DIGITAL ONLY

Stormwater Management Report

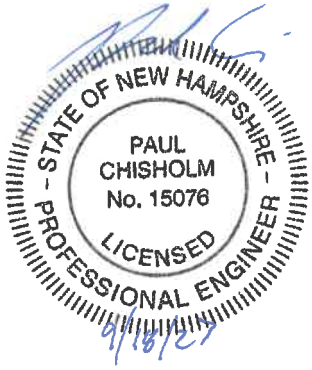
Central Gas

Map 182; Lot 217
77 Central Street
Hudson , New Hampshire

July 10, 2023

Revised: September 18, 2023

KNA Project No. 18-0612-3



Prepared For: Sousa Realty
10 Lowell Road
Hudson, NH 03051

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KNA KEACH-NORDSTROM ASSOCIATES, INC.

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I. INTRODUCTION

A. Project Description

The project proposes to construct a 4,560-convenience store and five double sided gas pumps on the existing property. The project includes construction of the twenty-six parking spaces, drive aisles, the 4,560 SF building, and one bioretention pond located on the western side of the property along Lowell Road. The total area of disturbance for construction is 77,079 SF, which is less than 100,000 square feet and therefore does not require an Alteration of Terrain Permit.

B. Existing Site Conditions

The subject property, referenced on Hudson Tax Map 182 as Lot 17, and is situated entirely within the business (B) Zoning District. The total area of all the parcel is approximately 2.69 acres in area and has frontage along Lowell Road and Central Street. The lot has been cleared and graded previously. There is an existing retaining wall in the rear of the property.

According to the Natural Resources Conservation Service (NRCS) web soil survey, the predominant soil type onsite is Windsor-Urban Land complex with slopes ranging from 3-15%. Windsor soils is classified as Hydrologic Soil Group (HSG) 'A'.

II. STORM DRAINAGE ANALYSIS & DESIGN

A. Methodology

In accordance with the Town of Hudson Site Plan Review Regulations and Standard Specifications for Road, Drain & Sewer Construction, 2-year, 10-year, 25-year & 50-year frequency storm have each been used in the various aspects of analysis and design of stormwater management considerations for the subject site.

KNA utilizes HydroCAD version 10.0 to analyze both pre and post-development watershed characteristics. This computer software system is based largely on hydrology techniques (TR-20) developed by the Soil Conservation Service (now the Natural Resources Conservation Service). In addition, the software derives Time of Concentration values using the methodology contained within USDA-S.C.S. publication Urban Hydrology for Small Watersheds Technical Release No. 55 (TR 55).

All design and analysis calculations performed using the referenced methodologies are attached to this report. The minimum time of concentrations used for the analysis is 6 minutes. These calculations document each catchment area, a breakdown of surface type, time of concentration, rainfall intensity, peak discharge volume, Manning's "n" value, peak velocity, and other descriptive design data for each watershed and pipe segment evaluated. In addition, the "Pre/Post Development Drainage Area Plans" graphically define and illustrate the extent of each watershed or catchment area investigated.

B. Pre-Development Drainage Conditions

In the pre-development scenario, two (2) points of analysis (POA) were identified as the appropriate points to compare pre vs. post development rates of stormwater discharge. These points of analysis reflect the main discharge points of the site and were analyzed to show the impact of the proposed improvements.

The pre-development drainage model's POA is further described as follows:

- A Central Street
- B First Brook

In general, the site slopes North to South toward First Brook. There is also a portion that slopes towards Central Street

For a more visual description of the information presented in this section, please refer to the attached "Pre-Development Drainage Areas Plan" attached in the appendix of this report.

C. Post-Development Drainage Conditions:

The same POA's that were identified in the pre-development scenario have been analyzed in the post-development scenario.

The proposed stormwater management system utilizes both open and closed drainage practices for the collection, storage, and detention of runoff. Stormwater runoff generated from most of the proposed development will be directed towards a series of deep sump catch basins throughout the parking lot and driveway entrances. Outfall from this closed drainage network will discharge to a proposed bioretention pond adjacent the proposed driveway onto Lowell Road. This pond will ultimately outlet treated stormwater downslope towards First Brook. The remainder of the site will continue to drain as it does today.

The peak stormwater runoff rates for the specific storm frequencies are presented and analyzed in the subsequent summary section of this report (Table 1). For a more visual description of the information presented in this section, please refer to the attached "Post-Development Drainage Areas Plan" attached in the appendix of this report.

As the proposed project is considered a high load project by state regulations, infiltration is not feasible as it is not allowed. An attempt to incorporate Low Impact Development was made, but options are limited when infiltration is not feasible. As part of looking at LIDs, a Bioretention Pond with a PVC liner was selected because it provides the necessary filtration/treatment of runoff while also still providing a localized area to provide detention and lower runoff rates.

D. Summary:

The subject site complies with the Town of Hudson Site Plan Review Regulations and Standard Specifications for Road, Drain & Sewer Construction regarding stormwater mitigation. Proposed stormwater best management practices (BMP) are designed in accordance with the New Hampshire Stormwater Manual Volume 2: Post-Construction Best Management Practices Selection and Design. Stormwater discharges, in terms of peak rate of runoff, are reported below in Table 1.

Table 1: Peak Flow Discharge Rate

	Site Pre-Development vs. Post-Development (cfs)									
Description	**2-Year**		**2-Year Frozen**		**10-Year**		**25-Year**		**50-Year**	
24-hr Rainfall	2.95 in/hr		2.95 in/hr		4.45 in/hr		5.62 in/hr		6.72 in/hr	
	Pre	**Post**	Pre	**Post**	Pre	**Post**	Pre	**Post**	Pre	**Post**
A	0.35	0.24	2.82	1.41	0.52	0.37	0.66	0.46	0.99	0.65
B	0.65	0.52	5.90	3.38	1.00	0.87	1.26	1.22	1.68	1.61

III. EROSION & SEDIMENTATION CONTROL PROVISIONS

A. Temporary Erosion Control Measures

As an integral part of the engineering design of this site, an erosion and sedimentation control plan has been developed with the intent of limiting the potential for soil loss and associated receiving water quality degradation, both during and after the construction period. As the project plans indicate, traditional temporary erosion and sedimentation control devices and practices, such as siltation fencing and temporary block and sediment barriers at. In preparation of these provisions, reference was made to the New Hampshire Stormwater Manual; Volume 3: Erosion and Sediment Temporary Controls During Construction. Construction details for each temporary erosion control measure and practice specified have been added to the project plans. These plans also contain a number of erosion control notes, which are offered to the selected contractor in order to supplement the specified measures and practices to the extent practical.

B. Construction Sequence

A site-specific construction sequence sensitive to limiting soil loss due to erosion and associated water quality degradation was prepared specifically for this project and is shown on the project plans. As pointed out in the erosion control notes, it is important for the contractor to recognize that proper judgment in the implementation of work will be essential if erosion is to be limited and protection of completed work is to be realized. Moreover, any specific changes in sequence and/or field conditions affecting the ability of specific erosion control measures to adequately serve their intended purpose should be reported to this office by the contractor. Further, the contractor is encouraged to supplement specified erosion control measures during the construction period where and when in his/ her best judgment additional protection is warranted.

C. Permanent Erosion Control Measures

In the design of this site, consideration was given to limiting the potential for long-term erosion of completed improvements. As a result, several permanent erosion control measures were incorporated into the site design. These provisions include:

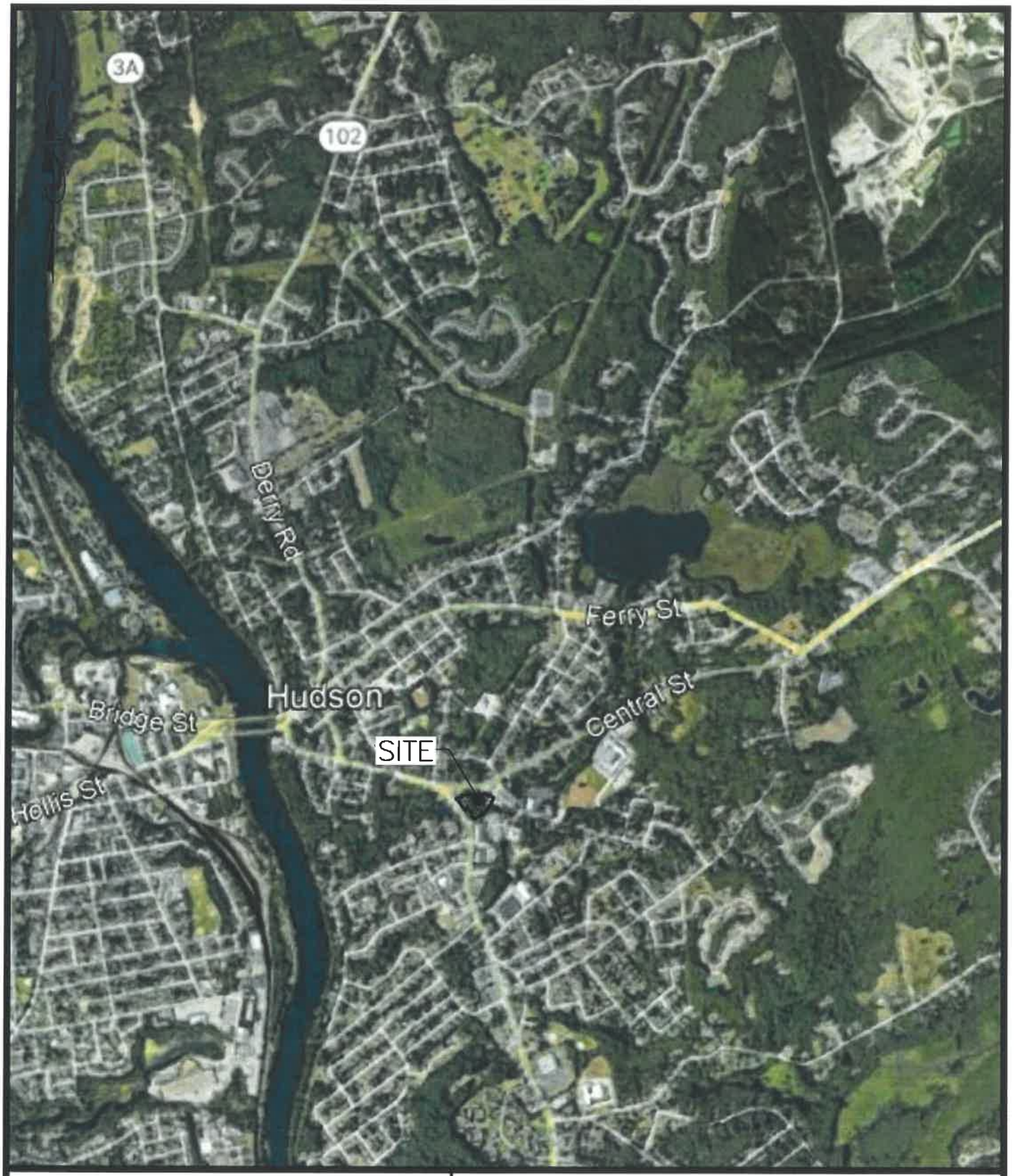
1) Specification of a turf establishment schedule and seed mixture, utilizing materials and workmanship recognized as appropriate for the site conditions at hand; and

2) The design has provided a catch basin with a sump to capture runoff and reduce the overland flow, thereby reducing erosion.

3) The stormwater pond was designed to reduce runoff and volume.

FIGURES AND SPREADSHEETS

FIGURE NO. 1 – AERIAL IMAGE
FIGURE NO. 2 – USGS IMAGE
FIGURE NO. 3 – SCS SOILS MAP
FIGURE NO. 4 – EXTREME PRECIPITATION TABLES
FIGURE NO. 5 – RIP RAP OUTLET PROTECTION APRON CALCULATIONS
FIGURE NO. 6 – BMP WORKSHEET
FIGURE NO. 7 – TSS, TP, & TN REMOVAL CALCULATIONS



KEACH–NORDSTROM ASSOCIATES, INC.
Civil Engineering Land Surveying Landscape Architecture
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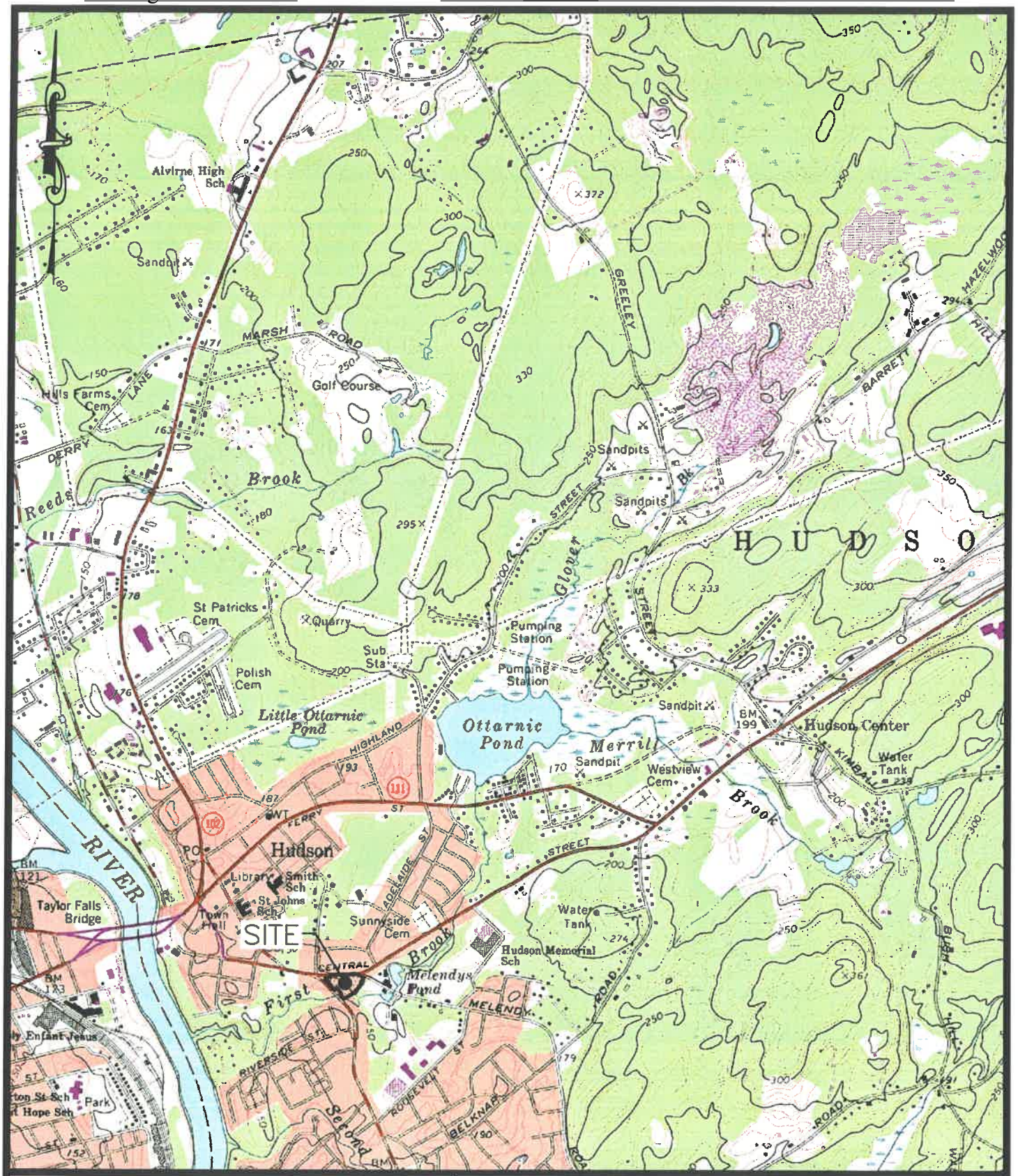
TITLE: AERIAL EXHIBIT PREPARED FOR:
FULLER LOTS
MAP 182; LOTS 217 - 77 CENTRAL STREET - HUDSON, NEW HAMPSHIRE

