ENVIRONMENTAL CONSULTANTS

January 24, 2024

City of Portsmouth
Planning & Sustainability
1 Junkins Avenue
Portsmouth, NH 03801

Re: Property Owner Authorization for Submittal of a Wetland Conditional Use Permit
50 Odiorne Point Road
Portsmouth, New Hampshire

To Whom it May Concern:

I (John Gardner), the property owner of the 50 Odiorne Point Road parcel, authorize Elizabeth Olliver of Normandeau Associates, Inc. to submit on my behalf an application for a Wetlands Conditional Use Permit for completion of restoration activities on said parcel.

Sincerely,

John Gardner

John Gardner

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

January 29, 2024

NHDES Water Division/Land Resources Management
Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, New Hampshire 03302
and
City of Portsmouth
Planning & Sustainability
1 Junkins Avenue
Portsmouth, NH 03801

Re: Restoration Plan
Gardner Property: Stone Wall, Swale, and Vegetation Restoration Project
Portsmouth, New Hampshire

Dear NHDES:

On behalf of Mr. John (Jack) Gardner, Normandeau Associates, Inc. (Normandeau) is submitting this Restoration Plan for the proposed Stone Wall, Swale, and Vegetation Restoration Project to address violations of the New Hampshire Wetland Rules and the City of Portsmouth's Zoning Ordinance associated with unpermitted work in jurisdictional areas at 50 Odiorne Point Road in Portsmouth, NH (Property).

Mr. Gardner is seeking approval from the New Hampshire Department of Environmental Services (NHDES) and the City of Portsmouth to conduct a restoration on the Property in response to a notification that the Property is in violation of the City of Portsmouth's Zoning Ordinance and the Fill and Dredge in Wetlands Act (RSA 482-A), Administrative Rules (Env-Wt 100-900) due to grading, installation of fill, and vegetation removal within the City of Portsmouth's 25' wetland buffer zone and the 100' Previously Develop Tidal Buffer Zone without prior application and approval for a City of Portsmouth Wetland Conditional Use Permit and/or a State Wetland Permit issued by NHDES. Mr. Gardner is required by the City of Portsmouth and NHDES to submit a restoration plan for mitigation of the unpermitted work completed on the Property. Normandeau provided wetlands consulting and wetlands delineation services, including the designing of the proposed restoration measures and methods in consultation with representatives from the City of Portsmouth and NHDES.

Included with this submittal is a detailed project overview narrative, required plans and figures, and additional supporting materials. Site visits to discuss the property were held on January 12, 2023 and May 22, 2023 and a virtual meeting was held on May 10, 2023 with additional phone correspondence with NHDES in December 2023.

A preliminary review of this restoration plan was completed by David Price of NHDES and Peter Britz and Kate Homet of the City of Portsmouth Planning & Sustainability Department. Both parties provided feedback based on this review and Normandeau has updated the restoration proposal accordingly.

Please feel free to contact Elizabeth Olliver at (603) 637-1122 or at eolliver@normandeau.com if you have any questions.

Sincerely,

Elizabeth A Olliver

Elizabeth Olliver
Senior Scientist

Attachments: Restoration Plan

CC: Mr. John (Jack) Gardner via Email

Restoration Plan

Gardner Property: Stone Wall, Swale, and Vegetation Restoration Project

Prepared For
Mr. John (Jack) Gardner
50 Odiorne Point Road
Portsmouth, NH 03801

Prepared By
Normandeau Associates, Inc.
25 Nashua Road
Bedford, NH 03110
(603) 472-5191
www.normandeau.com

January 2024

Table of Contents

RESTORATION PLAN NARRATIVE

PROJECT INTRODUCTION

Normandeau Associates, Inc. ("Normandeau") has prepared this restoration plan on behalf of Mr. John (Jack) Gardner in response to a requested mitigation for work completed in violation of the City of Portsmouth's Zoning Ordinance and the Fill and Dredge in Wetlands Act (RSA 482-A), Administrative Rules (Env-Wt 100-900) at 50 Odiorne Point Road in Portsmouth, New Hampshire ("the Property"). This work includes grading, installation of fill, and vegetation removal associated with the rebuilding of a pre-existing stone wall at the base of the Property in summer 2022 and the progressive installation of a stone swale that routes stormwater across the property between 2010 and summer 2022. Mr. Gardner proposes to restore the rebuilt section of stone wall to a design consistent with adjacent undisturbed stone wall on the property, completely remove the most recently installed section of stone swale, remove the lining and majority of stone in the older portion of the swale with a minimal amount of stone placed back in for temporary stabilization purposes, install woody vegetation throughout the length of the swale restoration, and restore and/or enhance vegetation coverage in previously disturbed areas of the Property. Normandeau provided environmental resource consultation, wetlands delineation, and restoration design services. Base Flow, LLC conducted a hydrological study of flows being conveyed by the existing stone swale. Knights Hill Survey surveyed the existing conditions on the Property.

SITE DESCRIPTION

The Property is 1.17 acres containing a private residence, driveway, and landscaped lawns and beds in front and behind the residence. The back of the Property slopes down to a stone wall that divides maintained backyard from the salt marsh that occurs along the shoreline of Tucker's Cove (POGW1 on the Project Plans in Attachment B), portions of which are infested by the invasive common reed (*Phragmites australis*). The stone wall was rebuilt in summer 2022 in response to erosion observed by Mr. Gardner in the vicinity of the pre-existing stone wall in 2021. The southern portion of this rebuilt stone wall extends 42 feet over the property line onto the abutting parcel (68 Odiorne Point Road) and was rebuilt following a verbal receipt of permission to do so by the abutting parcel owner (Mr. James Polus).

A stone swale extends northwest down the property slope from near the northwest corner of the residence to the northern end of the rebuilt stone wall, ranging in width from approximately 6 to 10 feet. This swale was progressively installed between 2010 and 2022, again in response to erosion observed on the slope directly north of the existing swale by Mr. Gardner shortly after purchasing the property in 2006. The cause of this erosion is stormwater flow from two culverts exiting a roadside headwall located on the parcel directly to the north. The northern culvert hydraulically connects to undelineated wetlands across Odiorne Point Road, while the southern culvert hydraulically connects to a portion of the storm drain system for the development. The stormwater from these culverts becomes channelized as a single channel upgradient of the Gardner property (POGS1 on the Project Plans in Attachment B). Prior to installation of the stone swale, Mr. Gardner observed progressive loss of vegetation cover and erosion of the substrate on the slope leading down to the salt marsh, which prompted his installation of the upper portion of the stone swale and a request for a site visit from representatives of the City of Portsmouth ("the City") in 2017 to discuss the issue of

erosion in the area directly north of the swale. Extension of the stone swale to its current configuration was completed in 2022 in response to erosion observed at the downstream end of the swale. Currently, much of the stormwater flow from the two culverts out of the roadside headwall is captured by the stone swale and a natural re-establishment of herbaceous ground cover on the slope north of the swale has been observed. However, some stormwater flow does escape from the swale at the top of the slope where plastic landscaping edging along the side of the swale has become unseated and is overtopped during certain events. The area into which the culverts discharge on the adjacent property, the previously eroded slope, and a small portion of the rebuilt stone wall lies within a palustrine forest wetland (POGW2 on the Project Plans in Attachment B). Please see Attachment A – Gardner Property Natural Resource Survey Report for a more detailed discussion of the existing natural resources on the Property, Attachment D – Gardner Property Hydrology & Hydraulic Memo for a discussion of the study of hydraulic flow conveyed by the existing swale, and Attachment G – NHDES Requested Protected Shoreland Data and Additional Buffer Information for the additional Protected Shoreland data requested by NHDES following their initial review of this restoration plan, as well as mapping of the various jurisdictional state and City of Portsmouth buffers.

PROJECT MOTIVATION

Normandeau was contracted by Mr. Gardner to provide services to facilitate bringing the Property under local and state regulatory compliance. A natural resource survey and wetland delineation of the parcel by a New Hampshire Certified Wetland Scientist, as well as a hydraulic study for the property, were completed in Fall/Winter 2022. Findings from this natural resource survey and the hydraulic study were provided to the City's Planning and Sustainability Department and the New Hampshire Department of Environmental Services ("NHDES") with a request for guidance from NHDES on what would be required to bring the property under state regulatory compliance, as what would be required from a local perspective was already stipulated in the Notice of Violation sent by the City. Following the receipt of guidance from NHDES and the City during site visits on January 12, 2023 and May 22, 2023, as well as virtual meeting with NHDES and the City on May 10, 2023, the property was surveyed by a New Hampshire Licensed Land Surveyor (Knights Hill Land Surveying, Inc.) in August 2023.

During the site visits and the virtual meetings, the following items of concern were identified by Mr. David Price of NHDES and Mr. Peter Britz of the City:

1. Most of the stone wall along the base of the property was rebuilt in Summer 2022 to be 2.5 ft. tall and 3 ft. wide, with a fitted and squared off design and a 327 sq. ft. footprint; 316 sq. ft. of which lies in wetland buffer area and 11 sq. ft. in wetland POGW2. The southern 122 sq. ft. of the rebuilt wall extends 42 ft. onto the abutting property to the south (68 Odiorne Point Road) and was rebuilt with verbal permission from the abutting property owner (Mr. James Polus). Rebuilding of the wall was achieved through the repositioning of existing stone from the collapsing stone wall on site to reform the base of the wall along the pre-existing centerline of the wall. An estimated addition of 10-15 tons of stone and filler gravel/crushed stone sourced from off- site were used to cleanly square off the wall and

increase its height. A small gap in the wall was established to provide easier access to the salt marsh below the wall that is periodically treated for *Phragmites* management. This resulted in a loss of 2,240 sq. ft. of herbaceous ground cover within the State 100' wetland buffer for wetland POGW1, which is a tidal and prime wetland, and the combined City of Portsmouth's 100' wetland buffer for wetlands POGW1 and POGW2. While concerns were originally raised about the potential use of a cementing agent in the 2022 rebuild, inspection of the wall by NHDES, City, and Normandeau staff during the May 2023 site visit confirmed that to not be the case.

2. A stone swale has been progressively installed on the property by the Owner between 2010 and 2022 to manage stormwater flow onto the Property that was resulting in loss of vegetation cover and erosion of the substrate. The upslope half of the swale, hereafter referred to as the Upper Swale, existed prior to 2022 and primarily consists of stone brought in from off site and installed by a contractor hired by the Owner that is underlain by a liner material. Periodic additions of stone collected on site by Mr. Gardner were made to re-enforce the edges of the Upper Swale and further contain flow within it. In total, the Upper Swale has a 476 sq. ft. footprint. Due to observed erosion and channel incision at the downslope end of the swale, the swale was extended an additional 300 sq. ft. at the same time as the rebuilding of the stone wall in summer 2022. This was achieved through the installation of landscaping fabric within an incising channel area at the downstream end of the existing stone lined swale, which was then topped with 4-inch stone left over from the stone wall rebuild. Collectively, the swale now impacts 776 sq. ft. of POGW2.

3. Left over gravel/crush stone was spread over 444 sq. ft. of the substrate north of the summer 2022 swale extension and 50 sq. ft. of substrate in the gap between the two sections of rebuilt stone wall with the intent of increasing substrate surface roughness and reducing erosion. The 444 sq. ft. of gravel north of the swale extension falls entirely within POGW2. The 50 sq. ft. associated with the gap in the wall falls within the 100' buffer of the tidal prime wetland downslope but does not directly impact any wetland areas.

The actions listed above, as well as the access of the property by equipment and associated loss of vegetation have resulted in a total disturbance of 4,572 sq. ft. on the property between 2010 and Summer 2022. These impacts fall within multiple overlapping jurisdictional areas including a delineated freshwater wetland (POGW2); the 100' tidal buffer zone and duly established 100' buffer of the Prime Wetlands along Sagamore Creek; the 250-ft Protected Shoreland of Sagamore Creek; and the City of Portsmouth's 100' wetland buffers for POGW1 and POGW2. Tables presenting the breakdown of these various impacts are provided below (Table 1 and 2).

Table 1 – Impacts to State Jurisdictional Areas

Jurisdictional Areas	Area (sq. ft.)
Delineated freshwater wetland (POGW2)	1,231
100-ft Previously Developed Tidal Buffer Zone and Prime Wetland Buffer	4,208*

250-ft Protected Shoreland (also total impacts on the property)	4,572*

* Includes impacts to overlapping jurisdictional areas

Table 2 – Wetland or Wetland Buffer Activity (Information provided in Steps 9 and 11 of the Wetlands Conditional Use Permit application)

Jurisdictional Areas	**Area (sq. ft.)**
Total Area of Inland Wetland (POGW2) both on and off the parcel	9,345
Total Area of Vernal Pool both on and off the parcel	0
Distance of proposed activity to edge of wetland	0
Total Wetland Buffer Area on Lot	24,277
Wetland Buffer Area to be Disturbed	3,341
Total Inland Wetland Area on Lot	6,133
Inland Wetland Area to be Disturbed	1,231
Total Vernal Pool Area on Lot	0
Vernal Pool Area to be Disturbed	0
Total Tidal Wetland Area on Lot	12,104
Tidal Wetland Area to be Disturbed	0
Total Impacts to Jurisdictional Areas on Property	**4,572**

This work was completed without prior obtainment of local and/or state level permits. While revegetation of the disturbed area is naturally occurring, after-the-fact permitting of the reconstructed stone wall and the stone swale as it exists now is not feasible, as both the City and NHDES have indicated the stone wall reconstruction and stone swale installation do not conform with existing regulations.

Thus, the City of Portsmouth and NHDES have requested that the following restoration actions be taken:

1. The stone wall be restored to a lower, loose-pile configuration that conforms with pre-disturbance conditions. As full documentation of wall prior to disturbance does not exist, the City and NHDES have agreed to the use of the existing stone wall at the northern end of the property that was not touched as part of the 2022 rebuild as a template. See Figures 1 and 2 in Attachment B.
2. The Lower Swale be completely removed and replaced with a combination of woody shrub and herbaceous groundcover. The liner and majority of stone in the upper half of the swale be removed and woody shrub also be installed. Re-installation of a minimal amount of stone will be permitted in the Upper Swale for stabilization purposes along the northwestern edge of the swale where it curves at the top of the slope. Re-installation of this stone is permitted with the understanding that when vegetation becomes established and the area is stabilized, some or all of the stone may be required to be removed at a future date. The decision to proceed with this removal will be

considered in coordination with NHDES and the City during post-construction monitoring.

3. All gravel/crushed stone spread over the substrate north of the Lower Swale and in the gap between the two sections of stone wall be completely removed.
4. All areas disturbed by the proposed restoration work be revegetated with native species appropriate for the environment.

Below Normandeau presents a plan for addressment of the restoration action items requested by the City and NHDES.

PROPOSED RESTORATION ACTIONS

On behalf of the Owner, Normandeau proposes to restore the rebuilt stone wall to a height, width, and loose-pile design extrapolated from undisturbed stone wall at the northern end of the Property, remove the filler gravel and stone installed in the substrate and stone wall, remove the Lower Swale, remove the underlying liner and majority of stone from the Upper Swale, install woody vegetation throughout the existing swale footprint to improve stormwater management functionality, and restore and/or enhance vegetative cover in various portions of 100-ft tidal buffer zone. This work is proposed to be completed in Spring/Summer 2024, pending approval of this restoration plan by NHDES and the City, attainment of all necessary permits, and acquisition of necessary planting materials.

RESTORATION AREA 1 - STONE WALL RESTORATION

The rebuilt stone wall (located in what is referred to on the plans in Attachment B as Restoration Area 1) will be restored to a lower height, with a loose-pile configuration. As comprehensive documentation of the wall prior to the rebuild in 2022 does not exist, the City and NHDES agreed during the May 22, 2023 site visit to use the existing stone wall on the northern end of the property that was not been disturbed as a template. See Figures 1 and 2 on Sheet 5 in Attachment B. The estimated 10-15 tons of filler stone and gravel brought in for the 2022 work will be removed from the 109 feet of rebuilt wall and disposed of off-site. The contractor responsible for the rebuilding of the wall in 2022 may provide advisement on which stone within the wall was brought in and which already existed on site. The 50 sq. ft. of gravel spread over the substrate in the gap between the two sections of rebuilt wall and in a small apron downslope of it will also be removed and disposed off-site. The larger, pre-existing stones that form the base of the wall will be retained to reconstruct the wall into a loose-pile design and the gap between the two sections of wall will be closed. The centerline of the restored wall will follow the centerline of the existing wall, as field review suggests the position of this centerline does not vary significantly from pre-disturbance conditions. Survey of the width of the existing undisturbed section of stone wall at the northern end of the property across three cross-sections determined it to have a 3.3 to 4.6 ft. wide base and a variable height ranging from of 0.5 to 1.73 ft. Based on this, we propose a restored loose-pile stone wall design with a variable base width of 3 to 4 ft. and a variable height of 0.5 to 1.5 ft. depending on available material after removal of the filler stone and gravel. Stone placement should avoid creating any level or squared off surfaces, resulting in a loosely triangular or mounded cross-section like that shown on Sheet 5 in Attachment B – Project Plans: Proposed Stone Wall Detail.

Written permission from the abutting property owner (Mr. James Polus) to restore the 122 sq. ft. of stone wall on the abutting property to the south (68 Odiorne Point Road) is provided in Attachment H.

Following removal of the substrate protection from the area upslope of the stone wall, the opportunistic vegetation cover currently in Restoration Area 1 will be retained to the extent practicable, if determined to not contain invasive species. This area will be lightly aerated using hand tools to mitigate soil compaction and prepare the substrate for planting. A mix of woody shrubs will be planted, including coastal sweet-pepperbush (*Clethra alnifolia*), American yew (*Taxus canadensis*), and mapleleaf viburnum (*Viburnum acerifolium*). Finally, a custom project seed mix consisting of deer tongue (*Dichanthelium clandestinum*), switch panicgrass (*Panicum virgatum*), and path rush (*Juncus tenuis*) will be spread over the over the substrate following completion of shrub installation and covered with a light layer of weed free straw. Please see Sheets 6 and 8 in Attachment B for specifications regarding the project seed mix and appropriate application rate, the proposed shrub species, their installation, and the estimated number of shrubs required for Restoration Area 1.

RESTORATION AREA 2 – LOWER SWALE REMOVAL

The 4-inch angular stone and landscaping fabric comprising the Lower Swale and the excess gravel spread on the 444 sq. ft of substrate north of the Lower Swale (referred to as Restoration Area 2), will be removed and disposed off-site. Minor grading of the substrate in Restoration Area 2 will be done as needed to remove remnants of any channel topography from the landscape. Grading may be performed using hand tools and/or the equipment discussed below as needed to complete the work. Biodegradable, wildlife-friendly erosion control blanket will be installed overtop the former Lower Swale footprint after completion of any necessary grading. Please see Sheet 4 in Attachment B for specifications on the erosion control blanket to be used and its installation.

Restoration of vegetation cover in Restoration Area 2 will be achieved through the combined installation of live stakes (or tubelings, depending on time of work) of silky dogwood (*Cornus amomum*) and pussy willow (*Salix discolor*) within the former footprint of the Lower Swale and shrub plantings of meadowsweet (*Spiraea alba var. latifolia*) in the area previously spread with gravel. Live stakes will be installed through the erosion control blanket. As with Restoration Area 1, the custom Project Seed Mix will be spread over the substrate following completion of live stake and shrub installation, then covered with a light layer of weed-free straw. Please see Sheets 6 through 8 in Attachment B for specifications regarding the project seed mix, live stakes and shrubs, their installation, and the estimated numbers required for Restoration Area 2.

RESTORATION AREA 3 – UPPER SWALE VEGETATIVE ENHANCEMENT

With agreement from the City of Portsmouth and NHDES, the liner and most of the stone in the Upper Swale (Restoration Area 3) will be removed and biodegradable, wildlife-friendly erosion control blanket will be installed overtop the substrate. Live stakes of silky dogwood (*Cornus amomum*) and pussy willow (*Salix discolor*) will be installed through the erosion control blanket. The plastic landscape siding along the northwestern edge of the Upper Swale, where it curves

before progressing downslope, will be removed and a minimal amount of retained stone will be re-established along the edge of the swale in this area. Twelve shrubs consisting of a mixture of silky dogwood and pussy willow will be planted in two rows directly downslope of this edging to help manage stormwater flow that overtops the edge of the swale during storm events. Finally, the New England Semi-shade Grass and Forbs seed mix from New England Wetland Plants will be spread over the slope north of the swale to help boost vegetation coverage in the area that was experiencing erosion prior to installation of the swale. Stone not re-installed in the Upper Swale will be disposed of off-site. The potential for hand removal of the stone in the Upper Swale will be considered in consultation with NHDES and the City during the five (5) year post-construction monitoring period following establishment of the live stakes. Please see Sheets 6 through 8 in Attachment B for specifications regarding live stakes and shrubs, their installation, and the estimated numbers required for Restoration Area 3. Please see Attachment E for a specification sheet of the species included in the New England Semi-shade Grass and Forbs seed mix and recommended application rate.

RESTORATION AREA 4 – ACCESS ROUTE RESTORATION

Upon completion of all activities requiring use of the access route from the driveway down to the bottom of the Property, the ground will be lightly aerated in preparation for planting and erosion control blanket installed on the steepest portions. Plantings of New York fern (*Parathelypteris noveboracensis*) or native fern sod depending on pricing and availability will be installed as depicted in Restoration Area 4 on Sheet 2 in Attachment B. The areas between plants and the portion of access route outside of the 100' previously developed tidal buffer zone will be spread with New England Erosion Control/Restoration Mix for Dry Sites from New England Wetland Plants. Please see Attachment F for a specification sheet of the species included in this seed mix and recommended application rate.

Please see Sheets 6 through 8 in Attachment B for specifications regarding all proposed plant species, installation of live stake and shrub plantings, appropriate seed application rates, and the estimated number of live stakes and plantings required for each Restoration Area.

TIMING OF WORK AND GENERAL COMMENTS

All work will be conducted in accordance with the best management practices outlined by the *New Hampshire Stormwater Manual* dated December 2008. Prior to the start of any restoration activities, erosion and sediment controls ("ESCs") will be installed. Please see Sheets 2 through 4 in Attachment B for proposed placement of these ESCs and specifications regarding their installation and maintenance. These ESCs will remain in place, be maintained, and supplemented for the duration of earth disturbing activities and for as long as necessary following completion of restoration activities until the substrate is determined satisfactorily stabilized by vegetation growth (>75% vegetation coverage) by the Environmental Monitor for the project. Erosion and sediment controls shown placed across the access route should be temporarily moved aside during active work and replaced at the end of the workday.

The equipment to be used will be the lightest weight equipment capable of conducting the work, while maintaining a safe and practical workflow. It is currently anticipated a small skid

steer and/or excavator may be necessary safely and efficiently remove the filler stone and gravel from the Property. Plywood sheeting will be placed over the substrate in Restoration Area 1 that the equipment must cross to prevent the development of ruts and access of the Property by heavy equipment should be avoided during wet conditions.

The activities outlined above are anticipated to take approximately two weeks in spring/early summer 2024. To the extent practicable, timing of activities requiring significant earth disturbance and the use of motorized equipment (i.e., stone wall restoration and removal of stone taken from the swale from the Property) should be conducted during drier substrate conditions, when significant rain events or high tide conditions that could result in erosion of active work areas are not in the forecast. Similarly, installation of all planting materials and application of seed should also not be conducted when significant rain events are in the forecast, as significant stormwater runoff shortly after installation could negatively impact their establishment. However, the use of live stakes requires their installation to be completed before the end of the woody vegetation senescence period (typically the end of March into early April). As the appropriate timing for installation of the live stakes may not align with sufficiently dry enough conditions to bring heavy equipment onto the property, the stone from the swale in Restoration Areas 2 and 3 and gravel over the substrate in Restoration Area 2 may be removed by hand and temporarily stockpiled within Restoration Area 1 or elsewhere within the previously disturbed tidal buffer zone on the property that does not contain wetlands. This stockpiled stone and gravel will be removed later in spring/summer 2024 as site conditions allow. Any temporary loss of vegetation covering the substrate beneath stockpiled stone and/or gravel within the previously developed tidal buffer zone will be restored as part of restoration efforts.

Per Section 10.1018.23 of the City of Portsmouth Zoning Ordinance, removal or cutting of vegetation is prohibited in a wetland or the vegetated buffer strip of a wetland. However, the 25-ft vegetated buffer strip of wetland POGW2 contains developed features, including portions of the primary residence, regularly mowed front and backyard lawns, and landscaped garden beds that are regularly maintained. The property owner requests the following allowances be made for him to maintain the aesthetic quality and value of the property:

1. Allow continued maintenance of the existing landscaped beds and portions of lawns that fall within the 25-ft vegetated buffer of wetland POGW2. These currently maintained areas will not be expanded past their current footprint and “Do not disturb or cut” signage will be posted along the boundary between the restoration areas and/or the wetland boundary and the existing maintained portions of the property to define this extent. Placement of this signage, either mounted on trees or on short permanent mountings in the ground, at the locations shown on Sheet 3 in Attachment B will designate the combined extent of restoration and wetland area on the property to be protected from future accidental landscaping and/or cutting in alignment with Section 10.1018.40 of the City’s Zoning Ordinance.

