Drainage Narrative

49 Winkley Pond Road
Barrington, NH
Tax Map 253, Lot 14

Prepared for

Hambone, LLC
242 Central Ave
Dover, NH 03820

Prepared By

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825
603-332-2863

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER – KENNETH A. BERRY No. 14243 LICENSED

File Number
DB2021-163

August 16, 2023

Revised November 13, 2023

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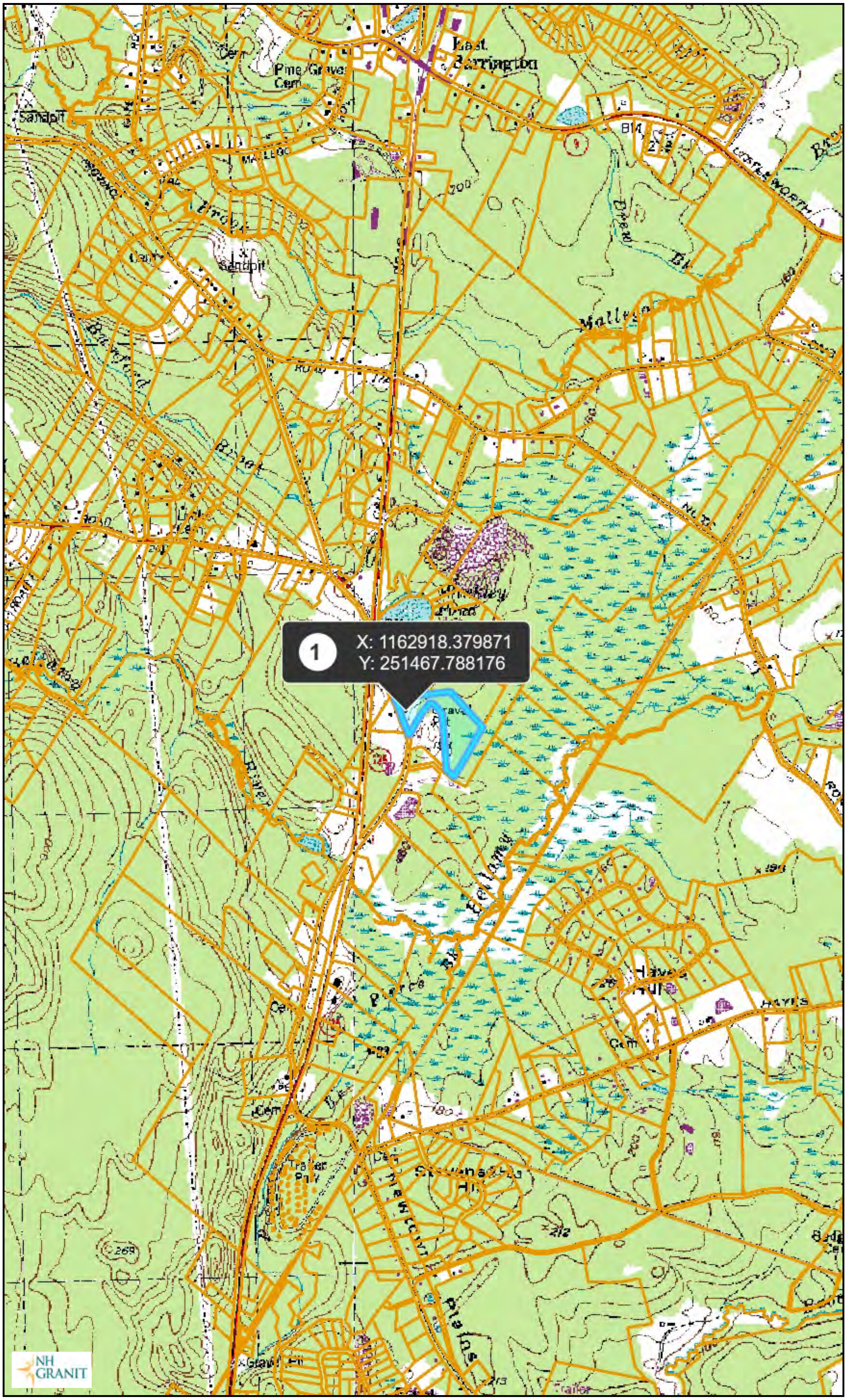

Legend

Parcels

- Parcel Polygons
- Attributes for Additional Lines
- State
- County
- City/Town

Map Scale

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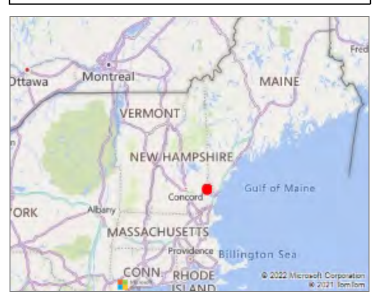

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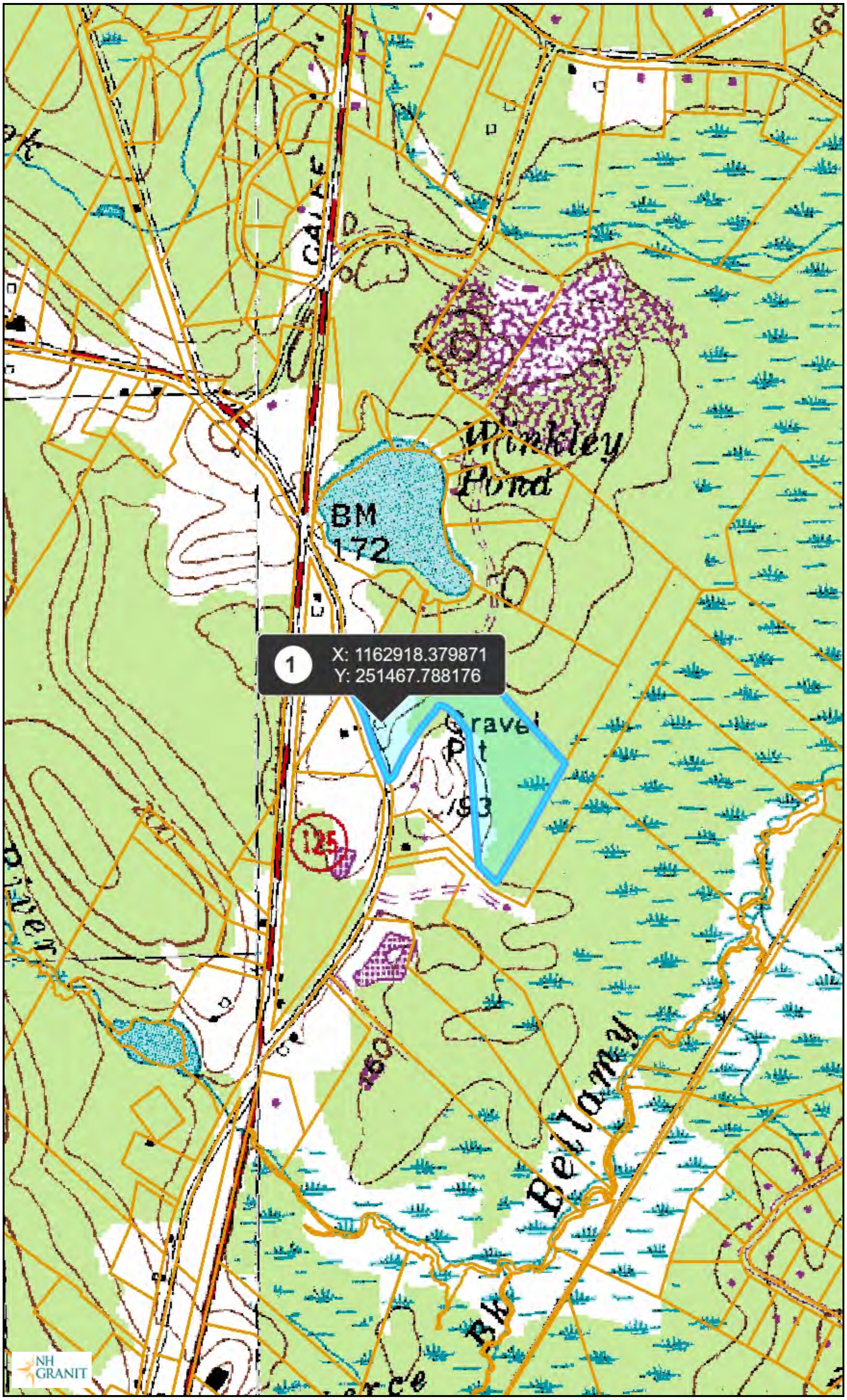

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Parcels

- Parcel Polygons
- Attributes for Additional Lines

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City/Town

Map Scale

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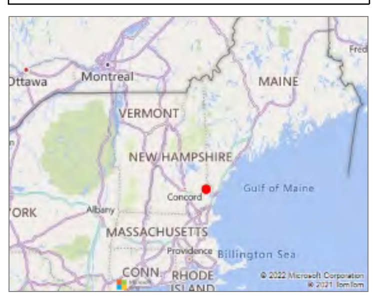

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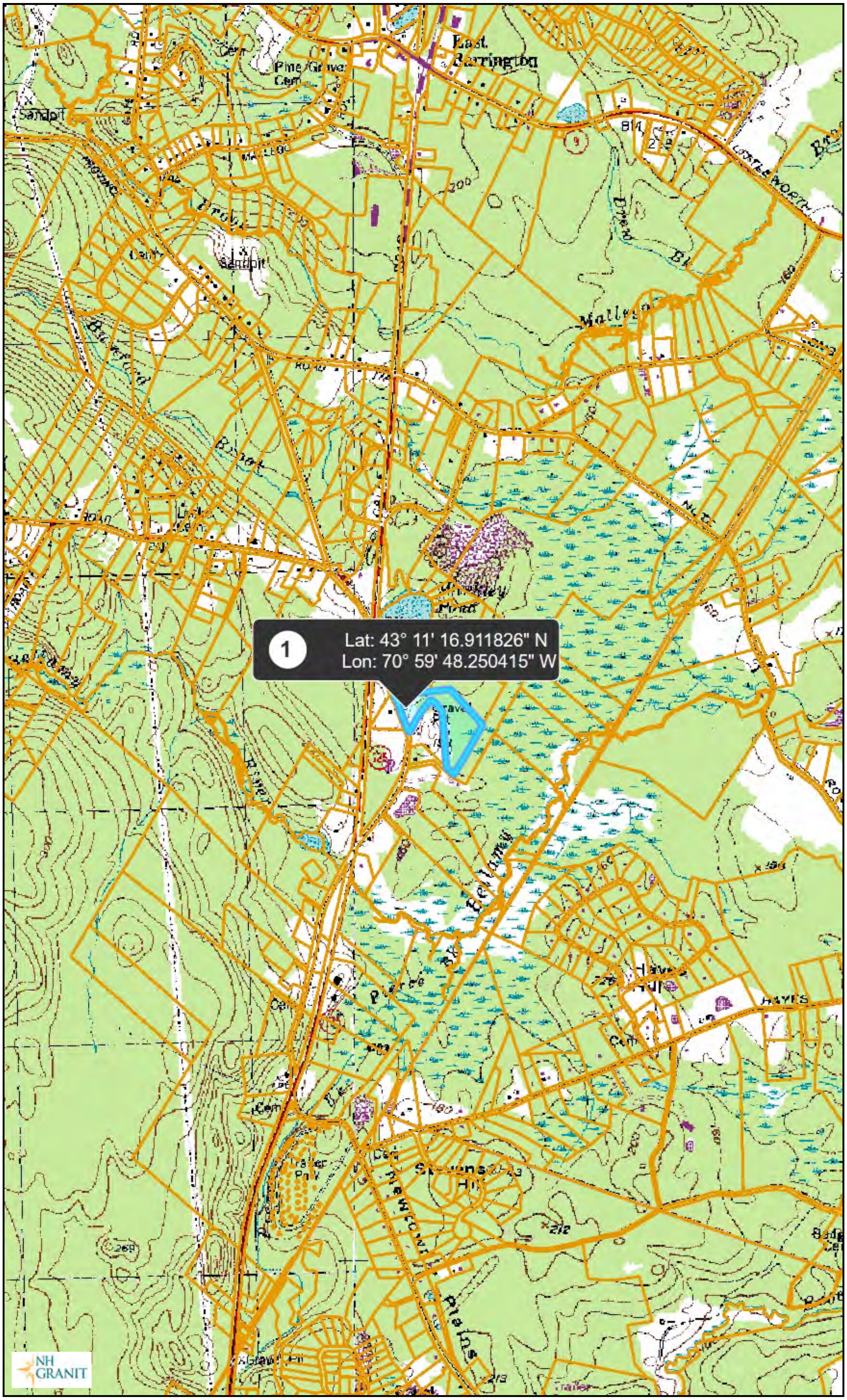

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Parcels

Parcel Polygons

Attributes for Additional Lines

State

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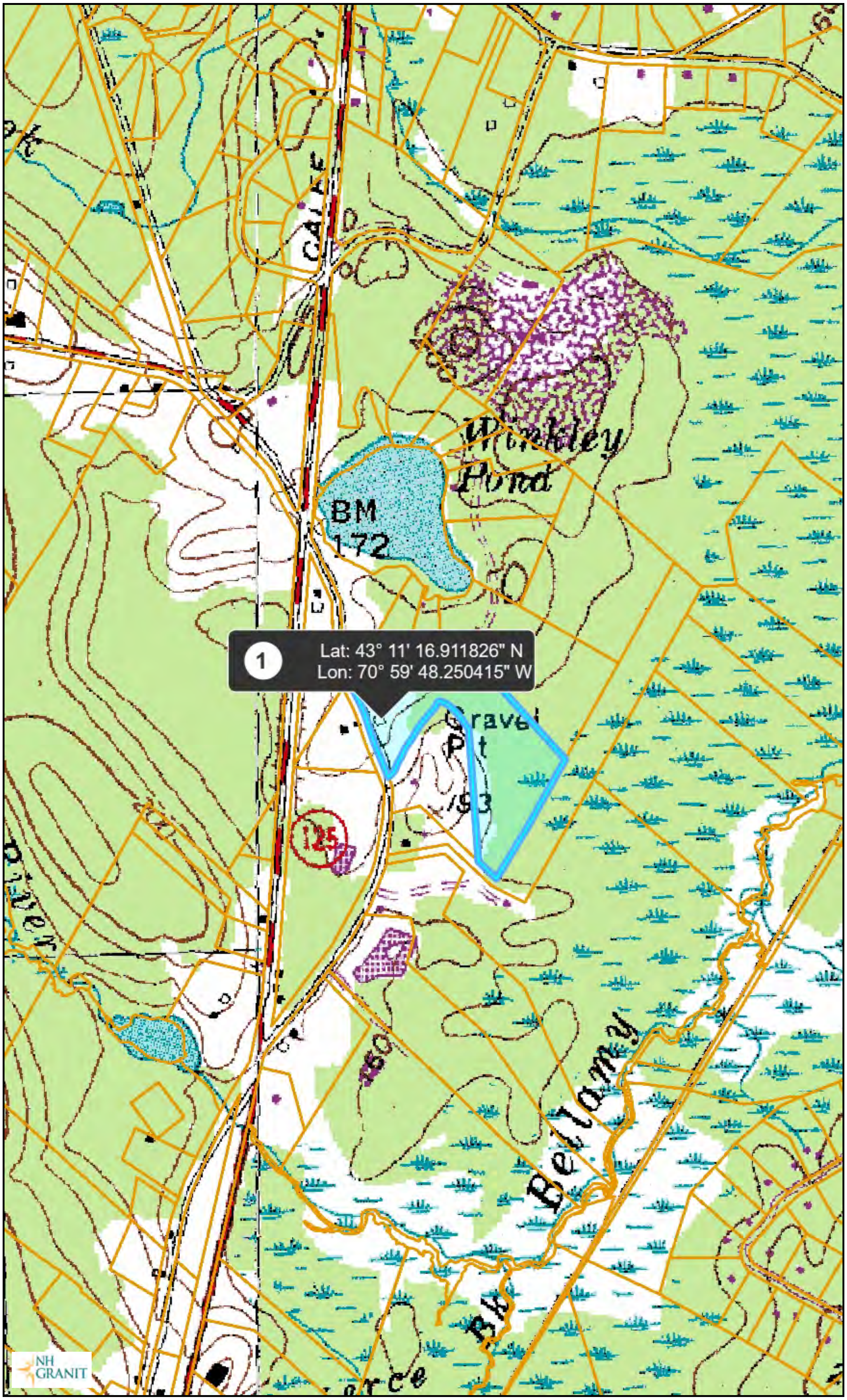

Legend

Parcels
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County
City/Town

Map Scale
1: 10,000

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Map Generated: 3/3/2022

Notes

DESIGN METHOD OBJECTIVES

The owner / developer of Tax Map 253, Lot 14, Hambone, LLC is proposing to develop the property at 49 Winkley Pond Road. The site is currently a single family lot including a house and a barn which are both proposed to be removed. The 7 proposed units will all be two-bedroom townhouse style construction.

On-site topography survey was completed by field crews of Berry Surveying & Engineering in October of 2022 and a Site Specific Soil Survey was completed by John P. Hayes with a report generated on July 26, 2023. Soils on site are included in three hydrologic soil groups: HSG B, HSG C, and HSG D. (See attached report). A wetland delineation was completed as part of the existing conditions package. The off-site land which drains onto the locus parcel has been delineated by USDA / NRCS soils in Websoil and USGS Equivalent contours from public sources. (Google Tin & NH Lidar)

An Existing and Proposed Conditions analysis was conducted for the purpose of estimating the peak rate of stormwater run-off and to subsequently design adequate mitigation of drainage. There is one existing drainage discharge point which was identified in the existing analysis and duplicated in the proposed conditions analysis. Designing two watershed models we have compared the differences in these rates of peak run-off and surface water volume. Sheet W1, Existing Conditions Watershed Plan, outlines the characteristics of the site in its existing or pre-construction conditions. The second analysis displays the proposed (post-construction) conditions (See Sheet W2). HydroCAD uses a series of node suffixes for numbering purposes (S = Subcatchment, P = Pond Device, R = Reach), to simplify annotation these suffixes are left off the watershed plans and node type is denoted by the symbol shape according to the displayed legend which coincides with HydroCAD graphics. The analysis was conducted using data for; 2 Yr - 24 Hr (3.08”), 10 Yr - 24 Hr (4.63”), 25 Yr - 24 Hr (5.85”), 50 Yr - 24 Hr (6.99”), and 100 YR - 24 Hr (8.36”) storm events. Storm event analysis was accomplished using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. Rainfall quantities are based on the Extreme Precipitation Table for this location from the Northeast Regional Climate Center / Cornell University (http://precip.eas.cornell.edu).

1.0 Existing Conditions Analysis:

Reference: Sheet W1 - Existing Conditions Watershed Plan (Enclosed)
Existing Conditions Plan

The existing parcel currently consists of 2 residential structures. The soils within the locus parcel are made up of multiple soil types, containing Hydrologic Soil Group (HSG) B, C, & D. See Site Specific Soils Map and report for more information. The land cover types involved are grassed land, woods, buildings, and road pavement. Off-site soils are likewise HSG A & C and again based on USDA / NRCS Websoil.

The land area analyzed consists of 2.03 acres of the 13.47 acre parcel as well as 2.72 acres of offsite land. The land analyzed is made up of a single subcatchment analyzed at an individual final reach.

Final Reach #100

Subcatchment #1 is land area in the northwestern portion of the property and drains to a delineated wetland being analyzed at **Final Reach #100** which eventually flows offsite.

2.0 Proposed Conditions Analysis:

Reference: Sheet W2 - Proposed Conditions Watershed Plan (Enclosed)
Proposed Grading & Drainage Plan

The client is proposing to develop the roadside portion of the parcel with 7 dwelling units and a dead end road consisting of 208 feet of roadway. The proposal is supported by an infiltration pond to help comply with groundwater recharge volume requirements and a closed drainage system of catch basins and drain manholes all directed to a single rain garden for treatment of onsite paved surfaces.

Final Reach #100

Subcatchment #1 is reduced in size due to the proposed development of the parcel and the construction of drainage practices. Runoff still flows to the wetland analyzed as **Final Reach #100**.

Subcatchment #11 is made up of the land directly surrounding and flowing to **Rain Garden #101** (**Pond #101**) extending to a portion of Winkley Pond Road. Runoff is directed through an outlet structure to the wetland analyzed as **Final Reach #100** through an overland reach (**Reach #101**).

Subcatchment #12 consists of the land directly surrounding and flowing to **Infiltration Basin #102** extending to portions of Winkley Pond Road as well as extending offsite to a high point north of the parcel. Runoff is infiltrated into the ground with any future excess runoff overflowing directly into **Rain Garden #101** and subsequently directed through an outlet structure and overland reach to the wetland analyzed as **Final Reach #100**.

Subcatchments #21-#24 encompass a majority of the impervious area of the proposed development. Runoff is collected in four catch basins (**Ponds #C01-#C04** respectively). **Catch Basins #2-#4** individually outlet into **Rain Garden #101** and eventually to **Final Reach #100**. **Catch Basin #1** collects runoff from the southeastern portion of the roadway as well as the front portions of the roofs of units **#6 & #7** and directs the runoff to **Catch Basin #2** and subsequently to **Final Reach #100**.

Subcatchment #25 is made up of a small portion of Winkley Pond Road and the paved apron of the proposed fire cistern. Runoff flows to **Catch Basin #5** (**Pond #C05**) and into **Rain Garden #101** through Drain Manhole #1 (**Pond #D01**).

3.0a Stormwater Treatment:

Treatment takes place within the rain garden and infiltration basin designed to support the development on site. Pre-treatment will be provided in the sediment forebay of the infiltration basin and the deep sump catch basins before entering the rain arden. The stormwater quality volume capability is treated within provided treatment area of the practices.

3.0b Stormwater Infiltration:

Groundwater recharge volume requirements are satisfied by Infiltration Basin #102 (Pond #102) (Sheet P-102). See Infiltration Feasibility Study also prepared by Berry Surveying & Engineering and published on the same day.

3.1 FULL COMPARATIVE ANALYSIS

ANALYSIS COMPONENT: PEAK RATE DISCHARGE (Cubic Feet / Second)

		2 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Final Reach #100	Existing	0.12	1.41	3.21	5.30	8.14
	Proposed	0.11	1.05	2.25	4.23	6.25

ANALYSIS COMPONENT: VOLUME (Acre Feet)

		2 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Final Reach #100	Existing	0.057	0.252	0.475	0.722	1.058
	Proposed	0.091	0.248	0.421	0.610	0.861

4.0 EROSION and SEDIMENT CONTROL PLAN & BEST MANAGEMENT PRACTICES (BMP's)

Reference: Proposed Site Plan and Grading Plan
Erosion & Sediment Control Plan
Erosion & Sediment Control Details

The proposed site development is protected from erosion and the abutting properties are protected from sediment by the use of Best Management Practices as outlined in the New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection & Design (December 2008, NHDES & US EPA). Any area disturbed by construction will be re-stabilized within 30 days and abutting properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them. Reference is also made to the Stormwater System Management: Inspection & Maintenance Manual and Stormwater Operations, Inspection & Maintenance Plan which has been developed specifically for this project and available to the owner.

Perimeter Control (Silt Fence / SiltSoxx / Erosion Control Mix Berm)

The plan set demonstrates the location of perimeter sediment control. The Erosion and Sediment Control Details, Sheet E-101, has the specifications for installation and maintenance of the silt fence, Filtrexx mulch filled SiltSoxx (or approved equal), and Erosion Control Mix Berm. There are locations on the site, for example bio-media rain garden protection, where SiltSoxx protection is specified. An area of permanent perimeter control is shown by the well house for wetland buffer protection from steeper slopes.

Bio-Retention System (Rain-Garden)

Description: A bioretention system (sometimes referred to as a "rain garden") is a type of filtration BMP designed to collect and filter moderate amounts of stormwater runoff using conditioned planting soil beds, gravel beds and vegetation within shallow depressions. The bioretention system may be designed with an underdrain, to collect treated water and convey it to discharge, or it may be designed to infiltrate the treated water directly to the subsoil. Bioretention cells are capable of reducing sediment, nutrients, oil and grease, and trace metals. Bioretention systems should be sited in close proximity to the origin of the stormwater runoff to be treated. The major difference between bioretention systems and other filtration systems is the use of vegetation. A typical surface sand filter is designed to be maintained with no vegetation, whereas a bioretention cell is planted with a variety of shrubs and perennials whose roots assist with pollutant uptake. The use of vegetation allows these systems to blend in with other landscaping features. See SWM Volume 2, 4-3.4c, Treatment Practices, Bio-Retention System, page 110.

Construction Considerations: After the stone and bio-media has been installed, Filtrexx Silt Soxx or approved equal, will be installed at the toe of slope intersection between the berm and bio-media and will remain until the slopes of the berm are stable.

Maintenance Considerations: Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection. Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually. Trash and debris should be removed at each inspection. At least once annually, system should be inspected for drawdown time. If bioretention system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function or infiltration function (as applicable), including but not limited to removal of accumulated sediments or reconstruction of the filter media. Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species. The rain garden is equipped with an underdrain and end cap assembly which will need to be routinely inspected for obstructions.

See the Stormwater Management Inspection and Maintenance Manual for more details.

In-Ground Infiltration Basin

Description: Infiltration basins are impoundments designed to temporarily store runoff, allowing all or a portion of the water to infiltrate into the ground. An infiltration basin is designed to completely drain between storm events. An infiltration basin is specifically designed to retain and infiltrate the entire Water Quality Volume. Some infiltration basins may infiltrate additional volumes during larger storm events, but many will be designed to release stormwater exceeding the water quality volume from the larger storms. In a properly sited and designed infiltration basin, water quality treatment is provided by runoff pollutants binding to soil particles beneath the basin as water percolates into the subsurface. Biological and chemical processes occurring in the soil also contribute to the breakdown of pollutants. Infiltrated water is used by plants to support growth or it is recharged to the underlying groundwater. As with all impoundment BMPs, surface infiltration basins should be designed with an outlet structure to pass peak flows during a range of storm events, as well as with an emergency spillway to pass peak flows around the embankment during extreme storm events that exceed the combined infiltration capacity and outlet structure capacity of the facility. See SWM Volume 2, 4-3.3b, Treatment Practices, In-Ground Infiltration Basin, page 88.

Maintenance Considerations: Removal of debris from inlet and outlet structures. Removal of accumulated sediment. Inspection and repair of outlet structures and appurtenances. Inspection of infiltration components at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection. Inspection of pretreatment measures at least twice annually, and removal of accumulated sediment as warranted by inspection, but no less than once annually. Periodic mowing of embankments. Removal of woody vegetation from embankments. Inspection and repair of embankments and spillways. If an infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

Vegetated Stabilization

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of breaking ground. Construction will be managed in such a manner that erosion is prevented and that no abutter's property will be subjected to any siltation, unless otherwise permitted. All areas to be planted with grass for long-term cover will follow the specification and on Sheet E-102 using seeding mixture C, as follows:

Mixture	Pounds per Acre	Pounds per 1,000 Sq. Ft.
Tall Fescue	24	0.55
Creeping Red Fescue	24	0.55
Total	**48**	**1.10**

Conservation Mix

Virginia Wild Rye	Native	FACW-
Little Bluestem	Native	FACU
Big Bluestem	Native	FAC
Red Fescue	Native	FACU
Switch Grass	Native	FAC
Partridge Pea	Native	FACU
Showy Tick Trefoil	Native	FAC
Butterfly Milkweed	Native	NI
Beggar Ticks	Native	FACW
Purple Joe Pye Weed	Native	FAC
Black Eyed Susan	Native	FACU-
Total	**25**	**0.57**

Conservation Mix to be provided by New England Wetland Plants, Inc., Amherst, MA as outline in their New England Conservation / Wildlife Mix or approved equal. Mix to be applied at a rate of 25 lbs. per acre or one-lb. per 1750 square feet. Ratio of seed is proprietary and substitutions are not allowed.

Conservation Mix will used to stabilize all 2:1 slopes and all land area disturbed within the wetland buffer. (If applicable).

Stabilized Construction Entrance

A temporary gravel construction entrance provides an area where mud can be dislodged from tires before the vehicle leaves the construction site to reduce the amount of mud and sediment transported onto paved municipal and state roads. The stone size for the pad should be 3" coarse aggregate, and the pad itself constructed to a minimum length of 75' for the full width of the access road. The aggregate should be placed at least six inches thick. A plan view and profile are shown on Sheet E-101- Erosion & Sediment Control Detail Plan. (If applicable).

Environmental Dust Control

Dust will be controlled on the site by the use of multiple Best Management Practices. Mulching and temporary seeding will be the first line of protection to be utilized where problems occur. If dust problems are not solved by these applications, the use of water and calcium chloride can be applied. Calcium chloride will be applied at a rate that will keep the surface moist but not cause pollution.

Drainage Swales / Stormwater Conveyance Channels / Conveyance Swales

Description: Conveyance swales are stabilized channels designed to convey runoff at non-erosive velocities. They may be stabilized using vegetation, riprap, or a combination, or with an alternative lining designed to accommodate design flows while protecting the integrity of the sides and bottom of the channel. Conveyance channels may provide incidental water quality benefits, but are not specifically designed to provide treatment. Conveyance swales are not considered a Treatment or Pretreatment Practice under the AoT regulations, unless they are also designed to meet the requirements of an acceptable Treatment/Pretreatment Practice as described elsewhere in this Chapter. See SWM Volume 2, 4-6.3 Conveyance Practices, Conveyance Swale, page 166.

Maintenance Considerations: Grassed channels should be inspected periodically (at least annually) for sediment accumulation, erosion, and condition of surface lining (vegetation or riprap). Repairs, including stone or vegetation replacement, should be made based on this inspection. Remove sediment and debris annually, or more frequently as warranted by inspection. Mow vegetated channels based on frequency specified by design. Mowing at least once per year is required to control establishment of woody vegetation. It is recommended to cut grass no shorter than 4 inches.

Construction Sequence

1. Cut and remove trees in construction area only as required.

2. Construct and/or install temporary and permanent sediment erosion and detention control facilities as specified. Erosion and sediment control measures shall be installed prior to any soil land disturbance and must be reviewed and approved by the community services department.

3. Erosion, sediment and detention control facility shall be installed & stabilized prior to directing runoff to them, temporary diversions may be required. Post construction storm water management practices must be initiated and stabilized early in the process.

4. Clear, cut and dispose of debris in approved facility.

5. Construct temporary water diversions (swales, basins, etc.) as needed until site is stabilized.

6. All swales are to be installed prior to rough grading of the site. Temporary water diversion (swales, etc.) must be used as necessary until areas are stabilized.

7. Construct roadways for access to desired construction areas. All roads shall be stabilized immediately.

8. Install pipe and construction associated appurtenances as required or directed. Install rain gardens. All disturbed areas shall stabilized immediately after grading.

9. Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded or mulched as required, or directed. Any area disturbed by construction will be re-stabilized within 45 days (Env-Wq 1504.16) and abutting properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them. Iaw EPA 2022 CGP 2.2.14, site stabilization will be initiated immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days. The installation of stabilization will be completed as soon as practicable but no later than 14 calendar days. All roadways and parking areas shall be stabilized within 72 hours of achieving finished grades. All cut and fill slopes shall be stabilized within 72 hours of achieving finished grades.

10. Construct temporary berms, drains ditches, silt fences, sediment traps, etc. Mulch and seed as required.

11. Inspect and maintain all erosion and sediment control measures during construction. All SWPPP inspections must be conducted by a qualified professional such as a professional engineer (PE), a certified professional in erosion and sediment control (CPESC), a certified erosion sediment and storm water inspector (CESSWI), or a certified professional in storm water quality (CPSWQ). Inspection reports shall be submitted to the community services department. Inspections shall be conducted weekly and within 24 hours of a 0.25 inch rain event.

12. Complete permanent seeding and landscaping.

13. Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete.

14. Smooth and revegetate all disturbed areas. Stabilization should occur within 14 days or removing temporary measures.

15. Finish graveling all roadways.

Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time.

2. Erosion, sediment control measures shall be installed as shown on the plans and at locations as required, or directed by the engineer.

3. All disturbed areas shall be returned to original grades and elevations. Disturbed areas shall be loamed with a minimum of 4” of loam and seeded with not less than 1.10 pound of seed per 1,000 square feet (48 pounds per acre) of area.

4. Silt fences and other barriers shall be inspected periodically and after every rainstorm during the life of the project. All damaged areas shall be repaired, sediment deposits shall periodically be removed and properly disposed of.

5. After all disturbed areas have been stabilized, the temporary erosion control measures are to be removed and the area disturbed by the removal smoothed and re-vegetated.

6. Areas must be seeded and mulched within 5 days of final grading, permanently stabilized within 15 days of final grading, or temporarily stabilized within 30 days of initial disturbance of soil.

Inspection and Maintenance Schedule

Perimeter control and catch basin inlet protection will be inspected during and after storm events of 0.25" or greaterto ensure that the BMP still has integrity and is not allowing sediment to pass. Depending on SWPPP criteria, all BMP controls will be inspected once every 7 days and after storm events. Inspection reports must be submitted to Town of Barrington Planning Department. See also Stormwater System Management: Inspection and Maintenance Manual with accompanying plan published separately also by Berry Surveying & Engineering. See also Storm Water Pollution Prevention Plan (SWPPP) developed in accordance with EPA NPDES requirements & the Town of Barrington Stormwater regulations.

Corrective Action measures will be made in accordance with SWPPP requirements and records maintained on site by the Contractor.

5.0 CONCLUSION

Peak rates of runoff flow are modeled to be reduced in the post-construction analysis, as compared to the pre-construction analysis. This reduction occurs at all storm events due to the installation of the low impact development stormwater devices.

The volume of stormwater discharge from the site at the final reach is minimally increased in the 2 Yr.-24 Hr. and reduced in all other events due to construction grading, the retention in the rain garden, and infiltration in the infiltration basin. The 2Yr.-24Hr. volume increase is less than 0.100 acre feet, allowed by NHDES AoT Bureau for Channel Protection Volume purposes.

A Site Specific, Terrain Alteration Permit (RSA 485: A-17) is not required for this site plan due to the area of disturbance being less than 100,000 SF. The impact is approximately 53,500 square feet, so that an EPA Notice of Intent will be required to be filed prior to construction and a Stormwater Pollution Prevention Plan prepared.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

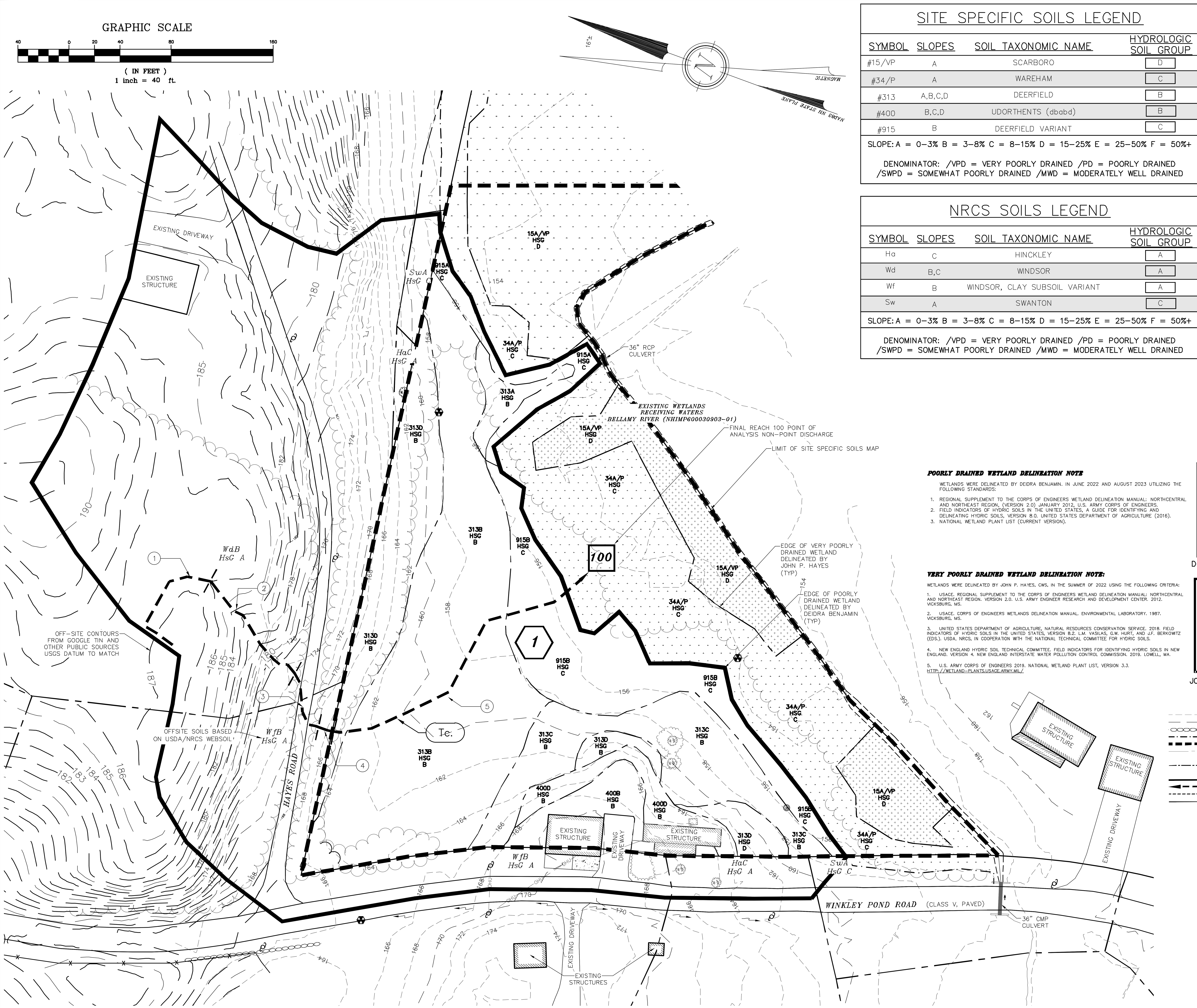
Christopher R. Berry, SIT 567
Principal, President

Kenneth A. Berry PE, LLS,
CPSWQ, CPESC, CESSWI
Principal, VP - Technical Operations

Kevin R. Poulin, PE
Design Engineer

Appendix I –Existing Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr -24 Hr. Node Listing
25 Yr -24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing
100 Yr -24 Hr. Node Listing



SITE SPECIFIC SOILS LEGEND

SYMBOL	SLOPES	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
#15/VP	A	SCARBORO	D
#34/P	A	WAREHAM	C
#313	A,B,C,D	DEERFIELD	B
#400	B,C,D	UDORTHENTS (dbabd)	B
#915	B	DEERFIELD VARIANT	C

SLOPE: A = 0–3% B = 3–8% C = 8–15% D = 15–25% E = 25–50% F = 50%+

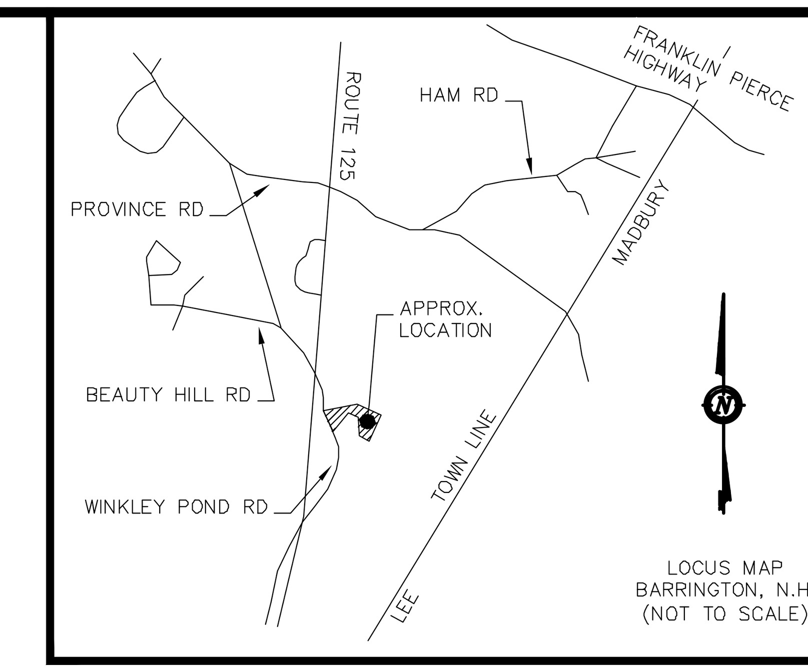
DENOMINATOR: /VPD = VERY POORLY DRAINED /PD = POORLY DRAINED /SWPD = SOMEWHAT POORLY DRAINED /MWD = MODERATELY WELL DRAINED

NRCS SOILS LEGEND

SYMBOL	SLOPES	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
Ha	C	HINCKLEY	A
Wd	B,C	WINDSOR	A
Wf	B	WINDSOR, CLAY SUBSOIL VARIANT	A
Sw	A	SWANTON	C

SLOPE: A = 0–3% B = 3–8% C = 8–15% D = 15–25% E = 25–50% F = 50%+

DENOMINATOR: /VPD = VERY POORLY DRAINED /PD = POORLY DRAINED /SWPD = SOMEWHAT POORLY DRAINED /MWD = MODERATELY WELL DRAINED



LOCUS MAP
BARRINGTON, N.H.
(NOT TO SCALE)

NOTES:

1.) OWNER: HAMBONE LLC
242 CENTRAL AVE
DOVER, NH 03820

2.) TAX MAP: TAX MAP 253, LOT 14

3.) LOT AREA: 586,793 Sq. Ft., 13.47 Ac.
330,912 Sq.Ft., 7.60 Ac., TOTAL UPLAND

4.) S.C.R.D. BOOK 4976, PAGE 1023

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, A PORTION OF THIS PARCEL FALLS WITHIN THE FLOOD PLAIN FLOOD HAZARD REF.: FEMA, COMMUNITY# 330178, MAP# 33017C0305E, DATED: SEPTEMBER 30, 2015.

6.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

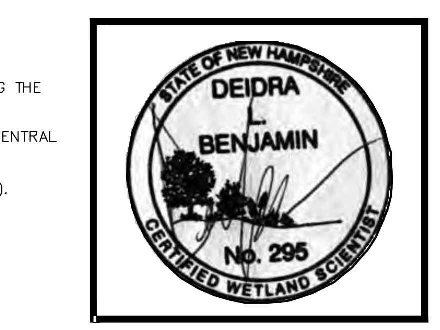
7.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING DRAINAGE CONDITIONS OF TAX MAP 253, LOT 14 AS OF THE DATE OF THE SURVEY.

8.) HYDROCAD USES A SERIES OF NODE SUFFIXES FOR NUMBERING PURPOSES (S=SUBCATCHMENT, P=POND DEVICE, R=REACH), TO SIMPLIFY ANNOTATION THESE SUFFIXES ARE LEFT OFF THE WATERSHED PLANS AND NODE TYPE IS DENOTED BY THE SYMBOL SHAPE ACCORDING TO THE DISPLAYED LEGEND WHICH COINCIDES WITH HYDROCAD GRAPHICS.

