DRAINAGE ANALYSIS
&
EROSION AND SEDIMENT CONTROL PLAN

Prepared for:

TSB Construction, LLC
44 Merryfield Lane
EAST HAMPSTEAD, NH 03826

Land of

TSB Construction, LLC
44 Merryfield Lane
EAST HAMPSTEAD, NH 03826

NH ROUTE 9, BARRINGTON, NH
TAX MAP 234, LOT 25-1

Prepared by:

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335 Second Crown Point Road
Barrington, NH 03825

Project Number:
DB 2022-051

January 18, 2023
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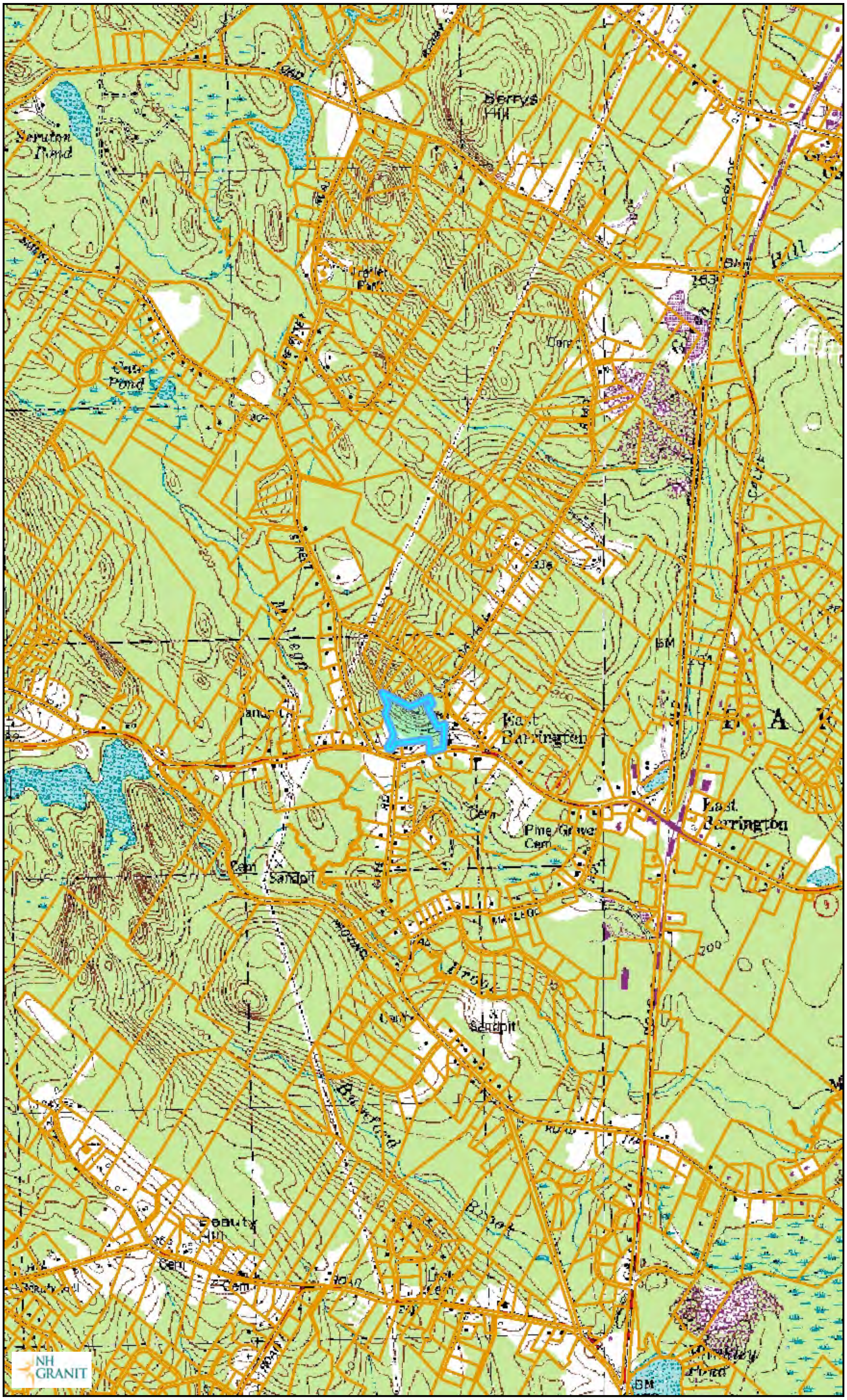

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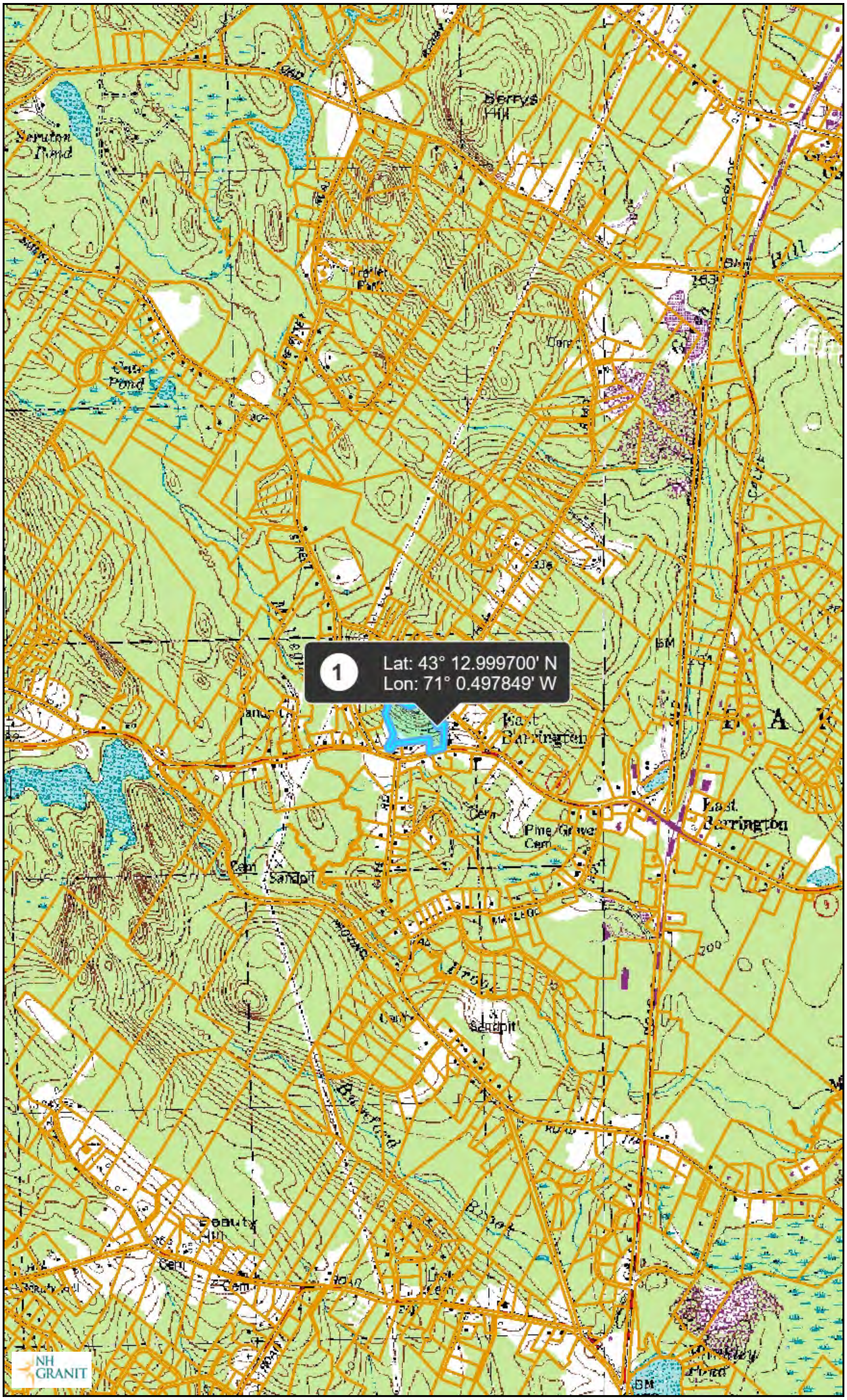

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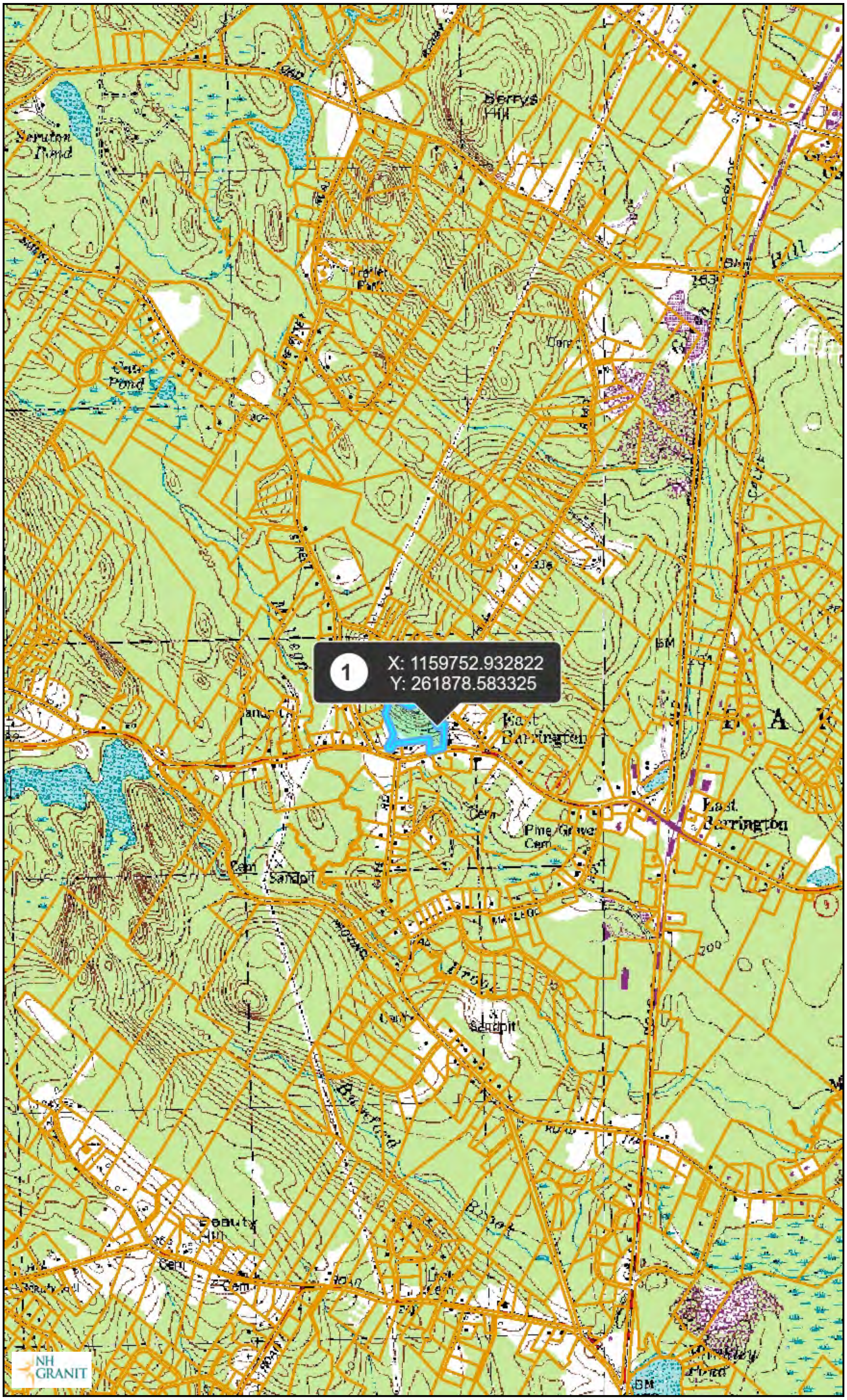

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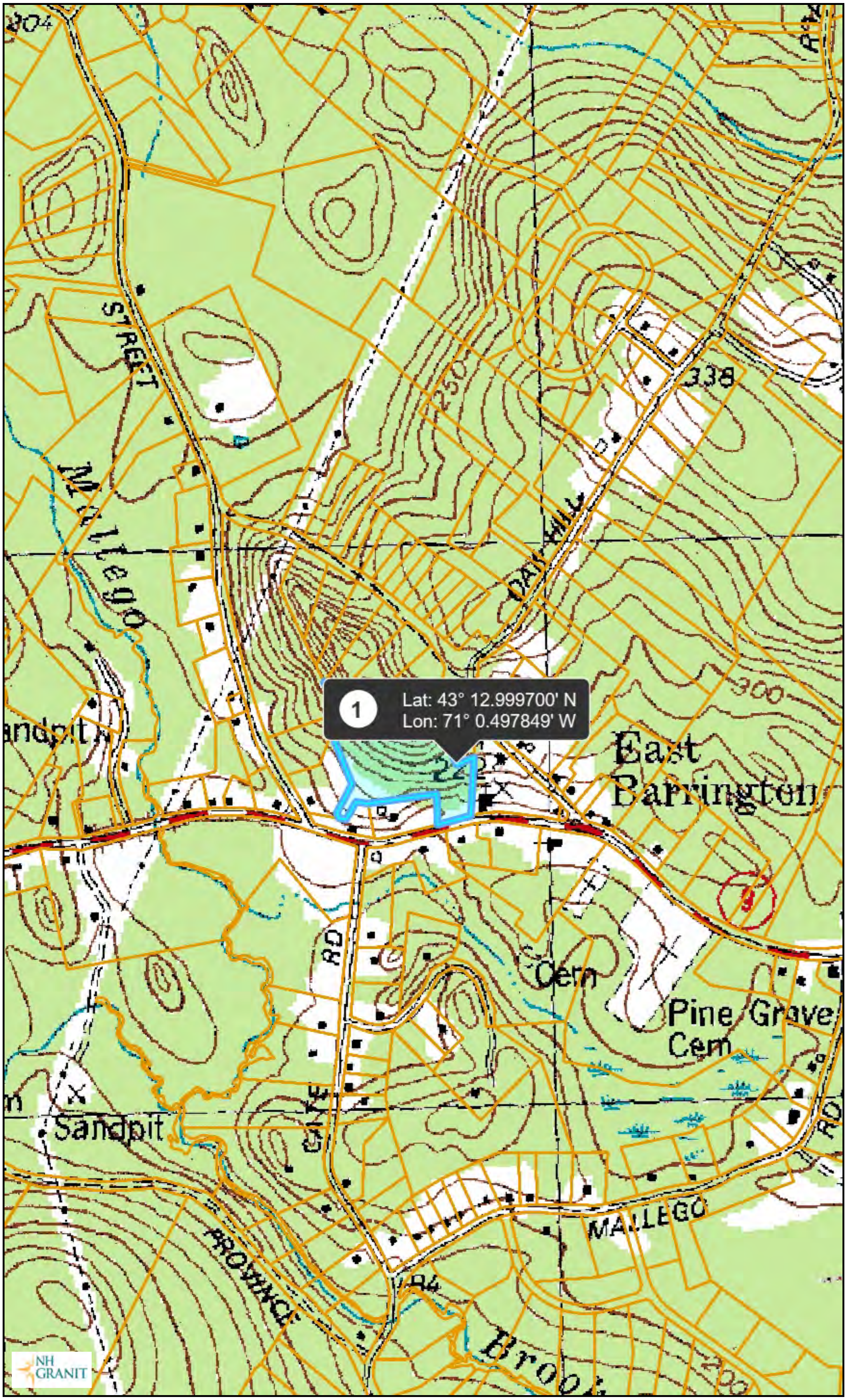

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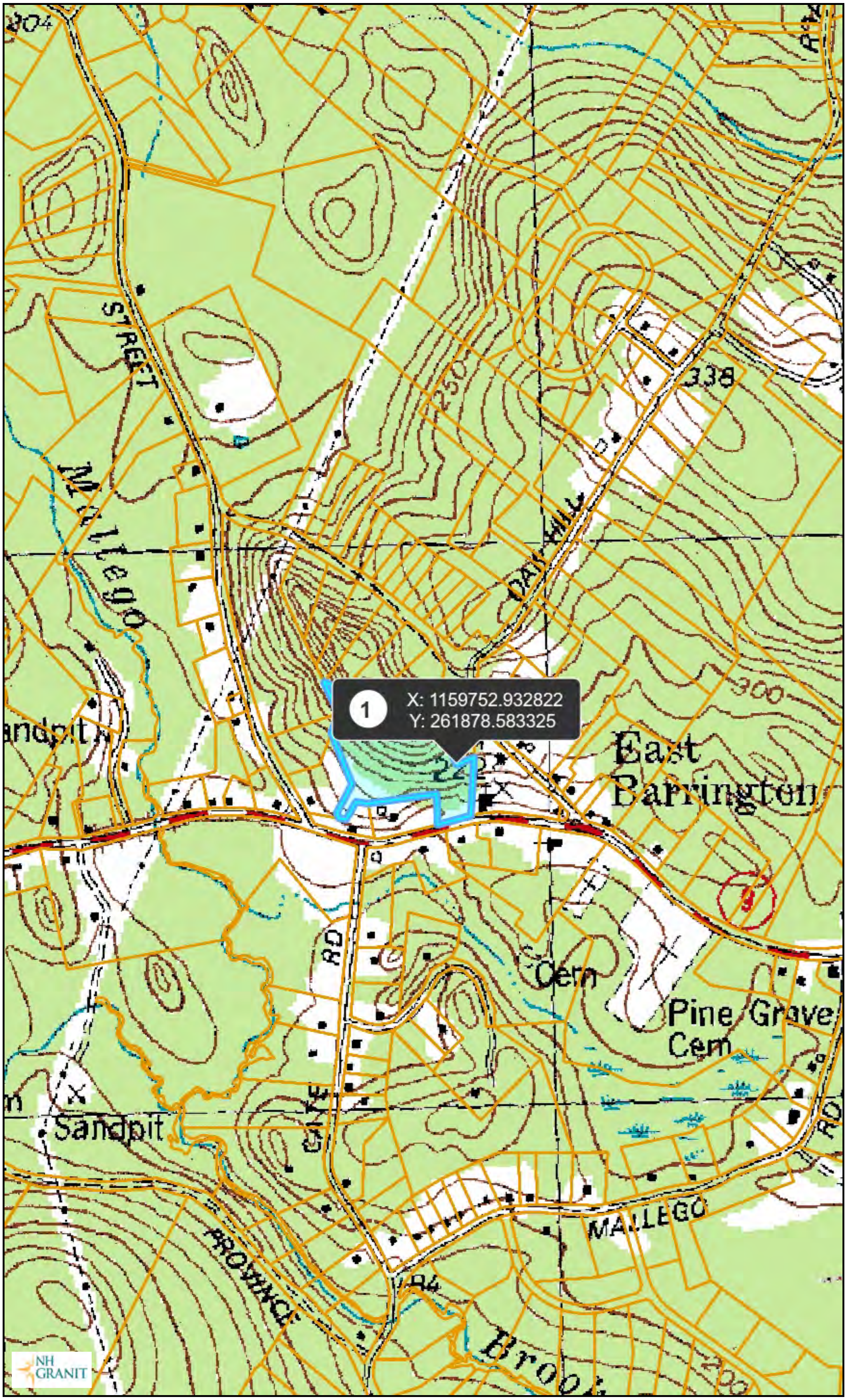

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Notes

DESIGN METHOD OBJECTIVES

TSB Construction, LLC is proposing to develop two single family houses and a duplex residential building which will share a common driveway. The property is currently vacant land.

An Existing and Proposed Conditions analysis was conducted for the purpose of estimating the peak rate of stormwater run-off from the property and subsequently designing adequate mitigation of drainage. There are two drainage discharge points which were identified in the existing analysis and duplicated in the proposed 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 and 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
Site Specific Soils Map Plan

The existing property is currently vacant land. There are three subcatchments each contributing runoff to two final reaches. The combined area of the property is 9.44 acres and the area of the project analysis is 21.45 acres. As a result of the subdivisions on either side of Meetinghouse Road surface water runoff was diverted by swales, culverts, and rain gardens. While the analyses of Meetinghouse Road encompass a larger area only Subcatchments #1, #2, & #3 contribute runoff to Final Reaches #100 & #200. For this reason only these subcatchments were analyzed in this project. As such the resulting construction surrounding Meetinghouse Road results in a difference of 2.47 acres in contributing land area of the analyzed subcatchments between the pre-construction and post-construction analyses. There is a small wetland identified on the site. On-site soils were mapped by John P. Hayes III, CSS #87 and shown on the Site Specific Soils Map and included report.

The site is made up of a number of soils including soils from Hydrologic Soil Groups (HSG) A, B, & C. Off-site soils consist of Windsor (WdA/WdB), which is classified as Hydrologic Soil Group A, as well as Hollis-Charlton complex (HdC) which is classified as a combination of HSG A & D based on the USDA, NRCS Websoil.

Final Reach #100:

Subcatchment #1 consists of the majority of the parcel, extending from NH Route 9 north to a point along the northern boundary line. Runoff flows south to a cross culvert under NH Route 9 analyzed as **Pond #1** outletting to **Final Reach #100**.

Subcatchment #2 consists of mostly offsite land to the north and the west of the parcel. Runoff generally flows in a southerly direction to the edge of NH Route 9 where it flows in the roadside drainage measures to the cross culvert (Pond #1) and subsequently **Final Reach #100**.

Subcatchment #3 consists of offsite land northwest of the parcel. Runoff generally flows in a southerly direction along Oak Hill Road where it flows in the roadside drainage measures to the dividing line of **Subcatchment #2** and subsequently **Final Reach #100** through a pair of overland reaches (**Reaches #2 & #3**).

2.0 Proposed Conditions Analysis:

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

The proposed conditions analysis consists of eight subcatchments. Final analysis points from the existing analysis are preserved.

Final Reach #100:

Subcatchments #2 & #3 remain unchanged by this development, however they are changed by the residential development on Meetinghouse Road and analyzed as such in this analysis.

Subcatchment #1 is greatly reduced in size due to the development of the site as a whole. The majority of Subcatchment one is now the offsite area along NH Route 9 **Final Reach #100**.

Subcatchment #21 is made up of the front portion of the parcel including area along NH Route 9 and the proposed entrance of Eagle Drive extending uphill close to the eastern property line. Runoff is collected in an infiltration rain garden (**Pond #201**) and directed to **Final Reach #100** via a level spreader and overland reach (**Reach #201**).

Subcatchment #22 is made up of a portion of land at the end of Eagle Drive along the southern property line. Runoff is collected in an infiltration rain garden (**Pond #202**) and completely infiltrated, with no runoff leaving the constructed spillway at any analyzed storm event.

Subcatchment #23 is largely made up of undeveloped, wooded land aside from the grading associated with Eagle Drive and the second residential building. Runoff is directed to a small roadside detention pond and into a cross culvert under the driveway (**Pond #23**), which is directed to **Pond #202** and subsequently **Final Reach #100**.

Subcatchment #24 is made up of undeveloped land as well as the middle portion of Eagle Drive and the associated grading. Runoff flows east and south and is collected in a small roadside detention pond near the corner of Eagle Drive and into a cross culvert under the roadway (**Pond #24**), which is directed to **Pond #201** (modeled within Pond #1 as an expansion of storage) and subsequently **Final Reach #100**.

Subcatchment #25 is a small portion of land uphill from Subcatchment #21 defined by the limits of a small detention pond designed to hold runoff from the small portion of Eagle Drive as well as runoff leaving **Pond #24** before directing runoff into **Pond #201** and subsequently **Final Reach #100**.

Summary

Runoff is partially infiltrated after treatment through the filter course of the rain garden (Pond #202). The peak rate of runoff from the proposal is reduced in the five storm events, at Final Reach #100, analyzed comparing pre-conditions to post-conditions.

3.0a Stormwater Treatment:

A portion of the surface water runoff from the development area is being treated by a rain garden w/ infiltration (Pond #202). Water Quality Volume calculations based on the Alteration of Terrain model along with Pond Storage Tables are included in Appendix 3 for the modeled practice.

3.0b Stormwater Infiltration:

Groundwater recharge volume requirements are satisfied by Rain Garden W/ Infiltration #202 (Pond #202) (Sheet P-202). 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	4.60	10.62	12.32	19.44	28.73
	Proposed	3.91	9.18	11.11	11.98	17.07
Final Reach #200	Existing	0.00	1.32	10.40	15.54	20.26
	Proposed	0.00	0.00	3.87	9.92	14.15

ANALYSIS COMPONENT: VOLUME (Acre Feet)

		2 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Final Reach #100	Existing	0.866	2.221	3.144	4.125	5.455
	Proposed	0.801	1.979	2.915	3.688	4.734
Final Reach #200	Existing	0.000	0.030	0.460	0.897	1.398
	Proposed	0.000	0.000	0.149	0.512	0.925

4.0 EROSION & SEDIMENT CONTROL PLANS 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 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. Reference is also made to the Stormwater System Management: Inspection & Maintenance Manual which has been written specifically for this project and available to the owner. 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.

As this proposed site redevelopment disturbs greater than one acre of land, a Notice of Intent is required to be submitted to the US EPA. This project will be covered by the Construction General Permit. As this project proposes less than 100,000 square feet of impact it does not require an issued permit by NHDES AoT, however construction is governed by a General Permit by Rule under NH RSA 485-A:17. Either a Stormwater Pollution Prevention Plan (SWPPP) or a Stormwater Management Plan (SWMP) as required by the Town of Barrington will be required.

Perimeter Control (Silt Fence / Silt Soxx)

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. It is noted that the engineer prefers the mulch berms below as well as the Filtrexx product.

Bioretention System (Rain Garden)

Description: Rain Gardens, or bioretention areas are located close to the source of runoff. They are intended to integrate with the site landscaping and become an aesthetically attractive opportunity to provide highly effective stormwater treatment. The rain gardens associated with this proposed development contribute toward recharge of surface water run-off into the ground. It is important that sediment be removed from run-off prior to discharge into the bioretention area to preserve the mulch and soil mix ratio. During construction it is important that the ground surface not be exposed to traffic or construction equipment to preserve the infiltration capabilities of the existing soil. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-3 Treatment Practices, 4c Bio-retention System.

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.

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

Detention Ponds

Description: A detention basin is an impoundment designed to temporarily store runoff and release it at a controlled rate, reducing the intensity of peak flows during storm events. Conventional detention basins are typically designed to control peak runoff rates under a range of storm conditions, and can be used to control discharges as required under the AoT Regulations and other requirements. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-6 Conveyance Practices, 1, Detention Basin.

Maintenance Considerations: Detention Ponds should be inspected at least twice annually and following any rainfall event exceeding 0.25 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

Also on an annual basis the vegetation should be inspected to ensure healthy condition. Invasive species need to be removed along with dead or diseased vegetation.

Vegetated Stabilization

All areas that are disturbed during construction will be stabilized with vegetated material within 14 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 be used to stabilize all 2:1 slopes.

Rain Garden Mix

The grass that is planted within a rain garden bio-filtration system within the bio-media must consist of a combination of warm season grass seed and cold season grass seed in order for the grass to start growing for stabilization and continue growing in the sandy well-drained environment. Planting specification will meet the requirements as outlined in 'Vegetation New Hampshire Sand and Gravel Pits' mix 1 (warm season grasses) (15 lbs/ac) and include annual and perennial rye grass seed (15 lbs/ac); the New England native warm season grass mix (23 lbs/ac) by New England Wetland Plants, Inc.; rain garden mix 180 (15 lbs/ac & 15 lbs/ac of rye) / rain garden grass mix 180-1 (20 lbs/ac & 10 lbs/ac of rye) by Ernst Conservation Seeds; or approved equal.
Maintenance Considerations: Permanent seeded areas for long-term cover will be inspected on a periodic basis looking for signs of growth loss or erosion. Any areas found to be damaged will be repaired and replanted to reestablish the growth. The grass should be mowed at least twice per year and any dead material removed. Any woody growth that becomes established will need to be cut and removed.

Long-term maintenance of the land cover is critical and must be maintained at least 85% grass / vegetation coverage, must be inspected for concentrated flow, rills, and channels; and must be repaired as necessary to prevent erosion.

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.

Sediment Track-Out / Stabilized Construction Entrance / Exit

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-inch coarse aggregate, and the pad itself constructed to a minimum length of 75’ for the full width of the access road with an entrance berm due to the sloping site. The aggregate should be placed at least six inches thick. A plan view and profile are shown on Construction Details Plan. The Construction Exit will be maintained in a condition that will prevent tracking of sediment onto the public highway. When the control pad becomes ineffective, the stone should be removed along with the collected soil material, regraded on site, and stabilized. A plan view and profile are shown on the Construction Details Plan in E-101 Erosion & Sediment Control Details.

Off-site Vehicle Tracking: A stabilized construction entrance has been provided to help reduce vehicle tracking of sediments. The paved street adjacent to the site entrance will be swept every other week or as necessary to remove any excess mud, dirt or rock tracked from the site. After the binder pavement has been placed, any construction activity that causes the tracking of sediments will also result in street sweeping. Pavement should be swept prior to surface pavement and periodically to remove materials. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

At a minimum, you must provide for maintenance that meets the following (EPA CGP Part 2.1.2.3.d) “Where sediment has been tracked-out from your site onto the surface of off-site streets, other paved areas, and sidewalks, you must remove the deposited sediment by the end of the same work day in which the track-out occurs or by the end of the next work day if track-out occurs on a non-work day. You must remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance (unless it is connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water.”

Stockpiled Sediment or Soil

Stockpiled materials including topsoil, excavated materials, borrow materials imported onto the site, construction aggregates, and sediment removed from temporary sediment traps will be located in designated areas at least 50 feet away form concentrated flows. All stockpiles will have erosion protection in the form of silt fence and diversion swales will be applied to protect the material and surrounding areas. Inactive stockpiles will be seeded for temporary stabilization. Erosion control measures will be inspected in accordance with the schedule for all other activities on site.

At a minimum, you must comply with following (EPA CGP Part 2.1.2.4d) “Do no hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similar effective control,) storm drain inlet, or surface water.”

Dewatering Practices

Dewatering practices are not known to be required on this site. If during construction this becomes required, an addendum will be published specific for the requirements. As a general rule, ground water that needs to be removed from an excavation will be pumped to a sediment basin or a storm drain inlet prior to discharge from the site.

At a minimum, you must comply with following (EPA CGP Part 2.1.3.4) "With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications."

Regarding dewatering practices in the State of New Hampshire, specifically see Construction General Permit Section 9.1.2 NHR12000 State of New Hampshire and "Clarification of Section 9.1.2 ... and other New Hampshire specific information for the U.S. EPA 2012 NPDES Construction General Permit (CGP), May 3, 2012"

Please be advised that should dewatering become required, the EPA CGP 2022 requires daily inspections, monitoring, and reporting quarterly to the agency.

Drainage Swales / Stormwater Conveyance Channels

Drainage swales will be stabilized with vegetation for long term cover as outlined below, and on Sheet E-102 using seed mixture C. As a general rule, velocities in the swale should not exceed 3.0 feet per second for a vegetated swale although velocities as high as 4.5 FPS are allowed under certain soil conditions (If applicable).

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 3 days of final grading, or temporarily stabilized within 14 days of initial disturbance of soil.

Inspection and Maintenance Schedule

Sediment control measures will be inspected during and after storm events to ensure that the practice still has integrity and is not allowing sediment to pass. Depending on SWPPP criteria, all controls will be inspected either once every 7 days and after storm events. Inspection reports must be submitted to Town of Barrington Planning Department. Sediment build-up in swales and level spreaders will be removed if it is deeper than six inches. See also Stormwater System Operation: Inspection & Maintenance Manual published separately also by Berry Surveying & Engineering. See also Storm Water Pollution Prevention Plan (SWPPP) and / or Stormwater Management Plan (SWMP) developed in accordance with EPA NPDES or Town of Barrington requirements.

Corrective Action measures will be made in accordance with Stormwater Management Plan (SWMP) / SWPPP requirements and records maintained on site by the Contractor.

5.0 CONCLUSION

Both peak rate of runoff and volume are reduced in the post-construction analysis, as compared to the pre-construction analysis at **Final Reaches #100 & #200**. This reduction occurs during the 2 Yr, 10 Yr, 25 Yr, 50 Yr, and 100 Yr-24 Hour storm events due to the infiltration of runoff in the rain garden.

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 and the site will operate as a General Permit by Rule under this rule. Because the site impact is greater than one acre, a Notice of Intent with the EPA is required.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

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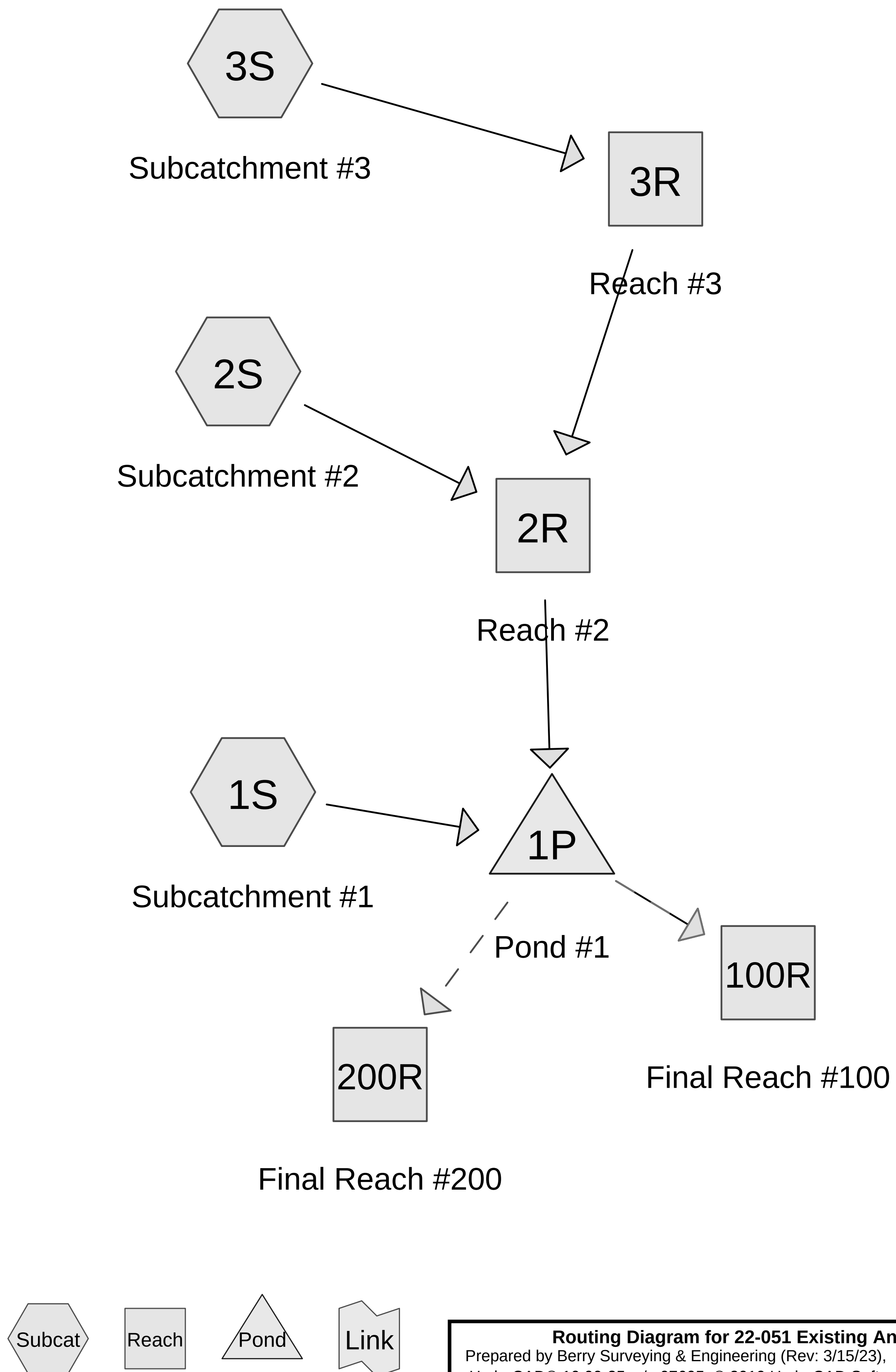
Project Engineer

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



Routing Diagram for 22-051 Existing Analysis
Prepared by Berry Surveying & Engineering (Rev: 3/15/23), Printed 3/15/2023
HydroCAD® 10.00-25 s/n 07605 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.178	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.128	61	>75% Grass cover, Good, HSG B (2S)
0.585	74	>75% Grass cover, Good, HSG C (2S, 3S)
1.533	80	>75% Grass cover, Good, HSG D (2S, 3S)
0.020	96	Gravel surface, HSG C (2S)
0.065	96	Gravel surface, HSG D (2S, 3S)
0.333	98	Paved parking, HSG A (1S, 2S)
0.074	98	Paved parking, HSG B (2S)
0.080	98	Paved parking, HSG C (3S)
0.271	98	Paved parking, HSG D (2S, 3S)
0.203	98	Unconnected roofs, HSG A (1S, 2S)
0.009	98	Unconnected roofs, HSG B (2S)
0.045	98	Unconnected roofs, HSG C (2S)
0.081	98	Unconnected roofs, HSG D (2S)
2.323	30	Woods, Good, HSG A (1S, 2S)
1.616	55	Woods, Good, HSG B (1S, 2S)
11.262	70	Woods, Good, HSG C (1S, 2S, 3S)
0.640	77	Woods, Good, HSG D (2S, 3S)
21.446	**64**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.037	HSG A	1S, 2S
1.827	HSG B	1S, 2S
11.992	HSG C	1S, 2S, 3S
2.590	HSG D	2S, 3S
0.000	Other	
21.446		**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
2.178	0.128	0.585	1.533	0.000	4.424	>75% Grass cover, Good	1S, 2S, 3S
0.000	0.000	0.020	0.065	0.000	0.085	Gravel surface	2S, 3S
0.333	0.074	0.080	0.271	0.000	0.759	Paved parking	1S, 2S, 3S
0.203	0.009	0.045	0.081	0.000	0.338	Unconnected roofs	1S, 2S
2.323	1.616	11.262	0.640	0.000	15.841	Woods, Good	1S, 2S, 3S
5.037	**1.827**	**11.992**	**2.590**	**0.000**	**21.446**	**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	1P	194.12	193.74	40.5	0.0094	0.012	18.0	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=298,718 sf 3.59% Impervious Runoff Depth>1.50"
Flow Length=912' Tc=21.7 min CN=56 Runoff=7.00 cfs 0.857 af

Subcatchment 2S: Subcatchment #2 Runoff Area=567,294 sf 4.96% Impervious Runoff Depth>2.31"
Flow Length=1,706' Tc=38.6 min UI Adjusted CN=66 Runoff=17.40 cfs 2.505 af

Subcatchment 3S: Subcatchment #3 Runoff Area=68,180 sf 13.06% Impervious Runoff Depth>3.24"
Flow Length=932' Tc=19.7 min CN=76 Runoff=4.04 cfs 0.422 af

Reach 2R: Reach #2 Avg. Flow Depth=0.49' Max Vel=4.14 fps Inflow=20.18 cfs 2.926 af
n=0.022 L=390.0' S=0.0168 '/' Capacity=20.98 cfs Outflow=20.15 cfs 2.922 af

Reach 3R: Reach #3 Avg. Flow Depth=0.18' Max Vel=3.69 fps Inflow=4.04 cfs 0.422 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=3.92 cfs 0.421 af

Reach 100R: Final Reach #100 Inflow=12.32 cfs 3.144 af
Outflow=12.32 cfs 3.144 af

Reach 200R: Final Reach #200 Inflow=10.40 cfs 0.460 af
Outflow=10.40 cfs 0.460 af

Pond 1P: Pond #1 Peak Elev=196.83' Storage=14,456 cf Inflow=25.96 cfs 3.779 af
0.173 af Primary=11.91 cfs 3.141 af Secondary=10.40 cfs 0.460 af Tertiary=0.41 cfs 0.004 af Outflow=23.74 cfs 3.777 af

Total Runoff Area = 21.446 ac Runoff Volume = 3.784 af Average Runoff Depth = 2.12"
94.89% Pervious = 20.350 ac 5.11% Impervious = 1.096 ac