2. Allow periodic pruning of shrubby vegetation within the restoration areas, once determined to be established and healthy. This periodic pruning will be to a height no less than 3 feet in accordance with Protected Shoreland requirements.

The Construction Sequence and Notes provided below and in Attachment B – Project Plans detail the proposed sequence restoration of activities on site and general notes.

CONSTRUCTION SEQUENCE AND NOTES

Notification of the specific timing and commencement of the various phases of restoration work will be communicated to the City's Planning and Sustainability Department and NHDES via email an agreed number of days prior to the start of work. The restoration work is to be conducted under the supervision of a qualified Environmental Monitor approved by the City of Portsmouth Conservation Commission and NHDES. The environmental monitor will be on-site to monitor restoration activities as necessary and adjust when appropriate to meet restoration goals, ensure compliance with project permits, and notify the City and NHDES at required inspection periods. Presented below is an ideal order of restoration activities on the Property. As discussed above, it may be necessary to rearrange the order of these activities to meet the timing needs of live stake installation in the swale while minimizing impacts by heavy equipment should early spring 2024 conditions on site be overly wet. The Environmental Monitor shall communicate the need for this adjustment to the City and NHDES prior to commencement of work.

1. Installation of all necessary erosion and sediment controls and substrate protection in Restoration Area 1 as shown on the plans and specified in the notes in Attachment B.

2. Remove the estimated 10-15 tons of non-native stone and gravel forming the top portion of the stone wall in Restoration Area 1 and the Lower Swale Restoration Area 2.

3. Remove all non-native gravel spread over the substrate in the 50 sq. ft. area between the sections of rebuilt wall in Restoration Area 1 and in the 444 sq. ft. area north of the lower half of the swale in Restoration Area 2. Also remove any remaining landscaping fabric from the Lower Swale.

4. Remove all the stone and liner from the Upper Swale in Restoration Area 3. Retain a subset of smaller stones for re-installation in the Upper Swale.

5. Reconfigure the remaining native stones on site to create a stone wall with a general cross-section shape and dimensions as outlined in the Proposed Stone Wall Detail on Sheet 5 in Attachment B. Centerline of the stone wall should follow that of the existing wall.

6. Regrade substrate in Restoration Area 2 to eliminate any trace channel topography and install biodegradable, wildlife friendly erosion control blanket over the swale footprint in Restoration Areas 2 and 3.

7. Remove substrate protection in Restoration Area 1, lightly aerate the substrate to mitigate soil compaction and prepare substrate for planting.

8. Install all shrubs and/or live stakes as specified on Sheets 3 and 6 through 8 in Restoration Areas 1 through 3. Re-install a minimal amount of reserved smaller stone in the Upper Swale at the same time as live stakes installation.

9. Lightly aerate the soil to mitigate soil compaction and install fern plantings in Restoration Area 4 as specified on Sheets 3, 6, and 8.

10. Spread the seed mixes at the appropriate application rates specified in the Restoration Planting Table on Sheet 6 in Attachment B. Cover all disturbed seeded areas with a light layer of weed-free straw.

11. Install any supplemental erosion and sediment controls determined needed at the conclusion of restoration activities.

12. Install "Do not disturb or cut" signage at specified locations shown on Sheet 3.

13. Complete as-built documentation and reporting and commence post-construction monitoring protocols as discussed below.

14. Temporary erosion and sediment controls will remain in place and be maintained until the site has been confirmed to be stabilized (>75% herbaceous ground cover and a lack of signs of erosion and sediment transport in all disturbed portions of the project area) by the environmental monitor. Maintenance and removal of erosion controls such as filter socks, silt fencing, and/or hay bales will be done by hand and be the responsibility of the Environmental Monitor. Erosion control blankets will remain in place and be allowed to biodegrade into the substrate.

This construction sequence is also provided on Sheet 9 in Attachment B – Project Plans. Please see Attachment C – Project Plan Detail Notes for full size copies of additional construction and planting notes included with the details provided in Attachment B – Project Plans.

AS-BUILT REPORTING

Following completion of the restoration activities described above, an as-built report, set of as-built plans, and photo log documenting the activities completed and conditions on site at the conclusion of restoration activities will be developed. A set of permanent photo stations around the restored and/or enhanced portions of the property will be selected, and their locations recorded with a GPS for inclusion on the as-built plans. Photos of the restored and enhanced areas on the property will be taken from these established photo stations at approximately the same angle and magnification during each follow-up site visit to the property. The location and species of each installed container shrub will also be GPS recorded and presented on the as-built plans. Finally, a tally of all woody vegetation plantings (both container shrubs and live stakes/tubelings) installed in Restoration Areas 1-3 will be recorded and provided as part of the

as-built report to serve as a baseline for assessing woody planting survival during post-construction monitoring. The as-built report, plans, and photo log will be provided to Mr. Gardner, the City, and NHDES within two weeks of the completion of restoration activities.

POST-CONSTRUCTION MONITORING PLAN AND PERMFORMANCE STANDARDS

STANDARDS OF SUCCESS

For the restoration project to be considered successful, the following conditions must be met in each Restoration Area:

1. Have at least 75% areal cover by planted and native volunteer species by the end of the second growing season and through the end of the monitoring period;

2. Have at least 80% survival of the planted container shrubs by the end of Year 1 of the monitoring period;

3. Have sufficiently successful establishment of the live stakes/tubelings in the swale by the end of Year 1 to avoid development of large gaps in woody vegetation coverage in the swale;

4. Have stable substrate with no erosion problems; and

5. Control any invasive plant species, if present, for the duration of the monitoring period.

TIMING AND FREQUENCY OF MONITORING

Immediately following completion of restoration activities, we propose to conduct inspections on a biweekly basis and within 24 hours of a storm event with >0.25 inches of rain until >75% herbaceous vegetation coverage is achieved in Restoration Areas 1 and 2. If no signs of erosion are observed in any of the Restoration Areas by the time that goal is achieved and the Environmental Monitor deems it to be appropriate, the remaining temporary erosion controls including any filter socks, silt fencing, and/or hay bales will be removed by hand. At this time, the Project will transition to conducting one planned visit annually with additional visits after significant storm events and/or when concern is raised by the property owner. Notification of this reduction in monitoring frequency will be communicated to the City and NHDES via submittal of a brief status report for the Project via email.

Long term progress of the Project's achievement of the conditions discussed above will be assessed during annual site visits. Annual assessments will occur in late June/early July with the first assessment occurring after completion of the proposed restoration actions and continuing for up to 5 years post completion of the initial restoration activities. Additional assessments may be conducted should an instance of disruption to the restoration be reported. During annual assessments, the environmental monitor will walk the property to photo document and record observations on the conditions in each Restoration Area. The estimated overall percent

cover of vegetation and invasive species in each Restoration Area, as well as a list of the observed plant species will be recorded. In Restoration Areas 1 through 3, a tally of the successfully established woody plantings (both planted container shrubs and live stakes/tubelings) will be conducted for comparison against the as-built tally and previous annual assessments. General observations of the health and propagation of the woody plantings will also be noted.

The results from each annual assessment will be presented in a report that compares them to the conditions listed above and previous annual assessment results. This report will be provided to the property owner by August 31st and the City and NHDES by September 30th of the given year of the assessment. Any evidence of the Project failing to meet the conditions listed above will immediately be brought to the attention of the property owner. In the case of Condition 2, if there is a less than 80% survival of the planted container shrubs by the end of Year 1, those shrubs which have failed will be assessed to determine if in-kind replacement of the shrubs is appropriate or if selection of an alternative species is more appropriate. Planting of replacement shrubs will occur the following year. In the case of Condition 3, if large patches of lives stakes/tubelings are observed to have not become established by the end of Year 1 (i.e., are not alive), additional live stakes/tubelings will be installed to replace them and fill in the gaps. The determination of what constitutes as a large patch of unsuccessful live stakes/tubelings will depend on its size, functional position within the swale, and observations made by the environmental monitor during or after storm events on how the lack of success of these live stakes is impacting flow within the restored swale.

Plans for addressment of any concerns observed as part of the post-construction monitoring will be developed in collaboration with the property owner, NHDES, and the City of Portsmouth Planning and Sustainability Department, and presented as part of the annual report for final review and approval. Finally, the annual report will provide a discussion on the feasibility of hand removal of some or all of the stone re-installed in the Upper Swale. The decision to proceed with removal of some or all this stone will be made in discussion with NHDES and the City of Portsmouth Planning and Sustainability Department and will weigh the benefits of removing the little remaining hardscape from a wetland area against the potential risk of disrupting the established swale system and destabilizing the slope. If a decision is made to remove stone, this removal should occur when no rain is in the forecast and the project seed mix or other native seed mix approved by NHDES and City of Portsmouth Planning and Sustainability Department should be spread over areas where stone is to be removed to stabilize the newly exposed substrate.

Attachment A: Gardner Property Natural Resource Report

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Gardner Property
Natural Resource Survey Report

Portsmouth, New Hampshire

Presented To:

Mr. John (Jack) Gardner.
50 Odiorne Point Road

Portsmouth, NH, 03801

Submitted By:

Normandeau Associates, Inc.
25 Nashua Road
Bedford, NH 03110

February 21, 2023

www.normandeau.com

Contents

Figures

Attachments

1.0 Introduction

Normandeau Associates, Inc. (Normandeau) conducted a wetland delineation and natural resource surveys on the Gardner property (Map 224 Block 10 Lot 3) on Odiorne Point Road in Portsmouth, New Hampshire (Figure 1). This property contains the Gardner's private residence. Following a site visit to the Gardner property by City of Portsmouth staff on June 16, 2022, Peter Britz, Environmental Planner/Sustainability Coordinator, issued a letter documenting that the property was in violation of the Zoning Ordinance of the City of Portsmouth, NH due to work that was completed in the City's 100' tidal buffer zone without a permit. The work included the grading and/or installation of fill around a rebuilt stone wall at the base of the property and the installation of stone extending a pre-existing stone swale that routes water across the property. The stone swale, soil and grading, wall reconstruction, and vegetation removal within the 25' wetland buffer all constitute work in the buffer zone which is not allowed without a City of Portsmouth Wetland Conditional Use Permit and a State Wetland Permit issued by NH Department of Environmental Services. Following recommendations made by City of Portsmouth staff during a meeting on July 19, 2022, Mr. Gardner contacted Normandeau on July 21, 2022 and, following a period of proposal development involving site visits for scoping purposes, Mr. Gardner contracted Normandeau for support services to bring the property under local and state regulatory compliance. As part of these services, a Normandeau wetland scientists completed a natural resource survey and delineation of the entire parcel on November 11 and 29, 2022, supplemented by photos and observations made during a proposal development site visit on August 11, 2022.

The Gardner property is 1.17 acres containing a private residence, driveway, and landscaped lawn at the front of the property. The back of the property slopes down to a stone wall that divides the landscaped backyard from salt marsh that occurs along the shoreline of Tucker's Cove, portions of which are infested by the invasive common reed (*Phragmites australis*). This stone wall was rebuilt in 2022 in response to observed erosion in the vicinity of the pre-existing stone wall in 2021. A stone swale extends northwest down the property slope from near the northwest corner of the residence to the northern end of the stone wall, ranging in width from approximately 6 to 10 feet. This swale was progressively installed between 2009 and 2022, again in response to erosion observed by the property shortly after purchasing the property in 2006. Most of the parcel upslope of the salt marsh is upland, with a freshwater wetland that includes the stone swale along most the northern side of the parcel and extends northeast onto the neighboring property to the north.

A summary of the site characteristics, methodology, and results of the natural resource surveys are provided below.

2.0 Desktop Mapping and Resource Data

The Wetland Permit Planning Tool (WPPT, Figure 2a) mapped the salt marsh bordering Tucker's Cove as floodplain wetland contiguous to a tier-3-or-higher watercourse and a designated prime wetland with a duly established 100-ft buffer. Therefore, these wetlands and areas within their 100-ft buffer are Priority Resource Areas (PRAs) according to New Hampshire Department of Environmental Services (NHDES) wetland regulations. The parcel is in the Upper Sagamore Creek water quality assessment unit (AUID: NHEST600031001-03) (Figure 2b). This assessment unit is listed as Severe for Aquatic Life Integrity and Recreation, and Poor for Fish and Shellfish Consumption on the 2018 305(b)/303(d) Assessment Watershed Report Card. The 2020 NH Wildlife Action Plan map of Highest Ranked Wildlife Habitat by Ecological Condition (Figure 2c) classifies the salt marsh as highest ranked habitat in New Hampshire based on the rarity of the habitat in the state. The Natural Resource Conservation Service (NRCS) has mapped the majority of the parcel as well-drained Chatfield-Hollis-Canton complex, while the salt marsh along the northwestern end of the parcel is very-poorly-drained Westbrook mucky peat (Figure 3). The Federal Emergency Management Agency (FEMA) mapped the 100-year floodplain at an elevation of 8 feet (Figure 4).

3.0 Vegetated Wetland Delineation and Assessment

3.1 Methods

Wetland boundaries were delineated according to the 1987 *Corps of Engineers Wetland Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, which utilize the three-parameter approach (i.e., evaluating the site for the presence of hydric soils, hydrophytic vegetation and wetland hydrology) for identifying wetlands and determining their jurisdictional limits[1,2]. The 1987 Corps Manual and the Regional Supplement describe the methodology that is required for wetland delineations that are subject to review under the NHDES Wetland Rules (Env-Wt 406.01). The wetland boundaries were flagged with pink "Wetland Delineation" flagging. The flags for each wetland are sequentially numbered and remain at the site. A New Hampshire Certified Wetland Scientist (NHCWS #298) reviewed the wetland delineation. Flags were GPS-surveyed at the time of delineation. Data from paired upland-wetland U.S. Army Corps of Engineers (USACE) data plots were collected to document representative wetland boundary information.

Wetlands were classified according to the US Fish and Wildlife Services classification system (Cowardin)[3] and functions and values (services) assessed based on the USACE Highway Methodology Workbook Supplement (1999)[4].

3.2 Results

Two wetlands were delineated within the study area. A sketch map of the wetlands is included in Figure 5 and a summary of significant characteristics is provided in Table 1 below. Brief descriptions of the wetlands are included below, and representative site photos are included in Attachment A. USACE wetland determination data forms for selected wetland are included in Attachment B and Highway Methodology Function and Values (Services) forms are included in Attachment C.

Wetland POGW1

Wetland POGW1 is an estuarine intertidal emergent wetland (E2EM1,5P) that occurs just downslope of the stone wall on the Gardner parcel, along the shoreline of Tucker's Cove that extends north and south of the parcel boundaries. Portions of this wetland, including most of the area within the Gardner property, are infested by the invasive common reed (*Phragmites australis*). The Gardner portion of this wetland is currently undergoing periodic spray treatment under a state permit to manage this invasive species. The stone swale installed to manage stormwater runoff on the parcel drains into POGW1 at the northern end of the rebuilt stone wall. The majority of the POGW1 within the Gardner parcel is dominated by common reed, although smooth cordgrass (*Spartina alterniflora*) becomes dominant downslope towards Tucker's Cove. In areas of the wetland adjacent the Gardner parcel not infested with common reed, the marsh platform is dominated by smooth cordgrass and,

---

[1] U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiments Station.

[2] U.S. Army Corps of Engineers. 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[3] Classification of Wetlands and Deepwater Habitats of the United States", adapted from Cowardin, Carter, Golet and LaRoe (1979), August 2013, FGDC- STD-004-2013.

[4] US Army Corps of Engineers New England District. September 1999. The Highway Methodology Workbook Supplement, Wetland Functions and Values, A Descriptive Approach. NAEEP-360-1-30a. 32 pp.

in higher elevation areas, saltmeadow cordgrass (*Spartina patens*). The landward edge of the saltmarsh contains some species more typical of freshwater wetlands, especially arrow-leaved tearthumb (*Persicaria sagittata*). The highest observable tide line (HOTL) is coincident with the boundary of this wetland on the Gardner parcel. Soils in the data plot were silt loams and met the depleted below dark surface hydric soil indicator. The wetland is regularly flooded at high tide, resulting in an observed water table at the substrate surface and water marks on woody vegetation stumps on the upslope fringe of the wetland. This wetland provides several functions and services, principle of which is sediment/shoreline stabilization due to its location on the shoreline of Tucker's Cover and uniqueness and heritage due to its designation as a prime wetland. POGW1 is also suitable for floodflow alteration, fish/shellfish habitat, sediment/toxicant retention, nutrient removal/retention, production export, and wildlife habitat, due to the high vegetation density, potential for runoff from lawns and impervious surfaces, and extent of saltmarsh habitat. This wetland is considered a PRA under NHDES Wetland Regulations due to its classification as a tidal wetland and floodplain wetland contiguous to a tier 3 or higher watercourse, as well as being a designated a prime wetland (Env-Wt 103.66).

Wetlands POGW2

Wetlands POGW2 is a forested wetland (PFO1E) that occurs on the slope on the northern half of the Gardner parcel, running from near the front of the property down to the stone wall at the back. This wetland extends onto the parcel to the north (26 Odiorne Point Rd.), where it is hydraulically connected via two culverts to undelineated potentially wetlands across the road at 49 Odiorne Point Rd. (Culvert N) and a portion of the stormwater drainage system for Odiorne Point Rd. (Culvert S). Discharge from these culverts exits the roadside headwall, becomes channelized into a single channel, and drains southwest onto the Gardner parcel adjacent the northern side of the house. The direction of flow shifts northwest once on the Gardner property, following the direction slope and is captured by the stone swale along the southwestern edge of POGW2. The tree/shrub canopy in the upslope portion of POGW2, into which the culverts discharge, is dominated by American hornbeam (*Carpinus caroliniana*) and red maple (*Acer rubrum*), with a dense herbaceous understory dominated by jewelweed (*Impatiens capensis*), poison-ivy (*Toxicodendron radicans*), sensitive fern (*Onoclea sensibilis*), and field horsetail (*Equisetum arvense*). The tree canopy in the mid and lower slope portions of POGW2 adjacent the stone swale are dominated by red maple with some red oak (*Quercus rubra*) and eastern white pine (*Pinus strobus*) also present. The understory in the mid to lower slope areas is dominated by switch panicgrass (*Panicum virgatum*), fowl manna grass (*Glyceria striata*), creeping buttercup (*Ranunculus repens*), and common wrinkle-leaved goldenrod (*Solidago rugosa*), which reduces in coverage progressing downslope. The hydric soil indicator is A11. Depleted below dark surface, with a water table observed within 6" of the substrate surface. Small patches of the invasive shrubs multiflora rose (*Rosa multiflora*) and false glossy buckthorn (*Frangula alnus*) were also observed in the mid slope portion of this wetland. This wetland provides fewer functions and services than POGW1, principle of which is sediment/toxicant retention due to its receiving of stormwater runoff. This wetland is also suitable for groundwater recharge/discharge, floodflow alteration, production export, sediment stabilization, and wildlife habitat. POGW2 is considered a PRA under NHDES Wetland Regulations due to its location within the duly-established 100-foot buffer of the designated prime wetland downslope that occurs along the entire shoreline of Tucker's Cove.

4.0 Channel Delineation

4.1 Methods

Stream channels located in and adjacent to the property were mapped using survey methods. The location of each culvert and points delineating the centerline of each channel were GPS-located on November 11. Stream characteristics including water depth at the time of survey, bankfull width, bank height, and dominant bed

substrate were identified at the time of the survey. Flow regime was determined for each stream based on bed and bank characteristics, as well as incorporating the flow observations of the landowner.

4.2 Results

Two streams, each originating from a separate culvert exiting a roadside headwall, were identified on the parcel to the north. These streams converge to form a single stream channel that flows onto the Garner property. These streams are discussed in more detail below.

Stream POGS1

POGS1 is channel which begins in the upslope portion of POGW2, sourced from a culvert that hydraulically connects wetland POGW2 with at a portion of the stormwater drainage system for the development. The channel runs northwest approximately 34 feet before converging with POGS2 to form a single channel. This combined flow runs southwest onto the Gardner parcel and is captured by the stone swale installed by the Gardner's. The swale conveys this flow northwest down the slope of the property to the northern end of the rebuilt stone wall. All channelized flow associated with POGS1 is contained within the delineated boundary of wetland POGW2. No evidence of channelized flow or sedimentation was observed downslope of the end of the swale into wetland POGW1. Prior to being captured by the stone swale POGS1 is classified as a riverine, ephemeral stream with a mud bottom. Under the Cowardin system ephemeral streams are not formally assigned, but the USACE tracks them under the classification R6. The NHDES Wetland Rules protect ephemeral streams as a jurisdictional area subject to regulation RSA 482-A (Env-Wt 103.25). Runoff from rainfall and snowmelt is the primary source of stream flow and so the stream has flowing water only during, and for a short duration after, precipitation or thaw events. The natural portion of the POGS1 channel has an average bankfull width of 1 foot and an average bank height of 4 inches. The stone swale portion of POGS1 has an average bankfull width of 6 feet and an average bank height of 1 inch. No water was observed within the natural or stone swale portion of the channel at the time of the natural resource survey.

Stream POGS2

POGS2 is a short channel located in the upslope portion of POGW2, sourced from a culvert that hydraulically connects wetland POGW2 with undelineated wetlands across Odiorne Point Rd. The channel runs southwest approximately 61 feet before converging with POGS1 to form a single channel. POGS2 is classified as a riverine, ephemeral stream with a mud bottom. Under the Cowardin system ephemeral streams are not formally assigned, but the USACE tracks them under the classification R6. Runoff from rainfall and snowmelt is the primary source of stream flow and so the stream has flowing water only during, and for a short duration after, precipitation or thaw events. The channel has an average bankfull width of 1 foot and an average bank height of 4 inches. No water was observed within the channel at the time of the natural resource survey.

Table 1 - Summary of delineated wetland and stream characteristics.

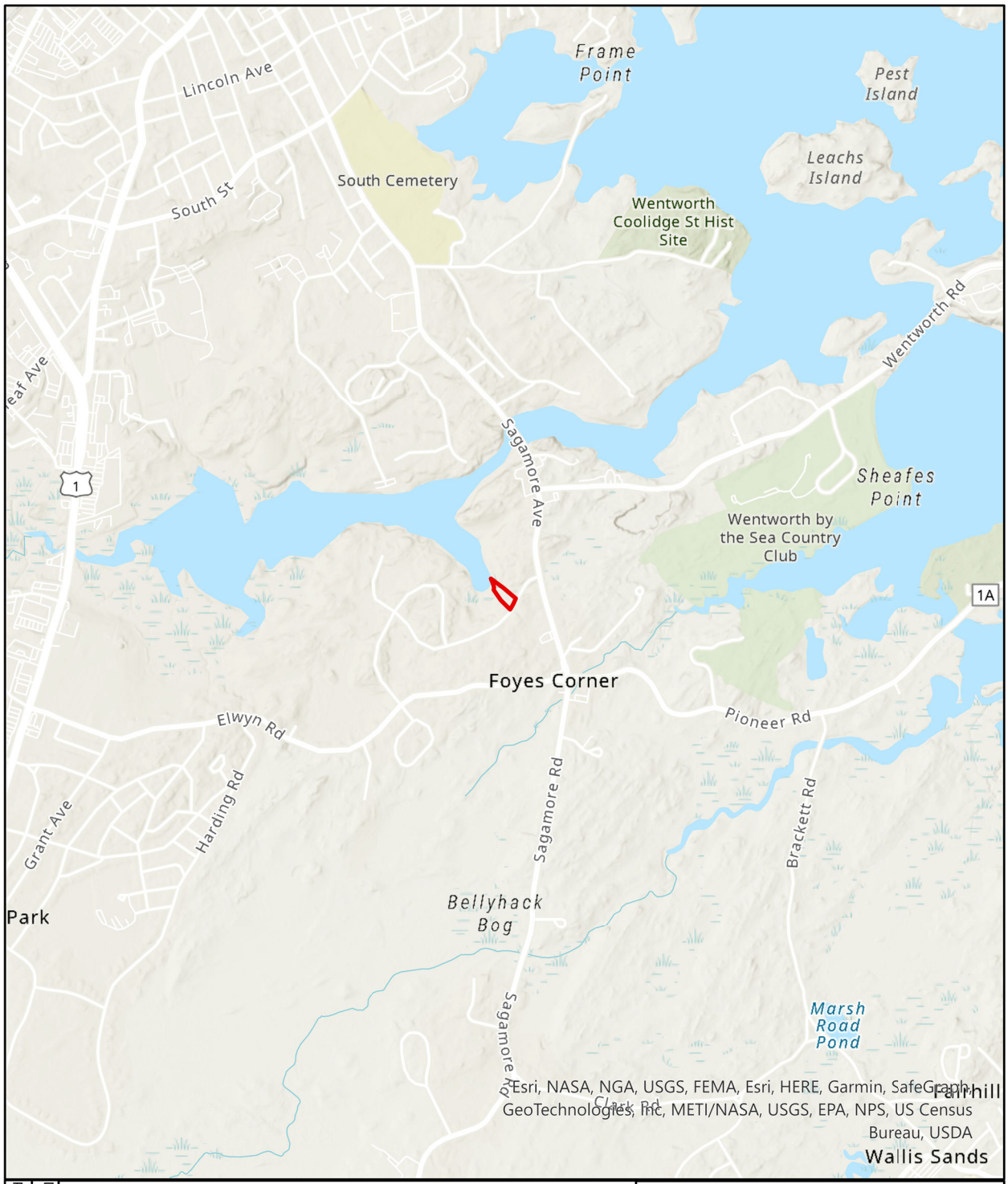
Wetland ID	Cowardin Classification	PRA	Associated Watercourse	Delineated Area/Length
POGW1	E2EM1,5P (100%)	Y	Sagamore Creek	12,104 sq. ft.
POGW2	PFO1E (100%)	Y	POGS1	9,345 sq. ft.
POGS1	R6UB3	Y	POGS2	163 ft. (on parcel) and 65 ft. (off parcel)
POGS2	R6UB3	N	POGS1	61 ft. (off parcel)

5.0 Discussion

Wetlands on the Gardner parcel, as well as the duly established 100-ft buffer of POGW1, are PRAs, and therefore permanent impacts of any size to these wetlands or the buffer are subject to compensatory mitigation. Clearing of vegetation in wetlands is considered a secondary impact, and the USACE may require mitigation for secondary impacts. Alteration of natural habitats adjacent to streams is also considered a secondary impact potentially subject to mitigation by the USACE if the alteration impairs the stream, so minimizing clearing and earthwork is imperative.