POORLY DRAINED WETLAND DELINEATION NOTE

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN. IN JUNE 2022 AND AUGUST 2023 UTILIZING THE FOLLOWING STANDARDS:

1. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, (VERSION 2.0) JANUARY 2012, U.S. ARMY CORPS OF ENGINEERS.
2. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, A GUIDE FOR IDENTIFYING AND DELINEATING HYDRIC SOILS, VERSION 8.0. UNITED STATES DEPARTMENT OF AGRICULTURE (2016).
3. NATIONAL WETLAND PLANT LIST (CURRENT VERSION).



DEIDRA BENJAMIN, CWS #295

VERY POORLY DRAINED WETLAND DELINEATION NOTE:

WETLANDS WERE DELINEATED BY JOHN P. HAYES, CWS, IN THE SUMMER OF 2022 USING THE FOLLOWING CRITERIA:

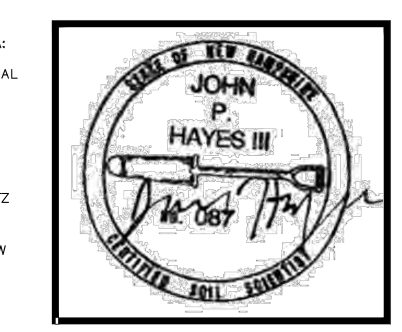
1. USACE. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. VERSION 2.0. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER. 2012. VICKSBURG, MS.

2. USACE. CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. ENVIRONMENTAL LABORATORY. 1987. VICKSBURG, MS.

3. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.

4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.

5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/



JOHN P. HAYES, III CSS #87

JOHN P. HAYES III, CWS #18

LEGEND:

299	EXISTING CONTOUR MINOR
300	EXISTING CONTOUR MAJOR
	STONE WALL
	WETLAND LINE
	PROPERTY LINE
	SOIL LINE
448A	SOIL SERIES
	NRCS SOIL LINE
HfB	NRCS SOIL LABEL
	LIMIT OF WATERSHED/SUBCATCHMENT
	TIME OF CONCENTRATION PATH
	FLOW REACH
	MATCH LINE
S.C.R.D.	STRAFFORD COUNTY REGISTRY OF DEEDS
TYP.	TYPICAL
FND	FOUND
TBR	TO BE REMOVED

SYMBOLS LEGEND:

#	SUBCATCHMENT AREA SYMBOL
#	FLOW REACH SYMBOL
#	POND DEVICE SYMBOL
Tc. / #	TIME OF CONCENTRATION SEGMENT

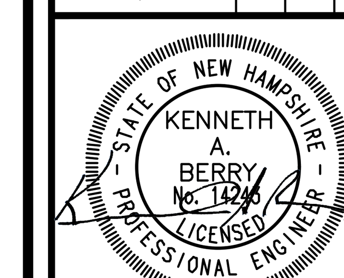
REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (EXISTING)

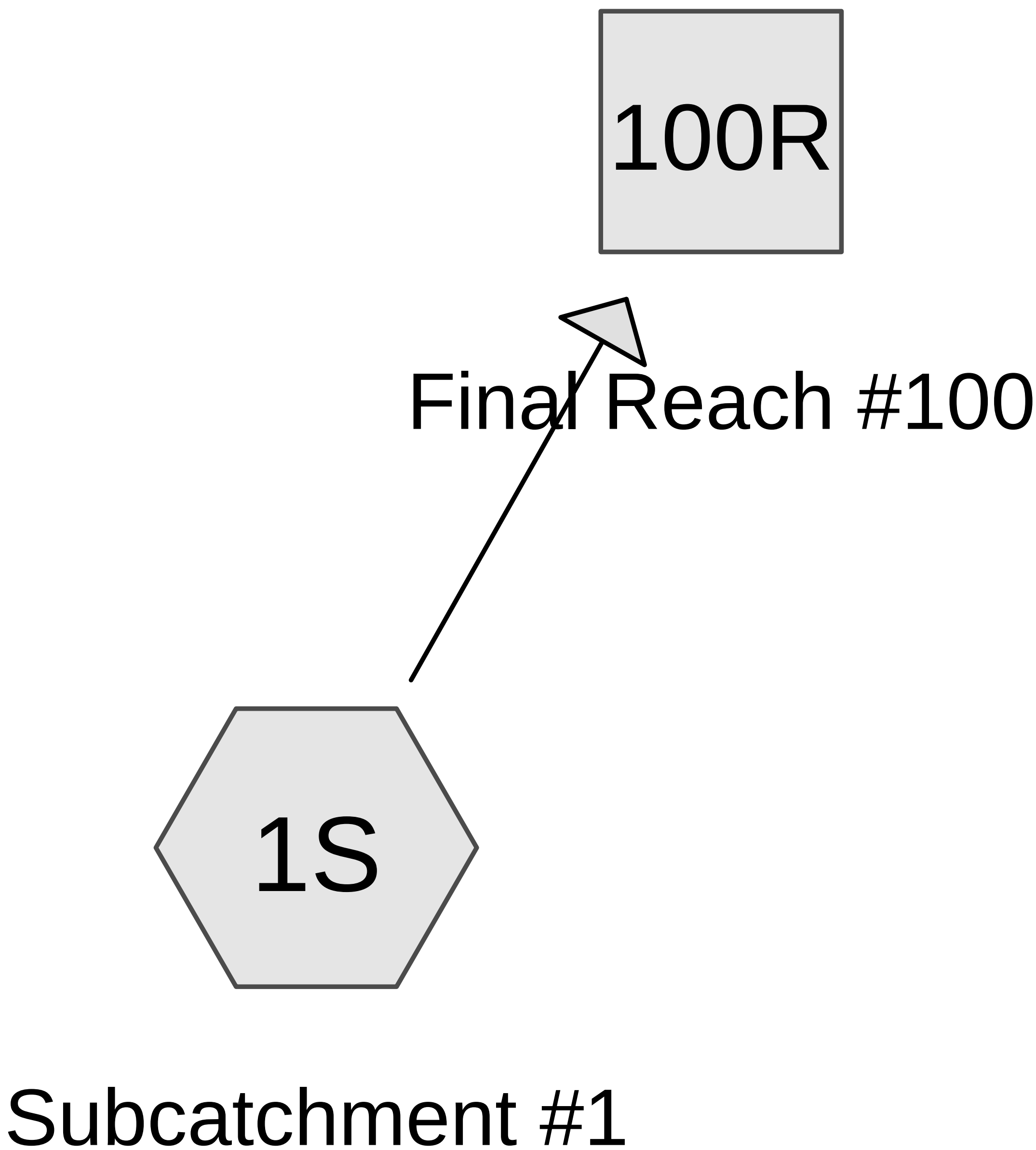
W-1 EXISTING WATERSHED CONDITIONS PLAN
LAND OF
HAMBONE LLC
49 WINKLEY POND ROAD
BARRINGTON, N.H.
TAX MAP 253, LOT 14

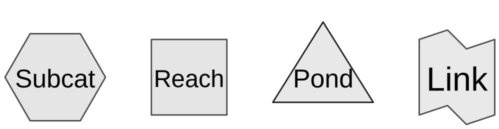
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JULY 16, 2023
FILE NO. : DB 2021-163



SHEET 1 OF 2





Routing Diagram for 21-163 Existing Analysis
Prepared by Berry Surveying & Engineering, Printed 8/14/2023
HydroCAD® 10.00-25 s/n 07605 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.930	39	>75% Grass cover, Good, HSG A (1S)
1.319	61	>75% Grass cover, Good, HSG B (1S)
0.326	74	>75% Grass cover, Good, HSG C (1S)
0.220	96	Gravel surface, HSG A (1S)
0.015	96	Gravel surface, HSG B (1S)
0.095	98	Paved parking, HSG A (1S)
0.000	98	Paved parking, HSG C (1S)
0.058	98	Roofs, HSG A (1S)
0.051	98	Roofs, HSG B (1S)
1.360	30	Woods, Good, HSG A (1S)
0.264	55	Woods, Good, HSG B (1S)
0.110	70	Woods, Good, HSG C (1S)
4.746	**52**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.663	HSG A	1S
1.648	HSG B	1S
0.436	HSG C	1S
0.000	HSG D	
0.000	Other	
4.746		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.930	1.319	0.326	0.000	0.000	2.574	>75% Grass cover, Good	1S
0.220	0.015	0.000	0.000	0.000	0.235	Gravel surface	1S
0.095	0.000	0.000	0.000	0.000	0.096	Paved parking	1S
0.058	0.051	0.000	0.000	0.000	0.109	Roofs	1S
1.360	0.264	0.110	0.000	0.000	1.733	Woods, Good	1S
2.663	**1.648**	**0.436**	**0.000**	**0.000**	**4.746**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=206,757 sf 4.31% Impervious Runoff Depth>1.20"
Flow Length=508' Tc=28.8 min CN=52 Runoff=3.21 cfs 0.475 af

Reach 100R: Final Reach #100 Inflow=3.21 cfs 0.475 af
Outflow=3.21 cfs 0.475 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.475 af Average Runoff Depth = 1.20"
95.69% Pervious = 4.542 ac 4.31% Impervious = 0.205 ac

Summary for Subcatchment 1S: Subcatchment #1

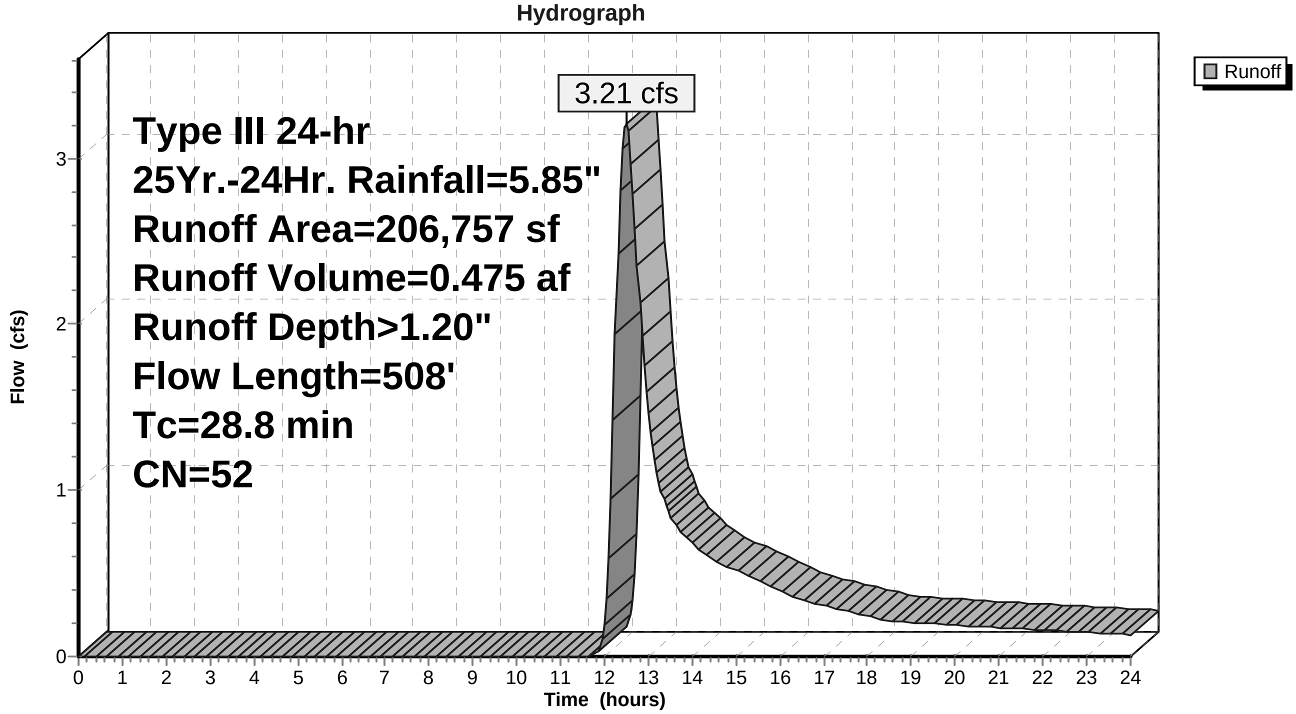
Runoff = 3.21 cfs @ 12.48 hrs, Volume= 0.475 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
40,505	39	>75% Grass cover, Good, HSG A
57,435	61	>75% Grass cover, Good, HSG B
14,195	74	>75% Grass cover, Good, HSG C
4,152	98	Paved parking, HSG A
8	98	Paved parking, HSG C
2,534	98	Roofs, HSG A
2,217	98	Roofs, HSG B
9,565	96	Gravel surface, HSG A
653	96	Gravel surface, HSG B
59,229	30	Woods, Good, HSG A
11,485	55	Woods, Good, HSG B
4,779	70	Woods, Good, HSG C
206,757	52	Weighted Average
197,846		95.69% Pervious Area
8,911		4.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	100	0.0150	0.07		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
1.0	102	0.1176	1.71		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.2	50	0.0800	4.55		**Shallow Concentrated Flow, Segment #3** Unpaved Kv= 16.1 fps
0.1	13	0.2300	2.40		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
2.9	243	0.0391	1.38		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
28.8	508	Total			

Subcatchment 1S: Subcatchment #1



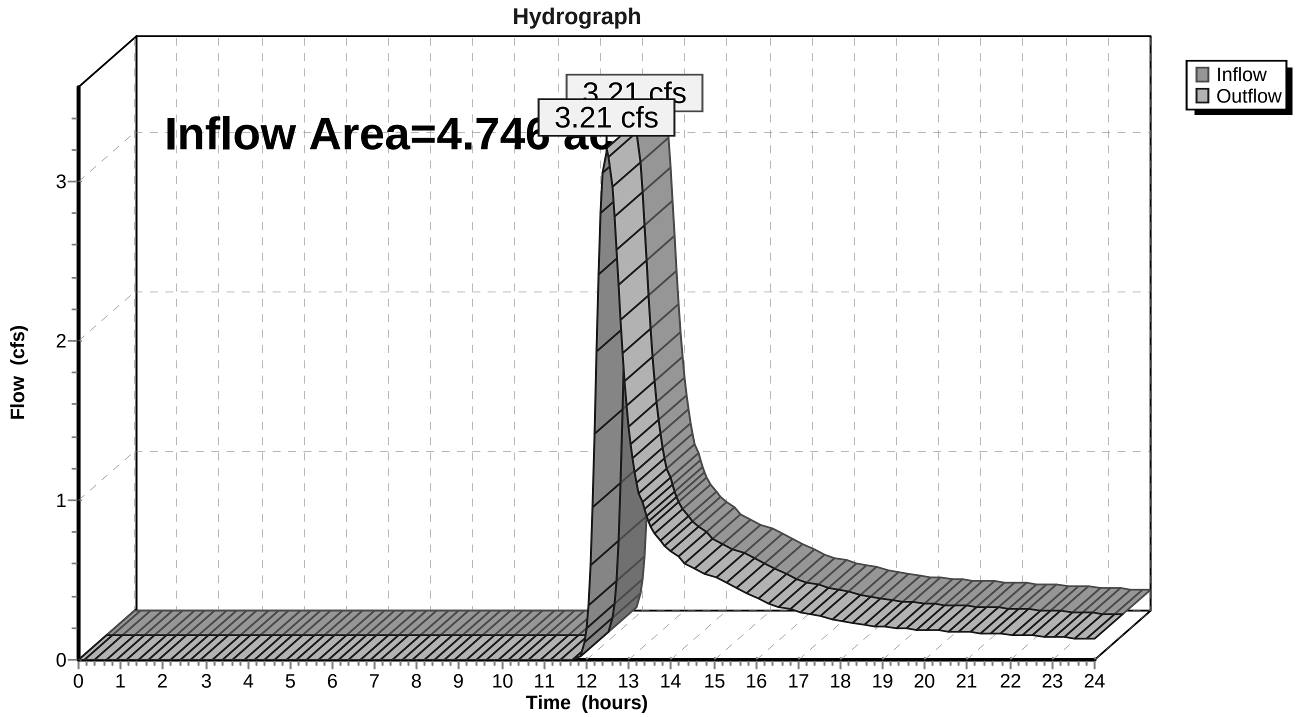
Summary for Reach 100R: Final Reach #100

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.746 ac, 4.31% Impervious, Inflow Depth > 1.20" for 25Yr.-24Hr. event
Inflow = 3.21 cfs @ 12.48 hrs, Volume= 0.475 af
Outflow = 3.21 cfs @ 12.48 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 100R: Final Reach #100



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=206,757 sf 4.31% Impervious Runoff Depth>0.14"
Flow Length=508' Tc=28.8 min CN=52 Runoff=0.12 cfs 0.057 af

Reach 100R: Final Reach #100 Inflow=0.12 cfs 0.057 af
Outflow=0.12 cfs 0.057 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.057 af Average Runoff Depth = 0.14"
95.69% Pervious = 4.542 ac 4.31% Impervious = 0.205 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=206,757 sf 4.31% Impervious Runoff Depth>0.64"
Flow Length=508' Tc=28.8 min CN=52 Runoff=1.41 cfs 0.252 af

Reach 100R: Final Reach #100 Inflow=1.41 cfs 0.252 af
Outflow=1.41 cfs 0.252 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.252 af Average Runoff Depth = 0.64"
95.69% Pervious = 4.542 ac 4.31% Impervious = 0.205 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=206,757 sf 4.31% Impervious Runoff Depth>1.20"
Flow Length=508' Tc=28.8 min CN=52 Runoff=3.21 cfs 0.475 af

Reach 100R: Final Reach #100 Inflow=3.21 cfs 0.475 af
Outflow=3.21 cfs 0.475 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.475 af Average Runoff Depth = 1.20"
95.69% Pervious = 4.542 ac 4.31% Impervious = 0.205 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=206,757 sf 4.31% Impervious Runoff Depth>1.83"
Flow Length=508' Tc=28.8 min CN=52 Runoff=5.30 cfs 0.722 af

Reach 100R: Final Reach #100 Inflow=5.30 cfs 0.722 af
Outflow=5.30 cfs 0.722 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.722 af Average Runoff Depth = 1.83"
95.69% Pervious = 4.542 ac 4.31% Impervious = 0.205 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=206,757 sf 4.31% Impervious Runoff Depth>2.67"
Flow Length=508' Tc=28.8 min CN=52 Runoff=8.14 cfs 1.058 af

Reach 100R: Final Reach #100 Inflow=8.14 cfs 1.058 af
Outflow=8.14 cfs 1.058 af

Total Runoff Area = 4.746 ac Runoff Volume = 1.058 af Average Runoff Depth = 2.67"
95.69% Pervious = 4.542 ac 4.31% Impervious = 0.205 ac

Appendix II - Proposed Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr -24 Hr. Node Listing
25 Yr -24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing
100 Yr -24 Hr. Node Listing

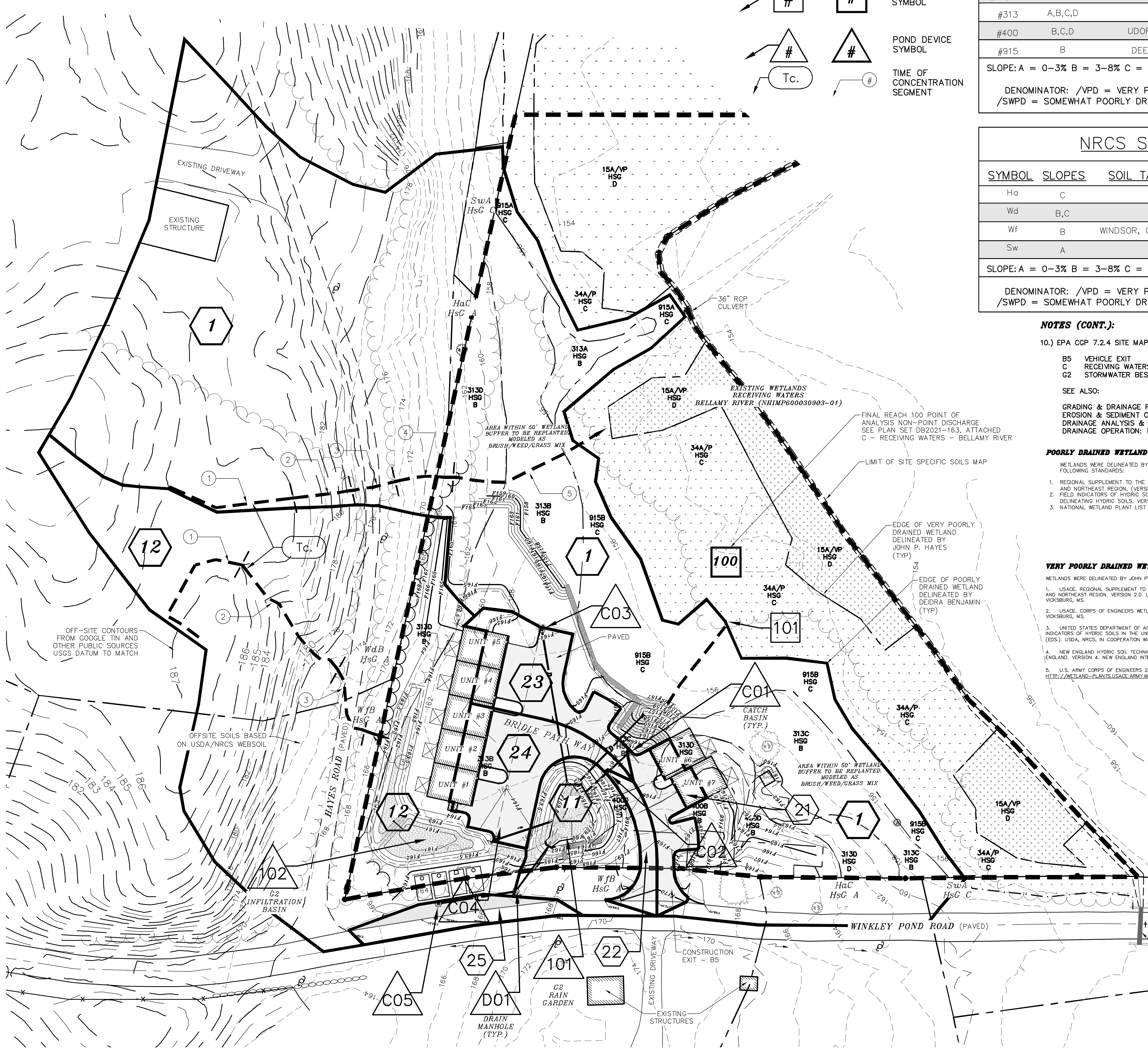
GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

SYMBOLS LEGEND:

#	SUBCATCHMENT AREA SYMBOL
#	FLOW REACH SYMBOL
#	POND DEVICE SYMBOL
Tc.	TIME OF CONCENTRATION SEGMENT



SITE SPECIFIC SOILS LEGEND

SYMBOL	SLOPES	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
#15/VP	A	SCARBORO	D
#34/P	A	WAREHAM	C
#313	A,B,C,D	DEERFIELD	B
#400	B,C,D	UDORTHENTS (dbabd)	B
#915	B	DEERFIELD VARIANT	C

SLOPE: A = 0–3% B = 3–8% C = 8–15% D = 15–25% E = 25–50% F = 50%+

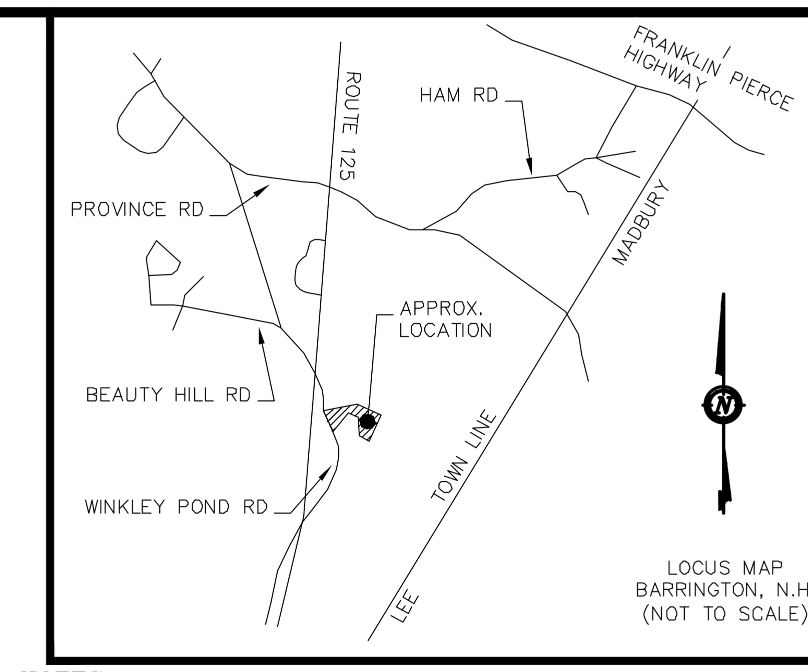
DENOMINATOR: /VPD = VERY POORLY DRAINED /PD = POORLY DRAINED /SWPD = SOMEWHAT POORLY DRAINED /MWD = MODERATELY WELL DRAINED

NRCS SOILS LEGEND

SYMBOL	SLOPES	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
Ha	C	HINCKLEY	A
Wd	B,C	WINDSOR	A
Wf	B	WINDSOR, CLAY SUBSOIL VARIANT	A
Sw	A	SWANTON	C

SLOPE: A = 0–3% B = 3–8% C = 8–15% D = 15–25% E = 25–50% F = 50%+

DENOMINATOR: /VPD = VERY POORLY DRAINED /PD = POORLY DRAINED /SWPD = SOMEWHAT POORLY DRAINED /MWD = MODERATELY WELL DRAINED



NOTES:

1.) OWNER: HAMBONE LLC
242 CENTRAL AVE
DOVER, NH 03820

2.) TAX MAP: TAX MAP 253, LOT 14

3.) LOT AREA: 586,793 Sq. Ft., 13.47 Ac.
330,912 Sq.Ft., 7.60 Ac., TOTAL UPLAND

4.) S.C.R.D. BOOK 4976, PAGE 1023

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, A PORTION OF THIS PARCEL FALLS WITHIN THE FLOOD PLAIN FLOOD HAZARD REF.: FEMA, COMMUNITY# 330178, MAP# 33017C0305E, DATED: SEPTEMBER 30, 2015.

6.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

7.) THE INTENT OF THIS PLAN IS TO SHOW THE POST CONSTRUCTION DRAINAGE CONDITIONS OF TAX MAP 253, LOT 14.

8.) SEE PROPOSED GRADING & DRAINAGE PLAN FOR SLOPES & EROSION & SEDIMENT CONTROL PLAN FOR STOCKPILE AREA AND CONSTRUCTION ENTRANCE.

9.) HYDROCAD USES A SERIES OF NODE SUFFIXES FOR NUMBERING PURPOSES (S=SUBCATCHMENT, P=POND DEVICE, R=REACH), TO SIMPLIFY ANNOTATION THESE SUFFIXES ARE LEFT OFF THE WATERSHED PLANS AND NODE TYPE IS DENOTED BY THE SYMBOL SHAPE ACCORDING TO THE DISPLAYED LEGEND WHICH COINCIDES WITH HYDROCAD GRAPHICS.

NOTES (CONT.):

10.) EPA CGP 7.2.4 SITE MAP LEGEND

B5 VEHICLE EXIT
C RECEIVING WATERS
G2 STORMWATER BEST MANAGEMENT PRACTICE

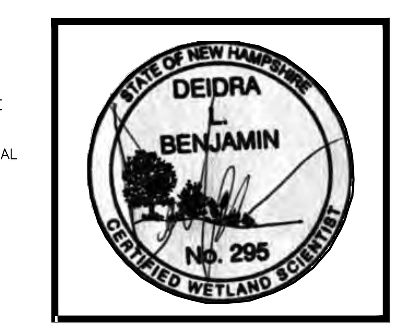
SEE ALSO:

GRADING & DRAINAGE PLAN
EROSION & SEDIMENT CONTROL PLAN
DRAINAGE ANALYSIS & EROSION AND SEDIMENT CONTROL MANUAL
DRAINAGE OPERATION: INSPECTION & MAINTENANCE MANUAL

POORLY DRAINED WETLAND DELINEATION NOTE

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN. IN JUNE 2022 AND AUGUST 2023 UTILIZING THE FOLLOWING STANDARDS:

1. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, (VERSION 2.0) JANUARY 2012, U.S. ARMY CORPS OF ENGINEERS.
2. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, A GUIDE FOR IDENTIFYING AND DELINEATING HYDRIC SOILS, VERSION 8.0. UNITED STATES DEPARTMENT OF AGRICULTURE (2016).
3. NATIONAL WETLAND PLANT LIST (CURRENT VERSION).



DEIDRA BENJAMIN, CWS #295

VERY POORLY DRAINED WETLAND DELINEATION NOTE:

WETLANDS WERE DELINEATED BY JOHN P. HAYES, CWS, IN THE SUMMER OF 2022 USING THE FOLLOWING CRITERIA:

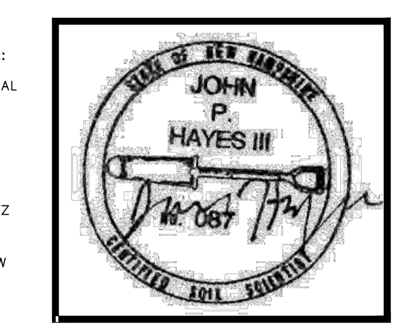
1. USACE. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. VERSION 2.0. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER. 2012. VICKSBURG, MS.

2. USACE. CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. ENVIRONMENTAL LABORATORY. 1987. VICKSBURG, MS.

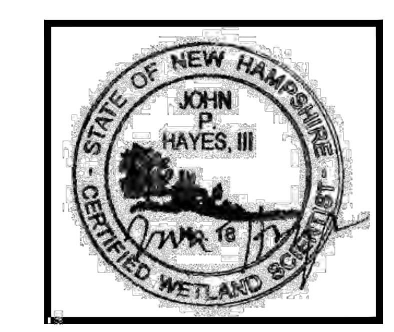
3. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.

4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.

5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/



JOHN P. HAYES, III CSS #87



JOHN P. HAYES III, CWS #18

LEGEND:

EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
STONE WALL
WETLAND LINE
PROPERTY LINE
SOIL LINE
448A SOIL SERIES
NRCS SOIL LINE
HfB NRCS SOIL LABEL
LIMIT OF WATERSHED/SUBCATCHMENT
TIME OF CONCENTRATION PATH
FLOW REACH
MATCH LINE
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND
TBR TO BE REMOVED
DRAIN MANHOLE W/STRUCTURE
CATCH BASIN W/ STRUCTURE
STORMWATER BMP OUTLET STRUCTURE
DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
U.D UNDERDRAIN

REVISION	DATE	DESCRIPTION
#1	11-8-23	REVISED PER CMA ENGINEERS REVIEW

SWPPP EPA SITE MAP (PROPOSED)
W-2 PROPOSED WATERSHED CONDITIONS PLAN
LAND OF
HAMBONE LLC
49 WINKLEY POND ROAD
BARRINGTON, N.H.
TAX MAP 253, LOT 14

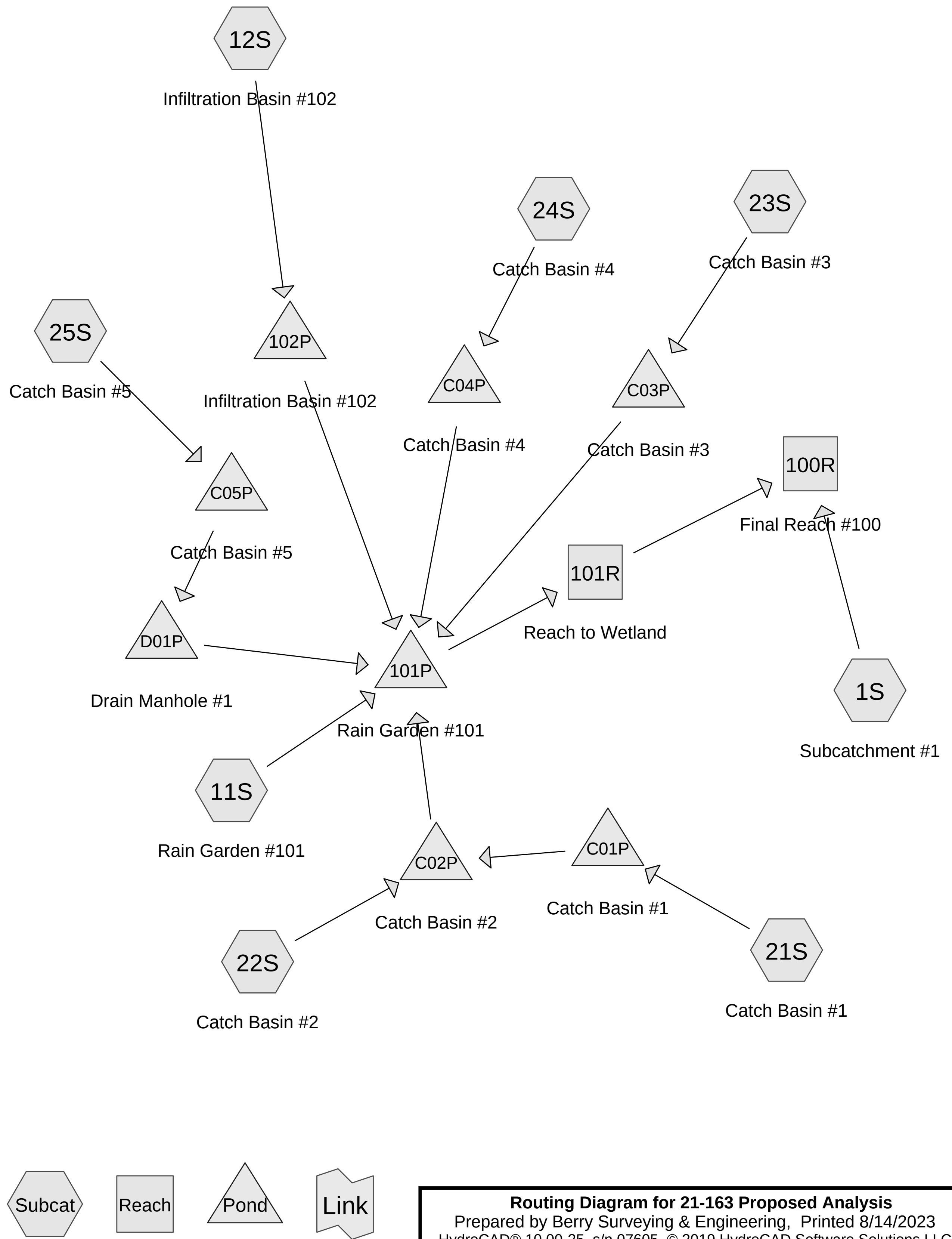
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : AUGUST 16, 2023
FILE NO. : DB 2021-163

STATE OF NEW HAMPSHIRE KENNETH A. BERRY No. 14743 LICENSED PROFESSIONAL ENGINEER

SHEET 2 OF 2

NOT FOR CONSTRUCTION



Routing Diagram for 21-163 Proposed Analysis
Prepared by Berry Surveying & Engineering, Printed 8/14/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.919	39	>75% Grass cover, Good, HSG A (1S, 11S, 12S)
0.798	61	>75% Grass cover, Good, HSG B (1S, 11S, 12S, 21S, 23S, 24S)
0.010	74	>75% Grass cover, Good, HSG C (1S)
0.303	48	Brush, Good, HSG B (1S)
0.316	65	Brush, Good, HSG C (1S)
0.213	96	Gravel surface, HSG A (1S, 11S, 12S)
0.020	96	Gravel surface, HSG B (1S, 11S, 12S, 23S)
0.129	98	Paved parking, HSG A (1S, 11S, 21S, 22S, 25S)
0.241	98	Paved parking, HSG B (21S, 22S, 23S, 24S)
0.000	98	Paved parking, HSG C (1S)
0.047	98	Roofs, HSG A (1S)
0.140	98	Roofs, HSG B (1S, 12S, 21S, 23S, 24S)
1.355	30	Woods, Good, HSG A (1S, 12S)
0.145	55	Woods, Good, HSG B (1S, 12S)
0.110	70	Woods, Good, HSG C (1S)
4.746	**53**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.663	HSG A	1S, 11S, 12S, 21S, 22S, 25S
1.648	HSG B	1S, 11S, 12S, 21S, 22S, 23S, 24S
0.436	HSG C	1S
0.000	HSG D	
0.000	Other	
4.746		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.919	0.798	0.010	0.000	0.000	1.727	>75% Grass cover, Good	1S, 11S, 12S, 21S, 23S, 24S
0.000	0.303	0.316	0.000	0.000	0.620	Brush, Good	1S
0.213	0.020	0.000	0.000	0.000	0.233	Gravel surface	1S, 11S, 12S, 23S
0.129	0.241	0.000	0.000	0.000	0.371	Paved parking	1S, 11S, 21S, 22S, 23S, 24S, 25S
0.047	0.140	0.000	0.000	0.000	0.187	Roofs	1S, 12S, 21S, 23S, 24S
1.355	0.145	0.110	0.000	0.000	1.610	Woods, Good	1S, 12S
2.663	**1.648**	**0.436**	**0.000**	**0.000**	**4.746**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	101P	157.30	157.00	60.0	0.0050	0.012	15.0	0.0	0.0
2	C01P	162.47	162.32	16.0	0.0094	0.012	15.0	0.0	0.0
3	C02P	162.22	161.00	17.5	0.0697	0.012	15.0	0.0	0.0
4	C03P	160.42	159.80	103.5	0.0060	0.012	15.0	0.0	0.0
5	C04P	160.14	159.90	36.0	0.0067	0.012	15.0	0.0	0.0
6	C05P	160.39	160.09	50.0	0.0060	0.012	15.0	0.0	0.0
7	D01P	159.99	159.80	37.0	0.0051	0.012	15.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=123,075 sf 3.79% Impervious Runoff Depth>1.13"
Flow Length=308' Tc=26.7 min CN=51 Runoff=1.81 cfs 0.266 af

Subcatchment 11S: Rain Garden #101 Runoff Area=6,863 sf 6.35% Impervious Runoff Depth>1.90"
Tc=6.0 min CN=61 Runoff=0.33 cfs 0.025 af

Subcatchment 12S: Infiltration Basin #102 Runoff Area=59,075 sf 4.04% Impervious Runoff Depth>0.67"
Flow Length=265' Tc=25.9 min CN=44 Runoff=0.39 cfs 0.076 af

Subcatchment 21S: Catch Basin #1 Runoff Area=2,967 sf 97.40% Impervious Runoff Depth>5.49"
Tc=6.0 min CN=97 Runoff=0.38 cfs 0.031 af

Subcatchment 22S: Catch Basin #2 Runoff Area=1,343 sf 100.00% Impervious Runoff Depth>5.61"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 23S: Catch Basin #3 Runoff Area=5,115 sf 86.55% Impervious Runoff Depth>5.03"
Tc=6.0 min CN=93 Runoff=0.63 cfs 0.049 af

Subcatchment 24S: Catch Basin #4 Runoff Area=5,766 sf 97.10% Impervious Runoff Depth>5.49"
Tc=6.0 min CN=97 Runoff=0.74 cfs 0.061 af

Subcatchment 25S: Catch Basin #5 Runoff Area=2,550 sf 100.00% Impervious Runoff Depth>5.61"
Tc=6.0 min CN=98 Runoff=0.33 cfs 0.027 af

Reach 100R: Final Reach #100 Inflow=2.25 cfs 0.421 af
Outflow=2.25 cfs 0.421 af

Reach 101R: Reach to Wetland Avg. Flow Depth=0.07' Max Vel=0.98 fps Inflow=0.45 cfs 0.156 af
n=0.035 L=66.5' S=0.0301 '/' Capacity=29.48 cfs Outflow=0.45 cfs 0.155 af

Pond 101P: Rain Garden #101 Peak Elev=162.77' Storage=4,162 cf Inflow=2.50 cfs 0.206 af
Outflow=0.45 cfs 0.156 af

Pond 102P: Infiltration Basin #102 Peak Elev=162.11' Storage=884 cf Inflow=0.39 cfs 0.076 af
Discarded=0.11 cfs 0.072 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.072 af

Pond C01P: Catch Basin #1 Peak Elev=162.78' Storage=0.000 af Inflow=0.38 cfs 0.031 af
15.0" Round Culvert n=0.012 L=16.0' S=0.0094 '/' Outflow=0.38 cfs 0.031 af

Pond C02P: Catch Basin #2 Peak Elev=162.77' Storage=0.000 af Inflow=0.55 cfs 0.046 af
15.0" Round Culvert n=0.012 L=17.5' S=0.0697 '/' Outflow=0.55 cfs 0.046 af

Pond C03P: Catch Basin #3 Peak Elev=162.77' Storage=0.001 af Inflow=0.63 cfs 0.049 af
15.0" Round Culvert n=0.012 L=103.5' S=0.0060 '/' Outflow=0.61 cfs 0.049 af

Pond C04P: Catch Basin #4 Peak Elev=162.77' Storage=0.001 af Inflow=0.74 cfs 0.061 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0067 '/' Outflow=0.72 cfs 0.060 af

Pond C05P: Catch Basin #5 Peak Elev=162.77' Storage=0.001 af Inflow=0.33 cfs 0.027 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0060 '/' Outflow=0.31 cfs 0.027 af

Pond D01P: Drain Manhole #1 Peak Elev=162.77' Storage=0.001 af Inflow=0.31 cfs 0.027 af
15.0" Round Culvert n=0.012 L=37.0' S=0.0051 '/' Outflow=0.30 cfs 0.027 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.550 af Average Runoff Depth = 1.39"
88.25% Pervious = 4.189 ac 11.75% Impervious = 0.558 ac