Summary for Subcatchment 1S: Subcatchment #1

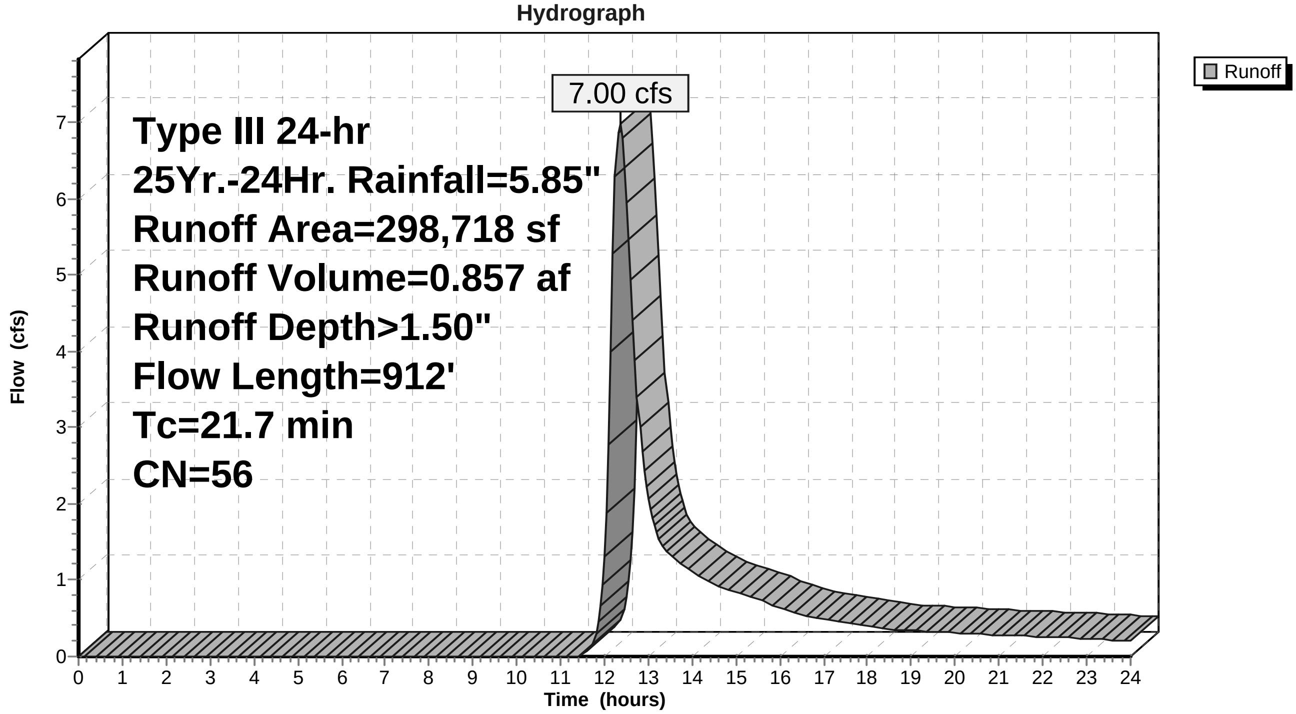
Runoff = 7.00 cfs @ 12.34 hrs, Volume= 0.857 af, Depth> 1.50"

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
4,967	98	Unconnected roofs, HSG A
20,184	39	>75% Grass cover, Good, HSG A
5,749	98	Paved parking, HSG A
84,127	30	Woods, Good, HSG A
35,023	55	Woods, Good, HSG B
148,668	70	Woods, Good, HSG C
298,718	56	Weighted Average
288,002		96.41% Pervious Area
10,716		3.59% Impervious Area
4,967		46.35% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.1700	0.18		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
1.4	239	0.3353	2.90		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
1.1	119	0.1346	1.83		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
8.2	264	0.0114	0.53		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
1.7	190	0.0737	1.90		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
21.7	912	Total			

Subcatchment 1S: Subcatchment #1



Summary for Subcatchment 2S: Subcatchment #2

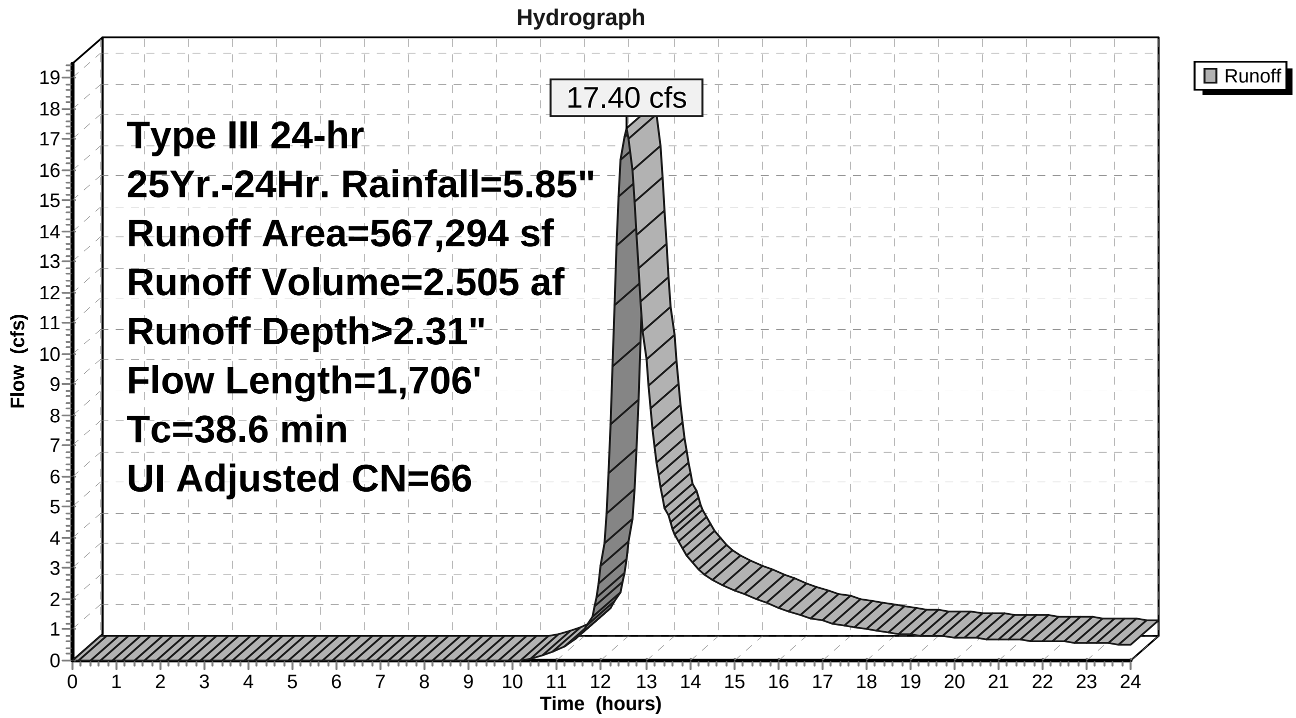
Runoff = 17.40 cfs @ 12.56 hrs, Volume= 2.505 af, Depth> 2.31"

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	Adj	Description
3,857	98		Unconnected roofs, HSG A
389	98		Unconnected roofs, HSG B
1,956	98		Unconnected roofs, HSG C
3,549	98		Unconnected roofs, HSG D
74,688	39		>75% Grass cover, Good, HSG A
5,582	61		>75% Grass cover, Good, HSG B
12,591	74		>75% Grass cover, Good, HSG C
59,930	80		>75% Grass cover, Good, HSG D
8,765	98		Paved parking, HSG A
3,235	98		Paved parking, HSG B
6,387	98		Paved parking, HSG D
17,061	30		Woods, Good, HSG A
35,354	55		Woods, Good, HSG B
310,231	70		Woods, Good, HSG C
20,606	77		Woods, Good, HSG D
860	96		Gravel surface, HSG C
2,253	96		Gravel surface, HSG D
567,294	67	66	Weighted Average, UI Adjusted
539,156			95.04% Pervious Area
28,138			4.96% Impervious Area
9,751			34.65% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0600	0.12		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
4.4	366	0.0765	1.38		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
1.0	71	0.0280	1.17		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
13.8	676	0.0266	0.82		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
2.1	172	0.0754	1.37		**Shallow Concentrated Flow, Segment #5** Woodland Kv= 5.0 fps
3.2	321	0.1151	1.70		**Shallow Concentrated Flow, Segment #6** Woodland Kv= 5.0 fps
38.6	1,706	Total			

Subcatchment 2S: Subcatchment #2



Summary for Subcatchment 3S: Subcatchment #3

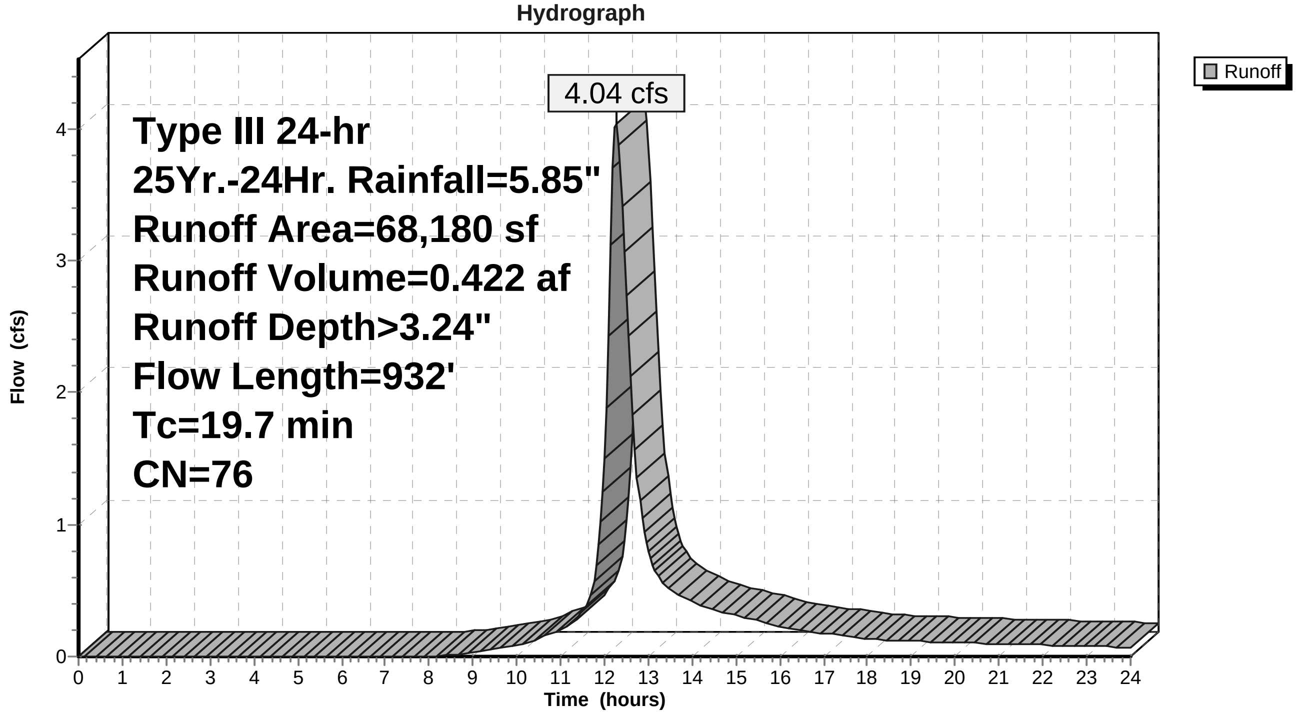
Runoff = 4.04 cfs @ 12.27 hrs, Volume= 0.422 af, Depth> 3.24"

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

Area (sf)	CN	Description
12,882	74	>75% Grass cover, Good, HSG C
6,834	80	>75% Grass cover, Good, HSG D
3,499	98	Paved parking, HSG C
5,407	98	Paved parking, HSG D
31,691	70	Woods, Good, HSG C
7,279	77	Woods, Good, HSG D
588	96	Gravel surface, HSG D
68,180	76	Weighted Average
59,274		86.94% Pervious Area
8,906		13.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0500	0.11		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
3.7	306	0.0752	1.37		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.8	526	0.0571	11.69	42.85	**Parabolic Channel, Segment #3** W=5.50' D=1.00' Area=3.7 sf Perim=6.0' n= 0.022 Earth, clean & straight
19.7	932	Total			

Subcatchment 3S: Subcatchment #3



Summary for Reach 2R: Reach #2

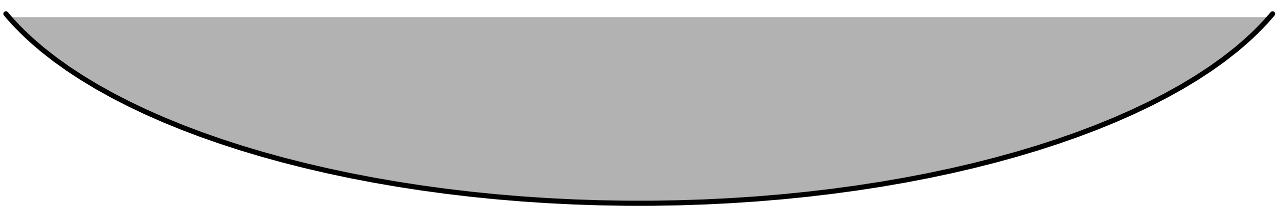
[62] Hint: Exceeded Reach 3R OUTLET depth by 0.35' @ 12.65 hrs

Inflow Area = 14.588 ac, 5.83% Impervious, Inflow Depth > 2.41" for 25Yr.-24Hr. event
Inflow = 20.18 cfs @ 12.52 hrs, Volume= 2.926 af
Outflow = 20.15 cfs @ 12.54 hrs, Volume= 2.922 af, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.14 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 3.8 min

Peak Storage= 1,896 cf @ 12.54 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 20.98 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 390.0' Slope= 0.0168 '/'
Inlet Invert= 200.66', Outlet Invert= 194.12'



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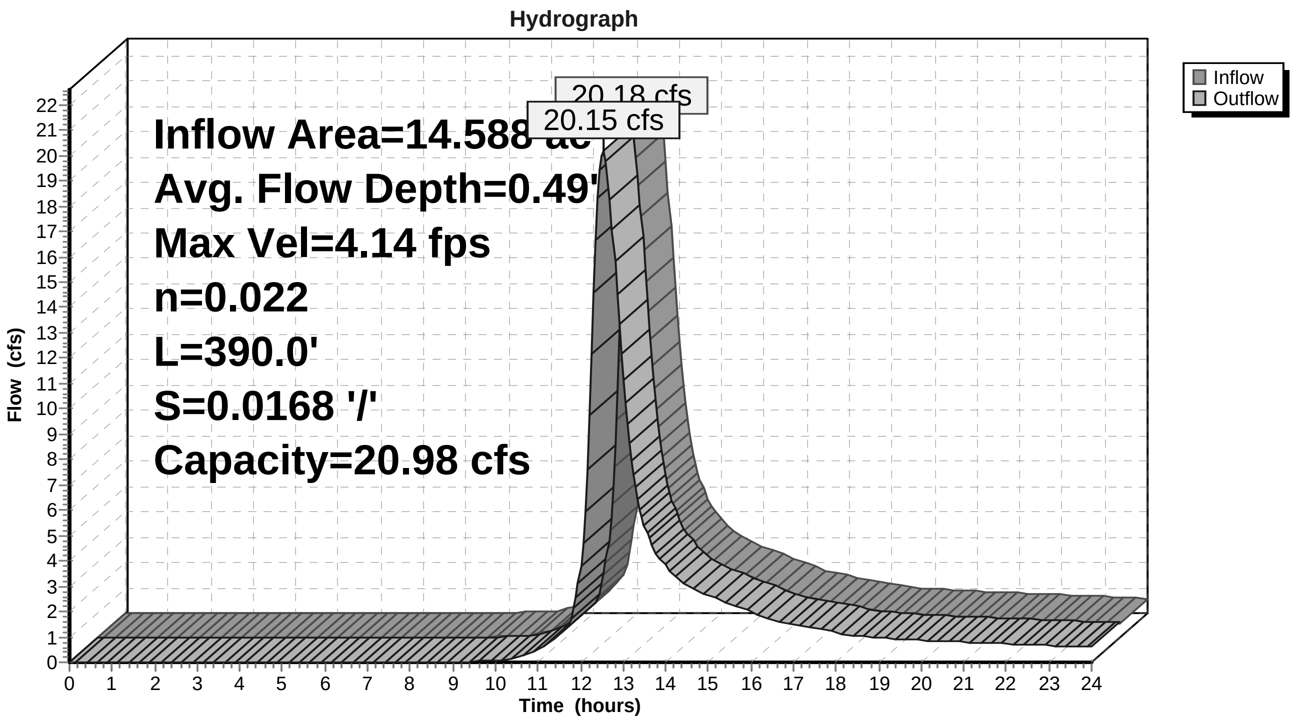
Reach 2R: Reach #2



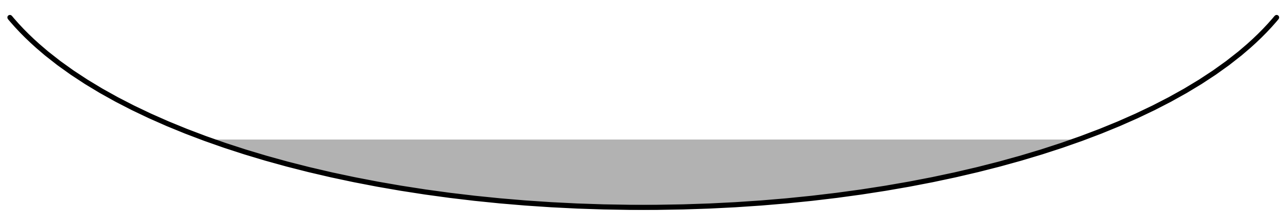
Summary for Reach 3R: Reach #3

Inflow Area = 1.565 ac, 13.06% Impervious, Inflow Depth > 3.24" for 25Yr.-24Hr. event
Inflow = 4.04 cfs @ 12.27 hrs, Volume= 0.422 af
Outflow = 3.92 cfs @ 12.32 hrs, Volume= 0.421 af, Atten= 3%, Lag= 3.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.69 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 10.1 min

Peak Storage= 920 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 36.82 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 868.8' Slope= 0.0516 '/'
Inlet Invert= 245.52', Outlet Invert= 200.66'



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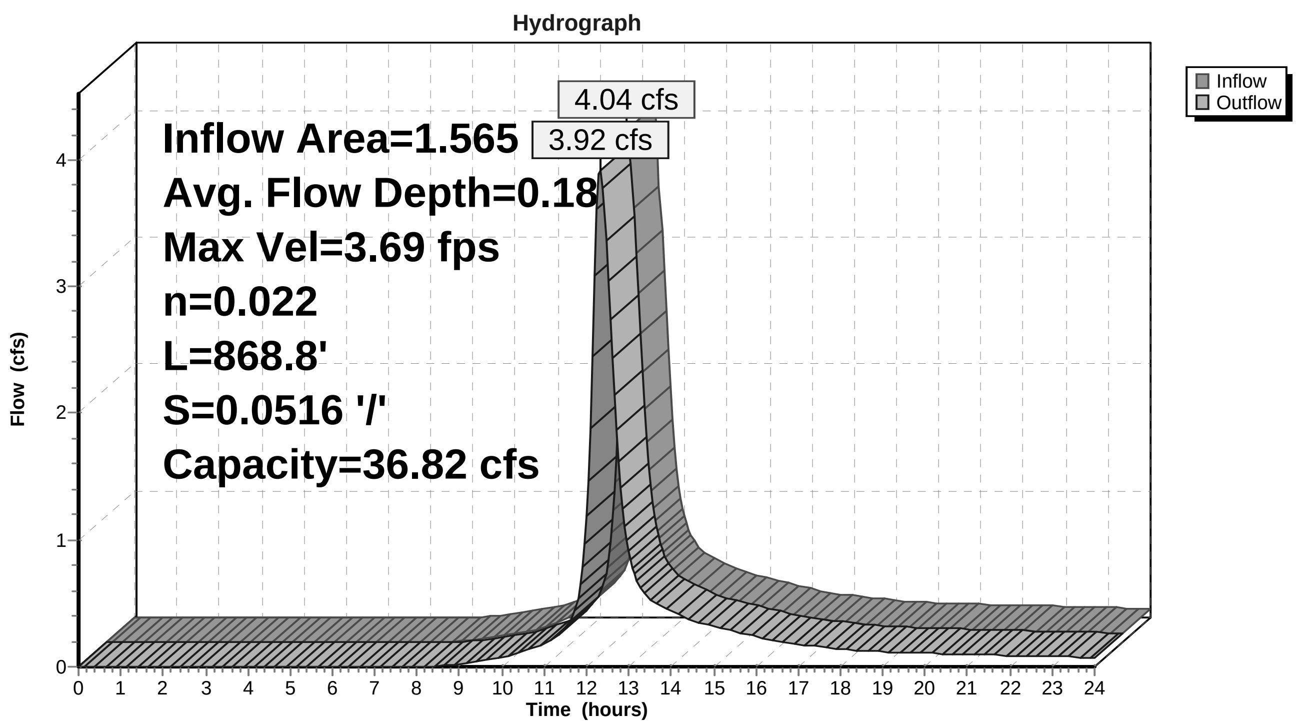
Reach 3R: Reach #3



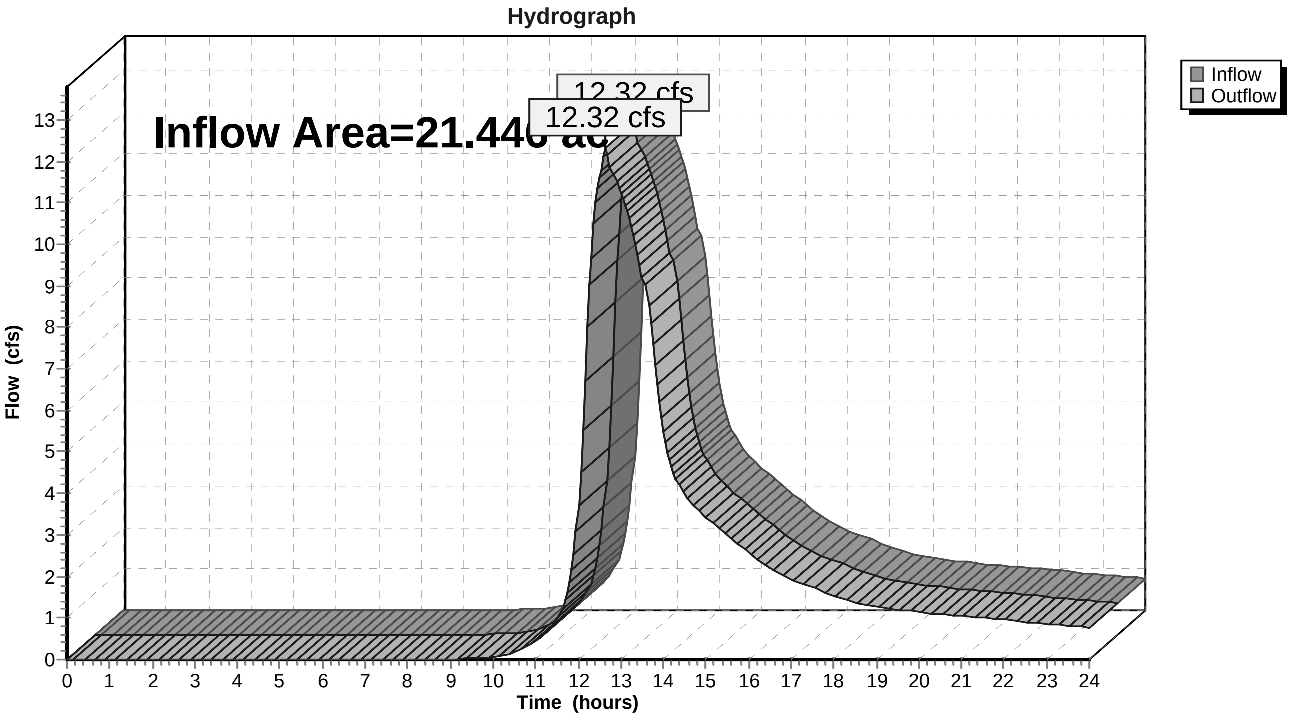
Summary for Reach 100R: Final Reach #100

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

Inflow Area =	21.446 ac,	5.11% Impervious, Inflow Depth > 1.76"	for 25Yr.-24Hr. event
Inflow =	12.32 cfs @	12.65 hrs, Volume=	3.144 af
Outflow =	12.32 cfs @	12.65 hrs, Volume=	3.144 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



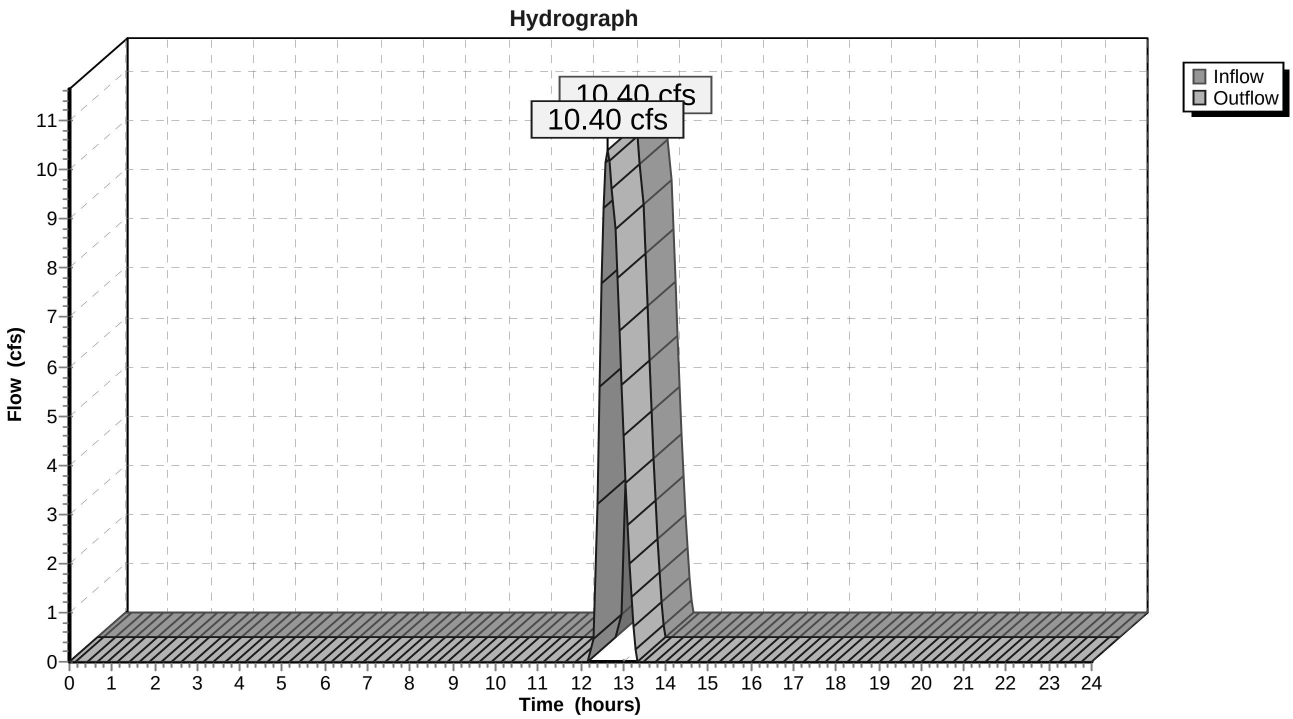
Summary for Reach 200R: Final Reach #200

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

Inflow	=	10.40 cfs @	12.65 hrs, Volume=	0.460 af
Outflow	=	10.40 cfs @	12.65 hrs, Volume=	0.460 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 200R: Final Reach #200



Summary for Pond 1P: Pond #1

[58] Hint: Peaked 0.03' above defined flood level
[62] Hint: Exceeded Reach 2R OUTLET depth by 2.23' @ 12.70 hrs

Inflow Area = 21.446 ac, 5.11% Impervious, Inflow Depth > 2.11" for 25Yr.-24Hr. event
Inflow = 25.96 cfs @ 12.49 hrs, Volume= 3.779 af
Outflow = 23.74 cfs @ 12.65 hrs, Volume= 3.777 af, Atten= 9%, Lag= 9.7 min
Discarded = 1.02 cfs @ 12.40 hrs, Volume= 0.173 af
Primary = 11.91 cfs @ 12.65 hrs, Volume= 3.141 af
Secondary = 10.40 cfs @ 12.65 hrs, Volume= 0.460 af
Tertiary = 0.41 cfs @ 12.65 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 196.83' @ 12.65 hrs Surf.Area= 14,717 sf Storage= 14,456 cf
Flood Elev= 196.80' Surf.Area= 14,717 sf Storage= 14,023 cf

Plug-Flow detention time= 6.5 min calculated for 3.770 af (100% of inflow)
Center-of-Mass det. time= 6.2 min (880.8 - 874.6)

Volume	Invert	Avail.Storage	Storage Description
#1	194.12'	24,325 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
194.12	12	14.0	0	0	12
196.00	6,700	469.6	4,384	4,384	17,551
196.50	14,717	797.7	5,224	9,608	50,641
197.50	14,717	797.7	14,717	24,325	51,439

Device	Routing	Invert	Outlet Devices
#1	Discarded	194.12'	**3.000 in/hr Infiltration 3IN/HR over Surface area**
#2	Primary	194.12'	**18.0" Round 18" HDPE** L= 40.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 194.12' / 193.74' S= 0.0094 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#3	Secondary	196.30'	**10.0' long x 40.0' breadth Overflow Over DW** 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
#4	Tertiary	196.80'	**30.0' long x 24.0' breadth Overflow Over Rt 9** 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

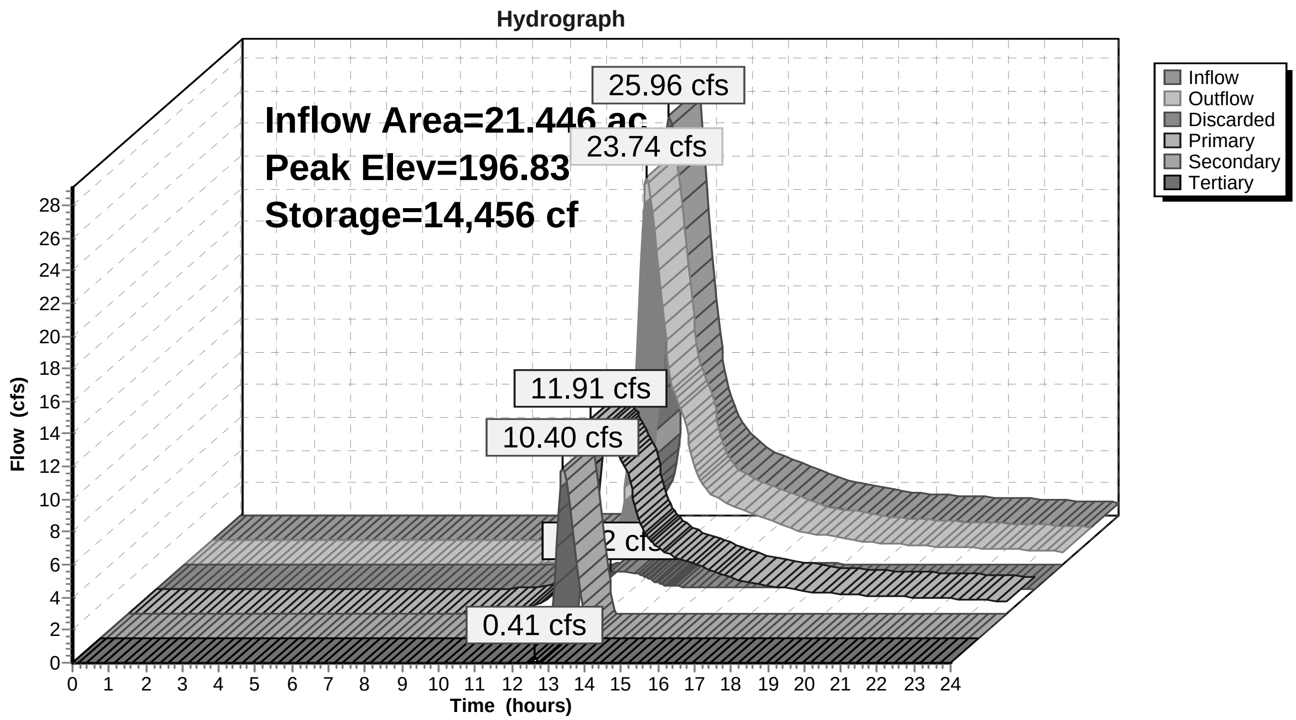
Discarded OutFlow Max=1.02 cfs @ 12.40 hrs HW=196.54' (Free Discharge)
└─**1=Infiltration 3IN/HR** (Exfiltration Controls 1.02 cfs)

Primary OutFlow Max=11.91 cfs @ 12.65 hrs HW=196.83' TW=0.00' (Dynamic Tailwater)
└─**2=18" HDPE** (Inlet Controls 11.91 cfs @ 6.74 fps)

Secondary OutFlow Max=10.39 cfs @ 12.65 hrs HW=196.83' TW=0.00' (Dynamic Tailwater)
└─**3=Overflow Over DW** (Weir Controls 10.39 cfs @ 1.96 fps)

Tertiary OutFlow Max=0.40 cfs @ 12.65 hrs HW=196.83' TW=0.00' (Dynamic Tailwater)
└─**4=Overflow Over Rt 9** (Weir Controls 0.40 cfs @ 0.46 fps)

Pond 1P: Pond #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=298,718 sf 3.59% Impervious Runoff Depth>0.24"
Flow Length=912' Tc=21.7 min CN=56 Runoff=0.57 cfs 0.137 af

Subcatchment 2S: Subcatchment #2 Runoff Area=567,294 sf 4.96% Impervious Runoff Depth>0.58"
Flow Length=1,706' Tc=38.6 min UI Adjusted CN=66 Runoff=3.57 cfs 0.625 af

Subcatchment 3S: Subcatchment #3 Runoff Area=68,180 sf 13.06% Impervious Runoff Depth>1.06"
Flow Length=932' Tc=19.7 min CN=76 Runoff=1.27 cfs 0.139 af

Reach 2R: Reach #2 Avg. Flow Depth=0.24' Max Vel=2.60 fps Inflow=4.42 cfs 0.763 af
n=0.022 L=390.0' S=0.0168 '/' Capacity=20.98 cfs Outflow=4.40 cfs 0.761 af

Reach 3R: Reach #3 Avg. Flow Depth=0.10' Max Vel=2.57 fps Inflow=1.27 cfs 0.139 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=1.20 cfs 0.138 af

Reach 100R: Final Reach #100 Inflow=4.60 cfs 0.866 af
Outflow=4.60 cfs 0.866 af

Reach 200R: Final Reach #200 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Pond #1 Peak Elev=195.24' Storage=1,004 cf Inflow=4.96 cfs 0.899 af
cfs 0.032 af Primary=4.60 cfs 0.866 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=4.77 cfs 0.898 af

Total Runoff Area = 21.446 ac Runoff Volume = 0.901 af Average Runoff Depth = 0.50"
94.89% Pervious = 20.350 ac 5.11% Impervious = 1.096 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=298,718 sf 3.59% Impervious Runoff Depth>0.85"
Flow Length=912' Tc=21.7 min CN=56 Runoff=3.48 cfs 0.486 af

Subcatchment 2S: Subcatchment #2 Runoff Area=567,294 sf 4.96% Impervious Runoff Depth>1.47"
Flow Length=1,706' Tc=38.6 min UI Adjusted CN=66 Runoff=10.67 cfs 1.590 af

Subcatchment 3S: Subcatchment #3 Runoff Area=68,180 sf 13.06% Impervious Runoff Depth>2.22"
Flow Length=932' Tc=19.7 min CN=76 Runoff=2.75 cfs 0.290 af

Reach 2R: Reach #2 Avg. Flow Depth=0.39' Max Vel=3.58 fps Inflow=12.57 cfs 1.879 af
n=0.022 L=390.0' S=0.0168 '/' Capacity=20.98 cfs Outflow=12.55 cfs 1.876 af

Reach 3R: Reach #3 Avg. Flow Depth=0.15' Max Vel=3.28 fps Inflow=2.75 cfs 0.290 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=2.65 cfs 0.289 af

Reach 100R: Final Reach #100 Inflow=10.62 cfs 2.221 af
Outflow=10.62 cfs 2.221 af

Reach 200R: Final Reach #200 Inflow=1.32 cfs 0.030 af
Outflow=1.32 cfs 0.030 af

Pond 1P: Pond #1 Peak Elev=196.43' Storage=8,683 cf Inflow=15.57 cfs 2.363 af
0.111 af Primary=10.62 cfs 2.221 af Secondary=1.32 cfs 0.030 af Tertiary=0.00 cfs 0.000 af Outflow=12.87 cfs 2.362 af

Total Runoff Area = 21.446 ac Runoff Volume = 2.367 af Average Runoff Depth = 1.32"
94.89% Pervious = 20.350 ac 5.11% Impervious = 1.096 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=298,718 sf 3.59% Impervious Runoff Depth>1.50"
Flow Length=912' Tc=21.7 min CN=56 Runoff=7.00 cfs 0.857 af

Subcatchment 2S: Subcatchment #2 Runoff Area=567,294 sf 4.96% Impervious Runoff Depth>2.31"
Flow Length=1,706' Tc=38.6 min UI Adjusted CN=66 Runoff=17.40 cfs 2.505 af

Subcatchment 3S: Subcatchment #3 Runoff Area=68,180 sf 13.06% Impervious Runoff Depth>3.24"
Flow Length=932' Tc=19.7 min CN=76 Runoff=4.04 cfs 0.422 af

Reach 2R: Reach #2 Avg. Flow Depth=0.49' Max Vel=4.14 fps Inflow=20.18 cfs 2.926 af
n=0.022 L=390.0' S=0.0168 '/' Capacity=20.98 cfs Outflow=20.15 cfs 2.922 af

Reach 3R: Reach #3 Avg. Flow Depth=0.18' Max Vel=3.69 fps Inflow=4.04 cfs 0.422 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=3.92 cfs 0.421 af

Reach 100R: Final Reach #100 Inflow=12.32 cfs 3.144 af
Outflow=12.32 cfs 3.144 af

Reach 200R: Final Reach #200 Inflow=10.40 cfs 0.460 af
Outflow=10.40 cfs 0.460 af

Pond 1P: Pond #1 Peak Elev=196.83' Storage=14,456 cf Inflow=25.96 cfs 3.779 af
0.173 af Primary=11.91 cfs 3.141 af Secondary=10.40 cfs 0.460 af Tertiary=0.41 cfs 0.004 af Outflow=23.74 cfs 3.777 af

Total Runoff Area = 21.446 ac Runoff Volume = 3.784 af Average Runoff Depth = 2.12"
94.89% Pervious = 20.350 ac 5.11% Impervious = 1.096 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=298,718 sf 3.59% Impervious Runoff Depth>2.20"
Flow Length=912' Tc=21.7 min CN=56 Runoff=10.81 cfs 1.257 af

Subcatchment 2S: Subcatchment #2 Runoff Area=567,294 sf 4.96% Impervious Runoff Depth>3.17"
Flow Length=1,706' Tc=38.6 min UI Adjusted CN=66 Runoff=24.21 cfs 3.439 af

Subcatchment 3S: Subcatchment #3 Runoff Area=68,180 sf 13.06% Impervious Runoff Depth>4.23"
Flow Length=932' Tc=19.7 min CN=76 Runoff=5.28 cfs 0.552 af

Reach 2R: Reach #2 Avg. Flow Depth=0.58' Max Vel=4.53 fps Inflow=27.85 cfs 3.990 af
n=0.022 L=390.0' S=0.0168 '/' Capacity=20.98 cfs Outflow=27.80 cfs 3.985 af

Reach 3R: Reach #3 Avg. Flow Depth=0.20' Max Vel=4.02 fps Inflow=5.28 cfs 0.552 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=5.14 cfs 0.551 af

Reach 100R: Final Reach #100 Inflow=19.44 cfs 4.125 af
Outflow=19.44 cfs 4.125 af

Reach 200R: Final Reach #200 Inflow=15.54 cfs 0.897 af
Outflow=15.54 cfs 0.897 af

Pond 1P: Pond #1 Peak Elev=197.00' Storage=16,923 cf Inflow=36.65 cfs 5.242 af
0.218 af Primary=12.41 cfs 3.927 af Secondary=15.54 cfs 0.897 af Tertiary=7.03 cfs 0.198 af Outflow=36.00 cfs 5.240 af

Total Runoff Area = 21.446 ac Runoff Volume = 5.248 af Average Runoff Depth = 2.94"
94.89% Pervious = 20.350 ac 5.11% Impervious = 1.096 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=298,718 sf 3.59% Impervious Runoff Depth>3.13"
Flow Length=912' Tc=21.7 min CN=56 Runoff=15.91 cfs 1.789 af

Subcatchment 2S: Subcatchment #2 Runoff Area=567,294 sf 4.96% Impervious Runoff Depth>4.27"
Flow Length=1,706' Tc=38.6 min UI Adjusted CN=66 Runoff=32.85 cfs 4.633 af

Subcatchment 3S: Subcatchment #3 Runoff Area=68,180 sf 13.06% Impervious Runoff Depth>5.47"
Flow Length=932' Tc=19.7 min CN=76 Runoff=6.79 cfs 0.713 af

Reach 2R: Reach #2 Avg. Flow Depth=0.68' Max Vel=4.84 fps Inflow=37.51 cfs 5.345 af
n=0.022 L=390.0' S=0.0168 '/' Capacity=20.98 cfs Outflow=37.46 cfs 5.339 af

Reach 3R: Reach #3 Avg. Flow Depth=0.23' Max Vel=4.35 fps Inflow=6.79 cfs 0.713 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=6.64 cfs 0.711 af

Reach 100R: Final Reach #100 Inflow=28.73 cfs 5.455 af
Outflow=28.73 cfs 5.455 af

Reach 200R: Final Reach #200 Inflow=20.26 cfs 1.398 af
Outflow=20.26 cfs 1.398 af

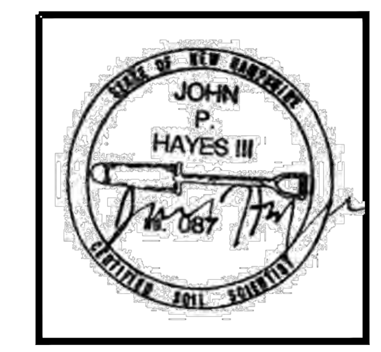
Pond 1P: Pond #1 Peak Elev=197.14' Storage=19,005 cf Inflow=50.33 cfs 7.128 af
.272 af Primary=12.82 cfs 4.832 af Secondary=20.26 cfs 1.398 af Tertiary=15.92 cfs 0.623 af Outflow=50.01 cfs 7.126 af

Total Runoff Area = 21.446 ac Runoff Volume = 7.135 af Average Runoff Depth = 3.99"
94.89% Pervious = 20.350 ac 5.11% Impervious = 1.096 ac

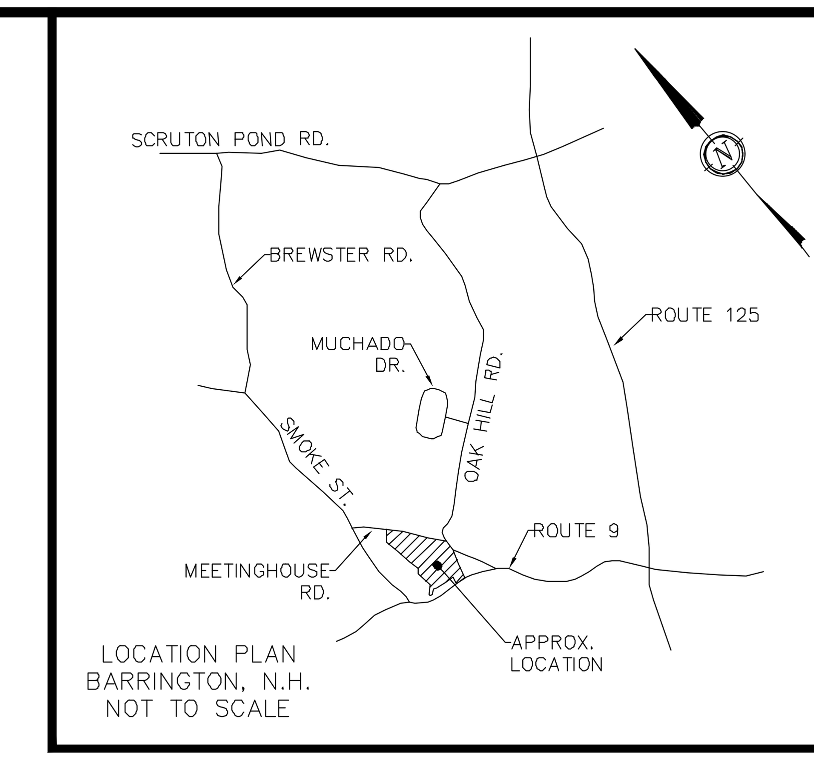
JURISDICTIONAL WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS IN SEPTEMBER OF 2017 AND UPDATED IN SEPTEMBER OF 2022 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014-41:1-42.
5) CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. JANUARY 1987. WETLANDS RESEARCH PROGRAM TECHNICAL REPORT Y-87-1.
6) REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. JANUARY 2012, VERSION 2. U.S. ARMY CORPS OF ENGINEERS. ENVIRONMENTAL LABORATORY ERDC/EL TR-12-1.
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS-79/31.