Correspondence with NHDES and the City of Portsmouth regarding the proposed project following a site visit to the property on January 12, 2023 is ongoing. Correspondence with the NH Natural Heritage Bureau (NHNHB) in response to the documented occurrence of a protected habitat in the vicinity of the proposed project area is ongoing following completion of a virtual meeting to discuss the proposed work and restoration planting plan. NHNHB has expressed satisfaction with the proposed project activities and planting plan but has requested they be kept informed should any significant changes to the proposed work or restoration plan occur. The results of the NHNHB review does not include any wildlife species records and therefore formal consultation with NH Fish & Game (NHFG) is not anticipated at this time.

Figures



50 Odiorne Point Road Property Line

N

0 1,000 2,000 Feet

Project No.: 24731.000

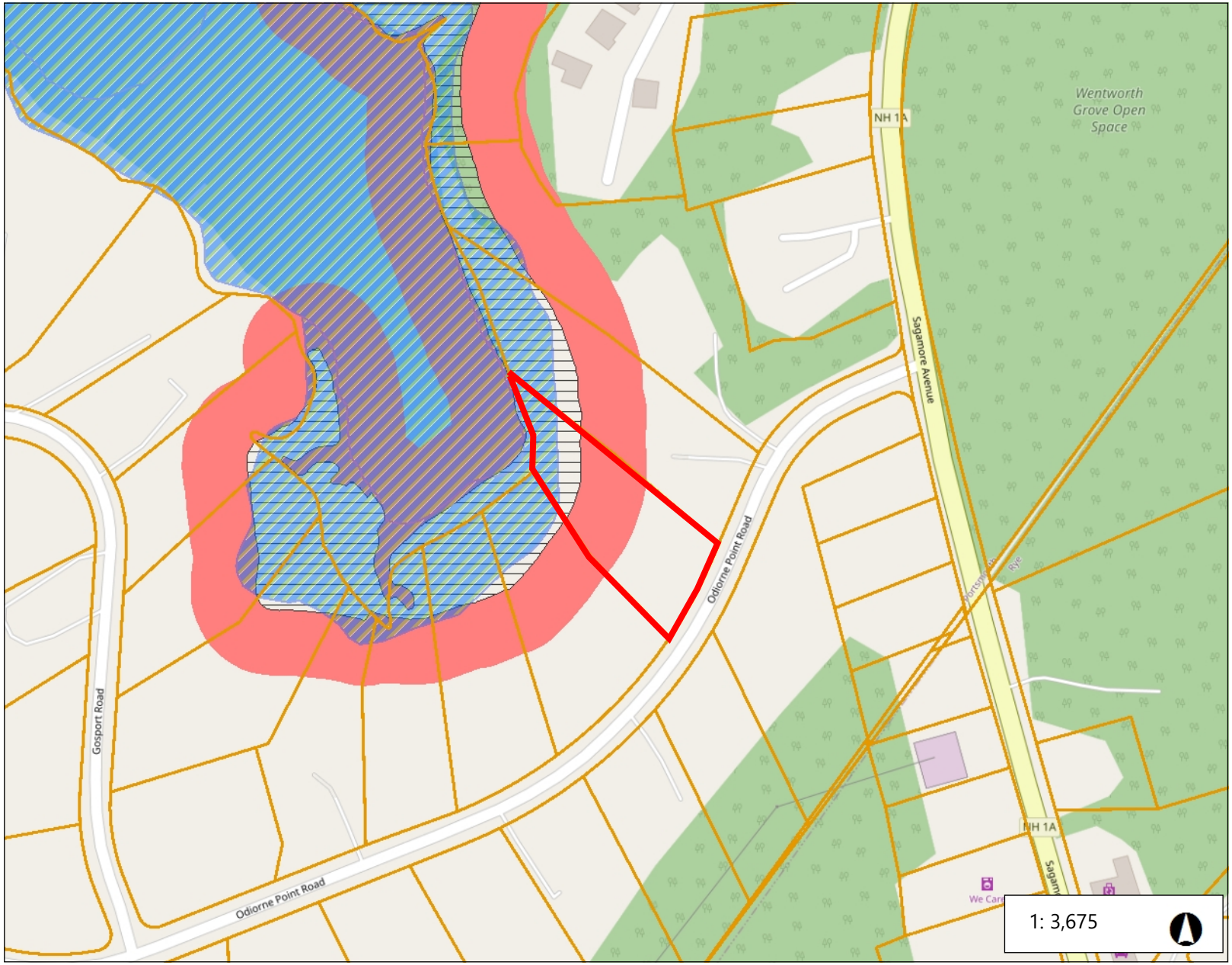
Drawn By: eolliver

Gardner Property
Project Locus
Portsmouth, NH

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

25 Nashua Road Bedford, NH 03110
(603) 472-5191 www.normandeau.com

Figure 2a. Wetland Permit Planning Tool - PRAs



Gardner Parcel

Legend

NH Parcels

Parcel Polygons

Flood Plain Wetlands Adjacent to Tier 3 Streams Prime Wetlands

Prime Wetlands

100 ft Prime Wetland Buffer

Dunes

backdune

foredune

interdune

other

Notes

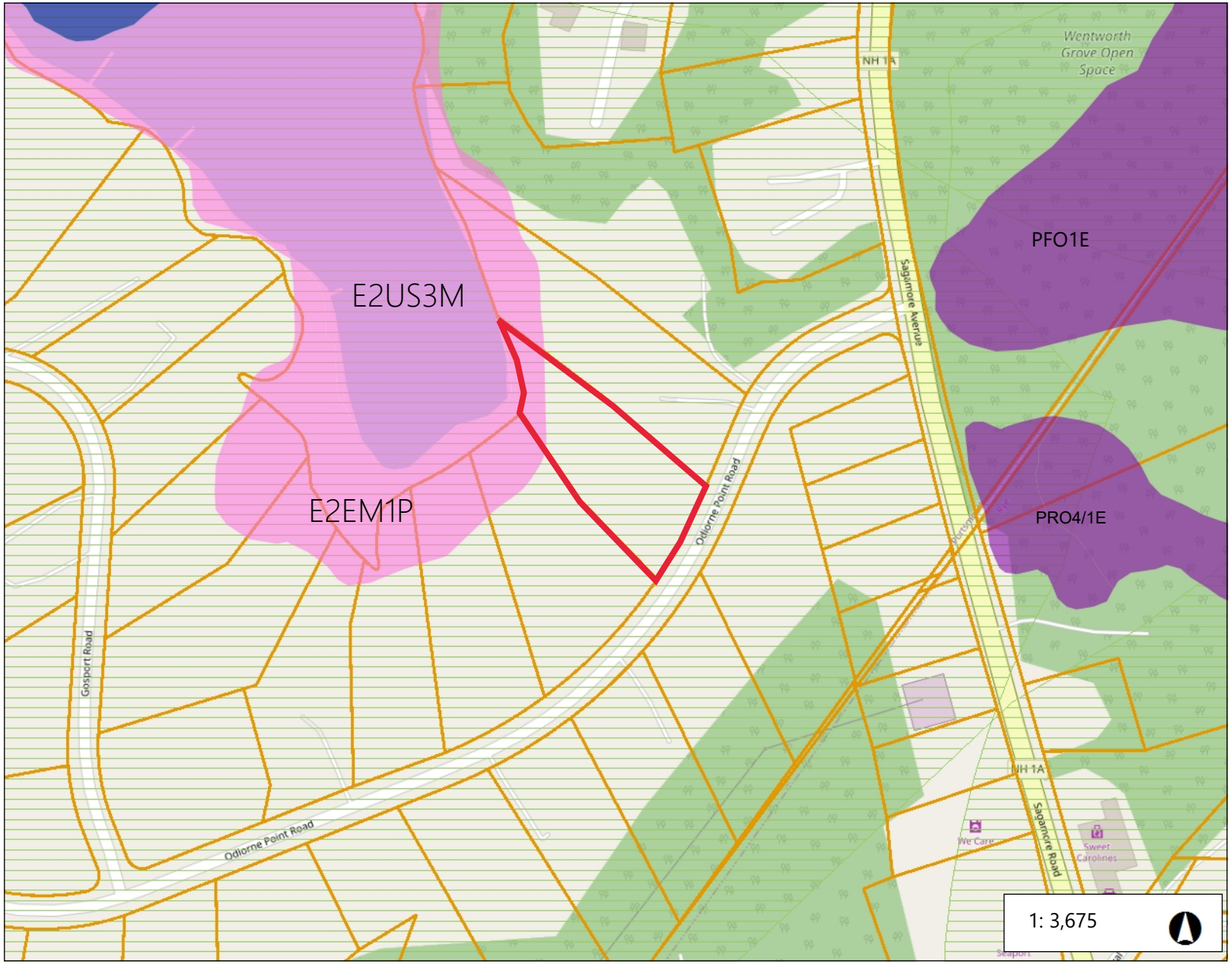
0.1 0 0.06 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Figure 2b. Wetland Permit Planning Tool - Impaired Waters and NWI Plus



Gardner Parcel

Legend

NH Parcels

- Parcel Polygons

Wetland Types and NWIPlus

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetlan
- Freshwater Pond
- Lake
- Other
- Riverine

- Watersheds with Chloride Impairments 2016
- Surface Waters with Impairments 2016 with Quarter Mile Buffer

Notes

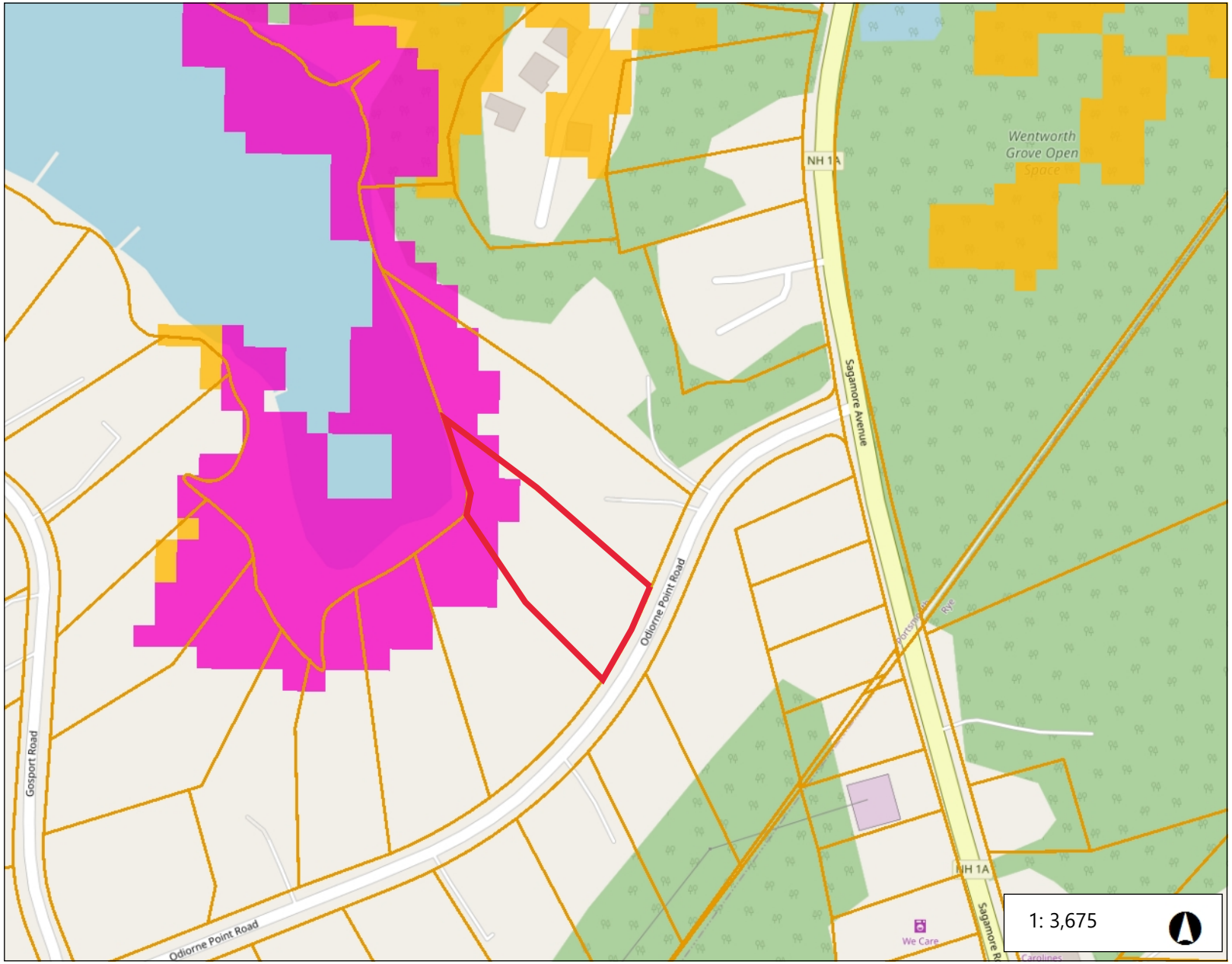
0.1 0 0.06 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Figure 2c. Wetland Permit Planning Tool - 2020 Highest Ranked Wildlife Habitat by Ecological Condition



Gardner Parcel

Legend

NH Parcels

Parcel Polygons

Highest Ranked Wildlife Habitat

0

1 Highest Ranked Habitat in NH

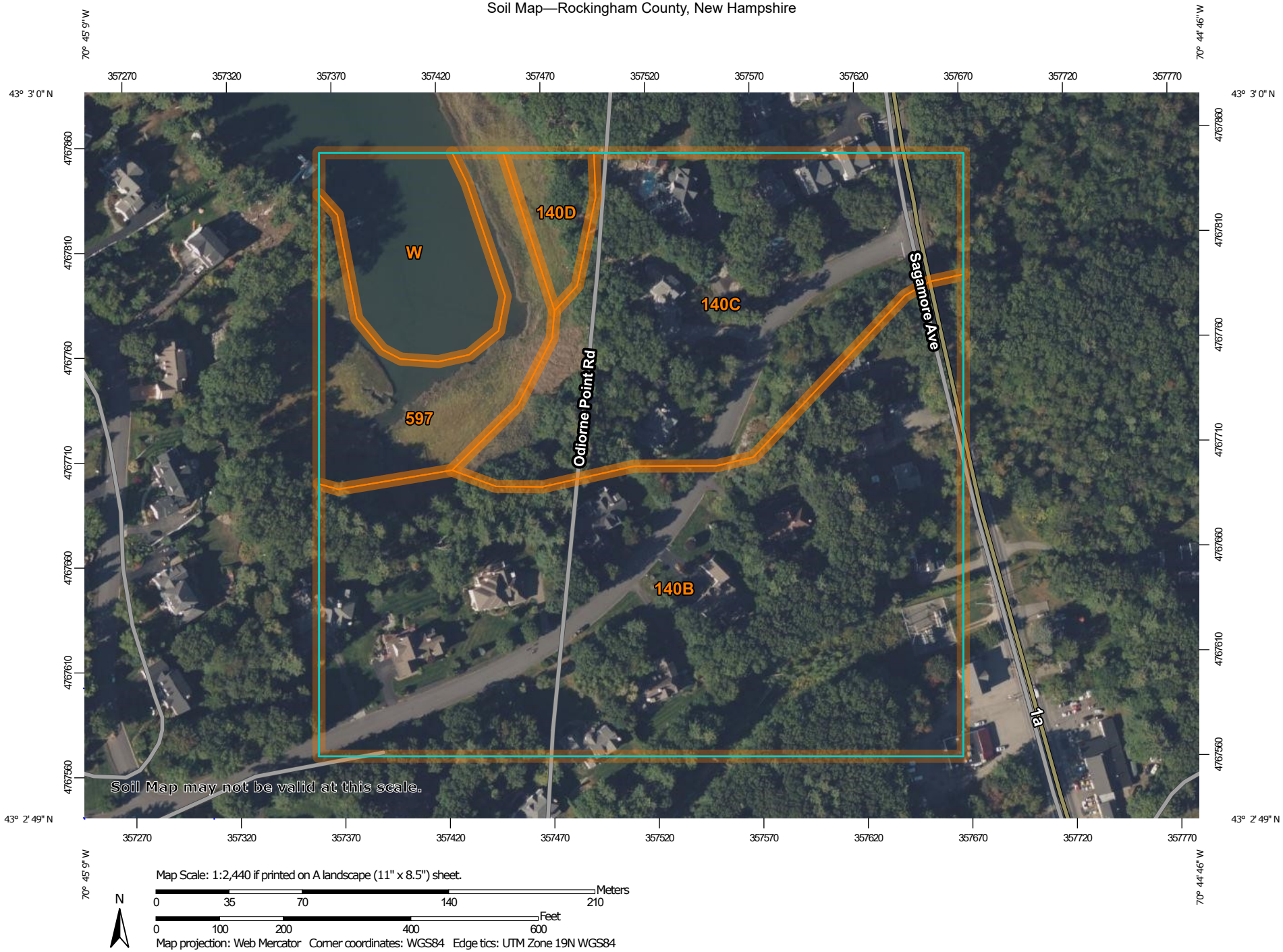
2 Highest Ranked Habitat in Regior

3 Supporting Landscape

Notes

0.1 0 0.06 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere



Map Scale: 1:2,440 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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 25, Sep 12, 2022

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	11.7	53.3%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	6.0	27.4%
140D	Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, rocky	0.5	2.3%
597	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded	2.1	9.6%
W	Water	1.6	7.4%
Totals for Area of Interest		**22.0**	**100.0%**

National Flood Hazard Layer FIRMette

FEMA

70°45'17"W 43°3'9"N

70°44'39"W 43°2'43"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

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 Cross Sections with 1% Annual Chance
- 17.5 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

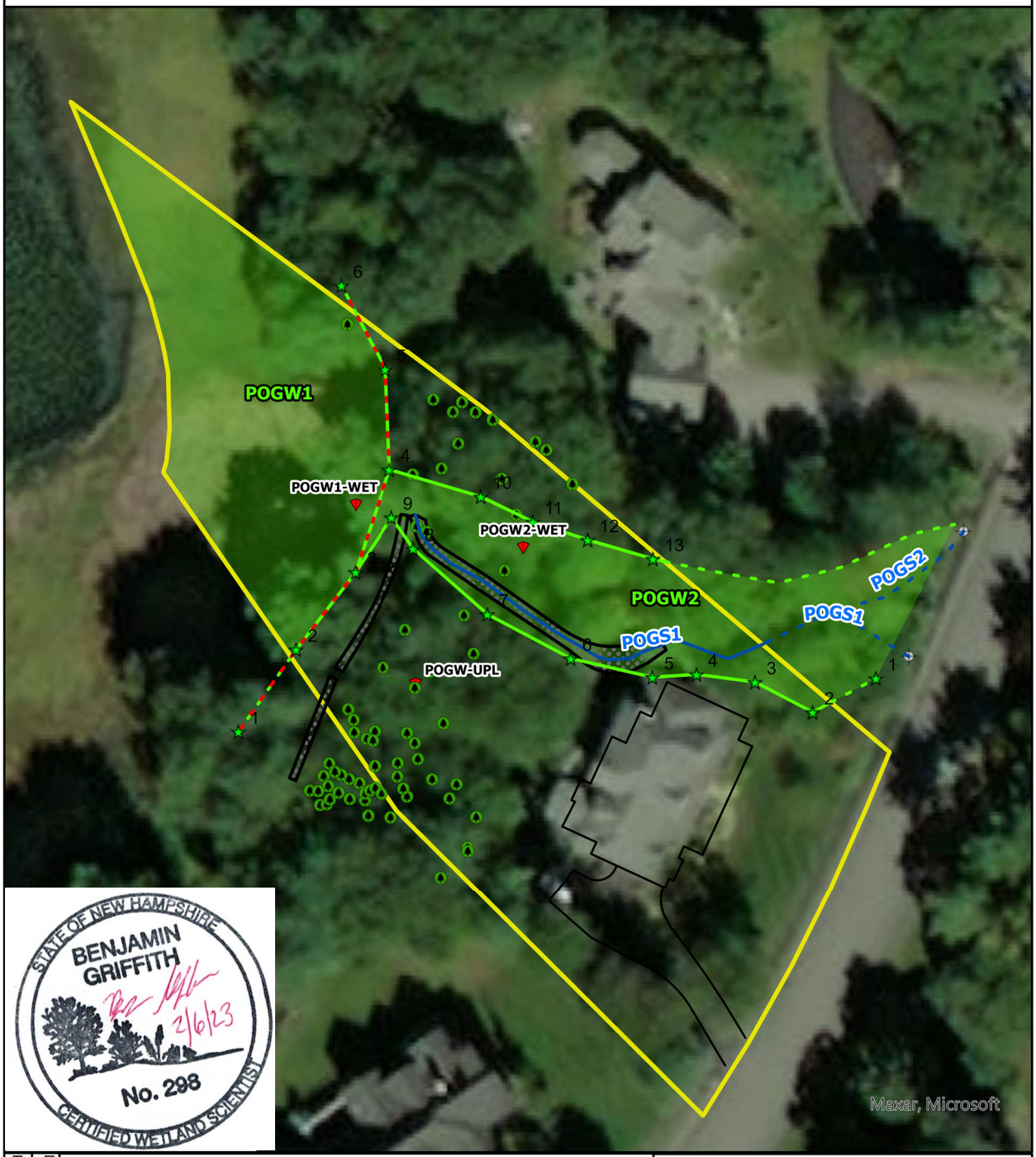
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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 1/10/2023 at 3:40 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.

Wetlands delineated by Elizabeth Olliver under the supervision of Benjamin Griffith (Certified Wetland Scientist #298) on November 11th and 29th, 2022.