Summary for Subcatchment 1S: Subcatchment #1

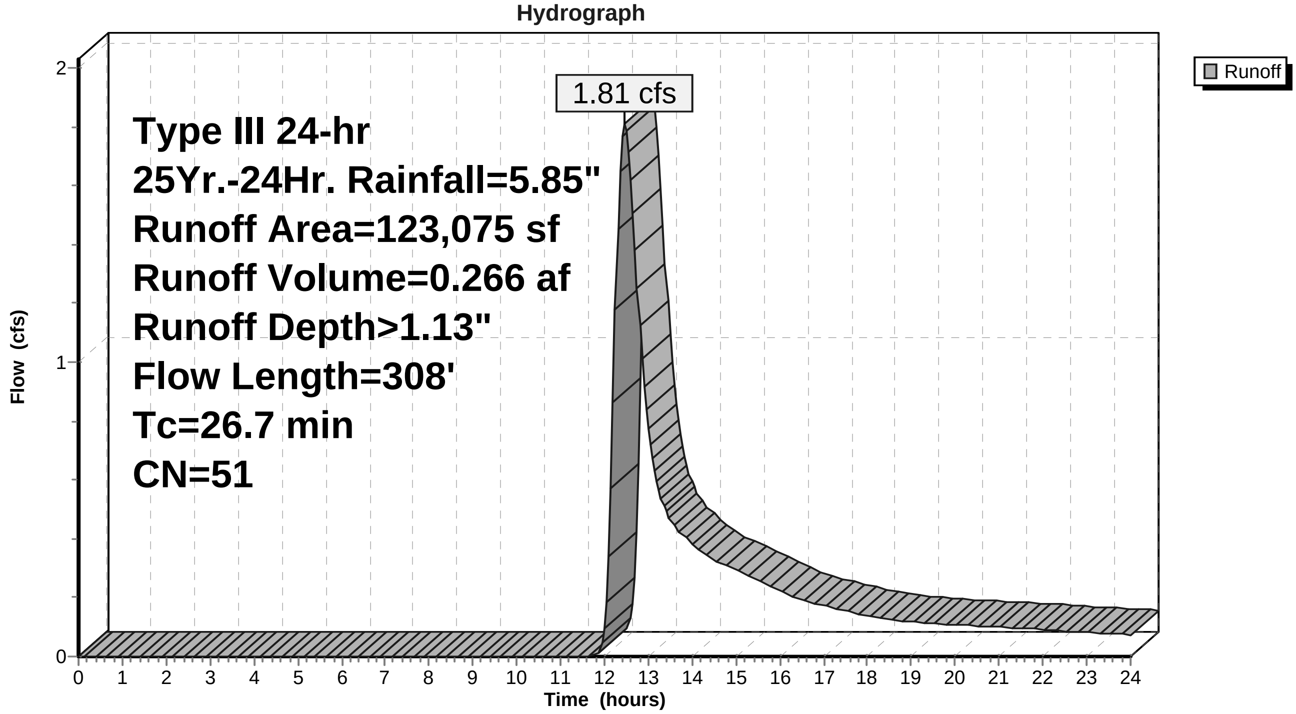
Runoff = 1.81 cfs @ 12.46 hrs, Volume= 0.266 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
32,716	39	>75% Grass cover, Good, HSG A
18,306	61	>75% Grass cover, Good, HSG B
422	74	>75% Grass cover, Good, HSG C
13,215	48	Brush, Good, HSG B
13,773	65	Brush, Good, HSG C
1,593	98	Paved parking, HSG A
8	98	Paved parking, HSG C
2,050	98	Roofs, HSG A
1,012	98	Roofs, HSG B
5,392	96	Gravel surface, HSG A
385	96	Gravel surface, HSG B
23,832	30	Woods, Good, HSG A
5,592	55	Woods, Good, HSG B
4,779	70	Woods, Good, HSG C
123,075	51	Weighted Average
118,412		96.21% Pervious Area
4,663		3.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	89	0.0112	0.06		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.4	41	0.1463	1.91		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.1	30	0.1333	5.88		**Shallow Concentrated Flow, Segment #3** Unpaved Kv= 16.1 fps
0.2	40	0.3000	2.74		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
0.9	108	0.0833	2.02		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
26.7	308	Total			

Subcatchment 1S: Subcatchment #1



Summary for Subcatchment 11S: Rain Garden #101

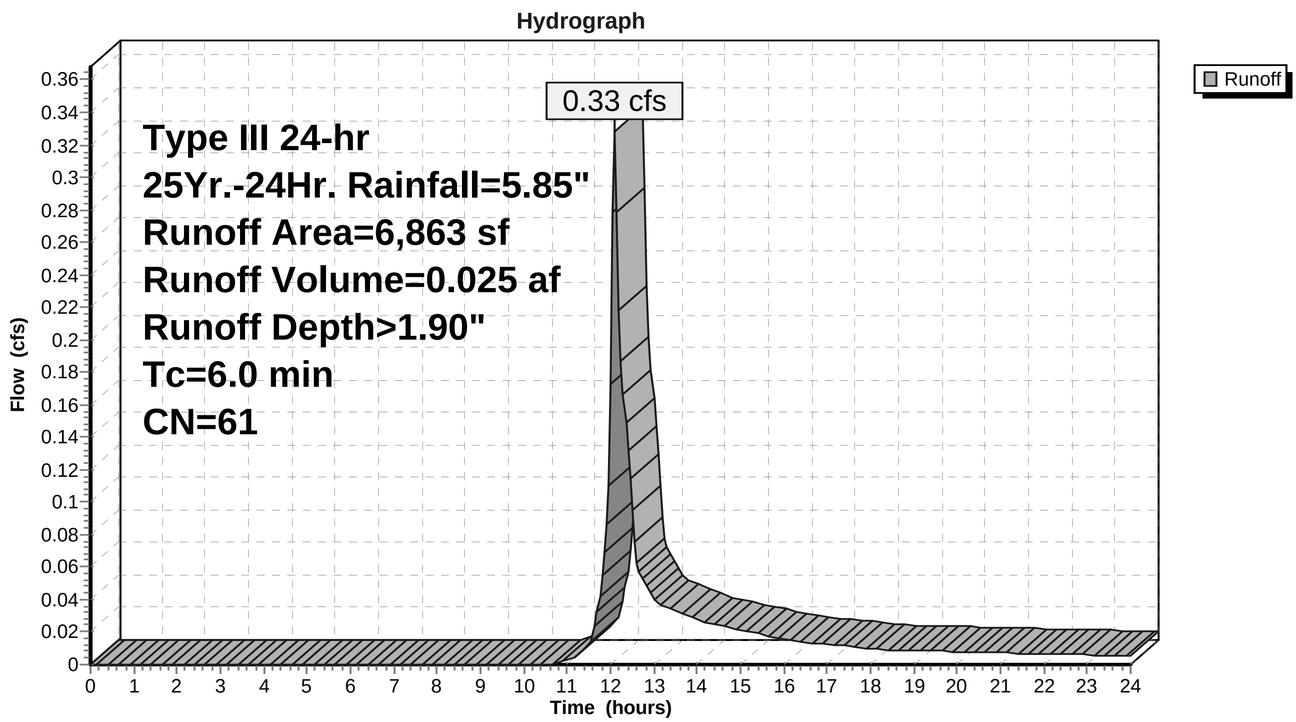
Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Depth> 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
1,573	39	>75% Grass cover, Good, HSG A
4,387	61	>75% Grass cover, Good, HSG B
436	98	Paved parking, HSG A
139	96	Gravel surface, HSG A
328	96	Gravel surface, HSG B
6,863	61	Weighted Average
6,427		93.65% Pervious Area
436		6.35% Impervious Area

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

Subcatchment 11S: Rain Garden #101



Summary for Subcatchment 12S: Infiltration Basin #102

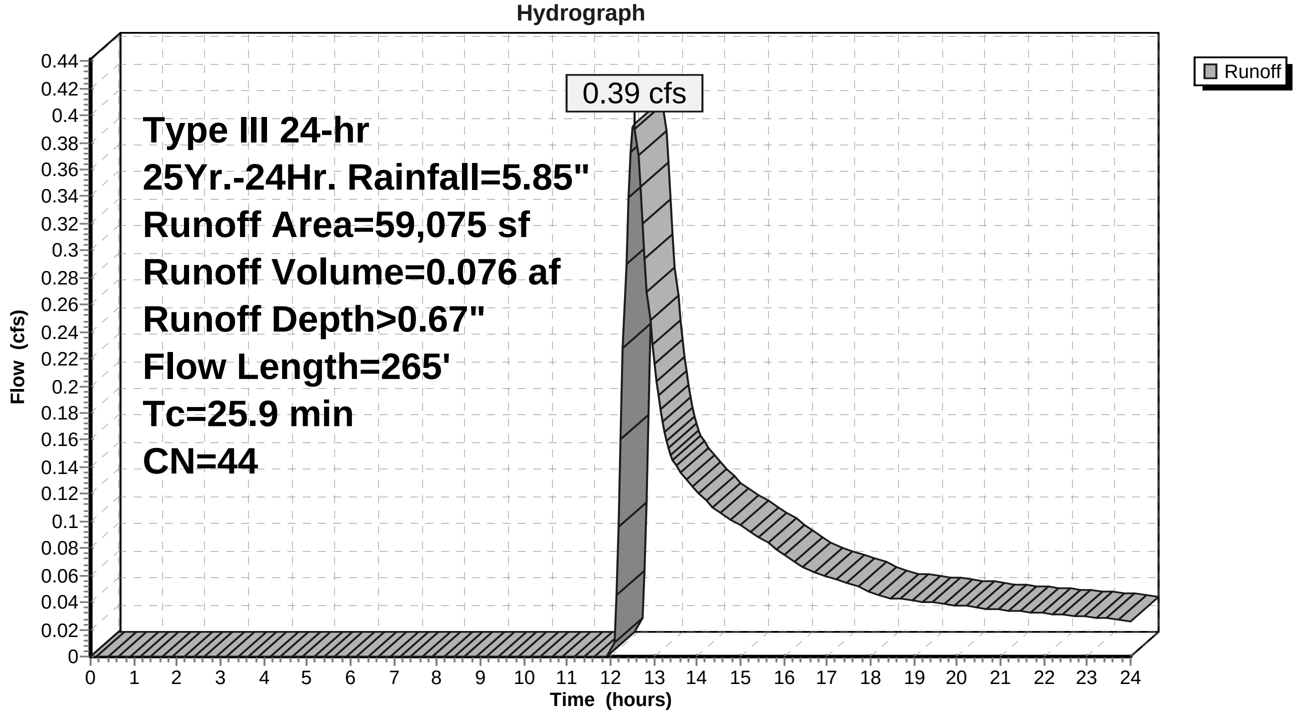
Runoff = 0.39 cfs @ 12.54 hrs, Volume= 0.076 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
5,750	39	>75% Grass cover, Good, HSG A
11,164	61	>75% Grass cover, Good, HSG B
2,388	98	Roofs, HSG B
3,751	96	Gravel surface, HSG A
95	96	Gravel surface, HSG B
35,187	30	Woods, Good, HSG A
740	55	Woods, Good, HSG B
59,075	44	Weighted Average
56,687		95.96% Pervious Area
2,388		4.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	100	0.0150	0.07		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
1.0	102	0.1176	1.71		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.2	50	0.0800	4.55		**Shallow Concentrated Flow, Segment #3** Unpaved Kv= 16.1 fps
0.1	13	0.2300	2.40		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
25.9	265	Total			

Subcatchment 12S: Infiltration Basin #102



Summary for Subcatchment 21S: Catch Basin #1

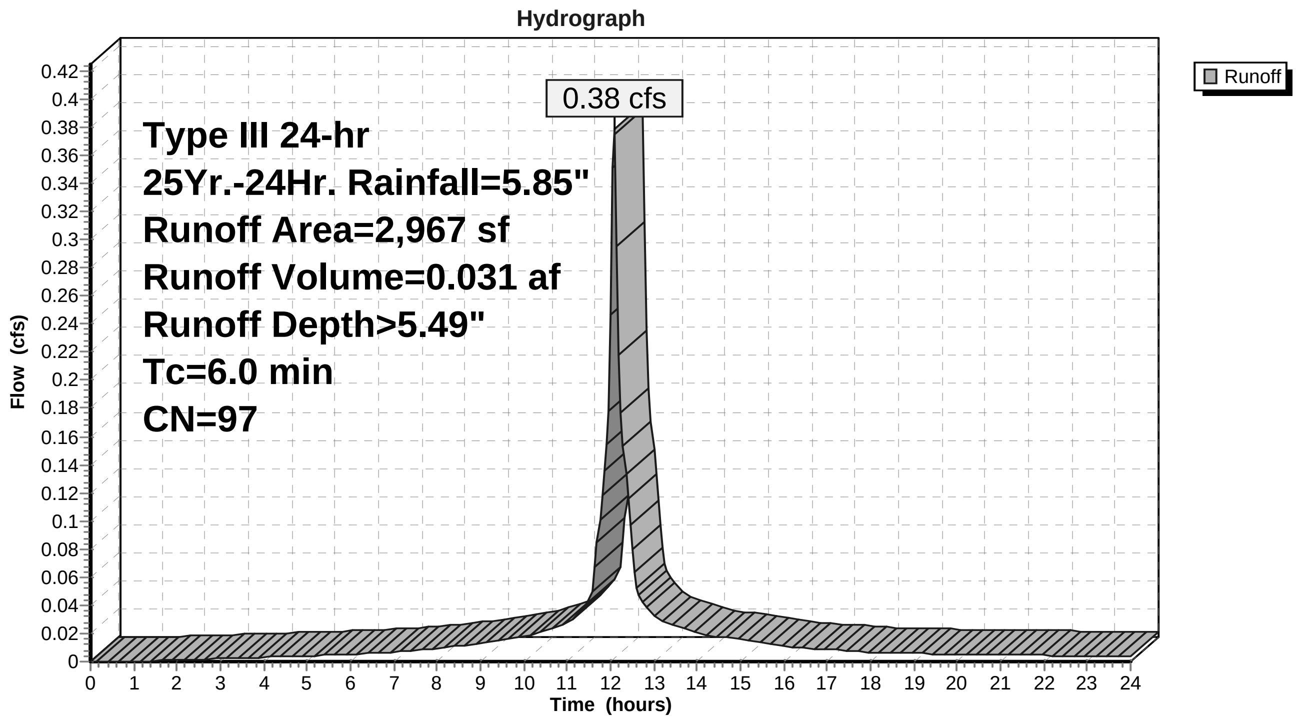
Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
456	98	Paved parking, HSG A
1,666	98	Paved parking, HSG B
768	98	Roofs, HSG B
77	61	>75% Grass cover, Good, HSG B
2,967	97	Weighted Average
77		2.60% Pervious Area
2,890		97.40% Impervious Area

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

Subcatchment 21S: Catch Basin #1



Summary for Subcatchment 22S: Catch Basin #2

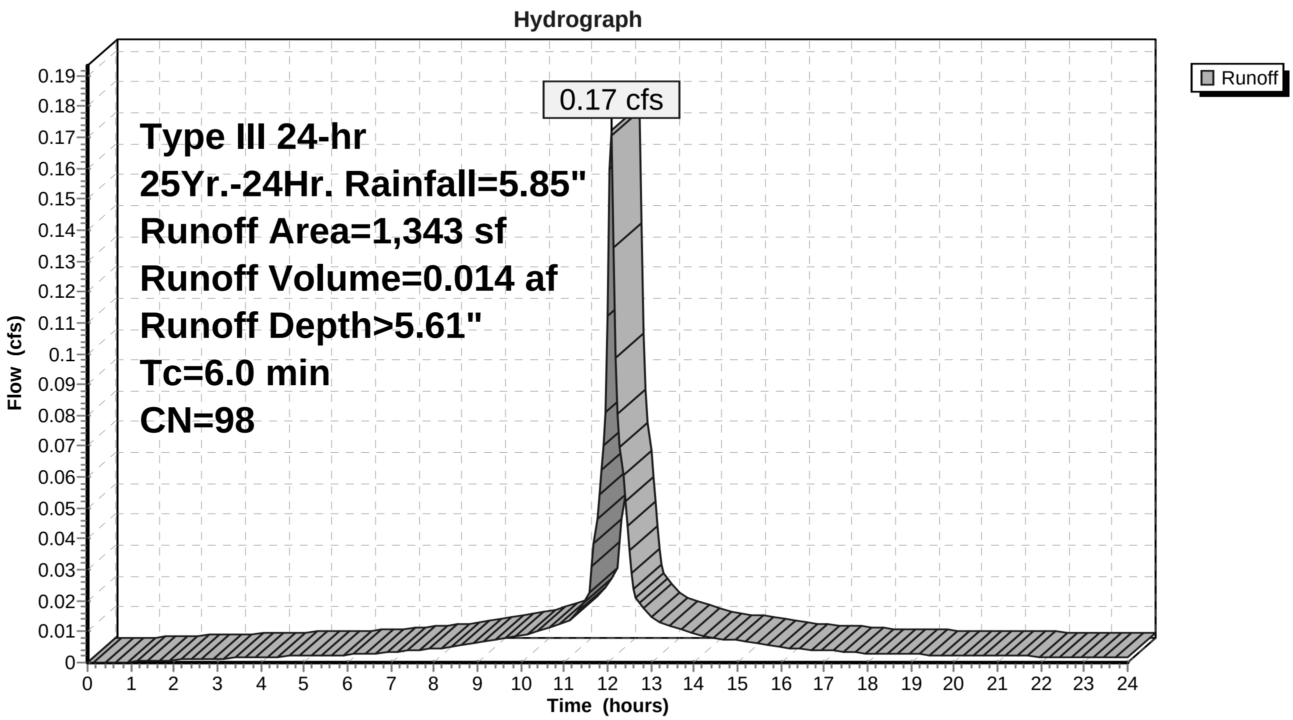
Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
580	98	Paved parking, HSG A
763	98	Paved parking, HSG B
1,343	98	Weighted Average
1,343		100.00% Impervious Area

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

Subcatchment 22S: Catch Basin #2



Summary for Subcatchment 23S: Catch Basin #3

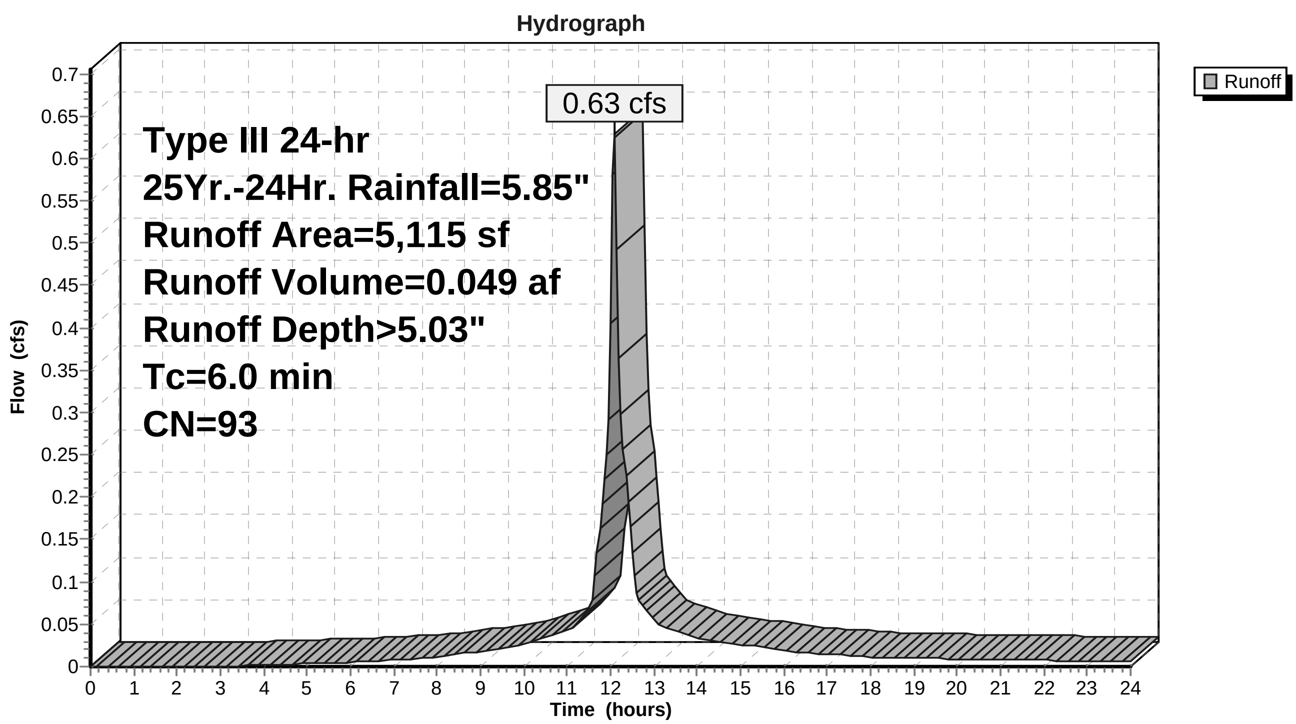
Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.049 af, Depth> 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
646	61	>75% Grass cover, Good, HSG B
3,611	98	Paved parking, HSG B
42	96	Gravel surface, HSG B
816	98	Roofs, HSG B
5,115	93	Weighted Average
688		13.45% Pervious Area
4,427		86.55% Impervious Area

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

Subcatchment 23S: Catch Basin #3



Summary for Subcatchment 24S: Catch Basin #4

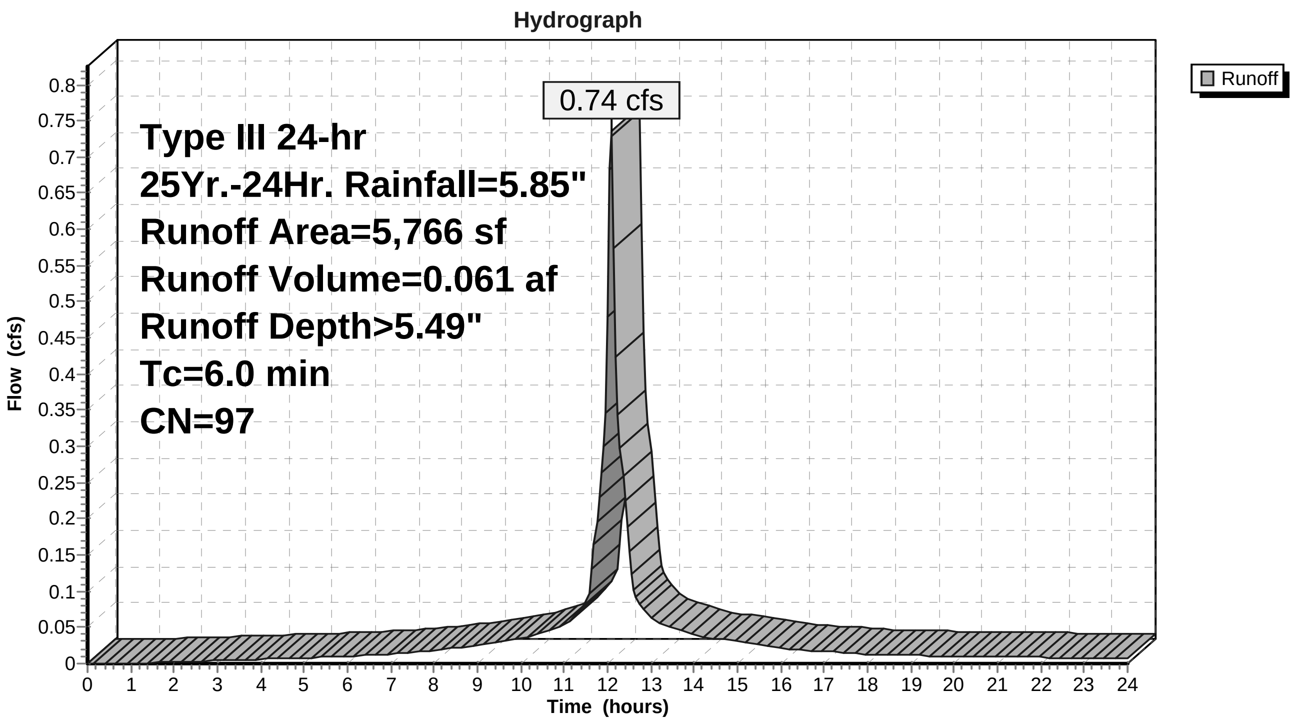
Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.061 af, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
4,477	98	Paved parking, HSG B
1,122	98	Roofs, HSG B
167	61	>75% Grass cover, Good, HSG B
5,766	97	Weighted Average
167		2.90% Pervious Area
5,599		97.10% Impervious Area

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

Subcatchment 24S: Catch Basin #4



Summary for Subcatchment 25S: Catch Basin #5

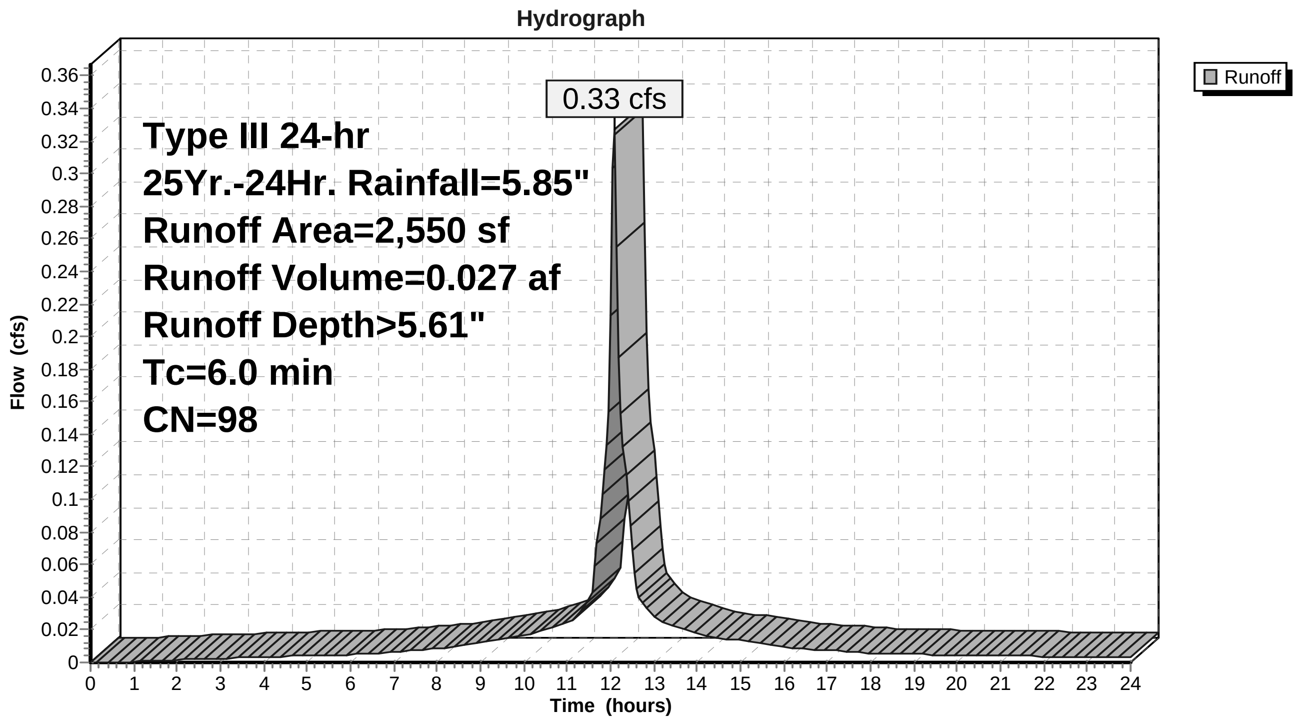
Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr.-24Hr. Rainfall=5.85"

Area (sf)	CN	Description
2,550	98	Paved parking, HSG A
2,550		100.00% Impervious Area

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

Subcatchment 25S: Catch Basin #5



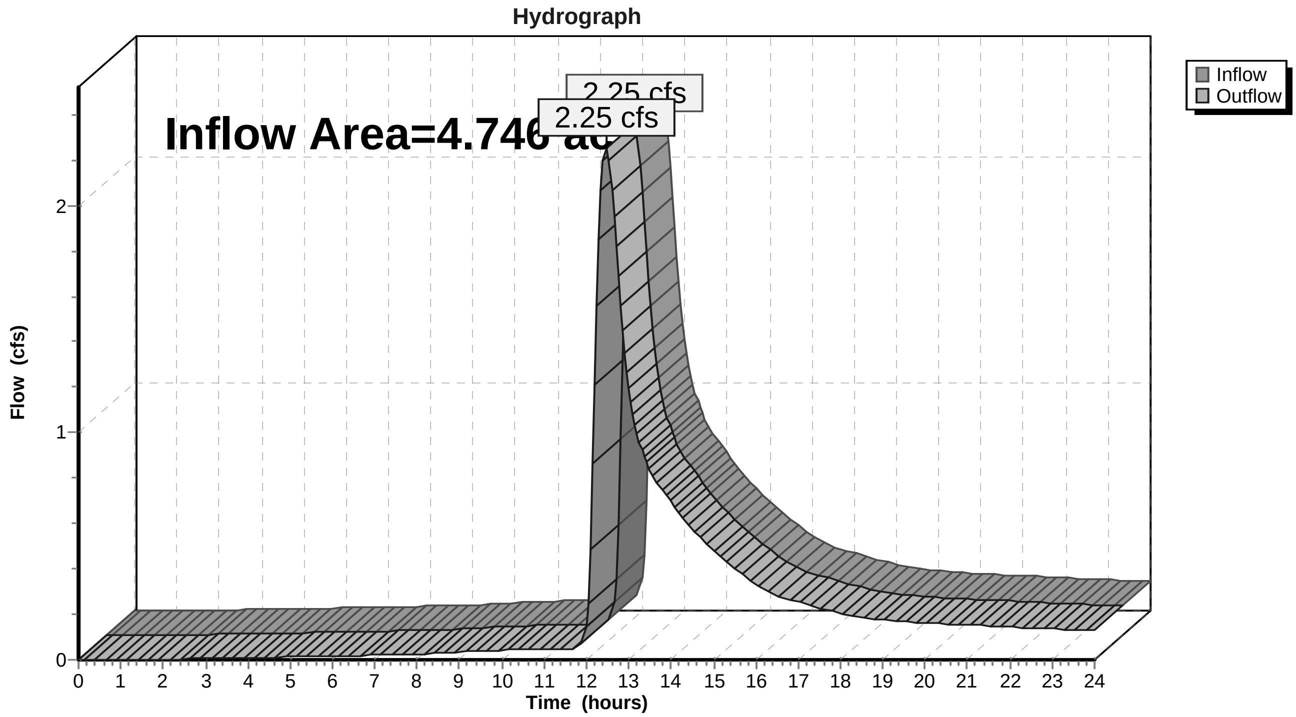
Summary for Reach 100R: Final Reach #100

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.746 ac, 11.75% Impervious, Inflow Depth > 1.07" for 25Yr.-24Hr. event
Inflow = 2.25 cfs @ 12.46 hrs, Volume= 0.421 af
Outflow = 2.25 cfs @ 12.46 hrs, Volume= 0.421 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 100R: Final Reach #100



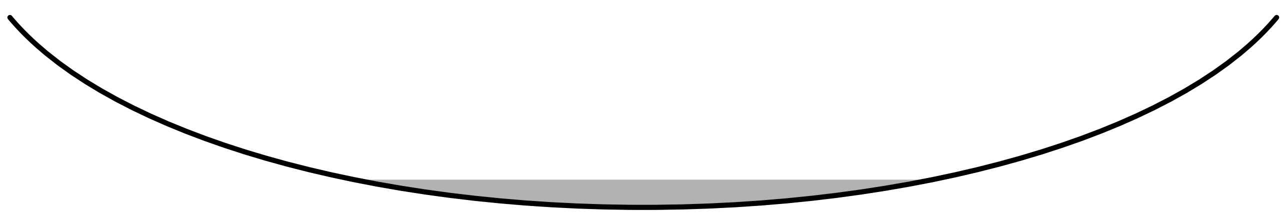
Summary for Reach 101R: Reach to Wetland

Inflow Area = 1.921 ac, 23.46% Impervious, Inflow Depth > 0.97" for 25Yr.-24Hr. event
Inflow = 0.45 cfs @ 12.55 hrs, Volume= 0.156 af
Outflow = 0.45 cfs @ 12.57 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.98 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 2.2 min

Peak Storage= 31 cf @ 12.57 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 29.48 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 66.5' Slope= 0.0301 '/'
Inlet Invert= 157.00', Outlet Invert= 155.00'



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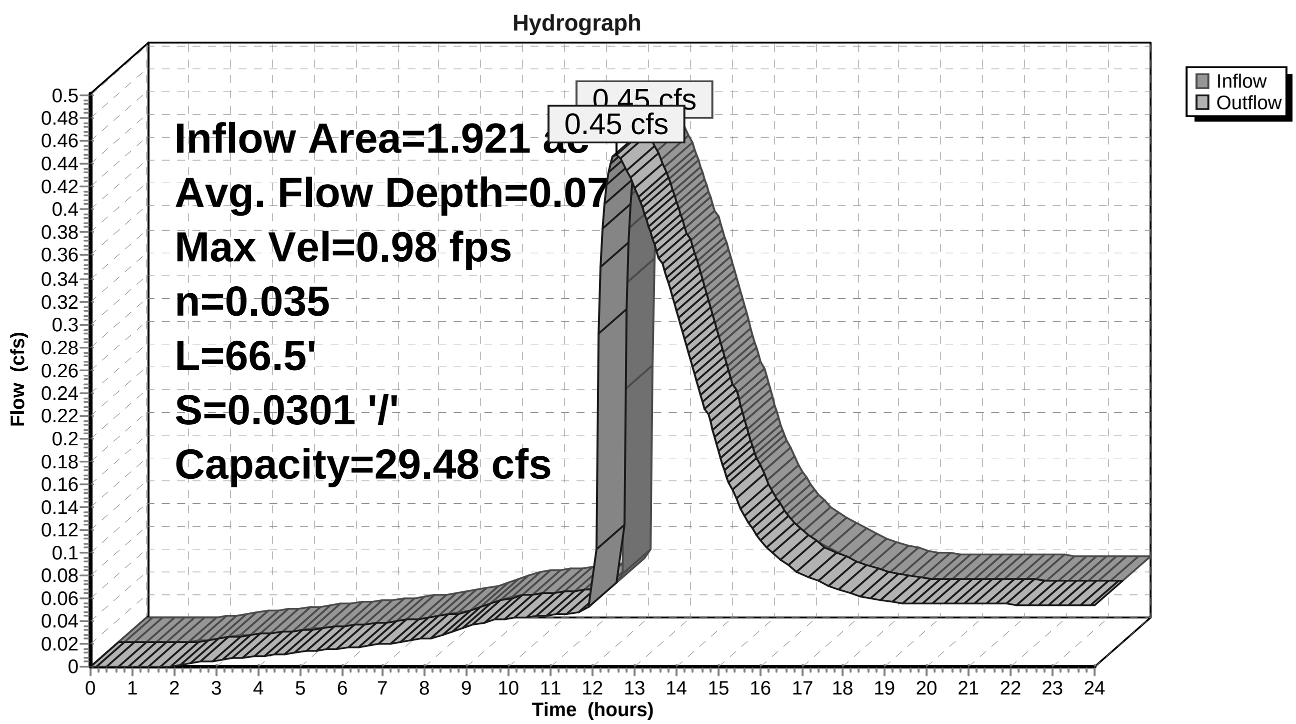
Reach 101R: Reach to Wetland



Summary for Pond 101P: Rain Garden #101

[80] Warning: Exceeded Pond C02P by 0.04' @ 12.35 hrs (0.28 cfs 0.006 af)
[80] Warning: Exceeded Pond C03P by 0.26' @ 12.10 hrs (2.71 cfs 0.184 af)
[80] Warning: Exceeded Pond C04P by 0.26' @ 12.10 hrs (3.00 cfs 0.266 af)
[80] Warning: Exceeded Pond D01P by 0.27' @ 12.10 hrs (3.07 cfs 0.628 af)

Inflow Area = 1.921 ac, 23.46% Impervious, Inflow Depth > 1.29" for 25Yr.-24Hr. event
Inflow = 2.50 cfs @ 12.09 hrs, Volume= 0.206 af
Outflow = 0.45 cfs @ 12.55 hrs, Volume= 0.156 af, Atten= 82%, Lag= 28.0 min
Primary = 0.45 cfs @ 12.55 hrs, Volume= 0.156 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.77' @ 12.55 hrs Surf.Area= 636 sf Storage= 4,162 cf
Flood Elev= 163.50' Surf.Area= 636 sf Storage= 5,626 cf

Plug-Flow detention time= 194.0 min calculated for 0.156 af (75% of inflow)
Center-of-Mass det. time= 105.6 min (876.7 - 771.2)

Volume	Invert	Avail.Storage	Storage Description
#1	157.30'	254 cf	**Stone (Irregular)** Listed below (Recalc) 636 cf Overall x 40.0% Voids
#2	158.30'	191 cf	**BioMedia (Irregular)** Listed below (Recalc) -Impervious 954 cf Overall x 20.0% Voids
#3	159.80'	5,180 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		5,626 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
157.30	636	110.2	0	0	636
158.30	636	110.2	636	636	746

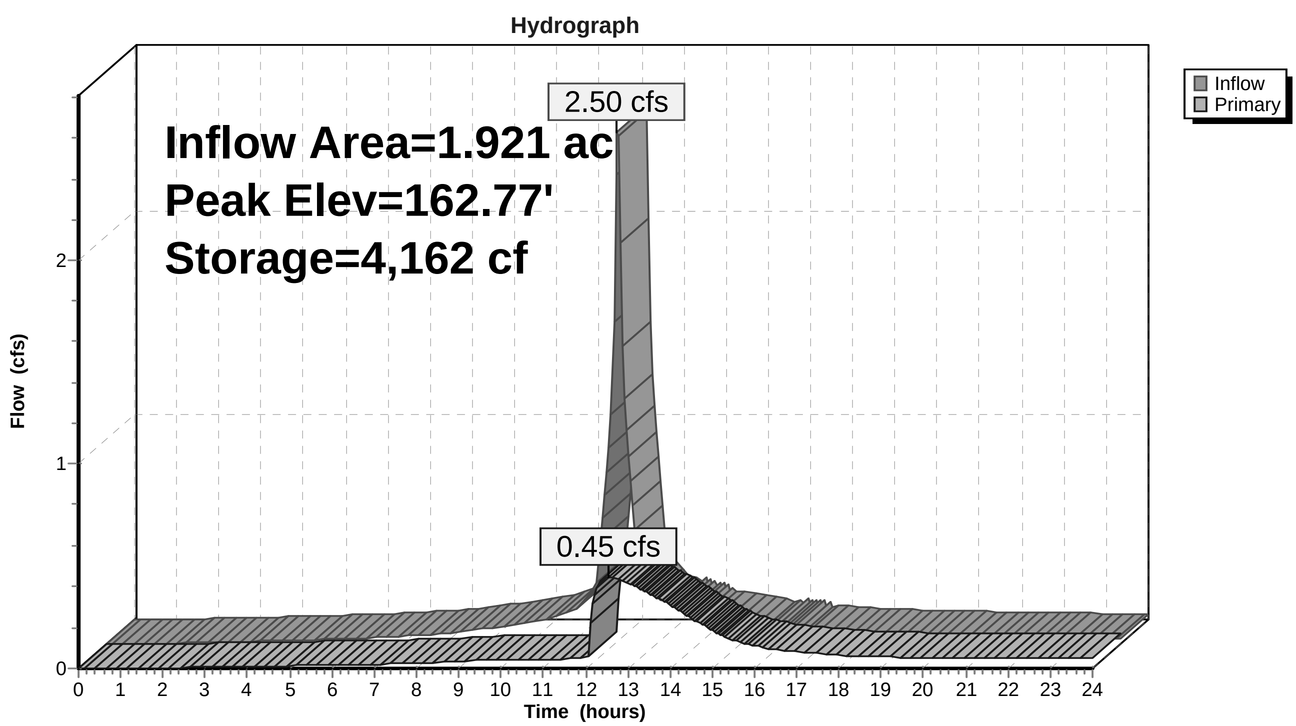
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
158.30	636	110.2	0	0	636
159.80	636	110.2	954	954	801

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
159.80	636	110.2	0	0	636
160.00	806	118.2	144	144	783
161.00	1,145	130.3	971	1,114	1,053
162.00	1,519	151.6	1,328	2,442	1,551
163.00	1,916	172.5	1,714	4,156	2,114
163.50	2,186	188.9	1,025	5,180	2,594

Device	Routing	Invert	Outlet Devices
#1	Primary	157.30'	**15.0" Round 15" HDPE N-12** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 157.30' / 157.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	157.30'	**1.0" Vert. 1" Orifice** C= 0.600
#3	Device 2	157.30'	**10.000 in/hr Filtration thru media over Surface area**
#4	Device 1	161.75'	**4.0" Vert. 4" Orifice** C= 0.600
#5	Device 1	163.00'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.45 cfs @ 12.55 hrs HW=162.76' TW=157.07' (Dynamic Tailwater)
└1=**15" HDPE N-12** (Passes 0.45 cfs of 12.75 cfs potential flow)
  ├2=**1" Orifice** (Orifice Controls 0.06 cfs @ 11.21 fps)
  │ └3=**Filtration thru media** (Passes 0.06 cfs of 0.15 cfs potential flow)
  ├4=**4" Orifice** (Orifice Controls 0.39 cfs @ 4.43 fps)
  └5=**48" Outlet Structure** (Controls 0.00 cfs)

Pond 101P: Rain Garden #101



Summary for Pond 102P: Infiltration Basin #102

Inflow Area = 1.356 ac, 4.04% Impervious, Inflow Depth > 0.67" for 25Yr.-24Hr. event
Inflow = 0.39 cfs @ 12.54 hrs, Volume= 0.076 af
Outflow = 0.11 cfs @ 14.36 hrs, Volume= 0.072 af, Atten= 72%, Lag= 109.5 min
Discarded = 0.11 cfs @ 14.36 hrs, Volume= 0.072 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.11' @ 14.36 hrs Surf.Area= 1,579 sf Storage= 884 cf
Flood Elev= 164.00' Surf.Area= 7,416 sf Storage= 6,431 cf

Plug-Flow detention time= 126.6 min calculated for 0.071 af (94% of inflow)
Center-of-Mass det. time= 97.8 min (1,037.5 - 939.7)

Volume	Invert	Avail.Storage	Storage Description
#1	161.00'	1,952 cf	**Infiltration Cell (Irregular)**Listed below (Recalc)
#2	162.00'	821 cf	**Sediment Forebay (Irregular)**Listed below (Recalc)
#3	163.00'	3,658 cf	**Open Water Storage (Irregular)**Listed below (Recalc)
		6,431 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
161.00	459	96.0	0	0	459
162.00	1,011	141.3	717	717	1,323
163.00	1,474	170.0	1,235	1,952	2,050

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	453	176.0	0	0	453
163.00	1,255	237.0	821	821	2,468

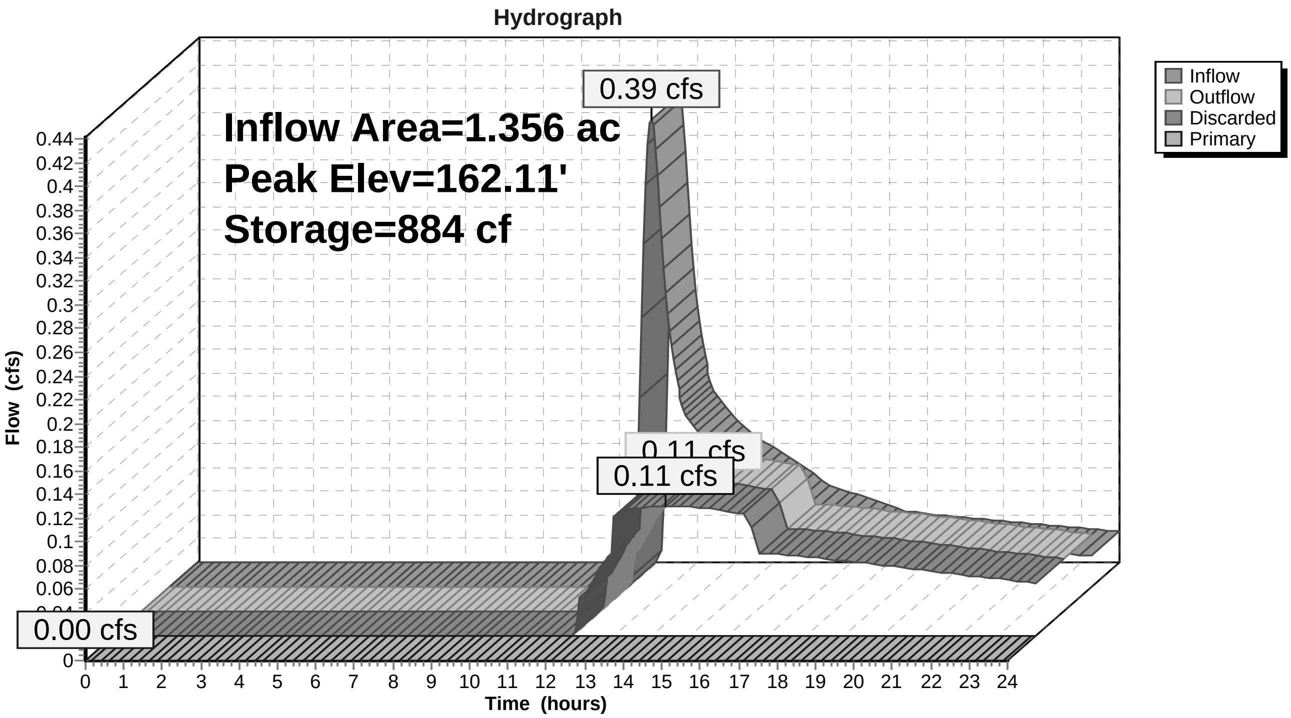
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
163.00	2,966	355.3	0	0	2,966
163.50	3,507	365.7	1,616	1,616	3,589
164.00	4,687	448.1	2,041	3,658	8,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	161.00'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	163.50'	**5.0' long x 30.0' breadth Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.11 cfs @ 14.36 hrs HW=162.11' (Free Discharge)
└─**1=Infiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.00' TW=157.30' (Dynamic Tailwater)
└─**2=Overflow** (Controls 0.00 cfs)

