Town of Barrington
Site Plan Application

STORMWATER MANAGEMENT SUBMISSION

BARRINGTON TOWN OFFICE BUILDING

Calef Highway (Route 125)
Barrington, New Hampshire

Prepared for

Town of Barrington
335 Calef Highway
Barrington, NH 03825
March 2020

CIVIL
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Stormwater Management Narrative

TOWN OF BARRINGTON
SITE PLAN APPLICATION
STORMWATER MANAGEMENT PLAN

Site Development
Barrington Town Office Building

Calef Highway, NH Route 125
Barrington, New Hampshire

Prepared for:

Town of Barrington
335 Calef Highway
Barrington, NH 03825

March, 2020

INTRODUCTION:

Stormwater runoff conditions have been evaluated for the proposed site development to construct new Town Offices with associated parking and stormwater management facilities. This report includes a review of the 1-, 2-, 10-, 25- and 50-yr storm events, as well as a description of treatment and groundwater recharge methods proposed.

The development proposed creates approximately 84,000 sf of disturbance, with 36,700 sf of impervious area. The entire area included in this application is currently woodland or existing pavement/road swale area. The remaining 47,300 sf consists of new disturbance for grading, stormwater management facilities, and the subsurface effluent disposal system.

While the proposed work does not trigger the requirement to obtain an Alteration of Terrain permit from the NH DES, the lot to be developed is part of a subdivision that will need to submit for an AoT permit. It is the intention of the proposed design to meet all of the requirements of an AoT project to allow the associated subdivision to utilized this design and submission when applying for that permit.

The analysis was performed to assess the influence of the proposed project area on future runoff and to recommend measures to control or mitigate runoff increases due to development, and to address ground water recharge as required by the current standards presented in Env-Wq 1500 and the Town of Barrington requirements of §4.7 of the Site Plan Review Regulations.

METHODOLOGY:

All runoff calculations were performed using the methods based on USDA-SCS Technical Release No. 20 (also known as TR-20). The one-, two-, ten-, twenty five-, and fifty-year, twenty-four hour storm event (Type III rainfall distribution) were used for the site specific analysis to determine pre- and post-development peak discharge rates. Runoff curve numbers (CN) and times of concentration (Tc) were determined by the methods outlined in USDA-SCS Technical Release No. 55 (better known as TR-55). Watershed areas were determined from the topographic map prepared for the site by on the ground survey.

SITE & SOIL INFORMATION:

The area to be developed is primarily Woodbridge soils as determined by a Site-Specific Soil Survey, with a small amount of Ridgebury soil adjacent to the nearby wetland.

Per the SSSNNE Special Publication No. 5 (2009), the Ksat range in the B horizon where the proposed infiltration will be located is listed as 0.6-2.0 in/hour.

Flow from the site currently flow to Rt 125, either through a wetland to the south or roadside swale to the north. All flows eventually reach the Cocheco River via Green Hill Brook.

There are no wetlands and/or streams that will be directly impacted by the proposed work.

Soil information was obtained from a Site Specific Soil Survey prepared by Luke Hurley of Gove Environmental based upon field investigations conducted in March 2019. Conditions at specific stormwater pond locations and septic sites were investigated by Michael Mariano in March 2020. The soils information has been provided in the attached supporting materials.

ANALYSIS:

As noted above, all surface waters within the site flow north to the Isinglass River. Flows exit the site at two separate locations. The watershed that will be altered by the proposed development has been evaluated in the following analysis. Property areas not influenced by the project have been ignored for the remainder of this report.

Pre-Development Areas

Two subcatchments were used to model the existing drainage conditions.

Subcatchment 1 includes the area at Route 125 and the majority of the project area. Flow from this subcatchment drains north along the roadway. The land outside of the road ROW is densely wooded, with an existing gravel entrance to the road.

Subcatchment 2 is the area further into the lot that drains to the on-site wetland. This area is densely wooded throughout.

The subcatchments were modeled to collect at two outlet locations. The first is the runoff that flows directly to the abutter to the south prior to reaching Route 125 (OUT 1) and the second is outletting to the drainage swale to the north along Route 125 (OUT 2).

Post-Development Areas

Six sub-areas were identified for the post development analysis. These reflect the intended separation of flows due to new building area and modified land cover.

There are two infiltration basins proposed that will treat the new imperious area. The basins will also control flows from proposed entrance area.

The north basin (11P) will be located directly south of the proposed entrance, and will handle those flows generated by the new impervious area as well as a small area of woodland to remain along Route 125. This basin will outlet to a swale along Route 125.

The south basin (21P) will treat the proposed parking lot and area east of the new building. This basin will outlet to the southern wetland.

Test pits and observation holes were evaluated to determine the soil types for a site specific soil survey, as well as to provide information on expected infiltration rates of the existing soils. It is the opinion of the soil scientist that the Ksat of the soils in the area will be ranges given in SSSNNE Pub #5 for Woodbridge soils. This publication gives an infiltration rate of 0.6-2.0 in/hour. The design infiltration rate utilized for design was 0.6/2 = 0.3 in/hour.

Refer to the attached soil report prepared by Michael Mariano, NH CSS #76 for further information.

The BMPs have been designed per the 2008 NH DES BMP Manual Vol. II. The design also meets the intent of the Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire, August 1992, as required in the Town of Northwood Zoning Ordinance and Site Review Regulations.

RESULTS:

Pre- and post- development runoff rates were computed for the project as outlined above.

The detailed analysis for this project was performed by computer utilizing "HYDROCAD". The computer print-outs are attached. The following table summarizes the results of the analysis:

SITE RUNOFF RATES - 2 Year Storm

Outlet	Runoff Runoff Rate (CFS) Pre	Post	Change
OUT 1	2.58	2.28	-0.30
Volume(ac-ft)	0.31	0.20	-0.11
OUT 2	4.42	4.36	-0.06
Volume(ac-ft)	0.50	0.52	+0.02

SITE RUNOFF RATES - 10 Year Storm

Outlet	Site Runoff Rates (CFS) Pre	Post	Change
OUT 1	5.62	4.49	-1.13
Volume(ac-ft)	0.65	0.45	-0.20
OUT 2	10.46	10.46	+/-0.0
Volume(ac-ft)	1.09	1.16	+0.07

SITE RUNOFF RATES - 25 Year Storm

Outlet	Site Runoff Rates (CFS) Pre	Post	Change
OUT 1	8.22	7.48	-0.74
Volume(ac-ft)	0.95	0.68	-0.27
OUT 2	15.74	15.72	-0.02
Volume(ac-ft)	1.62	1.73	+0.11

SITE RUNOFF RATES - 50 Year Storm

Outlet	Site Runoff Rates (CFS) Pre	Post	Change
OUT 1	10.73	10.61	-0.12
Volume(ac-ft)	1.23	0.91	-0.32
OUT 2	20.89	20.82	-0.07
Volume(ac-ft)	2.15	2.29	+0.14

See the attached plans and HydroCAD reports for details and calculations.

STORMWATER TREATMENT:

The development will be treated using two infiltration basins (Pond 11P and 21P).

The basis will provide the required groundwater recharge for the proposed development. The total groundwater recharge capacity of the system has been tabulated and is included on the BMP worksheet for GRV.

CONCLUSIONS:

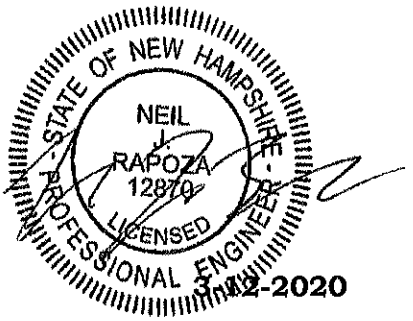
The project is designed to capture and infiltrate storm water from the new paved parking areas and roofs to eliminate adverse impacts to abutting lots and wetlands.

The results of the analysis predict post-development flows will remain at or below existing rates to the project outlet point for the 2-, 10-, 25- and 50-year events.

The overall flow volume off of the site to the receiving Green Hill Brook watershed has been reduced in all storms, and therefore meets the intent of Env-Wq 1500-1507.5 (b)(1)(a) and 1507.6. The stormwater management plan as presented also meets the requirements of the Town of Barrington Site Plan Review Regulation §4.7.

In our opinion, implementation of the facilities described on the plan will not adversely affect downstream property owners or the receiving swale and associated waterways.

A stormwater maintenance plan has also been attached to indicate the procedures and requirements to maintain the stormwater management system.



The seal affixed above applies to this report which consists of 3 pages of text and attached calculations.

J:\aaa\2019\1933600\DRAINAGE\20200310-1933600_DRAINAGE_NARRATIVE(Town).docx

CIVIL
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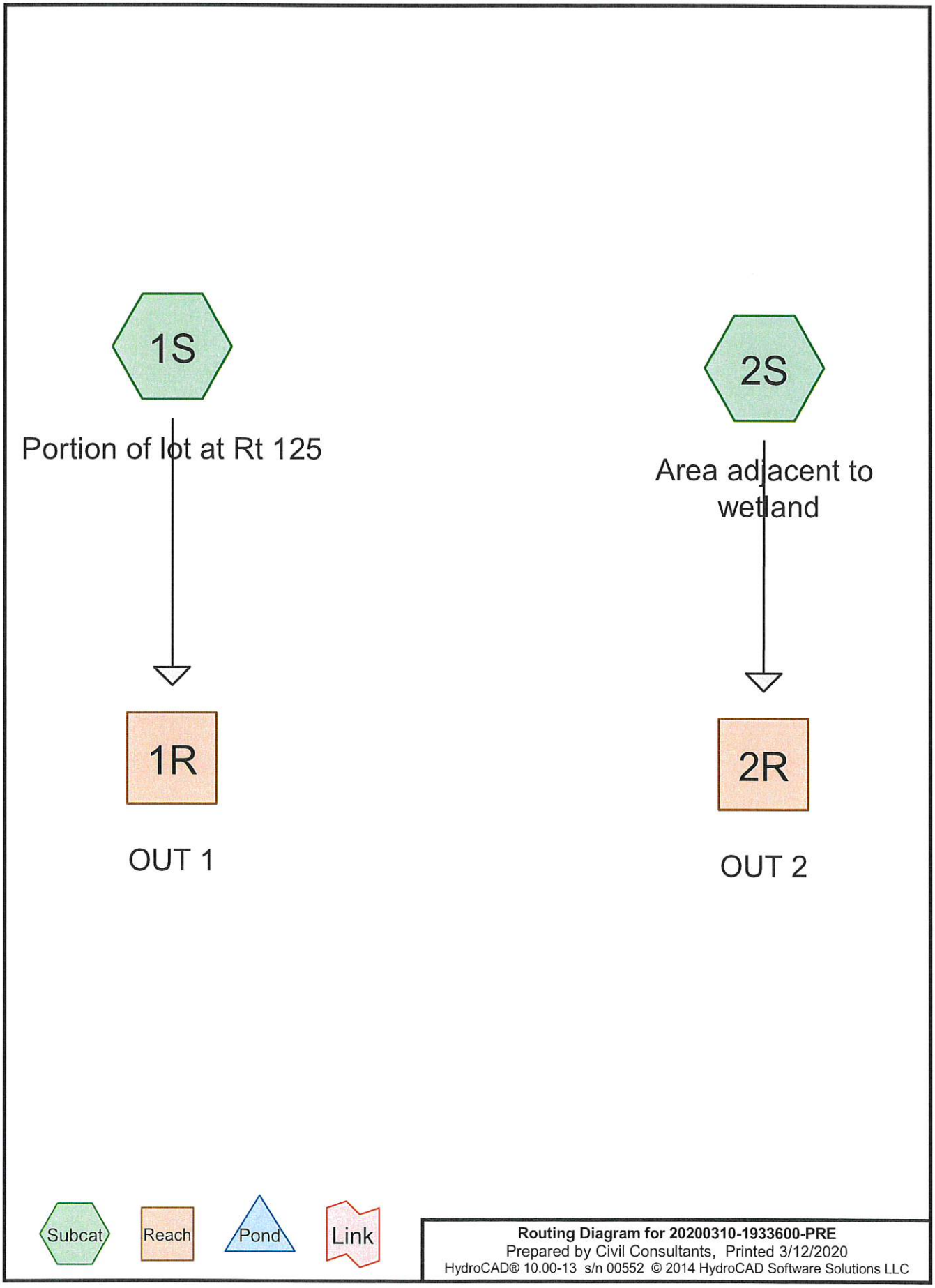
Pre-Development Calculations



Routing Diagram for 20200310-1933600-PRE
Prepared by Civil Consultants, Printed 3/12/2020
HydroCAD® 10.00-13 s/n 00552 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.528	92	Paved roads w/open ditches, 50% imp, HSG C (1S)
9.499	73	Woods, Fair, HSG C (1S, 2S)
10.027	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
10.027	HSG C	1S, 2S
0.000	HSG D	
0.000	Other	
10.027		**TOTAL AREA**

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

Subcatchment 1S: Portion of lot at Rt 125 Runoff Area=3.478 ac 7.59% Impervious Runoff Depth=1.07"
Flow Length=595' Tc=24.4 min CN=76 Runoff=2.58 cfs 0.310 af

Subcatchment 2S: Area adjacent to wetland Runoff Area=6.549 ac 0.00% Impervious Runoff Depth=0.91"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=4.42 cfs 0.495 af

Reach 1R: OUT 1 Inflow=2.58 cfs 0.310 af
Outflow=2.58 cfs 0.310 af

Reach 2R: OUT 2 Inflow=4.42 cfs 0.495 af
Outflow=4.42 cfs 0.495 af

Total Runoff Area = 10.027 ac Runoff Volume = 0.805 af Average Runoff Depth = 0.96"
97.37% Pervious = 9.763 ac 2.63% Impervious = 0.264 ac

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

Subcatchment 1S: Portion of lot at Rt 125 Runoff Area=3.478 ac 7.59% Impervious Runoff Depth=2.24"
Flow Length=595' Tc=24.4 min CN=76 Runoff=5.62 cfs 0.650 af

Subcatchment 2S: Area adjacent to wetland Runoff Area=6.549 ac 0.00% Impervious Runoff Depth=2.00"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=10.46 cfs 1.093 af

Reach 1R: OUT 1 Inflow=5.62 cfs 0.650 af
Outflow=5.62 cfs 0.650 af

Reach 2R: OUT 2 Inflow=10.46 cfs 1.093 af
Outflow=10.46 cfs 1.093 af

Total Runoff Area = 10.027 ac Runoff Volume = 1.742 af Average Runoff Depth = 2.09"
97.37% Pervious = 9.763 ac 2.63% Impervious = 0.264 ac

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

Subcatchment 1S: Portion of lot at Rt 125 Runoff Area=3.478 ac 7.59% Impervious Runoff Depth=3.26"
Flow Length=595' Tc=24.4 min CN=76 Runoff=8.22 cfs 0.945 af

Subcatchment 2S: Area adjacent to wetland Runoff Area=6.549 ac 0.00% Impervious Runoff Depth=2.97"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=15.74 cfs 1.622 af

Reach 1R: OUT 1 Inflow=8.22 cfs 0.945 af
Outflow=8.22 cfs 0.945 af

Reach 2R: OUT 2 Inflow=15.74 cfs 1.622 af
Outflow=15.74 cfs 1.622 af

Total Runoff Area = 10.027 ac Runoff Volume = 2.567 af Average Runoff Depth = 3.07"
97.37% Pervious = 9.763 ac 2.63% Impervious = 0.264 ac

Summary for Subcatchment 1S: Portion of lot at Rt 125

Runoff = 8.22 cfs @ 12.34 hrs, Volume= 0.945 af, Depth= 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Description
2.950	73	Woods, Fair, HSG C
0.528	92	Paved roads w/open ditches, 50% imp, HSG C
3.478	76	Weighted Average
3.214		92.41% Pervious Area
0.264		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	50	0.0180	0.06		**Sheet Flow, 1.1** Woods: Light underbrush n= 0.400 P2= 3.08"
5.1	205	0.0180	0.67		**Shallow Concentrated Flow, 1.2** Woodland Kv= 5.0 fps
6.2	340	0.0330	0.91		**Shallow Concentrated Flow, 1.3** Woodland Kv= 5.0 fps
24.4	595	Total			

Summary for Subcatchment 2S: Area adjacent to wetland

Runoff = 15.74 cfs @ 12.26 hrs, Volume= 1.622 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Description
6.549	73	Woods, Fair, HSG C
6.549		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	50	0.0190	0.06		**Sheet Flow, 2.1** Woods: Light underbrush n= 0.400 P2= 3.08"
3.5	143	0.0190	0.69		**Shallow Concentrated Flow, 2.2** Woodland Kv= 5.0 fps
2.4	441	0.0190	3.06	18.34	**Trap/Vee/Rect Channel Flow, 2.3** Bot.W=4.00' D=0.50' Z= 12.0 & 20.0 '/' Top.W=20.00' n= 0.030 Stream, clean & straight
18.7	634	Total			

Summary for Reach 1R: OUT 1

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

Inflow Area = 3.478 ac, 7.59% Impervious, Inflow Depth = 3.26" for 25-YR event
Inflow = 8.22 cfs @ 12.34 hrs, Volume= 0.945 af
Outflow = 8.22 cfs @ 12.34 hrs, Volume= 0.945 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 2R: OUT 2

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

Inflow Area = 6.549 ac, 0.00% Impervious, Inflow Depth = 2.97" for 25-YR event
Inflow = 15.74 cfs @ 12.26 hrs, Volume= 1.622 af
Outflow = 15.74 cfs @ 12.26 hrs, Volume= 1.622 af, Atten= 0%, Lag= 0.0 min

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

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

Subcatchment 1S: Portion of lot at Rt 125 Runoff Area=3.478 ac 7.59% Impervious Runoff Depth=4.26"
Flow Length=595' Tc=24.4 min CN=76 Runoff=10.73 cfs 1.234 af

Subcatchment 2S: Area adjacent to wetland Runoff Area=6.549 ac 0.00% Impervious Runoff Depth=3.94"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=20.89 cfs 2.148 af

Reach 1R: OUT 1 Inflow=10.73 cfs 1.234 af
Outflow=10.73 cfs 1.234 af

Reach 2R: OUT 2 Inflow=20.89 cfs 2.148 af
Outflow=20.89 cfs 2.148 af

Total Runoff Area = 10.027 ac Runoff Volume = 3.382 af Average Runoff Depth = 4.05"
97.37% Pervious = 9.763 ac 2.63% Impervious = 0.264 ac

CIVIL
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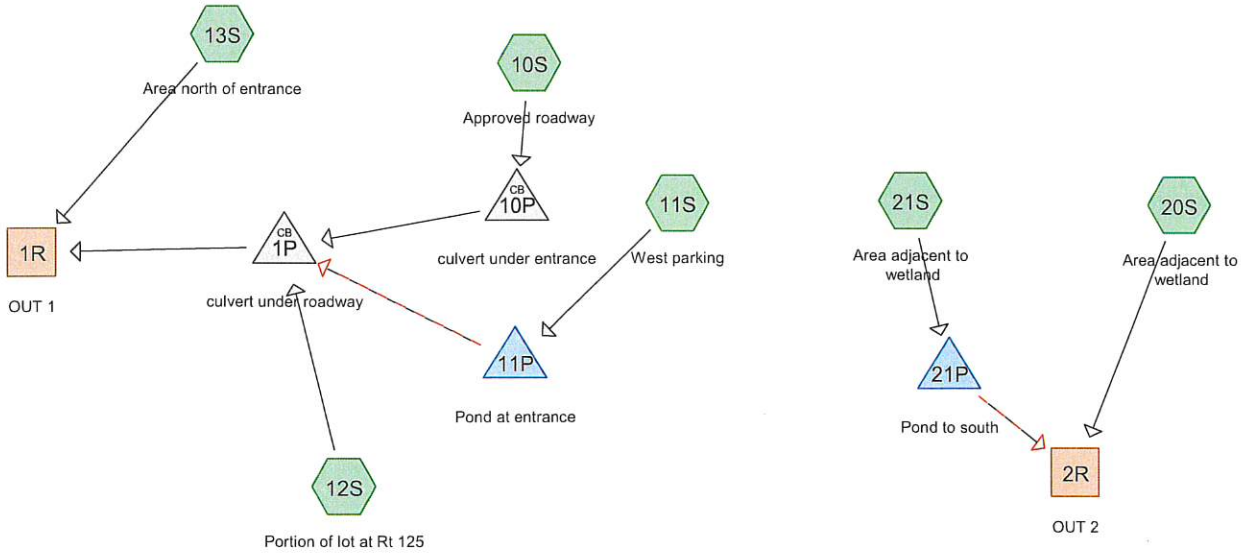


Subcat Reach Pond Link

Routing Diagram for 20200317-1933600-POST
Prepared by Civil Consultants, Printed 3/17/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.100	74	>75% Grass cover, Good, HSG C (10S, 11S, 13S, 20S, 21S)
0.286	98	Paved parking, HSG C (10S, 20S, 21S)
0.379	92	Paved roads w/open ditches, 50% imp, HSG C (13S)
0.594	98	Unconnected pavement, HSG C (11S, 12S)
7.668	73	Woods, Fair, HSG C (10S, 11S, 12S, 13S, 20S, 21S)
10.027	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
10.027	HSG C	10S, 11S, 12S, 13S, 20S, 21S
0.000	HSG D	
0.000	Other	
10.027		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: Approved roadway Runoff Area=0.128 ac 12.50% Impervious Runoff Depth=1.13"
Flow Length=125' Tc=6.8 min CN=77 Runoff=0.16 cfs 0.012 af

Subcatchment 11S: West parking Runoff Area=1.325 ac 29.81% Impervious Runoff Depth=1.13"
Flow Length=155' Tc=12.8 min UI Adjusted CN=77 Runoff=1.34 cfs 0.124 af

Subcatchment 12S: Portion of lot at Rt 125 Runoff Area=0.224 ac 88.84% Impervious Runoff Depth=2.53"
Flow Length=110' Tc=8.1 min CN=95 Runoff=0.58 cfs 0.047 af

Subcatchment 13S: Area north of entrance Runoff Area=1.422 ac 13.33% Impervious Runoff Depth=1.19"
Flow Length=365' Tc=11.1 min CN=78 Runoff=1.61 cfs 0.141 af

Subcatchment 20S: Area adjacent to wetland Runoff Area=6.400 ac 0.08% Impervious Runoff Depth=0.91"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=4.32 cfs 0.484 af

Subcatchment 21S: Area adjacent to Runoff Area=0.528 ac 50.19% Impervious Runoff Depth=1.73"
Flow Length=50' Slope=0.0300 '/' Tc=7.1 min CN=86 Runoff=1.02 cfs 0.076 af

Reach 1R: OUT 1 Inflow=2.28 cfs 0.200 af
Outflow=2.28 cfs 0.200 af

Reach 2R: OUT 2 Inflow=4.36 cfs 0.522 af
Outflow=4.36 cfs 0.522 af

Pond 1P: culvert under roadway Peak Elev=223.86' Inflow=0.74 cfs 0.059 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=0.74 cfs 0.059 af

Pond 10P: culvert under entrance Peak Elev=223.96' Inflow=0.16 cfs 0.012 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=0.16 cfs 0.012 af

Pond 11P: Pond at entrance Peak Elev=226.38' Storage=1,470 cf Inflow=1.34 cfs 0.124 af
Discarded=0.30 cfs 0.124 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.124 af

Pond 21P: Pond to south Peak Elev=230.70' Storage=1,703 cf Inflow=1.02 cfs 0.076 af
Discarded=0.02 cfs 0.038 af Primary=0.08 cfs 0.038 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.076 af

Total Runoff Area = 10.027 ac Runoff Volume = 0.884 af Average Runoff Depth = 1.06"
89.33% Pervious = 8.958 ac 10.67% Impervious = 1.070 ac

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: Approved roadway Runoff Area=0.128 ac 12.50% Impervious Runoff Depth=2.32"
Flow Length=125' Tc=6.8 min CN=77 Runoff=0.33 cfs 0.025 af

Subcatchment 11S: West parking Runoff Area=1.325 ac 29.81% Impervious Runoff Depth=2.32"
Flow Length=155' Tc=12.8 min UI Adjusted CN=77 Runoff=2.86 cfs 0.257 af

Subcatchment 12S: Portion of lot at Rt 125 Runoff Area=0.224 ac 88.84% Impervious Runoff Depth=4.06"
Flow Length=110' Tc=8.1 min CN=95 Runoff=0.91 cfs 0.076 af

Subcatchment 13S: Area north of entrance Runoff Area=1.422 ac 13.33% Impervious Runoff Depth=2.41"
Flow Length=365' Tc=11.1 min CN=78 Runoff=3.36 cfs 0.285 af

Subcatchment 20S: Area adjacent to wetland Runoff Area=6.400 ac 0.08% Impervious Runoff Depth=2.00"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=10.22 cfs 1.068 af

Subcatchment 21S: Area adjacent to Runoff Area=0.528 ac 50.19% Impervious Runoff Depth=3.13"
Flow Length=50' Slope=0.0300 '/' Tc=7.1 min CN=86 Runoff=1.82 cfs 0.138 af

Reach 1R: OUT 1 Inflow=4.49 cfs 0.453 af
Outflow=4.49 cfs 0.453 af

Reach 2R: OUT 2 Inflow=10.46 cfs 1.162 af
Outflow=10.46 cfs 1.162 af

Pond 1P: culvert under roadway Peak Elev=224.15' Inflow=1.77 cfs 0.168 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=1.77 cfs 0.168 af

Pond 10P: culvert under entrance Peak Elev=224.16' Inflow=0.33 cfs 0.025 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=0.33 cfs 0.025 af

Pond 11P: Pond at entrance Peak Elev=227.06' Storage=2,527 cf Inflow=2.86 cfs 0.257 af
Discarded=0.30 cfs 0.190 af Primary=1.30 cfs 0.067 af Secondary=0.00 cfs 0.000 af Outflow=1.60 cfs 0.257 af

Pond 21P: Pond to south Peak Elev=231.10' Storage=2,899 cf Inflow=1.82 cfs 0.138 af
Discarded=0.02 cfs 0.043 af Primary=0.28 cfs 0.095 af Secondary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.138 af

Total Runoff Area = 10.027 ac Runoff Volume = 1.848 af Average Runoff Depth = 2.21"
89.33% Pervious = 8.958 ac 10.67% Impervious = 1.070 ac

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: Approved roadway Runoff Area=0.128 ac 12.50% Impervious Runoff Depth=3.36"
Flow Length=125' Tc=6.8 min CN=77 Runoff=0.48 cfs 0.036 af

Subcatchment 11S: West parking Runoff Area=1.325 ac 29.81% Impervious Runoff Depth=3.36"
Flow Length=155' Tc=12.8 min UI Adjusted CN=77 Runoff=4.14 cfs 0.371 af

Subcatchment 12S: Portion of lot at Rt 125 Runoff Area=0.224 ac 88.84% Impervious Runoff Depth=5.27"
Flow Length=110' Tc=8.1 min CN=95 Runoff=1.16 cfs 0.098 af

Subcatchment 13S: Area north of entrance Runoff Area=1.422 ac 13.33% Impervious Runoff Depth=3.46"
Flow Length=365' Tc=11.1 min CN=78 Runoff=4.83 cfs 0.409 af

Subcatchment 20S: Area adjacent to wetland Runoff Area=6.400 ac 0.08% Impervious Runoff Depth=2.97"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=15.38 cfs 1.586 af

Subcatchment 21S: Area adjacent to Runoff Area=0.528 ac 50.19% Impervious Runoff Depth=4.28"
Flow Length=50' Slope=0.0300 '/' Tc=7.1 min CN=86 Runoff=2.46 cfs 0.188 af

Reach 1R: OUT 1 Inflow=7.48 cfs 0.682 af
Outflow=7.48 cfs 0.682 af

Reach 2R: OUT 2 Inflow=15.72 cfs 1.727 af
Outflow=15.72 cfs 1.727 af

Pond 1P: culvert under roadway Peak Elev=224.44' Inflow=3.13 cfs 0.272 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=3.13 cfs 0.272 af

Pond 10P: culvert under entrance Peak Elev=224.45' Inflow=0.48 cfs 0.036 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=0.48 cfs 0.036 af

Pond 11P: Pond at entrance Peak Elev=227.54' Storage=3,389 cf Inflow=4.14 cfs 0.371 af
Discarded=0.30 cfs 0.233 af Primary=2.46 cfs 0.138 af Secondary=0.00 cfs 0.000 af Outflow=2.76 cfs 0.371 af

Pond 21P: Pond to south Peak Elev=231.44' Storage=3,993 cf Inflow=2.46 cfs 0.188 af
Discarded=0.02 cfs 0.046 af Primary=0.38 cfs 0.142 af Secondary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.188 af

Total Runoff Area = 10.027 ac Runoff Volume = 2.688 af Average Runoff Depth = 3.22"
89.33% Pervious = 8.958 ac 10.67% Impervious = 1.070 ac

Summary for Subcatchment 10S: Approved roadway

Runoff = 0.48 cfs @ 12.10 hrs, Volume= 0.036 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Description
0.016	98	Paved parking, HSG C
0.032	73	Woods, Fair, HSG C
0.080	74	>75% Grass cover, Good, HSG C
0.128	77	Weighted Average
0.112		87.50% Pervious Area
0.016		12.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	30	0.0360	0.08		**Sheet Flow, 10.1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.1	30	0.2600	3.57		**Shallow Concentrated Flow, 10.2** Short Grass Pasture Kv= 7.0 fps
0.1	65	0.0880	14.26	71.32	**Trap/Vee/Rect Channel Flow, 10.3** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
6.8	125	Total			

Summary for Subcatchment 11S: West parking

Runoff = 4.14 cfs @ 12.18 hrs, Volume= 0.371 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Adj	Description
0.401	73		Woods, Fair, HSG C
0.529	74		>75% Grass cover, Good, HSG C
0.395	98		Unconnected pavement, HSG C
1.325	81	77	Weighted Average, UI Adjusted
0.930			70.19% Pervious Area
0.395			29.81% Impervious Area
0.395			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.08		**Sheet Flow, 11.1** Woods: Light underbrush n= 0.400 P2= 3.08"
1.3	65	0.0300	0.87		**Shallow Concentrated Flow, 11.2** Woodland Kv= 5.0 fps
0.8	40	0.0280	0.84		**Shallow Concentrated Flow, 11.3** Woodland Kv= 5.0 fps
12.8	155	Total			

Summary for Subcatchment 12S: Portion of lot at Rt 125

Runoff = 1.16 cfs @ 12.11 hrs, Volume= 0.098 af, Depth= 5.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Description
0.025	73	Woods, Fair, HSG C
0.091	98	Unconnected pavement, HSG C
0.108	98	Unconnected pavement, HSG C
0.224	95	Weighted Average
0.025		11.16% Pervious Area
0.199		88.84% Impervious Area
0.199		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	45	0.0500	0.09		**Sheet Flow, 12.1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.1	65	0.0400	8.20	26.13	**Trap/Vee/Rect Channel Flow, 12.2** Bot.W=2.00' D=0.75' Z= 3.0 '/' Top.W=6.50' n= 0.022 Earth, clean & straight
8.1	110	Total			

Summary for Subcatchment 13S: Area north of entrance

Runoff = 4.83 cfs @ 12.16 hrs, Volume= 0.409 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Description
0.379	92	Paved roads w/open ditches, 50% imp, HSG C
0.155	74	>75% Grass cover, Good, HSG C
0.888	73	Woods, Fair, HSG C
1.422	78	Weighted Average
1.232		86.67% Pervious Area
0.190		13.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		**Sheet Flow, 13.1** Woods: Light underbrush n= 0.400 P2= 3.08"
1.3	110	0.0850	1.46		**Shallow Concentrated Flow, 13.2** Woodland Kv= 5.0 fps
0.8	50	0.0400	1.00		**Shallow Concentrated Flow, 13.2** Woodland Kv= 5.0 fps
0.4	125	0.0100	5.66	62.31	**Trap/Vee/Rect Channel Flow, 13.4** Bot.W=8.00' D=1.00' Z= 3.0 '/' Top.W=14.00' n= 0.022 Earth, clean & straight
0.5	30	0.0400	1.00	3.45	**Trap/Vee/Rect Channel Flow, 13.5** Bot.W=10.00' D=0.25' Z= 15.0 '/' Top.W=17.50' n= 0.100 Heavy timber, flow below branches
11.1	365	Total			

Summary for Subcatchment 20S: Area adjacent to wetland

Runoff = 15.38 cfs @ 12.26 hrs, Volume= 1.586 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Description
0.094	74	>75% Grass cover, Good, HSG C
6.301	73	Woods, Fair, HSG C
0.005	98	Paved parking, HSG C
6.400	73	Weighted Average
6.395		99.92% Pervious Area
0.005		0.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	50	0.0190	0.06		**Sheet Flow, 20.1** Woods: Light underbrush n= 0.400 P2= 3.08"
3.5	143	0.0190	0.69		**Shallow Concentrated Flow, 20.2** Woodland Kv= 5.0 fps
2.4	441	0.0190	3.06	18.34	**Trap/Vee/Rect Channel Flow, 20.3** Bot.W=4.00' D=0.50' Z= 12.0 & 20.0 '/' Top.W=20.00' n= 0.030 Stream, clean & straight
18.7	634	Total			

Summary for Subcatchment 21S: Area adjacent to wetland

Runoff = 2.46 cfs @ 12.10 hrs, Volume= 0.188 af, Depth= 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.86"

Area (ac)	CN	Description
0.021	73	Woods, Fair, HSG C
0.242	74	>75% Grass cover, Good, HSG C
0.265	98	Paved parking, HSG C
0.528	86	Weighted Average
0.263		49.81% Pervious Area
0.265		50.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0300	0.12		**Sheet Flow, 21.1** Grass: Dense n= 0.240 P2= 3.08"

Summary for Reach 1R: OUT 1

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

Inflow Area = 3.099 ac, 25.80% Impervious, Inflow Depth = 2.64" for 25-YR event
Inflow = 7.48 cfs @ 12.17 hrs, Volume= 0.682 af
Outflow = 7.48 cfs @ 12.17 hrs, Volume= 0.682 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 5

Summary for Reach 2R: OUT 2

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

Inflow Area = 6.928 ac, 3.90% Impervious, Inflow Depth = 2.99" for 25-YR event
Inflow = 15.72 cfs @ 12.26 hrs, Volume= 1.727 af
Outflow = 15.72 cfs @ 12.26 hrs, Volume= 1.727 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 5

Summary for Pond 1P: culvert under roadway

Inflow Area = 1.677 ac, 36.37% Impervious, Inflow Depth = 1.95" for 25-YR event
Inflow = 3.13 cfs @ 12.35 hrs, Volume= 0.272 af
Outflow = 3.13 cfs @ 12.35 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min
Primary = 3.13 cfs @ 12.35 hrs, Volume= 0.272 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 5
Peak Elev= 224.44' @ 12.35 hrs
Flood Elev= 227.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	223.40'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 223.40' / 223.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.13 cfs @ 12.35 hrs HW=224.44' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 3.13 cfs @ 3.37 fps)

Summary for Pond 10P: culvert under entrance

Inflow Area = 0.128 ac, 12.50% Impervious, Inflow Depth = 3.36" for 25-YR event
Inflow = 0.48 cfs @ 12.10 hrs, Volume= 0.036 af
Outflow = 0.48 cfs @ 12.10 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.10 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 5
Peak Elev= 224.45' @ 12.35 hrs
Flood Elev= 227.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	223.70'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 223.70' / 223.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.48 cfs @ 12.10 hrs HW=224.26' TW=224.19' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.48 cfs @ 1.19 fps)

Summary for Pond 11P: Pond at entrance

Inflow Area = 1.325 ac, 29.81% Impervious, Inflow Depth = 3.36" for 25-YR event
Inflow = 4.14 cfs @ 12.18 hrs, Volume= 0.371 af
Outflow = 2.76 cfs @ 12.36 hrs, Volume= 0.371 af, Atten= 33%, Lag= 10.9 min
Discarded = 0.30 cfs @ 11.45 hrs, Volume= 0.233 af
Primary = 2.46 cfs @ 12.36 hrs, Volume= 0.138 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 5
Peak Elev= 227.54' @ 12.36 hrs Surf.Area= 1,941 sf Storage= 3,389 cf

Plug-Flow detention time= 34.3 min calculated for 0.370 af (100% of inflow)
Center-of-Mass det. time= 34.2 min (863.2 - 828.9)

Volume	Invert	Avail.Storage	Storage Description
#1	225.00'	9,988 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
225.00	770	0	0	770
226.00	1,210	982	982	1,224
227.00	1,680	1,439	2,420	1,713
228.00	2,182	1,926	4,346	2,238
229.00	2,962	2,562	6,908	3,038
230.00	3,200	3,080	9,988	3,347

Device	Routing	Invert	Outlet Devices
#1	Primary	224.90'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 224.90' / 224.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	226.35'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	226.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	227.45'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	225.00'	**0.30 cfs Exfiltration at all elevations** Phase-In= 0.10'
#6	Secondary	227.75'	**4.0' long x 7.0' 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Discarded OutFlow Max=0.30 cfs @ 11.45 hrs HW=225.10' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=2.42 cfs @ 12.36 hrs HW=227.53' TW=224.43' (Dynamic Tailwater)
└**1=Culvert** (Passes 2.42 cfs of 4.36 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.55 cfs @ 4.44 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 4.48 fps)
  └**4=Orifice/Grate** (Weir Controls 0.48 cfs @ 0.94 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=225.00' TW=223.40' (Dynamic Tailwater)
└**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 21P: Pond to south

Inflow Area =	0.528 ac, 50.19% Impervious,	Inflow Depth =	4.28"	for 25-YR event
Inflow =	2.46 cfs @ 12.10 hrs,	Volume=	0.188 af	
Outflow =	0.40 cfs @ 12.61 hrs,	Volume=	0.188 af,	Atten= 84%, Lag= 30.2 min
Discarded =	0.02 cfs @ 12.61 hrs,	Volume=	0.046 af	
Primary =	0.38 cfs @ 12.61 hrs,	Volume=	0.142 af	
Secondary =	0.00 cfs @ 0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 5
Peak Elev= 231.44' @ 12.61 hrs Surf.Area= 3,362 sf Storage= 3,993 cf

Plug-Flow detention time= 249.1 min calculated for 0.188 af (100% of inflow)
Center-of-Mass det. time= 248.8 min (1,048.4 - 799.6)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	5,991 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	2,123	0	0	2,123
231.00	3,075	2,584	2,584	3,092
232.00	3,750	3,407	5,991	3,798

Device	Routing	Invert	Outlet Devices
#1	Primary	230.00'	**12.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.00' / 229.00' S= 0.0087 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	230.30'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	230.60'	**3.5" Vert. Orifice/Grate** C= 0.600
#4	Discarded	230.00'	**0.300 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#5	Secondary	231.85'	**8.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#6	Device 1	231.60'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.61 hrs HW=231.44' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.38 cfs @ 12.61 hrs HW=231.44' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.38 cfs of 2.89 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 4.94 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.27 cfs @ 4.00 fps)
  └**6=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=230.00' TW=0.00' (Dynamic Tailwater)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: Approved roadway Runoff Area=0.128 ac 12.50% Impervious Runoff Depth=4.37"
Flow Length=125' Tc=6.8 min CN=77 Runoff=0.63 cfs 0.047 af

Subcatchment 11S: West parking Runoff Area=1.325 ac 29.81% Impervious Runoff Depth=4.37"
Flow Length=155' Tc=12.8 min UI Adjusted CN=77 Runoff=5.37 cfs 0.482 af

Subcatchment 12S: Portion of lot at Rt 125 Runoff Area=0.224 ac 88.84% Impervious Runoff Depth=6.41"
Flow Length=110' Tc=8.1 min CN=95 Runoff=1.39 cfs 0.120 af

Subcatchment 13S: Area north of entrance Runoff Area=1.422 ac 13.33% Impervious Runoff Depth=4.47"
Flow Length=365' Tc=11.1 min CN=78 Runoff=6.23 cfs 0.530 af

Subcatchment 20S: Area adjacent to wetland Runoff Area=6.400 ac 0.08% Impervious Runoff Depth=3.94"
Flow Length=634' Slope=0.0190 '/' Tc=18.7 min CN=73 Runoff=20.42 cfs 2.099 af

Subcatchment 21S: Area adjacent to Runoff Area=0.528 ac 50.19% Impervious Runoff Depth=5.37"
Flow Length=50' Slope=0.0300 '/' Tc=7.1 min CN=86 Runoff=3.05 cfs 0.236 af

Reach 1R: OUT 1 Inflow=10.61 cfs 0.911 af
Outflow=10.61 cfs 0.911 af

Reach 2R: OUT 2 Inflow=20.82 cfs 2.286 af
Outflow=20.82 cfs 2.286 af

Pond 1P: culvert under roadway Peak Elev=224.92' Inflow=5.58 cfs 0.380 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=5.58 cfs 0.380 af

Pond 10P: culvert under entrance Peak Elev=224.92' Inflow=0.63 cfs 0.047 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=0.63 cfs 0.047 af

Pond 11P: Pond at entrance Peak Elev=227.69' Storage=3,692 cf Inflow=5.37 cfs 0.482 af
Discarded=0.30 cfs 0.268 af Primary=4.49 cfs 0.214 af Secondary=0.00 cfs 0.000 af Outflow=4.79 cfs 0.482 af

Pond 21P: Pond to south Peak Elev=231.67' Storage=4,801 cf Inflow=3.05 cfs 0.236 af
Discarded=0.02 cfs 0.049 af Primary=0.83 cfs 0.187 af Secondary=0.00 cfs 0.000 af Outflow=0.86 cfs 0.236 af

Total Runoff Area = 10.027 ac Runoff Volume = 3.513 af Average Runoff Depth = 4.20"
89.33% Pervious = 8.958 ac 10.67% Impervious = 1.070 ac

CIVIL
CONSULTANTS

Engineers

Planners

Surveyors

APPENDICES

A – Location & Topographic Plan

B – Soils Report

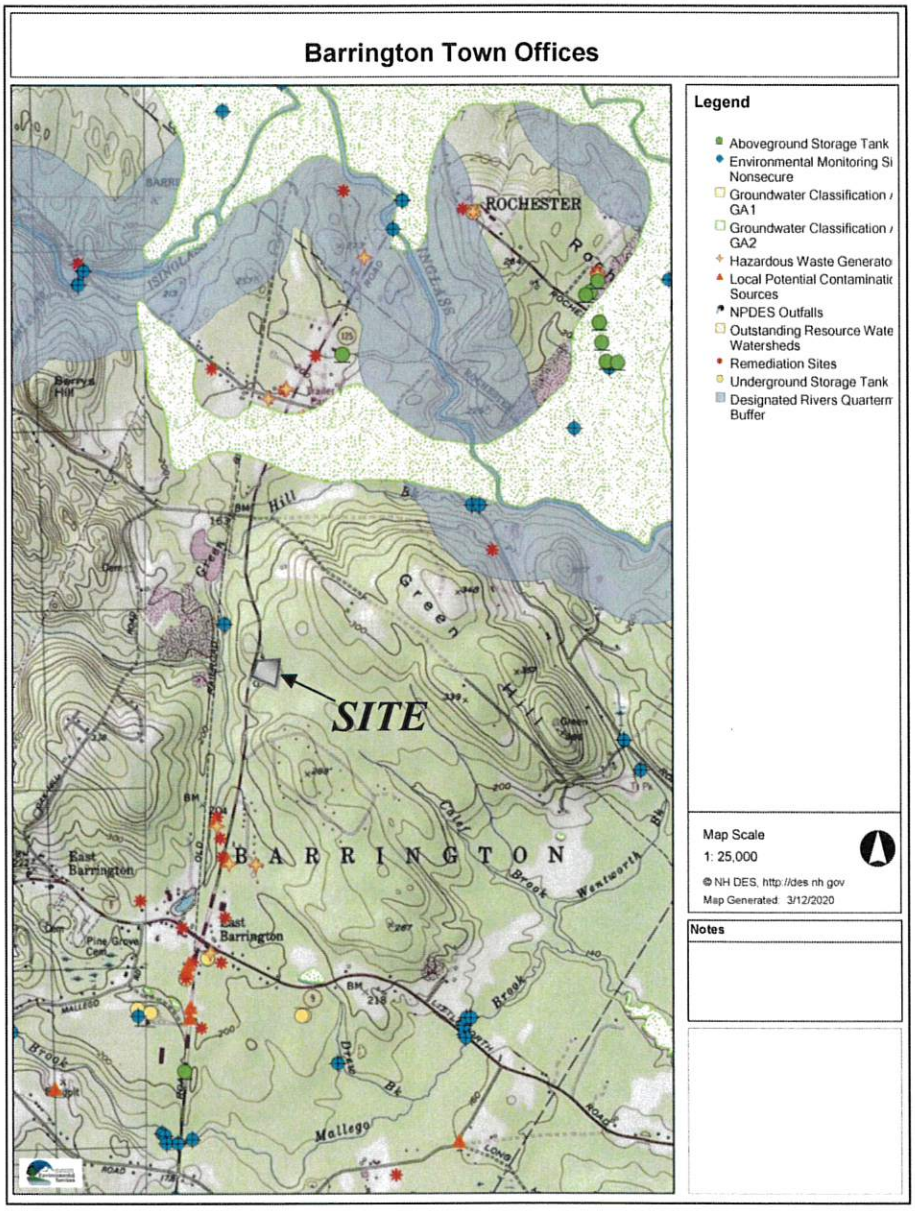
C – Supplemental Calculations

D – Stormwater Maintenance Plan and Inspection Log

E – Drainage & Site Plans

APPENDIX A

LOCATION AND TOPOGRAPHIC PLAN



Portion of USGS Maps Dover West		*PREPARED FOR:*	*Town of Barrington*
JOB NO: 19-336.00	*Reduced scale*	*DATE: March 2020*	

APPENDIX B

Medium Intensity Soil Survey Plan

Obtained from NRCS Web Soil Survey		*PREPARED FOR:*	*Town of Barrington*
JOB NO: 19-336.00	*Reduced scale*	*DATE: March 2020*	

APPENDIX C

Supplemental Stormwater Calculations

Conveyance Systems. Calculations for sizing on-site conveyance structures, including culverts are included in the HydroCad print outs included in this report. Stabilization calculations are included here. Ditch stabilization is per NHDOT Highway design manual. Riprap sizing and erosion control measures are shown and noted on the Site Plans. These plans also show scaled drawings and cross sections of these conveyance systems and associated practices.

Stormwater BMP Designs. See attached stormwater facility design spreadsheets developed by NH DES for sizing of proposed BMPs, as well as evaluation of existing BMP's that are proposed to remain.

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	70.991 degrees West
Latitude	43.227 degrees North
Elevation	0 feet
Date/Time	Thu, 09 Jan 2020 08:15:13 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.65	0.81	1.02	**1yr**	0.70	0.98	1.19	1.53	1.97	2.56	3.22	**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	3.84	**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	4.89	**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	5.84	**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	7.37	**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	8.81	**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	10.52	**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	12.59	**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	9.63	12.64	15.93	**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**

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Northeast Regional Climate Center

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Waumbeck	58	3	2.0	20.0	6.00	20.0	B	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Wineeski	102	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Woodbridge	29	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Winooski	9	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Canaan	663	4	2.0	20.0	2.00	20.0	C	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Cardigan	357	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Chatfield	89	4	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Elliottsville	128	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Glebe	671	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Glover	NA	4	0.6	2.0	0.60	2	D	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Hogback	91	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	4	0.6	6.0	0.60	6.0	C/D	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Kearsarge	359	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Lyman	92	4	2.0	6.0	2.00	6.0	A/D	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Macomber	252	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Millsite	251	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monson	133	4	0.6	2.0	0.60	2.0	D	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Pennichuck	460	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Rawsonville	98	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Ricker	674	4	2.0	6.0	2.00	6.0	A	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Saddleback	673	4	0.6	2.0	0.60	2.0	C/D	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Shapleigh	136	4					C/D	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Thorndike	84	4	0.6	2.0	0.60	2.0	C/D	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Tunbridge	99	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Winnecook	88	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Woodstock	93	4	2.0	6.0	2.00	6.0	C/D	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Au Gres	516	5					B	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bemis	224	5	0.6	0.2	0.00	0.2	C	Firm, platy, loamy till	cryic	loamy	no	
Binghamville	534	5	0.2	2.0	0.06	0.2	D	Terraces and glacial lake plains	mesic	silty	no	
Brayton	240	5	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Cabot	589	5	0.6	2.0	0.06	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Charles	209	5	0.6	100.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	silty	no	
Cohas	505	5	0.6	2.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Grange	433	5	0.6	2.0	0.60	2.0	C	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Kinsman	614	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Leicester	514	5	0.6	6.0	0.60	20.0	C	Loose till, loamy textures	mesic	loamy	no	
Lim	3	5	0.6	2.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	5	0.6	2.0	0.60	2.0	C	Flood Plain (Bottom Land)	mesic	silty	no	
Lyme	246	5	0.6	6.0	0.60	6.0	C	Loose till, sandy textures	frigid	loamy	no	
Mashpee	315	5	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	yes	
Monarda	569	5	0.2	2.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Moosilauke	414	5	6.0	20.0	6.00	20.0	C	Loose till, sandy textures	frigid	sandy	no	
Naumburg	214	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Pemi	633	5	0.6	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	5	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314	5					B	Outwash and Stream Terraces	mesic	sandy	yes	
Raynham	533	5	0.2	2.0	0.06	0.2	C	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	5	0.6	2.0	6.00	100.0	D	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Ridgebury	656	5	0.6	6.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	5	0.2	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	frigid	loamy	no	

DRAINAGE CULVERT & RIPRAP SIZING

Based on Manning's "n" = 0.012, Q=k*s^(0.5)

Culvert	Diam. (in)	Slope (ft/ft)	Capacity (cfs)	Design flow (cfs) (25 year event)	Velocity (fps)	Tailwater (feet	Apron Length (feet)	Width W1 (feet)	Width W2 (feet)	Min d50 (inches)	Spec d50 (inches)	Notes
CB 2 out	12	0.015	4.73	2.46	4.1	0.40	9	3.00	10	1.9	5	
CB 3 out	12	0.004	2.44	0.38	6.6	0.40	9	3.00	10	0.2	5	Conservatively assume velo from 2" orifice
CB 4 out	18	0.005	8.05	2.00	1..5	0.60	14	4.50	15	0.7	5	
CB 5 out	12	0.006	2.99	2.33	6.38	0.40	9	3.00	10	1.8	8	Conservatively assume velo from 4" orifice
Road Culvert	18	0.004	7.20	3.13	3.37	0.60	14	4.50	15	1.2	5	
Drive Culvert	18	0.005	8.05	0.48	0.93	0.60	Not needed			N/A	5	Outllet to adjacent riprap

NOTE: Where amount or velocity of flow from the culvet is not know/evaluated, a conservative flow has been assumed as well as a velocity that will require the installation of outlet protection.

Apron sizing determined using Maine Erosion & Sediment Control BMP Manual for high flow pipes

Groundwater Recharge Volume (GRV) Calculation

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

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

The proposed BMPs have the following recharge capacities:

BMP	Discarded flow (1-yr event)
Pond 11P	3,615 cf
Pond 21P	1,002 cf
TOTAL	4,617 cf

STORMWATER POND DESIGN CRITERIA (Env-Wq 1508.03)

Type/Node Name: **Pond 11P - Detention Pond w/Infiltration**

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

1.33 ac	A = Area draining to the practice	
0.39 ac	A_I = Impervious area draining to the practice	
0.29 decimal	I = percent impervious area draining to the practice, in decimal form	
0.31 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.42 ac-in	WQV= 1" x Rv x A	
1,516 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
152 cf	10% x WQV (check calc for sediment forebay and micropool volume)	
758 cf	50% x WQV (check calc for extended detention volume)	
234 cf	V_{SED} = sediment forebay volume	← ≥ 10%WQV
- cf	V_{PP} = permanent pool volume (volume below the lowest invert of the outlet structure)	
1,516 cf	V_{ED} = WQV - V_{PP} = extended detention volume	← ≤ X%[1] WQV
225.85	E_{ED} = elevation of V_{ED} (attach stage-storage table)	
0.04 cfs	$2Q_{avg}$ = 2* V_{ED} / 24 hrs * (1hr / 3600 sec) (used to check against Q_{EDmax} below)	
0.02 cfs	Q_{EDmax} = discharge at the E_{ED} (attach stage-discharge table)	← <2Q_{avg}
42.10 hours	T_{ED} = drawdown time of extended detention = $2V_{ED}/Q_{EDmax}$	← ≥ 24-hrs
3.00 :1	Pond side slopes	← ≥3:1
ft	Average permanent pool depth	← 3 - 6 ft
ft	Maximum depth of permanent pool	← ≤ 8 ft
ft	Length of the flow path between the inlet and outlet at mid-depth	
ft	Average Width ([average of the top width + average bottom width]/2)	
- :1	Length to Average Width ratio	← ≥ 3:1
Yes Yes/No	The perimeter should be curvilinear.	
No Yes/No	The inlet and outlet should be located as far apart as possible.	
No Yes/No	Is there a manually-controlled drain provided to dewater the pond over a 24hr period?	
If no state why:	Continuous drain currently installed, cleanout as necessary to provide dewatering.	
Nilex Georidge to be installed over outlets	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
227.45 ft	Peak elevation of the 50-year storm event	
228.50 ft	Berm elevation of the pond	
YES	50 peak elevation ≤ the berm elevation?	← yes
Qualified professional that developed the planting plan:		
Name, Profession:	Existing vegetation to remain	

1. "X" varies depending on type of stormwater pond design. See NH Stormwater Manual, Vol.2, Ch.4-3, Section 1, for the design permanent pool volumes and extended detention volumes.

Designer's Notes:

This pond will detain runoff and allow for a small amount of infiltration and to control peak flows from the site.

Stage-Area-Storage for Pond 11P: Pond at entrance

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
225.00	770	0
225.05	790	39
225.10	810	79
225.15	830	120
225.20	850	162
225.25	871	205
225.30	892	249
225.35	913	294
225.40	934	340
225.45	956	388
225.50	978	436
225.55	1,000	485
225.60	1,022	536
225.65	1,045	588
225.70	1,068	640
225.75	1,091	694
225.80	1,114	749
225.85	1,138	806
225.90	1,162	863
225.95	1,186	922
226.00	1,210	982
226.05	1,232	1,043
226.10	1,254	1,105
226.15	1,276	1,168
226.20	1,298	1,232
226.25	1,320	1,298
226.30	1,343	1,365
226.35	1,366	1,432
226.40	1,389	1,501
226.45	1,412	1,571
226.50	1,435	1,642
226.55	1,459	1,715
226.60	1,483	1,788
226.65	1,507	1,863
226.70	1,531	1,939
226.75	1,555	2,016
226.80	1,580	2,094
226.85	1,605	2,174
226.90	1,630	2,255
226.95	1,655	2,337
227.00	1,680	2,420
227.05	1,704	2,505
227.10	1,727	2,591
227.15	1,751	2,678
227.20	1,775	2,766
227.25	1,799	2,855
227.30	1,824	2,946
227.35	1,848	3,038
227.40	1,873	3,131
227.45	1,898	3,225
227.50	1,923	3,320
227.55	1,948	3,417
227.60	1,973	3,515
227.65	1,999	3,614
227.70	2,025	3,715
227.75	2,050	3,817
227.80	2,076	3,920
227.85	2,103	4,025
227.90	2,129	4,130
227.95	2,155	4,237
228.00	2,182	4,346
228.05	2,218	4,456
228.10	2,255	4,568
228.15	2,291	4,681
228.20	2,328	4,797
228.25	2,366	4,914
228.30	2,404	5,033
228.35	2,441	5,155
228.40	2,480	5,278
228.45	2,518	5,403
228.50	2,557	5,529
228.55	2,596	5,658
228.60	2,636	5,789
228.65	2,675	5,922
228.70	2,716	6,057
228.75	2,756	6,193
228.80	2,796	6,332
228.85	2,837	6,473
228.90	2,879	6,616
[illegible]	2,920	6,761
[illegible]	2,962	6,908
229.05	2,974	7,056
229.10	2,985	7,205
229.15	2,997	7,355
229.20	3,009	7,505
229.25	3,021	7,656
229.30	3,032	7,807
229.35	3,044	7,959
229.40	3,056	8,112
229.45	3,068	8,265
229.50	3,080	8,418
229.55	3,092	8,573
229.60	3,104	8,728
229.65	3,116	8,883
229.70	3,128	9,039
229.75	3,140	9,196
229.80	3,152	9,353
229.85	3,164	9,511
229.90	3,176	9,669
229.95	3,188	9,828
230.00	**3,200**	**9,988**

:ed=226.42

Ved=1516 cf

Stage-Discharge for Pond 11P: Pond at entrance

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)	
225.00	0.00	0.00	0.00	0.00	
225.10	0.30	**0.30**	0.00	0.00	
225.20	0.30	**0.30**	0.00	0.00	
225.30	0.30	0.30	0.00	0.00	
225.40	0.30	0.30	0.00	0.00	
225.50	0.30	0.30	0.00	0.00	
225.60	0.30	0.30	0.00	0.00	
225.70	0.30	0.30	0.00	0.00	
225.80	0.30	0.30	0.00	0.00	
225.90	0.30	0.30	0.00	0.00	
226.00	0.30	0.30	0.00	0.00	
226.10	0.30	0.30	0.00	0.00	
226.20	0.30	0.30	0.00	0.00	
ed=226.42 226.30	0.30	0.30	0.00	0.00	
226.40	0.31	0.30	0.01	0.00	Qed=0.02 cfs
226.50	0.38	0.30	0.08	0.00	
226.60	0.53	0.30	0.23	0.00	
226.70	0.76	0.30	0.46	0.00	
226.80	1.03	0.30	0.73	0.00	
226.90	1.28	0.30	0.98	0.00	
227.00	1.49	0.30	1.19	0.00	
227.10	1.66	0.30	1.36	0.00	
227.20	1.81	0.30	1.51	0.00	
227.30	1.95	0.30	1.65	0.00	
227.40	2.08	0.30	1.78	0.00	
227.50	2.43	0.30	2.13	0.00	
227.60	3.51	0.30	3.21	0.00	
227.70	4.83	0.30	4.53	0.00	
227.80	5.03	0.30	4.63	0.11	
227.90	5.58	0.30	4.72	0.56	
228.00	6.33	0.30	4.81	1.21	
228.10	7.27	0.30	4.91	2.06	
228.20	8.39	0.30	5.00	3.10	
228.30	9.72	0.30	5.08	4.33	
228.40	11.12	0.30	5.17	5.65	
228.50	12.53	0.30	5.26	6.98	
228.60	14.04	0.30	5.34	8.40	
228.70	15.65	0.30	5.42	9.93	
228.80	17.33	0.30	5.51	11.52	
228.90	19.07	0.30	5.59	13.18	
229.00	20.88	0.30	5.66	14.91	
229.10	22.75	0.30	5.74	16.71	
229.20	24.68	0.30	5.82	18.56	
229.30	26.67	0.30	5.90	20.47	
229.40	28.74	0.30	5.97	22.47	
229.50	30.88	0.30	6.05	24.54	
229.60	33.09	0.30	6.12	26.67	
229.70	35.36	0.30	6.19	28.86	
229.80	37.69	0.30	6.26	31.12	
229.90	40.09	0.30	6.33	33.45	
230.00	**42.55**	0.30	**6.40**	**35.84**	

STORMWATER POND DESIGN CRITERIA (Env-Wq 1508.03)

Type/Node Name: **Pond 21P - Detention Pond w/Infiltration**

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

0.53 ac	A = Area draining to the practice	
0.26 ac	A_I = Impervious area draining to the practice	
0.50 decimal	I = percent impervious area draining to the practice, in decimal form	
0.50 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.26 ac-in	WQV= 1" x Rv x A	
958 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
96 cf	10% x WQV (check calc for sediment forebay and micropool volume)	
479 cf	50% x WQV (check calc for extended detention volume)	
195 cf	V_{SED} = sediment forebay volume	← ≥ 10%WQV
- cf	V_{PP} = permanent pool volume (volume below the lowest invert of the outlet structure)	
958 cf	V_{ED} = WQV - V_{PP} = extended detention volume	← ≤ X%[1] WQV
229.45	E_{ED} = elevation of V_{ED} (attach stage-storage table)	
0.02 cfs	$2Q_{avg}$ = 2* V_{ED} / 24 hrs * (1hr / 3600 sec) (used to check against Q_{EDmax} below)	
0.02 cfs	Q_{EDmax} = discharge at the E_{ED} (attach stage-discharge table)	← <$2Q_{avg}$
26.62 hours	T_{ED} = drawdown time of extended detention = $2V_{ED}/Q_{EDmax}$	← ≥ 24-hrs
3.00 :1	Pond side slopes	← ≥3:1
ft	Average permanent pool depth	← 3 - 6 ft
ft	Maximum depth of permanent pool	← ≤ 8 ft
ft	Length of the flow path between the inlet and outlet at mid-depth	
ft	Average Width ([average of the top width + average bottom width]/2)	
- :1	Length to Average Width ratio	← ≥ 3:1
Yes Yes/No	The perimeter should be curvilinear.	
Yes Yes/No	The inlet and outlet should be located as far apart as possible.	
No Yes/No	Is there a manually-controlled drain provided to dewater the pond over a 24hr period?	
If no state why:	Continuous drain currently installed, cleanout as necessary to provide dewatering.	
Nilex Georidge to be installed over outlets	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
231.21 ft	Peak elevation of the 50-year storm event	
231.50 ft	Berm elevation of the pond	
YES	50 peak elevation ≤ the berm elevation?	← yes
Qualified professional that developed the planting plan:		
Name, Profession:	Existing vegetation to remain	

1. "X" varies depending on type of stormwater pond design. See NH Stormwater Manual, Vol.2, Ch.4-3, Section 1, for the design permanent pool volumes and extended detention volumes.

Designer's Notes:

This pond will detain runoff and allow for a small amount of infiltration and to control peak flows from the site.

Stage-Area-Storage for Pond 21P: Pond to south

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
230.00	2,123	0
230.02	2,140	43
230.04	2,158	86
230.06	2,175	129
230.08	2,193	173
230.10	2,210	217
230.12	2,228	261
230.14	2,246	306
230.16	2,264	351
230.18	2,281	396
230.20	2,299	442
230.22	2,317	488
230.24	2,335	535
230.26	2,354	582
230.28	2,372	629
230.30	2,390	677
230.32	2,409	725
230.34	2,427	773
230.36	2,445	822
230.38	2,464	871
230.40	2,483	920
ed=230.42		
230.42	2,501	970
230.44	2,520	1,020
230.46	2,539	1,071
230.48	2,558	1,122
230.50	2,577	1,173
230.52	2,596	1,225
230.54	2,615	1,277
230.56	2,634	1,330
230.58	2,654	1,382
230.60	2,673	1,436
230.62	2,693	1,489
230.64	2,712	1,543
230.66	2,732	1,598
230.68	2,751	1,653
230.70	2,771	1,708
230.72	2,791	1,763
230.74	2,811	1,819
230.76	2,830	1,876
230.78	2,850	1,933
230.80	2,871	1,990
230.82	2,891	2,048
230.84	2,911	2,106
230.86	2,931	2,164
230.88	2,951	2,223
230.90	2,972	2,282
230.92	2,992	2,342
230.94	3,013	2,402
230.96	3,034	2,462
230.98	3,054	2,523
231.00	3,075	2,584
231.02	3,088	2,646
231.04	3,101	2,708
231.06	3,114	2,770
231.08	3,127	2,832
231.10	3,139	2,895
231.12	3,152	2,958
231.14	3,165	3,021
231.16	3,179	3,085
231.18	3,192	3,148
231.20	3,205	3,212
231.22	3,218	3,276
231.24	3,231	3,341
231.26	3,244	3,406
231.28	3,257	3,471
231.30	3,270	3,536
231.32	3,284	3,602
231.34	3,297	3,667
231.36	3,310	3,733
231.38	3,324	3,800
231.40	3,337	3,866
231.42	3,350	3,933
Ved=958 cf	3,364	4,000
231.46	3,377	4,068
231.48	3,391	4,135
231.50	3,404	4,203
231.52	3,418	4,272
231.54	3,431	4,340
231.56	3,445	4,409
231.58	3,458	4,478
231.60	3,472	4,547
231.62	3,486	4,617
231.64	3,499	4,687
231.66	3,513	4,757
231.68	3,527	4,827
231.70	3,540	4,898
231.72	3,554	4,969
231.74	3,568	5,040
231.76	3,582	5,112
231.78	3,596	5,183
231.80	3,610	5,255
231.82	3,624	5,328
231.84	3,638	5,400
231.86	3,651	5,473
231.88	3,665	5,546
231.90	3,679	5,620
231.92	3,694	5,694
231.94	3,708	5,768
231.96	3,722	5,842
231.98	3,736	5,916
232.00	**3,750**	**5,991**

Stage-Discharge for Pond 21P: Pond to south

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
230.00	0.00	0.00	0.00	0.00
230.05	0.01	0.01	0.00	0.00
230.10	0.02	0.02	0.00	0.00
230.15	0.02	0.02	0.00	0.00
230.20	0.02	0.02	0.00	0.00
230.25	0.02	0.02	0.00	0.00
230.30	0.02	0.02	0.00	0.00
230.35	0.02	0.02	0.00	0.00
230.40	0.03	0.02	0.01	0.00
230.45	0.04	0.02	0.03	0.00
230.50	0.05	0.02	0.04	0.00
230.55	0.06	0.02	0.04	0.00
230.60	0.07	0.02	0.05	0.00
230.65	0.08	0.02	0.06	0.00
230.70	0.10	0.02	0.08	0.00
230.75	0.13	0.02	0.11	0.00
230.80	0.16	0.02	0.14	0.00
230.85	0.20	0.02	0.18	0.00
230.90	0.22	0.02	0.20	0.00
230.95	0.25	0.02	0.22	0.00
231.00	0.27	0.02	0.24	0.00
231.05	0.28	0.02	0.26	0.00
231.10	0.30	0.02	0.28	0.00
231.15	0.32	0.02	0.30	0.00
231.20	0.33	0.02	0.31	0.00
231.25	0.35	0.02	0.33	0.00
231.30	0.36	0.02	0.34	0.00
231.35	0.38	0.02	0.35	0.00
231.40	0.39	0.02	0.37	0.00
231.45	0.40	0.02	0.38	0.00
231.50	0.41	0.02	0.39	0.00
231.55	0.43	0.02	0.40	0.00
231.60	0.44	0.02	0.41	0.00
231.65	0.68	0.02	0.65	0.00
231.70	1.11	0.02	1.08	0.00
231.75	1.66	0.02	1.64	0.00
231.80	2.32	0.03	2.29	0.00
231.85	3.06	0.03	3.03	0.00
231.90	4.09	0.03	3.85	0.21
231.95	5.03	0.03	4.41	0.59
232.00	**5.57**	**0.03**	**4.45**	**1.09**

Ied=230.42 Qed=0.02 cfs

APPENDIX D

Stormwater Maintenance & Inspection Plan

During the construction of the Barrington Town Office Building, maintenance of all erosion, sedimentation, and stormwater flow control structures and devices will be the responsibility of the Contractor. Upon final stabilization of the site, all maintenance will be the responsibility of the Town of Barrington (Owner).

The Owner will be responsible for the maintenance of all erosion, sedimentation, and stormwater flow control structures and devices within the limits of the development and will retain that responsibility until such time as another individual and/or agency (acceptable to the NH DES and the Town) accepts the responsibility.

The Owner will be responsible for the continued maintenance of the stormwater treatment system.

During construction all erosion control devices and structures shall be checked monthly and after each "significant rainfall"**. Necessary repairs will be made to correct undermining or deterioration of the devices and/or structures. Sediment in the stormwater detention basins will be removed annually or as needed to maintain functionality of the facility.

The Owner shall maintain inspection logs (attached) of all stormwater and erosion control measures. The log shall reflect the dates of the inspections and describe actions taken. The log shall be kept on file for a minimum of 5 years and be made available to the Town upon request.

The activities listed in the inspection log will be accomplished in early spring and in late fall.

A major storm event is classified as a rainfall exceeding 2.9 inches (2yr) storm event.

** Significant rainfall is ½" in 24 hr

Sweeping

Paved surfaces shall be swept or vacuumed at least annually in the Spring to remove all Winter sand, and periodically during the year on an as-needed basis to minimize transportation of sediment during rainfall events.

Roadways and Parking Surfaces	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Clear accumulated winter sand in parking lots and along roadways	X			
Sweep pavement to remove sediment	X			
Grade road shoulders and remove excess sand either manually or by a front-end loader	X			
Grade gravel roads and gravel shoulders	X			
Clean-out the sediment within water bars or open top culverts	X			
Ensure that stormwater is not impeded by accumulations of material or false ditches in the shoulder	X			

Catch Basins and Culverts

All catch basins, and any other field inlets throughout the collection system, need to be inspected on a monthly basis to assure that the inlet entry point is clear of debris and will allow the intended water entry. These will be cleared, if necessary on a yearly basis or when sediment reaches two thirds of total sump volume. Catch basins need to be vacuumed and cleaned of all accumulated sediment. This work must be done by a vacuum truck. The removed material must be disposed of in accordance with the New Hampshire Solid Waste Disposal Rules.

	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Remove and legally dispose of accumulated sediments and debris from the bottom of the basin, inlet grates, inflow channels to the basin, and pipes between basins.	X	X		
Remove floating debris and floating oils (using oil absorptive pads) from any trap designed for such	X	X		
Remove accumulated sediments and debris at the inlet, at the outlet, and within the culvert.	X	X	X	
Repair any erosion damage at the culvert's inlet and outlet	X	X	X	

Vegetated Areas

All areas of maintained lawn are to be inspected regularly for signs of erosions and channelization. Areas where erosion is occurring or areas of sparse growth shall be replanted and stabilized. Channelized flows from the eroded land shall be diverted to buffers or other areas able to withstand the high sediment loan in the erosive runoff.

Vegetated Areas	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Inspect all slopes and embankments	X		X	
Replant bare areas or areas with sparse growth	X		X	
Armor areas with fill erosions with an appropriate lining or divert the erosive flows to on-site areas able to withstand concentrated flows	X		X	

Infiltration Facilities

Monitoring and Inspections: The infiltration area should be inspected several times in the first year of operation and at least annually thereafter. Conduct inspections after large storms to check for surface ponding at the inlet that may indicate clogging. Water levels in the observation wells (if applicable) should be recorded over several days after the storm to ensure that the system drains as designed. Records should be kept of all maintenance operations to help plan future work and identify problem areas.

Inspecting Embankments for Instability and Erosion: Embankments should be inspected annually for erosion, destabilization of side slopes, embankment settling, and other signs of structural failure. Corrective action should be taken immediately upon identification of problems.

Sediment Forebay Maintenance: The sediment forebay shall be inspected at least annually for deterioration and accumulation of sediment and debris. The forebay will be cleaned out when accumulated sediment and debris occupies more than 10% of the available capacity.

Pretreatment Buffer Strips: If a grass buffer strip is used in conjunction with the infiltration BMP it should be inspected regularly. Growth should be vigorous and dense. Bare spots or eroded areas should be repaired and/or re-seeded or re-sodded. Watering and /or fertilization should be provided during the first few months after the strip is established, and may periodically be needed in times of drought. Grass filter strips should be mowed regularly to prevent the uncontrolled growth of briars and weeds. Filter strips in residential or commercial areas will need to be mowed more frequently, but filter strip performance will be impaired if the grass is cut too short. Lawn clippings should be removed to prevent them from clogging the BMP.

Observation Wells, Measure of Sediment Accumulation, and Points of Access for Sediment Removal: Observation wells will be installed in the basins to determine the system's overall performance and infiltration rate. The observation well shall be a 4-inch diameter perforated PVC pipe with a removable and securable well cap, foot plate and rebar anchor. If impounded water drains at a rate of less than 2.41 in/hour, sediment at the surface of the basin shall be removed and disposed of appropriately. Marked rods shall be installed to determine the amount of sediment accumulation at the surface of the basins. Access to the basins shall be provided over the roadway and individual lots as needed.

Clearing Outlet Structures: The outlet structures should be checked periodically to ensure that they are not blocked by debris. Inspections should be conducted monthly during wet weather conditions from March to November.

Mowing: Basins with grass cover should be mowed at least twice per year. Clippings should be removed to minimize the amount of organic material accumulating in the basin.

Fertilization: Fertilization of the infiltration area should be avoided unless absolutely necessary to establish vegetation.

Harvesting and Weeding: Harvesting and pruning of excessive growth will need to be done occasionally. Weeding to control unwanted or invasive plants may also be necessary.

Snow Storage: Snow removed from any on-site or off-site areas may not be stored over an infiltration area.

Infiltration Facilities –Infiltration Basin				
	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Inspect the embankments for destabilization, slope erosion, internal piping, and downstream swamping. A professional engineer must review these immediately.		X	X	
Mow the embankment and basin surface to control woody vegetation.		X		
Inspect the sediment control areas (forebays) for accumulation of debris and sediment. Removed when more than 10% of available capacity is occupied, or when sediment is no longer contained to the forebay (at least annually).		X		X
Remove and dispose of sediments and debris upstream of the basin		X		X
The basin should be inspected several times in the first several months and at least annually thereafter		X		
Confirm infiltration rates via observation wells (if applicable) and monitor sediment accumulation on the basin surface via marked rods, remove sediment as needed (see below)		X	X	
The top several inches of the basin shall be replaced with fresh material when water ponds on the surface of the bed for more than 72 hours. The removed sediments should be disposed in an acceptable manner. A professional engineer shall review the condition of the facility to determine if additional actions are necessary to restore infiltration function.				X
Basins should be mowed at least 2 times per year, with clippings removed	X	X		
Fertilization of the basins should be avoided unless absolutely necessary to establish vegetation				
Harvesting and pruning of excessive growth will need to be done occasionally. Weeding to control unwanted or invasive plants may also be necessary		X		

Road Salt and Deicing Minimization

The intent should be to minimize the amount of salt and other deicing agents utilized to the extent practical. Efforts shall be made to avoid the use of dry salt and winter sand and other abrasive materials.

A table provided by the NH DES for Deicing Application Rate Guidelines has been included for reference with regard to the type and rate of deicing agents to be used.

Use of deicers for each storm event shall be tracked using the log sheet provided.

NO WINTER SANDING OF POROUS ASPHALT IS PERMITTED.

Control of Invasive Plants

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

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

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

Deicing Application Rate Guidelines

24' of pavement (typcial two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Pounds per two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

** A blend of 6 - 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

Figure 4-1. Deicing Application Rate Guidelines

Anti-icing Route Data Form

Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

CIVIL CONSULTANTS
P.O. Box 100 South Berwick, Maine 03908 207-384-2550

Stormwater Maintenance
Barrington Town Office Building
Maintenance Log

This log is intended to accompany the Stormwater Management Facilities Maintenance Plan for Barrington Town Office Building. The following items shall be checked, cleaned and maintained on regular basis as specified in the Maintenance Plan and as described in the table below. This log shall be kept on file for a minimum of five years. Qualified personnel familiar with drainage systems and soils shall perform all inspections.

Item	Maintenance Required & Frequency	Spring	Fall or Yearly	After a Major Storm	Every 2–5 Years	Date Completed	Maintenance Personnel	Comments
Sweeping of Roads	Clear accumulated winter sand in parking lots and along roadways	X						
	Sweep pavement to remove sediment	X						
	Grade road shoulders and remove excess sand either manually or by a front-end loader	X						
	Grade gravel roads and gravel shoulders	X						
	Clean-out the sediment within water bars or open top culverts	X						
	Ensure that stormwater is not impeded by accumulations of material or false ditches in the shoulder	X						

<table>
<tr><th>Item</th><th>Maintenance Required & Frequency</th><th>Date Completed</th><th>Maintenance Personnel</th><th>Comments</th></tr>
<tr><td>Vegetated Areas</td><td>
<table>
<tr><th colspan="5">Vegetated Areas</th></tr>
<tr><th></th><th>Spring</th><th>Fall or Yearly</th><th>After a Major Storm</th><th>Every 2– 5 Years</th></tr>
<tr><td>Inspect all slopes and embankments</td><td>X</td><td></td><td>X</td><td></td></tr>
<tr><td>Replant bare areas or areas with sparse growth</td><td>X</td><td></td><td>X</td><td></td></tr>
<tr><td>Armor areas with fill erosions with an appropriate lining or divert the erosive flows to on-site areas able to withstand concentrated flows</td><td>X</td><td></td><td>X</td><td></td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>Catch Basins (Item “1” on Plan)</td><td>
<table>
<tr><th></th><th>Spring</th><th>Fall or Yearly</th><th>After a Major Storm</th><th>Every 2– 5 Years</th></tr>
<tr><td>Remove and legally dispose of accumulated sediments and debris from the bottom of the basin, inlet grates, inflow channels to the basin, and pipes between basins.</td><td>X</td><td>X</td><td></td><td></td></tr>
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<tr><td>Remove accumulated sediments and debris at the inlet, at the outlet, and within the culvert.</td><td>X</td><td>X</td><td>X</td><td></td></tr>
<tr><td>Repair any erosion damage at the culvert’s inlet and outlet</td><td>X</td><td>X</td><td>X</td><td></td></tr>
</table>
</td><td></td><td></td><td></td></tr>
</table>

Item	Maintenance Required & Frequency					Date Completed	Maintenance Personnel	Comments
Roadway Ditches, Swales and Culverts (Item "2" on plan)	Inspect ditches, swales and other open stormwater channels	X	X	X				
	Remove any obstructions and accumulated sediments or debris	X	X					
	Control vegetated growth and woody vegetation		X					
	Repair any erosion of the ditch lining		X					
	Mow vegetated ditches		X					
	Remove woody vegetation growing through riprap		X					
	Repair any slumping side slopes	X	X					
	Replace riprap where underlying filter fabric or underdrain gravel is showing or where stones have dislodge	X			X			

Item	Maintenance Required & Frequency					Date Completed	Maintenance Personnel	Comments
Infiltration BMPs **Infiltration Basin (Item "3" on plan)**	**Infiltration Facilities –Infiltration Basin**							
		Spring	Fall or Yearly	After a Major Storm	Every 2–5 Years			
	Inspect the embankments for destabilization, slope erosion, internal piping, and downstream swamping. A professional engineer must review these immediately.		X	X				
	Mow the embankment and basin surface to control woody vegetation.		X					
	Inspect the sediment control areas (forebays) for accumulation of debris and sediment. Removed when more than 10% of available capacity is occupied, or when sediment is no longer contained to the forebay (at least annually).		X		X			
	Remove and dispose of sediments and debris upstream of the basin		X		X			
	The basin should be inspected several times in the first several months and at least annually thereafter		X					
	Confirm infiltration rates via observation wells (if applicable) and monitor sediment accumulation on the basin surface via marked rods, remove sediment as needed (see below)		X	X				
	The top several inches of the basin shall be replaced with fresh material when water ponds on the surface of the bed for more than 72 hours. The removed sediments should be disposed in an acceptable manner. A professional engineer shall review the condition of the facility to determine if additional actions are necessary to restore infiltration function.				X			
	Basins should be mowed at least 2 times per year, with clippings removed	X	X					

	Fertilization of the basins should be avoided unless absolutely necessary to establish vegetation							
	Harvesting and pruning of excessive growth will need to be done occasionally. Weeding to control unwanted or invasive plants may also be necessary		X					

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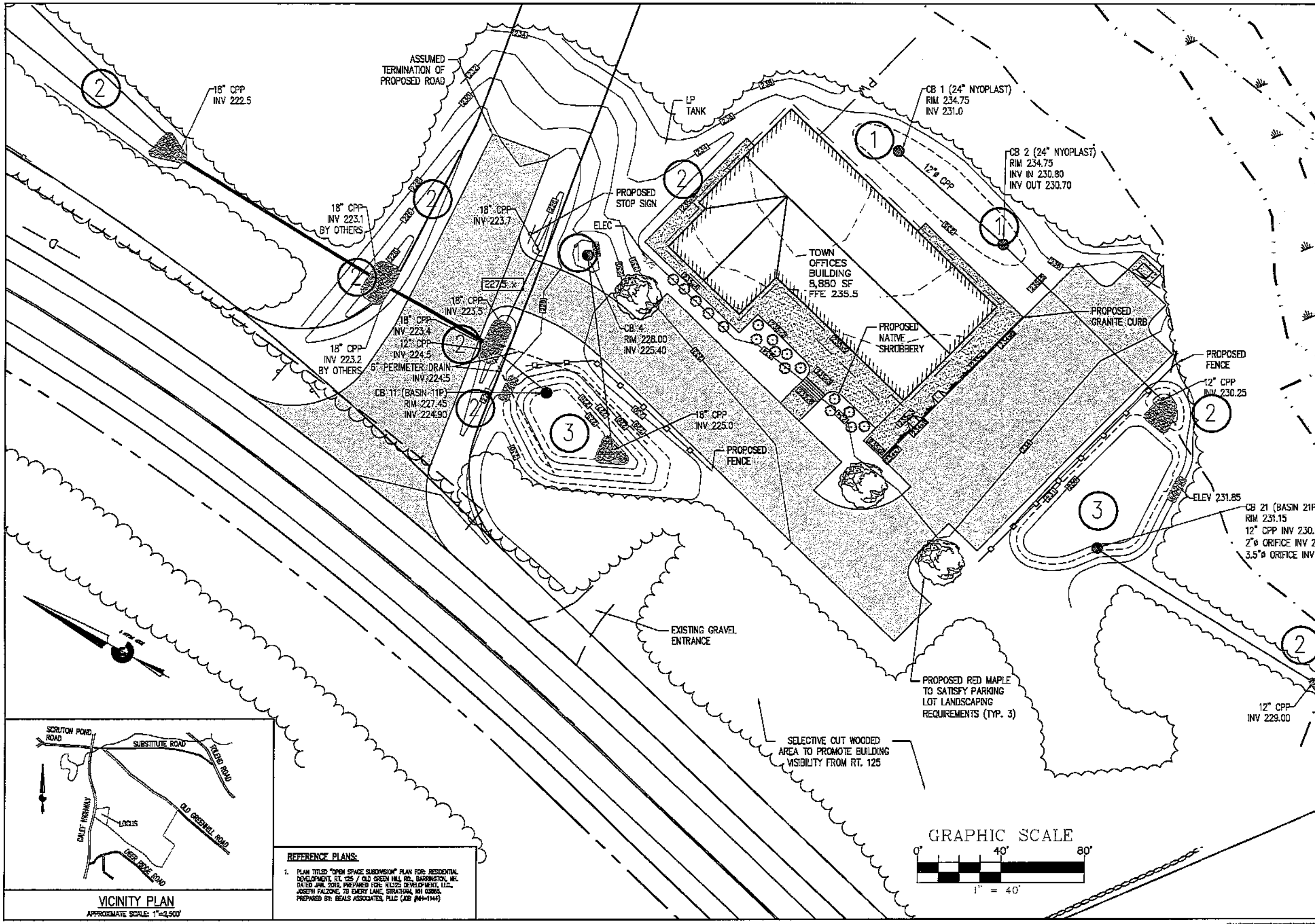
Stormwater Management System
Barrington Town Office Building

Inspection & Maintenance Checklist

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed *(List Items/Comments)*	Date of Cleaning/Repair	Performed By



REFERENCE PLANS:

1. PLAN TITLED "OPEN SPACE SUBDIVISION" PLAN FOR: RESIDENTIAL DEVELOPMENT, RT. 125 / OLD GREEN HILL RD., BARRINGTON, NH. DATED JAN. 2018. PREPARED FOR: RT.125 DEVELOPMENT, LLC., JOSEPH FALZONE, 78 EMERY LANE, STRATHAM, NH 03885. PREPARED BY: BEALS ASSOCIATES, PLLC (JOB #NH-1144)

OWNER: TOWN OF BARRINGTON, NH

DESIGN/BUILDER:

ARCHITECT: 959 Islington Street, Portsmouth, NH 03801

CIVIL CONSULTANTS — Engineers, Planners, Surveyors, P.O. Box 100, South Berwick, Maine 03908

REVISION HISTORY:

#	DATE	ISSUANCE

SEAL: 3/17/2020

PROJECT NAME: Barrington Town Hall

DRAWING TITLE: BMP LOCATION PLAN

PROJECT No.: CC1933600 PORT19-062

DATE: 03/17/2020

DRAWING SCALE: 1" = 40 FT

SHEET NUMBER: BMP-1

CIVIL
CONSULTANTS

Engineers

Planners

Surveyors

APPENDIX E

L1 – Site Plan

L2 - Notes and Details

D1 – Pre-Development Stormwater Plan

D2 – Post-Development Stormwater Plan

PLAN INDEX:

PLAN SHEETS INCLUDED IN THIS PACKAGE ARE:

L1 – PROPOSED SITE PLAN
L2 – CONSTRUCTION DETAILS AND NOTES

LEGEND

(R 110.77)	RECORD DISTANCE
	PROPERTY LINE
	BUILDING SETBACK
200	EXISTING CONTOUR
	WETLAND
	EDGE OF WETAND
	WETLAND BUFFER
	WELL
	TEST PIT
	SIGN
	CATCH BASIN
	UTILITY POLE
OHW	OVERHEAD WIRE
	HYDRANT
	PROPOSED 2FT CONTOURS
	PROPOSED DETAIL 1FT CONTOUR
	PROPOSED SPOT GRADE
	PROPOSED PAVEMENT
	PROPOSED CONCRETE WALKWAY
	PROPOSED LIGHT POLE
LP	PROPOSED LP LINE
UGE	PROPOSED UNDERGROUND ELEC
PW	PROPOSED WATER LINE
PS	PROPOSED SEWER LINE
	PROPOSED SHRUBBERY
	PROPOSED DECIDUOUS TREE

REFERENCE PLANS:

1. PLAN TITLED "OPEN SPACE SUBDIVISION" PLAN FOR: RESIDENTIAL DEVELOPMENT, RT. 125 / OLD GREEN HILL RD., BARRINGTON, NH. DATED JAN. 2019, PREPARED FOR: RT.125 DEVELOPMENT, LLC., JOSEPH FALZONE, 78 EMERY LANE, STRATHAM, NH 03885. PREPARED BY: BEALS ASSOCIATES, PLLC (JOB #NH-1144)
2. PLAN TITLED "SUBDIVISION PLAN "THE RIDGE AT GREEN HILL" FOR HARBOR STREET LIMITED PARTNERSHIP, LAND OF PAUL C HELFGOTT, RINA MYHRE & CAROL H. LEDOUX (TAX MAP 223, LOTS 24 & 26), ROUTE 125/CALEF HIGHWAY, BARRINGTON, NH" REVISION DATE FEBRUARY 29, 2020, PREPARED BY: DOUCET SURVEY INC. (JOB #5750)

SITE PLAN NOTES:

1. THE INTENT OF THIS PLAN IS TO CONSTRUCT AN 8,880 SF BUILDING FOR MUNICIPAL USE BY THE TOWN OF BARRINGTON AS THE TOWN OFFICE ON THE EXISTING UNDEVELOPED LOT. WORK INCLUDES SITE IMPROVEMENTS ASSOCIATED WITH THE USE.
2. INFORMATION DEPICTED HEREON IS BASED ON DATA OBTAINED FROM TOPOGRAPHIC MAPPING PROVIDED BY THE TOWN OF BARRINGTON IN A DIGITAL FILE OF REFERENCE PLAN 1.
3. UTILITY INFORMATION DEPICTED HEREON IS COMPILED USING PHYSICAL EVIDENCE LOCATED IN THE FIELD. UTILITIES DEPICTED HEREON MAY NOT NECESSARILY REPRESENT ALL EXISTING UTILITIES. CONTRACTORS NEED TO CONTACT DIGSAFE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
4. ASSESSOR'S INFORMATION:
   TOWN OF BARRINGTON ASSESSOR'S MAP 223 LOT 26 (LOT C1 OF SUBDIVISION APPROVED FOR "ROUTE 125 DEVELOPMENT, LLC")
5. RECORD OWNER:
   ROUTE 125 DEVELOPMENT, LLC.
   78 EMERY LANE
   STRATHAM, NH 03885
6. DEED REFERENCE:
   S.C.R.D. BK 4665 PG 975
7. ZONING INFORMATION:
   REGIONAL COMMERCIAL (RC)/
   STRATIFIED DRIFT AQUIFER OVERLAY (SDAO)

	REQUIRED	PROVIDED
MINIMUM LOT SIZE:	40,000 SF	254,900 SF
MINIMUM STREET FRONTAGE:	200'	284'
FRONT BUILD-TO LINE (COMM):	75'	>75'
REAR SETBACK (TO RES USE):	100'	>100'
SIDE SETBACK:	30'	>30'
MAXIMUM BUILDING HEIGHT:	40'	<30'
MAXIMUM LOT COVERAGE:	50%	12%

8. SUBJECT PARCEL IS NOT LOCATED WITHIN A FEDERALLY DESIGNATED FLOOD HAZARD AREA (COMMUNITY PANEL NUMBER 33017C0305E. EFFECTIVE DATE: SEPTEMBER 30, 2015). PARCEL IS IN THE COCHECO RIVER WATERSHED.
9. PROPERTY LINES ARE APPROXIMATE BASED ON INFORMATION OBTAINED FROM REFERENCE PLAN 1. ALL MONUMENTS TO BE SET IN ACCORDANCE WITH THE TOWN OF BARRINGTON SITE PLAN REGULATIONS.
10. LOCUS PARCEL CONTAINS 5.82 ACRES MORE OR LESS.
11. ELEVATIONS ARE BASED ON NAVD88.
12. UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL CONTACT DIGSAFE (1-888-344-7233) FOR LOCATION OF ALL EXISTING UTILITIES.
13. THE BUILDING WILL BE SERVED BY A NEW SUBSURFACE DISPOSAL FIELD AND WELL TO BE LOCATED ON-SITE.
14. BASED ON THE SECTION 4.9.13.2 TABLE 6 PARKING REGULATION TABLE:

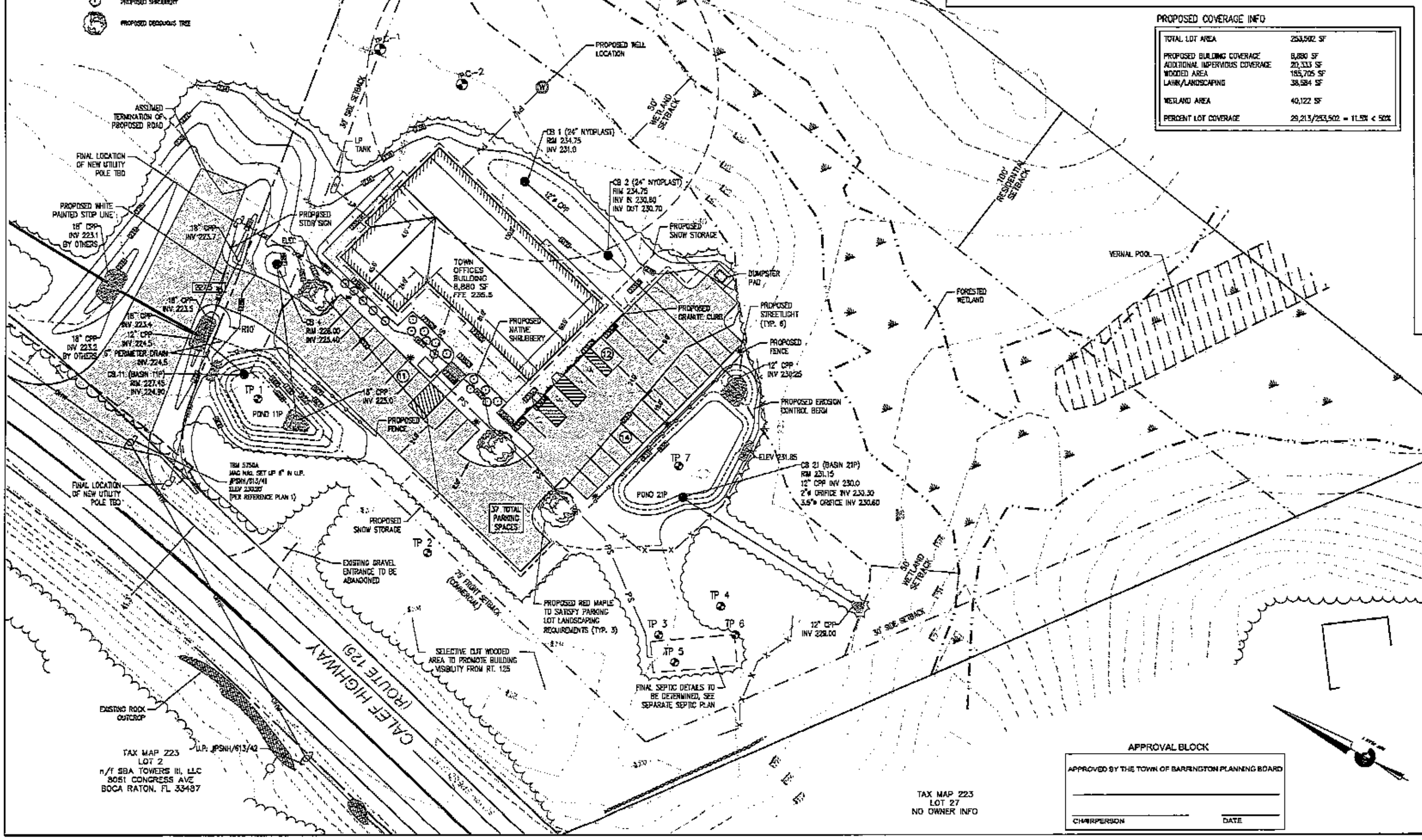
PROVIDED PARKING BASED ON SITE USERS:	
COMMUNITY CENTER (4:1000 SF)	4
OFFICE BUILDING (1:300 SF)	26
TOTAL REQUIRED	30
TOTAL PROVIDED	37

*ADDITIONAL SPACES FOR USE BY PUBLIC DURING BUSINESS HOURS

15. ALL PAVEMENT STRIPING TO BE 4" WHITE PAINT.
16. AS-BUILT PLANS OF THE SITE SHALL BE SUBMITTED IN A DIGITAL DXF FORMAT ON DISK TO THE TOWN OF BARRINGTON UPON COMPLETION OF THE PROJECT. AS-BUILT PLANS SHALL BE PREPARED AND CERTIFIED CORRECT BY A L.L.S. OR P.E. DIGITAL FILES SHALL BE GEO-REFERENCED TO NEW HAMPSHIRE STATE PLANE COORDINATES NAD83 AND SHALL BE EXPRESSED IN FEET.
17. EXTERIOR BUILDING LIGHTING SHALL BE CUT-OFF TYPE FIXTURES PER CHAPTER 4.12 AND SHALL PROVIDE LIGHTING DIRECTED ON-SITE ONLY. REFER TO APPROVED LIGHTING PLAN FOR LOCATION AND FIXTURE TYPE.
18. A MONITORED SECURITY SYSTEM SHALL BE INSTALLED.
19. ALL NEW ON-SITE UTILITIES TO BE INSTALLED UNDERGROUND.
20. FINAL CONNECTION AND SERVICE DETAILS TO BE PROVIDED BY CONTRACTOR AND APPROVED BY CODE ENFORCEMENT PRIOR TO INSTALLATION.
21. WETLANDS AND SOILS WITHIN THE PROJECT AREA HAVE BEEN DELINEATED BY COVE ENVIRONMENTAL SERVICES, NEW HAMPSHIRE CERTIFIED SOIL SCIENTIST (#095). SEE REFERENCE PLAN 1.
22. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO THE TOWN OF BARRINGTON SITE REVIEW REGULATIONS AND THE LATEST EDITION OF THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S (NHDOT) "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION". THE MORE STRINGENT SPECIFICATION SHALL APPLY.
23. REQUIRED EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY DISTURBANCE OF THE SITE'S SURFACE AREA AND SHALL BE MAINTAINED THROUGH THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED TO STOP ANY EROSION ON THE CONSTRUCTION SITE DUE TO ACTUAL SITE CONDITIONS, THE OWNER SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION AT NO EXPENSE TO THE TOWN.
24. A PRE-CONSTRUCTION CONFERENCE WITH THE OWNER, THE DESIGN ENGINEER, THE EARTHWORK CONTRACTOR AND THE TOWN ENGINEER SHALL OCCUR PRIOR TO ANY EARTH DISTURBING ACTIVITY.
25. SITE CONSTRUCTION HOURS SHALL BE LIMITED TO MONDAY-FRIDAY 7AM – 6PM. HOURS OF CONSTRUCTION MUST BE DOCUMENTED ON A SITE CONSTRUCTION SIGN ALONG WITH THE CONTACT INFORMATION FOR THE GENERAL CONTRACTOR. SAID SIGNAGE MUST BE LOCATED AND APPROVED BY THE TOWN.
26. BUILDING ADDRESS SHALL BE ASSIGNED BY THE BUILDING OFFICIAL AT THE TIME OF ISSUANCE OF A BUILDING PERMIT.
27. ANY RETAINING WALL TALLER THAN FOUR FEET (4') REQUIRES ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
28. ANY FENCE TALLER THAN SIX FEET (6') REQUIRES THE ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
29. THE SITE LAYOUT HAS BEEN DESIGNED IN COMPLIANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. THE PROPOSED STRUCTURE WILL BE ALSO BE DESIGNED IN ACCORDANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. (I.E. IBC, ANSI-117.1) AND NH RSA 155-A:5.
30. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT DEFICIENCIES EXIST IN THE APPROVED DESIGN DRAWINGS, THE OWNER SHALL BE REQUIRED TO CORRECT THE DEFICIENCIES TO MEET THE REQUIREMENTS OF THE REGULATIONS AT NO EXPENSE TO THE TOWN.
31. IN ACCORDANCE WITH THE TOWN REGULATIONS AND RSA 676:13, ALL IMPROVEMENTS SPECIFIED ON THESE PLANS SHALL BE CONSTRUCTED, COMPLETED, INSPECTED AND APPROVED BY THE TOWN OF BARRINGTON PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
32. NO FEDERAL PERMITS ARE REQUIRED FOR THIS PROJECT.
33. PER SECTION 4.9.7(4) OF THE TOWN OF BARRINGTON SITE PLAN REGULATIONS, ONE DECIDUOUS SHADE TREE IS BEING PROVIDED FOR EVERY 15 PARKING SPACES. ONE (1) RED MAPLES IS PROPOSED AT THE END OF EACH PARKING ROW, FOR A TOTAL OF THREE (3).
34. THIS PLAN IS TO BE RECORDED AT THE STRAFFORD COUNTY REGISTRY OF DEEDS.

PROPOSED COVERAGE INFO

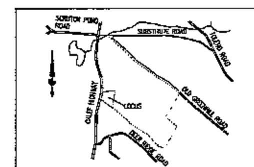
TOTAL LOT AREA	253,502 SF
PROPOSED BUILDING COVERAGE	8,880 SF
ADDITIONAL IMPERVIOUS COVERAGE	20,333 SF
WOODED AREA	185,705 SF
LAWN/LANDSCAPING	38,584 SF
WETLAND AREA	40,122 SF
PERCENT LOT COVERAGE	29,213/253,502 = 11.5% < 50%



APPROVAL BLOCK

APPROVED BY THE TOWN OF BARRINGTON PLANNING BOARD

CHAIRPERSON DATE



VICINITY PLAN

APPROXIMATE SCALE: 1"=2,000'

OWNER:

TOWN OF BARRINGTON, NH

DESIGN BUILDER:

Careau Construction Company, LLC

ARCHITECT:

PORTONE ARCHITECTS

959 Islington Street
Portsmouth, NH 03801

CIVIL CONSULTANTS

Engineers
Planners
Surveyors
P.O. Box 100
South Berwick
Maine
03908
207-384-2550
www.civcon.com

REVISION HISTORY:

#	DATE	ISSUANCE

SEAL:

USE DISCLAIMER:

PROJECT NAME: Barrington Town Hall

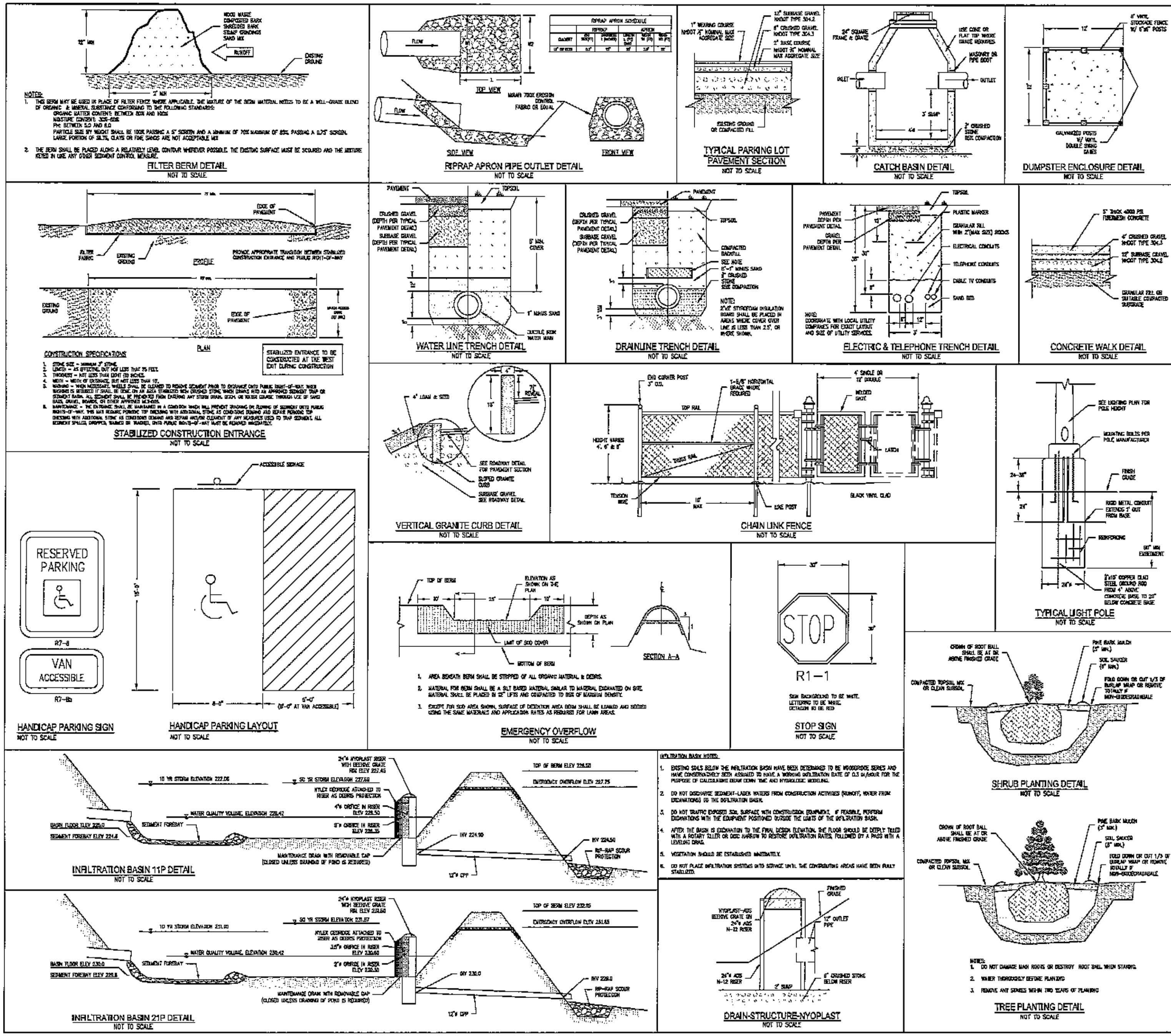
DRAWING TITLE: SITE PLAN

PROJECT NO.: CC1933600 PORT19-062

DATE: 03/17/2020

DRAWING SCALE: 1" = 30 FT

SHEET NUMBER: L-1



EROSION AND SEDIMENT CONTROL PRACTICES

1. NO SOIL SHALL BE DISTURBED DURING THE PERIOD OF MARCH 1 THROUGH APRIL 15, NOR DURING ANY OTHER PERIOD WHEN SOILS ARE SATURATED DUE TO RAIN OR SNOW MELT.
2. ALL PERIMETER CONTROLS ARE TO BE INSTALLED PRIOR TO EARTH MOVING OPERATIONS.
3. DISTURBED SOILS SHALL BE STABILIZED WITHIN ONE (1) WEEK FROM THE TIME IT WAS LAST ACTIVELY WORKED USING TEMPORARY OR PERMANENT MEASURES SUCH AS PLACEMENT OF RIPRAP, MULCH OR EROSION CONTROL BLANKET, OR OTHER COMPARABLE MEASURES.
4. HAY OR STRAW MULCH SHALL BE APPLIED AT A RATE OF AT LEAST ONE (1) BALE PER 500 SQUARE FEET (1-2 TONS PER ACRE).
5. IF MULCH IS LIKELY TO BE REMOVED DUE TO TO STEEP SLOPES OR WIND, IT SHALL BE ANCHORED WITH NETTING, PEG OR TWINE, OR OTHER SUITABLE METHOD AND SHALL BE MAINTAINED UNTIL A CATCH OF VEGETATION IS ESTABLISHED OVER THE ENTIRE DISTURBED AREA.
6. IN ADDITION TO PLACEMENT OF RIPRAP, MULCH OR EROSION CONTROL BLANKETS, ADDITIONAL STEPS SHALL BE TAKEN WHERE NECESSARY IN ORDER TO PREVENT SEDIMENTATION OF THE WATER. EVIDENCE OF SEDIMENTATION INCLUDES VISIBLE GULLY EROSION, DISCOLORATION OF WATER BY SUSPENDED PARTICLES AND SLUMPING OF BANKS. SILT FENCES, STAKED HAY BALES AND OTHER SEDIMENTATION CONTROL MEASURES, WHERE PLANNED FOR, SHALL BE IN PLACE PRIOR TO COMMENCEMENT OF WORK, BUT SHALL ALSO BE INSTALLED WHEREVER NECESSARY DUE TO SEDIMENTATION.
7. MULCH OR OTHER TEMPORARY MEASURES SHALL BE MAINTAINED UNTIL THE SITE IS PERMANENTLY STABILIZED WITH VEGETATION OR OTHER PERMANENT CONTROL MEASURES AFTER WHICH TEMPORARY MEASURES WILL BE REMOVED.
8. PERMANENT RE-VEGETATION OF ALL DISTURBED AREAS, USING NATIVE PLANT MATERIAL WHEN POSSIBLE, SHALL OCCUR WITHIN 30 DAYS FROM THE TIME THE AREAS WERE LAST ACTIVELY WORKED, OR FOR FALL AND WINTER ACTIVITIES, BY JUNE 15, EXCEPT WHERE PRECLUDED BY THE TYPE OF ACTIVITY (E.G. RIPRAP, ROAD SURFACES, ETC.). THE VEGETATIVE COVER SHALL BE MAINTAINED.
9. LIME AND FERTILIZER APPLICATION RATES SHALL NOT EXCEED THE FOLLOWING:

   GROUND LIMESTONE: 3 TONS/ACRE (130 LBS./1000 S.F.)
   FERTILIZER, 10-10-10 OF EQUIVALENT: 600 LBS./ACRE
   (14 LBS./1000 S.F.)
10. FERTILIZER SHALL NOT BE APPLIED BEFORE START OF THE GROWING SEASON NOR AFTER SEPTEMBER 30. FERTILIZED AREAS SHALL BE MULCHED TO REDUCE OFF-SITE TRANSPORT OF NUTRIENTS UNTIL USED BY VEGETATIVE GROWTH.
11. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL. ALL INSPECTIONS AND REPAIRS TO THE EROSION CONTROL PRACTICES ARE TO BE DOCUMENTED, AND COPIES OF THE DOCUMENTATION ARE TO BE AVAILABLE ON SITE FOR STATE/TOWN REVIEW UPON REQUEST.

SEEDING MIXTURE AND SCHEDULE:

SPREAD TOPSOIL UNIFORMLY 6" DEEP OVER AREAS TO BE RECLAIMED. THE FOLLOWING SEED MIXTURE SHALL BE USED:

LAWNS:

KENTUCKY BLUEGRASS	0.46 LBS./1000 S.F.
CREEPING RED FESCUE	0.46 LBS./1000 S.F.
PERENNIAL RYE GRASS	0.11 LBS./1000 S.F.
TOTAL	1.03 LBS./1000 S.F.

APPLY LIME AND FERTILIZER AS SPECIFIED UNDER THE EROSION AND SEDIMENTATION CONTROL NOTES. WORK INTO THE TOP (4) INCHES OF SOIL PRIOR TO SEEDING. AFTER SEEDING, APPLY MULCH HAY AS SPECIFIED. ON FLAT AREAS AND NOT EXPOSED TO WIND, THE MULCH WILL BE ANCHORED BY NETTING DOWN. IN OTHER AREAS, JUTE NETTING SHALL BE USED FOR ANCHORAGE. THE ABOVE SEEDING SCHEDULE IS APPLICABLE IF SEEDING DURING THE GROWING SEASON (APRIL 15 TO JUNE 15 AND AUGUST 30 TO SEPTEMBER 30). BETWEEN JUNE 15 AND AUGUST 30, SEEDING WILL BE DELAYED UNTIL AUGUST 30. IF SOIL IS DISTURBED BETWEEN OCTOBER 1 AND NOVEMBER 1, DELAY SEEDING UNTIL NOVEMBER 1. AFTER NOVEMBER 1 AND BEFORE A SNOW COVER FORMS, THE SAME PROCEDURE WILL BE FOLLOWED EXCEPT THE SEED RATE WILL BE DOUBLED. AFTER SNOW COVER AND BEFORE APRIL 15, SEEDING WILL BE DELAYED UNTIL APRIL 15. HAY MULCH WILL BE APPLIED AT A RATE OF 150 LBS./1000 SQUARE FEET. THIS WILL BE ANCHORED BY NON-ASPHALTIC TACKIFIER SPRAYED ON LAWNS AND JUTE NETTING IN DRAINAGE WAYS AND OTHER AREAS.

NH DES WINTER CONSTRUCTION NOTES:

1. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
2. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
3. AFTER NOVEMBER 15, INCOMPLETE ROAD OR PARKING SURFACE, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3

NH DES CONSTRUCTION SEQUENCE NOTES:

1. PROJECT TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.
2. ALL PONDS AND SWALES SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE.
3. ALL DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO RECEIVING RUNOFF.
4. ALL ROADWAYS AND PARKING AREAS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE. FLOWS TO BASINS SHALL BE DIVERTED UNTIL CONTRIBUTING AREA HAS BEEN STABILIZED.
5. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
6. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.

   AREAS SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:

   - BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
   - A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
   - A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED
   - EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED
7. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
8. ALL PERIMETER EROSION CONTROLS TO BE INSTALLED PRIOR TO EARTH MOVING OPERATIONS.

OWNER:

TOWN OF BARRINGTON, NH

DESIGN BUILDER:

Careau Construction Company, LLC

ARCHITECT:

PORTONE ARCHITECTS
959 Islington Street
Portsmouth, NH 03801

CIVIL CONSULTANTS
Engineers
Planners
Surveyors
P.O. Box 100
South Berwick
Maine
03908
207-384-2550

REVISION HISTORY

#	DATE	ISSUANCE

SEAL

USE DISCLAIMER:

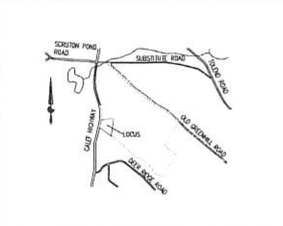
PROJECT NAME:

Barrington Town Hall

DRAWING TITLE:

CONSTRUCTION DETAILS

PROJECT No:	CC1933600 PORT19-062
DATE:	03/17/2020
DRAWING SCALE:	SCALE AS NOTED
SHEET NUMBER:	L-2



VICINITY PLAN
APPROXIMATE SCALE: 1"=2,500'

REFERENCE PLANS:

1. PLAN TITLED "OPEN SPACE SUBDIVISION" PLAN FOR: RESIDENTIAL DEVELOPMENT, RT. 125 / OLD GREEN HILL RD., BARRINGTON, NH. DATED JAN. 2019, PREPARED FOR: RT.125 DEVELOPMENT, LLC., JOSEPH FALZONE, 79 EMERY LANE, STRATHAM, NH 03885. PREPARED BY: BEALS ASSOCIATES, PLLC (JOB #NH-1144)
2. INFORMATION DEPICTED HEREON IS BASED ON DATA OBTAINED FROM TOPOGRAPHIC INFORMATION PROVIDED BY THE TOWN OF BARRINGTON IN A DIGITAL FILE OF REFERENCE PLAN 1.

POND — POND NUMBER

SUBCATCHMENT — SUBCATCHMENT NUMBER / SUBCATCHMENT ACREAGE

REACH — REACH NUMBER

Tc COMPONENTS

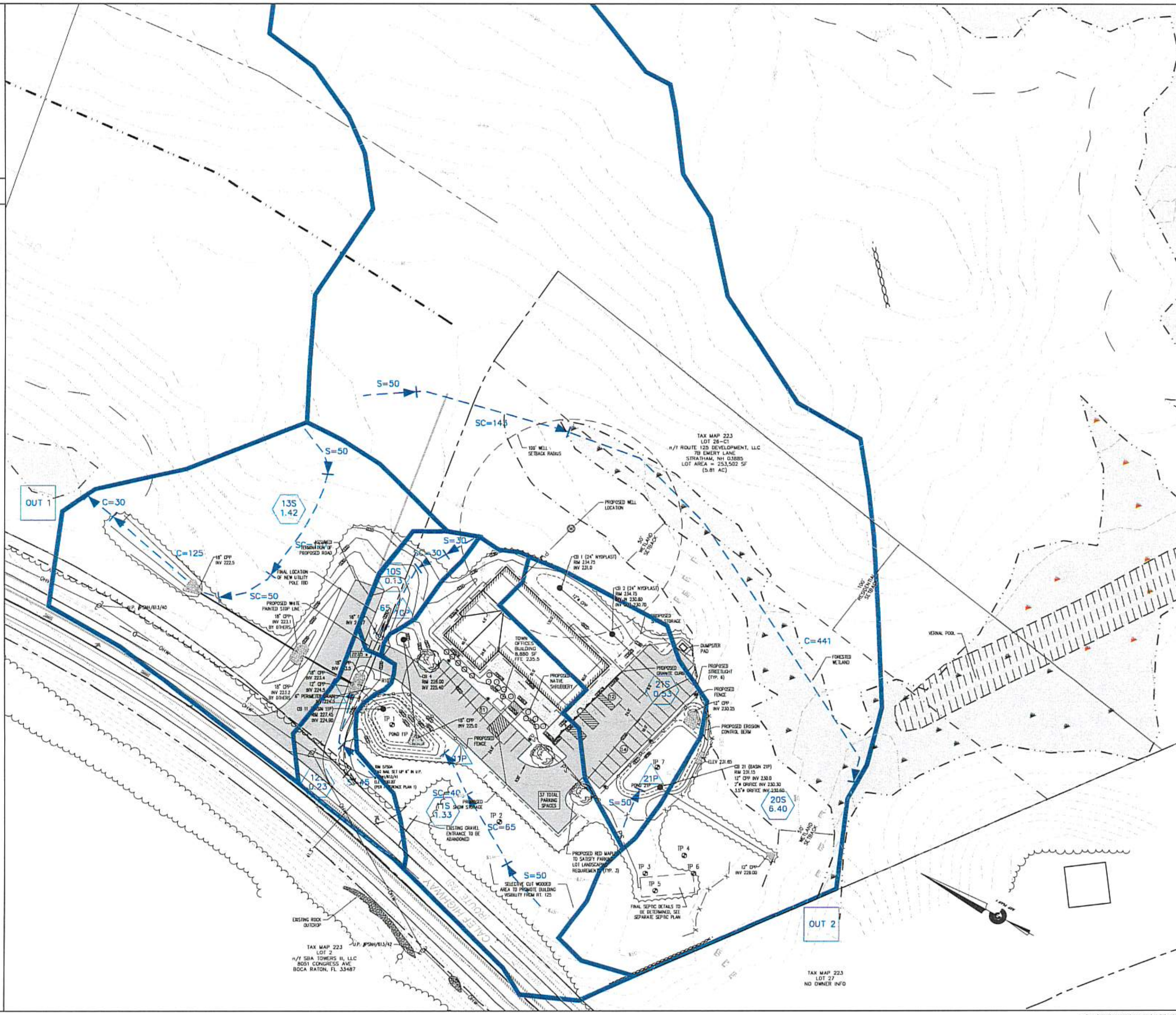
ROUTING DIRECTION

SOILS LEGEND
(NOT SHOWN FOR CLARITY, SEE SHEET B1)

A Soils: SCS Soils: HISS Soils:
B Soils: SCS Soils: HISS Soils:
C Soils: SCS Soils: HISS Soils: 29 (WOODBRIDGE) 656 (RIDGEBURY)
D Soils: SCS Soils: HISS Soils:

Subcatchment Boundaries Pre-Development
Subcatchment Boundaries Post-Development
SCS Soil Line
High Intensity Soil Line
Tc Flow Path & Direction Pre-Development
Tc Flow Path & Direction Post-Development

GRAPHIC SCALE
0' 30' 60' 90'
1" = 40'



OWNER:
TOWN OF BARRINGTON, NH

DESIGN BUILDER:

ARCHITECT:
959 Islington Street
Portsmouth, NH 03801

CIVIL CONSULTANTS
Engineers
Planners
Surveyors
P.O. Box 100
South Berwick
Maine
03908
207-384-2550
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REVISION HISTORY

#	DATE	ISSUANCE

SEAL:
STATE OF NEW HAMPSHIRE
NEIL RAPOZA
12870
LICENSED
PROFESSIONAL ENGINEER
3/17/2020

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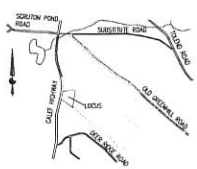
PROJECT NAME:
Barrington Town Hall

DRAWING TITLE:
POST-DEVELOPMENT STORMWATER MANAGEMENT PLAN

PROJECT No. CC1933600 PORT19-062
DATE: 3/17/2020
DRAWING SCALE: 1" = 40 FT
SHEET NUMBER:
D-2



VICINITY PLAN
APPROXIMATE SCALE: 1"=2,500'

REFERENCE PLANS:

1. PLAN TITLED "OPEN SPACE SUBDIVISION" PLAN FOR: RESIDENTIAL DEVELOPMENT, RT. 125 / OLD GREEN HILL RD., BARRINGTON, NH. DATED JAN. 2019, PREPARED FOR: RT.125 DEVELOPMENT, LLC., JOSEPH FALZONE, 7B EMERY LANE, STRATHAM, NH 03885. PREPARED BY: BEALS ASSOCIATES, PLLC (JOB #NH-1144)
2. INFORMATION DEPICTED HEREON IS BASED ON DATA OBTAINED FROM TOPOGRAPHIC INFORMATION PROVIDED BY THE TOWN OF BARRINGTON IN A DIGITAL FILE OF REFERENCE PLAN 1.

POND — 4 — POND NUMBER

SUBCATCHMENT — 11 / 0.56 — SUBCATCHMENT NUMBER / SUBCATCHMENT ACREAGE

REACH — 50 — REACH NUMBER

Tc COMPONENTS — Sheet Flow, Shallow Concentrated, Channel

ROUTING DIRECTION

SOILS LEGEND

- A Soils: SCS Soils: NSS Soils
- B Soils: SCS Soils: NSS Soils
- C Soils: SCS Soils: NSS Soils: 29 (WOODBRIDGE), 656 (ROCKSBURY)
- D Soils: SCS Soils: NSS Soils

- Subcatchment Boundaries Pre-Development
- Subcatchment Boundaries Post-Development
- SCS Soil Line
- High Intensity Soil Line
- Tc Flow Path & Direction Pre-Development
- Tc Flow Path & Direction Post-Development

GRAPHIC SCALE
0' 30' 90'
1" = 90'

OWNER
TOWN OF BARRINGTON, NH

DESIGN BUILDER

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REVISION HISTORY

#	DATE	ISSUANCE

SEAL
STATE OF NEW HAMPSHIRE — NEIL J. PAPPAZA — 12570 — LICENSED PROFESSIONAL ENGINEER — 3/17/2020

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PROJECT NAME
Barrington Town Hall

DRAWING TITLE
PRE-DEVELOPMENT STORMWATER MANAGEMENT PLAN

PROJECT NO. CC1933600 PORT19-062
DATE 3/17/2020
DRAWING SCALE 1" = 50 FT
SHEET NUMBER
D-1

Z:\AAA\2019\U\933600\CARLSON\ENGPU\933600-C-ST.DWG PLOTDATE: 3/17/2020