STATE OF NEW HAMPSHIRE
BENJAMIN GRIFFITH
2/6/23
No. 298
CERTIFIED WETLAND SCIENTIST

Project No.: 24731.000

Drawn By: eolliver

- Wetland Flag
- Stream Centerline
- Stream Centerline (off parcel)
- Stream Centerline (on parcel)
- Wetland Boundaries
- HOTL
- Wetland Boundary (off parcel)
- Wetland Boundary (on parcel)
- Delineated Wetland Area
- Tree
- Culvert
- USACE Plot
- House
- Driveway
- Stone Swale
- Rebuilt Stone Wall
- Property Line

N

0 30 60 Feet

Gardner Property
Natural Resource Delineation
Portsmouth, NH

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
25 Nashua Road Bedford, NH 03110
(603) 472-5191 www.normandeau.com

Attachment A

Site Photographs

Project Site Overview

Photo 1. Upper portion of the access route off the driveway to stone wall and swale project area, viewing southwest. (08-11-22)

Photo 2. Lower portion of the access route off the driveway to stone wall and swale project area, viewing northwest. (08-11-22)

Photo 3. Wider overview of the slope above the stone wall and south of the stone swale, viewing southeast. (08-11-22)

Photo 4. Overview of the northern half of the Gardner property containing POGW2 and the stone wale, viewing northwest from the deck. (08-11-22)

Photo 5. Overview of the upland slope south of the stone swale, viewing west from the deck. (08-11-22)

Photo 6. Overview of the upland slope south of the stone swale, viewing west. (08-11-22)

Stone Wall Overview

Photo 7. Area directly upslope of the stone wall previously disturbed by stone wall reconstruction, viewing south. (08-11-22)

Photo 8. Overview of the downslope side of the stone wall, viewing south from the northern end of the stone wall. Wetland POGW1 occurs in the right side of the photo. (08-11-22)

Photo 9.Overview of pre-existing stone wall on property to the south of the Gardner property, viewing south. (08-11-22)

Wetland POGW1 (Salt marsh at western end of Gardner property)

Photo 10. Overview of the POGW1, viewing west-southwest. (08-11-22)

Photo 11.Overview of POGW1 north of the Gardner property salt marsh, viewing north. (08-11-22)

Photo 12.Overview of POGW1 west of the Gardner property, viewing south. Area shown is undergoing treatment for Phragmites australis. (08-11-22)

Photo 13.Overview of POGW1 closer to the open water of Tucker's Cove, viewing southwest. Area shown is undergoing treatment for Phragmites australis. (08-11-22)

Wetland POGW2 and Stone Swale

Photo 14. Overview of the undelineated area and the inflow on eastern side of Odiorne Point Road that flows to the northern culvert outflow into POGW2 shown in Photo 16, viewing north. (08-11-22)

Photo 15. Overview of the northeastern most portion of POGW2 off the Gardner property containing Photos 16 to 20, viewing northeast. (08-11-22)

Photo 16. Northern culvert outflow (source of delineated POGS2) into POGW2, viewing west. (08-11-22)

Photo 17. Southern culvert outflow (source of POGS1) into POGW2, viewing west. (08-11-22)

Photo 18. POGS1 leading from the southern culvert outflow from the headwall at the northwestern edge of POGW2 (shown in Photo 17), viewing west, upstream. (08-11-22)

Photo 19. POGS1 leading onto the Gardner property from the culverts located at the northeastern end of POGW2, viewing northeast, upstream. Head wall from which the flows are sourced is in the upper right portion of the photo. Blue arrows indicate the paths of POGS1 and POGS2 from the two culvert outflows from the headwall to where they merge in the foreground. (08-11-22)

Photo 20. POGS1 leading onto the Gardner property from the culverts located at the northeastern end of POGW2, viewing south, downstream. Property boundary is indicated by the green rod indicated by the red arrow. (08-11-22)

Photo 21. POGS1 leading onto the Gardner property from the culverts located at the northeastern end of POGW2, viewing southwest, downstream. Property boundary is indicated by the green rod visible in the right side of the photo. (08-11-22)

Photo 22. POGS1 leading onto the Gardner property from the culverts located at the northeastern end of POGW2, viewing north-northeast, upstream. Property boundary is indicated by the green rod indicated by the red arrow. (08-11-22)

Photo 23. POGS1 bound by POGW2 running parallel to the northern side of the Gardner house, viewing southwest downstream. Channel path is indicated by the blue arrows. (08-11-22)

Photo 24. POGS1 parallel the north side of the house on the Gardner property in POGW2, viewing east upstream. (08-11-22)

Photo 25. Plastic landscaping barrier that funnels flow from POGS1 into the upper portion of the stone swale, viewing north. (08-11-22)

Photo 26. Upper portion of wetland POGW2, viewing west downslope from the plastic landscaping barrier forming the northwestern boundary of the channel that funnels into the upper portion of the stone swale. (08-11-22)

Photo 27. Overview of the older portion of the stone swale, viewing west from the near the top of the swale. (08-11-22)

Photo 28. Overview of the older, upper portion of the stone swale, viewing east upslope. (08-11-22)

Photo 29. Overview of the newer portion of the stone swale, viewing east from below the reconstructed stone wall. Location of the top of the stone swale extension is indicated by the red arrow. (08-11-22)

Photo 30. Lower portion of wetland POGW2, viewing east upslope from near the bottom of the stone swale. Top of the stone swale extension is indicated by the red arrow (08-11-22)

Photo 31. Bottom of the new portion of the stone swale, viewing west. (08-11-22)

Photo 32. Bottom of the stone swale, viewing northwest. (11-11-22)

Attachment B

USACE Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Gardner Property Stone Wall and Swale Addressment City/County: Portsmouth/Rockingham Sampling Date: November 11, 2022

Applicant/Owner: Jack Gardner State: NH Sampling Point: POGW1and2-UPL

Investigator(s): E. Olliver and B. Griffith Section, Township, Range:

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): None Slope %: 3

Subregion (LRR or MLRA): LRR R Lat: Long: Datum: WGS 1984

Soil Map Unit Name: Chatfield-Hollis-Canton complex NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation X, Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
This area is was relatively recently impacted by work on the property and is part of a regularly maintained lawn area as well. Additionally, the field delineation was completed following plant senescence making identification and determination of herbaceous species percent coverages difficult.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: OGW1and2-UF

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	50	Yes	FAC
2. *Pinus strobus*	40	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	90	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 5' R)			
1. *Symphyotrichum spp*	3	No	
2. Unidentified graminoids	5	Yes	
3. *Leucanthemum vulgare*	10	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	18	=Total Cover	
Woody Vine Stratum (Plot size: 30' R)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	40	x 4 =	160
UPL species	10	x 5 =	50
Column Totals:	100 (A)		360 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Field delineation was conducted after senescence of most of the herbaceous vegetation for the season. Additionally, the area is located on maintained private property and the plot area likely contained species that were planted by the property owner or previous property owner.

SOIL

Sampling Point: OGW1and2-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/3	100						loamy
5 - 9	10YR 5/6	100						sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Gardner Property Stone Wall and Swale Addressment City/County: Portsmouth/Rockingham Sampling Date: November 11, 2022

Applicant/Owner: City of Portsmouth State: NH Sampling Point: POGW1-Wet

Investigator(s): E. Olliver and B. Griffith Section, Township, Range:

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope %: 0

Subregion (LRR or MLRA): LRR R Lat: Long: Datum: WGS 1984

Soil Map Unit Name: Chatfield-Hollis-Canton complex NWI classification: E2EM1P (from NH WPPT)

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation X, Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No 0	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
This portion of the salt marsh has been infested by Phragmites australis and is under treatment for management of the invasive plant species. Additionally, the field delineation was completed following plant senescence making identification and determination of herbaceous species percent coverages difficult.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- Saturation (A3)
- X Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Surface water was not observed within the plot at the time of the November 11th delineation but has been observed in other portions of the wetland.

VEGETATION – Use scientific names of plants.

Sampling Point: POGW1-Wet

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	40	Yes	FACU
2. *Pinus strobus*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	50	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. *Smilax rotundifolia*	2	No	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	2	=Total Cover	
Herb Stratum (Plot size: 5' R)			
1. *Phragmites australis*	10	Yes	FACW
2. *Persicaria sagittata*	20	Yes	OBL
3. Unidentified graminoids	7	No	
4. *Rosa multiflora*	1	No	FACU
5. *Typha latifolia*	2	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
Woody Vine Stratum (Plot size: 30' R)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	22	x 1 =	22
FACW species	10	x 2 =	20
FAC species	2	x 3 =	6
FACU species	51	x 4 =	204
UPL species	0	x 5 =	0
Column Totals:	85 (A)		252 (B)

Prevalence Index = B/A = 2.96

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Field delineation was conducted after senescence of most of the herbaceous vegetation for the season. Additionally, the area has recently undergone chemical treatment for Phragmites australis infestation.

SOIL

Sampling Point POGW1-Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 3	7.5YR 2.5/1	100						Sandy silt/loamy
3 - 6	7.5YR 5/1	100						Sandy silt

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** ____

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Gardner Property Stone Wall and Swale Addressment City/County: Portsmouth/Rockingham Sampling Date: November 11, 2022

Applicant/Owner: Jack Gardner State: NH Sampling Point: POGW2-Wet

Investigator(s): E. Olliver and B. Griffith Section, Township, Range:

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): None Slope %: 3

Subregion (LRR or MLRA): LRR R Lat: Long: Datum: WGS 1984

Soil Map Unit Name: Chatfield-Hollis-Canton complex NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation X, Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
This area is located on a maintained private property and thus some of the plants could have been planted by the property owner or previous property owner. Additionally, the field delineation was completed following plant senescence making identification and determination of herbaceous species percent coverages difficult.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 6

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturation presence was subtle.

VEGETATION – Use scientific names of plants. Sampling Point: POGW2-Wet

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	50	Yes	FAC
2. *Pinus strobus*	5	No	FACU
3. *Quercus rubra*	5	No	FACU
4.			
5.			
6.			
7.			
	60	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' R)			
1. *Rosa multiflora*	5	Yes	FACU
2. *Frangula alnus*	3	Yes	FAC
3. *Viburnum plicatum**			UPL
4.			
5.			
6.			
7.			
	8	=Total Cover	
Herb Stratum (Plot size: 5' R)			
1. *Symphyotrichum spp*	10	No	
2. *Solidago rugosa*	20	Yes	FAC
3. *Ranunculus repens*	25	Yes	FAC
4. *Panicum virgatum*	30	Yes	FAC
5. *Circaea canadensis*	2	No	FACU
6. *Glyceria striata*	20	Yes	OBL
7. *Verbena urticifolia*	10	No	FAC
8. *Epilobium palustre*	2	No	OBL
9.			
10.			
11.			
12.			
	119	=Total Cover	
Woody Vine Stratum (Plot size: 30' R)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	22	x 1 =	22
FACW species	0	x 2 =	0
FAC species	138	x 3 =	414
FACU species	17	x 4 =	68
UPL species	0	x 5 =	0
Column Totals:	177 (A)		504 (B)

Prevalence Index = B/A = 2.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Field delineation was conducted after senescence of most of the herbaceous vegetation for the season. Additionally, the area is located on maintained private property and the plot area likely contained species that were planted by the property owner or previous property owner.

*=Planted

SOIL

Sampling Point POGW2-Wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 6	2.5Y 2.5/1	100					Loamy/Clayey	
6 - 10	2.5Y 4/1	70	2.5Y 5/3	30	C	PL	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** ____

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Attachment C

Wetland, Vernal Pool, and Stream

Functions and Values Forms

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Stream Data Sheet

Gardner Property

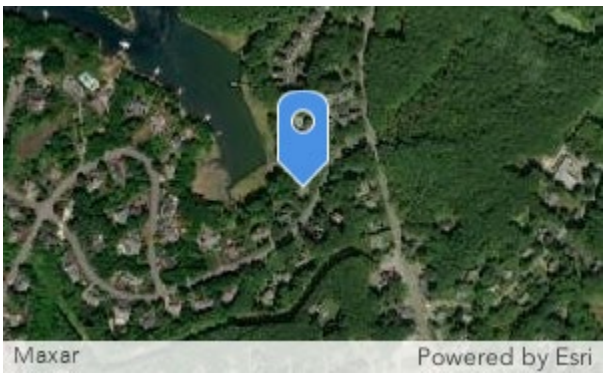
Portsmouth , NH

Stream ID:	POGS1	**Stream Name:**	
Cowardin Classification:	R6UB3	**Delineator(s):**	Elizabeth Olliver
Flow Regime:	Ephemeral	**Number of Flags:**	No flags hung
Associated Wetland:	Yes	**Wetland ID:**	POGW2
Stream Notes:			

Stream Characteristics:

Flow Observations:	Dry
Bed composition:	Fines w/ large cobble in portions.
Bank Height (ft):	0.5
Average Bankfull Width (ft)	1
Average Depth (inches):	0
Riffle/Pool Complex:	No
Defined Bed and Bank	No
Shown on USGS Topo?	No
Flows Continuously for at least 6 Months?	No
Aquatic Organisms Present?	No
Aquatic Vegetation Present?	No
Scoured Mineral Bottom?	Yes

Location:



Photos:

Southern culvert outflow serving as the delineated upstream end of POGS1 in wetland POGW2. (08-11-22)

Channel leading from the southern culvert outflow from the headwall at the western end of POGW2 (shown in Photo 1), viewing west, upstream. (08-11-22)

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Channel leading onto the Gardner property after POGS1 and POGS2 merge, viewing south, downstream. Approximate property boundary location is indicated by the green rod visible to the left of the channel. (08-11-22)

Wetland Function- Value Evaluation Form

Total area of wetland? 9,345 sq. ft. Human made? N Is wetland part of a wildlife corridor? N or a "habitat island"? N

Adjacent land use Residential and road Distance to nearest roadway or other development 10 ft

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin Mid point

How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Wetland ID POGW2

Latitude Longitude

Prepared by: eolliver_NAI_USA Date 11/11/2022

Wetland Impact:

Type Area

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y__X___ N_____

Function/Value	Suitability Y/N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	Y	15	☐	
Floodflow Alteration	Y	3,4,5,9,13,6	☐	
Fish and Shellfish Habitat	N		☐	
Sediment/Toxicant Retention	Y	1,4	☐	
Nutrient Removal	N		☐	
Production Export	N		☐	
Sediment/Shoreline Stabilization	Y	1,2,3,4,8,9	☐	
Wildlife Habitat	N		☐	
Recreation	N		☐	
Educational/Scientific Value	N		☐	
Uniqueness/Heritage	N		☐	
Visual Quality/Aesthetics	N		☐	
ES Endangered Species Habitat	N		☐	
Other	no			

Notes:

* Refer to backup list of numbered considerations.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	5			Modification of flow from culvert and stone swale.
2	N		☐	
3	N		☐	
4	Y	3,4,5,9,13,6	☐	
5	Y	15	☐	
6	N		☐	
7	N		☐	
8	N		☐	
9	N		☐	
10	Y	1,4	☐	
11	Y	1,2,3,4,8,9	☐	
12	N		☐	
13	N		☐	
14	N		☐	

Notes:

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Stream Data Sheet

Gardner Propery

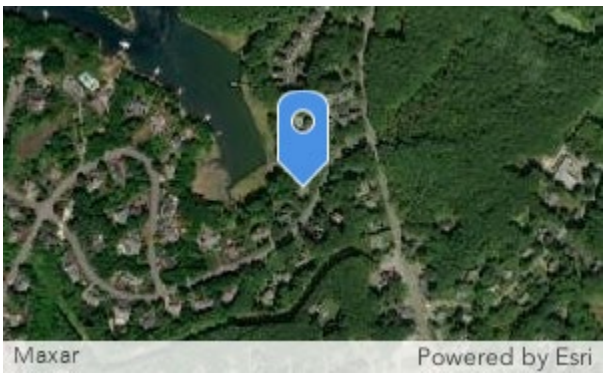
Portsmouth , NH

Stream ID:	POGS2	**Stream Name:**	
Cowardin Classification:	R6UB3	**Delineator(s):**	Elizabeth Olliver
Flow Regime:	Ephemeral	**Number of Flags:**	No flags hung
Associated Wetland:	Yes	**Wetland ID:**	POGW2
Stream Notes:			

Stream Characteristics:

Flow Observations:	Dry
Bed composition:	Fines w/large cobble in portions
Bank Height (ft):	0.5
Average Bankfull Width (ft)	1
Average Depth (inches):	0
Riffle/Pool Complex:	No
Defined Bed and Bank	No
Shown on USGS Topo?	No
Flows Continuously for at least 6 Months?	No
Aquatic Organisms Present?	No
Aquatic Vegetation Present?	No
Scoured Mineral Bottom?	Yes

Location:



Photos:

Northern culvert outflow serving as the delineated upstream end of POGS2 in wetland POGW2. (08-11-22)

Merging of flow from POGS2 and POGS1 in portion of POGW2 off the Gardner parcel. (08-11-22)

Wetland Function- Value Evaluation Form

Total area of wetland? 9,345 sq. ft. Human made? N Is wetland part of a wildlife corridor? N or a "habitat island"? N

Adjacent land use Residential and roads Distance to nearest roadway or other development 10 feet

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin Mid point

How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Wetland ID POGW2
Latitude Longitude
Prepared by: eolliver_NAI_USA Date 11/11/2022
Wetland Impact:
Type Area
Evaluation based on:
Office X Field X
Corps manual wetland delineation completed? Y__X___ N_____

Function/Value	Suitability Y/N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	Y	15	☐	
Floodflow Alteration	Y	3,4,5,9,13,6	☐	
Fish and Shellfish Habitat	N		☐	
Sediment/Toxicant Retention	Y	1,4	☐	
Nutrient Removal	N		☐	
Production Export	N		☐	
Sediment/Shoreline Stabilization	Y	1,2,3,4,8,9	☐	
Wildlife Habitat	N		☐	
Recreation	N		☐	
Educational/Scientific Value	N		☐	
Uniqueness/Heritage	N		☐	
Visual Quality/Aesthetics	N		☐	
ES Endangered Species Habitat	N		☐	
Other	no			

Notes:

* Refer to backup list of numbered considerations.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	5			Modification of flow from culvert.
2	N		☐	
3	N		☐	
4	Y	3,4,5,9,13,6	☐	
5	Y	15	☐	
6	N		☐	
7	N		☐	
8	N		☐	
9	N		☐	
10	Y	1,4	☐	
11	Y	1,2,3,4,8,9	☐	
12	N		☐	
13	N		☐	
14	N		☐	

Notes:

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Wetland Functions and Values Data Sheet

Gardner Stone Wall and Swale

Portsmouth, NH

Wetland ID:	POGW1	**Delineator(s):**	Elizabeth Olliver
Cowardin Classification:	E2EM1/5 (60/40%)	**Survey Date:**	November 11, 2022
Number of Flags:	6	**Open Water:**	No
Wetland Open/Closed	Open	**Wetland Open Details**	1 and 6
Associated Stream:	No	**Stream ID:**	Sagamore Creek into Tucker's Cove. Not delineated as part of this project.
Vernal Pool/Potential Vernal Pool Identified:	No	**VP/PVP ID:**	None
Wetland Description:	Salt marsh wetland invaded by stands of Phragmites with more freshwater species along top of wetland near stone wall.		

Functions and Values:

Groundwater Recharge/Discharge	No
Floodflow Alteration	Suitable
Fish/Shellfish Habitat	Suitable
Sediment/Toxicant Retention	Suitable
Nutrient Removal/Retention	Suitable
Production Export	Suitable
Sediment/Shoreline Stabilization	Principal
Wildlife Habitat	Suitable
Recreation	No
Education/Scientific Value	No
Uniqueness/Heritage	Principal
Visual Quality/Aesthetics	No
Rare/Threatened and Endangered Species	No
Other	no

Soils:

Texture: Silty
Parent Material: Alluvium
Restrictive Layer: No
Hydric Soil Indicator(s): A11. Depleted below dark surface

Soil Notes:

Dominant Plants:

Tree

Sapling/ Shrub

Herb/Seedling
Spartina alterniflora, Spartina patens, and *Persicaria sagittate*

Woody Vine

Invasives
Phragmites australis

Location:

Special wetland type/Unique Swamp: Tidal wetland.

Wetland Comments: Wetland is undergoing treatment for Phragmites australis.

NHDES Priority Resource Area / USACE Special Aquatic Site? Yes. Prime wetland with a duly established 100-ft buffer.

Wildlife:

List of observed wildlife: None

List of Potential Wildlife Small mammals and coastal wetland birds.

Evidence of wildlife: None

Wildlife and Habitat Comments: None

Photos:

Photo 1. Viewing across wetland towards bay from the rebuilt stone wall near POGW1 flag 3, viewing northwest. (11-11-22)

Photo 2. Viewing across wetland to outlet into bay from near POGW1 flag 3, viewing southwest. (11-11-22)

Photo 3. Looking along the upslope boundary of POGW1, viewing south. (11-11-22)

Wetland Function- Value Evaluation Form

Total area of wetland? 12,104 sq. ft. Human made? No Is wetland part of a wildlife corridor? N or a "habitat island"? N

Adjacent land use Residential and Tucker's Cove. Distance to nearest roadway or other development 100 ft

Dominant wetland systems present E2EM1,5 Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin Bottom

How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Wetland ID POGW1

Latitude _____ Longitude _____

Prepared by: eolliver_NAI_USA Date 11/11/2022

Wetland Impact: None

Type _____ Area _____

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N _____

Function/Value	Suitability Y/N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N		☐	
Floodflow Alteration	Y	5,6,9	☐	
Fish and Shellfish Habitat	Y	1,2	☐	
Sediment/Toxicant Retention	Y	2,1,3,4	☐	
Nutrient Removal	Y	3,4,5,7,10	☐	
Production Export	Y	2	☐	
Sediment/Shoreline Stabilization	Y	6,7,10,11,12,15	☑	
Wildlife Habitat	Y	6,7,8	☐	
Recreation	N		☐	
Educational/Scientific Value	N		☐	
Uniqueness/Heritage	Y		☑	
Visual Quality/Aesthetics	N		☐	
ES Endangered Species Habitat	N		☐	
Other	no			

Notes:

* Refer to backup list of numbered considerations.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1				
2	N		☐	
3	Y	1,2	☐	
4	Y	5,6,9	☐	
5	N		☐	
6	N		☐	
7	Y	3,4,5,7,10	☐	
8	Y	2	☐	
9	N		☐	
10	Y	2,1,3,4	☐	
11	Y	6,7,10,11,12,15	☑	
12	Y		☑	
13	N		☐	
14	Y	6,7,8	☐	

Notes:

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Wetland Functions and Values Data Sheet

Gardner Stone Wall and Swale

Portsmouth, NH

Wetland ID:	POGW2	**Delineator(s):**	Elizabeth Olliver
Cowardin Classification:	PF01E, 100%	**Survey Date:**	November 11, 2022
Number of Flags:	13	**Open Water:**	No
Wetland Open/Closed	Open	**Wetland Open Details**	1 and 13
Associated Stream:	Yes	**Stream ID:**	POGS1 and POGS2
Vernal Pool/Potential Vernal Pool Identified:	No	**VP/PVP ID:**	
Wetland Description:	Small wetland that culverts drain into. Wetland drains down to the slope towards the salt marsh and it's boundary meets with the salt marsh boundary.		

Functions and Values:

Groundwater Recharge/Discharge	Suitable
Floodflow Alteration	Suitable
Fish/Shellfish Habitat	No
Sediment/Toxicant Retention	Principal
Nutrient Removal/Retention	No
Production Export	Suitable
Sediment/Shoreline Stabilization	Suitable
Wildlife Habitat	Suitable
Recreation	No
Education/Scientific Value	No
Uniqueness/Heritage	No
Visual Quality/Aesthetics	No
Rare/Threatened and Endangered Species	No
Other	no

Soils:

Texture: Loamy
Parent Material: Till
Restrictive Layer: No
Hydric Soil Indicator(s): A11. Depleted below dark surface
Soil Notes: None

Dominant Plants:

Tree
Carpinus caroliniana and *Acer rubrum*

Sapling/ Shrub
Acer rubrum and *Frangula alnus*

Herb/Seedling
Equisetum arvense, Impatiens capensis, Toxicodendron radicans, Onoclea sensibilis, Panicum virgatum, Glyceria striata, Ranunculus repens, and *Solidago rugosa*

Woody Vine

Invasives
Rosa multiflora and *Frangula alnus*

Location:

Special wetland type/Unique Swamp: No

Wetland Comments: Wetland receives flow from stormwater system and from undelineated potential wetlands across the road.

NHDES Priority Resource Area / USACE Special Aquatic Site? A portion of this wetland lies within the duly established 100-ft buffer of the prime wetlands bordering Tucker's Cover downslope (delineated as POGW1).

Wildlife:

List of observed wildlife: None

List of Potential Wildlife Small mammals, amphibians, turtles, and birds.

Evidence of wildlife: None

Wildlife and Habitat Comments: None

Photos:

Photo 1. Viewing into the upper portion of the wetland between flags 4 and 5, viewing northeast. (11-11-22)

Photo 2. Viewing down into mid portion of the wetland running down the slope. Near first turn into swale between flags 5 and 6, viewing northwest. (11-11-22)

Photo 3. Viewing upslope into upper portion of the wetland. Near first turn into swale between flags 5 and 6, viewing northeast. (11-11-22)

Wetland Function- Value Evaluation Form

Total area of wetland? 9, 345 sq. ft. Human made? Unclear Is wetland part of a wildlife corridor? N or a "habitat island"? N

Adjacent land use Private property and roadway Distance to nearest roadway or other development 10 ft.

Dominant wetland systems present PF01E Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin Mid point

How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Wetland ID POGW2
Latitude Longitude
Prepared by: eolliver_NAI_USA Date 11/25/2022
Wetland Impact:
Type Area
Evaluation based on:
Office X Field X
Corps manual wetland delineation completed? Y__X___ N_____

Function/Value	Suitability Y/N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	Y	2,4,7	☐	
Floodflow Alteration	Y	4,5,6,9	☐	
Fish and Shellfish Habitat	N		☐	
Sediment/Toxicant Retention	Y	2,1 10	☑	
Nutrient Removal	N		☐	
Production Export	Y	2,1	☐	
Sediment/Shoreline Stabilization	Y	1	☐	
Wildlife Habitat	Y	8,7	☐	
Recreation	N		☐	
Educational/Scientific Value	N		☐	
Uniqueness/Heritage	N		☐	
Visual Quality/Aesthetics	N		☐	
ES Endangered Species Habitat	N		☐	
Other	no			

Notes:

* Refer to backup list of numbered considerations.