Pond 102P: Infiltration Basin #102



Summary for Pond C01P: Catch Basin #1

Inflow Area = 0.068 ac, 97.40% Impervious, Inflow Depth > 5.49" for 25Yr.-24Hr. event
Inflow = 0.38 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.38 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.1 min
Primary = 0.38 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.78' @ 12.09 hrs Surf.Area= 0.000 ac Storage= 0.000 af
Flood Elev= 166.97' Surf.Area= 0.000 ac Storage= 0.001 af

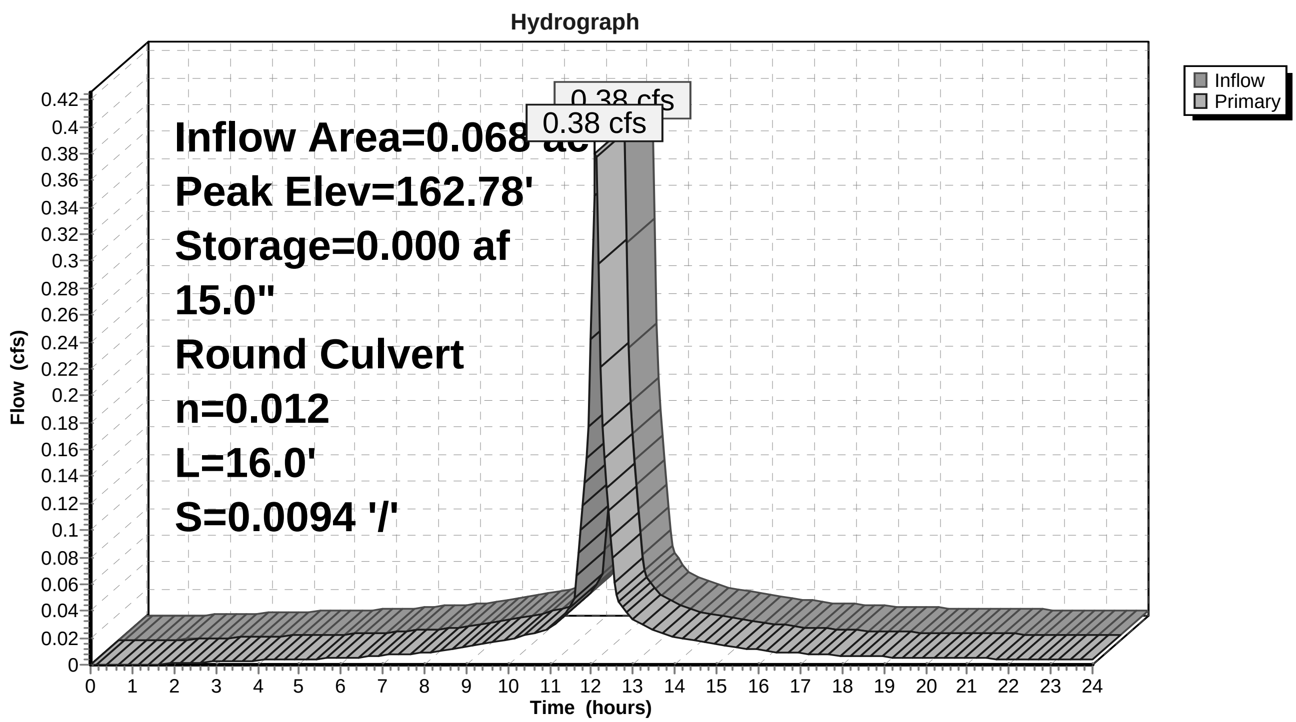
Plug-Flow detention time= 0.7 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (752.7 - 752.2)

Volume	Invert	Avail.Storage	Storage Description
#1	162.47'	0.001 af	**4.00'D x 4.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	162.47'	**15.0" Round 15" HDPE N-12** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.47' / 162.32' S= 0.0094 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=162.77' TW=162.56' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Outlet Controls 0.36 cfs @ 2.36 fps)

Pond C01P: Catch Basin #1



Summary for Pond C02P: Catch Basin #2

[80] Warning: Exceeded Pond C01P by 0.01' @ 12.50 hrs (0.07 cfs 0.001 af)

Inflow Area = 0.099 ac, 98.21% Impervious, Inflow Depth > 5.53" for 25Yr.-24Hr. event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 0.046 af
Outflow = 0.55 cfs @ 12.09 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.1 min
Primary = 0.55 cfs @ 12.09 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.77' @ 12.60 hrs Surf.Area= 0.000 ac Storage= 0.000 af
Flood Elev= 166.97' Surf.Area= 0.000 ac Storage= 0.001 af

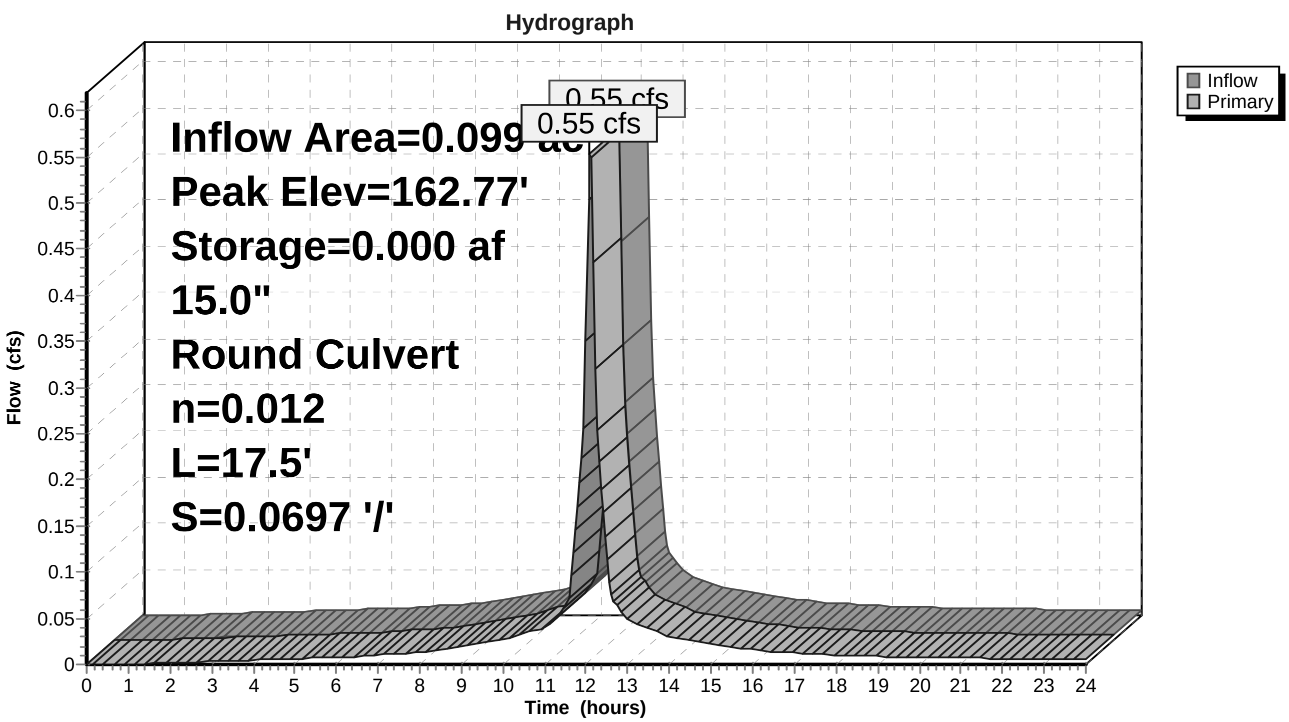
Plug-Flow detention time= 0.7 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (750.9 - 750.3)

Volume	Invert	Avail.Storage	Storage Description
#1	162.22'	0.001 af	**4.00'D x 4.75'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	162.22'	**15.0" Round 15" HDPE N-12** L= 17.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.22' / 161.00' S= 0.0697 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.54 cfs @ 12.09 hrs HW=162.56' TW=162.01' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Inlet Controls 0.54 cfs @ 1.99 fps)

Pond C02P: Catch Basin #2



Summary for Pond C03P: Catch Basin #3

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=42)

Inflow Area = 0.117 ac, 86.55% Impervious, Inflow Depth > 5.03" for 25Yr.-24Hr. event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.049 af
Outflow = 0.61 cfs @ 12.09 hrs, Volume= 0.049 af, Atten= 3%, Lag= 0.0 min
Primary = 0.61 cfs @ 12.09 hrs, Volume= 0.049 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.77' @ 12.60 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 163.92' Surf.Area= 0.000 ac Storage= 0.001 af

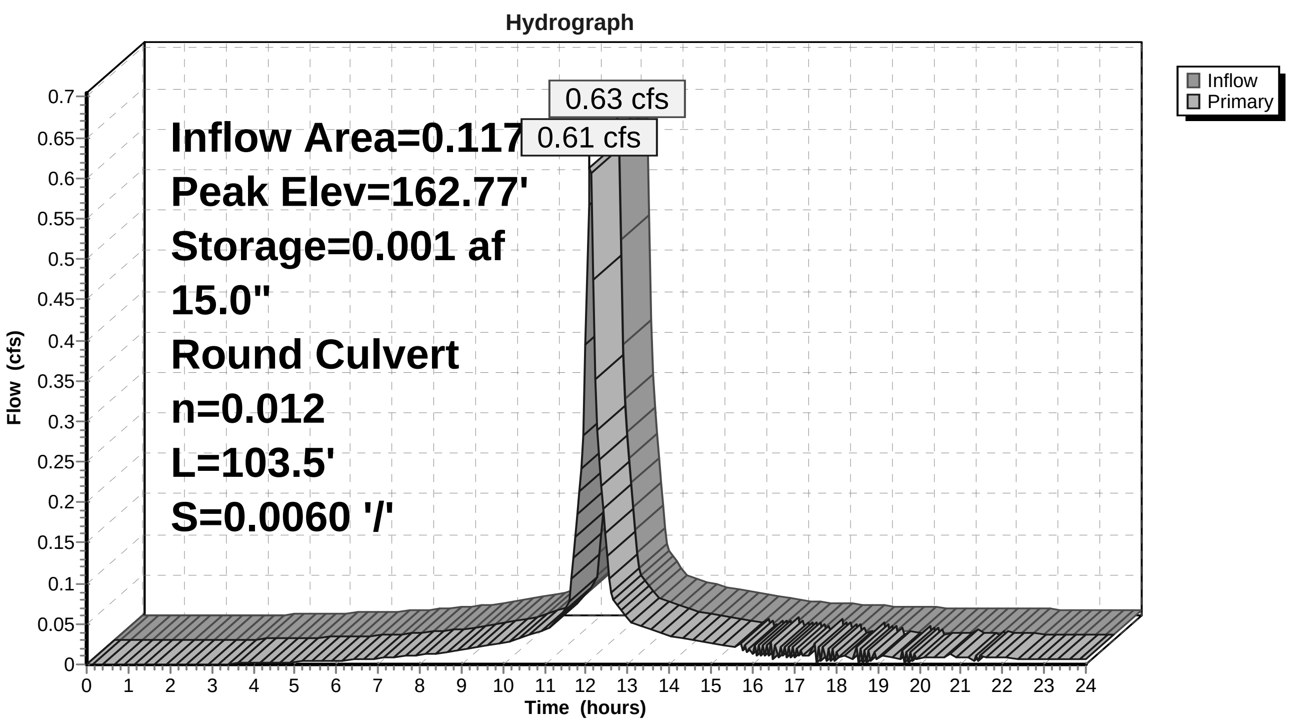
Plug-Flow detention time= 6.9 min calculated for 0.049 af (99% of inflow)
Center-of-Mass det. time= 1.8 min (775.1 - 773.3)

Volume	Invert	Avail.Storage	Storage Description
#1	160.42'	0.001 af	**4.00'D x 3.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	160.42'	**15.0" Round 15" HDPE N-12** L= 103.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 160.42' / 159.80' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=161.74' TW=161.99' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond C03P: Catch Basin #3



Summary for Pond C04P: Catch Basin #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=8)

Inflow Area = 0.132 ac, 97.10% Impervious, Inflow Depth > 5.49" for 25Yr.-24Hr. event
Inflow = 0.74 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.72 cfs @ 12.09 hrs, Volume= 0.060 af, Atten= 3%, Lag= 0.0 min
Primary = 0.72 cfs @ 12.09 hrs, Volume= 0.060 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.77' @ 12.60 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 163.64' Surf.Area= 0.000 ac Storage= 0.001 af

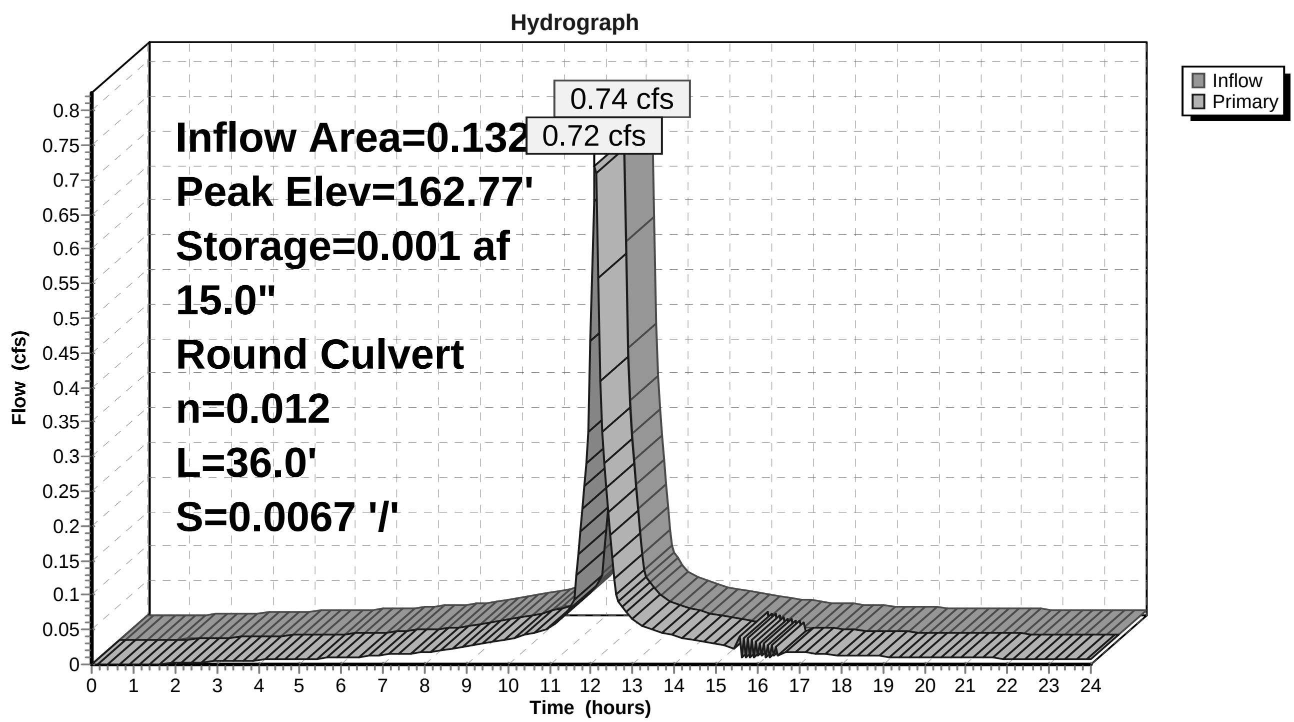
Plug-Flow detention time= 6.5 min calculated for 0.060 af (99% of inflow)
Center-of-Mass det. time= 1.8 min (754.0 - 752.2)

Volume	Invert	Avail.Storage	Storage Description
#1	160.14'	0.001 af	**4.00'D x 3.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	160.14'	**15.0" Round 15" HDPE N-12** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 160.14' / 159.90' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=161.74' TW=161.99' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond C04P: Catch Basin #4



Summary for Pond C05P: Catch Basin #5

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=64)

Inflow Area = 0.059 ac,100.00% Impervious, Inflow Depth > 5.61" for 25Yr.-24Hr. event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.31 cfs @ 12.08 hrs, Volume= 0.027 af, Atten= 4%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.08 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.77' @ 12.65 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 164.64' Surf.Area= 0.000 ac Storage= 0.001 af

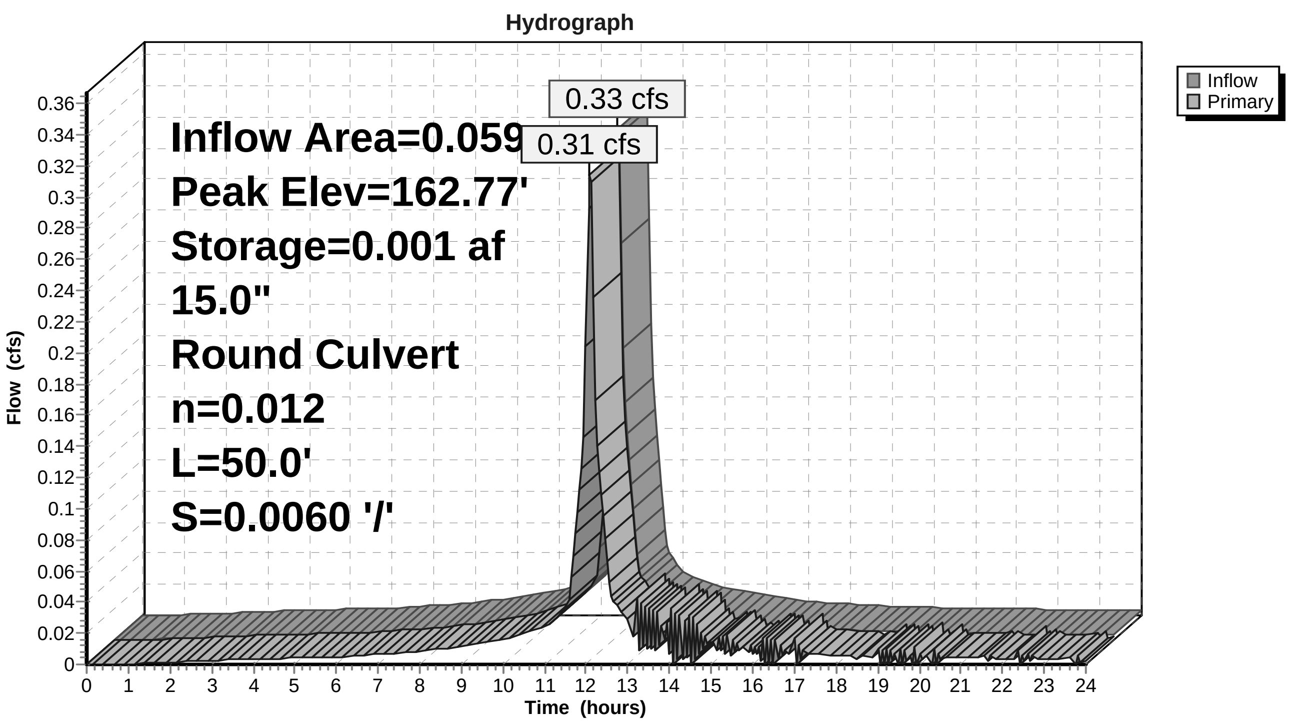
Plug-Flow detention time= 12.3 min calculated for 0.027 af (98% of inflow)
Center-of-Mass det. time= 3.6 min (748.7 - 745.1)

Volume	Invert	Avail.Storage	Storage Description
#1	160.39'	0.001 af	**4.00'D x 4.25'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	160.39'	**15.0" Round 15" HDPE N-12** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 160.39' / 160.09' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=161.50' TW=161.72' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond C05P: Catch Basin #5



Summary for Pond D01P: Drain Manhole #1

[80] Warning: Exceeded Pond C05P by 0.27' @ 12.15 hrs (3.06 cfs 0.453 af)

Inflow Area = 0.059 ac,100.00% Impervious, Inflow Depth > 5.53" for 25Yr.-24Hr. event
Inflow = 0.31 cfs @ 12.08 hrs, Volume= 0.027 af
Outflow = 0.30 cfs @ 12.08 hrs, Volume= 0.027 af, Atten= 6%, Lag= 0.0 min
Primary = 0.30 cfs @ 12.08 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.77' @ 12.60 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 166.24' Surf.Area= 0.000 ac Storage= 0.002 af

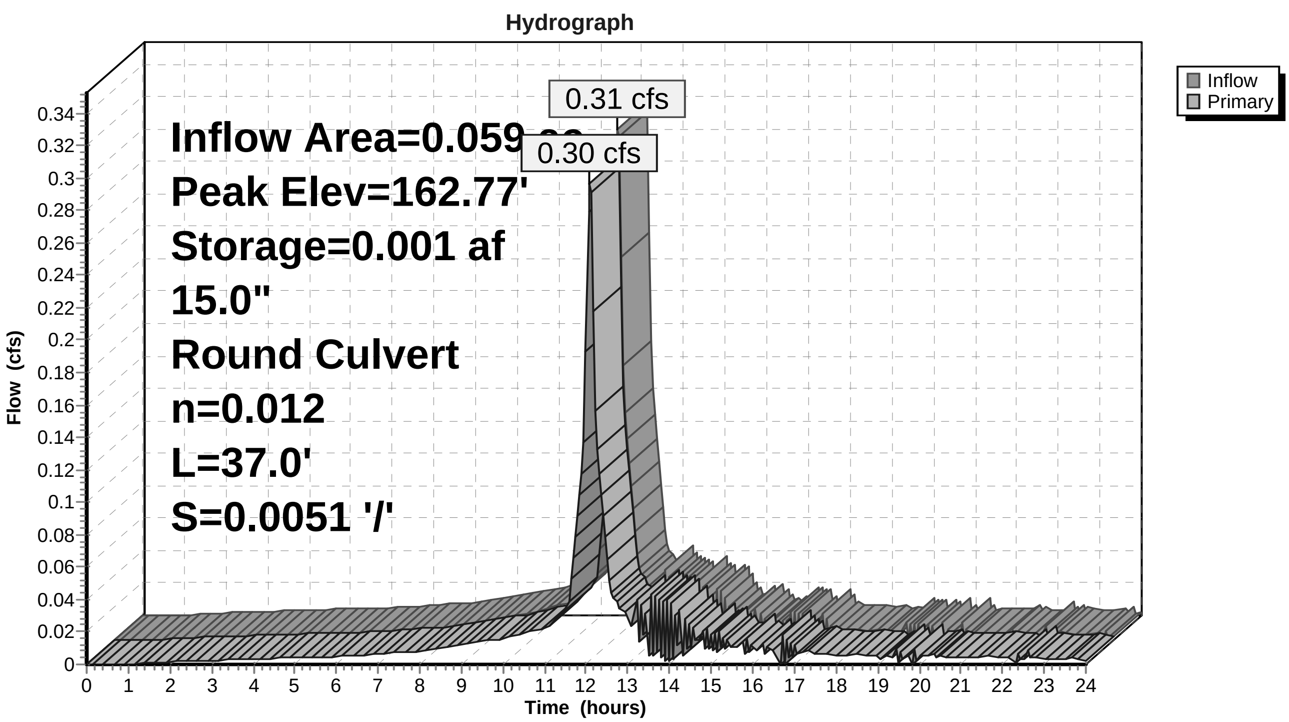
Plug-Flow detention time= 15.5 min calculated for 0.026 af (98% of inflow)
Center-of-Mass det. time= 4.3 min (752.9 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1	159.99'	0.002 af	**4.00'D x 6.25'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	159.99'	**15.0" Round 15" HDPE N-12** L= 37.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 159.99' / 159.80' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=161.71' TW=161.97' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond D01P: Drain Manhole #1



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=123,075 sf 3.79% Impervious Runoff Depth>0.12"
Flow Length=308' Tc=26.7 min CN=51 Runoff=0.05 cfs 0.029 af

Subcatchment 11S: Rain Garden #101 Runoff Area=6,863 sf 6.35% Impervious Runoff Depth>0.40"
Tc=6.0 min CN=61 Runoff=0.04 cfs 0.005 af

Subcatchment 12S: Infiltration Basin #102 Runoff Area=59,075 sf 4.04% Impervious Runoff Depth>0.02"
Flow Length=265' Tc=25.9 min CN=44 Runoff=0.00 cfs 0.002 af

Subcatchment 21S: Catch Basin #1 Runoff Area=2,967 sf 97.40% Impervious Runoff Depth>2.74"
Tc=6.0 min CN=97 Runoff=0.20 cfs 0.016 af

Subcatchment 22S: Catch Basin #2 Runoff Area=1,343 sf 100.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 23S: Catch Basin #3 Runoff Area=5,115 sf 86.55% Impervious Runoff Depth>2.33"
Tc=6.0 min CN=93 Runoff=0.30 cfs 0.023 af

Subcatchment 24S: Catch Basin #4 Runoff Area=5,766 sf 97.10% Impervious Runoff Depth>2.74"
Tc=6.0 min CN=97 Runoff=0.38 cfs 0.030 af

Subcatchment 25S: Catch Basin #5 Runoff Area=2,550 sf 100.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Reach 100R: Final Reach #100 Inflow=0.11 cfs 0.091 af
Outflow=0.11 cfs 0.091 af

Reach 101R: Reach to Wetland Avg. Flow Depth=0.03' Max Vel=0.51 fps Inflow=0.05 cfs 0.062 af
n=0.035 L=66.5' S=0.0301 '/' Capacity=29.48 cfs Outflow=0.05 cfs 0.062 af

Pond 101P: Rain Garden #101 Peak Elev=161.57' Storage=2,270 cf Inflow=1.16 cfs 0.094 af
Outflow=0.05 cfs 0.062 af

Pond 102P: Infiltration Basin #102 Peak Elev=161.00' Storage=0 cf Inflow=0.00 cfs 0.002 af
Discarded=0.00 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

Pond C01P: Catch Basin #1 Peak Elev=162.68' Storage=0.000 af Inflow=0.20 cfs 0.016 af
15.0" Round Culvert n=0.012 L=16.0' S=0.0094 '/' Outflow=0.20 cfs 0.016 af

Pond C02P: Catch Basin #2 Peak Elev=162.47' Storage=0.000 af Inflow=0.29 cfs 0.023 af
15.0" Round Culvert n=0.012 L=17.5' S=0.0697 '/' Outflow=0.29 cfs 0.023 af

Pond C03P: Catch Basin #3 Peak Elev=161.57' Storage=0.000 af Inflow=0.30 cfs 0.023 af
15.0" Round Culvert n=0.012 L=103.5' S=0.0060 '/' Outflow=0.30 cfs 0.023 af

Pond C04P: Catch Basin #4 Peak Elev=161.57' Storage=0.000 af Inflow=0.38 cfs 0.030 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0067 '/' Outflow=0.37 cfs 0.030 af

Pond C05P: Catch Basin #5 Peak Elev=161.55' Storage=0.000 af Inflow=0.17 cfs 0.014 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0060 '/' Outflow=0.17 cfs 0.014 af

Pond D01P: Drain Manhole #1 Peak Elev=161.57' Storage=0.000 af Inflow=0.17 cfs 0.014 af
15.0" Round Culvert n=0.012 L=37.0' S=0.0051 '/' Outflow=0.16 cfs 0.013 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.126 af Average Runoff Depth = 0.32"
88.25% Pervious = 4.189 ac 11.75% Impervious = 0.558 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=123,075 sf 3.79% Impervious Runoff Depth>0.59"
Flow Length=308' Tc=26.7 min CN=51 Runoff=0.76 cfs 0.139 af

Subcatchment 11S: Rain Garden #101 Runoff Area=6,863 sf 6.35% Impervious Runoff Depth>1.15"
Tc=6.0 min CN=61 Runoff=0.19 cfs 0.015 af

Subcatchment 12S: Infiltration Basin #102 Runoff Area=59,075 sf 4.04% Impervious Runoff Depth>0.29"
Flow Length=265' Tc=25.9 min CN=44 Runoff=0.10 cfs 0.033 af

Subcatchment 21S: Catch Basin #1 Runoff Area=2,967 sf 97.40% Impervious Runoff Depth>4.28"
Tc=6.0 min CN=97 Runoff=0.30 cfs 0.024 af

Subcatchment 22S: Catch Basin #2 Runoff Area=1,343 sf 100.00% Impervious Runoff Depth>4.39"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 23S: Catch Basin #3 Runoff Area=5,115 sf 86.55% Impervious Runoff Depth>3.83"
Tc=6.0 min CN=93 Runoff=0.49 cfs 0.038 af

Subcatchment 24S: Catch Basin #4 Runoff Area=5,766 sf 97.10% Impervious Runoff Depth>4.28"
Tc=6.0 min CN=97 Runoff=0.58 cfs 0.047 af

Subcatchment 25S: Catch Basin #5 Runoff Area=2,550 sf 100.00% Impervious Runoff Depth>4.39"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.021 af

Reach 100R: Final Reach #100 Inflow=1.05 cfs 0.248 af
Outflow=1.05 cfs 0.248 af

Reach 101R: Reach to Wetland Avg. Flow Depth=0.06' Max Vel=0.85 fps Inflow=0.29 cfs 0.109 af
n=0.035 L=66.5' S=0.0301 '/' Capacity=29.48 cfs Outflow=0.29 cfs 0.109 af

Pond 101P: Rain Garden #101 Peak Elev=162.22' Storage=3,237 cf Inflow=1.89 cfs 0.155 af
Outflow=0.29 cfs 0.109 af

Pond 102P: Infiltration Basin #102 Peak Elev=161.40' Storage=223 cf Inflow=0.10 cfs 0.033 af
Discarded=0.05 cfs 0.033 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.033 af

Pond C01P: Catch Basin #1 Peak Elev=162.74' Storage=0.000 af Inflow=0.30 cfs 0.024 af
15.0" Round Culvert n=0.012 L=16.0' S=0.0094 '/' Outflow=0.30 cfs 0.024 af

Pond C02P: Catch Basin #2 Peak Elev=162.53' Storage=0.000 af Inflow=0.44 cfs 0.036 af
15.0" Round Culvert n=0.012 L=17.5' S=0.0697 '/' Outflow=0.44 cfs 0.036 af

Pond C03P: Catch Basin #3 Peak Elev=162.22' Storage=0.001 af Inflow=0.49 cfs 0.038 af
15.0" Round Culvert n=0.012 L=103.5' S=0.0060 '/' Outflow=0.47 cfs 0.037 af

Pond C04P: Catch Basin #4 Peak Elev=162.22' Storage=0.001 af Inflow=0.58 cfs 0.047 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0067 '/' Outflow=0.56 cfs 0.047 af

Pond C05P: Catch Basin #5 Peak Elev=162.22' Storage=0.001 af Inflow=0.26 cfs 0.021 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0060 '/' Outflow=0.25 cfs 0.021 af

Pond D01P: Drain Manhole #1 Peak Elev=162.22' Storage=0.001 af Inflow=0.25 cfs 0.021 af
15.0" Round Culvert n=0.012 L=37.0' S=0.0051 '/' Outflow=0.23 cfs 0.021 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.328 af Average Runoff Depth = 0.83"
88.25% Pervious = 4.189 ac 11.75% Impervious = 0.558 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=123,075 sf 3.79% Impervious Runoff Depth>1.13"
Flow Length=308' Tc=26.7 min CN=51 Runoff=1.81 cfs 0.266 af

Subcatchment 11S: Rain Garden #101 Runoff Area=6,863 sf 6.35% Impervious Runoff Depth>1.90"
Tc=6.0 min CN=61 Runoff=0.33 cfs 0.025 af

Subcatchment 12S: Infiltration Basin #102 Runoff Area=59,075 sf 4.04% Impervious Runoff Depth>0.67"
Flow Length=265' Tc=25.9 min CN=44 Runoff=0.39 cfs 0.076 af

Subcatchment 21S: Catch Basin #1 Runoff Area=2,967 sf 97.40% Impervious Runoff Depth>5.49"
Tc=6.0 min CN=97 Runoff=0.38 cfs 0.031 af

Subcatchment 22S: Catch Basin #2 Runoff Area=1,343 sf 100.00% Impervious Runoff Depth>5.61"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 23S: Catch Basin #3 Runoff Area=5,115 sf 86.55% Impervious Runoff Depth>5.03"
Tc=6.0 min CN=93 Runoff=0.63 cfs 0.049 af

Subcatchment 24S: Catch Basin #4 Runoff Area=5,766 sf 97.10% Impervious Runoff Depth>5.49"
Tc=6.0 min CN=97 Runoff=0.74 cfs 0.061 af

Subcatchment 25S: Catch Basin #5 Runoff Area=2,550 sf 100.00% Impervious Runoff Depth>5.61"
Tc=6.0 min CN=98 Runoff=0.33 cfs 0.027 af

Reach 100R: Final Reach #100 Inflow=2.25 cfs 0.421 af
Outflow=2.25 cfs 0.421 af

Reach 101R: Reach to Wetland Avg. Flow Depth=0.07' Max Vel=0.98 fps Inflow=0.45 cfs 0.156 af
n=0.035 L=66.5' S=0.0301 '/' Capacity=29.48 cfs Outflow=0.45 cfs 0.155 af

Pond 101P: Rain Garden #101 Peak Elev=162.77' Storage=4,162 cf Inflow=2.50 cfs 0.206 af
Outflow=0.45 cfs 0.156 af

Pond 102P: Infiltration Basin #102 Peak Elev=162.11' Storage=884 cf Inflow=0.39 cfs 0.076 af
Discarded=0.11 cfs 0.072 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.072 af

Pond C01P: Catch Basin #1 Peak Elev=162.78' Storage=0.000 af Inflow=0.38 cfs 0.031 af
15.0" Round Culvert n=0.012 L=16.0' S=0.0094 '/' Outflow=0.38 cfs 0.031 af

Pond C02P: Catch Basin #2 Peak Elev=162.77' Storage=0.000 af Inflow=0.55 cfs 0.046 af
15.0" Round Culvert n=0.012 L=17.5' S=0.0697 '/' Outflow=0.55 cfs 0.046 af

Pond C03P: Catch Basin #3 Peak Elev=162.77' Storage=0.001 af Inflow=0.63 cfs 0.049 af
15.0" Round Culvert n=0.012 L=103.5' S=0.0060 '/' Outflow=0.61 cfs 0.049 af

Pond C04P: Catch Basin #4 Peak Elev=162.77' Storage=0.001 af Inflow=0.74 cfs 0.061 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0067 '/' Outflow=0.72 cfs 0.060 af

Pond C05P: Catch Basin #5 Peak Elev=162.77' Storage=0.001 af Inflow=0.33 cfs 0.027 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0060 '/' Outflow=0.31 cfs 0.027 af

Pond D01P: Drain Manhole #1 Peak Elev=162.77' Storage=0.001 af Inflow=0.31 cfs 0.027 af
15.0" Round Culvert n=0.012 L=37.0' S=0.0051 '/' Outflow=0.30 cfs 0.027 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.550 af Average Runoff Depth = 1.39"
88.25% Pervious = 4.189 ac 11.75% Impervious = 0.558 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=123,075 sf 3.79% Impervious Runoff Depth>1.74"
Flow Length=308' Tc=26.7 min CN=51 Runoff=3.05 cfs 0.409 af

Subcatchment 11S: Rain Garden #101 Runoff Area=6,863 sf 6.35% Impervious Runoff Depth>2.69"
Tc=6.0 min CN=61 Runoff=0.48 cfs 0.035 af

Subcatchment 12S: Infiltration Basin #102 Runoff Area=59,075 sf 4.04% Impervious Runoff Depth>1.14"
Flow Length=265' Tc=25.9 min CN=44 Runoff=0.82 cfs 0.129 af

Subcatchment 21S: Catch Basin #1 Runoff Area=2,967 sf 97.40% Impervious Runoff Depth>6.63"
Tc=6.0 min CN=97 Runoff=0.45 cfs 0.038 af

Subcatchment 22S: Catch Basin #2 Runoff Area=1,343 sf 100.00% Impervious Runoff Depth>6.75"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.017 af

Subcatchment 23S: Catch Basin #3 Runoff Area=5,115 sf 86.55% Impervious Runoff Depth>6.16"
Tc=6.0 min CN=93 Runoff=0.76 cfs 0.060 af

Subcatchment 24S: Catch Basin #4 Runoff Area=5,766 sf 97.10% Impervious Runoff Depth>6.63"
Tc=6.0 min CN=97 Runoff=0.88 cfs 0.073 af

Subcatchment 25S: Catch Basin #5 Runoff Area=2,550 sf 100.00% Impervious Runoff Depth>6.75"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.033 af

Reach 100R: Final Reach #100 Inflow=4.23 cfs 0.610 af
Outflow=4.23 cfs 0.610 af

Reach 101R: Reach to Wetland Avg. Flow Depth=0.12' Max Vel=1.35 fps Inflow=1.22 cfs 0.201 af
n=0.035 L=66.5' S=0.0301 '/' Capacity=29.48 cfs Outflow=1.27 cfs 0.201 af

Pond 101P: Rain Garden #101 Peak Elev=163.07' Storage=4,730 cf Inflow=3.10 cfs 0.255 af
Outflow=1.22 cfs 0.201 af

Pond 102P: Infiltration Basin #102 Peak Elev=162.67' Storage=1,957 cf Inflow=0.82 cfs 0.129 af
Discarded=0.16 cfs 0.117 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.117 af

Pond C01P: Catch Basin #1 Peak Elev=163.08' Storage=0.000 af Inflow=0.45 cfs 0.038 af
15.0" Round Culvert n=0.012 L=16.0' S=0.0094 '/' Outflow=0.45 cfs 0.038 af

Pond C02P: Catch Basin #2 Peak Elev=163.07' Storage=0.000 af Inflow=0.66 cfs 0.055 af
15.0" Round Culvert n=0.012 L=17.5' S=0.0697 '/' Outflow=0.66 cfs 0.055 af

Pond C03P: Catch Basin #3 Peak Elev=163.07' Storage=0.001 af Inflow=0.76 cfs 0.060 af
15.0" Round Culvert n=0.012 L=103.5' S=0.0060 '/' Outflow=0.74 cfs 0.060 af

Pond C04P: Catch Basin #4 Peak Elev=163.07' Storage=0.001 af Inflow=0.88 cfs 0.073 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0067 '/' Outflow=0.86 cfs 0.073 af

Pond C05P: Catch Basin #5 Peak Elev=163.07' Storage=0.001 af Inflow=0.39 cfs 0.033 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0060 '/' Outflow=0.38 cfs 0.033 af

Pond D01P: Drain Manhole #1 Peak Elev=163.07' Storage=0.001 af Inflow=0.38 cfs 0.033 af
15.0" Round Culvert n=0.012 L=37.0' S=0.0051 '/' Outflow=0.36 cfs 0.032 af

Total Runoff Area = 4.746 ac Runoff Volume = 0.794 af Average Runoff Depth = 2.01"
88.25% Pervious = 4.189 ac 11.75% Impervious = 0.558 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=123,075 sf 3.79% Impervious Runoff Depth>2.57"
Flow Length=308' Tc=26.7 min CN=51 Runoff=4.76 cfs 0.604 af

Subcatchment 11S: Rain Garden #101 Runoff Area=6,863 sf 6.35% Impervious Runoff Depth>3.72"
Tc=6.0 min CN=61 Runoff=0.67 cfs 0.049 af

Subcatchment 12S: Infiltration Basin #102 Runoff Area=59,075 sf 4.04% Impervious Runoff Depth>1.81"
Flow Length=265' Tc=25.9 min CN=44 Runoff=1.47 cfs 0.204 af

Subcatchment 21S: Catch Basin #1 Runoff Area=2,967 sf 97.40% Impervious Runoff Depth>8.00"
Tc=6.0 min CN=97 Runoff=0.54 cfs 0.045 af

Subcatchment 22S: Catch Basin #2 Runoff Area=1,343 sf 100.00% Impervious Runoff Depth>8.12"
Tc=6.0 min CN=98 Runoff=0.25 cfs 0.021 af

Subcatchment 23S: Catch Basin #3 Runoff Area=5,115 sf 86.55% Impervious Runoff Depth>7.52"
Tc=6.0 min CN=93 Runoff=0.92 cfs 0.074 af

Subcatchment 24S: Catch Basin #4 Runoff Area=5,766 sf 97.10% Impervious Runoff Depth>8.00"
Tc=6.0 min CN=97 Runoff=1.06 cfs 0.088 af

Subcatchment 25S: Catch Basin #5 Runoff Area=2,550 sf 100.00% Impervious Runoff Depth>8.12"
Tc=6.0 min CN=98 Runoff=0.47 cfs 0.040 af

Reach 100R: Final Reach #100 Inflow=6.25 cfs 0.861 af
Outflow=6.25 cfs 0.861 af

Reach 101R: Reach to Wetland Avg. Flow Depth=0.18' Max Vel=1.76 fps Inflow=3.24 cfs 0.258 af
n=0.035 L=66.5' S=0.0301 '/' Capacity=29.48 cfs Outflow=3.08 cfs 0.257 af

Pond 101P: Rain Garden #101 Peak Elev=163.17' Storage=4,930 cf Inflow=3.82 cfs 0.314 af
Outflow=3.24 cfs 0.258 af

Pond 102P: Infiltration Basin #102 Peak Elev=163.07' Storage=2,996 cf Inflow=1.47 cfs 0.204 af
Discarded=0.40 cfs 0.184 af Primary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.184 af

Pond C01P: Catch Basin #1 Peak Elev=163.18' Storage=0.000 af Inflow=0.54 cfs 0.045 af
15.0" Round Culvert n=0.012 L=16.0' S=0.0094 '/' Outflow=0.54 cfs 0.045 af

Pond C02P: Catch Basin #2 Peak Elev=163.18' Storage=0.000 af Inflow=0.79 cfs 0.066 af
15.0" Round Culvert n=0.012 L=17.5' S=0.0697 '/' Outflow=0.78 cfs 0.066 af

Pond C03P: Catch Basin #3 Peak Elev=163.18' Storage=0.001 af Inflow=0.92 cfs 0.074 af
15.0" Round Culvert n=0.012 L=103.5' S=0.0060 '/' Outflow=0.90 cfs 0.073 af