DATE: 7/14/2022	JOB. NO.18-0612-3
SCALE: 1" = 2,000'	SHEET 1 OF 1



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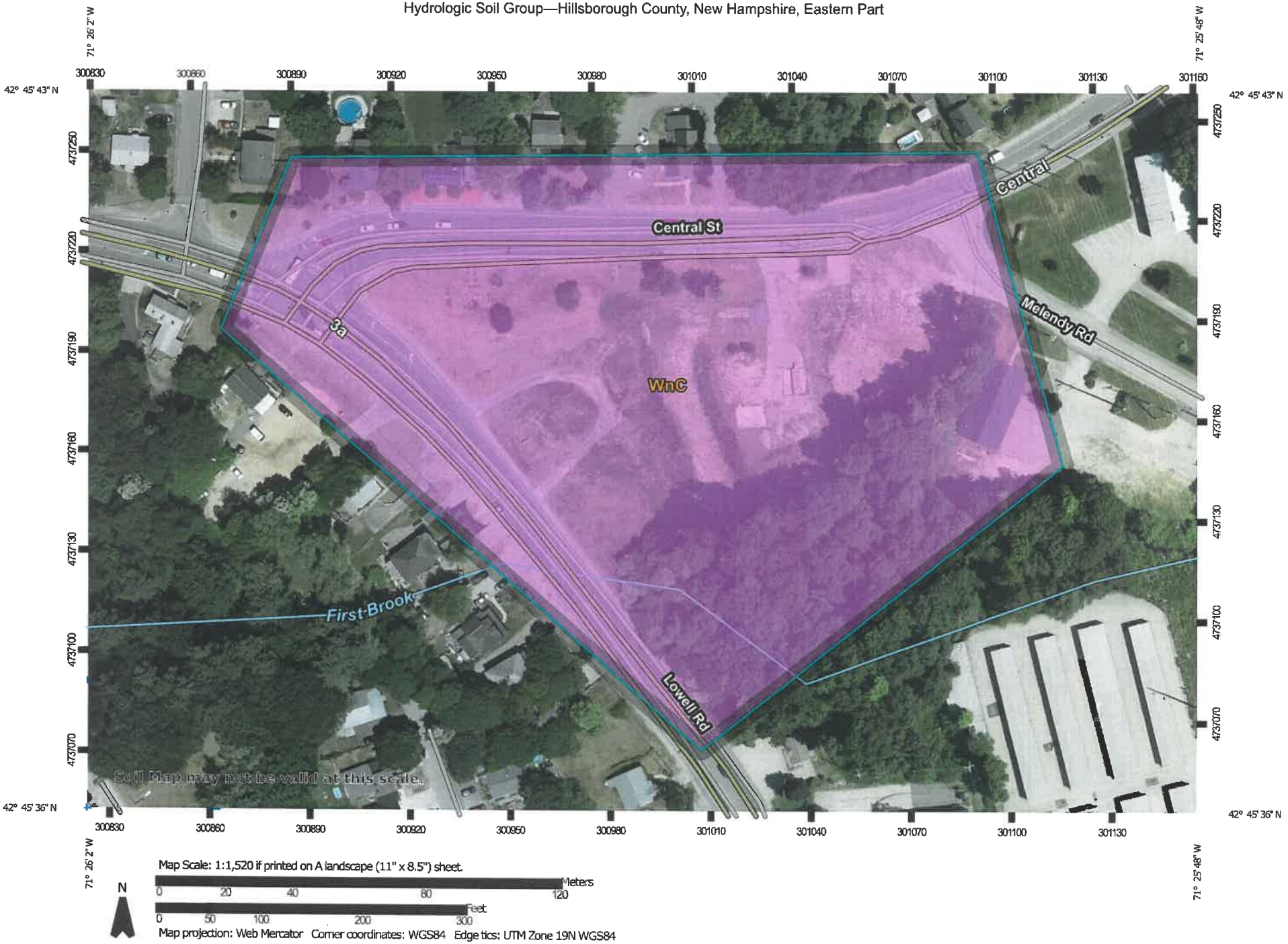
Hydrologic Soil Group—Hillsborough County, New Hampshire, Eastern Part



MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hillsborough County, New Hampshire, Eastern Part
Survey Area Data: Version 24, Aug 31, 2021

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

Date(s) aerial images were photographed: Jun 19, 2020—Aug 6, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WnC	Windsor-Urban land complex, 3 to 15 percent slopes	A	7.3	100.0%
Totals for Area of Interest			**7.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.434 degrees West
Latitude	42.761 degrees North
Elevation	0 feet
Date/Time	Mon, 14 Feb 2022 16:02:56 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.42	0.52	0.68	0.85	1.07	**1yr**	0.74	1.01	1.24	1.56	1.96	2.48	2.72	**1yr**	2.19	2.61	3.04	3.73	4.34	**1yr**
2yr	0.33	0.51	0.64	0.84	1.05	1.32	**2yr**	0.91	1.21	1.53	1.91	2.37	2.95	3.28	**2yr**	2.61	3.15	3.66	4.38	4.98	**2yr**
5yr	0.39	0.61	0.77	1.03	1.32	1.67	**5yr**	1.14	1.52	1.93	2.42	3.00	3.73	4.17	**5yr**	3.30	4.01	4.64	5.51	6.22	**5yr**
10yr	0.44	0.70	0.88	1.20	1.56	1.99	**10yr**	1.34	1.80	2.32	2.90	3.60	4.45	5.00	**10yr**	3.94	4.81	5.55	6.54	7.37	**10yr**
25yr	0.53	0.83	1.06	1.46	1.94	2.51	**25yr**	1.68	2.25	2.93	3.67	4.56	5.62	6.37	**25yr**	4.97	6.13	7.05	8.22	9.21	**25yr**
50yr	0.59	0.95	1.21	1.70	2.30	3.00	**50yr**	1.99	2.66	3.51	4.42	5.48	6.72	7.66	**50yr**	5.94	7.36	8.45	9.78	10.92	**50yr**
100yr	0.68	1.10	1.42	2.01	2.73	3.58	**100yr**	2.36	3.16	4.20	5.28	6.55	8.03	9.20	**100yr**	7.10	8.85	10.13	11.63	12.94	**100yr**
200yr	0.77	1.26	1.63	2.35	3.24	4.28	**200yr**	2.80	3.75	5.03	6.34	7.85	9.60	11.06	**200yr**	8.49	10.64	12.14	13.84	15.34	**200yr**
500yr	0.93	1.53	2.00	2.90	4.07	5.41	**500yr**	3.51	4.70	6.38	8.05	9.96	12.17	14.13	**500yr**	10.77	13.58	15.44	17.43	19.22	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.22	0.35	0.42	0.57	0.70	0.80	**1yr**	0.60	0.78	1.06	1.32	1.67	2.28	2.56	**1yr**	2.01	2.46	2.71	3.01	3.71	**1yr**
2yr	0.32	0.49	0.60	0.81	1.00	1.20	**2yr**	0.86	1.17	1.37	1.79	2.30	2.89	3.20	**2yr**	2.56	3.08	3.57	4.27	4.87	**2yr**
5yr	0.36	0.55	0.69	0.94	1.20	1.42	**5yr**	1.04	1.39	1.63	2.11	2.69	3.50	3.88	**5yr**	3.10	3.73	4.27	5.14	5.81	**5yr**
10yr	0.39	0.61	0.75	1.05	1.36	1.60	**10yr**	1.17	1.57	1.82	2.39	3.04	4.04	4.49	**10yr**	3.58	4.32	4.91	5.88	6.64	**10yr**
25yr	0.45	0.68	0.85	1.21	1.59	1.88	**25yr**	1.38	1.83	2.13	2.81	3.54	4.88	5.48	**25yr**	4.32	5.27	5.89	7.04	7.89	**25yr**
50yr	0.49	0.74	0.92	1.33	1.79	2.13	**50yr**	1.54	2.08	2.41	3.20	3.99	5.66	6.38	**50yr**	5.01	6.13	6.78	8.07	9.00	**50yr**
100yr	0.53	0.81	1.01	1.46	2.00	2.40	**100yr**	1.73	2.35	2.73	3.50	4.49	6.47	7.45	**100yr**	5.72	7.17	7.81	9.27	10.22	**100yr**
200yr	0.59	0.88	1.12	1.62	2.26	2.73	**200yr**	1.95	2.66	3.07	3.95	5.09	7.48	8.73	**200yr**	6.62	8.39	9.00	10.64	11.65	**200yr**
500yr	0.67	0.99	1.27	1.85	2.63	3.23	**500yr**	2.27	3.16	3.61	4.66	6.02	9.10	10.81	**500yr**	8.05	10.39	10.85	12.78	13.84	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.58	0.78	0.96	1.12	**1yr**	0.83	1.10	1.27	1.66	2.10	2.63	2.87	**1yr**	2.33	2.76	3.44	4.23	4.78	**1yr**
2yr	0.35	0.54	0.67	0.91	1.12	1.31	**2yr**	0.97	1.28	1.49	1.93	2.47	3.05	3.39	**2yr**	2.70	3.26	3.78	4.50	5.14	**2yr**
5yr	0.44	0.67	0.83	1.14	1.46	1.67	**5yr**	1.26	1.63	1.90	2.43	3.05	4.02	4.53	**5yr**	3.55	4.36	5.00	5.92	6.64	**5yr**
10yr	0.52	0.81	1.00	1.40	1.80	2.04	**10yr**	1.56	1.99	2.31	2.91	3.62	4.97	5.64	**10yr**	4.40	5.42	6.21	7.27	8.11	**10yr**
25yr	0.68	1.03	1.28	1.83	2.41	2.65	**25yr**	2.08	2.59	2.98	3.68	4.51	6.59	7.54	**25yr**	5.83	7.25	8.27	9.56	10.59	**25yr**
50yr	0.82	1.25	1.55	2.23	3.00	3.23	**50yr**	2.59	3.16	3.63	4.41	5.34	8.17	9.39	**50yr**	7.23	9.03	10.26	11.76	12.96	**50yr**
100yr	1.00	1.51	1.89	2.73	3.75	3.94	**100yr**	3.23	3.85	4.42	5.45	6.32	10.24	11.67	**100yr**	9.06	11.22	12.75	14.49	15.88	**100yr**
200yr	1.21	1.83	2.32	3.35	4.68	4.81	**200yr**	4.04	4.70	5.36	6.55	7.49	12.71	14.51	**200yr**	11.25	13.95	15.83	17.86	19.47	**200yr**
500yr	1.58	2.36	3.03	4.41	6.27	6.24	**500yr**	5.41	6.10	6.96	8.37	9.37	16.91	19.30	**500yr**	14.96	18.56	21.09	23.54	25.50	**500yr**

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KEACH-NORDSTROM ASSOCIATES, INC.

RIP RAP OUTLET PROTECTION APRON CALCULATIONS

Central Gas 7/10/2023
Project # 18-0612-3
The purpose of this spreadsheet is to calculate the dimensions of rip rap required to help prevent soil loss for the 10 year storm event.

Required input to the spreadsheet is

Q	peak flow in CFS
Do	diameter in feet of outlet or width of channel
Tw	tail water at end of apron

Depending on the tail water conditions either column 1 or column 2 is used for calculations

Column One where Tw<1/2Do	Column One where Tw>1/2Do
Length of Apron	
La = (1.8Q/Do^3/2)+7Do	La = 3*Q/Do^3/2+7Do
Width of Apron at outfall	
W1=3*Do	W1=3*Do
W2 = 3Do + La	W2=3Do+0.4*La
If defined channel use channel width for W1 and W2	
Rock Rip Rap	
d50 = (0.02*Q^4/3)/(Tw*Do)	Same

											RIRAP GRADATION ENVELOPE									
											d100		d85		d50		d15			
Input to Chart					Calculated Output						FROM	TO	FROM	TO	FROM	TO	FROM	TO	depth	USE depth
Description	(Optional)	Q (cfs)	Do (ft)	Tw (ft)	La	W1	W2	d50, ft	d50 in	USE d50 in.	in	in	in	in	in	in	in	in	in	in.
HW#1	Bio Pond Outlet	0.82	1.00	0.39	9	3	7	0.0	0.47	4	6	8	5	7	4	6	1	2	10	10
HW#3	Bio Pond Inlet	0.47	1.00	0.24	8	3	6	0.0	0.37	4	6	8	5	7	4	6	1	2	10	10

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Bioretention Pond**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
1.76	ac	A = Area draining to the practice	
1.05	ac	A_I = Impervious area draining to the practice	
0.60	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.59	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.03	ac-in	WQV= 1" x Rv x A	
3,750	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
938	cf	25% x WQV (check calc for sediment forebay volume)	
2,813	cf	75% x WQV (check calc for surface sand filter volume)	
Sediment Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
991	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
133.00	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.56	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
3.72	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
-	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
-	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
	ft	Elevation of the top of the practice	
-		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
3,791	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
18.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet 15		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet 15		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
	inches	D_{FC} = Filter course thickness	12", or 18" if within GPA mod. 304.1 (see spec)
Sheet		Note what sheet in the plan set contains the filter course spec.	