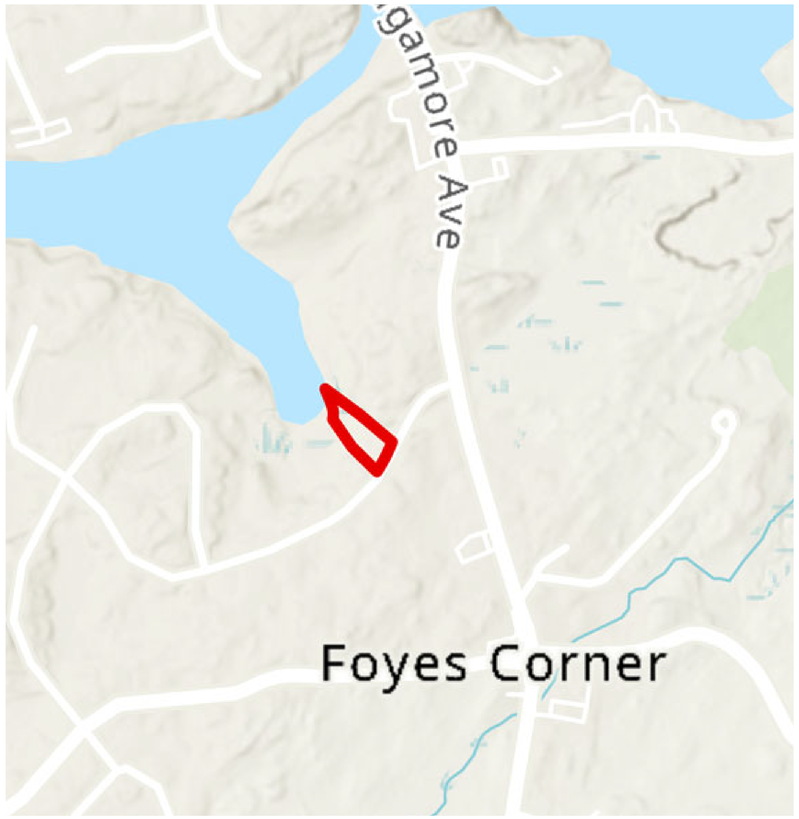
FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	3.6			
2	N		☐	
3	N		☐	
4	Y	4,5,6,9	☐	
5	Y	2,4,7	☐	
6	N		☐	
7	N		☐	
8	Y	2,1	☐	
9	N		☐	
10	Y	2,1 10	☑	
11	Y	1	☐	
12	N		☐	
13	N		☐	
14	Y	8,7	☐	

Notes:

Attachment B: Project Plans

GARDNER PROPERTY RESTORATION PROJECT

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS



PROJECT LOCUS

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES (ECSs) SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE NHDES BEST MANAGEMENT PRACTICES MANUAL FOR UTILITY MAINTENANCE IN AND ADJACENT TO WETLANDS AND WATERBODIES IN NEW HAMPSHIRE DATED MARCH 2019. PLEASE SEE DETAILS REGARDING SUGGESTED ESCs ON SHEET 4.
2. MEANS OF EROSION AND SEDIMENT PROTECTION AS NOTED ON THE DRAWINGS INDICATE MINIMUM RECOMMENDED PROVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR FINAL SELECTION AND PLACEMENT OF EROSION AND SEDIMENTATION CONTROLS BASED ON ACTUAL SITE AND CONSTRUCTION CONDITIONS. ADDITIONAL MEANS OF PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED FOR CONTINUED OR UNFORESEEN EROSION PROBLEMS, OR AS DIRECTED BY THE ENVIRONMENTAL MONITOR, AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. ESCs SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF AND DURING ALL PHASES OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO AND IMMEDIATELY AFTER ANY DISTURANCE OF EXISTING SURFACE MATERIAL ON THE SITE.
4. AFTER ANY SIGNIFICANT RAINFALL (>0.25 INCHES OF RAINFALL WITHIN 24 HOURS), ESCs SHALL BE INSPECTED FOR INTEGRITY. ANY DAMAGE SHALL BE CORRECTED IMMEDIATELY.
5. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES SHALL BE PROVIDED TO ENSURE THAT THE INTENDED PURPOSE IS ACCOMPLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEDIMENT LEAVING THE LIMIT OF WORK. ESCs SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKDAY.
6. THE CONTRACOTR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM ENTERING ANY STORM DRAINAGE SYSTEM AND FROM BEING CONVEYED TO ANY WETLAND RESOURCE AREA, PUBLIC WAYS, ABUTTING PROPERTY, OR OUTSIDE OF THE PROJECT LIMITS.
7. ANY SEDIMENT TRACKED ONTO PAVED AREAS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
8. ANY AREAS OUTSIDE OF THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR TO THE PRE-CONSTRUCTION CONDITION/GRADE AT NO COST TO THE OWNER.

GENERAL PROJECT NOTES:

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING FEATURES ARE PROVIDED IN THE “EXISTING CONDITIONS PLAN” PREPARED BY KNIGHT HILL LAND SURVEYING SERVICES, INC. DATED 11/06/23.
2. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS, AND SAFETY CODES IN THE EXECUTION OF THIS RESTORATION PLAN.
3. THE LOCATION OF ALL AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND NORMANDEAU ASSOCIATES, INC. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
4. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS, AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENVIRONMENTAL MONITOR OR OWNER’S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
5. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
6. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENTS TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
7. IT IS THE CONTRACTOR’S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER’S REPRESENTATION IMMEDIATELY.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION AND ESTABLISHMENT OF ALL EROSION AND SEDIMENT CONTROLS.
9. ELEVATION REFERENCED TO NAVD88.

GENERAL NOTES:

1.) THE EXISTING SITE DETAILS DEPICTED ON THIS PLAN ARE THE RESULTS OF AN ON THE GROUND INSTRUMENT FIELD SURVEY CONDUCTED AUGUST, 2023 BY KNIGHT HILL LAND SURVEYING SERVICES, INC.

2.) PORTIONS OF SUBJECT LOT LIE IN THE FEMA FLOOD ZONE AE DETERMINED TO BE AT OR BELOW ELEVATION 8 OF THE NORTH AMERICAN VERTICAL DATUM OF 88 (NAVD88) PER FLOOD INSURANCE RATE MAP (FIRM) 33015C0270F EFFECTIVE 1/29/2021.

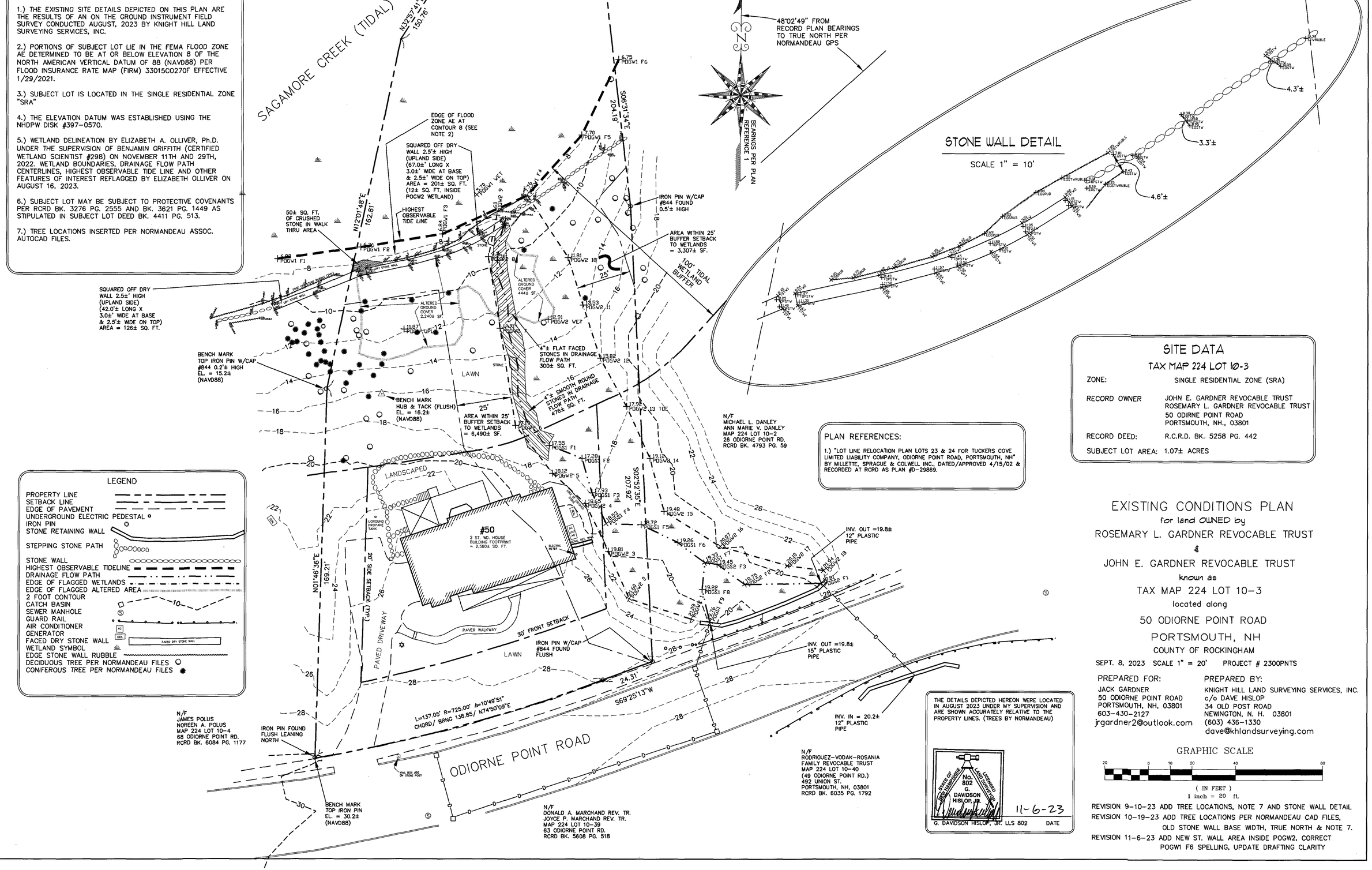
3.) SUBJECT LOT IS LOCATED IN THE SINGLE RESIDENTIAL ZONE "SRA"

4.) THE ELEVATION DATUM WAS ESTABLISHED USING THE NHDPW DISK #397-0570.

5.) WETLAND DELINEATION BY ELIZABETH A. OLLIVER, Ph.D. UNDER THE SUPERVISION OF BENJAMIN GRIFFITH (CERTIFIED WETLAND SCIENTIST #298) ON NOVEMBER 11TH AND 29TH, 2022. WETLAND BOUNDARIES, DRAINAGE FLOW PATH CENTERLINES, HIGHEST OBSERVABLE TIDE LINE AND OTHER FEATURES OF INTEREST REFLAGGED BY ELIZABETH OLLIVER ON AUGUST 16, 2023.

6.) SUBJECT LOT MAY BE SUBJECT TO PROTECTIVE COVENANTS PER RCRD BK. 3276 PG. 2555 AND BK. 3621 PG. 1449 AS STIPULATED IN SUBJECT LOT DEED BK. 4411 PG. 513.

7.) TREE LOCATIONS INSERTED PER NORMANDEAU ASSOC. AUTOCAD FILES.



STONE WALL DETAIL

SCALE 1" = 10'

LEGEND

- PROPERTY LINE
- SETBACK LINE
- EDGE OF PAVEMENT
- UNDERGROUND ELECTRIC PEDESTAL
- IRON PIN
- STONE RETAINING WALL
- STEPPING STONE PATH
- STONE WALL
- HIGHEST OBSERVABLE TIDELINE
- DRAINAGE FLOW PATH
- EDGE OF FLAGGED WETLANDS
- EDGE OF FLAGGED ALTERED AREA
- 2 FOOT CONTOUR
- CATCH BASIN
- SEWER MANHOLE
- GUARD RAIL
- AIR CONDITIONER (AC)
- GENERATOR (GEN)
- FACED DRY STONE WALL (FACED DRY STONE WALL)
- WETLAND SYMBOL
- EDGE STONE WALL RUBBLE
- DECIDUOUS TREE PER NORMANDEAU FILES
- CONIFEROUS TREE PER NORMANDEAU FILES

PLAN REFERENCES:

1.) "LOT LINE RELOCATION PLAN LOTS 23 & 24 FOR TUCKERS COVE LIMITED LIABILITY COMPANY, ODIORNE POINT ROAD, PORTSMOUTH, NH" BY MILLETTE, SPRAGUE & COLWELL INC., DATED/APPROVED 4/15/02 & RECORDED AT RCRD AS PLAN #D-29869.

THE DETAILS DEPICTED HEREON WERE LOCATED IN AUGUST 2023 UNDER MY SUPERVISON AND ARE SHOWN ACCURATELY RELATIVE TO THE PROPERTY LINES. (TREES BY NORMANDEAU)

STATE OF NEW HAMPSHIRE — No. 802 — G. DAVIDSON HISLOP, JR. — LICENSED LAND SURVEYOR

11-6-23

G. DAVIDSON HISLOP, JR. LLS 802 DATE

SITE DATA

TAX MAP 224 LOT 10-3

ZONE:	SINGLE RESIDENTIAL ZONE (SRA)
RECORD OWNER	JOHN E. GARDNER REVOCABLE TRUST ROSEMARY L. GARDNER REVOCABLE TRUST 50 ODIRNE POINT ROAD PORTSMOUTH, NH., 03801
RECORD DEED:	R.C.R.D. BK. 5258 PG. 442
SUBJECT LOT AREA:	1.07± ACRES

EXISTING CONDITIONS PLAN

for land OWNED by

ROSEMARY L. GARDNER REVOCABLE TRUST

&

JOHN E. GARDNER REVOCABLE TRUST

known as

TAX MAP 224 LOT 10-3

located along

50 ODIORNE POINT ROAD

PORTSMOUTH, NH

COUNTY OF ROCKINGHAM

SEPT. 8, 2023 SCALE 1" = 20' PROJECT # 2300PNTS

PREPARED FOR:
JACK GARDNER
50 ODIORNE POINT ROAD
PORTSMOUTH, NH, 03801
603-430-2127
jrgardner2@outlook.com

PREPARED BY:
KNIGHT HILL LAND SURVEYING SERVICES, INC.
c/o DAVE HISLOP
34 OLD POST ROAD
NEWINGTON, N. H. 03801
(603) 436-1330
dave@khlandsurveying.com

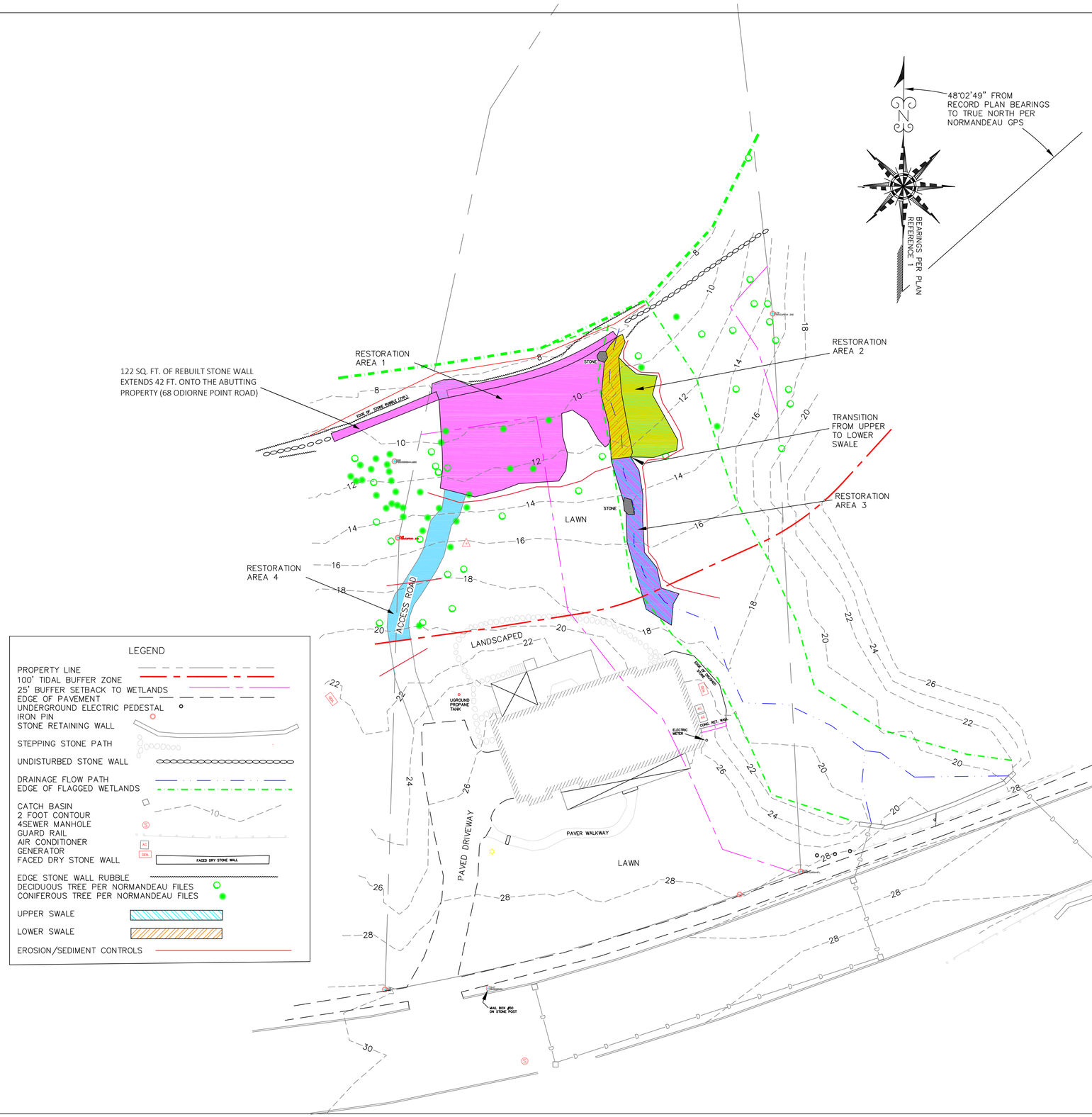
GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REVISION 9-10-23 ADD TREE LOCATIONS, NOTE 7 AND STONE WALL DETAIL
REVISION 10-19-23 ADD TREE LOCATIONS PER NORMANDEAU CAD FILES, OLD STONE WALL BASE WIDTH, TRUE NORTH & NOTE 7.
REVISION 11-6-23 ADD NEW ST. WALL AREA INSIDE POGW2, CORRECT POGW1 F6 SPELLING, UPDATE DRAFTING CLARITY

2300PNTS



NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

SURVEY INFORMATION PROVIDED BY: KNIGHT HILL SURVEYING SERVICES, INC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES, INC.
DATE: 01/08/24

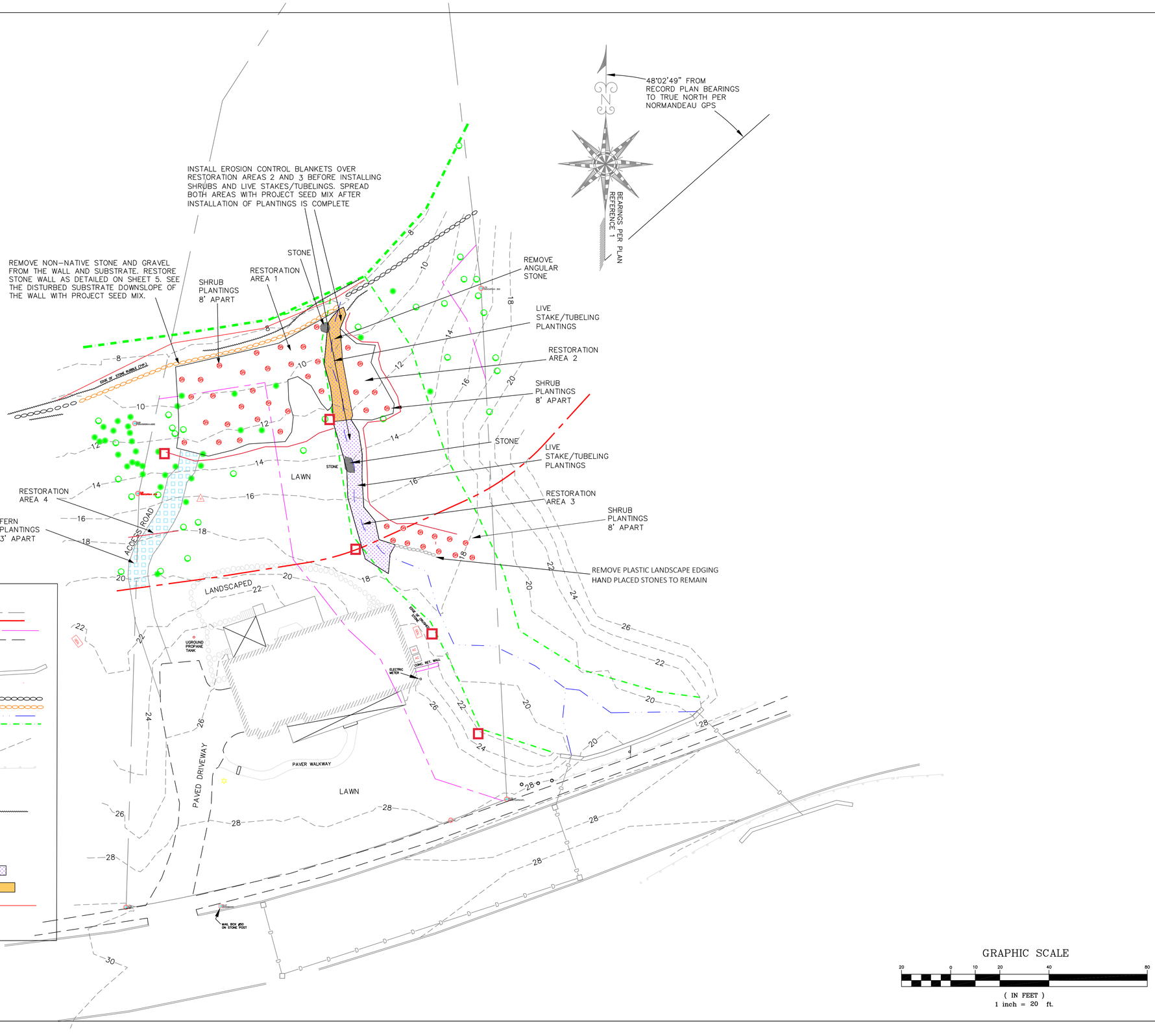
REVISIONS:

GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

PROPOSED RESTORATION AREAS
AND EROSION AND SEDIMENT CONTROLS

PROJECT NUMBER:
24780.000

SHEET NUMBER: 2 OF 9



NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

SURVEY INFORMATION PROVIDED BY: kNIGHT HILL SURVEYING SERVICES, iNC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES, INC.
DATE: 01/08/24

REVISIONS:

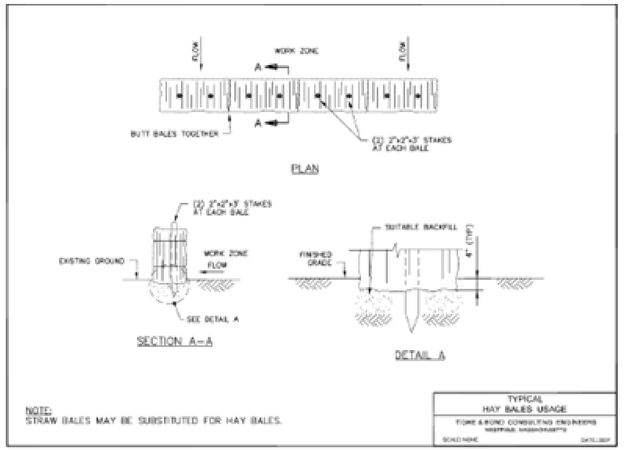
GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

PROPOSED CONDITIONS AND PLANTING PLAN

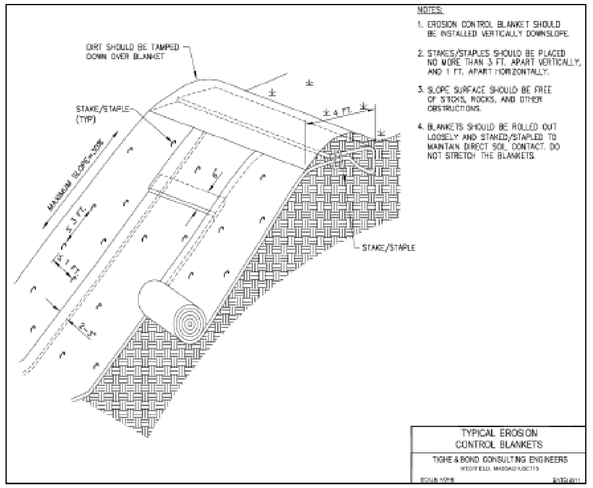
PROJECT NUMBER: 24780.000

SHEET NUMBER: 3 OF 9

Properly installed hay bale barrier with silt fence (direction of flow indicated by arrow).