Pond C04P: Catch Basin #4 Peak Elev=163.18' Storage=0.001 af Inflow=1.06 cfs 0.088 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0067 '/' Outflow=1.04 cfs 0.088 af

Pond C05P: Catch Basin #5 Peak Elev=163.17' Storage=0.001 af Inflow=0.47 cfs 0.040 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0060 '/' Outflow=0.46 cfs 0.039 af

Pond D01P: Drain Manhole #1 Peak Elev=163.17' Storage=0.001 af Inflow=0.46 cfs 0.039 af
15.0" Round Culvert n=0.012 L=37.0' S=0.0051 '/' Outflow=0.43 cfs 0.039 af

Total Runoff Area = 4.746 ac Runoff Volume = 1.125 af Average Runoff Depth = 2.84"
88.25% Pervious = 4.189 ac 11.75% Impervious = 0.558 ac

Appendix III - Calculations, Charts, & Graphs

Extreme Precipitation Tables
Rip-Rap Calculations
NHDES AoT Spreadsheet
USDA / NRCS Websoil
Site Specific Soil Survey Report & Plan
Stormwater System Management: Inspection and Maintenance
Watershed Report Card, 303(d) List, & ORW List
Infiltration Feasibility Study
KSat NH Manual
Manual Filtrexx Silt Soxx Specifications Cut Sheets

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.995 degrees West
Latitude	43.187 degrees North
Elevation	0 feet
Date/Time	Wed, 02 Mar 2022 12:30:12 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.53	1.98	2.57	2.81	**1yr**	2.27	2.70	3.11	3.83	4.41	**1yr**
2yr	0.32	0.49	0.61	0.80	1.01	1.28	**2yr**	0.87	1.16	1.49	1.89	2.41	3.09	3.43	**2yr**	2.73	3.30	3.80	4.52	5.15	**2yr**
5yr	0.37	0.57	0.72	0.96	1.23	1.57	**5yr**	1.06	1.44	1.84	2.36	3.03	3.90	4.39	**5yr**	3.45	4.22	4.83	5.71	6.46	**5yr**
10yr	0.40	0.63	0.80	1.09	1.42	1.84	**10yr**	1.22	1.69	2.17	2.80	3.61	4.66	5.29	**10yr**	4.12	5.09	5.81	6.81	7.66	**10yr**
25yr	0.46	0.74	0.94	1.29	1.72	2.26	**25yr**	1.49	2.09	2.69	3.50	4.55	5.89	6.78	**25yr**	5.21	6.52	7.41	8.60	9.62	**25yr**
50yr	0.52	0.83	1.06	1.48	2.00	2.66	**50yr**	1.73	2.45	3.17	4.15	5.42	7.04	8.18	**50yr**	6.23	7.87	8.91	10.27	11.43	**50yr**
100yr	0.58	0.94	1.21	1.71	2.33	3.12	**100yr**	2.01	2.88	3.74	4.92	6.45	8.42	9.87	**100yr**	7.45	9.50	10.71	12.27	13.58	**100yr**
200yr	0.64	1.05	1.36	1.96	2.71	3.67	**200yr**	2.34	3.39	4.42	5.85	7.69	10.07	11.92	**200yr**	8.91	11.47	12.88	14.66	16.15	**200yr**
500yr	0.76	1.25	1.63	2.36	3.31	4.54	**500yr**	2.86	4.21	5.49	7.33	9.70	12.76	15.31	**500yr**	11.30	14.72	16.46	18.57	20.33	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.36	0.45	0.60	0.74	0.90	**1yr**	0.64	0.88	0.92	1.25	1.53	1.95	2.49	**1yr**	1.73	2.40	2.92	3.30	3.97	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.18	**2yr**	0.86	1.15	1.36	1.82	2.34	3.00	3.33	**2yr**	2.65	3.20	3.68	4.41	5.03	**2yr**
5yr	0.35	0.54	0.67	0.92	1.16	1.40	**5yr**	1.01	1.37	1.61	2.14	2.77	3.61	4.04	**5yr**	3.20	3.89	4.49	5.35	6.02	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.56	1.82	2.44	3.13	4.14	4.68	**10yr**	3.67	4.50	5.20	6.20	6.88	**10yr**
25yr	0.44	0.67	0.83	1.19	1.56	1.91	**25yr**	1.35	1.87	2.12	2.84	3.65	4.94	5.65	**25yr**	4.38	5.43	6.33	7.53	8.33	**25yr**
50yr	0.49	0.74	0.92	1.32	1.78	2.19	**50yr**	1.54	2.14	2.37	3.21	4.10	5.65	6.51	**50yr**	5.00	6.26	7.35	8.71	9.61	**50yr**
100yr	0.54	0.82	1.03	1.49	2.04	2.52	**100yr**	1.76	2.46	2.66	3.60	4.58	6.44	7.49	**100yr**	5.70	7.20	8.54	10.08	11.00	**100yr**
200yr	0.61	0.91	1.16	1.67	2.34	2.88	**200yr**	2.02	2.82	2.98	4.05	5.12	7.34	8.91	**200yr**	6.50	8.57	9.94	11.66	12.62	**200yr**
500yr	0.71	1.06	1.36	1.98	2.81	3.48	**500yr**	2.43	3.40	3.48	4.72	5.97	8.68	10.81	**500yr**	7.68	10.39	12.15	14.16	15.07	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.07	**1yr**	0.75	1.05	1.23	1.73	2.19	2.77	3.03	**1yr**	2.45	2.91	3.34	4.12	4.74	**1yr**
2yr	0.33	0.50	0.62	0.84	1.03	1.24	**2yr**	0.89	1.21	1.46	1.94	2.50	3.20	3.54	**2yr**	2.83	3.41	3.92	4.65	5.30	**2yr**
5yr	0.39	0.60	0.75	1.02	1.30	1.57	**5yr**	1.13	1.54	1.84	2.47	3.16	4.19	4.73	**5yr**	3.71	4.55	5.19	6.06	6.87	**5yr**
10yr	0.45	0.70	0.87	1.21	1.56	1.90	**10yr**	1.35	1.86	2.21	3.01	3.80	5.17	5.89	**10yr**	4.58	5.67	6.44	7.41	8.36	**10yr**
25yr	0.55	0.84	1.05	1.49	1.97	2.45	**25yr**	1.70	2.39	2.84	3.90	4.87	6.85	7.89	**25yr**	6.06	7.59	8.54	9.74	10.77	**25yr**
50yr	0.64	0.97	1.21	1.74	2.34	2.95	**50yr**	2.02	2.88	3.45	4.74	5.89	8.48	9.87	**50yr**	7.50	9.49	10.60	11.95	13.16	**50yr**
100yr	0.74	1.12	1.41	2.03	2.79	3.56	**100yr**	2.41	3.48	4.17	5.79	7.14	10.50	12.35	**100yr**	9.29	11.87	13.14	14.68	16.06	**100yr**
200yr	0.86	1.30	1.64	2.38	3.32	4.30	**200yr**	2.86	4.21	5.07	7.07	8.63	13.04	15.10	**200yr**	11.54	14.52	16.29	18.02	19.65	**200yr**
500yr	1.05	1.57	2.02	2.93	4.16	5.51	**500yr**	3.59	5.38	6.53	9.22	11.13	17.41	20.24	**500yr**	15.41	19.46	21.64	23.68	25.66	**500yr**

Powered by ACIS
Northeast Regional Climate Center

RIP RAP CALCULATIONS

21-163 49 Winkley Pond Road

Hambone LLC

Barrington, NH

Berry Surveying & Engineering

335 Second Crown Point Road

Barrington, NH

8/16/2023/Rev:11/13/2023

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.* Rip Rap was sized for the 25 year storm event. (Some d50 sizes and T values have been modified)

TAILWATER < HALF THE Do

La = (1.8 x Q) / Do 3/2 + (7 x Do)   Q = Peak Flow & Do is Pipe Diameter

W = La + 3*Do or defined channel width

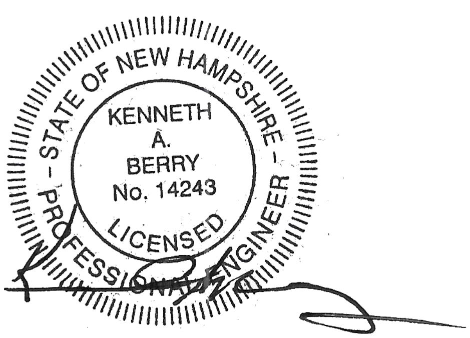
d50 = (0.02 x Q4/3) / (Tw x Do)   Tw = Tailwater Depth

T = Largest Stone Size x 1.5

Culvert or Catch Basin	Tailwater (Feet) Tw	Discharge (C.F.S.) Q	Diameter of Pipe Do	Length of Rip Rap La (feet)	Width of Rip Rap W (feet)	d50-Stone Rip Rap d50(ft.)	Actual Size	Thickness
15" HDPE (Pond #D01P)	0.25	0.30	1.25	9.1	12.9	0.01	0.50	1.20
15" HDPE (Pond #C02P)	0.25	0.55	1.25	9.5	13.2	0.03	0.50	1.20
15" HDPE (Pond #C03P)	0.25	0.61	1.25	9.5	13.3	0.03	0.50	1.20
15" HDPE (Pond #C04P)	0.25	0.72	1.25	9.7	13.4	0.04	0.50	1.20
15" HDPE (Pond #101P)	0.25	0.45	1.25	9.3	13.1	0.02	0.50	1.20

Please note that the designer chose to use the 25 Year Event for the dimensional calculations.

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d50 Size =	0.5	Feet	6	Inches
% of Weight Smaller		Size of Stone (Inches)		
Than the Given d50 Size		From		To
100%		9		12
85%		8		11
50%		6		9
15%		2		3



GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION
(Env-Wq 1507.04)

0.02	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.32	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
-	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
-	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.26	inches	Rd = Weighted groundwater recharge depth	
0.0892	ac-in	GRV = AI * Rd	
324	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

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

4,389 Cf Infiltrated in Infiltration Basin #102

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden #101**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
1.92	ac	A = Area draining to the practice	
0.45	ac	A_I = Impervious area draining to the practice	
0.23	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.26	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.50	ac-in	WQV= 1" x Rv x A	
1,821	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
455	cf	25% x WQV (check calc for sediment forebay volume)	
1,366	cf	75% x WQV (check calc for surface sand filter volume)	
Deep Sump		Method of Pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
161.41	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.05	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
20.23	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
158.30	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
157.30	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
159.67	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
156.33	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
1.97	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
(1.37)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
163.07	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
163.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
2,266	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	P101	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	P101	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

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

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

Designer's Notes:

Summary for Pond 101P: Rain Garden #101

[80] Warning: Exceeded Pond C02P by 0.13' @ 12.20 hrs (1.02 cfs 0.014 af)
[80] Warning: Exceeded Pond C03P by 0.26' @ 12.10 hrs (2.68 cfs 0.184 af)
[80] Warning: Exceeded Pond C04P by 0.26' @ 12.10 hrs (3.02 cfs 0.278 af)
[80] Warning: Exceeded Pond D01P by 0.28' @ 12.10 hrs (3.12 cfs 0.598 af)

Inflow Area = 1.921 ac, 23.46% Impervious, Inflow Depth > 1.59" for 50Yr.-24Hr. event
Inflow = 3.10 cfs @ 12.09 hrs, Volume= 0.255 af
Outflow = 1.22 cfs @ 12.33 hrs, Volume= 0.201 af, Atten= 61%, Lag= 14.6 min
Primary = 1.22 cfs @ 12.33 hrs, Volume= 0.201 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 163.07' @ 12.33 hrs Surf.Area= 636 sf Storage= 4,730 cf
Flood Elev= 163.50' Surf.Area= 636 sf Storage= 5,626 cf

Plug-Flow detention time= 172.7 min calculated for 0.201 af (79% of inflow)
Center-of-Mass det. time= 91.8 min (859.8 - 768.0)

Volume	Invert	Avail.Storage	Storage Description
#1	157.30'	254 cf	**Stone (Irregular)** Listed below (Recalc) 636 cf Overall x 40.0% Voids
#2	158.30'	191 cf	**BioMedia (Irregular)** Listed below (Recalc) -Impervious 954 cf Overall x 20.0% Voids
#3	159.80'	5,180 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		5,626 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
157.30	636	110.2	0	0	636
158.30	636	110.2	636	636	746

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
158.30	636	110.2	0	0	636
159.80	636	110.2	954	954	801

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
159.80	636	110.2	0	0	636
160.00	806	118.2	144	144	783
161.00	1,145	130.3	971	1,114	1,053
162.00	1,519	151.6	1,328	2,442	1,551
163.00	1,916	172.5	1,714	4,156	2,114
163.50	2,186	188.9	1,025	5,180	2,594

Device	Routing	Invert	Outlet Devices
#1	Primary	157.30'	**15.0" Round 15" HDPE N-12** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 157.30' / 157.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	157.30'	**1.0" Vert. 1" Orifice** C= 0.600
#3	Device 2	157.30'	**10.000 in/hr Filtration thru media over Surface area**
#4	Device 1	161.75'	**4.0" Vert. 4" Orifice** C= 0.600
#5	Device 1	163.00'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.21 cfs @ 12.33 hrs HW=163.07' TW=157.11' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Passes 1.21 cfs of 13.17 cfs potential flow)
  ├─**2=1" Orifice** (Orifice Controls 0.06 cfs @ 11.52 fps)
  │ └─**3=Filtration thru media** (Passes 0.06 cfs of 0.15 cfs potential flow)
  ├─**4=4" Orifice** (Orifice Controls 0.45 cfs @ 5.16 fps)
  └─**5=48" Outlet Structure** (Weir Controls 0.69 cfs @ 0.84 fps)

Stage-Area-Storage for Pond 101P: Rain Garden #101

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
157.30	**636**	0
157.40	636	25
157.50	636	51
157.60	636	76
157.70	636	102
157.80	636	127
157.90	636	153
158.00	636	178
158.10	636	204
158.20	636	229
158.30	636	254
158.40	636	267
158.50	636	280
158.60	636	293
158.70	636	305
158.80	636	318
158.90	636	331
159.00	636	343
159.10	636	356
159.20	636	369
159.30	636	382
159.40	636	394
159.50	636	407
159.60	636	420
159.70	636	432
159.80	636	445
159.90	636	513
160.00	636	589
160.10	636	671
160.20	636	757
160.30	636	845
160.40	636	937
160.50	636	1,032
160.60	636	1,130
160.70	636	1,232
160.80	636	1,338
160.90	636	1,447
161.00	636	1,560
161.10	636	1,676
161.20	636	1,796
161.30	636	1,919
161.40	636	2,046
161.50	636	2,177
161.60	636	2,311
161.70	636	2,449
161.80	636	2,591
161.90	636	2,737
162.00	636	2,887
162.10	636	3,041
162.20	636	3,199
162.30	636	3,360
162.40	636	3,525
162.50	636	3,694
162.60	636	3,868
162.70	636	4,045
162.80	636	4,226
162.90	636	4,411
163.00	636	4,601
163.10	636	4,795
163.20	636	4,995
163.30	636	5,200
163.40	636	5,410
163.50	636	**5,626**

1,821 CF Required for WQV
Elev: 158.3 Invert Stone (254 (CF)) 254 CF + 1,821 CF = 2,075 CF
WQV Elev: 161.41

Stage-Discharge for Pond 101P: Rain Garden #101

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
157.30	0.00	159.42	0.04	161.54	0.05
157.34	0.00	159.46	0.04	161.58	0.05
157.38	0.01	159.50	0.04	161.62	0.05
157.42	0.01	159.54	0.04	161.66	0.05
157.46	0.01	159.58	0.04	161.70	0.05
157.50	0.01	159.62	0.04	161.74	0.06
157.54	0.01	159.66	0.04	161.78	0.06
157.58	0.01	159.70	0.04	161.82	0.07
157.62	0.01	159.74	0.04	161.86	0.08
157.66	0.01	159.78	0.04	161.90	0.11
157.70	0.02	159.82	0.04	161.94	0.13
157.74	0.02	159.86	0.04	161.98	0.16
157.78	0.02	159.90	0.04	162.02	0.19
157.82	0.02	159.94	0.04	162.06	0.22
157.86	0.02	159.98	0.04	162.10	0.24
157.90	0.02	160.02	0.04	162.14	0.26
157.94	0.02	160.06	0.04	162.18	0.27
157.98	0.02	160.10	0.04	162.22	0.29
158.02	0.02	160.14	0.04	162.26	0.30
158.06	0.02	160.18	0.04	162.30	0.32
158.10	0.02	160.22	0.04	162.34	0.33
158.14	0.02	160.26	0.04	162.38	0.34
158.18	0.02	160.30	0.05	162.42	0.36
158.22	0.02	160.34	0.05	162.46	0.37
158.26	0.03	160.38	0.05	162.50	0.38
158.30	0.03	160.42	0.05	162.54	0.39
158.34	0.03	160.46	0.05	162.58	0.40
158.38	0.03	160.50	0.05	162.62	0.41
158.42	0.03	160.54	0.05	162.66	0.42
158.46	0.03	160.58	0.05	162.70	0.43
158.50	0.03	160.62	0.05	162.74	0.44
158.54	0.03	160.66	0.05	162.78	0.45
158.58	0.03	160.70	0.05	162.82	0.46
158.62	0.03	160.74	0.05	162.86	0.47
158.66	0.03	160.78	0.05	162.90	0.48
158.70	0.03	160.82	0.05	162.94	0.49
158.74	0.03	160.86	0.05	162.98	0.50
158.78	0.03	160.90	0.05	163.02	0.62
158.82	0.03	160.94	0.05	163.06	1.12
158.86	0.03	160.98	0.05	163.10	1.82
158.90	0.03	161.02	0.05	163.14	2.68
158.94	0.03	161.06	0.05	163.18	3.67
158.98	0.03	161.10	0.05	163.22	4.78
159.02	0.03	161.14	0.05	163.26	6.00
159.06	0.03	161.18	0.05	163.30	7.31
159.10	0.03	161.22	0.05	163.34	8.71
159.14	0.04	161.26	0.05	163.38	10.20
159.18	0.04	161.30	0.05	163.42	11.76
159.22	0.04	161.34	0.05	163.46	13.41
159.26	0.04	161.38	0.05	163.50	**13.75**
159.30	0.04	161.42	0.05		
159.34	0.04	161.46	0.05		
159.38	0.04	161.50	0.05		

WQV Elev: 161.41
WQV Discharge: 0.05 CFS

Stage-Area-Storage for Pond 101P: Rain Garden #101

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
157.30	**636**	0
157.40	636	25
157.50	636	51
157.60	636	76
157.70	636	102
157.80	636	127
157.90	636	153
158.00	636	178
158.10	636	204
158.20	636	229
158.30	636	254
158.40	636	267
158.50	636	280
158.60	636	293
158.70	636	305
158.80	636	318
158.90	636	331
159.00	636	343
159.10	636	356
159.20	636	369
159.30	636	382
159.40	636	394
159.50	636	407
159.60	636	420
159.70	636	432
159.80	636	445
159.90	636	513
160.00	636	589
160.10	636	671
160.20	636	757
160.30	636	845
160.40	636	937
160.50	636	1,032
160.60	636	1,130
160.70	636	1,232
160.80	636	1,338
160.90	636	1,447
161.00	636	1,560
161.10	636	1,676
161.20	636	1,796
161.30	636	1,919
161.40	636	2,046
161.50	636	2,177
161.60	636	2,311
161.70	636	2,449
161.80	636	2,591
161.90	636	2,737
162.00	636	2,887
162.10	636	3,041
162.20	636	3,199
162.30	636	3,360
162.40	636	3,525
162.50	636	3,694
162.60	636	3,868
162.70	636	4,045
162.80	636	4,226
162.90	636	4,411
163.00	636	4,601
163.10	636	4,795
163.20	636	4,995
163.30	636	5,200
163.40	636	5,410
163.50	636	**5,626**

Elev: 158.3 Invert Stone (254 CF)
Elev: 161.75 Lowest Outlet (2,520 CF)
2,520 CF - 254 CF = 2,266 CF Storage

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Basin #102**

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

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
1.36	ac	A = Area draining to the practice	
0.05	ac	A_I = Impervious area draining to the practice	
0.04	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.09	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.12	ac-in	WQV= 1" x Rv x A	
425	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
106	cf	25% x WQV (check calc for sediment forebay volume)	
Sediment Forebay		Method of pretreatment? (not required for clean or roof runoff)	
821	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
4,389	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
459	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
3.7	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
161.00	feet	E_{BTM} = Elevation of the bottom of the basin	
160.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
157.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
4.0	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
3.0	:1	If a basin is proposed, pond side slopes.	**≥3:1**
161.40	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
162.67	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
164.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

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

Designer's Notes:

Summary for Pond 102P: Infiltration Basin #102

Inflow Area = 1.356 ac, 4.04% Impervious, Inflow Depth > 1.14" for 50Yr.-24Hr. event
Inflow = 0.82 cfs @ 12.47 hrs, Volume= 0.129 af
Outflow = 0.16 cfs @ 14.75 hrs, Volume= 0.117 af, Atten= 81%, Lag= 136.8 min
Discarded = 0.16 cfs @ 14.75 hrs, Volume= 0.117 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 162.67' @ 14.75 hrs Surf.Area= 2,261 sf Storage= 1,957 cf
Flood Elev= 164.00' Surf.Area= 7,416 sf Storage= 6,431 cf

Plug-Flow detention time= 167.0 min calculated for 0.117 af (91% of inflow)
Center-of-Mass det. time= 124.1 min (1,041.4 - 917.3)

Volume	Invert	Avail.Storage	Storage Description
#1	161.00'	1,952 cf	**Infiltration Cell (Irregular)**Listed below (Recalc)
#2	162.00'	821 cf	**Sediment Forebay (Irregular)**Listed below (Recalc)
#3	163.00'	3,658 cf	**Open Water Storage (Irregular)**Listed below (Recalc)
		6,431 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
161.00	459	96.0	0	0	459
162.00	1,011	141.3	717	717	1,323
163.00	1,474	170.0	1,235	1,952	2,050

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
162.00	453	176.0	0	0	453
163.00	1,255	237.0	821	821	2,468

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
163.00	2,966	355.3	0	0	2,966
163.50	3,507	365.7	1,616	1,616	3,589
164.00	4,687	448.1	2,041	3,658	8,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	161.00'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	163.50'	**5.0' long x 30.0' breadth Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.16 cfs @ 14.75 hrs HW=162.67' (Free Discharge)
└─**1=Infiltration** (Exfiltration Controls 0.16 cfs)

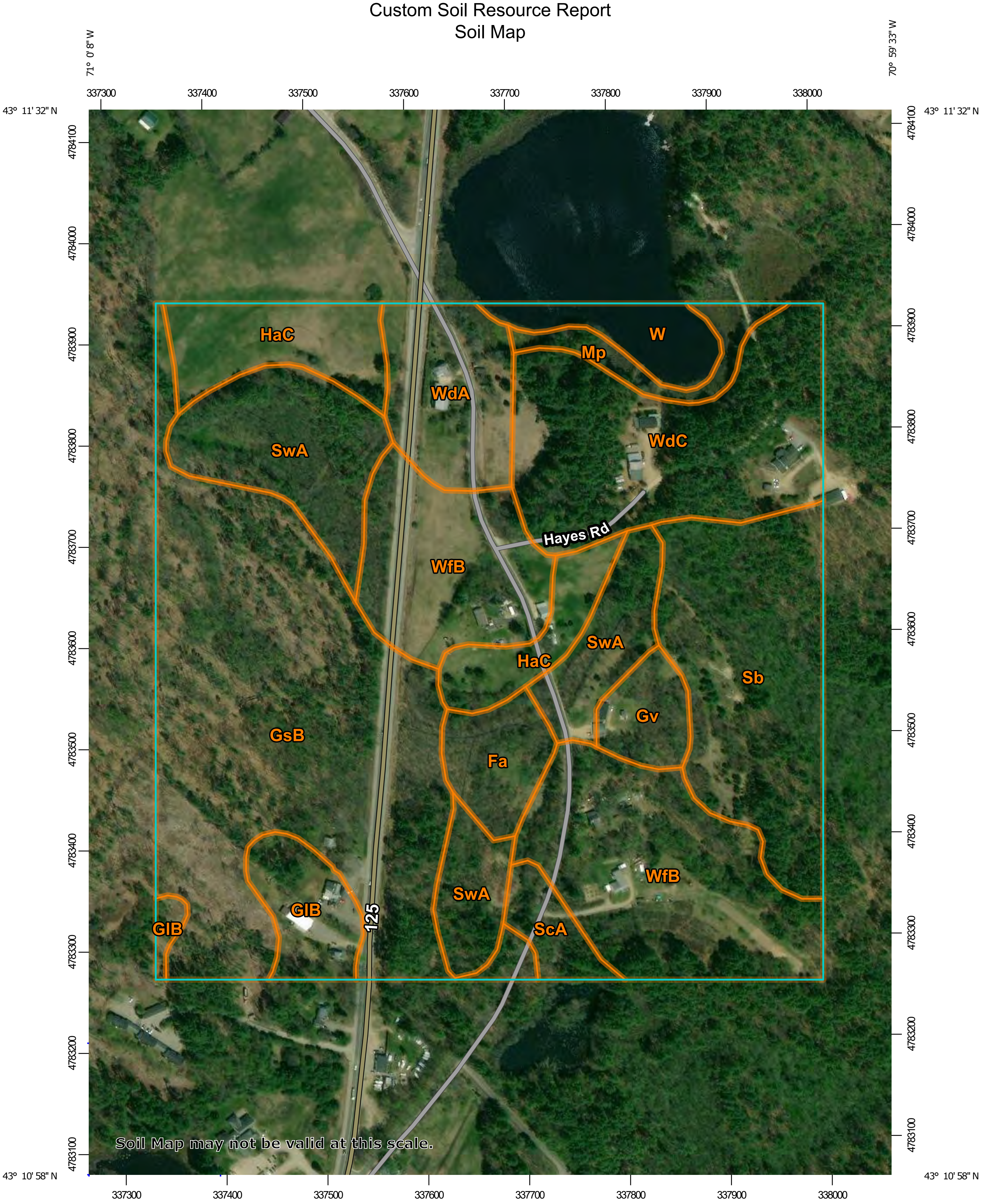
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.00' TW=157.30' (Dynamic Tailwater)
└─**2=Overflow** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 102P: Infiltration Basin #102

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
161.00	459	0
161.05	481	24
161.10	505	48
161.15	528	74
161.20	552	101
161.25	577	129
161.30	602	159
161.35	628	189
161.40	654	221
161.45	681	255
161.50	708	290
161.55	736	326
161.60	764	363
161.65	793	402
161.70	823	442
161.75	853	484
161.80	883	528
161.85	914	573
161.90	946	619
161.95	978	667
162.00	1,464	717
162.05	1,516	792
162.10	1,569	869
162.15	1,623	948
162.20	1,678	1,031
162.25	1,735	1,116
162.30	1,792	1,204
162.35	1,851	1,296
162.40	1,912	1,390
162.45	1,973	1,487
162.50	2,036	1,587
162.55	2,099	1,690
162.60	2,165	1,797
162.65	2,231	1,907
162.70	2,298	2,020
162.75	2,367	2,137
162.80	2,437	2,257
162.85	2,508	2,380
162.90	2,581	2,508
162.95	2,654	2,638
163.00	5,695	2,773
163.05	5,747	2,923
163.10	5,800	3,075
163.15	5,853	3,230
163.20	5,906	3,387
163.25	5,960	3,547
163.30	6,014	3,710
163.35	6,069	3,876
163.40	6,124	4,044
163.45	6,180	4,215
163.50	6,236	4,389
163.55	6,346	4,567
163.60	6,458	4,751
163.65	6,572	4,940
163.70	6,688	5,135
163.75	6,805	5,336
163.80	6,924	5,543
163.85	7,044	5,756
163.90	7,166	5,975
163.95	7,290	6,200
164.00	**7,416**	**6,431**

Spillway Elev: 163.50
4,389 CF Stored in BMP

Soil Map



Map Scale: 1:5,130 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

N

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Strafford County, New Hampshire
Survey Area Data: Version 22, Aug 31, 2021

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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
Fa	Fresh water marsh	2.8	2.5%
GlB	Gloucester fine sandy loam, 3 to 8 percent slopes	3.3	3.0%
GsB	Gloucester very stony fine sandy loam, 3 to 8 percent slopes	28.0	25.5%
Gv	Gravel and borrow pits	2.0	1.9%
HaC	Hinckley loamy sand, 8 to 15 percent slopes	6.9	6.3%
Mp	Freetown and Swansea mucky peats, 0 to 2 percent slopes	1.8	1.7%
Sb	Saugatuck loamy sand	12.1	11.0%
ScA	Scantic silt loam, 0 to 3 percent slopes	1.7	1.5%
SwA	Swanton fine sandy loam, 0 to 3 percent slopes	11.9	10.9%
W	Water	2.5	2.3%
WdA	Windsor loamy sand, 0 to 3 percent slopes	5.3	4.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	12.6	11.5%
WfB	Windsor loamy fine sand, clay subsoil variant, 0 to 8 percent slopes	18.8	17.1%
Totals for Area of Interest		**109.7**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

John P. Hayes III CSS, CWS,
7 Limestone Way
North Hampton, NH 03862
603-205-4396
johnphayes@comcast.net

8/4/23
Christopher Berry **Job # 22-006**
Berry Surveying and Engineering
335 Second Crown Point Road
Barrington NH 03825

Site Specific Soil Survey 7/26/23
Map 253 Lot 14
49 Winkley Pond Road
Barrington, NH

Dear Chris,

This report presents the findings of a Site Specific Soil Survey conducted on the referenced properties by John P. Hayes III on July 26, 2023. The soil survey was conducted in accordance with the New Hampshire Supplement of the Site-Specific Soil Mapping Standard For New Hampshire and Vermont, Special Publication # 3, Version 7.0 July 2021, published by the Society of Soil Scientist of Northern New England. Soil series information was also taken from the Soil Survey of Strafford County New Hampshire issued March 1973.

The property that is subject of the soil survey is located on the southeast side of Winkley Pond road, southwest of Hayes road, and east of Route 125, in Barrington, NH. The lot is approximately 7.8 acres in size. Only a portion of the parcel, on the easterly side, near Winkley Pond road, has been mapped. The plans used for these soil maps are a 30 scale plan, where 1 inch equals 30 feet, with two foot contours.

The purpose of the soil survey is to provide the client with soils information for urban and suburban or rural land planning. Soil characteristics on the property were evaluated through observation of numerous test pits, and hand auger probes conducted throughout the property. Slope phases were determined with the use of the topography provided on the plan. The Site-specific Soil Map Units identified are taken from the New Hampshire State-Wide Numerical Soils Legend, Issue #10 January 2011, and are briefly described below. Official Series Descriptions (OSD) for each of these soil series are enclosed with this report. The soil map units comply with the Range In Characteristics described in the OSD. Any limiting inclusions on the site, do not exceed 15 percent of any of the soil map units. Dissimilar inclusions, if any, will be noted in the report. Limits of the Site Specific mapping units are highlighted on the plan. The Hydrological Soil Groups for each of the soil series was determined using SSSNNE Publication No. 5 Ksat Values for New Hampshire Soils September 2009. Limits of the Site Specific mapping units are highlighted on the plan.

Portions of the soil map with the map unit denominator of P and VP contain poorly drained soils, and very poorly drained soils respectively. Portions of the soil map with the map unit 400, contain disturbed soils that have been excavated and/or regraded, that are moderately well drained, and are sandy in texture. A Disturbed Soil Mapping Unit Supplement for New Hampshire DES AoT Site Specific Soil Maps is also included. This supplement explains the additional information given about each disturbed soil map units that are present on the site.

MAP UNIT #	SOIL TAXANOMI C NAME	SLOPES	HYDRO LOGIC SOIL GROUP	DESCRIPTION
15 VP	**Scarboro**	A	D	The Scarboro series consists of very deep, very poorly drained soils in sandy glaciofluvial deposits, on outwash plains. These soils are located in the wetland areas, in the southeast portion of the mapped area of the property. The soil texture consists of 4 to 16 inches of organic material over sand. These soils are deep to bedrock. The saturated hydraulic conductivity is high or very high. Some inclusions of poorly drained Wareham and Shaker soils may be present, but are less than 10 percent of the mapped area. These soils are semi permanantly to permanately saturated.
34 P	**Wareham**	A	C	The Wareham series consists of very deep, poorly drained sandy soils formed in outwash on plains, deltas, and terraces. These soils are located in the southeastern portion of the mapped area of the lot.. The soil texture is loamy sand over coarse sand. These soils are deep to bedrock. Permeability is rapid throughout the soil profile. Some inclusions of very poorly drained Scarboro soils, poorly drained Shaker soils, and the somewhat poorly drained Deerfield Variant soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 0 to 10 inches.
313	**Deerfield**	A B C D	B	The Deerfield series consists of very deep, moderately well drained soils formed in glaciofluvial deposits. These soils are located in the upland area on the northwestern portion of the mapped area. The soil textures on this soil series on this site consist of loamy sand over sand and/or fine sand, and loamy sand over stratified very fine sand and silt. These soils are deep to bedrock. The saturated hydraulic conductivity is high or very high. Some inclusions of excessively well drained Windsor, moderately well drained Eldridge, and somewhat poorly drained Deerfield Variant, soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 15 to 38 inches.
400 (dbadb)	**Udorthents (sandy or gravelly)**	B C D	B	Udorthents are disturbed soils that have been excavated and/or regraded, and are sandy or gravelly in texture. These soils are located in the northwest

MAP UNIT #	SOIL TAXANOMIC NAME	SLOPES	HYDRO LOGIC SOIL GROUP	DESCRIPTION
400 (dbadb)	**Udorthents (sandy or gravelly)**	**B C D**	**B**	portion of the mapped area, around the 2 structures, and adjacent to Winkley Pond road. These disturbed soils are mostly likelyderived from the surrounding Deerfield soil series. These soils are moderately well drained, and are deep to bedrock. Saturated hydraulic conductivity is high or very high. Estimated seasonal high water tables in these soils range from 20 to 38 inches.
915	**Deerfield Variant (somewhat poorly drained)**	**B**	**C**	The Deerfield Variant series consists of very deep, somewhat poorly drained soils formed in glaciofluvial deposits. These soils are located in the northeast portion of the property, adjacent to the wetlands. The soil texture is loamy sand over stratified very fine sand and silt. These soils are deep to bedrock. Saturated hydraulic conductivity is high to very high. Some inclusions of moderately well drained Deerfield, somewhat poorly drained Eldridge Variant, and poorly drained Wareham soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 11 to 15 inches.

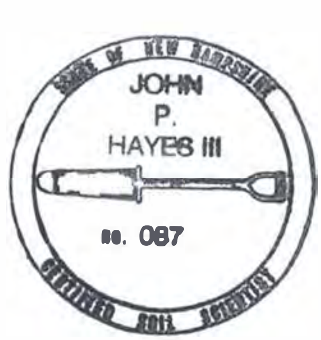
Slope Phases

Alpha Slope Symbol	Range
A	0 – 3%
B	3 – 8%
C	8 – 15%
D	15 – 25%
E	25 – 50%
F	> 50%

I trust that this Soil Survey and report meet your current planning needs. Please do not hesitate to contact me if you have any questions.

Sincerely:

John P. Hayes III



John P. Hayes III CSS, CWS

TEST PIT DATA:

TEST PITS WERE OBSERVED BY JOHN P. HAYES III, CSS, CWS
DATE : FEBRUARY 24, 2022

TEST PIT #1
0–10 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
10–13 7.5YR 6/1 GRAY, LOAMY SAND, GRANULAR, FRIABLE
13–18 5YR 3/3 DARK REDDISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
18–36 10 YR 5/4 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
36–72 10YR 6/2 LIGHT BROWNISH GRAY, FINE SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ 50"
TERMINATED @ 72"
REFUSAL @ NONE
PERC RATE : 5 MIN/INCH

TEST PIT #2
0–14 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
14–28 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
28–36 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
36–75 10YR 6/2 LIGHT BROWNISH GRAY, VERY FINE SAND WITH REDOX. FEATURES PRESENT, MASSIVE, FRIABLE
E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ N/A
TERMINATED @ 75"
REFUSAL @ NONE
PERC RATE : 4 MIN/INCH

TEST PIT #3
0–14 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
14–22 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
22–28 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
28–31 7.5YR 6/1 GRAY, LOAMY SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
31–36 5YR 3/3 DARK REDDISH BROWN, LOAMY SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
36–58 5Y 5/2 OLIVE GRAY, STRATIFIED VERY FINE SAND AND SILT WITH REDOX. FEATURES PRESENT, MASSIVE, FRIABLE
58–75 10YR 6/2 LIGHT BROWNISH GRAY, FINE SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
E.S.H.W.T. @ 28"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ 60"
TERMINATED @ 75"
REFUSAL @ NONE
PERC RATE : 5 MIN/INCH

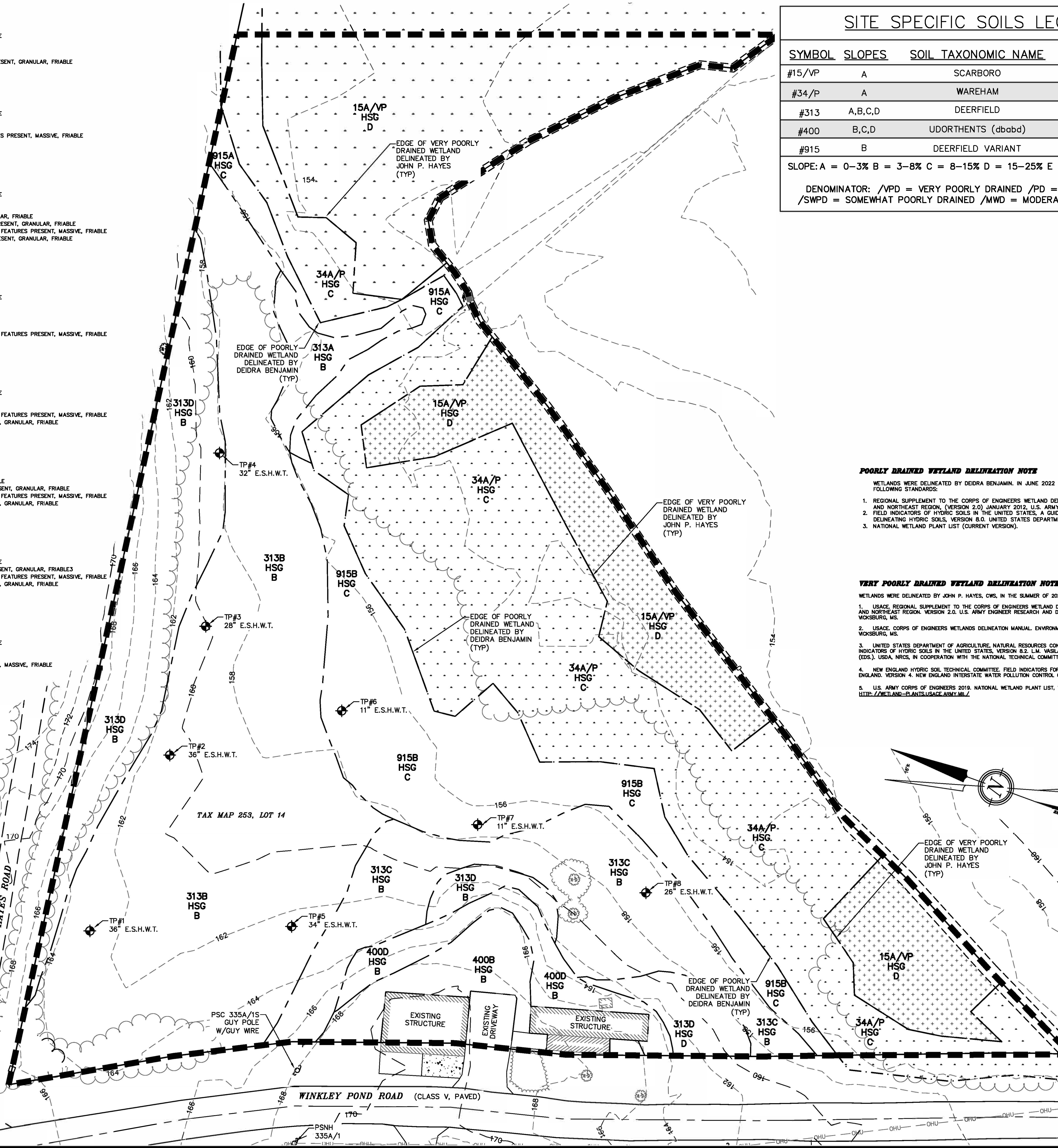
TEST PIT #4
0–14 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
14–20 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
20–24 7.5YR 6/1 GRAY, LOAMY SAND, GRANULAR, FRIABLE
24–28 5YR 3/3 DARK REDDISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
28–32 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
32–72 5Y 5/2 OLIVE GRAY, STRATIFIED VERY FINE SAND AND SILT WITH REDOX. FEATURES PRESENT, MASSIVE, FRIABLE
E.S.H.W.T. @ 32"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ 48"
TERMINATED @ 72"
REFUSAL @ NONE
PERC RATE : 5 MIN/INCH

TEST PIT #5
0–14 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
14–22 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
22–34 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
34–48 5Y 5/2 OLIVE GRAY, STRATIFIED VERY FINE SAND AND SILT WITH REDOX. FEATURES PRESENT, MASSIVE, FRIABLE
48–74 10YR 6/2 LIGHT BROWNISH GRAY, SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
E.S.H.W.T. @ 34"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ N/A
TERMINATED @ 48"
REFUSAL @ NONE
PERC RATE : 4 MIN/INCH

TEST PIT #6
0–11 10YR 3/2 VERY DARK GRAYISH BROWNL, LOAMY SAND, GRANULAR, FRIABLE
11–32 2.5Y 5/3 LIGHT OLIVE BROWN, LOAMY SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
32–45 5Y 5/2 OLIVE GRAY, STRATIFIED VERY FINE SAND AND SILT WITH REDOX. FEATURES PRESENT, MASSIVE, FRIABLE
45–62 10YR 6/2 LIGHT BROWNISH GRAY, SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
E.S.H.W.T. @ 11"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ 25"
TERMINATED @ 72"
REFUSAL @ NONE
PERC RATE : 20 MIN/INCH

TEST PIT #7
0–11 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
11–32 2.5Y 5/3 LIGHT OLIVE BROWN, LOAMY SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE3
32–45 5Y 5/2 OLIVE GRAY, STRATIFIED VERY FINE SAND AND SILT WITH REDOX. FEATURES PRESENT, MASSIVE, FRIABLE
45–62 10YR 6/2 LIGHT BROWNISH GRAY, SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE
E.S.H.W.T. @ 11"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ 25"
TERMINATED @ 62"
REFUSAL @ NONE
PERC RATE : 20 MIN/INCH

TEST PIT #8
0–14 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
14–20 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
20–26 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
26–75 10YR 6/2 LIGHT BROWNISH GRAY, SAND WITH REDOX. FEATURES PRESENT, MASSIVE, FRIABLE
E.S.H.W.T. @ 26"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ 60"
TERMINATED @ 75"
REFUSAL @ NONE
PERC RATE : 4 MIN/INCH

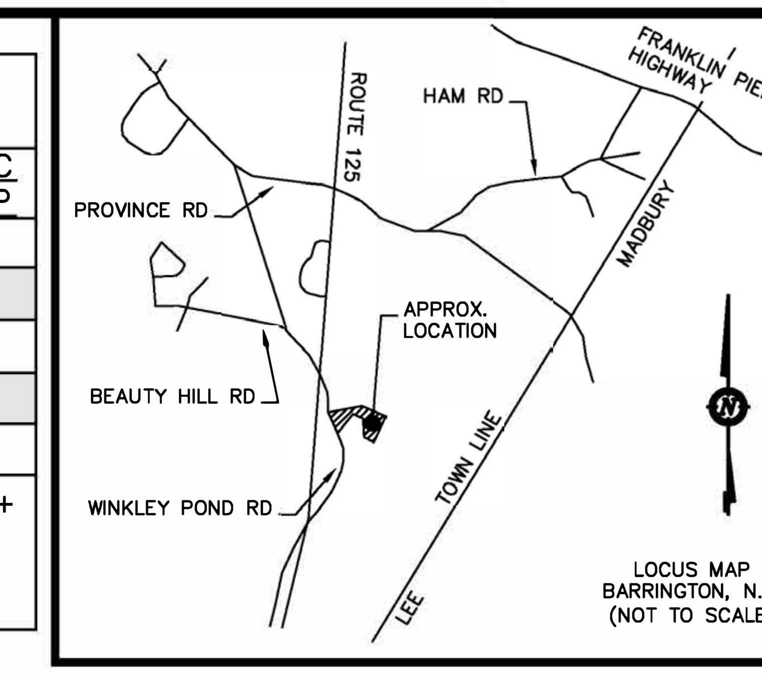


SITE SPECIFIC SOILS LEGEND

SYMBOL	SLOPES	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
#15/VP	A	SCARBORO	D
#34/P	A	WAREHAM	C
#313	A,B,C,D	DEERFIELD	B
#400	B,C,D	UDORTHENTS (dbabd)	B
#915	B	DEERFIELD VARIANT	C

SLOPE: A = 0–3% B = 3–8% C = 8–15% D = 15–25% E = 25–50% F = 50%+

DENOMINATOR: /VPD = VERY POORLY DRAINED /PD = POORLY DRAINED /SWPD = SOMEWHAT POORLY DRAINED /MWD = MODERATELY WELL DRAINED



NOTES:

1.) OWNER: HAMBONE LLC
242 CENTRAL AVE
DOVER, NH 03820

2.) TAX MAP: TAX MAP 253, LOT 14

3.) LOT AREA: 586,793 Sq. Ft., 13.47 Ac.
330,912 Sq.Ft., 7.60 Ac., TOTAL UPLAND

4.) S.C.R.D. BOOK 4976, PAGE 1023

5.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING SOILS CONDITIONS OF TAX MAP 253, LOT 14 AS OF THE DATE OF THE SURVEY.