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

Designer's Notes:

1806123-POST DEVELOPMENT-REV1 *Type III 24-hr 50-YEAR Rainfall=6.72"*
Prepared by {enter your company name here} Printed 9/19/2023

Stage-Discharge for Pond 4P: Bioretention Pond

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
131.50	0.00	133.58	1.02	135.66	9.13	137.74	10.57
131.54	0.39	133.62	1.05	135.70	9.16	137.78	10.59
131.58	0.39	133.66	1.07	135.74	9.19	137.82	10.62
131.62	0.40	133.70	1.10	135.78	9.22	137.86	10.65
131.66	0.40	133.74	1.12	135.82	9.25	137.90	10.67
131.70	0.41	133.78	1.14	135.86	9.28	137.94	10.70
131.74	0.41	133.82	1.17	135.90	9.31	137.98	10.72
131.78	0.41	133.86	1.19	135.94	9.34	138.02	10.75
131.82	0.42	133.90	1.21	135.98	9.36	138.06	10.77
131.86	0.42	133.94	1.23	136.02	9.39	138.10	10.80
131.90	0.43	133.98	1.25	136.06	9.42	138.14	10.82
131.94	0.43	134.02	1.28	136.10	9.45	138.18	10.85
131.98	0.44	134.06	1.31	136.14	9.48	138.22	10.87
132.02	0.44	134.10	1.35	136.18	9.51	138.26	10.90
132.06	0.44	134.14	1.38	136.22	9.54	138.30	10.92
132.10	0.45	134.18	1.41	136.26	9.57	138.34	10.95
132.14	0.45	134.22	1.45	136.30	9.59	138.38	**10.97**
132.18	0.46	134.26	1.48	136.34	9.62		
132.22	0.46	134.30	1.52	136.38	9.65		
132.26	0.47	134.34	1.55	136.42	9.68		
132.30	0.47	134.38	1.58	136.46	9.71		
132.34	0.48	134.42	1.65	136.50	9.74		
132.38	0.48	134.46	1.84	136.54	9.76		
132.42	0.49	134.50	2.09	136.58	9.79		
132.46	0.49	134.54	2.36	136.62	9.82		
132.50	0.50	134.58	2.68	136.66	9.85		
132.54	0.50	134.62	3.04	136.70	9.87		
132.58	0.51	134.66	3.43	136.74	9.90		
132.62	0.51	134.70	3.85	136.78	9.93		
132.66	0.52	134.74	4.29	136.82	9.96		
132.70	0.52	134.78	4.76	136.86	9.98		
132.74	0.52	134.82	5.26	136.90	10.01		
132.78	0.53	134.86	5.78	136.94	10.04		
132.82	0.53	134.90	6.33	136.98	10.07		
132.86	0.54	134.94	6.89	137.02	10.09		
132.90	0.54	134.98	7.48	137.06	10.12		
132.94	0.55	135.02	8.09	137.10	10.15		
132.98	0.55	135.06	8.67	137.14	10.17		
133.02	0.56	135.10	8.70	137.18	10.20		
133.06	0.57	135.14	8.73	137.22	10.23		
133.10	0.59	135.18	8.76	137.26	10.25		
133.14	0.62	135.22	8.79	137.30	10.28		
133.18	0.66	135.26	8.82	137.34	10.31		
133.22	0.70	135.30	8.86	137.38	10.33		
133.26	0.74	135.34	8.89	137.42	10.36		
133.30	0.79	135.38	8.92	137.46	10.39		
133.34	0.83	135.42	8.95	137.50	10.41		
133.38	0.87	135.46	8.98	137.54	10.44		
133.42	0.91	135.50	9.01	137.58	10.46		
133.46	0.94	135.54	9.04	137.62	10.49		
133.50	0.97	135.58	9.07	137.66	10.52		
133.54	1.00	135.62	9.10	137.70	10.54		

Stage-Area-Storage for Pond 4P: Bioretention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
131.50	2,079	0
131.60	2,136	211
131.70	2,192	427
131.80	2,249	649
131.90	2,305	877
132.00	2,362	1,110
132.10	2,426	1,350
132.20	2,489	1,595
132.30	2,553	1,848
132.40	2,617	2,106
132.50	2,681	2,371
132.60	2,744	2,642
132.70	2,808	2,920
132.80	2,872	3,204
132.90	2,935	3,494
133.00	2,999	3,791
133.10	3,063	4,094
133.20	3,126	4,403
133.30	3,190	4,719
133.40	3,254	5,041
133.50	3,318	5,370
133.60	3,381	5,705
133.70	3,445	6,046
133.80	3,509	6,394
133.90	3,572	6,748
134.00	3,636	7,108
134.10	3,917	7,486
134.20	4,198	7,892
134.30	4,480	8,326
134.40	4,761	8,788
134.50	**5,042**	**9,278**
134.60	5,042	9,278
134.70	5,042	9,278
134.80	5,042	9,278
134.90	5,042	9,278
135.00	5,042	9,278
135.10	5,042	9,278
135.20	5,042	9,278
135.30	5,042	9,278
135.40	5,042	9,278
135.50	5,042	9,278
135.60	5,042	9,278
135.70	5,042	9,278
135.80	5,042	9,278
135.90	5,042	9,278
136.00	5,042	9,278
136.10	5,042	9,278
136.20	5,042	9,278
136.30	5,042	9,278
136.40	5,042	9,278
136.50	5,042	9,278
136.60	5,042	9,278
136.70	5,042	9,278
136.80	5,042	9,278
136.90	5,042	9,278
137.00	5,042	9,278
137.10	5,042	9,278
137.20	5,042	9,278
137.30	5,042	9,278
137.40	5,042	9,278
137.50	5,042	9,278
137.60	5,042	9,278
137.70	5,042	9,278
137.80	5,042	9,278
137.90	5,042	9,278
138.00	5,042	9,278
138.10	5,042	9,278
138.20	5,042	9,278
138.30	5,042	9,278
138.40	5,042	9,278

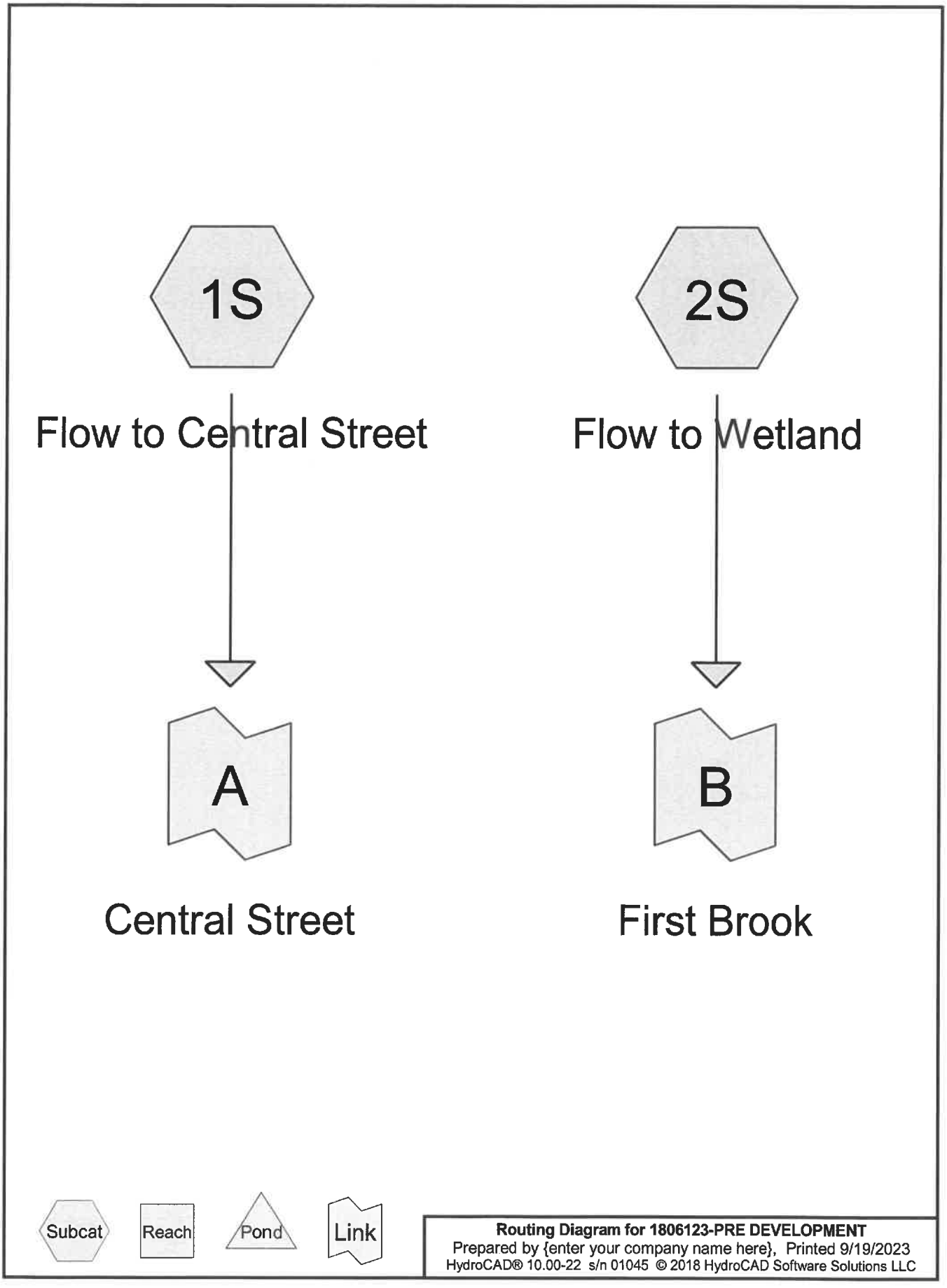
Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Stormwater Ponds	Wet Pond		B, F	70%	35%	45%
	Wet Extended Detention Pond		A, B	80%	55%	68%
	Micropool Extended Detention Pond	TBA				
	Multiple Pond System	TBA				
	Pocket Pond	TBA				
Stormwater Wetlands	Shallow Wetland		A, B, F, I	80%	55%	45%
	Extended Detention Wetland		A, B, F, I	80%	55%	45%
	Pond/Wetland System	TBA				
	Gravel Wetland		H	95%	85%	64%
Infiltration Practices	Infiltration Trench (≥75 ft from surface water)		B, D, I	90%	55%	60%
	Infiltration Trench (<75 ft from surface water)		B, D, I	90%	10%	60%
	Infiltration Basin (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Infiltration Basin (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Dry Wells			90%	55%	60%
	Drip Edges			90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H	85%	10%	45%
	Tree Box Filter	TBA				
	Bioretention System		I, G, H	90%	65%	65%
	Permeable Pavement that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Permeable Pavement that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe	90%	10%	45%

Bioretention Pond Weighted Average Removal Rates

TSS Removal		Phosphorus Removal		Nitrogen Removal	
Impervious Area (s.f.)	Removal Rate	Impervious Area (s.f.)	Removal Rate	Impervious Area (s.f.)	Removal Rate
44,042	0.9	44,042	0.65	44,042	0.65
2,849	0	2,849	0	2,849	0
46,891	0.845	46,891	0.611	46,891	0.611

HYDROCAD DRAINAGE ANALYSIS

I. PRE-DEVELOPMENT
II. POST-DEVELOPMENT


1S
2S
Flow to Central Street
Flow to Wetland
A
B
Central Street
First Brook
Subcat
Reach
Pond
Link
Routing Diagram for 1806123-PRE DEVELOPMENT
Prepared by {enter your company name here}, Printed 9/19/2023
HydroCAD® 10.00-22 s/n 01045 © 2018 HydroCAD Software Solutions LLC

1806123-PRE DEVELOPMENT
Prepared by {enter your company name here} Printed 9/19/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.690	39.0	>75% Grass cover, Good, HSG A (1S, 2S)
0.381	98.0	Paved parking, HSG A (1S, 2S)
1.263	30.0	Woods, Good, HSG A (1S, 2S)
3.334	**42.3**	**TOTAL AREA**

1806123-PRE DEVELOPMENT
Prepared by {enter your company name here} Printed 9/19/2023

Soil Listing (all nodes)

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

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=43,281 sf 12.23% Impervious Runoff Depth>0.33"
Tc=6.0 min CN=WQ Runoff=0.35 cfs 0.03 af

Subcatchment 2S: Flow to Wetland Runoff Area=101,940 sf 11.08% Impervious Runoff Depth>0.30"
Flow Length=348' Tc=9.7 min CN=WQ Runoff=0.65 cfs 0.06 af

Link A: Central Street Inflow=0.35 cfs 0.03 af
Primary=0.35 cfs 0.03 af

Link B: First Brook Inflow=0.65 cfs 0.06 af
Primary=0.65 cfs 0.06 af

Total Runoff Area = 3.334 ac Runoff Volume = 0.09 af Average Runoff Depth = 0.31"
88.57% Pervious = 2.953 ac 11.43% Impervious = 0.381 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.35 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
5,292	98.0	Paved parking, HSG A
2,087	30.0	Woods, Good, HSG A
35,902	39.0	>75% Grass cover, Good, HSG A
43,281		Weighted Average
37,989	38.5	87.77% Pervious Area
5,292	98.0	12.23% Impervious Area

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

Summary for Subcatchment 2S: Flow to Wetland

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.06 af, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
52,915	30.0	Woods, Good, HSG A
37,725	39.0	>75% Grass cover, Good, HSG A
11,300	98.0	Paved parking, HSG A
101,940		Weighted Average
90,640	33.7	88.92% Pervious Area
11,300	98.0	11.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
3.8	298	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.7	348	Total			

Summary for Link A: Central Street

Inflow Area = 0.994 ac, 12.23% Impervious, Inflow Depth > 0.33" for 2-YEAR event
Inflow = 0.35 cfs @ 12.08 hrs, Volume= 0.03 af
Primary = 0.35 cfs @ 12.08 hrs, Volume= 0.03 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.340 ac, 11.08% Impervious, Inflow Depth > 0.30" for 2-YEAR event
Inflow = 0.65 cfs @ 12.13 hrs, Volume= 0.06 af
Primary = 0.65 cfs @ 12.13 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=43,281 sf 12.23% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=WQ Runoff=2.82 cfs 0.22 af

Subcatchment 2S: Flow to Wetland Runoff Area=101,940 sf 11.08% Impervious Runoff Depth>2.72"
Flow Length=348' Tc=9.7 min AMC Adjusted CN=WQ Runoff=5.90 cfs 0.53 af

Link A: Central Street Inflow=2.82 cfs 0.22 af
Primary=2.82 cfs 0.22 af

Link B: First Brook Inflow=5.90 cfs 0.53 af
Primary=5.90 cfs 0.53 af

Total Runoff Area = 3.334 ac Runoff Volume = 0.75 af Average Runoff Depth = 2.72"
88.57% Pervious = 2.953 ac 11.43% Impervious = 0.381 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 2.82 cfs @ 12.08 hrs, Volume= 0.22 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
5,292	98.0	98.0	Paved parking, HSG A
2,087	30.0	98.0	Woods, Good, HSG A
35,902	39.0	98.0	>75% Grass cover, Good, HSG A
43,281			Weighted Average
37,989	38.5	98.0	87.77% Pervious Area, AMC Adjusted
5,292	98.0	98.0	12.23% Impervious Area, AMC Adjusted

