error code, because the value to which you have changed it is >50% of the expected value of the standard. In this case, it is necessary to re-calibrate the unit from the beginning starting with a blank. If this fails to produce adjustable and reproducible values for the 1.0 and 10.0 NTU standards, re-calibrate using new standards and discard the current standards. If the meter still fails to calibrate following repeated attempts at calibration, consult the equipment vendor for troubleshooting or equipment replacement.

   NOTE: If only performing a two-point calibration (depending on project requirements), the 0.0 NTU and 10 NTU (or comparable NTU level) standards should be used.

CALIBRATION PROCEDURES – MULTI-PARAMETER METER WITH FLOW-THROUGH CELL

This is a two point calibration with a standard and turbidity free water. The standard can be formazin, polymer beads, or a meter-specific quick calibration solution. Turbidity free water can be obtained by filtering distilled or deionized water through a 0.1, 0.3, or 0.45 micron filter.

1. Rinse the calibration cup and sensors with the turbidity free water. Fill the cup with enough water so that the turbidity sensor is covered (sensors pointed down).

2. Scan the sample (measure the standard). After the reading has stabilized, enter the zero turbidity value into the meter in accordance with manufacturer directions and record the reading on the field instrument calibration log.

3. Rinse the calibration cup and sensors with the standard solution. Fill the cup with enough standard solution so that the turbidity sensor is covered (sensors pointed down).

4. Scan the sample (measure the standard). After the reading has stabilized, enter the standard solution turbidity value into the meter in accordance with manufacturer directions and record the reading on the field instrument calibration log. If the reading is within the acceptance criteria, calibration is complete. If not, recalibrate the instrument. Record the reading and any significant changes on the field instrument calibration log.

   NOTE: If during the calibration procedure, you find the value of the standard is outside of the range acceptable by the meter and attempting to calibrate results in an error code, it is necessary to re-calibrate the unit from the beginning starting with a blank/turbidity free water. If this fails to produce acceptable and reproducible values for the standards, re-calibrate using new standards and discard the current standards. If the meter still fails to calibrate following repeated attempts at calibration, consult the equipment vendor for troubleshooting or equipment replacement.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for investigation-derived waste disposal with the Project Manager.

Each project must consider investigation-derived waste disposal methods and have a plan in place prior to performing the field work. Provisions must be in place as to what will be done with investigation-derived waste. If investigation-derived waste cannot be returned to the site, consider material containment, such as a composite drum or roll-off bin, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

In addition to checking the calibration of instruments prior to measurements, calibration checks may also be required at other times of the day. If there are significant temperature fluctuations or erroneous readings, a calibration check may be required. Some programs require a post-calibration check at the conclusion of the day to ensure that instrument drift has not occurred. Refer to the site-specific work plan for calibration frequency.

Comparing current values with historical values at the same measuring location can be helpful in assessing instrument and calibration reliability.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

All work must be dated and signed by the analyst. Any changes should be crossed out with a single line, initialed, and dated.

Prior to calibrating, the field equipment and calibration standard information should be recorded on a field instrument calibration log and/or in the field book. For field equipment, the information recorded should include the make, model number, and the serial number of the instrument. Each instrument can be assigned an identification number that can be referenced in future field notes or when filling out the field instrument calibration log.

For calibration standards, the information recorded should include the manufacturer, expiration date, true value, and any other description, such as lot number. Each calibration standard can also be assigned an identification number that can be referenced in future field notes or when filling out the field instrument calibration log. If standards are not supplied with an expiration date, the standards should be initialed and dated when received and when opened (not applicable for standards supplied with the rental equipment).

The calibration records provided by the equipment vendor and the certificates of analysis for each standard will be maintained in the project files.

All calibration measurements must be documented in the field book or on a separate field instrument calibration log. Example field instrument calibration logs are presented in Attachment B. At a minimum, the field instrument calibration log must include the instrument information described above, calibration standard information described above, calibration date, and the instrument calibration results.

6.0 REFERENCES

USEPA. January 19, 2010. *Standard Operating Procedure, Calibration of Field Instruments*, Revision No. 2. USEPA Region I.

American Public Health Association, American Water Works Association, and Water Environment Federation. January 2012. *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition.

YSI Environmental. 2005. *Measuring ORP on YSI 6-Series Sondes: Tips, Cautions and Limitations*. YSI Environmental Tech Note. http://www.ysi.com/media/pdfs/T608-Measuring-ORP-on-YSI-6-Series-Sondes-Tips-Cautions-and-Limitations.pdf.

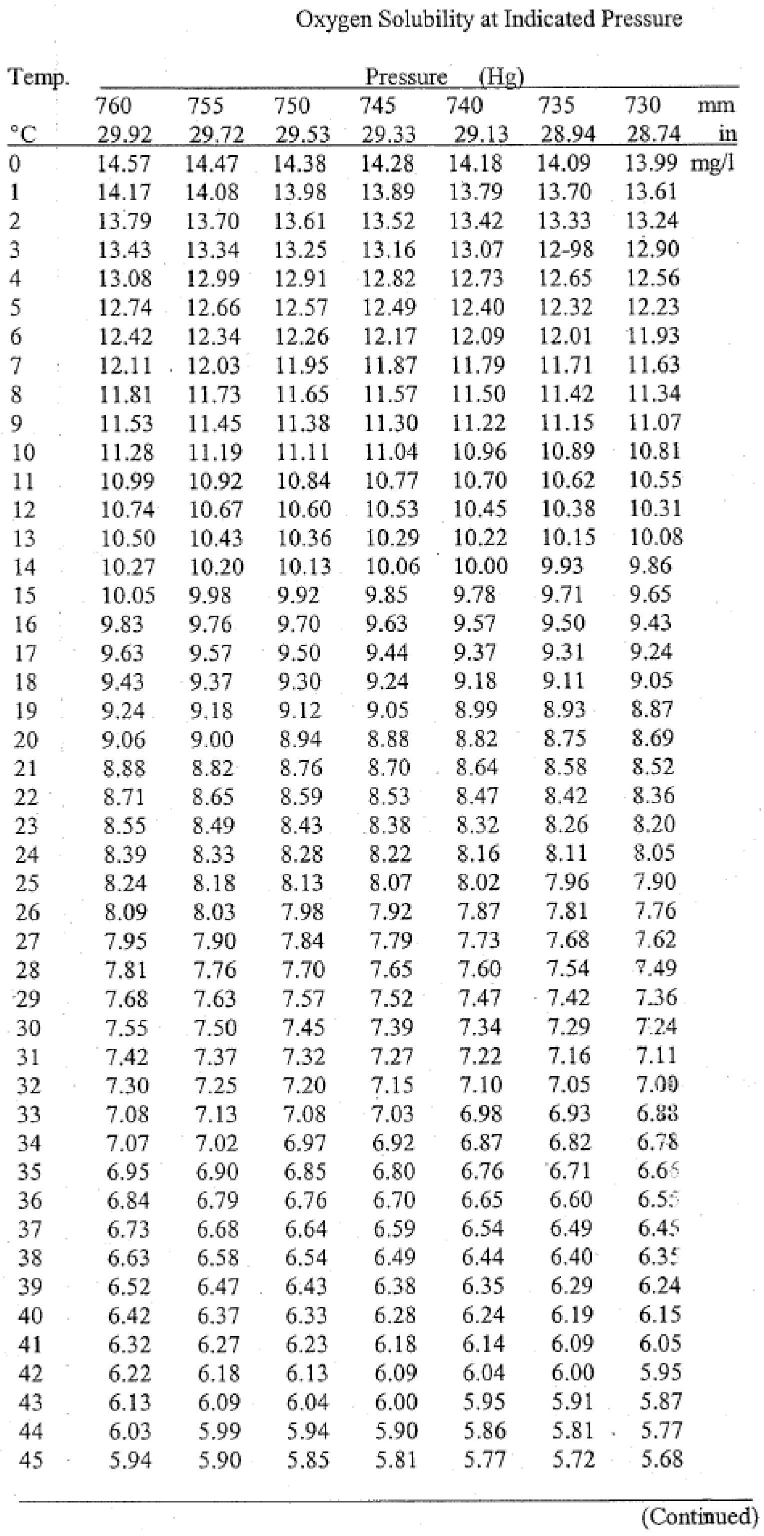
7.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
0	NOVEMBER 2014	NOT APPLICABLE
1	JANUARY 2020	TRC RE-BRANDING AND SOP RE-NUMBERING

Attachment A

Oxygen Solubility at Indicated Pressure

Attachment A (page 1 of 2)



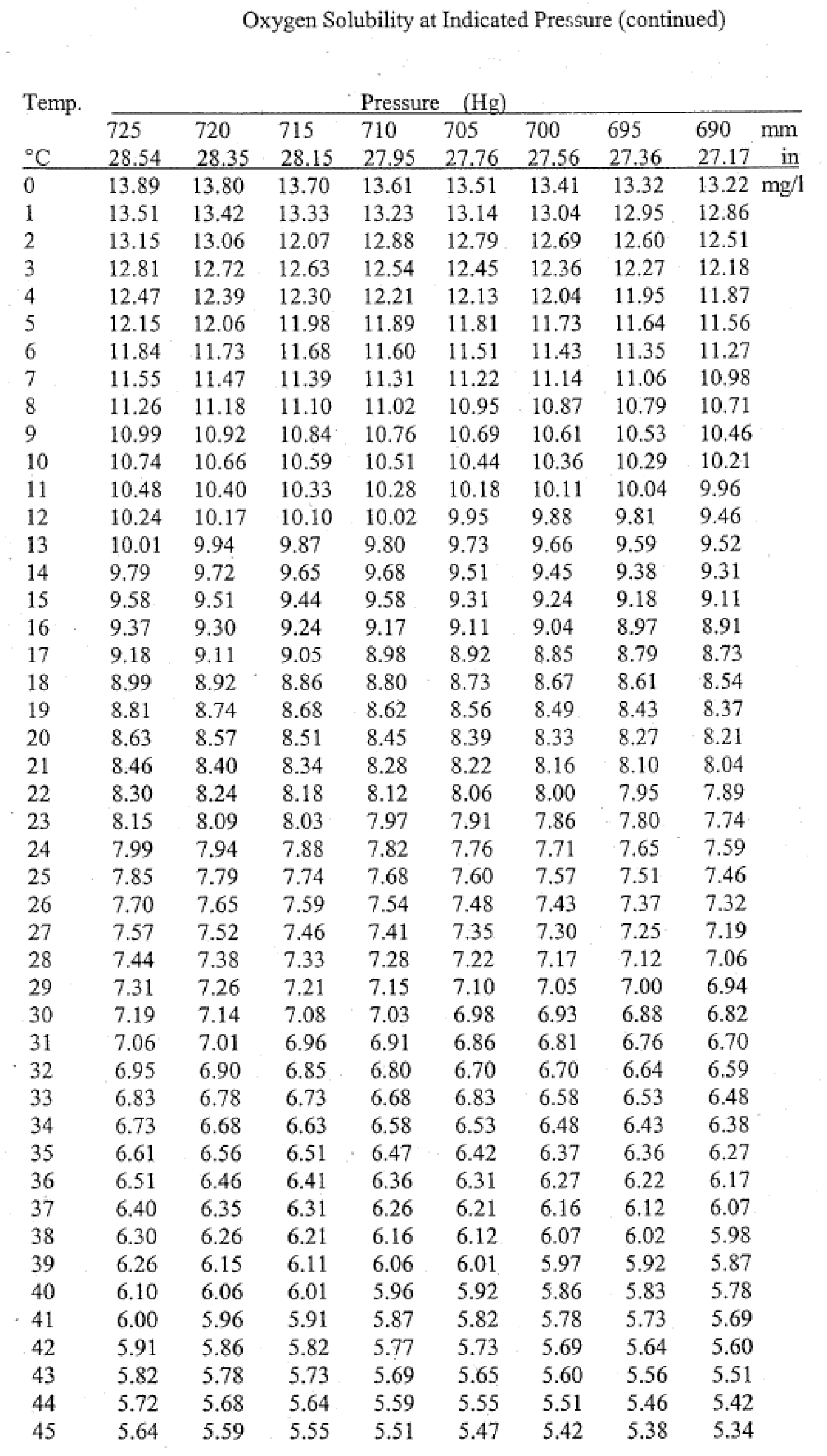
Oxygen Solubility at Indicated Pressure

Temp.	Pressure (Hg)							
	760	755	750	745	740	735	730	mm
°C	29.92	29.72	29.53	29.33	29.13	28.94	28.74	in
0	14.57	14.47	14.38	14.28	14.18	14.09	13.99	mg/l
1	14.17	14.08	13.98	13.89	13.79	13.70	13.61	
2	13.79	13.70	13.61	13.52	13.42	13.33	13.24	
3	13.43	13.34	13.25	13.16	13.07	12.98	12.90	
4	13.08	12.99	12.91	12.82	12.73	12.65	12.56	
5	12.74	12.66	12.57	12.49	12.40	12.32	12.23	
6	12.42	12.34	12.26	12.17	12.09	12.01	11.93	
7	12.11	12.03	11.95	11.87	11.79	11.71	11.63	
8	11.81	11.73	11.65	11.57	11.50	11.42	11.34	
9	11.53	11.45	11.38	11.30	11.22	11.15	11.07	
10	11.28	11.19	11.11	11.04	10.96	10.89	10.81	
11	10.99	10.92	10.84	10.77	10.70	10.62	10.55	
12	10.74	10.67	10.60	10.53	10.45	10.38	10.31	
13	10.50	10.43	10.36	10.29	10.22	10.15	10.08	
14	10.27	10.20	10.13	10.06	10.00	9.93	9.86	
15	10.05	9.98	9.92	9.85	9.78	9.71	9.65	
16	9.83	9.76	9.70	9.63	9.57	9.50	9.43	
17	9.63	9.57	9.50	9.44	9.37	9.31	9.24	
18	9.43	9.37	9.30	9.24	9.18	9.11	9.05	
19	9.24	9.18	9.12	9.05	8.99	8.93	8.87	
20	9.06	9.00	8.94	8.88	8.82	8.75	8.69	
21	8.88	8.82	8.76	8.70	8.64	8.58	8.52	
22	8.71	8.65	8.59	8.53	8.47	8.42	8.36	
23	8.55	8.49	8.43	8.38	8.32	8.26	8.20	
24	8.39	8.33	8.28	8.22	8.16	8.11	8.05	
25	8.24	8.18	8.13	8.07	8.02	7.96	7.90	
26	8.09	8.03	7.98	7.92	7.87	7.81	7.76	
27	7.95	7.90	7.84	7.79	7.73	7.68	7.62	
28	7.81	7.76	7.70	7.65	7.60	7.54	7.49	
29	7.68	7.63	7.57	7.52	7.47	7.42	7.36	
30	7.55	7.50	7.45	7.39	7.34	7.29	7.24	
31	7.42	7.37	7.32	7.27	7.22	7.16	7.11	
32	7.30	7.25	7.20	7.15	7.10	7.05	7.00	
33	7.08	7.13	7.08	7.03	6.98	6.93	6.88	
34	7.07	7.02	6.97	6.92	6.87	6.82	6.78	
35	6.95	6.90	6.85	6.80	6.76	6.71	6.66	
36	6.84	6.79	6.76	6.70	6.65	6.60	6.55	
37	6.73	6.68	6.64	6.59	6.54	6.49	6.45	
38	6.63	6.58	6.54	6.49	6.44	6.40	6.35	
39	6.52	6.47	6.43	6.38	6.35	6.29	6.24	
40	6.42	6.37	6.33	6.28	6.24	6.19	6.15	
41	6.32	6.27	6.23	6.18	6.14	6.09	6.05	
42	6.22	6.18	6.13	6.09	6.04	6.00	5.95	
43	6.13	6.09	6.04	6.00	5.95	5.91	5.87	
44	6.03	5.99	5.94	5.90	5.86	5.81	5.77	
45	5.94	5.90	5.85	5.81	5.77	5.72	5.68	

(Continued)

Table taken from EPA Region I SOP, Calibration of Field Instruments, January 10, 2010.

Attachment A (Page 2 of 2)



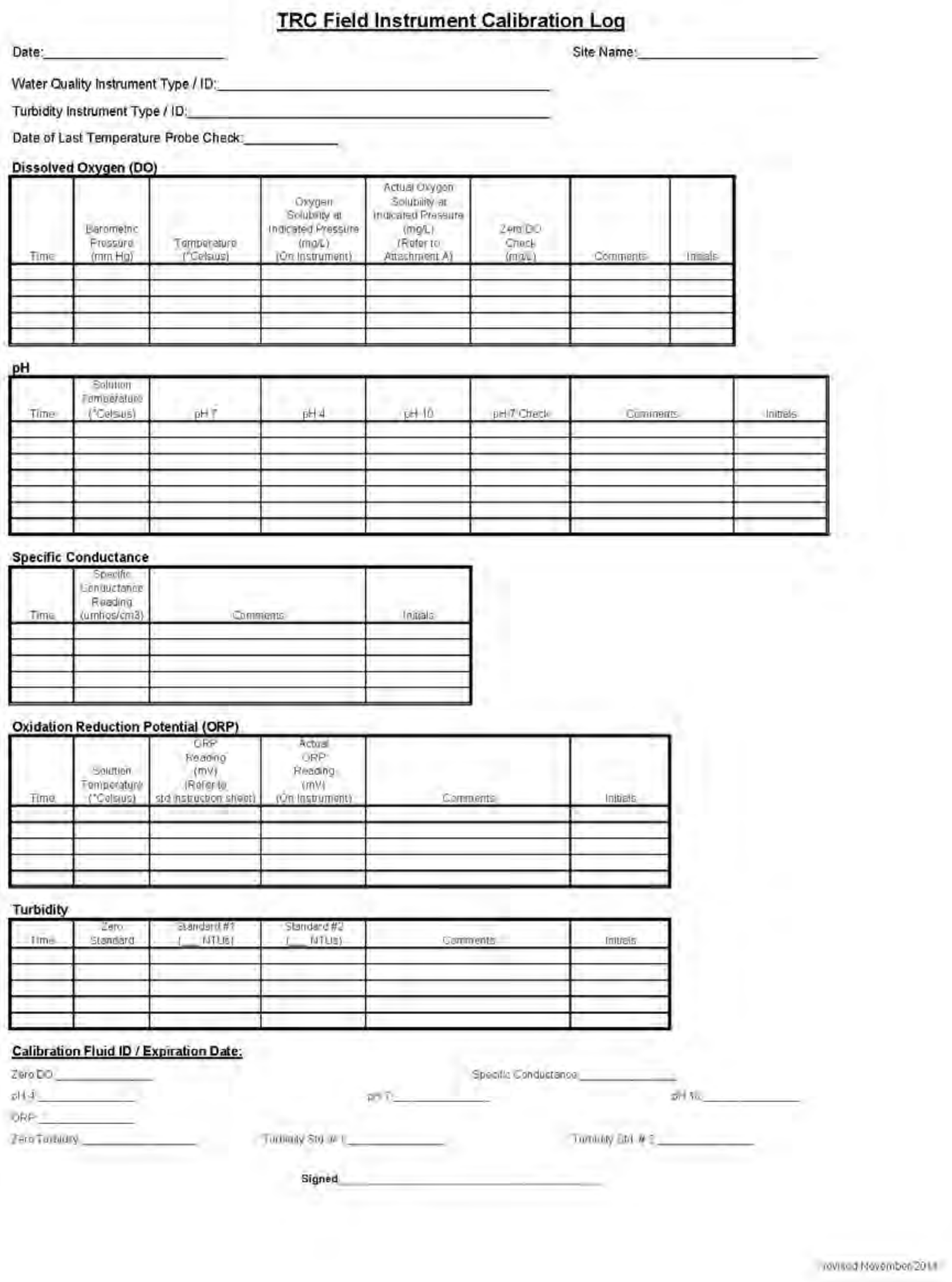
Oxygen Solubility at Indicated Pressure (continued)

Temp.	Pressure (Hg)								
	725	720	715	710	705	700	695	690	mm
°C	28.54	28.35	28.15	27.95	27.76	27.56	27.36	27.17	in
0	13.89	13.80	13.70	13.61	13.51	13.41	13.32	13.22	mg/l
1	13.51	13.42	13.33	13.23	13.14	13.04	12.95	12.86	
2	13.15	13.06	12.07	12.88	12.79	12.69	12.60	12.51	
3	12.81	12.72	12.63	12.54	12.45	12.36	12.27	12.18	
4	12.47	12.39	12.30	12.21	12.13	12.04	11.95	11.87	
5	12.15	12.06	11.98	11.89	11.81	11.73	11.64	11.56	
6	11.84	11.73	11.68	11.60	11.51	11.43	11.35	11.27	
7	11.55	11.47	11.39	11.31	11.22	11.14	11.06	10.98	
8	11.26	11.18	11.10	11.02	10.95	10.87	10.79	10.71	
9	10.99	10.92	10.84	10.76	10.69	10.61	10.53	10.46	
10	10.74	10.66	10.59	10.51	10.44	10.36	10.29	10.21	
11	10.48	10.40	10.33	10.28	10.18	10.11	10.04	9.96	
12	10.24	10.17	10.10	10.02	9.95	9.88	9.81	9.46	
13	10.01	9.94	9.87	9.80	9.73	9.66	9.59	9.52	
14	9.79	9.72	9.65	9.68	9.51	9.45	9.38	9.31	
15	9.58	9.51	9.44	9.58	9.31	9.24	9.18	9.11	
16	9.37	9.30	9.24	9.17	9.11	9.04	8.97	8.91	
17	9.18	9.11	9.05	8.98	8.92	8.85	8.79	8.73	
18	8.99	8.92	8.86	8.80	8.73	8.67	8.61	8.54	
19	8.81	8.74	8.68	8.62	8.56	8.49	8.43	8.37	
20	8.63	8.57	8.51	8.45	8.39	8.33	8.27	8.21	
21	8.46	8.40	8.34	8.28	8.22	8.16	8.10	8.04	
22	8.30	8.24	8.18	8.12	8.06	8.00	7.95	7.89	
23	8.15	8.09	8.03	7.97	7.91	7.86	7.80	7.74	
24	7.99	7.94	7.88	7.82	7.76	7.71	7.65	7.59	
25	7.85	7.79	7.74	7.68	7.60	7.57	7.51	7.46	
26	7.70	7.65	7.59	7.54	7.48	7.43	7.37	7.32	
27	7.57	7.52	7.46	7.41	7.35	7.30	7.25	7.19	
28	7.44	7.38	7.33	7.28	7.22	7.17	7.12	7.06	
29	7.31	7.26	7.21	7.15	7.10	7.05	7.00	6.94	
30	7.19	7.14	7.08	7.03	6.98	6.93	6.88	6.82	
31	7.06	7.01	6.96	6.91	6.86	6.81	6.76	6.70	
32	6.95	6.90	6.85	6.80	6.70	6.70	6.64	6.59	
33	6.83	6.78	6.73	6.68	6.83	6.58	6.53	6.48	
34	6.73	6.68	6.63	6.58	6.53	6.48	6.43	6.38	
35	6.61	6.56	6.51	6.47	6.42	6.37	6.36	6.27	
36	6.51	6.46	6.41	6.36	6.31	6.27	6.22	6.17	
37	6.40	6.35	6.31	6.26	6.21	6.16	6.12	6.07	
38	6.30	6.26	6.21	6.16	6.12	6.07	6.02	5.98	
39	6.26	6.15	6.11	6.06	6.01	5.97	5.92	5.87	
40	6.10	6.06	6.01	5.96	5.92	5.86	5.83	5.78	
41	6.00	5.96	5.91	5.87	5.82	5.78	5.73	5.69	
42	5.91	5.86	5.82	5.77	5.73	5.69	5.64	5.60	
43	5.82	5.78	5.73	5.69	5.65	5.60	5.56	5.51	
44	5.72	5.68	5.64	5.59	5.55	5.51	5.46	5.42	
45	5.64	5.59	5.55	5.51	5.47	5.42	5.38	5.34	

Table taken from EPA Region I SOP, Calibration of Field Instruments, January 10, 2010.

Attachment B

Example Field Instrument Calibration Logs



TRC Field Instrument Calibration Log

Date:____________________ Site Name:____________________

Water Quality Instrument Type / ID:____________________________________

Turbidity Instrument Type / ID:____________________________________

Date of Last Temperature Probe Check:____________

Dissolved Oxygen (DO)

Time	Barometric Pressure (mm Hg)	Temperature (°Celsius)	Oxygen Solubility at Indicated Pressure (mg/L) (On Instrument)	Actual Oxygen Solubility at Indicated Pressure (mg/L) (Refer to Attachment A)	Zero DO Check (mg/L)	Comments	Initials

pH

Time	Solution Temperature (°Celsius)	pH 7	pH 4	pH 10	pH 7 Check	Comments	Initials

Specific Conductance

Time	Specific Conductance Reading (umhos/cm3)	Comments	Initials

Oxidation Reduction Potential (ORP)

Time	Solution Temperature (°Celsius)	ORP Reading (mV) (Refer to std instruction sheet)	Actual ORP Reading (mV) (On Instrument)	Comments	Initials

Turbidity

Time	Zero Standard	Standard #1 (___ NTUs)	Standard #2 (___ NTUs)	Comments	Initials

Calibration Fluid ID / Expiration Date:

Zero DO:____________ Specific Conductance:____________

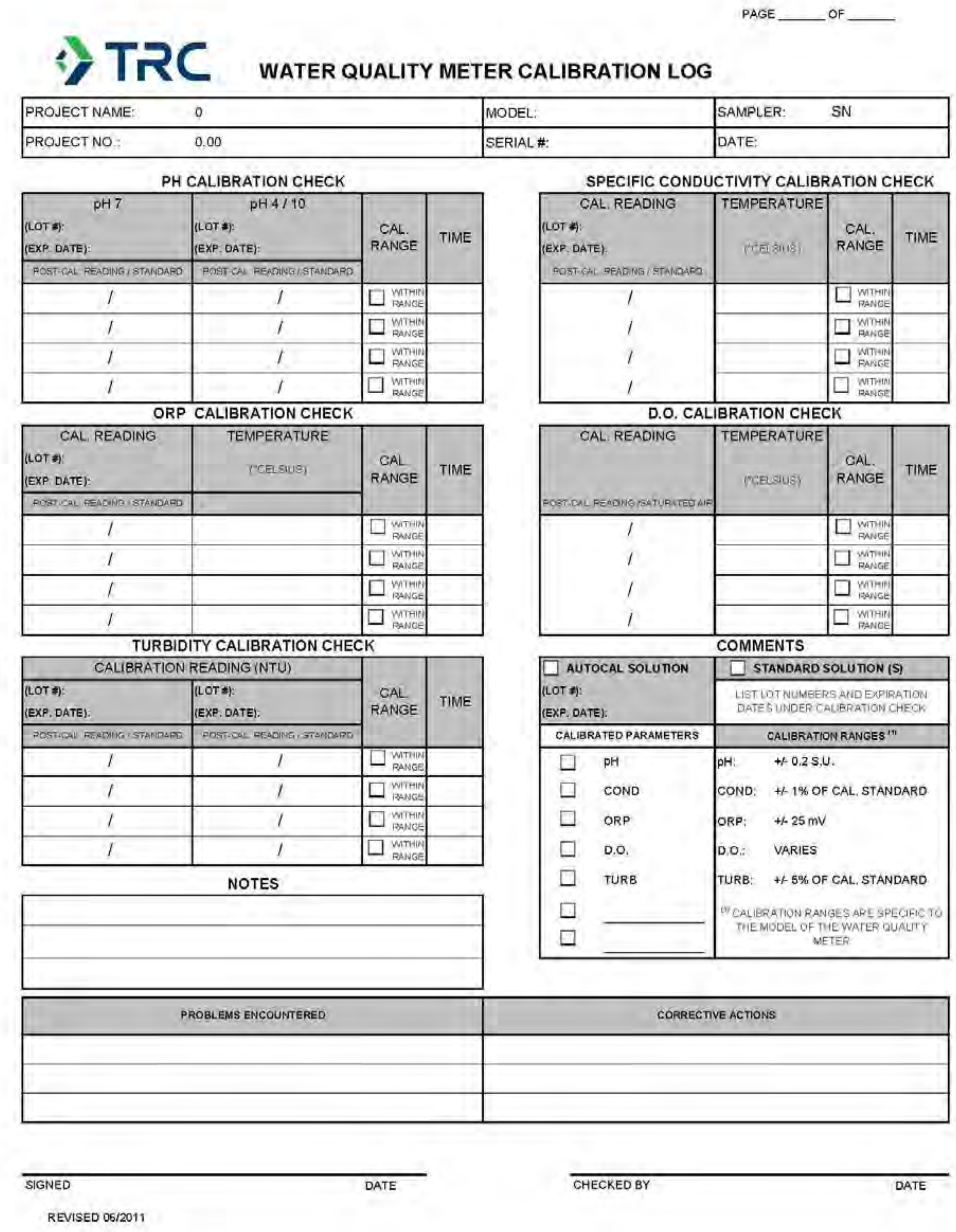
pH 4:____________ pH 7:____________ pH 10:____________

ORP:____________

Zero Turbidity:____________ Turbidity Std # 1:____________ Turbidity Std # 2:____________

Signed____________________________

revised November 2014



PAGE ______ OF ______

WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	0	MODEL:		SAMPLER:	SN
PROJECT NO.:	0.00	SERIAL #:		DATE:	

PH CALIBRATION CHECK

pH 7 (LOT #): (EXP. DATE): POST-CAL READING / STANDARD	pH 4 / 10 (LOT #): (EXP. DATE): POST-CAL READING / STANDARD	CAL. RANGE	TIME
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): (EXP. DATE): POST-CAL READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING (LOT #): (EXP. DATE): POST-CAL READING / STANDARD	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING POST-CAL READING /SATURATED AIR	TEMPERATURE (°CELSIUS)	CAL. RANGE	TIME
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	
/		☐ WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): (EXP. DATE): POST-CAL READING / STANDARD	(LOT #): (EXP. DATE): POST-CAL READING / STANDARD		
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	
/	/	☐ WITHIN RANGE	

COMMENTS

☐ AUTOCAL SOLUTION	☐ STANDARD SOLUTION (S)
(LOT #): (EXP. DATE):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES (1)
☐ pH	pH: +/- 0.2 S.U.
☐ COND	COND: +/- 1% OF CAL. STANDARD
☐ ORP	ORP: +/- 25 mV
☐ D.O.	D.O.: VARIES
☐ TURB	TURB: +/- 5% OF CAL. STANDARD
☐ ____________	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
☐ ____________	

NOTES

PROBLEMS ENCOUNTERED	CORRECTIVE ACTIONS

SIGNED ______________________ DATE

CHECKED BY ______________________ DATE

REVISED 06/2011

Attachment C

SOP Fact Sheet

WATER QUALITY PARAMETER INSTRUMENT CALIBRATION

PURPOSE AND OBJECTIVE

Before a meter is utilized in the field, it will be calibrated and checked in accordance with this SOP to ensure proper operation. Water quality instruments addressed in this SOP include those that measure temperature, pH, dissolved oxygen (DO), conductivity/specific conductance, oxidation-reduction potential (ORP), and turbidity for the purposes of field screening and field measurements.

WHAT TO BRING

- Appropriate Level of PPE
- Field book
- Field instrument calibration logs
- Water quality meter capable of measuring one or more of the following based on project scope: pH, temperature, DO, specific conductivity, and ORP (e.g., YSI 600XL, Horiba U-50, Hydrolab Quanta/QED MP-20, or equivalent)
- Deionized water
- Flow-through cell
- Ring stand with clamp
- Paper towels
- Soft tissue (e.g., Kimwipes®)
- Cuvettes
- Buffer solutions at pH 4, 7 and 10 standard units (SU)*
- Conductivity solution (potassium chloride, typically 1,413 μhos/cm)*
- ORP calibration solution (e.g., Zobell)*
- Turbidity standards (0, 1, 10 nephelometric turbidity units [NTUs] or StablCal Kit)*
- Zero DO solution (0.0 mg/L)*
- DO membrane kit (electrolyte solution, membranes)
- NIST thermometer (0.2°C accuracy)*
- Small glass or polyethylene jars to hold the calibration standards (4-8 oz.)
- Cup or spray bottle for the deionized water

*Dependent on the project-specific requirements and the instrument manufacturer

OFFICE

- Review project work plan and confirm what field measurements are required based on the scope of work.
- Confirm that all necessary equipment (including necessary calibration solutions) are available in-house or order if necessary.
- All meters may have different relative accuracy, which will be specified in the instrument manual. Confirm that the meter being used meets the project's accuracy requirements.
- Confirm that a copy of the manufacturer's instruction manual is available to accompany the instrument into the field.
- Properly clean/decontaminate the instrument before storage or returning equipment to rental vendor.

CALIBRATION PROCEDURES

- Prior to use, inspect instruments to ensure instruments are clean, check for possible malfunctions, and calibrate in accordance with manufacturer's procedures. Note: The initial calibration may be performed in the office prior to the field event or by the equipment supplier; however, calibration checks should be performed on site prior to use on the day of the fieldwork.
- Calibration checks (or verifying that instrument readings fall within an acceptable range of a standard without running through the full instrument calibration steps) will be performed on field instruments prior to their initial use, at least once daily, or whenever indications of faulty readings or instrument malfunction occurs. Some instruments or certain project scopes may require more frequent calibration checks depending on project quality objectives.
- In general, instrument selection and calibration will include the following steps:
  1. Determine which instruments are needed for the specific field tasks. Record the make, model number, and serial number of the instrument on the field instrument calibration log or in the field book.
  2. Obtain the necessary instruments and standard solutions for calibration. Check expiration dates on standard solutions and replace if out of date. Record the manufacturer, true value, lot number and expiration date of the standard solutions on the field instrument calibration log or in the field book.
  3. Assemble the instrument and turn it on allowing the instrument to warm up.
  4. Check battery charge, and charge or replace if necessary.
  5. Clean instrument (if necessary).
  6. If applicable, program the multi-probe instrument so that the applicable parameters to be measured will be displayed.
  7. Calibrate the instrument prior to field use in accordance with manufacturer's procedures. (Note: If applicable, calibrate DO and conductivity first, because these parameters may affect the other calibrations).
  8. Document all calibration activities and results in the field instrument calibration log or field book.
  9. If the instrument malfunctions and cannot be corrected, document the issues, qualify any erroneous data, and obtain a replacement.
  10. Clean and decontaminate the instrument after use and before storage.

11. Conduct calibration checks at least once per day or additionally as needed.

INVESTIGATION-DERIVED WASTE (IDW) DISPOSAL

Field personnel should review the project work plan and ensure project-specific IDW management documentation and containerization requirements are specified or discussed with the Project Manager before going to the project site.

DATA MANAGEMENT AND RECORDS MANAGEMENT

- Prior to calibrating, the field equipment and calibration standard information should be recorded on a field instrument calibration log and/or in a field book. For field equipment, the information recorded should include the make, model number, and the serial number of the instrument. Each instrument can be assigned an identification number that can be referenced in future field notes or when filling out the field instrument calibration log.
- For calibration standards, the information recorded should include the manufacturer, expiration date, true value, and any other description, such as lot number.
- The calibration records provided by the equipment vendor and the certificates of analysis for each standard will be maintained in the project files.
- All calibration measurements must be documented in a field logbook or on a separate field instrument calibration log. At a minimum, the field instrument calibration log must include the instrument information described above, calibration standard information described above, calibration date, and the instrument calibration results.

DOS AND DO NOTS OF WATER QUALITY PARAMETER INSTRUMENT CALIBRATION

DOs

- DO wear appropriate PPE (i.e., chemical resistant gloves and safety glasses) when cleaning and calibrating water quality instruments.
- DO confirm what field measurements are required, and what accuracy is required based on the scope of work.
- DO ensure you have the instrument instruction manual available if needed, as well as contact information for the manufacturer or rental company for troubleshooting questions.
- DO properly document calibration procedures and calibration checks performed.
- DO note when erroneous readings/equipment malfunctions are observed and any troubleshooting and/or corrective measures taken.
- DO conduct calibration checks at least once per day or additionally as needed.
- DO properly store the calibration standard solutions. Avoid extreme hot/cold temperatures. Frozen solution is useless and extreme temperatures can make calibration difficult and/or calibration may not work at all.

DO NOTs

- DO NOT use expired calibration solutions.
- DO NOT immerse the sensors in sea water or other highly saline water, alcohol, or organic solvents.
- DO NOT forget to clean and decontaminate the instrument after use and before storage.
- DO NOT store the sensors improperly (e.g., avoid storing in extreme hot or cold temperatures, make sure appropriate storage solutions are being used per manufacturer's recommendations).

Title: **Equipment Decontamination**	Procedure Number: **ECR 010**
	Revision Number: **3**
	Effective Date: **April 2021**

Authorization Signatures			
		Elizabeth Denly	
Technical Reviewer	Date	Environmental Sector Quality Director	Date
Cory Yates	4/29/21	Elizabeth Denly	4/29/21

TABLE OF CONTENTS

Page No.

ATTACHMENTS

Attachment A	SOP Fact Sheet
Attachment B	SOP Modifications for PFAS

1.0 INTRODUCTION

1.1 Scope & Applicability

This Standard Operating Procedure (SOP) was prepared to direct TRC personnel in the procedures needed for decontamination of equipment used in the field during environmental investigations (e.g., sediment, soil, groundwater investigations). Other state or federal requirements may be above and beyond the scope of this SOP and will be followed, if applicable. The actual procedures used should be documented and described in the field notes. Preventing or minimizing potential cross-contamination of samples is important for the collection of representative samples, avoiding the possible introduction of sampling error into sample results, and for protecting the health and safety of site personnel.

Removing or neutralizing potential contaminants that may have accumulated on equipment and vehicles ensures protection of personnel, reduces or eliminates potential transfer of contaminants to clean areas, and minimizes the likelihood of sample cross-contamination.

The use of dedicated or disposable sampling equipment (e.g., disposable liners, plastic spoons, plastic or aluminum bowls) should be considered as an alternative to equipment decontamination and the subsequent generation of decontamination fluids.

1.2 Summary of Method

Equipment decontamination is used to remove potential contaminants from a sampling device or piece of field equipment prior to and between the collection of samples. It is also used to limit personnel exposure to residual contamination that may be present on used field equipment.

Contaminants can be physically removed from equipment or deactivated by sterilization or disinfection. Gross contamination of equipment requires physical decontamination, including abrasive and nonabrasive methods. These may include the use of brushes, air and wet blasting, or high-pressure water, followed by a wash/rinse process using appropriate cleaning solutions. A solvent rinse may be required when organic contamination is present, and an acid rinse may be required when metals are parameters of interest. Equipment decontamination procedures can vary depending on the media being sampled and the type of sampling equipment being used. Disposal of decontamination fluids will be handled on a project-specific basis and will be conducted in accordance with the applicable regulations.

1.3 Equipment

The following equipment may be utilized when decontaminating equipment. Project-specific conditions or requirements may warrant the use of additional equipment or deletion of items from this list. For specialized sampling programs involving per- and polyfluoroalkyl substances (PFAS), refer to Attachment B for further details.

- Appropriate level of personal protective equipment (PPE) as specified in the site-specific Health and Safety Plan (HASP)

- Alconox®, Liquinox® or other non-phosphate, concentrated, laboratory-grade soap
- Simple Green® or other nontoxic biodegradable cleaner
- Deionized, distilled, organic-free, or potable water as appropriate as determined by the Project Manager. Water may be supplied by the laboratory or purchased from commercial vendors depending on project requirements.
- Pump sprayer
- Pressure sprayer
- Squeeze bottle filled with hexane (option for organic analyses)
- Squeeze bottle filled with methanol as appropriate (option for organic analyses)
- Squeeze bottle filled with isopropanol as appropriate (option for organic analyses)
- Squeeze bottle filled with 10 percent nitric acid (option for metals analyses and stainless-steel equipment)
- Squeeze bottle filled with 1 percent nitric acid (option for metals analyses)
- Container (squeeze bottle to 5-gallon bucket) filled with appropriate grade water and a non-phosphate, laboratory-grade soap (approximately 1 tablespoon of soap to 5 gallons of water)
- Extra quantities of above listed liquids
- Containers, such as buckets or wash basins (the type and number of containers is dependent on the procedure)
- Scrub brushes
- Small wire brush
- Aluminum foil
- Polyethylene sheeting
- A container for decontamination of pumps and associated tubing

1.4 Health & Safety Considerations

TRC personnel will be on site when implementing this SOP. Therefore, TRC personnel and/or subcontractors shall follow the site-specific HASP. TRC personnel and/or subcontractors will use the appropriate level of PPE as defined in the HASP.

Sampling equipment or materials that have come in contact with chemical contaminants may be handled during implementation of this SOP. Certain decontamination fluids, including solvents and/or acids, are considered hazardous materials, and TRC employees will always handle and store them appropriately. Hazardous substances may be incompatible or may cause dangerous chemical reactions, including the production of heat, violent reactivity, or produce toxic vapors or other byproducts. Some hazardous substances may be incompatible with clothing or equipment and can permeate or degrade protective clothing or equipment. Also, hazardous substances may pose a direct health hazard to workers through inhalation, skin contact, or if a combustible material is exposed to heat/flame. Safety data sheets (SDS) for chemicals handled by TRC personnel should be maintained in a designated location at the project site.

1.5 Cautions and Potential Problems

Special care should be taken when decontaminating equipment used for sampling for PFAS. Please refer to Attachment B for details.

- The use of deionized, distilled, or organic-free water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment, provided that it has been certified by the vendor as analyte-free and/or meets the project-specific requirements.

- Alconox®, Liquinox®, or other non-phosphate, concentrated, laboratory-grade soap may contain trace quantities of perchlorate or 1,4-dioxane.

- Avoid using an excessive amount of soap during decontamination procedures, as this could result in difficulty rinsing the soap residue off of the equipment. Typically, the soap solution is prepared using 1 tablespoon of soap to 5 gallons of water.

- Use sufficient amounts of decontamination fluid (e.g., acid or solvent rinses) so that the fluid flows over the equipment and runs off. Spraying the equipment with a minimal amount of decontamination fluid that does not run off is ineffective.

- Spent decontamination solutions are considered investigation-derived waste (IDW) and must be managed as directed by the site-specific field program. Project and regulatory requirements, chemical compatibility, ambient conditions, and professional judgment should be used to determine the appropriate decontamination process with respect to combining and/or segregating decontamination fluids. Section 3 of this SOP provides more guidance on the disposal procedures.

- Several procedures can be established to minimize the potential for cross-contamination or analytical interference by decontamination fluids. For example:

    - The use of methanol in the decontamination procedure may not be appropriate if methanol is a contaminant of concern.

    - Isopropanol may be used as a substitute for methanol but may not be appropriate when collecting samples for volatile organic compound (VOC) analyses. Residual isopropanol on the equipment may cause substantial interferences in subsequent VOC analyses and may result in unnecessary dilutions and/or false positive results if isopropanol is not removed in subsequent decontamination steps. It should also be noted that the application of isopropanol to hot metal surfaces (e.g., a steam-cleaned split spoon) may cause oxidation of the isopropanol to acetone.

    - If hexane is used in the decontamination procedure, caution should be used to ensure that the hexane is completely volatilized and the equipment is subsequently rinsed when samples are to be analyzed for VOCs and volatile petroleum hydrocarbons (VPH).

Residual hexane on equipment could interfere with the VOC and VPH analyses and may result in unnecessary dilutions and/or false positive results.

- Cover monitoring and sampling equipment with protective material (i.e., aluminum foil, polyethylene sheeting, or Ziploc® bags) to minimize potential re-contamination after decontamination.

- Use dedicated or disposable sampling equipment when appropriate to minimize the need for decontamination. Although disposable sampling tools are encouraged in order to minimize the generation of decontamination fluids, it should be noted that plastic tools may not be appropriate for collection of samples to be analyzed for semi-volatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs). Potential phthalate contamination may cause significant interferences in the subsequent analyses and may result in unnecessary dilutions and/or false positive results.

- After decontamination, equipment should be handled only by personnel wearing clean disposable, powder-free, nitrile gloves to prevent recontamination.
- Following decontamination, the equipment should be moved away (preferably upwind) from the decontamination area to prevent recontamination.
- Equipment that is not decontaminated properly may result in potentially high, biased results in field samples. **Note:** Equipment blank collection may be appropriate after decontamination of equipment used to collect highly contaminated samples.

1.6 Personnel Qualifications

Since this SOP will be implemented at sites or in work areas that entail potential exposure to toxic chemicals or hazardous environments, all TRC personnel must be adequately trained. Project and client-specific training requirements for samplers and other personnel on site should be developed in project planning documents, such as the sampling plan or project work plan. These requirements may include:

- Occupational Safety and Health Administration (OSHA) 40-hour Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER) workers; and
- 8-hour annual HAZWOPER refresher training.

2.0 PROCEDURES

Refer to the site-specific sampling plan and/or Quality Assurance Project Plan (QAPP), if applicable, for site-specific procedures. Other state or federal requirements may be above and beyond the scope of this SOP and will be followed if applicable. The actual procedures used should be documented and described in the field notes.

2.1 General

Personnel, sample containers, and equipment leaving the contaminated area of a site must be decontaminated. Various decontamination methods will either physically remove contaminants by abrasive and/or washing actions, inactivate contaminants by disinfection or sterilization, or both. Decontamination procedures should be documented in the field book.

2.2 Physical Decontamination Procedures

In many cases, gross contamination can be removed by physical means. The physical decontamination techniques appropriate for equipment decontamination can be grouped into two categories: abrasive methods and nonabrasive methods. In general, heavy equipment decontamination is conducted by drilling and construction subcontractors and not by TRC personnel. However, TRC personnel will typically need to document such decontamination efforts as part of project work. Special care should be taken during decontamination procedures following sampling for PFAS; please refer to Attachment B for details.

ABRASIVE CLEANING METHODS APPROPRIATE FOR DRILLING EQUIPMENT (DRILLING RIGS, ETC.)

Abrasive cleaning methods involve rubbing and wearing away the top layer of the surface containing the contaminant. The following abrasive methods are available but are not commonly used:

- *Mechanical:* Mechanical cleaning methods use metal or nylon brushes. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.

- *Air Blasting:* Air blasting is used for cleaning large equipment, such as bulldozers, drilling rigs, or auger bits. The equipment used in air blasting employs compressed air to force abrasive material through a nozzle at high velocities. The distance between the nozzle and the surface cleaned, as well as the pressure of air, the time of application, and the angle at which the abrasive material strikes the surface, determines cleaning efficiency. Air blasting has several disadvantages, including its inability to control the amount of materials removed, it can aerate contaminants, and it generates large amounts of waste.

- *Wet Blasting:* Wet blasting, also used to clean large equipment, involves use of a suspended fine abrasive delivered by compressed air to the contaminated area. The amount of materials removed can be carefully controlled by using very fine abrasives. One disadvantage of this method is the generation of a large amount of waste.

NONABRASIVE CLEANING METHODS APPROPRIATE FOR FIELD EQUIPMENT (DRILLING AUGERS AND RIGS, ETC.)

Nonabrasive cleaning methods involve forcing the contaminant off a surface with pressure. In general, less of the equipment surface is removed using nonabrasive methods. The following nonabrasive methods are available:

High-pressure Potable Water: This method consists of a high-pressure pump, an operator-controlled directional nozzle, and a high-pressure hose. Flow rates typically range from 20 to 140 liters per minute (approximately 5 to 37 US gallons per minute). This procedure is used the majority of the time and is more appropriate for equipment with painted surfaces.

Ultrahigh-Pressure Potable Water: This system produces a pressurized water jet. The ultrahigh-pressure spray removes tightly adhered surface film. The water velocity ranges from 500 meters per second (m/sec) to 900 m/sec (approximately 1,640 to 2,953 feet per second). Additives can enhance the method. This method is not applicable for hand-held sampling equipment. This procedure is not commonly used but would be appropriate for carbon steel drilling rods and augers.

Steam Cleaning: This method consists of a high-pressure hot water cleaner capable of generating a pressure of at least 2,500 pounds per square inch (psi) and producing hot water and/or steam (at least 200 degrees Fahrenheit), and is typically equipped with a soap compartment. Due to the high temperatures associated with this method, steam cleaning should not be used for polyvinyl chloride (PVC) or plastic equipment.

2.3 Procedure for Sampling Equipment

Sampling equipment, such as split-spoon samplers, shovels, hand augers, trowels, spoons, spatulas, bailers, tethers, dippers, and pumps, will be cleaned using the following procedure. Special care should be taken during decontamination procedures following sampling for PFAS; please refer to Attachment B for details. **Note:** The overall number of containers needed for collection of decontamination fluids may vary depending on chemical compatibilities, project and regulatory requirements, and ultimate disposal methods for these fluids.

1. Lay out sufficient polyethylene sheeting on the ground or floor to allow placement of the necessary number of containers (e.g., plastic wash basins or buckets) and an air-drying area. The number of decontamination steps and designated containers should be determined prior to field sampling based on the site-specific sampling plan. At a minimum, one container should be designated for the detergent wash. A second container should be designated for water rinsing. A third container may be designated for non-water rinsing. If more than one, the non-water rinsate fluids may need to be separated. Non-water rinsate fluids should not be combined with the detergent wash during decontamination. Place the containers on the polyethylene sheeting. The decontamination line should progress from “dirty” to “clean”.

   Note: In instances where acid or solvent rinses are required, additional containers may be needed to manage collection and subsequent disposal of the spent decontamination fluids.

2. Fill the first container with potable water. Add sufficient non-phosphate, concentrated, laboratory-grade soap to cause suds to form. Do not use an excessive amount of the soap (approximately 1 tablespoon of soap to 5 gallons of water) or rinsing the soap residue off the equipment will be difficult.

3. Disassemble the equipment, as appropriate.

4. Brush any visible dirt off sampling equipment into a designated area before getting equipment wet.

5. Using a clean, coarse scrub brush, submerge and wash the sampling equipment in the soap solution in the first container, removing all dirt and/or visible hydrocarbons. Allow excess soap to drain off the equipment into the container when finished.

6. If cleaning a pump that is not completely disassembled, run the submerged pump in the container long enough to allow sufficient contact time with the internal components of the pump.

7. Rinse the equipment with appropriate water over an appropriate container, using a coarse scrub brush or pressure sprayer to aid in the rinse if necessary. If an additional acid or solvent rinse is not required, proceed to Step 10.

8. ******If sampling for metals and if required by the project, rinse the equipment with nitric acid over an appropriate container. Consider using a container dedicated to acidic solutions to minimize the volume of liquid that needs to be neutralized later. A 10 percent nitric acid solution is used on stainless steel equipment. A 1 percent nitric acid solution is used on all other equipment. If not required, this step may be omitted.

9. ******If sampling for organic parameters and if required by the project, rinse the equipment over an appropriate container using methanol or isopropanol (see Cautions and Potential Problems). If oily, a hexane rinse should follow the methanol/isopropanol rinse, or as an alternative, Simple Green® can be used if approved by the Project Manager. Consider using an appropriate container dedicated to volatile solvents to minimize the volume of liquid that subsequently needs to be managed as IDW. If not required, this step may be omitted.

   Allow the equipment to completely air dry prior to proceeding to the next step.

   **** Steps 8 and 9 are optional and may be used on a site-specific basis. The site-specific sampling plan or QAPP, if available, should be consulted. In the absence of a sampling plan or QAPP, the Project Manager will decide upon the necessity of these steps.**

10. Rinse the equipment over an appropriate container using deionized, distilled or organic-free water after each step. If cleaning a pump that is not completely disassembled, run the submerged pump in the container long enough to allow sufficient contact time with the internal components of the pump.

11. Allow the equipment to completely air dry on a clean surface (e.g., polyethylene sheeting or a clean container) (See*NOTE).

    ***NOTE** that if temperature or humidity conditions preclude air drying equipment, sufficient spares, as applicable and if possible, should be available so that no item of sampling equipment need be used more than once. If an ample amount of spare equipment is not available and the equipment will not completely air dry, additional rinses with deionized, distilled or organic-free water should be used. The inability of equipment to air dry and the usage of additional rinses should be recorded in the field book or on the appropriate form.

12. Reassemble equipment, if necessary, and wrap completely in clean, unused, protective material. Reuse of equipment on the same day without wrapping in protective material is acceptable.

13. Spent decontamination fluids are considered IDW and must be managed as directed by the site-specific field program.

14. Record the decontamination procedure in the field book or on the appropriate form.

15. Decontamination solution and rinse water should be refreshed at regular intervals as appropriate to meet project quality objectives.

2.4 Procedure for Measuring Equipment

Measuring equipment, such as pressure transducers, water level indicators, oil/water interface probes, and soil moisture/pH meters will be cleaned using the following procedure, unless it conflicts with the manufacturer's recommendations. Special care should be taken during decontamination procedures following sampling for PFAS; please refer to Attachment B for details.

1. Fill two clean containers (e.g., plastic wash basins or buckets) with potable water.

2. Add sufficient nonphosphate, concentrated, laboratory-grade soap to one container to form a thin layer of soap suds. If oily residues are apparent, the use of Simple Green® may be required.

3. Brush any visible dirt off measuring equipment before getting the equipment wet.

4. Either spray rinse the device with the soap solution over the first container, or for heavily soiled equipment, immerse the device in the container containing soap and gently agitate. Scrub device if it is soiled. Do not submerse any electrical controls or take-up reels. Submerse only that portion of the device that came in contact with potential contaminants.

5. Immerse the device in the container containing the potable water and gently agitate. Do not submerse any electrical connectors or take-up reels. Submerse only that portion of the device that came in contact with potential contaminants.

6. Spray rinse equipment with deionized, distilled, or organic-free water over the last container used.

7. Allow the equipment to air dry if time allows.

8. Record the decontamination procedure in the field book or on the appropriate form.

3.0 INVESTIGATION-DERIVED WASTE DISPOSAL

Field personnel should discuss specific documentation and containerization requirements for IDW disposal with the Project Manager.

Each project must consider IDW disposal methods and have a plan in place prior to performing field work. Provisions must be in place regarding what will be done with IDW. If IDW must be removed from the site, consider material containment, such as a composite drum, proper labeling, on-site storage by the client, testing for disposal approval of the materials, and ultimately the pickup and disposal of the materials by appropriately licensed vendors.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

One type of quality control sample specific to the field decontamination process is the equipment blank. The equipment blank provides information about the effectiveness of the decontamination process employed in the field. An equipment blank can detect contamination that may arise from potentially contaminated equipment or equipment that has not been decontaminated effectively.

Equipment blanks consist of a sample of analyte-free (i.e., deionized, distilled, organic-free) water that is poured over and through a decontaminated sampling device and placed in a clean sample container. Ideally, the reagent water should come from the laboratory and be certified as clean. If the blank water is not certified as clean and/or not supplied by the laboratory performing the analyses, a separate water blank that has not run through the sampling equipment should also be sent to the laboratory for analysis.

Equipment blanks are typically collected for all parameters of interest at a minimum rate of 1 per day per matrix; however, the frequency of equipment blank collection will vary from project to project, depending upon the data quality objectives and/or regulatory requirements, and will be specified in either the site-specific sampling plan or QAPP. Equipment blanks are typically not required if dedicated sampling equipment is used.

5.0 DATA MANAGEMENT AND RECORDS MANAGEMENT

All reagents used must be documented in the field book or on the appropriate form. Any deviations from the decontamination procedures specified in the sampling plan or QAPP must be approved by the Quality Assurance Officer and Project Manager and documented in the field book. The lot number and vendor of each reagent used should be documented in the field book. Refer to ECR SOP 001 for field documentation procedures.

Planning for the collection of equipment blank samples can be tracked in the TRC Environmental Data Management System (EDMS). This can ensure the field teams are reminded by the mobile data collection app to collect equipment blank samples per the sampling plan or QAPP. Data quality checks for equipment blank samples can be automatically run by the TRC EDMS and highlight any non-conformities to the QAPP or concentrations detected in the equipment blank samples when data are loaded. Discuss with your EDMS data manager to have this automated report configured for your project site.

6.0 REFERENCES

USEPA. December 1987. *A Compendium of Superfund Field Operations Methods*. EPA/540/P-87/001.

USEPA. January 1991. *Compendium of ERT Groundwater Sampling Procedures*. OSWER Directive 9360.4-06. PB91-9211275.

USEPA. November 1992. *RCRA Ground-Water Monitoring: Draft Technical Guidance*. EPA/530-R-93-001. USEPA Office of Solid Waste.

USEPA. January 1999. *Compendium of ERT Groundwater Sampling Procedures*. EPA/540/P-91/007. OSWER Directive 9360.4-06. PB91-921275.

USEPA. June 22, 2020. *Field Equipment Cleaning and Decontamination*. LSASDPROC-205-R4. Region 4. Laboratory Services and Applied Science Division. Athens, Georgia.

7.0 SUSTAINABLE RECOMMENDATIONS

Sustainable practices should be incorporated wherever practical. Items to consider for equipment decontamination are as follows:

- Utilize Alconox® soap when appropriate due to its biodegradable nature;
- Utilize a reusable container such as a carboy for decontamination water;
- Utilize reusable decontamination equipment such as plastic spray bottles, plastic brushes, etc., when appropriate;
- Utilize recycled plastic sheeting to contain decontamination rinsate, if available; and,
- Send decontamination rinsate to a wastewater treatment facility for water reuse/recycling when practical.

8.0 SOP REVISION HISTORY

REVISION NUMBER	REVISION DATE	REASON FOR REVISION
1	DECEMBER 2016	ADDED ATTACHMENT B TO ACCOMMODATE SOP MODIFICATIONS REQUIRED WHEN SAMPLING FOR PFAS; CHANGED NAMING CONVENTION FOR SOP FROM RMD TO ECR.
2	JANUARY 2020	TRC RE-BRANDING
3	APRIL 2021	REVIEWED AND REVISED SOP

Attachment A: SOP Fact Sheet

EQUIPMENT DECONTAMINATION

PURPOSE AND OBJECTIVE

Removing or neutralizing potential contaminants that may have accumulated on equipment and vehicles ensures protection of personnel, reduces or eliminates potential transfer of contaminants to clean areas, and minimizes the likelihood of sample cross-contamination. Preventing or minimizing potential cross-contamination of samples is important for the collection of representative samples, avoiding the possible introduction of sampling error into sample results, and for protecting the health and safety of site personnel.

WHAT TO BRING

- Field book
- Appropriate PPE
- Site-specific HASP
- Alconox®, Liquinox® or other nonphosphate, concentrated, laboratory-grade soap
- Simple Green® or other nontoxic biodegradable cleaner
- Deionized, distilled, organic-free water, or potable water as appropriate as determined by the Project Manager
- Pump or pressure sprayer
- Squeeze bottles filled with appropriate decontamination chemicals (e.g., organic solvents, nitric acid)
- Containers, such as buckets or wash basins (type and number is dependent on the procedure)
- Scrub brushes and/or small wire brush
- Aluminum foil
- Polyethylene sheeting
- A container for decontamination of pumps and associated tubing

OFFICE

- Prepare/update the site-specific HASP; make sure the field team is familiar with the latest version.
- Review site-specific sampling plan/QAPP for decontamination procedures and procedures for management of investigation-derived waste (IDW) (e.g., used decontamination solutions).
- Confirm all required decontamination supplies are in stock or order as needed.

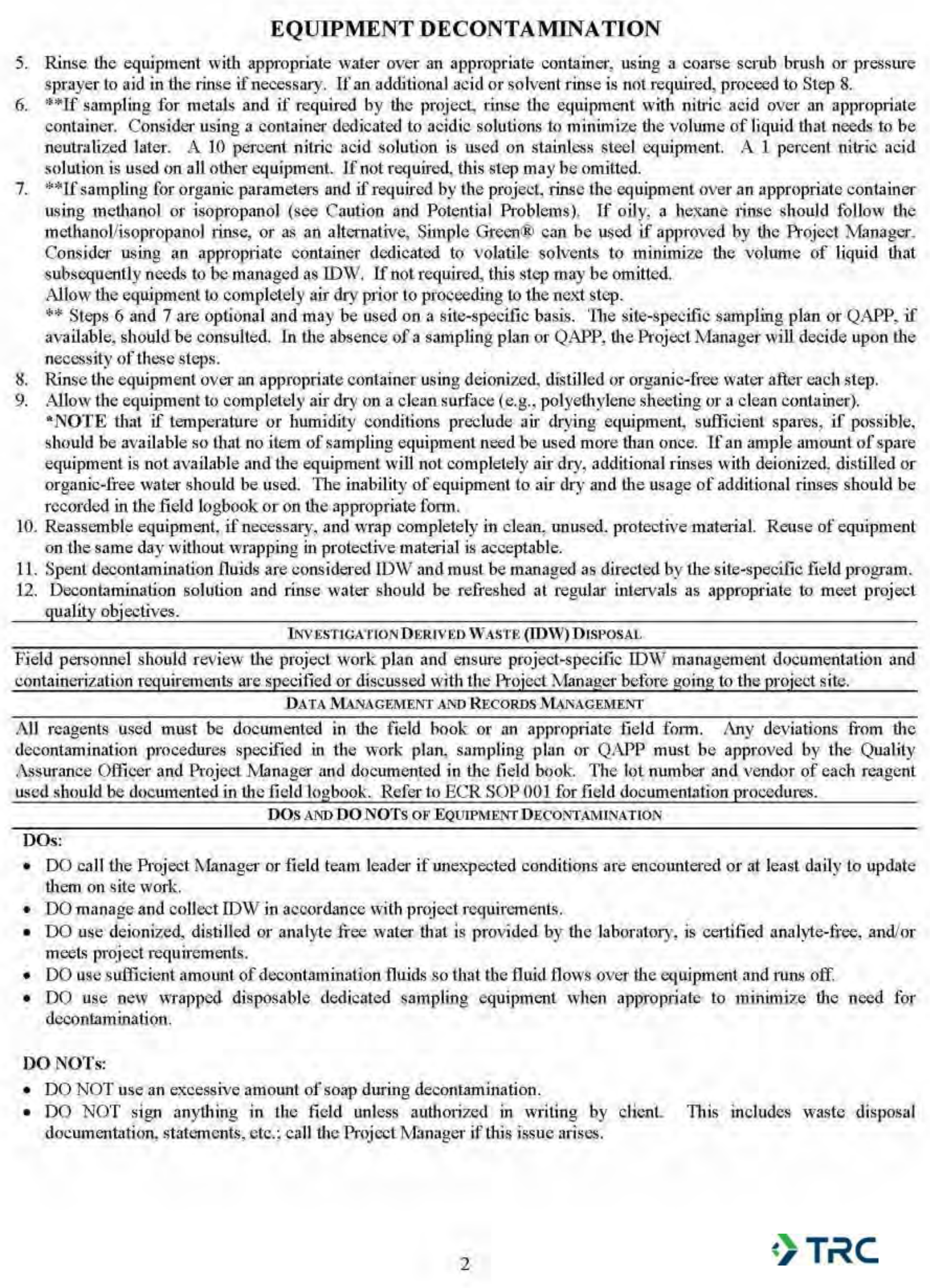
ON-SITE

- Verify project HASP including safety data sheets for decontamination chemicals used on site.
- Conduct daily Health & Safety tailgate meetings, as appropriate.
- Establish a designated equipment and personnel decontamination area.
- Provide for the proper collection and management of all IDW.
- Verify that appropriate PPE is worn by all site personnel (including subcontractors) and the work area is safe.

SAMPLING EQUIPMENT DECONTAMINATION - PROCEDURES

Sampling equipment, such as split-spoon samplers, shovels, hand augers, trowels, spoons, spatulas, bailers, tethers, dippers, and pumps, will be cleaned using the following procedure. **A more simplified procedure for decontamination of measuring equipment is presented in the SOP.** Note: The overall number of containers needed for collection of decontamination fluids may vary depending on chemical compatibilities, project and regulatory requirements, and ultimate disposal methods for these fluids.

1. Lay out sufficient polyethylene sheeting on the ground or floor to allow placement of the necessary number of containers (e.g., plastic wash basins or buckets) and an air-drying area. At a minimum, one container should be designated for the detergent wash. A second container should be designated for water rinsing. A third container may be designated for nonwater rinsing. Nonwater rinsate fluids should not be combined with the detergent wash during decontamination. The decontamination line should progress from "dirty" to "clean".
   Note: In instances where acid or solvent rinses are required, additional containers may be needed to manage collection and subsequent disposal of the spent decontamination fluids.
2. Fill the first container with potable water. Add sufficient nonphosphate concentrated laboratory-grade soap to cause suds to form. Do not use excessive amount of the soap (approximately 1 tablespoon of soap to 5 gallons of water) or rinsing the soap residue off the equipment will be difficult.
3. Brush any visible dirt off of the sampling equipment into a designated area before getting equipment wet.
4. Using a clean, coarse scrub brush, submerge and wash the sampling equipment in the soap solution in the first container, removing all dirt and/or visible hydrocarbons.



EQUIPMENT DECONTAMINATION

5. Rinse the equipment with appropriate water over an appropriate container, using a coarse scrub brush or pressure sprayer to aid in the rinse if necessary. If an additional acid or solvent rinse is not required, proceed to Step 8.
6. **If sampling for metals and if required by the project, rinse the equipment with nitric acid over an appropriate container. Consider using a container dedicated to acidic solutions to minimize the volume of liquid that needs to be neutralized later. A 10 percent nitric acid solution is used on stainless steel equipment. A 1 percent nitric acid solution is used on all other equipment. If not required, this step may be omitted.
7. **If sampling for organic parameters and if required by the project, rinse the equipment over an appropriate container using methanol or isopropanol (see Caution and Potential Problems). If oily, a hexane rinse should follow the methanol/isopropanol rinse, or as an alternative, Simple Green® can be used if approved by the Project Manager. Consider using an appropriate container dedicated to volatile solvents to minimize the volume of liquid that subsequently needs to be managed as IDW. If not required, this step may be omitted.
   Allow the equipment to completely air dry prior to proceeding to the next step.
   ** Steps 6 and 7 are optional and may be used on a site-specific basis. The site-specific sampling plan or QAPP, if available, should be consulted. In the absence of a sampling plan or QAPP, the Project Manager will decide upon the necessity of these steps.
8. Rinse the equipment over an appropriate container using deionized, distilled or organic-free water after each step.
9. Allow the equipment to completely air dry on a clean surface (e.g., polyethylene sheeting or a clean container).
   *NOTE that if temperature or humidity conditions preclude air drying equipment, sufficient spares, if possible, should be available so that no item of sampling equipment need be used more than once. If an ample amount of spare equipment is not available and the equipment will not completely air dry, additional rinses with deionized, distilled or organic-free water should be used. The inability of equipment to air dry and the usage of additional rinses should be recorded in the field logbook or on the appropriate form.
10. Reassemble equipment, if necessary, and wrap completely in clean, unused, protective material. Reuse of equipment on the same day without wrapping in protective material is acceptable.
11. Spent decontamination fluids are considered IDW and must be managed as directed by the site-specific field program.
12. Decontamination solution and rinse water should be refreshed at regular intervals as appropriate to meet project quality objectives.

INVESTIGATION DERIVED WASTE (IDW) DISPOSAL

Field personnel should review the project work plan and ensure project-specific IDW management documentation and containerization requirements are specified or discussed with the Project Manager before going to the project site.

DATA MANAGEMENT AND RECORDS MANAGEMENT

All reagents used must be documented in the field book or an appropriate field form. Any deviations from the decontamination procedures specified in the work plan, sampling plan or QAPP must be approved by the Quality Assurance Officer and Project Manager and documented in the field book. The lot number and vendor of each reagent used should be documented in the field logbook. Refer to ECR SOP 001 for field documentation procedures.

DOs AND DO NOTs OF EQUIPMENT DECONTAMINATION

DOs:

- DO call the Project Manager or field team leader if unexpected conditions are encountered or at least daily to update them on site work.
- DO manage and collect IDW in accordance with project requirements.
- DO use deionized, distilled or analyte free water that is provided by the laboratory, is certified analyte-free, and/or meets project requirements.
- DO use sufficient amount of decontamination fluids so that the fluid flows over the equipment and runs off.
- DO use new wrapped disposable dedicated sampling equipment when appropriate to minimize the need for decontamination.

DO NOTs:

- DO NOT use an excessive amount of soap during decontamination.
- DO NOT sign anything in the field unless authorized in writing by client. This includes waste disposal documentation, statements, etc.; call the Project Manager if this issue arises.

Attachment B: SOP Modifications for PFAS

Due to the pervasive nature of PFAS in various substances routinely used during sampling and the need to mitigate potential cross-contamination or sampling bias to ensure representative data are collected, special care should be taken when sampling for PFAS. The following table highlights the required modifications to this SOP when sampling for PFAS.

PFAS Equipment Decontamination Protocols	
SOP Section Number	**Modifications to SOP**
1.3	• Use only Alconox® or Liquinox® soap; do not use Decon 90. • Use new plastic buckets for wash and rinse water. • Ensure that PFAS-free water is used during the decontamination procedure. • Do not use aluminum foil.
1.5	Always consult the Site-specific Health and Safety Plan prior to conducting field work. The following considerations should be made with regards to decontamination procedures: • Tyvek® suits should not be worn. Cotton coveralls may be worn. • Boots and other field clothing containing Gore-Tex™ or other waterproof/resistant material should not be worn. This includes rain gear. Boots made with polyurethane and polyvinyl chloride (PVC) are acceptable. • Food and drink should not be allowed within the decontamination area. Bottled water and hydration drinks (e.g., Gatorade®) may be consumed in the staging area only. • Personnel involved with decontamination should wear a new pair of nitrile gloves after each decontamination procedure when handling equipment to avoid re-contamination. Avoid handling unnecessary items with nitrile gloves. • Do not store on or cover equipment with aluminum foil after decontamination. Use of polyethylene sheeting is acceptable. • Avoid wearing clothing laundered with fabric softeners. • Avoid wearing new clothing (recommended six washings since purchase). Clothing made of cotton is preferred. • Avoid using cosmetics, moisturizers, hand creams, or other related products as part of cleaning/showering the morning of sampling and decontamination field work.
2.2	• New nylon or metal bristle brushes should be used for mechanical cleaning methods. • If high-pressure water is used, it must be tested prior to use for the presence of PFAS.
2.3	• Ensure that PFAS-free water is used during the last step of the decontamination procedure.
2.4	• Ensure that PFAS-free water is used during the last step of the decontamination procedure.

New Hampshire Department of Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes

---

A1 Title and Signature Page

Document Title:	New Hampshire Department of Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes
Lead Organization:	NH Department of Environmental Services Water Division-Watershed Management Bureau
Preparer's Name:	Andrew Chapman
Preparer's Signature:	
Organizational Affiliation/Address:	NH Department of Environmental Services 29 Hazen Drive P.O. Box 95 Concord, NH 03302-0095
Preparation Date:	November, 2013

A2 Table of Contents

A3 Introduction (History, Justification)

The development and implementation of state-level biological assessment techniques and thresholds is directed under Sections 303 and 304 of the Clean Water Act. The US Environmental Protection Agency further clarified its position on the applicability of biological assessment programs in its 1991 statement of policy indicating that biological surveys shall be integrated into State water quality programs to help restore and maintain the biological integrity of the Nation's waters.

The primary goals of biological assessment programs are to determine "aquatic life use" status for applicable waterbodies, make decisions for specific permitting and regulatory actions, assist in setting planning and management priorities for waterbodies in need of controls, and prepare water quality reports.

Since 1997, NH DES has collected biological data from wadable streams with the goal of developing indices that can be used to estimate the overall ecological integrity of the biological community. Current New Hampshire water quality standards (Env-Wq 1700) define Biological and Aquatic Community Integrity as the ability to "maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region". The indices developed under the bioassessment program are meant to provide a numeric interpretation of the narrative standard outlined above.

The purpose of this document is to provide a detailed description of the collection and processing methods utilized for freshwater fish samples in order to compute a Indices of Biotic Integrity (IBIs) necessary for making biological assessments of wadeable streams and rivers.

A4 Definitions

Back-pack electroshocker: Backpack electrofisher generators are typically batttery powered. They employ a transformer to pulse the current before it is delivered into the water. The anode is located at the end of a long, 2 meter pole and is usually in the form of a ring. The cathode is a long, 3 meter braided steel cable that trails behind the operator. The electrofisher is operated by a deadman's switch on the anode pole.

A5 Field Procedures for Fish Collection

The Biomonitoring Program fish assessment protocol is an intensive effort and is adapted from the United States Environmental Protection Agency's Rapid Bioassessment Protocols (US EPA 1999). The methodology is designed for wadeable streams and rivers, and uses backpack electrofishing equipment to capture fish for identification and enumeration.

A5.1 Sampling Season

Surveys are conducted at a time when fish populations are most stable and variability is minimized by seasonal migration. Extremes in flow conditions can result in non-seasonal migration of certain species seeking less stressful habitat conditions. Therefore, sampling should also be avoided during periods of natural high or low flows.

Fish surveys are conducted by the biological monitoring program from the end of June through September, but may be extended into October if necessary. The sampling time frame represents a stable fish assemblage, when fish tend to remain in a particular localized area and is most likely to include the full range of resident species. If a survey is requested or required later in the fall, New Hampshire Department of Fish and Game is contacted for advice on avoiding fall spawning species.

A5.2 Fish Collection Permits

Prior to any fish surveys, a scientific collection permit must be obtained from the New Hampshire Fish and Game Department (NH F&G). A written letter to the commissioner of the NH F&G from the head of the biomonitoring program is sent out well ahead (e.g. 3 months) of the scheduled sampling period in order to obtain the necessary permit. The request must also contain the tentative sites planned for collection. Once approved, a hard copy of the permit is carried by the biomonitoring program field operations team at all times. See attachment A for an example scientific permit request letter, attachment B for an example scientific permit application and attachment C for an example scientific collection permit.

At the end of the field season, a report must be submitted to the NH F&G summarizing the results of the survey efforts. The report must include the stations sampled, including the exact location; a list of species encountered and the number of each species captured; the incidence of mortality for each species; and whether any of the species are included on state or federal threatened and endangered (T&E) species lists. Any sites known to contain T&E species must be approved for sampling prior to when the actual field work occurs.

A5.3 Training and Safety for Electrofishing

Electrofishing equipment can be hazardous if not operated competently by trained individuals. It is the policy of the biological monitoring program that any individual operating electrofishing equipment be trained by the current biological program manager before any field sampling.

As part of the training, all new field crew personnel are required to read the operation and safety manuals supplied by the manufacturer of the electrofishing equipment. A copy of the manuals for the current equipment used by the biological monitoring program is included in appendix XX. In addition, all individuals participating in electrofishing activities must have current CPR training. Opportunities to attend a CPR course will be identified and offered to all field crew personnel prior each field season.

At the completion of these activities and readings field personnel are required to sign a waiver (Appendix D-2) verifying that they have read and fully understand the hazards involved and the required safety protocols prior to any actual field survey work.

The biological program manager will also provide "hands on" training prior to "live" sampling allowing all field crew members to understand the various roles on the shocking crew team and instream safety precautions used to minimize the likelihood of injury related to electroshocking. Field crew members are required to practice these procedures and safety measures during all field operations. Failure to do so will result in their removal from the shocking crew.

In addition to above safety measures, all field crew members are required to wear protective equipment, including waders and rubber gloves at all times. If a member does not have these basic items, they will not be allowed to be in the water during the shocking. Wading belts and life jackets are also available if a crew member chooses to use them. Field crew members are also strongly urged to wear polarized sunglasses and a hat during sampling to minimize accidents and increasing sampling efficiency.

In order to ensure safety and efficiency in fish sampling efforts as well as equipment longevity, equipment must be inspected and appropriately maintained. Inspections of electrofishing equipment will be completed prior to each sampling event. Pre-operation inspections shall include: a visual check of electrical connections, wires, and shocking battery. Any loose connections, worn or frayed wires, leaking or cracked batteries will preclude any and all electroshocking activities until repairs can be made. In addition, an instream test shall be preformed prior to any sampling. The instream test is designed to check the shocker settings and performance, as well as the integrity of each field crew member's waders and gloves. The instream test will also be used to test the various built in safety mechanisms (e.g. tilt) on the electroshocker. At the end of the season a final inspection of each electroshocker will be completed so that any necessary repairs can be identified and completed.

A5.4 Equipment and Materials

The Biological Monitoring Unit utilizes two separate electroshocker models (Model 12 and LR-24) manufactured by Smith-Root, Inc. Both utilize DC (direct current) power generated from a 24 volt gel cell deep cycle battery. Each unit has a variety of waveform settings to accommodate a range of environmental conditions, specifically those related to in-stream specific conductance. Manuals for operation and care of each electroshocker are available for reference through the Biomonitoring Program or at www.smith-root.com.

Smith-Root Model 12

Smith-Root LR-24

A5.5 Rational for Stream Length to be Fished

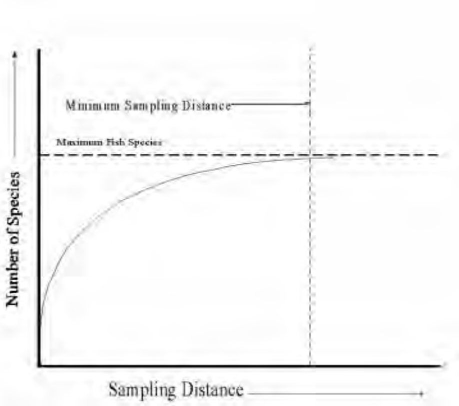


Figure 4-2. Basic relationship between the number of species vs. sampling distance

An accurate representation of the fish species present and their relative numbers at any given sample location is imperative in order to effectively assess biological condition. The first step towards this goal is the establishment of suite of standardized sampling protocols. Initially, this is accomplished by defining a representative sample reach from which a fish sample is collected. For the biological monitoring unit this means sampling a stretch of river or stream with the goal of capturing 95% of the species which are present. Figure XX demonstrates the basic relationship between number of fish species captured relative to the distance sampled; simply stated as the sampling distance increases the maximum number of species captured plateaus. Beyond this distance, additional sampling captures few new species, and thus, is unnecessary to obtain a representative sample of the resident fish community. The distance necessary to capture the majority of the species present is a function of stream order, geomorphologic characteristics, gradient, and other physical factors.

A5.6 Fish Collection Procedure

For wadeable streams in New Hampshire, a minimum distance of 150 meters is employed. This distance has been established as a reasonable minimum to optimize the representation of the resident species. For streams with wetted widths in excess of 30 feet but less than 50 feet, the wetted width is multiplied by 20 to determine the length of the stream reach. For streams over 50 feet wide, a visual survey of the habitat types is completed prior to establishing a set reach length. For these larger wadeable streams, the goal is to sample at least two of each habitat types observed. For some projects, reach lengths may not conform to these basic rules depending on the overall goals of the sampling effort.

Regardless of reach length, normal sampling will include a single pass through the study reach working in an upstream fashion. Sampling in an upstream direction eliminates problems of turbidity from the field crew and facilitates netting of fish as they drift towards the crew. Different fish species will inhabit a variety of microhabitat types and effort is made to shock all niches present in the stream reach.

The field sampling crew is comprised of one shocker, a minimum of two netters, and one person to carry a 5-gallon aerated bucket to place fish into for recovery. Netted fish are immediately transferred to the 5 gallon bucket upon capture. The individual operating the shocker serves as the point person on the field crew and dictates the pace and direction of shocking. The netters generally flank, and stay slightly behind, the shocker, while the person carrying the bucket stays behind both the netters and shocker. Communication between all crew members must be clear and continuous as to the expected direction of travel, pause intervals for fish transfer and repositioning, necessary rest periods, or emergencies. In the case of an immediate need to discontinue shocking field crew members, an "alert call" such as "out" will be utilized.

In some cases, two or more shock crews may be necessary to effectively shock a sample reach. In these cases, each shock crew proceeds in an upstream fashion at an approximately equal pace to maximize capture efficiency. The need for multiple shock crews is relatively infrequent and is dictated by stream size.

Numbers, species and shock time in seconds are recorded to determine the catch per unit of effort (CPUE), providing another level of standardization for making comparisons between sites. The programmed waveform for the pass should also be noted (i.e. Voltage setting, pulse width/pulse frequency). Initial settings should be 60Hz at 6ms which is the I5 mode setting (Figure 4-3). Initial chemical data including pH, temperature, dissolved oxygen and conductivity are made on the Biomonitoring Site Information Sheet (Appendix A-1) before electrofishing. Conductivity levels as well as the targeted species or size class to be captured, will dictate the waveform settings of the backpack shocker. Where macroinvertebrate monitoring is scheduled to take place in conjunction with fish community assessments, the kicks sites or rock basket placement should be within close proximity to the fish sampling reach.

A5.7 Fish Data Processing Procedure

Fish collected during the survey are processed and data recorded after completion of the single pass. Generally, fish are processed at the upstream end of the sample reach by recording the number of individuals for each species captured. The following reference guides are referred to for fish identification: *Freshwater Fishes of New Hampshire* (Scarola, 1987) and *Fishes of Vermont* (Langdon et al. 2006). For species in the trout family (Salmonidae), a separate tally, the number of young-of-the-year (YOY), are also recorded. The incidence of mortality in also tracked for each species with a target of less than 5% mortality for any one species. All data are recorded on a standardized fish collection data sheet (Appendix A-2). Fish less than 25mm in length are not included in the tabulation. If small fish (<25mm) are especially abundant and can be identified, then an appropriate note will be made on the field sheet. External anomalies will be noted on the field sheets as well as an estimation of the number of fish exhibiting the anomaly. After identification and enumeration, all fish are immediately released back into the stream or river. Un-identifiable fish may be photographed or retained for identification back in the laboratory. Finally, the cumulative "shock time" displayed by the electroshocker and shocker settings (e.g. waveform, frequency, voltage, duty cycle) is recorded on the data sheet. The time represents the actual duration, usually in seconds, electric current was discharged into the water. Generally, this shock time ranges from 1,000 - 2,000 seconds, but can be lower or higher depending on the level of effort needed to effectively shock the sample reach.

A6 Quality Assurance and Quality Control

Quality Assurance and Quality Control (QAQC) is performed for fish identification by having an experienced fish taxonomist identify fish species. Field identification manuals, including "Freshwater Fishes of New Hampshire," by John. F. Scarola and "Fishes of Vermont," by

Richard W. Langdon et al. are referred to in the field for less common species. When a fish can not be identified in the field, they are retained for laboratory identification. All species retained are preserved in formalin and labeled with date, site and staff responsible for collection.

A8 Data Sheets

The Fish Collection Data Sheet includes a table to record species, size, weight and number. See Attachment D.

Attachment A: Example Scientific Collection Permit Request Letter

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

April 11, 2013

Scott Decker
NH Fish and Game Department
Inland Fisheries
11 Hazen Drive
Concord, NH 03301

Subject: NH Department of Environmental Services Scientific Collection Permit Request

Dear Mr. Decker,

The NH Department of Environmental Services (NH DES) is requesting a scientific collection permit to collect fish for the year 2013. The permit will allow NH DES to participate in the U.S. Environmental Protection Agency's (EPA) National Rivers and Stream Assessment for 2013 and other NH DES Biomonitoring Program projects as needed.

There will be six EPA and DES staff assigned to one or more of the above mentioned fish collection projects. They include the following:

David Neils, NH DES
Steve Landry, NH DES
Andy Chapman, NH DES
Tom Faber, EPA
Hilary Snook, EPA
Dave McDonald, EPA

The following sites for fish collection have tentatively been identified to include:

Connecticut River (Monroe, Walpole, Lyme, Claremont, Northumberland and Columbia)
Merrimack River (Concord, Pembroke)
Androscoggin River (Errol)
Contoocook River (Concord, Greenfield)
Chocorua River (Tamworth)
Back Creek (Deerfield)

Moose River (Gorham)
Baker River (Wentworth)
Hale Brook (Nashua)
Unnamed Stream (Hinsdale) (42.7567N, -72.4633)

NH DES will notify F&G of any changes to the above plan.

The collection method will be electrofishing by boat or back-pack. In instances where boat shocking is completed, NH DES staff will accompany EPA staff on an EPA owned and operated equipment vessel. Most fish will be identified to species and then returned. A limited number of specimens of recreationally important fish species will be harvested for fish tissue analysis. In a limited number of cases, tissue plugs on separate individuals will be taken, as well as whole fish harvesting, for the purposes of tissue analysis. For fish that have plugs removed antibiotic salve will be placed over the wound and the fish released. Some voucher specimens may also be retained to confirm the species identification by laboratory inspection.

In addition, macroinvertebrate collections will be at various locations throughout the state in 2013. Individuals will be collected through the use of artificial substrates (rock baskets) that are deployed for a period of 6 - 8 weeks. Taxa collected are primarily from the Class Insecta and other arthropods. Samples will be preserved in 70% ethanol and identified by an NH DES retained contractor.

In all cases a complete account of the taxa capture and identified, including any mortality will be provided the NH F&G at the end of the field season.

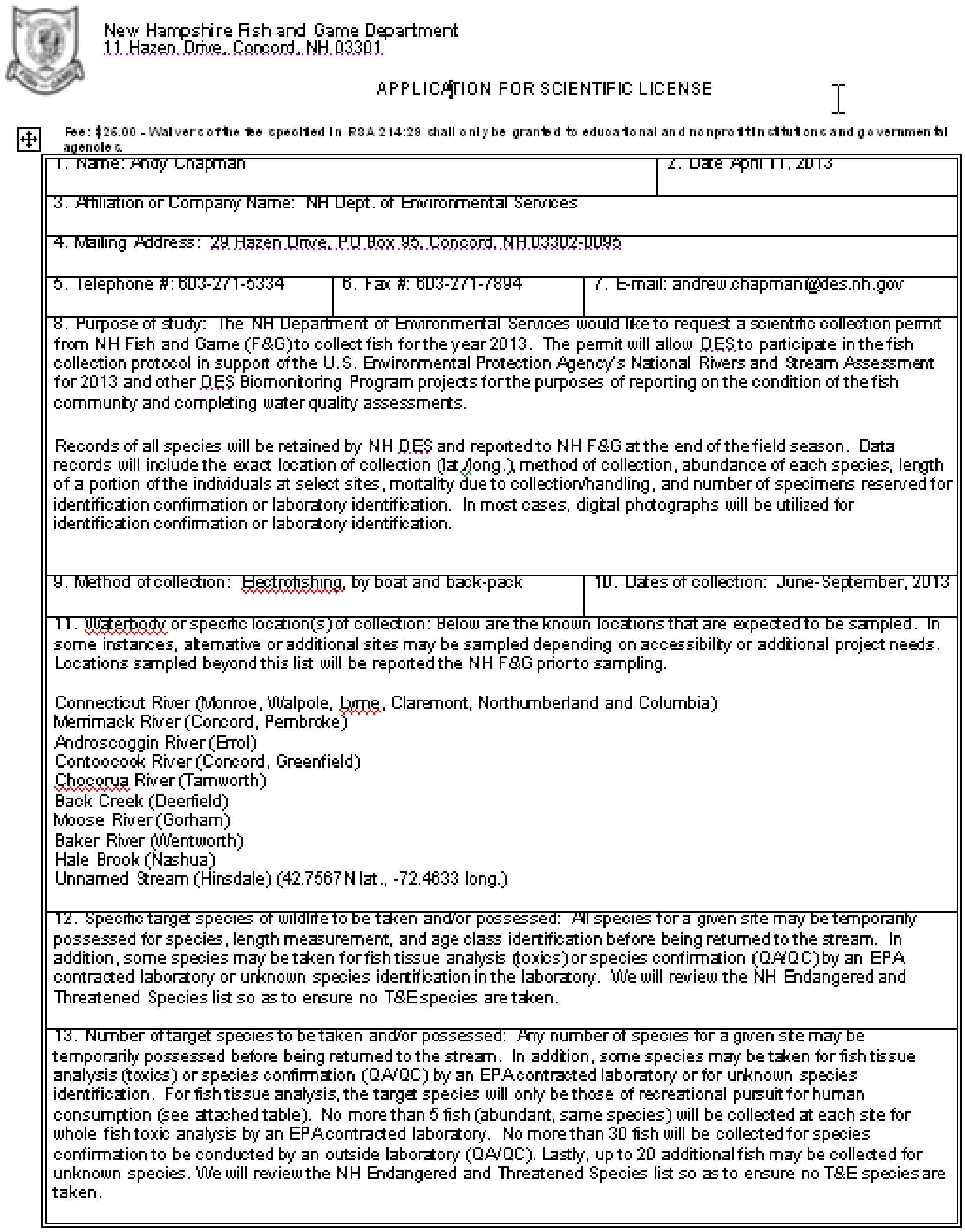
Should you have any questions, please do not hesitate to contact me directly at andrew.chapman@des.nh.gov or 603-271-5334

Thank you,

Andy Chapman
Biomonitoring Program
NH DES Watershed Management Bureau

Cc: Dave Neils (via email)

Attachment B: Example Scientific Collection Permit Application



New Hampshire Fish and Game Department
11 Hazen Drive, Concord, NH 03301

APPLICATION FOR SCIENTIFIC LICENSE

Fee: $26.00 - Waivers of the fee specified in RSA 214:29 shall only be granted to educational and nonprofit institutions and governmental agencies.

1. Name: Andy Chapman	2. Date April 11, 2013

3. Affiliation or Company Name: NH Dept. of Environmental Services

4. Mailing Address: 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

5. Telephone #: 603-271-5334	6. Fax #: 603-271-7894	7. E-mail: andrew.chapman@des.nh.gov

8. Purpose of study: The NH Department of Environmental Services would like to request a scientific collection permit from NH Fish and Game (F&G) to collect fish for the year 2013. The permit will allow DES to participate in the fish collection protocol in support of the U.S. Environmental Protection Agency's National Rivers and Stream Assessment for 2013 and other DES Biomonitoring Program projects for the purposes of reporting on the condition of the fish community and completing water quality assessments.

Records of all species will be retained by NH DES and reported to NH F&G at the end of the field season. Data records will include the exact location of collection (lat./long.), method of collection, abundance of each species, length of a portion of the individuals at select sites, mortality due to collection/handling, and number of specimens reserved for identification confirmation or laboratory identification. In most cases, digital photographs will be utilized for identification confirmation or laboratory identification.

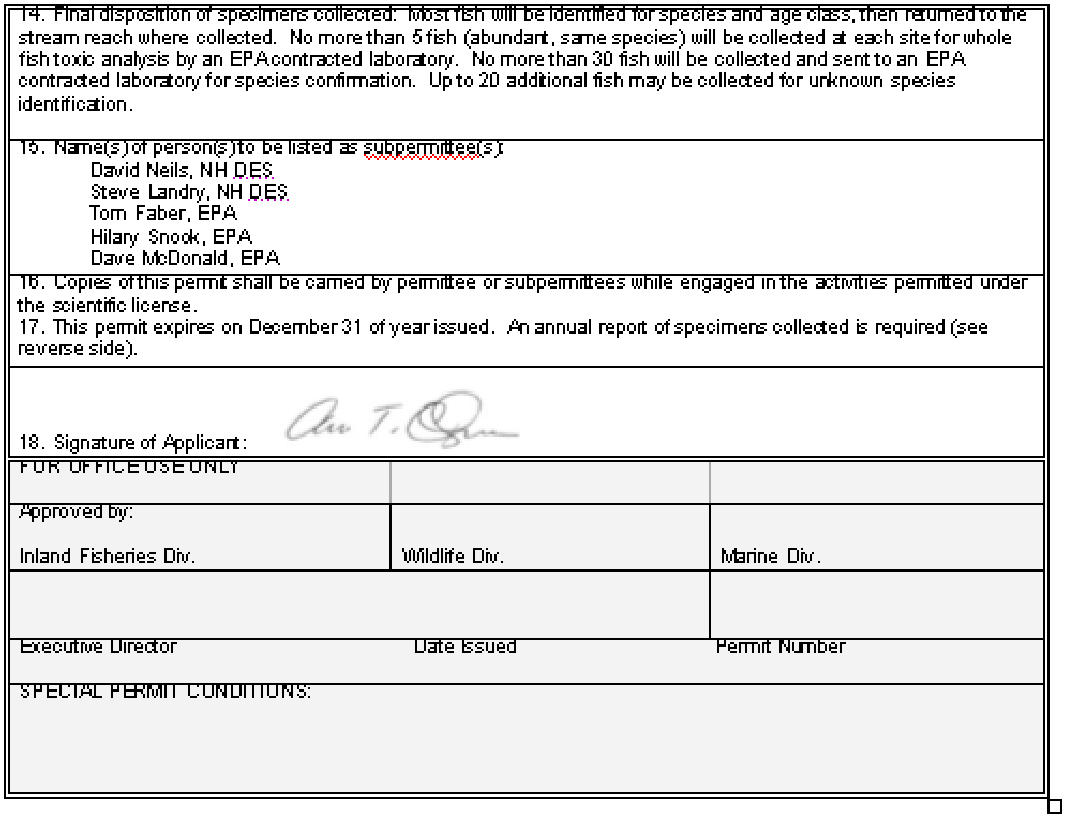
9. Method of collection: Electrofishing, by boat and back-pack	10. Dates of collection: June-September, 2013

11. Waterbody or specific location(s) of collection: Below are the known locations that are expected to be sampled. In some instances, alternative or additional sites may be sampled depending on accessibility or additional project needs. Locations sampled beyond this list will be reported the NH F&G prior to sampling.

Connecticut River (Monroe, Walpole, Lyme, Claremont, Northumberland and Columbia)
Merrimack River (Concord, Pembroke)
Androscoggin River (Errol)
Contoocook River (Concord, Greenfield)
Chocorua River (Tamworth)
Back Creek (Deerfield)
Moose River (Gorham)
Baker River (Wentworth)
Hale Brook (Nashua)
Unnamed Stream (Hinsdale) (42.7567 N lat., -72.4633 long.)

12. Specific target species of wildlife to be taken and/or possessed: All species for a given site may be temporarily possessed for species, length measurement, and age class identification before being returned to the stream. In addition, some species may be taken for fish tissue analysis (toxics) or species confirmation (QA/QC) by an EPA contracted laboratory or unknown species identification in the laboratory. We will review the NH Endangered and Threatened Species list so as to ensure no T&E species are taken.

13. Number of target species to be taken and/or possessed: Any number of species for a given site may be temporarily possessed before being returned to the stream. In addition, some species may be taken for fish tissue analysis (toxics) or species confirmation (QA/QC) by an EPA contracted laboratory or for unknown species identification. For fish tissue analysis, the target species will only be those of recreational pursuit for human consumption (see attached table). No more than 5 fish (abundant, same species) will be collected at each site for whole fish toxic analysis by an EPA contracted laboratory. No more than 30 fish will be collected for species confirmation to be conducted by an outside laboratory (QA/QC). Lastly, up to 20 additional fish may be collected for unknown species. We will review the NH Endangered and Threatened Species list so as to ensure no T&E species are taken.



14. Final disposition of specimens collected: Most fish will be identified for species and age class, then returned to the stream reach where collected. No more than 5 fish (abundant, same species) will be collected at each site for whole fish toxic analysis by an EPA contracted laboratory. No more than 30 fish will be collected and sent to an EPA contracted laboratory for species confirmation. Up to 20 additional fish may be collected for unknown species identification.

15. Name(s) of person(s) to be listed as subpermittee(s):
David Neils, NH DES
Steve Landry, NH DES
Tom Faber, EPA
Hilary Snook, EPA
Dave McDonald, EPA

16. Copies of this permit shall be carried by permittee or subpermittees while engaged in the activities permitted under the scientific license.
17. This permit expires on December 31 of year issued. An annual report of specimens collected is required (see reverse side).

18. Signature of Applicant:

FOR OFFICE USE ONLY		
Approved by: Inland Fisheries Div.	Wildlife Div.	Marine Div.
Executive Director	Date Issued	Permit Number

SPECIAL PERMIT CONDITIONS:

REPORTING REQUIREMENTS

The licensee shall submit a report of study results by January 31 for period covered by the scientific permit to include the following information:

(1) The name and address to which the scientific permit was issued;

(2) The purpose and objective of the study;

(3) Species and number wildlife taken;

(4) Age and sex, if known, of wildlife taken;

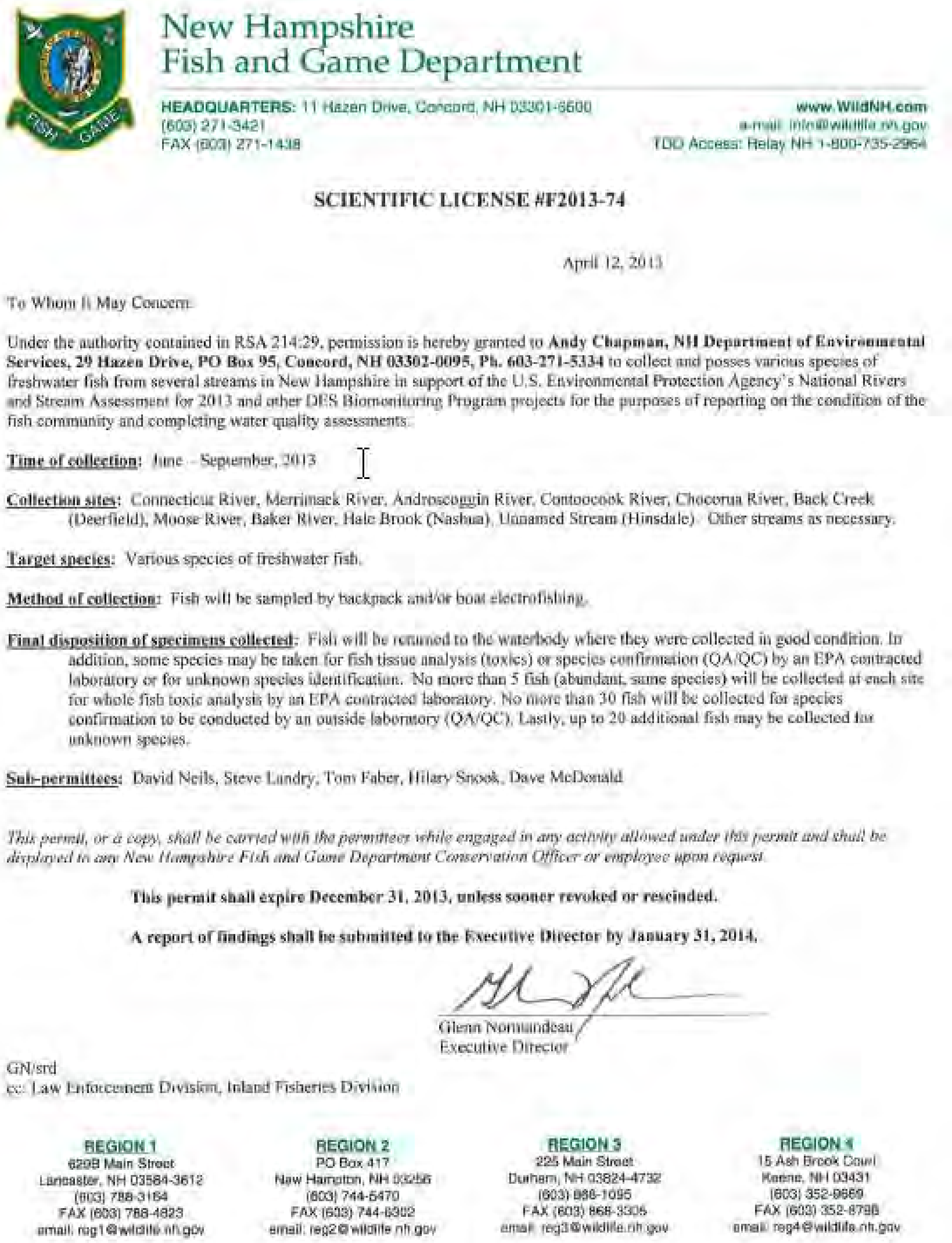
(5) Location(s) where species were taken or collected, including a map for those wildlife species tracked under this license;

(6) Date received or collected;

(7) Disposition of the wildlife; and

(8) Location where specimens are held, if applicable.

Attachment C: Example Scientific Collection Permit



New Hampshire
Fish and Game Department

HEADQUARTERS: 11 Hazen Drive, Concord, NH 03301-6500
(603) 271-3421
FAX (603) 271-1438

www.WildNH.com
e-mail: info@wildlife.nh.gov
TDD Access: Relay NH 1-800-735-2964

SCIENTIFIC LICENSE #F2013-74

April 12, 2013

To Whom It May Concern:

Under the authority contained in RSA 214:29, permission is hereby granted to **Andy Chapman, NH Department of Environmental Services, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095, Ph. 603-271-5334** to collect and posses various species of freshwater fish from several streams in New Hampshire in support of the U.S. Environmental Protection Agency's National Rivers and Stream Assessment for 2013 and other DES Biomonitoring Program projects for the purposes of reporting on the condition of the fish community and completing water quality assessments.

Time of collection: June – September, 2013

Collection sites: Connecticut River, Merrimack River, Androscoggin River, Contoocook River, Chocorua River, Back Creek (Deerfield), Moose River, Baker River, Hale Brook (Nashua), Unnamed Stream (Hinsdale). Other streams as necessary.

Target species: Various species of freshwater fish.

Method of collection: Fish will be sampled by backpack and/or boat electrofishing.

Final disposition of specimens collected: Fish will be returned to the waterbody where they were collected in good condition. In addition, some species may be taken for fish tissue analysis (toxics) or species confirmation (QA/QC) by an EPA contracted laboratory or for unknown species identification. No more than 5 fish (abundant, same species) will be collected at each site for whole fish toxic analysis by an EPA contracted laboratory. No more than 30 fish will be collected for species confirmation to be conducted by an outside laboratory (QA/QC). Lastly, up to 20 additional fish may be collected for unknown species.

Sub-permittees: David Neils, Steve Landry, Tom Faber, Hilary Snook, Dave McDonald

This permit, or a copy, shall be carried with the permittee while engaged in any activity allowed under this permit and shall be displayed to any New Hampshire Fish and Game Department Conservation Officer or employee upon request.

This permit shall expire December 31, 2013, unless sooner revoked or rescinded.

A report of findings shall be submitted to the Executive Director by January 31, 2014.

Glenn Normandeau
Executive Director

GN/srd
cc: Law Enforcement Division, Inland Fisheries Division

REGION 1
629B Main Street
Lancaster, NH 03584-3612
(603) 788-3164
FAX (603) 788-4823
email: reg1@wildlife.nh.gov

REGION 2
PO Box 417
New Hampton, NH 03256
(603) 744-5470
FAX (603) 744-6302
email: reg2@wildlife.nh.gov

REGION 3
225 Main Street
Durham, NH 03824-4732
(603) 868-1095
FAX (603) 868-3305
email: reg3@wildlife.nh.gov

REGION 4
15 Ash Brook Court
Keene, NH 03431
(603) 352-9669
FAX (603) 352-8798
email: reg4@wildlife.nh.gov

Attachment D: Fish Collection Data Sheet

Date:	**Electrofishing Info**	**Data Entry**
Site ID:	**Equipment Model:**	**Data entered into database**
Waterbody:	**Back-pack Setting:**	**Initials:** **Date:**
Town:	**Shock Time (s):**	**Data transcribed/ QC**
Visit #:	**Pass #:**	**Initials:** **Date:**
Fishing Crew/Notes:		

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

Species:		**Min**	**Max**	**Tally**
	1			
	2			
	3			
	4			
	5			

For Full Datasheet See: < "\\HAZDESFP3\wATERSHED\BIOLOGY\Biomonitoring\Sampling\Data Sheets\C-2_Fish Collection\20140508 Fish Collection Datasheet.xls"

Attachment E: Fish Collection Waiver for Electrofishing Equipment.

To assist the NHDES Biological Monitoring Program with fish collection by electrofishing methods, I ______________________, have read the New Hampshire Department of
Print Name
Environmental Services (NHDES) Protocols for Collection, Identification, and Enumeration of Freshwater Fishes and reviewed the appropriate SOP and safety manuals, available from the NHDES Biolomonitoring Program and or from the manufacturer which can be found on-line at www.smith-root.com.