POORLY DRAINED WETLAND DELINEATION NOTE

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN. IN JUNE 2022 AND AUGUST 2023 UTILIZING THE FOLLOWING STANDARDS:

1. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, (VERSION 2.0) JANUARY 2012, U.S. ARMY CORPS OF ENGINEERS.
2. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, A GUIDE FOR IDENTIFYING AND DELINEATING HYDRIC SOILS, VERSION 8.0. UNITED STATES DEPARTMENT OF AGRICULTURE (2016).
3. NATIONAL WETLAND PLANT LIST (CURRENT VERSION).

STATE OF NEW HAMPSHIRE DEIDRA L BENJAMIN No. 295 CERTIFIED WETLAND SCIENTIST

DEIDRA BENJAMIN, CWS #295

VERY POORLY DRAINED WETLAND DELINEATION NOTE:

WETLANDS WERE DELINEATED BY JOHN P. HAYES, CWS, IN THE SUMMER OF 2022 USING THE FOLLOWING CRITERIA:

1. USACE. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. VERSION 2.0. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER. 2012. VICKSBURG, MS.

2. USACE. CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. ENVIRONMENTAL LABORATORY. 1987. VICKSBURG, MS.

3. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.

4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.

5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/

JOHN P. HAYES III No. 087 CERTIFIED SOIL SCIENTIST

JOHN P. HAYES, III CSS #87

STATE OF NEW HAMPSHIRE JOHN P. HAYES, III No. 18 CERTIFIED WETLAND SCIENTIST

JOHN P. HAYES III, CWS #18

LEGEND:

IRON BOUND/IRON ROD (FND)
IRON PIPE (FND)
UTILITY POLE
TEST PIT
OVERHEAD UTILITIES LINE
EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
SOIL LINE
LIMIT OF SOIL SURVEY
WdA SOIL SERIES
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

FOR TOWN APPROVAL PURPOSES :

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP
LAND OF
HAMBONE LLC
49 WINKLEY POND ROAD
BARRINGTON, N.H.
TAX MAP 253, LOT 14

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JULY 16, 2023
FILE NO. : DB 2021-163

STATE OF NEW HAMPSHIRE No. 805 KENNETH A. BERRY LICENSED LAND SURVEYOR
SIGNATURE

BERRY SURVEYING & ENGINEERING
335 Second Crown Point Road
Barrington, NH 03825
Phone: (603) 332-2863
Fax: (603) 335-4623
www.BerrySurveying.Com

Stormwater System Management:

Inspection and Maintenance Manual

49 Winkley Pond Road
Barrington, NH
Tax Map 253, Lot 14

Prepared for

Hambone, LLC
242 Central Ave
Dover, NH 03820

Prepared By

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825
603-332-2863

STATE OF NEW HAMPSHIRE – KENNETH A. BERRY No. 14243 LICENSED – PROFESSIONAL ENGINEER

File Number
DB2021-163

August 16, 2023

Table of Contents

Introduction

The Best Management Practices (BMP) described in this manual are specified in more detail within the plan set giving design details and specifications. The New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection & Design (December 2008, NHDES & US EPA) is included by reference to this manual. Additional details, construction specifications, and example drawings are provided within this reference. (http://des.nh.gov/organization/divisions/water/stormwater/)

The BMP's are covered below in the general order in which the storm water flows. Each BMP has a description and maintenance consideration listed. A Check List table is proved after the narrative to summarize the maintenance responsibilities and schedule. A Log Form is also provided for the owners use.

For details regarding the design of the Storm Water System see also Drainage Analysis & Sediment and Erosion Control Plan also published by Berry Surveying & Engineering originally dated August 16, 2023, as revised. See also plan set completed for Hambone, LLC. originally dated August 16, 2023, as revised.

Robert Baldwin, Managing Member, is responsible for the Stormwater System Operation and Maintenance. A significant step in this responsibility is the Inspection and Maintenance of each component of the system. Ongoing, semi-annual, and annual inspection and maintenance requirement are documented below and must be taken seriously. Failure of any component of the system can result in surface water run-off ponding and/or freezing in the roadway and parking lots, leaving the developed site untreated, and/or causing violations to issued permits. The owner must maintain, and have available, plans of the Stormwater System in order properly inspect and maintain the system. (Reduced copies attached.) The Managing Member, Robert Baldwin, as the owner / operator, is responsible to ensure that any subsequent owner, Homeowners Association, or subcontractor has copies of the Log Form and Annual Report records and fully understands the responsibilities of this plan. The grantor owner will ensure this document is provided to the grantee owner by duplicating the Ownership Responsibility Sheet which is found toward the back of this document, which will be maintained with the Inspection & Maintenance Logs, provided to the Town of Barrington, Planning Department, with the Annual Report.

The owner of Tax Map 253, Lot 14, Hambone, LLC, is proposing the development of 7 townhouses. There will be an Infiltration Basin and a Rain Garden to manage and treat the surface water runoff.

The following drainage features will all require periodic inspections and maintenance based on this manual in addition to deep sump catch basins throughout:

Catch Basins (Ponds #C01-#C05)

Drain Manhole (Pond #D01)

Conveyance Swales and Roadside Ditches

Sediment Forebay (Pond #102)

Rain Garden #101 – P-101 w/ RipRap Inlet Protection, Outlet Structure, and Spillway.

Infiltration Basin #102 – P-102 w/ Sediment Forebay & RipRap Outlet

Outlet Protection and Level Spreader

Mulch Berm Buffer Protection (Permanent Perimeter Control)

Deep Sump Catch Basin / Drain Manhole

Description: A deep sump catch basin consists of a manhole-type structure with an inlet grate, an outlet pipe connected to the piped drainage system, and a sump with a depth several times the diameter of the outlet pipe. The inlet grate is located at the surface, and is sometimes combined with a vertical inlet integrated with a street or parking area curb. The sump's purpose is to capture coarse sediments and debris from the runoff intercepted by the structure. The outlet pipe can be fitted with a "hood" consisting of a cast metal or formed plastic fitting, designed to prevent floating materials from exiting the structure. Deep sump catch basins used as pretreatment are most effective if sited "off-line" since flow-through basins are more susceptible to sediment re-suspension. All pretreatment deep sump catch basins will have an outlet pipe hood which extends one-foot below the outlet invert and will include a hood vent. During construction the catch basins will be protected by inlet protection per the approved construction plans. Hoods are to be installed during initial construction. See SWM Volume 2, 4-4.5 Pre-treatment Practices, 5. Pre-treatment Swales, page 144.

Maintenance Considerations:

Catch basins may require frequent maintenance. Depending on location, this may require several cleanings of the sumps each year. At a minimum, it is recommended that catch basins be inspected at least twice annually, once following snow-melt and once following leaf drop, and cleaned as indicated by inspection. Sediment should be removed when it approaches half the sump depth. If floating hydrocarbons are observed during an inspection, the material should be removed immediately by skimming, absorbent materials, or other method and disposed in conformance with applicable state and federal regulations. Cleaning may require Vacuum-truck instead of "clam-shell" to avoid damage to hood. Damaged hoods should be replaced when noted by inspection.

Conveyance Swale

Description: Conveyance swales are stabilized channels designed to convey runoff at non-erosive velocities. They may be stabilized using vegetation, riprap, or a combination, or with an alternative lining designed to accommodate design flows while protecting the integrity of the sides and bottom of the channel. Conveyance channels may provide incidental water quality benefits, but are not specifically designed to provide treatment. Conveyance swales are not considered a Treatment or Pretreatment Practice under the AoT regulations, unless they are also designed to meet the requirements of an acceptable Treatment/Pretreatment Practice as described elsewhere in this Chapter. See SWM Volume 2, 4-6.3 Conveyance Practices, Conveyance Swale, page 166.

Maintenance Considerations: Grassed channels should be inspected periodically (at least annually) for sediment accumulation, erosion, and condition of surface lining (vegetation or riprap). Repairs, including stone or vegetation replacement, should be made based on this inspection. Remove sediment and debris annually, or more frequently as warranted by inspection. Mow vegetated channels based on frequency specified by design. Mowing at least once per year is required to control establishment of woody vegetation. It is recommended to cut grass no shorter than 4 inches.

Sediment Forebay

Description: A sediment forebay is an impoundment, basin, or other storage structure designed to dissipate the energy of incoming runoff and allow for initial settling of coarse sediments. Forebays are used for pretreatment of runoff prior to discharge into the primary water quality treatment BMP. In some cases, forebays may be constructed as separate structures but often, they are integrated into the design of larger stormwater management structures. See SWM Volume 2, 4-4.1 Pre-treatment Practices, Sediment Forebay, page 140.

Maintenance Considerations: Forebays help reduce the sediment load to downstream BMPs, and will therefore require more frequent cleaning. Inspect at least annually; Conduct periodic mowing of embankments (generally two times per year) to control growth of woody vegetation on embankments; Remove debris from outlet structures at least once annually; Remove and dispose of accumulated sediment based on inspection; Install and maintain a staff gage or other measuring device, to indicate depth of sediment accumulation and level at which clean-out is required.

Bio-Retention System (Rain-Garden)

Description: A bioretention system (sometimes referred to as a “rain garden”) is a type of filtration BMP designed to collect and filter moderate amounts of stormwater runoff using conditioned planting soil beds, gravel beds and vegetation within shallow depressions. The bioretention system may be designed with an underdrain, to collect treated water and convey it to discharge, or it may be designed to infiltrate the treated water directly to the subsoil. Bioretention cells are capable of reducing sediment, nutrients, oil and grease, and trace metals. Bioretention systems should be sited in close proximity to the origin of the stormwater runoff to be treated. The major difference between bioretention systems and other filtration systems is the use of vegetation. A typical surface sand filter is designed to be maintained with no vegetation, whereas a bioretention cell is planted with a variety of shrubs and perennials whose roots assist with pollutant uptake. The use of vegetation allows these systems to blend in with other landscaping features. See SWM Volume 2, 4-3.4c, Treatment Practices, Bio-Retention System, page 110.

Construction Considerations: After the stone and bio-media has been installed, Filtrexx Silt Soxx or approved equal, will be installed at the toe of slope intersection between the berm and bio-media and will remain until the slopes of the berm are stable.

Maintenance Considerations: Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection. Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually. Trash and debris should be removed at each inspection. At least once annually, system should be inspected for drawdown time. If bioretention system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function or infiltration function (as applicable), including but not limited to removal of accumulated sediments or reconstruction of the filter media. Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species. The rain garden is equipped with an underdrain and end cap assembly which will need to be routinely inspected for obstructions.

In-Ground Infiltration Basin

Description: Infiltration basins are impoundments designed to temporarily store runoff, allowing all or a portion of the water to infiltrate into the ground. An infiltration basin is designed to completely drain between storm events. An infiltration basin is specifically designed to retain and infiltrate the entire Water Quality Volume. Some infiltration basins may infiltrate additional volumes during larger storm events, but many will be designed to release stormwater exceeding the water quality volume from the larger storms. In a properly sited and designed infiltration basin, water quality treatment is provided by runoff pollutants binding to soil particles beneath the basin as water percolates into the subsurface. Biological and chemical processes occurring in the soil also contribute to the breakdown of pollutants. Infiltrated water is used by plants to support growth or it is recharged to the underlying groundwater. As with all impoundment BMPs, surface infiltration basins should be designed with an outlet structure to pass peak flows during a range of storm events, as well as with an emergency spillway to pass peak flows around the embankment during extreme storm events that exceed the combined infiltration capacity and outlet structure capacity of the facility. See SWM Volume 2, 4-3.3b, Treatment Practices, In-Ground Infiltration Basin, page 88.

Maintenance Considerations: Removal of debris from inlet and outlet structures. Removal of accumulated sediment. Inspection and repair of outlet structures and appurtenances. Inspection of infiltration components at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection. Inspection of pretreatment measures at least twice annually, and removal of accumulated sediment as warranted by inspection, but no less than once annually. Periodic mowing of embankments. Removal of woody vegetation from embankments. Inspection and repair of embankments and spillways. If an infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

Stone Berm Level Spreader

Description: A stone berm level spreader is an outlet structure constructed at zero percent grade across a slope used to convert concentrated flow to "sheet flow." It disperses or "spreads" flow thinly over a receiving area, usually consisting of undisturbed, vegetated ground. The conversion of concentrated flow to shallow, sheet flow allows runoff to be discharged at non-erosive velocities onto natural ground. To stabilize the spreader outlet, a stone berm is provided to dissipate flow energy, and help disperse flows along the length of the spreader. Level spreaders are not designed to remove pollutants from stormwater; however, some suspended sediment and associated phosphorous, nitrogen, metals and hydrocarbons will settle out of the runoff through settlement, filtration, infiltration, absorption, decomposition and volatilization. See SWM Volume 2, 4-6.6 Conveyance Practices, Stone Berm Level Spreader, page 162.

Maintenance Considerations: Inspect at least once annually for accumulation of sediment and debris and for signs of erosion within approach channel, spreader channel or down-slope of the spreader. Remove debris whenever observed during inspection. Remove sediment when accumulation exceeds 25% of spreader channel depth. Mow as required by landscaping design. At a minimum, mow annually to control woody vegetation within the spreader. Snow should not be stored within or down-slope of the level spreader or its approach channel. Repair any erosion and re-grade or replace stone berm material, as warranted by inspection. Reconstruct the spreader if down-slope channelization indicates that the spreader is not level or that discharge has become concentrated, and corrections cannot be made through minor re-grading.

Perimeter Control (Silt Fence / SiltSoxx / Erosion Control Mix Berm)

The plan set demonstrates the location of perimeter sediment control. The Erosion and Sediment Control Details, Sheet E-101, has the specifications for installation and maintenance of the silt fence, Filtrexx mulch filled SiltSoxx (or approved equal), and Erosion Control Mix Berm. There are locations on the site, for example bio-media rain garden protection, where SiltSoxx protection is specified. An area of permanent perimeter control is shown by the well house for wetland buffer protection from steeper slopes.

Control of Invasive Plants

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

Snow Removal & Winter Maintenance

Description: Drainage and stormwater systems need to be maintained during the winter months so that surface water runoff from a rain storm does not become a impounding and icing problem. Catch basins must remain viable and where sheet flow is a design factor, the edge of pavement and should need to be maintained so that runoff can leave the pavement area. Sand and salt should be used at the rate that prevents sedimentation problems or excess salt deposited but yet enough to allow for protection for pedestrians and vehicles.

Maintenance Considerations: Catch basins are required to be kept viable by removing snow that is block surface water runoff from entering the structure. The edge of pavement where surface water sheet flow is designed to leave the paved area, the edge of pavement and shoulder need to be plowed to allow runoff to leave the pavement. Snow is to piled in designated areas and removed from the site when the on-site storage locations have been exceeded. At the end of the winter season, sediment is to be swept from the paved surfaces and removed from the drainage system. (Sumps if provided, sediment forebays, swale lines.) (See catch basin and drainage pipe maintenance.) NHDES offers training (Green SnowPro Certification) for contractors and owners. https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification Please find attached NHDES Green SnoPro Utilization Chart which is required to be used.

Annual Report

Description: The owner is responsible to keep an **I & M Activity Log** that documents inspection, maintenance and repairs to the storm water management system, and a **Deicing Log** to track the amount and type of deicing material applied to the site. The original owner is responsible to ensure that any subsequent owner (s) have copies of the Stormwater System Operation: Inspection & Maintenance Manual, copies of past logs and check lists. This includes any owner association for potential condominium conversion of the property. The Annual Report will be prepared and submitted to the Town of Barrington, Planning Department with copies of both logs and check lists no later than December 15th of each year and made available to NHDES upon request. Upon an ownership change, the Annual Report will include the Transfer of Ownership Responsibility Forms duplicated from the form found below.

The plans that accompany this manual include a plan sheet, "Inspection & Maintenance Plan" and copies of the Stormwater Treatment Design Sheets. The owner will also maintain a complete set of the approved original design plans.

Respectfully
BERRY SURVEYING & ENGINEERING

Kenneth A. Berry, PE, LLS
CPSWQ, CPESC, CESSWI
Principal, VP – Technical Operations

Christopher R. Berry, SIT
Principal - President

Kevin R. Poulin, PE
Design Engineer

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Inspection & Maintenance Manual Checklist

49 Winkley Pond Road, Barrington, NH, Tax Map 253, Lot 14
Hambone, LLC
242 Central Ave
Dover, NH 03820

☑	Date	BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Pavement Sweeping	Three Times Per Year	Clean Pavement	Pavement areas will be swept and sedimentation removed so the surface is clean
		Litter/Trash Removal	Routinely	Inspect dumpsters, outdoor waste receptacles area, and yard areas.	Parcel will be free of litter/trash.
		Deicing Agents	N/A	N/A	Use salt as the primary agent for roadway safety during winter.
		Invasive Species	Two times per year.	Inspect for Invasive Species	Remove and dispose invasive species.
		Closed Drainage System:			
		Drainage Pipes	1 time per 2 years	Check for sediment accumulation & clogging.	Less than 2" sediment depth
		Drop Inlets & Catch Basins	2 times per year	Check for sediment accumulation & clogging.	Any accumulated Sediment or debris.

☑	Date	BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Rain Garden/ Infiltration Pond	2 times per year	Check for sediment and debris accumulation buildup.	Remove sediment & debris when required. Remove Invasive Species
		Rain Garden/ Infiltration Pond	Annually	Drain completely with 72 hours	Evaluate the surface of the practice for sedimentation and clogging. Remove clogging and restore the pond surface to original conditions.
		Mulch Berm Buffer Protection	2 times per year / as needed	Check berm for breaks	Repair berm as needed / ongoing
		Riprap Outlet Protection	Annually	Check for sediment buildup and structure damage.	Remove excess sediment and repair damage.
		Winter Maintenance	Ongoing	Remove snow as directed.	Ongoing
		Post Winter Maintenance	Annually	Remove excess sand, gross solids, and repair vegetation and plantings	Parcel will be free of excess sand, litter/trash.
		Annual Report	1 time per year	Submit Annual Report to Barrington Planning Dept. and kept on file by the owner.	Report to be submitted on or before December 15th each year.

Inspection Check List: Page 3

The following drainage features will all require periodic inspections and maintenance based on this manual in addition to deep sump catch basins throughout:

Catch Basins (Ponds #C01-#C05)

Drain Manhole (Pond #D01)

Conveyance Swales and Roadside Ditches

Sediment Forebay (Pond #102)

Rain Garden #101 – P-101 w/ RipRap Inlet Protection, Outlet Structure, and Spillway.

Infiltration Basin #102 – P-102 w/ Sediment Forebay & RipRap Outlet

Outlet Protection and Level Spreader

Mulch Berm Buffer Protection (Permanent Perimeter Control)

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Inspection & Maintenance Manual Log Form

49 Winkley Pond Road, Barrington, NH, Tax Map 253, Lot 14
Hambone, LLC
242 Central Ave
Dover, NH 03820

BMP / System	Date Inspected	Inspector	Cleaning/Repair (List Items & Comments)	Repair Date	Performed By:

See also attached Checklist for Inspection of Gravel Wetland

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Deicing Log Form

49 Winkley Pond Road, Barrington, NH, Tax Map 253, Lot 14
Hambone, LLC
242 Central Ave
Dover, NH 03820

Date	Amount Applied	Performed By:	Date	Amount Applied	Performed By:

STORMWATER SYSTEM OPERATION & MAINTENANCE PLAN CERTIFICATION

Owner	Responsibility
Name: Hambone, LLC Robert Baldwin, Managing Member Address: 242 Central Ave Dover, NH 03820 Telephone: 1-603-986-2373 E-mail: robert@centralfallsrealty.com.com	The owner is responsible for the conduct of all construction activities, and ultimate compliance with all the provisions of the Stormwater System Operation & Maintenance Plan and the implementation of the Inspection and Maintenance Manual.

49 Winkley Pond Road, Barrington, NH, Tax Map 253, Lot 14

OWNER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: ________________________________ Date: ______________________

Printed Name:

Representing:

NOTES:

1.) OWNER: HAMBONE LLC
242 CENTRAL AVE
DOVER, NH 03820

2.) TAX MAP: TAX MAP 253, LOT 14

3.) LOT AREA: 586,793 Sq. Ft., 13.47 Ac.
330,912 Sq.Ft., 7.60 Ac., TOTAL UPLAND

4.) S.C.R.D. BOOK 4976, PAGE 1023

5.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE DRAINAGE INFRASTRUCTURE THAT REQUIRES PERIODIC INSPECTION AND MAINTENANCE. IT IS TO ACCOMPANY A DOCUMENT ENTITLED "STORMWATER SYSTEM MANAGEMENT: INSPECTION AND MAINTENANCE MANUAL" PUBLISHED BY BERRY SURVEYING & ENGINEERING ON THE SAME DATE.

6.) 11x17" PLANS ARE TWICE THE PUBLISHED SCALE.

LEGEND:

PROPOSED DRAIN MANHOLE W/ STRUCTURE
PROPOSED CATCH BASIN W/ STRUCTURE
PROPOSED STORMWATER BMP OUTLET STRUCTURE
POORLY DRAINED JURISDICTIONAL WETLAND
50' WETLAND BUFFER
CONTOUR MINOR, EXISTING
CONTOUR MAJOR, EXISTING
CONTOUR MINOR, PROPOSED
CONTOUR MAJOR, PROPOSED
EXISTING DRAINAGE LINE
PROPOSED DRAINAGE LINE
RIP RAP
STORMWATER BEST MANAGEMENT PRACTICE (BMP)

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REVISION	DATE	DESCRIPTION
#1	11-8-23	REVISED PER CMA ENGINEERS REVIEW

INSPECTION & MAINTENANCE PLAN
LAND OF
HAMBONE LLC
49 WINKLEY POND ROAD
BARRINGTON, N.H.
TAX MAP 253, LOT 14

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : AUGUST 16, 2023
FILE NO. : DB 2021-163

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14778
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

Welcome to New Hampshire's Watershed Report Cards built from the 2020/2022, 305(b)/303(d)

Each Watershed Report Card covers a single 12-digit Hydrologic Unit Code (HUC12), on average a 34 square mile area. Each Watershed Report Card has three components;

1. REPORT CARD - A one page card that summarizes the overall use support for Aquatic Life Integrity, Primary Contact (i.e. Swimming), and Secondary Contact (i.e. Boating) Designated Uses on every Assessment Unit ID (AUID) within the HUC12.
2. HUC 12 MAP - A map of the watershed with abbreviated labels for each AUID within the HUC12.
3. ASSESSMENT DETAILS - Anywhere from one to forty pages with the detailed assessment information for each and every AUID in the Report Card and Map.

How are the Surface Water Quality Assessment determinations made?

All readily available data with reliable Quality Assurance/Quality Control is used in the biennial surface water quality assessments. For a full understanding of how the Surface Water Quality Standards (Env-Wq 1700) are translated into surface water quality assessments we urge the reader to review the 2020/2022 Consolidated Assessment and Listing Methodology (CALM).

Where can I find more advanced mapping resources?

GIS files are available by assessment cycle at the NHDES FTP site.

I'd like to see the more raw water quality data?

The web mapping tool allows you to download the data used in the assessment of the primary contact and aquatic life designated uses by clicking on the "Data Access Waterbody Data (Aquatic Life and Swimming Uses)" link for any assessment unit.

How are assessments coded in the report card?

Assessment outcomes are displayed on a color scale as well as an alpha numeric scale that provides additional distinctions for the designated use and parameter level assessments as outlined in the table below.

		Severe Not Supporting, Severe	Poor Not Supporting, Marginal	Likely Bad Insufficient Information – Potentially Not Supporting	No Data No Data	Likely Good Insufficient Information – Potentially Full Supporting	Marginal Full Support, Marginal	Good Full Support, Good
CATEGORY	**Description**							
Category 2	Meets standards						2-M or 2-OBS	2-G
Category 3	Insufficient Information			3-PNS	3-ND	3-PAS		
Category 4	Does not Meet Standards;							
4A	TMDL* Completed	4A-P	4A-M or 4A-T					
4B	Other enforceable measure will correct the issue.	4B-P	4B-M or 4B-T					
4C	Non-pollutant (i.e. exotic weeds)	4C-P	4C-M					
Category 5	TMDL* Needed	5-P	5-M or 5-T					

* TMDL stands for Total Maximum Daily Load studies

Watershed 305(b) Assessment Summary Report:

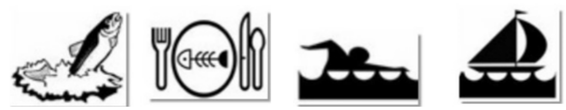
Assessment Cycle: 2020/2022

HUC 12: 010600030903

HUC 12 Name: Bellamy River

(Locator map on next page only applies to this HUC12)

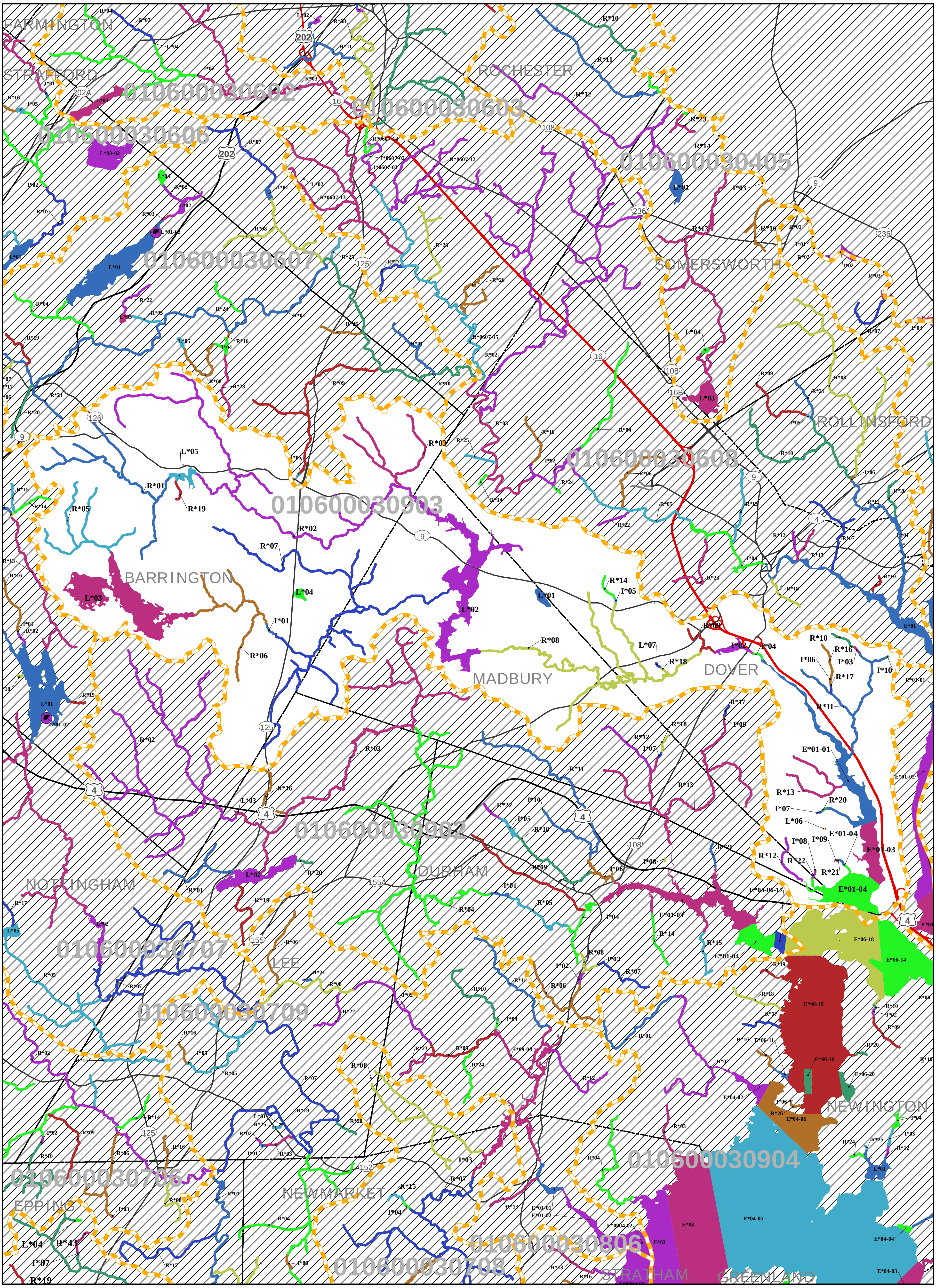
Good	Meets water quality standards/thresholds by a relatively large margin.
Marginal	Meets water quality standards/thresholds but only marginally.
Likely Good	Limited data available, however, the data that is available suggests that the parameter is Potentially Attaining Standards (PAS).
No Current Data	Insufficient information to make an assessment decision.
Likely Bad	Limited data available, however, the data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.
Poor	Not meeting water quality standards/thresholds. The impairment is marginal.
Severe	Not meeting water quality standards/thresholds. The impairment is more severe and causes poor water quality.



Assessment Unit ID	Map Label	Assessment Unit Name	Aquatic Life	Fish Consump.	Swimming	Boating
NHEST600030903-01-01	E*01-01	Bellamy River North		5-M	2-G	2-G
NHEST600030903-01-03	E*01-03	Bellamy River South Clement Point	5-P	5-M	2-G	2-G
NHEST600030903-01-04	E*01-04	Bellamy River South	5-P	5-M	2-G	2-G
NHIMP600030903-01	I*01	Bellamy River	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-02	I*02	Bellamy River - Sawyers Mill Dam Pond	5-M	4A-M	5-M	3-ND
NHIMP600030903-03	I*03	Canney Brook - Wildlife Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-04	I*04	Bellamy River Iv Dam	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-05	I*05	Knox Marsh Brook	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-06	I*06	Unnamed Brook - Thornwood Commons Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-07	I*07	Unnamed Brook - Bellamy River Wildlife Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-08	I*08	Unnamed Brook - Farm Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-09	I*09	Unnamed Brook - Webster Brook Dam	3-ND	4A-M	3-ND	3-ND

NHIMP600030903-10	I*10	Unnamed Brook - Farm Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-01	L*01	Barbadoes Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-02	L*02	Bellamy Reservoir	5-M	4A-M	3-ND	3-ND
NHLAK600030903-03	L*03	Swains Lake	5-P	4A-M	3-PAS	3-ND
NHLAK600030903-04	L*04	Winkley Pond	5-P	4A-M	3-ND	3-ND
NHLAK600030903-05	L*05	Branch Mallego Brook Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-06	L*06	Farm Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-07	L*07	Unnamed Pond	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-01	R*01	Madla Brook	5-M	4A-M	3-ND	3-ND
NHRIV600030903-02	R*02	Mallego Brook	5-P	4A-M	3-ND	3-ND
NHRIV600030903-03	R*03	Calef Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-05	R*05	Unnamed Brook - To Swains Lake	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-06	R*06	Bellamy River - Unnamed Brook	5-M	4A-M	3-ND	3-ND
NHRIV600030903-07	R*07	Bellamy River	5-P	4A-M	4A-P	4A-P
NHRIV600030903-08	R*08	Bellamy River - Kelly Brook - Knox Marsh Brook	5-P	4A-M	4A-P	3-PAS
NHRIV600030903-09	R*09	Bellamy River - Unnamed Brook	5-M	4A-M	4A-P	3-ND
NHRIV600030903-10	R*10	Canney Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-11	R*11	Varney Brook - Canney Brook	3-ND	4A-M	4A-P	4A-M
NHRIV600030903-12	R*12	Unnamed Brook - To Bellamy River Royalls Cove	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-13	R*13	Garrison Brook	3-ND	4A-M	4A-P	3-ND
NHRIV600030903-14	R*14	Knox Marsh Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-16	R*16	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-17	R*17	Varney Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-18	R*18	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-19	R*19	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-20	R*20	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-21	R*21	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-22	R*22	Unnamed Brook	3-ND	4A-M	3-ND	3-ND

AUIDs For HUC12: 010600030903 - Bellamy River



HUC12 Boundaries
Town Boundaries
Major Roads
Interstate Highway
US Highway
State Highway

Assessment Unit Coloring
AUs Ending with:
0 =
1 =
2 =
3 =
4 =
5 =
6 =
7 =
8 =
9 =

N W E S

Abbrv. Label: L* 03
HUC 12: 010 700060201
AUID = NH L AK700060201-03

Assessment Unit IDs are derived from the HUC12 they reside within. The labels have been shortened on this map for presentation purposes.
Example: the Label "L*03" in HUC12 = 010700060201 represents AUID = "NHLAK700060201-03"
In rare cases where an AUID extends beyond the boundary of a single HUC12, additional portions of the end of the HUC 12 number have also been replaced.

0 0.8 1.6 2.4 3.2 Miles

Scale:1:78,820

S:\WD-Watershed\WQ_Planning\305b_303d\2020\Report_Cards\HUC12_maps

Assessment Unit ID: NHIMP600030903-01
Assessment Unit Name: Bellamy River
Town(s) Primary Town is Listed First: Barrington

Size: 2.70 ACRES
Assessment Unit Category: 3-ND
Beach: N

2020/2022, 305(b)/303(d) - All Reviewed Parameters by Assessment Unit

Designated Use Description	Desig. Use Category	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category	TMDL Priority
Aquatic Life Integrity	3-ND	Chlorophyll-a	N	N/A	NLV	3-ND	
		Dissolved oxygen saturation	N			3-ND	
		Oxygen, Dissolved	N			3-ND	
		pH	N			3-ND	
Fish Consumption	4A-M	MERCURY - FISH CONSUMPTION ADVISORY	N			4A-M	
Potential Drinking Water Supply	2-G						
Primary Contact Recreation	3-ND	Escherichia coli	N			3-ND	
Secondary Contact Recreation	3-ND	Escherichia coli	N			3-ND	
Wildlife	3-ND						

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

2018	NHIMP600030902-04	OYSTER RIVER - MILL POND DAM	DURHAM	24	ACRES	Primary Contact Recreatior	Escherichia coli	4A-P	9/21/2010	NEW HAMPSHIRE STATEWIDE E	39272	Non-ORW
2018	NHIMP600030902-06	BEARDS CREEK	DURHAM	16	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-M				Non-ORW
2018	NHIMP600030902-06	BEARDS CREEK	DURHAM	16	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-M				Non-ORW
2018	NHIMP600030902-06	BEARDS CREEK	DURHAM	16	ACRES	Primary Contact Recreatior	Escherichia coli	4A-M	9/21/2010	NEW HAMPSHIRE STATEWIDE E	39272	Non-ORW
2018	NHIMP600030903-02	BELLAMY RIVER - SAWYERS MILL DAM POI	DOVER	20.717	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP600030903-02	BELLAMY RIVER - SAWYERS MILL DAM POI	DOVER	20.717	ACRES	Primary Contact Recreatior	Chlorophyll-a	5-M				Non-ORW
2018	NHIMP600030903-02	BELLAMY RIVER - SAWYERS MILL DAM POI	DOVER	20.717	ACRES	Primary Contact Recreatior	Escherichia coli	4A-P	9/21/2010	NEW HAMPSHIRE STATEWIDE E	39272	Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Arsenic	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Barium	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Benzo(a)pyrene (PAHs)	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Benzo[b]fluoranthene	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Benzo[k]fluoranthene	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	DDE	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Indeno[1,2,3-cd]pyrene	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Nickel	5-M				Non-ORW
2018	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON	1.377	ACRES	Aquatic Life Integrity	Zinc	5-M				Non-ORW
2018	NHIMP600031004-04	SECORD POND DAM	SEABROOK	2.5	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP600031004-04	SECORD POND DAM	SEABROOK	2.5	ACRES	Aquatic Life Integrity	Sedimentation/Siltation	4C-P				Non-ORW
2018	NHIMP600031004-05	CAINS BROOK	SEABROOK	2.4	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P				Non-ORW
2018	NHIMP600031004-05	CAINS BROOK	SEABROOK	2.4	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP600031004-06	CAINS BROOK - NOYES POND	SEABROOK	0.9	ACRES	Aquatic Life Integrity	Chloride	5-M				Non-ORW
2018	NHIMP600031004-06	CAINS BROOK - NOYES POND	SEABROOK	0.9	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-P				Non-ORW
2018	NHIMP600031004-06	CAINS BROOK - NOYES POND	SEABROOK	0.9	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P				Non-ORW
2018	NHIMP600031004-06	CAINS BROOK - NOYES POND	SEABROOK	0.9	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP600031004-06	CAINS BROOK - NOYES POND	SEABROOK	0.9	ACRES	Primary Contact Recreatior	Escherichia coli	4A-M	8/29/2011	58 NH BACTERIA IMPAIRED WA	40662	Non-ORW
2018	NHIMP700010104-01	LOON POND BROOK - LOON RESERVOIR	LINCOLN	0.15	ACRES							ORW
2018	NHIMP700010201-01	BOYCE BROOK - BOYCE BROOK DAM	LINCOLN	0.25	ACRES							ORW
2018	NHIMP700010201-04	UNNAMED BROOK - HIGHWAY DAM	FRANCONIA	2.415	ACRES							ORW
2018	NHIMP700010201-05	SHADOW LAKE	LINCOLN	3.091	ACRES							Review OneStop GIS
2018	NHIMP700010202-01	GORDON POND	WOODSTOCK	1	ACRES							ORW
2018	NHIMP700010203-01	BEAVER BROOK	WOODSTOCK	0.679	ACRES							Review OneStop GIS
2018	NHIMP700010206-01	DEER RUN POND DAM	CAMPTON	2.4	ACRES							ORW
2018	NHIMP700010302-01	BLACK BROOK - WEEKS CROSSING POND	WARREN	8.61	ACRES							ORW
2018	NHIMP700010302-03	ORE HILL MINE POND	WARREN	1.22	ACRES	Aquatic Life Integrity	Aluminum	5-M				ORW
2018	NHIMP700010302-03	ORE HILL MINE POND	WARREN	1.22	ACRES	Aquatic Life Integrity	Lead	5-P				ORW
2018	NHIMP700010302-03	ORE HILL MINE POND	WARREN	1.22	ACRES	Aquatic Life Integrity	pH	5-P				ORW
2018	NHIMP700010302-03	ORE HILL MINE POND	WARREN	1.22	ACRES	Aquatic Life Integrity	Zinc	5-P				ORW
2018	NHIMP700010401-01-01	SNOWS BROOK	WATERVILLE VALLEY	4.361	ACRES							ORW
2018	NHIMP700010401-01-02	SNOWS BROOK - CORCORAN POND TOWN	WATERVILLE VALLEY	1.38	ACRES	Primary Contact Recreatior	Escherichia coli	4A-M	9/21/2010	NEW HAMPSHIRE STATEWIDE E	39276	ORW
2018	NHIMP700010401-03	UNNAMED BROOK - LOCKE 1 DAM	CAMPTON	1.363	ACRES							ORW
2018	NHIMP700010401-04	CHICKENBORO BROOK RESERVOIR	CAMPTON	3.877	ACRES							ORW
2018	NHIMP700010801-08	PEMIGEWASSET RIVER - AYERS ISLAND DA	NEW HAMPTON, BRISTOL	500	ACRES	Aquatic Life Integrity	Non-Native Aquatic Plants	4C-P				Non-ORW
2018	NHIMP700010801-08	PEMIGEWASSET RIVER - AYERS ISLAND DA	NEW HAMPTON, BRISTOL	500	ACRES	Aquatic Life Integrity	pH	5-P				Non-ORW
2018	NHIMP700010803-02	FRANKLIN FALLS FLOOD CTRL - PEMIGEWA	FRANKLIN, HILL, SANBORNTON	440	ACRES	Aquatic Life Integrity	Non-Native Aquatic Plants	4C-M				Non-ORW
2018	NHIMP700010804-03	SUCKER BROOK-SUCKER BROOK I DAM	ANDOVER	0.15	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-M				Non-ORW
2018	NHIMP700010804-03	SUCKER BROOK-SUCKER BROOK I DAM	ANDOVER	0.15	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP700010804-08	CHANCE POND BROOK - WEBSTER LAKE D/	FRANKLIN	12.3	ACRES	Aquatic Life Integrity	Non-Native Aquatic Plants	4C-M				Non-ORW
2018	NHIMP700020102-01-01	JONES DAM POND	NEW DURHAM	56.558	ACRES	Aquatic Life Integrity	Non-Native Aquatic Plants	4C-M				Non-ORW
2018	NHIMP700020102-01-01	JONES DAM POND	NEW DURHAM	56.558	ACRES	Primary Contact Recreatior	Cyanobacteria hepatotoxic microcystins	5-M				Non-ORW
2018	NHIMP700020102-01-02	MARSH POND	NEW DURHAM, ALTON	58.208	ACRES	Primary Contact Recreatior	Cyanobacteria hepatotoxic microcystins	5-M				Non-ORW
2018	NHIMP700020102-02	MERRYMEETING RIVER - ALTON POWER D.	ALTON, NEW DURHAM	719	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP700020203-01	KNOWLES POND - TR WILLIAMS BROOK	NORTHFIELD	54.931	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-M				Non-ORW
2018	NHIMP700020203-01	KNOWLES POND - TR WILLIAMS BROOK	NORTHFIELD	54.931	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P				Non-ORW
2018	NHIMP700020203-01	KNOWLES POND - TR WILLIAMS BROOK	NORTHFIELD	54.931	ACRES	Aquatic Life Integrity	pH	4A-M	9/24/2004	KNOWLES POND	11506	Non-ORW
2018	NHIMP700020203-07	WINNIPESAUKEE RIVER - FRANKLIN FALLS I	FRANKLIN	1.5	ACRES	Primary Contact Recreatior	Escherichia coli	4B-M				Non-ORW
2018	NHIMP700030101-02	CONTOOCOOK RIVER DAM	JAFFREY	5	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-P				Non-ORW
2018	NHIMP700030101-02	CONTOOCOOK RIVER DAM	JAFFREY	5	ACRES	Aquatic Life Integrity	Non-Native Aquatic Plants	4C-P				Non-ORW
2018	NHIMP700030101-02	CONTOOCOOK RIVER DAM	JAFFREY	5	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P				Non-ORW
2018	NHIMP700030101-03	CONTOOCOOK RIVER	JAFFREY	0.5	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-M				Non-ORW
2018	NHIMP700030101-03	CONTOOCOOK RIVER	JAFFREY	0.5	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-M				Non-ORW
2018	NHIMP700030101-03	CONTOOCOOK RIVER	JAFFREY	0.5	ACRES	Aquatic Life Integrity	pH	5-P				Non-ORW
2018	NHIMP700030104-04	CONTOOCOOK RIVER - NOONE MILL POND	PETERBOROUGH	17.561	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP700030104-08	CONTOOCOOK RIVER - TRANSCRIPT PRINT	PETERBOROUGH	2.5	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP700030108-02	CONTOOCOOK RIVER - PIERCE POWER DAI	BENNINGTON	3.5	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP700030202-03	NORTH BRANCH - WILLIAMS DAM	STODDARD	55.437	ACRES	Aquatic Life Integrity	pH	5-P				Non-ORW
2018	NHIMP700030204-05-01	BEARDS BROOK - EAST WASHINGTON DAM	WASHINGTON	3.502	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP700030204-05-01	BEARDS BROOK - EAST WASHINGTON DAM	WASHINGTON	3.502	ACRES	Primary Contact Recreatior	Chlorophyll-a	5-P				Non-ORW
2018	NHIMP700030204-05-02	BEARDS BROOK - MILL POND TOWN BEACI	WASHINGTON	1.38	ACRES	Primary Contact Recreatior	Escherichia coli	4A-P	12/13/2006	MILL POND TOWN BEACH	31735	Non-ORW
2018	NHIMP700030304-04-02	SILVER BROOK - SILVER LAKE RESERVOIR B	WARNER	1.38	ACRES	Primary Contact Recreatior	Escherichia coli	4A-P	8/29/2011	58 NH BACTERIA IMPAIRED WA	40666	Non-ORW
2018	NHIMP700030402-04	BLACKWATER RIVER	NEW LONDON	2	ACRES	Aquatic Life Integrity	pH	5-M				Non-ORW
2018	NHIMP700030503-01-01	HOPKINTON DIKE ELM BROOK	HOPKINTON	213.8	ACRES	Aquatic Life Integrity	Non-Native Aquatic Plants	4C-P				Non-ORW
2018	NHIMP700030503-01-01	HOPKINTON DIKE ELM BROOK	HOPKINTON	213.8	ACRES	Primary Contact Recreatior	Cyanobacteria hepatotoxic microcystins	5-M				Non-ORW
2018	NHIMP700030503-01-02	STATE PARK BEACH ON ELM BROOK	HOPKINTON	1.38	ACRES	Primary Contact Recreatior	Cyanobacteria hepatotoxic microcystins	5-M				Non-ORW
2018	NHIMP700030503-01-02	STATE PARK BEACH ON ELM BROOK	HOPKINTON	1.38	ACRES	Primary Contact Recreatior	Escherichia coli	4A-P	9/21/2010	NEW HAMPSHIRE STATEWIDE E	39275	Non-ORW

