Stormwater Management Report

West End Yards

Cate Street / Route 1
Portsmouth, NH 03801

APPLICANT & OWNER

Cate Street Development, LLC

11 Elkins Street
Suite 420
Boston, MA 02127

May 20, 2019

STATE OF NEW HAMPSHIRE
RICHARD R. LUNDBORN
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PROFESSIONAL ENGINEER

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Project No. 20180317.A10

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1 Executive Summary

This Stormwater Management Report describes proposed work and stormwater management associated with the re-development of the Frank Jones Center Property as well as a collection of other properties along Cate Street, located between Route 1 Bypass and Bartlett Street, Portsmouth, New Hampshire (Site). The Site is identified on the Site Location Map, Figure 1.

The results of the redevelopment of these parcels of land are as follows:

1) 1.8 Acre reduction of impervious surfaces on the 13.31 Acres being redeveloped
   a. Equivalent to a 13.6% reduction

2) 0.35 Acre reduction of impervious surface in the wetland buffer along Hodgson Brook
   a. Equivalent to a 24% reduction of impervious surface in the buffer

3) 100% Stormwater pre-treatment
   a. Currently stormwater is not pre-treated

4) 50%-100% Stormwater Treatment
   a. Currently stormwater is not treated

5) Provision of a 25 to 30-ft wide vegetated wetland buffer along the top of bank to Hodgson Brook
   a. Currently only a short section of the wetland and brook has a vegetated buffer at the top of bank

6) Increased Stormwater Infiltration both passively through restoration of vegetated areas and actively through Stormwater Management Practices such as, bioretention areas and Infiltration Chamber Galleries

7) Net reduction on stormwater runoff to Hodgson Brook and the Watershed points of Analysis, both in Flow Rate and Volume

The proposal consists of the construction of:

1) A new City Street, in essence an extension of Cate Street to Route 1 Bypass at the current intersection of Route1 Bypass, Borthwick Avenue and the Frank Jones Center driveway

2) A multi-use / Bike Trail along the alignment of the new City Street from Route 1 Bypass to Bartlett Street.

3) A Dog Park

4) New greenspaces throughout the site

5) A 20,000-sf footprint Retail / Commercial / Office Building in the current location of the Frank Jones Center. Gross floor space of 40,000-sf over 2 floors

6) 2, 4 story Apartment Buildings providing a total of 325 apartment units

7) 23 Townhomes

8) Parking for all of the uses above Commercial, Office and Residential

Existing and proposed hydrologic conditions for the development of the project Site were evaluated to compare existing and proposed stormwater peak discharges and volumes. The evaluation demonstrates a net decrease in peak stormwater discharge and volume for the 2-year, 10-year, 25-year, and 100-year storm events.

1.1 Revisions

The following revisions are present in this Stormwater Management Report:

1. Tables 1.1, 1.2 and Tables 2.1 and 2.2 summarizing the results at the Analyses Points.
2. Appendix E - BMP Work Sheets
3. Appendix F - Revised HydroCAD Calculations
4. Appendix G - Rip Rap Outlet Protection Calculations
5. Appendix I - Infiltration Feasibility Report Items have been provided in Appendix I. These consist of a Test Pits with ESHWT, and Ksat calculations by McPhail Associates.

2 Project Description

2.1 Existing Conditions

The Site, 13.3 Acres of commercial land, is located east of U.S. Route 1 Bypass in Portsmouth, New Hampshire (Refer to Figure 1). Existing Site features include the Frank Jones Center and an accessory building on Tax Map 172 Lot 1, parking area on Tax Map 173 Lot 2, 2 industrial buildings on Tax Map 165 Lot 2, The PK Brown contractor yard and buildings on Tax Map 163 Lot 34, a House and outbuildings on Tax Map 163 Lot 33, and City Land occupied by Cate Street and a pocket of woods.

2.1.1 Site Parameters

A review of Federal, state, and local requirements for the Site generated the following results:

- The Site lies outside the 500-year flood plain, denoted as "Zone X" on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Community Panel Number 33015C0259E, May 17, 2005.

- The Site is free of Endangered Flora or Fauna Habitat that would be directly affected by the project per the New Hampshire Natural Heritage Bureau (NHB). Refer to Appendix C.

- Freshwater wetland resources exist on and adjacent to the property. Resource area delineations were completed by Luke Hurley, CWS, CSS of Gove Environmental Services, Inc. and are included on the plans. These Wetlands are subject to a 100-ft wetland buffer.

2.1.2 Soils

The Site is characterized by Natural Resources Conservation Service (NRCS, formerly SCS) as Urban land-Canton complex, which is classified as Hydrological Soil Group (HSG) D. A websoil survey of the soils within the Site can be found in Appendix C.

A Site Specific Soils Mapping (SSSM) has been prepared for the site by Luke Hurley, CWS, CSS of Gove Environmental Services, Inc. Based upon the mapping the site has been mapped as:

> *400A Udorthents, sandy or gravelly*
> This map unit typically includes the following concepts: 1) very gravelly (> 35%) sand or very gravelly loamy sand; Or 2) sand or loamy sand textures that may have lenses of loamy very fine sand or finer somewhere in the particle-size class control section (25 - 100 cm or 10 - 40"). Saturated hydraulic conductivity (Ksat) is high or very high. Drainage class ranges from excessively drained to somewhat poorly drained. Typical gravel pit.

Mr. Hurley has offered that this would equate to an Eldridge NRCS, 38 Hydrologic Soils Group (HSG) C. According to this guidance we have used HSG C for the drainage analysis.

Hydraulic conductivity has been confirmed by McPhail Associates, Inc., the team Geotechnical Engineers.

ESHWT has been confirmed by Testpit in each stormwater practice using infiltration.

2.2 Proposed Conditions

The redevelopment of the site, will reduce impervious cover by13.6% over the entire site area and greatly improve the stormwater collection, conveyance, treatment and ability to provide groundwater recharge on site. The practices implemented to accomplish this are discussed further in section 3.3.

2.2.1 Design Elements

The following measures have been incorporated in the project design to control the peak stormwater runoff rate, provide recharge, and treat stormwater generated by the site:

- Best Management Practices Designed in accordance with the City of Portsmouth regulations and the NHDES Stormwater Manual;

- An Erosion and Sediment Control plan has been developed that will prevent direct discharges to wetlands, and avoid or minimize channelized stormwater flow directly into wetland resource areas;

- Land disturbance and grading shall be conducted in a selective manner and appropriate construction BMPs are incorporated to preclude construction period runoff/erosion;

- Top soil is preserved or supplemented sufficient to maintain vegetation cover;

- All conveyances and outfalls are dissipated outside of wetland areas; and

- No work is proposed in Essential or Significant Wildlife Habitats or fisheries habitats, as identified by the NHB.

3 Hydrologic Analysis

The hydrologic analyses for existing and proposed conditions were completed using HydroCAD version 10.00-20 to determine peak runoff flow rates and total runoff volumes for the watershed models. HydroCAD is based on the NRCS Technical Release 20 and Technical Release 55, and is subject to cumulative rainfall/volume dependent routing calculations. Hydrographs are prepared for each element of the watershed and routed through the dynamic-storage-indication method to produce various time-based results.
Labeling on the drainage plans and HydroCAD diagrams is as follows:

- Subcatchments – represented by hexagons
- Ponds – represented by triangles
- Reaches and Analysis Points – represented by squares
- Time of Concentration – represented by circles with letters and flow lines

The Pre and Post-Development hydrologic analysis has been included in Appendix F.

3.1 Existing Watershed Summary

The majority of stormwater runoff from the existing on-site development is conveyed via the cities stormwater runoff system which runs south to north along U.S. Route 1 Bypass. The stormwater system and the outfalls into Hodgson Brook are designated as Analysis Point AP1. A small portion of stormwater flows offsite and is designated as Analysis Point AP2. All soils on Site are hydrologic soils group C.

14 subwatersheds have been established for the project's pre-development conditions. Refer to the Pre-Development Subwatershed Plan included as Figure 3.

3.2 Proposed Watershed Summary

Post-development stormwater management features have been located and designed to imitate a more natural distribution of stormwater over the site than what exists today due to the extreme amount of impervious coverage. Stormwater is conveyed via closed drainage system to one of the following:

- Water Quality Unit followed by a vegetated swale and level spreader
- Bioretention areas
- Subsurface Infiltration Chamber galleries

Overflow stormwater leaves the infiltration practices in large storm events and flows to either Hodgson Brook or the City closed Drainage system on Bartlett Street via overflow pipes tied to the proposed closed drainage system.

42 subwatersheds have been established for the project's post-development conditions. Refer to the Post-Development Subwatershed Plan included as Figure 4.

3.3 Best Management Practices

BMPs have been incorporated into the proposed Site improvements in order to protect natural resources from point source stormwater releases associated with the development. The following sections discuss the various BMP's employed.

3.3.1 Off-line Closed Drainage System

A project of this size will inevitably require a closed drainage stormwater collection system employing catch basins, drain manholes and pipe to route stormwater to locations on site available to treat and control it prior to release to downstream areas in the watershed.

There are two common types of closed drainage systems employed In-line and Off-line.

In an in-line closed drainage system, stormwater is collected by catch basins that are connected to each other in series as the system moves down gradient across the site. This type of system re-suspends any solids that settle in the downstream catch basin sumps as flow from upstream catch basins are conveyed through them. Ultimately, this provides little to no pre-treatment of suspended solids.

The proposal utilizes an off-line closed drainage system. In an off-line system, stormwater is collected by catch basins that are then connected to a "drain main" via drain manholes. The sump of each catch basin is then able to retain the suspended solids that enter the catch basin without being re-suspended by flow from another catch basin flowing through it. The proposal also implements catch basins that are “hooded”. The hoods are accessories that are mounted to the wall of the catch basin over the invert out that extend about 1-ft below the invert which help to retain floating solids and help settle sediment in the sump of the catch basin.

3.3.2 Bioretention Basins (Rain Gardens)

Bioretention areas are being employed to treat and control stormwater along the new City Street on the north side. The bioretention areas are located at the curve in the road at the east end of the site.

Bioretention basins utilize biologic actions that take place in all soil cross sections to treat stormwater. The soil in a bioretention basin, commonly referred to as a rain garden is a specific tested mix of soils components that create a soil with a very specific infiltration rate and organic soil / sand mix. Bioretention basins can be constructed in any existing soil condition.

Due to high

The proposal employs bioretention basins that provide some infiltration and groundwater recharge and are also equipped with underdrains to ensure that stormwater does not remain ponded for more than 72 hours.

3.3.3 Subsurface Infiltration Chambers

Subsurface Chambers are being used by this proposal. Particularly, Stormtech SC740 chambers. These chambers consist of high density poly ethylene (HDPE) arches embedded in clean washed stone. The chambers provide superior storage and the stone provides both storage and a stable interface with the in-situ soils the chamber gallery is constructed in. Stormtech Chamber systems provide an additional amount of pre-treatment in one row of chambers called the isolator row. Stormwater is directed to the isolator row first and flows laterally through perforations to the chambers and stone adjacent to it. The isolator row is constructed on top of filter fabric allowing any sediment finding its way to the chambers to be trapped and kept out of the stone. With adequate separation to ESHWT and acceptable Ksat rates, infiltration can be employed to allow the stormwater to recharge the groundwater.

After extensive soils mapping efforts, including a joint site visit for test pits and logging by the Soils Scientist form Gove Environmental Services and the Geotechnical Engineer from McPhail Associates, Infiltration Basin locations have been selected. Infiltration Basins 1, 2 and 3 take advantage of the outwash material in the center area of the site. The 3 infiltration basins have been sized using an average Ksat from the 3 test pits in their vicinity. Test pits 108, Test pit 109 and Test pit 110. See below for summary of Ksats and the Ksat(design) used.

Ksat108 = 3.47243 in/hr
Ksat109 = 0.52016 in/hr
Ksat110 = 1.82834 in/hr

Ksat(avg) = 1.19031 in/hr Factor of safety = 2.0 Ksat(design) = 0.97 in/hr

It should be noted that the infiltration basins will all be within the native soils represented by Test pit 108. All fill material will be excavated out. The implementation of design using Ksat based on an average of the 3 test pit rates accounts for possible contamination.

The area of surface drainage at the Townhouse portion of the project is in a clayey area of the property and due to this will employ lined subsurface chamber fields for detention. The chamber fields will have underdrains to ensure they drain fully.

3.3.4 Water Quality Unit (WQU)

A Water Quality Unit is being provided in the design just prior to the treatment swale and level spreader that allows discharge of stormwater from the closed drainage system to outlet to Hodgson Brook. The WQU will ensure maximum suspended solids removal ahead of stormwater release to the brook.

3.3.5 Treatment Swale with Level Spreader

A treatment swale and level spreader are provided at the outfall of the closed drainage system ahead of Hodgson Brook to ensure energy in the stormwater is dissipated prior to release.

3.3.6 Vegetated Buffer

The design as proposed provides a vegetated buffer along the alignment of the new City Street between the multi-use / bike trail and the top of bank to Hodgson Brook. While this is an improvement, it cannot be claimed as a treatment practice under the NHDES Stormwater rules because it is note deep enough.

3.4 Hydrologic Analysis Results

Today the stormwater generated on site either flows to Hodgson Brook at Analysis Point AP1 or to the City Closed Drainage system in Cate Street hat is connected to the system in Bartlett Street denoted by Analysis Point AP2. The Pre development site is highly impervious, developed with buildings and paved areas.

The post-development decrease in impervious ground cover and proposed BMPs will attenuate peak flows from the Site. The proposed improvements will result in a net decrease to the Analysis Points AP 1 and AP2 in peak stormwater discharge for the 2-year, 10-year, 25-year, and 100-year 24-hour storm events, as compared to the existing conditions peak stormwater flowrate. The following tables summarize existing vs. proposed stormwater flows for the watershed analysis.

Table 1.1: AP1 Peak Stormwater Flowrate Results at Analysis Point

Design Storm	Existing Flow (cfs)	Proposed Flow (cfs)	Net Change (cfs)
2-year	22.37	20.54	-1.83
10-year	37.07	35.02	-2.05
25-year	48.76	45.52	-3.24
50-year	59.67	55.20	--4.47
100-year	72.87	67.66	-5.21

Table 1.2: AP1 Total Stormwater Volume Results at Analysis Point

Design Storm	Existing Volume (cf)	Proposed Volume (cf)	Net Change (cf)
2-year	84,552	71,941	-12,611
10-year	140,147	123,508	-16,639
25-year	184,888	165,354	-19,534
50-year	227,114	205,063	-22,051
100-year	278,464	253,550	-24,914

Table 2.1: AP2 Peak Stormwater Flowrate Results at Analysis Point

Design Storm	Existing Flow (cfs)	Proposed Flow (cfs)	Net Change (cfs)
2-year	15.78	7.16	-8.62
10-year	25.01	14.09	-10.92
25-year	32.19	19.81	-12.38
50-year	38.85	23.69	-15.16
100-year	46.86	42.73	-4.13

Table 2.2: AP2 Total Stormwater Volume Results at Analysis Point

Design Storm	Existing Volume (cf)	Proposed Volume (cf)	Net Change (cf)
2-year	54,148	35,135	-19,013
10-year	88,033	65,147	-22,886
25-year	114,867	64,719	-50,148
50-year	139,997	113,136	-26,861
100-year	170,395	139,772	-30,623

As can be seen the re-development of the site affords a unique opportunity to reduce stormwater flows both in rate and volume to a taxed waterway and an existing City Storm Drain.

3.4.1 Groundwater Recharge Volume

The Groundwater Recharge Volume (GRV) required for this project is very small. The Impervious surface areas used to calculate the value were taken directly from HydroCAD. HydroCAD did not consider the large gravel area on the eastern side of the site to be impervious. If it were the project would have a negative GRV requirement. The paved, buildings and sidewalk surfaces in the post-development are almost an even match to the pre-development. GRV(required) is equal to 60-cf. See Appendix E.

The subsurface infiltration basins proposed far exceed the 60-cf of GRV in infiltrated stormwater.

4 Soil Erosion and Sedimentation Control

Soil erosion and sedimentation control details and narratives for construction periods are provided in the Site plans and the Stormwater Pollution Prevention Plan (SWPPP) which will be prepared and provided as the project is submitted to NHDES for an AoT Permit. Soil erosion and sedimentation control details and procedures are consistent with the NHDES best management Practices for Erosion and Sediment Control.

Erosion and sedimentation controls used on the Site during construction will include silt fence, check dams, hay bales, a construction entrance, and water for dust control. Additional erosion and sediment controls will be utilized as required. Silt fence and hay bales will be placed down-gradient of disturbed areas and up-gradient of wetlands. A construction entrance will be installed to ensure sediment does not get tracked onto US Route 1 Bypass or Bartlett Street.

Water will be applied to exposed soils to provide dust control as needed.
The schedule for the commencement or cessation of construction activities, grading, and soil stabilization measures ceased on a portion of the Site, and stabilization measures initiated, shall be recorded and maintained as part of the SWPPP.

4.1 Construction Support Activities

Waste materials generated from construction activities will include excavated soil, brush, asphalt, and building demo debris. All excavation debris and other waste will be transported to an approved disposal facility. If required, materials may be temporarily stockpiled within designated staging areas. Details and procedures are provided in the construction Site plans. Construction materials will be present on-site during various stages of construction. All materials will be temporarily stored within designated staging or lay-down areas and will be transported to the Site as needed. Construction vehicle fueling will take place at a designated staging area only. Staging areas will be located within the limit of work, outside the wetlands located on-site.

5 Summary

This Stormwater Management Report describes proposed work and stormwater management associated with the re-development of the Frank Jones Center and assembled properties.

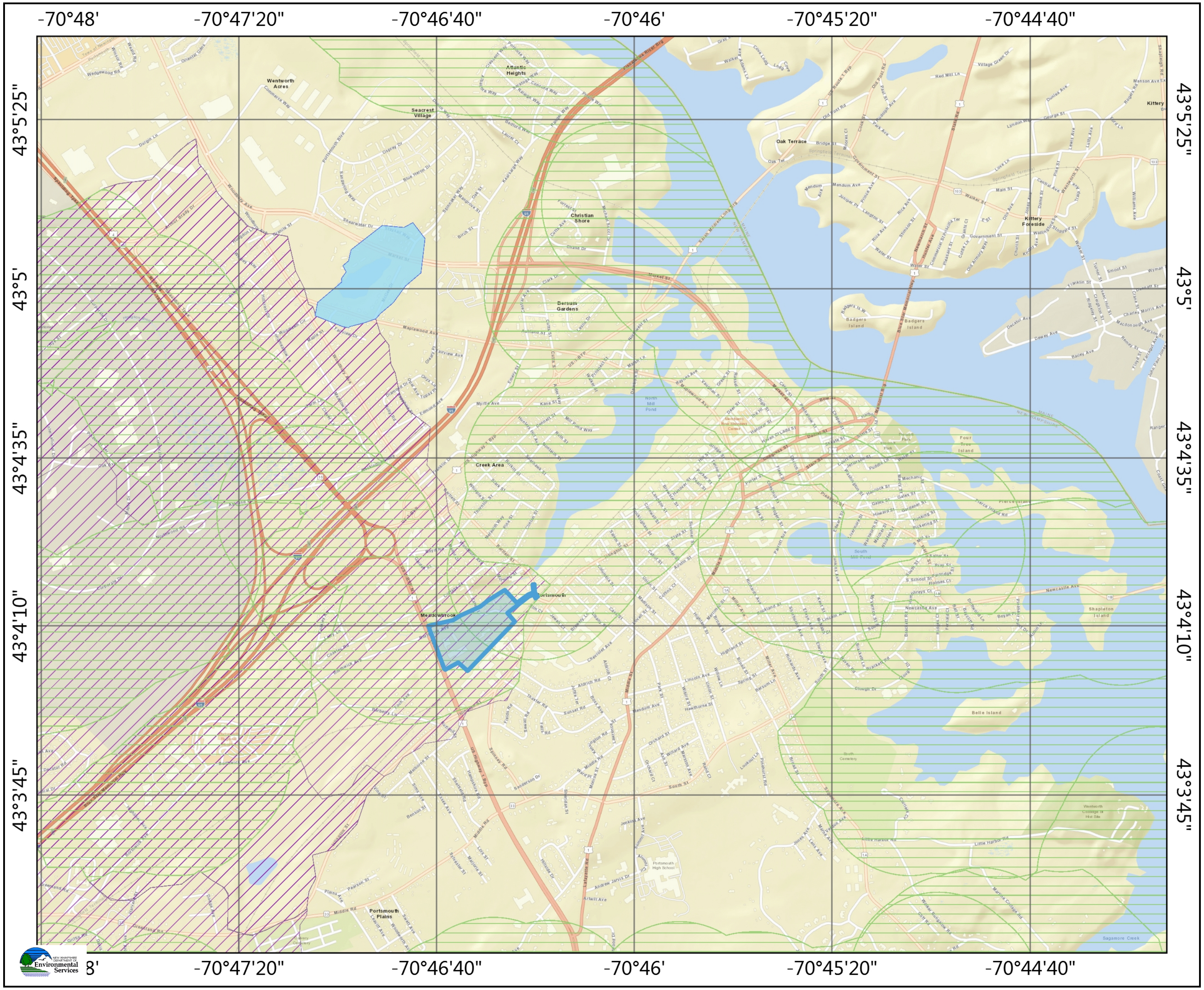
The proposed Site improvements will decrease post-development peak stormwater runoff rates and volumes. 2 bioretention areas and 4 subsurface infiltration galleries as well as an offline closed drainage system and a vegetated swale and level spreader all work together to accomplish the improvements.

Appendix A

NHDES WebGIS Printouts; Surface Water Impairments

NHDES WebGIS Printouts; AOT Screening Layers

Surface Water Impairments



Legend

- Designated Rivers Quarterm Buffer
- All Lakes, with a Quarter Mil Buffer
- Surface Waters with Impairn 2016 with Quarter Mile Buffe
- Watersheds with Chloride Impairments 2016

Map Scale

1: 24,000

Map Generated: 5/19/2019

Notes

Details

- AUID

  NHRIV600031001-04
- Shape

  N/A
- FID

  388
- Waterbodyi

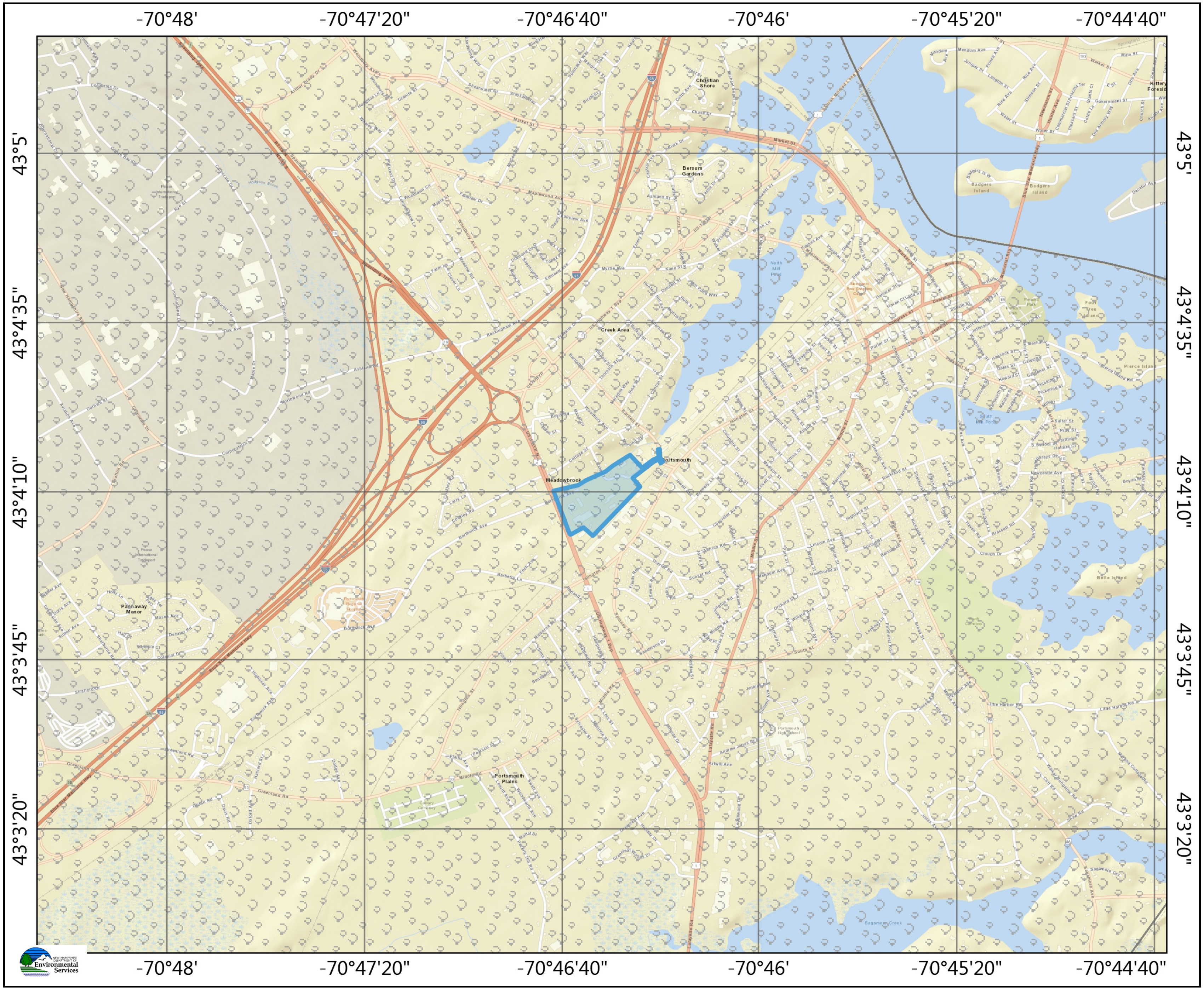
  NHRIV600031001-04
- Beach

  N
- Waterbodyn

  LOWER HODGSON BROOK
- Impairment

  Benthic-Macroinvertebrate Bioassessments (Streams), Chloride, Dissolved oxygen saturation, Escherichia coli, Dissolved Oxygen (mg/L)

Coastal and Great Bay Communities



Legend

Coastal and Great Bay Regi Communities

Designated Rivers Quarterm Buffer

Map Scale

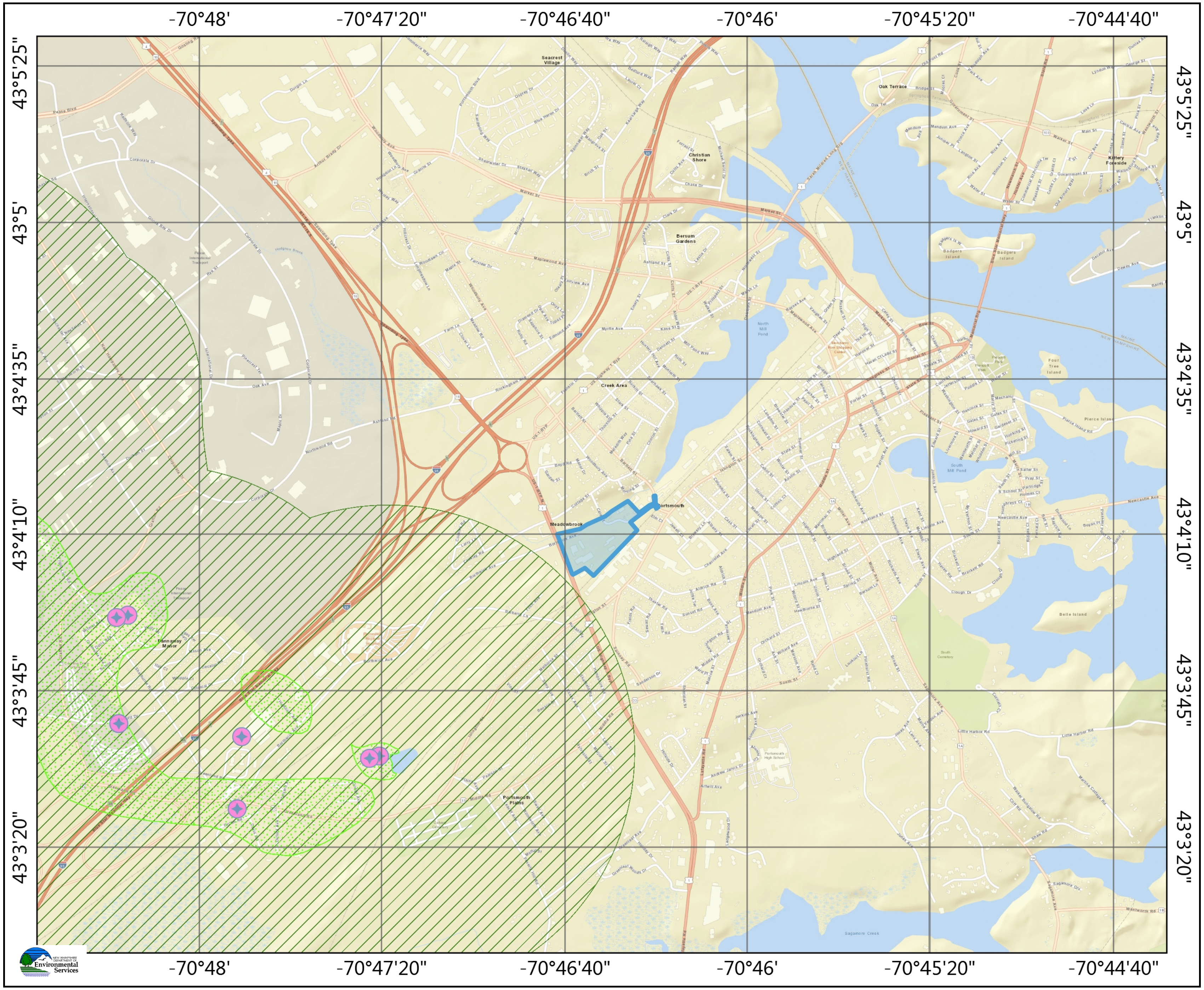
1: 24,000

© NH DES, http://des.nh.gov

Map Generated: 5/19/2019

Notes

Groundwater Protection Areas



Legend

- Designated Rivers Quarterm Buffer
- Public Water Supply Wells
- Groundwater Classification / GA1
- Groundwater Classification / GA2
- Water Supply Intake Protect Areas
- Wellhead Protection Areas

Map Scale

1: 25,977

© NH DES, http://des.nh.gov

Map Generated: 5/19/2019

Notes

Appendix B

NHB Letter

To: James Andretta
14 High Street
Wiscasset, ME 04578

Date: 4/13/2018

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 4/13/2018

NHB File ID: NHB18-1167

Applicant: Rick Lundborn

Location: Tax Map(s)/Lot(s): 172 Lot 1, 165 Lot 2, 163 Lot 34, 163 Lot 33, 173 Lot 2
Portsmouth

Project Description: Cate Street Development

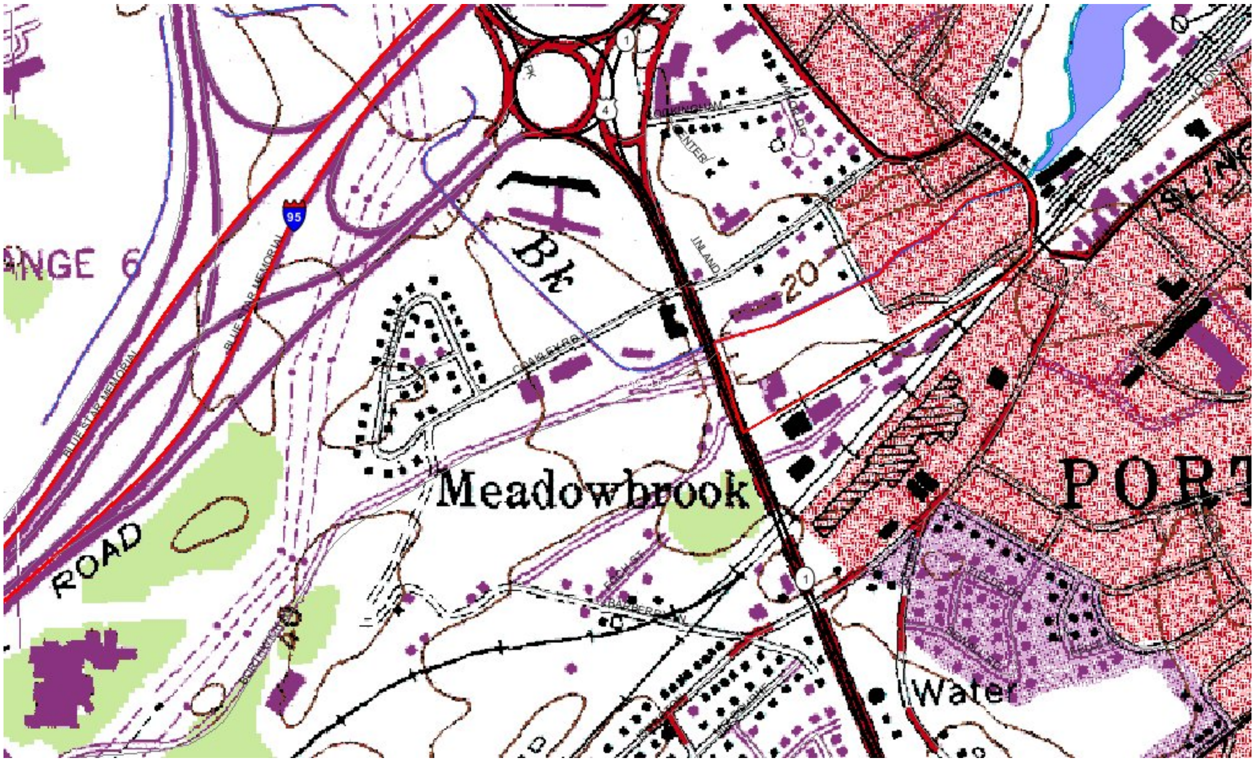
The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

This report is valid through 4/12/2019.

New Hampshire Natural Heritage Bureau

MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB18-1167



Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DRED/NHB
172 Pembroke Road
Concord NH 03301

Appendix C

NRCS Soil Survey Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Rockingham County, New Hampshire

April 16, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

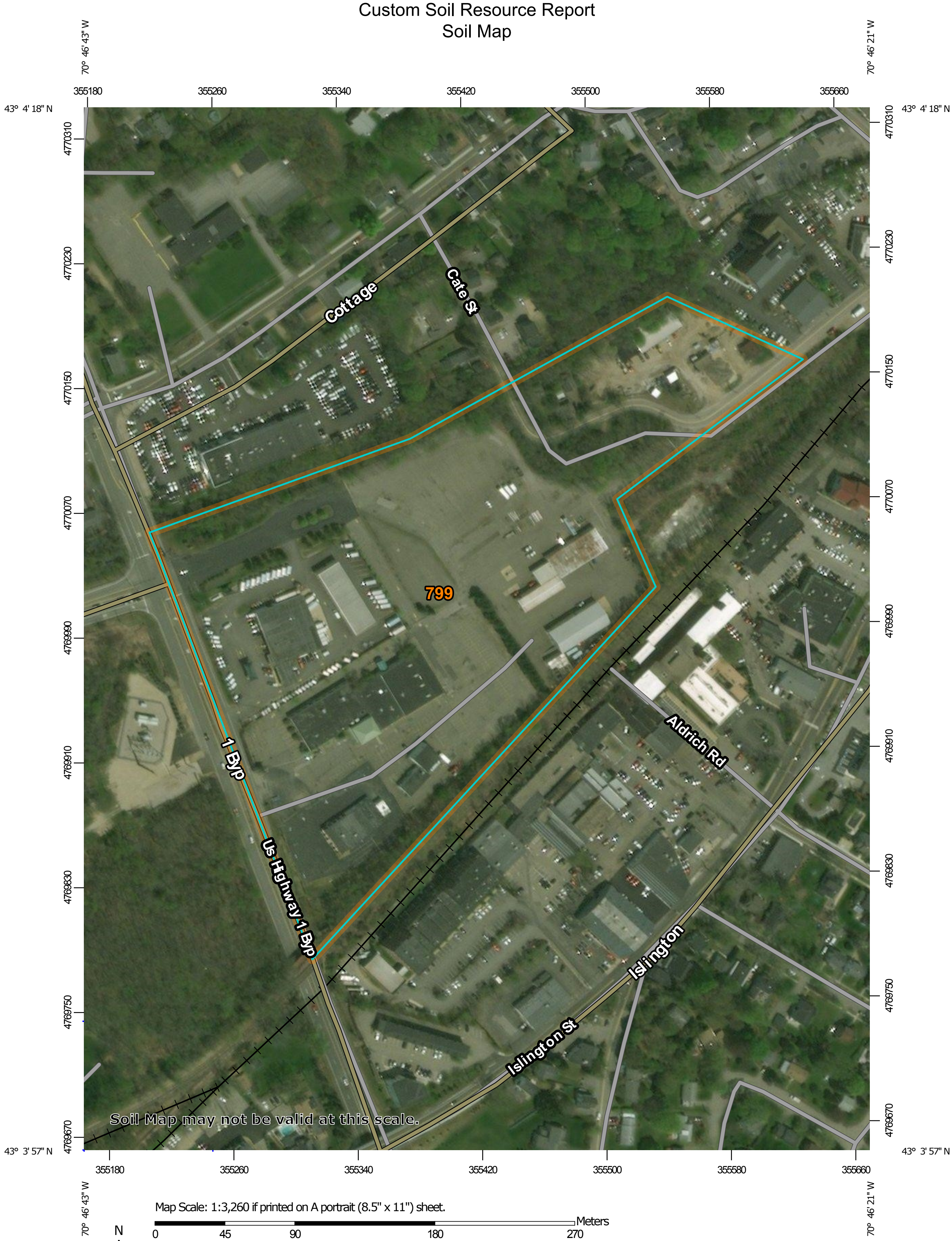
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:3,260 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 45, 90, 180, 270

Feet: 0, 150, 300, 600, 900

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 19, Sep 11, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 12, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
799	Urban land-Canton complex, 3 to 15 percent slopes	18.4	100.0%
Totals for Area of Interest		**18.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Rockingham County, New Hampshire

799—Urban land-Canton complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9cq0
Elevation: 0 to 1,000 feet
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Canton and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Parent material: Till

Typical profile

H1 - 0 to 5 inches: gravelly fine sandy loam
H2 - 5 to 21 inches: gravelly fine sandy loam
H3 - 21 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 5 percent
Hydric soil rating: No

Boxford and eldridge

Percent of map unit: 4 percent
Hydric soil rating: No

Squamscott and scitico

Percent of map unit: 4 percent
Landform: Marine terraces
Hydric soil rating: Yes

Chatfield

Percent of map unit: 4 percent
Hydric soil rating: No

Scituate and newfields

Percent of map unit: 4 percent
Hydric soil rating: No

Walpole

Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

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Appendix D

Aerial Photograph

Site Photographs

Cate Street Redevelopment: Existing Conditions Photo Key

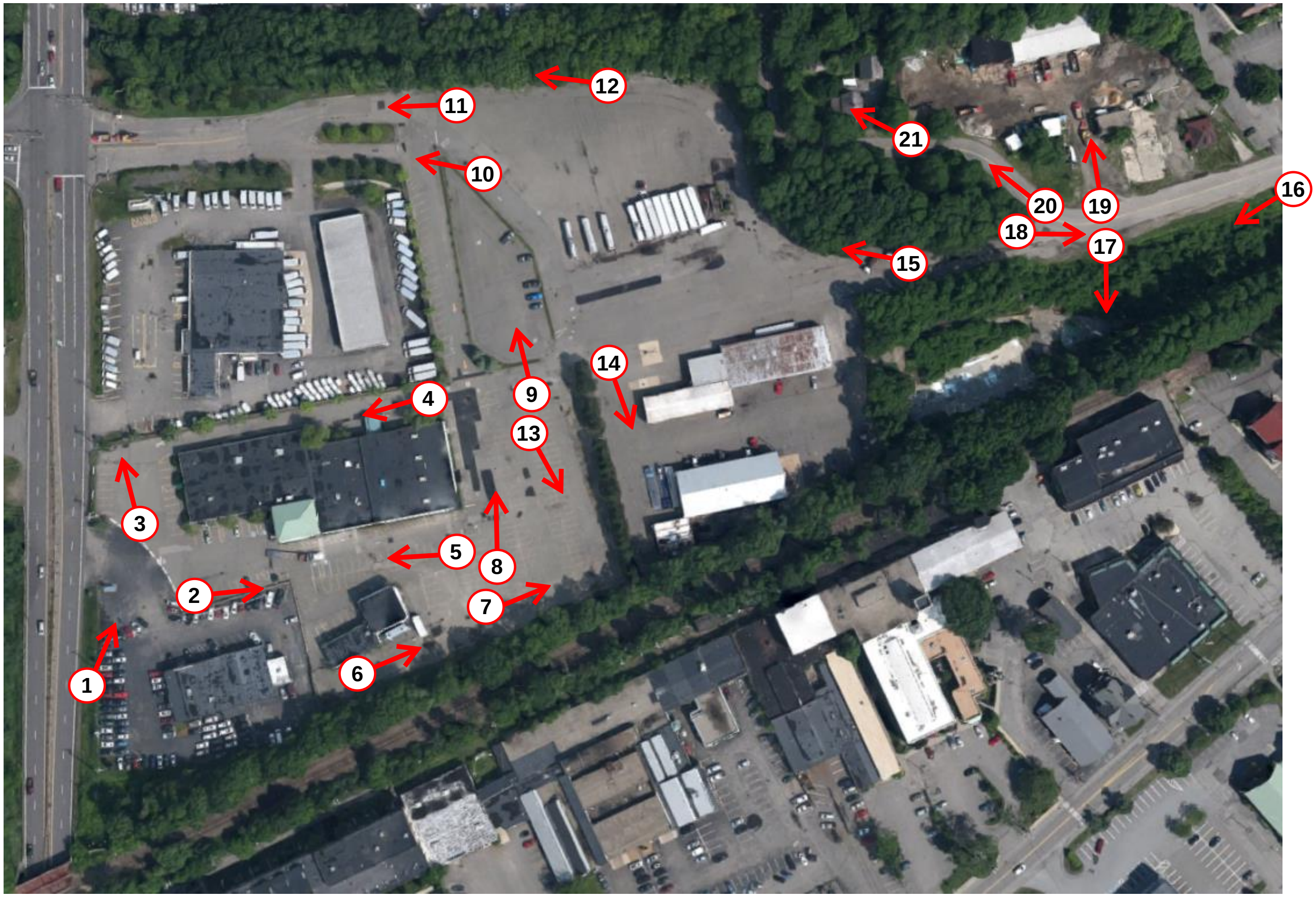


Photo 1
View looking north at Frank Jones Center

Photo 2
Rear of Frank Jones Center looking northeast

Photo 3
Parking area between Frank Jones center and Route 1 looking northwest

Photo 4
Front side of Frank Jones Center looking southwest towards Route 1

Photo 5
Rear of Frank Jones Center looking southwest towards Route 1

Photo 6
Building behind Frank Jones Center and railroad tracks looking northeast

Photo 7
Main parking lot at Frank Jones Center looking northeast

Photo 8
Main parking lot at Frank Jones Center looking northwest

Photo 9
Middle Parking area looking northwest

Photo 10
Looking west on Borthwick Ave towards Route 1

Photo 11
View from Borthwick Ave looking towards Route 1

Photo 12
View of Hodgson Brook looking west

Photo 13
Main parking lot at Frank Jones Center looking southeast

Photo 14
View of existing buildings looking southeast

Photo 15

Access road off Cate Street looing west

Photo 16

Current construction south of Cate Street looing southwest

Photo 17
Current construction south of Cate Street looing southeast

Photo 18
Current construction south of Cate Street looing northeast

Photo 19
Existing buildings north of Cate Street

Photo 20
Cate Street looking northeast

Photo 21
Existing house on Cate Street

Appendix E

Groundwater Recharge Volume Calculations

BMP Worksheets

Groundwater Recharge Volume (GRV) Calculation

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.17	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.10	inches	Rd = weighted groundwater recharge depth	
0.0167	ac-in	GRV = AI * Rd	
60	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **BIORETENTION BASIN 1**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

YES		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
0.12	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.50	decimal	I = percent impervious area draining to the practice, in decimal form	
0.50	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.06	ac-in	WQV= 1" x Rv x A	
211	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
53	cf	25% x WQV (check calc for sediment forebay volume)	
159	cf	75% x WQV (check calc for surface sand filter volume)	
Flow-Through Device		Method of Pretreatment? (not required for clean or roof runoff)	
53	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
1,620	sf	A_{SA} = surface area of the practice	
2.41	iph	I_{DESIGN} = design infiltration rate[1]	
YES	Yes/No	If I_{DESIGN} is < 0.50 iph, has an underdrain been provided?	
0.6	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
13.67	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
12.67	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
16.40	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
12.40	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
1.27	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
(2.73)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
16.11	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
17.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← **yes**
1,966	cf	V = volume of storage[3] (attach a stage-storage table)	← **≥ WQV**
18.0	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	CD511	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	← ≥3:1
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← 5:1
	inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet	L SHTS	Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

System Is Lined with UnderDrain

Stage-Area-Storage for Pond 27 BRB1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
15.50	1,013	0	16.58	1,443	1,323
15.52	1,021	20	16.60	1,452	1,352
15.54	1,028	41	16.62	1,460	1,381
15.56	1,036	61	16.64	1,468	1,411
15.58	1,043	82	16.66	1,476	1,440
15.60	1,051	103	16.68	1,485	1,470
15.62	1,058	124	16.70	1,493	1,499
15.64	1,066	146	16.72	1,501	1,529
15.66	1,074	167	16.74	1,510	1,560
15.68	1,082	188	16.76	1,518	1,590
15.70	1,089	210	16.78	1,526	1,620
15.72	1,097	232	16.80	1,535	1,651
15.74	1,105	254	16.82	1,543	1,682
15.76	1,113	276	16.84	1,552	1,713
15.78	1,121	299	16.86	1,560	1,744
15.80	1,129	321	16.88	1,569	1,775
15.82	1,136	344	16.90	1,577	1,806
15.84	1,144	367	16.92	1,586	1,838
15.86	1,152	389	16.94	1,594	1,870
15.88	1,160	413	16.96	1,603	1,902
15.90	1,168	436	16.98	1,611	1,934
15.92	1,176	459	17.00	**1,620**	**1,966**
15.94	1,185	483			
15.96	1,193	507			
15.98	1,201	531			
16.00	1,209	555			
16.02	1,217	579			
16.04	1,225	603			
16.06	1,232	628			
16.08	1,240	653			
16.10	1,248	678			
16.12	1,256	703			
16.14	1,264	728			
16.16	1,272	753			
16.18	1,280	779			
16.20	1,288	804			
16.22	1,296	830			
16.24	1,304	856			
16.26	1,312	882			
16.28	1,320	909			
16.30	1,328	935			
16.32	1,336	962			
16.34	1,345	989			
16.36	1,353	1,016			
16.38	1,361	1,043			
16.40	1,369	1,070			
16.42	1,378	1,098			
16.44	1,386	1,125			
16.46	1,394	1,153			
16.48	1,403	1,181			
16.50	1,411	1,209			
16.52	1,419	1,237			
16.54	1,427	1,266			
16.56	1,435	1,295			

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **BIORETENTION BASIN 2**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
0.28	ac	A = Area draining to the practice	
0.18	ac	A_I = Impervious area draining to the practice	
0.63	decimal	I = percent impervious area draining to the practice, in decimal form	
0.62	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.17	ac-in	WQV= 1" x Rv x A	
634	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
159	cf	25% x WQV (check calc for sediment forebay volume)	
476	cf	75% x WQV (check calc for surface sand filter volume)	
Flow-Through Device		Method of Pretreatment? (not required for clean or roof runoff)	
159	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
2,215	sf	A_{SA} = surface area of the practice	
2.41	iph	I_{DESIGN} = design infiltration rate[1]	
YES	Yes/No	If I_{DESIGN} is < 0.50 iph, has an underdrain been provided?	
1.4	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
16.67	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
15.67	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
20.40	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
17.73	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
(1.06)	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
(3.73)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
18.27	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
19.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← **yes**
2,826	cf	V = volume of storage[3] (attach a stage-storage table)	← **≥ WQV**
18.0	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	CD511	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	← ≥3:1
Sheet	L SHTS	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← 5:1
	inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 41 BRB2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
17.50	1,563	0	18.58	2,027	1,935
17.52	1,571	31	18.60	2,036	1,976
17.54	1,579	63	18.62	2,044	2,017
17.56	1,588	95	18.64	2,053	2,058
17.58	1,596	126	18.66	2,062	2,099
17.60	1,604	158	18.68	2,071	2,140
17.62	1,612	191	18.70	2,080	2,182
17.64	1,621	223	18.72	2,089	2,223
17.66	1,629	255	18.74	2,098	2,265
17.68	1,637	288	18.76	2,106	2,307
17.70	1,646	321	18.78	2,115	2,350
17.72	1,654	354	18.80	2,124	2,392
17.74	1,663	387	18.82	2,133	2,435
17.76	1,671	420	18.84	2,142	2,477
17.78	1,680	454	18.86	2,151	2,520
17.80	1,688	488	18.88	2,160	2,563
17.82	1,697	521	18.90	2,169	2,607
17.84	1,705	555	18.92	2,179	2,650
17.86	1,714	590	18.94	2,188	2,694
17.88	1,722	624	18.96	2,197	2,738
17.90	1,731	658	18.98	2,206	2,782
17.92	1,739	693	19.00	**2,215**	**2,826**
17.94	1,748	728	19.02	2,215	2,826
17.96	1,757	763	19.04	2,215	2,826
17.98	1,765	798	19.06	2,215	2,826
18.00	1,774	834	19.08	2,215	2,826
18.02	1,782	869	19.10	2,215	2,826
18.04	1,791	905	19.12	2,215	2,826
18.06	1,799	941	19.14	2,215	2,826
18.08	1,808	977	19.16	2,215	2,826
18.10	1,817	1,013	19.18	2,215	2,826
18.12	1,825	1,050	19.20	2,215	2,826
18.14	1,834	1,086	19.22	2,215	2,826
18.16	1,842	1,123	19.24	2,215	2,826
18.18	1,851	1,160	19.26	2,215	2,826
18.20	1,860	1,197	19.28	2,215	2,826
18.22	1,868	1,234	19.30	2,215	2,826
18.24	1,877	1,272	19.32	2,215	2,826
18.26	1,886	1,309	19.34	2,215	2,826
18.28	1,895	1,347	19.36	2,215	2,826
18.30	1,903	1,385	19.38	2,215	2,826
18.32	1,912	1,423	19.40	2,215	2,826
18.34	1,921	1,462	19.42	2,215	2,826
18.36	1,930	1,500	19.44	2,215	2,826
18.38	1,939	1,539	19.46	2,215	2,826
18.40	1,947	1,578	19.48	2,215	2,826
18.42	1,956	1,617	19.50	2,215	2,826
18.44	1,965	1,656			
18.46	1,974	1,695			
18.48	1,983	1,735			
18.50	1,992	1,775			
18.52	2,001	1,815			
18.54	2,009	1,855			
18.56	2,018	1,895			

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Underground Infiltration Basin #1**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
0.85	ac	A = Area draining to the practice	
0.85	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.81	ac-in	WQV= 1” x Rv x A	
2,940	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
735	cf	25% x WQV (check calc for sediment forebay volume)	
N/A		Method of pretreatment? (not required for clean or roof runoff)	
-	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← $\geq$ 25%WQV
1,100	cf	V = volume[1] (attach a stage-storage table)	← $\geq$ WQV
3,889	sf	A_{SA} = surface area of the bottom of the pond	
0.97	iph	I_{DESIGN} = design infiltration rate[2]	
3.5	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← $\leq$ 72-hrs
20.50	feet	E_{BTM} = elevation of the bottom of the basin	
17.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
13.80	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.50	feet	D_{SHWT} = separation from SHWT	← $\geq$ *[3]
6.7	feet	D_{ROCK} = separation from bedrock	← $\geq$ *[3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← $\geq$ 24"
N/A	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
Yes	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
N/A		If a trench is proposed, material in trench	
Stone		If a basin is proposed, basin floor material	
No	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
0.0	:1	If a basin is proposed, pond side slopes	← $\geq$3:1
22.20	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
23.48	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
24.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation $\leq$ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation $\leq$ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See Env-Wq 1504.14 for requirements for determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Stage-Area-Storage for Pond IB1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
20.50	**3,889**	0
20.55	3,889	78
20.60	3,889	156
20.65	3,889	233
20.70	3,889	311
20.75	3,889	389
20.80	3,889	467
20.85	3,889	544
20.90	3,889	622
20.95	3,889	700
21.00	3,889	778
21.05	3,889	939
21.10	3,889	1,100
21.15	3,889	1,261
21.20	3,889	1,421
21.25	3,889	1,581
21.30	3,889	1,741
21.35	3,889	1,900
21.40	3,889	2,058
21.45	3,889	2,216
21.50	3,889	2,373
21.55	3,889	2,529
21.60	3,889	2,685
21.65	3,889	2,840
21.70	3,889	2,994
21.75	3,889	3,147
21.80	3,889	3,300
21.85	3,889	3,452
21.90	3,889	3,603
21.95	3,889	3,753
22.00	3,889	3,902
22.05	3,889	4,050
22.10	3,889	4,197
22.15	3,889	4,343
22.20	3,889	4,488
22.25	3,889	4,631
22.30	3,889	4,774
22.35	3,889	4,915
22.40	3,889	5,055
22.45	3,889	5,194
22.50	3,889	5,331
22.55	3,889	5,466
22.60	3,889	5,601
22.65	3,889	5,733
22.70	3,889	5,863
22.75	3,889	5,992
22.80	3,889	6,118
22.85	3,889	6,243
22.90	3,889	6,365
22.95	3,889	6,485
23.00	3,889	6,602
23.05	3,889	6,717
23.10	3,889	6,828
23.15	3,889	6,936
23.20	3,889	7,039
23.25	3,889	7,137
23.30	3,889	7,229
23.35	3,889	7,316
23.40	3,889	7,400
23.45	3,889	7,482
23.50	3,889	7,561
23.55	3,889	7,639
23.60	3,889	7,717
23.65	3,889	7,794
23.70	3,889	7,872
23.75	3,889	7,950
23.80	3,889	8,028
23.85	3,889	8,105
23.90	3,889	8,183
23.95	3,889	8,261
24.00	3,889	**8,339**

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Underground Infiltration Basin #2**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
0.65	ac	A = Area draining to the practice	
0.65	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.62	ac-in	WQV= 1" x Rv x A	
2,258	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
564	cf	25% x WQV (check calc for sediment forebay volume)	
N/A		Method of pretreatment? (not required for clean or roof runoff)	
-	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← $\geq$ 25%WQV
639	cf	V = volume[1] (attach a stage-storage table)	← $\geq$ WQV
2,264	sf	A_{SA} = surface area of the bottom of the pond	
0.97	iph	I_{DESIGN} = design infiltration rate[2]	
3.5	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← $\leq$ 72-hrs
18.00	feet	E_{BTM} = elevation of the bottom of the basin	
17.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
16.20	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D_{SHWT} = separation from SHWT	← $\geq$ *[3]
1.8	feet	D_{ROCK} = separation from bedrock	← $\geq$ *[3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← $\geq$ 24"
N/A	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
Yes	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
N/A		If a trench is proposed, material in trench	
Stone		If a basin is proposed, basin floor material	
No	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
0.0	:1	If a basin is proposed, pond side slopes	← $\geq$3:1
19.64	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
20.46	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
21.50	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation $\leq$ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation $\leq$ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See Env-Wq 1504.14 for requirements for determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Stage-Area-Storage for Pond 56 IB2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
18.00	**2,264**	0
18.05	2,264	45
18.10	2,264	91
18.15	2,264	136
18.20	2,264	181
18.25	2,264	226
18.30	2,264	272
18.35	2,264	317
18.40	2,264	362
18.45	2,264	407
18.50	2,264	453
18.55	2,264	546
18.60	2,264	639
18.65	2,264	731
18.70	2,264	824
18.75	2,264	916
18.80	2,264	1,008
18.85	2,264	1,100
18.90	2,264	1,191
18.95	2,264	1,282
19.00	2,264	1,372
19.05	2,264	1,463
19.10	2,264	1,552
19.15	2,264	1,642
19.20	2,264	1,731
19.25	2,264	1,819
19.30	2,264	1,907
19.35	2,264	1,995
19.40	2,264	2,082
19.45	2,264	2,168
19.50	2,264	2,254
19.55	2,264	2,340
19.60	2,264	2,425
19.65	2,264	2,509
19.70	2,264	2,593
19.75	2,264	2,675
19.80	2,264	2,758
19.85	2,264	2,839
19.90	2,264	2,920
19.95	2,264	3,000
20.00	2,264	3,079
20.05	2,264	3,157
20.10	2,264	3,235
20.15	2,264	3,312
20.20	2,264	3,387
20.25	2,264	3,461
20.30	2,264	3,534
20.35	2,264	3,606
20.40	2,264	3,677
20.45	2,264	3,746
20.50	2,264	3,814
20.55	2,264	3,880
20.60	2,264	3,945
20.65	2,264	4,007
20.70	2,264	4,067
20.75	2,264	4,124
20.80	2,264	4,177
20.85	2,264	4,228
20.90	2,264	4,277
20.95	2,264	4,324
21.00	2,264	4,370
21.05	2,264	4,415
21.10	2,264	4,461
21.15	2,264	4,506
21.20	2,264	4,551
21.25	2,264	4,596
21.30	2,264	4,642
21.35	2,264	4,687
21.40	2,264	4,732
21.45	2,264	4,778
21.50	2,264	**4,823**

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Underground Infiltration Basin #3**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Value	Unit	Description	Criteria
Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
2.10	ac	A = Area draining to the practice	
1.48	ac	A_I = Impervious area draining to the practice	
0.71	decimal	I = percent impervious area draining to the practice, in decimal form	
0.68	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.44	ac-in	WQV= 1" x Rv x A	
5,216	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,304	cf	25% x WQV (check calc for sediment forebay volume)	
Deep Sump CB		Method of pretreatment? (not required for clean or roof runoff)	
-	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← $\geq$ 25%WQV
2,469	cf	V = volume[1] (attach a stage-storage table)	← $\geq$ WQV
8,686	sf	A_{SA} = surface area of the bottom of the pond	
0.97	iph	I_{DESIGN} = design infiltration rate[2]	
3.5	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← $\leq$ 72-hrs
18.00	feet	E_{BTM} = elevation of the bottom of the basin	
17.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
16.20	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D_{SHWT} = separation from SHWT	← $\geq$ *[3]
1.8	feet	D_{ROCK} = separation from bedrock	← $\geq$ *[3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← $\geq$ 24"
N/A	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
Yes	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
N/A		If a trench is proposed, material in trench	
Stone		If a basin is proposed, basin floor material	
No	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
0.0	:1	If a basin is proposed, pond side slopes	← $\geq$3:1
19.92	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
21.43	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
21.50	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation $\leq$ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation $\leq$ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See Env-Wq 1504.14 for requirements for determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Stage-Area-Storage for Pond 49 IB3:

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
18.00	8,685	0	20.70	9,700	15,924
18.05	8,704	174	20.75	9,719	16,143
18.10	8,723	347	20.80	9,738	16,350
18.15	8,742	521	20.85	9,757	16,545
18.20	8,760	695	20.90	9,775	16,734
18.25	8,779	869	20.95	9,794	16,916
18.30	8,798	1,042	21.00	9,813	17,093
18.35	8,817	1,216	21.05	9,832	17,267
18.40	8,836	1,390	21.10	9,850	17,440
18.45	8,854	1,563	21.15	9,869	17,614
18.50	8,873	1,737	21.20	9,888	17,788
18.55	8,892	2,103	21.25	9,907	17,961
18.60	8,911	2,469	21.30	9,926	18,135
18.65	8,930	2,834	21.35	9,944	18,309
18.70	8,948	3,198	21.40	9,963	18,482
18.75	8,967	3,561	21.45	9,982	18,656
18.80	8,986	3,923	21.50	**10,001**	**18,830**
18.85	9,005	4,284			
18.90	9,024	4,643			
18.95	9,042	5,001			
19.00	9,061	5,357			
19.05	9,080	5,712			
19.10	9,099	6,066			
19.15	9,118	6,417			
19.20	9,136	6,767			
19.25	9,155	7,115			
19.30	9,174	7,461			
19.35	9,193	7,806			
19.40	9,212	8,148			
19.45	9,230	8,488			
19.50	9,249	8,826			
19.55	9,268	9,162			
19.60	9,287	9,496			
19.65	9,305	9,826			
19.70	9,324	10,154			
19.75	9,343	10,480			
19.80	9,362	10,803			
19.85	9,381	11,123			
19.90	9,399	11,439			
19.95	9,418	11,753			
20.00	9,437	12,064			
20.05	9,456	12,371			
20.10	9,475	12,675			
20.15	9,493	12,974			
20.20	9,512	13,269			
20.25	9,531	13,560			
20.30	9,550	13,845			
20.35	9,569	14,126			
20.40	9,587	14,403			
20.45	9,606	14,674			
20.50	9,625	14,939			
20.55	9,644	15,197			
20.60	9,663	15,449			
20.65	9,681	15,691			

FUSS & O'NEILL

Appendix F

Pre-Development Hydrologic Analysis

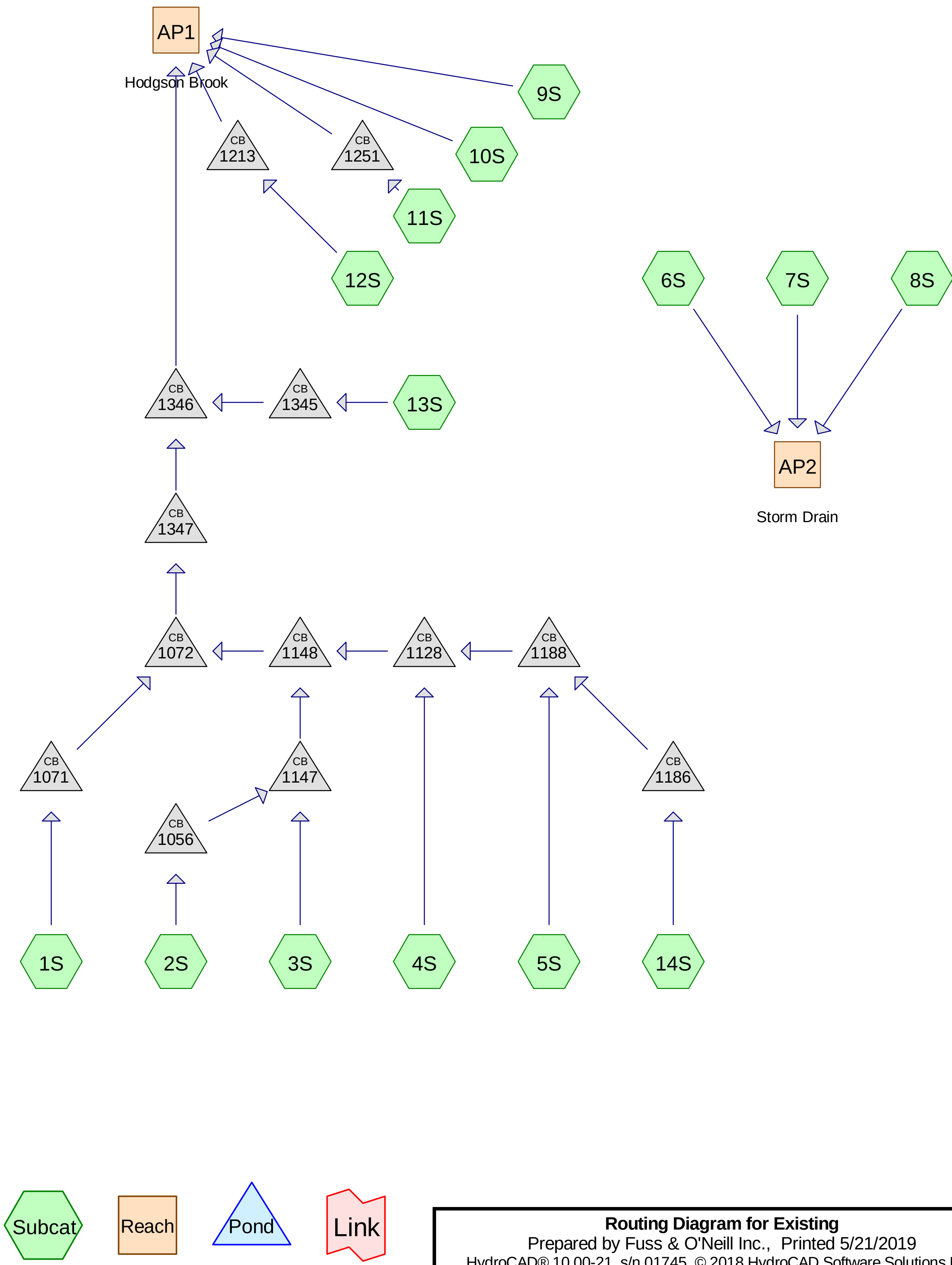
Post-Development Hydrologic Analysis

100%

Pre-Development Hydrologic Analysis

2-year Type III, 24 hour storm event summary
25-year Type III, 24 hour storm event summary
50-year Type III, 24 hour storm event summary
100-year Type III, 24 hour storm event summary

10-year Type III, 24 hour storm event summary, Hydrographs and Detailed Printouts



Routing Diagram for Existing
Prepared by Fuss & O'Neill Inc., Printed 5/21/2019
HydroCAD® 10.00-21 s/n 01745 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
484	86	<50% Grass cover, Poor, HSG C (7S)
63,922	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 12S, 13S)
54,987	96	Gravel surface, HSG C (8S, 9S)
328,763	98	Paved parking, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 12S, 13S, 14S)
61,523	98	Roofs, HSG C (1S, 2S, 3S, 5S, 6S, 7S, 8S, 9S, 14S)
70,288	70	Woods, Good, HSG C (10S, 14S)
9,551	72	Woods/grass comb., Good, HSG C (9S)
589,518	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
589,518	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S
0	HSG D	
0	Other	
589,518		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Numbe
0	0	484	0	0	484	<50% Grass cover, Poor	
0	0	63,922	0	0	63,922	>75% Grass cover, Good	
0	0	54,987	0	0	54,987	Gravel surface	
0	0	328,763	0	0	328,763	Paved parking	
0	0	61,523	0	0	61,523	Roofs	
0	0	70,288	0	0	70,288	Woods, Good	
0	0	9,551	0	0	9,551	Woods/grass comb., Good	
0	**0**	**589,518**	**0**	**0**	**589,518**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1056	18.30	17.70	128.5	0.0047	0.025	12.0	0.0	0.0
2	1071	17.50	17.30	31.0	0.0065	0.025	12.0	0.0	0.0
3	1072	17.10	15.90	31.0	0.0387	0.025	15.0	0.0	0.0
4	1128	22.90	14.70	860.0	0.0095	0.025	12.0	0.0	0.0
5	1147	18.30	18.20	36.0	0.0028	0.025	12.0	0.0	0.0
6	1148	18.20	17.50	311.5	0.0022	0.025	12.0	0.0	0.0
7	1186	22.30	21.00	161.5	0.0080	0.025	12.0	0.0	0.0
8	1188	20.00	18.90	191.0	0.0058	0.025	12.0	0.0	0.0
9	1213	17.60	14.60	150.0	0.0200	0.025	12.0	0.0	0.0
10	1251	16.50	14.70	82.0	0.0220	0.025	18.0	0.0	0.0
11	1345	19.10	17.40	915.0	0.0019	0.025	12.0	0.0	0.0
12	1346	15.70	14.70	143.0	0.0070	0.025	15.0	0.0	0.0
13	1347	15.90	15.80	204.0	0.0005	0.025	15.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1S:	Runoff Area=62,857 sf 94.73% Impervious Runoff Depth=3.34" Flow Length=505' Tc=8.9 min CN=97 Runoff=4.65 cfs 17,512 cf
Subcatchment 2S:	Runoff Area=36,669 sf 98.09% Impervious Runoff Depth=3.46" Flow Length=369' Tc=10.9 min CN=98 Runoff=2.59 cfs 10,560 cf
Subcatchment 3S:	Runoff Area=17,703 sf 90.15% Impervious Runoff Depth=3.23" Tc=6.0 min CN=96 Runoff=1.42 cfs 4,770 cf
Subcatchment 4S:	Runoff Area=38,050 sf 94.05% Impervious Runoff Depth=3.34" Tc=6.0 min CN=97 Runoff=3.10 cfs 10,601 cf
Subcatchment 5S:	Runoff Area=41,493 sf 97.25% Impervious Runoff Depth=3.34" Tc=0.0 min CN=97 Runoff=4.13 cfs 11,560 cf
Subcatchment 6S:	Runoff Area=30,394 sf 95.76% Impervious Runoff Depth=3.34" Tc=6.0 min CN=97 Runoff=2.48 cfs 8,468 cf
Subcatchment 7S:	Runoff Area=113,910 sf 73.61% Impervious Runoff Depth=2.82" Tc=6.0 min CN=92 Runoff=8.37 cfs 26,759 cf
Subcatchment 8S:	Runoff Area=72,641 sf 23.00% Impervious Runoff Depth=3.13" Flow Length=621' Tc=8.9 min CN=95 Runoff=5.19 cfs 18,922 cf
Subcatchment 9S:	Runoff Area=17,775 sf 29.63% Impervious Runoff Depth=2.10" Tc=6.0 min CN=84 Runoff=1.01 cfs 3,111 cf
Subcatchment 10S:	Runoff Area=110,643 sf 28.77% Impervious Runoff Depth=1.64" Tc=6.0 min CN=78 Runoff=4.85 cfs 15,151 cf
Subcatchment 11S:	Runoff Area=28,184 sf 92.95% Impervious Runoff Depth=3.23" Tc=6.0 min CN=96 Runoff=2.26 cfs 7,594 cf
Subcatchment 12S:	Runoff Area=9,264 sf 21.99% Impervious Runoff Depth=1.71" Tc=6.0 min CN=79 Runoff=0.43 cfs 1,324 cf
Subcatchment 13S:	Runoff Area=6,003 sf 66.57% Impervious Runoff Depth=2.63" Tc=6.0 min CN=90 Runoff=0.42 cfs 1,314 cf
Subcatchment 14S:	Runoff Area=3,932 sf 93.59% Impervious Runoff Depth=3.23" Tc=6.0 min CN=96 Runoff=0.32 cfs 1,059 cf
Reach AP1: Hodgson Brook	Inflow=22.37 cfs 84,552 cf Outflow=22.37 cfs 84,552 cf
Reach AP2: Storm Drain	Inflow=15.78 cfs 54,148 cf Outflow=15.78 cfs 54,148 cf

Pond 1056: Peak Elev=165.79' Inflow=2.59 cfs 10,560 cf
12.0" Round Culvert n=0.025 L=128.5' S=0.0047 '/' Outflow=2.59 cfs 10,560 cf

Pond 1071: Peak Elev=89.10' Inflow=4.65 cfs 17,512 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=4.65 cfs 17,512 cf

Pond 1072: Peak Elev=86.35' Inflow=13.44 cfs 56,059 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=13.44 cfs 56,059 cf

Pond 1128: Peak Elev=241.25' Inflow=6.32 cfs 23,217 cf
12.0" Round Culvert n=0.025 L=860.0' S=0.0095 '/' Outflow=6.32 cfs 23,217 cf

Pond 1147: Peak Elev=163.40' Inflow=3.82 cfs 15,330 cf
12.0" Round Culvert n=0.025 L=36.0' S=0.0028 '/' Outflow=3.82 cfs 15,330 cf

Pond 1148: Peak Elev=161.42' Inflow=9.24 cfs 38,547 cf
12.0" Round Culvert n=0.025 L=311.5' S=0.0022 '/' Outflow=9.24 cfs 38,547 cf

Pond 1186: Peak Elev=245.54' Inflow=0.32 cfs 1,059 cf
12.0" Round Culvert n=0.025 L=161.5' S=0.0080 '/' Outflow=0.33 cfs 1,057 cf

Pond 1188: Peak Elev=245.48' Inflow=4.34 cfs 12,616 cf
12.0" Round Culvert n=0.025 L=191.0' S=0.0058 '/' Outflow=4.34 cfs 12,616 cf

Pond 1213: Peak Elev=17.97' Inflow=0.43 cfs 1,324 cf
12.0" Round Culvert n=0.025 L=150.0' S=0.0200 '/' Outflow=0.43 cfs 1,324 cf

Pond 1251: Peak Elev=17.24' Inflow=2.26 cfs 7,594 cf
18.0" Round Culvert n=0.025 L=82.0' S=0.0220 '/' Outflow=2.26 cfs 7,594 cf

Pond 1345: Peak Elev=43.80' Inflow=0.42 cfs 1,314 cf
12.0" Round Culvert n=0.025 L=915.0' S=0.0019 '/' Outflow=0.42 cfs 1,314 cf

Pond 1346: Peak Elev=43.34' Inflow=13.86 cfs 57,373 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=13.86 cfs 57,373 cf

Pond 1347: Peak Elev=78.68' Inflow=13.44 cfs 56,059 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=13.44 cfs 56,059 cf

Total Runoff Area = 589,518 sf Runoff Volume = 138,703 cf Average Runoff Depth = 2.82"
33.80% Pervious = 199,232 sf 66.20% Impervious = 390,286 sf

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1S:	Runoff Area=62,857 sf 94.73% Impervious Runoff Depth=6.74" Flow Length=505' Tc=8.9 min CN=97 Runoff=9.10 cfs 35,315 cf
Subcatchment 2S:	Runoff Area=36,669 sf 98.09% Impervious Runoff Depth=6.86" Flow Length=369' Tc=10.9 min CN=98 Runoff=5.01 cfs 20,965 cf
Subcatchment 3S:	Runoff Area=17,703 sf 90.15% Impervious Runoff Depth=6.62" Tc=6.0 min CN=96 Runoff=2.81 cfs 9,771 cf
Subcatchment 4S:	Runoff Area=38,050 sf 94.05% Impervious Runoff Depth=6.74" Tc=6.0 min CN=97 Runoff=6.06 cfs 21,377 cf
Subcatchment 5S:	Runoff Area=41,493 sf 97.25% Impervious Runoff Depth=6.74" Tc=0.0 min CN=97 Runoff=8.07 cfs 23,312 cf
Subcatchment 6S:	Runoff Area=30,394 sf 95.76% Impervious Runoff Depth=6.74" Tc=6.0 min CN=97 Runoff=4.84 cfs 17,076 cf
Subcatchment 7S:	Runoff Area=113,910 sf 73.61% Impervious Runoff Depth=6.15" Tc=6.0 min CN=92 Runoff=17.49 cfs 58,412 cf
Subcatchment 8S:	Runoff Area=72,641 sf 23.00% Impervious Runoff Depth=6.51" Flow Length=621' Tc=8.9 min CN=95 Runoff=10.39 cfs 39,379 cf
Subcatchment 9S:	Runoff Area=17,775 sf 29.63% Impervious Runoff Depth=5.23" Tc=6.0 min CN=84 Runoff=2.44 cfs 7,754 cf
Subcatchment 10S:	Runoff Area=110,643 sf 28.77% Impervious Runoff Depth=4.57" Tc=6.0 min CN=78 Runoff=13.52 cfs 42,096 cf
Subcatchment 11S:	Runoff Area=28,184 sf 92.95% Impervious Runoff Depth=6.62" Tc=6.0 min CN=96 Runoff=4.47 cfs 15,556 cf
Subcatchment 12S:	Runoff Area=9,264 sf 21.99% Impervious Runoff Depth=4.68" Tc=6.0 min CN=79 Runoff=1.16 cfs 3,610 cf
Subcatchment 13S:	Runoff Area=6,003 sf 66.57% Impervious Runoff Depth=5.92" Tc=6.0 min CN=90 Runoff=0.90 cfs 2,962 cf
Subcatchment 14S:	Runoff Area=3,932 sf 93.59% Impervious Runoff Depth=6.62" Tc=6.0 min CN=96 Runoff=0.62 cfs 2,170 cf
Reach AP1: Hodgson Brook	Inflow=48.76 cfs 184,888 cf Outflow=48.76 cfs 184,888 cf
Reach AP2: Storm Drain	Inflow=32.19 cfs 114,867 cf Outflow=32.19 cfs 114,867 cf

Pond 1056: Peak Elev=588.74' Inflow=5.01 cfs 20,965 cf
12.0" Round Culvert n=0.025 L=128.5' S=0.0047 '/' Outflow=5.01 cfs 20,965 cf

Pond 1071: Peak Elev=296.21' Inflow=9.10 cfs 35,315 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=9.10 cfs 35,315 cf

Pond 1072: Peak Elev=285.68' Inflow=26.27 cfs 112,909 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=26.27 cfs 112,909 cf

Pond 1128: Peak Elev=877.62' Inflow=12.29 cfs 46,858 cf
12.0" Round Culvert n=0.025 L=860.0' S=0.0095 '/' Outflow=12.29 cfs 46,858 cf

Pond 1147: Peak Elev=579.60' Inflow=7.44 cfs 30,736 cf
12.0" Round Culvert n=0.025 L=36.0' S=0.0028 '/' Outflow=7.44 cfs 30,736 cf

Pond 1148: Peak Elev=571.99' Inflow=18.06 cfs 77,594 cf
12.0" Round Culvert n=0.025 L=311.5' S=0.0022 '/' Outflow=18.06 cfs 77,594 cf

Pond 1186: Peak Elev=894.05' Inflow=0.62 cfs 2,170 cf
12.0" Round Culvert n=0.025 L=161.5' S=0.0080 '/' Outflow=0.63 cfs 2,169 cf

Pond 1188: Peak Elev=893.86' Inflow=8.45 cfs 25,481 cf
12.0" Round Culvert n=0.025 L=191.0' S=0.0058 '/' Outflow=8.45 cfs 25,481 cf

Pond 1213: Peak Elev=18.23' Inflow=1.16 cfs 3,610 cf
12.0" Round Culvert n=0.025 L=150.0' S=0.0200 '/' Outflow=1.16 cfs 3,610 cf

Pond 1251: Peak Elev=17.60' Inflow=4.47 cfs 15,556 cf
18.0" Round Culvert n=0.025 L=82.0' S=0.0220 '/' Outflow=4.47 cfs 15,556 cf

Pond 1345: Peak Elev=123.38' Inflow=0.90 cfs 2,962 cf
12.0" Round Culvert n=0.025 L=915.0' S=0.0019 '/' Outflow=0.90 cfs 2,962 cf

Pond 1346: Peak Elev=121.22' Inflow=27.17 cfs 115,871 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=27.17 cfs 115,871 cf

Pond 1347: Peak Elev=256.49' Inflow=26.27 cfs 112,909 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=26.27 cfs 112,909 cf

Total Runoff Area = 589,518 sf Runoff Volume = 299,756 cf Average Runoff Depth = 6.10"
33.80% Pervious = 199,232 sf 66.20% Impervious = 390,286 sf

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1S: Runoff Area=62,857 sf 94.73% Impervious Runoff Depth=8.14"
Flow Length=505' Tc=8.9 min CN=97 Runoff=10.91 cfs 42,637 cf

Subcatchment 2S: Runoff Area=36,669 sf 98.09% Impervious Runoff Depth=8.26"
Flow Length=369' Tc=10.9 min CN=98 Runoff=6.01 cfs 25,240 cf

Subcatchment 3S: Runoff Area=17,703 sf 90.15% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=3.37 cfs 11,831 cf

Subcatchment 4S: Runoff Area=38,050 sf 94.05% Impervious Runoff Depth=8.14"
Tc=6.0 min CN=97 Runoff=7.27 cfs 25,810 cf

Subcatchment 5S: Runoff Area=41,493 sf 97.25% Impervious Runoff Depth=8.14"
Tc=0.0 min CN=97 Runoff=9.67 cfs 28,145 cf

Subcatchment 6S: Runoff Area=30,394 sf 95.76% Impervious Runoff Depth=8.14"
Tc=6.0 min CN=97 Runoff=5.81 cfs 20,617 cf

Subcatchment 7S: Runoff Area=113,910 sf 73.61% Impervious Runoff Depth=7.54"
Tc=6.0 min CN=92 Runoff=21.19 cfs 71,562 cf

Subcatchment 8S: Runoff Area=72,641 sf 23.00% Impervious Runoff Depth=7.90"
Flow Length=621' Tc=8.9 min CN=95 Runoff=12.51 cfs 47,819 cf

Subcatchment 9S: Runoff Area=17,775 sf 29.63% Impervious Runoff Depth=6.58"
Tc=6.0 min CN=84 Runoff=3.04 cfs 9,741 cf

Subcatchment 10S: Runoff Area=110,643 sf 28.77% Impervious Runoff Depth=5.85"
Tc=6.0 min CN=78 Runoff=17.21 cfs 53,984 cf

Subcatchment 11S: Runoff Area=28,184 sf 92.95% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=5.37 cfs 18,835 cf

Subcatchment 12S: Runoff Area=9,264 sf 21.99% Impervious Runoff Depth=5.98"
Tc=6.0 min CN=79 Runoff=1.47 cfs 4,613 cf

Subcatchment 13S: Runoff Area=6,003 sf 66.57% Impervious Runoff Depth=7.30"
Tc=6.0 min CN=90 Runoff=1.10 cfs 3,651 cf

Subcatchment 14S: Runoff Area=3,932 sf 93.59% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=0.75 cfs 2,628 cf

Reach AP1: Hodgson Brook Inflow=59.67 cfs 227,114 cf
Outflow=59.67 cfs 227,114 cf

Reach AP2: Storm Drain Inflow=38.85 cfs 139,997 cf
Outflow=38.85 cfs 139,997 cf

Pond 1056: Peak Elev=840.39' Inflow=6.01 cfs 25,240 cf
12.0" Round Culvert n=0.025 L=128.5' S=0.0047 '/' Outflow=6.01 cfs 25,240 cf

Pond 1071: Peak Elev=419.37' Inflow=10.91 cfs 42,637 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=10.91 cfs 42,637 cf

Pond 1072: Peak Elev=404.23' Inflow=31.51 cfs 136,289 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=31.51 cfs 136,289 cf

Pond 1128: Peak Elev=1,256.78' Inflow=14.84 cfs 56,581 cf
12.0" Round Culvert n=0.025 L=860.0' S=0.0095 '/' Outflow=14.84 cfs 56,581 cf

Pond 1147: Peak Elev=827.43' Inflow=8.93 cfs 37,071 cf
12.0" Round Culvert n=0.025 L=36.0' S=0.0028 '/' Outflow=8.93 cfs 37,071 cf

Pond 1148: Peak Elev=816.57' Inflow=21.66 cfs 93,652 cf
12.0" Round Culvert n=0.025 L=311.5' S=0.0022 '/' Outflow=21.66 cfs 93,652 cf

Pond 1186: Peak Elev=1,280.49' Inflow=0.75 cfs 2,628 cf
12.0" Round Culvert n=0.025 L=161.5' S=0.0080 '/' Outflow=0.76 cfs 2,626 cf

Pond 1188: Peak Elev=1,280.19' Inflow=10.16 cfs 30,771 cf
12.0" Round Culvert n=0.025 L=191.0' S=0.0058 '/' Outflow=10.16 cfs 30,771 cf

Pond 1213: Peak Elev=18.32' Inflow=1.47 cfs 4,613 cf
12.0" Round Culvert n=0.025 L=150.0' S=0.0200 '/' Outflow=1.47 cfs 4,613 cf

Pond 1251: Peak Elev=17.74' Inflow=5.37 cfs 18,835 cf
18.0" Round Culvert n=0.025 L=82.0' S=0.0220 '/' Outflow=5.37 cfs 18,835 cf

Pond 1345: Peak Elev=170.80' Inflow=1.10 cfs 3,651 cf
12.0" Round Culvert n=0.025 L=915.0' S=0.0019 '/' Outflow=1.10 cfs 3,651 cf

Pond 1346: Peak Elev=167.59' Inflow=32.61 cfs 139,940 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=32.61 cfs 139,940 cf

Pond 1347: Peak Elev=362.13' Inflow=31.51 cfs 136,289 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=31.51 cfs 136,289 cf

Total Runoff Area = 589,518 sf Runoff Volume = 367,113 cf Average Runoff Depth = 7.47"
33.80% Pervious = 199,232 sf 66.20% Impervious = 390,286 sf

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1S: Runoff Area=62,857 sf 94.73% Impervious Runoff Depth=9.83"
Flow Length=505' Tc=8.9 min CN=97 Runoff=13.10 cfs 51,480 cf

Subcatchment 2S: Runoff Area=36,669 sf 98.09% Impervious Runoff Depth=9.95"
Flow Length=369' Tc=10.9 min CN=98 Runoff=7.21 cfs 30,402 cf

Subcatchment 3S: Runoff Area=17,703 sf 90.15% Impervious Runoff Depth=9.71"
Tc=6.0 min CN=96 Runoff=4.05 cfs 14,320 cf

Subcatchment 4S: Runoff Area=38,050 sf 94.05% Impervious Runoff Depth=9.83"
Tc=6.0 min CN=97 Runoff=8.73 cfs 31,163 cf

Subcatchment 5S: Runoff Area=41,493 sf 97.25% Impervious Runoff Depth=9.83"
Tc=0.0 min CN=97 Runoff=11.61 cfs 33,983 cf

Subcatchment 6S: Runoff Area=30,394 sf 95.76% Impervious Runoff Depth=9.83"
Tc=6.0 min CN=97 Runoff=6.97 cfs 24,893 cf

Subcatchment 7S: Runoff Area=113,910 sf 73.61% Impervious Runoff Depth=9.22"
Tc=6.0 min CN=92 Runoff=25.62 cfs 87,483 cf

Subcatchment 8S: Runoff Area=72,641 sf 23.00% Impervious Runoff Depth=9.58"
Flow Length=621' Tc=8.9 min CN=95 Runoff=15.05 cfs 58,019 cf

Subcatchment 9S: Runoff Area=17,775 sf 29.63% Impervious Runoff Depth=8.21"
Tc=6.0 min CN=84 Runoff=3.75 cfs 12,167 cf

Subcatchment 10S: Runoff Area=110,643 sf 28.77% Impervious Runoff Depth=7.44"
Tc=6.0 min CN=78 Runoff=21.68 cfs 68,641 cf

Subcatchment 11S: Runoff Area=28,184 sf 92.95% Impervious Runoff Depth=9.71"
Tc=6.0 min CN=96 Runoff=6.45 cfs 22,797 cf

Subcatchment 12S: Runoff Area=9,264 sf 21.99% Impervious Runoff Depth=7.57"
Tc=6.0 min CN=79 Runoff=1.84 cfs 5,847 cf

Subcatchment 13S: Runoff Area=6,003 sf 66.57% Impervious Runoff Depth=8.97"
Tc=6.0 min CN=90 Runoff=1.33 cfs 4,486 cf

Subcatchment 14S: Runoff Area=3,932 sf 93.59% Impervious Runoff Depth=9.71"
Tc=6.0 min CN=96 Runoff=0.90 cfs 3,180 cf

Reach AP1: Hodgson Brook Inflow=72.87 cfs 278,464 cf
Outflow=72.87 cfs 278,464 cf

Reach AP2: Storm Drain Inflow=46.86 cfs 170,395 cf
Outflow=46.86 cfs 170,395 cf

Pond 1056: Peak Elev=1,204.42' Inflow=7.21 cfs 30,402 cf
12.0" Round Culvert n=0.025 L=128.5' S=0.0047 '/' Outflow=7.21 cfs 30,402 cf

Pond 1071: Peak Elev=597.60' Inflow=13.10 cfs 51,480 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=13.10 cfs 51,480 cf

Pond 1072: Peak Elev=575.77' Inflow=37.83 cfs 164,526 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=37.83 cfs 164,526 cf

Pond 1128: Peak Elev=1,803.63' Inflow=17.71 cfs 68,324 cf
12.0" Round Culvert n=0.025 L=860.0' S=0.0095 '/' Outflow=17.71 cfs 68,324 cf

Pond 1147: Peak Elev=1,185.51' Inflow=10.72 cfs 44,722 cf
12.0" Round Culvert n=0.025 L=36.0' S=0.0028 '/' Outflow=10.72 cfs 44,722 cf

Pond 1148: Peak Elev=1,169.72' Inflow=26.02 cfs 113,046 cf
12.0" Round Culvert n=0.025 L=311.5' S=0.0022 '/' Outflow=26.02 cfs 113,046 cf

Pond 1186: Peak Elev=1,837.74' Inflow=0.90 cfs 3,180 cf
12.0" Round Culvert n=0.025 L=161.5' S=0.0080 '/' Outflow=0.92 cfs 3,178 cf

Pond 1188: Peak Elev=1,837.35' Inflow=12.16 cfs 37,161 cf
12.0" Round Culvert n=0.025 L=191.0' S=0.0058 '/' Outflow=12.16 cfs 37,161 cf

Pond 1213: Peak Elev=18.43' Inflow=1.84 cfs 5,847 cf
12.0" Round Culvert n=0.025 L=150.0' S=0.0200 '/' Outflow=1.84 cfs 5,847 cf

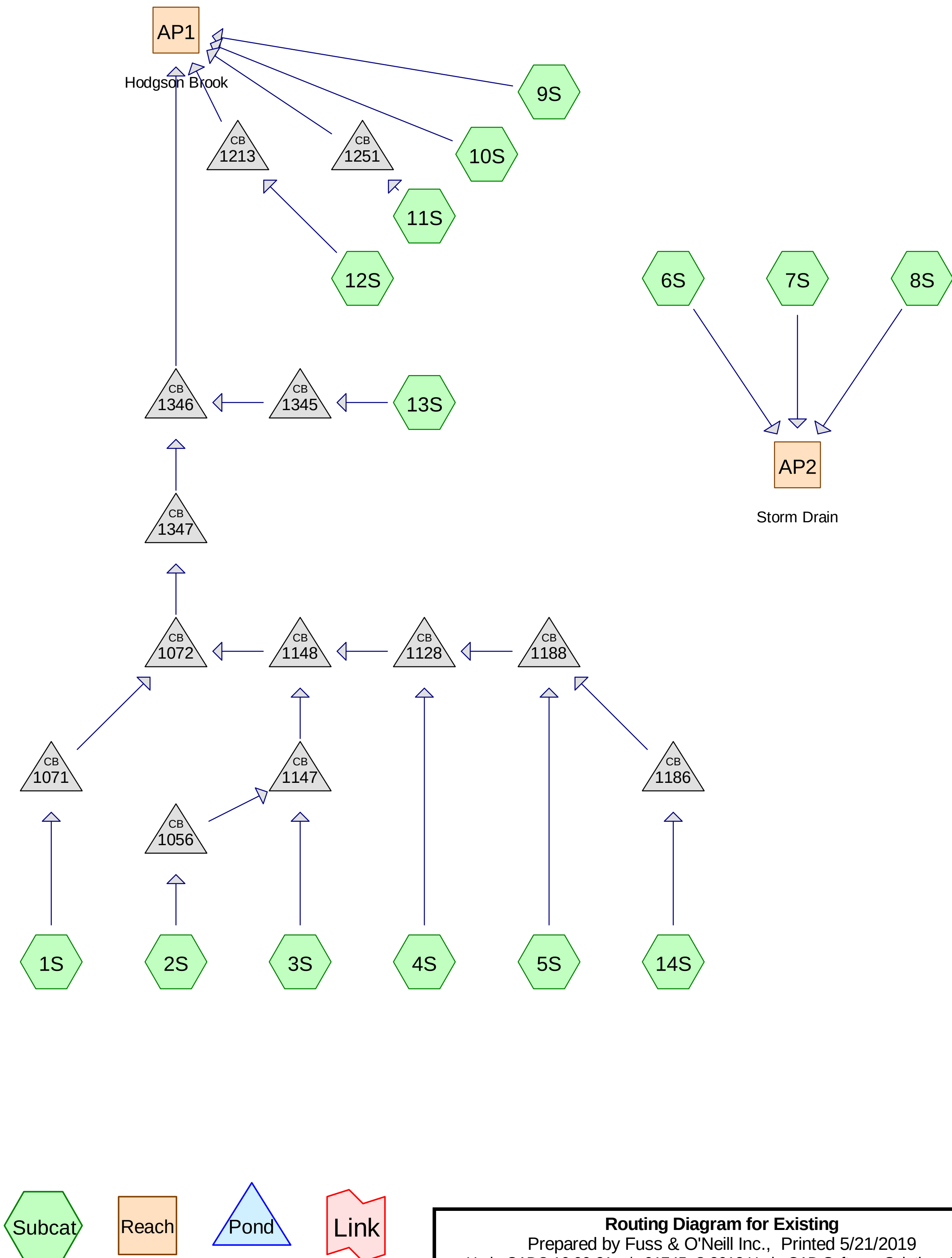
Pond 1251: Peak Elev=17.91' Inflow=6.45 cfs 22,797 cf
18.0" Round Culvert n=0.025 L=82.0' S=0.0220 '/' Outflow=6.45 cfs 22,797 cf

Pond 1345: Peak Elev=239.42' Inflow=1.33 cfs 4,486 cf
12.0" Round Culvert n=0.025 L=915.0' S=0.0019 '/' Outflow=1.33 cfs 4,486 cf

Pond 1346: Peak Elev=234.72' Inflow=39.17 cfs 169,012 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=39.17 cfs 169,012 cf

Pond 1347: Peak Elev=515.23' Inflow=37.83 cfs 164,526 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=37.83 cfs 164,526 cf

Total Runoff Area = 589,518 sf Runoff Volume = 448,861 cf Average Runoff Depth = 9.14"
33.80% Pervious = 199,232 sf 66.20% Impervious = 390,286 sf



Routing Diagram for Existing
Prepared by Fuss & O'Neill Inc., Printed 5/21/2019
HydroCAD® 10.00-21 s/n 01745 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
484	86	<50% Grass cover, Poor, HSG C (7S)
63,922	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 12S, 13S)
54,987	96	Gravel surface, HSG C (8S, 9S)
328,763	98	Paved parking, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 12S, 13S, 14S)
61,523	98	Roofs, HSG C (1S, 2S, 3S, 5S, 6S, 7S, 8S, 9S, 14S)
70,288	70	Woods, Good, HSG C (10S, 14S)
9,551	72	Woods/grass comb., Good, HSG C (9S)
589,518	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
589,518	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S
0	HSG D	
0	Other	
589,518		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Numbe
0	0	484	0	0	484	<50% Grass cover, Poor	
0	0	63,922	0	0	63,922	>75% Grass cover, Good	
0	0	54,987	0	0	54,987	Gravel surface	
0	0	328,763	0	0	328,763	Paved parking	
0	0	61,523	0	0	61,523	Roofs	
0	0	70,288	0	0	70,288	Woods, Good	
0	0	9,551	0	0	9,551	Woods/grass comb., Good	
0	**0**	**589,518**	**0**	**0**	**589,518**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1056	18.30	17.70	128.5	0.0047	0.025	12.0	0.0	0.0
2	1071	17.50	17.30	31.0	0.0065	0.025	12.0	0.0	0.0
3	1072	17.10	15.90	31.0	0.0387	0.025	15.0	0.0	0.0
4	1128	22.90	14.70	860.0	0.0095	0.025	12.0	0.0	0.0
5	1147	18.30	18.20	36.0	0.0028	0.025	12.0	0.0	0.0
6	1148	18.20	17.50	311.5	0.0022	0.025	12.0	0.0	0.0
7	1186	22.30	21.00	161.5	0.0080	0.025	12.0	0.0	0.0
8	1188	20.00	18.90	191.0	0.0058	0.025	12.0	0.0	0.0
9	1213	17.60	14.60	150.0	0.0200	0.025	12.0	0.0	0.0
10	1251	16.50	14.70	82.0	0.0220	0.025	18.0	0.0	0.0
11	1345	19.10	17.40	915.0	0.0019	0.025	12.0	0.0	0.0
12	1346	15.70	14.70	143.0	0.0070	0.025	15.0	0.0	0.0
13	1347	15.90	15.80	204.0	0.0005	0.025	15.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1S: Runoff Area=62,857 sf 94.73% Impervious Runoff Depth=5.25"
Flow Length=505' Tc=8.9 min CN=97 Runoff=7.15 cfs 27,475 cf

Subcatchment 2S: Runoff Area=36,669 sf 98.09% Impervious Runoff Depth=5.36"
Flow Length=369' Tc=10.9 min CN=98 Runoff=3.95 cfs 16,386 cf

Subcatchment 3S: Runoff Area=17,703 sf 90.15% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=96 Runoff=2.20 cfs 7,567 cf

Subcatchment 4S: Runoff Area=38,050 sf 94.05% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=97 Runoff=4.76 cfs 16,632 cf

Subcatchment 5S: Runoff Area=41,493 sf 97.25% Impervious Runoff Depth=5.25"
Tc=0.0 min CN=97 Runoff=6.34 cfs 18,137 cf

Subcatchment 6S: Runoff Area=30,394 sf 95.76% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=97 Runoff=3.81 cfs 13,285 cf

Subcatchment 7S: Runoff Area=113,910 sf 73.61% Impervious Runoff Depth=4.68"
Tc=6.0 min CN=92 Runoff=13.50 cfs 44,393 cf

Subcatchment 8S: Runoff Area=72,641 sf 23.00% Impervious Runoff Depth=5.01"
Flow Length=621' Tc=8.9 min CN=95 Runoff=8.12 cfs 30,354 cf

Subcatchment 9S: Runoff Area=17,775 sf 29.63% Impervious Runoff Depth=3.82"
Tc=6.0 min CN=84 Runoff=1.81 cfs 5,664 cf

Subcatchment 10S: Runoff Area=110,643 sf 28.77% Impervious Runoff Depth=3.23"
Tc=6.0 min CN=78 Runoff=9.61 cfs 29,763 cf

Subcatchment 11S: Runoff Area=28,184 sf 92.95% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=96 Runoff=3.50 cfs 12,047 cf

Subcatchment 12S: Runoff Area=9,264 sf 21.99% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=79 Runoff=0.83 cfs 2,567 cf

Subcatchment 13S: Runoff Area=6,003 sf 66.57% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=90 Runoff=0.69 cfs 2,230 cf

Subcatchment 14S: Runoff Area=3,932 sf 93.59% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=96 Runoff=0.49 cfs 1,681 cf

Reach AP1: Hodgson Brook Inflow=37.07 cfs 140,147 cf
Outflow=37.07 cfs 140,147 cf

Reach AP2: Storm Drain Inflow=25.01 cfs 88,033 cf
Outflow=25.01 cfs 88,033 cf

Pond 1056: Peak Elev=369.43' Inflow=3.95 cfs 16,386 cf
12.0" Round Culvert n=0.025 L=128.5' S=0.0047 '/' Outflow=3.95 cfs 16,386 cf

Pond 1071: Peak Elev=188.86' Inflow=7.15 cfs 27,475 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=7.15 cfs 27,475 cf

Pond 1072: Peak Elev=182.36' Inflow=20.64 cfs 87,878 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=20.64 cfs 87,878 cf

Pond 1128: Peak Elev=547.72' Inflow=9.65 cfs 36,450 cf
12.0" Round Culvert n=0.025 L=860.0' S=0.0095 '/' Outflow=9.65 cfs 36,450 cf

Pond 1147: Peak Elev=363.77' Inflow=5.85 cfs 23,953 cf
12.0" Round Culvert n=0.025 L=36.0' S=0.0028 '/' Outflow=5.85 cfs 23,953 cf

Pond 1148: Peak Elev=359.07' Inflow=14.19 cfs 60,403 cf
12.0" Round Culvert n=0.025 L=311.5' S=0.0022 '/' Outflow=14.19 cfs 60,403 cf

Pond 1186: Peak Elev=557.85' Inflow=0.49 cfs 1,681 cf
12.0" Round Culvert n=0.025 L=161.5' S=0.0080 '/' Outflow=0.49 cfs 1,680 cf

Pond 1188: Peak Elev=557.73' Inflow=6.64 cfs 19,817 cf
12.0" Round Culvert n=0.025 L=191.0' S=0.0058 '/' Outflow=6.64 cfs 19,818 cf

Pond 1213: Peak Elev=18.12' Inflow=0.83 cfs 2,567 cf
12.0" Round Culvert n=0.025 L=150.0' S=0.0200 '/' Outflow=0.83 cfs 2,567 cf

Pond 1251: Peak Elev=17.45' Inflow=3.50 cfs 12,047 cf
18.0" Round Culvert n=0.025 L=82.0' S=0.0220 '/' Outflow=3.50 cfs 12,047 cf

Pond 1345: Peak Elev=82.08' Inflow=0.69 cfs 2,230 cf
12.0" Round Culvert n=0.025 L=915.0' S=0.0019 '/' Outflow=0.69 cfs 2,230 cf

Pond 1346: Peak Elev=80.82' Inflow=21.33 cfs 90,107 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=21.33 cfs 90,107 cf

Pond 1347: Peak Elev=164.33' Inflow=20.64 cfs 87,878 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=20.64 cfs 87,878 cf

Total Runoff Area = 589,518 sf Runoff Volume = 228,179 cf Average Runoff Depth = 4.64"
33.80% Pervious = 199,232 sf 66.20% Impervious = 390,286 sf

Summary for Subcatchment 1S:

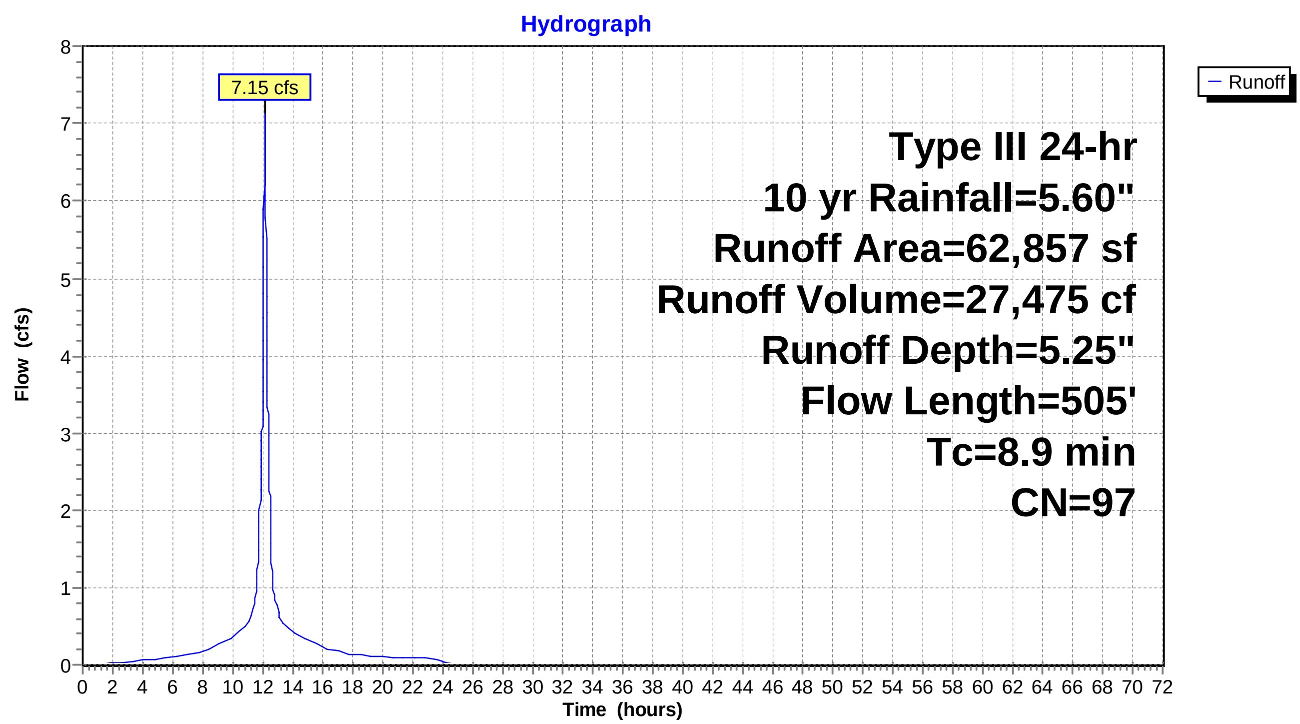
Runoff = 7.15 cfs @ 12.12 hrs, Volume= 27,475 cf, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
3,311	74	>75% Grass cover, Good, HSG C
19,506	98	Roofs, HSG C
40,040	98	Paved parking, HSG C
62,857	97	Weighted Average
3,311		5.27% Pervious Area
59,546		94.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.1600	0.16		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.21"
3.5	455	0.0114	2.17		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
8.9	505	Total			

Subcatchment 1S:



Summary for Subcatchment 2S:

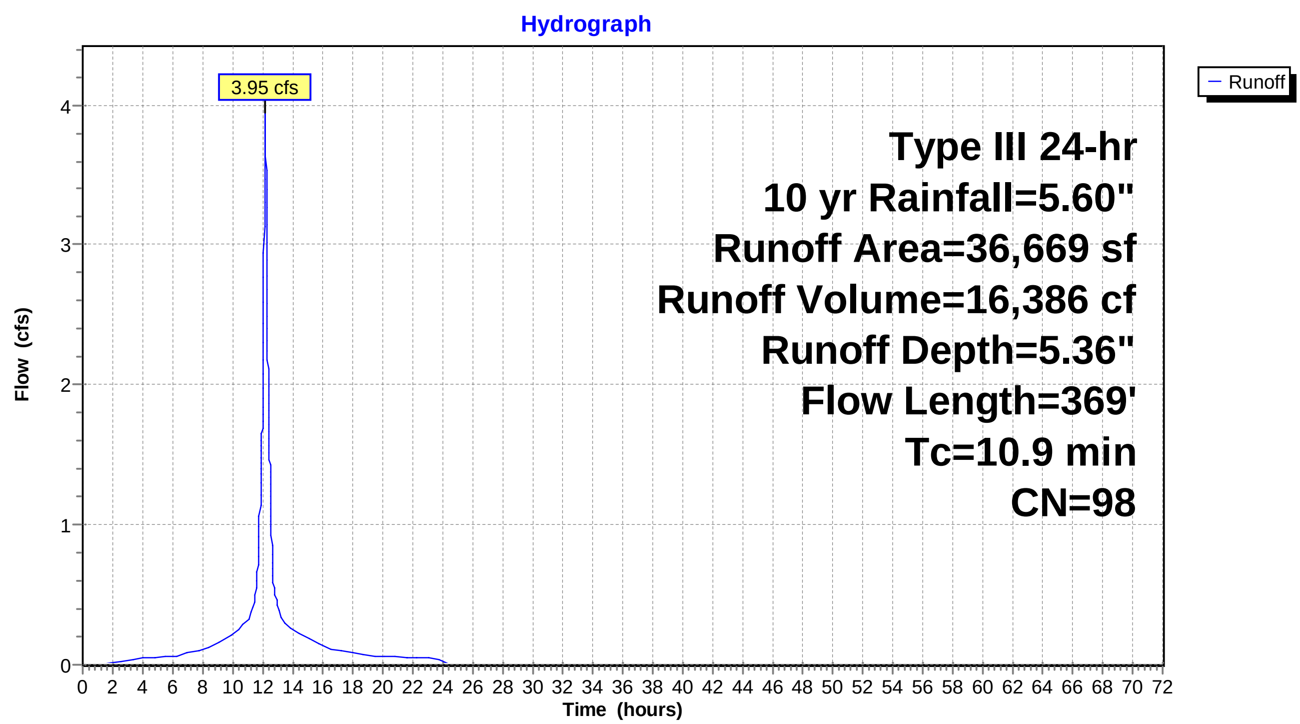
Runoff = 3.95 cfs @ 12.15 hrs, Volume= 16,386 cf, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
700	74	>75% Grass cover, Good, HSG C
2,984	98	Roofs, HSG C
32,985	98	Paved parking, HSG C
36,669	98	Weighted Average
700		1.91% Pervious Area
35,969		98.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.21"
1.6	319	0.0257	3.25		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
10.9	369	Total			

Subcatchment 2S:



Summary for Subcatchment 3S:

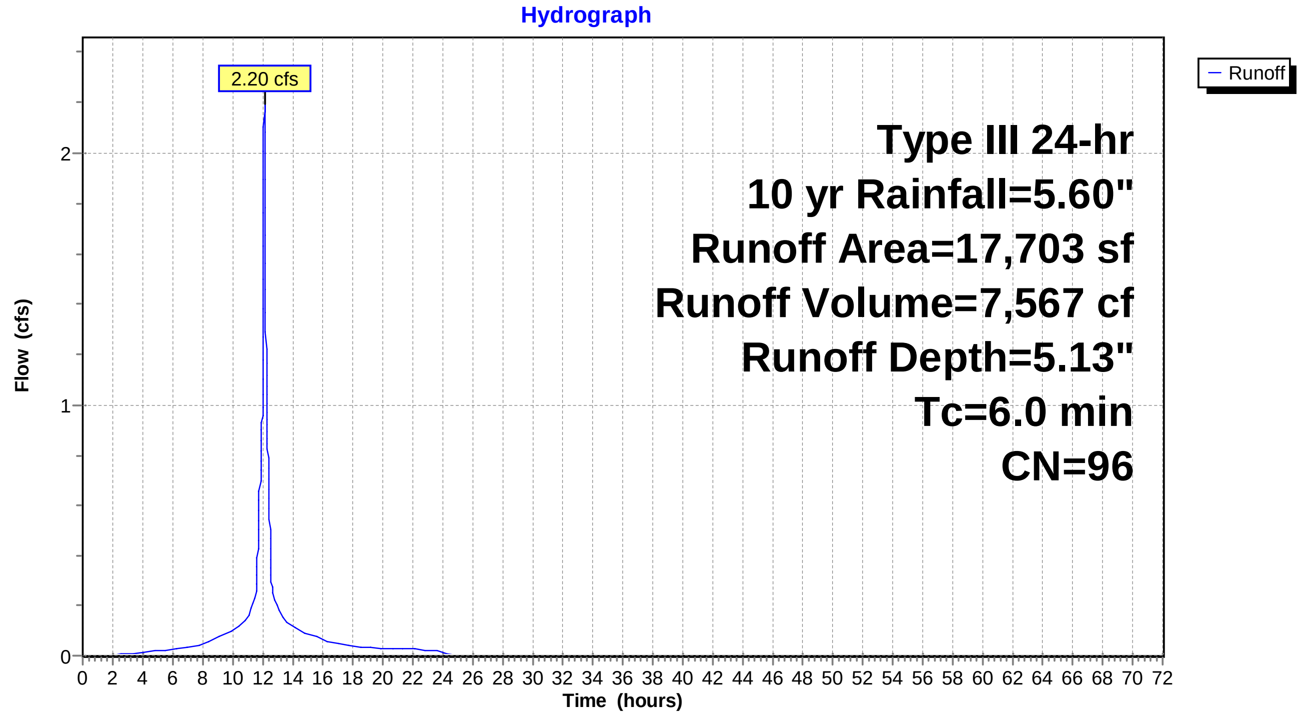
Runoff = 2.20 cfs @ 12.08 hrs, Volume= 7,567 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,743	74	>75% Grass cover, Good, HSG C
10,382	98	Roofs, HSG C
5,578	98	Paved parking, HSG C
17,703	96	Weighted Average
1,743		9.85% Pervious Area
15,960		90.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S:



Summary for Subcatchment 4S:

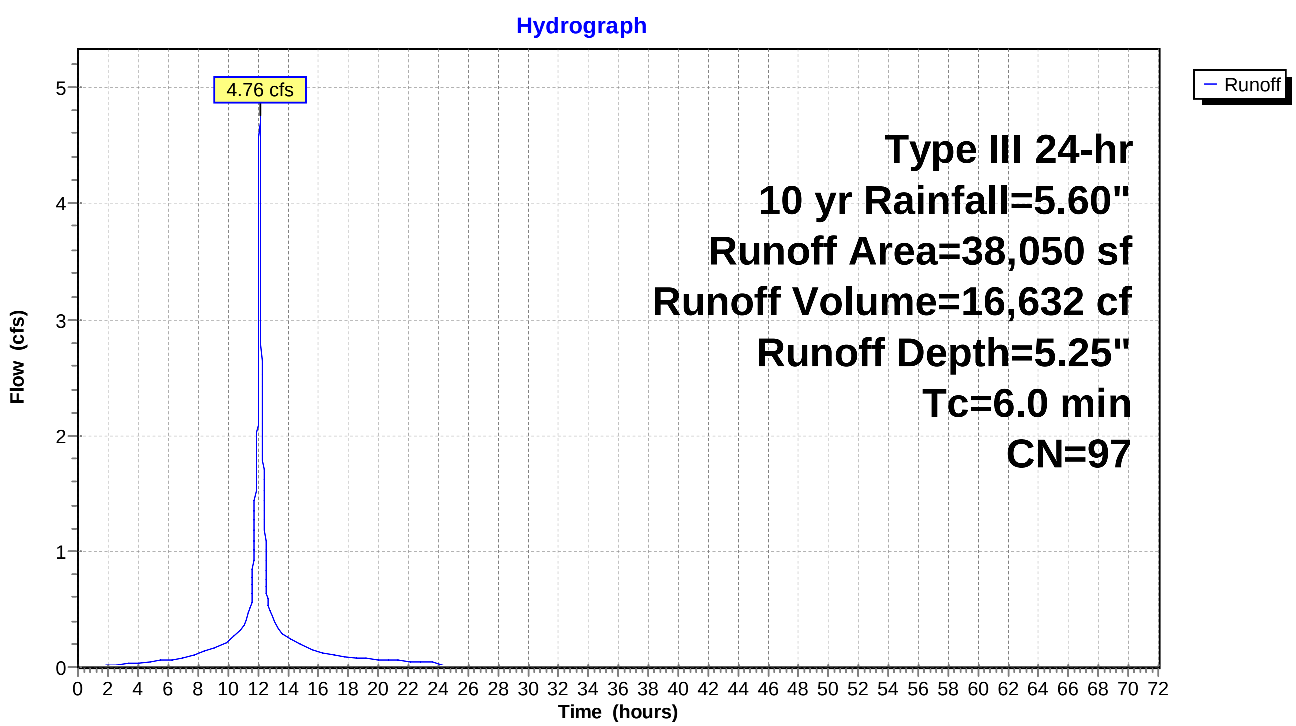
Runoff = 4.76 cfs @ 12.08 hrs, Volume= 16,632 cf, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,263	74	>75% Grass cover, Good, HSG C
35,787	98	Paved parking, HSG C
38,050	97	Weighted Average
2,263		5.95% Pervious Area
35,787		94.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S:



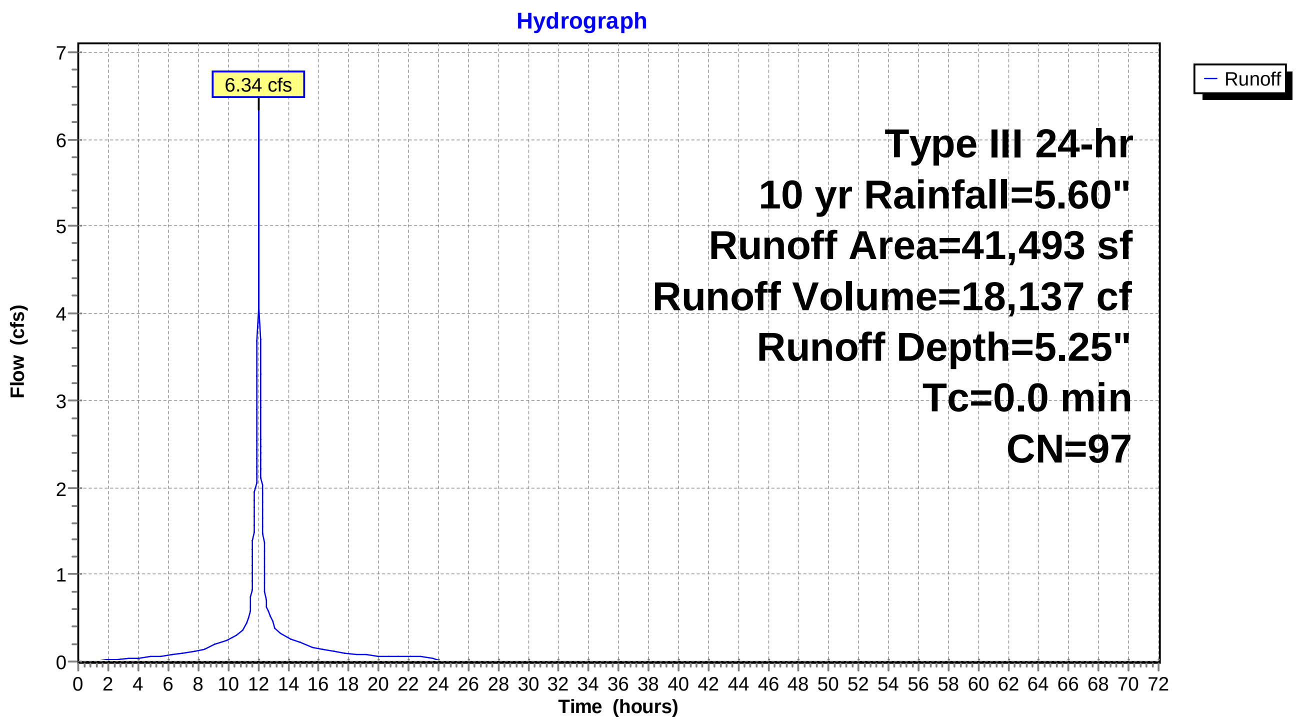
Summary for Subcatchment 5S:

Runoff = 6.34 cfs @ 12.00 hrs, Volume= 18,137 cf, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,139	74	>75% Grass cover, Good, HSG C
2,890	98	Roofs, HSG C
37,464	98	Paved parking, HSG C
41,493	97	Weighted Average
1,139		2.75% Pervious Area
40,354		97.25% Impervious Area

Subcatchment 5S:



Summary for Subcatchment 6S:

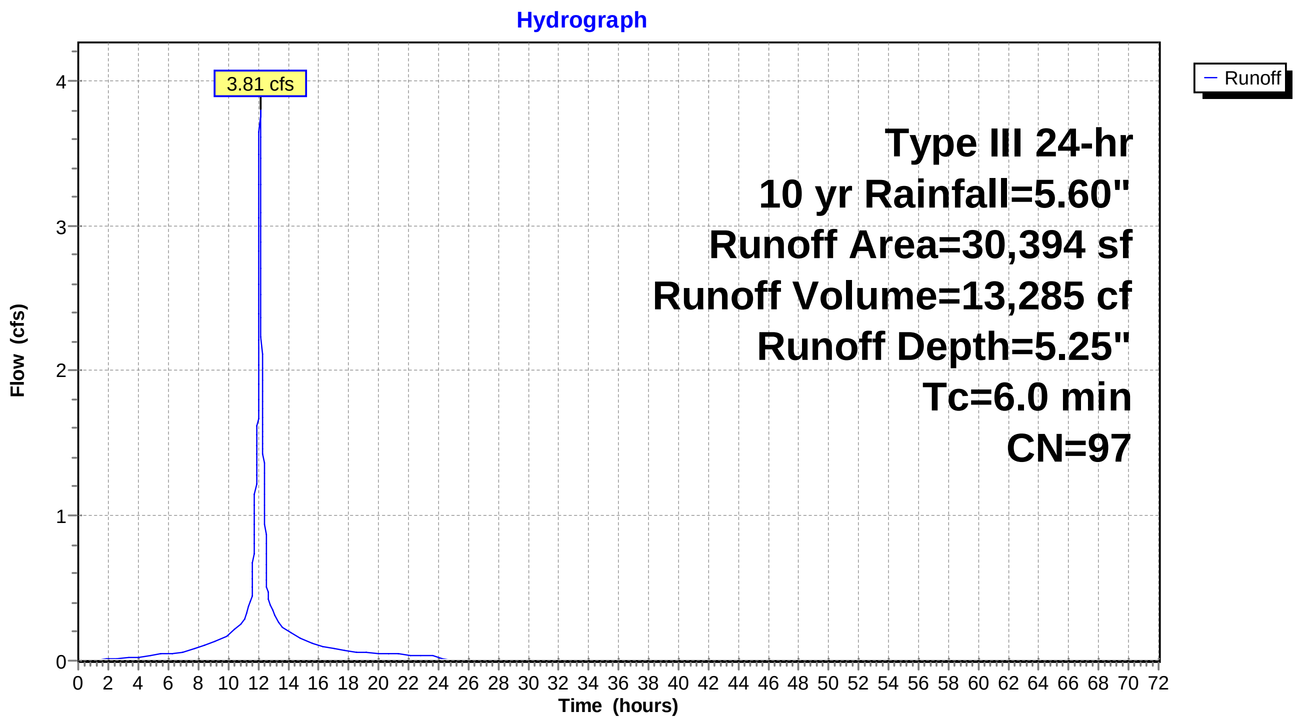
Runoff = 3.81 cfs @ 12.08 hrs, Volume= 13,285 cf, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,290	74	>75% Grass cover, Good, HSG C
4,065	98	Roofs, HSG C
25,039	98	Paved parking, HSG C
30,394	97	Weighted Average
1,290		4.24% Pervious Area
29,104		95.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S:



Summary for Subcatchment 7S:

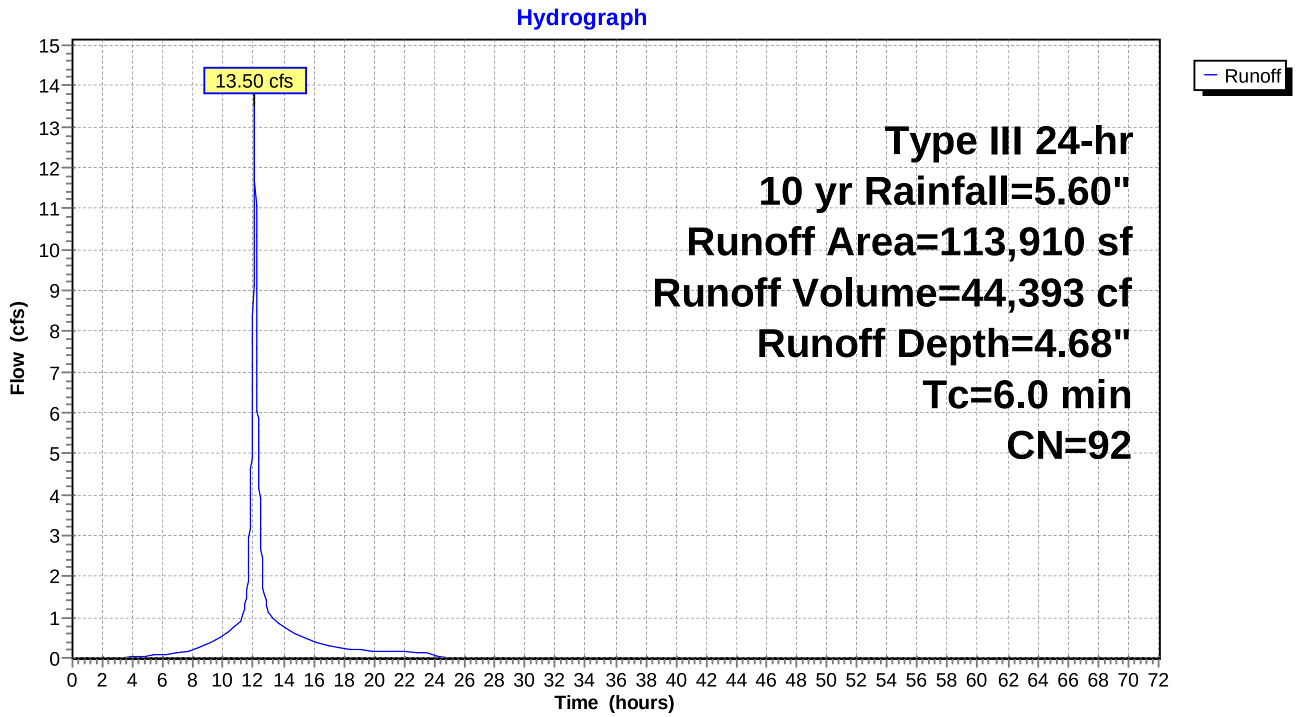
Runoff = 13.50 cfs @ 12.08 hrs, Volume= 44,393 cf, Depth= 4.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
29,577	74	>75% Grass cover, Good, HSG C
8,271	98	Roofs, HSG C
70,081	98	Paved parking, HSG C
5,497	98	Paved parking, HSG C
484	86	<50% Grass cover, Poor, HSG C
113,910	92	Weighted Average
30,061		26.39% Pervious Area
83,849		73.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S:



Summary for Subcatchment 8S:

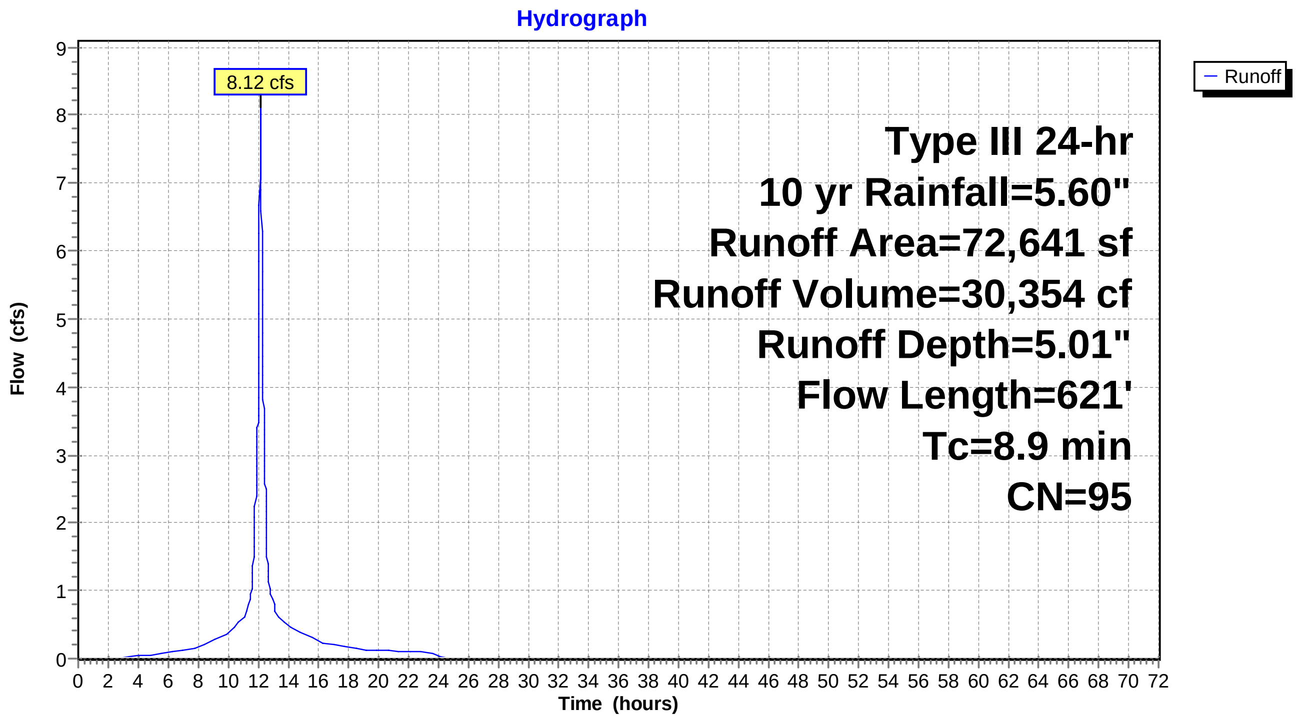
Runoff = 8.12 cfs @ 12.12 hrs, Volume= 30,354 cf, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
3,902	74	>75% Grass cover, Good, HSG C
6,363	98	Roofs, HSG C
52,030	96	Gravel surface, HSG C
10,346	98	Paved parking, HSG C
72,641	95	Weighted Average
55,932		77.00% Pervious Area
16,709		23.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0300	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.21"
4.1	571	0.0210	2.33		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.9	621	Total			

Subcatchment 8S:



Summary for Subcatchment 9S:

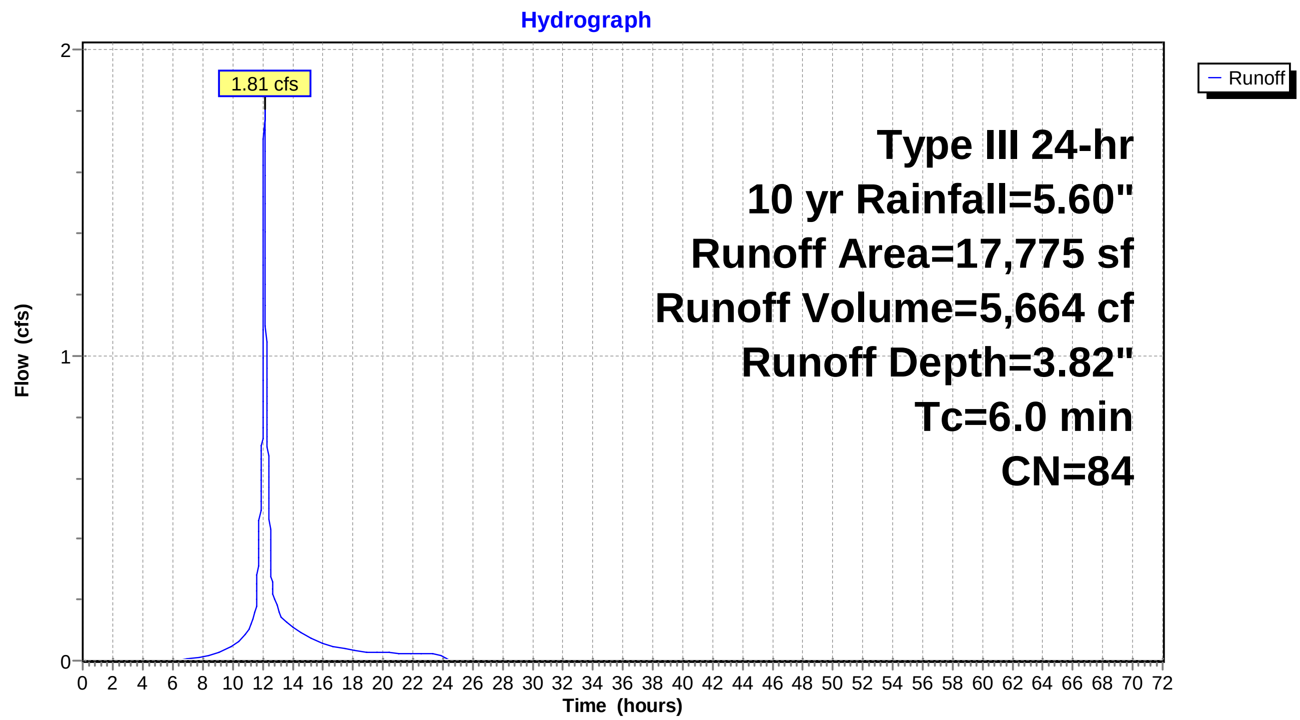
Runoff = 1.81 cfs @ 12.09 hrs, Volume= 5,664 cf, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
9,551	72	Woods/grass comb., Good, HSG C
5,267	98	Roofs, HSG C
2,957	96	Gravel surface, HSG C
17,775	84	Weighted Average
12,508		70.37% Pervious Area
5,267		29.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S:



Summary for Subcatchment 10S:

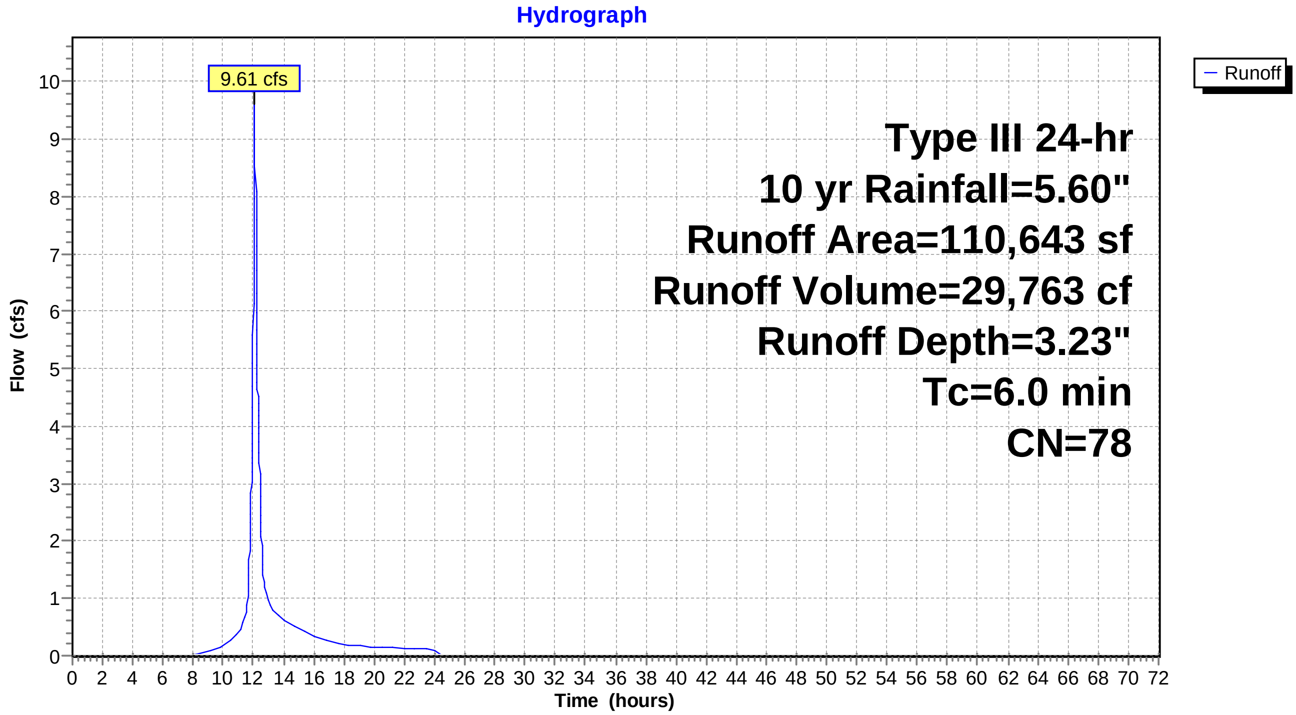
Runoff = 9.61 cfs @ 12.09 hrs, Volume= 29,763 cf, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
8,775	74	>75% Grass cover, Good, HSG C
70,036	70	Woods, Good, HSG C
31,832	98	Paved parking, HSG C
110,643	78	Weighted Average
78,811		71.23% Pervious Area
31,832		28.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S:



Summary for Subcatchment 11S:

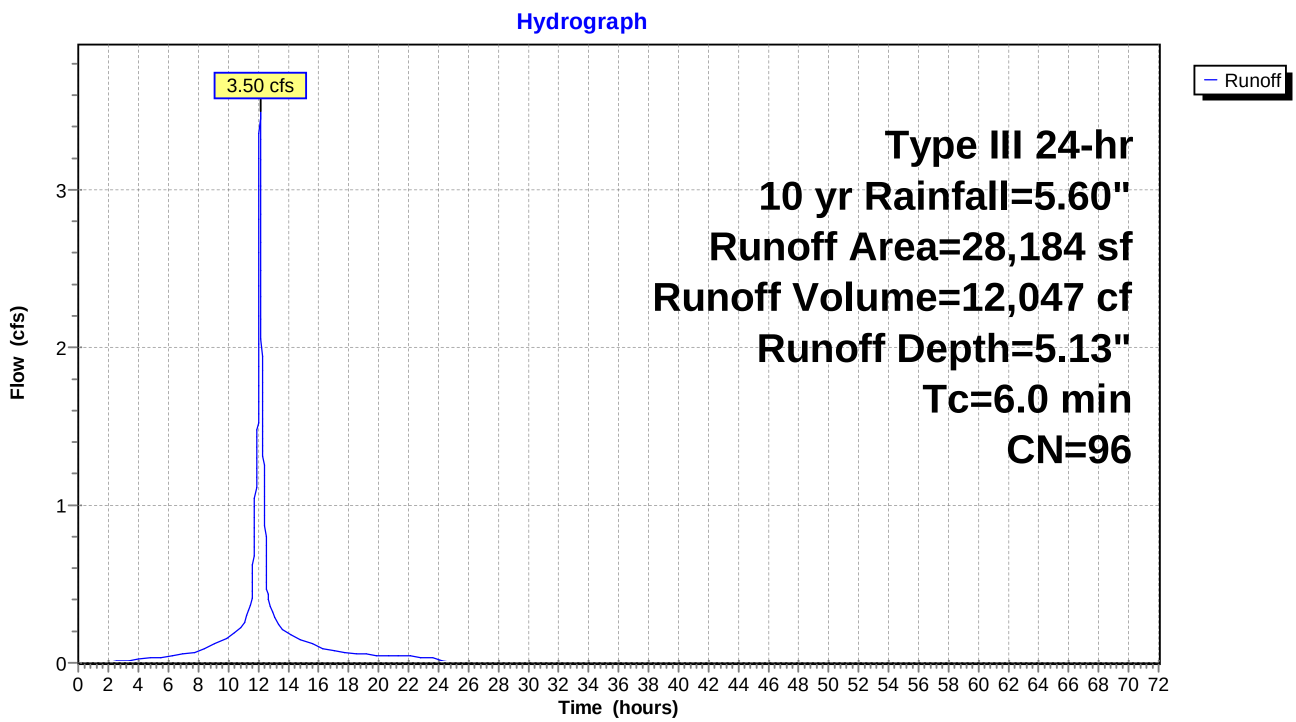
Runoff = 3.50 cfs @ 12.08 hrs, Volume= 12,047 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,988	74	>75% Grass cover, Good, HSG C
26,196	98	Paved parking, HSG C
28,184	96	Weighted Average
1,988		7.05% Pervious Area
26,196		92.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 11S:



Summary for Subcatchment 12S:

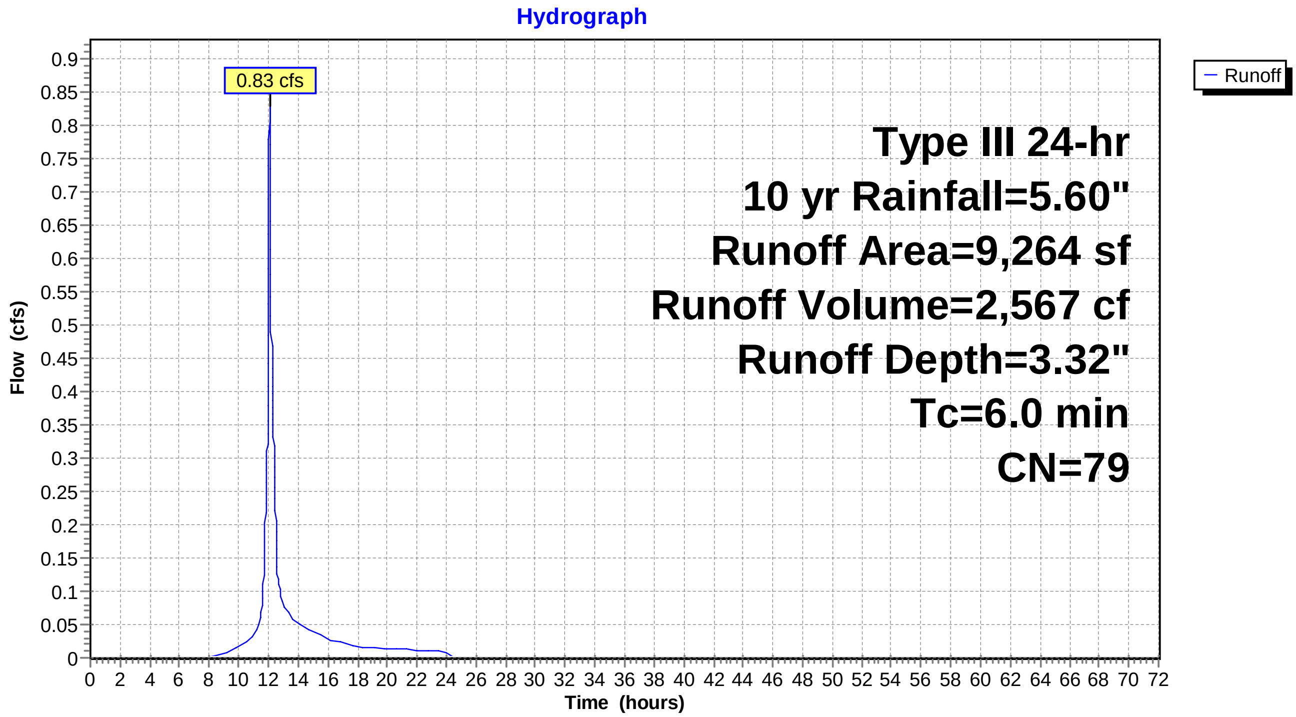
Runoff = 0.83 cfs @ 12.09 hrs, Volume= 2,567 cf, Depth= 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
7,227	74	>75% Grass cover, Good, HSG C
2,037	98	Paved parking, HSG C
9,264	79	Weighted Average
7,227		78.01% Pervious Area
2,037		21.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S:



Summary for Subcatchment 13S:

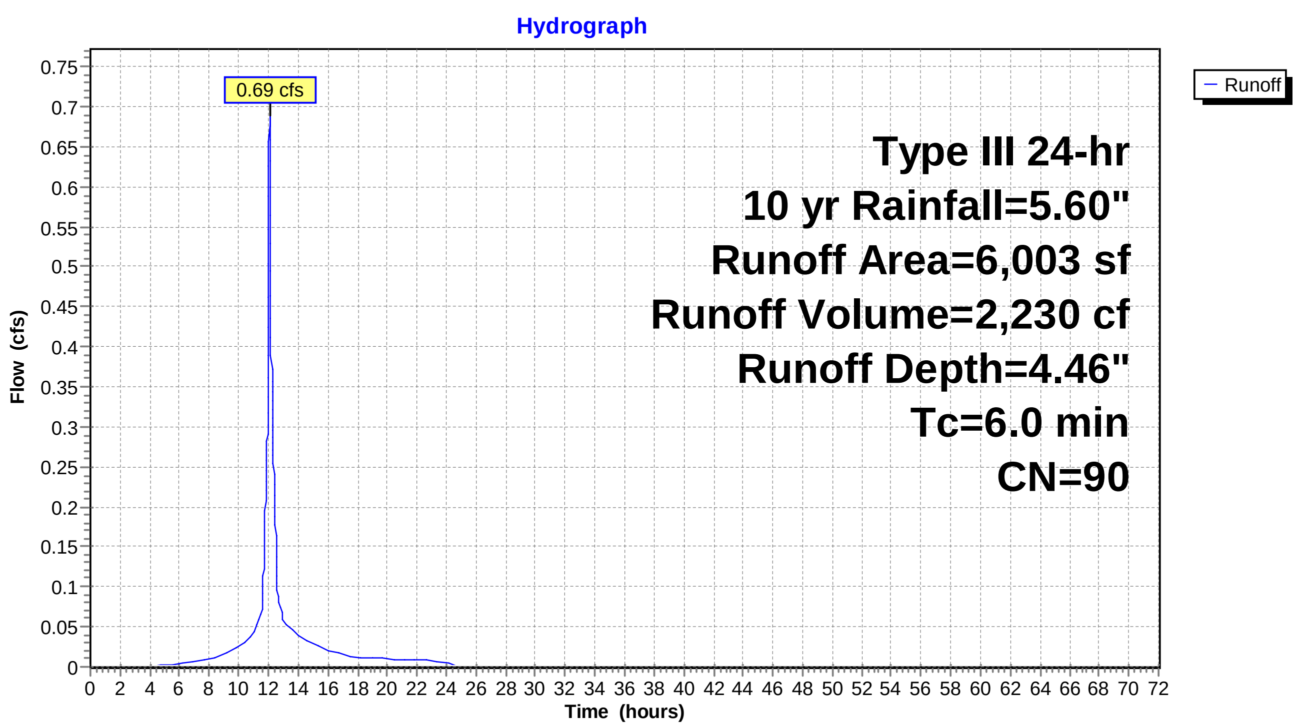
Runoff = 0.69 cfs @ 12.08 hrs, Volume= 2,230 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,007	74	>75% Grass cover, Good, HSG C
3,996	98	Paved parking, HSG C
6,003	90	Weighted Average
2,007		33.43% Pervious Area
3,996		66.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S:



Summary for Subcatchment 14S:

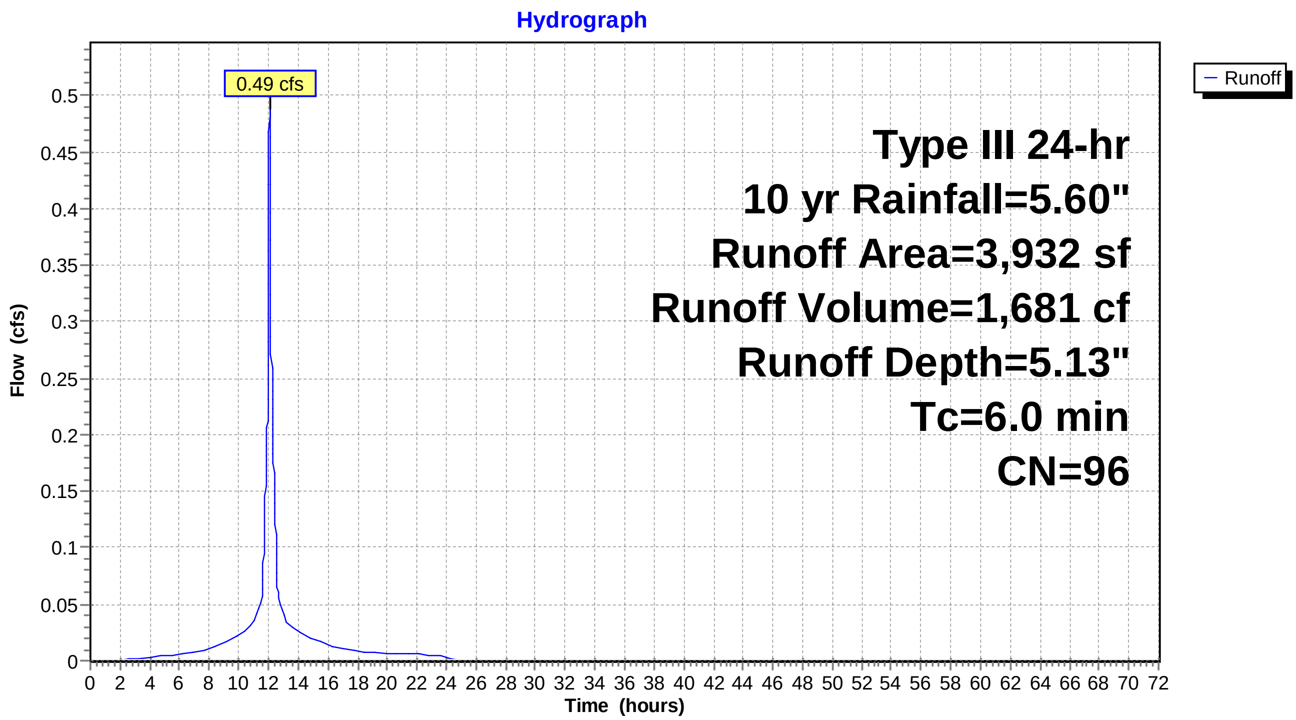
Runoff = 0.49 cfs @ 12.08 hrs, Volume= 1,681 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,795	98	Roofs, HSG C
252	70	Woods, Good, HSG C
1,885	98	Paved parking, HSG C
3,932	96	Weighted Average
252		6.41% Pervious Area
3,680		93.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 14S:

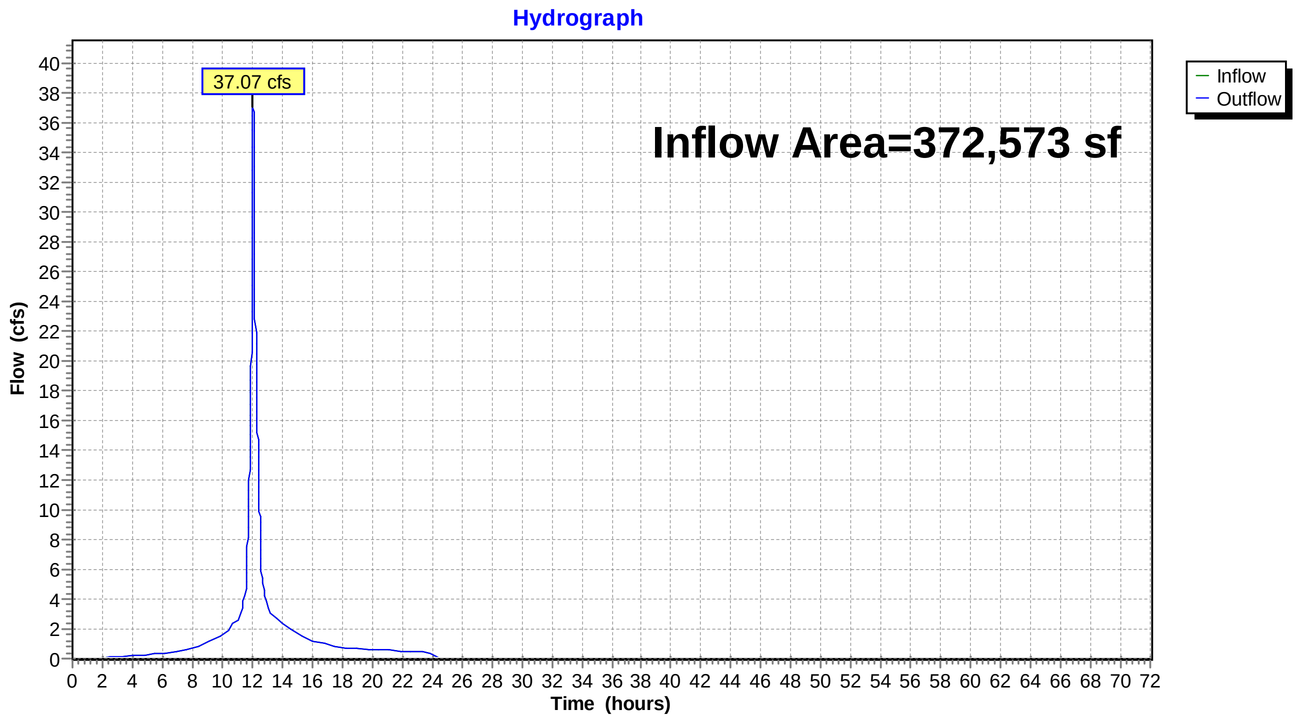


Summary for Reach AP1: Hodgson Brook

Inflow Area =	372,573 sf,	69.95% Impervious,	Inflow Depth = 4.51"	for 10 yr event
Inflow =	37.07 cfs @	12.09 hrs, Volume=	140,147 cf	
Outflow =	37.07 cfs @	12.09 hrs, Volume=	140,147 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP1: Hodgson Brook

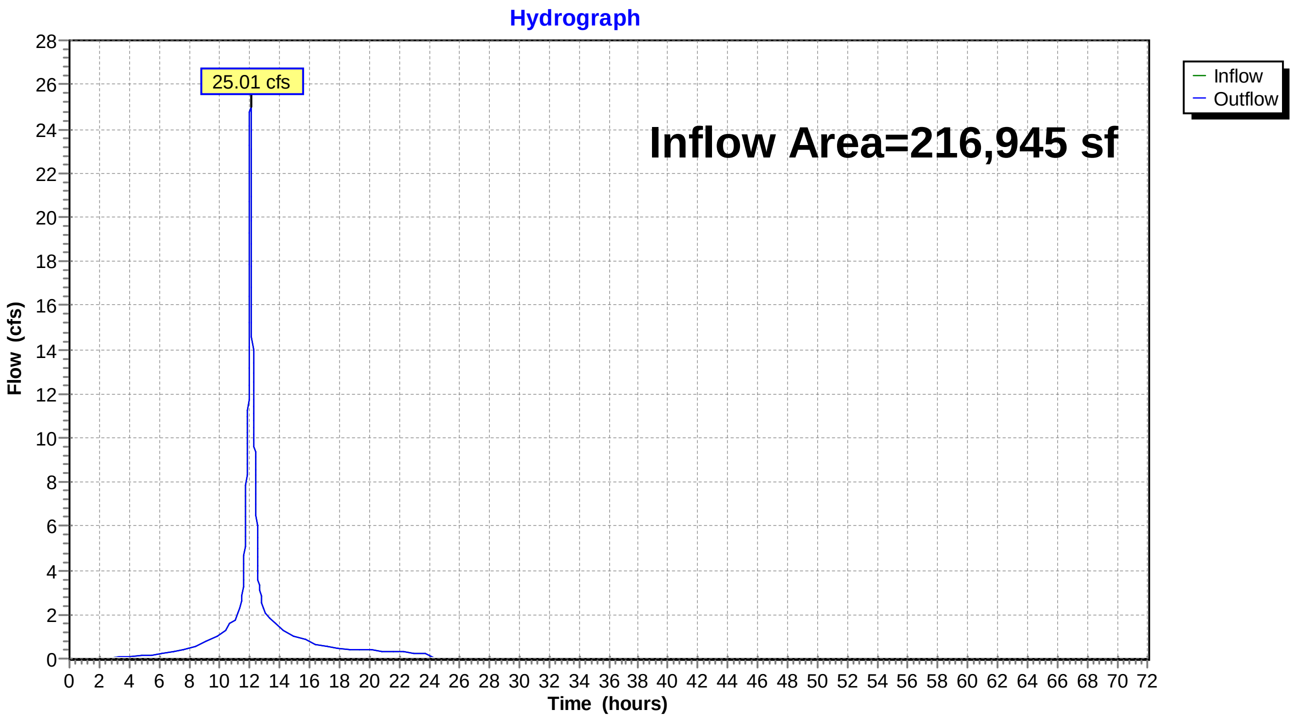


Summary for Reach AP2: Storm Drain

Inflow Area = 216,945 sf, 59.77% Impervious, Inflow Depth = 4.87" for 10 yr event
Inflow = 25.01 cfs @ 12.09 hrs, Volume= 88,033 cf
Outflow = 25.01 cfs @ 12.09 hrs, Volume= 88,033 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP2: Storm Drain



Summary for Pond 1056:

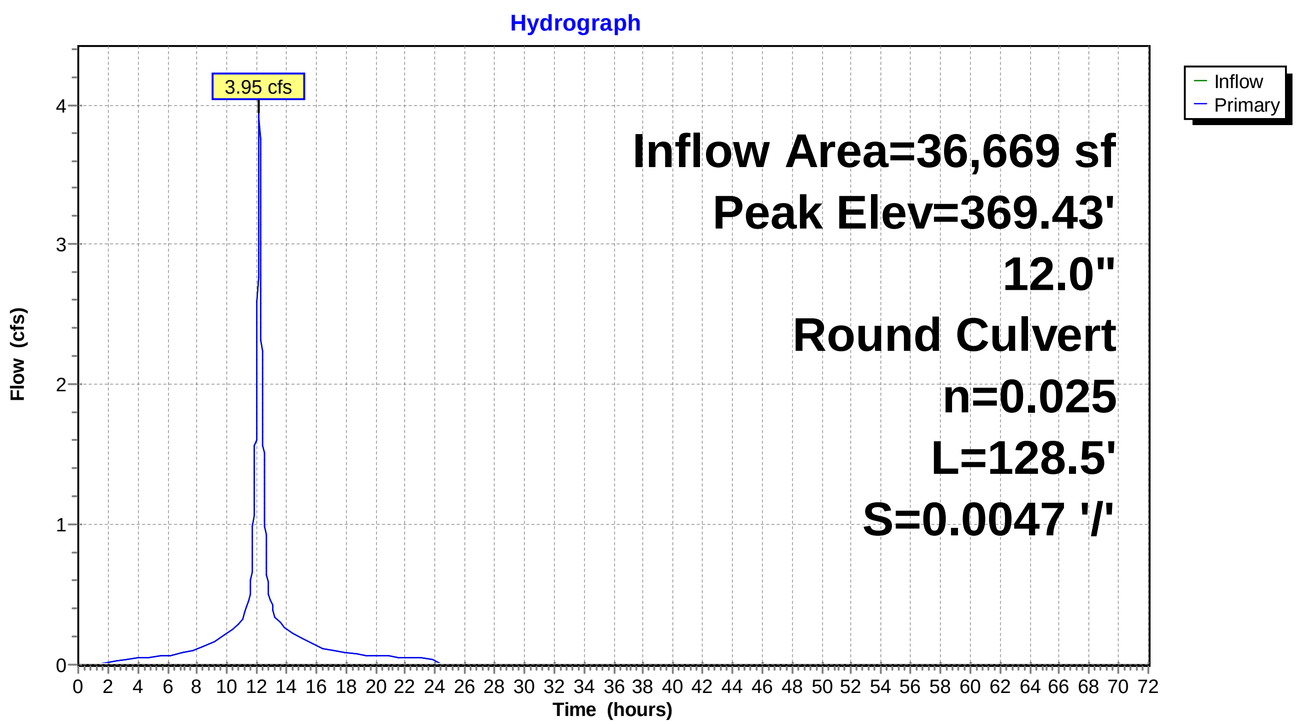
Inflow Area = 36,669 sf, 98.09% Impervious, Inflow Depth = 5.36" for 10 yr event
Inflow = 3.95 cfs @ 12.15 hrs, Volume= 16,386 cf
Outflow = 3.95 cfs @ 12.15 hrs, Volume= 16,386 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.95 cfs @ 12.15 hrs, Volume= 16,386 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 369.43' @ 12.11 hrs
Flood Elev= 23.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.30'	**12.0" Round Culvert** L= 128.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.30' / 17.70' S= 0.0047 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=6.56 cfs @ 12.15 hrs HW=348.61' TW=330.85' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 6.56 cfs @ 8.35 fps)

Pond 1056:



Summary for Pond 1071:

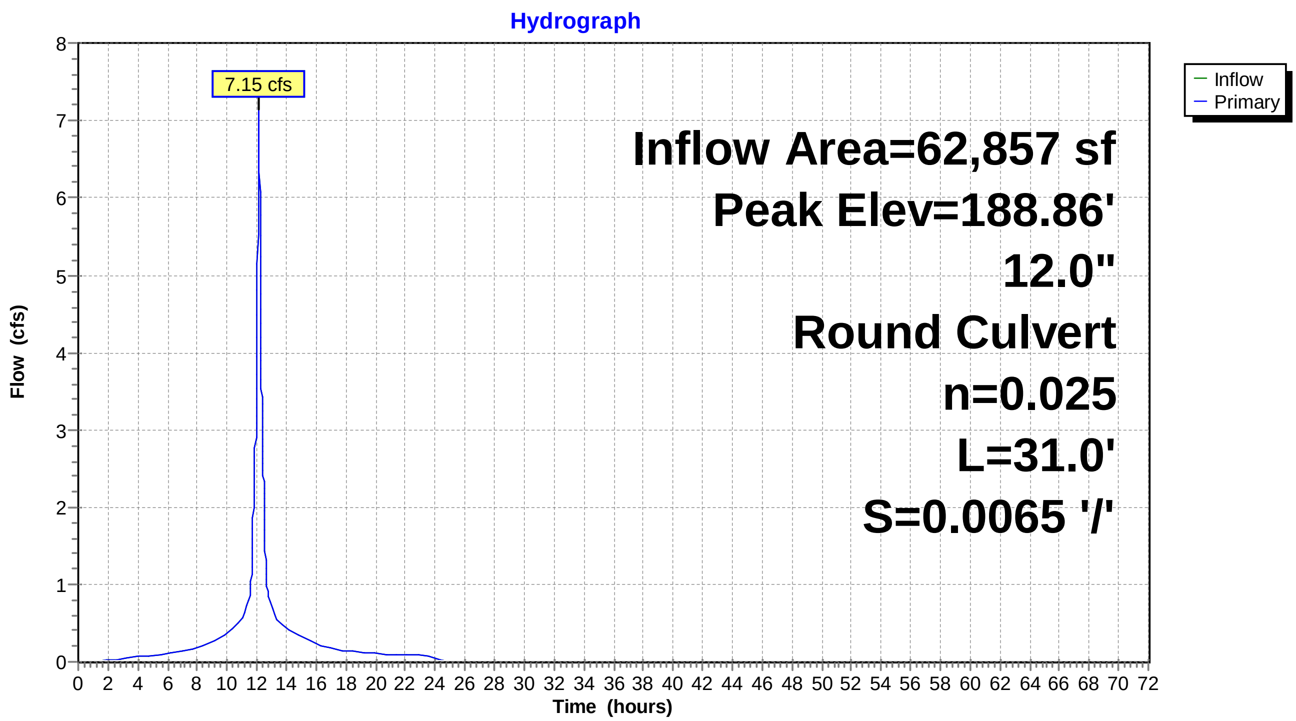
Inflow Area = 62,857 sf, 94.73% Impervious, Inflow Depth = 5.25" for 10 yr event
Inflow = 7.15 cfs @ 12.12 hrs, Volume= 27,475 cf
Outflow = 7.15 cfs @ 12.12 hrs, Volume= 27,475 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.15 cfs @ 12.12 hrs, Volume= 27,475 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 188.86' @ 12.11 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.50'	**12.0" Round Culvert** L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.50' / 17.30' S= 0.0065 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=8.08 cfs @ 12.12 hrs HW=187.80' TW=179.41' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.08 cfs @ 10.29 fps)

Pond 1071:



Summary for Pond 1072:

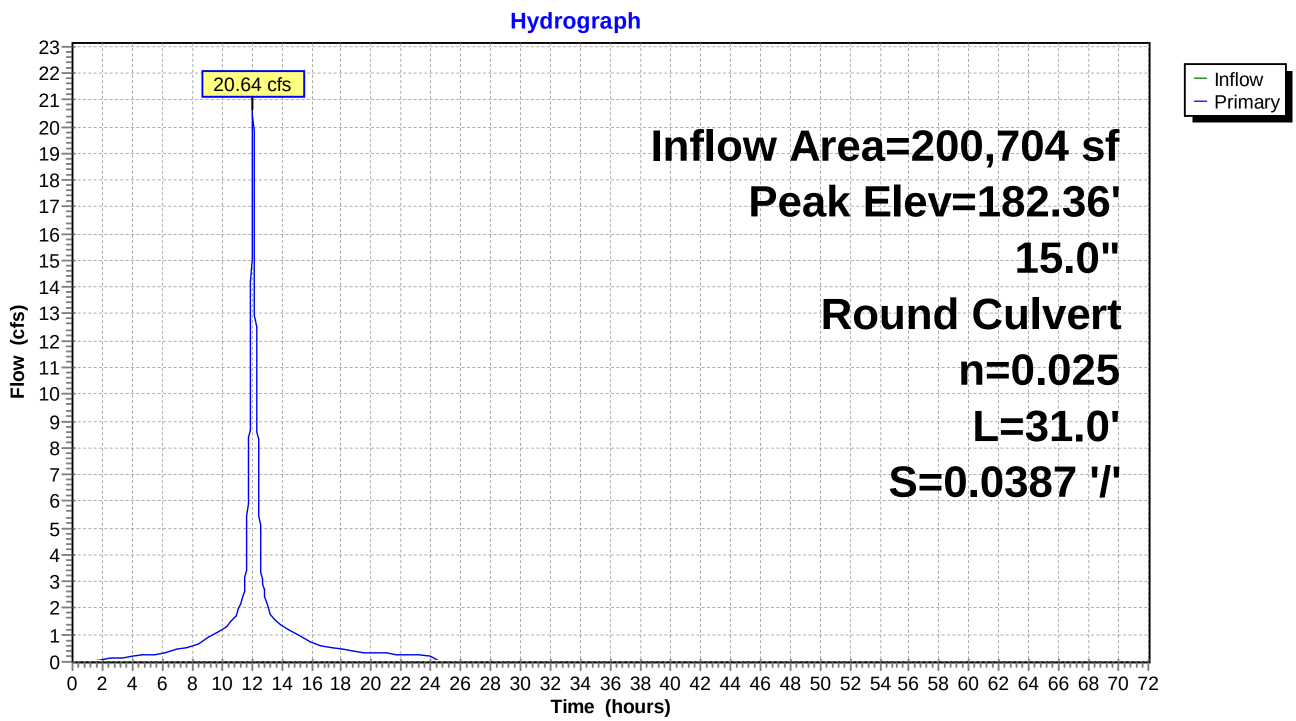
Inflow Area = 200,704 sf, 95.31% Impervious, Inflow Depth = 5.25" for 10 yr event
Inflow = 20.64 cfs @ 12.09 hrs, Volume= 87,878 cf
Outflow = 20.64 cfs @ 12.09 hrs, Volume= 87,878 cf, Atten= 0%, Lag= 0.0 min
Primary = 20.64 cfs @ 12.09 hrs, Volume= 87,878 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 182.36' @ 12.10 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.10'	**15.0" Round Culvert** L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.10' / 15.90' S= 0.0387 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=19.37 cfs @ 12.09 hrs HW=180.01' TW=163.87' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 19.37 cfs @ 15.78 fps)

Pond 1072:



Summary for Pond 1128:

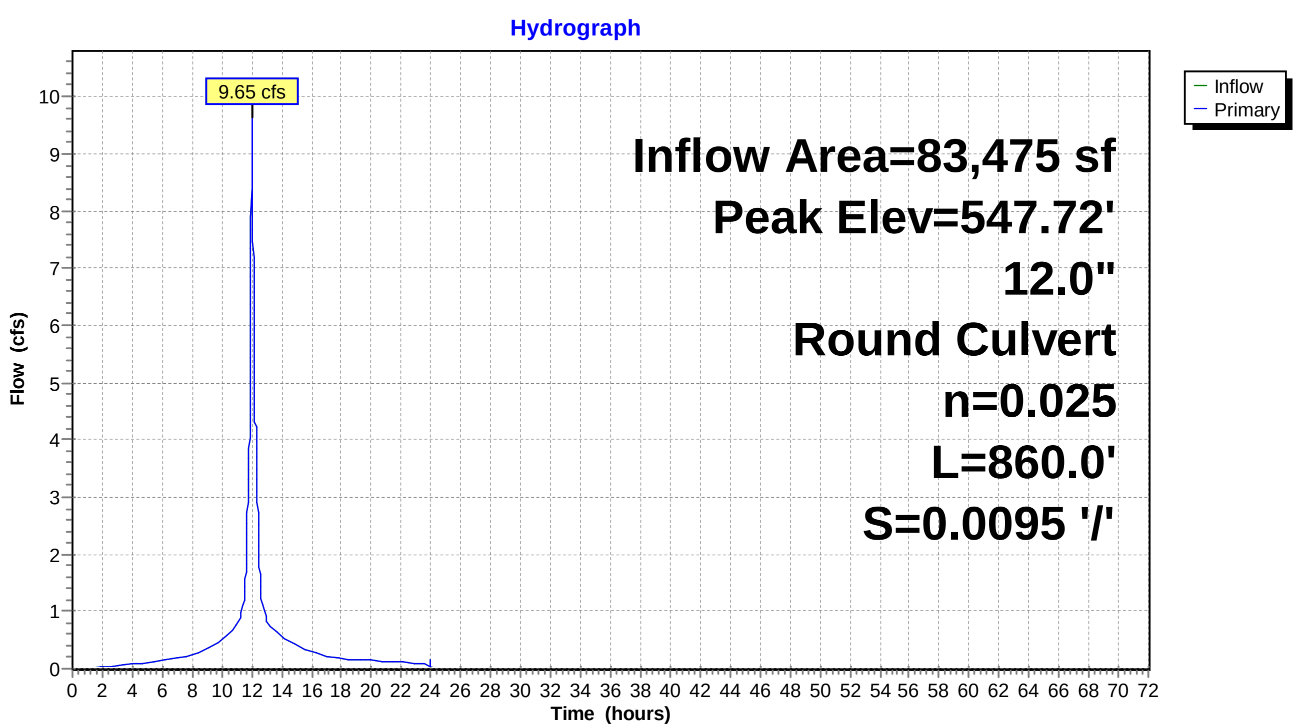
Inflow Area = 83,475 sf, 95.62% Impervious, Inflow Depth = 5.24" for 10 yr event
Inflow = 9.65 cfs @ 12.01 hrs, Volume= 36,450 cf
Outflow = 9.65 cfs @ 12.01 hrs, Volume= 36,450 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.65 cfs @ 12.01 hrs, Volume= 36,450 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 547.72' @ 12.06 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.90'	**12.0" Round Culvert** L= 860.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.90' / 14.70' S= 0.0095 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=9.20 cfs @ 12.01 hrs HW=490.86' TW=274.92' (Dynamic Tailwater)
1=Culvert (Outlet Controls 9.20 cfs @ 11.71 fps)

Pond 1128:



Summary for Pond 1147:

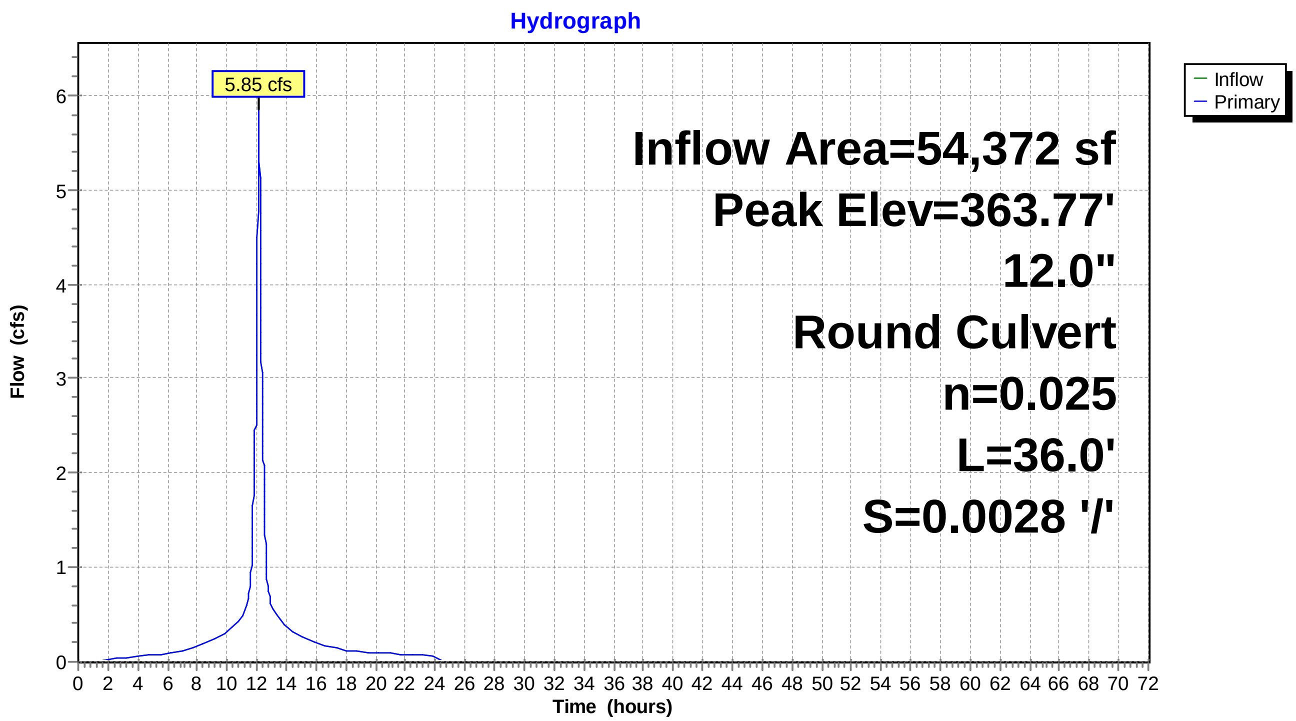
Inflow Area = 54,372 sf, 95.51% Impervious, Inflow Depth = 5.29" for 10 yr event
Inflow = 5.85 cfs @ 12.12 hrs, Volume= 23,953 cf
Outflow = 5.85 cfs @ 12.12 hrs, Volume= 23,953 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.85 cfs @ 12.12 hrs, Volume= 23,953 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 363.77' @ 12.10 hrs
Flood Elev= 22.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.30'	**12.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.30' / 18.20' S= 0.0028 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=8.93 cfs @ 12.12 hrs HW=355.86' TW=344.45' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.93 cfs @ 11.37 fps)

Pond 1147:



Summary for Pond 1148:

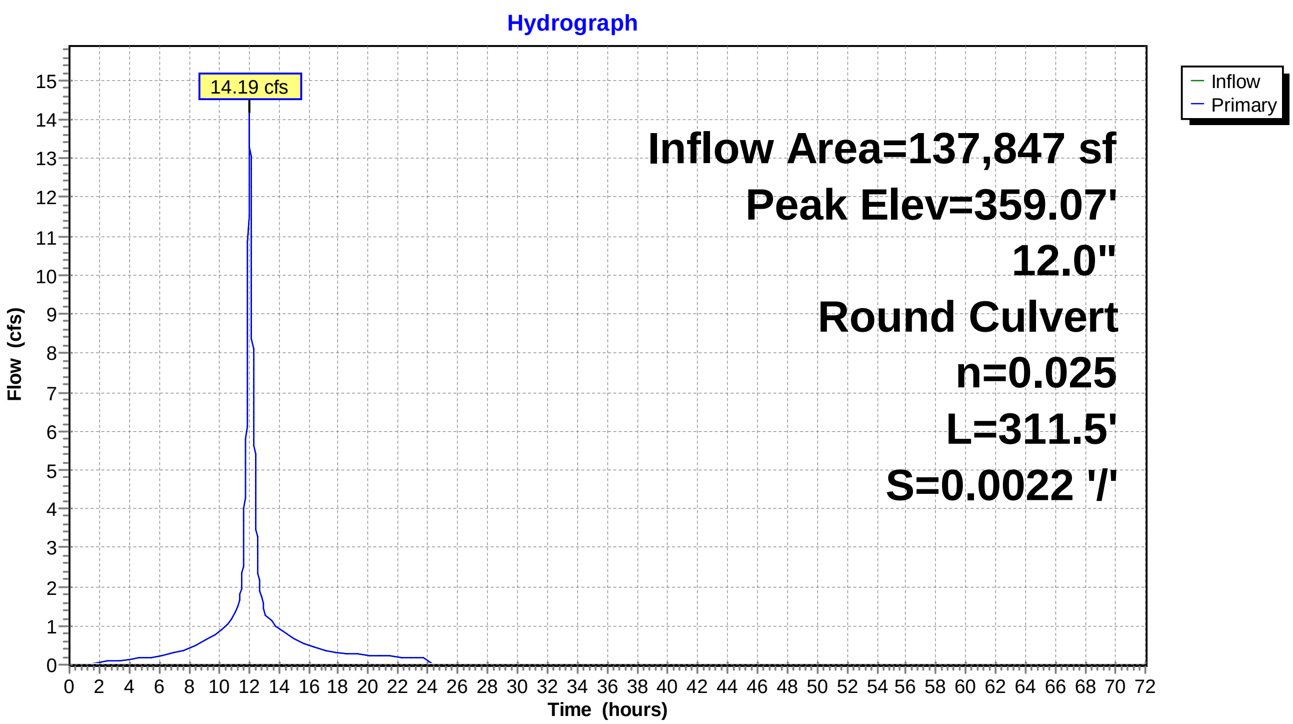
Inflow Area = 137,847 sf, 95.58% Impervious, Inflow Depth = 5.26" for 10 yr event
Inflow = 14.19 cfs @ 12.07 hrs, Volume= 60,403 cf
Outflow = 14.19 cfs @ 12.07 hrs, Volume= 60,403 cf, Atten= 0%, Lag= 0.0 min
Primary = 14.19 cfs @ 12.07 hrs, Volume= 60,403 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 359.07' @ 12.09 hrs
Flood Elev= 22.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.20'	**12.0" Round Culvert** L= 311.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.20' / 17.50' S= 0.0022 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=13.88 cfs @ 12.07 hrs HW=351.10' TW=168.48' (Dynamic Tailwater)
1=Culvert (Outlet Controls 13.88 cfs @ 17.67 fps)

Pond 1148:



Summary for Pond 1186:

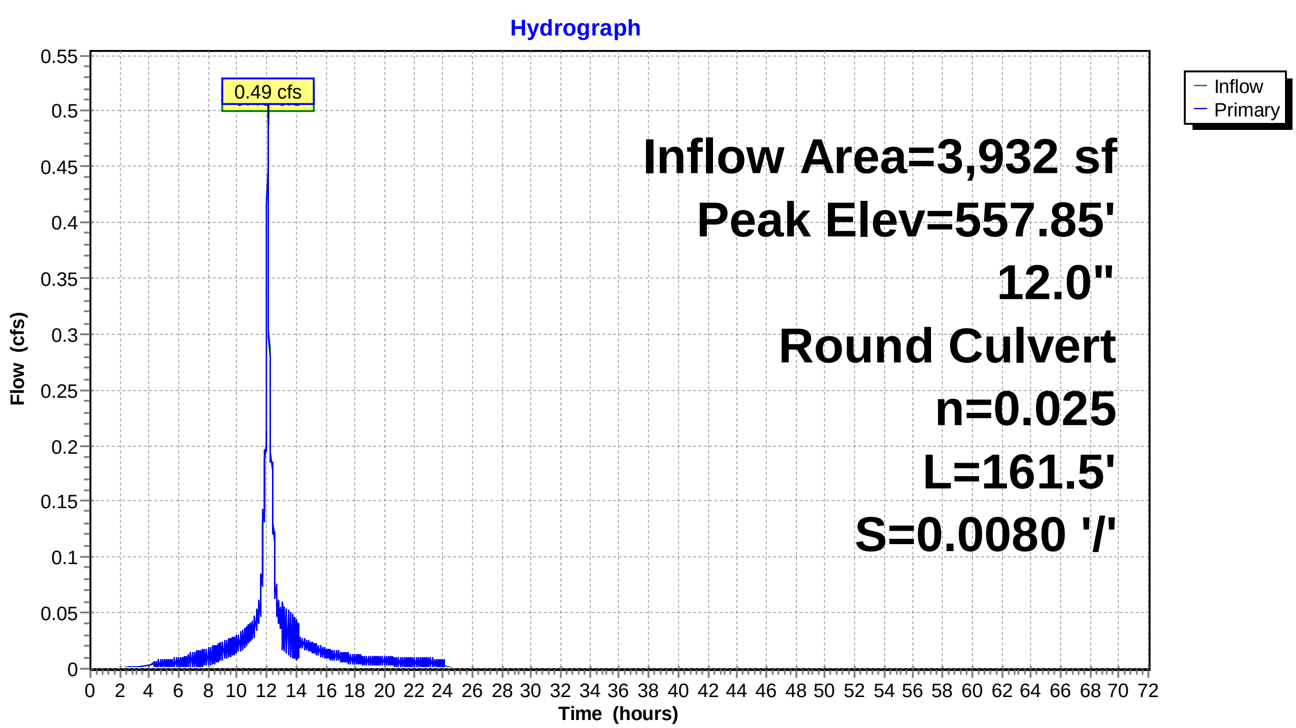
Inflow Area = 3,932 sf, 93.59% Impervious, Inflow Depth = 5.13" for 10 yr event
Inflow = 0.49 cfs @ 12.08 hrs, Volume= 1,681 cf
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 1,680 cf, Atten= 0%, Lag= 0.3 min
Primary = 0.49 cfs @ 12.09 hrs, Volume= 1,680 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 557.85' @ 12.08 hrs
Flood Elev= 23.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.30'	**12.0" Round Culvert** L= 161.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.30' / 21.00' S= 0.0080 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=3.84 cfs @ 12.09 hrs HW=556.08' TW=548.57' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 3.84 cfs @ 4.88 fps)

Pond 1186:



Summary for Pond 1188:

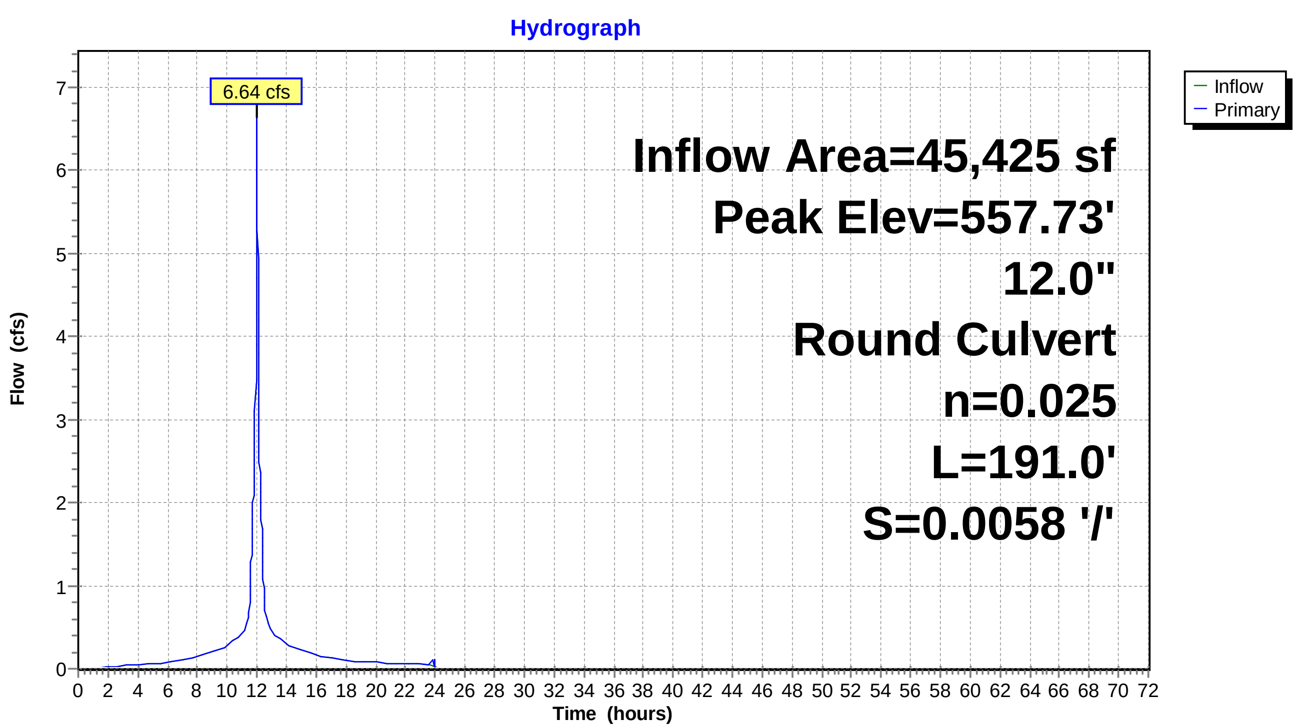
Inflow Area = 45,425 sf, 96.94% Impervious, Inflow Depth = 5.24" for 10 yr event
Inflow = 6.64 cfs @ 12.00 hrs, Volume= 19,817 cf
Outflow = 6.64 cfs @ 12.00 hrs, Volume= 19,818 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.64 cfs @ 12.00 hrs, Volume= 19,818 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 557.73' @ 12.07 hrs
Flood Elev= 25.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**12.0" Round Culvert** L= 191.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.00' / 18.90' S= 0.0058 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.00 hrs HW=450.62' TW=475.27' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 1188:



Summary for Pond 1213:

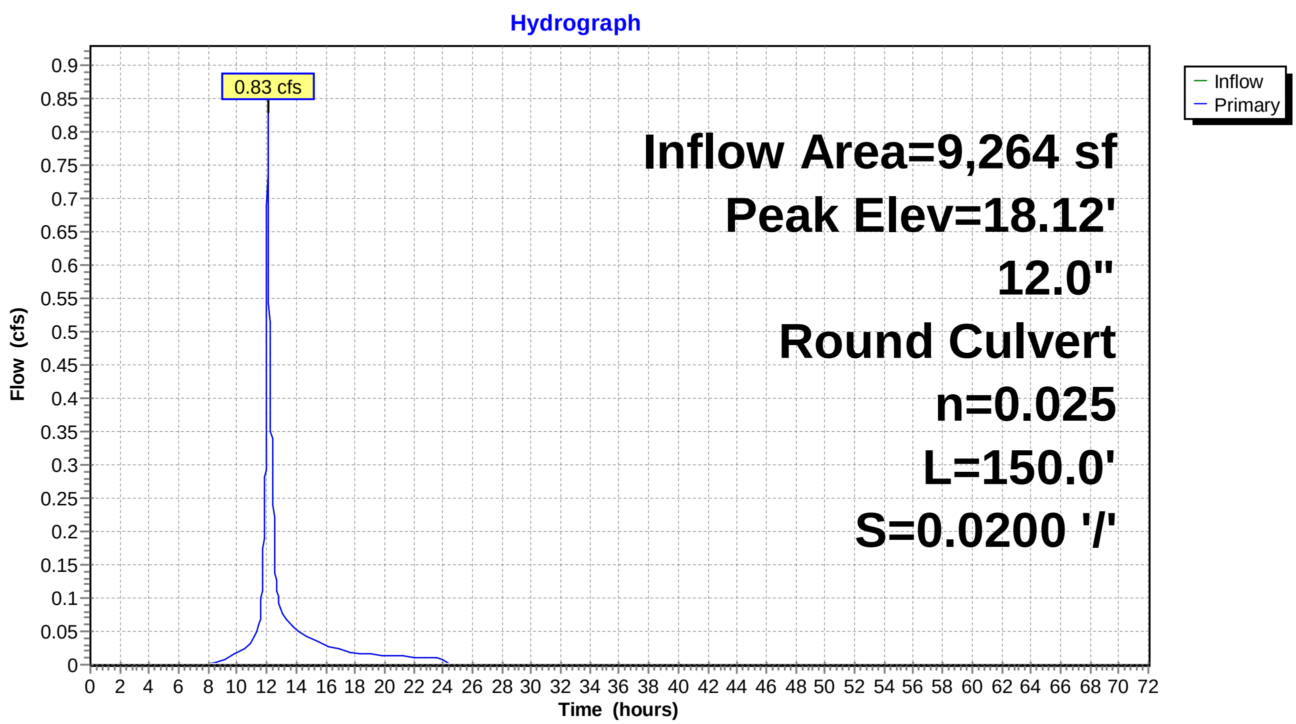
Inflow Area = 9,264 sf, 21.99% Impervious, Inflow Depth = 3.32" for 10 yr event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 2,567 cf
Outflow = 0.83 cfs @ 12.09 hrs, Volume= 2,567 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.83 cfs @ 12.09 hrs, Volume= 2,567 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 18.12' @ 12.09 hrs
Flood Elev= 20.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.60'	**12.0" Round Culvert** L= 150.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.60' / 14.60' S= 0.0200 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.09 hrs HW=18.12' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.83 cfs @ 2.93 fps)

Pond 1213:



Summary for Pond 1251:

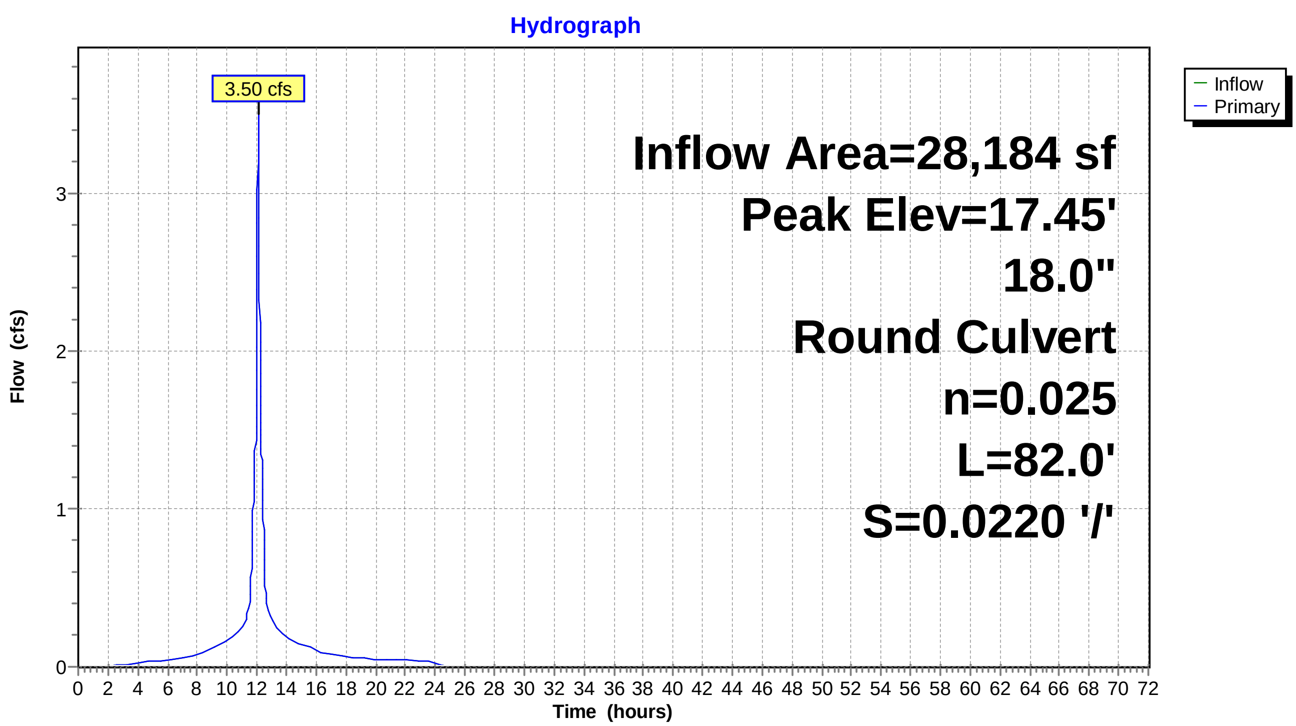
Inflow Area = 28,184 sf, 92.95% Impervious, Inflow Depth = 5.13" for 10 yr event
Inflow = 3.50 cfs @ 12.08 hrs, Volume= 12,047 cf
Outflow = 3.50 cfs @ 12.08 hrs, Volume= 12,047 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.50 cfs @ 12.08 hrs, Volume= 12,047 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 17.45' @ 12.08 hrs
Flood Elev= 20.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.50'	**18.0" Round Culvert** L= 82.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.50' / 14.70' S= 0.0220 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=3.50 cfs @ 12.08 hrs HW=17.45' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 3.50 cfs @ 4.24 fps)

Pond 1251:



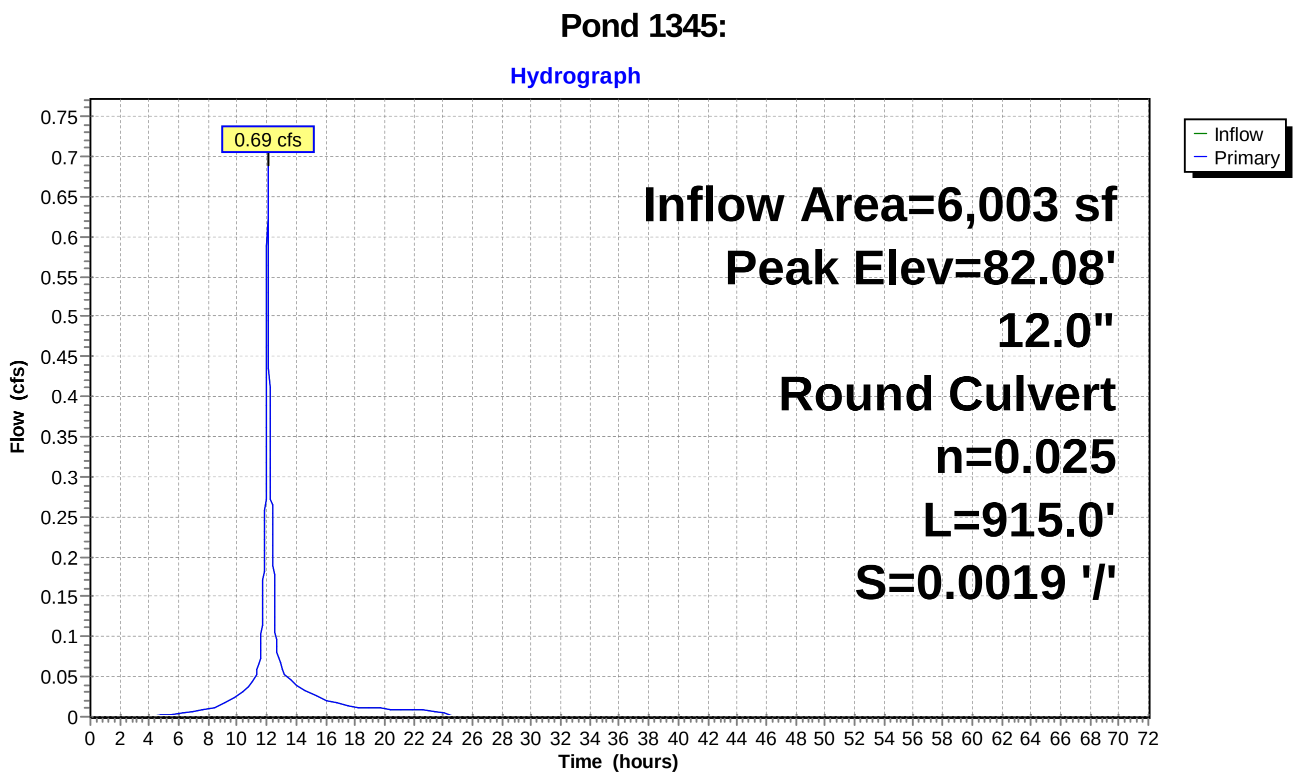
Summary for Pond 1345:

Inflow Area = 6,003 sf, 66.57% Impervious, Inflow Depth = 4.46" for 10 yr event
Inflow = 0.69 cfs @ 12.08 hrs, Volume= 2,230 cf
Outflow = 0.69 cfs @ 12.08 hrs, Volume= 2,230 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.69 cfs @ 12.08 hrs, Volume= 2,230 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 82.08' @ 12.10 hrs
Flood Elev= 23.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.10'	**12.0" Round Culvert** L= 915.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.10' / 17.40' S= 0.0019 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.08 hrs HW=81.27' TW=80.65' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.48 cfs @ 0.61 fps)



Summary for Pond 1346:

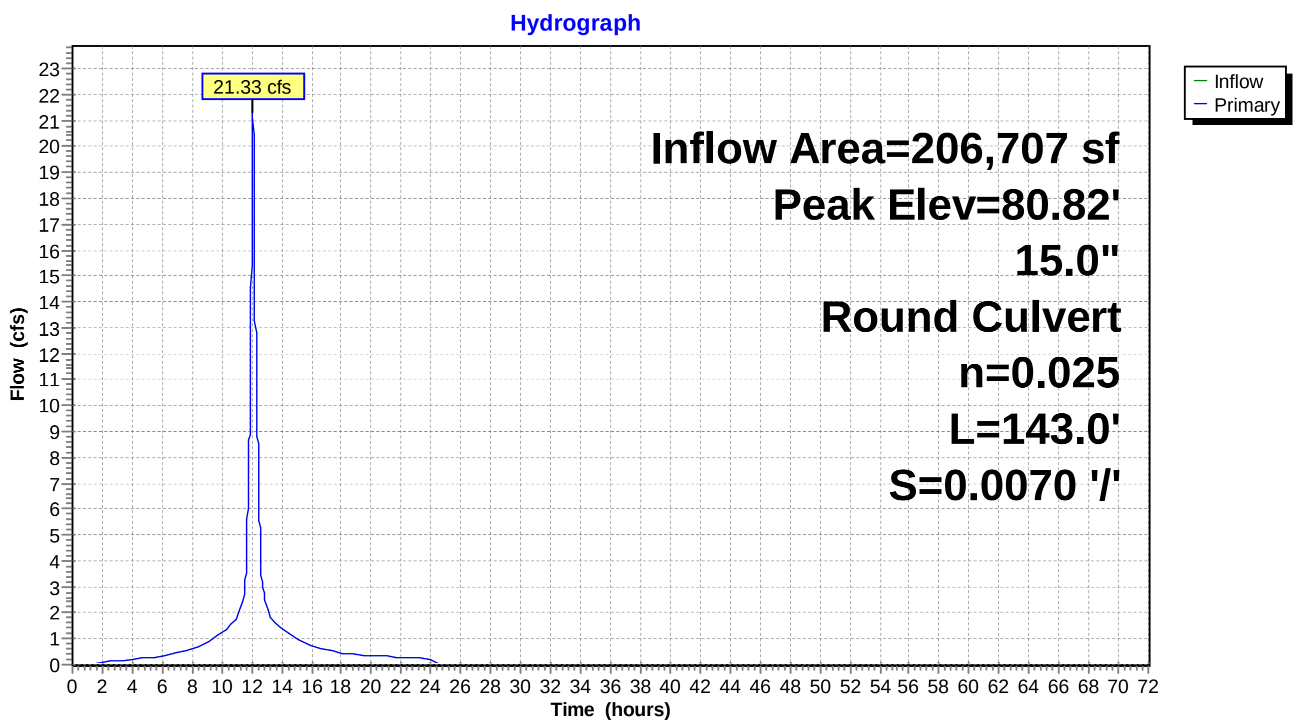
Inflow Area =	206,707 sf,	94.48% Impervious,	Inflow Depth = 5.23"	for 10 yr event
Inflow =	21.33 cfs @	12.09 hrs, Volume=	90,107 cf	
Outflow =	21.33 cfs @	12.09 hrs, Volume=	90,107 cf, Atten= 0%, Lag= 0.0 min	
Primary =	21.33 cfs @	12.09 hrs, Volume=	90,107 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 80.82' @ 12.09 hrs
Flood Elev= 25.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.70'	**15.0" Round Culvert** L= 143.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.70' / 14.70' S= 0.0070 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=21.30 cfs @ 12.09 hrs HW=80.68' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 21.30 cfs @ 17.36 fps)

Pond 1346:



Summary for Pond 1347:

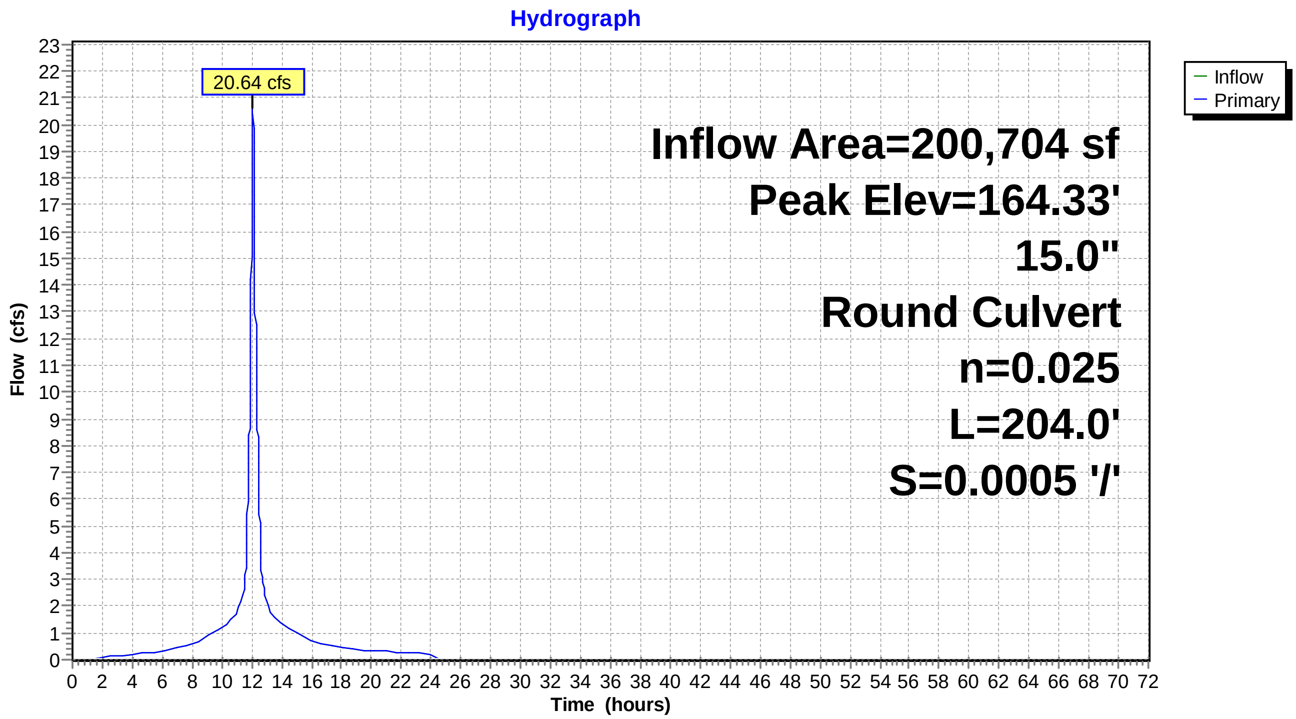
Inflow Area = 200,704 sf, 95.31% Impervious, Inflow Depth = 5.25" for 10 yr event
Inflow = 20.64 cfs @ 12.09 hrs, Volume= 87,878 cf
Outflow = 20.64 cfs @ 12.09 hrs, Volume= 87,878 cf, Atten= 0%, Lag= 0.0 min
Primary = 20.64 cfs @ 12.09 hrs, Volume= 87,878 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 164.33' @ 12.09 hrs
Flood Elev= 23.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.90'	**15.0" Round Culvert** L= 204.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.90' / 15.80' S= 0.0005 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=20.56 cfs @ 12.09 hrs HW=163.87' TW=80.69' (Dynamic Tailwater)
1=Culvert (Outlet Controls 20.56 cfs @ 16.75 fps)

Pond 1347:

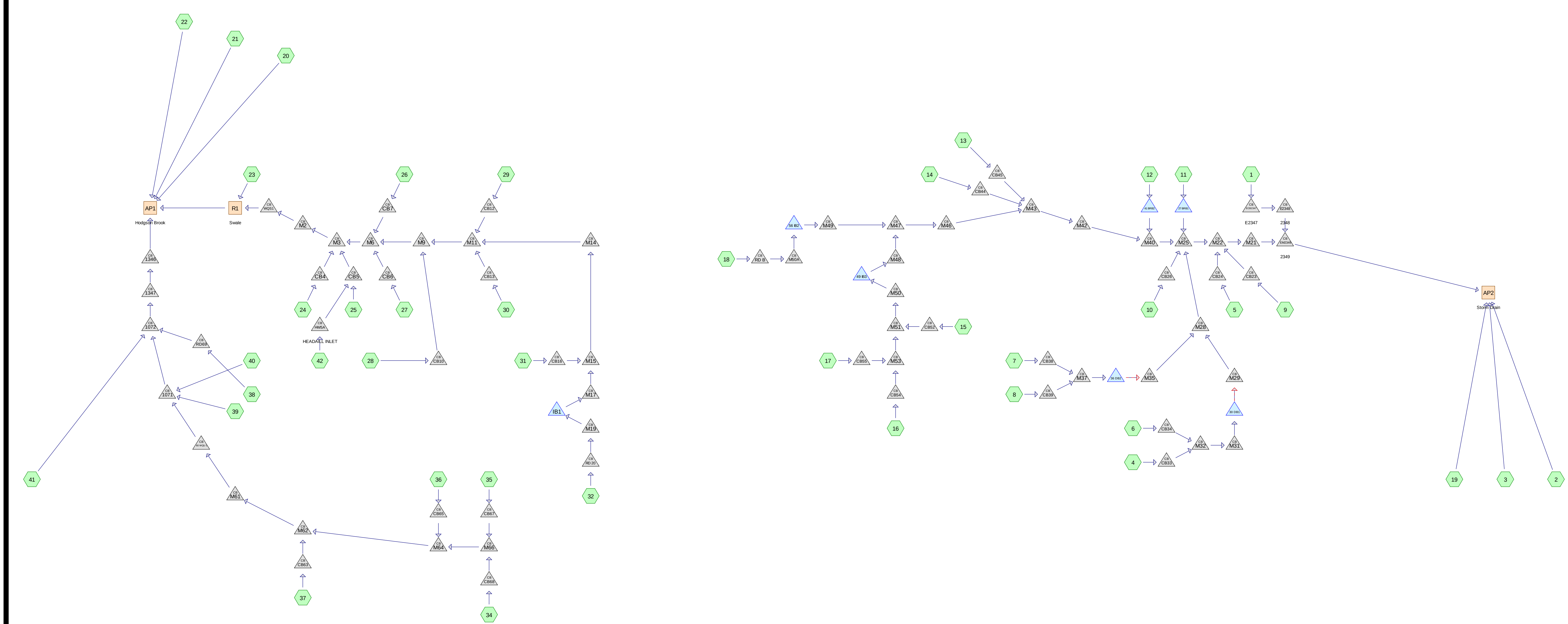


Post-Development Hydrologic Analysis

2-year Type III, 24 hour storm event summary
25-year Type III, 24 hour storm event summary
50-year Type III, 24 hour storm event summary
100-year Type III, 24 hour storm event summary

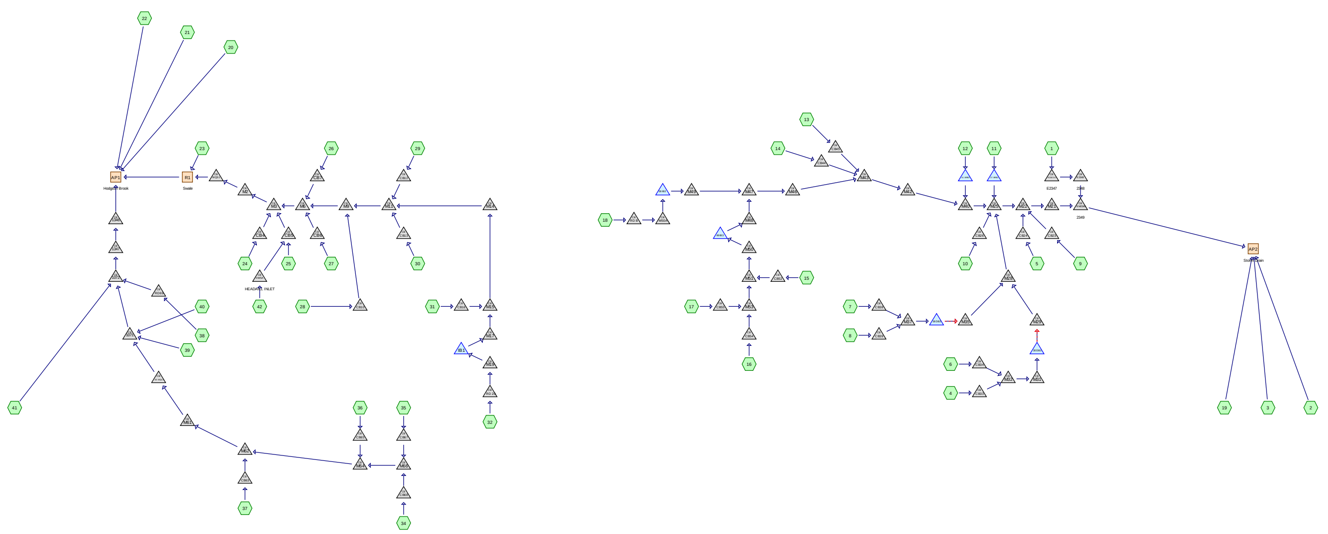
10-year Type III, 24 hour storm event summary, Hydrographs and Detailed Printouts

100%



Subcat Reach Pond Link

Routing Diagram for Proposed
Prepared by {enter your company name here}, Printed 5/20/2019
HydroCAD® 10.00-21 s/n 10611 © 2018 HydroCAD Software Solutions LLC



Subcat

Reach

Pond

Link

Routing Diagram for Proposed
Prepared by {enter your company name here}, Printed 5/20/2019
HydroCAD® 10.00-21 s/n 10611 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
191,976	74	>75% Grass cover, Good, HSG C (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 34, 35, 36, 37, 39, 40, 41, 42)
309,736	98	Paved parking, HSG C (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 34, 35, 36, 37, 39, 40, 41)
28,518	98	Roofs, HSG C (18)
59,288	98	Unconnected roofs, HSG C (32, 38)
589,518	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
589,518	HSG C	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42
0	HSG D	
0	Other	
589,518		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatch Numbers
0	0	191,976	0	0	191,976	>75% Grass cover, Good	
0	0	309,736	0	0	309,736	Paved parking	
0	0	28,518	0	0	28,518	Roofs	
0	0	59,288	0	0	59,288	Unconnected roofs	
0	**0**	**589,518**	**0**	**0**	**589,518**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	27 BRB1	12.43	12.30	26.5	0.0049	0.013	12.0	0.0	0.0
2	30 DB1	13.80	13.75	2.0	0.0250	0.013	12.0	0.0	0.0
3	30 DB1	12.80	12.80	2.0	0.0000	0.013	6.0	0.0	0.0
4	36 DB2	17.79	17.75	2.0	0.0200	0.013	12.0	0.0	0.0
5	36 DB2	16.25	16.25	2.0	0.0000	0.013	6.0	0.0	0.0
6	41 BRB2	14.43	14.33	20.0	0.0050	0.013	12.0	0.0	0.0
7	49 IB3	18.60	18.55	2.0	0.0250	0.013	12.0	0.0	0.0
8	56 IB2	18.60	18.55	2.0	0.0250	0.013	12.0	0.0	0.0
9	60 WQU 2	18.05	17.60	90.0	0.0050	0.013	12.0	0.0	0.0
10	1071	17.50	17.30	31.0	0.0065	0.025	12.0	0.0	0.0
11	1072	17.10	15.90	31.0	0.0387	0.025	15.0	0.0	0.0
12	1346	15.70	14.70	143.0	0.0070	0.025	15.0	0.0	0.0
13	1347	15.90	15.80	204.0	0.0005	0.025	15.0	0.0	0.0
14	CB10	18.87	18.37	56.0	0.0089	0.013	12.0	0.0	0.0
15	CB12	19.30	18.87	7.5	0.0573	0.013	12.0	0.0	0.0
16	CB13	19.30	18.87	7.5	0.0573	0.013	12.0	0.0	0.0
17	CB16	20.82	20.50	65.0	0.0049	0.013	12.0	0.0	0.0
18	CB23	13.20	13.13	15.5	0.0045	0.013	12.0	0.0	0.0
19	CB24	13.92	13.53	39.5	0.0099	0.013	12.0	0.0	0.0
20	CB26	13.00	12.20	14.0	0.0571	0.013	12.0	0.0	0.0
21	CB33	15.00	14.65	63.5	0.0055	0.013	12.0	0.0	0.0
22	CB34	15.50	15.15	24.0	0.0146	0.013	12.0	0.0	0.0
23	CB38	18.00	17.95	5.0	0.0100	0.013	12.0	0.0	0.0
24	CB39	19.00	18.74	53.0	0.0049	0.013	12.0	0.0	0.0
25	CB4	18.56	17.71	24.5	0.0347	0.013	12.0	0.0	0.0
26	CB44	19.50	18.50	15.0	0.0667	0.013	12.0	0.0	0.0
27	CB45	19.50	18.50	15.0	0.0667	0.013	12.0	0.0	0.0
28	CB5	17.60	17.43	33.5	0.0051	0.010	12.0	0.0	0.0
29	CB52	20.38	19.95	86.0	0.0050	0.013	12.0	0.0	0.0
30	CB54	20.24	20.02	44.0	0.0050	0.013	12.0	0.0	0.0
31	CB55	20.86	20.02	69.0	0.0122	0.013	12.0	0.0	0.0
32	CB6	17.83	17.49	13.0	0.0262	0.013	12.0	0.0	0.0
33	CB63	19.37	19.12	50.0	0.0050	0.013	12.0	0.0	0.0
34	CB65	20.60	20.57	3.5	0.0086	0.013	12.0	0.0	0.0
35	CB67	20.93	20.89	7.5	0.0053	0.013	12.0	0.0	0.0
36	CB68	21.15	20.89	52.0	0.0050	0.013	12.0	0.0	0.0
37	CB7	18.28	17.49	16.5	0.0479	0.013	12.0	0.0	0.0
38	E2348	9.70	9.60	15.0	0.0067	0.013	15.0	0.0	0.0
39	ECB2347	9.80	9.70	41.0	0.0024	0.013	15.0	0.0	0.0
40	EM2349	9.60	9.00	87.0	0.0069	0.010	24.0	0.0	0.0
41	HW5A	19.00	17.70	39.0	0.0333	0.013	12.0	0.0	0.0
42	IB1	21.10	21.00	6.0	0.0167	0.013	12.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
43	M11	18.37	17.87	101.0	0.0050	0.013	18.0	0.0	0.0
44	M14	19.27	18.47	160.0	0.0050	0.013	18.0	0.0	0.0
45	M15	20.00	19.37	122.0	0.0052	0.013	18.0	0.0	0.0
46	M17	20.90	20.50	81.0	0.0049	0.013	12.0	0.0	0.0
47	M19	22.60	22.54	2.0	0.0300	0.013	6.0	0.0	0.0
48	M2	16.26	16.22	10.0	0.0040	0.013	24.0	0.0	0.0
49	M21	10.29	9.70	119.0	0.0050	0.013	24.0	0.0	0.0
50	M22	10.73	10.39	67.5	0.0050	0.013	24.0	0.0	0.0
51	M25	11.10	10.83	54.0	0.0050	0.013	24.0	0.0	0.0
52	M28	12.57	12.31	51.5	0.0050	0.013	18.0	0.0	0.0
53	M29	12.70	12.67	6.0	0.0050	0.013	12.0	0.0	0.0
54	M3	16.71	16.36	70.5	0.0050	0.013	24.0	0.0	0.0
55	M31	14.40	14.34	2.0	0.0300	0.013	12.0	0.0	0.0
56	M32	14.55	14.50	5.0	0.0100	0.013	12.0	0.0	0.0
57	M35	16.15	15.94	43.0	0.0049	0.013	12.0	0.0	0.0
58	M37	17.85	17.79	2.0	0.0300	0.013	12.0	0.0	0.0
59	M40	11.78	11.20	116.5	0.0050	0.013	24.0	0.0	0.0
60	M42	12.35	11.88	93.5	0.0050	0.013	18.0	0.0	0.0
61	M43	13.11	12.45	133.0	0.0050	0.013	18.0	0.0	0.0
62	M46	14.21	13.61	119.5	0.0050	0.013	18.0	0.0	0.0
63	M47	14.48	14.31	34.5	0.0049	0.013	18.0	0.0	0.0
64	M48	15.10	15.00	6.5	0.0154	0.013	12.0	0.0	0.0
65	M49	15.80	15.00	160.5	0.0050	0.013	12.0	0.0	0.0
66	M50	18.92	18.92	2.0	0.0000	0.013	18.0	0.0	0.0
67	M50A	20.10	20.04	3.0	0.0200	0.013	6.0	0.0	0.0
68	M51	18.97	18.92	5.0	0.0100	0.013	18.0	0.0	0.0
69	M53	19.52	19.07	91.0	0.0049	0.013	18.0	0.0	0.0
70	M6	16.99	16.81	36.0	0.0050	0.013	24.0	0.0	0.0
71	M61	18.18	18.15	3.0	0.0100	0.013	12.0	0.0	0.0
72	M62	19.02	18.28	147.5	0.0050	0.013	12.0	0.0	0.0
73	M64	20.47	19.12	269.5	0.0050	0.013	12.0	0.0	0.0
74	M66	20.79	20.57	45.0	0.0049	0.013	12.0	0.0	0.0
75	M9	17.37	17.09	56.5	0.0050	0.013	24.0	0.0	0.0
76	RD 20	22.78	22.70	15.5	0.0052	0.013	6.0	0.0	0.0
77	RD B	20.78	20.20	116.0	0.0050	0.013	6.0	0.0	0.0
78	RD69	18.16	18.00	31.0	0.0052	0.013	6.0	0.0	0.0
79	WQS1	16.12	16.00	25.0	0.0048	0.013	24.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1: Runoff Area=5,130 sf 38.99% Impervious Runoff Depth=1.50"
Tc=6.0 min CN=83 Runoff=0.21 cfs 639 cf

Subcatchment 2: Runoff Area=6,350 sf 44.08% Impervious Runoff Depth=1.64"
Tc=6.0 min CN=85 Runoff=0.28 cfs 867 cf

Subcatchment 3: Runoff Area=17,966 sf 63.26% Impervious Runoff Depth=1.95"
Tc=6.0 min CN=89 Runoff=0.94 cfs 2,926 cf

Subcatchment 4: Runoff Area=14,022 sf 87.36% Impervious Runoff Depth=2.51"
Tc=6.0 min CN=95 Runoff=0.90 cfs 2,931 cf

Subcatchment 5: Runoff Area=1,807 sf 96.73% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=97 Runoff=0.12 cfs 409 cf

Subcatchment 6: Runoff Area=7,003 sf 96.19% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=97 Runoff=0.47 cfs 1,586 cf

Subcatchment 7: Runoff Area=2,462 sf 89.85% Impervious Runoff Depth=2.61"
Tc=6.0 min CN=96 Runoff=0.16 cfs 536 cf

Subcatchment 8: Runoff Area=6,973 sf 92.96% Impervious Runoff Depth=2.61"
Tc=6.0 min CN=96 Runoff=0.46 cfs 1,517 cf

Subcatchment 9: Runoff Area=3,790 sf 85.17% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=94 Runoff=0.24 cfs 761 cf

Subcatchment 10: Runoff Area=17,202 sf 78.76% Impervious Runoff Depth=2.31"
Tc=6.0 min CN=93 Runoff=1.04 cfs 3,314 cf

Subcatchment 11: Runoff Area=5,038 sf 50.34% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=86 Runoff=0.23 cfs 720 cf

Subcatchment 12: Runoff Area=12,361 sf 62.85% Impervious Runoff Depth=1.95"
Tc=6.0 min CN=89 Runoff=0.65 cfs 2,013 cf

Subcatchment 13: Runoff Area=2,486 sf 78.32% Impervious Runoff Depth=2.31"
Tc=6.0 min CN=93 Runoff=0.15 cfs 479 cf

Subcatchment 14: Runoff Area=5,742 sf 40.56% Impervious Runoff Depth=1.57"
Tc=6.0 min CN=84 Runoff=0.24 cfs 749 cf

Subcatchment 15: Runoff Area=27,997 sf 82.23% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=94 Runoff=1.74 cfs 5,618 cf

Subcatchment 16: Runoff Area=44,751 sf 69.67% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=91 Runoff=2.53 cfs 7,933 cf

Subcatchment 17: Runoff Area=18,629 sf 55.15% Impervious Runoff Depth=1.79"
Tc=6.0 min CN=87 Runoff=0.90 cfs 2,781 cf

Subcatchment 18: Runoff Area=28,518 sf 100.00% Impervious Runoff Depth=2.83"
Tc=6.0 min CN=98 Runoff=1.94 cfs 6,721 cf

Subcatchment 19: Runoff Area=4,108 sf 17.31% Impervious Runoff Depth=1.17"
Tc=6.0 min CN=78 Runoff=0.13 cfs 401 cf

Subcatchment 20: Runoff Area=1,524 sf 100.00% Impervious Runoff Depth=2.83"
Tc=6.0 min CN=98 Runoff=0.10 cfs 359 cf

Subcatchment 21: Runoff Area=792 sf 66.04% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=90 Runoff=0.04 cfs 135 cf

Subcatchment 22: Runoff Area=42,162 sf 1.21% Impervious Runoff Depth=0.95"
Tc=6.0 min CN=74 Runoff=1.01 cfs 3,326 cf

Subcatchment 23: Runoff Area=14,462 sf 0.00% Impervious Runoff Depth=0.95"
Flow Length=115' Slope=0.0011 '/' Tc=6.0 min CN=74 Runoff=0.35 cfs 1,141 cf

Subcatchment 24: Runoff Area=6,729 sf 56.26% Impervious Runoff Depth=1.87"
Flow Length=176' Tc=6.0 min CN=88 Runoff=0.34 cfs 1,050 cf

Subcatchment 25: Runoff Area=6,442 sf 34.31% Impervious Runoff Depth=1.43"
Tc=0.0 min CN=82 Runoff=0.30 cfs 766 cf

Subcatchment 26: Runoff Area=14,265 sf 86.53% Impervious Runoff Depth=2.51"
Tc=0.0 min CN=95 Runoff=1.12 cfs 2,981 cf

Subcatchment 27: Runoff Area=5,289 sf 76.01% Impervious Runoff Depth=2.22"
Flow Length=71' Slope=0.1342 '/' Tc=7.7 min CN=92 Runoff=0.29 cfs 978 cf

Subcatchment 28: Runoff Area=18,464 sf 86.68% Impervious Runoff Depth=2.51"
Tc=6.0 min CN=95 Runoff=1.18 cfs 3,859 cf

Subcatchment 29: Runoff Area=8,912 sf 80.50% Impervious Runoff Depth=2.31"
Tc=0.0 min CN=93 Runoff=0.66 cfs 1,717 cf

Subcatchment 30: Runoff Area=18,830 sf 38.59% Impervious Runoff Depth=1.50"
Flow Length=349' Slope=0.0138 '/' Tc=6.0 min CN=83 Runoff=0.76 cfs 2,346 cf

Subcatchment 31: Runoff Area=15,371 sf 10.01% Impervious Runoff Depth=1.06"
Tc=6.0 min CN=76 Runoff=0.42 cfs 1,352 cf

Subcatchment 32: Runoff Area=37,137 sf 100.00% Impervious Runoff Depth=2.83"
Tc=6.0 min CN=98 Runoff=2.53 cfs 8,752 cf

Subcatchment 34: Runoff Area=10,350 sf 83.59% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=94 Runoff=0.64 cfs 2,077 cf

Subcatchment 35: Runoff Area=10,664 sf 91.11% Impervious Runoff Depth=2.61"
Tc=6.0 min CN=96 Runoff=0.70 cfs 2,320 cf

Subcatchment 36: Runoff Area=35,753 sf 88.57% Impervious Runoff Depth=2.51"
Tc=6.0 min CN=95 Runoff=2.29 cfs 7,472 cf

Subcatchment 37: Runoff Area=49,536 sf 84.69% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=94 Runoff=3.08 cfs 9,941 cf

Subcatchment 38: Runoff Area=22,151 sf 100.00% Impervious Runoff Depth=2.83"
Tc=6.0 min CN=98 Runoff=1.51 cfs 5,220 cf

Subcatchment 39: Runoff Area=11,218 sf 43.45% Impervious Runoff Depth=1.57"
Tc=6.0 min CN=84 Runoff=0.47 cfs 1,464 cf

Subcatchment 40: Runoff Area=13,195 sf 78.02% Impervious Runoff Depth=2.31"
Tc=6.0 min CN=93 Runoff=0.80 cfs 2,542 cf

Subcatchment 41: Runoff Area=7,175 sf 49.39% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=86 Runoff=0.33 cfs 1,025 cf

Subcatchment 42: Runoff Area=6,762 sf 0.00% Impervious Runoff Depth=0.95"
Tc=6.0 min CN=74 Runoff=0.16 cfs 533 cf

Reach AP1: Hodgson Brook Inflow=15.85 cfs 55,672 cf
Outflow=15.85 cfs 55,672 cf

Reach AP2: Storm Drain Inflow=5.38 cfs 25,896 cf
Outflow=5.38 cfs 25,896 cf

Reach R1: Swale Avg. Flow Depth=0.36' Max Vel=2.65 fps Inflow=4.92 cfs 19,791 cf
n=0.035 L=100.0' S=0.0200 '/' Capacity=333.24 cfs Outflow=4.89 cfs 19,791 cf

Pond 27 BRB1: Peak Elev=15.65' Storage=154 cf Inflow=0.23 cfs 720 cf
Outflow=0.06 cfs 720 cf

Pond 30 DB1: Peak Elev=13.80' Storage=705 cf Inflow=1.37 cfs 4,517 cf
Primary=0.00 cfs 0 cf Secondary=0.70 cfs 4,515 cf Outflow=0.70 cfs 4,515 cf

Pond 36 DB2: Peak Elev=16.85' Storage=226 cf Inflow=0.62 cfs 2,053 cf
Primary=0.00 cfs 0 cf Secondary=0.45 cfs 2,052 cf Outflow=0.45 cfs 2,052 cf

Pond 41 BRB2: Peak Elev=17.88' Storage=620 cf Inflow=0.65 cfs 2,013 cf
Outflow=0.10 cfs 2,013 cf

Pond 49 IB3: Peak Elev=19.08' Storage=0.137 af Inflow=5.17 cfs 16,332 cf
Discarded=0.42 cfs 12,901 cf Primary=0.68 cfs 3,432 cf Outflow=1.10 cfs 16,332 cf

Pond 56 IB2: Peak Elev=19.21' Storage=1,741 cf Inflow=1.94 cfs 6,721 cf
Discarded=0.11 cfs 4,101 cf Primary=1.00 cfs 2,620 cf Outflow=1.11 cfs 6,721 cf

Pond 60 WQU 2: Peak Elev=64.74' Inflow=6.72 cfs 21,811 cf
12.0" Round Culvert n=0.013 L=90.0' S=0.0050 '/' Outflow=6.72 cfs 21,811 cf

Pond 1071: Peak Elev=60.34' Inflow=7.99 cfs 25,816 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=7.99 cfs 25,816 cf

Pond 1072: Peak Elev=52.65' Inflow=9.83 cfs 32,061 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=9.83 cfs 32,061 cf

Pond 1346: Peak Elev=29.72' Inflow=9.83 cfs 32,061 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=9.83 cfs 32,061 cf

Pond 1347: Peak Elev=48.61' Inflow=9.83 cfs 32,061 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=9.83 cfs 32,061 cf

Pond CB10: Peak Elev=19.47' Inflow=1.18 cfs 3,859 cf
12.0" Round Culvert n=0.013 L=56.0' S=0.0089 '/' Outflow=1.18 cfs 3,859 cf

Pond CB12: Peak Elev=19.71' Inflow=0.66 cfs 1,717 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=0.66 cfs 1,717 cf

Pond CB13: Peak Elev=19.74' Inflow=0.76 cfs 2,346 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=0.76 cfs 2,346 cf

Pond CB16: Peak Elev=21.20' Inflow=0.42 cfs 1,352 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=0.42 cfs 1,352 cf

Pond CB23: Peak Elev=13.49' Inflow=0.24 cfs 761 cf
12.0" Round Culvert n=0.013 L=15.5' S=0.0045 '/' Outflow=0.24 cfs 761 cf

Pond CB24: Peak Elev=14.09' Inflow=0.12 cfs 409 cf
12.0" Round Culvert n=0.013 L=39.5' S=0.0099 '/' Outflow=0.12 cfs 409 cf

Pond CB26: Peak Elev=13.53' Inflow=1.04 cfs 3,314 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0571 '/' Outflow=1.04 cfs 3,314 cf

Pond CB33: Peak Elev=15.64' Inflow=0.90 cfs 2,931 cf
12.0" Round Culvert n=0.013 L=63.5' S=0.0055 '/' Outflow=0.90 cfs 2,931 cf

Pond CB34: Peak Elev=15.84' Inflow=0.47 cfs 1,586 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0146 '/' Outflow=0.47 cfs 1,586 cf

Pond CB38: Peak Elev=18.33' Inflow=0.16 cfs 536 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.16 cfs 536 cf

Pond CB39: Peak Elev=19.40' Inflow=0.46 cfs 1,517 cf
12.0" Round Culvert n=0.013 L=53.0' S=0.0049 '/' Outflow=0.46 cfs 1,517 cf

Pond CB4: Peak Elev=18.85' Inflow=0.34 cfs 1,050 cf
12.0" Round Culvert n=0.013 L=24.5' S=0.0347 '/' Outflow=0.34 cfs 1,050 cf

Pond CB44: Peak Elev=19.74' Inflow=0.24 cfs 749 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.24 cfs 749 cf

Pond CB45: Peak Elev=19.69' Inflow=0.15 cfs 479 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.15 cfs 479 cf

Pond CB5: Peak Elev=18.09' Inflow=0.38 cfs 1,299 cf
12.0" Round Culvert n=0.010 L=33.5' S=0.0051 '/' Outflow=0.38 cfs 1,299 cf

Pond CB52: Peak Elev=21.26' Inflow=1.74 cfs 5,618 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0050 '/' Outflow=1.74 cfs 5,618 cf

Pond CB54: Peak Elev=21.42' Inflow=2.53 cfs 7,933 cf
12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=2.53 cfs 7,933 cf

Pond CB55: Peak Elev=21.43' Inflow=0.90 cfs 2,781 cf
12.0" Round Culvert n=0.013 L=69.0' S=0.0122 '/' Outflow=0.90 cfs 2,781 cf

Pond CB6: Peak Elev=18.29' Inflow=0.29 cfs 978 cf
12.0" Round Culvert n=0.013 L=13.0' S=0.0262 '/' Outflow=0.29 cfs 978 cf

Pond CB63: Peak Elev=73.30' Inflow=3.08 cfs 9,941 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=3.08 cfs 9,941 cf

Pond CB65: Peak Elev=75.39' Inflow=2.29 cfs 7,472 cf
12.0" Round Culvert n=0.013 L=3.5' S=0.0086 '/' Outflow=2.29 cfs 7,472 cf

Pond CB67: Peak Elev=75.26' Inflow=0.70 cfs 2,320 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0053 '/' Outflow=0.70 cfs 2,320 cf

Pond CB68: Peak Elev=75.26' Inflow=0.64 cfs 2,077 cf
12.0" Round Culvert n=0.013 L=52.0' S=0.0050 '/' Outflow=0.64 cfs 2,077 cf

Pond CB7: Peak Elev=18.83' Inflow=1.12 cfs 2,981 cf
12.0" Round Culvert n=0.013 L=16.5' S=0.0479 '/' Outflow=1.12 cfs 2,981 cf

Pond E2348: 2348 Peak Elev=10.47' Inflow=0.21 cfs 639 cf
15.0" Round Culvert n=0.013 L=15.0' S=0.0067 '/' Outflow=0.21 cfs 639 cf

Pond ECB2347: E2347 Peak Elev=10.48' Inflow=0.21 cfs 639 cf
15.0" Round Culvert n=0.013 L=41.0' S=0.0024 '/' Outflow=0.21 cfs 639 cf

Pond EM2349: 2349 Peak Elev=10.47' Inflow=4.10 cfs 21,702 cf
24.0" Round Culvert n=0.010 L=87.0' S=0.0069 '/' Outflow=4.10 cfs 21,702 cf

Pond HW5A: HEADAILL INLET Peak Elev=19.19' Inflow=0.16 cfs 533 cf
12.0" Round Culvert n=0.013 L=39.0' S=0.0333 '/' Outflow=0.16 cfs 533 cf

Pond IB1: Peak Elev=21.63' Storage=2,774 cf Inflow=2.53 cfs 8,752 cf
Discarded=0.12 cfs 5,683 cf Primary=0.79 cfs 3,069 cf Outflow=0.90 cfs 8,752 cf

Pond M11: Peak Elev=19.10' Inflow=1.88 cfs 8,484 cf
18.0" Round Culvert n=0.013 L=101.0' S=0.0050 '/' Outflow=1.88 cfs 8,484 cf

Pond M14: Peak Elev=19.80' Inflow=0.99 cfs 4,421 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=0.99 cfs 4,421 cf

Pond M15: Peak Elev=20.51' Inflow=0.99 cfs 4,421 cf
18.0" Round Culvert n=0.013 L=122.0' S=0.0052 '/' Outflow=0.99 cfs 4,421 cf

Pond M17: Peak Elev=21.43' Inflow=0.79 cfs 3,069 cf
12.0" Round Culvert n=0.013 L=81.0' S=0.0049 '/' Outflow=0.79 cfs 3,069 cf

Pond M19: Peak Elev=30.01' Inflow=2.53 cfs 8,752 cf
6.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=2.53 cfs 8,752 cf

Pond M2: Peak Elev=17.72' Inflow=4.57 cfs 18,650 cf
24.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=4.58 cfs 18,650 cf

Pond M21: Peak Elev=11.26' Inflow=3.91 cfs 21,063 cf
24.0" Round Culvert n=0.013 L=119.0' S=0.0050 '/' Outflow=3.91 cfs 21,063 cf

Pond M22: Peak Elev=11.75' Inflow=3.91 cfs 21,063 cf
24.0" Round Culvert n=0.013 L=67.5' S=0.0050 '/' Outflow=3.91 cfs 21,063 cf

Pond M25: Peak Elev=12.13' Inflow=3.60 cfs 19,893 cf
24.0" Round Culvert n=0.013 L=54.0' S=0.0050 '/' Outflow=3.60 cfs 19,893 cf

Pond M28: Peak Elev=13.13' Inflow=1.14 cfs 6,567 cf
18.0" Round Culvert n=0.013 L=51.5' S=0.0050 '/' Outflow=1.14 cfs 6,567 cf

Pond M29: Peak Elev=13.26' Inflow=0.70 cfs 4,515 cf
12.0" Round Culvert n=0.013 L=6.0' S=0.0050 '/' Outflow=0.70 cfs 4,515 cf

Pond M3: Peak Elev=18.04' Inflow=4.57 cfs 18,650 cf
24.0" Round Culvert n=0.013 L=70.5' S=0.0050 '/' Outflow=4.57 cfs 18,650 cf

Pond M31: Peak Elev=15.12' Inflow=1.37 cfs 4,517 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=1.37 cfs 4,517 cf

Pond M32: Peak Elev=15.33' Inflow=1.37 cfs 4,517 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=1.37 cfs 4,517 cf

Pond M35: Peak Elev=16.55' Inflow=0.45 cfs 2,052 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0049 '/' Outflow=0.45 cfs 2,052 cf

Pond M37: Peak Elev=18.30' Inflow=0.62 cfs 2,053 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=0.62 cfs 2,053 cf

Pond M40: Peak Elev=12.50' Inflow=1.72 cfs 9,293 cf
24.0" Round Culvert n=0.013 L=116.5' S=0.0050 '/' Outflow=1.72 cfs 9,293 cf

Pond M42: Peak Elev=13.04' Inflow=1.62 cfs 7,280 cf
18.0" Round Culvert n=0.013 L=93.5' S=0.0050 '/' Outflow=1.62 cfs 7,280 cf

Pond M43: Peak Elev=13.79' Inflow=1.62 cfs 7,280 cf
18.0" Round Culvert n=0.013 L=133.0' S=0.0050 '/' Outflow=1.62 cfs 7,280 cf

Pond M46: Peak Elev=14.83' Inflow=1.44 cfs 6,052 cf
18.0" Round Culvert n=0.013 L=119.5' S=0.0050 '/' Outflow=1.44 cfs 6,052 cf

Pond M47: Peak Elev=15.14' Inflow=1.44 cfs 6,052 cf
18.0" Round Culvert n=0.013 L=34.5' S=0.0049 '/' Outflow=1.44 cfs 6,052 cf

Pond M48: Peak Elev=15.56' Inflow=0.68 cfs 3,432 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=0.68 cfs 3,432 cf

Pond M49: Peak Elev=16.40' Inflow=1.00 cfs 2,620 cf
12.0" Round Culvert n=0.013 L=160.5' S=0.0050 '/' Outflow=1.00 cfs 2,620 cf

Pond M50: Peak Elev=20.34' Inflow=5.17 cfs 16,332 cf
18.0" Round Culvert n=0.013 L=2.0' S=0.0000 '/' Outflow=5.17 cfs 16,332 cf

Pond M50A: Peak Elev=24.57' Inflow=1.94 cfs 6,721 cf
6.0" Round Culvert n=0.013 L=3.0' S=0.0200 '/' Outflow=1.94 cfs 6,721 cf

Pond M51: Peak Elev=20.70' Inflow=5.17 cfs 16,332 cf
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=5.17 cfs 16,332 cf

Pond M53: Peak Elev=20.97' Inflow=3.42 cfs 10,714 cf
18.0" Round Culvert n=0.013 L=91.0' S=0.0049 '/' Outflow=3.42 cfs 10,714 cf

Pond M6: Peak Elev=18.25' Inflow=3.90 cfs 16,302 cf
24.0" Round Culvert n=0.013 L=36.0' S=0.0050 '/' Outflow=3.90 cfs 16,302 cf

Pond M61: Peak Elev=67.37' Inflow=6.72 cfs 21,811 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0100 '/' Outflow=6.72 cfs 21,811 cf

Pond M62: Peak Elev=72.78' Inflow=6.72 cfs 21,811 cf
12.0" Round Culvert n=0.013 L=147.5' S=0.0050 '/' Outflow=6.72 cfs 21,811 cf

Pond M64: Peak Elev=75.16' Inflow=3.63 cfs 11,870 cf
12.0" Round Culvert n=0.013 L=269.5' S=0.0050 '/' Outflow=3.63 cfs 11,870 cf

Pond M66: Peak Elev=75.24' Inflow=1.34 cfs 4,397 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0049 '/' Outflow=1.34 cfs 4,397 cf

Pond M9: Peak Elev=18.47' Inflow=3.04 cfs 12,343 cf
24.0" Round Culvert n=0.013 L=56.5' S=0.0050 '/' Outflow=3.04 cfs 12,343 cf

Pond RD 20: Peak Elev=37.11' Inflow=2.53 cfs 8,752 cf
6.0" Round Culvert n=0.013 L=15.5' S=0.0052 '/' Outflow=2.53 cfs 8,752 cf

Pond RD B: Peak Elev=40.74' Inflow=1.94 cfs 6,721 cf
6.0" Round Culvert n=0.013 L=116.0' S=0.0050 '/' Outflow=1.94 cfs 6,721 cf

Pond RD69: Peak Elev=55.99' Inflow=1.51 cfs 5,220 cf
6.0" Round Culvert n=0.013 L=31.0' S=0.0052 '/' Outflow=1.51 cfs 5,220 cf

Pond WQS1: Peak Elev=17.56' Inflow=4.58 cfs 18,650 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0048 '/' Outflow=4.58 cfs 18,650 cf

Total Runoff Area = 589,518 sf Runoff Volume = 104,255 cf Average Runoff Depth = 2.12"
32.56% Pervious = 191,976 sf 67.44% Impervious = 397,542 sf

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1: Runoff Area=5,130 sf 38.99% Impervious Runoff Depth=2.02"
Tc=6.0 min CN=83 Runoff=0.28 cfs 863 cf

Subcatchment 2: Runoff Area=6,350 sf 44.08% Impervious Runoff Depth=2.18"
Tc=6.0 min CN=85 Runoff=0.37 cfs 1,155 cf

Subcatchment 3: Runoff Area=17,966 sf 63.26% Impervious Runoff Depth=2.53"
Tc=6.0 min CN=89 Runoff=1.21 cfs 3,793 cf

Subcatchment 4: Runoff Area=14,022 sf 87.36% Impervious Runoff Depth=3.13"
Tc=6.0 min CN=95 Runoff=1.10 cfs 3,653 cf

Subcatchment 5: Runoff Area=1,807 sf 96.73% Impervious Runoff Depth=3.34"
Tc=6.0 min CN=97 Runoff=0.15 cfs 503 cf

Subcatchment 6: Runoff Area=7,003 sf 96.19% Impervious Runoff Depth=3.34"
Tc=6.0 min CN=97 Runoff=0.57 cfs 1,951 cf

Subcatchment 7: Runoff Area=2,462 sf 89.85% Impervious Runoff Depth=3.23"
Tc=6.0 min CN=96 Runoff=0.20 cfs 663 cf

Subcatchment 8: Runoff Area=6,973 sf 92.96% Impervious Runoff Depth=3.23"
Tc=6.0 min CN=96 Runoff=0.56 cfs 1,879 cf

Subcatchment 9: Runoff Area=3,790 sf 85.17% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=94 Runoff=0.29 cfs 954 cf

Subcatchment 10: Runoff Area=17,202 sf 78.76% Impervious Runoff Depth=2.92"
Tc=6.0 min CN=93 Runoff=1.30 cfs 4,184 cf

Subcatchment 11: Runoff Area=5,038 sf 50.34% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=86 Runoff=0.31 cfs 952 cf

Subcatchment 12: Runoff Area=12,361 sf 62.85% Impervious Runoff Depth=2.53"
Tc=6.0 min CN=89 Runoff=0.83 cfs 2,610 cf

Subcatchment 13: Runoff Area=2,486 sf 78.32% Impervious Runoff Depth=2.92"
Tc=6.0 min CN=93 Runoff=0.19 cfs 605 cf

Subcatchment 14: Runoff Area=5,742 sf 40.56% Impervious Runoff Depth=2.10"
Tc=6.0 min CN=84 Runoff=0.32 cfs 1,005 cf

Subcatchment 15: Runoff Area=27,997 sf 82.23% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=94 Runoff=2.16 cfs 7,048 cf

Subcatchment 16: Runoff Area=44,751 sf 69.67% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=91 Runoff=3.20 cfs 10,149 cf

Subcatchment 17: Runoff Area=18,629 sf 55.15% Impervious Runoff Depth=2.35"
Tc=6.0 min CN=87 Runoff=1.17 cfs 3,654 cf

Subcatchment 18: Runoff Area=28,518 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=2.35 cfs 8,213 cf

Subcatchment 19: Runoff Area=4,108 sf 17.31% Impervious Runoff Depth=1.64"
Tc=6.0 min CN=78 Runoff=0.18 cfs 563 cf

Subcatchment 20: Runoff Area=1,524 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=0.13 cfs 439 cf

Subcatchment 21: Runoff Area=792 sf 66.04% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=90 Runoff=0.05 cfs 173 cf

Subcatchment 22: Runoff Area=42,162 sf 1.21% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=74 Runoff=1.51 cfs 4,823 cf

Subcatchment 23: Runoff Area=14,462 sf 0.00% Impervious Runoff Depth=1.37"
Flow Length=115' Slope=0.0011 '/' Tc=6.0 min CN=74 Runoff=0.52 cfs 1,654 cf

Subcatchment 24: Runoff Area=6,729 sf 56.26% Impervious Runoff Depth=2.44"
Flow Length=176' Tc=6.0 min CN=88 Runoff=0.44 cfs 1,370 cf

Subcatchment 25: Runoff Area=6,442 sf 34.31% Impervious Runoff Depth=1.94"
Tc=0.0 min CN=82 Runoff=0.41 cfs 1,042 cf

Subcatchment 26: Runoff Area=14,265 sf 86.53% Impervious Runoff Depth=3.13"
Tc=0.0 min CN=95 Runoff=1.37 cfs 3,716 cf

Subcatchment 27: Runoff Area=5,289 sf 76.01% Impervious Runoff Depth=2.82"
Flow Length=71' Slope=0.1342 '/' Tc=7.7 min CN=92 Runoff=0.37 cfs 1,242 cf

Subcatchment 28: Runoff Area=18,464 sf 86.68% Impervious Runoff Depth=3.13"
Tc=6.0 min CN=95 Runoff=1.45 cfs 4,810 cf

Subcatchment 29: Runoff Area=8,912 sf 80.50% Impervious Runoff Depth=2.92"
Tc=0.0 min CN=93 Runoff=0.82 cfs 2,168 cf

Subcatchment 30: Runoff Area=18,830 sf 38.59% Impervious Runoff Depth=2.02"
Flow Length=349' Slope=0.0138 '/' Tc=6.0 min CN=83 Runoff=1.02 cfs 3,169 cf

Subcatchment 31: Runoff Area=15,371 sf 10.01% Impervious Runoff Depth=1.50"
Tc=6.0 min CN=76 Runoff=0.61 cfs 1,927 cf

Subcatchment 32: Runoff Area=37,137 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=3.06 cfs 10,695 cf

Subcatchment 34: Runoff Area=10,350 sf 83.59% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=94 Runoff=0.80 cfs 2,606 cf

Subcatchment 35: Runoff Area=10,664 sf 91.11% Impervious Runoff Depth=3.23"
Tc=6.0 min CN=96 Runoff=0.86 cfs 2,873 cf

Subcatchment 36: Runoff Area=35,753 sf 88.57% Impervious Runoff Depth=3.13"
Tc=6.0 min CN=95 Runoff=2.82 cfs 9,313 cf

Subcatchment 37: Runoff Area=49,536 sf 84.69% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=94 Runoff=3.82 cfs 12,471 cf

Subcatchment 38: Runoff Area=22,151 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=1.83 cfs 6,379 cf

Subcatchment 39: Runoff Area=11,218 sf 43.45% Impervious Runoff Depth=2.10"
Tc=6.0 min CN=84 Runoff=0.63 cfs 1,963 cf

Subcatchment 40: Runoff Area=13,195 sf 78.02% Impervious Runoff Depth=2.92"
Tc=6.0 min CN=93 Runoff=0.99 cfs 3,209 cf

Subcatchment 41: Runoff Area=7,175 sf 49.39% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=86 Runoff=0.44 cfs 1,356 cf

Subcatchment 42: Runoff Area=6,762 sf 0.00% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=74 Runoff=0.24 cfs 774 cf

Reach AP1: Hodgson Brook Inflow=20.54 cfs 71,941 cf
Outflow=20.54 cfs 71,941 cf

Reach AP2: Storm Drain Inflow=7.16 cfs 35,135 cf
Outflow=7.16 cfs 35,135 cf

Reach R1: Swale Avg. Flow Depth=0.43' Max Vel=2.92 fps Inflow=6.70 cfs 26,335 cf
n=0.035 L=100.0' S=0.0200 '/' Capacity=333.24 cfs Outflow=6.68 cfs 26,335 cf

Pond 27 BRB1: Peak Elev=15.73' Storage=246 cf Inflow=0.31 cfs 952 cf
Outflow=0.07 cfs 952 cf

Pond 30 DB1: Peak Elev=14.00' Storage=881 cf Inflow=1.68 cfs 5,604 cf
Primary=0.14 cfs 95 cf Secondary=0.76 cfs 5,506 cf Outflow=0.90 cfs 5,602 cf

Pond 36 DB2: Peak Elev=16.93' Storage=282 cf Inflow=0.76 cfs 2,542 cf
Primary=0.00 cfs 0 cf Secondary=0.52 cfs 2,541 cf Outflow=0.52 cfs 2,541 cf

Pond 41 BRB2: Peak Elev=18.02' Storage=867 cf Inflow=0.83 cfs 2,610 cf
Outflow=0.14 cfs 2,610 cf

Pond 49 IB3: Peak Elev=19.29' Storage=0.170 af Inflow=6.53 cfs 20,852 cf
Discarded=0.46 cfs 14,699 cf Primary=1.25 cfs 6,153 cf Outflow=1.71 cfs 20,852 cf

Pond 56 IB2: Peak Elev=19.33' Storage=1,965 cf Inflow=2.35 cfs 8,213 cf
Discarded=0.12 cfs 4,561 cf Primary=1.37 cfs 3,653 cf Outflow=1.49 cfs 8,213 cf

Pond 60 WQU 2: Peak Elev=90.95' Inflow=8.29 cfs 27,263 cf
12.0" Round Culvert n=0.013 L=90.0' S=0.0050 '/' Outflow=8.29 cfs 27,263 cf

Pond 1071: Peak Elev=84.26' Inflow=9.92 cfs 32,436 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=9.92 cfs 32,436 cf

Pond 1072: Peak Elev=72.38' Inflow=12.18 cfs 40,171 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=12.18 cfs 40,171 cf

Pond 1346: Peak Elev=37.12' Inflow=12.18 cfs 40,171 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=12.18 cfs 40,171 cf

Pond 1347: Peak Elev=66.17' Inflow=12.18 cfs 40,171 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=12.18 cfs 40,171 cf

Pond CB10: Peak Elev=19.55' Inflow=1.45 cfs 4,810 cf
12.0" Round Culvert n=0.013 L=56.0' S=0.0089 '/' Outflow=1.45 cfs 4,810 cf

Pond CB12: Peak Elev=19.76' Inflow=0.82 cfs 2,168 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=0.82 cfs 2,168 cf

Pond CB13: Peak Elev=19.82' Inflow=1.02 cfs 3,169 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=1.02 cfs 3,169 cf

Pond CB16: Peak Elev=21.28' Inflow=0.61 cfs 1,927 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=0.61 cfs 1,927 cf

Pond CB23: Peak Elev=13.53' Inflow=0.29 cfs 954 cf
12.0" Round Culvert n=0.013 L=15.5' S=0.0045 '/' Outflow=0.29 cfs 954 cf

Pond CB24: Peak Elev=14.11' Inflow=0.15 cfs 503 cf
12.0" Round Culvert n=0.013 L=39.5' S=0.0099 '/' Outflow=0.15 cfs 503 cf

Pond CB26: Peak Elev=13.60' Inflow=1.30 cfs 4,184 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0571 '/' Outflow=1.30 cfs 4,184 cf

Pond CB33: Peak Elev=15.75' Inflow=1.10 cfs 3,653 cf
12.0" Round Culvert n=0.013 L=63.5' S=0.0055 '/' Outflow=1.10 cfs 3,653 cf

Pond CB34: Peak Elev=15.88' Inflow=0.57 cfs 1,951 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0146 '/' Outflow=0.57 cfs 1,951 cf

Pond CB38: Peak Elev=18.39' Inflow=0.20 cfs 663 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.20 cfs 663 cf

Pond CB39: Peak Elev=19.44' Inflow=0.56 cfs 1,879 cf
12.0" Round Culvert n=0.013 L=53.0' S=0.0049 '/' Outflow=0.56 cfs 1,879 cf

Pond CB4: Peak Elev=18.89' Inflow=0.44 cfs 1,370 cf
12.0" Round Culvert n=0.013 L=24.5' S=0.0347 '/' Outflow=0.44 cfs 1,370 cf

Pond CB44: Peak Elev=19.78' Inflow=0.32 cfs 1,005 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.32 cfs 1,005 cf

Pond CB45: Peak Elev=19.71' Inflow=0.19 cfs 605 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.19 cfs 605 cf

Pond CB5: Peak Elev=18.32' Inflow=0.54 cfs 1,815 cf
12.0" Round Culvert n=0.010 L=33.5' S=0.0051 '/' Outflow=0.54 cfs 1,815 cf

Pond CB52: Peak Elev=21.61' Inflow=2.16 cfs 7,048 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0050 '/' Outflow=2.16 cfs 7,048 cf

Pond CB54: Peak Elev=22.14' Inflow=3.20 cfs 10,149 cf
12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=3.20 cfs 10,149 cf

Pond CB55: Peak Elev=21.69' Inflow=1.17 cfs 3,654 cf
12.0" Round Culvert n=0.013 L=69.0' S=0.0122 '/' Outflow=1.17 cfs 3,654 cf

Pond CB6: Peak Elev=18.54' Inflow=0.37 cfs 1,242 cf
12.0" Round Culvert n=0.013 L=13.0' S=0.0262 '/' Outflow=0.37 cfs 1,242 cf

Pond CB63: Peak Elev=104.02' Inflow=3.82 cfs 12,471 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=3.82 cfs 12,471 cf

Pond CB65: Peak Elev=107.16' Inflow=2.82 cfs 9,313 cf
12.0" Round Culvert n=0.013 L=3.5' S=0.0086 '/' Outflow=2.82 cfs 9,313 cf

Pond CB67: Peak Elev=106.96' Inflow=0.86 cfs 2,873 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0053 '/' Outflow=0.86 cfs 2,873 cf

Pond CB68: Peak Elev=106.96' Inflow=0.80 cfs 2,606 cf
12.0" Round Culvert n=0.013 L=52.0' S=0.0050 '/' Outflow=0.80 cfs 2,606 cf

Pond CB7: Peak Elev=18.90' Inflow=1.37 cfs 3,716 cf
12.0" Round Culvert n=0.013 L=16.5' S=0.0479 '/' Outflow=1.37 cfs 3,716 cf

Pond E2348: 2348 Peak Elev=10.64' Inflow=0.28 cfs 863 cf
15.0" Round Culvert n=0.013 L=15.0' S=0.0067 '/' Outflow=0.28 cfs 863 cf

Pond ECB2347: E2347 Peak Elev=10.65' Inflow=0.28 cfs 863 cf
15.0" Round Culvert n=0.013 L=41.0' S=0.0024 '/' Outflow=0.28 cfs 863 cf

Pond EM2349: 2349 Peak Elev=10.64' Inflow=5.54 cfs 29,624 cf
24.0" Round Culvert n=0.010 L=87.0' S=0.0069 '/' Outflow=5.54 cfs 29,624 cf

Pond HW5A: HEADAILL INLET Peak Elev=19.24' Inflow=0.24 cfs 774 cf
12.0" Round Culvert n=0.013 L=39.0' S=0.0333 '/' Outflow=0.24 cfs 774 cf

Pond IB1: Peak Elev=21.78' Storage=3,246 cf Inflow=3.06 cfs 10,695 cf
Discarded=0.12 cfs 6,232 cf Primary=1.17 cfs 4,463 cf Outflow=1.29 cfs 10,695 cf

Pond M11: Peak Elev=19.33' Inflow=2.77 cfs 11,727 cf
18.0" Round Culvert n=0.013 L=101.0' S=0.0050 '/' Outflow=2.77 cfs 11,727 cf

Pond M14: Peak Elev=19.97' Inflow=1.53 cfs 6,391 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=1.53 cfs 6,391 cf

Pond M15: Peak Elev=20.66' Inflow=1.53 cfs 6,391 cf
18.0" Round Culvert n=0.013 L=122.0' S=0.0052 '/' Outflow=1.53 cfs 6,391 cf

Pond M17: Peak Elev=21.56' Inflow=1.17 cfs 4,463 cf
12.0" Round Culvert n=0.013 L=81.0' S=0.0049 '/' Outflow=1.17 cfs 4,463 cf

Pond M19: Peak Elev=33.35' Inflow=3.06 cfs 10,695 cf
6.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=3.06 cfs 10,695 cf

Pond M2: Peak Elev=17.93' Inflow=6.19 cfs 24,680 cf
24.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=6.19 cfs 24,680 cf

Pond M21: Peak Elev=11.45' Inflow=5.30 cfs 28,761 cf
24.0" Round Culvert n=0.013 L=119.0' S=0.0050 '/' Outflow=5.30 cfs 28,761 cf

Pond M22: Peak Elev=11.96' Inflow=5.30 cfs 28,761 cf
24.0" Round Culvert n=0.013 L=67.5' S=0.0050 '/' Outflow=5.30 cfs 28,761 cf

Pond M25: Peak Elev=12.36' Inflow=4.96 cfs 27,303 cf
24.0" Round Culvert n=0.013 L=54.0' S=0.0050 '/' Outflow=4.96 cfs 27,303 cf

Pond M28: Peak Elev=13.20' Inflow=1.41 cfs 8,142 cf
18.0" Round Culvert n=0.013 L=51.5' S=0.0050 '/' Outflow=1.41 cfs 8,142 cf

Pond M29: Peak Elev=13.35' Inflow=0.90 cfs 5,602 cf
12.0" Round Culvert n=0.013 L=6.0' S=0.0050 '/' Outflow=0.90 cfs 5,602 cf

Pond M3: Peak Elev=18.28' Inflow=6.19 cfs 24,680 cf
24.0" Round Culvert n=0.013 L=70.5' S=0.0050 '/' Outflow=6.19 cfs 24,680 cf

Pond M31: Peak Elev=15.22' Inflow=1.68 cfs 5,604 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=1.68 cfs 5,604 cf

Pond M32: Peak Elev=15.44' Inflow=1.68 cfs 5,604 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=1.68 cfs 5,604 cf

Pond M35: Peak Elev=16.58' Inflow=0.52 cfs 2,541 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0049 '/' Outflow=0.52 cfs 2,541 cf

Pond M37: Peak Elev=18.36' Inflow=0.76 cfs 2,542 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=0.76 cfs 2,542 cf

Pond M40: Peak Elev=12.73' Inflow=2.66 cfs 14,025 cf
24.0" Round Culvert n=0.013 L=116.5' S=0.0050 '/' Outflow=2.66 cfs 14,025 cf

Pond M42: Peak Elev=13.27' Inflow=2.55 cfs 11,415 cf
18.0" Round Culvert n=0.013 L=93.5' S=0.0050 '/' Outflow=2.55 cfs 11,415 cf

Pond M43: Peak Elev=14.00' Inflow=2.55 cfs 11,415 cf
18.0" Round Culvert n=0.013 L=133.0' S=0.0050 '/' Outflow=2.55 cfs 11,415 cf

Pond M46: Peak Elev=15.01' Inflow=2.31 cfs 9,806 cf
18.0" Round Culvert n=0.013 L=119.5' S=0.0050 '/' Outflow=2.31 cfs 9,806 cf

Pond M47: Peak Elev=15.35' Inflow=2.31 cfs 9,806 cf
18.0" Round Culvert n=0.013 L=34.5' S=0.0049 '/' Outflow=2.31 cfs 9,806 cf

Pond M48: Peak Elev=15.77' Inflow=1.25 cfs 6,153 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=1.25 cfs 6,153 cf

Pond M49: Peak Elev=16.52' Inflow=1.37 cfs 3,653 cf
12.0" Round Culvert n=0.013 L=160.5' S=0.0050 '/' Outflow=1.37 cfs 3,653 cf

Pond M50: Peak Elev=20.58' Inflow=6.53 cfs 20,852 cf
18.0" Round Culvert n=0.013 L=2.0' S=0.0000 '/' Outflow=6.53 cfs 20,852 cf

Pond M50A: Peak Elev=26.54' Inflow=2.35 cfs 8,213 cf
6.0" Round Culvert n=0.013 L=3.0' S=0.0200 '/' Outflow=2.35 cfs 8,213 cf

Pond M51: Peak Elev=21.16' Inflow=6.53 cfs 20,852 cf
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=6.53 cfs 20,852 cf

Pond M53: Peak Elev=21.44' Inflow=4.37 cfs 13,803 cf
18.0" Round Culvert n=0.013 L=91.0' S=0.0049 '/' Outflow=4.37 cfs 13,803 cf

Pond M6: Peak Elev=18.52' Inflow=5.28 cfs 21,495 cf
24.0" Round Culvert n=0.013 L=36.0' S=0.0050 '/' Outflow=5.28 cfs 21,495 cf

Pond M61: Peak Elev=94.96' Inflow=8.29 cfs 27,263 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0100 '/' Outflow=8.29 cfs 27,263 cf

Pond M62: Peak Elev=103.20' Inflow=8.29 cfs 27,263 cf
12.0" Round Culvert n=0.013 L=147.5' S=0.0050 '/' Outflow=8.29 cfs 27,263 cf

Pond M64: Peak Elev=106.80' Inflow=4.47 cfs 14,792 cf
12.0" Round Culvert n=0.013 L=269.5' S=0.0050 '/' Outflow=4.47 cfs 14,792 cf

Pond M66: Peak Elev=106.93' Inflow=1.65 cfs 5,479 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0049 '/' Outflow=1.65 cfs 5,479 cf

Pond M9: Peak Elev=18.74' Inflow=4.21 cfs 16,537 cf
24.0" Round Culvert n=0.013 L=56.5' S=0.0050 '/' Outflow=4.21 cfs 16,537 cf

Pond RD 20: Peak Elev=43.77' Inflow=3.06 cfs 10,695 cf
6.0" Round Culvert n=0.013 L=15.5' S=0.0052 '/' Outflow=3.06 cfs 10,695 cf

Pond RD B: Peak Elev=50.26' Inflow=2.35 cfs 8,213 cf
6.0" Round Culvert n=0.013 L=116.0' S=0.0050 '/' Outflow=2.35 cfs 8,213 cf

Pond RD69: Peak Elev=77.30' Inflow=1.83 cfs 6,379 cf
6.0" Round Culvert n=0.013 L=31.0' S=0.0052 '/' Outflow=1.83 cfs 6,379 cf

Pond WQS1: Peak Elev=17.71' Inflow=6.19 cfs 24,680 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0048 '/' Outflow=6.19 cfs 24,680 cf

Total Runoff Area = 589,518 sf Runoff Volume = 132,569 cf Average Runoff Depth = 2.70"
32.56% Pervious = 191,976 sf 67.44% Impervious = 397,542 sf

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1: Runoff Area=5,130 sf 38.99% Impervious Runoff Depth=5.12"
Tc=6.0 min CN=83 Runoff=0.69 cfs 2,190 cf

Subcatchment 2: Runoff Area=6,350 sf 44.08% Impervious Runoff Depth=5.35"
Tc=6.0 min CN=85 Runoff=0.89 cfs 2,830 cf

Subcatchment 3: Runoff Area=17,966 sf 63.26% Impervious Runoff Depth=5.81"
Tc=6.0 min CN=89 Runoff=2.66 cfs 8,692 cf

Subcatchment 4: Runoff Area=14,022 sf 87.36% Impervious Runoff Depth=6.51"
Tc=6.0 min CN=95 Runoff=2.21 cfs 7,601 cf

Subcatchment 5: Runoff Area=1,807 sf 96.73% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=97 Runoff=0.29 cfs 1,015 cf

Subcatchment 6: Runoff Area=7,003 sf 96.19% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=97 Runoff=1.12 cfs 3,934 cf

Subcatchment 7: Runoff Area=2,462 sf 89.85% Impervious Runoff Depth=6.62"
Tc=6.0 min CN=96 Runoff=0.39 cfs 1,359 cf

Subcatchment 8: Runoff Area=6,973 sf 92.96% Impervious Runoff Depth=6.62"
Tc=6.0 min CN=96 Runoff=1.11 cfs 3,849 cf

Subcatchment 9: Runoff Area=3,790 sf 85.17% Impervious Runoff Depth=6.39"
Tc=6.0 min CN=94 Runoff=0.59 cfs 2,017 cf

Subcatchment 10: Runoff Area=17,202 sf 78.76% Impervious Runoff Depth=6.27"
Tc=6.0 min CN=93 Runoff=2.67 cfs 8,989 cf

Subcatchment 11: Runoff Area=5,038 sf 50.34% Impervious Runoff Depth=5.46"
Tc=6.0 min CN=86 Runoff=0.72 cfs 2,293 cf

Subcatchment 12: Runoff Area=12,361 sf 62.85% Impervious Runoff Depth=5.81"
Tc=6.0 min CN=89 Runoff=1.83 cfs 5,980 cf

Subcatchment 13: Runoff Area=2,486 sf 78.32% Impervious Runoff Depth=6.27"
Tc=6.0 min CN=93 Runoff=0.39 cfs 1,299 cf

Subcatchment 14: Runoff Area=5,742 sf 40.56% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=84 Runoff=0.79 cfs 2,505 cf

Subcatchment 15: Runoff Area=27,997 sf 82.23% Impervious Runoff Depth=6.39"
Tc=6.0 min CN=94 Runoff=4.38 cfs 14,903 cf

Subcatchment 16: Runoff Area=44,751 sf 69.67% Impervious Runoff Depth=6.04"
Tc=6.0 min CN=91 Runoff=6.80 cfs 22,514 cf

Subcatchment 17: Runoff Area=18,629 sf 55.15% Impervious Runoff Depth=5.58"
Tc=6.0 min CN=87 Runoff=2.69 cfs 8,656 cf

Subcatchment 18: Runoff Area=28,518 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=4.56 cfs 16,305 cf

Subcatchment 19: Runoff Area=4,108 sf 17.31% Impervious Runoff Depth=4.57"
Tc=6.0 min CN=78 Runoff=0.50 cfs 1,563 cf

Subcatchment 20: Runoff Area=1,524 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=0.24 cfs 871 cf

Subcatchment 21: Runoff Area=792 sf 66.04% Impervious Runoff Depth=5.92"
Tc=6.0 min CN=90 Runoff=0.12 cfs 391 cf

Subcatchment 22: Runoff Area=42,162 sf 1.21% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=74 Runoff=4.69 cfs 14,509 cf

Subcatchment 23: Runoff Area=14,462 sf 0.00% Impervious Runoff Depth=4.13"
Flow Length=115' Slope=0.0011 '/' Tc=6.0 min CN=74 Runoff=1.61 cfs 4,977 cf

Subcatchment 24: Runoff Area=6,729 sf 56.26% Impervious Runoff Depth=5.69"
Flow Length=176' Tc=6.0 min CN=88 Runoff=0.98 cfs 3,191 cf

Subcatchment 25: Runoff Area=6,442 sf 34.31% Impervious Runoff Depth=5.01"
Tc=0.0 min CN=82 Runoff=1.04 cfs 2,690 cf

Subcatchment 26: Runoff Area=14,265 sf 86.53% Impervious Runoff Depth=6.51"
Tc=0.0 min CN=95 Runoff=2.74 cfs 7,733 cf

Subcatchment 27: Runoff Area=5,289 sf 76.01% Impervious Runoff Depth=6.15"
Flow Length=71' Slope=0.1342 '/' Tc=7.7 min CN=92 Runoff=0.77 cfs 2,712 cf

Subcatchment 28: Runoff Area=18,464 sf 86.68% Impervious Runoff Depth=6.51"
Tc=6.0 min CN=95 Runoff=2.91 cfs 10,009 cf

Subcatchment 29: Runoff Area=8,912 sf 80.50% Impervious Runoff Depth=6.27"
Tc=0.0 min CN=93 Runoff=1.69 cfs 4,657 cf

Subcatchment 30: Runoff Area=18,830 sf 38.59% Impervious Runoff Depth=5.12"
Flow Length=349' Slope=0.0138 '/' Tc=6.0 min CN=83 Runoff=2.54 cfs 8,038 cf

Subcatchment 31: Runoff Area=15,371 sf 10.01% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=76 Runoff=1.79 cfs 5,567 cf

Subcatchment 32: Runoff Area=37,137 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=5.94 cfs 21,233 cf

Subcatchment 34: Runoff Area=10,350 sf 83.59% Impervious Runoff Depth=6.39"
Tc=6.0 min CN=94 Runoff=1.62 cfs 5,509 cf

Subcatchment 35: Runoff Area=10,664 sf 91.11% Impervious Runoff Depth=6.62"
Tc=6.0 min CN=96 Runoff=1.69 cfs 5,886 cf

Subcatchment 36: Runoff Area=35,753 sf 88.57% Impervious Runoff Depth=6.51"
Tc=6.0 min CN=95 Runoff=5.63 cfs 19,382 cf

Subcatchment 37: Runoff Area=49,536 sf 84.69% Impervious Runoff Depth=6.39"
Tc=6.0 min CN=94 Runoff=7.75 cfs 26,368 cf

Subcatchment 38: Runoff Area=22,151 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=3.54 cfs 12,665 cf

Subcatchment 39: Runoff Area=11,218 sf 43.45% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=84 Runoff=1.54 cfs 4,894 cf

Subcatchment 40: Runoff Area=13,195 sf 78.02% Impervious Runoff Depth=6.27"
Tc=6.0 min CN=93 Runoff=2.05 cfs 6,895 cf

Subcatchment 41: Runoff Area=7,175 sf 49.39% Impervious Runoff Depth=5.46"
Tc=6.0 min CN=86 Runoff=1.02 cfs 3,266 cf

Subcatchment 42: Runoff Area=6,762 sf 0.00% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=74 Runoff=0.75 cfs 2,327 cf

Reach AP1: Hodgson Brook Inflow=45.52 cfs 165,354 cf
Outflow=45.52 cfs 165,354 cf

Reach AP2: Storm Drain Inflow=19.81 cfs 89,834 cf
Outflow=19.81 cfs 89,834 cf

Reach R1: Swale Avg. Flow Depth=0.70' Max Vel=3.80 fps Inflow=16.15 cfs 64,719 cf
n=0.035 L=100.0' S=0.0200 '/' Capacity=333.24 cfs Outflow=16.08 cfs 64,719 cf

Pond 27 BRB1: Peak Elev=16.06' Storage=633 cf Inflow=0.72 cfs 2,293 cf
Outflow=0.29 cfs 2,293 cf

Pond 30 DB1: Peak Elev=14.99' Storage=1,721 cf Inflow=3.32 cfs 11,536 cf
Primary=2.80 cfs 2,202 cf Secondary=1.31 cfs 9,332 cf Outflow=4.10 cfs 11,534 cf

Pond 36 DB2: Peak Elev=17.51' Storage=646 cf Inflow=1.50 cfs 5,208 cf
Primary=0.00 cfs 0 cf Secondary=0.85 cfs 5,206 cf Outflow=0.85 cfs 5,206 cf

Pond 41 BRB2: Peak Elev=18.22' Storage=1,234 cf Inflow=1.83 cfs 5,980 cf
Outflow=1.44 cfs 5,980 cf

Pond 49 IB3: Peak Elev=20.48' Storage=0.341 af Inflow=13.86 cfs 46,073 cf
Discarded=0.72 cfs 22,275 cf Primary=4.45 cfs 23,798 cf Outflow=5.17 cfs 46,073 cf

Pond 56 IB2: Peak Elev=19.94' Storage=2,982 cf Inflow=4.56 cfs 16,305 cf
Discarded=0.15 cfs 6,382 cf Primary=3.33 cfs 9,922 cf Outflow=3.48 cfs 16,305 cf

Pond 60 WQU 2: Peak Elev=327.16' Inflow=16.69 cfs 57,145 cf
12.0" Round Culvert n=0.013 L=90.0' S=0.0050 '/' Outflow=16.69 cfs 57,145 cf

Pond 1071: Peak Elev=300.04' Inflow=20.28 cfs 68,934 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=20.28 cfs 68,934 cf

Pond 1072: Peak Elev=250.44' Inflow=24.84 cfs 84,864 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=24.84 cfs 84,864 cf

Pond 1346: Peak Elev=103.93' Inflow=24.84 cfs 84,864 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=24.84 cfs 84,864 cf

Pond 1347: Peak Elev=224.62' Inflow=24.84 cfs 84,864 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=24.84 cfs 84,864 cf

Pond CB10: Peak Elev=22.13' Inflow=2.91 cfs 10,009 cf
12.0" Round Culvert n=0.013 L=56.0' S=0.0089 '/' Outflow=2.91 cfs 10,009 cf

Pond CB12: Peak Elev=22.12' Inflow=1.69 cfs 4,657 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=1.69 cfs 4,657 cf

Pond CB13: Peak Elev=22.52' Inflow=2.54 cfs 8,038 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=2.54 cfs 8,038 cf

Pond CB16: Peak Elev=22.61' Inflow=1.79 cfs 5,567 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=1.79 cfs 5,567 cf

Pond CB23: Peak Elev=13.78' Inflow=0.59 cfs 2,017 cf
12.0" Round Culvert n=0.013 L=15.5' S=0.0045 '/' Outflow=0.59 cfs 2,017 cf

Pond CB24: Peak Elev=14.19' Inflow=0.29 cfs 1,015 cf
12.0" Round Culvert n=0.013 L=39.5' S=0.0099 '/' Outflow=0.29 cfs 1,015 cf

Pond CB26: Peak Elev=14.91' Inflow=2.67 cfs 8,989 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0571 '/' Outflow=2.67 cfs 8,989 cf

Pond CB33: Peak Elev=16.96' Inflow=2.21 cfs 7,601 cf
12.0" Round Culvert n=0.013 L=63.5' S=0.0055 '/' Outflow=2.21 cfs 7,601 cf

Pond CB34: Peak Elev=16.63' Inflow=1.12 cfs 3,934 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0146 '/' Outflow=1.12 cfs 3,934 cf

Pond CB38: Peak Elev=18.64' Inflow=0.39 cfs 1,359 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.39 cfs 1,359 cf

Pond CB39: Peak Elev=19.65' Inflow=1.11 cfs 3,849 cf
12.0" Round Culvert n=0.013 L=53.0' S=0.0049 '/' Outflow=1.11 cfs 3,849 cf

Pond CB4: Peak Elev=20.52' Inflow=0.98 cfs 3,191 cf
12.0" Round Culvert n=0.013 L=24.5' S=0.0347 '/' Outflow=0.98 cfs 3,191 cf

Pond CB44: Peak Elev=19.95' Inflow=0.79 cfs 2,505 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.79 cfs 2,505 cf

Pond CB45: Peak Elev=19.81' Inflow=0.39 cfs 1,299 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.39 cfs 1,299 cf

Pond CB5: Peak Elev=20.58' Inflow=1.48 cfs 5,016 cf
12.0" Round Culvert n=0.010 L=33.5' S=0.0051 '/' Outflow=1.48 cfs 5,016 cf

Pond CB52: Peak Elev=27.06' Inflow=4.38 cfs 14,903 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0050 '/' Outflow=4.38 cfs 14,903 cf

Pond CB54: Peak Elev=29.63' Inflow=6.80 cfs 22,514 cf
12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=6.80 cfs 22,514 cf

Pond CB55: Peak Elev=27.09' Inflow=2.69 cfs 8,656 cf
12.0" Round Culvert n=0.013 L=69.0' S=0.0122 '/' Outflow=2.69 cfs 8,656 cf

Pond CB6: Peak Elev=21.10' Inflow=0.77 cfs 2,712 cf
12.0" Round Culvert n=0.013 L=13.0' S=0.0262 '/' Outflow=0.77 cfs 2,712 cf

Pond CB63: Peak Elev=380.10' Inflow=7.75 cfs 26,368 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=7.75 cfs 26,368 cf

Pond CB65: Peak Elev=392.56' Inflow=5.63 cfs 19,382 cf
12.0" Round Culvert n=0.013 L=3.5' S=0.0086 '/' Outflow=5.63 cfs 19,382 cf

Pond CB67: Peak Elev=391.76' Inflow=1.69 cfs 5,886 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0053 '/' Outflow=1.69 cfs 5,886 cf

Pond CB68: Peak Elev=391.77' Inflow=1.62 cfs 5,509 cf
12.0" Round Culvert n=0.013 L=52.0' S=0.0050 '/' Outflow=1.62 cfs 5,509 cf

Pond CB7: Peak Elev=21.20' Inflow=2.74 cfs 7,733 cf
12.0" Round Culvert n=0.013 L=16.5' S=0.0479 '/' Outflow=2.74 cfs 7,733 cf

Pond E2348: 2348 Peak Elev=11.82' Inflow=0.69 cfs 2,190 cf
15.0" Round Culvert n=0.013 L=15.0' S=0.0067 '/' Outflow=0.69 cfs 2,190 cf

Pond ECB2347: E2347 Peak Elev=11.83' Inflow=0.69 cfs 2,190 cf
15.0" Round Culvert n=0.013 L=41.0' S=0.0024 '/' Outflow=0.69 cfs 2,190 cf

Pond EM2349: 2349 Peak Elev=11.82' Inflow=16.70 cfs 76,749 cf
24.0" Round Culvert n=0.010 L=87.0' S=0.0069 '/' Outflow=16.70 cfs 76,749 cf

Pond HW5A: HEADAILL INLET Peak Elev=20.61' Inflow=0.75 cfs 2,327 cf
12.0" Round Culvert n=0.013 L=39.0' S=0.0333 '/' Outflow=0.75 cfs 2,327 cf

Pond IB1: Peak Elev=22.75' Storage=5,981 cf Inflow=5.94 cfs 21,233 cf
Discarded=0.14 cfs 8,415 cf Primary=4.05 cfs 12,819 cf Outflow=4.19 cfs 21,233 cf

Pond M11: Peak Elev=22.07' Inflow=7.07 cfs 31,080 cf
18.0" Round Culvert n=0.013 L=101.0' S=0.0050 '/' Outflow=7.07 cfs 31,080 cf

Pond M14: Peak Elev=22.23' Inflow=4.88 cfs 18,386 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=4.88 cfs 18,386 cf

Pond M15: Peak Elev=22.32' Inflow=4.88 cfs 18,386 cf
18.0" Round Culvert n=0.013 L=122.0' S=0.0052 '/' Outflow=4.88 cfs 18,386 cf

Pond M17: Peak Elev=23.17' Inflow=4.05 cfs 12,819 cf
12.0" Round Culvert n=0.013 L=81.0' S=0.0049 '/' Outflow=4.05 cfs 12,819 cf

Pond M19: Peak Elev=62.31' Inflow=5.94 cfs 21,233 cf
6.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=5.94 cfs 21,233 cf

Pond M2: Peak Elev=19.54' Inflow=14.64 cfs 59,743 cf
24.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=14.65 cfs 59,743 cf

Pond M21: Peak Elev=12.77' Inflow=16.32 cfs 74,559 cf
24.0" Round Culvert n=0.013 L=119.0' S=0.0050 '/' Outflow=16.32 cfs 74,559 cf

Pond M22: Peak Elev=13.69' Inflow=16.32 cfs 74,559 cf
24.0" Round Culvert n=0.013 L=67.5' S=0.0050 '/' Outflow=16.32 cfs 74,559 cf

Pond M25: Peak Elev=14.56' Inflow=15.85 cfs 71,526 cf
24.0" Round Culvert n=0.013 L=54.0' S=0.0050 '/' Outflow=15.85 cfs 71,527 cf

Pond M28: Peak Elev=14.62' Inflow=4.94 cfs 16,740 cf
18.0" Round Culvert n=0.013 L=51.5' S=0.0050 '/' Outflow=4.94 cfs 16,740 cf

Pond M29: Peak Elev=15.58' Inflow=4.10 cfs 11,534 cf
12.0" Round Culvert n=0.013 L=6.0' S=0.0050 '/' Outflow=4.10 cfs 11,534 cf

Pond M3: Peak Elev=20.45' Inflow=14.64 cfs 59,743 cf
24.0" Round Culvert n=0.013 L=70.5' S=0.0050 '/' Outflow=14.64 cfs 59,743 cf

Pond M31: Peak Elev=15.77' Inflow=3.32 cfs 11,536 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=3.32 cfs 11,536 cf

Pond M32: Peak Elev=16.54' Inflow=3.32 cfs 11,536 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=3.32 cfs 11,536 cf

Pond M35: Peak Elev=16.71' Inflow=0.85 cfs 5,206 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0049 '/' Outflow=0.85 cfs 5,207 cf

Pond M37: Peak Elev=18.61' Inflow=1.50 cfs 5,208 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=1.50 cfs 5,208 cf

Pond M40: Peak Elev=14.97' Inflow=9.45 cfs 43,504 cf
24.0" Round Culvert n=0.013 L=116.5' S=0.0050 '/' Outflow=9.45 cfs 43,504 cf

Pond M42: Peak Elev=15.99' Inflow=8.12 cfs 37,524 cf
18.0" Round Culvert n=0.013 L=93.5' S=0.0050 '/' Outflow=8.12 cfs 37,524 cf

Pond M43: Peak Elev=17.16' Inflow=8.12 cfs 37,524 cf
18.0" Round Culvert n=0.013 L=133.0' S=0.0050 '/' Outflow=8.12 cfs 37,524 cf

Pond M46: Peak Elev=17.98' Inflow=7.41 cfs 33,720 cf
18.0" Round Culvert n=0.013 L=119.5' S=0.0050 '/' Outflow=7.41 cfs 33,720 cf

Pond M47: Peak Elev=18.52' Inflow=7.41 cfs 33,720 cf
18.0" Round Culvert n=0.013 L=34.5' S=0.0049 '/' Outflow=7.41 cfs 33,720 cf

Pond M48: Peak Elev=19.51' Inflow=4.45 cfs 23,798 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=4.45 cfs 23,798 cf

Pond M49: Peak Elev=20.29' Inflow=3.33 cfs 9,922 cf
12.0" Round Culvert n=0.013 L=160.5' S=0.0050 '/' Outflow=3.33 cfs 9,922 cf

Pond M50: Peak Elev=22.52' Inflow=13.86 cfs 46,073 cf
18.0" Round Culvert n=0.013 L=2.0' S=0.0000 '/' Outflow=13.86 cfs 46,073 cf

Pond M50A: Peak Elev=43.62' Inflow=4.56 cfs 16,305 cf
6.0" Round Culvert n=0.013 L=3.0' S=0.0200 '/' Outflow=4.56 cfs 16,305 cf

Pond M51: Peak Elev=25.12' Inflow=13.86 cfs 46,073 cf
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=13.86 cfs 46,073 cf

Pond M53: Peak Elev=26.48' Inflow=9.49 cfs 31,170 cf
18.0" Round Culvert n=0.013 L=91.0' S=0.0049 '/' Outflow=9.49 cfs 31,170 cf

Pond M6: Peak Elev=21.06' Inflow=12.31 cfs 51,535 cf
24.0" Round Culvert n=0.013 L=36.0' S=0.0050 '/' Outflow=12.31 cfs 51,535 cf

Pond M61: Peak Elev=343.40' Inflow=16.69 cfs 57,145 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0100 '/' Outflow=16.69 cfs 57,145 cf

Pond M62: Peak Elev=376.80' Inflow=16.69 cfs 57,145 cf
12.0" Round Culvert n=0.013 L=147.5' S=0.0050 '/' Outflow=16.69 cfs 57,145 cf

Pond M64: Peak Elev=391.14' Inflow=8.94 cfs 30,777 cf
12.0" Round Culvert n=0.013 L=269.5' S=0.0050 '/' Outflow=8.94 cfs 30,777 cf

Pond M66: Peak Elev=391.65' Inflow=3.31 cfs 11,395 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0049 '/' Outflow=3.31 cfs 11,395 cf

Pond M9: Peak Elev=21.43' Inflow=9.83 cfs 41,090 cf
24.0" Round Culvert n=0.013 L=56.5' S=0.0050 '/' Outflow=9.83 cfs 41,090 cf

Pond RD 20: Peak Elev=101.48' Inflow=5.94 cfs 21,233 cf
6.0" Round Culvert n=0.013 L=15.5' S=0.0052 '/' Outflow=5.94 cfs 21,233 cf

Pond RD B: Peak Elev=132.78' Inflow=4.56 cfs 16,305 cf
6.0" Round Culvert n=0.013 L=116.0' S=0.0050 '/' Outflow=4.56 cfs 16,305 cf

Pond RD69: Peak Elev=269.04' Inflow=3.54 cfs 12,665 cf
6.0" Round Culvert n=0.013 L=31.0' S=0.0052 '/' Outflow=3.54 cfs 12,665 cf

Pond WQS1: Peak Elev=18.63' Inflow=14.65 cfs 59,743 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0048 '/' Outflow=14.65 cfs 59,743 cf

Total Runoff Area = 589,518 sf Runoff Volume = 292,263 cf Average Runoff Depth = 5.95"
32.56% Pervious = 191,976 sf 67.44% Impervious = 397,542 sf

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1: Runoff Area=5,130 sf 38.99% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=83 Runoff=0.86 cfs 2,760 cf

Subcatchment 2: Runoff Area=6,350 sf 44.08% Impervious Runoff Depth=6.70"
Tc=6.0 min CN=85 Runoff=1.10 cfs 3,544 cf

Subcatchment 3: Runoff Area=17,966 sf 63.26% Impervious Runoff Depth=7.18"
Tc=6.0 min CN=89 Runoff=3.25 cfs 10,746 cf

Subcatchment 4: Runoff Area=14,022 sf 87.36% Impervious Runoff Depth=7.90"
Tc=6.0 min CN=95 Runoff=2.66 cfs 9,231 cf

Subcatchment 5: Runoff Area=1,807 sf 96.73% Impervious Runoff Depth=8.14"
Tc=6.0 min CN=97 Runoff=0.35 cfs 1,226 cf

Subcatchment 6: Runoff Area=7,003 sf 96.19% Impervious Runoff Depth=8.14"
Tc=6.0 min CN=97 Runoff=1.34 cfs 4,750 cf

Subcatchment 7: Runoff Area=2,462 sf 89.85% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=0.47 cfs 1,645 cf

Subcatchment 8: Runoff Area=6,973 sf 92.96% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=1.33 cfs 4,660 cf

Subcatchment 9: Runoff Area=3,790 sf 85.17% Impervious Runoff Depth=7.78"
Tc=6.0 min CN=94 Runoff=0.71 cfs 2,457 cf

Subcatchment 10: Runoff Area=17,202 sf 78.76% Impervious Runoff Depth=7.66"
Tc=6.0 min CN=93 Runoff=3.22 cfs 10,979 cf

Subcatchment 11: Runoff Area=5,038 sf 50.34% Impervious Runoff Depth=6.82"
Tc=6.0 min CN=86 Runoff=0.88 cfs 2,862 cf

Subcatchment 12: Runoff Area=12,361 sf 62.85% Impervious Runoff Depth=7.18"
Tc=6.0 min CN=89 Runoff=2.24 cfs 7,394 cf

Subcatchment 13: Runoff Area=2,486 sf 78.32% Impervious Runoff Depth=7.66"
Tc=6.0 min CN=93 Runoff=0.47 cfs 1,587 cf

Subcatchment 14: Runoff Area=5,742 sf 40.56% Impervious Runoff Depth=6.58"
Tc=6.0 min CN=84 Runoff=0.98 cfs 3,147 cf

Subcatchment 15: Runoff Area=27,997 sf 82.23% Impervious Runoff Depth=7.78"
Tc=6.0 min CN=94 Runoff=5.28 cfs 18,150 cf

Subcatchment 16: Runoff Area=44,751 sf 69.67% Impervious Runoff Depth=7.42"
Tc=6.0 min CN=91 Runoff=8.26 cfs 27,665 cf

Subcatchment 17: Runoff Area=18,629 sf 55.15% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=87 Runoff=3.30 cfs 10,769 cf

Subcatchment 18: Runoff Area=28,518 sf 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=5.46 cfs 19,630 cf

Subcatchment 19: Runoff Area=4,108 sf 17.31% Impervious Runoff Depth=5.85"
Tc=6.0 min CN=78 Runoff=0.64 cfs 2,004 cf

Subcatchment 20: Runoff Area=1,524 sf 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.29 cfs 1,049 cf

Subcatchment 21: Runoff Area=792 sf 66.04% Impervious Runoff Depth=7.30"
Tc=6.0 min CN=90 Runoff=0.14 cfs 482 cf

Subcatchment 22: Runoff Area=42,162 sf 1.21% Impervious Runoff Depth=5.38"
Tc=6.0 min CN=74 Runoff=6.07 cfs 18,886 cf

Subcatchment 23: Runoff Area=14,462 sf 0.00% Impervious Runoff Depth=5.38"
Flow Length=115' Slope=0.0011 '/' Tc=6.0 min CN=74 Runoff=2.08 cfs 6,478 cf

Subcatchment 24: Runoff Area=6,729 sf 56.26% Impervious Runoff Depth=7.06"
Flow Length=176' Tc=6.0 min CN=88 Runoff=1.21 cfs 3,958 cf

Subcatchment 25: Runoff Area=6,442 sf 34.31% Impervious Runoff Depth=6.34"
Tc=0.0 min CN=82 Runoff=1.31 cfs 3,401 cf

Subcatchment 26: Runoff Area=14,265 sf 86.53% Impervious Runoff Depth=7.90"
Tc=0.0 min CN=95 Runoff=3.30 cfs 9,390 cf

Subcatchment 27: Runoff Area=5,289 sf 76.01% Impervious Runoff Depth=7.54"
Flow Length=71' Slope=0.1342 '/' Tc=7.7 min CN=92 Runoff=0.93 cfs 3,323 cf

Subcatchment 28: Runoff Area=18,464 sf 86.68% Impervious Runoff Depth=7.90"
Tc=6.0 min CN=95 Runoff=3.50 cfs 12,155 cf

Subcatchment 29: Runoff Area=8,912 sf 80.50% Impervious Runoff Depth=7.66"
Tc=0.0 min CN=93 Runoff=2.04 cfs 5,688 cf

Subcatchment 30: Runoff Area=18,830 sf 38.59% Impervious Runoff Depth=6.46"
Flow Length=349' Slope=0.0138 '/' Tc=6.0 min CN=83 Runoff=3.17 cfs 10,130 cf

Subcatchment 31: Runoff Area=15,371 sf 10.01% Impervious Runoff Depth=5.61"
Tc=6.0 min CN=76 Runoff=2.30 cfs 7,192 cf

Subcatchment 32: Runoff Area=37,137 sf 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=7.12 cfs 25,562 cf

Subcatchment 34: Runoff Area=10,350 sf 83.59% Impervious Runoff Depth=7.78"
Tc=6.0 min CN=94 Runoff=1.95 cfs 6,710 cf

Subcatchment 35: Runoff Area=10,664 sf 91.11% Impervious Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=2.03 cfs 7,127 cf

Subcatchment 36: Runoff Area=35,753 sf 88.57% Impervious Runoff Depth=7.90"
Tc=6.0 min CN=95 Runoff=6.78 cfs 23,536 cf

Subcatchment 37: Runoff Area=49,536 sf 84.69% Impervious Runoff Depth=7.78"
Tc=6.0 min CN=94 Runoff=9.34 cfs 32,113 cf

Subcatchment 38: Runoff Area=22,151 sf 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=4.24 cfs 15,247 cf

Subcatchment 39: Runoff Area=11,218 sf 43.45% Impervious Runoff Depth=6.58"
Tc=6.0 min CN=84 Runoff=1.92 cfs 6,148 cf

Subcatchment 40: Runoff Area=13,195 sf 78.02% Impervious Runoff Depth=7.66"
Tc=6.0 min CN=93 Runoff=2.47 cfs 8,422 cf

Subcatchment 41: Runoff Area=7,175 sf 49.39% Impervious Runoff Depth=6.82"
Tc=6.0 min CN=86 Runoff=1.26 cfs 4,076 cf

Subcatchment 42: Runoff Area=6,762 sf 0.00% Impervious Runoff Depth=5.38"
Tc=6.0 min CN=74 Runoff=0.97 cfs 3,029 cf

Reach AP1: Hodgson Brook Inflow=55.20 cfs 205,063 cf
Outflow=55.20 cfs 205,063 cf

Reach AP2: Storm Drain Inflow=23.69 cfs 113,136 cf
Outflow=23.69 cfs 113,136 cf

Reach R1: Swale Avg. Flow Depth=0.77' Max Vel=4.00 fps Inflow=20.73 cfs 81,269 cf
n=0.035 L=100.0' S=0.0200 '/' Capacity=333.24 cfs Outflow=19.40 cfs 81,269 cf

Pond 27 BRB1: Peak Elev=16.11' Storage=685 cf Inflow=0.88 cfs 2,862 cf
Outflow=0.52 cfs 2,862 cf

Pond 30 DB1: Peak Elev=15.67' Storage=2,170 cf Inflow=4.00 cfs 13,981 cf
Primary=4.33 cfs 3,283 cf Secondary=1.51 cfs 10,696 cf Outflow=5.85 cfs 13,979 cf

Pond 36 DB2: Peak Elev=17.80' Storage=823 cf Inflow=1.80 cfs 6,305 cf
Primary=0.00 cfs 0 cf Secondary=0.97 cfs 6,304 cf Outflow=0.97 cfs 6,304 cf

Pond 41 BRB2: Peak Elev=18.27' Storage=1,331 cf Inflow=2.24 cfs 7,394 cf
Outflow=1.94 cfs 7,394 cf

Pond 49 IB3: Peak Elev=21.43' Storage=0.427 af Inflow=16.84 cfs 56,584 cf
Discarded=0.92 cfs 25,107 cf Primary=5.78 cfs 31,477 cf Outflow=6.70 cfs 56,584 cf

Pond 56 IB2: Peak Elev=20.46' Storage=3,763 cf Inflow=5.46 cfs 19,630 cf
Discarded=0.18 cfs 6,960 cf Primary=4.41 cfs 12,670 cf Outflow=4.59 cfs 19,630 cf

Pond 60 WQU 2: Peak Elev=469.46' Inflow=20.10 cfs 69,485 cf
12.0" Round Culvert n=0.013 L=90.0' S=0.0050 '/' Outflow=20.10 cfs 69,485 cf

Pond 1071: Peak Elev=430.13' Inflow=24.49 cfs 84,054 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=24.49 cfs 84,054 cf

Pond 1072: Peak Elev=357.79' Inflow=29.99 cfs 103,377 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=29.99 cfs 103,378 cf

Pond 1346: Peak Elev=144.21' Inflow=29.99 cfs 103,378 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=29.99 cfs 103,378 cf

Pond 1347: Peak Elev=320.14' Inflow=29.99 cfs 103,378 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=29.99 cfs 103,378 cf

Pond CB10: Peak Elev=23.77' Inflow=3.50 cfs 12,155 cf
12.0" Round Culvert n=0.013 L=56.0' S=0.0089 '/' Outflow=3.50 cfs 12,155 cf

Pond CB12: Peak Elev=24.13' Inflow=2.04 cfs 5,688 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=2.04 cfs 5,688 cf