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

Summary for Subcatchment 2S: Flow to Wetland

Runoff = 5.90 cfs @ 12.13 hrs, Volume= 0.53 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
52,915	30.0	98.0	Woods, Good, HSG A
37,725	39.0	98.0	>75% Grass cover, Good, HSG A
11,300	98.0	98.0	Paved parking, HSG A
101,940			Weighted Average
90,640	33.7	98.0	88.92% Pervious Area, AMC Adjusted
11,300	98.0	98.0	11.08% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
3.8	298	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.7	348	Total			

Summary for Link A: Central Street

Inflow Area = 0.994 ac, 12.23% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 2.82 cfs @ 12.08 hrs, Volume= 0.22 af
Primary = 2.82 cfs @ 12.08 hrs, Volume= 0.22 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.340 ac, 11.08% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 5.90 cfs @ 12.13 hrs, Volume= 0.53 af
Primary = 5.90 cfs @ 12.13 hrs, Volume= 0.53 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=43,281 sf 12.23% Impervious Runoff Depth>0.60"
Tc=6.0 min CN=WQ Runoff=0.52 cfs 0.05 af

Subcatchment 2S: Flow to Wetland Runoff Area=101,940 sf 11.08% Impervious Runoff Depth>0.50"
Flow Length=348' Tc=9.7 min CN=WQ Runoff=1.00 cfs 0.10 af

Link A: Central Street Inflow=0.52 cfs 0.05 af
Primary=0.52 cfs 0.05 af

Link B: First Brook Inflow=1.00 cfs 0.10 af
Primary=1.00 cfs 0.10 af

Total Runoff Area = 3.334 ac Runoff Volume = 0.15 af Average Runoff Depth = 0.53"
88.57% Pervious = 2.953 ac 11.43% Impervious = 0.381 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.05 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
5,292	98.0	Paved parking, HSG A
2,087	30.0	Woods, Good, HSG A
35,902	39.0	>75% Grass cover, Good, HSG A
43,281		Weighted Average
37,989	38.5	87.77% Pervious Area
5,292	98.0	12.23% Impervious Area

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

Summary for Subcatchment 2S: Flow to Wetland

Runoff = 1.00 cfs @ 12.13 hrs, Volume= 0.10 af, Depth> 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
52,915	30.0	Woods, Good, HSG A
37,725	39.0	>75% Grass cover, Good, HSG A
11,300	98.0	Paved parking, HSG A
101,940		Weighted Average
90,640	33.7	88.92% Pervious Area
11,300	98.0	11.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
3.8	298	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.7	348	Total			

Summary for Link A: Central Street

Inflow Area = 0.994 ac, 12.23% Impervious, Inflow Depth > 0.60" for 10-YEAR event
Inflow = 0.52 cfs @ 12.08 hrs, Volume= 0.05 af
Primary = 0.52 cfs @ 12.08 hrs, Volume= 0.05 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.340 ac, 11.08% Impervious, Inflow Depth > 0.50" for 10-YEAR event
Inflow = 1.00 cfs @ 12.13 hrs, Volume= 0.10 af
Primary = 1.00 cfs @ 12.13 hrs, Volume= 0.10 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=43,281 sf 12.23% Impervious Runoff Depth>0.94"
Tc=6.0 min CN=WQ Runoff=0.66 cfs 0.08 af

Subcatchment 2S: Flow to Wetland Runoff Area=101,940 sf 11.08% Impervious Runoff Depth>0.74"
Flow Length=348' Tc=9.7 min CN=WQ Runoff=1.26 cfs 0.14 af

Link A: Central Street Inflow=0.66 cfs 0.08 af
Primary=0.66 cfs 0.08 af

Link B: First Brook Inflow=1.26 cfs 0.14 af
Primary=1.26 cfs 0.14 af

Total Runoff Area = 3.334 ac Runoff Volume = 0.22 af Average Runoff Depth = 0.80"
88.57% Pervious = 2.953 ac 11.43% Impervious = 0.381 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.66 cfs @ 12.09 hrs, Volume= 0.08 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
5,292	98.0	Paved parking, HSG A
2,087	30.0	Woods, Good, HSG A
35,902	39.0	>75% Grass cover, Good, HSG A
43,281		Weighted Average
37,989	38.5	87.77% Pervious Area
5,292	98.0	12.23% Impervious Area

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

Summary for Subcatchment 2S: Flow to Wetland

Runoff = 1.26 cfs @ 12.13 hrs, Volume= 0.14 af, Depth> 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
52,915	30.0	Woods, Good, HSG A
37,725	39.0	>75% Grass cover, Good, HSG A
11,300	98.0	Paved parking, HSG A
101,940		Weighted Average
90,640	33.7	88.92% Pervious Area
11,300	98.0	11.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
3.8	298	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.7	348	Total			

Summary for Link A: Central Street

Inflow Area = 0.994 ac, 12.23% Impervious, Inflow Depth > 0.94" for 25-YEAR event
Inflow = 0.66 cfs @ 12.09 hrs, Volume= 0.08 af
Primary = 0.66 cfs @ 12.09 hrs, Volume= 0.08 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.340 ac, 11.08% Impervious, Inflow Depth > 0.74" for 25-YEAR event
Inflow = 1.26 cfs @ 12.13 hrs, Volume= 0.14 af
Primary = 1.26 cfs @ 12.13 hrs, Volume= 0.14 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=43,281 sf 12.23% Impervious Runoff Depth>1.36"
Tc=6.0 min CN=WQ Runoff=0.99 cfs 0.11 af

Subcatchment 2S: Flow to Wetland Runoff Area=101,940 sf 11.08% Impervious Runoff Depth>1.05"
Flow Length=348' Tc=9.7 min CN=WQ Runoff=1.68 cfs 0.20 af

Link A: Central Street Inflow=0.99 cfs 0.11 af
Primary=0.99 cfs 0.11 af

Link B: First Brook Inflow=1.68 cfs 0.20 af
Primary=1.68 cfs 0.20 af

Total Runoff Area = 3.334 ac Runoff Volume = 0.32 af Average Runoff Depth = 1.14"
88.57% Pervious = 2.953 ac 11.43% Impervious = 0.381 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.99 cfs @ 12.10 hrs, Volume= 0.11 af, Depth> 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
5,292	98.0	Paved parking, HSG A
2,087	30.0	Woods, Good, HSG A
35,902	39.0	>75% Grass cover, Good, HSG A
43,281		Weighted Average
37,989	38.5	87.77% Pervious Area
5,292	98.0	12.23% Impervious Area

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

Summary for Subcatchment 2S: Flow to Wetland

Runoff = 1.68 cfs @ 12.14 hrs, Volume= 0.20 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
52,915	30.0	Woods, Good, HSG A
37,725	39.0	>75% Grass cover, Good, HSG A
11,300	98.0	Paved parking, HSG A
101,940		Weighted Average
90,640	33.7	88.92% Pervious Area
11,300	98.0	11.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
3.8	298	0.0670	1.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.7	348	Total			

Summary for Link A: Central Street

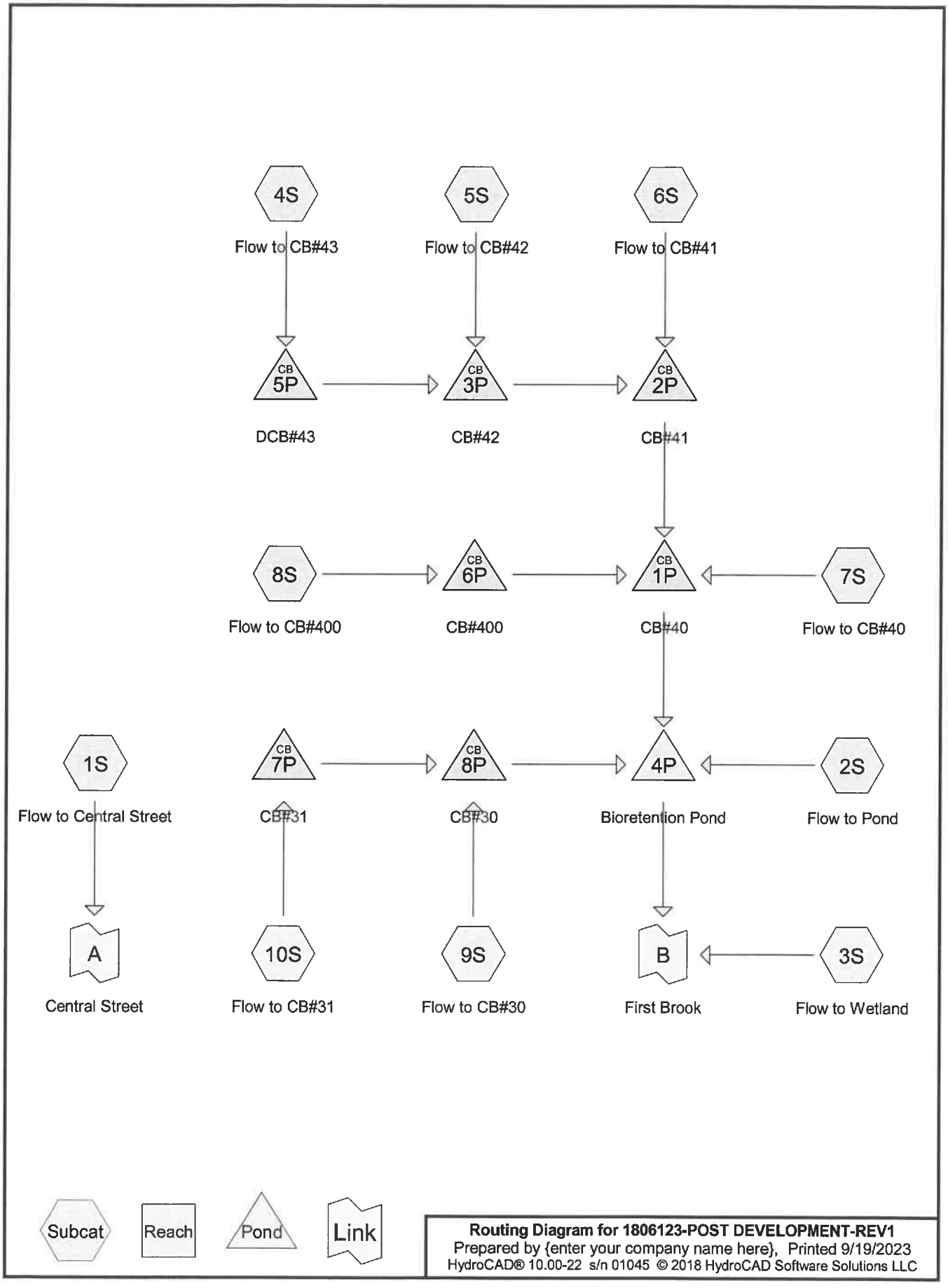
Inflow Area = 0.994 ac, 12.23% Impervious, Inflow Depth > 1.36" for 50-YEAR event
Inflow = 0.99 cfs @ 12.10 hrs, Volume= 0.11 af
Primary = 0.99 cfs @ 12.10 hrs, Volume= 0.11 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.340 ac, 11.08% Impervious, Inflow Depth > 1.05" for 50-YEAR event
Inflow = 1.68 cfs @ 12.14 hrs, Volume= 0.20 af
Primary = 1.68 cfs @ 12.14 hrs, Volume= 0.20 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs


4S
Flow to CB#43
5S
Flow to CB#42
6S
Flow to CB#41
CB 5P
DCB#43
CB 3P
CB#42
CB 2P
CB#41
8S
Flow to CB#400
CB 6P
CB#400
CB 1P
CB#40
7S
Flow to CB#40
1S
Flow to Central Street
CB 7P
CB#31
CB 8P
CB#30
4P
Bioretention Pond
2S
Flow to Pond
A
Central Street
10S
Flow to CB#31
9S
Flow to CB#30
B
First Brook
3S
Flow to Wetland
Subcat
Reach
Pond
Link
Routing Diagram for 1806123-POST DEVELOPMENT-REV1
Prepared by {enter your company name here}, Printed 9/19/2023
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1806123-POST DEVELOPMENT-REV1
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.533	39.0	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 8S, 10S)
1.154	98.0	Paved parking, HSG A (1S, 4S, 5S, 6S, 7S, 8S, 9S, 10S)
0.648	30.0	Woods, Good, HSG A (3S)
3.335	**57.7**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
3.335	HSG A	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.335		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=21,604 sf 17.10% Impervious Runoff Depth>0.46"
Tc=6.0 min CN=WQ Runoff=0.24 cfs 0.02 af

Subcatchment 2S: Flow to Pond Runoff Area=9,204 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39.0 Runoff=0.00 cfs 0.00 af

Subcatchment 3S: Flow to Wetland Runoff Area=46,922 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=175' Tc=8.4 min CN=WQ Runoff=0.00 cfs 0.00 af

Subcatchment 4S: Flow to CB#43 Runoff Area=28,080 sf 79.60% Impervious Runoff Depth>2.16"
Tc=6.0 min CN=WQ Runoff=1.46 cfs 0.12 af

Subcatchment 5S: Flow to CB#42 Runoff Area=7,985 sf 48.97% Impervious Runoff Depth>1.33"
Tc=6.0 min CN=WQ Runoff=0.25 cfs 0.02 af

Subcatchment 6S: Flow to CB#41 Runoff Area=7,909 sf 35.49% Impervious Runoff Depth>0.96"
Tc=6.0 min CN=WQ Runoff=0.18 cfs 0.01 af

Subcatchment 7S: Flow to CB#40 Runoff Area=3,682 sf 100.00% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=98.0 Runoff=0.24 cfs 0.02 af

Subcatchment 8S: Flow to CB#400 Runoff Area=9,784 sf 88.63% Impervious Runoff Depth>2.41"
Tc=6.0 min CN=WQ Runoff=0.57 cfs 0.05 af

Subcatchment 9S: Flow to CB#30 Runoff Area=3,575 sf 100.00% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=98.0 Runoff=0.23 cfs 0.02 af

Subcatchment 10S: Flow to CB#31 Runoff Area=6,532 sf 24.40% Impervious Runoff Depth>0.66"
Tc=6.0 min CN=WQ Runoff=0.10 cfs 0.01 af

Pond 1P: CB#40 Peak Elev=137.31' Inflow=2.70 cfs 0.22 af
15.0" Round Culvert n=0.013 L=31.0' S=0.0800 '/' Outflow=2.70 cfs 0.22 af