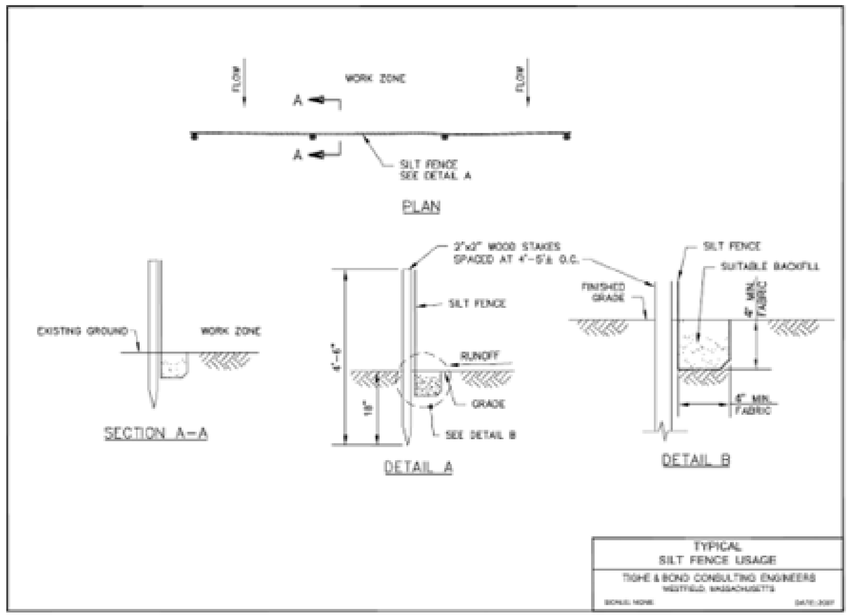


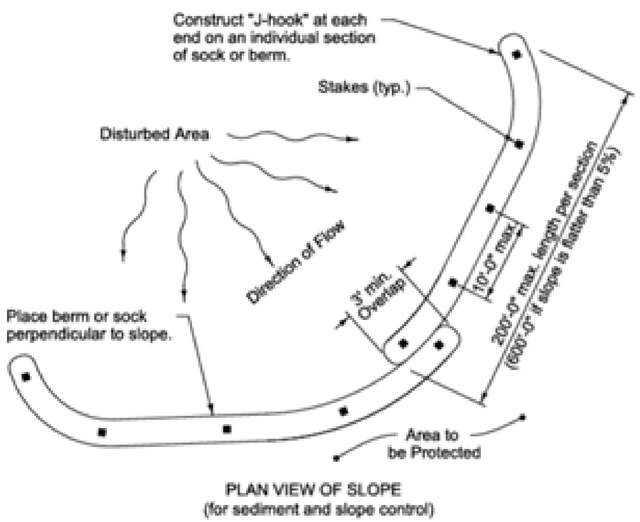
TYPICAL WEED FREE STRAW OR HAY BALE INSTALLATION

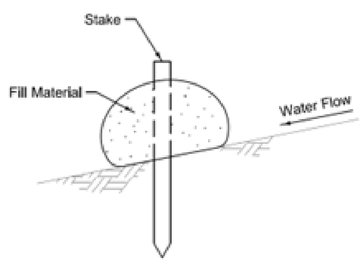


TYPICAL EROSION CONTROL BLANKET INSTALLATION

TYPICAL SILT FENCE INSTALLATION







TYPICAL FILTER SOCK INSTALLATION PLAN AND CROSS-SECTION VIEW

REFERENCES:
TYPICAL WEED FREE STRAW OR HAY BALE, EROSION CONTROL BLANKET, AND SILT FENCE INSTALLATION DETAILS ARE SOURCED FROM THE NHDES BEST MANAGEMENT PRACTICES MANUAL FOR UTILITY MAINENCE IN AND ADJACENT TO WETLANDS AND WATERBODIES IN NEW HAPSHIRE DATED MARCH 2019

TYPICAL FILTER SOCK INSTALLATION DETAILS ARE SOURCED FROM THE IOWA STATEWIDE URBAN DESIGN AND SPECIFICATIONS - STANDARD SPECIFICATIONS

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

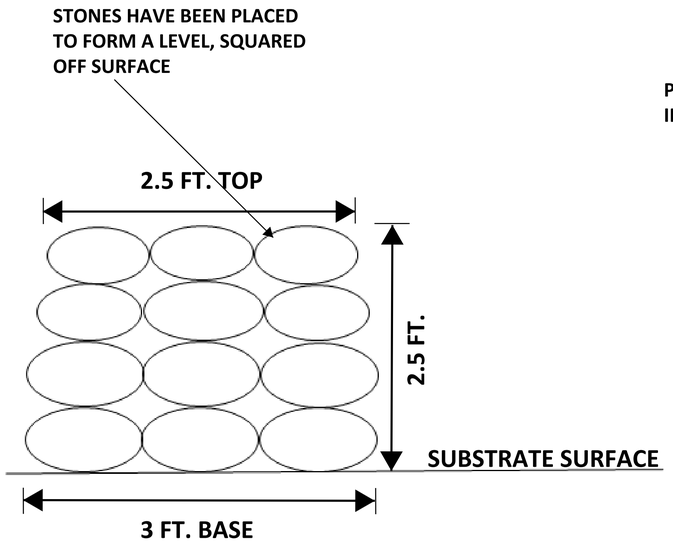
SURVEY INFORMATION PROVIDED BY: KNIGHT HILL SURVEYING SERVICES, INC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES, INC.
DATE: 01/08/24

REVISIONS:

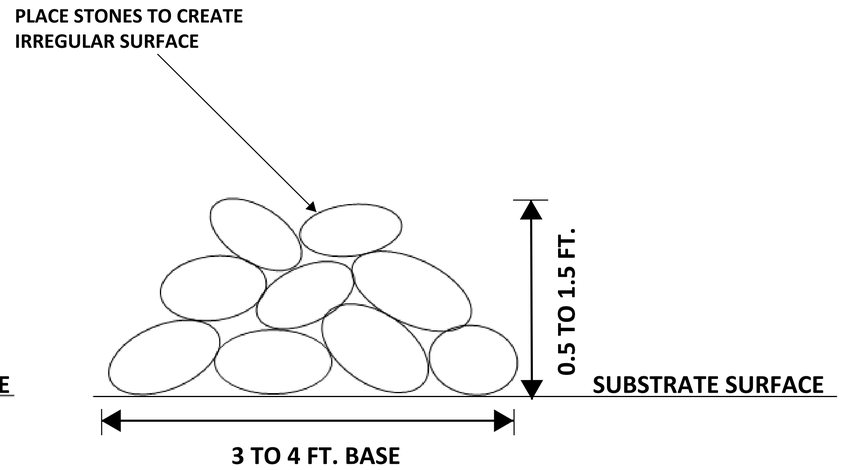
GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

EROSION CONTROL DETAILS

PROJECT NUMBER: 24780.000



TYPICAL EXISTING STONE WALL CROSS-SECTION
(NOT TO SCALE)



TYPICAL PROPOSED STONE WALL CROSS-SECTION
(NOT TO SCALE)

STONE WALL RESTORATION NOTES:

1. THE 10-15 TONS OF FILLER STONE AND GRAVEL BROUGHT IN FROM OFF-SITE SHALL BE REMOVED FROM THE STONE WALL TO THE EXTENT PRACTICAL AND DISPOSED OFF-SITE.
2. REMAINING STONE ON-SITE SHALL BE REORGANIZED AS NEEDED TO CREATE A LOW, LOOSE-PILE STONE WALL CONSISTENT WITH THE UNDISTURBED SECTION OF STONE WALL AT THE NORTHERN END OF THE PROPERTY (SEE FIGURES 1 AND 2 BELOW)
3. THE RESTORED STONE WALL SHALL BE BUILT TO HAVE A BASE OF VARIABLE WIDTH BETWEEN 3 AND 4 FEET AND A VARIABLE HEIGHT BETWEEN 0.5 AND 1.5 FEET RELATIVE TO THE SUBSTRATE SURFACE ON THE UPSLOPE SIDE OF THE WALL.
4. THE CROSS-SECTION SHAPE OF THE RESTORED WALL SHALL GENERAL CONFORM WITH THAT SHOWN IN THE PROPOSED STOEN WALL DETAIL, WITH NO LEVELED OR SQUARED OFF SURFACES.

*PLEASE NOTE THAT THE CROSS-SECTION DETAILS AND THE NUMBER AND DIMENSION OF STONES WITHIN THEM ARE REPRESENTATIVE AND NOT DRAWN TO SCALE OR TO REPLICATE REAL WORLD CONDITIONS.

FIGURE 1. UNDISTURBED PORTION OF STONE WALL AT NORTHERN END OF PROPERTY. CORRESPONDS WITH THE SECTION OF STONE WALL CIRCLED IN RED IN FIGURE 2. (8/26/23)

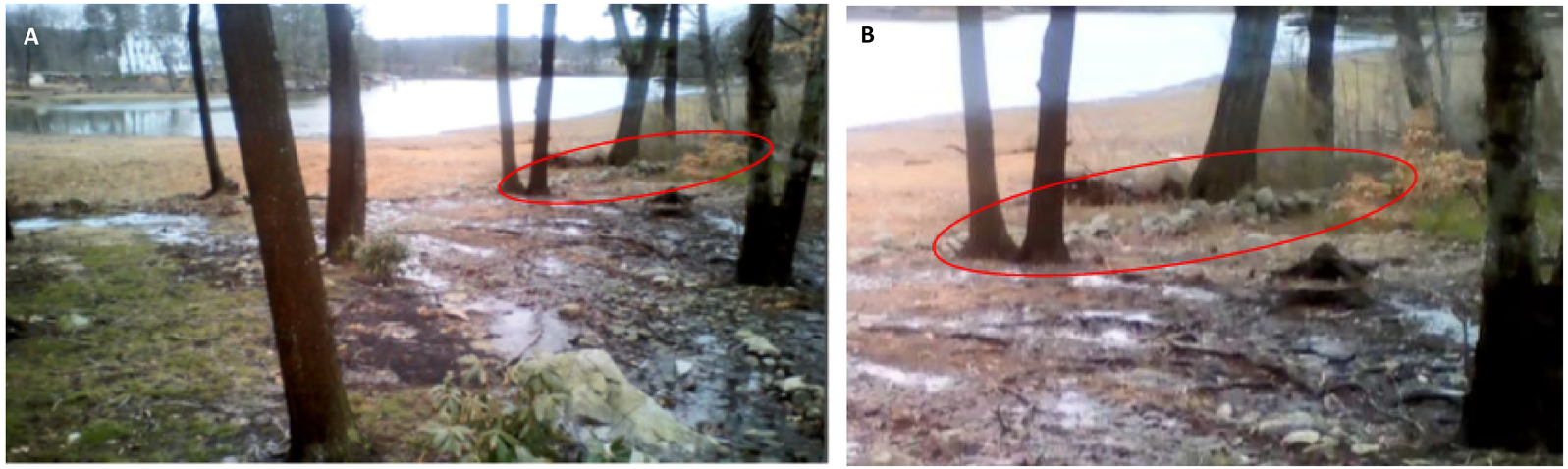


FIGURE 2. A) SCREEN CAPTURE FROM VIDEO SHOWING CONDITIONS ON IN VICINITY OF THE CURRENT LOWER HALF OF THE SWALE. VIDEO DATES TO PRIOR TO THE STONE WALL REBUILD IN 2022 BUT AFTER THE COMPLETION OF THE UPPER STONE SWALE INSTALLTION IN 2017. AREA CIRCLED IN RED REPRESENTS THE SECTION OF UNDISTURBED STONE WALL TO SERVE AS THE TEMPLATE FOR THE STONE WALL RESTORATION BASED ON DISCUSSIONS WITH THE CITY AND NHDES. B) ZOOMED IN VIEW OF THE TEMPLATE SECTION OF STONE WALL

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

SURVEY INFORMATION PROVIDED BY: kNIGHT HILL SURVEYING SERVICES, iNC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES,
INC. DATE: 01/08/24

REVISIONS:

GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

STONE WALL RESTORATION DETAILS

PROJECT NUMBER:
24780.000

SHEET NUMBER: 5 OF 9

RESTORATION PLANTINGS				
PLANT NAME	**TYPE**	**PLANT SIZE**	**PLANT QUANTITY**	**SPACING**
RESTORATION AREA 1 - STONE WALL RESTORATION				
CLETHRA ALNIFOLIA + (SWEET PEPPERBUSH)	SHRUB PLANTING	18-24" CONTAINER	8	8 FT. OC
TAXUS CANADENSIS ^ (AMERICAN YEW)	SHRUB PLANTING	Not listed at NEWP	8	8 FT. OC
VIBURNUM ACERIFOLIUM + (MAPLELEAF VIBURNUM)	SHRUB PLANTING	18-24" CONTAINER	10	8 FT. OC
RESTORATION AREA 2 - LOWER SWALE REMOVAL				
SPIRAEA ALBA + (MEADOWSWEET)	SHRUB PLANTING	18-24" CONTAINER	6	8 FT. OC
CORNUS AMOMUM + (SILKY DOGWOOD)	LIVE STAKE/TUBELING	2-3' (LIVE STAKES)/ 5" DEEP PLUG (TUBELINGS)	67	1-2 FT. OC
SALIX DISCOLOR + (PUSSY WILLOW)	LIVE STAKE/TUBELING	2-3' (LIVE STAKES)/ 5" DEEP PLUG (TUBELINGS)	67	1-2 FT. OC
PROJECT SEED MIX (TO BE SPREAD IN RESTORATION AREAS 1 AND 2)				
DICHANTHELIUM CLANDESTINUM * (DEER TONGUE)	SEED	-	1 lb./1000 sq. ft.	-
PANICUM VIRGATUM * (SWITCH PANIC GRASS)	SEED	-	1/2 lb./1000 sq. ft.	-
JUNCUS TENUIS ‡ (PATH RUSH)	SEED	-	0.6 lb./acre	-
RESTORATION AREAS 3 - UPPER SWALE REMOVAL				
CORNUS AMOMUM + (SILKY DOGWOOD)	LIVE STAKE/TUBELING	2-3' (LIVE STAKES)/ 5" DEEP PLUG (TUBELINGS)	106	1-2 FT. OC
SALIX DISCOLOR + (PUSSY WILLOW)	LIVE STAKE/TUBELING	2-3' (LIVE STAKES)/ 5" DEEP PLUG (TUBELINGS)	106	1-2 FT. OC
CORNUS AMOMUM + (SILKY DOGWOOD)	SHRUB PLANTING	18-24" CONTAINER	6	8 FT. OC
SALIX DISCOLOR + (PUSSY WILLOW)	SHRUB PLANTING	18-24" CONTAINER	6	8 FT. OC
NEW ENGLAND SEMI-SHADE GRASS AND FORBS +	SEED	-	1lb/1450 sq. ft.	-
RESTORATION AREA 4 - ACCESS ROUTE RESTORATION				
PARATHELYPTERIS NOVEBORACENSIS + (NEW YORK FERN)	FERN PLANTING	#1	60	2-3 FT. OC
NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DRY SITES +	SEED	-	1lb/1250 sq. ft.	-

GENERAL PLANTING NOTES:

1. **PLANTING MATERIALS CURRENTLY PROPOSED TO BE SOURCED FROM THE FOLLOWING PROVIDERS:**
   NEW ENGLAND WETLAND PLANTS, INC. (INDICATED BY +)
   PIERSON NURSERIES, INC. (INDICATED BY ^)
   THE VERMONT WILDFLOWER FARM (INDICATED BY *)
   ERNEST SEEDS (INDICATED BY ‡)
2. **SPACING OF PLANTING INSTALLATIONS FOR EACH SPECIES SHALL CONFORM WITH THE OFF-CENTER SPACING INFORMATION PROVIDED IN THE RESTORATION PLANTINGS TABLE.**
3. **CHOICE OF WHETHER TO USE LIVE STAKES OR TUBELINGS WILL DEPEND ON THE TIMING OF WORK. LIVE STAKES SHOULD ONLY BE USED IF IT IS POSSIBLE TO COMPLETE LIVE STAKE PLANTING PRIOR TO THE END OF THE WOODY VEGETATION SENESCENCE PERIOD (TYPICALLY THE END OF MARCH INTO EARLY APRIL).**
4. **APPLICATION RATE OF EACH SEED OR SEED MIX USED SHALL CONFORM WITH THOSE PROVIDED BY THE SELLER, WHICH ARE PROVIDED IN THE RESTORATION PLANTING TABLE. SEED CAN BE SOWN BY HAND OR WITH A HANDHELD SPREADER.**
5. **A LIGHT MULCH (NO MORE THAN 1" THICK) OF CLEAN, WEED FREE STRAW IS RECOMMENDED IN ALL RESTORATION AREAS.**
6. **IF SPRING CONDITIONS ARE DRIER THAN USUAL, WATERING OF PLANTINGS AND SEEDED AREA MAY BE REQUIRED.**
7. **A WARRANTY OF 1 YEAR, 85 PERCENT CARE AND REPLACEMENT WARRANTY FOR ALL PURCHASED SHRUB AND FERN PLANTINGS SHALL BE MAINTAINED BY THE CONTRACTOR RESPONSIBLE PLANTING INSTALLATION. A PERIOD OF CARE AND REPLACEMENT SHALL BEGIN AFTER INSPECTION AND APPROVAL OF THE INITIAL PLANTINGS INSTALLATION AND CONTINUE FOR 1 YEAR, WITH ONE POTENTIAL REPLACEMENT PERIOD. THE CONTRACTOR INSTALLING THE PLANTINGS SHALL NOT BE RESPONSIBLE FOR PLANTINGS THAT HAVE BEEN DAMAGED BY VANDALISM, FIRE, FLOODING, OR OTHER ACTIVTIES BEYOND THE CONTRACTORS CONTROL.**

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

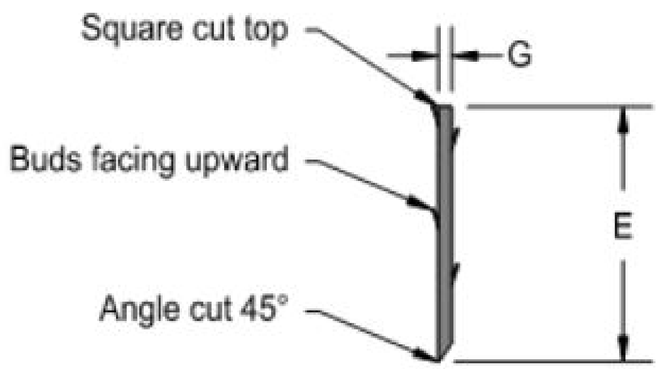
SURVEY INFORMATION PROVIDED BY: KNIGHT HILL SURVEYING SERVICES, INC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES, INC.
DATE: 01/08/24

REVISIONS:

GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

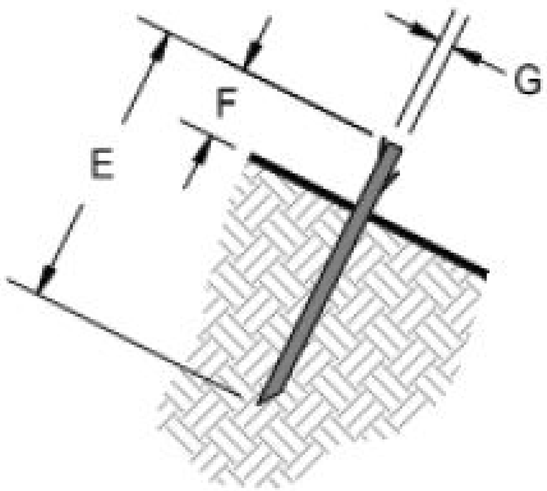
GENERAL PLANTING DETAILS

PROJECT NUMBER: 24780.000



LIVE STAKE DETAIL

TUBELING DETAIL



INSTALLED LIVE STAKE DETAIL

INSTALLED TUBELING DETAIL

LIVE STAKE/TUBELING NOTES:

1. LIVE STAKES/TUBELINGS SHALL CONSIST OF A MIX OF THE TWO FOLLOWING SPECIES, WITH EACH SPECIES COMPRISING APPROXIMATELY 50 PERCENT OF THE MIX: SILKY DOGWOOD (CORNUS AMOMUM) AND PUSSY WILLOW (SALIX DISCOLOR).

2. SEE GENERAL PLANTING NOTE #3 ON SHEET 6 REGARDING CHOICE OF USING LIVE STAKES VERSUS TUBELINGS FOR THIS PROJECT.

3. IF USING LIVE STAKES:
   a. LIVING CUTTINGS FOR LIVE STAKES SHALL BE ½ TO 1 ½ INCHES IN DIAMETER (G IN LIVE STAKE DETAILS) AND 2 TO 3 FEET IN LENGTH (E LIVE STAKE DETAILS). SIDE BRANCHES SHALL BE REMOVED AND THE BARK LEFT INTACT PRIOR TO INSTALLATION. BUDS ON THE STAKES SHALL BE ORIENTED IN AN UPWARD POSITION AND THE BASAL ENDS TAPERED FOR EASY INSERTION INTO THE SUBSTRATE. THE TOP SHALL BE CUT SMOOTH AND SQUARE
   b. PILOT HOLES, SMALLER IN DIAMETER THAN THE LIVE STAKES, SHALL BE DRILLED/DRIVEN INTO THE SUBSTRATE. THE STAKE SHALL THEN BE DRIVEN INTO THE PILOT HOLES SO THAT 67 TO 75 PERCENT OF EACH STAKE IS BELOW THE GROUND SURFACE (DIFFERENCE BETWEEN E AND F IN INSTALLED LIVE STAKE DETAIL).

4. IF USING TUBELINGS:
   a. TUBELINGS SHALL CONSIST OF A ROOTED CUTTING IN A 5-INCH DEEP PLUG CELL AND MEASURE BETWEEN 8 AND 24 INCHES IN HEIGHT.
   b. PLANTING HOLES SLIGHTLY DEEPER AND WILDER THAN THE 5-INCH DEEP PLUGS SHALL BE DUG INTO THE SUBSTRATE. THE PLUGS SHALL BE PLACED IN THESE HOLES AND BACK FILLED WITH EXCESS SOIL.

5. LIVE STAKES/TUBELINGS SHALL BE PLANTED AT 90 DEGREE ANGLE TO THE SUBSTRATE AND BE SPACED 1 TO 2 FEET OFF-CENTER. SMALLER SPACING (1 FOOF OFF-CENTER) SHALL BE USED IN THE CENTER 3 to 4 FEET OF THE SWALE, WITH SPACING GRADUALLY INCREASED UP TO 2 FEET OFF-CENTER PROGRESSING OUT TO THE SIDES OF THE SWALE. THE TWO SPECIES SHALL BE RANDOMLY INTERMIXXED.

6. MINIMAL RETAINED STONE SHALL BE INSTALLED BACK IN THE UPPER SWALE IN RESTORATION AREA 3 AT THE SAME TIME AS THE LIVE STAKE/ TUBELING INSTALLATION.

7. STAKES/TUBELINGS SHALL BE INSTALLED THROUGH THE EROSION CONTROL BLANKET, TO BE INSTALLED AFTER FINALIZATION OF ANY NECESSARY GRADING.

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

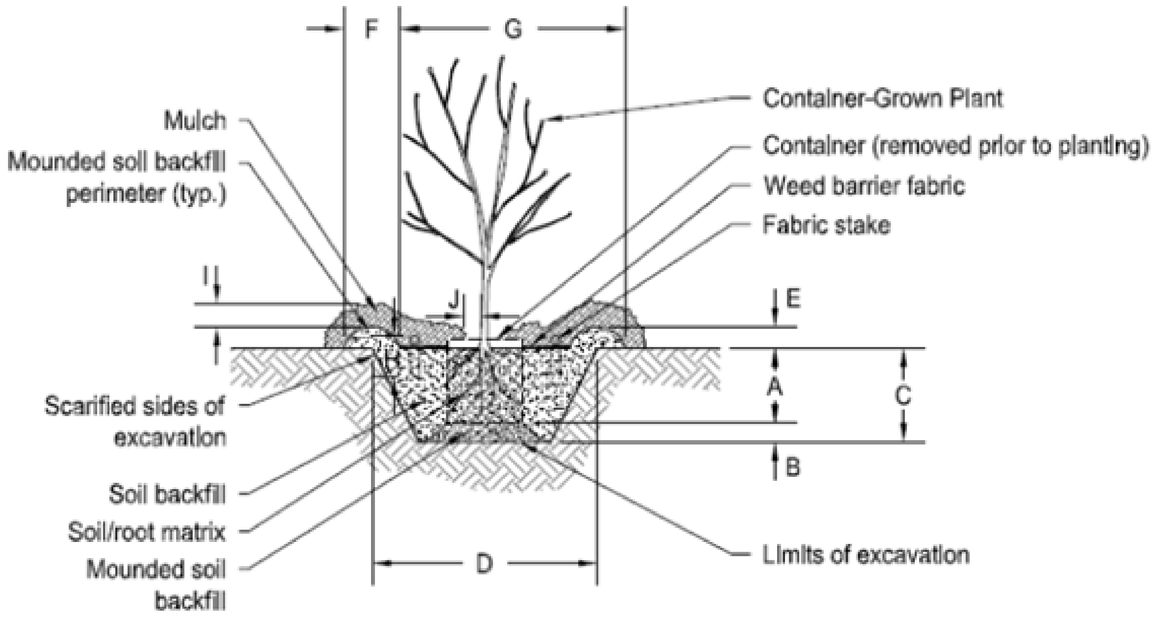
SURVEY INFORMATION PROVIDED BY: kNIGHT HILL SURVEYING SERVICES, iNC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES, INC.
DATE: 01/08/24

REVISIONS:

GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

LIVE STAKE/TUBELING DETAILS

PROJECT NUMBER: 24780.000



TYPICAL CONTAINER-GROWN PLANT INSTALLATION DETAIL

SHRUB AND FERN PLANTING NOTES:

1. **SHRUBS TO BE INSTALLED IN RESTORATION AREA 1 SHALL CONSIST OF A MIX OF THE THREE FOLLOWING SPECIES, WITH EACH SPECIES COMPRISING NO MORE THAN 50 PERCENT AND NO LESS THAN 20 PERCENT OF THE MIX: SWEET PEPPERBUSH (CLETHRA ALNIFOLIA), AMERICAN YEW (TAXUS CANADENSIS), AND MAPLELEAF VIBURNUM (VIBURNUM ACERFOLIUM). SHRUB SPECIES SHOULD BE PLANTED IN AN INTERMIXXED CONFIGURATION.**
2. **SHRUBS TO BE INSTALLED IN RESTORATION AREAS 2 SHALL BE MEADOWSWEET (SPIRAEA ALBA VAR. LATIFOLIA).**
3. **SHRUBS TO BE INSTALLED IN RESTORATION AREA 3 SHALL BE SILKY DOGWOOD (CORNUS AMOMUM) AND PUSSY WILLOW (SALIX DISCOLOR) AND SHOULB BE INTERMIXXED WHEN PLANTING.**
4. **FERNS TO BE INSTALLED IN RESTORATION AREA 4 SHALL CONSIST OF NEW YORK FERN (PARATHELYPTERIS NOVEBORACENSIS).**
5. **SHRUB AND FERN PLANTINGS SHALL BE INSTALLED BASED ON THE CONTAINER-GROWN PLANT INSTALLATION DETAIL AND ASSOCIATED TABLE.**
6. **SHRUBS SHALL BE INSTALLED IN A SPACING OF 8 FT. OFF-CENTER FROM OTHER SHRUBS. IN RESTORATION AREAS 1 THROUGH 3, THE THREE SPECIES OF SHRUB TO BE USED IN RESTORATION AREA 1 SHOULD BE INTERMIXXED.**
7. **FERNS SHALL BE INSTALLED IN A SPACING OF 2 to 3 FT. OFF-CENTER.**

Dimension[1]	Name	Typical Unit	Guidelines[2]	Description
A	Planting depth	Varies	Depth as required based on dimension of container soil and roots.	Planting depth of the container grown plant.
B	Heigth of mounded soil backfill	Inches	--	Height of mounded loose soil placed in over-excavated planting pit.
C	Depth of planting pit	Varies	Depth as required based on dimension of container soil and roots.	Depth of the planting pit; accomodates dimension of container soil and roots as well as mounded loose soil at bottom of pit.
D	Width of planting pit	Varies	1 ½ to 2 times the width of the container soil and roots.	Over-excavated width of the planting pit; accomodates the width of the container soil and roots.
E	Heigth of mounded soil perimeter	Inches	3"	Height of soil berm constructed along the perimeter of the planting pit; helps retain water.
F	Width of mounded soil perimeter	Inches	8"	Width of soil berm constructed along the perimeter of the planting pit; helps retain water.
G	Width of weed barrier fabric (not recommended)	Inches	--	Width of fabric placed on surface to control weeds within the mounded soil perimeter
H	Fabric stake length (not recommended)	Inches	4-6"	Length of staples/spikes used to secure weed barrier fabric
I	Thickness of mulch	Inches	1"	Thickness of weed free straw mulch.
J	Gap between mulch and plant stem/trunk	Inches	2"	Room between plant stem/trunk and mulch.

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

SURVEY INFORMATION PROVIDED BY: KNIGHT HILL SURVEYING SERVICES, INC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES, INC.
DATE: 01/08/24

REVISIONS:

GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

CONTAINER GROWN PLANTING NOTES

PROJECT NUMBER: 24780.000

Construction Sequence

1. **Installation of all necessary erosion and sediment controls and substrate protection in Restoration Area 1 as shown on the plans and specified in the notes in Attachment B.**

2. **Remove the estimated 10-15 tons of non-native stone and gravel forming the top portion of the stone wall in Restoration Area 1 and the Lower Swale Restoration Area 2.**

3. **Remove all non-native gravel spread over the substrate in the 50 sq. ft. area between the sections of rebuilt wall in Restoration Area 1 and in the 444 sq. ft. area north of the lower half of the swale in Restoration Area 2. Also remove any remaining landscaping fabric from the Lower Swale.**

4. **Remove all the stone and liner from the Upper Swale in Restoration Area 3. Retain a subset of smaller stones for re-installation in the Upper Swale.**

5. **Reconfigure the remaining native stones on site to create a stone wall with a general cross-section shape and dimensions as outlined in the Proposed Stone Wall Detail on Sheet 5 in Attachment B. Centerline of the stone wall should follow that of the existing wall.**

6. **Regrade substrate in Restoration Area 2 to eliminate any trace channel topography and install biodegradable, wildlife friendly erosion control blanket over the swale footprint in Restoration Areas 2 and 3.**

7. **Remove substrate protection in Restoration Area 1, lightly aerate the substrate to mitigate soil compaction and prepare substrate for planting.**

8. **Install all shrubs and/or live stakes as specified on Sheets 3 and 6 through 8 in Restoration Areas 1 through 3. Re-install a minimal amount of reserved smaller stone in the Upper Swale at the same time as live stakes installation.**

9. **Lightly aerate the soil to mitigate soil compaction and install fern plantings in Restoration Area 4 as specified on Sheets 3, 6, and 8.**

10. **Spread the seed mixes at the appropriate application rates specified in the Restoration Planting Table on Sheet 6 in Attachment B. Cover all disturbed seeded areas with a light layer of weed-free straw.**

11. **Install any supplemental erosion and sediment controls determined needed at the conclusion of restoration activities.**

12. **Install "Do not disturb or cut" signage at specified locations shown on Sheet 3.**

13. **Complete as-built documentation and reporting and commence post-construction monitoring protocols.**

14. **Temporary erosion and sediment controls will remain in place and be maintained until the site has been confirmed to be stabilized (>75% herbaceous ground cover and a lack of signs of erosion and sediment transport in all disturbed portions of the project area) by the environmental monitor. Maintenance and removal of erosion controls such as filter socks, silt fencing, and/or hay bales will be done by hand and be the responsibility of the Environmental Monitor. Erosion control blankets will remain in place and be allowed to biodegrade into the substrate.**

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

SURVEY INFORMATION PROVIDED BY: kNIGHT HILL SURVEYING SERVICES, iNC.
PROPOSED CONDITIONS PLAN PROVIDED BY: NORMANDEAU ASSOCIATES, INC. DATE: 01/08/24

REVISIONS:

GARDNER PROPERTY RESTORATION PLAN
NORMANDEAU ASSOCIATES, INC.
PORTSMOUTH, NEW HAMPSHIRE

CONSTRUCTION SEQUENCE

PROJECT NUMBER: 24780.000

Attachment C: Project Plan Notes

Full size copies of the notes provided on the Cover Sheet and Sheets 5 through 8 of the Project Plans in Attachment B.

EROSION AND SEDIMENT CONTROL NOTES (COVER SHEET):

1. ALL EROSION AND SEDIMENT CONTROL MEASURES (ECSs) SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE NHDES BEST MANAGEMENT PRACTICES MANUAL FOR UTILITY MAINTENANCE IN AND ADJACENT TO WETLANDS AND WATERBODIES IN NEW HAMPSHIRE DATED MARCH 2019. PLEASE SEE DETAILS REGARDING SUGGESTED ESCs ON SHEET 4.

2. MEANS OF EROSION AND SEDIMENT PROTECTION AS NOTED ON THE DRAWINGS INDICATE MINIMUM RECOMMENDED PROVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR FINAL SELECTION AND PLACEMENT OF EROSION AND SEDIMENTATION CONTROLS BASED ON ACTUAL SITE AND CONSTRUCTION CONDITIONS. ADDITIONAL MEANS OF PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED FOR CONTINUED OR UNFORESEEN EROSION PROBLEMS, OR AS DIRECTED BY THE ENVIRONMENTAL MONITOR, AT NO ADDITIONAL EXPENSE TO THE OWNER.

3. ESCs SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF AND DURING ALL PHASES OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO AND IMMEDIATELY AFTER ANY DISTURANCE OF EXISTING SURFACE MATERIAL ON THE SITE.

4. AFTER ANY SIGNIFICANT RAINFALL (>0.25 INCHES OF RAINFALL WITHIN 24 HOURS), ESCs SHALL BE INSPECTED FOR INTEGRITY. ANY DAMAGE SHALL BE CORRECTED IMMEDIATELY.

5. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES SHALL BE PROVIDED TO ENSURE THAT THE INTENDED PURPOSE IS ACCOMPLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEDIMENT LEAVING THE LIMIT OF WORK. ESCs SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKDAY.

6. THE CONTRACOTR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM ENTERING ANY STORM DRAINAGE SYSTEM AND FROM BEING CONVEYED TO ANY WETLAND RESOURCE AREA, PUBLIC WAYS, ABUTTING PROPERTY, OR OUTSIDE OF THE PROJECT LIMITS.

7. ANY SEDIMENT TRACKED ONTO PAVED AREAS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.

8. ANY AREAS OUTSIDE OF THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR TO THE PRE-CONSTRUCTION CONDITION/GRADE AT NO COST TO THE OWNER.

GENERAL PROJECT NOTES (COVER SHEET):

TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING FEATURES ARE PROVIDED IN THE "EXISTING CONDITIONS PLAN" PREPARED BY KNIGHTS HILL LAND SURVEYING SERVICES, INC. DATED 11/06/23.

THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS, AND SAFETY CODES IN THE EXECUTION OF THIS RESTORATION PLAN.

THE LOCATION OF ALL AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND NORMANDEAU ASSOCIATES, INC. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.

THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS, AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENVIRONMENTAL MONITOR OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.

PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENTS TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION AND ESTABLISHMENT OF ALL EROSION AND SEDIMENT CONTROLS.

ELEVATION REFERENCED TO NAVD88.

STONE WALL RESTORATION NOTES (SHEET 5):

1. THE 10-15 TONS OF FILLER STONE AND GRAVEL BROUGHT IN FROM OFF-SITE SHALL BE REMOVED FROM THE STONE WALL TO THE EXTENT PRACTICAL AND DISPOSED OFF-SITE.

2. REMAINING STONE ON-SITE SHALL BE REORGANIZED AS NEEDED TO CREATE A LOW, LOOSE-PILE STONE WALL CONSISTENT WITH THE UNDISTURBED SECTION OF STONE WALL AT THE NORTHERN END OF THE PROPERTY (SEE FIGURES 1 AND 2 BELOW)

3. THE RESTORED STONE WALL SHALL BE BUILT TO HAVE A BASE OF VARIABLE WIDTH BETWEEN 3 AND 4 FEET AND A VARIABLE HEIGHT BETWEEN 0.5 AND 1.5 FEET RELATIVE TO THE SUBSTRATE SURFACE ON THE UPSLOPE SIDE OF THE WALL.

4. THE CROSS-SECTION SHAPE OF THE RESTORED WALL SHALL GENERALLY CONFORM WITH THAT SHOWN IN THE PROPOSED STOEN WALL DETAIL, WITH NO LEVELED OR SQUARED OFF SURFACES.

GENERAL PLANTING NOTES (SHEET 6):

1. PLANTING MATERIALS CURRENTLY PROPOSED TO BE SOURCED FROM THE FOLLOWING PROVIDERS:
   NEW ENGLAND WETLAND PLANTS, INC. (INDICATED BY +)
   PIERSON NURSERIES, INC. (INDICATED BY ^)
   THE VERMONT WILDFLOWER FARM (INDICATED BY *)
   ERNEST SEEDS (INDICATED BY ǂ)

2. SPACING OF PLANTING INSTALLATIONS FOR EACH SPECIES SHALL CONFORM WITH THE OFF-CENTER SPACING INFORMATION PROVIDED IN THE RESTORATION PLANTINGS TABLE.

3. CHOICE OF WHETHER TO USE LIVE STAKES OR TUBELINGS WILL DEPEND ON THE TIMING OF WORK. LIVE STAKES SHOULD ONLY BE USED IF IT IS POSSIBLE TO COMPLETE LIVE STAKE PLANTING PRIOR TO THE END OF THE WOODY VEGETATION SENESCENCE PERIOD (TYPICALLY THE END OF MARCH INTO EARLY APRIL).

4. APPLICATION RATE OF EACH SEED OR SEED MIX USED SHALL CONFORM WITH THOSE PROVIDED BY THE SELLER, WHICH ARE PROVIDED IN THE RESTORATION PLANTING TABLE. SEED CAN BE SOWN BY HAND OR WITH A HANDHELD SPREADER.

5. A LIGHT MULCH (NO MORE THAN 1” THICK) OF CLEAN, WEED FREE STRAW IS RECOMMENDED IN RESTORATION AREAS 1, 2, AND 4.

6. IF SPRING CONDITIONS ARE DRIER THAN USUAL, WATERING OF PLANTINGS AND SEEDED AREA MAY BE REQUIRED.

7. A WARRANTY OF 1 YEAR, 85 PERCENT CARE AND REPLACEMENT WARRANTY FOR ALL PURCHASED SHRUB AND FERN PLANTINGS SHALL BE MAINTAINED BY THE CONTRACTOR RESPONSIBLE PLANTING INSTALLATION. A PERIOD OF CARE AND REPLACEMENT SHALL BEGIN AFTER INSPECTION AND APPROVAL OF THE INITIAL PLANTINGS INSTALLATION AND CONTINUE FOR 1 YEAR, WITH ONE POTENTIAL REPLACEMENT PERIOD. THE CONTRACTOR INSTALLING THE PLANTINGS SHALL NOT BE RESPONSIBLE FOR PLANTINGS THAT HAVE BEEN DAMAGED BY VANDALISM, FIRE, FLOODING, OR OTHER ACTIVTIES BEYOND THE CONTRACTORS CONTROL.

LIVE STAKE/TUBELING NOTES (SHEET 7):

1. LIVE STAKES/TUBELINGS SHALL CONSIST OF A MIX OF THE TWO FOLLOWING SPECIES, WITH EACH SPECIES COMPRISING APPROXIMATELY 50 PERCENT OF THE MIX: SILKY DOGWOOD (CORNUS AMOMUM) AND PUSSY WILLOW (SALIX DISCOLOR).

2. SEE GENERAL PLANTING NOTE #3 ON SHEET 6 REGARDING CHOICE OF USING LIVE STAKES VERSUS TUBELINGS FOR THIS PROJECT.

3. IF USING LIVE STAKES:
    a. LIVING CUTTINGS FOR LIVE STAKES SHALL BE ½ TO 1 ½ INCHES IN DIAMETER (G IN LIVE STAKE DETAILS) AND 2 TO 3 FEET IN LENGTH (E LIVE STAKE DETAILS). SIDE BRANCHES SHALL BE REMOVED AND THE BARK LEFT INTACT PRIOR TO INSTALLATION. BUDS ON THE STAKES SHALL BE ORIENTED IN AN UPWARD POSITION AND THE BASAL ENDS TAPERED FOR EASY INSERTION INTO THE SUBSTRATE. THE TOP SHALL BE CUT SMOOTH AND SQUARE
    b. PILOT HOLES, SMALLER IN DIAMETER THAN THE LIVE STAKES, SHALL BE DRILLED/DRIVEN INTO THE SUBSTRATE. THE STAKE SHALL THEN BE DRIVEN INTO THE PILOT HOLES SO THAT 67 TO 75 PERCENT OF EACH STAKE IS BELOW THE GROUND SURFACE (DIFFERENCE BETWEEN E AND F IN INSTALLED LIVE STAKE DETAIL).

4. IF USING TUBELINGS:
    a. TUBELINGS SHALL CONSIST OF A ROOTED CUTTING IN A 5-INCH DEEP PLUG CELL AND MEASURE BETWEEN 8 AND 24 INCHES IN HEIGHT.
    b. PLANTING HOLES SLIGHTLY DEEPER AND WIDER THAN THE 5-INCH DEEP PLUGS SHALL BE DUG INTO THE SUBSTRATE. THE PLUGS SHALL BE PLACED IN THESE HOLES AND BACK FILLED WITH EXCESS SOIL.

5. LIVE STAKES/TUBELINGS SHALL BE PLANTED AT 90 DEGREE ANGLE TO THE SUBSTRATE AND BE SPACED 1 TO 2 FEET OFF-CENTER. SMALLER SPACING (1 FOOF OFF-CENTER) SHALL

BE USED IN THE CENTER 3 to 4 FEET OF THE SWALE, WITH SPACING GRADUALLY INCREASED UP TO 2 FEET OFF-CENTER PROGRESSING OUT TO THE SIDES OF THE SWALE. THE TWO SPECIES SHALL BE RANDOMLY INTERMIXXED.

6. MINIMAL RETAINED STONE SHALL BE INSTALLED BACK IN THE UPPER SWALE IN RESTORATION AREA 3 AT THE SAME TIME AS THE LIVE STAKE/TUBELING INSTALLATION.

7. STAKES/TUBELINGS SHALL BE INSTALLED THROUGH THE EROSION CONTROL BLANKET, TO BE INSTALLED AFTER FINALIZATION OF ANY NECESSARY GRADING.

SHRUB AND FERN PLANTING NOTES (SHEET 8):

1. SHRUBS TO BE INSTALLED IN RESTORATION AREA 1 SHALL CONSIST OF A MIX OF THE THREE FOLLOWING SPECIES, WITH EACH SPECIES COMPRISING NO MORE THAN 50 PERCENT AND NO LESS THAN 20 PERCENT OF THE MIX: SWEET PEPPERBUSH (CLETHRA ALNIFOLIA), AMERICAN YEW (TAXUS CANADENSIS), AND MAPLELEAF VIBURNUM (VIBURNUM ACERFOLIUM). SHRUB SPECIES SHOULD BE PLANTED IN AN INTERMIXXED CONFIGURATION

2. SHRUBS TO BE INSTALLED IN RESTORATION AREAS 2 SHALL BE MEADOWSWEET (SPIRAEA ALBA VAR. LATIFOLIA).

3. SHRUBS TO BE INSTALLED IN RESTORATION AREA 3 SHALL BE SILKY DOGWOOD (CORNUS AMOMUM) AND PUSSY WILLOW (SALIX DISCOLOR).

4. FERNS TO BE INSTALLED IN RESTORATION AREA 4 SHALL CONSIST OF NEW YORK FERN (PARATHELYPTERIS NOVEBORACENSIS).

5. SHRUB AND FERN PLANTINGS SHALL BE INSTALLED BASED ON THE CONTAINER-GROWN PLANT INSTALLATION DETAIL AND ASSOCIATED TABLE.

6. SHRUBS SHALL BE INSTALLED IN A SPACING OF 8 FT. OFF-CENTER FROM OTHER SHRUBS.

7. FERNS SHALL BE INSTALLED IN A SPACING OF 2 TO 3 FT. OFF-CENTER.

Attachment D: Gardner Property Hydrology & Hydraulic Memo

BASE FLOW, LLC
3 Brimstone Hill Road, Amherst, NH 03031
C (603) 809-6101 baseflowinfo@gmail.com

Februrary 15, 2023

MEMO

To: Elizabeth Olliver, Normandeau Associates, Inc.

From: Gabe Bolin, PE

Base Flow Project No. 2022-01
Subject: Gardner Stone Wall & Swale, H&H Analysis

Base Flow, LLC (Base Flow) has prepared this memo to summarize a hydrology and hydraulic (H&H) analysis performed for the Gardner property, located at 50 Odiorne Point Road in Portsmouth, New Hampshire. The property is located along the shoreline of Sagamore Creek and receives surface water flows from both an unnamed stream and a stormwater runoff collection system associated with Odiorne Point Road. Surface water flows during storm events has caused soil erosion in the northern portion of the property, and the property owner previously installed a stone swale to convey storm flows through the property and to Sagamore Creek to mitigate the erosion. The property owner has also reported regular erosion of the ground surface directly north of the swale due to flows that are not contained in the swale during moderate to large storm events.

Unrelated to this analysis, the property owner recently improved upon the existing stone wall along the shorefront portion of the property. Due to conflicts with the wall installation and the New Hampshire Department of Environmental Services (NHDES) wetland regulations, the wall, swale and overall property is under review by NHDES staff and questions were raised as to whether the stone swale should be replaced with a more 'green' solution. Therefore, the purpose of this H&H analysis was to evaluate alternatives to the current stone swale, specifically to 1) determine if a greener solution was feasible and if that solution would 'hold up' to the existing surface water flow regime, and 2) if so, develop 1-2 green solution alternatives.

1. Existing Conditions

Base Flow performed a topographic survey of the site on November 11, 2022. A GPS base and rover unit was used to collect location and elevation data of the ground and site features including but not limited to the roadway edge, catch basin inverts, utilities, pipe inverts, trees, edge of driveway, landscaping features, house corners, stone walls, stream thalweg and banks, conveyance swale centerline and edge, tidal limits, etc. Data was collected in state plane coordinates (NAD83) and refers to the NAVD88 vertical datum. Data was uploaded into an AutoCAD drawing and used to create a triangulated irregular network (TIN), or graphical representation of the ground surface for the site. Contours were applied to the TIN and other features were developed to represent existing conditions. The AutoCAD drawing for this project is provided as Sheet 1, included at the end of this document.

The unnamed stream has an approximate drainage area of 21.51 acres (0.03 mi^2; StreamStats, 2023). Land use in the drainage area consists primarily of low density residential and forest, with 14.4% of the area covered by impervious surfaces and 22.6% covered by mix forest (StreamStats, 2023). Stream flow is conveyed to the property via a 12" high-density polyethylene (HDPE) pipe that exists under Odiorne Point Road. The pipe discharges at a large, stone masonry headwall adjacent to the property and neighboring property.

The stormwater collection system discharges via a 15" HDPE pipe at the same headwall. From inspection during our survey, the system consists of a few stormwater curb inlets and a relatively small subsurface stormwater conveyance system that collects stormwater along approximately 300 linear feet of Odiorne Point Road adjacent to Sagamore Avenue (NH Route 1A) and conveys it to the outlet at the headwall.

Surface water flows from both the unnamed stream and stormwater collection system combine approximately 35 feet northwest of the headwall and continues to flow west approximately 70 feet through a forested/vegetated natural area until flow reaches the stone swale. The property owner uses a section of landscape edging at the head of the swale to encourage flow into the swale, after which flows travel approximately 120 feet along the swale before discharging near the northern edge of the improved stone wall. Flow then travels around the wall and eventually into the creek. The depth of channel flow in the natural area upstream of the swale, which is primarily flat, is 1-2" with no real defined bankfull width. The stone swale, as shown in Figure 1, drops in elevation from approximately 17.5' to 8.4' for a slope of 7.6%. The swale is 10.5' wide at its widest section upslope and reduces down to 5-6' wide over the straight portion of the swale. It is comprised of mostly river cobble, with stone sizes ranging roughly from 3 to 6 inches in diameter (measured along the stone intermediate axis) with a few boulders located randomly in the swale.

The area directly north of the swale also receives stormwater runoff flows during certain events, when flows bypass the landscaping edging to the north. Some evidence of low to moderate soil erosion was observed in this area although it was difficult to make a full assessment due to leaf cover. However, it is evident that this area and most of the back yard adjacent to the creek cannot support grass or turf growth due to the density of trees on the property and resultant shade. The portion of this area subject to erosion would most likely not hold a layer of topsoil due to the frequency of stormwater flows. Figure 1 below provides photos of this portion of the property.

***Figure 1**. Downstream end of swale and discharge by improved stone wall end (top left); stone swale looking upstream, photo taken from area close to stone wall end (right); property directly north of swale subject to erosion, looking upstream, photo taken from area close to stone wall end (lower left).*

2. H&H Analysis

2-1: Hydrology

Base Flow accessed the StreamStats web application to obtain 1) approximate limits of the drainage area contributing surface water flows to the site and 2) estimated peak flows for recurrence interval storm events, to be used as input for the hydraulic model.

For quality control purposes, Base Flow performed a check of the drainage area limits provided by StreamStats with respect to accuracy, to ensure that the peak flow values provided are representative of existing conditions. We utilized our knowledge of the existing stormwater conveyance system and publicly available LiDAR (NHGranit, 2023) to confirm the delineation. It was concluded that the StreamStats

delineation was accurate after confirming that 1) the local stormwater conveyance system ends close to the neighboring property to the south along Odiorne Point Road (near the local highpoint in the roadway) and 2) the delineation seems to follow the drainage divides as indicated by elevations represented by local LiDAR. There are additional stormwater conveyance systems along Odiorne Point Road, however they convey flows to the south and do not contribute flow to this drainage area.

Table 1 provides a range of peak flow values relative to specific recurrence interval storm events, obtained from StreamStats. These flows were used as input for the one-dimensional steady state hydraulic model discussed in detail below.

Table 1: Summary of Peak Flows at the Site

Recurrence Interval (years)	Flow (cfs)
2	1.48
5	2.94
10	4.34
25	6.52
50	8.51
100	11.00

Source: Output from USGS StreamStats
Abbreviations: cfs = cubic feet per second
Date and Author: 2-15-2023, GMB

2-2: Hydraulics

Base Flow used the US Army Corps of Engineers (USACE) Hydrologic Engineering Center's River Analysis System model (HEC-RAS; http://www.hec.usace.army.mil/software/hec-ras/) to develop a one-dimensional, steady flow hydraulic model of the unnamed stream and adjacent areas. This model was used to simulate the peak flows for existing conditions.