Pond CB13: Peak Elev=24.72' Inflow=3.17 cfs 10,130 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=3.17 cfs 10,130 cf

Pond CB16: Peak Elev=24.71' Inflow=2.30 cfs 7,192 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=2.30 cfs 7,192 cf

Pond CB23: Peak Elev=14.65' Inflow=0.71 cfs 2,457 cf
12.0" Round Culvert n=0.013 L=15.5' S=0.0045 '/' Outflow=0.71 cfs 2,457 cf

Pond CB24: Peak Elev=14.64' Inflow=0.35 cfs 1,226 cf
12.0" Round Culvert n=0.013 L=39.5' S=0.0099 '/' Outflow=0.35 cfs 1,226 cf

Pond CB26: Peak Elev=16.21' Inflow=3.22 cfs 10,979 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0571 '/' Outflow=3.22 cfs 10,979 cf

Pond CB33: Peak Elev=17.73' Inflow=2.66 cfs 9,231 cf
12.0" Round Culvert n=0.013 L=63.5' S=0.0055 '/' Outflow=2.66 cfs 9,231 cf

Pond CB34: Peak Elev=17.25' Inflow=1.34 cfs 4,750 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0146 '/' Outflow=1.34 cfs 4,750 cf

Pond CB38: Peak Elev=18.73' Inflow=0.47 cfs 1,645 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.47 cfs 1,645 cf

Pond CB39: Peak Elev=19.72' Inflow=1.33 cfs 4,660 cf
12.0" Round Culvert n=0.013 L=53.0' S=0.0049 '/' Outflow=1.33 cfs 4,660 cf

Pond CB4: Peak Elev=21.62' Inflow=1.21 cfs 3,958 cf
12.0" Round Culvert n=0.013 L=24.5' S=0.0347 '/' Outflow=1.21 cfs 3,958 cf

Pond CB44: Peak Elev=20.01' Inflow=0.98 cfs 3,147 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.98 cfs 3,147 cf

Pond CB45: Peak Elev=19.84' Inflow=0.47 cfs 1,587 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.47 cfs 1,587 cf

Pond CB5: Peak Elev=21.73' Inflow=1.89 cfs 6,430 cf
12.0" Round Culvert n=0.010 L=33.5' S=0.0051 '/' Outflow=1.89 cfs 6,430 cf

Pond CB52: Peak Elev=30.81' Inflow=5.28 cfs 18,150 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0050 '/' Outflow=5.28 cfs 18,150 cf

Pond CB54: Peak Elev=34.65' Inflow=8.26 cfs 27,665 cf
12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=8.26 cfs 27,665 cf

Pond CB55: Peak Elev=30.93' Inflow=3.30 cfs 10,769 cf
12.0" Round Culvert n=0.013 L=69.0' S=0.0122 '/' Outflow=3.30 cfs 10,769 cf

Pond CB6: Peak Elev=22.36' Inflow=0.93 cfs 3,323 cf
12.0" Round Culvert n=0.013 L=13.0' S=0.0262 '/' Outflow=0.93 cfs 3,323 cf

Pond CB63: Peak Elev=546.26' Inflow=9.34 cfs 32,113 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=9.34 cfs 32,113 cf

Pond CB65: Peak Elev=564.28' Inflow=6.78 cfs 23,536 cf
12.0" Round Culvert n=0.013 L=3.5' S=0.0086 '/' Outflow=6.78 cfs 23,536 cf

Pond CB67: Peak Elev=563.14' Inflow=2.03 cfs 7,127 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0053 '/' Outflow=2.03 cfs 7,127 cf

Pond CB68: Peak Elev=563.14' Inflow=1.95 cfs 6,710 cf
12.0" Round Culvert n=0.013 L=52.0' S=0.0050 '/' Outflow=1.95 cfs 6,710 cf

Pond CB7: Peak Elev=22.55' Inflow=3.30 cfs 9,390 cf
12.0" Round Culvert n=0.013 L=16.5' S=0.0479 '/' Outflow=3.30 cfs 9,390 cf

Pond E2348: 2348 Peak Elev=12.21' Inflow=0.86 cfs 2,760 cf
15.0" Round Culvert n=0.013 L=15.0' S=0.0067 '/' Outflow=0.86 cfs 2,760 cf

Pond ECB2347: E2347 Peak Elev=12.22' Inflow=0.86 cfs 2,760 cf
15.0" Round Culvert n=0.013 L=41.0' S=0.0024 '/' Outflow=0.86 cfs 2,760 cf

Pond EM2349: 2349 Peak Elev=12.21' Inflow=19.18 cfs 96,842 cf
24.0" Round Culvert n=0.010 L=87.0' S=0.0069 '/' Outflow=19.18 cfs 96,842 cf

Pond HW5A: HEADAILL INLET Peak Elev=21.80' Inflow=0.97 cfs 3,029 cf
12.0" Round Culvert n=0.013 L=39.0' S=0.0333 '/' Outflow=0.97 cfs 3,029 cf

Pond IB1: Peak Elev=23.48' Storage=7,524 cf Inflow=7.12 cfs 25,562 cf
Discarded=0.16 cfs 9,039 cf Primary=5.17 cfs 16,525 cf Outflow=5.33 cfs 25,563 cf

Pond M11: Peak Elev=24.04' Inflow=9.56 cfs 39,536 cf
18.0" Round Culvert n=0.013 L=101.0' S=0.0050 '/' Outflow=9.56 cfs 39,536 cf

Pond M14: Peak Elev=24.14' Inflow=6.38 cfs 23,717 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=6.38 cfs 23,717 cf

Pond M15: Peak Elev=24.24' Inflow=6.38 cfs 23,717 cf
18.0" Round Culvert n=0.013 L=122.0' S=0.0052 '/' Outflow=6.38 cfs 23,717 cf

Pond M17: Peak Elev=24.52' Inflow=5.17 cfs 16,525 cf
12.0" Round Culvert n=0.013 L=81.0' S=0.0049 '/' Outflow=5.17 cfs 16,525 cf

Pond M19: Peak Elev=79.51' Inflow=7.12 cfs 25,562 cf
6.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=7.12 cfs 25,562 cf

Pond M2: Peak Elev=20.40' Inflow=18.78 cfs 74,791 cf
24.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=18.79 cfs 74,791 cf

Pond M21: Peak Elev=13.37' Inflow=18.69 cfs 94,082 cf
24.0" Round Culvert n=0.013 L=119.0' S=0.0050 '/' Outflow=18.69 cfs 94,082 cf

Pond M22: Peak Elev=14.62' Inflow=18.69 cfs 94,082 cf
24.0" Round Culvert n=0.013 L=67.5' S=0.0050 '/' Outflow=18.69 cfs 94,082 cf

Pond M25: Peak Elev=15.61' Inflow=18.10 cfs 90,399 cf
24.0" Round Culvert n=0.013 L=54.0' S=0.0050 '/' Outflow=18.10 cfs 90,399 cf

Pond M28: Peak Elev=15.97' Inflow=6.82 cfs 20,283 cf
18.0" Round Culvert n=0.013 L=51.5' S=0.0050 '/' Outflow=6.82 cfs 20,283 cf

Pond M29: Peak Elev=17.60' Inflow=5.85 cfs 13,979 cf
12.0" Round Culvert n=0.013 L=6.0' S=0.0050 '/' Outflow=5.85 cfs 13,979 cf

Pond M3: Peak Elev=21.52' Inflow=18.78 cfs 74,791 cf
24.0" Round Culvert n=0.013 L=70.5' S=0.0050 '/' Outflow=18.78 cfs 74,791 cf

Pond M31: Peak Elev=16.11' Inflow=4.00 cfs 13,981 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=4.00 cfs 13,981 cf

Pond M32: Peak Elev=17.13' Inflow=4.00 cfs 13,981 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=4.00 cfs 13,981 cf

Pond M35: Peak Elev=16.75' Inflow=0.97 cfs 6,304 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0049 '/' Outflow=0.97 cfs 6,304 cf

Pond M37: Peak Elev=18.71' Inflow=1.80 cfs 6,305 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=1.80 cfs 6,305 cf

Pond M40: Peak Elev=16.06' Inflow=11.37 cfs 56,275 cf
24.0" Round Culvert n=0.013 L=116.5' S=0.0050 '/' Outflow=11.37 cfs 56,275 cf

Pond M42: Peak Elev=17.06' Inflow=10.49 cfs 48,881 cf
18.0" Round Culvert n=0.013 L=93.5' S=0.0050 '/' Outflow=10.49 cfs 48,881 cf

Pond M43: Peak Elev=18.26' Inflow=10.49 cfs 48,881 cf
18.0" Round Culvert n=0.013 L=133.0' S=0.0050 '/' Outflow=10.49 cfs 48,881 cf

Pond M46: Peak Elev=18.97' Inflow=10.02 cfs 44,148 cf
18.0" Round Culvert n=0.013 L=119.5' S=0.0050 '/' Outflow=10.02 cfs 44,148 cf

Pond M47: Peak Elev=19.36' Inflow=10.02 cfs 44,148 cf
18.0" Round Culvert n=0.013 L=34.5' S=0.0049 '/' Outflow=10.02 cfs 44,148 cf

Pond M48: Peak Elev=21.19' Inflow=5.78 cfs 31,477 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=5.78 cfs 31,477 cf

Pond M49: Peak Elev=22.48' Inflow=4.41 cfs 12,670 cf
12.0" Round Culvert n=0.013 L=160.5' S=0.0050 '/' Outflow=4.41 cfs 12,670 cf

Pond M50: Peak Elev=24.13' Inflow=16.84 cfs 56,584 cf
18.0" Round Culvert n=0.013 L=2.0' S=0.0000 '/' Outflow=16.84 cfs 56,584 cf

Pond M50A: Peak Elev=53.76' Inflow=5.46 cfs 19,630 cf
6.0" Round Culvert n=0.013 L=3.0' S=0.0200 '/' Outflow=5.46 cfs 19,630 cf

Pond M51: Peak Elev=27.97' Inflow=16.84 cfs 56,584 cf
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=16.84 cfs 56,584 cf

Pond M53: Peak Elev=30.00' Inflow=11.56 cfs 38,435 cf
18.0" Round Culvert n=0.013 L=91.0' S=0.0049 '/' Outflow=11.56 cfs 38,435 cf

Pond M6: Peak Elev=22.31' Inflow=15.85 cfs 64,403 cf
24.0" Round Culvert n=0.013 L=36.0' S=0.0050 '/' Outflow=15.85 cfs 64,403 cf

Pond M61: Peak Elev=493.03' Inflow=20.10 cfs 69,485 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0100 '/' Outflow=20.10 cfs 69,485 cf

Pond M62: Peak Elev=541.48' Inflow=20.10 cfs 69,485 cf
12.0" Round Culvert n=0.013 L=147.5' S=0.0050 '/' Outflow=20.10 cfs 69,485 cf

Pond M64: Peak Elev=562.23' Inflow=10.76 cfs 37,372 cf
12.0" Round Culvert n=0.013 L=269.5' S=0.0050 '/' Outflow=10.76 cfs 37,372 cf

Pond M66: Peak Elev=562.98' Inflow=3.98 cfs 13,836 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0049 '/' Outflow=3.98 cfs 13,836 cf

Pond M9: Peak Elev=22.78' Inflow=12.91 cfs 51,690 cf
24.0" Round Culvert n=0.013 L=56.5' S=0.0050 '/' Outflow=12.91 cfs 51,690 cf

Pond RD 20: Peak Elev=135.76' Inflow=7.12 cfs 25,562 cf
6.0" Round Culvert n=0.013 L=15.5' S=0.0052 '/' Outflow=7.12 cfs 25,562 cf

Pond RD B: Peak Elev=181.78' Inflow=5.46 cfs 19,630 cf
6.0" Round Culvert n=0.013 L=116.0' S=0.0050 '/' Outflow=5.46 cfs 19,630 cf

Pond RD69: Peak Elev=384.52' Inflow=4.24 cfs 15,247 cf
6.0" Round Culvert n=0.013 L=31.0' S=0.0052 '/' Outflow=4.24 cfs 15,247 cf

Pond WQS1: Peak Elev=19.27' Inflow=18.79 cfs 74,791 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0048 '/' Outflow=18.76 cfs 74,791 cf

Total Runoff Area = 589,518 sf Runoff Volume = 359,306 cf Average Runoff Depth = 7.31"
32.56% Pervious = 191,976 sf 67.44% Impervious = 397,542 sf

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1: Runoff Area=5,130 sf 38.99% Impervious Runoff Depth=8.09"
Tc=6.0 min CN=83 Runoff=1.07 cfs 3,457 cf

Subcatchment 2: Runoff Area=6,350 sf 44.08% Impervious Runoff Depth=8.34"
Tc=6.0 min CN=85 Runoff=1.35 cfs 4,414 cf

Subcatchment 3: Runoff Area=17,966 sf 63.26% Impervious Runoff Depth=8.84"
Tc=6.0 min CN=89 Runoff=3.96 cfs 13,240 cf

Subcatchment 4: Runoff Area=14,022 sf 87.36% Impervious Runoff Depth=9.58"
Tc=6.0 min CN=95 Runoff=3.20 cfs 11,200 cf

Subcatchment 5: Runoff Area=1,807 sf 96.73% Impervious Runoff Depth=9.83"
Tc=6.0 min CN=97 Runoff=0.41 cfs 1,480 cf

Subcatchment 6: Runoff Area=7,003 sf 96.19% Impervious Runoff Depth=9.83"
Tc=6.0 min CN=97 Runoff=1.61 cfs 5,735 cf

Subcatchment 7: Runoff Area=2,462 sf 89.85% Impervious Runoff Depth=9.71"
Tc=6.0 min CN=96 Runoff=0.56 cfs 1,991 cf

Subcatchment 8: Runoff Area=6,973 sf 92.96% Impervious Runoff Depth=9.71"
Tc=6.0 min CN=96 Runoff=1.60 cfs 5,640 cf

Subcatchment 9: Runoff Area=3,790 sf 85.17% Impervious Runoff Depth=9.46"
Tc=6.0 min CN=94 Runoff=0.86 cfs 2,988 cf

Subcatchment 10: Runoff Area=17,202 sf 78.76% Impervious Runoff Depth=9.34"
Tc=6.0 min CN=93 Runoff=3.89 cfs 13,388 cf

Subcatchment 11: Runoff Area=5,038 sf 50.34% Impervious Runoff Depth=8.47"
Tc=6.0 min CN=86 Runoff=1.08 cfs 3,555 cf

Subcatchment 12: Runoff Area=12,361 sf 62.85% Impervious Runoff Depth=8.84"
Tc=6.0 min CN=89 Runoff=2.73 cfs 9,110 cf

Subcatchment 13: Runoff Area=2,486 sf 78.32% Impervious Runoff Depth=9.34"
Tc=6.0 min CN=93 Runoff=0.56 cfs 1,935 cf

Subcatchment 14: Runoff Area=5,742 sf 40.56% Impervious Runoff Depth=8.21"
Tc=6.0 min CN=84 Runoff=1.21 cfs 3,930 cf

Subcatchment 15: Runoff Area=27,997 sf 82.23% Impervious Runoff Depth=9.46"
Tc=6.0 min CN=94 Runoff=6.36 cfs 22,076 cf

Subcatchment 16: Runoff Area=44,751 sf 69.67% Impervious Runoff Depth=9.09"
Tc=6.0 min CN=91 Runoff=10.01 cfs 33,907 cf

Subcatchment 17: Runoff Area=18,629 sf 55.15% Impervious Runoff Depth=8.59"
Tc=6.0 min CN=87 Runoff=4.04 cfs 13,340 cf

Subcatchment 18: Runoff Area=28,518 sf 100.00% Impervious Runoff Depth=9.95"
Tc=6.0 min CN=98 Runoff=6.56 cfs 23,644 cf

Subcatchment 19: Runoff Area=4,108 sf 17.31% Impervious Runoff Depth=7.44"
Tc=6.0 min CN=78 Runoff=0.80 cfs 2,549 cf

Subcatchment 20: Runoff Area=1,524 sf 100.00% Impervious Runoff Depth=9.95"
Tc=6.0 min CN=98 Runoff=0.35 cfs 1,264 cf

Subcatchment 21: Runoff Area=792 sf 66.04% Impervious Runoff Depth=8.97"
Tc=6.0 min CN=90 Runoff=0.18 cfs 592 cf

Subcatchment 22: Runoff Area=42,162 sf 1.21% Impervious Runoff Depth=6.92"
Tc=6.0 min CN=74 Runoff=7.77 cfs 24,325 cf

Subcatchment 23: Runoff Area=14,462 sf 0.00% Impervious Runoff Depth=6.92"
Flow Length=115' Slope=0.0011 '/' Tc=6.0 min CN=74 Runoff=2.67 cfs 8,344 cf

Subcatchment 24: Runoff Area=6,729 sf 56.26% Impervious Runoff Depth=8.72"
Flow Length=176' Tc=6.0 min CN=88 Runoff=1.47 cfs 4,889 cf

Subcatchment 25: Runoff Area=6,442 sf 34.31% Impervious Runoff Depth=7.96"
Tc=0.0 min CN=82 Runoff=1.62 cfs 4,273 cf

Subcatchment 26: Runoff Area=14,265 sf 86.53% Impervious Runoff Depth=9.58"
Tc=0.0 min CN=95 Runoff=3.97 cfs 11,394 cf

Subcatchment 27: Runoff Area=5,289 sf 76.01% Impervious Runoff Depth=9.22"
Flow Length=71' Slope=0.1342 '/' Tc=7.7 min CN=92 Runoff=1.12 cfs 4,062 cf

Subcatchment 28: Runoff Area=18,464 sf 86.68% Impervious Runoff Depth=9.58"
Tc=6.0 min CN=95 Runoff=4.21 cfs 14,747 cf

Subcatchment 29: Runoff Area=8,912 sf 80.50% Impervious Runoff Depth=9.34"
Tc=0.0 min CN=93 Runoff=2.46 cfs 6,936 cf

Subcatchment 30: Runoff Area=18,830 sf 38.59% Impervious Runoff Depth=8.09"
Flow Length=349' Slope=0.0138 '/' Tc=6.0 min CN=83 Runoff=3.93 cfs 12,690 cf

Subcatchment 31: Runoff Area=15,371 sf 10.01% Impervious Runoff Depth=7.18"
Tc=6.0 min CN=76 Runoff=2.92 cfs 9,203 cf

Subcatchment 32: Runoff Area=37,137 sf 100.00% Impervious Runoff Depth=9.95"
Tc=6.0 min CN=98 Runoff=8.54 cfs 30,790 cf

Subcatchment 34: Runoff Area=10,350 sf 83.59% Impervious Runoff Depth=9.46"
Tc=6.0 min CN=94 Runoff=2.35 cfs 8,161 cf

Subcatchment 35: Runoff Area=10,664 sf 91.11% Impervious Runoff Depth=9.71"
Tc=6.0 min CN=96 Runoff=2.44 cfs 8,626 cf

Subcatchment 36: Runoff Area=35,753 sf 88.57% Impervious Runoff Depth=9.58"
Tc=6.0 min CN=95 Runoff=8.15 cfs 28,556 cf

Subcatchment 37: Runoff Area=49,536 sf 84.69% Impervious Runoff Depth=9.46"
Tc=6.0 min CN=94 Runoff=11.25 cfs 39,060 cf

Subcatchment 38: Runoff Area=22,151 sf 100.00% Impervious Runoff Depth=9.95"
Tc=6.0 min CN=98 Runoff=5.09 cfs 18,365 cf

Subcatchment 39: Runoff Area=11,218 sf 43.45% Impervious Runoff Depth=8.21"
Tc=6.0 min CN=84 Runoff=2.37 cfs 7,679 cf

Subcatchment 40: Runoff Area=13,195 sf 78.02% Impervious Runoff Depth=9.34"
Tc=6.0 min CN=93 Runoff=2.98 cfs 10,269 cf

Subcatchment 41: Runoff Area=7,175 sf 49.39% Impervious Runoff Depth=8.47"
Tc=6.0 min CN=86 Runoff=1.54 cfs 5,063 cf

Subcatchment 42: Runoff Area=6,762 sf 0.00% Impervious Runoff Depth=6.92"
Tc=6.0 min CN=74 Runoff=1.25 cfs 3,901 cf

Reach AP1: Hodgson Brook Inflow=67.66 cfs 253,550 cf
Outflow=67.66 cfs 253,550 cf

Reach AP2: Storm Drain Inflow=42.73 cfs 139,772 cf
Outflow=42.73 cfs 139,772 cf

Reach R1: Swale Avg. Flow Depth=0.86' Max Vel=4.25 fps Inflow=25.77 cfs 101,591 cf
n=0.035 L=100.0' S=0.0200 '/' Capacity=333.24 cfs Outflow=24.05 cfs 101,591 cf

Pond 27 BRB1: Peak Elev=16.41' Storage=1,082 cf Inflow=1.08 cfs 3,555 cf
Outflow=2.65 cfs 3,555 cf

Pond 30 DB1: Peak Elev=23.68' Storage=2,465 cf Inflow=4.81 cfs 16,935 cf
Primary=6.05 cfs 4,545 cf Secondary=1.51 cfs 12,388 cf Outflow=7.57 cfs 16,933 cf

Pond 36 DB2: Peak Elev=18.35' Storage=1,135 cf Inflow=2.16 cfs 7,632 cf
Primary=0.93 cfs 326 cf Secondary=1.27 cfs 7,304 cf Outflow=2.00 cfs 7,631 cf

Pond 41 BRB2: Peak Elev=18.47' Storage=1,721 cf Inflow=2.73 cfs 9,110 cf
Outflow=4.04 cfs 9,110 cf

Pond 49 IB3: Peak Elev=42.19' Storage=0.432 af Inflow=20.41 cfs 69,323 cf
Discarded=5.23 cfs 30,107 cf Primary=16.56 cfs 39,216 cf Outflow=21.60 cfs 69,323 cf

Pond 56 IB2: Peak Elev=32.88' Storage=4,823 cf Inflow=6.56 cfs 23,644 cf
Discarded=0.81 cfs 7,698 cf Primary=5.77 cfs 15,946 cf Outflow=5.99 cfs 23,645 cf

Pond 60 WQU 2: Peak Elev=676.04' Inflow=24.20 cfs 84,403 cf
12.0" Round Culvert n=0.013 L=90.0' S=0.0050 '/' Outflow=24.20 cfs 84,403 cf

Pond 1071: Peak Elev=619.00' Inflow=29.55 cfs 102,351 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=29.55 cfs 102,351 cf

Pond 1072: Peak Elev=513.66' Inflow=36.18 cfs 125,779 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=36.18 cfs 125,779 cf

Pond 1346: Peak Elev=202.68' Inflow=36.18 cfs 125,779 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=36.18 cfs 125,779 cf

Pond 1347: Peak Elev=458.84' Inflow=36.18 cfs 125,779 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=36.18 cfs 125,779 cf

Pond CB10: Peak Elev=26.76' Inflow=4.21 cfs 14,747 cf
12.0" Round Culvert n=0.013 L=56.0' S=0.0089 '/' Outflow=4.21 cfs 14,747 cf

Pond CB12: Peak Elev=26.81' Inflow=2.46 cfs 6,936 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=2.46 cfs 6,936 cf

Pond CB13: Peak Elev=27.73' Inflow=3.93 cfs 12,690 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=3.93 cfs 12,690 cf

Pond CB16: Peak Elev=27.72' Inflow=2.92 cfs 9,203 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=2.92 cfs 9,203 cf

Pond CB23: Peak Elev=20.78' Inflow=0.86 cfs 2,988 cf
12.0" Round Culvert n=0.013 L=15.5' S=0.0045 '/' Outflow=0.86 cfs 2,988 cf

Pond CB24: Peak Elev=20.76' Inflow=0.41 cfs 1,480 cf
12.0" Round Culvert n=0.013 L=39.5' S=0.0099 '/' Outflow=0.41 cfs 1,480 cf

Pond CB26: Peak Elev=22.14' Inflow=3.89 cfs 13,388 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0571 '/' Outflow=3.89 cfs 13,388 cf

Pond CB33: Peak Elev=24.98' Inflow=3.20 cfs 11,200 cf
12.0" Round Culvert n=0.013 L=63.5' S=0.0055 '/' Outflow=3.20 cfs 11,200 cf

Pond CB34: Peak Elev=24.78' Inflow=1.61 cfs 5,735 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0146 '/' Outflow=1.61 cfs 5,735 cf

Pond CB38: Peak Elev=18.85' Inflow=0.56 cfs 1,991 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.56 cfs 1,991 cf

Pond CB39: Peak Elev=19.81' Inflow=1.60 cfs 5,640 cf
12.0" Round Culvert n=0.013 L=53.0' S=0.0049 '/' Outflow=1.60 cfs 5,640 cf

Pond CB4: Peak Elev=23.57' Inflow=1.47 cfs 4,889 cf
12.0" Round Culvert n=0.013 L=24.5' S=0.0347 '/' Outflow=1.47 cfs 4,889 cf

Pond CB44: Peak Elev=28.09' Inflow=1.21 cfs 3,930 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=1.21 cfs 3,930 cf

Pond CB45: Peak Elev=28.06' Inflow=0.56 cfs 1,935 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.56 cfs 1,935 cf

Pond CB5: Peak Elev=23.72' Inflow=2.37 cfs 8,174 cf
12.0" Round Culvert n=0.010 L=33.5' S=0.0051 '/' Outflow=2.37 cfs 8,174 cf

Pond CB52: Peak Elev=50.95' Inflow=6.36 cfs 22,076 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0050 '/' Outflow=6.36 cfs 22,076 cf

Pond CB54: Peak Elev=53.15' Inflow=10.01 cfs 33,907 cf
12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=10.01 cfs 33,907 cf

Pond CB55: Peak Elev=51.04' Inflow=4.04 cfs 13,340 cf
12.0" Round Culvert n=0.013 L=69.0' S=0.0122 '/' Outflow=4.04 cfs 13,340 cf

Pond CB6: Peak Elev=24.76' Inflow=1.12 cfs 4,062 cf
12.0" Round Culvert n=0.013 L=13.0' S=0.0262 '/' Outflow=1.12 cfs 4,062 cf

Pond CB63: Peak Elev=787.41' Inflow=11.25 cfs 39,060 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=11.25 cfs 39,060 cf

Pond CB65: Peak Elev=813.49' Inflow=8.15 cfs 28,556 cf
12.0" Round Culvert n=0.013 L=3.5' S=0.0086 '/' Outflow=8.15 cfs 28,556 cf

Pond CB67: Peak Elev=811.83' Inflow=2.44 cfs 8,626 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0053 '/' Outflow=2.44 cfs 8,626 cf

Pond CB68: Peak Elev=811.84' Inflow=2.35 cfs 8,161 cf
12.0" Round Culvert n=0.013 L=52.0' S=0.0050 '/' Outflow=2.35 cfs 8,161 cf

Pond CB7: Peak Elev=25.03' Inflow=3.97 cfs 11,394 cf
12.0" Round Culvert n=0.013 L=16.5' S=0.0479 '/' Outflow=3.97 cfs 11,394 cf

Pond E2348: 2348 Peak Elev=16.83' Inflow=1.07 cfs 3,457 cf
15.0" Round Culvert n=0.013 L=15.0' S=0.0067 '/' Outflow=1.07 cfs 3,457 cf

Pond ECB2347: E2347 Peak Elev=16.84' Inflow=1.07 cfs 3,457 cf
15.0" Round Culvert n=0.013 L=41.0' S=0.0024 '/' Outflow=1.07 cfs 3,457 cf

Pond EM2349: 2349 Peak Elev=16.81' Inflow=37.71 cfs 119,569 cf
24.0" Round Culvert n=0.010 L=87.0' S=0.0069 '/' Outflow=37.71 cfs 119,569 cf

Pond HW5A: HEADAILL INLET Peak Elev=23.83' Inflow=1.25 cfs 3,901 cf
12.0" Round Culvert n=0.013 L=39.0' S=0.0333 '/' Outflow=1.25 cfs 3,901 cf

Pond IB1: Peak Elev=30.74' Storage=8,339 cf Inflow=8.54 cfs 30,790 cf
Discarded=0.34 cfs 9,638 cf Primary=6.50 cfs 21,153 cf Outflow=6.82 cfs 30,791 cf

Pond M11: Peak Elev=26.67' Inflow=12.00 cfs 49,982 cf
18.0" Round Culvert n=0.013 L=101.0' S=0.0050 '/' Outflow=12.00 cfs 49,982 cf

Pond M14: Peak Elev=26.80' Inflow=8.51 cfs 30,356 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=8.51 cfs 30,356 cf

Pond M15: Peak Elev=26.96' Inflow=8.51 cfs 30,356 cf
18.0" Round Culvert n=0.013 L=122.0' S=0.0052 '/' Outflow=8.51 cfs 30,356 cf

Pond M17: Peak Elev=30.01' Inflow=6.50 cfs 21,153 cf
12.0" Round Culvert n=0.013 L=81.0' S=0.0049 '/' Outflow=6.50 cfs 21,153 cf

Pond M19: Peak Elev=104.39' Inflow=8.54 cfs 30,790 cf
6.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=8.54 cfs 30,790 cf

Pond M2: Peak Elev=21.88' Inflow=23.23 cfs 93,248 cf
24.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=23.22 cfs 93,247 cf

Pond M21: Peak Elev=18.39' Inflow=36.83 cfs 116,112 cf
24.0" Round Culvert n=0.013 L=119.0' S=0.0050 '/' Outflow=36.83 cfs 116,112 cf

Pond M22: Peak Elev=20.75' Inflow=36.83 cfs 116,112 cf
24.0" Round Culvert n=0.013 L=67.5' S=0.0050 '/' Outflow=36.83 cfs 116,112 cf

Pond M25: Peak Elev=21.67' Inflow=35.80 cfs 111,644 cf
24.0" Round Culvert n=0.013 L=54.0' S=0.0050 '/' Outflow=35.80 cfs 111,644 cf

Pond M28: Peak Elev=22.02' Inflow=8.67 cfs 24,564 cf
18.0" Round Culvert n=0.013 L=51.5' S=0.0050 '/' Outflow=8.67 cfs 24,564 cf

Pond M29: Peak Elev=24.82' Inflow=7.57 cfs 16,933 cf
12.0" Round Culvert n=0.013 L=6.0' S=0.0050 '/' Outflow=7.57 cfs 16,933 cf

Pond M3: Peak Elev=23.42' Inflow=23.23 cfs 93,248 cf
24.0" Round Culvert n=0.013 L=70.5' S=0.0050 '/' Outflow=23.23 cfs 93,248 cf

Pond M31: Peak Elev=24.23' Inflow=4.81 cfs 16,935 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=4.81 cfs 16,935 cf

Pond M32: Peak Elev=24.73' Inflow=4.81 cfs 16,935 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=4.81 cfs 16,935 cf

Pond M35: Peak Elev=22.09' Inflow=2.00 cfs 7,631 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0049 '/' Outflow=2.00 cfs 7,631 cf

Pond M37: Peak Elev=18.82' Inflow=2.16 cfs 7,632 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=2.16 cfs 7,632 cf

Pond M40: Peak Elev=22.49' Inflow=24.31 cfs 70,137 cf
24.0" Round Culvert n=0.013 L=116.5' S=0.0050 '/' Outflow=24.31 cfs 70,137 cf

Pond M42: Peak Elev=25.88' Inflow=21.89 cfs 61,028 cf
18.0" Round Culvert n=0.013 L=93.5' S=0.0050 '/' Outflow=21.89 cfs 61,028 cf

Pond M43: Peak Elev=28.05' Inflow=21.89 cfs 61,028 cf
18.0" Round Culvert n=0.013 L=133.0' S=0.0050 '/' Outflow=21.89 cfs 61,028 cf

Pond M46: Peak Elev=30.58' Inflow=20.45 cfs 55,163 cf
18.0" Round Culvert n=0.013 L=119.5' S=0.0050 '/' Outflow=20.45 cfs 55,163 cf

Pond M47: Peak Elev=30.64' Inflow=20.45 cfs 55,163 cf
18.0" Round Culvert n=0.013 L=34.5' S=0.0049 '/' Outflow=20.45 cfs 55,163 cf

Pond M48: Peak Elev=41.76' Inflow=16.56 cfs 39,216 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=16.56 cfs 39,216 cf

Pond M49: Peak Elev=35.17' Inflow=5.77 cfs 15,946 cf
12.0" Round Culvert n=0.013 L=160.5' S=0.0050 '/' Outflow=5.77 cfs 15,946 cf

Pond M50: Peak Elev=44.10' Inflow=20.41 cfs 69,323 cf
18.0" Round Culvert n=0.013 L=2.0' S=0.0000 '/' Outflow=20.41 cfs 69,323 cf

Pond M50A: Peak Elev=68.43' Inflow=6.56 cfs 23,644 cf
6.0" Round Culvert n=0.013 L=3.0' S=0.0200 '/' Outflow=6.56 cfs 23,644 cf

Pond M51: Peak Elev=47.02' Inflow=20.41 cfs 69,323 cf
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=20.41 cfs 69,323 cf

Pond M53: Peak Elev=50.48' Inflow=14.05 cfs 47,247 cf
18.0" Round Culvert n=0.013 L=91.0' S=0.0049 '/' Outflow=14.05 cfs 47,247 cf

Pond M6: Peak Elev=24.68' Inflow=19.58 cfs 80,185 cf
24.0" Round Culvert n=0.013 L=36.0' S=0.0050 '/' Outflow=19.58 cfs 80,185 cf

Pond M61: Peak Elev=710.22' Inflow=24.20 cfs 84,403 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0100 '/' Outflow=24.20 cfs 84,403 cf

Pond M62: Peak Elev=780.47' Inflow=24.20 cfs 84,403 cf
12.0" Round Culvert n=0.013 L=147.5' S=0.0050 '/' Outflow=24.20 cfs 84,403 cf

Pond M64: Peak Elev=810.52' Inflow=12.95 cfs 45,343 cf
12.0" Round Culvert n=0.013 L=269.5' S=0.0050 '/' Outflow=12.95 cfs 45,343 cf

Pond M66: Peak Elev=811.59' Inflow=4.79 cfs 16,787 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0049 '/' Outflow=4.79 cfs 16,787 cf

Pond M9: Peak Elev=25.31' Inflow=16.04 cfs 64,729 cf
24.0" Round Culvert n=0.013 L=56.5' S=0.0050 '/' Outflow=16.04 cfs 64,729 cf

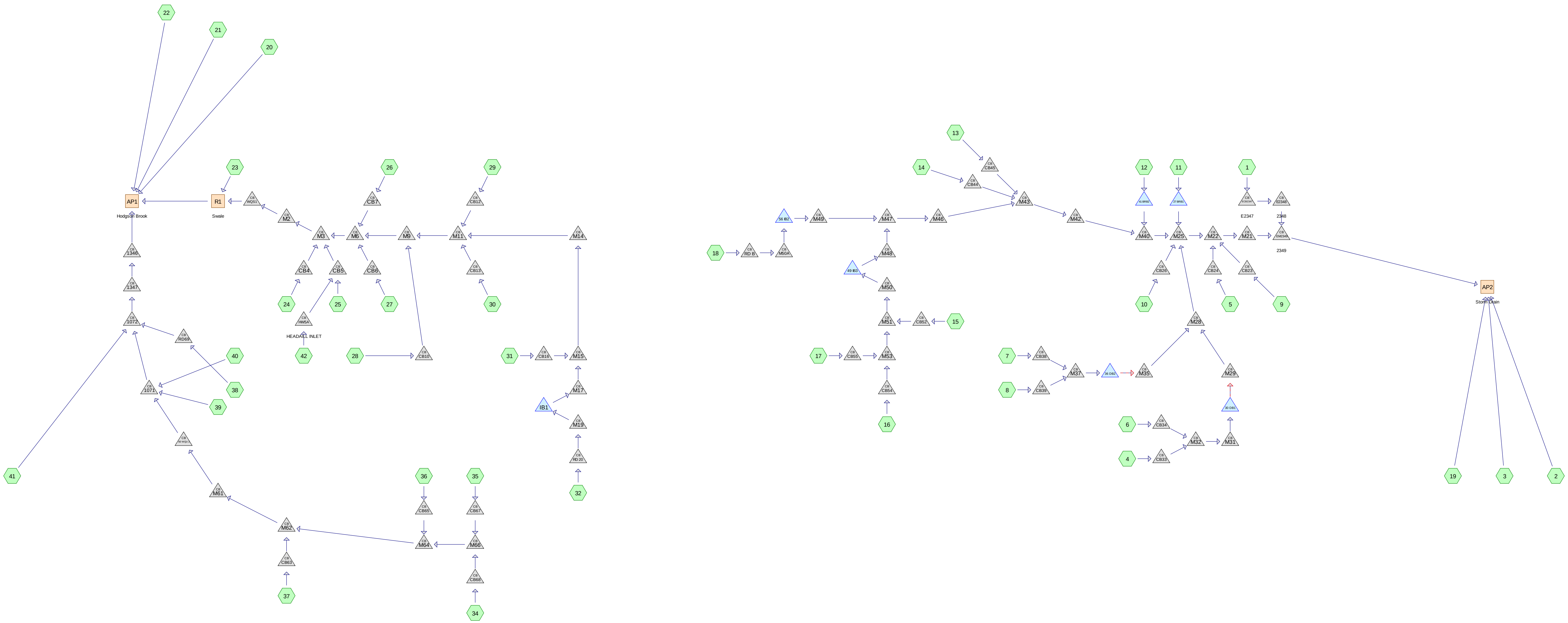
Pond RD 20: Peak Elev=185.33' Inflow=8.54 cfs 30,790 cf
6.0" Round Culvert n=0.013 L=15.5' S=0.0052 '/' Outflow=8.54 cfs 30,790 cf

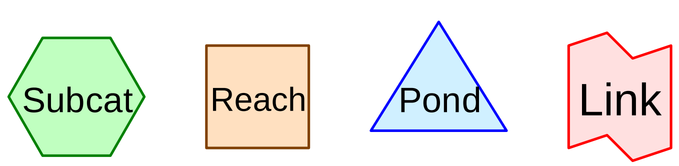
Pond RD B: Peak Elev=252.66' Inflow=6.56 cfs 23,644 cf
6.0" Round Culvert n=0.013 L=116.0' S=0.0050 '/' Outflow=6.56 cfs 23,644 cf

Pond RD69: Peak Elev=552.14' Inflow=5.09 cfs 18,365 cf
6.0" Round Culvert n=0.013 L=31.0' S=0.0052 '/' Outflow=5.09 cfs 18,365 cf

Pond WQS1: Peak Elev=20.17' Inflow=23.22 cfs 93,247 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0048 '/' Outflow=23.25 cfs 93,247 cf

Total Runoff Area = 589,518 sf Runoff Volume = 440,767 cf Average Runoff Depth = 8.97"
32.56% Pervious = 191,976 sf 67.44% Impervious = 397,542 sf





Routing Diagram for Proposed

Prepared by {enter your company name here}, Printed 5/20/2019

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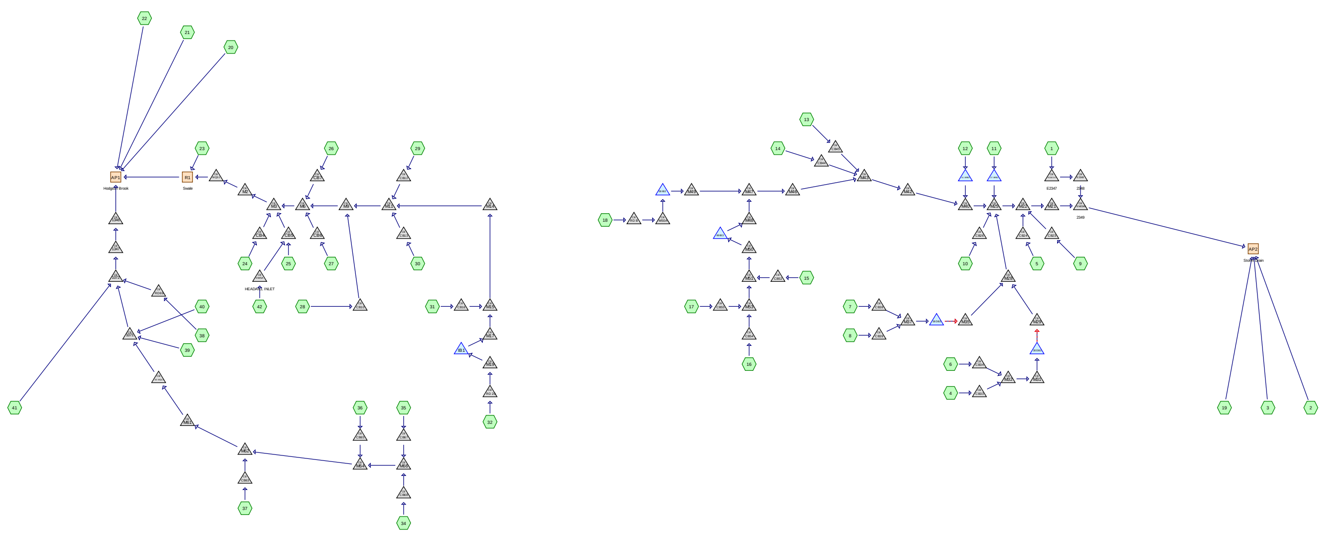
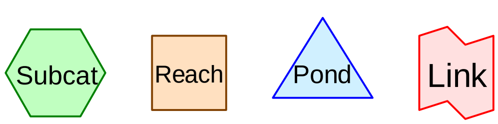




Routing Diagram for Proposed
Prepared by {enter your company name here}, Printed 5/20/2019

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
191,976	74	>75% Grass cover, Good, HSG C (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 34, 35, 36, 37, 39, 40, 41, 42)
309,736	98	Paved parking, HSG C (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 34, 35, 36, 37, 39, 40, 41)
28,518	98	Roofs, HSG C (18)
59,288	98	Unconnected roofs, HSG C (32, 38)
589,518	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
589,518	HSG C	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42
0	HSG D	
0	Other	
589,518		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatcl Numbers
0	0	191,976	0	0	191,976	>75% Grass cover, Good	
0	0	309,736	0	0	309,736	Paved parking	
0	0	28,518	0	0	28,518	Roofs	
0	0	59,288	0	0	59,288	Unconnected roofs	
0	**0**	**589,518**	**0**	**0**	**589,518**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	27 BRB1	12.43	12.30	26.5	0.0049	0.013	12.0	0.0	0.0
2	30 DB1	13.80	13.75	2.0	0.0250	0.013	12.0	0.0	0.0
3	30 DB1	12.80	12.80	2.0	0.0000	0.013	6.0	0.0	0.0
4	36 DB2	17.79	17.75	2.0	0.0200	0.013	12.0	0.0	0.0
5	36 DB2	16.25	16.25	2.0	0.0000	0.013	6.0	0.0	0.0
6	41 BRB2	14.43	14.33	20.0	0.0050	0.013	12.0	0.0	0.0
7	49 IB3	18.60	18.55	2.0	0.0250	0.013	12.0	0.0	0.0
8	56 IB2	18.60	18.55	2.0	0.0250	0.013	12.0	0.0	0.0
9	60 WQU 2	18.05	17.60	90.0	0.0050	0.013	12.0	0.0	0.0
10	1071	17.50	17.30	31.0	0.0065	0.025	12.0	0.0	0.0
11	1072	17.10	15.90	31.0	0.0387	0.025	15.0	0.0	0.0
12	1346	15.70	14.70	143.0	0.0070	0.025	15.0	0.0	0.0
13	1347	15.90	15.80	204.0	0.0005	0.025	15.0	0.0	0.0
14	CB10	18.87	18.37	56.0	0.0089	0.013	12.0	0.0	0.0
15	CB12	19.30	18.87	7.5	0.0573	0.013	12.0	0.0	0.0
16	CB13	19.30	18.87	7.5	0.0573	0.013	12.0	0.0	0.0
17	CB16	20.82	20.50	65.0	0.0049	0.013	12.0	0.0	0.0
18	CB23	13.20	13.13	15.5	0.0045	0.013	12.0	0.0	0.0
19	CB24	13.92	13.53	39.5	0.0099	0.013	12.0	0.0	0.0
20	CB26	13.00	12.20	14.0	0.0571	0.013	12.0	0.0	0.0
21	CB33	15.00	14.65	63.5	0.0055	0.013	12.0	0.0	0.0
22	CB34	15.50	15.15	24.0	0.0146	0.013	12.0	0.0	0.0
23	CB38	18.00	17.95	5.0	0.0100	0.013	12.0	0.0	0.0
24	CB39	19.00	18.74	53.0	0.0049	0.013	12.0	0.0	0.0
25	CB4	18.56	17.71	24.5	0.0347	0.013	12.0	0.0	0.0
26	CB44	19.50	18.50	15.0	0.0667	0.013	12.0	0.0	0.0
27	CB45	19.50	18.50	15.0	0.0667	0.013	12.0	0.0	0.0
28	CB5	17.60	17.43	33.5	0.0051	0.010	12.0	0.0	0.0
29	CB52	20.38	19.95	86.0	0.0050	0.013	12.0	0.0	0.0
30	CB54	20.24	20.02	44.0	0.0050	0.013	12.0	0.0	0.0
31	CB55	20.86	20.02	69.0	0.0122	0.013	12.0	0.0	0.0
32	CB6	17.83	17.49	13.0	0.0262	0.013	12.0	0.0	0.0
33	CB63	19.37	19.12	50.0	0.0050	0.013	12.0	0.0	0.0
34	CB65	20.60	20.57	3.5	0.0086	0.013	12.0	0.0	0.0
35	CB67	20.93	20.89	7.5	0.0053	0.013	12.0	0.0	0.0
36	CB68	21.15	20.89	52.0	0.0050	0.013	12.0	0.0	0.0
37	CB7	18.28	17.49	16.5	0.0479	0.013	12.0	0.0	0.0
38	E2348	9.70	9.60	15.0	0.0067	0.013	15.0	0.0	0.0
39	ECB2347	9.80	9.70	41.0	0.0024	0.013	15.0	0.0	0.0
40	EM2349	9.60	9.00	87.0	0.0069	0.010	24.0	0.0	0.0
41	HW5A	19.00	17.70	39.0	0.0333	0.013	12.0	0.0	0.0
42	IB1	21.10	21.00	6.0	0.0167	0.013	12.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
43	M11	18.37	17.87	101.0	0.0050	0.013	18.0	0.0	0.0
44	M14	19.27	18.47	160.0	0.0050	0.013	18.0	0.0	0.0
45	M15	20.00	19.37	122.0	0.0052	0.013	18.0	0.0	0.0
46	M17	20.90	20.50	81.0	0.0049	0.013	12.0	0.0	0.0
47	M19	22.60	22.54	2.0	0.0300	0.013	6.0	0.0	0.0
48	M2	16.26	16.22	10.0	0.0040	0.013	24.0	0.0	0.0
49	M21	10.29	9.70	119.0	0.0050	0.013	24.0	0.0	0.0
50	M22	10.73	10.39	67.5	0.0050	0.013	24.0	0.0	0.0
51	M25	11.10	10.83	54.0	0.0050	0.013	24.0	0.0	0.0
52	M28	12.57	12.31	51.5	0.0050	0.013	18.0	0.0	0.0
53	M29	12.70	12.67	6.0	0.0050	0.013	12.0	0.0	0.0
54	M3	16.71	16.36	70.5	0.0050	0.013	24.0	0.0	0.0
55	M31	14.40	14.34	2.0	0.0300	0.013	12.0	0.0	0.0
56	M32	14.55	14.50	5.0	0.0100	0.013	12.0	0.0	0.0
57	M35	16.15	15.94	43.0	0.0049	0.013	12.0	0.0	0.0
58	M37	17.85	17.79	2.0	0.0300	0.013	12.0	0.0	0.0
59	M40	11.78	11.20	116.5	0.0050	0.013	24.0	0.0	0.0
60	M42	12.35	11.88	93.5	0.0050	0.013	18.0	0.0	0.0
61	M43	13.11	12.45	133.0	0.0050	0.013	18.0	0.0	0.0
62	M46	14.21	13.61	119.5	0.0050	0.013	18.0	0.0	0.0
63	M47	14.48	14.31	34.5	0.0049	0.013	18.0	0.0	0.0
64	M48	15.10	15.00	6.5	0.0154	0.013	12.0	0.0	0.0
65	M49	15.80	15.00	160.5	0.0050	0.013	12.0	0.0	0.0
66	M50	18.92	18.92	2.0	0.0000	0.013	18.0	0.0	0.0
67	M50A	20.10	20.04	3.0	0.0200	0.013	6.0	0.0	0.0
68	M51	18.97	18.92	5.0	0.0100	0.013	18.0	0.0	0.0
69	M53	19.52	19.07	91.0	0.0049	0.013	18.0	0.0	0.0
70	M6	16.99	16.81	36.0	0.0050	0.013	24.0	0.0	0.0
71	M61	18.18	18.15	3.0	0.0100	0.013	12.0	0.0	0.0
72	M62	19.02	18.28	147.5	0.0050	0.013	12.0	0.0	0.0
73	M64	20.47	19.12	269.5	0.0050	0.013	12.0	0.0	0.0
74	M66	20.79	20.57	45.0	0.0049	0.013	12.0	0.0	0.0
75	M9	17.37	17.09	56.5	0.0050	0.013	24.0	0.0	0.0
76	RD 20	22.78	22.70	15.5	0.0052	0.013	6.0	0.0	0.0
77	RD B	20.78	20.20	116.0	0.0050	0.013	6.0	0.0	0.0
78	RD69	18.16	18.00	31.0	0.0052	0.013	6.0	0.0	0.0
79	WQS1	16.12	16.00	25.0	0.0048	0.013	24.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 1: Runoff Area=5,130 sf 38.99% Impervious Runoff Depth=3.72"
Tc=6.0 min CN=83 Runoff=0.51 cfs 1,591 cf

Subcatchment 2: Runoff Area=6,350 sf 44.08% Impervious Runoff Depth=3.93"
Tc=6.0 min CN=85 Runoff=0.66 cfs 2,078 cf

Subcatchment 3: Runoff Area=17,966 sf 63.26% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=89 Runoff=2.03 cfs 6,511 cf

Subcatchment 4: Runoff Area=14,022 sf 87.36% Impervious Runoff Depth=5.01"
Tc=6.0 min CN=95 Runoff=1.73 cfs 5,859 cf

Subcatchment 5: Runoff Area=1,807 sf 96.73% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=97 Runoff=0.23 cfs 790 cf

Subcatchment 6: Runoff Area=7,003 sf 96.19% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=97 Runoff=0.88 cfs 3,061 cf

Subcatchment 7: Runoff Area=2,462 sf 89.85% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=96 Runoff=0.31 cfs 1,052 cf

Subcatchment 8: Runoff Area=6,973 sf 92.96% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=96 Runoff=0.87 cfs 2,981 cf

Subcatchment 9: Runoff Area=3,790 sf 85.17% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=94 Runoff=0.46 cfs 1,548 cf

Subcatchment 10: Runoff Area=17,202 sf 78.76% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=93 Runoff=2.07 cfs 6,864 cf

Subcatchment 11: Runoff Area=5,038 sf 50.34% Impervious Runoff Depth=4.03"
Tc=6.0 min CN=86 Runoff=0.54 cfs 1,692 cf

Subcatchment 12: Runoff Area=12,361 sf 62.85% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=89 Runoff=1.40 cfs 4,480 cf

Subcatchment 13: Runoff Area=2,486 sf 78.32% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=93 Runoff=0.30 cfs 992 cf

Subcatchment 14: Runoff Area=5,742 sf 40.56% Impervious Runoff Depth=3.82"
Tc=6.0 min CN=84 Runoff=0.58 cfs 1,830 cf

Subcatchment 15: Runoff Area=27,997 sf 82.23% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=94 Runoff=3.41 cfs 11,434 cf

Subcatchment 16: Runoff Area=44,751 sf 69.67% Impervious Runoff Depth=4.57"
Tc=6.0 min CN=91 Runoff=5.23 cfs 17,029 cf

Subcatchment 17: Runoff Area=18,629 sf 55.15% Impervious Runoff Depth=4.14"
Tc=6.0 min CN=87 Runoff=2.02 cfs 6,420 cf

Subcatchment 18: Runoff Area=28,518 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=3.59 cfs 12,744 cf

Subcatchment 19: Runoff Area=4,108 sf 17.31% Impervious Runoff Depth=3.23"
Tc=6.0 min CN=78 Runoff=0.36 cfs 1,105 cf

Subcatchment 20: Runoff Area=1,524 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=0.19 cfs 681 cf

Subcatchment 21: Runoff Area=792 sf 66.04% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=90 Runoff=0.09 cfs 294 cf

Subcatchment 22: Runoff Area=42,162 sf 1.21% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=74 Runoff=3.23 cfs 10,019 cf

Subcatchment 23: Runoff Area=14,462 sf 0.00% Impervious Runoff Depth=2.85"
Flow Length=115' Slope=0.0011 '/' Tc=6.0 min CN=74 Runoff=1.11 cfs 3,437 cf

Subcatchment 24: Runoff Area=6,729 sf 56.26% Impervious Runoff Depth=4.24"
Flow Length=176' Tc=6.0 min CN=88 Runoff=0.75 cfs 2,378 cf

Subcatchment 25: Runoff Area=6,442 sf 34.31% Impervious Runoff Depth=3.62"
Tc=0.0 min CN=82 Runoff=0.76 cfs 1,944 cf

Subcatchment 26: Runoff Area=14,265 sf 86.53% Impervious Runoff Depth=5.01"
Tc=0.0 min CN=95 Runoff=2.14 cfs 5,961 cf

Subcatchment 27: Runoff Area=5,289 sf 76.01% Impervious Runoff Depth=4.68"
Flow Length=71' Slope=0.1342 '/' Tc=7.7 min CN=92 Runoff=0.59 cfs 2,061 cf

Subcatchment 28: Runoff Area=18,464 sf 86.68% Impervious Runoff Depth=5.01"
Tc=6.0 min CN=95 Runoff=2.27 cfs 7,716 cf

Subcatchment 29: Runoff Area=8,912 sf 80.50% Impervious Runoff Depth=4.79"
Tc=0.0 min CN=93 Runoff=1.31 cfs 3,556 cf

Subcatchment 30: Runoff Area=18,830 sf 38.59% Impervious Runoff Depth=3.72"
Flow Length=349' Slope=0.0138 '/' Tc=6.0 min CN=83 Runoff=1.87 cfs 5,840 cf

Subcatchment 31: Runoff Area=15,371 sf 10.01% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=76 Runoff=1.26 cfs 3,891 cf

Subcatchment 32: Runoff Area=37,137 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=4.68 cfs 16,595 cf

Subcatchment 34: Runoff Area=10,350 sf 83.59% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=94 Runoff=1.26 cfs 4,227 cf

Subcatchment 35: Runoff Area=10,664 sf 91.11% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=96 Runoff=1.32 cfs 4,558 cf

Subcatchment 36: Runoff Area=35,753 sf 88.57% Impervious Runoff Depth=5.01"
Tc=6.0 min CN=95 Runoff=4.40 cfs 14,940 cf

Subcatchment 37: Runoff Area=49,536 sf 84.69% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=94 Runoff=6.03 cfs 20,230 cf

Subcatchment 38: Runoff Area=22,151 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=2.79 cfs 9,898 cf

Subcatchment 39: Runoff Area=11,218 sf 43.45% Impervious Runoff Depth=3.82"
Tc=6.0 min CN=84 Runoff=1.14 cfs 3,574 cf

Subcatchment 40: Runoff Area=13,195 sf 78.02% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=93 Runoff=1.59 cfs 5,265 cf

Subcatchment 41: Runoff Area=7,175 sf 49.39% Impervious Runoff Depth=4.03"
Tc=6.0 min CN=86 Runoff=0.76 cfs 2,410 cf

Subcatchment 42: Runoff Area=6,762 sf 0.00% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=74 Runoff=0.52 cfs 1,607 cf

Reach AP1: Hodgson Brook Inflow=35.02 cfs 123,508 cf
Outflow=35.02 cfs 123,508 cf

Reach AP2: Storm Drain Inflow=14.09 cfs 65,147 cf
Outflow=14.09 cfs 65,147 cf

Reach R1: Swale Avg. Flow Depth=0.60' Max Vel=3.51 fps Inflow=12.27 cfs 47,410 cf
n=0.035 L=100.0' S=0.0200 '/' Capacity=333.24 cfs Outflow=12.23 cfs 47,410 cf

Pond 27 BRB1: Peak Elev=16.00' Storage=554 cf Inflow=0.54 cfs 1,692 cf
Outflow=0.08 cfs 1,692 cf

Pond 30 DB1: Peak Elev=14.42' Storage=1,254 cf Inflow=2.60 cfs 8,920 cf
Primary=1.04 cfs 981 cf Secondary=0.83 cfs 7,937 cf Outflow=1.81 cfs 8,918 cf

Pond 36 DB2: Peak Elev=17.23' Storage=470 cf Inflow=1.17 cfs 4,033 cf
Primary=0.00 cfs 0 cf Secondary=0.71 cfs 4,032 cf Outflow=0.71 cfs 4,032 cf

Pond 41 BRB2: Peak Elev=18.14' Storage=1,088 cf Inflow=1.40 cfs 4,480 cf
Outflow=0.79 cfs 4,480 cf

Pond 49 IB3: Peak Elev=19.92' Storage=0.266 af Inflow=10.66 cfs 34,882 cf
Discarded=0.60 cfs 19,218 cf Primary=3.11 cfs 15,665 cf Outflow=3.71 cfs 34,882 cf

Pond 56 IB2: Peak Elev=19.64' Storage=2,492 cf Inflow=3.59 cfs 12,744 cf
Discarded=0.13 cfs 5,691 cf Primary=2.36 cfs 7,053 cf Outflow=2.49 cfs 12,744 cf

Pond 60 WQU 2: Peak Elev=203.84' Inflow=13.02 cfs 43,956 cf
12.0" Round Culvert n=0.013 L=90.0' S=0.0050 '/' Outflow=13.02 cfs 43,956 cf

Pond 1071: Peak Elev=187.35' Inflow=15.74 cfs 52,795 cf
12.0" Round Culvert n=0.025 L=31.0' S=0.0065 '/' Outflow=15.74 cfs 52,795 cf

Pond 1072: Peak Elev=157.45' Inflow=19.29 cfs 65,104 cf
15.0" Round Culvert n=0.025 L=31.0' S=0.0387 '/' Outflow=19.29 cfs 65,104 cf

Pond 1346: Peak Elev=69.04' Inflow=19.29 cfs 65,104 cf
15.0" Round Culvert n=0.025 L=143.0' S=0.0070 '/' Outflow=19.29 cfs 65,104 cf

Pond 1347: Peak Elev=141.87' Inflow=19.29 cfs 65,104 cf
15.0" Round Culvert n=0.025 L=204.0' S=0.0005 '/' Outflow=19.29 cfs 65,104 cf

Pond CB10: Peak Elev=20.25' Inflow=2.27 cfs 7,716 cf
12.0" Round Culvert n=0.013 L=56.0' S=0.0089 '/' Outflow=2.27 cfs 7,716 cf

Pond CB12: Peak Elev=20.34' Inflow=1.31 cfs 3,556 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=1.31 cfs 3,556 cf

Pond CB13: Peak Elev=20.54' Inflow=1.87 cfs 5,840 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0573 '/' Outflow=1.87 cfs 5,840 cf

Pond CB16: Peak Elev=21.54' Inflow=1.26 cfs 3,891 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=1.26 cfs 3,891 cf

Pond CB23: Peak Elev=13.61' Inflow=0.46 cfs 1,548 cf
12.0" Round Culvert n=0.013 L=15.5' S=0.0045 '/' Outflow=0.46 cfs 1,548 cf

Pond CB24: Peak Elev=14.16' Inflow=0.23 cfs 790 cf
12.0" Round Culvert n=0.013 L=39.5' S=0.0099 '/' Outflow=0.23 cfs 790 cf

Pond CB26: Peak Elev=13.80' Inflow=2.07 cfs 6,864 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0571 '/' Outflow=2.07 cfs 6,864 cf

Pond CB33: Peak Elev=16.22' Inflow=1.73 cfs 5,859 cf
12.0" Round Culvert n=0.013 L=63.5' S=0.0055 '/' Outflow=1.73 cfs 5,859 cf

Pond CB34: Peak Elev=16.15' Inflow=0.88 cfs 3,061 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0146 '/' Outflow=0.88 cfs 3,061 cf

Pond CB38: Peak Elev=18.54' Inflow=0.31 cfs 1,052 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.31 cfs 1,052 cf

Pond CB39: Peak Elev=19.56' Inflow=0.87 cfs 2,981 cf
12.0" Round Culvert n=0.013 L=53.0' S=0.0049 '/' Outflow=0.87 cfs 2,981 cf

Pond CB4: Peak Elev=19.30' Inflow=0.75 cfs 2,378 cf
12.0" Round Culvert n=0.013 L=24.5' S=0.0347 '/' Outflow=0.75 cfs 2,378 cf

Pond CB44: Peak Elev=19.88' Inflow=0.58 cfs 1,830 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.58 cfs 1,830 cf

Pond CB45: Peak Elev=19.77' Inflow=0.30 cfs 992 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0667 '/' Outflow=0.30 cfs 992 cf

Pond CB5: Peak Elev=19.26' Inflow=1.06 cfs 3,551 cf
12.0" Round Culvert n=0.010 L=33.5' S=0.0051 '/' Outflow=1.06 cfs 3,551 cf

Pond CB52: Peak Elev=24.05' Inflow=3.41 cfs 11,434 cf
12.0" Round Culvert n=0.013 L=86.0' S=0.0050 '/' Outflow=3.41 cfs 11,434 cf

Pond CB54: Peak Elev=25.56' Inflow=5.23 cfs 17,029 cf
12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=5.23 cfs 17,029 cf

Pond CB55: Peak Elev=24.02' Inflow=2.02 cfs 6,420 cf
12.0" Round Culvert n=0.013 L=69.0' S=0.0122 '/' Outflow=2.02 cfs 6,420 cf

Pond CB6: Peak Elev=19.61' Inflow=0.59 cfs 2,061 cf
12.0" Round Culvert n=0.013 L=13.0' S=0.0262 '/' Outflow=0.59 cfs 2,061 cf

Pond CB63: Peak Elev=236.04' Inflow=6.03 cfs 20,230 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=6.03 cfs 20,230 cf

Pond CB65: Peak Elev=243.66' Inflow=4.40 cfs 14,940 cf
12.0" Round Culvert n=0.013 L=3.5' S=0.0086 '/' Outflow=4.40 cfs 14,940 cf

Pond CB67: Peak Elev=243.17' Inflow=1.32 cfs 4,558 cf
12.0" Round Culvert n=0.013 L=7.5' S=0.0053 '/' Outflow=1.32 cfs 4,558 cf

Pond CB68: Peak Elev=243.17' Inflow=1.26 cfs 4,227 cf
12.0" Round Culvert n=0.013 L=52.0' S=0.0050 '/' Outflow=1.26 cfs 4,227 cf

Pond CB7: Peak Elev=19.64' Inflow=2.14 cfs 5,961 cf
12.0" Round Culvert n=0.013 L=16.5' S=0.0479 '/' Outflow=2.14 cfs 5,961 cf

Pond E2348: 2348 Peak Elev=11.25' Inflow=0.51 cfs 1,591 cf
15.0" Round Culvert n=0.013 L=15.0' S=0.0067 '/' Outflow=0.51 cfs 1,591 cf

Pond ECB2347: E2347 Peak Elev=11.25' Inflow=0.51 cfs 1,591 cf
15.0" Round Culvert n=0.013 L=41.0' S=0.0024 '/' Outflow=0.51 cfs 1,591 cf

Pond EM2349: 2349 Peak Elev=11.24' Inflow=11.47 cfs 55,453 cf
24.0" Round Culvert n=0.010 L=87.0' S=0.0069 '/' Outflow=11.47 cfs 55,453 cf

Pond HW5A: HEADAILL INLET Peak Elev=19.47' Inflow=0.52 cfs 1,607 cf
12.0" Round Culvert n=0.013 L=39.0' S=0.0333 '/' Outflow=0.52 cfs 1,607 cf

Pond IB1: Peak Elev=22.20' Storage=4,500 cf Inflow=4.68 cfs 16,595 cf
Discarded=0.13 cfs 7,576 cf Primary=2.39 cfs 9,020 cf Outflow=2.52 cfs 16,596 cf

Pond M11: Peak Elev=20.32' Inflow=5.52 cfs 22,307 cf
18.0" Round Culvert n=0.013 L=101.0' S=0.0050 '/' Outflow=5.52 cfs 22,307 cf

Pond M14: Peak Elev=20.66' Inflow=3.16 cfs 12,911 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=3.16 cfs 12,911 cf

Pond M15: Peak Elev=21.15' Inflow=3.16 cfs 12,911 cf
18.0" Round Culvert n=0.013 L=122.0' S=0.0052 '/' Outflow=3.16 cfs 12,911 cf

Pond M17: Peak Elev=21.97' Inflow=2.39 cfs 9,020 cf
12.0" Round Culvert n=0.013 L=81.0' S=0.0049 '/' Outflow=2.39 cfs 9,020 cf

Pond M19: Peak Elev=47.31' Inflow=4.68 cfs 16,595 cf
6.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=4.68 cfs 16,595 cf

Pond M2: Peak Elev=18.68' Inflow=11.16 cfs 43,974 cf
24.0" Round Culvert n=0.013 L=10.0' S=0.0040 '/' Outflow=11.18 cfs 43,974 cf

Pond M21: Peak Elev=12.16' Inflow=11.05 cfs 53,862 cf
24.0" Round Culvert n=0.013 L=119.0' S=0.0050 '/' Outflow=11.05 cfs 53,862 cf

Pond M22: Peak Elev=12.77' Inflow=11.05 cfs 53,862 cf
24.0" Round Culvert n=0.013 L=67.5' S=0.0050 '/' Outflow=11.05 cfs 53,862 cf

Pond M25: Peak Elev=13.25' Inflow=10.52 cfs 51,525 cf
24.0" Round Culvert n=0.013 L=54.0' S=0.0050 '/' Outflow=10.52 cfs 51,525 cf

Pond M28: Peak Elev=13.56' Inflow=2.51 cfs 12,950 cf
18.0" Round Culvert n=0.013 L=51.5' S=0.0050 '/' Outflow=2.51 cfs 12,950 cf

Pond M29: Peak Elev=13.79' Inflow=1.81 cfs 8,918 cf
12.0" Round Culvert n=0.013 L=6.0' S=0.0050 '/' Outflow=1.81 cfs 8,918 cf

Pond M3: Peak Elev=19.21' Inflow=11.16 cfs 43,974 cf
24.0" Round Culvert n=0.013 L=70.5' S=0.0050 '/' Outflow=11.16 cfs 43,974 cf

Pond M31: Peak Elev=15.50' Inflow=2.60 cfs 8,920 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=2.60 cfs 8,920 cf

Pond M32: Peak Elev=15.98' Inflow=2.60 cfs 8,920 cf
12.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=2.60 cfs 8,920 cf

Pond M35: Peak Elev=16.66' Inflow=0.71 cfs 4,032 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0049 '/' Outflow=0.71 cfs 4,032 cf

Pond M37: Peak Elev=18.51' Inflow=1.17 cfs 4,033 cf
12.0" Round Culvert n=0.013 L=2.0' S=0.0300 '/' Outflow=1.17 cfs 4,033 cf

Pond M40: Peak Elev=13.59' Inflow=6.53 cfs 30,019 cf
24.0" Round Culvert n=0.013 L=116.5' S=0.0050 '/' Outflow=6.53 cfs 30,019 cf

Pond M42: Peak Elev=14.12' Inflow=5.75 cfs 25,539 cf
18.0" Round Culvert n=0.013 L=93.5' S=0.0050 '/' Outflow=5.75 cfs 25,539 cf

Pond M43: Peak Elev=14.80' Inflow=5.75 cfs 25,539 cf
18.0" Round Culvert n=0.013 L=133.0' S=0.0050 '/' Outflow=5.75 cfs 25,539 cf

Pond M46: Peak Elev=15.60' Inflow=5.22 cfs 22,717 cf
18.0" Round Culvert n=0.013 L=119.5' S=0.0050 '/' Outflow=5.22 cfs 22,717 cf

Pond M47: Peak Elev=16.00' Inflow=5.22 cfs 22,717 cf
18.0" Round Culvert n=0.013 L=34.5' S=0.0049 '/' Outflow=5.22 cfs 22,717 cf

Pond M48: Peak Elev=16.64' Inflow=3.11 cfs 15,665 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=3.11 cfs 15,665 cf

Pond M49: Peak Elev=16.91' Inflow=2.36 cfs 7,053 cf
12.0" Round Culvert n=0.013 L=160.5' S=0.0050 '/' Outflow=2.36 cfs 7,053 cf

Pond M50: Peak Elev=21.29' Inflow=10.66 cfs 34,882 cf
18.0" Round Culvert n=0.013 L=2.0' S=0.0000 '/' Outflow=10.66 cfs 34,882 cf

Pond M50A: Peak Elev=34.78' Inflow=3.59 cfs 12,744 cf
6.0" Round Culvert n=0.013 L=3.0' S=0.0200 '/' Outflow=3.59 cfs 12,744 cf

Pond M51: Peak Elev=22.85' Inflow=10.66 cfs 34,882 cf
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=10.66 cfs 34,882 cf

Pond M53: Peak Elev=23.66' Inflow=7.25 cfs 23,449 cf
18.0" Round Culvert n=0.013 L=91.0' S=0.0049 '/' Outflow=7.25 cfs 23,449 cf

Pond M6: Peak Elev=19.59' Inflow=9.47 cfs 38,045 cf
24.0" Round Culvert n=0.013 L=36.0' S=0.0050 '/' Outflow=9.47 cfs 38,045 cf

Pond M61: Peak Elev=213.72' Inflow=13.02 cfs 43,956 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0100 '/' Outflow=13.02 cfs 43,956 cf

Pond M62: Peak Elev=234.04' Inflow=13.02 cfs 43,956 cf
12.0" Round Culvert n=0.013 L=147.5' S=0.0050 '/' Outflow=13.02 cfs 43,956 cf

Pond M64: Peak Elev=242.79' Inflow=6.99 cfs 23,726 cf
12.0" Round Culvert n=0.013 L=269.5' S=0.0050 '/' Outflow=6.99 cfs 23,726 cf

Pond M66: Peak Elev=243.10' Inflow=2.58 cfs 8,786 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0049 '/' Outflow=2.58 cfs 8,786 cf

Pond M9: Peak Elev=19.85' Inflow=7.78 cfs 30,023 cf
24.0" Round Culvert n=0.013 L=56.5' S=0.0050 '/' Outflow=7.78 cfs 30,023 cf

Pond RD 20: Peak Elev=71.60' Inflow=4.68 cfs 16,595 cf
6.0" Round Culvert n=0.013 L=15.5' S=0.0052 '/' Outflow=4.68 cfs 16,595 cf

Pond RD B: Peak Elev=90.05' Inflow=3.59 cfs 12,744 cf
6.0" Round Culvert n=0.013 L=116.0' S=0.0050 '/' Outflow=3.59 cfs 12,744 cf

Pond RD69: Peak Elev=168.97' Inflow=2.79 cfs 9,898 cf
6.0" Round Culvert n=0.013 L=31.0' S=0.0052 '/' Outflow=2.79 cfs 9,898 cf

Pond WQS1: Peak Elev=18.14' Inflow=11.18 cfs 43,974 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0048 '/' Outflow=11.19 cfs 43,974 cf

Total Runoff Area = 589,518 sf Runoff Volume = 221,141 cf Average Runoff Depth = 4.50"
32.56% Pervious = 191,976 sf 67.44% Impervious = 397,542 sf

Summary for Subcatchment 1:

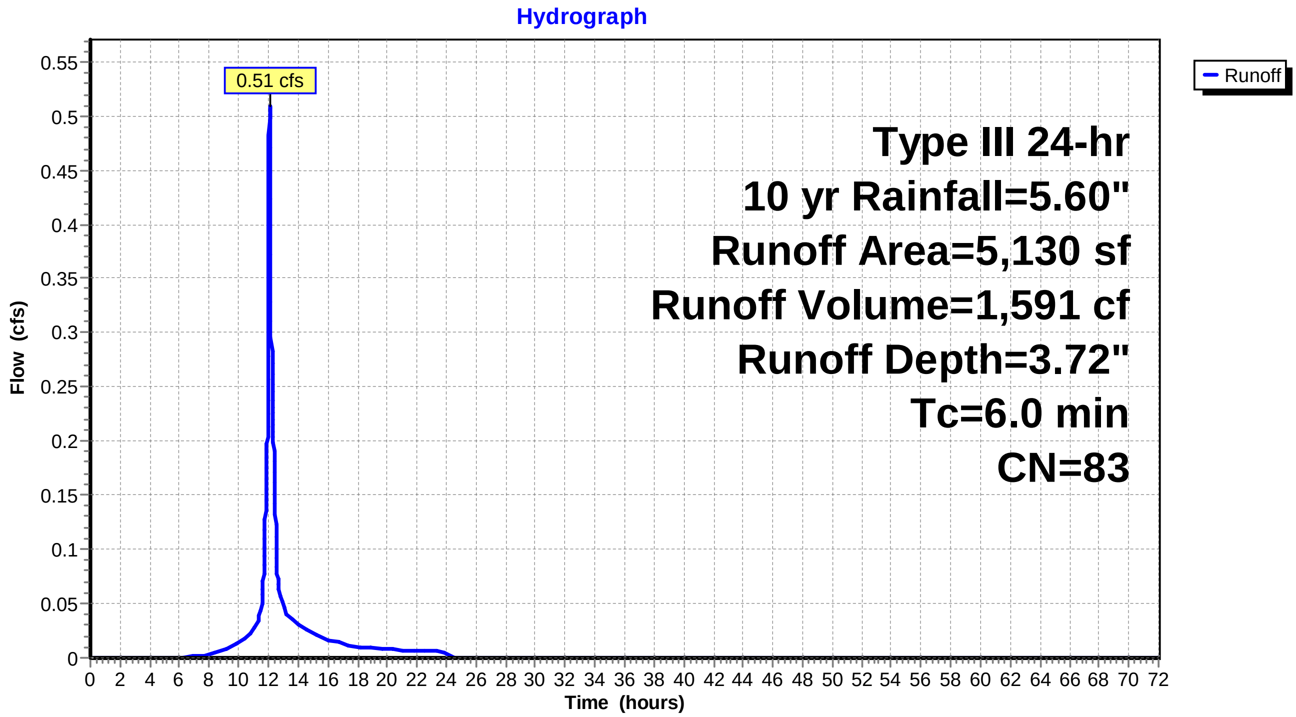
Runoff = 0.51 cfs @ 12.09 hrs, Volume= 1,591 cf, Depth= 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,000	98	Paved parking, HSG C
3,130	74	>75% Grass cover, Good, HSG C
5,130	83	Weighted Average
3,130		61.01% Pervious Area
2,000		38.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1:



Summary for Subcatchment 2:

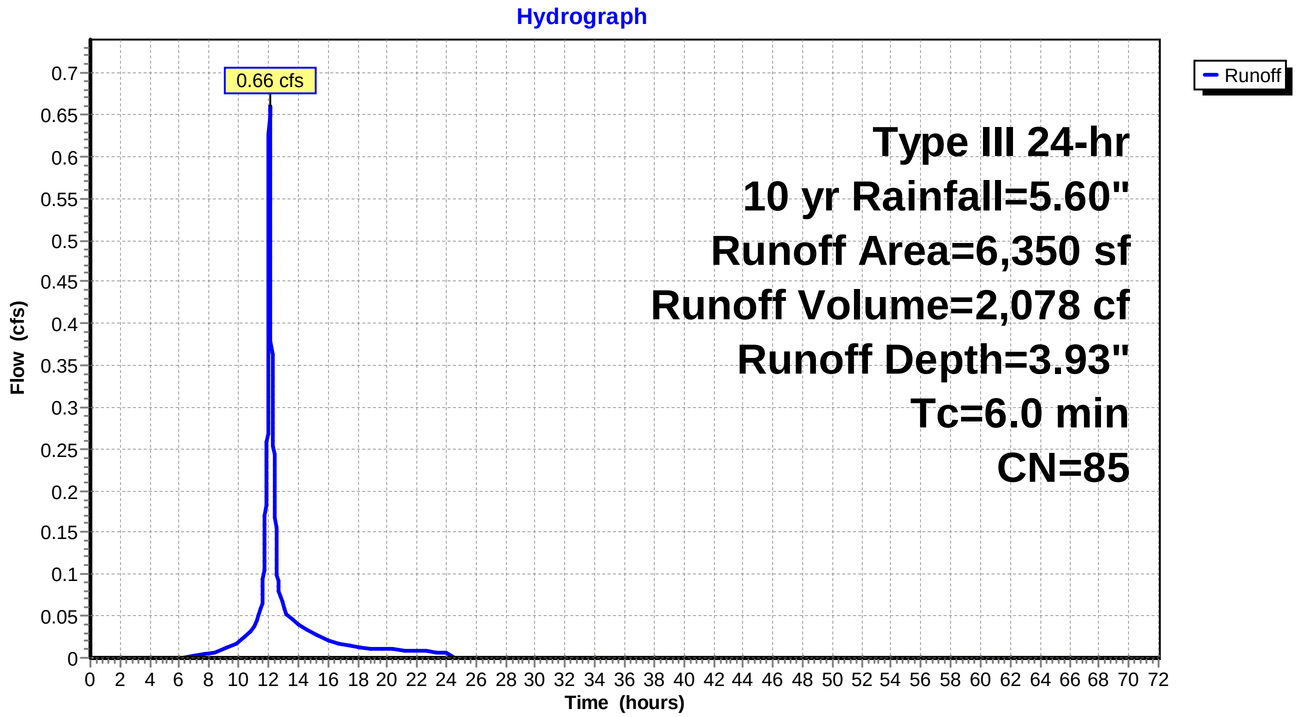
Runoff = 0.66 cfs @ 12.09 hrs, Volume= 2,078 cf, Depth= 3.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,799	98	Paved parking, HSG C
3,551	74	>75% Grass cover, Good, HSG C
6,350	85	Weighted Average
3,551		55.92% Pervious Area
2,799		44.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2:



Summary for Subcatchment 3:

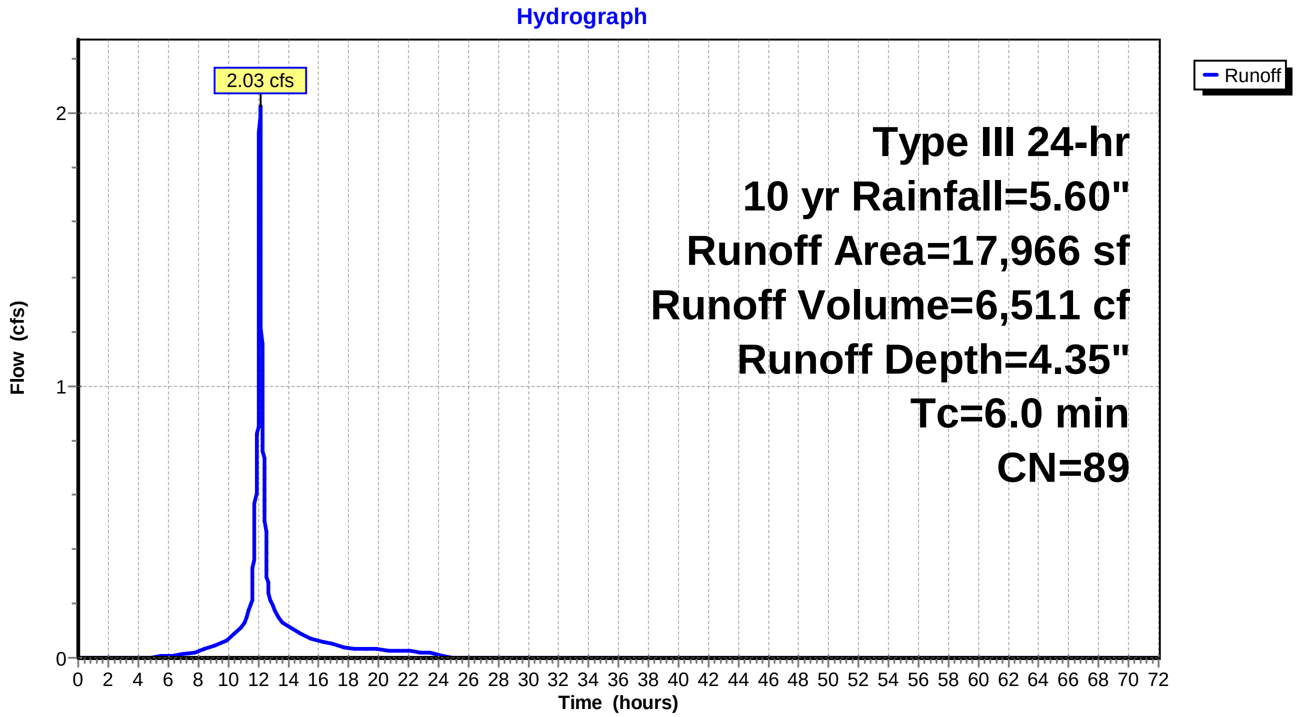
Runoff = 2.03 cfs @ 12.09 hrs, Volume= 6,511 cf, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
11,365	98	Paved parking, HSG C
6,601	74	>75% Grass cover, Good, HSG C
17,966	89	Weighted Average
6,601		36.74% Pervious Area
11,365		63.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3:



Summary for Subcatchment 4:

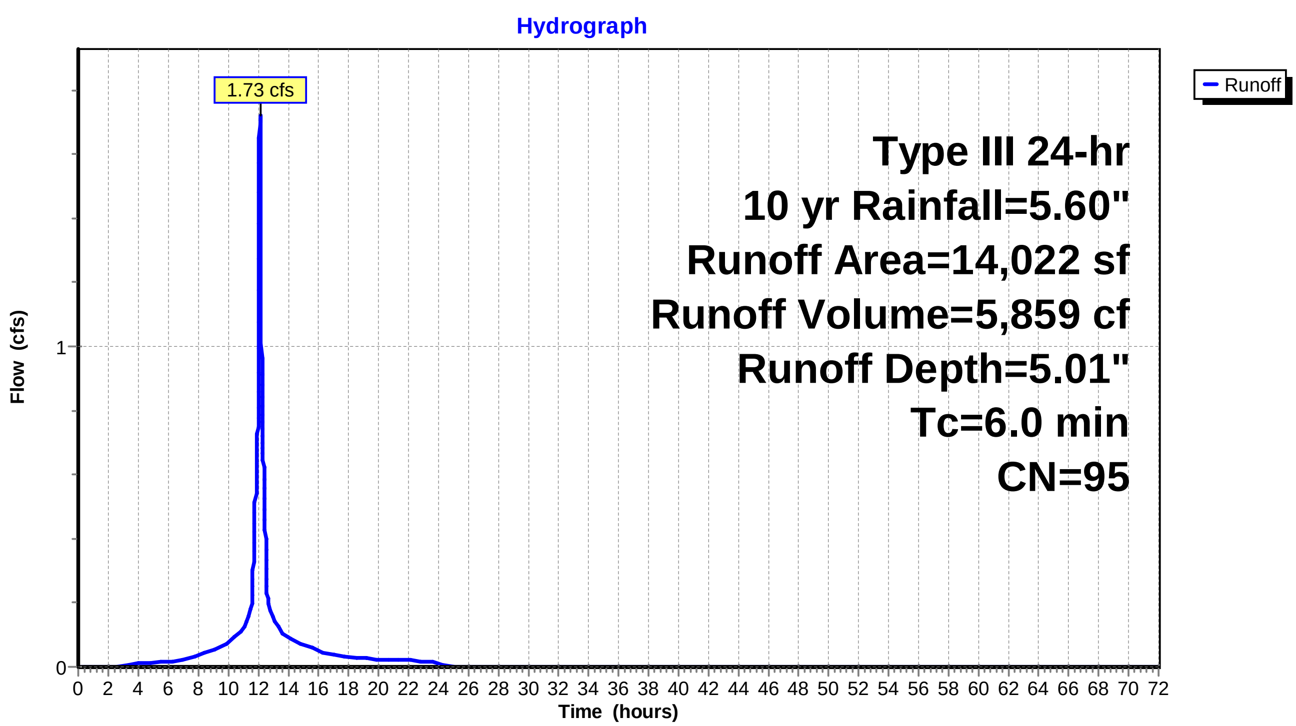
Runoff = 1.73 cfs @ 12.08 hrs, Volume= 5,859 cf, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
12,250	98	Paved parking, HSG C
1,772	74	>75% Grass cover, Good, HSG C
14,022	95	Weighted Average
1,772		12.64% Pervious Area
12,250		87.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4:



Summary for Subcatchment 5:

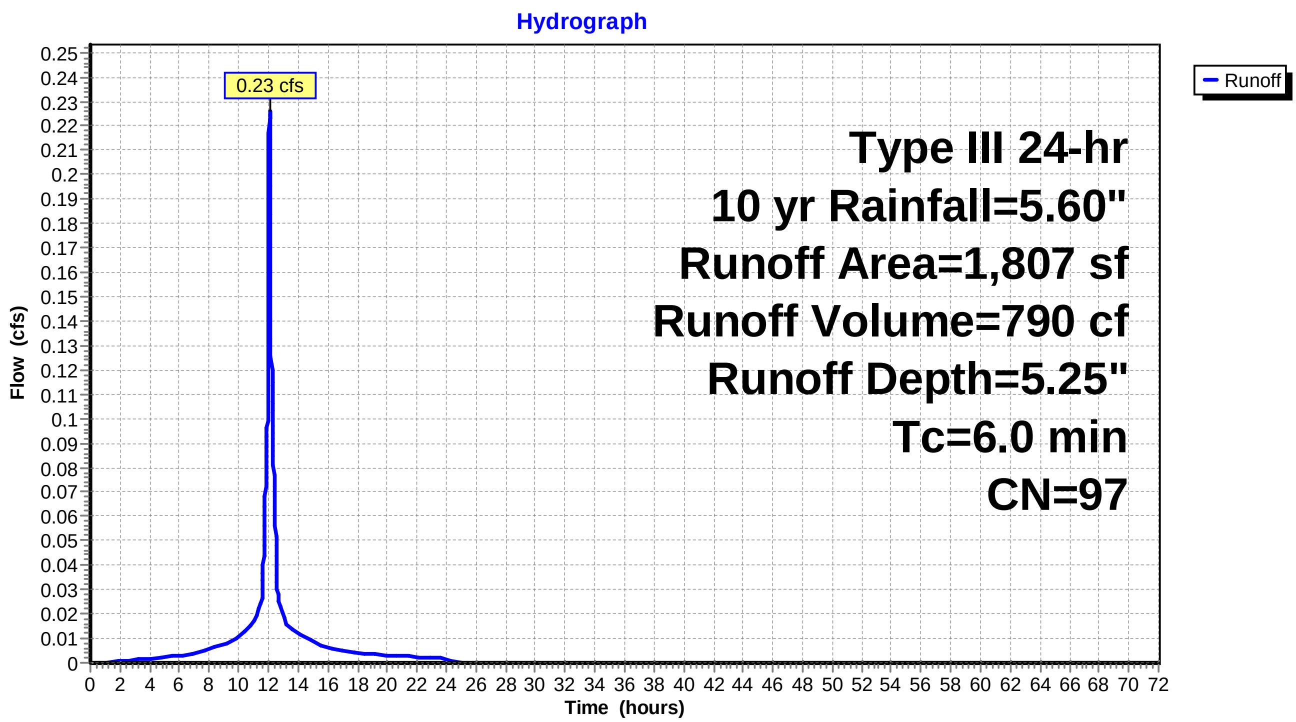
Runoff = 0.23 cfs @ 12.08 hrs, Volume= 790 cf, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,748	98	Paved parking, HSG C
59	74	>75% Grass cover, Good, HSG C
1,807	97	Weighted Average
59		3.27% Pervious Area
1,748		96.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5:



Summary for Subcatchment 6:

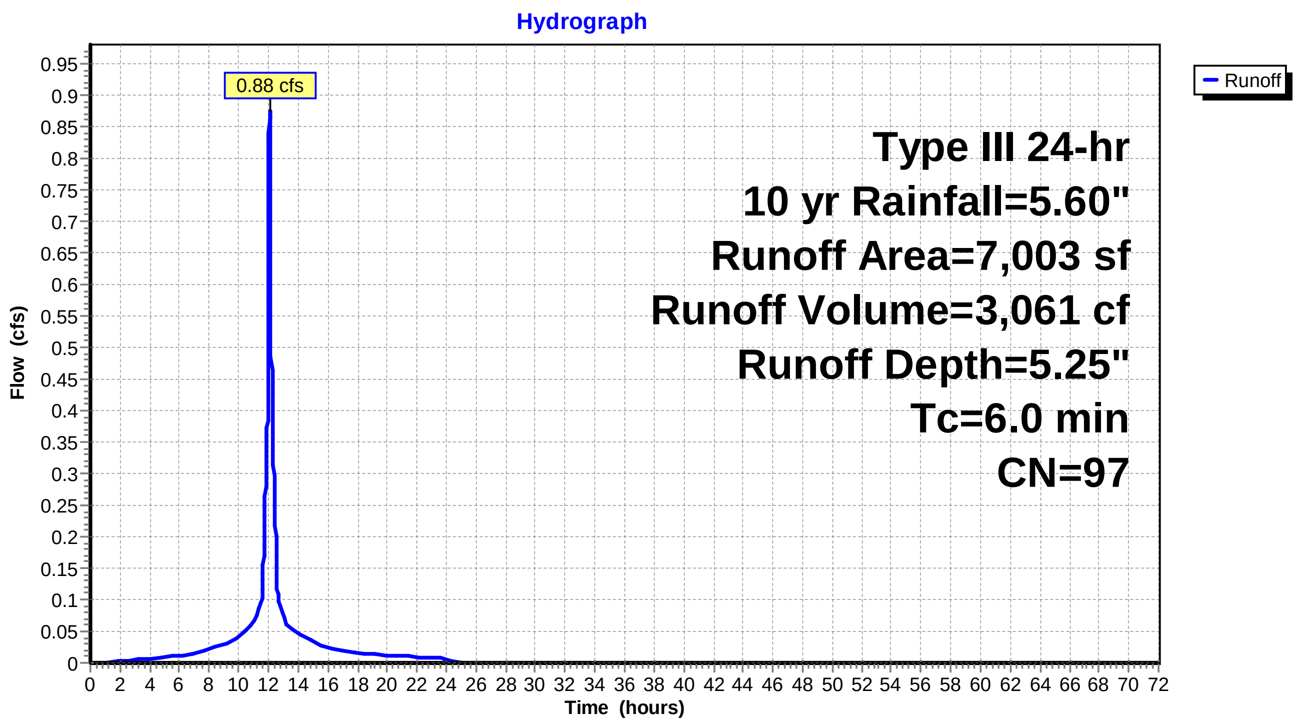
Runoff = 0.88 cfs @ 12.08 hrs, Volume= 3,061 cf, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
6,736	98	Paved parking, HSG C
267	74	>75% Grass cover, Good, HSG C
7,003	97	Weighted Average
267		3.81% Pervious Area
6,736		96.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6:



Summary for Subcatchment 7:

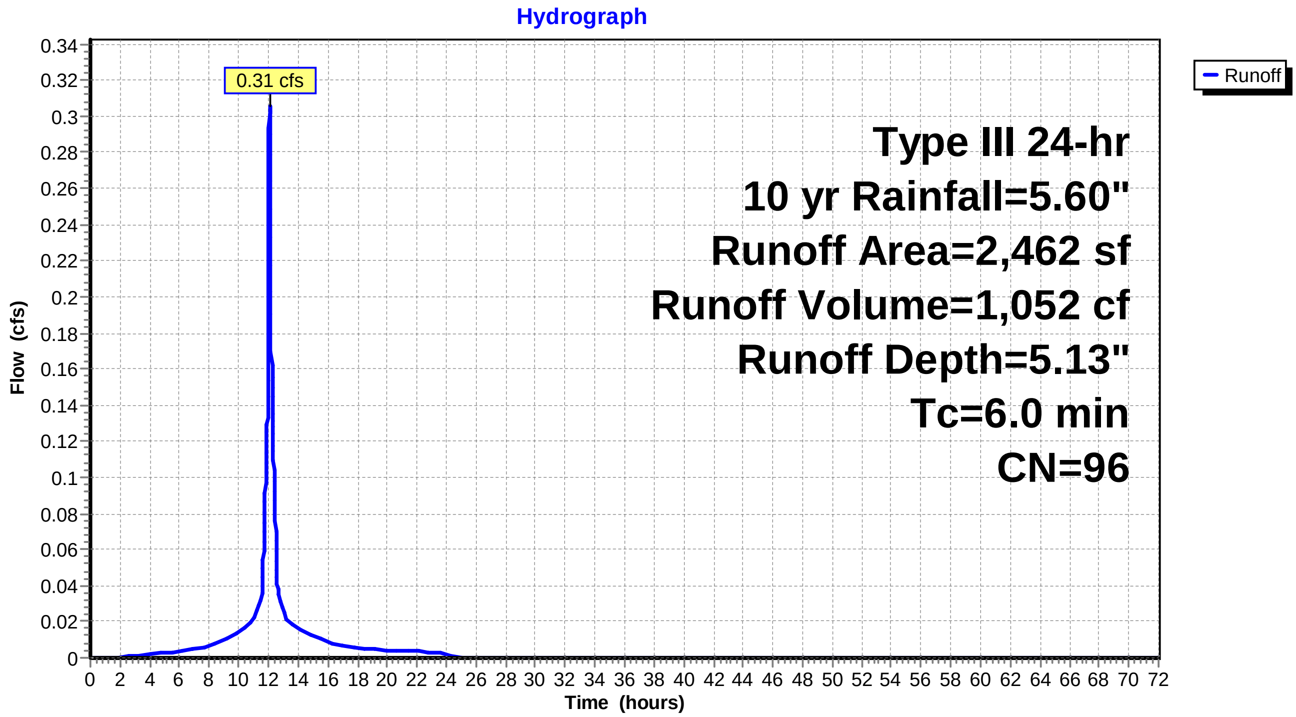
Runoff = 0.31 cfs @ 12.08 hrs, Volume= 1,052 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,212	98	Paved parking, HSG C
250	74	>75% Grass cover, Good, HSG C
2,462	96	Weighted Average
250		10.15% Pervious Area
2,212		89.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7:



Summary for Subcatchment 8:

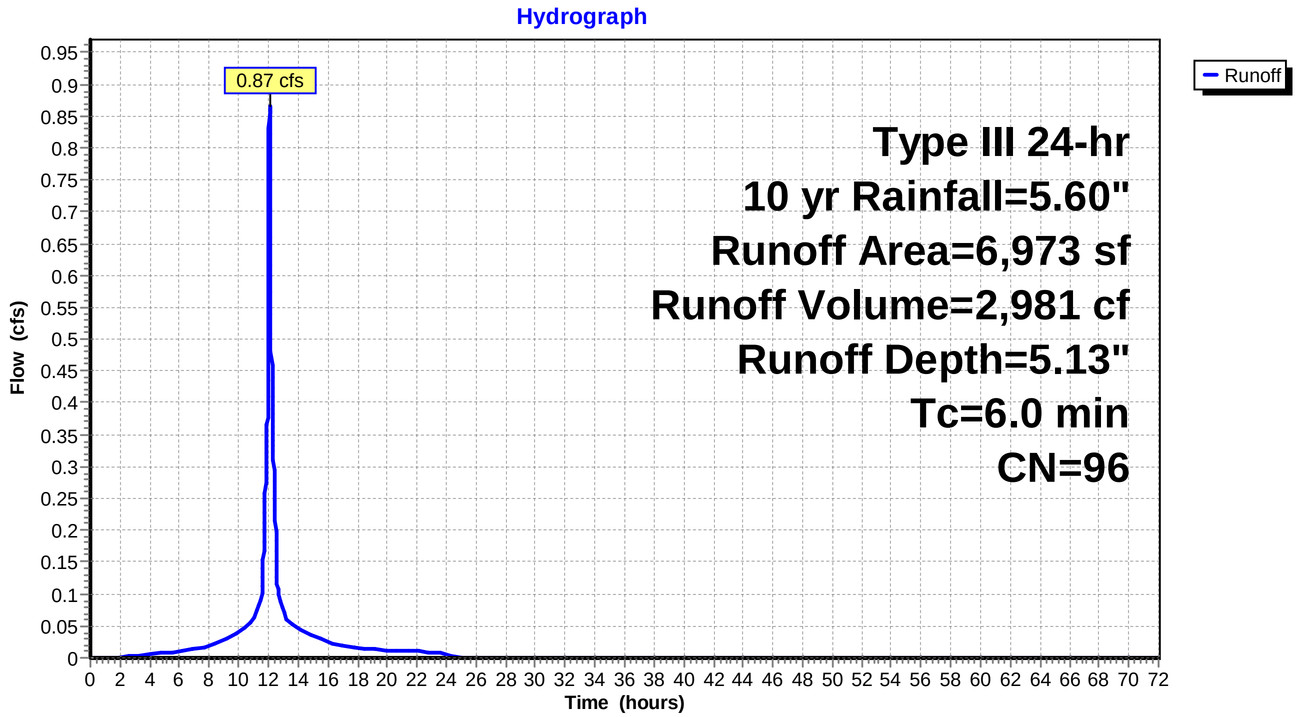
Runoff = 0.87 cfs @ 12.08 hrs, Volume= 2,981 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
6,482	98	Paved parking, HSG C
491	74	>75% Grass cover, Good, HSG C
6,973	96	Weighted Average
491		7.04% Pervious Area
6,482		92.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8:



Summary for Subcatchment 9:

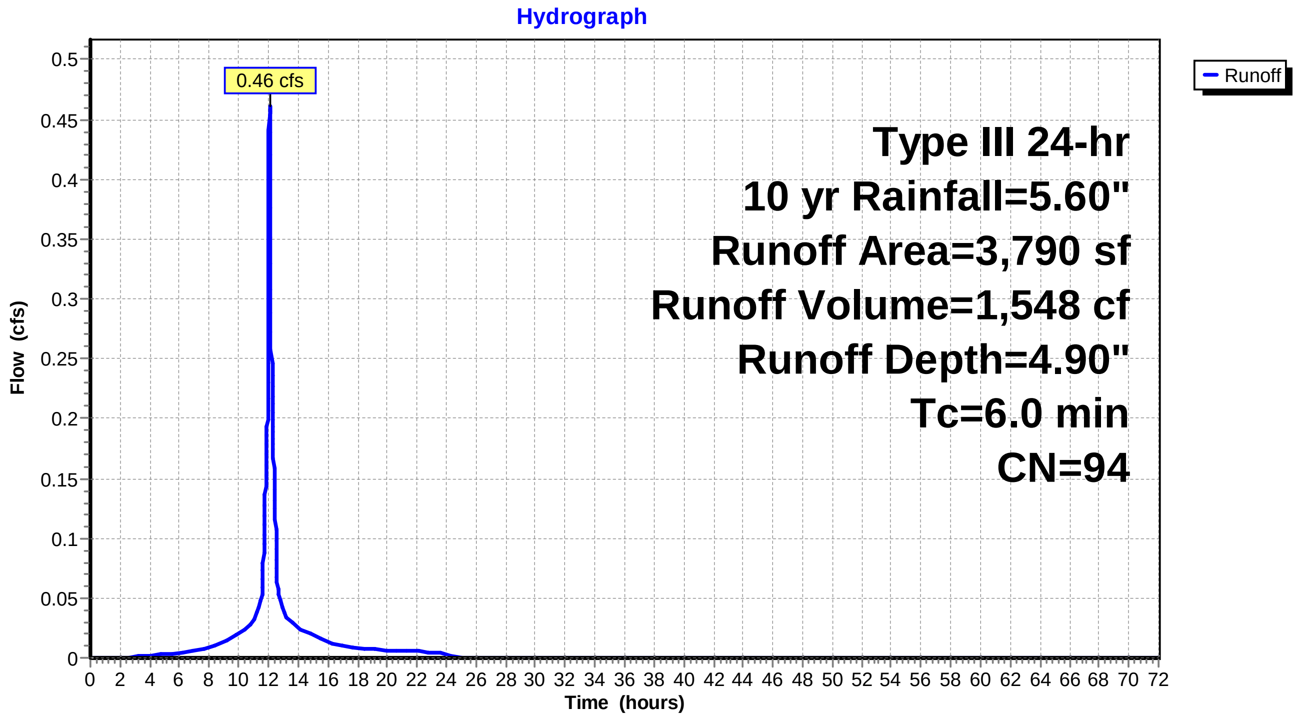
Runoff = 0.46 cfs @ 12.08 hrs, Volume= 1,548 cf, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
3,228	98	Paved parking, HSG C
562	74	>75% Grass cover, Good, HSG C
3,790	94	Weighted Average
562		14.83% Pervious Area
3,228		85.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9:



Summary for Subcatchment 10:

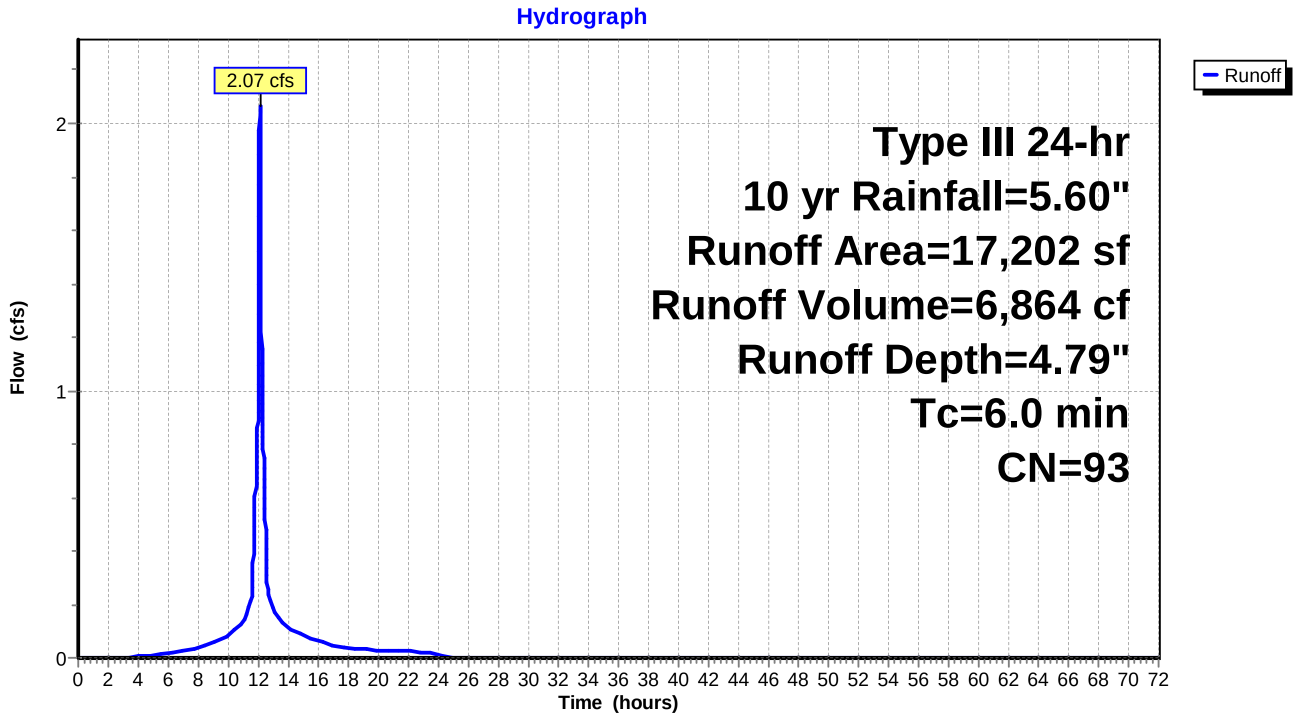
Runoff = 2.07 cfs @ 12.08 hrs, Volume= 6,864 cf, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
13,549	98	Paved parking, HSG C
3,653	74	>75% Grass cover, Good, HSG C
17,202	93	Weighted Average
3,653		21.24% Pervious Area
13,549		78.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10:



Summary for Subcatchment 11:

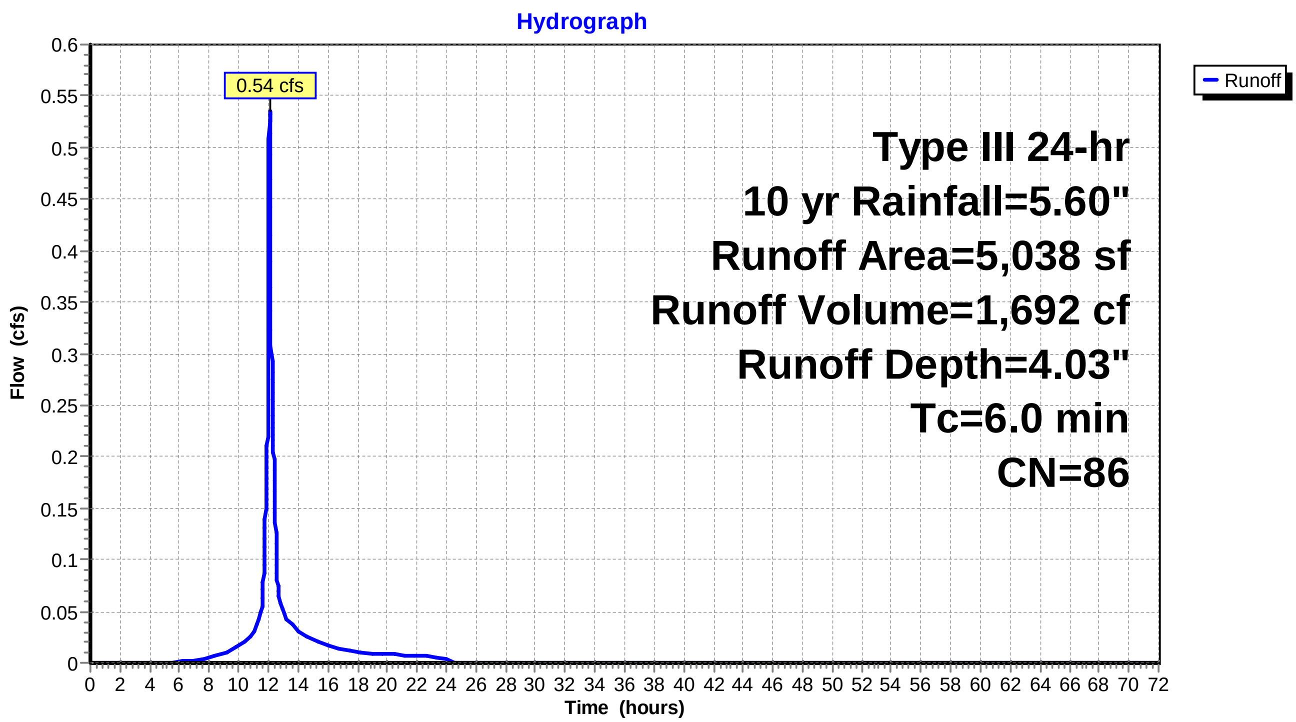
Runoff = 0.54 cfs @ 12.09 hrs, Volume= 1,692 cf, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,536	98	Paved parking, HSG C
2,502	74	>75% Grass cover, Good, HSG C
5,038	86	Weighted Average
2,502		49.66% Pervious Area
2,536		50.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 11:



Summary for Subcatchment 12:

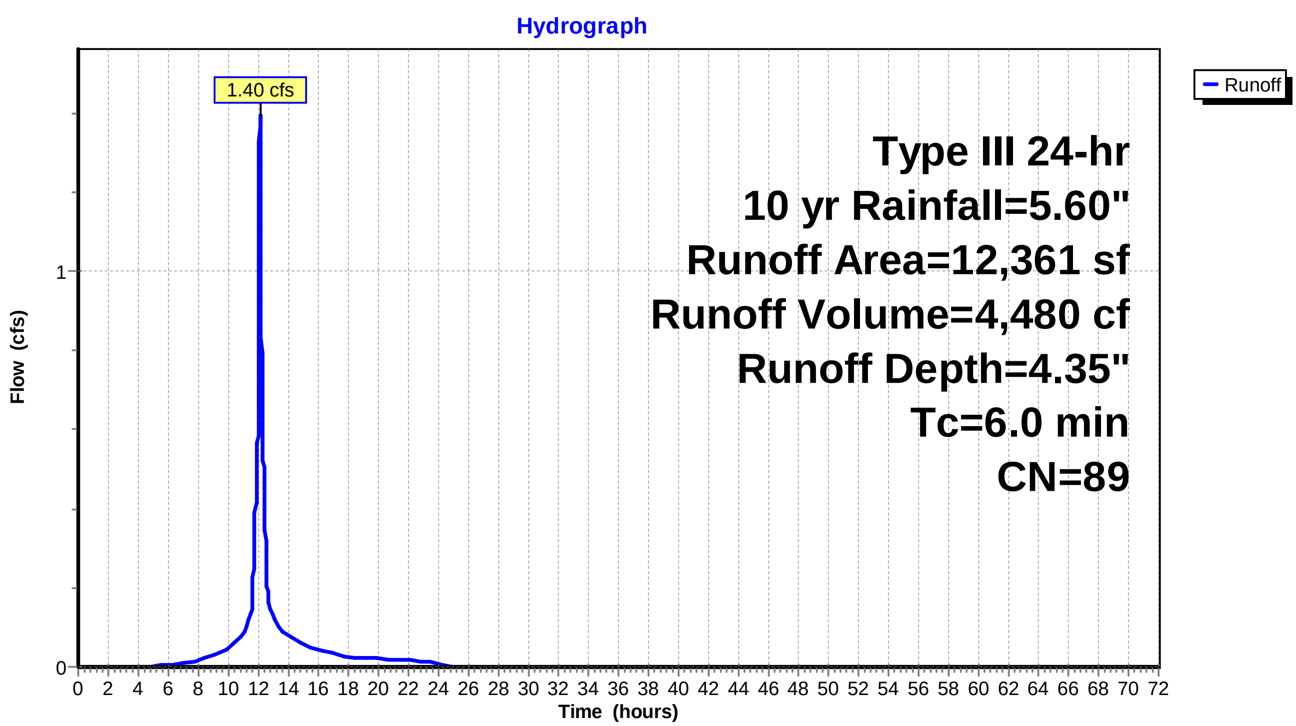
Runoff = 1.40 cfs @ 12.09 hrs, Volume= 4,480 cf, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
7,769	98	Paved parking, HSG C
4,592	74	>75% Grass cover, Good, HSG C
12,361	89	Weighted Average
4,592		37.15% Pervious Area
7,769		62.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12:



Summary for Subcatchment 13:

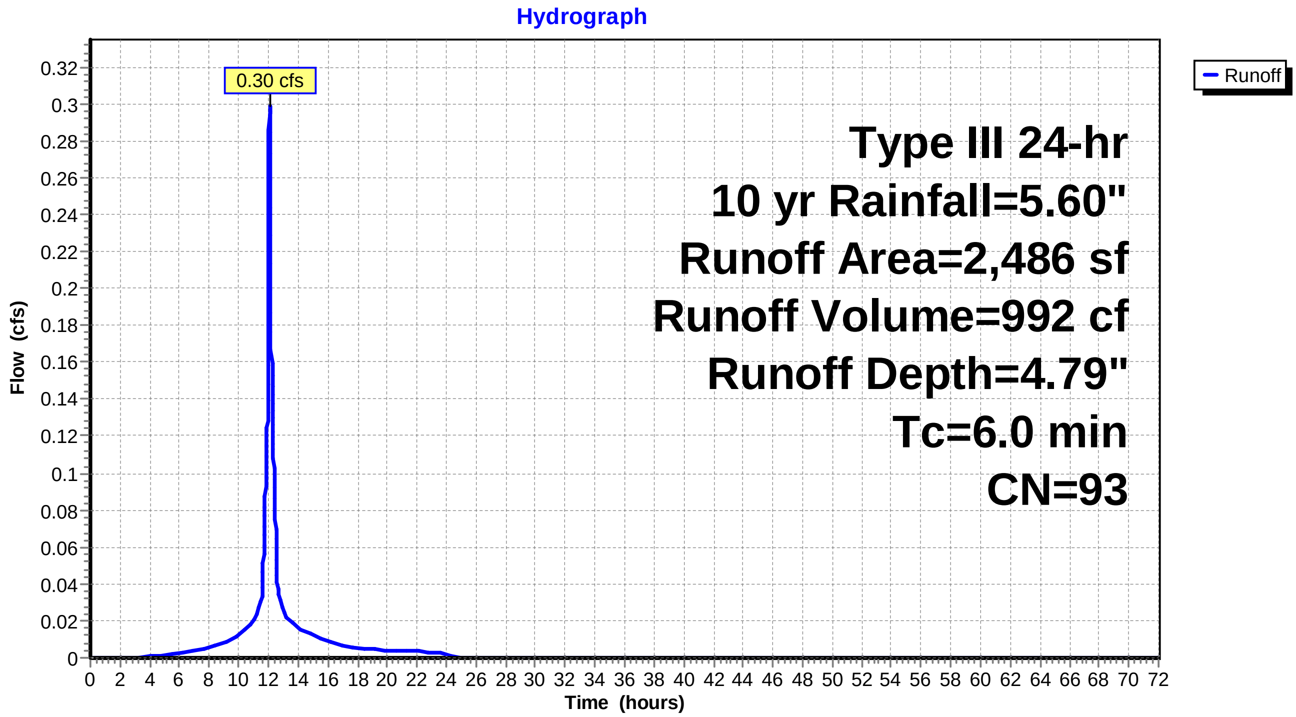
Runoff = 0.30 cfs @ 12.08 hrs, Volume= 992 cf, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,947	98	Paved parking, HSG C
539	74	>75% Grass cover, Good, HSG C
2,486	93	Weighted Average
539		21.68% Pervious Area
1,947		78.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13:



Summary for Subcatchment 14:

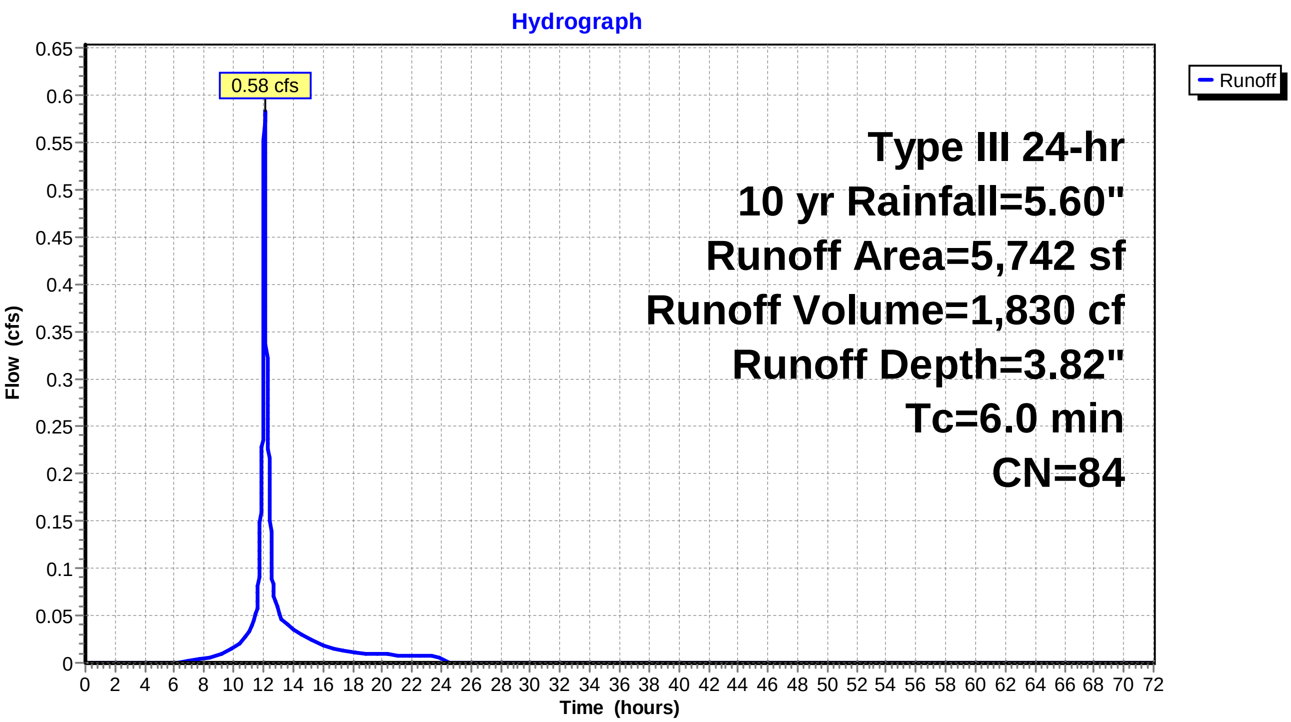
Runoff = 0.58 cfs @ 12.09 hrs, Volume= 1,830 cf, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,329	98	Paved parking, HSG C
3,413	74	>75% Grass cover, Good, HSG C
5,742	84	Weighted Average
3,413		59.44% Pervious Area
2,329		40.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 14:



Summary for Subcatchment 15:

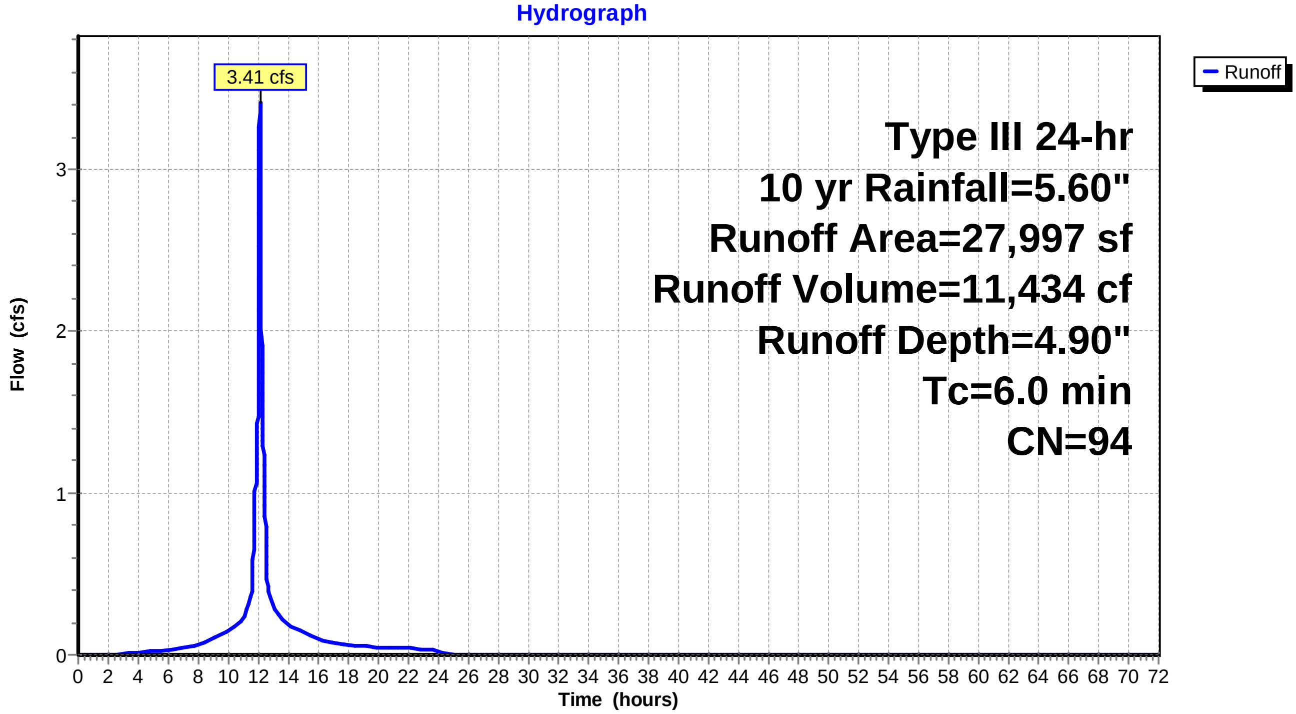
Runoff = 3.41 cfs @ 12.08 hrs, Volume= 11,434 cf, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
23,021	98	Paved parking, HSG C
4,976	74	>75% Grass cover, Good, HSG C
27,997	94	Weighted Average
4,976		17.77% Pervious Area
23,021		82.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 15:



Summary for Subcatchment 16:

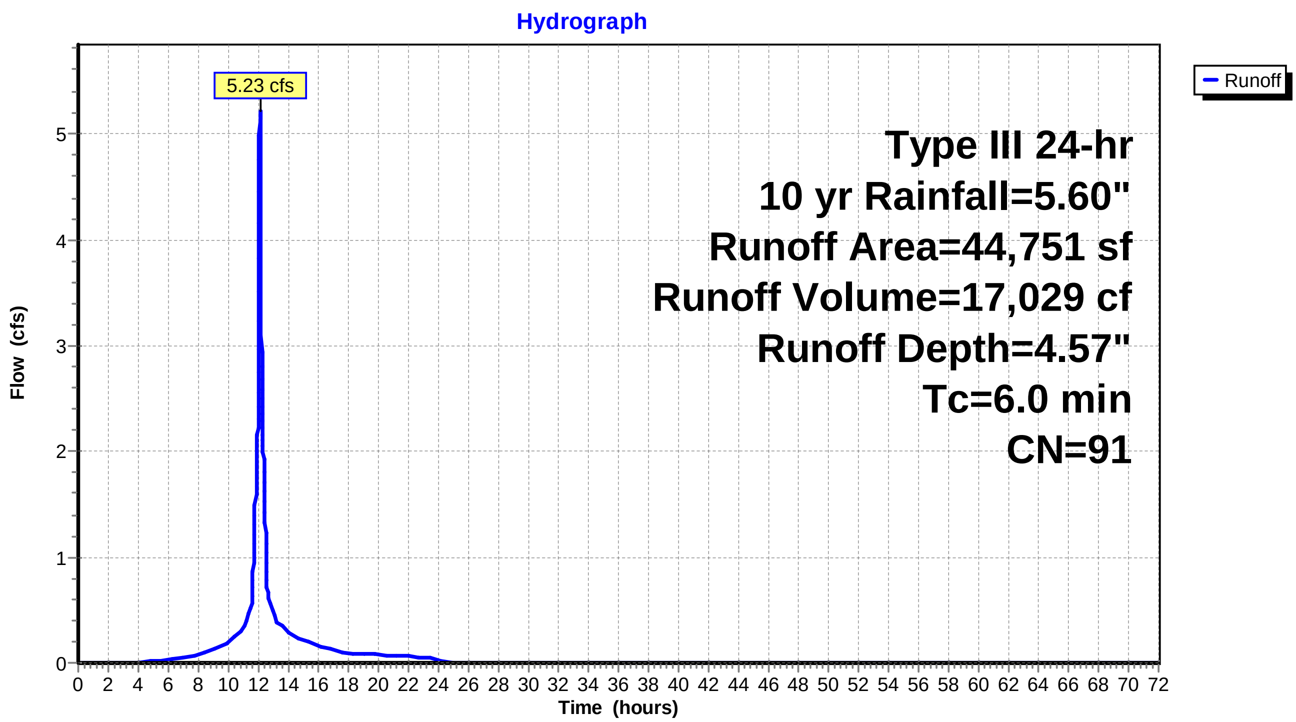
Runoff = 5.23 cfs @ 12.08 hrs, Volume= 17,029 cf, Depth= 4.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
31,180	98	Paved parking, HSG C
13,571	74	>75% Grass cover, Good, HSG C
44,751	91	Weighted Average
13,571		30.33% Pervious Area
31,180		69.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 16:



Summary for Subcatchment 17:

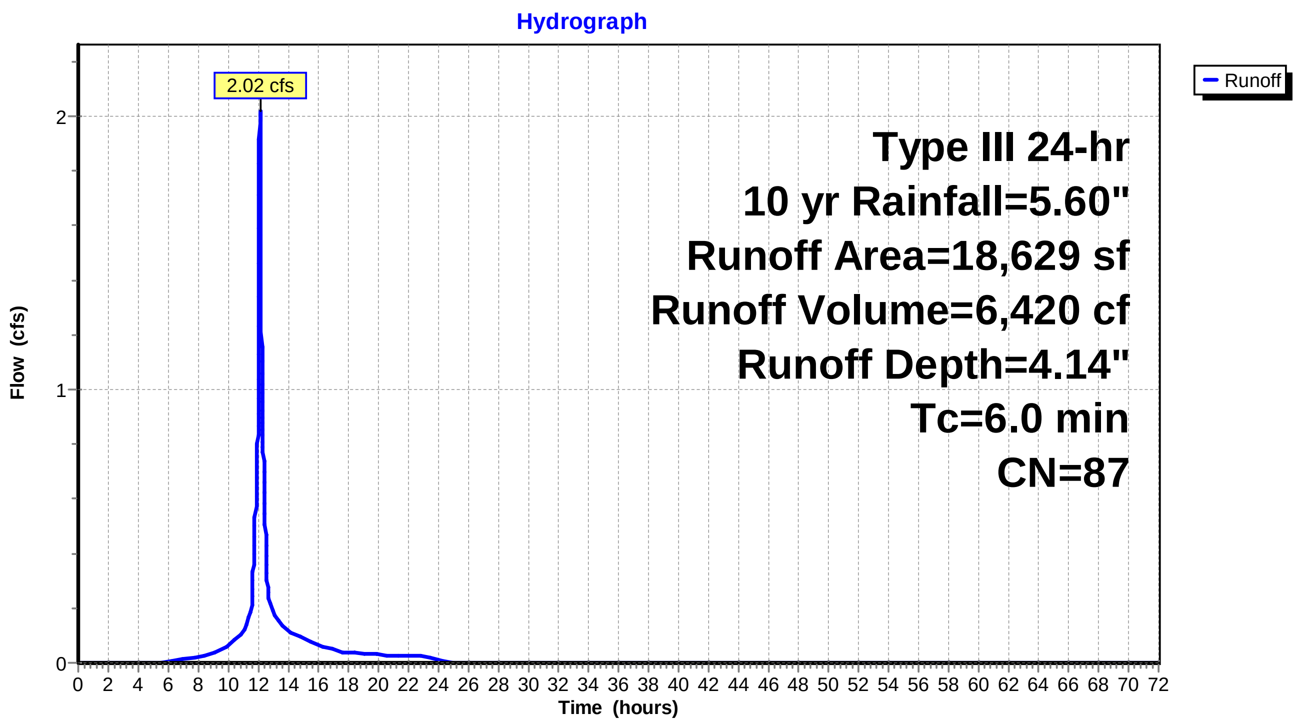
Runoff = 2.02 cfs @ 12.09 hrs, Volume= 6,420 cf, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
10,273	98	Paved parking, HSG C
8,356	74	>75% Grass cover, Good, HSG C
18,629	87	Weighted Average
8,356		44.85% Pervious Area
10,273		55.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 17:



Summary for Subcatchment 18:

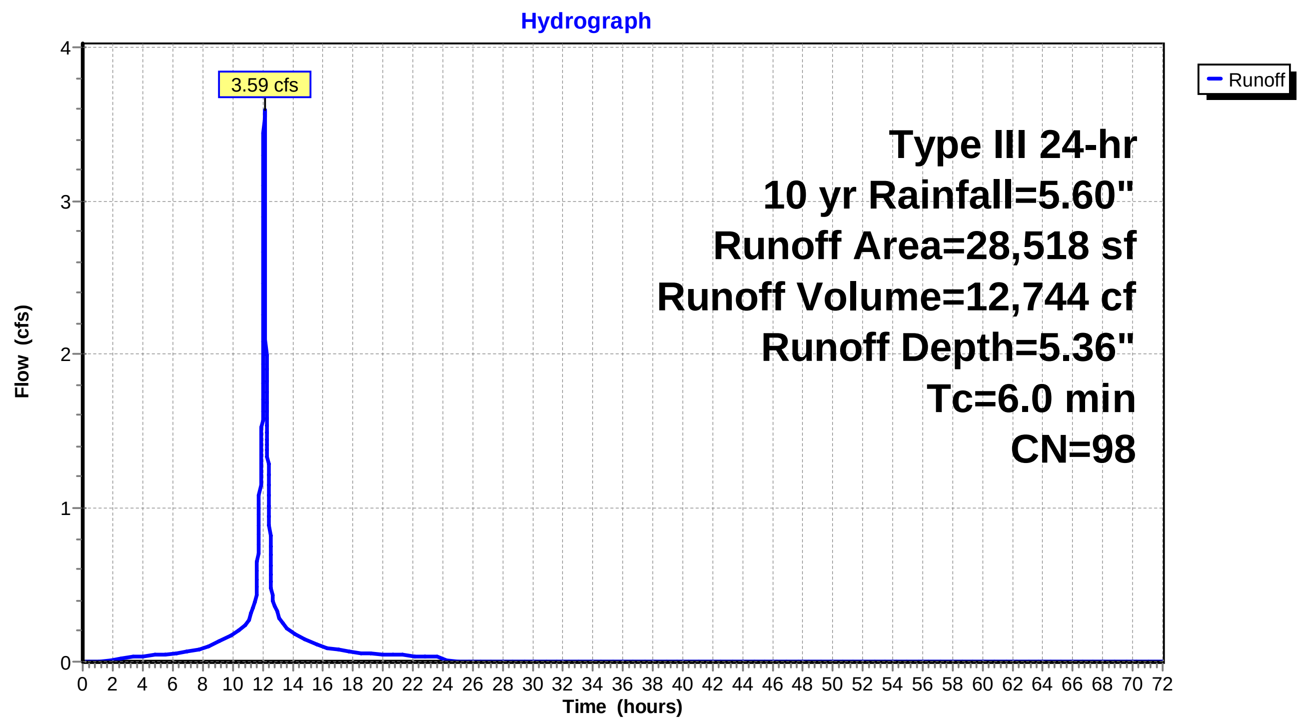
Runoff = 3.59 cfs @ 12.08 hrs, Volume= 12,744 cf, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
28,518	98	Roofs, HSG C
28,518		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 18:



Summary for Subcatchment 19:

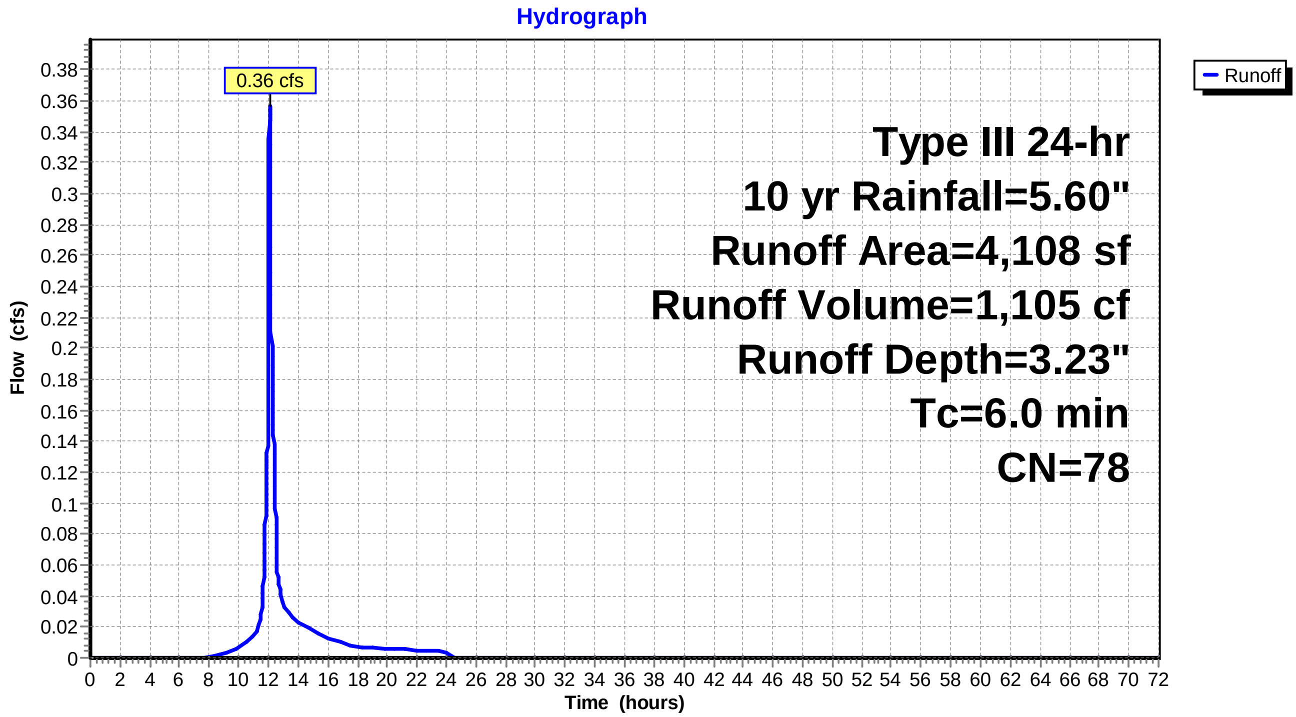
Runoff = 0.36 cfs @ 12.09 hrs, Volume= 1,105 cf, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
711	98	Paved parking, HSG C
3,397	74	>75% Grass cover, Good, HSG C
4,108	78	Weighted Average
3,397		82.69% Pervious Area
711		17.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 19:



Summary for Subcatchment 20:

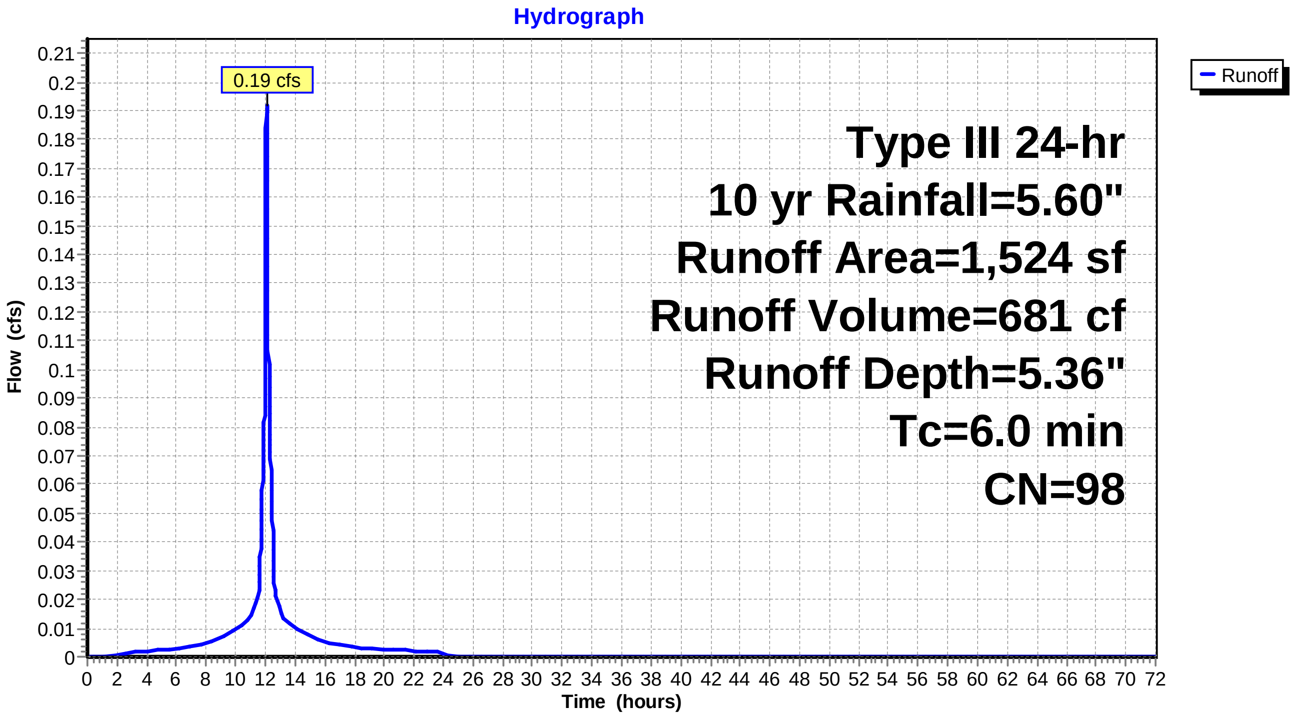
Runoff = 0.19 cfs @ 12.08 hrs, Volume= 681 cf, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,524	98	Paved parking, HSG C
1,524		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 20:



Summary for Subcatchment 21:

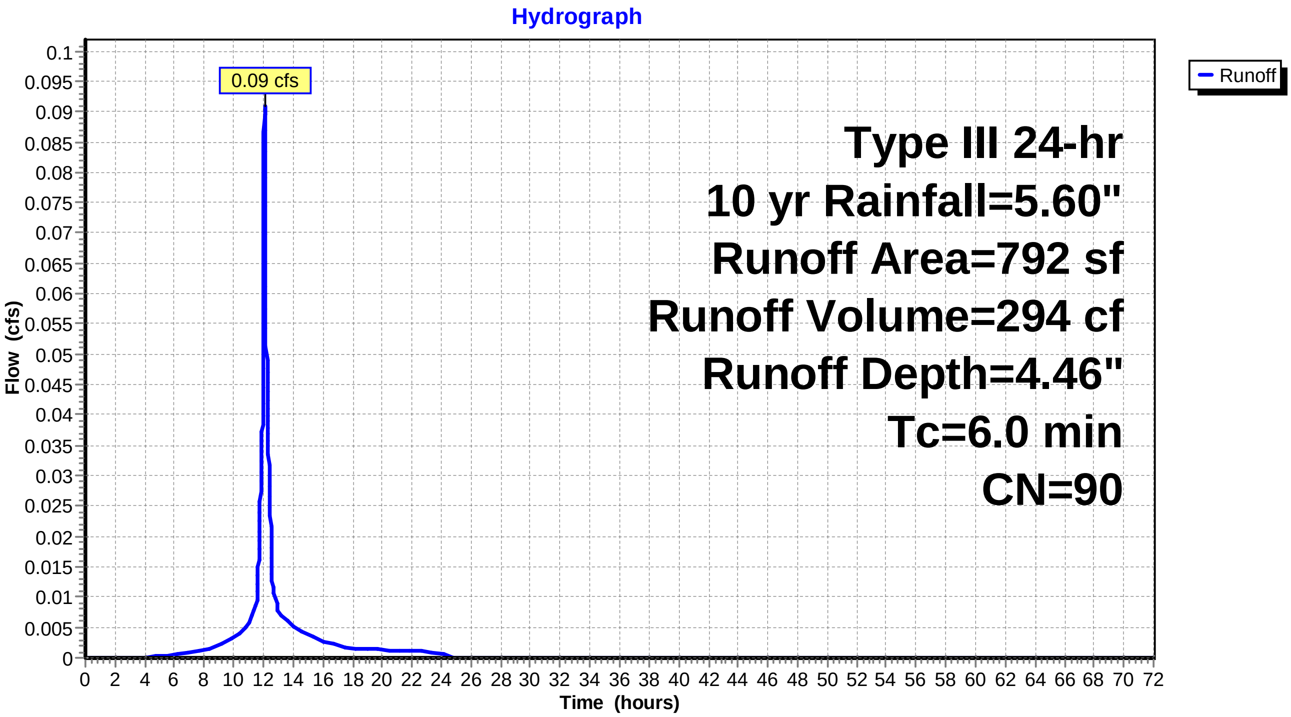
Runoff = 0.09 cfs @ 12.08 hrs, Volume= 294 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
523	98	Paved parking, HSG C
269	74	>75% Grass cover, Good, HSG C
792	90	Weighted Average
269		33.96% Pervious Area
523		66.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 21:



Summary for Subcatchment 22:

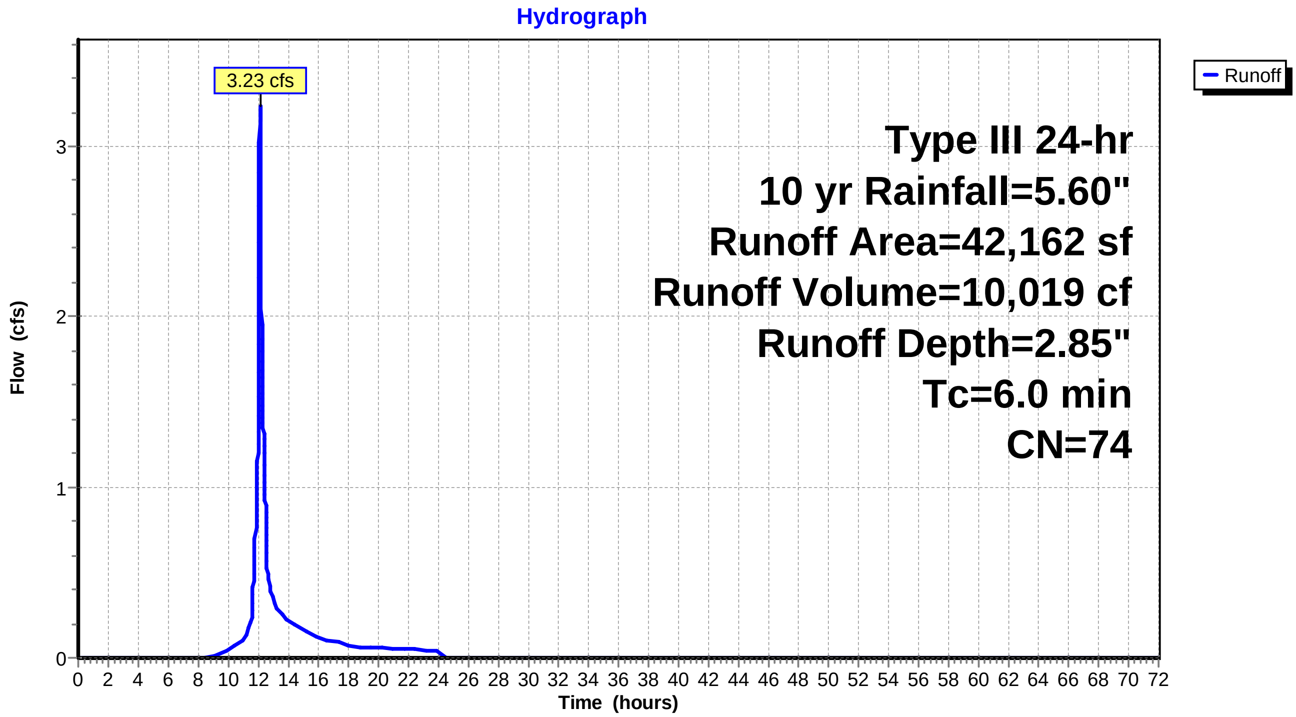
Runoff = 3.23 cfs @ 12.09 hrs, Volume= 10,019 cf, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
509	98	Paved parking, HSG C
41,653	74	>75% Grass cover, Good, HSG C
42,162	74	Weighted Average
41,653		98.79% Pervious Area
509		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 22:



Summary for Subcatchment 23:

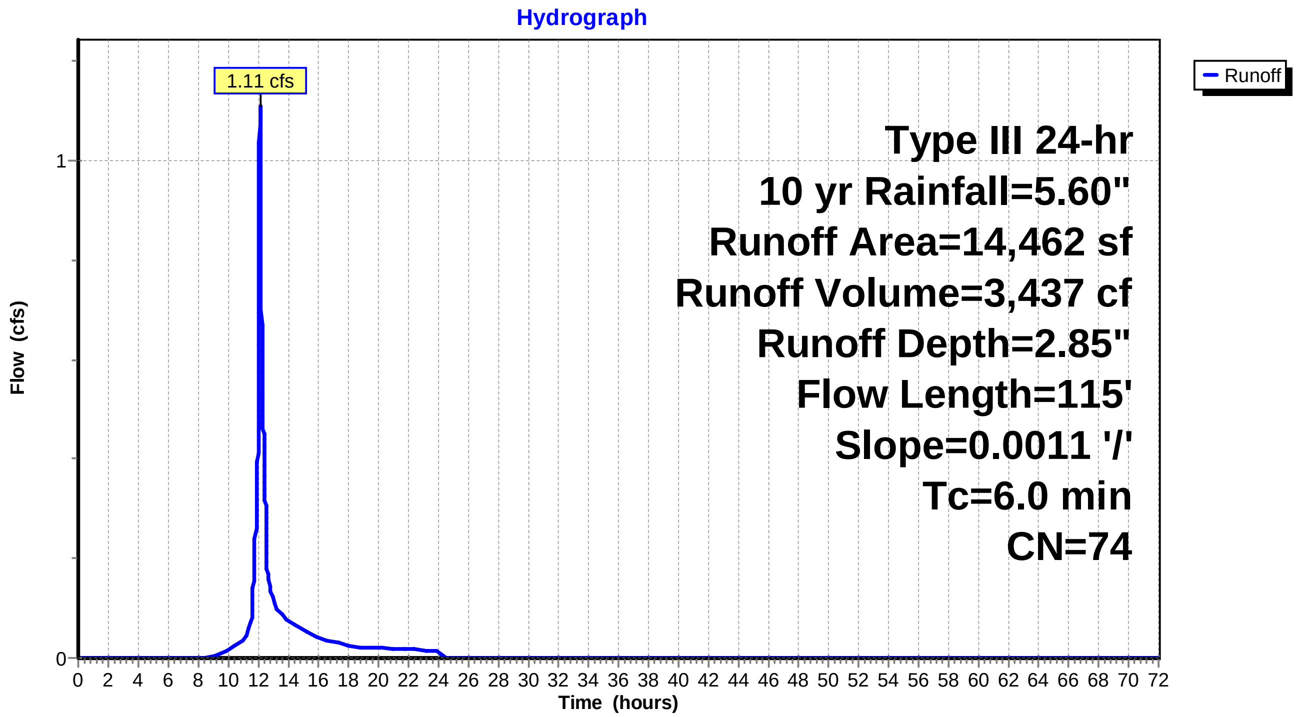
Runoff = 1.11 cfs @ 12.09 hrs, Volume= 3,437 cf, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
14,462	74	>75% Grass cover, Good, HSG C
14,462		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	115	0.0011	0.67		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.2					**Direct Entry,**
6.0	115	Total			