____

Signature Date

STANDARD OPERATING GUIDELINES FOR FRESHWATER MACROINVERTEBRATE SAMPLING AND ANALYSIS

1.0 INTRODUCTION

The following guidelines are to be used by ESS Group, Inc. (ESS) for freshwater macroinvertebrate sampling within a single stream habitat type. They are appropriate for sampling wadeable rivers and streams, as outlined by US EPA (1999). The laboratory analysis procedures outlined below specify critical techniques and quality assurance and quality control procedures.

2.0 REQUIRED MATERIALS

The following materials are likely to be necessary for this procedure:

Field Equipment

- Standard D-frame kick-net, 500 μm mesh, ~0.3 meter (~1.0 ft) frame width
- Stopwatch
- ≥70% ethanol for sample preservation
- White tray for retaining or examining sample debris
- Sample containers (liter- or quart-sized jars preferred)
- Fine point permanent marker for labeling outside of sample jars
- Weatherproof paper for internal sample lables
- Wash bottle or similar container for dispensing water and ethanol
- Fine forceps for picking macroinvertebrates from net
- Pencils
- Field data sheets on weatherproof paper
- Clipboard
- Measuring tape, ruler, or stick
- Meters, probes, and other devices necessary for making field measurements (use of these is covered under separate SOGs)
- Chest or hip waders
- Arm length protective gloves
- Digital camera
- Site list
- Sieve bucket, 500 μm mesh (Optional)
- Driving directions (Optional)
- Global Positioning System (GPS) Unit (Optional)

Laboratory Equipment

- Log in sheet for samples
- 70% ethanol for storage of specimens
- Forceps – ultrafine or superfine gauge (straight or angled per staff preference)
- Gridded sorting sieve (at least 16 grid cells) with mesh size of 500 µm or less
- Sorting sieve tray (dimensions sufficient to fit sieve)
- Scoop for removing sample material
- Specimen vials with caps or stoppers
- Sample labels
- Archival pen/pencil
- Dissecting microscope for organism identification
- Compound microscope for slide-mounted organism identification
- External light source (fiber optic gooseneck lamp ideal)
- Petri dishes – sectional preferred
- Regionally appropriate macroinvertebrate taxonomic keys
- Standard laboratory bench sheets for sorting and identification
- Holding wells (Optional)
- Lab notebook (Optional)

3.0 HABITAT ASSESSMENT AND MACROINVERTEBRATE COLLECTION

The details provided below assume that the "single habitat sampling approach" will be taken, as referred to by US EPA (Barbour et al. 1999), in order to standardize assessments among streams. Sampling the riffle habitat (run habitat where riffle not available) is anticipated to provide a representative sample of the stream reach.

Summary of Requirements:

- All kick samples to be taken with a standard D-frame net, working upstream along a representative 100 meter (m) reach.
- Conduct kick sampling for a three-minute duration, removing organisms from larger substrate particles by hand.
- All samples must be preserved in the field on the day of collection with ethanol solution in a leak proof container. Samples ma be diluted with water as necessary to bring preservative level to about 70%.
- Complete physical characterization and habitat assessment field sheets, as necessary.
- Complete sample log-in sheet upon returning samples to the laboratory.

- Clearly label all sample containers with sample identification code, date, stream name, sampling location, and collector name.

Specific Requirements:

1. A 100-m reach representative of the characteristics of the stream will be selected. If not specified by the client/project, the sampling reach should be sufficiently downstream from any road crossing to minimize its effect on stream velocity, depth, and overall habitat quality, with no major tributaries discharging to the stream in the study area. If access restrictions, available habitat, or other site constraints prevent this, areas upstream of or near bridges and/or culverts may be included.
2. Before sampling, any required physical characterization field sheets should be completed to document water quality prior to disturbing stream sediments. Sheet entries will be reviewed after sampling.
3. A map of the sampling reach should be drawn to characterize key in-steam and riparian corridor attributes (e.g., riffles, falls, fallen trees, pools, bends, undercut banks, areas or erosion, vegetation, possible pollutant sources, etc.). An arrow will indicate the direction of flow. Take care not to disturb portions of the stream that will be sampled for macroinvertebrates.
4. Sampling should begin at the downstream end of the reach and proceed upstream to avoid disturbing targeted in-stream habitat. Using a D-frame kick net, sampling will be conducted at various locations in a riffle or series of riffles for a total active sampling time of three minutes. The area sampled should be representative of available habitat. Therefore, if multiple areas of riffle habitat are available, the sample should be composited from multiple riffles within the stream reach. If only one area of appropriate habitat is available, the sample should be composited from multiple locations within this area. If no riffle habitat is available, sampling should be done in the most similar habitat available (i.e., higher velocities with hard substrates).

   In general, sampling should last for no more than 30 seconds at any one net location. Cobbles should be picked up, placed at the lip of the net, and rubbed by hand to remove attached organisms. Boulders or exposed bedrock may be sampled by placing the net downstream and rocking and/or rubbing the surface of the rock to dislodge organisms into the net. Areas of gravel may be sampled by standing upstream of the net and gently disrupting the substrate with the toe and heel of wader boots. The goal of sampling is to dislodge burrowing, clinging, or attached organisms. Therefore, it is not desirable to violently disturb or kick substrate into the water column; this may result in damage to sampled organisms and excessive accumulation of sand and gravel in the net. Before moving to a new sampling location within the reach, collected material should be rinsed by splashing or running clean stream water through the net two to three times. If clogging does occur, the material in the net should be emptied into a sampling tray before returning to the stream to continue sampling.

   If field duplicate samples are required, these should be collected simultaneously by a second trained staff member. Each staff member should sample the same habitat features and switch sides of the stream halfway through the duration of the sampling event. This will help to counter potential sampling bias.
5. Once a complete sample has been collected,, larger debris (e.g., cobbles, twigs, large leaves) may be carefully rinsed with stream water to remove any macroinvertebrates and discarded. Sample material should be transferred from the net to sample container(s) and preserved in enough ethanol to cover the sample. Forceps may be needed to remove organisms from the net. Ethanol should not

be diluted below 70%. A label should be placed into the sample container indicating the sample identification code, date, stream name, sampling location, and collector name. The outside of the container will include the same information and indicate that the sample is preserved in ethanol. If more than one container is needed for a sample, each container label will contain all the information for the sample and should be numbered (e.g., 1 of 2, 2 of 2, etc.).

6. Sample container information as noted in step (5) will be recorded, on the US EPA "Sample Log-In Sheet" or comparable form.
7. Walking the reach, an assessment of the surrounding habitat will be conducted by completing a US EPA "Habitat Assessment Field Data Sheet" or comparable form. The sheet should be appropriate to the gradient of the stream being assessed (i.e., low or high).
8. Complete any other required tasks at this time.

4.0 PROTOCOL FOR LABORATORY ANALYSIS

Summary of Requirements:

- Samples will be rinsed to remove preservatives and fine sediments.
- Large, unique, or rare species will be removed prior to sub-sampling.
- Sub-samples will be taken using a grid-marked sorting sieve tray and metal frame.
- Sub-samples will be sorted under a dissecting microscope until the target number of organisms has been removed.
- Organisms will be preserved with ethanol in small, appropriately labeled, vials or jars.
- Unsorted residue and sorted residue should be preserved with ethanol in appropriately labeled jars.
- Midges and worms may be mounted on labeled slides, as necessary, for identification.
- Identification to genus/species level or the lowest practicable taxonomic level using a compound microscope for mounted slides and a dissecting microscope for other organisms.

Specific Requirements:

1. The sample log-in sheet will be reviewed and annotated, as necessary, to verify that all samples have arrived and are in proper condition for processing.
2. Sample processing begins by rinsing the sample material in a 500-µm mesh sieve to remove preservative and fine sediment. A sieve tray should be placed under the sieve to capture all rinseate. Take care to ensure that direct flow of water does not impinge and damage organisms against the mesh screen. Large organic material (whole leaves, twigs. algal or macrophyte mats, etc.) not removed in the field may be carefully rinsed, visually inspected, and discarded once organisms have been removed and placed in the sieve. If the samples have been preserved in alcohol, it may be necessary to soak the sample contents in water for about 15 minutes to hydrate the benthic organisms, which will prevent them from floating on the water surface during sorting.
3. After washing, the sub-sample will be evenly spread across the sorting sieve by immersing in water and then quickly removing from the water once organisms and debris are evenly distributed. Cover the sieve to keep sample material moist during sorting.

4. Large, rare or unique organisms should be picked out, identified and reported as supplemental information for each location prior to sub-sampling.

5. Use a random number table to select a grid cell from the tray for sub-sampling. Debris overhanging the grid may be cut with scissors. A scoop will be used to remove all debris and organisms from the grid. The sub-sample will then be transferred to a small container or Petri dish for temporary holding and sorting.

6. The sub-sample will be sorted under a dissecting microscope or other magnifying device sufficient to pick out organisms as small as 500 µm. All organisms from the sub-sampled material should be sorted from sample debris. If fewer than the target number of organisms is removed from the sub-sampled material, then another random grid from the sorting sieve must be selected and steps (4) and (5) repeated. These steps should be repeated until the whole sample has been sorted or the target number of organisms has been removed. On most projects, sorting may be stopped if the number of sub-sampled organisms is within 10% of the target value. However, this should be confirmed with the project manager on a project-by-project basis.

7. The sorted organisms should be placed into glass vials and preserved in 70% ethanol. The vials will be labeled inside and out with the sample identifier or lot number, date, stream name, sampling location and taxonomic group. If more than one vial is needed, each will be labeled separately and numbered (e.g., 1 of 2, 2 of 2). Most projects will require sorting into at least three vials, by taxonomic classification. Typically, these three vials will be labeled “Chironomidae/Oligochaeta”, “Mollusca/Crustacea” and “Others”, unless otherwise indicated by the project manager. An additional vial, called “Supplemental” may be used where supplemental organisms have been removed from the sample material.

8. The sorted debris residue will be saved in a separate container (sealable plastic bag is acceptable, as long as it is placed within a sealed jar) and labeled as “sorted residue”. The label will also include all prior sample label information and indicate preservation in 70% ethanol. The remaining unsorted sample debris residue will be saved in the original sample container when possible.

9. Oligochaete worms (Oligochaeta) and non-biting midge (Chironomidae) larvae and pupae may be mounted on slides, as necessary for identification. These should be mounted in an appropriate medium (e.g., CMC-9 or -10) using a method consistent with Epler (2001). Slides should be labeled with the project name, site identifier, and date collected. Multiple mounts may be completed on each slide but the slide label should be marked to index the location of each on the slide. As with midges, may also be mounted on slides and will be appropriately labeled.

10. The sorter will fill out the laboratory bench sheet, noting sub-sampling/sorting information, the number of grids picked, time expenditure, and number of organisms. QC checks performed on a particular sample should be indicated on the reverse of this sheet or in a QA/QC logbook. The sorter will record the date of sorting and slide monitoring, if applicable, on log-in sheet as documentation of progress and status of completion of the sample lot.

11. Identification and enumeration for sorted organisms within each sample will be determined through the use of a dissecting microscope (up to 45X magnification), a fiber optic lamp, standard dissecting tools, and using appropriate taxonomic keys. Midges and oligochaete worms mounted on slides will be identified using a compound microscope. Each taxon found in a sample will be recorded and enumerated on a lab bench sheet or be transcribed to the laboratory bench sheet from a lab notebook. Any difficulties encountered during identification (e.g.. missing anatomical features, degraded condition, early instar) should be noted on these sheets.

12. Any sample material that is released to the client or to an outside laboratory must be accompanied by a signed chain-of-custody form. Copies of all chains-of-custody should be retained on file, as needed.
13. For archiving samples, specimen vials will be placed in labeled jars with a small amount of denatured 70% ethanol and tightly capped.

5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The QA/QC protocol for the benthic monitoring program will be comparable to procedures outlined for other similar assessment programs. In the field, after sampling has been completed at a given site, all nets, pans, etc. that have come into contact with the sample will be rinsed thoroughly examined carefully and picked free of debris or organisms. Also, a duplicate sample will be taken at 10% of the sites to evaluate the precision or repeatability of the sampling technique or the collection team.

In the lab, ESS will randomly perform a quality check on a minimum of 10% of the samples analyzed. This quality check will cover both the sorting and the identification phases of the analysis.

For the sorting phase, if more than 10 % error (calculated by dividing the number found in the quality check by the total number of individuals) is found between the sorter and the quality assurance check, 4 additional samples will be reprocessed. If the percent error in those samples is more than 10% in those samples, then all samples sorted by that individual will be reprocessed.

For identification, a second ESS staff member trained in macroinvertebrate identification will randomly check a minimum of 10% of the samples analyzed. The purpose of this check will be to validate the identifications made on the individuals comprising the sample. In addition, ESS will confirm the identifications made with other regional experts as necessary.

A reference collection of samples will be maintained. These specimens will be labeled and preserved in 70% ethanol and stored for future reference and/or for study by other regional experts as necessary

Records of the results of each of the various quality assurance checks described above will be kept in a laboratory analysis log.

6.0 QUALIFICATIONS

Habitat Assessment and Physical Characterization

Staff responsible for habitat assessment and physical characterization must be familiar with the protocols and requirements necessary to complete field sheets and meet project needs. In-house training with the QA officer or field crew leader is required to minimize bias among individual staff completing the habitat assessment scoring.

Macroinverterbrate Sample Collection

Staff responsible for macroinvertebrate sample collection must be familiar with the protocols and requirements necessary to collect a representative single-habitat sample from wadeable streams. In-house training with the QA officer or field crew leader is required to ensure sampling methods and effort are consistent among individual staff. In-house training in proper sample preservation techniques is also required.

Macroinvertebrate Sorting and Identification

To properly conduct the taxonomic identification of aquatic macroinvertebrates, the taxonomist and QC officer must be familiar with the protocols stated in this SOG, have confidence in the appropriate use of aquatic macroinvertebrate keys and be familiar with the organisms from the area in question.

Staff responsible for slide mounting of Chironomidae and Oligochaeta must be familiar with the protocols stated in this SOG and be proficient in the methods outlined by Epler (2001).

In-house training with an experienced aquatic macroinvertebrate taxonomist is required for all staff responsible for entering taxonomic data into a project database. The staff member responsible for data entry must be familiar with the structure of the database and nature of the calculated metrics in order to ensure accuracy of the data and any associated calculations.

7.0 REFERENCES

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. Washington, D.C.: U.S. Environmental Protection Agency; Office of Water;

Epler, J.H. 2001. Identification Manual for the Larval Chironomidae (Diptera) of North and South Carolina. Special Publication SJ2001-SP13. North Carolina Department of Environment and Natural Resources, Raleigh, NC and St. Johns River Water Management District, Palatka FL.

GUIDELINES FOR MEASURING GROUNDWATER SEEPAGE QUANTITY AND QUALITY

1.0 INTRODUCTION

These Standard Operating Guidelines (SOG) provide basic instructions for the routine measurement of groundwater seepage quality and quantity. These standard methods describe the proper installation of seepage meters and the operation of Littoral Interstitial Porewater (LIP) samplers.

2.0 REQUIRED MATERIALS

The following materials are necessary for the seepage meter installation procedure:

- Seepage meters of known diameter
- Plastic tubing with one hole stopper
- Seepage bags with one hole stoppers and plastic clamps
- 250 mL graduated cylinder
- Field book or data sheets

The following materials are necessary for the collection of groundwater samples for analysis:

- Hand pump
- 2-1 L filter flasks with stoppers and tubing
- Littoral Interstitial Porewater (LIP) sampler
- Sample bottles with labels

3.0 METHODS

3.1 Seepage Meter Installation

- Initially, representative segments of the shoreline, where seepage meters will be positioned, are selected based on topography and housing density. Such segments may also be assigned to shoreline locations based on specific project objectives.

- ESS personnel shall estimate seepage quantity by installing two seepage meters per defined shoreline segment and measuring the change in volume in the attached seepage bag over time. Change in volume multiplied by a conversion factor relating the allotted seepage time (i.e., fraction of the day for which the seepage meter was running) and then adjusting to unit area (square meter), yields the liters of inseepage (positive value) or outseepage (negative value) per square meter per day.

- Seepage meters shall be firmly embedded in the substrate to depth of greater than 4 inches. Inserting seepage meters to this preferred depth will ensure that volumetric changes observed in the attached seepage bags are truly representative of groundwater flows and will increase the likelihood that seepage meters will not be disrupted by strong currents or wave action.

- At each designated shoreline location (segments pre-determined by project plan), one seepage meter should be placed at a relatively shallow depth and one at a deeper depth in order to capture ground water flows that may be occurring in different strata.

- Seepage meters must be allowed to equilibrate for a minimum of 5 minutes before the system is “closed” by the attachment of the seepage bags.

- The seepage bag should be filled with an appropriate pre-measured volume of water. In most instances 250 mL will be appropriate. The pre-determined volume of water is necessary since this volume is compared to the volume obtained after sufficient time has elapsed to quantify the change in volume (either positive or negative).

- Seepage bags are to be secured in place with as little disturbance of the seepage meter as possible. The best approach is to slowly twist the seepage bag’s rubber stopper into the hole of the seepage meter.

- Prior to use, seepage bags must be air dried in order to ensure that all residual water is removed from bags and therefore will not confound the change in volume measurements. Additionally, each bag and associated stopper must be visually inspected and air pressure tested prior to each use to ensure that no leakage can occur.

3.2. Groundwater Sampling Using Littoral Interstitial Porewater Sampler

- Groundwater seepage quality can be collected through sampling with a Littoral Interstitial Porewater (LIP) sampler. A hand pump, attached to a 250 ml HDPE plastic flask, creates a low-pressure vacuum causing water to flow from the LIP sampler into the attached plastic flask. To avoid accidental contact of the extracted water with the hand pump, a second plastic flask should be connected in-line using additional tubing.

- Porewater should be extracted from a minimum of three locations in each segment and composited using equal volumes from each location.

- Samples collected may be tested in the field for parameters such as, temperature, conductivity, and pH, and/or transferred into labeled bottles and sent to a laboratory for the other analyses.

4.0 DOCUMENTATION

Record data on field sheets, field notebooks, or electronic tablets. Any unanticipated site-specific information, which requires deviation from the above guidelines should also be recorded. Documentation should include a minimum of the following:

- Name or initials of person conducting the measurement
- Date
- Site ID or name
- Size of seepage meter (diameter)
- Time of seepage meter installation
- Time of seepage meter retrieval
- Volume of water added to seepage meter bag at installation
- Volume of water remaining in seepage meter bag at retrieval
- Results of in-lake and extracted groundwater field parameter measurements (temperature, pH, and specific conductance at a minimum)
- Environmental conditions (wind, temperature, etc.) and other relevant observations about site conditions
- Photographic evidence of conditions

GUIDELINES FOR MEASURING STREAMFLOW

1.0 INTRODUCTION

These guidelines provide instructions for the field measurement of flow rate in bodies of running water.

Descriptions of two field techniques are provided.

The first, called the time of travel method, is simple and does not require expensive or specialized equipment. This is most appropriate for rapid streamflow assessments where order of magnitude accuracy is acceptable or water depth is too low for the accurate measurement using a velocity meter.

The second method requires the use of a current meter, which is the preferred method where discharge measurements are being used to develop at-a-station rating curves and water depth is sufficient for measurement.

Additionally, these guidelines provide This method of calculating streamflow involves determining the cross-sectional area of the stream and measuring the average time it takes for a neutrally buoyant object to travel a known distance.

2.0 REQUIRED MATERIALS

The following materials are necessary for the measuring streamflow:

- Measuring stick to measure stream depth (folding stick is recommended)
- Flexible tape measure (longer than the width of the stream)
- Field data sheet, logbook, or tablet with electronic data sheet

If using a velocity meter, the following additional materials are also required:

- Swoffer Model 2100 current velocity meter (or similar)
- Calibrated wading rod

If using the time of travel method, the following additional materials are also required.

- A neutrally buoyant float
- Stopwatch (built-in app on most smartphones)
- Net (to catch the float)

3.0 METHODS

3.1 Choosing a Cross Section

Measuring stream depth using a folding yard stick.

- Select an appropriate stream cross section. The location selected should be straight (no bends), and free of obstructions. Unobstructed runs are ideal.

- Identify the left and right banks of the stream. When working in streams, left and right are relative to the mean flow direction. Therefore, the left bank will be to one's left when facing downstream but to one's right when facing upstream.

- To assure consistency of measurements and allow for easier comparison of data across time, flow should be measured at the same cross section of the stream during all visits. Include descriptions of site landmarks in field notes, and/or take photos of measurement locations. If site conditions allow, install permanent cross section markers, such as stakes or rebar.

- If a staff gauge is present near the stream measurement location, record the staff gauge depth during each visit.

3.2. Divide the Channel into Subsections

- Establish a transect by stretching the measuring tape across the stream, perpendicular to the channel axis. Secure each end of the tape to the stream banks so that the tape is taut.

- Take a minimum of four photographs, including one each facing upstream, the left bank, downstream, and the right bank.

- Starting with the left edge of water, measure width and stream depth at no less than three locations (stations) within the steam channel. This is the minimum number of stations and most streams will require more than three measurements to accurately calculate discharge.

- The area between each vertical station represents a channel subsection.

3.3. Measuring Velocity

3.3.1 Time-of-Travel Method

- To measure travel time, time how long it takes for a neutrally buoyant object (a float) to travel a known distance. Suitable objects should float, but sit very low in the water to minimize influence from wind, and can be untethered or tethered (methods adapted from EPA, 2012a described below). Suitable floats include:

  - citrus fruits or pieces of citrus peel
  - cheese puffs
  - small sponge rubber balls
  - small sticks or bits of vegetation

- Always face upstream when taking velocity measurements. Stand far enough downstream that stream velocity is not affected in the location being measured.

- Surface velocity is generally greater than depth-averaged velocity, so a correction factor (0.8 for rocky-bottom streams, 0.9 for muddy-bottom streams) is applied to float travel times (see Section 3.3, EPA 2012b)

- Untethered floats should be biodegradable, or a second person equipped with a net should be stationed downstream of the sampling reach to retrieve the float(s).

- Hold the measuring stick above the water surface, perpendicular to the cross section. Release the untethered float somewhat upstream of the end of the measuring stick to allow the float to reach full flow velocity. Using a stopwatch, time how long it takes for the float to travel a known distance (3 ft is recommended for most streams but longer distances may be appropriate where velocity is high). Repeat this process three times to obtain an average time to travel at one station before proceeding to the next station.

  -

3.3.2 Depth-Averaged Current Meter Method

- Set the current meter to average measurements over at least a three second period. Longer periods may be used if appropriate to conditions.

- Always face upstream when taking velocity measurements. Stand far enough downstream that stream velocity is not affected in the location being measured.

- Carefully place the wading rod in the flow until the base is firmly on the stream bottom.

- Orient the current meter perpendicular to the cross section transect.

- Ensure that the wading rod is straight up and down (not angled).

- Hold the wading rod steady while adjusting the calibrated height of current meter to match the measured depth. This will allow collection of measurements that are reflective of depth-averaged velocity.

- Once at least three seconds have passed, view the reading from the current meter. Allow at least three readings to occur before recording. This will prevent erroneous data due to averaging of measurements from the set up process.

3.4. Calculating Flow

- The following equation is used to calculate flow using the time-of-travel method):

$$Q = \sum(a*l*C)/t$$

- Q = discharge
- a = cross sectional area of each stream subsection (subsection width x average depth)
- l = average distance traveled by the float for each subsection
- C = correction factor (0.8 for rough streambeds, 0.9 for smooth streambeds)
- t = average time of travel for each subsection (seconds)

The following equation is used to calculate flow using the depth-averaged current meter method:

$$Q = \sum(d*w*v)$$

- Q = stream discharge
- d = average subsection depth
- w = subsection width
- v = average subsection velocity at 60% depth

4.0 DOCUMENTATION

Record streamflow data on field sheets, field notebooks, or electronic tablets. Any unanticipated site-specific information, which requires deviation from the above guidelines should also be recorded. In addition to recording the required discharge data, field notes for streamflow measurement should include a minimum of the following:

- Name or initials of person conducting the measurement
- Discharge measurement method used
- Site ID or name
- Date and time of streamflow measurement
- Environmental conditions (wind, temperature, etc.)
- Other relevant observations about site conditions
- Photographic evidence of streamflow and site conditions is also useful for verification of relative stream stage and flow from different visits, as well as any environmental factors that may have influenced data collection.

5.0 REFERENCES

EPA, 2012a. Water: Monitoring and Assessment. 5.1 Stream Flow. United States Environmental Protection Agency. Office of Water. EPA 841-B-97-003. Accessed January 27, 2020 at https://archive.epa.gov/water/archive/web/html/vms51.html

EPA, 2012b. SESD Operating Procedure, Hydrologic Studies. Effective Date November 1, 2012. United States Environmental Protection Agency. Office of Water. SESDPROC-501-R3. Accessed

January 27, 2020 at https://www.epa.gov/sites/production/files/2015-06/documents/Hydrological-Studies.pdf

Pebble count methods

The composition of the streambed and banks are important facets of stream character, influencing channel form and hydraulics, erosion rates, sediment supply, and other parameters. Each permanent reference site includes a basic characterization of bed and bank material. For studies of fish habitat, riparian ecosystems or stream hydraulics, the characterization of substrates and bank materials may require greater detail than can be covered here.

Observations tell us that steep mountain streams with beds of boulders and cobbles act differently from low-gradient streams with beds of sand or silt. You can document this difference by collecting representative samples of the bed materials using a procedure called a pebble count.

The most efficient basic technique is the Wolman Pebble Count. This requires an observer with a metric ruler who wades through the stream and a note taker who wades along side, or remains on the bank with the field book. Particles are tallied by using size classes or categories similar to the ones shown in Table 1.

Table 1. Pebble count size classes (**modified**)

Size categories	Size ranges (**mm**)
(**BC**) Silt/clay Very small (smooth feel)	
(**BC**) Sand (Small grainy feel)	< 2
(**BC**) Gravel (Pea to tennis ball diameter)	
1. Fine gravel	2 – 8
2. Medium gravel	9 – 16
3. Coarse gravel	17 – 64
(**BC**) Cobble (Tennis ball to basket ball diameter)	
1. Small cobble	65 – 90
2. Medium cobble	91 – 128
3. Large cobble	129 – 256
(**BC**) Boulder (Basketball to car diameter)	
1. Small boulder	257 – 512
2. Medium boulder	513 – 1024
3. Large boulder	> 1024
(**BC**) Bedrock Large solid surface	
(**BC**) Woody debris Sticks, leaves etc.	
	(**BC**) – **Broad category**

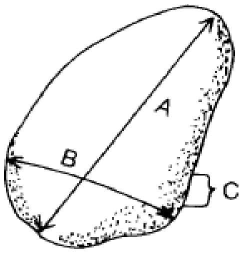
Pebble counts grids along the stream's length can be transects, zigzags, or based upon the channel habitats (i.e. percentage of riffles, runs and pools). Usually, a random step-toe procedure is used to collect the pebbles. The step-toe procedure is described below and a zigzag pattern is illustrated on page two.

Collection procedure

Select a reach and indicate it on your site map. For stream characterization, sample pools, runs and riffles in the same proportions as they occur in the study reach. For other purposes, it may be appropriate to sample these separately or sample the entire reach randomly using a zigzag pattern. In some cases only riffles are sampled. Measure a minimum of 100 particles to obtain a valid count. Usually less are collected if single channel features are sampled.

Start the collection at the lower end (downstream) of your reach at one of the bankfull elevations (not necessarily the present water level). Averting your gaze, pick up the first particle touched by the tip of your index finger at the toe of your wader.

Measure the intermediate axis (neither the longest nor shortest of the three mutually perpendicular sides of each particle picked up). Measure embedded particles or those too large to be moved in place. For these, measure the smaller of the two exposed axes.
Call out the measurement. The note taker tallies it by size class and repeats it back for confirmation.



(**A**) Long axis
(**B**) Intermediate axis
(**C**) Short axis

The intermediate axis is the pebble's diameter.

Take one step across the channel in the direction of the opposite bank and repeat the process, continuing to pickup particles until you have the requisite number (100 or more) of measurements. The note taker keeps count. Traverse across the stream perpendicular to the flow or in a zigzag pattern. Continue your traverse until you reach the opposite bank so that all areas between the bankfull elevations are representatively sampled. You may have to duck under bank top vegetation or reach down through brush to get an accurate count. Move upstream randomly or at a predetermined distance and make additional transects to sample a total of at least 100 particles.

The **red line** drawn in the image indicates the approximate path the students chose while conducting their pebble count within a 100-meter reach of Skaggs Run.

Pebble count methods

Bankfull physical features include the top (level surface) of adjacent point bars, change in slope, and change in bank composition, limit of woody vegetation and in some cases debris and scour lines. About of 10% of your pebble count should be collected from bankfull (i.e. exposed bars).

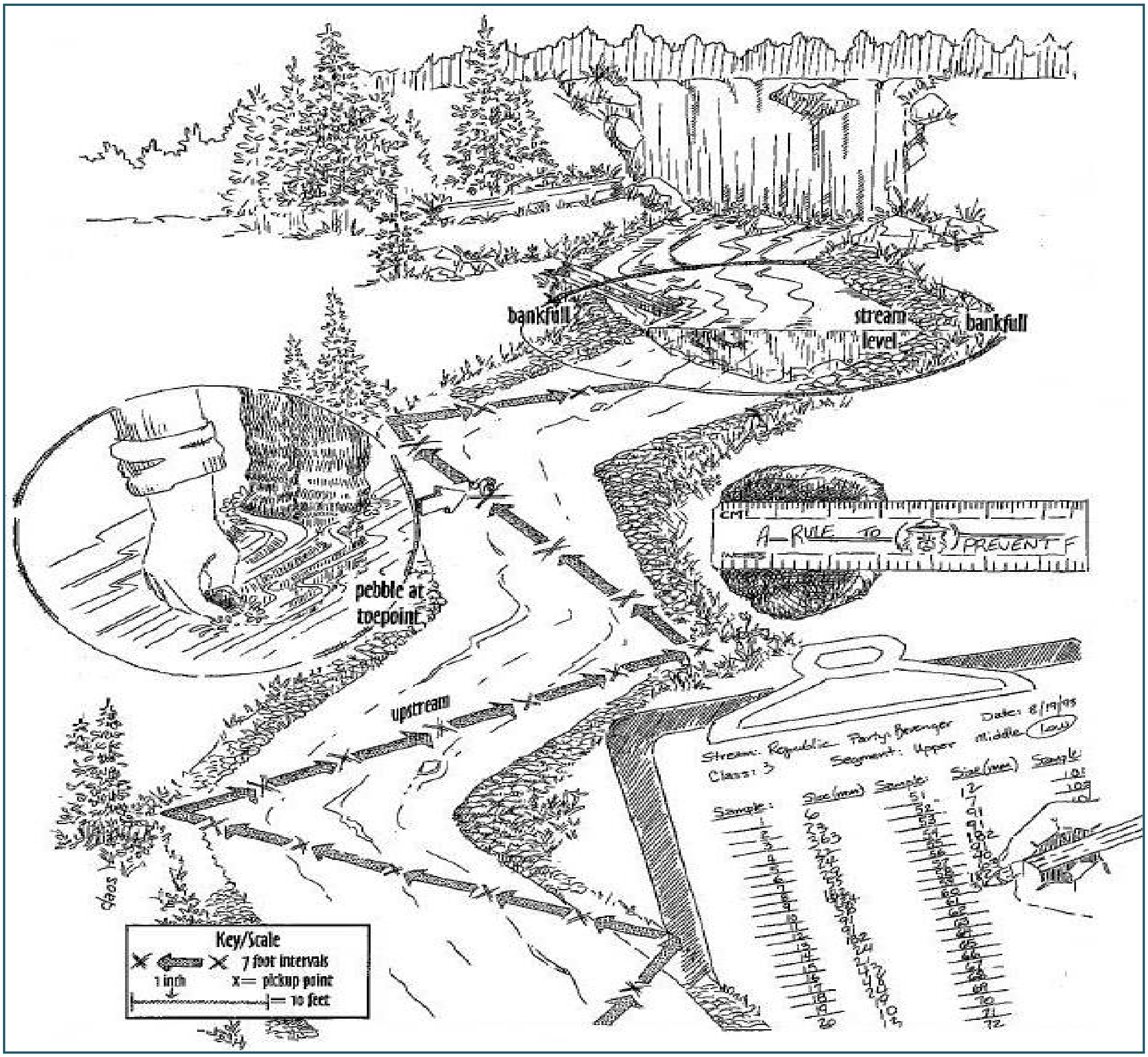
References

Harrelson, Cheryl C; Rawlins, C. L.; Potyondy, John P. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station

Leopold, L. B., M. Wolman, and J. Miller, 1964. Fluvial Processes in Geomorphology. W. H. Freeman, San Francisco, CA

G.S. Bevenger and R.M. King. 1995. A Pebble Count Procedure for Assessing Watershed Cumulative Effects. Res. Pap. RM-RP-319. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station

The zigzag pattern



Pebble Count Data Sheet

Size categories	Size ranges (mm)	Tallies (counts)
Silt/clay	< 0.06	
Very fine sand	0.06 – 0.125	
Fine sand	0.126 – 0.25	
Medium sand	0.26 – 0.5	
Coarse sand	0.5 – 1	
Very coarse sand	1 - 2	
Very fine gravel	2 - 4	
Fine gravel	5 - 8	
Medium gravel	9 - 16	
Coarse gravel	17 - 32	
Very coarse gravel	33 - 64	
Small cobble	65 - 90	
Medium cobble	91 - 128	
Large cobble	129 - 180	
Very large cobble	181 - 255	
Small boulder	256 - 512	
Medium boulder	513 - 1024	
Large boulder	1025 – 2048	
Very large boulder	> 2048	
Bedrock	Large unbroken rock surface	
Woody debris	Leaves, sticks etc.	

Stations
1
2
3
4
5
6
7
8
9
10

Enter the tape positions

Indicate the method used below

☐ Zigzag
☐ % Habitat
☐ Transects/Stations
(**Enter your tape position**)

Total count ☐

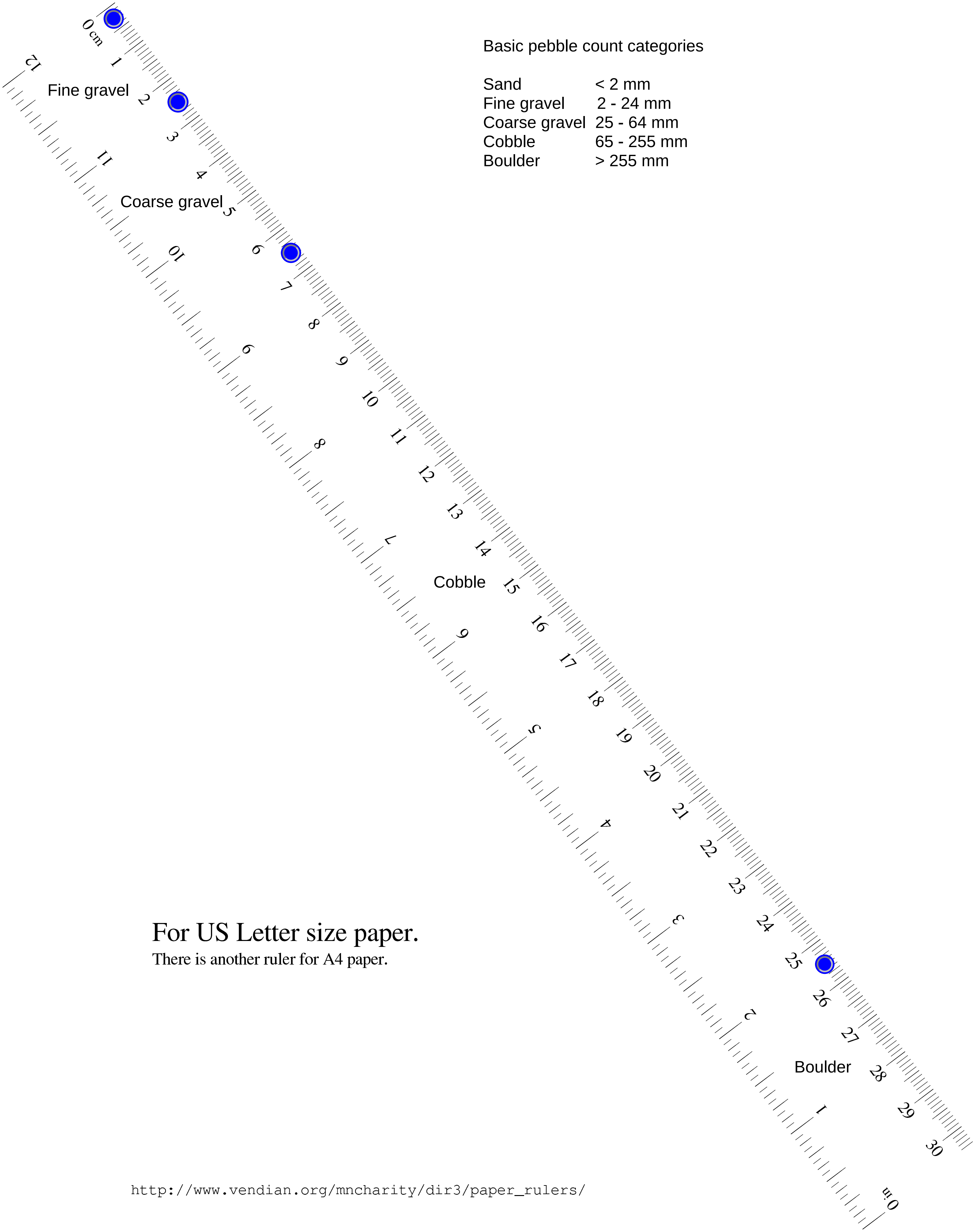
% Channel features (Estimate)

Riffles	Runs	Pools

Note: This data sheet incorporates both basic and advanced pebble count classification. Basic categories include silt, sand, fine and coarse gravel, cobble, boulder and bedrock. Pebble counts can be part of SOS levels 1-3 and should be performed at least once per year during low-water conditions. A version of the pebble count is included on all SOS biosurvey forms.

Basic pebble count categories

Sand	< 2 mm
Fine gravel	2 - 24 mm
Coarse gravel	25 - 64 mm
Cobble	65 - 255 mm
Boulder	> 255 mm



For US Letter size paper.

There is another ruler for A4 paper.

http://www.vendian.org/mncharity/dir3/paper_rulers/

http://www.dep.wv.gov/WWE/getinvolved/sos/Pages/SOPpebble.aspx


RECEIVING
7
8
9
10
PINARD
PINARD
PINARD


RECEIVING
7
8
9
10

DRAINAGE ANALYSIS

SEDIMENT AND EROSION CONTROL PLAN

375 Banfield Road
Portsmouth, NH 03801
Tax Map 266, Lot 7

Prepared for:

Banfield Realty, LLC
304 Maplewood Ave.
Portsmouth, NH 03801

MICHAEL J. KERIVAN No. 9846

8/17/2021

Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
December 30, 2020
REVISED February 17, 2021
REVISED May 17, 2021
REVISED August 16, 2021
JBE Project No. 19190.2

EXECUTIVE SUMMARY

Banfield Realty, LLC proposes to construct a 75,000 S.F. industrial warehouse building on a 14.96-acre parcel of land located at 375 Banfield Road in Portsmouth, NH. Currently the parcel consists of two commercial buildings with an associated accessory shed and parking. The existing buildings and parking with their associated utilities are to be removed so the new development can occur.
A drainage analysis of the entire site was conducted for the purpose of estimating the peak rate of stormwater runoff and to subsequently design adequate drainage structures. Two models were compiled, one for the area in its existing (pre-construction) condition, and a second for its proposed (post-construction) condition. The analysis was conducted using data for the 2 Year – 24 Hour (3.71"), 10 Year – 24 Hour (5.64"), 25 Year – 24 Hour (7.14"), and 50 Year – 24 Hour (8.57") storm events using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. This data was taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC), and the values have been increased by 15% due to the project being within the Coastal/Great Bay Region. A summary of the existing and proposed conditions peak rates of runoff is as follows:

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	2.82	2.51	9.93	6.76	16.83	10.64	24.06	18.66
Analysis Point #2	0.00	0.00	0.02	0.01	0.12	0.05	0.39	0.19

The project site is located in the Industrial (I) Zoning District. The existing topography is such that runoff for the majority of the site (Subcatchment 1) flows into a major wetland (Analysis Point 1) which ultimately drains to a cross-street 12" culvert. Runoff from the undeveloped western corner (Subcatchment 2) sheet flows directly into an abutting lot (Analysis Point 2). The proposed development results in a decrease in the peak flow rate to both Analysis Points during all analyzed storms.

The proposed site development consists of the aforementioned industrial warehouse building with associated parking, utilities, and septic system. The same 2 Analysis Points were used in the Post Development Analysis. Runoff from most of the developed portions of the site will be treated with ACF Focal Point biofiltration systems and then detained in the ACF R-Tank subsurface detention basin before being discharged through a vegetated swale into Analysis Point 1. The exception to that is for the driveway that will be discharged through a level spreader into a Developed Area Buffer, designed per NHDES standards for stormwater treatment. Runoff from the periphery of the site will maintain its existing flow pattern.

The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this drainage system and will be observed during all stages of construction. All land disturbed during construction will be stabilized within thirty days of groundbreaking and abutting property owners will suffer minimal adversity resultant of this development.

TABLE OF CONTENTS

1.0 RAINFALL CHARACTERISTICS

This drainage report includes an existing conditions analysis of the area involved in the proposed development, as well as a proposed condition, or post-construction analysis, of the same location. These analyses were accomplished using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. The curve numbers were developed using the SCS TR-55 Runoff Curve numbers for Urban Areas. A Type III SCS 24-hour rainfall distribution was utilized in analyzing the data for the 2 Year – 24 Hour (3.71"), 10 Year – 24 Hour (5.64"), 25 Year – 24 Hour (7.14"), and 50 Year – 24 Hour (8.57") storm events. This data was taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC), and the values have been increased by 15% due to the project being within the Coastal/Great Bay Region.

The proposed peak rates of runoff will be reduced from the existing condition, thereby minimizing any potential for a negative impact on abutting properties or erosion of the wetland system. This is accomplished through treatment of stormwater runoff and attenuation of peak flows resulting from storm events.

2.0 EXISTING CONDITIONS ANALYSIS

The subject parcel consists of two commercial buildings and an accessory shed with associated parking. Behind this development, there are foot trails, lawns, woods, and two separate wetlands; one of which encumbers a large portion of the property and has an associated 100' buffer and another small, isolated wetland. The existing buildings are serviced by City water, natural gas, overhead electric, and an on-site septic system. The existing topography of the site features a hill on the north side with a sharp dropoff to relatively level ground around the major wetland system.

In the existing condition, the aforementioned hill divides the site into two subcatchments. Subcatchment 1 consists of developed area, lawn, and woods, runoff from all of which flows directly into the major wetland. Subcatchment 2 consists of a small area of forest and lawn on the opposite slope of the hill from which runoff flows to the abutter's property.

Existing soil types were determined through a Site-Specific Soil Survey conducted by a Certified Soil Scientist. These soils are categorized into Hydrologic Soil Groups (HSG) A, C, and D.

3.0 PROPOSED CONDITIONS ANALYSIS

The addition of the proposed impervious parking areas and the 75,000 S.F. industrial warehouse building causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), the result being a potential increase in peak rates of runoff from the site. The construction of the parking lot, industrial warehouse building, catch basins, focal points, R-Tank, and associated grading, split the site into 11 subcatchments. The site will be graded such that runoff from most of the developed areas of the site will receive treatment through ACF Focal Point biofiltration systems. All runoff treated by the biofiltration system will then be directed into a lined R-Tank subsurface detention system for attenuation before being discharged into a vegetated swale which leads Analysis Point 1. The driveway will runoff through a level spreader into a Developed Area Buffer per NHDES standards for stormwater treatment. The undeveloped remainder of the site will maintain its existing flow pattern.

The peak flow rates to Analysis Point 2 are decreased as the site grading leads to a smaller portion of land being sloped in that direction, all of which is to remain undisturbed with this development.

4.0 SEDIMENT & EROSION CONTROL BEST MANAGEMENT PRACTICES

The proposed site development is protected from erosion and the roadways and abutting properties are protected from sediment by the use of Best Management Practices as outlined in the NHDES Stormwater Manual. Any area disturbed by construction will be re-stabilized within 30 days and abutting properties and wetlands will suffer minimal adversity resultant of this development. All drainage structures will be constructed and stabilized prior to having runoff directed to them.

4.1 Silt Fence / Construction Fence

The plan set delineates the location of silt fence for sediment control. Sheet E1 – Erosion and Sediment Control Details, has the specifications for installation of the silt fence. This is necessary in areas where there is adjacent property or wetlands downslope of the area of development. In areas where the limits of construction need to be emphasized to operators, construction fence for added visibility will be installed. Orange construction fence will be VISI Perimeter Fence by Conwed Plastic Fencing, or equal. The four-foot fencing to be installed using six-foot posts at least two feet in the ground at a spacing of six to eight feet.

4.2 Stabilized Construction Entrance

A temporary gravel construction entrance provides an area where mud can be dislodged from tires before the vehicle leaves the construction site to reduce the amount of mud and sediment transported onto paved municipal and state roads. The stone size for the pad should be between 3-inch coarse aggregate, and the pad itself constructed to a minimum length of 50 feet for the full width of the access road. The aggregate should be placed at least six inches thick. A plan view and profile are shown on Sheet E1.

4.3 Environmental Dust Control

Dust will be controlled on the site by the use of multiple Best Management Practices. Mulching and temporary seeding will be the first line of protection to be utilized where problems occur. If dust problems are not solved by these applications, the use of water can be applied. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

4.4 Vegetated Stabilization

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of breaking ground. Construction will be managed in such a manner that erosion is prevented and that no abutting property will be subjected to any siltation, unless otherwise permitted. All areas to be planted with grass for long-term cover will follow the specification on Sheet E1 using seeding mixture C.

4.5 Temporary Sediment Traps

Temporary Sediment Traps are small temporary ponding areas that are formed by excavation or by constructing an earthen embankment across a drainage way and providing a stabilized outlet. These structures intercept sediment-laden runoff from small, disturbed areas and detain it long enough for the majority of the sediment to settle out into the sump of the trap.

4.6 Riprap Outlet Protection

Riprap Outlet Protection will be provided at the outlet of all culverts that discharge runoff into the environment (as opposed to a catch basin). The riprap outlet protection has been designed with the equations provided in the NHDES Stormwater Manual depending on inlet or outlet control. Details of the protection design can be found on Sheet E1 – Erosion & Sediment Control Details.

4.7 Catch Basins

A catch basin is a pre-cast concrete structure intended for the capture of stormwater utilized in streets and parking areas. Grease hoods attached to the outlet pipe of the structures allow for the capture of grease, oils, and other floatable solids from runoff, thereby minimizing their presence in the subsequent discharge.

4.8 Construction Sequence

1. Prior to the start of *any* activity, it is the responsibility of the site's Developer (or Owner) to file a Notice of Intent (NOI) form and a copy of one (shared) Stormwater Pollution Prevention Plan (SWPPP) with the U.S. Environmental Protection Agency (EPA) in order to gain coverage under the NPDES General Permit for Stormwater Discharges from Construction Activities. A pre-construction meeting shall be held prior to the start of construction to discuss the SWPPP and all associated responsibilities. Participants shall include the developer (or owner), the General Contractor, the Site Contractor, and the Engineer.

2. Cut and remove trees in construction area as required or directed.

3. Install silt fencing, and construction entrances prior to the start of earthwork. These shall be maintained until the final pavement surfacing and landscaping areas are established.

4. Clear, cut, grub, and dispose of debris in approved facilities. This includes any required demolition of existing structures, utilities, etc.

5. Construct and/or install temporary sediment basin(s) as required. These facilities shall be installed and stabilized prior to directing runoff to them.

6. Strip loam and pavement, or reclaim existing pavement within limits of work per the recommendations of the project engineer and stockpile excess material. Stabilize stockpile as necessary.

7. Perform preliminary site grading in accordance with the plans, including the construction of any stormwater detention/retention ponds, drainage swales, retaining walls, and sound walls.

8. Prepare building pad(s) to enable building construction to begin.

9. Install the sewer and drainage systems first, then any other utilities in accordance with the plans and details. Any conflicts between utilities are to be resolved with the involvement and approval of the engineer.

10. Install inlet protection at all catch basins as they are constructed, in accordance with the details.

11. All swales and drainage structures are to be constructed and stabilized prior to having runoff directed to them.

12. Daily, or as required, construct temporary berms, drainage ditches, check dams, sediment traps, etc., to prevent erosion on the site and prevent any siltation of abutting waters and/or property.

13. Perform final fine grading, including placement of any "select" subgrade materials.

14. Pave all parking lots and roadways with initial base course.

15. Perform all remaining site construction (i.e. building, curbing, utility connections, etc.).

16. Loam and seed all disturbed areas and install any required sediment and erosion control facilities (i.e. riprap, erosion control blankets, etc.).

17. Finish paving all roadways and parking areas with finish course.

18. Complete permanent seeding and landscaping.

19. Remove temporary erosion control measures after seeding areas have been 85% established and site improvements are complete. Smooth and re-vegetate all disturbed areas.

20. Clean site and all drainage structures, pipes, and sumps of all silt and debris.

21. Install all painted pavement markings and signage per the plans and details.

22. Upon completion of construction, it is the responsibility of the contractor to notify any relevant permitting agencies that the construction has been finished in a satisfactory manner.

4.9 Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time. At no time shall an area in excess of that required for construction be exposed.

2. Erosion, sediment and detention measures shall be installed as shown on the plans and at locations as required, or directed by the engineer.

3. All disturbed areas (including pond areas below the proposed waterline) shall be returned to proposed grades and elevations. Disturbed areas shall be loamed with a minimum of 6" of loam and seeded with seed mixture "C" at a rate not less than 1.10 pounds of seed per 1,000 square feet of area (48 lbs. per acre).

4. Silt fences and other barriers shall be inspected every seven days and within 24 hours of a rainfall of 0.5" or greater. All damaged areas shall be repaired, and sediment deposits shall periodically be removed and properly disposed of.

5. After all disturbed areas have been stabilized, the temporary erosion control measures are to be removed and the area disturbed by the removal smoothed and revegetated.

6. Areas must be seeded and mulched within 3 days of final grading, or temporarily stabilized within 14 days of initial disturbance of soil.

7. All proposed vegetated areas not stabilized by or are disturbed after October 15th must be protected with North American Green S75 erosion control blankets (or an equivalent approved in writing by the engineer) and seeded with winter rye or oats at a rate of 2.50 pounds per 1,000 square feet of area (108.90 lbs. per acre). Unstabilized swales shall be protected with erosion control blankets appropriate to the design flow conditions and seeded to the same specification. Placement of blankets shall not occur over accumulated snow.

8. An area shall be considered stable if one of the following has occurred:
   a. Base course gravels have been installed in areas to be paved;
   b. A minimum of 85% vegetated growth has been established;
   c. A minimum of 3" or non-erosive material such as stone or riprap has been installed; or
   d. Erosion control blankets have been properly installed.

9. After October 15th where work has stopped for the season, incomplete roadway or parking surfaces shall be protected with a minimum of 3" of crushed gravel meeting NHDOT Item 304.3.

10. In order to ensure the stability of the site and effective implementation of the sediment and erosion control measures specified in the plans for the duration of construction, the contractor shall be in strict compliance with the inspection and maintenance requirements to those called for in the SWPPP.

4.10 Inspection and Maintenance Schedule

4.26.1 Temporary Best Management Practices

Silt Fencing

During the construction process, all silt fencing will be inspected during and after storm events to ensure that the fence still has integrity and is not allowing sediment to pass. Any section of fence that has failed or is failing is to be replaced immediately, overlapping adjacent fence sections by at least one foot. If the problem persists, measures such as additional fencing (i.e. double) or the addition of hay-bales on the project side of the fence line should be considered. Sediment is to be removed from behind the fencing if found to be deeper than six inches and disposed of properly.

Swales

Sediment build-up in swales will be removed if it is deeper than six inches and disposed of properly.

Sediment Traps

Sediment traps are to be inspected once per week and after every precipitation event. Sediment is to be removed from the traps if it is deeper than six inches and disposed of properly. The lip of the outlet crest should be maintained so as to provide an even, level edge so as to promote sheet flow out of the structure so as to minimize the potential for erosion downstream form the structure. Any erosion must be repaired and stabilized immediately.

4.26.2 Permanent Best Management Practices

Catch Basins

Sediment and debris is to be removed from catch basin sumps semi-annually (as well as from sumps below the inlet of culverts). Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet should also be removed.

Drainage Swales

Sediment build-up in swales is to be removed if it is deeper than six inches, and any debris also removed. Areas where vegetation has not become established or has died should be reseeded. If this fails, additional loam and seed may be required. *Fertilizers should be utilized only as a last resort.* Mowing should be performed at least once a year, but not shorter than four inches, and all grass clippings removed.

5.0 CONCLUSION

This proposed site development located at 375 Banfield Road in Portsmouth, NH will have minimal adverse effect on abutting infrastructures, properties, and wetlands by way of stormwater runoff or siltation. Appropriate steps will be taken to eliminate erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of site grading, curbing, catch basins, ACF Focal Point biofiltration systems, a treatment buffer, and subsurface detention with a downstream vegetated swale. The use of Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced throughout the construction process.

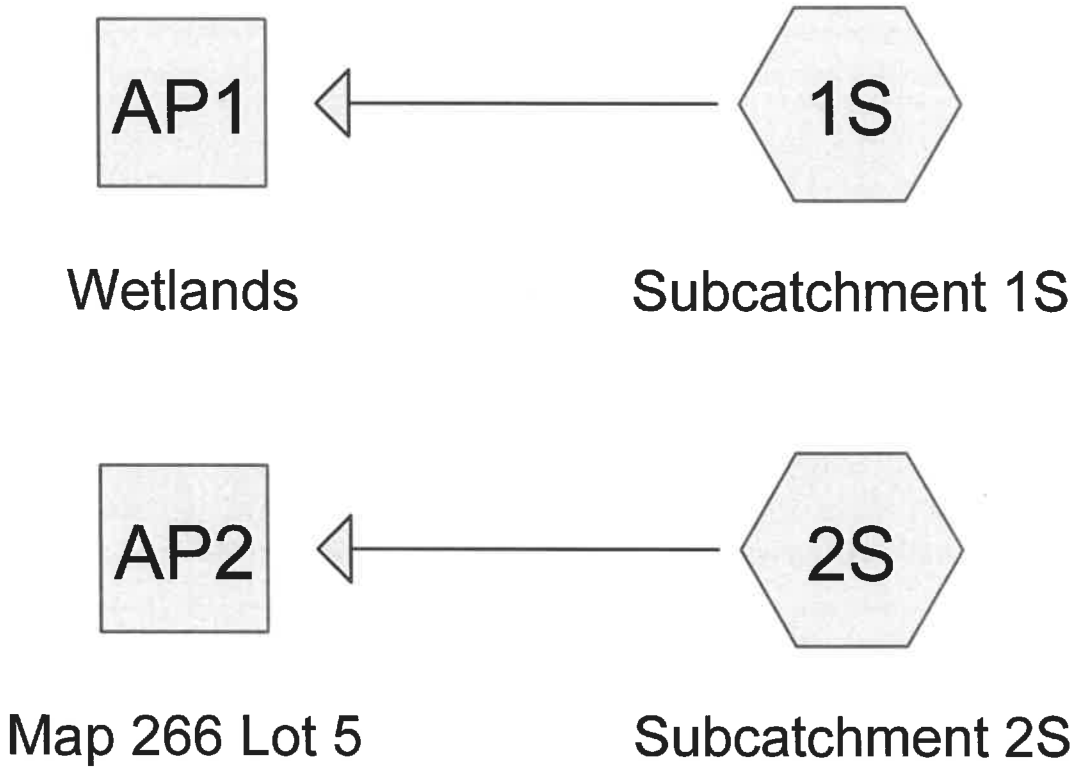
A site specific, terrain alteration permit (RSA 485:A-17) <u>is</u> required for this site plan due to the area of disturbance being greater than 100,000 square-feet.

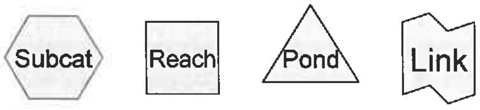
Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.
Daniel Meditz
Daniel Meditz, E.I.T
Project Engineer

APPENDIX I

EXISTING CONDITIONS DRAINAGE ANALYSIS

Summary 2 YEAR
Complete 10 YEAR
Summary 25 YEAR
Complete 50 YEAR





Routing Diagram for 19190-EXISTING_AoT
Prepared by {enter your company name here}, Printed 8/16/2021
HydroCAD® 10.10-4a s/n 10589 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.601	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.786	74	>75% Grass cover, Good, HSG C (1S)
0.045	80	>75% Grass cover, Good, HSG D (1S)
0.389	65	Brush, Good, HSG C (1S)
0.033	96	Gravel surface, HSG D (1S)
0.010	98	Paved parking, HSG A (1S)
0.715	98	Paved parking, HSG D (1S)
0.166	98	Roofs, HSG D (1S)
2.453	30	Woods, Good, HSG A (1S, 2S)
2.318	70	Woods, Good, HSG C (1S)
0.141	77	Woods, Good, HSG D (1S)
0.050	32	Woods/grass comb., Good, HSG A (1S)
1.059	72	Woods/grass comb., Good, HSG C (1S)
10.766	**56**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.113	HSG A	1S, 2S
0.000	HSG B	
4.552	HSG C	1S
1.101	HSG D	1S
0.000	Other	
10.766		**TOTAL AREA**

```
                  Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
                 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
        Reach routing by Dyn-Stor-Ind method  -  Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S        Runoff Area=420,946 sf  9.22% Impervious   Runoff Depth>0.58"
                                    Flow Length=864'   Tc=27.0 min   CN=59   Runoff=2.82 cfs  0.463 af

Subcatchment2S: Subcatchment2S        Runoff Area=48,019 sf   0.00% Impervious   Runoff Depth=0.00"
                                    Flow Length=371'   Tc=15.3 min   CN=33   Runoff=0.00 cfs  0.000 af

Reach AP1: Wetlands                                                         Inflow=2.82 cfs  0.463 af
                                                                           Outflow=2.82 cfs  0.463 af

Reach AP2: Map 266 Lot 5                                                    Inflow=0.00 cfs  0.000 af
                                                                           Outflow=0.00 cfs  0.000 af

          Total Runoff Area = 10.766 ac   Runoff Volume = 0.463 af   Average Runoff Depth = 0.52"
                                         91.72% Pervious = 9.875 ac    8.28% Impervious = 0.891 ac
```

```
                    Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
                   Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
          Reach routing by Dyn-Stor-Ind method  -  Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S      Runoff Area=420,946 sf  9.22% Impervious  Runoff Depth>1.60"
                                   Flow Length=864'  Tc=27.0 min  CN=59  Runoff=9.93 cfs  1.289 af

Subcatchment2S: Subcatchment2S       Runoff Area=48,019 sf  0.00% Impervious  Runoff Depth>0.11"
                                   Flow Length=371'  Tc=15.3 min  CN=33  Runoff=0.02 cfs  0.010 af

Reach AP1: Wetlands                                                        Inflow=9.93 cfs  1.289 af
                                                                          Outflow=9.93 cfs  1.289 af

Reach AP2: Map 266 Lot 5                                                   Inflow=0.02 cfs  0.010 af
                                                                          Outflow=0.02 cfs  0.010 af

          Total Runoff Area = 10.766 ac   Runoff Volume = 1.300 af   Average Runoff Depth = 1.45"
                                         91.72% Pervious = 9.875 ac   8.28% Impervious = 0.891 ac
```

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 9.93 cfs @ 12.42 hrs, Volume= 1.289 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
7,231	98	Roofs, HSG D
31,165	98	Paved parking, HSG D
416	98	Paved parking, HSG A
19,112	39	>75% Grass cover, Good, HSG A
53,727	39	>75% Grass cover, Good, HSG A
26,447	39	>75% Grass cover, Good, HSG A
72,824	30	Woods, Good, HSG A
2,193	32	Woods/grass comb., Good, HSG A
6,121	77	Woods, Good, HSG D
46,133	72	Woods/grass comb., Good, HSG C
100,976	70	Woods, Good, HSG C
25,142	74	>75% Grass cover, Good, HSG C
9,094	74	>75% Grass cover, Good, HSG C
16,936	65	Brush, Good, HSG C
1,295	80	>75% Grass cover, Good, HSG D
679	80	>75% Grass cover, Good, HSG D
1,455	96	Gravel surface, HSG D
420,946	59	Weighted Average
382,134		90.78% Pervious Area
38,812		9.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	31	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
2.7	20	0.0500	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
4.5	49	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
4.1	124	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	111	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	105	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.1	94	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	330	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
27.0	864	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.02 cfs @ 15.08 hrs, Volume= 0.010 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
34,026	30	Woods, Good, HSG A
13,993	39	>75% Grass cover, Good, HSG A
48,019	33	Weighted Average
48,019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	72	0.0300	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
5.4	28	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
0.6	48	0.0625	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	113	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	110	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.3	371	Total			

Summary for Reach AP1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.664 ac, 9.22% Impervious, Inflow Depth > 1.60" for 10 Yr 24 Hr(+15%) event
Inflow = 9.93 cfs @ 12.42 hrs, Volume= 1.289 af
Outflow = 9.93 cfs @ 12.42 hrs, Volume= 1.289 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Reach AP2: Map 266 Lot 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.102 ac, 0.00% Impervious, Inflow Depth > 0.11" for 10 Yr 24 Hr(+15%) event
Inflow = 0.02 cfs @ 15.08 hrs, Volume= 0.010 af
Outflow = 0.02 cfs @ 15.08 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

```
                      Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
                      Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
          Reach routing by Dyn-Stor-Ind method  -  Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S       Runoff Area=420,946 sf  9.22% Impervious  Runoff Depth>2.59"
                                   Flow Length=864'  Tc=27.0 min  CN=59  Runoff=16.83 cfs  2.083 af

Subcatchment2S: Subcatchment2S        Runoff Area=48,019 sf  0.00% Impervious  Runoff Depth>0.40"
                                    Flow Length=371'  Tc=15.3 min  CN=33  Runoff=0.12 cfs  0.037 af

Reach AP1: Wetlands                                                         Inflow=16.83 cfs  2.083 af
                                                                           Outflow=16.83 cfs  2.083 af

Reach AP2: Map 266 Lot 5                                                     Inflow=0.12 cfs  0.037 af
                                                                            Outflow=0.12 cfs  0.037 af

            Total Runoff Area = 10.766 ac   Runoff Volume = 2.120 af   Average Runoff Depth = 2.36"
                                          91.72% Pervious = 9.875 ac     8.28% Impervious = 0.891 ac
```

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=420,946 sf 9.22% Impervious Runoff Depth>3.63"
Flow Length=864' Tc=27.0 min CN=59 Runoff=24.06 cfs 2.920 af

Subcatchment2S: Subcatchment2S Runoff Area=48,019 sf 0.00% Impervious Runoff Depth>0.81"
Flow Length=371' Tc=15.3 min CN=33 Runoff=0.39 cfs 0.075 af

Reach AP1: Wetlands Inflow=24.06 cfs 2.920 af
Outflow=24.06 cfs 2.920 af

Reach AP2: Map 266 Lot 5 Inflow=0.39 cfs 0.075 af
Outflow=0.39 cfs 0.075 af

Total Runoff Area = 10.766 ac Runoff Volume = 2.995 af Average Runoff Depth = 3.34"
91.72% Pervious = 9.875 ac 8.28% Impervious = 0.891 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 24.06 cfs @ 12.39 hrs, Volume= 2.920 af, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
7,231	98	Roofs, HSG D
31,165	98	Paved parking, HSG D
416	98	Paved parking, HSG A
19,112	39	>75% Grass cover, Good, HSG A
53,727	39	>75% Grass cover, Good, HSG A
26,447	39	>75% Grass cover, Good, HSG A
72,824	30	Woods, Good, HSG A
2,193	32	Woods/grass comb., Good, HSG A
6,121	77	Woods, Good, HSG D
46,133	72	Woods/grass comb., Good, HSG C
100,976	70	Woods, Good, HSG C
25,142	74	>75% Grass cover, Good, HSG C
9,094	74	>75% Grass cover, Good, HSG C
16,936	65	Brush, Good, HSG C
1,295	80	>75% Grass cover, Good, HSG D
679	80	>75% Grass cover, Good, HSG D
1,455	96	Gravel surface, HSG D
420,946	59	Weighted Average
382,134		90.78% Pervious Area
38,812		9.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	31	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
2.7	20	0.0500	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
4.5	49	0.2400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
4.1	124	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	111	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	105	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.1	94	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	330	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
27.0	864	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.39 cfs @ 12.43 hrs, Volume= 0.075 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
34,026	30	Woods, Good, HSG A
13,993	39	>75% Grass cover, Good, HSG A
48,019	33	Weighted Average
48,019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	72	0.0300	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
5.4	28	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
0.6	48	0.0625	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	113	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	110	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.3	371	Total			

Summary for Reach AP1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.664 ac, 9.22% Impervious, Inflow Depth > 3.63" for 50 Yr 24 Hr(+15%) event
Inflow = 24.06 cfs @ 12.39 hrs, Volume= 2.920 af
Outflow = 24.06 cfs @ 12.39 hrs, Volume= 2.920 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Reach AP2: Map 266 Lot 5

[40] Hint: Not Described (Outflow=Inflow)

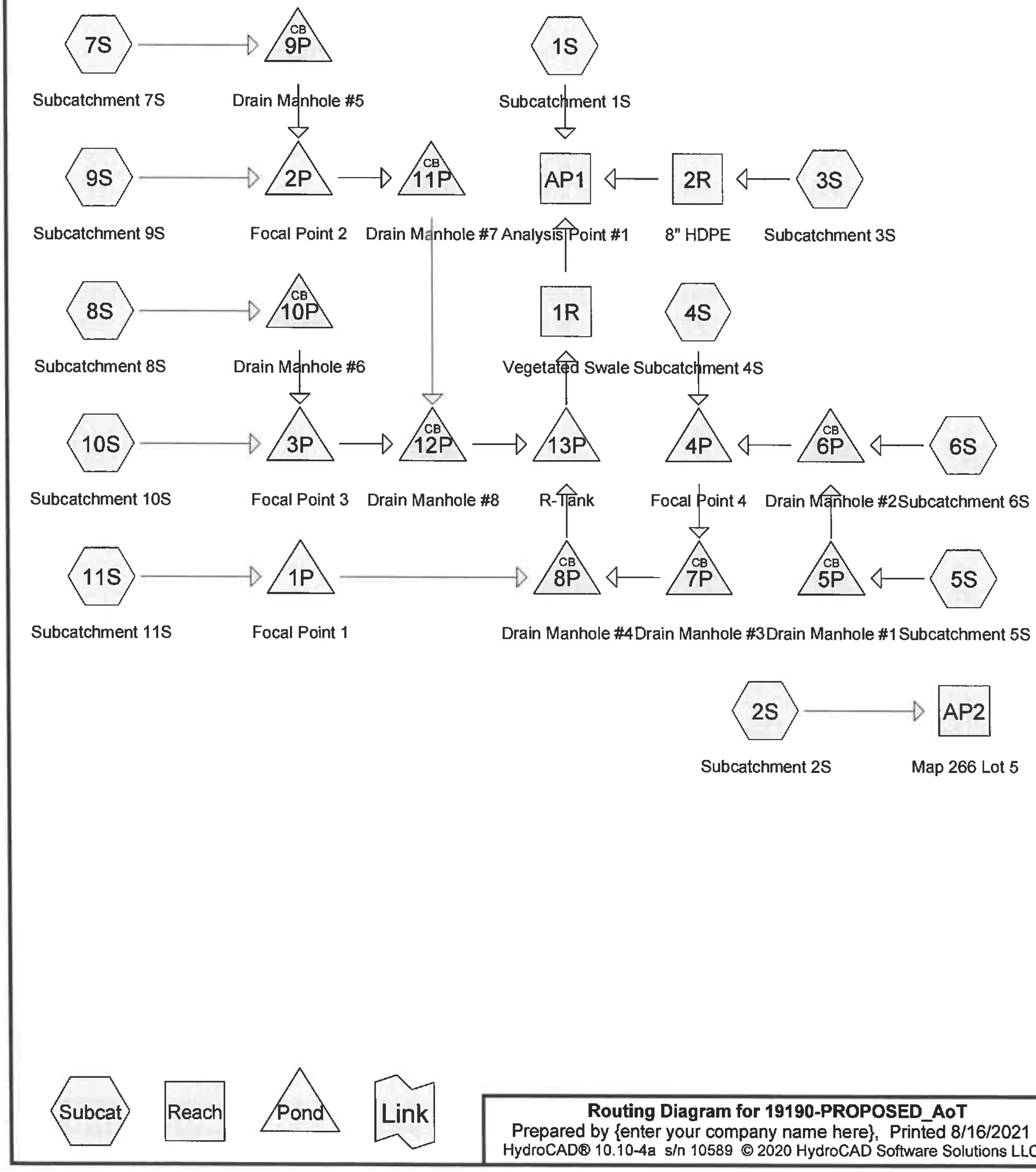
Inflow Area = 1.102 ac, 0.00% Impervious, Inflow Depth > 0.81" for 50 Yr 24 Hr(+15%) event
Inflow = 0.39 cfs @ 12.43 hrs, Volume= 0.075 af
Outflow = 0.39 cfs @ 12.43 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

APPENDIX II

PROPOSED CONDITIONS DRAINAGE ANALYSIS

Summary 2 YEAR
Complete 10 YEAR
Summary 25 YEAR
Complete 50 YEAR



Routing Diagram for 19190-PROPOSED_AoT
Prepared by {enter your company name here}, Printed 8/16/2021
HydroCAD® 10.10-4a s/n 10589 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.661	39	>75% Grass cover, Good, HSG A (1S, 2S, 4S, 9S, 10S, 11S)
0.575	74	>75% Grass cover, Good, HSG C (1S, 10S, 11S)
0.641	80	>75% Grass cover, Good, HSG D (1S, 3S, 4S, 11S)
0.746	98	Paved parking, HSG A (9S, 10S, 11S)
0.313	98	Paved parking, HSG C (10S, 11S)
0.164	98	Paved parking, HSG D (3S, 11S)
1.205	98	Roofs, HSG A (5S, 6S, 7S, 8S)
0.271	98	Roofs, HSG C (5S, 6S, 7S, 8S)
0.245	98	Roofs, HSG D (5S, 6S)
1.501	30	Woods, Good, HSG A (1S, 2S, 4S)
2.292	70	Woods, Good, HSG C (1S)
0.051	77	Woods, Good, HSG D (1S)
1.101	72	Woods/grass comb., Good, HSG C (1S)
10.766	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.113	HSG A	1S, 2S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
0.000	HSG B	
4.552	HSG C	1S, 5S, 6S, 7S, 8S, 10S, 11S
1.101	HSG D	1S, 3S, 4S, 5S, 6S, 11S
0.000	Other	
10.766		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=224,391 sf 0.00% Impervious Runoff Depth>0.76"
Flow Length=646' Tc=32.6 min CN=63 Runoff=2.08 cfs 0.325 af

Subcatchment2S: Subcatchment2S Runoff Area=27,616 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=223' Tc=11.9 min CN=32 Runoff=0.00 cfs 0.000 af

Subcatchment3S: Subcatchment3S Runoff Area=15,195 sf 18.21% Impervious Runoff Depth>2.03"
Flow Length=176' Tc=8.0 min CN=83 Runoff=0.77 cfs 0.059 af

Subcatchment4S: Subcatchment4S Runoff Area=33,970 sf 0.00% Impervious Runoff Depth>0.19"
Flow Length=225' Tc=17.6 min CN=48 Runoff=0.03 cfs 0.012 af

Subcatchment5S: Subcatchment5S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>3.47"
Tc=6.0 min CN=98 Runoff=1.52 cfs 0.125 af

Subcatchment6S: Subcatchment6S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>3.47"
Tc=6.0 min CN=98 Runoff=1.52 cfs 0.125 af

Subcatchment7S: Subcatchment7S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>3.47"
Tc=6.0 min CN=98 Runoff=1.52 cfs 0.125 af

Subcatchment8S: Subcatchment8S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>3.47"
Tc=6.0 min CN=98 Runoff=1.52 cfs 0.125 af

Subcatchment9S: Subcatchment9S Runoff Area=54,147 sf 45.38% Impervious Runoff Depth>0.91"
Flow Length=471' Tc=19.6 min CN=66 Runoff=0.79 cfs 0.094 af

Subcatchment10S: Subcatchment10S Runoff Area=19,625 sf 68.74% Impervious Runoff Depth>2.55"
Flow Length=170' Tc=7.7 min CN=89 Runoff=1.24 cfs 0.096 af

Subcatchment11S: Subcatchment11S Runoff Area=19,032 sf 65.45% Impervious Runoff Depth>1.96"
Flow Length=195' Tc=6.0 min CN=82 Runoff=0.98 cfs 0.071 af

Reach 1R: Vegetated Swale Avg. Flow Depth=0.33' Max Vel=0.27 fps Inflow=0.27 cfs 0.277 af
n=0.150 L=100.0' S=0.0050 '/' Capacity=11.89 cfs Outflow=0.27 cfs 0.275 af

Reach 2R: 8" HDPE Avg. Flow Depth=0.27' Max Vel=5.78 fps Inflow=0.77 cfs 0.059 af
8.0" Round Pipe n=0.013 L=70.0' S=0.0343 '/' Capacity=2.24 cfs Outflow=0.77 cfs 0.059 af

Reach AP1: Analysis Point #1 Inflow=2.51 cfs 0.659 af
Outflow=2.51 cfs 0.659 af

Reach AP2: Map 266 Lot 5 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Focal Point 1 Peak Elev=41.99' Storage=115 cf Inflow=0.98 cfs 0.071 af
Outflow=0.86 cfs 0.071 af

Pond 2P: Focal Point 2 Peak Elev=46.26' Storage=207 cf Inflow=1.85 cfs 0.219 af
Outflow=1.67 cfs 0.219 af

Pond 3P: Focal Point 3 Peak Elev=46.96' Storage=389 cf Inflow=2.74 cfs 0.220 af
Outflow=2.59 cfs 0.220 af

Pond 4P: Focal Point 4 Peak Elev=45.82' Storage=491 cf Inflow=3.04 cfs 0.262 af
Outflow=2.31 cfs 0.262 af

Pond 5P: Drain Manhole #1 Peak Elev=46.96' Inflow=1.52 cfs 0.125 af
12.0" Round Culvert n=0.013 L=60.0' S=0.0050 '/' Outflow=1.52 cfs 0.125 af

Pond 6P: Drain Manhole #2 Peak Elev=46.59' Inflow=3.04 cfs 0.249 af
15.0" Round Culvert n=0.013 L=26.0' S=0.0077 '/' Outflow=3.04 cfs 0.249 af

Pond 7P: Drain Manhole #3 Peak Elev=39.95' Inflow=2.31 cfs 0.262 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0075 '/' Outflow=2.31 cfs 0.262 af

Pond 8P: Drain Manhole #4 Peak Elev=39.95' Inflow=3.17 cfs 0.333 af
24.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=3.17 cfs 0.332 af

Pond 9P: Drain Manhole #5 Peak Elev=47.57' Inflow=1.52 cfs 0.125 af
12.0" Round Culvert n=0.013 L=86.0' S=0.0058 '/' Outflow=1.52 cfs 0.125 af

Pond 10P: Drain Manhole #6 Peak Elev=48.28' Inflow=1.52 cfs 0.125 af
12.0" Round Culvert n=0.013 L=46.0' S=0.0065 '/' Outflow=1.52 cfs 0.125 af

Pond 11P: Drain Manhole #7 Peak Elev=43.00' Inflow=1.67 cfs 0.219 af
18.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=1.67 cfs 0.219 af

Pond 12P: Drain Manhole #8 Peak Elev=42.37' Inflow=4.24 cfs 0.439 af
24.0" Round Culvert n=0.013 L=30.0' S=0.0067 '/' Outflow=4.24 cfs 0.439 af

Pond 13P: R-Tank Peak Elev=39.95' Storage=23,998 cf Inflow=7.40 cfs 0.775 af
Outflow=0.27 cfs 0.277 af

Total Runoff Area = 10.766 ac Runoff Volume = 1.156 af Average Runoff Depth = 1.29"
72.65% Pervious = 7.821 ac 27.35% Impervious = 2.945 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1S Runoff Area=224,391 sf 0.00% Impervious Runoff Depth>1.91"
Flow Length=646' Tc=32.6 min CN=63 Runoff=6.04 cfs 0.821 af

Subcatchment 2S: Subcatchment 2S Runoff Area=27,616 sf 0.00% Impervious Runoff Depth>0.08"
Flow Length=223' Tc=11.9 min CN=32 Runoff=0.01 cfs 0.004 af

Subcatchment 3S: Subcatchment 3S Runoff Area=15,195 sf 18.21% Impervious Runoff Depth>3.75"
Flow Length=176' Tc=8.0 min CN=83 Runoff=1.40 cfs 0.109 af

Subcatchment 4S: Subcatchment 4S Runoff Area=33,970 sf 0.00% Impervious Runoff Depth>0.84"
Flow Length=225' Tc=17.6 min CN=48 Runoff=0.37 cfs 0.054 af

Subcatchment 5S: Subcatchment 5S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>5.40"
Tc=6.0 min CN=98 Runoff=2.32 cfs 0.194 af

Subcatchment 6S: Subcatchment 6S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>5.40"
Tc=6.0 min CN=98 Runoff=2.32 cfs 0.194 af

Subcatchment 7S: Subcatchment 7S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>5.40"
Tc=6.0 min CN=98 Runoff=2.32 cfs 0.194 af

Subcatchment 8S: Subcatchment 8S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>5.40"
Tc=6.0 min CN=98 Runoff=2.32 cfs 0.194 af

Subcatchment 9S: Subcatchment 9S Runoff Area=54,147 sf 45.38% Impervious Runoff Depth>2.17"
Flow Length=471' Tc=19.6 min CN=66 Runoff=2.08 cfs 0.224 af

Subcatchment 10S: Subcatchment 10S Runoff Area=19,625 sf 68.74% Impervious Runoff Depth>4.38"
Flow Length=170' Tc=7.7 min CN=89 Runoff=2.08 cfs 0.165 af

Subcatchment 11S: Subcatchment 11S Runoff Area=19,032 sf 65.45% Impervious Runoff Depth>3.65"
Flow Length=195' Tc=6.0 min CN=82 Runoff=1.82 cfs 0.133 af

Reach 1R: Vegetated Swale Avg. Flow Depth=0.47' Max Vel=0.33 fps Inflow=0.53 cfs 0.431 af
n=0.150 L=100.0' S=0.0050 '/' Capacity=11.89 cfs Outflow=0.53 cfs 0.429 af

Reach 2R: 8" HDPE Avg. Flow Depth=0.38' Max Vel=6.75 fps Inflow=1.40 cfs 0.109 af
8.0" Round Pipe n=0.013 L=70.0' S=0.0343 '/' Capacity=2.24 cfs Outflow=1.40 cfs 0.109 af

Reach AP1: Analysis Point #1 Inflow=6.76 cfs 1.359 af
Outflow=6.76 cfs 1.359 af

Reach AP2: Map 266 Lot 5 Inflow=0.01 cfs 0.004 af
Outflow=0.01 cfs 0.004 af

Pond 1P: Focal Point 1 Peak Elev=42.58' Storage=272 cf Inflow=1.82 cfs 0.133 af
Outflow=1.70 cfs 0.131 af

Pond 2P: Focal Point 2 Peak Elev=46.72' Storage=396 cf Inflow=3.46 cfs 0.418 af
Outflow=3.62 cfs 0.418 af

Pond 3P: Focal Point 3 Peak Elev=47.13' Storage=473 cf Inflow=4.38 cfs 0.358 af
Outflow=4.32 cfs 0.358 af

Pond 4P: Focal Point 4 Peak Elev=46.13' Storage=713 cf Inflow=4.72 cfs 0.442 af
Outflow=4.72 cfs 0.442 af

Pond 5P: Drain Manhole #1 Peak Elev=47.71' Inflow=2.32 cfs 0.194 af
12.0" Round Culvert n=0.013 L=60.0' S=0.0050 '/' Outflow=2.32 cfs 0.194 af

Pond 6P: Drain Manhole #2 Peak Elev=47.11' Inflow=4.64 cfs 0.387 af
15.0" Round Culvert n=0.013 L=26.0' S=0.0077 '/' Outflow=4.64 cfs 0.387 af

Pond 7P: Drain Manhole #3 Peak Elev=42.18' Inflow=4.72 cfs 0.442 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0075 '/' Outflow=4.72 cfs 0.442 af

Pond 8P: Drain Manhole #4 Peak Elev=42.18' Inflow=6.35 cfs 0.573 af
24.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=6.35 cfs 0.573 af

Pond 9P: Drain Manhole #5 Peak Elev=47.90' Inflow=2.32 cfs 0.194 af
12.0" Round Culvert n=0.013 L=86.0' S=0.0058 '/' Outflow=2.32 cfs 0.194 af

Pond 10P: Drain Manhole #6 Peak Elev=48.60' Inflow=2.32 cfs 0.194 af
12.0" Round Culvert n=0.013 L=46.0' S=0.0065 '/' Outflow=2.32 cfs 0.194 af

Pond 11P: Drain Manhole #7 Peak Elev=43.48' Inflow=3.62 cfs 0.418 af
18.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=3.62 cfs 0.418 af

Pond 12P: Drain Manhole #8 Peak Elev=42.87' Inflow=7.93 cfs 0.776 af
24.0" Round Culvert n=0.013 L=30.0' S=0.0067 '/' Outflow=7.93 cfs 0.776 af

Pond 13P: R-Tank Peak Elev=42.18' Storage=42,761 cf Inflow=14.27 cfs 1.349 af
Outflow=0.53 cfs 0.431 af

Total Runoff Area = 10.766 ac Runoff Volume = 2.286 af Average Runoff Depth = 2.55"
72.65% Pervious = 7.821 ac 27.35% Impervious = 2.945 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 6.04 cfs @ 12.49 hrs, Volume= 0.821 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
17,375	39	>75% Grass cover, Good, HSG A
33,619	30	Woods, Good, HSG A
19,910	74	>75% Grass cover, Good, HSG C
99,843	70	Woods, Good, HSG C
47,938	72	Woods/grass comb., Good, HSG C
3,491	80	>75% Grass cover, Good, HSG D
2,215	77	Woods, Good, HSG D
224,391	63	Weighted Average
224,391		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0600	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
1.3	78	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.1	468	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.6	646	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.01 cfs @ 15.34 hrs, Volume= 0.004 af, Depth> 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
22,122	30	Woods, Good, HSG A
5,494	39	>75% Grass cover, Good, HSG A
27,616	32	Weighted Average
27,616		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0400	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
1.1	123	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	223	Total			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 1.40 cfs @ 12.11 hrs, Volume= 0.109 af, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
2,767	98	Paved parking, HSG D
12,428	80	>75% Grass cover, Good, HSG D
15,195	83	Weighted Average
12,428		81.79% Pervious Area
2,767		18.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0400	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.4	33	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.0	176	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 0.37 cfs @ 12.34 hrs, Volume= 0.054 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
14,449	39	>75% Grass cover, Good, HSG A
9,642	30	Woods, Good, HSG A
9,879	80	>75% Grass cover, Good, HSG D
33,970	48	Weighted Average
33,970		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	41	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
2.4	27	0.3300	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
1.1	17	0.3300	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
2.7	85	0.0050	0.52	3.13	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.00' Z= 3.0 '/' Top.W=9.00' n= 0.150 Sheet flow over Short Grass
0.9	55	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps

17.6 225 Total

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
11,448	98	Roofs, HSG A
3,233	98	Roofs, HSG C
4,069	98	Roofs, HSG D
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
11,834	98	Roofs, HSG A
293	98	Roofs, HSG C
6,623	98	Roofs, HSG D
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
18,108	98	Roofs, HSG A
642	98	Roofs, HSG C
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
11,115	98	Roofs, HSG A
7,635	98	Roofs, HSG C
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 9S: Subcatchment 9S

Runoff = 2.08 cfs @ 12.29 hrs, Volume= 0.224 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
24,571	98	Paved parking, HSG A
29,576	39	>75% Grass cover, Good, HSG A
54,147	66	Weighted Average
29,576		54.62% Pervious Area
24,571		45.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	38	0.0200	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
2.2	39	0.3300	0.30		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
5.7	177	0.0050	0.52	3.13	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.00' Z= 3.0 '/' Top.W=9.00' n= 0.150 Sheet flow over Short Grass
0.6	37	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	180	0.0140	2.40		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
19.6	471	Total			

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 2.08 cfs @ 12.11 hrs, Volume= 0.165 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
153	98	Paved parking, HSG A
13,337	98	Paved parking, HSG C
1,022	39	>75% Grass cover, Good, HSG A
5,113	74	>75% Grass cover, Good, HSG C
19,625	89	Weighted Average
6,135		31.26% Pervious Area
13,490		68.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	36	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
0.2	6	0.0100	0.60		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.8	58	0.0200	1.24		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.4	70	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.7	170	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 1.82 cfs @ 12.09 hrs, Volume= 0.133 af, Depth> 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr(+15%) Rainfall=5.64"

Area (sf)	CN	Description
7,767	98	Paved parking, HSG A
319	98	Paved parking, HSG C
4,370	98	Paved parking, HSG D
4,431	39	>75% Grass cover, Good, HSG A
30	74	>75% Grass cover, Good, HSG C
2,115	80	>75% Grass cover, Good, HSG D
19,032	82	Weighted Average
6,576		34.55% Pervious Area
12,456		65.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	37	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.6	63	0.0400	1.66		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.4	95	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.4	195	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: Vegetated Swale

Inflow Area = 4.632 ac, 62.21% Impervious, Inflow Depth > 1.12" for 10 Yr 24 Hr(+15%) event
Inflow = 0.53 cfs @ 16.34 hrs, Volume= 0.431 af
Outflow = 0.53 cfs @ 16.41 hrs, Volume= 0.429 af, Atten= 0%, Lag= 3.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.33 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 0.25 fps, Avg. Travel Time= 6.7 min

Peak Storage= 160 cf @ 16.41 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 4.82'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 11.89 cfs

2.00' x 2.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 36.50', Outlet Invert= 36.00'

Summary for Reach 2R: 8" HDPE

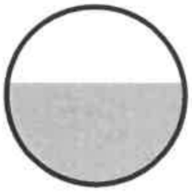
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.349 ac, 18.21% Impervious, Inflow Depth > 3.75" for 10 Yr 24 Hr(+15%) event
Inflow = 1.40 cfs @ 12.11 hrs, Volume= 0.109 af
Outflow = 1.40 cfs @ 12.12 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 6.75 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.46 fps, Avg. Travel Time= 0.5 min

Peak Storage= 15 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 0.66'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 2.24 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.0' Slope= 0.0343 '/'
Inlet Invert= 40.20', Outlet Invert= 37.80'



Summary for Reach AP1: Analysis Point #1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.132 ac, 29.07% Impervious, Inflow Depth > 1.61" for 10 Yr 24 Hr(+15%) event
Inflow = 6.76 cfs @ 12.47 hrs, Volume= 1.359 af
Outflow = 6.76 cfs @ 12.47 hrs, Volume= 1.359 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Map 266 Lot 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.634 ac, 0.00% Impervious, Inflow Depth > 0.08" for 10 Yr 24 Hr(+15%) event
Inflow = 0.01 cfs @ 15.34 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 15.34 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Focal Point 1

Inflow Area = 0.437 ac, 65.45% Impervious, Inflow Depth > 3.65" for 10 Yr 24 Hr(+15%) event
Inflow = 1.82 cfs @ 12.09 hrs, Volume= 0.133 af
Outflow = 1.70 cfs @ 12.14 hrs, Volume= 0.131 af, Atten= 7%, Lag= 2.7 min
Primary = 1.70 cfs @ 12.14 hrs, Volume= 0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 42.58' @ 12.13 hrs Surf.Area= 526 sf Storage= 272 cf

Plug-Flow detention time= 14.9 min calculated for 0.131 af (98% of inflow)
Center-of-Mass det. time= 5.5 min (816.4 - 810.9)

Volume	Invert	Avail.Storage	Storage Description
#1	39.25'	53 cf	**3.00'W x 20.00'L x 2.25'H Focal Point Area 1 Z=1.0** 267 cf Overall x 20.0% Voids
#2	41.50'	641 cf	**Surface Bowl (Prismatic)**Listed below (Recalc)
		694 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
41.50	60	0	0
43.50	581	641	641

Device	Routing	Invert	Outlet Devices
#1	Primary	38.46'	**24.0" Round Culvert** L= 27.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.46' / 37.95' S= 0.0189 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 3	39.25'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	38.46'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	42.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

```
Primary OutFlow Max=1.63 cfs @ 12.14 hrs  HW=42.58'  TW=39.76'  (Dynamic Tailwater)
 └1=Culvert (Passes 1.63 cfs of 20.02 cfs potential flow)
   ├3=Orifice/Grate (Passes 1.21 cfs of 2.02 cfs potential flow)
   │ └2=Exfiltration (Exfiltration Controls 1.21 cfs)
   └4=Orifice/Grate (Weir Controls 0.42 cfs @ 0.90 fps)
```

Summary for Pond 2P: Focal Point 2

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.673 ac, 59.43% Impervious, Inflow Depth > 3.00" for 10 Yr 24 Hr(+15%) event
Inflow = 3.46 cfs @ 12.11 hrs, Volume= 0.418 af
Outflow = 3.62 cfs @ 12.12 hrs, Volume= 0.418 af, Atten= 0%, Lag= 0.3 min
Primary = 3.62 cfs @ 12.12 hrs, Volume= 0.418 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

```
Peak Elev= 46.72' @ 12.12 hrs   Surf.Area= 899 sf   Storage= 396 cf

Plug-Flow detention time= 1.1 min calculated for 0.417 af (100% of inflow)
Center-of-Mass det. time= 1.1 min ( 808.7 - 807.6 )

Volume      Invert    Avail.Storage   Storage Description
  #1        43.75'           138 cf   8.00'W x 27.50'L x 2.25'H Focal Point Area 1  Z=1.0
                                      690 cf Overall  x 20.0% Voids
  #2        46.00'         1,215 cf   Surface Bowl (Prismatic)Listed below (Recalc)
                           1,353 cf   Total Available Storage

 Elevation          Surf.Area       Inc.Store      Cum.Store
    (feet)            (sq-ft)    (cubic-feet)   (cubic-feet)
     46.00                220               0              0
     48.00                995           1,215          1,215

Device  Routing          Invert  Outlet Devices
  #1    Primary          42.96'  18.0"  Round Culvert
                                 L= 36.0'  CPP, projecting, no headwall,  Ke= 0.900
                                 Inlet / Outlet Invert= 42.96' / 42.40'   S= 0.0156 '/'   Cc= 0.900
                                 n= 0.013  Corrugated PE, smooth interior,  Flow Area= 1.77 sf
  #2    Device 3         43.75'  100.000 in/hr Exfiltration over Surface area   Phase-In= 0.10'
  #3    Device 1         42.96'  6.0" W x 6.0" H Vert. Orifice/Grate   C= 0.600
                                 Limited to weir flow at low heads
  #4    Device 1         46.50'  18.0" Horiz. Orifice/Grate   C= 0.600
                                 Limited to weir flow at low heads

Primary OutFlow Max=3.44 cfs @ 12.12 hrs  HW=46.70'  TW=43.44'   (Dynamic Tailwater)
 └─1=Culvert (Passes 3.44 cfs of 11.62 cfs potential flow)
    ├─3=Orifice/Grate (Passes 2.06 cfs of 2.17 cfs potential flow)
    │  └─2=Exfiltration (Exfiltration Controls 2.06 cfs)
    └─4=Orifice/Grate (Weir Controls 1.38 cfs @ 1.46 fps)
```

Summary for Pond 3P: Focal Point 3

```
Inflow Area =      0.881 ac, 84.01% Impervious,  Inflow Depth >  4.88"   for  10 Yr 24 Hr(+15%) event
Inflow      =      4.38 cfs @   12.10 hrs,  Volume=        0.358 af
Outflow     =      4.32 cfs @   12.11 hrs,  Volume=        0.358 af,  Atten= 1%,  Lag= 0.7 min
Primary     =      4.32 cfs @   12.11 hrs,  Volume=        0.358 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 47.13' @ 12.11 hrs   Surf.Area= 813 sf   Storage= 473 cf

Plug-Flow detention time= 1.2 min calculated for 0.358 af (100% of inflow)
Center-of-Mass det. time= 1.2 min ( 767.8 - 766.6 )

Volume      Invert    Avail.Storage   Storage Description
  #1        43.75'            93 cf   7.00'W x 20.00'L x 2.25'H Focal Point  Z=1.0
                                      467 cf Overall  x 20.0% Voids
  #2        46.00'         1,996 cf   Surface Bowl (Prismatic)Listed below (Recalc)
                           2,089 cf   Total Available Storage
```

```
Elevation        Surf.Area        Inc.Store        Cum.Store
   (feet)          (sq-ft)     (cubic-feet)     (cubic-feet)
    46.00              140                0                0
    48.00              832              972              972
    49.00            1,216            1,024            1,996

Device  Routing          Invert  Outlet Devices
   #1   Primary          42.96'  15.0"  Round Culvert
                                 L= 40.0'   CPP, projecting, no headwall,  Ke= 0.900
                                 Inlet / Outlet Invert= 42.96' / 42.05'   S= 0.0228 '/'   Cc= 0.900
                                 n= 0.013  Corrugated PE, smooth interior,  Flow Area= 1.23 sf
   #2   Device 3         43.75'  100.000 in/hr Exfiltration over Surface area   Phase-In= 0.10'
   #3   Device 1         42.96'  6.0" W x 6.0" H Vert. Orifice/Grate  C= 0.600
                                 Limited to weir flow at low heads
   #4   Device 1         46.80'  15.0" Horiz. Orifice/Grate  C= 0.600
                                 Limited to weir flow at low heads

Primary OutFlow Max=4.24 cfs @ 12.11 hrs  HW=47.12'  TW=42.84'  (Dynamic Tailwater)
└─1=Culvert (Passes 4.24 cfs of 8.78 cfs potential flow)
   ├─3=Orifice/Grate (Passes 1.88 cfs of 2.38 cfs potential flow)
   │  └─2=Exfiltration (Exfiltration Controls 1.88 cfs)
   └─4=Orifice/Grate (Weir Controls 2.36 cfs @ 1.86 fps)
```

Summary for Pond 4P: Focal Point 4

```
Inflow Area =       1.641 ac,  52.47% Impervious,  Inflow Depth >  3.23"   for  10 Yr 24 Hr(+15%) event
Inflow      =       4.72 cfs @  12.09 hrs,  Volume=          0.442 af
Outflow     =       4.72 cfs @  12.12 hrs,  Volume=          0.442 af,  Atten= 0%,  Lag= 1.6 min
Primary     =       4.72 cfs @  12.12 hrs,  Volume=          0.442 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 46.13' @ 12.12 hrs   Surf.Area= 1,234 sf   Storage= 713 cf

Plug-Flow detention time= 1.2 min calculated for 0.442 af (100% of inflow)
Center-of-Mass det. time= 1.2 min ( 768.0 - 766.8 )

Volume       Invert    Avail.Storage  Storage Description
   #1        42.75'          145 cf   5.00'W x 42.00'L x 2.25'H Focal Point  Z=1.0
                                      726 cf Overall  x 20.0% Voids
   #2        45.00'        1,437 cf   Surface Bowl (Prismatic)Listed below (Recalc)
                           1,582 cf   Total Available Storage

Elevation        Surf.Area        Inc.Store        Cum.Store
   (feet)          (sq-ft)     (cubic-feet)     (cubic-feet)
    45.00              210                0                0
    46.00              735              473              473
    47.00            1,193              964            1,437
```

Device	Routing	Invert	Outlet Devices
#1	Primary	41.96'	**15.0" Round Culvert** L= 180.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.96' / 38.75' S= 0.0178 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 3	42.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	41.96'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	45.80'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

```
Primary OutFlow Max=4.48 cfs @ 12.12 hrs HW=46.10' TW=40.12' (Dynamic Tailwater)
└─1=Culvert (Passes 4.48 cfs of 8.75 cfs potential flow)
   ├─3=Orifice/Grate (Orifice Controls 2.37 cfs @ 9.49 fps)
   │  └─2=Exfiltration (Passes 2.37 cfs of 2.83 cfs potential flow)
   └─4=Orifice/Grate (Weir Controls 2.10 cfs @ 1.79 fps)
```

Summary for Pond 5P: Drain Manhole #1

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth > 5.40" for 10 Yr 24 Hr(+15%) event
Inflow = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af
Outflow = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 47.71' @ 12.09 hrs
Flood Elev= 53.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.05'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.05' / 45.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

```
Primary OutFlow Max=2.26 cfs @ 12.09 hrs HW=47.64' TW=47.06' (Dynamic Tailwater)
└─1=Culvert (Inlet Controls 2.26 cfs @ 2.88 fps)
```

Summary for Pond 6P: Drain Manhole #2

Inflow Area = 0.861 ac,100.00% Impervious, Inflow Depth > 5.40" for 10 Yr 24 Hr(+15%) event
Inflow = 4.64 cfs @ 12.09 hrs, Volume= 0.387 af
Outflow = 4.64 cfs @ 12.09 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.0 min
Primary = 4.64 cfs @ 12.09 hrs, Volume= 0.387 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 47.11' @ 12.09 hrs
Flood Elev= 53.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.50'	**15.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 45.50' / 45.30' S= 0.0077 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.52 cfs @ 12.09 hrs HW=47.06' TW=46.06' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.52 cfs @ 3.68 fps)

Summary for Pond 7P: Drain Manhole #3

Inflow Area = 1.641 ac, 52.47% Impervious, Inflow Depth > 3.23" for 10 Yr 24 Hr(+15%) event
Inflow = 4.72 cfs @ 12.12 hrs, Volume= 0.442 af
Outflow = 4.72 cfs @ 12.12 hrs, Volume= 0.442 af, Atten= 0%, Lag= 0.0 min
Primary = 4.72 cfs @ 12.12 hrs, Volume= 0.442 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 42.18' @ 16.33 hrs
Flood Elev= 44.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	38.50'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.50' / 38.20' S= 0.0075 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.48 cfs @ 12.12 hrs HW=40.12' TW=39.68' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.48 cfs @ 2.54 fps)

Summary for Pond 8P: Drain Manhole #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 2.078 ac, 55.20% Impervious, Inflow Depth > 3.31" for 10 Yr 24 Hr(+15%) event
Inflow = 6.35 cfs @ 12.12 hrs, Volume= 0.573 af
Outflow = 6.35 cfs @ 12.12 hrs, Volume= 0.573 af, Atten= 0%, Lag= 0.0 min
Primary = 6.35 cfs @ 12.12 hrs, Volume= 0.573 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 42.18' @ 16.34 hrs
Flood Elev= 45.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	37.85'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.85' / 37.60' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.10 cfs @ 12.12 hrs HW=39.69' TW=39.41' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.10 cfs @ 2.02 fps)

Summary for Pond 9P: Drain Manhole #5

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth > 5.40" for 10 Yr 24 Hr(+15%) event
Inflow = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af
Outflow = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 47.90' @ 12.09 hrs
Flood Elev= 49.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.80'	**12.0" Round Culvert** L= 86.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.80' / 46.30' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.26 cfs @ 12.09 hrs HW=47.87' TW=46.67' (Dynamic Tailwater)
↰**1=Culvert** (Inlet Controls 2.26 cfs @ 2.88 fps)

Summary for Pond 10P: Drain Manhole #6

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth > 5.40" for 10 Yr 24 Hr(+15%) event
Inflow = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af
Outflow = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 2.32 cfs @ 12.09 hrs, Volume= 0.194 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.60' @ 12.09 hrs
Flood Elev= 52.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**12.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 47.50' / 47.20' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.26 cfs @ 12.09 hrs HW=48.57' TW=47.11' (Dynamic Tailwater)
↰**1=Culvert** (Inlet Controls 2.26 cfs @ 2.88 fps)

Summary for Pond 11P: Drain Manhole #7

Inflow Area = 1.673 ac, 59.43% Impervious, Inflow Depth > 3.00" for 10 Yr 24 Hr(+15%) event
Inflow = 3.62 cfs @ 12.12 hrs, Volume= 0.418 af
Outflow = 3.62 cfs @ 12.12 hrs, Volume= 0.418 af, Atten= 0%, Lag= 0.0 min
Primary = 3.62 cfs @ 12.12 hrs, Volume= 0.418 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.48' @ 12.12 hrs
Flood Elev= 49.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.30'	**18.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.30' / 41.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.45 cfs @ 12.12 hrs HW=43.44' TW=42.83' (Dynamic Tailwater)
↰**1=Culvert** (Outlet Controls 3.45 cfs @ 3.32 fps)

Summary for Pond 12P: Drain Manhole #8

Inflow Area = 2.554 ac, 67.91% Impervious, Inflow Depth > 3.65" for 10 Yr 24 Hr(+15%) event
Inflow = 7.93 cfs @ 12.11 hrs, Volume= 0.776 af
Outflow = 7.93 cfs @ 12.11 hrs, Volume= 0.776 af, Atten= 0%, Lag= 0.0 min
Primary = 7.93 cfs @ 12.11 hrs, Volume= 0.776 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 42.87' @ 12.12 hrs
Flood Elev= 49.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	41.30'	**24.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.30' / 41.10' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.66 cfs @ 12.11 hrs HW=42.83' TW=39.38' (Dynamic Tailwater)
↰**1=Culvert** (Barrel Controls 7.66 cfs @ 4.10 fps)

Summary for Pond 13P: R-Tank

Inflow Area = 4.632 ac, 62.21% Impervious, Inflow Depth > 3.50" for 10 Yr 24 Hr(+15%) event
Inflow = 14.27 cfs @ 12.12 hrs, Volume= 1.349 af
Outflow = 0.53 cfs @ 16.34 hrs, Volume= 0.431 af, Atten= 96%, Lag= 253.6 min
Primary = 0.53 cfs @ 16.34 hrs, Volume= 0.431 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 42.18' @ 16.34 hrs Surf.Area= 9,582 sf Storage= 42,761 cf

Plug-Flow detention time= 420.8 min calculated for 0.430 af (32% of inflow)
Center-of-Mass det. time= 249.3 min (1,034.6 - 785.3)

```
Volume     Invert   Avail.Storage  Storage Description
  #1A      36.95'       3,703 cf   60.43'W x 74.37'L x 8.21'H Field A
                                   36,879 cf Overall - 27,621 cf Embedded = 9,257 cf  x 40.0% Voids
  #2A      37.20'      26,240 cf   ACF R-Tank HD  5 x 1290  Inside #1
                                   Inside= 15.7"W x 83.5"H => 8.67 sf x 2.35'L = 20.3 cf
                                   Outside= 15.7"W x 83.5"H => 9.13 sf x 2.35'L = 21.4 cf
                                   1290 Chambers in 43 Rows
  #3B      36.95'       4,708 cf   30.25'W x 168.21'L x 8.21'H Field B
                                   41,746 cf Overall - 29,977 cf Embedded = 11,770 cf  x 40.0% Voids
  #4B      37.20'      28,478 cf   ACF R-Tank HD  5 x 1400  Inside #3
                                   Inside= 15.7"W x 83.5"H => 8.67 sf x 2.35'L = 20.3 cf
                                   Outside= 15.7"W x 83.5"H => 9.13 sf x 2.35'L = 21.4 cf
                                   1400 Chambers in 20 Rows
                       63,129 cf   Total Available Storage

   Storage Group A created with Chamber Wizard
   Storage Group B created with Chamber Wizard

Device  Routing       Invert  Outlet Devices
  #1    Primary       37.00'  15.0"  Round Culvert
                              L= 100.0'   CPP, projecting, no headwall,  Ke= 0.900
                              Inlet / Outlet Invert= 37.00' / 36.50'   S= 0.0050 '/'   Cc= 0.900
                              n= 0.013  Corrugated PE, smooth interior,  Flow Area= 1.23 sf
  #2    Device 1      37.20'  2.5" Vert. Orifice/Grate   C= 0.600   Limited to weir flow at low heads
  #3    Device 1      42.00'  15.0" Vert. Orifice/Grate   C= 0.600
                              Limited to weir flow at low heads

Primary OutFlow Max=0.53 cfs @ 16.34 hrs  HW=42.18'  TW=36.97'  (Dynamic Tailwater)
 └─1=Culvert  (Passes 0.53 cfs of 9.96 cfs potential flow)
     ├─2=Orifice/Grate  (Orifice Controls 0.36 cfs @ 10.64 fps)
     └─3=Orifice/Grate  (Orifice Controls 0.16 cfs @ 1.46 fps)
```