Pond 2P: CB#41 Peak Elev=138.47' Inflow=1.90 cfs 0.15 af
12.0" Round Culvert n=0.013 L=33.0' S=0.0200 '/' Outflow=1.90 cfs 0.15 af

Pond 3P: CB#42 Peak Elev=140.16' Inflow=1.71 cfs 0.14 af
12.0" Round Culvert n=0.013 L=162.4' S=0.0101 '/' Outflow=1.71 cfs 0.14 af

Pond 4P: Bioretention Pond Peak Elev=132.70' Storage=2,906 cf Inflow=3.04 cfs 0.24 af
Outflow=0.52 cfs 0.24 af

Pond 5P: DCB#43 Peak Elev=141.06' Inflow=1.46 cfs 0.12 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0100 '/' Outflow=1.46 cfs 0.12 af

Pond 6P: CB#400 Peak Elev=139.53' Inflow=0.57 cfs 0.05 af
12.0" Round Culvert n=0.013 L=105.0' S=0.0200 '/' Outflow=0.57 cfs 0.05 af

Pond 7P: CB#31 Peak Elev=134.65' Inflow=0.10 cfs 0.01 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=0.10 cfs 0.01 af

Pond 8P: CB#30 Peak Elev=134.45' Inflow=0.34 cfs 0.03 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.34 cfs 0.03 af

Link A: Central Street Inflow=0.24 cfs 0.02 af
Primary=0.24 cfs 0.02 af

Link B: First Brook Inflow=0.52 cfs 0.24 af
Primary=0.52 cfs 0.24 af

Total Runoff Area = 3.335 ac Runoff Volume = 0.26 af Average Runoff Depth = 0.94"
65.39% Pervious = 2.181 ac 34.61% Impervious = 1.154 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
3,694	98.0	Paved parking, HSG A
17,910	39.0	>75% Grass cover, Good, HSG A
21,604		Weighted Average
17,910	39.0	82.90% Pervious Area
3,694	98.0	17.10% Impervious Area

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

Summary for Subcatchment 2S: Flow to Pond

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
9,204	39.0	>75% Grass cover, Good, HSG A
9,204	39.0	100.00% Pervious Area

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

Summary for Subcatchment 3S: Flow to Wetland

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
28,209	30.0	Woods, Good, HSG A
18,713	39.0	>75% Grass cover, Good, HSG A
46,922		Weighted Average
46,922	33.6	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0800	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
1.0	125	0.1830	2.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	175	Total			

Summary for Subcatchment 4S: Flow to CB#43

Runoff = 1.46 cfs @ 12.08 hrs, Volume= 0.12 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
5,727	39.0	>75% Grass cover, Good, HSG A
22,353	98.0	Paved parking, HSG A
28,080		Weighted Average
5,727	39.0	20.40% Pervious Area
22,353	98.0	79.60% Impervious Area

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

Summary for Subcatchment 5S: Flow to CB#42

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
4,075	39.0	>75% Grass cover, Good, HSG A
3,910	98.0	Paved parking, HSG A
7,985		Weighted Average
4,075	39.0	51.03% Pervious Area
3,910	98.0	48.97% Impervious Area

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

Summary for Subcatchment 6S: Flow to CB#41

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.01 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
5,102	39.0	>75% Grass cover, Good, HSG A
2,807	98.0	Paved parking, HSG A
7,909		Weighted Average
5,102	39.0	64.51% Pervious Area
2,807	98.0	35.49% Impervious Area

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

Summary for Subcatchment 7S: Flow to CB#40

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
3,682	98.0	Paved parking, HSG A
3,682	98.0	100.00% Impervious Area

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

Summary for Subcatchment 8S: Flow to CB#400

Runoff = 0.57 cfs @ 12.08 hrs, Volume= 0.05 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
1,112	39.0	>75% Grass cover, Good, HSG A
8,672	98.0	Paved parking, HSG A
9,784		Weighted Average
1,112	39.0	11.37% Pervious Area
8,672	98.0	88.63% Impervious Area

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

Summary for Subcatchment 9S: Flow to CB#30

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
3,575	98.0	Paved parking, HSG A
3,575	98.0	100.00% Impervious Area

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

Summary for Subcatchment 10S: Flow to CB#31

Runoff = 0.10 cfs @ 12.08 hrs, Volume= 0.01 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YEAR Rainfall=2.95"

Area (sf)	CN	Description
4,938	39.0	>75% Grass cover, Good, HSG A
1,594	98.0	Paved parking, HSG A
6,532		Weighted Average
4,938	39.0	75.60% Pervious Area
1,594	98.0	24.40% Impervious Area

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

Summary for Pond 1P: CB#40

Inflow Area = 1.319 ac, 72.12% Impervious, Inflow Depth > 1.96" for 2-YEAR event
Inflow = 2.70 cfs @ 12.08 hrs, Volume= 0.22 af
Outflow = 2.70 cfs @ 12.08 hrs, Volume= 0.22 af, Atten= 0%, Lag= 0.0 min
Primary = 2.70 cfs @ 12.08 hrs, Volume= 0.22 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 137.31' @ 12.08 hrs
Flood Elev= 145.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.48'	**15.0" Round Culvert**

L= 31.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 136.48' / 134.00' S= 0.0800 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=2.68 cfs @ 12.08 hrs HW=137.31' TW=132.15' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.68 cfs @ 3.10 fps)

Summary for Pond 2P: CB#41

Inflow Area = 1.010 ac, 66.11% Impervious, Inflow Depth > 1.80" for 2-YEAR event
Inflow = 1.90 cfs @ 12.08 hrs, Volume= 0.15 af
Outflow = 1.90 cfs @ 12.08 hrs, Volume= 0.15 af, Atten= 0%, Lag= 0.0 min
Primary = 1.90 cfs @ 12.08 hrs, Volume= 0.15 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 138.47' @ 12.08 hrs
Flood Elev= 145.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.71'	**12.0" Round Culvert** L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.71' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.88 cfs @ 12.08 hrs HW=138.46' TW=137.31' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.88 cfs @ 2.96 fps)

Summary for Pond 3P: CB#42

Inflow Area = 0.828 ac, 72.82% Impervious, Inflow Depth > 1.98" for 2-YEAR event
Inflow = 1.71 cfs @ 12.08 hrs, Volume= 0.14 af
Outflow = 1.71 cfs @ 12.08 hrs, Volume= 0.14 af, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.08 hrs, Volume= 0.14 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 140.16' @ 12.08 hrs
Flood Elev= 146.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.45'	**12.0" Round Culvert** L= 162.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.45' / 137.81' S= 0.0101 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.70 cfs @ 12.08 hrs HW=140.16' TW=138.46' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.70 cfs @ 2.86 fps)

Summary for Pond 4P: Bioretention Pond

Inflow Area = 1.762 ac, 60.71% Impervious, Inflow Depth > 1.65" for 2-YEAR event
Inflow = 3.04 cfs @ 12.08 hrs, Volume= 0.24 af
Outflow = 0.52 cfs @ 12.54 hrs, Volume= 0.24 af, Atten= 83%, Lag= 27.5 min
Primary = 0.52 cfs @ 12.54 hrs, Volume= 0.24 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 132.70' @ 12.54 hrs Surf.Area= 2,805 sf Storage= 2,906 cf
Flood Elev= 134.50' Surf.Area= 5,042 sf Storage= 9,278 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.8 min (791.5 - 757.6)

Volume	Invert	Avail.Storage	Storage Description
#1	131.50'	9,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	132.00'	0 cf	**Sediment Forebay (No Storage) (Prismatic)** Listed below (Recalc) -Imperv 991 cf Overall x 0.0% Voids
		9,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.50	2,079	0	0
132.00	2,362	1,110	1,110
134.00	3,636	5,998	7,108
134.50	5,042	2,170	9,278

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	212	0	0
134.00	779	991	991

Device	Routing	Invert	Outlet Devices
#1	Device 4	131.50'	**8.000 in/hr Exfiltration over Surface area**
#2	Device 4	133.00'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 4	134.40'	**48.0" W x 48.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	129.00'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.54 hrs HW=132.70' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Passes 0.52 cfs of 6.55 cfs potential flow)
  ├**1=Exfiltration** (Exfiltration Controls 0.52 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 5P: DCB#43

Inflow Area = 0.645 ac, 79.60% Impervious, Inflow Depth > 2.16" for 2-YEAR event
Inflow = 1.46 cfs @ 12.08 hrs, Volume= 0.12 af
Outflow = 1.46 cfs @ 12.08 hrs, Volume= 0.12 af, Atten= 0%, Lag= 0.0 min
Primary = 1.46 cfs @ 12.08 hrs, Volume= 0.12 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 141.06' @ 12.09 hrs
Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	140.40'	**12.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.40' / 139.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.42 cfs @ 12.08 hrs HW=141.05' TW=140.16' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.42 cfs @ 3.71 fps)

Summary for Pond 6P: CB#400

Inflow Area = 0.225 ac, 88.63% Impervious, Inflow Depth > 2.41" for 2-YEAR event
Inflow = 0.57 cfs @ 12.08 hrs, Volume= 0.05 af
Outflow = 0.57 cfs @ 12.08 hrs, Volume= 0.05 af, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 12.08 hrs, Volume= 0.05 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 139.53' @ 12.08 hrs
Flood Elev= 146.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.15'	**12.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.15' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 12.08 hrs HW=139.52' TW=137.31' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.56 cfs @ 2.08 fps)

Summary for Pond 7P: CB#31

Inflow Area = 0.150 ac, 24.40% Impervious, Inflow Depth > 0.66" for 2-YEAR event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 0.01 af
Outflow = 0.10 cfs @ 12.08 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
Primary = 0.10 cfs @ 12.08 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.65' @ 12.09 hrs
Flood Elev= 138.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.48'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.48' / 134.26' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.10 cfs @ 12.08 hrs HW=134.65' TW=134.45' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.10 cfs @ 1.68 fps)

Summary for Pond 8P: CB#30

Inflow Area = 0.232 ac, 51.14% Impervious, Inflow Depth > 1.39" for 2-YEAR event
Inflow = 0.34 cfs @ 12.08 hrs, Volume= 0.03 af
Outflow = 0.34 cfs @ 12.08 hrs, Volume= 0.03 af, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.08 hrs, Volume= 0.03 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.45' @ 12.08 hrs
Flood Elev= 138.33'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.14'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.14' / 134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.08 hrs HW=134.45' TW=132.15' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.33 cfs @ 2.39 fps)

Summary for Link A: Central Street

Inflow Area = 0.496 ac, 17.10% Impervious, Inflow Depth > 0.46" for 2-YEAR event
Inflow = 0.24 cfs @ 12.08 hrs, Volume= 0.02 af
Primary = 0.24 cfs @ 12.08 hrs, Volume= 0.02 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.839 ac, 37.67% Impervious, Inflow Depth > 1.02" for 2-YEAR event
Inflow = 0.52 cfs @ 12.54 hrs, Volume= 0.24 af
Primary = 0.52 cfs @ 12.54 hrs, Volume= 0.24 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=21,604 sf 17.10% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=WQ Runoff=1.41 cfs 0.11 af

Subcatchment 2S: Flow to Pond Runoff Area=9,204 sf 0.00% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=98.0 Runoff=0.60 cfs 0.05 af

Subcatchment 3S: Flow to Wetland Runoff Area=46,922 sf 0.00% Impervious Runoff Depth>2.72"
Flow Length=175' Tc=8.4 min AMC Adjusted CN=WQ Runoff=2.83 cfs 0.24 af

Subcatchment 4S: Flow to CB#43 Runoff Area=28,080 sf 79.60% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=WQ Runoff=1.83 cfs 0.15 af

Subcatchment 5S: Flow to CB#42 Runoff Area=7,985 sf 48.97% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=WQ Runoff=0.52 cfs 0.04 af

Subcatchment 6S: Flow to CB#41 Runoff Area=7,909 sf 35.49% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=WQ Runoff=0.52 cfs 0.04 af

Subcatchment 7S: Flow to CB#40 Runoff Area=3,682 sf 100.00% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=98.0 Runoff=0.24 cfs 0.02 af

Subcatchment 8S: Flow to CB#400 Runoff Area=9,784 sf 88.63% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=WQ Runoff=0.64 cfs 0.05 af

Subcatchment 9S: Flow to CB#30 Runoff Area=3,575 sf 100.00% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=98.0 Runoff=0.23 cfs 0.02 af

Subcatchment 10S: Flow to CB#31 Runoff Area=6,532 sf 24.40% Impervious Runoff Depth>2.72"
Tc=6.0 min AMC Adjusted CN=WQ Runoff=0.43 cfs 0.03 af

Pond 1P: CB#40 Peak Elev=137.51' Inflow=3.75 cfs 0.30 af
15.0" Round Culvert n=0.013 L=31.0' S=0.0800 '/' Outflow=3.75 cfs 0.30 af

Pond 2P: CB#41 Peak Elev=138.79' Inflow=2.87 cfs 0.23 af
12.0" Round Culvert n=0.013 L=33.0' S=0.0200 '/' Outflow=2.87 cfs 0.23 af

Pond 3P: CB#42 Peak Elev=140.33' Inflow=2.35 cfs 0.19 af
12.0" Round Culvert n=0.013 L=162.4' S=0.0101 '/' Outflow=2.35 cfs 0.19 af

Pond 4P: Bioretention Pond Peak Elev=133.51' Storage=5,390 cf Inflow=5.00 cfs 0.40 af
Outflow=0.97 cfs 0.40 af

Pond 5P: DCB#43 Peak Elev=141.18' Inflow=1.83 cfs 0.15 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0100 '/' Outflow=1.83 cfs 0.15 af

Pond 6P: CB#400 Peak Elev=139.55' Inflow=0.64 cfs 0.05 af
12.0" Round Culvert n=0.013 L=105.0' S=0.0200 '/' Outflow=0.64 cfs 0.05 af

Pond 7P: CB#31 Peak Elev=134.84' Inflow=0.43 cfs 0.03 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=0.43 cfs 0.03 af

Pond 8P: CB#30 Peak Elev=134.60' Inflow=0.66 cfs 0.05 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.66 cfs 0.05 af

Link A: Central Street Inflow=1.41 cfs 0.11 af
Primary=1.41 cfs 0.11 af

Link B: First Brook Inflow=3.38 cfs 0.64 af
Primary=3.38 cfs 0.64 af

Total Runoff Area = 3.335 ac Runoff Volume = 0.75 af Average Runoff Depth = 2.72"
65.39% Pervious = 2.181 ac 34.61% Impervious = 1.154 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 1.41 cfs @ 12.08 hrs, Volume= 0.11 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
3,694	98.0	98.0	Paved parking, HSG A
17,910	39.0	98.0	>75% Grass cover, Good, HSG A
21,604			Weighted Average
17,910	39.0	98.0	82.90% Pervious Area, AMC Adjusted
3,694	98.0	98.0	17.10% Impervious Area, AMC Adjusted

