

DRAINAGE ANALYSIS & SEDIMENT AND EROSION CONTROL PLAN

Prepared for:
**RED BARN PROPERTY LLC
RESIDENTIAL SUBDIVISION PLAN**

Prepared by:
**BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVENUE
STRATHAM, NH 03885**

Project Number:
NH-1566
210 Portsmouth Avenue
Stratham, New Hampshire
March 11, 2026
Revised July 13, 2026

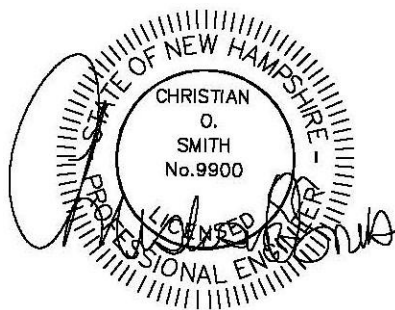


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1.0 ANALYSIS SUMMARY

Red Barn Property LLC proposes to construct a subdivision plan to construct 4 new duplexes on an 11.1+-acre parcel of land located on Portsmouth Avenue in Stratham New Hampshire. A drainage analysis of 4.8+ acres of the proposed site improvement was conducted for the purpose of estimating the peak rate of stormwater run-off and to subsequently design adequate drainage structures. Two models were compiled: one for the area in its existing (pre-construction) condition and a second for its proposed (post-construction) condition. The analysis was conducted using Extreme Precipitation data provided by Cornell University for the following 24-hour duration storm events:

Storm Event	Rainfall Depth (inches)
2-Year	3.20
10-Year	4.87
25-Year	6.19
50-Year (Ponds Only)	7.42

These storm events use the USDA NRCS TR-20 method within the HydroCAD Stormwater Modeling System environment to model the rainfall and predict stormwater runoff flows and volumes. A Type III storm pattern was used in the model. Additionally, the 50-year 24-hour storm event was analyzed for the HydroCAD proposed “ponds”. The purpose of this analysis is to estimate the peak rates of run-off from the site for detention adequacy purposes, and to compare the peak rate of run-off between the existing and proposed conditions.

Peak Rate of Discharge

Analysis Point # Analysis Point Description	Condition	Component Peak Rate of Discharge (CFS)		
		2-Year	10-Year	25-Year
Reach #100	Existing	0.60	1.21	1.72
Flow to Route 33	Proposed	1.22	2.27	3.16
Reach #200	Existing	1.89	4.06	5.95
Flow to South/Pond	Proposed	0.35	0.73	1.10
Reach #300	Existing	1.18	3.73	6.19
Flow to Southeast	Proposed	1.10	3.29	5.40

Channel Protection

Analysis Point # Analysis Point Description	Condition	2-Year Storm Volume (Acre-Feet)
Reach #100	Existing	0.047
Flow to Route 33	Proposed	0.098
Reach #200	Existing	0.170
Flow to South/Pond	Proposed	0.027
Reach #300	Existing	0.132
Flow to Southeast	Proposed	0.120

The proposed development includes a new paved shared driveway into the site where the existing northern driveway exists. This driveway will extend into the site to provide access to 4 proposed duplexes and a relocated barn. The proposed improvement area includes three different subcatchments. The peak rate of runoff in the proposed conditions for the two subcatchments into the site is decreased from that of the existing conditions, due to the addition of three infiltration ponds. All paved and gravel areas in subcatchments #200 and #300 receives treatment from a forebay and infiltration pond prior to discharging overland towards the adjacent wetlands. Peak flows and storm volume for subcatchment #100 towards Portsmouth Avenue have increases due to the addition of the paved driveway. NHDOT will review this drainage design to verify the impact and capacity of the existing swale along Portsmouth Avenue. In addition, the potential for increased erosion and sedimentation is handled by way of silt barrier surrounding the disturbed areas. The use of Best Management Practices per the Rockingham Conservation District / DES Handbook have been applied to the design of these structures and will be observed during all stages of construction. All land disturbed during construction will be stabilized within 30 days of groundbreaking. Existing wetlands and abutters will suffer no adverse effects resulting from this proposed development.

2.0 EXISTING CONDITIONS ANALYSIS

The existing property is located on a parcel consisting of an existing duplex, barn, gravel driveways and parking areas, woodlands, lawns, and onsite wetlands. The existing topography is such that the site analysis is divided into three subcatchments within the area proposed to be improved. Final Reach #100 flows to the existing swale along Portsmouth Avenue, Final Reach #200 flows to the South to an existing wetland, and Reach #300 flows to an existing wetland to the southeast.

Classified by a Site-Specific Soil Mapping, the land of the site is composed of relatively flat slopes and soils categorized into the Hydrologic Soil Groups (HSG) B and C (See appendix for Hiss/HSG designations).

3.0 PROPOSED CONDITIONS ANALYSIS

The addition of the impervious area, clearing of trees, and grading of slopes causes an increase in the curve number (Cn) and a decrease in the time of concentration (Tc) which results in a potential increase in peak rates of runoff from the site. To reduce these flows to pre-development conditions, various stormwater management systems will be proposed. The proposed development divides the site into several different post-construction subcatchments, but ultimately the three main subcatchments match the pre-construction analysis. The runoff is directed to offsite areas through HydroCAD “reaches” and “ponds”, consisting of a three infiltration ponds.

In an effort to prevent the sedimentation of abutting properties, the paved driveway and fire truck turn around areas will be graded to flow into a sediment forebay prior to flowing towards an infiltration pond where possible. During construction, appropriate Best Management Practices (BMP's) will be applied so as to negate the potential for sediment-laden run-off to discharge off-site prior to the final stabilization of the proposed grading. The structures outlined in this proposal provide for adequate treatment of stormwater run-off for sediment control.

4.0 SEDIMENT & EROSION CONTROL PLANS **BEST MANAGEMENT PRACTICES (BMP's)**

The proposed site development is protected from erosion and the roadways and abutting properties are protected from sediment by the use of Best Management Practices as outlined in the New Hampshire Stormwater Manual. Any area disturbed by construction will be re-stabilized within 30 days, and abutting properties and wetlands 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.

4.1 Silt Barrier / Construction Fence

The plan set demonstrates the location of silt barriers for sediment control. Sheet E-1, Erosion and Sediment Control Details, has the specifications for installation and maintenance of the silt barriers selected for the site. In areas where the limits of construction need to be emphasized to operators, construction fence for added visibility will be installed. Orange construction fence will be VISI Perimeter Fence by Conwed Plastic Fencing, or approved equal. The four-foot construction fencing is to be installed using six-foot posts buried at least two feet into the ground spaced six to eight feet apart.

4.2 Vegetated Stabilization

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of disturbance. 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 specifications on Sheet E-1 using the seeding mixture below:

Mixture C	Pounds per Acre	Pounds per 1,000 sf
Tall Fescue	20	0.45
Creeping Red Fescue	20	0.45
Birdsfoot Trefoil	8	0.20
Total	48	1.10

4.3 Stabilized Construction Entrance/Exit

A temporary gravel construction entrance/exit 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 gravel pad should be between 1- and 2-inch coarse aggregate and the pad itself constructed to a minimum length of 50' for the full width of the access road. The aggregate should be placed at least six inches thick. Plan and profile view details are shown on the Sediment and Erosion Control Detail Plan.

4.4 Drainage Swales / Stormwater Conveyance Channels

Drainage swales will be stabilized with vegetation for long term cover as outlined below 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.

4.5 Vegetated Buffers

Vegetated buffers are areas of land with natural or planted vegetation designed to receive sheet run-off from upgradient development. These natural areas, preferably wooded, are effective in removing sediment and sediment-laden pollutants from such run-off, although their effectiveness is severely diminished when forced to deal with concentrated flow and must therefore be equipped with a level-spreading device. Vegetated buffers should not have a slope exceeding fifteen percent and have a minimum length of seventy-five feet.

4.6 Filter Strips

Filter strips are areas of land with natural or planted vegetation designed to receive sheet run-off from upgradient development. These natural areas, preferably wooded, are effective in removing sediment and sediment-laden pollutants from such run-off, although their effectiveness is severely diminished when forced to deal with concentrated flow and must therefore be equipped with a level-spreading device. Filter strips should not have a slope exceeding fifteen percent and have a minimum length of seventy-five feet.

4.7 Environmental Dust Control

Dust will be controlled on the site using 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.

4.8 Construction Sequence

1. Cut and remove trees in construction areas as directed or required.
2. Construct and/or install temporary and permanent sediment erosion and detention control facilities, as required. Erosion, sediment, and facilities shall be installed and stabilized prior to any earth moving operation, and prior to directing run-off to them.
3. Clear, cut, grub, and dispose of debris in approved facilities.
4. Excavate and stockpile topsoil / loam. All disturbed areas shall be stabilized immediately after grading.
5. Construct the driveway and its associated drainage structures.
6. Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded and mulched as required or directed.

7. Daily, or as required, construct temporary berms, drainage ditches, sediment traps, etc. to prevent erosion on the site and prevent any siltation of abutting waters or property.
8. Inspect and maintain all erosion and sediment control measures during construction.
9. Complete permanent seeding and landscaping.
10. Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete. Smooth and re-vegetate all disturbed areas.
11. All swales and drainage structures will be constructed and stabilized prior to having run-off being directed to them.
12. Finish paving all driveway and parking areas.

4.9 Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time.
2. Erosion and 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 barriers shall be inspected periodically and after every rainstorm during the life of the project. All damaged areas shall be repaired and sediment deposits shall periodically be removed and properly disposed of.
5. After all disturbed areas have been stabilized, the temporary erosion control measures are to be removed and the area disturbed by the removal smoothed and revegetated.
6. Areas must be seeded and mulched within 5 days of final grading, permanently stabilized within 15 days of final grading, or temporarily stabilized within 30 days of initial disturbance of soil.

4.10 Inspection and Maintenance Schedule

Silt barriers shall be inspected during and after storm events to ensure that the fence still has integrity and is not allowing sediment to pass.

5.0 CONCLUSION

This proposed site development on Portsmouth Avenue in Stratham, NH will have no adverse effect on the abutting property owners by way of stormwater run-off or siltation. For the abutting properties, the post-construction peak rates of runoff for the site will be lower than the existing conditions for the storm events, as shown in the tables above. The peak rate of runoff towards Portsmouth Avenue is increased and will be reviewed by NHDOT to verify capacity within the existing roadside swale. Appropriate steps will be taken to eliminate erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of three sediment forebays with infiltration ponds. The Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and these applications will be enforced throughout the construction process.

An Alteration of Terrain Permit (RSA 485: A-17) is not required for this project due to the area of disturbance being less than 100,000 square feet.

Respectfully Submitted,

BEALS ASSOCIATES, *PLLC*.

Christian O. Smith

Christian O Smith, PE
Principal

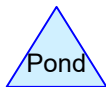
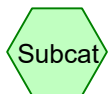
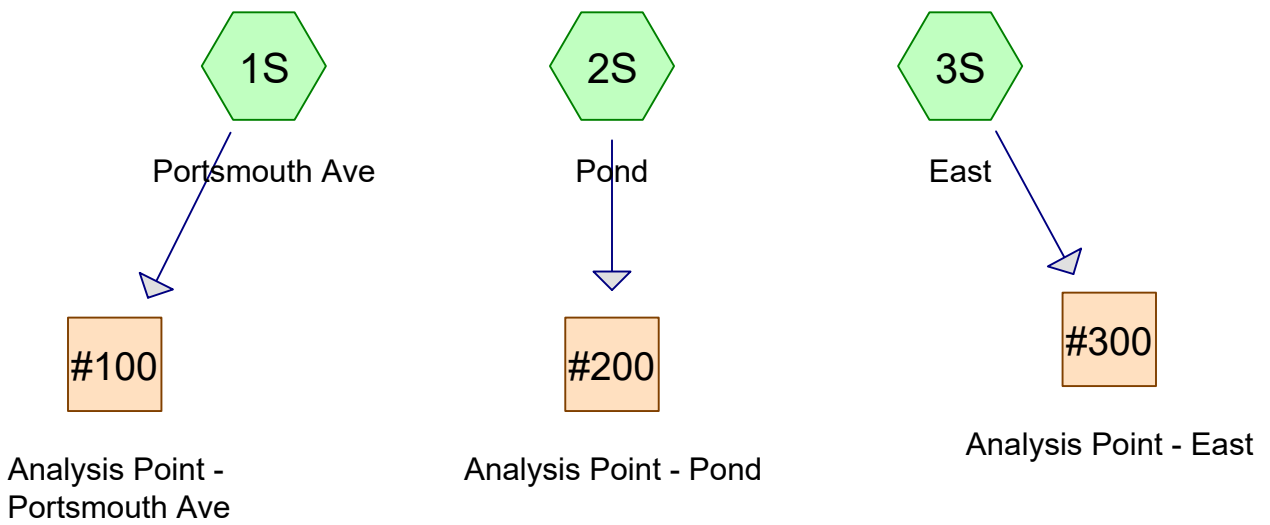
Appendix I

Existing Conditions Analysis

2-Year 24-Hour Summary

10-Year 24-Hour Complete

25-Year 24-Hour Summary



NH-1566 Existing

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.118	61	>75% Grass cover, Good, HSG B (2S, 3S)
1.348	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S)
0.068	80	>75% Grass cover, Good, HSG D (2S)
0.079	96	Gravel surface, HSG C (1S)
0.049	98	Roofs, HSG C (1S, 2S)
0.142	98	Water Surface, HSG D (2S)
1.150	55	Woods, Good, HSG B (2S, 3S)
1.859	70	Woods, Good, HSG C (1S, 2S, 3S)
0.032	77	Woods, Good, HSG D (2S)
4.845	69	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.268	HSG B	2S, 3S
3.335	HSG C	1S, 2S, 3S
0.242	HSG D	2S
0.000	Other	
4.845		TOTAL AREA