Subcatchment 23:



Summary for Subcatchment 24:

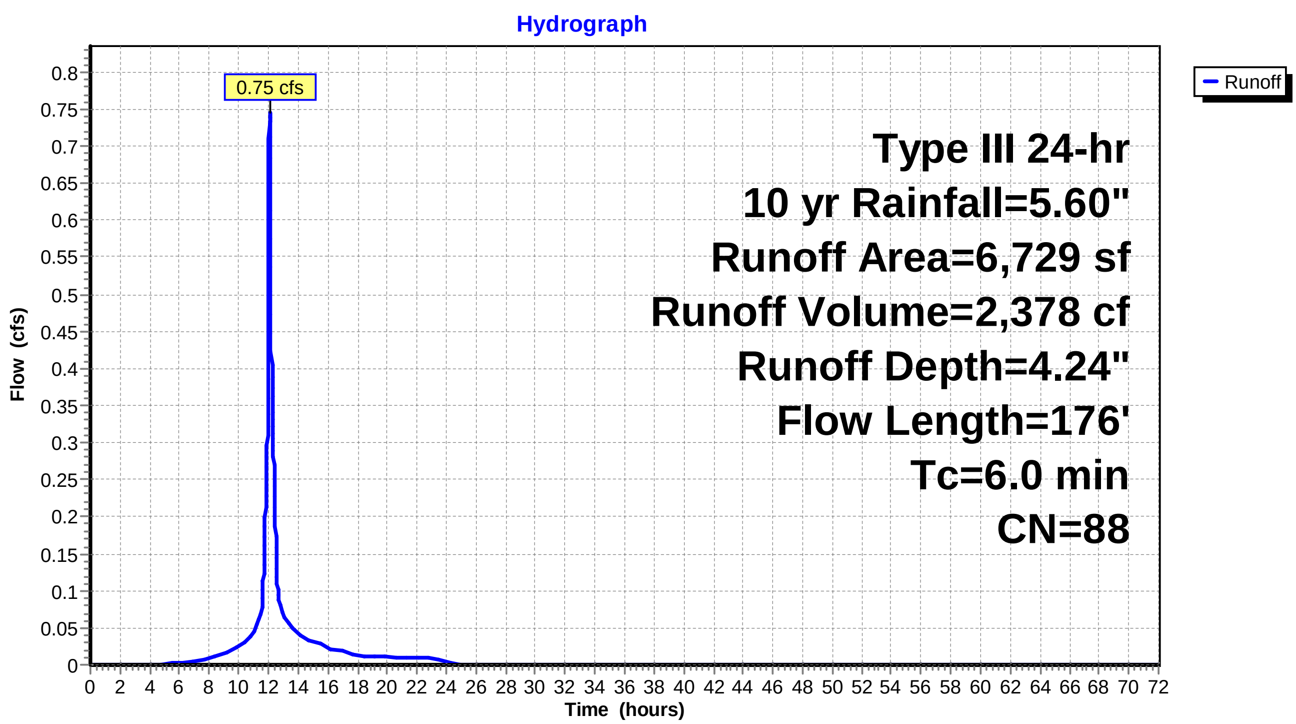
Runoff = 0.75 cfs @ 12.09 hrs, Volume= 2,378 cf, Depth= 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
3,786	98	Paved parking, HSG C
2,943	74	>75% Grass cover, Good, HSG C
6,729	88	Weighted Average
2,943		43.74% Pervious Area
3,786		56.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	50	0.0894	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
0.9	126	0.0138	2.38		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.0					**Direct Entry,**
6.0	176	Total			

Subcatchment 24:



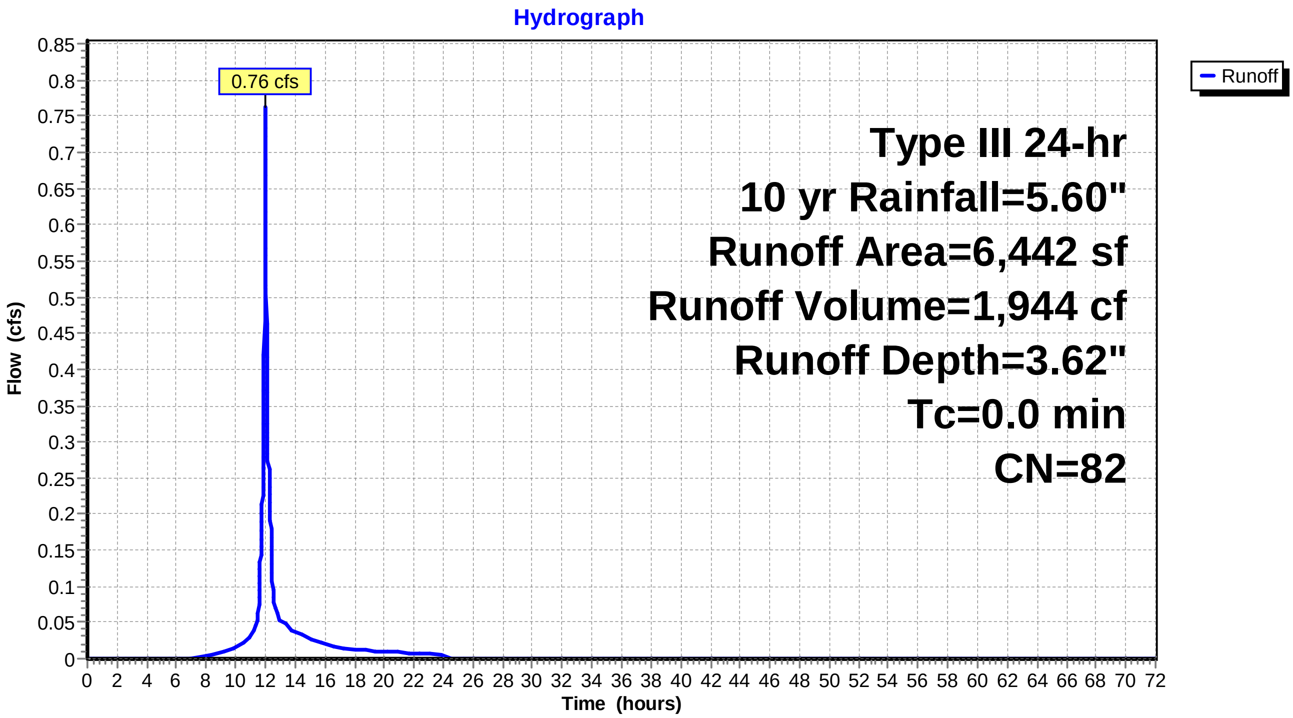
Summary for Subcatchment 25:

Runoff = 0.76 cfs @ 12.00 hrs, Volume= 1,944 cf, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
2,210	98	Paved parking, HSG C
4,232	74	>75% Grass cover, Good, HSG C
6,442	82	Weighted Average
4,232		65.69% Pervious Area
2,210		34.31% Impervious Area

Subcatchment 25:



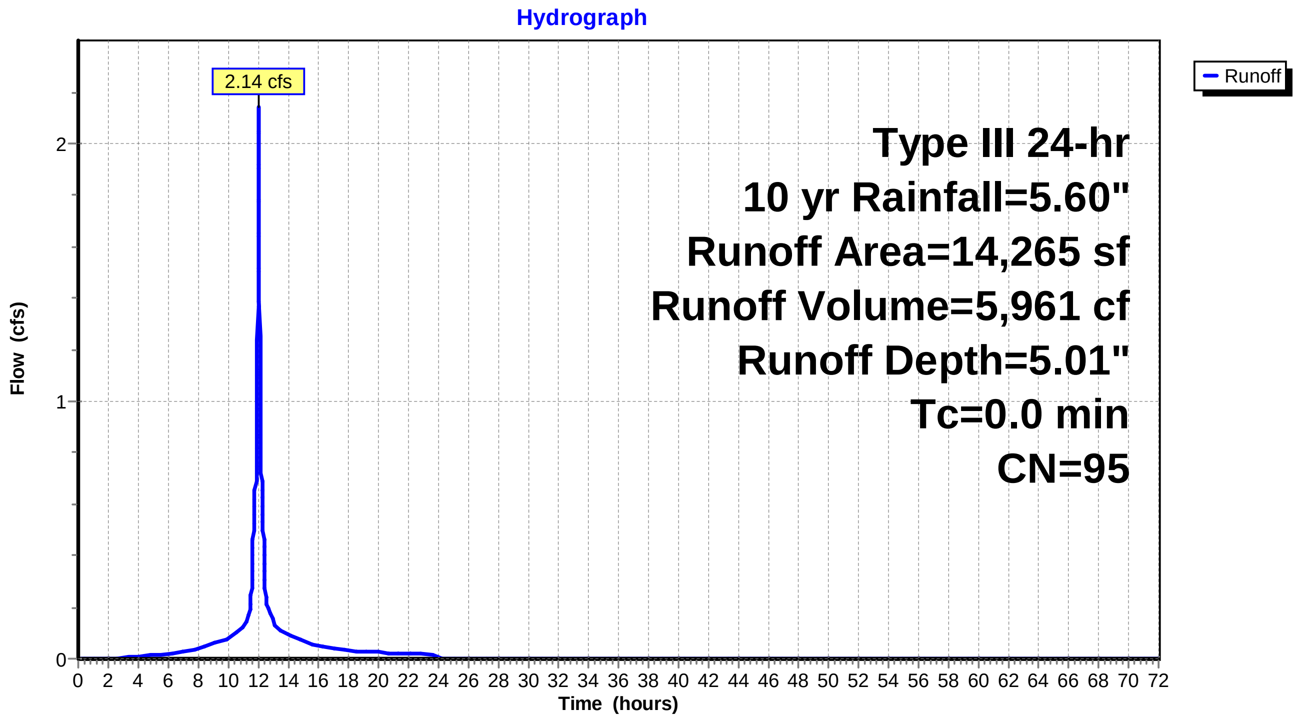
Summary for Subcatchment 26:

Runoff = 2.14 cfs @ 12.00 hrs, Volume= 5,961 cf, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
12,344	98	Paved parking, HSG C
1,921	74	>75% Grass cover, Good, HSG C
14,265	95	Weighted Average
1,921		13.47% Pervious Area
12,344		86.53% Impervious Area

Subcatchment 26:



Summary for Subcatchment 27:

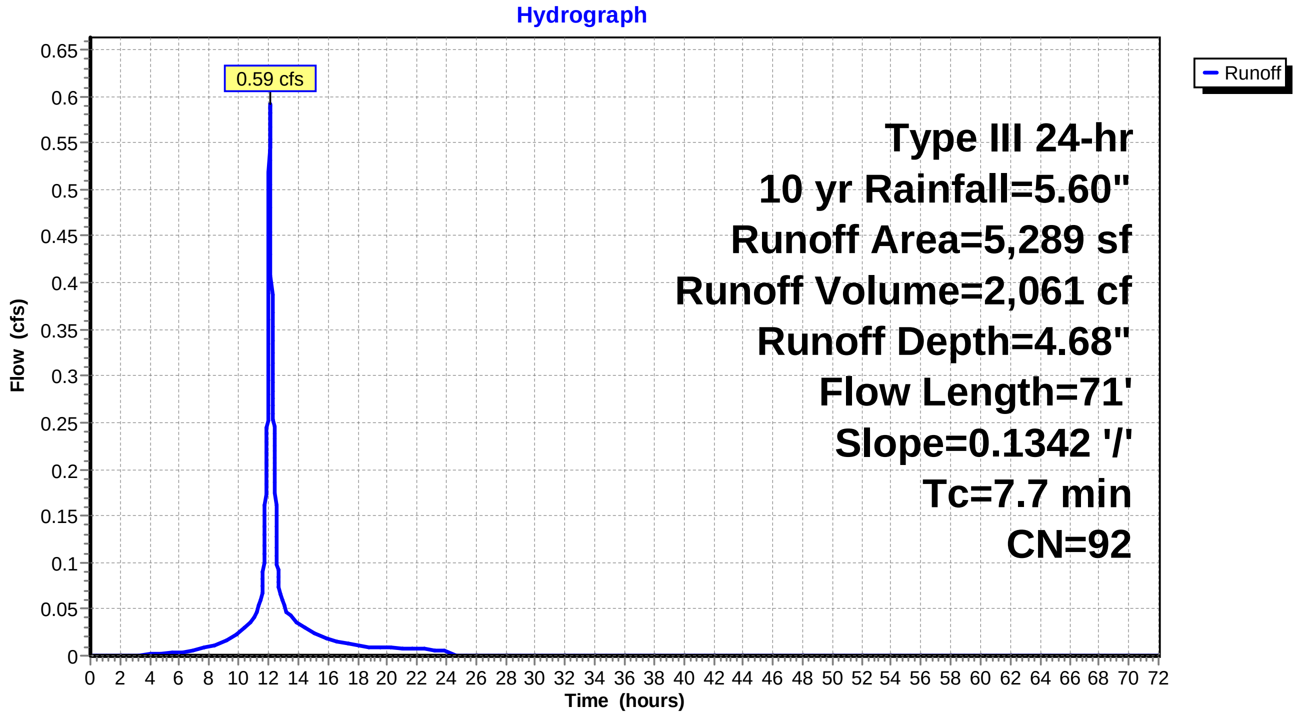
Runoff = 0.59 cfs @ 12.11 hrs, Volume= 2,061 cf, Depth= 4.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
4,020	98	Paved parking, HSG C
1,269	74	>75% Grass cover, Good, HSG C
5,289	92	Weighted Average
1,269		23.99% Pervious Area
4,020		76.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	71	0.1342	0.15		**Sheet Flow, sheet into hodgson brook** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 27:



Summary for Subcatchment 28:

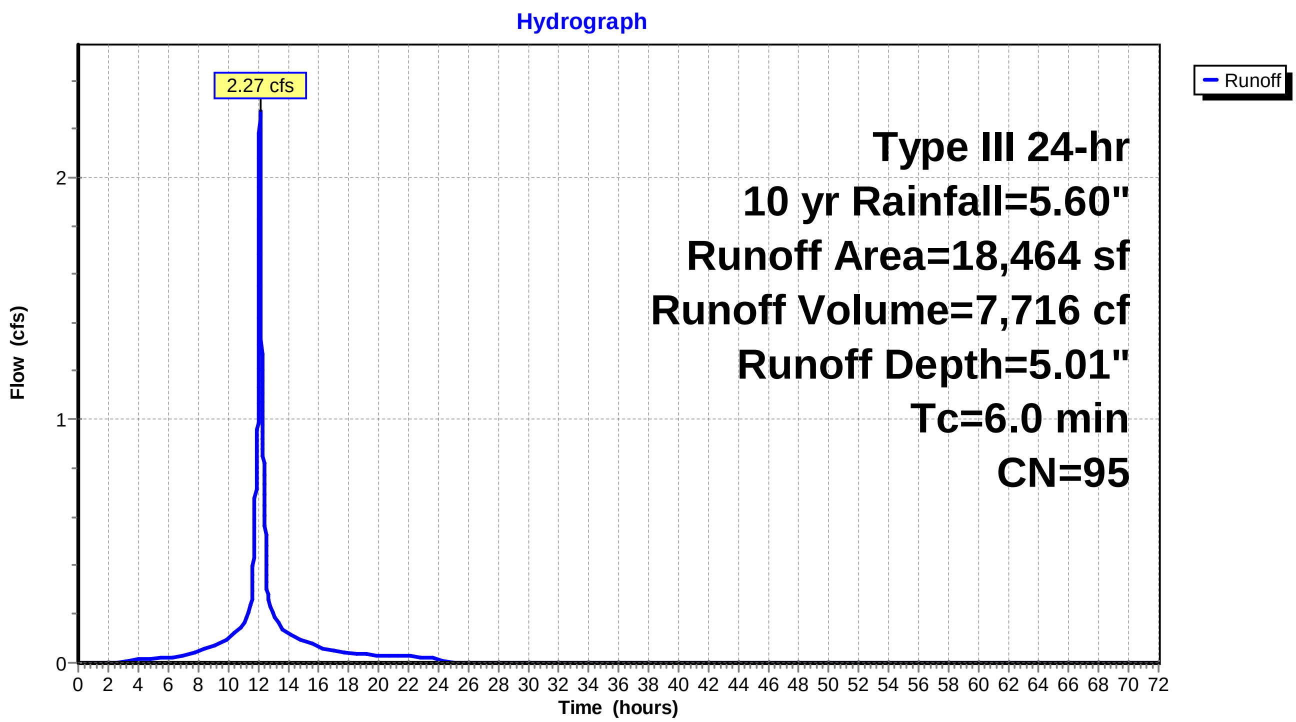
Runoff = 2.27 cfs @ 12.08 hrs, Volume= 7,716 cf, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
16,004	98	Paved parking, HSG C
2,460	74	>75% Grass cover, Good, HSG C
18,464	95	Weighted Average
2,460		13.32% Pervious Area
16,004		86.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 28:



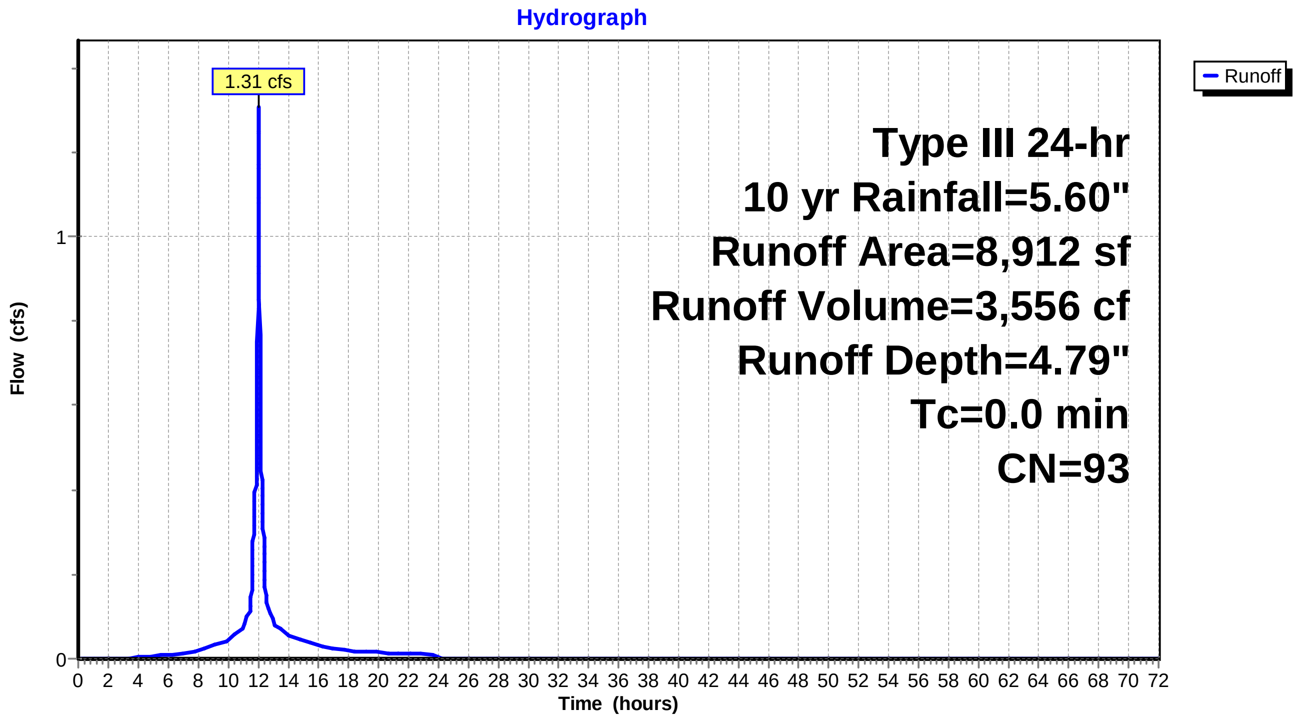
Summary for Subcatchment 29:

Runoff = 1.31 cfs @ 12.00 hrs, Volume= 3,556 cf, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
7,174	98	Paved parking, HSG C
1,738	74	>75% Grass cover, Good, HSG C
8,912	93	Weighted Average
1,738		19.50% Pervious Area
7,174		80.50% Impervious Area

Subcatchment 29:



Summary for Subcatchment 30:

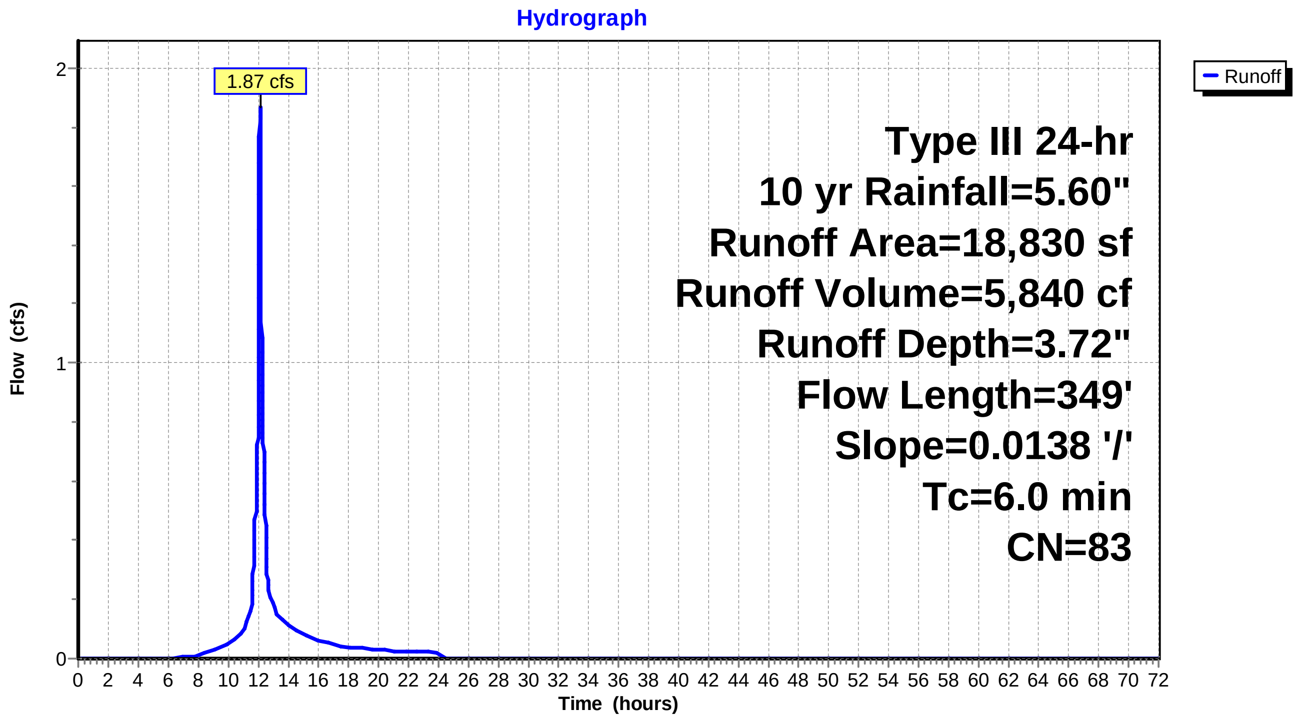
Runoff = 1.87 cfs @ 12.09 hrs, Volume= 5,840 cf, Depth= 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
7,266	98	Paved parking, HSG C
11,564	74	>75% Grass cover, Good, HSG C
18,830	83	Weighted Average
11,564		61.41% Pervious Area
7,266		38.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	349	0.0138	2.38		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6					**Direct Entry,**
6.0	349	Total			

Subcatchment 30:



Summary for Subcatchment 31:

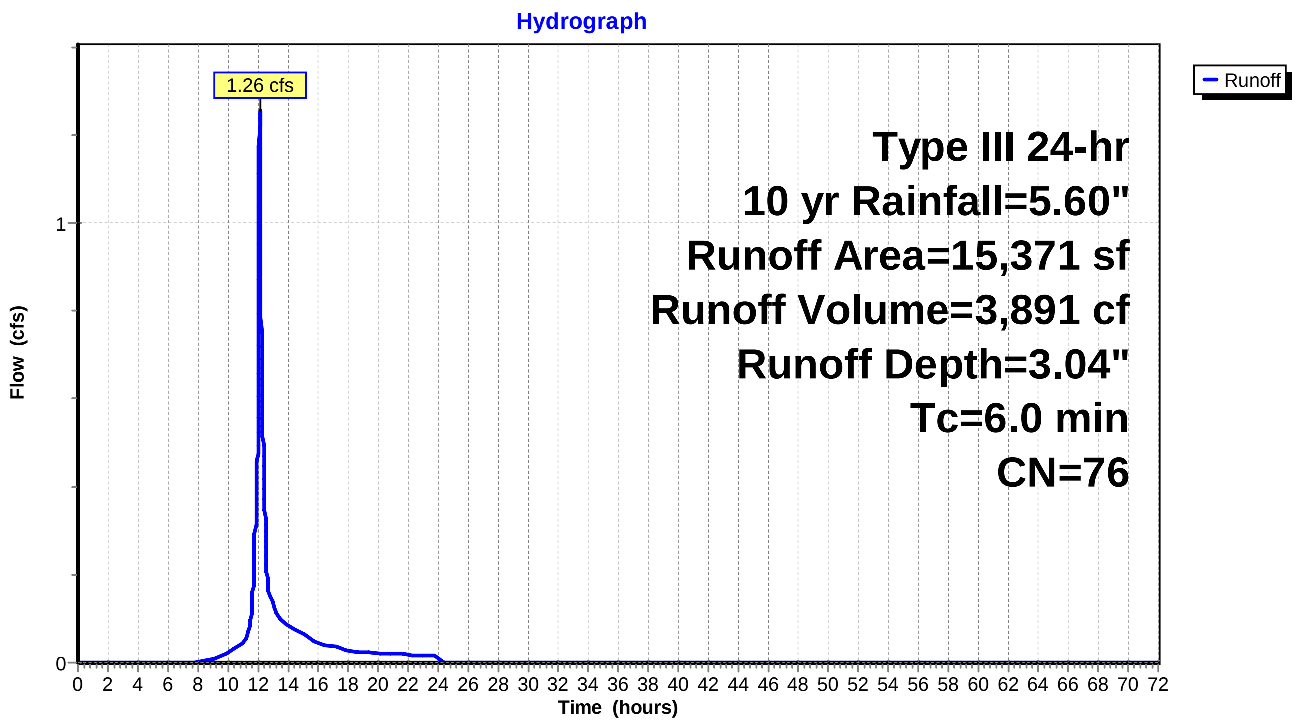
Runoff = 1.26 cfs @ 12.09 hrs, Volume= 3,891 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
1,539	98	Paved parking, HSG C
13,832	74	>75% Grass cover, Good, HSG C
15,371	76	Weighted Average
13,832		89.99% Pervious Area
1,539		10.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 31:



Summary for Subcatchment 32:

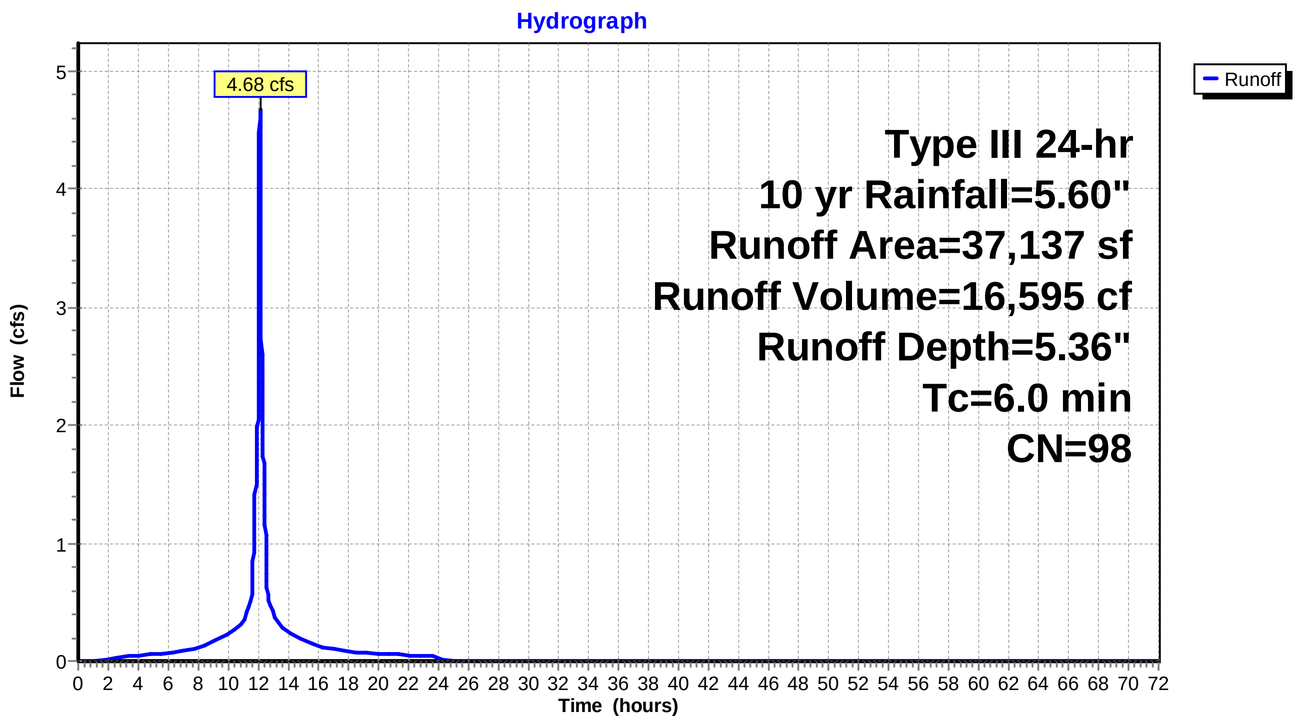
Runoff = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
37,137	98	Unconnected roofs, HSG C
37,137		100.00% Impervious Area
37,137		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 32:



Summary for Subcatchment 34:

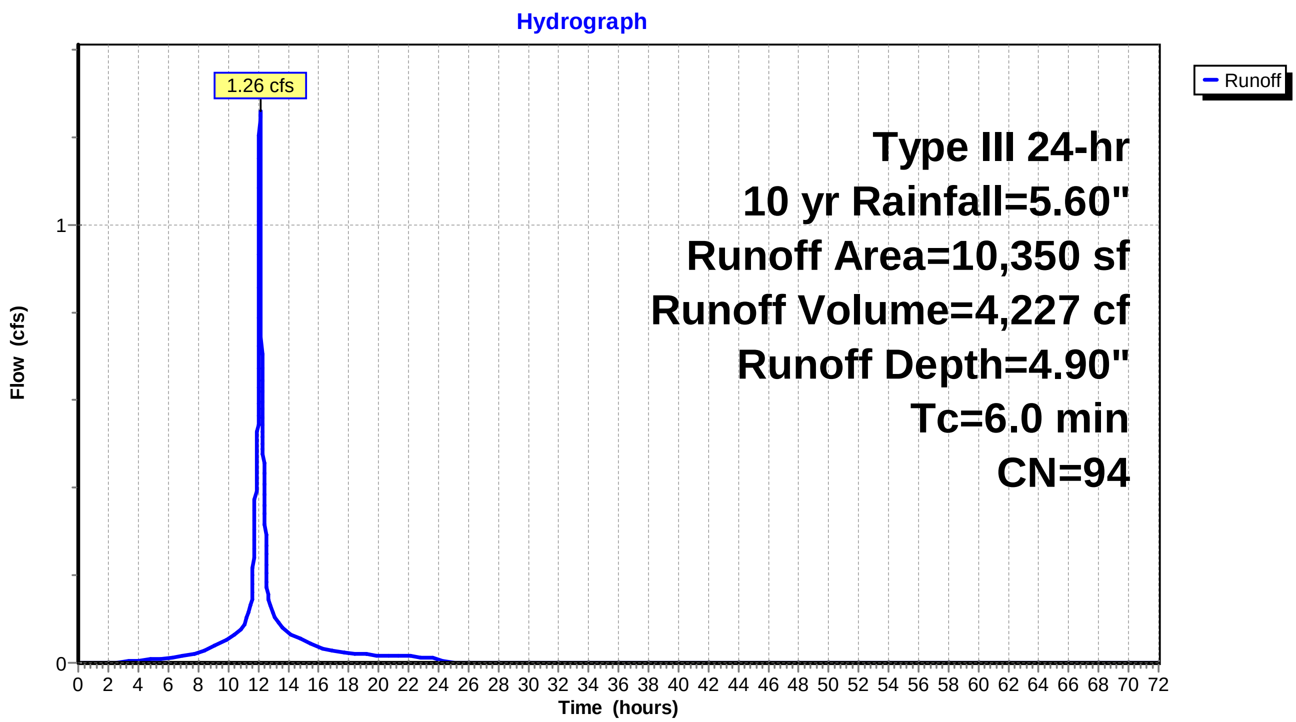
Runoff = 1.26 cfs @ 12.08 hrs, Volume= 4,227 cf, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
8,652	98	Paved parking, HSG C
1,698	74	>75% Grass cover, Good, HSG C
10,350	94	Weighted Average
1,698		16.41% Pervious Area
8,652		83.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 34:



Summary for Subcatchment 35:

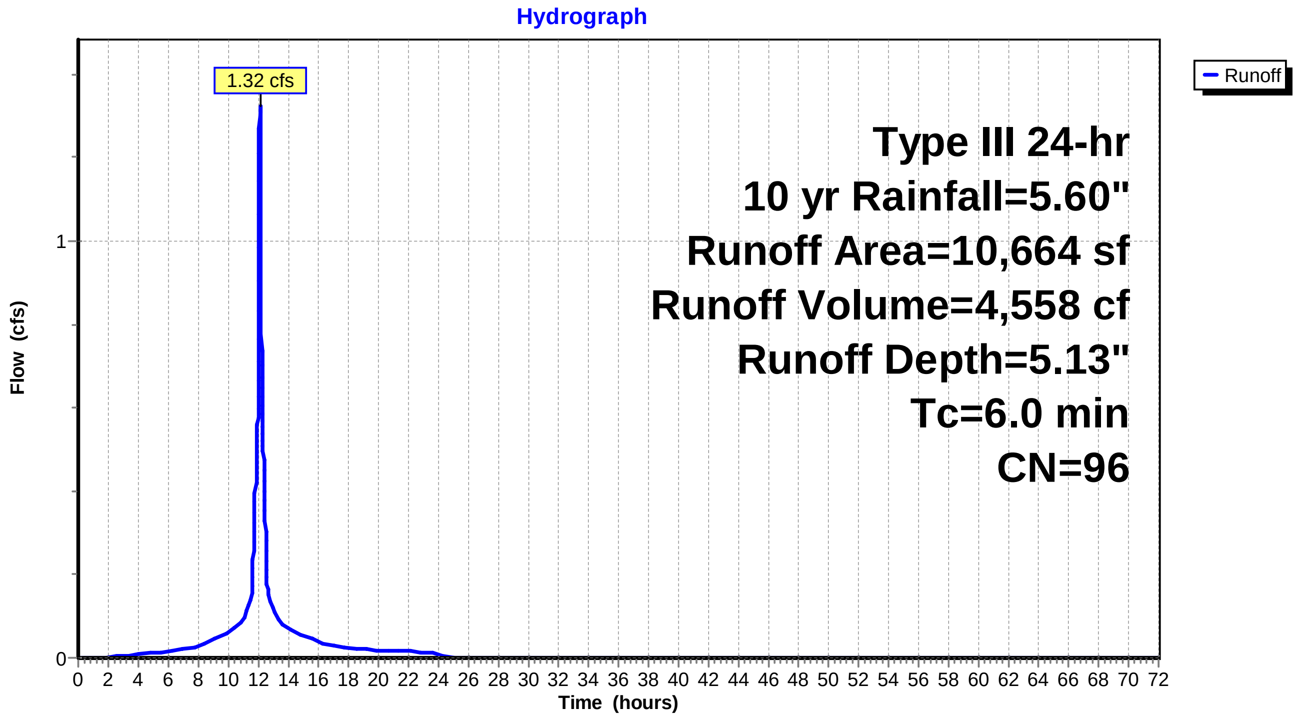
Runoff = 1.32 cfs @ 12.08 hrs, Volume= 4,558 cf, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
9,716	98	Paved parking, HSG C
948	74	>75% Grass cover, Good, HSG C
10,664	96	Weighted Average
948		8.89% Pervious Area
9,716		91.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 35:



Summary for Subcatchment 36:

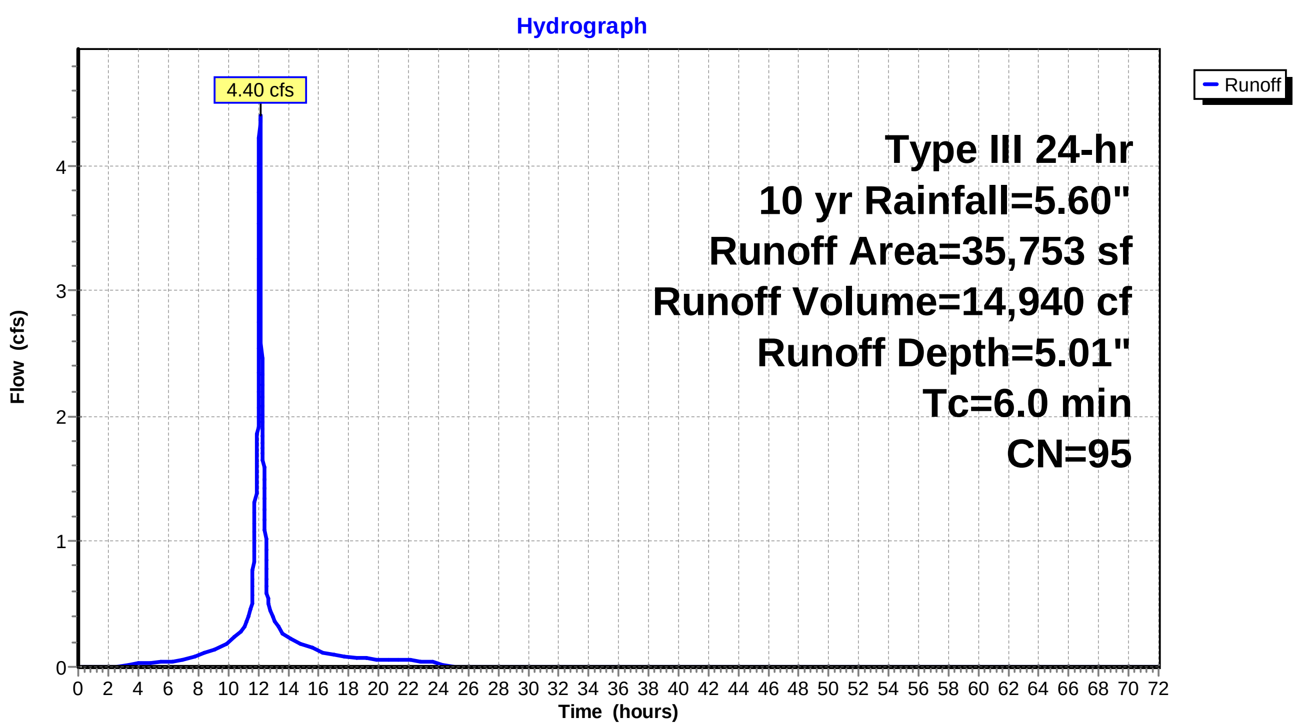
Runoff = 4.40 cfs @ 12.08 hrs, Volume= 14,940 cf, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
31,667	98	Paved parking, HSG C
4,086	74	>75% Grass cover, Good, HSG C
35,753	95	Weighted Average
4,086		11.43% Pervious Area
31,667		88.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 36:



Summary for Subcatchment 37:

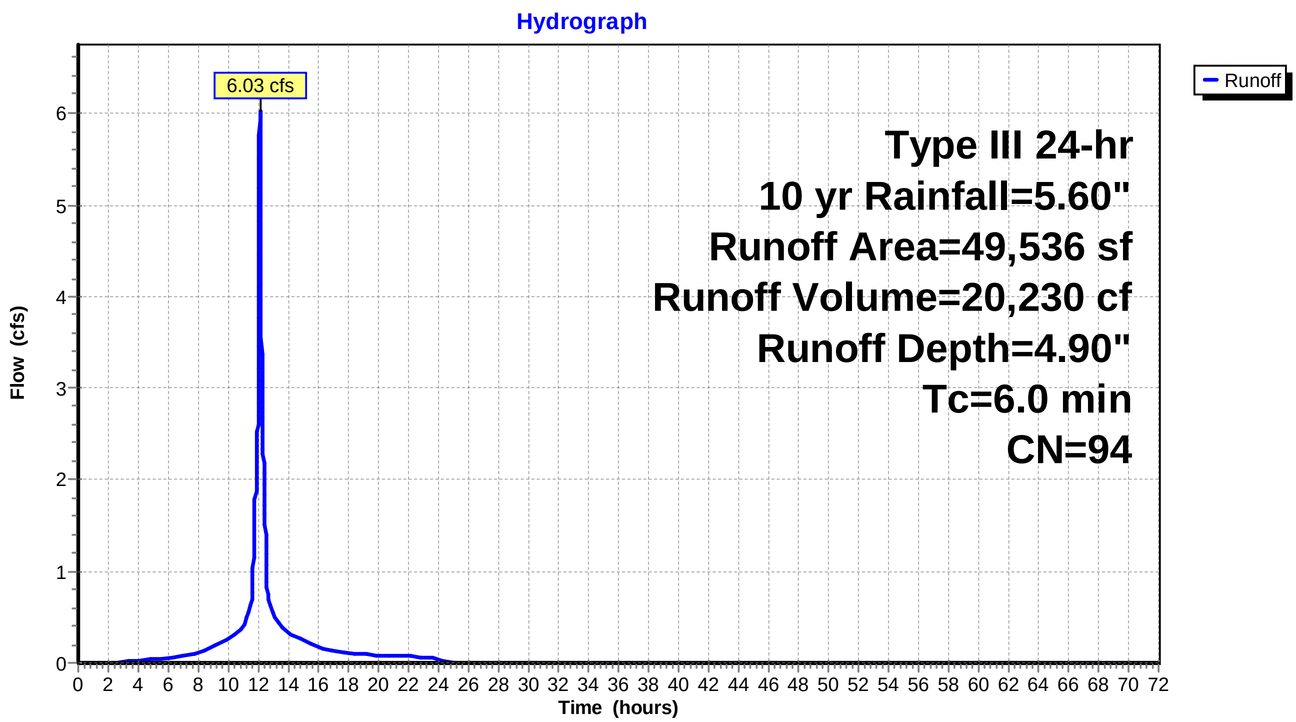
Runoff = 6.03 cfs @ 12.08 hrs, Volume= 20,230 cf, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
41,954	98	Paved parking, HSG C
7,582	74	>75% Grass cover, Good, HSG C
49,536	94	Weighted Average
7,582		15.31% Pervious Area
41,954		84.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 37:



Summary for Subcatchment 38:

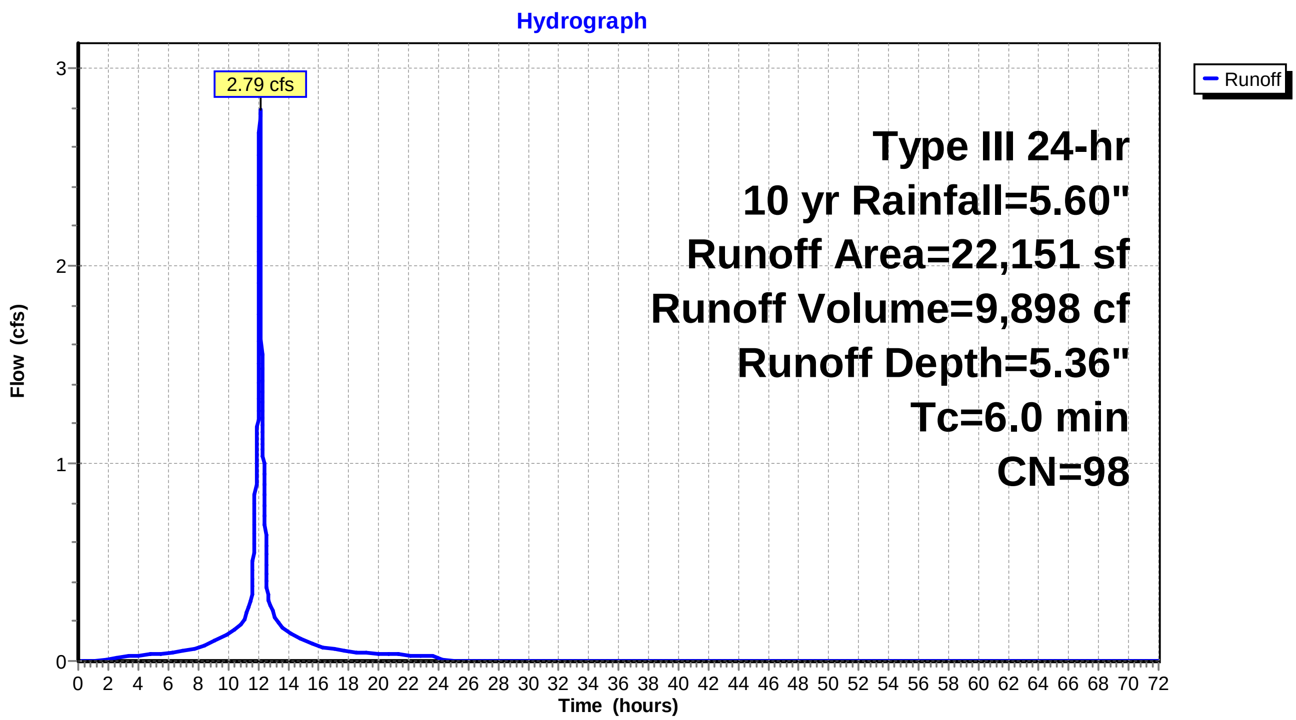
Runoff = 2.79 cfs @ 12.08 hrs, Volume= 9,898 cf, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
22,151	98	Unconnected roofs, HSG C
22,151		100.00% Impervious Area
22,151		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 38:



Summary for Subcatchment 39:

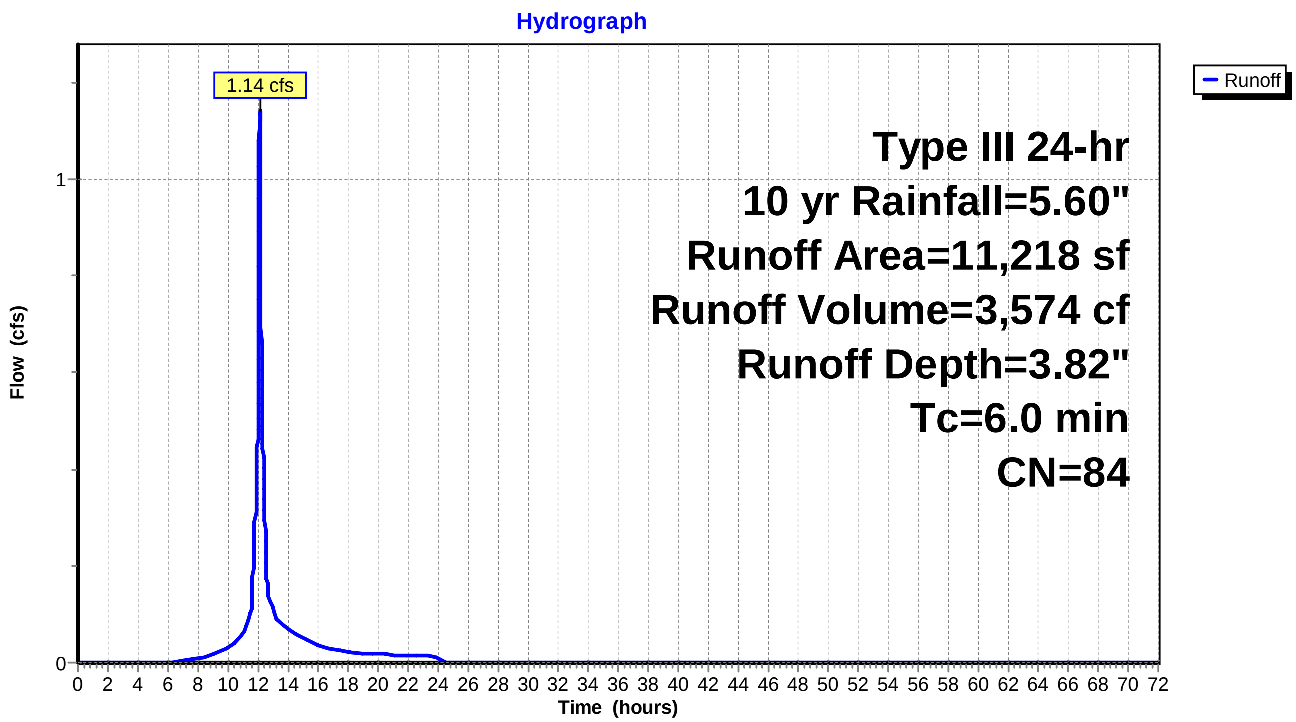
Runoff = 1.14 cfs @ 12.09 hrs, Volume= 3,574 cf, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
6,344	74	>75% Grass cover, Good, HSG C
4,874	98	Paved parking, HSG C
11,218	84	Weighted Average
6,344		56.55% Pervious Area
4,874		43.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 39:



Summary for Subcatchment 40:

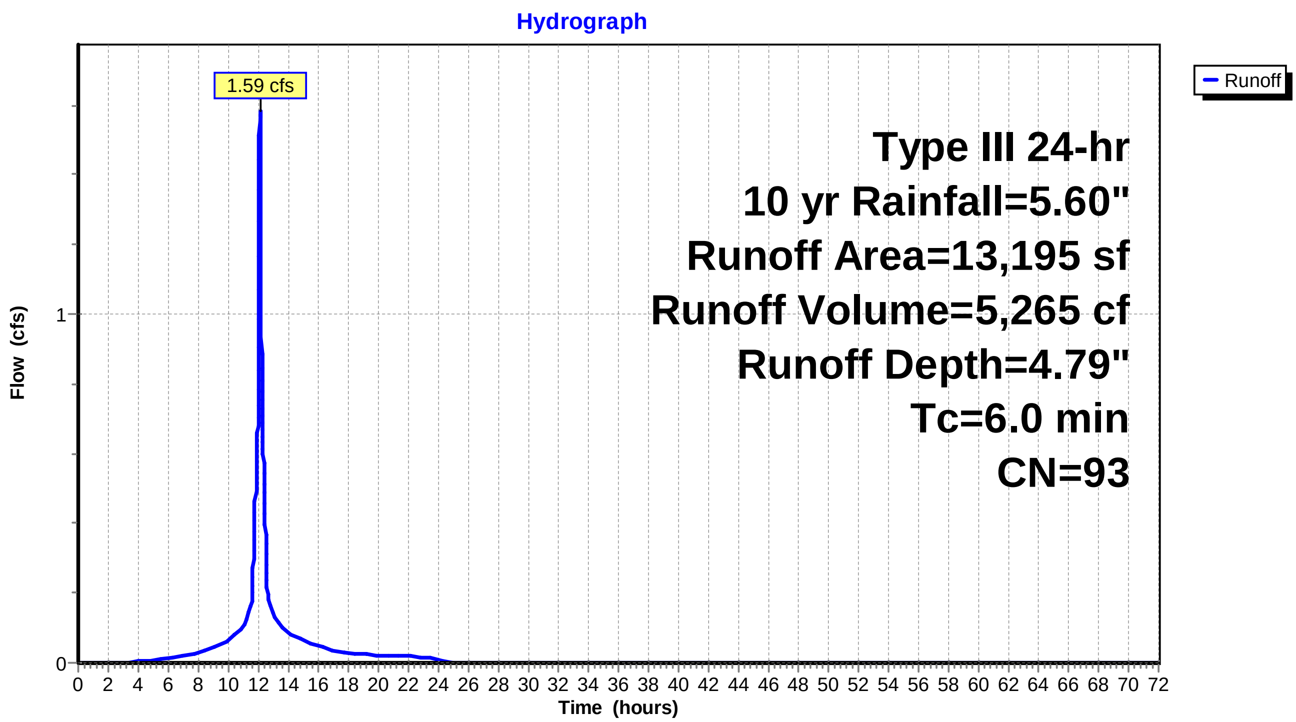
Runoff = 1.59 cfs @ 12.08 hrs, Volume= 5,265 cf, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
10,295	98	Paved parking, HSG C
2,900	74	>75% Grass cover, Good, HSG C
13,195	93	Weighted Average
2,900		21.98% Pervious Area
10,295		78.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 40:



Summary for Subcatchment 41:

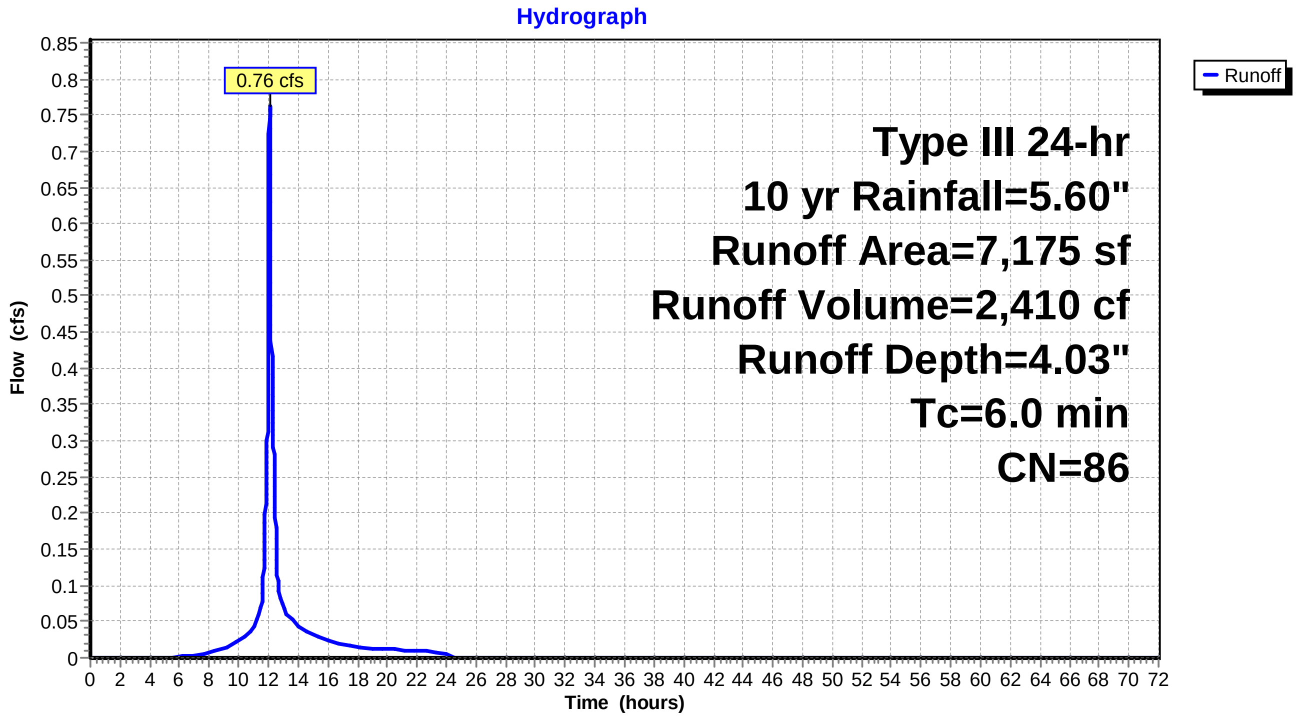
Runoff = 0.76 cfs @ 12.09 hrs, Volume= 2,410 cf, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
3,631	74	>75% Grass cover, Good, HSG C
3,544	98	Paved parking, HSG C
7,175	86	Weighted Average
3,631		50.61% Pervious Area
3,544		49.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 41:



Summary for Subcatchment 42:

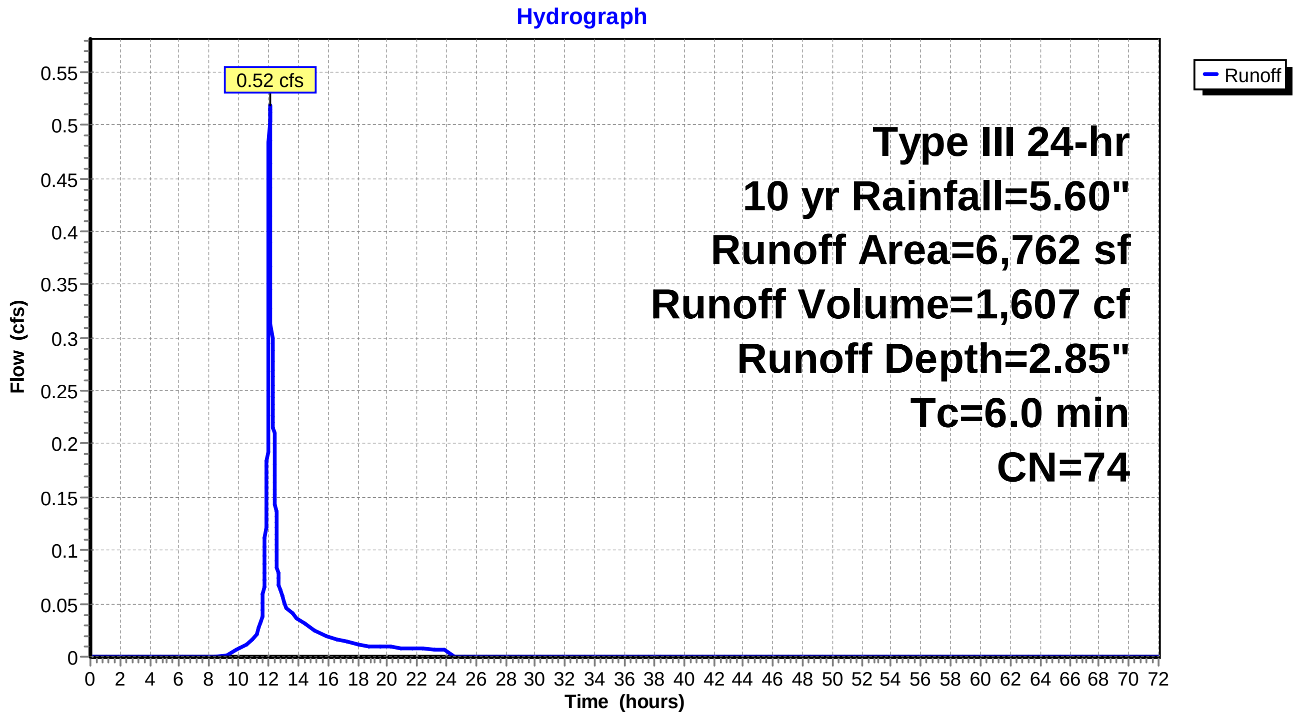
Runoff = 0.52 cfs @ 12.09 hrs, Volume= 1,607 cf, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.60"

Area (sf)	CN	Description
6,762	74	>75% Grass cover, Good, HSG C
6,762		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 42:

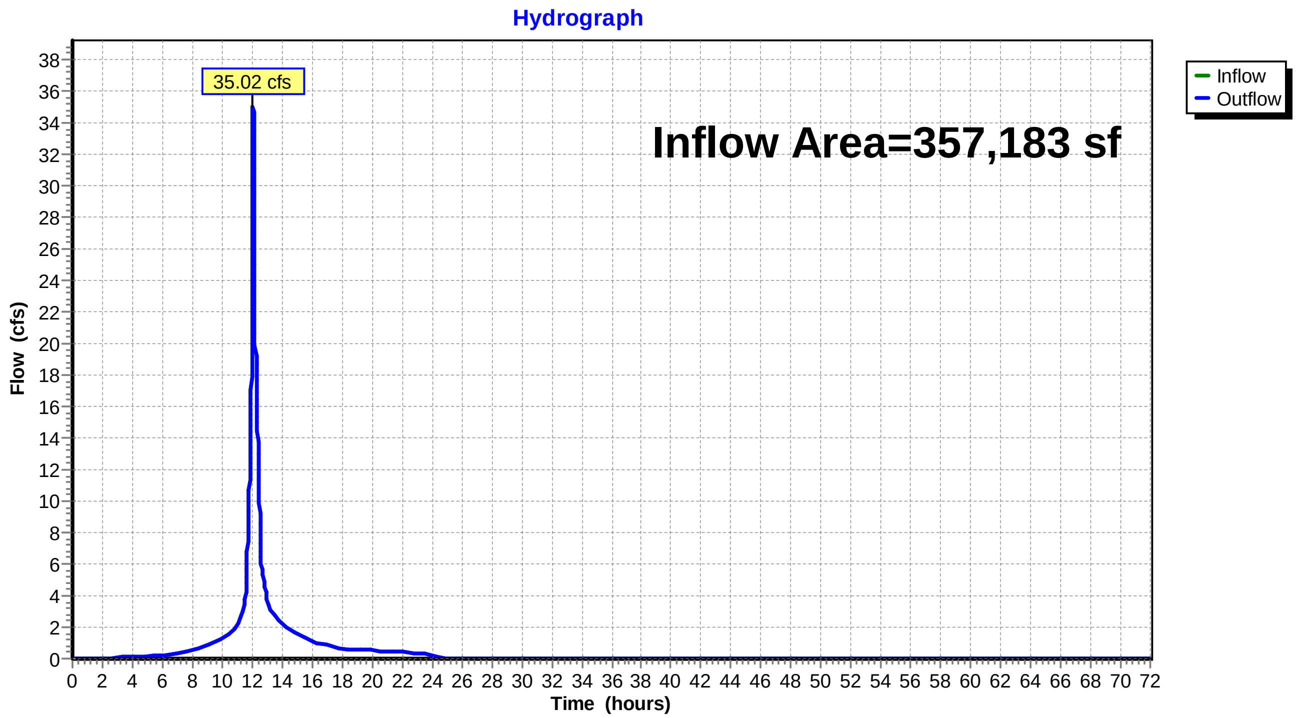


Summary for Reach AP1: Hodgson Brook

Inflow Area = 357,183 sf, 63.52% Impervious, Inflow Depth = 4.15" for 10 yr event
Inflow = 35.02 cfs @ 12.08 hrs, Volume= 123,508 cf
Outflow = 35.02 cfs @ 12.08 hrs, Volume= 123,508 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP1: Hodgson Brook

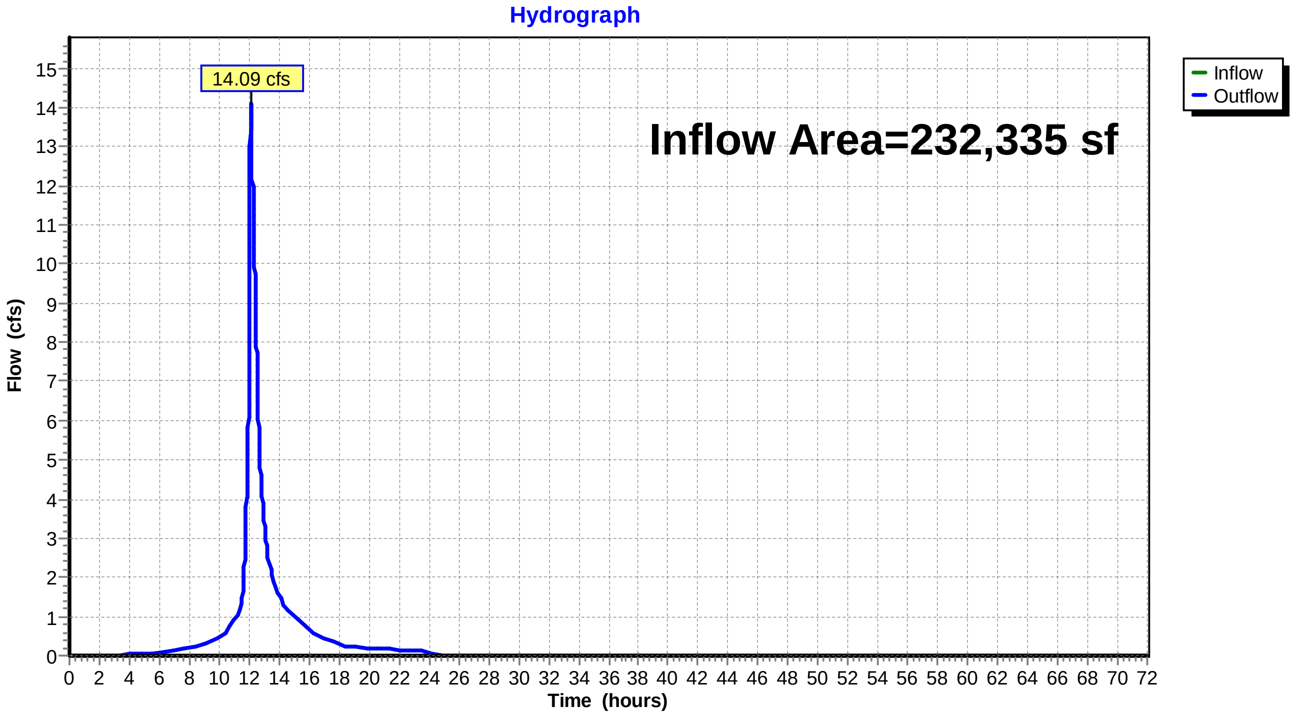


Summary for Reach AP2: Storm Drain

Inflow Area = 232,335 sf, 73.45% Impervious, Inflow Depth = 3.36" for 10 yr event
Inflow = 14.09 cfs @ 12.12 hrs, Volume= 65,147 cf
Outflow = 14.09 cfs @ 12.12 hrs, Volume= 65,147 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP2: Storm Drain



Summary for Reach R1: Swale

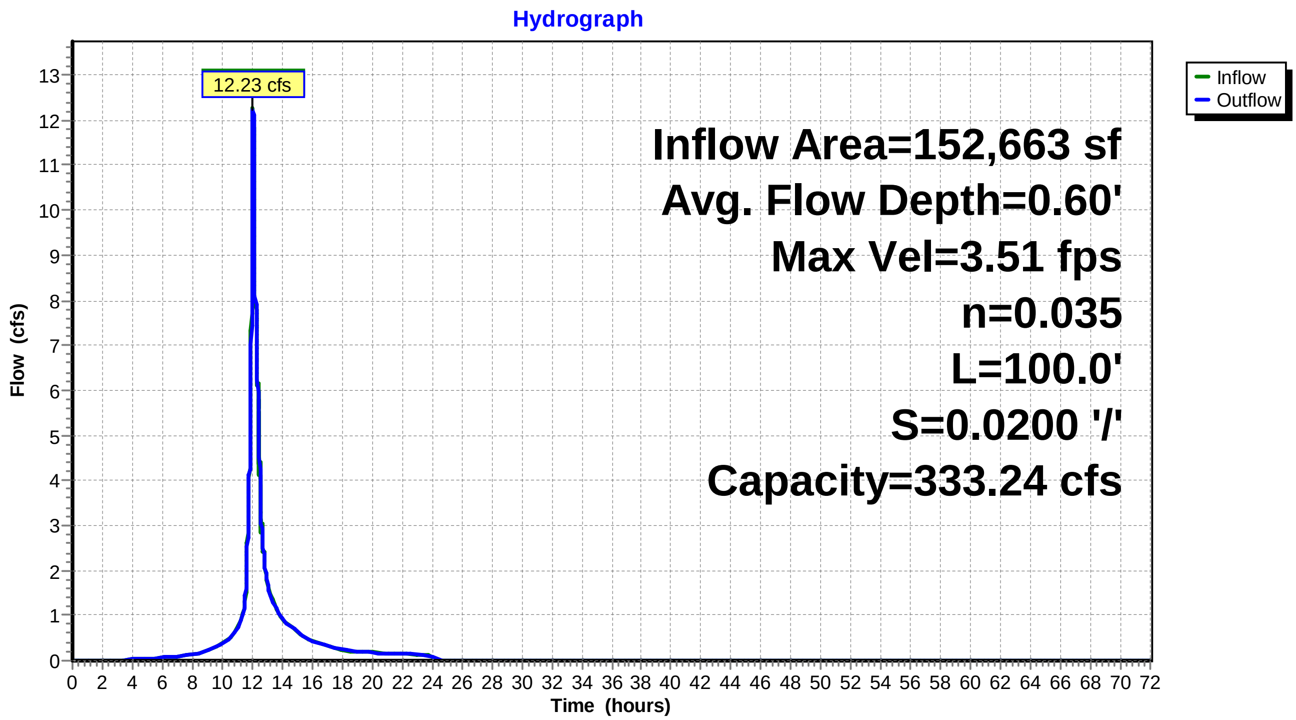
Inflow Area = 152,663 sf, 59.92% Impervious, Inflow Depth = 3.73" for 10 yr event
Inflow = 12.27 cfs @ 12.07 hrs, Volume= 47,410 cf
Outflow = 12.23 cfs @ 12.08 hrs, Volume= 47,410 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.51 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 1.7 min

Peak Storage= 348 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 333.24 cfs

4.00' x 3.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 100.0' Slope= 0.0200 '/'
Inlet Invert= 17.00', Outlet Invert= 15.00'

Reach R1: Swale



Summary for Pond 27 BRB1:

Inflow Area = 5,038 sf, 50.34% Impervious, Inflow Depth = 4.03" for 10 yr event
Inflow = 0.54 cfs @ 12.09 hrs, Volume= 1,692 cf
Outflow = 0.08 cfs @ 12.60 hrs, Volume= 1,692 cf, Atten= 86%, Lag= 30.6 min
Primary = 0.08 cfs @ 12.60 hrs, Volume= 1,692 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 16.00' @ 12.60 hrs Surf.Area= 1,209 sf Storage= 554 cf
Flood Elev= 16.00' Surf.Area= 1,209 sf Storage= 555 cf

Plug-Flow detention time= 53.8 min calculated for 1,692 cf (100% of inflow)
Center-of-Mass det. time= 53.8 min (854.0 - 800.2)

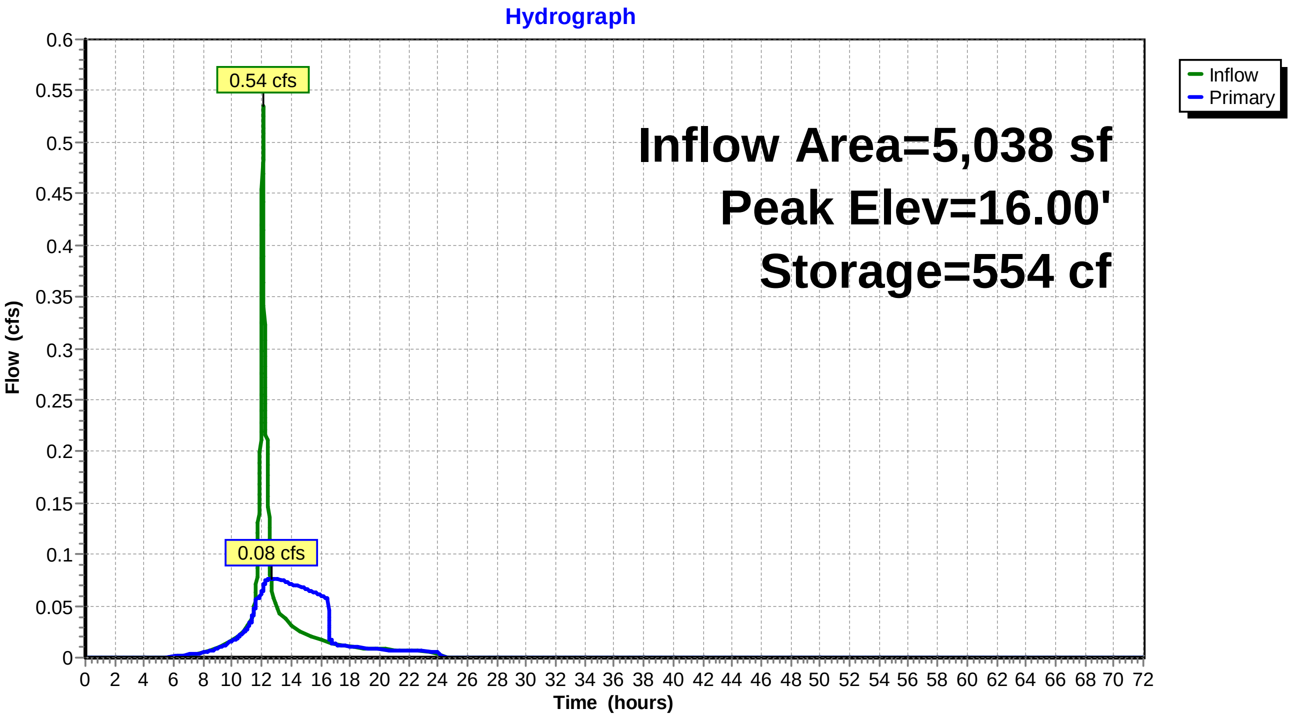
Volume	Invert	Avail.Storage	Storage Description
#1	15.50'	1,966 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
15.50	1,013	192.9	0	0	1,013
16.00	1,209	199.1	555	555	1,230
16.50	1,411	205.5	654	1,209	1,459
17.00	1,620	211.7	757	1,966	1,690

Device	Routing	Invert	Outlet Devices
#1	Primary	12.43'	**12.0" Round Culvert** L= 26.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.43' / 12.30' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	12.91'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	15.50'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 12.40' Phase-In= 0.01'
#4	Device 1	16.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 12.60 hrs HW=16.00' TW=12.44' (Dynamic Tailwater)
1=Culvert (Passes 0.08 cfs of 6.63 cfs potential flow)
2=Orifice/Grate (Passes 0.08 cfs of 1.59 cfs potential flow)
3=Exfiltration (Controls 0.08 cfs)
4=Orifice/Grate (Controls 0.00 cfs)

Pond 27 BRB1:


Hydrograph
0.54 cfs
0.08 cfs
Inflow
Primary
Inflow Area=5,038 sf
Peak Elev=16.00'
Storage=554 cf
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Pond 30 DB1:

Inflow Area = 21,025 sf, 90.30% Impervious, Inflow Depth = 5.09" for 10 yr event
Inflow = 2.60 cfs @ 12.08 hrs, Volume= 8,920 cf
Outflow = 1.81 cfs @ 12.15 hrs, Volume= 8,918 cf, Atten= 31%, Lag= 4.3 min
Primary = 1.04 cfs @ 12.16 hrs, Volume= 981 cf
Secondary = 0.83 cfs @ 12.10 hrs, Volume= 7,937 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 14.42' @ 12.16 hrs Surf.Area= 1,170 sf Storage= 1,254 cf

Plug-Flow detention time= 18.7 min calculated for 8,917 cf (100% of inflow)
Center-of-Mass det. time= 18.8 min (780.1 - 761.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	12.80'	1,087 cf	**25.25'W x 46.34'L x 3.50'H Field A** 4,095 cf Overall - 1,378 cf Embedded = 2,717 cf x 40.0% Voids
#2A	13.30'	1,378 cf	**ADS_StormTech SC-740 +Cap** x 30 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 6 Chambers
		2,465 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	13.80'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.80' / 13.75' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	12.80'	**6.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.80' / 12.80' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=1.04 cfs @ 12.16 hrs HW=14.42' TW=13.78' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 1.04 cfs @ 2.90 fps)

Secondary OutFlow Max=0.81 cfs @ 12.10 hrs HW=14.30' TW=13.56' (Dynamic Tailwater)
↑—**2=Culvert** (Inlet Controls 0.81 cfs @ 4.12 fps)

Pond 30 DB1: - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

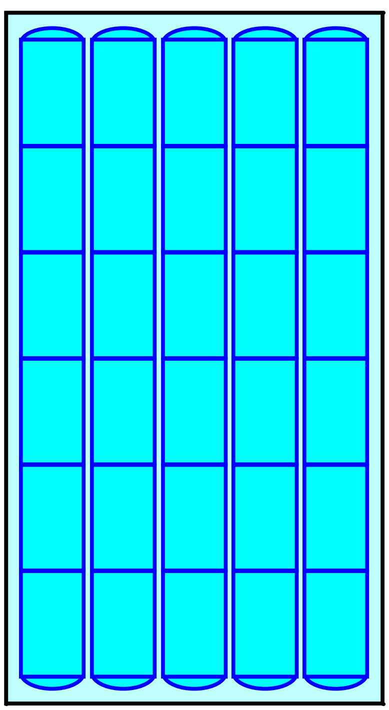
6 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 44.34' Row Length +12.0" End Stone x 2 = 46.34' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

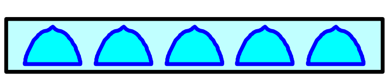
30 Chambers x 45.9 cf = 1,378.2 cf Chamber Storage

4,095.0 cf Field - 1,378.2 cf Chambers = 2,716.8 cf Stone x 40.0% Voids = 1,086.7 cf Stone Storage

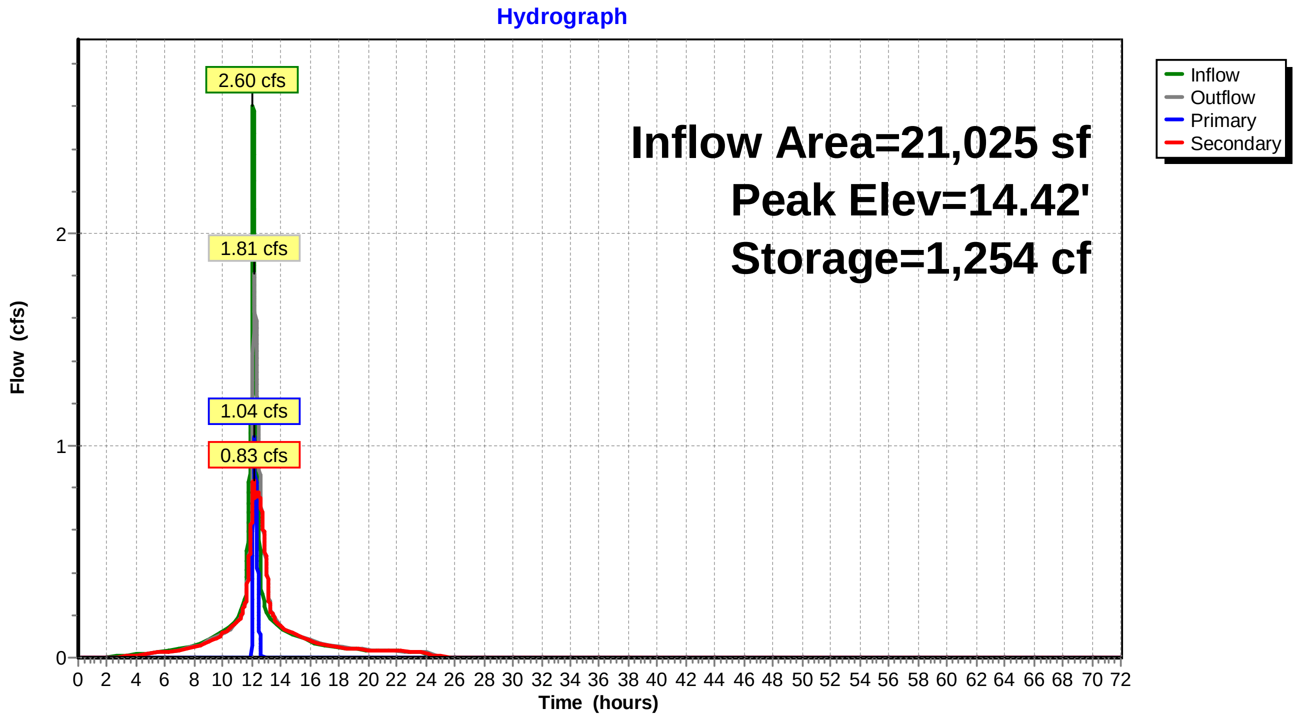
Chamber Storage + Stone Storage = 2,464.9 cf = 0.057 af
Overall Storage Efficiency = 60.2%
Overall System Size = 46.34' x 25.25' x 3.50'

30 Chambers
151.7 cy Field
100.6 cy Stone





Pond 30 DB1:


Hydrograph
2.60 cfs
1.81 cfs
1.04 cfs
0.83 cfs
Inflow Area=21,025 sf
Peak Elev=14.42'
Storage=1,254 cf
Inflow
Outflow
Primary
Secondary
Flow (cfs)
0
1
2
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Summary for Pond 36 DB2:

Inflow Area = 9,435 sf, 92.15% Impervious, Inflow Depth = 5.13" for 10 yr event
Inflow = 1.17 cfs @ 12.08 hrs, Volume= 4,033 cf
Outflow = 0.71 cfs @ 12.18 hrs, Volume= 4,032 cf, Atten= 39%, Lag= 5.9 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.71 cfs @ 12.18 hrs, Volume= 4,032 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 17.23' @ 12.18 hrs Surf.Area= 823 sf Storage= 470 cf

Plug-Flow detention time= 17.7 min calculated for 4,032 cf (100% of inflow)
Center-of-Mass det. time= 17.5 min (777.3 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	16.25'	785 cf	**11.00'W x 74.82'L x 3.50'H Field A** 2,880 cf Overall - 919 cf Embedded = 1,962 cf x 40.0% Voids
#2A	16.75'	919 cf	**ADS_StormTech SC-740 +Cap** x 20 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 10 Chambers
		1,703 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	17.79'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.79' / 17.75' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	16.25'	**6.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.25' / 16.25' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.25' TW=16.15' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.71 cfs @ 12.18 hrs HW=17.23' TW=16.66' (Dynamic Tailwater)
↑—**2=Culvert** (Inlet Controls 0.71 cfs @ 3.63 fps)

Pond 36 DB2: - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

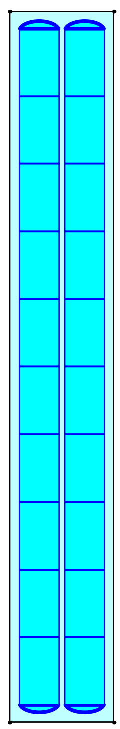
10 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 72.82' Row Length +12.0" End Stone x 2 = 74.82' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

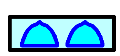
20 Chambers x 45.9 cf = 918.8 cf Chamber Storage

2,880.4 cf Field - 918.8 cf Chambers = 1,961.6 cf Stone x 40.0% Voids = 784.7 cf Stone Storage

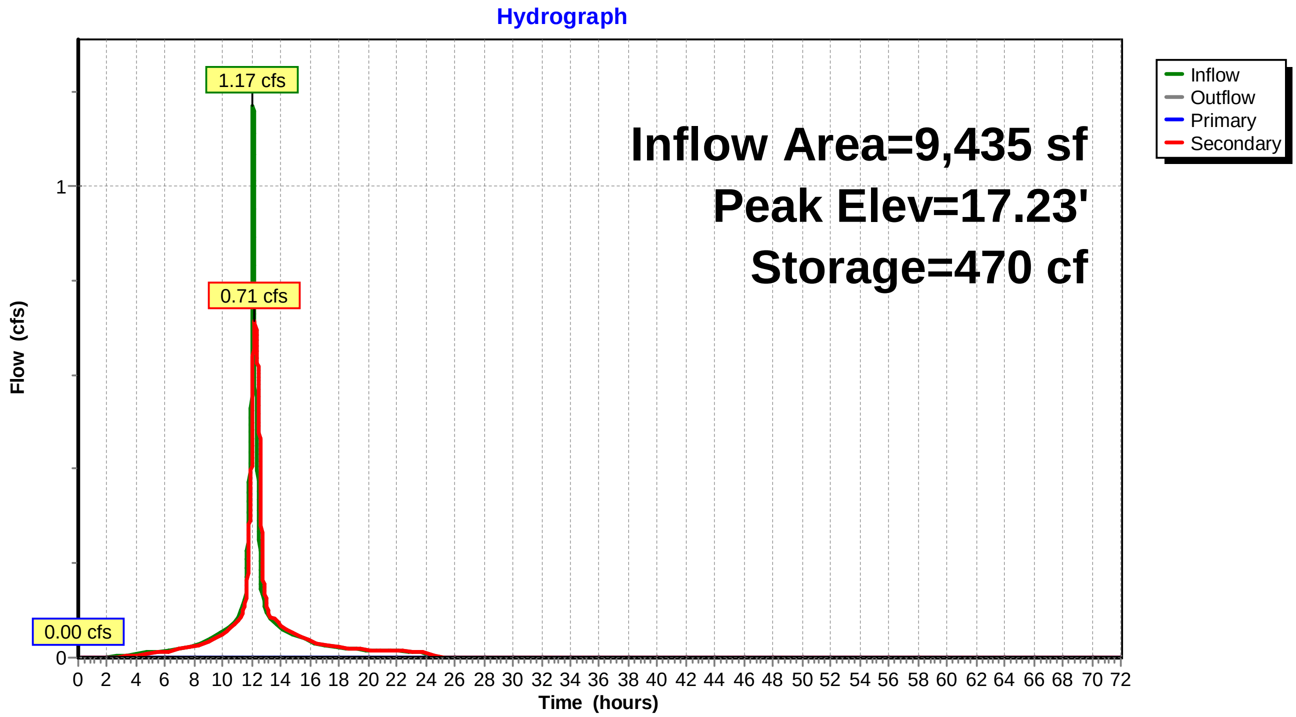
Chamber Storage + Stone Storage = 1,703.5 cf = 0.039 af
Overall Storage Efficiency = 59.1%
Overall System Size = 74.82' x 11.00' x 3.50'

20 Chambers
106.7 cy Field
72.7 cy Stone





Pond 36 DB2:


Hydrograph
1.17 cfs
0.71 cfs
0.00 cfs
Inflow Area=9,435 sf
Peak Elev=17.23'
Storage=470 cf
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
1
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Pond 41 BRB2:

Inflow Area = 12,361 sf, 62.85% Impervious, Inflow Depth = 4.35" for 10 yr event
Inflow = 1.40 cfs @ 12.09 hrs, Volume= 4,480 cf
Outflow = 0.79 cfs @ 12.20 hrs, Volume= 4,480 cf, Atten= 43%, Lag= 6.9 min
Primary = 0.79 cfs @ 12.20 hrs, Volume= 4,480 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 18.14' @ 12.20 hrs Surf.Area= 1,834 sf Storage= 1,088 cf
Flood Elev= 19.50' Surf.Area= 2,215 sf Storage= 2,826 cf

Plug-Flow detention time= 50.6 min calculated for 4,480 cf (100% of inflow)
Center-of-Mass det. time= 50.6 min (841.1 - 790.5)

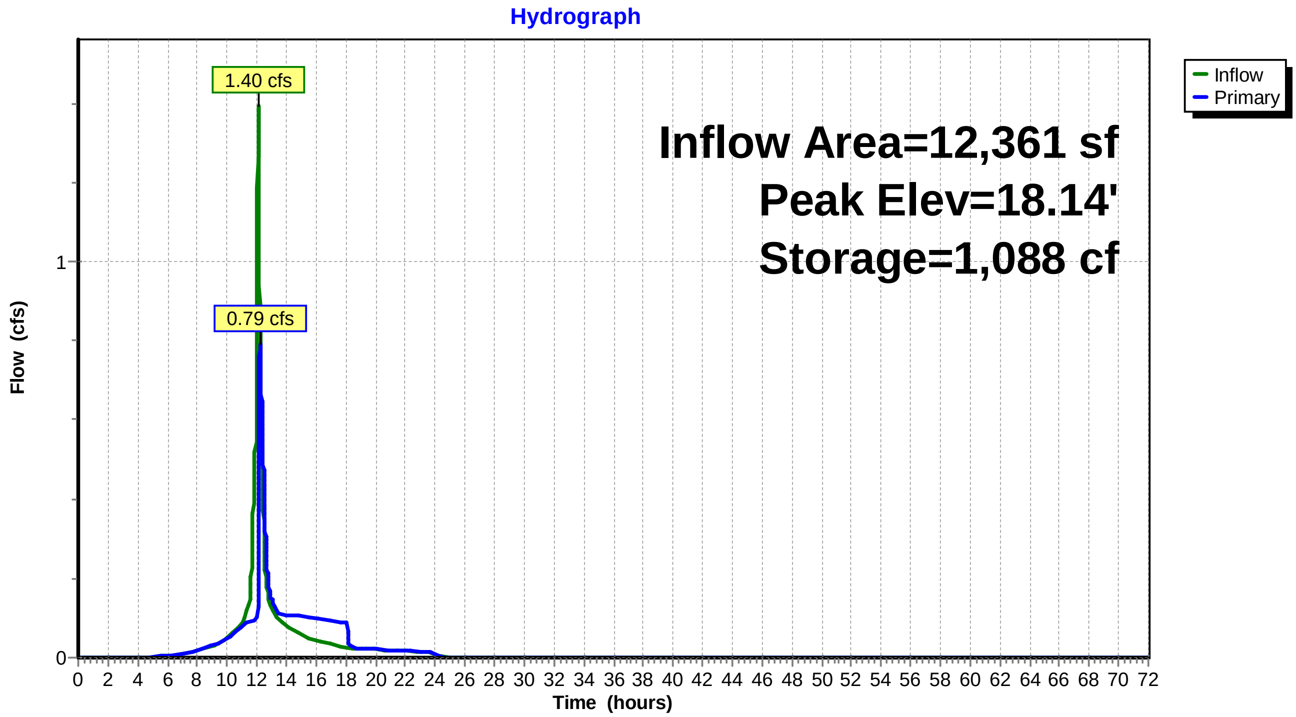
Volume	Invert	Avail.Storage	Storage Description
#1	17.50'	2,826 cf	**Rain Garden 5 (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
17.50	1,563	208.2	0	0	1,563
18.00	1,774	214.5	834	834	1,800
18.50	1,992	220.7	941	1,775	2,041
19.00	2,215	227.0	1,051	2,826	2,291

Device	Routing	Invert	Outlet Devices
#1	Primary	14.43'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.43' / 14.33' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	14.93'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	17.50'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 12.40' Phase-In= 0.01'
#4	Device 1	18.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.79 cfs @ 12.20 hrs HW=18.14' TW=13.57' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.79 cfs of 6.78 cfs potential flow)
  ├─**2=Orifice/Grate** (Passes 0.11 cfs of 1.63 cfs potential flow)
  │ └─**3=Exfiltration** (Controls 0.11 cfs)
  └─**4=Orifice/Grate** (Weir Controls 0.68 cfs @ 1.23 fps)

Pond 41 BRB2:


Hydrograph
1.40 cfs
0.79 cfs
Inflow Area=12,361 sf
Peak Elev=18.14'
Storage=1,088 cf
Inflow
Primary
Flow (cfs)
1
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Summary for Pond 49 IB3:

Inflow Area =	91,377 sf,	70.56% Impervious,	Inflow Depth = 4.58"	for 10 yr event
Inflow =	10.66 cfs @	12.08 hrs, Volume=	34,882 cf	
Outflow =	3.71 cfs @	12.35 hrs, Volume=	34,882 cf,	Atten= 65%, Lag= 16.2 min
Discarded =	0.60 cfs @	12.35 hrs, Volume=	19,218 cf	
Primary =	3.11 cfs @	12.35 hrs, Volume=	15,665 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.92' @ 12.35 hrs Surf.Area= 0.199 ac Storage= 0.266 af

Plug-Flow detention time= 77.6 min calculated for 34,882 cf (100% of inflow)
Center-of-Mass det. time= 77.6 min (859.1 - 781.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	18.00'	0.177 af	**106.00'W x 81.94'L x 3.50'H Field A**
			0.698 af Overall - 0.255 af Embedded = 0.443 af x 40.0% Voids
#2A	18.50'	0.255 af	**ADS_StormTech SC-740 +Cap** x 242 Inside #1
			Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
			Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
			22 Rows of 11 Chambers
		0.432 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	**0.970 in/hr Exfiltration over Wetted area**
			Conductivity to Groundwater Elevation = 17.00' Phase-In= 0.01'
#2	Primary	18.60'	**12.0" Round Overflow**
			L= 2.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 18.60' / 18.55' S= 0.0250 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.60 cfs @ 12.35 hrs HW=19.92' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.60 cfs)

Primary OutFlow Max=3.11 cfs @ 12.35 hrs HW=19.92' TW=16.57' (Dynamic Tailwater)
↑—**2=Overflow** (Barrel Controls 3.11 cfs @ 3.97 fps)

Pond 49 IB3: - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

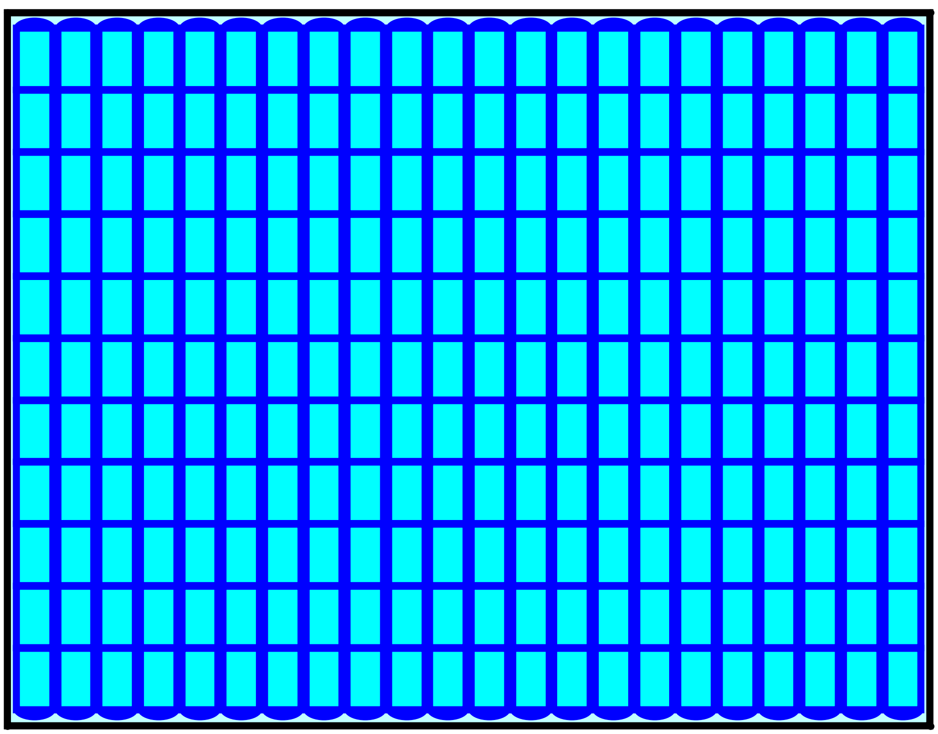
11 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 79.94' Row Length +12.0" End Stone x 2 = 81.94' Base Length
22 Rows x 51.0" Wide + 6.0" Spacing x 21 + 12.0" Side Stone x 2 = 106.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

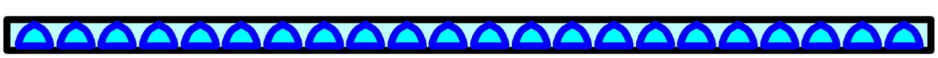
242 Chambers x 45.9 cf = 11,117.5 cf Chamber Storage

30,398.5 cf Field - 11,117.5 cf Chambers = 19,281.0 cf Stone x 40.0% Voids = 7,712.4 cf Stone Storage

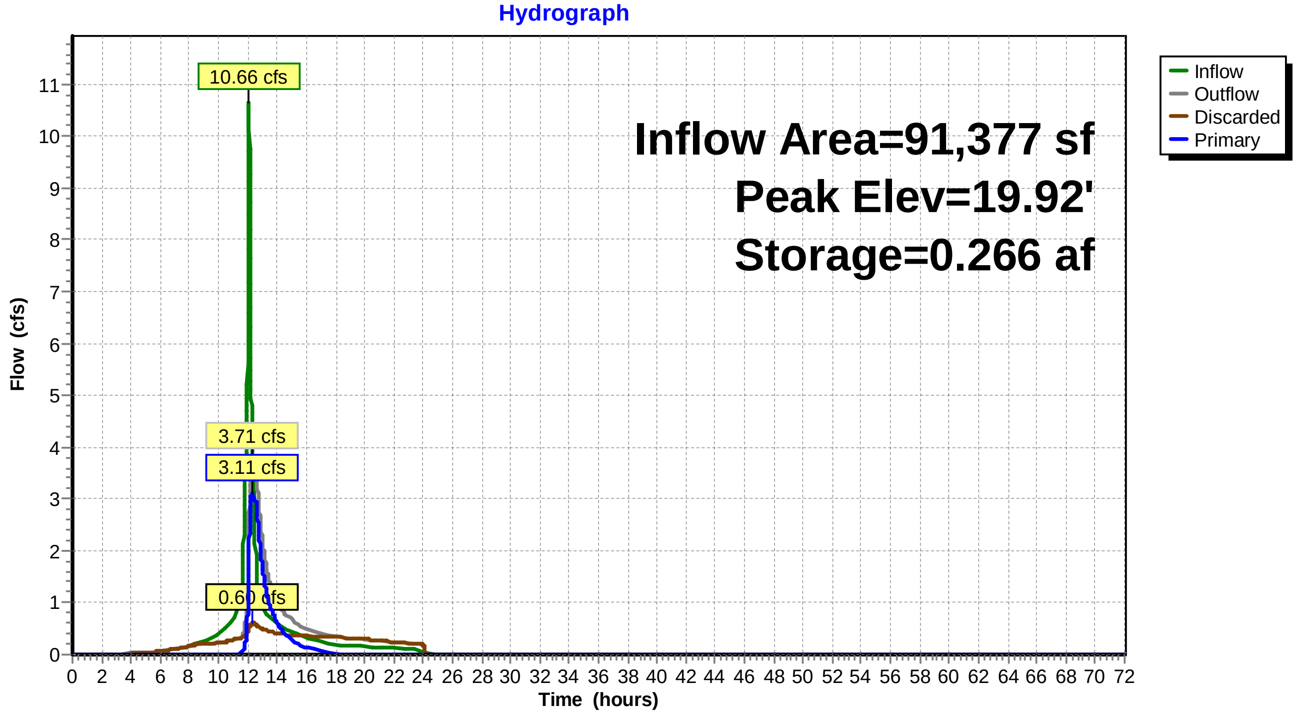
Chamber Storage + Stone Storage = 18,829.9 cf = 0.432 af
Overall Storage Efficiency = 61.9%
Overall System Size = 81.94' x 106.00' x 3.50'

242 Chambers
1,125.9 cy Field
714.1 cy Stone





Pond 49 IB3:


Hydrograph
10.66 cfs
3.71 cfs
3.11 cfs
0.60 cfs
Inflow Area=91,377 sf
Peak Elev=19.92'
Storage=0.266 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Pond 56 IB2:

Inflow Area = 28,518 sf,100.00% Impervious, Inflow Depth = 5.36" for 10 yr event
Inflow = 3.59 cfs @ 12.08 hrs, Volume= 12,744 cf
Outflow = 2.49 cfs @ 12.16 hrs, Volume= 12,744 cf, Atten= 31%, Lag= 4.8 min
Discarded = 0.13 cfs @ 12.16 hrs, Volume= 5,691 cf
Primary = 2.36 cfs @ 12.16 hrs, Volume= 7,053 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.64' @ 12.16 hrs Surf.Area= 2,264 sf Storage= 2,492 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 52.5 min (798.7 - 746.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	18.00'	2,066 cf	**20.50'W x 110.42'L x 3.50'H Field A** 7,922 cf Overall - 2,756 cf Embedded = 5,166 cf x 40.0% Voids
#2A	18.50'	2,756 cf	**ADS_StormTech SC-740 +Cap** x 60 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Rows of 15 Chambers
		4,823 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	18.00'	**0.970 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 17.00'
#2	Primary	18.60'	**12.0" Round Overflow** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.60' / 18.55' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.13 cfs @ 12.16 hrs HW=19.64' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.13 cfs)

Primary OutFlow Max=2.36 cfs @ 12.16 hrs HW=19.64' TW=16.90' (Dynamic Tailwater)
↑—**2=Overflow** (Barrel Controls 2.36 cfs @ 3.59 fps)

Pond 56 IB2: - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

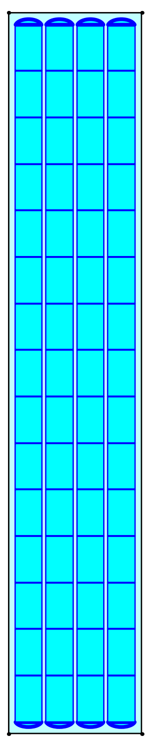
15 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 108.42' Row Length +12.0" End Stone x 2 = 110.42' Base Length
4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

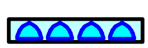
60 Chambers x 45.9 cf = 2,756.4 cf Chamber Storage

7,922.4 cf Field - 2,756.4 cf Chambers = 5,166.0 cf Stone x 40.0% Voids = 2,066.4 cf Stone Storage

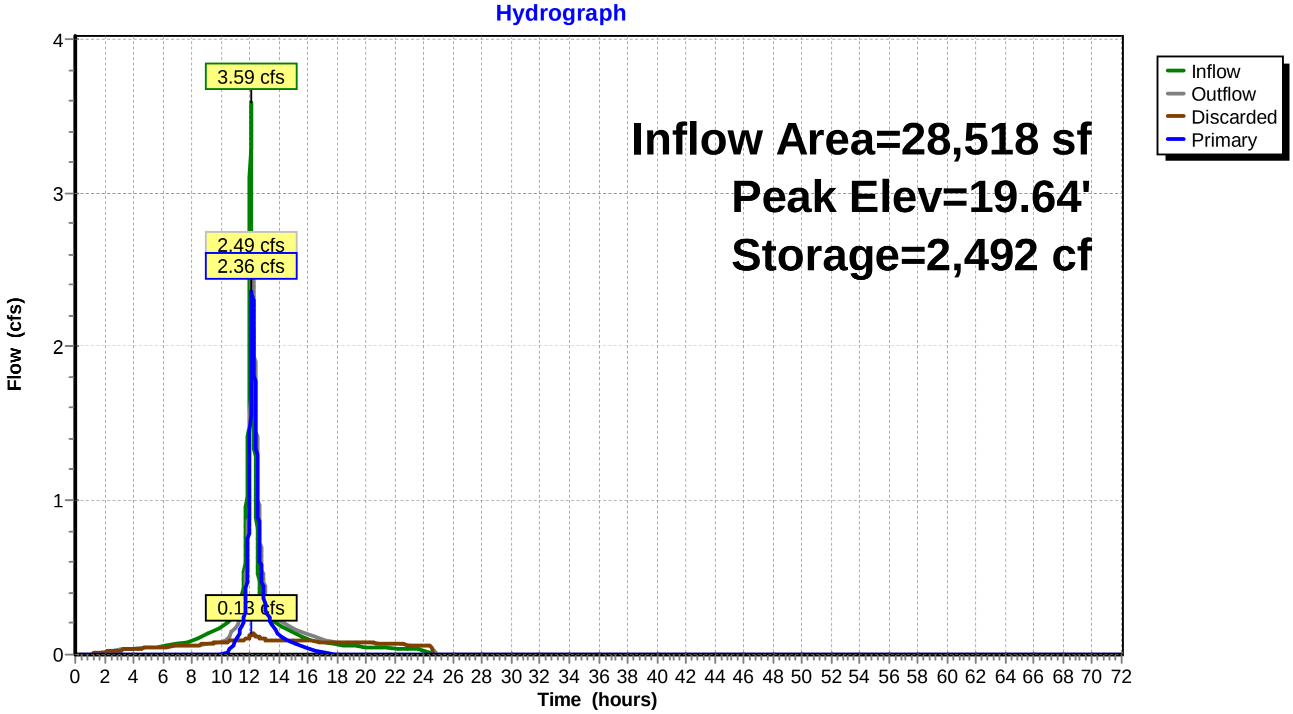
Chamber Storage + Stone Storage = 4,822.8 cf = 0.111 af
Overall Storage Efficiency = 60.9%
Overall System Size = 110.42' x 20.50' x 3.50'

60 Chambers
293.4 cy Field
191.3 cy Stone





Pond 56 IB2:


Hydrograph
3.59 cfs
2.49 cfs
2.36 cfs
0.13 cfs
Inflow Area=28,518 sf
Peak Elev=19.64'
Storage=2,492 cf
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Pond 60 WQU 2:

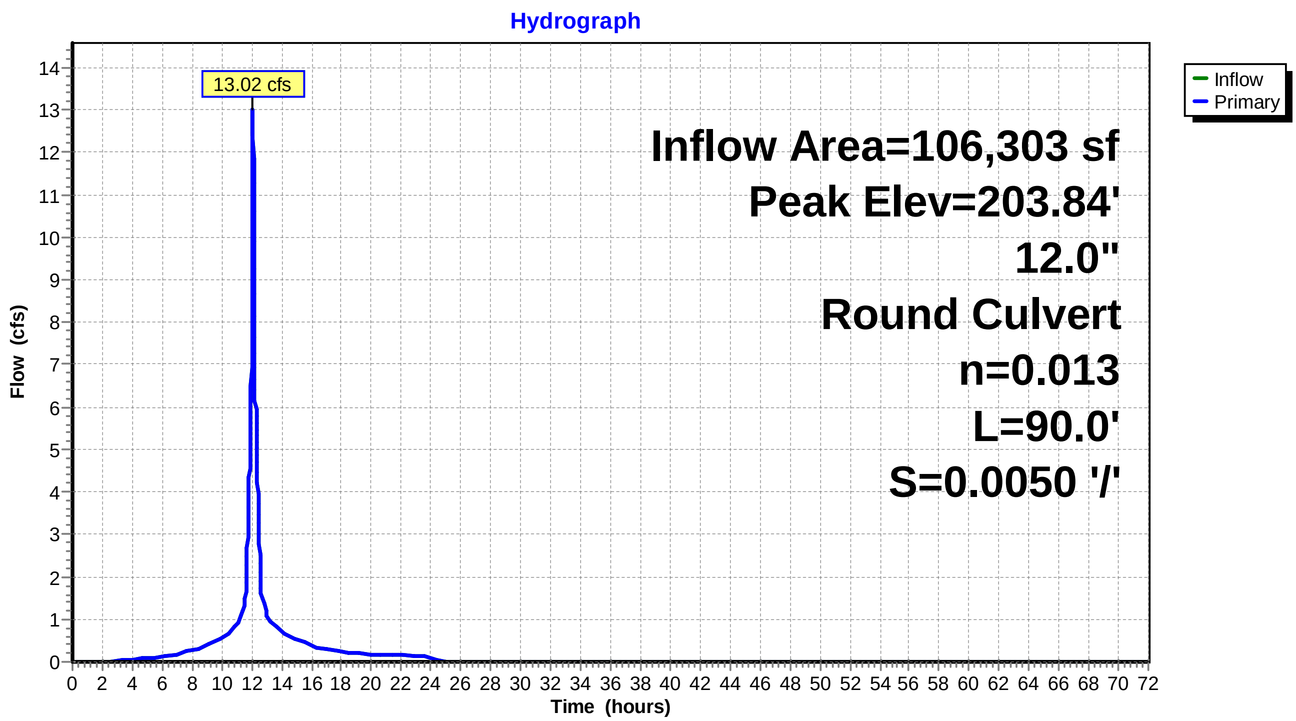
Inflow Area = 106,303 sf, 86.53% Impervious, Inflow Depth = 4.96" for 10 yr event
Inflow = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf
Outflow = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 203.84' @ 12.11 hrs
Flood Elev= 25.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.05'	**12.0" Round Culvert** L= 90.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.05' / 17.60' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=8.07 cfs @ 12.08 hrs HW=184.88' TW=177.79' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.07 cfs @ 10.28 fps)

Pond 60 WQU 2:



Summary for Pond 1071:

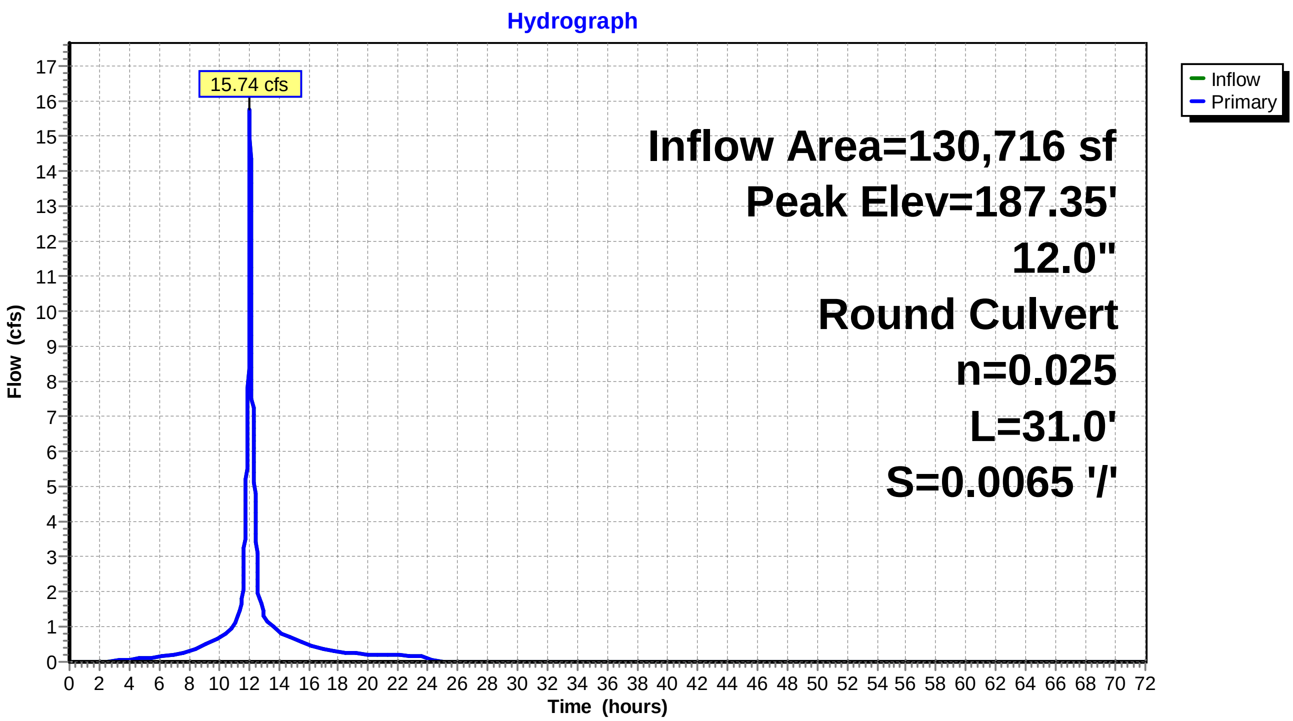
Inflow Area =	130,716 sf,	81.98% Impervious,	Inflow Depth = 4.85"	for 10 yr event
Inflow =	15.74 cfs @	12.08 hrs, Volume=	52,795 cf	
Outflow =	15.74 cfs @	12.08 hrs, Volume=	52,795 cf, Atten= 0%, Lag= 0.0 min	
Primary =	15.74 cfs @	12.08 hrs, Volume=	52,795 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 187.35' @ 12.10 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.50'	**12.0" Round Culvert** L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.50' / 17.30' S= 0.0065 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=13.78 cfs @ 12.08 hrs HW=177.99' TW=153.60' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 13.78 cfs @ 17.55 fps)

Pond 1071:



Summary for Pond 1072:

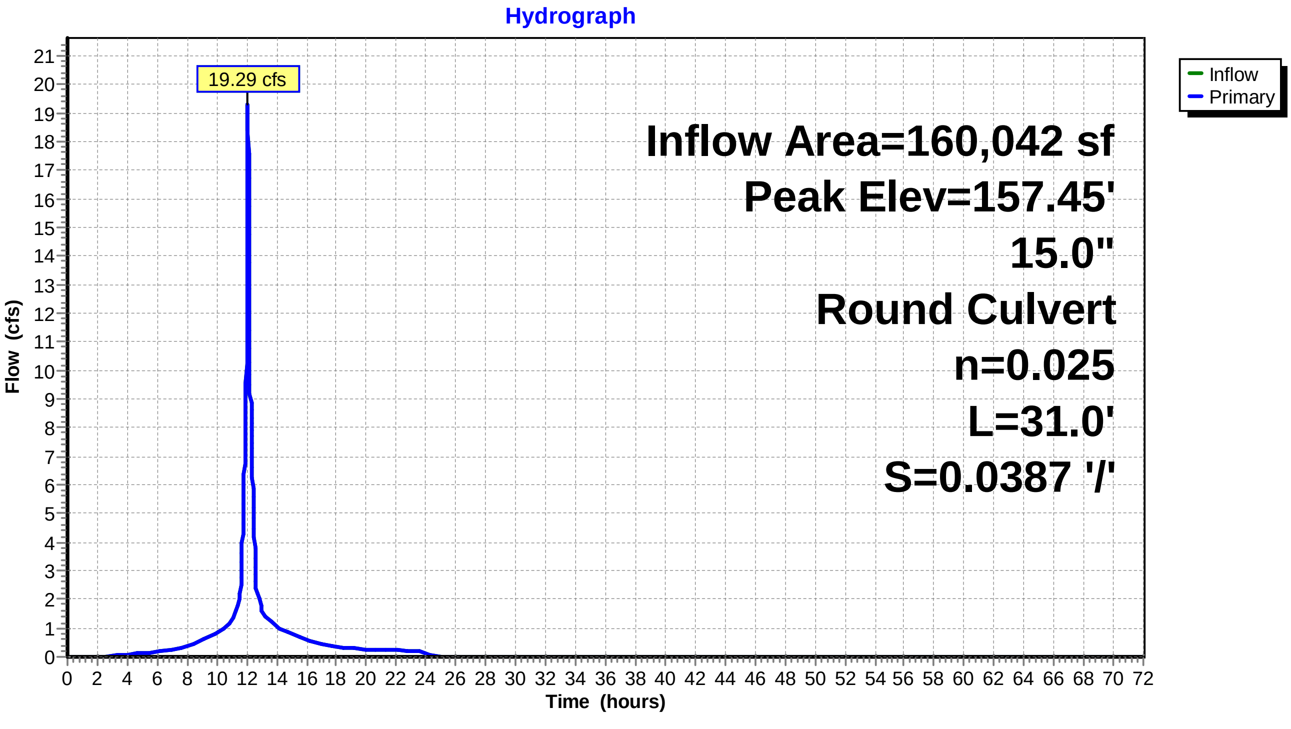
Inflow Area = 160,042 sf, 83.01% Impervious, Inflow Depth = 4.88" for 10 yr event
Inflow = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf
Outflow = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf, Atten= 0%, Lag= 0.0 min
Primary = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 157.45' @ 12.10 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.10'	**15.0" Round Culvert** L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.10' / 15.90' S= 0.0387 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=17.04 cfs @ 12.08 hrs HW=153.59' TW=141.09' (Dynamic Tailwater)
1=Culvert (Outlet Controls 17.04 cfs @ 13.89 fps)

Pond 1072:



Summary for Pond 1346:

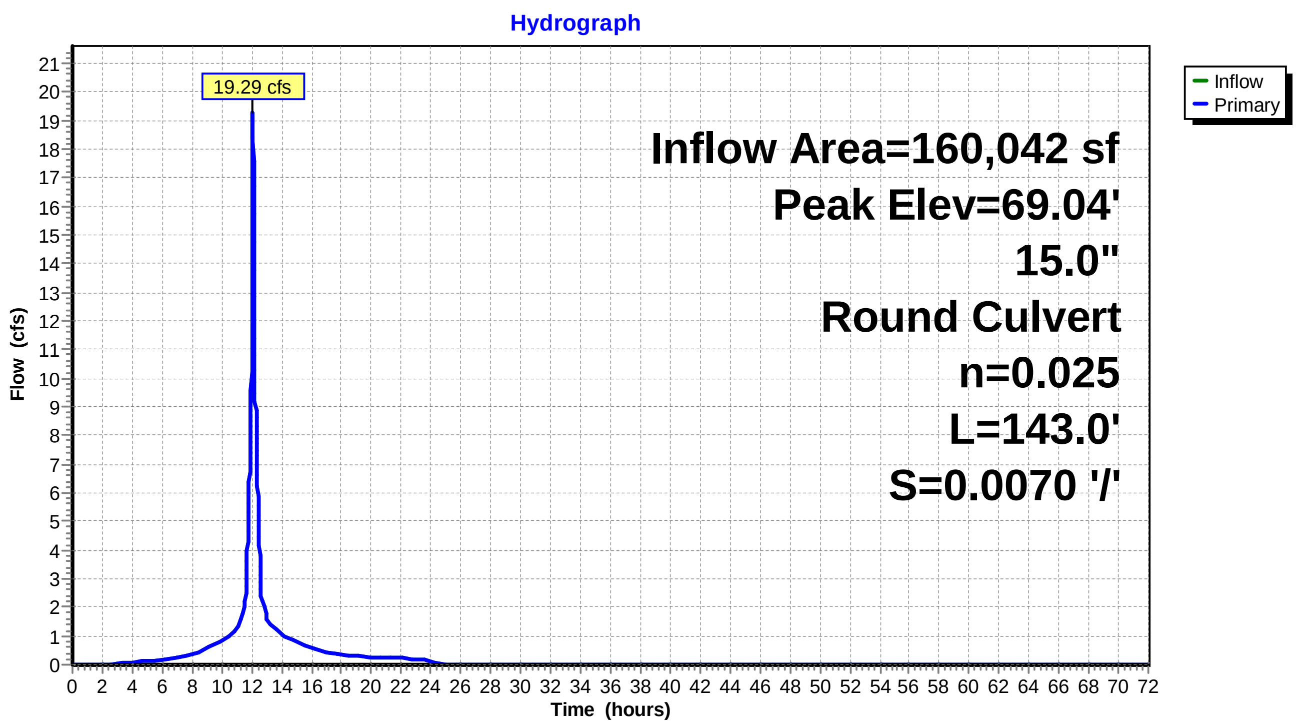
Inflow Area = 160,042 sf, 83.01% Impervious, Inflow Depth = 4.88" for 10 yr event
Inflow = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf
Outflow = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf, Atten= 0%, Lag= 0.0 min
Primary = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 69.04' @ 12.08 hrs
Flood Elev= 25.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.70'	**15.0" Round Culvert** L= 143.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.70' / 14.70' S= 0.0070 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=19.26 cfs @ 12.08 hrs HW=68.85' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 19.26 cfs @ 15.69 fps)

Pond 1346:



Summary for Pond 1347:

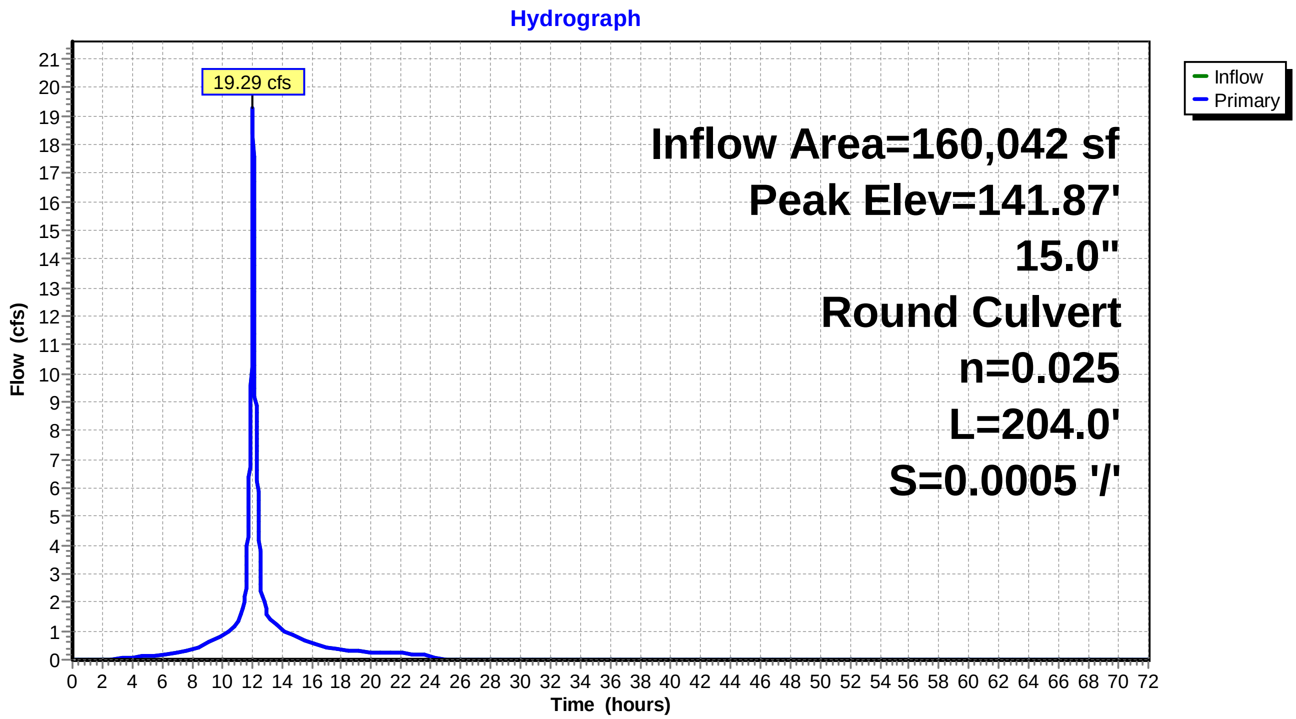
Inflow Area = 160,042 sf, 83.01% Impervious, Inflow Depth = 4.88" for 10 yr event
Inflow = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf
Outflow = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf, Atten= 0%, Lag= 0.0 min
Primary = 19.29 cfs @ 12.08 hrs, Volume= 65,104 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 141.87' @ 12.09 hrs
Flood Elev= 23.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.90'	**15.0" Round Culvert** L= 204.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.90' / 15.80' S= 0.0005 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=19.16 cfs @ 12.08 hrs HW=141.09' TW=68.85' (Dynamic Tailwater)
1=Culvert (Outlet Controls 19.16 cfs @ 15.61 fps)

Pond 1347:



Summary for Pond CB10:

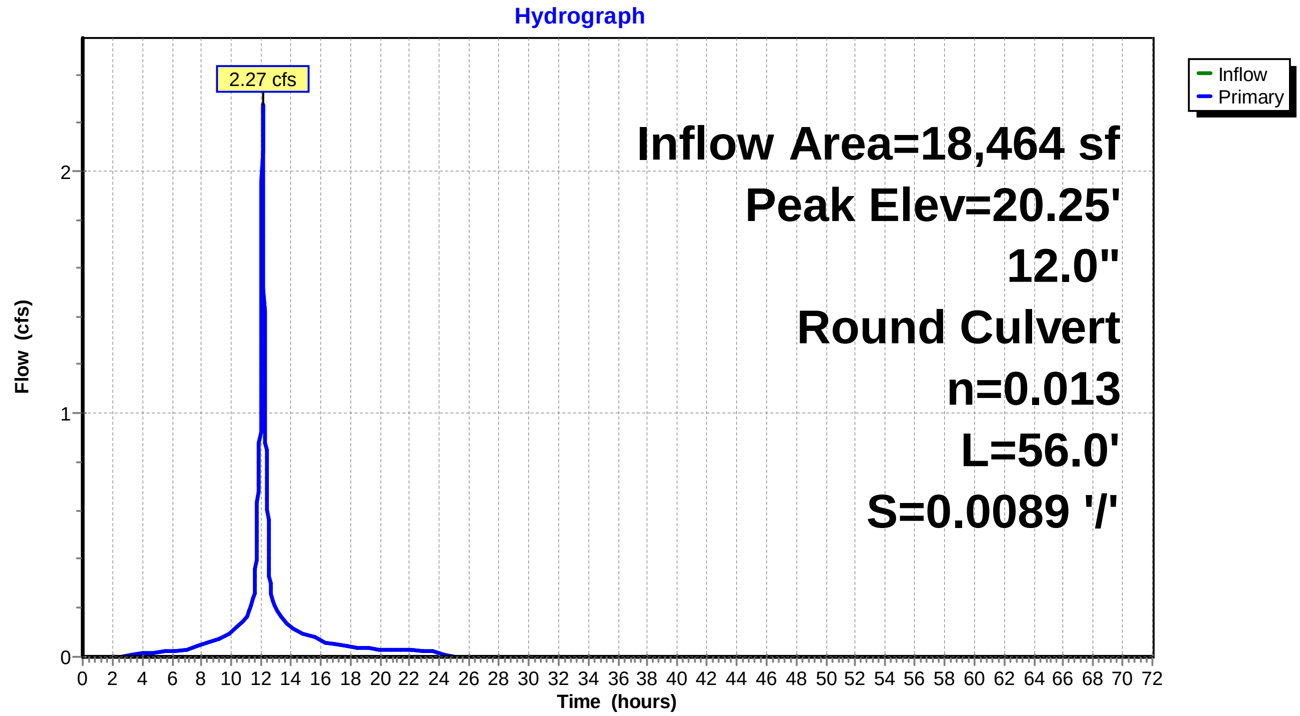
Inflow Area = 18,464 sf, 86.68% Impervious, Inflow Depth = 5.01" for 10 yr event
Inflow = 2.27 cfs @ 12.08 hrs, Volume= 7,716 cf
Outflow = 2.27 cfs @ 12.08 hrs, Volume= 7,716 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.27 cfs @ 12.08 hrs, Volume= 7,716 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 20.25' @ 12.10 hrs
Flood Elev= 24.11'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.87'	**12.0" Round Culvert** L= 56.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.87' / 18.37' S= 0.0089 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.09 cfs @ 12.08 hrs HW=20.14' TW=19.80' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.09 cfs @ 2.70 fps)

Pond CB10:



Summary for Pond CB12:

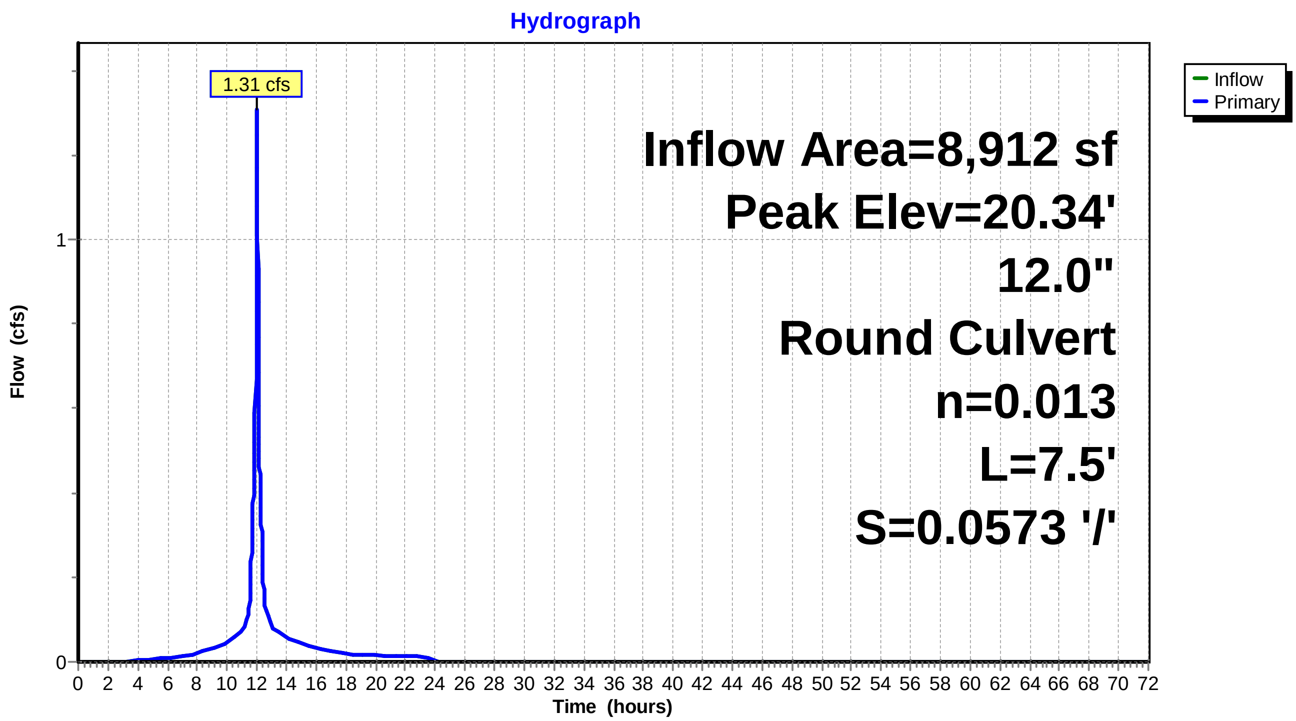
Inflow Area =	8,912 sf,	80.50% Impervious,	Inflow Depth = 4.79"	for 10 yr event
Inflow =	1.31 cfs @	12.00 hrs, Volume=	3,556 cf	
Outflow =	1.31 cfs @	12.00 hrs, Volume=	3,556 cf, Atten= 0%, Lag= 0.0 min	
Primary =	1.31 cfs @	12.00 hrs, Volume=	3,556 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 20.34' @ 12.12 hrs
Flood Elev= 24.07'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.30'	**12.0" Round Culvert** L= 7.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.30' / 18.87' S= 0.0573 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.18 cfs @ 12.00 hrs HW=19.92' TW=19.61' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.18 cfs @ 3.33 fps)

Pond CB12:



Summary for Pond CB13:

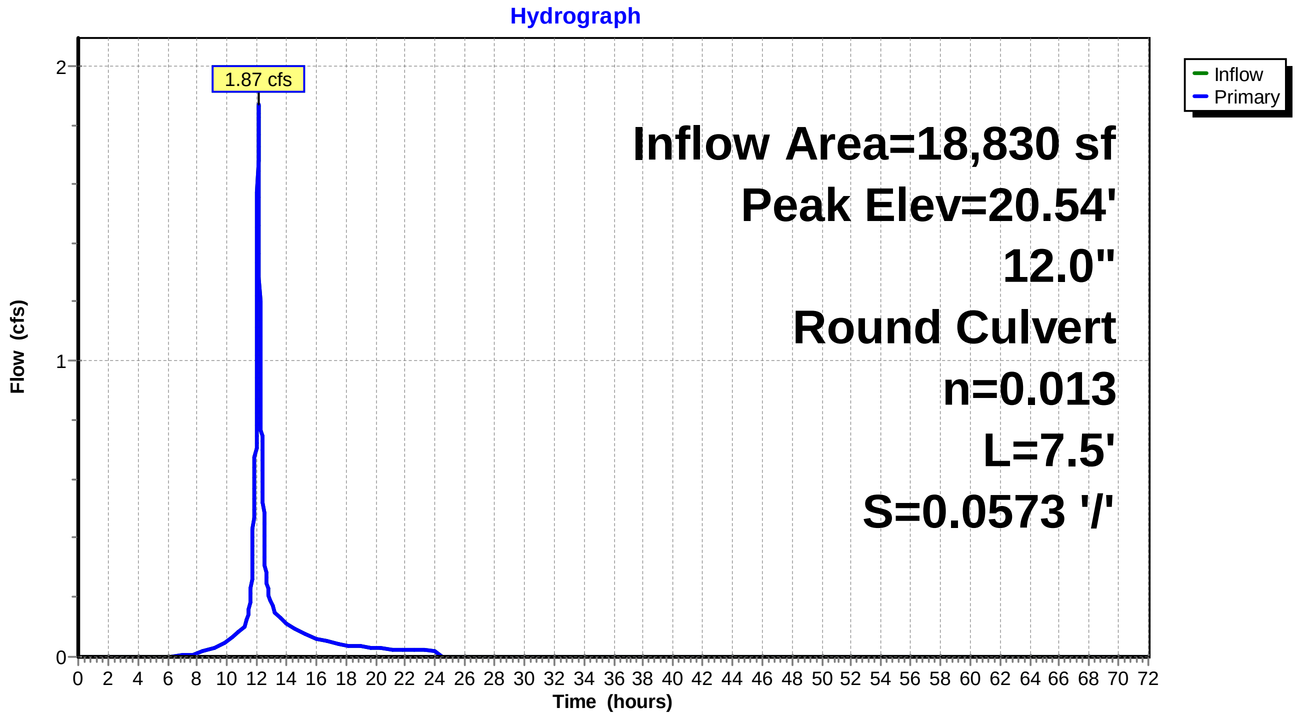
Inflow Area = 18,830 sf, 38.59% Impervious, Inflow Depth = 3.72" for 10 yr event
Inflow = 1.87 cfs @ 12.09 hrs, Volume= 5,840 cf
Outflow = 1.87 cfs @ 12.09 hrs, Volume= 5,840 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.87 cfs @ 12.09 hrs, Volume= 5,840 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 20.54' @ 12.11 hrs
Flood Elev= 24.07'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.30'	**12.0" Round Culvert** L= 7.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.30' / 18.87' S= 0.0573 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.57 cfs @ 12.09 hrs HW=20.41' TW=20.24' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.57 cfs @ 2.00 fps)

Pond CB13:



Summary for Pond CB16:

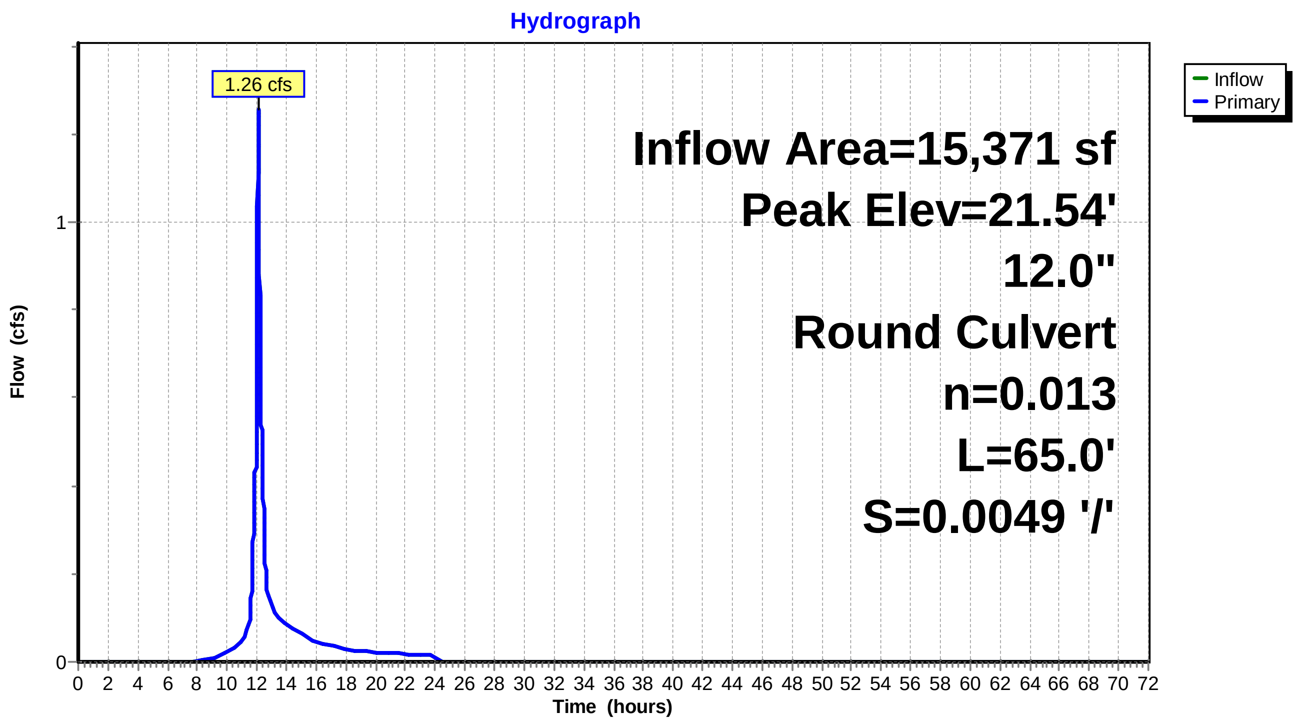
Inflow Area = 15,371 sf, 10.01% Impervious, Inflow Depth = 3.04" for 10 yr event
Inflow = 1.26 cfs @ 12.09 hrs, Volume= 3,891 cf
Outflow = 1.26 cfs @ 12.09 hrs, Volume= 3,891 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.26 cfs @ 12.09 hrs, Volume= 3,891 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 21.54' @ 12.11 hrs
Flood Elev= 27.37'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.82'	**12.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.82' / 20.50' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.21 cfs @ 12.09 hrs HW=21.52' TW=21.07' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.21 cfs @ 2.90 fps)

Pond CB16:



Summary for Pond CB23:

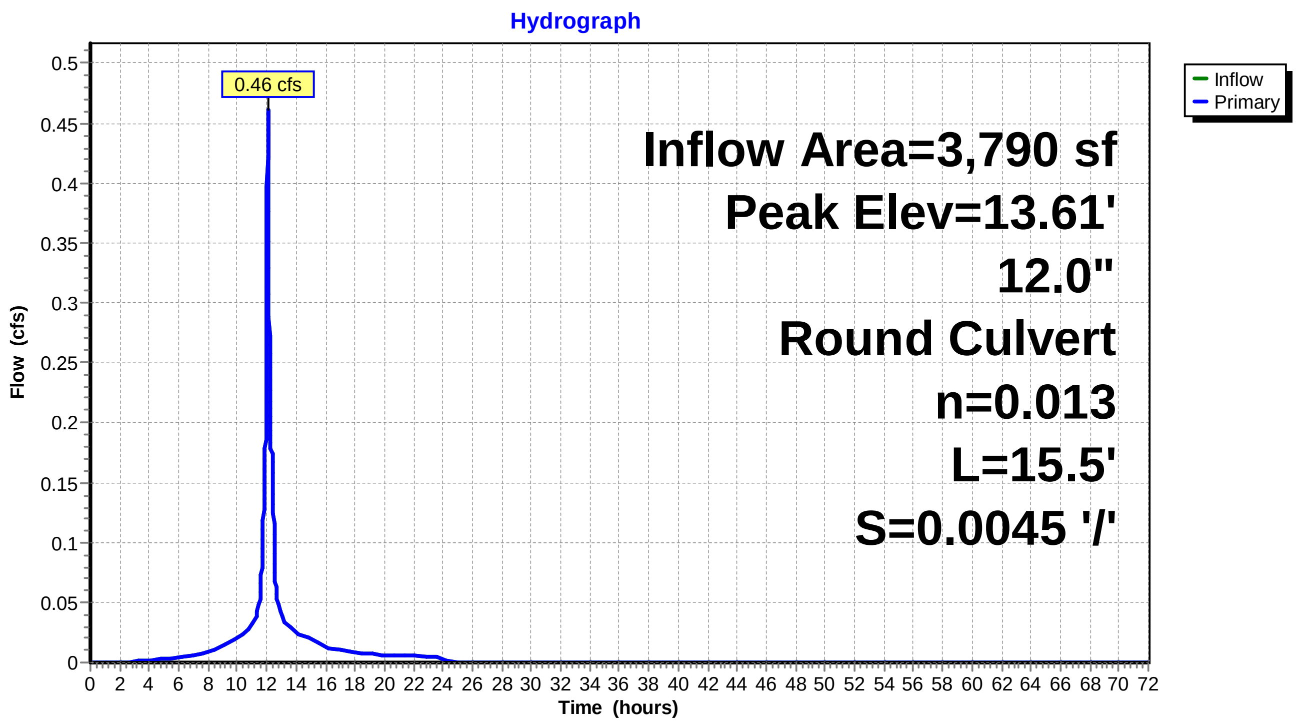
Inflow Area =	3,790 sf, 85.17% Impervious,	Inflow Depth = 4.90"	for 10 yr event
Inflow =	0.46 cfs @ 12.08 hrs, Volume=	1,548 cf	
Outflow =	0.46 cfs @ 12.08 hrs, Volume=	1,548 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.46 cfs @ 12.08 hrs, Volume=	1,548 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 13.61' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.20'	**12.0" Round Culvert** L= 15.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.20' / 13.13' S= 0.0045 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.46 cfs @ 12.08 hrs HW=13.61' TW=12.53' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.46 cfs @ 2.21 fps)

Pond CB23:



Summary for Pond CB24:

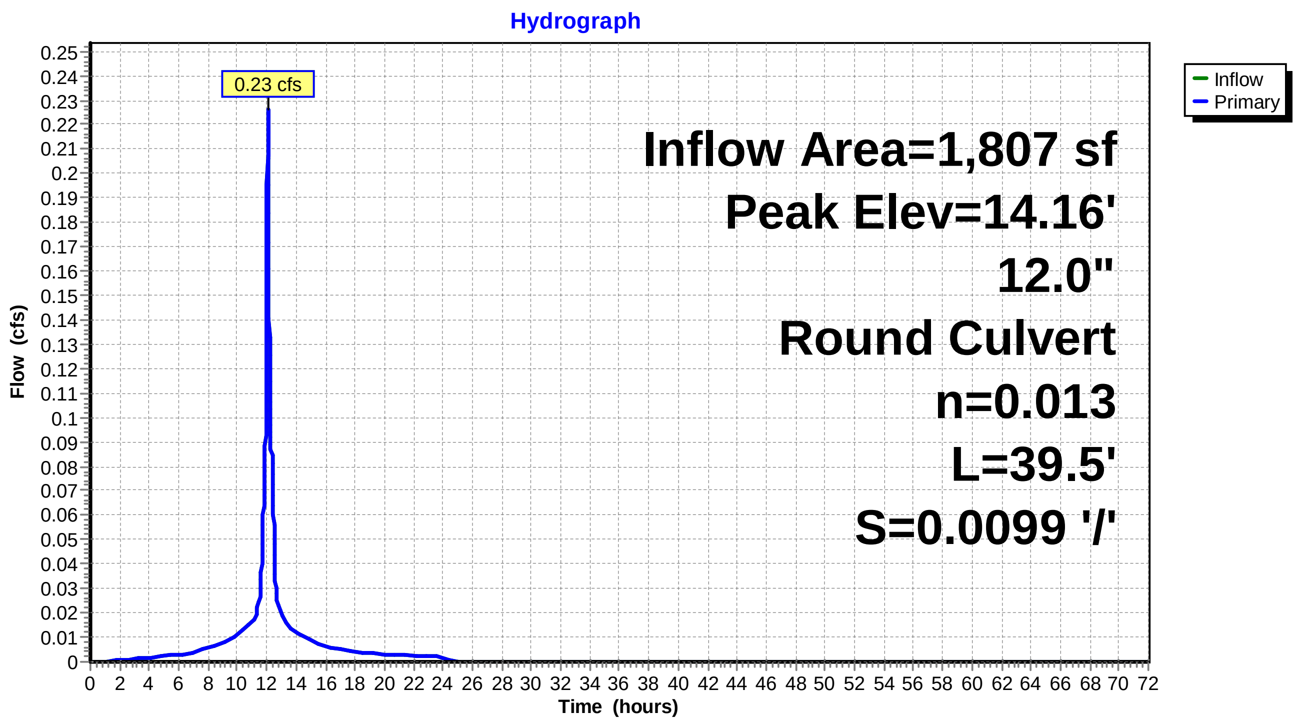
Inflow Area =		1,807 sf, 96.73% Impervious,	Inflow Depth = 5.25"	for 10 yr event
Inflow	=	0.23 cfs @ 12.08 hrs, Volume=	790 cf	
Outflow	=	0.23 cfs @ 12.08 hrs, Volume=	790 cf, Atten= 0%, Lag= 0.0 min	
Primary	=	0.23 cfs @ 12.08 hrs, Volume=	790 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 14.16' @ 12.08 hrs
Flood Elev= 17.72'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.92'	**12.0" Round Culvert** L= 39.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.92' / 13.53' S= 0.0099 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 12.08 hrs HW=14.16' TW=12.53' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.23 cfs @ 2.35 fps)

Pond CB24:



Summary for Pond CB26:

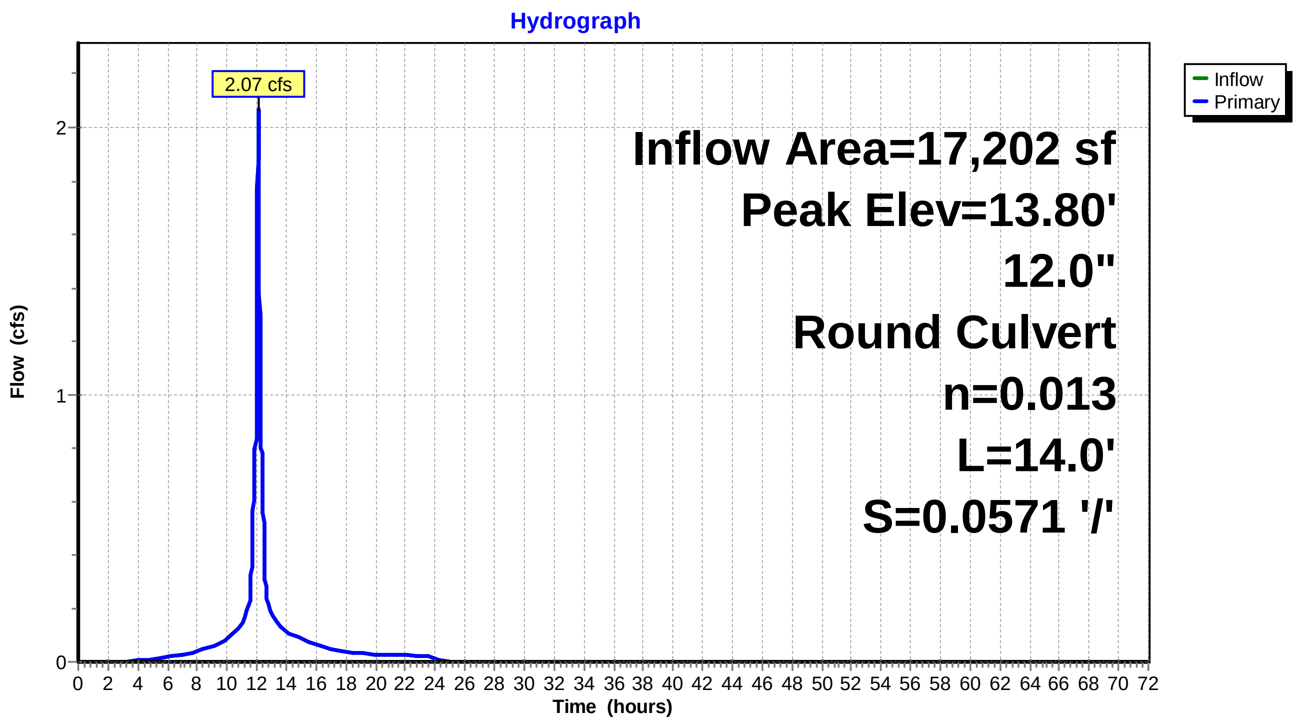
Inflow Area = 17,202 sf, 78.76% Impervious, Inflow Depth = 4.79" for 10 yr event
Inflow = 2.07 cfs @ 12.08 hrs, Volume= 6,864 cf
Outflow = 2.07 cfs @ 12.08 hrs, Volume= 6,864 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.07 cfs @ 12.08 hrs, Volume= 6,864 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 13.80' @ 12.08 hrs
Flood Elev= 18.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.00' / 12.20' S= 0.0571 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.06 cfs @ 12.08 hrs HW=13.80' TW=12.94' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.06 cfs @ 3.05 fps)