DEIDRA BENJAMIN, CWS #295



JOHN P. HAYES III, CSS #87



LOCATION PLAN
BARRINGTON, N.H.
NOT TO SCALE

NOTES:

1.) OWNER: TSB CONSTRUCTION, LLC.
44 MERRYFIELD LANE
EAST HAMPSTEAD, NH 03826

2.) TAX MAP 234, LOT 25-1

3.) LOT AREA: 411,188 Sq. Ft., 9.44 Ac.

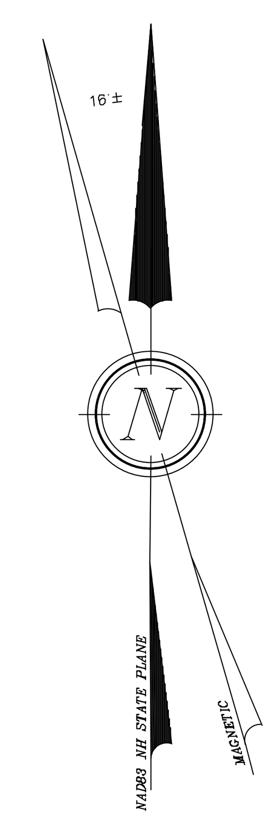
4.) S.C.R.D. BOOK 5050, PAGE 348

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN FLOOD HAZARD REF.: FEMA COMMUNITY# -330178, MAP# - 33017C0285D, DATED: MAY 17, 2005.

6.) VERTICAL DATUM BASED ON USGS NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING TOPCON HIPER SR SURVEY GRADE GPS RECEIVERS.

7.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE EXISTING WATERSHED CONDITIONS OF TAX MAP 234, LOT 25-1.

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.



SITE SPECIFIC SOILS LEGEND

SYMBOL	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
11A	GLOUCESTER SANDY LOAM	A
11B	GLOUCESTER SANDY LOAM	A
11C	GLOUCESTER SANDY LOAM	A
11D	GLOUCESTER SANDY LOAM	A
44B	MONTAUK FINE SANDY LOAM	C
44C	MONTAUK FINE SANDY LOAM	C
44D	MONTAUK FINE SANDY LOAM	C
44E	MONTAUK FINE SANDY LOAM	C
62E	CHARLTON FINE SANDY LOAM	B
62F	CHARLTON FINE SANDY LOAM	B
313B	DEERFIELD LOAMY SAND	B
915B	DEERFIELD VARIANT	B
448B	SCITUATE FINE SANDY LOAM	C
448C	SCITUATE FINE SANDY LOAM	C
448D	SCITUATE FINE SANDY LOAM	C
448E	SCITUATE FINE SANDY LOAM	C
514P	LEICESTER SANDY LOAM	C
514C	LEICESTER SANDY LOAM	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

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
	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:

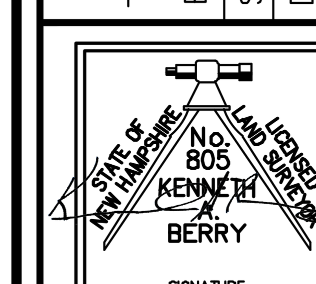
# / #	SUBCATCHMENT AREA SYMBOL
# / #	FLOW REACH SYMBOL
# / #	POND DEVICE SYMBOL
Tc. / #	TIME OF CONCENTRATION SEGMENT

REVISION	DATE	DESCRIPTION
#1	3-15-23	REVS. PER CMA ENGINEERS AND NHDOT COMMENT

W-1 EXISTING CONDITIONS WATERSHED
LAND OF
TSB CONSTRUCTION LLC
FRANKLIN PIERCE HIGHWAY /NH ROUTE 9
BARRINGTON, NH
TAX MAP 234, LOT 25-1

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

SCALE : 1 IN. EQUALS 80 FT.
DATE : JANUARY 18, 2023
FILE NO. : DB 2022 - 051

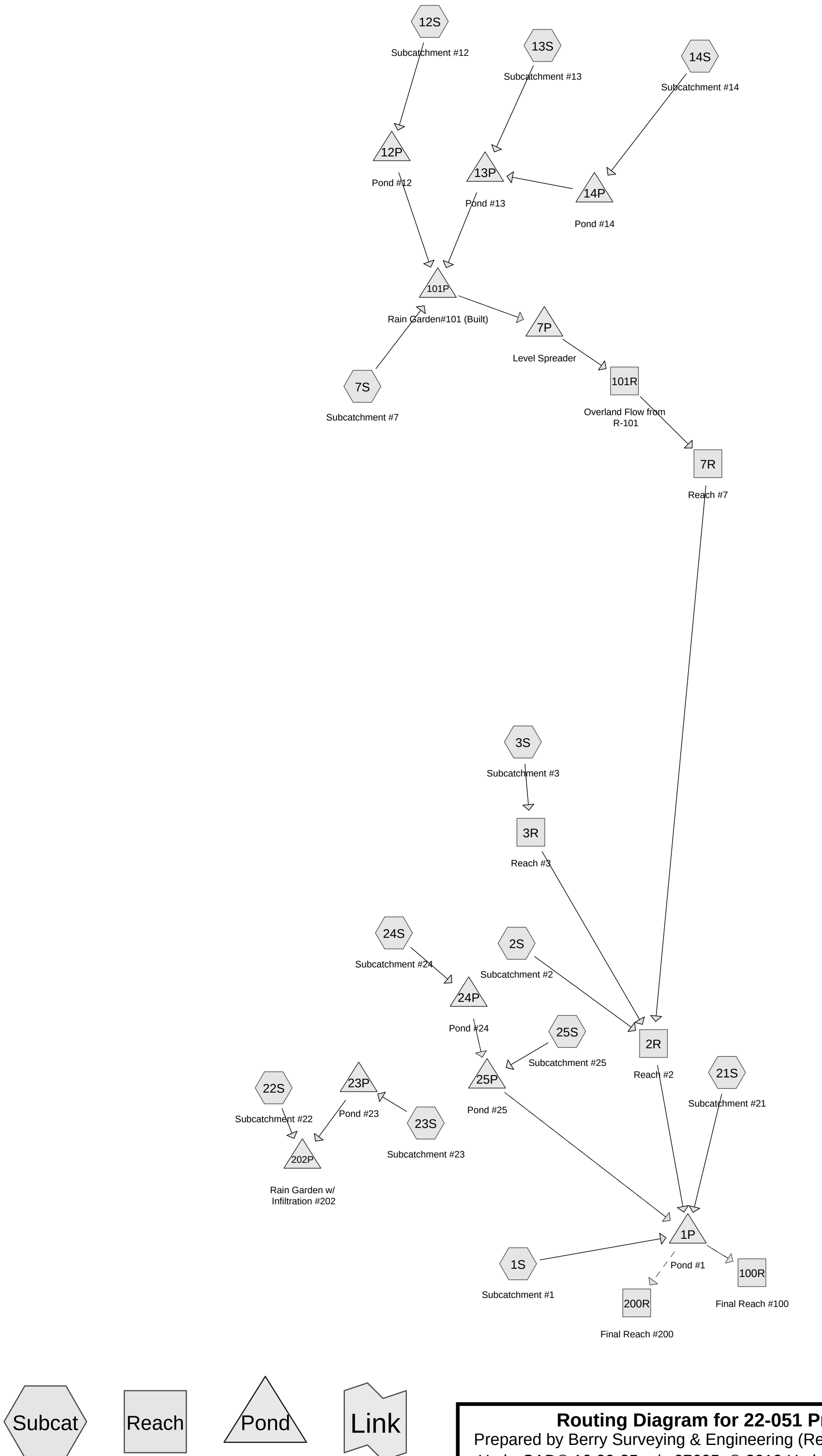


SHEET 1 OF 2

NOT FOR CONSTRUCTION

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



Routing Diagram for 22-051 Proposed Analysis
Prepared by Berry Surveying & Engineering (Rev: 4/13/23), Printed 4/13/2023
HydroCAD® 10.00-25 s/n 07605 © 2019 HydroCAD Software Solutions LLC

Project Notes

While the analyses of Meetinghouse Road encompass a larger area only Subcatchments #1, #2, & #3 contribute runoff to Final Reaches #100 & #200. For this reason only these subcatchments were analyzed in this project. As such the resulting construction surrounding Meetinghouse Road results in a difference of 2.47 acres in contributing land area of the analyzed subcatchments between the pre-construction and post-construction analyses.

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.693	39	>75% Grass cover, Good, HSG A (1S, 2S, 21S, 22S, 23S)
0.931	61	>75% Grass cover, Good, HSG B (1S, 2S, 7S, 21S, 22S, 23S)
3.126	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 7S, 12S, 13S, 14S, 21S, 23S, 24S, 25S)
1.623	80	>75% Grass cover, Good, HSG D (2S, 3S, 12S, 13S)
0.552	98	Paved parking, HSG A (1S, 2S, 21S, 22S, 24S)
0.144	98	Paved parking, HSG B (1S, 2S, 21S, 22S, 24S)
0.430	98	Paved parking, HSG C (2S, 3S, 7S, 12S, 13S, 14S, 21S, 22S, 23S, 24S, 25S)
0.319	98	Paved parking, HSG D (2S, 3S, 12S, 13S, 14S)
0.115	98	Roofs, HSG A (1S, 23S)
0.027	98	Roofs, HSG B (22S, 23S)
0.042	98	Roofs, HSG C (23S, 24S, 25S)
0.098	98	Unconnected roofs, HSG A (2S, 22S)
0.009	98	Unconnected roofs, HSG B (2S)
0.064	98	Unconnected roofs, HSG C (2S, 21S)
0.081	98	Unconnected roofs, HSG D (2S)
1.575	30	Woods, Good, HSG A (1S, 2S, 21S)
0.443	55	Woods, Good, HSG B (2S, 21S, 22S, 23S)
6.140	70	Woods, Good, HSG C (1S, 2S, 3S, 12S, 13S, 21S, 22S, 23S, 24S, 25S)
0.566	77	Woods, Good, HSG D (2S, 3S)
18.980	**66**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.034	HSG A	1S, 2S, 21S, 22S, 23S, 24S
1.554	HSG B	1S, 2S, 7S, 21S, 22S, 23S, 24S
9.802	HSG C	1S, 2S, 3S, 7S, 12S, 13S, 14S, 21S, 22S, 23S, 24S, 25S
2.590	HSG D	2S, 3S, 12S, 13S, 14S
0.000	Other	
18.980		**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
2.693	0.931	3.126	1.623	0.000	8.374	>75% Grass cover, Good	1S, 2S, 3S, 7S, 12S, 13S, 14S, 21S, 22S, 23S, 24S, 25S
0.552	0.144	0.430	0.319	0.000	1.446	Paved parking	1S, 2S, 3S, 7S, 12S, 13S, 14S, 21S, 22S, 23S, 24S, 25S
0.115	0.027	0.042	0.000	0.000	0.184	Roofs	1S, 22S, 23S, 24S, 25S
0.098	0.009	0.064	0.081	0.000	0.252	Unconnected roofs	2S, 21S, 22S
1.575	0.443	6.140	0.566	0.000	8.724	Woods, Good	1S, 2S, 3S, 12S, 13S, 21S, 22S, 23S, 24S, 25S
5.034	**1.554**	**9.802**	**2.590**	**0.000**	**18.980**	**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	1P	194.12	193.74	40.5	0.0094	0.012	18.0	0.0	0.0
2	12P	269.20	269.00	40.0	0.0050	0.012	15.0	0.0	0.0
3	13P	271.00	270.00	45.0	0.0222	0.012	18.0	0.0	0.0
4	14P	271.50	271.10	21.9	0.0183	0.012	12.0	0.0	0.0
5	23P	224.00	219.00	65.0	0.0769	0.012	15.0	0.0	0.0
6	24P	208.50	208.00	38.0	0.0132	0.012	15.0	0.0	0.0
7	25P	200.50	197.50	38.0	0.0789	0.012	18.0	0.0	0.0
8	101P	263.40	263.28	24.0	0.0050	0.012	24.0	0.0	0.0

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	While the analyses of Meetinghouse Road encompass a larger area only Subcatchments #1, #2, & #3 contribute runoff to Final Reaches #100 & #200. For this reason only these subcatchments were analyzed in this project. As such the resulting construction surrounding Meetinghouse Road results in a difference of 2.47 acres in contributing land area of the analyzed subcatchments between the pre-construction and post-construction analyses.

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=110,110 sf 12.30% Impervious Runoff Depth>0.87"
Flow Length=145' Tc=7.9 min CN=47 Runoff=1.57 cfs 0.183 af

Subcatchment 2S: Subcatchment #2 Runoff Area=394,636 sf 7.55% Impervious Runoff Depth>2.31"
Flow Length=1,118' Tc=37.4 min CN=66 Runoff=12.28 cfs 1.743 af

Subcatchment 3S: Subcatchment #3 Runoff Area=28,734 sf 17.82% Impervious Runoff Depth>3.54"
Tc=6.0 min CN=79 Runoff=2.68 cfs 0.195 af

Subcatchment 7S: Subcatchment #7 Runoff Area=19,980 sf 10.51% Impervious Runoff Depth>3.24"
Flow Length=721' Tc=12.7 min CN=76 Runoff=1.39 cfs 0.124 af

Subcatchment 12S: Subcatchment #12 Runoff Area=47,185 sf 2.86% Impervious Runoff Depth>2.86"
Flow Length=485' Tc=18.5 min CN=72 Runoff=2.52 cfs 0.258 af

Subcatchment 13S: Subcatchment #13 Runoff Area=30,563 sf 5.93% Impervious Runoff Depth>2.86"
Flow Length=400' Tc=17.4 min CN=72 Runoff=1.67 cfs 0.167 af

Subcatchment 14S: Subcatchment #14 Runoff Area=6,937 sf 53.05% Impervious Runoff Depth>4.37"
Tc=6.0 min CN=87 Runoff=0.78 cfs 0.058 af

Subcatchment 21S: Subcatchment #21 Runoff Area=18,611 sf 24.79% Impervious Runoff Depth>3.05"
Flow Length=312' Tc=14.4 min CN=74 Runoff=1.17 cfs 0.109 af

Subcatchment 22S: Subcatchment #22 Runoff Area=41,415 sf 15.74% Impervious Runoff Depth>1.82"
Flow Length=442' Tc=13.2 min CN=60 Runoff=1.50 cfs 0.144 af

Subcatchment 23S: Subcatchment #23 Runoff Area=57,287 sf 2.85% Impervious Runoff Depth>2.59"
Flow Length=348' Tc=10.1 min CN=69 Runoff=3.41 cfs 0.284 af

Subcatchment 24S: Subcatchment #24 Runoff Area=63,055 sf 13.75% Impervious Runoff Depth>3.15"
Flow Length=340' Tc=10.2 min CN=75 Runoff=4.60 cfs 0.380 af

Subcatchment 25S: Subcatchment #25 Runoff Area=8,261 sf 38.37% Impervious Runoff Depth>3.95"
Tc=6.0 min CN=83 Runoff=0.85 cfs 0.062 af

Reach 2R: Reach #2 Avg. Flow Depth=0.40' Max Vel=4.05 fps Inflow=14.33 cfs 2.489 af
n=0.022 L=31.0' S=0.0213 '/' Capacity=23.64 cfs Outflow=14.32 cfs 2.488 af

Reach 3R: Reach #3 Avg. Flow Depth=0.14' Max Vel=3.16 fps Inflow=2.68 cfs 0.195 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=2.34 cfs 0.194 af

Reach 7R: Reach #7 Avg. Flow Depth=0.10' Max Vel=3.07 fps Inflow=1.38 cfs 0.553 af
n=0.022 L=772.0' S=0.0762 '/' Capacity=44.74 cfs Outflow=1.38 cfs 0.552 af

Reach 100R: Final Reach #100 Inflow=11.11 cfs 2.915 af
Outflow=11.11 cfs 2.915 af

Reach 101R: Overland Flow from R-101 Avg. Flow Depth=0.16' Max Vel=1.58 fps Inflow=1.38 cfs 0.553 af
n=0.045 L=32.0' S=0.0469 '/' Capacity=17.15 cfs Outflow=1.38 cfs 0.553 af

Reach 200R: Final Reach #200 Inflow=3.87 cfs 0.149 af
Outflow=3.87 cfs 0.149 af

Pond 1P: Pond #1 Peak Elev=196.57' Storage=10,734 cf Inflow=17.77 cfs 3.222 af
0.157 af Primary=11.11 cfs 2.915 af Secondary=3.87 cfs 0.149 af Tertiary=0.00 cfs 0.000 af Outflow=16.00 cfs 3.221 af

Pond 7P: Level Spreader Peak Elev=264.08' Storage=519 cf Inflow=1.38 cfs 0.564 af
Outflow=1.38 cfs 0.553 af

Pond 12P: Pond #12 Peak Elev=270.20' Storage=0 cf Inflow=2.52 cfs 0.258 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=2.52 cfs 0.258 af

Pond 13P: Pond #13 Peak Elev=271.66' Storage=14 cf Inflow=2.07 cfs 0.225 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0222 '/' Outflow=2.07 cfs 0.225 af

Pond 14P: Pond #14 Peak Elev=271.95' Storage=6 cf Inflow=0.78 cfs 0.058 af
12.0" Round Culvert n=0.012 L=21.9' S=0.0183 '/' Outflow=0.78 cfs 0.058 af

Pond 23P: Pond #23 Peak Elev=224.93' Storage=543 cf Inflow=3.41 cfs 0.284 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0769 '/' Outflow=3.24 cfs 0.283 af

Pond 24P: Pond #24 Peak Elev=209.72' Storage=27 cf Inflow=4.60 cfs 0.380 af
Primary=4.59 cfs 0.380 af Secondary=0.00 cfs 0.000 af Outflow=4.59 cfs 0.380 af

Pond 25P: Pond #25 Peak Elev=201.65' Storage=96 cf Inflow=5.28 cfs 0.442 af
Primary=5.29 cfs 0.442 af Secondary=0.00 cfs 0.000 af Outflow=5.29 cfs 0.442 af

Pond 101P: Rain Garden#101 (Built) Peak Elev=267.16' Storage=9,858 cf Inflow=5.85 cfs 0.607 af
Primary=1.38 cfs 0.564 af Secondary=0.00 cfs 0.000 af Outflow=1.38 cfs 0.564 af

Pond 202P: Rain Garden w/ Infiltration #202 Peak Elev=215.77' Storage=9,669 cf Inflow=4.73 cfs 0.427 af
Outflow=0.28 cfs 0.298 af

Total Runoff Area = 18.980 ac Runoff Volume = 3.707 af Average Runoff Depth = 2.34"
90.08% Pervious = 17.098 ac 9.92% Impervious = 1.882 ac

Summary for Subcatchment 1S: Subcatchment #1

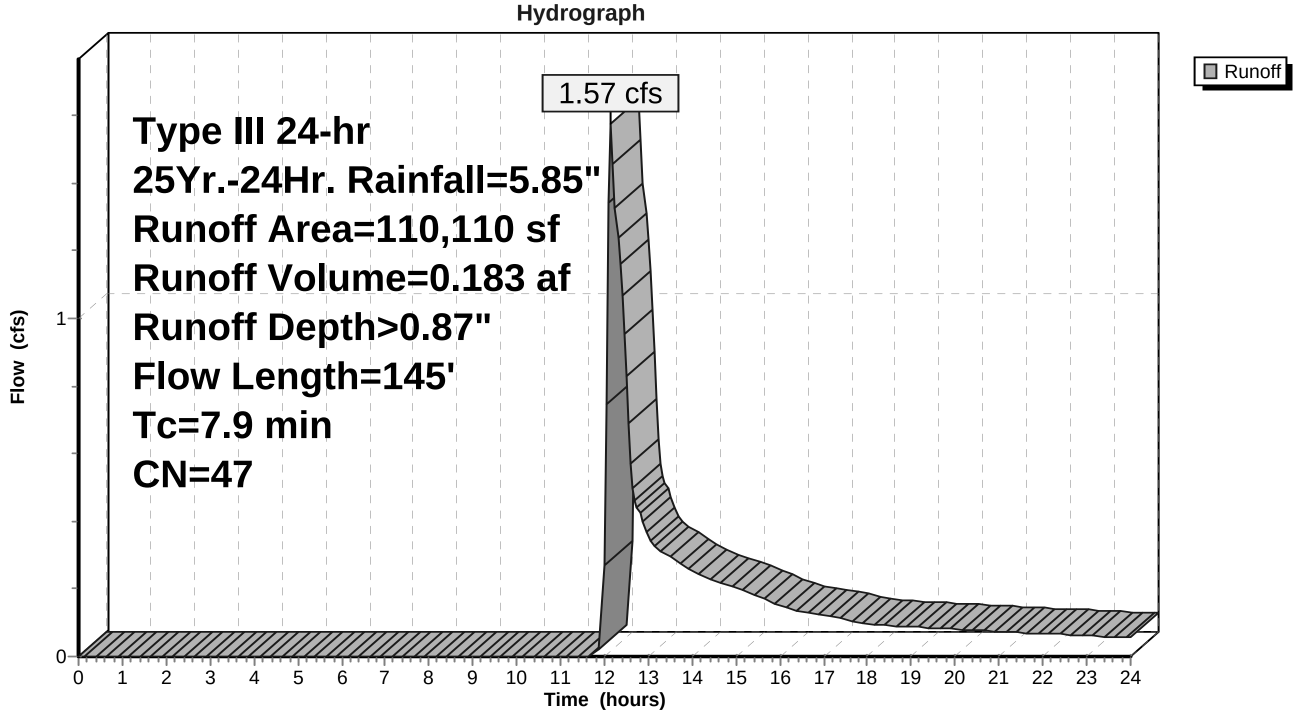
Runoff = 1.57 cfs @ 12.16 hrs, Volume= 0.183 af, Depth> 0.87"

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
4,968	98	Roofs, HSG A
26,401	39	>75% Grass cover, Good, HSG A
8,559	98	Paved parking, HSG A
50,493	30	Woods, Good, HSG A
7,119	61	>75% Grass cover, Good, HSG B
16	98	Paved parking, HSG B
7,711	74	>75% Grass cover, Good, HSG C
4,843	70	Woods, Good, HSG C
110,110	47	Weighted Average
96,567		87.70% Pervious Area
13,543		12.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	77	0.1823	0.17		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.6	68	0.1332	1.82		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
7.9	145	Total			

Subcatchment 1S: Subcatchment #1



Summary for Subcatchment 2S: Subcatchment #2

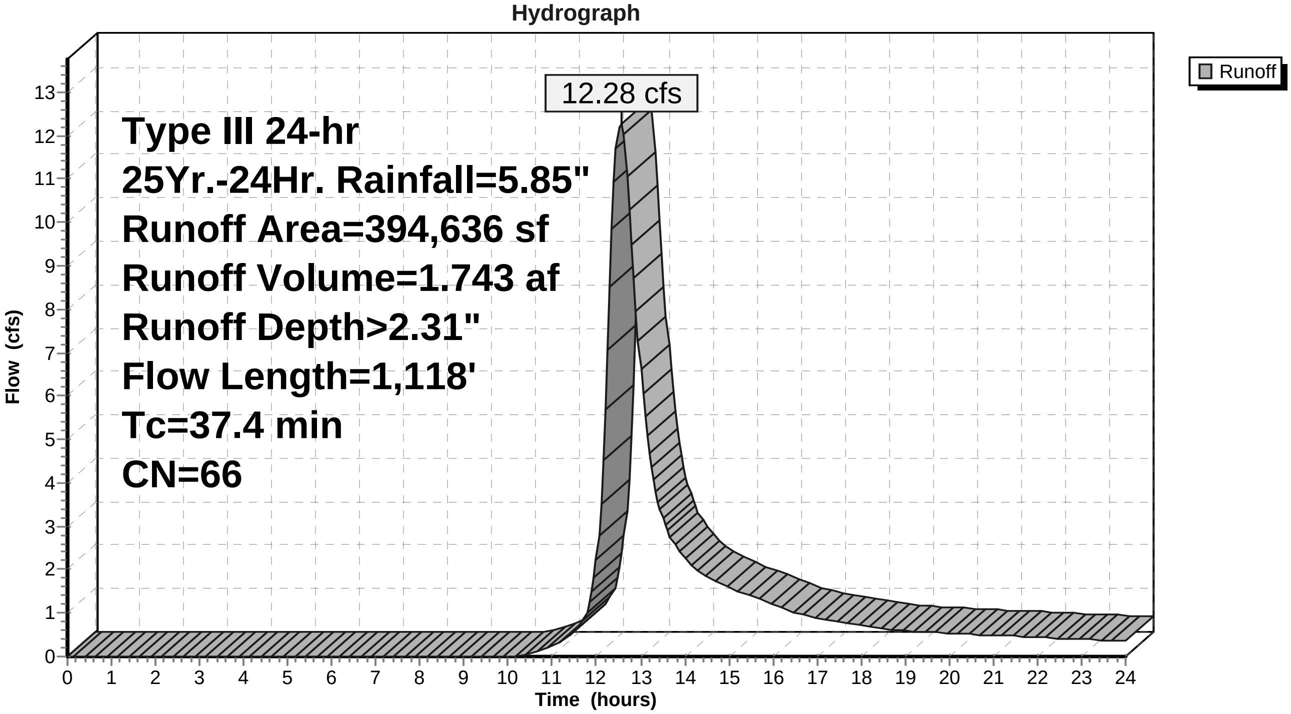
Runoff = 12.28 cfs @ 12.55 hrs, Volume= 1.743 af, Depth> 2.31"

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
3,856	98	Unconnected roofs, HSG A
389	98	Unconnected roofs, HSG B
2,494	98	Unconnected roofs, HSG C
3,549	98	Unconnected roofs, HSG D
74,868	39	>75% Grass cover, Good, HSG A
21,849	61	>75% Grass cover, Good, HSG B
48,235	74	>75% Grass cover, Good, HSG C
60,403	80	>75% Grass cover, Good, HSG D
8,483	98	Paved parking, HSG A
4,101	98	Paved parking, HSG B
530	98	Paved parking, HSG C
6,387	98	Paved parking, HSG D
17,053	30	Woods, Good, HSG A
5,351	55	Woods, Good, HSG B
119,594	70	Woods, Good, HSG C
17,494	77	Woods, Good, HSG D
394,636	66	Weighted Average
364,847		92.45% Pervious Area
29,789		7.55% Impervious Area
10,288		34.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.9	100	0.0200	0.08		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
10.2	525	0.0295	0.86		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
2.1	172	0.0754	1.37		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
3.2	321	0.1151	1.70		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
37.4	1,118	Total			

Subcatchment 2S: Subcatchment #2



Summary for Subcatchment 3S: Subcatchment #3

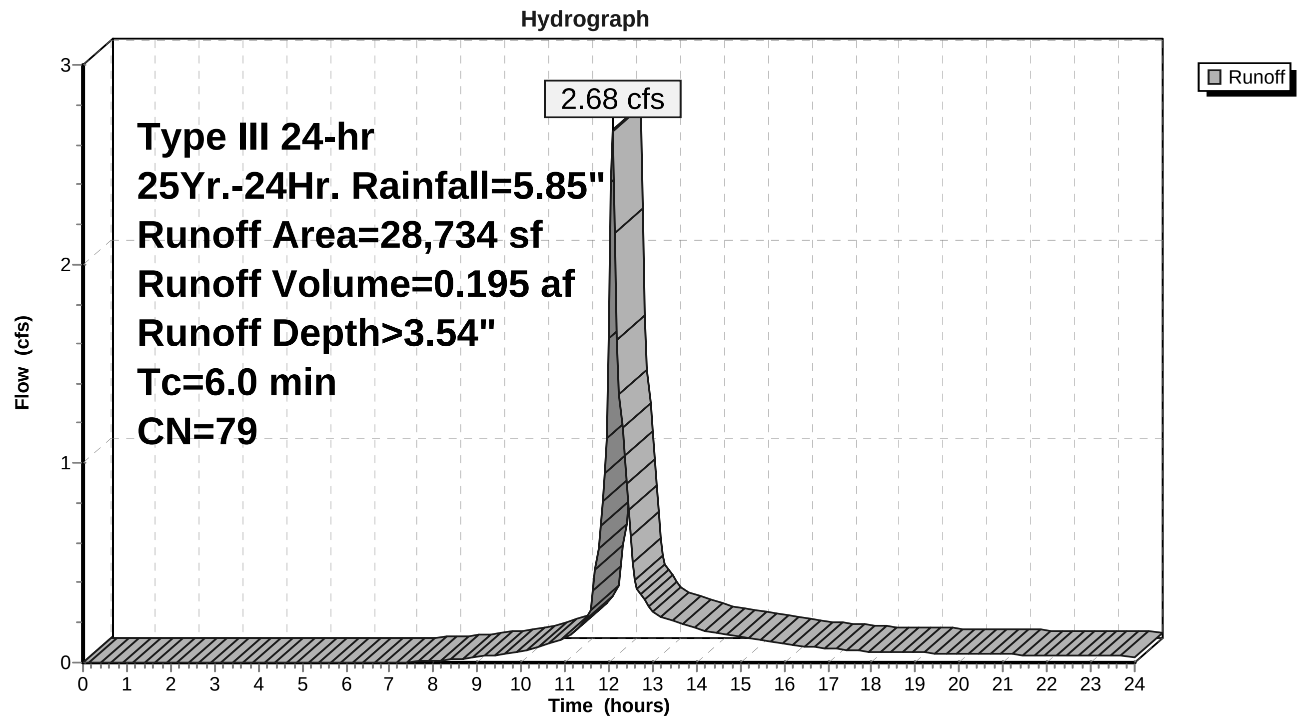
Runoff = 2.68 cfs @ 12.09 hrs, Volume= 0.195 af, Depth> 3.54"

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
583	74	>75% Grass cover, Good, HSG C
5,749	80	>75% Grass cover, Good, HSG D
822	98	Paved parking, HSG C
4,299	98	Paved parking, HSG D
10,131	70	Woods, Good, HSG C
7,150	77	Woods, Good, HSG D
28,734	79	Weighted Average
23,613		82.18% Pervious Area
5,121		17.82% Impervious Area

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

Subcatchment 3S: Subcatchment #3



Summary for Subcatchment 7S: Subcatchment #7

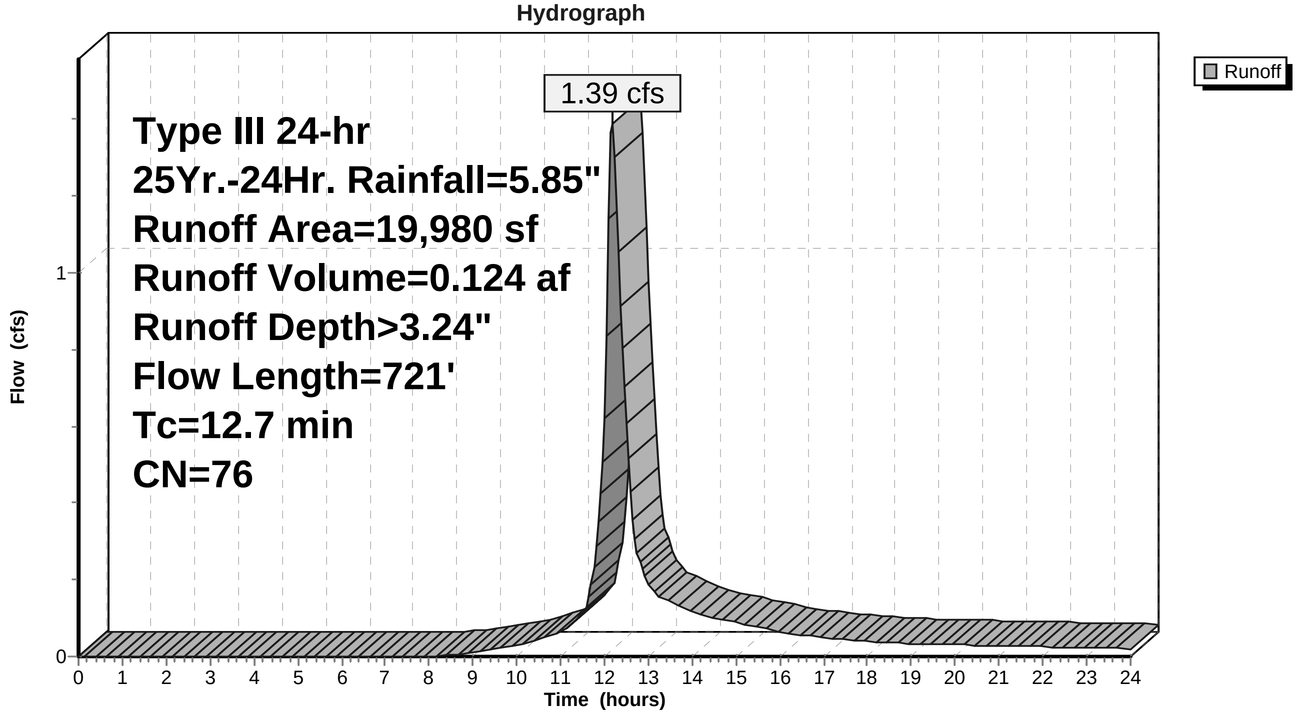
Runoff = 1.39 cfs @ 12.18 hrs, Volume= 0.124 af, Depth> 3.24"

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

Area (sf)	CN	Description
963	61	>75% Grass cover, Good, HSG B
16,917	74	>75% Grass cover, Good, HSG C
2,100	98	Paved parking, HSG C
19,980	76	Weighted Average
17,880		89.49% Pervious Area
2,100		10.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.1600	0.17		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.9	116	0.1726	2.08		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.5	76	0.1570	2.77		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
0.2	64	0.0625	5.08		**Shallow Concentrated Flow, Segment #4** Paved Kv= 20.3 fps
0.9	100	0.0700	1.85		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
0.7	265	0.0135	6.24	37.41	**Trap/Vee/Rect Channel Flow, Segment #6** Bot.W=4.00' D=1.00' Z= 2.0 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
12.7	721	Total			