NH-1566 Existing*Type III 24-hr 2-YR Rainfall=3.20"*

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PortsmouthAve

Runoff Area=17,930 sf 3.03% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=WQ Runoff=0.60 cfs 0.047 af

Subcatchment2S: Pond

Runoff Area=75,767 sf 10.26% Impervious Runoff Depth=1.18"
Flow Length=317' Tc=10.2 min CN=WQ Runoff=1.89 cfs 0.170 af

Subcatchment3S: East

Runoff Area=117,358 sf 0.00% Impervious Runoff Depth=0.59"
Flow Length=326' Tc=10.8 min CN=WQ Runoff=1.18 cfs 0.132 af

Reach#100: AnalysisPoint - PortsmouthAve

Inflow=0.60 cfs 0.047 af
Outflow=0.60 cfs 0.047 af

Reach#200: AnalysisPoint - Pond

Inflow=1.89 cfs 0.170 af
Outflow=1.89 cfs 0.170 af

Reach#300: AnalysisPoint - East

Inflow=1.18 cfs 0.132 af
Outflow=1.18 cfs 0.132 af

Total Runoff Area = 4.845 ac Runoff Volume = 0.350 af Average Runoff Depth = 0.87"
96.06% Pervious = 4.654 ac 3.94% Impervious = 0.191 ac

NH-1566 Existing*Type III 24-hr 10-YR Rainfall=4.87"*

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PortsmouthAve

Runoff Area=17,930 sf 3.03% Impervious Runoff Depth=2.66"
Tc=6.0 min CN=WQ Runoff=1.21 cfs 0.091 af

Subcatchment2S: Pond

Runoff Area=75,767 sf 10.26% Impervious Runoff Depth=2.41"
Flow Length=317' Tc=10.2 min CN=WQ Runoff=4.06 cfs 0.349 af

Subcatchment3S: East

Runoff Area=117,358 sf 0.00% Impervious Runoff Depth=1.51"
Flow Length=326' Tc=10.8 min CN=WQ Runoff=3.73 cfs 0.340 af

Reach#100: AnalysisPoint - PortsmouthAve

Inflow=1.21 cfs 0.091 af
Outflow=1.21 cfs 0.091 af

Reach#200: AnalysisPoint - Pond

Inflow=4.06 cfs 0.349 af
Outflow=4.06 cfs 0.349 af

Reach#300: AnalysisPoint - East

Inflow=3.73 cfs 0.340 af
Outflow=3.73 cfs 0.340 af

Total Runoff Area = 4.845 ac Runoff Volume = 0.780 af Average Runoff Depth = 1.93"
96.06% Pervious = 4.654 ac 3.94% Impervious = 0.191 ac

NH-1566 Existing

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Type III 24-hr 10-YR Rainfall=4.87"

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Summary for Subcatchment 1S: Portsmouth Ave

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.091 af, Depth= 2.66"

Routed to Reach #100 : Analysis Point - Portsmouth Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
4,302	70	Woods, Good, HSG C
9,664	74	>75% Grass cover, Good, HSG C
3,420	96	Gravel surface, HSG C
544	98	Roofs, HSG C
17,930		Weighted Average
17,386		96.97% Pervious Area
544		3.03% Impervious Area

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

Summary for Subcatchment 2S: Pond

Runoff = 4.06 cfs @ 12.15 hrs, Volume= 0.349 af, Depth= 2.41"

Routed to Reach #200 : Analysis Point - Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
834	55	Woods, Good, HSG B
4,550	61	>75% Grass cover, Good, HSG B
12,043	70	Woods, Good, HSG C
46,212	74	>75% Grass cover, Good, HSG C
1,585	98	Roofs, HSG C
1,399	77	Woods, Good, HSG D
2,959	80	>75% Grass cover, Good, HSG D
6,185	98	Water Surface, HSG D
75,767		Weighted Average
67,997		89.74% Pervious Area
7,770		10.26% Impervious Area

NH-1566 Existing

Type III 24-hr 10-YR Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0860	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.92"
2.6	248	0.0520	1.60		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	19	0.0320	0.89		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.2	317	Total			

Summary for Subcatchment 3S: East

Runoff = 3.73 cfs @ 12.16 hrs, Volume= 0.340 af, Depth= 1.51"
 Routed to Reach #300 : Analysis Point - East

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
49,277	55	Woods, Good, HSG B
579	61	>75% Grass cover, Good, HSG B
64,644	70	Woods, Good, HSG C
2,858	74	>75% Grass cover, Good, HSG C
0	77	Woods, Good, HSG D
117,358		Weighted Average
117,358		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0960	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.92"
3.9	276	0.0550	1.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.8	326	Total			

Summary for Reach #100: Analysis Point - Portsmouth Ave

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

Inflow Area = 0.412 ac, 3.03% Impervious, Inflow Depth = 2.66" for 10-YR event
 Inflow = 1.21 cfs @ 12.09 hrs, Volume= 0.091 af
 Outflow = 1.21 cfs @ 12.09 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

NH-1566 Existing*Type III 24-hr 10-YR Rainfall=4.87"*

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Summary for Reach #200: Analysis Point - Pond

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

Inflow Area = 1.739 ac, 10.26% Impervious, Inflow Depth = 2.41" for 10-YR event
Inflow = 4.06 cfs @ 12.15 hrs, Volume= 0.349 af
Outflow = 4.06 cfs @ 12.15 hrs, Volume= 0.349 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach #300: Analysis Point - East

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

Inflow Area = 2.694 ac, 0.00% Impervious, Inflow Depth = 1.51" for 10-YR event
Inflow = 3.73 cfs @ 12.16 hrs, Volume= 0.340 af
Outflow = 3.73 cfs @ 12.16 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

NH-1566 Existing*Type III 24-hr 25-YR Rainfall=6.19"*

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: PortsmouthAve

Runoff Area=17,930 sf 3.03% Impervious Runoff Depth=3.78"
Tc=6.0 min CN=WQ Runoff=1.72 cfs 0.130 af

Subcatchment2S: Pond

Runoff Area=75,767 sf 10.26% Impervious Runoff Depth=3.49"
Flow Length=317' Tc=10.2 min CN=WQ Runoff=5.95 cfs 0.506 af

Subcatchment3S: East

Runoff Area=117,358 sf 0.00% Impervious Runoff Depth=2.40"
Flow Length=326' Tc=10.8 min CN=WQ Runoff=6.19 cfs 0.540 af

Reach#100: AnalysisPoint - PortsmouthAve

Inflow=1.72 cfs 0.130 af
Outflow=1.72 cfs 0.130 af

Reach#200: AnalysisPoint - Pond

Inflow=5.95 cfs 0.506 af
Outflow=5.95 cfs 0.506 af

Reach#300: AnalysisPoint - East

Inflow=6.19 cfs 0.540 af
Outflow=6.19 cfs 0.540 af

Total Runoff Area = 4.845 ac Runoff Volume = 1.175 af Average Runoff Depth = 2.91"
96.06% Pervious = 4.654 ac 3.94% Impervious = 0.191 ac

Appendix II

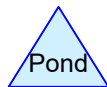
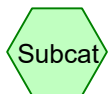
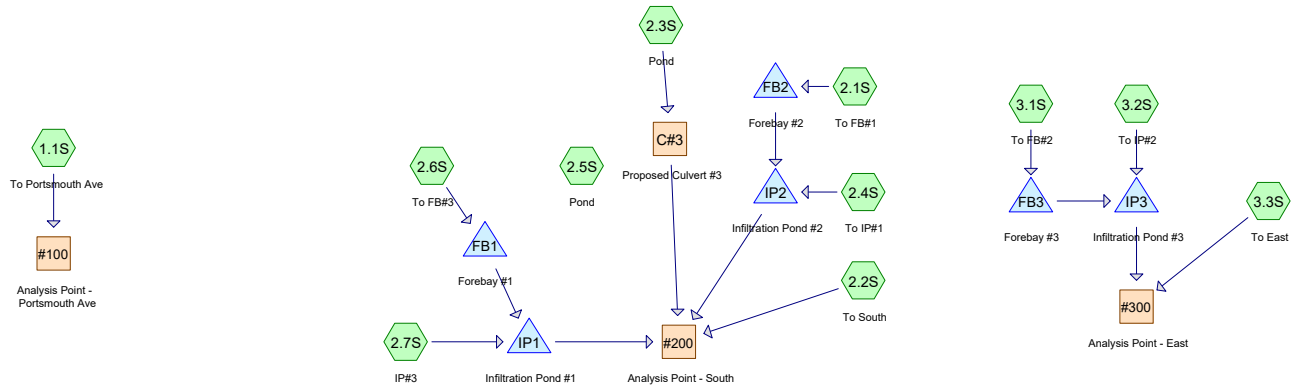
Proposed Conditions Analysis

2-Year 24-Hour Summary

10-Year 24-Hour Complete

25-Year 24-Hour Summary

50-Year 24-Hour Summary (Ponds Only)



Routing Diagram for NH-1566 Proposed
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NH-1566 Proposed

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.357	61	>75% Grass cover, Good, HSG B (2.5S, 2.7S, 3.1S, 3.2S, 3.3S)
1.161	74	>75% Grass cover, Good, HSG C (1.1S, 2.1S, 2.2S, 2.3S, 2.4S, 2.5S, 2.6S, 2.7S, 3.1S, 3.3S)
0.068	80	>75% Grass cover, Good, HSG D (2.5S)
0.018	96	Gravel surface, HSG C (2.1S, 3.1S)
0.018	98	Paved parking, HSG B (3.1S)
0.478	98	Paved parking, HSG C (1.1S, 2.1S, 2.6S, 3.1S)
0.017	98	Roofs, HSG B (3.1S, 3.3S)
0.210	98	Roofs, HSG C (1.1S, 2.1S, 2.2S, 2.4S, 2.5S, 2.6S, 3.1S, 3.3S)
0.142	98	Water Surface, HSG D (2.5S)
0.876	55	Woods, Good, HSG B (2.5S, 3.3S)
1.469	70	Woods, Good, HSG C (1.1S, 2.2S, 2.3S, 2.5S, 3.1S, 3.3S)
0.032	77	Woods, Good, HSG D (2.5S)
4.845	73	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.268	HSG B	2.5S, 2.7S, 3.1S, 3.2S, 3.3S
3.335	HSG C	1.1S, 2.1S, 2.2S, 2.3S, 2.4S, 2.5S, 2.6S, 2.7S, 3.1S, 3.3S
0.242	HSG D	2.5S
0.000	Other	
4.845		TOTAL AREA

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Type III 24-hr 2-YR Rainfall=3.20"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To PortsmouthAve	Runoff Area=31,000 sf 34.64% Impervious Runoff Depth=1.65" Tc=6.0 min CN=WQ Runoff=1.22 cfs 0.098 af
Subcatchment2.1S: To FB#1	Runoff Area=11,494 sf 59.68% Impervious Runoff Depth=2.27" Tc=6.0 min CN=WQ Runoff=0.62 cfs 0.050 af
Subcatchment2.2S: To South	Runoff Area=9,308 sf 15.48% Impervious Runoff Depth=1.31" Tc=6.0 min CN=WQ Runoff=0.30 cfs 0.023 af
Subcatchment2.3S: Pond	Runoff Area=2,165 sf 0.00% Impervious Runoff Depth=0.90" Tc=6.0 min CN=WQ Runoff=0.05 cfs 0.004 af
Subcatchment2.4S: To IP#1	Runoff Area=4,445 sf 16.11% Impervious Runoff Depth=1.35" Tc=6.0 min CN=WQ Runoff=0.15 cfs 0.011 af
Subcatchment2.5S: Pond	Runoff Area=29,166 sf 22.77% Impervious Runoff Depth=1.42" Tc=6.0 min CN=WQ Runoff=0.99 cfs 0.079 af
Subcatchment2.6S: To FB#3	Runoff Area=8,304 sf 53.29% Impervious Runoff Depth=2.07" Tc=6.0 min CN=WQ Runoff=0.41 cfs 0.033 af
Subcatchment2.7S: IP#3	Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=0.64" Tc=6.0 min CN=WQ Runoff=0.02 cfs 0.001 af
Subcatchment3.1S: To FB#2	Runoff Area=11,518 sf 46.11% Impervious Runoff Depth=1.81" Tc=6.0 min CN=WQ Runoff=0.48 cfs 0.040 af
Subcatchment3.2S: To IP#2	Runoff Area=2,768 sf 0.00% Impervious Runoff Depth=0.44" Tc=6.0 min CN=WQ Runoff=0.02 cfs 0.002 af
Subcatchment3.3S: To East	Runoff Area=99,698 sf 1.55% Impervious Runoff Depth=0.63" Flow Length=214' Tc=10.8 min CN=WQ Runoff=1.10 cfs 0.120 af
Reach#100: AnalysisPoint - PortsmouthAve	Inflow=1.22 cfs 0.098 af Outflow=1.22 cfs 0.098 af
Reach#200: AnalysisPoint - South	Inflow=0.35 cfs 0.027 af Outflow=0.35 cfs 0.027 af
Reach#300: AnalysisPoint - East	Inflow=1.10 cfs 0.120 af Outflow=1.10 cfs 0.120 af
ReachC#3: ProposedCulvert#3	Avg. Flow Depth=0.08' Max Vel=1.71 fps Inflow=0.05 cfs 0.004 af 12.0" Round Pipe n=0.012 L=38.0' S=0.0105 '/' Capacity=3.96 cfs Outflow=0.05 cfs 0.004 af
Pond FB1: Forebay#1	Peak Elev=94.59' Storage=110 cf Inflow=0.41 cfs 0.033 af Outflow=0.41 cfs 0.031 af

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Type III 24-hr 2-YR Rainfall=3.20"

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Pond FB2: Forebay#2Peak Elev=97.62' Storage=479 cf Inflow=0.62 cfs 0.050 af
Outflow=0.61 cfs 0.040 af**Pond FB3: Forebay#3**Peak Elev=97.60' Storage=606 cf Inflow=0.48 cfs 0.040 af
Outflow=0.48 cfs 0.027 af**Pond IP1: InfiltrationPond#1**Peak Elev=94.24' Storage=525 cf Inflow=0.42 cfs 0.032 af
Discarded=0.05 cfs 0.032 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.032 af**Pond IP2: InfiltrationPond#2**Peak Elev=96.81' Storage=1,773 cf Inflow=0.76 cfs 0.052 af
Discarded=0.01 cfs 0.043 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.043 af**Pond IP3: InfiltrationPond#3**Peak Elev=96.77' Storage=349 cf Inflow=0.50 cfs 0.029 af
Discarded=0.09 cfs 0.029 af Primary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.029 af**Total Runoff Area = 4.845 ac Runoff Volume = 0.462 af Average Runoff Depth = 1.15"**
82.15% Pervious = 3.980 ac 17.85% Impervious = 0.865 ac

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Type III 24-hr 10-YR Rainfall=4.87"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To PortsmouthAve	Runoff Area=31,000 sf 34.64% Impervious Runoff Depth=3.00" Tc=6.0 min CN=WQ Runoff=2.27 cfs 0.178 af
Subcatchment2.1S: To FB#1	Runoff Area=11,494 sf 59.68% Impervious Runoff Depth=3.78" Tc=6.0 min CN=WQ Runoff=1.03 cfs 0.083 af
Subcatchment2.2S: To South	Runoff Area=9,308 sf 15.48% Impervious Runoff Depth=2.59" Tc=6.0 min CN=WQ Runoff=0.61 cfs 0.046 af
Subcatchment2.3S: Pond	Runoff Area=2,165 sf 0.00% Impervious Runoff Depth=2.05" Tc=6.0 min CN=WQ Runoff=0.12 cfs 0.009 af
Subcatchment2.4S: To IP#1	Runoff Area=4,445 sf 16.11% Impervious Runoff Depth=2.64" Tc=6.0 min CN=WQ Runoff=0.30 cfs 0.022 af
Subcatchment2.5S: Pond	Runoff Area=29,166 sf 22.77% Impervious Runoff Depth=2.70" Tc=6.0 min CN=WQ Runoff=1.95 cfs 0.150 af
Subcatchment2.6S: To FB#3	Runoff Area=8,304 sf 53.29% Impervious Runoff Depth=3.53" Tc=6.0 min CN=WQ Runoff=0.70 cfs 0.056 af
Subcatchment2.7S: IP#3	Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=1.61" Tc=6.0 min CN=WQ Runoff=0.05 cfs 0.004 af
Subcatchment3.1S: To FB#2	Runoff Area=11,518 sf 46.11% Impervious Runoff Depth=3.14" Tc=6.0 min CN=WQ Runoff=0.86 cfs 0.069 af
Subcatchment3.2S: To IP#2	Runoff Area=2,768 sf 0.00% Impervious Runoff Depth=1.29" Tc=6.0 min CN=WQ Runoff=0.09 cfs 0.007 af
Subcatchment3.3S: To East	Runoff Area=99,698 sf 1.55% Impervious Runoff Depth=1.57" Flow Length=214' Tc=10.8 min CN=WQ Runoff=3.29 cfs 0.300 af
Reach#100: AnalysisPoint - PortsmouthAve	Inflow=2.27 cfs 0.178 af Outflow=2.27 cfs 0.178 af
Reach#200: AnalysisPoint - South	Inflow=0.73 cfs 0.058 af Outflow=0.73 cfs 0.058 af
Reach#300: AnalysisPoint - East	Inflow=3.29 cfs 0.300 af Outflow=3.29 cfs 0.300 af
ReachC#3: ProposedCulvert#3	Avg. Flow Depth=0.12' Max Vel=2.24 fps Inflow=0.12 cfs 0.009 af 12.0" Round Pipe n=0.012 L=38.0' S=0.0105 '/' Capacity=3.96 cfs Outflow=0.12 cfs 0.009 af
Pond FB1: Forebay#1	Peak Elev=94.79' Storage=145 cf Inflow=0.70 cfs 0.056 af Outflow=0.70 cfs 0.054 af

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Type III 24-hr 10-YR Rainfall=4.87"

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Pond FB2: Forebay#2Peak Elev=97.75' Storage=539 cf Inflow=1.03 cfs 0.083 af
Outflow=1.02 cfs 0.073 af**Pond FB3: Forebay#3**Peak Elev=97.65' Storage=630 cf Inflow=0.86 cfs 0.069 af
Outflow=0.84 cfs 0.057 af**Pond IP1: InfiltrationPond#1**Peak Elev=94.79' Storage=947 cf Inflow=0.75 cfs 0.057 af
Discarded=0.06 cfs 0.054 af Primary=0.10 cfs 0.003 af Outflow=0.16 cfs 0.057 af**Pond IP2: InfiltrationPond#2**Peak Elev=97.75' Storage=3,396 cf Inflow=1.32 cfs 0.096 af
Discarded=0.01 cfs 0.062 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.062 af**Pond IP3: InfiltrationPond#3**Peak Elev=97.29' Storage=1,096 cf Inflow=0.93 cfs 0.063 af
Discarded=0.11 cfs 0.063 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.063 af**Total Runoff Area = 4.845 ac Runoff Volume = 0.925 af Average Runoff Depth = 2.29"**
82.15% Pervious = 3.980 ac 17.85% Impervious = 0.865 ac

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Type III 24-hr 10-YR Rainfall=4.87"

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Summary for Subcatchment 1.1S: To Portsmouth Ave

Runoff = 2.27 cfs @ 12.09 hrs, Volume= 0.178 af, Depth= 3.00"
Routed to Reach #100 : Analysis Point - Portsmouth Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
7,917	70	Woods, Good, HSG C
12,345	74	>75% Grass cover, Good, HSG C
9,601	98	Paved parking, HSG C
1,137	98	Roofs, HSG C
31,000		Weighted Average
20,262		65.36% Pervious Area
10,738		34.64% Impervious Area

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

Summary for Subcatchment 2.1S: To FB#1

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.083 af, Depth= 3.78"
Routed to Pond FB2 : Forebay #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
4,107	74	>75% Grass cover, Good, HSG C
5,388	98	Paved parking, HSG C
1,472	98	Roofs, HSG C
527	96	Gravel surface, HSG C
11,494		Weighted Average
4,634		40.32% Pervious Area
6,860		59.68% Impervious Area

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

Summary for Subcatchment 2.2S: To South

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 0.046 af, Depth= 2.59"
Routed to Reach #200 : Analysis Point - South

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.87"

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Type III 24-hr 10-YR Rainfall=4.87"

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Area (sf)	CN	Description
989	70	Woods, Good, HSG C
6,878	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
1,441	98	Roofs, HSG C
9,308		Weighted Average
7,867		84.52% Pervious Area
1,441		15.48% Impervious Area

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

Summary for Subcatchment 2.3S: Pond

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.009 af, Depth= 2.05"
 Routed to Reach C#3 : Proposed Culvert #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
0	61	>75% Grass cover, Good, HSG B
0	98	Paved parking, HSG B
1,394	70	Woods, Good, HSG C
771	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
0	98	Roofs, HSG C
0	77	Woods, Good, HSG D
0	80	>75% Grass cover, Good, HSG D
0	98	Water Surface, HSG D
2,165		Weighted Average
2,165		100.00% Pervious Area

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

Summary for Subcatchment 2.4S: To IP#1

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 2.64"
 Routed to Pond IP2 : Infiltration Pond #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

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Type III 24-hr 10-YR Rainfall=4.87"

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Area (sf)	CN	Description
0	55	Woods, Good, HSG B
0	61	>75% Grass cover, Good, HSG B
0	98	Paved parking, HSG B
0	70	Woods, Good, HSG C
3,729	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
716	98	Roofs, HSG C
0	77	Woods, Good, HSG D
0	80	>75% Grass cover, Good, HSG D
0	98	Water Surface, HSG D
4,445		Weighted Average
3,729		83.89% Pervious Area
716		16.11% Impervious Area

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

Summary for Subcatchment 2.5S: Pond

Runoff = 1.95 cfs @ 12.09 hrs, Volume= 0.150 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
834	55	Woods, Good, HSG B
3,746	61	>75% Grass cover, Good, HSG B
0	98	Roofs, HSG B
724	70	Woods, Good, HSG C
12,862	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
457	98	Roofs, HSG C
1,399	77	Woods, Good, HSG D
2,959	80	>75% Grass cover, Good, HSG D
6,185	98	Water Surface, HSG D
29,166		Weighted Average
22,524		77.23% Pervious Area
6,642		22.77% Impervious Area

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

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Type III 24-hr 10-YR Rainfall=4.87"

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Summary for Subcatchment 2.6S: To FB#3

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 3.53"

Routed to Pond FB1 : Forebay #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
0	61	>75% Grass cover, Good, HSG B
0	98	Roofs, HSG B
0	70	Woods, Good, HSG C
3,879	74	>75% Grass cover, Good, HSG C
2,676	98	Paved parking, HSG C
1,749	98	Roofs, HSG C
8,304		Weighted Average
3,879		46.71% Pervious Area
4,425		53.29% Impervious Area

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

Summary for Subcatchment 2.7S: IP#3

Runoff = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af, Depth= 1.61"

Routed to Pond IP1 : Infiltration Pond #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
803	61	>75% Grass cover, Good, HSG B
0	98	Paved parking, HSG B
0	70	Woods, Good, HSG C
387	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
0	98	Roofs, HSG C
0	77	Woods, Good, HSG D
0	80	>75% Grass cover, Good, HSG D
0	98	Water Surface, HSG D
1,190		Weighted Average
1,190		100.00% Pervious Area

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Type III 24-hr 10-YR Rainfall=4.87"

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

Summary for Subcatchment 3.1S: To FB#2

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.069 af, Depth= 3.14"
 Routed to Pond FB3 : Forebay #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
2,671	61	>75% Grass cover, Good, HSG B
800	98	Paved parking, HSG B
0	96	Gravel surface, HSG B
384	98	Roofs, HSG B
1,213	70	Woods, Good, HSG C
2,071	74	>75% Grass cover, Good, HSG C
3,164	98	Paved parking, HSG C
252	96	Gravel surface, HSG C
963	98	Roofs, HSG C
11,518		Weighted Average
6,207		53.89% Pervious Area
5,311		46.11% Impervious Area

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

Summary for Subcatchment 3.2S: To IP#2

Runoff = 0.09 cfs @ 12.10 hrs, Volume= 0.007 af, Depth= 1.29"
 Routed to Pond IP3 : Infiltration Pond #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
2,768	61	>75% Grass cover, Good, HSG B
0	70	Woods, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
0	77	Woods, Good, HSG D
2,768		Weighted Average
2,768		100.00% Pervious Area

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Type III 24-hr 10-YR Rainfall=4.87"

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

Summary for Subcatchment 3.3S: To East

Runoff = 3.29 cfs @ 12.16 hrs, Volume= 0.300 af, Depth= 1.57"
 Routed to Reach #300 : Analysis Point - East

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.87"

Area (sf)	CN	Description
37,304	55	Woods, Good, HSG B
5,571	61	>75% Grass cover, Good, HSG B
358	98	Roofs, HSG B
51,747	70	Woods, Good, HSG C
3,527	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
1,191	98	Roofs, HSG C
99,698		Weighted Average
98,149		98.45% Pervious Area
1,549		1.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0680	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 2.92"
2.9	164	0.0365	0.96		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
10.8	214	Total			

Summary for Reach #100: Analysis Point - Portsmouth Ave

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

Inflow Area = 0.712 ac, 34.64% Impervious, Inflow Depth = 3.00" for 10-YR event
 Inflow = 2.27 cfs @ 12.09 hrs, Volume= 0.178 af
 Outflow = 2.27 cfs @ 12.09 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach #200: Analysis Point - South

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

Inflow Area = 0.847 ac, 36.42% Impervious, Inflow Depth = 0.82" for 10-YR event
 Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.058 af
 Outflow = 0.73 cfs @ 12.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

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Type III 24-hr 10-YR Rainfall=4.87"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach #300: Analysis Point - East

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

Inflow Area = 2.617 ac, 6.02% Impervious, Inflow Depth = 1.38" for 10-YR event
Inflow = 3.29 cfs @ 12.16 hrs, Volume= 0.300 af
Outflow = 3.29 cfs @ 12.16 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach C#3: Proposed Culvert #3

[52] Hint: Inlet/Outlet conditions not evaluated

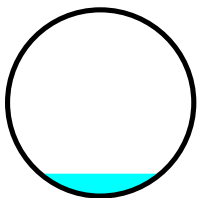
Inflow Area = 0.050 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10-YR event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 0.009 af
Outflow = 0.12 cfs @ 12.10 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.2 min
Routed to Reach #200 : Analysis Point - South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.24 fps, Min. Travel Time= 0.3 min
Avg. Velocity= 0.83 fps, Avg. Travel Time= 0.8 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 0.64'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.96 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 38.0' Slope= 0.0105 '/'
Inlet Invert= 96.20', Outlet Invert= 95.80'



Summary for Pond FB1: Forebay #1

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=39)

Inflow Area = 0.191 ac, 53.29% Impervious, Inflow Depth = 3.53" for 10-YR event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.056 af
Outflow = 0.70 cfs @ 12.10 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.4 min
Primary = 0.70 cfs @ 12.10 hrs, Volume= 0.054 af
Routed to Pond IP1 : Infiltration Pond #1

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 94.79'@ 12.57 hrs Surf.Area= 197 sf Storage= 145 cf

Flood Elev= 95.00' Surf.Area= 235 sf Storage= 192 cf

Plug-Flow detention time=46.9 min calculated for 0.054 af (96% of inflow)