2020	NHEST600031004-09-06	HAMPTON/SEABROOK HARBOR - HAMPTON HARBOR	HAMPTON	Yes	0.000	SQUARE	Shellfish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	Y		
2020	NHEST600031004-09-06	HAMPTON/SEABROOK HARBOR - HAMPTON HARBOR	HAMPTON	Yes	0.000	SQUARE	Shellfish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	Y		
2020	NHEST600031004-09-07	FISH COOP 150 FT SZ	SEABROOK	Yes	0.006	SQUARE	Fish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-07	FISH COOP 150 FT SZ	SEABROOK	Yes	0.006	SQUARE	Fish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-07	FISH COOP 150 FT SZ	SEABROOK	Yes	0.006	SQUARE	Shellfish Consumption	DIOXIN - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-07	FISH COOP 150 FT SZ	SEABROOK	Yes	0.006	SQUARE	Shellfish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-07	FISH COOP 150 FT SZ	SEABROOK	Yes	0.006	SQUARE	Shellfish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-08	HAMPTON RIVER MARINA SZ	HAMPTON	Yes	0.146	SQUARE	Fish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-08	HAMPTON RIVER MARINA SZ	HAMPTON	Yes	0.146	SQUARE	Fish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-08	HAMPTON RIVER MARINA SZ	HAMPTON	Yes	0.146	SQUARE	Shellfish Consumption	DIOXIN - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-08	HAMPTON RIVER MARINA SZ	HAMPTON	Yes	0.146	SQUARE	Shellfish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-08	HAMPTON RIVER MARINA SZ	HAMPTON	Yes	0.146	SQUARE	Shellfish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Aquatic Life Integrity	Aluminum	5-M	LOW	N	2006	2006
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Aquatic Life Integrity	DDD	5-M	LOW	N	2006	2004
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Aquatic Life Integrity	Dieldrin	5-M	LOW	N	2006	2004
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Aquatic Life Integrity	Lindane	5-M	LOW	N	2006	2004
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Aquatic Life Integrity	trans-Nonachlor	5-M	LOW	N	2006	N/A
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Fish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Fish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Shellfish Consumption	DIOXIN - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Shellfish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-09-09	HAMPTON/SEABROOK HARBOR	SEABROOK, HAMPTON, HAMPTON FALLS	Yes	0.615	SQUARE MILES	Shellfish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-10	LITTLE RIVER	NORTH HAMPTON, HAMPTON	Yes	0.011	SQUARE	Fish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-10	LITTLE RIVER	NORTH HAMPTON, HAMPTON	Yes	0.011	SQUARE	Fish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-10	LITTLE RIVER	NORTH HAMPTON, HAMPTON	Yes	0.011	SQUARE	Shellfish Consumption	DIOXIN - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-10	LITTLE RIVER	NORTH HAMPTON, HAMPTON	Yes	0.011	SQUARE	Shellfish Consumption	MERCURY - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHEST600031004-10	LITTLE RIVER	NORTH HAMPTON, HAMPTON	Yes	0.011	SQUARE	Shellfish Consumption	PCBS - FISH CONSUMPTION ADVISORY	5-M	LOW	N		
2020	NHIMP400010605-01	ANDROSCOGGIN RIVER - D. C. POWER DAM	BERLIN		100.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2018	2018
2020	NHIMP400020103-01	ANDROSCOGGIN RIVER - REFLECTION POND	SHELBURNE		56.219	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2013	2011
2020	NHIMP600020105-04	GOODRICH FALLS DAM-ELLIS RIVER	BARTLETT		3.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2011	2011
2020	NHIMP600020901-03	COLD BROOK - MILL BROOK	FREEDOM		2.000	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-P	LOW	N	2008	N/A
2020	NHIMP600020901-03	COLD BROOK - MILL BROOK	FREEDOM		2.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2008	2008
2020	NHIMP600030405-03	SALMON FALLS RIVER - GREAT FALLS UPPER DAM	SOMERSWORTH	Yes	50.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2018	2018
2020	NHIMP600030405-04	SALMON FALLS RIVER - BAXTER MILL DAM POND	ROCHESTER	Yes	157.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2016	2014
2020	NHIMP600030406-03	SALMON FALLS RIVER - ROLLINSFORD DAM	ROLLINSFORD, SOMERSWORTH	Yes	57.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2018	2016
2020	NHIMP600030406-04	SALMON FALLS RIVER - SOUTH BERWICK DAM	ROLLINSFORD	Yes	58.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2018	2016
2020	NHIMP600030406-04	SALMON FALLS RIVER - SOUTH BERWICK DAM	ROLLINSFORD	Yes	58.000	ACRES	Primary Contact Recreation	Chlorophyll-a	5-M	LOW	N	2018	2016
2020	NHIMP600030603-01	COCHECO RIVER - CITY DAM 1	ROCHESTER	Yes	50.000	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-M	LOW	N	2019	2002
2020	NHIMP600030603-01	COCHECO RIVER - CITY DAM 1	ROCHESTER	Yes	50.000	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-M	LOW	N	2019	2007
2020	NHIMP600030603-01	COCHECO RIVER - CITY DAM 1	ROCHESTER	Yes	50.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2019
2020	NHIMP600030603-02	COCHECO RIVER - HATFIELD DAM	ROCHESTER	Yes	1.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2010	2010
2020	NHIMP600030607-02	COCHECO RIVER - GONIC DAM POND	ROCHESTER	Yes	18.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2019
2020	NHIMP600030608-02	COCHECO RIVER - WATSON WALDRON DAM	DOVER	Yes	54.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2016	2016
2020	NHIMP600030608-04	COCHECO RIVER - CENTRAL AVE DAM	DOVER	Yes	20.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2018	2016
2020	NHIMP600030701-01	LAMPREY RIVER	DEERFIELD		40.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2017	2017
2020	NHIMP600030708-03	PISCASSIC RIVER	NEWMARKET	Yes	4.000	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-P	LOW	N	2017	2010
2020	NHIMP600030708-03	PISCASSIC RIVER	NEWMARKET	Yes	4.000	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P	LOW	N	2017	2017
2020	NHIMP600030708-03	PISCASSIC RIVER	NEWMARKET	Yes	4.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2017	2017
2020	NHIMP600030709-02	LAMPREY RIVER - WISWALL DAM	DURHAM, LEE		30.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2019
2020	NHIMP600030709-03	LAMPREY RIVER - MACALLEN DAM	DURHAM, NEWMARKET	Yes	120.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2019
2020	NHIMP600030803-03	EXETER RIVER	FREMONT, BRENTWOOD	Yes	24.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2018
2020	NHIMP600030901-02	WINNICUT RIVER DAM POND	GREENLAND	Yes	1.000	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-P	LOW	N	2018	2018
2020	NHIMP600030901-02	WINNICUT RIVER DAM POND	GREENLAND	Yes	1.000	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P	LOW	N	2018	2018
2020	NHIMP600030901-02	WINNICUT RIVER DAM POND	GREENLAND	Yes	1.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2018	2018
2020	NHIMP600030902-04	OYSTER RIVER - MILL POND DAM	DURHAM	Yes	24.000	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-M	LOW	N	2019	2017
2020	NHIMP600030902-04	OYSTER RIVER - MILL POND DAM	DURHAM	Yes	24.000	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P	LOW	N	2019	2019
2020	NHIMP600030902-04	OYSTER RIVER - MILL POND DAM	DURHAM	Yes	24.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2018
2020	NHIMP600030902-04	OYSTER RIVER - MILL POND DAM	DURHAM	Yes	24.000	ACRES	Primary Contact Recreation	Chlorophyll-a	5-M	LOW	N	2007	2007
2020	NHIMP600030902-06	BEARDS CREEK	DURHAM	Yes	16.000	ACRES	Aquatic Life Integrity	Dissolved oxygen saturation	5-M	LOW	N	2016	2005
2020	NHIMP600030902-06	BEARDS CREEK	DURHAM	Yes	16.000	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-M	LOW	N	2016	2007
2020	NHIMP600030903-02	BELLAMY RIVER - SAWYERS MILL DAM POND	DOVER	Yes	20.717	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2018
2020	NHIMP600030903-02	BELLAMY RIVER - SAWYERS MILL DAM POND	DOVER	Yes	20.717	ACRES	Primary Contact Recreation	Chlorophyll-a	5-M	LOW	N	2007	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Arsenic	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Barium	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Benzo(a)pyrene (PAHs)	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Benzo[b]fluoranthene	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Benzo[k]fluoranthene	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	DDE	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Indeno[1,2,3-cd]pyrene	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Nickel	5-M	LOW	N	2006	2006
2020	NHIMP600031003-19	RICE DAM POND - ON TAYLOR RIVER	HAMPTON FALLS, HAMPTON		1.377	ACRES	Aquatic Life Integrity	Zinc	5-M	LOW	N	2006	2006
2020	NHIMP600031004-04	SECORD POND DAM	SEABROOK	Yes	2.500	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2009	2008
2020	NHIMP600031004-05	CAINS BROOK	SEABROOK	Yes	2.400	ACRES	Aquatic Life Integrity	Oxygen, Dissolved	5-P	LOW	N	2009	2009
2020	NHIMP600031004-05	CAINS BROOK	SEABROOK	Yes	2.400	ACRES	Aquatic Life Integrity	pH	5-M	LOW	N	2009	2008

Control of Invasive Plants

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Douglas Cygan
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This guide lists garden plants and weeds which are already causing significant changes to natural areas in the Mid-Atlantic. **Measures for controlling each species are indicated by number, e.g., (3), in the text with a full explanation at the end of this article.** Click on the word Control: to jump to that section. Then click your "back" button to return to the text. Following each section suggested alternative plants are given. These alternatives are native plants, well adapted and needing little care, attractive to birds and butterflies, and an important part of the food web for our indigenous species.

INVASIVE TREES

NORWAY MAPLE (*Acer platanoides*) has large leaves similar to sugar maple. To easily confirm that the plant is Norway maple, break off a leaf and if it's truly Norway maple it will exude milky white sap. Fall foliage is yellow. (Exception: cultivars such as 'Crimson King,' which have red leaves in spring or summer, may have red autumn leaves.) The leaves turn color late, usually in late October after native trees have dropped their foliage. This tree suppresses growth of grass, garden plants, and forest understory beneath it, at least as far as the drip-line. Its wind-borne seeds can germinate and grow in deep shade. The presence of young Norway maples in our woodlands is increasing.
Control: (1); (7), (8), (9), or (10); (11) in mid-October to early November, before the leaves turn color.

TREE OF HEAVEN (*Ailanthus altissima*), is incredibly tough and can grow in the poorest conditions. It produces huge quantities of wind-borne seeds, grows rapidly, and secretes a toxin that kills other plants. Its long compound leaves, with 11-25 lance-shaped leaflets, smell like peanut butter or burnt coffee when crushed. Once established, this tree cannot be removed by mechanical means alone.
Control: (1) - seedlings only. Herbicide - use Garlon 3a (9) with no more than a 1" gap between cuts, or (10); plus (11) on re-growth. Or paint bottom 12" of bark with Garlon 4 Ultra (in February or March to protect surrounding plants). USE MAXIMUM STRENGTH SPECIFIED ON LABEL for all herbicide applications on Ailanthus. Glyphosate is not effective against Ailanthus.

INVASIVE SHRUBS

AUTUMN OLIVE (*Eleagnus umbellata*): Formerly recommended for erosion control and wildlife value, these have proved highly invasive and diminish the overall quality of wildlife habitat.
Control: (1) - up to 4" diameter trunks; (7) or (10) or bury stump. Do not mow.
MULTIFLORA ROSE (*Rosa multiflora*), formerly recommended for erosion control, hedges, and wildlife habitat, becomes a huge shrub that chokes out all other vegetation and is too dense for many species of birds to nest in, though a few favor it. In shade, it grows up trees like a vine. It is covered with white flowers in June. (Our native roses have fewer flowers, mostly pink.) Distinguish multiflora by its size, and by the presence of very hard, curved thorns, and a fringed edge to the leaf stalk.
Control: (1) - pull seedlings, dig out larger plants at least 6" from the crown and 6" down; (4) on extensive infestations; (10) or (11). It may remain green in winter, so herbicide may *applied when other plants are dormant. For foliar application, mix Rodeo with extra sticker-spreader, or use Roundup Sure Shot Foam on small plants.*

BUSH HONEYSUCKLES (*Lonicera spp.*), including Belle, Amur, Morrow's, and Tatarian honeysuckle. (In our region, assume that any honeysuckle is exotic unless it is a scarlet-flowered vine). Bush honeysuckles create denser shade than native shrubs, reducing plant diversity and eliminating nest sites for many forest interior species.
Control: (2) on ornamentals; (1); on shady sites only, brush cut in early spring and again in early fall (3); (4) during the growing season; (7); or (10) late in the growing season.

BLUNT-LEAVED PRIVET (*Ligustrum* obtusifolium). Control: (1); (7) or (10); or trim off all flowers. Do not cut back or mow.

BURNING BUSH, WINGED EUONYMUS (*Euonymus alatus*), identified by wide, corky wings on the branches.
Control: (1); (7) or (10); or trim off all flowers.

JAPANESE BARBERRY (*Berberis thunbergii*), and all cultivars and varieties.
Control: (1); (7) or (10); or trim off all flowers.

INVASIVE WOODY VINES

All of these vines shade out the shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle. DO NOT PLANT NEXT TO OPEN SPACE.

JAPANESE HONEYSUCKLE (*Lonicera japonica*), including Hall's honeysuckle, has gold-and-white flowers with a heavenly scent and sweet nectar in June. This is probably the familiar honeysuckle of your childhood. It is a rampant grower that spirals around trees, often strangling them.
Control: (1); (3); (10); (11) in fall or early spring when native vegetation is dormant. Plan to re-treat repeatedly.

ORIENTAL BITTERSWEET (*Celastrus orbiculatus*) has almost completely displaced American bittersweet (*C. scandens*). The Asian plant has its flowers and bright orange seed capsules in clusters all along the stem, while the native species bears them only at the branch tips.
Control: (1); keep ornamental plants cut back, remove all fruits as soon as they open, and bag or burn fruits; to eradicate use Garlon 3a (10).

JAPANESE KNOTWEED, MEXICAN BAMBOO (*Polygonum cuspidatum*) can grow in shade. The stems have knotty joints, reminiscent of bamboo. It grows 6-10' tall and has large pointed oval or triangular leaves.
Control: Cut at least 3 times each growing season and/or treat with Rodeo (10) or (11). In gardens, heavy mulch or dense shade may kill it.

INVASIVE HERBACEOUS PLANTS

GARLIC MUSTARD (*Alliaria petiolata*, *A. officinalis*), a white-flowered biennial with rough, scalloped leaves (kidney-, heart- or arrow-shaped), recognizable by the smell of garlic and taste of mustard when its leaves are crushed. (The odor fades by fall.)
Control: Pull before it flowers in spring (1), removing crown and roots. Tamp down soil afterwards. Once it has flowered, cut (2), being careful not to scatter seed, then bag and burn or send to the landfill. (11) may be appropriate in some settings.

JAPANESE STILT GRASS (*Microstegium vimineum*) can be identified by its lime-green color and a line of silvery hairs down the middle of the 2-3" long blade. It tolerates sun or dense shade and quickly invades areas left bare or disturbed by tilling or flooding. An annual grass, it builds up a large seed bank in the soil.

Control: Easily pulled in early to mid-summer (1) - be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to landfill. Mowing weekly or when it has just begun to flower may prevent it from setting seed (3). Use glyphosate (11) or herbicidal soap (less effective) on large infestations. Follow up with (5) in spring.

MILE-A-MINUTE VINE, DEVIL'S TAIL TEARTHUMB (*Polygonum perfoliatum*), a rapidly growing annual vine with triangular leaves, barbed stems, and turquoise berries in August which are spread by birds. It quickly covers and shades out herbaceous plants.
Control: same as for stilt grass.

SPOTTED KNAPWEED (*Centaurea maculosa*), a biennial with thistle-like flowers.
Control: Do NOT pull (1) unless the plant is young and the ground is very soft - the tap root will break off and produce several new plants. Wear sturdy gloves. (2); (6); (10) or (11).

CONTROL MEASURES

(1) PULL seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs.
(2) DEADHEAD to prevent spread of seeds of invasive plants. Cut off seeds or fruits before they ripen. Bag, and burn or send to a landfill.
(3) MOW or CUTTING at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year.
(4) CONTROLLED BURNING during the spring, repeated over several years, allows native vegetation to compete more effectively with the invasive species. This requires a permit. Spot treatment with glyphosate in late fall can be used to make this method more effective.
(5) Use a CORN-BASED PRE-EMERGENCE HERBICIDE on annual weeds. This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.
(6) In lawns, SPOT TREAT with BROAD-LEAF WEEDKILLER. Good lawn-care practices (test soil; use lime and fertilizer only when soil test shows a need; mow high and frequently; leave clippings on lawn) reduce weed infestations.
(7) CUT DOWN the tree. Grind out the stump, or clip off re-growth.
(8) GIRDLE tree: cut through the bark and growing layer (cambium) all around the trunk, about 6" above the ground. Girdling is most effective in spring when the sap is rising, and from middle to late summer when the tree is sending down food to the roots. Clip off sucker sprouts.
(9) FRILL: Using a machete, hatchet or similar device, hack scars (several holes in larger trees) downward into the cambium layer, and squirt in glyphosate (or triclopyr if recommended in text above). Follow label directions for Injection and Frill Applications. This is most effective from middle to late summer. Clip off any sucker sprouts or treat with glyphosate.
(10) CUT STEM / CUT STUMP WITH GLYPHOSATE (or triclopyr if specified above). Follow label directions for Cut Stump Application. Clip off sucker sprouts or paint with glyphosate. See Note on Herbicides.
(11) FOLIAR SPRAY WITH GLYPHOSATE herbicide (see Note on Herbicides). Use a backpack or garden sprayer or mist blower, following label directions. Avoid overspray and/or dripping onto non-target plants, because glyphosate kills most plants except moss. If it rolls off waxy or grass-like foliage, use additional sticker-spreader. Deciduous trees, shrubs, and perennials move nutrients down to the roots in late summer. Glyphosate is particularly effective at this time and when plants have just gone out of flowering. Several invasive species retain their foliage after native plants have lost theirs, and resume growth earlier in spring than most natives. This allows you to treat them without harming the natives. However, the plant must be actively growing for the herbicide to work. Retreatments may be necessary the following year if suckering occurs or the plant hasn't been entirely killed.

NOTE ON HERBICIDES: It is highly recommended that small populations try to be controlled using non-chemical methods wherever feasible. However, for large infestations, and for a few plants specified above, herbicide use is essential. Apply herbicides carefully to avoid non-target plants, glyphosate is the least environmentally damaging herbicide in most cases. Add food coloring for visibility, and a soap-based sticker such as Cide-Kick. Glyphosate is ineffective on some plants; for these, triclopyr (Garlon) may be indicated. When using herbicides, read the entire label and observe all precautions listed, including proper disposal. If in doubt, call your local Cooperative Extension Service.

Infiltration Feasibility Report

49 Winkley Pond Road
Barrington, NH
Tax Map 253, Lot 14

Prepared for

Hambone, LLC
242 Central Ave
Dover, NH 03820

Prepared By

Berry Surveying & Engineering
335 Second Crown Point Road
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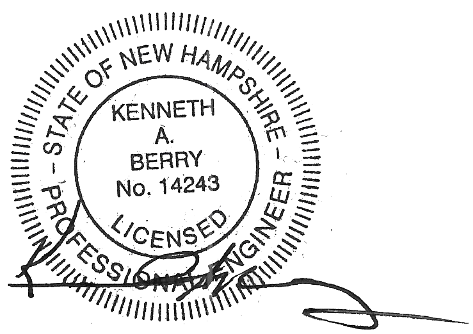


File Number
DB2021-163

August 16, 2023
Revised: November 13, 2023

Table of Contents

1.0 Location of Practices:

The project proposes one location of infiltration for ground water recharge as well as channel flow protection purposes via Infiltration Basin #102.

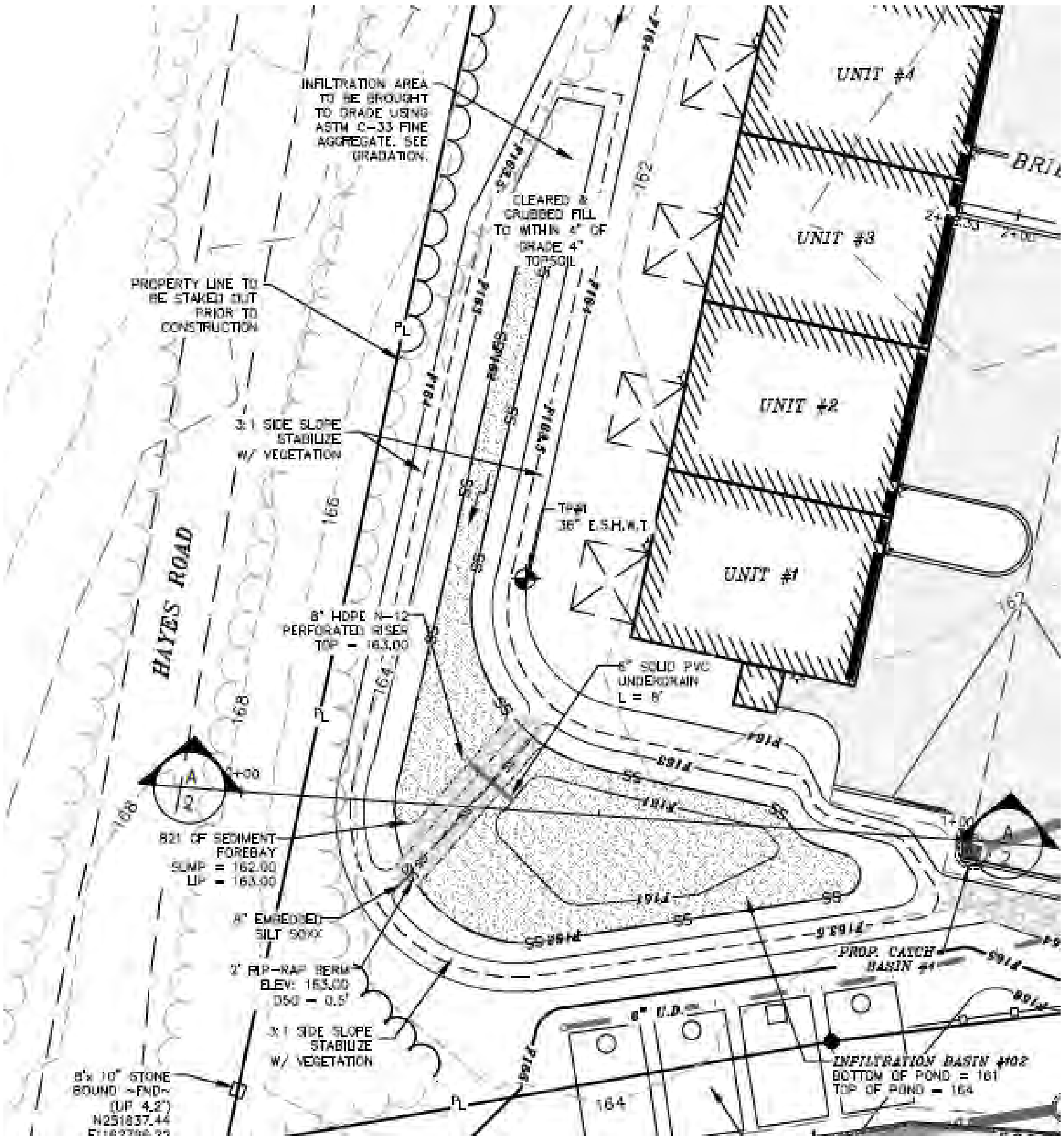
Infiltration Basin #102 (POND 102) – This infiltration basin is on the northeasterly corner of the row of townhouses at the end of the proposed shared driveway. Runoff is collected in a sediment forebay where pre-treatment occurs, before being infiltrated into the ground. This practice infiltrates runoff from residential buildings, grassed area, and collects runoff from uphill of the area of construction.

2.0 Existing Topography at the Location of the Practice

Infiltration Basin #102 (POND #102) – The existing topography within the area is at a 3-8% slope. The area is currently a grassed yard that has been mowed over the years. This land has been used for forestry practices in the past.

3.0 Test Pit Locations

Infiltration Basin #102 (POND 102) – The practice has a surface area of 459 SF at the lowest point. The practice is located over test pit #1. See test pit profiles below. See test pit locations on Sheet P-102, Proposed Infiltration Basin #102 Detail Plan. The test holes were completed in February 2022, (See Site Specific Soil Map Report by John P Hayes III). The soil in the vicinity of this practice is Deerfield (313B), considered to be HSG B soil where the most restrictive published Ksat is 6 inches per hour. This practice was designed using 3 in. / hr.



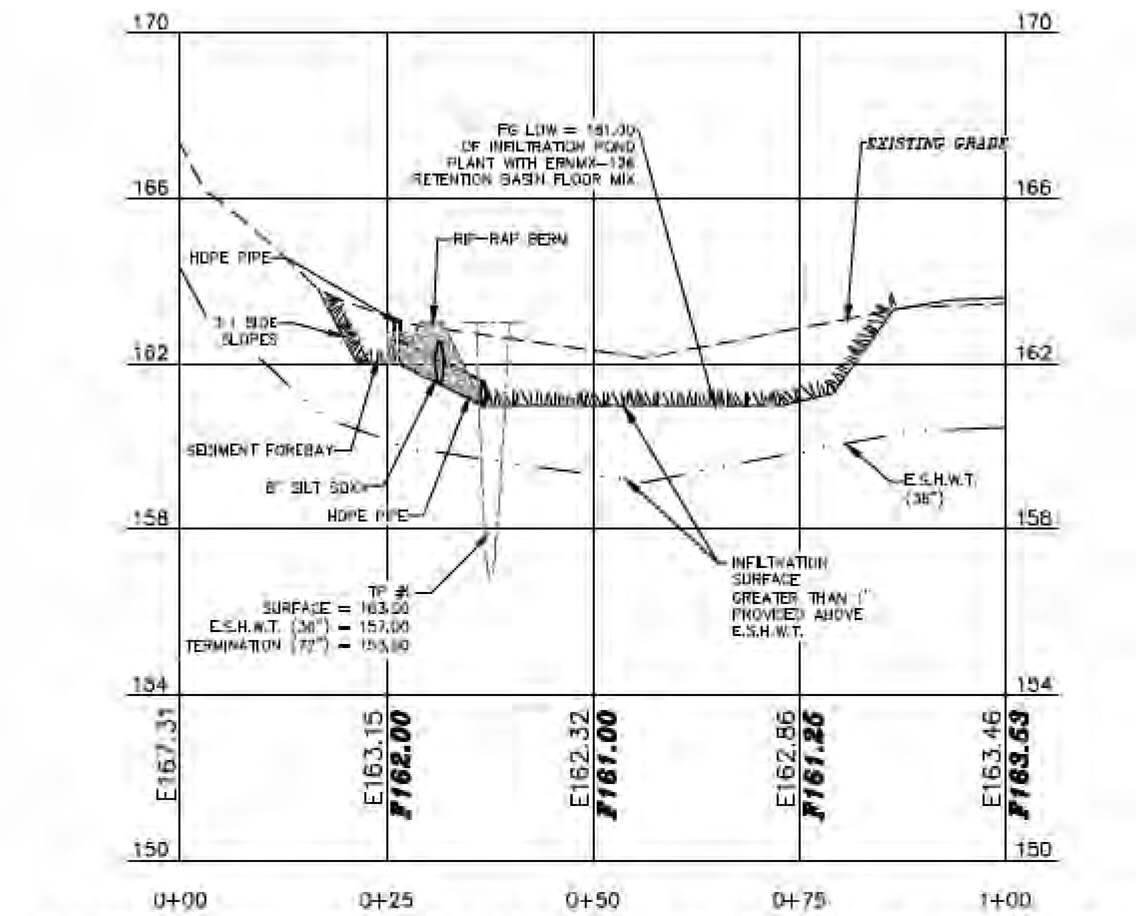
Infiltration Basin #102 (POND 102) – (Reference Sheet P-102)

4.0 Seasonal High Water Table (SHWT) and Bedrock Elevations

TP#103:	Existing Surface Elevation of TP =	163.00’
	SHWT = 36 Inches	160.00’
	Bedrock > 72 Inches	157.00’
	Ground Water = 50 Inches	158.83
	Deepest Elevation of TP =	157.00’

Infiltration Basin #102 (Pond 102):	Inv. Open Water Storage	161.00’

See cross section below.



SECTION OF INFILTRATION POND #102

5.0 Profile descriptions

The following test pit data was collected, see profile below.

TEST PIT #1

0-10” 10YR 3/2 VERY DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE

10-13” 7.5YR 6/1 GRAY, LOAMY SAND, GRANULAR, FRIABLE

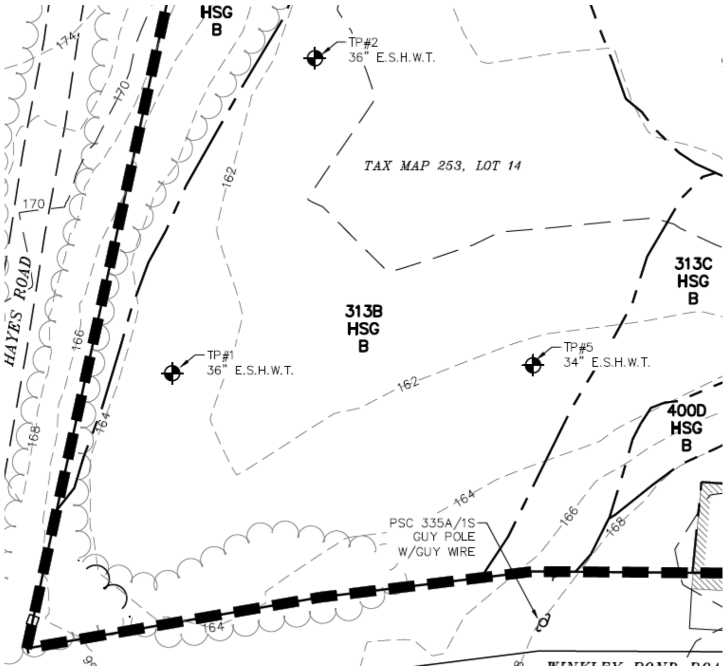
13-18” 5YR 3/3 DARK REDDISH BROWN, LOAMY SAND, GRANULAR, FRIABLE

18-36” 10YR 5/4 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE

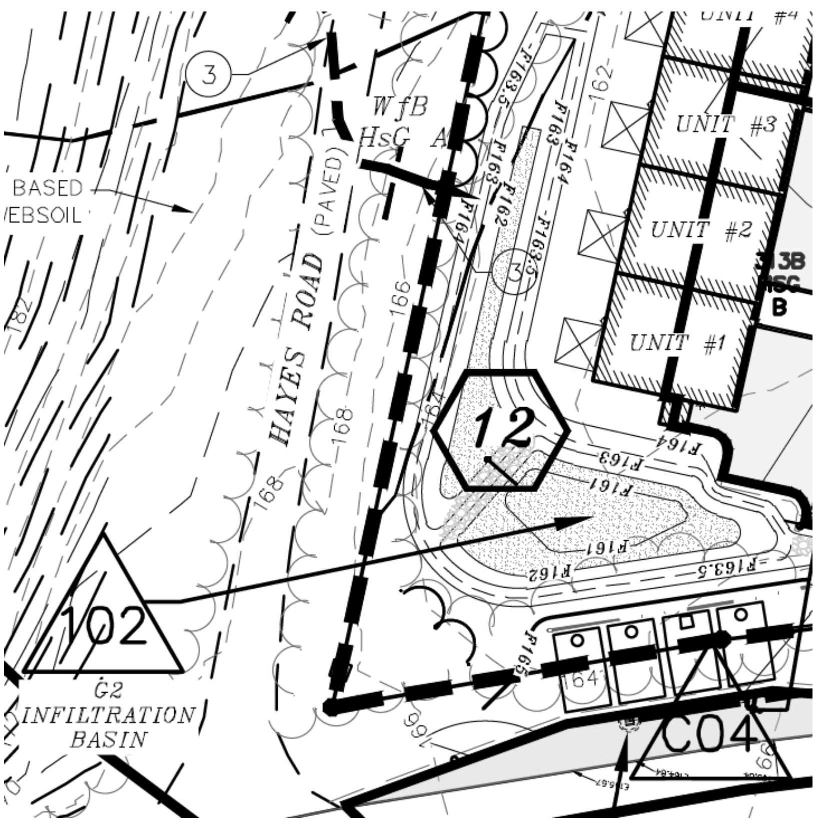
36-72” 10YR 6/2 LIGHT BROWNISH GRAY, FINE SAND WITH REDOX. FEATURES PRESENT, GRANULAR, FRIABLE

E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ NONE
GROUND WATER @ 50"
TERMINATED @ 72"
REFUSAL @ NONE

6.0 Soil Plan in the Area of the Constructed Practice



Infiltration Basin #102 (Pond #102) is located over Deerfield soil. See Test Pit #1.



Infiltration Basin #102 (Pond #102)

7.0 Summary of Infiltration Rate

Infiltration Basin #102 is located in Deerfield (313B), considered to be HSG B, soil area as mapped by Site Specific Soil Survey by John P. Hayes III, CSS, with a documented Ksat of 6 inches per hour. The design exfiltration rate for the infiltration basin is 3 inches per hour.

Amoozemeter testing was not conducted on site and the alternate method of using the USDA / NRCS published values was employed. Reference is made to K Sat Values for New Hampshire Soils (Including Hydrologic and DES Soil Lot Sizing Groups, sponsored by the Society of Soil Scientists of Norther New England, Publication #5 dated September 2009.

Respectfully submitted:

BERRY SURVEYING & ENGINEERING

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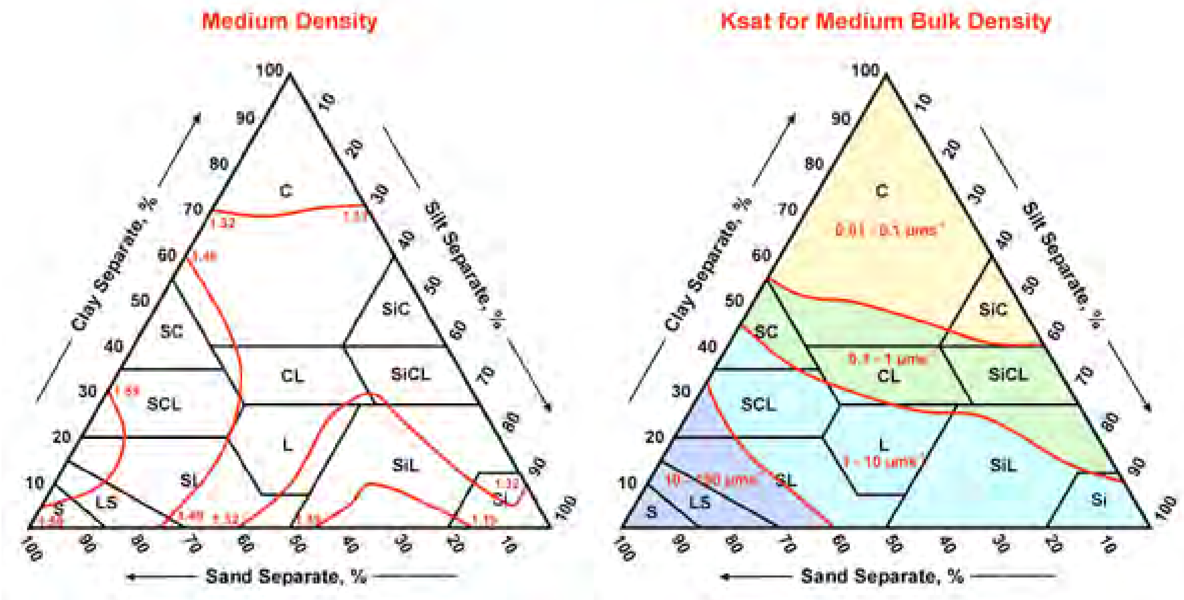
K_{sat} VALUES
FOR
NEW HAMPSHIRE SOILS
(Including Hydrologic and DES Soil Lot Sizing Groups)



From: Guide for Estimating Ksat from Soil Properties (**Exhibit 618-9**). (http://soils.usda.gov/technical/handbook/contents/part618ex.html)

Sponsored by the Society of Soil Scientists of Northern New England
SSSNNE Special Publication No. 5
September, 2009

K_{sat} VALUES
FOR
NEW HAMPSHIRE SOILS

ABOUT THE SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND

The Society of Soil Scientists of Northern New England (SSSNNE) is a non-profit professional organization of soil scientists, both in the private and public sectors, which is dedicated to the advancement of soil science. The Society fosters the profession of soil classification, mapping and interpretation, and encourages the dissemination of information concerning soil science. With the intent of contributing to the general human welfare, the Society seeks to educate the public on the wise use of soils and the associated natural resources.

INTRODUCTION

The publication "K_{sat} Values for New Hampshire Soils" is designed to assist soil scientists, engineers, and other professionals by assembling tables of existing data for all soil series currently on the state soil legend with regard to K_{sat} values and hydrologic groupings (Hyd.Grp.). The need for this information has become more important since the adoption by the New Hampshire Department of Environmental Services of the revised Alteration of Terrain rules for stormwater management. Additional information has been provided for each soil series with regard to landform, temperature regime (Temp.), soil textures, NHDES Soil Lot Size Groupings (Group), whether the soil is a Spodosol (Spodosol?) and other information which will be valuable to a variety of soil information users.

The data for each soil series has been sorted 3 ways for ease of searching:

Table A-Sorted by Numerical Legend
Table B-Sorted by Soil Series Name
Table C-Sorted by NHDES Soil Group for Establishing Lot Size

The report represents cumulative efforts by private soil scientists and NHDES staff with assistance from the USDA Natural Resource Conservation Service.

Comments or inquires on the information in this publication may be directed to the Board of Directors at the following address:

Society of Soil Scientists
of Northern New England
PO Box 76
Durham, NH 03824

SATURATED HYDRAULIC CONDUCTIVITY (K_{SAT})

K_{sat} refers to the ease with which pores in a saturated soil transmit water. The estimates presented here are expressed in terms of inches per hour (NRCS official data presents K_{sat} in both micrometers per second and inches per hour). K_{sat} values are based on soil characteristics observed in the field, particularly structure, consistence, porosity, and texture. (USDA NRCS, Web Soil Survey)

Saturated flow occurs when the soil water pressure is positive; that is, when the soil matric potential is zero (satiated wet condition). In most soils this situation takes place when about 95 percent of the total pore space is filled with water. The remaining 5 percent is filled with entrapped air. Saturated hydraulic conductivity cannot be used to describe water movement under unsaturated conditions. (Soil Survey Manual, 1993)

It is commonly known that soil features (and thus data) for a certain soil series name may be slightly different from one county soil survey to the next and the range in characteristics (via the Typical Pedon) may be slightly different. For example – a Marlow soil (series) in Carroll County may have a higher sand content in its B horizon as opposed to a Marlow soil (series) in Coos County; resulting in a slightly different Ksat range for the B horizon.