Subcatchment 7S: Subcatchment #7



Summary for Subcatchment 12S: Subcatchment #12

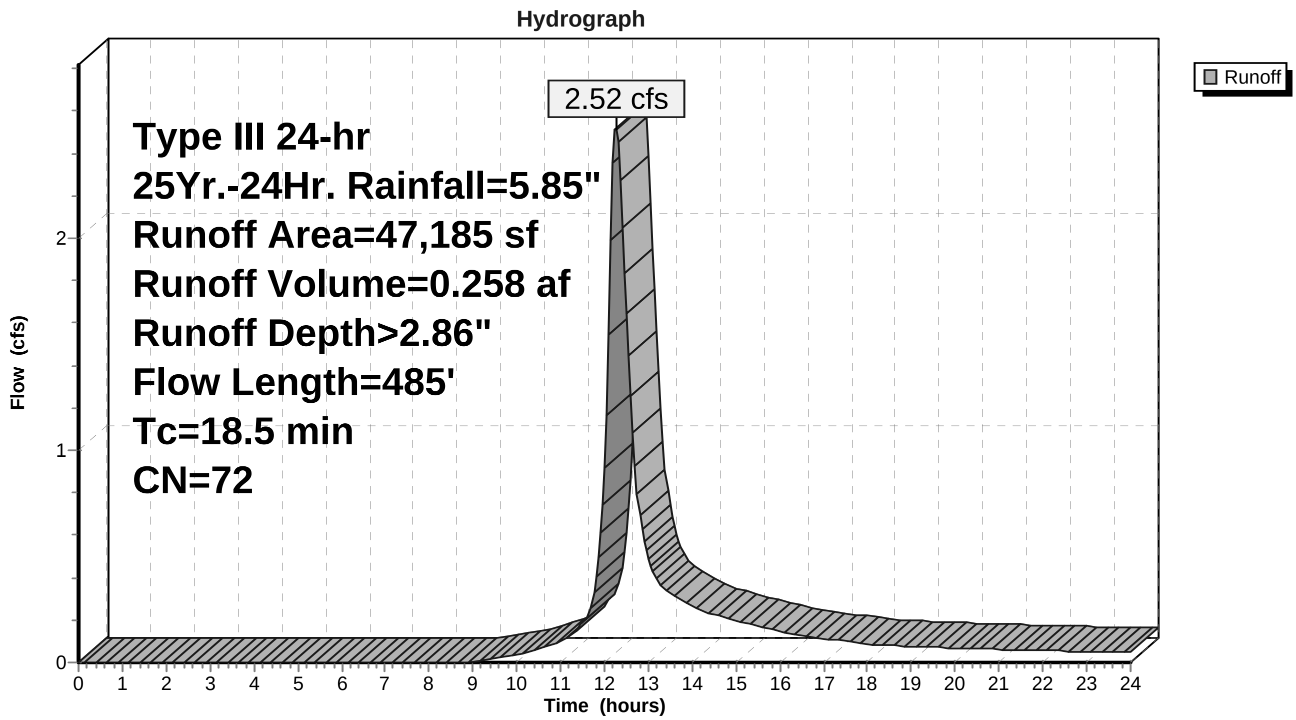
Runoff = 2.52 cfs @ 12.26 hrs, Volume= 0.258 af, Depth> 2.86"

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
7,608	74	>75% Grass cover, Good, HSG C
4,476	80	>75% Grass cover, Good, HSG D
103	98	Paved parking, HSG C
1,246	98	Paved parking, HSG D
33,752	70	Woods, Good, HSG C
47,185	72	Weighted Average
45,836		97.14% Pervious Area
1,349		2.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0600	0.12		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
3.0	253	0.0790	1.41		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
1.4	132	0.0531	1.61		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
18.5	485	Total			

Subcatchment 12S: Subcatchment #12



Summary for Subcatchment 13S: Subcatchment #13

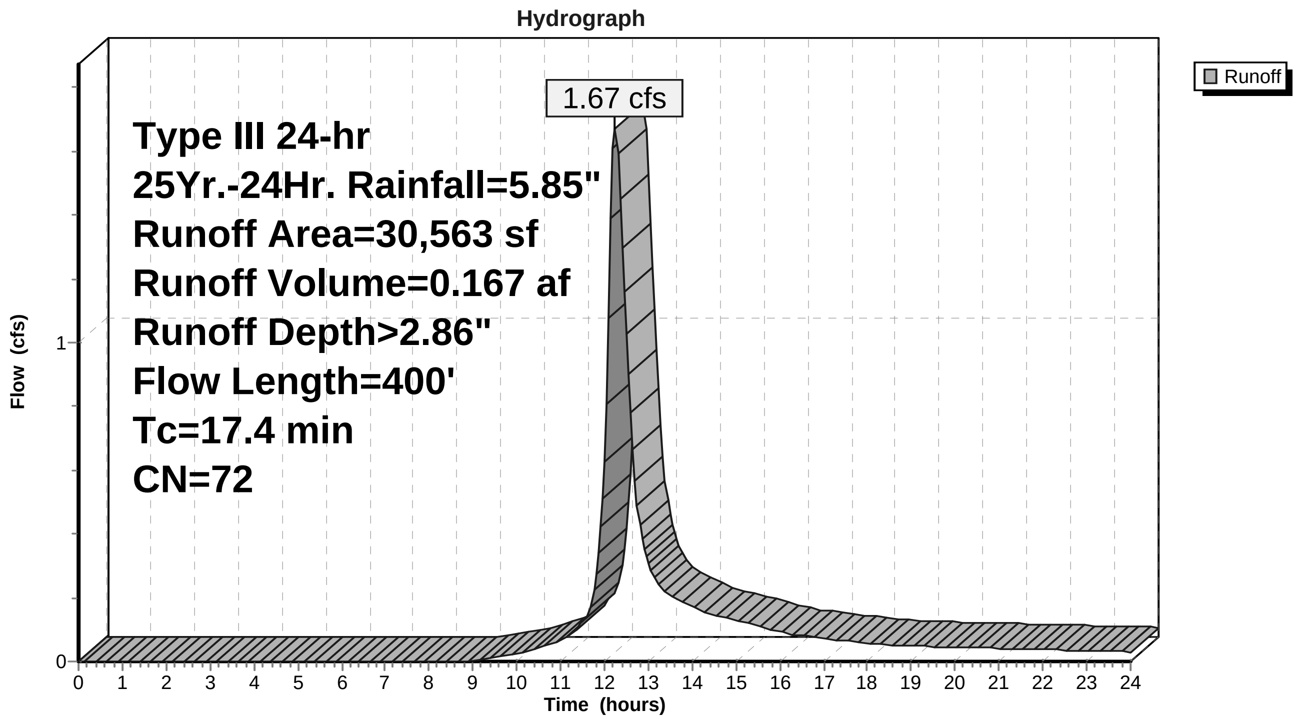
Runoff = 1.67 cfs @ 12.25 hrs, Volume= 0.167 af, Depth> 2.86"

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
4,701	74	>75% Grass cover, Good, HSG C
83	80	>75% Grass cover, Good, HSG D
940	98	Paved parking, HSG C
872	98	Paved parking, HSG D
23,967	70	Woods, Good, HSG C
30,563	72	Weighted Average
28,751		94.07% Pervious Area
1,812		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1	100	0.0600	0.12		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
3.3	300	0.0901	1.50		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
17.4	400	Total			

Subcatchment 13S: Subcatchment #13



Summary for Subcatchment 14S: Subcatchment #14

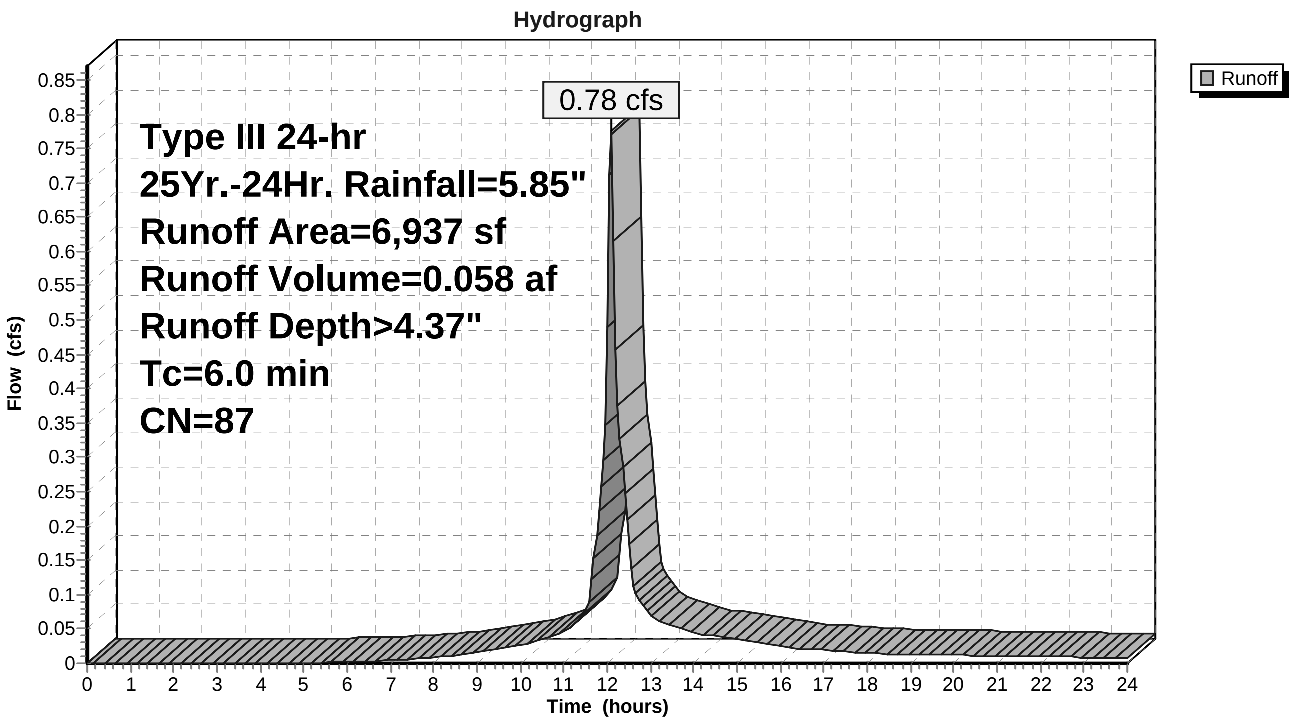
Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.058 af, Depth> 4.37"

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

Area (sf)	CN	Description
3,257	74	>75% Grass cover, Good, HSG C
2,589	98	Paved parking, HSG C
1,091	98	Paved parking, HSG D
6,937	87	Weighted Average
3,257		46.95% Pervious Area
3,680		53.05% Impervious Area

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

Subcatchment 14S: Subcatchment #14



Summary for Subcatchment 21S: Subcatchment #21

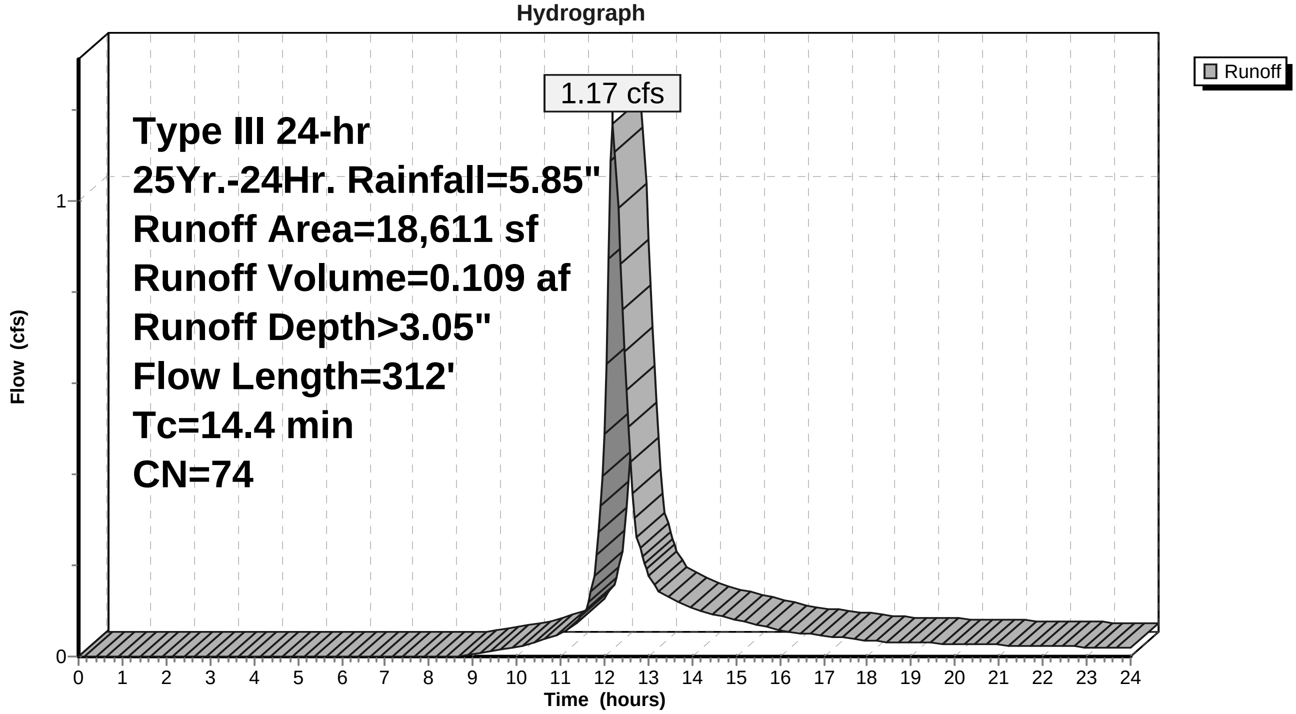
Runoff = 1.17 cfs @ 12.20 hrs, Volume= 0.109 af, Depth> 3.05"

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
442	39	>75% Grass cover, Good, HSG A
1,531	98	Paved parking, HSG A
1,079	30	Woods, Good, HSG A
3,013	61	>75% Grass cover, Good, HSG B
1,338	98	Paved parking, HSG B
544	55	Woods, Good, HSG B
273	98	Unconnected roofs, HSG C
8,262	74	>75% Grass cover, Good, HSG C
1,471	98	Paved parking, HSG C
658	70	Woods, Good, HSG C
18,611	74	Weighted Average
13,998		75.21% Pervious Area
4,613		24.79% Impervious Area
273		5.92% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.1000	0.14		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.3	30	0.1007	1.59		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.5	76	0.2889	2.69		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
2.1	106	0.0282	0.84		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
14.4	312	Total			

Subcatchment 21S: Subcatchment #21



Summary for Subcatchment 22S: Subcatchment #22

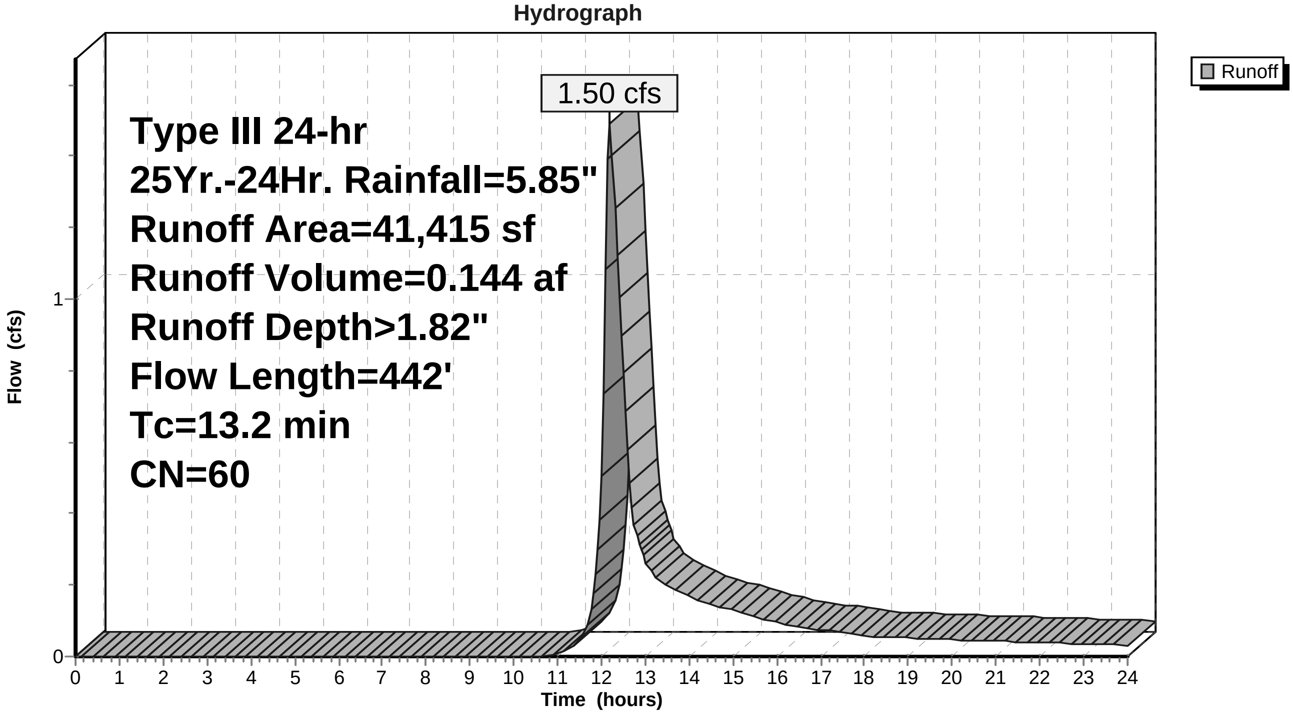
Runoff = 1.50 cfs @ 12.20 hrs, Volume= 0.144 af, Depth> 1.82"

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
432	98	Unconnected roofs, HSG A
15,020	39	>75% Grass cover, Good, HSG A
3,076	98	Paved parking, HSG A
395	98	Roofs, HSG B
2,730	61	>75% Grass cover, Good, HSG B
212	98	Paved parking, HSG B
6,235	55	Woods, Good, HSG B
2,405	98	Paved parking, HSG C
10,910	70	Woods, Good, HSG C
41,415	60	Weighted Average
34,895		84.26% Pervious Area
6,520		15.74% Impervious Area
432		6.63% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	67	0.1272	0.15		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
3.6	33	0.1960	0.15		**Sheet Flow, Segment #2** Woods: Light underbrush n= 0.400 P2= 3.08"
1.3	231	0.3358	2.90		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
0.7	111	0.1579	2.78		**Shallow Concentrated Flow, Segment #4** Short Grass Pasture Kv= 7.0 fps
13.2	442	Total			

Subcatchment 22S: Subcatchment #22



Summary for Subcatchment 23S: Subcatchment #23

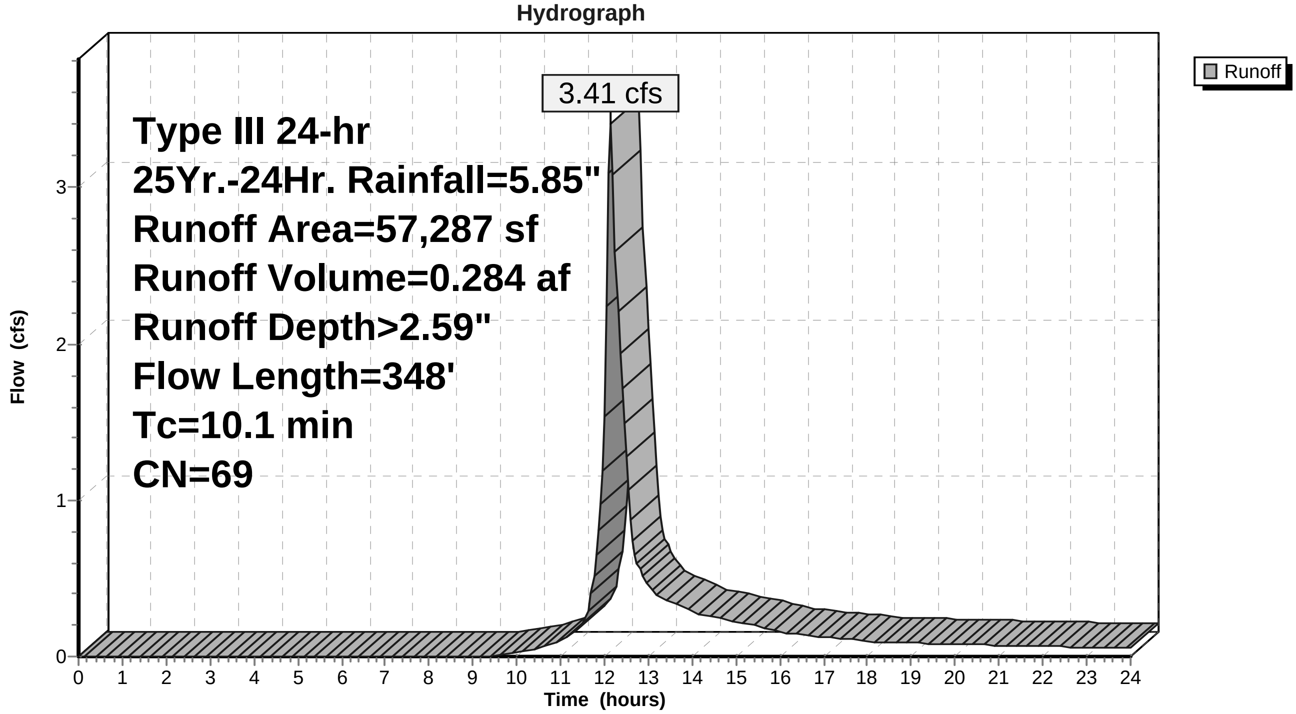
Runoff = 3.41 cfs @ 12.15 hrs, Volume= 0.284 af, Depth> 2.59"

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
61	98	Roofs, HSG A
575	39	>75% Grass cover, Good, HSG A
767	98	Roofs, HSG B
4,895	61	>75% Grass cover, Good, HSG B
7,160	55	Woods, Good, HSG B
529	98	Roofs, HSG C
10,113	74	>75% Grass cover, Good, HSG C
276	98	Paved parking, HSG C
32,911	70	Woods, Good, HSG C
57,287	69	Weighted Average
55,654		97.15% Pervious Area
1,633		2.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.2000	0.19		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
1.1	184	0.3147	2.80		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.3	64	0.2814	3.71		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
10.1	348	Total			

Subcatchment 23S: Subcatchment #23



Summary for Subcatchment 24S: Subcatchment #24

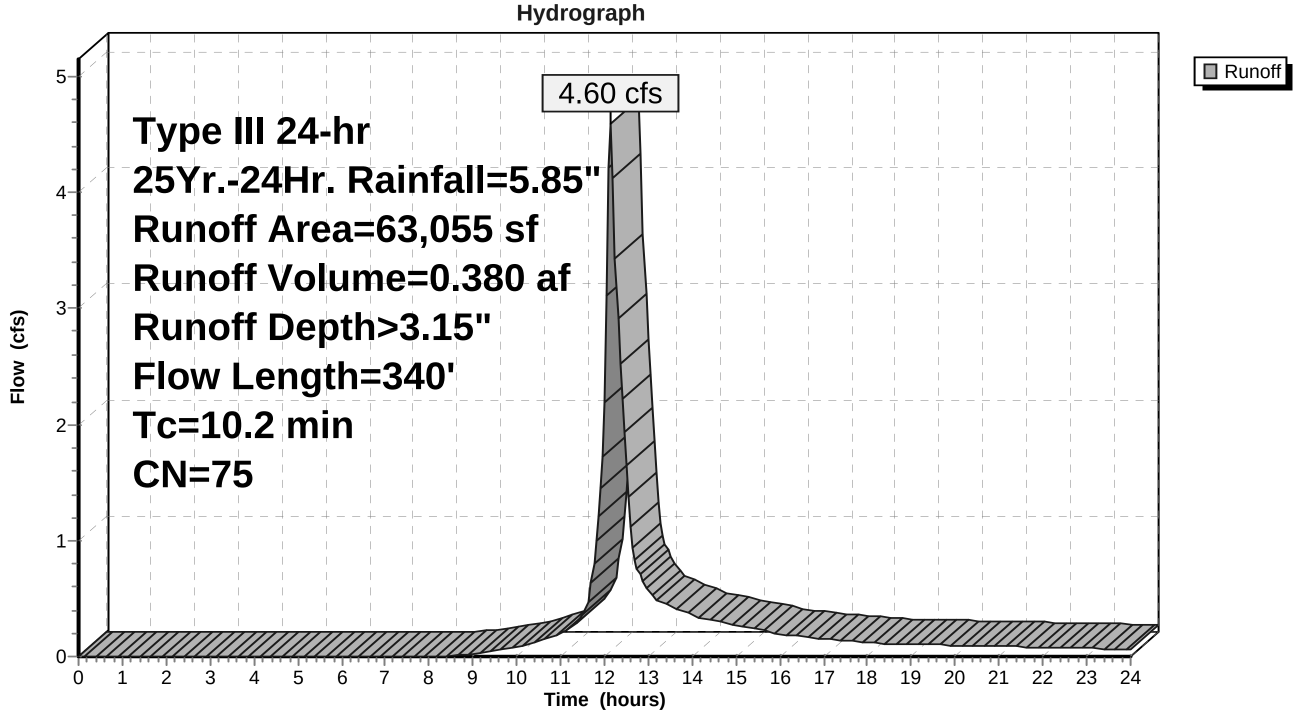
Runoff = 4.60 cfs @ 12.15 hrs, Volume= 0.380 af, Depth> 3.15"

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
2,405	98	Paved parking, HSG A
601	98	Paved parking, HSG B
1,058	98	Roofs, HSG C
24,321	74	>75% Grass cover, Good, HSG C
4,603	98	Paved parking, HSG C
30,067	70	Woods, Good, HSG C
63,055	75	Weighted Average
54,388		86.25% Pervious Area
8,667		13.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.2100	0.20		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
1.1	175	0.2852	2.67		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.6	65	0.1228	1.75		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
10.2	340	Total			

Subcatchment 24S: Subcatchment #24



Summary for Subcatchment 25S: Subcatchment #25

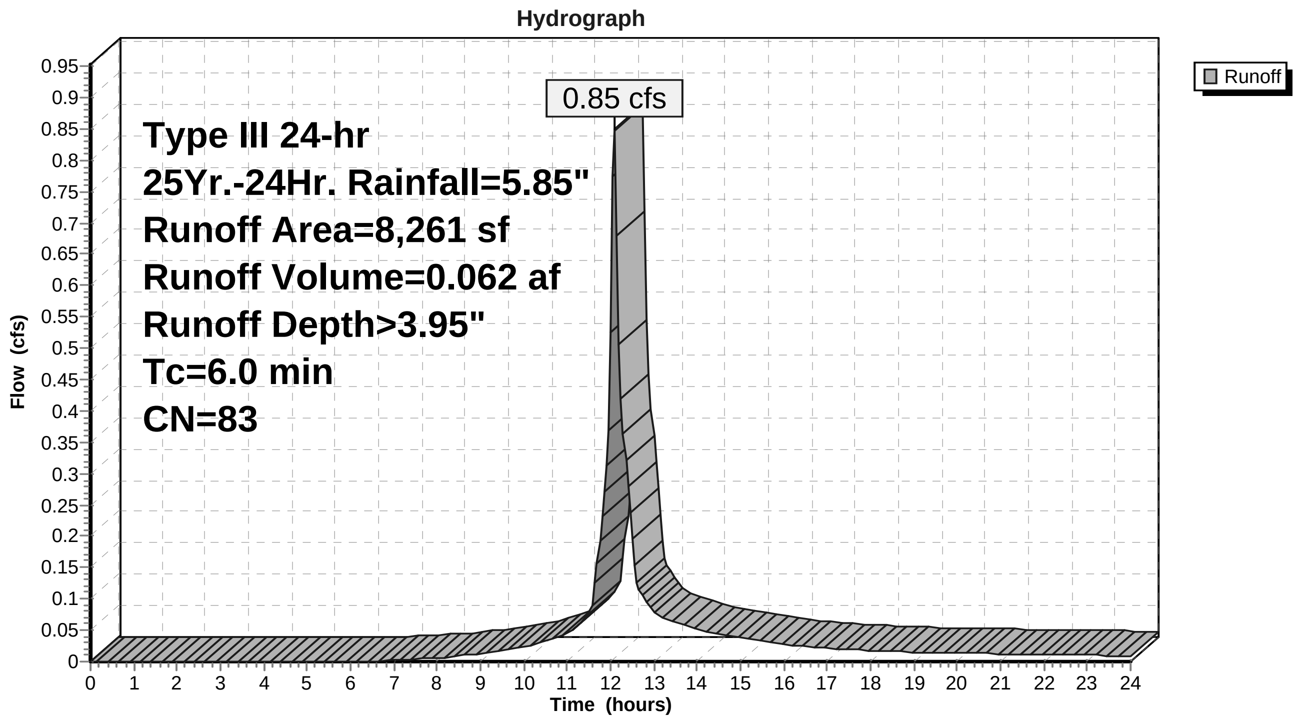
Runoff = 0.85 cfs @ 12.09 hrs, Volume= 0.062 af, Depth> 3.95"

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
257	98	Roofs, HSG C
4,481	74	>75% Grass cover, Good, HSG C
2,913	98	Paved parking, HSG C
610	70	Woods, Good, HSG C
8,261	83	Weighted Average
5,091		61.63% Pervious Area
3,170		38.37% Impervious Area

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

Subcatchment 25S: Subcatchment #25



Summary for Reach 2R: Reach #2

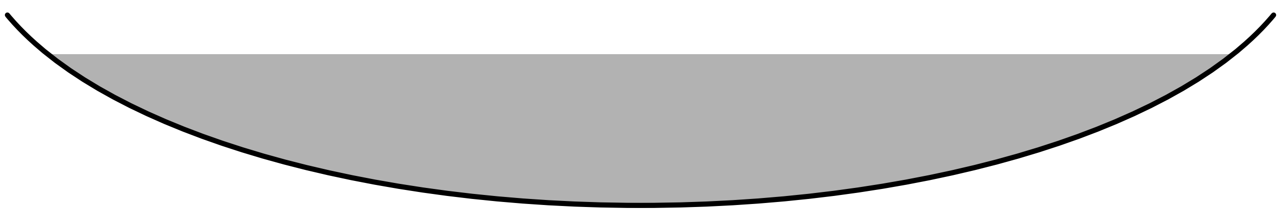
[62] Hint: Exceeded Reach 3R OUTLET depth by 0.32' @ 12.60 hrs
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.30' @ 12.50 hrs

Inflow Area = 12.122 ac, 8.30% Impervious, Inflow Depth > 2.46" for 25Yr.-24Hr. event
Inflow = 14.33 cfs @ 12.52 hrs, Volume= 2.489 af
Outflow = 14.32 cfs @ 12.53 hrs, Volume= 2.488 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.05 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 0.3 min

Peak Storage= 110 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 23.64 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 31.0' Slope= 0.0213 '/'
Inlet Invert= 200.66', Outlet Invert= 200.00'



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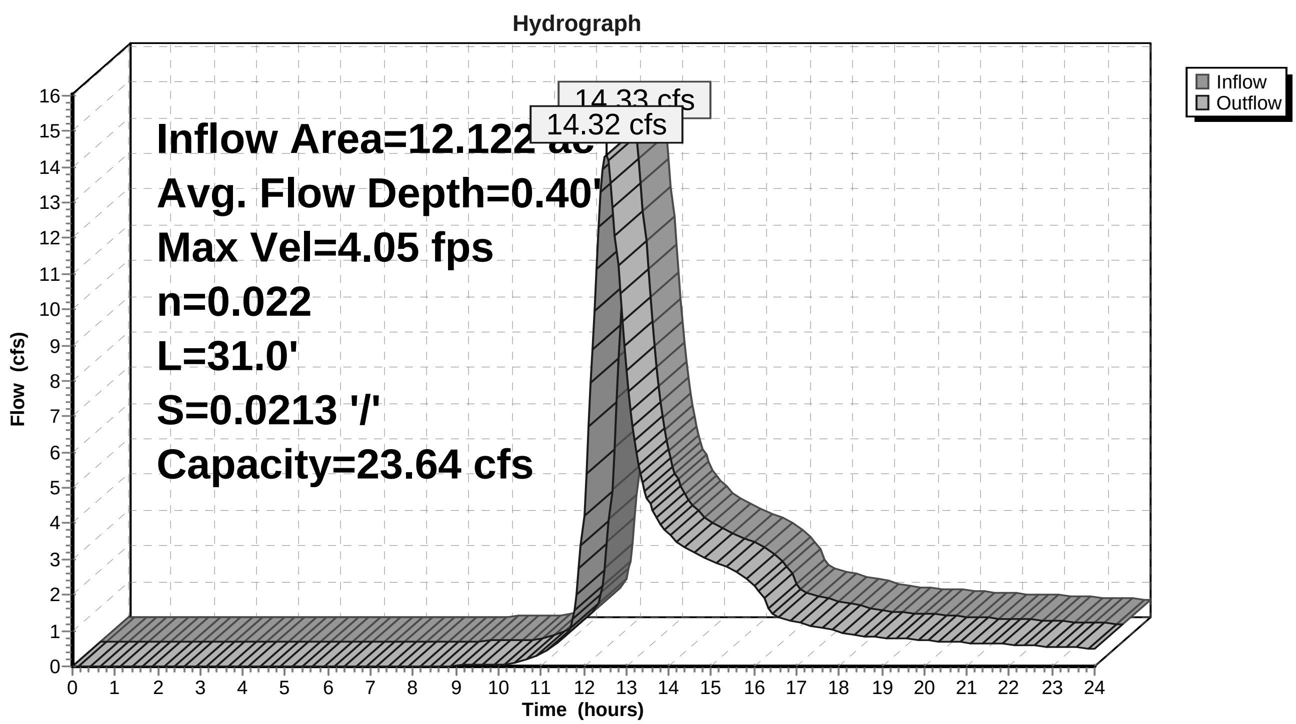
Reach 2R: Reach #2



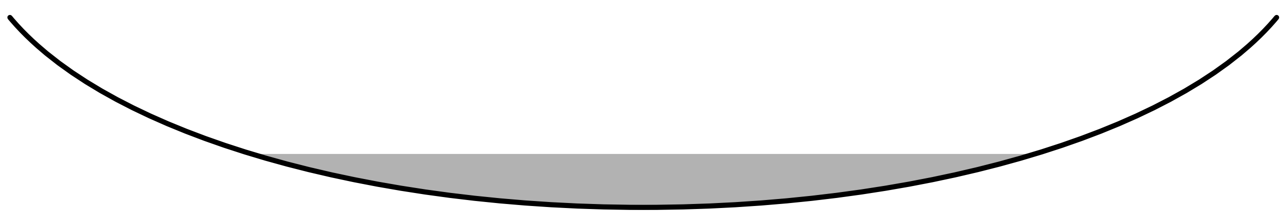
Summary for Reach 3R: Reach #3

Inflow Area = 0.660 ac, 17.82% Impervious, Inflow Depth > 3.54" for 25Yr.-24Hr. event
Inflow = 2.68 cfs @ 12.09 hrs, Volume= 0.195 af
Outflow = 2.34 cfs @ 12.14 hrs, Volume= 0.194 af, Atten= 13%, Lag= 3.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.16 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 13.0 min

Peak Storage= 645 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 36.82 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 868.8' Slope= 0.0516 '/'
Inlet Invert= 245.52', Outlet Invert= 200.66'



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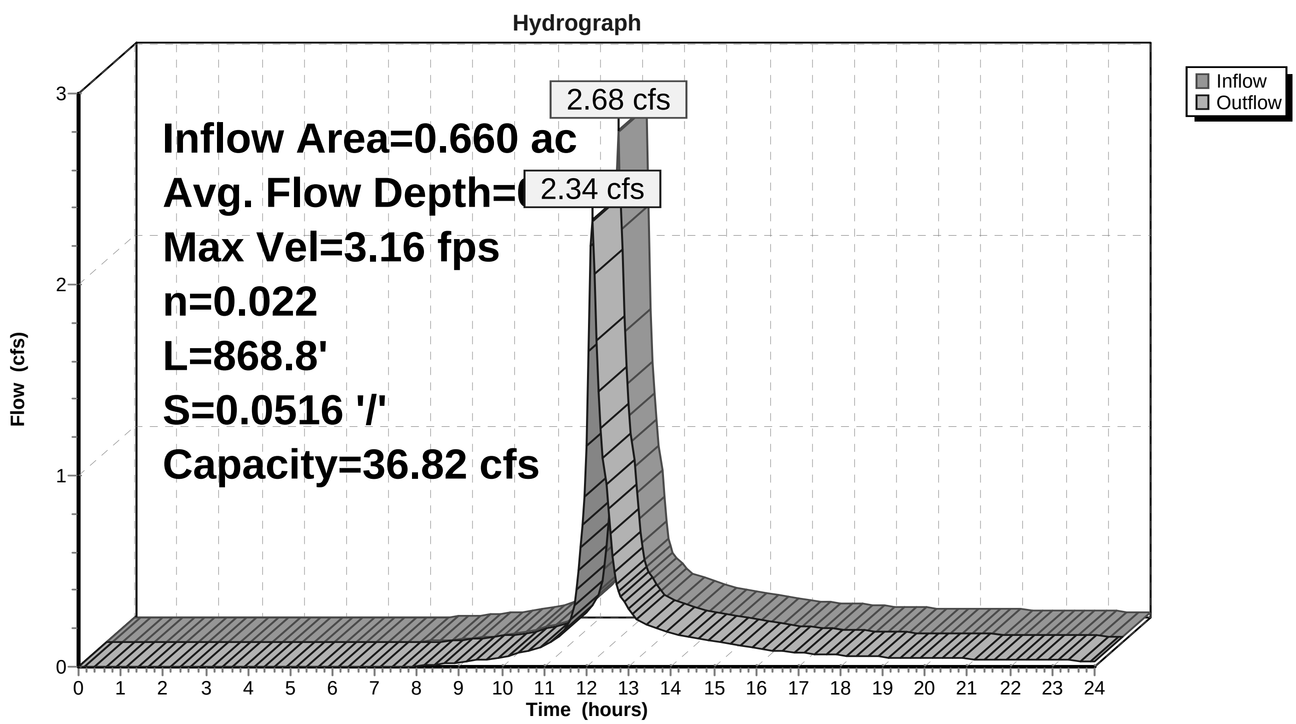
Reach 3R: Reach #3



Summary for Reach 7R: Reach #7

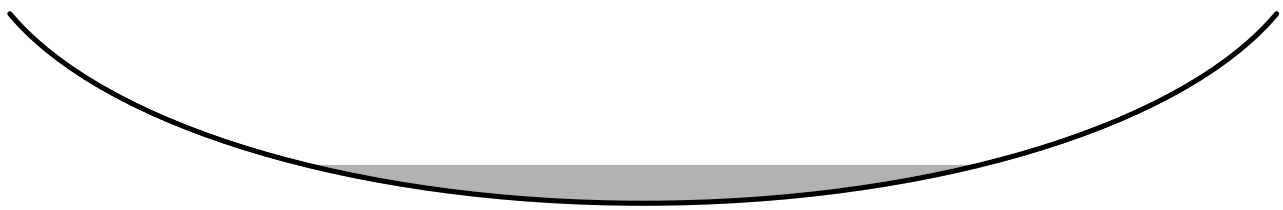
[61] Hint: Exceeded Reach 101R outlet invert by 0.10' @ 12.90 hrs

Inflow Area = 2.403 ac, 8.54% Impervious, Inflow Depth > 2.76" for 25Yr.-24Hr. event
Inflow = 1.38 cfs @ 12.81 hrs, Volume= 0.553 af
Outflow = 1.38 cfs @ 12.89 hrs, Volume= 0.552 af, Atten= 0%, Lag= 5.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.07 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 6.2 min

Peak Storage= 347 cf @ 12.89 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 44.74 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 772.0' Slope= 0.0762 '/'
Inlet Invert= 259.50', Outlet Invert= 200.66'



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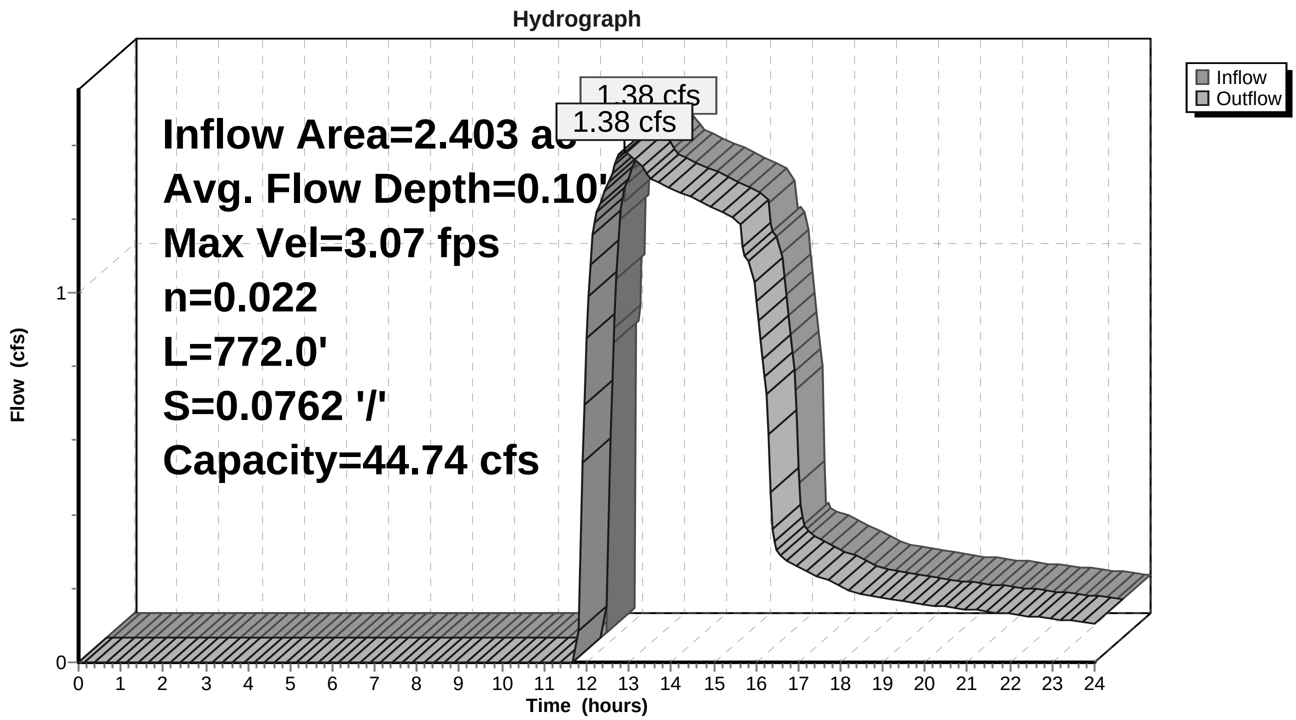
Reach 7R: Reach #7