Pond CB26:



Summary for Pond CB33:

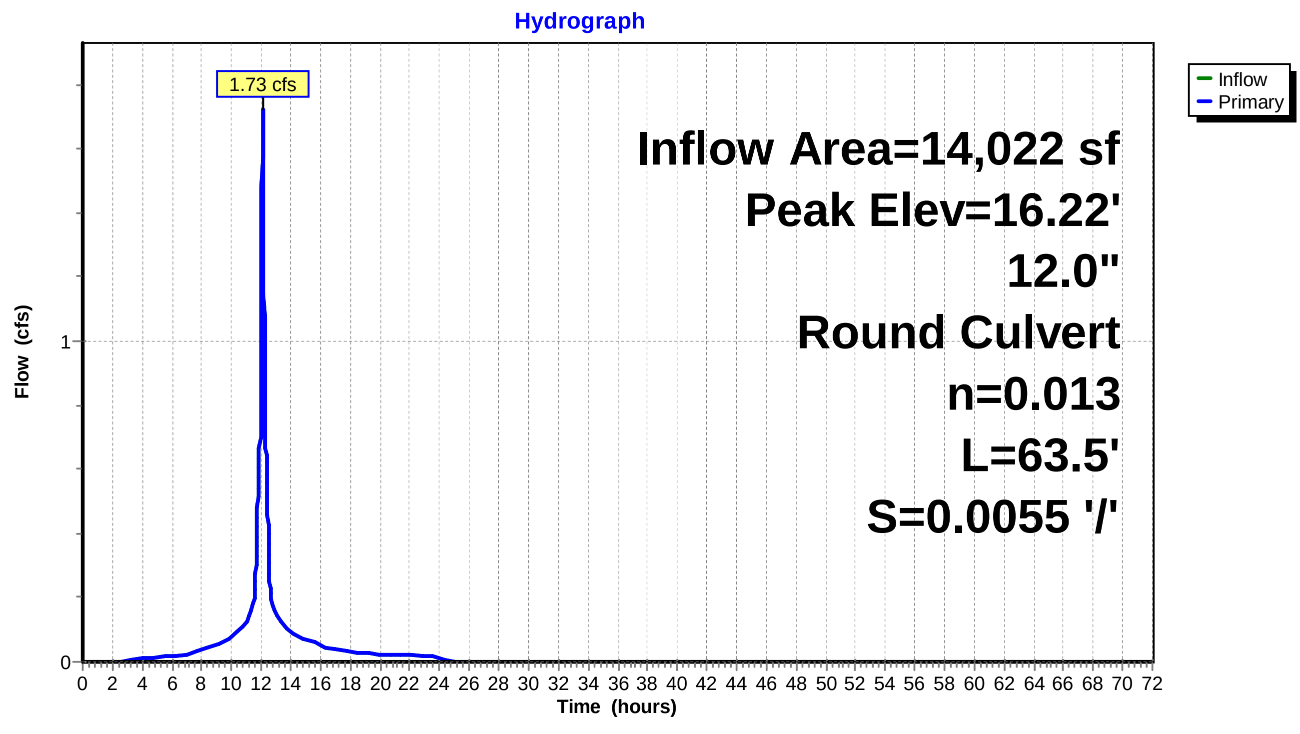
Inflow Area =	14,022 sf,	87.36% Impervious,	Inflow Depth = 5.01"	for 10 yr event
Inflow =	1.73 cfs @	12.08 hrs, Volume=	5,859 cf	
Outflow =	1.73 cfs @	12.08 hrs, Volume=	5,859 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.73 cfs @	12.08 hrs, Volume=	5,859 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 16.22' @ 12.10 hrs
Flood Elev= 19.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.00'	**12.0" Round Culvert** L= 63.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.00' / 14.65' S= 0.0055 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.63 cfs @ 12.08 hrs HW=16.20' TW=15.97' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.63 cfs @ 2.20 fps)

Pond CB33:



Summary for Pond CB34:

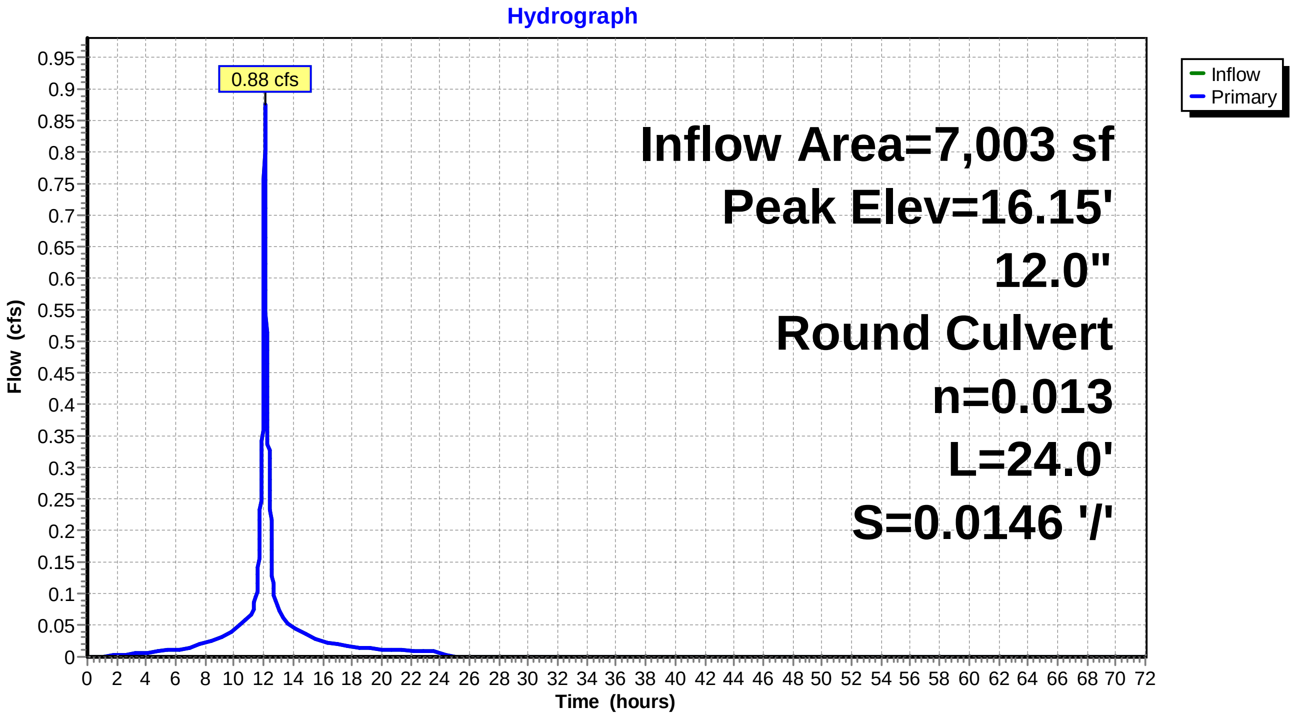
Inflow Area = 7,003 sf, 96.19% Impervious, Inflow Depth = 5.25" for 10 yr event
Inflow = 0.88 cfs @ 12.08 hrs, Volume= 3,061 cf
Outflow = 0.88 cfs @ 12.08 hrs, Volume= 3,061 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 12.08 hrs, Volume= 3,061 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 16.15' @ 12.10 hrs
Flood Elev= 19.74'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.50'	**12.0" Round Culvert** L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.50' / 15.15' S= 0.0146 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.81 cfs @ 12.08 hrs HW=16.14' TW=15.97' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.81 cfs @ 2.19 fps)

Pond CB34:



Summary for Pond CB38:

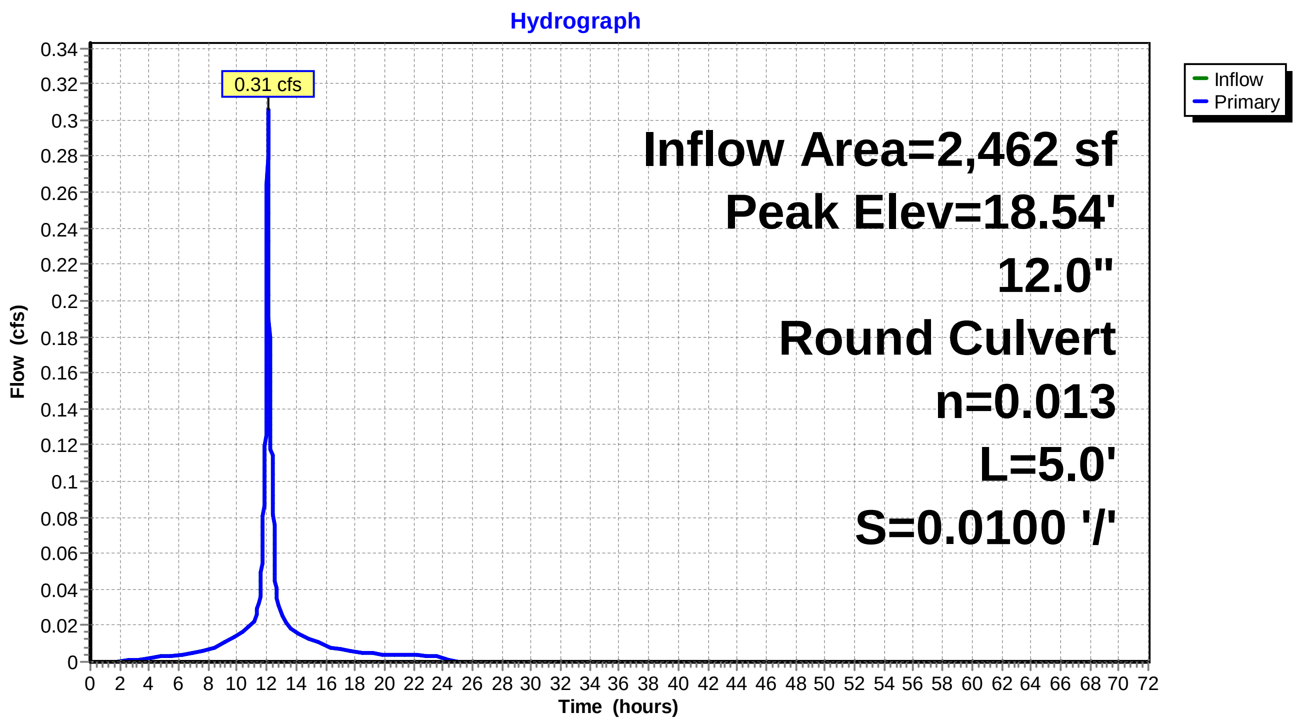
Inflow Area =	2,462 sf, 89.85% Impervious,	Inflow Depth = 5.13"	for 10 yr event
Inflow =	0.31 cfs @ 12.08 hrs, Volume=	1,052 cf	
Outflow =	0.31 cfs @ 12.08 hrs, Volume=	1,052 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.31 cfs @ 12.08 hrs, Volume=	1,052 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 18.54' @ 12.09 hrs
Flood Elev= 22.07'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.95' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 12.08 hrs HW=18.53' TW=18.51' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.29 cfs @ 0.99 fps)

Pond CB38:



Summary for Pond CB39:

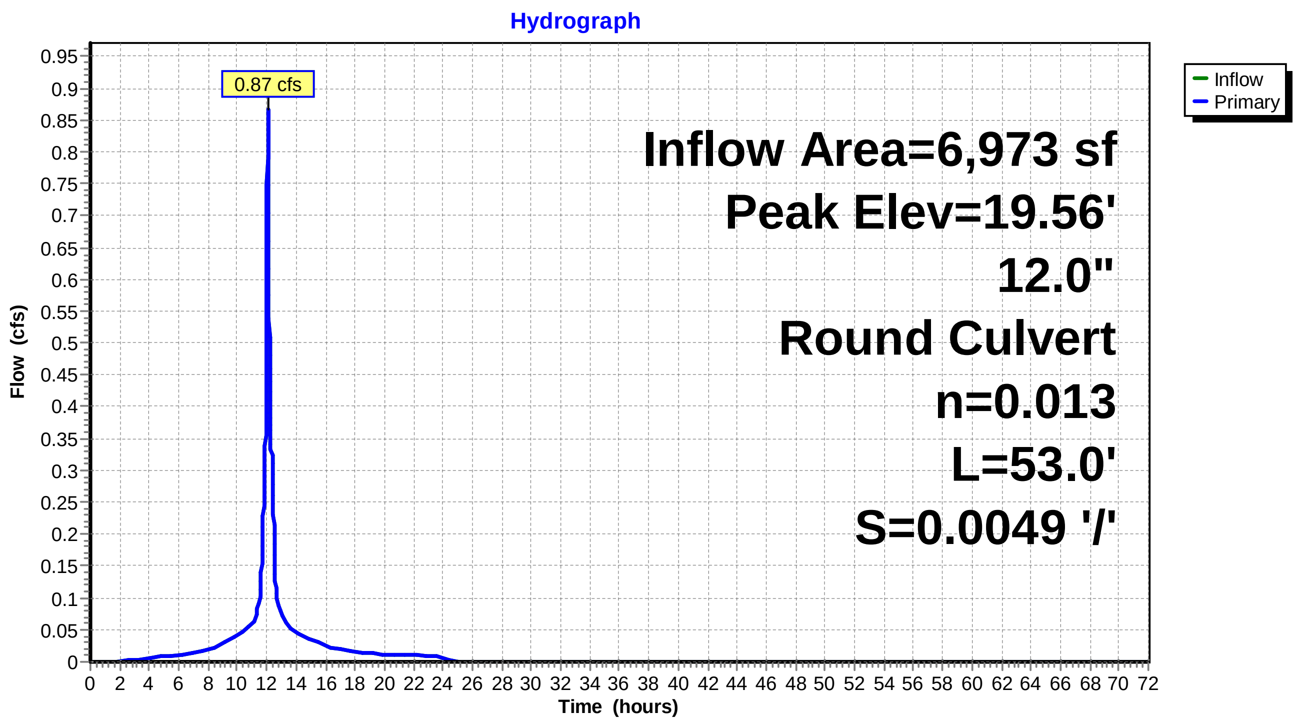
Inflow Area = 6,973 sf, 92.96% Impervious, Inflow Depth = 5.13" for 10 yr event
Inflow = 0.87 cfs @ 12.08 hrs, Volume= 2,981 cf
Outflow = 0.87 cfs @ 12.08 hrs, Volume= 2,981 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.87 cfs @ 12.08 hrs, Volume= 2,981 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.56' @ 12.08 hrs
Flood Elev= 23.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	**12.0" Round Culvert** L= 53.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.00' / 18.74' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.86 cfs @ 12.08 hrs HW=19.56' TW=18.51' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.86 cfs @ 2.74 fps)

Pond CB39:



Summary for Pond CB4:

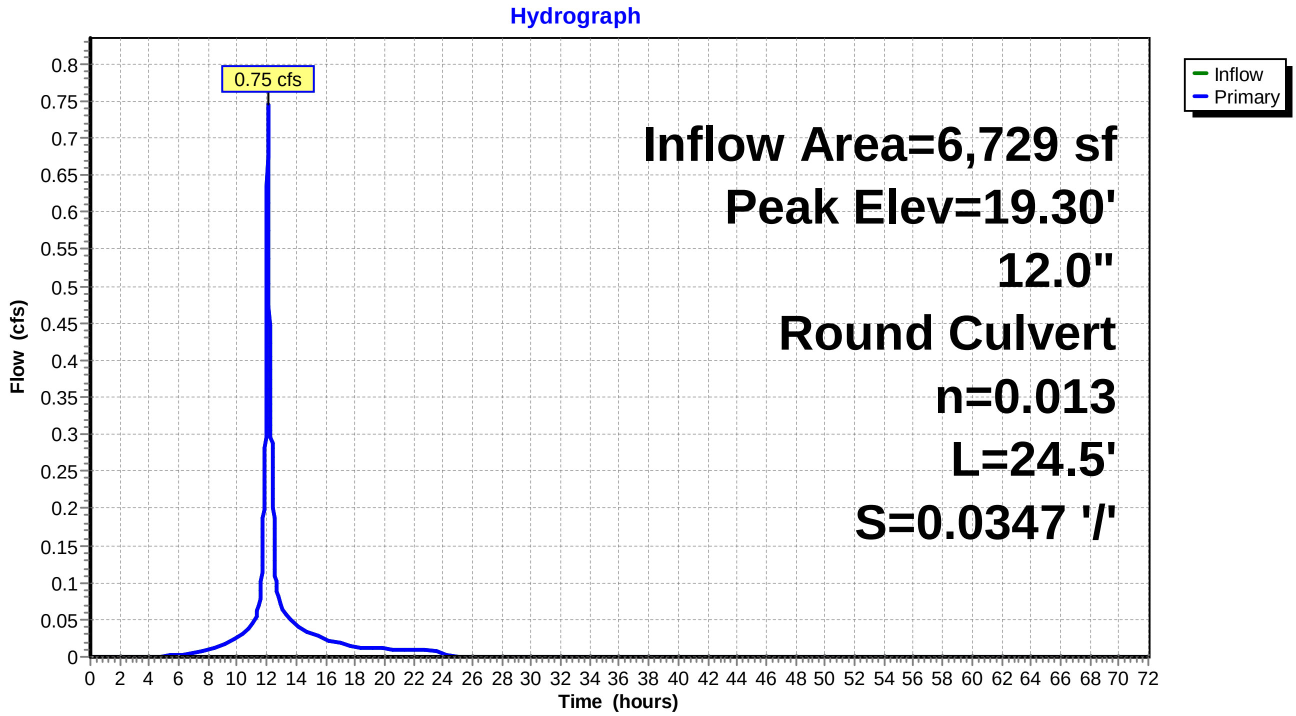
Inflow Area = 6,729 sf, 56.26% Impervious, Inflow Depth = 4.24" for 10 yr event
Inflow = 0.75 cfs @ 12.09 hrs, Volume= 2,378 cf
Outflow = 0.75 cfs @ 12.09 hrs, Volume= 2,378 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.75 cfs @ 12.09 hrs, Volume= 2,378 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.30' @ 12.09 hrs
Flood Elev= 23.31'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.56'	**12.0" Round Culvert** L= 24.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.56' / 17.71' S= 0.0347 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.70 cfs @ 12.09 hrs HW=19.29' TW=19.21' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.70 cfs @ 1.57 fps)

Pond CB4:



Summary for Pond CB44:

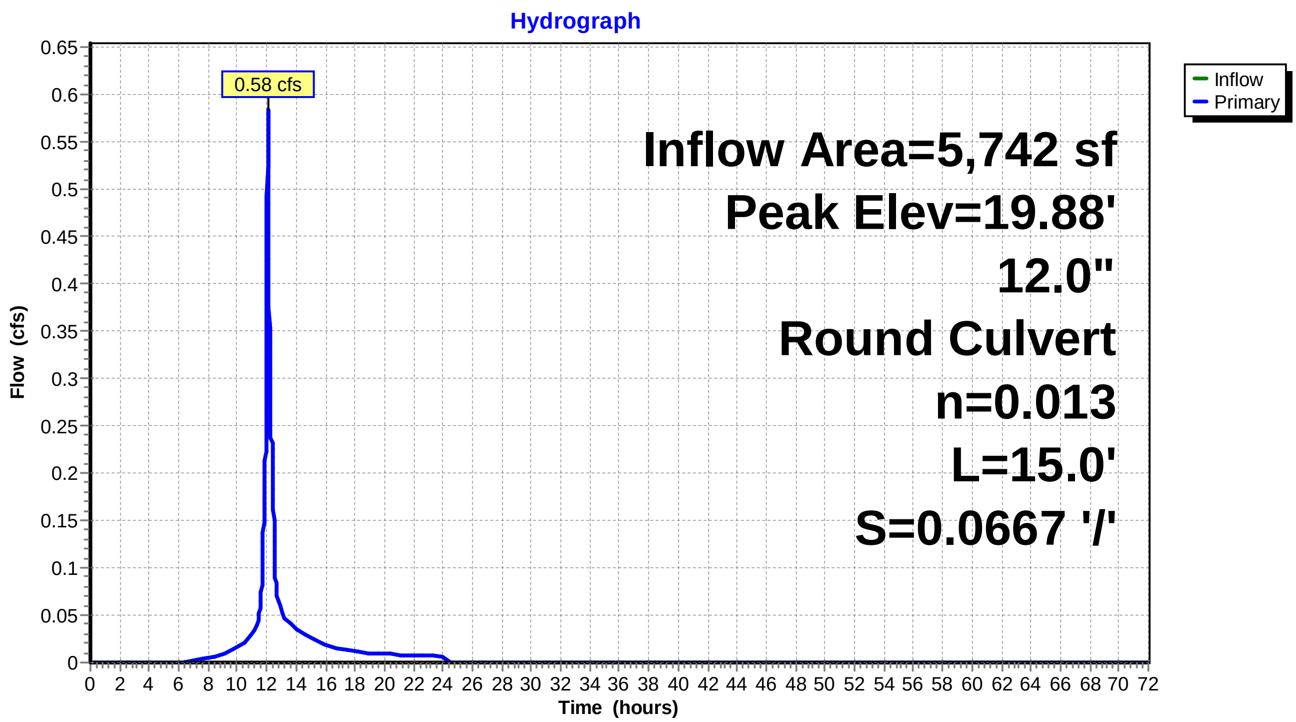
Inflow Area = 5,742 sf, 40.56% Impervious, Inflow Depth = 3.82" for 10 yr event
Inflow = 0.58 cfs @ 12.09 hrs, Volume= 1,830 cf
Outflow = 0.58 cfs @ 12.09 hrs, Volume= 1,830 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 12.09 hrs, Volume= 1,830 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.88' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	19.50'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.50' / 18.50' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.58 cfs @ 12.09 hrs HW=19.88' TW=14.44' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.58 cfs @ 2.11 fps)

Pond CB44:



Summary for Pond CB45:

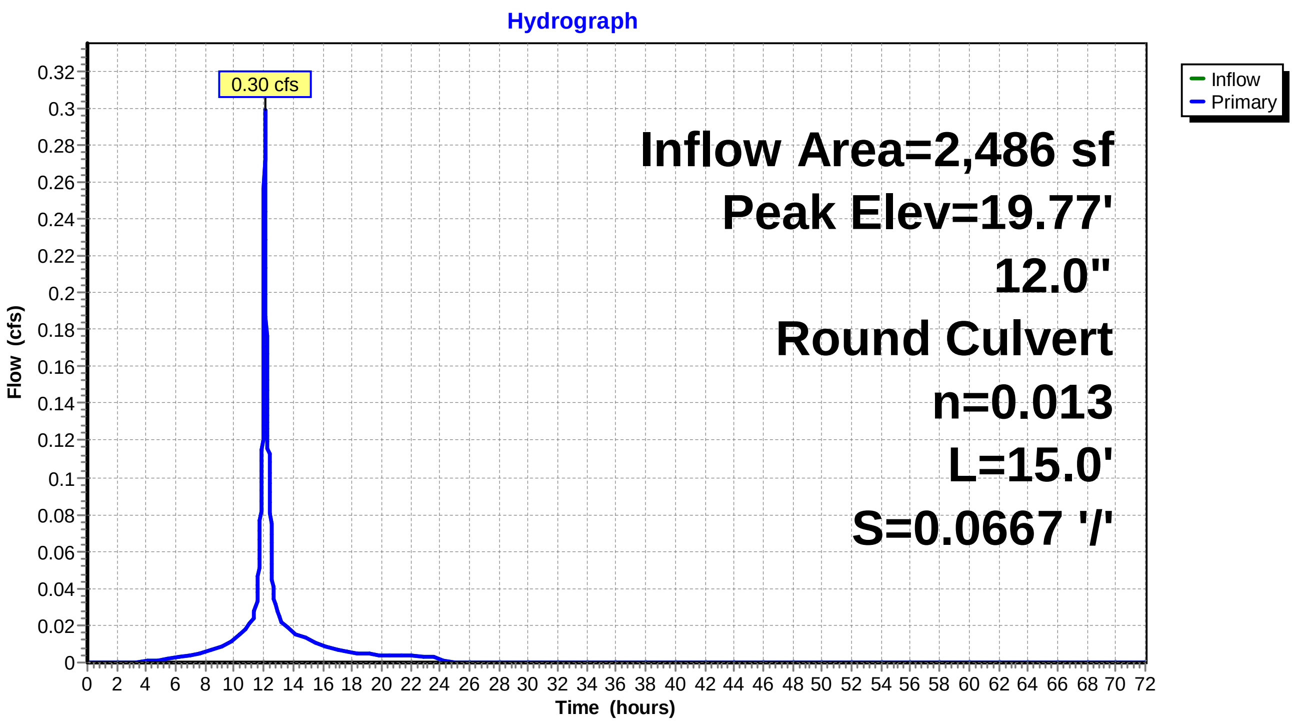
Inflow Area =	2,486 sf, 78.32% Impervious,	Inflow Depth = 4.79"	for 10 yr event
Inflow =	0.30 cfs @ 12.08 hrs, Volume=	992 cf	
Outflow =	0.30 cfs @ 12.08 hrs, Volume=	992 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.30 cfs @ 12.08 hrs, Volume=	992 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.77' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	19.50'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.50' / 18.50' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.08 hrs HW=19.77' TW=14.43' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.30 cfs @ 1.76 fps)

Pond CB45:



Summary for Pond CB5:

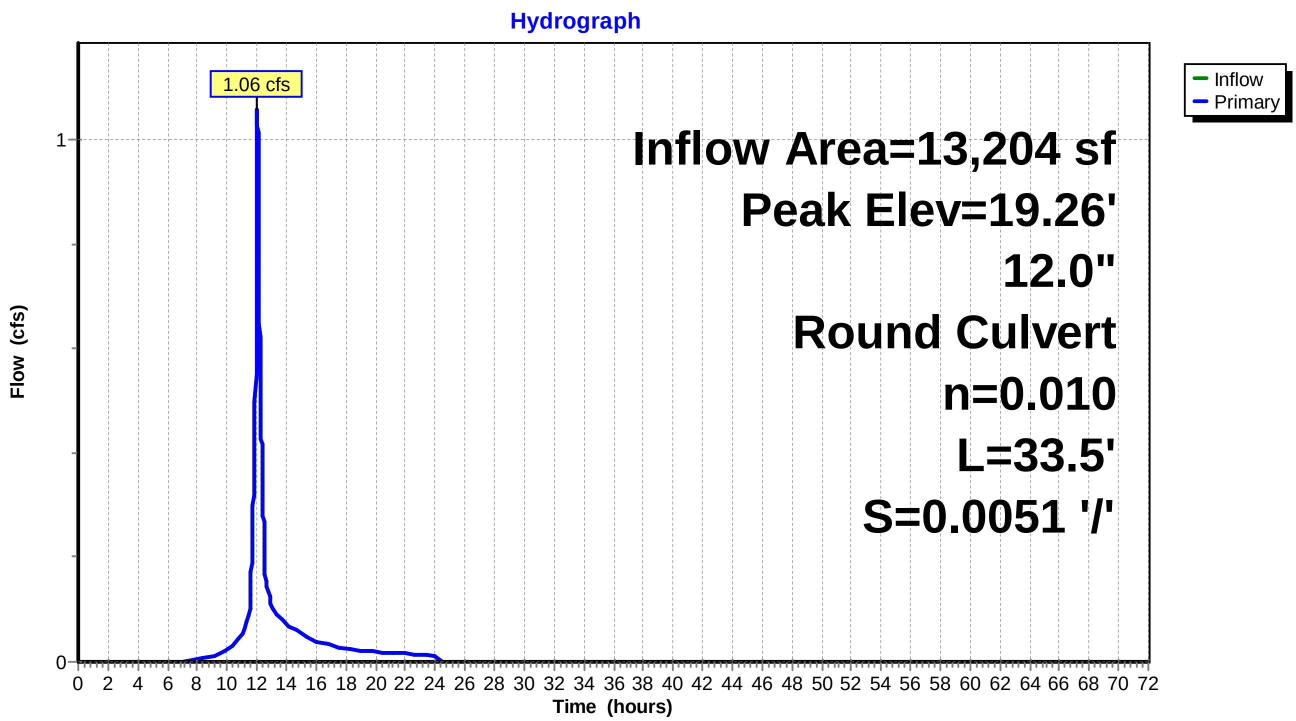
Inflow Area = 13,204 sf, 16.74% Impervious, Inflow Depth = 3.23" for 10 yr event
Inflow = 1.06 cfs @ 12.01 hrs, Volume= 3,551 cf
Outflow = 1.06 cfs @ 12.01 hrs, Volume= 3,551 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.06 cfs @ 12.01 hrs, Volume= 3,551 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.26' @ 12.09 hrs
Flood Elev= 20.32'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.60'	**12.0" Round Culvert** L= 33.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.60' / 17.43' S= 0.0051 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.01 hrs HW=18.75' TW=18.76' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond CB5:



Summary for Pond CB52:

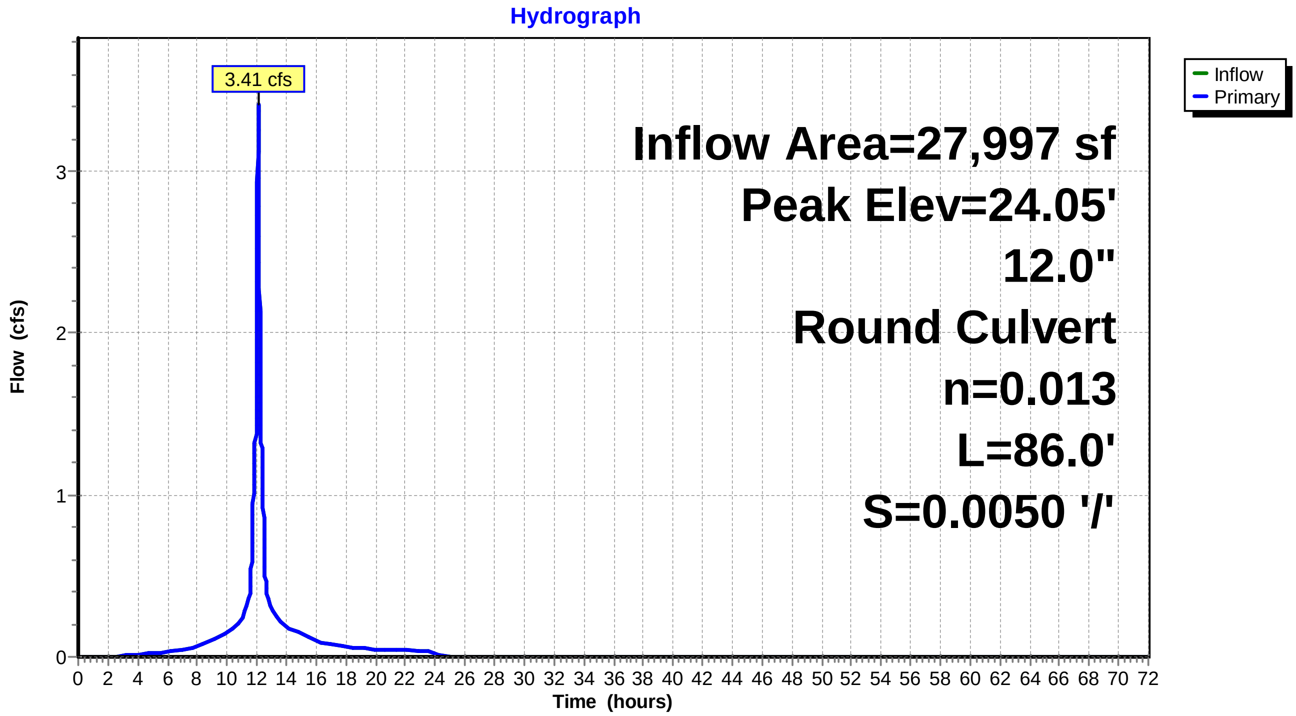
Inflow Area =	27,997 sf,	82.23% Impervious,	Inflow Depth = 4.90"	for 10 yr event
Inflow =	3.41 cfs @	12.08 hrs, Volume=	11,434 cf	
Outflow =	3.41 cfs @	12.08 hrs, Volume=	11,434 cf, Atten= 0%, Lag= 0.0 min	
Primary =	3.41 cfs @	12.08 hrs, Volume=	11,434 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 24.05' @ 12.09 hrs
Flood Elev= 25.14'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.38'	**12.0" Round Culvert** L= 86.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.38' / 19.95' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.31 cfs @ 12.08 hrs HW=23.99' TW=22.83' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 3.31 cfs @ 4.21 fps)

Pond CB52:



Summary for Pond CB54:

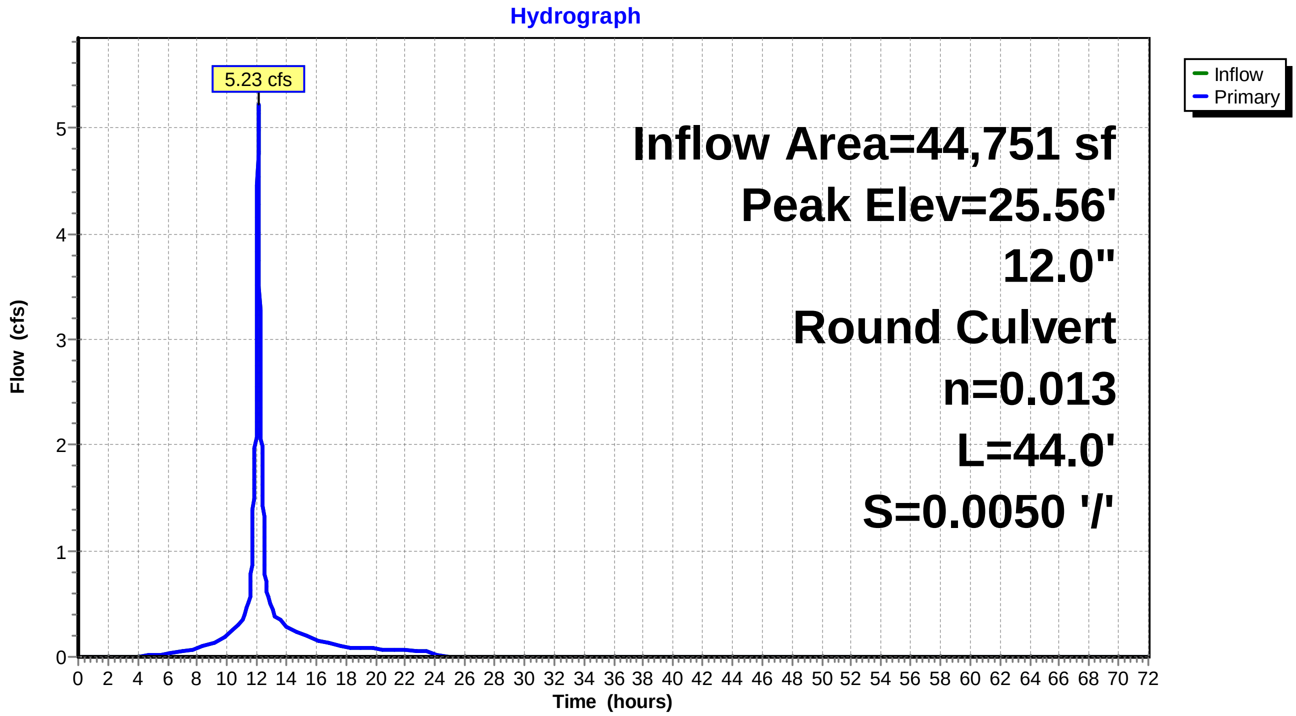
Inflow Area = 44,751 sf, 69.67% Impervious, Inflow Depth = 4.57" for 10 yr event
Inflow = 5.23 cfs @ 12.08 hrs, Volume= 17,029 cf
Outflow = 5.23 cfs @ 12.08 hrs, Volume= 17,029 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.23 cfs @ 12.08 hrs, Volume= 17,029 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 25.56' @ 12.10 hrs
Flood Elev= 23.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.24'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.24' / 20.02' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.02 cfs @ 12.08 hrs HW=25.42' TW=23.60' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 5.02 cfs @ 6.39 fps)

Pond CB54:



Summary for Pond CB55:

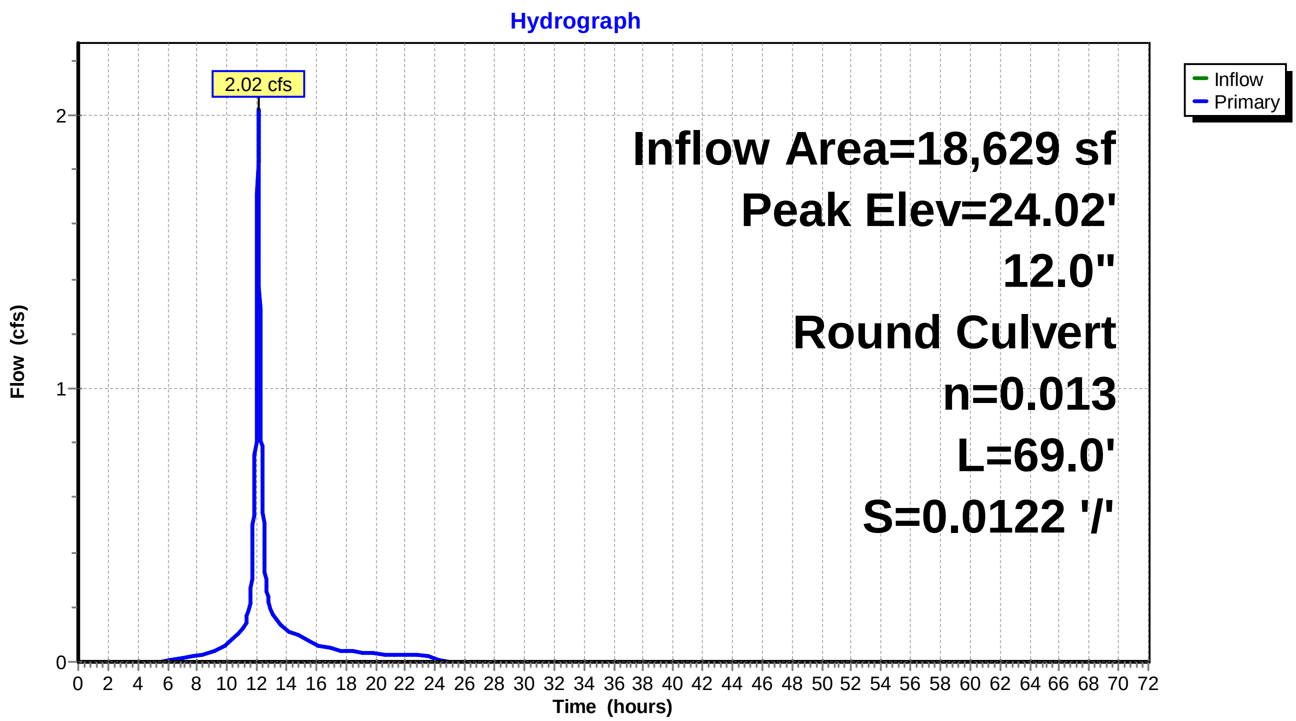
Inflow Area = 18,629 sf, 55.15% Impervious, Inflow Depth = 4.14" for 10 yr event
Inflow = 2.02 cfs @ 12.09 hrs, Volume= 6,420 cf
Outflow = 2.02 cfs @ 12.09 hrs, Volume= 6,420 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.02 cfs @ 12.09 hrs, Volume= 6,420 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 24.02' @ 12.10 hrs
Flood Elev= 24.43'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.86'	**12.0" Round Culvert** L= 69.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.86' / 20.02' S= 0.0122 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.62 cfs @ 12.09 hrs HW=23.85' TW=23.61' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.62 cfs @ 2.06 fps)

Pond CB55:



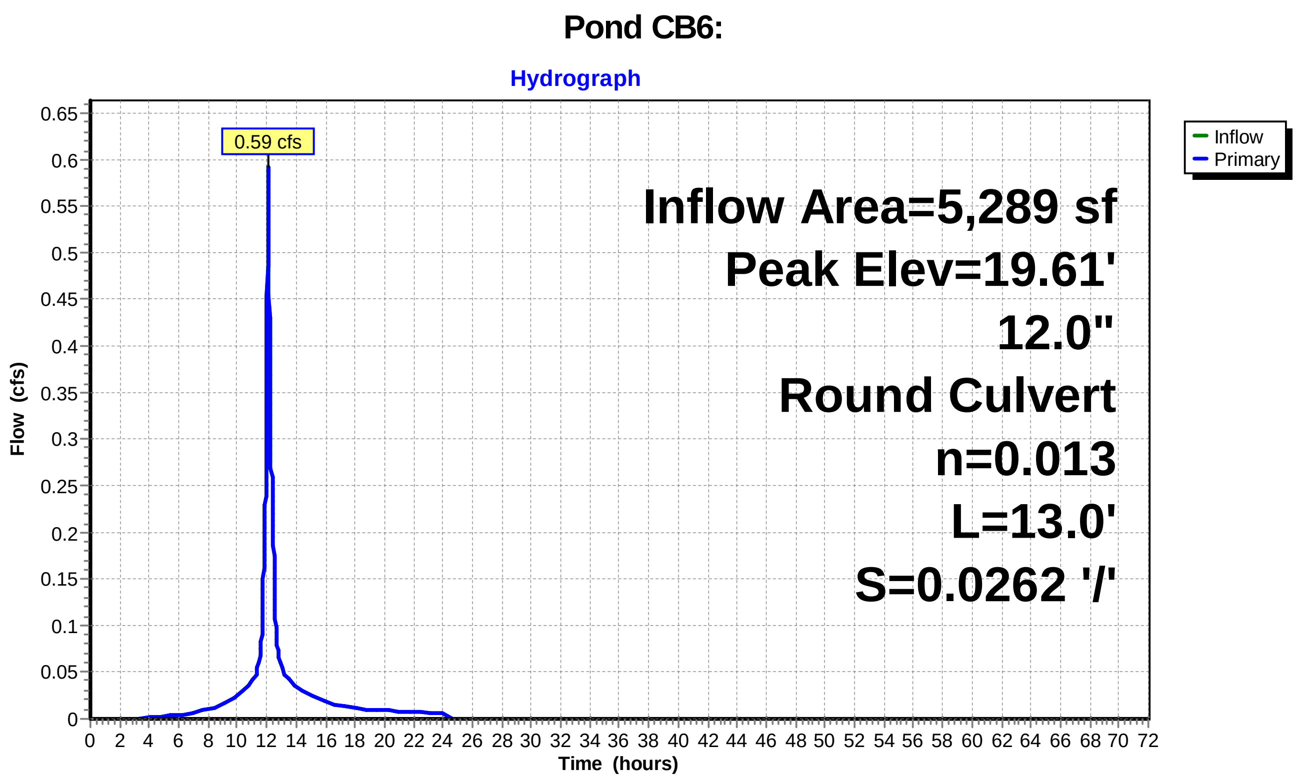
Summary for Pond CB6:

Inflow Area =	5,289 sf,	76.01% Impervious,	Inflow Depth = 4.68"	for 10 yr event
Inflow =	0.59 cfs @	12.11 hrs, Volume=	2,061 cf	
Outflow =	0.59 cfs @	12.11 hrs, Volume=	2,061 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.59 cfs @	12.11 hrs, Volume=	2,061 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.61' @ 12.10 hrs
Flood Elev= 22.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.83'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.83' / 17.49' S= 0.0262 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.92 cfs @ 12.11 hrs HW=19.60' TW=19.55' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.92 cfs @ 1.17 fps)



Summary for Pond CB63:

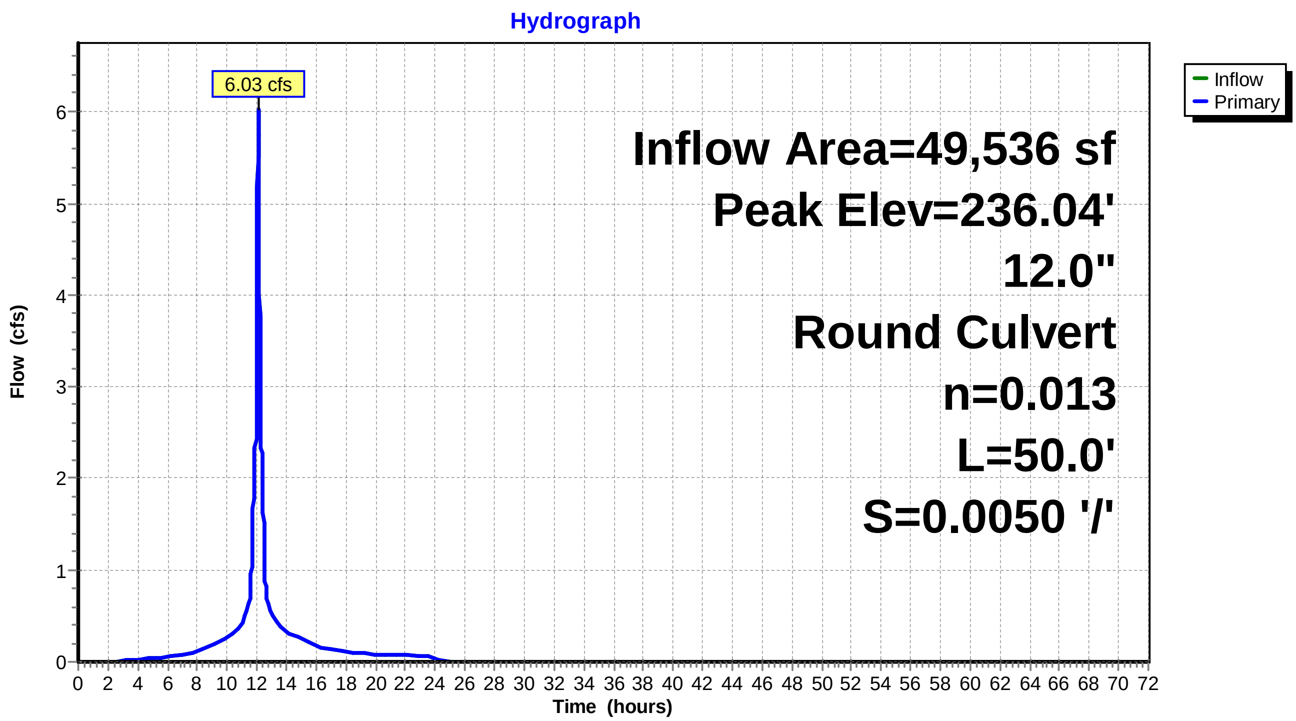
Inflow Area = 49,536 sf, 84.69% Impervious, Inflow Depth = 4.90" for 10 yr event
Inflow = 6.03 cfs @ 12.08 hrs, Volume= 20,230 cf
Outflow = 6.03 cfs @ 12.08 hrs, Volume= 20,230 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.03 cfs @ 12.08 hrs, Volume= 20,230 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 236.04' @ 12.13 hrs
Flood Elev= 23.22'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.37'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.37' / 19.12' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=175.72' TW=191.28' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond CB63:



Summary for Pond CB65:

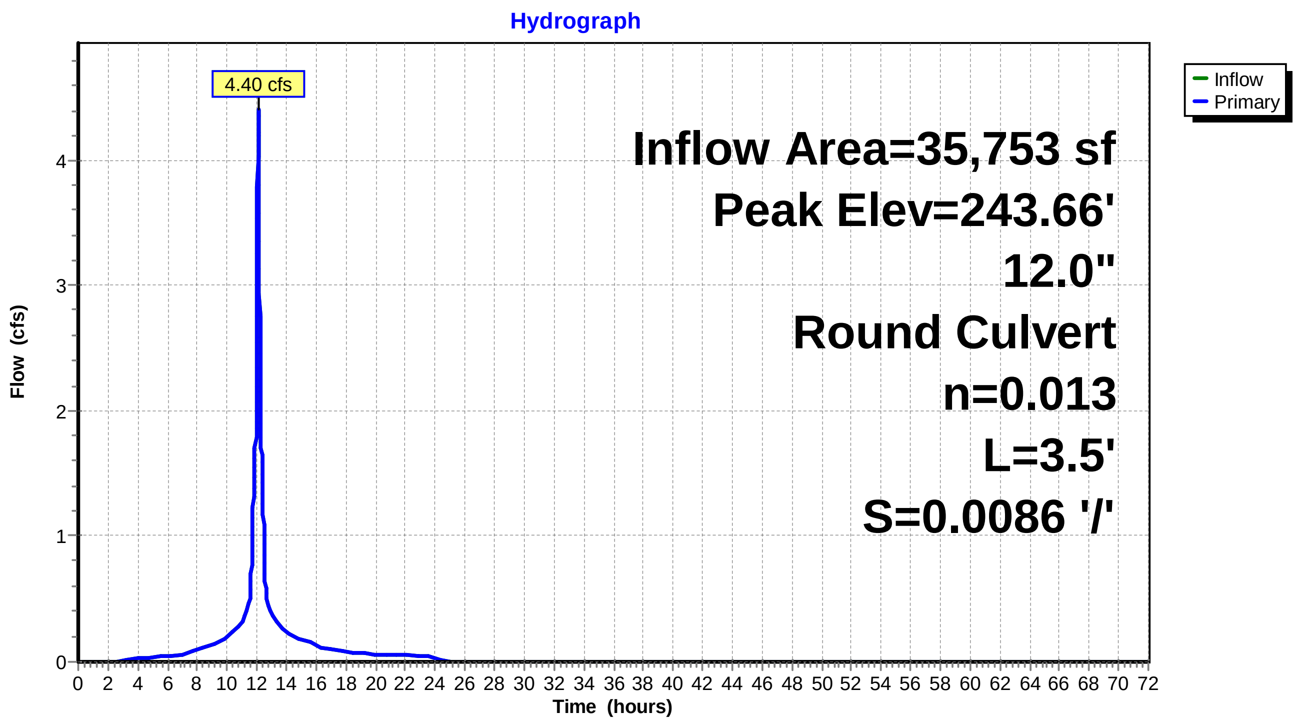
Inflow Area = 35,753 sf, 88.57% Impervious, Inflow Depth = 5.01" for 10 yr event
Inflow = 4.40 cfs @ 12.08 hrs, Volume= 14,940 cf
Outflow = 4.40 cfs @ 12.08 hrs, Volume= 14,940 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.40 cfs @ 12.08 hrs, Volume= 14,940 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 243.66' @ 12.14 hrs
Flood Elev= 24.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.60'	**12.0" Round Culvert** L= 3.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.60' / 20.57' S= 0.0086 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=167.08' TW=184.76' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Pond CB65:



Summary for Pond CB67:

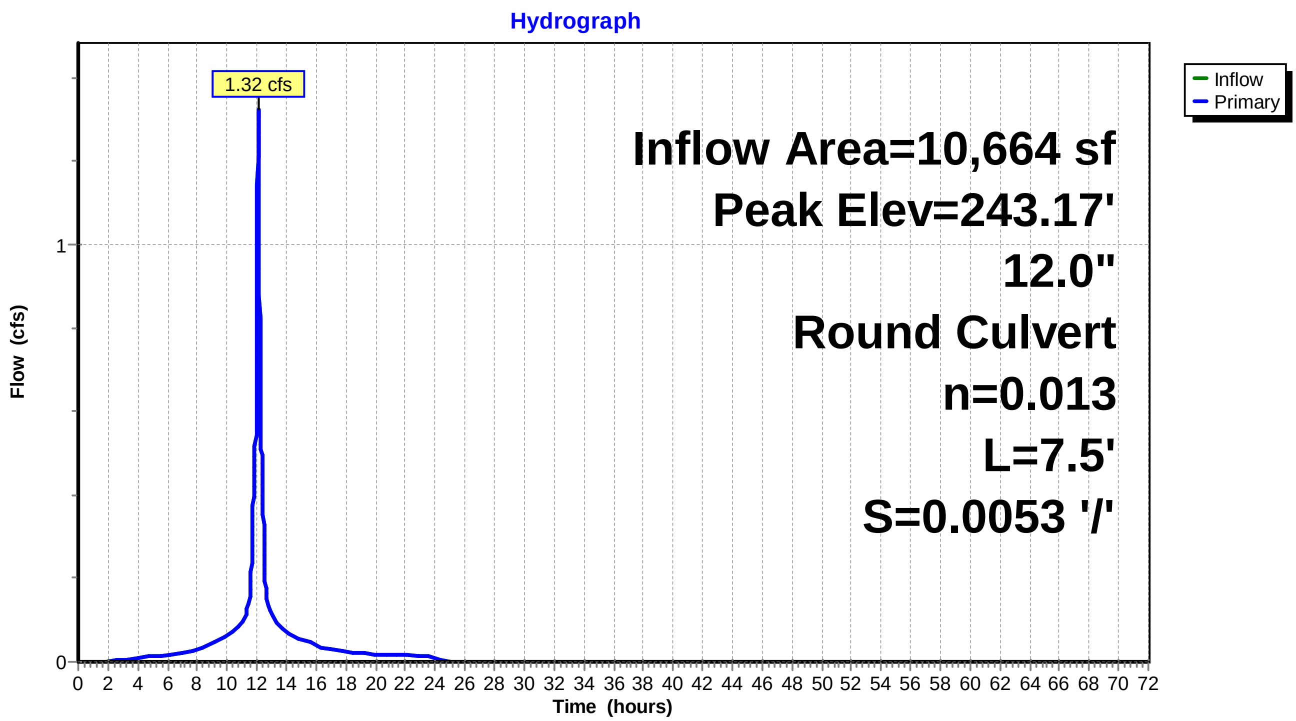
Inflow Area = 10,664 sf, 91.11% Impervious, Inflow Depth = 5.13" for 10 yr event
Inflow = 1.32 cfs @ 12.08 hrs, Volume= 4,558 cf
Outflow = 1.32 cfs @ 12.08 hrs, Volume= 4,558 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.32 cfs @ 12.08 hrs, Volume= 4,558 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 243.17' @ 12.15 hrs
Flood Elev= 25.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.93'	**12.0" Round Culvert** L= 7.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.93' / 20.89' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=147.29' TW=165.90' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond CB67:



Summary for Pond CB68:

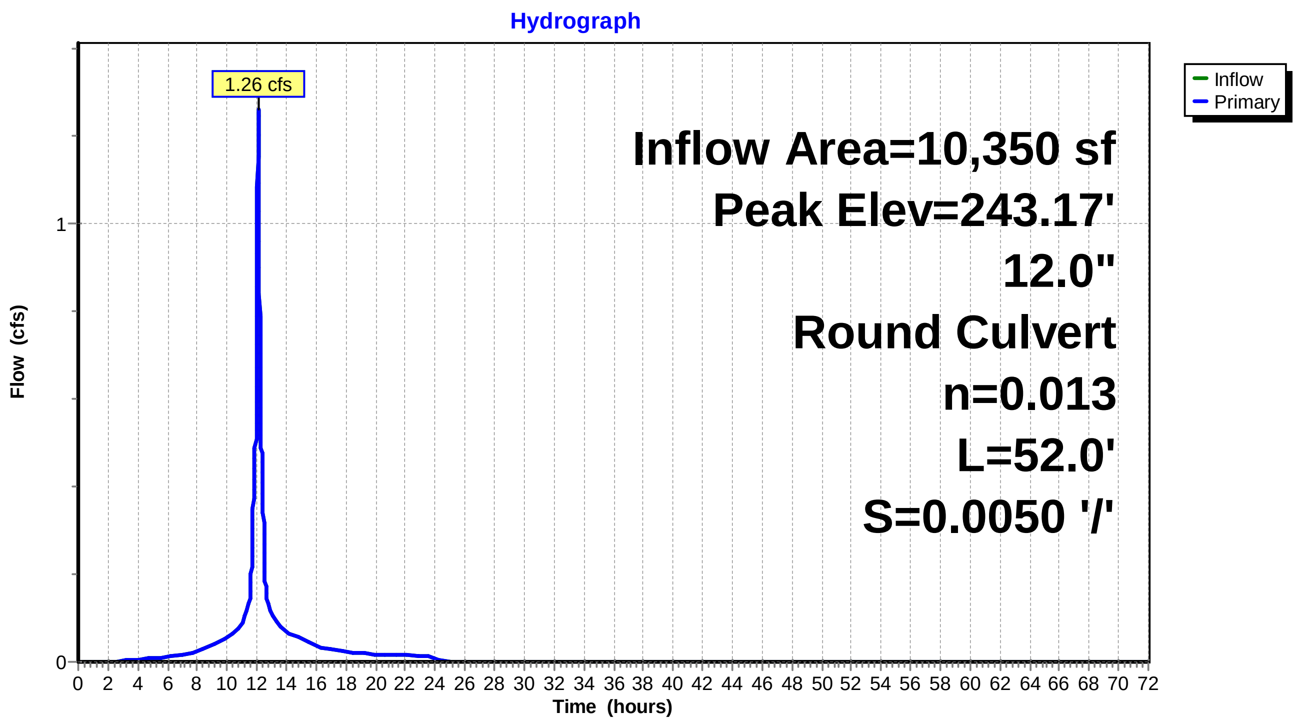
Inflow Area = 10,350 sf, 83.59% Impervious, Inflow Depth = 4.90" for 10 yr event
Inflow = 1.26 cfs @ 12.08 hrs, Volume= 4,227 cf
Outflow = 1.26 cfs @ 12.08 hrs, Volume= 4,227 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.26 cfs @ 12.08 hrs, Volume= 4,227 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 243.17' @ 12.15 hrs
Flood Elev= 25.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.15'	**12.0" Round Culvert** L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.15' / 20.89' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=147.95' TW=166.59' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond CB68:



Summary for Pond CB7:

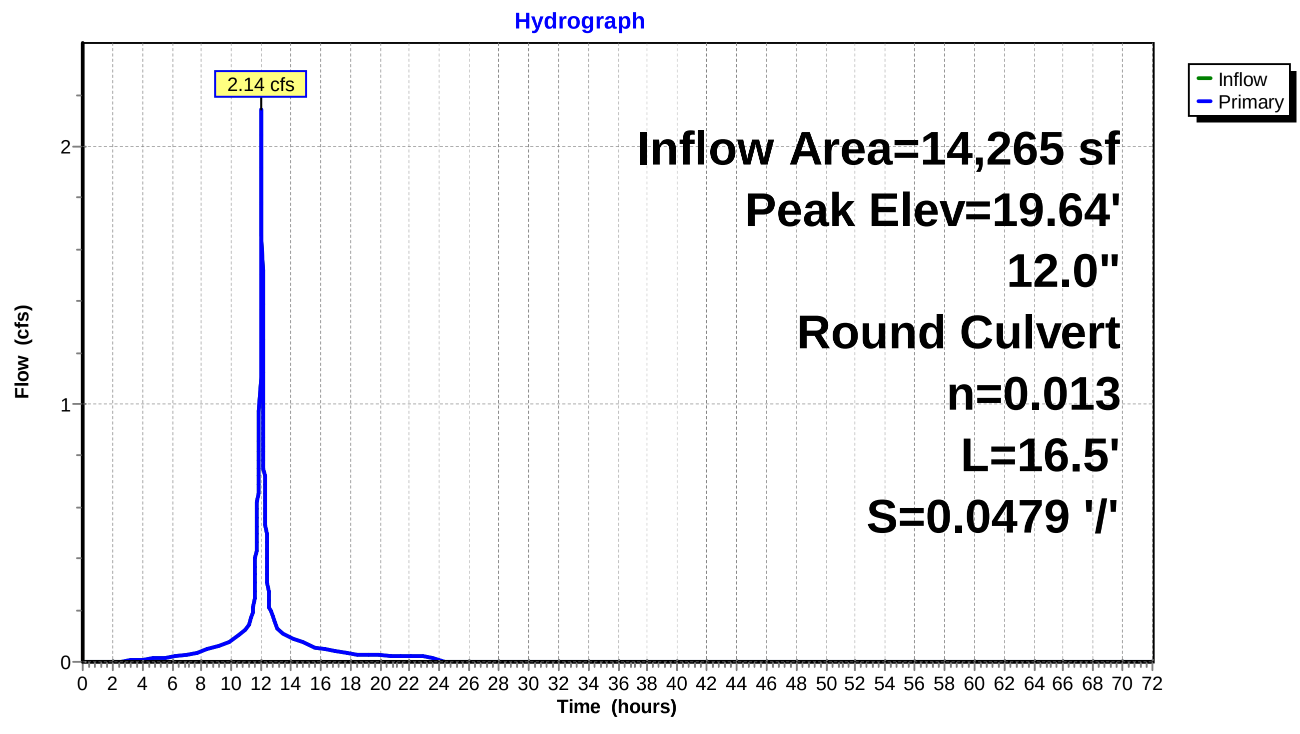
Inflow Area = 14,265 sf, 86.53% Impervious, Inflow Depth = 5.01" for 10 yr event
Inflow = 2.14 cfs @ 12.00 hrs, Volume= 5,961 cf
Outflow = 2.14 cfs @ 12.00 hrs, Volume= 5,961 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.00 hrs, Volume= 5,961 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.64' @ 12.10 hrs
Flood Elev= 22.46'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.28'	**12.0" Round Culvert** L= 16.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.28' / 17.49' S= 0.0479 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.86 cfs @ 12.00 hrs HW=19.23' TW=18.94' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.86 cfs @ 3.13 fps)

Pond CB7:



Summary for Pond E2348: 2348

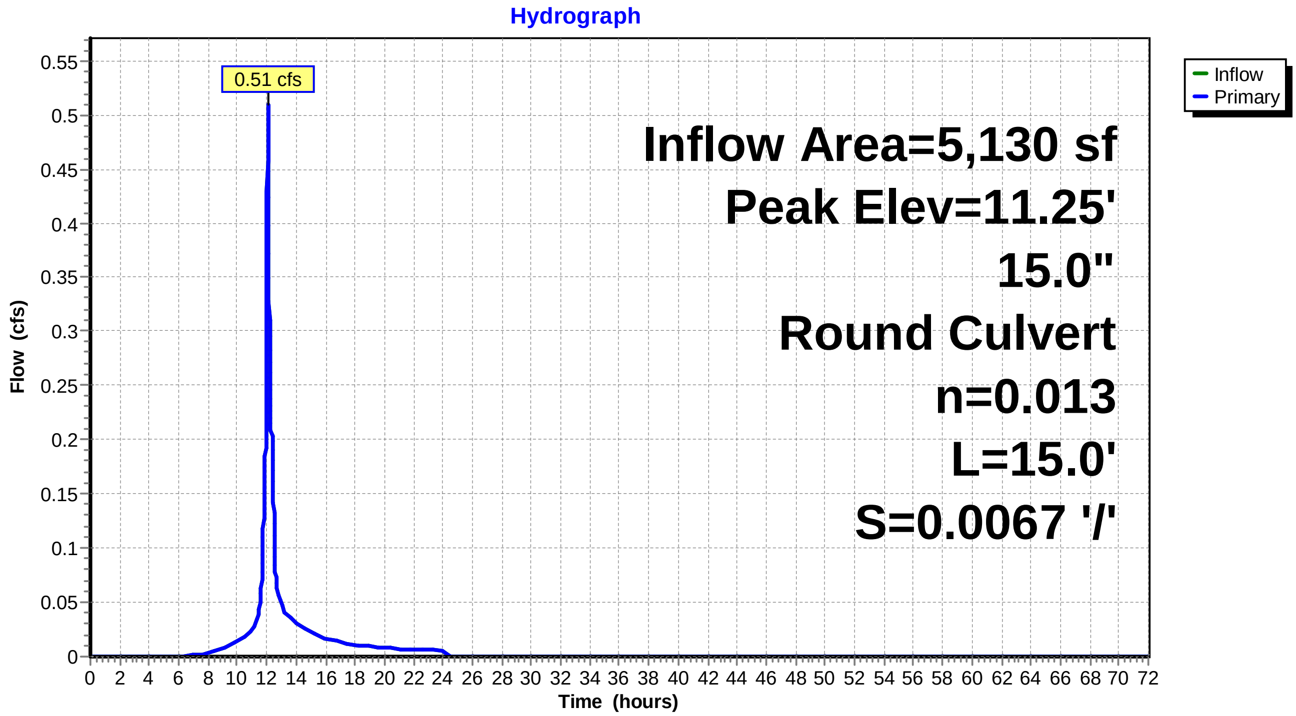
Inflow Area = 5,130 sf, 38.99% Impervious, Inflow Depth = 3.72" for 10 yr event
Inflow = 0.51 cfs @ 12.09 hrs, Volume= 1,591 cf
Outflow = 0.51 cfs @ 12.09 hrs, Volume= 1,591 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.51 cfs @ 12.09 hrs, Volume= 1,591 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 11.25' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	9.70'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 9.70' / 9.60' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=11.09' TW=11.12' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond E2348: 2348



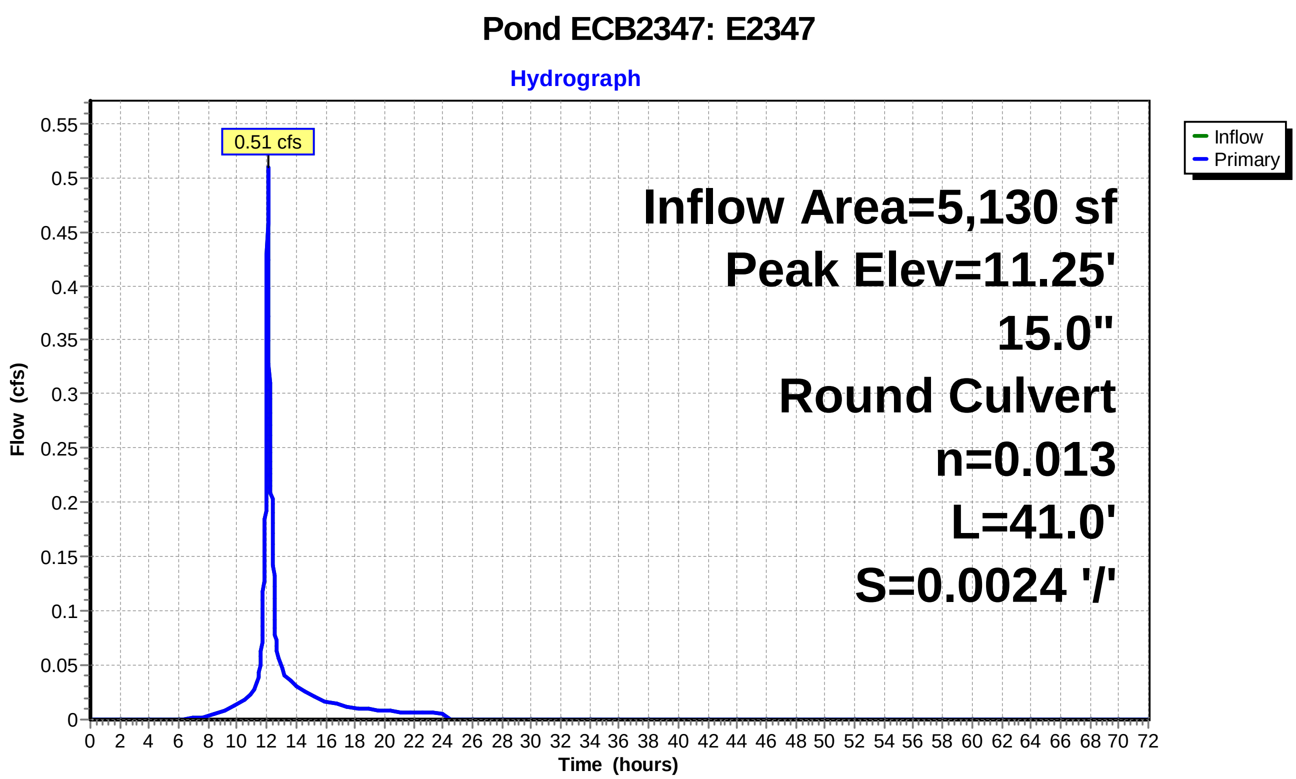
Summary for Pond ECB2347: E2347

Inflow Area =	5,130 sf,	38.99% Impervious,	Inflow Depth = 3.72"	for 10 yr event
Inflow =	0.51 cfs @	12.09 hrs, Volume=	1,591 cf	
Outflow =	0.51 cfs @	12.09 hrs, Volume=	1,591 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.51 cfs @	12.09 hrs, Volume=	1,591 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 11.25' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	9.80'	**15.0" Round Culvert** L= 41.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 9.80' / 9.70' S= 0.0024 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=11.05' TW=11.09' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)



Summary for Pond EM2349: 2349

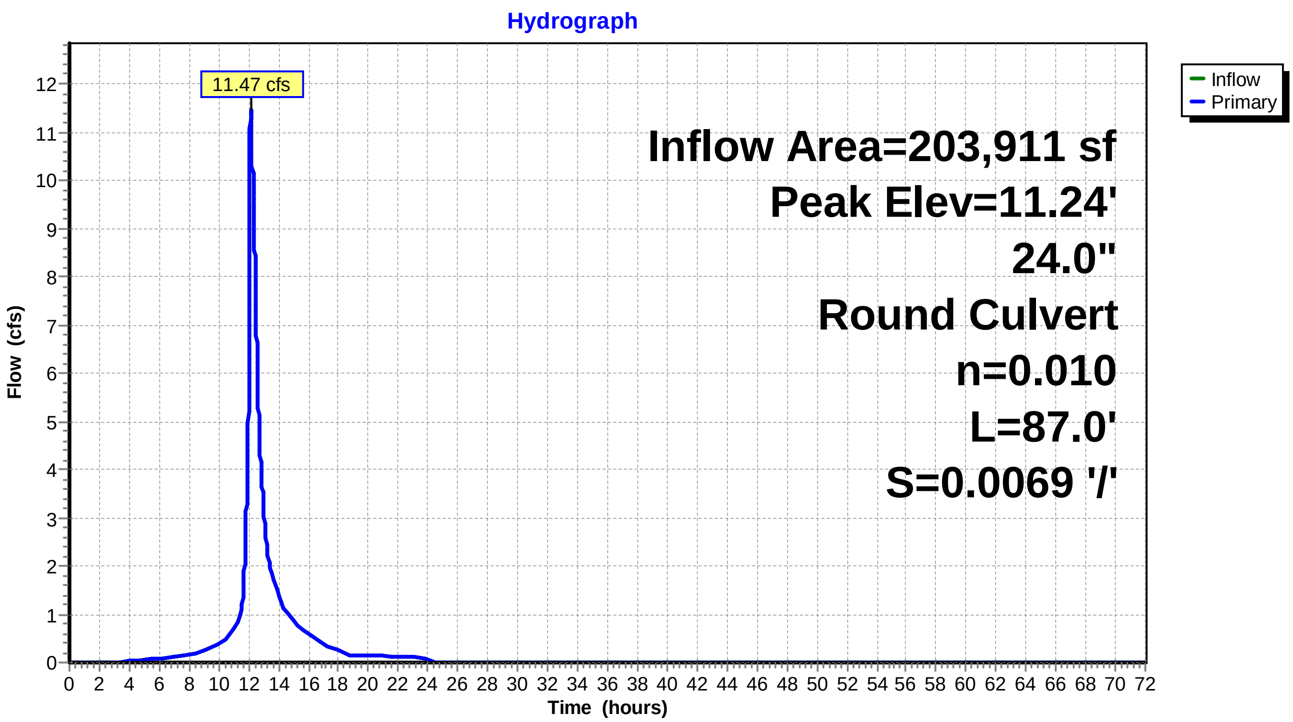
Inflow Area = 203,911 sf, 76.40% Impervious, Inflow Depth = 3.26" for 10 yr event
Inflow = 11.47 cfs @ 12.14 hrs, Volume= 55,453 cf
Outflow = 11.47 cfs @ 12.14 hrs, Volume= 55,453 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.47 cfs @ 12.14 hrs, Volume= 55,453 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 11.24' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	9.60'	**24.0" Round Culvert** L= 87.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 9.60' / 9.00' S= 0.0069 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=11.46 cfs @ 12.14 hrs HW=11.24' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 11.46 cfs @ 5.64 fps)

Pond EM2349: 2349



Summary for Pond HW5A: HEADAILL INLET

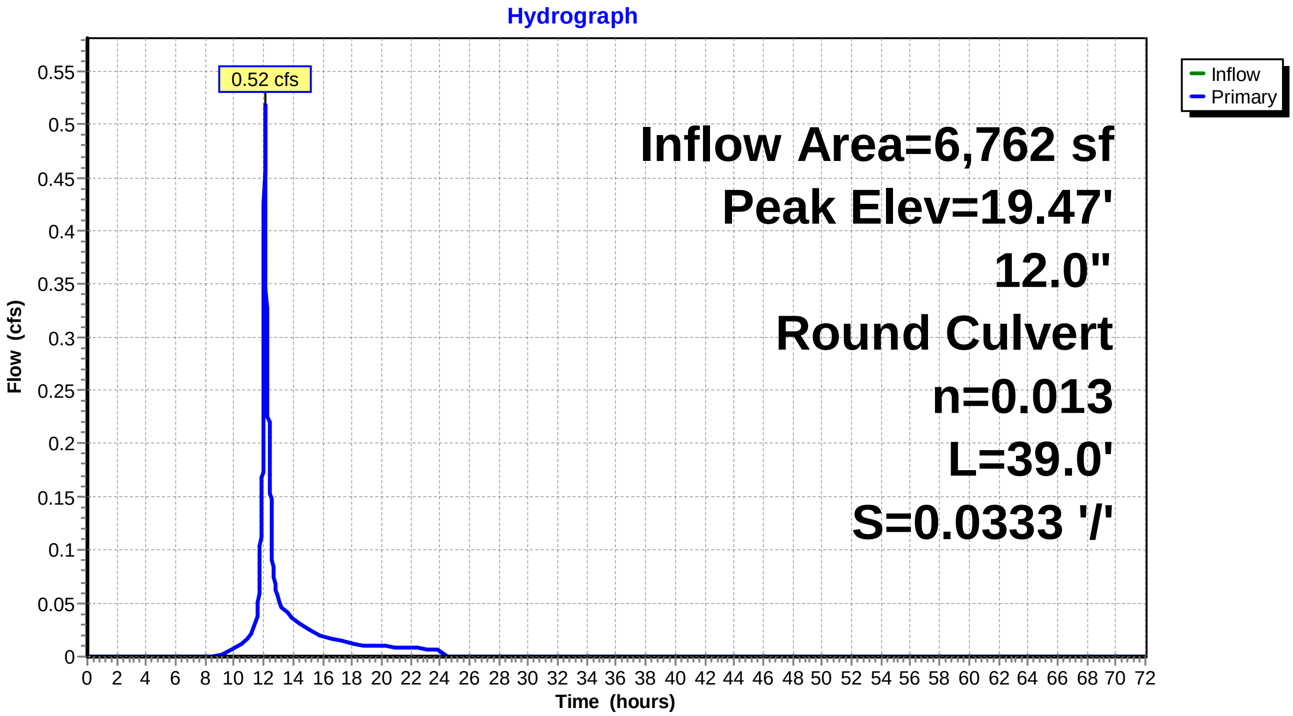
Inflow Area = 6,762 sf, 0.00% Impervious, Inflow Depth = 2.85" for 10 yr event
Inflow = 0.52 cfs @ 12.09 hrs, Volume= 1,607 cf
Outflow = 0.52 cfs @ 12.09 hrs, Volume= 1,607 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.09 hrs, Volume= 1,607 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.47' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	**12.0" Round Culvert** L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.00' / 17.70' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.09 hrs HW=19.47' TW=19.26' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.49 cfs @ 2.02 fps)

Pond HW5A: HEADAILL INLET



Summary for Pond IB1:

Inflow Area = 37,137 sf,100.00% Impervious, Inflow Depth = 5.36" for 10 yr event
Inflow = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf
Outflow = 2.52 cfs @ 12.40 hrs, Volume= 16,596 cf, Atten= 46%, Lag= 19.0 min
Discarded = 0.13 cfs @ 12.23 hrs, Volume= 7,576 cf
Primary = 2.39 cfs @ 12.40 hrs, Volume= 9,020 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 22.20' @ 12.23 hrs Surf.Area= 3,889 sf Storage= 4,500 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 74.3 min (820.5 - 746.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	20.50'	3,515 cf	**72.75'W x 53.46'L x 3.50'H Field A** 13,611 cf Overall - 4,824 cf Embedded = 8,788 cf x 40.0% Voids
#2A	21.00'	4,824 cf	**ADS_StormTech SC-740 +Cap** x 105 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 15 Rows of 7 Chambers
		8,339 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	21.10'	**12.0" Round Overflow** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.10' / 21.00' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Discarded	20.50'	**0.970 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 17.00'

Discarded OutFlow Max=0.13 cfs @ 12.23 hrs HW=22.20' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.13 cfs)

Primary OutFlow Max=1.51 cfs @ 12.40 hrs HW=22.12' TW=21.96' (Dynamic Tailwater)
↑—**1=Overflow** (Inlet Controls 1.51 cfs @ 1.92 fps)

Pond IB1: - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

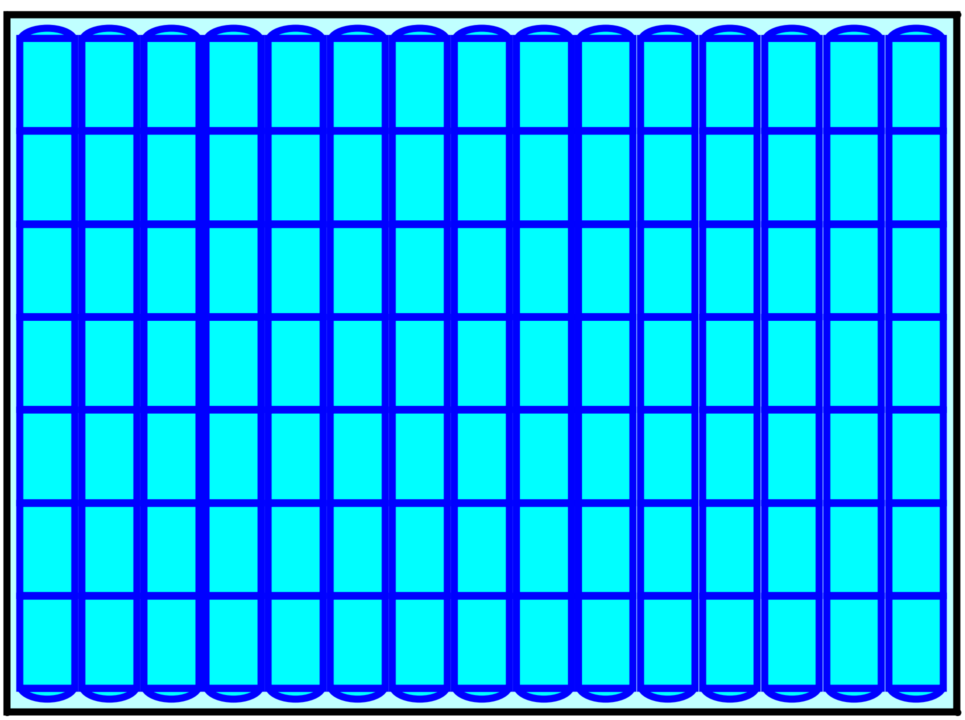
7 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 51.46' Row Length +12.0" End Stone x 2 = 53.46' Base Length
15 Rows x 51.0" Wide + 6.0" Spacing x 14 + 12.0" Side Stone x 2 = 72.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

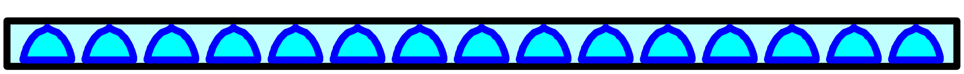
105 Chambers x 45.9 cf = 4,823.7 cf Chamber Storage

13,611.4 cf Field - 4,823.7 cf Chambers = 8,787.7 cf Stone x 40.0% Voids = 3,515.1 cf Stone Storage

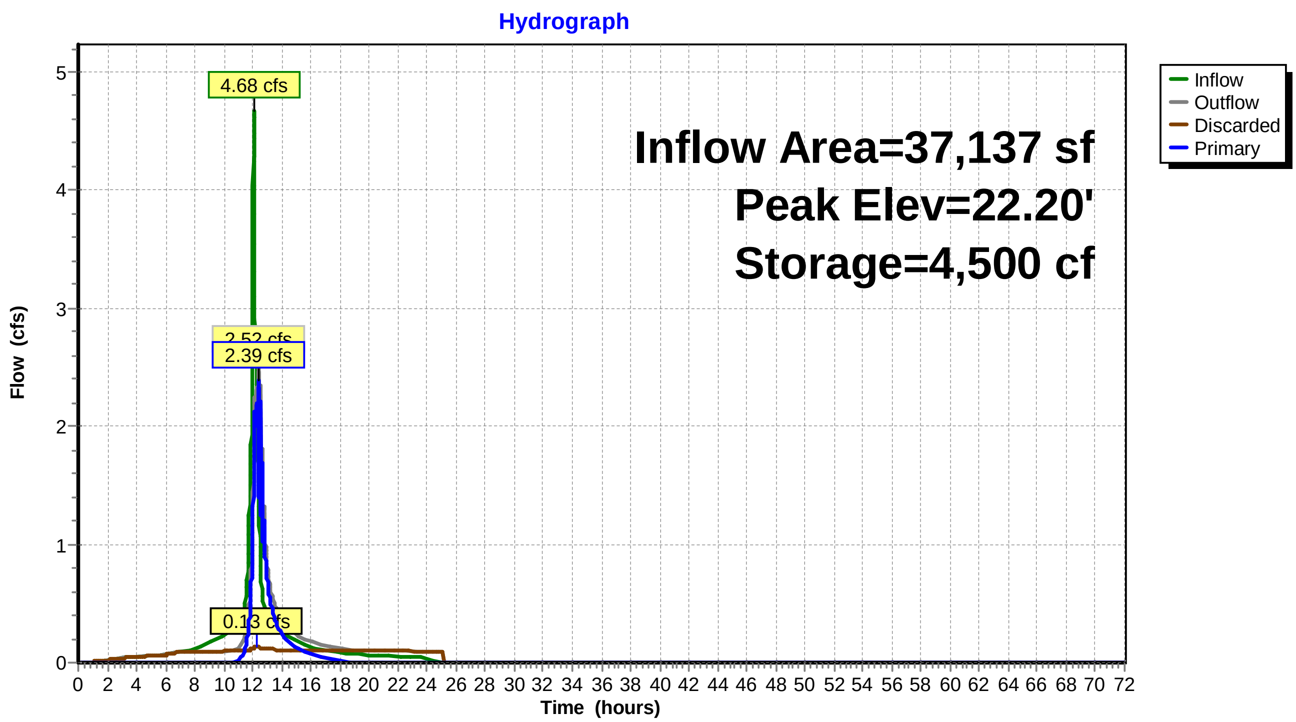
Chamber Storage + Stone Storage = 8,338.8 cf = 0.191 af
Overall Storage Efficiency = 61.3%
Overall System Size = 53.46' x 72.75' x 3.50'

105 Chambers
504.1 cy Field
325.5 cy Stone





Pond IB1:


Hydrograph
4.68 cfs
2.52 cfs
2.39 cfs
0.13 cfs
Inflow Area=37,137 sf
Peak Elev=22.20'
Storage=4,500 cf
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

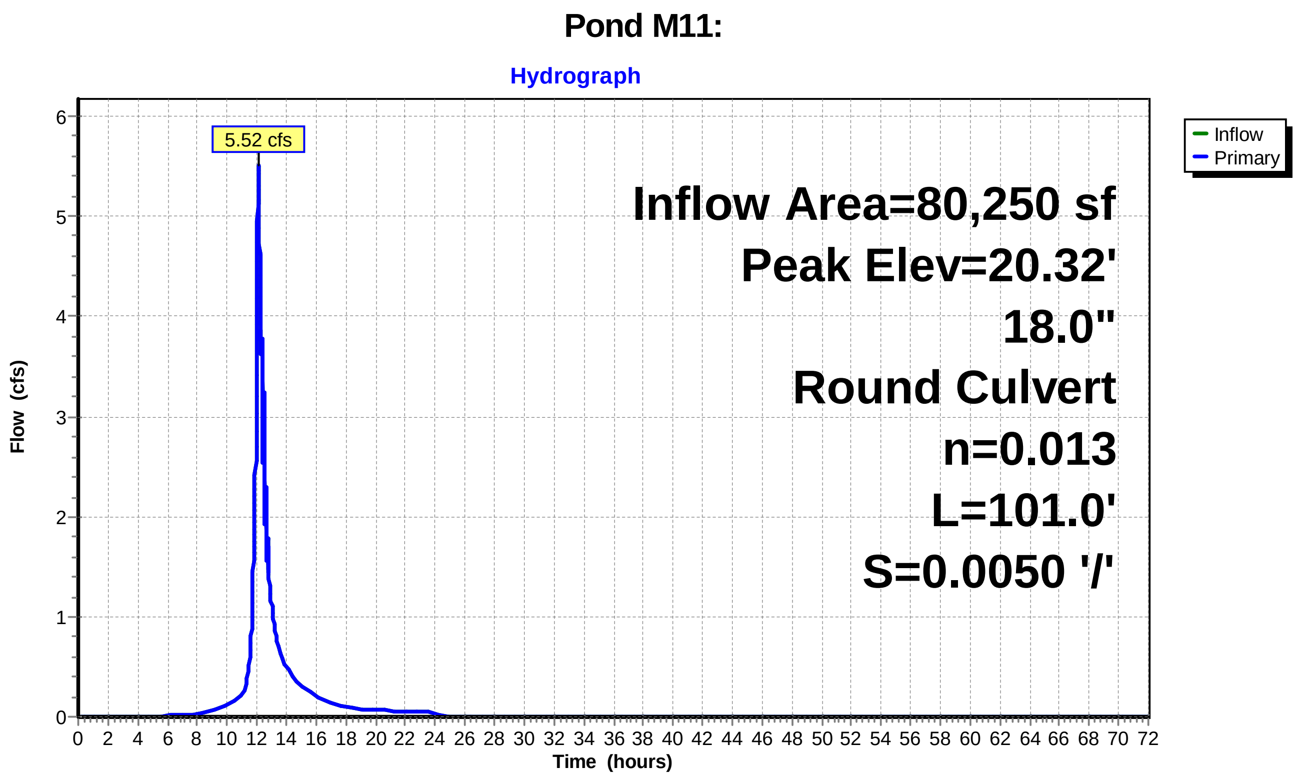
Summary for Pond M11:

Inflow Area = 80,250 sf, 66.19% Impervious, Inflow Depth = 3.34" for 10 yr event
Inflow = 5.52 cfs @ 12.09 hrs, Volume= 22,307 cf
Outflow = 5.52 cfs @ 12.09 hrs, Volume= 22,307 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.52 cfs @ 12.09 hrs, Volume= 22,307 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 20.32' @ 12.11 hrs
Flood Elev= 24.29'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.37'	**18.0" Round Culvert** L= 101.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.37' / 17.87' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.21 cfs @ 12.09 hrs HW=20.26' TW=19.84' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.21 cfs @ 3.01 fps)



Summary for Pond M14:

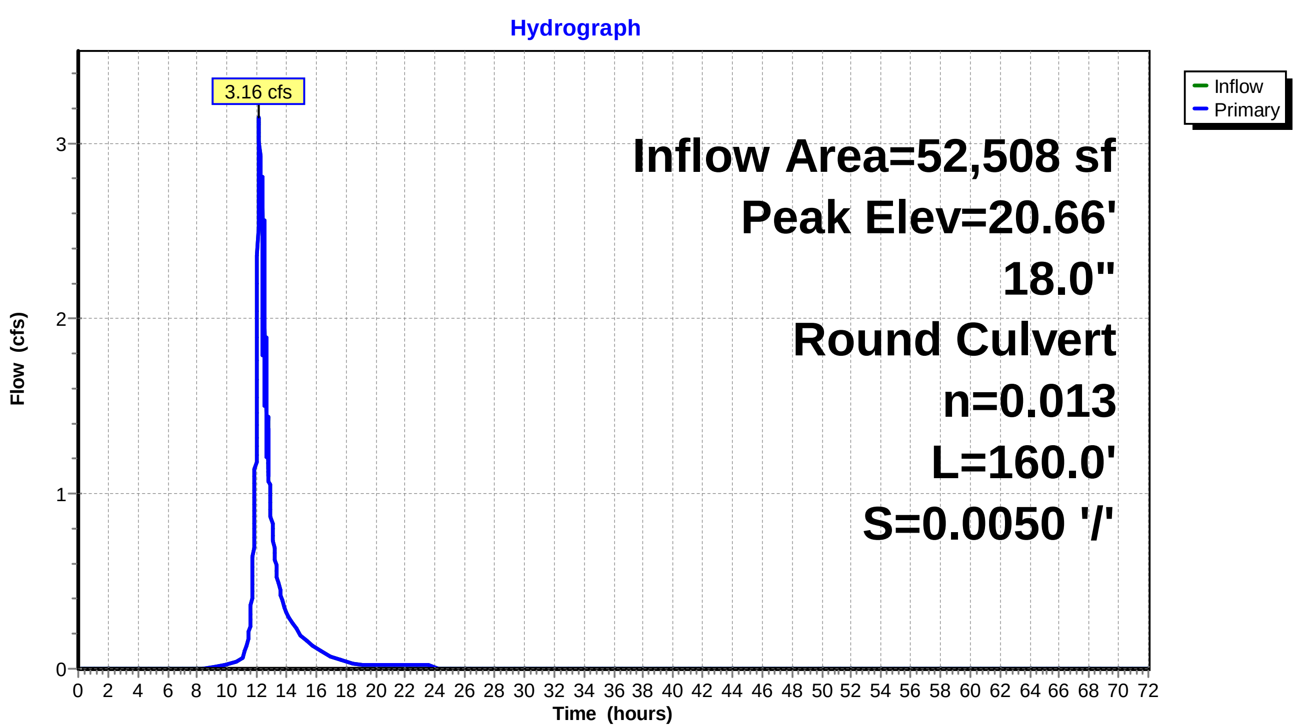
Inflow Area = 52,508 sf, 73.66% Impervious, Inflow Depth = 2.95" for 10 yr event
Inflow = 3.16 cfs @ 12.12 hrs, Volume= 12,911 cf
Outflow = 3.16 cfs @ 12.12 hrs, Volume= 12,911 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.16 cfs @ 12.12 hrs, Volume= 12,911 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 20.66' @ 12.12 hrs
Flood Elev= 28.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.27'	**18.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.27' / 18.47' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.27 cfs @ 12.12 hrs HW=20.66' TW=20.29' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 3.27 cfs @ 2.50 fps)

Pond M14:



Summary for Pond M15:

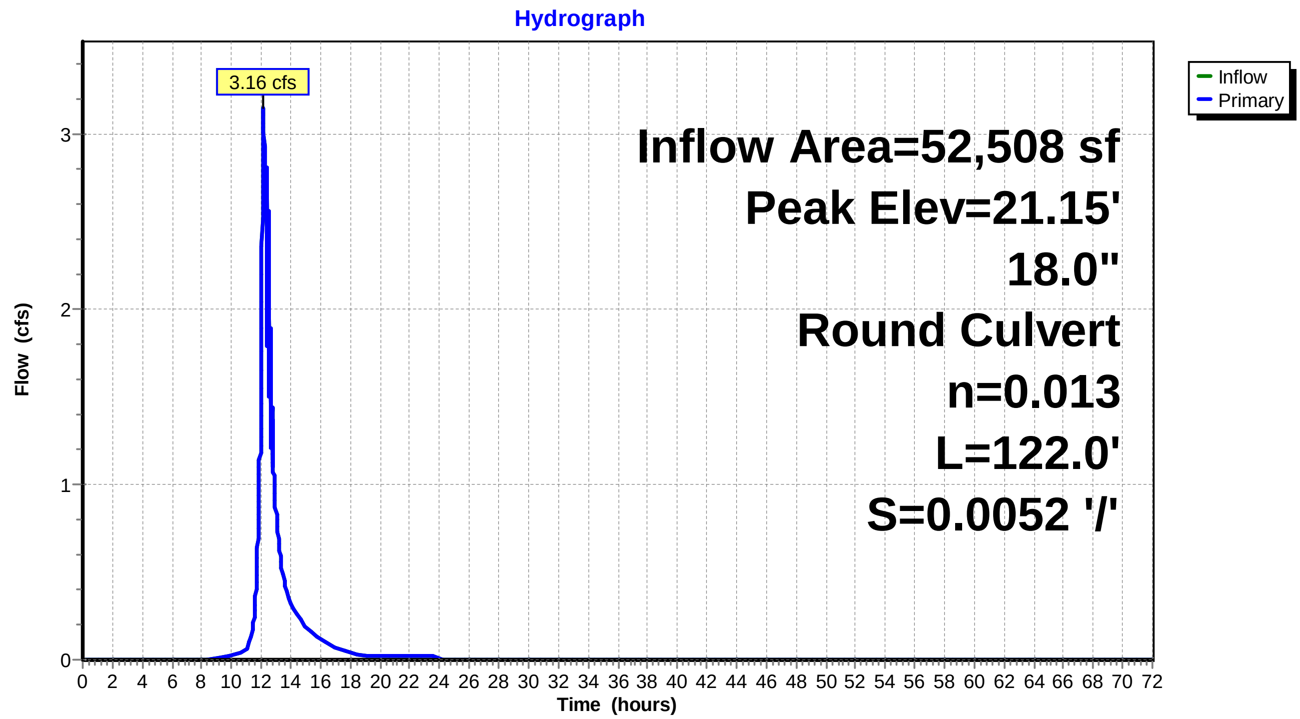
Inflow Area =	52,508 sf, 73.66% Impervious,	Inflow Depth = 2.95" for 10 yr event		
Inflow =	3.16 cfs @	12.12 hrs, Volume=	12,911 cf	
Outflow =	3.16 cfs @	12.12 hrs, Volume=	12,911 cf,	Atten= 0%, Lag= 0.0 min
Primary =	3.16 cfs @	12.12 hrs, Volume=	12,911 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 21.15' @ 12.12 hrs
Flood Elev= 27.37'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 122.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.37' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.12 cfs @ 12.12 hrs HW=21.14' TW=20.66' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.12 cfs @ 2.99 fps)

Pond M15:



Summary for Pond M17:

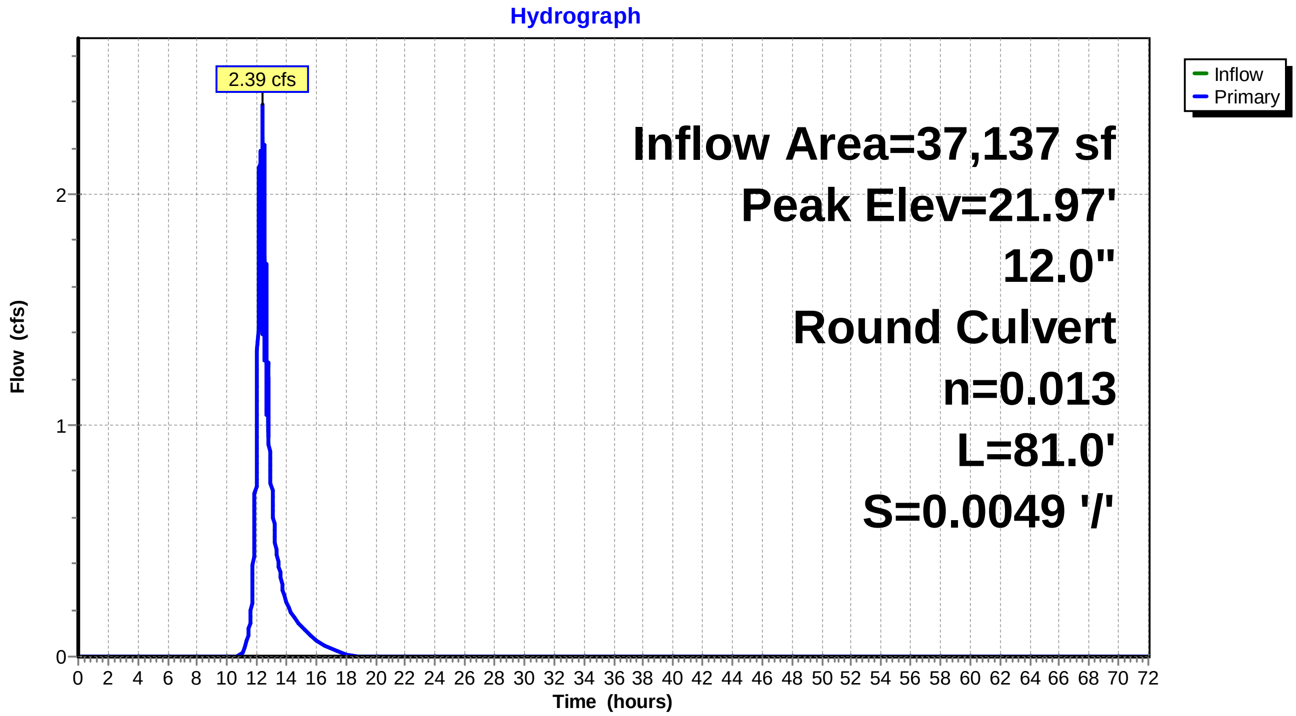
Inflow Area = 37,137 sf,100.00% Impervious, Inflow Depth = 2.91" for 10 yr event
Inflow = 2.39 cfs @ 12.40 hrs, Volume= 9,020 cf
Outflow = 2.39 cfs @ 12.40 hrs, Volume= 9,020 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.39 cfs @ 12.40 hrs, Volume= 9,020 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 21.97' @ 12.40 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	20.90'	**12.0" Round Culvert** L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.90' / 20.50' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.35 cfs @ 12.40 hrs HW=21.96' TW=20.90' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 2.35 cfs @ 3.52 fps)

Pond M17:



Summary for Pond M19:

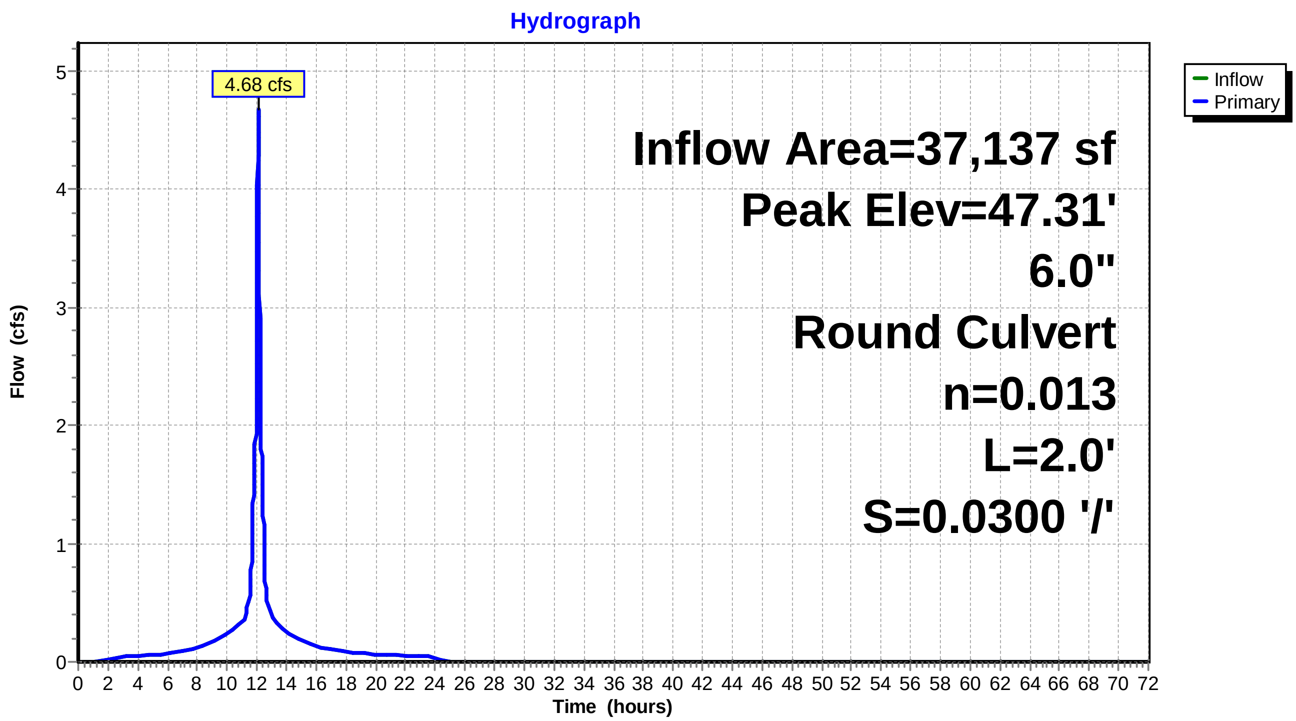
Inflow Area = 37,137 sf,100.00% Impervious, Inflow Depth = 5.36" for 10 yr event
Inflow = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf
Outflow = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 47.31' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	22.60'	**6.0" Round Roof Drain** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.60' / 22.54' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=4.67 cfs @ 12.08 hrs HW=47.23' TW=21.97' (Dynamic Tailwater)
└─**1=Roof Drain** (Inlet Controls 4.67 cfs @ 23.78 fps)

Pond M19:



Summary for Pond M2:

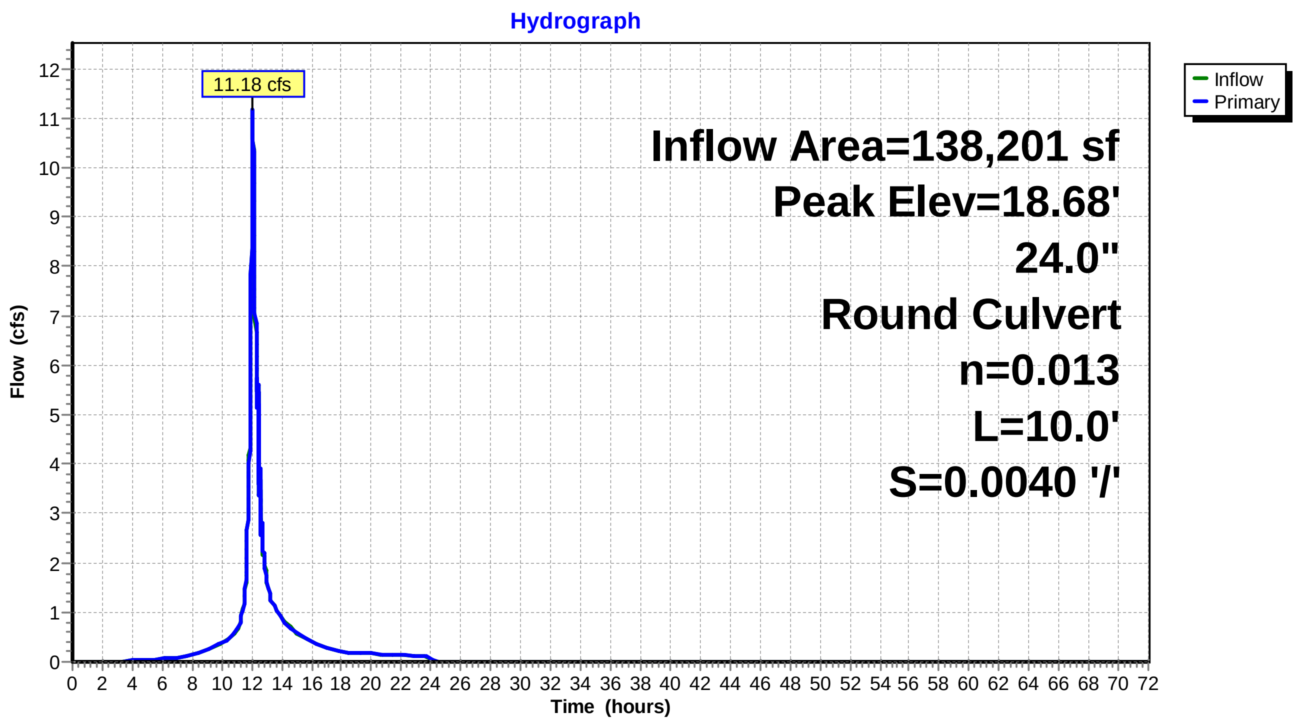
Inflow Area = 138,201 sf, 66.19% Impervious, Inflow Depth = 3.82" for 10 yr event
Inflow = 11.16 cfs @ 12.07 hrs, Volume= 43,974 cf
Outflow = 11.18 cfs @ 12.07 hrs, Volume= 43,974 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.18 cfs @ 12.07 hrs, Volume= 43,974 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 18.68' @ 12.08 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.26'	**24.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.26' / 16.22' S= 0.0040 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.98 cfs @ 12.07 hrs HW=18.67' TW=18.14' (Dynamic Tailwater)
1=Culvert (Inlet Controls 10.98 cfs @ 3.50 fps)

Pond M2:



Summary for Pond M21:

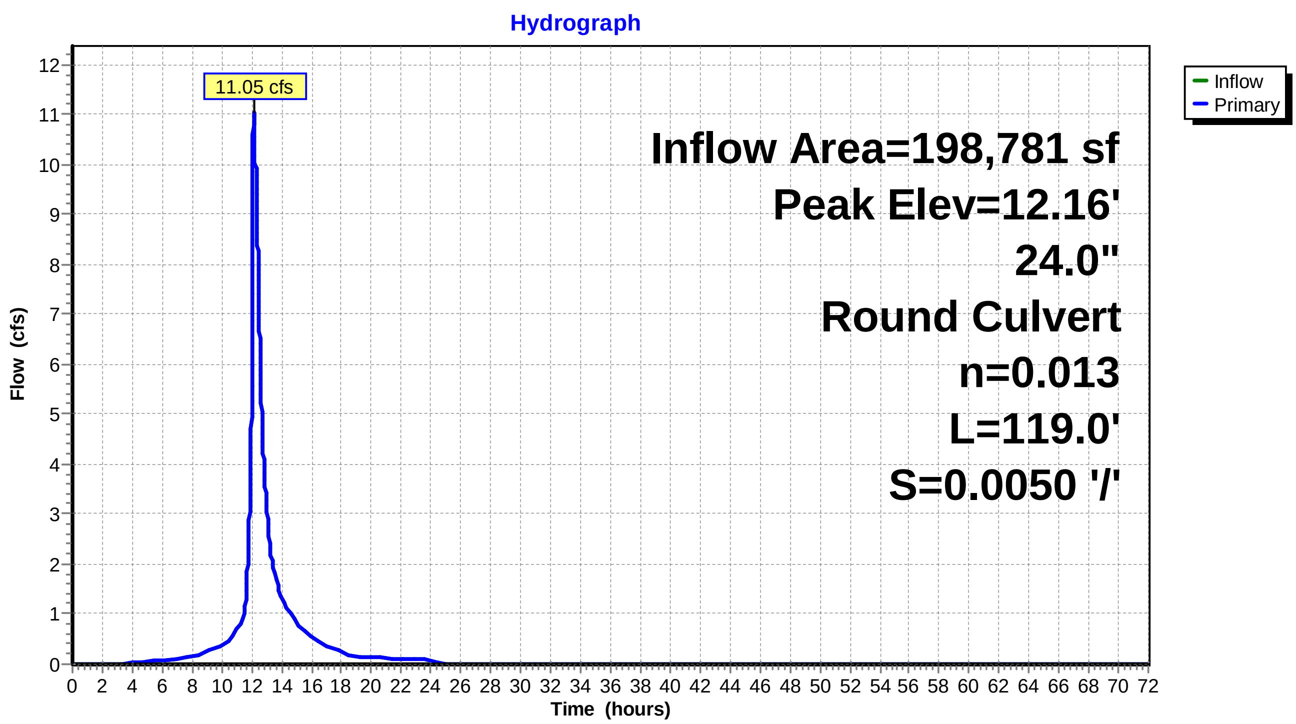
Inflow Area = 198,781 sf, 77.36% Impervious, Inflow Depth = 3.25" for 10 yr event
Inflow = 11.05 cfs @ 12.15 hrs, Volume= 53,862 cf
Outflow = 11.05 cfs @ 12.15 hrs, Volume= 53,862 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.05 cfs @ 12.15 hrs, Volume= 53,862 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 12.16' @ 12.15 hrs
Flood Elev= 14.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	10.29'	**24.0" Round Culvert** L= 119.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 10.29' / 9.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=11.04 cfs @ 12.15 hrs HW=12.16' TW=11.24' (Dynamic Tailwater)
1=Culvert (Outlet Controls 11.04 cfs @ 4.69 fps)

Pond M21:



Summary for Pond M22:

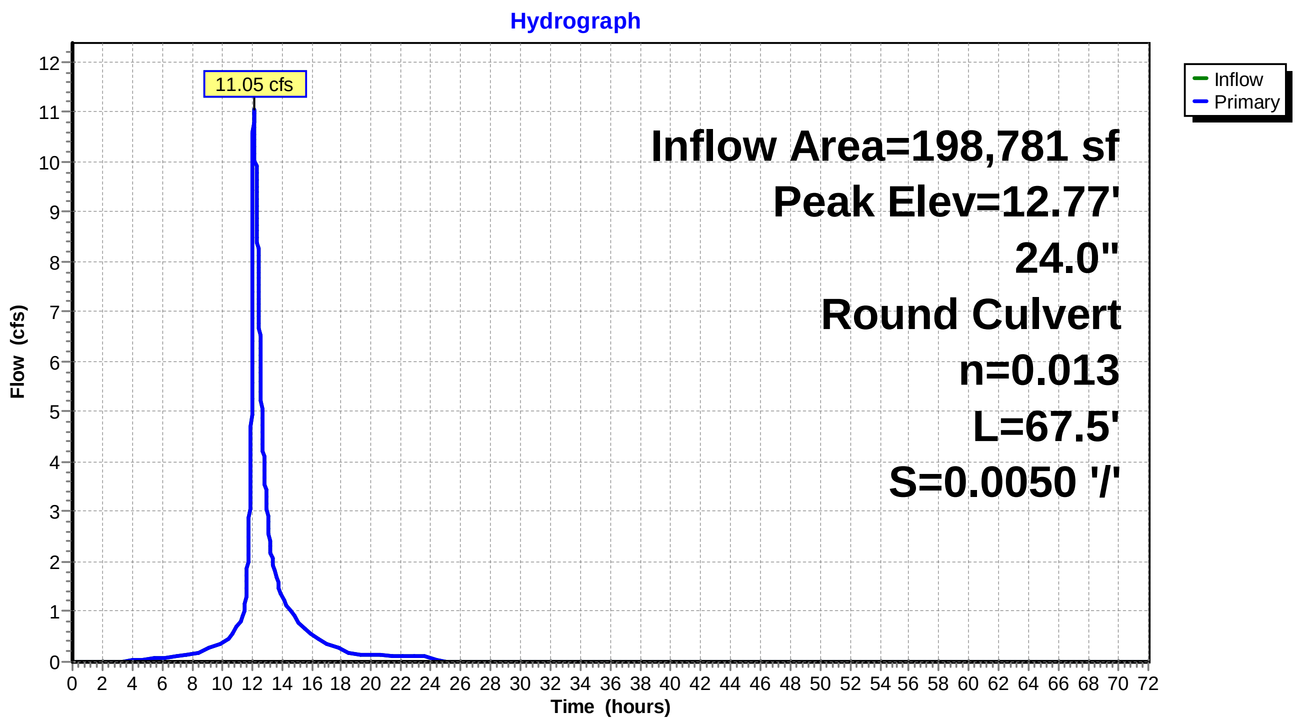
Inflow Area = 198,781 sf, 77.36% Impervious, Inflow Depth = 3.25" for 10 yr event
Inflow = 11.05 cfs @ 12.15 hrs, Volume= 53,862 cf
Outflow = 11.05 cfs @ 12.15 hrs, Volume= 53,862 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.05 cfs @ 12.15 hrs, Volume= 53,862 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 12.77' @ 12.15 hrs
Flood Elev= 17.21'

Device	Routing	Invert	Outlet Devices
#1	Primary	10.73'	**24.0" Round Culvert** L= 67.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 10.73' / 10.39' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.99 cfs @ 12.15 hrs HW=12.77' TW=12.16' (Dynamic Tailwater)
└1=Culvert (Outlet Controls 10.99 cfs @ 4.27 fps)

Pond M22:



Summary for Pond M25:

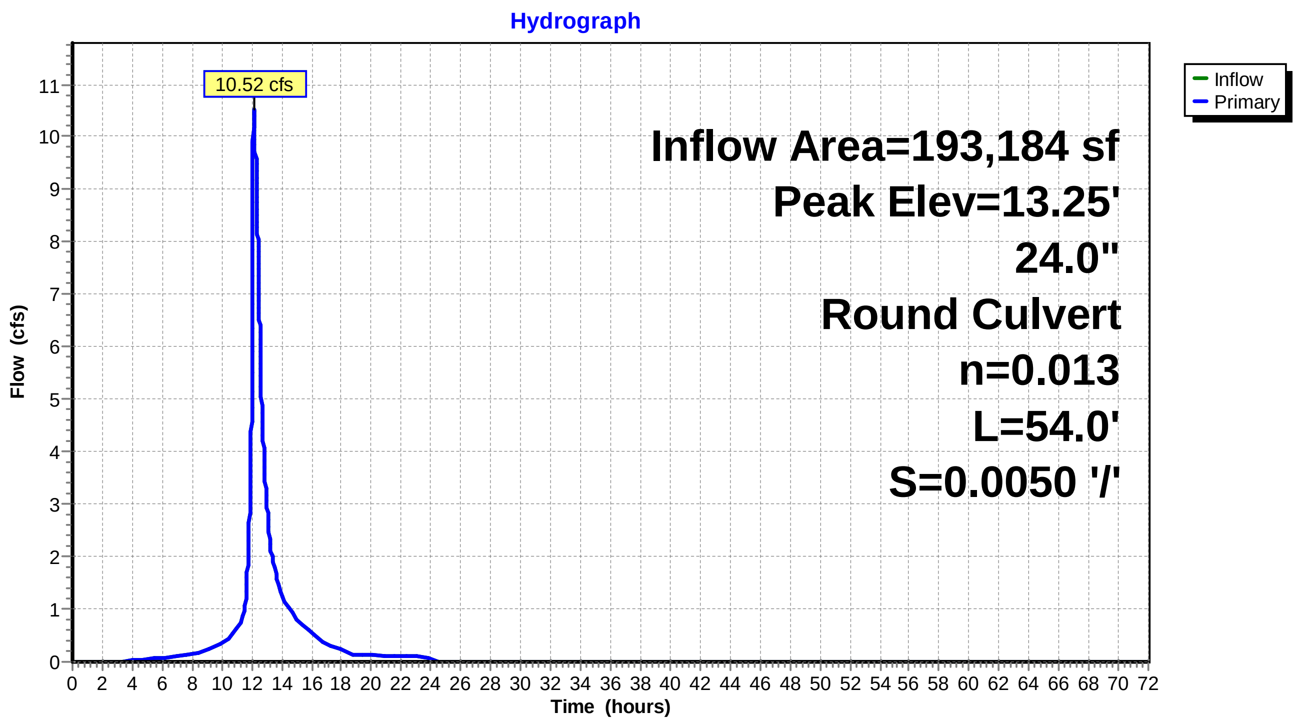
Inflow Area = 193,184 sf, 77.03% Impervious, Inflow Depth = 3.20" for 10 yr event
Inflow = 10.52 cfs @ 12.15 hrs, Volume= 51,525 cf
Outflow = 10.52 cfs @ 12.15 hrs, Volume= 51,525 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.52 cfs @ 12.15 hrs, Volume= 51,525 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 13.25' @ 12.16 hrs
Flood Elev= 19.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.10'	**24.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.10' / 10.83' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.46 cfs @ 12.15 hrs HW=13.25' TW=12.77' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 10.46 cfs @ 3.33 fps)

Pond M25:



Summary for Pond M28:

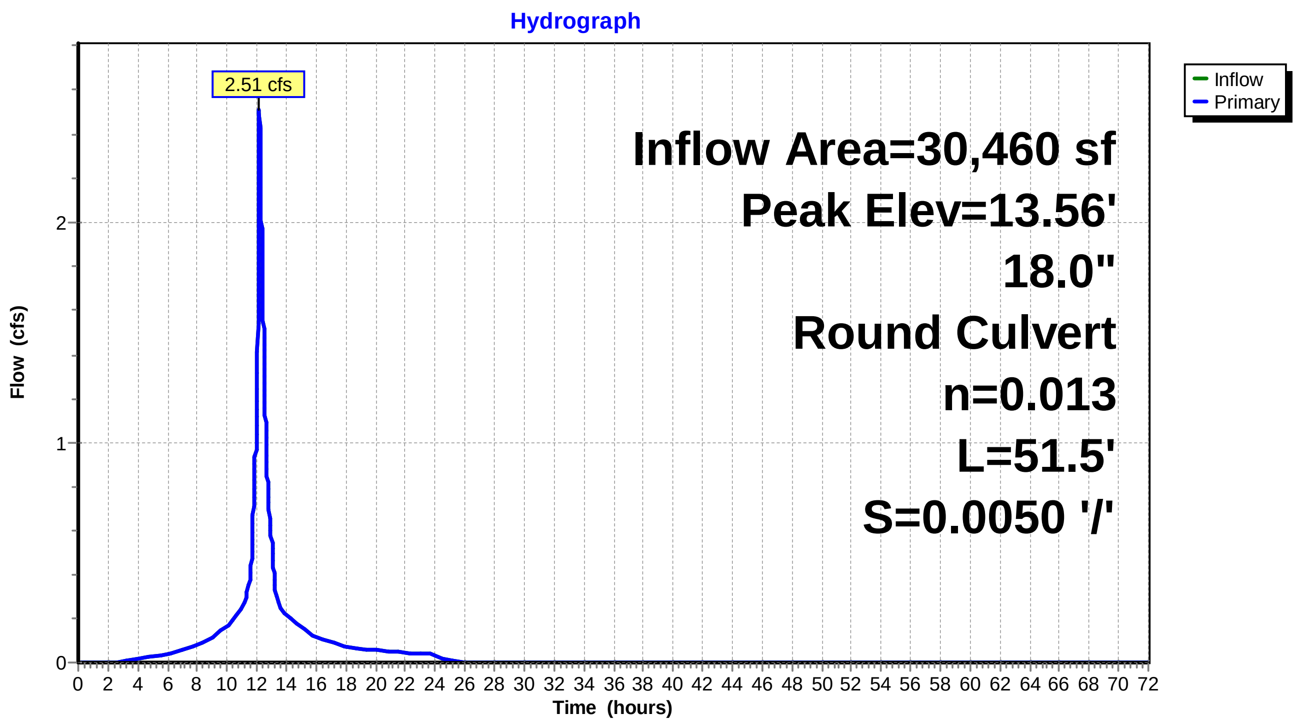
Inflow Area = 30,460 sf, 90.87% Impervious, Inflow Depth = 5.10" for 10 yr event
Inflow = 2.51 cfs @ 12.16 hrs, Volume= 12,950 cf
Outflow = 2.51 cfs @ 12.16 hrs, Volume= 12,950 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.51 cfs @ 12.16 hrs, Volume= 12,950 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 13.56' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.57'	**18.0" Round Culvert** L= 51.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.57' / 12.31' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.47 cfs @ 12.16 hrs HW=13.56' TW=13.25' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 2.47 cfs @ 2.84 fps)

Pond M28:



Summary for Pond M29:

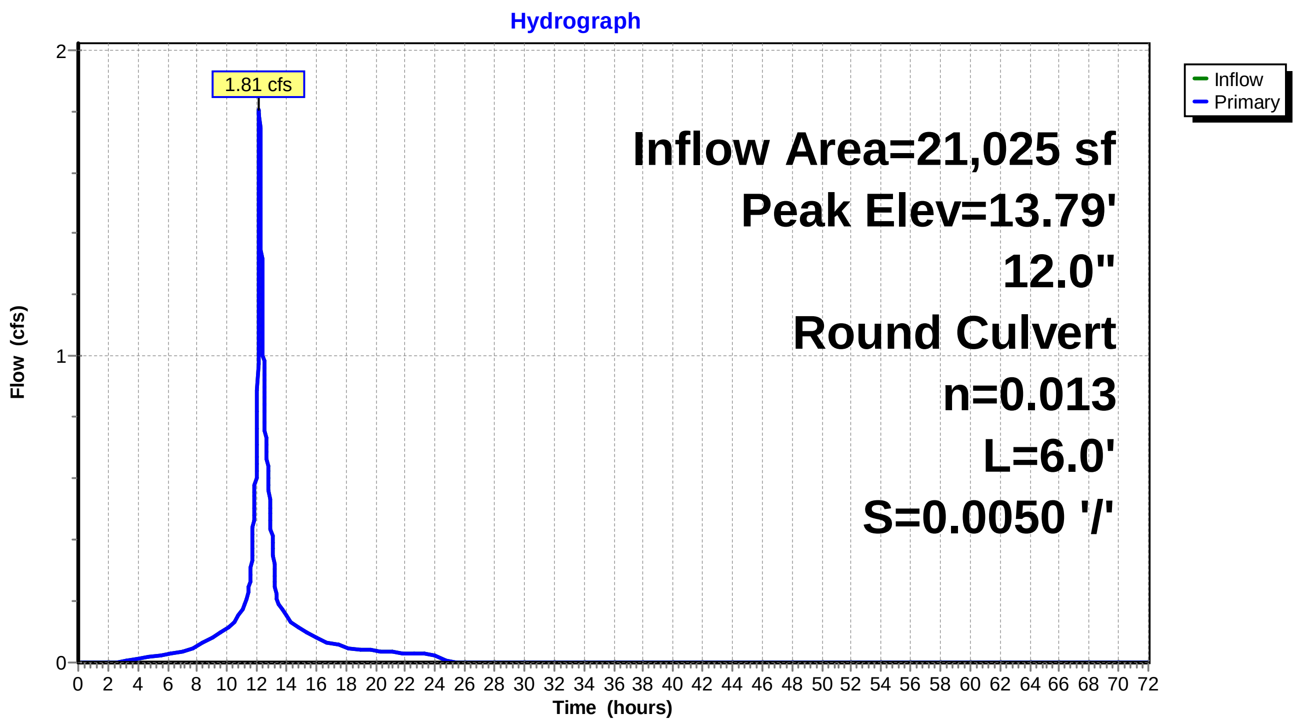
Inflow Area = 21,025 sf, 90.30% Impervious, Inflow Depth = 5.09" for 10 yr event
Inflow = 1.81 cfs @ 12.15 hrs, Volume= 8,918 cf
Outflow = 1.81 cfs @ 12.15 hrs, Volume= 8,918 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.15 hrs, Volume= 8,918 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 13.79' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.70'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.70' / 12.67' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.75 cfs @ 12.15 hrs HW=13.77' TW=13.56' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.75 cfs @ 2.22 fps)

Pond M29:



Summary for Pond M3:

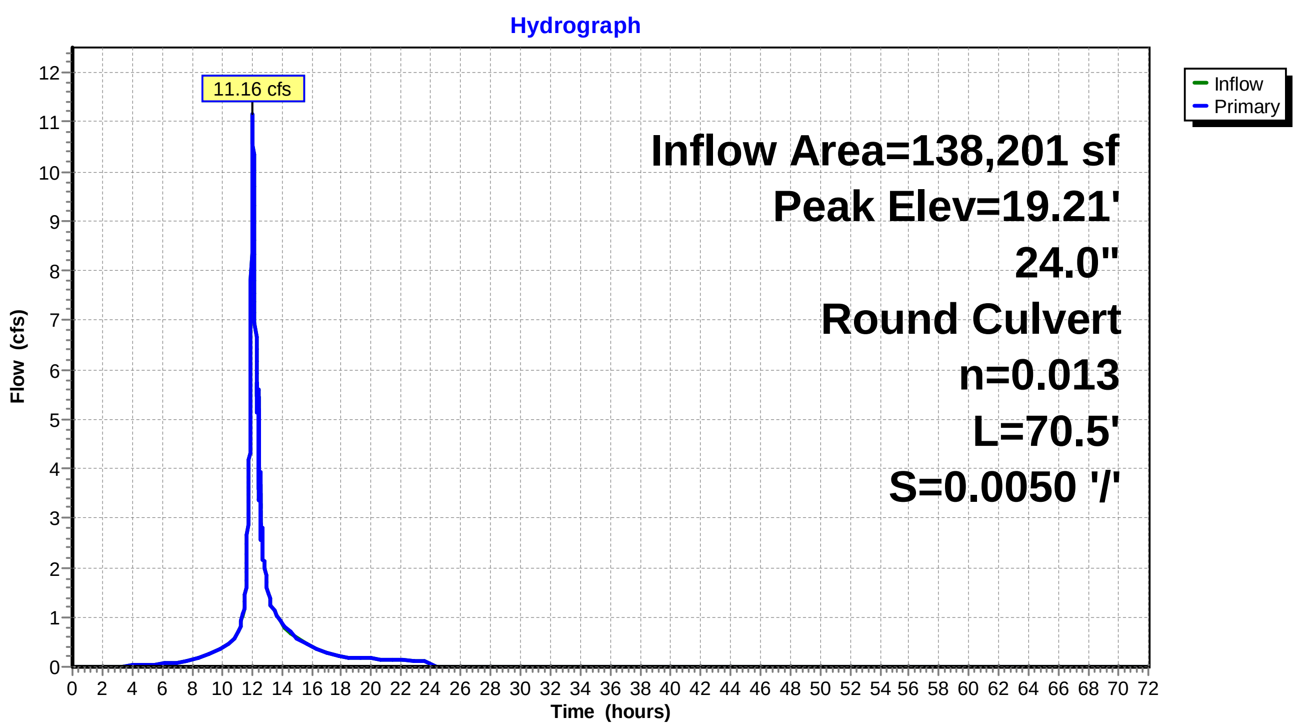
Inflow Area = 138,201 sf, 66.19% Impervious, Inflow Depth = 3.82" for 10 yr event
Inflow = 11.16 cfs @ 12.07 hrs, Volume= 43,974 cf
Outflow = 11.16 cfs @ 12.07 hrs, Volume= 43,974 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.16 cfs @ 12.07 hrs, Volume= 43,974 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.21' @ 12.09 hrs
Flood Elev= 23.27'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.71'	**24.0" Round Culvert** L= 70.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.71' / 16.36' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.88 cfs @ 12.07 hrs HW=19.19' TW=18.67' (Dynamic Tailwater)
1=Culvert (Inlet Controls 10.88 cfs @ 3.46 fps)

Pond M3:



Summary for Pond M31:

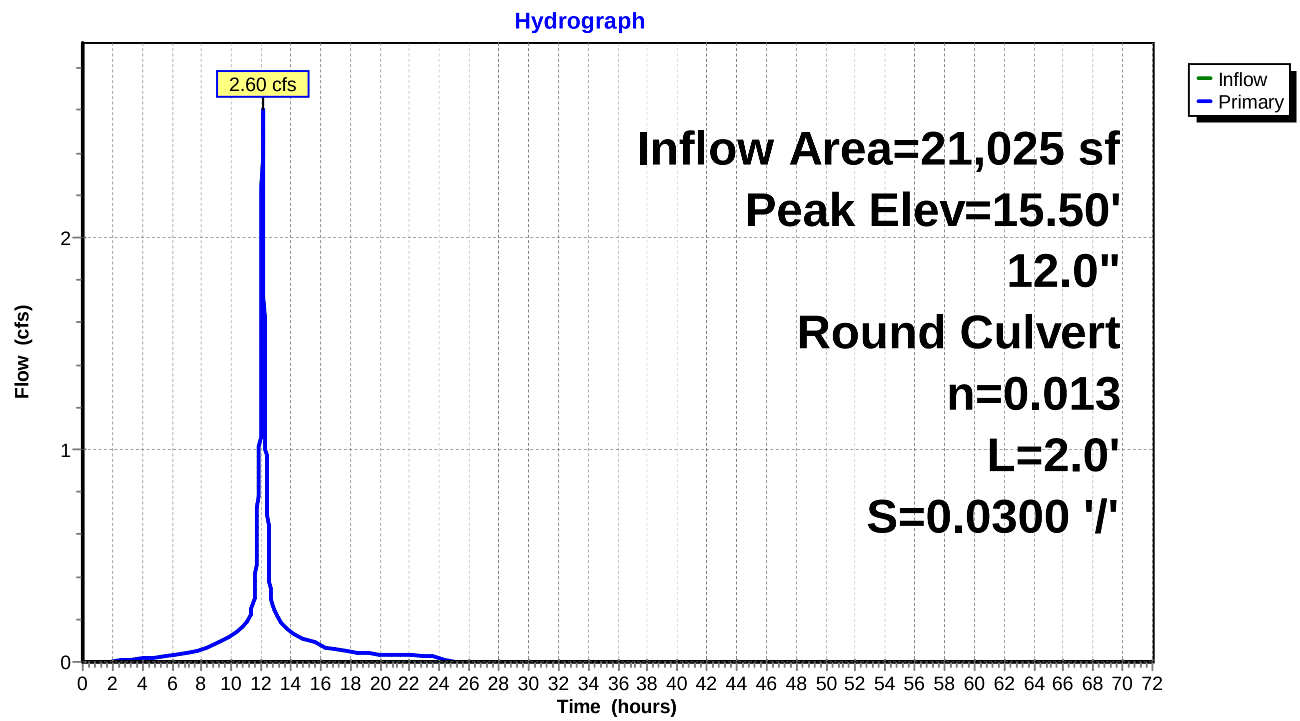
Inflow Area =	21,025 sf, 90.30% Impervious,	Inflow Depth = 5.09"	for 10 yr event
Inflow =	2.60 cfs @ 12.08 hrs, Volume=	8,920 cf	
Outflow =	2.60 cfs @ 12.08 hrs, Volume=	8,920 cf, Atten= 0%, Lag= 0.0 min	
Primary =	2.60 cfs @ 12.08 hrs, Volume=	8,920 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 15.50' @ 12.08 hrs
Flood Elev= 19.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.40'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.40' / 14.34' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.60 cfs @ 12.08 hrs HW=15.50' TW=14.22' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 2.60 cfs @ 3.74 fps)

Pond M31:



Summary for Pond M32:

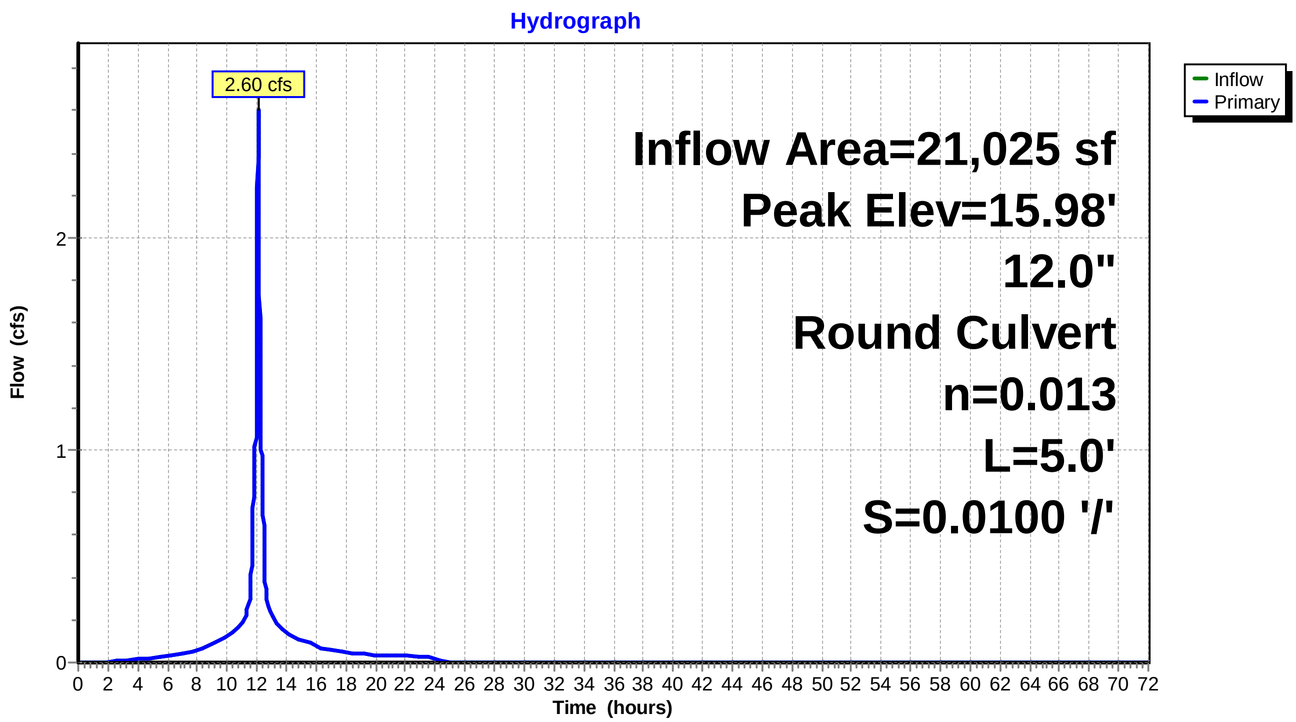
Inflow Area = 21,025 sf, 90.30% Impervious, Inflow Depth = 5.09" for 10 yr event
Inflow = 2.60 cfs @ 12.08 hrs, Volume= 8,920 cf
Outflow = 2.60 cfs @ 12.08 hrs, Volume= 8,920 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.60 cfs @ 12.08 hrs, Volume= 8,920 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 15.98' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.55'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.55' / 14.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.58 cfs @ 12.08 hrs HW=15.97' TW=15.50' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.58 cfs @ 3.29 fps)

Pond M32:



Summary for Pond M35:

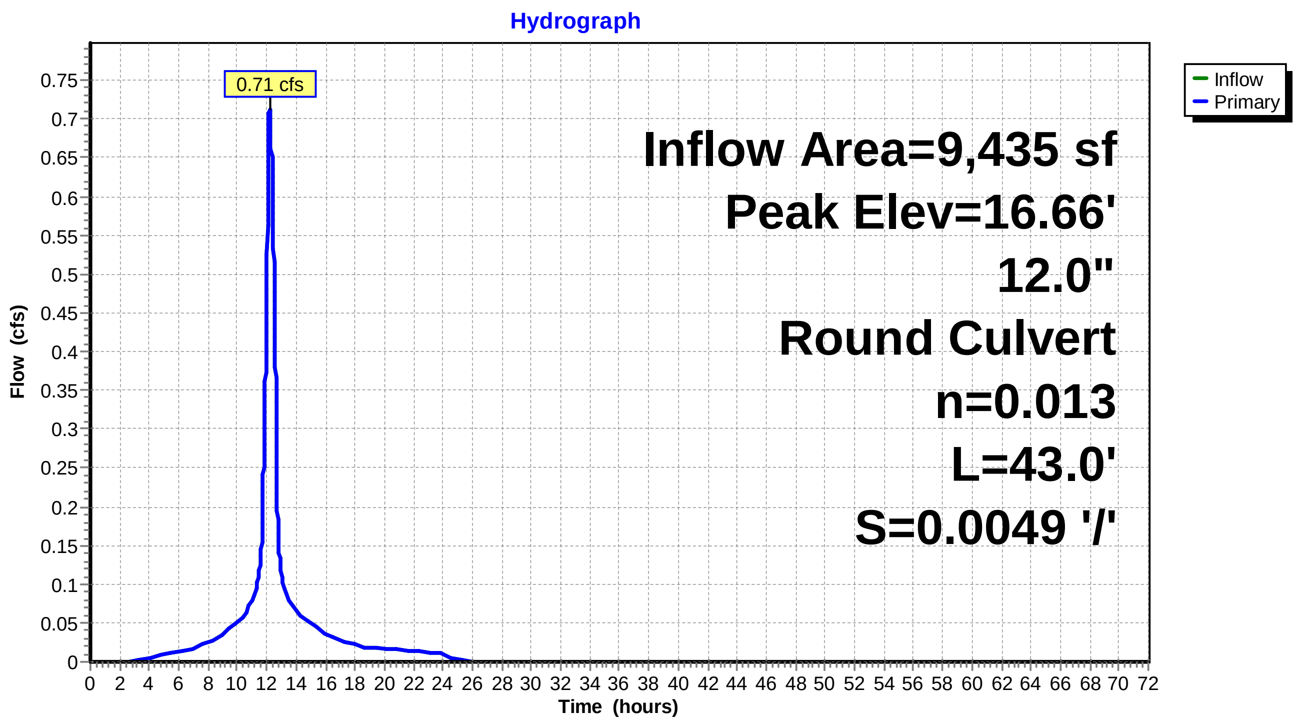
Inflow Area = 9,435 sf, 92.15% Impervious, Inflow Depth = 5.13" for 10 yr event
Inflow = 0.71 cfs @ 12.18 hrs, Volume= 4,032 cf
Outflow = 0.71 cfs @ 12.18 hrs, Volume= 4,032 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.71 cfs @ 12.18 hrs, Volume= 4,032 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 16.66' @ 12.18 hrs
Flood Elev= 19.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.15'	**12.0" Round Culvert** L= 43.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.15' / 15.94' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 12.18 hrs HW=16.66' TW=13.56' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.71 cfs @ 2.59 fps)

Pond M35:



Summary for Pond M37:

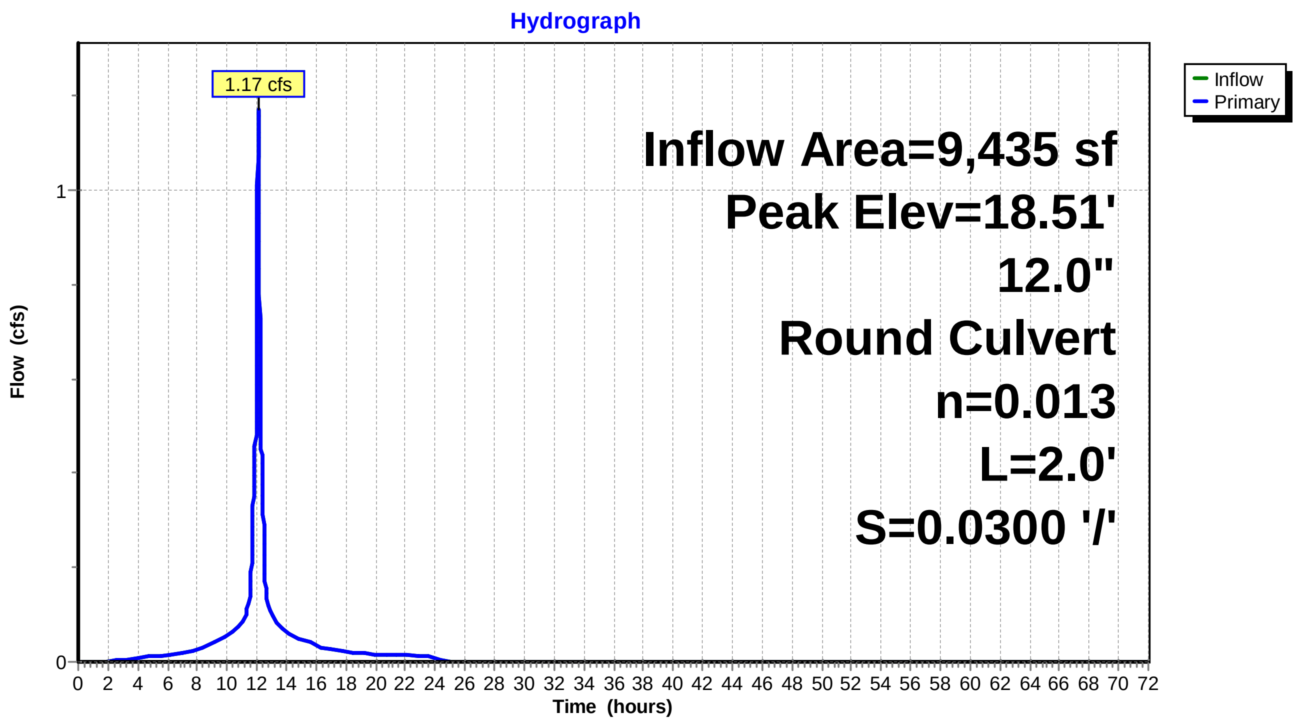
Inflow Area = 9,435 sf, 92.15% Impervious, Inflow Depth = 5.13" for 10 yr event
Inflow = 1.17 cfs @ 12.08 hrs, Volume= 4,033 cf
Outflow = 1.17 cfs @ 12.08 hrs, Volume= 4,033 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.17 cfs @ 12.08 hrs, Volume= 4,033 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 18.51' @ 12.08 hrs
Flood Elev= 23.36'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.85'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.85' / 17.79' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.17 cfs @ 12.08 hrs HW=18.51' TW=17.06' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.17 cfs @ 3.04 fps)

Pond M37:



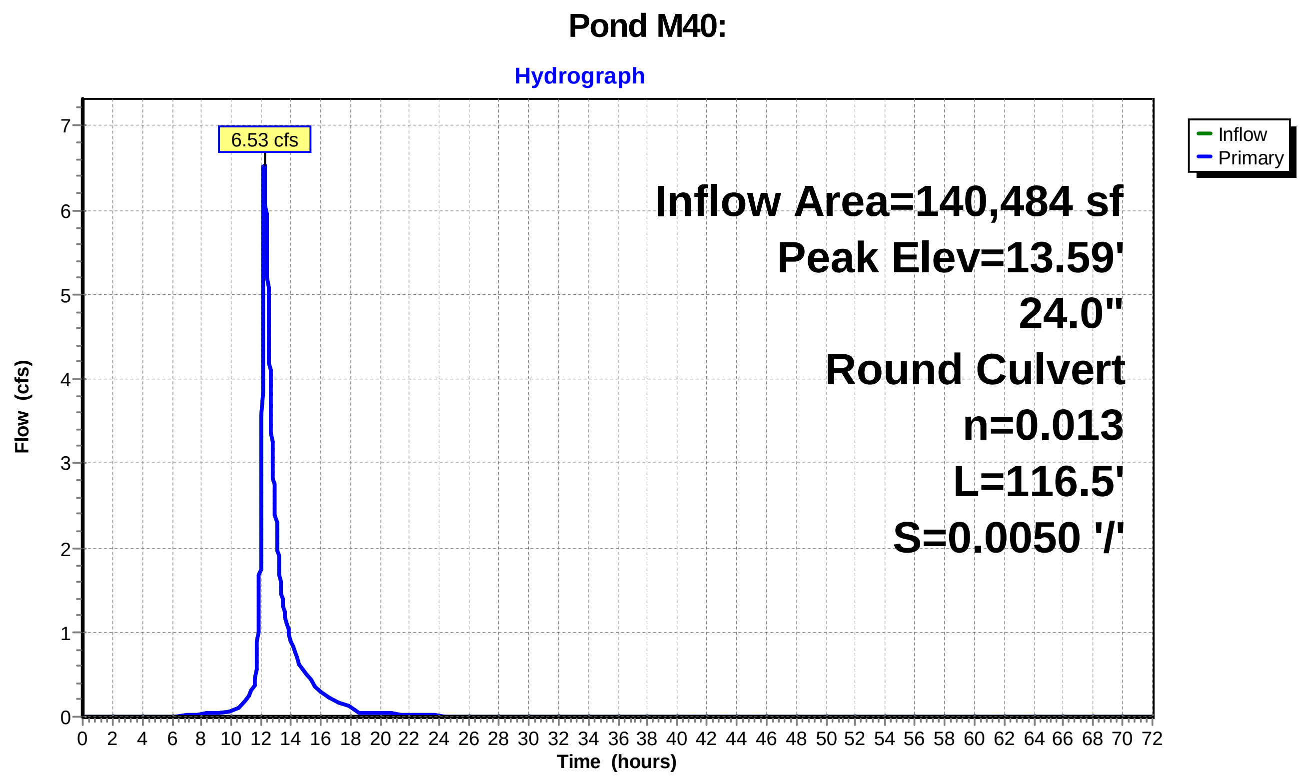
Summary for Pond M40:

Inflow Area = 140,484 sf, 74.77% Impervious, Inflow Depth = 2.56" for 10 yr event
Inflow = 6.53 cfs @ 12.19 hrs, Volume= 30,019 cf
Outflow = 6.53 cfs @ 12.19 hrs, Volume= 30,019 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.53 cfs @ 12.19 hrs, Volume= 30,019 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 13.59' @ 12.17 hrs
Flood Elev= 21.59'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.78'	**24.0" Round Culvert** L= 116.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 11.78' / 11.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.70 cfs @ 12.19 hrs HW=13.58' TW=13.22' (Dynamic Tailwater)
1=Culvert (Outlet Controls 6.70 cfs @ 2.96 fps)



Summary for Pond M42:

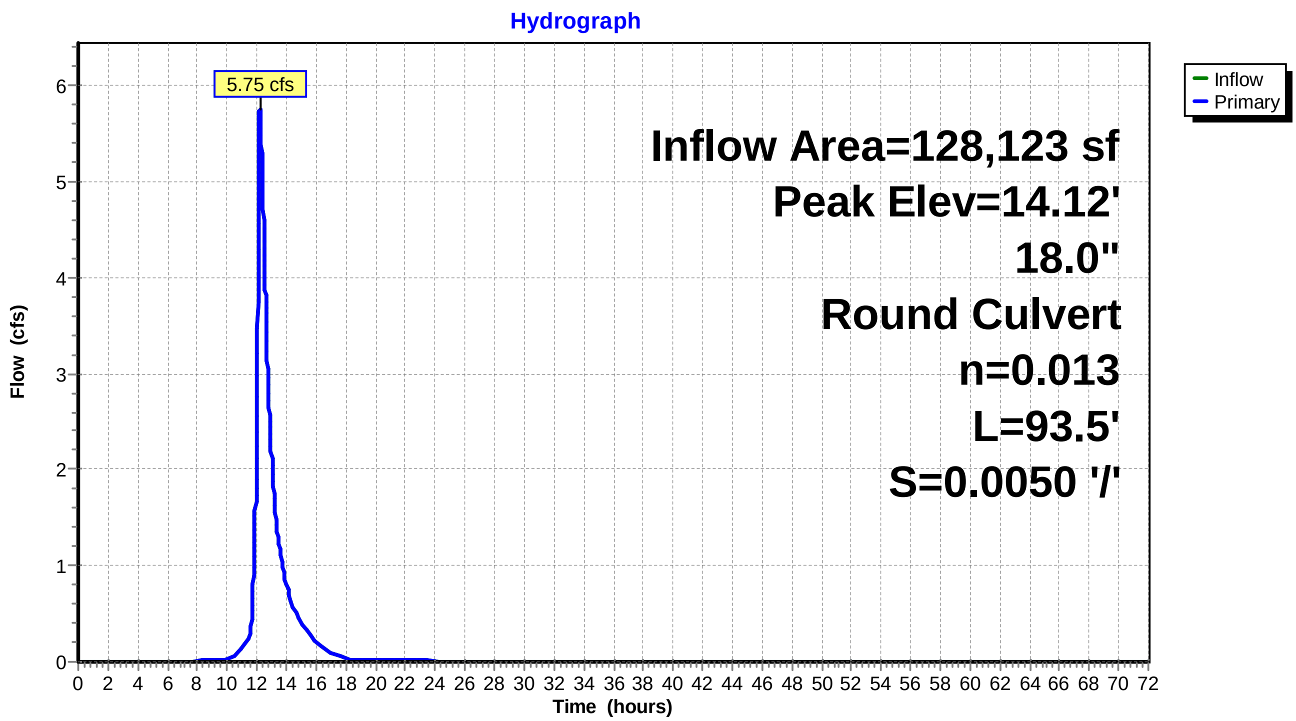
Inflow Area =	128,123 sf,	75.92% Impervious,	Inflow Depth = 2.39"	for 10 yr event
Inflow =	5.75 cfs @	12.18 hrs, Volume=	25,539 cf	
Outflow =	5.75 cfs @	12.18 hrs, Volume=	25,539 cf, Atten= 0%, Lag= 0.0 min	
Primary =	5.75 cfs @	12.18 hrs, Volume=	25,539 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 14.12' @ 12.18 hrs
Flood Elev= 23.14'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.35'	**18.0" Round Culvert** L= 93.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.35' / 11.88' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.76 cfs @ 12.18 hrs HW=14.12' TW=13.59' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.76 cfs @ 3.48 fps)

Pond M42:



Summary for Pond M43:

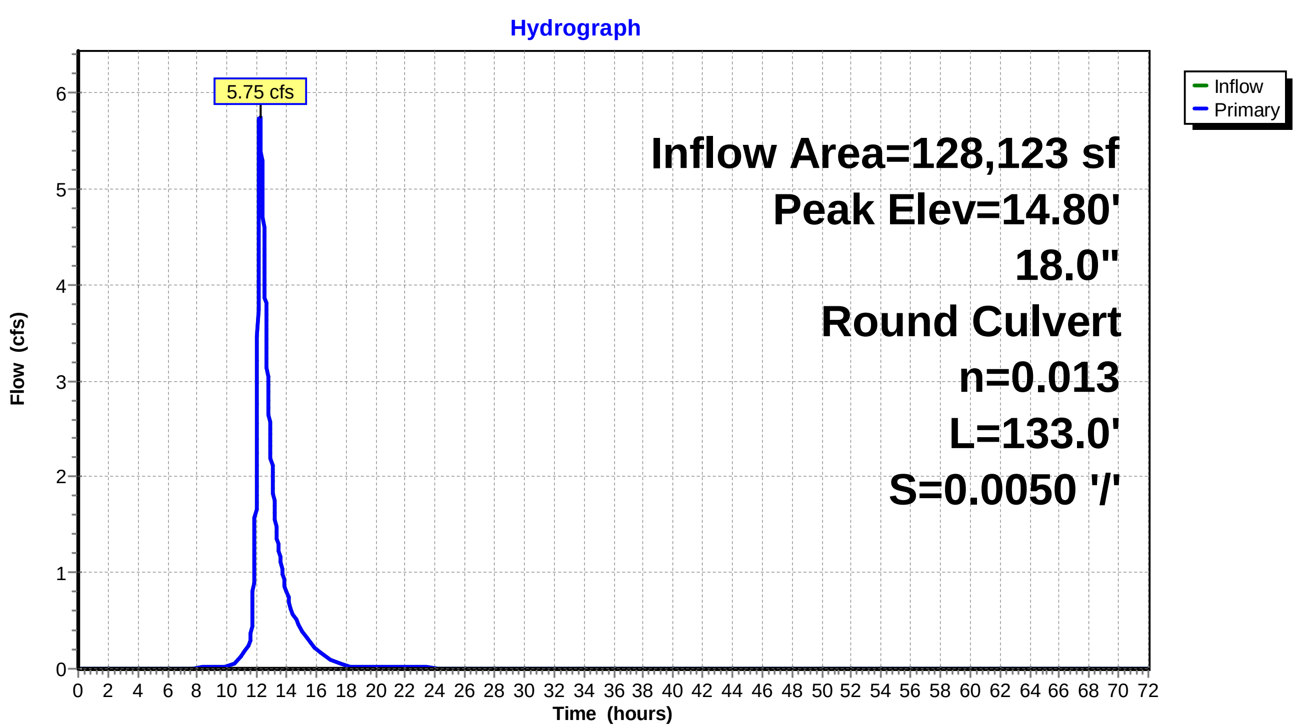
Inflow Area = 128,123 sf, 75.92% Impervious, Inflow Depth = 2.39" for 10 yr event
Inflow = 5.75 cfs @ 12.18 hrs, Volume= 25,539 cf
Outflow = 5.75 cfs @ 12.18 hrs, Volume= 25,539 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.75 cfs @ 12.18 hrs, Volume= 25,539 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 14.80' @ 12.19 hrs
Flood Elev= 26.01'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.11'	**18.0" Round Culvert** L= 133.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.11' / 12.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.72 cfs @ 12.18 hrs HW=14.80' TW=14.12' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 5.72 cfs @ 3.59 fps)

Pond M43:



Summary for Pond M46:

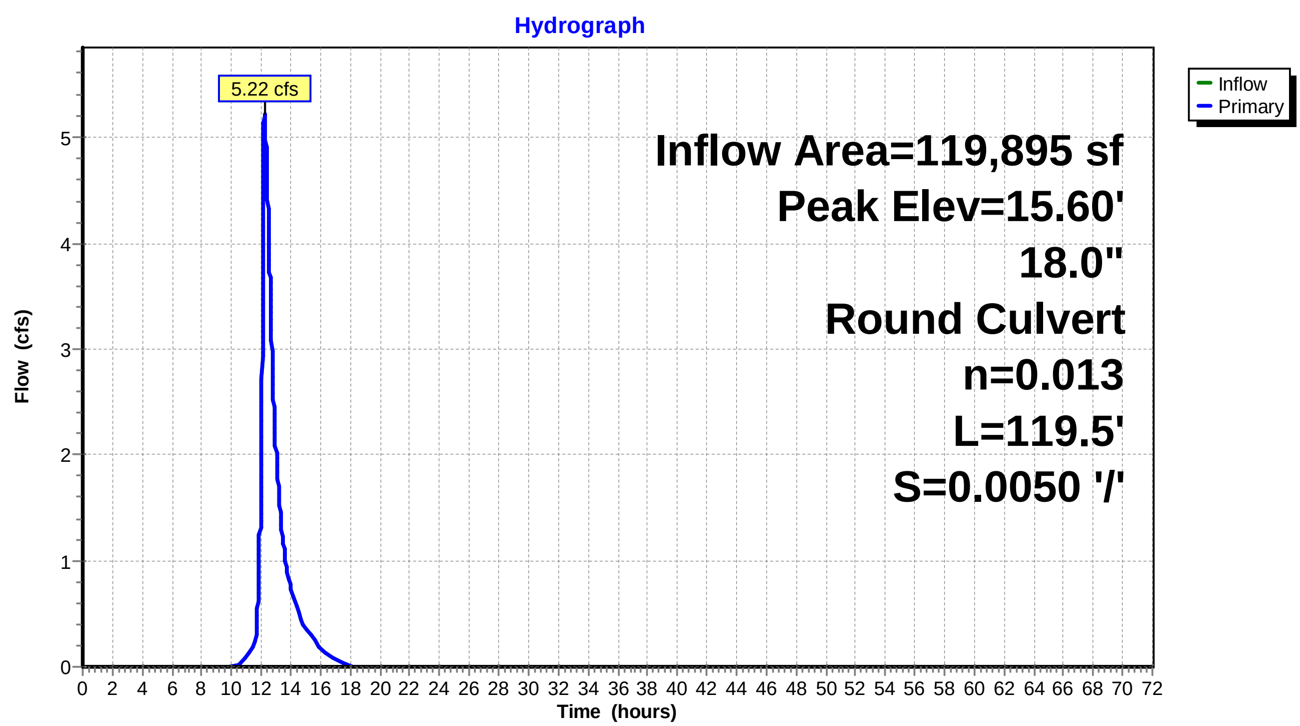
Inflow Area =	119,895 sf, 77.56% Impervious,	Inflow Depth = 2.27"	for 10 yr event
Inflow =	5.22 cfs @ 12.21 hrs, Volume=	22,717 cf	
Outflow =	5.22 cfs @ 12.21 hrs, Volume=	22,717 cf, Atten= 0%, Lag= 0.0 min	
Primary =	5.22 cfs @ 12.21 hrs, Volume=	22,717 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 15.60' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.21'	**18.0" Round Culvert** L= 119.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.21' / 13.61' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.24 cfs @ 12.21 hrs HW=15.60' TW=14.80' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.24 cfs @ 4.00 fps)

Pond M46:



Summary for Pond M47:

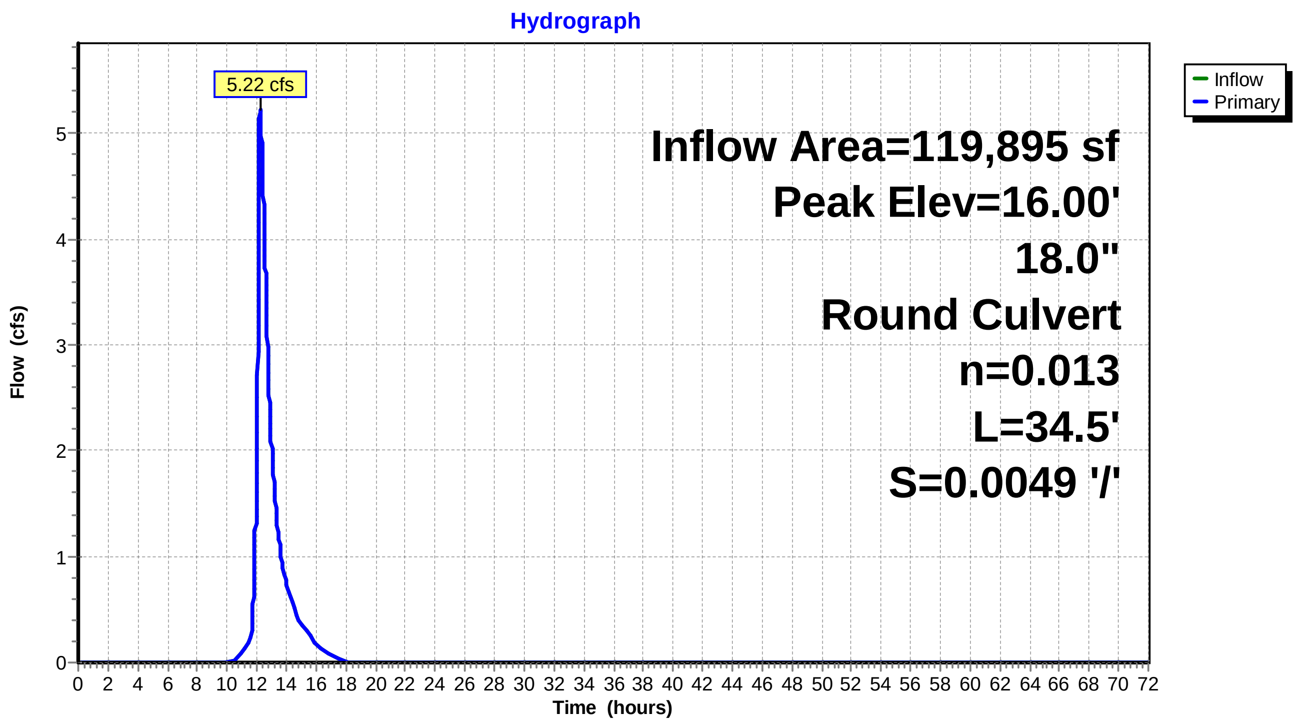
Inflow Area =	119,895 sf, 77.56% Impervious,	Inflow Depth = 2.27"	for 10 yr event
Inflow =	5.22 cfs @ 12.21 hrs, Volume=	22,717 cf	
Outflow =	5.22 cfs @ 12.21 hrs, Volume=	22,717 cf, Atten= 0%, Lag= 0.0 min	
Primary =	5.22 cfs @ 12.21 hrs, Volume=	22,717 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 16.00' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.48'	**18.0" Round Culvert** L= 34.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.48' / 14.31' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.22 cfs @ 12.21 hrs HW=16.00' TW=15.60' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 5.22 cfs @ 3.61 fps)

Pond M47:



Summary for Pond M48:

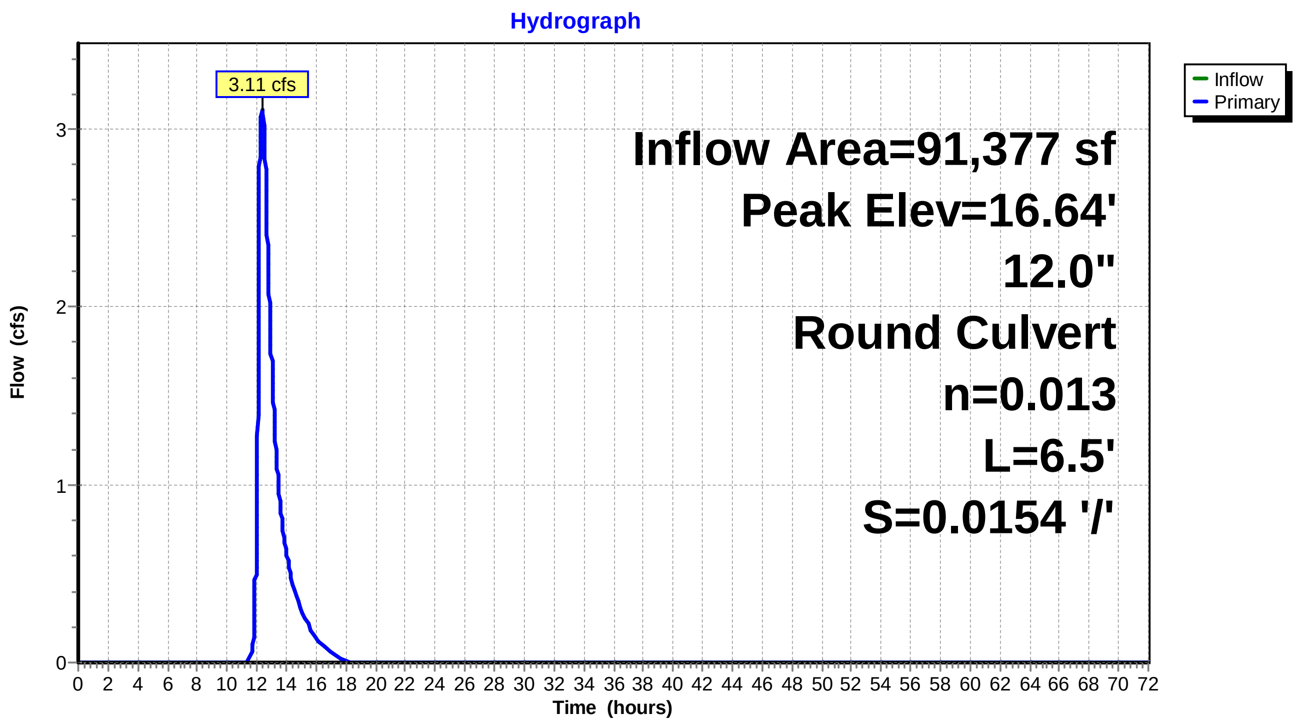
Inflow Area =	91,377 sf,	70.56% Impervious,	Inflow Depth = 2.06"	for 10 yr event
Inflow =	3.11 cfs @	12.35 hrs, Volume=	15,665 cf	
Outflow =	3.11 cfs @	12.35 hrs, Volume=	15,665 cf, Atten= 0%, Lag= 0.0 min	
Primary =	3.11 cfs @	12.35 hrs, Volume=	15,665 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 16.64' @ 12.25 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	15.10'	**12.0" Round Culvert** L= 6.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.10' / 15.00' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.13 cfs @ 12.35 hrs HW=16.57' TW=15.88' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.13 cfs @ 3.99 fps)

Pond M48:



Summary for Pond M49:

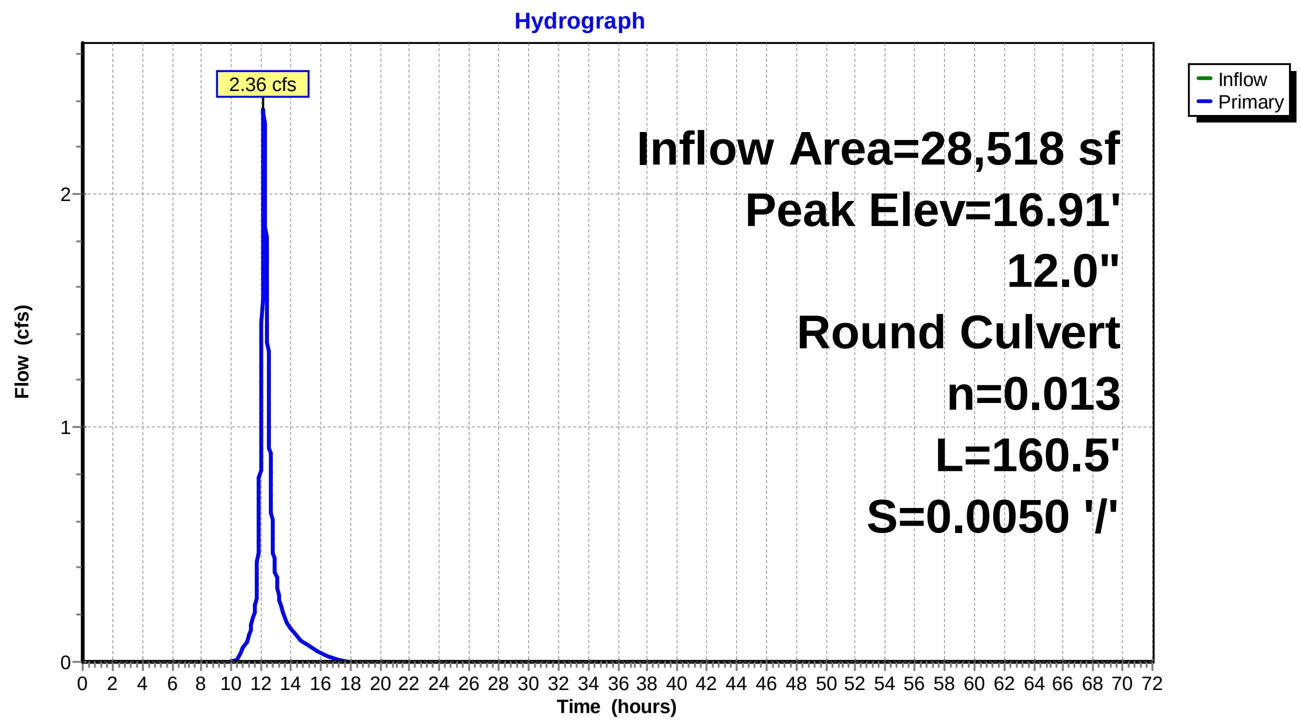
Inflow Area = 28,518 sf,100.00% Impervious, Inflow Depth = 2.97" for 10 yr event
Inflow = 2.36 cfs @ 12.16 hrs, Volume= 7,053 cf
Outflow = 2.36 cfs @ 12.16 hrs, Volume= 7,053 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.36 cfs @ 12.16 hrs, Volume= 7,053 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 16.91' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	15.80'	**12.0" Round Culvert** L= 160.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.80' / 15.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.33 cfs @ 12.16 hrs HW=16.90' TW=15.96' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 2.33 cfs @ 3.36 fps)

Pond M49:



Summary for Pond M50:

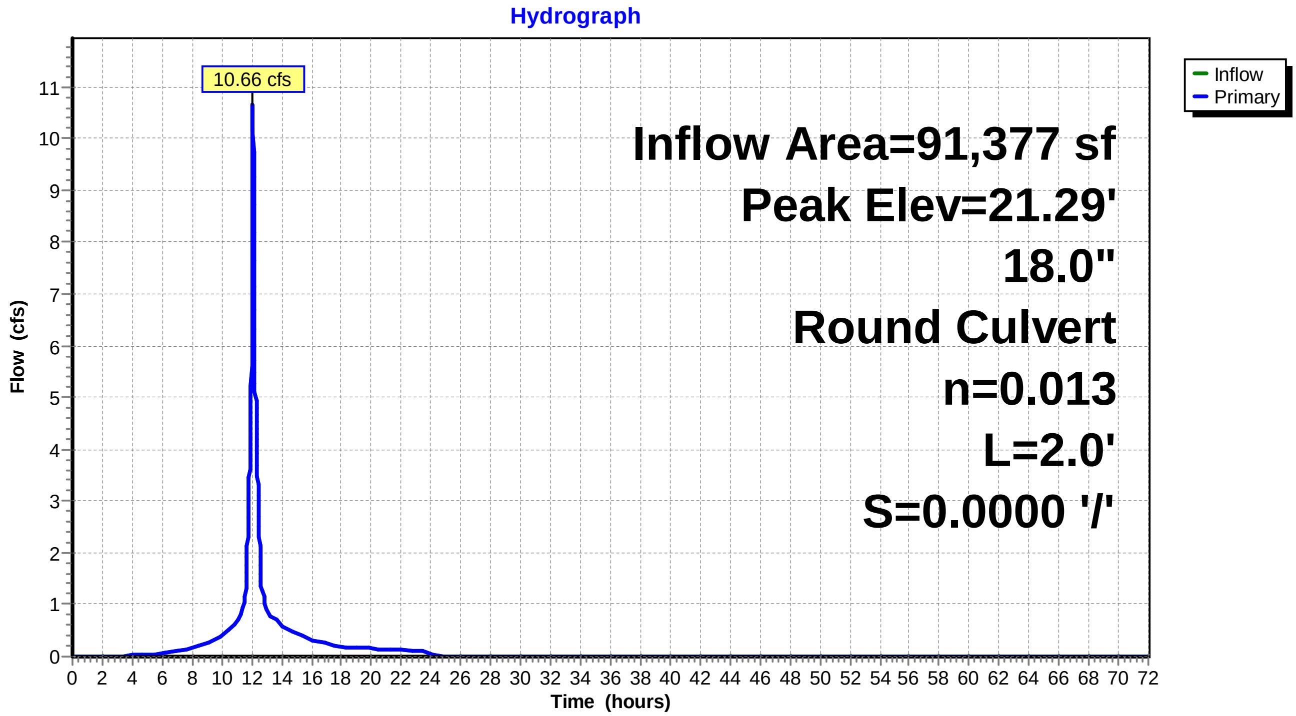
Inflow Area = 91,377 sf, 70.56% Impervious, Inflow Depth = 4.58" for 10 yr event
Inflow = 10.66 cfs @ 12.08 hrs, Volume= 34,882 cf
Outflow = 10.66 cfs @ 12.08 hrs, Volume= 34,882 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.66 cfs @ 12.08 hrs, Volume= 34,882 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 21.29' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	18.92'	**18.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.92' / 18.92' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.64 cfs @ 12.08 hrs HW=21.28' TW=19.49' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 10.64 cfs @ 6.02 fps)

Pond M50:



Summary for Pond M50A:

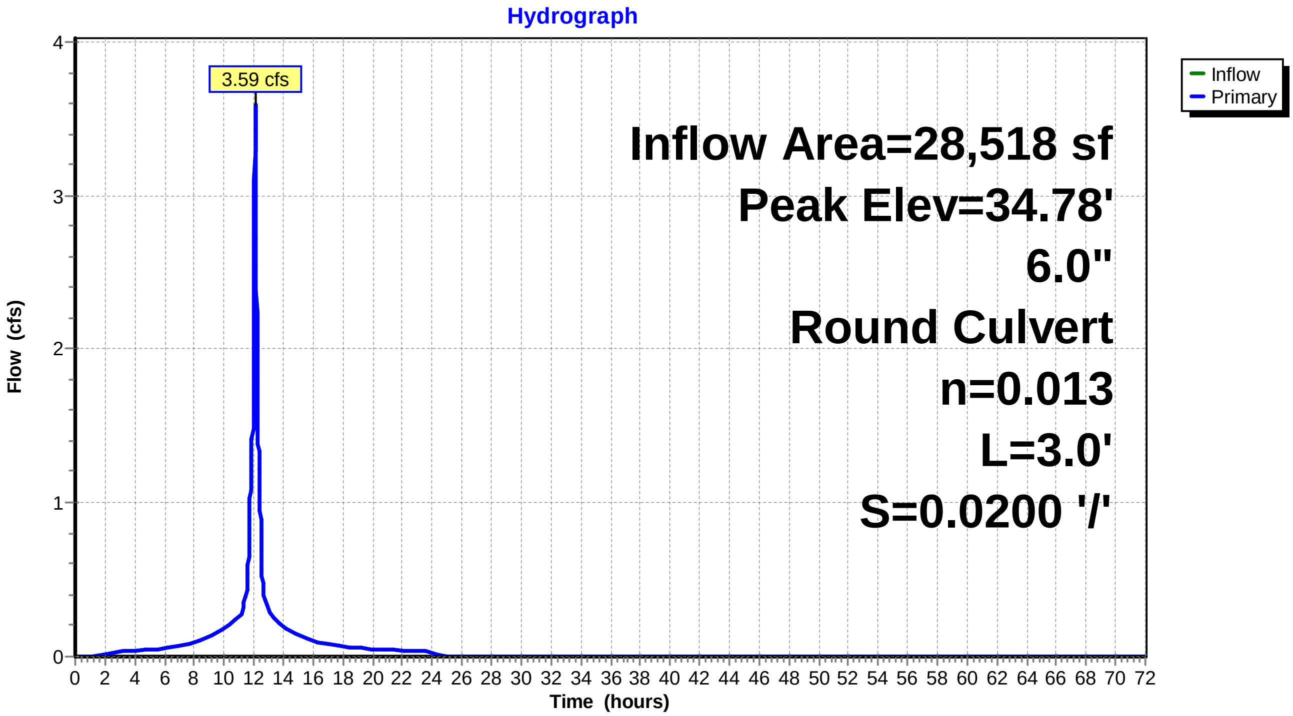
Inflow Area = 28,518 sf,100.00% Impervious, Inflow Depth = 5.36" for 10 yr event
Inflow = 3.59 cfs @ 12.08 hrs, Volume= 12,744 cf
Outflow = 3.59 cfs @ 12.08 hrs, Volume= 12,744 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.59 cfs @ 12.08 hrs, Volume= 12,744 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 34.78' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	20.10'	**6.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.10' / 20.04' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=3.58 cfs @ 12.08 hrs HW=34.73' TW=19.50' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.58 cfs @ 18.26 fps)

Pond M50A:



Summary for Pond M51:

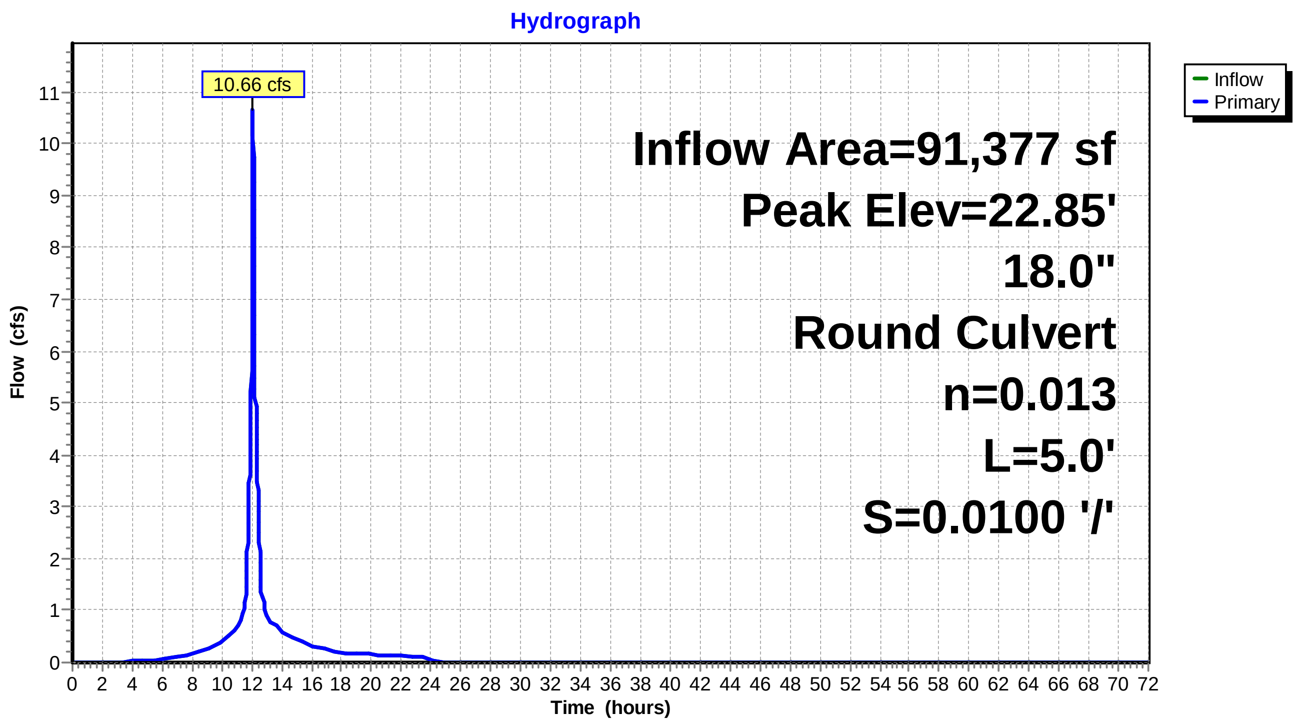
Inflow Area = 91,377 sf, 70.56% Impervious, Inflow Depth = 4.58" for 10 yr event
Inflow = 10.66 cfs @ 12.08 hrs, Volume= 34,882 cf
Outflow = 10.66 cfs @ 12.08 hrs, Volume= 34,882 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.66 cfs @ 12.08 hrs, Volume= 34,882 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 22.85' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	18.97'	**18.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.97' / 18.92' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.59 cfs @ 12.08 hrs HW=22.83' TW=21.28' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.59 cfs @ 5.99 fps)

Pond M51:



Summary for Pond M53:

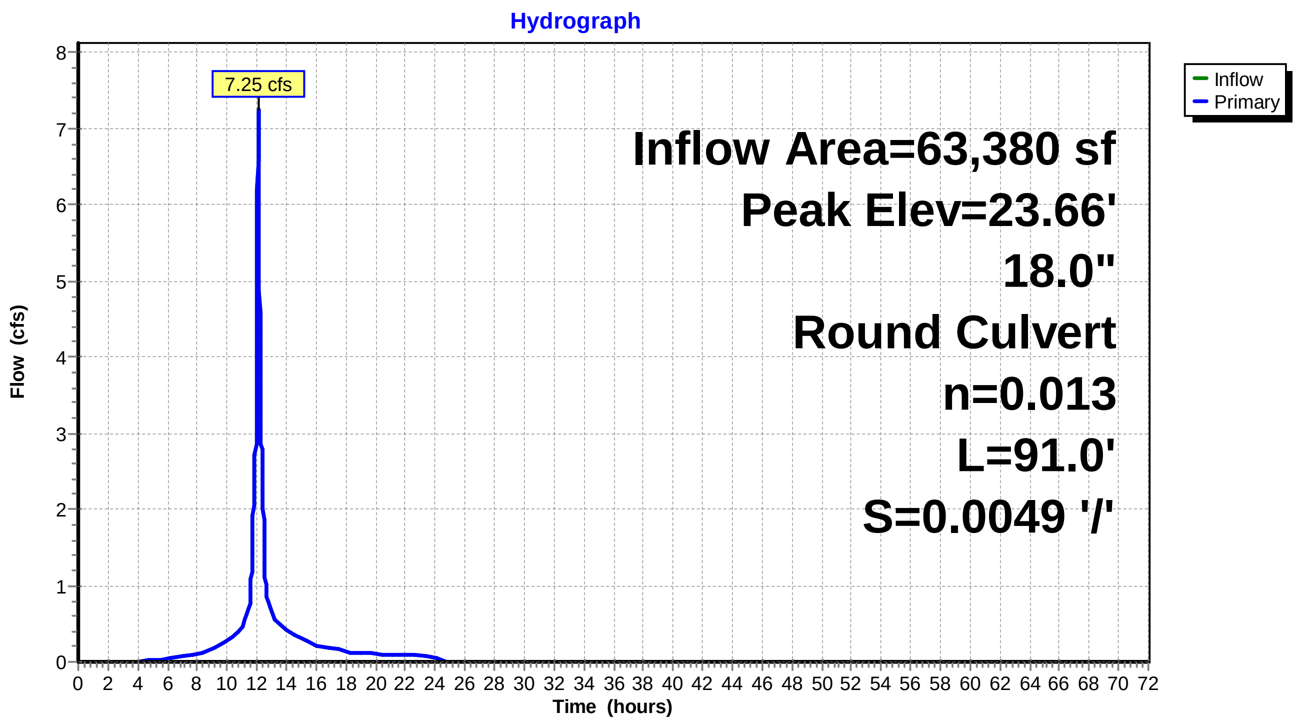
Inflow Area = 63,380 sf, 65.40% Impervious, Inflow Depth = 4.44" for 10 yr event
Inflow = 7.25 cfs @ 12.08 hrs, Volume= 23,449 cf
Outflow = 7.25 cfs @ 12.08 hrs, Volume= 23,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.25 cfs @ 12.08 hrs, Volume= 23,449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 23.66' @ 12.09 hrs
Flood Elev= 24.99'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.52'	**18.0" Round Culvert** L= 91.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.52' / 19.07' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.97 cfs @ 12.08 hrs HW=23.60' TW=22.83' (Dynamic Tailwater)
1=Culvert (Outlet Controls 6.97 cfs @ 3.94 fps)

Pond M53:



Summary for Pond M6:

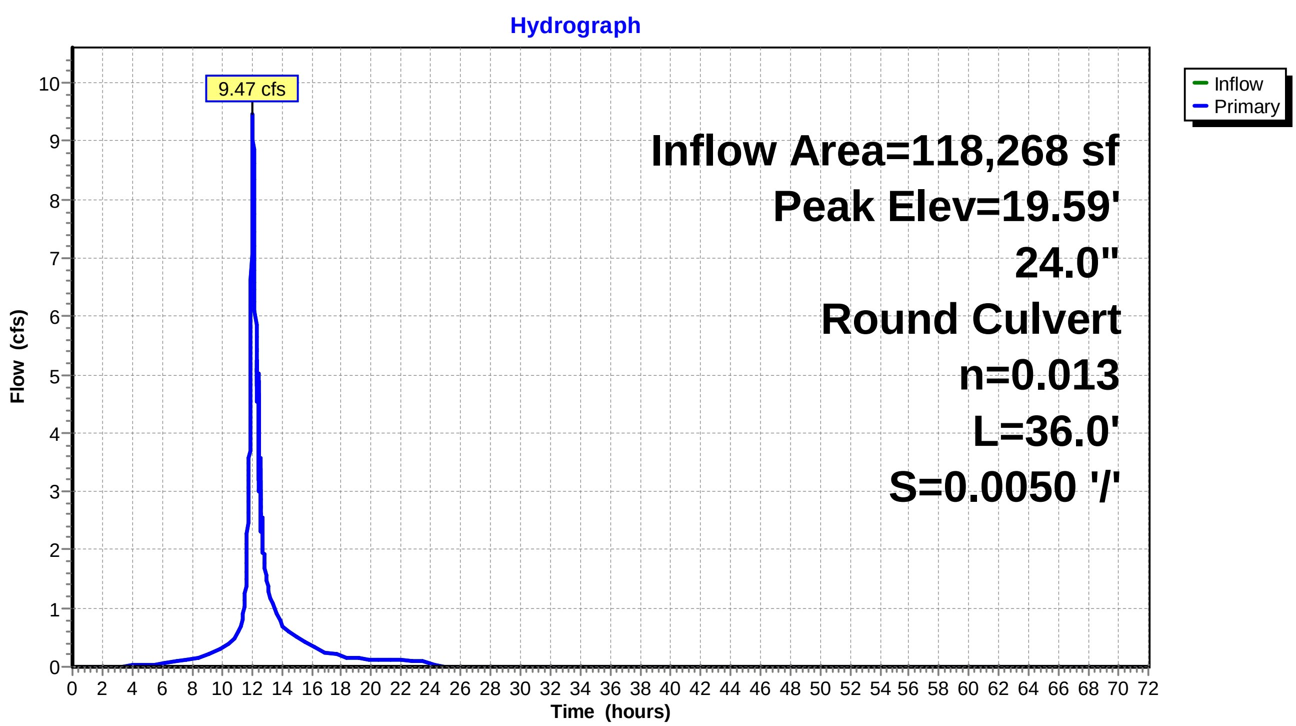
Inflow Area =	118,268 sf,	72.28% Impervious,	Inflow Depth = 3.86"	for 10 yr event
Inflow =	9.47 cfs @	12.07 hrs, Volume=	38,045 cf	
Outflow =	9.47 cfs @	12.07 hrs, Volume=	38,045 cf, Atten= 0%, Lag= 0.0 min	
Primary =	9.47 cfs @	12.07 hrs, Volume=	38,045 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.59' @ 12.09 hrs
Flood Elev= 22.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.99'	**24.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.99' / 16.81' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=8.95 cfs @ 12.07 hrs HW=19.54' TW=19.19' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 8.95 cfs @ 2.85 fps)

Pond M6:



Summary for Pond M61:

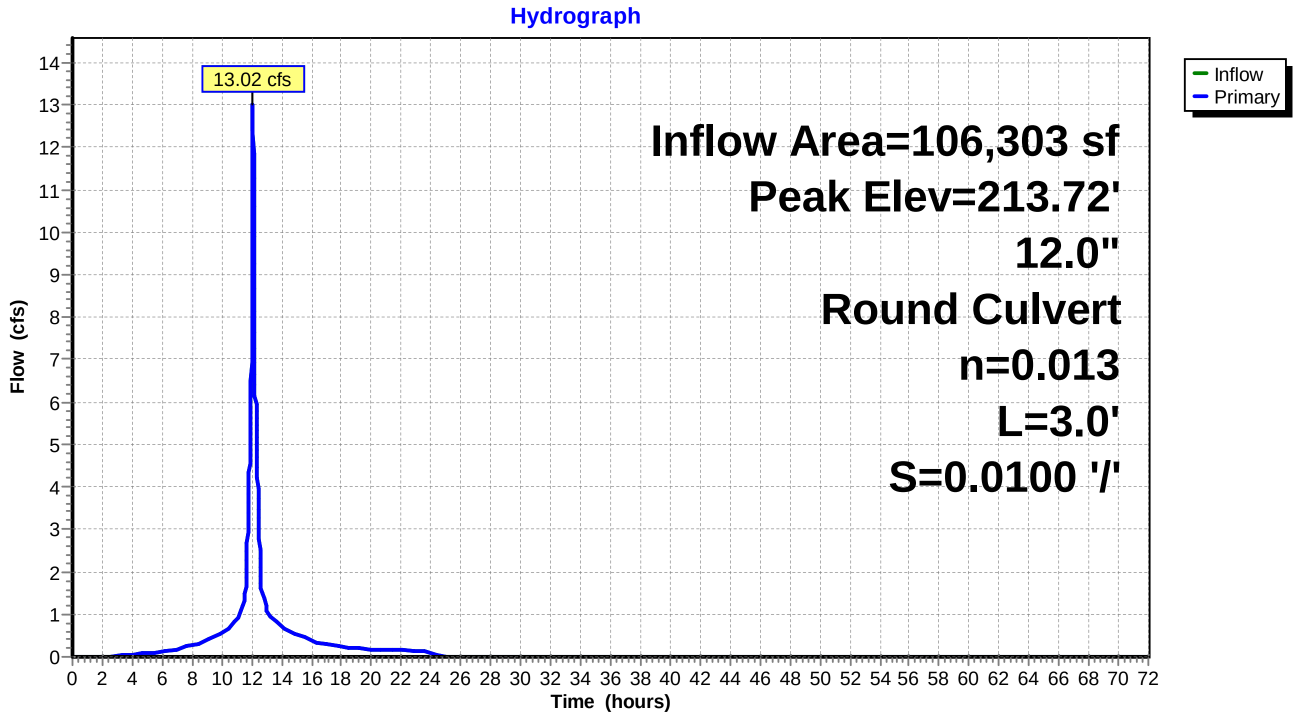
Inflow Area = 106,303 sf, 86.53% Impervious, Inflow Depth = 4.96" for 10 yr event
Inflow = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf
Outflow = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 213.72' @ 12.12 hrs
Flood Elev= 25.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.18'	**12.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.18' / 18.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=182.02' TW=184.88' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond M61:



Summary for Pond M62:

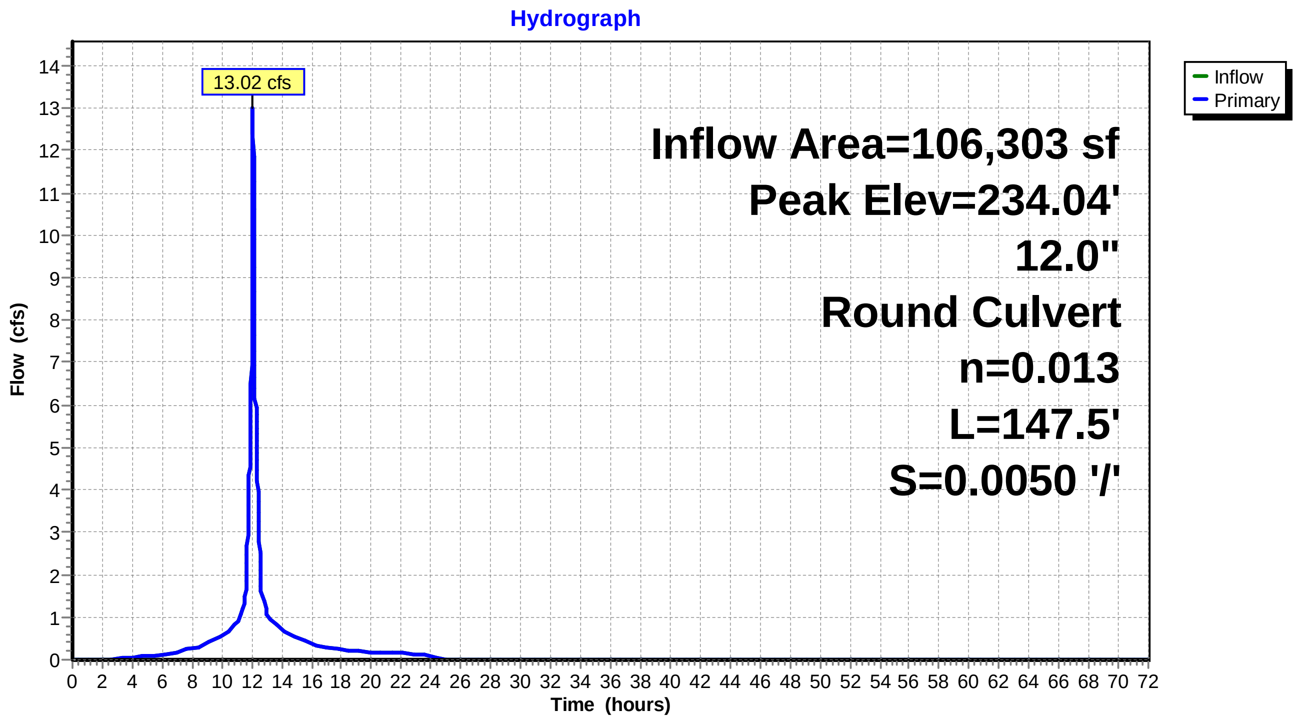
Inflow Area = 106,303 sf, 86.53% Impervious, Inflow Depth = 4.96" for 10 yr event
Inflow = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf
Outflow = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.02 cfs @ 12.08 hrs, Volume= 43,956 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 234.04' @ 12.12 hrs
Flood Elev= 24.53'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.02'	**12.0" Round Culvert** L= 147.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.02' / 18.28' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=7.67 cfs @ 12.08 hrs HW=191.10' TW=182.02' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 7.67 cfs @ 9.76 fps)

Pond M62:



Summary for Pond M64:

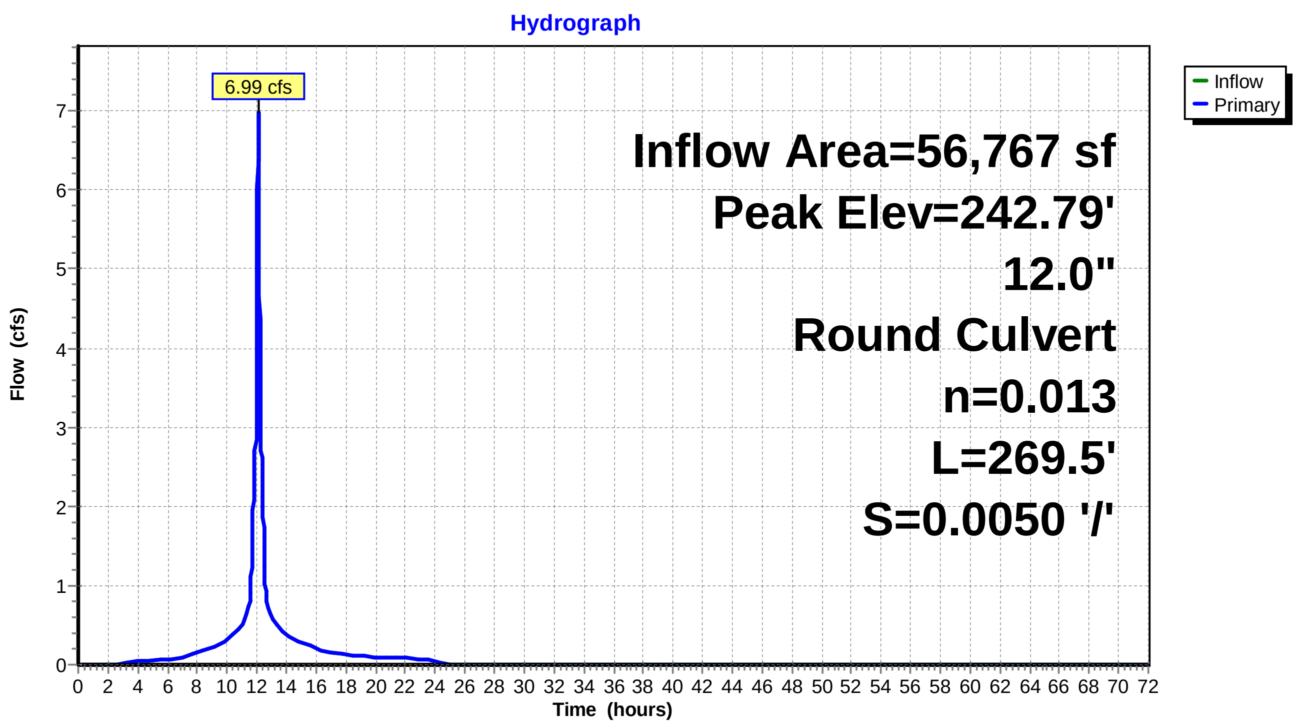
Inflow Area =	56,767 sf, 88.14% Impervious,	Inflow Depth = 5.02"	for 10 yr event
Inflow =	6.99 cfs @ 12.08 hrs, Volume=	23,726 cf	
Outflow =	6.99 cfs @ 12.08 hrs, Volume=	23,726 cf, Atten= 0%, Lag= 0.0 min	
Primary =	6.99 cfs @ 12.08 hrs, Volume=	23,726 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 242.79' @ 12.13 hrs
Flood Elev= 24.32'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.47'	**12.0" Round Culvert** L= 269.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.47' / 19.12' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=184.76' TW=190.95' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond M64:



Summary for Pond M66:

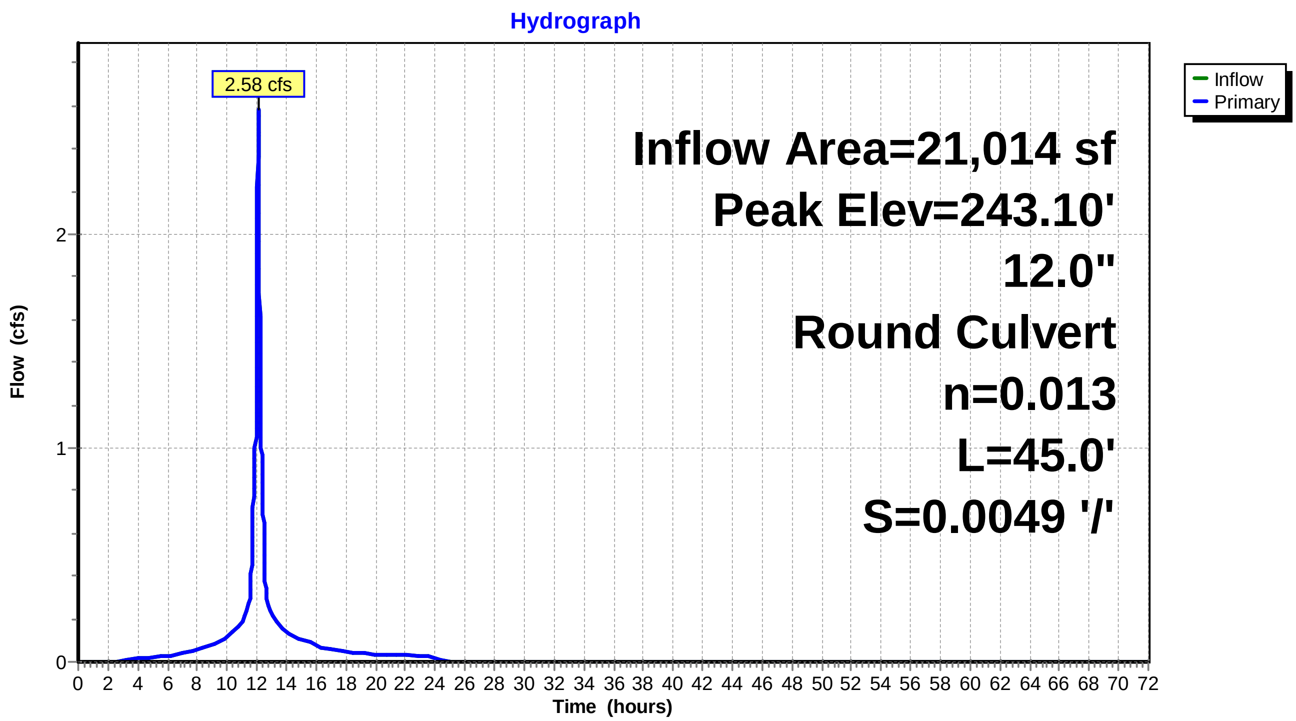
Inflow Area = 21,014 sf, 87.41% Impervious, Inflow Depth = 5.02" for 10 yr event
Inflow = 2.58 cfs @ 12.08 hrs, Volume= 8,786 cf
Outflow = 2.58 cfs @ 12.08 hrs, Volume= 8,786 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.58 cfs @ 12.08 hrs, Volume= 8,786 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 243.10' @ 12.14 hrs
Flood Elev= 25.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.79'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.79' / 20.57' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=166.23' TW=184.77' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond M66:



Summary for Pond M9:

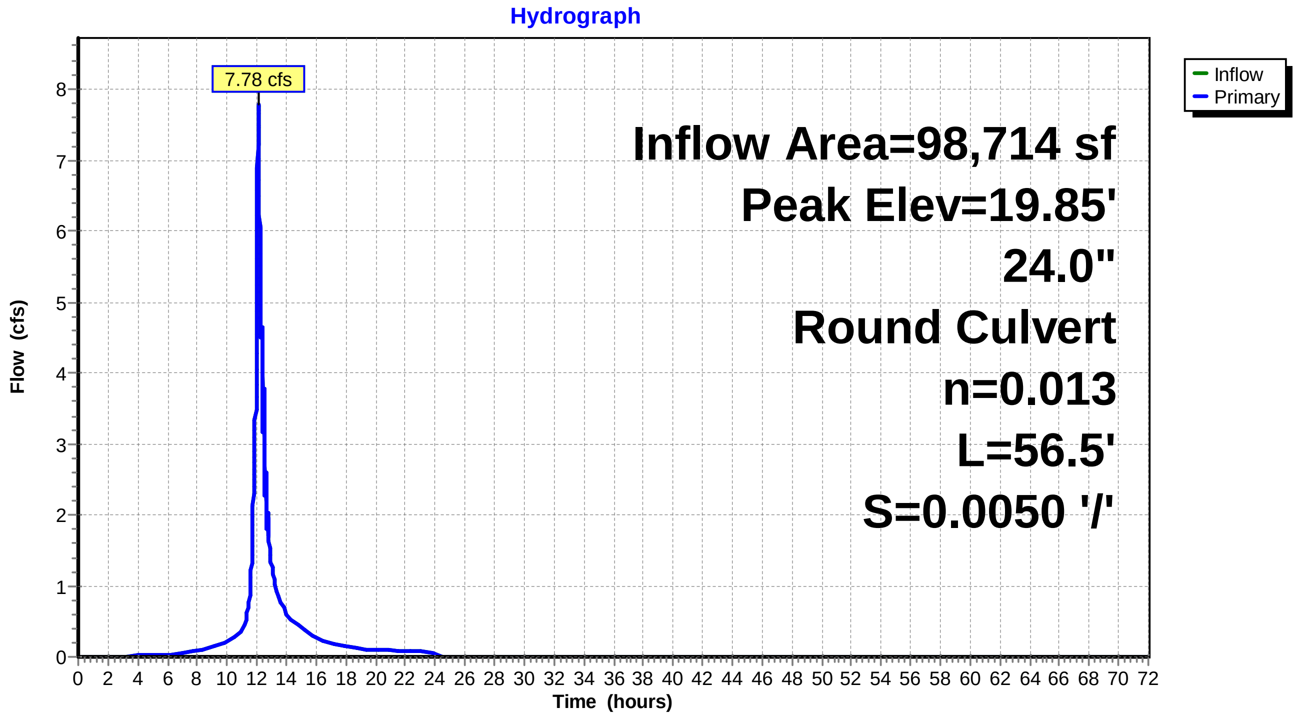
Inflow Area = 98,714 sf, 70.02% Impervious, Inflow Depth = 3.65" for 10 yr event
Inflow = 7.78 cfs @ 12.09 hrs, Volume= 30,023 cf
Outflow = 7.78 cfs @ 12.09 hrs, Volume= 30,023 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.78 cfs @ 12.09 hrs, Volume= 30,023 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 19.85' @ 12.10 hrs
Flood Elev= 23.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.37'	**24.0" Round Culvert** L= 56.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.37' / 17.09' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.38 cfs @ 12.09 hrs HW=19.82' TW=19.58' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 7.38 cfs @ 2.35 fps)

Pond M9:



Summary for Pond RD 20:

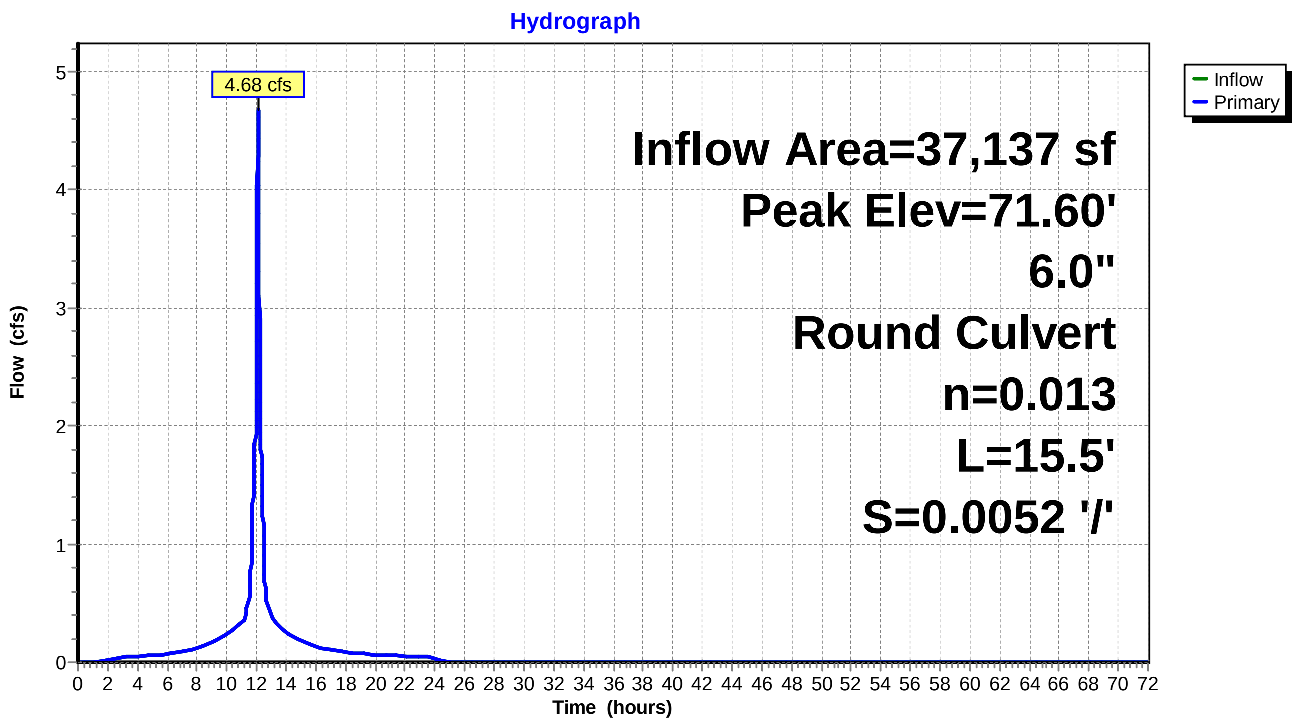
Inflow Area = 37,137 sf,100.00% Impervious, Inflow Depth = 5.36" for 10 yr event
Inflow = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf
Outflow = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.08 hrs, Volume= 16,595 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 71.60' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	22.78'	**6.0" Round Culvert** L= 15.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.78' / 22.70' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=4.63 cfs @ 12.08 hrs HW=71.26' TW=47.23' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.63 cfs @ 23.60 fps)

Pond RD 20:



Summary for Pond RD B:

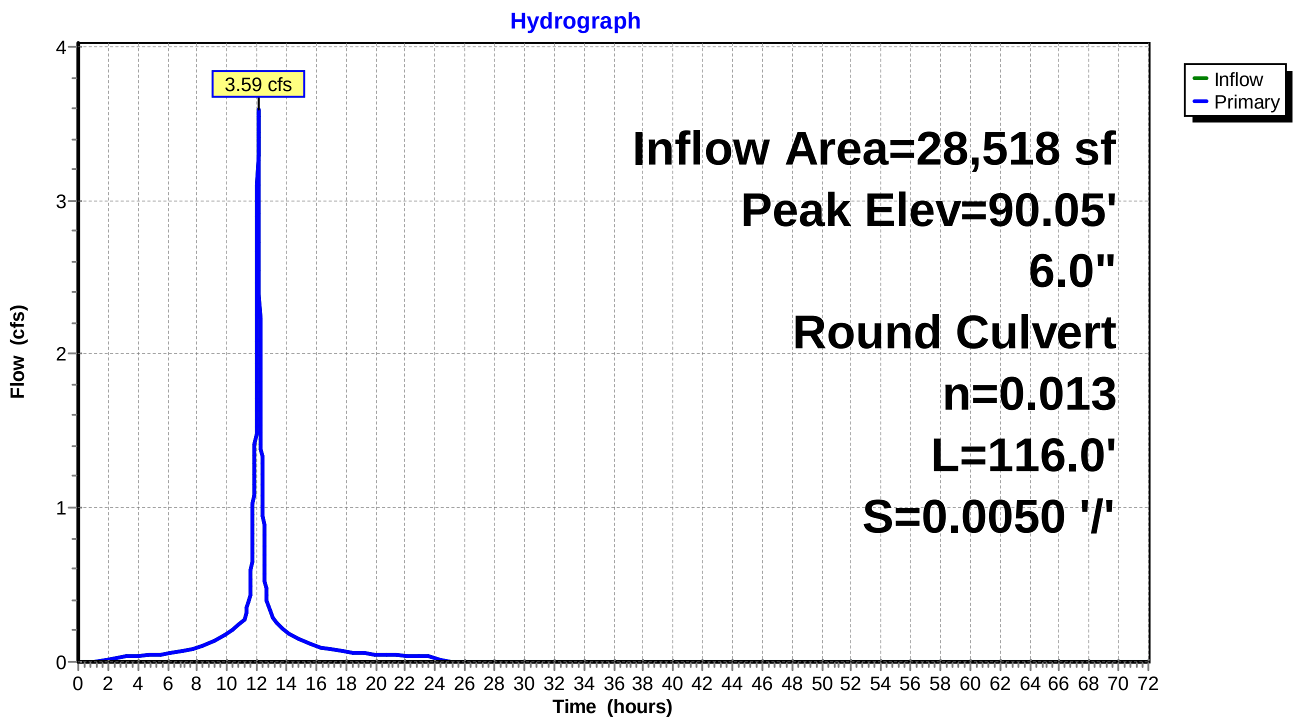
Inflow Area =	28,518 sf,100.00% Impervious,	Inflow Depth = 5.36"	for 10 yr event
Inflow =	3.59 cfs @ 12.08 hrs, Volume=	12,744 cf	
Outflow =	3.59 cfs @ 12.08 hrs, Volume=	12,744 cf, Atten= 0%, Lag= 0.0 min	
Primary =	3.59 cfs @ 12.08 hrs, Volume=	12,744 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 90.05' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	20.78'	**6.0" Round Culvert** L= 116.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.78' / 20.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=3.58 cfs @ 12.08 hrs HW=89.78' TW=34.73' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 3.58 cfs @ 18.22 fps)

Pond RD B:



Summary for Pond RD69:

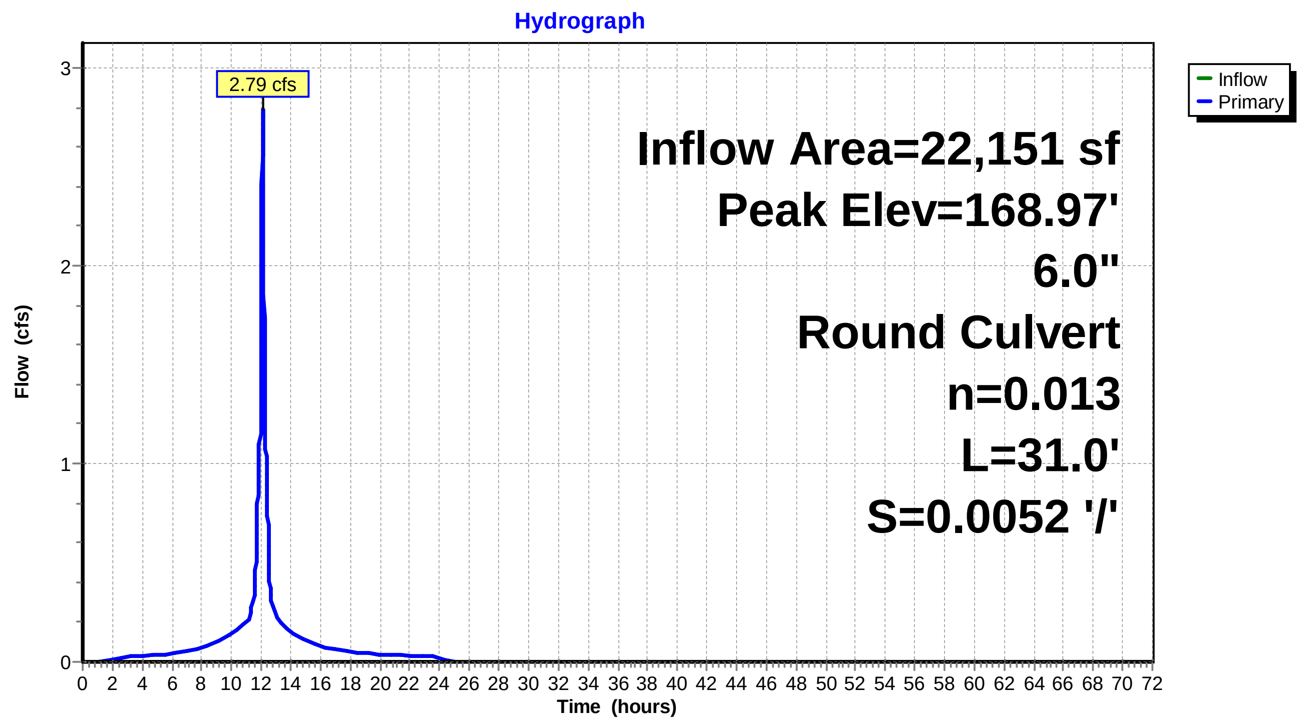
Inflow Area = 22,151 sf,100.00% Impervious, Inflow Depth = 5.36" for 10 yr event
Inflow = 2.79 cfs @ 12.08 hrs, Volume= 9,898 cf
Outflow = 2.79 cfs @ 12.08 hrs, Volume= 9,898 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.79 cfs @ 12.08 hrs, Volume= 9,898 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 168.97' @ 12.10 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.16'	**6.0" Round Culvert** L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.16' / 18.00' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=1.72 cfs @ 12.08 hrs HW=157.98' TW=153.24' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.72 cfs @ 8.78 fps)

Pond RD69:



Summary for Pond WQS1:

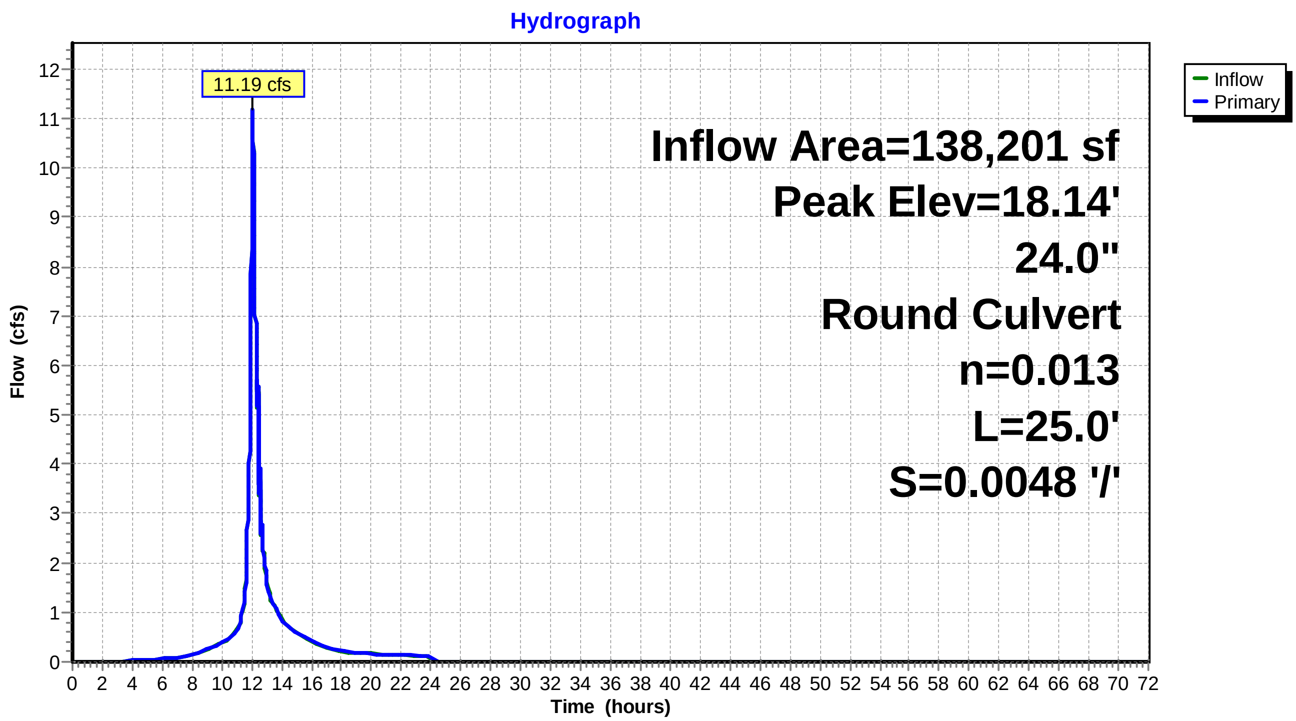
Inflow Area = 138,201 sf, 66.19% Impervious, Inflow Depth = 3.82" for 10 yr event
Inflow = 11.18 cfs @ 12.07 hrs, Volume= 43,974 cf
Outflow = 11.19 cfs @ 12.07 hrs, Volume= 43,974 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.19 cfs @ 12.07 hrs, Volume= 43,974 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 18.14' @ 12.07 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.12'	**24.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.12' / 16.00' S= 0.0048 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=11.13 cfs @ 12.07 hrs HW=18.14' TW=17.60' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 11.13 cfs @ 3.54 fps)

Pond WQS1:



Appendix G

Rip-Rap Apron / Energy Dissipation Calculations

Project Name:	Cate Street			Project Location.:	Portsmouth
Project No.:	20180317	Date:	20-May	By: RRL	Chk'd By: JVA

Design Storm: **25** **Year**

Apron Location: Outle to Hodgson Brook from WQU 1

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**16.15**	**cfs**		**From HydroCAD**
Channel Bottom Width =	**4**	**ft.**	(3 x Do)	
Slope (along channel) =	**0.02**	**ft/ft**		
Left Side Slope =	**3**	**h:v ang. =**	18.43	deg.
Right Side Slope =	**3**	**h:v ang. =**	18.43	deg.
Depth of Flow =	**0.741**	**ft.**		**Iterative Input**
Manning's 'n' =	**0.0393**			
Area =	4.61	sq.ft.		
Wetted Perimeter =	8.69	ft.		
Hydraulic Radius =	0.53	ft.		
Top Width =	8.45	ft.		
Velocity =	3.50	ft/sec		
Q (determined) =	**16.16**	**cfs**	**FLOW DEPTH ACHIEVED**	

ROCK RIP-RAP SIZE:

(Equ. Taken from Figure 7-43, 7-44, NH Erosion control Handbook)

Trapazoidal Channel:

d50 = 12((118QS^(13/6))(R/P))^(2/5) — **d50 = 3.0 inches***

n(based on d50 and DF) = (DF^(1/6)/(21.6 x log(DF/d50)+14) — **n = 0.0393 ****

Triangular Channel:

(likely not used; if it is change cell E14 to refernce cell H32)

d50 = 12((64.4QS^(13/6))(Z/((Z^2)+1))^(2/5) — **d50 = 5.0 inches***

n(based on d50 and DF) = (DF^(1/6)/(21.6 x log(DF/d50)+14) — **n = 0.0490 ****

*Please note d50 has been rounded to the nearest whole number in inches for easier gradation
**'n' is base on the rounded d50 in order to give the proper coefficent for rip-rap as specified

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**24**	**Inches**	**From HydroCAD**
Tail Water Depth (TW) =	**0.74**	**ft.**	(greater of depth of flow above or TW below)
Length of Apron (La) =	24.28	ft.	
Width of Apron @ Do (Wo) =	6	ft.	
Width of Apron @ D.S. End (W) =	30.28	ft.	
Width of Apron if Channel (W) =	4	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.40

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

Class B

d50 = (0.02 x Q^(4/3))/(TW x Do) — **d50 = 6.61 inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed — **USE: 7 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	**11**	to	14
85	**9**	to	13
50	**7**	to	11
15	**2**	to	4

Minimum Rock RipRap Blanket Thickness = 16 **in. use** 16 in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

FORMULAE USED:

References:

NHDES Erosion Control Handbook, Pages 7-114, 7-115

NH Stromwater Manual: Volume 2, section 4-6.6, pages 172-174

Note: This spreadsheet was generated using the print-out "Pipe Outlet Protection Apron Design and d50 Riprap Sizing" prepared by Ed Minick of the Rockingham County Conservation District as a guide.

Manning's Uniform Channel Flow:	Q = 1.486*(A x r^(2/3) x s^(1/2)) / n
Length of Apron (La) TW < Do/2:	La = (1.8 x Q/(Do^(1.5)) + 7Do
Length of Apron (La) TW > Do/2:	La = (3.0 x Q/(Do^(1.5)) + 7Do
Width of Apron @ D.S. End TW < Do/2:	W = 3Do + La
Width of Apron @ D.S. End TW >= Do/2:	W = 3Do + 0.4La
Width of D.S. End if Channel:	W = Channel Bottom Width
Width of Apron at Culvert:	Wo = 3 xDo

Appendix H

Site Specific Soils Survey

100%

Richard Lundborn

From: Luke Hurley <lhurley@gesinc.biz>
Sent: Wednesday, September 12, 2018 9:32 AM
To: Richard Lundborn
Subject: Cate street soil Map

Hi Rick,
Here is the soil map. Pretty straight forward:

400A Udorthents, sandy or gravelly

This map unit typically includes the following concepts: 1) very gravelly (> 35%) sand or very gravelly loamy sand; Or 2) sand or loamy sand textures that may have lenses of loamy very fine sand or finer somewhere in the particle-size class control section (25 - 100 cm or 10 - 40"). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class ranges from excessively drained to somewhat poorly drained. Typical gravel pit.

This would equaste to an Eldridge NRCS, 89 HSG C.

I see no need to mark up the plan.
Luke

Appendix I

Infiltration Feasibility Report

100%

GOVE ENVIRONMENTAL SERVICES, INC.

TEST PIT DATA

Project : Cate Street
Client: Torrington Properties
GES Project No. 2018141
03/01/2019– Luke Hurley

Test Pit No.	**101**	Lot No.:	
ESHWT:	36”	WSPCD Group:	
Termination @	68”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	62”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–24”	FILL				NONE	
24-36”	10YR 2/1	S	SG	FR	NONE	
36-68”	2.5Y 3/1	FS	BLK	FI	15% 10YR 5/6	

Test Pit No.	**102**	Lot No.:	
ESHWT:	32”	WSPCD Group:	
Termination @	90”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	70”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0-20”	FILL				NONE	
20-32”	2.5Y 4/4	FSL	GR	FR	NONE	
32-90”	2.5Y 4/3	FS	BLK	FI	15% 10YR 5/6	

Test Pit No.	**103**	Lot No.:	
ESHWT:	30”	WSPCD Group:	
Termination @	70”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	60”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–30”	FILL				NONE	
30-48”	G2.5/10Y	SLCL	BLK	FR	10% 10YR 5/6	
48-70”	2.5Y 4/4	FS	GR	FR	10% 10YR 5/6	

Test Pit No.	**104**	Lot No.:	
ESHWT:	36”	WSPCD Group:	
Termination @	72”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	67”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–36”	FILL				NONE	
36-60”	10YR 3/2	FSL	GR	FR	10% 10YR 5/6	
60-72”	2.5Y 4/4	FS	GR	FR	15% 10YR 5/6	

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526
Ph (603) 778 0644 / *Fax* (603) 778 0654
info@gesinc.biz
www.gesinc.biz

Test Pit No.	**105**	Lot No.:	
ESHWT:	24”	WSPCD Group:	
Termination @	80”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	74”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–24”	FILL				NONE	
24-80”	2.5Y 4/4	FS	BLK	FI	20% CON. & DEPL. 10YR 5/6	

Test Pit No.	**106**	Lot No.:	
ESHWT:	18”	WSPCD Group:	
Termination @	86”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	86”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–18”	FILL				NONE	
18-48”	2.5Y 4/3	FSL	BLK	FI	25% 10YR 5/6	
48-86”	2.5Y 4/4	FS	BLK	FI	20% 10YR 5/6	

Test Pit No.	**107**	Lot No.:	
ESHWT:	36”	WSPCD Group:	
Termination @	80”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	NA	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–36”	FILL				NONE	
36-46”	2.5Y 5/2	SL	BLK	FI	30% 10YR 5/6	
46-80”	2.5Y 4/4	FS	BLK	FI	10% 10YR 5/6	

Test Pit No.	**108**	Lot No.:	
ESHWT:	80”	WSPCD Group:	
Termination @	90”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	90”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–24”	FILL				NONE	
24-55”	10YR 4/6	FSL	GR	FR		
55-80”	10YR ¾	FS	GR	FR		
80-90”	2.5Y 4/4	FS	BLK	FI	15% 10YR 5/6	

Test Pit No.	**109**	Lot No.:	
ESHWT:	12”	WSPCD Group:	
Termination @	75”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	NA	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon

0–12”	FILL				NONE	
12-42”	G2.5/10Y	SLCL	OM	FI	15% 10YR 5/6	
42-75”	10YR 4/4	FS	GR	FR	15% 10YR 5/6	

Test Pit No.	**110**	Lot No.:	
ESHWT:	10”	WSPCD Group:	
Termination @	70”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	NA	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–10”	FILL				NONE	
10-48”	2.5Y 4/2	SLCL	OM	FI	35% 10YR 5/6	
48-70”	2.5Y 4/4	SLCL	OM	FR	25% 10YR 5/6	

Test Pit No.	**111**	Lot No.:	
ESHWT:	40”	WSPCD Group:	
Termination @	74”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	NA	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–12”	10YR 3/2	FSL	GR	FR	NONE	
12-24”	2.5Y 4/2	SIL	BLK	FI	NONE	
24-40”	2.5Y 4/3	FSL	GR	FR	NONE	
40-74”	2.5Y 4/3	FS	SG	FR	25% 10YR 5/6	

Test Pit No.	**112**	Lot No.:	
ESHWT:	17”	WSPCD Group:	
Termination @	68”	Roots to:	
Refusal:	None	SCS Soil:	NA
Obs. Water:	62”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–17”	FILL				NONE	
17-22”	G2.5/10Y	SLCL	BLK	FI	15% 10YR 5/6	
22-55”	2.5Y 2.5/1	SLCL	BLK	FI	15% 10YR 5/6	
55-63”	10YR 2/1	M	GR	FR	15% 10YR 5/6	
63-68”	G4/N	CL	BLK	FI	15% 10YR 5/6	

SEEP @ 42”

Test Pit No.	**113**	Lot No.:	
ESHWT:	NA	WSPCD Group:	
Termination @	42”	Roots to:	
Refusal: Ledge	42”	SCS Soil:	NA
Obs. Water:	NA	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
014”	FILL				NONE	
14-42”	2.5Y 4/4	FSL	GR	FR	NONE	

Test Pit No.	**114**	Lot No.:	
ESHWT:	NA	WSPCD Group:	

Termination @	76”	Roots to:	NA
Refusal:	None	SCS Soil:	NA
Obs. Water:	NA	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–16”	FILL				NONE	
16-42”	2.5Y 4/4	FS	GR	FR	NONE	
42-76”	2.5Y 3/3	FS	GR	FR	NONE	

Test Pit No.	**115**	Lot No.:	
ESHWT:	30”	WSPCD Group:	
Termination @	62”	Roots to:	NA
Refusal:	None	SCS Soil:	NA
Obs. Water:	NA	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–30”	FILL				NONE	
30-62”	2.5Y 4/4	FSL	GR	FR	10% 10YR 5/6	

Test Pit No.	**116**	Lot No.:	
ESHWT:	23”	WSPCD Group:	
Termination @	75”	Roots to:	NA
Refusal:	None	SCS Soil:	NA
Obs. Water:	75”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–23”	FILL				NONE	
23-75”	2.5Y 4/2	SLCL	OM	FI	25% 10YR 5/6	

Test Pit No.	**117**	Lot No.:	
ESHWT:	24”	WSPCD Group:	
Termination @	75”	Roots to:	NA
Refusal:	None	SCS Soil:	NA
Obs. Water:	65”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–24”	FILL				NONE	
24-40”	FILL				15% 10YR 5/6	
40-75”	2.5Y 4/2	SLCL	OM	FI	15% 10YR 5/6	

Test Pit No.	**118**	Lot No.:	
ESHWT:	20”	WSPCD Group:	
Termination @	76”	Roots to:	NA
Refusal:	None	SCS Soil:	NA
Obs. Water:	68”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–20”	FILL				NONE	
20-76”	2.5Y 4/2	SLCL	OM	FI	20% 10YR 5/6	

Test Pit No.	**119**	Lot No.:	
ESHWT:	30”	WSPCD Group:	
Termination @	70”	Roots to:	NA

Refusal:	None	SCS Soil:	NA
Obs. Water:	60”	HIS Type:	NA

Depth	Color	Texture	Structure	Consistence	Redox %	Horizon
0–30”	FILL				NONE	
30-70”	2.5Y 4/2	SLCL	OM	FI	20% 10YR 5/6	

March 18, 2019

Torrington Properties, Inc.
60 K Street
Boston, MA 02127

Attention: Mr. Jay Bisognano

Reference: West End Yards Development Site; Portsmouth, New Hampshire
Subsurface Exploration Program

Ladies and Gentlemen:

This letter documents the results of our subsurface exploration program, including the results of soil permeability analyses associated the proposed subsurface infiltration systems to be constructed for the West End Yards Development project to be located in Portsmouth, New Hampshire.

On March 1 and 5, 2019, nineteen (19) test pits TP-101 through TP-119 were performed at the site by P. K. Brown Construction of Portsmouth, New Hampshire under contract to McPhail Associates, LLC (McPhail). Approximate test pit locations are as indicated on the enclosed Subsurface Exploration Plan, **Figure 1**. A detailed description of the subsurface conditions encountered within the explorations is documented on the attached test pit logs.

The test pits were performed within the footprint of the proposed subsurface infiltration systems. A fill deposit encountered within the test pits was observed to extend to depths ranging from 1 to 5.5 feet below the existing ground surface. In general, the fill deposit consists of loose to compact, light brown to gray black silty sand and gravel to sandy silt with trace to some gravel containing cobbles, brick and wood. Below the fill material, an organic deposit was encountered within three (3) test pits TP-101, TP-112, and TP-117 at depths ranging from 3.5 to 5.5 feet below ground surface. The organic deposit was observed to consist of a soft, black, organic silt with trace sand. A natural marine clay deposit was present below the fill and/or organic deposits within seven (7) test pits TP-101, TP-103, TP-112, TP-116, TP-117, TP-118, and TP-119 at depths ranging from 3 to 5.5 feet below ground surface corresponding to Elevation +15.4 to Elevation +17.6. The marine clay deposit was observed to consist of a soft to stiff, blue to gray, silty clay. A natural glacial outwash deposit was present below the fill deposit within twelve (12) test pits at depths ranging from 0.3 to 5.5 feet below ground surface corresponding to Elevation +26.2 to Elevation +20.8. The glacial outwash deposit was observed to consist of a compact to very dense, light gray/brown, silty fine sand with trace to some gravel. Grain-size distributions of typical samples of glacial outwash are presented on the enclosed **Figures 2** and **3**. Within the exception of test pits TP-108 and TP-113 that were terminated on refusal on possible bedrock, the remaining test pits were terminated within glacial outwash or marine clay deposits.

Groundwater was observed during excavation in test pits TP-102, TP-105, TP-106, TP-108, TP-112, TP-116, TP-117, TP-118 and TP-119 at respective depths of 6, 6.5, 7, 7, 5, 6, 5.5, 5, and 5.5 feet below ground surface. Groundwater was not observed in other completed

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test pits. Due to the relatively impervious nature of the marine clay deposit and underlying bedrock, groundwater at the site is considered to be "perched" on the surface of the marine clay deposit and/or bedrock during and after precipitation events. It is anticipated that future groundwater levels across the project site may vary from those reported herein based on such factors such as normal seasonal changes, runoff during or following periods of heavy precipitation, and alterations to existing drainage patterns.

Soil Permeability

McPhail estimated the coefficient of permeability of the glacial outwash deposit based on laboratory grain-size distribution using the Kozeny-Carmen formula. This method involves the use of additional parameters such as void ratio and particle shape, which are estimated from the exploration data and the representative soil samples. The results of the Kozeny-Carmen formula indicate values of the coefficient of permeability within published ranges for similar soils.

Specifically, below are the tabulated results of the coefficient of permeability based on laboratory grain-size distribution using the Kozeny-Carmen formula within ten (10) test pits.

Exploration	Depth [feet]	Strata	k at 20°C [cm/s]	k at 10°C [cm/s]
TP-102	3.5 to 7.5	Glacial Outwash	3.41E-04	2.62E-04
TP-105	0 to 7.5	Glacial Outwash	8.17E-04	6.28E-04
TP-107	4 to 6.5	Glacial Outwash	6.07E-04	4.67E-04
TP-108	0 to 7.5	Glacial Outwash	2.45E-03	1.88E-03
TP-109	3 to 6	Glacial Outwash	3.67E-04	2.82E-04
TP-110	4.5 to 6	Glacial Outwash	1.29E-03	9.93E-04
TP-111	3.5 to 6	Glacial Outwash	6.90E-04	5.31E-04
TP-113	1.25 to 3.75	Glacial Outwash	4.57E-04	3.51E-04
TP-115	1 to 5	Glacial Outwash	3.01E-04	2.31E-04

In consideration of the above, a coefficient of permeability in the range of 1.9×10^{-3} to 3×10^{-4} cm/s and is recommended for the glacial outwash deposit.

It should be noted that the existing glacial outwash deposit is heterogeneous in composition and variable in density, thus, it is anticipated that the coefficient of permeability in the glacial outwash deposit will be highly variable and the results of our permeability testing may not be representative of the entire glacial outwash deposit at the site. The analyses and recommendations presented in this letter are based upon the data obtained from the subsurface explorations performed at the approximate locations indicated on the enclosed plan. If variations in the nature and extent of subsurface conditions between the widely spaced explorations become evident during the course of construction, it will be necessary for a re-evaluation of the recommendations of this letter to be made after performing on-site observations during the construction period and noting the characteristics of any variations.

Additionally, given that the marine clay deposit is consider impermeable, sieve and permeability analyses of this deposit were not performed. Generally, the marine clay deposit was encountered within the test pits performed at the northern and southern areas of the site. The approximate locations of these areas are indicated on the attached plan.

Furthermore, the approximate areas of the test pits that were terminated on refusal on possible bedrock are indicated on the attached plan.

Final Comments

We trust that the above is sufficient for your present requirements. Should you have any questions concerning the recommendations presented herein, please do not hesitate to call us.

Very truly yours,

McPHAIL ASSOCIATES, LLC

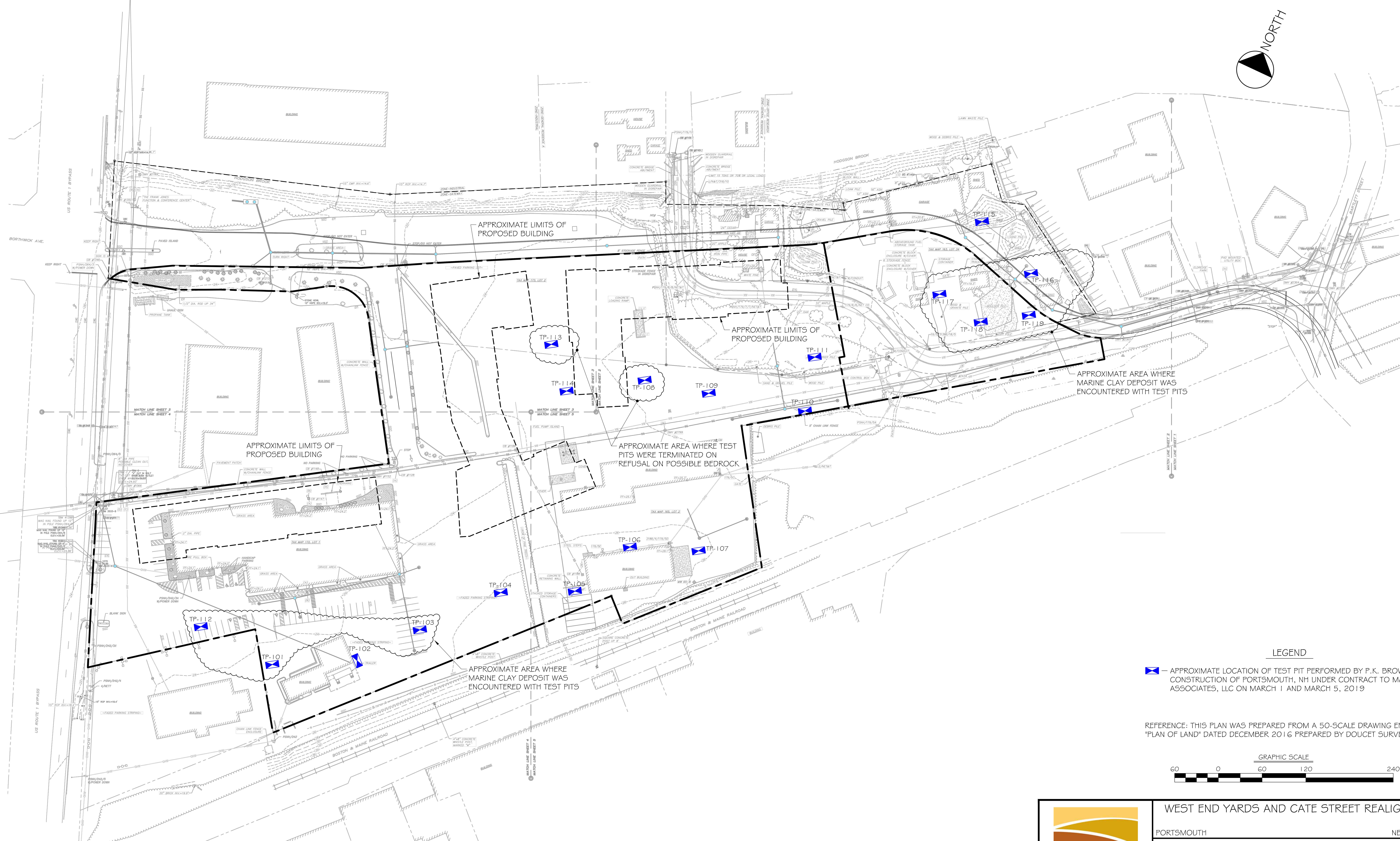
Fatima Babic-Konjic

Fatima Babic-Konjic, P.E.

Ambrose J. Donovan, P.E., L.S.P.

N:\Working Documents\Reports\6524_SEP_031819.docx

FBK/ajd



LEGEND

— APPROXIMATE LOCATION OF TEST PIT PERFORMED BY P.K. BROWN CONSTRUCTION OF PORTSMOUTH, NH UNDER CONTRACT TO McPHAIL ASSOCIATES, LLC ON MARCH 1 AND MARCH 5, 2019

REFERENCE: THIS PLAN WAS PREPARED FROM A 50-SCALE DRAWING ENTITLED, "PLAN OF LAND" DATED DECEMBER 2016 PREPARED BY DOUCET SURVEY INC.

GRAPHIC SCALE

60 0 60 120 240

McPHAIL ASSOCIATES, LLC
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WEST END YARDS AND CATE STREET REALIGNMENT

PORTSMOUTH NEW HAMPSHIRE

CONCEPTUAL SUBSURFACE EXPLORATION PLAN

FOR

TORRINGTON PROPERTIES, INC.

BY

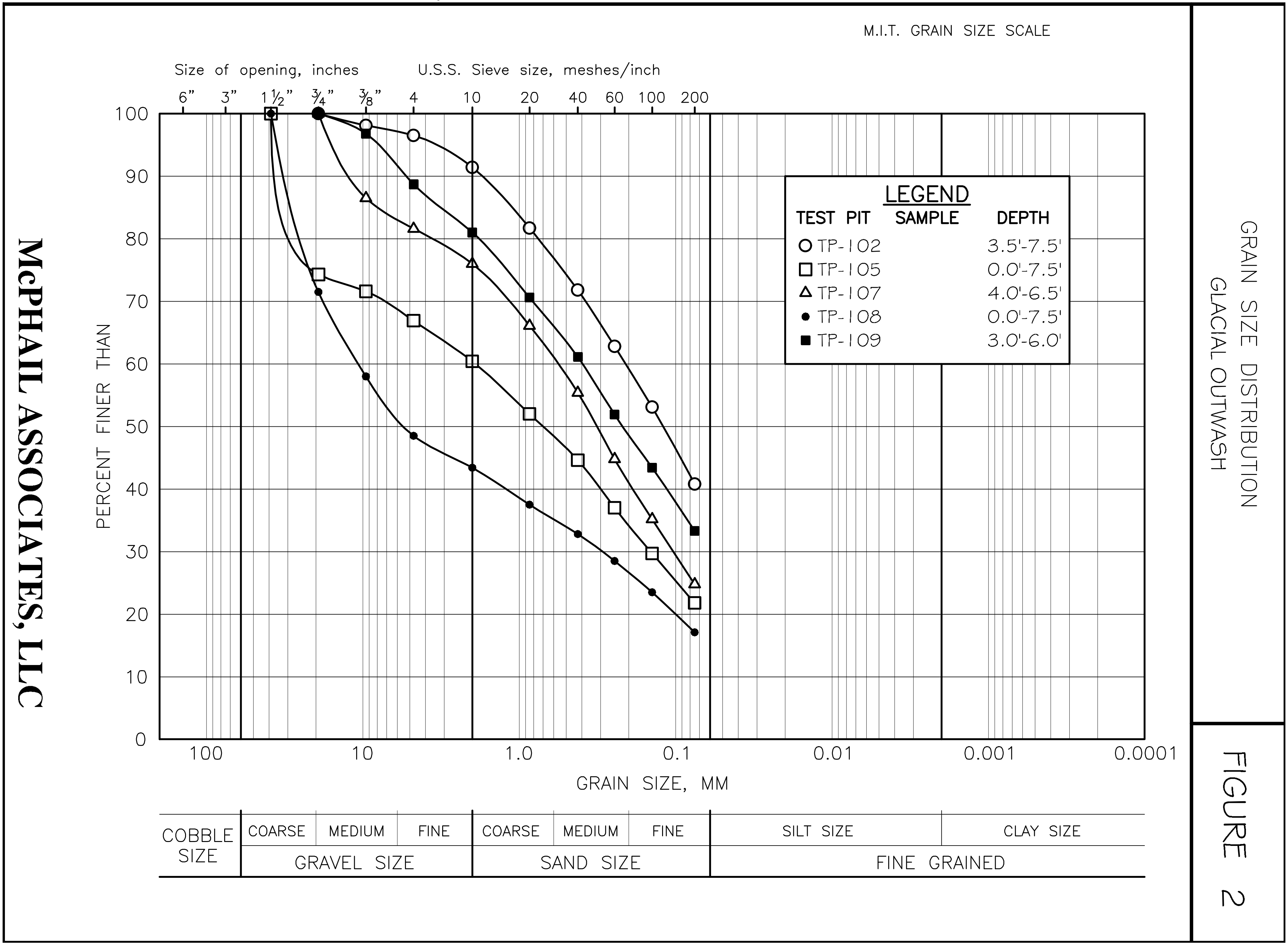
McPHAIL ASSOCIATES, LLC

Date: MARCH 2019	Dwn: M.B.S.	Chkd: F.B.K.	Scale: 1" = 60'
Project No: 6524			FIGURE 1

FILE NAME: N:\Acad\JOBS\6524\Storm Infiltration\6524-F01.dwg

FILE NAME: N:\Acad\JOBS\6524\Storm Infiltration\6524-F02_Sieve.dwg

PROJECT No. 6524



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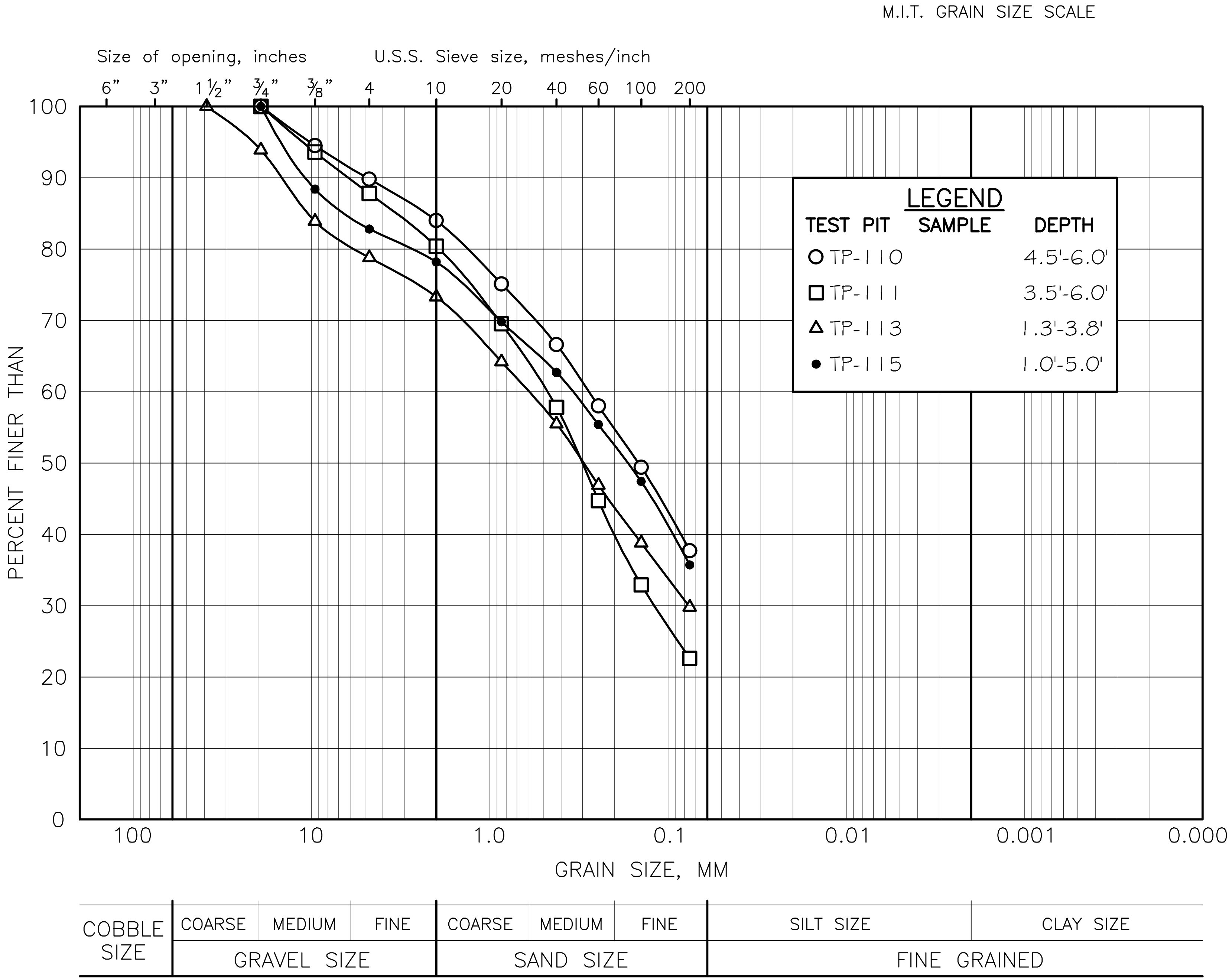
PROJECT No. 6524



McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
GLACIAL OUTWASH

FIGURE 3

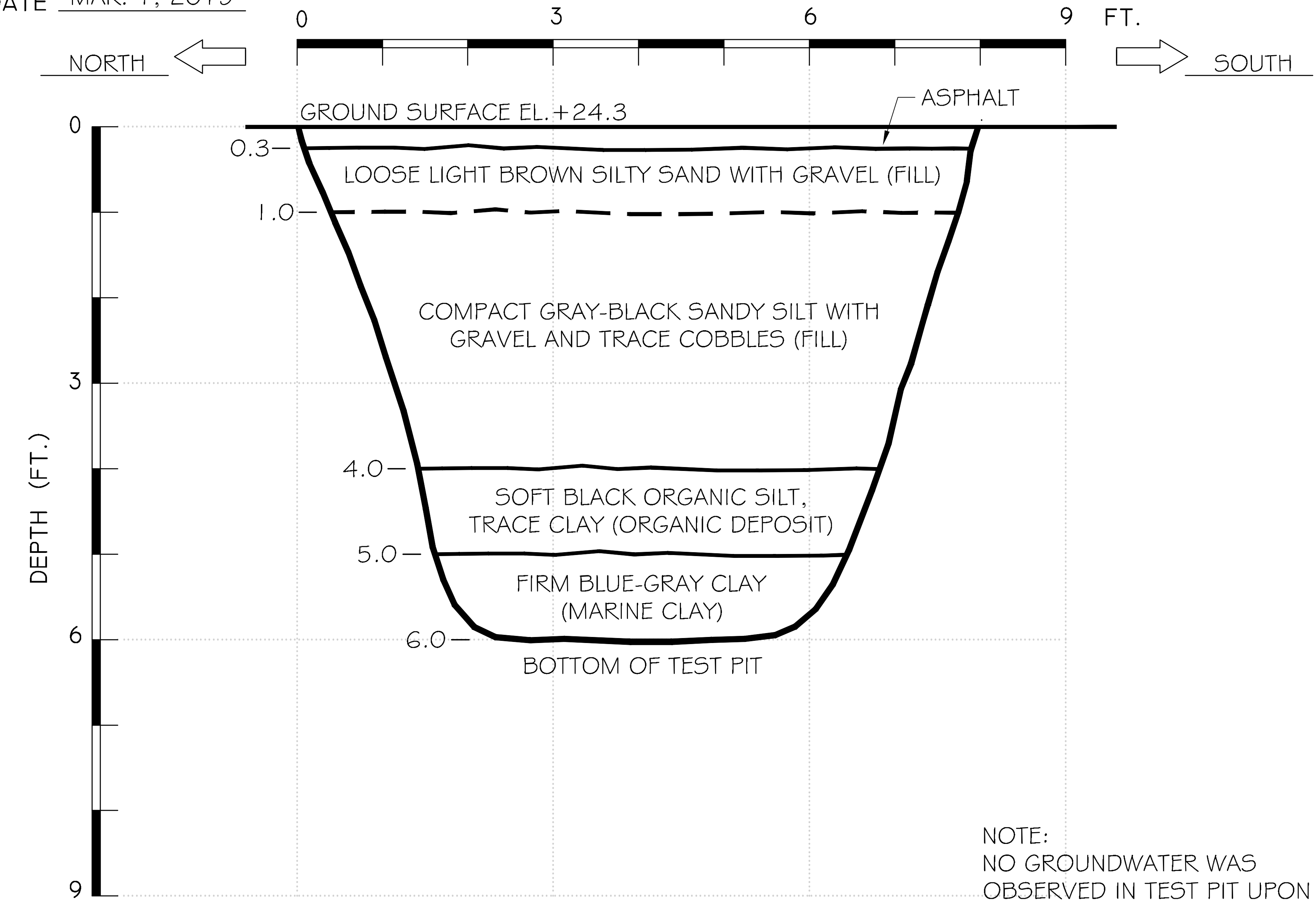
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 101



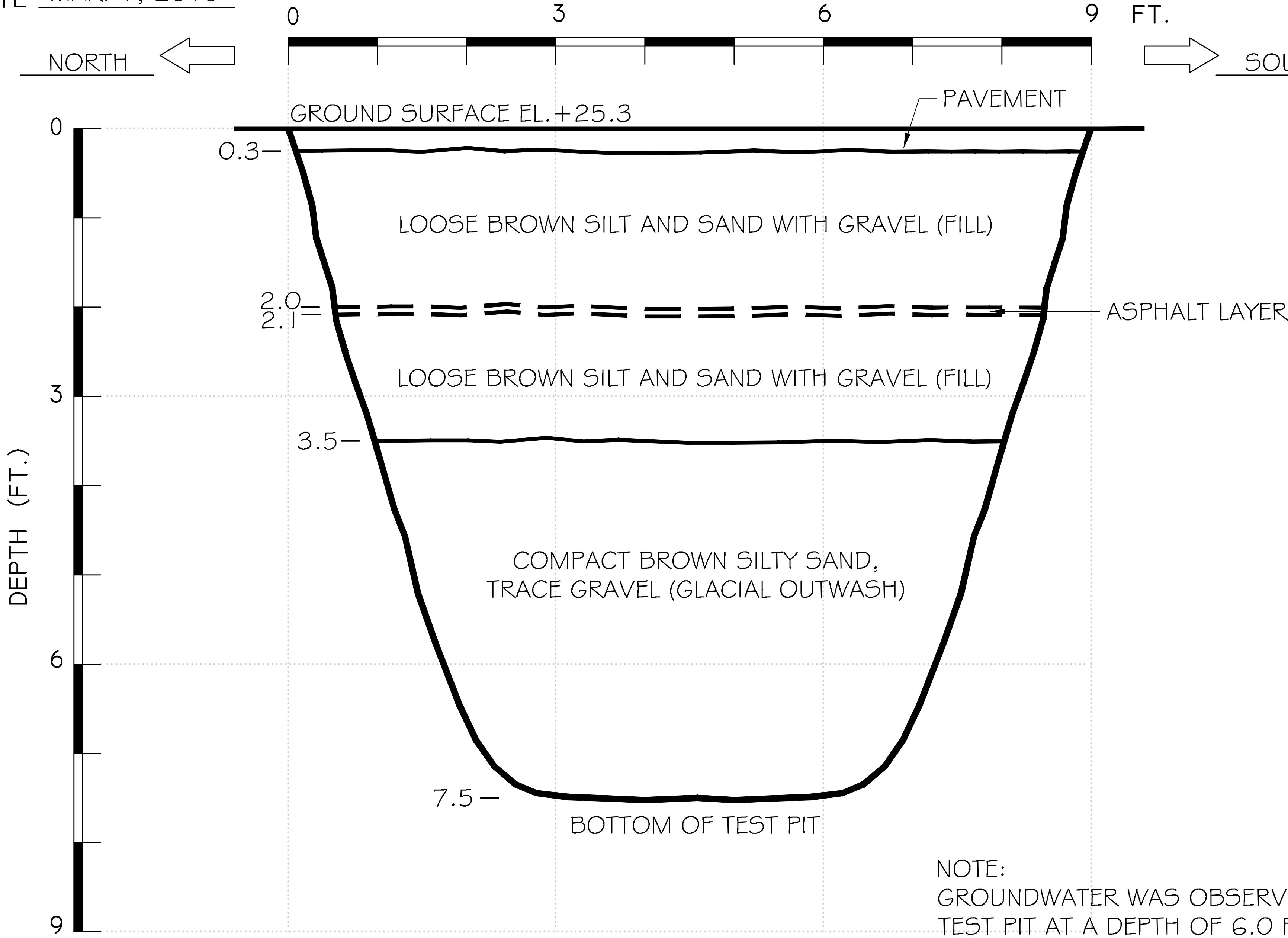
NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 102



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 6.0 FEET UPON COMPLETION OF EXCAVATION

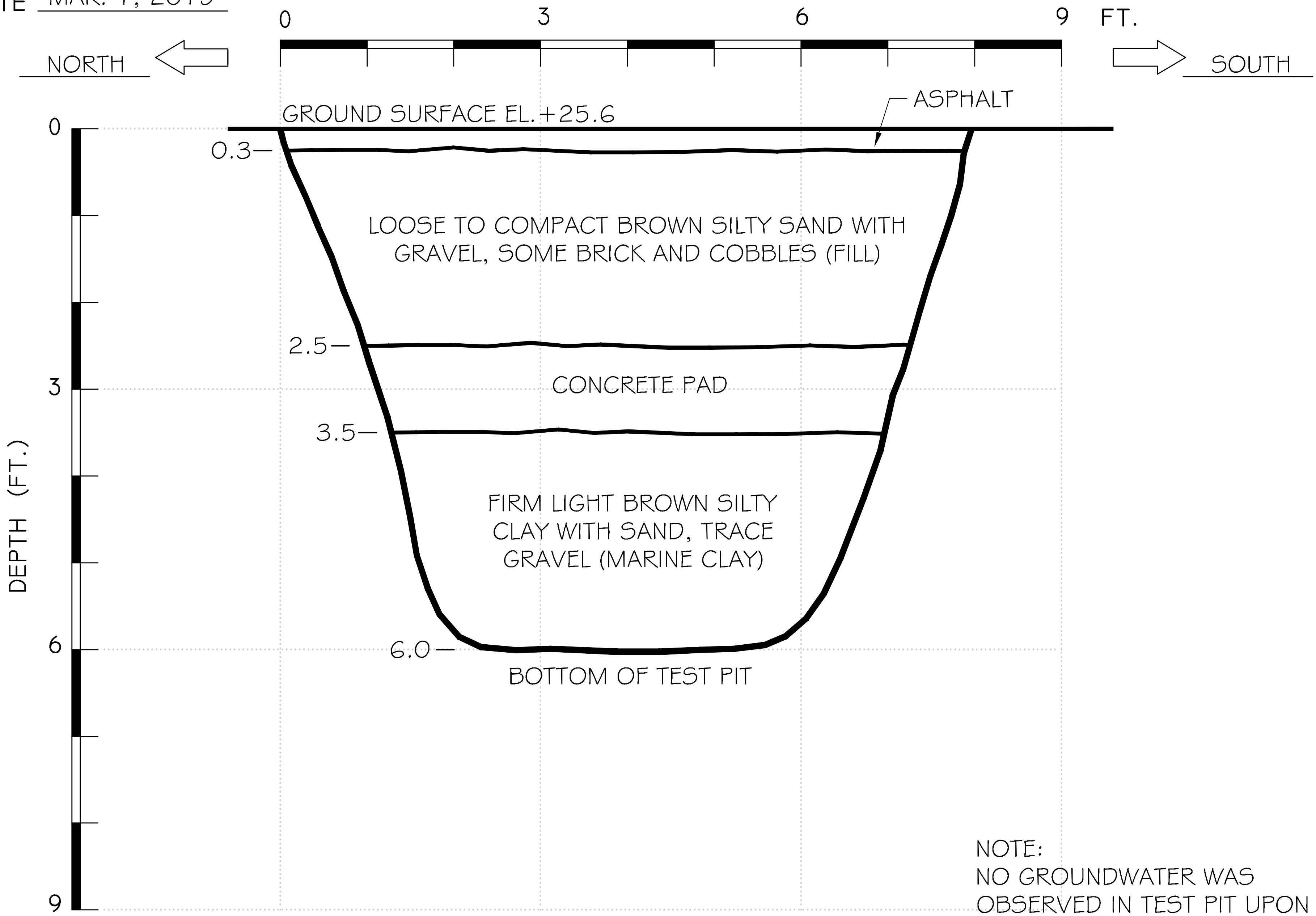
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 103



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

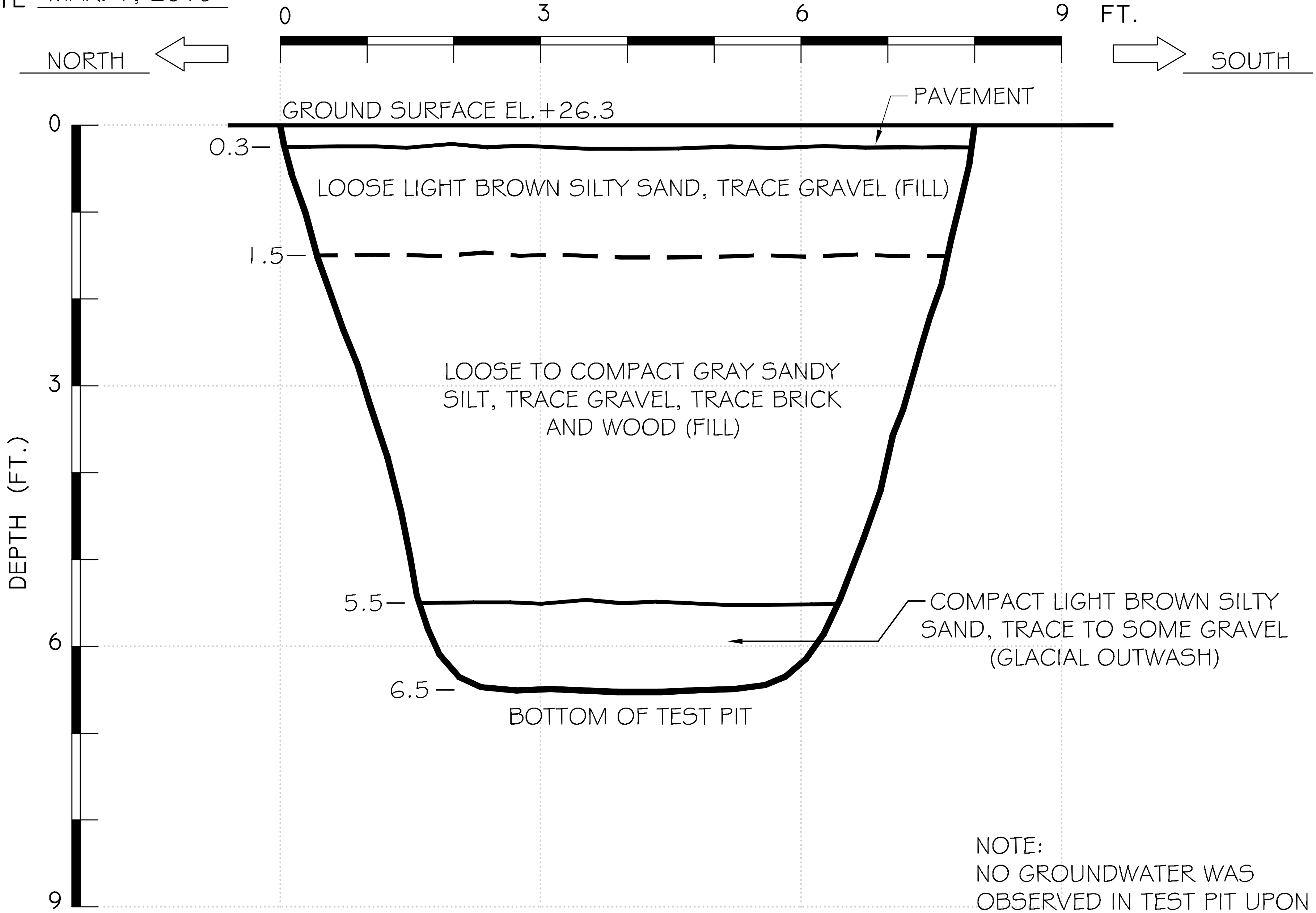
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 104



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

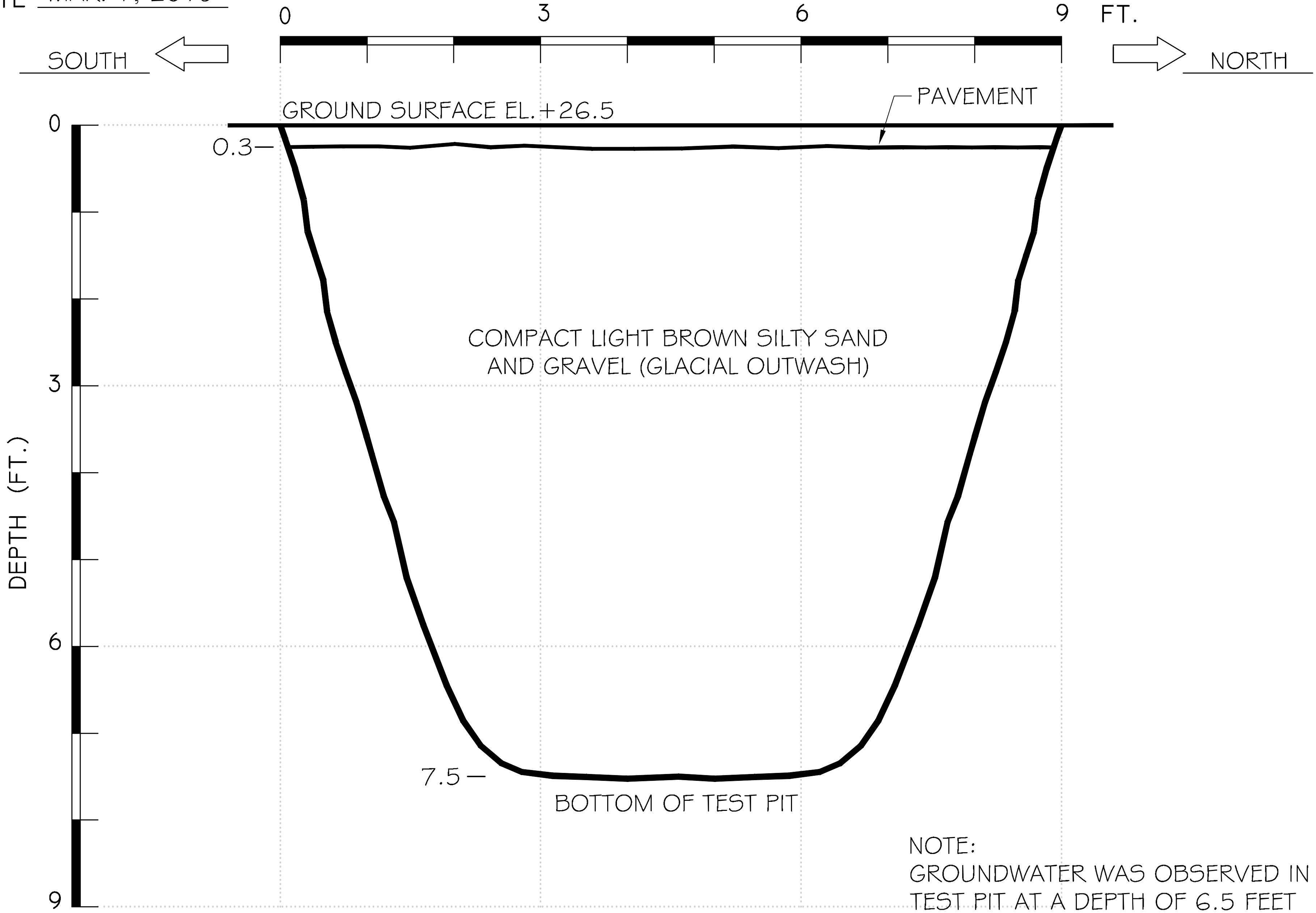
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 105



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 6.5 FEET UPON COMPLETION OF EXCAVATION

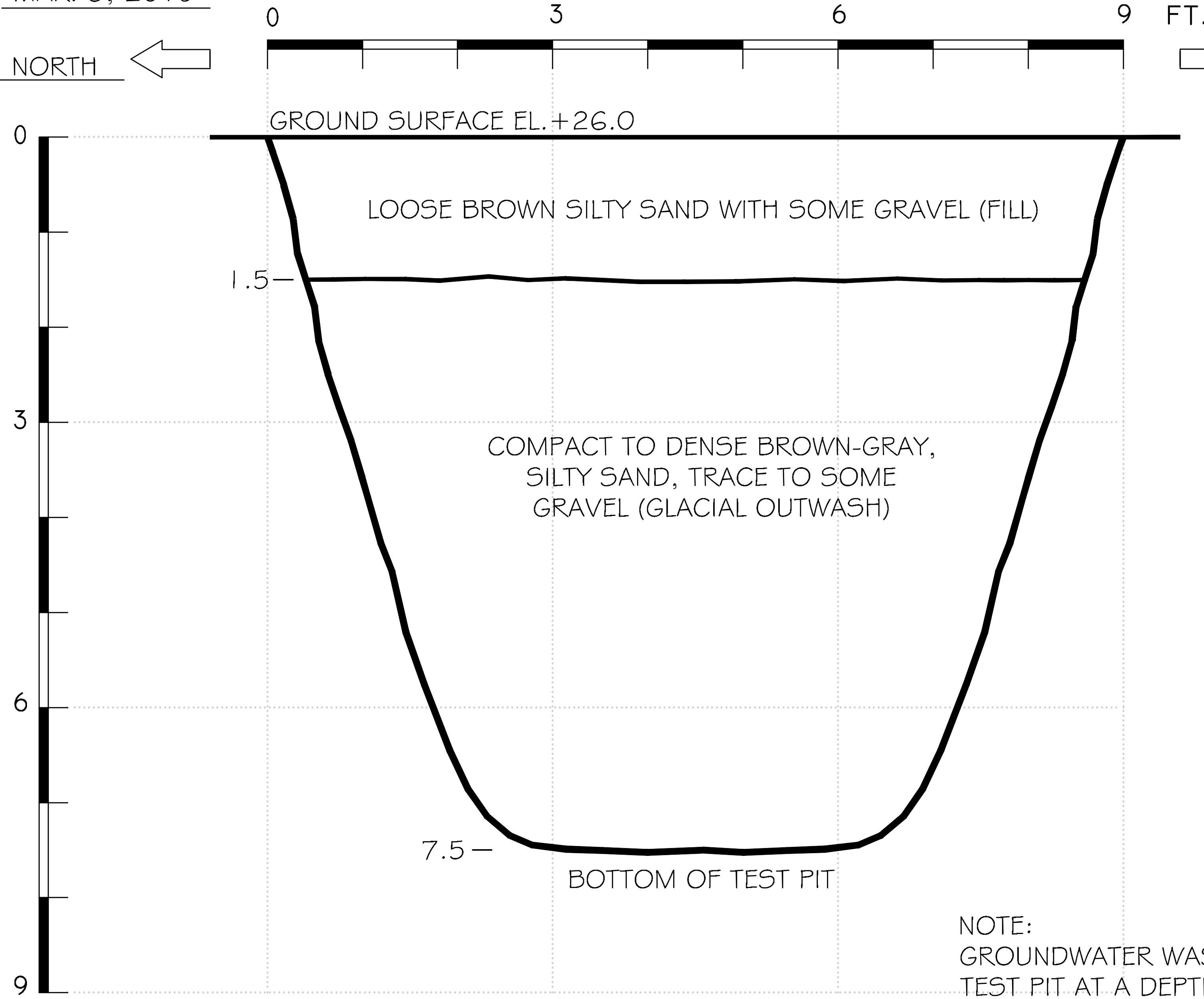
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 106



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 7.0 FEET UPON COMPLETION OF EXCAVATION

McPHAIL ASSOCIATES, LLC

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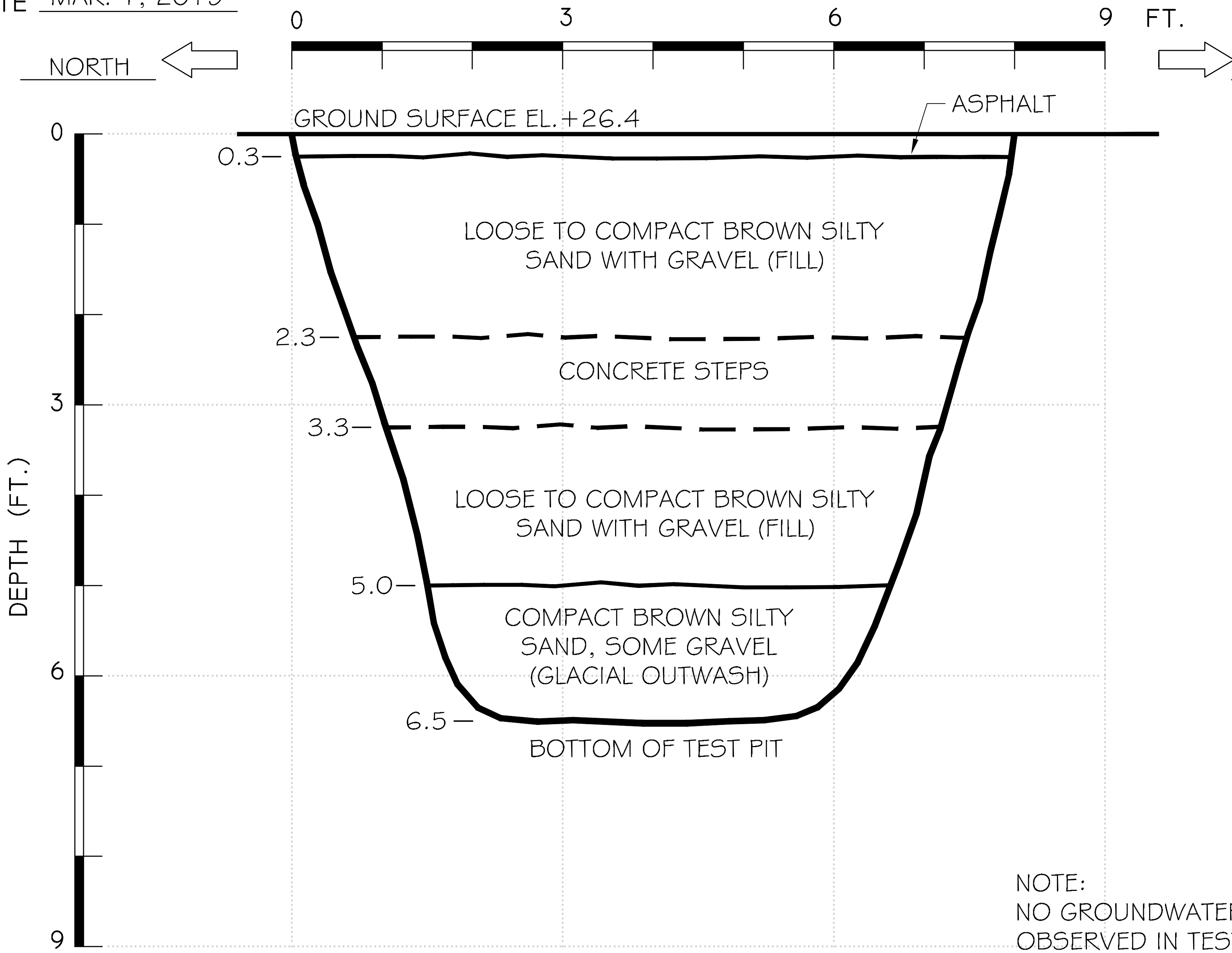
JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 107



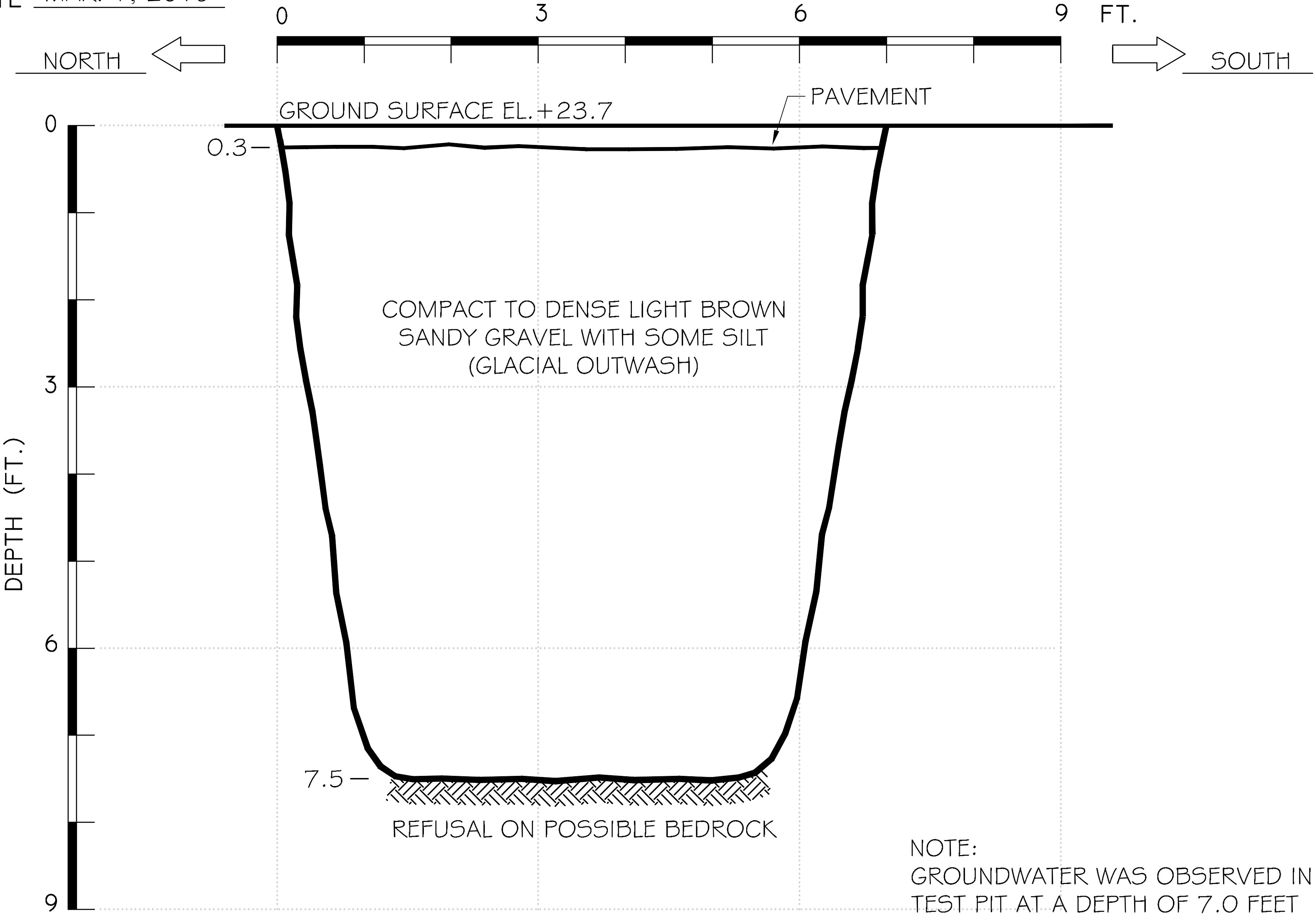
NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 108



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 7.0 FEET UPON COMPLETION OF EXCAVATION

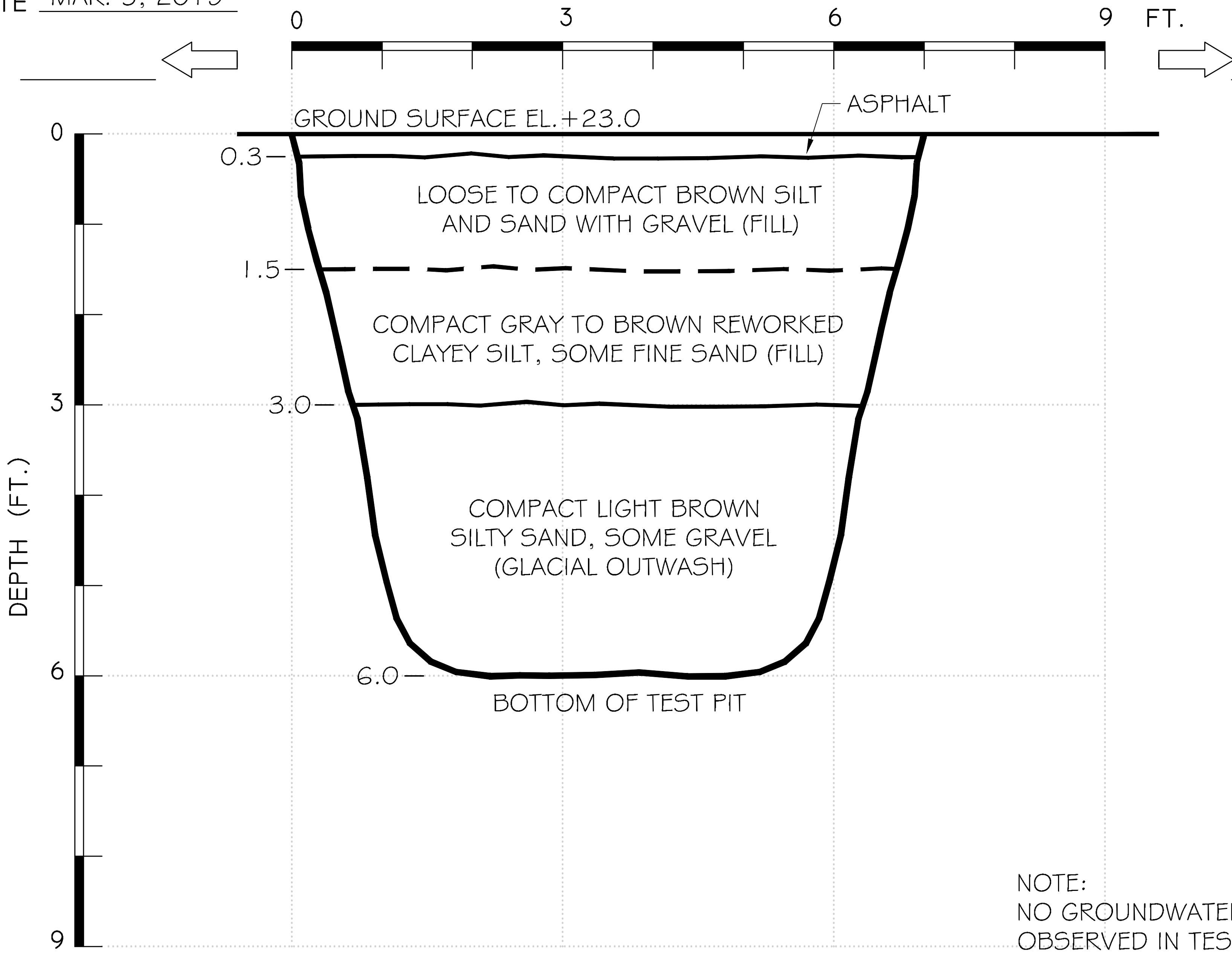
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 109



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

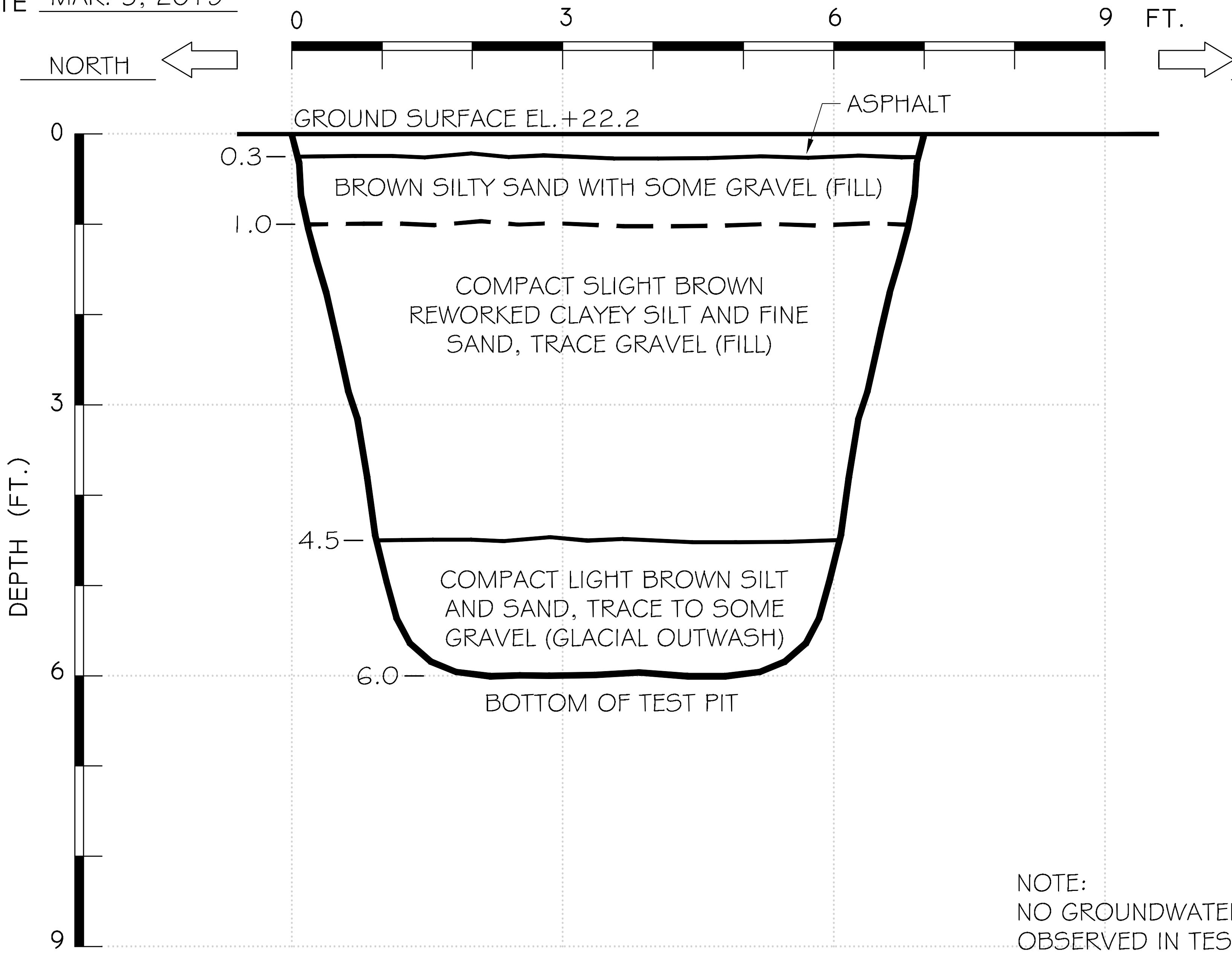
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 110



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

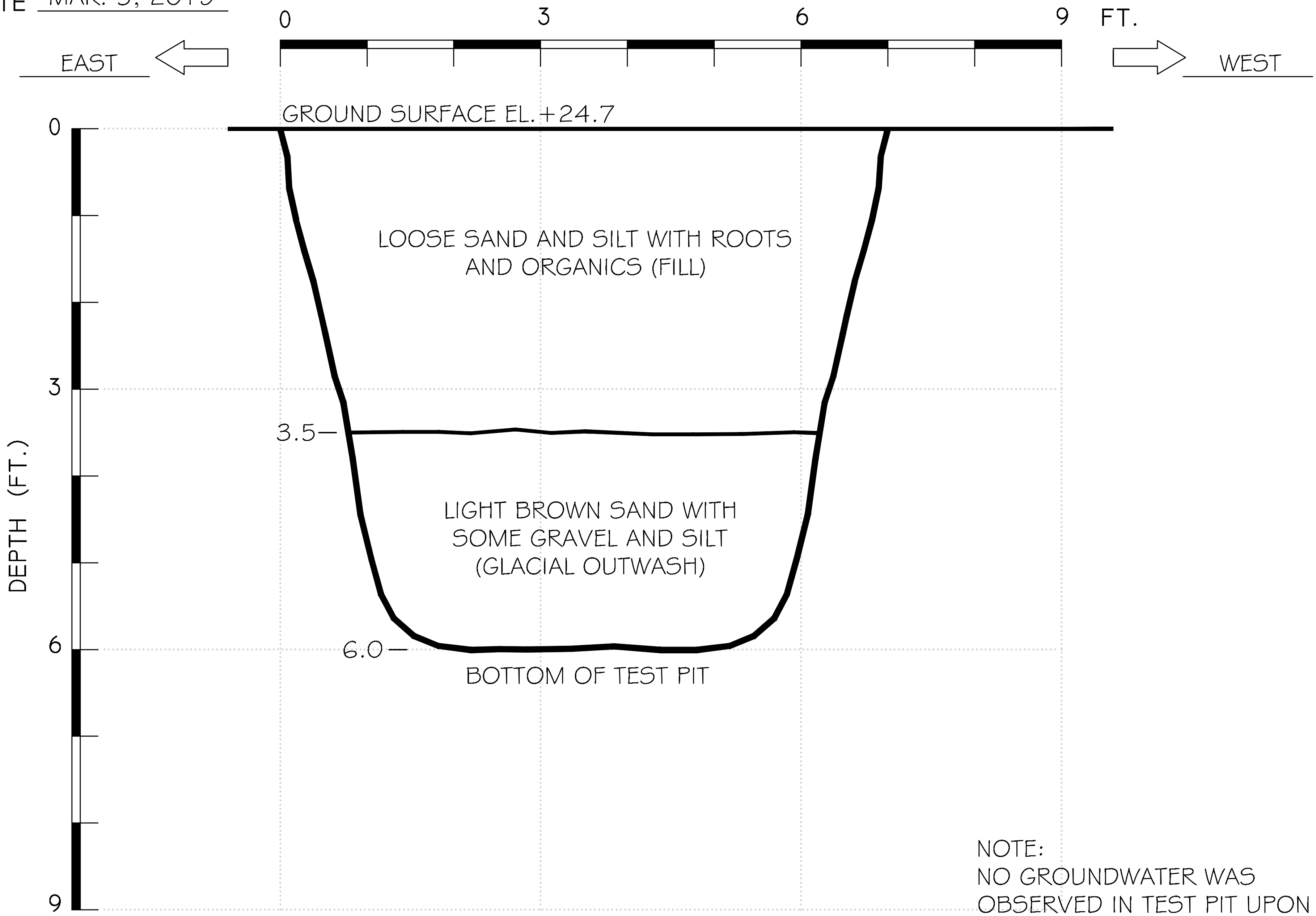
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 111



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

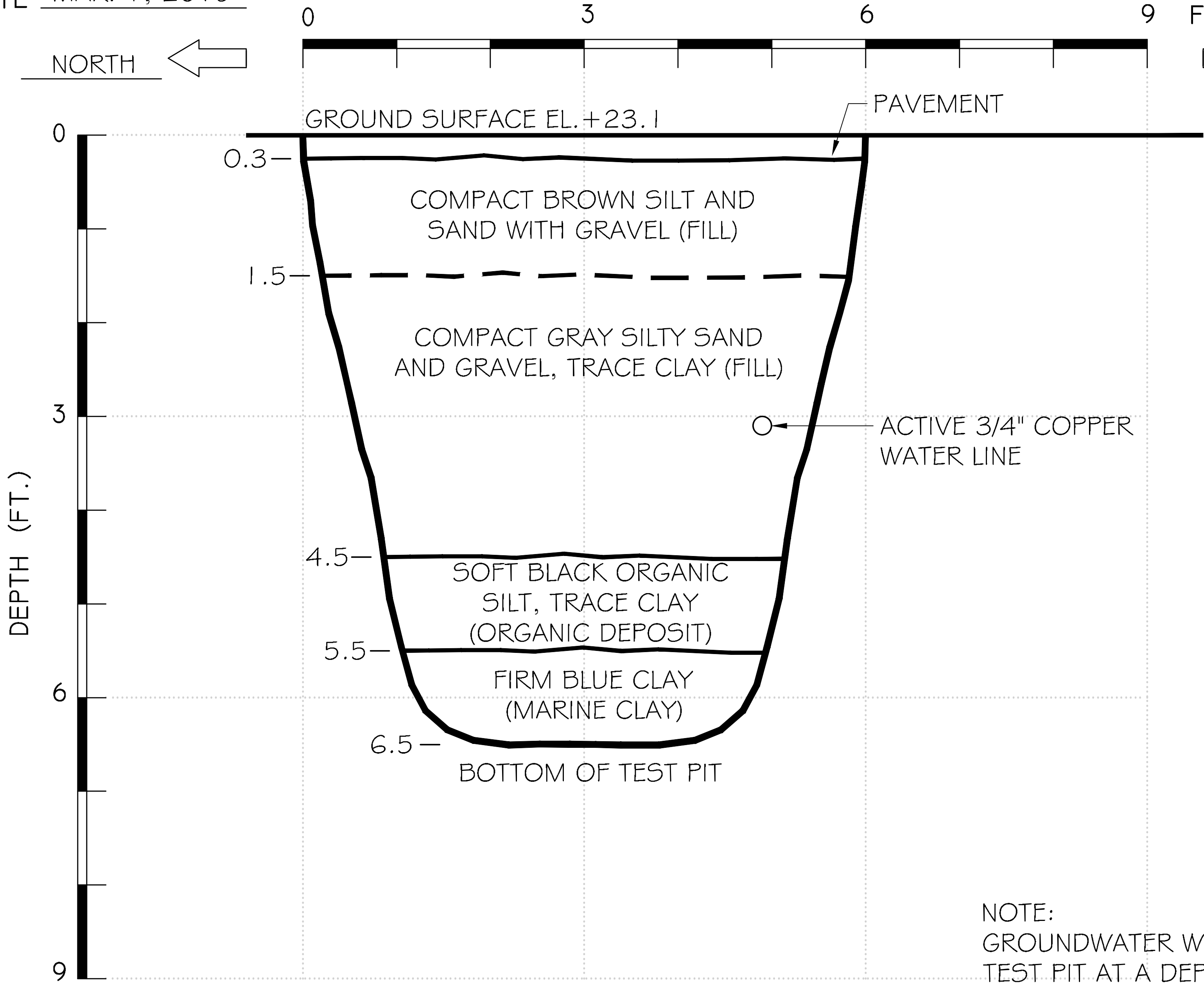
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT NO. 112



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 5.0 FEET UPON COMPLETION OF EXCAVATION