The K_{sat} data for this publication was obtained from the USDA-NRCS Soil Data Mart using the Typical Pedon from the county that best reflected the soil and/or had the most acres of that soil. This data is presented in B and C horizons only as it is assumed that the topsoil (A or A_p horizon) will be removed in typical construction practices.

References:

Web Soil Survey. *Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.*

Soil Data Mart. *http://soildatamart.nrcs.usda.gov/*.

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.*

HYDROLOGIC SOIL GROUPS

Hydrologic group is a group of soils having the same runoff potential under similar storm and cover conditions.

Hydrologic groups are used in equations that estimate runoff from rainfall. These estimates are needed for solving hydrologic problems that arise in planning stormwater management, watershed protection, and flood-prevention projects and for planning or designing structures for the use, control, and disposal of water.

Classifications assigned to soils were based on the use of rainfall-runoff data from small watersheds and infiltrometer plots. From these data, relationships between soil properties and hydrologic groups were established. Assignment of soils to hydrologic groups is based on the relationship between soil properties and hydrologic groups. Wetness characteristics, permeability after prolonged wetting, and depth to very slowly permeable layers are properties that assist in estimating hydrologic groups. Minimum annual steady ponded infiltration rate for a bare ground surface determines the hydrologic soil groups.

Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. (The influence of ground cover is treated independently, not in hydrologic soil groups.).

The soils in the United States are placed into four groups, A, B, C, and D, and three dual classes, *A/D, B/D,* and *C/D.* In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

Group A- Saturated hydraulic conductivity is very high or in the upper half of high and internal free water occurrence is very deep. Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group A are as follows. The saturated hydraulic conductivity of all soil layers exceeds 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer are in group A if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 10 micrometers per second (1.42 inches per hour).

Group B- Saturated hydraulic conductivity is in the lower half of high or in the upper half of moderately high and free water occurrence is deep or very deep. Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group B are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] ranges from 10.0 micrometers per second (1.42 inches per hour) to 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer or water table are in group B if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 4.0 micrometers per second (0.57 inches per hour) but is less than 10.0 micrometers per second (1.42 inches per hour).
Group C- Saturated hydraulic conductivity is in the lower half of moderately high or in the upper half of moderately low and internal free water occurrence is deeper than shallow. Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group C are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] is between 1.0 micrometers per second (0.14 inches per hour) and 10.0 micrometers per second (1.42 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a restriction or water table are in group C if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 0.40 micrometers per second (0.06 inches per hour) but is less than 4.0 micrometers per second (0.57 inches per hour). .
Group D- Saturated hydraulic conductivity is below the upper half of moderately low, and/or internal free water occurrence is shallow or very shallow and transitory through permanent. Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential. All soils with a depth to a water impermeable layer less than 50 centimeters [20 inches] and all soils with a water table within 60 centimeters [24 inches] of the surface are in this group, although some may have a dual classification, as described in the next section, if they can be adequately drained. The limits on the physical diagnostic characteristics of group D are as follows. For soils with a water impermeable layer at a depth between 50 centimeters and 100 centimeters [20 and 40 inches], the saturated hydraulic conductivity in the least transmissive soil layer is less than or equal to 1.0 micrometers per second (0.14 inches per hour). For soils that are deeper than 100 centimeters [40 inches] to a restriction or water table, the saturated hydraulic

conductivity of all soil layers within 100 centimeters [40 inches] of the surface is less than or equal to 0.40 micrometers per second (0.06 inches per hour).

Dual hydrologic soil groups-Certain wet soils are placed in group D based solely on the presence of a water table within 60 centimeters [24 inches] of the surface even though the saturated hydraulic conductivity may be favorable for water transmission. If these soils can be adequately drained, then they are assigned to dual hydrologic soil groups *(A/D, B/D,* and *C/D)* based on their saturated hydraulic conductivity and the water table depth when drained. The first letter applies to the drained condition and the second to the undrained condition. For the purpose of hydrologic soil group, adequately drained means that the seasonal high water table is kept at least 60 centimeters [24 inches] below the surface in a soil where it would be higher in a natural state.

References:

National Engineering Handbook, Natural Resource Conservation Service, U.S. Department of Agriculture.

Soil Data Mart. *http://soildatamart.nrcs.usda.gov/*.

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 18.*

TABLE A

NUMERICAL LEGEND

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Madawaska, aquentic	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Ricker	674	2.0	6.0	2.00	6.0	A	4	Organic over bedrock (up to 4" of mineral)	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep

(shaded)	no longer recognized
(stippled)	organic materials

TABLE B

SOIL SERIES

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
ladawaska, aquer	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	oamy over sandy, sandy-skeleta	yes	gravelly loamy sand in C
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Ricker	674	2.0	6.0	2.00	6.0	A	4	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep

no longer recognized
organic materials

TABLE C

NHDES SOIL GROUPINGS

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Adams	36	1	6.0	20.0	20.00	99.0	A	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Caesar	526	1	20.0	100.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	coarse sand	no	
Champlain	35	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	gravelly sand	no	
Colton	22	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Gloucester	11	1	6.0	20.0	6.00	20.0	A	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hermon	55	1	2.0	20.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hoosic	510	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Masardis	23	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Merrimac	10	1	2.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Quonset	310	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Redstone	665	1	2.0	6.0	6.00	20.0	A	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Success	154	1	2.0	6.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	cemented
Suncook	2	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Warwick	210	1	2.0	6.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Windsor	26	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	sandy	no	
Abenaki	501	2	0.6	2.0	6.00	99.0	B	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Agawam	24	2	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	2	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Bangor	572	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Berkshire	72	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bice	226	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	no	sandy loam
Canton	42	2	2.0	6.0	6.00	20.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Charlton	62	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Dutchess	366	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Fryeburg	208	2	0.6	2.0	2.00	6.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Groveton	27	2	0.6	2.0	0.60	6.0	B	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	2	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	2	0.6	2.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Houghtonville	795	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Lombard	259	2	0.6	6.0	2.00	20.0	C/D	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Monadnock	142	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	oamy over sandy, sandy-skeleta	yes	gravelly loamy sand in C
Occum	1	2	0.6	2.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Salmon	630	2	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Stetson	523	2	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Unadilla	30	2	0.6	2.0	2.00	20.0	B	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Chichester	442	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Acton	146	3	2.0	20.0	2.00	20.0	B	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Becket	56	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	3	0.6	2.0	0.06	2.0	B	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bernardston	330	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Boxford	32	3	0.1	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	silty clay loam

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Buckland	237	3	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Buxton	232	3	0.1	0.6	0.00	0.2	C	Silt and Clay Deposits	frigid	fine	no	silty clay
Canterbury	166	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Chatfield Var.	289	3	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Colonel	927	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Croghan	613	3	20.0	100.0	20.00	100.0	B	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	3	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	3	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Eldridge	38	3	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elmridge	238	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116	3					C	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Gilmanton	478	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Henniker	46	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hitchcock	130	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Howland	566	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Lanesboro	228	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Lovewell	307	3	0.6	2.0	0.60	2.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Machias	520	3	2.0	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Madawaska	28	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Madawaska, aquer	48	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Melrose	37	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Metacomet	458	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	3	6.0	100.0	6.00	100.0	B	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39	3					C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Montauk	44	3	0.6	6.0	0.06	0.6	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Mundal	610	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Newfields	444	3	0.6	2.0	0.60	2.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	3	0.6	2.0	0.60	2.0	C	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	3	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Paxton	66	3	0.6	2.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Peru	78	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	
Pittstown	334	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	3	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Poocham	230	3	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Scio	531	3	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scituate	448	3	0.6	2.0	0.06	0.2	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Sheepscot	14	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Sudbury	118	3	2.0	6.0	2.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Suffield	536	3	0.6	2.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Surplus	669	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	3	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	
Telos	123	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Waumbeck	58	3	2.0	20.0	6.00	20.0	B	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Winooski	103	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Woodbridge	29	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Winooski	9	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Canaan	663	4	2.0	20.0	2.00	20.0	C	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Cardigan	357	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Chatfield	89	4	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Elliottsville	128	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Glebe	671	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Glover	NA	4	0.6	2.0	0.60	2	D	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Hogback	91	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	4	0.6	6.0	0.60	6.0	C/D	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Kearsarge	359	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Lyman	92	4	2.0	6.0	2.00	6.0	A/D	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Macomber	252	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Millsite	251	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monson	133	4	0.6	2.0	0.60	2.0	D	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Pennichuck	460	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Rawsonville	98	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Ricker	674	4	2.0	6.0	2.00	6.0	A	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Saddleback	673	4	0.6	2.0	0.60	2.0	C/D	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Shapleigh	136	4					C/D	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Thorndike	84	4	0.6	2.0	0.60	2.0	C/D	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Tunbridge	99	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Winnecook	88	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Woodstock	93	4	2.0	6.0	2.00	6.0	C/D	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Au Gres	516	5					B	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bemis	224	5	0.6	0.2	0.00	0.2	C	Firm, platy, loamy till	cryic	loamy	no	
Binghamville	534	5	0.2	2.0	0.06	0.2	D	Terraces and glacial lake plains	mesic	silty	no	
Brayton	240	5	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Cabot	589	5	0.6	2.0	0.06	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Charles	209	5	0.6	100.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	silty	no	
Cohas	505	5	0.6	2.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Grange	433	5	0.6	2.0	0.60	2.0	C	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Kinsman	614	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Leicester	514	5	0.6	6.0	0.60	20.0	C	Loose till, loamy textures	mesic	loamy	no	
Lim	3	5	0.6	2.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	5	0.6	2.0	0.60	2.0	C	Flood Plain (Bottom Land)	mesic	silty	no	
Lyme	246	5	0.6	6.0	0.60	6.0	C	Loose till, sandy textures	frigid	loamy	no	
Mashpee	315	5	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	yes	
Monarda	569	5	0.2	2.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Moosilauke	414	5	6.0	20.0	6.00	20.0	C	Loose till, sandy textures	frigid	sandy	no	
Naumburg	214	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Pemi	633	5	0.6	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	5	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314	5					B	Outwash and Stream Terraces	mesic	sandy	yes	
Raynham	533	5	0.2	2.0	0.06	0.2	C	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	5	0.6	2.0	6.00	100.0	D	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Ridgebury	656	5	0.6	6.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	5	0.2	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	frigid	loamy	no	

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Saugatuck	16	5	0.06	0.2	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	5	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	
Scitico	33	5	0.0	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	
Shaker	439	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Squamscott	538	5	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stissing	340	5	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Swanton	438	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Walpole	546	5	2.0	6.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Biddeford	234	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	organic over clay
Bucksport	895	6					D	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	6	0.2	6.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Catden	296	6					A/D	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Chocorua	395	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Greenwood	295	6					A/D	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Ipswich	397	6					D	Tidal Flat	mesic	hemic/sapric	no	deep organic
Matunuck	797	6			20.00	100.0	D	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	6	0.6	2.0	0.60	2.0	D	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Natchaug	496	6			0.20	2.0	D	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Ossipee	495	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497	6			20.00	100.0	D	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Peacham	549	6	0.6	2.0	0.00	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over loam
Pondicherry	992	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Saco	6	6	0.6	2.0	6.00	20.0	D	Flood Plain (Bottom Land)	mesic	silty	no	strata
Scarboro	115	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Searsport	15	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Timakwa	393	6			6.00	100.0	D	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Vassalboro	150	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waskish	195	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Westbrook	597	6			0.00	2.0	D	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	6	0.0	0.2	0.00	0.2	D	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Wonsqueak	995	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam

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Filtrexx® Sediment Control

Sediment & Perimeter Control Technology

PURPOSE & DESCRIPTION

Filtrexx® Sediment control is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for **perimeter control** of sediment and other soluble pollutants (such as phosphorus and petroleum hydrocarbons), on and around construction activities.

APPLICATION

Filtrexx® Sediment control is to be installed down slope of any disturbed area requiring erosion and sediment control and filtration of soluble pollutants from runoff. Sediment control is effective when installed perpendicular to sheet or low concentrated flow. Acceptable applications include:

- Site perimeters
- Above and below disturbed areas subject to sheet runoff, interrill and rill erosion
- Above and below exposed and erodable slopes
- Around area drains or inlets located in a 'sump'
- On compacted soils where trenching of silt fence is difficult or impossible
- Around sensitive trees where trenching of silt fence is not beneficial for tree survival or may unnecessarily disturb established vegetation.
- On frozen ground where trenching of silt fence is impossible.
- On paved surfaces where trenching of silt fence is impossible.

INSTALLATION

1. Sediment control used for perimeter control of sediment and soluble pollutants in storm runoff shall meet Filtrexx® Soxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
2. Contractor is required to be Filtrexx® Certified™, or use pre-filled Filtrexx® Sediment control products manufactured by a Filtrexx® Certified Manufacturer™ as determined by Filtrexx® International, LLC (440-926-2607 or visit www.filtrexx.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application. Look for the Filtrexx® Certified™ Seal.
3. Sediment control will be placed at locations indicated on plans as directed by the Engineer.
4. Sediment control should be installed parallel to the base of the slope or other disturbed area. In extreme conditions (i.e., 2:1 slopes), a second Sediment control shall be constructed at the top of the slope.
5. Effective Soxx™ height in the field should be as follows: 8" Diameter Sediment control = 6.5" high, 12" Diameter Sediment control = 9.5" high, 18" Diameter SiltSoxx™ = 14.5" high, 24" Diameter Sediment control = 19" high.
6. Stakes shall be installed through the middle of the Sediment control on 10 ft (3m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) hard wood stakes. In the event staking is not possible, i.e., when Sediment control is used on pavement, heavy concrete blocks shall be used behind the Sediment control to help stabilize during rainfall/runoff events.
7. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.
8. Loose compost may be backfilled along the upslope side of the Sediment control, filling the seam between the soil surface and the device, improving filtration and sediment retention.
9. If the Sediment control is to be left as a permanent filter or part of the natural landscape, it may be seeded at time of installation for

establishment of permanent vegetation. The Engineer will specify seed requirements.

10. Filtrexx® Sediment control is not to be used in perennial, ephemeral, or intermittent streams.

See design drawing schematic for correct Filtrexx® Sediment control installation (Figure 1.1).

INSPECTION AND MAINTENANCE

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Sediment control should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Sediment control may be required to reduce effective slope length or sediment removal may be necessary. Sediment control shall be inspected until area above has been permanently stabilized and construction activity has ceased

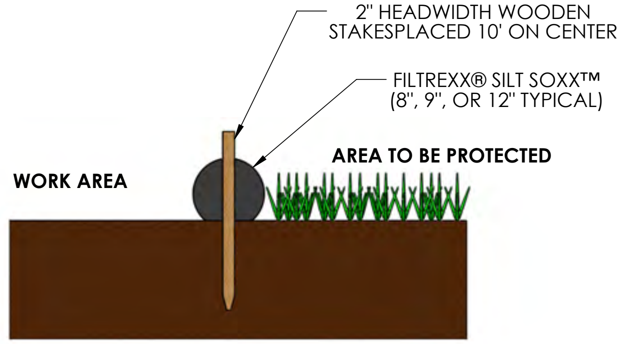
1. The Contractor shall maintain the Sediment control in a functional condition at all times and it shall be routinely inspected.
2. If the Sediment control has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the Sediment control when accumulation has reached 1/2 of the effective height of the Sediment control, or as directed by the Engineer. Alternatively, a new Sediment control can be placed on top of and slightly behind the original one creating more sediment storage capacity without soil disturbance.
4. Sediment control shall be maintained until disturbed area above the device has been permanently stabilized and construction activity has ceased.
5. The FilterMedia™ will be dispersed on site once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.
6. For long-term sediment and pollution control applications, Sediment control can be seeded at the time of installation to create a vegetative filtering system for prolonged and increased filtration of sediment and soluble pollutants (contained vegetative filter strip). The appropriate seed mix shall be determined by the Engineer.

Slope Percent	Maximum Slope Length Above Sediment Control in Feet (meters)*				
	8 in (200 mm) Sediment control	12 in (300 mm) Sediment control	18 in (450 mm) Sediment control	24 in (600mm) Sediment control	32 in (800mm) Sediment control
	6.5 in (160 mm)**	9.5 in (240 mm) **	14.5 in (360 mm) **	19 in (480 mm) **	26 in (650 mm) **
2 (or less)	600 (180)	750 (225)	1000 (300)	1300 (400)	1650 (500)
5	400 (120)	500 (150)	550 (165)	650 (200)	750 (225)
10	200 (60)	250 (75)	300 (90)	400 (120)	500 (150)
15	140 (40)	170 (50)	200 (60)	325 (100)	450 (140)
20	100 (30)	125 (38)	140 (42)	260 (80)	400 (120)
25	80 (24)	100 (30)	110 (33)	200 (60)	275 (85)
30	60 (18)	75 (23)	90 (27)	130 (40)	200 (60)
35	60 (18)	75 (23)	80 (24)	115 (35)	150 (45)
40	60 (18)	75 (23)	80 (24)	100 (30)	125 (38)
45	40 (12)	50 (15)	60 (18)	80 (24)	100 (30)
50	40 (12)	50 (15)	55 (17)	65 (20)	75 (23)

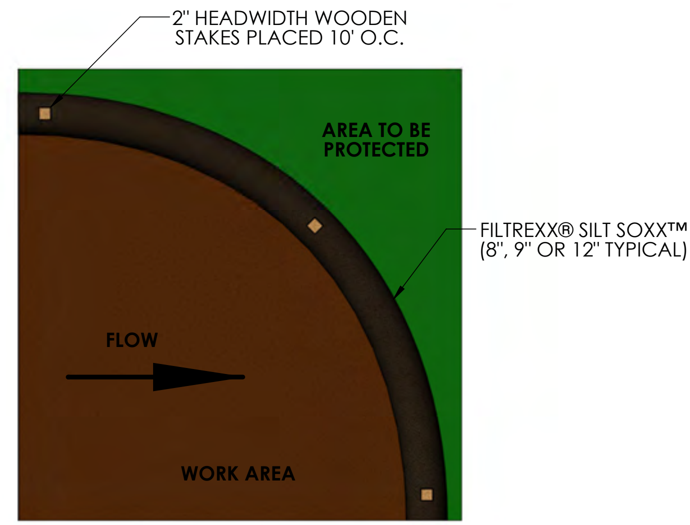
* Based on a failure point of 36 in (0.9 m) super silt fence (wire reinforced) at 1000 ft (303 m) of slope, watershed width equivalent to receiving length of sediment control device, 1 in/ 24 hr (25 mm/24 hr) rain event.

** Effective height of Sediment control after installation and with constant head from runoff as determined by Ohio State University.

FILTREXX® SILT SOXX™

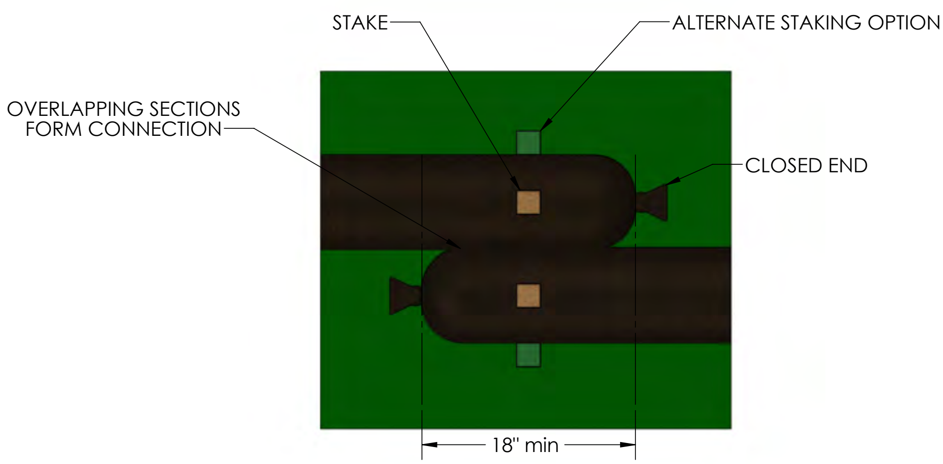


SECTION VIEW

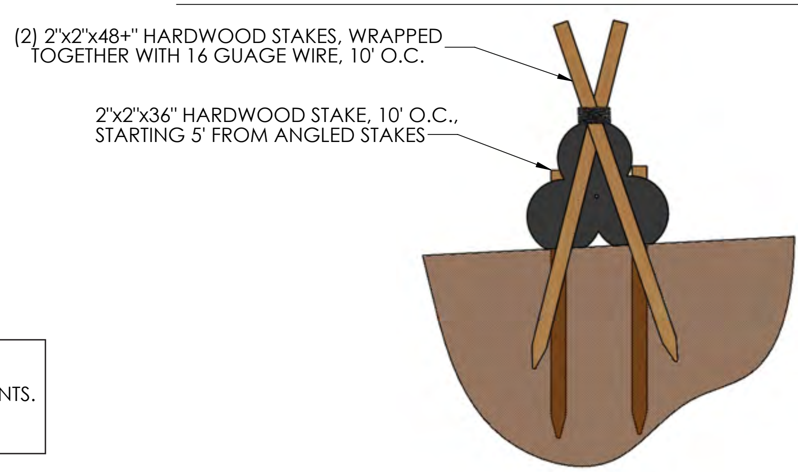


TOP VIEW

COMPOST SOCK CONNECTION/ATTACHMENT DETAIL



FILTREXX® PYRAMID STAKING DETAIL



NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. SILT SOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

Section 1: Erosion & Sediment Control – Construction Activities

SWPPP Cut Sheet:

Filtrexx® Inlet Protection

Sediment & Perimeter Control Technology

PURPOSE & DESCRIPTION

Filtrexx® Inlet protection is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for storm drain **inlet protection** of sediment and soluble pollutants (such as phosphorus and petroleum hydrocarbons) on and around construction activities.

APPLICATION

Drain inlets are located in areas that receive runoff from surrounding lands, often exposed and disturbed soils, and are located at a low point, or in a sump. Inlet protection used around drain inlets (or *Drain* Inlet protection) should completely enclose the circumference of the drain and where possible should not be placed on a grade or slope. Inlet protection used around drain inlets should never be the only form of site sediment control and should be accompanied by erosion control/slope stabilization practices, such as Slope protection or rolled erosion control blankets (RECB). Inlet protection should never be placed where they divert runoff flow from the drain inlet, or on top of the inlet, which can cause flooding. Under high runoff and sediment loading conditions placement of 1-2 in (25-50 mm) diameter rock (AASHTO #2) may be placed around the outer circumference of the Inlet protection up to ½ the height of the Inlet protection. This will slow runoff velocity as it contacts the Inlet protection and will reduce sediment build-up and clogging of the Inlet protection.

Curb inlets are generally located on paved surfaces and are designed to rapidly drain storm runoff from roadways to prevent flooding that poses a hazard to vehicular traffic. Inlet protection devices should be placed in a manner which intercepts runoff prior to entering the inlet, but does not block or divert runoff from the inlet. To prevent diversion of runoff, Inlet protection used around curbs (or *Curb* Inlet protection) should be used in low points, or sumps, and minor slopes or grades. Inlet protection should never be placed in or on the curb inlet drain, or placed in a manner than obstructs vehicular traffic. Inlet protection height should be at least 1 in (25 mm) lower than top of curb inlet to allow for overflow into the drain and not over the curb. Maximum sediment removal efficiency occurs when minor ponding exists behind Inlet protection but should never lead to flooding.

Curb sediment containment systems are used to reduce the sediment and pollutant load flowing to a curb inlet. They are generally placed on paved surfaces perpendicular to runoff flow and should be lower than the height of the curb. Curb sediment containment systems should never cause flooding or placed where they are a hazard to vehicular traffic. Inlet protection used for curb sediment containment (or *Curb Sediment Containment* Inlet protection) can be placed on a grade but should never be placed directly upslope from curb inlet where it may inadvertently divert runoff from entering curb inlet.

INSTALLATION

1. Inlet protection used for inlet protection to reduce sediment and soluble pollutants entering storm drains shall meet Filtrexx® FilterSoxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
2. Contractor is required to be a Filtrexx® Certified™ Installer as determined by Filtrexx® International, LLC (440-926-2607 or visit web site at Filtrexx.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application (current list of installers can be found at www.filtrexx.com). Look for the Filtrexx® Certified™ Installer Seal.

3. Filtrexx® Inlet protection shall be placed at locations indicated on plans as directed by the Engineer. Inlet protection should be installed in a pattern that allows complete protection of the inlet area.
4. Installation of curb Inlet protection will ensure a minimal overlap of at least 1 ft (300mm) on either side of the opening being protected. The Inlet protection will be anchored to the soil behind the curb using staples, stakes or other devices capable of holding the Inlet protection in place.
5. Standard Inlet protection for curb inlet protection and curb sediment containment will use 8 in (200mm) diameter Inlet protection, and drain inlets on soil will use 12 in (300mm) or 18 in (450mm) diameter Inlet protection. In severe flow situations, larger Inlet protection may be specified by the Engineer. During curb installation, Inlet protection shall be compacted to be slightly shorter than curb height.
6. If Inlet protection becomes clogged with debris and sediment, they shall be maintained so as to assure proper drainage and water flow into the storm drain. In severe storm events, overflow of the Inlet protection may be acceptable in order to keep the area from flooding.
7. Curb and drain Inlet protection shall be positioned so as to provide a permeable physical barrier to the drain itself, allowing sediment to collect on the outside of the Inlet protection.
8. For drains and inlets that have only curb cuts, without street grates, a spacer is required in order to keep the Inlet protection away from the drain opening. This spacer should be a hog wire screen bent to overlap the grate opening and keep the sock from falling into the opening. Use at least one spacer for every 4 ft (1.2m) of curb drain opening. The wire grid also prevents other floatable waste from passing over the Inlet protection.
9. Stakes shall be installed through the middle of the drain Inlet protection on 5 ft (1.5m) centers, using 2 in (50mm) x 2 in (50mm) x 3 ft (1m) wood stakes.
10. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.

INSPECTION AND MAINTENANCE

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Inlet protection should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Inlet protection may be required or sediment removal may be necessary. Inlet protection shall be inspected until contributing drainage area has been permanently stabilized and construction activity has ceased

1. The Contractor shall maintain the Inlet protection in a functional condition at all times and it shall be routinely inspected.
2. If the Inlet protection has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the Inlet protection when accumulation has reached 1/2 of the effective height of the Inlet protection, or as directed by the Engineer. Alternatively, for drain Inlet protection a new Soxx™ may be placed on top of the original increasing the sediment storage capacity without soil disturbance.
4. Inlet protection shall be maintained until disturbed area above or around the device has been permanently stabilized and construction activity has ceased.
5. Regular maintenance includes lifting the Inlet protection and cleaning around and under them as sediment collects.
6. The FilterMedia™ will be removed from paved areas or dispersed on site soil or behind curb once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.

Table 2.4 Spacing for Curb Sediment Containment Systems.

Grade (%)	Spacing (ft)	Spacing (mm)
0.5	100	30
1.0	50	15
2.0	25	8
3.0	16	5
4.0	13	4
5.0	10	3

Source: Fifield, 2001.

Figure 2.1. Engineering Design Drawing for Curb and Drain Inlet Protection

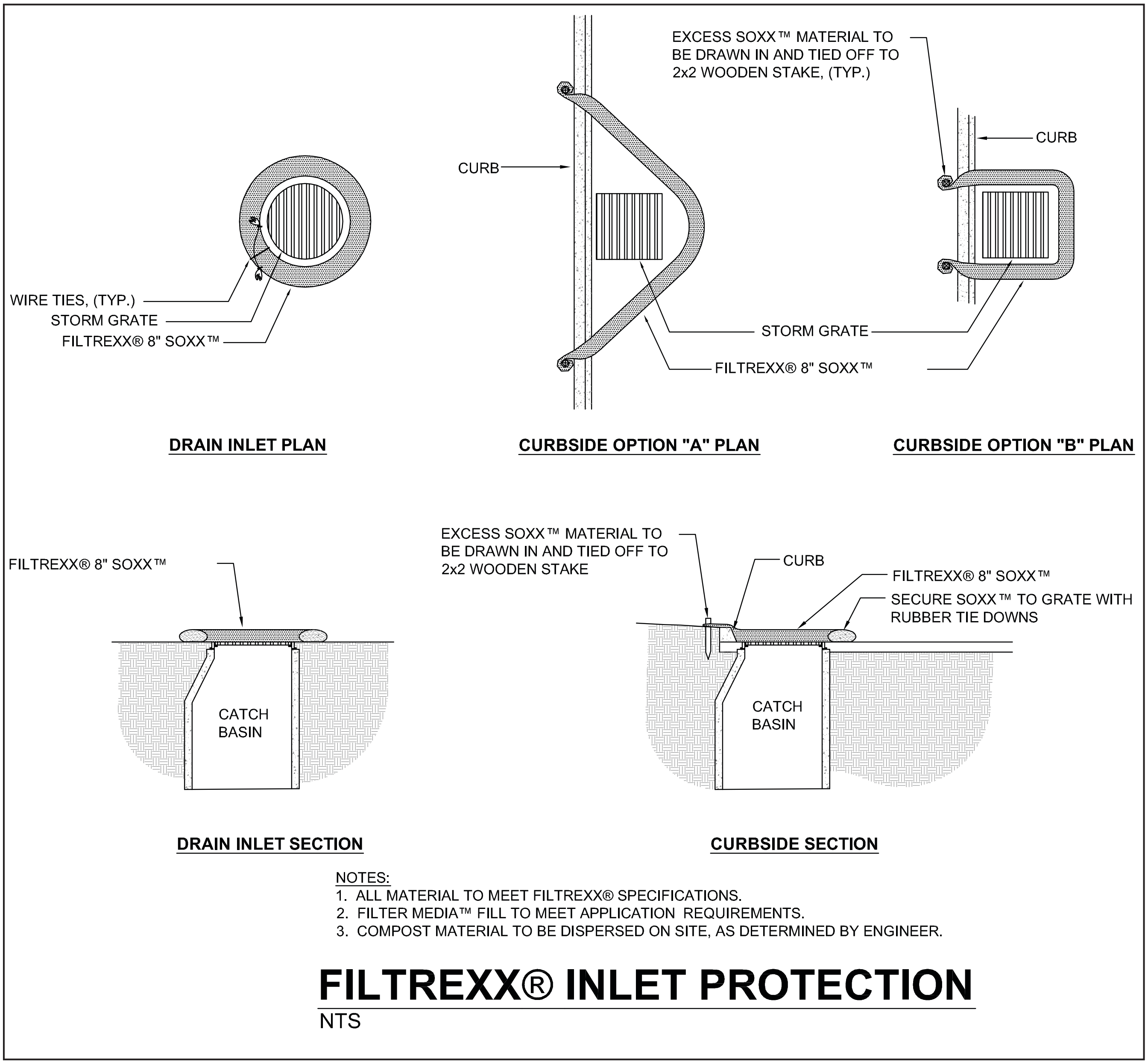
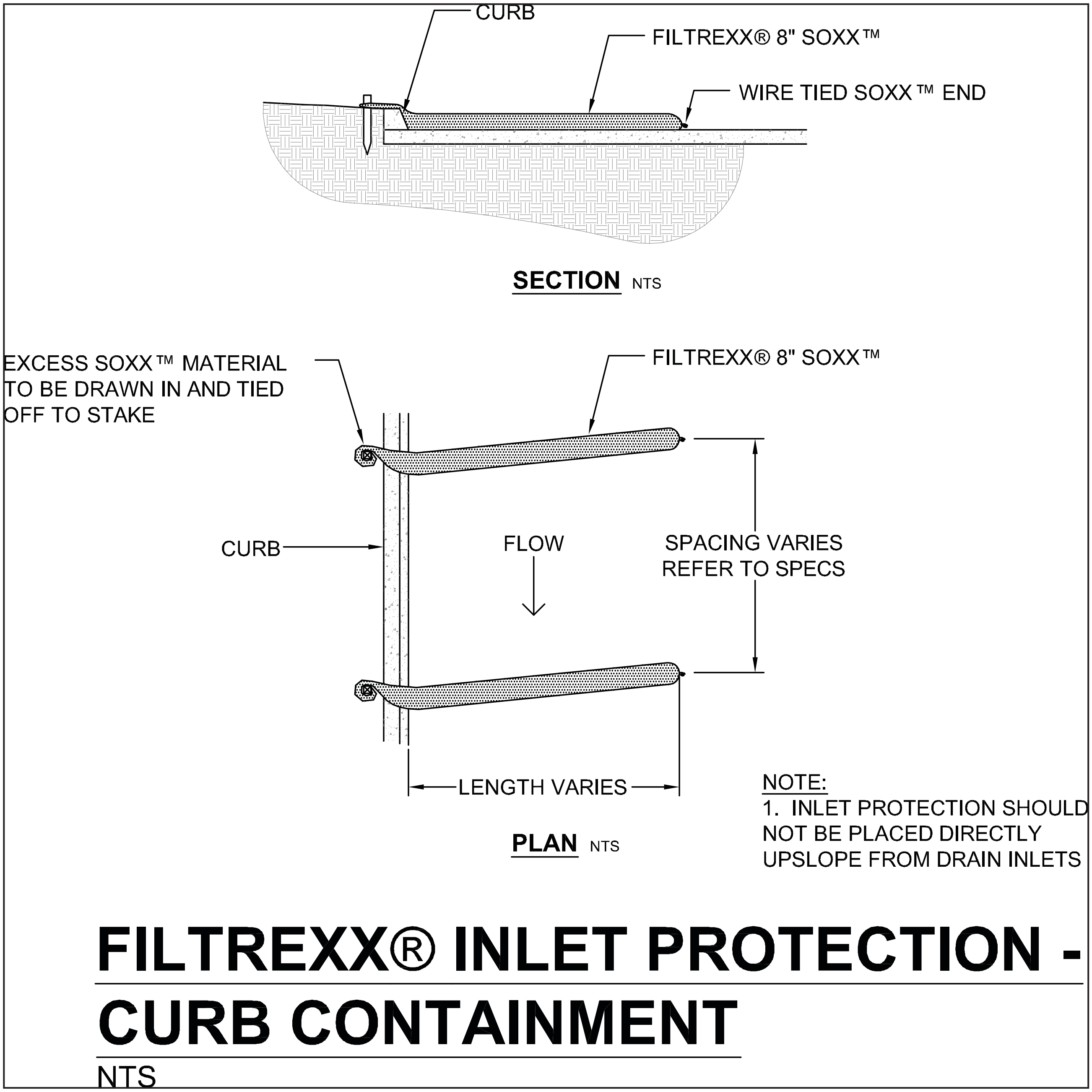


Figure 2.2. Engineering Design Drawing for Curb Sediment Containment Inlet Protection



Pavement Temp. (°F) and Trend (↑ ↓)	Weather Condition	Maintenance Actions	Application Rate (lbs/per 1000 sq.ft.)			
			Salt Prewetted/Pretreated with salt brine	Salt Prewetted/Pretreated with other blends	Dry salt	Winter sand
>30 ↑	Snow	Plow, treat intersections only				Not recommended
	Frz. Rain	Apply chemical				Not recommended
30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
20 - 25 ↑	Snow or frz. Rain	Plow and Apply chemical				3.25 for frz. Rain
20 - 25 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↓	Snow or Frz. Rain	Plow and apply chemical				3.25 for frz. Rain
0 to 15 ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed
< 0	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed

Table 19. Application Rates for Deicing

These rates & table format are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.

EROSION AND SEDIMENT CONTROL NOTES:

1.) OWNER: HAMBONE LLC
242 CENTRAL AVEUNE
DOVER, NH 03820

2.) APPLICANT: HAMBONE LLC
242 CENTRAL AVEUNE
DOVER, NH 03820

3.) LOT AREA: 586,793 Sq. Ft., 13.47 Ac.
330,912 Sq.Ft., 7.60 Ac., TOTAL UPLAND

4.) S.C.R.D. BOOK 4976, PAGE 1023

5.) EROSION AND SEDIMENT CONTROL INSPECTIONS TO BE CONDUCTED ONCE PER EVERY SEVEN DAYS AND AT AN INCREASED FREQUENCY INCLUDING WITHIN 24-HOURS OF A 0.25 INCH RAIN EVENT. INSPECTIONS TO BE CONDUCTED BY A "QUALIFIED PERSON" AS DEFINED BY EPA CGP 4.1.1 AND INSPECTION REPORTS SUBMITTED TO THE TOWN OF BARRINGTON, PLANNING DEPARTMENT WITHIN 24 HOURS IN ACCORDANCE WITH CGP 4.1.7 AND MAINTAINED BY THE OWNER FOR A PERIOD OF THREE YEARS AFTER THE PROJECT IS COMPLETED.

6.) PER EPA CGP Z.1.2.2 (INSTALL PERIMETER CONTROL), "YOU MUST INSTALL SEDIMENT CONTROLS ALONG THOSE PERIMETER AREAS OF YOUR SITE THAT WILL RECEIVE STORMWATER FROM EARTH DISTURBING ACTIVITIES." AS A RESULT OF SWPPP INSPECTIONS, THE CONTRACTOR MAY HAVE TO EXPAND PERIMETER CONTROLS TO MEET THIS REQUIREMENT. THE E&SC PLAN IS INITIAL GUIDANCE AS TO THE ANTICIPATED REQUIREMENTS AND IT THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT STORMWATER VIOLATION DO NOT OCCUR

7.) CONTRACTOR IS REQUIRED TO HAVE A CONSTRUCTION ENTRANCE.

8.) CONTRACTOR IS RESPONSIBLE FOR SWEEPING THE DRIVEWAY TO ENSURE THAT NO SEDIMENT IS BEING TRACKED ONTO WINKLEY POND ROAD.

9.) CONTRACTOR IS RESPONSIBLE FOR CLEANING AND MAINTAINING THE INLET PROTECTION ONCE INSTALLED.

10.) FUGITIVE DUST IS TO BE CONTROLLED THROUGHOUT THE CONSTRUCTION PROCESS IN ACCORDANCE WITH ENV-A 1000.

11.) CONTRACTOR IS TO MEET THE REQUIREMENTS SPECIFIED IN RSA 430:51-57 AND AGR 3800, RELATING TO INVASIVE SPECIES.

12.) CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE WATER QUALITY FROM ANY RUN OFF DURING THE CONSTRUCTION PROCESS, IN ACCORDANCE WITH ENV-WQ 1507, IN ORDER TO PREVENT VIOLATIONS OF THE STORM WATER QUALITY STANDARDS.

13.) CONTRACTOR CAN USE SILT FENCE, SILT SOXX OR MULCH BERM FOR PERIMETER CONTROL. SPECIFIC PRACTICES MAY BE SPECIFIED, SEE PLAN. SILT FENCE OR SILT SOXX REQUIRED WHEN UPGRADIENT DISTURBED SOIL IS GREATER THAN 5%. MULCH BERM CAN BE USED WHEN THE UPGRADIENT DISTURBED SOIL IS 5% OR LESS.

STABILIZATION NOTE:
SEE NOTE #6, SHEET E-102, DETAIL E-18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

LEGEND:

- STONE BOUND ~FND~
- UTILITY POLE/GUY WIRE
- TEST PIT
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- STREAM
- POORLY DRAINED JURISDICTIONAL WETLAND
- VERY POORLY DRAINED JURISDICTIONAL WETLAND
- WETLAND BUFFER
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- BUILDING SETBACK LINE
- WELL RADIUS
- TREELINE
- ROAD CENTERLINE
- SHOULDER
- PAVEMENT SEAM
- D — DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
- U.D — UNDERDRAIN
- GUARD RAIL
- RIP RAP
- STORMWATER BEST MANAGEMENT PRACTICE (BMP)
- DRAIN MANHOLE W/STRUCTURE
- CATCH BASIN W/ STRUCTURE
- STORMWATER BMP OUTLET STRUCTURE
- SF — SILT FENCE / EROSION MIX BERM
- SS — FILTREXX 8" - 12" SILT SOXX AS SPECIFIED
- P/C — PERIMETER CONTROL
- C — CONSTRUCTION FENCE
- (B) STORMWATER BMP PROTECTION
- (P) PERIMETER CONTROL
- (C) RESIDENTIAL/ROADWAY CONSTRUCTION
- POORLY DRAINED JURISDICTIONAL WETLAND HATCH
- VERY POORLY DRAINED JURISDICTIONAL WETLAND HATCH

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

SOILS & DEWATERING:

313	*DEEREFIELD*	*LOAMY SAND K= 0.17*
400	*UDORTHENTS (DEERFIELD DERIVED)*	*LOAMY SAND K= 0.17*
915	*DEEREFIELD VARIANT*	*LOAMY SAND K= 0.17*

SEE SITE SPECIFIC SOILS MAP (SSSM)
SEE WEBSOIL USDA-NRCS
ERODIBILITY FACTOR - K, CPESC MANUAL, ENVIROCERT INTERNATIONAL INC. & ROCKINGHAM COUNTTY SOIL SURVEY, ROCKWEB SOIL ATTRIBUTES.

CONTRACTOR TO BE AWARE OF THE SOIL PROFILES AND ENSURE THAT PROPER EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE TAKEN AT ALL TIMES. ANY DEWATERING REQUIREMENTS IN NEW HAMPSHIRE REQUIRE SPECIAL PROVISIONS IN ACCORDANCE WITH THE "CLARIFICATION OF SECTION 9.1.2 (STATE OF NEW HAMPSHIRE CONDITIONS) AND OTHER NH SPECIFIC INFORMATION FOR THE U.S. EPA 2012 NPDES CONSTRUCTION GENERAL PERMIT (CGP)" DATED MAY 3, 2012 INCLUDED IN THE SWPPP.

COVER MANAGEMENT DURING CONSTRUCTION FOR EXPOSED SOIL WILL INCLUDE HAY / STRAW APPLIED AT A RATE OF 2.0 TONS PER ACRE, TEMPORARY SEEDING OF ANNUAL RYE GRASS, AND PERMANENT SEEDING AT THE EARLIES OPPORTUNITY. SEE ADDITIONAL REQUIREMENT FOR STABILIZATION ON THE EROSION AND SEDIMENT CONTROL DETAIL SHEETS, E-101 AND E-102.

THE CONSTRUCTION SCHEDULE WILL BE MANAGED SO THAT ALL STORMWATER STRUCTURES WILL BE BUILT AND STABILIZED PRIOR TO RECEIVING SURFACE WATER RUNOFF. CONTRACTOR TO BE RESPONSIBLE FOR ALL DIVERSIONS DURING CONSTRUCTION AND FOR INTERIM SEDIMENT AND EROSION CONTROL MEASURES.

FOR PLANNING BOARD APPROVAL PURPOSES:

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

REVISION	DATE	DESCRIPTION
#1	11-8-23	REVISED PER CMA ENGINEERS REVIEW

EROSION AND SEDIMENT CONTROL PLAN
LAND OF
HAMBONE LLC
49 WINKLEY POND ROAD
BARRINGTON, N.H.
TAX MAP 253, LOT 14

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : AUGUST 16, 2023
FILE NO. : DB 2021-163

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION