DRAINAGE ANALYSIS
&
SEDIMENT AND EROSION CONTROL PLAN

Prepared for:

J & L TERRA HOLDINGS, INC
US ROUTE 9 – BARRINGTON, NH

Prepared by:

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Project Number:
NH-1263
Route 9
Barrington, New Hampshire

August 10, 2020
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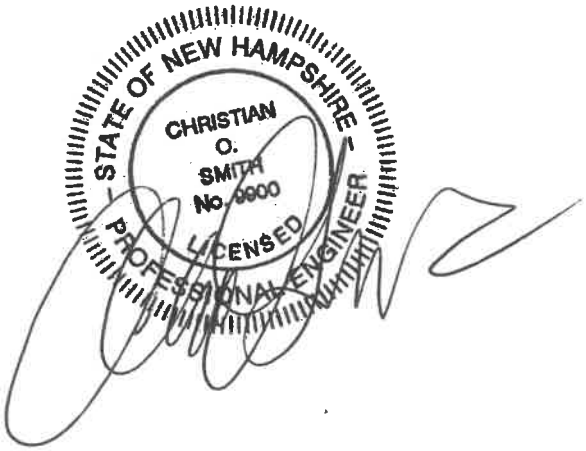

DESIGN METHOD OBJECTIVES

J & L Terra Holdings, Inc. proposes an 80-unit residential condominium development on approximately 21+-acres of land located off Route 9 in Barrington, NH. A drainage analysis of the area (including 2-offsite subcatchments) was conducted for the purpose of estimating the peak rate of stormwater run-off and to subsequently design adequate drainage structures. It should be noted that all roof runoff from the newly proposed buildings will be required to be infiltrated by stone trench drip edges. 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 data for the 2, 10 & 50 Yr – 24 Hr storm event using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. Rainfall data is based on the Extreme Precipitation Tables as published by the Northeast Regional Climate Center of Cornell University. The purpose of this analysis is to estimate the peak rates of run-off from the site for swale adequacy purposes, and to compare the peak rate of run-off between the existing and proposed conditions.

METHODOLOGY

Modeling consists of identifying all surface water flow paths that drain to, across and from the property as applicable. The "watershed area", is divided into discrete subcatchments based on natural drainage patterns. HydroCAD models each drainage structure and subcatchment as an individual interconnected node. Subcatchment nodes are modeled as individual watersheds with unique physical characteristics consisting of surface area, surface condition, overland flow lengths and associated land slope. Appropriate input parameters were determined through field observation, and analysis of field surveyed AutoCAD drawings. Rainfall distribution and depth are standardized inputs, based on geographic location. The Time-of-Concentration, or Tc, is the time required for runoff to travel from the most hydrologically distant point of the subcatchment to the point of collection. The time of concentration (Tc) is determined by summing the travel time (Tt) for each consecutive flow segment along the subcatchment's hydraulic path. This process requires identification of the type of flow occurring in each segment, and application of the appropriate method for calculating the Tc. For sheet flow segments, no longer than 50' is used in the analysis though shorter lengths are used where logical (transition of ground cover e.g. paved to grass, etc.) Tc values for subcatchments that resulted in less than 6-minutes/inch were direct input at 6-minutes as is standard practice. Subcatchment area take-offs are broken out by ground cover type and hydrologic soil group. Each unique area within a subcatchment is given a runoff curve number (CN) and the areas are summed to result in a weighted CN for the overall subcat. As a single roof runoff/infiltration Subcat & pond have demonstrated that the 3' wide x 4.5' deep stone trenches will handle the entire roof runoff for the 50-YR storm without overtopping, the remaining building areas have been eliminated from the model which is the reason the overall area in the proposed model is slightly less than that of the existing.

ANALYSIS	COMPONENT PEAK RATE of DISCHARGE (CFS)					
	2 YR		10 YR		50YR	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Reach #100	1.08	1.03	6.63	6.52	20.23	20.11
Reach #200	0.00	0.00	0.01	0.01	0.26	0.26

ANALYSIS	COMPONENT VOLUME (AF)	
	2 YR	
	Existing	Proposed
Reach #100	0.327	0.320
Reach #200	0.000	0.000

The existing property is located on a parcel consisting of an existing dwelling, agricultural fields, excavated and natural wetlands, and forested areas. The existing topography is such that the site analysis is divided into three subcatchments. These reaches flow offsite to culverts/swales in the Salmon Falls ROW, southeast to an adjacent parcel, and finally southwest to a very large wetland complex that is the remaining acreage of the parent parcel.

The proposed development includes 1,750 l.f. of proposed 20' wide paved road to serve the new units, underground utilities, onsite well & septic systems, fire suppression, and drainage structures. The proposed layout results in twenty different subcatchments. The overall storm water volume from the site is reduced or equal to existing at both analysis points under the 2-YR storm event. The peak rate of run-off from the proposed development is equal to or decreased from that of the existing conditions at all analysis points. The addition of swales, culverts, bioretention ponds, a wet pond and deep sump catch basins maintain the existing drainage patterns and surface water hydrology to the extent possible. Impervious area runoff receives treatment through bioretention pond and wet pond prior to release toward the analysis points. The proposed bioretention ponds provide for reducing potential pollutants in storm water by: 99% of total suspended solids; 58+% of total petroleum hydrocarbons in the diesel range; 99+% of total zinc; 29% of Dissolved inorganic Nitrogen, and 5+% of total phosphorous. Pre-treatment will be provided by deep sump catch basins and sediment forebays upstream of the ponds. The use of Best Management Practices per the NH Stormwater Manual has been applied to the design of these structures and will be observed during all stages of construction. All land disturbed during construction will be permanently stabilized within 60 days of groundbreaking, and abutting property owners will suffer no adversity resulting from this development.

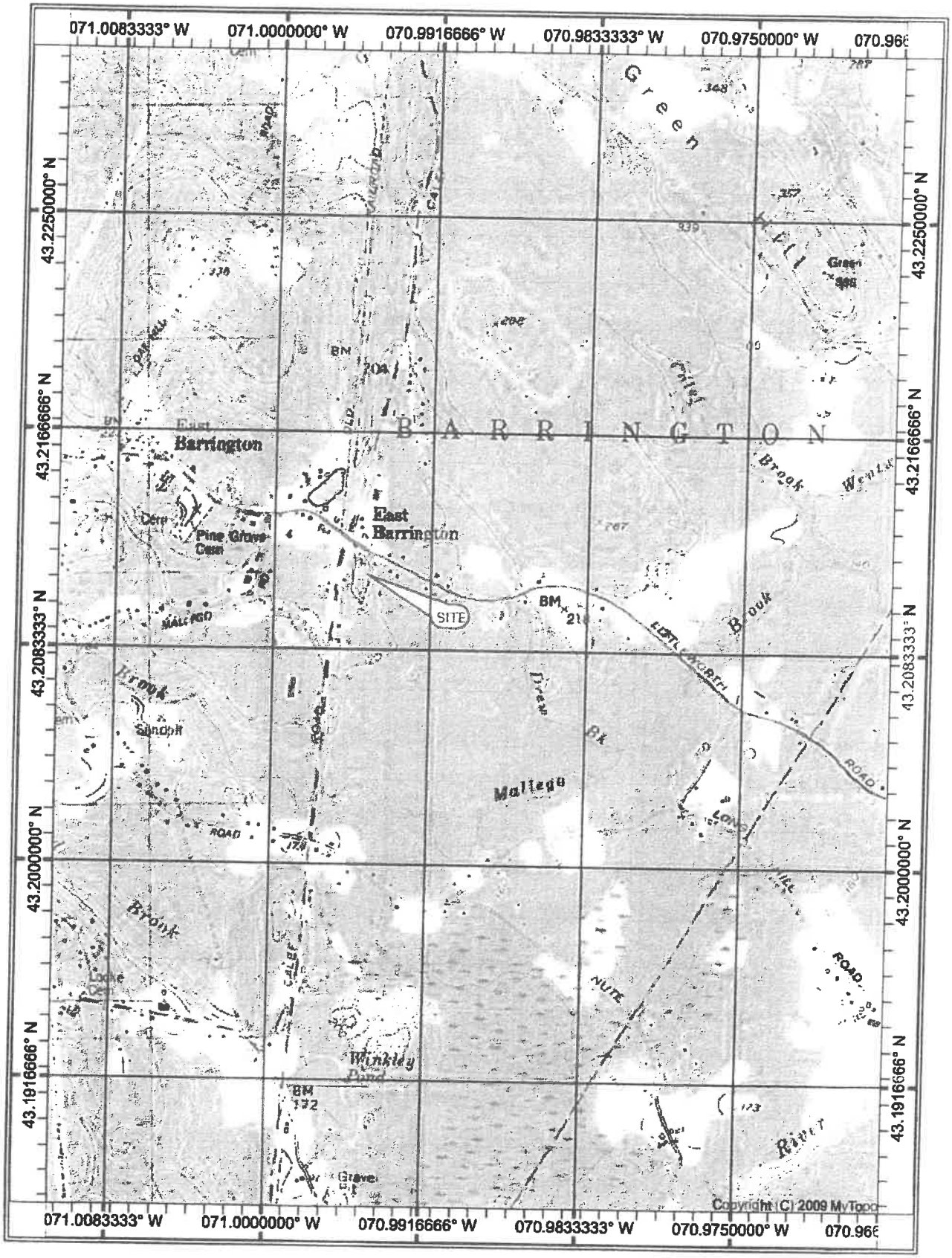

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Table of Contents

Design Method Objectives

USGS Quadrangle

1.0	Rainfall Characteristics	Page 1
2.0	Existing Conditions Analysis	Page 1
3.0	Proposed Subdivision Analysis	Pages 1-2
4.0	Sediment & Erosion Control, BMP's	Pages 2-5
5.0	Conclusion	Page 5

Appendix I - Existing Conditions Analysis

Existing Conditions Analysis
Summary 2 YR - 24 HR rainfall = 3.08"
Complete 10 YR - 24 HR rainfall = 4.64"
Summary 50 YR - 24 HR rainfall = 7.00"
Sheet W-1 Existing Conditions Watershed Plan

Appendix II - Proposed Conditions Analysis

Proposed Conditions Analysis
Summary 2 YR - 24 HR rainfall = 3.08"
Complete 10 YR - 24 HR rainfall = 4.64"
Summary 50 YR - 24 HR rainfall = 7.00"
Sheet W-2 Proposed Conditions Watershed Plan

Appendix III - Charts, Graphs, and Calculations

1.0 RAINFALL CHARACTERISTICS

This drainage report includes an existing conditions analysis of the area involved in the proposed development, as well as proposed conditions, or post-construction analysis of the same location. These analyses were accomplished using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. The curve numbers were developed using the SCS TR-55 Runoff Curve numbers for Urban Areas. A Type III SCS 24-hour rainfall distribution was utilized in analyzing the data for the 2, 10 & 50 Yr. – 24 Hr. storm events. The purpose of this analysis is to estimate the peak rates of run-off from the site for swale adequacy purposes, and to compare the peak rate of run-off between the existing and proposed conditions.

ANALYSIS	COMPONENT PEAK RATE of DISCHARGE (CFS)					
	2 YR		10 YR		50YR	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Reach #100	1.08	1.03	6.63	6.52	20.23	20.11
Reach #200	0.00	0.00	0.01	0.01	0.26	0.26

ANALYSIS	COMPONENT VOLUME (AF)	
	2 YR	
	Existing	Proposed
Reach #100	0.327	0.320
Reach #200	0.000	0.000

2.0 EXISTING CONDITIONS

Reference: Sheet W-1, Existing Conditions Watershed Plan (Enclosed)
Existing Conditions Plans

The existing property is located on a parcel consisting of forested woodlands, woods roads, and natural wetland areas. The existing topography is such that the site analysis is divided into four subcatchments. These reaches flow offsite to the wetland onsite southeast to an adjacent parcel, and ultimately southwest to a large wetland complex that drains into the Mallego Brook.

Classified by SSS Mapping, the land within the drainage analysis is composed of slopes ranging from 0% to 15%, and soils categorized into the Hydrologic Soil Groups (HSG) A, B, C & D. All development is within HSG B soils.

3.0 PROPOSED CONDITIONS

Reference: W-Sheets Proposed Conditions Watershed Plans (Enclosed)
C Sheets Proposed Conditions Plans

The addition of the impervious area from the proposed road, and individual lot development can cause an increase in the curve number (Cn) and a decrease in the time of concentration (Tc), the

net result being a potential increase in peak rates of run-off from the site. The proposed layout results in twenty different subcatchments. The run-off is directed to swales, catch basins, a bioretention pond and a wet pond modeled through HydroCAD reaches" and "ponds.

The proposed development includes 1,750 l.f. of proposed 20' wide paved road to serve the new units, underground utilities, onsite well & septic systems, fire suppression, and drainage structures. The proposed layout results in twenty different subcatchments. The overall storm water volume from the site is reduced or equal to existing at both analysis points under the 2-YR storm event. The peak rate of run-off from the proposed development is equal to or decreased from that of the existing conditions at all analysis points. The addition of swales, culverts, bioretention ponds, a wet pond and deep sump catch basins maintain the existing drainage patterns and surface water hydrology to the extent possible. Impervious area runoff receives treatment through bioretention pond and wet pond prior to release toward the analysis points. The proposed bioretention ponds provide for reducing potential pollutants in storm water by: 99% of total suspended solids; 58+% of total petroleum hydrocarbons in the diesel range; 99+% of total zinc; 29% of Dissolved inorganic Nitrogen, and 5+% of total phosphorous. Pre-treatment will be provided by deep sump catch basins and sediment forebays upstream of the ponds. The use of Best Management Practices per the NH Stormwater Manual has been applied to the design of these structures and will be observed during all stages of construction. All land disturbed during construction will be permanently stabilized within 60 days of groundbreaking, and abutting property owners will suffer no adversity resulting from this development.

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

Reference: P Sheets Proposed Conditions Plan
E Sheet Erosion & Sediment Control Details

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 NH Stormwater Manual. Any area disturbed by construction will be permanently re-stabilized within 60 days and abutting properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them.

4.1 Silt Fence / Construction Fence or Compost Berm

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

4.2 Drainage Swales / Stormwater Conveyance Channels

Drainage swales will be stabilized with vegetation for long term cover as outlined below, and on Sheet E-1 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.

4.3 Vegetated Stabilization

All areas that are disturbed during construction will be stabilized with vegetated material within 60 days of breaking ground. Construction will be managed in such a manner that erosion is prevented and that no abutter's property will be subjected to any siltation. All areas to be planted with grass for long-term cover will follow the specification and on Sheet E-1 using seeding mixture C, as follows:

Mixture	**Pounds per Acre**	**Pounds per 1,000 Sq. Ft.**
Tall Fescue	20	0.45
Creeping Red Fescue	28	0.65
Total	48	1.10

4.4 Stabilized Construction Entrance

A temporary gravel construction entrance provides an area where mud can be dislodged from tires before the vehicle leaves the construction site. Mud and sediment should not be transported onto paved municipal and state roads. If mud and sediment becomes excessive, the Contractor shall be responsible for regular sweeping. The stone size for the 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. A plan view and profile are shown on Sheet E1 - Sediment and Erosion Control Detail Plan.

4.5 Environmental Dust Control

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

4.6 Construction Sequence

1. Construct and/or install temporary and permanent sediment erosion and detention control facilities (silt fence, vegetated swales, level spreaders, and constructed filter strips), 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.

2. Clear, cut, grub, and dispose of debris in approved facilities.

3. Excavate and stockpile topsoil / loam. All disturbed areas shall be stabilized immediately after grading.

4. Construct the roadway and its associated drainage structures.

5. Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded and mulched as required, or directed.

6. 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.

7. Inspect and maintain all erosion and sediment control measures during construction every two weeks and after every storm event with 0.5" or more rain.

8. Complete permanent seeding and landscaping.

9. Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete. Smooth and re-vegetate all disturbed areas.

10. All swales and drainage structures will be constructed and stabilized prior to having run-off being directed to them.

11. Finish graveling all roadways/parking.

4.7 Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time.
2. Erosion, sediment control measures shall be installed as shown on the plans and at locations as required, or directed by the engineer.
3. All disturbed areas shall be returned to original grades and elevations. Disturbed areas shall be loamed with a minimum of 4" of loam and seeded with not less than 1.10 pound of seed per 1,000 square feet (48 pounds per acre) of area.
4. Silt fences and other barriers shall be inspected periodically and after every rainstorm during the life of the project. All damaged areas shall be repaired; sediment deposits shall periodically be removed and properly disposed of.
5. After all disturbed areas have been stabilized, the temporary erosion control measures are to be removed and the area disturbed by the removal smoothed and 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.

4.8 Inspection and Maintenance Schedule

1. Fencing will be inspected during and after storm events to ensure that the fence still has integrity and is not allowing sediment to pass. Sediment build-up in swales will be removed if it is deeper than six inches.
2. Gravel wetland systems should be inspected at least twice per year and following any rain event of 2.5" or greater in a 24-hr period. Inspect soil and repair eroded areas monthly, & re-mulch void areas as needed. Remove litter and debris at least twice per year. Treat diseased vegetation as needed. Remove and replace dead vegetation twice per year (spring and fall.) Proper selection of plant species and support during establishment of vegetation should minimize—if not eliminate—the need for fertilizers and pesticides. Remove invasive species as needed to prevent these species from spreading into the bioretention area. Replace mulch every two years, in the early spring. Upon failure, excavate bioretention area, scarify bottom and sides, replace filter fabric and soil, replant, and mulch.
3. Deep sump catch basins shall be inspected monthly and cleaned per manufacturer recommendations. At least twice per year and after each storm in excess of 0.5"of rain, sediment should be removed from trapping devices when it has reached one half of the depth of the trap.
4. Inlets should be inspected annually and after every major storm. Accumulated debris and sediment should be removed as needed; Pipes should be inspected and repaired as necessary.
5. Outlets should be inspected annually and after every major storm. The condition of pipes should be noted and repaired as needed. If erosion is taking place, then measures should be taken to stabilize and protect the affected area.

5.0 CONCLUSION

This proposed development off Route 9 in Barrington, NH will have no adverse effect on the abutting property owners by way of storm water run-off or siltation. The post-construction peak rate of run-off from the site toward abutting parcels will be decreased from that of the existing conditions and impervious run-off flow will be treated appropriately prior to discharge. Appropriate steps will be taken to eliminate erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of swales, catch basins and BMP treatment 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.

A Site Specific, Terrain Alteration Permit (RSA 485: A-17) is required for this project due to the area of disturbance being greater than 100,000 square feet.

Respectfully Submitted,

BEALS ASSOCIATES, *PLLC.*

Christian O. Smith, PE
Principal

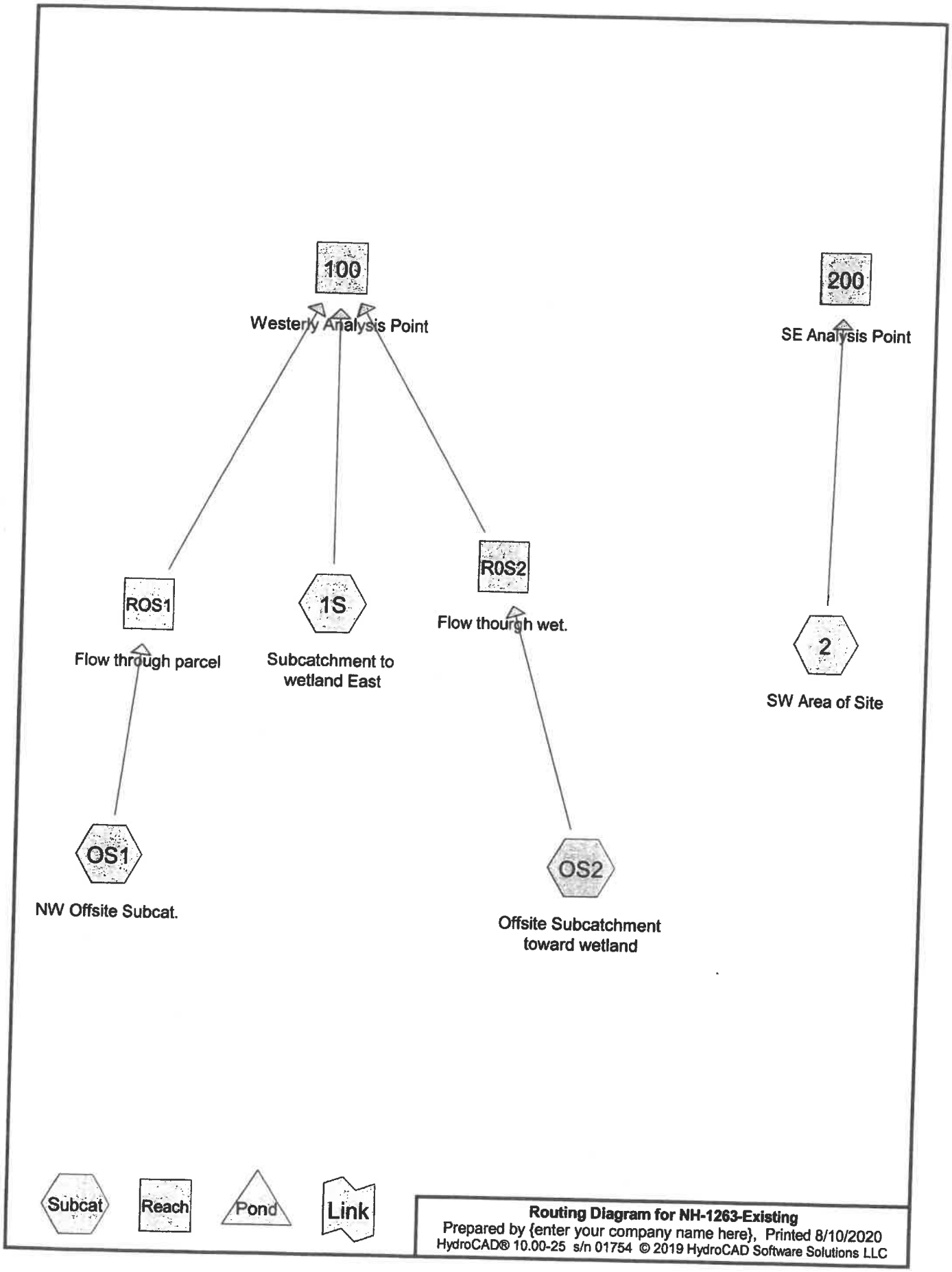
APPENDIX I

Existing Conditions Drainage Analysis

Summary 2 YR - 24 HR rainfall = 3.08"

Complete 10 YR - 24 HR rainfall = 4.64"

Summary 50 YR - 24 HR rainfall = 7.00"



Routing Diagram for NH-1263-Existing
Prepared by {enter your company name here}, Printed 8/10/2020
HydroCAD® 10.00-25 s/n 01754 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.656	51	1 acre lots, 20% imp, HSG A (OS2)
0.892	39	>75% Grass cover, Good, HSG A (OS1)
0.447	96	Gravel surface, HSG B (1S)
0.176	70	Woods, Good, HSG C (1S)
0.361	77	Woods, Good, HSG D (1S)
19.416	32	Woods/grass comb., Good, HSG A (1S, 2, OS1, OS2)
12.672	58	Woods/grass comb., Good, HSG B (1S)
34.620	**44**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
20.965	HSG A	1S, 2, OS1, OS2
13.119	HSG B	1S
0.176	HSG C	1S
0.361	HSG D	1S
0.000	Other	
34.620		**TOTAL AREA**

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcatchment to Runoff Area=703,941 sf 0.00% Impervious Runoff Depth=0.24"
Flow Length=942' Tc=37.1 min CN=56 Runoff=1.08 cfs 0.327 af

Subcatchment 2: SW Area of Site Runoff Area=225,026 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=653' Tc=32.0 min CN=32 Runoff=0.00 cfs 0.000 af

Subcatchment OS1: NW Offsite Subcat. Runoff Area=215,064 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=665' Tc=37.6 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment OS2: Offsite Subcatchment Runoff Area=364,021 sf 1.57% Impervious Runoff Depth=0.00"
Flow Length=473' Tc=29.1 min CN=33 Runoff=0.00 cfs 0.000 af

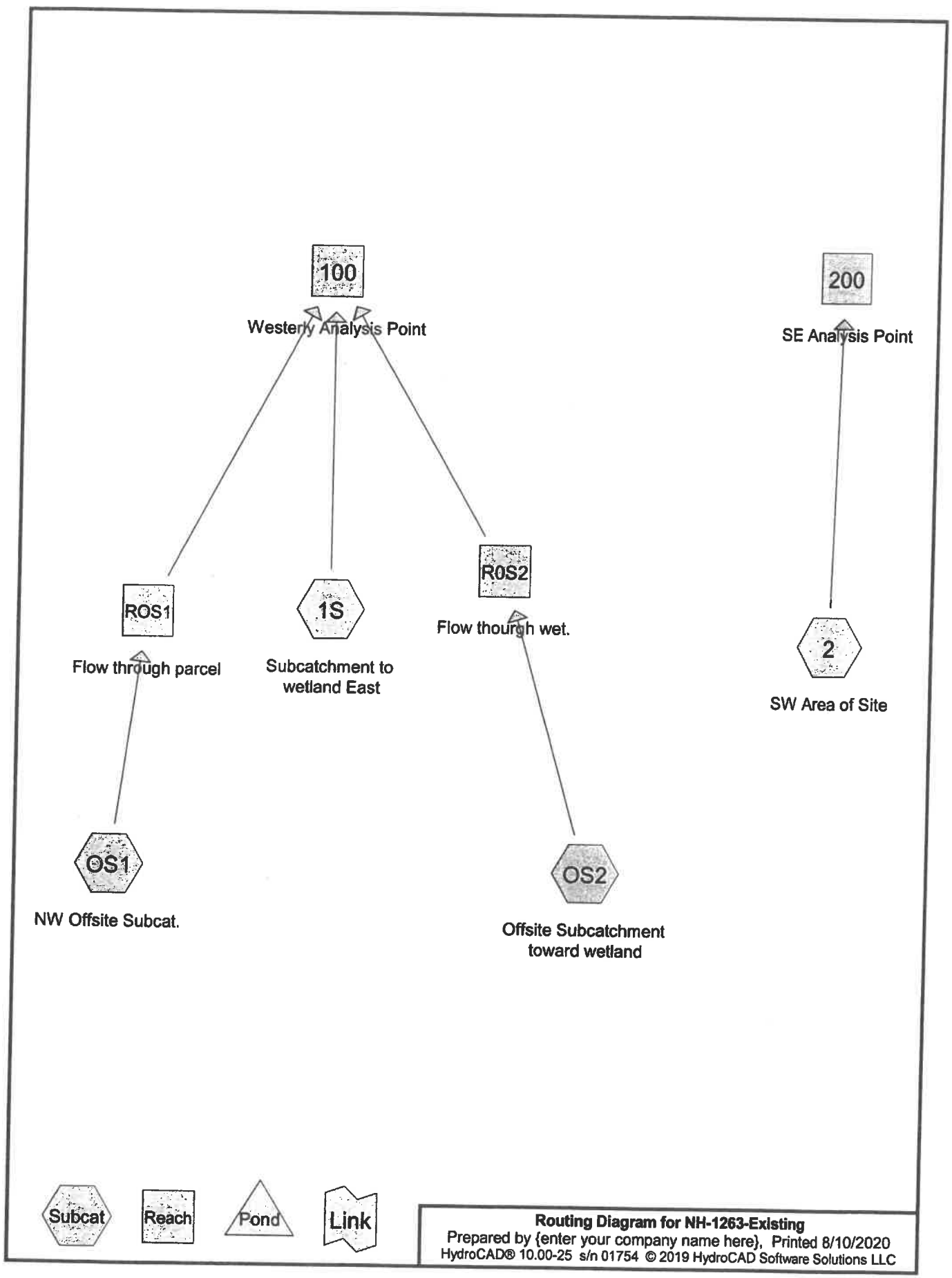
Reach 100: Westerly Analysis Point Inflow=1.08 cfs 0.327 af
Outflow=1.08 cfs 0.327 af

Reach 200: SE Analysis Point Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach R0S2: Flow thourgh wet. Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.040 L=756.0' S=0.0159 '/' Capacity=22.49 cfs Outflow=0.00 cfs 0.000 af

Reach ROS1: Flow through parcel Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.040 L=909.0' S=0.0215 '/' Capacity=26.15 cfs Outflow=0.00 cfs 0.000 af

Total Runoff Area = 34.620 ac Runoff Volume = 0.327 af Average Runoff Depth = 0.11"
99.62% Pervious = 34.489 ac 0.38% Impervious = 0.131 ac



Routing Diagram for NH-1263-Existing
Prepared by {enter your company name here}, Printed 8/10/2020

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcatchment to Runoff Area=703,941 sf 0.00% Impervious Runoff Depth=0.86"
Flow Length=942' Tc=37.1 min CN=56 Runoff=6.63 cfs 1.161 af

Subcatchment 2: SW Area of Site Runoff Area=225,026 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=653' Tc=32.0 min CN=32 Runoff=0.01 cfs 0.003 af

Subcatchment OS1: NW Offsite Subcat. Runoff Area=215,064 sf 0.00% Impervious Runoff Depth=0.02"
Flow Length=665' Tc=37.6 min CN=33 Runoff=0.01 cfs 0.007 af

Subcatchment OS2: Offsite Subcatchment Runoff Area=364,021 sf 1.57% Impervious Runoff Depth=0.02"
Flow Length=473' Tc=29.1 min CN=33 Runoff=0.02 cfs 0.011 af

Reach 100: Westerly Analysis Point Inflow=6.63 cfs 1.178 af
Outflow=6.63 cfs 1.178 af

Reach 200: SE Analysis Point Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Reach R0S2: Flow thourgh wet. Avg. Flow Depth=0.02' Max Vel=0.26 fps Inflow=0.02 cfs 0.011 af
n=0.040 L=756.0' S=0.0159 '/' Capacity=22.49 cfs Outflow=0.02 cfs 0.011 af

Reach ROS1: Flow through parcel Avg. Flow Depth=0.01' Max Vel=0.24 fps Inflow=0.01 cfs 0.007 af
n=0.040 L=909.0' S=0.0215 '/' Capacity=26.15 cfs Outflow=0.01 cfs 0.007 af

Total Runoff Area = 34.620 ac Runoff Volume = 1.181 af Average Runoff Depth = 0.41"
99.62% Pervious = 34.489 ac 0.38% Impervious = 0.131 ac

Summary for Subcatchment 1S: Subcatchment to wetland East

Runoff = 6.63 cfs @ 12.62 hrs, Volume= 1.161 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
109,109	32	Woods/grass comb., Good, HSG A
551,984	58	Woods/grass comb., Good, HSG B
7,649	70	Woods, Good, HSG C
15,714	77	Woods, Good, HSG D
19,485	96	Gravel surface, HSG B
703,941	56	Weighted Average
703,941		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0110	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
5.2	309	0.0388	0.98		**Shallow Concentrated Flow, SC to wetland** Woodland Kv= 5.0 fps
15.7	583	0.0154	0.62		**Shallow Concentrated Flow, SC to PL** Woodland Kv= 5.0 fps
37.1	942	Total			

Summary for Subcatchment 2: SW Area of Site

Runoff = 0.01 cfs @ 23.72 hrs, Volume= 0.003 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
225,026	32	Woods/grass comb., Good, HSG A
225,026		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0120	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
16.4	603	0.0150	0.61		**Shallow Concentrated Flow, Sc to analysis point** Woodland Kv= 5.0 fps
32.0	653	Total			

Summary for Subcatchment OS1: NW Offsite Subcat.

Runoff = 0.01 cfs @ 22.35 hrs, Volume= 0.007 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
38,877	39	>75% Grass cover, Good, HSG A
176,187	32	Woods/grass comb., Good, HSG A
215,064	33	Weighted Average
215,064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
20.8	615	0.0097	0.49		**Shallow Concentrated Flow, SC to PL** Woodland Kv= 5.0 fps
37.6	665	Total			

Summary for Subcatchment OS2: Offsite Subcatchment toward wetland

Runoff = 0.02 cfs @ 22.28 hrs, Volume= 0.011 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
335,438	32	Woods/grass comb., Good, HSG A
28,583	51	1 acre lots, 20% imp, HSG A
364,021	33	Weighted Average
358,304		98.43% Pervious Area
5,717		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0110	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
12.9	423	0.0120	0.55		**Shallow Concentrated Flow, SC to PL** Woodland Kv= 5.0 fps
29.1	473	Total			

Summary for Reach 100: Westerly Analysis Point

Inflow Area = 29.454 ac, 0.45% Impervious, Inflow Depth = 0.48" for 10 YR event
Inflow = 6.63 cfs @ 12.62 hrs, Volume= 1.178 af
Outflow = 6.63 cfs @ 12.62 hrs, Volume= 1.178 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach 200: SE Analysis Point

Inflow Area = 5.166 ac, 0.00% Impervious, Inflow Depth = 0.01" for 10 YR event
Inflow = 0.01 cfs @ 23.72 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 23.72 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach R0S2: Flow thourgh wet.

Inflow Area = 8.357 ac, 1.57% Impervious, Inflow Depth = 0.02" for 10 YR event
Inflow = 0.02 cfs @ 22.28 hrs, Volume= 0.011 af
Outflow = 0.02 cfs @ 23.69 hrs, Volume= 0.011 af, Atten= 1%, Lag= 84.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.26 fps, Min. Travel Time= 48.8 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 77.6 min

Peak Storage= 57 cf @ 22.87 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.50' Flow Area= 10.0 sf, Capacity= 22.49 cfs

30.00' x 0.50' deep Parabolic Channel, n= 0.040 Winding stream, pools & shoals
Length= 756.0' Slope= 0.0159 '/'
Inlet Invert= 192.00', Outlet Invert= 180.00'

‡

Summary for Reach ROS1: Flow through parcel

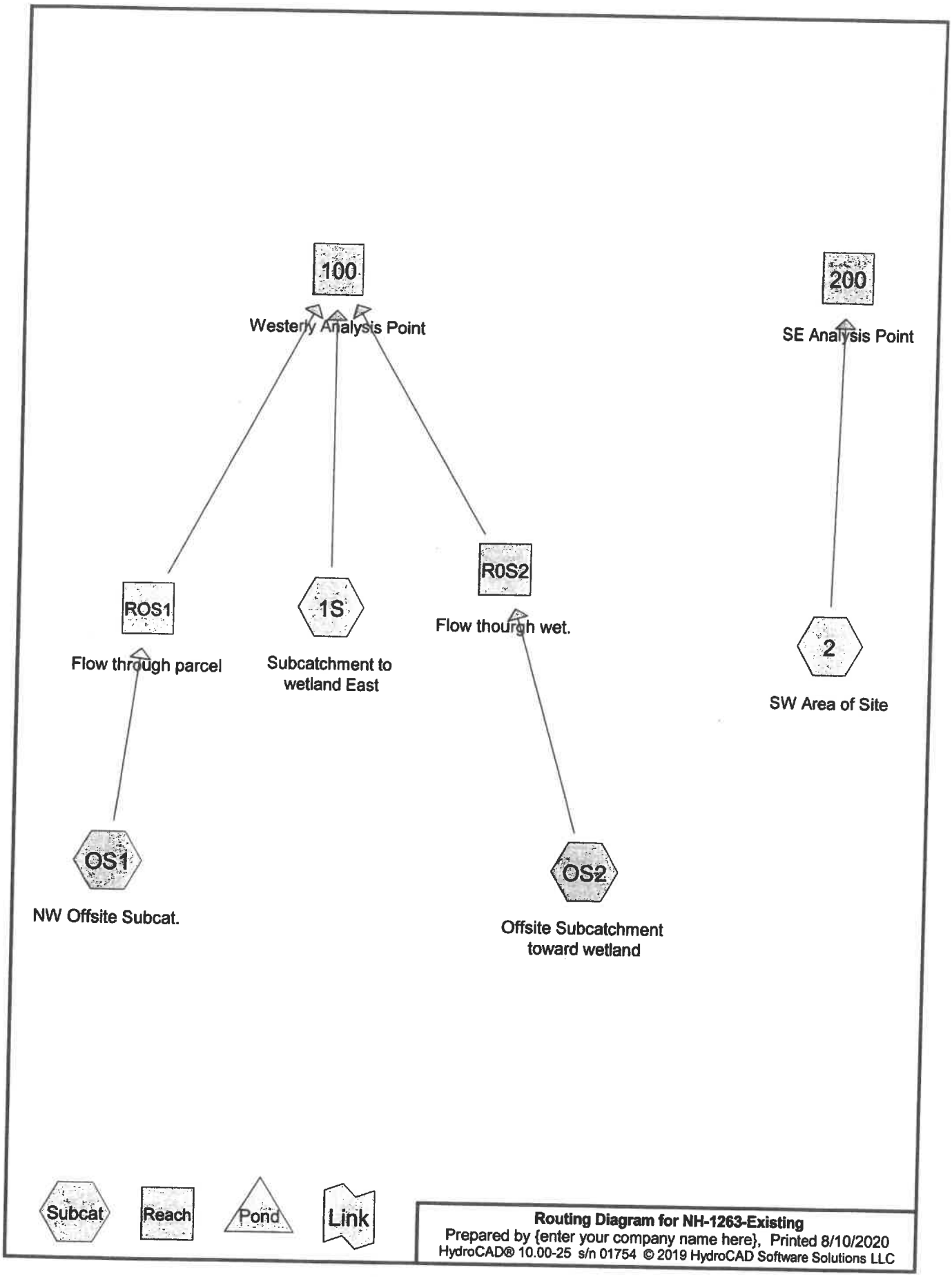
Inflow Area = 4.937 ac, 0.00% Impervious, Inflow Depth = 0.02" for 10 YR event
Inflow = 0.01 cfs @ 22.35 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 24.23 hrs, Volume= 0.007 af, Atten= 1%, Lag= 112.7 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.24 fps, Min. Travel Time= 61.9 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 91.5 min

Peak Storage= 43 cf @ 23.20 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 0.50' Flow Area= 10.0 sf, Capacity= 26.15 cfs

30.00' x 0.50' deep Parabolic Channel, n= 0.040 Winding stream, pools & shoals
Length= 909.0' Slope= 0.0215 '/'
Inlet Invert= 198.50', Outlet Invert= 179.00'

‡



Routing Diagram for NH-1263-Existing
Prepared by {enter your company name here}, Printed 8/10/2020

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcatchment to Runoff Area=703,941 sf 0.00% Impervious Runoff Depth=2.22"
Flow Length=942' Tc=37.1 min CN=56 Runoff=20.23 cfs 2.987 af

Subcatchment 2: SW Area of Site Runoff Area=225,026 sf 0.00% Impervious Runoff Depth=0.32"
Flow Length=653' Tc=32.0 min CN=32 Runoff=0.26 cfs 0.136 af

Subcatchment OS1: NW Offsite Subcat. Runoff Area=215,064 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=665' Tc=37.6 min CN=33 Runoff=0.34 cfs 0.153 af

Subcatchment OS2: Offsite Subcatchment Runoff Area=364,021 sf 1.57% Impervious Runoff Depth=0.37"
Flow Length=473' Tc=29.1 min CN=33 Runoff=0.63 cfs 0.259 af

Reach 100: Westerly Analysis Point Inflow=20.23 cfs 3.399 af
Outflow=20.23 cfs 3.399 af

Reach 200: SE Analysis Point Inflow=0.26 cfs 0.136 af
Outflow=0.26 cfs 0.136 af

Reach R0S2: Flow thourgh wet. Avg. Flow Depth=0.09' Max Vel=0.72 fps Inflow=0.63 cfs 0.259 af
n=0.040 L=756.0' S=0.0159 '/' Capacity=22.49 cfs Outflow=0.54 cfs 0.259 af

Reach ROS1: Flow through parcel Avg. Flow Depth=0.06' Max Vel=0.66 fps Inflow=0.34 cfs 0.153 af
n=0.040 L=909.0' S=0.0215 '/' Capacity=26.15 cfs Outflow=0.30 cfs 0.153 af

Total Runoff Area = 34.620 ac Runoff Volume = 3.535 af Average Runoff Depth = 1.23"
99.62% Pervious = 34.489 ac 0.38% Impervious = 0.131 ac

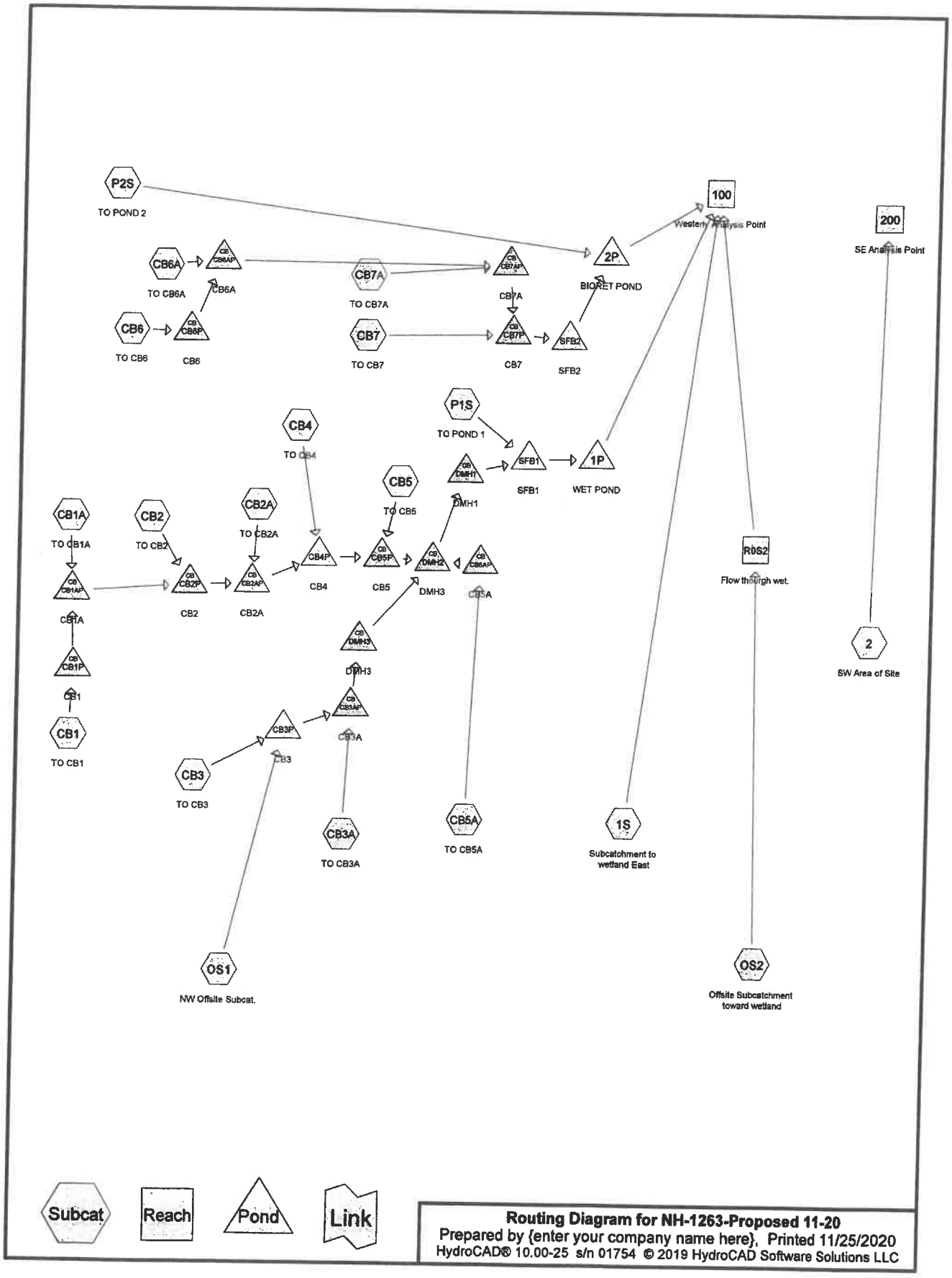
APPENDIX II

Proposed Conditions Drainage Analysis

Summary 2 YR - 24 HR rainfall = 3.08"

Complete 10 YR - 24 HR rainfall = 4.64"

Summary 50 YR - 24 HR rainfall = 7.00"



Routing Diagram for NH-1263-Proposed 11-20
Prepared by {enter your company name here}, Printed 11/25/2020
HydroCAD® 10.00-25 s/n 01754 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.656	51	1 acre lots, 20% imp, HSG A (OS2)
0.892	39	>75% Grass cover, Good, HSG A (OS1)
3.339	61	>75% Grass cover, Good, HSG B (1S, CB1, CB1A, CB2, CB2A, CB3, CB3A, CB4, CB5, CB5A, CB6, CB6A, CB7, CB7A, P1S, P2S)
0.309	96	Gravel surface, HSG B (1S)
0.013	98	Paved parking, HSG B (P1S)
2.118	98	Paved roads w/curbs & sewers, HSG B (CB1, CB1A, CB2, CB2A, CB3A, CB5, CB5A, CB6, CB6A, CB7, CB7A)
1.160	98	Roofs, HSG B (1S, CB2, CB2A, CB3, CB4, CB5, CB5A, CB6A, CB7, CB7A, P1S, P2S)
0.121	98	Unconnected roofs, HSG B (CB3A)
0.140	55	Woods, Good, HSG B (CB4)
0.176	70	Woods, Good, HSG C (1S)
0.361	77	Woods, Good, HSG D (1S)
19.416	32	Woods/grass comb., Good, HSG A (1S, 2, OS1, OS2)
5.914	58	Woods/grass comb., Good, HSG B (1S, CB1, CB1A, CB2, CB3, CB3A, P2S)
34.615	**48**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
20.965	HSG A	1S, 2, OS1, OS2
13.114	HSG B	1S, CB1, CB1A, CB2, CB2A, CB3, CB3A, CB4, CB5, CB5A, CB6, CB6A, CB7, CB7A, P1S, P2S
0.176	HSG C	1S
0.361	HSG D	1S
0.000	Other	
34.615		**TOTAL AREA**

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Subcatchmentto Runoff Area=356,295 sf 0.74% Impervious Runoff Depth=0.17"
Flow Length=868' Tc=36.2 min CN=53 Runoff=0.27 cfs 0.114 af

Subcatchment2: SW Area of Site Runoff Area=225,026 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=653' Tc=32.0 min CN=32 Runoff=0.00 cfs 0.000 af

SubcatchmentCB1: TO CB1 Runoff Area=18,997 sf 15.42% Impervious Runoff Depth=0.54"
Flow Length=148' Tc=20.6 min CN=65 Runoff=0.14 cfs 0.020 af

SubcatchmentCB1A: TO CB1A Runoff Area=10,873 sf 23.04% Impervious Runoff Depth=0.67"
Flow Length=79' Tc=17.1 min CN=68 Runoff=0.12 cfs 0.014 af

SubcatchmentCB2: TO CB2 Runoff Area=49,969 sf 38.00% Impervious Runoff Depth=0.96"
Flow Length=331' Tc=24.8 min CN=74 Runoff=0.74 cfs 0.092 af

SubcatchmentCB2A: TO CB2A Runoff Area=11,303 sf 82.97% Impervious Runoff Depth=2.24"
Tc=6.0 min CN=92 Runoff=0.67 cfs 0.048 af

SubcatchmentCB3: TO CB3 Runoff Area=35,631 sf 14.82% Impervious Runoff Depth=0.54"
Flow Length=490' Tc=22.7 min CN=65 Runoff=0.25 cfs 0.037 af

SubcatchmentCB3A: TO CB3A Runoff Area=43,639 sf 60.59% Impervious Runoff Depth=1.51"
Flow Length=322' Tc=20.4 min CN=83 Runoff=1.18 cfs 0.126 af

SubcatchmentCB4: TO CB4 Runoff Area=30,988 sf 17.04% Impervious Runoff Depth=0.58"
Flow Length=289' Tc=16.0 min CN=66 Runoff=0.28 cfs 0.035 af

SubcatchmentCB5: TO CB5 Runoff Area=13,520 sf 96.80% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=97 Runoff=0.91 cfs 0.071 af

SubcatchmentCB5A: TO CB5A Runoff Area=20,101 sf 95.00% Impervious Runoff Depth=2.63"
Flow Length=383' Tc=19.1 min CN=96 Runoff=0.92 cfs 0.101 af

SubcatchmentCB6: TO CB6 Runoff Area=6,341 sf 60.48% Impervious Runoff Depth=1.51"
Tc=6.0 min CN=83 Runoff=0.26 cfs 0.018 af

SubcatchmentCB6A: TO CB6A Runoff Area=17,197 sf 94.44% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=96 Runoff=1.14 cfs 0.087 af

SubcatchmentCB7: TO CB7 Runoff Area=6,668 sf 84.24% Impervious Runoff Depth=2.24"
Tc=6.0 min CN=92 Runoff=0.39 cfs 0.029 af

SubcatchmentCB7A: TO CB7A Runoff Area=10,646 sf 75.92% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=89 Runoff=0.56 cfs 0.040 af

SubcatchmentOS1: NW Offsite Subcat. Runoff Area=215,064 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=665' Tc=37.6 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment OS2: Offsite Subcatchment Runoff Area=364,021 sf 1.57% Impervious Runoff Depth=0.00"
Flow Length=473' Tc=29.1 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment P1S: TO POND 1 Runoff Area=20,873 sf 14.77% Impervious Runoff Depth=0.58"
Flow Length=123' Tc=12.3 min CN=66 Runoff=0.21 cfs 0.023 af

Subcatchment P2S: TO POND 2 Runoff Area=50,658 sf 12.08% Impervious Runoff Depth=0.50"
Flow Length=580' Tc=34.6 min CN=64 Runoff=0.27 cfs 0.049 af

Reach 100: Westerly Analysis Point Inflow=1.03 cfs 0.320 af
Outflow=1.03 cfs 0.320 af

Reach 200: SE Analysis Point Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach R0S2: Flow thourgh wet. Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.040 L=756.0' S=0.0159 '/' Capacity=22.49 cfs Outflow=0.00 cfs 0.000 af

Pond 1P: WET POND Peak Elev=189.67' Storage=11,468 cf Inflow=1.01 cfs 0.304 af
Outflow=0.82 cfs 0.304 af

Pond 2P: BIORET POND Peak Elev=189.08' Storage=2,821 cf Inflow=1.36 cfs 0.212 af
Discarded=0.34 cfs 0.212 af Primary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.212 af

Pond CB1AP: CB1A Peak Elev=195.35' Inflow=0.25 cfs 0.034 af
12.0" Round Culvert n=0.013 L=148.0' S=0.0120 '/' Outflow=0.25 cfs 0.034 af

Pond CB1P: CB1 Peak Elev=195.62' Inflow=0.14 cfs 0.020 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=0.14 cfs 0.020 af

Pond CB2AP: CB2A Peak Elev=193.09' Inflow=1.23 cfs 0.174 af
15.0" Round Culvert n=0.013 L=162.0' S=0.0120 '/' Outflow=1.23 cfs 0.174 af

Pond CB2P: CB2 Peak Elev=193.71' Inflow=0.99 cfs 0.125 af
15.0" Round Culvert n=0.013 L=48.0' S=0.0121 '/' Outflow=0.99 cfs 0.125 af

Pond CB3AP: CB3A Peak Elev=191.77' Inflow=1.39 cfs 0.160 af
15.0" Round Culvert n=0.013 L=33.0' S=0.0100 '/' Outflow=1.39 cfs 0.160 af

Pond CB3P: CB3 Peak Elev=193.95' Storage=125 cf Inflow=0.25 cfs 0.037 af
Outflow=0.25 cfs 0.034 af

Pond CB4P: CB4 Peak Elev=193.67' Storage=740 cf Inflow=1.50 cfs 0.208 af
Outflow=1.48 cfs 0.198 af

Pond CB5AP: CB5A Peak Elev=190.54' Inflow=0.92 cfs 0.101 af
15.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.92 cfs 0.101 af

Pond CB5P: CB5 Peak Elev=190.75' Inflow=1.85 cfs 0.269 af
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=1.85 cfs 0.269 af

Pond CB6AP: CB6A Peak Elev=193.60' Inflow=1.39 cfs 0.105 af
12.0" Round Culvert n=0.013 L=132.0' S=0.0080 '/' Outflow=1.39 cfs 0.105 af

Pond CB6P: CB6 Peak Elev=193.69' Inflow=0.26 cfs 0.018 af
12.0" Round Culvert n=0.013 L=46.0' S=0.0080 '/' Outflow=0.26 cfs 0.018 af

Pond CB7AP: CB7A Peak Elev=192.63' Inflow=1.96 cfs 0.145 af
15.0" Round Culvert n=0.013 L=14.0' S=0.0050 '/' Outflow=1.96 cfs 0.145 af

Pond CB7P: CB7 Peak Elev=192.51' Inflow=2.35 cfs 0.174 af
15.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=2.35 cfs 0.174 af

Pond DMH1: DMH1 Peak Elev=190.49' Inflow=4.05 cfs 0.531 af
24.0" Round Culvert n=0.013 L=68.0' S=0.0050 '/' Outflow=4.05 cfs 0.531 af

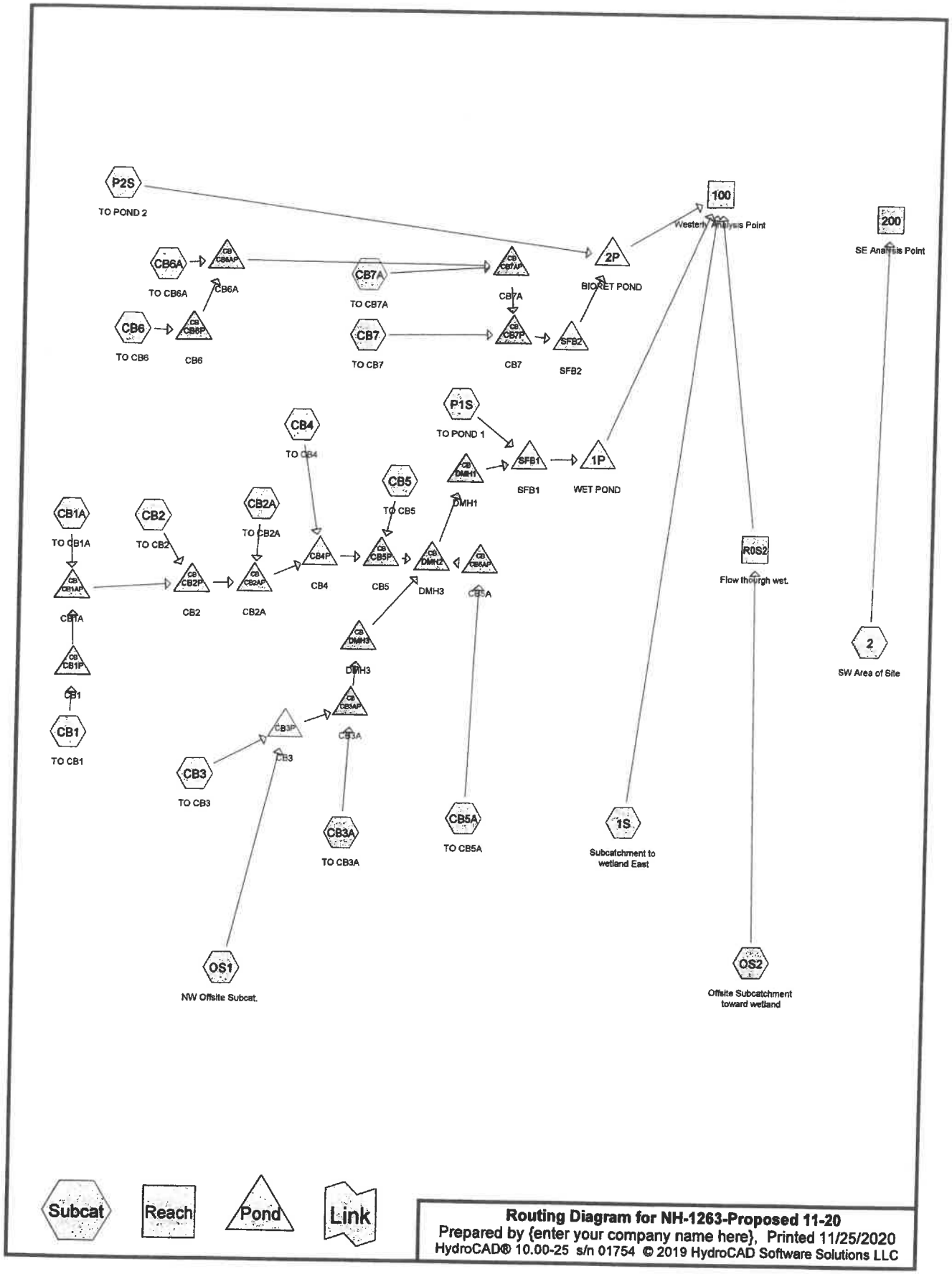
Pond DMH2: DMH3 Peak Elev=190.85' Inflow=4.05 cfs 0.531 af
24.0" Round Culvert n=0.013 L=55.0' S=0.0051 '/' Outflow=4.05 cfs 0.531 af

Pond DMH3: DMH3 Peak Elev=191.21' Inflow=1.39 cfs 0.160 af
24.0" Round Culvert n=0.013 L=14.0' S=0.0050 '/' Outflow=1.39 cfs 0.160 af

Pond SFB1: SFB1 Peak Elev=189.17' Storage=389 cf Inflow=1.00 cfs 0.304 af
Outflow=1.00 cfs 0.304 af

Pond SFB2: SFB2 Peak Elev=191.26' Storage=584 cf Inflow=1.56 cfs 0.115 af
Outflow=1.55 cfs 0.091 af

Total Runoff Area = 34.615 ac Runoff Volume = 0.904 af Average Runoff Depth = 0.31"
89.77% Pervious = 31.072 ac 10.23% Impervious = 3.543 ac


P2S
TO POND 2
100
Western Analysis Point
200
SE Analysis Point
CB6A
TO CB6A
CB6A
CB7A
TO CB7A
CB7A
2P
BIORET POND
CB6
TO CB6
CB6
CB7
TO CB7
CB7
SFB2
SFB2
P1S
TO POND 1
CB4
TO CB4
SFB1
1P
WET POND
SFB1
CB5
TO CB5
DMH1
CB1A
TO CB1A
CB2
TO CB2
CB2A
TO CB2A
CB4P
CB4
CB5
DMH3
CB5A
R0S2
Flow through wet.
CB1A
CB2
CB2A
CB1P
CB1
CB1
TO CB1
CB3P
CB3A
CB3
CB3
TO CB3
CB3A
TO CB3A
CB5A
TO CB5A
1S
Subcatchment to wetland East
2
SW Area of Site
OS1
NW Offsite Subcat.
OS2
Offsite Subcatchment toward wetland
Subcat
Reach
Pond
Link
Routing Diagram for NH-1263-Proposed 11-20
Prepared by {enter your company name here}, Printed 11/25/2020
HydroCAD® 10.00-25 s/n 01754 © 2019 HydroCAD Software Solutions LLC

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcatchment to Runoff Area=356,295 sf 0.74% Impervious Runoff Depth=0.70"
Flow Length=868' Tc=36.2 min CN=53 Runoff=2.50 cfs 0.477 af

Subcatchment 2: SW Area of Site Runoff Area=225,026 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=653' Tc=32.0 min CN=32 Runoff=0.01 cfs 0.003 af

Subcatchment CB1: TO CB1 Runoff Area=18,997 sf 15.42% Impervious Runoff Depth=1.42"
Flow Length=148' Tc=20.6 min CN=65 Runoff=0.45 cfs 0.052 af

Subcatchment CB1A: TO CB1A Runoff Area=10,873 sf 23.04% Impervious Runoff Depth=1.63"
Flow Length=79' Tc=17.1 min CN=68 Runoff=0.33 cfs 0.034 af

Subcatchment CB2: TO CB2 Runoff Area=49,969 sf 38.00% Impervious Runoff Depth=2.08"
Flow Length=331' Tc=24.8 min CN=74 Runoff=1.70 cfs 0.199 af

Subcatchment CB2A: TO CB2A Runoff Area=11,303 sf 82.97% Impervious Runoff Depth=3.74"
Tc=6.0 min CN=92 Runoff=1.08 cfs 0.081 af

Subcatchment CB3: TO CB3 Runoff Area=35,631 sf 14.82% Impervious Runoff Depth=1.42"
Flow Length=490' Tc=22.7 min CN=65 Runoff=0.81 cfs 0.097 af

Subcatchment CB3A: TO CB3A Runoff Area=43,639 sf 60.59% Impervious Runoff Depth=2.85"
Flow Length=322' Tc=20.4 min CN=83 Runoff=2.24 cfs 0.238 af

Subcatchment CB4: TO CB4 Runoff Area=30,988 sf 17.04% Impervious Runoff Depth=1.49"
Flow Length=289' Tc=16.0 min CN=66 Runoff=0.86 cfs 0.088 af

Subcatchment CB5: TO CB5 Runoff Area=13,520 sf 96.80% Impervious Runoff Depth=4.29"
Tc=6.0 min CN=97 Runoff=1.40 cfs 0.111 af

Subcatchment CB5A: TO CB5A Runoff Area=20,101 sf 95.00% Impervious Runoff Depth=4.17"
Flow Length=383' Tc=19.1 min CN=96 Runoff=1.43 cfs 0.161 af

Subcatchment CB6: TO CB6 Runoff Area=6,341 sf 60.48% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=83 Runoff=0.49 cfs 0.035 af

Subcatchment CB6A: TO CB6A Runoff Area=17,197 sf 94.44% Impervious Runoff Depth=4.17"
Tc=6.0 min CN=96 Runoff=1.76 cfs 0.137 af

Subcatchment CB7: TO CB7 Runoff Area=6,668 sf 84.24% Impervious Runoff Depth=3.74"
Tc=6.0 min CN=92 Runoff=0.64 cfs 0.048 af

Subcatchment CB7A: TO CB7A Runoff Area=10,646 sf 75.92% Impervious Runoff Depth=3.43"
Tc=6.0 min CN=89 Runoff=0.96 cfs 0.070 af

Subcatchment OS1: NW Offsite Subcat. Runoff Area=215,064 sf 0.00% Impervious Runoff Depth=0.02"
Flow Length=665' Tc=37.6 min CN=33 Runoff=0.01 cfs 0.007 af

Subcatchment OS2: Offsite Subcatchment Runoff Area=364,021 sf 1.57% Impervious Runoff Depth=0.02"
Flow Length=473' Tc=29.1 min CN=33 Runoff=0.02 cfs 0.011 af

Subcatchment P1S: TO POND 1 Runoff Area=20,873 sf 14.77% Impervious Runoff Depth=1.49"
Flow Length=123' Tc=12.3 min CN=66 Runoff=0.64 cfs 0.059 af

Subcatchment P2S: TO POND 2 Runoff Area=50,658 sf 12.08% Impervious Runoff Depth=1.35"
Flow Length=580' Tc=34.6 min CN=64 Runoff=0.90 cfs 0.131 af

Reach 100: Westerly Analysis Point Inflow=6.52 cfs 1.601 af
Outflow=6.52 cfs 1.601 af

Reach 200: SE Analysis Point Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Reach R0S2: Flow thourgh wet. Avg. Flow Depth=0.02' Max Vel=0.26 fps Inflow=0.02 cfs 0.011 af
n=0.040 L=756.0' S=0.0159 '/' Capacity=22.49 cfs Outflow=0.02 cfs 0.011 af

Pond 1P: WET POND Peak Elev=189.99' Storage=12,697 cf Inflow=6.08 cfs 1.113 af
Outflow=5.73 cfs 1.113 af

Pond 2P: BIORET POND Peak Elev=190.63' Storage=7,452 cf Inflow=4.03 cfs 0.410 af
Discarded=0.38 cfs 0.410 af Primary=0.00 cfs 0.000 af Outflow=0.38 cfs 0.410 af

Pond CB1AP: CB1A Peak Elev=195.55' Inflow=0.77 cfs 0.085 af
12.0" Round Culvert n=0.013 L=148.0' S=0.0120 '/' Outflow=0.77 cfs 0.085 af

Pond CB1P: CB1 Peak Elev=195.79' Inflow=0.45 cfs 0.052 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=0.45 cfs 0.052 af

Pond CB2AP: CB2A Peak Elev=193.42' Inflow=2.85 cfs 0.365 af
15.0" Round Culvert n=0.013 L=162.0' S=0.0120 '/' Outflow=2.85 cfs 0.365 af

Pond CB2P: CB2 Peak Elev=194.02' Inflow=2.44 cfs 0.284 af
15.0" Round Culvert n=0.013 L=48.0' S=0.0121 '/' Outflow=2.44 cfs 0.284 af

Pond CB3AP: CB3A Peak Elev=192.13' Inflow=3.01 cfs 0.339 af
15.0" Round Culvert n=0.013 L=33.0' S=0.0100 '/' Outflow=3.01 cfs 0.339 af

Pond CB3P: CB3 Peak Elev=194.01' Storage=133 cf Inflow=0.81 cfs 0.103 af
Outflow=0.81 cfs 0.101 af

Pond CB4P: CB4 Peak Elev=193.81' Storage=1,048 cf Inflow=3.67 cfs 0.453 af
Outflow=3.62 cfs 0.443 af

Pond CB5AP: CB5A Peak Elev=190.69' Inflow=1.43 cfs 0.161 af
15.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=1.43 cfs 0.161 af

Pond CB5P: CB5 Peak Elev=191.19' Inflow=4.15 cfs 0.554 af
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=4.15 cfs 0.554 af

Pond CB6AP: CB6A Peak Elev=193.83' Inflow=2.24 cfs 0.172 af
12.0" Round Culvert n=0.013 L=132.0' S=0.0080 '/' Outflow=2.24 cfs 0.172 af

Pond CB6P: CB6 Peak Elev=193.79' Inflow=0.49 cfs 0.035 af
12.0" Round Culvert n=0.013 L=46.0' S=0.0080 '/' Outflow=0.49 cfs 0.035 af

Pond CB7AP: CB7A Peak Elev=192.93' Inflow=3.20 cfs 0.242 af
15.0" Round Culvert n=0.013 L=14.0' S=0.0050 '/' Outflow=3.20 cfs 0.242 af

Pond CB7P: CB7 Peak Elev=192.85' Inflow=3.84 cfs 0.289 af
15.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=3.84 cfs 0.289 af

Pond DMH1: DMH1 Peak Elev=191.04' Inflow=6.05 cfs 1.053 af
24.0" Round Culvert n=0.013 L=68.0' S=0.0050 '/' Outflow=6.05 cfs 1.053 af

Pond DMH2: DMH3 Peak Elev=191.40' Inflow=6.05 cfs 1.053 af
24.0" Round Culvert n=0.013 L=55.0' S=0.0051 '/' Outflow=6.05 cfs 1.053 af

Pond DMH3: DMH3 Peak Elev=191.51' Inflow=3.01 cfs 0.339 af
24.0" Round Culvert n=0.013 L=14.0' S=0.0050 '/' Outflow=3.01 cfs 0.339 af

Pond SFB1: SFB1 Peak Elev=189.28' Storage=432 cf Inflow=6.08 cfs 1.113 af
Outflow=6.08 cfs 1.113 af

Pond SFB2: SFB2 Peak Elev=191.32' Storage=617 cf Inflow=3.84 cfs 0.289 af
Outflow=3.83 cfs 0.279 af

Total Runoff Area = 34.615 ac Runoff Volume = 2.037 af Average Runoff Depth = 0.71"
89.77% Pervious = 31.072 ac 10.23% Impervious = 3.543 ac

Summary for Subcatchment 1S: Subcatchment to wetland East

Runoff = 2.50 cfs @ 12.63 hrs, Volume= 0.477 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
109,109	32	Woods/grass comb., Good, HSG A
178,773	58	Woods/grass comb., Good, HSG B
7,649	70	Woods, Good, HSG C
15,714	77	Woods, Good, HSG D
28,941	61	>75% Grass cover, Good, HSG B
13,469	96	Gravel surface, HSG B
2,640	98	Roofs, HSG B
356,295	53	Weighted Average
353,655		99.26% Pervious Area
2,640		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0120	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
4.9	235	0.0260	0.81		**Shallow Concentrated Flow, SC to wetland** Woodland Kv= 5.0 fps
15.7	583	0.0154	0.62		**Shallow Concentrated Flow, SC to PL** Woodland Kv= 5.0 fps
36.2	868	Total			

Summary for Subcatchment 2: SW Area of Site

Runoff = 0.01 cfs @ 23.72 hrs, Volume= 0.003 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
225,026	32	Woods/grass comb., Good, HSG A
225,026		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0120	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
16.4	603	0.0150	0.61		**Shallow Concentrated Flow, Sc to analysis point** Woodland Kv= 5.0 fps
32.0	653	Total			

Summary for Subcatchment CB1: TO CB1

Runoff = 0.45 cfs @ 12.31 hrs, Volume= 0.052 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
2,929	98	Paved roads w/curbs & sewers, HSG B
2,707	61	>75% Grass cover, Good, HSG B
13,361	58	Woods/grass comb., Good, HSG B
18,997	65	Weighted Average
16,068		84.58% Pervious Area
2,929		15.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	50	0.0090	0.05		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.00"
3.1	98	0.0110	0.52		**Shallow Concentrated Flow, SC TO CB** Woodland Kv= 5.0 fps
20.6	148	Total			

Summary for Subcatchment CB1A: TO CB1A

Runoff = 0.33 cfs @ 12.25 hrs, Volume= 0.034 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
2,505	98	Paved roads w/curbs & sewers, HSG B
3,705	61	>75% Grass cover, Good, HSG B
4,663	58	Woods/grass comb., Good, HSG B
10,873	68	Weighted Average
8,368		76.96% Pervious Area
2,505		23.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	29	0.0120	1.64		**Shallow Concentrated Flow, SC TO CB** Grassed Waterway Kv= 15.0 fps
17.1	79	Total			

Summary for Subcatchment CB2: TO CB2

Runoff = 1.70 cfs @ 12.37 hrs, Volume= 0.199 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
11,068	98	Paved roads w/curbs & sewers, HSG B
7,920	98	Roofs, HSG B
15,348	61	>75% Grass cover, Good, HSG B
15,633	58	Woods/grass comb., Good, HSG B
49,969	74	Weighted Average
30,981		62.00% Pervious Area
18,988		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	50	0.0080	0.05		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.00"
6.4	281	0.0110	0.73		**Shallow Concentrated Flow, SC TO CB** Short Grass Pasture Kv= 7.0 fps
24.8	331	Total			

Summary for Subcatchment CB2A: TO CB2A

Runoff = 1.08 cfs @ 12.08 hrs, Volume= 0.081 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
6,738	98	Paved roads w/curbs & sewers, HSG B
2,640	98	Roofs, HSG B
1,925	61	>75% Grass cover, Good, HSG B
11,303	92	Weighted Average
1,925		17.03% Pervious Area
9,378		82.97% Impervious Area

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

Summary for Subcatchment CB3: TO CB3

Runoff = 0.81 cfs @ 12.34 hrs, Volume= 0.097 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
5,280	98	Roofs, HSG B
14,777	61	>75% Grass cover, Good, HSG B
15,574	58	Woods/grass comb., Good, HSG B
35,631	65	Weighted Average
30,351		85.18% Pervious Area
5,280		14.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	50	0.0090	0.05		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	62	0.0100	0.50		**Shallow Concentrated Flow, SC TO SWALE** Woodland Kv= 5.0 fps
3.1	378	0.0180	2.01		**Shallow Concentrated Flow, SC TO CB** Grassed Waterway Kv= 15.0 fps
22.7	490	Total			

Summary for Subcatchment CB3A: TO CB3A

Runoff = 2.24 cfs @ 12.27 hrs, Volume= 0.238 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
21,161	98	Paved roads w/curbs & sewers, HSG B
5,280	98	Unconnected roofs, HSG B
9,831	61	>75% Grass cover, Good, HSG B
7,367	58	Woods/grass comb., Good, HSG B
43,639	83	Weighted Average
17,198		39.41% Pervious Area
26,441		60.59% Impervious Area
5,280		19.97% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	50	0.0090	0.05		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.00"
1.8	75	0.0100	0.70		**Shallow Concentrated Flow, SC TO PAVE** Short Grass Pasture Kv= 7.0 fps
1.1	197	0.0210	2.94		**Shallow Concentrated Flow, SC TO CB** Paved Kv= 20.3 fps
20.4	322	Total			

Summary for Subcatchment CB4: TO CB4

Runoff = 0.86 cfs @ 12.24 hrs, Volume= 0.088 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
5,280	98	Roofs, HSG B
19,617	61	>75% Grass cover, Good, HSG B
6,091	55	Woods, Good, HSG B
30,988	66	Weighted Average
25,708		82.96% Pervious Area
5,280		17.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	50	0.0100	0.07		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.00"
4.8	239	0.0270	0.82		**Shallow Concentrated Flow, SC TO CB** Woodland Kv= 5.0 fps
16.0	289	Total			

Summary for Subcatchment CB5: TO CB5

Runoff = 1.40 cfs @ 12.08 hrs, Volume= 0.111 af, Depth= 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
10,448	98	Paved roads w/curbs & sewers, HSG B
2,640	98	Roofs, HSG B
432	61	>75% Grass cover, Good, HSG B
13,520	97	Weighted Average
432		3.20% Pervious Area
13,088		96.80% Impervious Area

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

Summary for Subcatchment CB5A: TO CB5A

Runoff = 1.43 cfs @ 12.25 hrs, Volume= 0.161 af, Depth= 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
13,816	98	Paved roads w/curbs & sewers, HSG B
5,280	98	Roofs, HSG B
1,005	61	>75% Grass cover, Good, HSG B
20,101	96	Weighted Average
1,005		5.00% Pervious Area
19,096		95.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0110	0.05		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	55	0.0100	0.70		**Shallow Concentrated Flow, SC TO PAVE** Short Grass Pasture Kv= 7.0 fps
1.6	278	0.0200	2.87		**Shallow Concentrated Flow, SC TO CB** Paved Kv= 20.3 fps
19.1	383	Total			

Summary for Subcatchment CB6: TO CB6

Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
3,835	98	Paved roads w/curbs & sewers, HSG B
2,506	61	>75% Grass cover, Good, HSG B
6,341	83	Weighted Average
2,506		39.52% Pervious Area
3,835		60.48% Impervious Area

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

Summary for Subcatchment CB6A: TO CB6A

Runoff = 1.76 cfs @ 12.08 hrs, Volume= 0.137 af, Depth= 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
9,640	98	Paved roads w/curbs & sewers, HSG B
6,600	98	Roofs, HSG B
957	61	>75% Grass cover, Good, HSG B
17,197	96	Weighted Average
957		5.56% Pervious Area
16,240		94.44% Impervious Area

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

Summary for Subcatchment CB7: TO CB7

Runoff = 0.64 cfs @ 12.08 hrs, Volume= 0.048 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
4,417	98	Paved roads w/curbs & sewers, HSG B
1,200	98	Roofs, HSG B
1,051	61	>75% Grass cover, Good, HSG B
6,668	92	Weighted Average
1,051		15.76% Pervious Area
5,617		84.24% Impervious Area

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

Summary for Subcatchment CB7A: TO CB7A

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
5,682	98	Paved roads w/curbs & sewers, HSG B
2,400	98	Roofs, HSG B
2,564	61	>75% Grass cover, Good, HSG B
10,646	89	Weighted Average
2,564		24.08% Pervious Area
8,082		75.92% Impervious Area

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

Summary for Subcatchment OS1: NW Offsite Subcat.

Runoff = 0.01 cfs @ 22.35 hrs, Volume= 0.007 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
38,877	39	>75% Grass cover, Good, HSG A
176,187	32	Woods/grass comb., Good, HSG A
215,064	33	Weighted Average
215,064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
20.8	615	0.0097	0.49		**Shallow Concentrated Flow, SC to PL** Woodland Kv= 5.0 fps
37.6	665	Total			

Summary for Subcatchment OS2: Offsite Subcatchment toward wetland

Runoff = 0.02 cfs @ 22.28 hrs, Volume= 0.011 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
335,438	32	Woods/grass comb., Good, HSG A
28,583	51	1 acre lots, 20% imp, HSG A
364,021	33	Weighted Average
358,304		98.43% Pervious Area
5,717		1.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0110	0.05		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.00"
12.9	423	0.0120	0.55		**Shallow Concentrated Flow, SC to PL** Woodland Kv= 5.0 fps
29.1	473	Total			

Summary for Subcatchment P1S: TO POND 1

Runoff = 0.64 cfs @ 12.18 hrs, Volume= 0.059 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
563	98	Paved parking, HSG B
2,520	98	Roofs, HSG B
17,790	61	>75% Grass cover, Good, HSG B
20,873	66	Weighted Average
17,790		85.23% Pervious Area
3,083		14.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	50	0.0090	0.07		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.00"
0.6	73	0.0820	2.00		**Shallow Concentrated Flow, SC TO P1** Short Grass Pasture Kv= 7.0 fps
12.3	123	Total			

Summary for Subcatchment P2S: TO POND 2

Runoff = 0.90 cfs @ 12.53 hrs, Volume= 0.131 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.64"

Area (sf)	CN	Description
6,120	98	Roofs, HSG B
22,310	61	>75% Grass cover, Good, HSG B
22,228	58	Woods/grass comb., Good, HSG B
50,658	64	Weighted Average
44,538		87.92% Pervious Area
6,120		12.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	50	0.0080	0.05		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.00"
15.0	413	0.0084	0.46		**Shallow Concentrated Flow, SC TO LAWN** Woodland Kv= 5.0 fps
1.2	117	0.0550	1.64		**Shallow Concentrated Flow, SC TO P2** Short Grass Pasture Kv= 7.0 fps
34.6	580	Total			

Summary for Reach 100: Westerly Analysis Point

Inflow Area = 29.449 ac, 12.03% Impervious, Inflow Depth = 0.65" for 10 YR event
Inflow = 6.52 cfs @ 12.40 hrs, Volume= 1.601 af
Outflow = 6.52 cfs @ 12.40 hrs, Volume= 1.601 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach 200: SE Analysis Point

Inflow Area = 5.166 ac, 0.00% Impervious, Inflow Depth = 0.01" for 10 YR event
Inflow = 0.01 cfs @ 23.72 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 23.72 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach R0S2: Flow thourgh wet.

Inflow Area = 8.357 ac, 1.57% Impervious, Inflow Depth = 0.02" for 10 YR event
Inflow = 0.02 cfs @ 22.28 hrs, Volume= 0.011 af
Outflow = 0.02 cfs @ 23.69 hrs, Volume= 0.011 af, Atten= 1%, Lag= 84.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.26 fps, Min. Travel Time= 48.8 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 77.6 min

Peak Storage= 57 cf @ 22.87 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.50' Flow Area= 10.0 sf, Capacity= 22.49 cfs

30.00' x 0.50' deep Parabolic Channel, n= 0.040 Winding stream, pools & shoals
Length= 756.0' Slope= 0.0159 '/'
Inlet Invert= 192.00', Outlet Invert= 180.00'

‡

Summary for Pond 1P: WET POND

Inflow Area = 10.812 ac, 22.52% Impervious, Inflow Depth = 1.23" for 10 YR event
Inflow = 6.08 cfs @ 12.28 hrs, Volume= 1.113 af
Outflow = 5.73 cfs @ 12.35 hrs, Volume= 1.113 af, Atten= 4%, Lag= 4.1 min
Primary = 5.73 cfs @ 12.35 hrs, Volume= 1.113 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Starting Elev= 189.23' Surf.Area= 3,526 sf Storage= 9,833 cf
Peak Elev= 189.99' @ 12.35 hrs Surf.Area= 4,047 sf Storage= 12,697 cf (2,864 cf above start)
Flood Elev= 192.00' Surf.Area= 5,426 sf Storage= 22,235 cf (12,401 cf above start)

Plug-Flow detention time= 136.9 min calculated for 0.887 af (80% of inflow)
Center-of-Mass det. time= 9.6 min (847.2 - 837.6)

Volume	Invert	Avail.Storage	Storage Description
#1	184.50'	22,235 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
184.50	886	0	0
186.00	1,528	1,811	1,811
188.00	2,679	4,207	6,018
190.00	4,056	6,735	12,753
192.00	5,426	9,482	22,235

Device	Routing	Invert	Outlet Devices
#1	Primary	189.23'	**5.0' long x 23.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.72 cfs @ 12.35 hrs HW=189.99' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 5.72 cfs @ 2.31 fps)

Summary for Pond 2P: BIORET POND

Inflow Area = 2.101 ac, 43.60% Impervious, Inflow Depth = 2.34" for 10 YR event
Inflow = 4.03 cfs @ 12.09 hrs, Volume= 0.410 af
Outflow = 0.38 cfs @ 14.09 hrs, Volume= 0.410 af, Atten= 91%, Lag= 119.7 min
Discarded = 0.38 cfs @ 14.09 hrs, Volume= 0.410 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 190.63' @ 14.09 hrs Surf.Area= 5,450 sf Storage= 7,452 cf
Flood Elev= 191.50' Surf.Area= 6,195 sf Storage= 12,493 cf

Plug-Flow detention time= 189.7 min calculated for 0.410 af (100% of inflow)
Center-of-Mass det. time= 189.7 min (1,018.4 - 828.8)

Volume	Invert	Avail.Storage	Storage Description
#1	187.50'	12,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
187.50	4,904	0.0	0	0
188.50	4,904	40.0	1,962	1,962
190.00	4,904	30.0	2,207	4,168
191.50	6,195	100.0	8,324	12,493

Device	Routing	Invert	Outlet Devices
#1	Primary	191.00'	**5.0' long x 8.0' 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) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	187.50'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.38 cfs @ 14.09 hrs HW=190.63' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=187.50' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond CB1AP: CB1A

Inflow Area =	0.686 ac, 18.19% Impervious, Inflow Depth = 1.49"	for 10 YR event		
Inflow =	0.77 cfs @ 12.29 hrs, Volume=	0.085 af		
Outflow =	0.77 cfs @ 12.29 hrs, Volume=	0.085 af, Atten= 0%, Lag= 0.0 min		
Primary =	0.77 cfs @ 12.29 hrs, Volume=	0.085 af		

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 195.55' @ 12.29 hrs
Flood Elev= 198.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.11'	**12.0" Round Culvert** L= 148.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.11' / 193.33' S= 0.0120 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.77 cfs @ 12.29 hrs HW=195.55' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.77 cfs @ 2.27 fps)

Summary for Pond CB1P: CB1

Inflow Area =	0.436 ac, 15.42% Impervious, Inflow Depth = 1.42"	for 10 YR event		
Inflow =	0.45 cfs @ 12.31 hrs, Volume=	0.052 af		
Outflow =	0.45 cfs @ 12.31 hrs, Volume=	0.052 af, Atten= 0%, Lag= 0.0 min		
Primary =	0.45 cfs @ 12.31 hrs, Volume=	0.052 af		

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 195.79' @ 12.31 hrs
Flood Elev= 198.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.43'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.43' / 195.21' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.45 cfs @ 12.31 hrs HW=195.79' (Free Discharge)
1=Culvert (Barrel Controls 0.45 cfs @ 2.66 fps)

Summary for Pond CB2AP: CB2A

Inflow Area = 2.092 ac, 37.08% Impervious, Inflow Depth = 2.09" for 10 YR event
Inflow = 2.85 cfs @ 12.31 hrs, Volume= 0.365 af
Outflow = 2.85 cfs @ 12.31 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.0 min
Primary = 2.85 cfs @ 12.31 hrs, Volume= 0.365 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 193.42' @ 12.31 hrs
Flood Elev= 196.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	192.56'	**15.0" Round Culvert** L= 162.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 192.56' / 190.62' S= 0.0120 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.85 cfs @ 12.31 hrs HW=193.42' (Free Discharge)
1=Culvert (Inlet Controls 2.85 cfs @ 3.16 fps)

Summary for Pond CB2P: CB2

Inflow Area = 1.833 ac, 30.59% Impervious, Inflow Depth = 1.86" for 10 YR event
Inflow = 2.44 cfs @ 12.33 hrs, Volume= 0.284 af
Outflow = 2.44 cfs @ 12.33 hrs, Volume= 0.284 af, Atten= 0%, Lag= 0.0 min
Primary = 2.44 cfs @ 12.33 hrs, Volume= 0.284 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 194.02' @ 12.33 hrs
Flood Elev= 197.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	193.24'	**15.0" Round Culvert** L= 48.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 193.24' / 192.66' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.44 cfs @ 12.33 hrs HW=194.02' (Free Discharge)
1=Culvert (Inlet Controls 2.44 cfs @ 3.01 fps)

Summary for Pond CB3AP: CB3A

Inflow Area = 6.757 ac, 10.78% Impervious, Inflow Depth = 0.60" for 10 YR event
Inflow = 3.01 cfs @ 12.30 hrs, Volume= 0.339 af
Outflow = 3.01 cfs @ 12.30 hrs, Volume= 0.339 af, Atten= 0%, Lag= 0.0 min
Primary = 3.01 cfs @ 12.30 hrs, Volume= 0.339 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 192.13' @ 12.30 hrs
Flood Elev= 195.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	191.17'	**15.0" Round Culvert** L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 191.17' / 190.84' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.01 cfs @ 12.30 hrs HW=192.13' (Free Discharge)
1=Culvert (Barrel Controls 3.01 cfs @ 4.10 fps)

Summary for Pond CB3P: CB3

Inflow Area = 5.755 ac, 2.11% Impervious, Inflow Depth = 0.22" for 10 YR event
Inflow = 0.81 cfs @ 12.34 hrs, Volume= 0.103 af
Outflow = 0.81 cfs @ 12.34 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.2 min
Primary = 0.81 cfs @ 12.34 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 194.01' @ 12.34 hrs Surf.Area= 135 sf Storage= 133 cf

Plug-Flow detention time= 20.1 min calculated for 0.101 af (97% of inflow)
Center-of-Mass det. time= 5.8 min (910.9 - 905.1)

Volume	Invert	Avail.Storage	Storage Description
#1	188.40'	1,225 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
188.40	13	0	0
193.00	13	60	60
194.00	129	71	131
196.00	965	1,094	1,225

Device	Routing	Invert	Outlet Devices
#1	Primary	191.40'	**15.0" Round Culvert** L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 191.40' / 191.17' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	193.90'	**19.0" x 19.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.81 cfs @ 12.34 hrs HW=194.01' (Free Discharge)
└1=**Culvert** (Passes 0.81 cfs of 8.34 cfs potential flow)
└2=**Orifice/Grate** (Weir Controls 0.81 cfs @ 1.11 fps)

Summary for Pond CB4P: CB4

Inflow Area = 2.804 ac, 32.00% Impervious, Inflow Depth = 1.94" for 10 YR event
Inflow = 3.67 cfs @ 12.29 hrs, Volume= 0.453 af
Outflow = 3.62 cfs @ 12.32 hrs, Volume= 0.443 af, Atten= 1%, Lag= 2.3 min
Primary = 3.62 cfs @ 12.32 hrs, Volume= 0.443 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 193.81' @ 12.32 hrs Surf.Area= 2,397 sf Storage= 1,048 cf

Plug-Flow detention time= 24.1 min calculated for 0.443 af (98% of inflow)
Center-of-Mass det. time= 11.2 min (862.3 - 851.1)

Volume	Invert	Avail.Storage	Storage Description
#1	187.67'	5,890 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
187.67	13	0	0
193.00	13	69	69
194.00	2,950	1,482	1,551
195.00	5,728	4,339	5,890

Device	Routing	Invert	Outlet Devices
#1	Primary	190.42'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 190.42' / 190.10' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	193.50'	**19.0" x 19.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.60 cfs @ 12.32 hrs HW=193.81' (Free Discharge)
└1=**Culvert** (Passes 3.60 cfs of 12.86 cfs potential flow)
└2=**Orifice/Grate** (Weir Controls 3.60 cfs @ 1.83 fps)

Summary for Pond CB5AP: CB5A

Inflow Area = 0.461 ac, 95.00% Impervious, Inflow Depth = 4.17" for 10 YR event
Inflow = 1.43 cfs @ 12.25 hrs, Volume= 0.161 af
Outflow = 1.43 cfs @ 12.25 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min
Primary = 1.43 cfs @ 12.25 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 190.69' @ 12.25 hrs
Flood Elev= 193.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	**15.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 190.00' / 189.95' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.43 cfs @ 12.25 hrs HW=190.69' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.43 cfs @ 2.96 fps)

Summary for Pond CB5P: CB5

Inflow Area = 3.114 ac, 38.46% Impervious, Inflow Depth = 2.14" for 10 YR event
Inflow = 4.15 cfs @ 12.30 hrs, Volume= 0.554 af
Outflow = 4.15 cfs @ 12.30 hrs, Volume= 0.554 af, Atten= 0%, Lag= 0.0 min
Primary = 4.15 cfs @ 12.30 hrs, Volume= 0.554 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 191.19' @ 12.30 hrs
Flood Elev= 193.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	**18.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 190.00' / 189.95' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.15 cfs @ 12.30 hrs HW=191.19' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.15 cfs @ 3.77 fps)

Summary for Pond CB6AP: CB6A

Inflow Area = 0.540 ac, 85.29% Impervious, Inflow Depth = 3.82" for 10 YR event
Inflow = 2.24 cfs @ 12.08 hrs, Volume= 0.172 af
Outflow = 2.24 cfs @ 12.08 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.0 min
Primary = 2.24 cfs @ 12.08 hrs, Volume= 0.172 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 193.83' @ 12.08 hrs
Flood Elev= 196.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	192.95'	**12.0" Round Culvert** L= 132.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 192.95' / 191.89' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.24 cfs @ 12.08 hrs HW=193.83' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.24 cfs @ 4.10 fps)

Summary for Pond CB6P: CB6

Inflow Area = 0.146 ac, 60.48% Impervious, Inflow Depth = 2.85" for 10 YR event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.09 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 193.79' @ 12.09 hrs
Flood Elev= 196.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	193.42'	**12.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 193.42' / 193.05' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.09 hrs HW=193.79' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.48 cfs @ 2.70 fps)

Summary for Pond CB7AP: CB7A

Inflow Area = 0.785 ac, 82.37% Impervious, Inflow Depth = 3.70" for 10 YR event
Inflow = 3.20 cfs @ 12.08 hrs, Volume= 0.242 af
Outflow = 3.20 cfs @ 12.08 hrs, Volume= 0.242 af, Atten= 0%, Lag= 0.0 min
Primary = 3.20 cfs @ 12.08 hrs, Volume= 0.242 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 192.93' @ 12.08 hrs
Flood Elev= 194.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	191.79'	**15.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 191.79' / 191.72' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.19 cfs @ 12.08 hrs HW=192.92' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.19 cfs @ 3.59 fps)

Summary for Pond CB7P: CB7

Inflow Area = 0.938 ac, 82.67% Impervious, Inflow Depth = 3.70" for 10 YR event
Inflow = 3.84 cfs @ 12.08 hrs, Volume= 0.289 af
Outflow = 3.84 cfs @ 12.08 hrs, Volume= 0.289 af, Atten= 0%, Lag= 0.0 min
Primary = 3.84 cfs @ 12.08 hrs, Volume= 0.289 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 192.85' @ 12.08 hrs
Flood Elev= 194.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	191.62'	**15.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 191.62' / 191.12' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.83 cfs @ 12.08 hrs HW=192.85' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.83 cfs @ 3.95 fps)

Summary for Pond DMH1: DMH1

Inflow Area = 10.333 ac, 22.88% Impervious, Inflow Depth = 1.22" for 10 YR event
Inflow = 6.05 cfs @ 12.29 hrs, Volume= 1.053 af
Outflow = 6.05 cfs @ 12.29 hrs, Volume= 1.053 af, Atten= 0%, Lag= 0.0 min
Primary = 6.05 cfs @ 12.29 hrs, Volume= 1.053 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 191.04' @ 12.29 hrs
Flood Elev= 196.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	189.50'	**24.0" Round Culvert** L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 189.50' / 189.16' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.05 cfs @ 12.29 hrs HW=191.04' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 6.05 cfs @ 4.55 fps)

Summary for Pond DMH2: DMH3

Inflow Area = 10.333 ac, 22.88% Impervious, Inflow Depth = 1.22" for 10 YR event
Inflow = 6.05 cfs @ 12.29 hrs, Volume= 1.053 af
Outflow = 6.05 cfs @ 12.29 hrs, Volume= 1.053 af, Atten= 0%, Lag= 0.0 min
Primary = 6.05 cfs @ 12.29 hrs, Volume= 1.053 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 191.40' @ 12.29 hrs
Flood Elev= 194.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	189.85'	**24.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 189.85' / 189.57' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.05 cfs @ 12.29 hrs HW=191.40' (Free Discharge)
↑**1=Culvert** (Barrel Controls 6.05 cfs @ 4.51 fps)

Summary for Pond DMH3: DMH3

Inflow Area =	6.757 ac,	10.78% Impervious,	Inflow Depth =	0.60" for 10 YR event
Inflow =	3.01 cfs @	12.30 hrs, Volume=	0.339 af	
Outflow =	3.01 cfs @	12.30 hrs, Volume=	0.339 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.01 cfs @	12.30 hrs, Volume=	0.339 af	

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 191.51' @ 12.30 hrs
Flood Elev= 195.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	190.62'	**24.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 190.62' / 190.55' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.01 cfs @ 12.30 hrs HW=191.51' (Free Discharge)
↑**1=Culvert** (Barrel Controls 3.01 cfs @ 3.27 fps)

Summary for Pond SFB1: SFB1

Inflow Area =	10.812 ac,	22.52% Impervious,	Inflow Depth =	1.23" for 10 YR event
Inflow =	6.08 cfs @	12.28 hrs, Volume=	1.113 af	
Outflow =	6.08 cfs @	12.28 hrs, Volume=	1.113 af,	Atten= 0%, Lag= 0.1 min
Primary =	6.08 cfs @	12.28 hrs, Volume=	1.113 af	

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Starting Elev= 189.00' Surf.Area= 347 sf Storage= 328 cf
Peak Elev= 189.28' @ 12.28 hrs Surf.Area= 403 sf Storage= 432 cf (104 cf above start)
Flood Elev= 192.00' Surf.Area= 1,069 sf Storage= 2,397 cf (2,069 cf above start)

Plug-Flow detention time= 8.2 min calculated for 1.105 af (99% of inflow)
Center-of-Mass det. time= 0.3 min (837.6 - 837.2)

Volume	Invert	Avail.Storage	Storage Description
#1	187.00'	2,397 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
187.00	25	0	0
188.00	142	84	84
190.00	551	693	777
192.00	1,069	1,620	2,397

Device	Routing	Invert	Outlet Devices
#1	Primary	189.00'	**25.0' long x 8.0' 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) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=6.04 cfs @ 12.28 hrs HW=189.28' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 6.04 cfs @ 1.30 fps)

Summary for Pond SFB2: SFB2

Inflow Area = 0.938 ac, 82.67% Impervious, Inflow Depth = 3.70" for 10 YR event
Inflow = 3.84 cfs @ 12.08 hrs, Volume= 0.289 af
Outflow = 3.83 cfs @ 12.09 hrs, Volume= 0.279 af, Atten= 0%, Lag= 0.3 min
Primary = 3.83 cfs @ 12.09 hrs, Volume= 0.279 af

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Starting Elev= 189.00' Surf.Area= 81 sf Storage= 50 cf
Peak Elev= 191.32' @ 12.09 hrs Surf.Area= 551 sf Storage= 617 cf (567 cf above start)
Flood Elev= 191.50' Surf.Area= 608 sf Storage= 724 cf (674 cf above start)

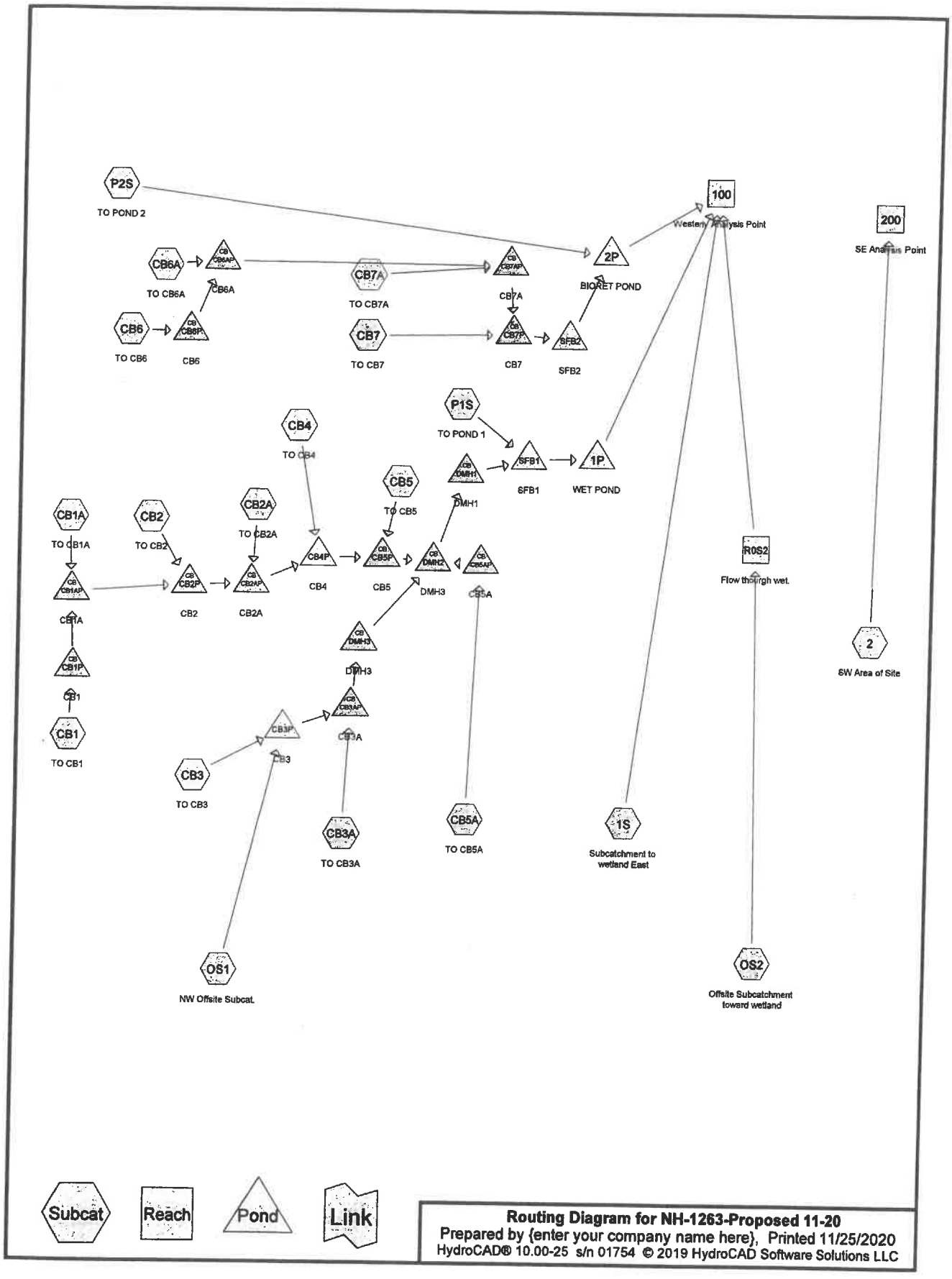
Plug-Flow detention time= 40.4 min calculated for 0.278 af (96% of inflow)
Center-of-Mass det. time= 15.8 min (797.6 - 781.8)

Volume	Invert	Avail.Storage	Storage Description
#1	188.00'	724 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
188.00	19	0	0
190.00	142	161	161
191.50	608	563	724

Device	Routing	Invert	Outlet Devices
#1	Primary	191.10'	**16.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.82 cfs @ 12.09 hrs HW=191.32' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.82 cfs @ 1.11 fps)



Routing Diagram for NH-1263-Proposed 11-20
Prepared by {enter your company name here}, Printed 11/25/2020
HydroCAD® 10.00-25 s/n 01754 © 2019 HydroCAD Software Solutions LLC

Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Subcatchmentto Runoff Area=356,295 sf 0.74% Impervious Runoff Depth=1.94"
Flow Length=868' Tc=36.2 min CN=53 Runoff=8.77 cfs 1.321 af

Subcatchment2: SW Area of Site Runoff Area=225,026 sf 0.00% Impervious Runoff Depth=0.32"
Flow Length=653' Tc=32.0 min CN=32 Runoff=0.26 cfs 0.136 af

SubcatchmentCB1: TO CB1 Runoff Area=18,997 sf 15.42% Impervious Runoff Depth=3.10"
Flow Length=148' Tc=20.6 min CN=65 Runoff=1.04 cfs 0.113 af

SubcatchmentCB1A: TO CB1A Runoff Area=10,873 sf 23.04% Impervious Runoff Depth=3.41"
Flow Length=79' Tc=17.1 min CN=68 Runoff=0.71 cfs 0.071 af

SubcatchmentCB2: TO CB2 Runoff Area=49,969 sf 38.00% Impervious Runoff Depth=4.04"
Flow Length=331' Tc=24.8 min CN=74 Runoff=3.34 cfs 0.386 af

SubcatchmentCB2A: TO CB2A Runoff Area=11,303 sf 82.97% Impervious Runoff Depth=6.05"
Tc=6.0 min CN=92 Runoff=1.71 cfs 0.131 af

SubcatchmentCB3: TO CB3 Runoff Area=35,631 sf 14.82% Impervious Runoff Depth=3.10"
Flow Length=490' Tc=22.7 min CN=65 Runoff=1.88 cfs 0.211 af

SubcatchmentCB3A: TO CB3A Runoff Area=43,639 sf 60.59% Impervious Runoff Depth=5.03"
Flow Length=322' Tc=20.4 min CN=83 Runoff=3.89 cfs 0.420 af

SubcatchmentCB4: TO CB4 Runoff Area=30,988 sf 17.04% Impervious Runoff Depth=3.20"
Flow Length=289' Tc=16.0 min CN=66 Runoff=1.95 cfs 0.190 af

SubcatchmentCB5: TO CB5 Runoff Area=13,520 sf 96.80% Impervious Runoff Depth>6.64"
Tc=6.0 min CN=97 Runoff=2.12 cfs 0.172 af

SubcatchmentCB5A: TO CB5A Runoff Area=20,101 sf 95.00% Impervious Runoff Depth=6.52"
Flow Length=383' Tc=19.1 min CN=96 Runoff=2.19 cfs 0.251 af

SubcatchmentCB6: TO CB6 Runoff Area=6,341 sf 60.48% Impervious Runoff Depth=5.03"
Tc=6.0 min CN=83 Runoff=0.84 cfs 0.061 af

SubcatchmentCB6A: TO CB6A Runoff Area=17,197 sf 94.44% Impervious Runoff Depth=6.52"
Tc=6.0 min CN=96 Runoff=2.69 cfs 0.215 af

SubcatchmentCB7: TO CB7 Runoff Area=6,668 sf 84.24% Impervious Runoff Depth=6.05"
Tc=6.0 min CN=92 Runoff=1.01 cfs 0.077 af

SubcatchmentCB7A: TO CB7A Runoff Area=10,646 sf 75.92% Impervious Runoff Depth=5.71"
Tc=6.0 min CN=89 Runoff=1.55 cfs 0.116 af

SubcatchmentOS1: NW Offsite Subcat. Runoff Area=215,064 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=665' Tc=37.6 min CN=33 Runoff=0.34 cfs 0.153 af

Subcatchment OS2: Offsite Subcatchment Runoff Area=364,021 sf 1.57% Impervious Runoff Depth=0.37"
Flow Length=473' Tc=29.1 min CN=33 Runoff=0.63 cfs 0.259 af

Subcatchment P1S: TO POND 1 Runoff Area=20,873 sf 14.77% Impervious Runoff Depth=3.20"
Flow Length=123' Tc=12.3 min CN=66 Runoff=1.45 cfs 0.128 af

Subcatchment P2S: TO POND 2 Runoff Area=50,658 sf 12.08% Impervious Runoff Depth=3.00"
Flow Length=580' Tc=34.6 min CN=64 Runoff=2.14 cfs 0.291 af

Reach 100: Westerly Analysis Point Inflow=20.11 cfs 3.968 af
Outflow=20.11 cfs 3.968 af

Reach 200: SE Analysis Point Inflow=0.26 cfs 0.136 af
Outflow=0.26 cfs 0.136 af

Reach R0S2: Flow thourgh wet. Avg. Flow Depth=0.09' Max Vel=0.72 fps Inflow=0.63 cfs 0.259 af
n=0.040 L=756.0' S=0.0159 '/' Capacity=22.49 cfs Outflow=0.54 cfs 0.259 af

Pond 1P: WET POND Peak Elev=190.40' Storage=14,449 cf Inflow=15.28 cfs 2.213 af
Outflow=14.80 cfs 2.213 af

Pond 2P: BIORET POND Peak Elev=191.30' Storage=11,273 cf Inflow=6.75 cfs 0.750 af
Discarded=0.42 cfs 0.574 af Primary=2.04 cfs 0.176 af Outflow=2.46 cfs 0.750 af

Pond CB1AP: CB1A Peak Elev=195.83' Inflow=1.74 cfs 0.184 af
12.0" Round Culvert n=0.013 L=148.0' S=0.0120 '/' Outflow=1.74 cfs 0.184 af

Pond CB1P: CB1 Peak Elev=196.01' Inflow=1.04 cfs 0.113 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=1.04 cfs 0.113 af

Pond CB2AP: CB2A Peak Elev=194.11' Inflow=5.68 cfs 0.701 af
15.0" Round Culvert n=0.013 L=162.0' S=0.0120 '/' Outflow=5.68 cfs 0.701 af

Pond CB2P: CB2 Peak Elev=194.59' Inflow=5.02 cfs 0.570 af
15.0" Round Culvert n=0.013 L=48.0' S=0.0121 '/' Outflow=5.02 cfs 0.570 af

Pond CB3AP: CB3A Peak Elev=192.85' Inflow=5.73 cfs 0.781 af
15.0" Round Culvert n=0.013 L=33.0' S=0.0100 '/' Outflow=5.73 cfs 0.781 af

Pond CB3P: CB3 Peak Elev=194.10' Storage=146 cf Inflow=1.89 cfs 0.364 af
Outflow=1.89 cfs 0.362 af

Pond CB4P: CB4 Peak Elev=194.00' Storage=1,564 cf Inflow=7.52 cfs 0.891 af
Outflow=7.42 cfs 0.881 af

Pond CB5AP: CB5A Peak Elev=190.89' Inflow=2.19 cfs 0.251 af
15.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=2.19 cfs 0.251 af

Pond CB5P: CB5 Peak Elev=191.96' Inflow=8.26 cfs 1.053 af
18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=8.26 cfs 1.053 af

Pond CB6AP: CB6A Peak Elev=194.66' Inflow=3.53 cfs 0.276 af
12.0" Round Culvert n=0.013 L=132.0' S=0.0080 '/' Outflow=3.53 cfs 0.276 af

Pond CB6P: CB6 Peak Elev=193.93' Inflow=0.84 cfs 0.061 af
12.0" Round Culvert n=0.013 L=46.0' S=0.0080 '/' Outflow=0.84 cfs 0.061 af

Pond CB7AP: CB7A Peak Elev=193.43' Inflow=5.08 cfs 0.392 af
15.0" Round Culvert n=0.013 L=14.0' S=0.0050 '/' Outflow=5.08 cfs 0.392 af

Pond CB7P: CB7 Peak Elev=193.84' Inflow=6.09 cfs 0.469 af
15.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=6.09 cfs 0.469 af

Pond DMH1: DMH1 Peak Elev=191.97' Inflow=14.12 cfs 2.085 af
24.0" Round Culvert n=0.013 L=68.0' S=0.0050 '/' Outflow=14.12 cfs 2.085 af

Pond DMH2: DMH3 Peak Elev=192.32' Inflow=14.12 cfs 2.085 af
24.0" Round Culvert n=0.013 L=55.0' S=0.0051 '/' Outflow=14.12 cfs 2.085 af

Pond DMH3: DMH3 Peak Elev=191.90' Inflow=5.73 cfs 0.781 af
24.0" Round Culvert n=0.013 L=14.0' S=0.0050 '/' Outflow=5.73 cfs 0.781 af

Pond SFB1: SFB1 Peak Elev=189.42' Storage=490 cf Inflow=15.28 cfs 2.213 af
Outflow=15.28 cfs 2.213 af

Pond SFB2: SFB2 Peak Elev=191.39' Storage=658 cf Inflow=6.09 cfs 0.469 af
Outflow=6.08 cfs 0.459 af

Total Runoff Area = 34.615 ac Runoff Volume = 4.701 af Average Runoff Depth = 1.63"
89.77% Pervious = 31.072 ac 10.23% Impervious = 3.543 ac

APPENDIX III

Charts, Graphs, and Calculations

Test Pit Logs for RTE 9 and 125 in Barrington
5/21/2020. JP Gove

#1

0-10". 10YR3/3. Loamy fine sand. Friable. Granular
10-29". 10YR5/6. Loamy sand. Friable. Granular
29-68". 2.5Y5/3. Loamy sand. Friable. Massive with 30% redox. Loamy very fine sand layer.
Water table at 29".

#2
0-12". 10YR3/3. Loamy fine sand. Friable. Granular
12-31". 10YR5/6. Loamy sand. Friable. Granular
31-70". 2.5Y5/3. Loamy sand. Friable. Massive with 30% redox. Observed water at 60"
Water table at 31".

#3
0-7". 10YR3/3. Loamy fine sand. Friable. Granular
7-32". 10YR5/6. Loamy sand. Friable. Granular
32-68". 2.5Y5/4. Loamy sand. Friable. Massive with 30% redox. Observed water at 55".
Water table at 32".

#4
0-7". 10YR3/3. Fine sandy loam Friable. Granular
7-30". 10YR4/6. Loamy sand. Friable. Granular
30-67". 2.5Y5/2. Silty clay loam. Firm. Platy. 30% redox. Observed water at 33".
Water table at 30".

#5
0-9". 10YR3/3. Loamy fine sand. Friable. Granular
9-30". 10YR5/6. Loamy sand. Friable. Granular
30-69. 2.5Y5/3. Loamy sand. Friable. Massive. 30% redox. Observed water at 68".
Water table at 30".

#6
0-7". 10YR3/3. Loamy fine sand. Friable Granular
7-34". 10YR5/6. Loamy sand. Friable. Granular
34-75". 2.5Y5/3 Sand. Friable. Massive. 30% redox.
Water table at 34".

#7".
0-11". 10YR3/3. Loamy fine sand. Friable. Granular
11-33". 10YR5/6. Loamy sand. Friable Granular
33-73". 2.5Y5/3. Sand. Friable. Massive. 30% redox.
Water table at 33".

#8
0-7". 10YR3/3. Fine sandy loam. Friable Granular. Old fill
7-39". 10YR4/6. Loamy sand. Friable. Granular. Relic mottles at 7".
39-68". 2.5Y5/3. Sand. Friable. Massive. 30% redox
Water table at 39".

A
0-11". 10YR3/3. Loamy fine sand. Friable Granular
11-38". 10YR5/6. Loamy sand. Friable. Granular
38-69. 2.5Y5/3. Sand. Friable. Massive. 30% redox
Water table at 38".

B
0- 13". 10YR3/3. Loamy fine sand. Friable. Granular
13-38". 10YR5/6. Loamy sand. Friable. Granular
38-68". 2.5Y5/3. Sand. Friable. Massive. 30% redox
Water table at 38".

GOVE ENVIRONMENTAL SERVICES, INC.

SITE-SPECIFIC SOIL SURVEY REPORT
ROUTES 9 AND 125
BARRINGTON, NH
GES # 2020036

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 5.0, December 2017. 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.

2. DATE SOIL MAP PRODUCED

21 May 2020

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

Approximately 29 was soil mapped. Tax map 238 , Lot 36 . The site is located in the Town of Barrington, NH.

4. PURPOSE OF THE SOIL MAP

The preparation of this map was requested by Beals Associates. The purpose was to meet the requirements of NH Alteration of Terrain.

5. SOIL IDENTIFICATION LEGEND

SSSM SYM.	SSS MAP NAME	HISS SYM.	HYDROLOGIC SOIL GRP.
26	Windsor loamy sand	111	A
34	Wareham fine sandy loam	511	C
115	Scarboro muck	611	D
313	Deerfield loamy sand	311	B

SLOPE PHASE:

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

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526
Ph (603) 778 0644 / *Fax* (603) 778 0654
info@gesinc.biz
www.gesinc.biz

6. SOIL MAP UNIT DESCRIPTIONS

26 WINDSOR LOAMY SAND is an outwash soil that has developed on sand plains. The soil is excessively drained and is sandy throughout. Inclusions would be Deerfield loamy sand. Water tables are below 40 inches. In this case, relic mottles were observed in the soil profile at less than 40 inches.

34 WAREHAM FINE SANDY LOAM is found in outwash sand plains and has developed as a poorly drained hydric soil. Estimated seasonal high water table is within 12 inches of the soil surface. Inclusions would be soils that have silty clay loam texture within the substratum.

115 SCARBORO MUCK is found in outwash sand plains and has developed on areas so wet that a much layer has formed at the soil surface. The estimated seasonal high water table is at the surface, and sometimes above the surface as ponded areas. Inclusions would be soils that have silty clay loam textures within he substratum.

311 DEERFIELD LOAMY SAND is found in outwash sand plains and is moderately well drained. The majority of the observed test pits had estimated seasonal high water tables at 30 to 39 inches below the soil surface. Inclusions were soils that had silty clay loam textures within the substratum. Only one pit had the silty clay loam within 40 inches of the soils surface. Typically the silty clay loam textures were deeper than 75 inches from the soil surface. Some pits had relic mottles higher than the estimated seasonal high water tables.

7. RESPONSIBLE SOIL SCIENTIST

James P. Gove, C.S.S. #004

8. OTHER DISTINGUISHING FEATURES OF SITE

Area was cut heavily and has many new shrubs and saplings.

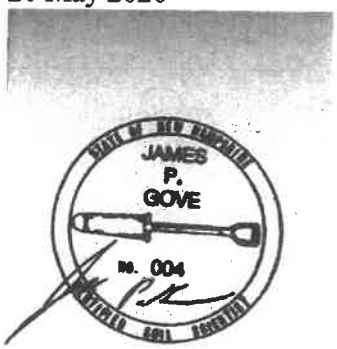
9. MAXIMUM SIZE OF LIMITING INCLUSIONS

15%

10. SPECIAL FEATURE SYMBOLS

None used.

20 May 2020



Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.984 degrees West
Latitude	43.230 degrees North
Elevation	0 feet
Date/Time	Thu, 02 May 2019 17:28:22 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.65	0.81	1.02	1yr	0.70	0.98	1.19	1.53	1.97	2.56	2.82	1yr	2.26	2.71	3.12	3.85	4.41	1yr
2yr	0.32	0.49	0.61	0.80	1.01	1.28	2yr	0.87	1.16	1.49	1.89	2.41	3.08	3.44	2yr	2.73	3.30	3.80	4.53	5.16	2yr
5yr	0.37	0.57	0.72	0.96	1.23	1.57	5yr	1.06	1.44	1.84	2.36	3.03	3.89	4.39	5yr	3.44	4.22	4.84	5.71	6.45	5yr
10yr	0.40	0.63	0.80	1.09	1.42	1.84	10yr	1.22	1.69	2.17	2.80	3.60	4.64	5.29	10yr	4.11	5.09	5.82	6.80	7.65	10yr
25yr	0.46	0.74	0.94	1.30	1.73	2.27	25yr	1.49	2.08	2.69	3.50	4.53	5.86	6.77	25yr	5.19	6.51	7.43	8.57	9.57	25yr
50yr	0.52	0.83	1.07	1.49	2.01	2.67	50yr	1.73	2.45	3.17	4.15	5.40	7.00	8.17	50yr	6.19	7.85	8.94	10.22	11.35	50yr
100yr	0.58	0.94	1.21	1.72	2.33	3.13	100yr	2.01	2.88	3.74	4.92	6.42	8.36	9.85	100yr	7.40	9.48	10.75	12.20	13.47	100yr
200yr	0.65	1.06	1.37	1.97	2.72	3.68	200yr	2.35	3.39	4.43	5.85	7.66	9.99	11.89	200yr	8.84	11.43	12.94	14.56	15.99	200yr
500yr	0.76	1.25	1.64	2.38	3.33	4.56	500yr	2.87	4.21	5.50	7.32	9.65	12.64	15.25	500yr	11.19	14.67	16.55	18.40	20.08	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.36	0.44	0.60	0.73	0.90	1yr	0.63	0.88	0.91	1.25	1.51	1.95	2.48	1yr	1.73	2.39	2.93	3.28	3.97	1yr
2yr	0.31	0.48	0.59	0.81	0.99	1.18	2yr	0.86	1.15	1.35	1.81	2.34	2.99	3.34	2yr	2.65	3.21	3.69	4.41	5.03	2yr
5yr	0.35	0.54	0.67	0.91	1.16	1.40	5yr	1.00	1.37	1.61	2.14	2.77	3.61	4.06	5yr	3.20	3.90	4.52	5.34	6.04	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.60	10yr	1.14	1.56	1.81	2.43	3.12	4.14	4.70	10yr	3.66	4.52	5.25	6.17	6.92	10yr
25yr	0.44	0.67	0.83	1.19	1.56	1.91	25yr	1.35	1.87	2.12	2.83	3.62	4.95	5.70	25yr	4.38	5.48	6.41	7.44	8.22	25yr
50yr	0.49	0.74	0.92	1.33	1.78	2.19	50yr	1.54	2.14	2.37	3.20	4.05	5.66	6.58	50yr	5.01	6.33	7.46	8.58	9.47	50yr
100yr	0.54	0.82	1.03	1.49	2.04	2.52	100yr	1.76	2.46	2.67	3.59	4.51	6.45	7.59	100yr	5.71	7.30	8.69	9.89	10.81	100yr
200yr	0.61	0.91	1.16	1.68	2.34	2.89	200yr	2.02	2.82	3.00	4.04	5.03	7.36	8.77	200yr	6.51	8.43	10.13	11.40	12.36	200yr
500yr	0.71	1.06	1.36	1.98	2.82	3.49	500yr	2.43	3.42	3.51	4.72	5.82	8.71	10.60	500yr	7.71	10.20	12.41	13.77	14.70	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.07	1yr	0.75	1.05	1.23	1.72	2.18	2.76	3.01	1yr	2.44	2.90	3.34	4.14	4.73	1yr
2yr	0.33	0.50	0.62	0.84	1.03	1.24	2yr	0.89	1.21	1.46	1.94	2.50	3.19	3.55	2yr	2.82	3.41	3.92	4.67	5.32	2yr
5yr	0.39	0.60	0.75	1.02	1.30	1.57	5yr	1.12	1.53	1.83	2.47	3.16	4.17	4.71	5yr	3.69	4.53	5.18	6.07	6.83	5yr
10yr	0.45	0.70	0.87	1.21	1.56	1.90	10yr	1.35	1.86	2.21	3.01	3.80	5.14	5.85	10yr	4.55	5.63	6.42	7.41	8.29	10yr
25yr	0.55	0.84	1.05	1.49	1.97	2.44	25yr	1.70	2.38	2.84	3.91	4.88	6.80	7.81	25yr	6.02	7.51	8.50	9.79	10.75	25yr
50yr	0.64	0.97	1.21	1.74	2.34	2.93	50yr	2.02	2.87	3.44	4.75	5.92	8.40	9.73	50yr	7.44	9.36	10.54	12.01	13.18	50yr
100yr	0.74	1.13	1.41	2.04	2.79	3.53	100yr	2.41	3.45	4.17	5.81	7.19	10.39	12.13	100yr	9.20	11.66	13.04	14.76	16.09	100yr
200yr	0.87	1.30	1.65	2.39	3.33	4.27	200yr	2.87	4.17	5.06	7.09	8.71	12.89	15.14	200yr	11.41	14.56	16.15	18.13	19.67	200yr
500yr	1.06	1.57	2.02	2.94	4.18	5.46	500yr	3.61	5.33	6.53	9.25	11.26	17.18	20.29	500yr	15.20	19.51	21.43	23.83	25.67	500yr

Powered by ACIS
Northeast Regional Climate Center

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

RIP RAP CALCULATIONS

Residential Development
JL Terra
Barrington, NH

Beals Associates, PLLC
70 Portsmouth Ave
Stratam, NH

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.* Rip Rap was sized for the 10 year storm event (4.64").

TAILWATER < HALF THE Do

La = (1.8 x Q) / Do 3/2 + (7 x Do) — Q = Peak Flow & Do is Diameter of Pipe
W = La + 3Do or defined channel width
d50 = (0.02 x Q4/3) / (Tw x Do) — Tw = Tailwater Depth
T = Largest stone size of d50 x 1.5 — T= Thickness of Apron
d50= Median Stone Size (0.25' Min.)

Culvert or Catch Basin (Sta. No.)	Tail Water (Feet) Tw	Dischg. (C.F.S.) Q	Dia. of Pipe Do	Length of Rip Rap La (feet)	Width of Rip Rap W (feet)	Calculated Rip Rap **(0.25 Min)**	Actual Rip Rap (Feet)	Thickness of Apron (Feet)
24" HDPE (DMH 1)	0.89	6.47	2.00	18.1	24.1	0.14	0.25	0.56
12" HDPE (CB 7A)	0.35	2.57	1.00	11.6	14.6	0.20	0.25	0.56

Table 7-24 -- Recommended Rip Rap Gradation Ranges

d50 Size =	0.25	Feet	3	Inches	0.5	Feet	6	Inches
% of Weight Smaller Than the Given d50 Size		Size of Stone (Inches) From		To		Size of Stone (Inches) From		To
100%		5		6		9		12
85%		4		5		8		11
50%		3		5		6		9
15%		1		2		2		3

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

STORMWATER POND DESIGN CRITERIA

Env-Wq 1508.03

Type/Node Name: **Wet Pond/1P**

Enter the type of stormwater pond (e.g., Wet Pond) and the node name in the drainage analysis, if applicable.

10.04	ac	A = Area draining to the practice	
1.62	ac	A_I = Impervious area draining to the practice	
0.16	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.20	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.96	ac-in	WQV= 1" x Rv x A	
7,115	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
712	cf	10% x WQV (check calc for sediment forebay and micropool volume)	
3,558	cf	50% x WQV (check calc for extended detention volume)	
2,069	cf	V_{SED} = Sediment forebay volume	≥ 10%WQV
9,381	cf	V_{PP} = Permanent pool volume (volume below the lowest invert of the outlet structure) Attach stage-storage table.	
no	cf	Extended Detention?[1]	≤ 50% WQV
		V_{ED} = Volume of extended detention (if "yes" is given in box above)	
189.25		E_{ED} = Elevation of WQV if "yes" is given in box above[2]	
-	cfs	$2Q_{avg}$ = 2* V_{ED} / 24 hrs * (1hr / 3600 sec) (used to check against Q_{EDmax} below)	
0.01	cfs	Q_{EDmax} = Discharge at the E_{ED} (attach stage-discharge table)	< $2Q_{avg}$
-	hours	T_{ED} = Drawdown time of extended detention = $2V_{ED}/Q_{EDmax}$	≥ 24-hrs
3.00	:1	Pond side slopes	≥3:1
189.50	ft	Elevation of seasonal high water table	
189.00	ft	Elevation of lowest pond outlet	
184.50	ft	Max floor = Maximum elevation of pond bottom (ft)	
181.00	ft	Minimum floor (to maintain depth at less than 8')	≤ 8 ft
184.50	ft	Elevation of pond floor[3]	≤ Max floor and > Min floor
89.00	ft	Length of the flow path between the inlet and outlet at mid-depth	
28.00	ft	Average width ([average of the top width + average bottom width]/2)	
3.18	:1	Length to average width ratio	≥ 3:1
yes	Yes/No	Is the perimeter curvilinear.	← Yes
yes	Yes/No	Are the inlet and outlet located as far apart as possible.	← Yes
no	Yes/No	Is there a manually-controlled drain to dewater the pond over a 24hr period?	
If no state why:		Submersible pump will be used to dewater if necessary	
N/A		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of <6")?	
190.21	ft	Peak elevation of the 50-year storm event	
192.00	ft	Berm elevation of the pond	
YES		50 peak elevation ≤ the berm elevation?	←yes

1. If the entire WQV is stored in the perm. pool, there is no extended det., and the following five lines do not apply.
2. This is the elevation of WQV if the hydrologic analysis is set up to include the permanent pool storage in the node description.
3. If the pond floor elevation is above the max floor elev., a hydrologic budget must be submitted to demonstrate that a minimum depth of 3 feet can be maintained. (First check whether a revised "lowest pond outlet" elev. will resolve the issue.)

Designer's Notes:

Stage-Area-Storage for Pond 1P: WET POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
184.50	886	0
184.60	929	91
184.70	972	186
184.80	1,014	285
184.90	1,057	389
185.00	1,100	497
185.10	1,143	609
185.20	1,186	725
185.30	1,228	846
185.40	1,271	971
185.50	1,314	1,100
185.60	1,357	1,234
185.70	1,400	1,371
185.80	1,442	1,513
185.90	1,485	1,660
186.00	1,528	1,811
186.10	1,586	1,966
186.20	1,643	2,128
186.30	1,701	2,295
186.40	1,758	2,468
186.50	1,816	2,646
186.60	1,873	2,831
186.70	1,931	3,021
186.80	1,988	3,217
186.90	2,046	3,419
187.00	2,104	3,626
187.10	2,161	3,839
187.20	2,219	4,058
187.30	2,276	4,283
187.40	2,334	4,514
187.50	2,391	4,750
187.60	2,449	4,992
187.70	2,506	5,240
187.80	2,564	5,493
187.90	2,621	5,752
188.00	2,679	6,018
188.10	2,748	6,289
188.20	2,817	6,567
188.30	2,886	6,852
188.40	2,954	7,144
188.50	3,023	7,443
188.60	3,092	7,749
188.70	3,161	8,061
188.80	3,230	8,381
188.90	3,299	8,707
189.00	3,368	9,041
189.10	3,436	9,381
189.20	3,505	9,728
189.30	3,574	10,082
189.40	3,643	10,443
189.50	3,712	10,811
189.60	3,781	11,185
189.70	3,849	11,567
189.80	3,918	11,955
189.90	3,987	12,350
190.00	4,056	12,753
190.10	4,124	13,162
190.20	4,193	13,577
190.30	4,262	14,000
190.40	4,330	14,430
190.50	4,399	14,866
190.60	4,467	15,309
190.70	4,535	15,760
190.80	4,604	16,217
190.90	4,673	16,680
191.00	4,741	17,151
191.10	4,809	17,629
191.20	4,878	18,113
191.30	4,947	18,604
191.40	5,015	19,102
191.50	5,084	19,607
191.60	5,152	20,119
191.70	5,220	20,638
191.80	5,289	21,163
191.90	5,358	21,695
192.00	**5,426**	**22,235**

Stage-Discharge for Pond 1P: WET POND

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
184.50	0.00	186.58	0.00	188.66	0.00	190.74	24.44
184.54	0.00	186.62	0.00	188.70	0.00	190.78	25.40
184.58	0.00	186.66	0.00	188.74	0.00	190.82	26.37
184.62	0.00	186.70	0.00	188.78	0.00	190.86	27.37
184.66	0.00	186.74	0.00	188.82	0.00	190.90	28.38
184.70	0.00	186.78	0.00	188.86	0.00	190.94	29.40
184.74	0.00	186.82	0.00	188.90	0.00	190.98	30.44
184.78	0.00	186.86	0.00	188.94	0.00	191.02	31.49
184.82	0.00	186.90	0.00	188.98	0.00	191.06	32.55
184.86	0.00	186.94	0.00	189.02	0.00	191.10	33.63
184.90	0.00	186.98	0.00	189.06	0.00	191.14	34.71
184.94	0.00	187.02	0.00	189.10	0.00	191.18	35.81
184.98	0.00	187.06	0.00	189.14	0.00	191.22	36.92
185.02	0.00	187.10	0.00	189.18	0.00	191.26	38.03
185.06	0.00	187.14	0.00	189.22	0.00	191.30	39.16
185.10	0.00	187.18	0.00	189.26	0.07	191.34	40.30
185.14	0.00	187.22	0.00	189.30	0.25	191.38	41.46
185.18	0.00	187.26	0.00	189.34	0.49	191.42	42.62
185.22	0.00	187.30	0.00	189.38	0.78	191.46	43.79
185.26	0.00	187.34	0.00	189.42	1.11	191.50	44.97
185.30	0.00	187.38	0.00	189.46	1.48	191.54	46.17
185.34	0.00	187.42	0.00	189.50	1.88	191.58	47.37
185.38	0.00	187.46	0.00	189.54	2.32	191.62	48.59
185.42	0.00	187.50	0.00	189.58	2.79	191.66	49.81
185.46	0.00	187.54	0.00	189.62	3.29	191.70	51.05
185.50	0.00	187.58	0.00	189.66	3.81	191.74	52.29
185.54	0.00	187.62	0.00	189.70	4.35	191.78	53.55
185.58	0.00	187.66	0.00	189.74	4.92	191.82	54.81
185.62	0.00	187.70	0.00	189.78	5.51	191.86	56.09
185.66	0.00	187.74	0.00	189.82	6.12	191.90	57.37
185.70	0.00	187.78	0.00	189.86	6.73	191.94	58.67
185.74	0.00	187.82	0.00	189.90	7.35	191.98	**59.97**
185.78	0.00	187.86	0.00	189.94	7.98		
185.82	0.00	187.90	0.00	189.98	8.62		
185.86	0.00	187.94	0.00	190.02	9.28		
185.90	0.00	187.98	0.00	190.06	9.98		
185.94	0.00	188.02	0.00	190.10	10.70		
185.98	0.00	188.06	0.00	190.14	11.43		
186.02	0.00	188.10	0.00	190.18	12.19		
186.06	0.00	188.14	0.00	190.22	12.96		
186.10	0.00	188.18	0.00	190.26	13.75		
186.14	0.00	188.22	0.00	190.30	14.57		
186.18	0.00	188.26	0.00	190.34	15.41		
186.22	0.00	188.30	0.00	190.38	16.26		
186.26	0.00	188.34	0.00	190.42	17.13		
186.30	0.00	188.38	0.00	190.46	18.01		
186.34	0.00	188.42	0.00	190.50	18.89		
186.38	0.00	188.46	0.00	190.54	19.79		
186.42	0.00	188.50	0.00	190.58	20.70		
186.46	0.00	188.54	0.00	190.62	21.63		
186.50	0.00	188.58	0.00	190.66	22.56		
186.54	0.00	188.62	0.00	190.70	23.49		

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Bioret pond/2P**

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

yes	Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
1.65 ac	A = Area draining to the practice	
0.51 ac	A_I = Impervious area draining to the practice	
0.31 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.33 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.54 ac-in	WQV= 1" x Rv x A	
1,971 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
493 cf	25% x WQV (check calc for sediment forebay volume)	
1,478 cf	75% x WQV (check calc for surface sand filter volume)	
Sed Forebay	Method of Pretreatment? (not required for clean or roof runoff)	
1,108 cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:		
4,904 sf	A_{SA} = Surface area of the practice	
3.00 iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
n/a Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
1.6 hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:		
ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.10 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
10.95 hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
188.50 feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
n/a feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
187.50 feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
183.75 feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
#VALUE! feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
4.75 feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
1.00 feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
191.07 ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
191.50 ft	Elevation of the top of the practice	
YES	50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:		
YES ac	Drainage Area check.	< 10 ac
cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	Note what sheet in the plan set contains the filter course specification.	
Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
9,503	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
18.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	18	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	18	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
	inches	D_{FC} = Filter course thickness	12", or 18" if within GPA mod. 304.1 (see spec)
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.
2. See lines 34, 40 and 48 for required depths of filter media.
3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 2P: BIORET POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
187.50	4,904	0
187.55	4,904	98
187.60	4,904	196
187.65	4,904	294
187.70	4,904	392
187.75	4,904	490
187.80	4,904	588
187.85	4,904	687
187.90	4,904	785
187.95	4,904	883
188.00	4,904	981
188.05	4,904	1,079
188.10	4,904	1,177
188.15	4,904	1,275
188.20	4,904	1,373
188.25	4,904	1,471
188.30	4,904	1,569
188.35	4,904	1,667
188.40	4,904	1,765
188.45	4,904	1,864
188.50	4,904	1,962
188.55	4,904	2,035
188.60	4,904	2,109
188.65	4,904	2,182
188.70	4,904	2,256
188.75	4,904	2,329
188.80	4,904	2,403
188.85	4,904	2,477
188.90	4,904	2,550
188.95	4,904	2,624
189.00	4,904	2,697
189.05	4,904	2,771
189.10	4,904	2,844
189.15	4,904	2,918
189.20	4,904	2,991
189.25	4,904	3,065
189.30	4,904	3,139
189.35	4,904	3,212
189.40	4,904	3,286
189.45	4,904	3,359
189.50	4,904	3,433
189.55	4,904	3,506
189.60	4,904	3,580
189.65	4,904	3,653
189.70	4,904	3,727
189.75	4,904	3,801
189.80	4,904	3,874
189.85	4,904	3,948
189.90	4,904	4,021
189.95	4,904	4,095
190.00	4,904	4,168
190.05	4,947	4,415
190.10	4,990	4,663
190.15	5,033	4,914
190.20	5,076	5,166
190.25	5,119	5,421
190.30	5,162	5,678
190.35	5,205	5,938
190.40	5,248	6,199
190.45	5,291	6,462
190.50	5,334	6,728
190.55	5,377	6,996
190.60	5,420	7,266
190.65	5,463	7,538
190.70	5,506	7,812
190.75	5,550	8,088
190.80	5,593	8,367
190.85	5,636	8,648
190.90	5,679	8,931
190.95	5,722	9,216
191.00	5,765	9,503
191.05	5,808	9,792
191.10	5,851	10,084
191.15	5,894	10,377
191.20	5,937	10,673
191.25	5,980	10,971
191.30	6,023	11,271
191.35	6,066	11,573
191.40	6,109	11,877
191.45	6,152	12,184
191.50	**6,195**	**12,493**

Custom Soil Resource Report
Soil Map

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HaA	Hinckley loamy sand, 0 to 3 percent slopes	0.0	0.0%
WdA	Windsor loamy sand, 0 to 3 percent slopes	32.6	100.0%
Totals for Area of Interest		**32.6**	**100.0%**

Map Unit Descriptions

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

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

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

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