Center-of-Mass det. time=23.8 min (799.3 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	192 cf	Custom Stage Data (Conid) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.00	4	0	0	4
94.00	87	37	37	89
95.00	235	155	192	244

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlowMax=0.70 cfs@ 12.10 hrs HW=94.63' TW=94.27' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Weir Controls 0.70 cfs @ 0.87 fps)**Summary for Pond FB2: Forebay #2**

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=5)

Inflow Area = 0.264 ac, 59.68% Impervious, Inflow Depth = 3.78" for 10-YR event
 Inflow = 1.03 cfs @ 12.09 hrs, Volume= 0.083 af
 Outflow = 1.02 cfs @ 12.10 hrs, Volume= 0.073 af, Atten= 1%, Lag= 0.9 min
 Primary = 1.02 cfs @ 12.10 hrs, Volume= 0.073 af
 Routed to Pond IP2 : Infiltration Pond #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 97.75'@ 24.01 hrs Surf.Area= 472 sf Storage= 539 cf

Flood Elev= 98.00' Surf.Area= 538 sf Storage= 663 cf

Plug-Flow detention time=130.2 min calculated for 0.073 af (88% of inflow)

Center-of-Mass det. time=73.6 min (842.2 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1	95.50'	663 cf	Custom Stage Data (Conid) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
95.50	59	0	0	59
96.00	127	45	45	129
98.00	538	618	663	558

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Device	Routing	Invert	Outlet Devices
#1	Primary	97.50'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.01 cfs @ 12.10 hrs HW=97.67' TW=96.50' (Dynamic Tailwater)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 1.01 cfs @ 0.98 fps)

Summary for Pond FB3: Forebay #3

Inflow Area = 0.264 ac, 46.11% Impervious, Inflow Depth = 3.14" for 10-YR event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.069 af
Outflow = 0.84 cfs @ 12.11 hrs, Volume= 0.057 af, Atten= 2%, Lag= 1.1 min
Primary = 0.84 cfs @ 12.11 hrs, Volume= 0.057 af
Routed to Pond IP3 : Infiltration Pond #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 97.65' @ 12.11 hrs Surf.Area= 529 sf Storage= 630 cf

Flood Elev= 98.00' Surf.Area= 626 sf Storage= 831 cf

Plug-Flow detention time=135.0 min calculated for 0.057 af (82% of inflow)

Center-of-Mass det. time=59.3 min (838.4 - 779.1)

Volume	Invert	Avail.Storage	Storage Description	
#1	95.50'	831 cf	Custom Stage Data (Conid) listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
95.50	104	0	0	104
96.00	180	70	70	183
98.00	626	761	831	649

Device	Routing	Invert	Outlet Devices
#1	Primary	97.50'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.82 cfs @ 12.11 hrs HW=97.65' TW=96.88' (Dynamic Tailwater)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.82 cfs @ 0.92 fps)

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Type III 24-hr 10-YR Rainfall=4.87"

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Summary for Pond IP1: Infiltration Pond #1

[80] Warning: Exceeded Pond FB1 by 0.05' @ 12.30 hrs (0.79 cfs 0.019 af)

Inflow Area = 0.218 ac, 46.61% Impervious, Inflow Depth = 3.16" for 10-YR event
 Inflow = 0.75 cfs @ 12.10 hrs, Volume= 0.057 af
 Outflow = 0.16 cfs @ 12.52 hrs, Volume= 0.057 af, Atten= 79%, Lag= 25.2 min
 Discarded = 0.06 cfs @ 12.52 hrs, Volume= 0.054 af
 Primary = 0.10 cfs @ 12.52 hrs, Volume= 0.003 af
 Routed to Reach #200 : Analysis Point - South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 94.79' @ 12.52 hrs Surf.Area= 872 sf Storage= 947 cf
 Flood Elev= 95.00' Surf.Area= 952 sf Storage= 1,142 cf

Plug-Flow detention time=152.4 min calculated for 0.057 af (100% of inflow)
 Center-of-Mass det. time=152.3 min (955.3 - 803.0)

Volume	Invert	Avail.Storage	Storage Description													
#1	93.25'	1,142 cf	Custom Stage Data (Conid) listed below (Recalc)													
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)			Cum.Store (cubic-feet)			Wet.Area (sq-ft)							
93.25	385	0.0	0			0			385							
94.00	607	100.0	369			369			615							
95.00	952	100.0	773			1,142			973							
Device	Routing	Invert	Outlet Devices													
#1	Discarded	93.25'	3.000 in/hr Exfiltration over Surface area Phase-In= 0.01'													
#2	Primary	94.75'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir													
			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)	2.38	2.54	2.69	2.68	2.67	2.67	2.65	2.66	2.66	2.68			
				2.72	2.73	2.76	2.79	2.88	3.07	3.32						

Discarded OutFlow Max=0.06 cfs @ 12.52 hrs HW=94.79' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.06 cfs)**Primary OutFlow** Max=0.09 cfs @ 12.52 hrs HW=94.79' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.09 cfs @ 0.45 fps)**Summary for Pond IP2: Infiltration Pond #2**

Inflow Area = 0.366 ac, 47.53% Impervious, Inflow Depth = 3.14" for 10-YR event
 Inflow = 1.32 cfs @ 12.10 hrs, Volume= 0.096 af
 Outflow = 0.01 cfs @ 23.96 hrs, Volume= 0.062 af, Atten= 99%, Lag= 711.8 min
 Discarded = 0.01 cfs @ 23.96 hrs, Volume= 0.062 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach #200 : Analysis Point - South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

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Peak Elev= 97.75' @ 23.96 hrs Surf.Area= 2,000 sf Storage= 3,396 cf

Flood Elev= 98.00' Surf.Area= 2,153 sf Storage= 3,907 cf

Plug-Flow detention time=1,643.3 min calculated for 0.062 af (64% of inflow)

Center-of-Mass det. time=1,522.6 min (2,358.0 - 835.4)

Volume	Invert	Avail.Storage	Storage Description
#1	95.15'	3,907 cf	Custom Stage Data (Conid) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
95.15	679	0.0	0	0	679
96.00	1,076	100.0	739	739	1,086
98.00	2,153	100.0	3,167	3,907	2,199

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.15'	0.300 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	97.85'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir
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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68			
2.72 2.73 2.76 2.79 2.88 3.07 3.32			

Discarded OutFlow Max=0.01 cfs @ 23.96 hrs HW=97.75' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=95.15' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond IP3: Infiltration Pond #3**

Inflow Area = 0.328 ac, 37.18% Impervious, Inflow Depth = 2.32" for 10-YR event
 Inflow = 0.93 cfs @ 12.11 hrs, Volume= 0.063 af
 Outflow = 0.11 cfs @ 12.90 hrs, Volume= 0.063 af, Atten= 88%, Lag= 47.4 min
 Discarded = 0.11 cfs @ 12.90 hrs, Volume= 0.063 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach #300 : Analysis Point - East

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 97.29' @ 12.90 hrs Surf.Area= 1,555 sf Storage= 1,096 cf

Flood Elev= 98.00' Surf.Area= 1,890 sf Storage= 2,314 cf

Plug-Flow detention time=94.2 min calculated for 0.063 af (100% of inflow)

Center-of-Mass det. time=94.1 min (936.4 - 842.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.50'	2,314 cf	Custom Stage Data (Conid) listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
96.50	1,220	0.0	0	0	1,220
98.00	1,890	100.0	2,314	2,314	1,922

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.50'	3.000 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	97.75'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir
			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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68
			2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlowMax=0.11 cfs @ 12.90 hrs HW=97.29' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.11 cfs)**Primary OutFlow**Max=0.00 cfs @ 0.00 hrs HW=96.50' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Type III 24-hr 25-YR Rainfall=6.19"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To PortsmouthAve	Runoff Area=31,000 sf 34.64% Impervious Runoff Depth=4.15" Tc=6.0 min CN=WQ Runoff=3.16 cfs 0.246 af
Subcatchment2.1S: To FB#1	Runoff Area=11,494 sf 59.68% Impervious Runoff Depth=5.01" Tc=6.0 min CN=WQ Runoff=1.37 cfs 0.110 af
Subcatchment2.2S: To South	Runoff Area=9,308 sf 15.48% Impervious Runoff Depth=3.71" Tc=6.0 min CN=WQ Runoff=0.88 cfs 0.066 af
Subcatchment2.3S: Pond	Runoff Area=2,165 sf 0.00% Impervious Runoff Depth=3.10" Tc=6.0 min CN=WQ Runoff=0.18 cfs 0.013 af
Subcatchment2.4S: To IP#1	Runoff Area=4,445 sf 16.11% Impervious Runoff Depth=3.77" Tc=6.0 min CN=WQ Runoff=0.43 cfs 0.032 af
Subcatchment2.5S: Pond	Runoff Area=29,166 sf 22.77% Impervious Runoff Depth=3.80" Tc=6.0 min CN=WQ Runoff=2.77 cfs 0.212 af
Subcatchment2.6S: To FB#3	Runoff Area=8,304 sf 53.29% Impervious Runoff Depth=4.73" Tc=6.0 min CN=WQ Runoff=0.94 cfs 0.075 af
Subcatchment2.7S: IP#3	Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=2.53" Tc=6.0 min CN=WQ Runoff=0.08 cfs 0.006 af
Subcatchment3.1S: To FB#2	Runoff Area=11,518 sf 46.11% Impervious Runoff Depth=4.28" Tc=6.0 min CN=WQ Runoff=1.18 cfs 0.094 af
Subcatchment3.2S: To IP#2	Runoff Area=2,768 sf 0.00% Impervious Runoff Depth=2.13" Tc=6.0 min CN=WQ Runoff=0.15 cfs 0.011 af
Subcatchment3.3S: To East	Runoff Area=99,698 sf 1.55% Impervious Runoff Depth=2.47" Flow Length=214' Tc=10.8 min CN=WQ Runoff=5.40 cfs 0.472 af
Reach#100: AnalysisPoint - PortsmouthAve	Inflow=3.16 cfs 0.246 af Outflow=3.16 cfs 0.246 af
Reach#200: AnalysisPoint - South	Inflow=1.10 cfs 0.125 af Outflow=1.10 cfs 0.125 af
Reach#300: AnalysisPoint - East	Inflow=5.40 cfs 0.472 af Outflow=5.40 cfs 0.472 af
ReachC#3: ProposedCulvert#3	Avg. Flow Depth=0.14' Max Vel=2.54 fps Inflow=0.18 cfs 0.013 af 12.0" Round Pipe n=0.012 L=38.0' S=0.0105 '/' Capacity=3.96 cfs Outflow=0.18 cfs 0.013 af
Pond FB1: Forebay#1	Peak Elev=94.85' Storage=159 cf Inflow=0.94 cfs 0.075 af Outflow=0.95 cfs 0.073 af

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Type III 24-hr 25-YR Rainfall=6.19"

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Pond FB2: Forebay#2Peak Elev=97.89' Storage=604 cf Inflow=1.37 cfs 0.110 af
Outflow=1.36 cfs 0.100 af**Pond FB3: Forebay#3**Peak Elev=97.69' Storage=649 cf Inflow=1.18 cfs 0.094 af
Outflow=1.16 cfs 0.082 af**Pond IP1: InfiltrationPond#1**Peak Elev=94.85' Storage=1,003 cf Inflow=1.03 cfs 0.079 af
Discarded=0.06 cfs 0.062 af Primary=0.48 cfs 0.016 af Outflow=0.54 cfs 0.079 af**Pond IP2: InfiltrationPond#2**Peak Elev=97.89' Storage=3,669 cf Inflow=1.78 cfs 0.132 af
Discarded=0.01 cfs 0.065 af Primary=0.11 cfs 0.029 af Outflow=0.12 cfs 0.094 af**Pond IP3: InfiltrationPond#3**Peak Elev=97.64' Storage=1,672 cf Inflow=1.31 cfs 0.093 af
Discarded=0.12 cfs 0.093 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.093 af**Total Runoff Area = 4.845 ac Runoff Volume = 1.337 af Average Runoff Depth = 3.31"**
82.15% Pervious = 3.980 ac 17.85% Impervious = 0.865 ac

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Type III 24-hr 50-YR Rainfall=7.42"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond IP1: InfiltrationPond#1

Peak Elev=94.91' Storage=1,060 cf Inflow=1.14 cfs 0.099 af

Discarded=0.06 cfs 0.069 af Primary=0.94 cfs 0.031 af Outflow=1.00 cfs 0.099 af

Pond IP2: InfiltrationPond#2

Peak Elev=97.96' Storage=3,812 cf Inflow=2.22 cfs 0.167 af

Discarded=0.01 cfs 0.065 af Primary=0.49 cfs 0.064 af Outflow=0.51 cfs 0.129 af

Pond IP3: InfiltrationPond#3

Peak Elev=97.81' Storage=1,970 cf Inflow=1.68 cfs 0.122 af

Discarded=0.12 cfs 0.112 af Primary=0.23 cfs 0.010 af Outflow=0.35 cfs 0.122 af

Appendix III

Charts, Graphs, and Calculations

GROUNDWATER RECHARGE VOLUME (GRV) (Env-Wq 1504.12)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.04	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.58	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.11 inches		Rd = Weighted groundwater recharge depth	
0.0666 ac-in		GRV = AI * Rd	
242 cf		GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
← Y/N		Is a stage-storage table attached showing that the GRV can be stored below the lowest invert of the outlet structure (if applicable)? Multiple stormwater control measures may be used to meet the GRV requirements.	

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

Infiltration Pond #1: 2-Year Storm Contributing Volume = 0.032 af = 1,394 cf

Infiltration Pond #2: 2-Year Storm Contributing Volume = 0.043 af = 1,873 cf

Infiltration Pond #3: 2-Year Storm Contributing Volume = 0.029 af = 1,263 cf

Recharge Volume Provided = 4,530 cf (> 242 cf required)

INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.07)

Type/Node Name: Infiltration Pond #1 / IP1

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

Yes		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	← yes
0.22	ac	A = Area draining to the practice	
0.10	ac	A _I = Impervious area draining to the practice	
0.47	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.47	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)	
0.10	ac-in	WQV = 1" x R _v x A	
372	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
93	cf	25% x WQV (check calc for sediment forebay volume)	
Sediment Forebay		Method of pretreatment? (not required for clean or roof runoff)	
96	cf	V _{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
916	cf	V = Volume ¹ (attach a stage-storage table)	≥ WQV
385	sf	A _{SA} = Surface area of the bottom of the pond	
3.00	iph	K _{sat} _{DESIGN} = Design infiltration rate ²	
3.9	hours	I _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN})	≤ 72-hrs
93.25	feet	E _{BTM} = Elevation of the bottom of the basin	
92.25	feet	E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
90.58	feet	E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D _{SHWT} = Separation from SHWT	≥ * ³
2.7	feet	D _{ROCK} = Separation from bedrock	≥ * ³
	ft	D _{amend} = Depth of amended soil, if applicable due high infiltration rate	≥ 24"
	ft	D _T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	← yes
		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements. ⁴	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥ 3:1
94.79	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
94.91	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
98.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench? ⁵	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

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

Designer's Notes:

NH-1566 Proposed

Prepared by Beals Associates, PLLC

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Type III 24-hr 50-YR Rainfall=7.42"

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Stage-Area-Storage for Pond FB1: Forebay #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
93.00	4	0	94.08	96	44
93.02	5	0	94.10	99	46
93.04	5	0	94.12	101	48
93.06	6	0	94.14	103	50
93.08	7	0	94.16	106	52
93.10	7	1	94.18	108	54
93.12	8	1	94.20	111	56
93.14	9	1	94.22	113	59
93.16	10	1	94.24	116	61
93.18	11	1	94.26	119	63
93.20	12	2	94.28	121	66
93.22	13	2	94.30	124	68
93.24	14	2	94.32	127	71
93.26	15	2	94.34	129	73
93.28	16	3	94.36	132	76
93.30	18	3	94.38	135	78
93.32	19	3	94.40	138	81
93.34	20	4	94.42	140	84
93.36	22	4	94.44	143	87
93.38	23	5	94.46	146	90
93.40	24	5	94.48	149	93
93.42	26	6	94.50	152	96
93.44	27	6	94.52	155	99
93.46	29	7	94.54	158	102
93.48	30	7	94.56	161	105
93.50	32	8	94.58	164	108
93.52	34	9	94.60	167	112
93.54	35	9	94.62	170	115
93.56	37	10	94.64	173	118
93.58	39	11	94.66	177	122
93.60	41	12	94.68	180	125
93.62	43	12	94.70	183	129
93.64	45	13	94.72	186	133
93.66	47	14	94.74	190	136
93.68	49	15	94.76	193	140
93.70	51	16	94.78	196	144
93.72	53	17	94.80	200	148
93.74	55	18	94.82	203	152
93.76	57	19	94.84	206	156
93.78	60	21	94.86	210	160
93.80	62	22	94.88	213	165
93.82	64	23	94.90	217	169
93.84	67	24	94.92	221	173
93.86	69	26	94.94	224	178
93.88	71	27	94.96	228	182
93.90	74	29	94.98	231	187
93.92	76	30	95.00	235	192
93.94	79	32			
93.96	82	33			
93.98	84	35			
94.00	87	37			
94.02	89	38			
94.04	92	40			
94.06	94	42			

NH-1566 Proposed

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Stage-Area-Storage for Pond IP1: Infiltration Pond #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
93.25	385	0	94.33	712	586
93.27	390	8	94.35	719	601
93.29	396	16	94.37	726	615
93.31	401	24	94.39	732	630
93.33	406	32	94.41	739	644
93.35	412	40	94.43	746	659
93.37	417	48	94.45	753	674
93.39	423	57	94.47	760	689
93.41	428	65	94.49	766	705
93.43	434	74	94.51	773	720
93.45	439	82	94.53	780	736
93.47	445	91	94.55	787	751
93.49	451	100	94.57	794	767
93.51	456	109	94.59	801	783
93.53	462	118	94.61	808	799
93.55	468	128	94.63	815	815
93.57	474	137	94.65	822	832
93.59	479	147	94.67	830	848
93.61	485	156	94.69	837	865
93.63	491	166	94.71	844	882
93.65	497	176	94.73	851	899
93.67	503	186	94.75	859	916
93.69	509	196	94.77	866	933
93.71	515	206	94.79	873	950
93.73	521	217	94.81	881	968
93.75	527	227	94.83	888	986
93.77	534	238	94.85	895	1,003
93.79	540	249	94.87	903	1,021
93.81	546	259	94.89	910	1,039
93.83	552	270	94.91	918	1,058
93.85	559	281	94.93	925	1,076
93.87	565	293	94.95	933	1,095
93.89	571	304	94.97	941	1,114
93.91	578	316	94.99	948	1,132
93.93	584	327			
93.95	591	339			
93.97	597	351			
93.99	604	363			
94.01	610	375			
94.03	616	387			
94.05	622	400			
94.07	629	412			
94.09	635	425			
94.11	641	437			
94.13	647	450			
94.15	654	463			
94.17	660	477			
94.19	667	490			
94.21	673	503			
94.23	680	517			
94.25	686	530			
94.27	693	544			
94.29	699	558			
94.31	706	572			

INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.07)

Type/Node Name: Infiltration Pond #2 / IP2

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

Yes		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	← yes
0.37	ac	A = Area draining to the practice	
0.17	ac	A _I = Impervious area draining to the practice	
0.48	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.48	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)	
0.17	ac-in	WQV = 1" x R _v x A	
635	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
159	cf	25% x WQV (check calc for sediment forebay volume)	
Sediment Forebay		Method of pretreatment? (not required for clean or roof runoff)	
427	cf	V _{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
3,591	cf	V = Volume ¹ (attach a stage-storage table)	≥ WQV
679	sf	A _{SA} = Surface area of the bottom of the pond	
0.30	iph	K _{sat} _{DESIGN} = Design infiltration rate ²	
37.4	hours	I _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN})	≤ 72-hrs
95.15	feet	E _{BTM} = Elevation of the bottom of the basin	
94.15	feet	E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
90.65	feet	E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D _{SHWT} = Separation from SHWT	≥ * ³
4.5	feet	D _{ROCK} = Separation from bedrock	≥ * ³
	ft	D _{amend} = Depth of amended soil, if applicable due high infiltration rate	≥ 24"
	ft	D _T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	← yes
		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements. ⁴	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥ 3:1
97.75	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
97.96	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
98.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench? ⁵	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

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

Designer's Notes:

NH-1566 Proposed

Prepared by Beals Associates, PLLC

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Type III 24-hr 50-YR Rainfall=7.42"

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Stage-Area-Storage for Pond FB2: Forebay #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
95.50	59	0
95.55	65	3
95.60	71	6
95.65	77	10
95.70	83	14
95.75	90	18
95.80	97	23
95.85	104	28
95.90	111	34
95.95	119	39
96.00	127	45
96.05	134	52
96.10	141	59
96.15	148	66
96.20	155	74
96.25	163	82
96.30	171	90
96.35	178	99
96.40	186	108
96.45	195	117
96.50	203	127
96.55	212	138
96.60	220	148
96.65	229	160
96.70	238	171
96.75	248	183
96.80	257	196
96.85	267	209
96.90	277	223
96.95	287	237
97.00	297	251
97.05	307	267
97.10	318	282
97.15	329	298
97.20	339	315
97.25	351	332
97.30	362	350
97.35	373	369
97.40	385	387
97.45	397	407
97.50	409	427
97.55	421	448
97.60	433	469
97.65	446	491
97.70	458	514
97.75	471	537
97.80	484	561
97.85	497	585
97.90	511	611
97.95	524	636
98.00	538	663

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Stage-Area-Storage for Pond IP2: Infiltration Pond #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
95.15	679	0	97.85	2,059	3,591
95.20	700	34	97.90	2,090	3,695
95.25	721	70	97.95	2,122	3,800
95.30	742	107	98.00	2,153	3,907
95.35	764	144			
95.40	786	183			
95.45	809	223			
95.50	831	264			
95.55	854	306			
95.60	878	349			
95.65	902	394			
95.70	925	439			
95.75	950	486			
95.80	974	534			
95.85	999	584			
95.90	1,025	634			
95.95	1,050	686			
96.00	1,076	739			
96.05	1,098	794			
96.10	1,121	849			
96.15	1,144	906			
96.20	1,167	964			
96.25	1,190	1,023			
96.30	1,214	1,083			
96.35	1,238	1,144			
96.40	1,262	1,207			
96.45	1,286	1,270			
96.50	1,311	1,335			
96.55	1,335	1,401			
96.60	1,360	1,469			
96.65	1,385	1,537			
96.70	1,411	1,607			
96.75	1,437	1,678			
96.80	1,462	1,751			
96.85	1,489	1,825			
96.90	1,515	1,900			
96.95	1,541	1,976			
97.00	1,568	2,054			
97.05	1,595	2,133			
97.10	1,623	2,213			
97.15	1,650	2,295			
97.20	1,678	2,378			
97.25	1,706	2,463			
97.30	1,734	2,549			
97.35	1,762	2,636			
97.40	1,791	2,725			
97.45	1,820	2,816			
97.50	1,849	2,907			
97.55	1,878	3,000			
97.60	1,908	3,095			
97.65	1,938	3,191			
97.70	1,968	3,289			
97.75	1,998	3,388			
97.80	2,029	3,489			

INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.07)

Type/Node Name: Infiltration Pond #3 / IP3

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

Yes		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	← yes
0.33	ac	A = Area draining to the practice	
0.12	ac	A _I = Impervious area draining to the practice	
0.37	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.38	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)	
0.13	ac-in	WQV = 1" x R _v x A	
458	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
114	cf	25% x WQV (check calc for sediment forebay volume)	
Sediment Forebay		Method of pretreatment? (not required for clean or roof runoff)	
553	cf	V _{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
1,857	cf	V = Volume ¹ (attach a stage-storage table)	≥ WQV
1,220	sf	A _{SA} = Surface area of the bottom of the pond	
3.00	iph	K _{sat} _{DESIGN} = Design infiltration rate ²	
1.5	hours	I _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN})	≤ 72-hrs
96.50	feet	E _{BTM} = Elevation of the bottom of the basin	
95.50	feet	E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
93.83	feet	E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D _{SHWT} = Separation from SHWT	≥ * ³
2.7	feet	D _{ROCK} = Separation from bedrock	≥ * ³
	ft	D _{amend} = Depth of amended soil, if applicable due high infiltration rate	≥ 24"
	ft	D _T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	← yes
		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements. ⁴	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥ 3:1
97.29	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
97.81	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
98.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench? ⁵	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

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

Designer's Notes:

NH-1566 Proposed

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Stage-Area-Storage for Pond FB3: Forebay #3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
95.50	104	0
95.55	111	5
95.60	118	11
95.65	125	17
95.70	132	24
95.75	139	30
95.80	147	37
95.85	155	45
95.90	163	53
95.95	171	61
96.00	180	70
96.05	188	79
96.10	196	89
96.15	204	99
96.20	212	109
96.25	221	120
96.30	230	131
96.35	239	143
96.40	248	155
96.45	257	168
96.50	266	181
96.55	276	195
96.60	286	209
96.65	295	223
96.70	305	238
96.75	316	254
96.80	326	270
96.85	337	286
96.90	347	303
96.95	358	321
97.00	369	339
97.05	381	358
97.10	392	377
97.15	404	397
97.20	415	418
97.25	427	439
97.30	439	460
97.35	452	483
97.40	464	505
97.45	477	529
97.50	489	553
97.55	502	578
97.60	515	603
97.65	529	629
97.70	542	656
97.75	556	684
97.80	569	712
97.85	583	741
97.90	597	770
97.95	612	800
98.00	626	831

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Stage-Area-Storage for Pond IP3: Infiltration Pond #3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
96.50	1,220	0	97.58	1,688	1,563
96.52	1,228	24	97.60	1,697	1,597
96.54	1,236	49	97.62	1,706	1,631
96.56	1,244	74	97.64	1,716	1,665
96.58	1,252	99	97.66	1,725	1,700
96.60	1,260	124	97.68	1,735	1,734
96.62	1,268	149	97.70	1,744	1,769
96.64	1,276	175	97.72	1,754	1,804
96.66	1,285	200	97.74	1,763	1,839
96.68	1,293	226	97.76	1,773	1,875
96.70	1,301	252	97.78	1,783	1,910
96.72	1,309	278	97.80	1,792	1,946
96.74	1,317	304	97.82	1,802	1,982
96.76	1,326	331	97.84	1,812	2,018
96.78	1,334	357	97.86	1,821	2,054
96.80	1,342	384	97.88	1,831	2,091
96.82	1,351	411	97.90	1,841	2,128
96.84	1,359	438	97.92	1,851	2,165
96.86	1,367	465	97.94	1,860	2,202
96.88	1,376	493	97.96	1,870	2,239
96.90	1,384	521	97.98	1,880	2,277
96.92	1,393	548	98.00	1,890	2,314
96.94	1,401	576			
96.96	1,410	604			
96.98	1,419	633			
97.00	1,427	661			
97.02	1,436	690			
97.04	1,444	719			
97.06	1,453	748			
97.08	1,462	777			
97.10	1,470	806			
97.12	1,479	835			
97.14	1,488	865			
97.16	1,497	895			
97.18	1,506	925			
97.20	1,514	955			
97.22	1,523	986			
97.24	1,532	1,016			
97.26	1,541	1,047			
97.28	1,550	1,078			
97.30	1,559	1,109			
97.32	1,568	1,140			
97.34	1,577	1,172			
97.36	1,586	1,203			
97.38	1,595	1,235			
97.40	1,604	1,267			
97.42	1,614	1,299			
97.44	1,623	1,332			
97.46	1,632	1,364			
97.48	1,641	1,397			
97.50	1,650	1,430			
97.52	1,660	1,463			
97.54	1,669	1,496			
97.56	1,678	1,530			



Mission Wetland & Ecological Services, LLC
P.O. Box 4028
Portsmouth, NH 03802
(603) 361-3204

MEMORANDUM

To	Eric Salovitch, LLS – Northam Survey	Page 1
CC		
Subject	Wetland Delineation – 210 Portsmouth Avenue (Tax Map 21, Lot 81) Stratham, NH	
From	Sergio Bonilla, PWS, CWS 	
Date	January 15, 2025	

Mission Wetland & Ecological Services, LLC (Mission) delineated the project-relevant boundaries of the freshwater wetlands associated with the above-referenced project locus on January 14, 2025. The wetland delineation was conducted by Sergio Bonilla, New Hampshire Certified Wetland Scientist (CWS) #261 (the State of Maine reciprocates the New Hampshire wetland scientist certification), in accordance with the *United States Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1* (January 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2 – TR-12-1, January 2012)*. The boundaries of the freshwater wetlands are demarcated in the field using solid pink, blue, and pin flagging, alpha-numerically labeled **SB-1 (start open)** through **SB-9 (stop open)**, **A-1 (start open)** through **A-9 (stop open)**, **B-1 (start open)** through **B-16 (stop open)**, **C-1 (start open)** through **C-14 (stop open)**, and **D-1 (start)** through **D-5 (connect)**. Per Chapter 5 of the above-referenced document, Difficult Wetland Situations in the Northcentral and Northeast Region, in this case the limit of disturbed, poorly-drained hydric soils within a maintained lawn scenario underlain with hydric soil is included within the boundary (approximately C-4 through C-7, and D-1 through D-5). In addition, there are wetlands present on the easterly portion of the parcel that were not delineate as part of this scope.

The wetlands were classified in accordance with the *US Fish & Wildlife Service Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, 1979) as palustrine emergent and forested wetland systems with deciduous vegetation that are seasonally flooded/saturated/intermittently exposed (PFO1E, PFO1G), and a permanently-flooded palustrine unconsolidated bottom and excavated pond system (PUBHx). Mission utilized *The National Wetland Plant List, ERDC/CRREL TR-12-11, Hanover, NH: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory* (Lichvar, R.W. 2012, 2016) and referenced the *Field Indicators for Identifying Hydric Soils in New England, Version 4* (2019) and/or *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.2* (2018) to determine the presence of hydric soils.

The wetlands are located in drainage saddle configurations associated with the site at topographically lower elevations and supported by a high seasonal groundwater table and fine sandy loam soils with a depleted matrix that exhibit redoximorphic features. In addition, the “A-series” wetland extension is supported hydrologically by Jewitt Hill Brook, a perennial stream at the rear portion of the parcel. The vegetation in the wetlands includes, but is not limited to, red maple (*Acer rubrum*), white ash (*Fraxinus americana*), winterberry (*Ilex verticillata*), spicebush (*Lindera benzoin*), speckled alder (*Alnus rugosa*),

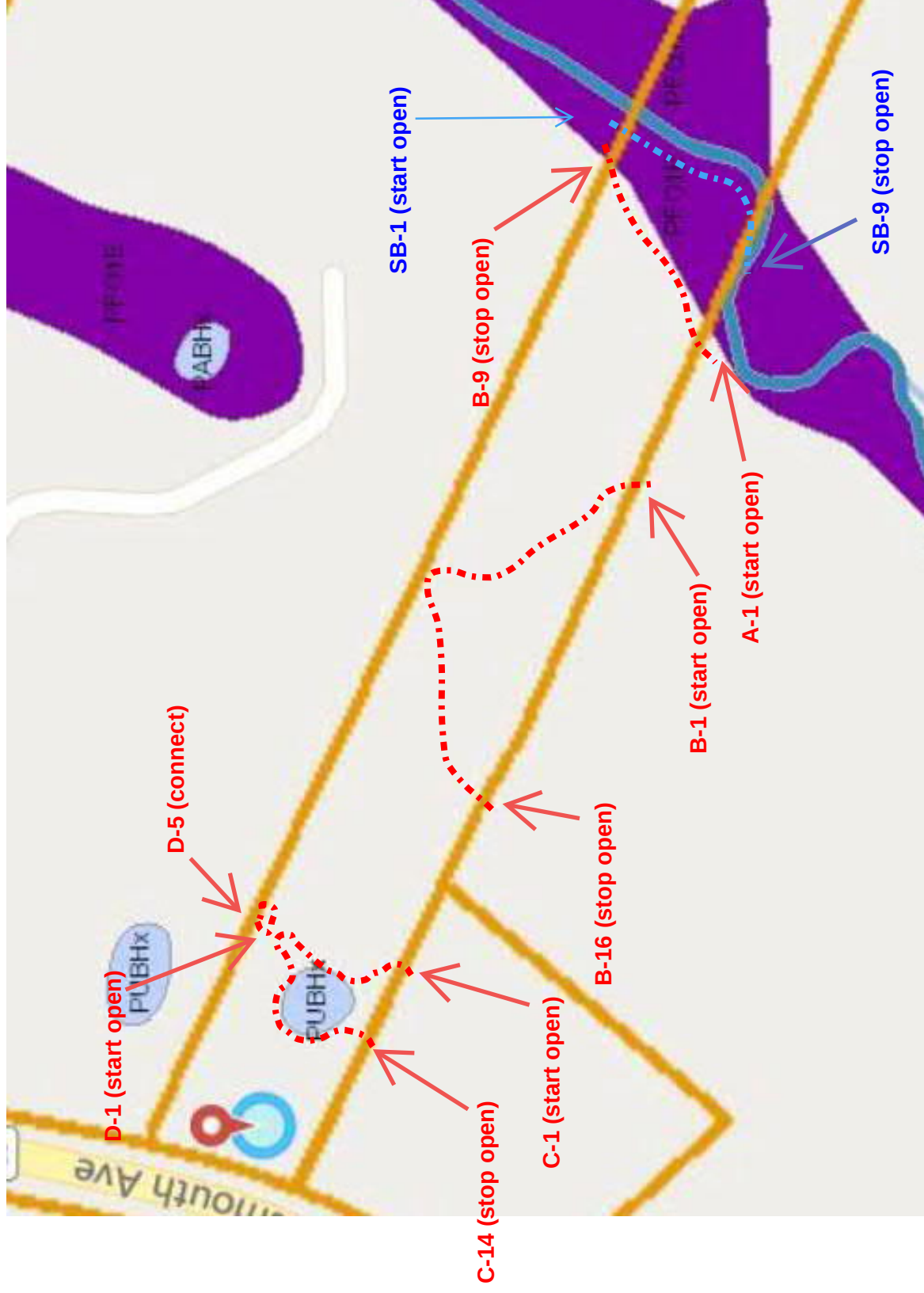
MEMORANDUM

Page 2 of 2

silky dogwood (*Cornus amomum*), glossy buckthorn (*Frangula alnus*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), poison ivy (*Toxicodendron radicans*), royal fern (*Osmunda regalis*), purple loosestrife (*Lythrum salicaria*), soft rush, (*Juncus effusus*), fringed sedge (*Carex crinita*), and sphagnum moss (*Shagnum* spp.).

Attached, please find a wetland delineation sketch to facilitate any future instrument survey. Please call me with any questions or if you require additional information.

23-050 -- Northam Survey 210 Portsmouth - Avenue Stratham, NH



SB-1 (start open) through SB-9 (stop open) - MAHW of Jewitt Hill Brook (perennial stream)

A-1 (start open) through A-9 (stop open) - PFO1G

B-1 (start open) through B-16 (stop open) - PFO1E

C-1 (start open) through C-14 (stop open) - PUBHx/PEMIE

D-1 (start open) through D-5 (connect) - PEMIE

* sketch only
** not to scale
*** to facilitate survey location

***any potential wetlands associated with the easterly side of Jewitt Hill Brook and beyond have not been delineated as part of this scope.**



SITE-SPECIFIC SOIL SURVEY REPORT

210 Portsmouth Ave

Stratham

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 7.0, July 2021. This map product is within the technical standards of the National Cooperative Soil Survey. It is a special product, intended for the submission to NH DES Alteration of Terrain. It was produced by a professional soil scientist and is not a product of the USDA Natural Resource Conservation Service.

Hydrologic Soil Group was determined using SSSNNE Special Publication No. 5.

Scale of soil map:

Approximately 1" equals 60'

Contours:

Intervals of 2 foot

2. DATE SOIL MAP PRODUCED

Date(s) of on-site fieldwork: 11/24/25

Date(s) of test pits: 3/26/2024, Test pits

4-9 & D1-D3 9/10/2025

Test pits recorded by: Joseph Nichols Designer # 1451

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Stratham

Location: 210 Portsmouth Ave, Map 21, Lot 81

Size of area: Approximately 6 acres

Was the map for the entire lot? No

The area where the soil mapping was performed is an existing residential lot, with house, driveway and barn, as well as open fields, wooded hillsides and wetlands. The mapping area was only for the proposed development area.

4. PURPOSE OF THE SOIL MAP

Was the map prepared to meet the requirement of Alteration of Terrain? Yes

If no, what was the purpose of the map?

Who was the map prepared for? Beals Associates, PLLC

5. SOIL IDENTIFICATION LEGEND

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
313	Deerfield	311	B
448	Scituate	323	C
546	Walpole	521	C
115	Scarboro	621	D



Hurley Environmental

AND LAND PLANNING, LLC

SLOPE PHASE:

0-8% B 8-15% C 15-25% D 25%+ E

6.0 UNIT DESCRIPTIONS

HISS

Hydrologic Soil Group

313

Deerfield

311

B

The Deerfield series consists of very deep, moderately well drained soils formed in glaciofluvial deposits. They are nearly level to strongly sloping soils on terraces, deltas, and outwash plains. Slope ranges from 0 to 15 percent. These soils are found on the site in some of the side slope areas adjacent to the wetlands as well as in the rear, eastern portion of the mapping area. They have an ESHWT between 15-40 inches and no ledge was encountered.

Typical Profile

0" - 5" 10YR 3/3 Dark Brown, Fine Sandy Loam, , Friable

5" - 36" 10YR 5/4 Yellowish Brown, Gravelly, Fine Sandy Loam Granular, Friable

36" - 55" 2.5Y 5/3 Light Olive Brown, Gravelly, Fine Loamy Sand Massive, Firm W/ Redox

ESHWT = 36 Inches

Observed Ground Water - None

Restrictive @ 36 Inches

Refusal - None

448

Scituate

313

C

The Scituate series consists of moderately well drained soils formed in a loamy eolian influenced mantle of till underlain by sandy lodgement till. The soils are very deep to bedrock and moderately deep to a densic contact. They are nearly level through moderately steep soils on glaciated uplands. Saturated hydraulic conductivity is moderately high or high in the solum and moderately low or moderately high in the substratum. These soils are the dominant series within the mapping area. They are typically firm with a mineral restrictive layer in the C horizon. They have an ESHWT between 15-40 inches and no ledge.

Typical Profile

0" - 7" 10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable

7" - 30" 10YR 5/4 Yellowish Brown, Fine Sandy Loam Granular, Friable

30" - 40" 10YR 5/3 Brown Gravelly, Fine Sandy Loam, Granular, Friable

40" - 47" 10YR 4/2 Dark Grayish Brown, Gravelly, Loamy Sand Massive, Friable W/ Redox

47" - 63" 2.5Y 5/3 Light Olive Brown, Fine Sandy Loam Blocky, Firm W/ Redox

ESHWT = 40 Inches

Observed Ground Water - None

Restrictive @ 40 Inches

Refusal - None

Perc Rate = 10 min/inch @ 20"

546

Walpole

521

C

The Walpole Series consists of very deep, poorly drained sandy soils formed in outwash and stratified drift. They are nearly level to gently sloping soils in low-lying positions on terraces and plains. Slope ranges from 0 to 8 percent. Saturated hydraulic conductivity is moderately high or high in the surface layer and subsoil, and high or very high in the substratum.



Hurley Environmental

AND LAND PLANNING, LLC

115 Scarboro

621

D

The Scarboro series consists of very deep, very poorly drained soils in sandy glaciofluvial deposits on outwash plains, deltas, and terraces. They are nearly level soils in depressions. Slope ranges from 0 through 3 percent. Saturated hydraulic conductivity is high or very high.

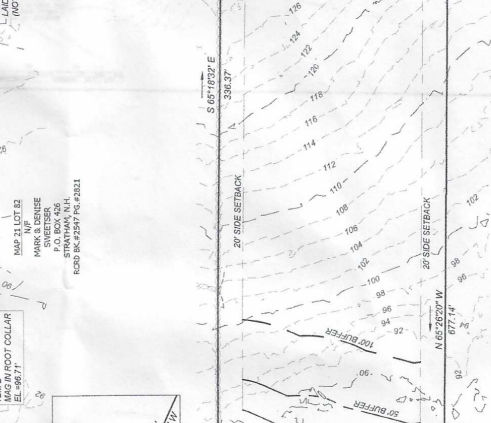
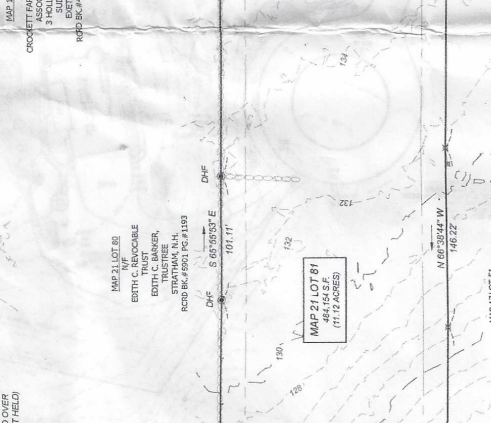
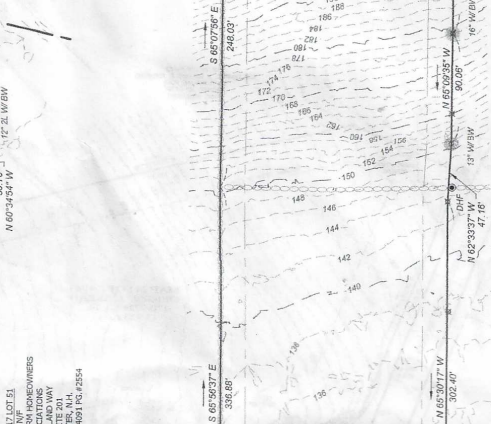
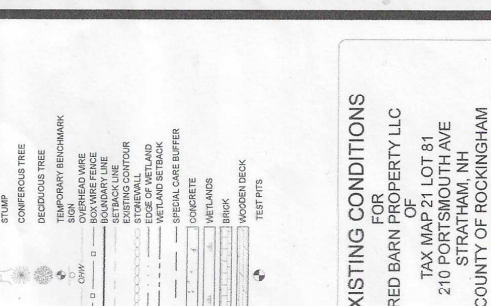
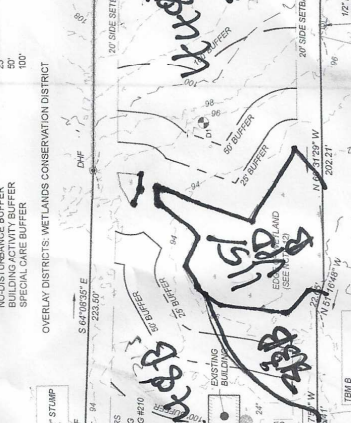
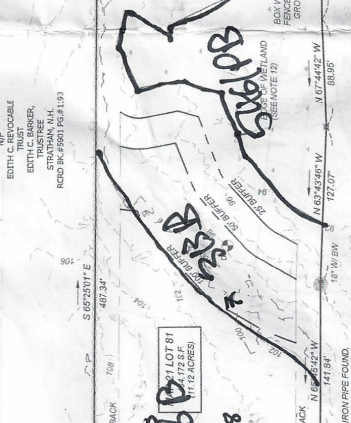
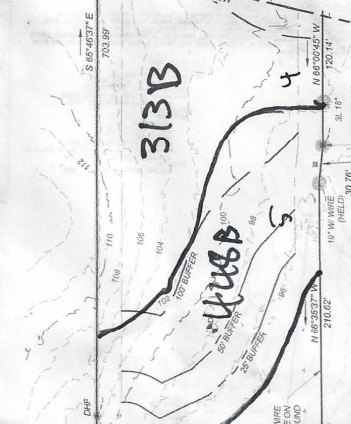
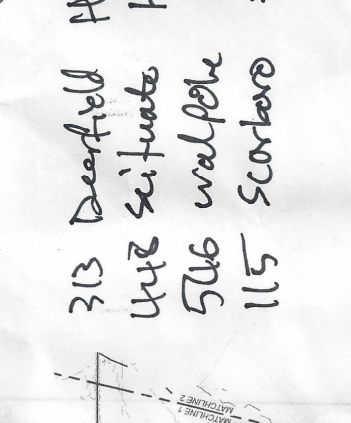
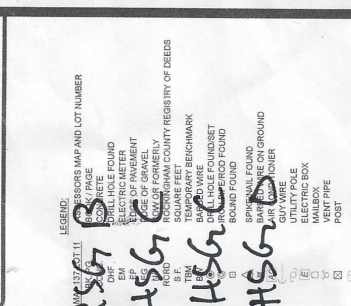
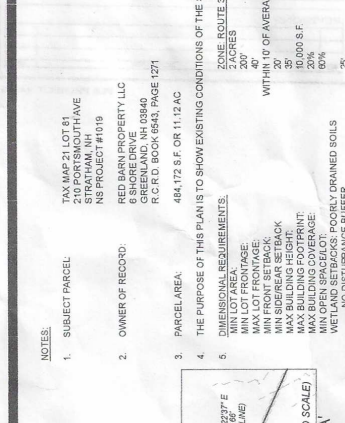
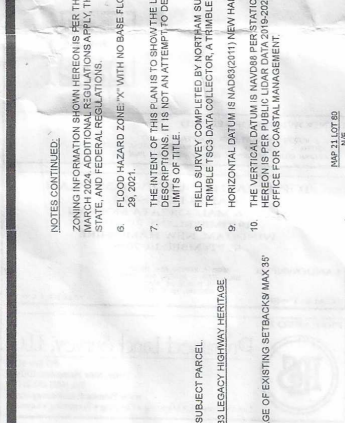
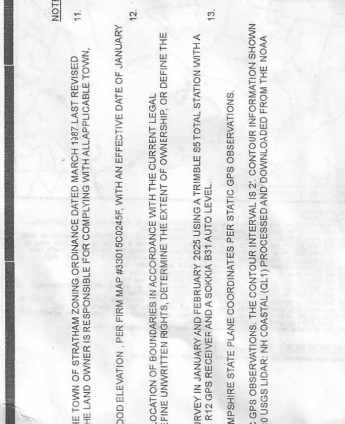
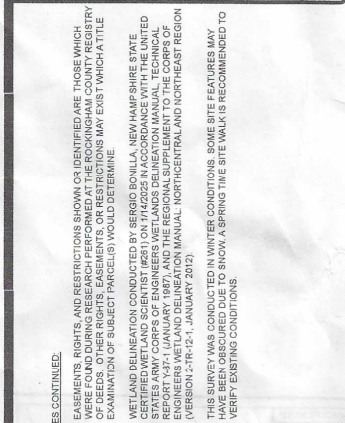
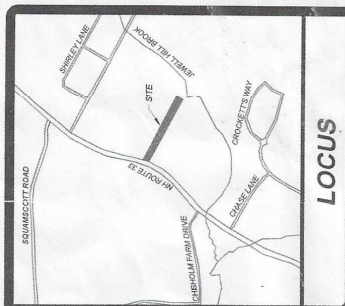
OTHER DISTINGUISHING FEATURES OF SITE

Is the site in a natural condition? Yes.

8.0 Inclusions

No Inclusions were mapped







NICHOLS ENVIRONMENTAL, LLC.

102 CHESTER ROAD
FREMONT, NH 03044
nicholsenviro@gmail.com
Office: 603-244-5325
Cell: 603-234-3228

Job Number 24-027

Test pits 1-3 Logged on 3/26/2024, Test pits 4-9 & D1-D3 9/10/2025 By Joseph Nichols Designer # 1451

Witnessed by Mike Cuomo Rockingham County Conservation District

Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # 1

0" - 7"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
7" - 30"	10YR 5/4 Yellowish Brown, Fine Sandy Loam Granular, Friable
30" - 40"	10YR 5/3 Brown Gravelly, Fine Sandy Loam, Granular, Friable
40" - 47"	10YR 4/2 Dark Grayish Brown, Gravelly, Loamy Sand Massive, Friable W/ Redox
47" - 63"	2.5Y 5/3 Light Olive Brown, Fine Sandy Loam Blocky, Firm W/ Redox

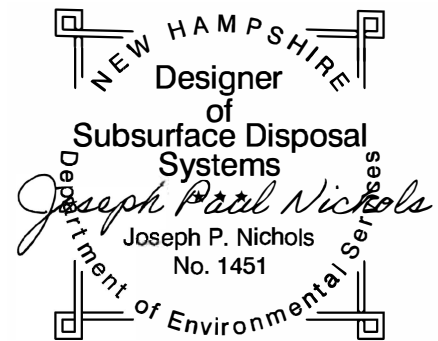
ESHWT = 40 Inches

Observed Ground Water - None

Restrictive @ 40 Inches

Refusal - None

Perc Rate = 10 min/inch @ 20"





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Witnessed by Mike Cuomo Rockingham County Conservation District

Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # 2

0" - 5"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
5" - 36"	10YR 5/4 Yellowish Brown, Gravelly, Fine Sandy Loam Granular, Friable
36" - 55"	2.5Y 5/3 Light Olive Brown, Gravelly, Fine Loamy Sand Massive, Firm W/ Redox

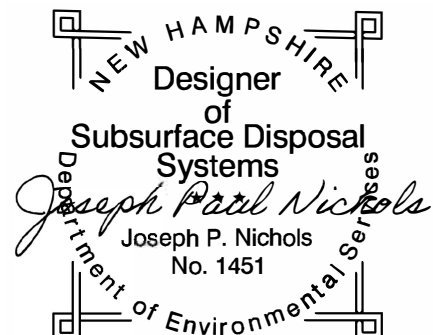
ESHWT = 36 Inches

Observed Ground Water - None

Restrictive @ 36 Inches

Refusal - None

Perc Rate = 6 min/inch @ 20"





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210 Portsmouth Ave.

Stratham, NH

Test Pit # 3

0" - 5"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
5" - 25"	10YR 5/4 Yellowish Brown, Fine Sandy Loam Granular, Friable
25" - 56"	2.5Y 5/3 Light Olive Brown, Fine Loamy Sand Massive, Firm W/ Redox

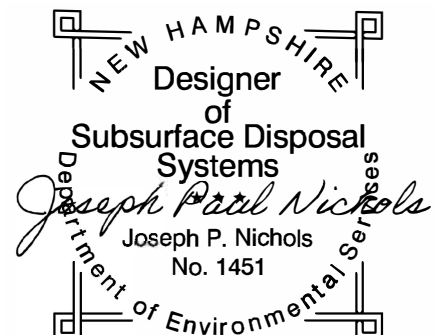
ESHWT = 25 Inches

Observed Ground Water - None

Restrictive @ 25 Inches

Refusal - None

Perc Rate = 8 min/inch @ 20"





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Witnessed by Mike Cuomo Rockingham County Conservation District

Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # 4

0" - 8"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
8" - 16"	10YR 5/4 Yellowish Brown, Fine Sandy Loam Granular, Friable
16" - 38"	2.5Y 6/4 Light Yellowish Brown, Fine Loamy Sand Massive, Friable
38" - 65"	2.5Y 6/2 Light Brownish Gray, Fine Loamy Sandy Blocky, Friable W/ Redox

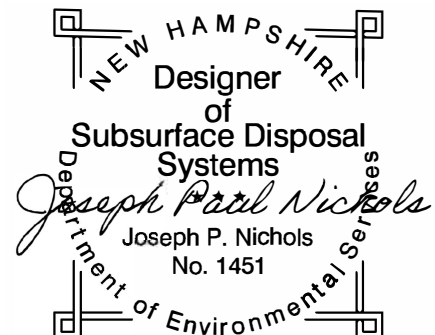
ESHWT = 38 Inches

Observed Ground Water - None

Restrictive - None

Refusal - None

Perc Rate = 6 min/inch @ 30"





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Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # 5

0" - 8"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
8" - 30"	10YR 5/4 Yellowish Brown, Fine Sand Massive, Friable
30" - 38"	2.5Y 5/3 Light Olive Brown, Fine to Medium Sand Massive, Friable W/ Redox
38" - 62"	2.5Y 5/2 Grayish Brown, Very Fine Silt Loam Blocky, Firm W/ Redox

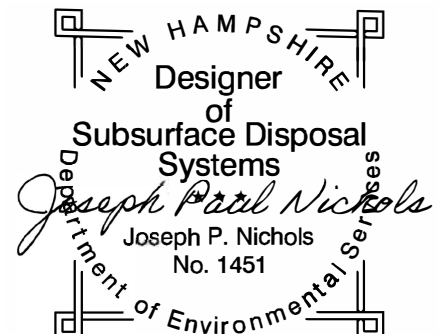
ESHWT = 30 Inches

Observed Ground Water - None

Restrictive @ 38 Inches

Refusal - None

Perc Rate = 6 min/inch @ 24"





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Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # 6

0" - 8"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
8" - 13"	10YR 5/4 Yellowish Brown, Fine Sandy Loam Granular, Friable
13" - 24"	2.5Y 6/4 Light Yellowish Brown, Gravelly, Sandy Loam Massive, Friable
24" - 53"	2.5Y 6/3 Light Yellowish Brown, Gravelly Loamy Sand Massive, Firm W/ Redox

ESHWT = 24 Inches

Observed Ground Water - None

Restrictive @ 24 Inches

Refusal - None

Perc Rate = 6 min/inch @ 20"





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210 Portsmouth Ave.

Stratham, NH

Test Pit # 7

0" - 4"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
4" - 8"	10YR 5/4 Yellowish Brown, Fine Sand Massive, Friable
8" - 27"	2.5Y 6/4 Light Yellowish Brown, Fine Sand Massive, Friable
27" - 61"	2.5Y 6/3 Light Yellowish Brown, Fine Sand Blocky, Friable W/ Redox

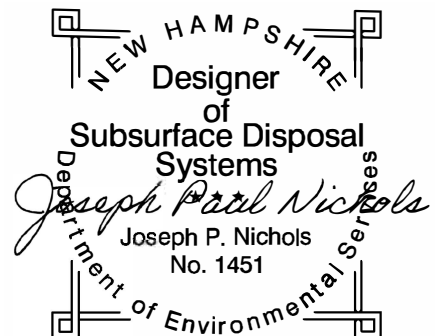
ESHWT = 27 Inches

Observed Ground Water - None

Restrictive - None

Refusal - None

Perc Rate = 6 min/inch @ 24"





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Witnessed by Mike Cuomo Rockingham County Conservation District

Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # 8

0" - 8"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
8" - 20"	2.5Y 6/4 Light Yellowish Brown, Fine Sand Massive, Friable
20" - 30"	10YR 5/4 Light Yellowish Brown, Gravelly, Loamy Sand Massive, Friable
30" - 60"	2.5Y 6/3 Light Yellowish Brown, Gravelly, Fine Sand Massive, Firm W/ Redox

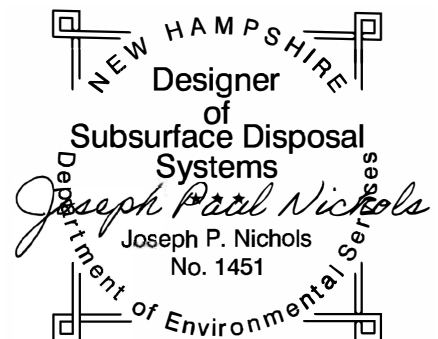
ESHWT = 30 Inches

Observed Ground Water - None

Restrictive @ 30 Inches

Refusal - None

Perc Rate = 6 min/inch @ 28"





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Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # 9

0" - 8"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
8" - 22"	10YR 5/6 Yellowish Brown, Fine Sandy Loam Granular, Friable
22" - 33"	10YR 5/4 Light Yellowish Brown, Gravelly, Loamy Sand Massive, Friable
33" - 53"	2.5Y 5/3 Light Yellowish Brown, Gravelly, Loamy Sand Massive, Friable W/ Redox

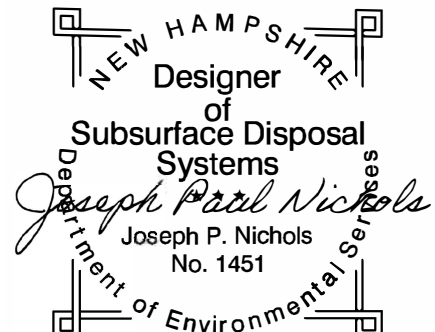
ESHWT = 33 Inches

Observed Ground Water - None

Restrictive - None

Refusal - None

Perc Rate = 6 min/inch @ 28"





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Witnessed by Mike Cuomo Rockingham County Conservation District

Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # D1

0" - 10"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
10" - 18"	2.5Y 5/6 Light Olive Brown, Fine Sand Massive, Friable
18" - 60"	2.5Y 6/2 Light Brownish Gray, Fine Sandy Loam Blocky, Firm W/ Redox

ESHWT = 18 Inches

Observed Ground Water - None

Restrictive @ 18 Inches

Refusal - None

Perc Rate = 6 min/inch @ 18"





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Witnessed by Mike Cuomo Rockingham County Conservation District

Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # D2

0" - 12"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
12" - 18"	10YR 6/4 Light Yellowish Brown, Fine Sand Massive, Friable
18" - 30"	2.5Y 7/4 Pale Yellow, Fine Sand Massive, Friable
30" - 60"	2.5Y 6/3 Light Yellowish Brown, Fine Sand Blocky, Friable W/ Redox

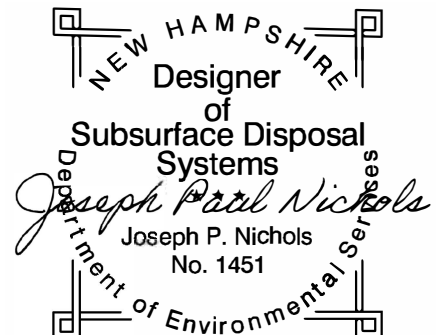
ESHWT = 30 Inches

Observed Ground Water - None

Restrictive - None

Refusal - None

Perc Rate = 6 min/inch @ 20"





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Job Number 24-027

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Witnessed by Mike Cuomo Rockingham County Conservation District

Tax Map 21, Lot 81

210 Portsmouth Ave.

Stratham, NH

Test Pit # D3

0" - 8"	10YR 3/3 Dark Brown, Fine Sandy Loam, Granular, Friable
8" - 17"	10YR 5/4 Yellowish Brown, Fine Sandy Loam Granular, Friable
17" - 28"	2.5Y 6/4 Light Yellowish Brown, Gravelly, Fine Sandy Loam Granular, Friable
28" - 72"	2.5Y 6/3 Light Yellowish Brown, Gravelly, Fine Loamy Sand Massive, Firm W/ Redox

ESHWT = 28 Inches

Observed Ground Water - None

Restrictive @ 28 Inches

Refusal - None

Perc Rate = 8 min/inch @ 24"



Appendix IV

Plans

** THIS DRAWING IS FOR DRAINAGE PURPOSES ONLY **

WATERSHED LEGEND

- 4 SUBCATCHMENT
4 REACH
4 POND
LIMIT OF SUBCATCHMENT
FLOW PATH

ZONING REQUIREMENTS

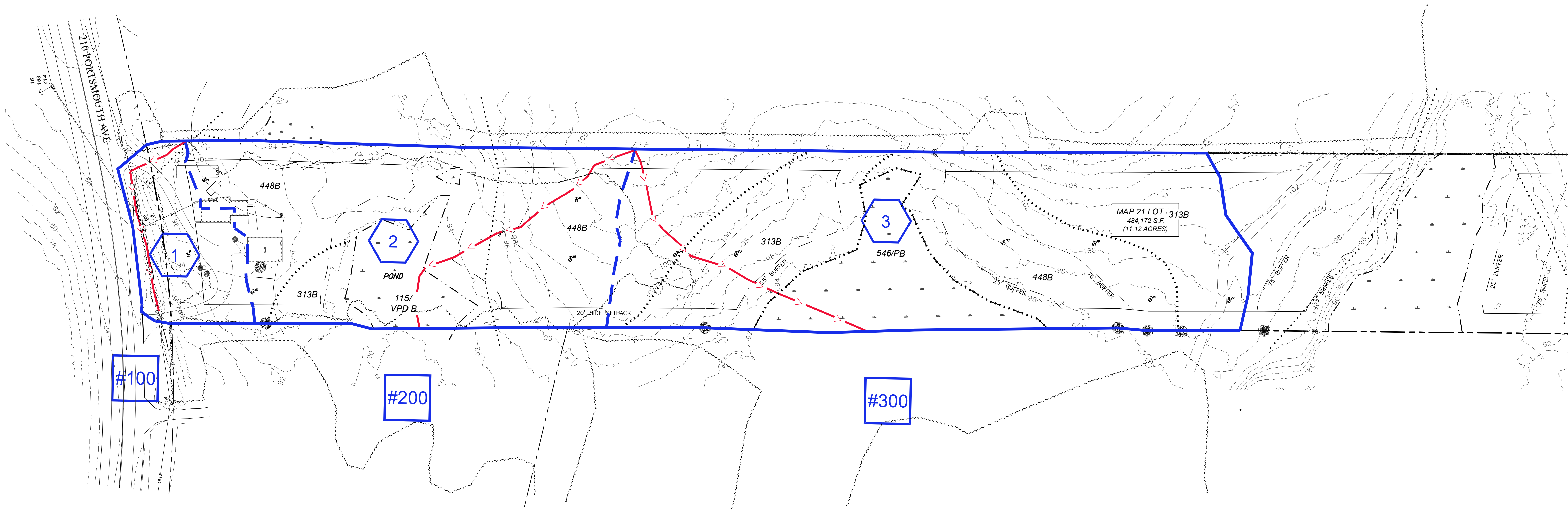
- ROUTE 33 LEGACY HIGHWAY HERITAGE
ZONE FRONT YARD 35 FT.
SIDE & REAR YARD 20 FT.
BUILDING HEIGHT 35 FT.
WETLAND SETBACKS 25 FT. NO DISTURBANCE
50 FT. BUILDING
75 FT. SEPTIC

PREPARED FOR:

RED BARN PROPERTY LLC
6 SHORE DRIVE
GREENLAND, NH 03840



70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,



THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION OF TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

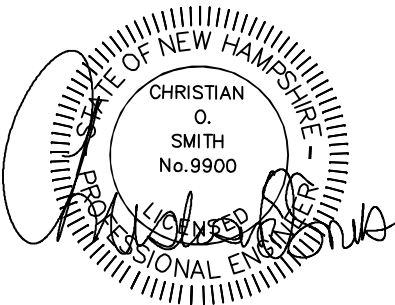
THE SITE SPECIFIC SOIL SURVEY (SSSS) WAS PRODUCED 11/24/25, AND WAS PREPARED BY LUKE HURLEY, CSS # 095, HURLEY ENVIRONMENTAL AND LAND PLANNING, LLC.

SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE #10, JANUARY 2011. THE NUMERIC LEGEND WAS AMENDED TO IDENTIFY THE CORRECT SOILS COMPONENTS OF THE COMPLEX.

HYDROLOGIC SOIL GROUP FROM KSAT VALUES FOR NEW HAMPSHIRE SOILS, SOCIETY OF SOIL SCIENTISTS OF NEW ENGLAND, SPECIAL PUBLICATION NO. 5, SEPTEMBER, 2009.

SSSM SYMBOL	SSS MAP NAME	HISS SYMBOL	HYDROLOGIC SOIL GROUP
313	DEERFIELD	311	B
448	SCITUATE	323	C
546	WALPOLE	521	C
115	SCARBORO	621	D

SLOPE PHASE:
0-8% B 8-15% C 15-25% D 25%+ E



REVISIONS: DATE:

PRE-DEVELOPMENT PLAN

PLAN FOR:
RESIDENTIAL DEVELOPMENT
210 PORTSMOUTH AVE
STRATHAM, NH

DATE: MAR 11, 2026 SCALE: 1"=50'
PROJ. NO: NH-1566 SHEET NO. WS-1

** THIS DRAWING IS FOR DRAINAGE PURPOSES ONLY **

WATERSHED LEGEND

- 4 SUBCATCHMENT
4 REACH
4 POND
LIMIT OF SUBCATCHMENT
FLOW PATH

ZONING REQUIREMENTS

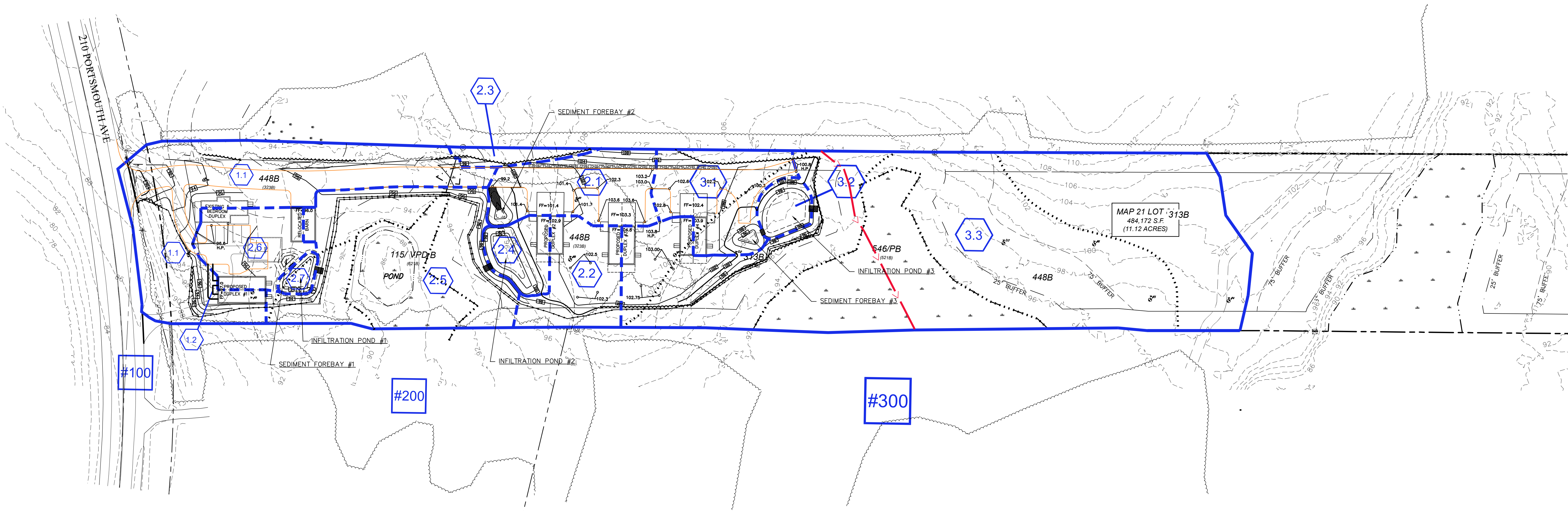
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FRONT YARD	35 FT.
SIDE & REAR YARD	20 FT.
BUILDING HEIGHT	35 FT.
WETLAND SETBACKS	25 FT. NO DISTURBANCE 50 FT. BUILDING 75 FT. SEPTIC

PREPARED FOR:

RED BARN PROPERTY LLC
6 SHORE DRIVE
GREENLAND, NH 03840



70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
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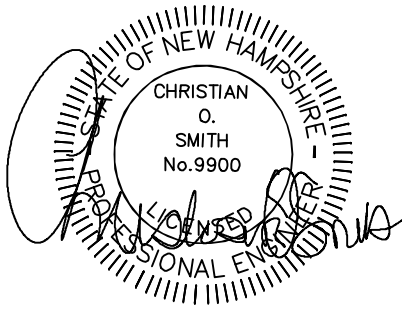
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SLOPE PHASE:
0-8% B 8-15% C 15-25% D 25%+ E



REVISED PER REVIEW COMMENTS	07/13/26
REVISIONS:	DATE:

POST DEVELOPMENT PLAN

PLAN FOR:
RESIDENTIAL DEVELOPMENT
210 PORTSMOUTH AVE
STRATHAM, NH

DATE:	MAR 11, 2026	SCALE:	1"=50'
PROJ. NO:	NH-1566	SHEET NO.	WS-2