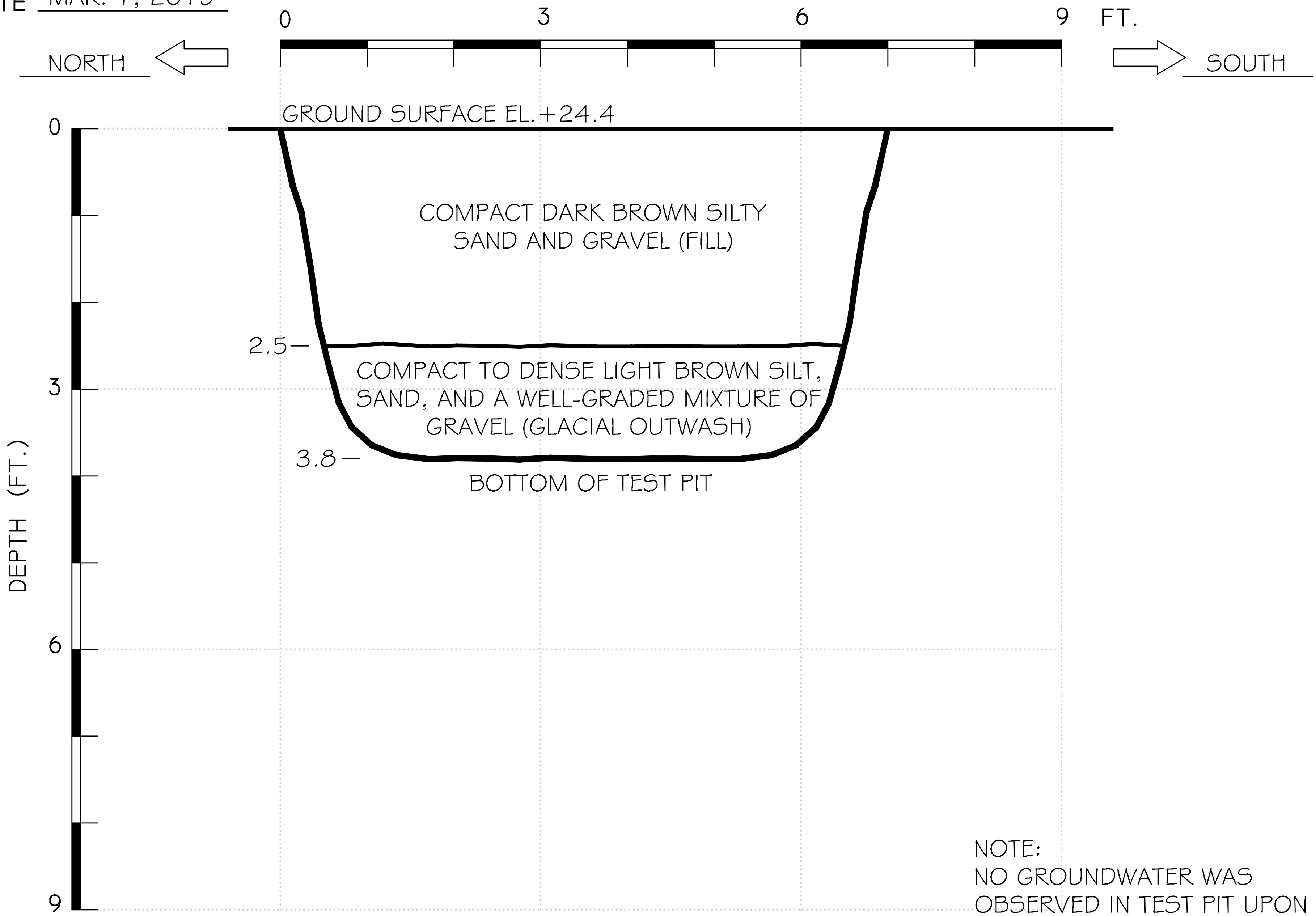
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 113



NOTE:
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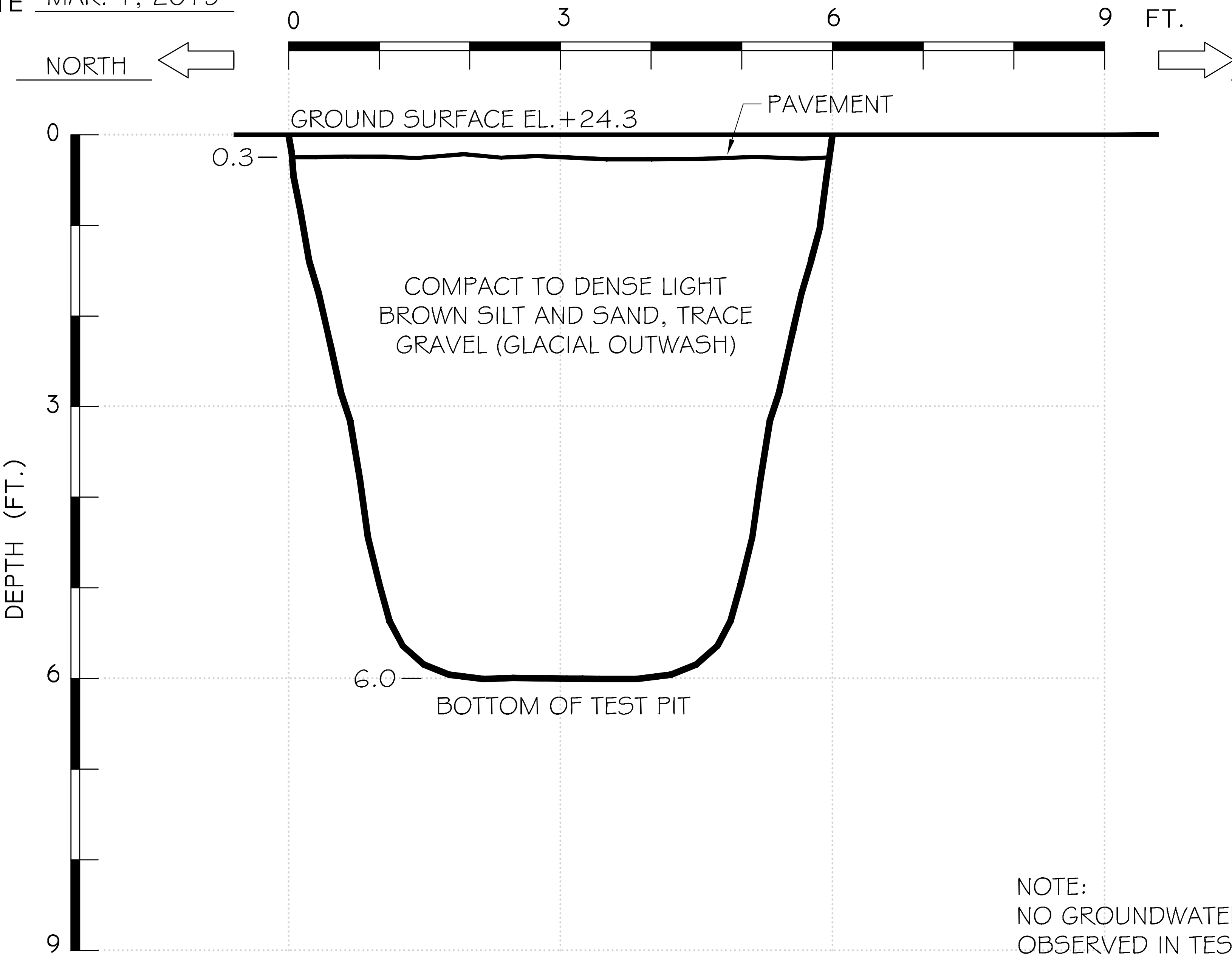
McPHAIL ASSOCIATES, LLC

JOB NO. 6524
DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 114



NOTE:
NO GROUNDWATER WAS
OBSERVED IN TEST PIT UPON
COMPLETION OF EXCAVATION

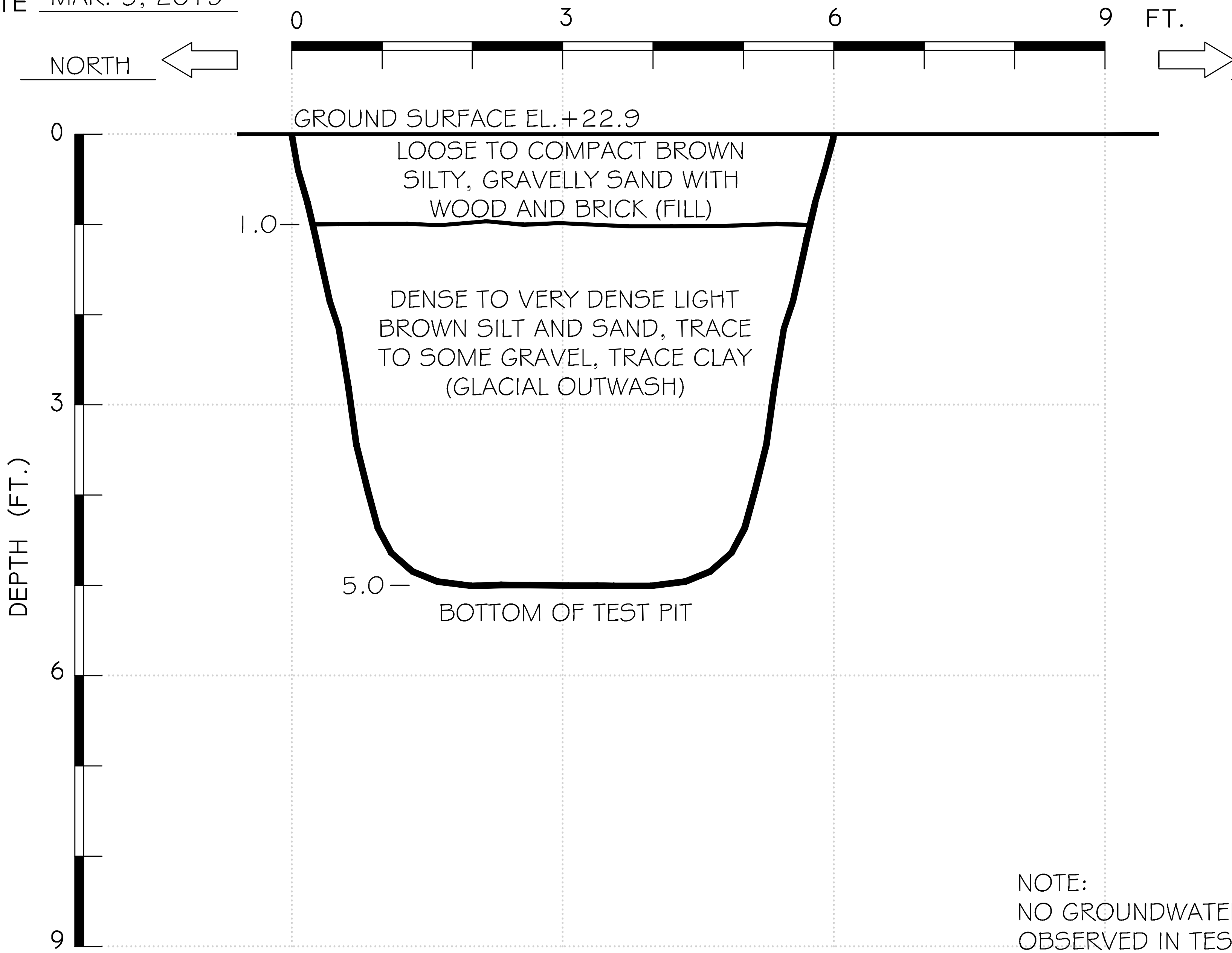
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 115



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

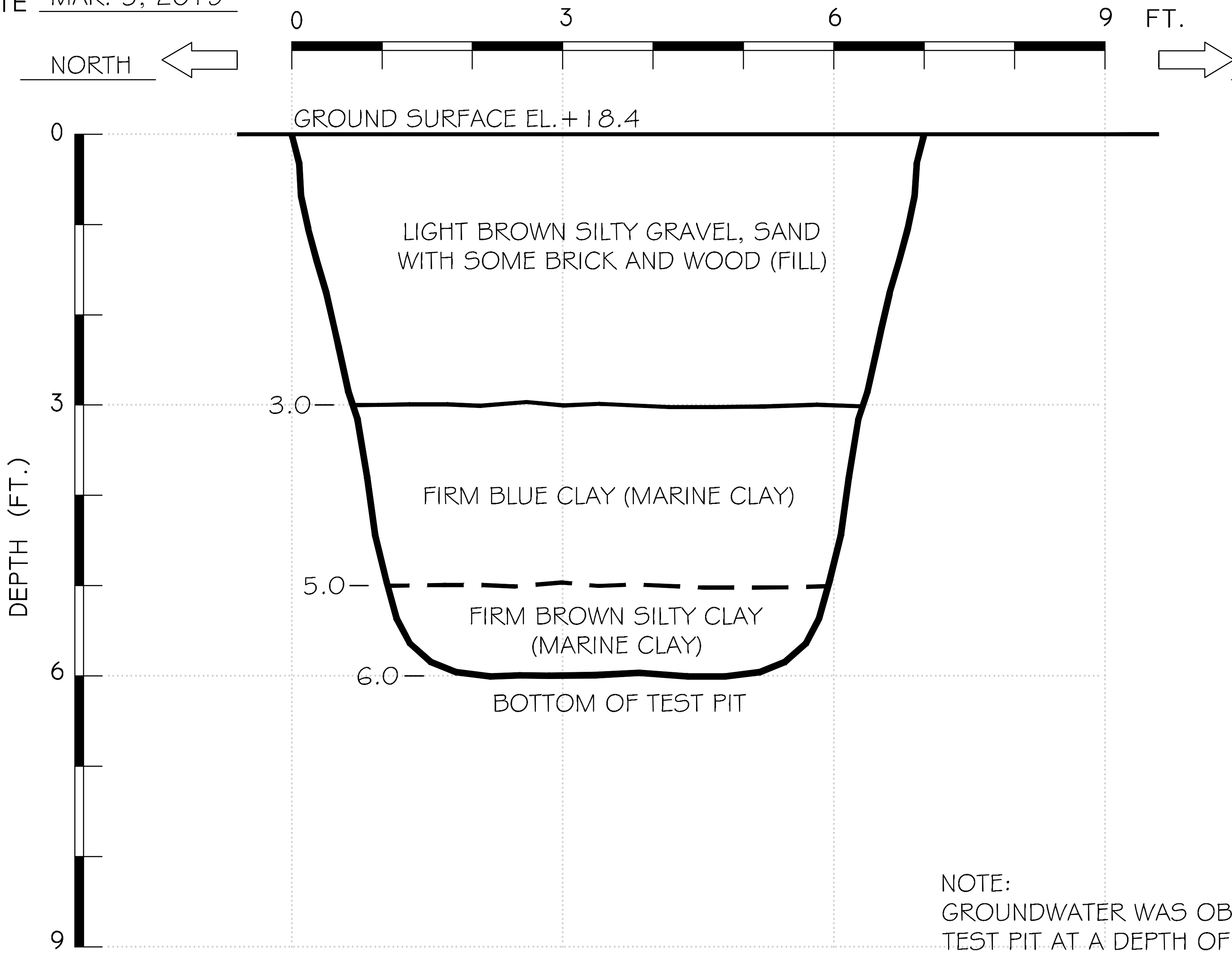
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 116



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 6.0 FEET UPON COMPLETION OF EXCAVATION

McPHAIL ASSOCIATES, LLC

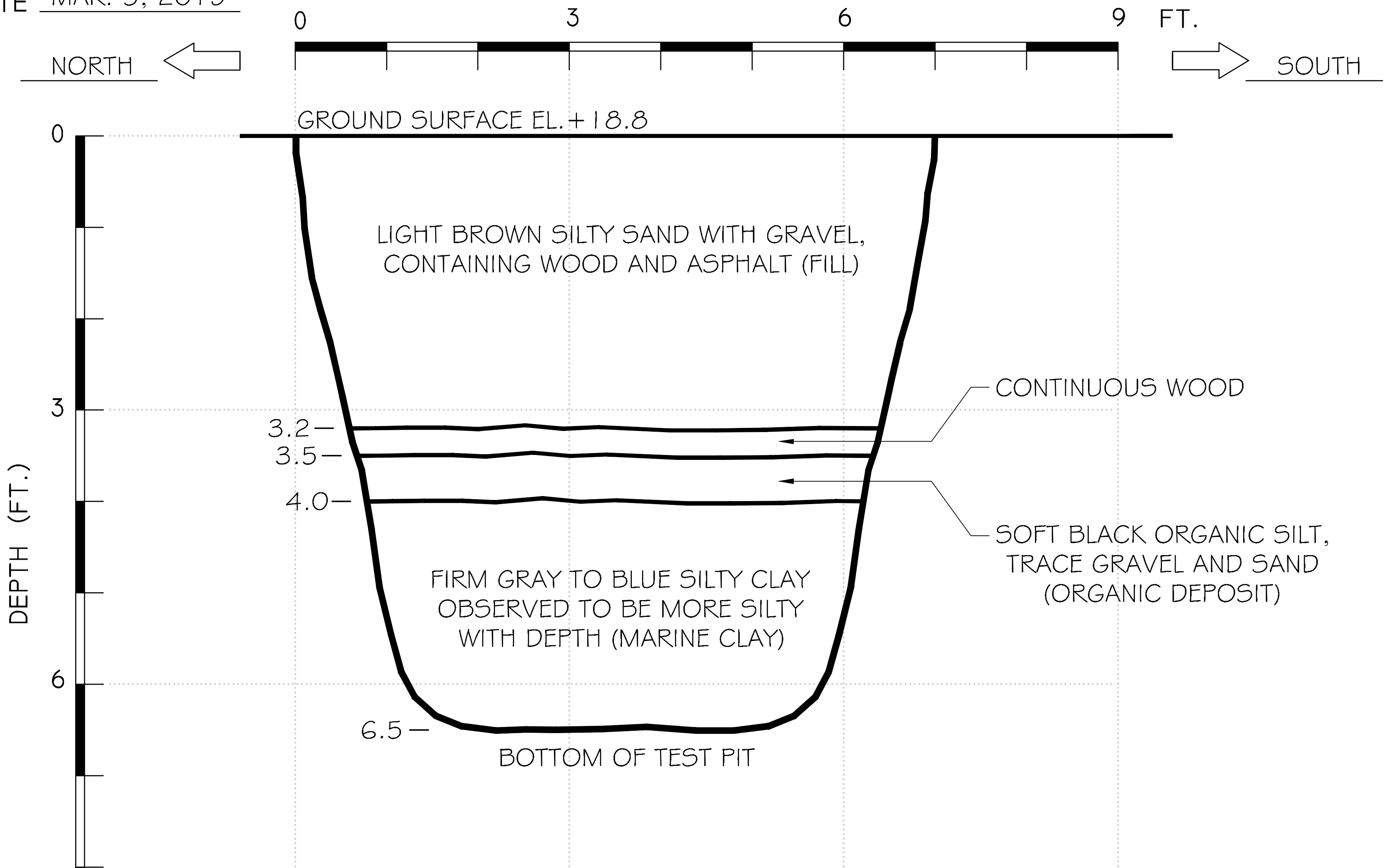
JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 117

McPHAIL ASSOCIATES, LLC



NOTE:
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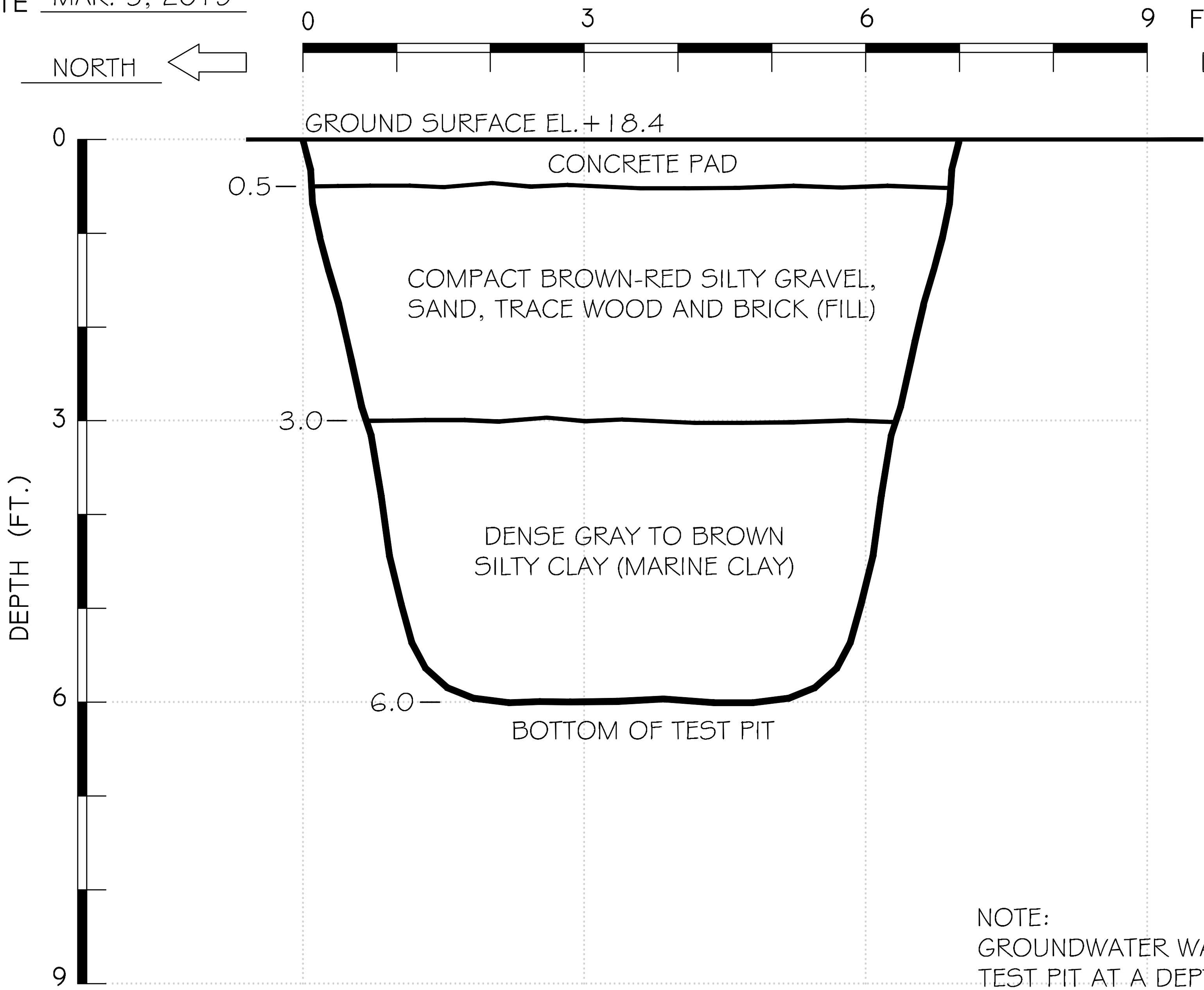
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 118



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 5.0 FEET UPON COMPLETION OF EXCAVATION

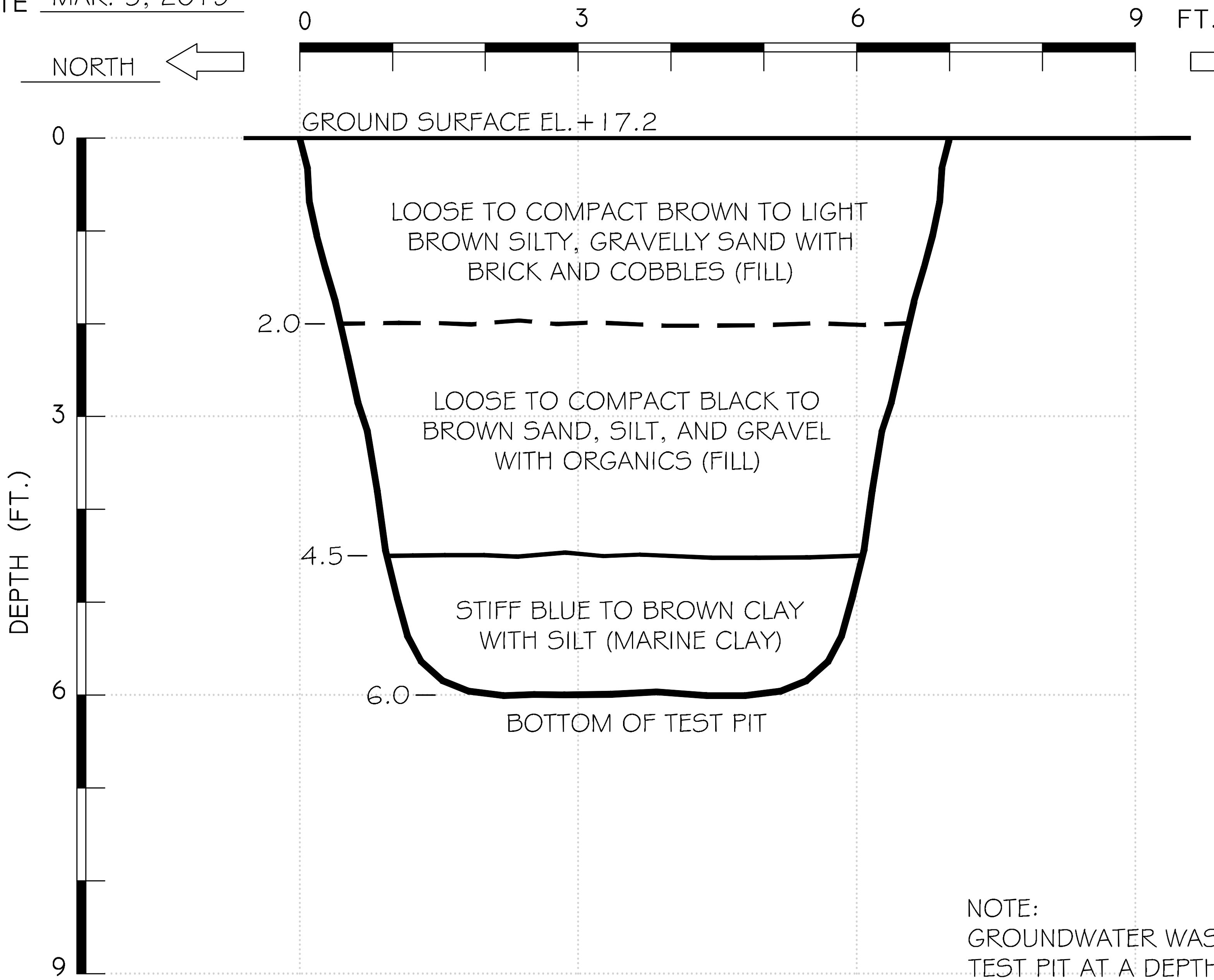
JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 119

McPHAIL ASSOCIATES, LLC



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 5.5 FEET UPON COMPLETION OF EXCAVATION

Exploration	Depth (feet)	Strata	K at 20◦ C [cm/s]	K at 20◦ C [in/hr]	K at 10◦ C [cm/s]	K at 10◦ C [in/hr]
TP-102	3.5 to 7.5	Glacial Outwash	0.00034	0.48331	0.00026	0.37134
TP-105	0 to 7.5	Glacial Outwash	0.00082	1.15795	0.00063	0.89008
TP-107	4 to 6.5	Glacial Outwash	0.00061	0.86031	0.00047	0.66189
TP-108	0 to 7.5	Glacial Outwash	0.00245	3.47243	0.00188	2.66456
TP-109	3 to 6	Glacial Outwash	0.00037	0.52016	0.00028	0.39968
TP-110	4.5 to 6	Glacial Outwash	0.00129	1.82834	0.00099	1.40740
TP-111	3.5 to 6	Glacial Outwash	0.00069	0.97795	0.00053	0.75260
TP-113	1.25 to 3.75	Glacial Outwash	0.00046	0.64772	0.00035	0.49748
TP-115	1 to 5	Glacial Outwash	0.00030	0.42661	0.00023	0.32740

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www.mcphailgeo.com
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FOUNDATION ENGINEERING REPORT

WEST END YARDS

PORTSMOUTH, NEW HAMPSHIRE

APRIL 16, 2019

Prepared For:

Torrington Properties, Inc.
60 K Street
Boston, MA 02127

PROJECT NO. 6524.2.00

April 16, 2019

Torrington Properties, Inc.
60 K Street
Boston, MA 02127

Attention: Mr. Jay Bisognano

Reference: West End Yards; Portsmouth, New Hampshire
Foundation Engineering Report

Ladies and Gentlemen:

This report documents the results of our subsurface exploration programs and foundation design study for the proposed West End Yards development project to be located in Portsmouth, New Hampshire. Refer to the Project Location Plan (**Figure 1**) for the general site location.

This report was prepared in accordance with our proposal dated November 26, 2018 and the subsequent authorization of Torrington Properties, Inc (TPI). These services are subject to the limitations contained in **Appendix A**.

Purpose and Scope

The purposes of the subsurface exploration programs and foundation design study are to define the subsurface soil, rock, and groundwater conditions as they relate to foundation design and, based on these conditions, to provide engineering recommendations for safe and economical foundation design of the proposed development.

Foundation design includes foundation support of the proposed structures and their lowest level slabs, treatment of the lowest level slabs in consideration of groundwater, lateral earth pressures on foundation walls, and seismic design considerations in accordance with the provisions of the New Hampshire State Building Code, which is understood to be the 2009 International Building Code (IBC) with the City of Portsmouth amendments. Foundation construction considerations relating to geotechnical aspects of the proposed construction and pavement design criteria are also presented herein.

Available Information

McPhail Associates, LLC (McPhail) prior involvement with this site included the preparation of the following documents:

- A report entitled "Phase II Environmental Site Assessment Report – Portsmouth Parcels" dated February 5, 2018;

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- A memorandum entitled "Results of Test Pits Exploration – Cate Street Development" dated July 18, 2018;
- A report entitled "Phase I/II Environmental Site Assessment Report – West End Yards" dated February 18, 2019;
- A letter entitled "West End Yards Development Site – Subsurface Exploration Program" dated March 18, 2019;
- A report entitled "Initial Site Characterization Report – 55 Cate Street" dated March 20, 2019; and
- A memorandum entitled "Foundation Design Considerations" dated April 8, 2019.

Available information provided to McPhail included the following:

- A civil drawing set entitled "West End Yards – Cate Street" dated March 2019 and prepared by Fuss & O'Neill; and
- A 50-scale drawing entitled "Plan of Land" dated December 2016 prepared by Doucet Survey, Inc. (DSI).

Elevations cited herein are in feet and are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

Existing Conditions

The subject site occupies an approximate 12-acre plan area fronting onto US Route 1 Bypass to the west and generally bounded by railroad tracks and an active construction site to the south-southeast and Hodgson Brook to the north-northeast. In addition, the site consists of five (5) contiguous parcels identified as 428 US Route 1 Bypass, 55 Cate Street, 161 Cate Street and Cate Street, and is divided by Cate Street.

In general, the site is occupied by several existing buildings consisting of a convention center, a storage/warehouse building and industrial/commercial buildings, a vacant residential house, an unattached garage, sheds, elevated loading ramp within central portion of the site, asphalt paved parking lots and landscape areas. Furthermore, it is understood that an existing sewer line with an invert at about Elevation +11 is crossing the central portion of the subject site.

Ground surface across the site generally slopes downward from southeast to northwest from approximately Elevation +26.6 to Elevation +21.6. In addition, within the Cate Street roadway located at the northern corner of the western portion of the site, ground surface varies from about Elevation +28 to Elevation +24.

Proposed Development

It is understood that the proposed development includes the demolition of the existing buildings, relocation of Cate Street and the construction of three (3) multi-story buildings identified as the Commercial Building, Building A, and Building B. The approximate footprints of the proposed buildings are indicated on the enclosed **Figure 2**. Also, it is understood that several stormwater infiltration systems will be constructed as part of the site development. The remainder of the site is planned to consist of landscaped regions and paved parking areas and roadways.

The proposed new structures are understood to include the following:

Building B is planned to consist of a 4-story wood-framed building with an approximate 28,600 square-foot plan area. The building will be constructed at the northern portion of the site, in the area of the existing Cate Street that will be relocated during the construction. The lowest-level slab is proposed to be located at Elevation +27.8. The existing grade within the western portion of the proposed building ranges between Elevation +23.4 to Elevation +24.5, and within the eastern portion of the proposed building the existing grade is at Elevation +27.9. Therefore, up to about 4.4 feet of fill will need to be placed within the western portion of the building to raise the grade for construction of the proposed lowest level slab.

Building A is planned to consist of a 4-story wood-framed building with an approximate 36,600 square-foot plan area and it will be located within the central portion of the site. The lowest-level slab is proposed to be located at Elevation +26.8. Approximately 1.5 to 5.5 feet of fill will typically need to be placed to raise the grade for construction of the lowest level slab. Based on the available information provided to us, it is understood that the exiting sewer line traversing the southern portion of the building will not be utilized for the new development and will be removed.

Commercial Building is planned to consist of a 2-story steel-framed structure occupying an approximate 22,630 square-foot plan area and it will be constructed within the western area of the site, partially within the footprint of an existing building that will be demolished. The lowest level slab is proposed to be constructed at about Elevation +26 which is about 1 to 3 feet above the existing grade. Based on our conversation with the project structural engineer, the maximum column load is estimated to be about 200 kips. In addition, it is understood that the existing sewer line located north of the proposed building will remain in service. It is understood that the location of the Commercial Building has not been finalized and it may be located south of the location described herein.

Recent Subsurface Exploration Program

During the period of March 1 through 5 and 11 through 18, 2019, a subsurface exploration program consisting of twenty-six (26) borings (B-101 to B-104, B-106 to B-119, B-122 and B-123) and nineteen (19) test pits (TP-101 to TP-119) was completed at the project site by

McPhail. Approximate plan locations of the explorations are indicated on the enclosed Subsurface Exploration Plan, **Figure 2**. Generalized subsurface sections are present on **Figure 3**.

The borings were performed by Carr-Dee Corp. (Carr-Dee) of Medford, Massachusetts under contract to McPhail. The borings were drilled to depths ranging from 3 to 18.5 feet below existing grade and were typically terminated within the natural glacial deposits or possible bedrock. The borings were performed using a truck-mounted drill-rig and advanced utilizing 2-1/4-inch hollow stem augers. Standard 2-inch O.D. split-spoon samples and standard penetration tests were obtained at minimum 5-foot intervals of depth in accordance with the standard procedures described in ASTM D1586. Recent boring logs prepared by Carr-Dee are contained in **Appendix B** following the text of this report.

The test pits were performed by P.K. Brown Construction of Portsmouth, New Hampshire under contract to McPhail. The test pits extended to depths ranging from 3.8 to 7.5 feet below ground surface. The test pits were performed with a 314 CAT excavator. Test pit logs prepared by McPhail are contained in **Appendix C** following the text of this report.

The explorations were monitored by a McPhail field representative who performed field layout, prepared field logs, obtained and visually classified soil samples, monitored groundwater conditions in the open explorations, and determined the required exploration depths based upon the actual subsurface conditions encountered.

Field locations of the borings and test pits were determined by taping from existing site features included on the above-referenced existing conditions plan prepared by DSI. The existing ground surface elevation at each exploration location was determined by a level survey performed by our field staff utilizing vertical control information on the above-referenced existing conditions plan by DSI.

Previous Subsurface Exploration Programs

In addition to the subsurface exploration program described above, the following previous subsurface exploration programs as indicated on the enclosed Subsurface Exploration Plan, **Figure 2**, were performed at the site:

- Three (3) borings (B-1 through B-3) performed at the site on December 10, 2018 by Carr-Dee under contract to McPhail. The boring logs prepared by McPhail are enclosed in **Appendix D**.

- Four (4) test pits (TP-1 through TP-4) were conducted at the site on June 21, 2018 by Severino Trucking, Co. Inc. (STC) under contract to others. The test pit logs prepared by McPhail are enclosed in **Appendix E**.

- Fifteen (15) geoprobes (GP-1 through GP-15) were conducted at the site on January 19 and 22 2018 by Technical Drilling Services, Inc. (TDS) under contract to McPhail. The geoprobe logs prepared by McPhail are contained in **Appendix F**.

Laboratory Testing

At the completion of the subsurface exploration programs, soil samples were returned to our laboratory for more detailed classification, analysis, and testing. The laboratory testing consisted of sieve analyses to determine the grain size distribution and confirm the visual classifications of the fill and glacial outwash deposits. Laboratory test procedures were in general accordance with applicable ASTM Standards. Results of the sieve analyses for the fill material appear on **Figure 4**, **Figure 5** and **Figure 6**. Results of the sieve analyses for the glacial outwash deposit appear on **Figure 7**, **Figure 8**, **Figure 9** and **Figure 10**.

Subsurface Conditions

A detailed description of the subsurface conditions encountered in the borings, geoprobes and test pits is documented on the logs contained in **Appendix B** through **Appendix F**. It should be noted that not all strata, as described below, were encountered at all exploration locations. Note that the descriptions of the soil strata are primarily based on the visual observations of soil samples obtained from the test pits, geoprobes and borings.

- Fill: Loose to very dense, brown to dark brown, sand and gravel, with trace to some silt, varying to a well-graded mixture of silt, sand and gravel, also containing varying amounts of brick. Grain size distributions of samples of the fill deposit are presented on the enclosed **Figure 4**, **Figure 5** and **Figure 6**.

- Organic Deposit: Soft to stiff, brown to black, organic silt with some sand and clay and trace peat fibers.

- Marine Clay Deposit: Yellow to blue, silty clay transitioning with depth from very stiff to very soft. Based on our experience on nearby projects and from our review of published information about the Portsmouth clay deposit, the undrained shear strength of the marine clay is anticipated to vary from about 250 to 400 pounds per square-foot (psf). Furthermore, the marine clay deposit is anticipated to be slightly over-consolidated.

- Glacial Deposits:
    - Glaciomarine Deposit: Compact, gray, silty sand, some gravel varying to silty sand and gravel with pieces of weathered bedrock.
    - Glacial Outwash: Compact to very dense, gray, sand and gravel, with trace to some silt, varying to a well-graded mixture of sand, gravel and silt. Grain size distributions of samples of the glacial outwash deposit are contained on the enclosed **Figure 7**, **Figure 8** and **Figure 9**.

- Possible Bedrock: Based on the published United States Geological Survey (USGS) bedrock maps for the general area of the site, bedrock is anticipated to be associated with the Kittery Formation and consist of metasandstone and phyllite.

- Groundwater: Where groundwater was encountered within the recent explorations, it was observed to range from 4 to 11 feet below ground surface corresponding to Elevation +19.9 to Elevation +14.1 with a general downward gradient from south to north. Groundwater was observed within five (5) accessible installed wells (GP-5, GP-6, GP-10, GP-13, and GP-15) to range from 2.8 to 8.3 feet below the existing ground surface corresponding to Elevation +21.8 to Elevation +15. Other installed wells at the site were not accessible due to snow or ice or they were demolished. Groundwater Monitoring Reports are enclosed in **Appendix G**. It is anticipated that future groundwater levels across the project site may vary from those reported herein based on such factors such as normal seasonal changes, runoff during or following periods of heavy precipitation and alterations to existing drainage patterns.

The following is a description of the subsurface conditions encountered from ground surface downward within the vicinity of each proposed new structure. Elevations corresponding to the surface of the natural marine or glacial outwash deposit noted below are also presented on **Figure 2**. In addition, a generalized subsurface section through each structure is indicated on the enclosed Generalized Subsurface Sections A-A, B-B and C-C, **Figure 3**.

Building B: Underneath the surface treatments, generally the explorations encountered a layer of fill material which ranged from 0.7 to 3.5 feet in thickness. The explorations performed within the western portion of the building encountered a glacial outwash deposit below the subsurface improvements or fill material at depths ranging from about 0.5 to 4 feet below ground surface corresponding to Elevation +23.4 to Elevation +21.6. Boring B-108 performed within the east end of the proposed building encountered a 3-foot thickness of firm marine clay at a depth of 4 feet below ground surface which corresponds to Elevation +23.9. Each boring conducted within the footprint of this building encountered refusal on possible boulders or bedrock at depths ranging between 3 to 10.7 feet below ground surface corresponding to Elevation +20.4 and Elevation +13.8. Groundwater was observed to vary from 7 to 9.5 feet below ground surface corresponding to Elevation +20.9 to Elevation +15.

Building A: Underlying the asphalt surface treatment, the explorations encountered a layer of fill material which ranged from 3.7 to 14.2 feet in thickness. The fill was typically thinner within the eastern portion of the proposed building footprint. Below the fill material, the explorations encountered a compact to very dense glacial outwash deposit below an uncontrolled fill material at depths ranging from about 4 to 14.5 feet below ground surface. In general, the surface of the natural glacial deposit in the explorations was observed to vary from about Elevation +15.1 to Elevation +23.2 with the exception of at boring B-110 where it was observed to be at Elevation +9. Groundwater was observed to range from 7 to 9.5 feet below ground surface corresponding to Elevation +18.3 to Elevation +14.2.

Commercial Building: Borings B-101 through B-104 were performed in the direct vicinity of the proposed Commercial Building. Within these borings, an uncontrolled fill material extends to depths from 5 to 7 feet below ground surface corresponding to Elevation +19.7 to Elevation +17.8. Below the fill material, a 0.5 to 1-foot thickness of an organic deposit was encountered within the northwest corner of the proposed building footprint in borings B-101 and B-102. A natural inorganic marine clay deposit was encountered below the fill and/or organics within the western portion of the building in borings B-101, B-102 and B-104 at elevations ranging from +17.9 to +19.2. The upper portion of the marine clay deposit was generally observed to consist of a very stiff silty clay. Within borings B-101 and B-104, which were performed on the north side of the building, the consistency of the clay transitioned with depth to very soft. The total thickness of the marine clay deposit, where penetrated, ranges from 4 to 13 feet. Directly below the fill within the eastern portion of the building and below the marine clay in the western portion of the building, the explorations encountered a compact to very dense glacial deposit at depths ranging between 5 to 18.5 feet below ground surface corresponding to Elevation +17.8 and Elevation +6.2. Groundwater was observed to vary from 4 to 11 below ground surface corresponding to Elevation +19.9 to Elevation +14.1.

Foundation Design Recommendations

Based on our current understanding of the proposed development and the anticipated subsurface conditions, foundation support for the proposed development is recommended to consist of conventional spread footing foundations in conjunction with soil-supported slabs-on-grade. In consideration of the various footing support conditions as described below, it is recommended for continuity that the footings be proportioned utilizing a maximum design bearing pressure of two (2) tons per square-foot (tsf). The use of higher allowable bearing pressures may be feasible subject to further understanding of the proposed structural loads and the selection of the footing support method. Detailed recommendations for each building are presented below as well as recommendations in consideration for the lowest-level slabs and general foundation recommendations.

Building B

The surface of the natural glacial or marine clay deposit within Building B varies from Elevation +23.4 to Elevation +23.9. In consideration that the proposed lowest level slab will be at Elevation +27.8, it is anticipated that the surface of the natural inorganic deposits will either be slightly above or below the design bottom of footing elevation. As such, for Building B it is recommended the spread footings bear directly on the natural marine clay, glacial deposit or bedrock, or on compacted structural fill placed over the natural marine clay, glacial deposit or bedrock.

The lowest level slab should be designed as a conventional slab-on-grade bearing on the existing fill subject to proof-compaction as described below.

The lateral limits of the excavation for footings supported on structural fill should extend beyond the outside edges of the footing a horizontal distance equal to the distance between the bottom of the proposed footing and the surface of the underlying natural glacial or marine clay deposit, plus two feet in every plan direction. Depending on the final configuration of the proposed footings, it may be more efficient for the earthwork contractor to remove all the existing fill material from the proposed building footprint and the lateral limits for structural fill discussed above and replace it with compacted structural fill.

Structural fill placed for support of the spread footings and slab-on-grade should consist of suitable on-site fill or glacial outwash or an off-site gravel borrow consisting of well-graded, natural sand and gravel containing less than 8 percent passing the No. 200 sieve. All structural fill placed within the footprint of the proposed buildings should be placed in lifts having a compacted thickness of 6 inches and be compacted to a minimum of 95 percent of its maximum modified Proctor dry density. The placement and compaction of structural fill should be monitored by a registered design professional or his designated representative in accordance with the provisions of the Code. Reuse of the on-site soil is discussed in more detail in the "Foundation Construction Considerations" section of this report.

Building A

As indicated above, the surface of the natural glacial deposit in Building A was observed to vary from about Elevation +15.1 to Elevation +23.2 with the exception of at boring B-110 where it was observed to be at Elevation +9. Therefore, in consideration that the proposed lowest level slab will be at Elevation +26.8, it is anticipated that the surface of the natural glacial deposits will be slightly above or up to about 14 feet below the design bottom of footing elevation.

As such for Building A it is recommended that the spread footings bear directly on the glacial outwash, on compacted structural fill or lean concrete placed over the glacial deposit, or on fill that is improved by aggregate piers (APs) ground improvement method. We recommend that the specific building pad preparation method be based on economic conditions at the time the project is bid for construction.

The use of APs would allow for the utilization of conventional spread footing construction without requiring overexcavation of the existing uncontrolled fill or significant dewatering. The structural design of footings support on soil improved by ground improvement methods would be the same if structural fill or lean concrete were used to replace unsuitable soils. If utilized, the APs for Building A can be ungrouted and would extend to the top of the glacial outwash deposit and would likely range up to about 18 feet in length. Recommendations for APs are contained below and recommendations for Structural Fill are contained above.

The lowest level slab of the proposed building should be designed as a conventional slab-on-grade bearing on the existing fill subject to proof-compaction described below and/or on AP improved site soils.

As an alternative to placement of structural fill or ground improvement in areas where the fill deposit is thicker, proposed footings may be supported on lean concrete placed on the surface of the natural glacial deposit. Lean concrete placed for support of the spread footings should have a minimum design compressive strength of 1,000 pounds per square-inch. The limits of the excavation for lean concrete placement should extend beyond the outside edge of the footing for a minimum horizontal distance of 6 inches. The excavation required for the placement of lean concrete is anticipated to be performed within a trench box which should minimize the size of the over-excavation and, hence, will generate less excess soil in comparison with the excavation required for the placement of structural fill.

Commercial Building

As described above, a natural inorganic marine clay deposit building was encountered below the fill and/or organics within the western portion of the building. Directly below the fill within the eastern portion of the building and below the marine clay in the western portion of the building, the explorations encountered a compact to very dense glacial deposit at depths ranging between 5 to 18.5 feet below ground surface corresponding to Elevation +17.8 and Elevation +6.2.

In consideration of the anticipated low shear strength of the marine clay deposit, utilization of footings bearing on the marine clay deposit without ground improvement would require the use of a low bearing pressure and may lead to unacceptable differential settlement. Therefore, ground improvement is recommended to be installed in order to construct conventional footings. Also, due to the close proximity of the existing sewer line along the north side of the proposed building, ground improvement consisting of rigid inclusions (RIs) would need to be installed in the vicinity of the sewer pipe to avoid transfer of the proposed footing load to the existing sewer. Elsewhere, grouted aggregate piers should be installed below the proposed footings.

It is noted that moving the proposed building footprint to the south may result in the elimination of the RIs. Furthermore, if the organic and soft clay deposit are not present below the building, then utilization of ungrouted APs or the elimination of ground improvement may be feasible.

Typically, APs installed through organic and soft clay soils for footing support are grouted from the bottom of the pier to the top of the compressible deposit in order to minimize the anticipated amount of settlement of the footing to an acceptable amount. This would also allow the construction of footings supported on grouted APs shortly after installation of the APs (before consolidation settlement of the organic and marine clay deposit is complete).

In order to raise the grade to slab subgrade, approximately 1 to 3 feet of fill will need to be placed across the building footprint which will induce settlement of the underlying compressible organic and marine clay soils that are typically present in the western portion of the building. It is recommended that ungrouted APs be utilized in a grid layout beneath the proposed slab to facilitate conventional, slab-on-grade construction. The installation of the ungrouted APs beneath the slab-on-grade is anticipated to provide drainage paths shortening the time required for consolidation settlement of the building pad to occur.

APs and RIs should be installed through the exiting fill, organic and marine clay deposit into the underlying glacial deposit to provide continuity of bearing across the building footprint. Based on the results of the explorations, the APs and RIs would likely range up to about 8 to 20 feet in length. Recommendations for ground improvement are contained below.

Also, with the use of APs, ordinary fill can be used in lieu of structural fill to raise the grade within the building footprint. Ordinary fill generally costs less than structural fill to import and since the compaction requirements for ordinary fill are less, it can generally be placed more quickly. Ordinary fill should be placed in maximum 12-inch thick loose lifts and compacted to a minimum of 92 percent of its maximum modified Proctor dry density.

Rigid Inclusions (RIs) and Aggregate Piers (APs)

RIs and APs are two (2) common ground improvement methods installed to improve the density and stiffness of existing soils. Ground improvement methods would densify the existing fill and increase the lateral stress in the soil matrix beneath the proposed building foundations. Thus, the uncontrolled existing fill soils, organics, and/or marine clay would be improved to a stiffer composite soil matrix allowing the use of footing foundations by minimizing settlement to within acceptable limits.

RIs are constructed by advancing a hollow mandrel to the design depth, densifying the surrounding soils by displacement. Once reaching the design depth, concrete is pumped through the mandrel, which opens as it is raised. If required, the mandrel can be raised and lowered several times, vertically ramming lifts of concrete to create an expanded base. The RI elements are typically installed in a grid pattern and are used in conjunction with an engineered granular pad to produce an intermediate foundation system for support of foundation loads. The type and thickness of the engineered pad is dependent on the design bearing pressure and is designed by the RI design-build consultant.

In general, for APs an aggregate pier cavity is created by driving a specially designed 12- to 16-inch diameter mandrel and tamper foot using a large static force augmented by dynamic vertical impact energy. A sacrificial plate is placed at the bottom of the tamper foot to prevent soil from entering the mandrel during installation. This method of advancement minimizes drill spoils as penetrated soils are displaced laterally. After installation to the design depth, coarse aggregate is placed inside the mandrel and the mandrel is lifted, leaving the sacrificial plate at the bottom of the cavity. Typically, the tamper foot is lifted approximately four feet and then driven and vibrated back down three feet, forming a one-foot thick compacted lift of approximately 20 inches in diameter. This process is repeated to the top of the cavity, forming the completed aggregate pier.

Since ground improvement techniques are provided by a design-build consultant, detailed design calculations should be submitted to the Architect and design team for review prior to the beginning of construction. A detailed explanation of the design parameters for capacity and settlement calculations should be included in the design submittal. The design submittal should also include a testing program to demonstrate the capacity of the elements. In addition, the submittal should illustrate that loads from the proposed Commercial Building are not shed onto the existing sewer. All calculations and drawings should be prepared and sealed by a Professional Engineer who is licensed in the State of New Hampshire, and is retained by the Contractor who is to perform the work.

The following general criteria should be utilized in the design of the rigid inclusions and aggregate piers:

1. Rigid inclusions and aggregate piers should extend at least to the surface of the natural glacial deposit;

2. Estimated long-term settlement for footings and slabs should be less than 1-inch;

3. Estimated long-term differential settlement of adjacent footings should be less than 1/2-inch; and

4. Modulus load tests should be performed on a selective RI and AP to a minimum of 150 percent of the maximum design stress.

Slab Recommendations

The lowest level slab of the proposed buildings should be designed as a conventional slab-on-grade bearing on the existing fill subject to proof compaction or on AP improved site soils. As indicated above, APs are recommended, at a minimum, to support the slab-on-grade of the Commercial Building, and are also recommended to be considered for slab support of Building A due to the presence of a loose fill layer.

Frequent control joints should be employed in the lowest level slabs to reduce the potential for cracking. Some future cosmetic settlement of the slab should be anticipated due to the heterogenous fill deposit. The future settlements may cause some minor dishing and cracking of the slabs possibly requiring future repair. Slabs-on-grade bearing on AP-improved soils would minimize potential future settlement of the slab.

The lowest level slab of the occupied building area should be underlain by a polyethylene vapor barrier spread across the surface of a 9-inch minimum thickness of off-site gravel borrow. See below **Radon Ventilation System** section of the report for additional recommendations.

It is understood that the lowest level slabs will be constructed roughly coincident with, or slightly above, proposed finished grades. Therefore, the lowest level slabs and foundation walls are not considered to require underslab and perimeter foundation drainage, respectively.

All localized depressions in the lowest level slabs extending below grade (such as elevator pits, etc.) should be provided with properly tied continuous waterstops in all construction joints and cementitious waterproofing to protect against groundwater intrusion. Depressions in the lowest level slabs should be designed to resist a hydrostatic uplift pressure resulting from the groundwater being present at the 100-year design flood elevation.

In the event that APs are not installed below the proposed slabs, the existing uncontrolled fill exposed at the slab subgrades should be proof compacted with a minimum of six passes of a 10-ton vibratory drum roller prior to the placement of structural fill. After the proof compaction, all soft and/or weaving subgrade areas should be removed and replaced with compacted structural fill. Additionally, structural fill should be used to raise the proposed grade below the proposed slabs unless APs are used.

Where construction of the proposed lowest level slab for the Commercial Building requires the placement of fill above existing site grades, the fill will induce settlement of the underlying compressible organic and marine clay soils. The magnitude of settlement and time required for settlement to occur is dependent upon the soil conditions and soil properties, including such factors as the thickness of the organics and marine clay, the stress history of the deposits, the in-situ vertical effective stress, and the compressibility parameters of the deposits. Our preliminary analysis indicates that the placement of 1 to 3 feet of fill could result in approximately 1 to 3 inches of settlement.

As the APs installed for support of the slab-on-grade are anticipated to be ungrouted, these APs would provide drainage paths shortening the time required for consolidation settlement of the building pads to occur. Alternatively, wick drains could be used to expedite the consolidation process. In addition, the magnitude of post-construction settlement could be reduced by preloading. Preloading generally involves placing a height of fill above the proposed finished grade for a period of time prior to construction. The height of the preload should, at a minimum, be about 1-foot above the proposed finished grade. The preload stresses in the soil would be greater than those which would exist after construction is completed, thereby reducing post-construction settlements.

Prior to construction of the slab-on-grade for the Commercial Building, the observed rate of settlement with time will need to have decreased sufficiently to minimize the future settlement of the slab. Settlement of the building pad should be monitored and slab-on-grade should not be constructed until an acceptable magnitude of settlement has occurred. Specifically, this occurs when settlement has either stopped or when the time rate of settlement is very small.

A detailed settlement analysis should be performed once the proposed building details are finalized (i.e. footing layout, structural loads, floor finishes, etc.). This information in conjunction with additional site-specific subsurface information (i.e. further delineation of where the organics and soft clay are present, consolidation testing to determine soil parameters for settlement analysis) would allow the total amount of settlement and time for the settlement to occur to be further estimated. Further, the settlement analysis could be used to evaluate the effectiveness of various preloading scenarios.

General Foundation Recommendations

All foundations should be designed in accordance with the requirements of the Code.

Recommended minimum footing widths for continuous and isolated spread footings are 24 and 36 inches, respectively. All perimeter foundations and interior foundations located adjacent to unheated areas should be provided with a minimum 4-foot thickness of soil cover as frost protection. Interior footings below heated areas should be located such that the top of the foundation concrete is at least 6 inches below the underside of the lowest level slab. Additionally, all foundations should be located such that they are below a theoretical line drawn upward and outward at 2 to 1 (horizontal to vertical) from the bottom exterior edge of all adjacent footings, structures and utilities.

Below-grade foundation walls receiving lateral support at the top and bottom (i.e. restrained walls) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 60 pounds per cubic foot (pcf). Similarly, drained cantilevered retaining walls, (i.e. receiving no lateral support at the top) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 40 pcf. To these values must be added the pressures attributable to earthquake forces per the Code.

Lateral forces can be considered to be transmitted from the structure to the soil by passive Pressure against the perimeter foundation walls utilizing an equivalent fluid density of 120 pounds per cubic-foot providing that the foundation walls are designed to resist these pressures. Lateral force can also be considered to be transmitted from the structure to the soil by friction on the base of footings using a coefficient of 0.4, to which a safety factor of 1.5 should be applied.

Radon Ventilation System

We recommend the installation of a sub slab radon ventilation system within each of the proposed structures. The radon ventilation system should consist of 4-inch diameter perforated PVC pipe laid flat with its invert located 12 inches below the bottom of the lowest level slabs surrounded by 6 inches of ¾-inch crushed stone and filter fabric. The radon systems should include vertical riser pipe, consisting of solid PVC pipe within the interior of the building. It is anticipated that this system could be designed as a passive radon mitigation system which could be converted to an active mitigation system in the future, if required.

Seismic Design Considerations

For the purposes of determining parameters for structural seismic design, the following are the recommended Site Classes for the various buildings as defined in Section 1613.0 of the Code:

- Building B: Site Class C
- Building A: Site Class D
- Commercial Building: Site Class E

Further, the bearing strata on the site is not considered to be subject to liquefaction during an earthquake based on the criterion of Section 1806.4 of the Code.

Pavement Design Criteria

Preparation of the subgrade for all paved areas should first consist of stripping all existing asphalt and surficial topsoil, if encountered. The existing granular fill, where encountered, may remain in place below the base course materials provided it is proof-compacted with a minimum of six passes of a 10-ton vibratory drum roller prior to placement of gravel borrow to raise grades. All soft, spongy or "weaving" areas observed during the proof compaction should be cut-out and replaced with compacted gravel borrow.

Portions of the site contain compressible organic and/or marine clay soils which could consolidate causing surface settlement depending on the height of fill to be placed. The proposed grading plan will need to be reviewed in conjunction with the available subsurface information to determine what the potential settlement-related impacts area and what, if any, remediation measures should be taken. If remediation is required, preloading could be considered to reduce the amount of post-construction settlement and/or a woven geotextile fabric, such as Mirafi 270HP or equal, could be placed to potentially lessen the impacts of settlement on the paved surfaces.

The base and subbase layers should be placed in lifts having a compacted thickness of 6 inches and be compacted to a minimum of 95 percent of its maximum modified Proctor dry density.

The following are the recommended minimum flexible pavement sections:

Flexible Pavement Sections			
Layer	*NHDOT Material Specification*	*Standard-Duty [Passenger Car Parking] Thickness (Inches)*	*City Right-of-Way and High Traffic or Truck Areas Thickness (Inches)*
Bituminous Concrete Wearing Course	Section 401 Wearing Course	1.5 [Type E]	1.5 [3/8" Superpave]
Bituminous Concrete Binder Course	Section 401 Binder Course	1.5 [Type B]	2.5 [3/4" Superpave]
Base Course	Item No. 304.3 "Crushed Gravel"	6	12
Subbase	Item No. 304.2 "Gravel"	12	12

The heavy-duty pavement section is recommended to be used in the main drive/access lanes and the standard-duty pavement should be used in vehicle parking areas. Furthermore, a rigid concrete pavement section could alternatively be used to provide suitable support at areas of high traffic or severe turns, such as at trash enclosures.

The pavement design recommendations contained herein are contingent upon proper drainage and surface water control being provided.

Foundation Construction Considerations

The primary foundation construction considerations include the removal of existing site structures and utilities, removal of obstructions to AP/RI installations, vibration monitoring during AP/RI installation, foundation bearing surface preparation, reuse of on-site soils, construction dewatering, and off-site removal of excess excavated soil.

Prior to construction of the proposed buildings, it is recommended that all existing structures, foundation remains and utilities within the footprint of the proposed buildings be removed in their entirety. A minimum of ten (10) feet outside the footprint of the proposed buildings, abandoned structures and utilities may be cut off and removed to a depth of at least 2 feet below finished grades or proposed utilities and backfilled with compacted ordinary fill.

Obstructions to AP/RI installation encountered in the fill material should be removed by the earthwork contractor. Obstructions that prevent continued installation at a particular AP or RI location should be evaluated on a case-by-case basis to determine the necessity to remove the obstruction or to design the footing to span over the obstruction.

Ground vibrations are produced as a result of the ground improvement installation procedures. Based on our experience, impacts from these vibrations are not anticipated to result in structural damage to existing, adjacent structures, however, the magnitude of vibrations may be of sufficient magnitude to cause cosmetic cracking of adjacent structures and annoyance of occupants. It is not anticipated that ground vibrations caused by construction will cause damage to nearby structures. However, due to the proximity of the adjacent buildings to the site, it is recommended that preconstruction surveys of adjacent buildings and below-grade utilities be completed before the start of construction and that vibration monitoring be performed during the ground improvement installation activities.

The final excavation of the footing subgrades should be accomplished using an excavator that is equipped with smooth-edged bucket to avoid disturbance of the bearing surface. Further, it is recommended that foundation bearing surfaces be immediately covered with a minimum 3-inch thickness of compacted 3/4-inch crushed stone to prevent disturbance of the subgrade during subsequent forming operations and construction traffic.

It is anticipated that portions of the excavated soils may be re-used on-site as ordinary fill and structural fill, provided they are maintained in a dry condition and can be properly compacted. Excavated fill and glacial outwash soil to be reused on-site as structural fill should typically contain less than 30% by weight passing the No. 200 sieve. Excavated soil with greater than 30% by weight passing the No. 200 sieve should be segregated and can be reused on-site as ordinary fill subject to the provisions contained herein.

Grain size distributions of representative samples of the fill material indicate that the fines content ranges from about 1.5 to 32 percent. In addition, grain size distributions of representative samples of the glacial outwash deposit indicate that the fines content ranges from about 18 to 36 percent. It is emphasized that excavated material will become unsuitable for re-use if it becomes too wet. Therefore, it is recommended that stockpiles of excavated material intended for reuse be protected against increases in moisture content by securely covering the stockpiles at all times with 6-mil polyethylene for protection from precipitation and also as a dust mitigation measure. The placement and compaction of on-site material should be completed during relatively dry and non-freezing conditions. If, due to any of the above conditions, the excavated material is unsuitable for reuse, an off-site gravel borrow should be used.

Proper control of groundwater and surface water will be necessary to maintain a firm subgrade to support construction traffic and to complete the construction in-the-dry. Even with proper control of both surface water and groundwater, it is probable that during periods of wet weather off-site gravel fill and/or crushed stone may be required to maintain trafficability for construction equipment.

Based on the soil and groundwater conditions encountered in the subsurface explorations, it is anticipated that groundwater and surface water can generally be controlled using conventional sumping in combination with strategic use of trenches and berms. However, if excavation below the groundwater level occurs within the building areas, it will be necessary to temporarily depress the groundwater level across the site to complete the proposed below-grade construction in-the-dry. The construction dewatering design should be prepared by a professional engineer registered in the State of New Hampshire who is employed by the Contractor. The design should also be submitted for review by McPhail.

In consideration of the observed depth of the groundwater below the existing ground surface and the anticipated scope of the proposed development, on-site recharge of groundwater may not be considered practical. Therefore, off-site discharge of groundwater during foundation excavation and construction may be required. All dewatering operations should be performed in accordance with the rules and regulations of the City of Portsmouth.

Should off-site removal of excess excavated soil from the site be necessary, it is anticipated that chemical analysis of the excess soil will be required in order to conform to applicable regulations and policies. Chemical analysis of existing soil is not anticipated to be required if it is reused on-site.

Final Comments

The subsurface information obtained from the explorations performed to date is considered sufficient for foundation design purposes. However, an additional subsurface exploration program consisting of borings and/or test pits is recommended to be performed to obtain further subsurface information in the following areas:

- Eastern portion of Building B
- Central portion of Building A
- Within the portion of the Commercial Building occupied by the existing building

It is recommended that McPhail be retained to provide design assistance to the design team during the final design phase of this project. The purpose of this involvement is to review the structural foundation drawings and foundation notes for conformance with the recommendations presented herein and to prepare the earthwork and ground improvement specification sections for inclusion into the Contract Documents for construction.

It is recommended that a representative of McPhail be present during the earthwork phase of the project to monitor the installation of ground improvement, to monitor overexcavation of unsuitable soil at footing locations, preparation of foundation bearing surfaces, preparation of slab and pavement subgrades, placement and compaction of fill materials, and segregation of on-site soils in accordance with the provisions of the Code and the provisions of the Contract Documents. Our involvement during the construction phase of the work should minimize costly delays due to unanticipated field problems since our field engineer would be under the direct supervision of our project manager who was responsible for the subsurface exploration program and foundation design recommendations documented herein.

We trust that the above is sufficient for your present requirements. Should you have any questions concerning the recommendations presented herein, please do not hesitate to contact us.

Sincerely,

McPHAIL ASSOCIATES, LLC

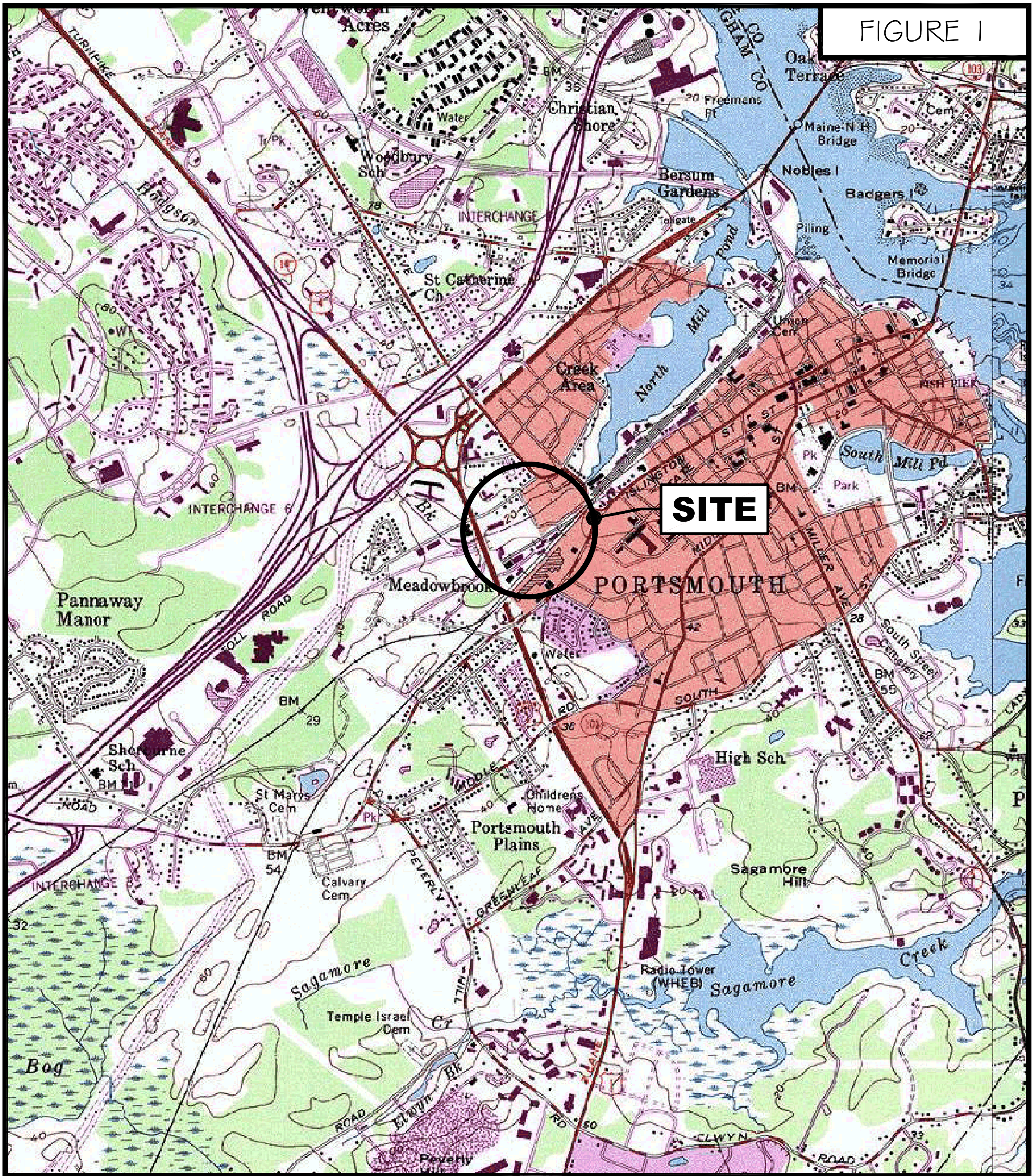
Fatima Babic-Konjic

Fatima Babic-Konjic, P.E.

Jonathan W. Patch

Jonathan W. Patch, P.E.

N:\Working Documents\Reports\6524_FER_041619.docx
FBK/JWP



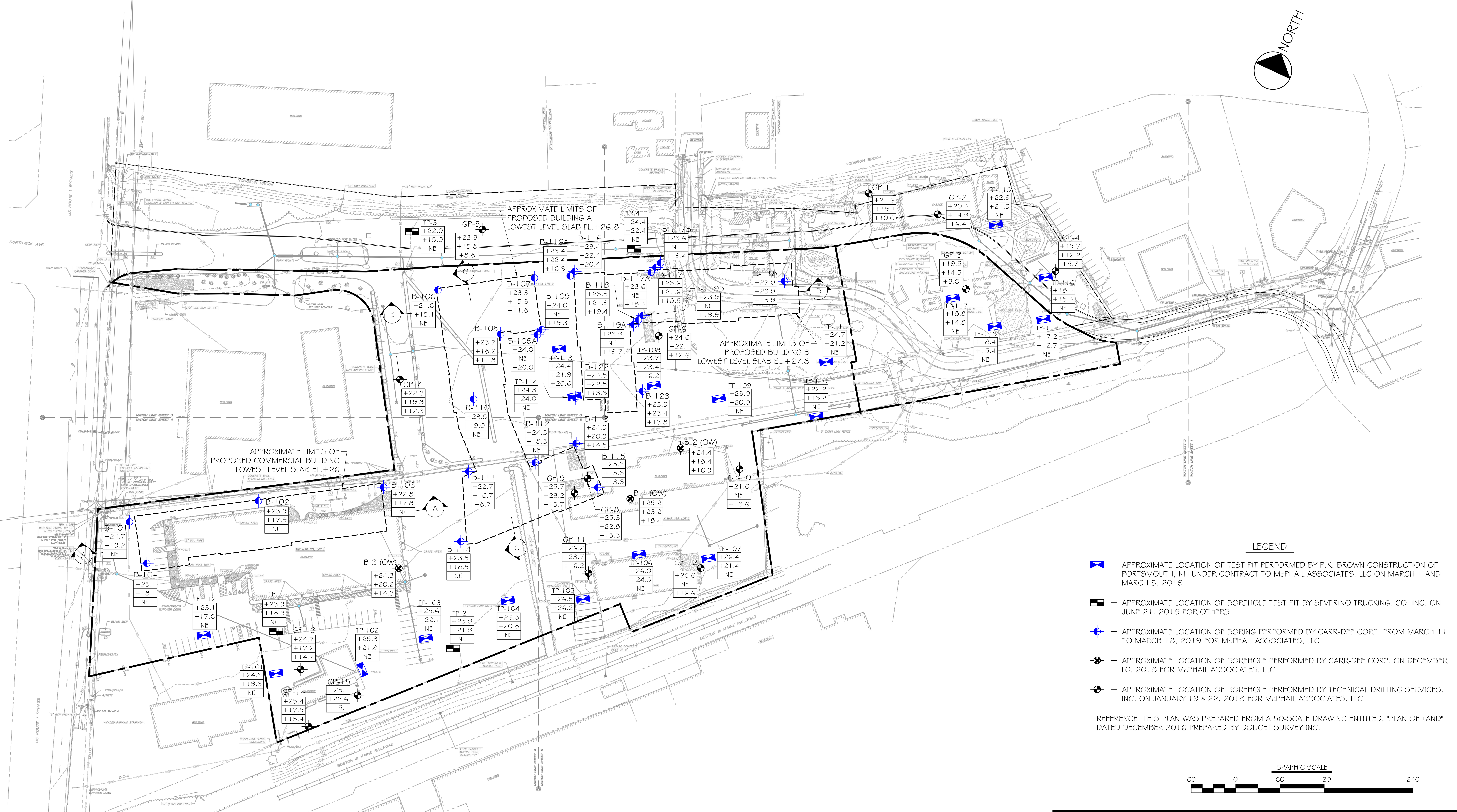
McPHAIL ASSOCIATES, LLC
Geotechnical and Geoenvironmental Engineers
2269 Massachusetts Avenue
Cambridge, MA 02140
617/868-1420
617/868-1423 (Fax)
www.mcphailgeo.com

SCALE 1:25,000

PROJECT LOCATION PLAN

WEST END YARDS

PORTSMOUTH NEW HAMPSHIRE



LEGEND

— APPROXIMATE LOCATION OF TEST PIT PERFORMED BY P.K. BROWN CONSTRUCTION OF PORTSMOUTH, NH UNDER CONTRACT TO McPHAIL ASSOCIATES, LLC ON MARCH 1 AND MARCH 5, 2019

— APPROXIMATE LOCATION OF BOREHOLE TEST PIT BY SEVERINO TRUCKING, CO. INC. ON JUNE 21, 2018 FOR OTHERS

— APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. FROM MARCH 11 TO MARCH 18, 2019 FOR McPHAIL ASSOCIATES, LLC

— APPROXIMATE LOCATION OF BOREHOLE PERFORMED BY CARR-DEE CORP. ON DECEMBER 10, 2018 FOR McPHAIL ASSOCIATES, LLC

— APPROXIMATE LOCATION OF BOREHOLE PERFORMED BY TECHNICAL DRILLING SERVICES, INC. ON JANUARY 19 & 22, 2018 FOR McPHAIL ASSOCIATES, LLC

REFERENCE: THIS PLAN WAS PREPARED FROM A 50-SCALE DRAWING ENTITLED, "PLAN OF LAND" DATED DECEMBER 2016 PREPARED BY DOUCET SURVEY INC.

GRAPHIC SCALE

60 0 60 120 240

+23.3	ELEVATION OF EXISTING GROUND SURFACE
+15.3	ELEVATION OF TOP OF NATURAL MARINE CLAY OR GLACIAL OUTWASH DEPOSIT
+11.8	ELEVATION OF TOP OF PRACTICAL REFUSAL* AT EXPLORATION LOCATION
NE	NOT ENCOUNTERED

* PRACTICAL REFUSAL IS CONSIDERED INDICATIVE OF EITHER BOULDERS IN THE GLACIAL DEPOSIT OR THE UNDERLYING BEDROCK SURFACE

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WEST END YARDS

PORTSMOUTH NEW HAMPSHIRE

SUBSURFACE EXPLORATION PLAN

FOR

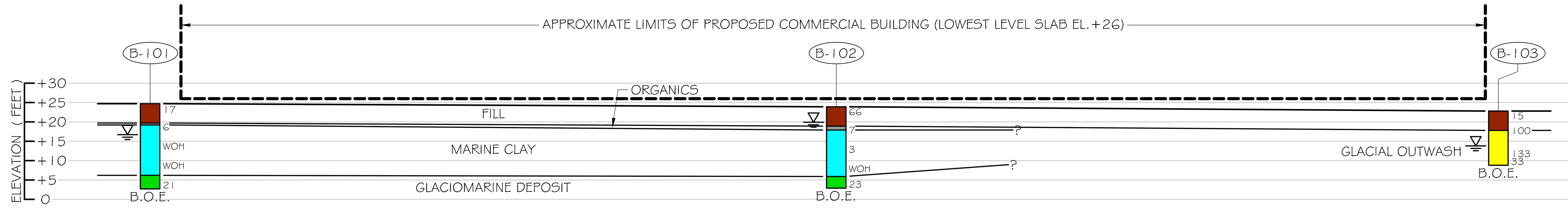
TORRINGTON PROPERTIES, INC.

BY

McPHAIL ASSOCIATES, LLC

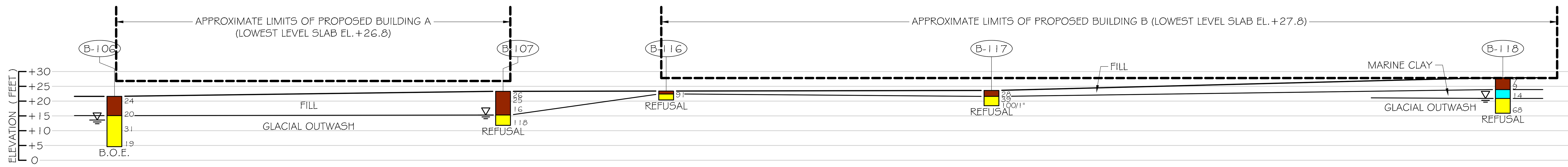
Date: APRIL 2019	Dwn: M.B.S.	Chkd: F.B.K.	Scale: 1" = 60'
Project No: 6524			FIGURE 2

FILE NAME: N:\Acad\JOBS\6524\FFR\6524-F02.dwg



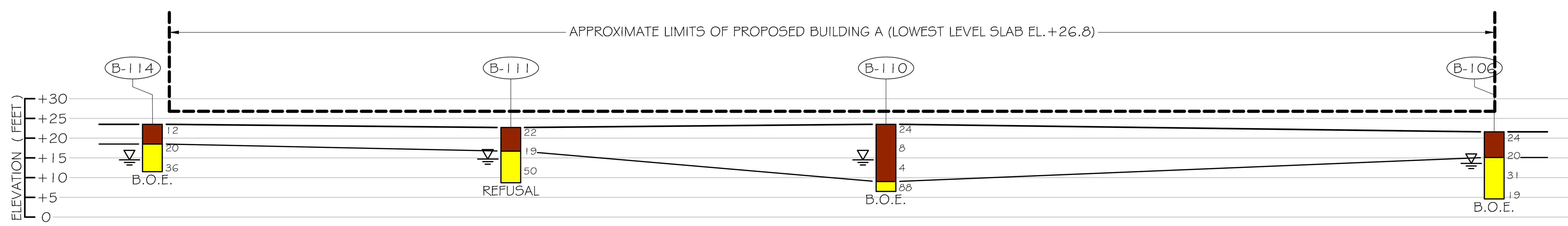
SECTION A-A

1" = 20'



SECTION B-B

1" = 20'



SECTION C-C

1" = 20'

LEGEND

B-101 — BOREHOLE NUMBER

— INDICATES GROUNDWATER LEVEL OBSERVED IN COMPLETED BOREHOLE

17 — STANDARD PENETRATION RESISTANCE OR N-VALUE, BLOWS PER FOOT. (1-3/8" I.D. SPLIT SPOON, 140LB. HAMMER, 30" DROP)

B.O.E. — BOTTOM OF EXPLORATION

REFUSAL — INDICATES SPLIT SPOOL AND ROLLER BIT REFUSAL ENCOUNTERED WITHIN COMPLETED BOREHOLE

NOTES:

1. REFER TO FIGURE 2 FOR LOCATION AND ORIENTATION OF SUBSURFACE SECTIONS.
2. STRATIFICATION LINES BETWEEN EXPLORATIONS ARE BASED ON LINEAR INTERPOLATION OF DATA FROM THE EXPLORATIONS AND MAY NOT NECESSARILY REPRESENT ACTUAL SUBSURFACE CONDITIONS.

SUBSURFACE UNIT	GRAPHIC SYMBOL	GENERAL DESCRIPTION
FILL		LOOSE TO VERY DENSE, BROWN TO DARK BROWN, SAND AND GRAVEL WITH TRACE TO SOME SILT, VARYING TO A WELL GRADED MIXTURE OF SAND, GRAVEL, AND SILT WITH BRICK
ORGANICS		SOFT TO STIFF, BROWN TO BLACK, ORGANIC SILT, SOME SAND AND CLAY
MARINE CLAY		VERY SOFT TO STIFF, YELLOW TO BLUE, SILTY CLAY
GLACIOMARINE DEPOSIT		COMPACT, GRAY, SILTY SAND, SOME GRAVEL, VARYING TO SILTY SAND AND GRAVEL WITH WEATHERED BEDROCK
GLACIAL OUTWASH		COMPACT TO VERY DENSE, GRAY, SAND AND GRAVEL WITH TRACE TO SOME SILT, VARYING TO A WELL-GRADED MIXTURE OF SAND, GRAVEL, AND SILT

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WEST END YARDS

PORTSMOUTH NEW HAMPSHIRE

GENERALIZED SUBSURFACE SECTIONS A-A, B-B, AND C-C

FOR

TORRINGTON PROPERTIES, INC.

BY

McPHAIL ASSOCIATES, LLC

Date: APRIL 2019 | Dwn: M.B.S. | Chkd: F.B.K. | Scale: 1" = 20'

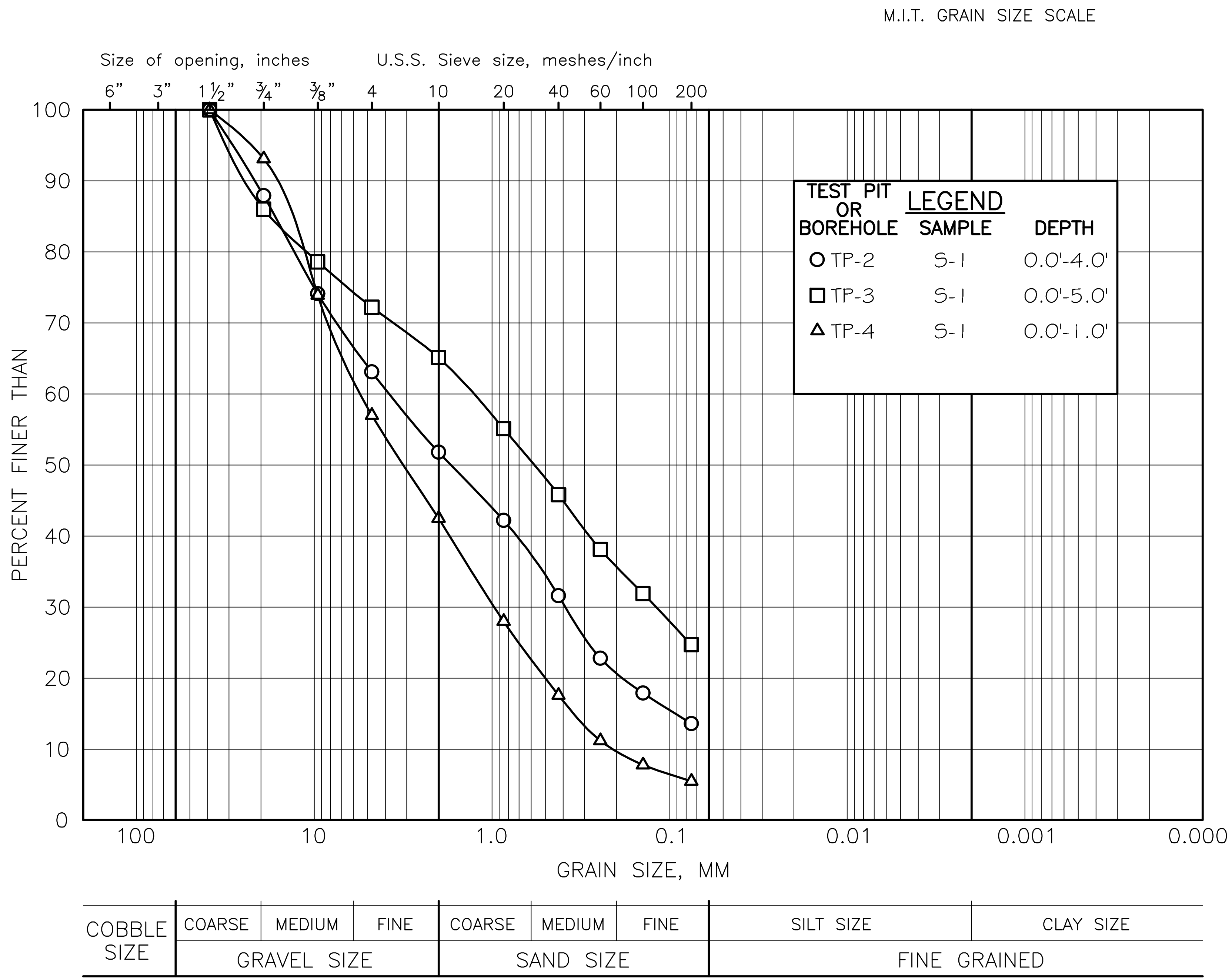
Project No: 6524

FIGURE 3

FILE NAME: N:\Acad\JOBS\6524\FFR\6524-F03_Sections.dwg

FILE NAME: N:\Acad\JOBS\6524\FFER\6524-F04_Sieve.dwg

PROJECT No. 6524



McPHAIL ASSOCIATES, LLC

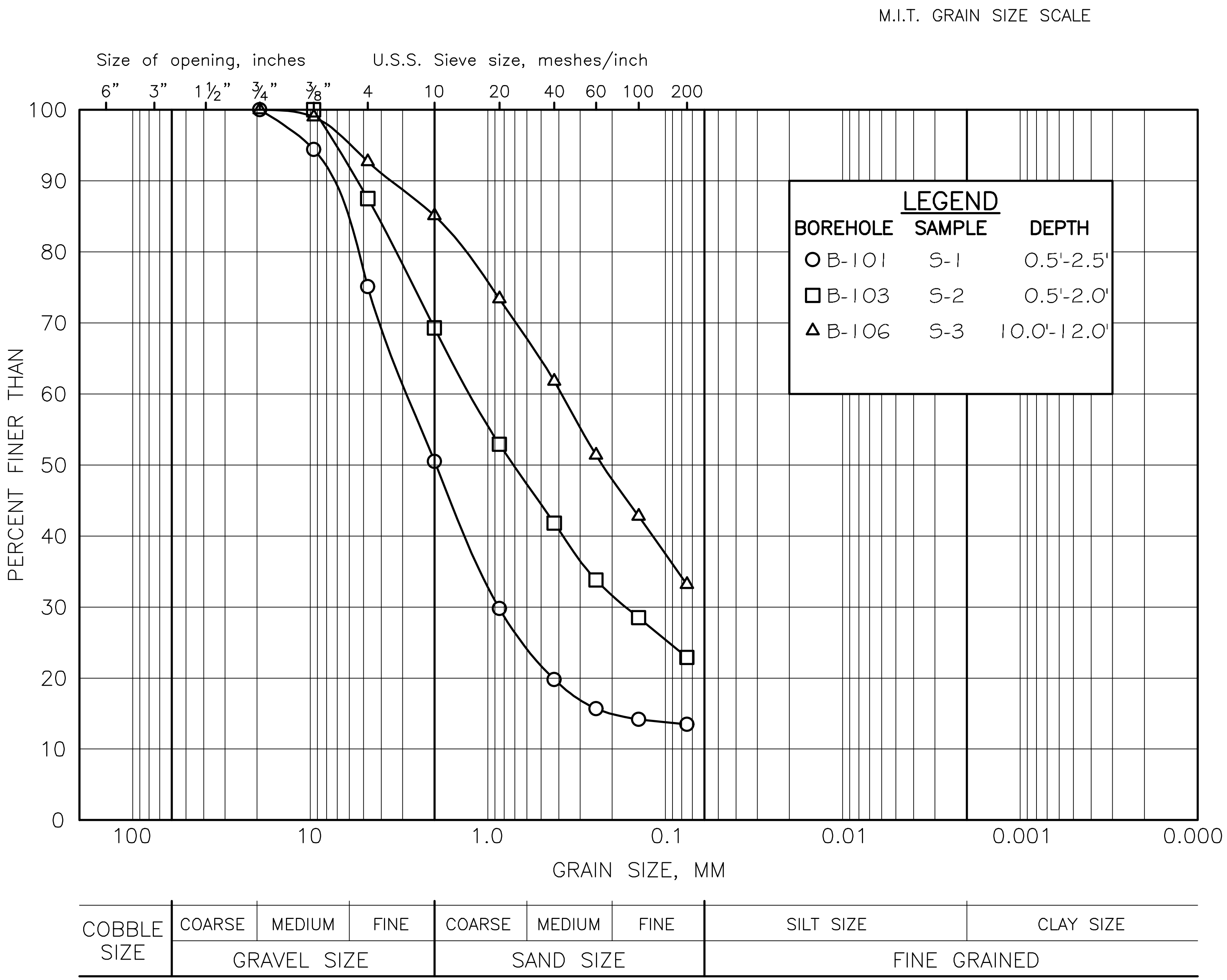
GRAIN SIZE DISTRIBUTION

FILL

FIGURE 4

FILE NAME: N:\Acad\JOBS\6524\FFER\6524-F05_Sieve.dwg

PROJECT No. 6524



McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION

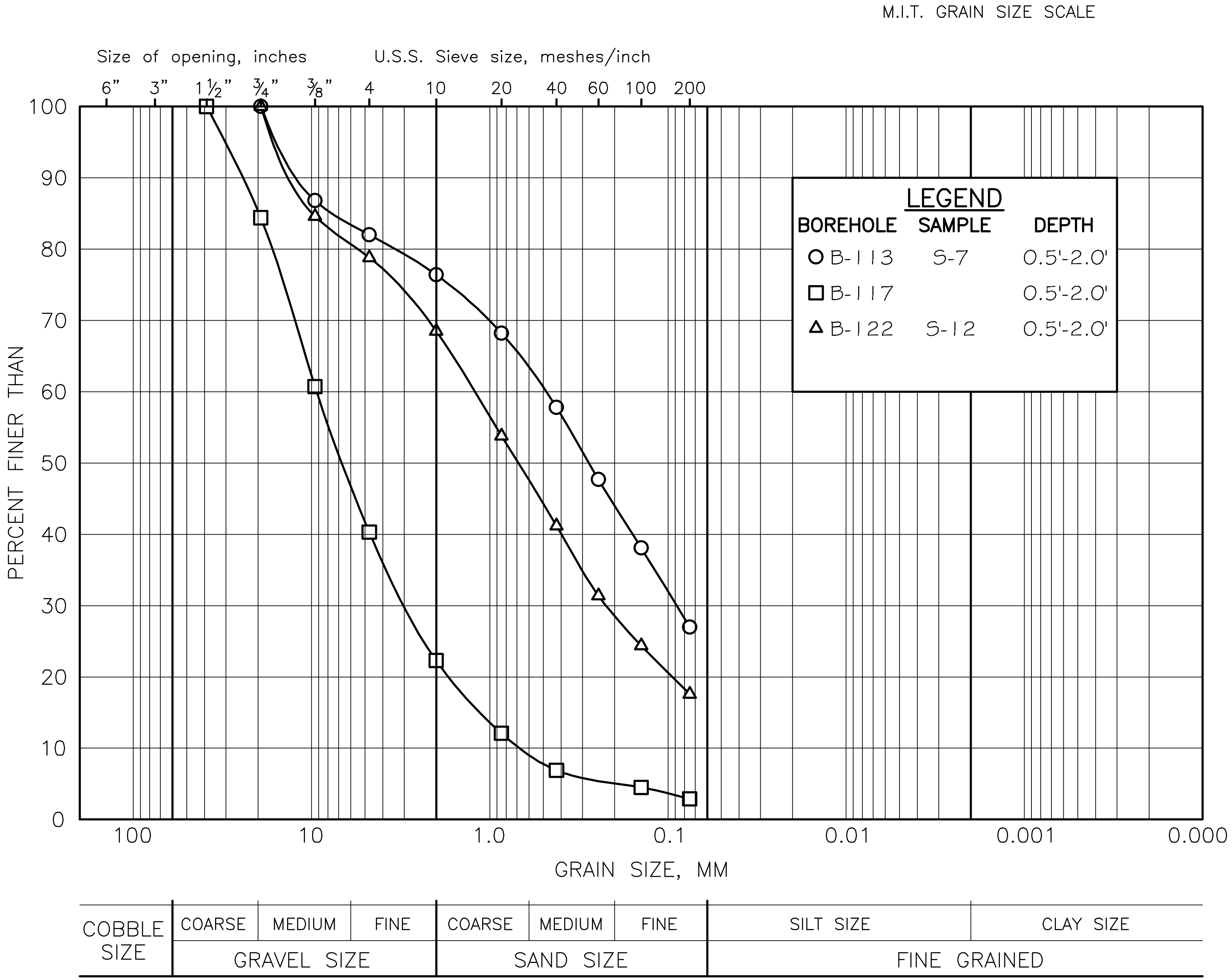
FILL

FIGURE 5

FILE NAME: N:\Acad\JOBS\6524\FFER\6524-F06_Sieve.dwg

PROJECT No. 6524

McPHAIL ASSOCIATES, LLC



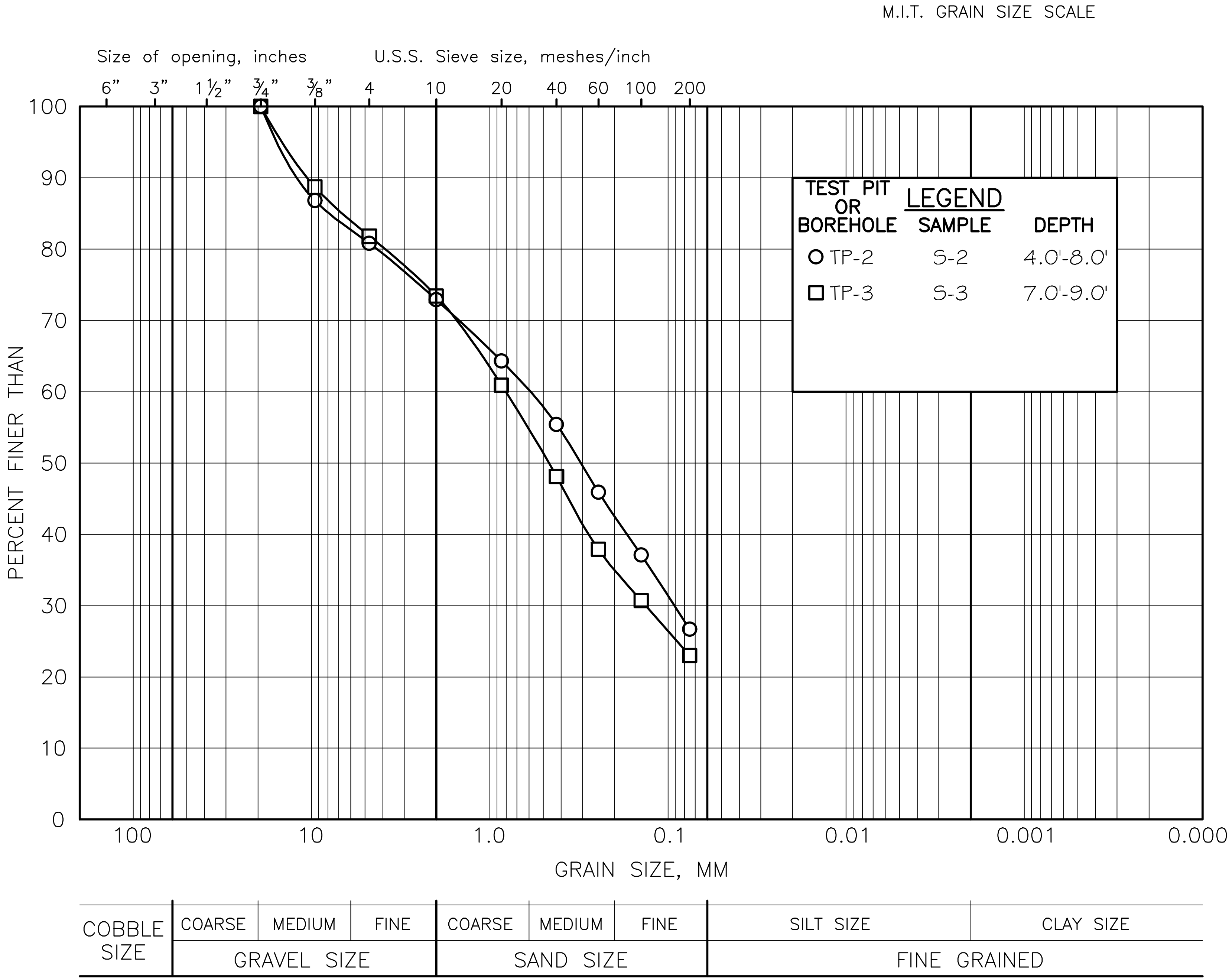
GRAIN SIZE DISTRIBUTION

FILL

FIGURE 6

FILE NAME: N:\Acad\JOBS\6524\FFER\6524-F07_Sieve.dwg

PROJECT No. 6524



McPHAIL ASSOCIATES, LLC

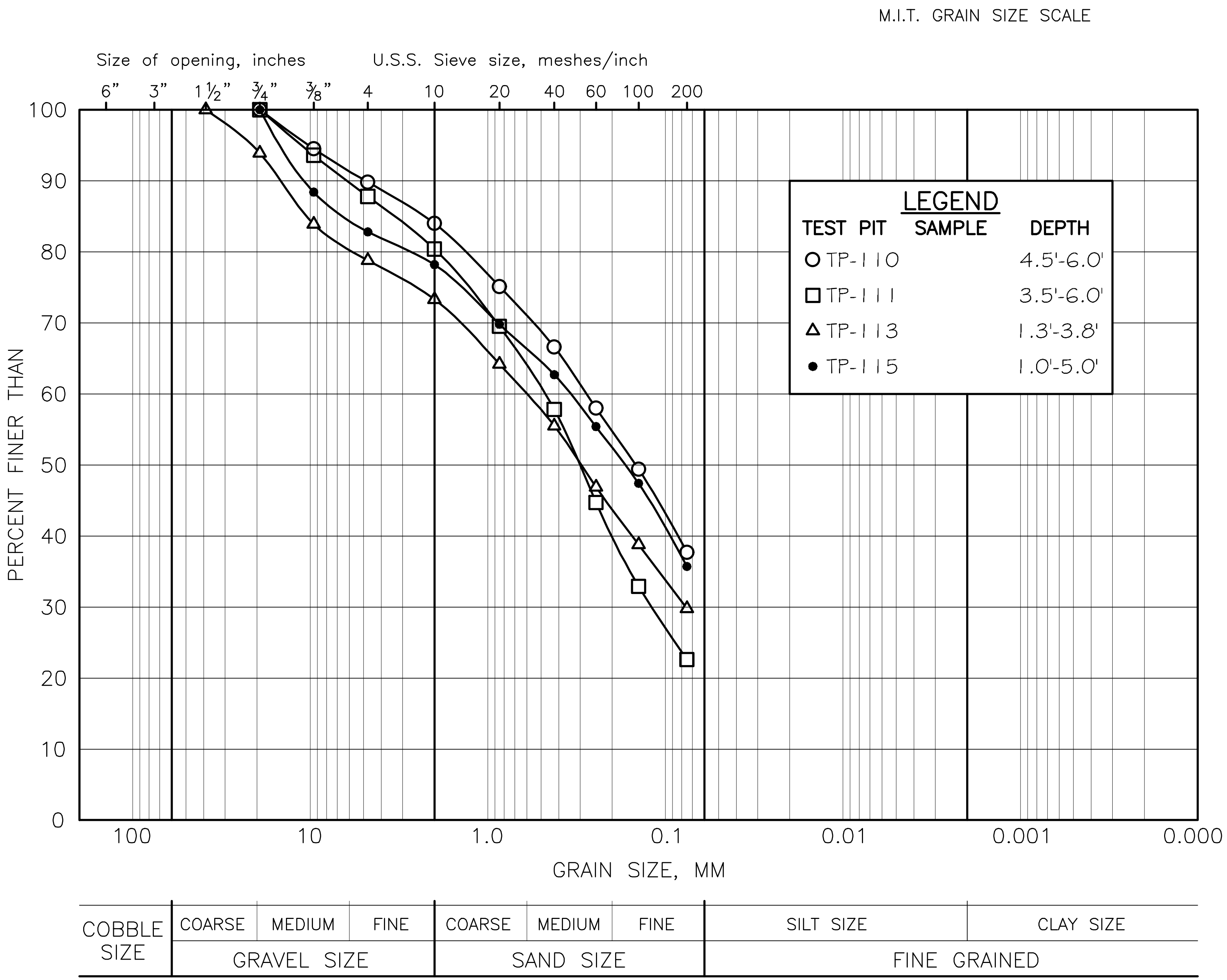
GRAIN SIZE DISTRIBUTION

GLACIAL OUTWASH

FIGURE 7

FILE NAME: N:\Acad\JOBS\6524\FFER\6524-F08_Sieve.dwg

PROJECT No. 6524



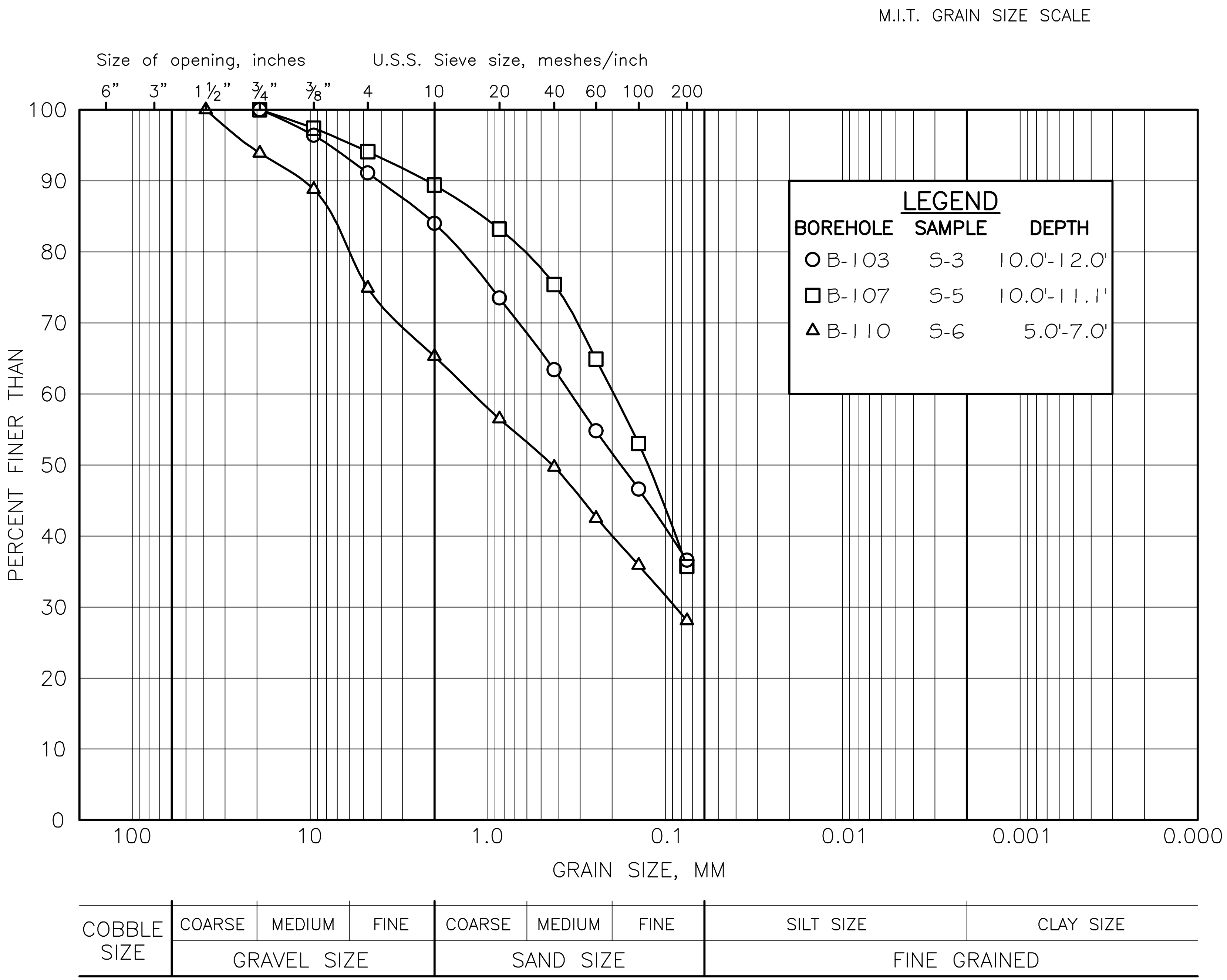
McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
GLACIAL OUTWASH

FIGURE 8

FILE NAME: N:\Acad\JOBS\6524\FFER\6524-F09_Sieve.dwg

PROJECT No. 6524



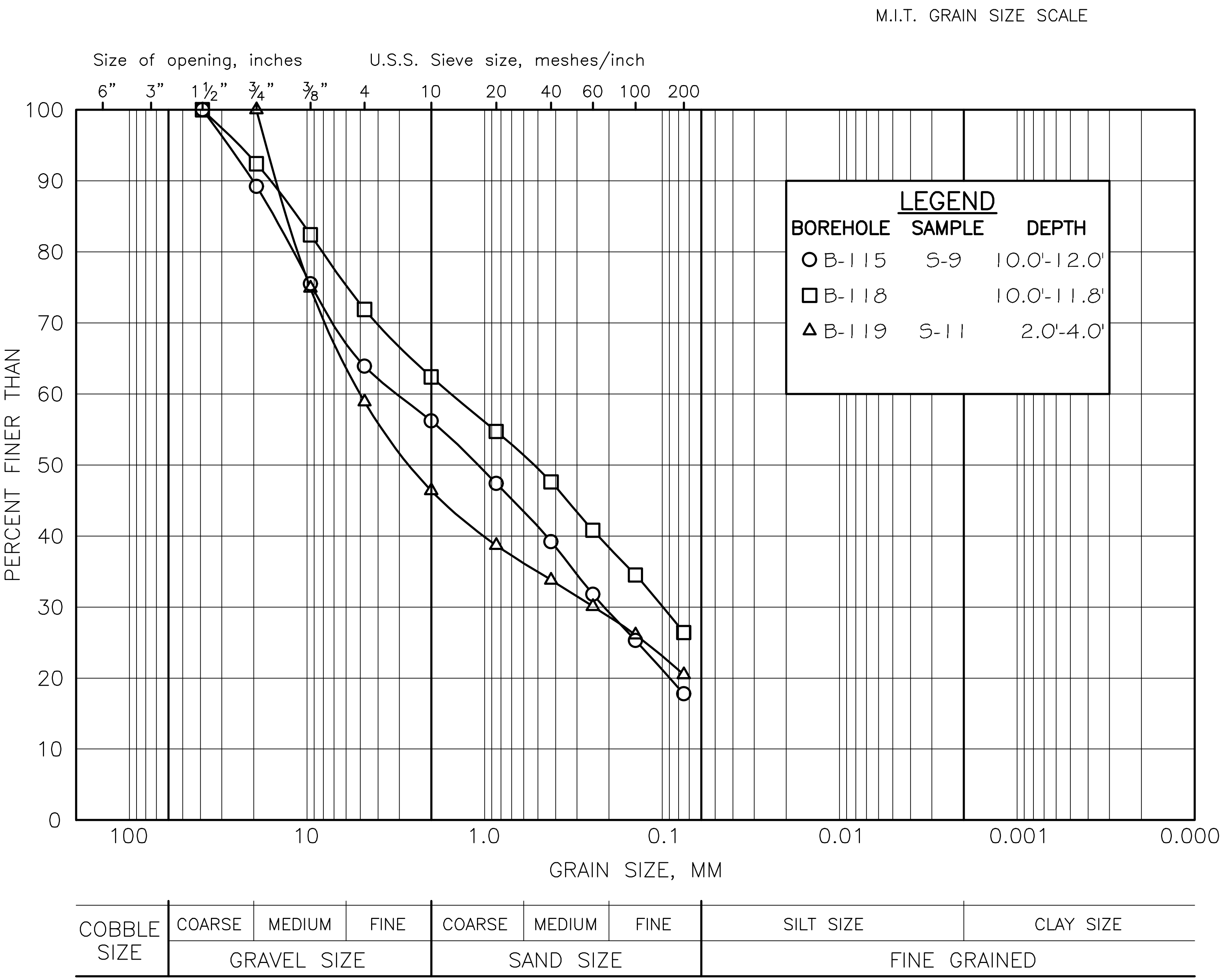
McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
GLACIAL OUTWASH

FIGURE 9

FILE NAME: N:\Acad\JOBS\6524\FFER\6524-F10_Sieve.dwg

PROJECT No. 6524



McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
GLACIAL OUTWASH

FIGURE 10

McPHAIL ASSOCIATES, LLC

APPENDIX A:

LIMITATIONS

LIMITATIONS

This report has been prepared on behalf of and for the exclusive use of Torrington Properties, Inc. for specific application to the proposed West End Yards development to be located in Portsmouth, New Hampshire in accordance with generally accepted soil and geotechnical engineering practices. No other warranty, expressed or implied, is made.

In the event that any changes in nature or design of the proposed construction are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by McPhail Associates, LLC.

The analyses and recommendations presented in this report are based upon the data obtained from the subsurface explorations performed at the approximate locations indicated on the enclosed plan. If variations in the nature and extent of subsurface conditions between the explorations become evident during the course of construction, it will be necessary for a re-evaluation of the recommendations of this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations.

APPENDIX B:

BORING LOGS PREPARED BY CARR-DEE CORP.
B-101 TO B-104, B-106 TO B-119, B-122 AND B-123

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND
SURFACE
+24.7

BORING 101

3"	ASPHALT	
	SAND AND GRAVEL, SOME SILT SILT (FILL)	S#1, 6" to 2'6" (3-5-12-10) RECOVERED 7 in.
5'	(OGRANIC DEPOSIT)*	S#2, 5' to 5'6" (2) RECOVERED 1 in.
5'6"	MEDIUM STIFF BLUE CLAY (MARINE CLAY)	S#2A, 5'6" to 7' (3-3-5) RECOVERED 12 in.
9'	VERY SOFT BLUE CLAY (MARINE CLAY)	S#3, 10' to 12' (1/12-WOH/12) RECOVERED 20 in. S#4, 15' to 17' (WOH/24) RECOVERED 24 in.
18'6"	COMPACT SILTY SAND & GRAVEL WITH WEATHERED BEDROCK. (GLACIOMARINE DEPOSIT)	S#5, 20' to 22' (14-9-12-9) RECOVERED 10 in.
22'		

WATER LEVEL 8'
SIZE OF AUGER: 2 1/4" LENGTH: 20'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-12-2019
RIG TYPE: D-50 AUTO HAMMER

*SOFT, BROWN TO BLACK, ORGANIC SILT WITH SOME SAND AND CLAY.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

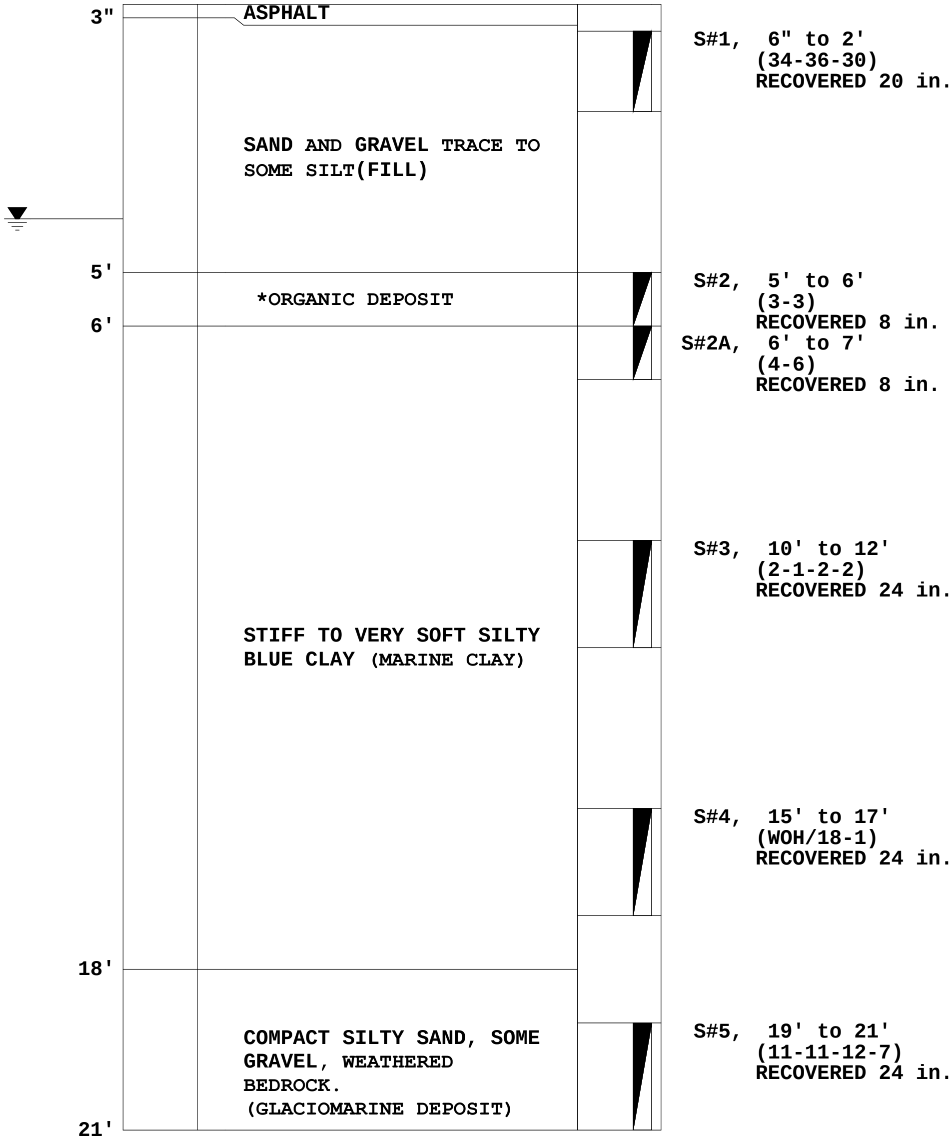
37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +23.9

BORING 102



WATER LEVEL 4'
SIZE OF AUGER: 2 1/4" LENGTH: 19'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-12-2019
RIG TYPE: D-50 AUTO HAMMER

*FIRM, BROWN TO BLACK, ORGANIC SILT WITH SOME SAND AND CLAY.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

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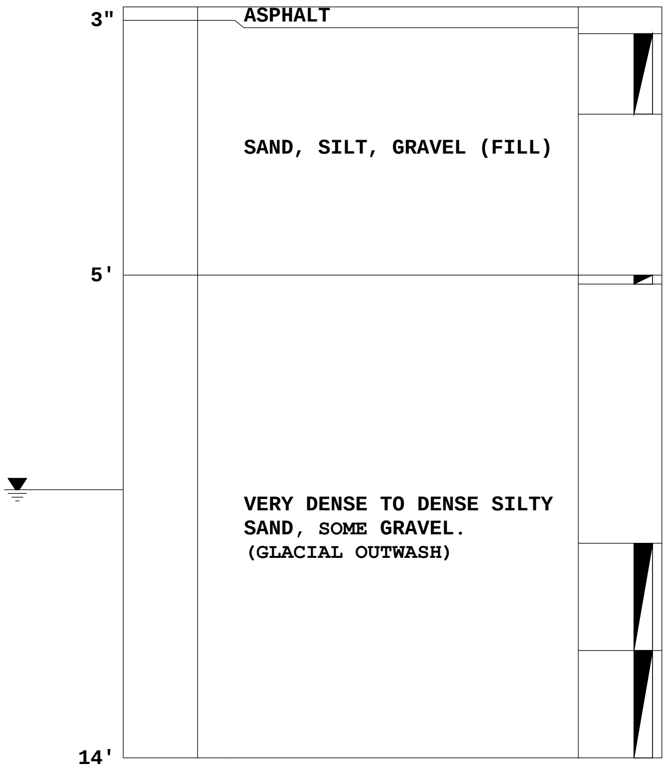
To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +22.8

BORING 103



S#1, 6" to 2'
(14-7-8)
RECOVERED 12 in.

S#2, 5' to 5'2"
(100)
RECOVERED 2 in.

S#3, 10' to 12'
(22-100-33-38)
RECOVERED 24 in.

S#4, 12' to 14'
(22-18-15-17)
RECOVERED 20 in.

WATER LEVEL 9'
SIZE OF AUGER: 2 1/4" LENGTH: 10'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-12-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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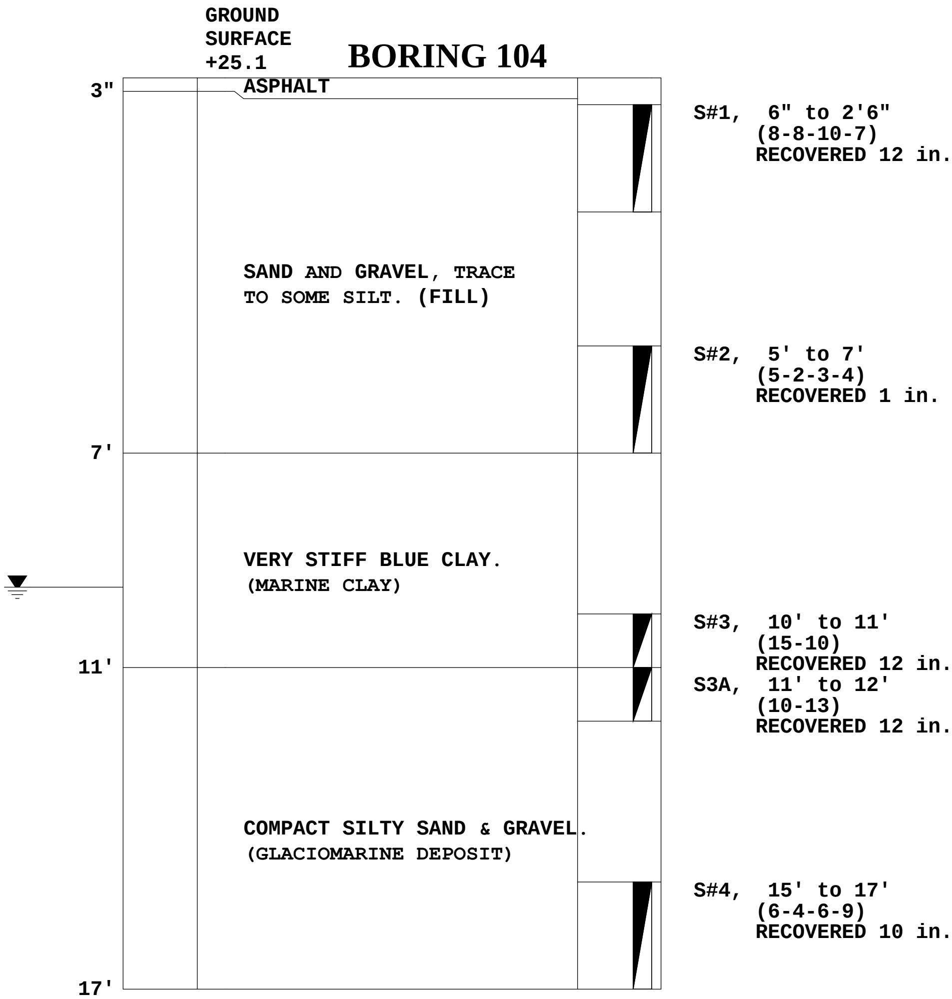
To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 104



WATER LEVEL 9'6"
SIZE OF AUGER: 2 1/4" LENGTH: 15'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-12-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

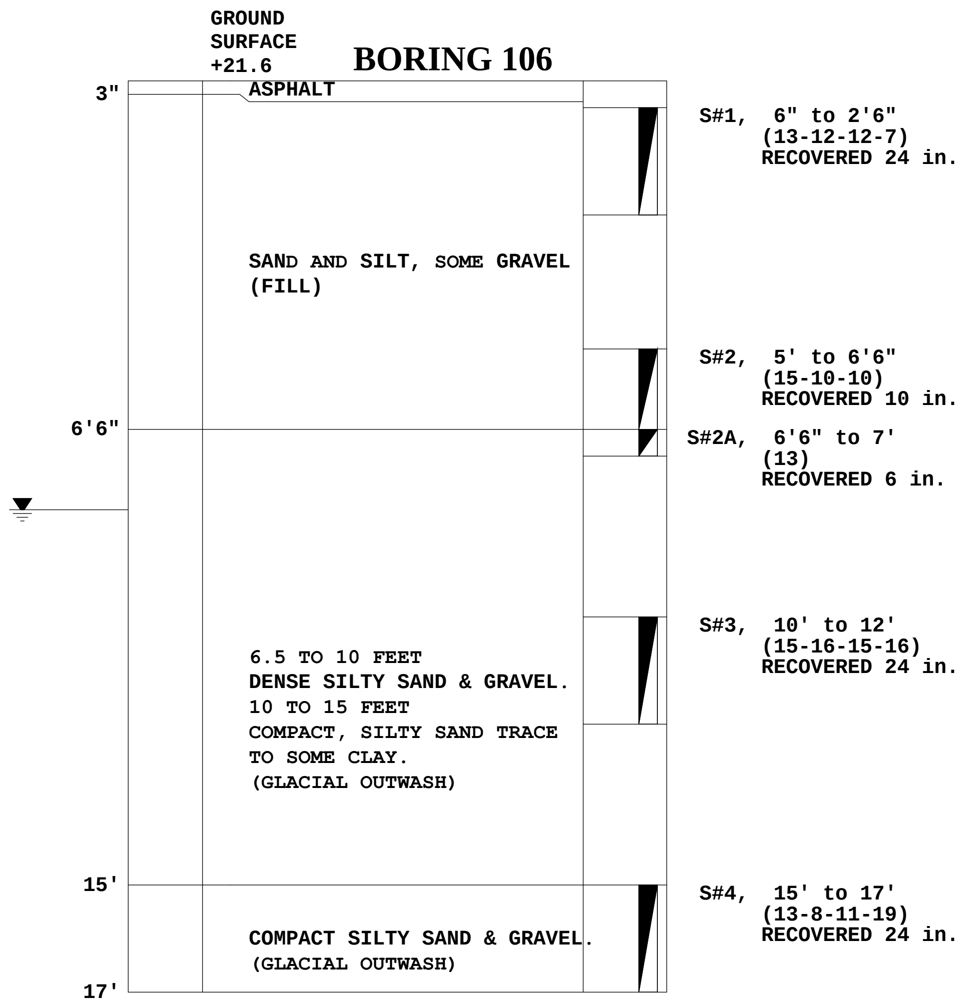
CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 106



WATER LEVEL 8'
SIZE OF AUGER: 2 1/4" LENGTH: 15'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-8-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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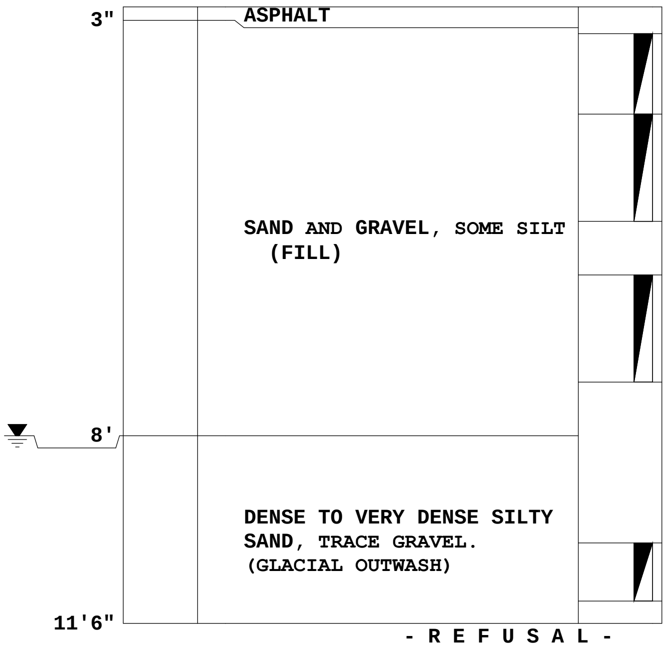
37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +23.3

BORING 107



S#1, 6" to 2'
(16-12-14)
RECOVERED 12 in.

S#2, 2' to 4'
(13-11-14-11)
RECOVERED 14 in.

S#3, 5' to 7'
(7-7-9-9)
RECOVERED 24 in.

S#4, 10' to 11'1"
(12-18-100/1)
RECOVERED 12 in.

\- R E F U S A L -
(NO PENETRATION WITH AUGER)

WATER LEVEL 8'
SIZE OF AUGER: 2 1/4" LENGTH: 11'6"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-8-2019
RIG TYPE: D-50 AUTO HAMMER

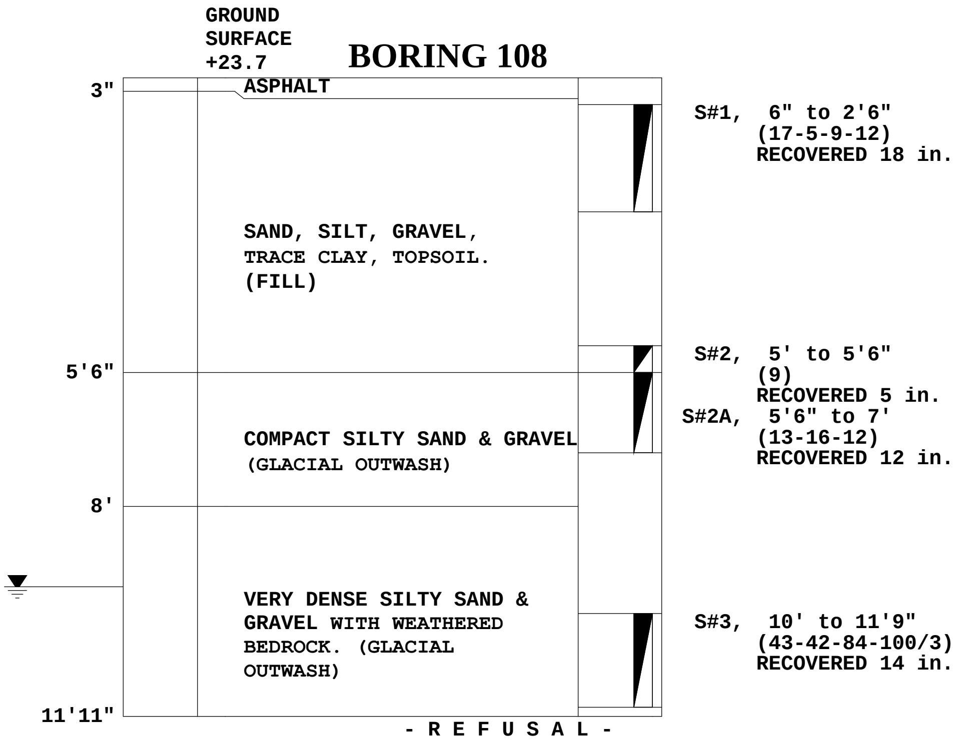
All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.



(NO PENETRATION WITH AUGER)

WATER LEVEL 9'6"
SIZE OF AUGER: 2 1/4" LENGTH: 11'11"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-8-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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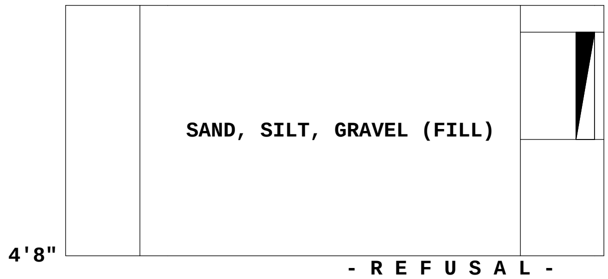
To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND
SURFACE
+24

BORING 109



S#1, 6" to 2'6"
(13-13-10-24)
RECOVERED 18 in.

- R E F U S A L -

(NO PENETRATION WITH AUGER)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 4'8"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-8-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +24

BORING 109A

NO SAMPLES TAKEN

4'

- R E F U S A L -

(NO PENETRATION WITH AUGER)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 4'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-8-2019
RIG TYPE: D-50 AUTO HAMMER
NOTE: BORING MOVED 4'0" N.E. FROM B-109

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

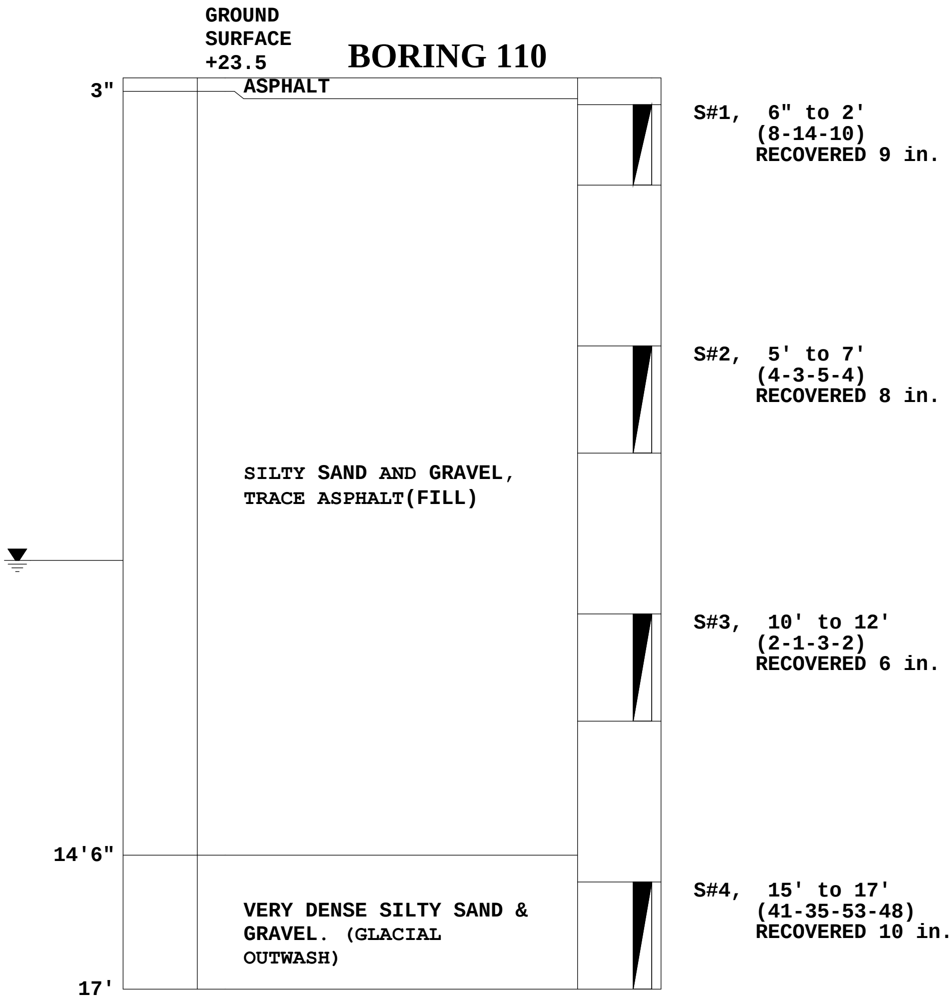
CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 110



WATER LEVEL 9'
SIZE OF AUGER: 2 1/4" LENGTH: 15'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-11-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

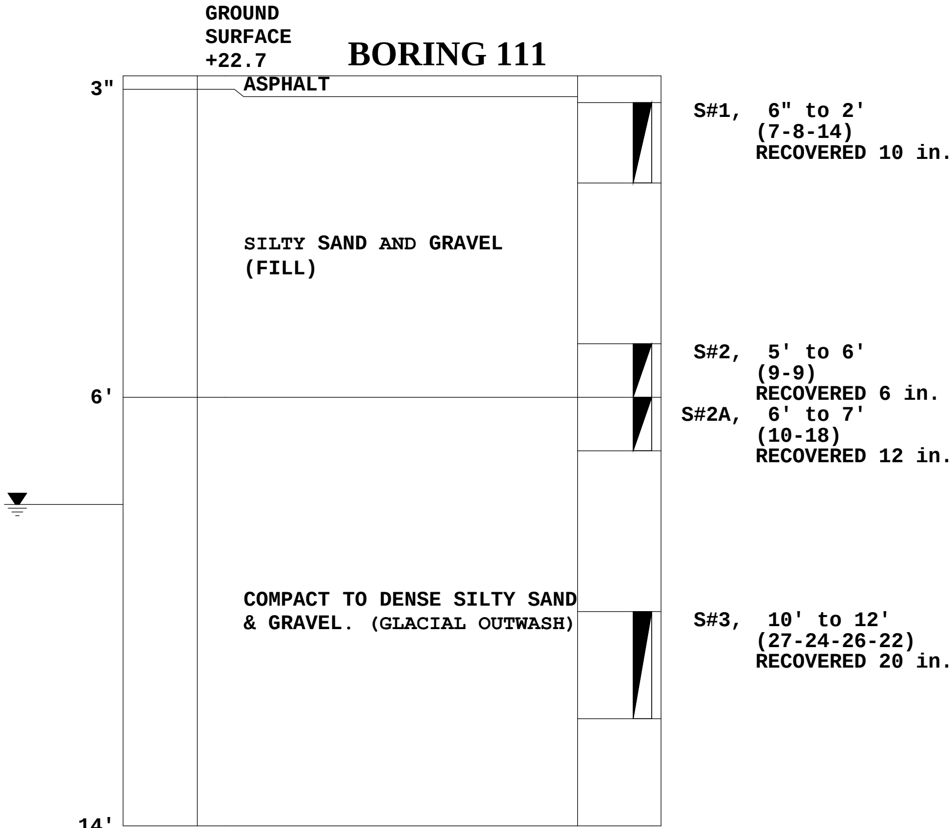
CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 111



- R E F U S A L -
(NO PENETRATION WITH AUGER & SPLIT SPOON)

WATER LEVEL 8'
SIZE OF AUGER: 2 1/4" LENGTH: 14'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-11-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

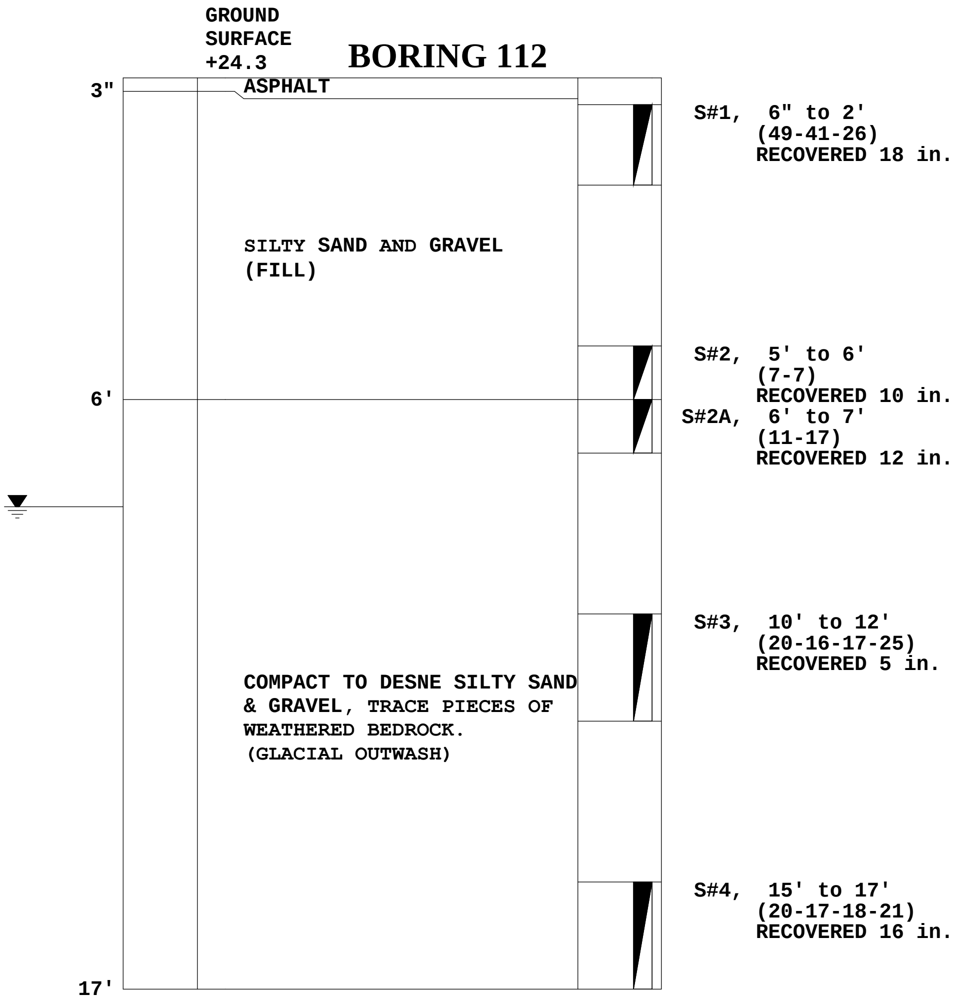
CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 112



WATER LEVEL 8'
SIZE OF AUGER: 2 1/4" LENGTH: 15'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-11-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

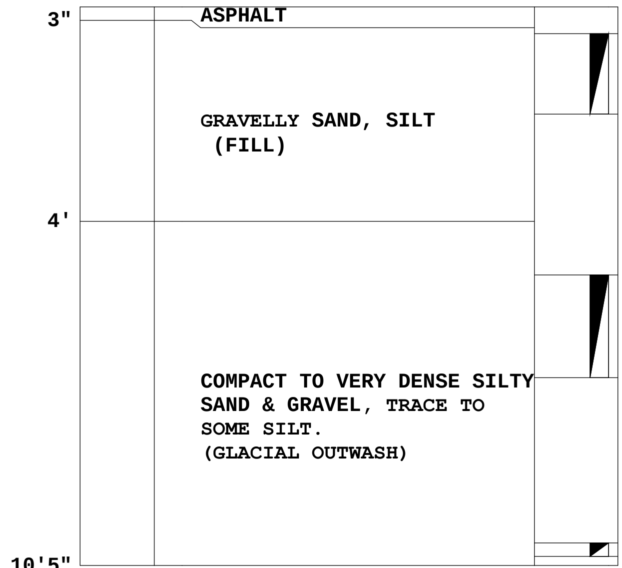
37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND
SURFACE
+24.9

BORING 113



S#1, 6" to 2'
(13-8-12)
RECOVERED 18 in.

S#2, 5' to 6'11"
(11-9-12-100/5)
RECOVERED 12 in.

S#3, 10' to 10'3"
(100/3)
RECOVERED 0 in.

\- R E F U S A L -
(NO PENETRATION WITH AUGER)
SIZE OF AUGER: 2 1/4" LENGTH: 10'5"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-11-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

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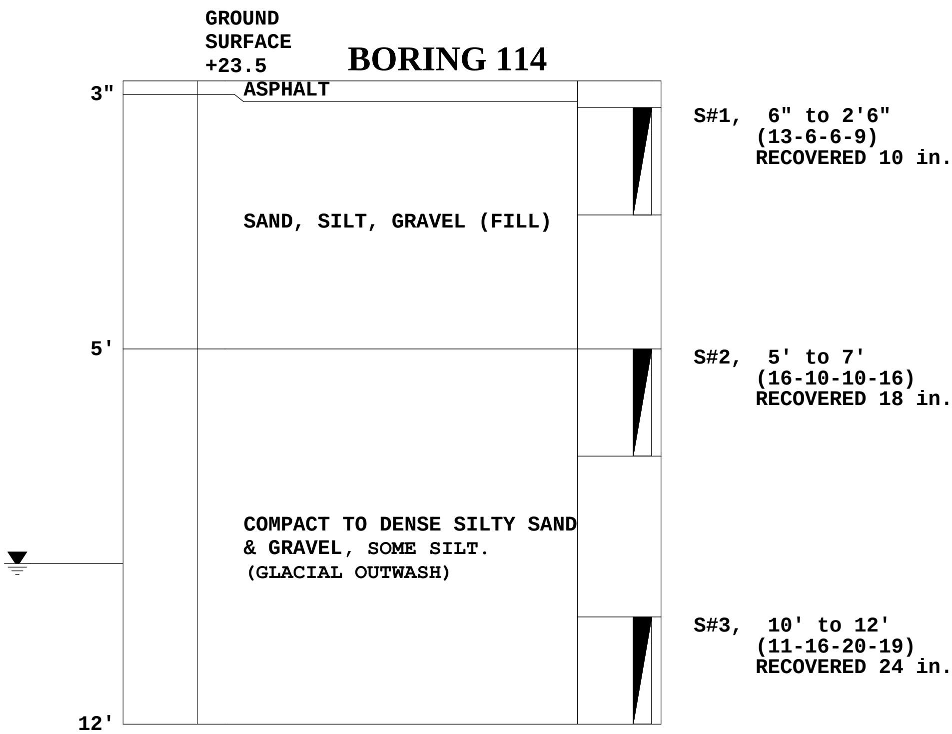
To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 114



WATER LEVEL 9'
SIZE OF AUGER: 2 1/4" LENGTH: 10'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-12-2019
RIG TYPE: D-50 AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

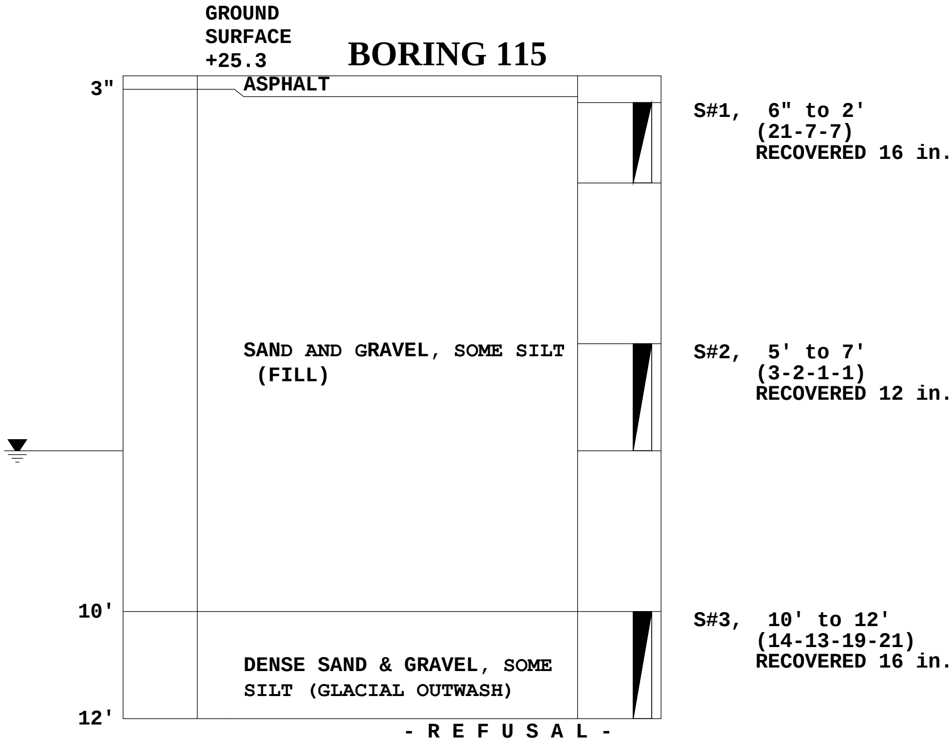
CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 115



- R E F U S A L -
(NO PENETRATION WITH AUGER & 2" S.S.)

WATER LEVEL 7'
SIZE OF AUGER: 2 1/4" LENGTH: 14'1"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-11-2019
RIG TYPE: D-50, AUTO HAMMER

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +23.4

BORING 116

3"	ASPHALT	
1'	SAND, GRAVEL, SILT (FILL)	S#1, 6" to 1' (26) RECOVERED 6 in.
3'	VERY DENSE SILTY SAND & GRAVEL. (GLACIAL OUTWASH)	S#1A, 1' to 2' (41-50) RECOVERED 10 in.

- R E F U S A L -

(NO PENETRATION WITH AUGERS)
SIZE OF AUGER: 2 1/4" LENGTH: 3'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +23.4

BORING 116A

0 to 1'	AUGERED	
1' to 6'5"	VERY DENSE SAND & GRAVEL, SOME SILT. (GLACIAL OUTWASH)	S#1, 5' to 6'1" (20-86-100/1") RECOVERED 12 in.

- R E F U S A L -
(NO PENETRATION WITH AUGERS)
SIZE OF AUGER: 2 1/4" LENGTH: 6'5"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +23.6

BORING 117

6"	ASPHALT	
2'	SAND, GRAVEL, SILT (FILL)	S#1, 6" to 2' (18-15-13) RECOVERED 12 in.
5'2"	DENSE SAND & GRAVEL, SOME SILT. (GLACIAL OUTWASH)	S#2, 2' to 4' (16-12-27-21) RECOVERED 14 in. S33, 5' to 5'1" (100/1") RECOVERED 1 in.

- R E F U S A L -

(NO PENETRATION WITH AUGERS)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 5'2"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND
SURFACE
+23.6

BORING 117A

	AUGERED (NO SAMPLES TAKEN)	
4'2"		

- R E F U S A L -
(NO PENETRATION WITH AUGERS)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 4'2"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.
NOTE: THIS BORING MOVED 5'0" SW OF ORGINAL LOCATION.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 117B

GROUND SURFACE		
	AUGERED (NO SAMPLES TAKEN)	
5'2"		

- R E F U S A L -

(NO PENETRATION WITH AUGERS)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 5'2"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.
NOTE: THIS BORING MOVED 6'0" NW OF ORGINAL LOCATION.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET   MEDFORD, MA 02155-0001   Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA   Date: 3-13-2019   Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH   Scale: 1 in.= 3.5 ft.

GROUND SURFACE +27.9

BORING 118

6"	LOAM (TOPSOIL)	S#1,	0' to 6" (7) RECOVERED 1 in.
4'	SILTY SAND, SOME GRAVEL (FILL)	S#1A,	6" to 2' (4-3-3) RECOVERED 12 in.
		S#2,	2' to 4' (3-5-4-5) RECOVERED 12 in.
7'	FIRM, SILTY CLAY, TRACE TO SOME SAND. (MARINE CLAY)	S#3,	5' to 7' (6-7-7-17) RECOVERED 24 in.
12'	VERY DENSE SILTY SAND & GRAVEL. (GLACIAL OUTWASH)	S#4,	10' to 11'9" (21-43-25-100/3") RECOVERED 9 in.

- R E F U S A L -
(NO PENETRATION WITH AUGERS)

WATER LEVEL 7'
SIZE OF AUGER: 2 1/4" LENGTH: 12'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

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To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND SURFACE +23.9

BORING 119

SILTY SAND, SOME GRAVEL (FILL)

S#1, 6" to 2'
(7-10-13)
RECOVERED 12 in.

2'

VERY DENSE SANDY GRAVEL, SOME SILT. (GLACIAL OUTWASH)

S#2, 2' to 4'
(23-21-32-52)
RECOVERED 12 in.

4'6"

- R E F U S A L -

(NO PENETRATION WITH AUGERS)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 4'6"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

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To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND
SURFACE
+23.9

BORING 119A

	AUGERED (NO SAMPLES TAKEN)	
4'2"		

- R E F U S A L -

(NO PENETRATION WITH AUGERS)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 4'2"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.
NOTE: THIS BORING MOVED 6'0" WEST OF ORIGINAL LOCATION.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND
SURFACE
+23.9

BORING 119B

		AUGERED (NO SAMPLES TAKEN)	
4'			

- R E F U S A L -
(NO PENETRATION WITH AUGERS)
NO WATER ENCOUNTERED
SIZE OF AUGER: 2 1/4" LENGTH: 4'0"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.
NOTE: THIS BORING MOVED 6'0" NW OF ORIGINAL LOCATION.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

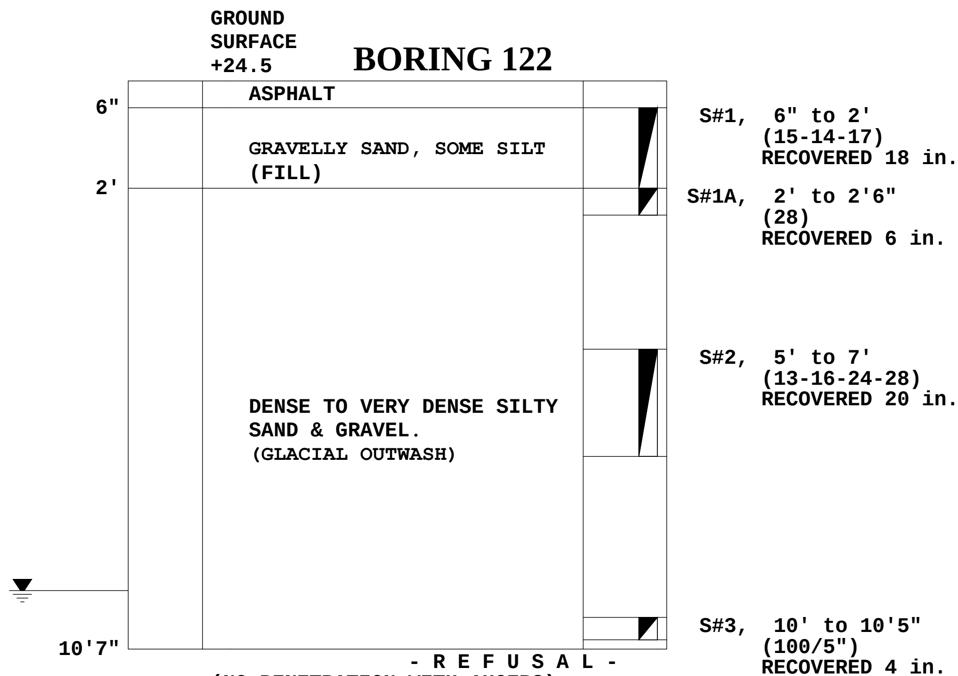
CARR-DEE CORP.

37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

BORING 122



(NO PENETRATION WITH AUGERS)

WATER LEVEL 9'6"
SIZE OF AUGER: 2 1/4" LENGTH: 10'7"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-8-2019
RIG TYPE: D-50, AUTO HAMMER.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

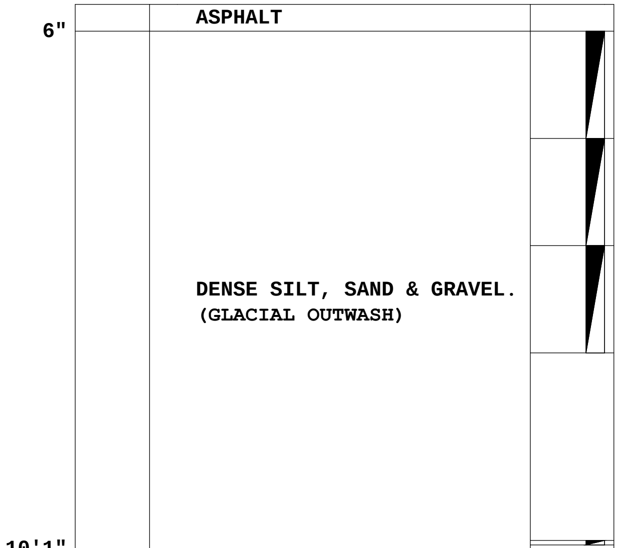
37 LINDEN STREET MEDFORD, MA 02155-0001 Telephone (781) 391-4500

To: MCPHAIL ASSOC., LLC, 2269 MASS. AVE., CAMBRIDGE, MA Date: 3-13-2019 Job No.: 2019-49

Location: WEST END YARDS, ROUTE 1 BY-PASS, PORTSMOUTH, NH Scale: 1 in.= 3.5 ft.

GROUND
SURFACE
+23.9

BORING 123



S#1, 6" to 2'6"
(7-7-11-19)
RECOVERED 24 in.

S#2, 2'6" to 4'6"
(17-16-23-38)
RECOVERED 16 in.

S#3, 4'6" to 6'6"
(30-23-17-18)
RECOVERED 16 in.

S#4, 10' to 10'1"
(100/1")
RECOVERED 0 in.

SIZE OF AUGER: 2 1/4" LENGTH: 10'1"
DRILLER: S. DESIMONE JR. INSPECTOR: J. MILLER
DATE STARTED & COMPLETED: 3-7-2019
RIG TYPE: D-50, AUTO HAMMER.

All samples have been visually classified by . Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

McPHAIL ASSOCIATES, LLC

APPENDIX C:

TEST PIT LOGS
TP-101 THROUGH TP-119

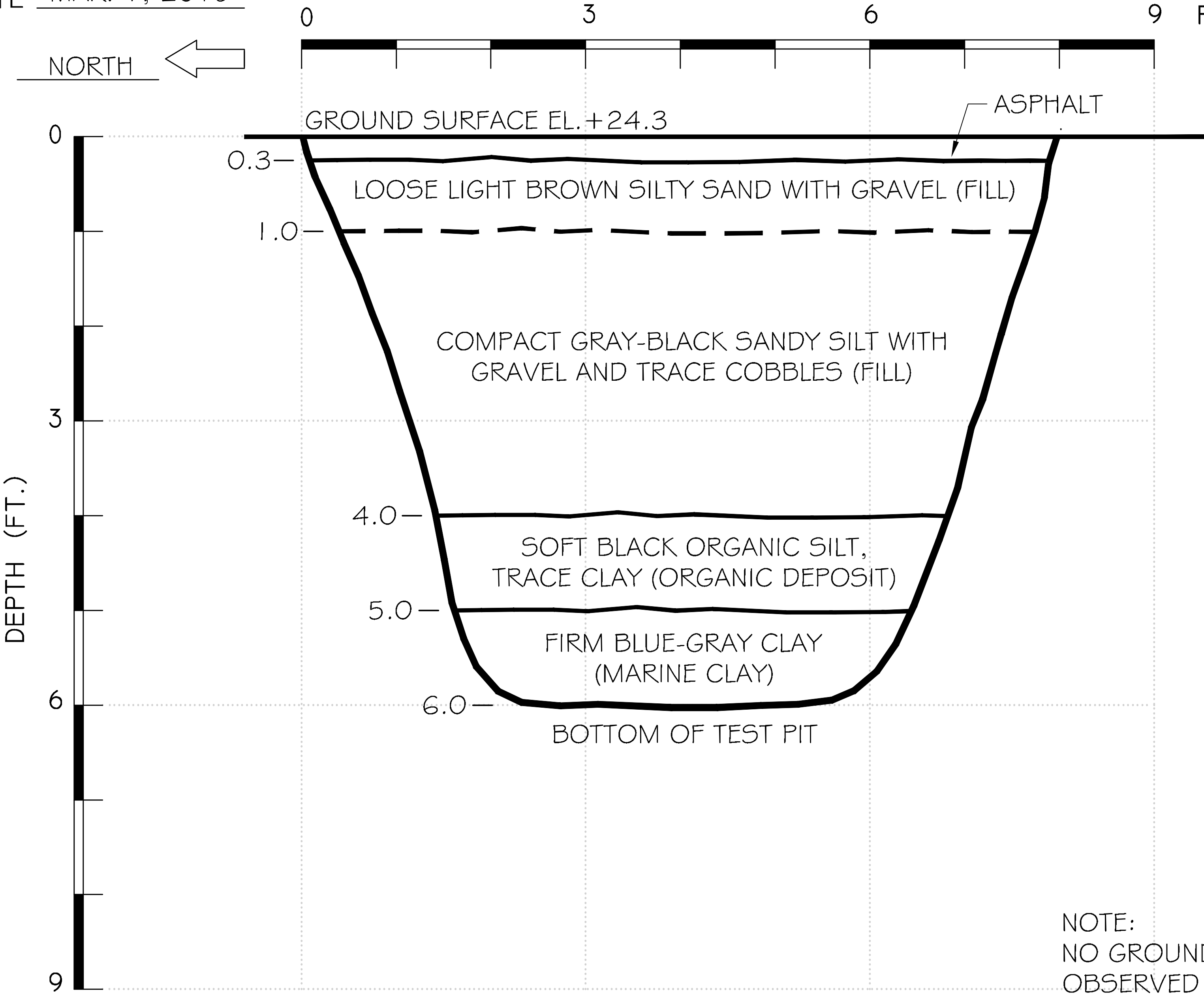
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 101



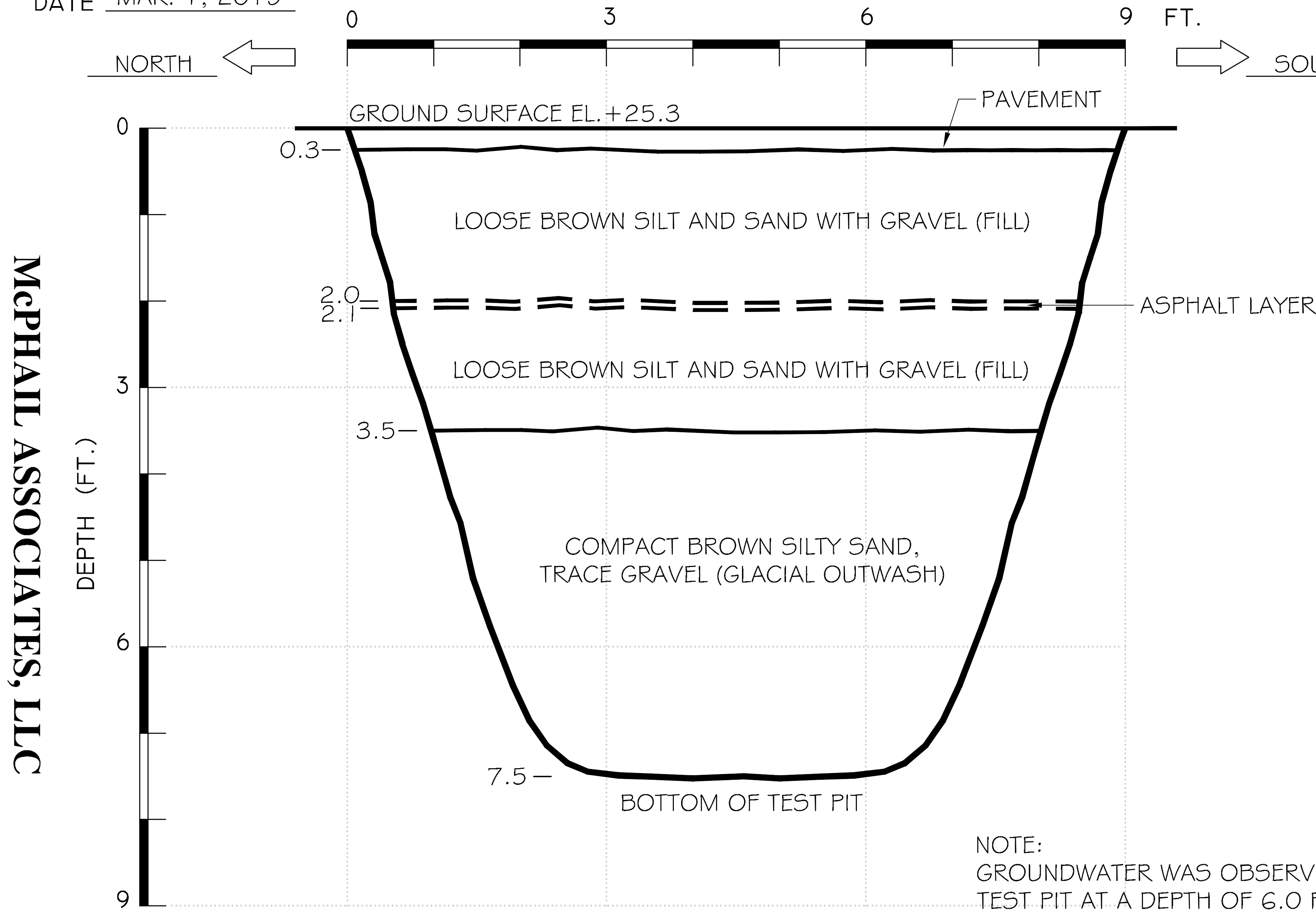
NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

JOB NO. 6524

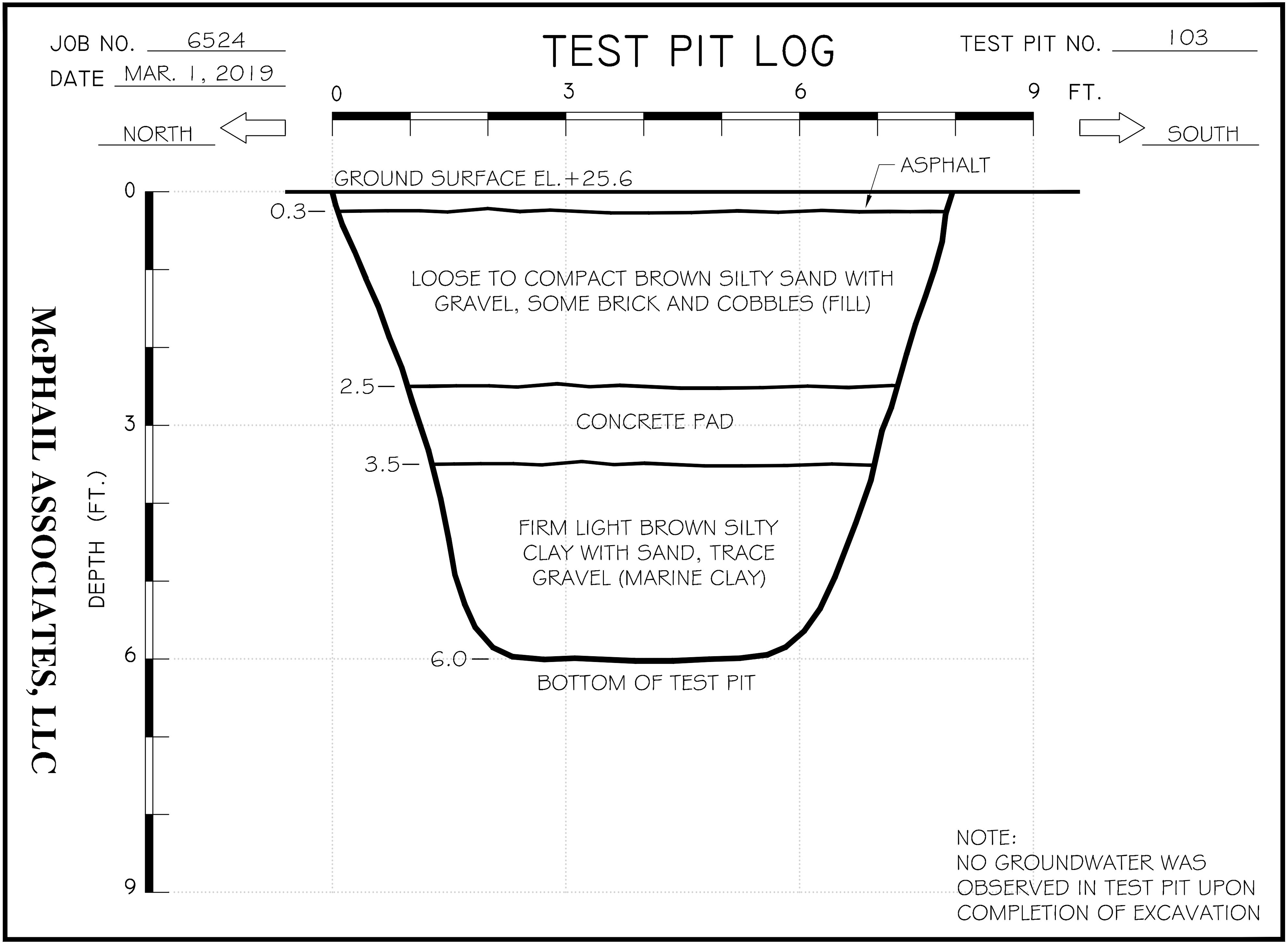
DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 102



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 6.0 FEET UPON COMPLETION OF EXCAVATION



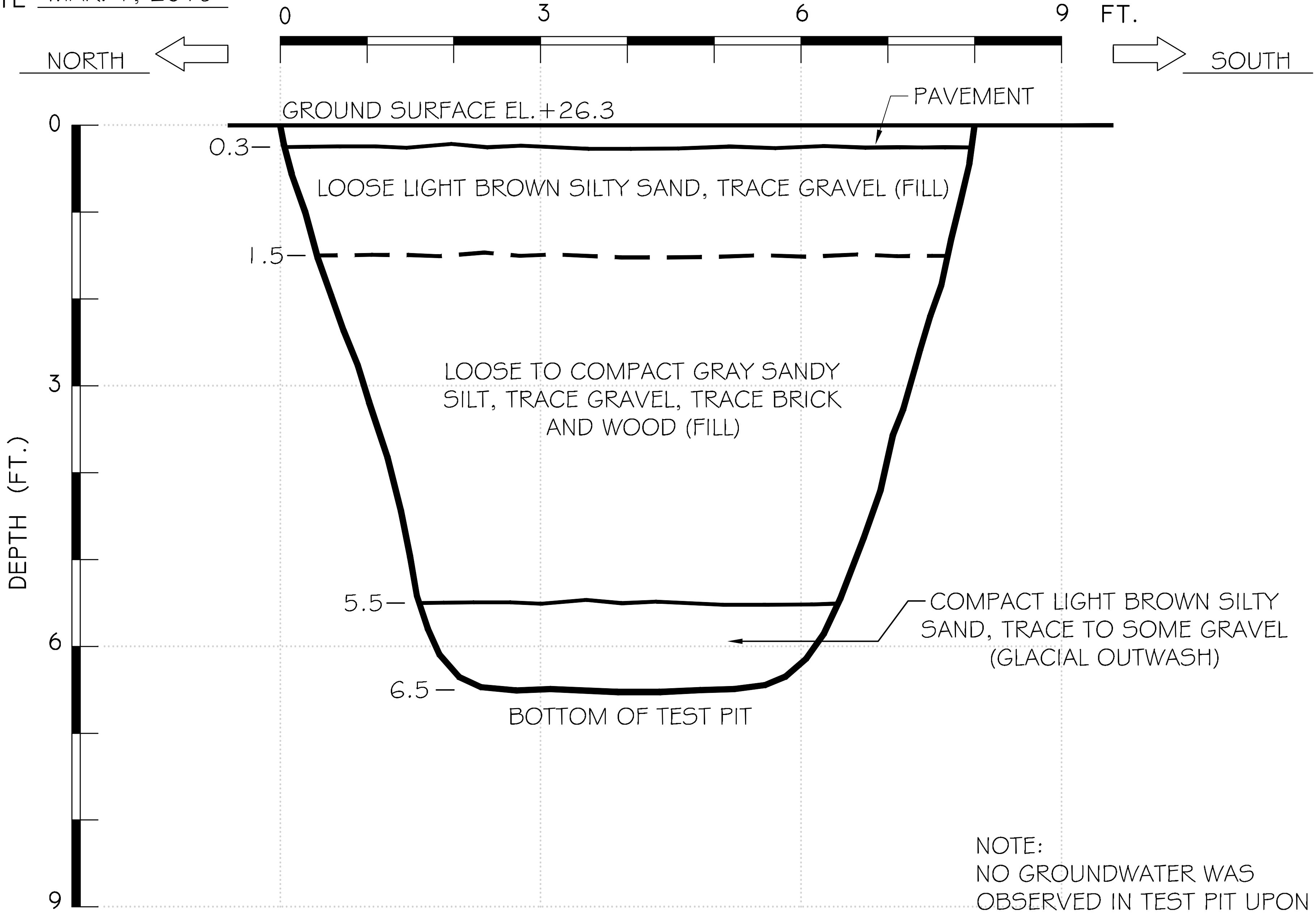
JOB NO. 6524
DATE MAR. 1, 2019
TEST PIT LOG
TEST PIT NO. 103
NORTH
SOUTH
0
3
6
9
FT.
GROUND SURFACE EL.+25.6
ASPHALT
0.3
LOOSE TO COMPACT BROWN SILTY SAND WITH GRAVEL, SOME BRICK AND COBBLES (FILL)
2.5
CONCRETE PAD
3.5
FIRM LIGHT BROWN SILTY CLAY WITH SAND, TRACE GRAVEL (MARINE CLAY)
6.0
BOTTOM OF TEST PIT
DEPTH (FT.)
McPHAIL ASSOCIATES, LLC
NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 104



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

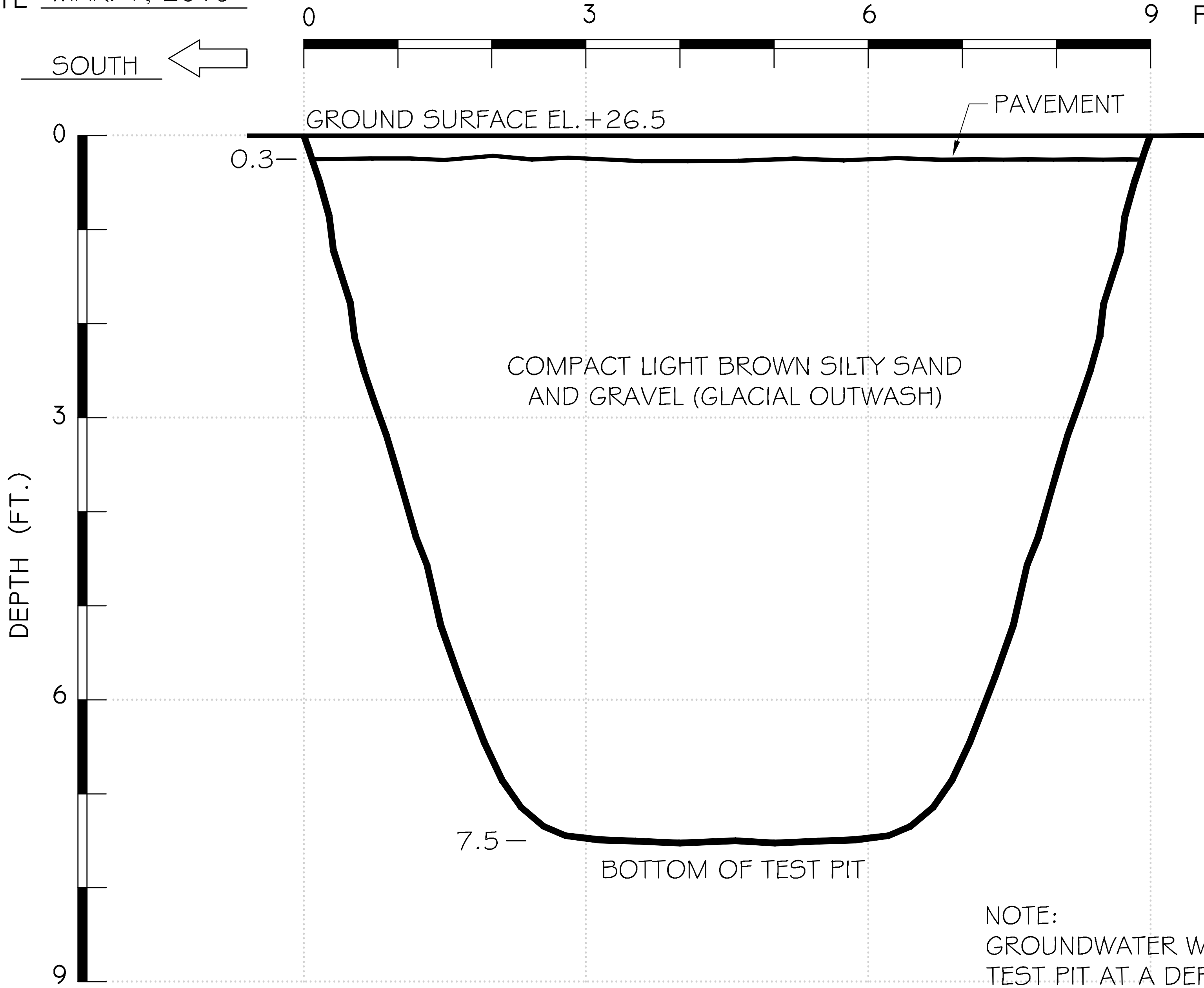
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 105



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 6.5 FEET UPON COMPLETION OF EXCAVATION

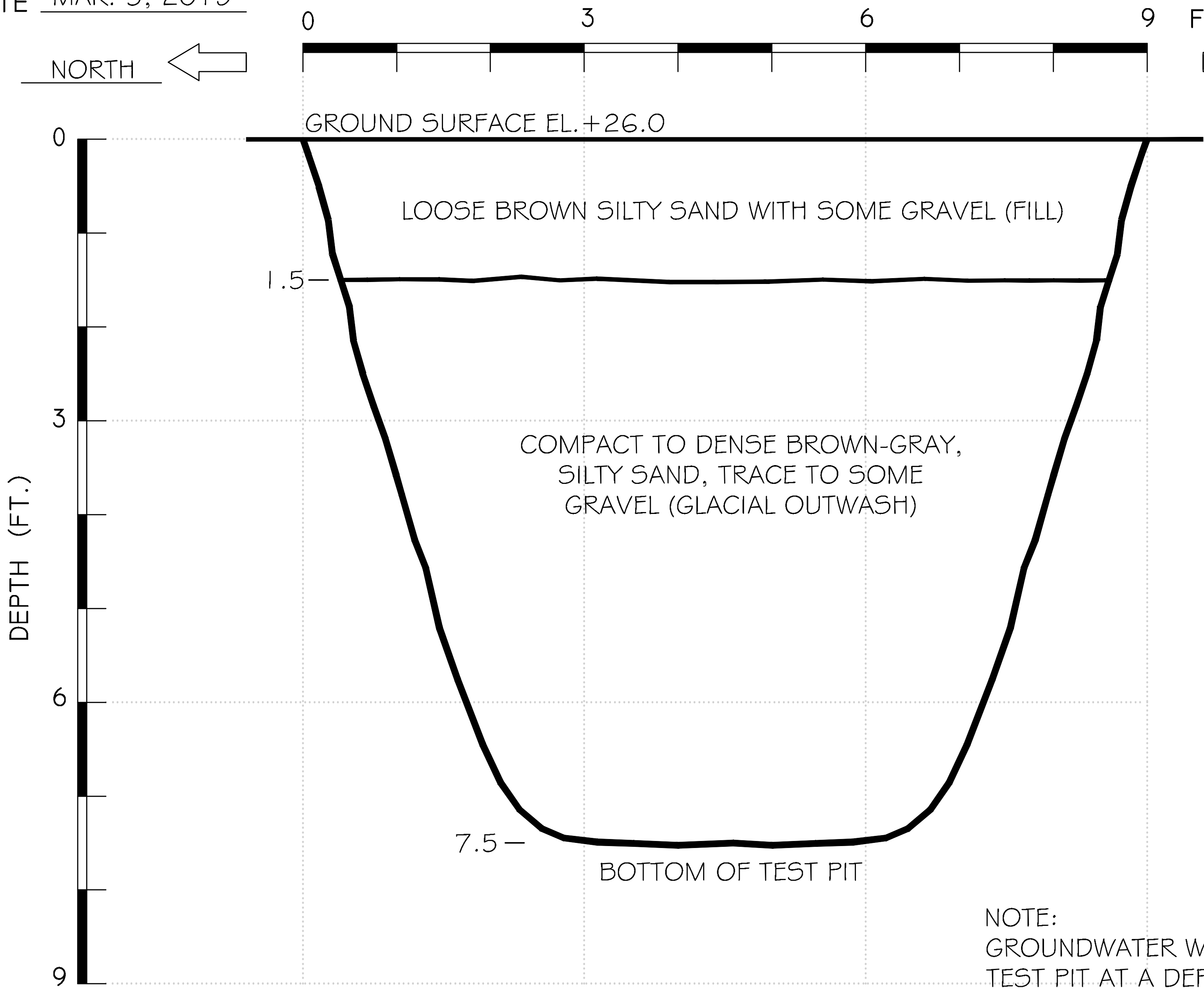
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 106



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 7.0 FEET UPON COMPLETION OF EXCAVATION

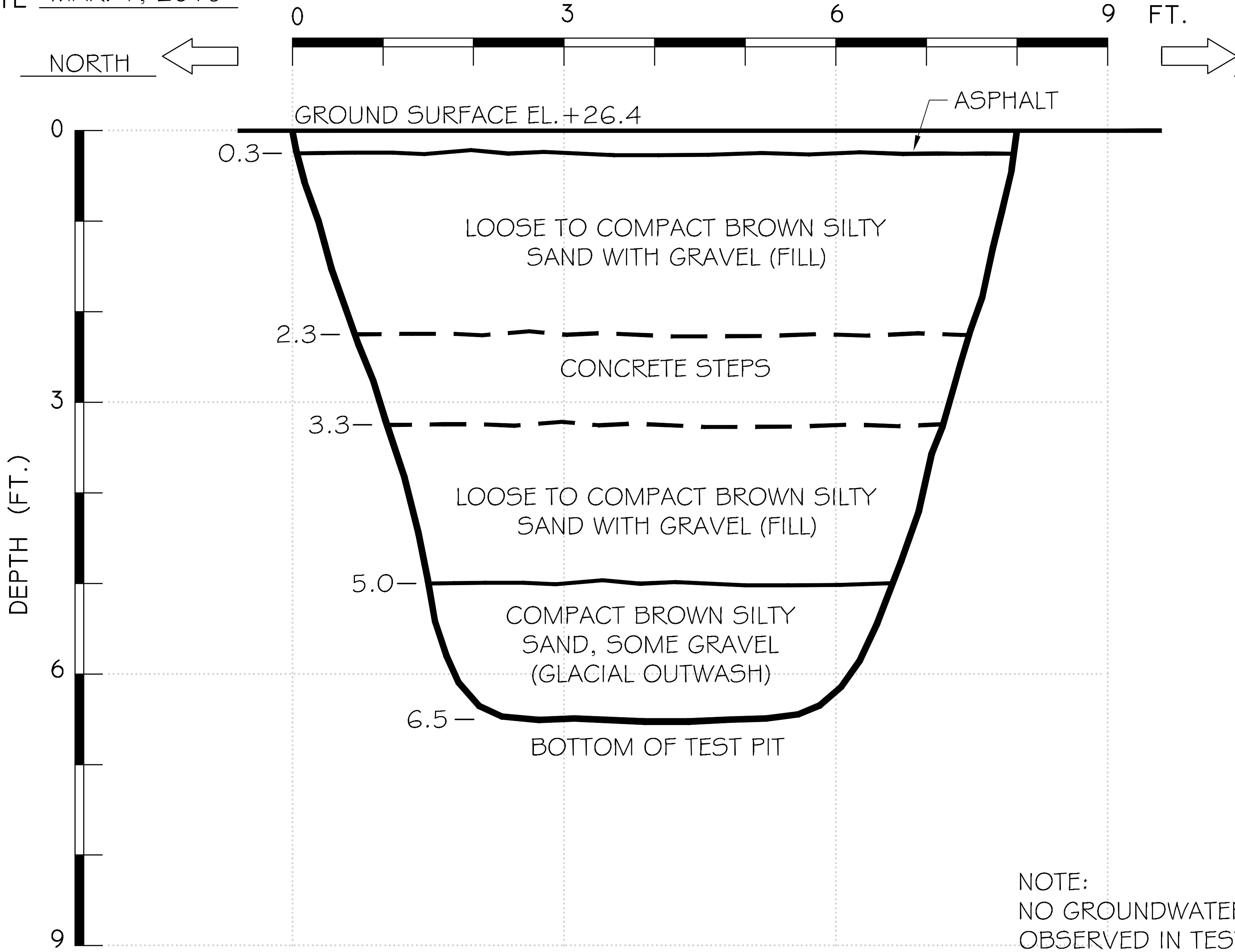
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 107



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

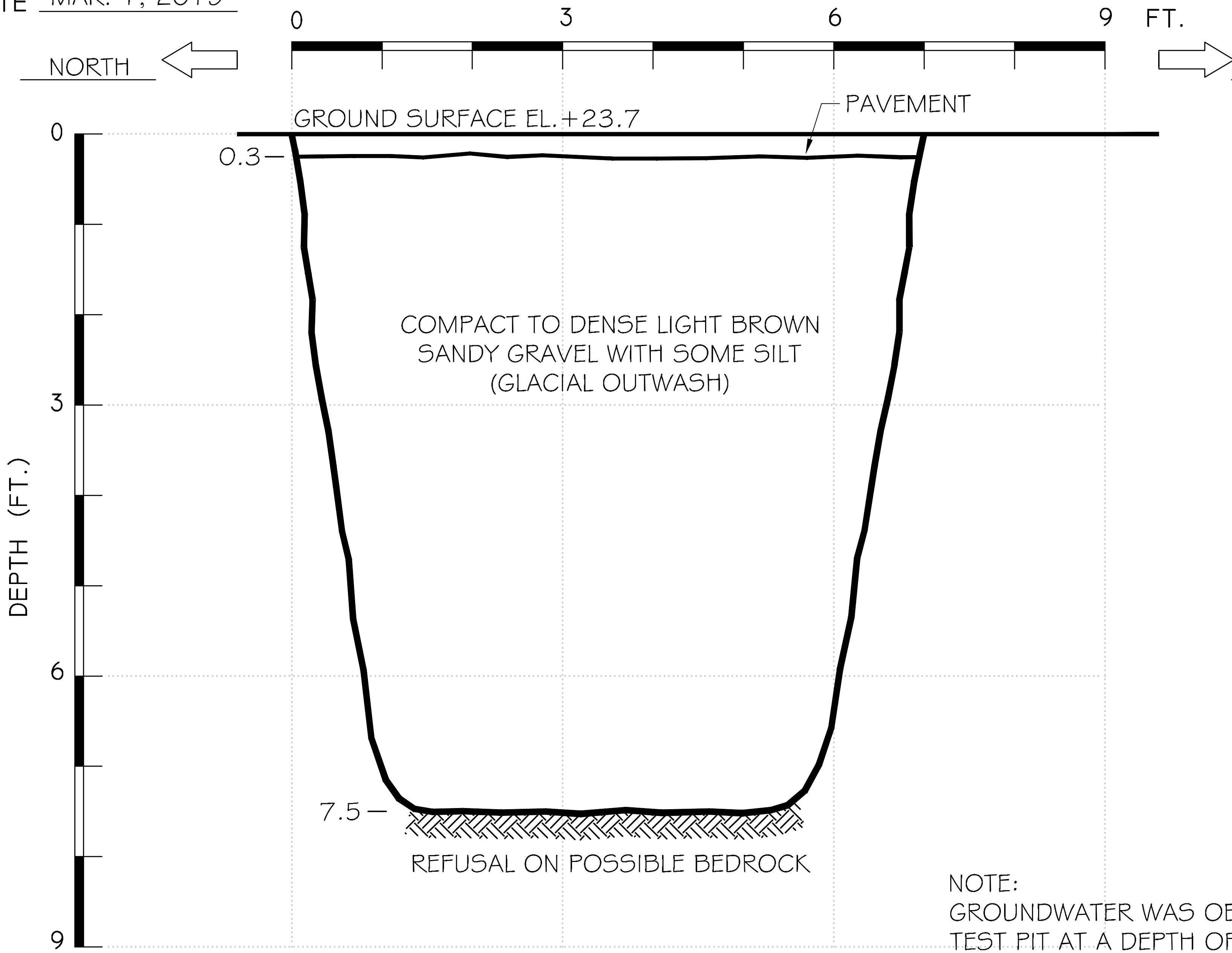
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 108



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 7.0 FEET UPON COMPLETION OF EXCAVATION

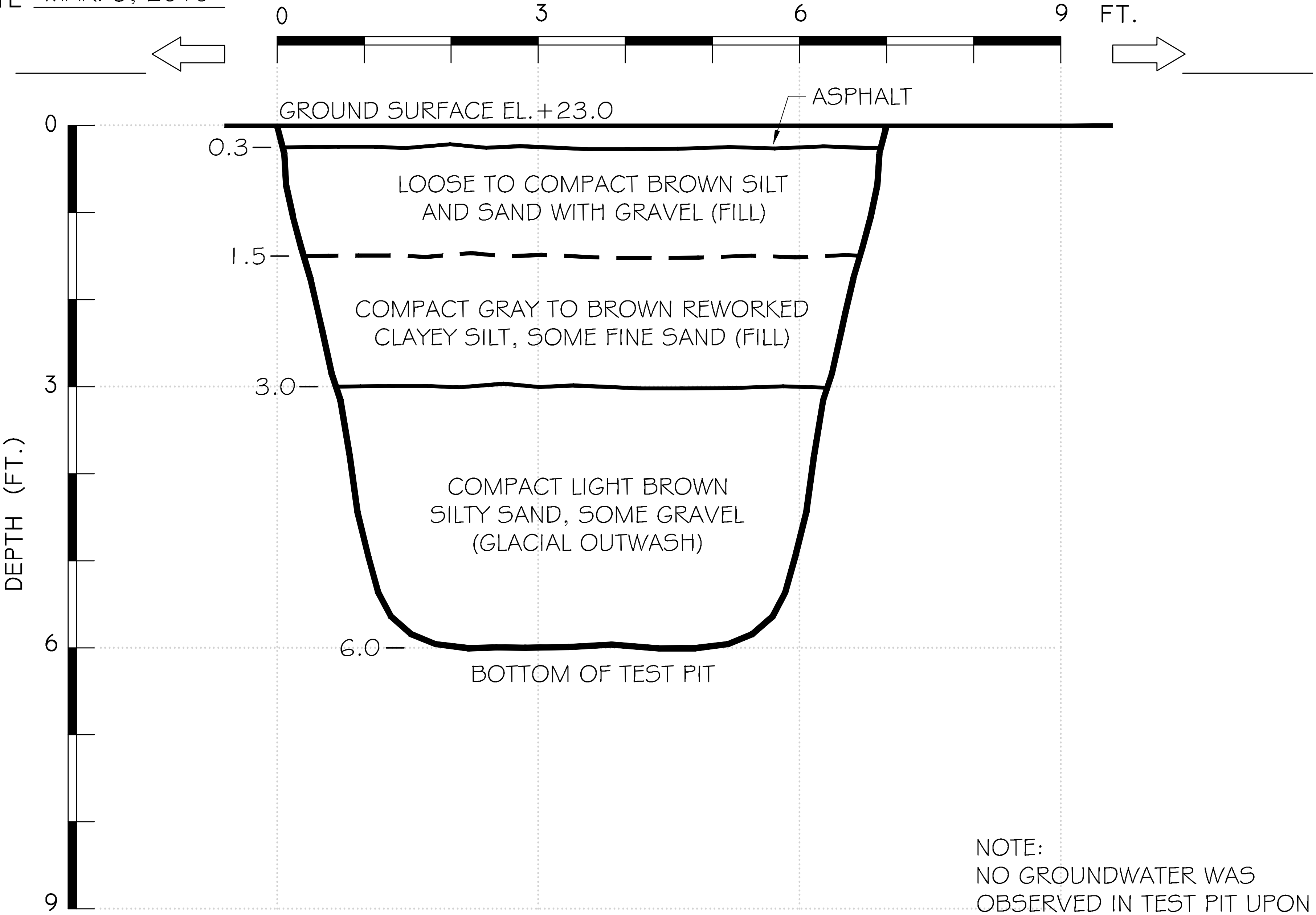
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 109



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

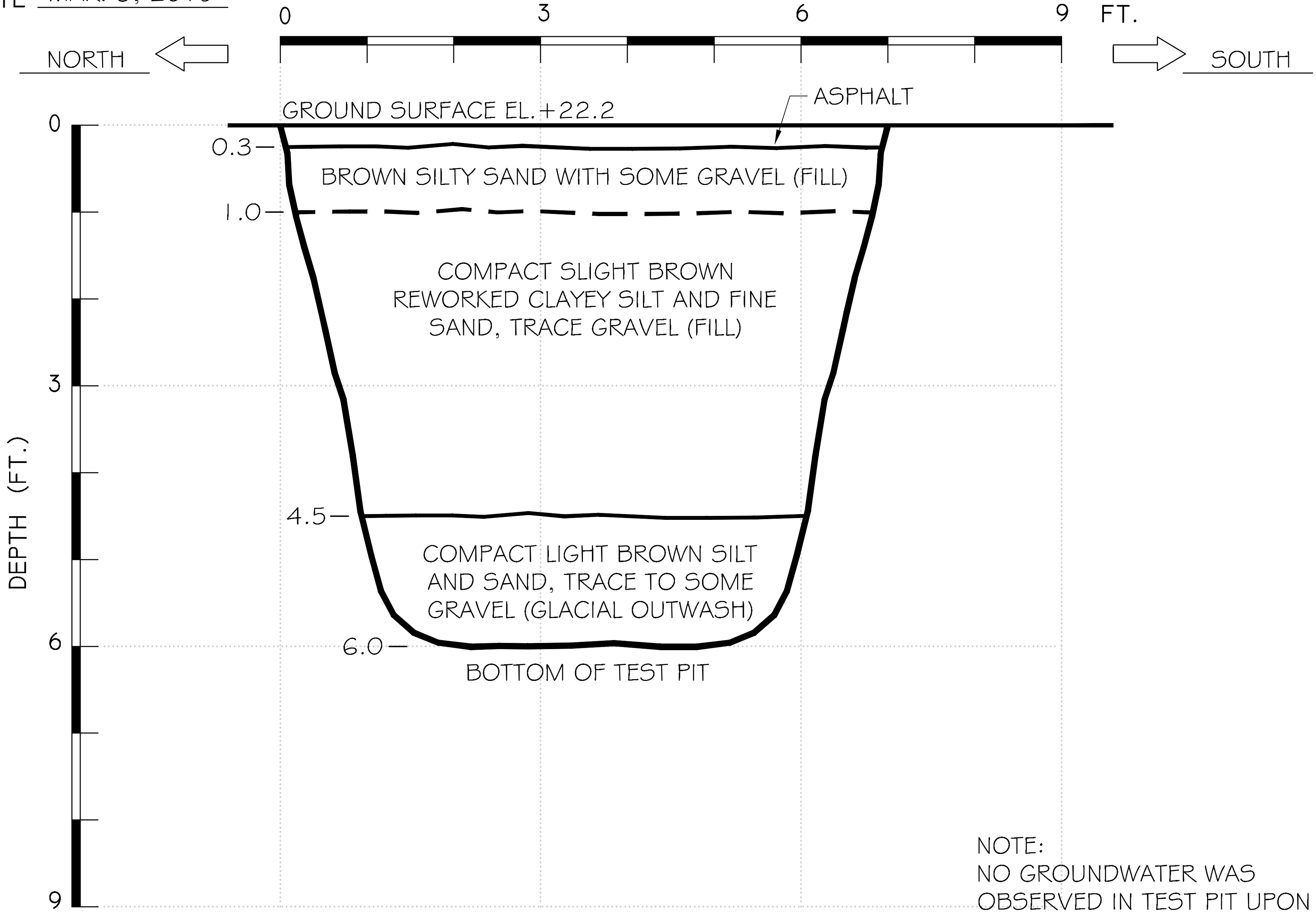
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 110



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

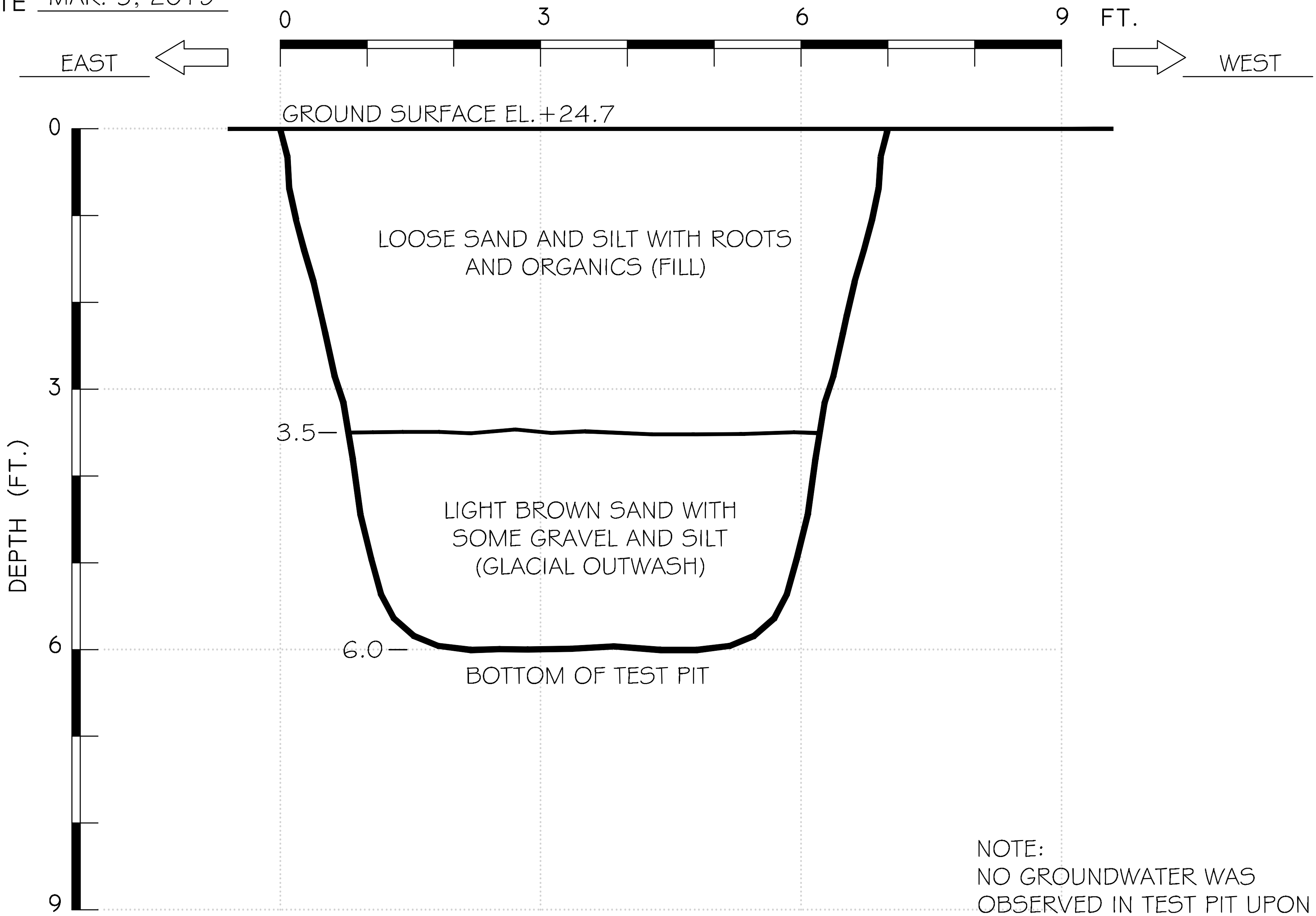
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 111



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

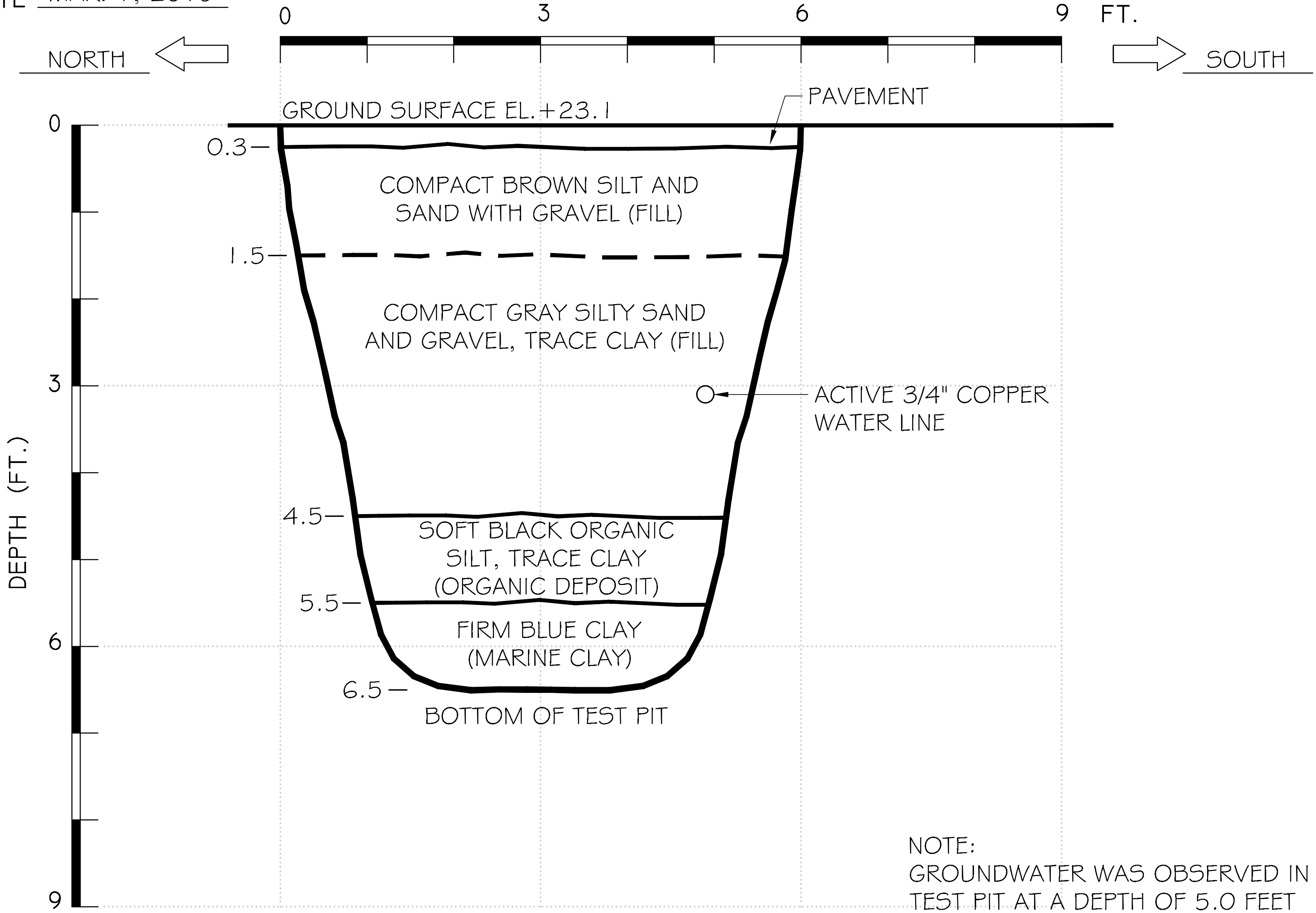
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT NO. 112



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 5.0 FEET UPON COMPLETION OF EXCAVATION

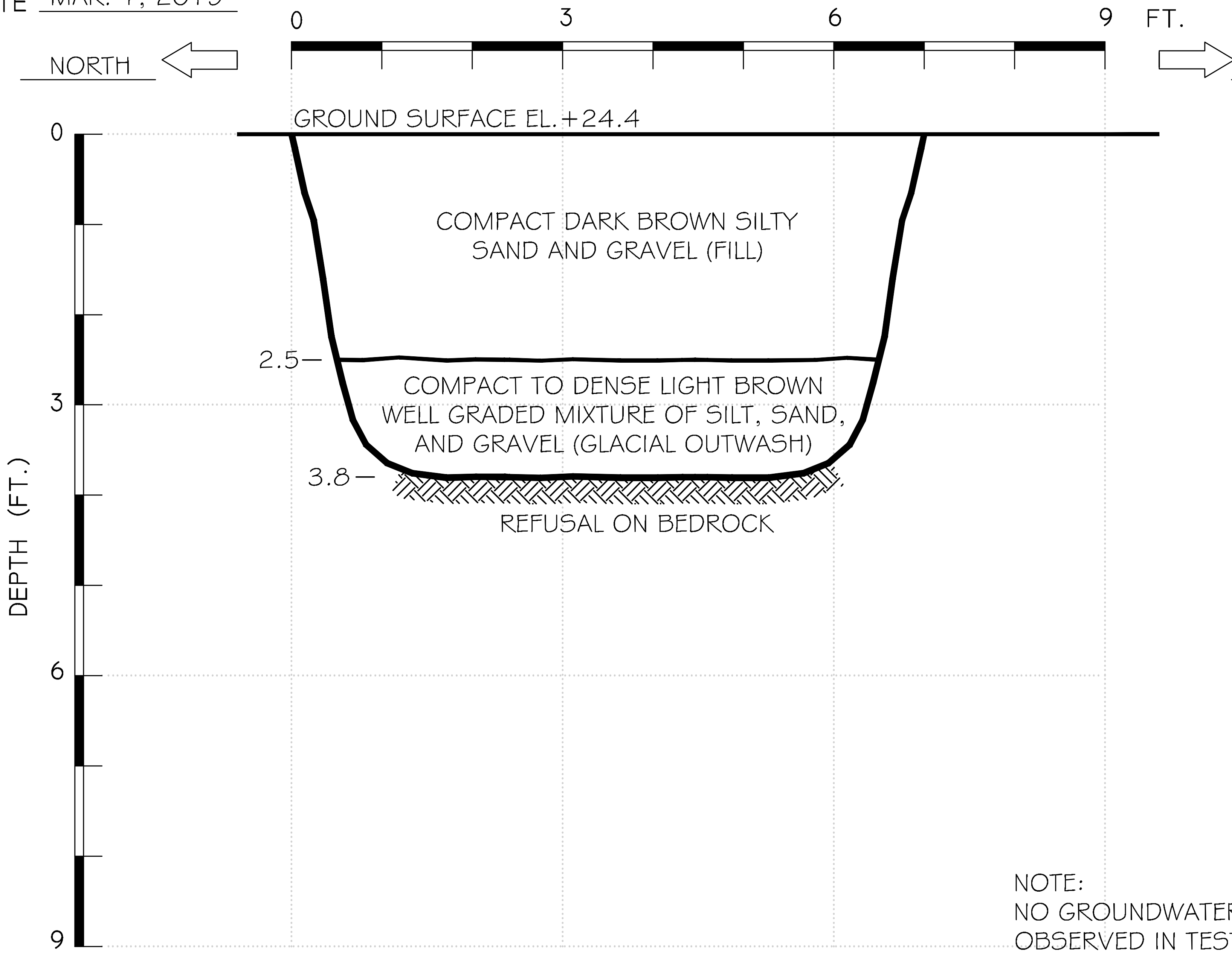
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 113



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

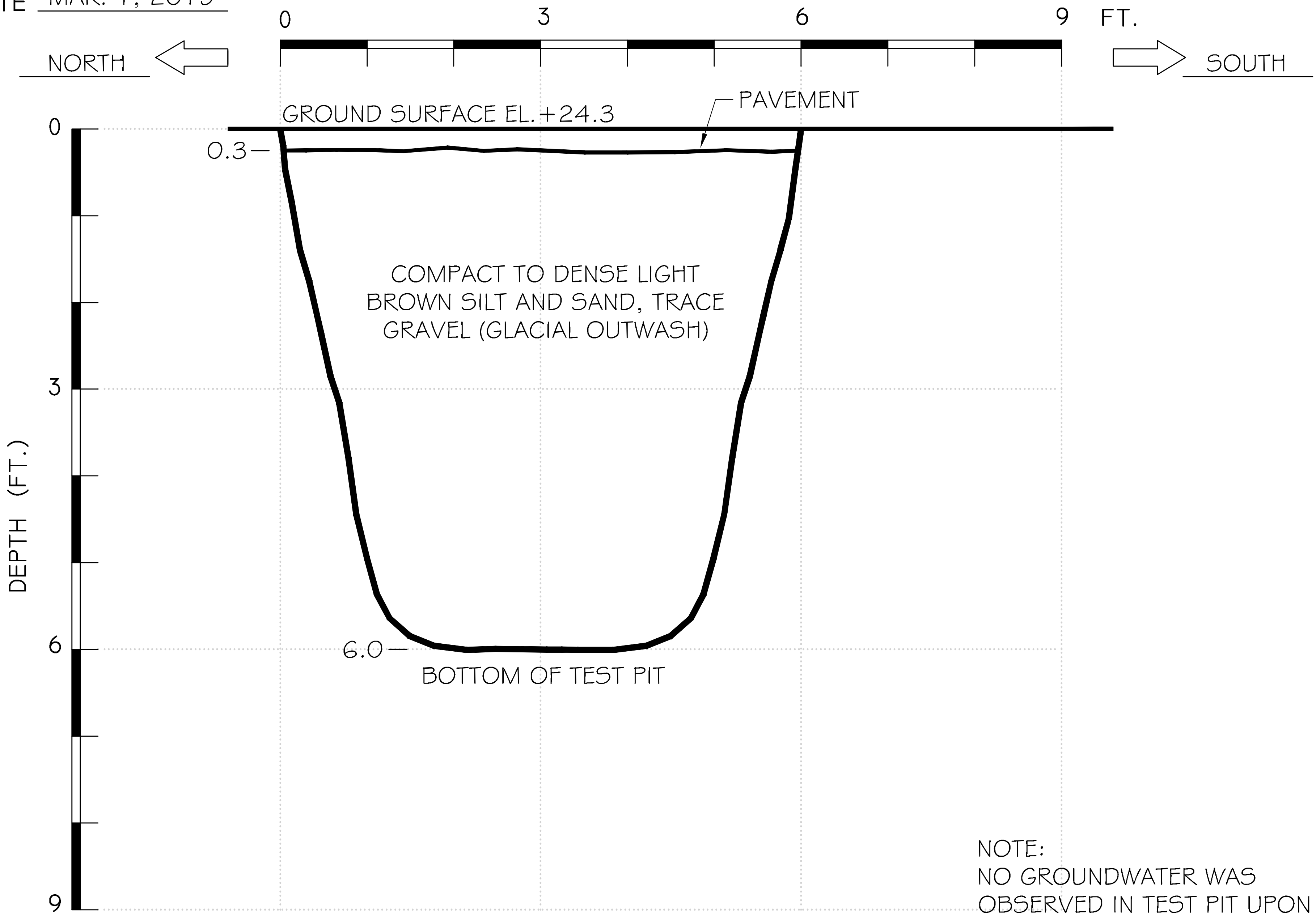
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 1, 2019

TEST PIT LOG

TEST PIT NO. 114



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

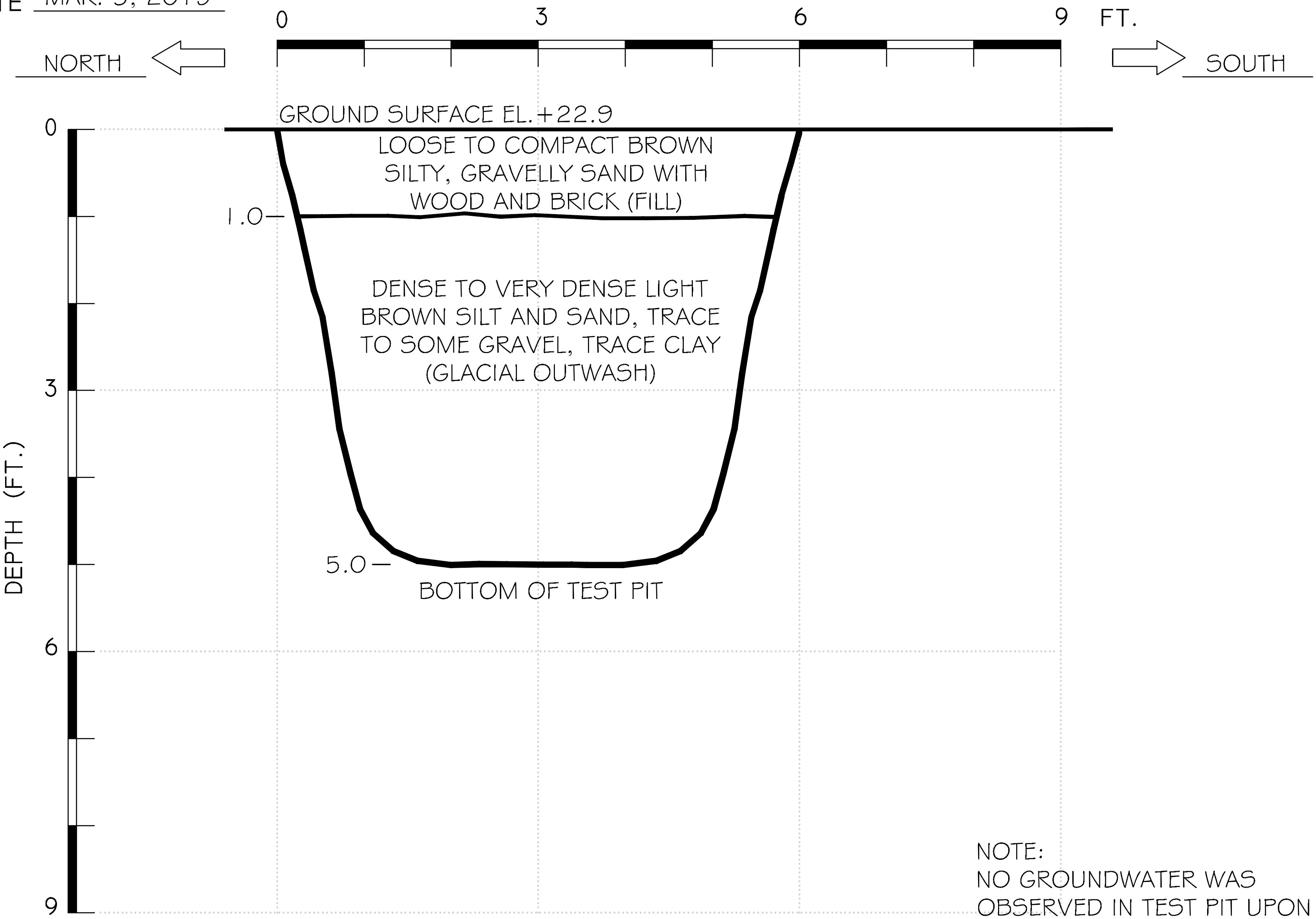
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 115



NOTE:
NO GROUNDWATER WAS OBSERVED IN TEST PIT UPON COMPLETION OF EXCAVATION

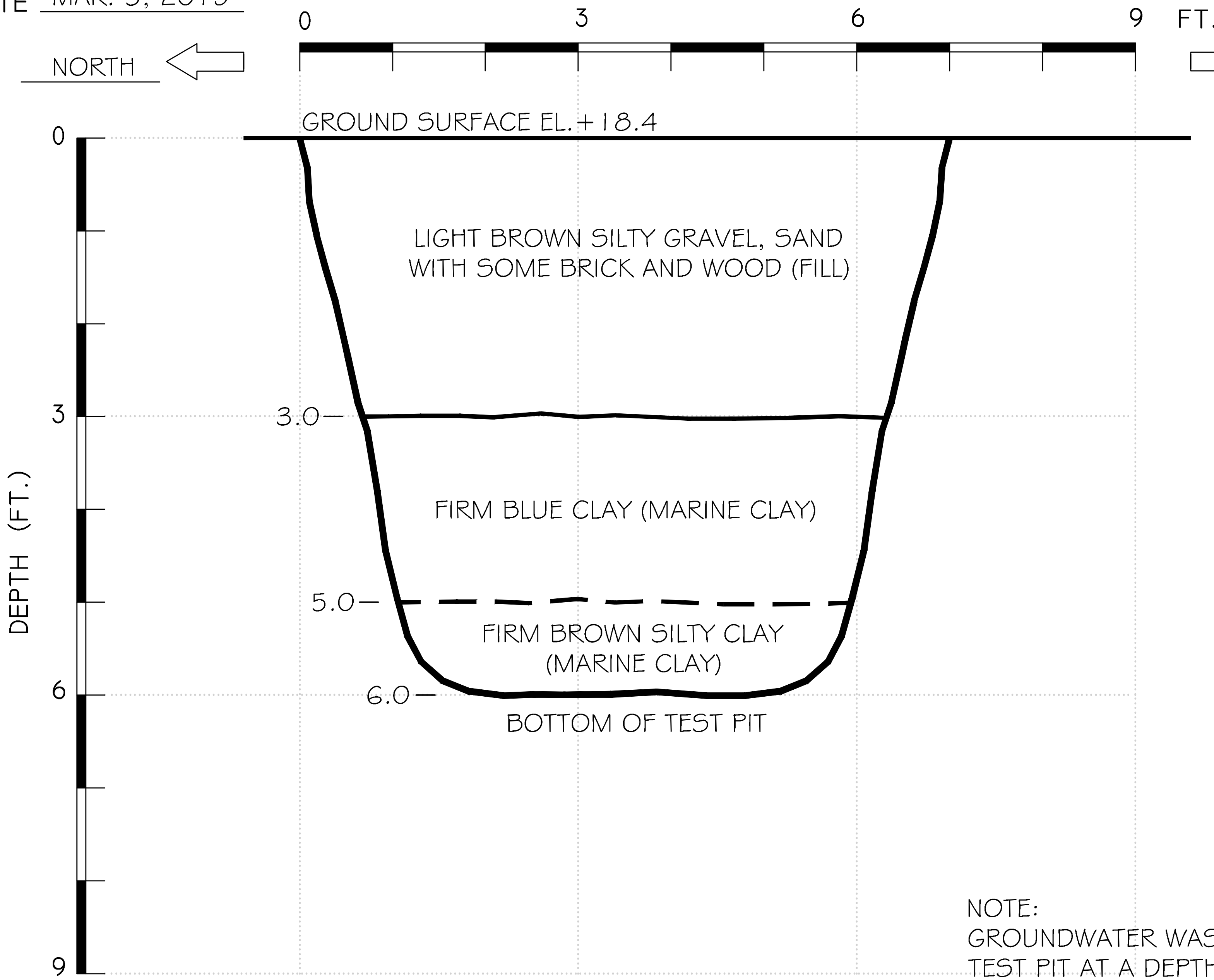
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 116



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 6.0 FEET UPON COMPLETION OF EXCAVATION

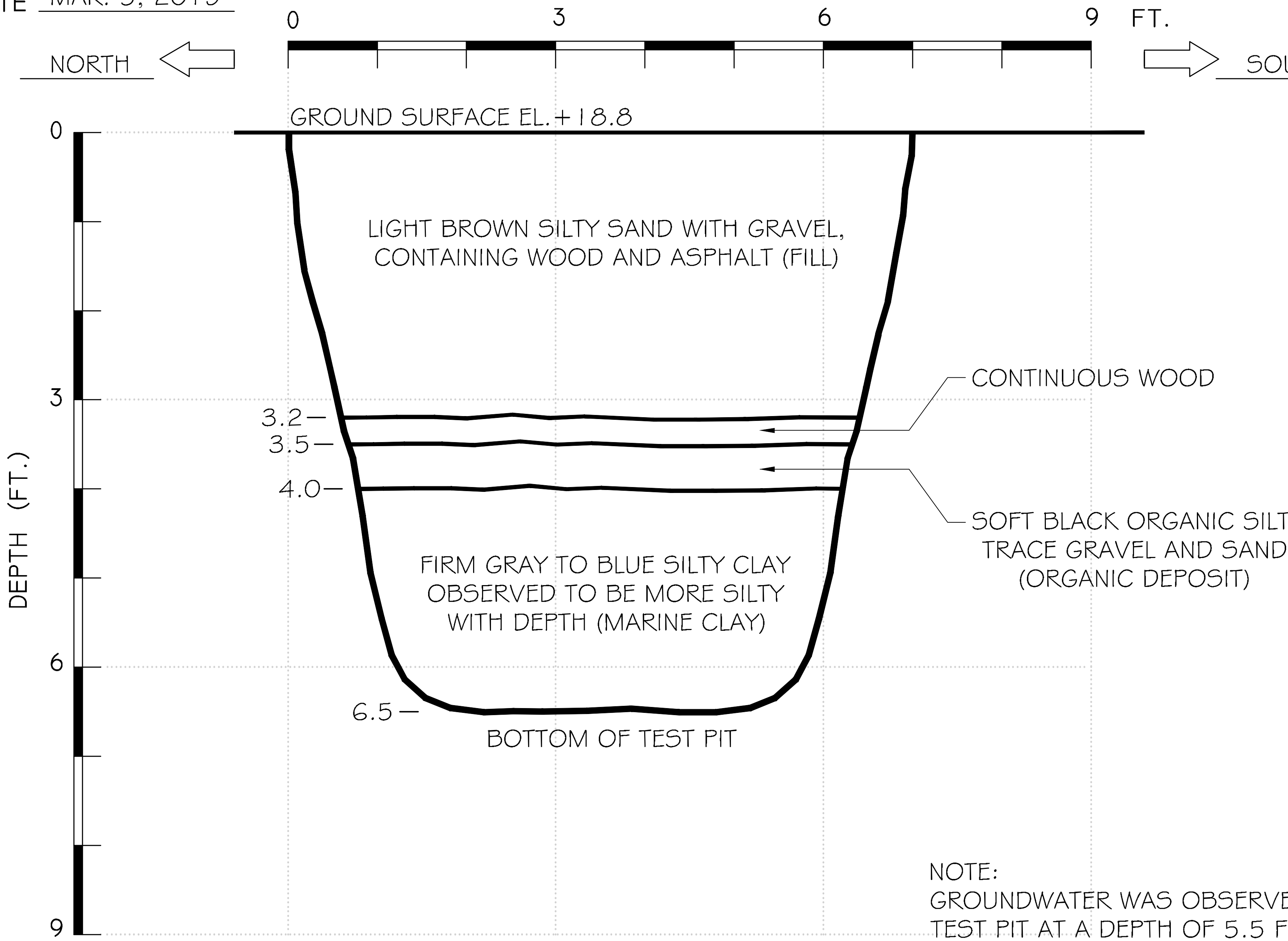
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT LOG

TEST PIT NO. 117



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 5.5 FEET UPON COMPLETION OF EXCAVATION

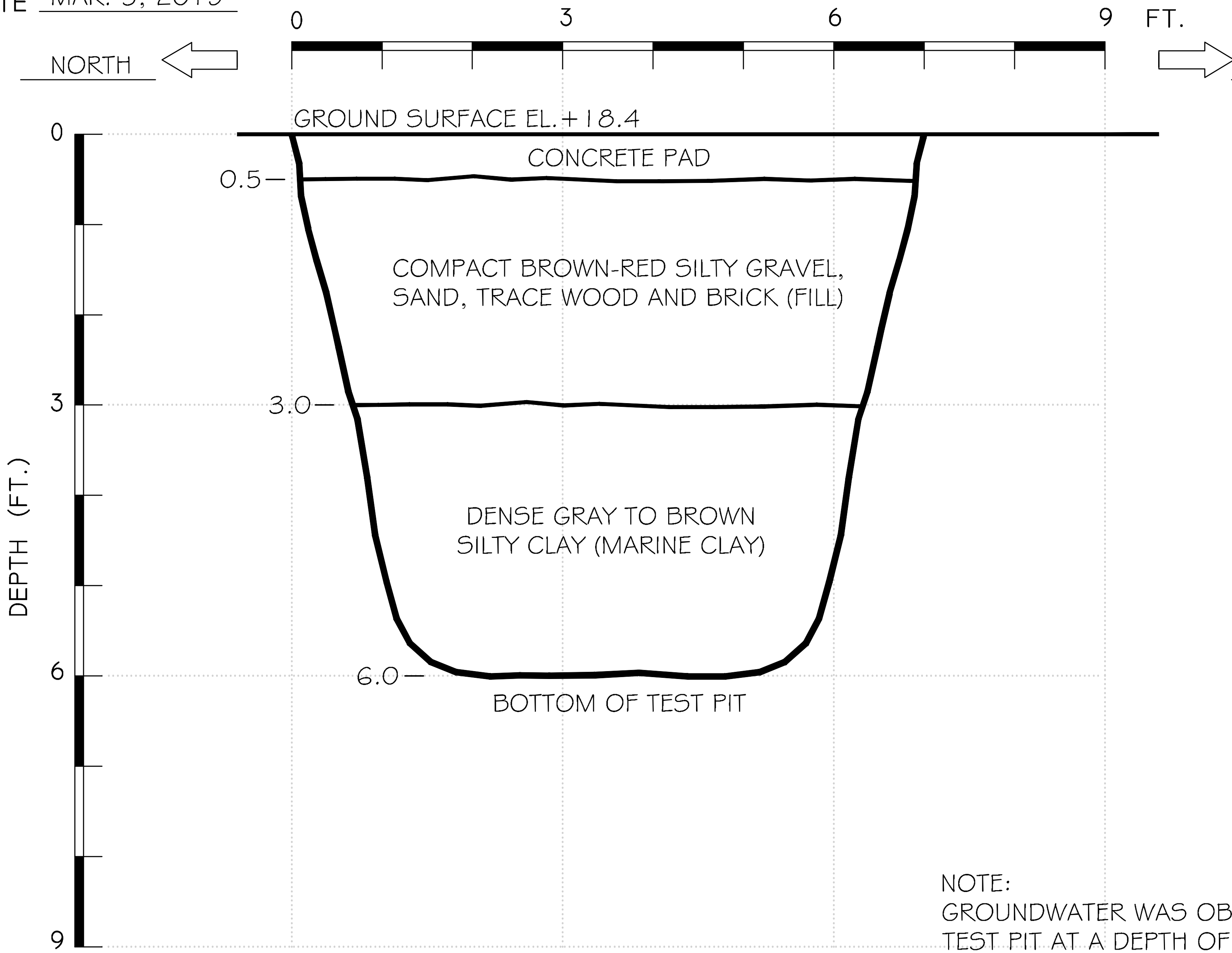
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE MAR. 5, 2019

TEST PIT NO. 118

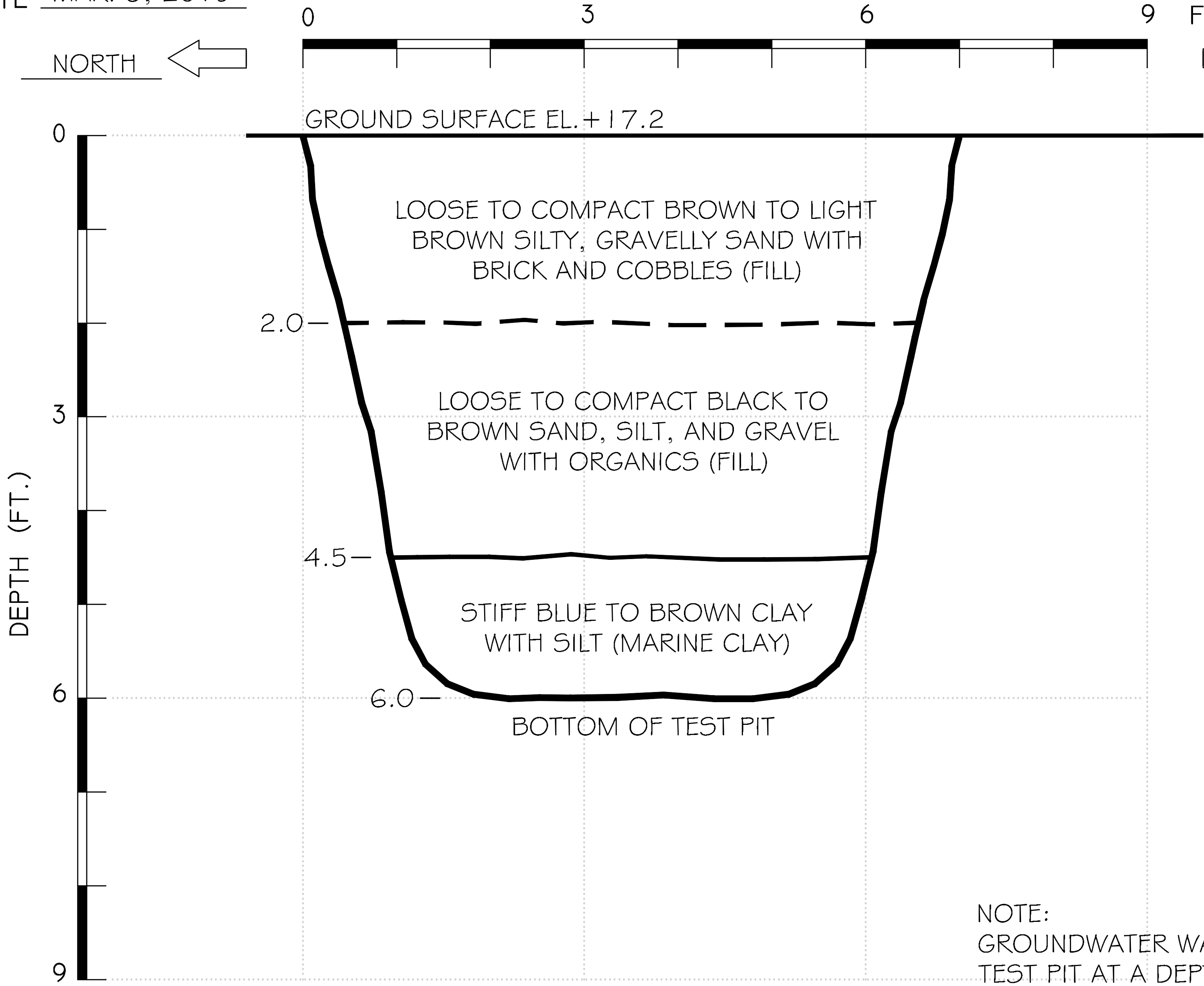


NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 5.0 FEET UPON COMPLETION OF EXCAVATION

McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524
DATE MAR. 5, 2019
TEST PIT NO. 119



NOTE:
GROUNDWATER WAS OBSERVED IN TEST PIT AT A DEPTH OF 5.5 FEET UPON COMPLETION OF EXCAVATION

McPHAIL ASSOCIATES, LLC

McPHAIL ASSOCIATES, LLC

APPENDIX D:

BORING LOGS
B-1 THROUGH B-3

Project: Portsmouth Parcels	**Job #:** 6524.9.01		Boring No.
Location: 55 Cate Stree	**Date Started:** 12-10-19		**B-1 (OW)**
City/State: Portsmouth, NH	**Date Finished:** 12-10-19		

Contractor: Carr-Dee Corp.
Driller/Helper: Steve/Frank
Logged By/Reviewed By: J. Miller
Surface Elevation (ft): 25.2

Casing Type/Depth (ft): 3"
Casing Hammer (lbs)/Drop (in): 300/24"
Sampler Size/Type: 24" split spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-10-19	4	21.2	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample TVOC (ppm)	N-Value / RQD	No.	Pen./Rec. (in)	Depth (ft)	Blows/6" / Min/ft	Sample Description and Boring Notes
	25		0.4 / 24.8	ASPHALT							
1	24		2.0 / 23.2	FILL	0.0	22	S1	18/16	0.5-2.0	40 22 18	Compact, light brown to black, SAND and GRAVEL, some silt, with asphalt and glass (FILL).
2–4	23–21			GLACIAL OUTWASH	0.0	89	S2	24/16	2.0-4.0	30 29 60 65	Very dense, light brown, SILTY SAND, some gravel (GLACIAL OUTWASH).
4–6	21–19				0.0	62	S3	24/2	4.0-6.0	29 30 32 42	Very dense, light brown, SILTY SAND, some gravel (GLACIAL OUTWASH).
6	19		6.8 / 18.4		0.0	130/10"	S4	10/4	6.0-6.8	30 100/4"	Very dense, brown, SAND and SILT and GRAVEL (GLACIAL OUTWASH). Split spoon refusal 6'10" below ground surface. Roller bit refusal 6'11" below ground surface.
7	18			Bottom of borehole 6.83' below ground surface.							
8	17										
9	16										
10	15										
11	14										
12	13										
13	12										
14	11										

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
OW installed 6.83' below ground surface.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather:
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project: Portsmouth Parcels	**Job #:** 6524.9.01	Boring No.
Location: 55 Cate Street	**Date Started:** 12-10-19	**B-2 (OW)**
City/State: Portsmouth, NH	**Date Finished:** 12-10-19	

Contractor: Carr-Dee Corp.
Driller/Helper: Steve/Frank
Logged By/Reviewed By: J. Miller
Surface Elevation (ft): 24.4
Casing Type/Depth (ft): N/A
Casing Hammer (lbs)/Drop (in): N/A
Sampler Size/Type: 24" split spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations			
Date	Depth	Elev.	Notes
12-10-19	6	18.4	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	TVOC (ppm)	N-Value / RQD	No.	Pen./Rec. (in)	Depth (ft)	Blows/6" / Min/ft	Sample Description and Boring Notes
	24		0.3 / 24.1	ASPHALT							
1–2	23			FILL	0.0	29	S1	18/14	0.5-2.0	36 29 54	Compact, brown, SILTY SAND, some gravel, with brick and asphalt (FILL).
2–4	22, 21			FILL	0.0	34	S2	24/12	2.0-4.0	40 24 10 13	Dense, black to brown, SILTY SAND, some gravel, some cobbles (FILL).
4–6	20, 19		6.0 / 18.4	FILL	1.7	41	S3	24/10	4.0-6.0	17 16 25 33	Dense, black, SAND and GRAVEL, some silt, with wood and ash and cinders (FILL). Odor of mothballs.
6–7	18, 17		7.5 / 16.9	GLACIAL OUTWASH	0.0	36	S4	17/14	6.0-7.4	54 36 11/5"	Dense, brown to light brown, SAND and SILT and GRAVEL (GLACIAL OUTWASH). Split spoon refusal 7'5" below ground surface. Auger refusal 7'6" below ground surface.
8–14	16–10			Bottom of borehole 7.5' below ground surface.							

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
OW installed 7.5' below ground surface.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather:
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Portsmouth Parcels	Job #:	6524.9.01	Boring No.
Location:	55 Cate Street	Date Started:	12-10-18	**B-3 (OW)**
City/State:	Portsmouth, NH	Date Finished:	12-10-18	

Contractor: Carr-Dee Corp.
Driller/Helper: Steve/Frank
Logged By/Reviewed By: J. Miller
Surface Elevation (ft): 24.2
Casing Type/Depth (ft): 3"
Casing Hammer (lbs)/Drop (in): 300/24"
Sampler Size/Type: 24" split spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-10-19	6	18.2	

Depth (ft)	Elev. (ft)	Depth/EL to Strata Change (ft)	Stratum	TVOC (ppm)	N-Value / RQD	No.	Pen. /Rec. (in)	Depth (ft)	Blows/6" / Min/ft	Sample Description and Boring Notes
	24	0.4 / 23.8	ASPHALT							
1	23		FILL	0.0	28	S1	18/10	0.5-2.0	18 28 18	Dense, light brown, SAND and GRAVEL, trace silt (FILL).
2-4	22-20	4.0 / 20.2	FILL	0.0	46	S2	24/16	2.0-4.0	21 23 23 23	Dense, light brown, SAND and GRAVEL, trace silt (FILL).
4-6	20-18		GLACIAL OUTWASH	0.0	50	S3	24/20	4.0-6.0	27 24 26 30	Dense to very dense, SILTY SAND and GRAVEL (GLACIAL OUTWASH).
6-8	18-16		GLACIAL OUTWASH	0.0	54	S4	24/14	6.0-8.0	25 26 28 35	Very dense, light brown, SILTY SAND and GRAVEL (GLACIAL OUTWASH).
8-10	16-14	9.9 / 14.3	GLACIAL OUTWASH	0.0	53	S5	23/12	8.0-9.9	25 22 31 100/5"	Very dense, light brown, SILT and SAND, some gravel (GLACIAL OUTWASH). Split spoon refusal 9'11" below ground surface.
10	14		Bottom of borehole 10.42' below ground surface.							
11	13									
12	12									
13	11									
14	10									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
OW installed 10' below ground surface. 10' of screen.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather:
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

APPENDIX E:

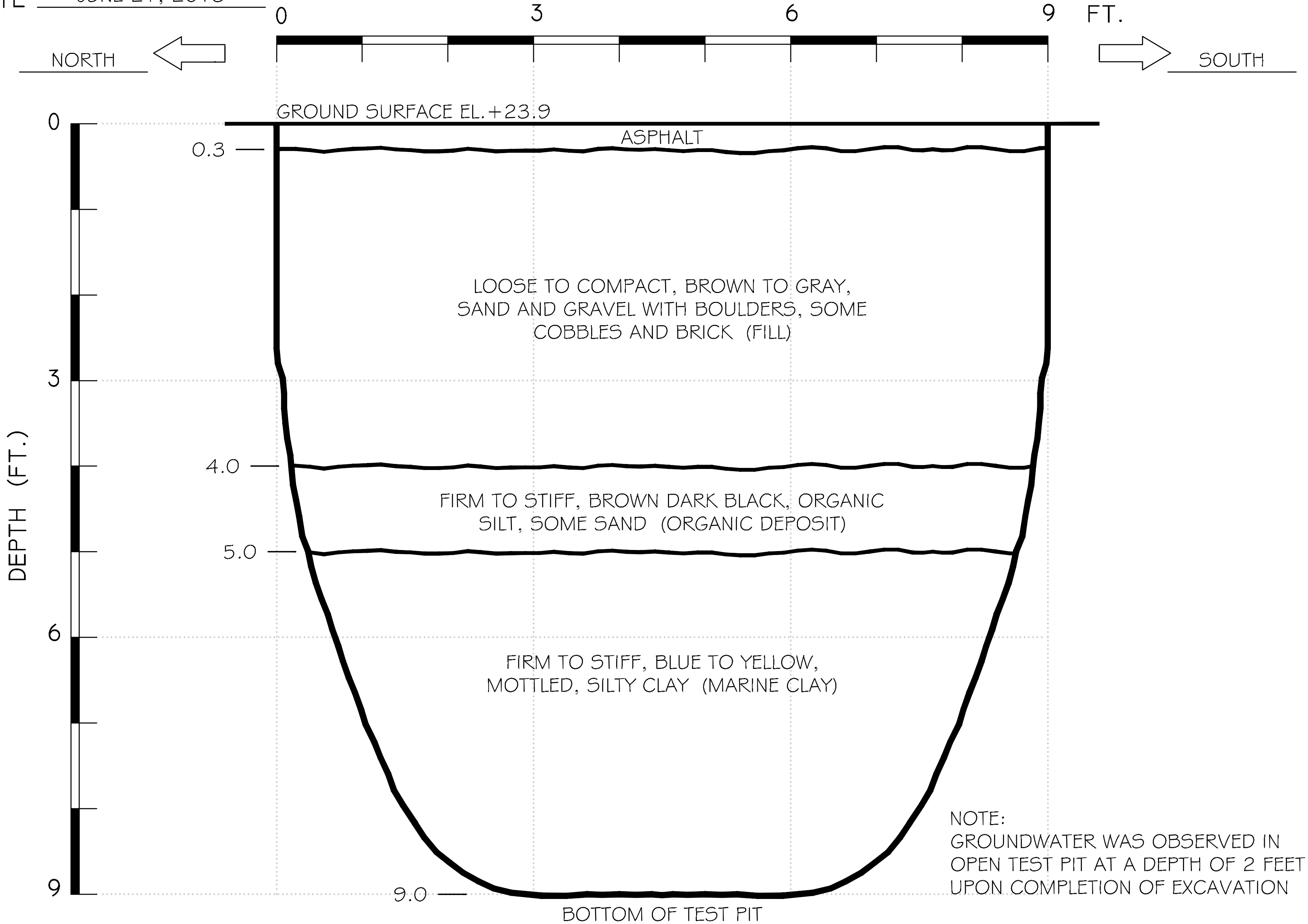
TEST PIT LOGS
TP-1 THROUGH TP-4

TEST PIT LOG

JOB NO. 6524

DATE JUNE 21, 2018

TEST PIT NO. 1



NOTE:
GROUNDWATER WAS OBSERVED IN OPEN TEST PIT AT A DEPTH OF 2 FEET UPON COMPLETION OF EXCAVATION

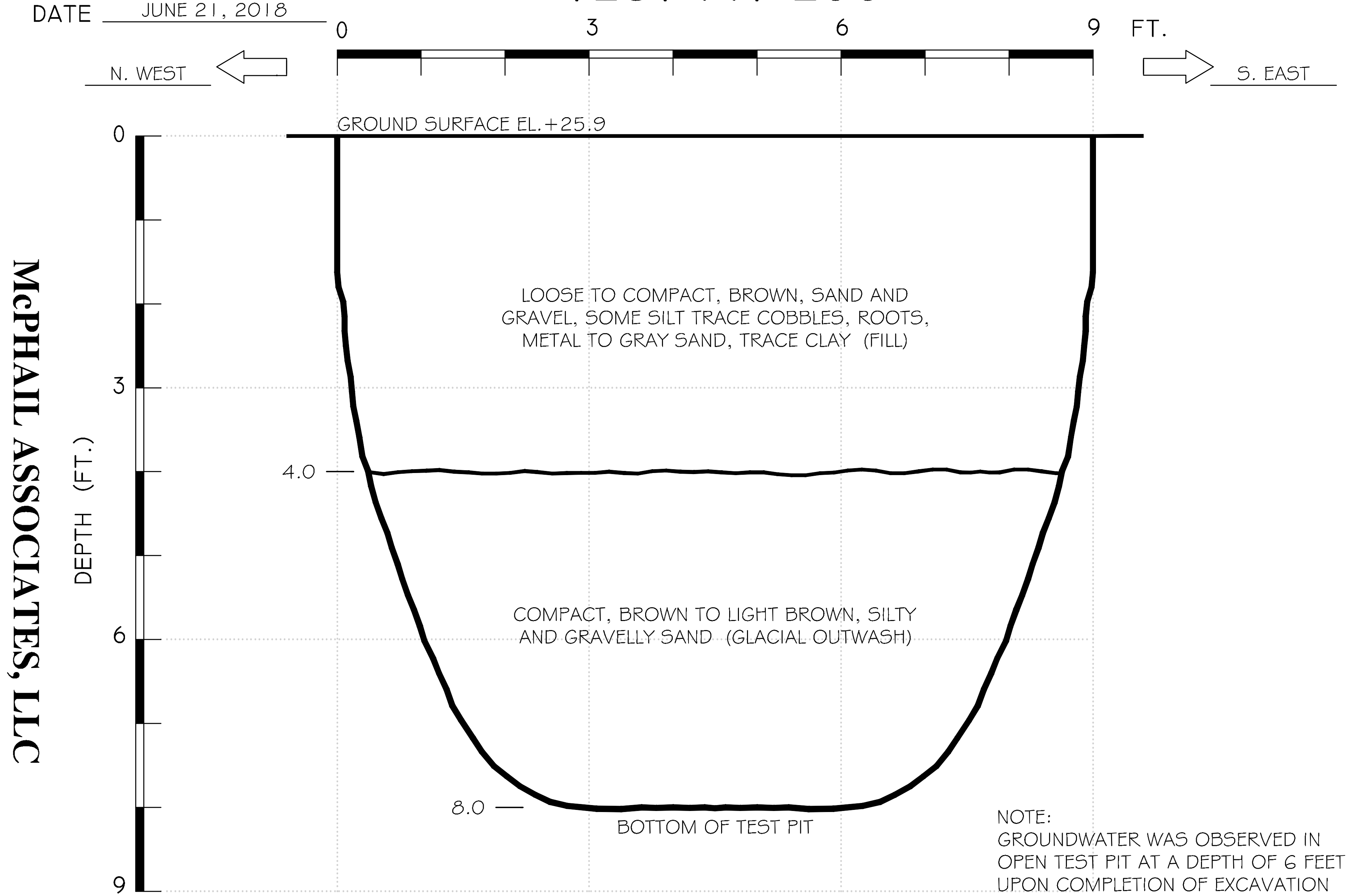
McPHAIL ASSOCIATES, LLC

JOB NO. 6524

DATE JUNE 21, 2018

TEST PIT LOG

TEST PIT NO. 2

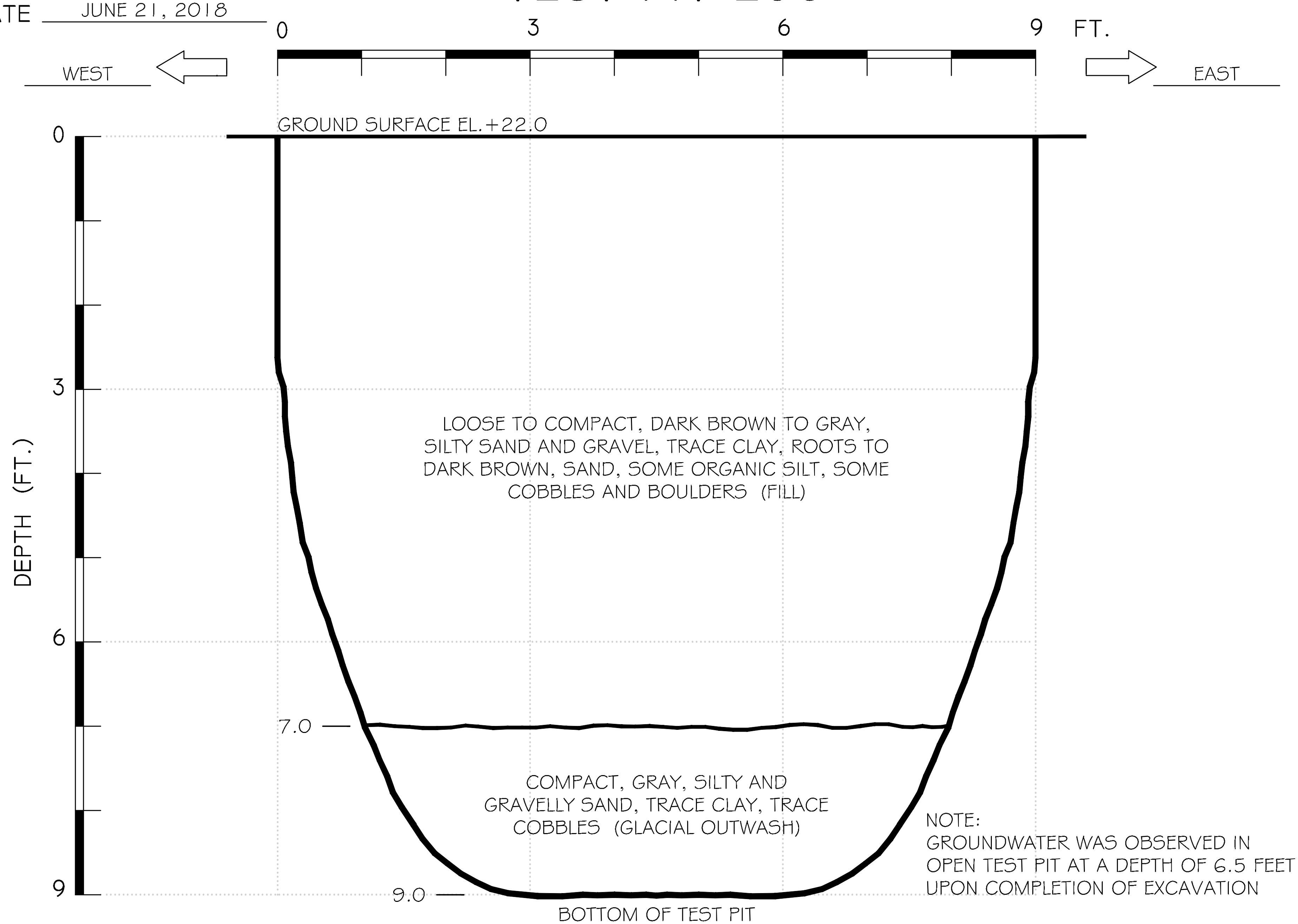


TEST PIT LOG

JOB NO. 6524

DATE JUNE 21, 2018

TEST PIT NO. 3



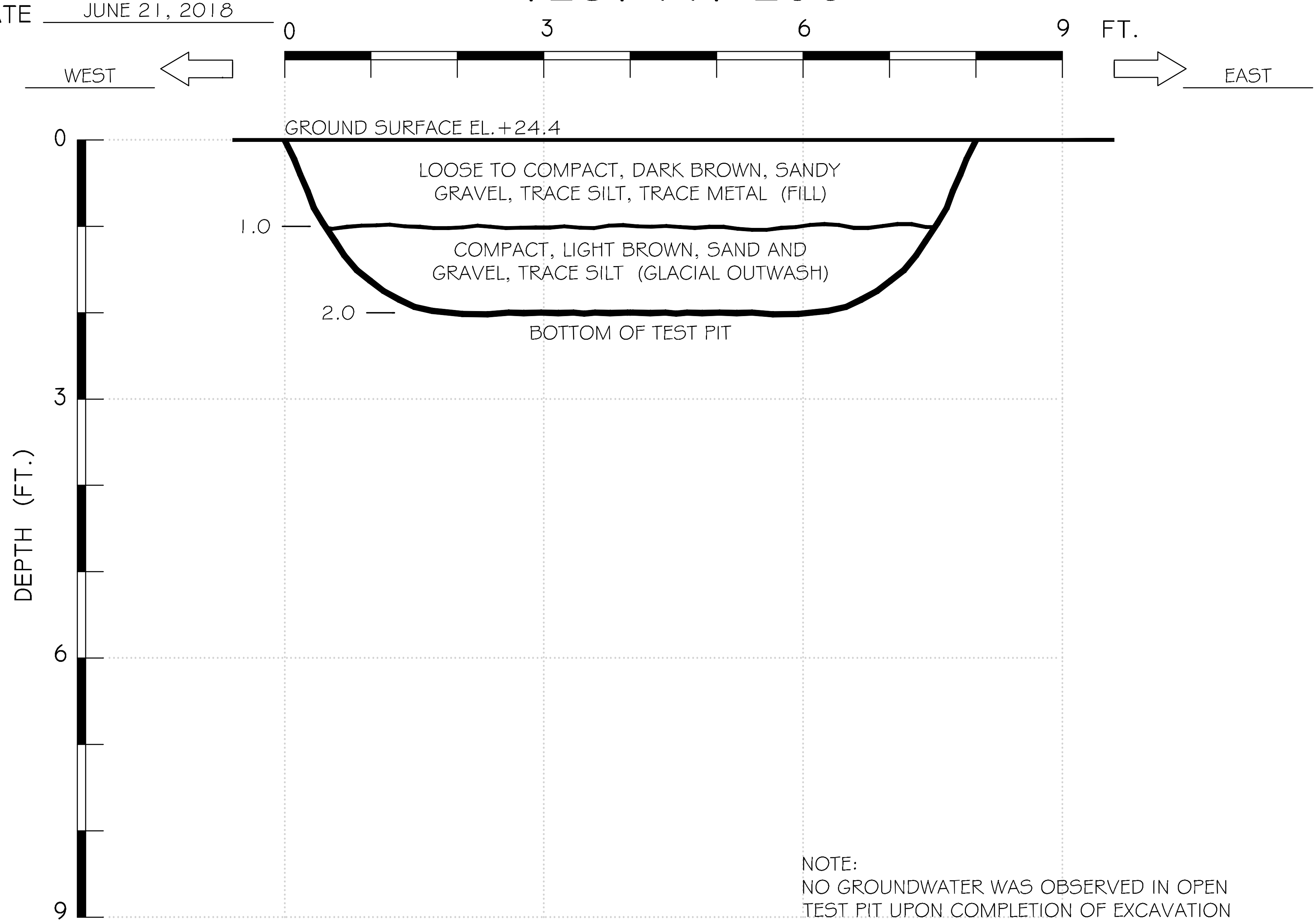
McPHAIL ASSOCIATES, LLC

TEST PIT LOG

JOB NO. 6524

DATE JUNE 21, 2018

TEST PIT NO. 4



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

McPHAIL ASSOCIATES, LLC

McPHAIL ASSOCIATES, LLC

APPENDIX F:

GEOPROBE LOGS
GP-1 THROUGH GP-15

Project:	Portsmouth Parcels	**Job #:**	6524.9.00	Boring No.
Location:	55 Cate Street	**Date Started:**	1-19-18	**GP-1 (OW)**
City/State:	Portsmouth, NH	**Date Finished:**	1-19-18	

Contractor: TDS
Driller/Helper: Darwin
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 21.6

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-19-18	DRY		
1-22-18	7.21	14.4	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows Per 6"	Sample Description and Boring Notes
0-2.5	21-19		2.5 / 19.1	FILL	n/a	S1	30/16	0.0-2.5		Brown/gray/black, SILTY SAND, trace gravel, with brick. (Fill)
2.5-10	19-12		10.0 / 11.6	OUTWASH	n/a	S2	30/16	2.5-5.0		Brown/gray, SILTY SAND, some gravel, trace cobbles. (Outwash)
					n/a	S3	27/20	5.0-7.3		Brown/gray, SILTY SAND, some gravel. (Outwash)
					n/a	S4	27/20	7.3-9.5		Brown/gray, SILTY SAND, some gravel, some clay with fine sand partings. (Outwash)
10				Geoprobe refusal at 10 feet below ground surface.						

Depth scale (ft): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
Elev. scale (ft): 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, -1

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Overcast

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Portsmouth Parcels	**Job #:**	6524.9.00
Location:	55 Cate Street	**Date Started:**	1-19-18
City/State:	Portsmouth, NH	**Date Finished:**	1-19-18

Boring No.

GP-2 (OW)

Contractor: TDS
Driller/Helper: Darwin
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 20.4

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-19-18	5.5	14.9	
1-22-18	8.76	11.6	

Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0.5 / 19.9	CONCRETE						
		n/a	S1	30/15	0.0-2.5		Brown/black, SILT, SAND, trace gravel. (Fill)
4.5 / 15.9	FILL	n/a	S2	30/15	2.5-5.0		Brown/gray/black, SILTY SAND, trace gravel with ash & cinders. (Fill)
5.5 / 14.9	ORGANIC DEPOSIT	n/a	S3	30/30	5.0-7.5		Gray, SILTY SAND, trace clay, with organic fibers. (Organic Deposit)
	OUTWASH	n/a	S4	30/30	7.5-10.0		Brown/gray, mottled, SILTY SAND, some clay. (Outwash)
		n/a	S5	24/10	10.0-12.0		Brown/gray, mottled, SILTY SAND, some clay. (Outwash)
14.0 / 6.4		n/a	S6	24/10	12.0-14.0		Brown/gray, mottled, SILTY SAND, some clay. (Outwash)
	Geoprobe refusal at 14 feet below ground surface.						

Depth (ft): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
Elev. (ft): 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, -1, -2

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 14 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Overcast

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
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Project: Portsmouth Parcels	**Job #:** 6524.9.00		Boring No.	
Location: 55 Cate Street	**Date Started:** 1-19-18		**GP-3 (OW)**	
City/State: Portsmouth, NH	**Date Finished:** 1-19-18			

Contractor: TDS
Driller/Helper: Darwin
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 19.5
Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-19-18	4	15.5	
1-22-18	6.24	13.3	

Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
	FILL	n/a	S1	30/27	0.0-2.5		Brown/gray, SILY SAND, trace gravel. (Fill)
5.0 / 14.5		n/a	S2	30/27	2.5-5.0		Brown/gray, SILT, some clay, with wood and organic fibers. (Fill)
	MARINE CLAY	n/a	S3	30/30	5.0-7.5		Brown/gray, mottled, SILTY CLAY. (Marine Clay)
		n/a	S4	30/30	7.5-10.0		Brown/gray, mottled, SILTY CLAY. (Marine Clay)
		n/a	S5	30/20	10.0-12.5		Brown/gray, mottled, SILTY CLAY with fine sand partings. (Marine Clay)
		n/a	S6	30/20	12.5-15.0		Brown/gray, mottled, SILTY CLAY with fine sand partings. (Marine Clay)
16.5 / 3.0		n/a	S7	18/23	15.0-16.5		Brown/gray, mottled, SILTY CLAY with fine sand partings. (Marine Clay)
	Geoprobe refusal at 16.5 feet below ground surface.						

Depth (ft): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
Elev. (ft): 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, -1, -2, -3

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 16.5 feet below ground surface with 13.5 feet of PVC screen and 3 feet of PVC riser.

Weather: Overcast

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
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Project: Portsmouth Parcels	**Job #:** 6524.9.00	Boring No.	
Location: 55 Cate Street	**Date Started:** 1-19-18	**GP-4 (OW)**	
City/State: Portsmouth, NH	**Date Finished:** 1-19-18		

Contractor: TDS
Driller/Helper: Darwin
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 19.7
Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-19-18	5.5	14.2	
1-22-18	5.13	14.6	

Depth (ft)	Elev. (ft)	Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0.0-2.5			FILL	n/a	S1	30/19	0.0-2.5		Brown/gray, SILTY SAND, some gravel, with trace bricks. (Fill)
			FILL	n/a	S2	30/19	2.5-5.0		Brown/gray, SAND, some silt, some gravel. (Fill)
		7.5 / 12.2	FILL	n/a	S3	30/22	5.0-7.5		Brown/gray, SILT, SAND, some gravel, with trace asphalt. (Fill)
			OUTWASH	n/a	S4	30/22	7.5-10.0		Brown/yellow, SILTY SAND, some gravel. (Outwash) Petroleum odor and staining observed approximately 9 feet bgs.
			OUTWASH	n/a	S5	24/18	10.0-12.0		Brown/gray, GRAVEL, some sand, some silt. (Outwash)
		14.0 / 5.7	OUTWASH	n/a	S6	24/18	12.0-14.0		Brown/gray, SILTY SAND. (Outwash)
			Geoprobe refusal at 14 feet below ground surface.						

Depth scale (ft): 1–22; Elev. scale (ft): 19 to -3

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 14 feet below ground surface with 11 feet of PVC screen and 3 feet of PVC riser.

Weather: Overcast

McPHAIL ASSOCIATES, LLC
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Project:	Portsmouth Parcels	**Job #:**	6524.9.00
Location:	428 Bypass Road	**Date Started:**	1-19-18
City/State:	Portsmouth, NH	**Date Finished:**	1-19-18

Boring No.

GP-5 (OW)

Contractor: TDS
Driller/Helper: Darwin
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 23.3

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-19-18	6	17.3	
1-22-18	7.95	15.4	

Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0.3 / 23.0	ASPHALT	n/a	S1	30/16	0.0-2.5		Brown/black, SILTY SAND, some gravel, with brick and asphalt. (Fill)
	FILL	n/a	S2	30/16	2.5-5.0		Brown/black, SILTY SAND, some gravel, with brick. (Fill)
7.5 / 15.8		n/a	S3	30/8	5.0-7.5		Brown, SILTY SAND and GRAVEL, trace cobbles, with wood. (Fill)
	OUTWASH	n/a	S4	30/8	7.5-10.0		Brown, SILTY SAND, some gravel. (Outwash)
		n/a	S5	27/16	10.0-12.3		Gray, SAND and GRAVEL, some silt. (Outwash)
14.5 / 8.8		n/a	S6	27/16	12.3-14.5		Brown, SILTY SAND and GRAVEL. (Outwash)
	Geoprobe refusal at 14.5 feet below ground surface.						

Depth (ft): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Elev. (ft): 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 14.5 feet below ground surface with 11.5 feet of PVC screen and 3 feet of PVC riser.

Weather: Overcast

McPHAIL ASSOCIATES, LLC

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2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
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Project:	Portsmouth Parcels	**Job #:**	6524.9.00
Location:	428 Bypass Road	**Date Started:**	1-19-18
City/State:	Portsmouth, NH	**Date Finished:**	1-19-18

Boring No.

GP-6 (OW)

Contractor: TDS
Driller/Helper: Darwin
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 24.6

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-19-18	10	14.6	
1-22-18	8.65	16.0	

Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0.3 / 24.3	ASPHALT						
2.5 / 22.1	FILL	n/a	S1	30/18	0.0-2.5		Brown/gray, SILTY SAND, some gravel, with ash & cinders. (Fill)
	OUTWASH	n/a	S2	30/18	2.5-5.0		Brown, SAND, some silt, some gravel. (Outwash)
		n/a	S3	30/2	5.0-7.5		Brown, SILTY SAND. (Outwash)
		n/a	S4	30/2	7.5-10.0		Brown, SILTY SAND and cobble blocking the geoprobe. (Outwash)
12.0 / 12.6		n/a	S5	24/7	10.0-12.0		Brown/gray, SILTY SAND, some clay. (Outwash)
	Geoprobe refusal at 12 feet below ground surface.						

Depth (ft): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
Elev. (ft): 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 12 feet below ground surface with 9 feet of PVC screen and 3 feet of PVC riser.

Weather: Overcast

McPHAIL ASSOCIATES, LLC
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2269 MASSACHUSETTS AVENUE
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Project: Portsmouth Parcels	**Job #:** 6524.9.00	Boring No.	
Location: 428 Bypass Road	**Date Started:** 1-22-18	**GP-7 (OW)**	
City/State: Portsmouth, NH	**Date Finished:** 1-22-18		

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 22.3
Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	5	17.3	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0	22		0.3 / 22.0	ASPHALT						
1–2	21–20		2.5 / 19.8	FILL	n/a	S1	30/20	0.0-2.5		Brown/black, SILT, SAND, some gravel, with ash & cinders. (Fill)
3–5	19–17			MARINE CLAY	n/a	S2	30/20	2.5-5.0		Brown/gray, mottled, SILTY CLAY. (Marine Clay)
5–7	17–15				n/a	S3	30/30	5.0-7.5		Brown/gray, mottled, SILT, SAND, some clay. (Marine Clay)
8–10	14–12		10.0 / 12.3		n/a	S4	30/30	7.5-10.0		Brown/gray, mottled, SILTY SAND and CLAY, some gravel. (Marine Clay)
10	12			Geoprobe refusal at 10 feet below ground surface.						
11	11									
12	10									
13	9									
14	8									
15	7									
16	6									
17	5									
18	4									
19	3									
20	2									
21	1									
22	0									

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
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FAX: 617-868-1423

Project: Portsmouth Parcels	**Job #:** 6524.9.00	Boring No.
Location: 428 Bypass Road	**Date Started:** 1-22-18	**GP-8 (OW)**
City/State: Portsmouth, NH	**Date Finished:** 1-22-18	

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 25.3

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	DRY		

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0–2.5	25–23		0.3 / 25.0 2.5 / 22.8	ASPHALT FILL	n/a	S1	30/20	0.0-2.5		Brown/black, SILT and SAND, some gravel, with ash & cinders and bricks. (Fill)
2.5–5	22–21			OUTWASH	n/a	S2	30/20	2.5-5.0		Brown/gray, SILTY SAND, some gravel. (Outwash)
5–7.5	20–18				n/a	S3	30/10	5.0-7.5		Brown/gray, SILTY SAND, some gravel. (Outwash)
7.5–10	17–16		10.0 / 15.3		n/a	S4	30/10	7.5-10.0		Brown/gray, SAND, some gravel, some silt. (Outwash)
10–22	15–3			Geoprobe refusal at 10 feet below ground surface.						

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

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CAMBRIDGE, MA 02140
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Project:	Portsmouth Parcels	**Job #:**	6524.9.00
Location:	428 Bypass Road	**Date Started:**	1-22-18
City/State:	Portsmouth, NH	**Date Finished:**	1-22-18

Boring No.
GP-9 (OW)

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 25.7

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	5	20.7	

Depth/EL to Strata Change (ft)	Stratum	Sample N-Value	Sample No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0.3 / 25.4	ASPHALT						
2.5 / 23.2	FILL	n/a	S1	30/14	0.0-2.5		Brown/gray/black, SILT and SAND, trace gravel. (Fill)
	OUTWASH	n/a	S2	30/14	2.5-5.0		Brown/gray, mottled, SILTY SAND, some clay, trace gravel. (Outwash)
		n/a	S3	30/12	5.0-7.5		Brown/gray, SILTY SAND. (Outwash)
10.0 / 15.7		n/a	S4	30/12	7.5-10.0		Brown/gray, SILTY SAND, some gravel. (Outwash)
	Geoprobe refusal at 10 feet below ground surface.						

Depth (ft): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
Elev. (ft): 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

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Project:	Portsmouth Parcels	**Job #:**	6524.9.00
Location:	428 Bypass Road	**Date Started:**	1-22-18
City/State:	Portsmouth, NH	**Date Finished:**	1-22-18

Boring No.

GP-10 (OW)

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 21.6

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	DRY		

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value	Sample No.	Sample Pen. /Rec. (in)	Sample Depth (ft)	Sample Blows Per 6"	Sample Description and Boring Notes
0–0.3	21.6–21.3		0.3 / 21.3	ASPHALT						
0.3–8.0	21.3–13.6		8.0 / 13.6	FILL	n/a	S1	30/20	0.0-2.5		Brown/gray, SAND, some silt, some gravel, with ash & cinders and crushed stone. (Fill)
					n/a	S2	30/20	2.5-5.0		Brown, SAND, some gravel, trace silt. (Fill)
					n/a	S3	36/30	5.0-8.0		Brown/gray, SAND and GRAVEL, with crushed stone and ash & cinders. (Fill) Petroleum odor and staining observed.
				Geoprobe refusal at 8 feet below ground surface.						

Depth scale (ft): 1–22; Elev. scale (ft): 21 to -1.

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 8 feet below ground surface with 5 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Portsmouth Parcels	**Job #:**	6524.9.00	Boring No.	
Location:	428 Bypass Road	**Date Started:**	1-22-18	**GP-11 (OW)**	
City/State:	Portsmouth, NH	**Date Finished:**	1-22-18		

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 26.2

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	3.5	22.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value	Sample No.	Sample Pen. /Rec. (in)	Sample Depth (ft)	Sample Blows Per 6"	Sample Description and Boring Notes
	26		0.3 / 25.9	ASPHALT						Brown/gray, SILTY SAND, some gravel, with ash & cinders. (Fill)
1	25			FILL	n/a	S1	30/15	0.0-2.5		
2	24		2.5 / 23.7							
3	23									Brown/gray, SAND, some silt, some gravel, some clay with fine sand partings. (Outwash)
4	22				n/a	S2	30/15	2.5-5.0		
5	21									Brown/gray, SILTY SAND, trace gravel. (Outwash)
6	20			OUTWASH	n/a	S3	30/14	5.0-7.5		
7	19									
8	18									Brown/gray, SILTY SAND and GRAVEL. (Outwash)
9	17				n/a	S4	30/14	7.5-10.0		
10	16		10.0 / 16.2	Geoprobe refusal at 10 feet below ground surface.						
11	15									
12	14									
13	13									
14	12									
15	11									
16	10									
17	9									
18	8									
19	7									
20	6									
21	5									
22	4									

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project: Portsmouth Parcels	**Job #:** 6524.9.00	Boring No.
Location: 428 Bypass Road	**Date Started:** 1-22-18	**GP-12 (OW)**
City/State: Portsmouth, NH	**Date Finished:** 1-22-18	

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 26.6

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	DRY		

Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0.3 / 26.3	ASPHALT						
	FILL	n/a	S1	30/20	0.0-2.5		Brown/gray, SILTY SAND, trace gravel, with trace pulverized gravel. (Fill)
		n/a	S2	30/20	2.5-5.0		Brown/gray, SILTY SAND. (Fill)
		n/a	S3	30/30	5.0-7.5		Brown/gray/black, SILTY SAND, with some crushed stone. (Fill)
10.0 / 16.6		n/a	S4	30/30	7.5-10.0		Brown, SILTY SAND, some gravel, trace clay. (Fill)
	Geoprobe refusal at 10 feet below ground surface.						

Depth (ft): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Elev. (ft): 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Portsmouth Parcels	**Job #:**	6524.9.00	Boring No.
Location:	428 Bypass Road	**Date Started:**	1-22-18	**GP-13 (OW)**
City/State:	Portsmouth, NH	**Date Finished:**	1-22-18	

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 24.7

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	5	19.7	

Depth (ft)	Elev. (ft)	Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0-2.5	24.7-22.2	0.3 / 24.4	ASPHALT						
			FILL	n/a	S1	30/15	0.0-2.5		Brown/gray/black, SILTY SAND, trace clay. (Fill)
2.5-5.0			FILL	n/a	S2	30/15	2.5-5.0		Brown/gray, SILTY SAND, trace clay, with bricks. (Fill)
5.0-7.5		7.5 / 17.2	FILL	n/a	S3	30/15	5.0-7.5		Brown/gray/blue, SILTY SAND, some clay, with ash & cinders. (Fill)
7.5-10.0		10.0 / 14.7	MARINE CLAY	n/a	S4	30/15	7.5-10.0		Gray/blue, SILTY CLAY, some gravel. (Marine Clay)
			Geoprobe refusal at 10 feet below ground surface.						

Depth scale (ft): 1–22; Elev. scale (ft): 24–2.

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

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Project:	Portsmouth Parcels	Job #:	6524.9.00	Boring No.
Location:	428 Bypass Road	Date Started:	1-22-18	**GP-14 (OW)**
City/State:	Portsmouth, NH	Date Finished:	1-22-18	

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 25.4

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes

Depth/EL to Strata Change (ft)	Stratum	N-Value	No.	Pen./Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
0.3 / 25.1	ASPHALT						
	FILL	n/a	S1	30/18	0.0-2.5		Brown/gray, SILT, some sand, trace gravel. (Fill)
		n/a	S2	30/18	2.5-5.0		Brown/gray/black, SILTY SAND, trace clay. (Fill)
7.5 / 17.9		n/a	S3	30/15	5.0-7.5		Blue/gray, mottled, SILT, some clay, trace sand, with some organic fibers. (Fill)
10.0 / 15.4	OUTWASH	n/a	S4	30/15	7.5-10.0		Brown/gray/blue, mottled, SILTY SAND, some gravel, trace clay. (Outwash)
	Geoprobe refusal at 10 feet below ground surface.						

Depth (ft): 1–22; Elev. (ft): 25–3

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

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FAX: 617-868-1423

Project: Portsmouth Parcels	**Job #:** 6524.9.00	Boring No.
Location: 428 Bypass Road	**Date Started:** 1-22-18	**GP-15 (OW)**
City/State: Portsmouth, NH	**Date Finished:** 1-22-18	

Contractor: TDS
Driller/Helper: Matt
Logged By/Reviewed By: K. Hanrahan
Surface Elevation (ft): 25.1

Casing Type/Depth (ft): NA
Casing Hammer (lbs)/Drop (in): NA
Sampler Size/Type: 5' Sleeve
Sampler Hammer (lbs)/Drop (in): NA

Groundwater Observations

Date	Depth	Elev.	Notes
1-22-18	5	20.1	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value	Sample No.	Pen. /Rec. (in)	Depth (ft)	Blows Per 6"	Sample Description and Boring Notes
			0.3 / 24.8	ASPHALT						
1	24			FILL	n/a	S1	30/24	0.0-2.5		Brown/gray/black, SILTY SAND, trace gravel, with ash & cinders. (Fill)
2	23		2.5 / 22.6							
3	22			MARINE CLAY						Brown/gray, SILT and SAND, some clay. (Marine Clay)
4	21				n/a	S2	30/24	2.5-5.0		
5	20									Brown/gray, mottled, SILTY SAND and CLAY. (Marine Clay)
6	19				n/a	S3	30/30	5.0-7.5		
7	18									
8	17									Brown/gray, SILTY SAND and CLAY, some gravel. (Marine Clay)
9	16				n/a	S4	30/30	7.5-10.0		
10	15		10.0 / 15.1							
11	14			Geoprobe refusal at 10 feet below ground surface.						
12	13									
13	12									
14	11									
15	10									
16	9									
17	8									
18	7									
19	6									
20	5									
21	4									
22	3									

GRANULAR SOILS

BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Geoprobe installed observation well at 10 feet below ground surface with 7 feet of PVC screen and 3 feet of PVC riser.

Weather: Snow/Rain

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2269 MASSACHUSETTS AVENUE
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McPHAIL ASSOCIATES, LLC

APPENDIX G:

GROUNDWATER MONITORING REPORTS
GP-1 THROUGH GP-15 AND B-1(OW) THROUGH B-3(OW)

GROUNDWATER MONITORING REPORT

Well I.D. GP-1 (OW)	**Elevation of Road Box** +21.6	**Job. No.** 6524.9.00	**Job Name** Portsmouth Parcels

Date	Time	Elapsed Time	Depth of Water from Road Box	Elevation of Water	Remarks	Read By
		Days	Feet	Feet		
1/19/2018	11:30	Initial	DRY		Screened installed from 3' to 10' bgs	KEH
1/22/2018		3	7.21	+14.39	Well Sampled	KEH
1/25/2018		6	6.05	+15.55	Well Sampled	KEH
6/21/2018		153			Well destroyed	CAC

GROUNDWATER MONITORING REPORT

Well I.D. GP-2 (OW)	**Elevation of Road Box** +20.4	**Job. No.** 6524.9.00 **Job Name** Portsmouth Parcels

Date	Time	Elapsed Time	Depth of Water from Road Box	Elevation of Water	Remarks	Read By
		Days	Feet	Feet		
1/19/2018	12:30	Initial	5.5	+14.90	Screened installed from 3' to 14' bgs	KEH
1/22/2018		3	8.76	+11.64	Well Sampled	KEH
1/25/2018		6	4.68	+15.72	Well Sampled	KEH
6/21/2018		153			Well was inaccessible	CAC
11/8/2018		293	4.21	+16.19	Well read	KEH
12/10/2018		325	4.17	+16.23	Well read	KEH
12/13/2018		328	4.6	+15.80	Well read	PJH

GROUNDWATER MONITORING REPORT

Well I.D.	GP-3 (OW)	**Elevation of Road Box**	+19.5	**Job. No.** / **Job Name**	6524.9.00 / Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/19/2018	13:30	Initial	4	+15.50	Screened installed from 3' to 10.5' bgs	KEH
1/22/2018		3	6.24	+13.26	Well Sampled	KEH
1/25/2018		6			Ice in the well at 1.5' b.g.s preventing an accurate reading	KEH
6/21/2018		153			Damaged well; could not be read.	CAC
11/8/2018		293	1	+18.50	Roadbox missing; PVC with plug located and well sampled	KEH

GROUNDWATER MONITORING REPORT						
Well I.D.	GP-4 (OW)	**Elevation of Road Box**	+19.7	**Job. No.** **Job Name**	6524.9.00 Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/19/2018	14:30	Initial	5.5	+14.20	Screened installed from 3' to 14' bgs	KEH
1/22/2018		3	5.13	+14.57	Well Sampled	KEH
1/25/2018		6	4.71	+14.99	Well Sampled	KEH
6/21/2018		153			Well was inaccessible; stockpile over well.	CAC

GROUNDWATER MONITORING REPORT

Well I.D.	GP-5 (OW)	**Elevation of Road Box**	+23.3	**Job. No.** / **Job Name**	6524.9.00 / Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/19/2018	14:30	Initial	6	+17.30	Screened installed from 3' to 14.5' bgs	KEH
1/22/2018		3	7.95	+15.35	Well Sampled	KEH
1/25/2018		6	7.2	+16.10	Well Sampled	KEH
6/21/2018		153	8.25	+15.05	Well read	CAC
11/8/2018		293	6.62	+16.68	Well read	KEH
12/10/2018		325	7.61	+15.69	Well read	KEH
12/13/2018		328	7.8	+15.50	Well read	PJH
3/8/2019		413	8.3	+15.00	Well read	JM
3/10/2019		415	7.1	+16.20	Well read	JM

GROUNDWATER MONITORING REPORT

Well I.D. GP-6 (OW)	**Elevation of Road Box** +24.6	**Job. No.** 6524.9.00 **Job Name** Portsmouth Parcels

Date	Time	Elapsed Time	Depth of Water from Road Box	Elevation of Water	Remarks	Read By
		Days	Feet	Feet		
1/19/2018	14:30	Initial	10	+14.60	Screened installed from 3' to 12' bgs	KEH
1/22/2018		3	8.65	+15.95	Well Sampled	KEH
1/25/2018		6	7.95	+16.65	Well Sampled	KEH
6/21/2018		153	8.5	+16.10	Well read	CAC
11/8/2018		293	7.96	+16.64	Well read	KEH
12/10/2018		325	6.4	+18.20	Well read	KEH
12/13/2018		328	6.8	+17.80	Well read	PJH
3/8/2019		413	6.9	+17.70	Well read	JM
3/10/2019		415	6.8	+17.80	Well read	JM

GROUNDWATER MONITORING REPORT

Well I.D. GP-7 (OW)	**Elevation of Road Box** +22.3	**Job. No.** 6524.9.00 **Job Name** Portsmouth Parcels

Date	Time	Elapsed Time	Depth of Water from Road Box	Elevation of Water	Remarks	Read By
		Days	Feet	Feet		
1/22/2018	8:30	Initial	5	+17.30	Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	2.75	+19.55	Well sampled	KEH
6/21/2018		150	3.15	+19.15	No well cap	CAC
11/8/2018		290			Road Box missing	KEH
3/8/2019		410			Broken	JM
3/10/2019		412			Broken	JM

GROUNDWATER MONITORING REPORT						
Well I.D. GP-8 (OW)		**Elevation of Road Box** +25.3		**Job. No.** 6524.9.00 **Job Name** Portsmouth Parcels		
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/22/2018	9:00	Initial	DRY		Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	DRY			KEH
6/21/2018		150	DRY		No well cap	CAC
11/8/2018		290			Road box missing	KEH
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412			well not read, cover with snow	JM

GROUNDWATER MONITORING REPORT

Well I.D.	GP-9 (OW)	**Elevation of Road Box**	+25.7	**Job. No.** / **Job Name**	6524.9.00 / Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/22/2018	9:30	Initial	5	+20.70	Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	5.95	+19.75	Well Sampled	KEH
6/21/2018		150	7	+18.70	Well read	CAC
11/8/2018		290	5.65	+18.70	Well read	KEH
12/10/2018		322	5.6	+18.70	Well read	KEH
12/13/2018		325	5.95	+18.70	Well read	PJH
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412			well not read, cover with snow	JM

GROUNDWATER MONITORING REPORT						
Well I.D.	GP-10 (OW)	**Elevation of Road Box**	+24.1	**Job. No.** **Job Name**	6524.9.00 Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/22/2018	10:00	Initial	DRY		Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	5.45	+18.65	Well sampled	KEH
6/21/2018		150			Damaged well cap prevented well from being read	CAC
11/8/2018		290	5.65	+18.45	Well sampled	KEH
12/10/2018		322	5.66	+18.44	Well read	KEH
12/13/2018		325	5.75	+18.35	Well read and sampled	PJH
3/8/2019		410	5.65	+18.45	Well read	JM
3/10/2019		412	5.45	+18.65	Well read	JM

GROUNDWATER MONITORING REPORT						
Well I.D.	GP-11 (OW)	**Elevation of Road Box**	+26.2	**Job. No.** / **Job Name**	6524.9.00 / Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/22/2018	11:00	Initial	5.5	+20.70	Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	4.4	+21.80	Well sampled	KEH
6/21/2018		150	5.85	+20.35	Well Read	CAC
11/8/2018		290	3.3	+22.90	Well Read	KEH
12/10/2018		322	3.5	+22.70	Well Read	KEH
12/13/2018		325	3.8	+22.40	Well read	PJH
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412			well not read, cover with snow	JM

GROUNDWATER MONITORING REPORT

Well I.D.	GP-12 (OW)	**Elevation of Road Box**	+26.6	**Job. No.** / **Job Name**	6524.9.00 / Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/22/2018	11:00	Initial	DRY		Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	4.7	+21.90	Purged dry from sampling	KEH
6/21/2018		150			Well couldn't be read	CAC
11/8/2018		290	4.55	+22.05	Well read	KEH
12/10/2018		322	4	+22.60	Well read	KEH
12/13/2018		325	4.55	+22.05	Well read	KEH
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412			well not read, cover with snow	JM

GROUNDWATER MONITORING REPORT						
Well I.D.	GP-13 (OW)	**Elevation of Road Box**	+24.7	**Job. No.** **Job Name**	6524.9.00 Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/22/2018	12:00	Initial	DRY		Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	N/A		Well was covered in ice	KEH
6/21/2018		150	3.85	+20.85	Well read	CAC
11/8/2018		290	0.4	+24.30	Well read	KEH
12/10/2018		322	2.51	+22.19	Well read	KEH
12/13/2018		325	2.8	+21.90	Well read	PJH
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412	2.8	+21.90	Well read	JM
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412			well not read, cover with snow	JM

GROUNDWATER MONITORING REPORT						
Well I.D. GP-14 (OW)		**Elevation of Road Box** +25.4		**Job. No.** 6524.9.00 **Job Name** Portsmouth Parcels		
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
1/22/2018	13:30	Initial	5	+20.40	Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	2.49	+22.91	Well sampled	KEH
6/21/2018		150	4.00	+21.40	Well read	CAC
11/8/2018		290	0.70	+24.70	Well read	KEH
12/10/2018		322	2.75	+22.65	Well read	KEH
12/13/2018		325	3.1	+22.30	Well read	PJH
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412			well not read, cover with snow	JM

GROUNDWATER MONITORING REPORT

Well I.D. GP-15 (OW)	**Elevation of Road Box** +25.1	**Job. No.** 6524.9.00 **Job Name** Portsmouth Parcels

Date	Time	Elapsed Time	Depth of Water from Road Box	Elevation of Water	Remarks	Read By
		Days	Feet	Feet		
1/22/2018	14:00	Initial	5	+20.10	Screened installed from 3' to 10' bgs	KEH
1/25/2018		3	2.35	+22.75	Well sampled	KEH
6/21/2018		150	3.6	+21.50	Well read	CAC
11/8/2018		290	1.75	+23.35	Well read	KEH
12/10/2018		322	2.6	+22.50	Well read	KEH
12/13/2018		325	3	+22.10	Well read	PJH
3/8/2019		410			well not read, cover with snow	JM
3/10/2019		412	3	+22.10	well read	JM

GROUNDWATER MONITORING REPORT

Well I.D.	B-1(OW)	**Elevation of Road Box**	+25.2	**Job. No.** **Job Name**	6524.9.00 Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
12/10/2018	14:00	Initial	4	+21.20	Well installed; all screen from 0' to 8' b	JDM
12/13/2018			4.85	+20.35	Well read and sampled	PJH

GROUNDWATER MONITORING REPORT

Well I.D.	B-2(OW)	**Elevation of Road Box**	+24.2	**Job. No.** **Job Name**	6524.9.00 Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
12/10/2018	14:00	Initial	6	+18.20	Well installed; all screen from 0' to 7.5	JDM
12/13/2018			NA	NA	Well dry	PJH

GROUNDWATER MONITORING REPORT

Well I.D.	B-3(OW)	**Elevation of Road Box**	+24.2	**Job. No.** **Job Name**	6524.9.00 Portsmouth Parcels	
Date	**Time**	**Elapsed Time**	**Depth of Water from Road Box**	**Elevation of Water**	**Remarks**	**Read By**
		Days	**Feet**	**Feet**		
12/10/2018	14:00	Initial	6	+18.20	Well installed; all screen from 0' to 10'	JDM
12/13/2018			3.55	+20.65	Well read and sampled	PJH

Appendix J

UIC Registration for infiltration to Groundwater (underground systems)

PENDING

Appendix K

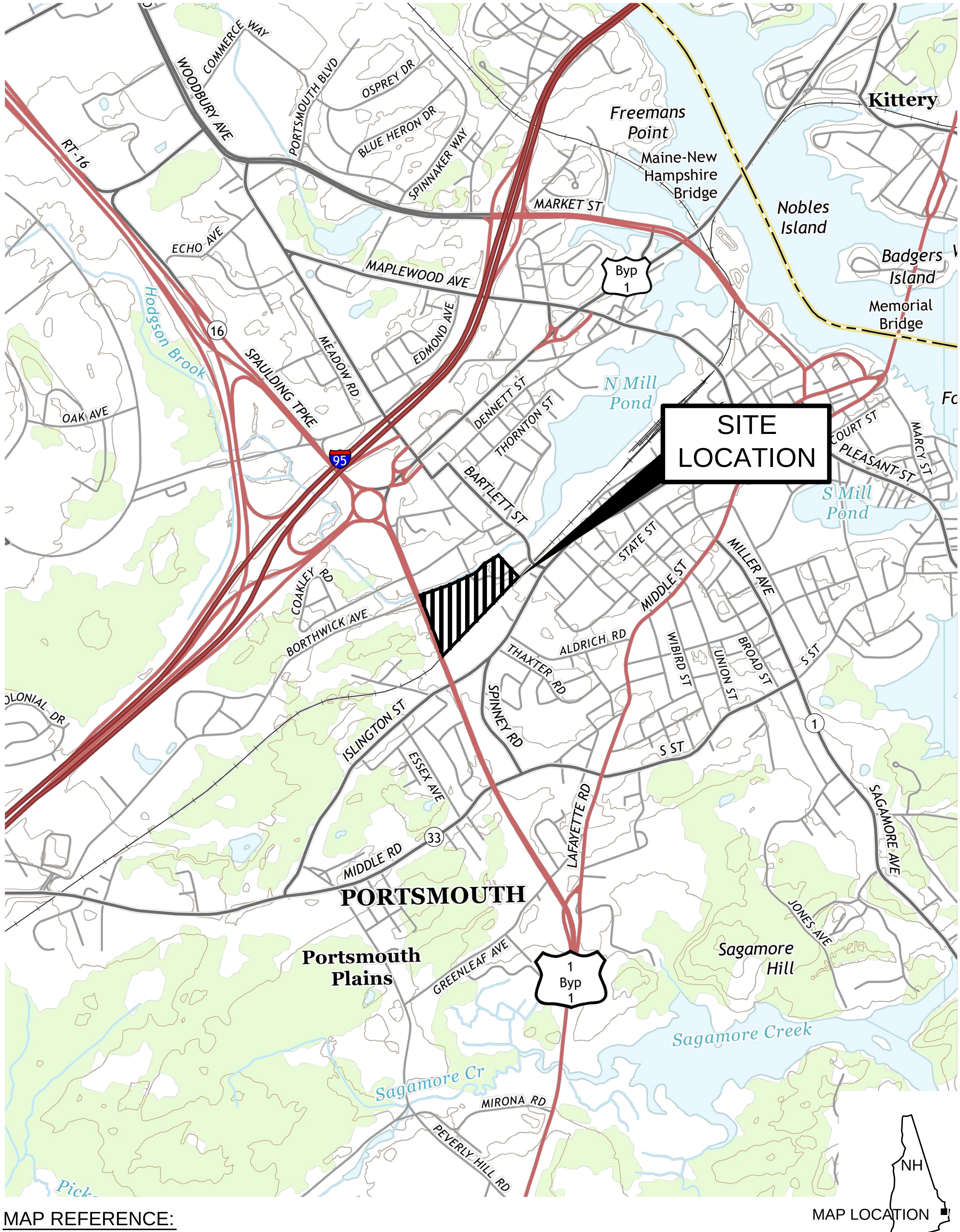
Inspection and Maintenance Manual

PENDING

Figure 1

Site Location Map

100%



MAP LOCATION

MAP REFERENCE:

2015 USGS US TOPO 7.5-MINUTE MAP FOR PORTSMOUTH, NH QUADRANGLE

SCALE:	
HORZ.: 1" = 2000'	
VERT.:	
DATUM:	
HORZ.: NAD83	
VERT.: NAVD88	

0 1000 2000

GRAPHIC SCALE

FUSS & O'NEILL
LIBBY HOUSE
5 FLETCHER STREET, SUITE 1
KENNEBUNK, MAINE 04043
207.363.0669
www.fando.com

AAM 15 MANAGEMENT, LLC

SITE LOCATION MAP

FRANK JONES CENTER

PORTSMOUTH NEW HAMPSHIRE

PROJ. No.: 20180317.A10

DATE: 05/08/2018

FIGURE 1

LAYER STATE:

MS VIEW:

File Path: F:\P2018\0317\A10\Civil3\Dwg\20180317A10_COV01.dwg Layout: FIGURE 1 Plotted: Tue, May 08, 2018 - 10:43 AM User: jandretta
Plotter: DWG TO PDF.PC3 CTB File: FO.STB

Figure 2

FEMA Flood Insurance Rate Map

National Flood Hazard Layer FIRMette

FEMA

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Effective LOMRs
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

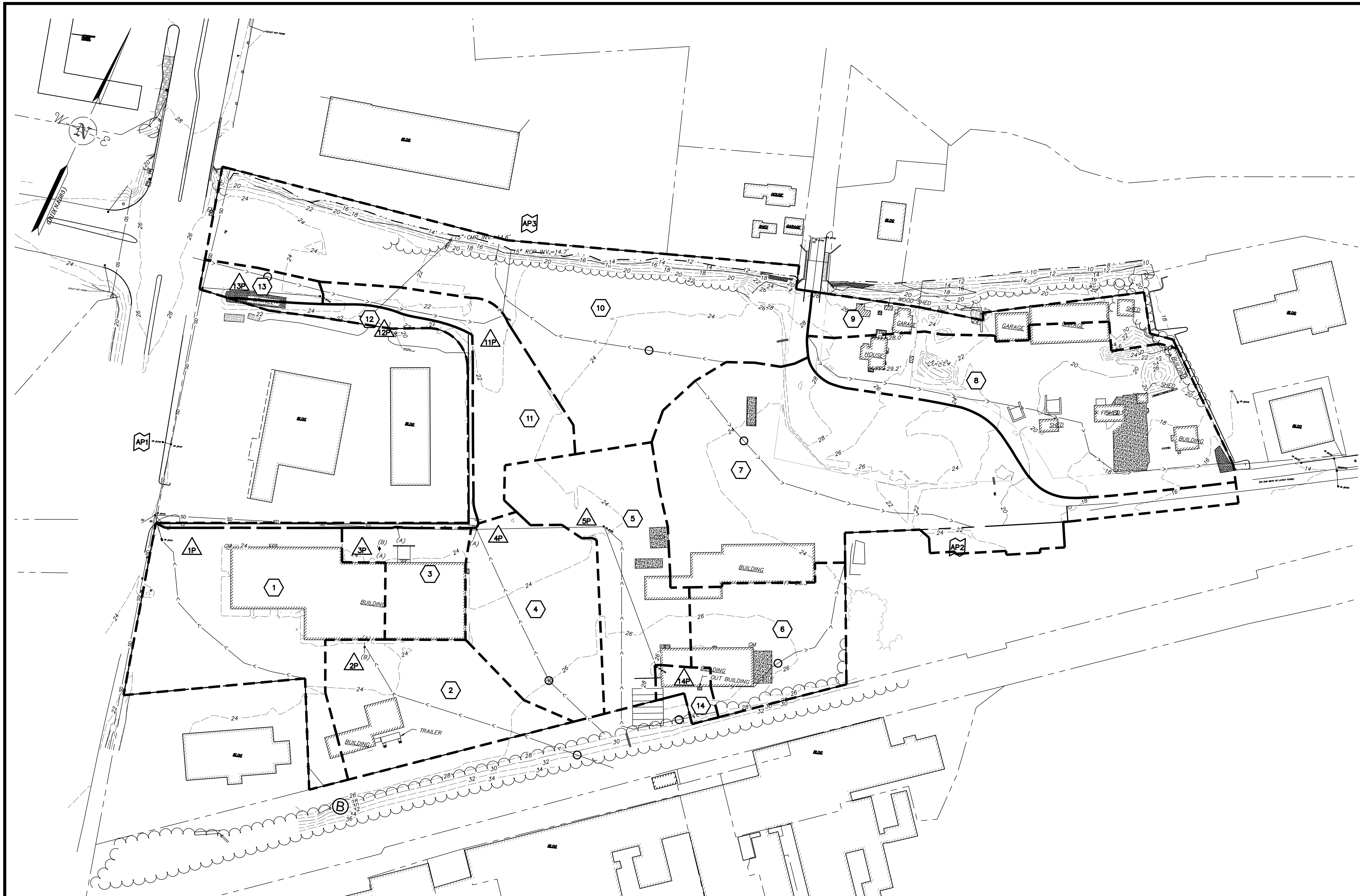
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/18/2018 at 8:15:07 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Figure 3

Pre-Development Subwatershed Plan



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
2.	5/20/2019	TAC SUBMITTAL	JVA/DAD	RRL
1.	3/18/2019	TAC SUBMITTAL	JVA/DAD	RRL

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER
RICHARD R. LUNDBORN
No. 10943
LICENSED

SCALE:
HORZ.: 1"=50'
VERT.:
DATUM:
HORZ.:
VERT.:
50 25 0 50
GRAPHIC SCALE

FUSS & O'NEILL
UPPER SQUARE BUSINESS CENTER
5 FLETCHER STREET, SUITE 1
KENNEBUNK, MAINE 04043
207.363.0669
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CATE STREET DEVELOPMENT, LLC
EXISTING DRAINAGE PLAN
CATE STREET
PORTSMOUTH NEW HAMPSHIRE

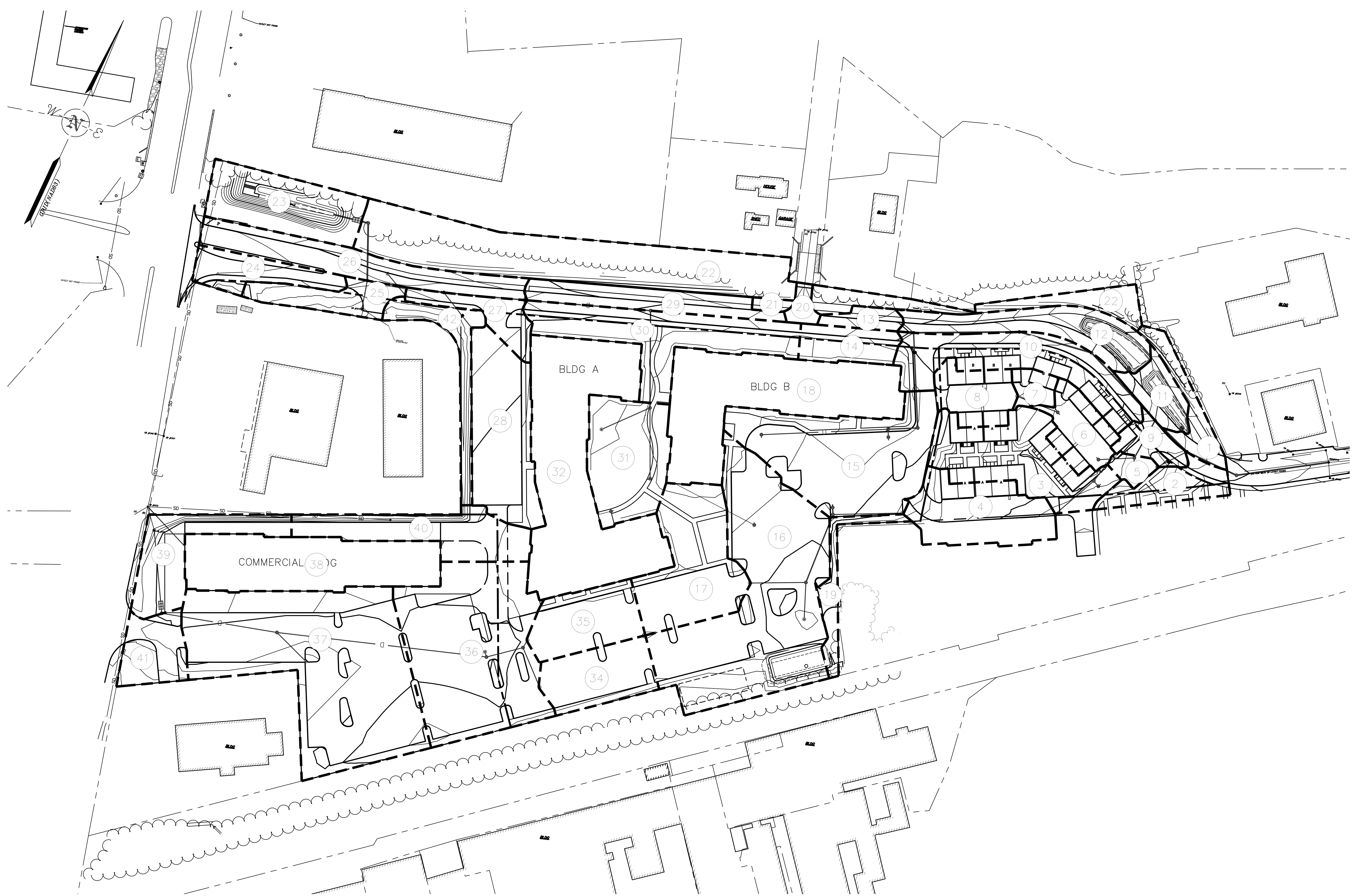
PROJ. No.: 20180317.A10
DATE: 05/20/2019

DR-101

File Path: F:\P2018\0317\A10\Civil3\Dwg\20180317A10_DRA01.dwg Layout: CU-101-60SC Plotted: Tue, May 21, 2019 - 8:48 AM User: jandretta
Plotter: DWG TO PDF.PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:

Figure 4

Post-Development Subwatershed Plan



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MS VIEW: | LAYER STATE: | Plotter: DWG TO PDF.PC3 CTB File: FO.STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
2.	5/20/2019	TAC SUBMITTAL	JVA/DAD	RRL
1.	3/18/2019	TAC SUBMITTAL	JVA/DAD	RRL

STATE OF NEW HAMPSHIRE – RICHARD R. LUNDBORN No. 10943 LICENSED PROFESSIONAL ENGINEER

SCALE:
HORZ.: 1"=50'
VERT.:
DATUM:
HORZ.:
VERT.:
50 25 0 50
GRAPHIC SCALE

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CATE STREET DEVELOPMENT, LLC
PROPOSED DRAINAGE PLAN
CATE STREET
PORTSMOUTH NEW HAMPSHIRE

PROJ. No.: 20180317.A10
DATE: 05/20/2019

DR-102