The TIN surface developed as part of this project was used as the source of topography for the existing conditions hydraulic model. TIN surface data along cross sections defined in the AutoCAD map were exported from AutoCAD and imported into HEC-RAS Mapper, a user interface provided with the program. The series of long, dashed lines on Sheet 1 with labels 'STA = 1+XX' provide a graphical representation of the cross sections. The station numbering starts from zero at the end of the hydraulic model (at the northern

end of the improved wall) and continues in the upstream direction to the start of the model, at station 5+74 (not visible in Sheet 1).

Once the geometry file was created, features such as the swale, headwall, pipes, ineffective flow areas, upstream channel, stream bank stations, distances between cross-sections, and Manning's roughness coefficient at each cross-section were more fully defined. Manning's n values were selected based on channel surface roughness and presence of vegetation, informed from on site inspections and observations of aerial imagery.

HES-RAS requires boundary conditions to set the starting water surface elevation at the upstream and/or downstream ends of the river system being modeled. Additionally, a flow regime (subcritical, supercritical, or mixed) must be selected for each analysis. For this project, the steady flow analysis was completed using a subcritical flow regime, which is well suited for the size of site and hydraulic conditions. While only the downstream boundary condition is needed for a subcritical flow analysis, we specified upstream and downstream normal depth energy slope boundary conditions equal to 0.008 and 0.073, respectively, for all flow profiles. The energy slopes were estimated based on the channel slopes in the vicinity of the upstream and downstream portions of the project.

2-3: Model Results

Table 2 provides results at Station 0+44, which corresponds to a location that is approximately in the middle of the straight section of the swale (Sheet 1). The table provides results for velocity and shear within the limits of the swale channel. As discussed further in Section 3, these variables are considered most relevant to the assessment of erosion potential due to surface water flows on the property.

Table 2: Summary of Model Results at Station 0+44

Recurrence Interval (years)	Q Total (cfs)	Velocity in Channel (ft/s)	Shear in Channel (lb/sq ft)
2	1.48	2.53	0.79
5	2.94	2.87	0.92
10	4.34	3.12	1.04
25	6.52	2.99	0.90
50	8.51	2.18	0.44
100	11.00	2.39	0.52

Source: Output from HEC-RAS model
Abbreviations: cfs = cubic feet per second; ft/s = feet per second; lb/sq ft = pounds force per square foot
Date and Author: 2-15-2023, GMB

3. Discussion & Conclusions

Table 2 provides model results for velocity, which is the speed at which surface water flows over a channel boundary, and shear, which is a measure of the fluid force on the channel boundary. While in this analysis, both parameters will be used to assess the potential for channel erosion to occur, shear is the more applicable variable to predict the potential of channel boundary erosion.

When the ability of a stream to transport sediment exceeds the availability of sediments within the incoming flow, and stability thresholds for the material forming the boundary of the channel are exceeded, erosion occurs (Fischenich, 2001). For this project, it is suspected that there is a relatively low amount of sediment in the incoming flow, and the velocity and the shear forces associated with that flow range from moderate to high, depending on the intensity and duration of the storm event. So, the potential for erosion at the site is dependent on the channel boundary material and the particular storm event.

A relation of channel boundary material, flow velocity and shear is provided as Table 2 in Fischenich, 2001 (https://www.marincounty.org/-/media/files/departments/pw/mcstoppp/residents/fischenichstabilitythresholds.pdf). The table includes permissible shear stress and velocity values for soils, varying types of vegetation and types of stabilization techniques from a variety of sources. Ranges of values presented in the table reflect various measures presented within the literature (Fischenich, 2001).

Similarly, Table 3 below provides permissible shear stress and velocity values for the boundary types applicable to existing conditions at the site, along with recurrence intervals exceed (per the hydraulic model) for each boundary type.

Table 3: Summary of Permissible Shear Stress and Velocity for Applicable Channel Lining Materials with Recurrence Interval Exceedances

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/s)	Recurrence Intervals Exceeded (shear and/or velocity)
Soils	Silty Loam (noncolloidal)	0.045 – 0.05	1.75 – 2.25	All (except 50-year for velocity)
	Firm Loam	0.075	2.5	All (except 50 & 100-year for velocity)
Gravel/ Cobble	2-inch	0.67	3 - 6	All (except 50 & 100-year for shear)
	6-inch	2.0	4 – 7.5	None
Soil Bioengineering	Wattles	0.2 – 1.0	3.0	10-year for both

Source: Fischenich, 2001 (columns 1-4); Base Flow (column 5)
Abbreviations: ft/s = feet per second; lb/sq ft = pounds force per square foot
Date and Author: 2-15-2023, GMB

The boundary types included in Table 3 include what already exists on site, including our interpretation of site surficial soils and those materials found in the stone swale. We also reviewed the table in the Fischenich document for boundary types that could be included in the table for green alternatives, however, the choices were limited due to the anticipated growth limitations for vegetation at the site. For example, no boundary types from the Vegetation category of Table 2 in the Fischenich reference are included in our Table 3 above because we do not expect that turf or grasses can be established at the site due to light limitations. Temporary Degradable Rolled Erosion Control Products (RECPs) and Non-Degradable RECPs were also not considered because all of those products depend on the long-term establishment of vegetation. Wattles is the only item from the Soil Bioengineering category included in the analysis since it does not relay on establishment of vegetation, however, wattles are considered temporary controls and they would not be feasible as a long-term solution. The remaining items in that category either rely on vegetation establishment, are not a viable long-term option or may introduce aggressive plant species that may not be appropriate for the habitable portion of a residential backyard.

The comparisons made in Table 3 indicate that bare soils at the site are subject to erosion from surface water flows during all major recurrence interval storm events. Small gravels (≤2 inches) are also subject to erosion during the higher frequency storm events.

The 6-inch material is the only material in the comparison that is predicted to remain stable during all events, according to the estimates in the Fischenich document. These findings are consistent with the existing conditions of the stable stone swale and reports from the land owner that since installation of the swale, erosion within the limits of the swale has been successfully mitigated. These findings are also consistent with

the landowner claims that any flows that bypass the stone swale often result in soil erosion of the portion of the property directly north of the swale, and limited observations of erosion in this area made by Base Flow staff during the site survey.

Based on this analysis, we have concluded that the existing stone swale is the most appropriate solution to address erosion at the property. Considering the limited alternatives for replacement of the stone swale, the potential land disturbance that would occur along the creek shoreline if it was replaced, and the potential unnecessary costs to the landowner, we believe that there is no reason to pursue development of alternatives to the stone swale and believe that the existing swale should remain in place.

If a greener solution is still desired, it may be possible to plant between some of the stones in the swale. This could serve as a compromise that would incorporate vegetation, potentially improve water quality and still provide for the channel boundary stability required for the flow regime. However, plants would be limited to those that are shade tolerant and a maintenance plan may need to be developed with the landowner.

4. References

Fischenich, C., 2001. Stability Thresholds for Stream Restoration Materials. USAE Research and Development Center, Environmental Laboratory, Vicksburg MS. ERDC TN-EMRRP-SR-29. May, 2001. (Available at: https://www.marincounty.org/-/media/files/departments/pw/mcstoppp/residents/fischenichstabilitythresholds.pdf)

U.S. Geological Survey, 2016. The StreamStats program, online at http://streamstats.usgs.gov, accessed on (December 5, 2022).

Attachment E: New England Semi-Shade Grass and Forbs Mix

NEW ENGLAND WETLAND PLANTS, INC

820 WEST STREET, AMHERST, MA 01002

PHONE: 413-548-8000 FAX 413-549-4000

EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

New England Semi-Shade Grass and Forbs Mix

Botanical Name	Common Name	Indicator
Elymus virginicus	Virginia Wild Rye	FACW-
Elymus canadensis	Canada Wild Rye	FACU+
Festuca rubra	Red Fescue	FACU
Chamaecrista fasciculata	Partridge Pea	FACU
Liatris spicata	Spiked Gayfeather/Marsh Blazing Star	FAC+
Onoclea sensibilis	Sensitive Fern	FACW
Aster prenanthoides (Symphyotrichum prenanthoide	Zigzag Aster	FAC
Eupatorium fistulosum (Eutrochium fistulosum)	Hollow-Stem Joe Pye Weed	FACW
Eupatorium perfoliatum	Boneset	FACW
Juncus tenuis	Path Rush	FAC

PRICE PER LB. $87.00 MIN. QUANITY 1 LBS. **TOTAL:** $87.00 APPLY: 30 LBS/ACRE :1450 sq ft/lb

The New England Semi Shade Grass & Forb Mix contains a broad spectrum of native grasses and forbs that will tolerate semi-shade and edge conditions. Always apply on clean bare soil. The mix may be applied by hydro-seeding, by mechanical spreader, or on small sites it can be spread by hand. Lightly rake, or roll to ensure proper seed to soil contact. Best results are obtained with a Spring seeding. Late Spring and early Summer seeding will benefit with a light mulching of weed-free straw to conserve moisture. If conditions are drier than usual, watering will be required. Late Fall and Winter dormant seeding require an increase in the seeding rate. Fertilization is not required unless the soils are particularly infertile. Preparation of a clean weed free seed bed is necessary for optimal results.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is $/bulk pound, FOB warehouse, Plus SH and applicable taxes.

Attachment F: New England Erosion Control/Restoration Mix for Dry Sites

NEW ENGLAND WETLAND PLANTS, INC

820 WEST STREET, AMHERST, MA 01002

PHONE: 413-548-8000 FAX 413-549-4000

EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

New England Erosion Control/Restoration Mix for Dry Sites

Botanical Name	Common Name	Indicator
Elymus canadensis	Canada Wild Rye	FACU+
Festuca rubra	Red Fescue	FACU
Lolium multiflorum	Annual Ryegrass	
Lolium perenne	Perrenial Ryegrass	
Schizachyrium scoparium	Little Bluestem	FACU
Panicum virgatum	Switch Grass	FAC
Sorghastrum nutans	Indian Grass	UPL

PRICE PER LB. $18.00 MIN. QUANITY 5 LBS. **TOTAL:** $90.00 APPLY: 35 LBS/ACRE :1250 sq ft/lb

The New England Erosion Control/Restoration Mix For Dry Sites provides an appropriate selection of native and naturalized grasses to ensure that dry and recently disturbed sites will be quickly revegetated and the soil surface stabilized. It is an appropriate seed mix for road cuts, pipelines, steeper slopes, and areas requiring quick cover during the ecological restoration process. The mix may be applied by hydro-seeding, by mechanical spreader, or on small sites it can be spread by hand. Lightly rake, or roll to ensure proper soil-seed contact. Best results are obtained with a Spring or late Summer seeding. Late Spring through Mid-Summer seeding will benefit from a light mulching of weed-free straw to conserve moisture. If conditions are drier than usual, watering will be required. Fertilization is not required unless the soils are particularly infertile. Preparation of a clean weed free seed bed is necessary for optimal results.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is $/bulk pound, FOB warehouse, Plus SH and applicable taxes.

Attachment G: NHDES Requested Protected Shoreland Data and Additional Buffer Information

INTRODUCTION

As part of the 2022 natural resource survey of the Gardner Property, Normandeau Associates, Inc. (Normandeau) completed a tree inventory of all trees in the vicinity of the disturbed portions of the Gardner property associated with the stone swale and stone wall. The reference line for this inventory is the HOTL, which was delineated by Normandeau in November 2022 and surveyed by Knights Hill Survey in August 2023. The data and summary report provided in this supplemental attachment has been developed at the request of New Hampshire Department of Environmental Services as part of the process for receiving approval for the restoration plan for the property. This report outlines the results of this tree inventory, methods used, and the basic Protected Shoreland regulatory requirements associated with removal of vegetation from the site.

Vegetation is an important component in preserving and protecting water quality. Well vegetated shorelands that are comprised of native trees, shrubs, and ground cover provide significant benefits in terms of stormwater runoff. The Shoreland Water Quality Protection Act (SWQPA), RSA 483-B, serves to protect the water quality of New Hampshire's surface waters by managing the disturbance of shoreland areas. The protected shoreland area includes lands located within 250 feet from the reference line of public waters. The reference line for coastal waters is the highest observable tide line (HOTL), which means a line defining the furthest landward limit of tidal flow. The HOTL was previously delineated by Normandeau in November 2022.

The SWQPA attempts to maintain a shoreland buffer of natural vegetation to reduce the transportation of excess nutrients, sediments, and other pollutants into waterbodies. The SWQPA protects a 150-foot wide vegetated buffer adjacent to public waters such as lakes, ponds, rivers, and tidal waters. The vegetated buffer area is divided into two zones: the waterfront buffer and the natural woodland buffer. The waterfront buffer encompasses the first 50 feet beginning at the reference line, and the natural woodland buffer includes the area between 50 feet and 150 feet from the reference line.

Trees and saplings can be removed from the protected shoreland area, though different vegetation removal limitations apply within the two zones described above. Removal of trees and saplings within the waterfront buffer must be performed in accordance with a grid and point system. Removal of trees and saplings within the natural woodland buffer must comply with the unaltered state requirement. There are no limitations on tree removal in areas extending beyond 150 feet from the reference line.

METHODS

While the entire property falls within the 250 ft protected shoreland of Sagamore Creek, the tree inventory was limited to those areas in the vicinity of the disturbed areas in the back half of the property including the areas containing the stone swale, rebuilt stone wall, and access

route down to the stone wall from the driveway. Thus, this inventory does not represent a fully inventory of trees on the property. Each tree/sapling was located using a GPS unit capable of sub-meter accuracy, identified to the species level, if possible, and a diameter at breast height (DBH) measurement recorded. When a cluster of trees or saplings were growing from one individual plant, a diameter was recorded for each stem within the grouping. In addition to performing the inventory of individual trees and saplings, a general description of understory vegetation within the survey areas was also documented.

After conducting the field inventories, trees and saplings within the waterfront buffer (first 50 feet beginning at the reference line) were assigned a score based on DBH. Tree and sapling scores were calculated using the following guidelines:

- Diameter of one to three inches = 1 point
- Diameter greater than 3 inches and including 6 inches = 5 points
- Diameter greater than 6 inches and including 12 inches = 10 points
- Diameter greater than 12 inches = 15 points

For specimens with multiple stems greater than 1 inch, a diameter was recorded for each individual stem as described above. To calculate the score for plants with multiple stems, the score for each stem was determined, and then a sum of all scores for the plant resulted in a total score for that specimen. For example, a plant with three stems measuring diameters of 3 inches (1 point), 5 inches (5 points), and 6 inches (5 points) was assigned a total score of 11 points.

To complete each tree inventory assessment, the waterfront buffer in each surveyed area was divided into 25-foot by 50-foot grid segments. The purpose of the grid segments was to determine the tree and sapling score within each grid. Under the SWQPA, a minimum tree and sapling score of 25 points must be maintained within each grid segment. A general characterization of the percent shrub cover within the waterfront buffer was also recorded during each survey. This included an account of dominant species as well as the presence of any invasive species that were not recorded during the tree inventories.

RESULTS

The conditions at the back of the Gardner property, where the tree survey was conducted, consisted of a combination of regularly mowed lawn, landscaped garden beds, minimally to unmaintained fringing woodlands north and south of the mowed lawn, and a tidal wetland forming the very back of the property. Much of the woodland buffer (between 50 and 150 feet from the HOTL) has been developed on this property, although the fringing woodlands north and south of the mowed lawn (shaded in purple in the map below) constitute as unaltered natural woodland and comprise 33% of the woodland buffer on the property. The southern portion of unaltered woodlands has an understory that is sparsely vegetated with New York fern (*Parathelypteris noveboracensis*) that was impacted by the access route from the driveway to the stone wall. The northern portion of unaltered woodlands has an understory that is more

densely vegetated, primarily with herbaceous species, and contains a freshwater palustrine forest wetland (POGW2) that was eroded by stormwater runoff from the two culverts upslope prior to the installation of the swale. Please see Attachment A – Garner Property Natural Resource Report for specific information on the groundcover within this area and for photos of the protected shoreland on the property. Between the maintained lawn and rebuilt stone wall, a strip of bare substrate was observed that was the result of impacts by equipment used during the stone wall rebuild and swale extension in 2022. As stated above, the tree survey focused on those trees and saplings near the disturbed portions of the property and the species observed within the 50-foot waterfront buffer are displayed in Table 1 below. The most dominant species within the waterfront buffer were Eastern white pine (*Pinus strobus*) and sweet birch (*Betula lenta*). A total of twelve (12) Eastern white pine were recorded in the waterfront buffer with an average diameter of 10.2 inches. A total of seven (7) sweet birch were documented within the waterfront buffer with an average diameter of 8 inches.

Table 1. Trees and sapling inventory within the Gardner property waterfront buffer.

Scientific Name	**Common Name**
Betula lenta	Sweet birch
Pinus strobus	Eastern white pine
Quercus alba	White oak
Quercus rubra	Northern red oak
Acer rubrum	Red maple

As detailed in the methods section of this report, the waterfront buffer was divided into 25-foot by 50-foot grid segments, with a total of 7 grids located on the Gardner property. The scores within grid segments ranged from a low of 0 points in Grid 1 to a high of 62 points in Grid 7 (Table 2). All grid segments and the location of each tree and shrub inventoried are depicted in the map provided at the end of this report. Please note that two of the grids, Grids 1 and 7, are not fully contained within the limits of the property. In the case of Grid 1, most of the grid lies outside of the property boundary. While the tree survey suggests no trees occur within this this grid, that is potentially misleading because the tree survey in this area was kept strictly within the property boundary due to its distance from the impacts on the property and proposed impacts associated with the restoration plan. In the case of Grid 7, most of this grid lies within the property boundary and was fully surveyed because the rebuilt stone wall now proposed to be restored extends off the property in this area. A score for the entire grid, as well as for just the portion of the grid within the property boundaries is provided in the table below.

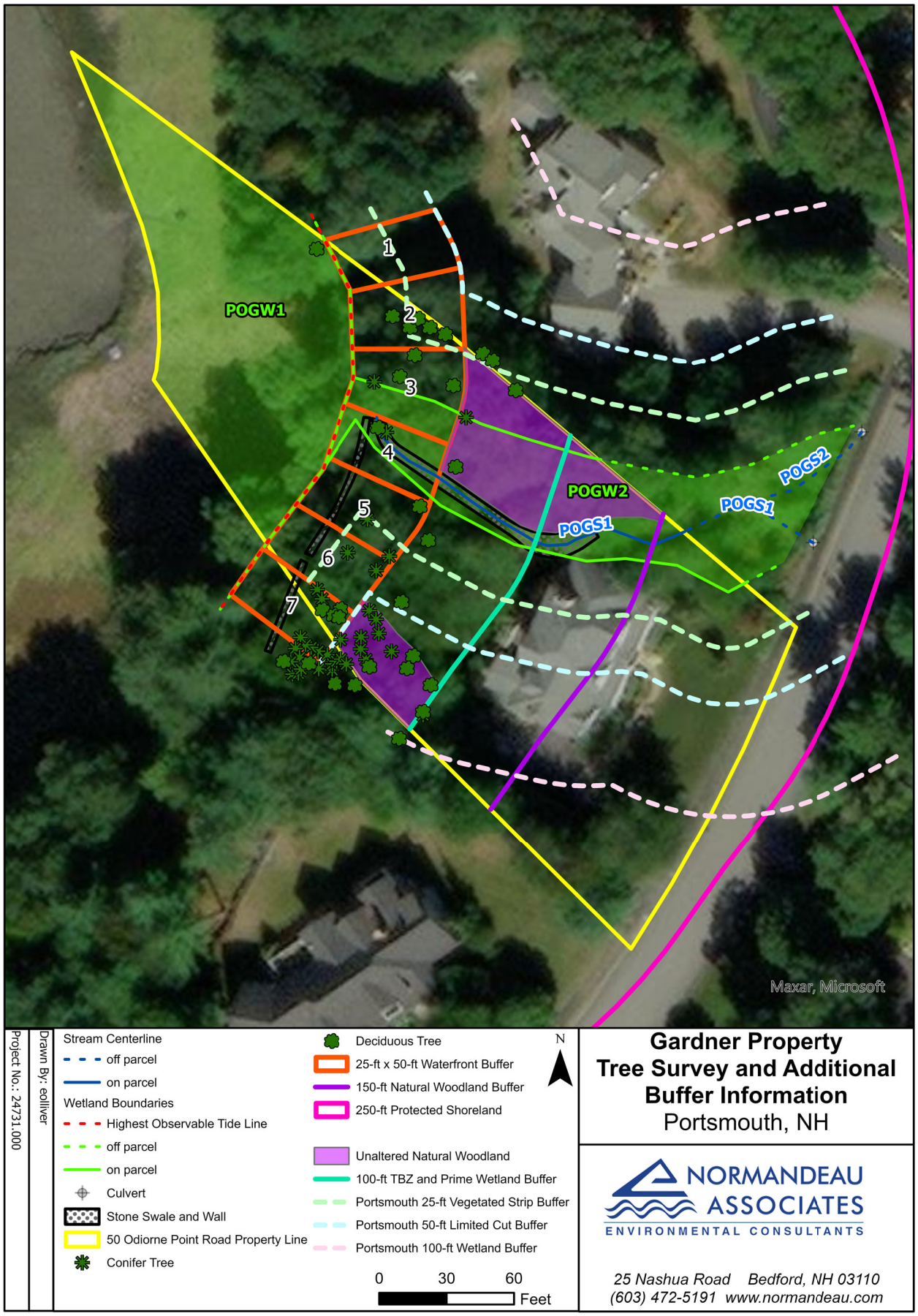
Table 2. Trees identified in the Gardner property survey.

Grid	Species	Stem Diameter (in.)					Tree and Sapling Score
		1	2	3	4	5	
Grid 1 Total Tree Score for portion on the property							**0**
2	Betula lenta	8	-	-	-	-	10
2	Betula lenta	8	5	-	-	-	15
2	Betula lenta	4	-	-	-	-	5
2	Quercus rubra	10	-	-	-	-	10
2	Quercus alba	12	-	-	-	-	10
Grid 2 Total Tree Score							**50**
3	Quercus alba	10	-	-	-	-	10
3	Quercus alba	1	-	-	-	-	1
3	Betula lenta	6	10	12			25
3	Pinus strobus	30	-	-	-	-	15
Grid 3 Total Tree Score							**51**
4	Quercus rubra	16	-	-	-	-	15
4	Pinus strobus	16	-	-	-	-	15
Grid 4 Total Tree Score							**30**
5	Quercus rubra	14	13	-	-	-	30
5	Pinus strobus	12	-	-	-	-	10
5	Pinus strobus	14	-	-	-	-	15
Grid 5 Total Tree Score							**55**
6	Pinus strobus	10	-	-	-	-	10
6	Pinus strobus	12	-	-	-	-	10
Grid 6 Total Tree Score							**20**
7	Betula lenta	10	-	-	-	-	10
7	Betula lenta	12	-	-	-	-	10
7	Betula lenta	8	-	-	-	-	10
7	Acer rubrum	4	-	-	-	-	5
7	Pinus strobus	8	-	-	-	-	10
7	Pinus strobus	6	-	-	-	-	5
Grid 7 Total Tree Score for portion on the property							**50**
7	Pinus strobus	3	-	-	-	-	1
7	Pinus strobus	1	-	-	-	-	1
7	Pinus strobus	4	-	-	-	-	5
7	Pinus strobus	6	-	-	-	-	5
Grid 7 Total Score including trees not on the property							**62**

DISCUSSION

The unpermitted work completed on the property between 2010 and 2022 in the protected shoreland area resulted in loss of herbaceous cover and increased hardscape in association with the stone swale. However, none of these activities involved the removal of any pre-existing shrubs, saplings, and/or trees and the currently proposed restoration will result in a nearly complete removal of the unpermitted hardscape associated with the swale. The restoration will also restore the lost herbaceous vegetation cover and enhance the protected shoreland beyond

its condition pre-disturbance through the installation of shrubby vegetation in multiple portions of the protected shoreland. Container shrub plantings will be installed in the area upslope of the stone wall, within the waterfront buffer, as well as further up in the unaltered natural woodland adjacent to the curvature in the swale at the top of the slope. Additionally, the swale will be converted from a hardscape to a fully vegetated green design with the removal of all geotextile liners and most of the stone and the installation of live stakes/tubelings, which will improve the management of stormwater runoff across the property.



Please note, the extent of rebuilt stone wall and existing swale presented on this map represent the data collected as part of the initial natural resource survey in November 2022. Please refer to Attachment B for the survey grade presentation of the stone wall and swale features on the property.

Attachment H: Permission from abutting property owner to restore section of stone wall on their property to approximate pre-existing conditions

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

January 29, 2024

City of Portsmouth
Planning & Sustainability
1 Junkins Avenue
Portsmouth, NH 03801

Re: Property Owner Authorization for Completion of Work on Property in Association with Work on the 50 Odiorne Point Road Property
68 Odiorne Point Road
Portsmouth, New Hampshire

To Whom it May Concern:

I (James Polus), the property owner of the 68 Odiorne Point Road parcel, confirm that I provided verbal approval for Mr. John Gardner to rebuild a portion of existing stone wall on my property in the summer of 2022. Pending the approval of the necessary Wetland's Conditional Use Permit from the City of Portsmouth and Restoration Order from the New Hampshire Department of Environmental Services, I now grant permission for Mr. Gardner to restore that rebuilt stone wall to approximate pre-existing conditions as outlined in the Gardner Property: Stone Wall, Swale, and Vegetation Restoration Project dated January 2024.

Sincerely,

James Polus