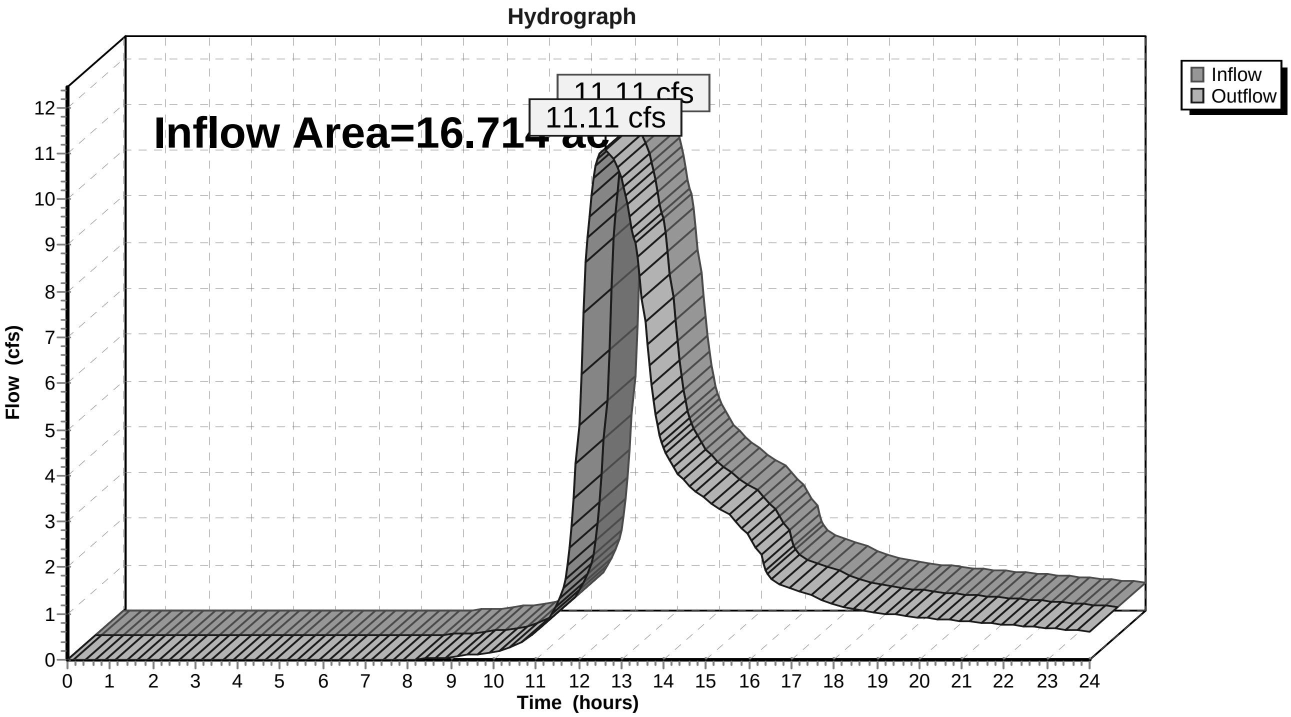
Summary for Reach 100R: Final Reach #100

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

Inflow Area =	16.714 ac, 10.14% Impervious,	Inflow Depth > 2.09"	for 25Yr.-24Hr. event	
Inflow =	11.11 cfs @	12.62 hrs, Volume=	2.915 af	
Outflow =	11.11 cfs @	12.62 hrs, Volume=	2.915 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: Overland Flow from R-101

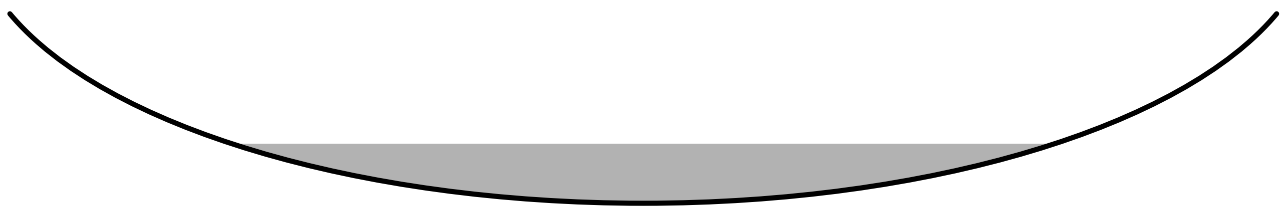
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 2.403 ac, 8.54% Impervious, Inflow Depth > 2.76" for 25Yr.-24Hr. event
Inflow = 1.38 cfs @ 12.84 hrs, Volume= 0.553 af
Outflow = 1.38 cfs @ 12.81 hrs, Volume= 0.553 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.58 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 0.5 min

Peak Storage= 28 cf @ 12.81 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 17.15 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.045
Length= 32.0' Slope= 0.0469 '/'
Inlet Invert= 261.00', Outlet Invert= 259.50'



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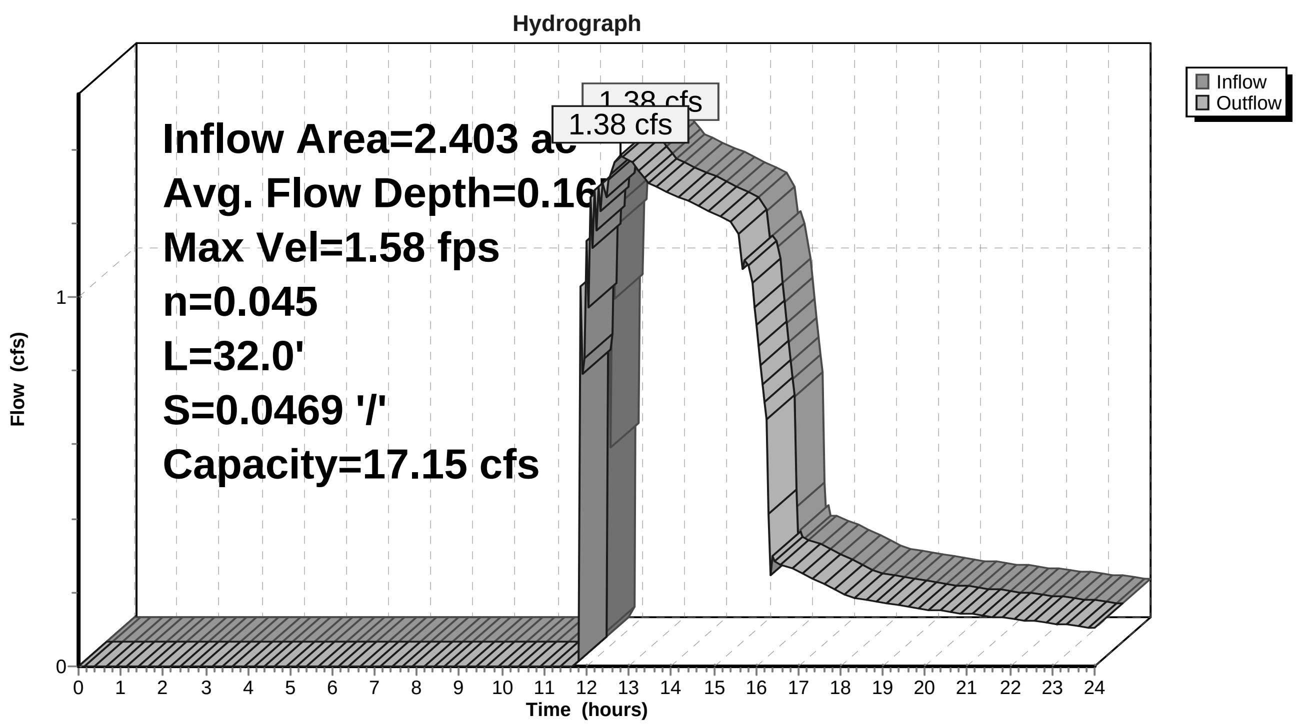
Reach 101R: Overland Flow from R-101



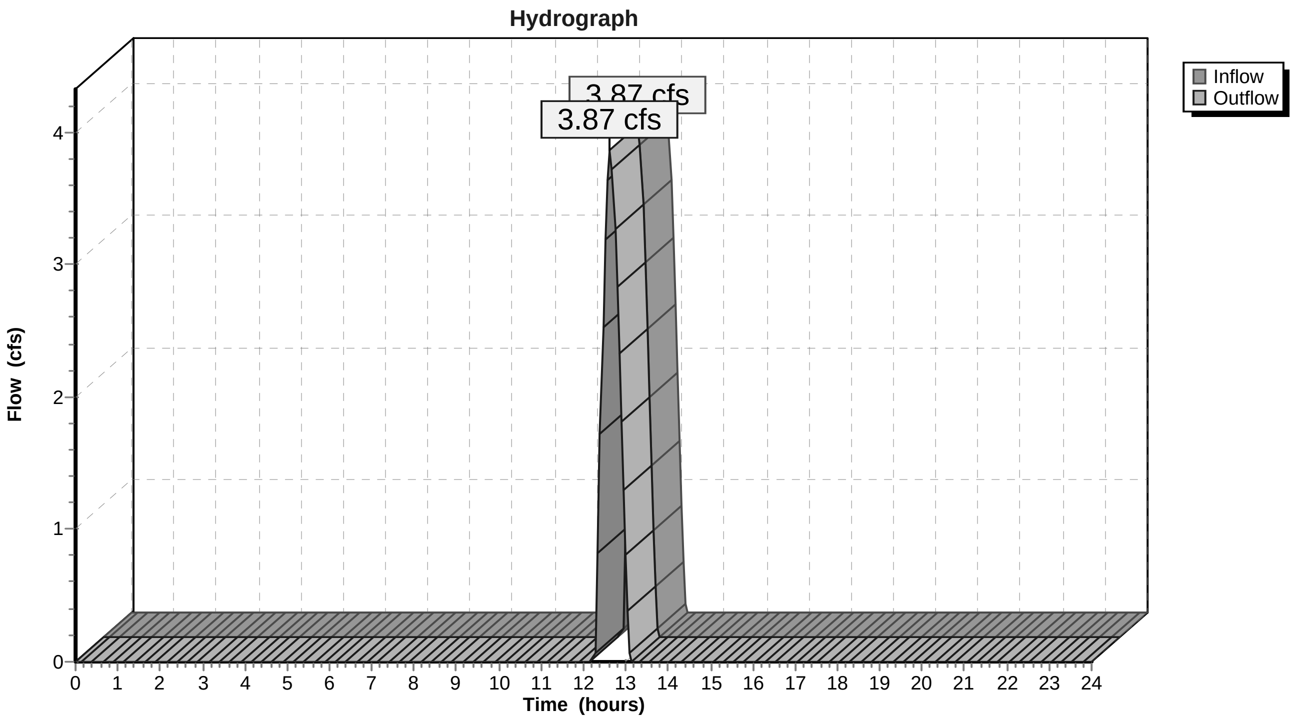
Summary for Reach 200R: Final Reach #200

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

Inflow	=	3.87 cfs @	12.62 hrs, Volume=	0.149 af
Outflow	=	3.87 cfs @	12.62 hrs, Volume=	0.149 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 200R: Final Reach #200



Summary for Pond 1P: Pond #1

Inflow Area = 16.714 ac, 10.14% Impervious, Inflow Depth > 2.31" for 25Yr.-24Hr. event
Inflow = 17.77 cfs @ 12.44 hrs, Volume= 3.222 af
Outflow = 16.00 cfs @ 12.62 hrs, Volume= 3.221 af, Atten= 10%, Lag= 10.6 min
Discarded = 1.02 cfs @ 12.45 hrs, Volume= 0.157 af
Primary = 11.11 cfs @ 12.62 hrs, Volume= 2.915 af
Secondary = 3.87 cfs @ 12.62 hrs, Volume= 0.149 af
Tertiary = 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= 196.57' @ 12.62 hrs Surf.Area= 14,717 sf Storage= 10,734 cf
Flood Elev= 197.00' Surf.Area= 14,717 sf Storage= 17,094 cf

Plug-Flow detention time= 6.0 min calculated for 3.214 af (100% of inflow)
Center-of-Mass det. time= 5.8 min (876.3 - 870.5)

Volume	Invert	Avail.Storage	Storage Description
#1	194.12'	24,325 cf	**Existing Depression (Irregular)**Listed below (Recalc)
#2	196.25'	631 cf	**Detention Pond #201 (Irregular)**Listed below (Recalc) -Impervious
		24,956 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
194.12	12	14.0	0	0	12
196.00	6,700	469.6	4,384	4,384	17,551
196.50	14,717	797.7	5,224	9,608	50,641
197.50	14,717	797.7	14,717	24,325	51,439

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
196.25	15	15.0	0	0	15
196.50	139	48.8	17	17	187
197.00	314	87.9	110	127	613
198.00	721	136.7	504	631	1,493

Device	Routing	Invert	Outlet Devices
#1	Discarded	194.12'	**3.000 in/hr Infiltration 3IN/HR over Surface area**
#2	Primary	194.12'	**18.0" Round 18" HDPE** L= 40.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 194.12' / 193.74' S= 0.0094 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#3	Secondary	196.30'	**10.0' long x 40.0' breadth Overflow Over DW** 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
#4	Tertiary	196.80'	**30.0' long x 24.0' breadth Overflow Over Rt 9** 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

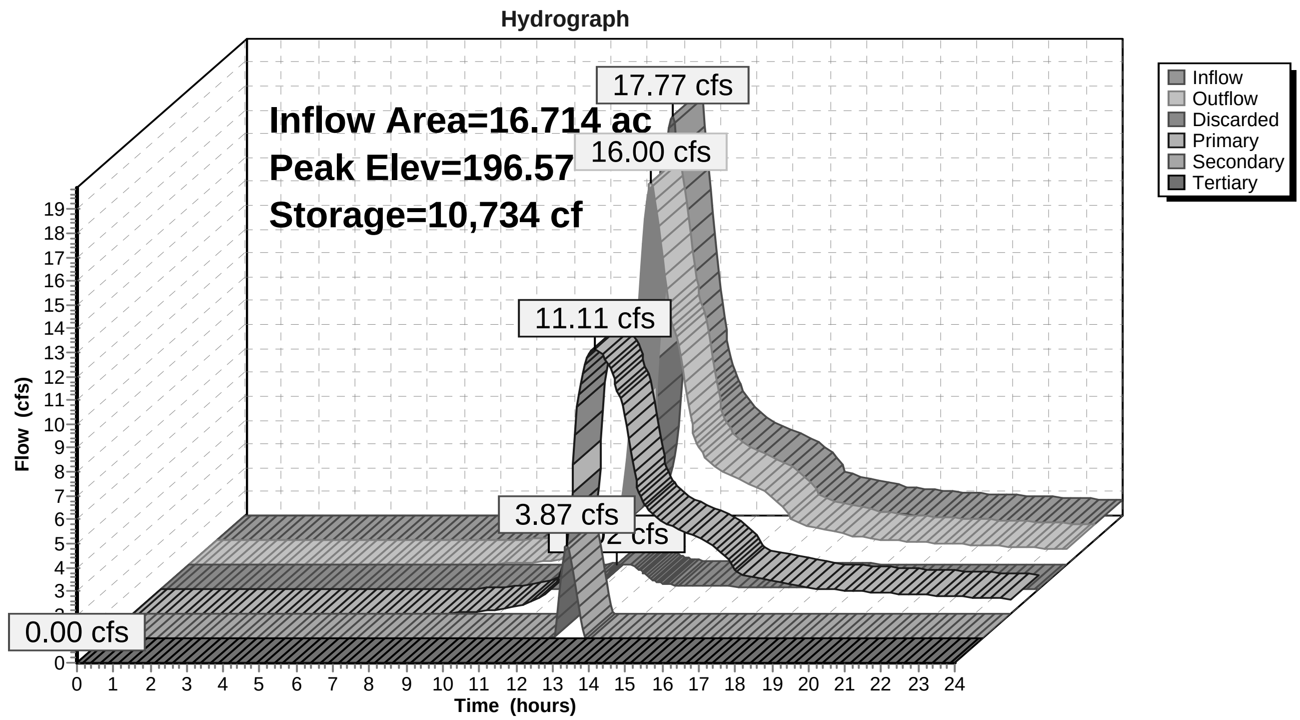
Discarded OutFlow Max=1.02 cfs @ 12.45 hrs HW=196.51' (Free Discharge)
└─**1=Infiltration 3IN/HR** (Exfiltration Controls 1.02 cfs)

Primary OutFlow Max=11.10 cfs @ 12.62 hrs HW=196.57' TW=0.00' (Dynamic Tailwater)
└─**2=18" HDPE** (Inlet Controls 11.10 cfs @ 6.28 fps)

Secondary OutFlow Max=3.84 cfs @ 12.62 hrs HW=196.57' TW=0.00' (Dynamic Tailwater)
└─**3=Overflow Over DW** (Weir Controls 3.84 cfs @ 1.40 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=194.12' TW=0.00' (Dynamic Tailwater)
└─**4=Overflow Over Rt 9** (Controls 0.00 cfs)

Pond 1P: Pond #1



Summary for Pond 7P: Level Spreader

Inflow Area = 2.403 ac, 8.54% Impervious, Inflow Depth > 2.82" for 25Yr.-24Hr. event
Inflow = 1.38 cfs @ 12.83 hrs, Volume= 0.564 af
Outflow = 1.38 cfs @ 12.84 hrs, Volume= 0.553 af, Atten= 0%, Lag= 0.4 min
Primary = 1.38 cfs @ 12.84 hrs, Volume= 0.553 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 264.08' @ 12.84 hrs Surf.Area= 496 sf Storage= 519 cf

Plug-Flow detention time= 14.6 min calculated for 0.553 af (98% of inflow)
Center-of-Mass det. time= 4.5 min (902.5 - 898.0)

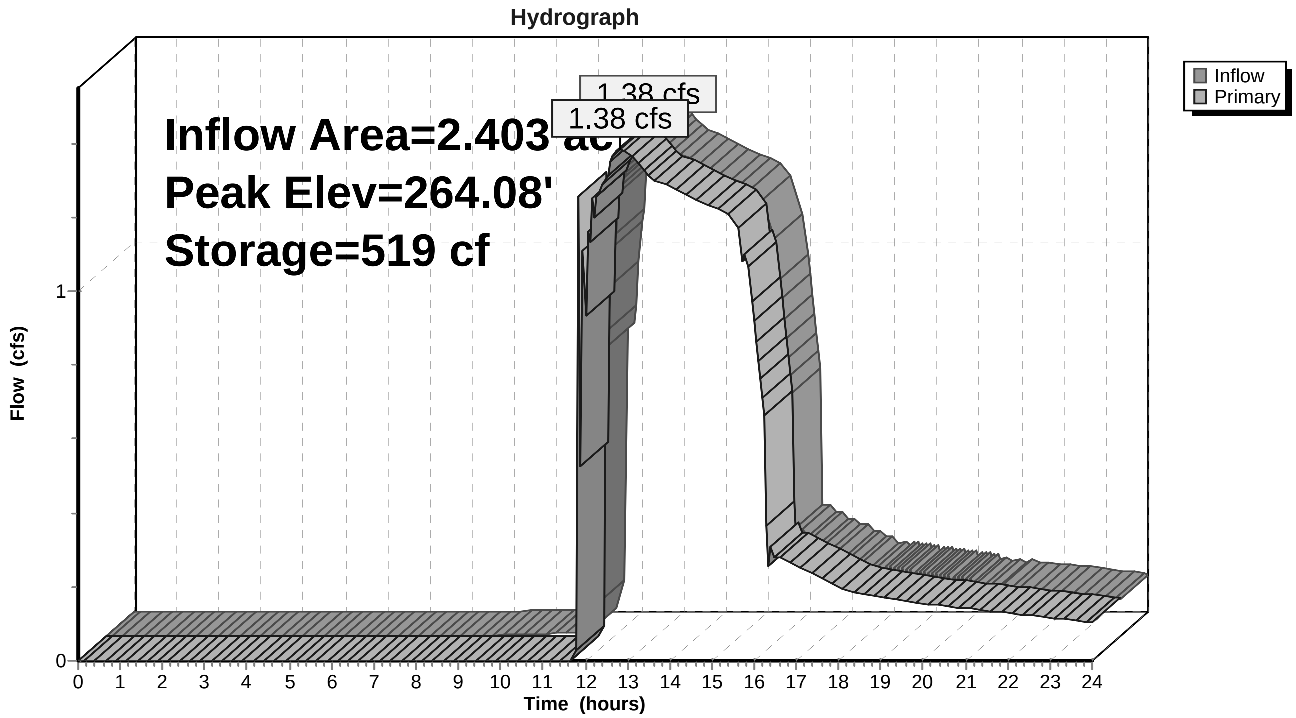
Volume	Invert	Avail.Storage	Storage Description
#1	262.50'	531 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
262.50	176	53.0	0	0	176
263.00	262	59.3	109	109	239
264.00	496	88.2	373	482	586
264.10	496	88.2	50	531	595

Device	Routing	Invert	Outlet Devices
#1	Primary	264.00'	**26.0' long x 2.0' breadth Level Lip** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.38 cfs @ 12.84 hrs HW=264.08' TW=261.16' (Dynamic Tailwater)
└─**1=Level Lip** (Weir Controls 1.38 cfs @ 0.70 fps)

Pond 7P: Level Spreader



Summary for Pond 12P: Pond #12

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 1.083 ac, 2.86% Impervious, Inflow Depth > 2.86" for 25Yr.-24Hr. event
Inflow = 2.52 cfs @ 12.26 hrs, Volume= 0.258 af
Outflow = 2.52 cfs @ 12.26 hrs, Volume= 0.258 af, Atten= 0%, Lag= 0.0 min
Primary = 2.52 cfs @ 12.26 hrs, Volume= 0.258 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 270.20' @ 12.26 hrs Surf.Area= 114 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (844.1 - 844.1)

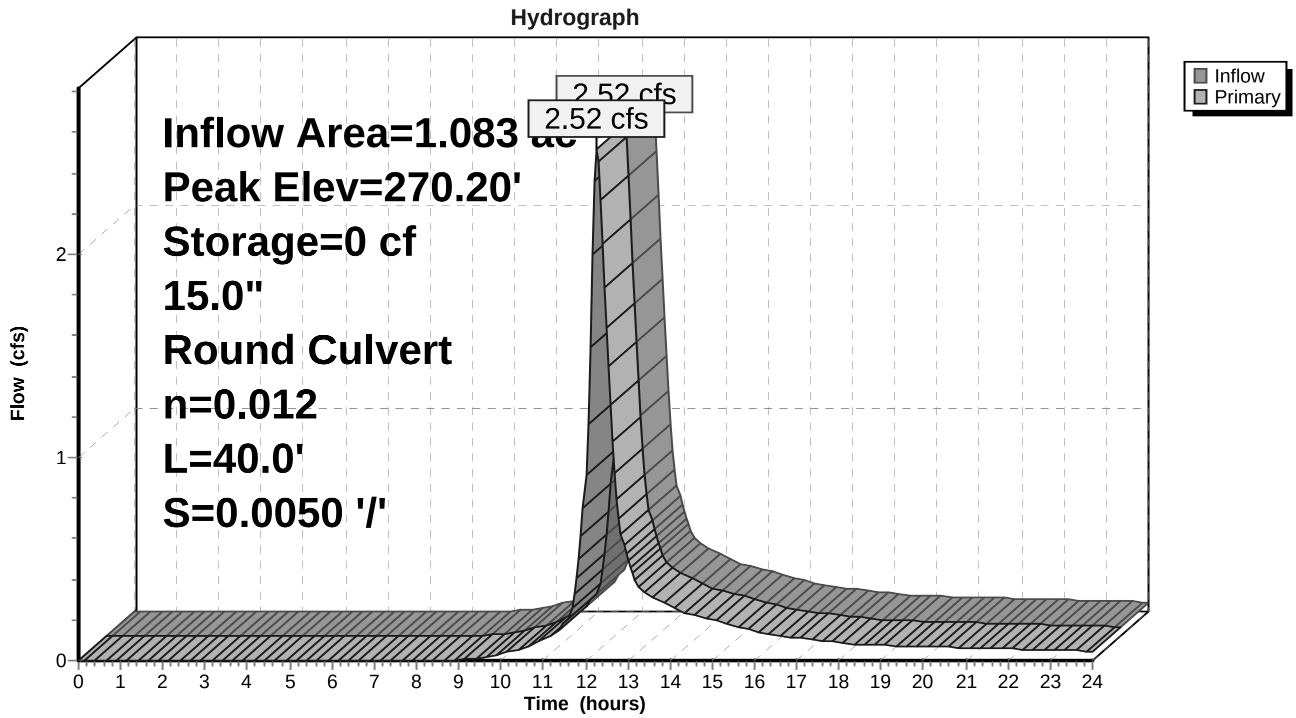
Volume	Invert	Avail.Storage	Storage Description
#1	270.20'	312 cf	**Open Water Storage (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
270.20	114	48.0	0	0	114
271.00	114	48.0	91	91	152
272.00	348	122.2	220	312	1,161

Device	Routing	Invert	Outlet Devices
#1	Primary	269.20'	**15.0" Round 15" HDPE N-12** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 269.20' / 269.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.80 cfs @ 12.26 hrs HW=270.20' TW=266.51' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Barrel Controls 2.80 cfs @ 3.64 fps)

Pond 12P: Pond #12



Summary for Pond 13P: Pond #13

Inflow Area = 0.861 ac, 14.65% Impervious, Inflow Depth > 3.14" for 25Yr.-24Hr. event
Inflow = 2.07 cfs @ 12.21 hrs, Volume= 0.225 af
Outflow = 2.07 cfs @ 12.21 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.1 min
Primary = 2.07 cfs @ 12.21 hrs, Volume= 0.225 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 271.66' @ 12.21 hrs Surf.Area= 35 sf Storage= 14 cf

Plug-Flow detention time= 0.2 min calculated for 0.225 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (831.0 - 830.9)

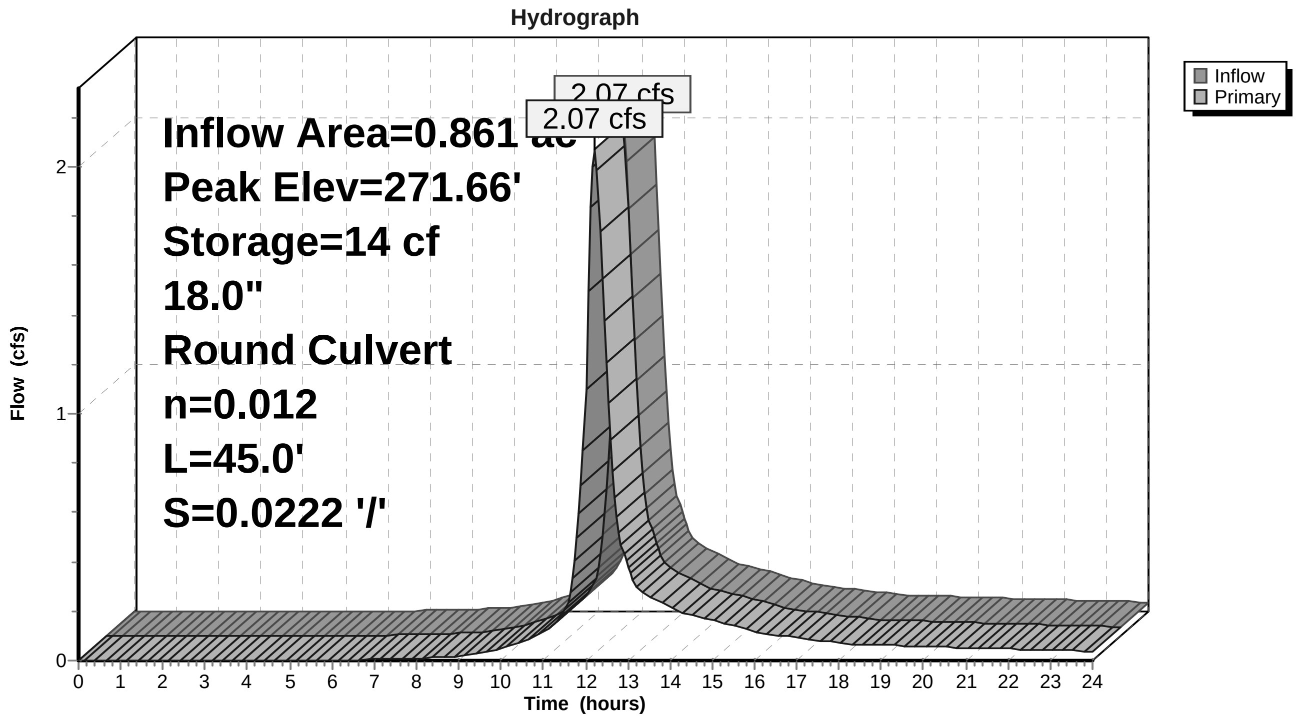
Volume	Invert	Avail.Storage	Storage Description
#1	271.00'	491 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
271.00	10	11.6	0	0	10
272.00	54	29.4	29	29	72
273.00	204	75.4	121	150	459
274.00	499	169.9	341	491	2,308

Device	Routing	Invert	Outlet Devices
#1	Primary	271.00'	**18.0" Round 18" HDPE N-12** L= 45.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 271.00' / 270.00' S= 0.0222 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=2.06 cfs @ 12.21 hrs HW=271.66' TW=266.37' (Dynamic Tailwater)
└─**1=18" HDPE N-12** (Inlet Controls 2.06 cfs @ 2.76 fps)

Pond 13P: Pond #13



Summary for Pond 14P: Pond #14

Inflow Area = 0.159 ac, 53.05% Impervious, Inflow Depth > 4.37" for 25Yr.-24Hr. event
Inflow = 0.78 cfs @ 12.09 hrs, Volume= 0.058 af
Outflow = 0.78 cfs @ 12.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.1 min
Primary = 0.78 cfs @ 12.09 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 271.95' @ 12.10 hrs Surf.Area= 13 sf Storage= 6 cf

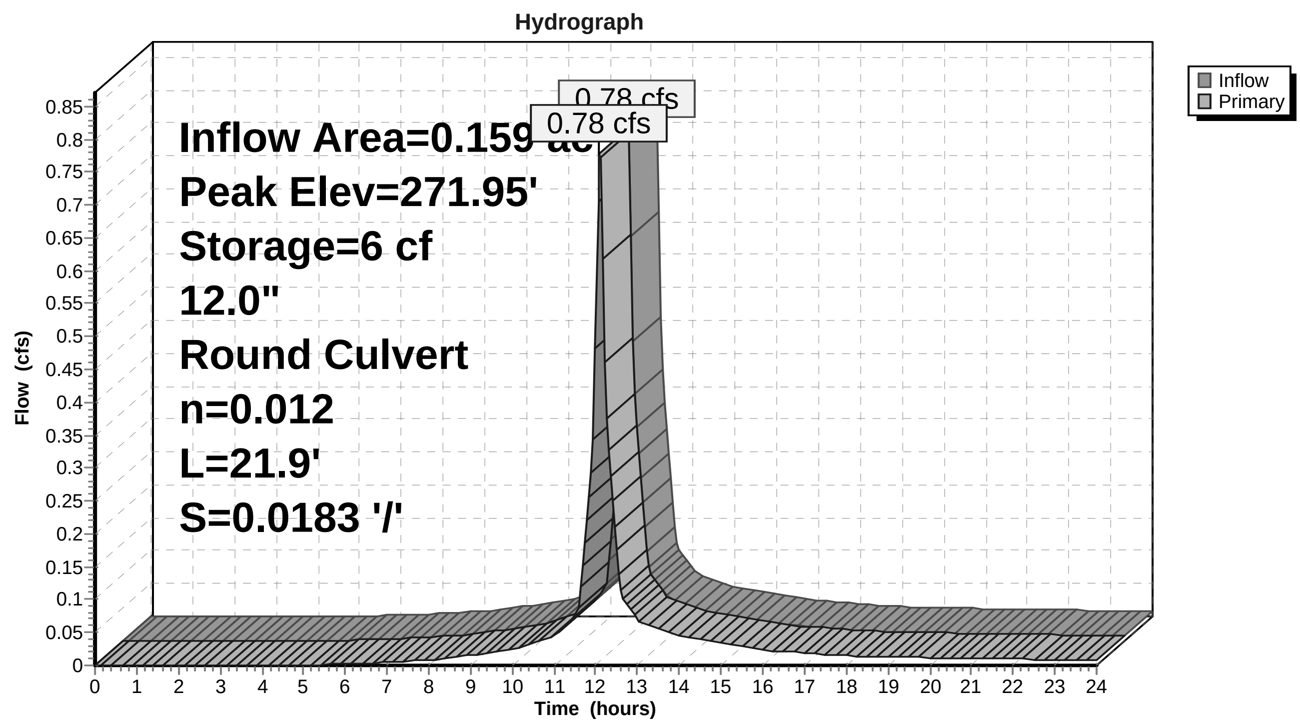
Plug-Flow detention time= 0.4 min calculated for 0.058 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (795.4 - 795.1)

Volume	Invert	Avail.Storage	Storage Description
#1	271.50'	85 cf	**4.00'D x 6.75'H Catch Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	271.50'	**12.0" Round 12" HDPE N-12** L= 21.9' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 271.50' / 271.10' S= 0.0183 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.70 cfs @ 12.09 hrs HW=271.95' TW=271.61' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Outlet Controls 0.70 cfs @ 3.05 fps)

Pond 14P: Pond #14



Summary for Pond 23P: Pond #23

Inflow Area = 1.315 ac, 2.85% Impervious, Inflow Depth > 2.59" for 25Yr.-24Hr. event
Inflow = 3.41 cfs @ 12.15 hrs, Volume= 0.284 af
Outflow = 3.24 cfs @ 12.19 hrs, Volume= 0.283 af, Atten= 5%, Lag= 2.2 min
Primary = 3.24 cfs @ 12.19 hrs, Volume= 0.283 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 224.93' @ 12.19 hrs Surf.Area= 689 sf Storage= 543 cf
Flood Elev= 227.00' Surf.Area= 1,295 sf Storage= 2,535 cf

Plug-Flow detention time= 6.6 min calculated for 0.282 af (99% of inflow)
Center-of-Mass det. time= 4.2 min (848.7 - 844.5)

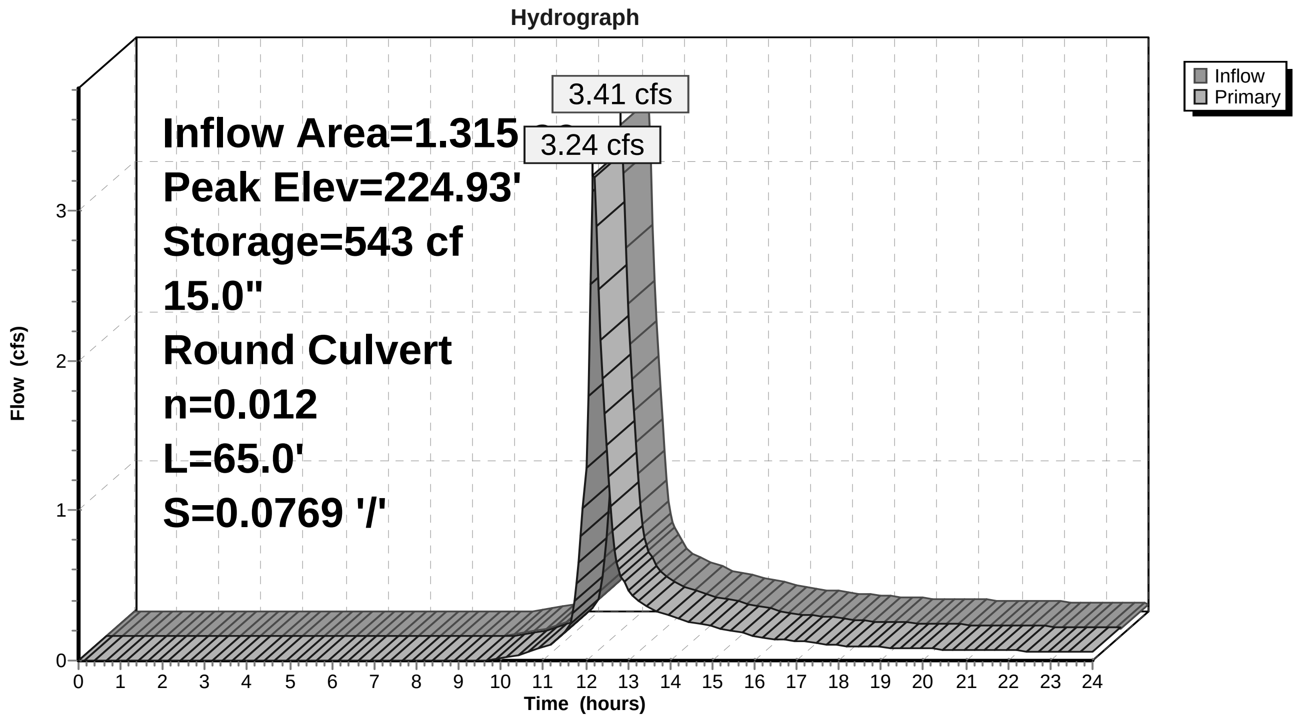
Volume	Invert	Avail.Storage	Storage Description
#1	224.00'	2,535 cf	**Open Water Storage (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
224.00	480	105.8	0	0	480
225.00	705	118.4	589	589	731
226.00	954	131.0	826	1,415	1,011
227.00	1,295	172.2	1,120	2,535	2,016

Device	Routing	Invert	Outlet Devices
#1	Primary	224.00'	**15.0" Round 15" HDPE N-12** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 224.00' / 219.00' S= 0.0769 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.20 cfs @ 12.19 hrs HW=224.93' TW=214.37' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Inlet Controls 3.20 cfs @ 3.28 fps)

Pond 23P: Pond #23



Summary for Pond 24P: Pond #24

Inflow Area = 1.448 ac, 13.75% Impervious, Inflow Depth > 3.15" for 25Yr.-24Hr. event
Inflow = 4.60 cfs @ 12.15 hrs, Volume= 0.380 af
Outflow = 4.59 cfs @ 12.15 hrs, Volume= 0.380 af, Atten= 0%, Lag= 0.2 min
Primary = 4.59 cfs @ 12.15 hrs, Volume= 0.380 af
Secondary = 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= 209.72' @ 12.15 hrs Surf.Area= 56 sf Storage= 27 cf
Flood Elev= 212.00' Surf.Area= 370 sf Storage= 487 cf

Plug-Flow detention time= 0.1 min calculated for 0.379 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (830.4 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	208.50'	672 cf	**Open Water Storage (Irregular)** Listed below (Recalc)

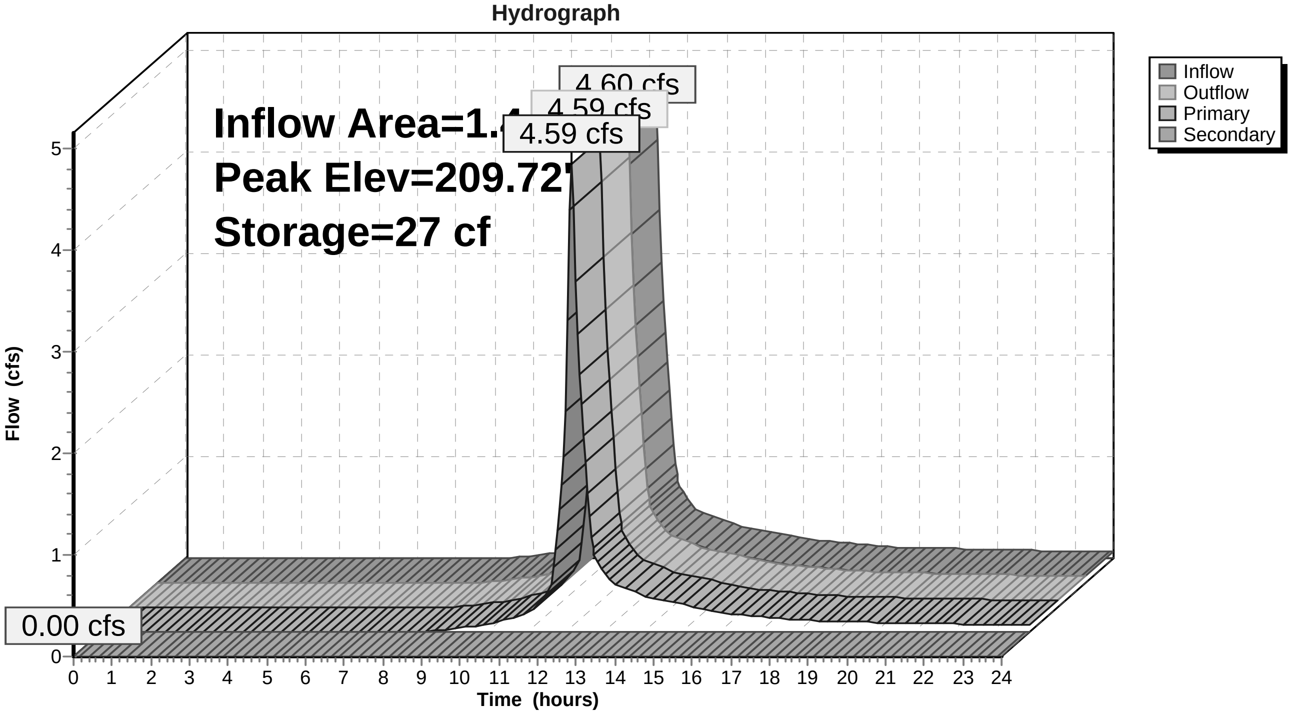
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.50	2	6.0	0	0	2
209.00	13	16.3	3	3	21
210.00	81	43.8	42	45	156
211.00	225	81.3	147	192	535
212.00	370	90.3	295	487	684
212.50	370	90.3	185	672	730

Device	Routing	Invert	Outlet Devices
#1	Primary	208.50'	**15.0" Round 15" HDPE N-12** L= 38.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.50' / 208.00' S= 0.0132 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Secondary	212.25'	**5.0' long x 24.0' breadth Broad-Crested Rectangular Weir** 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

Primary OutFlow Max=4.59 cfs @ 12.15 hrs HW=209.72' TW=201.65' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Inlet Controls 4.59 cfs @ 3.76 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.50' TW=200.50' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 24P: Pond #24



Summary for Pond 25P: Pond #25

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.637 ac, 16.60% Impervious, Inflow Depth > 3.24" for 25Yr.-24Hr. event
Inflow = 5.28 cfs @ 12.14 hrs, Volume= 0.442 af
Outflow = 5.29 cfs @ 12.15 hrs, Volume= 0.442 af, Atten= 0%, Lag= 0.5 min
Primary = 5.29 cfs @ 12.15 hrs, Volume= 0.442 af
Secondary = 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= 201.65' @ 12.15 hrs Surf.Area= 186 sf Storage= 96 cf
Flood Elev= 203.00' Surf.Area= 550 sf Storage= 579 cf

Plug-Flow detention time= 0.2 min calculated for 0.442 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (827.3 - 827.1)

Volume	Invert	Avail.Storage	Storage Description
#1	200.50'	854 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

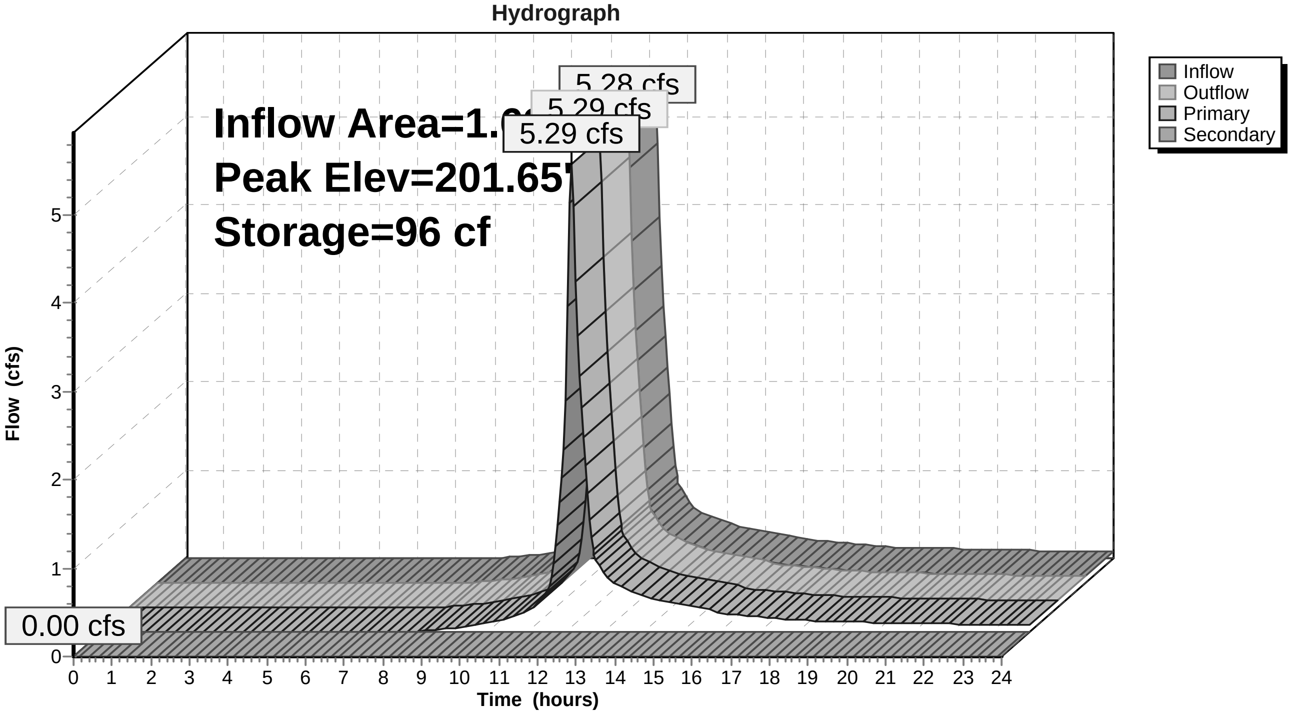
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
200.50	4	25.0	0	0	4
201.00	72	78.4	15	15	444
202.00	271	112.5	161	176	971
203.00	550	142.4	402	579	1,591
203.50	550	142.4	275	854	1,662

Device	Routing	Invert	Outlet Devices
#1	Primary	200.50'	**18.0" Round 18" HDPE N-12** L= 38.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 200.50' / 197.50' S= 0.0789 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	203.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.28 cfs @ 12.15 hrs HW=201.65' TW=195.91' (Dynamic Tailwater)
└─**1=18" HDPE N-12** (Inlet Controls 5.28 cfs @ 3.64 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=200.50' TW=194.12' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 25P: Pond #25



Summary for Pond 101P: Rain Garden#101 (Built)

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=66)

Inflow Area = 2.403 ac, 8.54% Impervious, Inflow Depth > 3.03" for 25Yr.-24Hr. event
Inflow = 5.85 cfs @ 12.22 hrs, Volume= 0.607 af
Outflow = 1.38 cfs @ 12.83 hrs, Volume= 0.564 af, Atten= 76%, Lag= 36.4 min
Primary = 1.38 cfs @ 12.83 hrs, Volume= 0.564 af
Secondary = 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= 267.16' @ 12.83 hrs Surf.Area= 5,872 sf Storage= 9,858 cf
Flood Elev= 271.00' Surf.Area= 6,756 sf Storage= 49,781 cf

Plug-Flow detention time= 97.5 min calculated for 0.563 af (93% of inflow)
Center-of-Mass det. time= 61.7 min (898.0 - 836.3)

Volume	Invert	Avail.Storage	Storage Description
#1	263.50'	1,843 cf	**Stone (Irregular)** Listed below (Recalc) -Impervious 4,642 cf Overall - 34 cf Embedded = 4,608 cf x 40.0% Voids
#2	264.50'	1,393 cf	**Bio-Media (Irregular)** Listed below (Recalc) 6,963 cf Overall x 20.0% Voids
#3	266.00'	45,130 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
#4	266.00'	1,381 cf	**Forebay (Irregular)** Listed below (Recalc)
#5	263.50'	15 cf	**6.0" Round 6" U.D.** Inside #1 L= 75.0'
#6	263.50'	8 cf	**6.0" Round 6" U.D.** Inside #1 L= 40.0'
#7	263.50'	12 cf	**6.0" Round 6" U.D.** Inside #1 L= 60.0'
		49,781 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.50	4,642	276.7	0	0	4,642
264.50	4,642	276.7	4,642	4,642	4,919

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.50	4,642	276.7	0	0	4,642
266.00	4,642	276.7	6,963	6,963	5,057

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
266.00	4,642	276.7	0	0	4,642
267.00	5,208	289.3	4,922	4,922	5,276
267.50	5,543	300.2	2,687	7,610	5,808
268.00	8,513	630.7	3,488	11,097	30,292
269.00	10,465	882.3	9,472	20,569	60,595
270.00	12,286	915.0	11,363	31,933	65,357
271.00	14,130	928.0	13,197	45,130	67,475

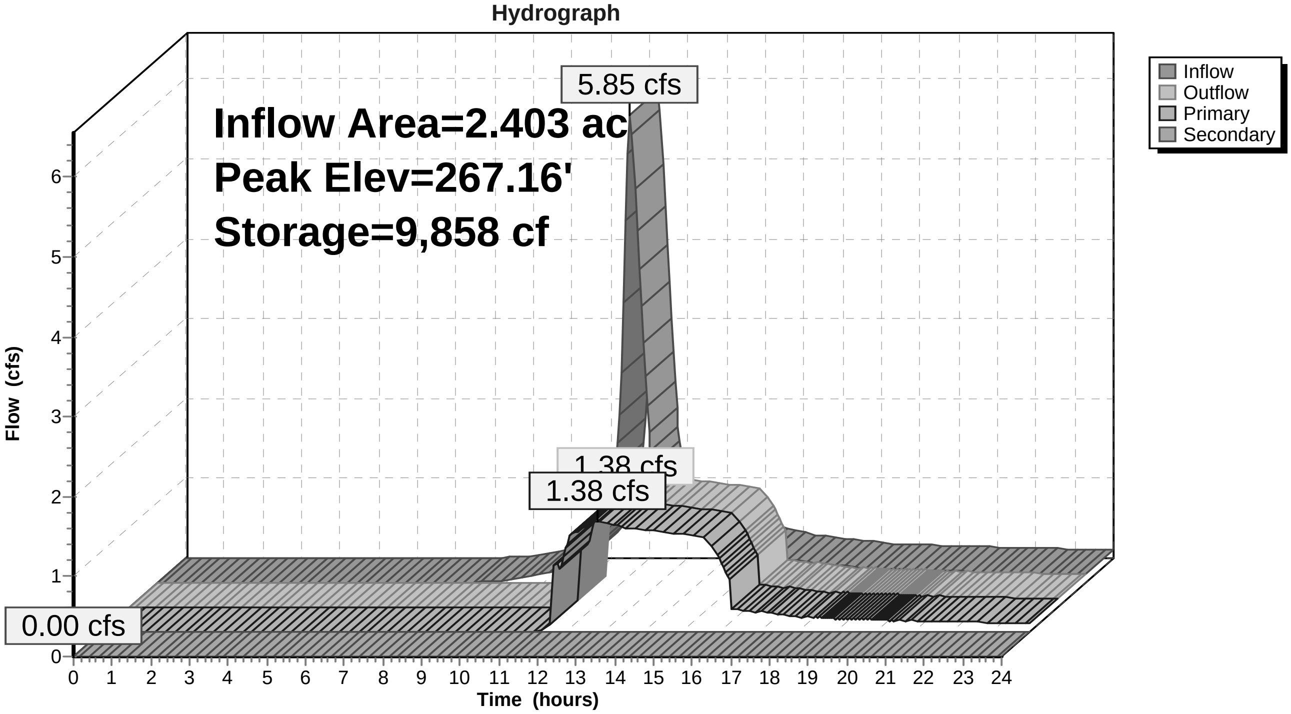
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
266.00	434	223.0	0	0	434
267.00	895	236.0	651	651	961
267.50	2,114	483.4	731	1,381	15,126

Device	Routing	Invert	Outlet Devices
#1	Primary	263.40'	**24.0" Round 24" HDPE N-12** L= 24.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 263.40' / 263.28' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	263.50'	**6.0" Vert. 6" Vertical** C= 0.600
#3	Device 1	270.00'	**24.0" Horiz. 24" Top Plate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	263.50'	**0.7" Vert. .75" Orifice - Anaerobic** C= 0.600
#5	Device 2	264.50'	**10.000 in/hr Exfiltration over Surface area**
#6	Secondary	270.50'	**15.0' long x 8.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=1.38 cfs @ 12.83 hrs HW=267.16' TW=264.08' (Dynamic Tailwater)
└─**1=24" HDPE N-12** (Passes 1.38 cfs of 25.13 cfs potential flow)
  ├─**2=6" Vertical** (Passes 1.38 cfs of 1.66 cfs potential flow)
  │ ├─**4=.75" Orifice - Anaerobic** (Orifice Controls 0.02 cfs @ 8.46 fps)
  │ └─**5=Exfiltration** (Exfiltration Controls 1.36 cfs)
  └─**3=24" Top Plate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=263.50' TW=262.50' (Dynamic Tailwater)
└─**6=E-Spillway** (Controls 0.00 cfs)

Pond 101P: Rain Garden#101 (Built)



Summary for Pond 202P: Rain Garden w/ Infiltration #202

Inflow Area = 2.266 ac, 8.26% Impervious, Inflow Depth > 2.26" for 25Yr.-24Hr. event
Inflow = 4.73 cfs @ 12.19 hrs, Volume= 0.427 af
Outflow = 0.28 cfs @ 11.80 hrs, Volume= 0.298 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.28 cfs @ 11.80 hrs, Volume= 0.298 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 215.77' @ 15.81 hrs Surf.Area= 4,000 sf Storage= 9,669 cf
Flood Elev= 218.25' Surf.Area= 4,000 sf Storage= 28,301 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 196.4 min (1,052.0 - 855.7)

Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	1,600 cf	**Stone (Irregular)** Listed below (Recalc) 4,000 cf Overall x 40.0% Voids
#2	213.00'	1,200 cf	**BioMedia (Irregular)** Listed below (Recalc) -Impervious 6,000 cf Overall x 20.0% Voids
#3	214.50'	25,501 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		28,301 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.00	4,000	258.6	0	0	4,000
213.00	4,000	258.6	4,000	4,000	4,259

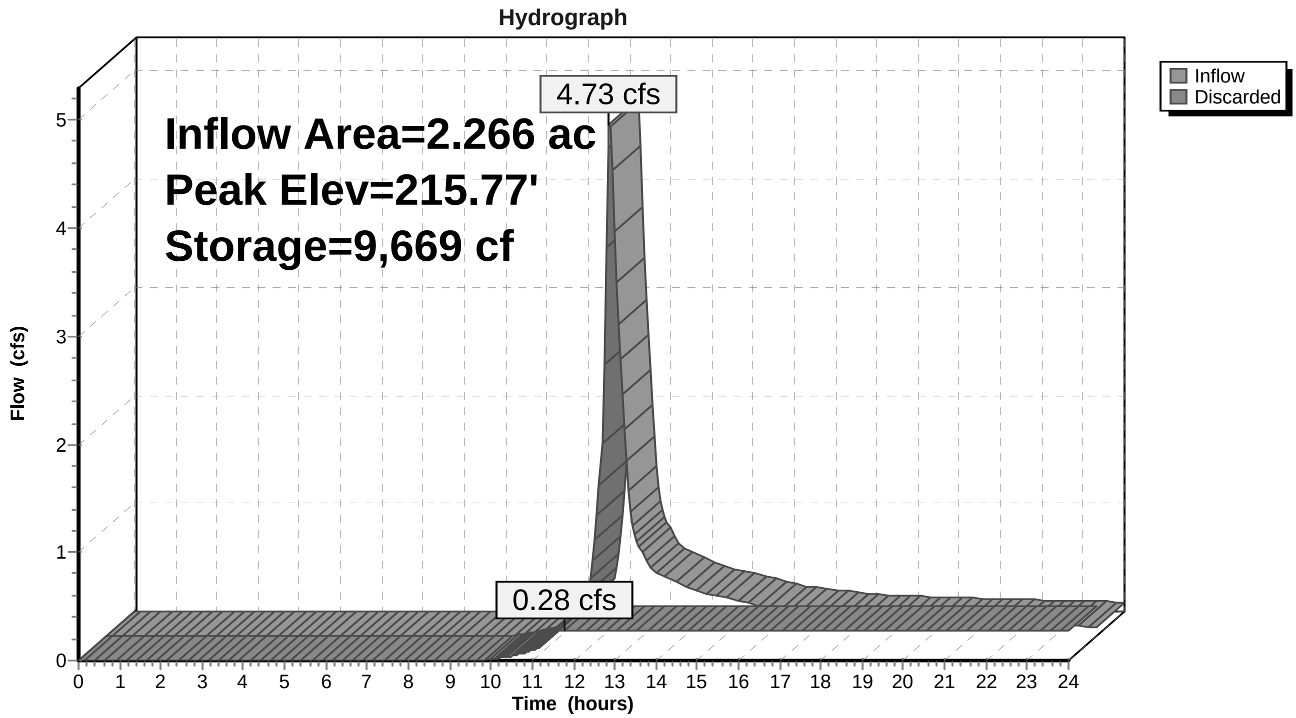
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
213.00	4,000	258.6	0	0	4,000
214.50	4,000	258.6	6,000	6,000	4,388

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.50	4,000	258.6	0	0	4,000
214.75	5,115	327.0	1,137	1,137	7,188
215.00	5,365	332.7	1,310	2,446	7,499
216.00	6,398	353.1	5,874	8,320	8,664
217.00	7,486	371.9	6,935	15,255	9,807
218.00	8,630	390.8	8,051	23,306	11,016
218.25	8,925	395.5	2,194	25,501	11,326

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.00'	**3.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.28 cfs @ 11.80 hrs HW=212.08' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Pond 202P: Rain Garden w/ Infiltration #202



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=110,110 sf 12.30% Impervious Runoff Depth>0.06"
Flow Length=145' Tc=7.9 min CN=47 Runoff=0.02 cfs 0.012 af

Subcatchment 2S: Subcatchment #2 Runoff Area=394,636 sf 7.55% Impervious Runoff Depth>0.58"
Flow Length=1,118' Tc=37.4 min CN=66 Runoff=2.53 cfs 0.435 af

Subcatchment 3S: Subcatchment #3 Runoff Area=28,734 sf 17.82% Impervious Runoff Depth>1.25"
Tc=6.0 min CN=79 Runoff=0.93 cfs 0.068 af

Subcatchment 7S: Subcatchment #7 Runoff Area=19,980 sf 10.51% Impervious Runoff Depth>1.07"
Flow Length=721' Tc=12.7 min CN=76 Runoff=0.44 cfs 0.041 af

Subcatchment 12S: Subcatchment #12 Runoff Area=47,185 sf 2.86% Impervious Runoff Depth>0.85"
Flow Length=485' Tc=18.5 min CN=72 Runoff=0.68 cfs 0.077 af

Subcatchment 13S: Subcatchment #13 Runoff Area=30,563 sf 5.93% Impervious Runoff Depth>0.85"
Flow Length=400' Tc=17.4 min CN=72 Runoff=0.45 cfs 0.050 af

Subcatchment 14S: Subcatchment #14 Runoff Area=6,937 sf 53.05% Impervious Runoff Depth>1.81"
Tc=6.0 min CN=87 Runoff=0.33 cfs 0.024 af

Subcatchment 21S: Subcatchment #21 Runoff Area=18,611 sf 24.79% Impervious Runoff Depth>0.96"
Flow Length=312' Tc=14.4 min CN=74 Runoff=0.34 cfs 0.034 af

Subcatchment 22S: Subcatchment #22 Runoff Area=41,415 sf 15.74% Impervious Runoff Depth>0.36"
Flow Length=442' Tc=13.2 min CN=60 Runoff=0.18 cfs 0.029 af

Subcatchment 23S: Subcatchment #23 Runoff Area=57,287 sf 2.85% Impervious Runoff Depth>0.71"
Flow Length=348' Tc=10.1 min CN=69 Runoff=0.81 cfs 0.078 af

Subcatchment 24S: Subcatchment #24 Runoff Area=63,055 sf 13.75% Impervious Runoff Depth>1.01"
Flow Length=340' Tc=10.2 min CN=75 Runoff=1.40 cfs 0.122 af

Subcatchment 25S: Subcatchment #25 Runoff Area=8,261 sf 38.37% Impervious Runoff Depth>1.51"
Tc=6.0 min CN=83 Runoff=0.33 cfs 0.024 af

Reach 2R: Reach #2 Avg. Flow Depth=0.21' Max Vel=2.65 fps Inflow=3.60 cfs 0.640 af
n=0.022 L=31.0' S=0.0213 '/' Capacity=23.64 cfs Outflow=3.60 cfs 0.639 af

Reach 3R: Reach #3 Avg. Flow Depth=0.08' Max Vel=2.22 fps Inflow=0.93 cfs 0.068 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=0.75 cfs 0.068 af

Reach 7R: Reach #7 Avg. Flow Depth=0.08' Max Vel=2.66 fps Inflow=1.04 cfs 0.137 af
n=0.022 L=772.0' S=0.0762 '/' Capacity=44.74 cfs Outflow=0.86 cfs 0.137 af

Reach 100R: Final Reach #100 Inflow=3.91 cfs 0.801 af
Outflow=3.91 cfs 0.801 af

Reach 101R: Overland Flow from R-101 Avg. Flow Depth=0.14' Max Vel=1.45 fps Inflow=0.91 cfs 0.137 af
n=0.045 L=32.0' S=0.0469 '/' Capacity=17.15 cfs Outflow=1.04 cfs 0.137 af

Reach 200R: Final Reach #200 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Pond #1 Peak Elev=195.13' Storage=755 cf Inflow=4.21 cfs 0.831 af
cfs 0.030 af Primary=3.91 cfs 0.801 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=4.06 cfs 0.831 af

Pond 7P: Level Spreader Peak Elev=264.06' Storage=510 cf Inflow=0.95 cfs 0.148 af
Outflow=0.91 cfs 0.137 af

Pond 12P: Pond #12 Peak Elev=270.20' Storage=0 cf Inflow=0.68 cfs 0.077 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=0.68 cfs 0.077 af

Pond 13P: Pond #13 Peak Elev=271.35' Storage=5 cf Inflow=0.62 cfs 0.074 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0222 '/' Outflow=0.62 cfs 0.074 af

Pond 14P: Pond #14 Peak Elev=271.78' Storage=4 cf Inflow=0.33 cfs 0.024 af
12.0" Round Culvert n=0.012 L=21.9' S=0.0183 '/' Outflow=0.33 cfs 0.024 af

Pond 23P: Pond #23 Peak Elev=224.41' Storage=212 cf Inflow=0.81 cfs 0.078 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0769 '/' Outflow=0.75 cfs 0.077 af

Pond 24P: Pond #24 Peak Elev=209.07' Storage=4 cf Inflow=1.40 cfs 0.122 af
Primary=1.40 cfs 0.122 af Secondary=0.00 cfs 0.000 af Outflow=1.40 cfs 0.122 af

Pond 25P: Pond #25 Peak Elev=201.09' Storage=22 cf Inflow=1.67 cfs 0.146 af
Primary=1.67 cfs 0.146 af Secondary=0.00 cfs 0.000 af Outflow=1.67 cfs 0.146 af

Pond 101P: Rain Garden#101 (Built) Peak Elev=264.94' Storage=2,284 cf Inflow=1.69 cfs 0.191 af
Primary=0.95 cfs 0.148 af Secondary=0.00 cfs 0.000 af Outflow=0.95 cfs 0.148 af

Pond 202P: Rain Garden w/ Infiltration #202 Peak Elev=212.53' Storage=843 cf Inflow=0.90 cfs 0.106 af
Outflow=0.28 cfs 0.106 af

Total Runoff Area = 18.980 ac Runoff Volume = 0.993 af Average Runoff Depth = 0.63"
90.08% Pervious = 17.098 ac 9.92% Impervious = 1.882 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=110,110 sf 12.30% Impervious Runoff Depth>0.41"
Flow Length=145' Tc=7.9 min CN=47 Runoff=0.46 cfs 0.087 af

Subcatchment 2S: Subcatchment #2 Runoff Area=394,636 sf 7.55% Impervious Runoff Depth>1.47"
Flow Length=1,118' Tc=37.4 min CN=66 Runoff=7.54 cfs 1.107 af

Subcatchment 3S: Subcatchment #3 Runoff Area=28,734 sf 17.82% Impervious Runoff Depth>2.48"
Tc=6.0 min CN=79 Runoff=1.89 cfs 0.137 af

Subcatchment 7S: Subcatchment #7 Runoff Area=19,980 sf 10.51% Impervious Runoff Depth>2.23"
Flow Length=721' Tc=12.7 min CN=76 Runoff=0.95 cfs 0.085 af

Subcatchment 12S: Subcatchment #12 Runoff Area=47,185 sf 2.86% Impervious Runoff Depth>1.91"
Flow Length=485' Tc=18.5 min CN=72 Runoff=1.66 cfs 0.172 af

Subcatchment 13S: Subcatchment #13 Runoff Area=30,563 sf 5.93% Impervious Runoff Depth>1.91"
Flow Length=400' Tc=17.4 min CN=72 Runoff=1.10 cfs 0.112 af

Subcatchment 14S: Subcatchment #14 Runoff Area=6,937 sf 53.05% Impervious Runoff Depth>3.22"
Tc=6.0 min CN=87 Runoff=0.58 cfs 0.043 af

Subcatchment 21S: Subcatchment #21 Runoff Area=18,611 sf 24.79% Impervious Runoff Depth>2.07"
Flow Length=312' Tc=14.4 min CN=74 Runoff=0.79 cfs 0.074 af

Subcatchment 22S: Subcatchment #22 Runoff Area=41,415 sf 15.74% Impervious Runoff Depth>1.09"
Flow Length=442' Tc=13.2 min CN=60 Runoff=0.82 cfs 0.086 af

Subcatchment 23S: Subcatchment #23 Runoff Area=57,287 sf 2.85% Impervious Runoff Depth>1.69"
Flow Length=348' Tc=10.1 min CN=69 Runoff=2.17 cfs 0.185 af

Subcatchment 24S: Subcatchment #24 Runoff Area=63,055 sf 13.75% Impervious Runoff Depth>2.15"
Flow Length=340' Tc=10.2 min CN=75 Runoff=3.12 cfs 0.259 af

Subcatchment 25S: Subcatchment #25 Runoff Area=8,261 sf 38.37% Impervious Runoff Depth>2.84"
Tc=6.0 min CN=83 Runoff=0.62 cfs 0.045 af

Reach 2R: Reach #2 Avg. Flow Depth=0.32' Max Vel=3.55 fps Inflow=9.29 cfs 1.599 af
n=0.022 L=31.0' S=0.0213 '/' Capacity=23.64 cfs Outflow=9.29 cfs 1.599 af

Reach 3R: Reach #3 Avg. Flow Depth=0.12' Max Vel=2.82 fps Inflow=1.89 cfs 0.137 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=1.61 cfs 0.136 af

Reach 7R: Reach #7 Avg. Flow Depth=0.10' Max Vel=2.98 fps Inflow=1.36 cfs 0.358 af
n=0.022 L=772.0' S=0.0762 '/' Capacity=44.74 cfs Outflow=1.24 cfs 0.356 af

Reach 100R: Final Reach #100 Inflow=9.18 cfs 1.979 af
Outflow=9.18 cfs 1.979 af

Reach 101R: Overland Flow from R-101 Avg. Flow Depth=0.15' Max Vel=1.57 fps Inflow=1.56 cfs 0.358 af
n=0.045 L=32.0' S=0.0469 '/' Capacity=17.15 cfs Outflow=1.36 cfs 0.358 af

Reach 200R: Final Reach #200 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Pond #1 Peak Elev=196.10' Storage=5,143 cf Inflow=11.41 cfs 2.063 af
cfs 0.083 af Primary=9.18 cfs 1.979 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=9.75 cfs 2.063 af

Pond 7P: Level Spreader Peak Elev=264.08' Storage=522 cf Inflow=1.24 cfs 0.369 af
Outflow=1.56 cfs 0.358 af

Pond 12P: Pond #12 Peak Elev=270.20' Storage=0 cf Inflow=1.66 cfs 0.172 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=1.66 cfs 0.172 af

Pond 13P: Pond #13 Peak Elev=271.53' Storage=10 cf Inflow=1.39 cfs 0.154 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0222 '/' Outflow=1.39 cfs 0.154 af

Pond 14P: Pond #14 Peak Elev=271.88' Storage=5 cf Inflow=0.58 cfs 0.043 af
12.0" Round Culvert n=0.012 L=21.9' S=0.0183 '/' Outflow=0.58 cfs 0.043 af

Pond 23P: Pond #23 Peak Elev=224.71' Storage=394 cf Inflow=2.17 cfs 0.185 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0769 '/' Outflow=2.06 cfs 0.184 af

Pond 24P: Pond #24 Peak Elev=209.41' Storage=13 cf Inflow=3.12 cfs 0.259 af
Primary=3.12 cfs 0.259 af Secondary=0.00 cfs 0.000 af Outflow=3.12 cfs 0.259 af

Pond 25P: Pond #25 Peak Elev=201.41' Storage=58 cf Inflow=3.62 cfs 0.304 af
Primary=3.63 cfs 0.304 af Secondary=0.00 cfs 0.000 af Outflow=3.63 cfs 0.304 af

Pond 101P: Rain Garden#101 (Built) Peak Elev=266.50' Storage=5,931 cf Inflow=3.90 cfs 0.412 af
Primary=1.24 cfs 0.369 af Secondary=0.00 cfs 0.000 af Outflow=1.24 cfs 0.369 af

Pond 202P: Rain Garden w/ Infiltration #202 Peak Elev=214.92' Storage=4,807 cf Inflow=2.88 cfs 0.270 af
Outflow=0.28 cfs 0.270 af

Total Runoff Area = 18.980 ac Runoff Volume = 2.391 af Average Runoff Depth = 1.51"
90.08% Pervious = 17.098 ac 9.92% Impervious = 1.882 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=110,110 sf 12.30% Impervious Runoff Depth>0.87"
Flow Length=145' Tc=7.9 min CN=47 Runoff=1.57 cfs 0.183 af

Subcatchment 2S: Subcatchment #2 Runoff Area=394,636 sf 7.55% Impervious Runoff Depth>2.31"
Flow Length=1,118' Tc=37.4 min CN=66 Runoff=12.28 cfs 1.743 af

Subcatchment 3S: Subcatchment #3 Runoff Area=28,734 sf 17.82% Impervious Runoff Depth>3.54"
Tc=6.0 min CN=79 Runoff=2.68 cfs 0.195 af

Subcatchment 7S: Subcatchment #7 Runoff Area=19,980 sf 10.51% Impervious Runoff Depth>3.24"
Flow Length=721' Tc=12.7 min CN=76 Runoff=1.39 cfs 0.124 af

Subcatchment 12S: Subcatchment #12 Runoff Area=47,185 sf 2.86% Impervious Runoff Depth>2.86"
Flow Length=485' Tc=18.5 min CN=72 Runoff=2.52 cfs 0.258 af

Subcatchment 13S: Subcatchment #13 Runoff Area=30,563 sf 5.93% Impervious Runoff Depth>2.86"
Flow Length=400' Tc=17.4 min CN=72 Runoff=1.67 cfs 0.167 af

Subcatchment 14S: Subcatchment #14 Runoff Area=6,937 sf 53.05% Impervious Runoff Depth>4.37"
Tc=6.0 min CN=87 Runoff=0.78 cfs 0.058 af

Subcatchment 21S: Subcatchment #21 Runoff Area=18,611 sf 24.79% Impervious Runoff Depth>3.05"
Flow Length=312' Tc=14.4 min CN=74 Runoff=1.17 cfs 0.109 af

Subcatchment 22S: Subcatchment #22 Runoff Area=41,415 sf 15.74% Impervious Runoff Depth>1.82"
Flow Length=442' Tc=13.2 min CN=60 Runoff=1.50 cfs 0.144 af

Subcatchment 23S: Subcatchment #23 Runoff Area=57,287 sf 2.85% Impervious Runoff Depth>2.59"
Flow Length=348' Tc=10.1 min CN=69 Runoff=3.41 cfs 0.284 af

Subcatchment 24S: Subcatchment #24 Runoff Area=63,055 sf 13.75% Impervious Runoff Depth>3.15"
Flow Length=340' Tc=10.2 min CN=75 Runoff=4.60 cfs 0.380 af

Subcatchment 25S: Subcatchment #25 Runoff Area=8,261 sf 38.37% Impervious Runoff Depth>3.95"
Tc=6.0 min CN=83 Runoff=0.85 cfs 0.062 af

Reach 2R: Reach #2 Avg. Flow Depth=0.40' Max Vel=4.05 fps Inflow=14.33 cfs 2.489 af
n=0.022 L=31.0' S=0.0213 '/' Capacity=23.64 cfs Outflow=14.32 cfs 2.488 af

Reach 3R: Reach #3 Avg. Flow Depth=0.14' Max Vel=3.16 fps Inflow=2.68 cfs 0.195 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=2.34 cfs 0.194 af

Reach 7R: Reach #7 Avg. Flow Depth=0.10' Max Vel=3.07 fps Inflow=1.38 cfs 0.553 af
n=0.022 L=772.0' S=0.0762 '/' Capacity=44.74 cfs Outflow=1.38 cfs 0.552 af

Reach 100R: Final Reach #100 Inflow=11.11 cfs 2.915 af
Outflow=11.11 cfs 2.915 af

Reach 101R: Overland Flow from R-101 Avg. Flow Depth=0.16' Max Vel=1.58 fps Inflow=1.38 cfs 0.553 af
n=0.045 L=32.0' S=0.0469 '/' Capacity=17.15 cfs Outflow=1.38 cfs 0.553 af

Reach 200R: Final Reach #200 Inflow=3.87 cfs 0.149 af
Outflow=3.87 cfs 0.149 af

Pond 1P: Pond #1 Peak Elev=196.57' Storage=10,734 cf Inflow=17.77 cfs 3.222 af
0.157 af Primary=11.11 cfs 2.915 af Secondary=3.87 cfs 0.149 af Tertiary=0.00 cfs 0.000 af Outflow=16.00 cfs 3.221 af

Pond 7P: Level Spreader Peak Elev=264.08' Storage=519 cf Inflow=1.38 cfs 0.564 af
Outflow=1.38 cfs 0.553 af

Pond 12P: Pond #12 Peak Elev=270.20' Storage=0 cf Inflow=2.52 cfs 0.258 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=2.52 cfs 0.258 af

Pond 13P: Pond #13 Peak Elev=271.66' Storage=14 cf Inflow=2.07 cfs 0.225 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0222 '/' Outflow=2.07 cfs 0.225 af

Pond 14P: Pond #14 Peak Elev=271.95' Storage=6 cf Inflow=0.78 cfs 0.058 af
12.0" Round Culvert n=0.012 L=21.9' S=0.0183 '/' Outflow=0.78 cfs 0.058 af

Pond 23P: Pond #23 Peak Elev=224.93' Storage=543 cf Inflow=3.41 cfs 0.284 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0769 '/' Outflow=3.24 cfs 0.283 af

Pond 24P: Pond #24 Peak Elev=209.72' Storage=27 cf Inflow=4.60 cfs 0.380 af
Primary=4.59 cfs 0.380 af Secondary=0.00 cfs 0.000 af Outflow=4.59 cfs 0.380 af

Pond 25P: Pond #25 Peak Elev=201.65' Storage=96 cf Inflow=5.28 cfs 0.442 af
Primary=5.29 cfs 0.442 af Secondary=0.00 cfs 0.000 af Outflow=5.29 cfs 0.442 af

Pond 101P: Rain Garden#101 (Built) Peak Elev=267.16' Storage=9,858 cf Inflow=5.85 cfs 0.607 af
Primary=1.38 cfs 0.564 af Secondary=0.00 cfs 0.000 af Outflow=1.38 cfs 0.564 af

Pond 202P: Rain Garden w/ Infiltration #202 Peak Elev=215.77' Storage=9,669 cf Inflow=4.73 cfs 0.427 af
Outflow=0.28 cfs 0.298 af

Total Runoff Area = 18.980 ac Runoff Volume = 3.707 af Average Runoff Depth = 2.34"
90.08% Pervious = 17.098 ac 9.92% Impervious = 1.882 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=110,110 sf 12.30% Impervious Runoff Depth>1.40"
Flow Length=145' Tc=7.9 min CN=47 Runoff=3.06 cfs 0.294 af

Subcatchment 2S: Subcatchment #2 Runoff Area=394,636 sf 7.55% Impervious Runoff Depth>3.17"
Flow Length=1,118' Tc=37.4 min CN=66 Runoff=17.10 cfs 2.393 af

Subcatchment 3S: Subcatchment #3 Runoff Area=28,734 sf 17.82% Impervious Runoff Depth>4.57"
Tc=6.0 min CN=79 Runoff=3.44 cfs 0.251 af

Subcatchment 7S: Subcatchment #7 Runoff Area=19,980 sf 10.51% Impervious Runoff Depth>4.24"
Flow Length=721' Tc=12.7 min CN=76 Runoff=1.82 cfs 0.162 af

Subcatchment 12S: Subcatchment #12 Runoff Area=47,185 sf 2.86% Impervious Runoff Depth>3.81"
Flow Length=485' Tc=18.5 min CN=72 Runoff=3.37 cfs 0.344 af

Subcatchment 13S: Subcatchment #13 Runoff Area=30,563 sf 5.93% Impervious Runoff Depth>3.81"
Flow Length=400' Tc=17.4 min CN=72 Runoff=2.23 cfs 0.223 af

Subcatchment 14S: Subcatchment #14 Runoff Area=6,937 sf 53.05% Impervious Runoff Depth>5.47"
Tc=6.0 min CN=87 Runoff=0.96 cfs 0.073 af

Subcatchment 21S: Subcatchment #21 Runoff Area=18,611 sf 24.79% Impervious Runoff Depth>4.02"
Flow Length=312' Tc=14.4 min CN=74 Runoff=1.55 cfs 0.143 af

Subcatchment 22S: Subcatchment #22 Runoff Area=41,415 sf 15.74% Impervious Runoff Depth>2.59"
Flow Length=442' Tc=13.2 min CN=60 Runoff=2.20 cfs 0.205 af

Subcatchment 23S: Subcatchment #23 Runoff Area=57,287 sf 2.85% Impervious Runoff Depth>3.50"
Flow Length=348' Tc=10.1 min CN=69 Runoff=4.65 cfs 0.384 af

Subcatchment 24S: Subcatchment #24 Runoff Area=63,055 sf 13.75% Impervious Runoff Depth>4.13"
Flow Length=340' Tc=10.2 min CN=75 Runoff=6.03 cfs 0.499 af

Subcatchment 25S: Subcatchment #25 Runoff Area=8,261 sf 38.37% Impervious Runoff Depth>5.01"
Tc=6.0 min CN=83 Runoff=1.07 cfs 0.079 af

Reach 2R: Reach #2 Avg. Flow Depth=0.46' Max Vel=4.46 fps Inflow=19.58 cfs 3.388 af
n=0.022 L=31.0' S=0.0213 '/' Capacity=23.64 cfs Outflow=19.58 cfs 3.388 af

Reach 3R: Reach #3 Avg. Flow Depth=0.16' Max Vel=3.42 fps Inflow=3.44 cfs 0.251 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=3.04 cfs 0.250 af

Reach 7R: Reach #7 Avg. Flow Depth=0.11' Max Vel=3.21 fps Inflow=1.59 cfs 0.746 af
n=0.022 L=772.0' S=0.0762 '/' Capacity=44.74 cfs Outflow=1.59 cfs 0.745 af

Reach 100R: Final Reach #100 Inflow=11.98 cfs 3.688 af
Outflow=11.98 cfs 3.688 af

Reach 101R: Overland Flow from R-101 Avg. Flow Depth=0.17' Max Vel=1.65 fps Inflow=1.59 cfs 0.747 af
n=0.045 L=32.0' S=0.0469 '/' Capacity=17.15 cfs Outflow=1.59 cfs 0.746 af

Reach 200R: Final Reach #200 Inflow=9.92 cfs 0.512 af
Outflow=9.92 cfs 0.512 af

Pond 1P: Pond #1 Peak Elev=196.81' Storage=14,292 cf Inflow=24.32 cfs 4.403 af
0.203 af Primary=11.86 cfs 3.687 af Secondary=9.92 cfs 0.512 af Tertiary=0.12 cfs 0.001 af Outflow=22.92 cfs 4.402 af

Pond 7P: Level Spreader Peak Elev=264.08' Storage=523 cf Inflow=1.59 cfs 0.758 af
Outflow=1.59 cfs 0.747 af

Pond 12P: Pond #12 Peak Elev=270.33' Storage=15 cf Inflow=3.37 cfs 0.344 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=3.38 cfs 0.344 af

Pond 13P: Pond #13 Peak Elev=271.77' Storage=18 cf Inflow=2.73 cfs 0.295 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0222 '/' Outflow=2.73 cfs 0.295 af

Pond 14P: Pond #14 Peak Elev=272.03' Storage=7 cf Inflow=0.96 cfs 0.073 af
12.0" Round Culvert n=0.012 L=21.9' S=0.0183 '/' Outflow=0.96 cfs 0.073 af

Pond 23P: Pond #23 Peak Elev=225.16' Storage=706 cf Inflow=4.65 cfs 0.384 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0769 '/' Outflow=4.36 cfs 0.382 af

Pond 24P: Pond #24 Peak Elev=210.16' Storage=60 cf Inflow=6.03 cfs 0.499 af
Primary=6.01 cfs 0.499 af Secondary=0.00 cfs 0.000 af Outflow=6.01 cfs 0.499 af

Pond 25P: Pond #25 Peak Elev=201.88' Storage=147 cf Inflow=6.86 cfs 0.578 af
Primary=6.83 cfs 0.578 af Secondary=0.00 cfs 0.000 af Outflow=6.83 cfs 0.578 af

Pond 101P: Rain Garden#101 (Built) Peak Elev=267.71' Storage=13,560 cf Inflow=7.70 cfs 0.801 af
Primary=1.59 cfs 0.758 af Secondary=0.00 cfs 0.000 af Outflow=1.59 cfs 0.758 af

Pond 202P: Rain Garden w/ Infiltration #202 Peak Elev=216.58' Storage=15,042 cf Inflow=6.56 cfs 0.587 af
Outflow=0.28 cfs 0.310 af

Total Runoff Area = 18.980 ac Runoff Volume = 5.049 af Average Runoff Depth = 3.19"
90.08% Pervious = 17.098 ac 9.92% Impervious = 1.882 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=110,110 sf 12.30% Impervious Runoff Depth>2.14"
Flow Length=145' Tc=7.9 min CN=47 Runoff=5.15 cfs 0.451 af

Subcatchment 2S: Subcatchment #2 Runoff Area=394,636 sf 7.55% Impervious Runoff Depth>4.27"
Flow Length=1,118' Tc=37.4 min CN=66 Runoff=23.22 cfs 3.224 af

Subcatchment 3S: Subcatchment #3 Runoff Area=28,734 sf 17.82% Impervious Runoff Depth>5.84"
Tc=6.0 min CN=79 Runoff=4.36 cfs 0.321 af

Subcatchment 7S: Subcatchment #7 Runoff Area=19,980 sf 10.51% Impervious Runoff Depth>5.48"
Flow Length=721' Tc=12.7 min CN=76 Runoff=2.35 cfs 0.209 af

Subcatchment 12S: Subcatchment #12 Runoff Area=47,185 sf 2.86% Impervious Runoff Depth>4.99"
Flow Length=485' Tc=18.5 min CN=72 Runoff=4.42 cfs 0.451 af

Subcatchment 13S: Subcatchment #13 Runoff Area=30,563 sf 5.93% Impervious Runoff Depth>5.00"
Flow Length=400' Tc=17.4 min CN=72 Runoff=2.93 cfs 0.292 af

Subcatchment 14S: Subcatchment #14 Runoff Area=6,937 sf 53.05% Impervious Runoff Depth>6.80"
Tc=6.0 min CN=87 Runoff=1.18 cfs 0.090 af

Subcatchment 21S: Subcatchment #21 Runoff Area=18,611 sf 24.79% Impervious Runoff Depth>5.24"
Flow Length=312' Tc=14.4 min CN=74 Runoff=2.01 cfs 0.186 af

Subcatchment 22S: Subcatchment #22 Runoff Area=41,415 sf 15.74% Impervious Runoff Depth>3.60"
Flow Length=442' Tc=13.2 min CN=60 Runoff=3.12 cfs 0.285 af

Subcatchment 23S: Subcatchment #23 Runoff Area=57,287 sf 2.85% Impervious Runoff Depth>4.65"
Flow Length=348' Tc=10.1 min CN=69 Runoff=6.19 cfs 0.510 af

Subcatchment 24S: Subcatchment #24 Runoff Area=63,055 sf 13.75% Impervious Runoff Depth>5.36"
Flow Length=340' Tc=10.2 min CN=75 Runoff=7.79 cfs 0.646 af

Subcatchment 25S: Subcatchment #25 Runoff Area=8,261 sf 38.37% Impervious Runoff Depth>6.32"
Tc=6.0 min CN=83 Runoff=1.33 cfs 0.100 af

Reach 2R: Reach #2 Avg. Flow Depth=0.52' Max Vel=4.86 fps Inflow=25.99 cfs 4.530 af
n=0.022 L=31.0' S=0.0213 '/' Capacity=23.64 cfs Outflow=25.99 cfs 4.530 af

Reach 3R: Reach #3 Avg. Flow Depth=0.18' Max Vel=3.68 fps Inflow=4.36 cfs 0.321 af
n=0.022 L=868.8' S=0.0516 '/' Capacity=36.82 cfs Outflow=3.90 cfs 0.320 af

Reach 7R: Reach #7 Avg. Flow Depth=0.11' Max Vel=3.21 fps Inflow=1.59 cfs 0.988 af
n=0.022 L=772.0' S=0.0762 '/' Capacity=44.74 cfs Outflow=1.59 cfs 0.986 af

Reach 100R: Final Reach #100 Inflow=17.07 cfs 4.734 af
Outflow=17.07 cfs 4.734 af

Reach 101R: Overland Flow from R-101 Avg. Flow Depth=0.17' Max Vel=1.65 fps Inflow=1.59 cfs 0.988 af
n=0.045 L=32.0' S=0.0469 '/' Capacity=17.15 cfs Outflow=1.59 cfs 0.988 af

Reach 200R: Final Reach #200 Inflow=14.15 cfs 0.925 af
Outflow=14.15 cfs 0.925 af

Pond 1P: Pond #1 Peak Elev=196.95' Storage=16,382 cf Inflow=32.58 cfs 5.913 af
0.252 af Primary=12.28 cfs 4.585 af Secondary=14.15 cfs 0.925 af Tertiary=4.79 cfs 0.149 af Outflow=32.25 cfs 5.911 af

Pond 7P: Level Spreader Peak Elev=264.08' Storage=523 cf Inflow=1.59 cfs 0.999 af
Outflow=1.59 cfs 0.988 af

Pond 12P: Pond #12 Peak Elev=270.57' Storage=43 cf Inflow=4.42 cfs 0.451 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=4.40 cfs 0.451 af

Pond 13P: Pond #13 Peak Elev=271.89' Storage=24 cf Inflow=3.54 cfs 0.382 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0222 '/' Outflow=3.54 cfs 0.382 af

Pond 14P: Pond #14 Peak Elev=272.11' Storage=8 cf Inflow=1.18 cfs 0.090 af
12.0" Round Culvert n=0.012 L=21.9' S=0.0183 '/' Outflow=1.18 cfs 0.090 af

Pond 23P: Pond #23 Peak Elev=225.52' Storage=990 cf Inflow=6.19 cfs 0.510 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0769 '/' Outflow=5.60 cfs 0.508 af

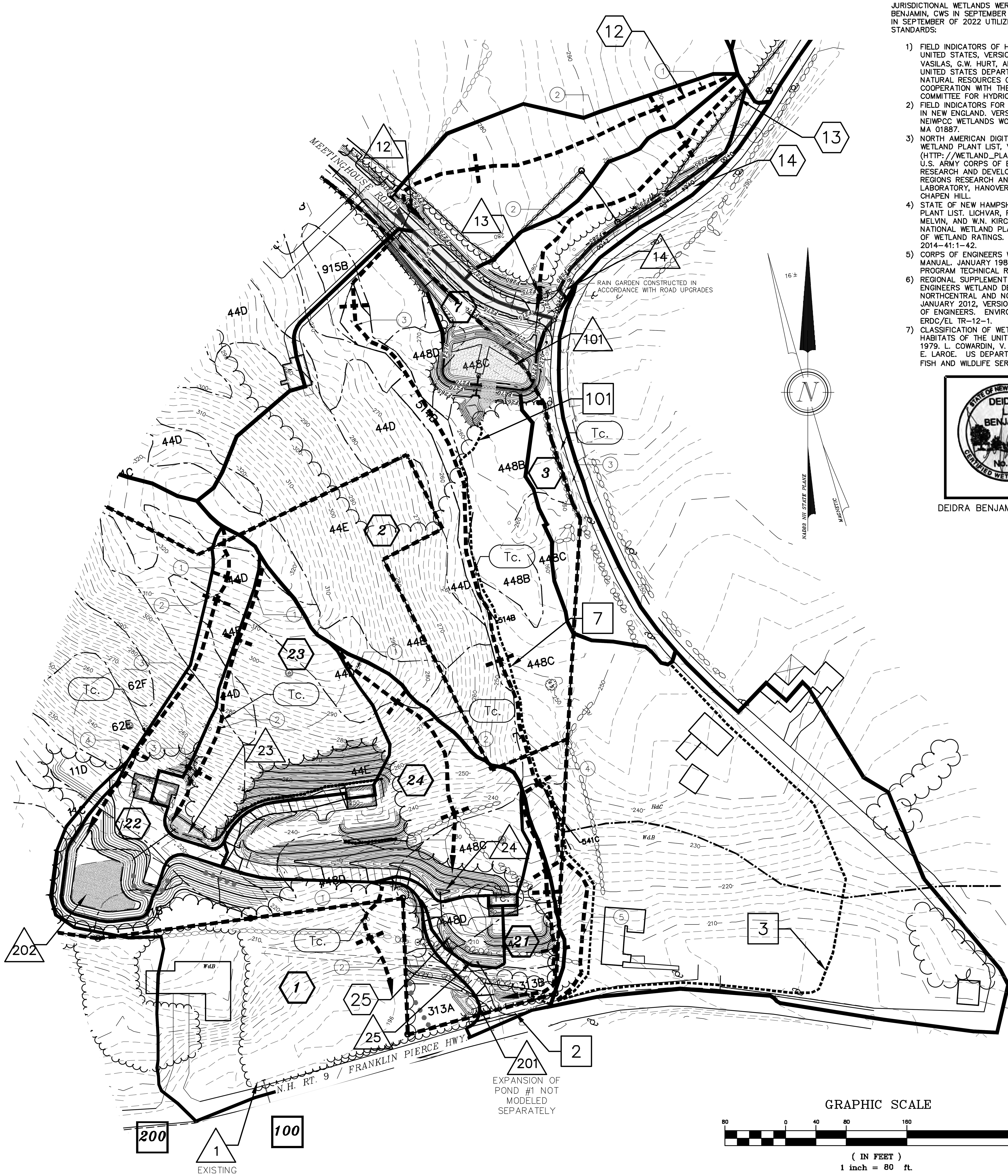
Pond 24P: Pond #24 Peak Elev=210.79' Storage=150 cf Inflow=7.79 cfs 0.646 af
Primary=7.63 cfs 0.646 af Secondary=0.00 cfs 0.000 af Outflow=7.63 cfs 0.646 af

Pond 25P: Pond #25 Peak Elev=202.26' Storage=255 cf Inflow=8.66 cfs 0.746 af
Primary=8.55 cfs 0.746 af Secondary=0.00 cfs 0.000 af Outflow=8.55 cfs 0.746 af

Pond 101P: Rain Garden#101 (Built) Peak Elev=268.35' Storage=18,816 cf Inflow=10.06 cfs 1.042 af
Primary=1.59 cfs 0.999 af Secondary=0.00 cfs 0.000 af Outflow=1.59 cfs 0.999 af

Pond 202P: Rain Garden w/ Infiltration #202 Peak Elev=217.55' Storage=22,352 cf Inflow=8.71 cfs 0.793 af
Outflow=0.28 cfs 0.324 af

Total Runoff Area = 18.980 ac Runoff Volume = 6.765 af Average Runoff Depth = 4.28"
90.08% Pervious = 17.098 ac 9.92% Impervious = 1.882 ac



JURISDICTIONAL WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS IN SEPTEMBER OF 2017 AND UPDATED IN SEPTEMBER OF 2022 UTILIZING THE FOLLOWING STANDARDS:

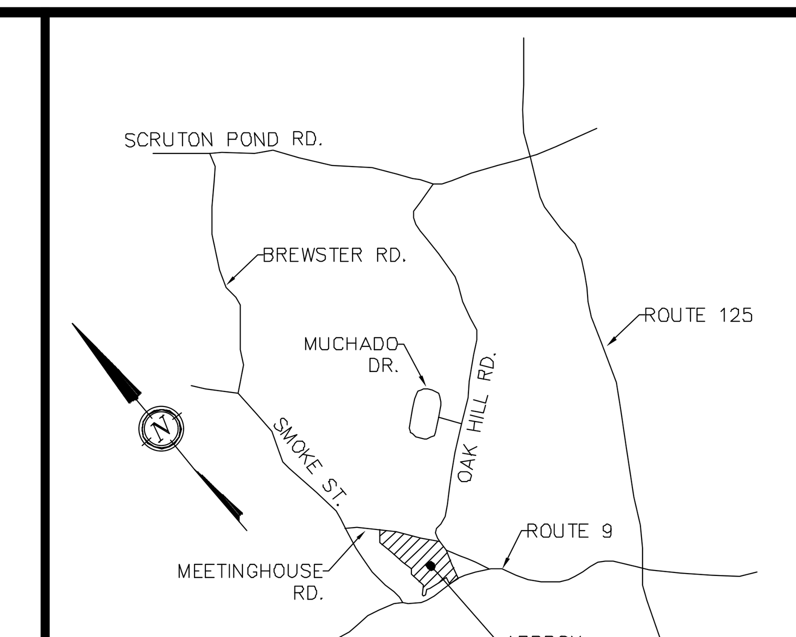
1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014-41:1-42.
5) CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. JANUARY 1987. WETLANDS RESEARCH PROGRAM TECHNICAL REPORT Y-87-1.
6) REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. JANUARY 2012, VERSION 2. U.S. ARMY CORPS OF ENGINEERS. ENVIRONMENTAL LABORATORY ERDC/EL TR-12-1.
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS-79/31.

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

DEIDRA BENJAMIN, CWS #295

STATE OF NEW HAMPSHIRE JOHN P. HAYES III No. 087 CERTIFIED SOIL SCIENTIST

JOHN P. HAYES III, CSS #87



LOCATION PLAN
BARRINGTON, N.H.
NOT TO SCALE

NOTES:

1.) OWNER: TSB CONSTRUCTION, LLC.
44 MERRYFIELD LANE
EAST HAMPSTEAD, NH 03826

2.) TAX MAP 234, LOT 25-1

3.) LOT AREA: 411,188 Sq. Ft., 9.44 Ac.

4.) S.C.R.D. BOOK 5050, PAGE 348

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN FLOOD HAZARD REF.: FEMA COMMUNITY# -330178, MAP# - 33017C0285D, DATED: MAY 17, 2005.

6.) VERTICAL DATUM BASED ON USGS NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING TOPCON HIPER SR SURVEY GRADE GPS RECEIVERS.

7.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE EXISTING WATERSHED CONDITIONS OF TAX MAP 234, LOT 25-1.

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.

SITE SPECIFIC SOILS LEGEND

SYMBOL	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
11A	GLOUCESTER SANDY LOAM	A
11B	GLOUCESTER SANDY LOAM	A
11C	GLOUCESTER SANDY LOAM	A
11D	GLOUCESTER SANDY LOAM	A
44B	MONTAUK FINE SANDY LOAM	C
44C	MONTAUK FINE SANDY LOAM	C
44D	MONTAUK FINE SANDY LOAM	C
44E	MONTAUK FINE SANDY LOAM	C
62E	CHARLTON FINE SANDY LOAM	B
62F	CHARLTON FINE SANDY LOAM	B
313B	DEERFIELD LOAMY SAND	B
915B	DEERFIELD VARIANT	B
448B	SCITUATE FINE SANDY LOAM	C
448C	SCITUATE FINE SANDY LOAM	C
448D	SCITUATE FINE SANDY LOAM	C
448E	SCITUATE FINE SANDY LOAM	C
514P	LEICESTER SANDY LOAM	C
514C	LEICESTER SANDY LOAM	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

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

LEGEND:

	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
	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
#2	4-13-23	REVS. PER NHDOT COMMENT
#1	3-15-23	REVS. PER CMA ENGINEERS AND NHDOT COMMENT

W-2 PROPOSED CONDITIONS WATERSHED
LAND OF
TSB CONSTRUCTION LLC
FRANKLIN PIERCE HIGHWAY /NH ROUTE 9
BARRINGTON, NH
TAX MAP 234, LOT 25-1

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

SCALE : 1 IN. EQUALS 80 FT.
DATE : JANUARY 18, 2023
FILE NO. : DB 2022 - 051

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

SHEET 2 OF 2

NOT FOR CONSTRUCTION

Appendix III - Calculations, Charts, & Graphs

Extreme Precipitation Tables
Rip-Rap Calculations
NHDES AoT Spreadsheet
USDA / NRCS Websoil
Site Specific Soil Survey Report & Plan
Infiltration Feasibility Study
KSat NH Manual
Stormwater System Management: Inspection and Maintenance 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	71.006 degrees West
Latitude	43.216 degrees North
Elevation	0 feet
Date/Time	Mon, 10 Oct 2022 13:45:07 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.65	0.81	1.02	**1yr**	0.70	0.98	1.19	1.53	1.97	2.56	2.81	**1yr**	2.26	2.70	3.11	3.84	4.40	**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	3.08	3.42	**2yr**	2.72	3.29	3.79	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	3.02	3.88	4.38	**5yr**	3.44	4.21	4.83	5.69	6.44	**5yr**
10yr	0.40	0.63	0.80	1.09	1.42	1.84	**10yr**	1.22	1.69	2.17	2.80	3.60	4.63	5.27	**10yr**	4.10	5.07	5.80	6.78	7.63	**10yr**
25yr	0.46	0.74	0.94	1.30	1.73	2.27	**25yr**	1.49	2.08	2.69	3.49	4.53	5.85	6.75	**25yr**	5.18	6.49	7.40	8.56	9.56	**25yr**
50yr	0.52	0.83	1.07	1.49	2.01	2.67	**50yr**	1.73	2.45	3.17	4.15	5.40	6.99	8.14	**50yr**	6.19	7.83	8.89	10.21	11.35	**50yr**
100yr	0.58	0.94	1.21	1.72	2.34	3.13	**100yr**	2.02	2.88	3.74	4.92	6.42	8.36	9.83	**100yr**	7.39	9.45	10.69	12.19	13.47	**100yr**
200yr	0.65	1.06	1.37	1.97	2.72	3.68	**200yr**	2.35	3.39	4.43	5.85	7.66	9.99	11.86	**200yr**	8.84	11.40	12.87	14.55	16.00	**200yr**
500yr	0.76	1.26	1.64	2.38	3.33	4.56	**500yr**	2.88	4.21	5.50	7.32	9.66	12.65	15.21	**500yr**	11.20	14.63	16.44	18.41	20.10	**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	0.44	0.60	0.73	0.90	**1yr**	0.63	0.88	0.91	1.25	1.52	1.94	2.48	**1yr**	1.72	2.39	2.92	3.28	3.94	**1yr**
2yr	0.31	0.48	0.60	0.81	0.99	1.18	**2yr**	0.86	1.15	1.35	1.81	2.34	2.98	3.33	**2yr**	2.64	3.20	3.68	4.40	5.02	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.61	2.14	2.77	3.59	4.03	**5yr**	3.18	3.88	4.49	5.34	6.01	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.56	1.81	2.43	3.12	4.11	4.67	**10yr**	3.64	4.49	5.20	6.17	6.87	**10yr**
25yr	0.44	0.67	0.83	1.19	1.57	1.91	**25yr**	1.35	1.87	2.12	2.84	3.63	4.90	5.63	**25yr**	4.34	5.42	6.34	7.46	8.24	**25yr**
50yr	0.49	0.74	0.92	1.33	1.79	2.19	**50yr**	1.54	2.15	2.38	3.20	4.06	5.60	6.49	**50yr**	4.95	6.24	7.36	8.62	9.51	**50yr**
100yr	0.55	0.83	1.03	1.49	2.05	2.52	**100yr**	1.77	2.46	2.67	3.60	4.53	6.37	7.47	**100yr**	5.64	7.18	8.55	9.96	10.87	**100yr**
200yr	0.61	0.92	1.16	1.68	2.35	2.89	**200yr**	2.03	2.83	3.00	4.04	5.06	7.25	8.81	**200yr**	6.42	8.47	9.95	11.50	12.45	**200yr**
500yr	0.72	1.06	1.37	1.99	2.83	3.50	**500yr**	2.44	3.42	3.51	4.72	5.87	8.55	10.67	**500yr**	7.57	10.26	12.17	13.93	14.83	**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	1.72	2.18	2.76	3.02	**1yr**	2.44	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	3.19	3.54	**2yr**	2.82	3.40	3.92	4.65	5.30	**2yr**
5yr	0.39	0.60	0.75	1.02	1.30	1.57	**5yr**	1.12	1.53	1.83	2.47	3.16	4.18	4.71	**5yr**	3.70	4.53	5.18	6.05	6.84	**5yr**
10yr	0.45	0.70	0.87	1.21	1.56	1.90	**10yr**	1.35	1.86	2.21	3.00	3.80	5.16	5.86	**10yr**	4.56	5.64	6.42	7.39	8.32	**10yr**
25yr	0.55	0.84	1.05	1.50	1.97	2.44	**25yr**	1.70	2.38	2.84	3.90	4.87	6.83	7.84	**25yr**	6.05	7.54	8.51	9.73	10.72	**25yr**
50yr	0.64	0.97	1.21	1.74	2.35	2.94	**50yr**	2.02	2.87	3.44	4.74	5.89	8.46	9.79	**50yr**	7.48	9.42	10.55	11.94	13.12	**50yr**
100yr	0.75	1.13	1.41	2.04	2.80	3.54	**100yr**	2.41	3.46	4.17	5.79	7.15	10.47	12.23	**100yr**	9.27	11.76	13.07	14.66	16.00	**100yr**
200yr	0.86	1.30	1.65	2.39	3.33	4.27	**200yr**	2.87	4.18	5.06	7.06	8.65	13.01	15.03	**200yr**	11.52	14.46	16.19	17.99	19.56	**200yr**
500yr	1.06	1.57	2.02	2.94	4.18	5.47	**500yr**	3.61	5.34	6.51	9.21	11.17	17.38	20.13	**500yr**	15.38	19.36	21.49	23.64	25.53	**500yr**

Custom Soil Resource Report
Soil Map

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 23, Sep 9, 2022

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

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

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	0.3	1.1%
GsE	Gloucester very stony fine sandy loam, 25 to 60 percent slopes	3.4	12.9%
HaB	Hinckley loamy sand, 3 to 8 percent slopes	0.2	0.9%
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	9.4	36.0%
LrA	Leicester-Ridgebury fine sandy loams, 0 to 3 percent slopes, very stony	1.1	4.3%
WdB	Windsor loamy sand, 3 to 8 percent slopes	11.7	44.8%
Totals for Area of Interest		**26.1**	**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.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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

0.24	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.10	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.39	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
(0.02)	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.22	inches	Rd = Weighted groundwater recharge depth	
0.158	ac-in	GRV = AI * Rd	
574	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):

Due to the development of Meetinghouse Road resulting in a change in subcatchments off site from the proposed development area of this project there is a minor decrease in impervious HSG D soils. A portion of the HSG D soils was captured in a different subcatchment of the Meetinghouse Road project and sent to a different final reach.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Infiltration Rain Garden #202**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
2.27	ac	A = Area draining to the practice	
0.19	ac	A_I = Impervious area draining to the practice	
0.08	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.12	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.28	ac-in	WQV= 1" x Rv x A	
1,023	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
256	cf	25% x WQV (check calc for sediment forebay volume)	
767	cf	75% x WQV (check calc for surface sand filter volume)	
Sediment Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
2,535	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
4,000	sf	A_{SA} = Surface area of the practice	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
N/A	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
1.0	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
213.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
209.58	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
207.33	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
213.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
5.67	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
3.42	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
216.58	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
218.25	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**
23,225	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	P-202	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	P-202	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 202P: Rain Garden w/ Infiltration #202

Inflow Area = 2.266 ac, 8.26% Impervious, Inflow Depth > 3.11" for 50Yr.-24Hr. event
Inflow = 6.56 cfs @ 12.19 hrs, Volume= 0.587 af
Outflow = 0.28 cfs @ 11.60 hrs, Volume= 0.310 af, Atten= 96%, Lag= 0.0 min
Discarded = 0.28 cfs @ 11.60 hrs, Volume= 0.310 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 216.58' @ 16.73 hrs Surf.Area= 4,000 sf Storage= 15,042 cf
Flood Elev= 218.25' Surf.Area= 4,000 sf Storage= 28,301 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 190.0 min (1,036.2 - 846.3)

Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	1,600 cf	**Stone (Irregular)** Listed below (Recalc) 4,000 cf Overall x 40.0% Voids
#2	213.00'	1,200 cf	**BioMedia (Irregular)** Listed below (Recalc) -Impervious 6,000 cf Overall x 20.0% Voids
#3	214.50'	25,501 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		28,301 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.00	4,000	258.6	0	0	4,000
213.00	4,000	258.6	4,000	4,000	4,259

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
213.00	4,000	258.6	0	0	4,000
214.50	4,000	258.6	6,000	6,000	4,388

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
214.50	4,000	258.6	0	0	4,000
214.75	5,115	327.0	1,137	1,137	7,188
215.00	5,365	332.7	1,310	2,446	7,499
216.00	6,398	353.1	5,874	8,320	8,664
217.00	7,486	371.9	6,935	15,255	9,807
218.00	8,630	390.8	8,051	23,306	11,016
218.25	8,925	395.5	2,194	25,501	11,326

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.00'	**3.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.28 cfs @ 11.60 hrs HW=212.08' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Stage-Area-Storage for Pond 202P: Rain Garden w/ Infiltration #202

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
212.00	**4,000**	0
212.10	4,000	160
212.20	4,000	320
212.30	4,000	480
212.40	4,000	640
212.50	4,000	800
212.60	4,000	960
212.70	4,000	1,120
212.80	4,000	1,280
212.90	4,000	1,440
213.00	4,000	1,600
213.10	4,000	1,680
213.20	4,000	1,760
213.30	4,000	1,840
213.40	4,000	1,920
213.50	4,000	2,000
213.60	4,000	2,080
213.70	4,000	2,160
213.80	4,000	2,240
213.90	4,000	2,320
214.00	4,000	2,400
214.10	4,000	2,480
214.20	4,000	2,560
214.30	4,000	2,640
214.40	4,000	2,720
214.50	4,000	2,800
214.60	4,000	3,221
214.70	4,000	3,687
214.80	4,000	4,194
214.90	4,000	4,715
215.00	4,000	5,246
215.10	4,000	5,788
215.20	4,000	6,339
215.30	4,000	6,901
215.40	4,000	7,472
215.50	4,000	8,054
215.60	4,000	8,646
215.70	4,000	9,249
215.80	4,000	9,862
215.90	4,000	10,486
216.00	4,000	11,120
216.10	4,000	11,765
216.20	4,000	12,421
216.30	4,000	13,087
216.40	4,000	13,764
216.50	4,000	14,452
216.60	4,000	15,150
216.70	4,000	15,860
216.80	4,000	16,581
216.90	4,000	17,312
217.00	4,000	18,055
217.10	4,000	18,809
217.20	4,000	19,575
217.30	4,000	20,351
217.40	4,000	21,139
217.50	4,000	21,938
217.60	4,000	22,748
217.70	4,000	23,570
217.80	4,000	24,404
217.90	4,000	25,249
218.00	4,000	26,106
218.10	4,000	26,975
218.20	4,000	**27,856**

Spillway Elev:
217.85=24,825

24,825 CF Storage at E Spillway
-1,600 CF Storage within stone
23,225CF Total BMP Storage

RIP RAP CALCULATIONS

22-051 TSB Construction, LLC

Dover, NH

Berry Surveying & Engineering

335 Second Crown Point Road

Barrington, NH

1/18/2023: Rev 4/13/23

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

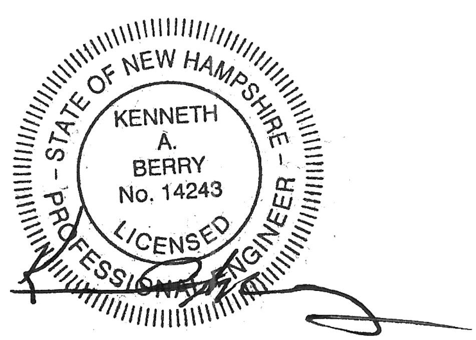
d50 = (0.02 x Q4/3) / (Tw x Do)   Tw = Tailwater Depth

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 #23)	0.25	3.24	1.25	12.9	16.7	0.31	0.50	1.20
15" HDPE (Pond #24)	0.25	4.59	1.25	14.7	18.4	0.49	0.50	1.20
18" HDPE (Pond #25)	0.30	5.29	1.50	15.7	20.2	0.41	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 Than the Given d50 Size	Size of Stone (Inches) From	To
100%	9	12
85%	8	11
50%	6	9
15%	2	3



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Inspection and Maintenance Manual

Stormwater System Management

Tax Map 234, Lot 25-1
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Prepared for:

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44 Merryfield Lane
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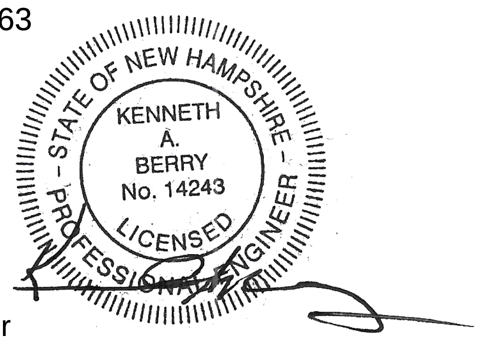


File Number
DB2022-051

January 18, 2023
Revised: March 15, 2023

Inspection and Maintenance Manual

Stormwater System Management

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, **January 18, 2023**, as revised. See also plan set completed for **TSB Construction, LLC**, originally dated **January 18, 2023**, as revised.

TSB Construction, LLC, development company with David Coish as the operator, is responsible for the Operation, Inspection, and Maintenance of the Stormwater Management System. 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 followed diligently. 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 / developer must maintain, and have available, plans of the Stormwater System in order properly inspect and maintain the system. (Reduced copies attached.) The responsible party will conduct the inspections, complete the required maintenance, and will maintain the Inspection & Maintenance Check Lists and Logs, and will provide copies with the Annual Report to the Town of Barrington, Planning Department by December 15th of each year. If the development is converted from rental units or is sold to a subsequent party, copies of the Inspection & Maintenance Manual complete with attachments and plans must be transferred to the incoming management / ownership team. The

The owners of Tax Map 234, Lot 25-1, TSB Construction, LLC, are proposing a residential multi-family site development consisting of 4 residential units made up of one duplex and two single family homes and 618 linear feet of shared driveway.

The following practices and drainage features will all require periodic inspections and maintenance based on this manual and drainage layout:

Drainage Pipes

Conveyance Swales

Detention Pond #201 with forebay

Rain Garden w/ Infiltration #202 with forebay and spillway

Conveyance Swales (Grassed & Rip-Rap)

Description: "Swales are stabilized channels designed to convey runoff at non-erosive velocities." (NHDES SWM) They will be trapezoidal or parabolic in section view. A conveyance swale is intended to move surface water runoff from one point to another where as a treatment swale will slow the velocity to a point where sediment will settle out of the stormwater flow. A treatment swale will be constructed to a width of between four and eight feet and have a minimum length of 100 feet. The flow characteristics will also meet design criteria. See SWM Volume 2, 4.3 Treatment Practices, 5. Treatment Swales, page 123.

Project Intent: The swales are individually designed in the drainage analysis and specified on the design plans. The designed swales must have greater than 85% vegetated growth prior to receiving runoff. The bottom of a treatment swale must be above the seasonal high water table.

Maintenance Considerations: Grassed swales will be inspected twice annually, removing accumulated sediment and gross solids. Grass will be mowed periodically but to a depth of not less than 4 inches. Any damage to the vegetation will be repaired and woody vegetation and invasive vegetation will be removed. Rip-rap lined swales should be inspected to ensure the rip-rap is not being displaced by flow or vegetation. Excess sedimentation should be removed.

Culvert Pipes, Flared End Sections / Headwalls

Description: Culvert pipes are placed to route surface water runoff from catch basins to drain manholes, and drain manholes to a discharge point conveying the runoff in such a manner that erosion does not take place. Culvert pipes are often terminated with flared end sections or headwalls.

Maintenance Considerations: The entrance and exit of the culvert pipe should be cleaned of any trash and sediment build-up. The culvert should be clear to let runoff pass through the culvert unobstructed. Flared end sections and headwalls should be inspected for erosion and destabilization, with repairs made as required.

Sediment Forebay

Description: A sediment forebay is designed to reduce the velocity of incoming surface water runoff allowing sediment to fall out of suspension initially pre-treating the runoff before it is sent to a treatment structure. This earthen basin will have vegetated side-slopes and a check dam to further reduce and pretreat the runoff. At the point of incoming runoff, the basin will be protected by rip rap outlet protection construction and the outgoing edge will be protected with rip rap. The check dam will be constructed from one side of the basin to the other and cause runoff to either go through or over. The volume of the forebay is generally 10% the volume of the Water Quality Volume (WQV) for gravel wetlands, and 25% for rain gardens. A dewatering drain is designed into the two-foot berm of the forebay. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-4 Pretreatment Practices 1, Sediment Forebays.

Maintenance Considerations: The basin and slopes will be periodically mowed, at least twice per year ensuring that woody material does not get an opportunity to grow. Sediment accumulated in the basin will be removed and properly disposed of when it reaches half the height of the check dam. Erosion or other damage to the basin will be repaired and revegetated. (See Outlet Protection) Inspect and clean the dewatering drain to ensure runoff is not trapped for more than 72 hours in the forebay.

Detention Ponds

Description:

A detention basin is an impoundment designed to temporarily store runoff and release it at a controlled rate, reducing the intensity of peak flows during storm events. Conventional detention basins are typically designed to control peak runoff rates under a range of storm conditions, and can be used to control discharges as required under the AoT Regulations and other requirements. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-6 Conveyance Practices, 1, Detention Basin.

Maintenance Considerations:

Detention Ponds should be inspected at least twice annually and following any rainfall event exceeding 0.25 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

Also on an annual basis the vegetation should be inspected to ensure healthy condition. Invasive species need to be removed along with dead or diseased vegetation.

Bio-Filtration System (Rain Gardens)

Description:

Rain Gardens, or bio-filtration areas are located close to the source of runoff. They are intended to integrate with the site landscaping an become an aesthetically attractive opportunity to provide highly effective stormwater treatment. The rain gardens associated with this proposed development contribute toward recharge of surface water run-off into the ground. It is important that sediment be removed from run-off prior to discharge into the bio-filtration area to preserve the mulch and soil mix ratio. During construction it is important that the ground surface not be exposed to traffic or construction equipment to preserve the infiltration capabilities of the existing soil. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-3 Treatment Practices, 4c Bioretention System. (Bio-media and bio-filtration mean bioretention filter media.)

Maintenance Considerations:

Rain Gardens should be inspected at least twice annually and following any rainfall event exceeding 0.25 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

On an annual basis the infiltration capabilities need to be confirmed by evaluation the drawdown time. If the bio-filtration system does not drain within 72-hours following a rainfall event, a qualified professional will assess the condition of the rain garden to determine measures required to restore the infiltration function. This is normally the direct result of sediment accumulation which will be removed to restore the filter media ratio.

Also on an annual basis the vegetation should be inspected to ensure healthy condition. Invasive species need to be removed along with dead or diseased vegetation.

Rip Rap Outlet Protection, Level Spreaders, & Emergency Spillways

Description: Outlet Protection consists of a riprap apron or preformed scour hole that is designed to provide velocity reduction of the surface water run-off that is leaving a culvert. The design is dependent on the culvert size, soil conditions, velocity, and quantity of the run-off. There are to be no bend or curves at the intersection of the conduit and apron. Level spreaders are intended to provide a level lip where surface water runoff is allowed to continue downhill closer to sheet flow. The level lip is to be constructed as level as possible for the entire length. Emergency Spillways are rip rap reinforced outlets near the top of the berm that allow runoff to leave a practice during periods of very high flow. Ref.: NHDES SWM Volume 2, Section 4-6 Conveyance Practices, 6. Outlet Protection and 1. Detention Ponds, Note 3, Page 158.

Maintenance Considerations: The riprap outlet protection will be inspected annually for damage, which must be corrected immediately. Any sediment buildup will be removed and disposed of correctly. Sediment and subsequent vegetation will build up in the Level Spreader. This material will be cleaned out along with any gross solids and disposed of properly. (See invasive species below) Any rip rap that has been displaced from the original construction will be repaired, especially recreating the level lip.

Stabilization for Long Term Cover

Vegetated Stabilization – Original Planting

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 will used to stabilize all 2:1 slopes. As the site is to be stabilized with erosion control mix as a mulch, the vegetation should be established with a high percentage of white clover for growth to be established.

Rain Garden Mix

The grass that is planted within a rain garden bio-filtration system within the bio-media must consist of a combination of warm season grass seed and cold season grass seed in order for the grass to start growing for stabilization and continue growing in the sandy well-drained environment. Planting specification will meet the requirements as outlined in 'Vegetation New Hampshire Sand and Gravel Pits' mix 1 (warm season grasses) (15 lbs/ac) and include annual and perennial rye grass seed (15 lbs/ac); the New England native warm season grass mix (23 lbs/ac) by New England Wetland Plants, Inc.; rain garden mix 180 (15 lbs/ac & 15 lbs/ac of rye) / rain garden grass mix 180-1 (20 lbs/ac & 10 lbs/ac of rye) by Ernst Conservation Seeds; or approved equal.

Maintenance Considerations: Permanent seeded areas for long-term cover will be inspected on a periodic basis looking for signs of growth loss or erosion. Any areas found to be damaged will be repaired and replanted to reestablish the growth. The grass should be mowed at least twice per year and any dead material removed. Any woody growth that becomes established will need to be cut and removed.

Long-term maintenance of the land cover is critical and must be maintained at least 85% grass / vegetation coverage, must be inspected for concentrated flow, rills, and channels; and must be repaired as necessary to prevent erosion.

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.

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 Inspection & Maintenance Manual, Stormwater System Management, copies of past logs and check lists. This includes any owner association that might become involved with the property. The Annual Report will be prepared and submitted to Town of Barrington, Planning Department with copies of both logs and check lists no later than December 15th of each year. 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 includes four sheets, "Drainage Operation, Inspection, & Maintenance Plan". The owners and municipality will also maintain a complete set of the approved original design plans.

Respectfully,
BERRY SURVEYING & ENGINEERING

Kevin R. Poulin, EIT
Project Engineer / Manager

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

STORMWATER SYSTEM: INSPECTION AND MAINTENANCE MANUAL

Inspection & Maintenance Manual Checklist

Franklin Pierce Highway, Barrington, NH 03825

TSB Construction, LLC
44 Merryfield Lane,
Hampstead, NH 03826

☑	Date	BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Pavement Sweeping	Three Times Per Year	N/A	N/A
		Litter/Trash Removal	Routinely	Inspect swales, inlet sumps, 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 & Inlet Sumps	2 times per year	Check for sediment accumulation & clogging.	Less than 2" sediment depth
☑	**Date**	**BMP / System**	**Minimum Inspection Frequency**	**Minimum Inspection Requirements**	**Maintenance / Cleanout Threshold**

		Detention Ponds, Infiltration Ponds	2 times per year	Check for sediment and debris accumulation buildup.	Remove sediment & debris when required. Remove Invasive Species
		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. Vegetation per approved plans.
		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. Copies submitted to NHDES by that date.

The following practices and drainage features will all require periodic inspections and maintenance based on this manual and drainage layout:

Drainage Pipes

Conveyance Swales

Detention Pond #201 with forebay

Rain Garden w/ Infiltration #202 with forebay and spillway

STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Inspection & Maintenance Manual Log Form

Franklin Pierce Highway, Barrington, NH 03825

TSB Construction, LLC
44 Merryfield Lane,
Hampstead, NH 03826

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

STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Deicing Log Form

Franklin Pierce Highway, Barrington, NH 03825

TSB Construction, LLC
44 Merryfield Lane,
Hampstead, NH 03826

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

STORMWATER SYSTEM OPERATION & MAINTENANCE PLAN CERTIFICATION

Owner	Responsibility
Name: TSB Construction, LLC Owners / Developers David Coish, Operator Telephone: (603) 765-9176 (Mobile) Email: Coishdavid@yahoo.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.

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:

PROJECT NOTES:

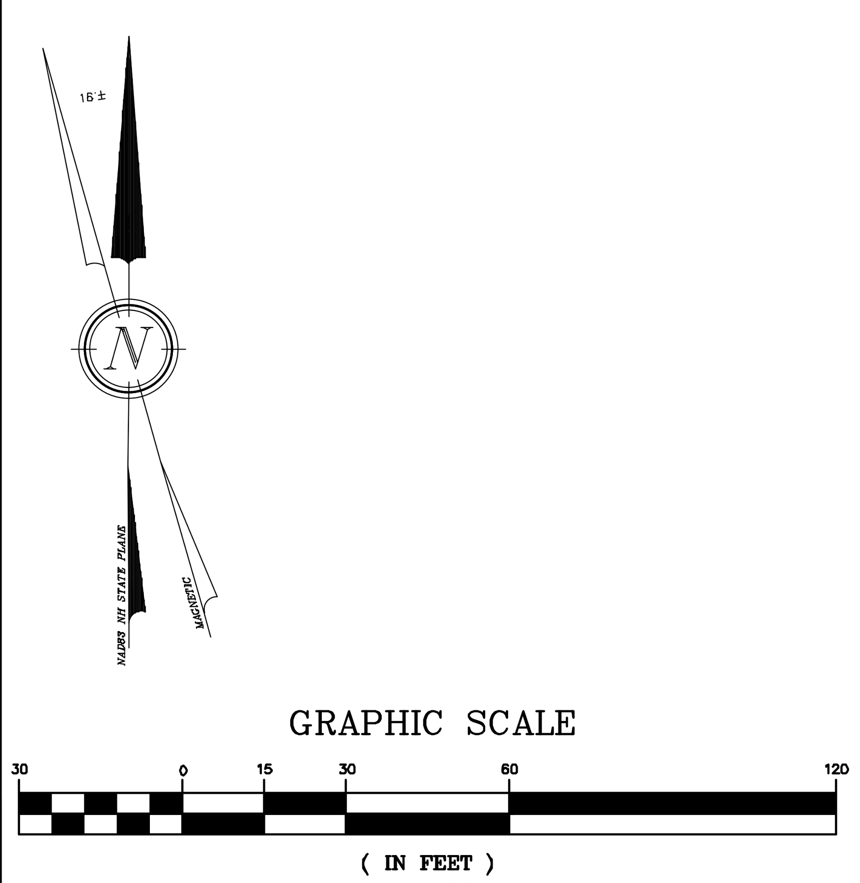
1.) OWNER & APPLICANT: TSB CONSTRUCTION LLC
44 MERRYFIELD LANE
EAST HAMPSTEAD, NH 03826

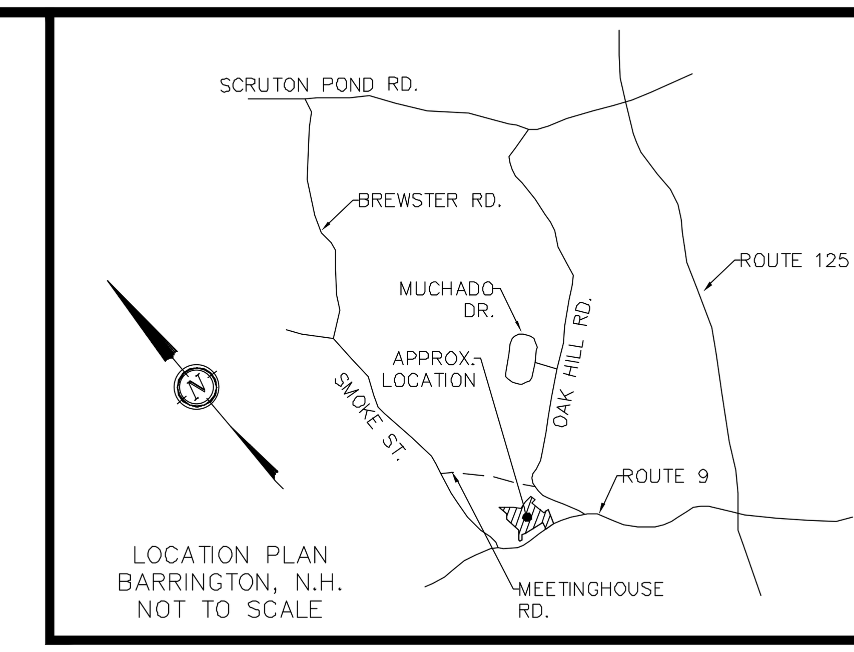
2.) TAX MAP 234, LOT 25-1

3.) LOT AREA: 411,188 Sq. Ft., 9.44 Ac.

4.) 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.

5.) 11x17" PLANS ARE TWICE THE PUBLISHED SCALE.





LOCATION PLAN
BARRINGTON, N.H.
NOT TO SCALE

LEGEND:

- IRON PIPE ~FND~
- IRON BOUND ~FND~
- 3/4" REBAR W/ ID CAP ~TBS~
- UTILITY POLE
- TEST PIT
- FLOW ARROW
- TEMPORARY BENCHMARK (T.B.M.)
- STONE WALL
- STONE WALL REMAINS
- POORLY DRAINED JURISDICTIONAL WETLAND
- WETLAND BUFFER
- BUILDING SETBACK LINE
- CENTER LINE
- EDGE OF TRAVELED WAY (GRAVEL)
- 176 CONTOUR MINOR, EXISTING
- 175 CONTOUR MAJOR, EXISTING
- EXISTING DRAINAGE LINE
- F211 CONTOUR MINOR, PROPOSED
- F210 CONTOUR MAJOR, PROPOSED
- RIP RAP
- STORMWATER BEST MANAGEMENT PRACTICE (BMP)
- BERM

S.C.R.D.	STRAFFORD COUNTY REGISTRY OF DEEDS
TYP.	TYPICAL
FND	FOUND
PL	PROPERTY LINE
R.O.W.	RIGHT OF WAY
E.T.W.	EDGE OF PAVEMENT

REVISION	DATE	DESCRIPTION
#2	4-13-23	REVS. PER CMA ENGINEERS AND NHDOT COMMENT
#1	3-15-23	REVS. PER NHDOT COMMENT

INSPECTION & MAINTENANCE PLAN
LAND OF
TSB CONSTRUCTION LLC
FRANKLIN PIERCE HIGHWAY /NH ROUTE 9
BARRINGTON, NH
TAX MAP 234, LOT 25-1

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

SCALE : 1 IN. EQUALS 30 FT.
DATE : JANUARY 18, 2023
FILE NO. : DB 2022 - 051

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

Infiltration Feasibility Report

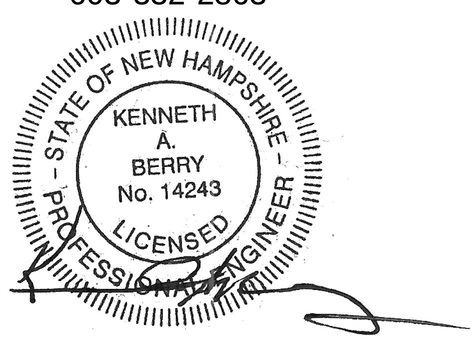
Tax Map 234, Lot 25-1
Franklin Pierce Highway
Barrington, NH 03825

Prepared for:

TSB Construction, LLC
44 Merryfield Lane
East Hampstead, NH 03826

Prepared By

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



File Number
DB2022-051

January 18, 2023

Table of Contents

1.0 Location of Practices:

The project proposes locations of infiltration for ground water recharge as well as channel flow protection purposes via Rain Garden with Infiltration #202.

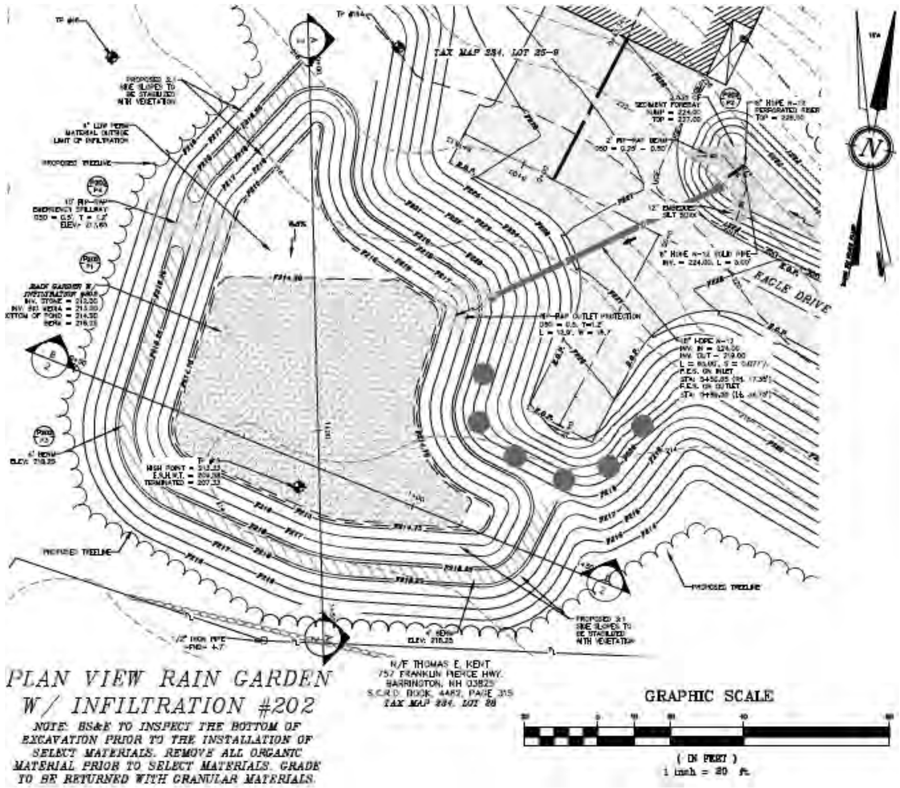
Rain Garden with Infiltration #202 (POND 202) – This Rain Garden is on the southerly side of the end of the proposed shared driveway. Runoff is collected in an inlet sump/sediment forebay where pre-treatment occurs, before being treated in the biomedia. This practice treats runoff from driveway, residential buildings and collects runoff from uphill of the area of construction.

2.0 Existing topography at the location of the practice

Rain Garden with Infiltration #202 (POND 202) – The existing topography within the area is at an 3-8% slope. The area was woodlands and is comprised of a natural state soils. This land has been used for forestry practices in the past.

3.0 Test Pit Locations

Rain Garden with Infiltration #202 (POND 202) – The practice has a surface area of 4,000 SF. The practice is located over test pits #15. See test pit profiles below. See test pit locations on Sheet P-202, Proposed Rain Garden with Infiltration #202 Detail Plan. The test holes were completed in Summer 2017, (See Site Specific Soil Map Report by John P Hayes III). The soil in the vicinity of this practice is Gloucester Sandy Loam, considered to be HSG A soil where the most restrictive published Ksat is 6.0 inches per hour. This practice was designed using 3.0 in. / hr.



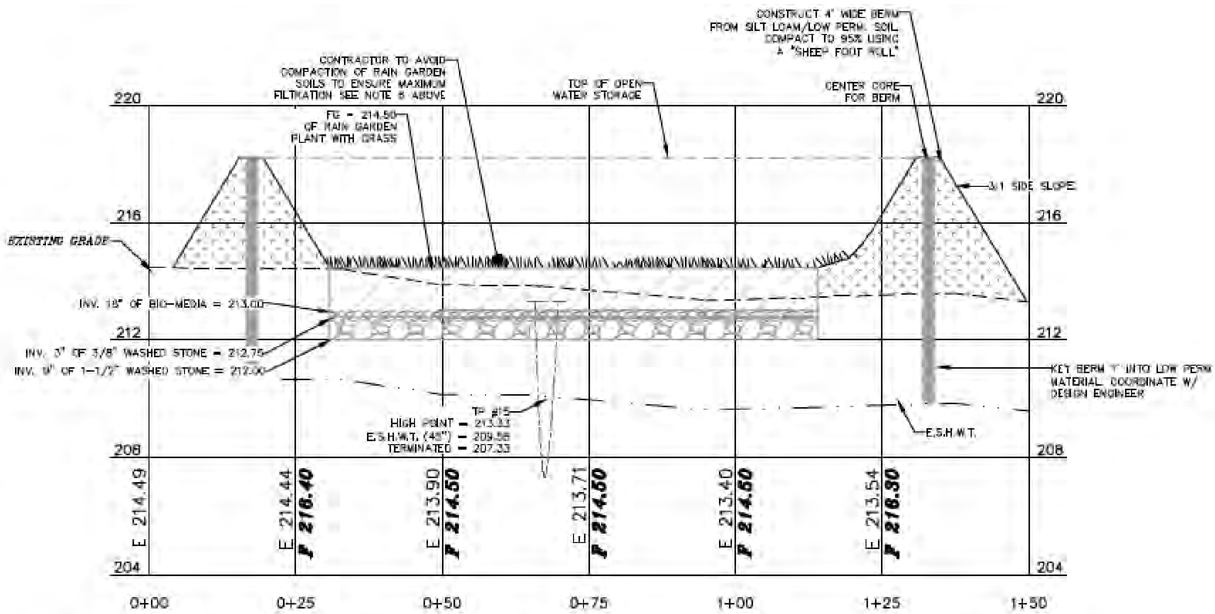
Rain Garden with Infiltration #202 (POND 202) – (Reference Sheet P-202)

4.0 Seasonal high water table (SHWT) and bedrock elevations

TP#15:	Existing Surface Elevation of TP =	213.33’
	SHWT = 45 Inches	209.58’
	Bedrock = >72 Inches	207.33’
	Ground Water = N/A	
	Deepest Elevation of TP =	207.33’

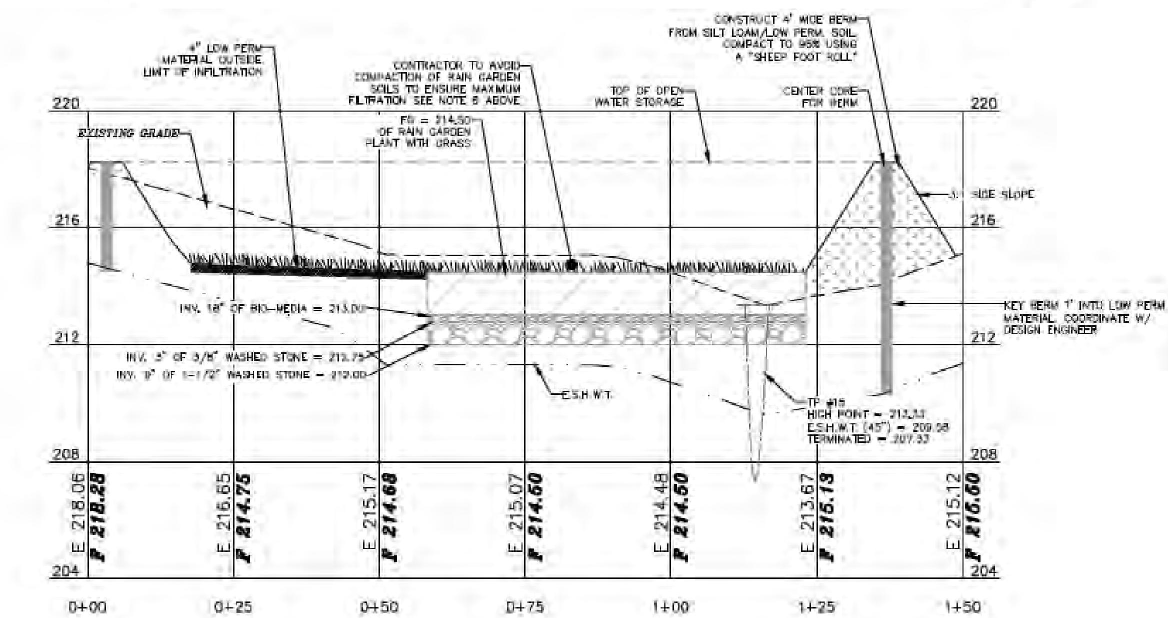
Rain Garden w/ Infiltration #202 (Pond 202): Inv. Biomedia 213.00’

See cross section below.



SECTION OF RAIN GARDEN W/ INFILTRATION #102

B
2



SECTION OF RAIN GARDEN W/ INFILTRATION #102

A
2

5.0 Profile descriptions

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

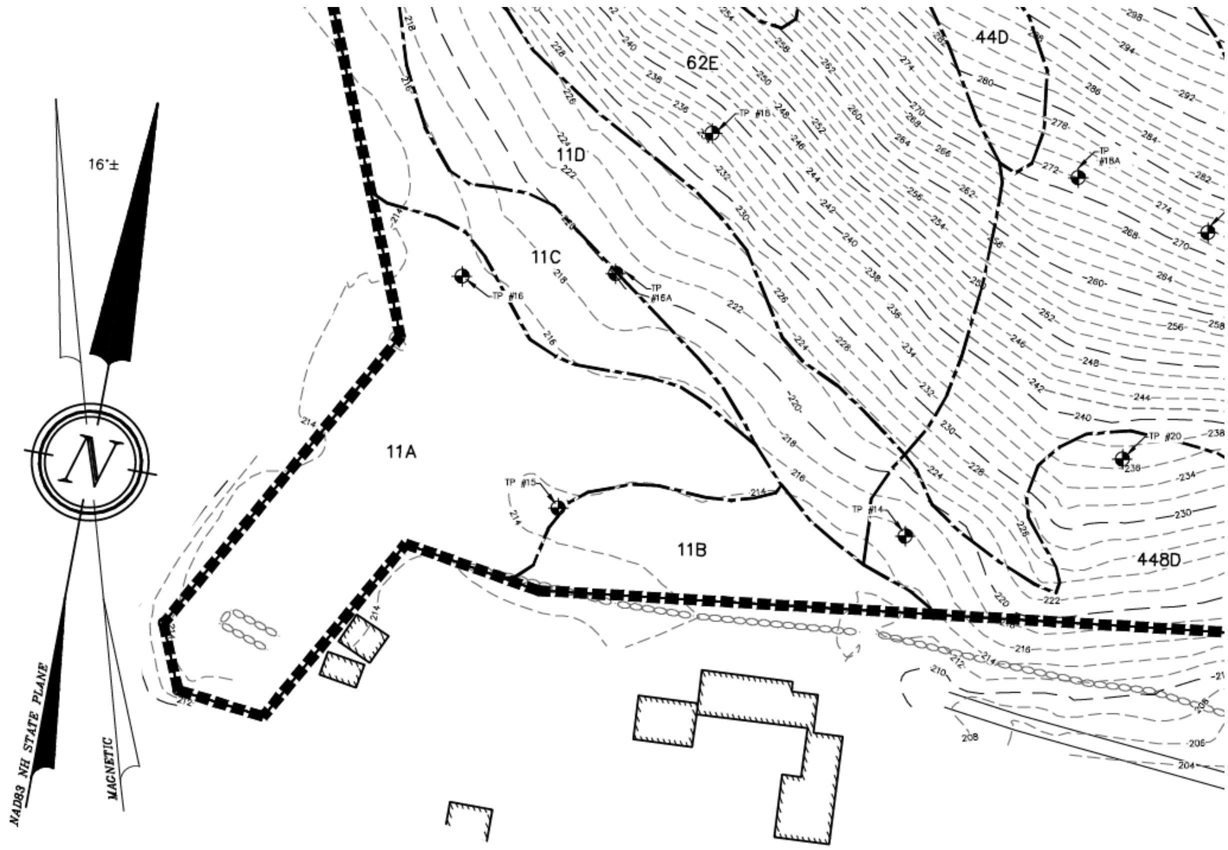
TEST PIT #15 Summer 2017

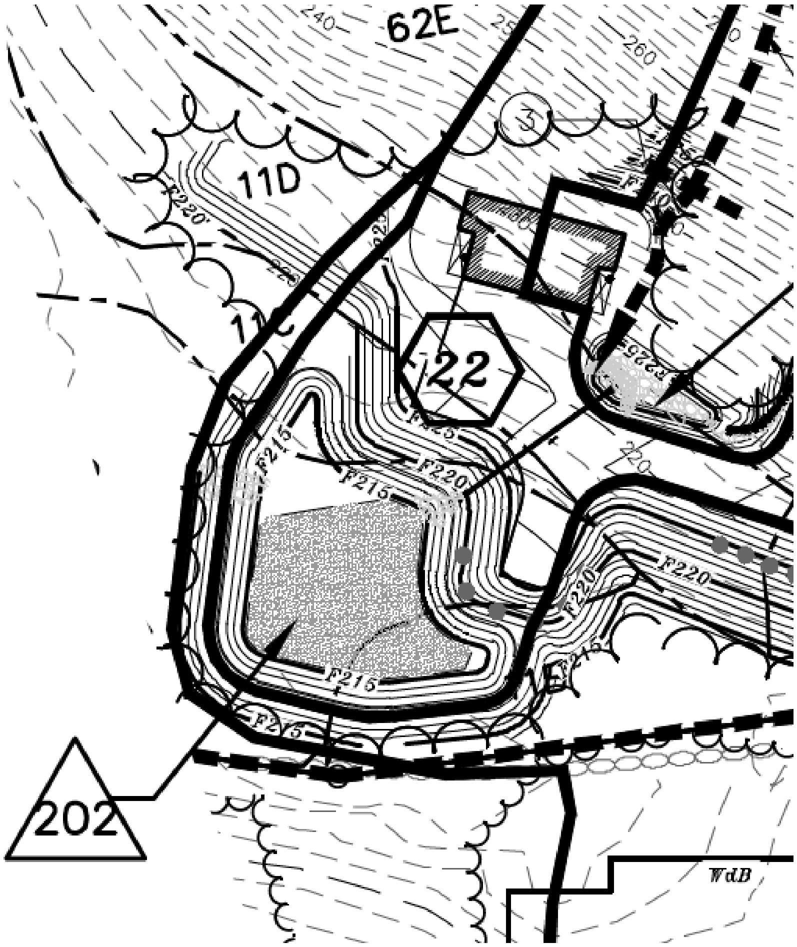
0-10"	10YR 3/3, FINE SANDY LOAM, GRANULAR, FRIABLE
10-12"	10YR 4/4, FINE SANDY LOAM, GRANULAR, FRIABLE
12-21"	2.5Y 5/4, FINE SANDY LOAM, GRANULAR, FRIABLE
21-39"	2.5Y 5/3, FINE SANDY LOAM, ANGULAR BLOCKY, FRIABLE
39-45"	10YR 4/6, COARSE SAND, SINGLE GRAIN, LOOSE 30% GRAVEL/COBBLES
45-72"+	2.5Y 5/4, COARSE SAND, SINGLE GRAIN, LOOSE MOTTLES - 10YR 4/6 CONCENTRATIONS & DEPLETIONS 30% GRAVEL/COBBLES

E.S.H.W.T. @ 45"
ROOTS TO 40"
RESTRICTIVE LAYER - N/A"
WATER OBSERVED >72"
LEDGE @ >72"
TERMINATED @ 72"
PERC. RATE = 4 MIN./IN.

6.0 Soil plan in the area of the constructed practice

Rain Garden with Infiltration is located over Gloucester Sandy Loam (Pond #202) See Test Pit #15.





Rain Garden with Infiltration #202 (Pond 202)

7.0 Summary of Infiltration Rate

Rain Garden with Infiltration #202 is located within a Gloucester Sandy Loam, HSG A soil area as mapped by Site Specific Soil Survey by John P. Hayes III, CSS, with a documented Ksat of 6.0 inches per hour. The design exfiltration rate for the rain garden is 3.0 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

Kevin R. Poulin, EIT
Project Engineer

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

Control of Invasive Plants

New Hampshire
Department of Agriculture,
Markets & Food
Douglas Cygan
603-271-3488
doug.cygan@agr.nh.gov

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.

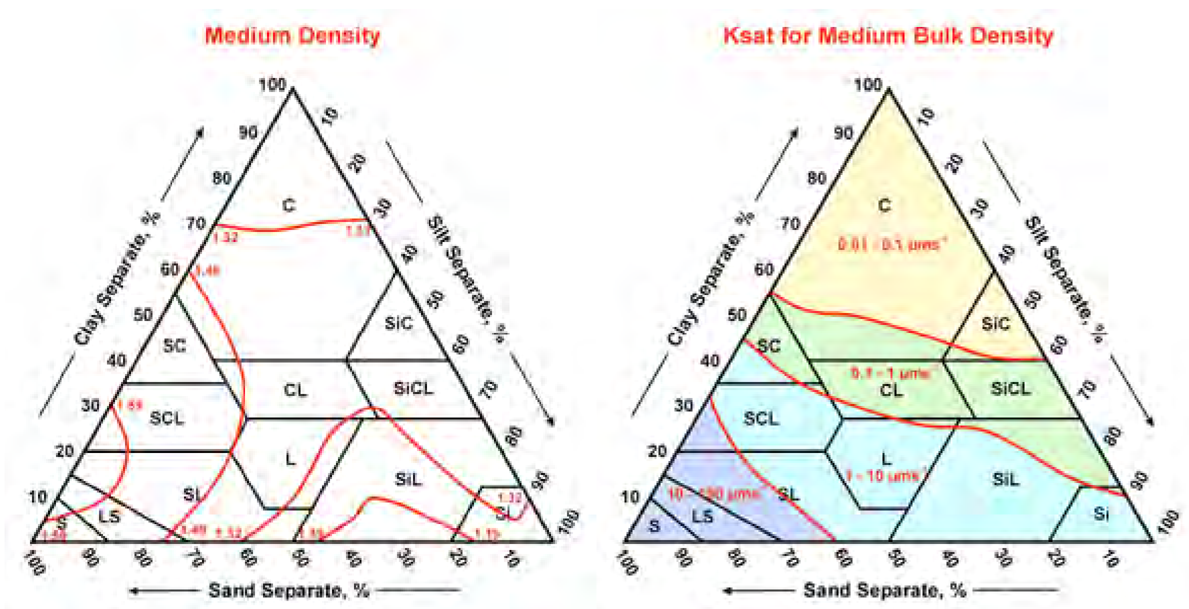
SPOTTED KNAPWEED (*Centaurea maculosa*), a biennial with thistle-like flowers.
Control: Do NOT pull (1) unless the plant is young and the ground is very soft - the tap root will break off and produce several new plants. Wear sturdy gloves. (2); (6); (10) or (11).

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.

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
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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
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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

(dark grey)	no longer recognized
(light grey)	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 & phylite	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

(dark grey shading) no longer recognized
(light shading) 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
ladawaska, 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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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

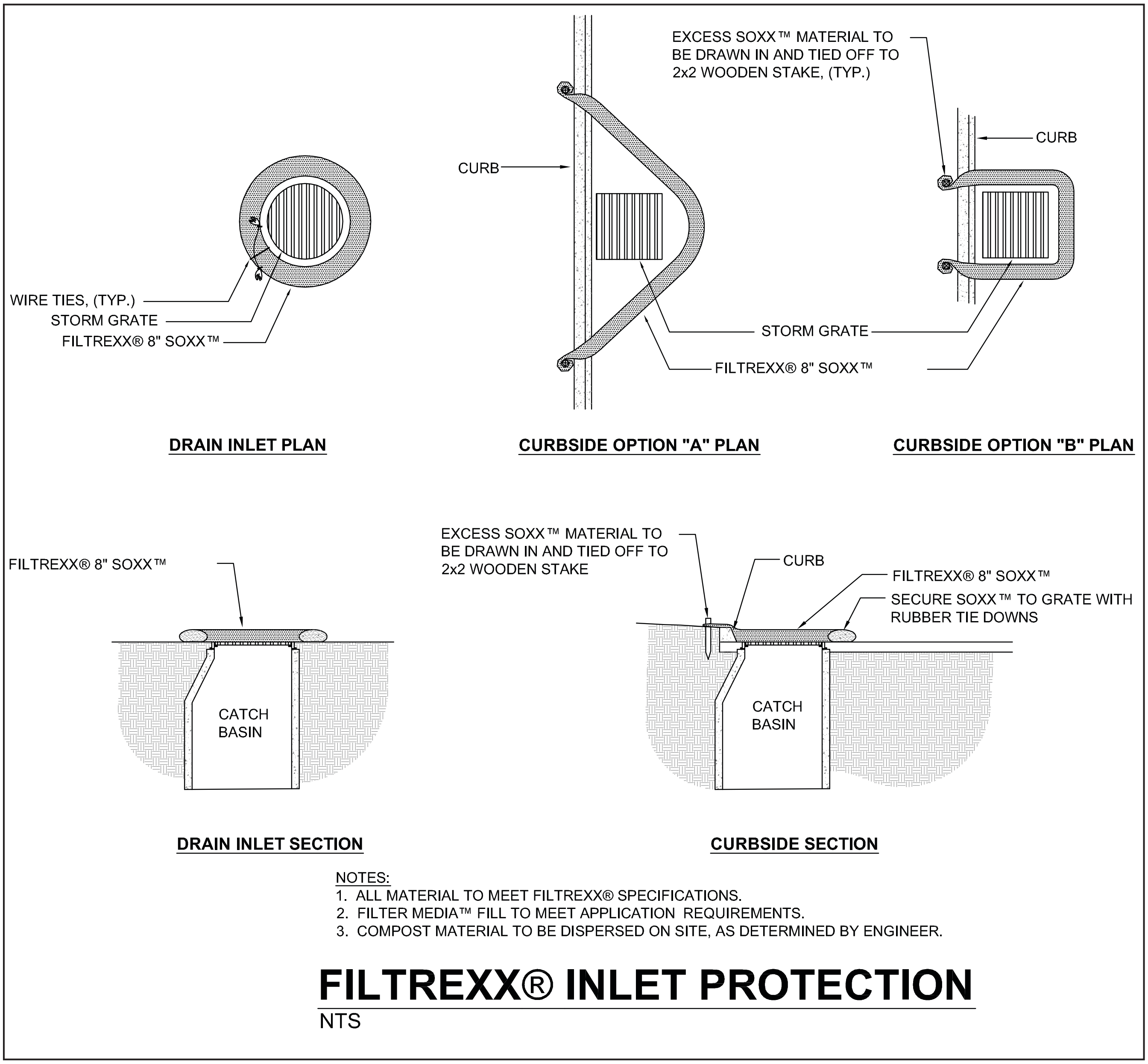
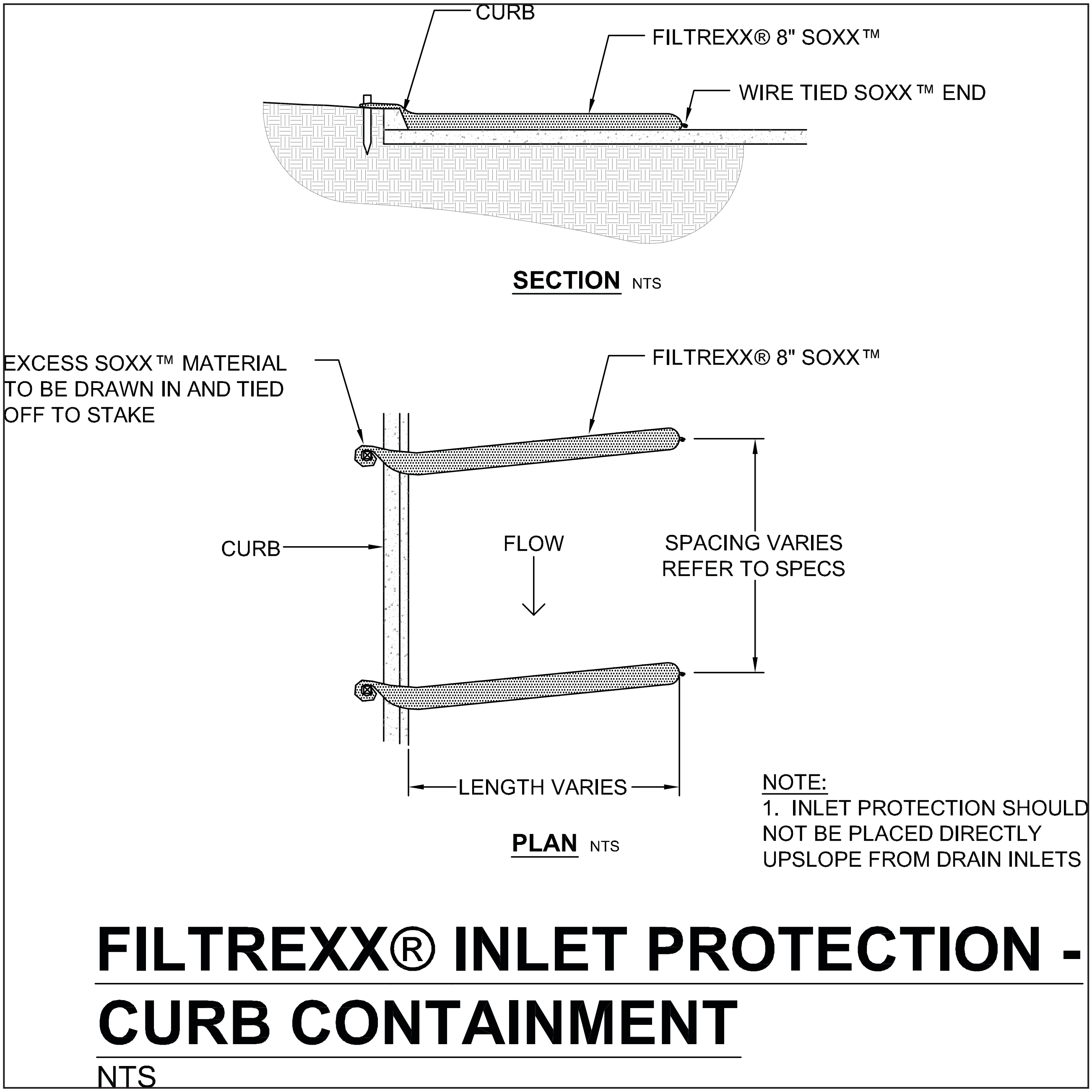


Figure 2.2. Engineering Design Drawing for Curb Sediment Containment Inlet Protection



SWPPP Cut Sheet:

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

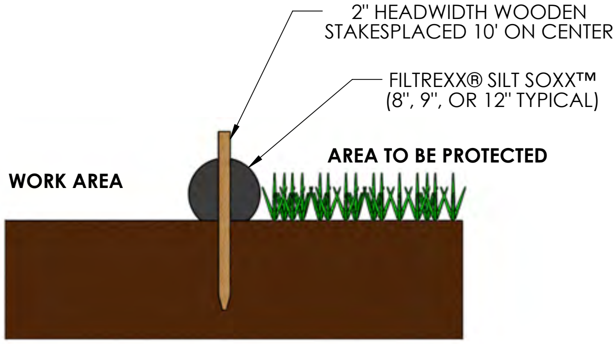
1. The Contractor shall maintain the Sediment control in a functional condition at all times and it shall be routinely inspected.
2. If the Sediment control has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of 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)

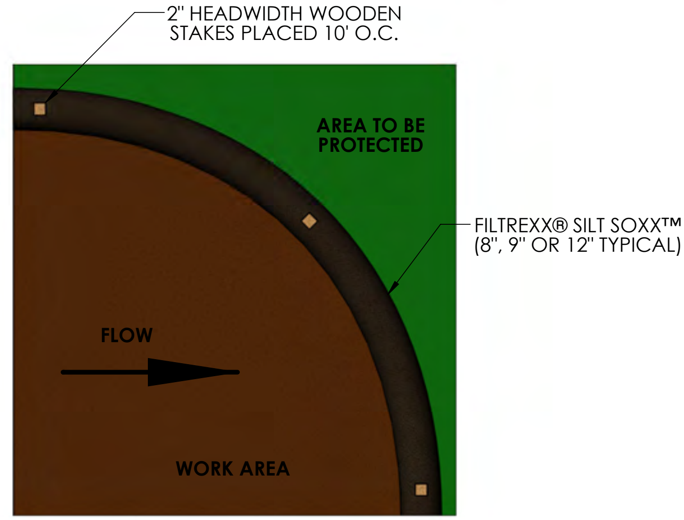
* Based on a failure point of 36 in (0.9 m) super silt fence (wire reinforced) at 1000 ft (303 m) of slope, watershed width equivalent to receiving length of sediment control device, 1 in/ 24 hr (25 mm/24 hr) rain event.

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

FILTREXX® SILT SOXX™

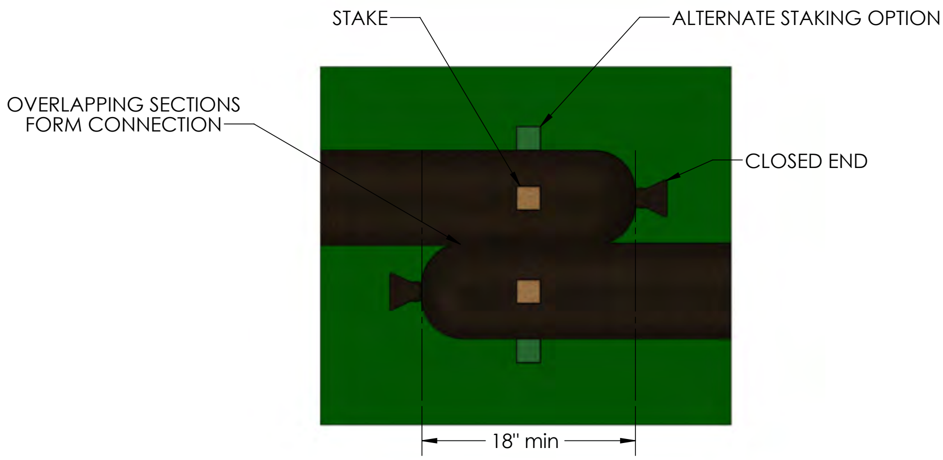


SECTION VIEW

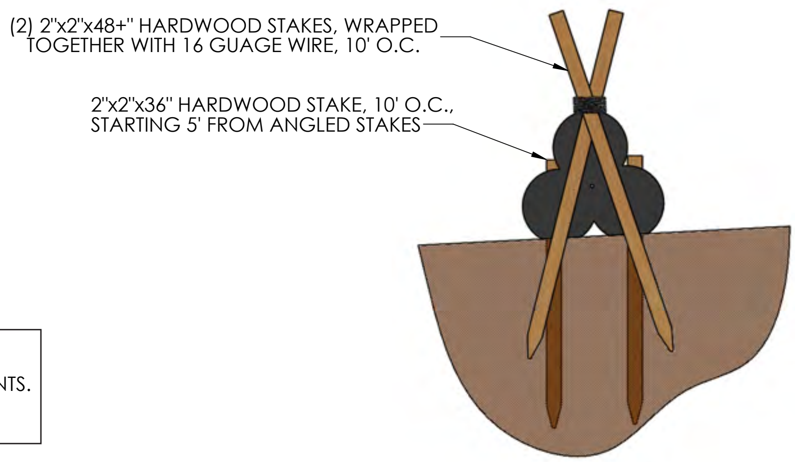


TOP VIEW

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.