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=224,391 sf 0.00% Impervious Runoff Depth>2.98"
Flow Length=646' Tc=32.6 min CN=63 Runoff=9.69 cfs 1.281 af

Subcatchment2S: Subcatchment2S Runoff Area=27,616 sf 0.00% Impervious Runoff Depth>0.34"
Flow Length=223' Tc=11.9 min CN=32 Runoff=0.05 cfs 0.018 af

Subcatchment3S: Subcatchment3S Runoff Area=15,195 sf 18.21% Impervious Runoff Depth>5.15"
Flow Length=176' Tc=8.0 min CN=83 Runoff=1.91 cfs 0.150 af

Subcatchment4S: Subcatchment4S Runoff Area=33,970 sf 0.00% Impervious Runoff Depth>1.56"
Flow Length=225' Tc=17.6 min CN=48 Runoff=0.84 cfs 0.101 af

Subcatchment5S: Subcatchment5S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>6.90"
Tc=6.0 min CN=98 Runoff=2.94 cfs 0.247 af

Subcatchment6S: Subcatchment6S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>6.90"
Tc=6.0 min CN=98 Runoff=2.94 cfs 0.247 af

Subcatchment7S: Subcatchment7S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>6.90"
Tc=6.0 min CN=98 Runoff=2.94 cfs 0.247 af

Subcatchment8S: Subcatchment8S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>6.90"
Tc=6.0 min CN=98 Runoff=2.94 cfs 0.247 af

Subcatchment9S: Subcatchment9S Runoff Area=54,147 sf 45.38% Impervious Runoff Depth>3.30"
Flow Length=471' Tc=19.6 min CN=66 Runoff=3.24 cfs 0.342 af

Subcatchment10S: Subcatchment10S Runoff Area=19,625 sf 68.74% Impervious Runoff Depth>5.84"
Flow Length=170' Tc=7.7 min CN=89 Runoff=2.73 cfs 0.219 af

Subcatchment11S: Subcatchment11S Runoff Area=19,032 sf 65.45% Impervious Runoff Depth>5.04"
Flow Length=195' Tc=6.0 min CN=82 Runoff=2.49 cfs 0.184 af

Reach 1R: Vegetated Swale Avg. Flow Depth=0.98' Max Vel=0.49 fps Inflow=2.37 cfs 0.886 af
n=0.150 L=100.0' S=0.0050 '/' Capacity=11.89 cfs Outflow=2.36 cfs 0.884 af

Reach 2R: 8" HDPE Avg. Flow Depth=0.47' Max Vel=7.18 fps Inflow=1.91 cfs 0.150 af
8.0" Round Pipe n=0.013 L=70.0' S=0.0343 '/' Capacity=2.24 cfs Outflow=1.91 cfs 0.150 af

Reach AP1: Analysis Point #1 Inflow=10.64 cfs 2.314 af
Outflow=10.64 cfs 2.314 af

Reach AP2: Map 266 Lot 5 Inflow=0.05 cfs 0.018 af
Outflow=0.05 cfs 0.018 af

Pond 1P: Focal Point 1 Peak Elev=42.70' Storage=314 cf Inflow=2.49 cfs 0.184 af
Outflow=2.65 cfs 0.181 af

```
Pond 2P: Focal Point 2                   Peak Elev=46.81'  Storage=445 cf   Inflow=4.85 cfs  0.589 af
                                                                           Outflow=4.80 cfs  0.589 af

Pond 3P: Focal Point 3                   Peak Elev=47.23'  Storage=528 cf   Inflow=5.64 cfs  0.467 af
                                                                           Outflow=5.59 cfs  0.467 af

Pond 4P: Focal Point 4                   Peak Elev=46.24'  Storage=806 cf   Inflow=6.24 cfs  0.596 af
                                                                           Outflow=6.14 cfs  0.596 af

Pond 5P: Drain Manhole #1                                  Peak Elev=48.78'  Inflow=2.94 cfs  0.247 af
                     12.0"  Round Culvert  n=0.013  L=60.0'  S=0.0050 '/'  Outflow=2.94 cfs  0.247 af

Pond 6P: Drain Manhole #2                                  Peak Elev=47.81'  Inflow=5.89 cfs  0.495 af
                     15.0"  Round Culvert  n=0.013  L=26.0'  S=0.0077 '/'  Outflow=5.89 cfs  0.495 af

Pond 7P: Drain Manhole #3                                  Peak Elev=42.72'  Inflow=6.14 cfs  0.596 af
                     18.0"  Round Culvert  n=0.013  L=40.0'  S=0.0075 '/'  Outflow=6.14 cfs  0.596 af

Pond 8P: Drain Manhole #4                                  Peak Elev=42.70'  Inflow=8.79 cfs  0.777 af
                     24.0"  Round Culvert  n=0.013  L=50.0'  S=0.0050 '/'  Outflow=8.79 cfs  0.777 af

Pond 9P: Drain Manhole #5                                  Peak Elev=48.30'  Inflow=2.94 cfs  0.247 af
                     12.0"  Round Culvert  n=0.013  L=86.0'  S=0.0058 '/'  Outflow=2.94 cfs  0.247 af

Pond 10P: Drain Manhole #6                                 Peak Elev=48.97'  Inflow=2.94 cfs  0.247 af
                     12.0"  Round Culvert  n=0.013  L=46.0'  S=0.0065 '/'  Outflow=2.94 cfs  0.247 af

Pond 11P: Drain Manhole #7                                 Peak Elev=43.77'  Inflow=4.80 cfs  0.589 af
                    18.0"  Round Culvert  n=0.013  L=100.0'  S=0.0050 '/'  Outflow=4.80 cfs  0.589 af

Pond 12P: Drain Manhole #8                                Peak Elev=43.16'  Inflow=10.35 cfs  1.056 af
                    24.0"  Round Culvert  n=0.013  L=30.0'  S=0.0067 '/'  Outflow=10.35 cfs  1.056 af

Pond 13P: R-Tank                     Peak Elev=42.70'  Storage=47,050 cf  Inflow=19.12 cfs  1.833 af
                                                                           Outflow=2.37 cfs  0.886 af

         Total Runoff Area = 10.766 ac   Runoff Volume = 3.284 af   Average Runoff Depth = 3.66"
                                    72.65% Pervious = 7.821 ac     27.35% Impervious = 2.945 ac
```

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=224,391 sf 0.00% Impervious Runoff Depth>4.09"
Flow Length=646' Tc=32.6 min CN=63 Runoff=13.45 cfs 1.757 af

Subcatchment2S: Subcatchment2S Runoff Area=27,616 sf 0.00% Impervious Runoff Depth>0.73"
Flow Length=223' Tc=11.9 min CN=32 Runoff=0.19 cfs 0.038 af

Subcatchment3S: Subcatchment3S Runoff Area=15,195 sf 18.21% Impervious Runoff Depth>6.52"
Flow Length=176' Tc=8.0 min CN=83 Runoff=2.39 cfs 0.189 af

Subcatchment4S: Subcatchment4S Runoff Area=33,970 sf 0.00% Impervious Runoff Depth>2.37"
Flow Length=225' Tc=17.6 min CN=48 Runoff=1.39 cfs 0.154 af

Subcatchment5S: Subcatchment5S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>8.32"
Tc=6.0 min CN=98 Runoff=3.54 cfs 0.299 af

Subcatchment6S: Subcatchment6S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>8.32"
Tc=6.0 min CN=98 Runoff=3.54 cfs 0.299 af

Subcatchment7S: Subcatchment7S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>8.32"
Tc=6.0 min CN=98 Runoff=3.54 cfs 0.299 af

Subcatchment8S: Subcatchment8S Runoff Area=18,750 sf 100.00% Impervious Runoff Depth>8.32"
Tc=6.0 min CN=98 Runoff=3.54 cfs 0.299 af

Subcatchment9S: Subcatchment9S Runoff Area=54,147 sf 45.38% Impervious Runoff Depth>4.46"
Flow Length=471' Tc=19.6 min CN=66 Runoff=4.42 cfs 0.462 af

Subcatchment10S: Subcatchment10S Runoff Area=19,625 sf 68.74% Impervious Runoff Depth>7.24"
Flow Length=170' Tc=7.7 min CN=89 Runoff=3.35 cfs 0.272 af

Subcatchment11S: Subcatchment11S Runoff Area=19,032 sf 65.45% Impervious Runoff Depth>6.40"
Flow Length=195' Tc=6.0 min CN=82 Runoff=3.12 cfs 0.233 af

Reach 1R: Vegetated Swale Avg. Flow Depth=1.43' Max Vel=0.61 fps Inflow=5.47 cfs 1.351 af
n=0.150 L=100.0' S=0.0050 '/' Capacity=11.89 cfs Outflow=5.46 cfs 1.349 af

Reach 2R: 8" HDPE Avg. Flow Depth=0.59' Max Vel=7.31 fps Inflow=2.39 cfs 0.189 af
8.0" Round Pipe n=0.013 L=70.0' S=0.0343 '/' Capacity=2.24 cfs Outflow=2.38 cfs 0.189 af

Reach AP1: Analysis Point #1 Inflow=18.66 cfs 3.295 af
Outflow=18.66 cfs 3.295 af

Reach AP2: Map 266 Lot 5 Inflow=0.19 cfs 0.038 af
Outflow=0.19 cfs 0.038 af

Pond 1P: Focal Point 1 Peak Elev=43.40' Storage=640 cf Inflow=3.12 cfs 0.233 af
Outflow=3.05 cfs 0.230 af

```
Pond 2P: Focal Point 2                          Peak Elev=46.92'  Storage=506 cf   Inflow=6.15 cfs  0.761 af
                                                                                  Outflow=6.21 cfs  0.761 af

Pond 3P: Focal Point 3                          Peak Elev=47.37'  Storage=607 cf   Inflow=6.84 cfs  0.570 af
                                                                                  Outflow=6.55 cfs  0.570 af

Pond 4P: Focal Point 4                          Peak Elev=46.44'  Storage=986 cf   Inflow=7.76 cfs  0.751 af
                                                                                  Outflow=7.11 cfs  0.751 af

Pond 5P: Drain Manhole #1                                        Peak Elev=50.07'   Inflow=3.54 cfs  0.299 af
                        12.0"  Round Culvert  n=0.013  L=60.0'  S=0.0050 '/'   Outflow=3.54 cfs  0.299 af

Pond 6P: Drain Manhole #2                                        Peak Elev=48.67'   Inflow=7.07 cfs  0.597 af
                        15.0"  Round Culvert  n=0.013  L=26.0'  S=0.0077 '/'   Outflow=7.07 cfs  0.597 af

Pond 7P: Drain Manhole #3                                        Peak Elev=43.50'   Inflow=7.11 cfs  0.751 af
                        18.0"  Round Culvert  n=0.013  L=40.0'  S=0.0075 '/'   Outflow=7.11 cfs  0.751 af

Pond 8P: Drain Manhole #4                                      Peak Elev=43.40'   Inflow=10.07 cfs  0.981 af
                      24.0"  Round Culvert  n=0.013  L=50.0'  S=0.0050 '/'   Outflow=10.07 cfs  0.981 af

Pond 9P: Drain Manhole #5                                        Peak Elev=48.74'   Inflow=3.54 cfs  0.299 af
                        12.0"  Round Culvert  n=0.013  L=86.0'  S=0.0058 '/'   Outflow=3.54 cfs  0.299 af

Pond 10P: Drain Manhole #6                                       Peak Elev=49.40'   Inflow=3.54 cfs  0.299 af
                        12.0"  Round Culvert  n=0.013  L=46.0'  S=0.0065 '/'   Outflow=3.54 cfs  0.299 af

Pond 11P: Drain Manhole #7                                       Peak Elev=44.30'   Inflow=6.21 cfs  0.761 af
                      18.0"  Round Culvert  n=0.013  L=100.0'  S=0.0050 '/'   Outflow=6.21 cfs  0.761 af

Pond 12P: Drain Manhole #8                                     Peak Elev=43.48'   Inflow=12.71 cfs  1.331 af
                      24.0"  Round Culvert  n=0.013  L=30.0'  S=0.0067 '/'   Outflow=12.71 cfs  1.331 af

Pond 13P: R-Tank                             Peak Elev=43.37'  Storage=52,683 cf   Inflow=22.75 cfs  2.312 af
                                                                                  Outflow=5.47 cfs  1.351 af

                Total Runoff Area = 10.766 ac   Runoff Volume = 4.300 af   Average Runoff Depth = 4.79"
                                          72.65% Pervious = 7.821 ac     27.35% Impervious = 2.945 ac
```

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 13.45 cfs @ 12.47 hrs, Volume= 1.757 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
17,375	39	>75% Grass cover, Good, HSG A
33,619	30	Woods, Good, HSG A
19,910	74	>75% Grass cover, Good, HSG C
99,843	70	Woods, Good, HSG C
47,938	72	Woods/grass comb., Good, HSG C
3,491	80	>75% Grass cover, Good, HSG D
2,215	77	Woods, Good, HSG D
224,391	63	Weighted Average
224,391		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0600	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
1.3	78	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.1	468	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.6	646	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.19 cfs @ 12.41 hrs, Volume= 0.038 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
22,122	30	Woods, Good, HSG A
5,494	39	>75% Grass cover, Good, HSG A
27,616	32	Weighted Average
27,616		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0400	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
1.1	123	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	223	Total			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 2.39 cfs @ 12.11 hrs, Volume= 0.189 af, Depth> 6.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
2,767	98	Paved parking, HSG D
12,428	80	>75% Grass cover, Good, HSG D
15,195	83	Weighted Average
12,428		81.79% Pervious Area
2,767		18.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0400	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.4	33	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.0	176	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 1.39 cfs @ 12.27 hrs, Volume= 0.154 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
14,449	39	>75% Grass cover, Good, HSG A
9,642	30	Woods, Good, HSG A
9,879	80	>75% Grass cover, Good, HSG D
33,970	48	Weighted Average
33,970		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	41	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
2.4	27	0.3300	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
1.1	17	0.3300	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
2.7	85	0.0050	0.52	3.13	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.00' Z= 3.0 '/' Top.W=9.00' n= 0.150 Sheet flow over Short Grass
0.9	55	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps

17.6 225 Total

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
11,448	98	Roofs, HSG A
3,233	98	Roofs, HSG C
4,069	98	Roofs, HSG D
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
11,834	98	Roofs, HSG A
293	98	Roofs, HSG C
6,623	98	Roofs, HSG D
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
18,108	98	Roofs, HSG A
642	98	Roofs, HSG C
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af, Depth> 8.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
11,115	98	Roofs, HSG A
7,635	98	Roofs, HSG C
18,750	98	Weighted Average
18,750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 9S: Subcatchment 9S

[47] Hint: Peak is 141% of capacity of segment #3

Runoff = 4.42 cfs @ 12.27 hrs, Volume= 0.462 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
24,571	98	Paved parking, HSG A
29,576	39	>75% Grass cover, Good, HSG A
54,147	66	Weighted Average
29,576		54.62% Pervious Area
24,571		45.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	38	0.0200	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
2.2	39	0.3300	0.30		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
5.7	177	0.0050	0.52	3.13	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.00' Z= 3.0 '/' Top.W=9.00' n= 0.150 Sheet flow over Short Grass
0.6	37	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	180	0.0140	2.40		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
19.6	471	Total			

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 3.35 cfs @ 12.11 hrs, Volume= 0.272 af, Depth> 7.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
153	98	Paved parking, HSG A
13,337	98	Paved parking, HSG C
1,022	39	>75% Grass cover, Good, HSG A
5,113	74	>75% Grass cover, Good, HSG C
19,625	89	Weighted Average
6,135		31.26% Pervious Area
13,490		68.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	36	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.23"
0.2	6	0.0100	0.60		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.8	58	0.0200	1.24		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.4	70	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.7	170	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 3.12 cfs @ 12.09 hrs, Volume= 0.233 af, Depth> 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr(+15%) Rainfall=8.57"

Area (sf)	CN	Description
7,767	98	Paved parking, HSG A
319	98	Paved parking, HSG C
4,370	98	Paved parking, HSG D
4,431	39	>75% Grass cover, Good, HSG A
30	74	>75% Grass cover, Good, HSG C
2,115	80	>75% Grass cover, Good, HSG D
19,032	82	Weighted Average
6,576		34.55% Pervious Area
12,456		65.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	37	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.23"
0.6	63	0.0400	1.66		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.23"
0.4	95	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.4	195	Total, Increased to minimum Tc = 6.0 min			

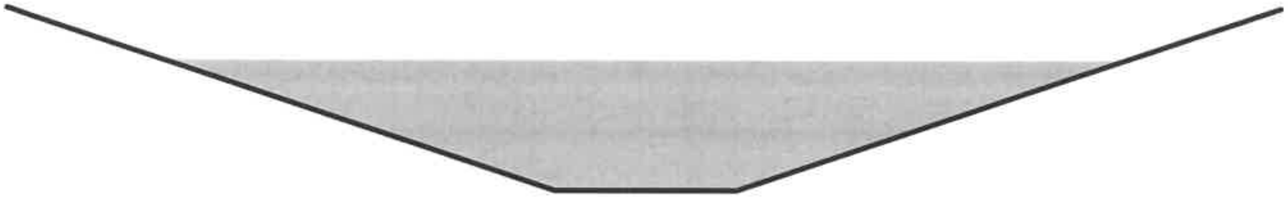
Summary for Reach 1R: Vegetated Swale

Inflow Area = 4.632 ac, 62.21% Impervious, Inflow Depth > 3.50" for 50 Yr 24 Hr(+15%) event
Inflow = 5.47 cfs @ 12.70 hrs, Volume= 1.351 af
Outflow = 5.46 cfs @ 12.74 hrs, Volume= 1.349 af, Atten= 0%, Lag= 2.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.61 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.30 fps, Avg. Travel Time= 5.5 min

Peak Storage= 895 cf @ 12.74 hrs
Average Depth at Peak Storage= 1.43' , Surface Width= 10.56'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 11.89 cfs

2.00' x 2.00' deep channel, n= 0.150 Sheet flow over Short Grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 36.50', Outlet Invert= 36.00'



Summary for Reach 2R: 8" HDPE

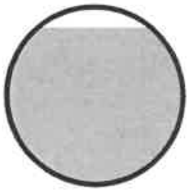
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 107% of Manning's capacity

Inflow Area = 0.349 ac, 18.21% Impervious, Inflow Depth > 6.52" for 50 Yr 24 Hr(+15%) event
Inflow = 2.39 cfs @ 12.11 hrs, Volume= 0.189 af
Outflow = 2.38 cfs @ 12.11 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 7.31 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.79 fps, Avg. Travel Time= 0.4 min

Peak Storage= 23 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.59' , Surface Width= 0.43'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 2.24 cfs

8.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.0' Slope= 0.0343 '/'
Inlet Invert= 40.20', Outlet Invert= 37.80'



Summary for Reach AP1: Analysis Point #1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.132 ac, 29.07% Impervious, Inflow Depth > 3.90" for 50 Yr 24 Hr(+15%) event
Inflow = 18.66 cfs @ 12.51 hrs, Volume= 3.295 af
Outflow = 18.66 cfs @ 12.51 hrs, Volume= 3.295 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Map 266 Lot 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.634 ac, 0.00% Impervious, Inflow Depth > 0.73" for 50 Yr 24 Hr(+15%) event
Inflow = 0.19 cfs @ 12.41 hrs, Volume= 0.038 af
Outflow = 0.19 cfs @ 12.41 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Focal Point 1

```
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=3)

Inflow Area =      0.437 ac, 65.45% Impervious, Inflow Depth >  6.40"   for 50 Yr 24 Hr(+15%) event
Inflow      =     3.12 cfs @  12.09 hrs, Volume=          0.233 af
Outflow     =     3.05 cfs @  12.09 hrs, Volume=          0.230 af, Atten= 2%, Lag= 0.1 min
Primary     =     3.05 cfs @  12.09 hrs, Volume=          0.230 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.40' @ 12.68 hrs   Surf.Area= 740 sf   Storage= 640 cf

Plug-Flow detention time= 16.3 min calculated for 0.229 af (99% of inflow)
Center-of-Mass det. time= 8.4 min ( 803.5 - 795.2 )

Volume      Invert    Avail.Storage   Storage Description
  #1        39.25'          53 cf     3.00'W x 20.00'L x 2.25'H Focal Point Area 1  Z=1.0
                                      267 cf Overall  x 20.0% Voids
  #2        41.50'         641 cf     Surface Bowl (Prismatic)Listed below (Recalc)
                           694 cf     Total Available Storage

 Elevation      Surf.Area        Inc.Store       Cum.Store
    (feet)        (sq-ft)      (cubic-feet)    (cubic-feet)
    41.50            60                0               0
    43.50           581              641             641

Device  Routing          Invert   Outlet Devices
  #1    Primary          38.46'   24.0"  Round Culvert
                                  L= 27.0'   CPP, projecting, no headwall,  Ke= 0.900
                                  Inlet / Outlet Invert= 38.46' / 37.95'   S= 0.0189 '/'   Cc= 0.900
                                  n= 0.013  Corrugated PE, smooth interior,  Flow Area= 3.14 sf
  #2    Device 3         39.25'   100.000 in/hr Exfiltration over Surface area   Phase-In= 0.10'
  #3    Device 1         38.46'   6.0" W x 6.0" H Vert. Orifice/Grate   C= 0.600
                                  Limited to weir flow at low heads
  #4    Device 1         42.50'   24.0" Horiz. Orifice/Grate   C= 0.600
                                  Limited to weir flow at low heads

Primary OutFlow Max=3.05 cfs @ 12.09 hrs  HW=42.70'  TW=41.60'   (Dynamic Tailwater)
↑—1=Culvert (Passes 3.05 cfs of 12.53 cfs potential flow)
   ↑—3=Orifice/Grate (Orifice Controls 1.26 cfs @ 5.05 fps)
   |   ↑—2=Exfiltration (Passes 1.26 cfs of 1.29 cfs potential flow)
   └—4=Orifice/Grate (Weir Controls 1.79 cfs @ 1.45 fps)
```

Summary for Pond 2P: Focal Point 2

```
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area =      1.673 ac, 59.43% Impervious, Inflow Depth >  5.46"   for 50 Yr 24 Hr(+15%) event
Inflow      =     6.15 cfs @  12.13 hrs, Volume=          0.761 af
Outflow     =     6.21 cfs @  12.16 hrs, Volume=          0.761 af, Atten= 0%, Lag= 1.8 min
Primary     =     6.21 cfs @  12.16 hrs, Volume=          0.761 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 46.92' @ 12.15 hrs Surf.Area= 978 sf Storage= 506 cf

Plug-Flow detention time= 1.1 min calculated for 0.761 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (802.0 - 800.9)

Volume	Invert	Avail.Storage	Storage Description
#1	43.75'	138 cf	**8.00'W x 27.50'L x 2.25'H Focal Point Area 1 Z=1.0** 690 cf Overall x 20.0% Voids
#2	46.00'	1,215 cf	**Surface Bowl (Prismatic)** Listed below (Recalc)
		1,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	220	0	0
48.00	995	1,215	1,215

Device	Routing	Invert	Outlet Devices
#1	Primary	42.96'	**18.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.96' / 42.40' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 3	43.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	42.96'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.18 cfs @ 12.16 hrs HW=46.92' TW=44.25' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.18 cfs of 10.99 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.97 cfs @ 7.87 fps)
  │ └─**2=Exfiltration** (Passes 1.97 cfs of 2.26 cfs potential flow)
  └─**4=Orifice/Grate** (Weir Controls 4.21 cfs @ 2.12 fps)

Summary for Pond 3P: Focal Point 3

Inflow Area =	0.881 ac,	84.01% Impervious,	Inflow Depth > 7.77"	for 50 Yr 24 Hr(+15%) event	
Inflow =	6.84 cfs @	12.10 hrs,	Volume=	0.570 af	
Outflow =	6.55 cfs @	12.12 hrs,	Volume=	0.570 af,	Atten= 4%, Lag= 1.3 min
Primary =	6.55 cfs @	12.12 hrs,	Volume=	0.570 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 47.37' @ 12.12 hrs Surf.Area= 894 sf Storage= 607 cf

Plug-Flow detention time= 1.3 min calculated for 0.570 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (759.4 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	43.75'	93 cf	**7.00'W x 20.00'L x 2.25'H Focal Point Z=1.0** 467 cf Overall x 20.0% Voids
#2	46.00'	1,996 cf	**Surface Bowl (Prismatic)**Listed below (Recalc)
		2,089 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	140	0	0
48.00	832	972	972
49.00	1,216	1,024	1,996

Device	Routing	Invert	Outlet Devices
#1	Primary	42.96'	**15.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.96' / 42.05' S= 0.0228 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 3	43.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	42.96'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	46.80'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

```
Primary OutFlow Max=6.43 cfs @ 12.12 hrs  HW=47.35'  TW=43.43'  (Dynamic Tailwater)
└─1=Culvert (Passes 6.43 cfs of 9.05 cfs potential flow)
   ├─3=Orifice/Grate (Passes 2.06 cfs of 2.38 cfs potential flow)
   │  └─2=Exfiltration (Exfiltration Controls 2.06 cfs)
   └─4=Orifice/Grate (Orifice Controls 4.37 cfs @ 3.56 fps)
```

Summary for Pond 4P: Focal Point 4

```
Inflow Area =      1.641 ac, 52.47% Impervious, Inflow Depth >  5.49"   for 50 Yr 24 Hr(+15%) event
Inflow      =     7.76 cfs @  12.09 hrs, Volume=          0.751 af
Outflow     =     7.11 cfs @  12.12 hrs, Volume=          0.751 af, Atten= 8%, Lag= 1.9 min
Primary     =     7.11 cfs @  12.12 hrs, Volume=          0.751 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 46.44' @ 12.13 hrs Surf.Area= 1,379 sf Storage= 986 cf

Plug-Flow detention time= 1.4 min calculated for 0.750 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (770.0 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1	42.75'	145 cf	**5.00'W x 42.00'L x 2.25'H Focal Point Z=1.0** 726 cf Overall x 20.0% Voids
#2	45.00'	1,437 cf	**Surface Bowl (Prismatic)**Listed below (Recalc)
		1,582 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	210	0	0
46.00	735	473	473
47.00	1,193	964	1,437

Device	Routing	Invert	Outlet Devices
#1	Primary	41.96'	**15.0" Round Culvert** L= 180.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.96' / 38.75' S= 0.0178 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 3	42.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	41.96'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	45.80'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.87 cfs @ 12.12 hrs HW=46.42' TW=43.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.87 cfs of 7.37 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 2.23 cfs @ 8.90 fps)
  │ └─**2=Exfiltration** (Passes 2.23 cfs of 3.17 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 4.64 cfs @ 3.78 fps)

Summary for Pond 5P: Drain Manhole #1

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth > 8.32" for 50 Yr 24 Hr(+15%) event
Inflow = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af
Outflow = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min
Primary = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 50.07' @ 12.09 hrs
Flood Elev= 53.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.05'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.05' / 45.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.44 cfs @ 12.09 hrs HW=49.87' TW=48.54' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.44 cfs @ 4.38 fps)

Summary for Pond 6P: Drain Manhole #2

Inflow Area = 0.861 ac,100.00% Impervious, Inflow Depth > 8.32" for 50 Yr 24 Hr(+15%) event
Inflow = 7.07 cfs @ 12.09 hrs, Volume= 0.597 af
Outflow = 7.07 cfs @ 12.09 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.0 min
Primary = 7.07 cfs @ 12.09 hrs, Volume= 0.597 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 48.67' @ 12.09 hrs
Flood Elev= 53.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.50'	**15.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 45.50' / 45.30' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.88 cfs @ 12.09 hrs HW=48.54' TW=46.36' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 6.88 cfs @ 5.61 fps)

Summary for Pond 7P: Drain Manhole #3

Inflow Area = 1.641 ac, 52.47% Impervious, Inflow Depth > 5.49" for 50 Yr 24 Hr(+15%) event
Inflow = 7.11 cfs @ 12.12 hrs, Volume= 0.751 af
Outflow = 7.11 cfs @ 12.12 hrs, Volume= 0.751 af, Atten= 0%, Lag= 0.0 min
Primary = 7.11 cfs @ 12.12 hrs, Volume= 0.751 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.50' @ 12.50 hrs
Flood Elev= 44.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	38.50'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.50' / 38.20' S= 0.0075 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=7.03 cfs @ 12.12 hrs HW=43.00' TW=41.90' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 7.03 cfs @ 3.98 fps)

Summary for Pond 8P: Drain Manhole #4

Inflow Area = 2.078 ac, 55.20% Impervious, Inflow Depth > 5.67" for 50 Yr 24 Hr(+15%) event
Inflow = 10.07 cfs @ 12.11 hrs, Volume= 0.981 af
Outflow = 10.07 cfs @ 12.11 hrs, Volume= 0.981 af, Atten= 0%, Lag= 0.0 min
Primary = 10.07 cfs @ 12.11 hrs, Volume= 0.981 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.40' @ 12.69 hrs
Flood Elev= 45.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	37.85'	**24.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.85' / 37.60' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=9.97 cfs @ 12.11 hrs HW=41.78' TW=41.08' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 9.97 cfs @ 3.18 fps)

Summary for Pond 9P: Drain Manhole #5

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth > 8.32" for 50 Yr 24 Hr(+15%) event
Inflow = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af
Outflow = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min
Primary = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 48.74' @ 12.09 hrs
Flood Elev= 49.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.80'	**12.0" Round Culvert** L= 86.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.80' / 46.30' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.44 cfs @ 12.09 hrs HW=48.67' TW=46.89' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 3.44 cfs @ 4.38 fps)

Summary for Pond 10P: Drain Manhole #6

Inflow Area = 0.430 ac,100.00% Impervious, Inflow Depth > 8.32" for 50 Yr 24 Hr(+15%) event
Inflow = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af
Outflow = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min
Primary = 3.54 cfs @ 12.09 hrs, Volume= 0.299 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 49.40' @ 12.09 hrs
Flood Elev= 52.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**12.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 47.50' / 47.20' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.44 cfs @ 12.09 hrs HW=49.33' TW=47.32' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.44 cfs @ 4.38 fps)

Summary for Pond 11P: Drain Manhole #7

Inflow Area = 1.673 ac, 59.43% Impervious, Inflow Depth > 5.46" for 50 Yr 24 Hr(+15%) event
Inflow = 6.21 cfs @ 12.16 hrs, Volume= 0.761 af
Outflow = 6.21 cfs @ 12.16 hrs, Volume= 0.761 af, Atten= 0%, Lag= 0.0 min
Primary = 6.21 cfs @ 12.16 hrs, Volume= 0.761 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 44.30' @ 12.14 hrs
Flood Elev= 49.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.30'	**18.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.30' / 41.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.18 cfs @ 12.16 hrs HW=44.25' TW=43.40' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 6.18 cfs @ 3.50 fps)

Summary for Pond 12P: Drain Manhole #8

Inflow Area = 2.554 ac, 67.91% Impervious, Inflow Depth > 6.25" for 50 Yr 24 Hr(+15%) event
Inflow = 12.71 cfs @ 12.13 hrs, Volume= 1.331 af
Outflow = 12.71 cfs @ 12.13 hrs, Volume= 1.331 af, Atten= 0%, Lag= 0.0 min
Primary = 12.71 cfs @ 12.13 hrs, Volume= 1.331 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.48' @ 12.58 hrs
Flood Elev= 49.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	41.30'	**24.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.30' / 41.10' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.50 cfs @ 12.13 hrs HW=43.43' TW=41.25' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 12.50 cfs @ 4.64 fps)

Summary for Pond 13P: R-Tank

Inflow Area = 4.632 ac, 62.21% Impervious, Inflow Depth > 5.99" for 50 Yr 24 Hr(+15%) event
Inflow = 22.75 cfs @ 12.12 hrs, Volume= 2.312 af
Outflow = 5.47 cfs @ 12.70 hrs, Volume= 1.351 af, Atten= 76%, Lag= 34.9 min
Primary = 5.47 cfs @ 12.70 hrs, Volume= 1.351 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.37' @ 12.70 hrs Surf.Area= 9,582 sf Storage= 52,683 cf

Plug-Flow detention time= 243.1 min calculated for 1.351 af (58% of inflow)
Center-of-Mass det. time= 127.6 min (908.8 - 781.2)

```
Volume    Invert    Avail.Storage  Storage Description
  #1A     36.95'        3,703 cf   60.43'W x 74.37'L x 8.21'H Field A
                                   36,879 cf Overall - 27,621 cf Embedded = 9,257 cf  x 40.0% Voids
  #2A     37.20'       26,240 cf   ACF R-Tank HD  5 x 1290  Inside #1
                                   Inside= 15.7"W x 83.5"H => 8.67 sf x 2.35'L = 20.3 cf
                                   Outside= 15.7"W x 83.5"H => 9.13 sf x 2.35'L = 21.4 cf
                                   1290 Chambers in 43 Rows
  #3B     36.95'        4,708 cf   30.25'W x 168.21'L x 8.21'H Field B
                                   41,746 cf Overall - 29,977 cf Embedded = 11,770 cf  x 40.0% Voids
  #4B     37.20'       28,478 cf   ACF R-Tank HD  5 x 1400  Inside #3
                                   Inside= 15.7"W x 83.5"H => 8.67 sf x 2.35'L = 20.3 cf
                                   Outside= 15.7"W x 83.5"H => 9.13 sf x 2.35'L = 21.4 cf
                                   1400 Chambers in 20 Rows
                       63,129 cf   Total Available Storage

   Storage Group A created with Chamber Wizard
   Storage Group B created with Chamber Wizard

Device  Routing      Invert  Outlet Devices
  #1    Primary      37.00'  15.0"  Round Culvert
                             L= 100.0'   CPP, projecting, no headwall,  Ke= 0.900
                             Inlet / Outlet Invert= 37.00' / 36.50'   S= 0.0050 '/'   Cc= 0.900
                             n= 0.013  Corrugated PE, smooth interior,  Flow Area= 1.23 sf
  #2    Device 1     37.20'  2.5" Vert. Orifice/Grate   C= 0.600   Limited to weir flow at low heads
  #3    Device 1     42.00'  15.0" Vert. Orifice/Grate   C= 0.600
                             Limited to weir flow at low heads

Primary OutFlow  Max=5.47 cfs @ 12.70 hrs  HW=43.37'  TW=37.92'   (Dynamic Tailwater)
 1=Culvert  (Passes 5.47 cfs of 10.88 cfs potential flow)
   2=Orifice/Grate  (Orifice Controls 0.38 cfs @ 11.23 fps)
   3=Orifice/Grate  (Orifice Controls 5.09 cfs @ 4.15 fps)
```

APPENDIX III

Charts, Graphs, and Calculations:

Extreme Precipitation Estimates
Rip Rap Sizing Calculations
Focal Point Design Worksheets with WQF Worksheet and HydroCAD Printouts
Site Specific Soil Survey Report & Map
Pre- and Post-Construction Watershed Maps

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.790 degrees West
Latitude	43.043 degrees North
Elevation	0 feet
Date/Time	Mon, 03 Aug 2020 15:51:28 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.82	1.04	1yr	0.71	0.98	1.22	1.57	2.04	2.67	2.94	1yr	2.37	2.83	3.24	3.96	4.58	1yr
2yr	0.32	0.50	0.62	0.81	1.02	1.30	2yr	0.88	1.18	1.52	1.94	2.50	3.23	3.59	2yr	2.86	3.45	3.96	4.71	5.36	2yr
5yr	0.37	0.58	0.73	0.98	1.25	1.61	5yr	1.08	1.47	1.89	2.44	3.15	4.09	4.61	5yr	3.62	4.43	5.07	5.97	6.74	5yr
10yr	0.41	0.65	0.82	1.12	1.45	1.89	10yr	1.25	1.73	2.24	2.90	3.77	4.90	5.57	10yr	4.34	5.35	6.13	7.16	8.03	10yr
25yr	0.48	0.76	0.97	1.34	1.78	2.34	25yr	1.53	2.15	2.78	3.64	4.76	6.21	7.15	25yr	5.50	6.87	7.87	9.09	10.12	25yr
50yr	0.54	0.86	1.10	1.54	2.08	2.76	50yr	1.79	2.53	3.30	4.34	5.69	7.45	8.64	50yr	6.59	8.31	9.50	10.90	12.07	50yr
100yr	0.60	0.97	1.25	1.77	2.42	3.26	100yr	2.09	2.98	3.92	5.18	6.81	8.92	10.46	100yr	7.90	10.05	11.49	13.08	14.39	100yr
200yr	0.68	1.10	1.43	2.05	2.83	3.85	200yr	2.44	3.52	4.63	6.16	8.13	10.69	12.65	200yr	9.46	12.16	13.89	15.69	17.16	200yr
500yr	0.80	1.32	1.72	2.49	3.49	4.78	500yr	3.01	4.39	5.79	7.74	10.29	13.60	16.27	500yr	12.03	15.65	17.86	19.98	21.68	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.89	1yr	0.63	0.87	0.92	1.33	1.67	2.24	2.55	1yr	1.99	2.45	2.88	3.17	3.91	1yr
2yr	0.32	0.49	0.60	0.81	1.00	1.19	2yr	0.86	1.16	1.37	1.82	2.34	3.08	3.48	2yr	2.72	3.35	3.85	4.58	5.11	2yr
5yr	0.35	0.54	0.67	0.92	1.17	1.41	5yr	1.01	1.38	1.61	2.12	2.73	3.82	4.24	5yr	3.38	4.08	4.76	5.59	6.30	5yr
10yr	0.39	0.60	0.74	1.03	1.33	1.60	10yr	1.15	1.57	1.81	2.39	3.06	4.41	4.93	10yr	3.91	4.74	5.52	6.49	7.28	10yr
25yr	0.44	0.67	0.84	1.19	1.57	1.91	25yr	1.36	1.86	2.10	2.76	3.54	4.75	6.00	25yr	4.20	5.77	6.78	7.92	8.80	25yr
50yr	0.49	0.74	0.92	1.32	1.78	2.18	50yr	1.54	2.13	2.35	3.08	3.94	5.37	6.95	50yr	4.75	6.68	7.91	9.22	10.17	50yr
100yr	0.54	0.82	1.03	1.48	2.03	2.48	100yr	1.75	2.42	2.63	3.42	4.36	6.04	8.04	100yr	5.35	7.73	9.24	10.74	11.76	100yr
200yr	0.60	0.90	1.14	1.66	2.31	2.83	200yr	1.99	2.77	2.94	3.78	4.81	6.78	9.31	200yr	6.00	8.95	10.79	12.52	13.61	200yr
500yr	0.70	1.04	1.34	1.94	2.76	3.39	500yr	2.38	3.31	3.42	4.32	5.49	7.89	11.30	500yr	6.99	10.86	13.26	15.37	16.49	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.72	0.89	1.08	1yr	0.77	1.06	1.26	1.74	2.20	3.01	3.16	1yr	2.66	3.04	3.61	4.39	5.08	1yr
2yr	0.34	0.52	0.64	0.86	1.07	1.27	2yr	0.92	1.24	1.48	1.96	2.51	3.45	3.71	2yr	3.05	3.57	4.10	4.85	5.67	2yr
5yr	0.40	0.62	0.77	1.05	1.34	1.62	5yr	1.15	1.59	1.88	2.53	3.24	4.36	4.96	5yr	3.86	4.77	5.40	6.38	7.17	5yr
10yr	0.47	0.72	0.89	1.25	1.61	1.98	10yr	1.39	1.93	2.28	3.10	3.94	5.37	6.20	10yr	4.75	5.96	6.80	7.85	8.76	10yr
25yr	0.58	0.88	1.09	1.56	2.05	2.57	25yr	1.77	2.51	2.95	4.06	5.13	7.84	8.31	25yr	6.94	7.99	9.09	10.34	11.41	25yr
50yr	0.67	1.02	1.27	1.83	2.46	3.13	50yr	2.12	3.06	3.59	4.99	6.28	9.81	10.40	50yr	8.68	10.00	11.34	12.71	13.95	50yr
100yr	0.79	1.19	1.49	2.16	2.96	3.81	100yr	2.55	3.72	4.36	6.14	7.71	12.28	13.01	100yr	10.87	12.51	14.13	15.66	17.06	100yr
200yr	0.92	1.39	1.76	2.55	3.55	4.65	200yr	3.07	4.55	5.32	7.56	9.46	15.41	16.29	200yr	13.63	15.66	17.64	19.29	20.88	200yr
500yr	1.14	1.70	2.19	3.18	4.53	6.04	500yr	3.91	5.90	6.91	9.98	12.44	20.81	21.93	500yr	18.42	21.08	23.64	25.40	27.27	500yr

Powered by ACIS

RIP RAP CALCULATIONS
Industrial Warehouse
375 Banfield Road
Portsmouth, NH 03801

Jones & Beach Engineers, Inc.
P.O. Box 219
Stratham, NH 03885
28-Apr-21

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.*
Aprons are sized for the 25-Year storm event.

TAILWATER < HALF THE D_o

$L_a = (1.8 \times Q) / D_0^{3/2} + (7 \times D_o)$

$W = L_a + (3 \times D_o)$ or defined channel width

$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
				#DIV/0!	#DIV/0!	#DIV/0!
				#DIV/0!	#DIV/0!	#DIV/0!

TAILWATER > HALF THE D_o

$L_a = (3.0 \times Q) / D_0^{3/2} + (7 \times D_o)$

$W = (0.4 \times L_a) + (3 \times D_o)$ or defined channel width

$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
15" HDPE (Pond 13P)	0.64	2.39	1.25	13.9	9	0.08
12" HDPE (Pond 9P)	0.9	2.94	1	15.8	9	0.09
12" HDPE (Pond 10P)	0.84	2.95	1	15.9	9	0.10
15" HDPE (Pond 6P)	1.25	4.57	1.25	18.6	11	0.10

Table 7-24 -- Recommended Rip Rap Gradation Ranges

d_{50} Size =	0.25	Feet	3	Inches
% of Weight Smaller			Size of Stone (Inches)	
Than the Given d_{50} Size		From		To
100%		5		6
85%		4		5
50%		3		5
15%		1		2

Table 7-24 -- Recommended Rip Rap Gradation Ranges

d_{50} Size =	0.5	Feet	6	Inches
% of Weight Smaller			Size of Stone (Inches)	
Than the Given d_{50} Size		From		To
100%		9		12
85%		8		11
50%		6		9
15%		2		3

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.44	ac	A = Area draining to the practice
0.28	ac	A_I = Impervious area draining to the practice
0.64	decimal	I = Percent impervious area draining to the practice, in decimal form
0.62	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.27	ac-in	WQV= 1" x Rv x A
995	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.62	inches	Q = Water quality depth. Q = WQV/A
96	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.4	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.086	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T_c = Time of Concentration
700.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.300	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by $1mi^2$/640ac.

Designer's Notes:

For Focal Point 1 (Pond 1P)

See Attached Focal Point Sizing Sheet

FP 1

DESIGN WORKSHEET

FOCALPOINT

NEW HAMPSHIRE AOT PROJECTS

1. **Determine FocalPoint bed area (minimum 174 sf/acre of impervious area - ex: 0.2 acres = 35 sf) See step 2 to determine if minimum size is appropriate.**
   - Tributary impervious area: = 0.28 ac (A)
   - Tributary pervious area: = 0.16 ac (B)
   - Minimum FocalPoint bed area required: = ((A x 1.0) + (B x 0.4)) * 174 = 60 sf
   - FocalPoint bed area provided: = 60 sf
   - Dimensions of proposed FocalPoint: = 3 ft x 20 ft

2. **Model a Type II & III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6 - 12 in above the mulch). Note: a 1.2 - 1.3 in rainfall event usually generates 1.0 in of runoff. Contact ACF for a sample HydroCAD node.**
   - Water quality volume (WQv) goal: = 995 ft³
   - Type II & III 24-hr rainfall depth to generate WQv: = 1.95 in
   - Temporary storage depth provided: = 12 in (typically 6 - 12 in)
   - Temporary storage volume provided at above depth: = 680 ft³
   - Peak ponding depth from Type III 24-hr storm event: = 0 in

3. **Size the Harco PVC domed overflow riser. Note: ACF recommends installation of a Fabco domed overflow filter kit for overflow protection.**
   - Domed overflow riser diameter: = 24 in
   - Rim elevation of overflow riser: = 42.5 (typically 6 - 12 in above mulch surface)
   - 6 in invert in elevation from FocalPoint: = 38.46 (typically 3 ft below mulch surface)
   - 24 in invert out elevation: = 38.46

4. **Flood control - peak flow attenuation of major storms**
   The treated flow and bypass flow can be routed to a detention system such as an open pond or a subsurface solution like an expanded R-Tank system. (contact ACF for additional information on designing expanded R-Tank systems)

5. **Prepare a landscape plan for the FocalPoint bed area** ☑

6. **Design review and installation oversight by manufacturer's representative**
   - The design has been reviewed by ACF Environmental ☐
   - Engineer will coordinate installation inspection with ACF Environmental ☐

Summary for Pond 1P: Focal Point 1

```
Inflow Area =      0.437 ac, 65.45% Impervious, Inflow Depth >  0.24"   for  Focal Point WQF event
Inflow      =      0.10 cfs @  12.11 hrs, Volume=        0.009 af
Outflow     =      0.10 cfs @  12.12 hrs, Volume=        0.009 af, Atten= 0%, Lag= 0.1 min
Primary     =      0.10 cfs @  12.12 hrs, Volume=        0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 39.32' @ 12.12 hrs   Surf.Area= 63 sf   Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 0.1 min ( 895.0 - 894.9 )

Volume     Invert    Avail.Storage  Storage Description
  #1       39.25'          53 cf    3.00'W x 20.00'L x 2.25'H Focal Point Area 1  Z=1.0
                                    267 cf Overall  x 20.0% Voids
  #2       41.50'         641 cf    Surface Bowl (Prismatic) Listed below (Recalc)
                          694 cf    Total Available Storage

Elevation      Surf.Area      Inc.Store      Cum.Store
  (feet)         (sq-ft)    (cubic-feet)   (cubic-feet)
  41.50             60             0              0
  43.50            581           641            641

Device  Routing       Invert   Outlet Devices
  #1    Primary       38.46'   24.0"  Round Culvert
                               L= 27.0'  CPP, projecting, no headwall,  Ke= 0.900
                               Inlet / Outlet Invert= 38.46' / 37.95'  S= 0.0189 '/'  Cc= 0.900
                               n= 0.013  Corrugated PE, smooth interior,  Flow Area= 3.14 sf
  #2    Device 3      39.25'   100.000 in/hr Exfiltration over Surface area    Phase-In= 0.10'
  #3    Device 1      38.46'   6.0" W x 6.0" H Vert. Orifice/Grate    C= 0.600
                               Limited to weir flow at low heads
  #4    Device 1      42.50'   24.0" Horiz. Orifice/Grate    C= 0.600
                               Limited to weir flow at low heads

Primary OutFlow  Max=0.09 cfs @ 12.12 hrs  HW=39.31'  TW=38.32'  (Dynamic Tailwater)
 └─1=Culvert  (Passes 0.09 cfs of 3.17 cfs potential flow)
    ├─3=Orifice/Grate  (Passes 0.09 cfs of 0.93 cfs potential flow)
    │  └─2=Exfiltration  (Exfiltration Controls 0.09 cfs)
    └─4=Orifice/Grate  ( Controls 0.00 cfs)
```

NEW HAMPSHIRE
DEPARTMENT OF
Environmental
Services

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

1.67	ac	A = Area draining to the practice
0.99	ac	A_I = Impervious area draining to the practice
0.59	decimal	I = Percent impervious area draining to the practice, in decimal form
0.58	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.97	ac-in	WQV= 1" x Rv x A
3,537	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.58	inches	Q = Water quality depth. Q = WQV/A
95	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.5	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.098	inches	Ia = Initial abstraction. Ia = 0.2S
19.6	minutes	T_c = Time of Concentration
550.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.837	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes:
For Focal Point 2 (Pond 2P)
See attached Focal Point Sizing Sheet

FP2

DESIGN WORKSHEET

FOCALPOINT

NEW HAMPSHIRE AOT PROJECTS

1. **Determine FocalPoint bed area (minimum 174 sf/acre of impervious area - ex: 0.2 acres = 35 sf) See step 2 to determine if minimum size is appropriate.**
   - Tributary impervious area: = 0.99 ac (A)
   - Tributary pervious area: = 0.68 ac (B)
   - Minimum FocalPoint bed area required: = ((A x 1.0) + (B x 0.4)) * 174 = 220 sf
   - FocalPoint bed area provided: = 220 sf
   - Dimensions of proposed FocalPoint: = 8 ft x 27.5 ft
2. **Model a Type II & III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6 - 12 in above the mulch). Note: a 1.2 - 1.3 in rainfall event usually generates 1.0 in of runoff. Contact ACF for a sample HydroCAD node.**
   - Water quality volume (WQv) goal: = 3537 ft³
   - Type II & III 24-hr rainfall depth to generate WQv: = 2.03 in
   - Temporary storage depth provided: = 6 in (typically 6 - 12 in)
   - Temporary storage volume provided at above depth: = 302 ft³
   - Peak ponding depth from Type III 24-hr storm event: = 0 in
3. **Size the Harco PVC domed overflow riser. Note: ACF recommends installation of a Fabco domed overflow filter kit for overflow protection.**
   - Domed overflow riser diameter: = 18 in
   - Rim elevation of overflow riser: = 46.5 (typically 6 - 12 in above mulch surface)
   - 6 in invert in elevation from FocalPoint: = 42.96 (typically 3 ft below mulch surface)
   - 18 in invert out elevation: = 42.96
4. **Flood control - peak flow attenuation of major storms**
   The treated flow and bypass flow can be routed to a detention system such as an open pond or a subsurface solution like an expanded R-Tank system. (contact ACF for additional information on designing expanded R-Tank systems)
5. **Prepare a landscape plan for the FocalPoint bed area** ☑
6. **Design review and installation oversight by manufacturer's representative**
   - The design has been reviewed by ACF Environmental ☐
   - Engineer will coordinate installation inspection with ACF Environmental ☐

Contact Rob Woodman - Senior Stormwater Engineer
Cell: 207.272.4431 | Email: rwoodman@acfenv.com

ACF ENVIRONMENTAL

Summary for Pond 2P: Focal Point 2

Inflow Area = 1.673 ac, 59.43% Impervious, Inflow Depth > 0.29" for Focal Point WQF event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.50 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.2 min
Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 43.85' @ 12.09 hrs Surf.Area= 227 sf Storage= 4 cf

Plug-Flow detention time= 0.1 min calculated for 0.040 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (791.4 - 791.2)

Volume	Invert	Avail.Storage	Storage Description
#1	43.75'	138 cf	**8.00'W x 27.50'L x 2.25'H Focal Point Area 1 Z=1.0** 690 cf Overall x 20.0% Voids
#2	46.00'	1,215 cf	**Surface Bowl (Prismatic)** Listed below (Recalc)
		1,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	220	0	0
48.00	995	1,215	1,215

Device	Routing	Invert	Outlet Devices
#1	Primary	42.96'	**18.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.96' / 42.40' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 3	43.75'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	42.96'	**6.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	46.50'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

```
Primary OutFlow  Max=0.49 cfs @ 12.09 hrs  HW=43.84'  TW=42.66'  (Dynamic Tailwater)
└─1=Culvert  (Passes 0.49 cfs of 2.74 cfs potential flow)
   ├─3=Orifice/Grate  (Passes 0.49 cfs of 0.95 cfs potential flow)
   │  └─2=Exfiltration  (Exfiltration Controls 0.49 cfs)
   └─4=Orifice/Grate  ( Controls 0.00 cfs)
```

NEW HAMPSHIRE
DEPARTMENT OF
**Environmental
Services**

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.88	ac	A = Area draining to the practice
0.74	ac	A_I = Impervious area draining to the practice
0.84	decimal	I = Percent impervious area draining to the practice, in decimal form
0.81	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.71	ac-in	WQV= 1" x Rv x A
2,577	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.81	inches	Q = Water quality depth. Q = WQV/A
98	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*$[Q^2 + 1.25*Q*P]^{0.5}$)
0.2	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.037	inches	Ia = Initial abstraction. Ia = 0.2S
7.7	minutes	T_c = Time of Concentration
675.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.749	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes:
For Focal Point 3 (Pond 3P)
See attached Focal Point Sizing Sheet

FP 3

DESIGN WORKSHEET

FOCALPOINT

NEW HAMPSHIRE AOT PROJECTS

1. **Determine FocalPoint bed area (minimum 174 sf/acre of impervious area - ex: 0.2 acres = 35 sf)**
   See step 2 to determine if minimum size is appropriate.
   - Tributary impervious area: = 0.74 ac **(A)**
   - Tributary pervious area: = 0.14 ac **(B)**
   - Minimum FocalPoint bed area required: = **((A x 1.0) + (B x 0.4)) * 174** = 138 sf
   - FocalPoint bed area provided: = 140 sf
   - Dimensions of proposed FocalPoint: = 20 ft x 7 ft

2. **Model a Type II & III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6 - 12 in above the mulch). Note: a 1.2 - 1.3 in rainfall event usually generates 1.0 in of runoff.**
   Contact ACF for a sample HydroCAD node.
   - Water quality volume (WQv) goal: = 2577 ft^3
   - Type II & III 24-hr rainfall depth to generate WQv: = 1.34 in
   - Temporary storage depth provided: = 18 in (typically 6 - 12 in)
   - Temporary storage volume provided at above depth: = 550 ft^3
   - Peak ponding depth from Type III 24-hr storm event: = 0 in

3. **Size the Harco PVC domed overflow riser.**
   Note: ACF recommends installation of a Fabco domed overflow filter kit for overflow protection.
   - Domed overflow riser diameter: = 15 in
   - Rim elevation of overflow riser: = 46.8 (typically 6 - 12 in above mulch surface)
   - 6 in invert in elevation from FocalPoint: = 42.96 (typically 3 ft below mulch surface)
   - 15 in invert out elevation: = 42.96

4. **Flood control - peak flow attenuation of major storms**
   The treated flow and bypass flow can be routed to a detention system such as an open pond or a subsurface solution like an expanded R-Tank system. (contact ACF for additional information on designing expanded R-Tank systems)

5. **Prepare a landscape plan for the FocalPoint bed area** ☑

6. **Design review and installation oversight by manufacturer's representative**
   - The design has been reviewed by ACF Environmental ☐
   - Engineer will coordinate installation inspection with ACF Environmental ☐

Contact Rob Woodman - Senior Stormwater Engineer
Cell: 207.272.4431 | Email: rwoodman@acfenv.com

Summary for Pond 3P: Focal Point 3

```
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area =     0.881 ac, 84.01% Impervious, Inflow Depth >  0.78"  for Focal Point WQF event
Inflow      =    0.73 cfs @  12.10 hrs, Volume=        0.057 af
Outflow     =    0.61 cfs @  12.16 hrs, Volume=        0.057 af, Atten= 16%, Lag= 3.5 min
Primary     =    0.61 cfs @  12.16 hrs, Volume=        0.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 45.74' @ 12.16 hrs   Surf.Area= 263 sf   Storage= 79 cf

Plug-Flow detention time= 0.5 min calculated for 0.057 af (100% of inflow)
Center-of-Mass det. time= 0.5 min ( 803.5 - 803.0 )

Volume      Invert    Avail.Storage   Storage Description
  #1        43.75'           93 cf    7.00'W x 20.00'L x 2.25'H Focal Point  Z=1.0
                                      467 cf Overall  x 20.0% Voids
  #2        46.00'        1,996 cf    Surface Bowl (Prismatic) Listed below (Recalc)
                          2,089 cf    Total Available Storage

 Elevation        Surf.Area         Inc.Store        Cum.Store
    (feet)          (sq-ft)      (cubic-feet)     (cubic-feet)
     46.00              140                 0                0
     48.00              832               972              972
     49.00            1,216             1,024            1,996

Device   Routing          Invert   Outlet Devices
  #1     Primary          42.96'   15.0"  Round Culvert
                                   L= 40.0'   CPP, projecting, no headwall,  Ke= 0.900
                                   Inlet / Outlet Invert= 42.96' / 42.05'   S= 0.0228 '/'   Cc= 0.900
                                   n= 0.013  Corrugated PE, smooth interior,  Flow Area= 1.23 sf
  #2     Device 3         43.75'   100.000 in/hr Exfiltration over Surface area     Phase-In= 0.10'
  #3     Device 1         42.96'   6.0" W x 6.0" H Vert. Orifice/Grate     C= 0.600
                                   Limited to weir flow at low heads
  #4     Device 1         46.80'   15.0" Horiz. Orifice/Grate     C= 0.600
                                   Limited to weir flow at low heads

Primary OutFlow  Max=0.61 cfs @ 12.16 hrs  HW=45.71'  TW=41.78'   (Dynamic Tailwater)
 1=Culvert  (Passes 0.61 cfs of 6.81 cfs potential flow)
   3=Orifice/Grate  (Passes 0.61 cfs of 1.90 cfs potential flow)
      2=Exfiltration  (Exfiltration Controls 0.61 cfs)
   4=Orifice/Grate  ( Controls 0.00 cfs)
```

NEW HAMPSHIRE
DEPARTMENT OF
Environmental Services

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

1.64	ac	A = Area draining to the practice
0.86	ac	A_I = Impervious area draining to the practice
0.52	decimal	I = Percent impervious area draining to the practice, in decimal form
0.52	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.86	ac-in	WQV= 1" x Rv x A
3,107	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.52	inches	Q = Water quality depth. Q = WQV/A
94	unitless	CN = Unit peak discharge curve number. $CN = 1000/(10+5P+10Q-10*[Q^2 + 1.25*Q*P]^{0.5})$
0.6	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.120	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T_c = Time of Concentration
640.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.856	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes:
For Focal Point 4 (Pond 4P)
See attached Focal Point sizing sheet

FP 4

DESIGN WORKSHEET

FOCALPOINT

NEW HAMPSHIRE AOT PROJECTS

1. **Determine FocalPoint bed area (minimum 174 sf/acre of impervious area - ex: 0.2 acres = 35 sf)**
   See step 2 to determine if minimum size is appropriate.
   - Tributary impervious area: = 0.86 ac (A)
   - Tributary pervious area: = 0.78 ac (B)
   - Minimum FocalPoint bed area required: = ((A x 1.0) + (B x 0.4)) * 174 = 204 sf
   - FocalPoint bed area provided: = 210 sf
   - Dimensions of proposed FocalPoint: = 5 ft x 42 ft

2. **Model a Type II & III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6 - 12 in above the mulch). Note: a 1.2 - 1.3 in rainfall event usually generates 1.0 in of runoff.**
   Contact ACF for a sample HydroCAD node.
   - Water quality volume (WQv) goal: = 3107 ft^3
   - Type II & III 24-hr rainfall depth to generate WQv: = 1.20 in
   - Temporary storage depth provided: = 10 in (typically 6 - 12 in)
   - Temporary storage volume provided at above depth: = 437 ft^3
   - Peak ponding depth from Type III 24-hr storm event: = 0 in

3. **Size the Harco PVC domed overflow riser.**
   Note: ACF recommends installation of a Fabco domed overflow filter kit for overflow protection.
   - Domed overflow riser diameter: = 15 in
   - Rim elevation of overflow riser: = 45.8 (typically 6 - 12 in above mulch surface)
   - 6 in invert in elevation from FocalPoint: = 41.96 (typically 3 ft below mulch surface)
   - 18 in invert out elevation: = 41.96

4. **Flood control - peak flow attenuation of major storms**
   The treated flow and bypass flow can be routed to a detention system such as an open pond or a subsurface solution like an expanded R-Tank system. (contact ACF for additional information on designing expanded R-Tank systems)

5. **Prepare a landscape plan for the FocalPoint bed area** ☑

6. **Design review and installation oversight by manufacturer's representative**
   - The design has been reviewed by ACF Environmental ☑
   - Engineer will coordinate installation inspection with ACF Environmental ☑

Contact Rob Woodman - Senior Stormwater Engineer
Cell: 207.272.4431 | Email: rwoodman@acfenv.com

ACF ENVIRONMENTAL

Summary for Pond 4P: Focal Point 4

```
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

Inflow Area =      1.641 ac, 52.47% Impervious, Inflow Depth >  0.57"   for Focal Point WQF event
Inflow      =      1.01 cfs @  12.09 hrs, Volume=        0.078 af
Outflow     =      0.86 cfs @  12.14 hrs, Volume=        0.078 af,  Atten= 15%,  Lag= 3.1 min
Primary     =      0.86 cfs @  12.14 hrs, Volume=        0.078 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 44.35' @ 12.14 hrs   Surf.Area= 371 sf   Storage= 92 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.4 min ( 779.5 - 779.1 )

Volume      Invert    Avail.Storage   Storage Description
  #1        42.75'          145 cf    5.00'W x 42.00'L x 2.25'H Focal Point  Z=1.0
                                      726 cf Overall  x 20.0% Voids
  #2        45.00'        1,437 cf    Surface Bowl (Prismatic) Listed below (Recalc)
                          1,582 cf    Total Available Storage

Elevation      Surf.Area       Inc.Store      Cum.Store
   (feet)         (sq-ft)    (cubic-feet)   (cubic-feet)
    45.00            210               0              0
    46.00            735             473            473
    47.00          1,193             964          1,437

Device   Routing        Invert   Outlet Devices
  #1     Primary        41.96'   15.0"  Round Culvert
                                 L= 180.0'  CPP, projecting, no headwall,  Ke= 0.900
                                 Inlet / Outlet Invert= 41.96' / 38.75'  S= 0.0178 '/'  Cc= 0.900
                                 n= 0.013  Corrugated PE, smooth interior,  Flow Area= 1.23 sf
  #2     Device 3       42.75'   100.000 in/hr Exfiltration over Surface area    Phase-In= 0.10'
  #3     Device 1       41.96'   6.0" W x 6.0" H Vert. Orifice/Grate    C= 0.600
                                 Limited to weir flow at low heads
  #4     Device 1       45.80'   15.0" Horiz. Orifice/Grate    C= 0.600
                                 Limited to weir flow at low heads

Primary OutFlow  Max=0.85 cfs @ 12.14 hrs  HW=44.31'  TW=38.96'  (Dynamic Tailwater)
└─1=Culvert  (Passes 0.85 cfs of 6.13 cfs potential flow)
   ├─3=Orifice/Grate  (Passes 0.85 cfs of 1.75 cfs potential flow)
   │  └─2=Exfiltration  (Exfiltration Controls 0.85 cfs)
   └─4=Orifice/Grate  ( Controls 0.00 cfs)
```

GOVE ENVIRONMENTAL SERVICES, INC.

SITE-SPECIFIC SOIL SURVEY REPORT
375 Banfield Road
Portsmouth, NH
GES # 2020032

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 5.0, December 2017. This map product is within the technical standards of the National Cooperative Soil Survey. It is a special product, intended for the submission to NH DES Alteration of Terrain. It was produced by a professional soil scientist and is not a product of the USDA Natural Resource Conservation Service.

Hydrologic Soil Group was determined using SSSNNE Special Publication No. 5, Ksat Values for New Hampshire Soils, September 2009.

High Intensity Soil Survey (HISS) Symbols were determined using SSSNNE Special Publication No. 1, High Intensity Soil Maps for New Hampshire, December 2017.

2. DATE SOIL MAP PRODUCED

Field work conducted on 20 July 2020.
Test pits by Jones & Beach on April 8, 2020, were used to assist in the preparation of the soil map.

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

Approximately 16 acres. Tax map 266, Lot 7. The site is located in Portsmouth, NH.

4. PURPOSE OF THE SOIL MAP

The preparation of this map was requested by Jones & Beach Engineers. The purpose was to meet the requirements of NH Alteration of Terrain. Also provided is a conversion to HISS map units is in the Soil Identification Legend.

5. SOIL IDENTIFICATION LEGEND

This map product is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product, intended for infiltration requirements by the NH DES Alteration of Terrain Bureau. It was produced by a professional soil scientist, and is not a product of the USDA Natural Resources Conservation Service.

The site specific soil survey field work was conducted 07-20-2020 and was prepared by James P. Gove, CSS # 004, Gove Environmental Services, Inc. The survey area is located on Banfield Road, Portsmouth, NH.
Soils were identified with the New Hampshire State-wide Numerical Soils Legend, USDA NRCS, Durham, NH. Issue # 10, January 2011. The numeric legend was amended to identify the correct soil components of the complex.

Hydrologic Soil Group from Ksat Values for New Hampshire Soils, Society of Soil Scientists of New England, Special Publication No. 5, September, 2009.

Hydrologic soil groups were estimated for disturbed soil map units 100, 100H, 400. 599. 900.

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
38	Eldridge fsl	343	C
100	Udorthents, wet substratum	363	C
100H	Udorthents, wet substratum, hydric	563	D
115	Scarboro muck	643	D
400	Udorthents, gravelly	161	A
510	Hoosic gsl	111	A
538	Squamscott fsl	543	C
599	Urban Land – Hoosic Complex	761/161	D/A
900	Endoaquents, gravelly	561	D

fsl = fine sandy loam gsl = gravelly sandy loam

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%+	E				

Note: Map symbols 100, 100H, 400, 599, and 900 represent man-disturbed areas that were excavated, filled or graded.

SLOPE PHASE:

0-8% B 8-15% C 15-25% D

25%+ E

6. SOIL MAP UNIT DESCRIPTIONS

ELDRIDGE FSL (38) IS A SOIL THAT HAS DEVELOPED WITH LOAM OR SANDY OVERLAYING SILTS AND CLAYS. Based upon the test pits, the depth to seasonal high water table is 18" to 24". The mineral restrictive layer of silt loam begins at the same depth as the estimated seasonal high water table.

UDORTHENTS, WET SUBSTRATUM (100) AND UDORTHENTS, WET SUBSTRATUM, HYDRIC (100H) REPRESENT MAP UNITS WHERE FILL WAS PLACED OVER HYDRIC SOILS. The map unit 100 is no longer wetland, but have wetland soils buried 2 to 3 feet below the soil surface. Some of the fill was non-soil debris. The map unit 100H represents similar disturbance of filling, but is still wetlands with hydric soils near the surface (see photo below).

SCARBORO MUCK (115B) IS LOCATED ON THE LARGE, FLAT WETLAND AREA THAT LIES TO THE SOUTH OF THE PROPERTY. It appears that some of the muck areas were filled in the distant past (see 100 and 100H). There is over 16 inches of sapric organic over the underlying mineral soils (see photo below).

UDORTHENTS, GRAVELLY REPRESENT THE GRAVEL PIT THAT WAS PRESENT ON THE SITE. This is a shale dominated area that was excavated and graded. Along the northern boundary is a cut face that shows the depth of the original pit. The gravel material came from the Hoosic soil area that is still present. The soil boundary of this unit is intermixed with the Eldridge and would expect inclusions of each within the other map unit (see photo below).

HOOSIC GRAVELLY SANDY LOAM (510) IS FOUND IN THE HILL ON THE EASTERN PORTION OF THE SIRE. While much of the topsoil was removed from these map units, the basic substratum is still intact, with sandy textures, shale rock fragments and extremely deep water tables (see photo below).

SQUAMSCOTT FINE SANDY LOAM (538) REPRESENTS THE OTHER NATURAL WETLAND ON THE SITE. These are poorly drained soils with loam/sand textures over silt/clay textures. The seasonal water table is at the surface, but does drop over the course of the summer.

URBAN LAND – HOOSIC COMPLEX (599) REPRESENTS AREAS OF BUILDING AND PAVEMENT OVER THE EXCAVATED PIT AREA. Much of this map unit is impervious, but the soils around the impervious areas have the sand shale material of the original pit area.

ENDOAQUENTS, GRAVELLY (900) IS AN AREA OF EXCAVATION THAT HAS DEVELOPED INTO A WETLAND. This area is at the base of the cut face of the pit and captures water during the spring. It has a pipe outlet. The area has a short hydroperiod but, by definition in the soil standards, has a hydrologic soil group of D (see photo below).

7. RESPONSIBLE SOIL SCIENTIST

James P. Gove, C.S.S. #004

8. OTHER DISTINGUISHING FEATURES OF SITE

It is clear that a significant amount of soil disturbance took place on the site. The entire top of the hill was flattened and graded. Some of the side slopes are spoil piles or steep excavated or filled areas. In the southern portion of the site, fill was placed over wetlands years ago. Some of the trees on the fill are 60 years old. The fill was not clean but had non-soil material mixed in (see photo below).

9. LIMITING INCLUSIONS

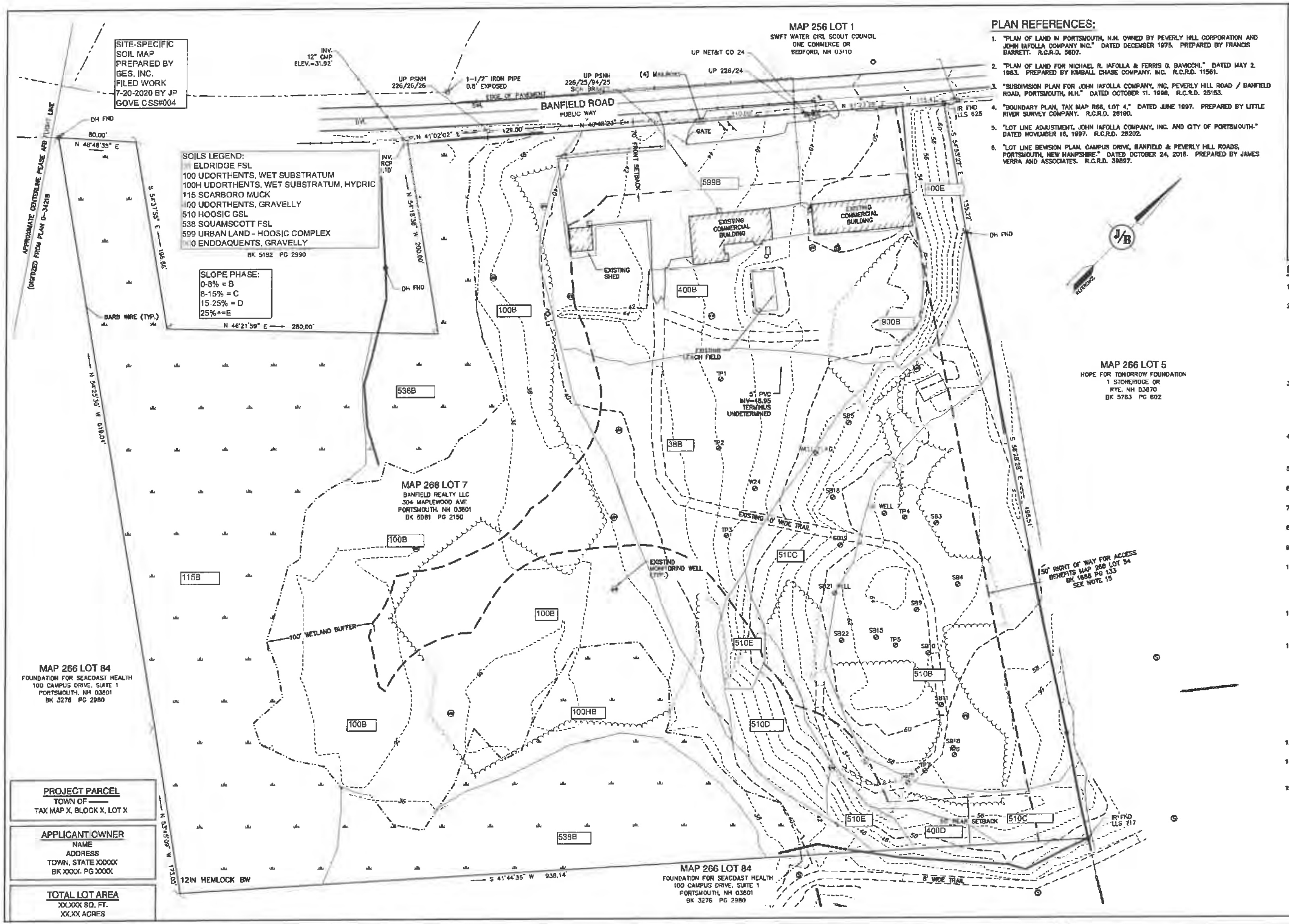
Obviously this is a mixed site of soil disturbance from man. Due to the disturbance, expectations of soils from one map unit will be found in another map unit. The only true clean map units are the wetlands that were flagged and located, and that is only for the natural wetland areas. The disturbed wetland areas (110H) has mounds of debris within the map units.

10. SPECIAL FEATURE SYMBOLS

None used

STATE OF NEW HAMPSHIRE
JAMES
P.
GOVE
NO. 004
CERTIFIED SOIL SCIENTIST

07-23-2020



SITE-SPECIFIC
SOIL MAP
PREPARED BY
GES, INC.
FILED WORK
7-20-2020 BY JP
GOVE CSS#004

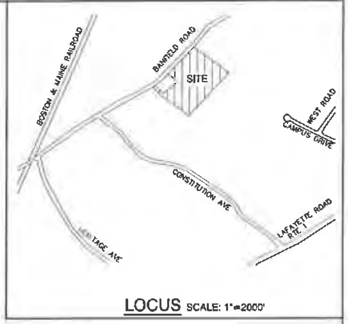
SOILS LEGEND:
38 ELDRIDGE FSL
100 UDORTHENTS, WET SUBSTRATUM
100H UDORTHENTS, WET SUBSTRATUM, HYDRIC
115 SCARBORO MUCK
400 UDORTHENTS, GRAVELLY
510 HOOSIC GSL
538 SQUAMSCOTT FSL
599 URBAN LAND - HOOSIC COMPLEX
900 ENDOAQUENTS, GRAVELLY

BK 5182 PG 2990

SLOPE PHASE:
0-8% = B
8-15% = C
15-25% = D
25%+=E

PLAN REFERENCES:

1. "PLAN OF LAND IN PORTSMOUTH, N.H. OWNED BY PEVERLY HILL CORPORATION AND JOHN IAFOLLA COMPANY INC." DATED DECEMBER 1975. PREPARED BY FRANCIS BARRETT. R.C.R.D. 5607.
2. "PLAN OF LAND FOR MICHAEL R. IAFOLLA & FERRIS G. BAVICCHI." DATED MAY 2, 1983. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 11561.
3. "SUBDIVISION PLAN FOR JOHN IAFOLLA COMPANY, INC. PEVERLY HILL ROAD / BANFIELD ROAD, PORTSMOUTH, N.H." DATED OCTOBER 11, 1996. R.C.R.D. 25153.
4. "BOUNDARY PLAN, TAX MAP R66, LOT 4." DATED JUNE 1997. PREPARED BY LITTLE RIVER SURVEY COMPANY. R.C.R.D. 26190.
5. "LOT LINE ADJUSTMENT, JOHN IAFOLLA COMPANY, INC. AND CITY OF PORTSMOUTH." DATED NOVEMBER 16, 1997. R.C.R.D. 25202.
6. "LOT LINE REVISION PLAN, CAMPUS DRIVE, BANFIELD & PEVERLY HILL ROADS, PORTSMOUTH, NEW HAMPSHIRE." DATED OCTOBER 24, 2016. PREPARED BY JAMES VERRA AND ASSOCIATES. R.C.R.D. 39897.



LOCUS SCALE: 1"=2000'

NOTES:

1. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF LOT 7 AS SHOW ON PORTSMOUTH TAX MAP 266.
2. ZONING DISTRICT: INDUSTRIAL
   LOT AREA MINIMUM = 2 ACRES
   LOT FRONTAGE MINIMUM = 200'
   BUILDING SETBACKS (MINIMUM):
   FRONT SETBACK = 70'
   SIDE SETBACK = 50'
   REAR SETBACK = 50'
   WETLAND BUFFER = 100'
   MAX. BUILDING HEIGHT = 50'
   MIN. OPEN SPACE = 20%
3. THE UTILITY LOCATIONS SHOWN HEREON WERE DETERMINED BY OBSERVED ABOVE GROUND EVIDENCE AND SHOULD BE CONSIDERED APPROXIMATE IN LOCATION ONLY. LOCATION, DEPTH, SIZE, TYPE, EXISTENCE OR NONEXISTENCE OF UNDERGROUND UTILITIES AND/OR UNDERGROUND STORAGE TANKS WAS NOT VERIFIED BY THIS SURVEY. ALL CONTRACTORS SHOULD NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK OR CALL DIG-SAFE AT 1-888-DIG-SAFE.
4. THE SUBJECT PARCEL IS LOCATED NOT WITHIN AN AREA HAVING A SPECIAL FLOOD HASARD AREA DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, ON FLOOD INSURANCE RATE MAP NO. 33015C0270E, WITH EFFECTIVE DATE OF MAY 17, 2005.
5. BASIS OF BEARING: HORIZONTAL – NAD83 NH STATE PLANE.
   VERTICAL – NAVD88.
6. CERTAIN DATA HEREON MAY VARY FROM RECORDED DATA DUE TO DIFFERENCES IN DECLINATION, ORIENTATION, AND METHODS OF MEASUREMENT.
7. ALL BOOK AND PAGE NUMBERS REFER TO THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
8. THE TAX MAP AND LOT NUMBERS ARE BASED ON THE CITY OF PORTSMOUTH TAX RECORDS AND ARE SUBJECT TO CHANGE.
9. RESEARCH WAS PERFORMED AT THE CITY OF PORTSMOUTH ASSESSOR'S OFFICE AND THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
10. THIS SURVEY IS NOT A CERTIFICATION TO OWNERSHIP OR TITLE OF LANDS SHOWN. OWNERSHIP AND ENCUMBRANCES ARE MATTERS OF TITLE EXAMINATION NOT OF A BOUNDARY SURVEY. THE INTENT OF THIS PLAN IS TO RETRACE THE BOUNDARY LINES OF DEEDS REFERENCED HEREON. OWNERSHIP OF ADJOINING PROPERTIES IS ACCORDING TO ASSESSOR'S RECORDS. THIS PLAN MAY OR MAY NOT INDICATE ALL ENCUMBRANCES EXPRESSED, IMPLIED OR PRESCRIPTIVE.
11. ANY USE OF THIS PLAN AND OR ACCOMPANYING DESCRIPTIONS SHOULD BE DONE WITH LEGAL COUNSEL, TO BE CERTAIN THAT TITLES ARE CLEAR, THAT INFORMATION IS CURRENT, AND THAT ANY NECESSARY CERTIFICATES ARE IN PLACE FOR A PARTICULAR CONVEYANCE, OR OTHER USES.
12. THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY BRENDEN WALDEN OF GOVE ENVIRONMENTAL SERVICES IN MARCH 2020 IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
    A. THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
    B. THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
    C. THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
    D. THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.
13. THIS PLAN IS THE RESULT OF A CLOSED TRAVERSE WITH A RAW, UNADJUSTED LINEAR ERROR OF CLOSURE GREATER THAN 1 IN 15,000.
14. SURVEY TIE LINES SHOWN HEREON ARE NOT BOUNDARY LINES. THEY SHOULD ONLY BE USED TO LOCATE THE PARCEL SURVEYED FROM THE FOUND MONUMENTS SHOWN AND LOCATED BY THIS SURVEY.
15. 50 FOOT WIDE RIGHT-OF-WAY AS DESCRIBED IN RCRD DEED BOOK 1686 PAGE 133 IS FOR ACCESS BY VEHICLE OR AN OTHER MEANS OF TRANSPORTATION AND BENEFITS LOT 4 AS INDICATED ON TAX MAP 256.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 feet

PROJECT PARCEL
TOWN OF ——
TAX MAP X, BLOCK X, LOT X

APPLICANT OWNER
NAME
ADDRESS
TOWN, STATE XXXXX
BK XXXX- PG XXXX

TOTAL LOT AREA
XX,XXX SQ. FT.
XX.XX ACRES

Design: BWG	Draft: DMC	Date: XX/XX/XX
Checked: DMC	Scale: AS-NOTED	Project No.: 19190
Drawing Name: 19190-EX-CONDITIONS.dwg		

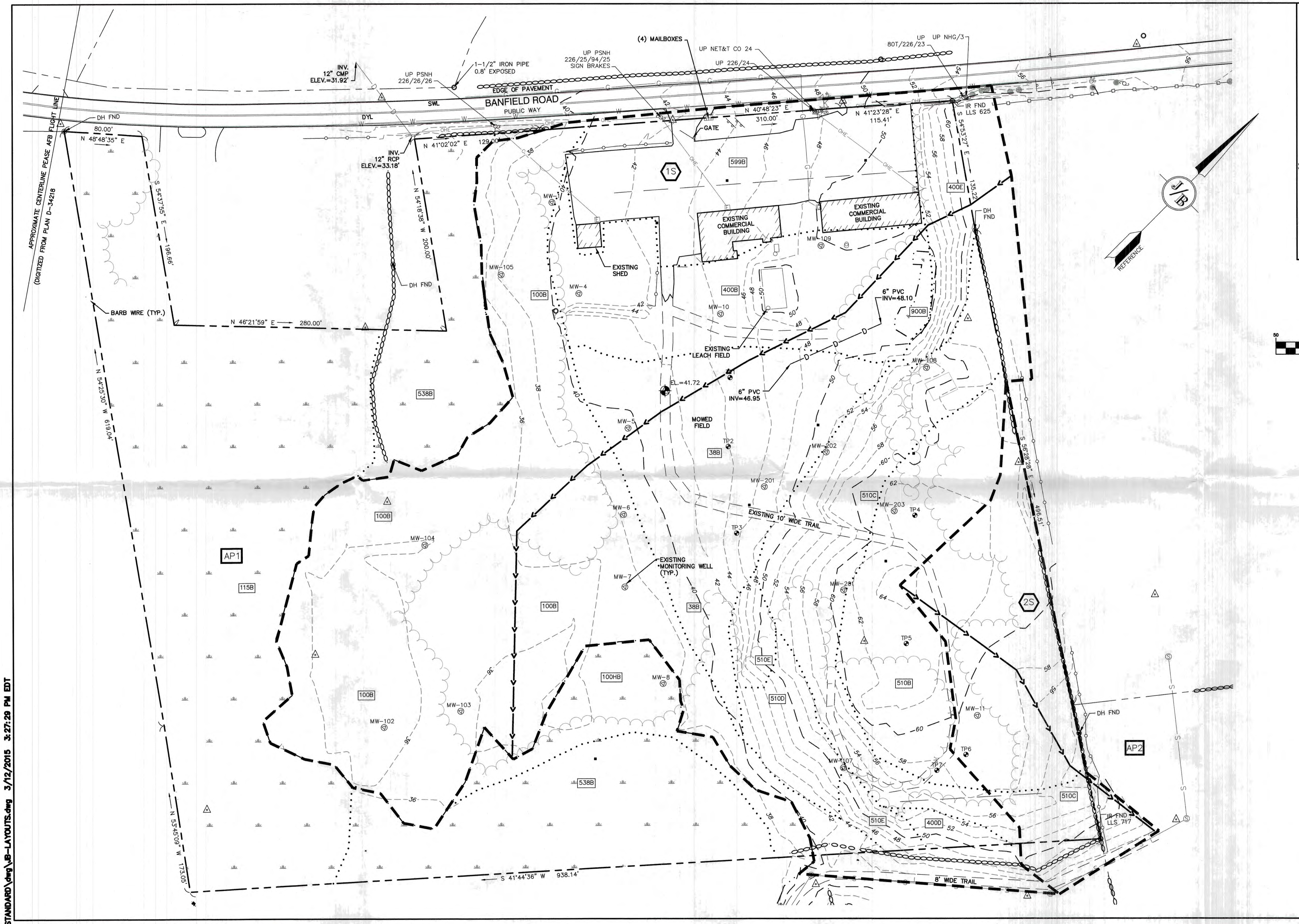
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

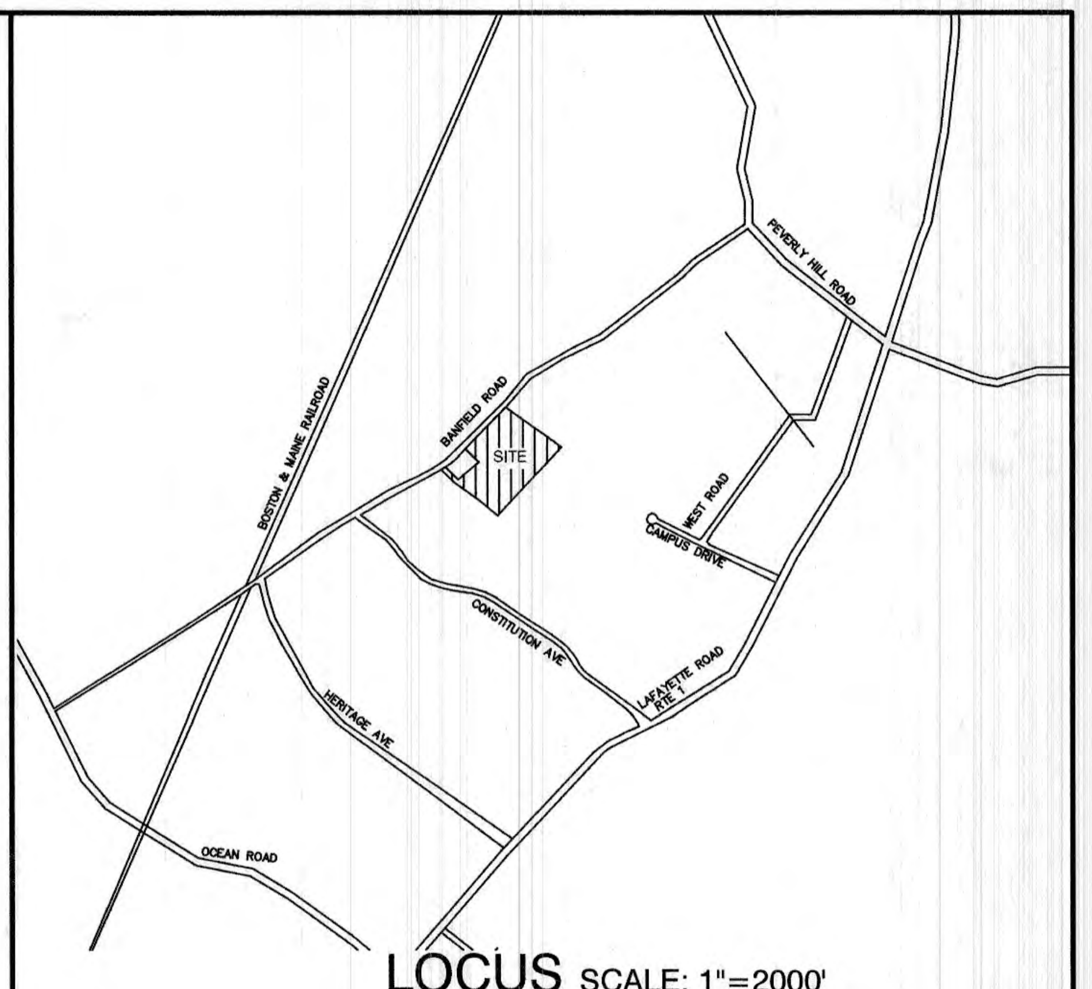
0	—	ISSUED FOR REVIEW	—
REV.	DATE	REVISION	BY

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING CONDITIONS PLAN
Project:	375 BANFIELD ROAD PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
C1
SHEET X OF X
JBE PROJECT NO. 19190





LOCUS SCALE: 1"=2000'

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

SUBCATCHMENT BOUNDARY	— — —
SUBCATCHMENT	⬡ X
REACH	☒
POND	△ X
TC PATH	—>—>—
WETLANDS	— · · — · · —
HISS SOILS	· · · · · · · · ·
FLOW ARROW	⤳

PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
651,747 S.F.
14.96 ACRES

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

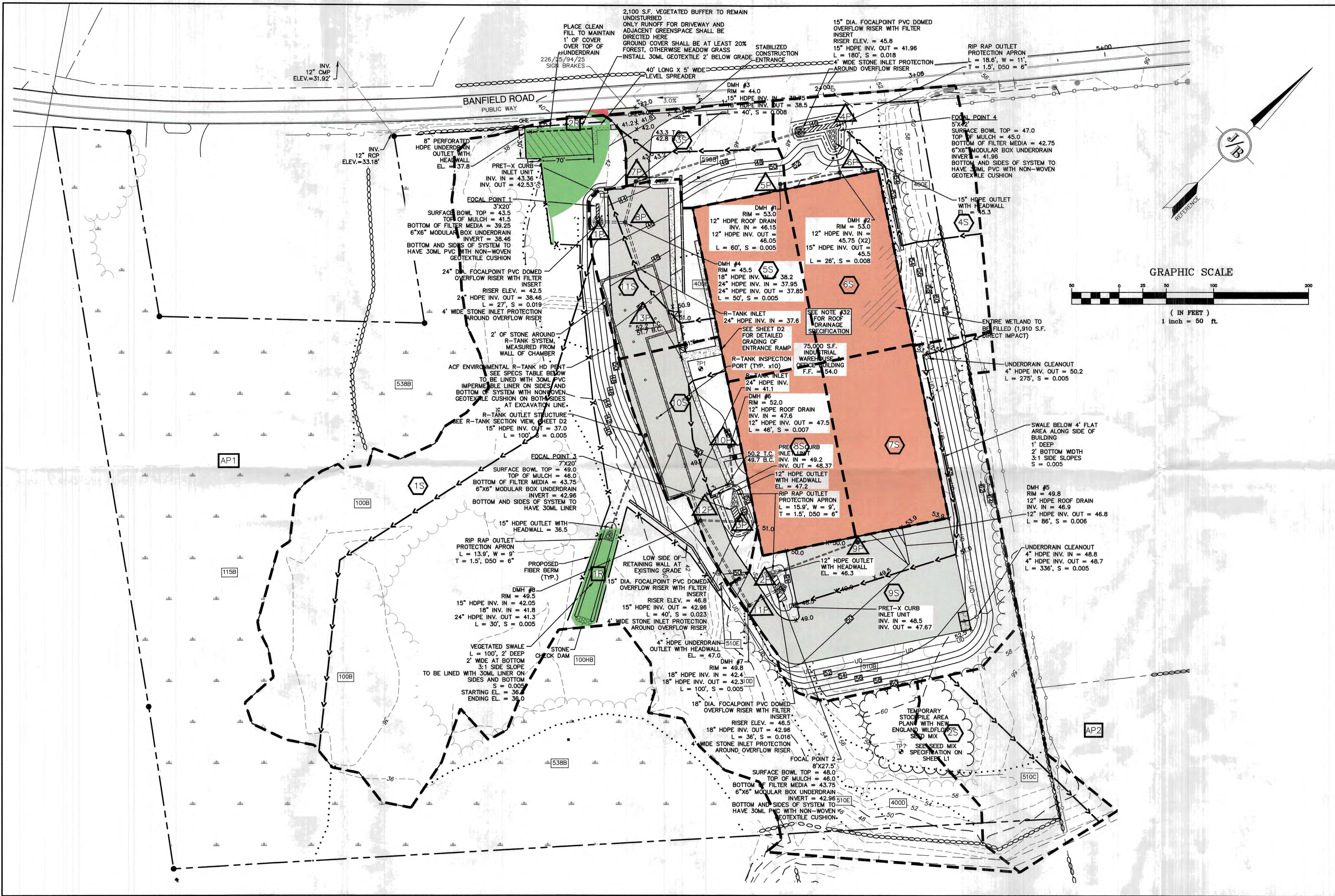
MICHAEL J. KERIVAN No. 9846

REV.	DATE	REVISION	BY
3	5/17/21	REVISED PER CITY COMMENTS	DJM
2	5/3/21	REVISED PER CITY COMMENTS	DJM
1	2/17/21	REVISED PER CITY COMMENTS	DJM
0	12/30/20	ISSUED FOR REVIEW	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING WATERSHED PLAN
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 19190.2



LEGEND

SUBCATCHMENT BOUNDARY	— —
SUBCATCHMENT	⬡X
REACH	☒
POND	△X
TC PATH	→→
WETLANDS	—·—
HISS SOILS	········
FLOW ARROW	⤳

PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
651,747 S.F.
14.96 ACRES

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

REV.	DATE	REVISION	BY
3	5/17/21	REVISED PER CITY COMMENTS	DJM
2	5/3/21	REVISED PER CITY COMMENTS	DJM
1	2/17/21	REVISED PER CITY COMMENTS	DJM
0	12/30/20	ISSUED FOR REVIEW	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: **PROPOSED WATERSHED PLAN**
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
W2
SHEET 2 OF 2
JBE PROJECT NO. 19190.2

STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

Prepared for:

Banfield Realty, LLC
Map 266, Lot 7
375 Banfield Road
Portsmouth, NH
ATTN: Robert Graham
(603) 479-3666
rob@graham-consult.com

STATE OF NEW HAMPSHIRE
MICHAEL J. KERIVAN
No. 9846
LICENSED
PROFESSIONAL ENGINEER

8/17/2021

Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
Phone: (603) 772-4746
December 30, 2020
Revised May 17, 2021
Revised July 30, 2021
JBE Project No. 19190.2

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. Banfield Realty, LLC, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. Banfield Realty, LLC, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form. Permanent stormwater BMPs shall be inspected annually following construction and the annual report and certification shall be submitted to the City by December 31st of each year. The Inspection and Maintenance records must be provided to NH Department of Environmental Services upon request.

B. General Inspection and Maintenance Requirements

1. Temporary and permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:

   a. Silt fencing
   b. Temporary diversion and swales
   c. Construction entrances
   d. Drain manholes
   e. Culverts
   f. Vegetated Swale
   g. Vegetation and landscaping
   h. Parking lots and roadways
   i. Stormwater Treatment Buffer
   j. Convergent PRETX Pretreatment
   k. ACF Environmental R-Tank Underground Detention System
   l. ACF Environmental Focal Point Biofiltration System
   m. Riprap inlet and outlet protection aprons

2. Maintenance of temporary measures shall follow the following schedule:

   a. The general contractor shall strictly adhere to the Stormwater Pollution Prevention Plan (SWPPP) during construction operations.

   b. During the construction process, all silt fencing will be **inspected during and after storm events** to ensure that the fence still has integrity and is not allowing sediment to pass. Any section of fence that has failed or is failing is to be replaced immediately, overlapping adjacent fence sections by at least one foot. If the problem persists, measures such as additional fencing (i.e. double) or the addition of haybales on the project side of the fence line should be considered. Sediment is to be removed from behind the fencing if found to be deeper than six inches and disposed of properly.

c. Sediment is to be removed from behind diversions if found to be deeper than six inches and disposed of properly.

d. Culvert inlet protection measures should be **inspected once per week** and after every major storm event. Sediment accumulations around the stone should be removed if they are deeper than six inches. If extensive amounts of sediment appear to have become trapped within the gravel filter stone such that proper operation of the structure has become impractical, the stone should be cleaned or otherwise replaced.

e. The stabilized construction entrance(s) shall be **inspected weekly** and after every rain event in order to ensure that the pad(s) are not becoming choked with sediment. Additional stone shall be added if required.

f. All construction debris and trash shall be removed from the site at the completion of construction and disposed of properly.

g. Once construction has been completed, the contractor is to remove all temporary erosion control measures and, if necessary, smooth and revegetated the areas disturbed by the removal.

3. Maintenance of permanent measures shall follow the following schedule:

a. Normal winter roadway and parking lot maintenance including plowing and snow removal. Snow removal contractors shall be NH Certified Green SnowPro.

b. Road and parking lot sweeping at the end of every winter, preferably at the start of the spring rain season.

c. **Inspection** of culvert inlets and outlets at least **once per month** during the rainy season (March to November). Any debris is to be removed and disposed of properly.

d. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately.

e. Annual inspection of drain manholes to determine if they need to be cleaned. Manholes should be cleaned of any material upon inspection. Manholes can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials should be stored, treated, and disposed. Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet should also be removed.

f. **Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in kind if they are found to be dead or dying.

g. Permanent stone check dams should be **inspected annually** in order to ensure that they are in good condition. Any sediment accumulated behind them shall be removed if it is deeper than six inches.

h. Rock riprap should be **inspected annually** and after every major storm event in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock should be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. If the riprap is adjacent to a stream or other waterbody, the water should be kept clear of obstructions, debris, and sediment deposits.

i. Stormwater Treatment Buffer:

This 70'x30' area shall remain undisturbed in perpetuity or until the construction of a new approved use, i.e one other than the 75,000 S.F. industrial warehouse and office building, with its own stormwater management system begins. At least 20% of its ground cover shall be forested and the remainder shall be meadow grass. This area shall be **inspected annually** to ensure that it has been kept in its intended state as aforementioned, and that its functioning has not been compromised by erosion or siltation. Allowed uses include mowing of grass to a height of not below 4 inches, removal of unsafe, dead, or diseased trees, or maintenance to correct erosion or siltation. Disallowed uses include but are not limited to the construction of new buildings, parking areas, outdoor patios, or recreational areas in the buffer.

j. Convergent PRETX Pretreatment:

See attached Convergent inspection and maintenance guidance document.

k. ACF Environmental R-Tank Underground Detention System:

See attached ACF Environmental inspection and maintenance guidance document.

l. ACF Environmental Focal Point Biofiltration System:

See attached ACF Environmental inspection and maintenance guidance document.

m. Vegetated Swale:

Inspect annually for erosion, sediment accumulation, vegetation loss, and presence of invasive species. Perform periodic mowing; frequency depends on location and type of grass. Do not cut shorter than Water Quality Flow depth (maximum 4-inches). Remove debris and accumulated sediment, based on inspection. Repair eroded areas, remove invasive species and dead vegetation, and reseed with applicable grass mix as warranted by inspection.

Annual Operations and Maintenance Report

Banfield Realty, LLC, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. Banfield Realty, LLC, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form. Permanent stormwater BMPs shall be inspected annually following construction and the annual report and certification shall be submitted to the City by December 31st of each year. The Inspection and Maintenance records must be provided to NH Department of Environmental Services upon request.

Construction Activity	**Date of Inspection**	**Who Inspected**	**Findings of Inspector**
Drain Manhole #1			
Drain Manhole #2			
Drain Manhole #3			
Drain Manhole #4			
Drain Manhole #5			
Drain Manhole #6			
Drain Manhole #7			

Drain Manhole #8			
Culverts			
Vegetation and landscaping			
Parking lots and roadways			
Stormwater Treatment Buffer			
Vegetated Swale			
Convergent PRETX Pretreatment			

ACF R-Tank			
ACF Focal Point #1			
ACF Focal Point #2			
ACF Focal Point #3			
ACF Focal Point #4			
Rip-Rap Inlet and Outlet Protection Aprons			

Other:			
Other:			
Other:			

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above-mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885

T#: (603) 772-4746
F#: (603) 772-0227

Commitment to maintenance requirements

I agree to complete and/or observe all of the required maintenance practices and their respective schedules as outlined above.

____
Owner's Name

____
Print Name

____
Title

____
Date

Deicing Log

Date Applied	Type of Deicing Material	Amount Applied

CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Background:

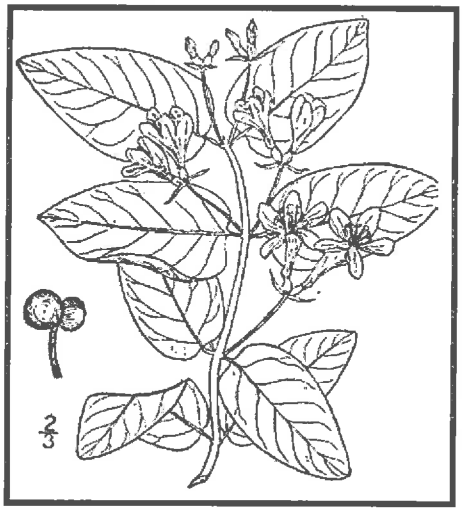
Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions.* Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

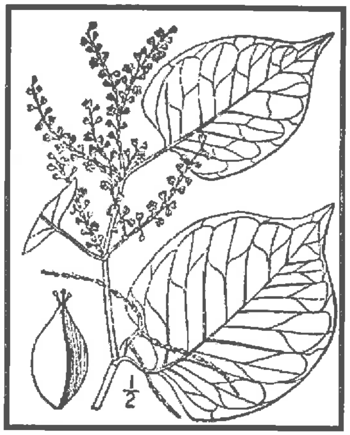
No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

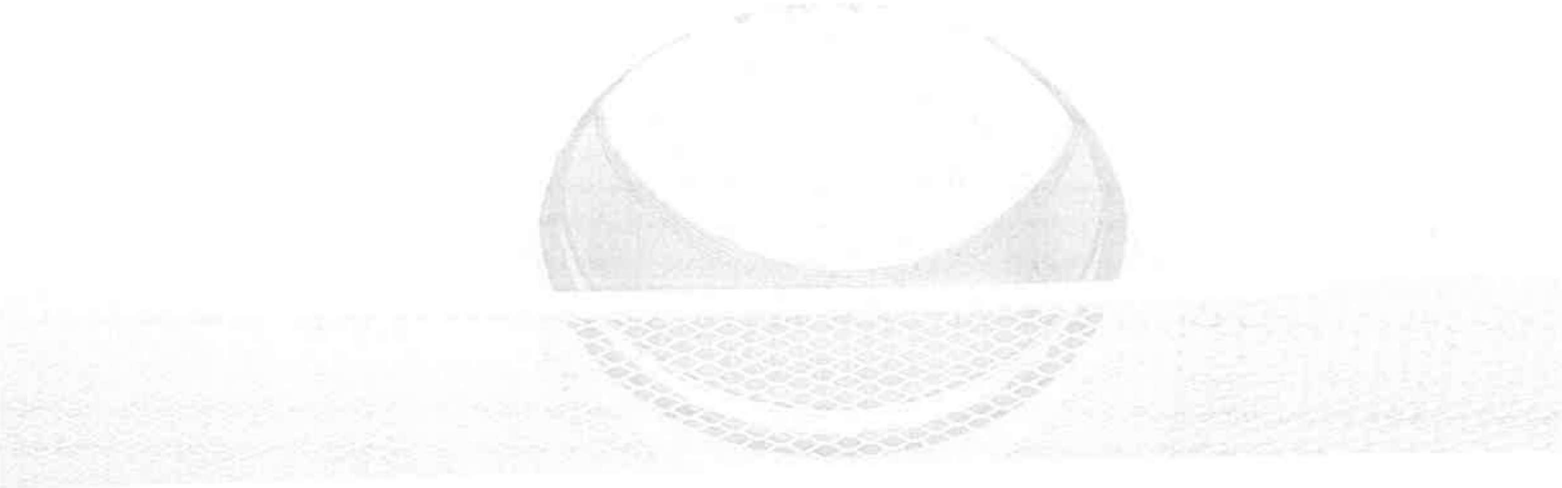
This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

Woody Plants	Method of Reproducing	Methods of Disposal
Norway maple *(Acer platanoides)* European barberry *(Berberis vulgaris)* Japanese barberry *(Berberis thunbergii)* autumn olive *(Elaeagnus umbellata)* burning bush *(Euonymus alatus)* Morrow's honeysuckle *(Lonicera morrowii)* Tatarian honeysuckle *(Lonicera tatarica)* showy bush honeysuckle *(Lonicera x bella)* common buckthorn *(Rhamnus cathartica)* glossy buckthorn *(Frangula alnus)*	**Fruit and Seeds** ↕	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Use as firewood. ▪ Make a brush pile. ▪ Chip. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip once all fruit has dropped from branches. ▪ Leave resulting chips on site and monitor.
oriental bittersweet *(Celastrus orbiculatus)* multiflora rose *(Rosa multiflora)*	**Fruits, Seeds, Plant Fragments** ↕	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Make a brush pile. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.

Non-Woody Plants	Method of Reproducing	Methods of Disposal
garlic mustard *(Alliaria petiolata)* spotted knapweed *(Centaurea maculosa)* - Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. black swallow-wort *(Cynanchum nigrum)* - May cause skin rash. Wear gloves and long sleeves when handling. pale swallow-wort *(Cynanchum rossicum)* giant hogweed *(Heracleum mantegazzianum)* - Can cause major skin rash. Wear gloves and long sleeves when handling. dame's rocket *(Hesperis matronalis)* perennial pepperweed *(Lepidium latifolium)* purple loosestrife *(Lythrum salicaria)* Japanese stilt grass *(Microstegium vimineum)* mile-a-minute weed *(Polygonum perfoliatum)*	**Fruits and Seeds** ↕	**Prior to flowering** Depends on scale of infestation Small infestation - Pull or cut plant and leave on site with roots exposed. Large infestation - Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). - Monitor. Remove any re-sprouting material. **During and following flowering** Do nothing until the following year or remove flowering heads and bag and let rot. Small infestation - Pull or cut plant and leave on site with roots exposed. Large infestation - Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). - Monitor. Remove any re-sprouting material.
common reed *(Phragmites australis)* Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**Fruits, Seeds, Plant Fragments** Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.	**Small infestation** - Bag all plant material and let rot. - Never pile and use resulting material as compost. - Burn. **Large infestation** - Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile. - Monitor and remove any sprouting material. - Pile, let dry, and burn.

January 2010

CONVERGENT
WATER TECHNOLOGIES



PRETX OPERATION AND MAINTENANCE GUIDE

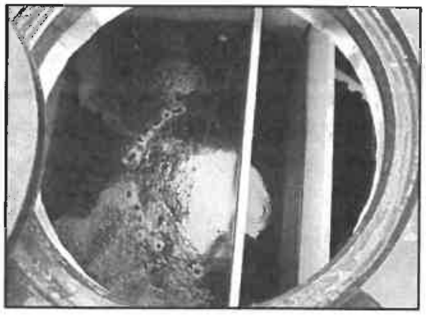
February 2020

PRETX™ BIOFILTER PRETREATMENT
OPERATION AND MAINTENANCE GUIDANCE

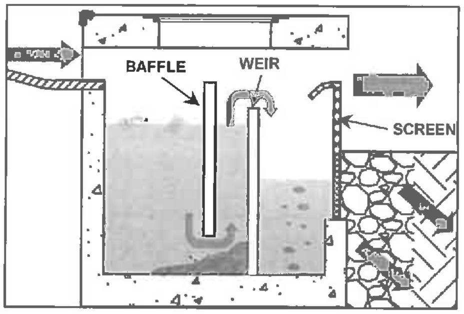
PRETX systems provide pretreatment of sediment and debris prior to filtration and infiltration. Maintenance of PRETX pretreatment catch basins is simple and typically uses a standard vactor truck for cleaning. Simply remove the manhole cover and vactor out debris from within the sump and clean internal components by pressure washing. PRETX units are comprised of an outer precast concrete shell and consist of HDPE and stainless-steel internals that are resistant to rust and rot from corrosive winter runoff. Ideal tools include camera, shovel, hoe/rake, manhole pick, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local authority or company procedures.

Routine annual inspections and periodic maintenance is required for the effective operation of PRETX systems. The Responsible Parties should maintain PRETX systems in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for PRETX systems, along with a suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending upon a variety of factors including land use intensity, seasonality, the occurrence of large storm events, overly wet or dry (i.e., drought) regional hydrologic conditions, and any changes or redevelopment in the upstream land use.

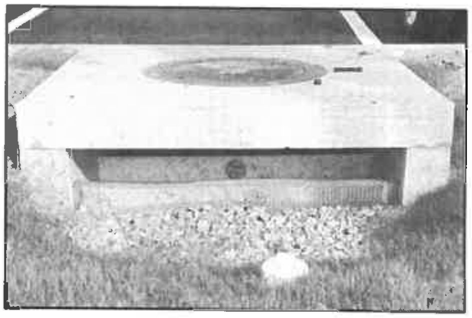
Activity	Frequency
NOTE: A properly functioning PRETX system will trap floatables such as bottles, cups, and leaves within the first sump area behind the baffle. Settleables such as sand, saturated leaves and trash will fall to the bottom of the sump area behind the weir wall. Lastly, removal of smaller debris such as cigarettes, grass clippings, etc. will be removed by the screened outlet.	Annual Inspection
Cleaning of PRETX systems is best conducted by a vactor truck with pressure washing for removal of accumulated sediment, trash, and debris.	
Remove maintenance cover and inspect for accumulation of trash and debris.	
Inspect for floatables behind baffle wall and remove as needed by vactor.	
Inspect for settleable behind weir wall and remove as needed by vactor.	
Inspect outlet screen for accumulated debris and clean as needed by pressure wash.	
Check the inlet area (curb throat or drop inlet grate) and surrounding pavement area immediately upstream for sediment deposition, weed growth, etc. Remove as needed with a broom and shovel or by vactor.	
Check to insure the PRETX system drains to the outvert level completely after storm events.	
This process is to be repeated until proper drainage and function has been restored.	As Needed
Repair or replace any damaged structural parts, inlets, outlets, grates.	



TOP VIEW WITH COVER REMOVED



SIDE VIEW OF TRASH AND DEBRIS ACCUMULATION



REAR VIEW OF OUTLET SCREEN

February 2020

CHECKLIST FOR OPERATION & MAINTENANCE
PRETX^{TM} BIOFILTER PRETREATMENT

Location:
Inspector:
Date: Time: Site Conditions:
Date Since Last Rain Event:

NOTE: A properly functioning PRETX system will trap floatables such as bottles, cups, and leaves within the first sump area behind the baffle. Settleables such as sand, saturated leaves and trash will fall to the bottom of the sump area behind the weir wall. Lastly, removal of smaller debris such as cigarettes, grass clippings, etc. will be removed by the screened outlet.

Inspection Items	**Satisfactory (S) or Unsatisfactory (U)**	**Comments/Corrective Action**
1. Remove maintenance cover to allow for visual inspection	S U	
2. Complete drainage of PRETX system to outvert elevation after storm flow ceases	S U	
3. Proper grading and drainage to PRETX inlet and outlet, no evidence of short-circuit or bypass of flow around or under structure	S U	
4. Accumulation of settleable trash and debris within PRETX sump is 6" or less	S U	
5. Sump area is empty of floatable trash and debris. Excessive accumulation of floatables will bypass baffle wall.	S U	
6. Outlet screen is clear of debris	S U	
7. Clogging and function of inlet/outlet components	S U	
8. Cracking, spalling, or deterioration of concrete	S U	
9. Nuisance vegetation, animal burrows, or settling of structure	S U	
10. Undesirable odors	S U	
11. Complaints from residents	S U	
12. Public hazards noted	S U	
13.	S U	
14.	S U	
15.	S U	

Corrective Action Needed	**Due Date**
1.	
2.	
3.	
4.	
5.	

R TANK

R-TANK OPERATION, INSPECTION & MAINTENANCE

Operation

Your ACF R-Tank System has been designed to function in conjunction with the engineered drainage system on your site, the existing municipal infrastructure, and/or the existing soils and geography of the receiving watershed. Unless your site included certain unique and rare features, the operation of your R-Tank System will be driven by naturally occurring systems and will function autonomously. However, upholding a proper schedule of Inspection & Maintenance is critical to ensuring continued functionality and optimum performance of the system.

Inspection

Both the R-Tank and all stormwater pre-treatment features incorporated into your site must be inspected regularly. Inspection frequency for your system must be determined based on the contributing drainage area, but should never exceed one year between inspections (six months during the first year of operation).

Inspections may be required more frequently for pre-treatment systems. You should refer to the manufacturer requirements for the proper inspection schedule.

With the right equipment your inspection and measurements can be accomplished from the surface without physically entering any confined spaces. If your inspection does require confined space entry, you MUST follow all local/regional requirements as well as OSHA standards.

R-Tank Systems may incorporate Inspection Ports, Maintenance Ports, and/or adjoining manholes. Each of these features are easily accessed by removing the lid at the surface. With the cover removed, a visual inspection can be performed to identify sediment deposits within the structure. Using a flashlight, ALL access points should be examined to complete a thorough inspection.

Inspection Ports

Usually located centrally in the R-Tank System, these perforated columns are designed to give the user a base-line sediment depth across the system floor.

Maintenance Ports

Usually located near the inlet and outlet connections, you'll likely find deeper deposits of heavier sediments when compared to the Inspection Ports.

Manholes

Most systems will include at least two manholes - one at the inlet and another at the outlet. There may be more than one location where stormwater enters the system, which would result in additional manholes to inspect.

Bear in mind that these manholes often include a sump below the invert of the pipe connecting to the R-Tank. These sumps are designed to capture sediment before it reaches the R-Tank, and they should be kept clean to ensure they function properly. However, existence of sediment in the sump does NOT necessarily mean sediment has accumulated in the R-Tank.

After inspecting the bottom of the structure, use a mirror on a pole (or some other device) to check for sediment or debris in the pipe connecting to the R-Tank.

If sediment or debris is observed in any of these structures, you should determine the depth of the material. This is typically accomplished with a stadia rod, but you should determine the best way to obtain the measurement.

All observations and measurements should be recorded on an Inspection Log kept on file. We've included a form you can use at the end of this guideline.

Maintenance

The R-Tank System should be back-flushed once sediment accumulation has reached 6" or 15% of the total system height. Use the chart below as a guideline to determine the point at which maintenance is required on your system.

R-Tank Unit	Height	Max Sediment Dept
Mini	9.5"	1.5"
Single	17"	3"
Double	34"	5"
Triple	50"	6"
Quad	67"	6"
Pent	84"	6"

Before any maintenance is performed on your system, be sure to plug the outlet pipe to prevent contamination of the adjacent systems.

To back-flush the R-Tank, water is pumped into the system through the Maintenance Ports as rapidly as possible. Water should be pumped into ALL Maintenance Ports. The turbulent action of the water moving through the R-Tank will suspend sediments which may then be pumped out.

If your system includes an Outlet Structure, this will be the ideal location to pump contaminated water out of the system. However, removal of back-flush water may be accomplished through the Maintenance Ports, as well.

For systems with large footprints that would require extensive volumes of water to properly flush the system, you should consider performing your maintenance within 24 hours of a rain event. Stormwater entering the system will aid in the suspension of sediments and reduce the volume of water required to properly flush the system.

Once removed, sediment-laden water may be captured for disposal or pumped through a Dirtbag™ (if permitted by the locality).

Step-By-Step Inspection & Maintenance Routine

1) **Inspection**
   a. Inspection Port
      i. Remove Cap
      ii. Use flashlight to detect sediment deposits
      iii. If present, measure sediment depth with stadia rod
      iv. Record results on Maintenance Log
      v. Replace Cap
   b. Maintenance Port/s
      i. Remove Cap
      ii. Use flashlight to detect sediment deposits
      iii. If present, measure sediment depth with stadia rod
      iv. Record results on Maintenance Log
      v. Replace Cap
      vi. Repeat for ALL Maintenance Ports
   c. Adjacent Manholes
      i. Remove Cover
      ii. Use flashlight to detect sediment deposits
      iii. If present, measure sediment depth with stadia rod, accounting for depth of sump (if present)
      iv. Inspect pipes connecting to R-Tank
      v. Record results on Maintenance Log
      vi. Replace Cover
      vii. Repeat for ALL Manholes that connect to the R-Tank

2) **Maintenance**
   a. Plug system outlet to prevent discharge of back-flush water
   b. Determine best location to pump out back-flush water
   c. Remove Cap from Maintenance Port
   d. Pump water as rapidly as possible (without over-topping port) into system until at least 1” of water covers system bottom
   e. Replace Cap
   f. Repeat at ALL Maintenance Ports
   g. Pump out back-flush water to complete back-flushing
   h. Vacuum all adjacent structures and any other structures or stormwater pre-treatment systems that require attention
   i. Sediment-laden water may be captured for disposal or pumped through a Dirtbag™.
   j. Replace any remaining Caps or Covers
   k. Record the back-flushing event in your Maintenance Log with any relevant specifics

ACF ENVIRONMENTAL
LET'S GET IT DONE

R-Tank Maintenance Log

Site Name:____________________________

Location:____________________________

System Owner:____________________________

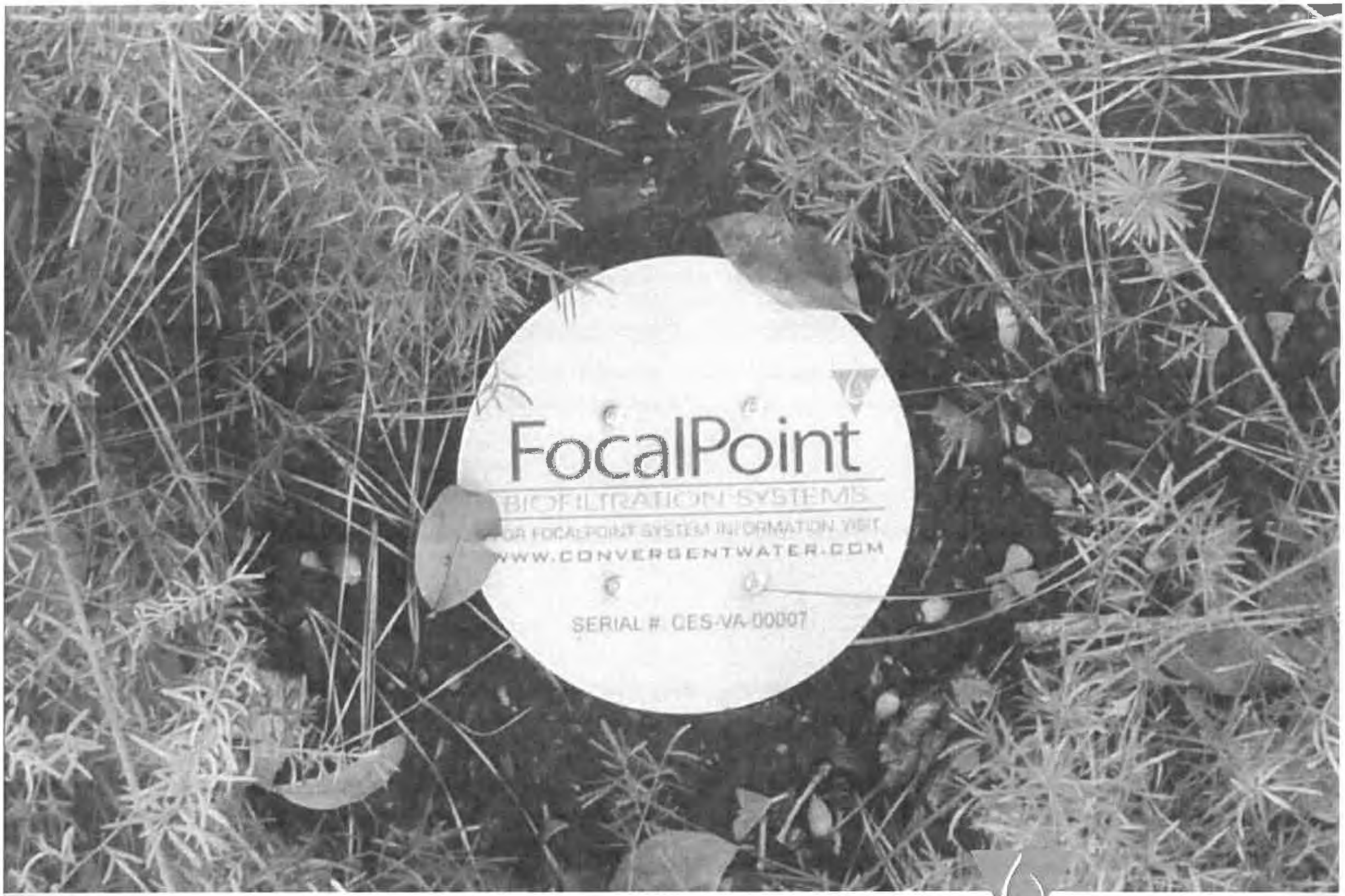
Company Responsible for Maintenance:____________________________

Contact:____________________________

Phone Number:____________________________

Date	Location	Depth to Bottom	Depth to Sediment	Sediment Depth	Observations/Notes	Initials

For more information about our products, contact Inside Sales at 800.448.3636 or email at info@acfenv.com



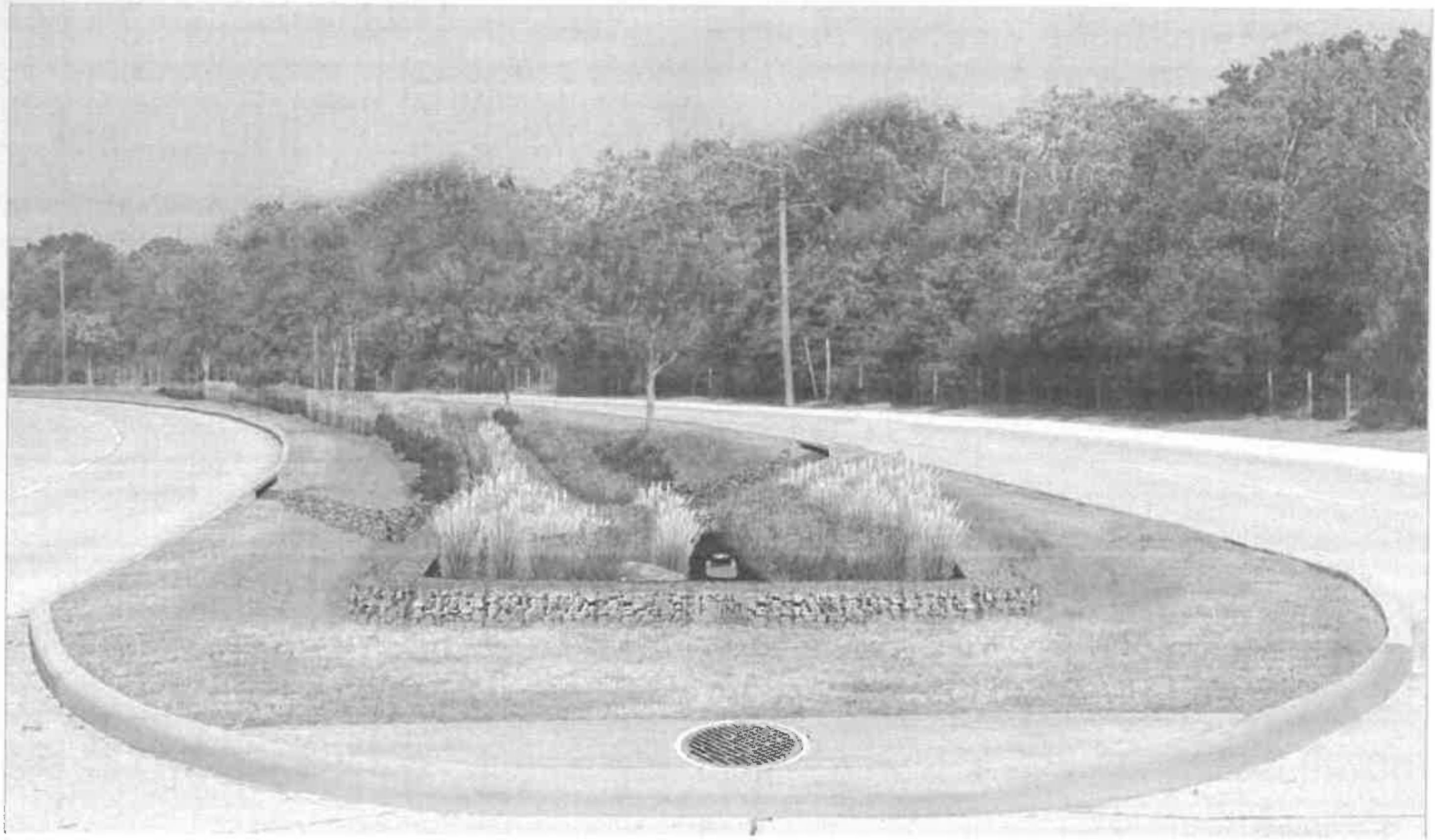
FocalPoint

BIOFILTRATION SYSTEMS

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS)

Operations & Maintenance

ACF
ENVIRONMENTAL
Customer Focused, Environmentally Committed



GENERAL DESCRIPTION

The following general specifications describe the general operations and maintenance requirements for the FocalPoint® High Performance Modular Biofiltration System (HPMBS). The system utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system is a fully equipped, modular, constructed in place system designed to treat contaminated runoff.

Stormwater enters the FocalPoint® HPMBS, is filtered by the High Flow Biofiltration Media and passes through to the underdrain/storage system where the treated water is detained, retained or infiltrated to sub-soils, prior to discharge to the storm sewer system of any remaining flow.

Higher flows bypass the FocalPoint® HPMBS via a downstream inlet or other overflow conveyance. Maintenance is a simple, inexpensive and safe operation that does not require confined space entry, pumping or vacuum equipment, or specialized tools. Properly trained landscape personnel can effectively maintain FocalPoint® HPMBS by following instructions in this manual.

BASIC OPERATIONS

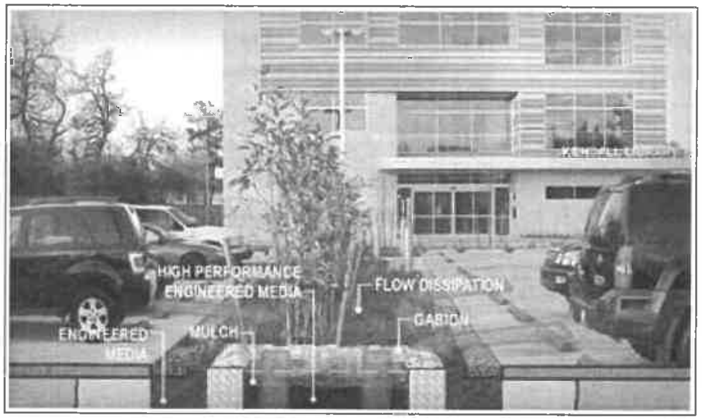
FocalPoint® is a modular, high performance biofiltration system that often works in tandem with other integrated management practices (IMP). Contaminated stormwater runoff enters the biofiltration bed through a conveyance swale, planter box, or directly through a curb cut or false inlet. Energy is dissipated by a rock or vegetative dissipation device and is absorbed by a 3-inch layer of aged, double shredded hardwood mulch, with fines removed, (when specified) on the surface of the biofiltration media.

As the water passes through the mulch layer, most of the larger sediment particles and heavy metals are removed through sedimentation and chemical reactions with the organic material in the mulch. Water passes through the biofiltration media where the finer particles are removed and numerous chemical reactions take place to immobilize and capture pollutants in the soil media.

The cleansed water passes into the underdrain/storage system and remaining flows are directed to a storm sewer system or other appropriate discharge point. Once the pollutants are in the soil, bacteria begin to break down and metabolize the materials and the plants begin to uptake and metabolize the pollutants. Some pollutants such as heavy metals, which are chemically bound to organic particles in the mulch, are released over time as the organic matter decomposes to release the metals to the feeder roots of the plants and the cells of the bacteria in the soil where they remain and are recycled. Other pollutants such as phosphorus are chemically bound to the soil particles and released slowly back to the plants and bacteria and used in their metabolic processes. Nitrogen goes through a variety of very complex biochemical processes where it can ultimately end up in the plant/bacteria biomass, turned to nitrogen gas or dissolves back into the water column as nitrates depending on soil temperature, pH and the availability of oxygen. The pollutants ultimately are retained in the mulch, soil and biomass with some passing out of the system into the air or back into the water.

DESIGN AND INSTALLATION

Each project presents different scopes for the use of FocalPoint® HPMBS. To ensure the safe and specified function of this stormwater BMP, Convergent Water Technologies and/or its Value Added Resellers (VAR) review each application before supply. Information and design assistance is available to the design engineer during the planning process. Correct FocalPoint® sizing is essential to optimum performance. The engineer shall submit calculations for approval by the local jurisdiction when required. The contractor and/or VAR is responsible for the correct installation of FocalPoint® HPMBS units as described in approved plans. A comprehensive installation manual is available at www.convergentwater.com.



MAINTENANCE

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons for maintenance include:

- Avoid legal challenges from your jurisdiction's maintenance enforcement program.
- Prolong the lifespan of your FocalPoint® HPMBS.
- Avoid costly repairs.
- Help reduce pollutant loads leaving your property.

Simple maintenance of the FocalPoint® HPMBS is required to continue effective pollutant removal from stormwater runoff before any discharge into downstream waters. This procedure will also extend the longevity of the living biofiltration system. The unit will recycle and accumulate pollutants within the biomass, but may also subjected to other materials entering the surface of the system. This may include trash, silt and leaves etc. which will be contained above the mulch and/or biofiltration media layer. Too much silt may inhibit the FocalPoint's® HPMBS flow rate, which is a primary reason for system maintenance. Removal of accumulated silt/sediment and/or replacement of the mulch layer (when specified), is an important activity that prevents over accumulation of such silt/sediment.

When to Maintain?

Convergent Water Technologies and/or its VAR includes a 1-year maintenance plan with each system purchased. Annual included maintenance consists of two (2) scheduled maintenance visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated for full operation. Full operation is defined as when the site is appropriately stabilized, the unit is installed and activated (by VAR), i.e., when mulch (if specified) and plantings are added.

Activation should be avoided until the site is fully stabilized (full landscaping, grass cover, final paving and street sweeping completed). Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands. The fall visit helps the system by removing excessive leaf litter.

A first inspection to determine if maintenance is necessary should be performed at least twice annually after storm events of greater than (1) one inch total depth (subject to regional climate). Please refer to the maintenance checklist for specific conditions that indicate if maintenance is necessary.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required. Regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the VAR/Maintenance contractor and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the VAR/Maintenance contractor of any damage to the plant(s), which constitute(s) an integral part of the biofiltration technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance of the FocalPoint® HPMBS to the VAR/Maintenance contractor (i.e. no pruning or fertilizing).

EXCLUSION OF SERVICES

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant(s) in the FocalPoint® HPMBS.

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the VAR/Maintenance contractor maintenance contract. Should a major contamination event occur, the Owner must block off the outlet pipe of the FocalPoint® (where the cleaned runoff drains to, such as drop-inlet) and block off the point where water enters of the FocalPoint® HPMBS. The VAR/Maintenance contractor should be informed immediately.

MAINTENANCE VISIT SUMMARY

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of FocalPoint® HPMBS and surrounding area
2. Removal of debris, trash and mulch
3. Mulch replacement
4. Plant health evaluation (including measurements) and pruning or replacement as necessary
5. Clean area around FocalPoint® HPMBS
6. Complete paperwork, including date stamped photos of the tasks listed above.

MAINTENANCE TOOLS, SAFETY EQUIPMENT AND SUPPLIES

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes.

MAINTENANCE VISIT PROCEDURE

Inspection of FocalPoint® HPMBS and surrounding area

Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

____ Standing Water yes | no
____ Is Bypass Inlet Clear? yes | no
____ Damage to HPMBS System yes | no
to Overflow conveyance yes | no

Removal of Silt / Sediment / Clay

Dig out silt (if any) and mulch and remove trash & foreign items.

____ Silt / Clay Found? yes | no
____ Cups / Bags Found? yes | no
____ Leaves? yes | no
____ Volume of material removed ________ (volume or weight)

Removal of debris, trash and mulch

After removal of mulch and debris, measure distance from the top of the FocalPoint® HPMBS engineered media soil to the flow line elevation of the adjacent overflow conveyance. If this distance is greater than that specified on the plans (typ. 6" - 12"), add media (not top soil or other) to recharge to the distance specified.

____ Distance to media surface to flow line of overflow conveyance (inches) ____________
____ # of Buckets of Media Added _________

Mulch Replacement

Most maintenance visits require only replacement mulch (if utilized) which must be, aged, double shredded hardwood mulch with fines removed. For smaller projects, one cubic foot of mulch will cover four square feet of biofiltration bed, and for larger projects, one cubic yard of mulch will cover 108 square feet of biofiltration bed. Some visits may require additional FocalPoint® HPMBS engineered soil media available from the VAR/Contractor.

____ Add double shredded, aged hardwood mulch which has been screened to remove fines, evenly across the entire biofiltration media bed to a depth of 3".
____ Clean accumulated sediment from energy dissipation system at the inlet to the FocalPoint® HPMBS to allow for entry of trash during a storm event.

Plant health evaluation and pruning or replacement as necessary

Examine the plant's health and replace if dead or dying.
Prune as necessary to encourage growth in the correct directions

____ Height above Grate (feet) _______
____ Width at Widest point (feet) _______
____ Health alive | dead
____ Damage to Plant yes | no

Clean area around FocalPoint® HPMBS

____ Clean area around unit and remove all refuse to be disposed of appropriately.

Complete paperwork

____ Deliver Maintenance Report and photographs as appropriate.
____ Some jurisdictions may require submission of maintenance reports in accordance with approvals.
____ It is the responsibility of the Owner to comply with local regulations.

FocalPoint

BIOFILTRATION SYSTEM

FocalPoint Warranty

Seller warrants goods sold hereunder against defects in materials and workmanship only, for a period of (1) year from date the Seller activates the system into service. Seller makes no other warranties, express or implied.

Seller's liability hereunder shall be conditioned upon the Buyer's installation, maintenance, and service of the goods in strict compliance with the written instructions and specifications provided by the Seller. Any deviation from Seller's instructions and specifications or any abuse or neglect shall void warranties.

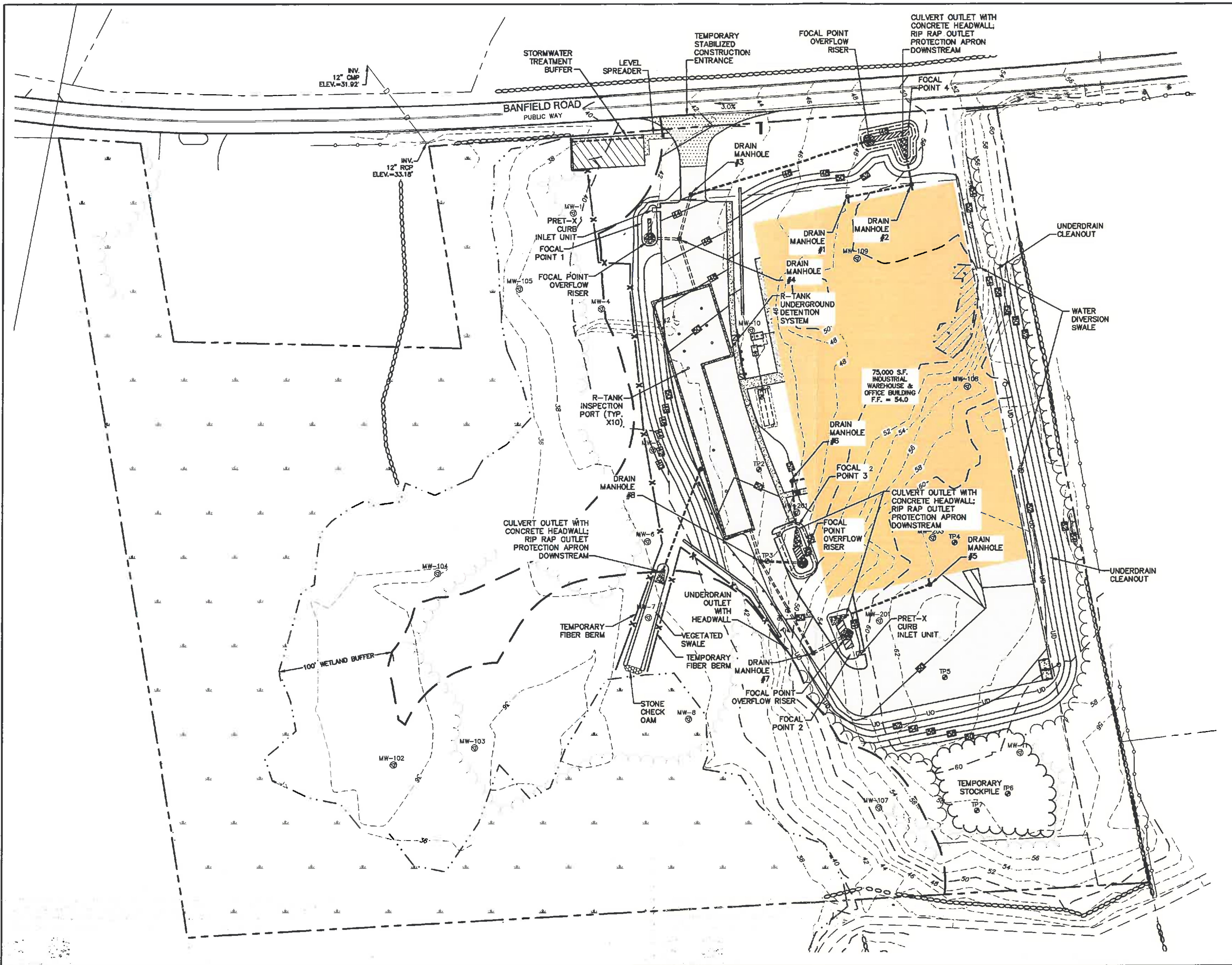
In the event of any claim upon Seller's warranty, the burden shall be upon the Buyer to prove strict compliance with all instructions and specifications provided by the Seller.

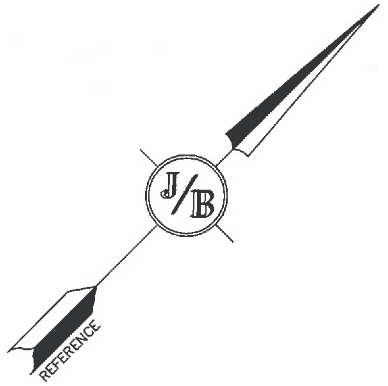
Seller's liability hereunder shall be limited only to the cost or replacement of the goods. Buyer agrees that Seller shall not be liable for any consequential losses arising from the purchase, installation, and/or use of the goods.

Maintenance Checklist

Element	Problem	What To Check	Should Exist	Action
Inlet	Excessive sediment or trash accumulation	Accumulation of sediment or trash impair free flow of water into FocalPoint	Inlet free of obstructions allowing free flow into FocalPoint System	Sediments or trash should be removed
Mulch Cover	Trash and floatable debris accumulation	Excessive trash or debris accumulation.	Minimal trash or other debris on mulch cover	Trash and debris should be removed and mulch cover raked level. Ensure that bark nugget
Mulch Cover	Ponding of water on mulch cover	Ponding in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils	Stormwater should drain freely and evenly over mulch cover.	Contact VAR for advice.
Plants	Plants not growing, or in poor condition	Soil/mulch too wet, evidence of spill. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact VAR for advice.
Plants	Plant growth excessive	Plants should be appropriate to the species and location of FocalPoint		Trim/prune plants in accordance with typical landscaping and

FocalPoint
BIOFILTRATION SYSTEMS





THIS PLAN IS NOT
FOR CONSTRUCTION

THIS PLAN IS INTENDED TO SERVE AS A GUIDE FOR INSPECTION AND MAINTENANCE OPERATIONS, ANNUALLY OR AS REQUIRED.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 feet

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
651,747 S.F.
14.96 ACRES

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

REV.	DATE	REVISION	BY
2	7/30/21	REVISED PER AOT COMMENTS	DJM
1	5/3/21	REVISED PER NEW LAYOUT	DJM
0	1/27/21	ISSUED FOR REVIEW	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: BMP LOCATION PLAN

Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801

Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
BMP
SHEET 1 OF 1
JBE PROJECT NO. 19190.2

JONES&BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

June 23, 2021

Portsmouth Planning Board
Attn: Dexter Legg
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Green Building Statement
375 Banfield Road, Portsmouth, NH
Tax Map 266, Lot 7
JBE Project No. 19190.2

Dear Mr. Legg,

The intent of this proposal is to construct a 75,000 S.F. industrial warehouse building with associated parking, loading, drainage, and utilities. Throughout the design process, low-impact solutions to site issues were considered and implemented. The orientation of the site with parking generally located south of the proposed building and on top of a fill slope ensures that the parking area receives maximum sunlight during the winter months, which will reduce the amount of salt that will need to be used. This being said, robust landscaping trees such as October Glory Red Maple, Pink Flowering Dogwood, and Greenspire Littleleaf Linden will ensure that the periphery of the parking area is shaded during the summer months, reducing the potential for a "heat island" in this area.

This site is already developed. The site has been previously used as a landfill and an auto salvage facility. The proposed design utilizes the minimum amount of new impervious surface practicable for the intended use. In the existing condition, there is significant impervious surface in the 100' wetland buffer which is being removed with this development. Post-construction, there will be almost no impervious surface within the wetland buffer. The temporary stockpile area and the areas adjacent to the wetland buffer will be restored with a wildflower seed mix. The constraints were the size of the building, the necessity for a loading area that can be used by WB-62 trucks for delivery, and the City of Portsmouth's parking requirements. The addition of impervious surface causes the potential for increased rates of off-site runoff, so a stormwater management system was designed for this development to provide for treatment and detention of runoff. We are using low-impact solutions for treatment and detention, including small-footprint "Focal Point" biofiltration areas, PreTx curb inlet units for pre-treatment, a meadow buffer, and underground detention underneath pavement in lieu of a traditional pond. These systems will provide for treatment and detention of stormwater in a small footprint. The minimum amount of ground practicable will be disturbed with this development.

The building will meet or exceed the NH State energy code as amended by the City of Portsmouth that is in effect at the time of building permit application. It is anticipated that LED fixtures will be used for general lighting within the building and a "cool" membrane roof will be used. Limited fenestration on the exterior walls will improve the performance of the exterior envelope. LEED certification is not anticipated at this time.

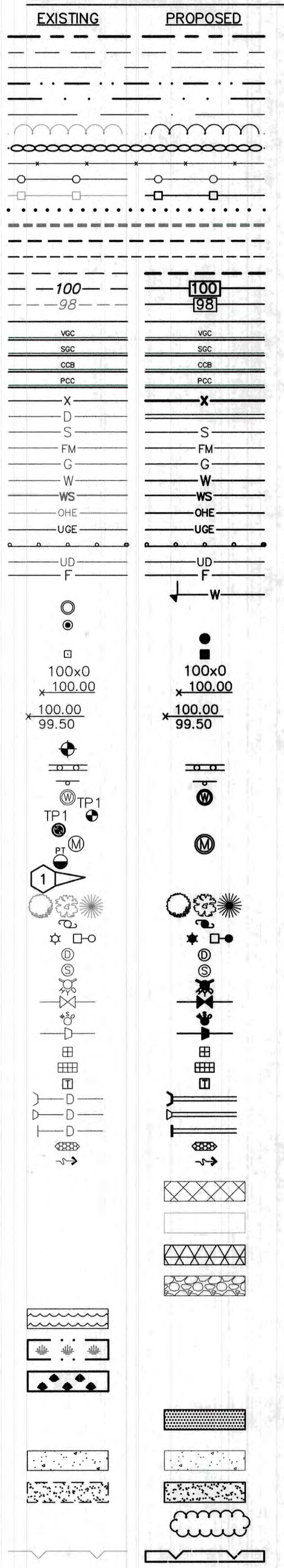
Very truly yours,
JONES & BEACH ENGINEERS, INC.

Daniel Meditz

Daniel Meditz, E.I.T.
Project Engineer

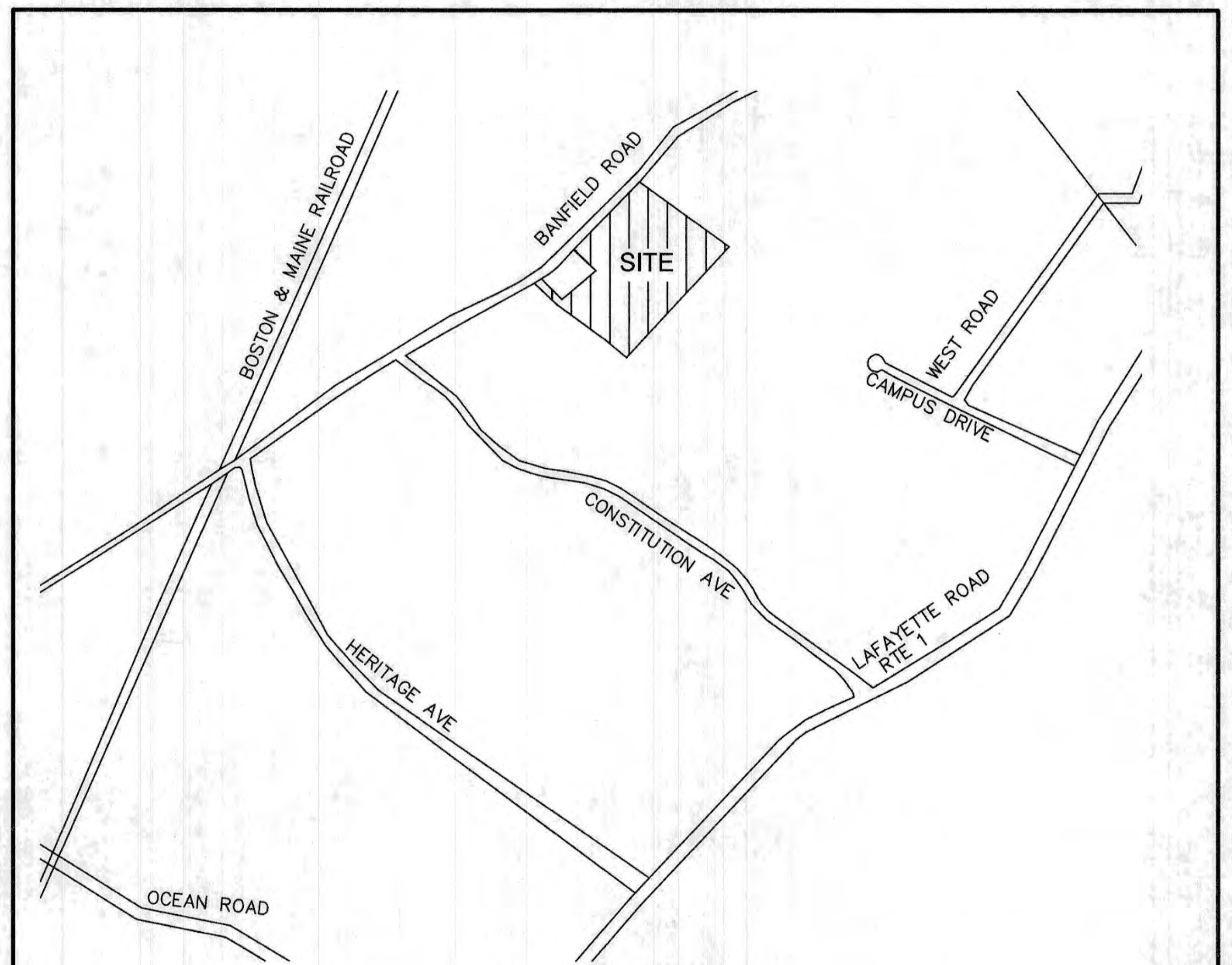
COMMERCIAL SITE PLAN
"INDUSTRIAL WAREHOUSE"
TAX MAP 266, LOT 7
375 BANFIELD ROAD, PORTSMOUTH, NH

GENERAL LEGEND



DESCRIPTION

- PROPERTY LINES
- SETBACK LINES
- CENTERLINE
- FRESHWATER WETLANDS LINE
- TIDAL WETLANDS LINE
- STREAM CHANNEL
- TREE LINE
- STONEWALL
- BARBED WIRE
- FENCE
- STOCKADE FENCE
- SOIL BOUNDARY
- AQUIFER PROTECTION LINE
- FLOOD PLAIN LINE
- ZONELINE
- EASEMENT
- MAJOR CONTOUR
- MINOR CONTOUR
- EDGE OF PAVEMENT
- VERTICAL GRANITE CURB
- SLOPE GRANITE CURB
- CAPE COD BERM
- POURED CONCRETE CURB
- SILT FENCE / FIBER BERM
- DRAINAGE LINE
- SEWER LINE
- SEWER FORCE MAIN
- GAS LINE
- WATER LINE
- WATER SERVICE
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- GUARDRAIL
- UNDERDRAIN
- FIRE PROTECTION LINE
- THRUST BLOCK
- IRON PIPE/IRON ROD
- DRILL HOLE
- IRON ROD/DRILL HOLE
- STONE/GRANITE BOUND
- SPOT GRADE
- PAVEMENT SPOT GRADE
- CURB SPOT GRADE
- BENCHMARK (TBM)
- DOUBLE POST SIGN
- SINGLE POST SIGN
- WELL
- TEST PIT
- FAILED TEST PIT
- MONITORING WELL
- PERC TEST
- PHOTO LOCATION
- TREES AND BUSHES
- UTILITY POLE
- LIGHT POLES
- DRAIN MANHOLE
- SEWER MANHOLE
- HYDRANT
- WATER GATE
- WATER SHUT OFF
- REDUCER
- SINGLE GRATE CATCH BASIN
- DOUBLE GRATE CATCH BASIN
- TRANSFORMER
- CULVERT W/WINGWALLS
- CULVERT W/FLARED END SECTION
- CULVERT W/STRAIGHT HEADWALL
- STONE CHECK DAM
- DRAINAGE FLOW DIRECTION
- 4K SEPTIC AREA
- WETLAND IMPACT
- VEGETATED FILTER STRIP
- RIPRAP
- OPEN WATER
- FRESHWATER WETLANDS
- TIDAL WETLANDS
- STABILIZED CONSTRUCTION ENTRANCE
- CONCRETE
- GRAVEL
- SNOW STORAGE
- RETAINING WALL



LOCUS MAP
SCALE 1" = 1000'

SHEET INDEX

CS	COVER SHEET
C1	EXISTING CONDITIONS PLAN
DM1	DEMOLITION PLAN
C2	SITE PLAN
C3	GRADING AND DRAINAGE PLAN
C4	UTILITY PLAN
L1	LANDSCAPE PLAN
L2	LIGHTING PLAN
S1	EFFLUENT DISPOSAL DESIGN
D1-D7	DETAIL SHEETS
E1	EROSION AND SEDIMENT CONTROL DETAILS
H1-H2	HIGHWAY ACCESS PLAN
T1-T5	TRUCK TURNING PLAN

CIVIL ENGINEER / SURVEYOR
JONES & BEACH ENGINEERS, INC.
85 PORTSMOUTH AVENUE
PO BOX 219
STRATHAM, NH 03885
(603) 772-4746
CONTACT: JOSEPH CORONATI
JCORONATI@JONESANDBEACH.COM

WETLAND AND SOIL CONSULTANT
GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DRIVE BUILDING 2 UNIT H
EXETER, NH 03833
(603) 778-0644
CONTACT: JAMES GOVE
JGOVE@GESINC.BIZ

LANDSCAPE DESIGNER
LM LAND DESIGN
11 SOUTH ROAD
BRENTWOOD, NH 03833
CONTACT: LISE MCNAUGHTON
(603) 770-7728
LMLANDDESIGN@GMAIL.COM

NATURAL GAS
UNITIL SERVICE CORP.
325 WEST ROAD
PORTSMOUTH, NH 03801
CONTACT: DAVID MACLEAN
(603) 294-5261
MACLEAND@UNITIL.COM

ELECTRIC
EVERSOURCE ENERGY
74 OLD DOVER ROAD
ROCHESTER, NH 03867
CONTACT: MARK BOUCHER
(603) 555-5334

TELEPHONE
CONSOLIDATED COMMUNICATIONS
1575 GREENLAND ROAD
GREENLAND, NH 03840
CONTACT: JOE CONSIDINE
(603) 427-5525

CABLE TV
COMCAST COMMUNICATION CORPORATION
334-B CALEF HIGHWAY
EPPING, NH 03402-2325
(603) 679-5695

NEW HAMPSHIRE FISH & GAME AoT PERMIT CONDITIONS RELATED TO THREATENED AND ENDANGERED SPECIES:

- BLANDING'S TURTLES (STATE-ENDANGERED) AND SPOTTED TURTLES (STATE-THREATENED) OCCUR WITHIN THE VICINITY OF THE PROJECT SITE. SITE OPERATORS SHALL BE INFORMED OF THE POTENTIAL PRESENCE OF THESE SPECIES AND SHALL BE PROVIDED A FLYER THAT HELPS TO IDENTIFY THESE SPECIES ALONG WITH NHFG CONTACT INFORMATION. SEE PLAN SHEET E1.
- CULVERTS AND DRAINPIPES SHALL BE DAYLIGHTED SO ENTRAPPED WILDLIFE HAS AN OPPORTUNITY TO ESCAPE. SEE PLAN SHEET D7 FOR SPECS.
- A GRATE SHALL BE INCLUDED IN THE IN-CURB INLET STRUCTURE NEAR EDGES OF THE PARKING LOT TO REDUCE THE SIZE OF THE OPENING AND THE POTENTIAL FOR WILDLIFE TO FALL WITHIN THE STRUCTURE.
- OUTLET CONTROL STRUCTURES IN STORMWATER DETENTION PONDS, IF ANY, SHALL NOT BE PLACED ADJACENT TO THE SIDE SLOPES BUT RATHER AS FAR AWAY AS POSSIBLE TO DETER WILDLIFE CRAWLING ONTO THEM AND FALLING THROUGH THE GRATE OPENINGS. SEE PLAN SHEET C3 FOR SPECS.
- ALL MANUFACTURED EROSION AND SEDIMENT CONTROL PRODUCTS, EXCEPT FOR SILT FENCE INSTALLED IN ACCORDANCE WITH ENV-WQ 1506.04, UTILIZED FOR, BUT NOT LIMITED TO, SLOPE PROTECTION, RUNOFF DIVERSION, SLOPE INTERRUPTION, PERIMETER CONTROL, INLET PROTECTION, CHECK DAMS, AND SEDIMENT TRAPS SHALL NOT CONTAIN WELDED PLASTIC, PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH. SEE PLAN SHEET D7 & E1 FOR SPECS.
- ALL OBSERVATIONS OF THREATENED OR ENDANGERED SPECIES SHALL BE REPORTED IMMEDIATELY TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM BY PHONE AT 603-271-2461 AND BY EMAIL AT NHFGREVIEW@WILDLIFE.NH.GOV. EMAIL SUBJECT LINE: NHB20-3122, PORTSMOUTH INDUSTRIAL WAREHOUSE, WILDLIFE SPECIES OBSERVATION. PHOTOGRAPHS SHALL BE PROVIDED FOR VERIFICATION AS FEASIBLE.
- THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT SHALL HAVE ACCESS TO THE PROPERTY DURING THE TERM OF THE PERMIT.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
636,088 S.F.
14.60 ACRES

APPROVED – PORTSMOUTH, NH
PLANNING BOARD

____
____
____
____
____

DATE: __________

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846
12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

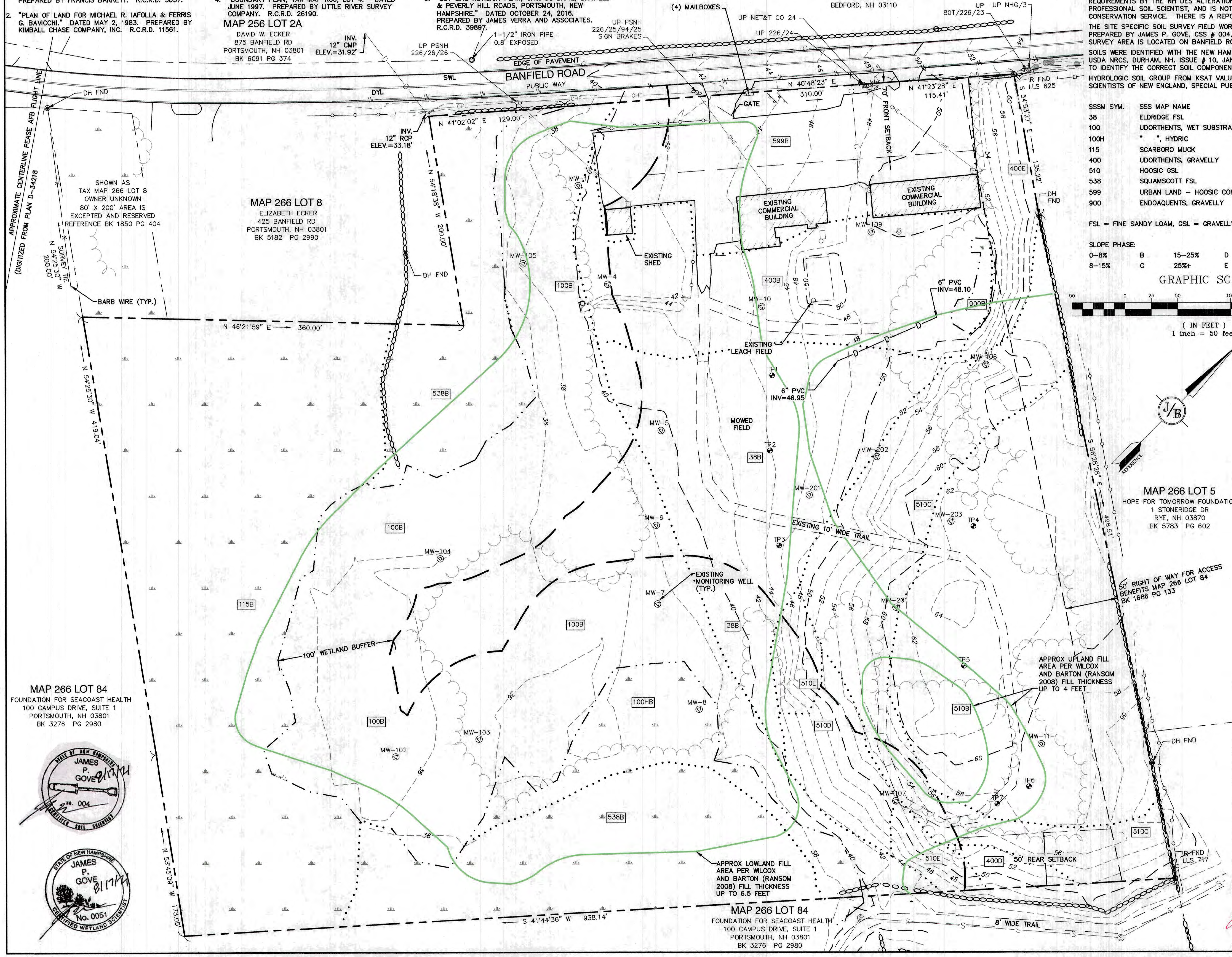
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	COVER SHEET
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
CS
SHEET 1 OF 24
JBE PROJECT NO. 19190.2

PLAN REFERENCES:

1. "PLAN OF LAND IN PORTSMOUTH, N.H. OWNED BY PEVERLY HILL CORPORATION AND JOHN IAFOLLA COMPANY INC." DATED DECEMBER 1975. PREPARED BY FRANCIS BARRETT. R.C.R.D. 5657.
2. "PLAN OF LAND FOR MICHAEL R. IAFOLLA & FERRIS G. BAVICCHI." DATED MAY 2, 1983. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 11561.
3. "SUBDIVISION PLAN FOR JOHN IAFOLLA COMPANY, INC, PEVERLY HILL ROAD / BANFIELD ROAD, PORTSMOUTH, N.H." DATED OCTOBER 11, 1996. R.C.R.D. 25153.
4. "BOUNDARY PLAN, TAX MAP R66, LOT 4." DATED JUNE 1997. PREPARED BY LITTLE RIVER SURVEY COMPANY. R.C.R.D. 26190.
5. "LOT LINE ADJUSTMENT, JOHN IAFOLLA COMPANY, INC. AND CITY OF PORTSMOUTH." DATED NOVEMBER 16, 1997. R.C.R.D. 26202.
6. "LOT LINE REVISION PLAN, CAMPUS DRIVE, BANFIELD & PEVERLY HILL ROADS, PORTSMOUTH, NEW HAMPSHIRE." DATED OCTOBER 24, 2016. PREPARED BY JAMES VERRA AND ASSOCIATES. R.C.R.D. 39897.



JAMES P. GOVE No. 004 8/17/21

JAMES P. GOVE No. 0051 8/17/21

SOIL NOTES:

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION OF TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

THE SITE SPECIFIC SOIL SURVEY FIELD WORK WAS CONDUCTED 07-20-2020, AND WAS PREPARED BY JAMES P. GOVE, CSS # 004, GOVE ENVIRONMENTAL SERVICES, INC. THE SURVEY AREA IS LOCATED ON BANFIELD ROAD, PORTSMOUTH, NH.

SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE # 10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOIL COMPONENTS OF THE COMPLEX.

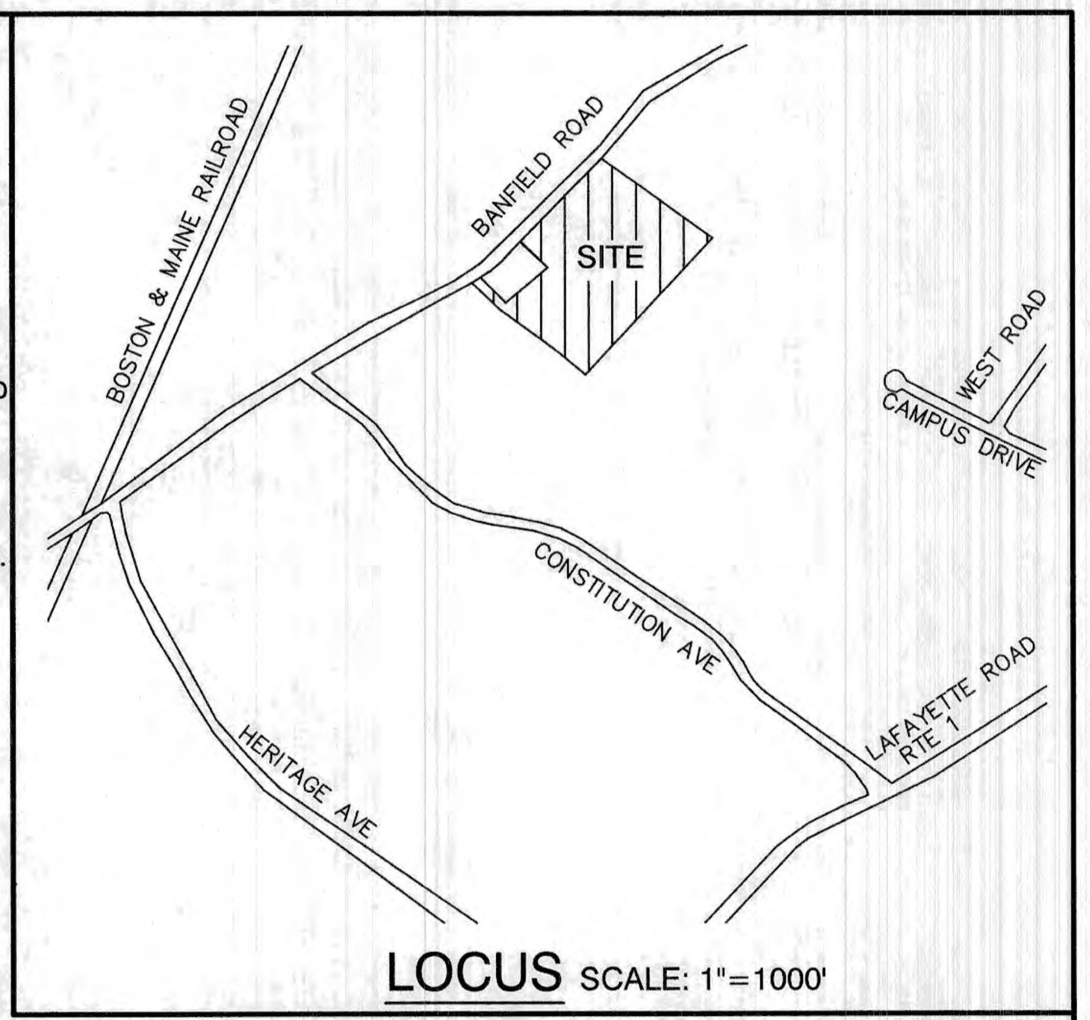
HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO. 5, SEPTEMBER, 2009

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
38	ELDRIDGE FSL	343	C
100	UDORTHENTS, WET SUBSTRATUM	363	C
100H	" ", HYDRIC	563	D
115	SCARBORO MUCK	643	D
400	UDORTHENTS, GRAVELLY	161	A
510	HOOSIC GSL	111	A
538	SQUAMSCOTT FSL	543	C
599	URBAN LAND – HOOSIC COMPLEX	761/161	D/A
900	ENDOAQUENTS, GRAVELLY	561	D

FSL = FINE SANDY LOAM, GSL = GRAVELLY SANDY LOAM

SLOPE PHASE:

0-8%	B	15-25%	D
8-15%	C	25%+	E



LOCUS SCALE: 1"=1000'

NOTES:

1. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF LOT 7 AS SHOWN ON PORTSMOUTH TAX MAP 266.
2. ZONING DISTRICT: INDUSTRIAL
   LOT AREA MINIMUM = 2 ACRES
   LOT FRONTAGE MINIMUM = 200'
   BUILDING SETBACKS (MINIMUM):
     FRONT SETBACK = 70'
     SIDE SETBACK = 50'
     REAR SETBACK = 50'
   WETLAND BUFFER = 100'
   MAX. BUILDING HEIGHT = 50'
   MIN. OPEN SPACE = 20%
3. THE UTILITY LOCATIONS SHOWN HEREON WERE DETERMINED BY OBSERVED ABOVE GROUND EVIDENCE AND SHOULD BE CONSIDERED APPROXIMATE IN LOCATION ONLY. LOCATION, DEPTH, SIZE, TYPE, EXISTENCE OR NONEXISTENCE OF UNDERGROUND UTILITIES AND/OR UNDERGROUND STORAGE TANKS WAS NOT VERIFIED BY THIS SURVEY. ALL CONTRACTORS SHOULD NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK OR CALL DIG-SAFE AT 1-888-DIG-SAFE.
4. THE SUBJECT PARCEL IS NOT LOCATED WITHIN AN AREA HAVING A SPECIAL FLOOD HAZARD AREA DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, ON FLOOD INSURANCE RATE MAP NO. 33015C0270E, WITH EFFECTIVE DATE OF MAY 17, 2005.
5. BASIS OF BEARING: HORIZONTAL – NAD83 NH STATE PLANE.
   VERTICAL – NAVD88.
6. CERTAIN DATA HEREON MAY VARY FROM RECORDED DATA DUE TO DIFFERENCES IN DECLINATION, ORIENTATION, AND METHODS OF MEASUREMENT.
7. ALL BOOK AND PAGE NUMBERS REFER TO THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
8. THE TAX MAP AND LOT NUMBERS ARE BASED ON THE CITY OF PORTSMOUTH TAX RECORDS AND ARE SUBJECT TO CHANGE.
9. RESEARCH WAS PERFORMED AT THE CITY OF PORTSMOUTH ASSESSOR'S OFFICE AND THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
10. THIS SURVEY IS NOT A CERTIFICATION TO OWNERSHIP OR TITLE OF LANDS SHOWN. OWNERSHIP AND ENCUMBRANCES ARE MATTERS OF TITLE EXAMINATION NOT OF A BOUNDARY SURVEY. THE INTENT OF THIS PLAN IS TO RETRACE THE BOUNDARY LINES OF DEEDS REFERENCED HEREON. OWNERSHIP OF ADJOINING PROPERTIES IS ACCORDING TO ASSESSOR'S RECORDS. THIS PLAN MAY OR MAY NOT INDICATE ALL ENCUMBRANCES EXPRESSED, IMPLIED OR PRESCRIPTIVE.
11. ANY USE OF THIS PLAN AND OR ACCOMPANYING DESCRIPTIONS SHOULD BE DONE WITH LEGAL COUNSEL, TO BE CERTAIN THAT TITLES ARE CLEAR, THAT INFORMATION IS CURRENT, AND THAT ANY NECESSARY CERTIFICATES ARE IN PLACE FOR A PARTICULAR CONVEYANCE, OR OTHER USES.
12. THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY GOVE ENVIRONMENTAL SERVICES IN MARCH 2020 IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
    A. THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
    B. THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
    C. THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
    D. THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.
13. THIS PLAN IS THE RESULT OF A CLOSED TRAVERSE WITH A RAW, UNADJUSTED LINEAR ERROR OF CLOSURE GREATER THAN 1 IN 15,000.
14. SURVEY TIE LINES SHOWN HEREON ARE NOT BOUNDARY LINES. THEY SHOULD ONLY BE USED TO LOCATE THE PARCEL SURVEYED FROM THE FOUND MONUMENTS SHOWN AND LOCATED BY THIS SURVEY.
15. 50 FOOT WIDE RIGHT-OF-WAY AS DESCRIBED IN RCRD DEED BOOK 1686 PAGE 133 IS FOR ACCESS BY VEHICLE OR AN OTHER MEANS OF TRANSPORTATION AND BENEFITS LOT 4 AS INDICATED ON TAX MAP 266.

CERTIFICATION:

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

12/21/2021
No. 892 DAVID M. COLLIER
SIGNATURE

12/21/2021

DAVID M. COLLIER, LLS 892 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
636,088 S.F.
14.60 ACRES

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

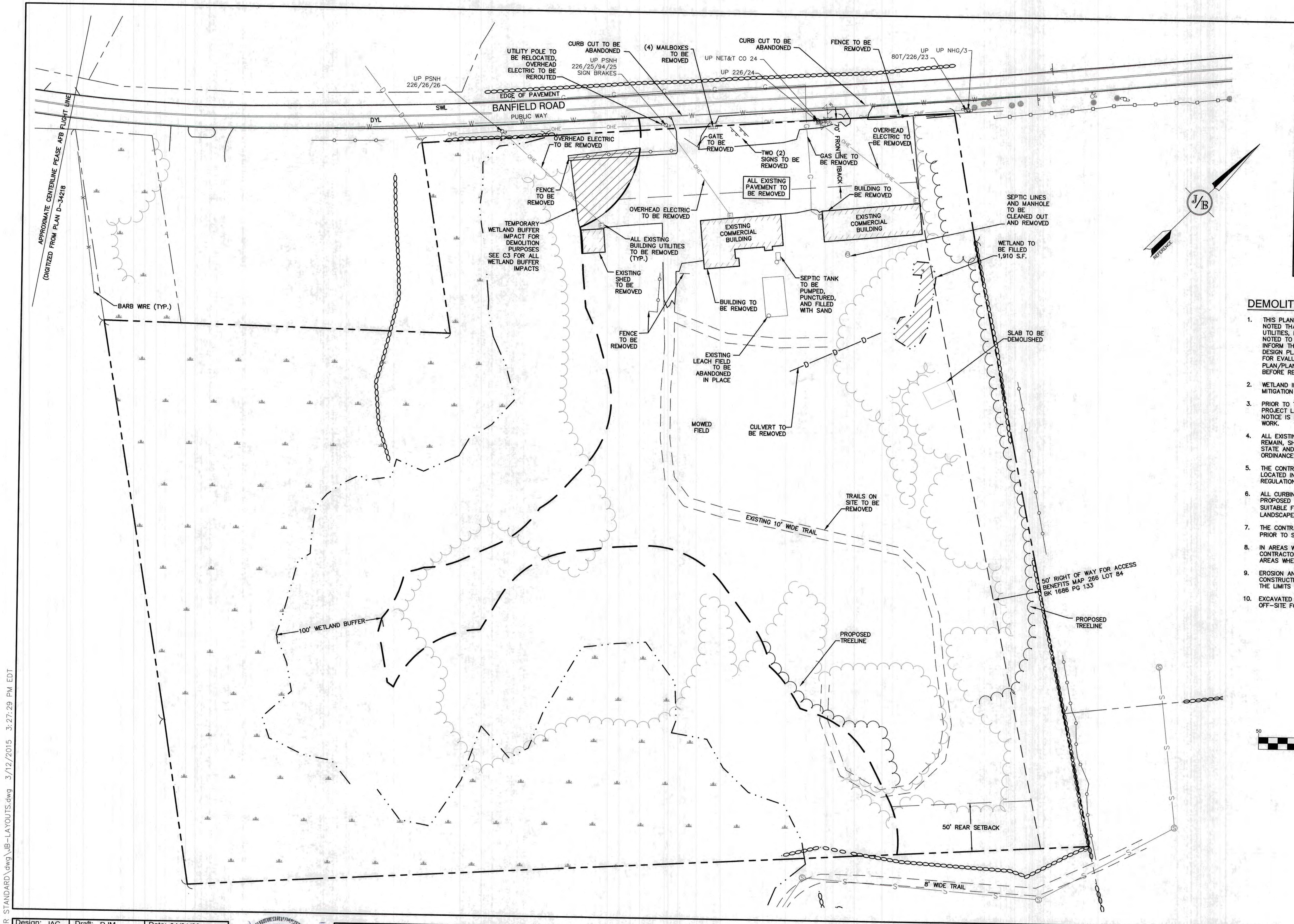
MICHAEL J. KERIVAN No. 9846
12/21/2021

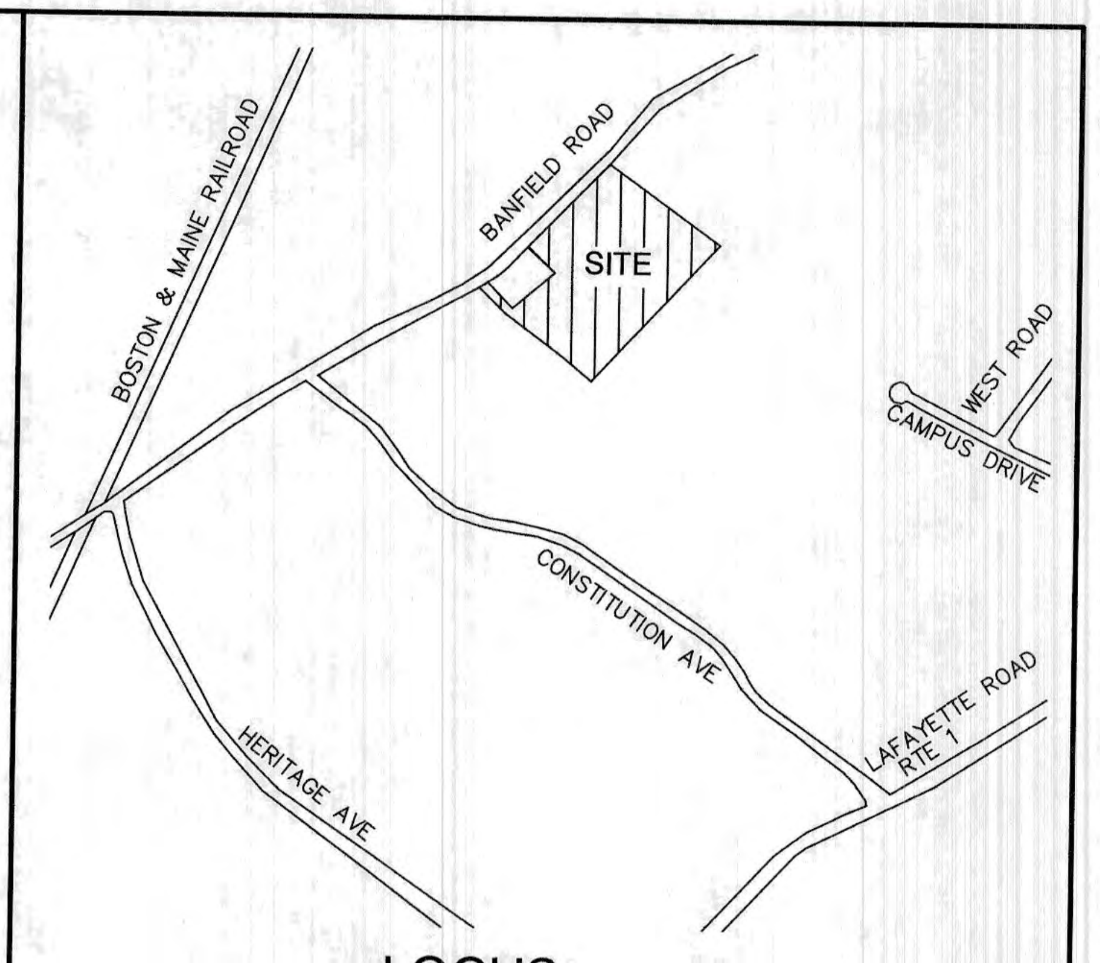
REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING CONDITIONS PLAN
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
C1
SHEET 2 OF 24
JBE PROJECT NO. 19190.2



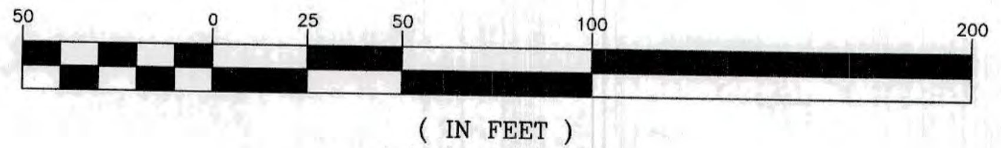


LOCUS SCALE: 1"=1000'

DEMOLITION NOTES:

1. THIS PLAN IS INTENDED TO PROVIDE MINIMUM GUIDELINES FOR SITE DEMOLITION. IT SHOULD BE NOTED THAT ALL MANMADE FEATURES, PAVEMENT, SIGNS, POLES, CURBING, CONCRETE WALKS, UTILITIES, ETC., SHALL BE REMOVED AS NECESSARY TO CONSTRUCT WORK, UNLESS OTHERWISE NOTED TO REMAIN. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCIES FROM DATA AS SHOWN ON DESIGN PLANS. THIS INCLUDES ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS OF THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED.
2. WETLAND IMPACTS SHALL NOT OCCUR UNTIL ALL PERMITS HAVE BEEN ACQUIRED AND IMPACT MITIGATION REQUIREMENTS HAVE BEEN SATISFIED.
3. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED. CLEARING LIMITS ARE THE EDGE OF THE PROPERTY AND THE LIMITS OF WORK.
4. ALL EXISTING STRUCTURES WITHIN THE CONSTRUCTION AREA, UNLESS OTHERWISE NOTED TO REMAIN, SHALL BE REMOVED AND DISPOSED OF OFF-SITE IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL GUIDELINES. ANY BURNING ON-SITE SHALL BE SUBJECT TO LOCAL ORDINANCES.
5. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL CONTAMINATED MATERIAL LOCATED IN THE AREA OF EXISTING LEACHFIELDS IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS.
6. ALL CURBING, CONCRETE, PAVEMENT, BUILDINGS AND SUBBASE MATERIALS LOCATED WITHIN PROPOSED LANDSCAPED AREAS SHALL BE REMOVED AND REPLACED WITH LOAM MATERIALS SUITABLE FOR LANDSCAPING IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS. (SEE ALSO LANDSCAPE PLAN).
7. THE CONTRACTOR SHALL OBTAIN TREE CLEARING PERMIT FROM LOCAL AND STATE AUTHORITIES PRIOR TO START OF CONSTRUCTION (IF REQUIRED).
8. IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
9. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND ANY EARTH MOVING OPERATIONS. FIBER BERMS SHALL BE INSTALLED AT THE LIMITS OF IMPACT AREAS ACCORDING TO THE DETAILS SHOWN ON SHEET E1.
10. EXCAVATED MATERIALS WILL BE PLACED WITHIN UPLAND AREAS AS FILL MATERIAL OR HAULED OFF-SITE FOR DISPOSAL IN AN APPROPRIATE UPLAND LOCATION.

GRAPHIC SCALE



(IN FEET)
1 inch = 50 feet

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
636,088 S.F.
14.60 ACRES

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DEMOLITION PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.

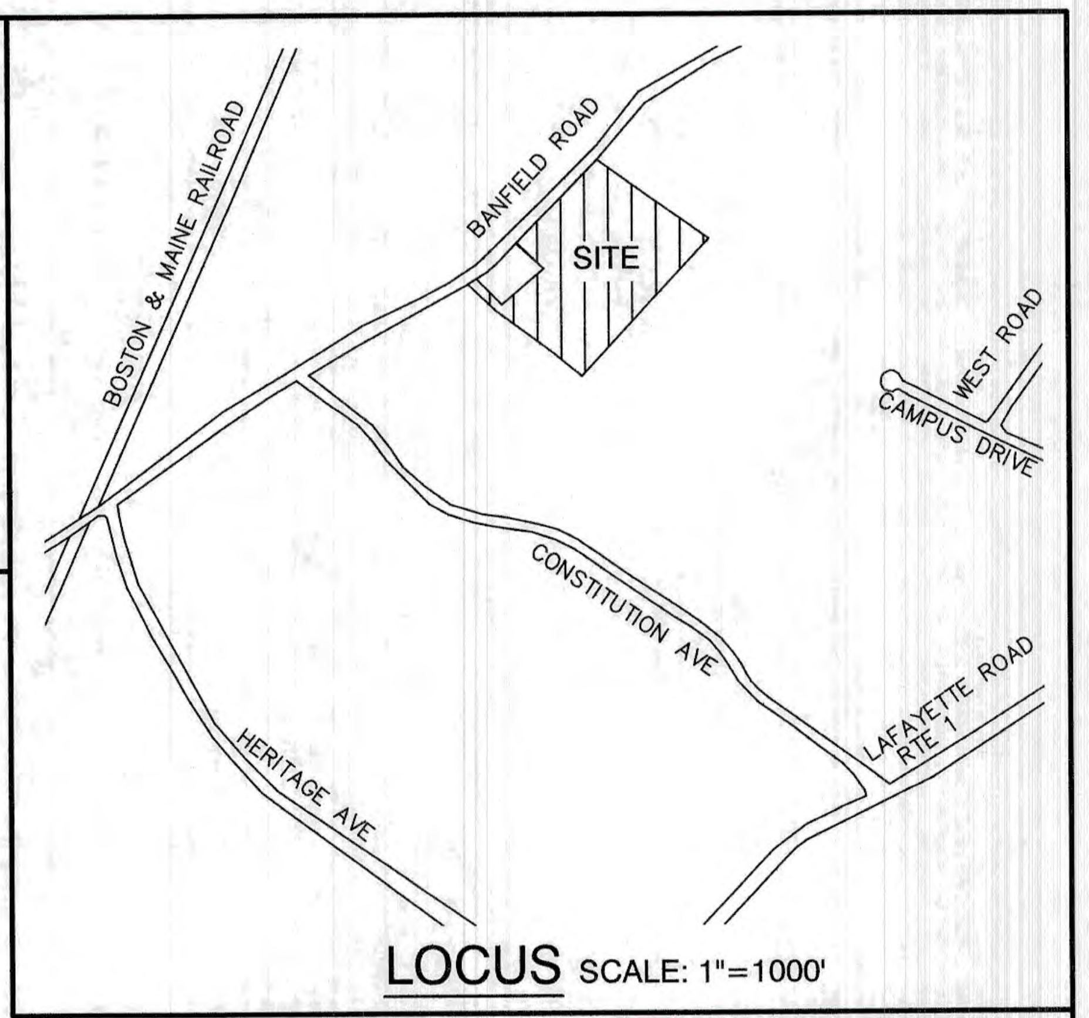
DM-1

SHEET 3 OF 24
JBE PROJECT NO. 19190.2

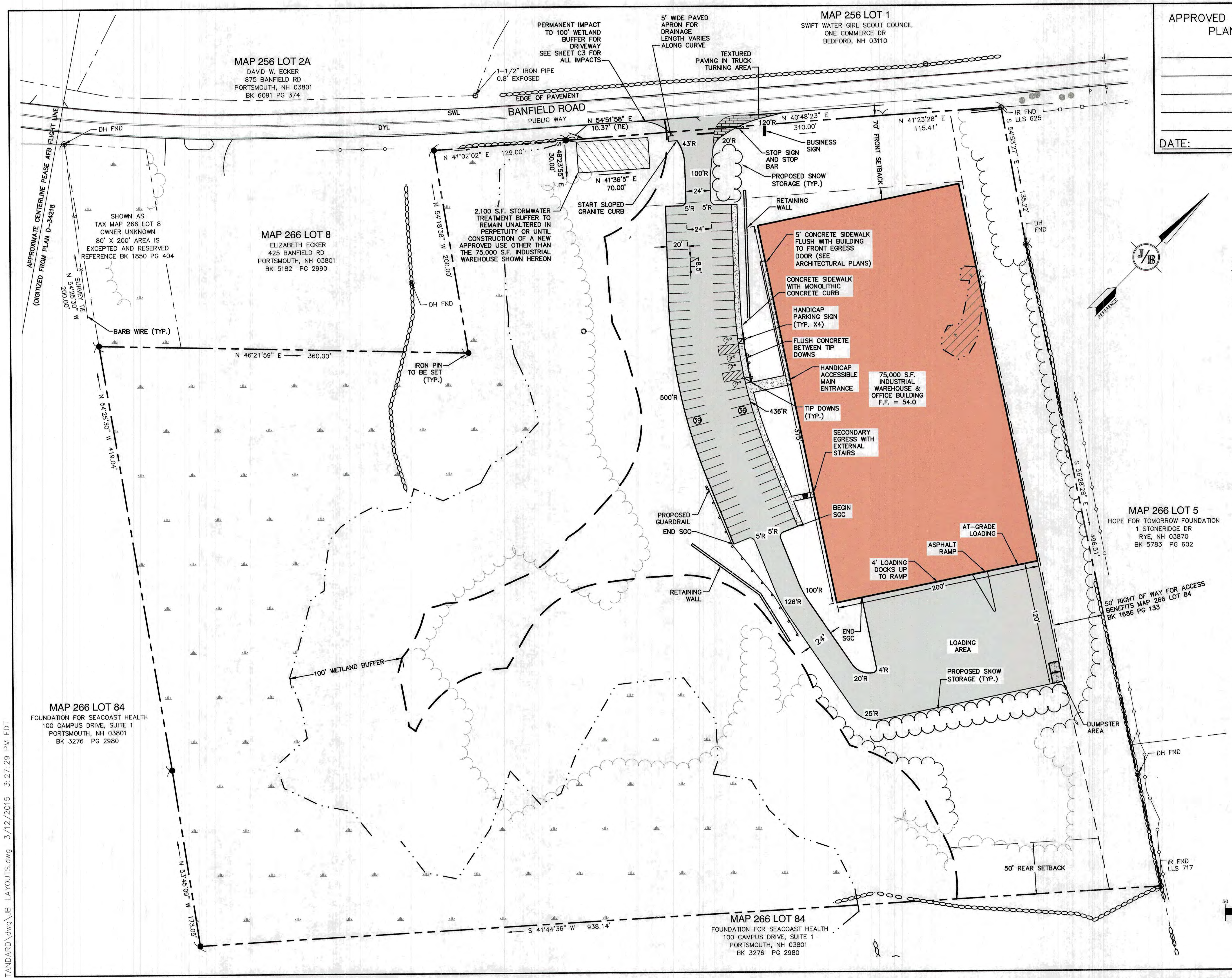
F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

APPROVED – PORTSMOUTH, NH
PLANNING BOARD

DATE:



LOCUS SCALE: 1"=1000'



SITE NOTES:

1. THE INTENT OF THIS PLAN IS TO CONSTRUCT AN INDUSTRIAL WAREHOUSE & OFFICE BUILDING WITH ASSOCIATED GRADING, DRAINAGE, AND UTILITIES.

2. ZONING DISTRICT: INDUSTRIAL
LOT AREA MINIMUM = 2 ACRES
LOT FRONTAGE MINIMUM = 200'
BUILDING SETBACKS (MINIMUM):
FRONT SETBACK = 70'
SIDE SETBACK = 50'
REAR SETBACK = 50'
MAX. BUILDING HEIGHT = 70'
MAX. BUIDLING COVERAGE = 50%
MIN. OPEN SPACE = 20%
OPEN SPACE PROVIDED = 524,200 S.F. = 82.4%
BUILDING COVERAGE PROVIDED = 75,000 S.F. = 11.8%

3. THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON-SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED. CONTRACTOR TO ALWAYS CONTACT DIG SAFE PRIOR TO DIGGING ONSITE OR OFFSITE TO ENSURE SAFETY AND OBEY THE LAW.

4. PARKING CALCULATIONS: GENERAL MANUFACTURING: 1 SPACE REQUIRED PER 1000 SF GFA
75,000 S.F. GFA PROPOSED: 75 PARKING SPACES REQUIRED
75 PARKING SPACES PROVIDED

5. NHDES ALTERATION OF TERRAIN PERMIT NO. AOT-2040, DATED 10/28/2021
NHDES SEPTIC SYSTEM APPROVAL FOR CONSTRUCTION NO. eCA2021102913, DATED 10/29/2021
NHDES WETLANDS BUREAU PERMIT NO. 2021-00240, DATED 12/06/2021

6. ALL CONSTRUCTION SHALL CONFORM TO TOWN STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.

7. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, FEES AND BONDS.

8. ALL PROPOSED SIGNAGE SHALL CONFORM WITH THE TOWN ZONING REGULATIONS, UNLESS A VARIANCE IS OTHERWISE REQUESTED.

9. ALL SIGNAGE AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AND NHDOT STANDARDS AND SPECIFICATIONS (NON-REFLECTORIZED PAVEMENT MARKINGS), UNLESS OTHERWISE NOTED.

10. ALL PARKING STALLS SHALL BE SEPARATED USING 4" WIDE SOLID STRIPES. STRIPING SHALL HAVE TWO COATS OF PAINT, ALKYD BASIN SYNTHETIC RESIN, FEDERAL SPECIFICATION TTP-115 TYPE 1, IN A COLOR OF WHITE.

11. ALL STOP BARS SHALL BE 18" IN WIDTH IN A COLOR OF WHITE; ALL TRAFFIC ARROWS SHALL BE PAINTED IN A COLOR OF WHITE.

12. ALL BUILDING DIMENSIONS SHALL BE VERIFIED WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PROVIDED BY THE OWNER. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND OWNER PRIOR TO THE START OF CONSTRUCTION. BUILDING DIMENSIONS AND AREAS TO BE TO OUTSIDE OF MASONRY, UNLESS OTHERWISE NOTED.

13. SNOW TO BE STORED AT EDGE OF PAVEMENT AND IN AREAS SHOWN ON THE PLANS, OR TRUCKED OFFSITE TO AN APPROVED SNOW DUMPING LOCATION.

14. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.

15. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

16. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.

17. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.

18. THE PRACTICES LISTED IN THE SALT MINIMIZATION PLAN PREPARED FOR THIS DEVELOPMENT AS A REQUIREMENT FOR ISSUANCE OF THE SITE-SPECIFIC ALTERATION OF TERRAIN PERMIT ARE TO BE IMPLEMENTED BY THE SITE OWNER AS WELL AS ALL FUTURE OWNERS AND ASSIGNS.

19. SNOW REMOVAL SHOULD BE PERFORMED BY SNO-PRO CERTIFIED PERSONNEL TO MINIMIZE THE POTENTIAL FOR CHLORIDE CONTAMINATION.

20. IF THE TENANT CHOOSES TO HAVE AN OUTDOOR SEATING AREA FOR EMPLOYEES, IT SHALL NOT BE LOCATED WITHIN THE 100' WETLAND BUFFER OR ON TOP OF SEPTIC COMPONENTS OR DRAINAGE PRACTICES.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 feet

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
636,088 S.F.
14.60 ACRES

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846
12/21/21

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SITE PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
C2
SHEET 4 OF 24
JBE PROJECT NO. 19190.2

GRADING AND DRAINAGE NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES AND/OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 888-DIG-SAFE (888-344-7233).
2. VERTICAL DATUM: NAVD88.
3. ALL BENCHMARKS AND TOPOGRAPHY SHOULD BE FIELD VERIFIED BY THE CONTRACTOR.
4. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE CONSTRUCTION SEQUENCE ON SHEET E1.
5. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT'S LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
6. ALL ROOF DRAINS FROM BUILDING SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLAN AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT THE END. ALL EXTERIOR ROOF DOWNSPOUTS ARE TO BE INSTALLED WITH OVERFLOW DEVICES.
7. ALL SWALES AND DETENTION PONDS ARE TO BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
8. PROPOSED RIM ELEVATIONS OF DRAINAGE STRUCTURES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES.
9. ALL SWALES AND ANY SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH NORTH AMERICAN GREEN BIONET S75BN EROSION CONTROL BLANKETS (OR AN EQUIVALENT FREE OF WELDED PLASTIC, PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH APPROVED IN WRITING BY THE ENGINEER), UNLESS OTHERWISE SPECIFIED.
10. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS. CATCH BASINS SHALL HAVE 3' DEEP SUMPS WITH GREASE HOODS, UNLESS OTHERWISE NOTED.
11. ALL DRAINAGE STRUCTURES SHALL BE PRECAST, UNLESS OTHERWISE SPECIFIED. SEE SHEETS D2-D6 FOR DRAINAGE DETAILS.
12. ALL DRAINAGE STRUCTURES AND STORMWATER PIPES SHALL MEET HEAVY DUTY TRAFFIC H20 LOADING AND SHALL BE INSTALLED ACCORDINGLY.
13. IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
14. ALL DRAINAGE PIPE SHALL BE NON-PERFORATED ADS N-12 OR APPROVED EQUAL.
15. STONE INLET PROTECTION SHALL BE PLACED AT ALL CATCH BASINS. SEE DETAIL WITHIN THE DETAIL SHEETS.
16. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY ALL GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE EPA SWPPP DURING CONSTRUCTION OPERATIONS.
17. NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL ALL EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
18. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING.
19. SHOULD CONSTRUCTION STOP FOR LONGER THAN 3 DAYS, THE SITE SHALL BE SEEDED AS SPECIFIED.
20. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.5" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
21. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
22. CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
23. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
24. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
25. SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
26. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
27. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON-SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
28. ALL CULVERT OR DRAINPIPE OUTLETS ARE TO HAVE CONCRETE HEADWALLS UNLESS OTHERWISE STATED.
29. AREA OF TOTAL DISTURBANCE = 225,000 S.F.
    AREA OF IMPACT TO 100' WETLAND BUFFER: SEE BELOW
    AREA OF WETLAND FILL = 1,910 S.F.
30. ALL STORMWATER TREATMENT, DETENTION, AND BIOFILTRATION PRACTICES TO BE LINED TO RESTRICT INFILTRATION AS SPECIFIED
31. ROOF TO BE SPLIT INTO FOUR QUADRANTS FOR DRAINAGE, EACH SLOPED INTO SEPERATE GUTTER. GUTTERS TO BE SLOPED TOWARD ROOF DRAINS AT DEPICTED LOCATIONS.

WETLAND BUFFER IMPACT LEGEND

🟥	= PERMANENT IMPACT (85 S.F. FOR CORNER OF DRIVEWAY)
🟩	= TEMPORARY IMPACT (3,350 S.F. EXISTING ASPHALT AND BUILDING REMOVAL, 140 S.F. FOR CORNER OF DRIVEWAY, 4,420 S.F. FOR STORMWATER MANAGEMENT = 7,910 S.F. TOTAL)

R-TANK SPECS

TOP OF FILL	>47.07, < 52.41 (20"-84" ALLOWED)
TOP OF STONE COVER	45.16
TOP OF CHAMBER	44.16
BOTTOM OF CHAMBER	37.2
BOTTOM OF STONE BASE	36.95
CHAMBERS PER ROW, SECTION 1	30
# OF ROWS, SECTION 1	43
CHAMBERS PER ROW, SECTION 2	70
# OF ROWS, SECTION 2	20
LENGTH, SECTION 1	74.37'
WIDTH, SECTION 1	60.43'
LENGTH, SECTION 2	168.21'
WIDTH, SECTION 2	30.25'

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 266, LOT 7

TOTAL LOT AREA
636,088 S.F.
14.60 ACRES

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

STATE OF NEW HAMPSHIRE
MICHAEL J. KERIVAN
No. 9846
LICENSED PROFESSIONAL ENGINEER
12/21/21

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

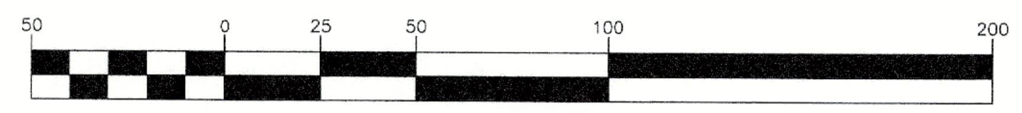
Plan Name: **GRADING AND DRAINAGE PLAN**
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
C3
SHEET 5 OF 24
JBE PROJECT NO. 19190.2

UTILITY NOTES:

1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, CONNECTION FEES AND BONDS.
2. THE CONTRACTOR SHALL PROVIDE A MINIMUM NOTICE OF FOURTEEN (14) DAYS TO ALL CORPORATIONS, COMPANIES AND/OR LOCAL AUTHORITIES OWNING OR HAVING A JURISDICTION OVER UTILITIES RUNNING TO, THROUGH OR ACROSS PROJECT AREAS PRIOR TO DEMOLITION AND/OR CONSTRUCTION ACTIVITIES.
3. THE LOCATION, SIZE, DEPTH AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE TO THE STANDARDS AND REQUIREMENTS OF THE RESPECTIVE UTILITY COMPANY (ELECTRIC, TELEPHONE, CABLE TELEVISION, FIRE ALARM, GAS, WATER, AND SEWER).
4. A PRECONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, ENGINEER, ARCHITECT, CONTRACTOR, LOCAL OFFICIALS, AND ALL PROJECT-RELATED UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO START OF CONSTRUCTION.
5. ALL CONSTRUCTION SHALL CONFORM TO THE TOWN STANDARDS AND REGULATIONS, AND NHDES STANDARDS AND SPECIFICATIONS, WHICHEVER ARE MORE STRINGENT, UNLESS OTHERWISE SPECIFIED.
6. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
7. BUILDING TO BE SERVICED BY UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR IS TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITY STUBS PRIOR TO CONSTRUCTION AND DISCONNECT ALL EXISTING SERVICE CONNECTIONS AT THEIR RESPECTIVE MAINS IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY'S STANDARDS AND SPECIFICATIONS. ENGINEER TO BE NOTIFIED.
9. AS-BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS.
10. INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW AT CHANGES IN DIRECTION. THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE THROUGH CHANNEL UNDERLAYMENT OF INVERT, AND SHELF SHALL CONSIST OF BRICK MASONRY.
11. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30 INCH DIA, CLEAR OPENING. THE WORD "SEWER" OR "DRAIN" SHALL BE CAST INTO THE CENTER OF THE UPPER FACE OF EACH COVER WITH RAISED, 3" LETTERS.
12. SHALLOW MANHOLE: IN LIEU OF A CONE SECTION, WHEN MANHOLE DEPTH IS LESS THAN 6 FEET, A REINFORCED CONCRETE SLAB COVER MAY BE USED HAVING AN ECCENTRIC ENTRANCE OPENING AND CAPABLE OF SUPPORTING H20 LOADS.
13. CONTRACTOR SHALL PLACE 2" WIDE METAL WIRE IMPREGNATED RED PLASTIC WARNING TAPE OVER ENTIRE LENGTH OF ALL GRAVITY SEWERS, SERVICES, AND FORCE MAINS.
14. PROPOSED RIM ELEVATIONS OF DRAINAGE AND SANITARY MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES. ADJUST ALL OTHER RIM ELEVATIONS OF MANHOLES, WATER GATES, GAS GATES AND OTHER UTILITIES TO FINISH GRADE AS SHOWN ON THE GRADING AND DRAINAGE PLAN.
15. ALL WATER MAINS AND SERVICE PIPES SHALL HAVE A MINIMUM 12" VERTICAL AND 24" HORIZONTAL SEPARATION TO MANHOLES, OR CONTRACTOR SHALL INSTALL BOARD INSULATION FOR FREEZING PROTECTION.
16. WATER MAINS SHALL BE HYDROSTATICALLY PRESSURE TESTED FOR LEAKAGE PRIOR TO ACCEPTANCE. WATERMAINS SHALL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 150 PSI, WHICH EVER IS GREATER. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 4 OF AWWA STANDARD C 600. WATERMAINS SHALL BE DISINFECTED AFTER THE ACCEPTANCE OF THE PRESSURE AND LEAKAGE TESTS ACCORDING TO AWWA STANDARD C 651.
17. ALL WATER AND SANITARY LEADS TO BUILDING(S) SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLANS AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT END.
18. IF THE BUILDING IS REQUIRED TO HAVE A SPRINKLER SYSTEM, A PRECONSTRUCTION MEETING SHALL BE HELD BETWEEN THE CONTRACTOR, OWNER, ARCHITECT AND THE LOCAL FIRE DEPARTMENT PRIOR TO THE INSTALLATION.
19. THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
20. DIMENSIONS ARE SHOWN TO CENTERLINE OF PIPE OR FITTING.
21. THE CONTRACTOR SHALL HAVE THE APPROVAL OF ALL GOVERNING AGENCIES HAVING JURISDICTION OVER FIRE PROTECTION SYSTEM PRIOR TO INSTALLATION.
22. CONTRACTOR TO FURNISH SHOP DRAWINGS FOR UTILITY RELATED ITEMS TO ENSURE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SHOULD BE SENT IN TRIPLICATE TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
23. EXISTING UTILITIES SHALL BE DIGSAFED BEFORE CONSTRUCTION.
24. ALL WATER LINES SHOULD HAVE TESTABLE BACKFLOW PREVENTERS AT THE ENTRANCE TO EACH BUILDING.
25. ALL WATER AND SANITARY LEADS TO BUILDING(S) SHALL END AT RIGHT OF WAY AS SHOWN ON PLANS AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT END.
26. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRIC CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
27. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.

GRAPHIC SCALE



(IN FEET)
1 inch = 50 feet

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name:	19190-PLAN-NEW-LAYOUT.dwg	

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

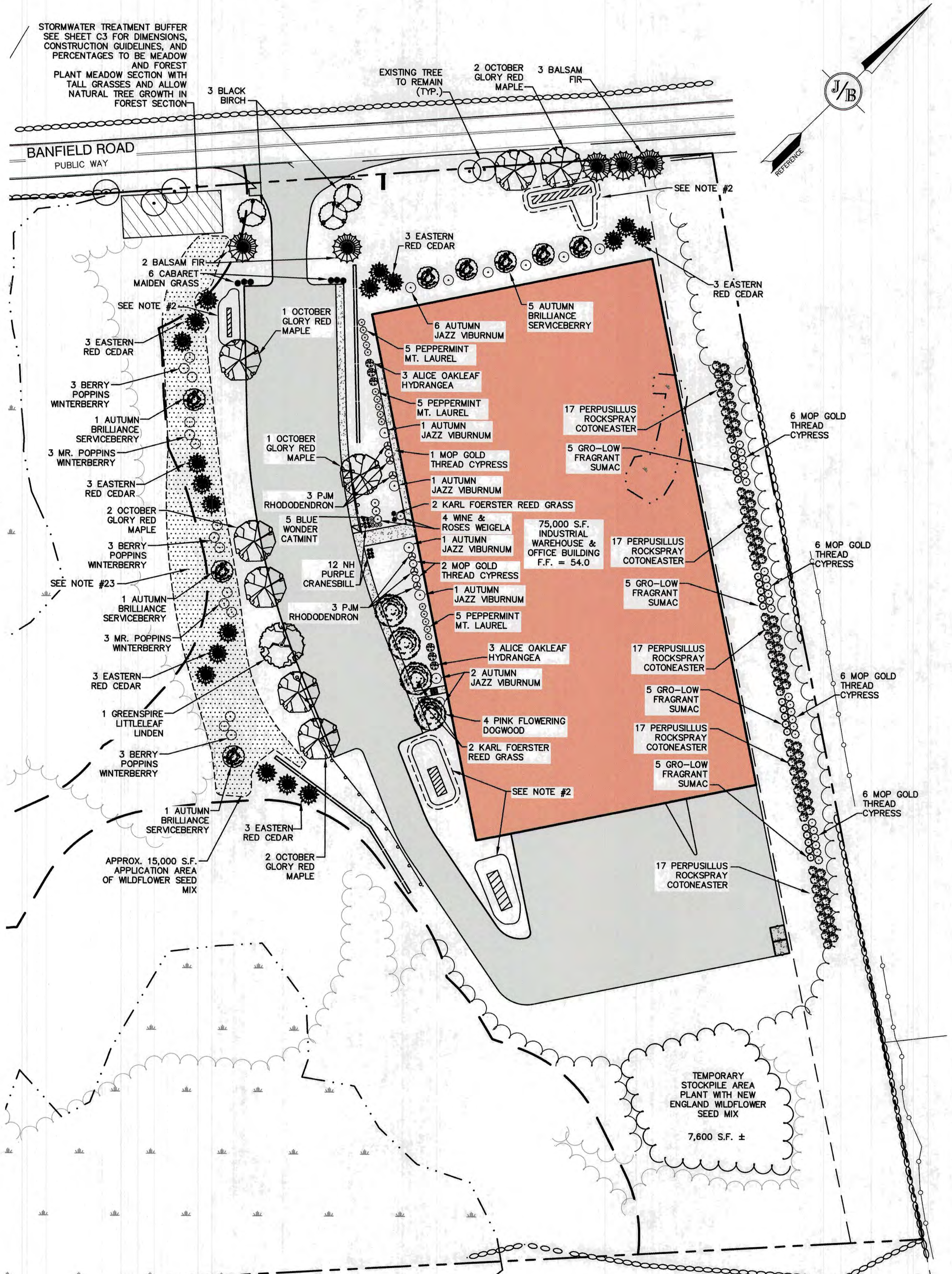
6/14/2023

REV.	DATE	REVISION	BY
20	6/13/23	REVISED PER TAC COMMENT	DJM
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	UTILITY PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
C4
SHEET 6 OF 24
JBE PROJECT NO. 19190.2



PLANT LIST

QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE
5	ABIES BALSAMEA	BALSAM FIR	8-10 FT. HT.
8	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	3.5" CALIPER
4	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	AUTUMN BRILLIANCE SERVICEBERRY	15 GALLON
3	BETULA LENTA	BLACK BIRCH	10 FT. HT. MULTI
4	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	KARL FOERSTER REED GRASS	2 GALLON
28	CHAMAECYPARIS PISIFERA 'MOP'	MOP GOLD THREAD CYPRESS	3 GALLON
4	CORNUS FLORIDA F. RUBRA	PINK FLOWERING DOGWOOD	2.5" CALIPER
85	COTONEASTER HORIZONTALIS 'PERPUSILLUS'	PERPUSILLUS ROCKSPRAY COTONEASTER	2 GALLON
12	GERANIUM SANGUINEUM 'NH PURPLE'	NH PURPLE CRANESBILL	1 Gallon
6	HYDRANGEA QUERCIFOLIA 'ALICE'	ALICE OAKLEAF HYDRANGEA	5 GALLON
9	ILEX VERTICILLATA 'FARROWBPOP'	BERRY POPPINS WINTERBERRY	5 GALLON
6	ILEX VERTICILLATA 'FARROWMRP'	MR. POPPINS WINTERBERRY	5 GALLON
18	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	6-7 FT. HT.
15	KALMIA LATIFOLIA 'PEPPERMINT'	PEPPERMINT MT LAUREL	5 GALLON
6	MISCANTHUS SINENSIS 'CABARET'	CABARET MAIDEN GRASS	2 GALLON
5	NEPETA X FAASSENII 'BLUE WONDER'	BLUE WONDER CATMINT	1 GALLON
6	RHODODENDRON 'PJM'	PJM RHODODENDRON	5 GALLON
20	RHUS AROMATICA 'GRO-LOW'	GRO-LOW FRAGRANT SUMAC	3 GALLON
1	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LITTLELEAF LINDEN	3.5" CALIPER
12	VIBURNUM DENTATUM 'AUTUMN JAZZ'	AUTUMN JAZZ VIBURNUM	5 GALLON
4	WEIGELA FLORIDA 'ALEXANDRA'	WINE & ROSES WEIGELA	3 GALLON

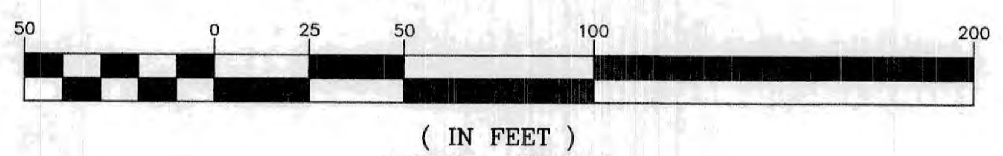
NEW ENGLAND WILDFLOWER SEED MIX

BOTANICAL NAME	COMMON NAME	INDICATOR
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	FACU
SORGHASTRUM NUTANS	INDIAN GRASS	UPL
CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	FACU
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	FACW-
ELYMUS CANADENSIS	CANADA WILD RYE	FACU+
FESTUCA RUBRA	RED FESCUE	FACU
ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	NI
VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	FACW+
OENOTHERA BIENNIS	EVENING PRIMROSE	FACU-
ASTER NOVAE-ANGLIAE (SYMPHYOTRICHUM NOVAE-ANGLIA)	NEW ENGLAND ASTER	FACW-
RUDBECKIA HIRTA	BLACK EYED SUSAN	FACU-
SOLIDAGO JUNCEA	EARLY GOLDENROD	
EUPATORIUM FISTULOSUM (EUTROCHIUM FISTULOSUM)	HOLLOW-STEM JOE PYE WEED	FACW
ASTER LATERIFLORUS (SYMPHYOTRICHUM LATERIFLORUM)	STARVED/CALICO ASTER	FACW

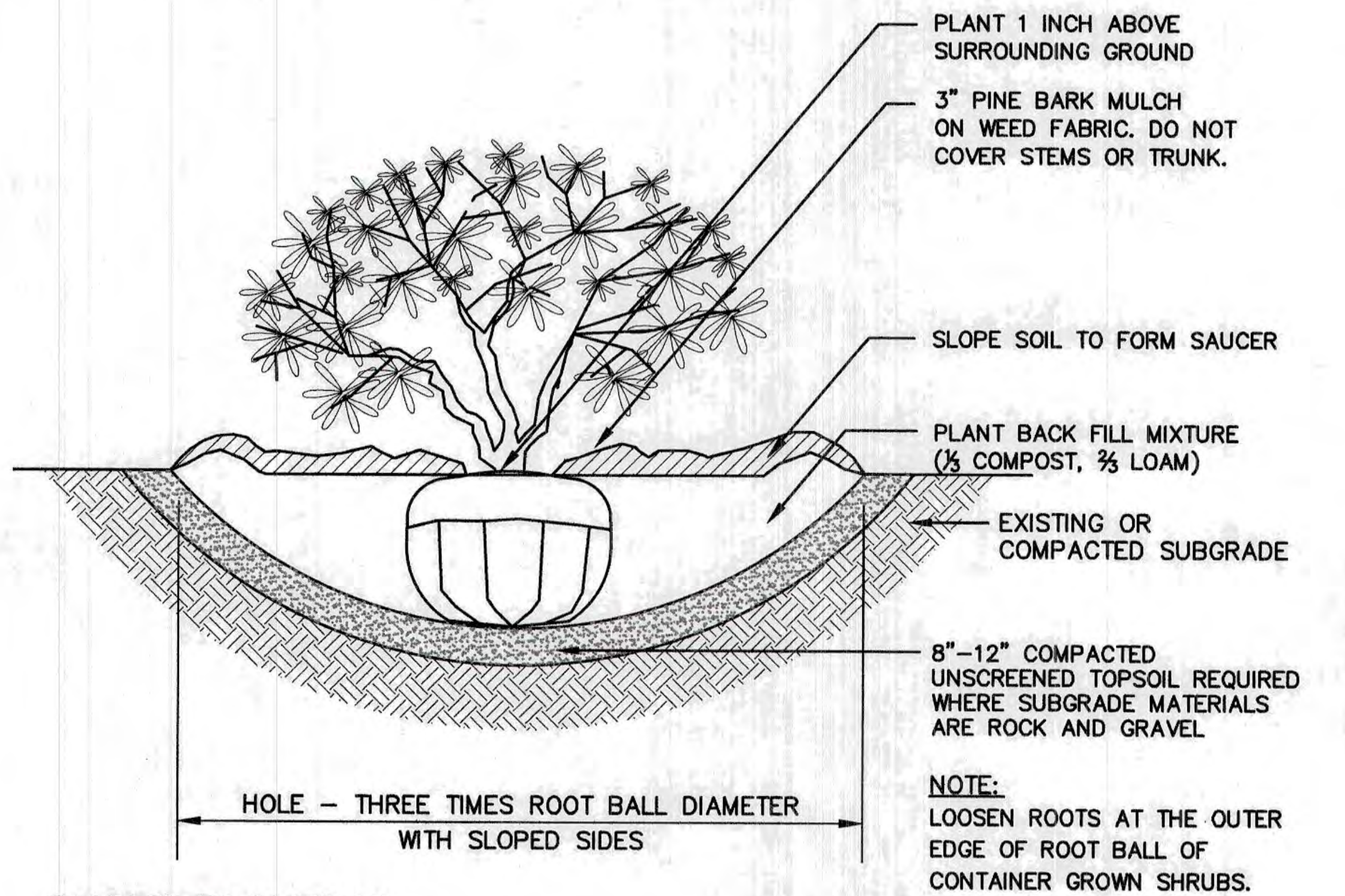
SEED MIX NOTES:

1. APPLICATION RATE: 23 LBS/ACRE, 1900 SQ. FT./LB
2. USE THE ABOVE "NEW ENGLAND WILDFLOWER MIX" TO RESTORE THE STOCKPILE AREA AFTER CONSTRUCTION.
3. FOR APPROX. 7,600 S.F. STOCKPILE AREA AND 15,000 S.F. PLANTING ALONG WETLAND BUFFER (22,600 S.F. TOTAL), UTILIZE 4 LBS± OF SEED MIX. COST IS APPROX. $75/LB.
4. THIS MIX CAN BE APPLIED BY HYDRO-SEEDING (NO TACKIFIERS), BY MECHANICAL SPREADER, OR BY HAND. LIGHTLY RAKE OR ROLL AFTER SOWING TO INCREASE SEED TO SOIL CONTACT. APPLY ON A CLEAN, WEED FREE SEED BED, BEST RESULTS ARE OBTAINED WITH A SPRING OR LATE FALL DORMANT SEEDING.
5. SOURCE: NEW ENGLAND WETLAND PLANTS, INC., 820 WEST STREET, AMHERST, MA 01002. PHONE: 413-548-8000. EMAIL: INFO@NEWP.COM, WEB: WWW.NEWP.COM

GRAPHIC SCALE



(IN FEET)
1 inch = 50 feet



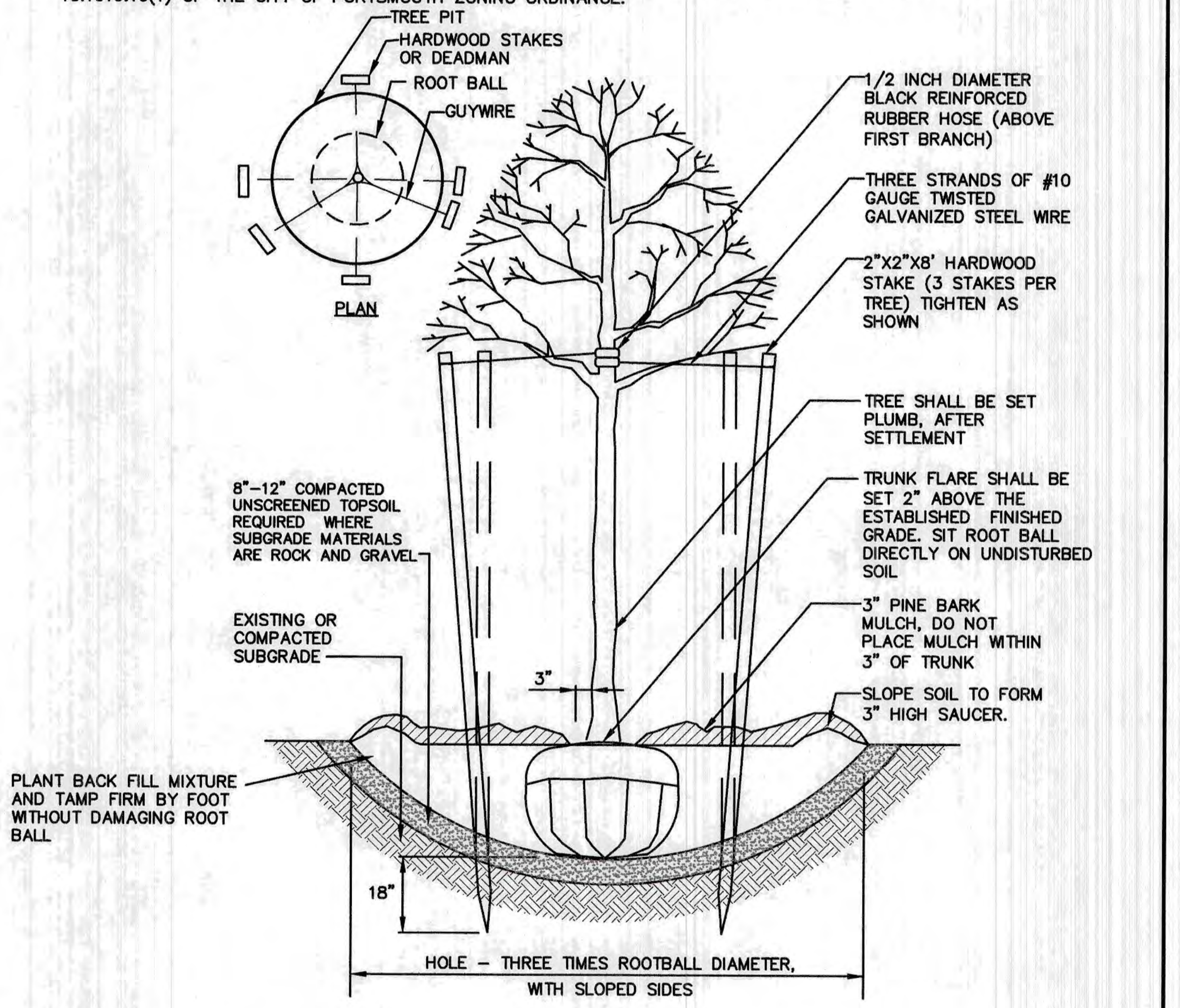
NOTE:
LOOSEN ROOTS AT THE OUTER EDGE OF ROOT BALL OF CONTAINER GROWN SHRUBS.

SHRUB PLANTING

NOT TO SCALE

LANDSCAPE NOTES:

1. THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING WORK.
2. FOCAL POINT STORMWATER TREATMENT AREAS TO BE PLANTED WITH PERENNIAL GRASSES, CONEFLOWERS, DAYLILIES, BUTTERFLY MILKWEED, BEE BALM, BLUE FLAG IRIS, AND JOE PYE WEED. PLANT IN RANDOM GROUPINGS OF 10-12 PLANTS APPROXIMATELY 3 FEET ON CENTER. REMOVE STONE INLET PROTECTION AROUND OVERFLOW RISER AFTER CONSTRUCTION AND PLANT IN AFFECTED AREA.
3. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTINGS SHOWN ON THE DRAWINGS.
4. ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
5. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL AT THE PLACE OF GROWTH, UPON DELIVERY OR AT THE JOB SITE WHILE WORK IS ON-GOING FOR CONFORMITY TO SPECIFIED QUALITY, SIZE AND VARIETY.
6. PLANTS FURNISHED IN CONTAINERS SHALL HAVE THE ROOTS WELL ESTABLISHED IN THE SOIL MASS AND SHALL HAVE AT LEAST ONE (1) GROWING SEASON. ROOT-BOUND PLANTS OR INADEQUATELY SIZED CONTAINERS TO SUPPORT THE PLANT MAY BE DEEMED UNACCEPTABLE.
7. ALL WORK AND PLANTS SHALL BE DONE, INSTALLED AND DETAILED IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
8. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24-HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN IF NECESSARY, DURING THE FIRST GROWING SEASON.
9. ALL LANDSCAPE AREAS TO BE GRASS COMMON TO REGION, EXCEPT FOR INTERIOR LANDSCAPED ISLANDS OR WHERE OTHER PLANT MATERIAL IS SPECIFIED.
10. ALL TREES AND SHRUBS SHALL BE PLANTED IN MULCH BEDS WITH EDGE STRIPS TO SEPARATE TURF GRASS AREAS.
11. THE CONTRACTOR SHALL REMOVE WEEDS, ROCKS, CONSTRUCTION ITEMS, ETC. FROM ANY LANDSCAPE AREA SO DESIGNATED TO REMAIN, WHETHER ON OR OFF-SITE. GRASS SEED OR PINE BARK MULCH SHALL BE APPLIED AS DEPICTED ON PLANS.
12. FINISHED GRADES IN LANDSCAPED ISLANDS SHALL BE INSTALLED SO THAT THEY ARE 1" HIGHER THAN THE TOP OF THE SURROUNDING CURB.
13. ALL LANDSCAPING SHALL MEET THE TOWN STANDARDS AND REGULATIONS.
14. EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH TEMPORARY SNOW FENCING AT THE DRIPLINE OF THE TREE. THE CONTRACTOR SHALL NOT STORE VEHICLES OR MATERIALS WITHIN THE LANDSCAPED AREAS. ANY DAMAGE TO EXISTING TREES, SHRUBS OR LAWN SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
15. ALL MULCH AREAS SHALL RECEIVE A 3" LAYER OF SHREDDED PINE BARK MULCH OVER A 10 MIL WEED MAT EQUAL TO 'WEEDBLOCK' BY EASY GARDENER OR DEWITT WEED BARRIER.
16. ALL LANDSCAPED AREAS SHALL HAVE SELECT MATERIALS REMOVED TO A DEPTH OF AT LEAST 9" BELOW FINISH GRADE. THE RESULTING VOID IS TO BE FILLED WITH A MINIMUM OF 9" HIGH-QUALITY SCREENED LOAM AMENDED WITH 3" OF AGED ORGANIC COMPOST.
17. THIS PLAN IS INTENDED FOR LANDSCAPING PURPOSES ONLY. REFER TO CIVIL/SITE DRAWINGS FOR OTHER SITE CONSTRUCTION INFORMATION.
18. IRRIGATION PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY OWNER AND ENGINEER PRIOR TO INSTALLATION.
19. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND REPLACEMENT OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS.
20. ALL REQUIRED PLANT MATERIALS SHALL BE TENDED AND MAINTAINED IN A HEALTHY GROWING CONDITION, REPLACED WHEN NECESSARY, AND KEPT FREE OF REFUSE AND DEBRIS. ALL REQUIRED FENCES AND WALLS SHALL BE MAINTAINED IN GOOD REPAIR.
21. THE PROPERTY OWNER SHALL BE RESPONSIBLE TO REMOVE AND REPLACE DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE, AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED, AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.
22. ALL BURLAP AND CAGES SHOULD BE REMOVED FOR LANDSCAPE PLANTS.
23. PLANTING IN WETLAND BUFFER WITHOUT FILLING OR DREDGING THE SAME AREA IS A PERMITTED USE PER SECTION 10.1016.10(1) OF THE CITY OF PORTSMOUTH ZONING ORDINANCE.



TREE PLANTING (FOR TREES UNDER 4" CALIPER)

NOT TO SCALE

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9646
12/21/2021

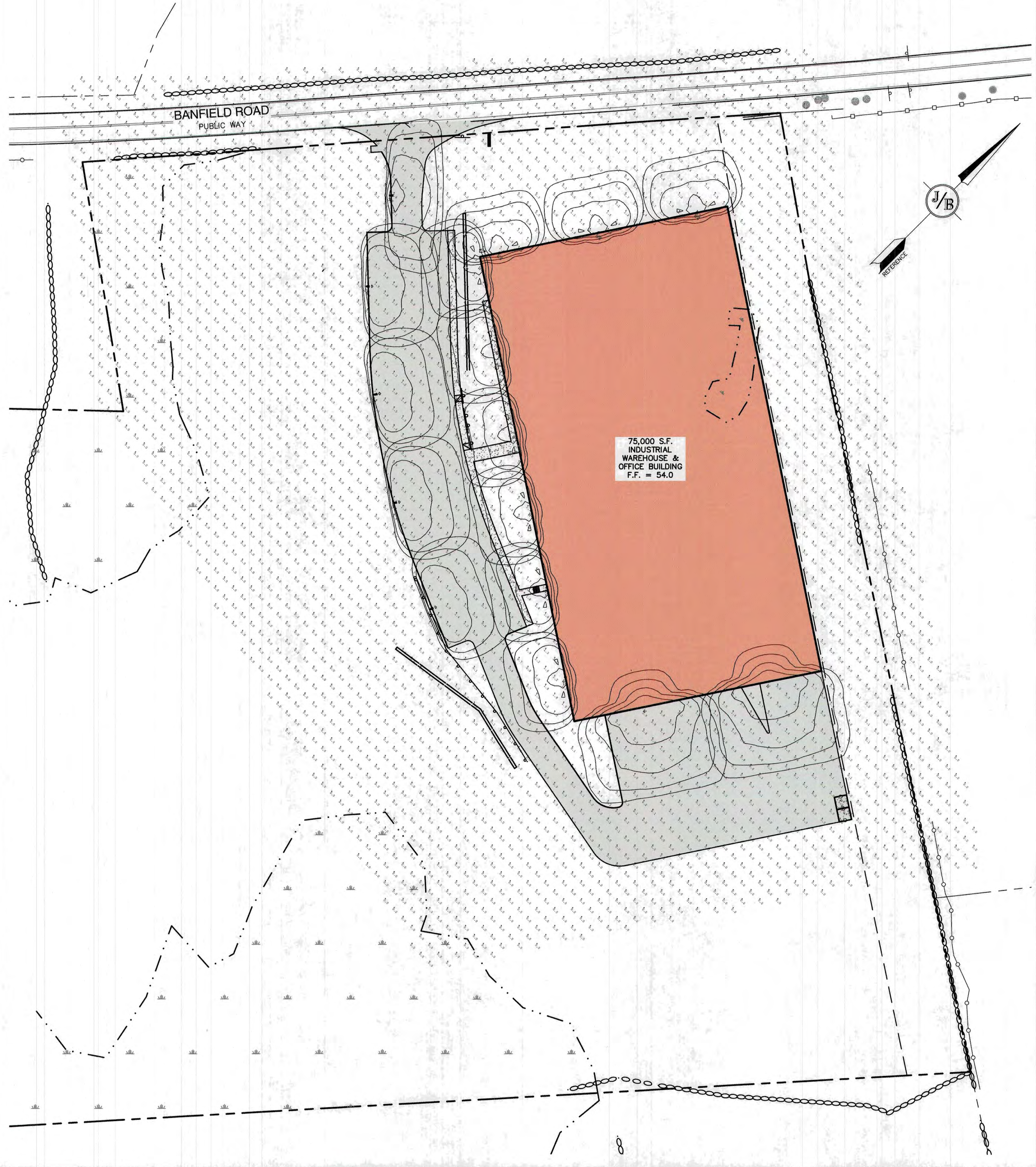
REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH

Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: LANDSCAPE PLAN
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
L1
SHEET 7 OF 24
JBE PROJECT NO. 19190.2



McGraw-Edison

DESCRIPTION

The Galleon™ LED luminaire delivers exceptional performance in a highly scalable, low-profile design. Patented, high-efficiency AccuLED Optics™ system provides uniform and energy conscious illumination to walkways, parking lots, roadways, building areas and security lighting applications. IP66 rated and UL/cUL Listed for wet locations.

Catalog #		Type
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Construction
Extruded aluminum driver enclosure thermally isolated from Light Squares for optimal thermal performance. Heavy-wall, die-cast aluminum end caps enclose housing and die-cast aluminum heat sinks. A unique, patent pending interlocking housing and heat sink provides scalability with superior structural rigidity. 3G vibration tested and rated. Optional tool-less hardware available for ease of entry into electrical chamber. Housing is IP66 rated.

Optics
Patented, high-efficiency injection-molded AccuLED Optics technology. Optics are precisely designed to shape the distribution maximizing efficiency and application spacing. AccuLED Optics create consistent distributions with the scalability to meet customized application requirements. Offered standard in 4000K (+/- 275K) CCT 70 CRI. Optional 3000K, 5000K and 6000K CCT.

Electrical
LED drivers are mounted to removable tray assembly for ease of maintenance. 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. Standard with 0-10V dimming. Shipped standard with Eaton proprietary circuit module designed to withstand 10kV of transient line surge. The Galleon LED luminaire is suitable for operation in -40°C to 40°C ambient environments. For applications with ambient temperatures exceeding 40°C, specify the HA (High Ambient) option. Light Squares are IP66 rated. Greater than 90% lumen maintenance expected at 60,000 hours. Available in standard 1A drive current and optional 600mA, 800mA and 1200mA drive currents (nominal).

Mounting
STANDARD ARM MOUNT: Extruded aluminum arm includes internal bolt guides allowing for easy positioning of fixture during mounting. When mounting two or more luminaires at 90° and 120° apart, the EA extended arm may be required. Refer to the arm mounting requirement table. Round pole adapter included. For wall mounting, specify wall mount bracket option. QUICK MOUNT ARM: Adapter is bolted directly to the pole. Quick mount arm slide into place on the adapter and is secured via two screws, facilitating quick and easy installation. The versatile, patent pending, quick mount arm accommodates multiple drill patterns ranging from 1-1/2" to 4-7/8". Removal of the door on the quick mount arm enables wiring of the fixture without having to access the driver compartment. A knock-out enables round pole mounting.

Finish
Housing finished in super durable TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Heat sink is powder coated black. Standard housing colors include black, bronze, grey, white, dark platinum and graphite metallic. RAL and custom color matches available.

Warranty
Five-year warranty.

GLEON
GALLEON LED

1-10 Light Squares
Solid State LED

AREA/SITE LUMINAIRE

LumenSafe Technology
CLICK HERE

DIMENSIONS

3-15/16" [100mm]
"A"
21-3/4" [553mm]
"B"

DIMENSION DATA

Number of Light Squares	"A" Width	"B" Standard Arm Length	"B" Optional Arm Length ¹	Weight with Arm (lbs.)	EPA with Arm ²(Sq. Ft.)
1-4	15-1/2" (394mm)	7" (178mm)	10" (254mm)	33 (15.0 kgs.)	0.96
5-6	21-5/8" (549mm)	7" (178mm)	10" (254mm)	44 (20.0 kgs.)	1.00
7-8	27-5/8" (702mm)	7" (178mm)	13" (330mm)	54 (24.5 kgs.)	1.07
9-10	33-3/4" (857mm)	7" (178mm)	16" (406mm)	63 (28.6 kgs.)	1.12

NOTES: 1. Optional arm length to be used when mounting two fixtures at 90° on a single pole. 2. EPA calculated with optional arm length.

DRILLING PATTERN

TYPE "N"
3/4" [19mm] Diameter Hole
2" [51mm]
7/8" [22mm]
1-3/4" [44mm]
(2) 9/16" [14mm] Diameter Holes

CERTIFICATION DATA
UL/cUL Wet Location Listed
ISO 9001
LM79 / LM80 Compliant
3G Vibration Rated
IP66 Rated
DesignLights Consortium® Qualified*

ENERGY DATA
Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120V-277V 50/60Hz
347V & 480V 60Hz
-40°C Min. Temperature
40°C Max. Temperature
50°C Max. Temperature (HA Option)

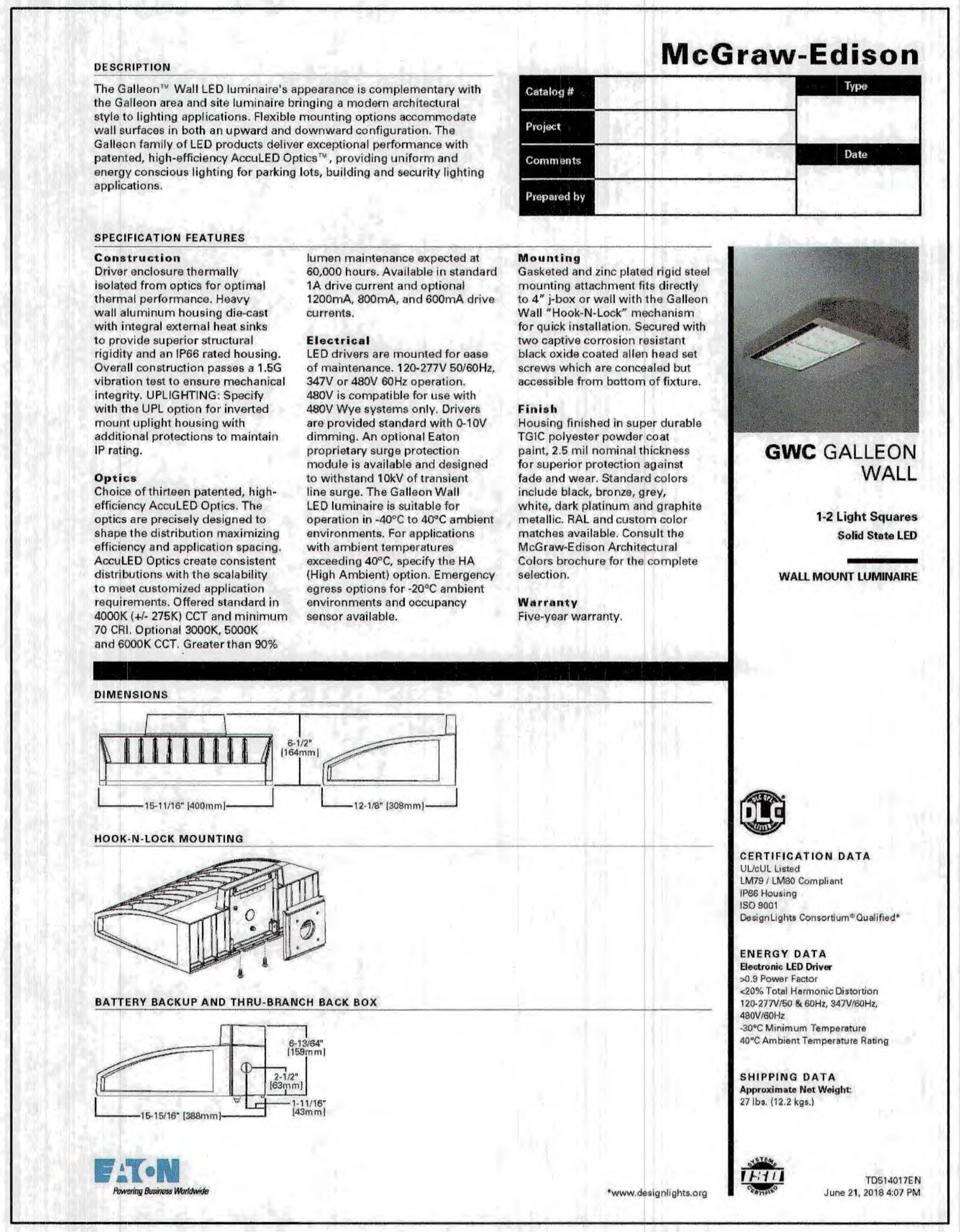
EATON
Powering Business Worldwide

*www.designlights.org

TD500020EN
January 17, 2019 2:38 PM

LIGHTING AND ELECTRICAL NOTES:

1. SITE ELECTRICAL CONTRACTOR SHALL COORDINATE LOCATION OF EASEMENTS, UNDERGROUND UTILITIES AND DRAINAGE BEFORE DRILLING POLE BASES.
2. CONTRACTOR SHALL INSTALL PROPOSED LIGHT POLES ACCORDING TO TOWN REGULATIONS.
3. ALL OUTDOOR LIGHTING SYSTEMS SHALL BE EQUIPPED WITH TIMERS TO REDUCE ILLUMINATION LEVELS TO NON-OPERATIONAL VALUES PER TOWN REGULATIONS.
4. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
5. ILLUMINATION READINGS SHOWN ARE BASED ON A TOTAL LLF OF 0.75 AT GRADE. ILLUMINATION READINGS SHOWN ARE IN UNITS OF FOOT-CANDLES.
6. LIGHTING CALCULATIONS SHOWN ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM AND SAFETY.
7. ALL LIGHTING FIXTURES SHALL BE FULL CUT-OFF DARK-SKY COMPLIANT, UNLESS OTHERWISE NOTED.
8. NL INDICATES THAT THIS LUMINAIRE SHALL BE ON A NIGHT LIGHT CIRCUIT. FL INDICATES THAT THIS LUMINAIRE SHALL BE A FLOOD LIGHT FIXTURE. MOUNTING BRACKET FOR THIS FL FIXTURE SHALL BE MOUNTED 25' ABOVE BOTTOM OF POLE BASE FOR ALL LIGHT POLES. THESE DESIGNATIONS INDICATE WHAT PHASE LIGHTS ARE WIRED TO (TYP).
9. THE PROPOSED LIGHTING CALCULATIONS AND DESIGN WAS PERFORMED BY CHARRON, INC., P.O. BOX 4550, MANCHESTER, NH 03108, ATTENTION KEN SWEENEY. ALL LIGHTS SHOULD BE PURCHASED FROM THIS COMPANY OR ONE OF THEIR SUPPLIERS, OR AN EQUAL LIGHTING DESIGN SHOULD BE SUBMITTED FOR REVIEW IF EQUAL SUBSTITUTIONS ARE PROPOSED BY THE CONTRACTOR OR OWNER.



McGraw-Edison

DESCRIPTION

The Galleon™ Wall LED luminaire's appearance is complementary with the Galleon area and site luminaire bringing a modern architectural style to lighting applications. Flexible mounting options accommodate wall surfaces in both an upward and downward configuration. The Galleon family of LED products deliver exceptional performance with patented, high-efficiency AccuLED Optics™, providing uniform and energy conscious lighting for parking lots, building and security lighting applications.

Catalog #		Type
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Construction
Driver enclosure thermally isolated from optics for optimal thermal performance. Heavy wall aluminum housing die-cast with integral external heat sinks to provide superior structural rigidity and an IP66 rated housing. Overall construction passes a 1.5G vibration test to ensure mechanical integrity. UPLIGHTING: Specify with the UPL option for inverted mount uplight housing with additional protections to maintain IP rating.

Optics
Choice of thirteen patented, high-efficiency AccuLED Optics. The optics are precisely designed to shape the distribution maximizing efficiency and application spacing. AccuLED Optics create consistent distributions with the scalability to meet customized application requirements. Offered standard in 4000K (+/- 275K) CCT and minimum 70 CRI. Optional 3000K, 5000K and 6000K CCT. Greater than 90% lumen maintenance expected at 60,000 hours. Available in standard 1A drive current and optional 1200mA, 800mA, and 600mA drive currents.

Electrical
LED drivers are mounted for ease of maintenance. 120-277V 50/60Hz, 347V or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. Drivers are provided standard with 0-10V dimming. An optional Eaton proprietary surge protection module is available and designed to withstand 10kV of transient line surge. The Galleon Wall LED luminaire is suitable for operation in -40°C to 40°C ambient environments. For applications with ambient temperatures exceeding 40°C, specify the HA (High Ambient) option. Emergency egress options for -20°C ambient environments and occupancy sensor available.

Mounting
Gasketed and zinc plated rigid steel mounting attachment fits directly to 4" j-box or wall with the Galleon Wall "Hook-N-Lock" mechanism for quick installation. Secured with two captive corrosion resistant black oxide coated allen head set screws which are concealed but accessible from bottom of fixture.

Finish
Housing finished in super durable TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Standard colors include black, bronze, grey, white, dark platinum and graphite metallic. RAL and custom color matches available. Consult the McGraw-Edison Architectural Colors brochure for the complete selection.

Warranty
Five-year warranty.

GWC GALLEON WALL

1-2 Light Squares
Solid State LED

WALL MOUNT LUMINAIRE

DIMENSIONS

6-1/2" [164mm]
15-11/16" [400mm]
12-1/8" [308mm]

HOOK-N-LOCK MOUNTING

BATTERY BACKUP AND THRU-BRANCH BACK BOX

6-13/64" [159mm]
2-1/2" [63mm]
1-11/16" [43mm]
15-15/16" [388mm]

CERTIFICATION DATA
UL/cUL Listed
LM79 / LM80 Compliant
IP66 Housing
ISO 9001
DesignLights Consortium® Qualified*

ENERGY DATA
Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120-277V/50 & 60Hz, 347V/60Hz, 480V/60Hz
-30°C Minimum Temperature
40°C Ambient Temperature Rating

SHIPPING DATA
Approximate Net Weight:
27 lbs. (12.2 kgs.)

EATON
Powering Business Worldwide

*www.designlights.org

TD514017EN
June 21, 2018 4:07 PM

GRAPHIC SCALE

(IN FEET)
1 inch = 50 feet

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description
	1	S3	SINGLE	GLEON-AF-01-LED-E1-SL3-HSS/ SSS4A20SFN1 (20' AFG)
	4	S4	SINGLE	GLEON-AF-01-LED-E1-SL4-HSS/ SSS4A20SFN1 (20' AFG)
	2	W	SINGLE	GWC-AF-02-LED-E1-T4FT/ WALL MTD 20' AFG
	9	W4	SINGLE	GWC-AF-01-LED-E1-SL4-600/ WALL MTD 15' AFG

F:\CADD\MASTER STANDARD.dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

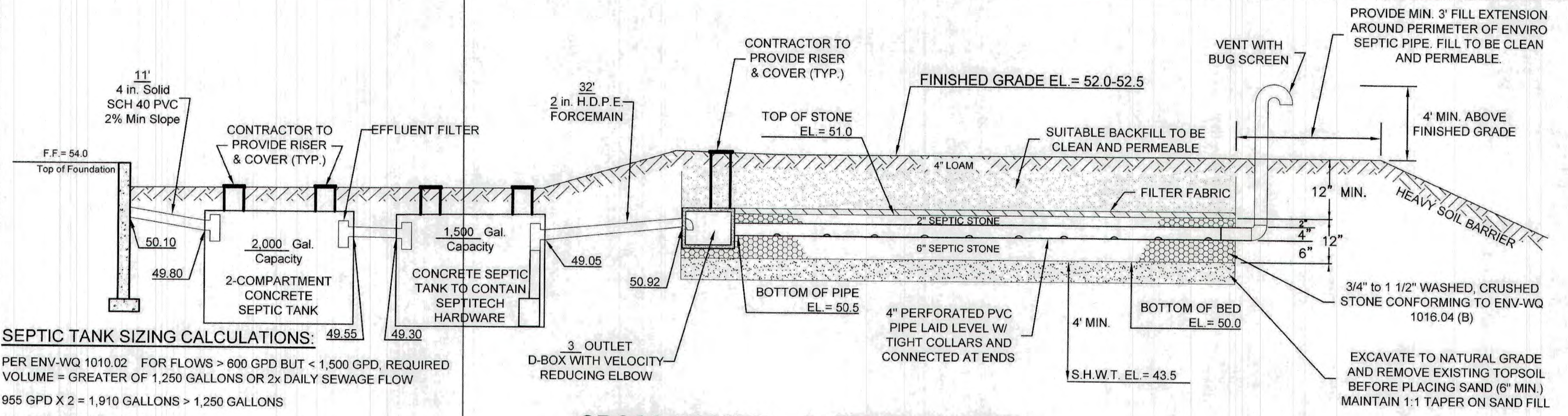
12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	LIGHTING PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
L2
SHEET 8 OF 24
JBE PROJECT NO. 19190.2



SEPTIC TANK SIZING CALCULATIONS:

PER ENV-WQ 1010.02 FOR FLOWS > 600 GPD BUT < 1,500 GPD, REQUIRED VOLUME = GREATER OF 1,250 GALLONS OR 2x DAILY SEWAGE FLOW

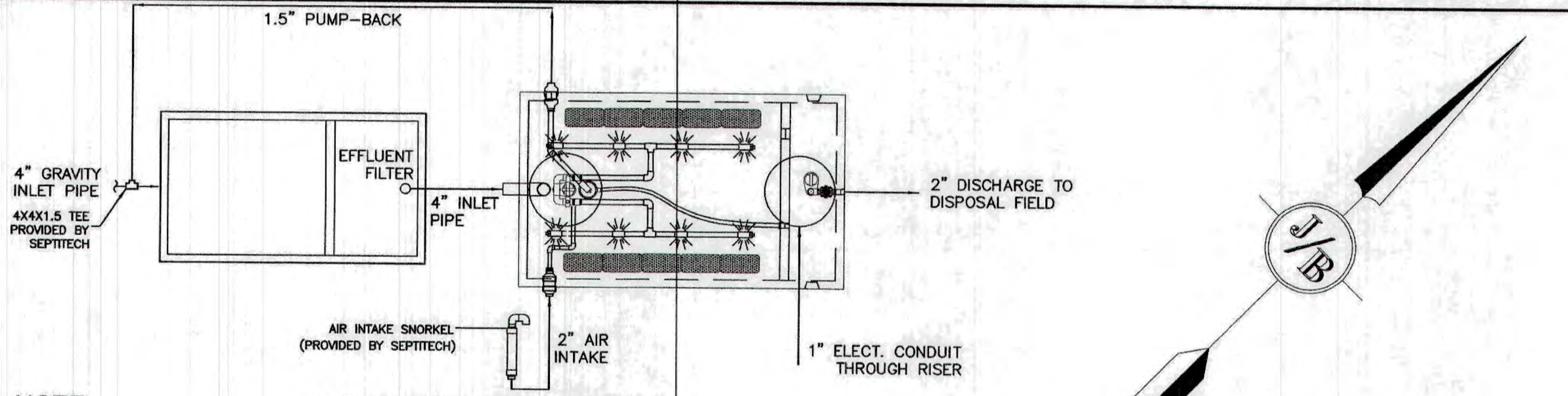
955 GPD X 2 = 1,910 GALLONS > 1,250 GALLONS

1,910 GALLONS REQUIRED

2,000 GAL. PROVIDED.

CROSS SECTION - DISPOSAL SYSTEM

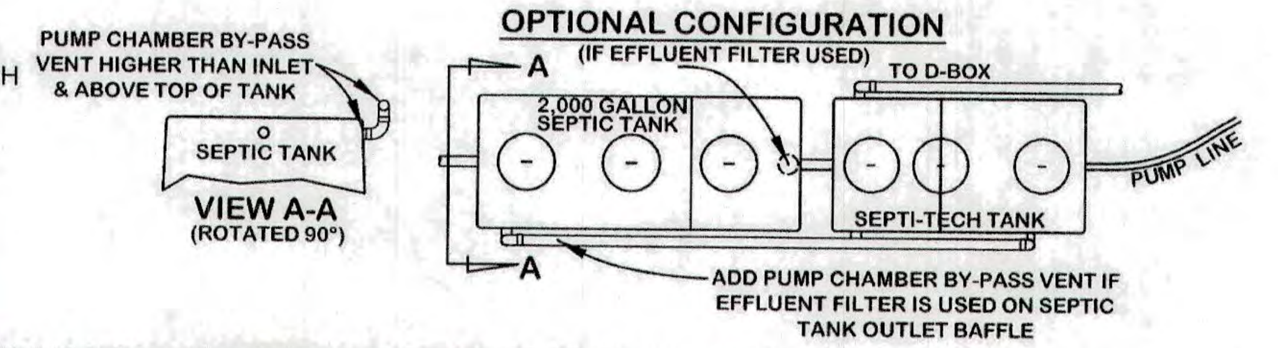
N.T.S.



SEPTI-TECH PLAN VIEW

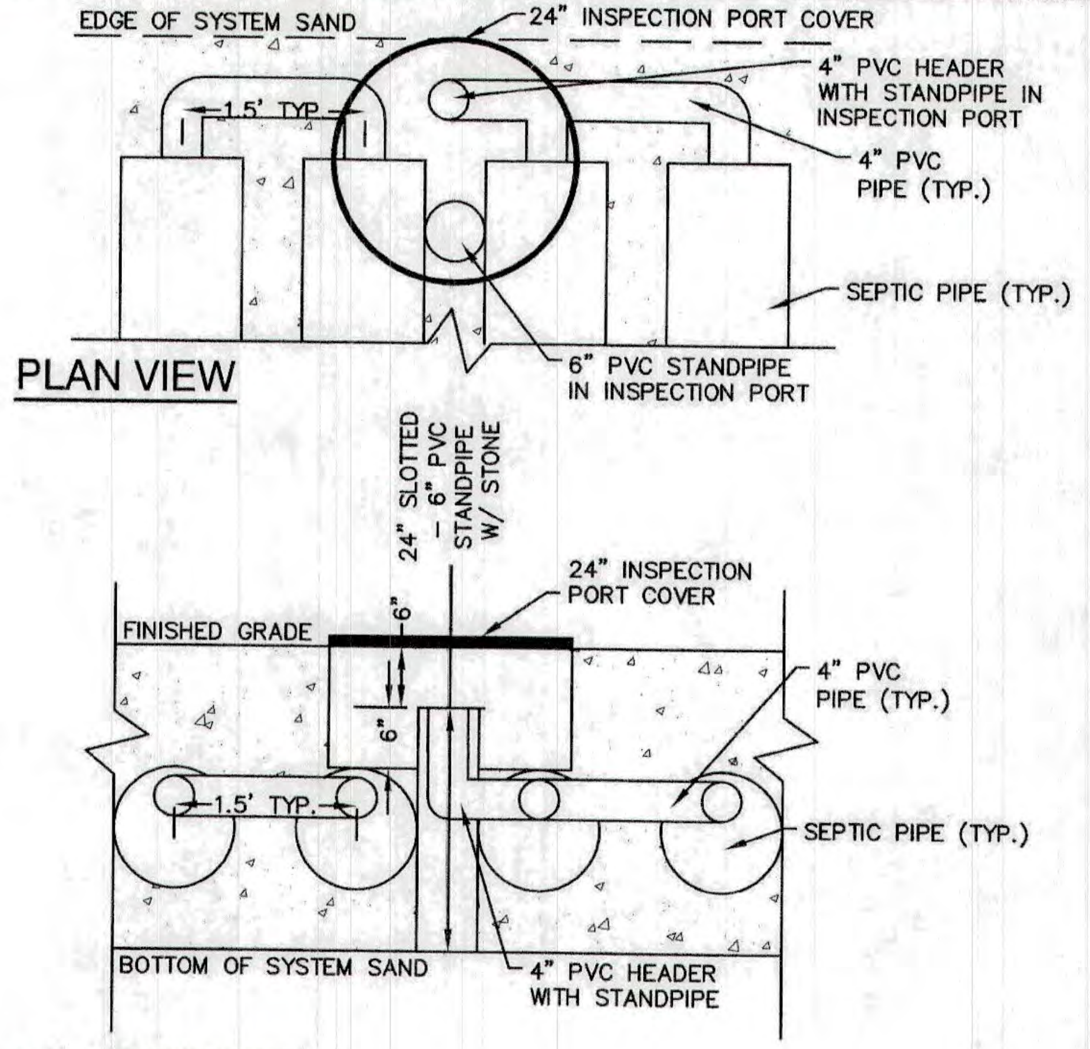
NOTE:

- CONTRACTOR IS RESPONSIBLE FOR PURCHASE AND INSTALLATION OF BOTH TANKS ON THE LOT. SEPTITECH WILL INSTALL THE EQUIPMENT AFTER THE TANK IS INSTALLED IN GROUND
- ALL PUMP SPECIFICATIONS AND MODELS TO BE SUPPLIED BY SEPTITECH
- SEPTITECH MODEL STAAR 1.0 DENITE REQUIRES A DISCHARGE PUMP UPGRADE THAT IS TO BE DETERMINED BY SEPTITECH.



BY-PASS VENTING W/ EFFLUENT FILTER

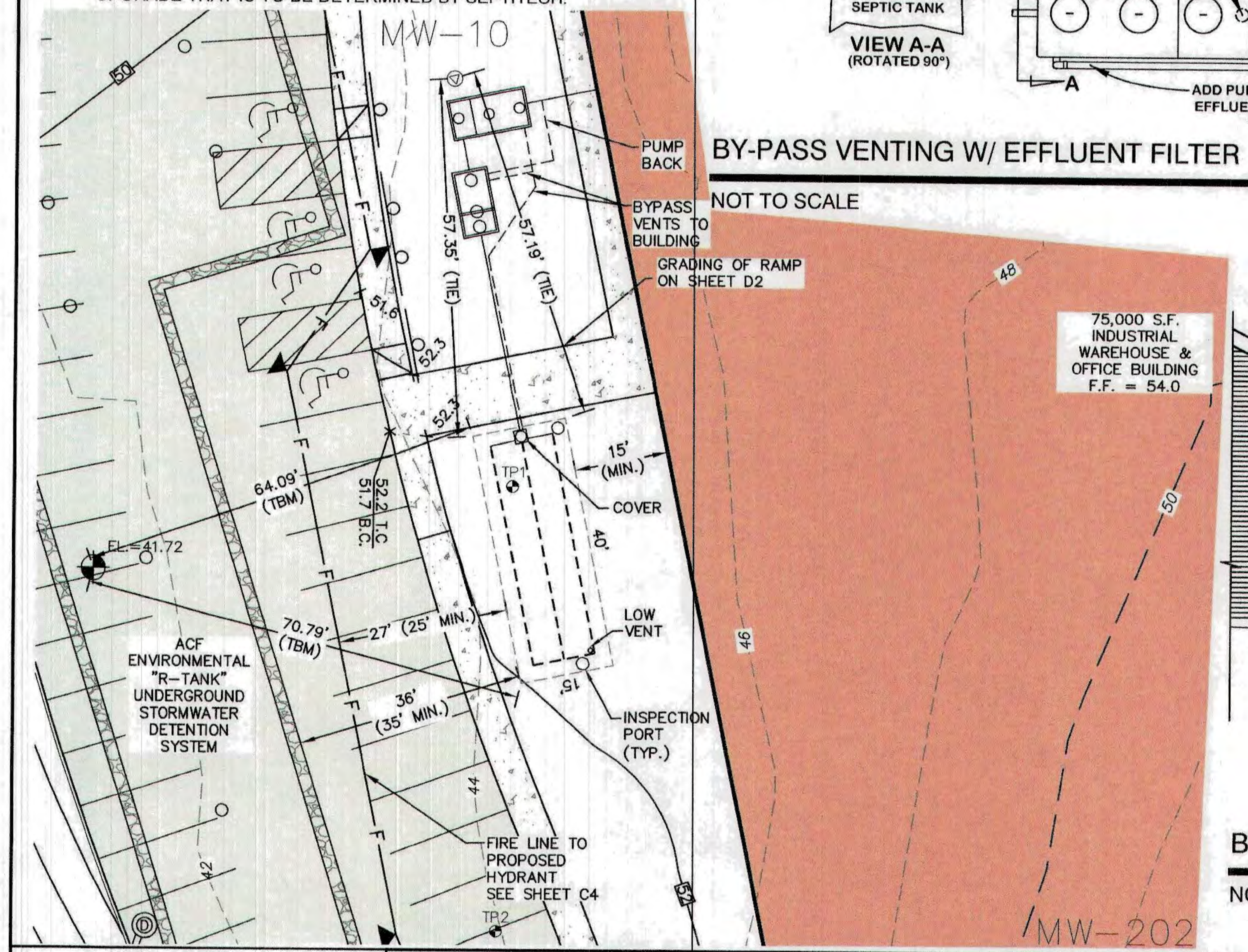
NOT TO SCALE

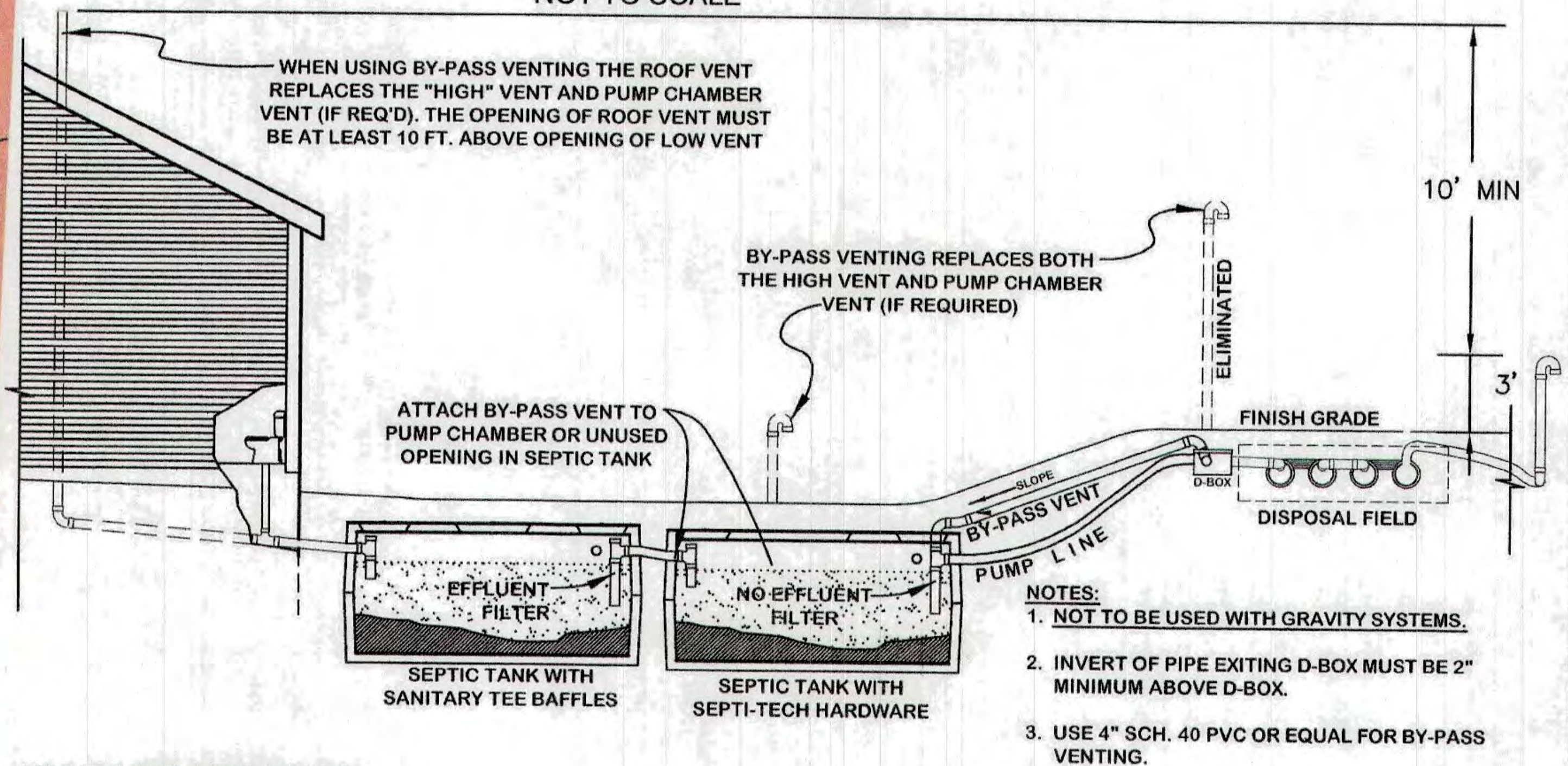


SECTION VIEW

INSPECTION PORT DETAIL

NOT TO SCALE





NOTES:
1. NOT TO BE USED WITH GRAVITY SYSTEMS.
2. INVERT OF PIPE EXITING D-BOX MUST BE 2" MINIMUM ABOVE D-BOX.
3. USE 4" SCH. 40 PVC OR EQUAL FOR BY-PASS VENTING.
4. GLUE ALL PVC JOINTS OR EQUAL.

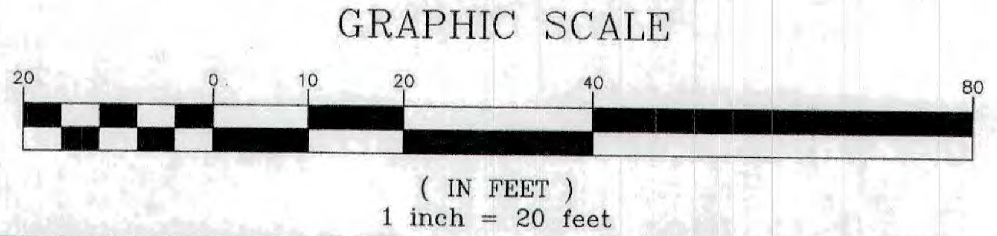
BY-PASS VENTING

NOT TO SCALE

Dig Safe Systems, Inc.

It's Smart. It's Easy. It's the Law.

1-888-DIG-SAFE
digsafe.com



TEST PIT LOGS

PERFORMED BY: JOSEPH CORONATI, JONES & BEACH ENGINEERS, INC. SSD# 1716

TEST PIT #1

0"-8"		LOAM
8"-18"	10YR 4/4	DARK YELLOWISH BROWN FINE SANDY LOAM GRANULAR, FRIABLE
18"-90"	10YR 5/6	YELLOWISH BROWN SILTY LOAM FIRM

SHWT = 18"
ROOTS = 18"
H_2O @ 32"
NO REFUSAL OBSERVED

◕ TEST PIT, DATE: APRIL 8, 2020
◐ PERC. TEST, DATE: APRIL 8, 2020
16 MIN./INCH

STONE & PIPE DESIGN CALCULATIONS

WAREHOUSE: 70 EMPLOYEES = 700 GPD (10 GPD / PERSON, PER ENV-WQ 1008-1)

OFFICE WITH CAFETERIA: 17 EMPLOYEES = 255 GPD (15 GPD / PERSON, PER ENV-WQ 1008-1)

955 GPD @ 16 MIN./INCH = 2,148 S.F. REQUIRED PER ENV-WQ 1016-1.
2,148 S.F. x 75% PRE-TREATMENT REDUCTION = 537 S.F. REQUIRED.

600 S.F. PROVIDED (SEE DIMENSIONS BELOW)

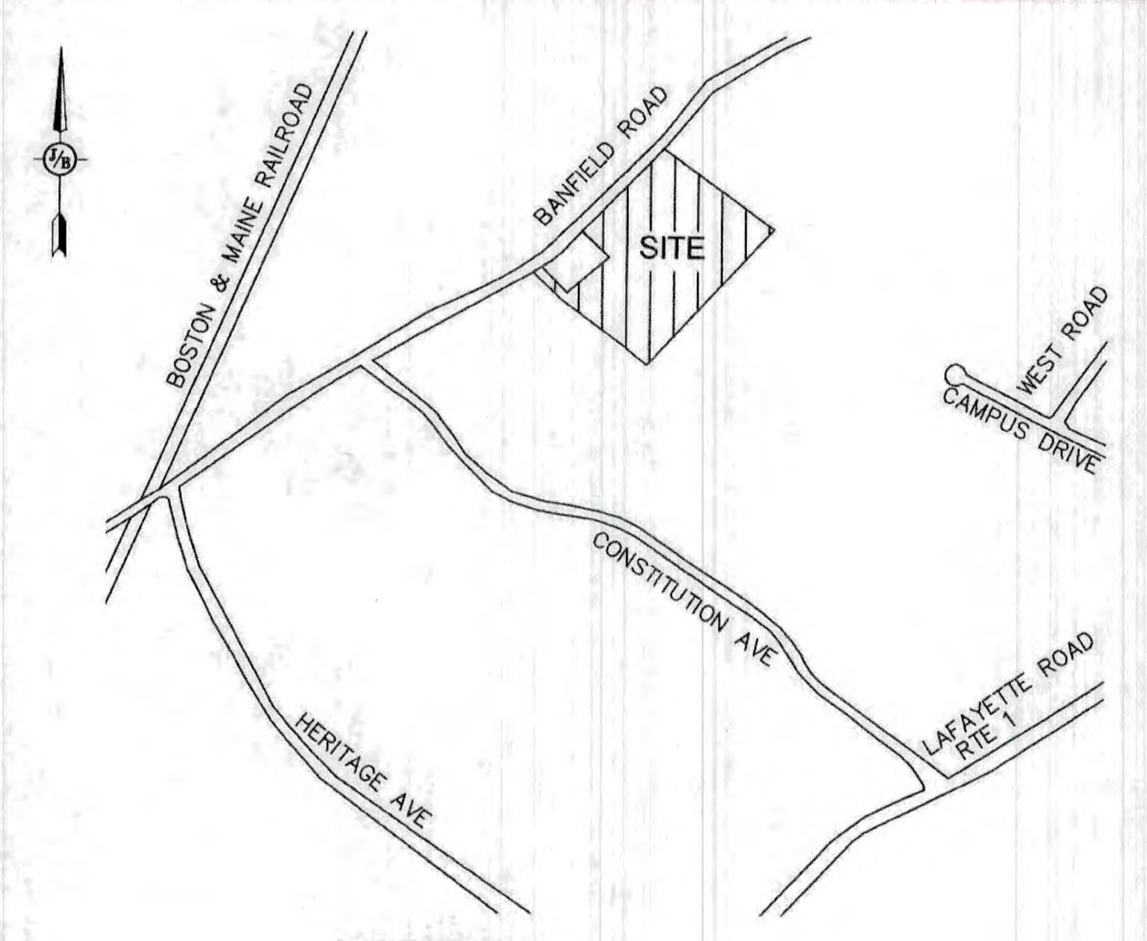
BED DIMENSIONS 40' x 15' .

DESIGN INTENT

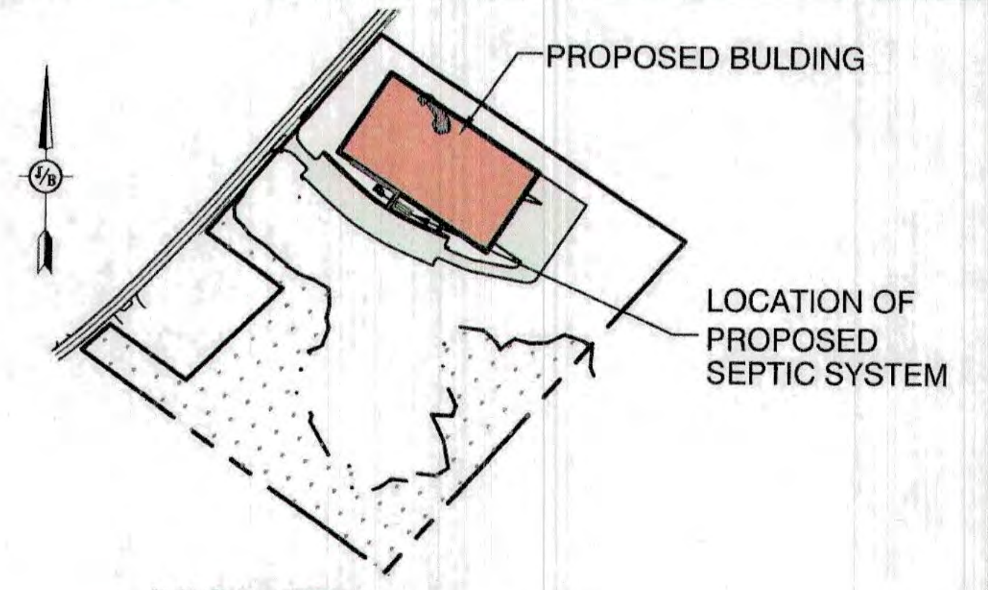
THE BOTTOM OF THE EFFLUENT DISPOSAL SYSTEM (E.D.S.) SHALL BE CONSTRUCTED AT ELEVATION 50.00 . THIS IS APPROXIMATELY 5.00 FT ABOVE ORIGINAL GROUND ON THE HIGH CONTOUR (45.00) OF THE DESIGNED E.D.S. (ENV-WQ-1003.13(aa))

GENERAL NOTES

- CONTRACTOR TO VERIFY ALL ELEVATIONS IN FIELD PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY DESIGNER OF ANY ABNORMAL CONDITIONS (HARDPAN OR SATURATED SOILS, LEDGE, ETC.) FOUND WHEN EXCAVATING PRIOR TO INSTALLATION OF THE SYSTEM.
- PER ENV-WQ 1016.03, CONTRACTOR IS TO PROTECT THE NATURAL ABSORPTION QUALITIES OF THE SOIL. DO NOT COMPACT OR DRIVE OVER THE AREA WITH EQUIPMENT AND PROTECT OPEN EXCAVATION TO PREVENT THE ENTRANCE OF SILT AND DEBRIS.
- FILL TO BE MEDIUM TO COURSE-TEXTURED SAND (0.5mm-2.0mm).
- REMOVE TOPSOIL BEFORE PLACING FILL.
- 4 INCH THICK LOAM & SEED AROUND PERIMETER OF FILL.
- CONTRACTOR TO INSTALL A VENT WHEN PROVIDING MORE THAN 18" OF COVER.
- VENTING IS REQUIRED FOR PUMP SYSTEMS
- SLOPE SYSTEM AWAY FROM BUILDING.
- SYSTEM WILL BE REPLACED IN SAME LOCATION IN CASE OF FAILURE.
- JOINTS ARE TO BE BELLED PVC OR STANDARD SLIP COLLARS.
- PER ENV-WQ 1010.11, THE FIRST COMPARTMENT IN MULTI-COMPARTMENT SEPTIC TANKS MUST EQUAL AT LEAST 2/3 OF THE REQUIRED VOLUME.
- PER ENV-WQ 1010.10, EXCEPTING LEDGE TANKS, THE LIQUID DEPTH OF THE SEPTIC TANK IS TO BE AT LEAST 40".
- THE OUTLET BAFFLE SHALL BE A VENTED TEE WHICH SHALL EXTEND TO A DISTANCE BELOW THE SURFACE EQUAL TO 40% OF THE LIQUID DEPTH AND SHALL EXTEND ABOVE THE LIQUID LINE TO NOT LESS THAN ONE INCH FROM THE TOP OF THE TANK.
- ALL CONNECTIONS BETWEEN A SEPTIC TANK AND THE PIPES LEADING TO AND EXITING FROM THE SEPTIC TANK SHALL BE SEALED WITH A WATERTIGHT, FLEXIBLE JOINT CONNECTOR THAT: (1) WILL ACCOMMODATE NORMAL MOVEMENT OF THE SEPTIC TANK WITHOUT LEAKING OR BREAKING; AND (2) HAS BEEN CERTIFIED BY ITS MANUFACTURER OR DISTRIBUTOR AS MEETING OR EXCEEDING THE APPLICABLE STANDARD IN ASTM C 1644-06, SECTION 7.
- CONTRACTOR TO PROVIDE RISERS FOR TANKS WITH MORE THAN 12" OF COVER.
- IF GARBAGE GRINDERS ARE DESIRED, SEPTIC TANK SHALL BE 50% LARGER.
- CITY OF PORTSMOUTH REQUIRES BED BOTTOM INSPECTION.
- PVC PIPING TO BE SUPPLIED BY: ELIMINATOR SYSTEMS INC. (603) 868-2242) OR EQUAL.
- 2,000 GALLON TWO-COMPARTMENT SEPTIC TANK, 1,500 GALLON SEPTIC TANK, & D-BOX TO BE SUPPLIED BY: SHEA CONCRETE. (800-696-7432) OR EQUAL.
- ADVANCED NITRATE TREATMENT SYSTEM TO BE SUPPLIED BY: SEPTITECH / BIO-MICROBICS MAINE INC., 207-333-6940. PRODUCT MAY NOT BE SUBSTITUTED WITHOUT FIRST CONTACTING THE DESIGNER.
- ROCKINGHAM COUNTY SOIL CONSERVATION SERVICE SOIL TYPE: ELDRIDGE.
- ANY CHANGES TO SEPTIC TANK, BUILDING OR WELL LOCATION/ORIENTATION WILL REQUIRE AN AS-BUILT PLAN TO BE PROVIDED BY THE DESIGNER PRIOR TO NHDES FINAL INSPECTION.
- PER ENV-WQ 1003.13(a)(3) THERE ARE NO KNOWN BURIAL SITES OR CEMETERIES ON THE LOT WITHIN 100' OF ANY COMPONENT OF THE ISDS.
- 50' SETBACK FROM POORLY DRAINED SOILS.
- DISTANCE FROM SEWER PIPE TO SURFACE WATER, OPEN DRAINAGE, VERY POORLY DRAINED SOIL, AN OPEN LOOP GEOTHERMAL WELL, OR A PRIVATE ON-SITE WELL SHALL BE 75 FT. THIS MAY BE REDUCED TO 50 FT IF SDR26 OR EQUIVALENT IS USED IN ACCORDANCE WITH ENV-WQ 1008.04(c)(1).
- DISTANCE FROM SEPTIC TANK TO SURFACE WATER, OPEN DRAINAGE, VERY POORLY DRAINED SOIL, AN OPEN LOOP GEOTHERMAL WELL, OR A PRIVATE ON-SITE WELL SHALL BE 75 FT. THIS MAY BE REDUCED TO 50 FT IF THE SEPTIC TANK IS EITHER MADE FROM PLASTIC OR COATED WITH A SEALANT TO PREVENT INFILTRATION AND EXFILTRATION IN ACCORDANCE WITH ENV-WQ 1008.04(c)(2).



LOCUS SCALE: 1"=1000'



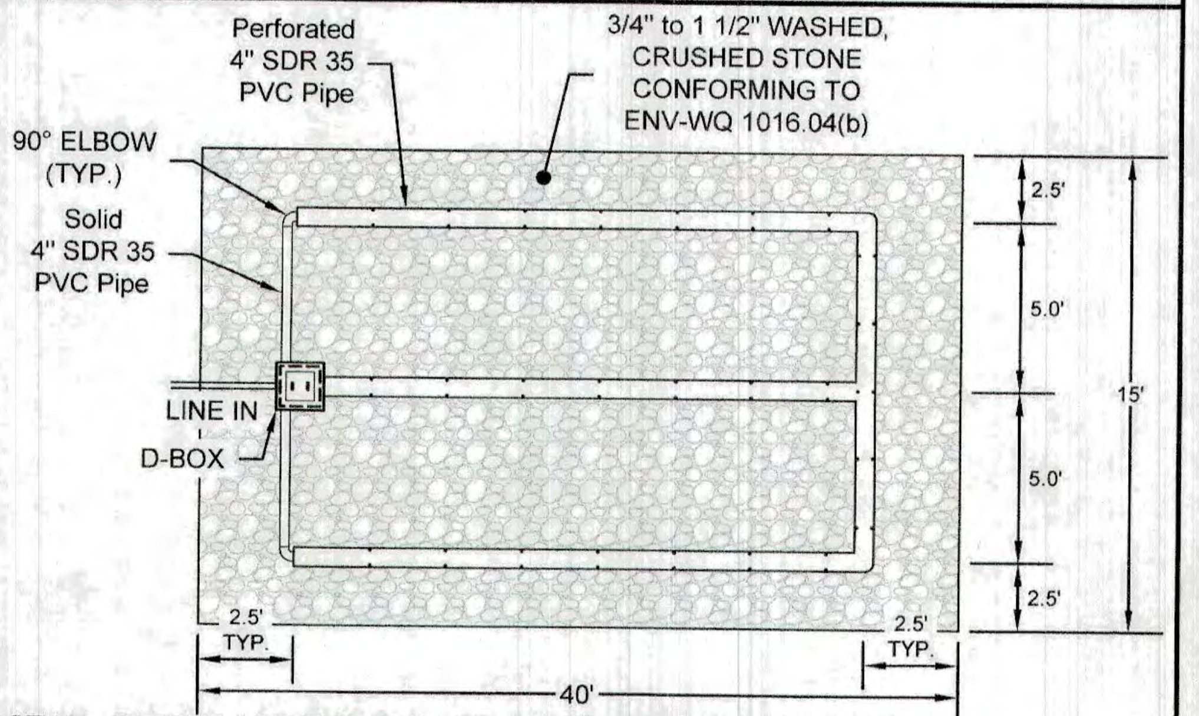
VICINITY SCALE: 1"=400'

REFERENCES

APPROVAL FOR CONSTRUCTION IS VALID FOR 4 YEARS FROM DATE OF ISSUE

- PREV. CONSTRUCTION APPROVAL #CA1998009388 ISSUED: 06/03/1998.
- SUBDIVISION APPROVAL: LARGER THAN 5 ACRES.

TYPICAL PLAN VIEW



ACTUAL SYSTEM UTILIZES 3 ROWS OF 4" PERFORATED PVC PIPE.
SEE PLAN VIEW (LEFT) FOR ACTUAL LAYOUT/CONFIGURATION OF SYSTEM.

WETLAND DELINEATION

WETLANDS ON-SITE WERE DELINEATED BY:

GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DRIVE, UNIT H
EXETER, NH 03833

DATE: SPRING, 2020

OWNER NOTES

- KNOW THE LOCATION OF YOUR SEPTIC TANK AND LEACHING AREA.
- INSPECT YOUR SEPTIC TANK YEARLY. HAVE THE SEPTIC TANK PUMPED AS NEEDED BUT AT LEAST ONCE EVERY THREE YEARS.
- DO NOT FLUSH BULKY ITEMS SUCH AS DIAPERS, SANITARY PADS OR BABY WIPES.
- DO NOT FLUSH TOXIC CHEMICALS SUCH AS PAINT THINNERS, DRANO, PESTICIDES, OR CHLORINE, AS THEY MAY KILL THE NECESSARY BACTERIA IN THE SEPTIC TANK.
- REPAIR LEAKING FIXTURES IN THE BUILDING PROMPTLY.
- BE CONSERVATIVE WITH WATER USE, SPREAD OUT USE OVER TIME, AND USE WATER-REDUCING FIXTURES WHENEVER AND WHEREVER POSSIBLE. TOO MUCH USE IN A SHORT TIME CAN OVERLOAD THE SYSTEM, WHICH MAY LEAD TO FAILURE.
- MOW YOUR LEACHING AREA REGULARLY. PREVENT DEEP-ROOTED TREES AND SHRUBS FROM GROWING ON AND ADJACENT TO YOUR LEACHING AREA.
- NO VEHICULAR TRAVEL, LIVESTOCK TRAVEL, OR SNOW REMOVAL IN AREA OF SYSTEM.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 266, LOT 7
R.C.R.D. BK. 6081 PG. 2150
TOTAL LOT AREA ACRES

- CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING THE SEPTIC PLAN FROM THE NHDES APPROVED PLAN
- THE BUILDER/SITE CONTRACTOR IS RESPONSIBLE TO CONFIRM THE ZONING DIMENSIONAL REQUIREMENTS AND SETBACK LINE REQUIREMENTS PRIOR TO INITIATING CONSTRUCTION OF THE PROPOSED BUILDING AND SEPTIC SYSTEM. THE ZONING ORDINANCE OF THE MUNICIPALITY IS TO BE COMPLIED WITH. THE BUILDER/SITE CONTRACTOR IS ALSO RESPONSIBLE TO CONTACT THE MUNICIPALITY REGARDING INSPECTIONS PRIOR TO AND DURING CONSTRUCTION, I.E. LOCATION AND BED-BOTTOM INSPECTIONS.

REVIEWED AND APPROVED
IN ACCORDANCE WITH THE
REQUIREMENTS OF THE
NH DEPT OF ENVIRONMENTAL SERVICES
WATER DIVISION
Tayl Walter
Date: 10/29/2021
#eCA2021102913

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: 1" = 20'	Project No.: 19190.2
Drawing Name:	W-LAYOUT.DWG	

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

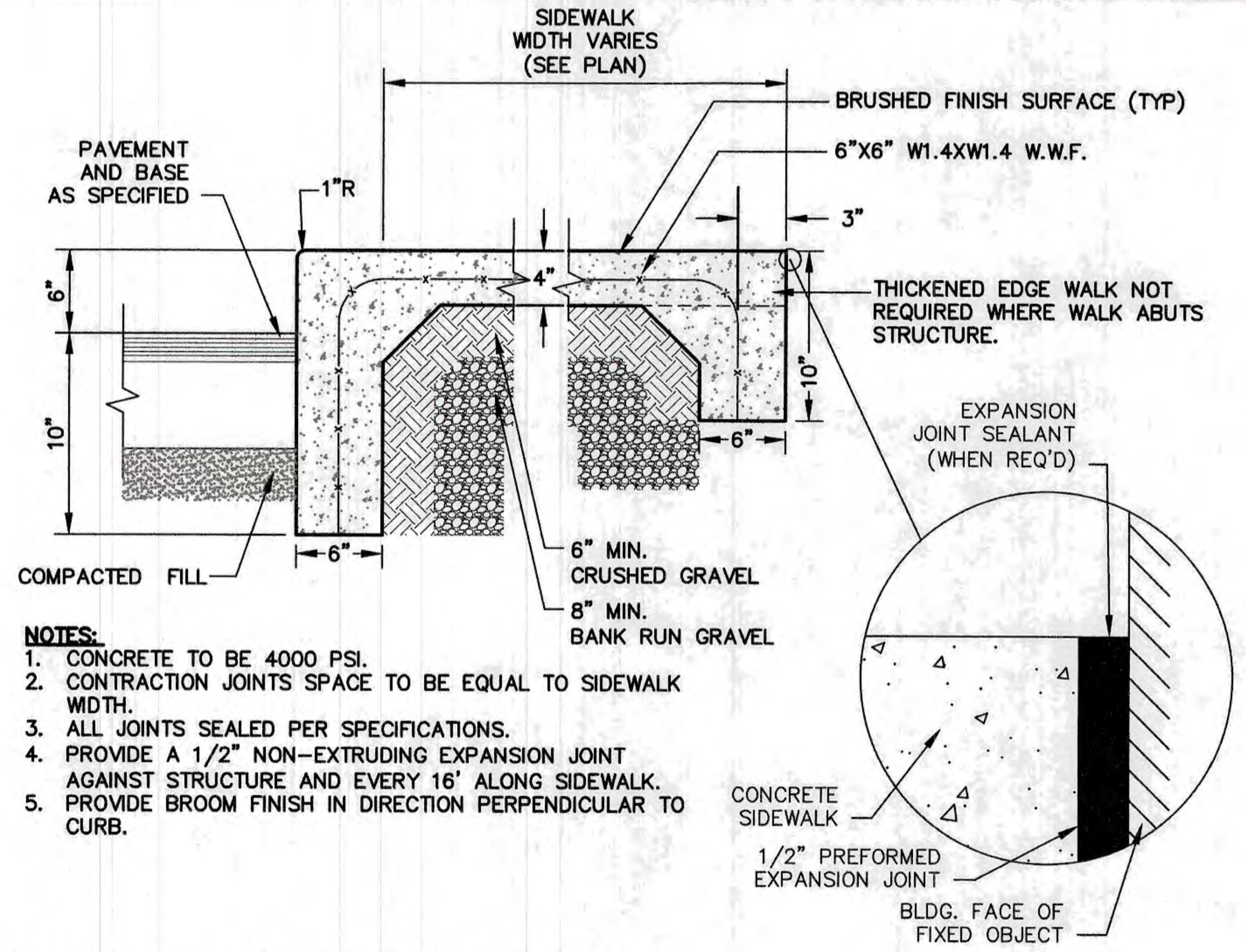
Designer
Joseph Coronati
1716

REV.	DATE	REVISION	BY
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM
14	7/9/21	REVISED SEPTIC PLAN FOR SUBMISSION	DJM
13	6/23/21	REVISED PER CITY COMMENTS	DJM
12	5/18/21	REVISED PLANTINGS PER NHB	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EFFLUENT DISPOSAL DESIGN
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

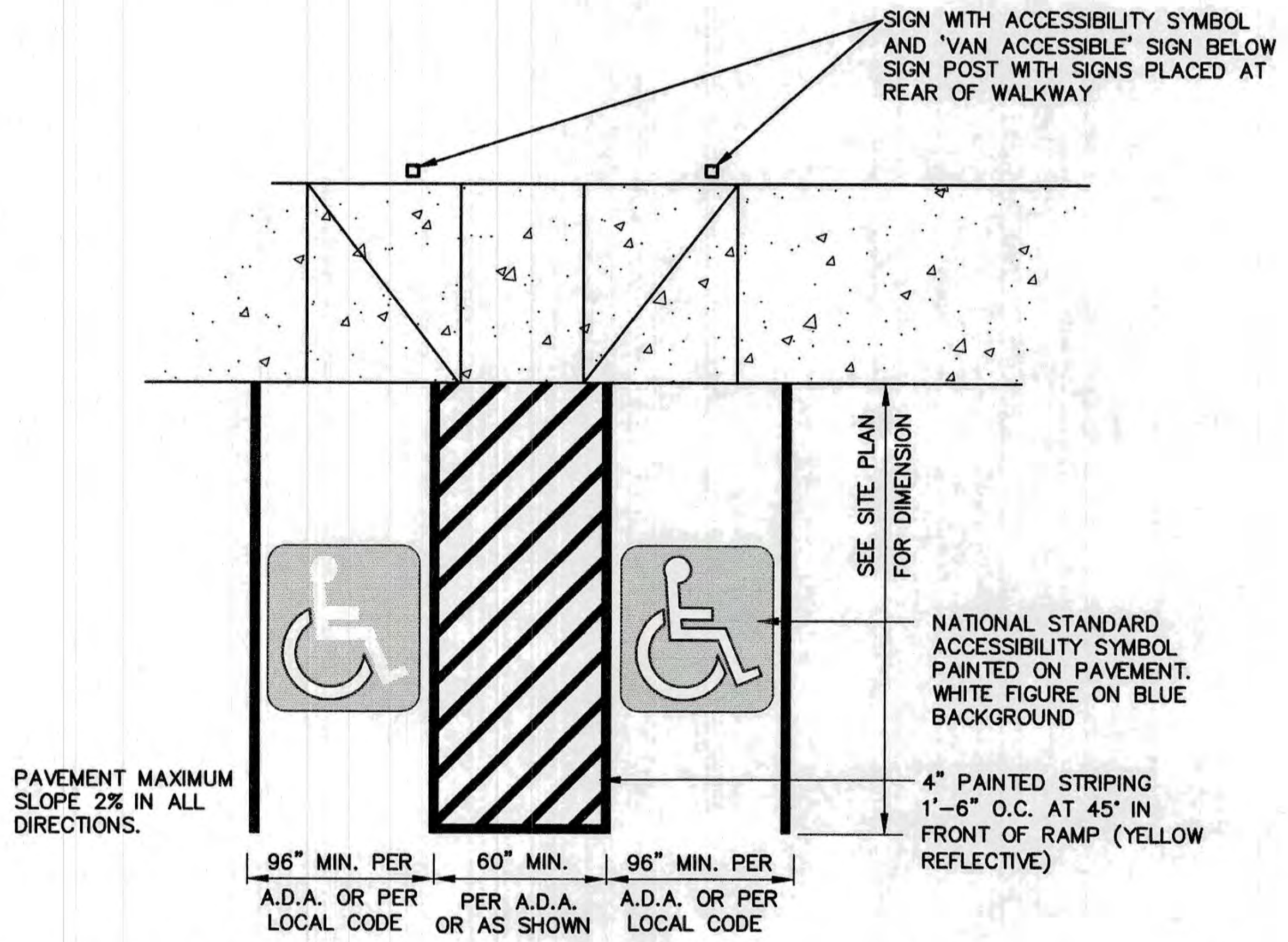
DRAWING No.
S1
SHEET 9 OF 24
JBE PROJECT NO. 19190.2



NOTES:
1. CONCRETE TO BE 4000 PSI.
2. CONTRACTION JOINTS SPACE TO BE EQUAL TO SIDEWALK WIDTH.
3. ALL JOINTS SEALED PER SPECIFICATIONS.
4. PROVIDE A 1/2" NON-EXTRUDING EXPANSION JOINT AGAINST STRUCTURE AND EVERY 16' ALONG SIDEWALK.
5. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.

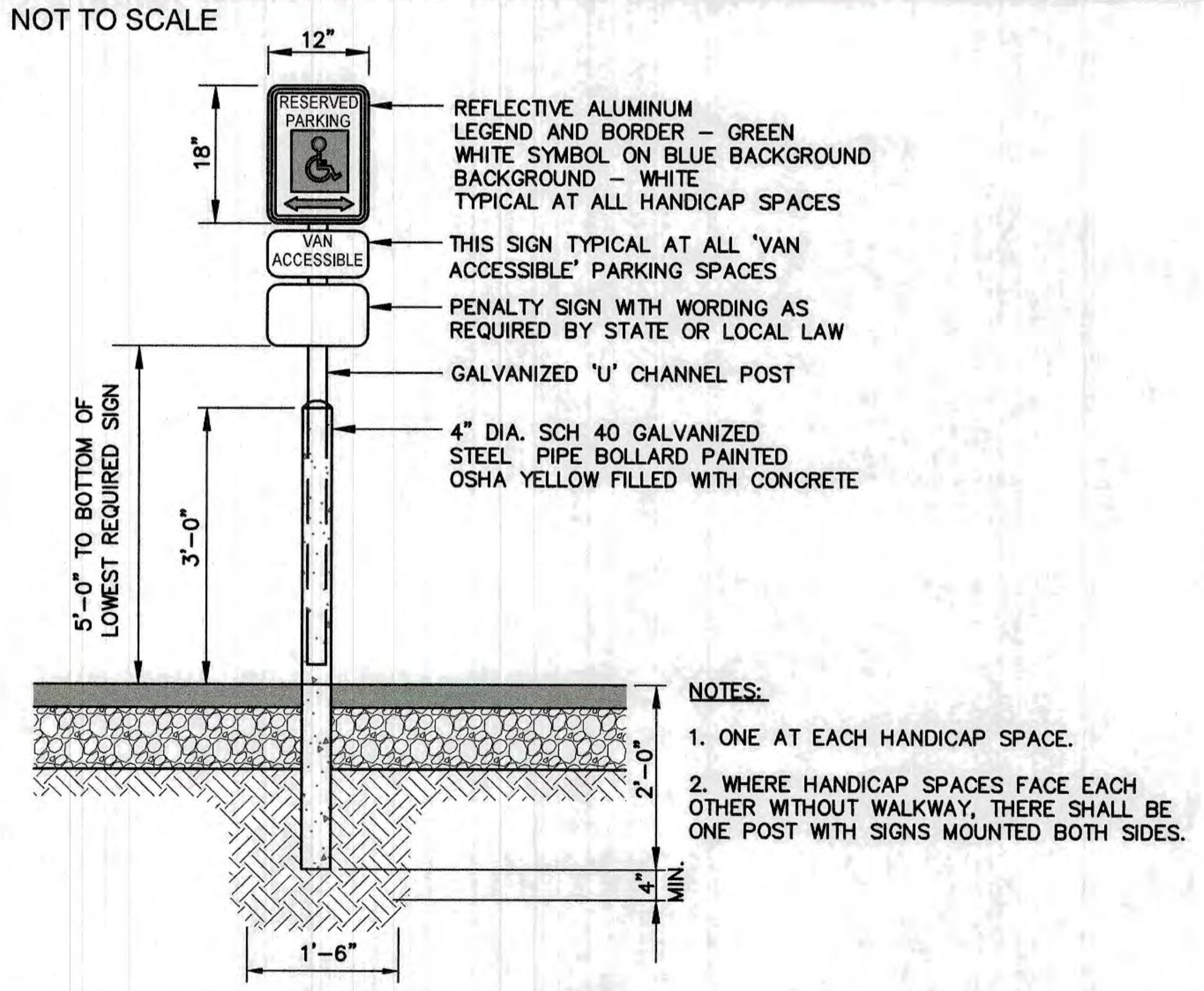
MONOLITHIC CONCRETE SIDEWALK

NOT TO SCALE



HANDICAP PARKING LAYOUT

NOT TO SCALE



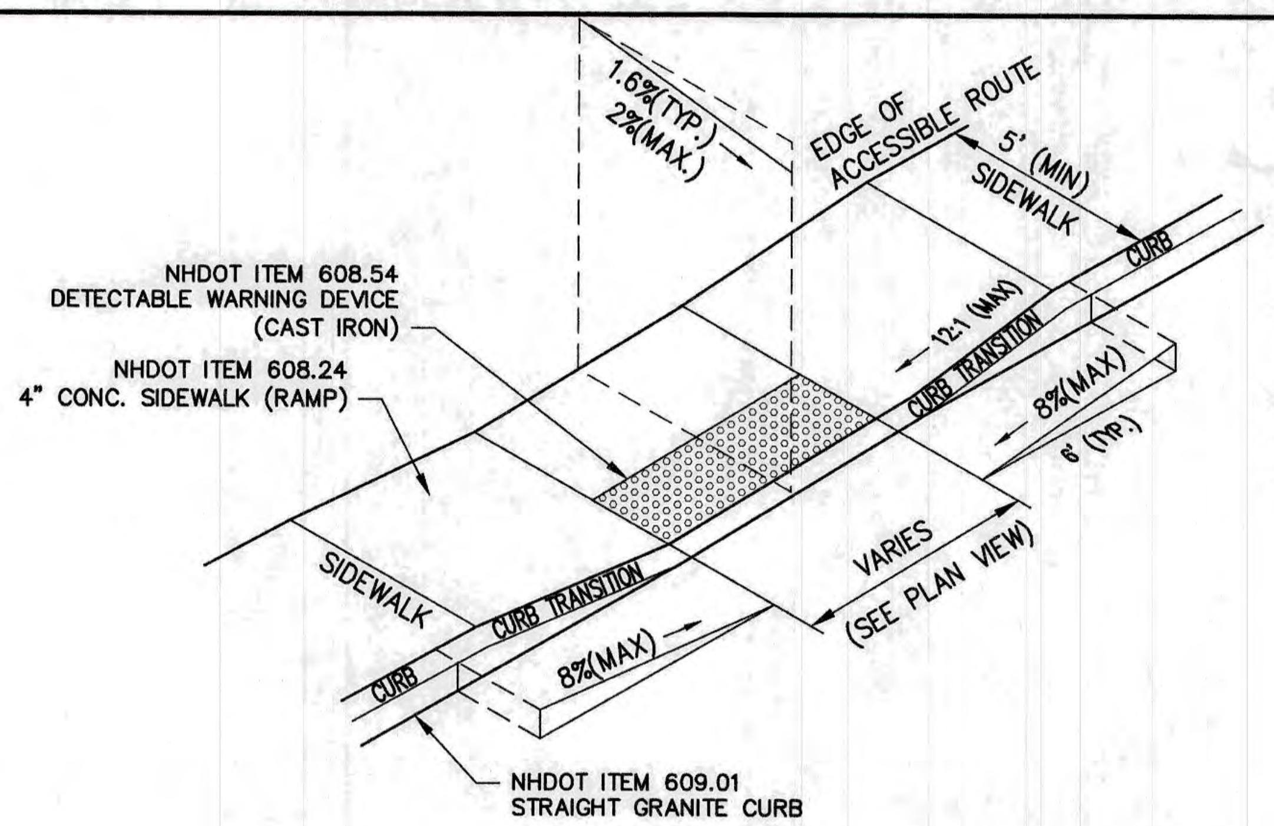
NOTES:

1. ONE AT EACH HANDICAP SPACE.

2. WHERE HANDICAP SPACES FACE EACH OTHER WITHOUT WALKWAY, THERE SHALL BE ONE POST WITH SIGNS MOUNTED BOTH SIDES.

HANDICAP PARKING SIGN (R7-8)

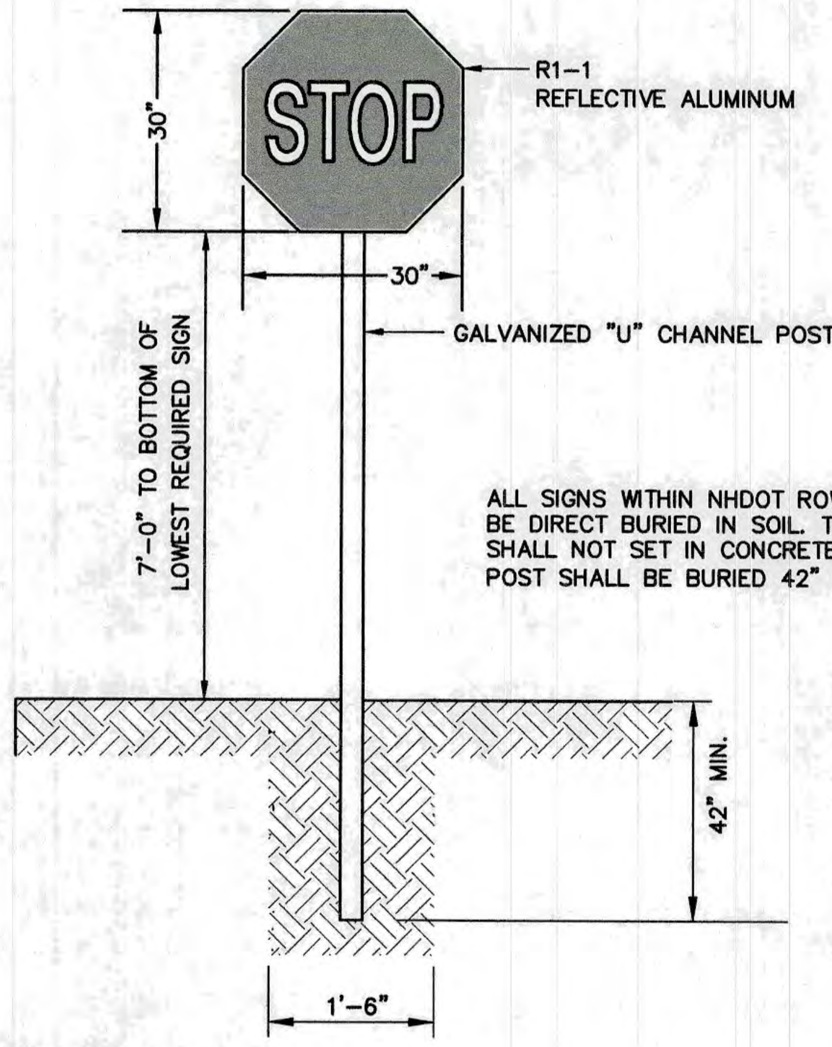
NOT TO SCALE



NOTES:
1. THE MAXIMUM ALLOWABLE CROSS SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) AND CURB SHALL BE 1.5%.
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%,
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) CURB RAMPS SHALL BE 8%,
4. A MINIMUM OF 4 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (i.e., HYDRANTS, UTLITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. BASE OF RAMP SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SECTION FOR RAMP CONSTRUCTION.

ACCESSIBLE CURB RAMP (TYPE `A')

NOT TO SCALE

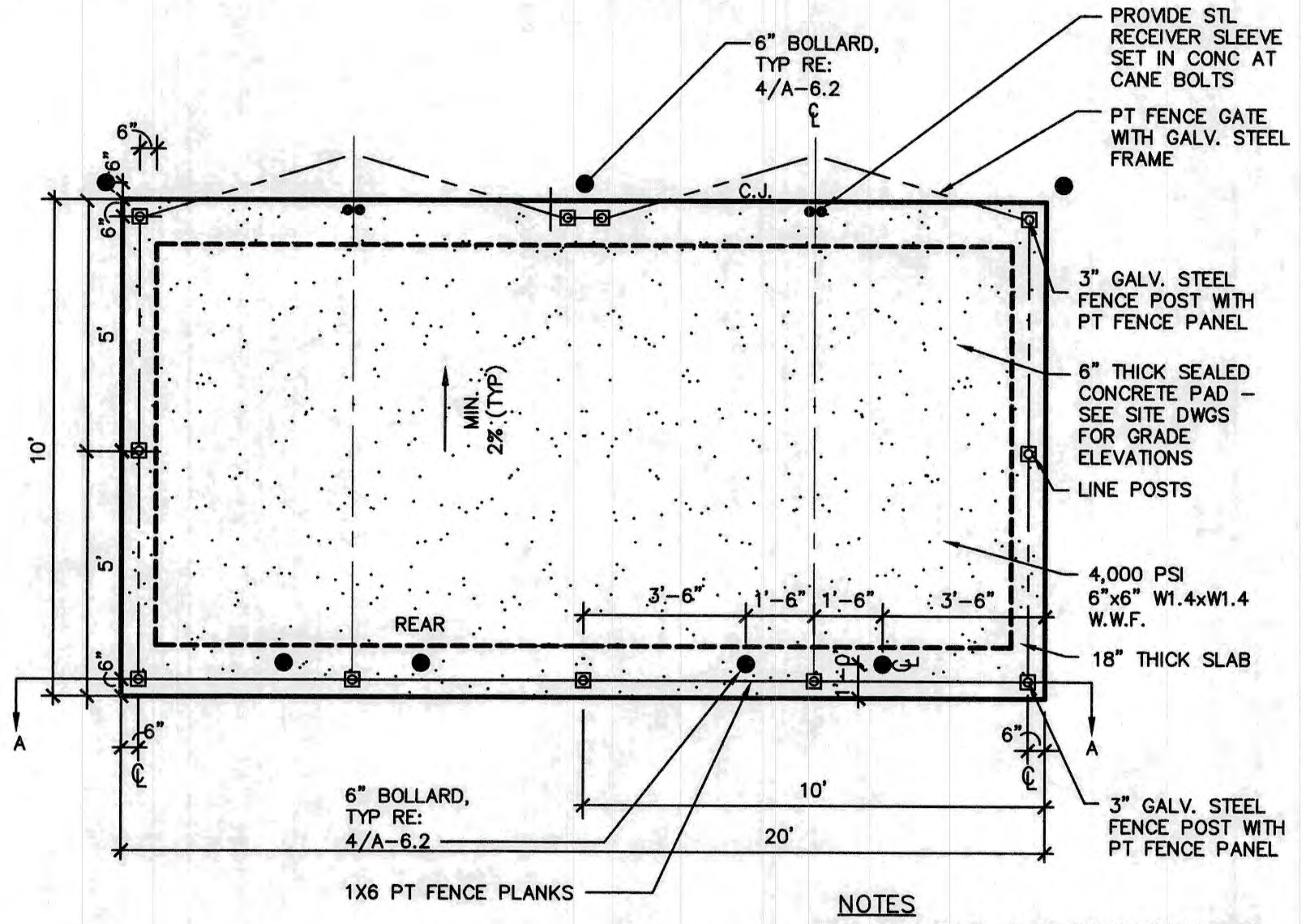


ALL SIGNS WITHIN NHDOT ROW SHALL BE DIRECT BURIED IN SOIL. THE SIGNS SHALL NOT SET IN CONCRETE. THE POST SHALL BE BURIED 42" MIN.

NOTES:
1. ALL SIGNAGE SHALL BE TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS AND NHDOT STANDARDS.
2. SIGN, HARDWARE, AND INSTALLATION TO CONFORM TO 2016 NHDOT STANDARD SPECIFICATION, SECTION 615 – TRAFFIC SIGNS.
3. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS/CATALOG CUTS TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ERECTING SIGNS.
4. THE LOCATION OF THE SIGNS SHALL BE AS INDICATED ON THE DRAWINGS AND/OR AS DIRECTED BY THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS.

STOP SIGN (R1-1)

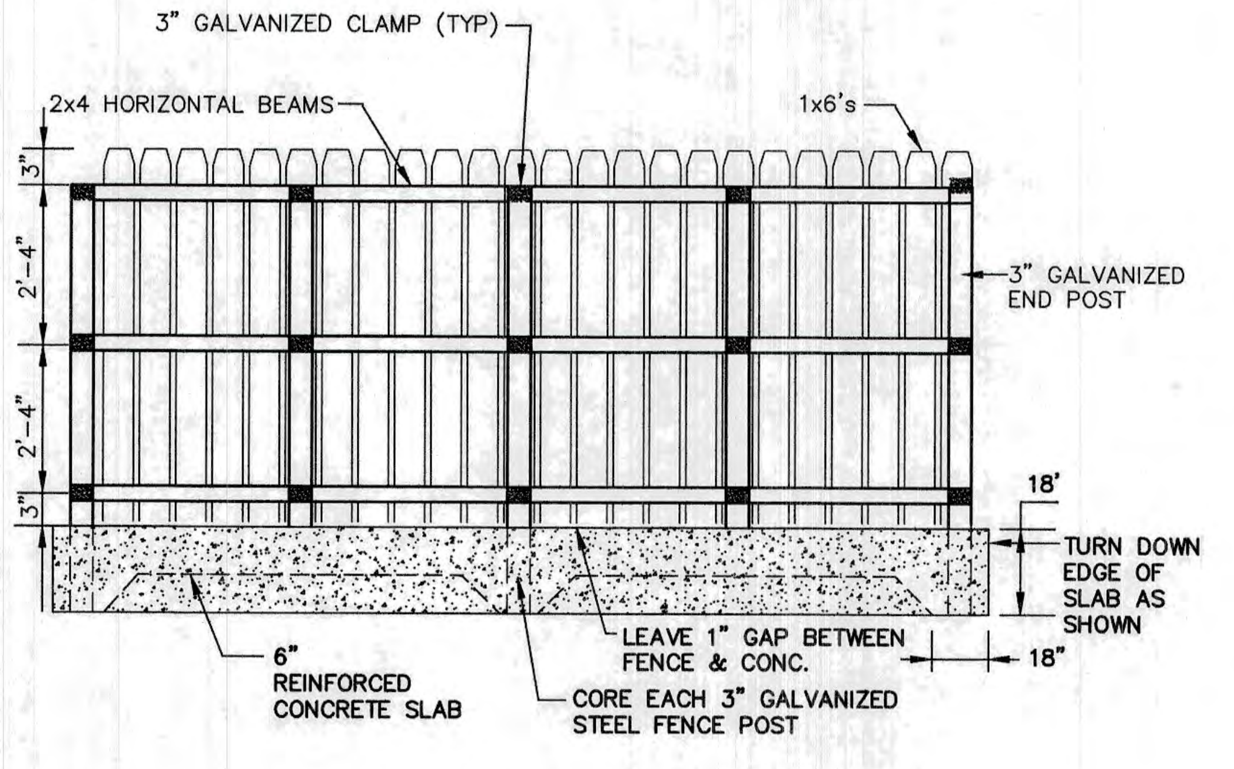
NOT TO SCALE



NOTES
1. ALL LUMBER TO BE PRESSURE TREATED.

2. WOOD FENCE TO BE PAINTED OR STAINED TO MATCH BUILDING FOUNDATION.

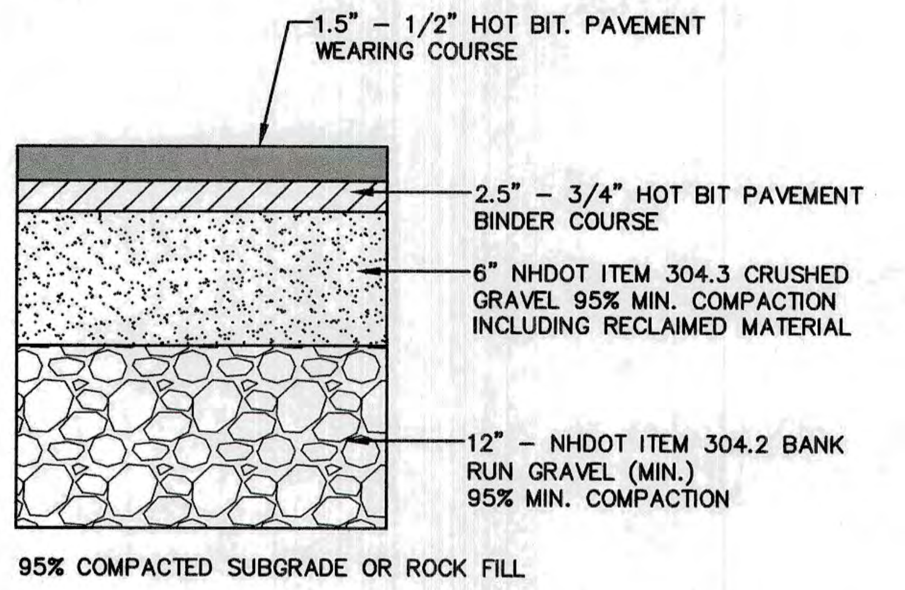
3. DUMPSTER SIZE VARIES, SEE SITE PLANS FOR SCREENING SIZE



SECTION A–A

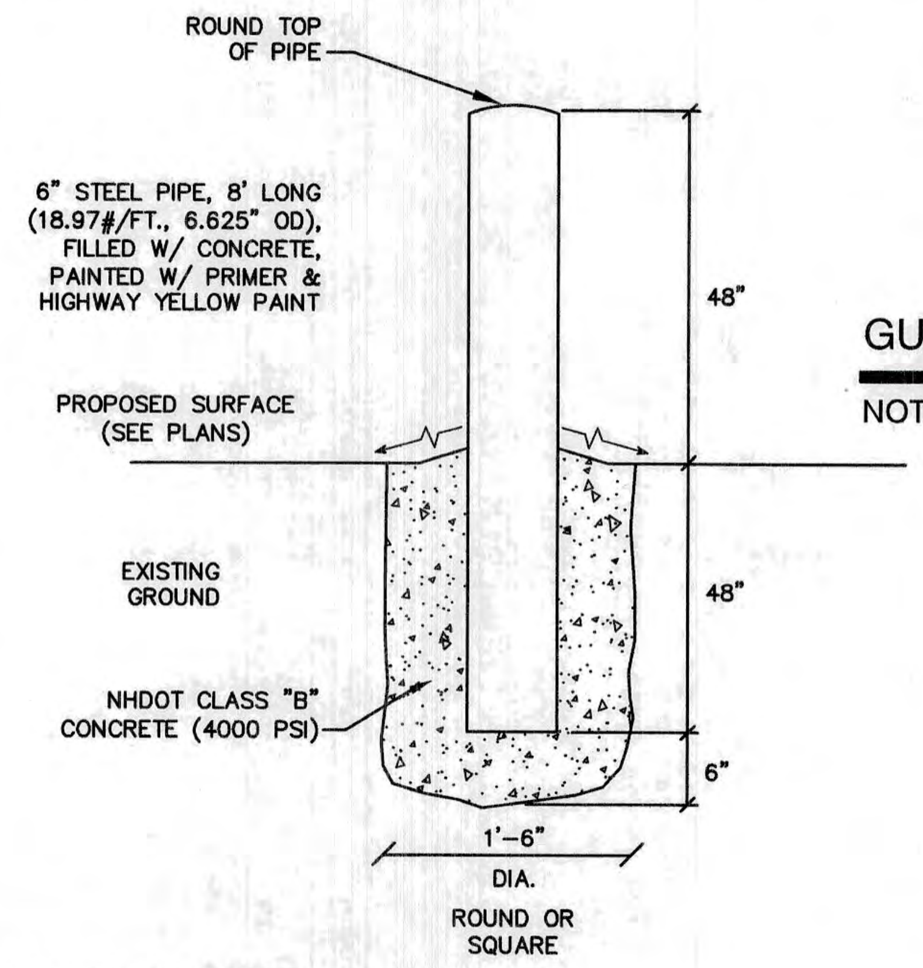
DUMPSTER ENCLOSURE PLAN

NOT TO SCALE



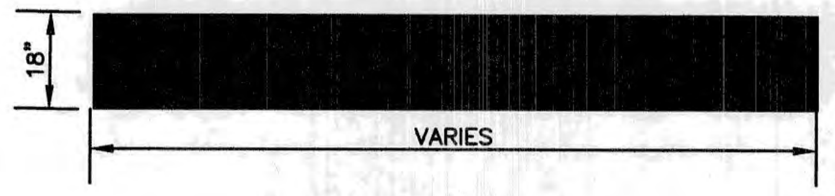
TYPICAL BITUMINOUS PAVEMENT

NOT TO SCALE



BOLLARD DETAIL

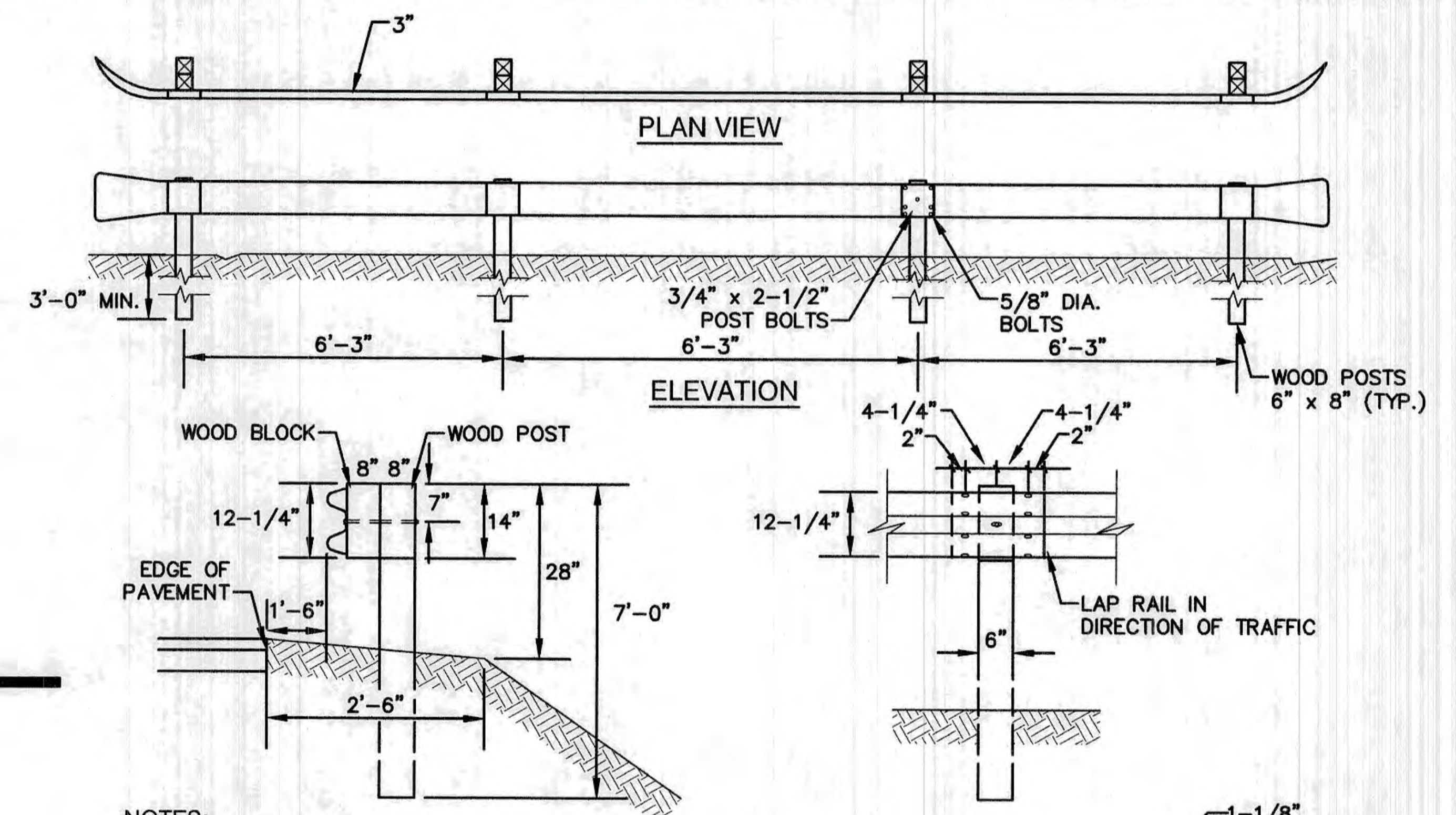
NOT TO SCALE



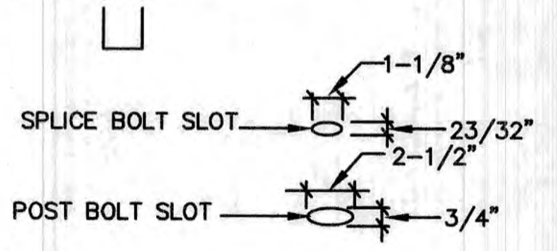
NOTES:
1. ALL STOP BARS TO BE SOLID WHITE REFLECTIVE TRAFFIC PAINT AS PER DIMENSIONS ABOVE.

STOP BAR

NOT TO SCALE

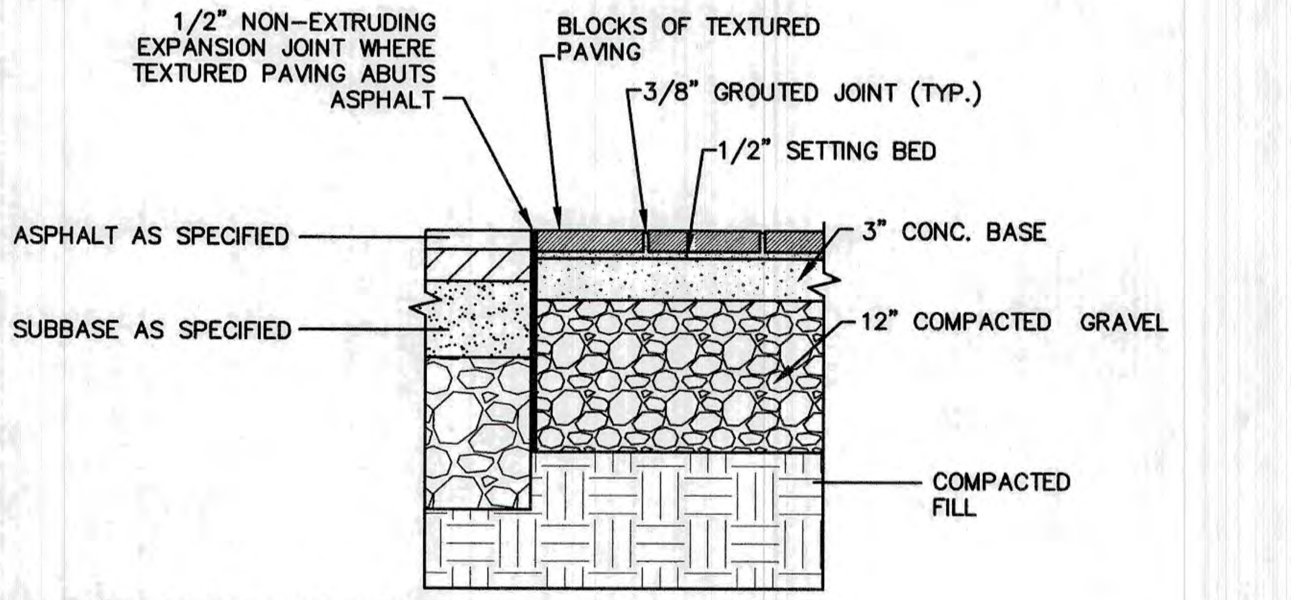


NOTES:
1. USE IN HEAVY TRAFFIC AREAS.
2. GUARD RAIL TO BE "CORE-TEN" TYPE (OR EQUIVALENT APPROVED BY THE ENGINEER.
3. USE 6'-0" POSTS WHEN FILL SLOPE IS 4:1 OR FLATTER.
4. ALL TIMBER POSTS TO BE TREATED WITH PRESERVATIVE MATERIAL CONFORMING TO AASHTO M133.
5. POST BOLTS TO BE 18" W/MIN. 2½" THREAD LENGTH.



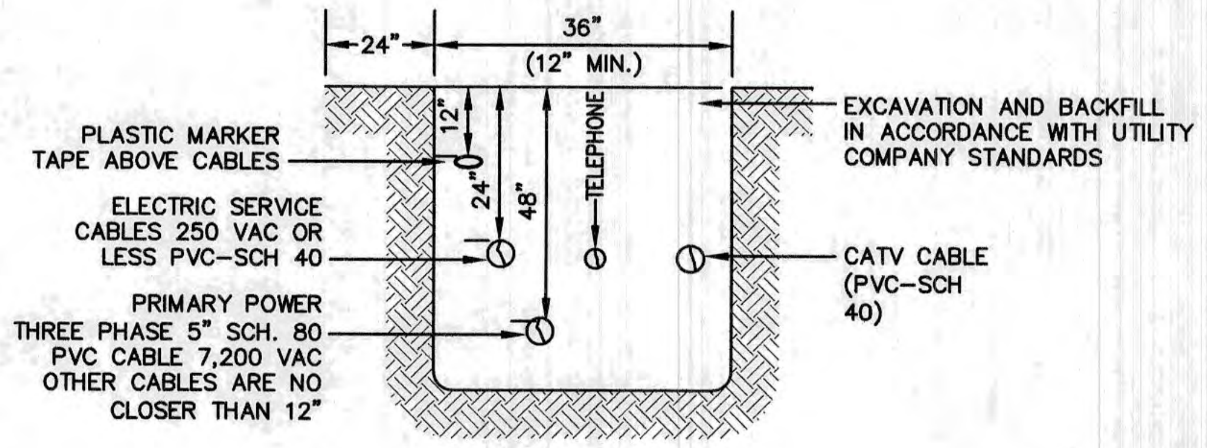
GUARD RAIL (CORE-TEN)

NOT TO SCALE



TEXTURED PAVEMENT DETAIL

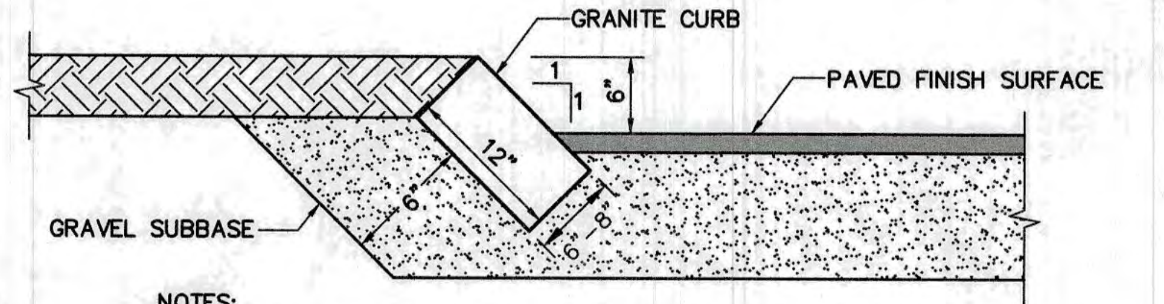
NOT TO SCALE



NOTE: ALL UTILITIES SHALL BE REVIEWED AND APPROVED BY APPROPRIATE UTILITY COMPANY.

UTILITY TRENCH

NOT TO SCALE



NOTES:
1. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
2. JOINTS BETWEEN STONES SHALL BE MORTARED.
3. SALVAGE GRANITE CURBS ON-SITE AND RESET TO THE EXTENT POSSIBLE.

SLOPED GRANITE CURB

NOT TO SCALE

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name:	19190-PLAN-NEW-LAYOUT.dwg	

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9848

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

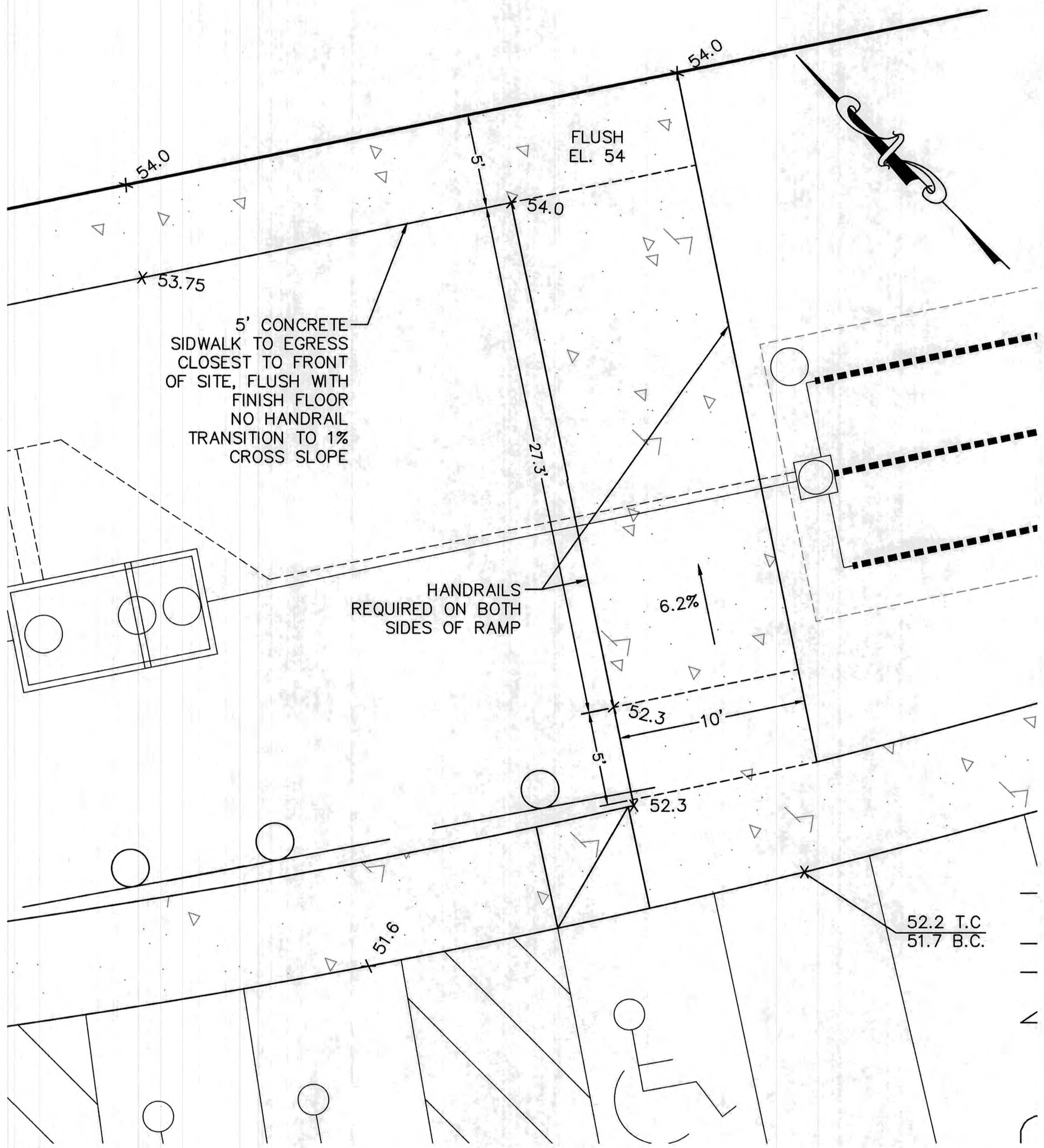
Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.

D1

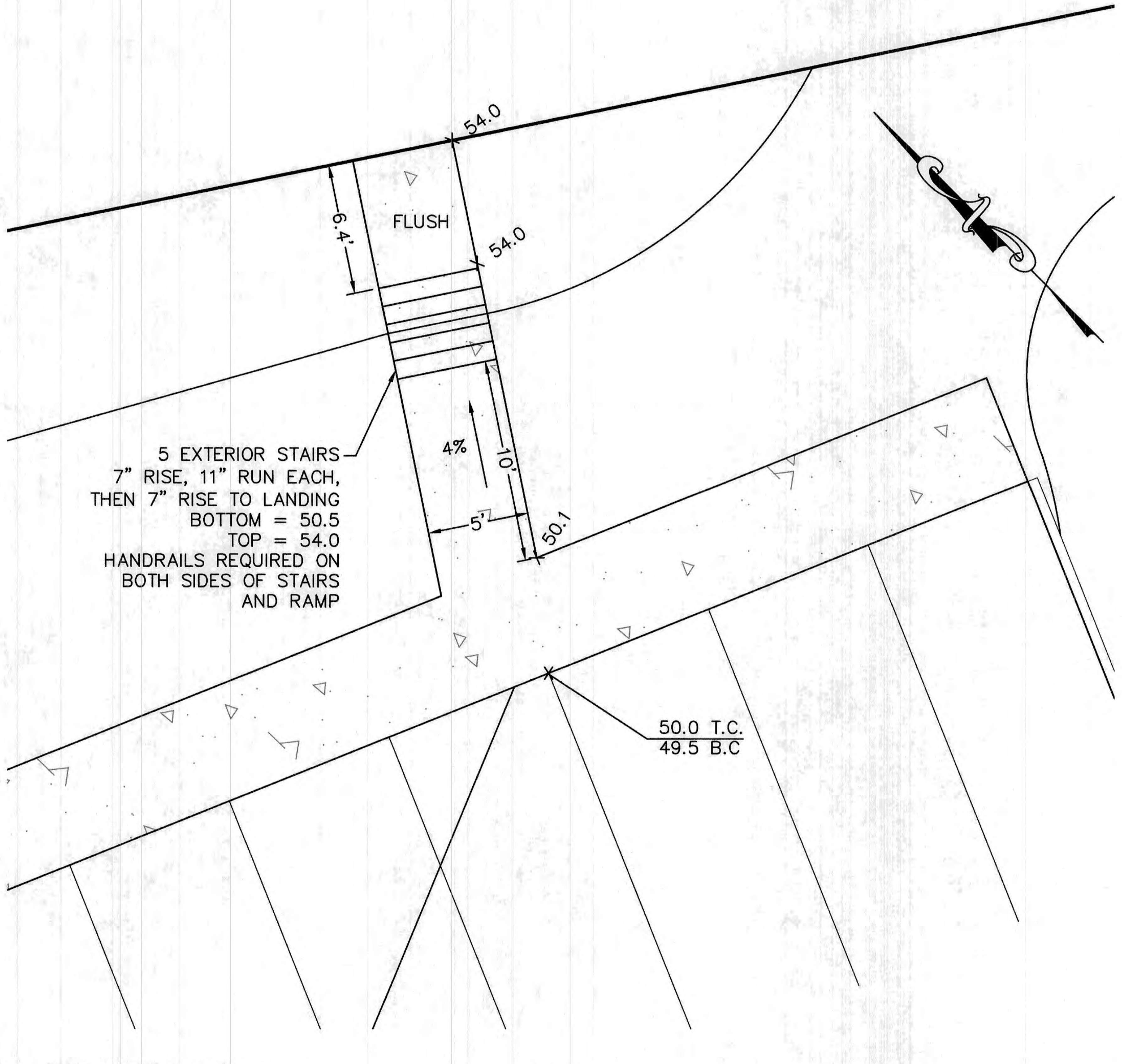
SHEET 10 OF 24
JBE PROJECT NO. 19190.2



NOTES:
1. RAMP TO CONTAIN 6"x6" W1.4xW1.4 W.W.F. EXTENDING INTO FOOTING.
2. RAMP TO BE OF CONTRASTING COLOR TO WALK AND PAVEMENT.

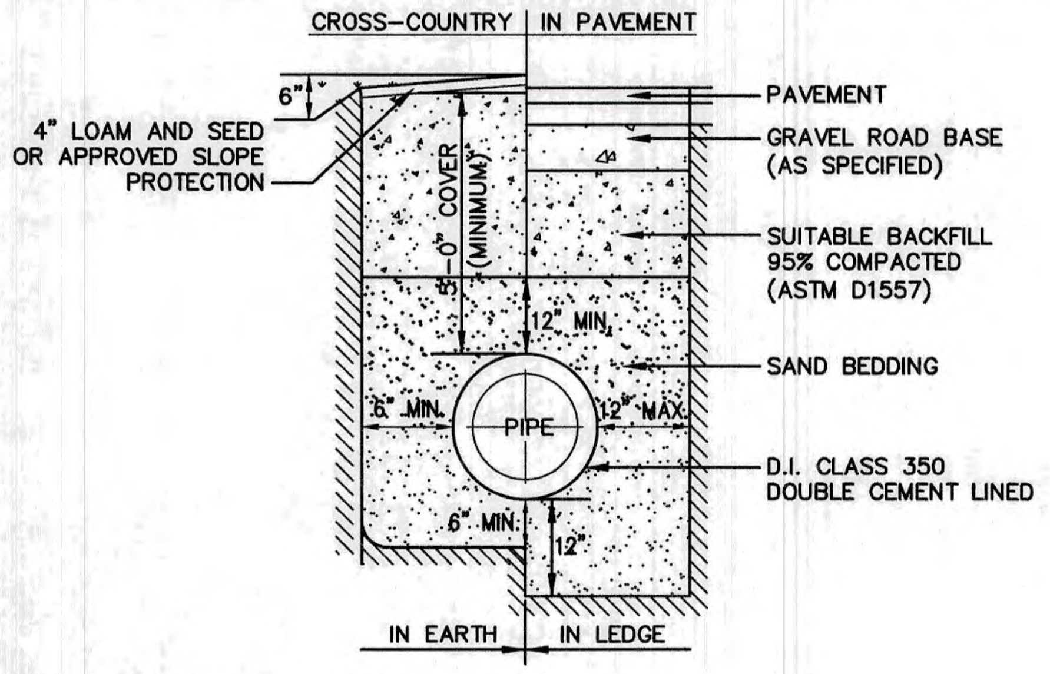
MAIN ENTRANCE DETAIL

1 INCH = 5 FEET



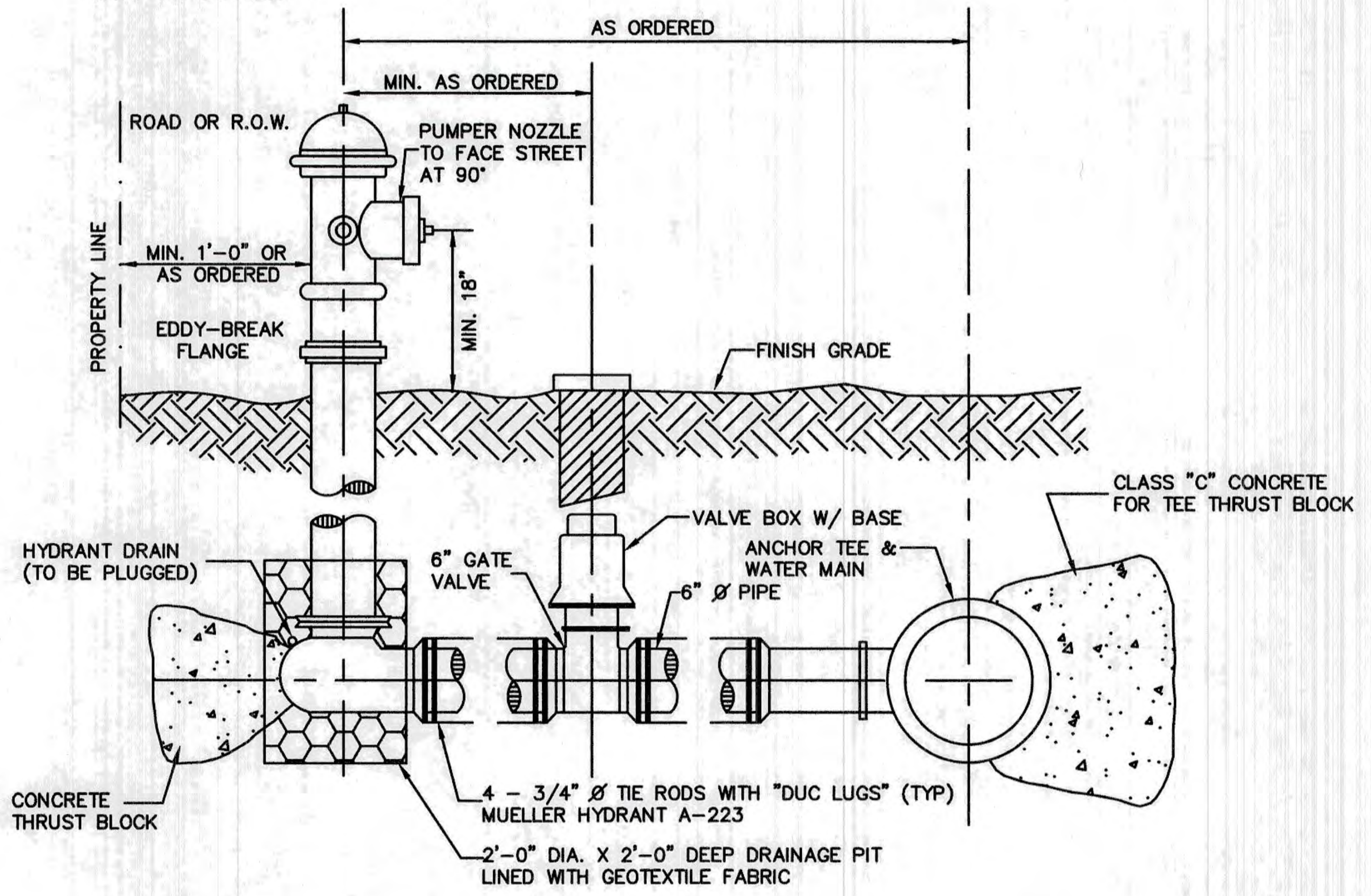
SECONDARY EGRESS DETAIL

1 INCH = 5 FEET



WATER SYSTEM TRENCH

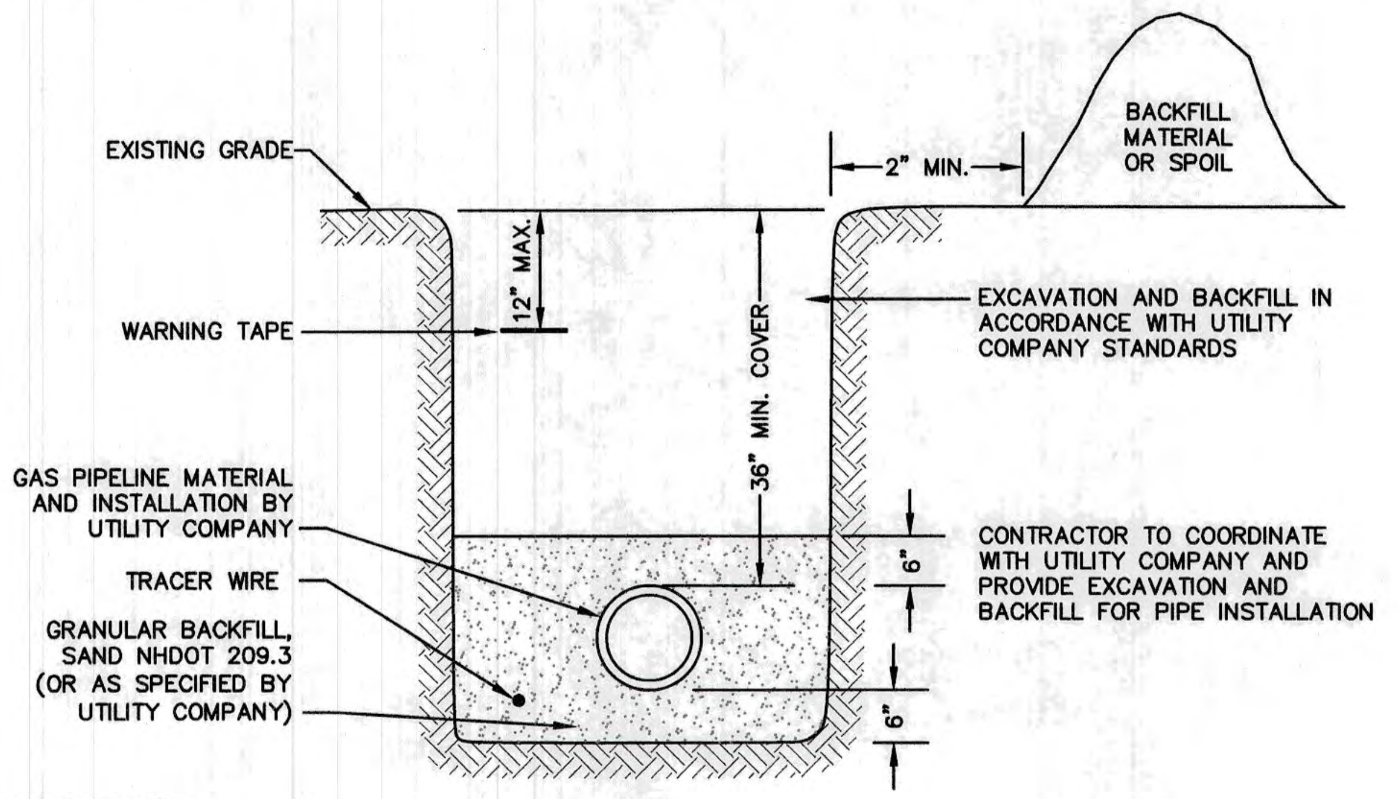
NOT TO SCALE



NOTES
1. ALL PIPE FITTINGS TO BE D.I. PRESSURE CLASS 350, THICKNESS CLASS 52.
2. HYDRANT TO BE PAINTED RED WITH WHITE "REFLECTOR" PAINT ON BONNET.
3. MECHANICAL JOINTS SHALL HAVE MEGALUG RETAINING GLANDS AS MADE BY EBBA OR APPROVED EQUAL.
4. STEAMER NOZZLE TO BE "STORCH" TYPE.
5. NATIONAL STANDARD THREAD.

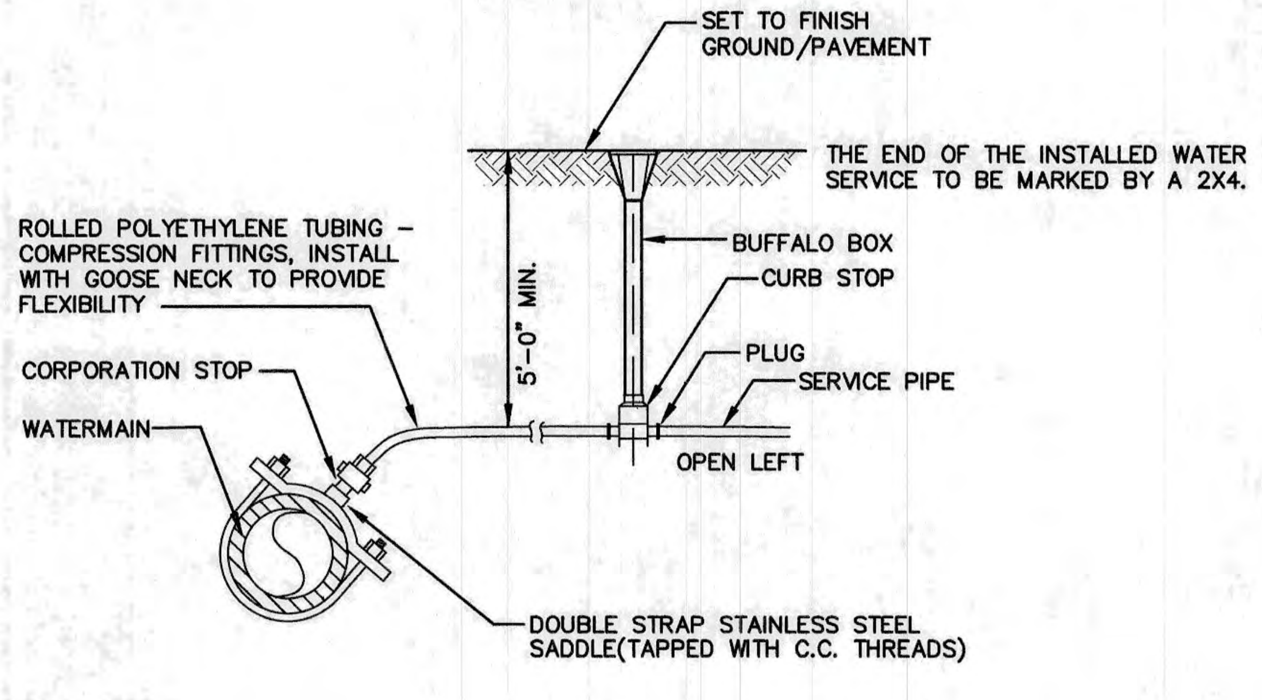
HYDRANT INSTALLATION

NOT TO SCALE



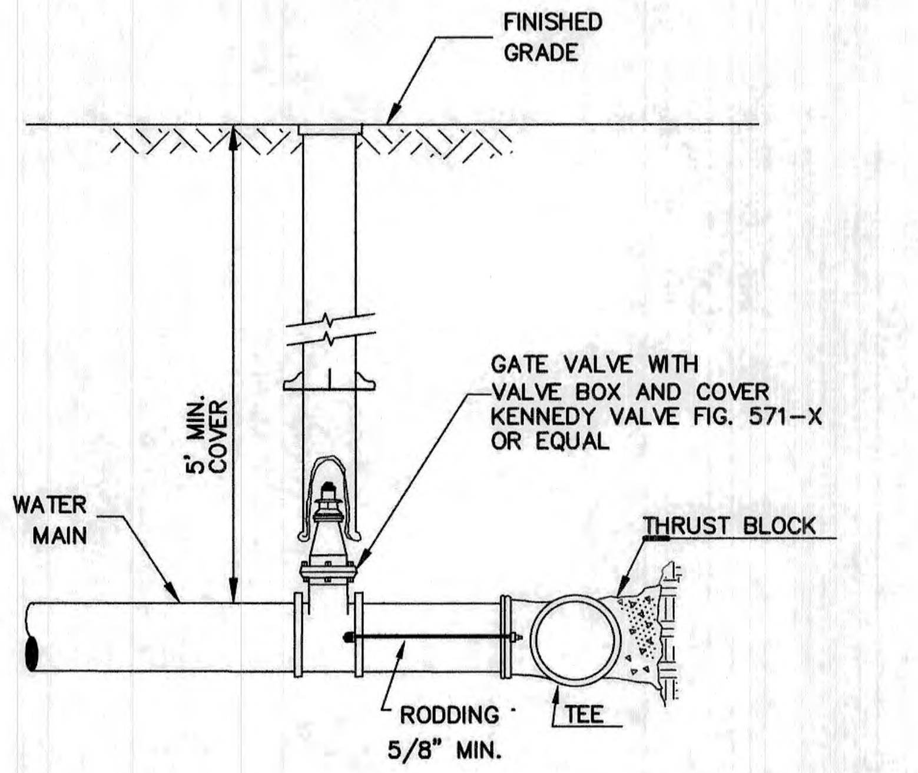
GAS TRENCH

NOT TO SCALE



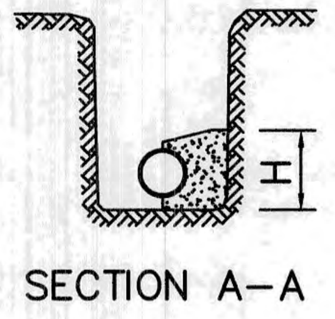
WATER SERVICE CONNECTION-POLYETHYLENE

NOT TO SCALE



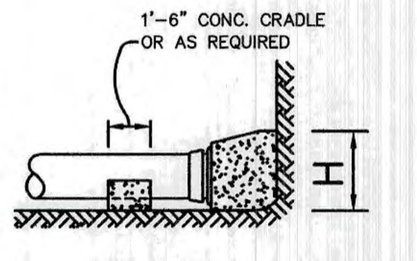
BURIED GATE VALVE DETAIL

NOT TO SCALE

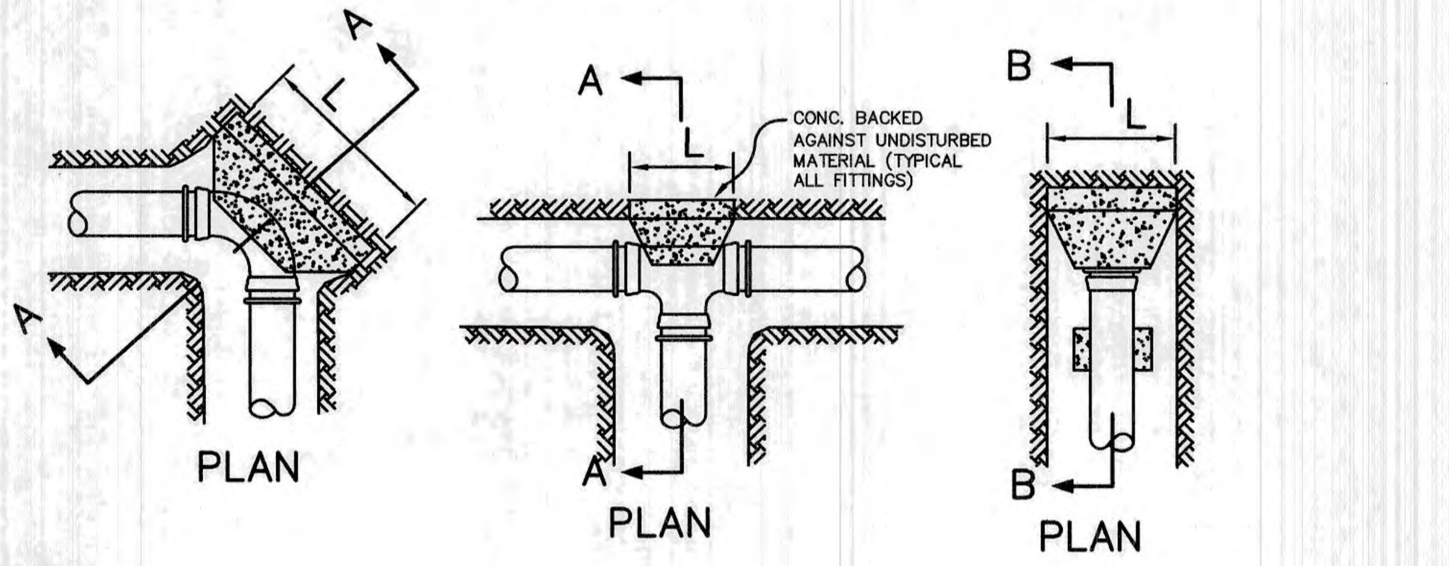

SECTION A-A

CONCRETE THRUST BLOCK DIMENSIONS								
PIPE DIA. (IN.)	TEE		90° BEND OR STUB		45° BEND		22.5° BEND	
	H	L	H	L	H	L	H	L
4"/6"	1'-6"	1'-6"	1'-6"	2'-0"	1'-6"	1'-6"	1'-6"	1'-6"
8"	2'-0"	2'-0"	2'-0"	3'-0"	1'-6"	2'-0"	1'-6"	1'-6"
10"	2'-0"	3'-0"	2'-6"	3'-6"	2'-0"	2'-6"	1'-6"	2'-0"
12"	2'-6"	3'-6"	3'-0"	4'-0"	2'-0"	3'-6"	1'-6"	2'-6"
15"	3'-0"	4'-6"	3'-6"	5'-6"	3'-0"	3'-6"	2'-0"	2'-6"
18"	4'-0"	5'-0"	4'-6"	6'-0"	3'-6"	4'-0"	2'-6"	3'-0"
24"	5'-0"	7'-0"	6'-0"	8'-0"	4'-0"	6'-0"	3'-0"	4'-6"

PIPING W/ MECHANICAL JOINT FITTINGS SHALL HAVE RETAINING GLANDS



SECTION B-B



THRUST BLOCK DETAILS

NOT TO SCALE

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9848

12/21/21

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

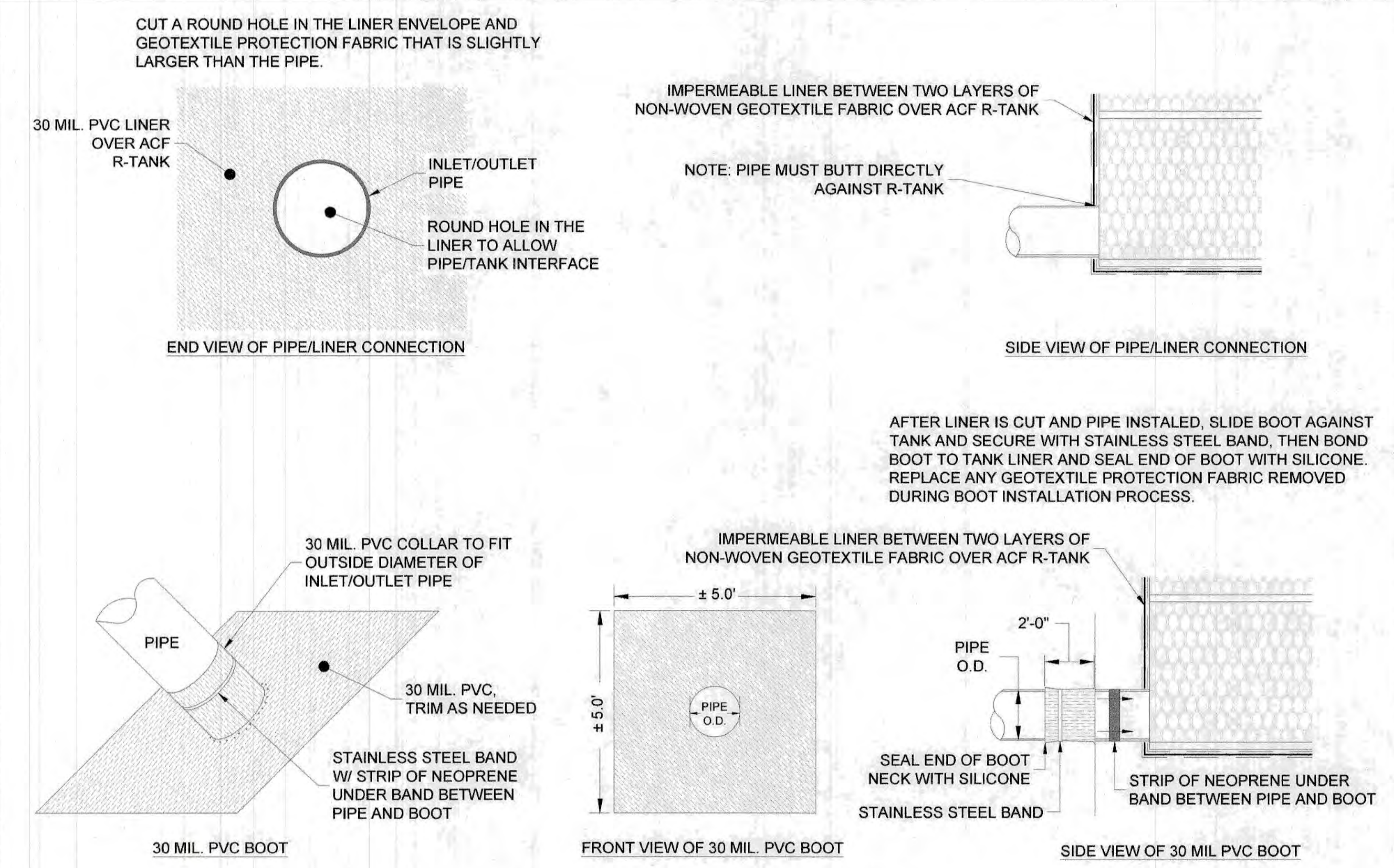
Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: DETAIL SHEET
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
D2
SHEET 11 OF 24
JBE PROJECT NO. 19190.2

CUT A ROUND HOLE IN THE LINER ENVELOPE AND GEOTEXTILE PROTECTION FABRIC THAT IS SLIGHTLY LARGER THAN THE PIPE.

AFTER LINER IS CUT AND PIPE INSTALED, SLIDE BOOT AGAINST TANK AND SECURE WITH STAINLESS STEEL BAND, THEN BOND BOOT TO TANK LINER AND SEAL END OF BOOT WITH SILICONE. REPLACE ANY GEOTEXTILE PROTECTION FABRIC REMOVED DURING BOOT INSTALLATION PROCESS.



07/26/19

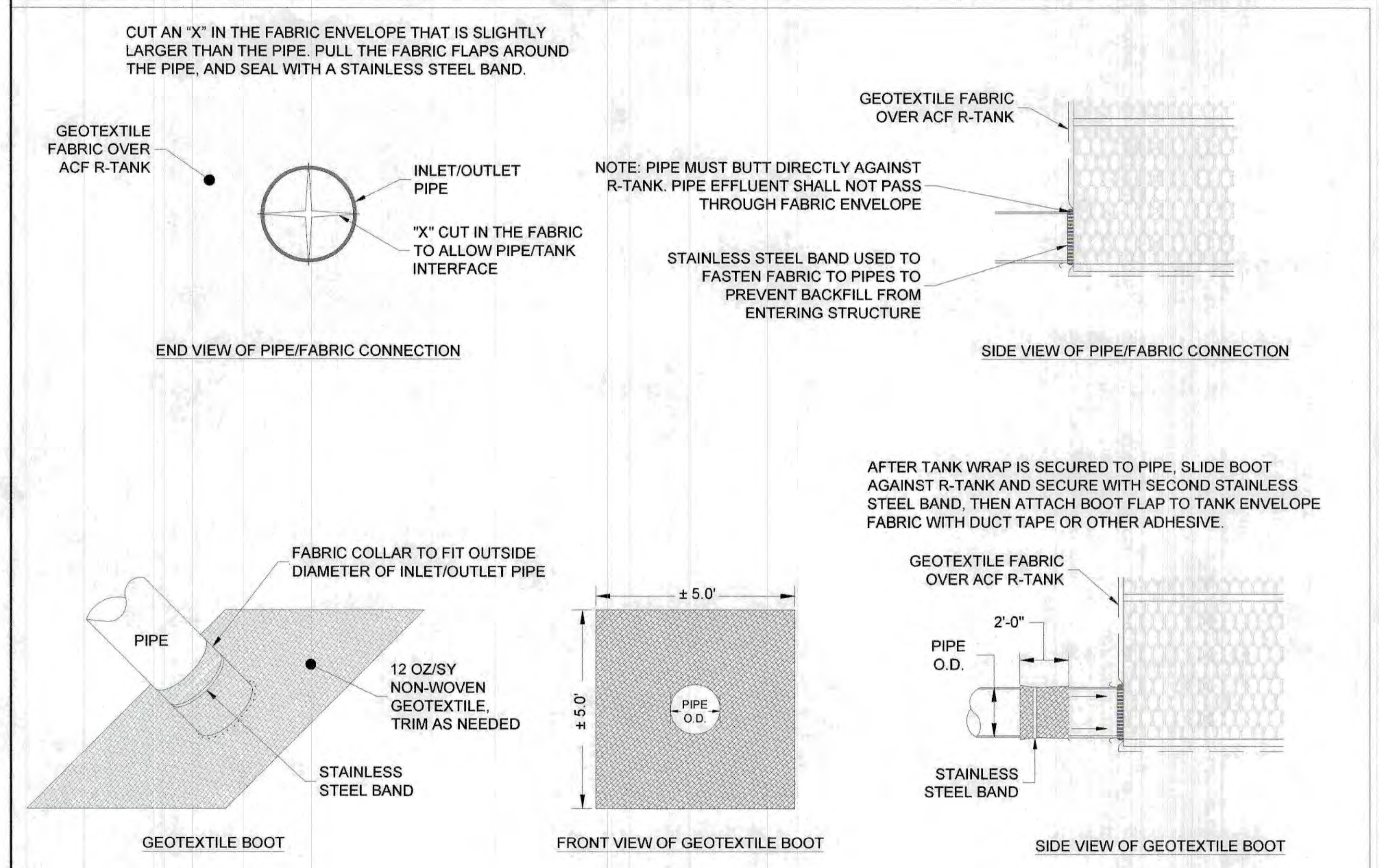
R-TANK TYPICAL INLET/OUTLET W/ 30 MIL PVC BOOT

ACF ENVIRONMENTAL
LET'S GET IT DONE

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

CUT AN "X" IN THE FABRIC ENVELOPE THAT IS SLIGHTLY LARGER THAN THE PIPE. PULL THE FABRIC FLAPS AROUND THE PIPE, AND SEAL WITH A STAINLESS STEEL BAND.

AFTER TANK WRAP IS SECURED TO PIPE, SLIDE BOOT AGAINST R-TANK AND SECURE WITH SECOND STAINLESS STEEL BAND, THEN ATTACH BOOT FLAP TO TANK ENVELOPE FABRIC WITH DUCT TAPE OR OTHER ADHESIVE.

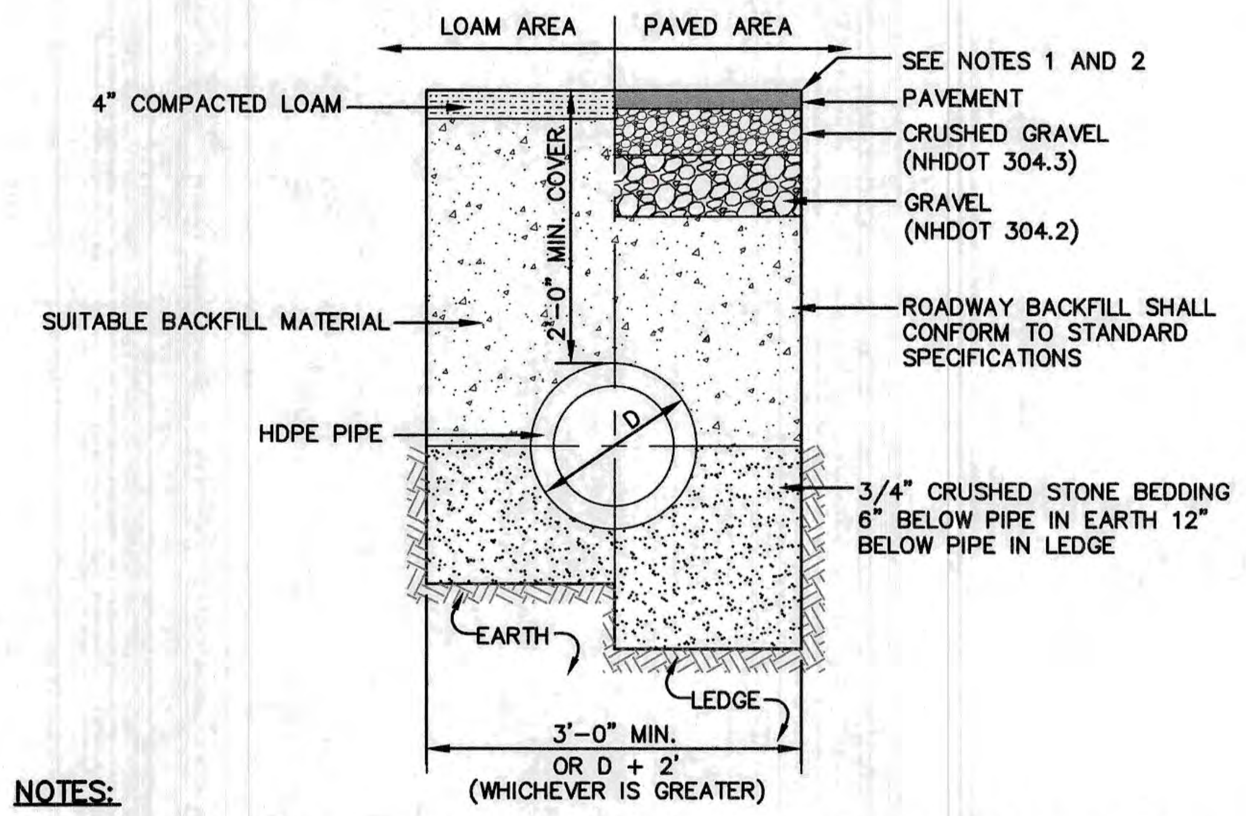


07/26/19

R-TANK TYPICAL INLET/OUTLET W/ GEOTEXTILE BOOT

ACF ENVIRONMENTAL
LET'S GET IT DONE

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com



NOTES:

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM WITH PROJECT AND TOWN SPECIFICATIONS.
3. ALL MATERIALS ARE TO BE COMPACTED TO 95% OF ASTM D-1557.

DRAINAGE TRENCH

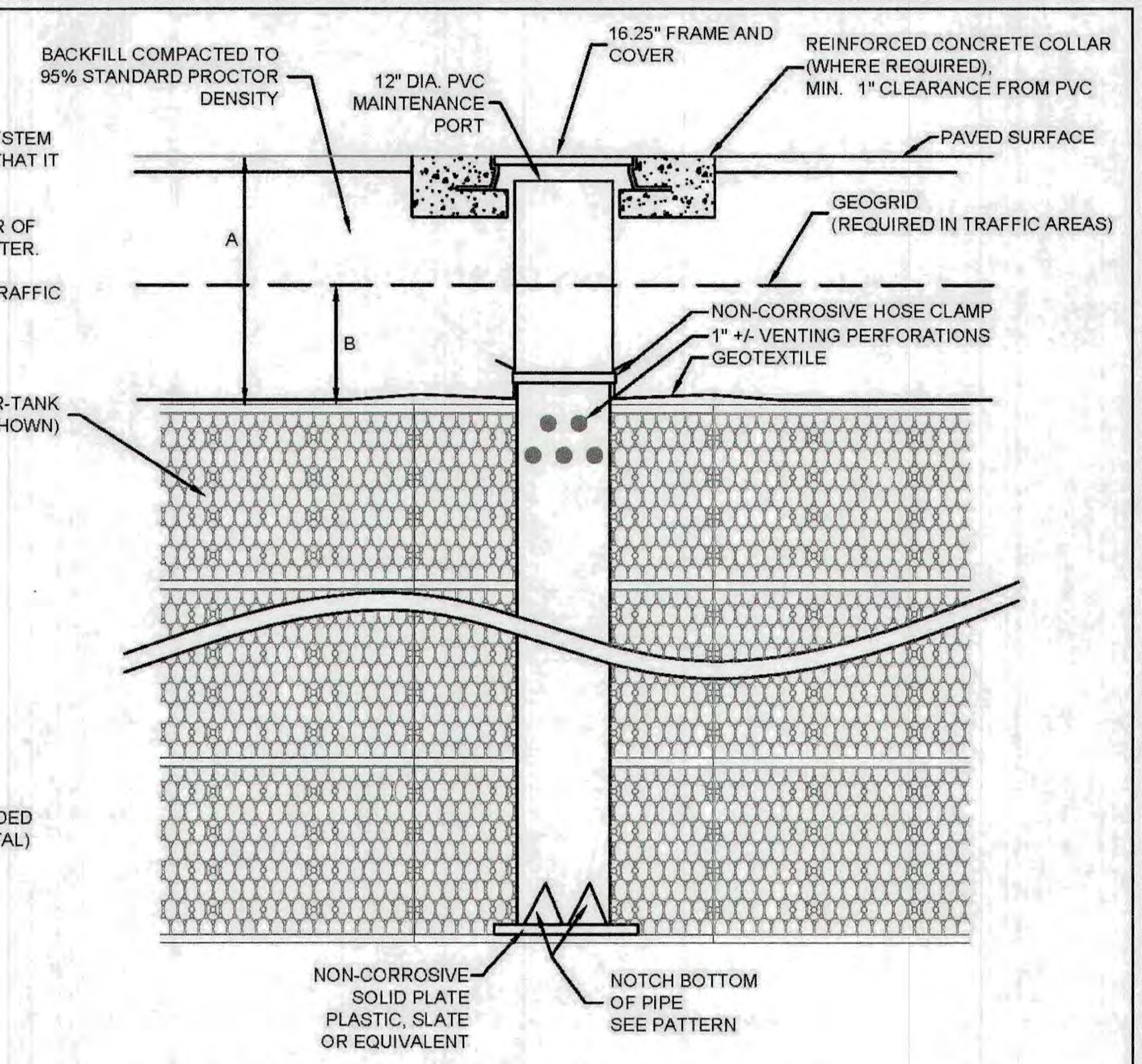
NOT TO SCALE

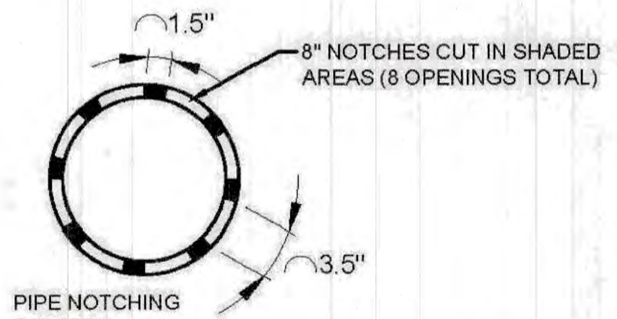
NOTES

- THIS PORT IS USED TO PUMP WATER INTO THE SYSTEM AND RE-SUSPEND ACCUMULATED SEDIMENT SO THAT IT MAY BE PUMPED OUT.
- MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.
- ONLY R-TANK^{HD} AND R-TANK^{SD} MAY BE USED IN TRAFFIC APPLICATIONS.

DEPTH SUMMARY

TYPE	A	B
R-TANK^{LD}	12" MIN - 36" MAX	AS SHOWN ON PLANS
R-TANK^{HD}	20" MIN - 6.99' MAX	12"
R-TANK^{SD}	18" MIN - 9.99' MAX	12"





PIPE NOTCHING PATTERN

02/06/19

MAINTENANCE PORT
FOR R-TANK^{LD}, R-TANK^{HD}, AND R-TANK^{SD}

ACF ENVIRONMENTAL
LET'S GET IT DONE

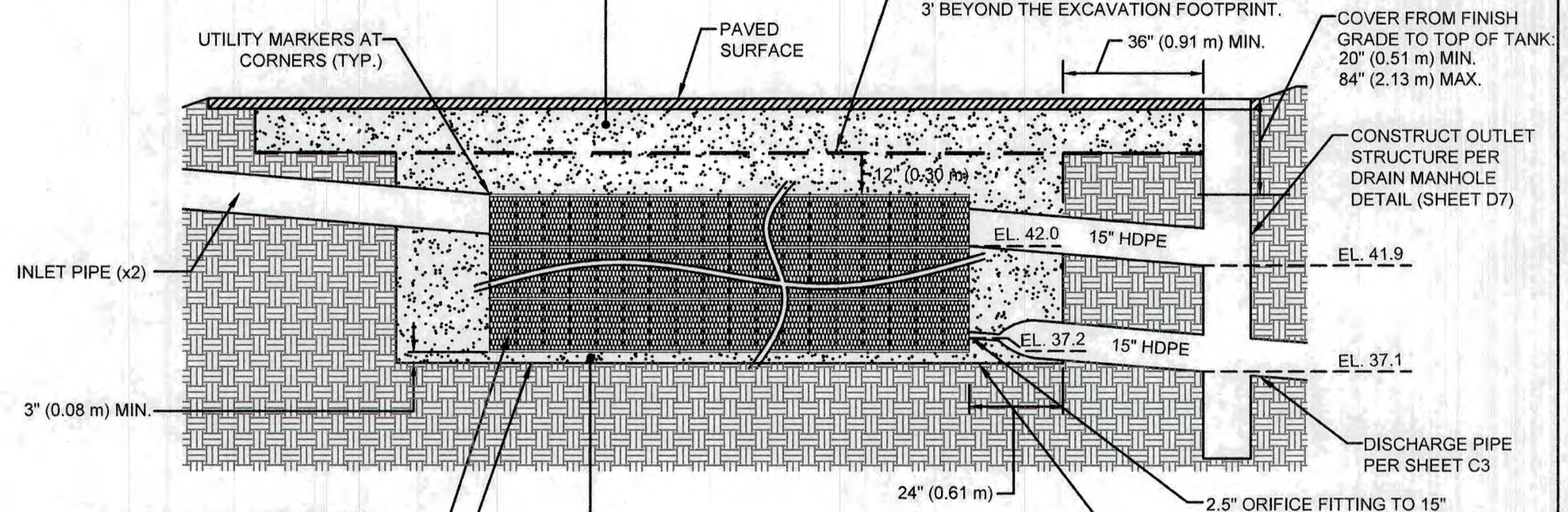
FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

TOTAL COVER: 20" MINIMUM AND 84" MAXIMUM. FIRST 12" MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5" OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT<10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12" COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 7'. CONTACT ACF ENVIRONMENTAL IF MORE THAN 7' OR LESS THAN 20" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

NOTES:

1. FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK^{HD} MODULE SHEET .
2. INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF HL-93 LOADING PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS, 7TH EDITION, 2014 WITH 2015 AND 2016 INTERIM REVISIONS.
3. PRE-TREATMENT STRUCTURES NOT SHOWN.
4. R-TANK SYSTEM SHALL BE ENVELOPED BY 30ML PVC IMPERMEABLE LINER ON SIDES AND BOTTOM OF SYSTEM WITH NONWOVEN GEOTEXTILE CUSHION ON BOTH SIDES AT EXCAVATION LINE AND BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03A) TO PROVIDE A LEVEL BASE. SURFACE MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK^{HD} FOOTPRINT.

GEOGRID (ACF BX-12) PLACED 12" ABOVE THE R-TANK^{HD} SYSTEM. OVERLAP ADJACENT PANELS BY 18" MIN. GEOGRID SHOULD EXTEND 3' BEYOND THE EXCAVATION FOOTPRINT.



R-TANK^{HD} UNITS WRAPPED IN 8 OZ. NONWOVEN GEOTEXTILE (OR EQUAL) LOAD RATING: 33.4 PSI (MODULE ONLY)

SUBGRADE / EXCAVATION LINE: COMPACT PER SPEC SECTION 3.02 D. A BEARING CAPACITY OF 2,000 PSF MUST BE ACHIEVED PRIOR TO INSTALLING R-TANK^{HD}

BASE: 3" MIN. BEDDING MATERIAL (SPEC SECTION 2.03A) MAY BE STONE (<1.5") OR SOIL (USCS CLASS GW, GP, SW OR SP). MUST BE FREE OF LUMPS AND DEBRIS, AND EXTEND 2' BEYOND R-TANK^{HD}. COMPACT PER SPEC SECTION 3.03 A. NATIVE SOILS MAY BE USED IF THEY MEET THE REQUIREMENTS OF SPEC SECTION 2.03A AND ARE ACCEPTED BY OWNER'S ENGINEER.

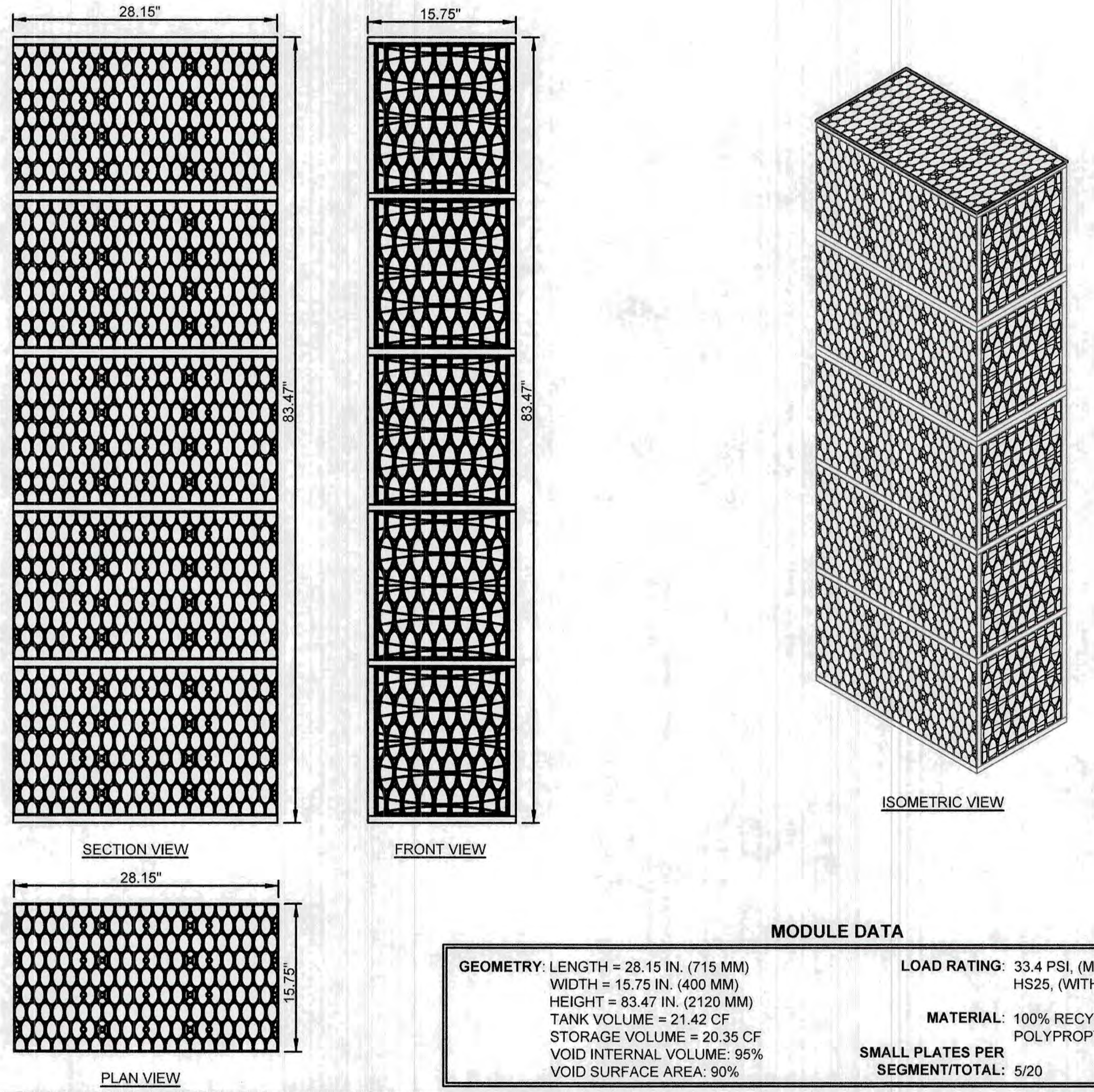
SIDE BACKFILL: 24" MIN. OF FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5" OR SOIL (USCS CLASS GW, GP, SW OR SP). MUST BE FREE FROM LUMPS, DEBRIS AND OTHER SHARP OBJECTS. SPREAD EVENLY TO PREVENT R-TANK^{HD} MOVEMENT. COMPACT SIDE BACKFILL WITH POWERED MECHANICAL COMPACTOR IN 12" LIFTS (PER SPEC SECTION 3.05 A2).

08/29/2018

R-TANK^{HD} & HS-20 LOADS - SECTION VIEW

ACF ENVIRONMENTAL
LET'S GET IT DONE

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com



MODULE DATA

GEOMETRY:	LENGTH = 28.15 IN. (715 MM) WIDTH = 15.75 IN. (400 MM) HEIGHT = 83.47 IN. (2120 MM) TANK VOLUME = 21.42 CF STORAGE VOLUME = 20.35 CF VOID INTERNAL VOLUME: 95% VOID SURFACE AREA: 90%	**LOAD RATING:**	33.4 PSI, (MODULE ONLY) HS25, (WITH ACF COVER SYSTEM)
		MATERIAL:	100% RECYCLED POLYPROPYLENE
		SMALL PLATES PER SEGMENT/TOTAL:	5/20

R-TANK^{HD} - PENT MODULE

ACF ENVIRONMENTAL
LET'S GET IT DONE

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

5/16

19190-PLAN-NEW-LAYOUT.dwg 12/21/21

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9848

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: DETAIL SHEET

Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801

Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.

D3

SHEET 12 OF 24
JBE PROJECT NO. 19190.2

PRETX SPECIFICATIONS

A. GENERAL

1. PRETX SYSTEMS ARE A PRE-FILTER AND CRITICAL MAINTENANCE DEVICE THAT EXTENDS THE OPERATING LIFE AND REDUCES THE MAINTENANCE BURDEN OF BIORETENTION SYSTEMS, RAIN GARDENS, BIOSWALES AND OTHER TYPES OF SURFACE BEST MANAGEMENT PRACTICES BY FILTERING OUT SEDIMENT, TRASH AND DEBRIS AT THE INLET.

B. PRODUCTS

1. PRETX IS AVAILABLE IN 3 MODELS THAT MANAGE MOST BIORETENTIOIN INLET CONFIGURATIONS: CURB, DROP, AND INLINE.
2. PRETX-CURB IS FOR EDGE OF PAVEMENT RUNOFF AT A CURB CUT IN LIEU OF A STONE SPREADER.
3. PRETX-DROP IS FOR USE AS A DROP INLET CONFIGURATION ALONG A CURB LINE AND WOULD BE INSTALLED WITH A STANDARD DROP INLET GRATE.
4. PRETX-INLINE IS FOR USE WITH SUBSURFACE INLET AND OUTLET PIPE.
5. PRETX IS SIZED TO PRETREAT WATER QUALITY FLOWS AND BYPASS LARGER FLOWS THAT HAVE MINIMAL TRASH AND DEBRIS. PRETX CAN BE USED BOTH IN RETROFIT OR NEW INSTALLATIONS.
6. ACCEPTABLE SYSTEM SUPPLIER:

CONVERGENT WATER TECHNOLOGIES, INC. OR ITS AUTHORIZED VALUE-ADDED RESELLER
(800) 711-5428
WWW.CONVERGENTWATER.COM

C. SUBMITTALS

1. SUBMIT PROPOSED LAYOUT DRAWINGS. DRAWINGS SHALL INCLUDE TYPICAL SECTION DETAILS ANNOTED WITH SYSTEM ELEVATIONS (E.G., RIM, PIPE INVERTS, OUTSIDE BOTTOM OF STRUCTURE, ETC.).
2. SUBMIT MATERIAL CERTIFICATES FOR FRAMES AND COVERS
3. ANY PROPOSED EQUAL ALTERNATE PRODUCT SUBSTITUION TO THIS SPECIFICATON MUST BE SUBMITTED FOR REVIEW AND APPROVED PRIOR TO BID OPENING.

D. EXECUTION

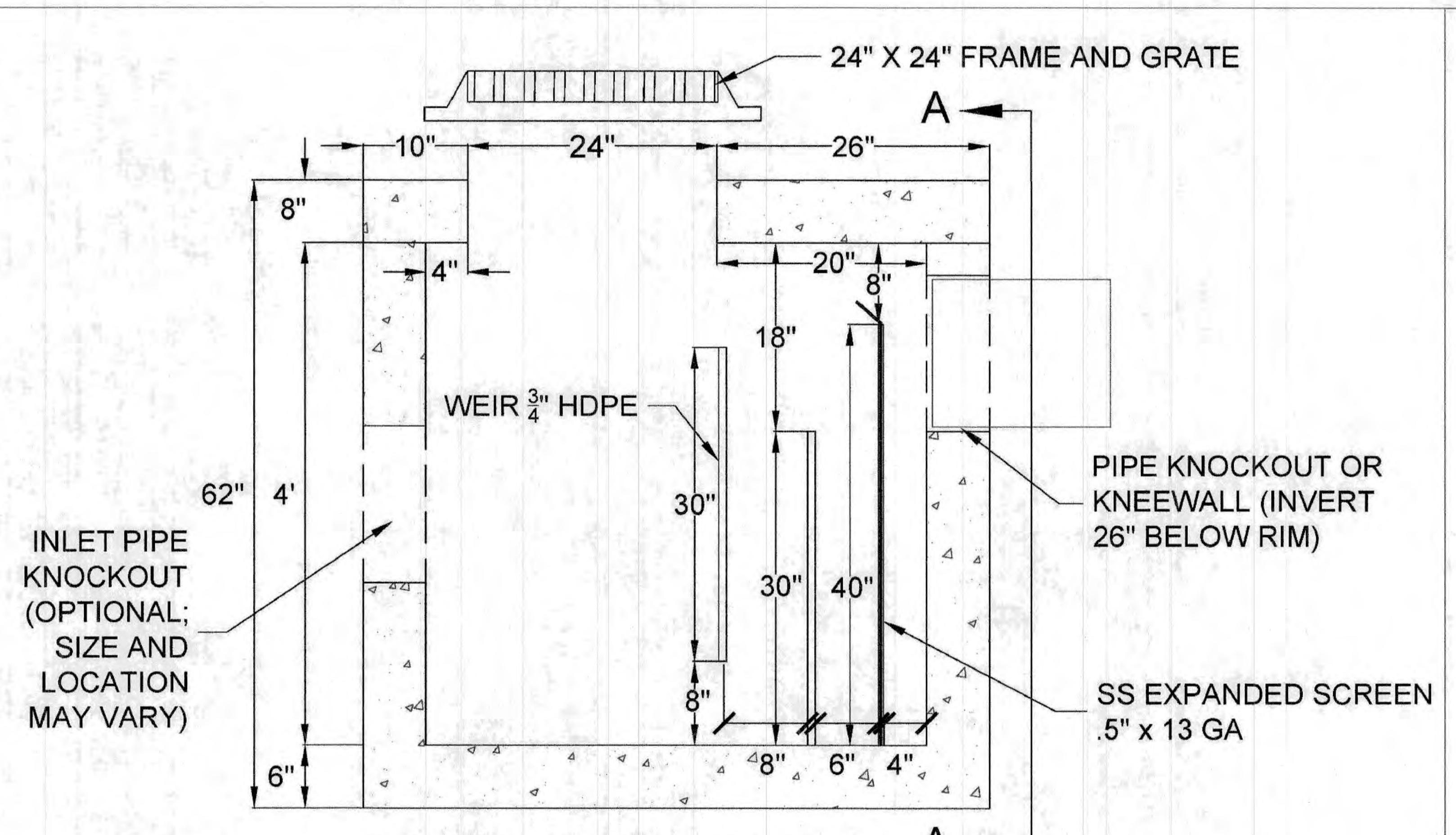
1. All PUBLIC STORM DRAINAGE SYSTEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS AND ACCORDING TO LOCAL MUNICIPAL REQUIREMENTS.
2. All STORM DRAINAGE SYSTEM CONSTRUCTION IS SUBJECT TO INSPECTION AND APPROVAL BY THE PROJECT ENGINEER.
3. THE CONTRACTOR SHALL NOTIFYTHE PROJECT ENGINEER A MINIMUM OF TWO FULL BUSINESS DAYS PRIOR TO THE START OF CONSTRUCTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING AND OBTAINING APPROVAL FROM DIG-SAFE AND DETERMINING THE LOCATION OF All UNDERGROUND UTILITIES PRIOR TO THE START OF CONSTRUCTION/ EXCAVATION AND SHALL NOTIFY THE PROJECT ENGINEER OF ANY POTENTIAL CONFLICTS.
5. TO PROTECT STORMWATER FLOW CONTROL AND QUALITY TREATMENT FACILITIES FROM SEDIMENTATION, THEY SHALL BE CONNECTED TO THE STORM CONVEYANCE SYSTEM ONLY AFTER ALL SITE WORK, ROAD CONSTRUCTION, UTILITY WORK AND LANDSCAPING ARE IN PLACE IN ALL AREAS ABOVE AND UPSTREAM OF THE FACILITY.
6. THE EXISTING STORM SEWER SYSTEM SHALL STAY ISOLATED FROM THE NEW SYSTEM UNTIL THE NEW SYSTEM IS CLEANED, AND APPROVED FOR USE. THERE SHALL BE NO DEBRIS IN THE LINES OR FURTHER CLEANING Will BE REQUIRED PRIOR TO ACCEPTANCE.
7. PROVIDE A 1.5" MINIMUM GAP BETWEEN THE KNOCKOUT WALL AND THE OUTSIDE OF THE PIPE. AFTER THE PIPE IS INSTALLED, FILL THE GAP WITH JOINT MORTAR
8. THE OPENING SHALL BE MEASURED ATTHE TOP OF THE PRECAST BASE SECTION.
9. All PICKUP HOLES SHALL BE GROUTED FULL AFTER THE BASIN HAS BEEN PLACED.
10. STANDARD CURB INLETS AND TIPDOWNS SHALL BE PRECAST CONCRETE OR ASPHALT.
11. PIPE ENDS SHALL BE FLUSH WITH THE INNER WALL OR 1" MAXIMUM INTRUSION. MASONRY, CINDER BLOCKS, OR SIMILIAR MATERIALS MAY BE USED TO ADJUST THE RISERS TO GRADE PRIOR TO GROUTING.
12. GROUTING SHALL BE SUFFICIENTTO PREVENT LEAKS BETWEEN THE PRECAST COMPONENTS OF THE COMPLETED STRUCTURE & SHALL BE PERFORMED INSIDE, BETWEEN & OUTSIDE OF All RISERS, JOINTS & PIPE PENETRATIONS.
13. MANHOLES TO BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
14. All REINFORCED CAST IN PLACE CONCRETE SHALL BE CLASS 4000. All PRECAST CONCRETE SHALL BE CLASS 4000.
15. RECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM.
16. MATING SURFACES OF MANHOLE RINGS AND COVERSSHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITIONS.

E. CONSTRUCTION AND SEQUENCING

1. EXAMINATION
   - A. VERIFY LAYOUT AND ORIENTATION OF PRE-TX SYSTEM AREA INCLUDING EDGE OF PAVEMENT, TIP DOWN, CURBS AND SIDEWALK, BIOFILTRATION SYSTEM, AND CONNECTIONS.
   - B. VERIFY EXCAVATION BASE IS READY TO RECEIVE WORK AND EXCAVATIONS, DIMENSIONS, AND ELEVATIONS ARE AS INDICATED ON DRAWINGS.
2. PREPARATION
   - A. CALL DIG SAFE AND RECEIVE APPROVAL BEFORE PERFORMING WORK.
   - B. REQUEST UNDERGROUND UTILITIES TO BE LOCATED AND MARKED WITHIN AND SURROUNDING CONSTRUCTION AREAS.
   - C. IDENTIFY REQUIRED LINES, LEVELS, CONTOURS, AND DATUM.
   - D. CLEAR AND GRUB THE PROPOSED PRE-TX SYSTEM AREA.
3. EXCAVATION AND INSTALLATION
   - A. THE FOLLOWING CONSTRUCTION SEQUENCE IS TO BE USED AS A GENERAL GUIDELINE. COORDINATE WITH THE OWNER, AND ENGINEERS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
   - B. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS TO DIVERT STORM WATER AWAY FROM THE PRE-TX SYSTEM AREA.
   - C. EXCAVATE TO THE BOTTOM INVERT OF THE SYSTEM.
   - D. TO MINIMIZE COMPACTION OF ADJACENT BIOFILTRATION SYSTEMS, WORK EXCAVATORS OR BACKHOES FROM THE SIDES TO EXCAVATE THE PRE-TX SYSTEM AREA TO ITS APPROPRIATE DESIGN DEPTH AND DIMENSIONS.
   - E. ROUGH GRADE THE PRE-TX SYSTEM AREA DURING GENERAL CONSTRUCTION. EXCAVATE THE PRE-TX SYSTEM FACILITIES TO WITHIN 1 FOOT OF STRUCTURE BOTTOM .
   - F. PLACE 1 FOOT BED OF COARSE STONE TO ELEVATION OF BASE OF STRUCTURE.
   - G. ESTABLISH ELEVATIONS FOR ADJACENT CURBS, EDGE OF PAVEMENT AND TIP DOWN, SIDEWALK, PIPE INVERTS FOR INLETS AND OUTLETS AS INDICATED ON DRAWINGS.
4. INSTALLATION
   - A. PLACE THE PRECAST SYSTEM TO NECESSARY ELEVATION.
   - B. VERIFY ELEVATIONS FOR ADJACENT CURBS, EDGE OF PAVEMENT, PAVEMENT GRADING FOR INLET GRATE FOR PRETX-DROP, SIDEWALK, PIPE INVERTS FOR INLETS AND OUTLETS, OUTLET INVERT FOR KNEE WALL.
   - C. FOR PRETX-SURFACE:
     - a. VERIFY ELEVATIONS FOR ADJACENT CURBS.
     - b. VERIFY EDGE OF PAVEMENT TIP DOWN PAVEMENT GRADING FOR INLET GRATE.
     - c. VERIFY CURB ELEVATION IN RELATION TO PAVEMENT AND TIP DOWN.
     - d. VERIFY OUTLET INVERT FOR KNEE WALL IN RELATION TO FILTER MEDIA.
   - D. FOR PRETX-DROP:
     - a. VERIFY ALL INLET PIPES ENTER THE STRUCTURE UPSTREAM OF BAFFLE.
     - b. VERIFY FRAME AND GRATE OFFSET ON INLET SIDE AND UPSTREAM OF BAFFLE.
     - c. VERIFY CURB LOCATION WITH RESPECT TO FRAME AND GRATE ORIENTATION.
   - E. INSTALL BAFFLES, WEIR, AND SCREENS AS INDICATED ON DRAWINGS.
   - F. VERIFY MAINTENANCE ACCESS THROUGH GRATE OR COVER AND CLEARANCE FOR VACTOR.
   - G. INSTALL TOP OF STRUCTURE LEVEL WITH ADJACENT CURB OR SIDEWALK AS PER MANUFACTURERS SPECIFICATIONS. ENGINEER FIELD VISIT REQUIRED PRIOR TO BACKFILLING.
5. BACKFILLING
   - A. BACKFILL WITH APPROVED SOIL AND STONE TO THE DESIGN GRADE AS SPECIFIED IN THE DRAWINGS.
   - B. BACKFILL WITH 12" OF NO. 57 STONE AROUND REAR, LEFT, AND RIGHT SIDES TO LEVEL WITH TOP OF HDPE SCREEN.
   - C. BACKFILL WITH BIORETENTION SOIL MIX BEYOND STONE BACKFILL TO EQUAL ELEVATION OF THE TOP OF HDPE SCREEN.
   - D. DO NOT BACKFILL SOIL OR STONE AGAINST STAINLESS SCREEN.
   - E. DO NOT COMPACT ADJACENT FILTRATION SYSTEM SOIL WITH MECHANICAL EQUIPMENT.
   - F. STABILIZE All REMAINING DISTURBED AREAS AND SIDE SLOPES WITH SEEDING, HYDROSEEDING, AND/ ORerosion CONTROL BLANKETS AS INDICATED ON DRAWINGS.
6. CLEAN UP
   - A. AFTER COMPLETION OF THE WORK, REMOVE AND PROPERLY DISPOSE ALL DEBRIS, CONSTRUCTION MATERIALS, RUBBISH, EXCESS SOIL, ETC., FROM THE PROJECT SITE. REPAIR PROMPTLY ANY IDENTIFIED DEFICIENCIES AND LEAVE THE PROJECT SITE IN A CLEAN AND SATISFACTORY CONDITION.

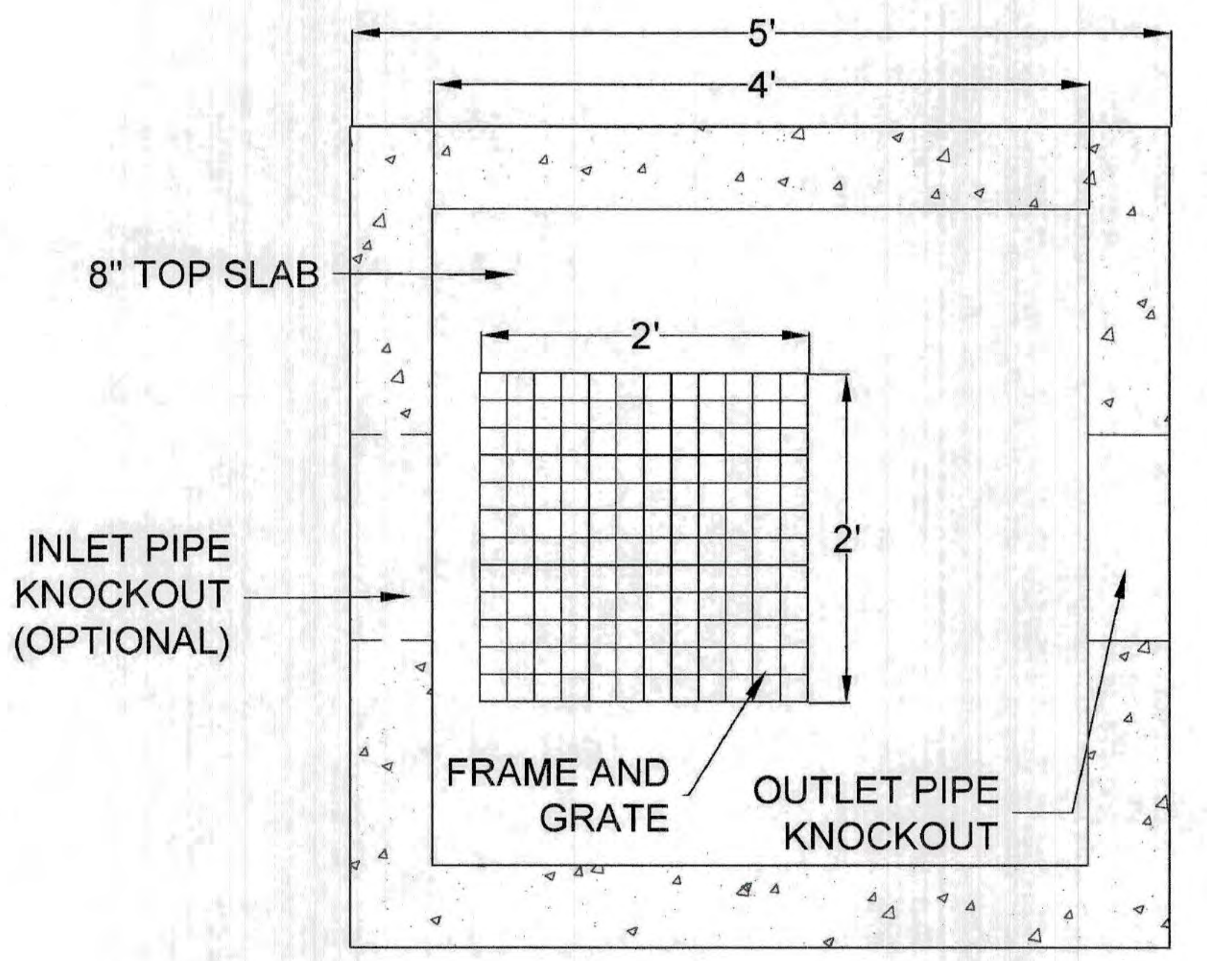
PRETX–CURB ELEVATION GUIDE

POINT	DESCRIPTION	ELEV.
A	OUTSIDE OF TOP SLAB	4" BELOW B
B	EDGE OF PAVEMENT	PER PLAN
C	PIPE INVERT	PER PLAN
D	SUMP INVERT	52" BELOW B
E	OUTSIDE BOTTOM	58" BELOW B
F	INLET PIPE KNOCKOUT	N/A



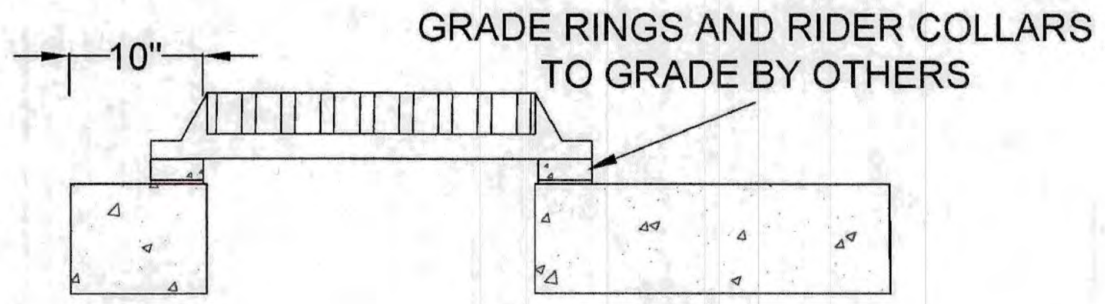
1 D1 PRETREATMENT CATCH BASIN CROSS SECTION VIEW

NOT TO SCALE



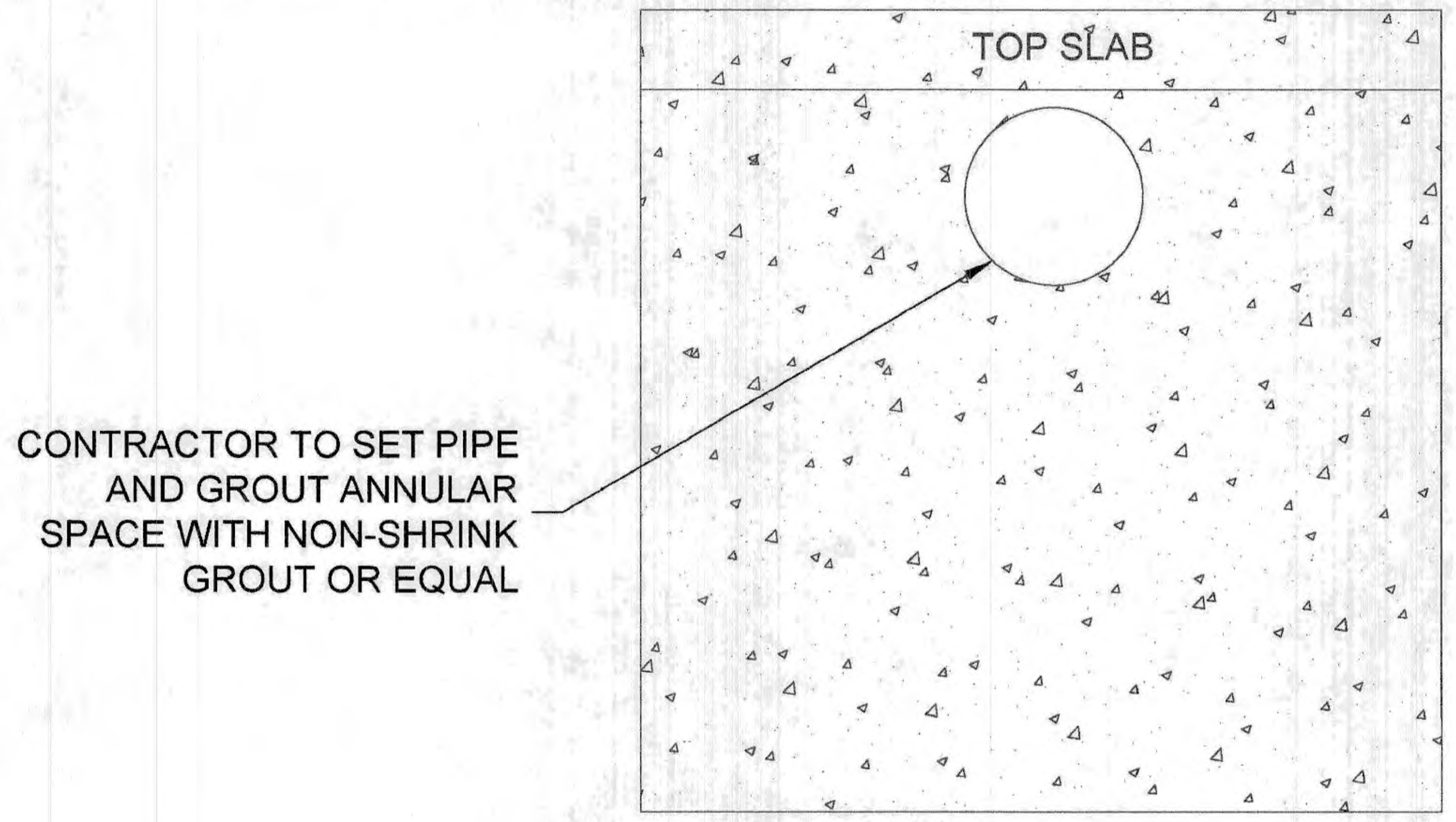
2 D1 PLAN VIEW DETAIL

NOT TO SCALE



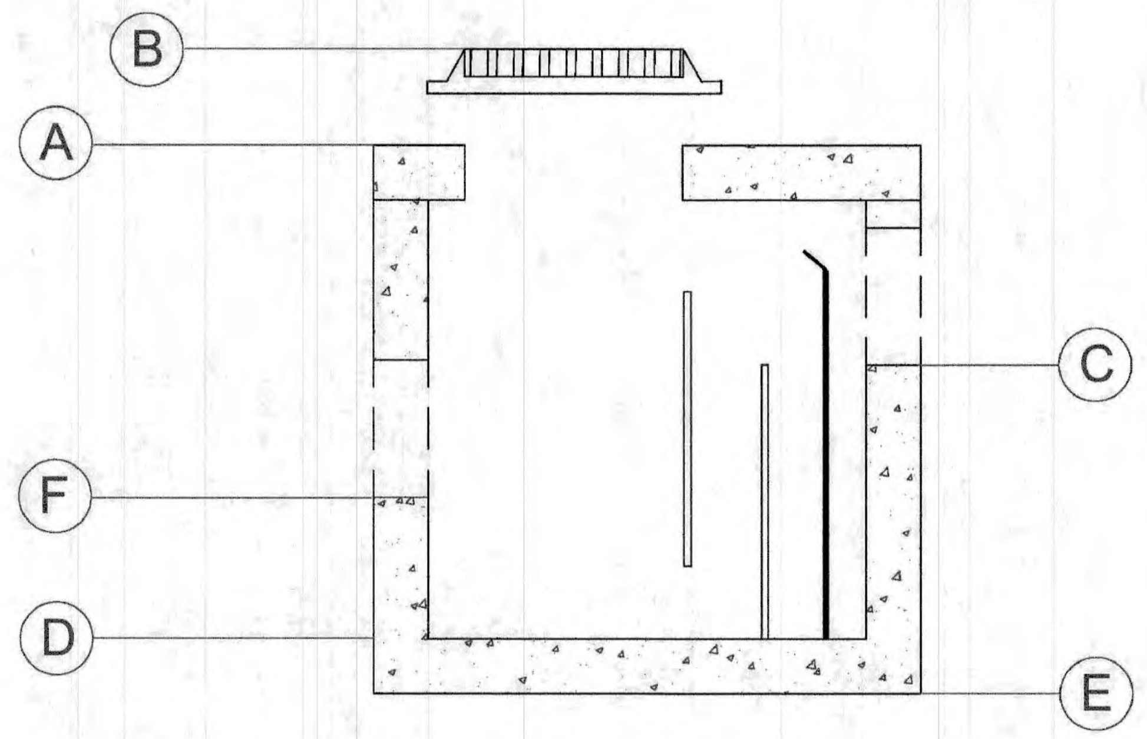
3 D1 PRETX DROP SIDE DETAIL

NOT TO SCALE



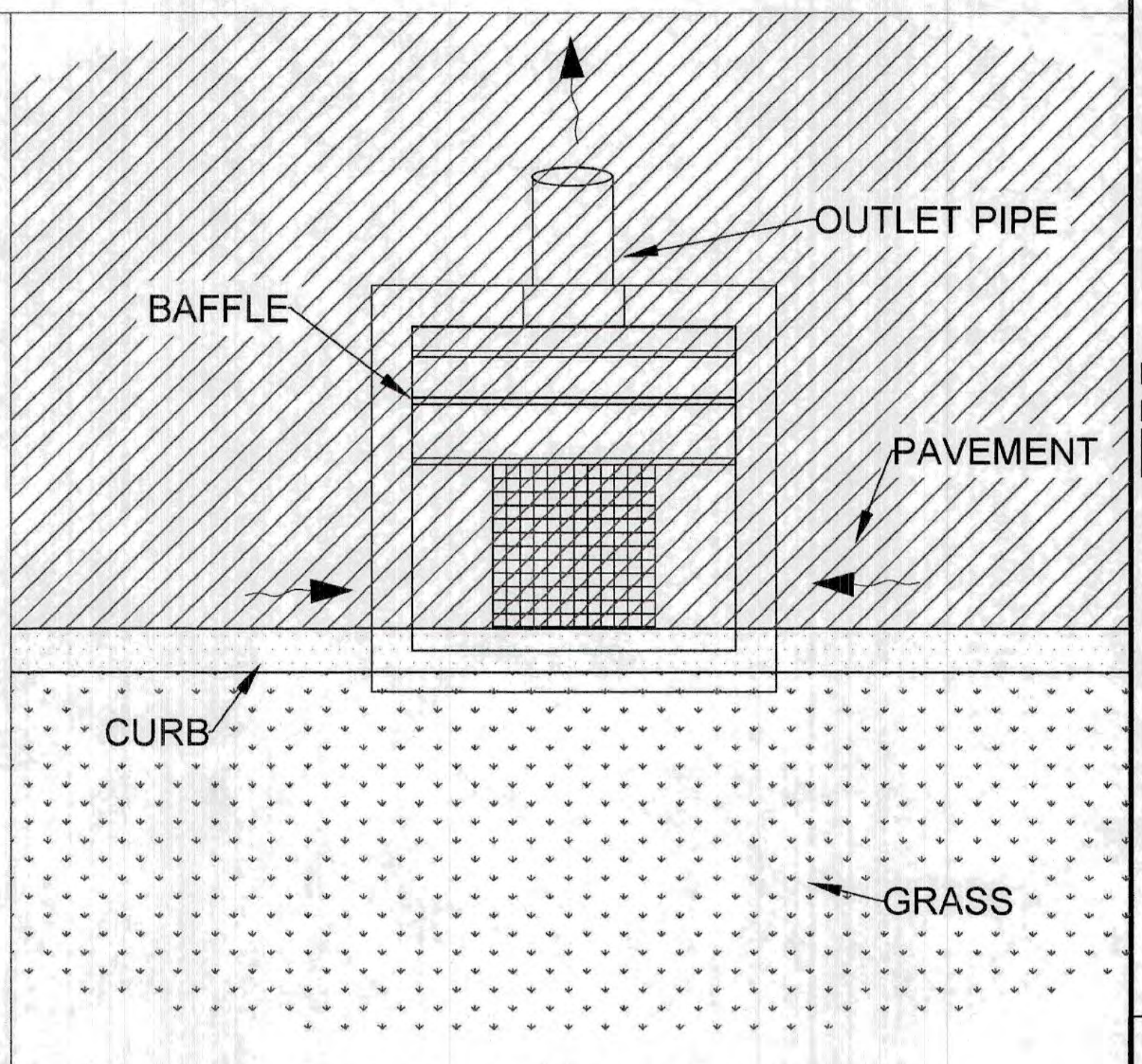
4 D1 SECTION A-A

NOT TO SCALE



5 D1 KEY TO ELEVATION GUIDE

NOT TO SCALE



6 D1 PRETX DROP OUTLET CONFIGURATION

NOT TO SCALE

D-1 PRETX™ DROP INLET PRETREATMENT DETAIL

TO FIND A VALUE ADDED RESELLER IN YOUR AREA VISIT
WWW.CONVERGENTWATER.COM/STORMWATER-PRODUCTS
OR CONTACT CONVERGENT WATER TECHNOLOGIES AT
1.800.711.5428

REVISED 11/20/18; ELEVATION DETAILS ADDED; CHECKED BY RR

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC | Draft: DJM | Date: 04/21/20
Checked: JAC | Scale: AS NOTED | Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9848

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: DETAIL SHEET
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
D4
SHEET 13 OF 24
JBE PROJECT NO. 19190.2

ACF BEEHIVE OVERFLOW FILTER STRUCTURE DETAILS

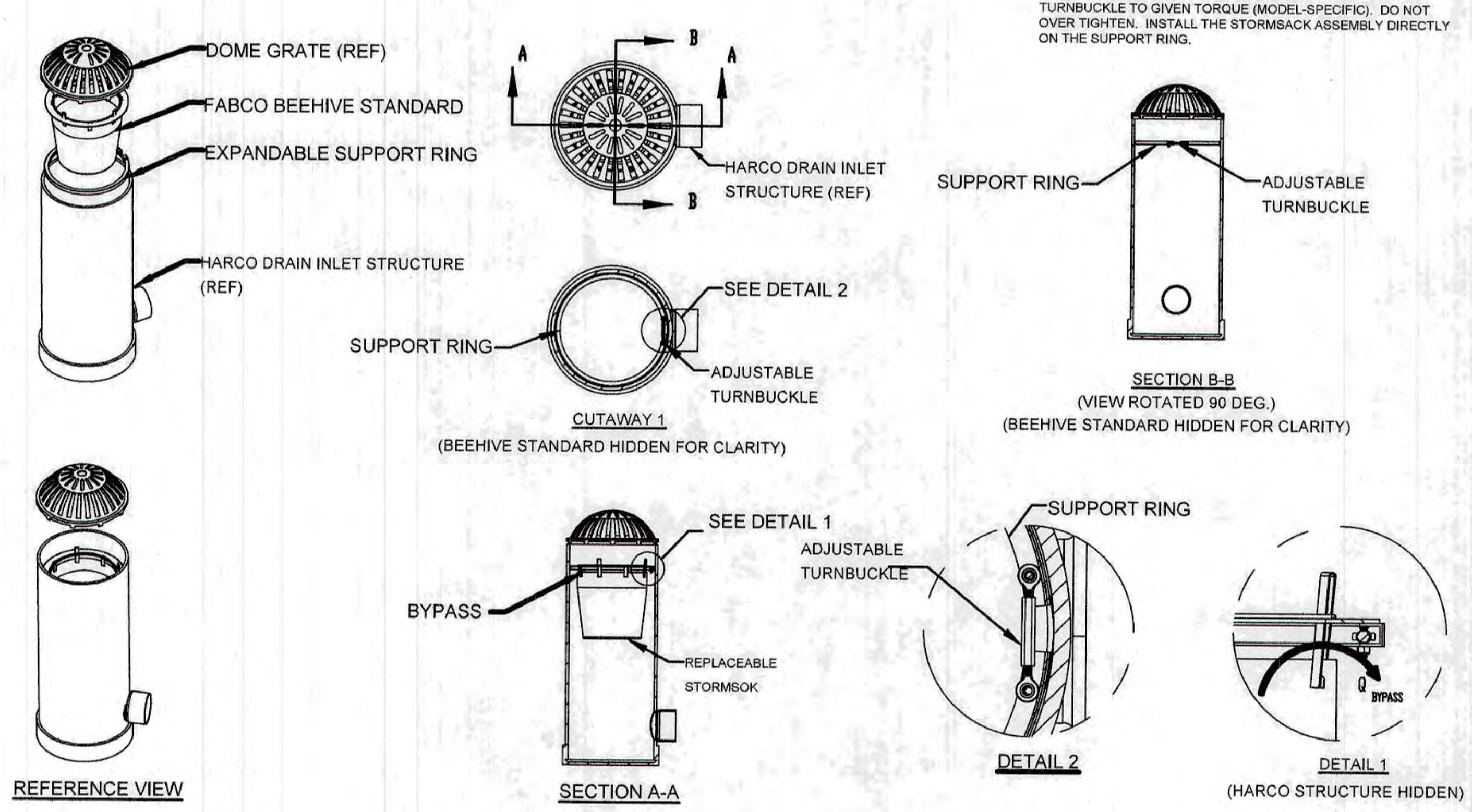
STRUCTURE DIAMETER (IN.)	DEBRIS CAPACITY (CU.FT)	FILTERED FLOWRATE (CFS)	BYPASS FLOWRATE (CFS)
12	0.66	1.7	1.0
15	1.0	2.1	1.3
18	1.2	2.3	1.4
24	2.8	3.9	2.2
30	2.8	3.9	2.2

NOTES:

1. MATERIAL:
   - A) SUPPORT FLANGE: ALUMINUM ALLOY PLATE, 5000 SERIES
   - B) STORMSOK: WOVEN POLYPROPYLENE GEOTEXTILE
   - C) EXPANSION RING: ALUMINUM ALLOY CHANNEL, 6000 SERIES
   - D) HARDWARE: STAINLESS STEEL
2. RECOMMENDED MINIMUM VAULT DEPTH: 2-IN BELOW STORMSOK
3. USE ONLY WITH FABCO REPLACEABLE STORMSOK

GENERAL INSTALLATION:

ADJUST THE TURNBUCKLE DOWN TO GIVE THE SMALLEST RING DIAMETER AND LOCATE THE EXPANSION RING INTO THE HARCO STRUCTURE MINIMUM OF 6-IN DOWN FROM THE TOP OPENING AS SHOWN. BEGIN OPENING THE TURNBUCKLE UNTIL THE EXPANSION RING IS SELF SUPPORTING, THEN VERIFY THE RING IS LEVEL AND PLUMB TO THE HARCO STRUCTURE. USING A CALIBRATED TORQUE WRENCH, CONTINUE TO OPEN THE TURNBUCKLE TO GIVEN TORQUE (MODEL-SPECIFIC). DO NOT OVER TIGHTEN. INSTALL THE STORMSACK ASSEMBLY DIRECTLY ON THE SUPPORT RING.



FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

FocalPoint
BIOFILTRATION SYSTEMS

REVISED
AUG 2020

FOCALPOINT HP CONSTRUCTION GUIDE

FOCALPOINT HP PERFORMANCE SPECIFICATION:

HIGH PERFORMANCE MEDIA

HIGH PERFORMANCE MEDIA MUST MEET A MINIMUM OF 100" PER HOUR INFILTRATION RATE.

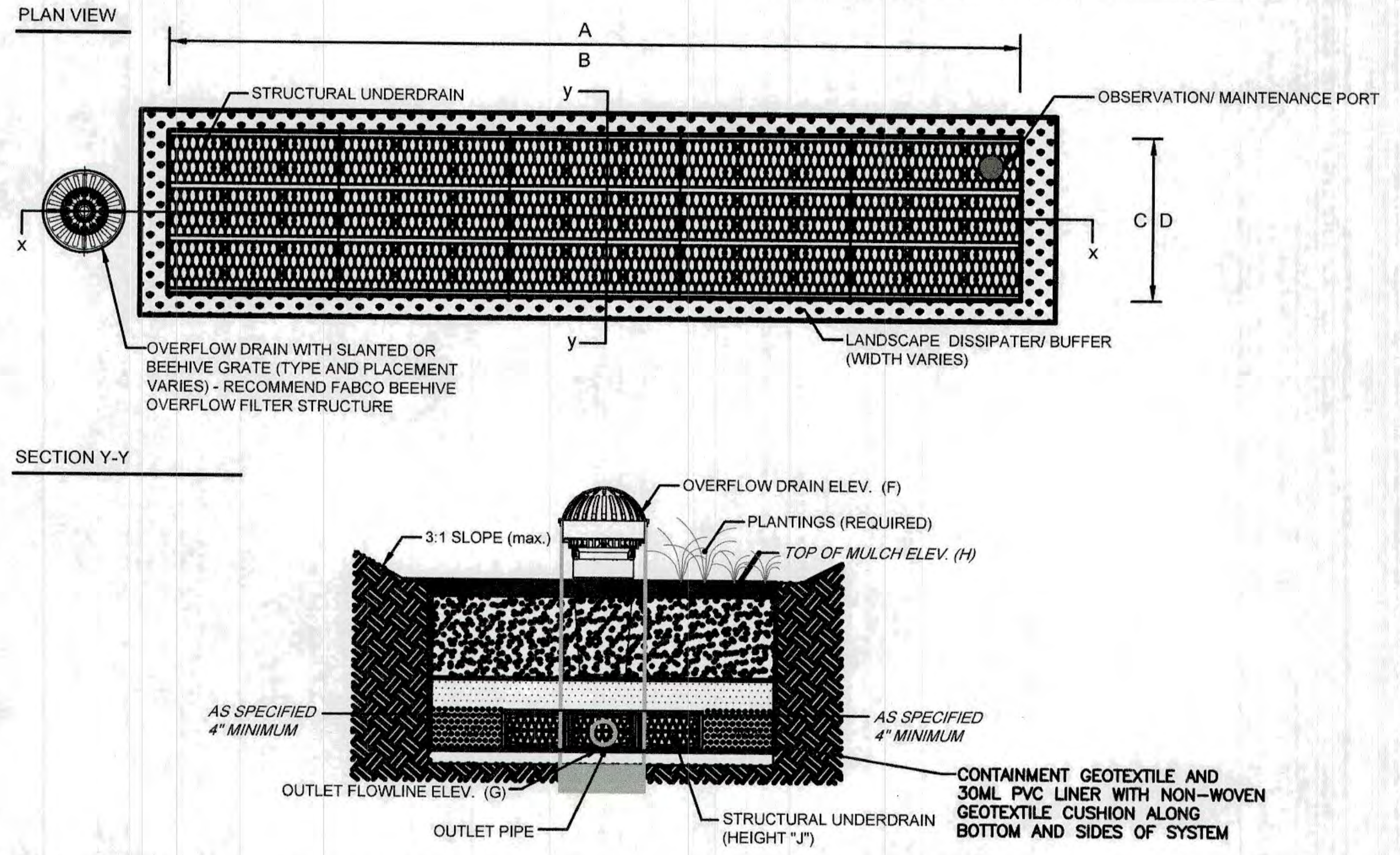
HIGH PERFORMANCE STRUCTURAL UNDERDRAIN

MUST HAVE A MINIMUM OF 19 SQUARE INCHES OF ORIFICE OPENING PER SQUARE FOOT.
MUST MEET H20 LOADING REQUIREMENTS.
MUST BE MODULAR IN NATURE AND ASSEMBLED ON SITE.
MUST HAVE MINIMUM 90% INTERIOR VOID SPACE.

PLANT COMPONENT

SUPPLIER SHALL PROVIDE LIST OF ACCEPTABLE PLANTS
IF PLANTS ARE NOT INCLUDED IN THE LANDSCAPE CONTRACT/PLANS. SITE CONTRACTOR SHALL PROVIDE PLANTS.
PLANTS SHALL BE INSTALLED AT THE TIME THE SYSTEM IS COMMISSIONED FOR USE. PLANTING OUTSIDE THIS TIME REQUIRES APPROVAL BY THE ENGINEER/LANDSCAPE ARCHITECT OF RECORD.
SEE FOCALPOINT INSTALLATION GUIDE FOR PLANT SPACING, PLANTING PROCEDURES ETC.

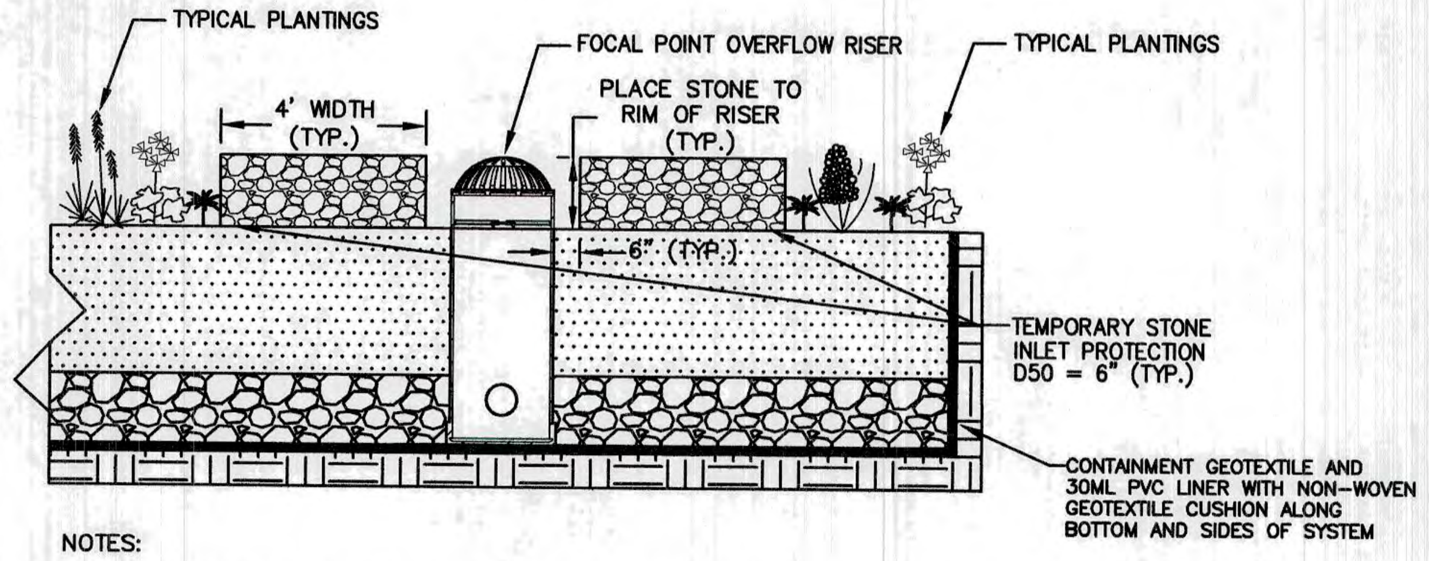
FOCALPOINT HP CONSTRUCTION GUIDE		
A	FOCALPOINT LENGTH	SEE PLANS
B	# UNDERDRAIN LONG	SEE PLANS
C	FOCALPOINT WIDTH	SEE PLANS
D	# UNDERDRAIN WIDE	SEE PLANS
E	WATER QUALITY VOLUME	VARIES
F	OVERFLOW ELEVATION	SEE PLANS
G	OUTLET FLOWLINE	SEE PLANS
H	TOP OF MULCH	SEE PLANS
I	TOP OF GABION (OPTIONAL)	NO GABION
J	UNDERDRAIN HEIGHT	SEE PLANS



FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

FocalPoint
BIOFILTRATION SYSTEMS

REVISED
AUG 2020



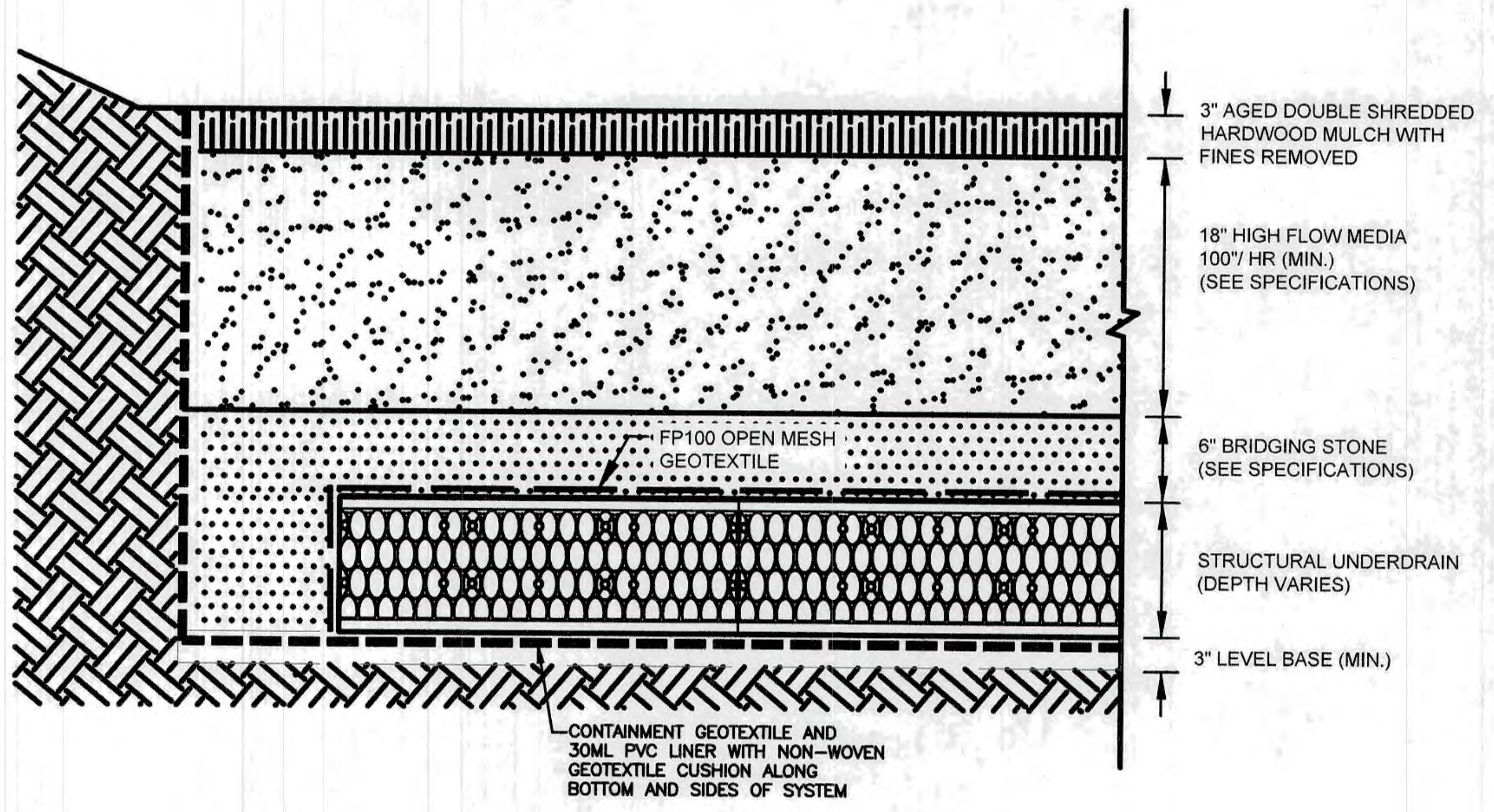
NOTES:

1. AFTER CONSTRUCTION, REMOVE STONE INLET PROTECTION AND VEGETATE AFFECTED AREA WITH TYPICAL BIORETENTION PLANTINGS AS SPECIFIED ON SHEET L1.
2. STONE INLET PROTECTION SHALL WRAP ALL THE WAY AROUND THE RISER IN A CIRCLE.

FOCAL POINT RISER STONE INLET PROTECTION

NOT TO SCALE

FOCALPOINT HP DETAILED CROSS SECTION

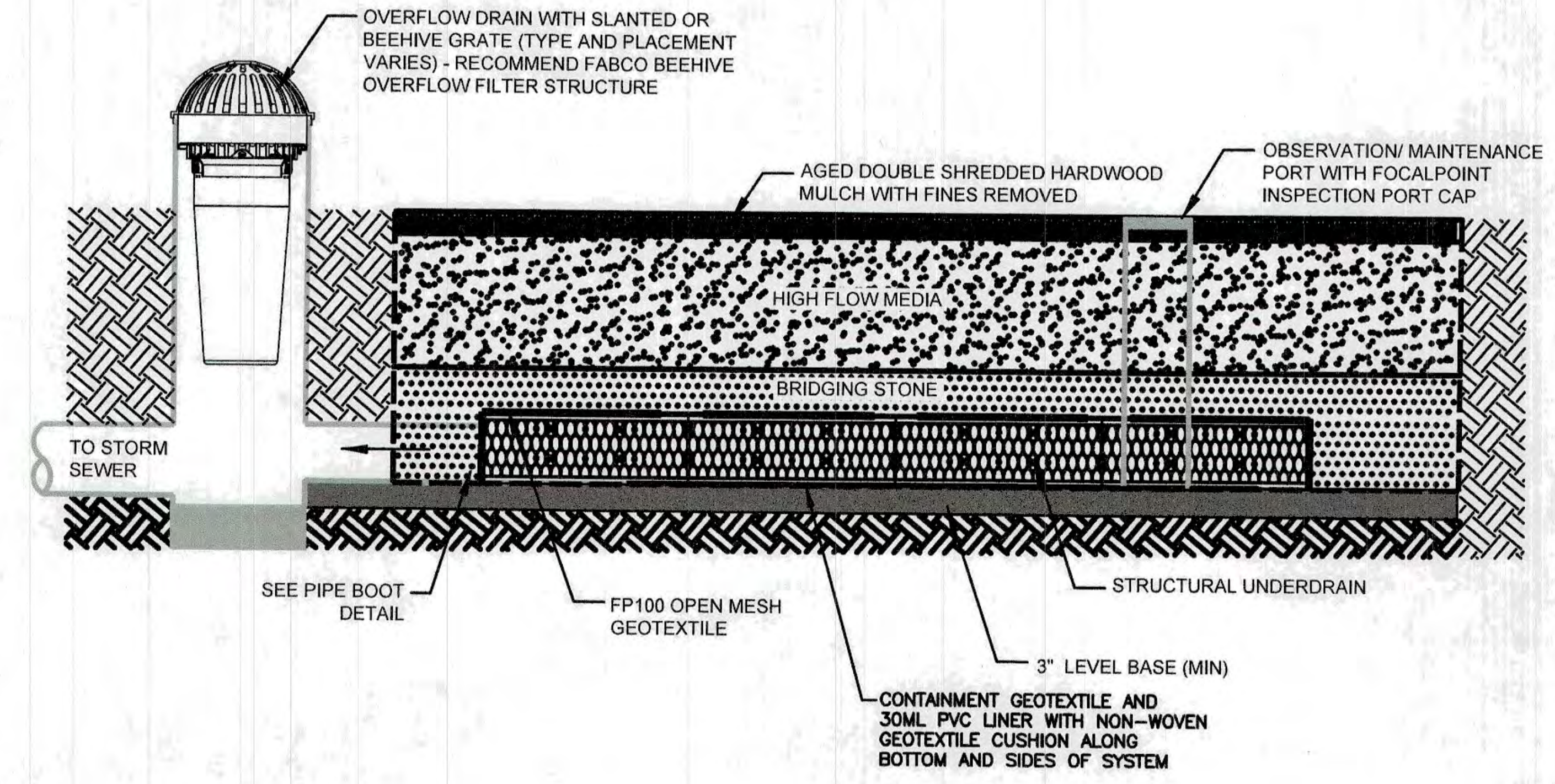


FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

FocalPoint
BIOFILTRATION SYSTEMS

REVISED
AUG 2020

FOCALPOINT HP SECTION X-X



FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

FocalPoint
BIOFILTRATION SYSTEMS

REVISED
AUG 2020

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

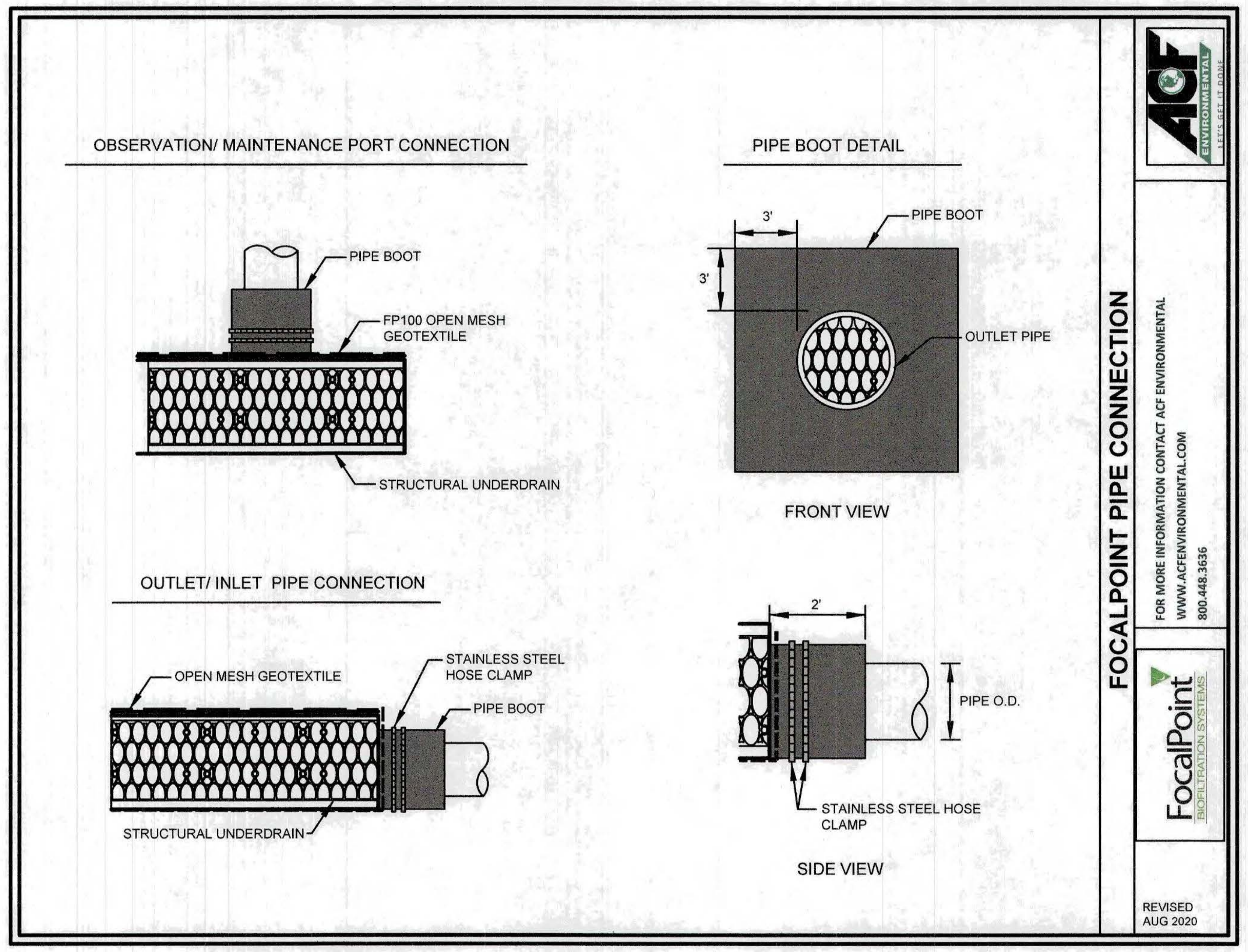
12/21/2021

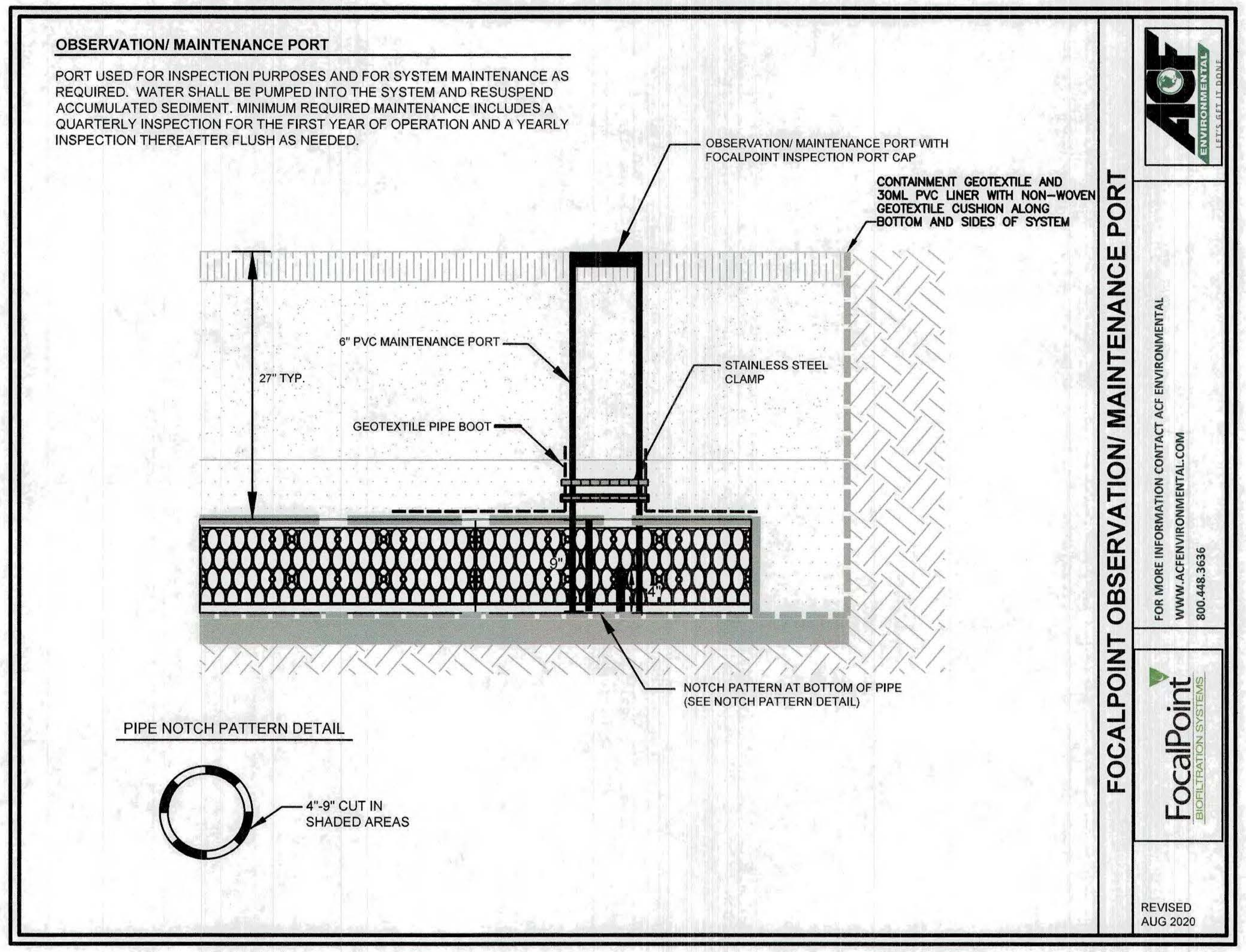
REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
D5
SHEET 14 OF 24
JBE PROJECT NO. 19190.2





OBSERVATION/ MAINTENANCE PORT

PORT USED FOR INSPECTION PURPOSES AND FOR SYSTEM MAINTENANCE AS REQUIRED. WATER SHALL BE PUMPED INTO THE SYSTEM AND RESUSPEND ACCUMULATED SEDIMENT. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION FOR THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER FLUSH AS NEEDED.

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

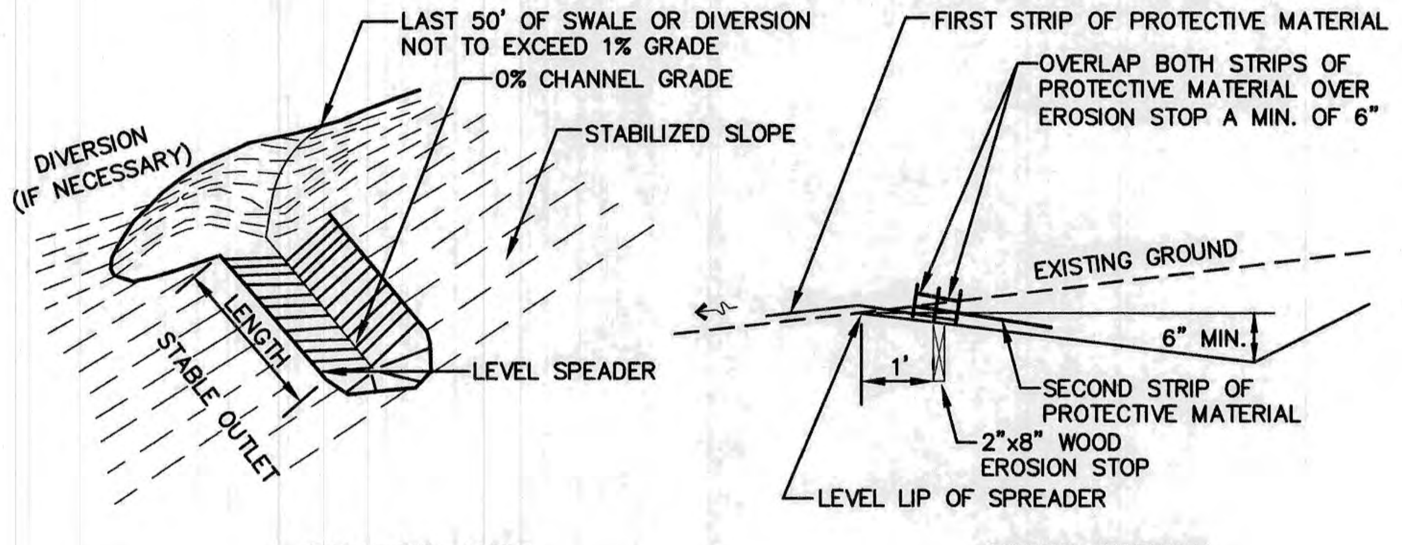
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.

D6

SHEET 15 OF 24
JBE PROJECT NO. 19190.2



ISOMETRIC VIEW

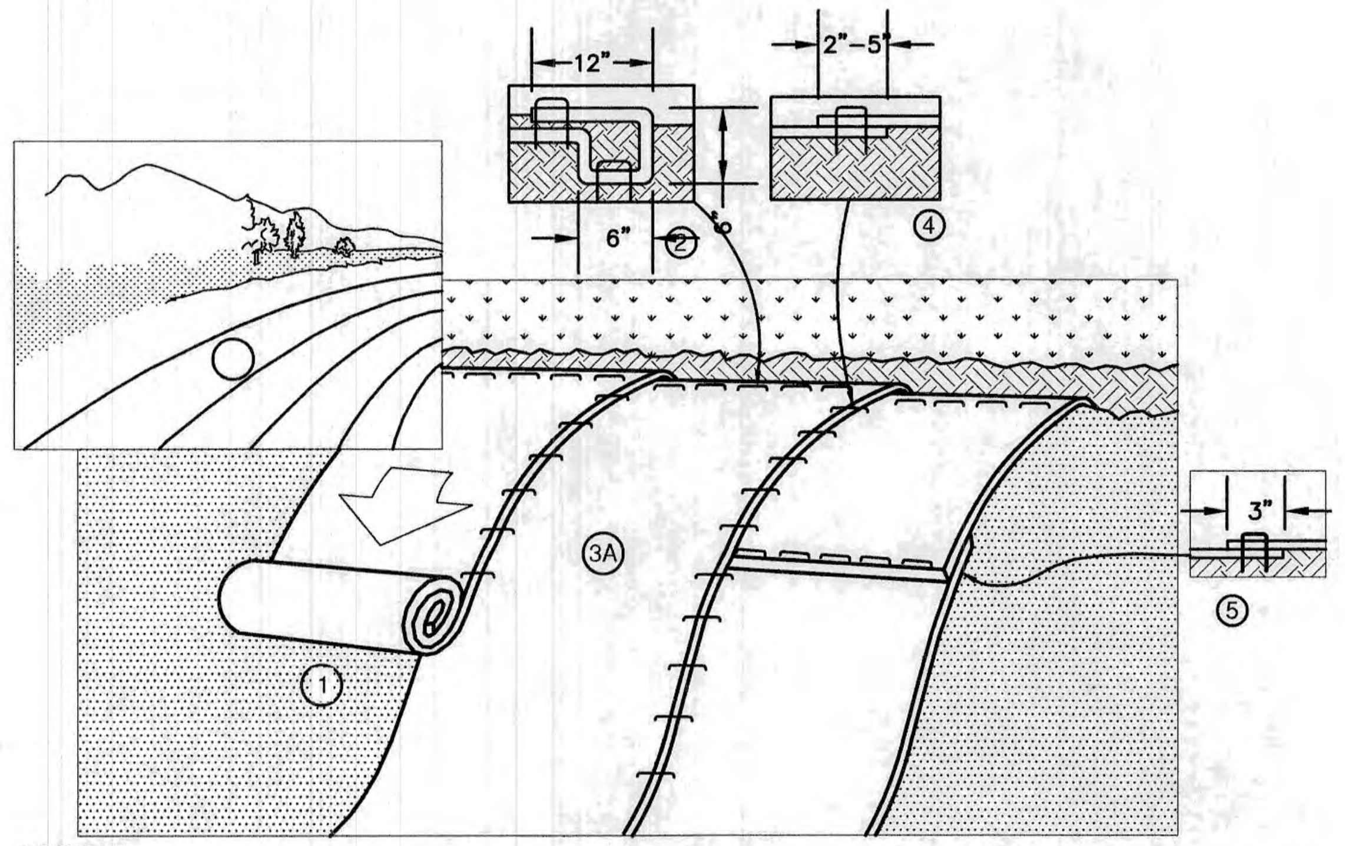
CROSS SECTION

NOTES:

1. CONSTRUCT THE LEVEL SPREADER LIP ON A ZERO PERCENT GRADE TO ENSURE UNIFORM SPREADING OF RUNOFF.
2. LEVEL SPREADER SHALL BE CONSTRUCTED ON UNDISTURBED SOIL AND NOT ON FILL.
3. AN EROSION STOP SHALL BE PLACED VERTICALLY A MINIMUM OF SIX INCHES DEEP IN A SLIT TRENCH ONE FOOT BACK OF THE LEVEL LIP AND PARALLEL TO THE LIP. THE EROSION STOP SHALL EXTEND THE ENTIRE LENGTH OF THE LEVEL LIP.
4. ENTIRE LEVEL LIP AREA SHALL BE PROTECTED BY PLACING TWO STRIPS OF JUTE OR EXCELSIOR MATTING ALONG THE LIP. EACH STRIP SHALL OVERLAP THE EROSION STOP BY AT LEAST SIX INCHES.
5. ENTRANCE CHANNEL TO THE LEVEL SPREADER SHALL NOT EXCEED A 1 PERCENT GRADE FOR AT LEAST 50 FEET BEFORE ENTERING THE SPREADER.
6. THE FLOW FROM THE LEVEL SPREADER SHALL OUTLET ONTO STABILIZED AREAS. WATER MUST NOT RECONCENTRATE IMMEDIATELY BELOW THE SPREADER.
7. PERIODIC INSPECTION AND REQUIRED MAINTENANCE SHALL BE PERFORMED.
8. MAINTENANCE: THE LEVEL SPREADER SHOULD BE CHECKED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE IF THE SPREADER HAS BEEN DAMAGED. SEDIMENT DEEPER THAN 4" ACCUMULATION SHOULD BE REMOVED. IF RILLING HAS TAKEN PLACE ON THE LIP, THEN THE DAMAGE SHOULD BE REPAIRED AND REVEGETATED. THE VEGETATION SHOULD BE MOWED OCCASIONALLY TO CONTROL WEEDS AND THE ENCROACHMENT OF WOODY VEGETATION. CLIPPINGS SHOULD BE REMOVED AND DISPOSED OF OUTSIDE THE SPREADER AND AWAY FROM OUTLET AREA. FERTILIZATION SHOULD BE DONE AS NECESSARY TO KEEP THE VEGETATION HEALTHY AND DENSE.

LEVEL SPREADER

NOT TO SCALE



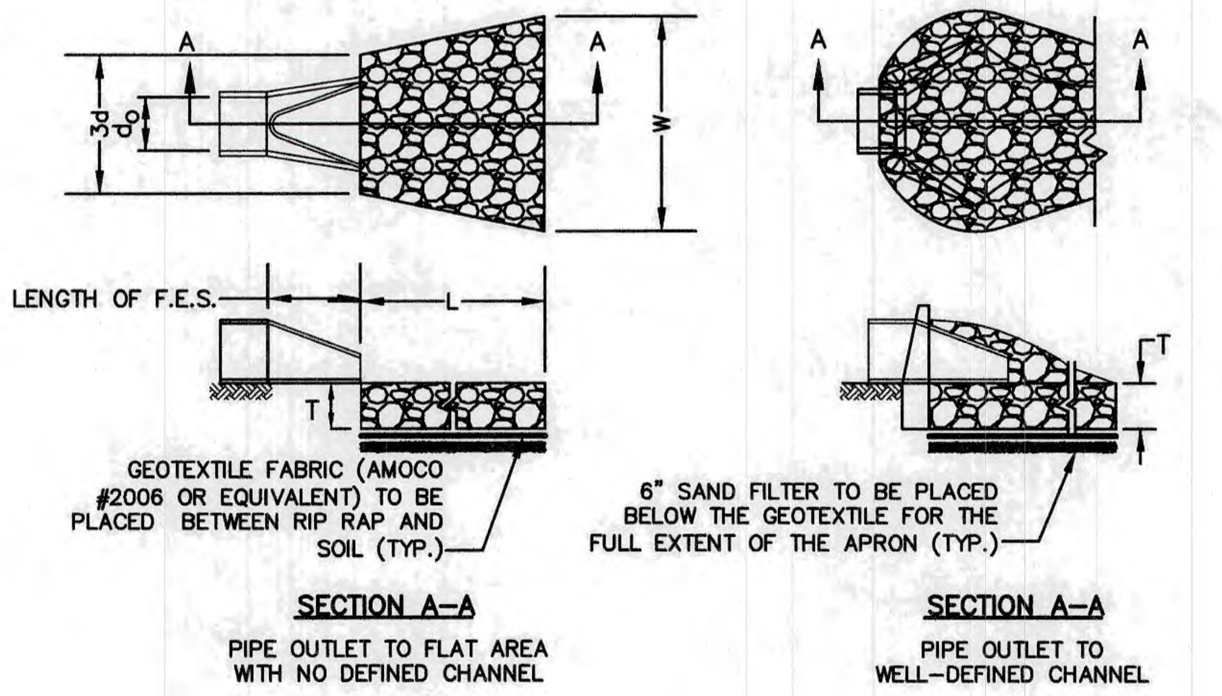
NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH. NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

NORTH AMERICAN GREEN
14649 HIGHWAY 41 NORTH
EVANSVILLE, INDIANA 47725
1-800-772-2040

EROSION CONTROL BLANKET SLOPE INSTALLATION (NORTH AMERICAN GREEN BIONET S75BN)

NOT TO SCALE



SECTION A-A
PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL

SECTION A-A
PIPE OUTLET TO WELL-DEFINED CHANNEL

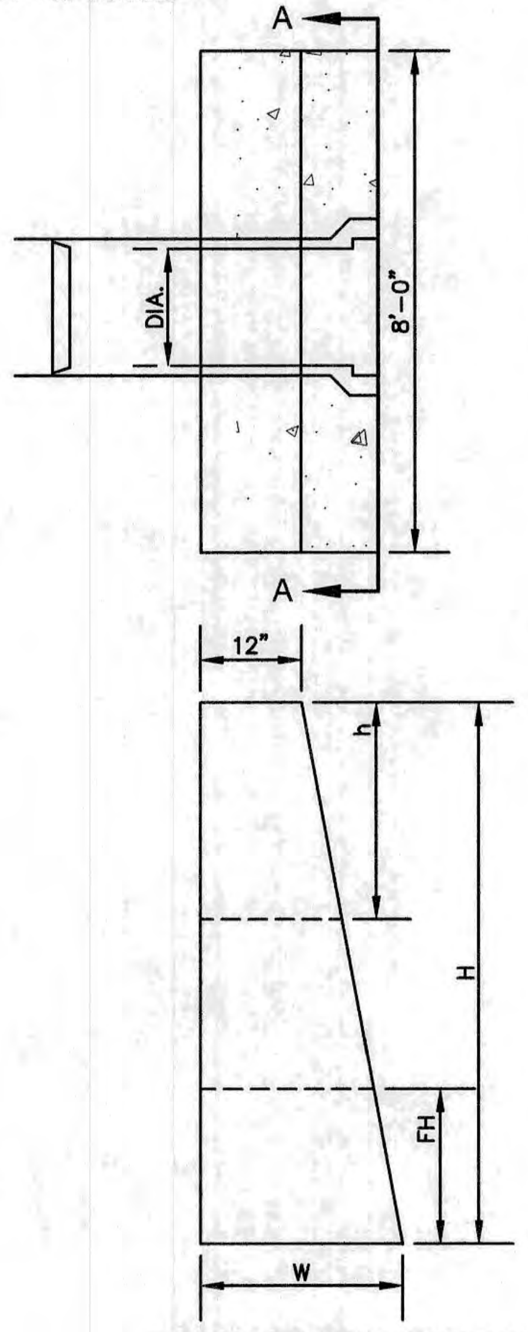
TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES		
THICKNESS OF RIP RAP = 1.5 FEET		
d50 SIZE= 0.50 FEET 6 INCHES		
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	9	12
85%	8	11
50%	6	9
15%	2	3

NOTES:

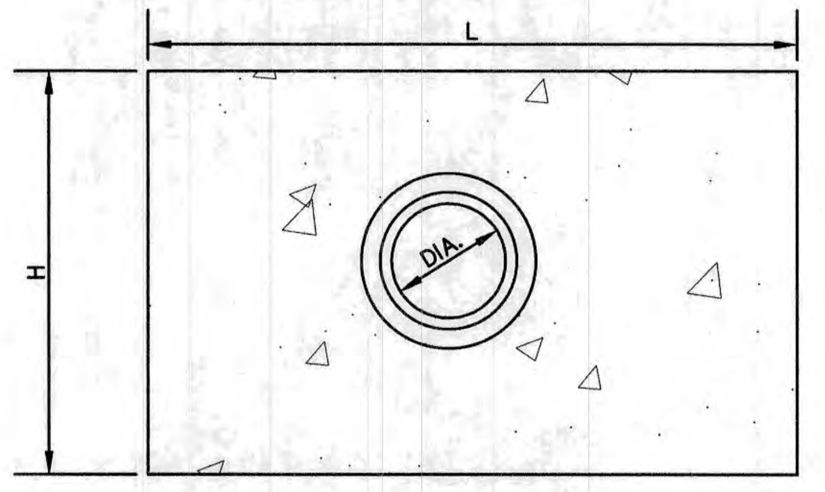
1. THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE RIP RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.
5. OUTLETS TO A DEFINED CHANNEL SHALL HAVE 2:1 OR FLATTER SIDE SLOPES AND SHOULD BEGIN AT THE TOP OF THE CULVERT AND TAPER DOWN TO THE CHANNEL BOTTOM THROUGH THE LENGTH OF THE APRON.
6. MAINTENANCE: THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIP RAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO OUTLET PROTECTION.

RIP RAP OUTLET PROTECTION APRON

NOT TO SCALE



LONGITUDINAL SECTION



SECTION A-A

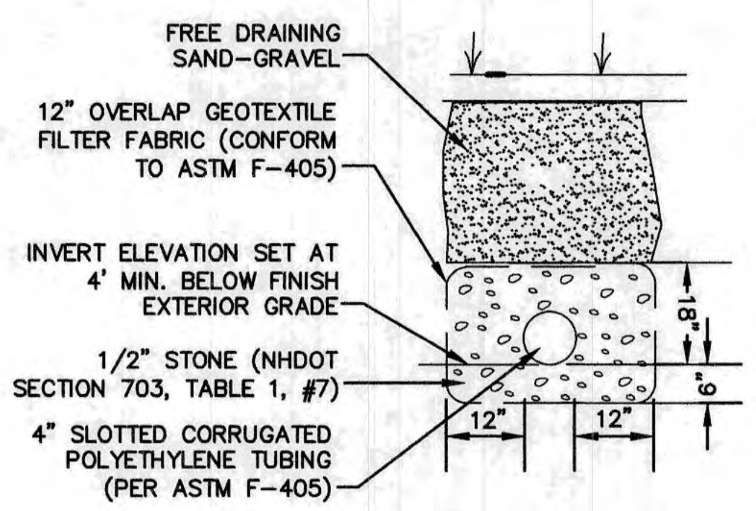
DIA.	HEADWALL LENGTH	HEADWALL HEIGHT	FILL HEIGHT	PIPE COVER	HEADWALL BOTTOM WIDTH
D	L	H	FH	h	W
12"	4'-2"	3'-9"	1'-6"	1'-3"	1'-11"
15"	5'-11"	4'-2"	1'-6"	1'-5"	2'-0"
18"	6'-11"	4'-5"	1'-6"	1'-5"	2'-1"
24"	8'-10"	4'-11"	1'-6"	1'-5"	2'-3"

NOTES:

1. ALL DIMENSIONS GIVEN IN FEET & INCHES.
2. PROVIDE BELL END AT INLET HEADWALL, AND SPIGOT END AT OUTLET END HEADWALL.
3. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS. CEMENT TO BE TYPE III PER ASTM C-150. REINFORCING TO MEET OR EXCEED ASTM A-615 GRADE 60 DEFORMED BARS.
4. 1" THREADED INSERTS PROVED FOR FINAL ATTACHMENT IN FIELD BY OTHERS.

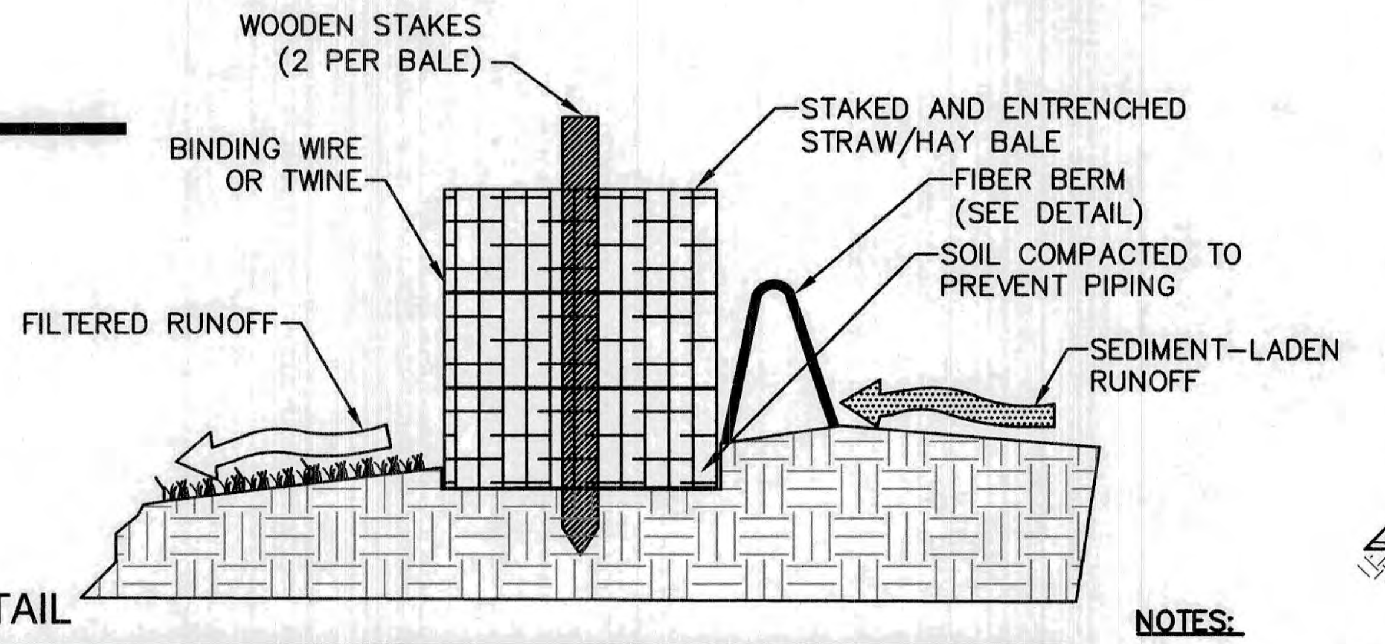
PRECAST CONCRETE HEADWALL

NOT TO SCALE



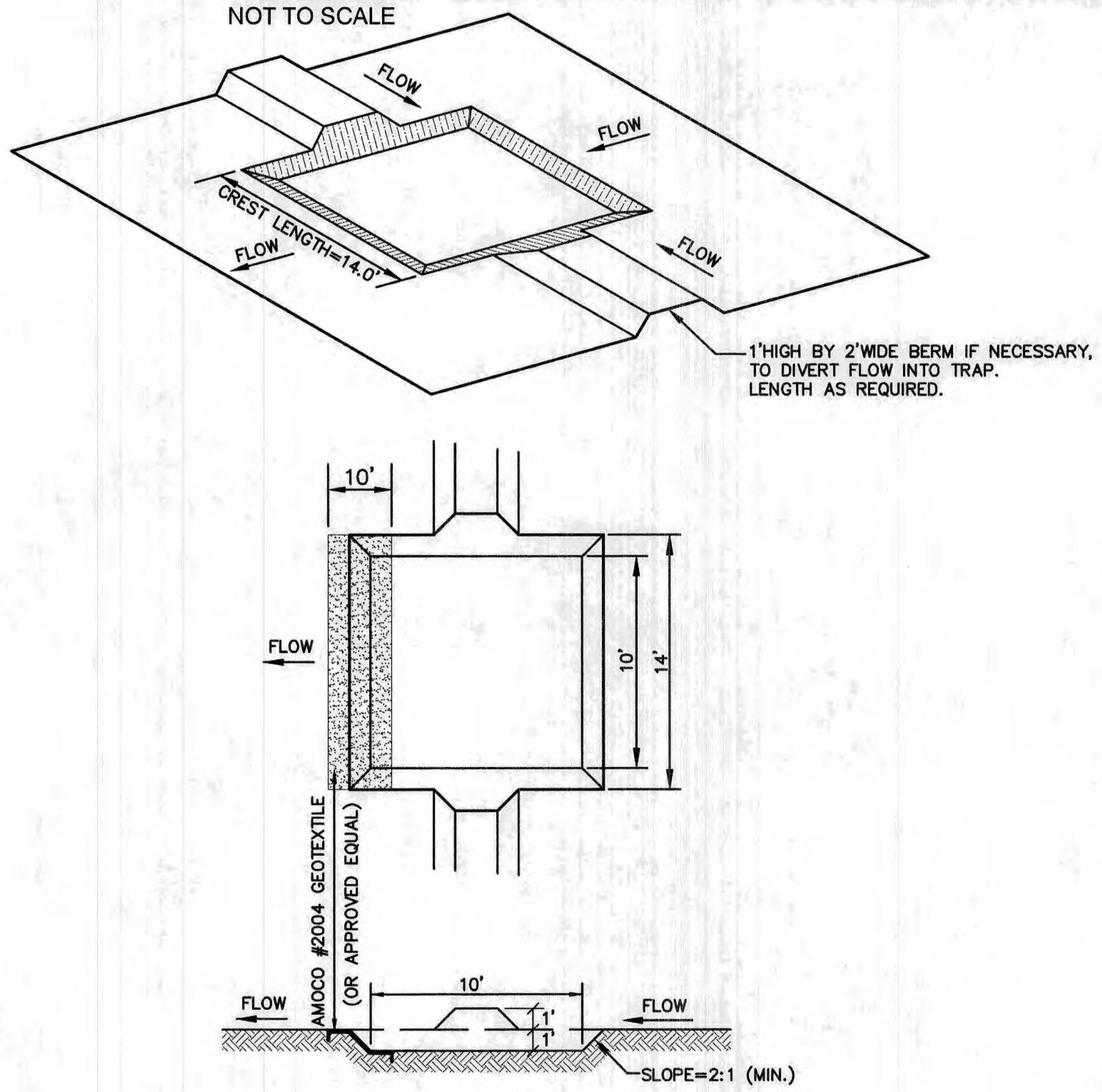
UNDERDRAIN DETAIL

NOT TO SCALE



HAYBALE DETAIL

NOT TO SCALE

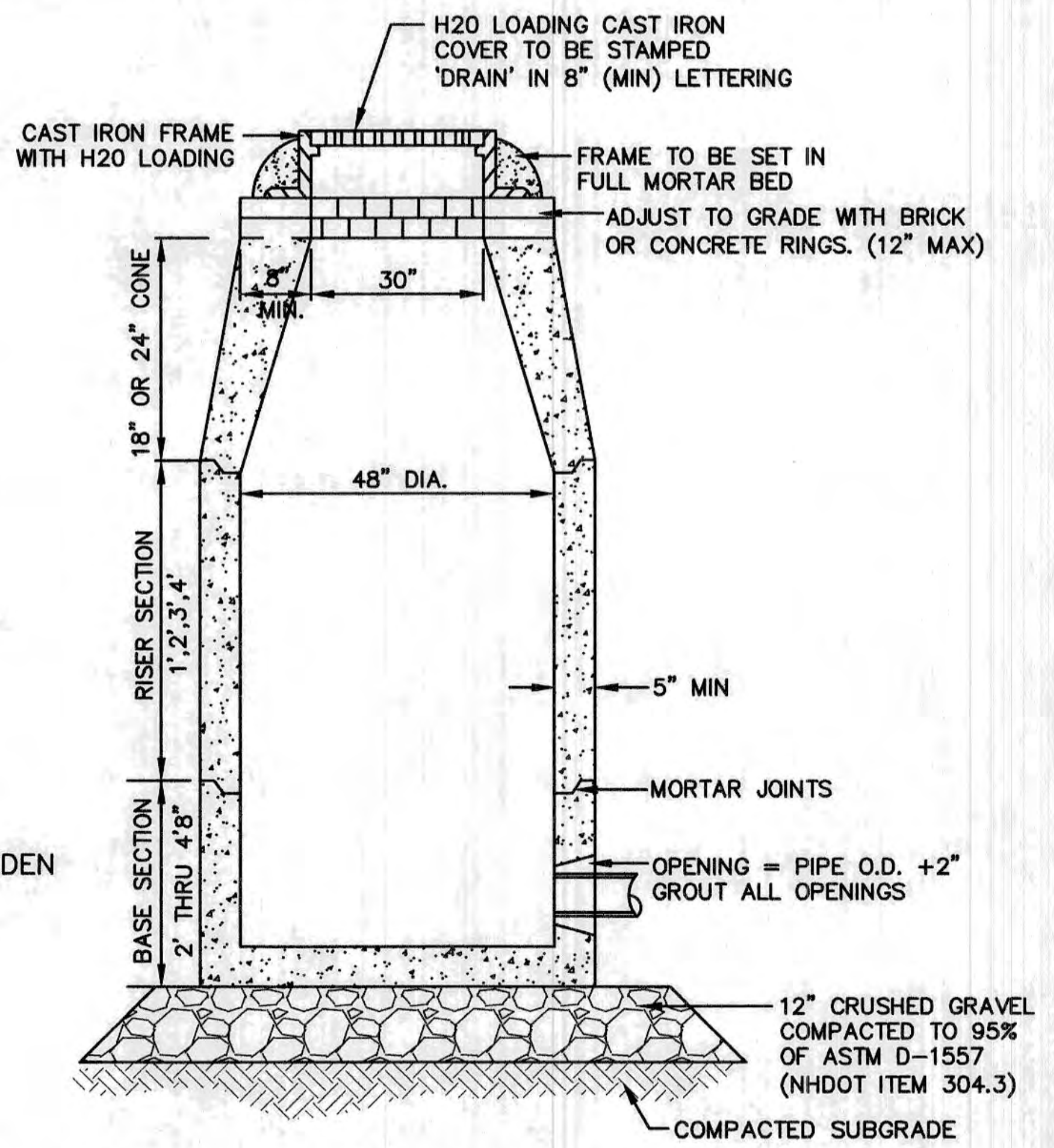


CONSTRUCTION SPECIFICATIONS:

1. THE AREA UNDER THE EMBANKMENT SHALL BE CLEARED, GRUBBED, AND STRIPPED OF ALL VEGETATION, ROOTS, AND DEBRIS.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS, WOODY VEGETATION, STONES OVER 6" SIZE, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIALS. THE FILL SHALL BE COMPACTED BY ROUTING CONSTRUCTION EQUIPMENT OVER IT SO THAT THE ENTIRE AREA OF THE FILL IS TRAVERSED BY AT LEAST ONE WHEEL OR TREAD TRACK OF THE EQUIPMENT.
3. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
4. ALL CUT AND FILL SLOPES SHALL BE 2:1 (H:V) OR FLATTER.
5. OUTLET CREST ELEVATIONS SHALL BE AT LEAST ONE FOOT BELOW THE TOP OF THE EMBANKMENT.
6. OUTLET CREST IS TO BE STABILIZED WITH AMOCO #2004 GEOTEXTILE (OR APPROVED EQUAL), WHICH IS TO BE "TOED" INTO THE GROUND AT ITS ENDS AT LEAST SIX INCHES AND IS TO EXTEND AT LEAST ONE FOOT INTO THE TRAP AND ONE FOOT DOWNSTREAM FROM THE OUTLET EDGE FOR THE ENTIRE LENGTH OF THE CREST.
7. ALL DISTURBED AREAS SHALL BE VEGETATED USING THE APPROPRIATE VEGETATIVE BEST MANAGEMENT PRACTICE.
8. ALL TRAPS ARE TO HAVE SEDIMENT DEPOSITS REMOVED AND DISPOSED PROPERLY AT LEAST ONCE WEEKLY AND AFTER EACH RAINFALL.

TEMPORARY SEDIMENT TRAP

NOT TO SCALE

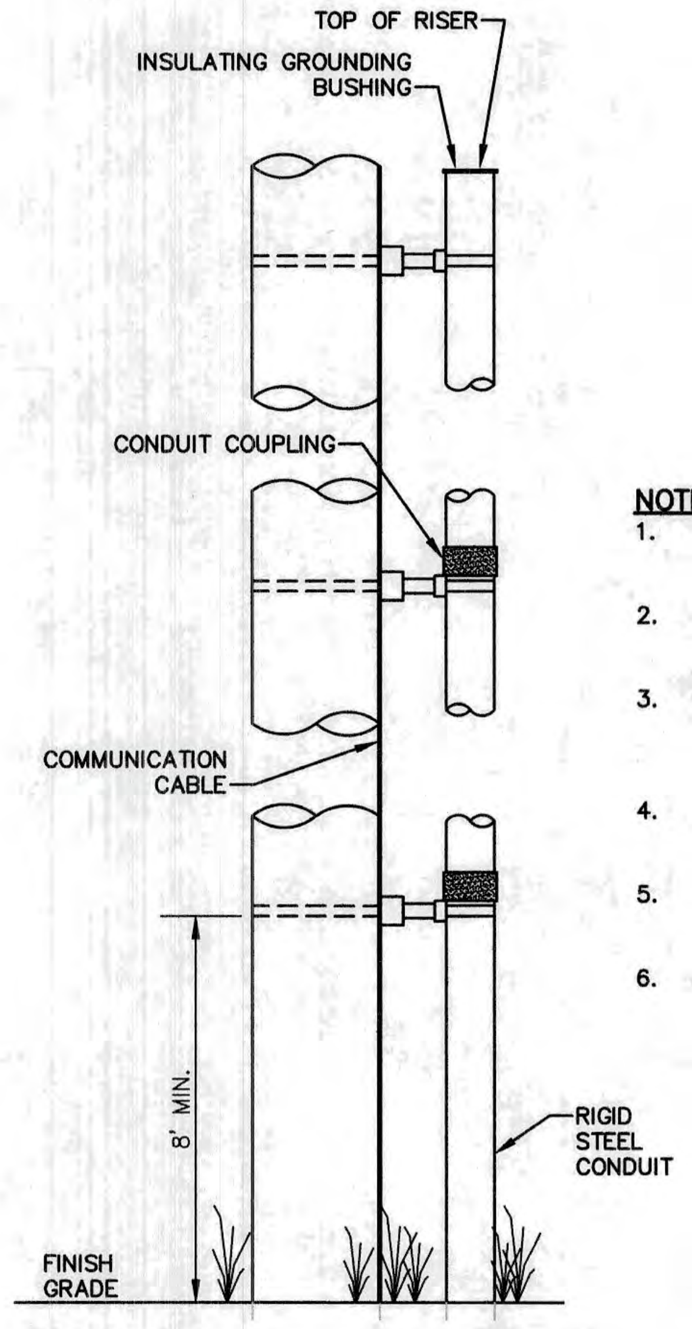


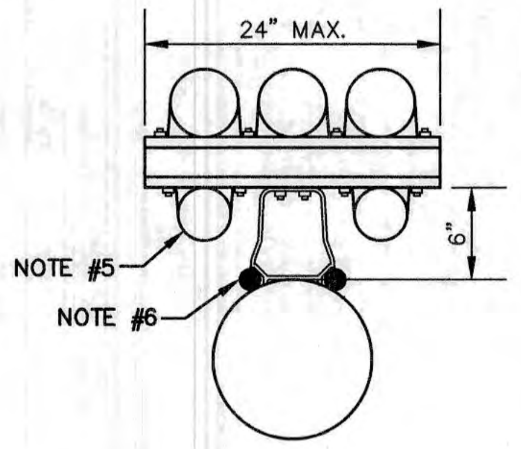
NOTES:

1. BASE SECTION SHALL BE MONOLITHIC WITH 48" INSIDE DIAMETER.
2. ALL SECTIONS SHALL BE DESIGNED FOR H20 LOADING.
3. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.
4. FRAMES AND GRATES SHALL BE HEAVY DUTY AND DESIGNED FOR H20 LOADING.
5. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS SO AS TO BE WATERTIGHT.
6. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
7. ALL DRAIN MANHOLE FRAMES AND GRATES SHALL BE NHDOT TYPE MH-1, OR NEENAH R-1798 OR APPROVED EQUAL (30" DIA. TYPICAL).
8. STANDARD FRAME(S) AND GRATE(S) SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM, BUT NO MORE THAN 12"), OR PRECAST CONCRETE 'DONUTS'.

DRAIN MANHOLE

NOT TO SCALE





NOTES:

1. CONDUIT STANDOFF BRACKETS TO BE USED WITH METAL CONDUIT ONLY.
2. LOWEST BRACKET SHALL BE A MINIMUM OF 8 FEET ABOVE FINISH GRADE.
3. ONE BRACKET SHALL BE USED TO SUPPORT EACH 10 FT. SECTION OF CONDUIT WITH THE BRACKET PLACED JUST BELOW THE RISER CONDUIT COUPLING.
4. A BRACKET SHALL ALSO BE PLACED TO HOLD THE ROD OF THE RISER CONDUIT.
5. ALTERNATE LOCATION FOR COMMUNICATION CABLE IF RUN IN METAL CONDUIT.
6. COMMUNICATION CABLE MAY BE ATTACHED DIRECTLY TO POLE ADJACENT TO BRACKETS.

MATERIALS:

QUANTITY AS NEEDED		ALUMA-FORM
CONDUIT STANDOFF BRACKET		6-CSO
4-WAY T-SLOT (CUT TO REQUIRED LENGTH)		4WT-48
CONDUIT STRAP KITS	2"	STK-2
	2.5"	STK-2.5
	3"	STK-3
	3.5"	STK-3.5
	4"	STK-4
	5"	STL-5
	6"	STK-6

UTILITY POLE RISER DETAIL

NOT TO SCALE

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN
No. 9846

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: DETAIL SHEET

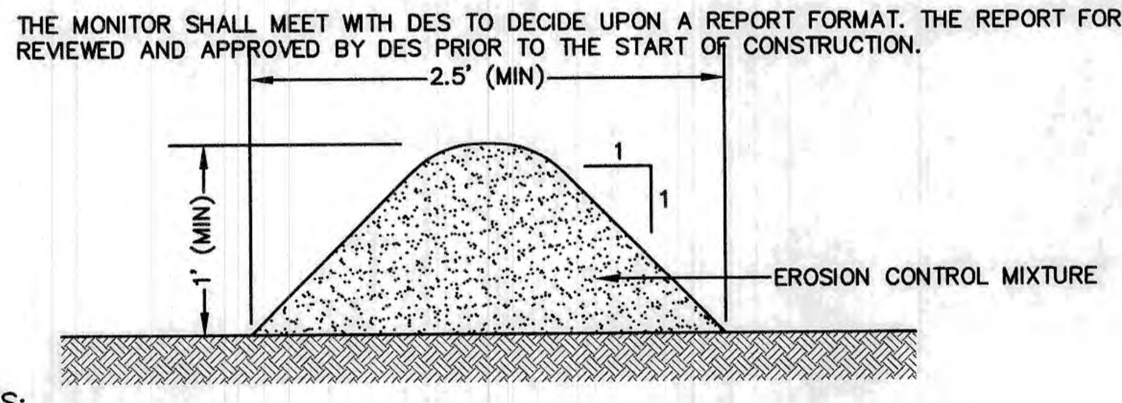
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801

Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
D7
SHEET 16 OF 24
JBE PROJECT NO. 19190.2

TEMPORARY EROSION CONTROL NOTES

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME. AT NO TIME SHALL AN AREA IN EXCESS OF 5 ACRES BE EXPOSED AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED, DIRECTED BY THE ENGINEER.
3. ALL DISTURBED AREAS (INCLUDING POND AREAS BELOW THE PROPOSED WATERLINE) SHALL BE RETURNED TO PROPOSED GRADES AND ELEVATIONS. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 6" OF SCREENED ORGANIC LOAM AND SEEDED WITH SEED MIXTURE 'C' AT A RATE NOT LESS THAN 1.10 POUNDS OF SEED PER 1,000 S.F. OF AREA (48 LBS. / ACRE).
4. FIBER BERMS AND OTHER BARRIERS SHALL BE INSPECTED EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 0.5" OR GREATER. ALL DAMAGED AREAS SHALL BE REPAIRED, AND SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
5. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
6. AREAS MUST BE SEEDED AND MULCHED OR OTHERWISE PERMANENTLY STABILIZED WITHIN 3 DAYS OF FINAL GRADING, OR TEMPORARILY STABILIZED WITHIN 7 DAYS OF THE INITIAL DISTURBANCE OF SOIL OR AS DIRECTED BY THE CITY ENGINEER. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
7. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING NORTH AMERICAN GREEN BIONET S75BN EROSION CONTROL BLANKETS (OR AN EQUIVALENT FREE OF WELDED PLASTIC, PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH APPROVED IN WRITING BY THE ENGINEER) ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
8. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
9. AFTER OCTOBER 15th, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3" OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
10. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    a. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
    b. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
    c. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH STONE OR RIPRAP HAS BEEN INSTALLED; OR
    d. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
11. FUGITIVE DUST CONTROL IS REQUIRED TO BE CONTROLLED IN ACCORDANCE WITH ENV-A 1000, AND THE PROJECT IS TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.
12. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR'S NAME, ADDRESS, AND PHONE NUMBER SHALL BE SUBMITTED TO DES VIA EMAIL (SEE BELOW).
13. IN ORDER TO ENSURE THE STABILITY OF THE SITE AND EFFECTIVE IMPLEMENTATION OF THE SEDIMENT AND EROSION CONTROL MEASURES SPECIFIED IN THE PLANS FOR THE DURATION OF CONSTRUCTION, THE CONTRACTOR SHALL BE IN STRICT COMPLIANCE WITH THE FOLLOWING INSPECTION AND MAINTENANCE REQUIREMENTS IN ADDITION TO THOSE CALLED FOR IN THE SWPPP:
    a. A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL <u>OR</u> A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE ("MONITOR") SHALL BE EMPLOYED TO INSPECT THE SITE FROM THE START OF ALTERATION OF TERRAIN ACTIVITIES UNTIL THE SITE IS IN FULL COMPLIANCE WITH THE SITE SPECIFIC PERMIT ("PERMIT").
    b. DURING THIS PERIOD, THE MONITOR SHALL INSPECT THE SUBJECT SITE AT LEAST ONCE A WEEK, AND IF POSSIBLE, DURING ANY ½ INCH OR GREATER RAIN EVENT (I.E. ½ INCH OF PRECIPITATION OR MORE WITHIN A 24 HOUR PERIOD). IF UNABLE TO BE PRESENT DURING SUCH A STORM, THE MONITOR SHALL INSPECT THE SITE WITHIN 24 HOURS OF THIS EVENT.
    c. THE MONITOR SHALL PROVIDE TECHNICAL ASSISTANCE AND RECOMMENDATIONS TO THE CONTRACTOR ON THE APPROPRIATE BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROLS REQUIRED TO MEET THE REQUIREMENTS OF RSA 485 A:17 AND ALL APPLICABLE DES PERMIT CONDITIONS.
    d. WITHIN 24 HOURS OF EACH INSPECTION, THE MONITOR SHALL SUBMIT A REPORT TO DES VIA EMAIL (RIDGELY MAUCK AT: RIDGELY.MAUCK@DES.NH.GOV).
    e. THE MONITOR SHALL MEET WITH DES TO DECIDE UPON A REPORT FORMAT. THE REPORT FORMAT SHALL BE REVIEWED AND APPROVED BY DES PRIOR TO THE START OF CONSTRUCTION.

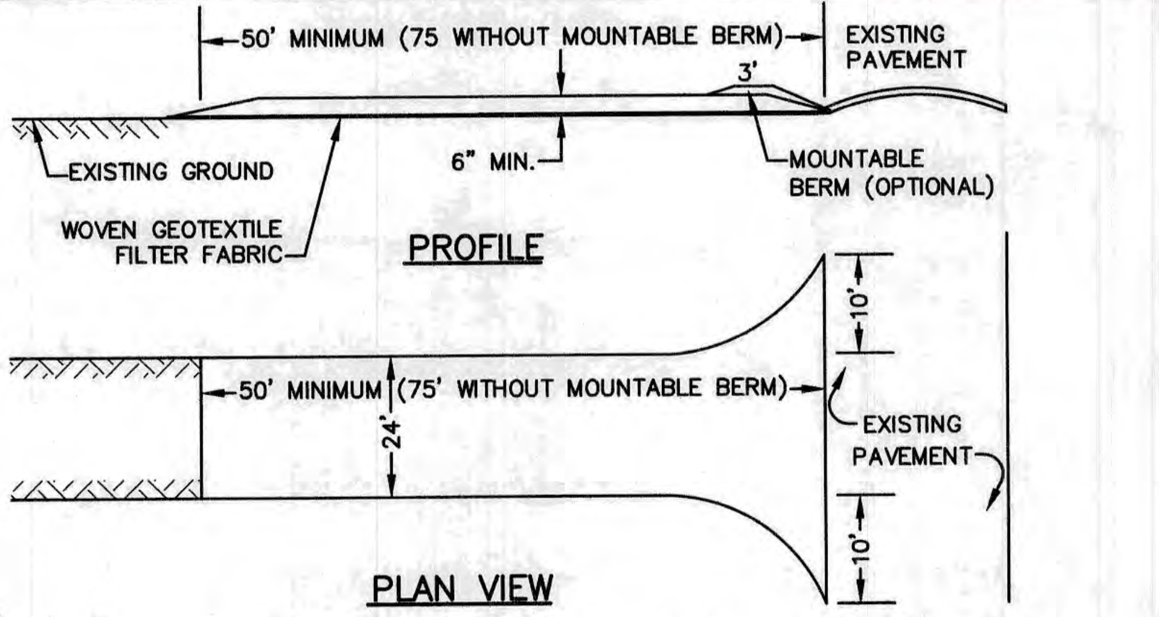


NOTES:

1. ORGANIC FIBER BERMS SHALL BE UTILIZED IN LIEU OF SILT FENCE.
2. THE EROSION CONTROL MIX USED IN THE FILTER BERMS SHALL BE A WELL-GRADED MIXTURE OF PARTICLE SIZES, MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER, STUMP GRINDINGS, SHREDDED OR COMPOSTED BARK, OR ACCEPTABEL MANUFACTURED PRODUCTS, AND SHALL BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH, AND SHALL MEET THE FOLLOWING STANDARDS:
    a) THE ORGANIC CONTENT SHALL BE 80-100% OF DRY WEIGHT.
    b) PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN, AND 70-85% PASSING A 0.75" SCREEN.
    c) THE ORGANIC PORTION SHALL BE FIBROUS AND ELONGATED.
    d) LARGE PORTIONS OF SILTS, CLAYS, OR FINE SANDS SHALL NOT BE INCLUDED IN THE MIXTURE.
    e) SOLUBLE SALTS CONTENT SHALL BE >4.0mmhos/cm.
    f) THE pH SHALL BE BETWEEN 5.0 AND 8.0.
3. ORGANIC FILTER BERMS SHALL BE INSTALLED ALONG A RELATIVELY LEVEL CONTOUR. IT MAY BE NECESSARY TO CUT TALL GRASSES OR WOODY VEGETATION TO AVOID CREATING VOIDS AND BRIDGES THAT WOULD ENABLE FINES TO WASH UNDER THE BERM.
4. ON SLOPES LESS THAN 5%, OR AT THE BOTTOM OF SLOPES STEEPER THAN 3:1, UP TO 20' LONG, THE BERM SHALL BE A MINIMUM OF 12" HIGH (AS MEASURED ON THE UPHILL SIDE), AND A MINIMUM OF 36" WIDE. ON LONGER OR STEEPER SLOPES, THE BERM SHALL BE WIDER TO ACCOMMODATE THE POTENTIAL ADDITIONAL RUNOFF.
5. FROZEN GROUND, OUTCROPS OF BEDROCK, AND VERY ROOTED FORESTED AREAS PRESENT THE MOST PRACTICAL AND EFFECTIVE LOCATIONS FOR ORGANIC FILTER BERMS. OTHER BMP'S SHOULD BE USED AT LOW POINTS OF CONCENTRATED RUNOFF, BELOW CULVERT OUTLET APRONS, AROUND CATCH BASINS, AND AT THE BOTTOM OF STEEP PERIMETER SLOPES THAT HAVE A LARGE CONTRIBUTING AREA.
6. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE STRUCTURE.
7. STRUCTURES MAY BE LEFT IN PLACE ONCE THE SITE IS STABILIZED.

ORGANIC FIBER BERM

NOT TO SCALE

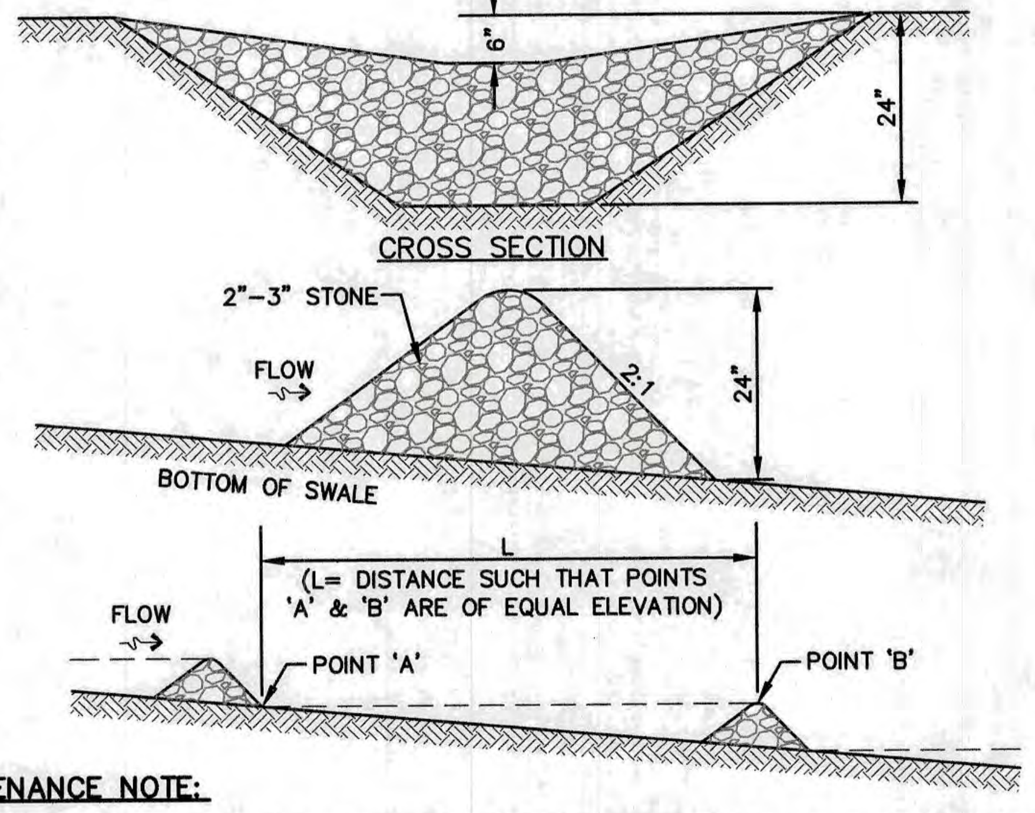


NOTES:

1. STONE FOR STABILIZED CONSTRUCTION ENTRANCE SHALL BE 3 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, 75' WITHOUT A MOUNTABLE BERM, AND EXCEPT FOR A SINGLE RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS, OR 10 FEET, WHICHEVER IS GREATER.
5. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER FABRIC IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.
6. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A STONE BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO THE PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

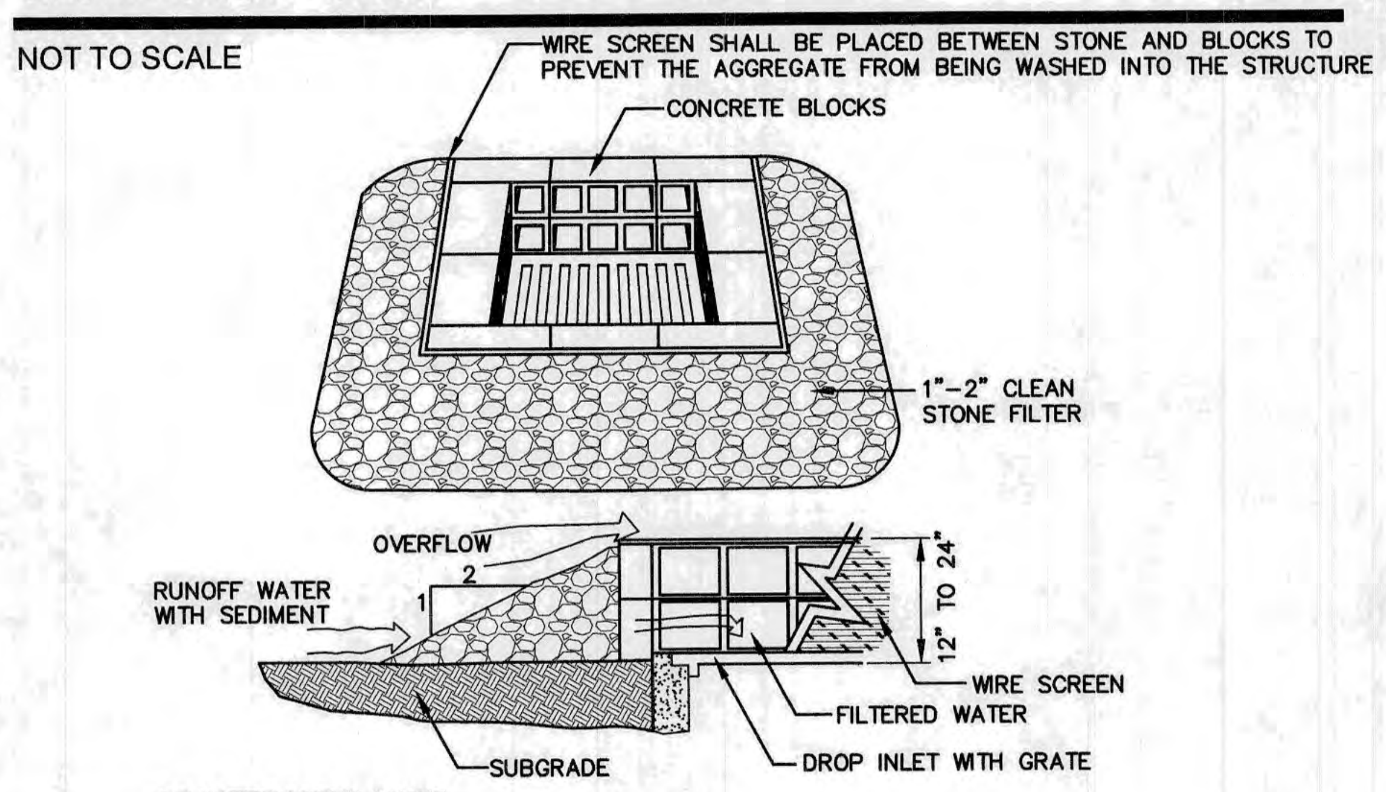


MAINTENANCE NOTE:

1. STONE CHECK DAMS SHOULD BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY NECESSARY REPAIRS SHOULD BE MADE IMMEDIATELY. PARTICULAR ATTENTION SHOULD BE GIVEN TO END RUN AND EROSION AT THE DOWNSTREAM TOE OF THE STRUCTURE. WHEN THE STRUCTURES ARE REMOVED, THE DISTURBED PORTION SHOULD BE BROUGHT TO THE EXISTING CHANNEL GRADE AND THE AREAS PREPARED, SEEDED AND MULCHED. WHILE THIS PRACTICE IS NOT INTENDED TO BE USED PRIMARILY FOR SEDIMENT TRAPPING, SOME SEDIMENT WILL ACCUMULATE BEHIND THE STRUCTURES. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF OF THE ORIGINAL HEIGHT OF THE STRUCTURE.

STONE CHECK DAM

NOT TO SCALE



MAINTENANCE NOTE:

1. ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAINFALL AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED IN A SUITABLE UPLAND AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURE OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

TEMPORARY CATCH BASIN INLET PROTECTION
(Block and Gravel Drop Inlet Sediment Filter)

NOT TO SCALE

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
    A. SLOPES SHALL NOT BE STEEPER THAN 2:1 WITHOUT APPROPRIATE EROSION CONTROL MEASURES AS SPECIFIED ON THE PLANS (3:1 SLOPES OR FLATTER ARE PREFERRED).
    B. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. SEEDBED PREPARATION
    A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
    B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND FERTILIZER AND LIME MIXED INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. ESTABLISHING A STAND
    A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. TYPES AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
    AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ.FT.
    NITROGEN(N), 50 LBS. PER ACRE OR 1.1 LBS. PER 1,000 SQ.FT.
    PHOSPHATE(P205), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
    POTASH(K20), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
    (NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10.)
    B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.
    C. REFER TO THE 'SEEDING GUIDE' AND 'SEEDING RATES' TABLES ON THIS SHEET FOR APPROPRIATE SEED MIXTURES AND RATES OF SEEDING. ALL LEGUMES (CROWNVETCH, BIRDSFOOT, TREFOIL AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT PRIOR TO THEIR INTRODUCTION TO THE SITE.
    D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20th OR FROM AUGUST 10th TO SEPTEMBER 1st.
4. MULCH
    A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.
    B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90 LBS PER 1000 S.F.
5. MAINTENANCE TO ESTABLISH A STAND
    A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
    B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME FULLY ESTABLISHED.
    C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, ANNUAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A B C	FAIR POOR POOR	GOOD GOOD GOOD	GOOD FAIR EXCELLENT	FAIR FAIR GOOD
	D	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A C	GOOD GOOD	GOOD EXCELLENT	GOOD EXCELLENT	FAIR FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A B C	GOOD GOOD GOOD	GOOD GOOD EXCELLENT	GOOD FAIR EXCELLENT	FAIR POOR FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E F	FAIR FAIR	EXCELLENT EXCELLENT	EXCELLENT EXCELLENT	2/ 2/

GRAVEL PIT, SEE NH-PM-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.

1/ REFER TO SEEDING MIXTURES AND RATES IN TABLE BELOW.
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND ATHLETIC FIELDS.

NOTE: TEMPORARY SEED MIX FOR STABILIZATION OF TURF SHALL BE WINTER RYE OR OATS AT A RATE OF 2.5 LBS. PER 1000 S.F. AND SHALL BE PLACED PRIOR TO OCTOBER 15th, IF PERMANENT SEEDING NOT YET COMPLETE.

SEEDING GUIDE

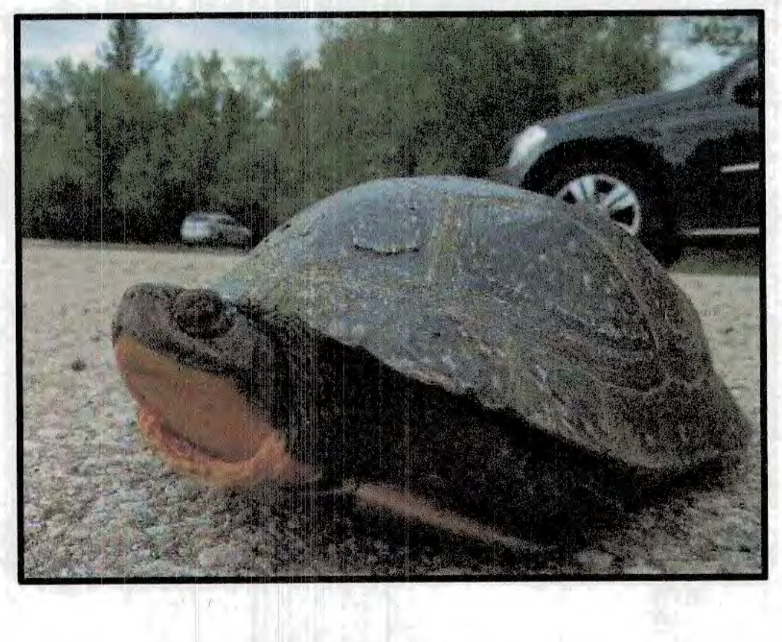
	MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
	A. TALL FESCUE	20	0.45
	CREEPING RED FESCUE	20	0.45
	RED TOP	2	0.05
	TOTAL	42	0.95
	B. TALL FESCUE	15	0.35
	CREEPING RED FESCUE	10	0.25
	CROWN VETCH	15	0.35
	OR		
	FLAT PEA	30	0.75
	TOTAL	40 OR 55	0.95 OR 1.35
*	C. TALL FESCUE	20	0.45
	CREEPING RED FESCUE	20	0.45
	BIRDS FOOT TREFOIL	8	0.20
	TOTAL	48	1.10
	D. TALL FESCUE	20	0.45
	FLAT PEA	30	0.75
	TOTAL	50	1.20
	E. CREEPING RED FESCUE 1/	50	1.15
	KENTUCKY BLUEGRASS 1/	50	1.15
	TOTAL	100	2.30
	F. TALL FESCUE 1	150	3.60

1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEDING RATES.

SEEDING RATES

PLEASE REPORT OBSERVATIONS OF RARE TURTLES

The NH Fish & Game Department is requesting observations of the following turtle species

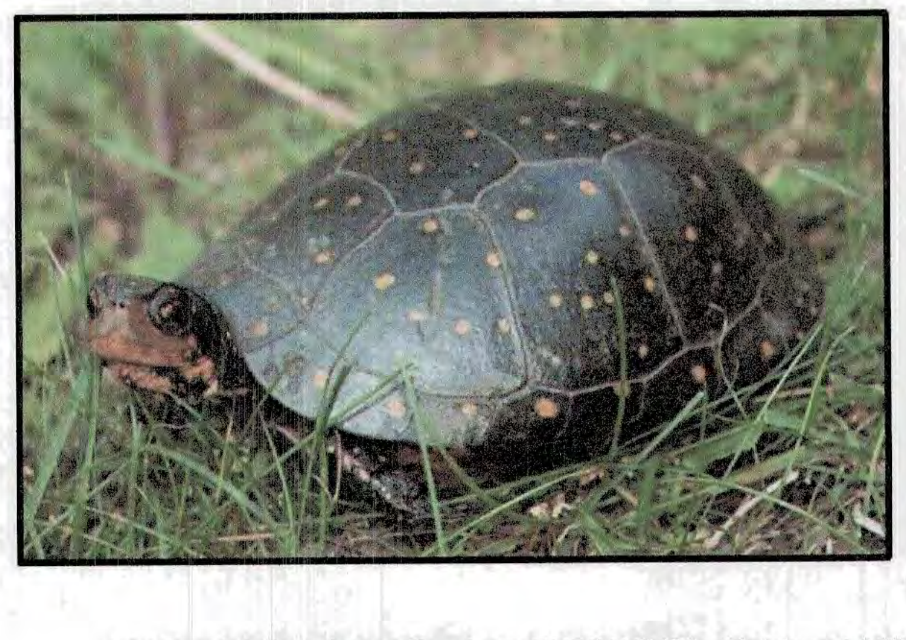


Blanding's turtle
(State Endangered)

Large, dark/black domed shell with lighter speckles.

Distinct yellow throat/chin.

Aquatic but often moves on land.



Spotted turtle
(State Threatened)

Small, mostly aquatic with black or dark brown with yellow spots.

Fairly flat shell compared to Blanding's turtle.

Spots vary in color and number.

Report sightings immediately to NHFG Wildlife Division at 603-271-2461 (M-F 8-4) or to NHFG Wildlife Biologist Melissa Doperalski 603-479-1129 (cell) anytime.

Please report promptly, noting specific location and date – Photographs strongly encouraged

CONSTRUCTION SEQUENCE

1. PRIOR TO THE START OF ANY ACTIVITY, IT IS THE RESPONSIBILITY OF THE SITE'S SITE DEVELOPER (OR OWNER) TO FILE A NOTICE OF INTENT (NOI) FORM WITH THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN ORDER TO GAIN COVERAGE UNDER THE NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES. A PRE CONSTRUCTION MEETING SHALL BE HELD WITH ALL DEPARTMENT HEADS PRIOR TO THE START OF CONSTRUCTION. AN ONSITE PRE CONSTRUCTION MEETING IS TO BE HELD WITH THE CITY OF ENGINEER OR DESIGNATED REPRESENTATIVE PRIOR TO INITIATING EARTH MOVING ACTIVITIES AND AFTER PERIMETER EROSION CONTROL MEASURES, PROTECTIVE FENCING, WASTE DISPOSAL AND CONSTRUCTION ACCESS PADS HAVE BEEN INSTALLED.
2. WETLAND BOUNDARIES ARE TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION. AT LEAST A TEMPORARY CULVERT OR ROADBED TO BE IN PLACE PRIOR TO THE START OF CONSTRUCTION.
3. CUT AND REMOVE TREES IN CONSTRUCTION AREA AS REQUIRED OR DIRECTED.
4. INSTALL SILT FENCING, HAY BALES AND CONSTRUCTION ENTRANCES PRIOR TO THE START OF CONSTRUCTION. THESE ARE TO BE MAINTAINED UNTIL THE FINAL PAVEMENT SURFACING AND LANDSCAPING AREAS ARE ESTABLISHED.
5. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. THIS INCLUDES ANY REQUIRED DEMOLITION OF EXISTING STRUCTURES, UTILITIES, ETC.
6. CONSTRUCT AND/OR INSTALL TEMPORARY OR PERMANENT SEDIMENT AND/OR DETENTION BASIN(S) AS REQUIRED. THESE FACILITIES SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING RUN-OFF TO THEM.
7. STRIP LOAM AND PAVEMENT, OR RECLAIM EXISTING PAVEMENT WITHIN LIMITS OF WORK PER THE RECOMMENDATIONS OF THE PROJECT ENGINEER AND STOCKPILE EXCESS MATERIAL. STABILIZE STOCKPILE AS NECESSARY.
8. PERFORM PRELIMINARY SITE GRADING IN ACCORDANCE WITH THE PLANS, INCLUDING THE CONSTRUCTION OF ANY RETAINING WALLS AND SOUND WALLS.
9. PREPARE BUILDING PAD(S) TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
10. INSTALL THE SEWER AND DRAINAGE SYSTEMS FIRST, THEN ANY OTHER UTILITIES IN ACCORDANCE WITH THE PLAN AND DETAILS. ANY CONFLICTS BETWEEN UTILITIES ARE TO BE RESOLVED WITH THE INVOLVEMENT AND APPROVAL OF THE ENGINEER.
11. INSTALL INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED IN ACCORDANCE WITH DETAILS.
12. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
13. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINAGE DITCHES, CHECK DAMS, SEDIMENT TRAPS, ETC., TO PREVENT EROSION ON THE SITE AND PREVENT ANY SILTATION OF ABUTTING WATERS AND/OR PROPERTY.
14. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
15. PAVE ALL PARKING LOTS AND ROADWAYS WITH INITIAL 'BASE COURSE'.
16. PERFORM ALL REMAINING SITE CONSTRUCTION (i.e. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
17. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (i.e. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
18. FINISH PAVING ALL ROADWAYS AND PARKING AREAS WITH 'FINISH' COURSE.
19. ALL ROADWAYS AND PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
20. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
21. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
22. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDING AREAS HAVE BEEN 75%-85% ESTABLISHED AND SITE IMPROVEMENTS ARE COMPLETE. SMOOTH AND RE-VEGETATE ALL DISTURBED AREAS.
23. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
24. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
25. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL.
26. UPON COMPLETION OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ANY RELEVANT PERMITTING AGENCIES THAT THE CONSTRUCTION HAS BEEN FINISHED IN A SATISFACTORY MANNER.

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

12/21/2021

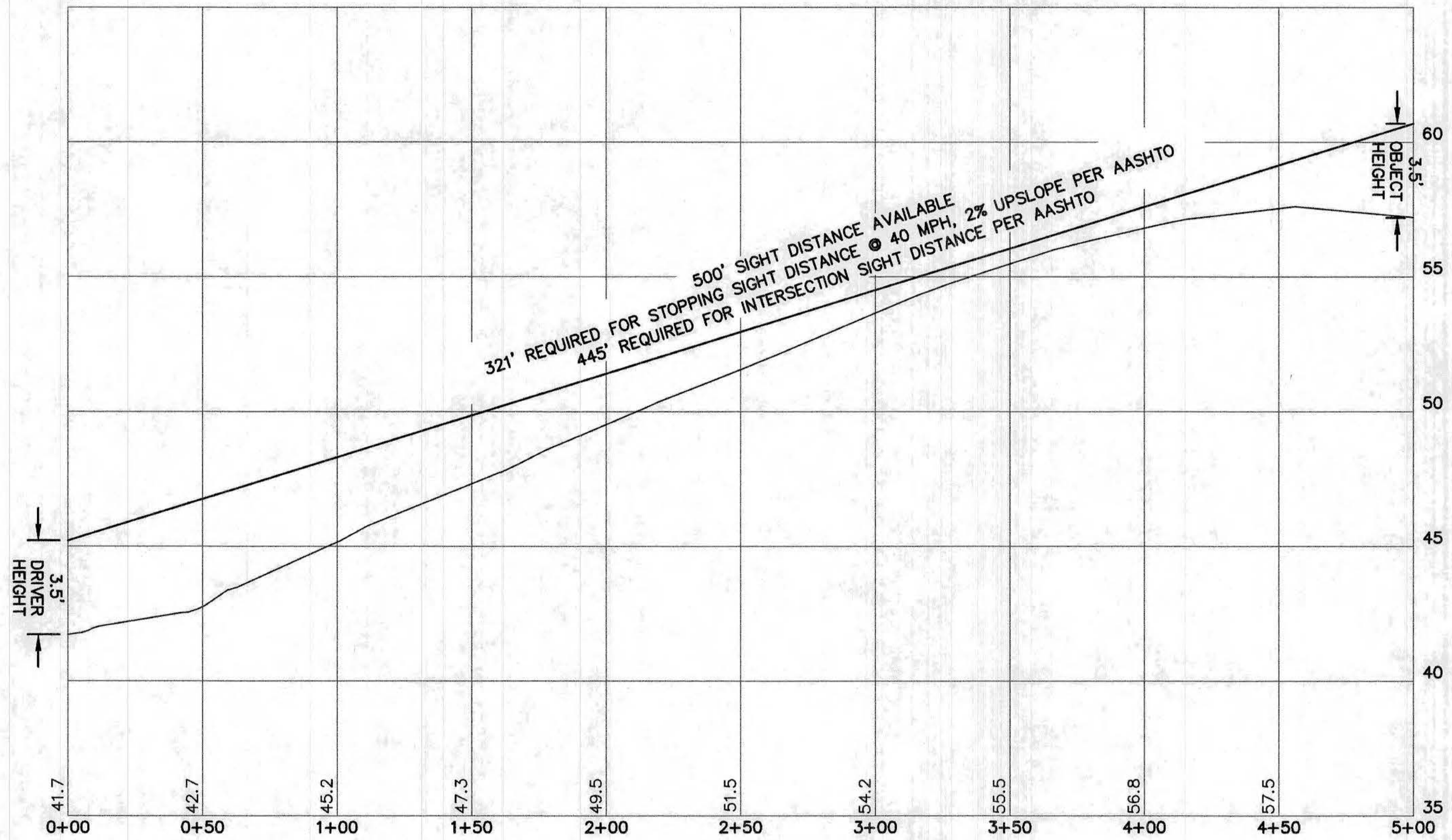
REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

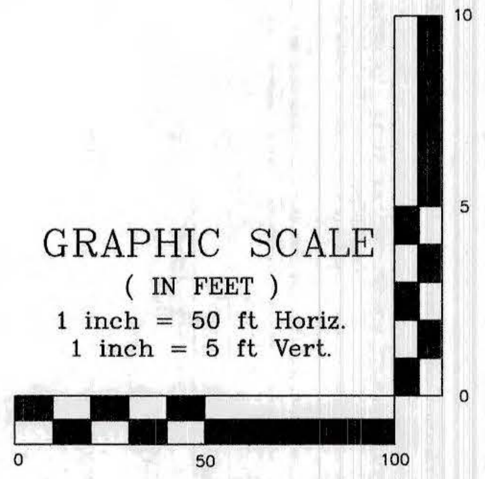
Plan Name: EROSION AND SEDIMENT CONTROL DETAILS
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
E1
SHEET 17 OF 24
JBE PROJECT NO. 19190.2

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT



INTERSECTION SIGHT DISTANCE PROFILE



F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

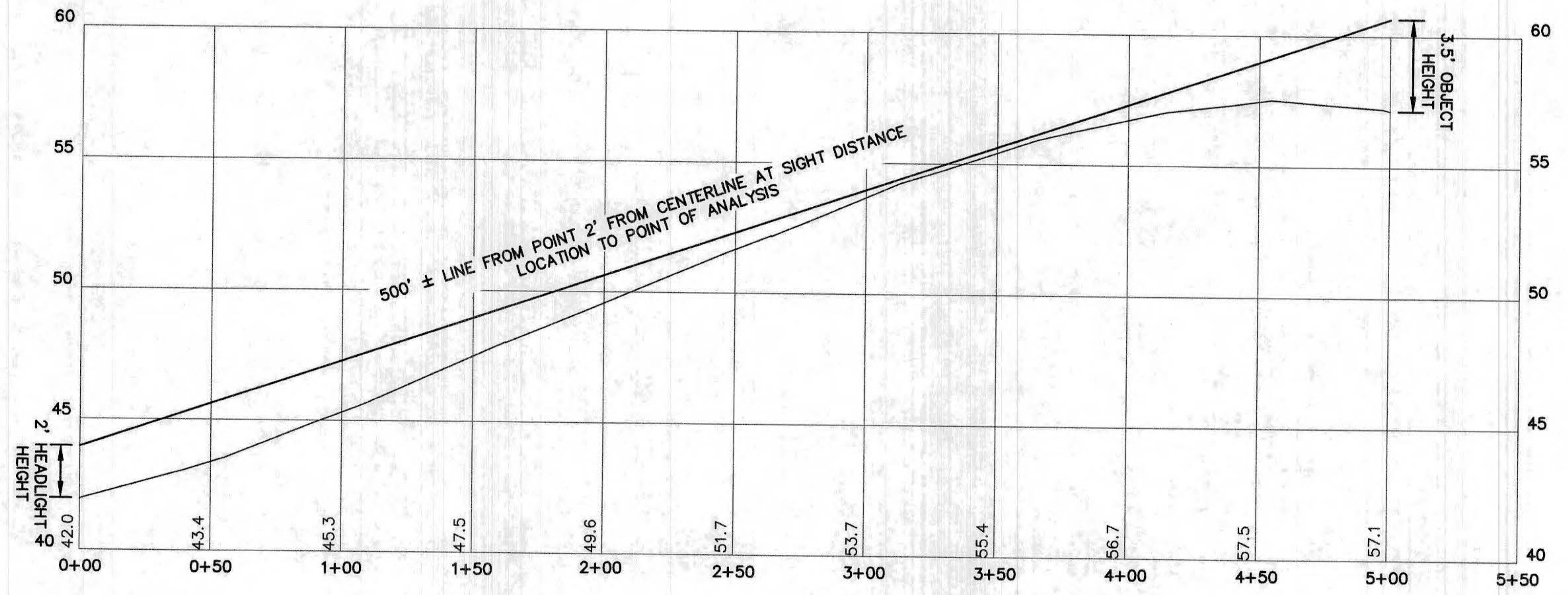
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	HIGHWAY ACCESS PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.

H1

SHEET 18 OF 24
JBE PROJECT NO. 19190.2



SIGHT DISTANCE PROFILE ALONG BANFIELD ROAD

GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft Horiz.
1 inch = 5 ft Vert.

0 50 100

0 5 10

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9848

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH

Jones & Beach Engineers, Inc.

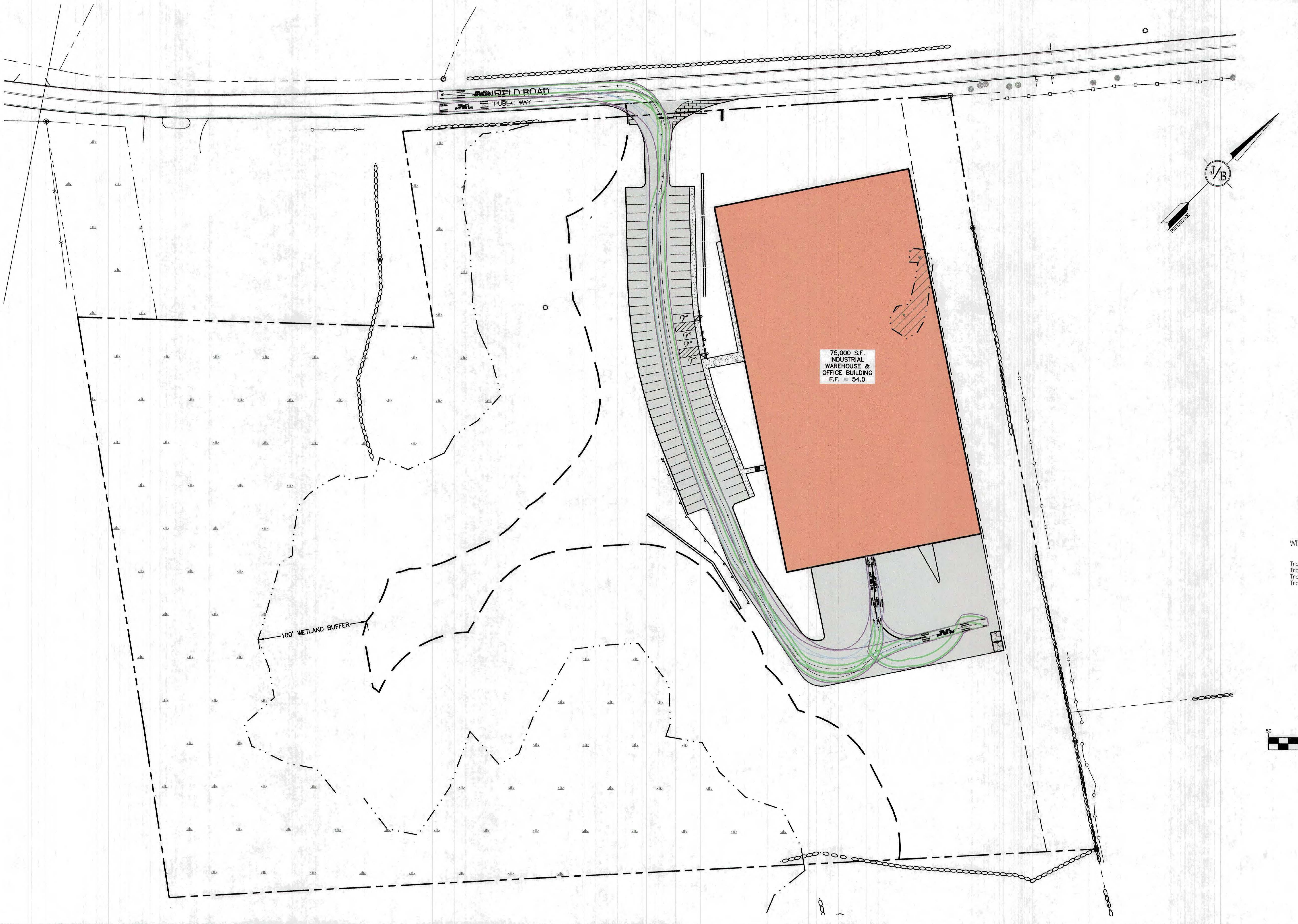
Civil Engineering Services

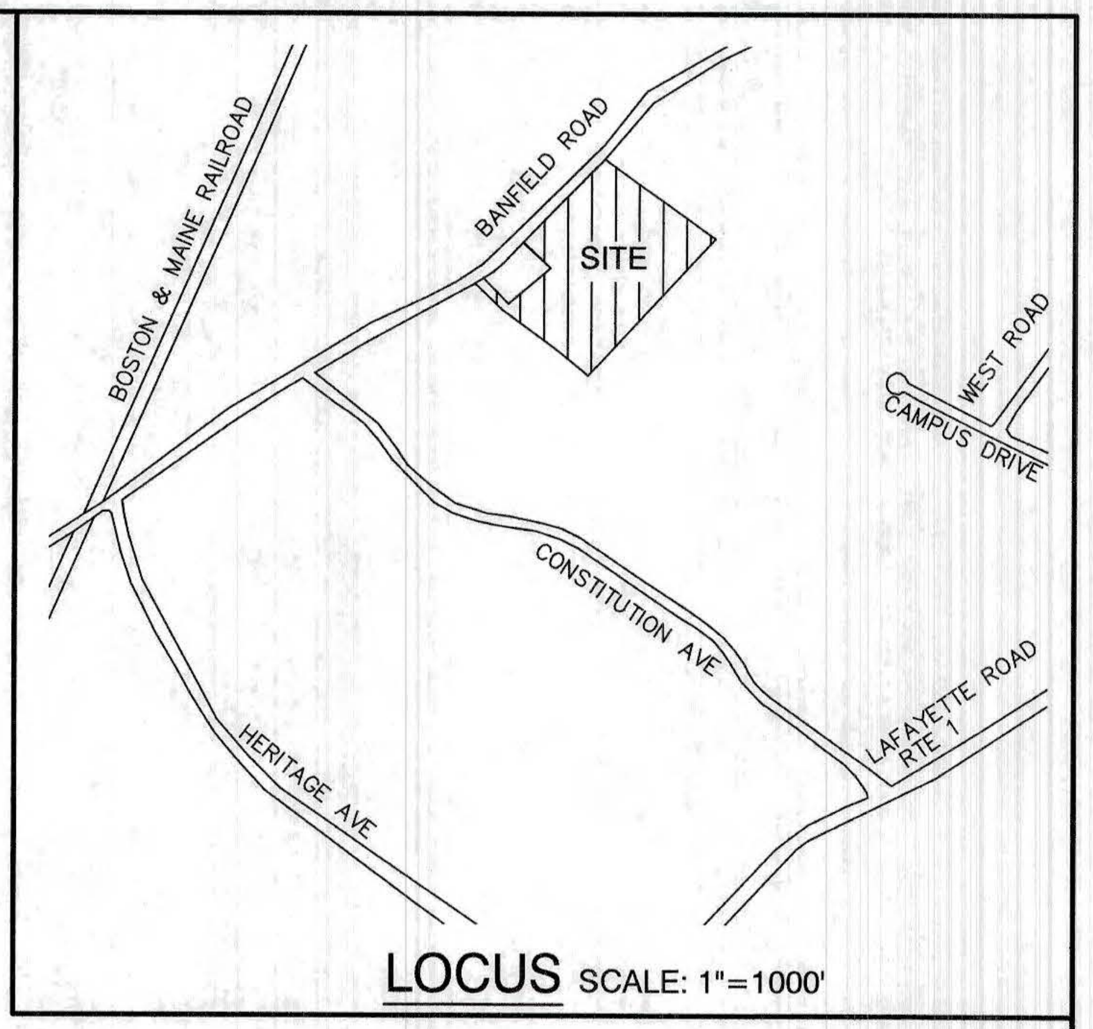
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	HIGHWAY ACCESS PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
H2
SHEET 19 OF 24
JBE PROJECT NO. 19190.2

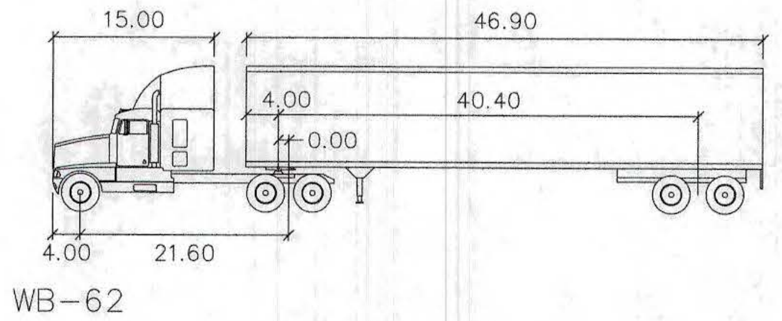




LOCUS SCALE: 1"=1000'

LEGEND

- FRONT TIRES
- REAR TIRES
- VEHICLE BODY



WB-62

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 31.9
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

GRAPHIC SCALE

(IN FEET)
1 inch = 50 feet

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC | Draft: DJM | Date: 04/21/20
Checked: JAC | Scale: AS-NOTED | Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

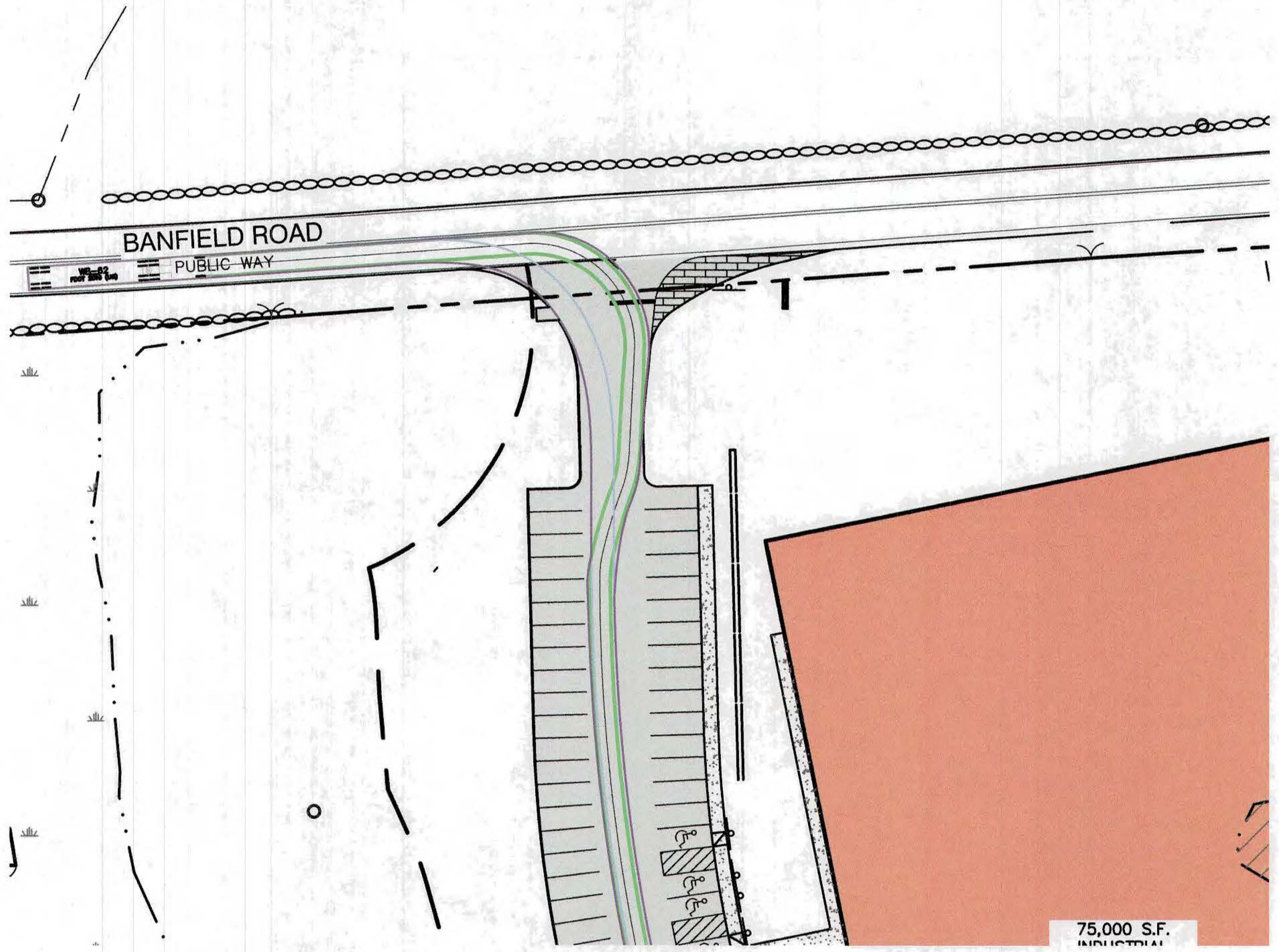
12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

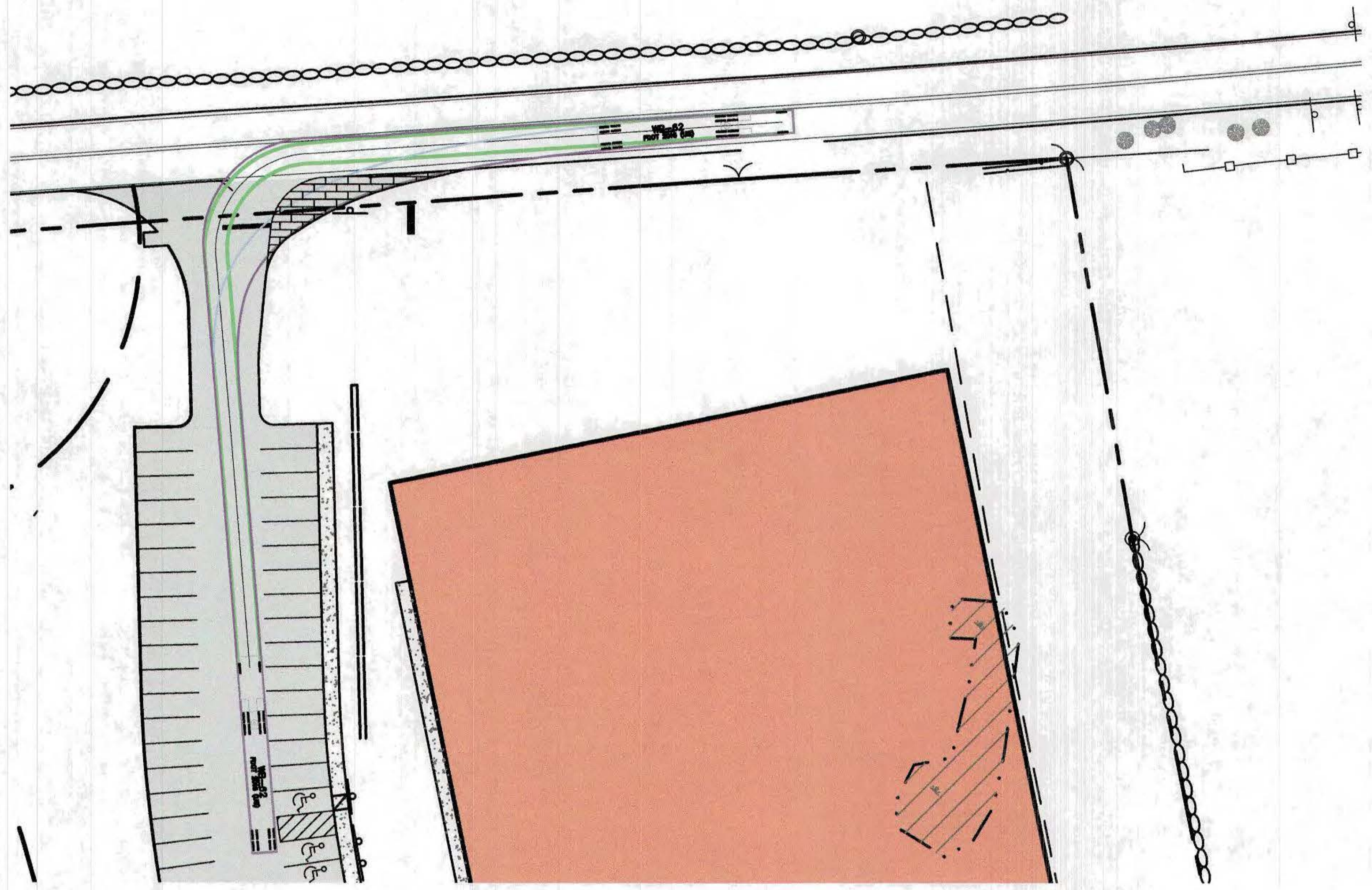
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: OVERVIEW TRUCK TURNING PLAN
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

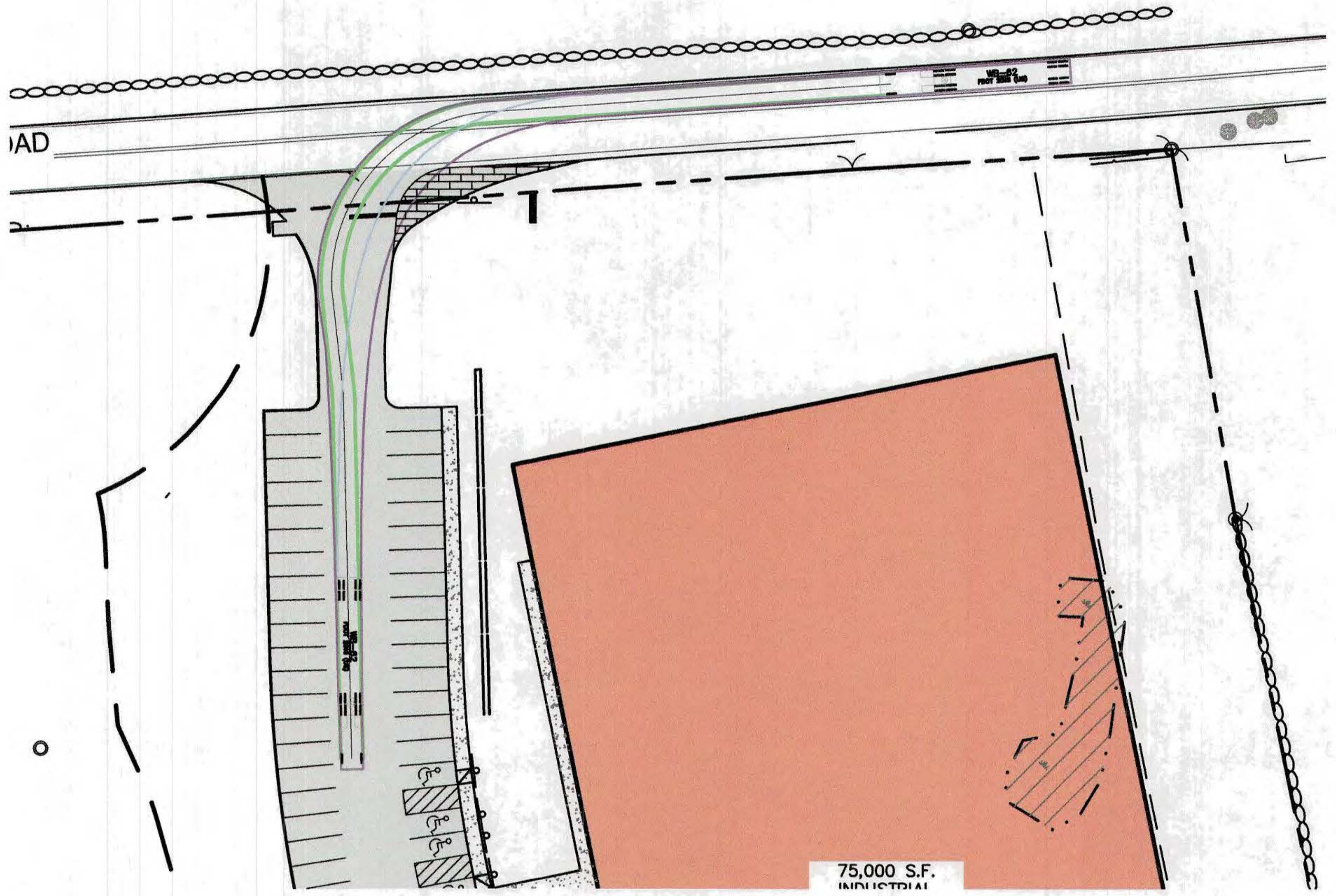
DRAWING No.
T1
SHEET 20 OF 24
JBE PROJECT NO. 19190.2



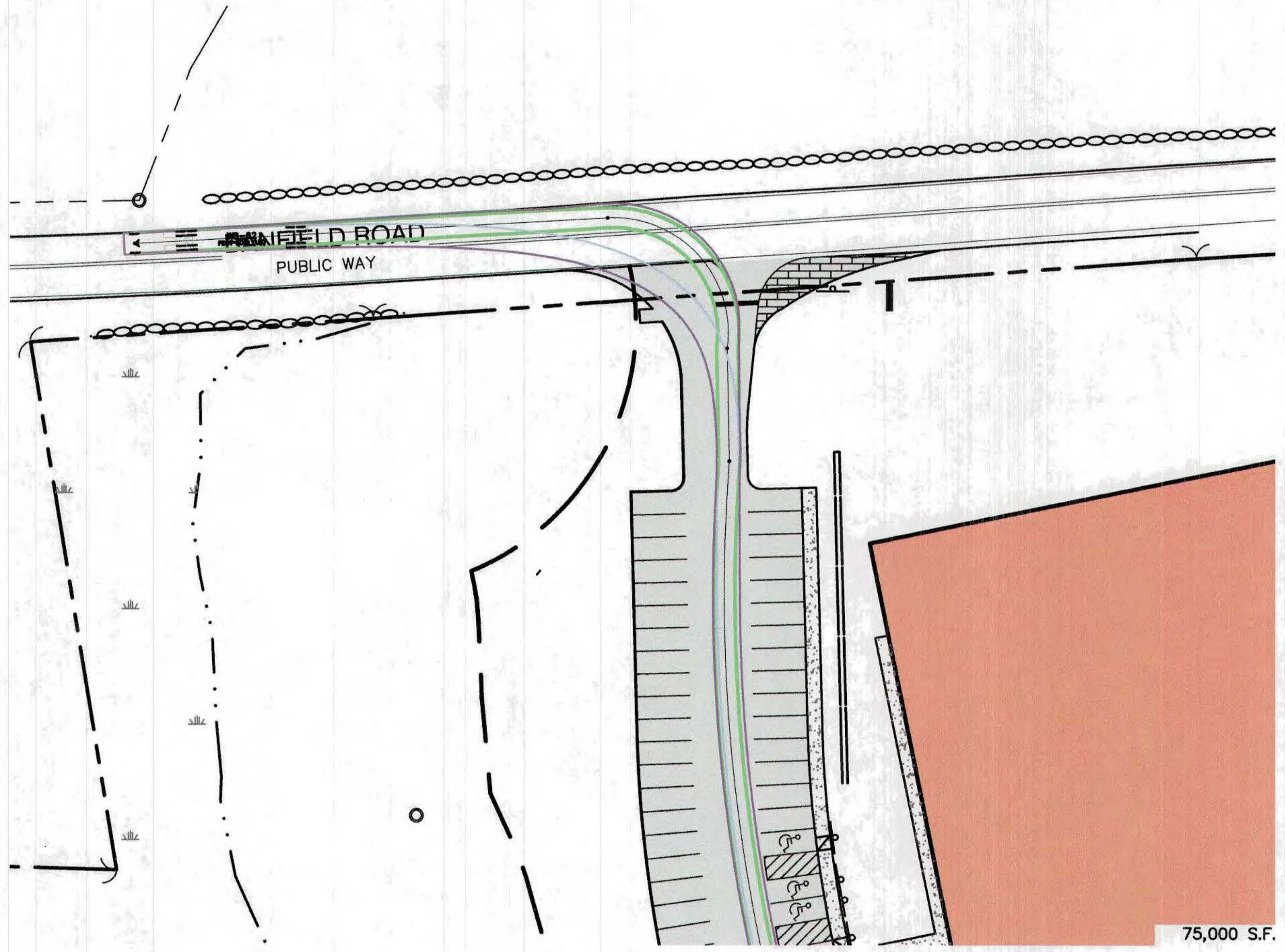
RIGHT TURN IN PLAN



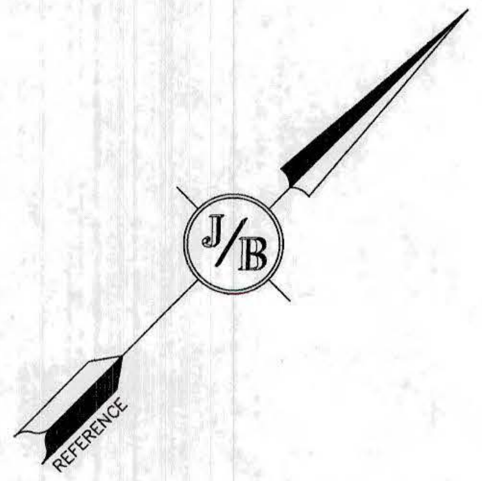
RIGHT TURN OUT PLAN

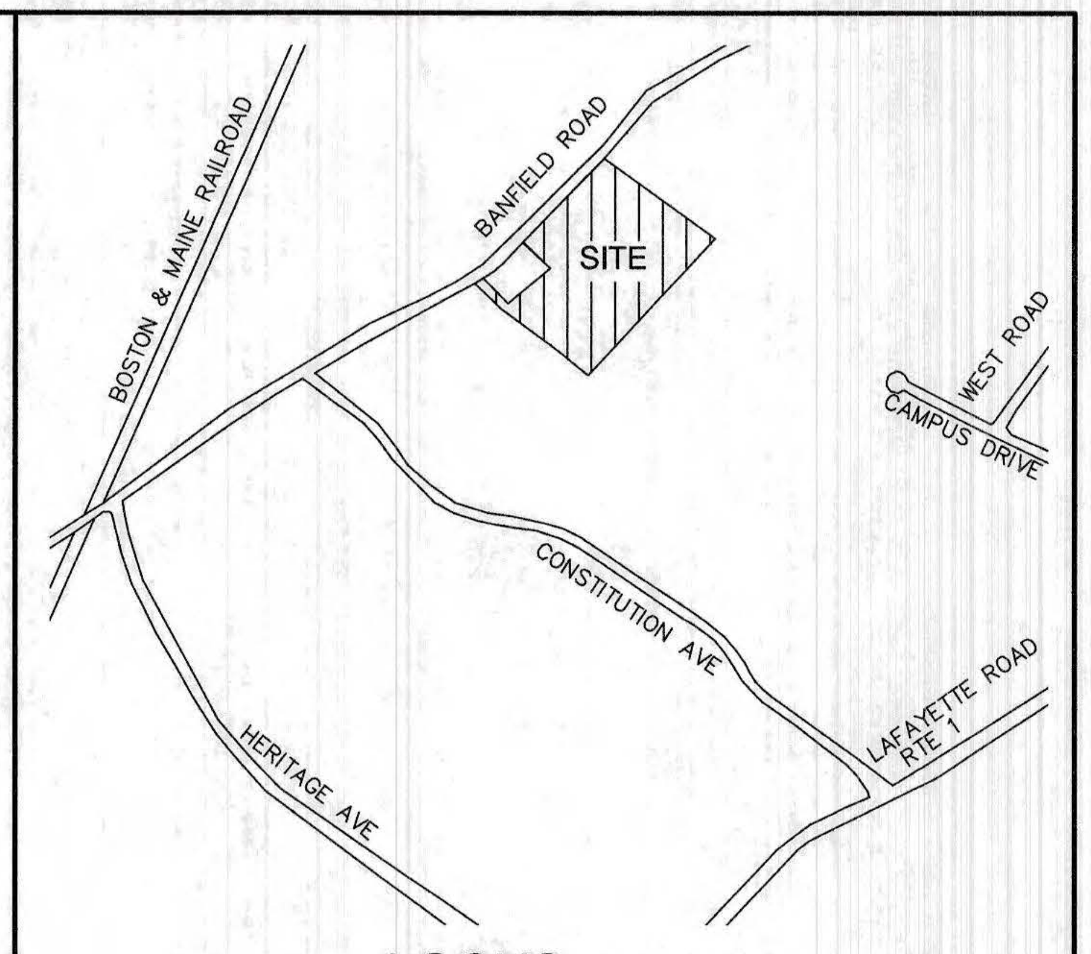


LEFT TURN IN PLAN



LEFT TURN OUT PLAN





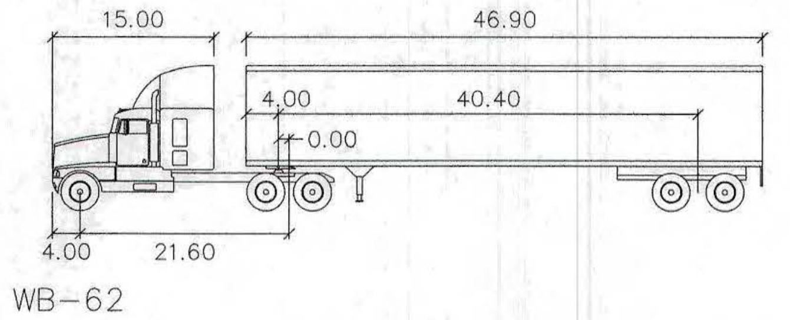
LOCUS SCALE: 1"=1000'

LEGEND

— = FRONT TIRES

— = REAR TIRES

— = VEHICLE BODY



WB-62

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 31.9
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

GRAPHIC SCALE

(IN FEET)
1 inch = 50 feet

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2

Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg

MICHAEL J. KERIVAN No. 9846

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

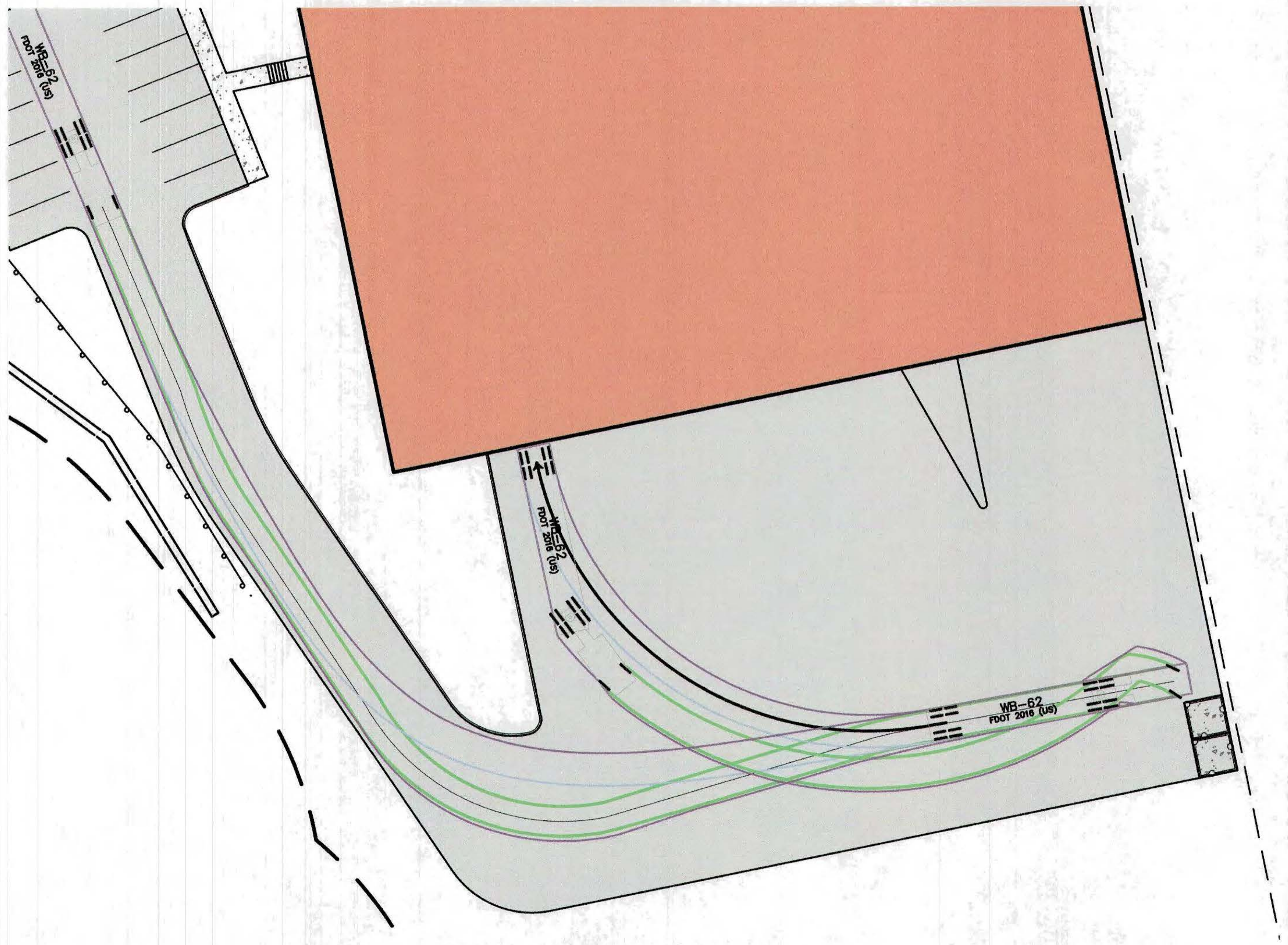
Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: DETAIL TRUCK TURNING PLAN

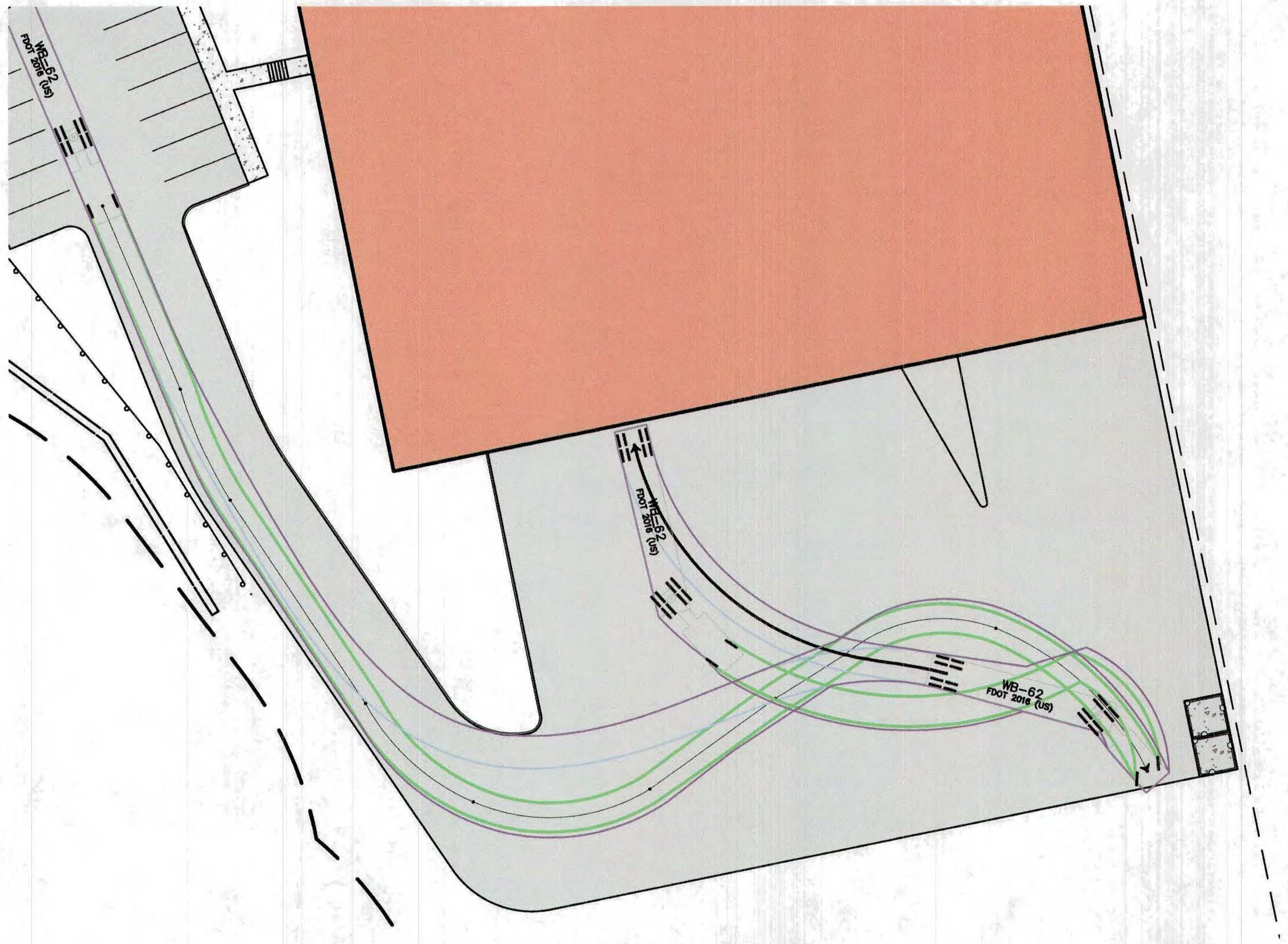
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801

Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

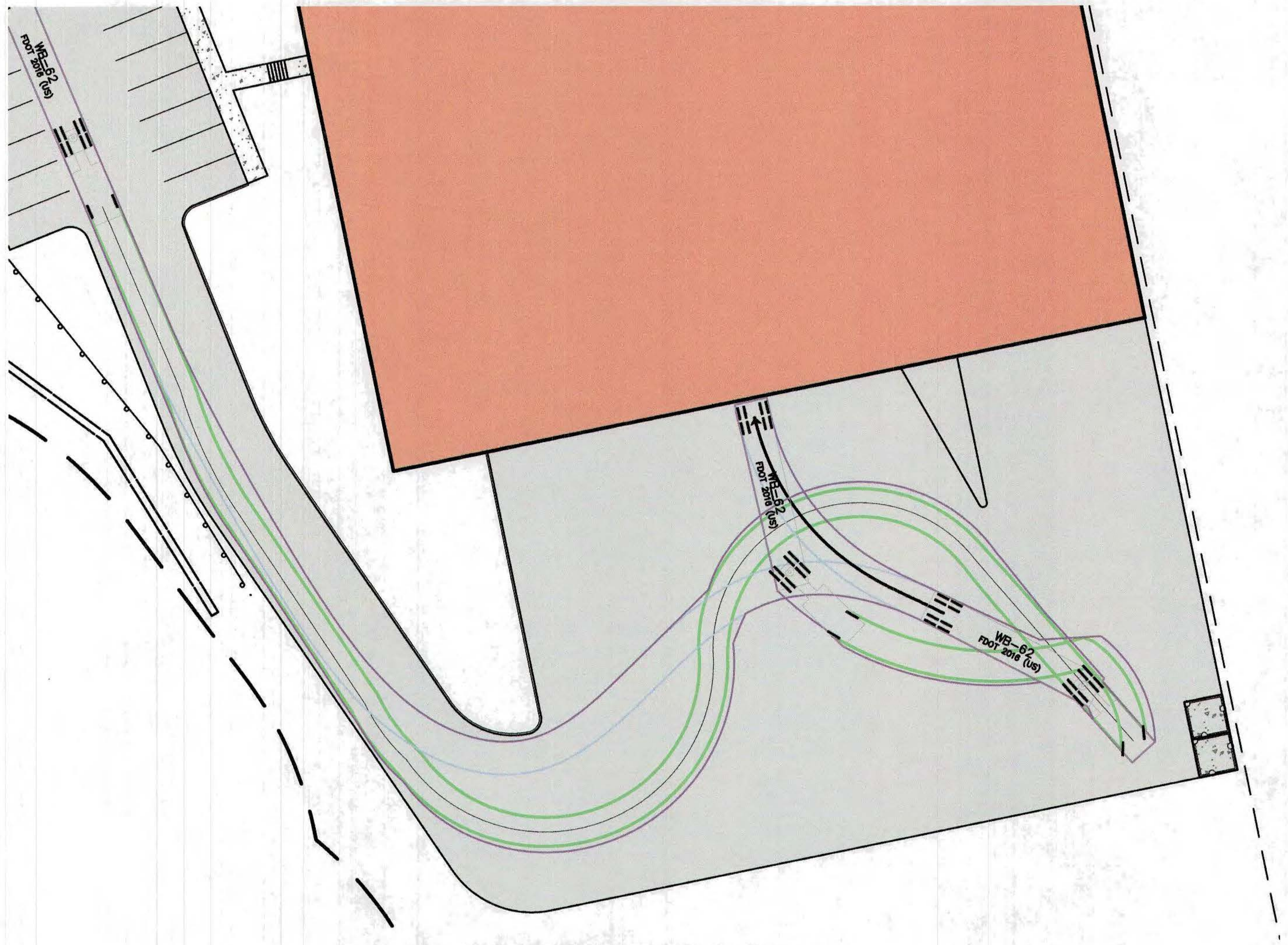
DRAWING No.
T2
SHEET 21 OF 24
JBE PROJECT NO. 19190.2



POTENTIAL LOADING AREA #1

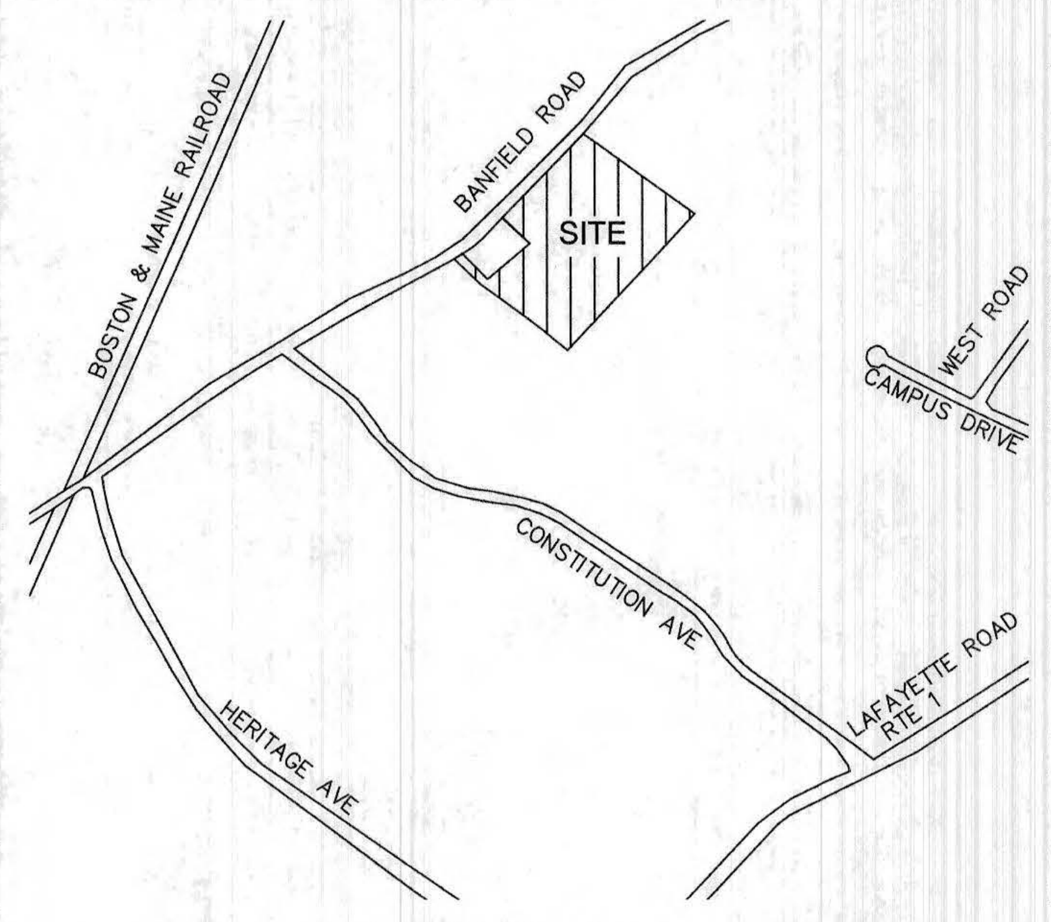


POTENTIAL LOADING AREA #2



POTENTIAL LOADING AREA #3

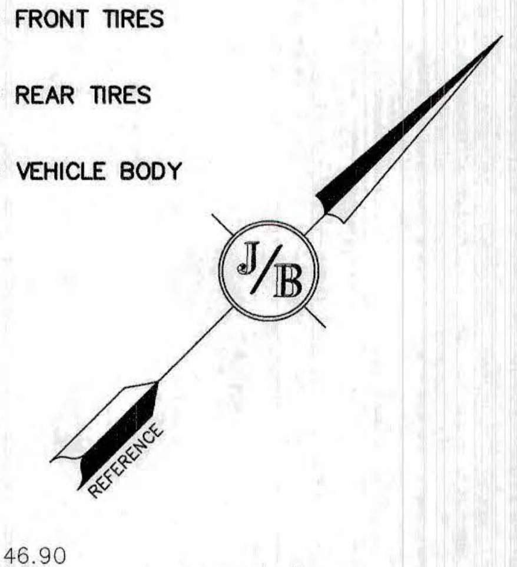
POTENTIAL LOADING AREA #4

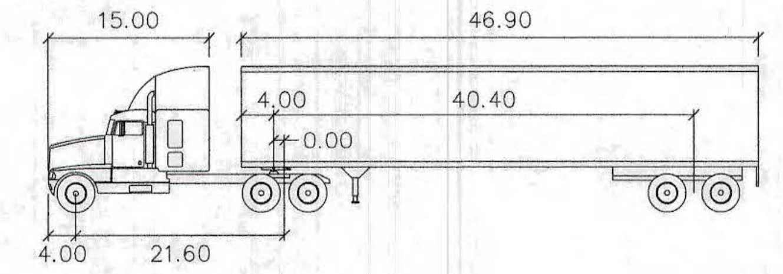


LOCUS SCALE: 1"=1000'

LEGEND

🟩 = FRONT TIRES
▭ = REAR TIRES
▬ = VEHICLE BODY





WB-62

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 31.9
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

GRAPHIC SCALE

(IN FEET)
1 inch = 50 feet

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9848

12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	REAR TRUCK TURNING PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.

T3

SHEET 22 OF 24
JBE PROJECT NO. 19190.2

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC | Draft: DJM | Date: 04/21/20
Checked: JAC | Scale: AS-NOTED | Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846

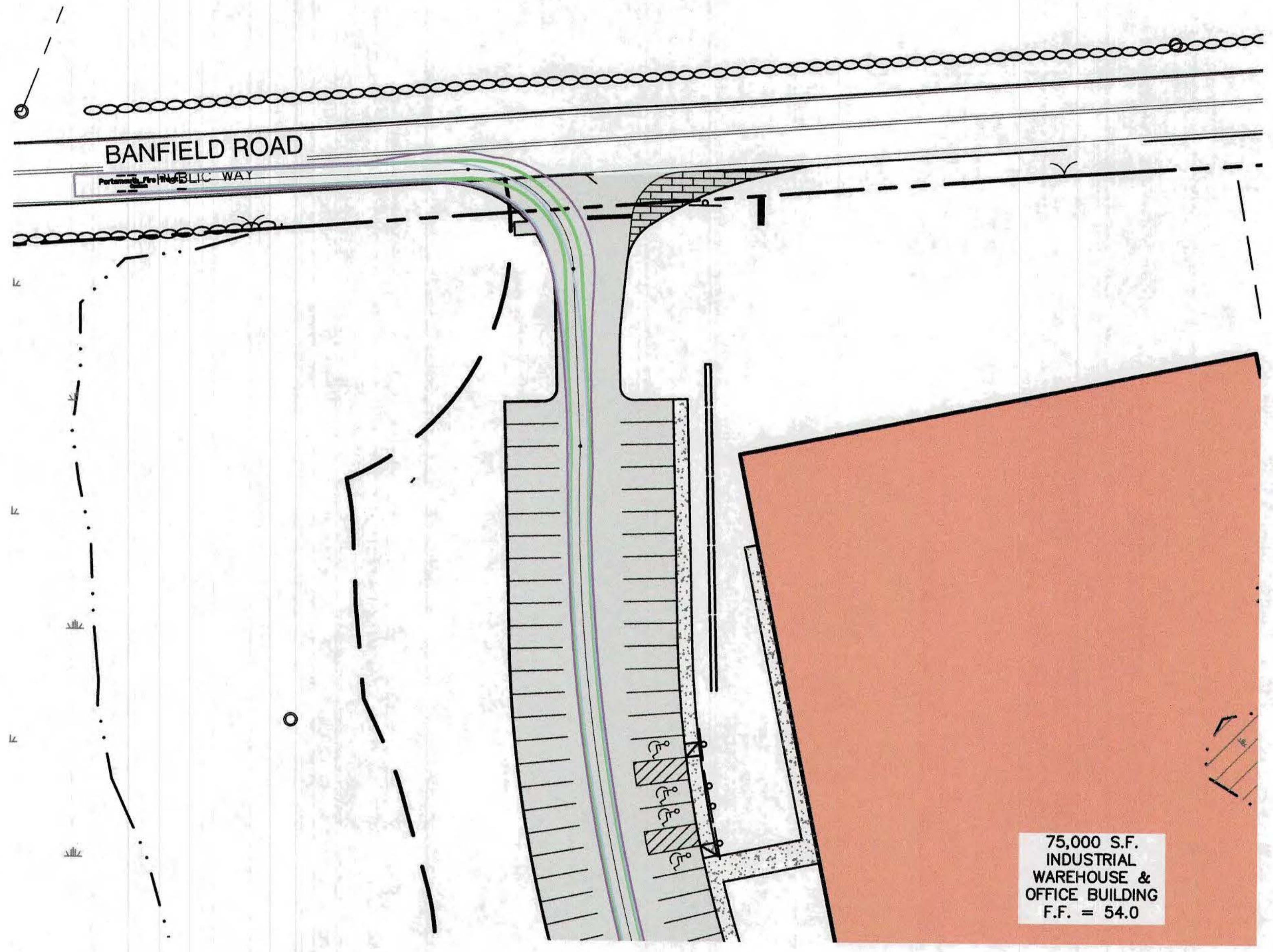
12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

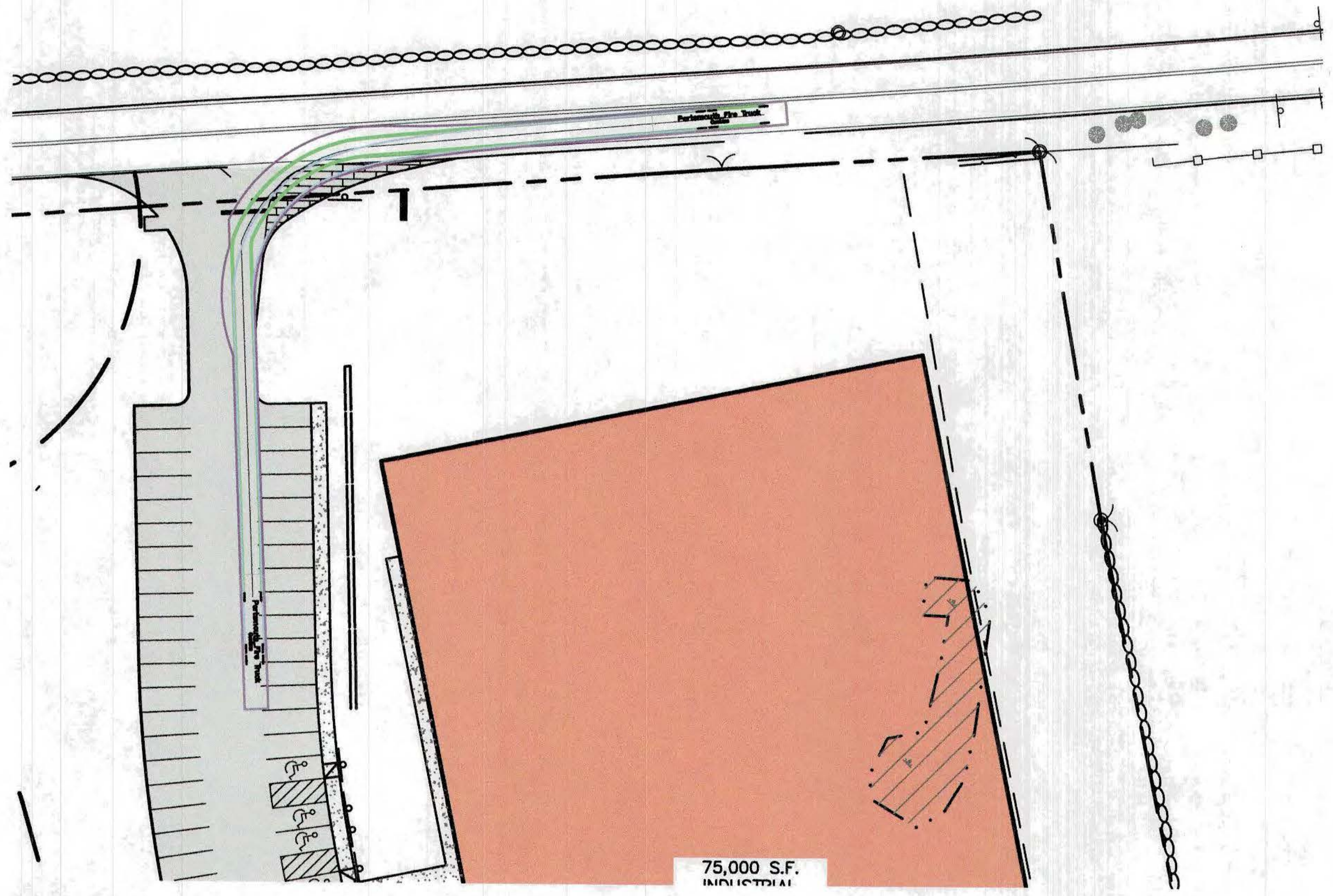
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: **OVERVIEW TRUCK TURNING PLAN**
Project: INDUSTRIAL WAREHOUSE
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

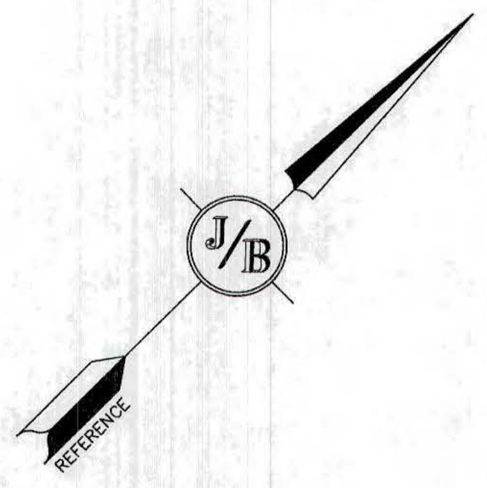
DRAWING No.
T4
SHEET 23 OF 24
JBE PROJECT NO. 19190.2

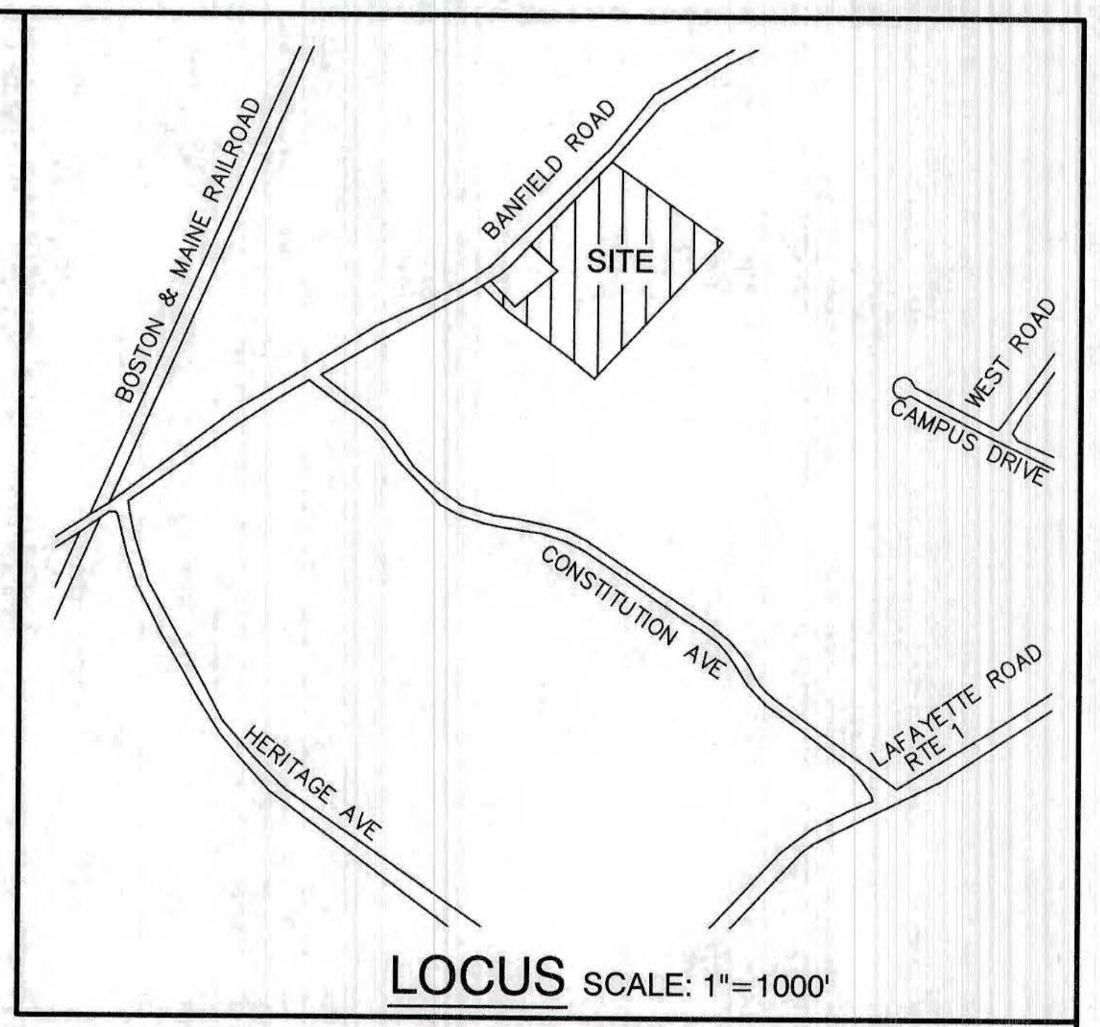


RIGHT TURN IN PLAN



RIGHT TURN OUT PLAN

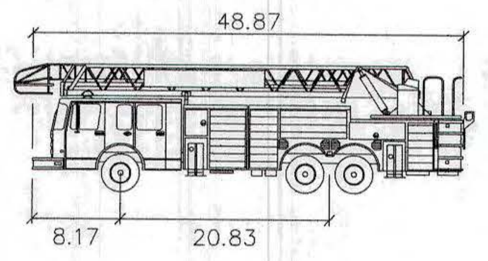




LOCUS SCALE: 1"=1000'

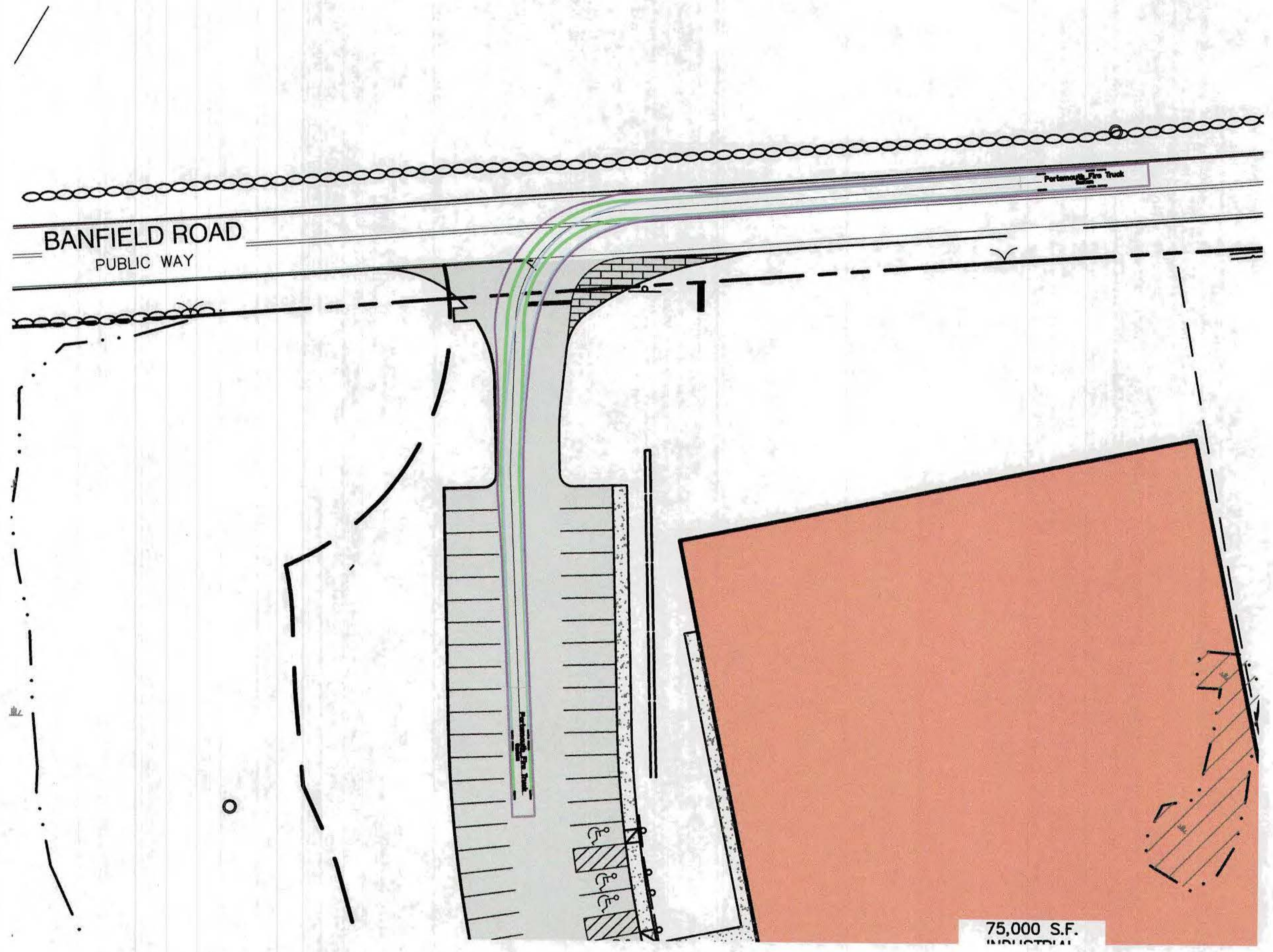
LEGEND

- 🟩 = FRONT TIRES
- = REAR TIRES
- = VEHICLE BODY

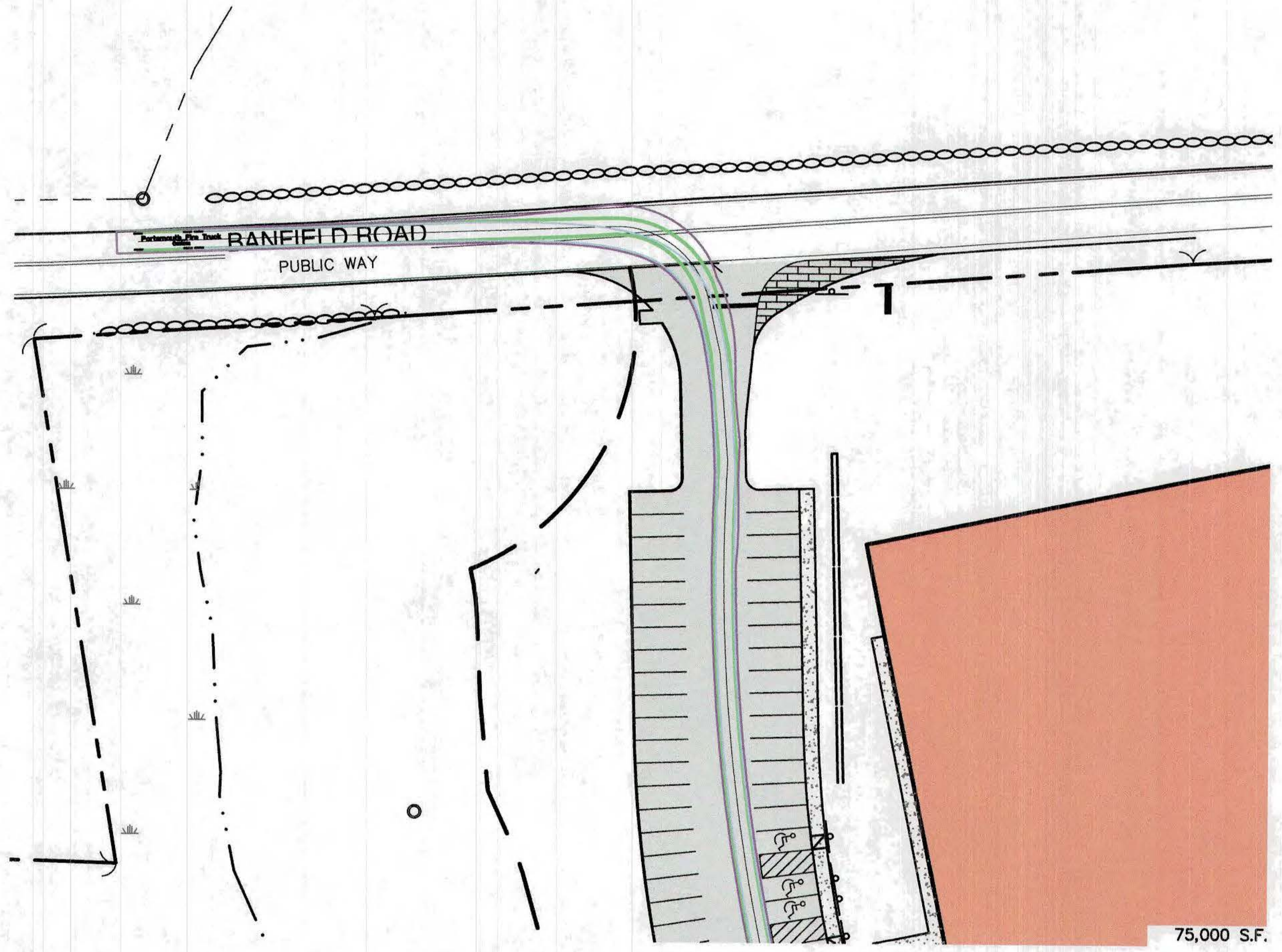


Portsmouth Fire Truck

	feet
Width	: 8.50
Track	: 6.91
Lock to Lock Time	: 6.0
Steering Angle	: 38.7



LEFT TURN IN PLAN



LEFT TURN OUT PLAN

GRAPHIC SCALE

(IN FEET)
1 inch = 50 feet

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

MICHAEL J. KERIVAN No. 9846
12/21/2021

REV.	DATE	REVISION	BY
19	12/20/21	REVISED PER TAC AND REVIEW ENGINEER COMMENTS	DJM
18	10/29/21	ADDED AOT AND SEPTIC APPROVAL NUMBERS	DJM
17	10/26/21	REVISED PER NH FISH AND GAME COMMENTS	DJM
16	8/18/21	REVISED PER CITY COMMENTS	DJM
15	7/30/21	REVISED PER AOT COMMENTS	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL TRUCK TURNING PLAN
Project:	INDUSTRIAL WAREHOUSE 375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record:	BANFIELD REALTY LLC 304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
T5
SHEET 24 OF 24
JBE PROJECT NO. 19190.2

JONES&BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

August 30, 2023

Portsmouth Planning Board
Attn: Rick Chellman, Chairman
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Subdivision Application
Case # LU-23-107
375 Banfield Road, Portsmouth, NH
Tax Map 266, Lot 7
JBE Project No. 19190.2

Dear Mr. Chellman,

Jones & Beach Engineers, Inc., respectfully submits a Subdivision application on behalf of the applicant, Banfield Realty, LLC. The intent of this application is to subdivide the lot into two separate parcels. The new lot 7-1 will be a non-building lot and is being subdivided for financing reasons. TAC approval was granted on August 1, 2023, we are requesting to be on the agenda for the September 21st Planning Board meeting.

The following items are provided in support of this Application:

1. Completed Subdivision Checklist.
2. TAC Approval dated August 7, 2023.
3. Waiver Requests.
4. Letter from Banfield Realty, LLC dated August 28, 2023, on Parcel Ownership.
5. State of New Hampshire Certificate of Formation.
6. Letter of Authorization.
7. Current Deed.
8. One (1) Full Size Plan (Folded).

If you have any questions or need any additional information, please feel free to contact our office. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.

Joseph A. Coronati
Vice President

cc: Rob Graham, Banfield Realty, LLC (via email)
Cindy Nix, Banfield Realty, LLC (via email)
Lynn Preston, Esq (via email)
Bill Wilcox, Wilcox & Barton (via email)

JONES&BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

August 30, 2023

Portsmouth Planning Board
Attn: Rick Chellman, Chairman
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Waiver Request Letter
Case # LU-23-107
375 Banfield Road, Portsmouth, NH
Tax Map 266, Lot 7
JBE Project No. 19190.2

Dear Mr. Chellman,

On behalf of the applicant, Banfield Realty, LLC, Jones & Beach Engineers, Inc. respectfully requests waivers from the following requirements of the Portsmouth, NH Subdivision Regulations for the above-referenced Subdivision Application:

Subdivision Regulations, Section IX.1 – Improvements and Installation Bonds

Jones & Beach requests a waiver from the requirement for improvements and installation bonds because Lot 7-1 will be a non-building lot and no site improvements are proposed on this lot. The proposed warehouse and parking and loading area on Lot 7 are part of a separate application.

Subdivision Regulations, Section IX.2 – Maintenance Bonds

Jones & Beach requests a waiver from the requirements maintenance bonds because Lot 7-1 will be a non-building lot and no site improvements are proposed on this lot. The proposed warehouse and parking and loading area on Lot 7 are part of a separate application.

We look forward to discussing this waiver request at the September 21st Planning Board Meeting. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.

Joseph A. Coronati
Vice President

cc: Rob Graham, Banfield Realty, LLC (via email)
Cindy Nix, Banfield Realty, LLC (via email)
Lynn Preston, Esq (via email)
Bill Wilcox, Wilcox & Barton (via email)

City of Portsmouth, New Hampshire

Subdivision Application Checklist

This subdivision application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all subdivision review requirements. Please refer to the Subdivision review regulations for full details.

Applicant Responsibilities (Section III.C): Applicable fees are due upon application submittal along with required number of copies of the Preliminary or final plat and supporting documents and studies. Please consult with Planning staff for submittal requirements.

Owner: Banfield Realty LLC Date Submitted: 7/17/2023

Applicant: Same as Owner

Phone Number: 603-479-3666 E-mail: rob@grahm-consult.com

Site Address 1: 375 Banfield Road Map: 266 Lot: 7

Site Address 2: ______ Map: ____ Lot: ____

Application Requirements

☑	Required Items for Submittal	Item Location (e.g. Page or Plan Sheet/Note #)	Waiver Requested
☑	Completed Application form. **(III.C.2-3)**		N/A
☑	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF) on compact disc, DVD or flash drive. **(III.C.4)**		N/A

Requirements for Preliminary/Final Plat

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Required for Preliminary / Final Plat	Waiver Requested
☑	Name and address of record owner, any option holders, descriptive name of subdivision, engineer and/or surveyor or name of person who prepared the plat. **(Section IV.1/V.1)**	A1	☑ Preliminary Plat ☑ Final Plat	N/A

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✓	**Preliminary Plat** Names and addresses of all adjoining property owners. **(Section IV.2)** **Final Plat** Names and addresses of all abutting property owners, locations of buildings within one hundred (100) feet of the parcel, and any new house numbers within the subdivision. **(Section V.2)**	A1	☑ Preliminary Plat ☑ Final Plat	N/A
✓	North point, date, and bar scale. **(Section IV.3/V3)**	Required on all Plan Sheets	☑ Preliminary Plat ☑ Final Plat	N/A
✓	Zoning classification and minimum yard dimensions required. **(Section IV.4/V.4)**	A1, Note 2	☑ Preliminary Plat ☑ Final Plat	N/A
✓	**Preliminary Plat** Scale (not to be smaller than one hundred (100) feet = 1 inch) and location map (at a scale of 1" = 1000'). **(Section IV.5)** **Final Plat** Scale (not to be smaller than 1"=100'), Location map (at a scale of 1"=1,000') showing the property being subdivided and its relation to the surrounding area within a radius of 2,000 feet. Said location map shall delineate all streets and other major physical features that my either affect or be affected by the proposed development. **(Section V.5)**	A1	☑ Preliminary Plat ☑ Final Plat	N/A
✓	Location and approximate dimensions of all existing and proposed property lines including the entire area proposed to be subdivided, the areas of proposed lots, and any adjacent parcels in the same ownership. **(Section IV.6)**	A1	☑ Preliminary Plat ☑ Final Plat	
☐	Dimensions and areas of all lots and any and all property to be dedicated or reserved for schools, parks, playgrounds, or other public purpose. Dimensions shall include radii and length of all arcs and calculated bearing for all straight lines. (Section V.6/ IV.7)		☑ Preliminary Plat ☑ Final Plat	N/A
☐	Location, names, and present widths of all adjacent streets, with a designation as to whether public or private and approximate location of existing utilities to be used. Curbs and sidewalks shall be shown. (Section IV.8/V.7)		☑ Preliminary Plat ☑ Final Plat	

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✓	Location of significant physical features, including bodies of water, watercourses, wetlands, railroads, important vegetation, stone walls and soils types that my influence the design of the subdivision. **(Section IV.9/V.8)**	A1	☑ Preliminary Plat ☑ Final Plat	
☐	**Preliminary Plat** Proposed locations, widths and other dimensions of all new streets and utilities, including water mains, storm and sanitary sewer mains, catch basins and culverts, street lights, fire hydrants, sewerage pump stations, etc. **(Section IV.10)** **Final Plat** Proposed locations and profiles of all proposed streets and utilities, including water mains, storm and sanitary sewer mains, catchbasins and culverts, together with typical cross sections. Profiles shall be drawn to a horizontal scale of 1"=50' and a vertical scale of 1"=5', showing existing centerline grade, existing left and right sideline grades, and proposed centerline grade. **(Section V.9)**		☑ Preliminary Plat ☑ Final Plat	
☐	When required by the Board, the plat shall be accompanied by profiles of proposed street grades, including extensions for a reasonable distance beyond the subject land; also grades and sizes of proposed utilities. **(Section IV.10)**		☑ Preliminary Plat ☑ Final Plat	
✓	Base flood elevation (BFE) for subdivisions involving greater than five (5) acres or fifty (50) lots. **(Section IV.11)**	A1, Note 4	☑ Preliminary Plat ☑ Final Plat	
☐	For subdivisions of five (5) lots or more, or at the discretion of the Board otherwise, the preliminary plat shall show contours at intervals no greater than two (2) feet. Contours shall be shown in dotted lines for existing natural surface and in solid lines for proposed final grade, together with the final grade elevations shown in figures at all lot corners. If existing grades are not to be changed, then the contours in these areas shall be solid lines. **(Section IV.12/ V.12)**		☑ Preliminary Plat ☑ Final Plat	

Requirements for Preliminary/Final Plat				
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Required for Preliminary / Final Plat**	**Waiver Requested**
✓	Dates and permit numbers of all necessary permits from governmental agencies from which approval is required by Federal or State law. **(Section V.10)**	A1, Note 13	☐ Preliminary Plat ☑ Final Plat	
☐	For subdivisions involving greater than five (5) acres or fifty (50) lots, the final plat shall show hazard zones and shall include elevation data for flood hazard zones. **(Section V.11)**		☐ Preliminary Plat ☑ Final Plat	
✓	Location of all permanent monuments. **(Section V.12)**	A1	☐ Preliminary Plat ☑ Final Plat	

General Requirements[1]

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☐	**1. Basic Requirements: (VI.1)**		
☐	a. Conformity to Official Plan or Map		
☐	b. Hazards		
☐	c. Relation to Topography		
☐	d. Planned Unit Development		
☑	**2. Lots: (VI.2)**	A1	
☑	a. Lot Arrangement		
☑	b. Lot sizes		
☑	c. Commercial and Industrial Lots		
☐	**3. Streets: (VI.3)**		
☐	a. Relation to adjoining Street System		
☐	b. Street Rights-of-Way		
☐	c. Access		
☐	d. Parallel Service Roads		
☐	e. Street Intersection Angles		
☐	f. Merging Streets		
☐	g. Street Deflections and Vertical Alignment		
☐	h. Marginal Access Streets		
☐	i. Cul-de-Sacs		
☐	j. Rounding Street Corners		
☐	k. Street Name Signs		
☐	l. Street Names		
☐	m. Block Lengths		
☐	n. Block Widths		
☐	o. Grade of Streets		
☐	p. Grass Strips		
☐	**4. Curbing: (VI.4)**		
☐	**5. Driveways: (VI.5)**		
☐	**6. Drainage Improvements: (VI.6)**		
☐	**7. Municipal Water Service: (VI.7)**		
☐	**8. Municipal Sewer Service: (VI.8)**		
☐	**9. Installation of Utilities: (VI.9)**		
☐	a. All Districts		
☐	b. Indicator Tape		
☐	**10. On-Site Water Supply: (VI.10)**		
☐	**11. On-Site Sewage Disposal Systems: (VI.11)**		
☑	**12. Open Space: (VI.12)**	A1, Note 2	
☐	a. Natural Features		
☐	b. Buffer Strips		
☐	c. Parks		
☐	d. Tree Planting		
☑	**13. Flood Hazard Areas: (VI.13)**	A1, Note 4	
☐	a. Permits		
☐	b. Minimization of Flood Damage		
☐	c. Elevation and Flood-Proofing Records		
☐	d. Alteration of Watercourses		
☐	**14. Erosion and Sedimentation Control (VI.14)**		

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☑	**15. Easements (VI.15)**		
☑	a. Utilities	A1	
☑	b. Drainage		
☑	**16. Monuments: (VI.16)**	A1	
☐	**17. Benchmarks: (VI.17)**		
☐	**18. House Numbers (VI.18)**		

	Design Standards		
	Required Items for Submittal	**Indicate compliance and/or provide explanation as to alternative design**	**Waiver Requested**
☐	**1. Streets have been designed according to the design standards required under Section (VII.1).** a. Clearing b. Excavation c. Rough Grade and Preparation of Sub-Grade d. Base Course e. Street Paving f. Side Slopes g. Approval Specifications h. Curbing i. Sidewalks j. Inspection and Methods		
☐	**2. Storm water Sewers and Other Drainage Appurtenances have been designed according to the design standards required under Section (VII.2).** a. Design b. Standards of Construction		
☐	**3. Sanitary Sewers have been designed according to the design standards required under Section (VII.3).** a. Design b. Lift Stations c. Materials d. Construction Standards		
☐	**4. Water Mains and Fire Hydrants have been designed according to the design standards required under Section (VII.4).** a. Connections to Lots b. Design and Construction c. Materials d. Notification Prior to Construction		

Applicant's/Representative's Signature:__________ **Date:** 7/17/2023

---

[1] See City of Portsmouth, NH Subdivision Rules and Regulations for details.

CITY OF PORTSMOUTH
Planning Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801
(603) 610-7216

TECHNICAL ADVISORY COMMITTEE

August 7, 2023

Robert Graham
Banfield Realty, LLC
304 Maplewood Avenue
Portsmouth, New Hampshire 03801

RE: Preliminary & Final Subdivision for property located at 375 Banfield Road (LU-23-107)

Dear Mr. Graham:

The Technical Advisory Committee, at its regularly scheduled meeting of Tuesday, August 1, 2023, considered your application for Preliminary and Final Subdivision approval to subdivide one lot into two lots to create the following: Proposed Lot 1 with 6.65 acres of lot area and 354 feet of street frontage and Proposed Lot 2 with 7.96 acres of lot area and 200 feet of street frontage. Said property is shown on Assessor Map 266 Lot 7 and lies within the Industrial (I) District. As a result of said consideration, the Committee voted to to recommend **approval** to the Planning Board with the following **conditions:**

1) The necessary waivers are requested prior to Planning Board approval.
2) Proof of clean up responsibility required prior to Planning Board approval.

This matter will be placed on the agenda for the Planning Board meeting scheduled for **Thursday, September 21, 2023**. One (1) hard copy of all plans and supporting reports and exhibits as well as an updated electronic file (in a PDF format) must be filed in the Planning Department and uploaded to the online permit system no later than **Wednesday, August 30, 2023**.

Per Section 2.5 of the Site Plan Regulations, a site plan review application to the Planning Board must include all applicable information and supporting materials including but not limited to the following items:

- *Full updated plan set*
- *Draft Easements*
- *Drainage Analysis*
- *Traffic Studies*
- *Etc.*

All comments, corrections, and conditions identified as "Items to be addressed before

Planning Board submittal' must be resolved/corrected for the Planning Board application submittal to be deemed complete.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

Peter Britz,
Planning and Sustainability Director

cc:

Joseph Coronati, Jones & Beach Engineers

Letter of Authorization

I, Banfield Realty, LLC, 304 Maplewood Avenue, Portsmouth, NH 03801, owner of property located in Portsmouth, NH, known as Tax Map 266, Lot 7, do hereby authorize Jones & Beach Engineers, Inc., PO Box 219, Stratham, NH, to act on my behalf concerning the previously-mentioned property. The parcel is located on 375 Banfield Road in Portsmouth, NH.

I hereby appoint Jones & Beach Engineers, Inc., as my agent to act on my behalf in the review process, to include any required signatures.

Cynthia Nix
Witness

Banfield Realty, LLC

7-23-20
Date

E # 20005358 02/05/2020 12:13:02 PM
Book 6081 Page 2150 Page 1 of 6
Register of Deeds, Rockingham County
Cathy Ann Stacey

LCHIP	ROA480986	25.00
TRANSFER TAX	R0094654	18,000.00
RECORDING		30.00
SURCHARGE		2.00

Return to:

WARRANTY DEED

KNOW ALL PERSONS BY THESE PRESENTS, that we, **William E. Copeland** a married man of 26 Constitution Way, Dover, NH 03820, **Jack Copeland** a single man of 245 Middle Street, Apartment #227, Portsmouth, NH 03801, **Kevin Copeland** a single man of P.O. Box 4213, Valley Village, CA 91617, **Joseph P. Copeland**, married man of 142 Dennett Road, Kittery, ME 03904, and **Roeseland Holdings 5, LLC**, a New Hampshire limited liability company with an address of 21 Moody Point Drive, Newmarket, NH 03857, grant to **Banfield Realty LLC**, a New Hampshire limited liability company with an address of 304 Maplewood Avenue, Portsmouth, NH 03801, **with warranty covenants**, all our right, title and interest in the following described premises:

A certain lot or parcel of land together with the buildings thereon situated on the Southeasterly sideline of Banfield Road in Portsmouth, County of Rockingham and State of New Hampshire, bounded and described as follows:

Commencing at a point on said Southeasterly sideline of Banfield Road at the intersection of two stone walls and at land now or formerly of one Barratt; thence running in a Southeasterly direction by and along an old stone wall and land now or formerly of said Barratt, Thompson, Pickering, Iafolla, Wood and Myers, a total distance of Two Thousand Six Hundred Sixty-Three feet (2,663') more or less to a point at the intersection of two stone walls; thence turning and running by and along a stone wall and land of Myers N 58° 22' E, a distance of One Hundred Twenty-Eight feet (128') to other land of Iafolla; thence turning and running by and along another stone wall and land of Iafolla, S 18° 21' E, a distance of Three Hundred Twenty feet (320'); thence turning and running by and along another stone wall S 54° 8' 30" W, a distance of Thirty feet (30'); thence turning and running by a stone wall S 47° 49' 30" E, a distance of One Hundred Seven feet (107') to a point adjoining land of Peverly Hill Corp., thence turning and running S 70° 15' W, a distance of Five Hundred Thirty-Three feet (533') to a point; thence turning and running N 25° 11' W, a distance of Three Hundred Twenty-Five feet (325') to a point at an old stone wall; thence turning and running in a Southwesterly direction by and along said stone wall and land of said Peverly Hill Corp. and also by land of Stef, a distance of Four Hundred Forty-Six feet (446') to a point; thence turning and running in a Northwesterly direction by a stone wall and land of Stef, a distance of One Thousand Four Hundred Ninety-Five feet (1,495') more or less to a point; thence turning and running S 65° 16' W, a distance of Ninety-Two feet (92') also by land of Stef to a point adjoining land now or formerly of Dow; thence turning and running N 25° 31' W, a distance of One Hundred Seventy-Five feet (175') to a point; thence continuing N 33° 50' W, a distance of Three Hundred and Eighteen feet (318') to a point; thence continuing N 35° 25' W, a distance of

Four Hundred Five feet (405') to a point adjoining land of Copeland; thence turning and running N 64° 17' E, a distance of Three Hundred Sixty feet (360') to a point; thence turning and running N 33° 21' W, a distance of Two Hundred feet (200'), the last two courses by land of Copeland, to a point at an old stone wall on the Southeasterly sideline of Banfield Road; thence turning and running by said stone wall N 63° 50' E, a distance of One Hundred Twenty-Nine feet (129'); thence continuing N 60° 28' E, a distance of Three Hundred Ten feet (310'); thence continuing N 61° 1' E, a distance of One Hundred Twenty-One feet (121') to the stone wall and point of beginning.

Excepting and excluding from this conveyance that portion of the above-described premises previously conveyed by warranty deed of William H. Copeland and Virginia A. Copeland to John Iafolla Co., Inc. dated September 3, 1963, recorded in Rockingham County Registry of Deeds at Book 1686, Page 133.

Subject to a right of way Fifty feet (50') in width lying along the Northeasterly sideline of the premises herein conveyed, and adjoining a stone wall designating said boundary, for access from Banfield Road to property conveyed by William H. Copeland and Virginia A. Copeland to John Iafolla Co., Inc. by warranty deed dated September 3, 1963, recorded in Rockingham County Registry of Deeds at Book 1686, Page 133.

Meaning and intending to describe and convey a portion of the same premises conveyed by Harry Zaitland and Irving Zaitland to William H. Copeland and Virginia A. Copeland by warranty deed dated September 3, 1963, recorded in Rockingham County Registry of Deeds at Book 1686, Page 128. William H. Copeland conveyed his interest in the premises to Virginia A. Copeland by quitclaim deed dated March 15, 2001, recorded in Rockingham County Registry of Deeds at Book 3555, Page 0083. Virginia A. Copeland died on September 10, 2008. See Estate of Virginia A. Copeland, 10th Circuit – Probate Division – Brentwood, Case No. 318-2008-ET-01202. Virginia A. Copeland's interest in the premises passed to the grantors William E. Copeland, Jack Copeland, Kevin Copeland and to James R. Copeland, who died on June 4, 2018. See Estate of James R. Copeland, 10th Circuit – Probate Division – Brentwood, Case No. 318-2018-ET-01138. James R. Copeland's interest in the premises passed to his sons, Joseph P. Copeland and James W. Copeland. James W. Copeland conveyed his portion of the premises to Roeseland Holdings 5, LLC, by Quitclaim Deed dated May 7, 2019, recorded in Rockingham County Registry of Deeds at Book 5998, Page 2778.

The premises conveyed hereby is not homestead property of the Grantors.

Executed this 5th day of February, 2020.

[Signature Page Attached]

[Signature Page to Warranty Deed]

William E. Copeland

Jack Copeland

Kevin Copeland

Joseph P. Copeland

Roeseland Holdings 5, LLC

By: ____________________
James W. Copeland
Its: Member

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 27 day of January 2020, by William E. Copeland.

ALEC L. McEACHERN
MY COMMISSION EXPIRES JULY 13, 2021

Notary Public
My Commission Expires:

[Signature Page to Warranty Deed]

William E. Copeland

Jack Copeland

Kevin Copeland

Joseph P. Copeland

Roeseland Holdings 5, LLC

By: ______________________
James W. Copeland
Its: Member

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this ___ day of __________ 2020, by William E. Copeland.

See attached certificate

Notary Public
My Commission Expires:

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 28 day of January 2020, by Jack Copeland.

ALEC L. McEACHERN
MY COMMISSION EXPIRES JULY 13, 2021

Notary Public
My Commission Expires:

STATE OF CALIFORNIA
COUNTY OF ____________________

The foregoing instrument was acknowledged before me on this _____ day of __________ 2020, by Kevin Copeland.

See attached certificate.

Notary Public
My Commission Expires:

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 5th day of February 2020, by Joseph P. Copeland.

LEE-ANNE R. SANFACON
Commission Expires 07-31-2024

Notary Public
My Commission Expires:

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me on this 5th day of February 2020, by James W. Copeland in his capacity as Member of Roeseland Holdings 5, LLC.

LEE-ANNE R. SANFACON
Commission Expires 07-31-2024

Notary Public
My Commission Expires:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Los Angeles)

On 01/27/2020 before me, Andre Smadja, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared KEVIN COPELAND
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

ANDRE SMADJA
Notary Public - California
Los Angeles County
Commission # 2293699
My Comm. Expires Jul 3, 2023

Signature ____________________
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: WARRANTY DEED
Document Date: 01/27/2020 Number of Pages: 4
Signer(s) Other Than Named Above:

Capacity(ies) Claimed by Signer(s)

Signer's Name: ____________________
☐ Corporate Officer — Title(s): ____________________
☐ Partner — ☐ Limited ☐ General
☒ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: ____________________
Signer Is Representing: ____________________

Signer's Name: ____________________
☐ Corporate Officer — Title(s): ____________________
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other: ____________________
Signer Is Representing: ____________________

BANFIELD REALTY, LLC
304 Maplewood Avenue
Portsmouth, NH 03801
(603) 294-0421

August 28, 2023

Rick Chellman
Chairman of the Planning Board
Planning Department
1 Junkins Avenue
Portsmouth, NH 03801

Re: Banfield Realty, LLC, 375 Banfield Road (LU-20-259)

Dear M. Chellman:

Pursuant to the Technical Advisory Committee's request, I write to confirm the details concerning the ownership of the two parcels that will be created if the proposed Subdivision Plan is approved by this Board. Specifically, the northeastern lot (the lot on which we intend to seek approvals for construction of a warehouse) will continue to be owned by Banfield Realty LLC. The southwestern lot (which will be Lot 7-1) will be owned by an entity to be determined which is an entity that is created by the members of Banfield Realty, LLC. Currently, we have filed with the New Hampshire Secretary of State a Certificate of Formation for "Green Valley Realty, LLC." Please see the attached Certificate.

In other words, the two parcels' owners will have the same members and, as such, the subdivision of this property into two lots will not change the already ongoing cleanup efforts already begun by Banfield Realty, LLC, there.

Sincerely,

Robert Graham

Rob Graham
Banfield Realty, LLC

Enclosure

State of New Hampshire
Department of State

Date Submitted: 8/25/2023
David M. Scanlan
Secretary of State

Form LLC-1
RSA 304-C:31

CERTIFICATE OF FORMATION
NEW HAMPSHIRE LIMITED LIABILITY COMPANY

THE UNDERSIGNED, under the New Hampshire Limited Liability Company Laws submits the following certificate of formation:

FIRST: The name of the limited liability company is:

GREEN VALLEY REALTY, LLC

Principal Business Information:

Principal Office Address:

304 Maplewood Avenue	**Portsmouth**	**NH**	**03801**
(no. & street)	(city/town)	(state)	(zip code)

Principal Mailing Address (if different):

304 Maplewood Avenue	**Portsmouth**	**NH**	**03801**
(no. & street)	(city/town)	(state)	(zip code)

Business Phone: **6032940421**

Business Email: **cnix@mjdc304.com**

Notification Email: **cnix@mjdc304.com**

☑ Please check if you would prefer to receive the Annual Report Reminder Notice by email.

SECOND: Describe the nature of the primary business or purposes (and if known, list the NAICS Code and Sub Code):

53-Real Estate and Rental and Leasing - 120-Lessors of Nonresidential Buildings (except Miniwarehouses)

THIRD: The name of the limited liability company's initial registered agent is:

Cynthia Nix

The complete address of its registered office (agent's business address) is:

304 Maplewood Avenue	**Portsmouth**	**NH**	**03801**
(no. & street)	(city/town)	(state)	(zip code)

FOURTH: The management of the limited liability company **is** vested in a manager or managers.

The period of its duration is: **Perpetual**.

Manager/Member Information:

Name	Title	Address
Michael Grondahl	Manager	304 Maplewood AVenue, Portsmouth, NH, 03801, USA

Title: **Manager**
Signature: **Michael Grondahl**
Name of Signer: **Michael Grondahl**
Date signed: **08/25/2023**
Effective Date: **08/25/2023 11:29:00 AM**

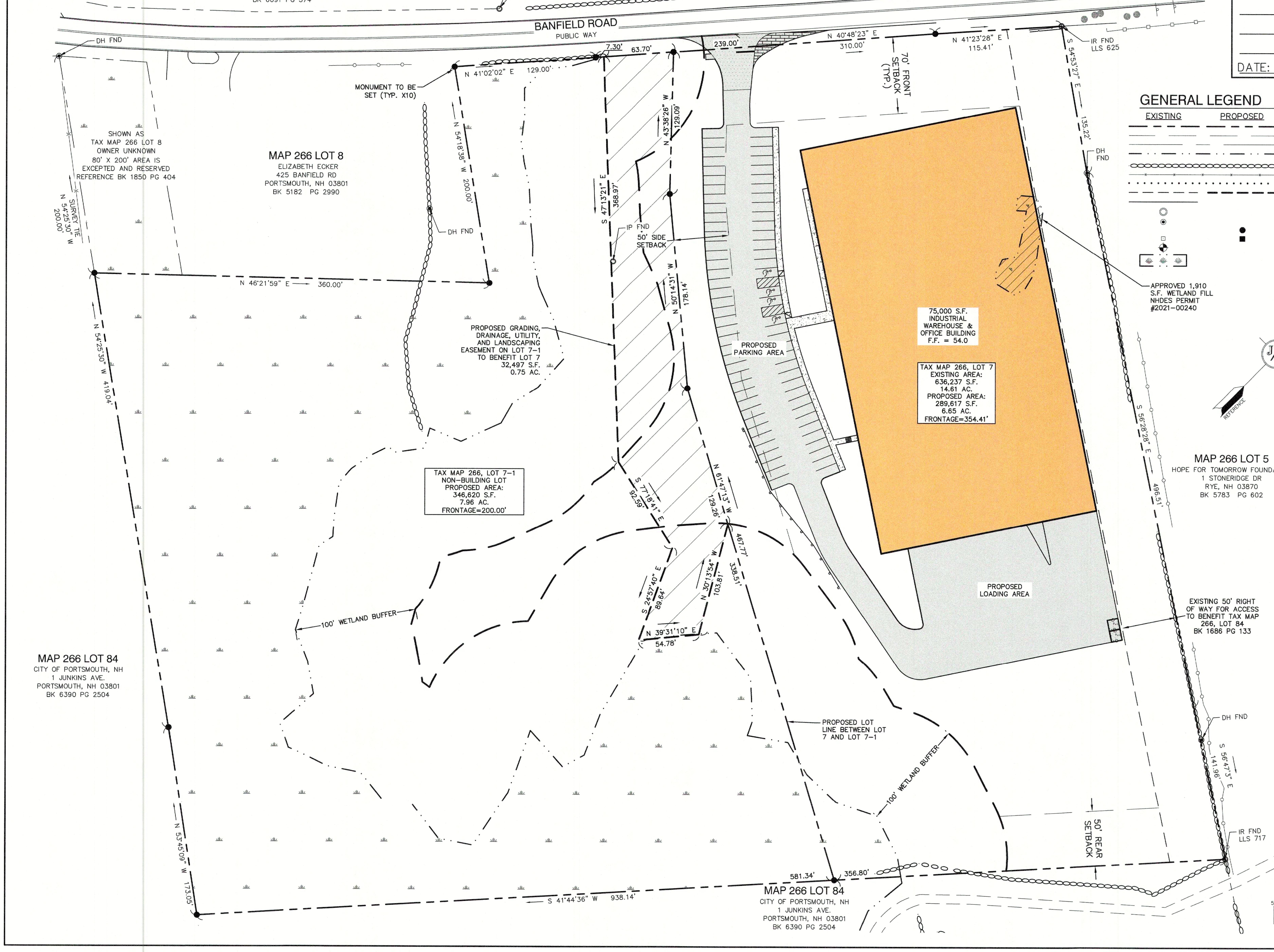
Note: The sale or offer for sale of membership interests of the limited liability company will comply with the requirements of the New Hampshire Uniform Securities Act (RSA 421-B). The membership interests of the limited liability company: 1) have been registered or when offered will be registered under RSA 421-B; 2) are exempted or when offered will be exempted under RSA 421-B; 3) are or will be offered in a transaction exempted from registration under RSA 421-B; 4) are not securities under RSA 421-B; OR 5) are federal covered securities under RSA 421-B. The statement above shall not by itself constitute a registration or a notice of exemption from registration of securities within the meaning of sections 448 and 461(i)(3) of the United States Internal Revenue Code and the regulation promulgated thereunder.

* Must be signed by a **manager**; if no manager, must be signed by a **member.**

DISCLAIMER: All documents filed with the Corporation Division become public records and will be available for public inspection in either tangible or electronic form.

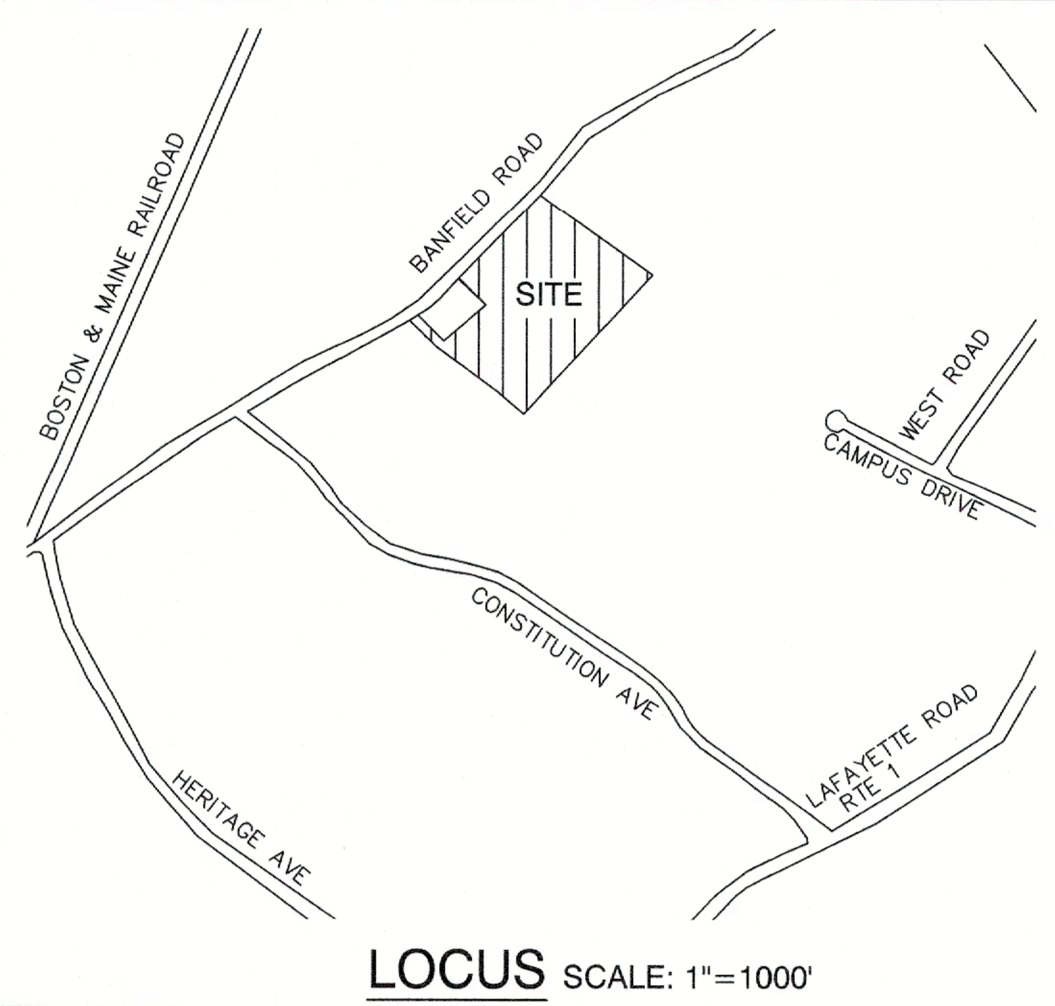
PLAN REFERENCES:

1. "PLAN OF LAND IN PORTSMOUTH, N.H. OWNED BY PEVERLY HILL CORPORATION AND JOHN IAFOLLA COMPANY INC." DATED DECEMBER 1975. PREPARED BY FRANCIS BARRETT. R.C.R.D. 5657.
2. "PLAN OF LAND FOR MICHAEL R. IAFOLLA & FERRIS G. BAVICCHI." DATED MAY 2, 1983. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 11561.
3. "SUBDIVISION PLAN FOR JOHN IAFOLLA COMPANY, INC, PEVERLY HILL ROAD / BANFIELD ROAD, PORTSMOUTH, N.H." DATED OCTOBER 11, 1996. R.C.R.D. 25153.
4. "BOUNDARY PLAN, TAX MAP R66, LOT 4." DATED JUNE 1997. PREPARED BY LITTLE RIVER SURVEY COMPANY. R.C.R.D. 26190.
5. "LOT LINE ADJUSTMENT, JOHN IAFOLLA COMPANY, INC. AND CITY OF PORTSMOUTH." DATED NOVEMBER 16, 1997. R.C.R.D. 26202.
6. "LOT LINE REVISION PLAN, CAMPUS DRIVE, BANFIELD & PEVERLY HILL ROADS, PORTSMOUTH, NEW HAMPSHIRE." DATED OCTOBER 24, 2016. PREPARED BY JAMES VERRA AND ASSOCIATES. R.C.R.D. 39897.



APPROVED – PORTSMOUTH, NH
PLANNING BOARD

DATE:



LOCUS SCALE: 1"=1000'

GENERAL LEGEND

EXISTING PROPOSED DESCRIPTION

- PROPERTY LINES
- SETBACK LINES
- CENTERLINE
- FRESHWATER WETLAND LINE
- STONEWALL
- FENCE
- SOIL BOUNDARY
- EASEMENT
- EDGE OF PAVEMENT
- IRON PIPE/IRON ROD
- DRILL HOLE
- IRON ROD/DRILL HOLE
- STONE/GRANITE BOUND
- BENCHMARK (TBM)
- FRESHWATER WETLANDS

SUBDIVISION NOTES:

1. THE INTENT OF THIS PLAN IS TO SUBDIVIDE MAP 266, LOT 7 INTO TWO (2) LOTS.
2. ZONING DISTRICT: INDUSTRIAL
   LOT AREA MINIMUM = 2 ACRES
   LOT FRONTAGE MINIMUM = 200'
   BUILDING SETBACKS (MINIMUM):
     FRONT SETBACK = 70'
     SIDE SETBACK = 50'
     REAR SETBACK = 50'
   MAX. BUILDING HEIGHT = 70'
   MAX. BUILDING COVERAGE = 50%
   MIN. OPEN SPACE = 20%
   OPEN SPACE PROVIDED = 161,600 S.F. = 55.8% OF LOT 7; 346,620 S.F. = 100% OF LOT 7-1
   BUILDING COVERAGE PROVIDED = 75,000 S.F. = 25.9% OF LOT 7; 0 S.F. = 0% OF LOT 7-1
3. THE FOLLOWING WAIVERS ARE REQUESTED FROM THE CITY OF PORTSMOUTH SUBDIVISION REGULATIONS:
   SECTION IX.1 – IMPROVEMENTS AND INSTALLATION BONDS
   SECTION IX.2 – MAINTENANCE BONDS
4. THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON-SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED.
5. THE SUBJECT PARCEL IS NOT LOCATED WITHIN AN AREA HAVING A SPECIAL FLOOD HAZARD AREA DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, ON FLOOD INSURANCE RATE MAP NO. 33015C0270E, WITH EFFECTIVE DATE OF MAY 17, 2005.
6. ALL MONUMENTS TO BE SET ARE 5/8" IRON RODS WITH ALUMINUM CAPS MARKED "JONES & BEACH ENGINEERS BOUNDARY, DO NOT DISTURB, STRATHAM, N.H." AS SHOWN.
7. WETLANDS WERE DELINEATED BY GOVE ENVIRONMENTAL SERVICES, INC., DURING MARCH 2020, AND LOCATED BY THIS OFFICE
8. LANDOWNERS ARE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING PERMITTING REQUIRED UNDER THESE REGULATIONS.
9. ALL BOOK AND PAGE NUMBERS REFER TO THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
10. THE TAX MAP AND LOT NUMBERS AND ABUTTING OWNERS ARE BASED ON THE CITY OF PORTSMOUTH TAX RECORDS AND ARE SUBJECT TO CHANGE.
11. RESEARCH WAS PERFORMED AT THE TOWN OF PORTSMOUTH ASSESSORS OFFICE AND THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
12. THIS SURVEY IS NOT A CERTIFICATION TO OWNERSHIP OR TITLE OF LANDS SHOWN. OWNERSHIP AND ENCUMBRANCES ARE MATTERS OF TITLE EXAMINATION NOT OF A BOUNDARY SURVEY. THE INTENT OF THIS PLAN IS TO RETRACE THE BOUNDARY LINES OF DEEDS REFERENCED HEREON. OWNERSHIP OF ADJOINING PROPERTIES IS ACCORDING TO ASSESSOR'S RECORDS. THIS PLAN MAY OR MAY NOT INDICATE ALL ENCUMBRANCES EXPRESSED, IMPLIED OR PRESCRIPTIVE.
13. ANY USE OF THIS PLAN AND OR ACCOMPANYING DESCRIPTIONS SHOULD BE DONE WITH LEGAL COUNSEL TO BE CERTAIN THAT TITLES ARE CLEAR, THAT INFORMATION IS CURRENT, AND THAT ANY NECESSARY CERTIFICATES ARE IN PLACE FOR A PARTICULAR CONVEYANCE, OR OTHER USES.
14. NHDES ALTERATION OF TERRAIN PERMIT NO. AOT-2040, DATED 10/28/2021
    NHDES SEPTIC SYSTEM APPROVAL FOR CONSTRUCTION NO. ECA2021102913, DATED 10/29/2021
    NHDES WETLANDS BUREAU PERMIT NO. 2021-00240, DATED 12/06/2021

CERTIFICATION:

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

8/29/2023
No. 892
DAVID M. COLLIER
SIGNATURE

8/29/2023

DAVID M. COLLIER, LLS 892 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 feet

TOTAL LOT AREA
636,237 S.F.
14.61 ACRES

Design: JAC	Draft: DJM	Date: 04/21/20
Checked: JAC	Scale: AS-NOTED	Project No.: 19190.2
Drawing Name: 19190-PLAN-NEW-LAYOUT.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

REV.	DATE	REVISION	BY
1	8/30/23	REVISED PER TAC COMMENTS	DJM
0	7/17/23	ISSUED FOR REVIEW	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: **SUBDIVISION AND EASEMENT PLAN**
TAX MAP 266, LOT 7
Project: SUBDIVISION PLAN
375 BANFIELD ROAD, PORTSMOUTH, NH 03801
Owner of Record: BANFIELD REALTY LLC
304 MAPLEWOOD AVENUE, PORTSMOUTH, NH 03801

DRAWING No.
A1
SHEET 1 OF 1
JBE PROJECT NO. 19190.2

JONES&BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

August 31, 2023

Portsmouth Planning Board
Attn: Rick Chellman, Chairman
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Conditional Use Permit Criteria Letter
Case # LU-20-259
375 Banfield Road, Portsmouth, NH
Tax Map 266, Lot 7
JBE Project No. 19190.2

Dear Mr. Chellman,

Jones & Beach Engineers, Inc., respectfully submits responses to the Criteria for Approval, Section 10.1017.50 for a Conditional Use Permit on behalf of the applicant, Banfield Realty, LLC.

1. The land is reasonably suited to the use, activity or alteration.
   Response: The land is zoned Industrial and the proposal is an Industrial building, which is a conforming use. The wetland buffer impacts are for stormwater treatment of a site that currently does not have any stormwater treatment on it.

2. There is no alterative location outside the wetland buffer that is feasible and reasonable for the proposed use, active or alteration.
   Response: The impacts to the wetland buffers are for stormwater outfalls and treatment. These items have to be located in the buffer in order to treat and convey the stormwater to the wetlands. There is no other alternative for these minor impacts.

3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.
   Response: There is certainly no adverse impact on the functional values of the site. These improvements will assist in the cleaning up of this previously polluted site.

4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals; and

Response: Neither of the areas proposed for wetland buffer impacts are in a natural vegetative state. One area is near the Banfield Road where we are removing asphalt and creating a vegetative filter strip for stormwater treatment and the other is in the rear of the site where the existing solid waste disposal area has existed for decades.

5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this Section.
   Response: This proposal is the least impacting alternative to the wetland buffers. We are not proposing any impervious area and are removing existing asphalt from the buffer and replacing with vegetation.

6. Any area within the vegetated buffer strip will be returning to a natural state to the extent feasible.
   Response: Correct, all of the impact areas will be returned to a vegetative state. The area out front, will be planted and the drainage outfall swale will also be planted. We are removing existing asphalt from the wetland buffer.

If you have any questions or need any additional information, please feel free to contact our office. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.

Joseph Coronati

Joseph A. Coronati
Vice President

cc: Rob Graham, Banfield Realty, LLC (via email)
Bill Wilcox, Wilcox & Barton (via email)
Lynn Preston, Sheehan Phinney Bass & Green (via email)