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

Summary for Subcatchment 2S: Flow to Pond

Runoff = 0.60 cfs @ 12.08 hrs, Volume= 0.05 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
9,204	39.0	98.0	>75% Grass cover, Good, HSG A
9,204			Weighted Average
9,204	39.0	98.0	100.00% Pervious Area, AMC Adjusted

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

Summary for Subcatchment 3S: Flow to Wetland

Runoff = 2.83 cfs @ 12.11 hrs, Volume= 0.24 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
28,209	30.0	98.0	Woods, Good, HSG A
18,713	39.0	98.0	>75% Grass cover, Good, HSG A
46,922			Weighted Average
46,922	33.6	98.0	100.00% Pervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0800	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
1.0	125	0.1830	2.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	175	Total			

Summary for Subcatchment 4S: Flow to CB#43

Runoff = 1.83 cfs @ 12.08 hrs, Volume= 0.15 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
5,727	39.0	98.0	>75% Grass cover, Good, HSG A
22,353	98.0	98.0	Paved parking, HSG A
28,080			Weighted Average
5,727	39.0	98.0	20.40% Pervious Area, AMC Adjusted
22,353	98.0	98.0	79.60% Impervious Area, AMC Adjusted

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

Summary for Subcatchment 5S: Flow to CB#42

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.04 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
4,075	39.0	98.0	>75% Grass cover, Good, HSG A
3,910	98.0	98.0	Paved parking, HSG A
7,985			Weighted Average
4,075	39.0	98.0	51.03% Pervious Area, AMC Adjusted
3,910	98.0	98.0	48.97% Impervious Area, AMC Adjusted

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

Summary for Subcatchment 6S: Flow to CB#41

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.04 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
5,102	39.0	98.0	>75% Grass cover, Good, HSG A
2,807	98.0	98.0	Paved parking, HSG A
7,909			Weighted Average
5,102	39.0	98.0	64.51% Pervious Area, AMC Adjusted
2,807	98.0	98.0	35.49% Impervious Area, AMC Adjusted

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

Summary for Subcatchment 7S: Flow to CB#40

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Description
3,682	98.0	Paved parking, HSG A
3,682	98.0	100.00% Impervious Area

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

Summary for Subcatchment 8S: Flow to CB#400

Runoff = 0.64 cfs @ 12.08 hrs, Volume= 0.05 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
1,112	39.0	98.0	>75% Grass cover, Good, HSG A
8,672	98.0	98.0	Paved parking, HSG A
9,784			Weighted Average
1,112	39.0	98.0	11.37% Pervious Area, AMC Adjusted
8,672	98.0	98.0	88.63% Impervious Area, AMC Adjusted

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

Summary for Subcatchment 9S: Flow to CB#30

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Description
3,575	98.0	Paved parking, HSG A
3,575	98.0	100.00% Impervious Area

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

Summary for Subcatchment 10S: Flow to CB#31

Runoff = 0.43 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-YR Frozen Rainfall=2.95", AMC=4

Area (sf)	CN	Adj	Description
4,938	39.0	98.0	>75% Grass cover, Good, HSG A
1,594	98.0	98.0	Paved parking, HSG A
6,532			Weighted Average
4,938	39.0	98.0	75.60% Pervious Area, AMC Adjusted
1,594	98.0	98.0	24.40% Impervious Area, AMC Adjusted

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

Summary for Pond 1P: CB#40

Inflow Area = 1.319 ac, 72.12% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 3.75 cfs @ 12.08 hrs, Volume= 0.30 af
Outflow = 3.75 cfs @ 12.08 hrs, Volume= 0.30 af, Atten= 0%, Lag= 0.0 min
Primary = 3.75 cfs @ 12.08 hrs, Volume= 0.30 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 137.51' @ 12.08 hrs
Flood Elev= 145.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.48'	**15.0" Round Culvert**

L= 31.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 136.48' / 134.00' S= 0.0800 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.71 cfs @ 12.08 hrs HW=137.50' TW=132.73' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.71 cfs @ 3.45 fps)

Summary for Pond 2P: CB#41

Inflow Area = 1.010 ac, 66.11% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 2.87 cfs @ 12.08 hrs, Volume= 0.23 af
Outflow = 2.87 cfs @ 12.08 hrs, Volume= 0.23 af, Atten= 0%, Lag= 0.0 min
Primary = 2.87 cfs @ 12.08 hrs, Volume= 0.23 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 138.79' @ 12.08 hrs
Flood Elev= 145.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.71'	**12.0" Round Culvert** L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.71' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.84 cfs @ 12.08 hrs HW=138.77' TW=137.50' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.84 cfs @ 3.62 fps)

Summary for Pond 3P: CB#42

Inflow Area = 0.828 ac, 72.82% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 2.35 cfs @ 12.08 hrs, Volume= 0.19 af
Outflow = 2.35 cfs @ 12.08 hrs, Volume= 0.19 af, Atten= 0%, Lag= 0.0 min
Primary = 2.35 cfs @ 12.08 hrs, Volume= 0.19 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 140.33' @ 12.09 hrs
Flood Elev= 146.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.45'	**12.0" Round Culvert** L= 162.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.45' / 137.81' S= 0.0101 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.30 cfs @ 12.08 hrs HW=140.33' TW=138.77' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 2.30 cfs @ 4.19 fps)

Summary for Pond 4P: Bioretention Pond

Inflow Area = 1.762 ac, 60.71% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 5.00 cfs @ 12.08 hrs, Volume= 0.40 af
Outflow = 0.97 cfs @ 12.52 hrs, Volume= 0.40 af, Atten= 81%, Lag= 25.9 min
Primary = 0.97 cfs @ 12.52 hrs, Volume= 0.40 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 133.51' @ 12.52 hrs Surf.Area= 3,321 sf Storage= 5,390 cf
Flood Elev= 134.50' Surf.Area= 5,042 sf Storage= 9,278 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 53.6 min (811.3 - 757.6)

Volume	Invert	Avail.Storage	Storage Description
#1	131.50'	9,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	132.00'	0 cf	**Sediment Forebay (No Storage) (Prismatic)** Listed below (Recalc) -Imperv 991 cf Overall x 0.0% Voids
		9,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.50	2,079	0	0
132.00	2,362	1,110	1,110
134.00	3,636	5,998	7,108
134.50	5,042	2,170	9,278

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	212	0	0
134.00	779	991	991

Device	Routing	Invert	Outlet Devices
#1	Device 4	131.50'	**8.000 in/hr Exfiltration over Surface area**
#2	Device 4	133.00'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 4	134.40'	**48.0" W x 48.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	129.00'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.97 cfs @ 12.52 hrs HW=133.51' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Passes 0.97 cfs of 7.34 cfs potential flow)
  ├**1=Exfiltration** (Exfiltration Controls 0.62 cfs)
  ├**2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 2.63 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 5P: DCB#43

Inflow Area = 0.645 ac, 79.60% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 1.83 cfs @ 12.08 hrs, Volume= 0.15 af
Outflow = 1.83 cfs @ 12.08 hrs, Volume= 0.15 af, Atten= 0%, Lag= 0.0 min
Primary = 1.83 cfs @ 12.08 hrs, Volume= 0.15 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 141.18' @ 12.09 hrs
Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	140.40'	**12.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.40' / 139.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.77 cfs @ 12.08 hrs HW=141.17' TW=140.33' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.77 cfs @ 3.75 fps)

Summary for Pond 6P: CB#400

Inflow Area = 0.225 ac, 88.63% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 0.64 cfs @ 12.08 hrs, Volume= 0.05 af
Outflow = 0.64 cfs @ 12.08 hrs, Volume= 0.05 af, Atten= 0%, Lag= 0.0 min
Primary = 0.64 cfs @ 12.08 hrs, Volume= 0.05 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 139.55' @ 12.08 hrs
Flood Elev= 146.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.15'	**12.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.15' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.63 cfs @ 12.08 hrs HW=139.55' TW=137.50' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.63 cfs @ 2.15 fps)

Summary for Pond 7P: CB#31

Inflow Area = 0.150 ac, 24.40% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 0.43 cfs @ 12.08 hrs, Volume= 0.03 af
Outflow = 0.43 cfs @ 12.08 hrs, Volume= 0.03 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.08 hrs, Volume= 0.03 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.84' @ 12.09 hrs
Flood Elev= 138.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.48'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.48' / 134.26' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.08 hrs HW=134.84' TW=134.59' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.41 cfs @ 2.39 fps)

Summary for Pond 8P: CB#30

Inflow Area = 0.232 ac, 51.14% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 0.66 cfs @ 12.08 hrs, Volume= 0.05 af
Outflow = 0.66 cfs @ 12.08 hrs, Volume= 0.05 af, Atten= 0%, Lag= 0.0 min
Primary = 0.66 cfs @ 12.08 hrs, Volume= 0.05 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.60' @ 12.08 hrs
Flood Elev= 138.33'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.14'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.14' / 134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.65 cfs @ 12.08 hrs HW=134.59' TW=132.73' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.65 cfs @ 2.76 fps)

Summary for Link A: Central Street

Inflow Area = 0.496 ac, 17.10% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 1.41 cfs @ 12.08 hrs, Volume= 0.11 af
Primary = 1.41 cfs @ 12.08 hrs, Volume= 0.11 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.839 ac, 37.67% Impervious, Inflow Depth > 2.72" for 2-YR Frozen event
Inflow = 3.38 cfs @ 12.12 hrs, Volume= 0.64 af
Primary = 3.38 cfs @ 12.12 hrs, Volume= 0.64 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=21,604 sf 17.10% Impervious Runoff Depth>0.81"
Tc=6.0 min CN=WQ Runoff=0.37 cfs 0.03 af

Subcatchment 2S: Flow to Pond Runoff Area=9,204 sf 0.00% Impervious Runoff Depth>0.10"
Tc=6.0 min CN=39.0 Runoff=0.00 cfs 0.00 af

Subcatchment 3S: Flow to Wetland Runoff Area=46,922 sf 0.00% Impervious Runoff Depth>0.04"
Flow Length=175' Tc=8.4 min CN=WQ Runoff=0.01 cfs 0.00 af

Subcatchment 4S: Flow to CB#43 Runoff Area=28,080 sf 79.60% Impervious Runoff Depth>3.37"
Tc=6.0 min CN=WQ Runoff=2.22 cfs 0.18 af

Subcatchment 5S: Flow to CB#42 Runoff Area=7,985 sf 48.97% Impervious Runoff Depth>2.11"
Tc=6.0 min CN=WQ Runoff=0.39 cfs 0.03 af

Subcatchment 6S: Flow to CB#41 Runoff Area=7,909 sf 35.49% Impervious Runoff Depth>1.56"
Tc=6.0 min CN=WQ Runoff=0.28 cfs 0.02 af

Subcatchment 7S: Flow to CB#40 Runoff Area=3,682 sf 100.00% Impervious Runoff Depth>4.21"
Tc=6.0 min CN=98.0 Runoff=0.37 cfs 0.03 af

Subcatchment 8S: Flow to CB#400 Runoff Area=9,784 sf 88.63% Impervious Runoff Depth>3.74"
Tc=6.0 min CN=WQ Runoff=0.86 cfs 0.07 af

Subcatchment 9S: Flow to CB#30 Runoff Area=3,575 sf 100.00% Impervious Runoff Depth>4.21"
Tc=6.0 min CN=98.0 Runoff=0.35 cfs 0.03 af

Subcatchment 10S: Flow to CB#31 Runoff Area=6,532 sf 24.40% Impervious Runoff Depth>1.11"
Tc=6.0 min CN=WQ Runoff=0.16 cfs 0.01 af

Pond 1P: CB#40 Peak Elev=137.59' Inflow=4.11 cfs 0.34 af
15.0" Round Culvert n=0.013 L=31.0' S=0.0800 '/' Outflow=4.11 cfs 0.34 af

Pond 2P: CB#41 Peak Elev=138.79' Inflow=2.88 cfs 0.24 af
12.0" Round Culvert n=0.013 L=33.0' S=0.0200 '/' Outflow=2.88 cfs 0.24 af

Pond 3P: CB#42 Peak Elev=140.42' Inflow=2.61 cfs 0.21 af
12.0" Round Culvert n=0.013 L=162.4' S=0.0101 '/' Outflow=2.61 cfs 0.21 af

Pond 4P: Bioretention Pond Peak Elev=133.38' Storage=4,964 cf Inflow=4.62 cfs 0.38 af
Outflow=0.87 cfs 0.38 af

Pond 5P: DCB#43 Peak Elev=141.29' Inflow=2.22 cfs 0.18 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0100 '/' Outflow=2.22 cfs 0.18 af

Pond 6P: CB#400 Peak Elev=139.62' Inflow=0.86 cfs 0.07 af
12.0" Round Culvert n=0.013 L=105.0' S=0.0200 '/' Outflow=0.86 cfs 0.07 af

Pond 7P: CB#31 Peak Elev=134.71' Inflow=0.16 cfs 0.01 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=0.16 cfs 0.01 af

Pond 8P: CB#30 Peak Elev=134.54' Inflow=0.51 cfs 0.04 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.51 cfs 0.04 af

Link A: Central Street Inflow=0.37 cfs 0.03 af
Primary=0.37 cfs 0.03 af

Link B: First Brook Inflow=0.87 cfs 0.39 af
Primary=0.87 cfs 0.39 af

Total Runoff Area = 3.335 ac Runoff Volume = 0.42 af Average Runoff Depth = 1.50"
65.39% Pervious = 2.181 ac 34.61% Impervious = 1.154 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.37 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
3,694	98.0	Paved parking, HSG A
17,910	39.0	>75% Grass cover, Good, HSG A
21,604		Weighted Average
17,910	39.0	82.90% Pervious Area
3,694	98.0	17.10% Impervious Area

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

Summary for Subcatchment 2S: Flow to Pond

Runoff = 0.00 cfs @ 14.79 hrs, Volume= 0.00 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
9,204	39.0	>75% Grass cover, Good, HSG A
9,204	39.0	100.00% Pervious Area

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

Summary for Subcatchment 3S: Flow to Wetland

Runoff = 0.01 cfs @ 14.80 hrs, Volume= 0.00 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
28,209	30.0	Woods, Good, HSG A
18,713	39.0	>75% Grass cover, Good, HSG A
46,922		Weighted Average
46,922	33.6	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0800	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
1.0	125	0.1830	2.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	175	Total			

Summary for Subcatchment 4S: Flow to CB#43

Runoff = 2.22 cfs @ 12.08 hrs, Volume= 0.18 af, Depth> 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
5,727	39.0	>75% Grass cover, Good, HSG A
22,353	98.0	Paved parking, HSG A
28,080		Weighted Average
5,727	39.0	20.40% Pervious Area
22,353	98.0	79.60% Impervious Area

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

Summary for Subcatchment 5S: Flow to CB#42

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
4,075	39.0	>75% Grass cover, Good, HSG A
3,910	98.0	Paved parking, HSG A
7,985		Weighted Average
4,075	39.0	51.03% Pervious Area
3,910	98.0	48.97% Impervious Area

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

Summary for Subcatchment 6S: Flow to CB#41

Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
5,102	39.0	>75% Grass cover, Good, HSG A
2,807	98.0	Paved parking, HSG A
7,909		Weighted Average
5,102	39.0	64.51% Pervious Area
2,807	98.0	35.49% Impervious Area

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

Summary for Subcatchment 7S: Flow to CB#40

Runoff = 0.37 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
3,682	98.0	Paved parking, HSG A
3,682	98.0	100.00% Impervious Area

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

Summary for Subcatchment 8S: Flow to CB#400

Runoff = 0.86 cfs @ 12.08 hrs, Volume= 0.07 af, Depth> 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
1,112	39.0	>75% Grass cover, Good, HSG A
8,672	98.0	Paved parking, HSG A
9,784		Weighted Average
1,112	39.0	11.37% Pervious Area
8,672	98.0	88.63% Impervious Area

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

Summary for Subcatchment 9S: Flow to CB#30

Runoff = 0.35 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
3,575	98.0	Paved parking, HSG A
3,575	98.0	100.00% Impervious Area

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

Summary for Subcatchment 10S: Flow to CB#31

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.01 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-YEAR Rainfall=4.45"

Area (sf)	CN	Description
4,938	39.0	>75% Grass cover, Good, HSG A
1,594	98.0	Paved parking, HSG A
6,532		Weighted Average
4,938	39.0	75.60% Pervious Area
1,594	98.0	24.40% Impervious Area

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

Summary for Pond 1P: CB#40

Inflow Area = 1.319 ac, 72.12% Impervious, Inflow Depth > 3.07" for 10-YEAR event
Inflow = 4.11 cfs @ 12.08 hrs, Volume= 0.34 af
Outflow = 4.11 cfs @ 12.08 hrs, Volume= 0.34 af, Atten= 0%, Lag= 0.0 min
Primary = 4.11 cfs @ 12.08 hrs, Volume= 0.34 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 137.59' @ 12.08 hrs
Flood Elev= 145.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.48'	**15.0" Round Culvert**

L= 31.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 136.48' / 134.00' S= 0.0800 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=4.07 cfs @ 12.08 hrs HW=137.58' TW=132.62' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.07 cfs @ 3.57 fps)

Summary for Pond 2P: CB#41

Inflow Area =	1.010 ac, 66.11% Impervious, Inflow Depth > 2.82"		for 10-YEAR event	
Inflow =	2.88 cfs @	12.08 hrs, Volume=	0.24 af	
Outflow =	2.88 cfs @	12.08 hrs, Volume=	0.24 af, Atten= 0%, Lag= 0.0 min	
Primary =	2.88 cfs @	12.08 hrs, Volume=	0.24 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 138.79' @ 12.08 hrs
Flood Elev= 145.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.71'	**12.0" Round Culvert**
			L= 33.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 137.71' / 137.05' S= 0.0200 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.86 cfs @ 12.08 hrs HW=138.78' TW=137.58' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.86 cfs @ 3.64 fps)

Summary for Pond 3P: CB#42

Inflow Area =	0.828 ac, 72.82% Impervious, Inflow Depth > 3.09"		for 10-YEAR event	
Inflow =	2.61 cfs @	12.08 hrs, Volume=	0.21 af	
Outflow =	2.61 cfs @	12.08 hrs, Volume=	0.21 af, Atten= 0%, Lag= 0.0 min	
Primary =	2.61 cfs @	12.08 hrs, Volume=	0.21 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 140.42' @ 12.09 hrs
Flood Elev= 146.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.45'	**12.0" Round Culvert**
			L= 162.4' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 139.45' / 137.81' S= 0.0101 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.58 cfs @ 12.08 hrs HW=140.41' TW=138.78' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.58 cfs @ 3.33 fps)

Summary for Pond 4P: Bioretention Pond

Inflow Area = 1.762 ac, 60.71% Impervious, Inflow Depth > 2.60" for 10-YEAR event
Inflow = 4.62 cfs @ 12.08 hrs, Volume= 0.38 af
Outflow = 0.87 cfs @ 12.52 hrs, Volume= 0.38 af, Atten= 81%, Lag= 26.2 min
Primary = 0.87 cfs @ 12.52 hrs, Volume= 0.38 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 133.38' @ 12.52 hrs Surf.Area= 3,239 sf Storage= 4,964 cf
Flood Elev= 134.50' Surf.Area= 5,042 sf Storage= 9,278 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 51.6 min (805.9 - 754.3)

Volume	Invert	Avail.Storage	Storage Description
#1	131.50'	9,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	132.00'	0 cf	**Sediment Forebay (No Storage) (Prismatic)** Listed below (Recalc) -Imperv 991 cf Overall x 0.0% Voids
		9,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.50	2,079	0	0
132.00	2,362	1,110	1,110
134.00	3,636	5,998	7,108
134.50	5,042	2,170	9,278

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	212	0	0
134.00	779	991	991

Device	Routing	Invert	Outlet Devices
#1	Device 4	131.50'	**8.000 in/hr Exfiltration over Surface area**
#2	Device 4	133.00'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 4	134.40'	**48.0" W x 48.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	129.00'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.87 cfs @ 12.52 hrs HW=133.38' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Passes 0.87 cfs of 7.22 cfs potential flow)
  └**1=Exfiltration** (Exfiltration Controls 0.60 cfs)
  └**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 2.09 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 5P: DCB#43

Inflow Area = 0.645 ac, 79.60% Impervious, Inflow Depth > 3.37" for 10-YEAR event
Inflow = 2.22 cfs @ 12.08 hrs, Volume= 0.18 af
Outflow = 2.22 cfs @ 12.08 hrs, Volume= 0.18 af, Atten= 0%, Lag= 0.0 min
Primary = 2.22 cfs @ 12.08 hrs, Volume= 0.18 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 141.29' @ 12.09 hrs
Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	140.40'	**12.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.40' / 139.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.14 cfs @ 12.08 hrs HW=141.28' TW=140.41' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.14 cfs @ 3.89 fps)

Summary for Pond 6P: CB#400

Inflow Area = 0.225 ac, 88.63% Impervious, Inflow Depth > 3.74" for 10-YEAR event
Inflow = 0.86 cfs @ 12.08 hrs, Volume= 0.07 af
Outflow = 0.86 cfs @ 12.08 hrs, Volume= 0.07 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.08 hrs, Volume= 0.07 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 139.62' @ 12.08 hrs
Flood Elev= 146.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.15'	**12.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.15' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 12.08 hrs HW=139.62' TW=137.58' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.85 cfs @ 2.34 fps)

Summary for Pond 7P: CB#31

Inflow Area = 0.150 ac, 24.40% Impervious, Inflow Depth > 1.11" for 10-YEAR event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 0.01 af
Outflow = 0.16 cfs @ 12.08 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.08 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.71' @ 12.10 hrs
Flood Elev= 138.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.48'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.48' / 134.26' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.15 cfs @ 12.08 hrs HW=134.71' TW=134.53' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.15 cfs @ 1.72 fps)

Summary for Pond 8P: CB#30

Inflow Area = 0.232 ac, 51.14% Impervious, Inflow Depth > 2.20" for 10-YEAR event
Inflow = 0.51 cfs @ 12.08 hrs, Volume= 0.04 af
Outflow = 0.51 cfs @ 12.08 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min
Primary = 0.51 cfs @ 12.08 hrs, Volume= 0.04 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.54' @ 12.08 hrs
Flood Elev= 138.33'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.14'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.14' / 134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.51 cfs @ 12.08 hrs HW=134.53' TW=132.62' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.51 cfs @ 2.62 fps)

Summary for Link A: Central Street

Inflow Area = 0.496 ac, 17.10% Impervious, Inflow Depth > 0.81" for 10-YEAR event
Inflow = 0.37 cfs @ 12.08 hrs, Volume= 0.03 af
Primary = 0.37 cfs @ 12.08 hrs, Volume= 0.03 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.839 ac, 37.67% Impervious, Inflow Depth > 1.63" for 10-YEAR event
Inflow = 0.87 cfs @ 12.52 hrs, Volume= 0.39 af
Primary = 0.87 cfs @ 12.52 hrs, Volume= 0.39 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=21,604 sf 17.10% Impervious Runoff Depth>1.20"
Tc=6.0 min CN=WQ Runoff=0.46 cfs 0.05 af

Subcatchment 2S: Flow to Pond Runoff Area=9,204 sf 0.00% Impervious Runoff Depth>0.34"
Tc=6.0 min CN=39.0 Runoff=0.02 cfs 0.01 af

Subcatchment 3S: Flow to Wetland Runoff Area=46,922 sf 0.00% Impervious Runoff Depth>0.16"
Flow Length=175' Tc=8.4 min CN=WQ Runoff=0.05 cfs 0.01 af

Subcatchment 4S: Flow to CB#43 Runoff Area=28,080 sf 79.60% Impervious Runoff Depth>4.35"
Tc=6.0 min CN=WQ Runoff=2.81 cfs 0.23 af

Subcatchment 5S: Flow to CB#42 Runoff Area=7,985 sf 48.97% Impervious Runoff Depth>2.81"
Tc=6.0 min CN=WQ Runoff=0.49 cfs 0.04 af

Subcatchment 6S: Flow to CB#41 Runoff Area=7,909 sf 35.49% Impervious Runoff Depth>2.13"
Tc=6.0 min CN=WQ Runoff=0.35 cfs 0.03 af

Subcatchment 7S: Flow to CB#40 Runoff Area=3,682 sf 100.00% Impervious Runoff Depth>5.38"
Tc=6.0 min CN=98.0 Runoff=0.46 cfs 0.04 af

Subcatchment 8S: Flow to CB#400 Runoff Area=9,784 sf 88.63% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=WQ Runoff=1.09 cfs 0.09 af

Subcatchment 9S: Flow to CB#30 Runoff Area=3,575 sf 100.00% Impervious Runoff Depth>5.38"
Tc=6.0 min CN=98.0 Runoff=0.45 cfs 0.04 af

Subcatchment 10S: Flow to CB#31 Runoff Area=6,532 sf 24.40% Impervious Runoff Depth>1.57"
Tc=6.0 min CN=WQ Runoff=0.20 cfs 0.02 af

Pond 1P: CB#40 Peak Elev=137.88' Inflow=5.20 cfs 0.44 af
15.0" Round Culvert n=0.013 L=31.0' S=0.0800 '/' Outflow=5.20 cfs 0.44 af

Pond 2P: CB#41 Peak Elev=139.14' Inflow=3.65 cfs 0.31 af
12.0" Round Culvert n=0.013 L=33.0' S=0.0200 '/' Outflow=3.65 cfs 0.31 af

Pond 3P: CB#42 Peak Elev=140.71' Inflow=3.30 cfs 0.28 af
12.0" Round Culvert n=0.013 L=162.4' S=0.0101 '/' Outflow=3.30 cfs 0.28 af

Pond 4P: Bioretention Pond Peak Elev=133.84' Storage=6,533 cf Inflow=5.85 cfs 0.50 af
Outflow=1.18 cfs 0.50 af

Pond 5P: DCB#43 Peak Elev=141.53' Inflow=2.81 cfs 0.23 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0100 '/' Outflow=2.81 cfs 0.23 af

Pond 6P: CB#400 Peak Elev=139.69' Inflow=1.09 cfs 0.09 af
12.0" Round Culvert n=0.013 L=105.0' S=0.0200 '/' Outflow=1.09 cfs 0.09 af

Pond 7P: CB#31 Peak Elev=134.75' Inflow=0.20 cfs 0.02 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=0.20 cfs 0.02 af

Pond 8P: CB#30 Peak Elev=134.59' Inflow=0.65 cfs 0.06 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.65 cfs 0.06 af

Link A: Central Street Inflow=0.46 cfs 0.05 af
Primary=0.46 cfs 0.05 af

Link B: First Brook Inflow=1.22 cfs 0.51 af
Primary=1.22 cfs 0.51 af

Total Runoff Area = 3.335 ac Runoff Volume = 0.56 af Average Runoff Depth = 2.03"
65.39% Pervious = 2.181 ac 34.61% Impervious = 1.154 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.46 cfs @ 12.08 hrs, Volume= 0.05 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
3,694	98.0	Paved parking, HSG A
17,910	39.0	>75% Grass cover, Good, HSG A
21,604		Weighted Average
17,910	39.0	82.90% Pervious Area
3,694	98.0	17.10% Impervious Area

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

Summary for Subcatchment 2S: Flow to Pond

Runoff = 0.02 cfs @ 12.39 hrs, Volume= 0.01 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
9,204	39.0	>75% Grass cover, Good, HSG A
9,204	39.0	100.00% Pervious Area

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

Summary for Subcatchment 3S: Flow to Wetland

Runoff = 0.05 cfs @ 12.42 hrs, Volume= 0.01 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
28,209	30.0	Woods, Good, HSG A
18,713	39.0	>75% Grass cover, Good, HSG A
46,922		Weighted Average
46,922	33.6	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0800	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
1.0	125	0.1830	2.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	175	Total			

Summary for Subcatchment 4S: Flow to CB#43

Runoff = 2.81 cfs @ 12.08 hrs, Volume= 0.23 af, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
5,727	39.0	>75% Grass cover, Good, HSG A
22,353	98.0	Paved parking, HSG A
28,080		Weighted Average
5,727	39.0	20.40% Pervious Area
22,353	98.0	79.60% Impervious Area

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

Summary for Subcatchment 5S: Flow to CB#42

Runoff = 0.49 cfs @ 12.08 hrs, Volume= 0.04 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
4,075	39.0	>75% Grass cover, Good, HSG A
3,910	98.0	Paved parking, HSG A
7,985		Weighted Average
4,075	39.0	51.03% Pervious Area
3,910	98.0	48.97% Impervious Area

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

Summary for Subcatchment 6S: Flow to CB#41

Runoff = 0.35 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
5,102	39.0	>75% Grass cover, Good, HSG A
2,807	98.0	Paved parking, HSG A
7,909		Weighted Average
5,102	39.0	64.51% Pervious Area
2,807	98.0	35.49% Impervious Area

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

Summary for Subcatchment 7S: Flow to CB#40

Runoff = 0.46 cfs @ 12.08 hrs, Volume= 0.04 af, Depth> 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
3,682	98.0	Paved parking, HSG A
3,682	98.0	100.00% Impervious Area

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

Summary for Subcatchment 8S: Flow to CB#400

Runoff = 1.09 cfs @ 12.08 hrs, Volume= 0.09 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
1,112	39.0	>75% Grass cover, Good, HSG A
8,672	98.0	Paved parking, HSG A
9,784		Weighted Average
1,112	39.0	11.37% Pervious Area
8,672	98.0	88.63% Impervious Area

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

Summary for Subcatchment 9S: Flow to CB#30

Runoff = 0.45 cfs @ 12.08 hrs, Volume= 0.04 af, Depth> 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
3,575	98.0	Paved parking, HSG A
3,575	98.0	100.00% Impervious Area

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

Summary for Subcatchment 10S: Flow to CB#31

Runoff = 0.20 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-YEAR Rainfall=5.62"

Area (sf)	CN	Description
4,938	39.0	>75% Grass cover, Good, HSG A
1,594	98.0	Paved parking, HSG A
6,532		Weighted Average
4,938	39.0	75.60% Pervious Area
1,594	98.0	24.40% Impervious Area

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

Summary for Pond 1P: CB#40

Inflow Area = 1.319 ac, 72.12% Impervious, Inflow Depth > 3.97" for 25-YEAR event
Inflow = 5.20 cfs @ 12.08 hrs, Volume= 0.44 af
Outflow = 5.20 cfs @ 12.08 hrs, Volume= 0.44 af, Atten= 0%, Lag= 0.0 min
Primary = 5.20 cfs @ 12.08 hrs, Volume= 0.44 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 137.88' @ 12.08 hrs
Flood Elev= 145.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.48'	**15.0" Round Culvert**

L= 31.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 136.48' / 134.00' S= 0.0800 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.15 cfs @ 12.08 hrs HW=137.87' TW=133.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.15 cfs @ 4.20 fps)

Summary for Pond 2P: CB#41

Inflow Area = 1.010 ac, 66.11% Impervious, Inflow Depth > 3.67" for 25-YEAR event
Inflow = 3.65 cfs @ 12.08 hrs, Volume= 0.31 af
Outflow = 3.65 cfs @ 12.08 hrs, Volume= 0.31 af, Atten= 0%, Lag= 0.0 min
Primary = 3.65 cfs @ 12.08 hrs, Volume= 0.31 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 139.14' @ 12.08 hrs
Flood Elev= 145.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.71'	**12.0" Round Culvert** L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.71' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.62 cfs @ 12.08 hrs HW=139.12' TW=137.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.62 cfs @ 4.61 fps)

Summary for Pond 3P: CB#42

Inflow Area = 0.828 ac, 72.82% Impervious, Inflow Depth > 4.01" for 25-YEAR event
Inflow = 3.30 cfs @ 12.08 hrs, Volume= 0.28 af
Outflow = 3.30 cfs @ 12.08 hrs, Volume= 0.28 af, Atten= 0%, Lag= 0.0 min
Primary = 3.30 cfs @ 12.08 hrs, Volume= 0.28 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 140.71' @ 12.09 hrs
Flood Elev= 146.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.45'	**12.0" Round Culvert** L= 162.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.45' / 137.81' S= 0.0101 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.23 cfs @ 12.08 hrs HW=140.70' TW=139.12' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.23 cfs @ 4.23 fps)

Summary for Pond 4P: Bioretention Pond

Inflow Area = 1.762 ac, 60.71% Impervious, Inflow Depth > 3.40" for 25-YEAR event
Inflow = 5.85 cfs @ 12.08 hrs, Volume= 0.50 af
Outflow = 1.18 cfs @ 12.52 hrs, Volume= 0.50 af, Atten= 80%, Lag= 26.1 min
Primary = 1.18 cfs @ 12.52 hrs, Volume= 0.50 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 133.84' @ 12.52 hrs Surf.Area= 3,534 sf Storage= 6,533 cf
Flood Elev= 134.50' Surf.Area= 5,042 sf Storage= 9,278 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 55.8 min (810.5 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	131.50'	9,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	132.00'	0 cf	**Sediment Forebay (No Storage) (Prismatic)** Listed below (Recalc) -Imperv 991 cf Overall x 0.0% Voids
		9,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.50	2,079	0	0
132.00	2,362	1,110	1,110
134.00	3,636	5,998	7,108
134.50	5,042	2,170	9,278

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	212	0	0
134.00	779	991	991

Device	Routing	Invert	Outlet Devices
#1	Device 4	131.50'	**8.000 in/hr Exfiltration over Surface area**
#2	Device 4	133.00'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 4	134.40'	**48.0" W x 48.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	129.00'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.18 cfs @ 12.52 hrs HW=133.84' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Passes 1.18 cfs of 7.65 cfs potential flow)
  ├**1=Exfiltration** (Exfiltration Controls 0.65 cfs)
  ├**2=Orifice/Grate** (Orifice Controls 0.52 cfs @ 3.82 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 5P: DCB#43

Inflow Area = 0.645 ac, 79.60% Impervious, Inflow Depth > 4.35" for 25-YEAR event
Inflow = 2.81 cfs @ 12.08 hrs, Volume= 0.23 af
Outflow = 2.81 cfs @ 12.08 hrs, Volume= 0.23 af, Atten= 0%, Lag= 0.0 min
Primary = 2.81 cfs @ 12.08 hrs, Volume= 0.23 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 141.53' @ 12.10 hrs
Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	140.40'	**12.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.40' / 139.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.65 cfs @ 12.08 hrs HW=141.50' TW=140.70' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.65 cfs @ 3.82 fps)

Summary for Pond 6P: CB#400

Inflow Area = 0.225 ac, 88.63% Impervious, Inflow Depth > 4.81" for 25-YEAR event
Inflow = 1.09 cfs @ 12.08 hrs, Volume= 0.09 af
Outflow = 1.09 cfs @ 12.08 hrs, Volume= 0.09 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.08 hrs, Volume= 0.09 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 139.69' @ 12.08 hrs
Flood Elev= 146.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.15'	**12.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.15' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.08 hrs HW=139.69' TW=137.87' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.08 cfs @ 2.50 fps)

Summary for Pond 7P: CB#31

Inflow Area = 0.150 ac, 24.40% Impervious, Inflow Depth > 1.57" for 25-YEAR event
Inflow = 0.20 cfs @ 12.08 hrs, Volume= 0.02 af
Outflow = 0.20 cfs @ 12.08 hrs, Volume= 0.02 af, Atten= 0%, Lag= 0.0 min
Primary = 0.20 cfs @ 12.08 hrs, Volume= 0.02 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.75' @ 12.10 hrs
Flood Elev= 138.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.48'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.48' / 134.26' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.19 cfs @ 12.08 hrs HW=134.74' TW=134.59' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.19 cfs @ 1.72 fps)

Summary for Pond 8P: CB#30

Inflow Area = 0.232 ac, 51.14% Impervious, Inflow Depth > 2.92" for 25-YEAR event
Inflow = 0.65 cfs @ 12.08 hrs, Volume= 0.06 af
Outflow = 0.65 cfs @ 12.08 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.08 hrs, Volume= 0.06 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.59' @ 12.08 hrs
Flood Elev= 138.33'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.14'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.14' / 134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.64 cfs @ 12.08 hrs HW=134.59' TW=133.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.64 cfs @ 2.76 fps)

Summary for Link A: Central Street

Inflow Area = 0.496 ac, 17.10% Impervious, Inflow Depth > 1.20" for 25-YEAR event
Inflow = 0.46 cfs @ 12.08 hrs, Volume= 0.05 af
Primary = 0.46 cfs @ 12.08 hrs, Volume= 0.05 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.839 ac, 37.67% Impervious, Inflow Depth > 2.17" for 25-YEAR event
Inflow = 1.22 cfs @ 12.49 hrs, Volume= 0.51 af
Primary = 1.22 cfs @ 12.49 hrs, Volume= 0.51 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Flow to Central Street Runoff Area=21,604 sf 17.10% Impervious Runoff Depth>1.66"
Tc=6.0 min CN=WQ Runoff=0.65 cfs 0.07 af

Subcatchment 2S: Flow to Pond Runoff Area=9,204 sf 0.00% Impervious Runoff Depth>0.67"
Tc=6.0 min CN=39.0 Runoff=0.07 cfs 0.01 af

Subcatchment 3S: Flow to Wetland Runoff Area=46,922 sf 0.00% Impervious Runoff Depth>0.37"
Flow Length=175' Tc=8.4 min CN=WQ Runoff=0.14 cfs 0.03 af

Subcatchment 4S: Flow to CB#43 Runoff Area=28,080 sf 79.60% Impervious Runoff Depth>5.29"
Tc=6.0 min CN=WQ Runoff=3.39 cfs 0.28 af

Subcatchment 5S: Flow to CB#42 Runoff Area=7,985 sf 48.97% Impervious Runoff Depth>3.51"
Tc=6.0 min CN=WQ Runoff=0.61 cfs 0.05 af

Subcatchment 6S: Flow to CB#41 Runoff Area=7,909 sf 35.49% Impervious Runoff Depth>2.73"
Tc=6.0 min CN=WQ Runoff=0.45 cfs 0.04 af

Subcatchment 7S: Flow to CB#40 Runoff Area=3,682 sf 100.00% Impervious Runoff Depth>6.48"
Tc=6.0 min CN=98.0 Runoff=0.55 cfs 0.05 af

Subcatchment 8S: Flow to CB#400 Runoff Area=9,784 sf 88.63% Impervious Runoff Depth>5.82"
Tc=6.0 min CN=WQ Runoff=1.31 cfs 0.11 af

Subcatchment 9S: Flow to CB#30 Runoff Area=3,575 sf 100.00% Impervious Runoff Depth>6.48"
Tc=6.0 min CN=98.0 Runoff=0.54 cfs 0.04 af

Subcatchment 10S: Flow to CB#31 Runoff Area=6,532 sf 24.40% Impervious Runoff Depth>2.09"
Tc=6.0 min CN=WQ Runoff=0.26 cfs 0.03 af

Pond 1P: CB#40 Peak Elev=138.24' Inflow=6.30 cfs 0.53 af
15.0" Round Culvert n=0.013 L=31.0' S=0.0800 '/' Outflow=6.30 cfs 0.53 af

Pond 2P: CB#41 Peak Elev=139.59' Inflow=4.44 cfs 0.38 af
12.0" Round Culvert n=0.013 L=33.0' S=0.0200 '/' Outflow=4.44 cfs 0.38 af

Pond 3P: CB#42 Peak Elev=142.12' Inflow=4.00 cfs 0.34 af
12.0" Round Culvert n=0.013 L=162.4' S=0.0101 '/' Outflow=4.00 cfs 0.34 af

Pond 4P: Bioretention Pond Peak Elev=134.29' Storage=8,266 cf Inflow=7.15 cfs 0.62 af
Outflow=1.50 cfs 0.62 af

Pond 5P: DCB#43 Peak Elev=143.12' Inflow=3.39 cfs 0.28 af
12.0" Round Culvert n=0.013 L=85.0' S=0.0100 '/' Outflow=3.39 cfs 0.28 af

Pond 6P: CB#400 Peak Elev=139.75' Inflow=1.31 cfs 0.11 af
12.0" Round Culvert n=0.013 L=105.0' S=0.0200 '/' Outflow=1.31 cfs 0.11 af

Pond 7P: CB#31 Peak Elev=134.80' Inflow=0.26 cfs 0.03 af
12.0" Round Culvert n=0.013 L=22.0' S=0.0100 '/' Outflow=0.26 cfs 0.03 af

Pond 8P: CB#30 Peak Elev=134.65' Inflow=0.80 cfs 0.07 af
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.80 cfs 0.07 af

Link A: Central Street Inflow=0.65 cfs 0.07 af
Primary=0.65 cfs 0.07 af

Link B: First Brook Inflow=1.61 cfs 0.65 af
Primary=1.61 cfs 0.65 af

Total Runoff Area = 3.335 ac Runoff Volume = 0.72 af Average Runoff Depth = 2.58"
65.39% Pervious = 2.181 ac 34.61% Impervious = 1.154 ac

Summary for Subcatchment 1S: Flow to Central Street

Runoff = 0.65 cfs @ 12.10 hrs, Volume= 0.07 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
3,694	98.0	Paved parking, HSG A
17,910	39.0	>75% Grass cover, Good, HSG A
21,604		Weighted Average
17,910	39.0	82.90% Pervious Area
3,694	98.0	17.10% Impervious Area

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

Summary for Subcatchment 2S: Flow to Pond

Runoff = 0.07 cfs @ 12.15 hrs, Volume= 0.01 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
9,204	39.0	>75% Grass cover, Good, HSG A
9,204	39.0	100.00% Pervious Area

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

Summary for Subcatchment 3S: Flow to Wetland

Runoff = 0.14 cfs @ 12.30 hrs, Volume= 0.03 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
28,209	30.0	Woods, Good, HSG A
18,713	39.0	>75% Grass cover, Good, HSG A
46,922		Weighted Average
46,922	33.6	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0800	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
1.0	125	0.1830	2.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.4	175	Total			

Summary for Subcatchment 4S: Flow to CB#43

Runoff = 3.39 cfs @ 12.09 hrs, Volume= 0.28 af, Depth> 5.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
5,727	39.0	>75% Grass cover, Good, HSG A
22,353	98.0	Paved parking, HSG A
28,080		Weighted Average
5,727	39.0	20.40% Pervious Area
22,353	98.0	79.60% Impervious Area

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

Summary for Subcatchment 5S: Flow to CB#42

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 0.05 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
4,075	39.0	>75% Grass cover, Good, HSG A
3,910	98.0	Paved parking, HSG A
7,985		Weighted Average
4,075	39.0	51.03% Pervious Area
3,910	98.0	48.97% Impervious Area

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

Summary for Subcatchment 6S: Flow to CB#41

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.04 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
5,102	39.0	>75% Grass cover, Good, HSG A
2,807	98.0	Paved parking, HSG A
7,909		Weighted Average
5,102	39.0	64.51% Pervious Area
2,807	98.0	35.49% Impervious Area

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

Summary for Subcatchment 7S: Flow to CB#40

Runoff = 0.55 cfs @ 12.08 hrs, Volume= 0.05 af, Depth> 6.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
3,682	98.0	Paved parking, HSG A
3,682	98.0	100.00% Impervious Area

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

Summary for Subcatchment 8S: Flow to CB#400

Runoff = 1.31 cfs @ 12.08 hrs, Volume= 0.11 af, Depth> 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
1,112	39.0	>75% Grass cover, Good, HSG A
8,672	98.0	Paved parking, HSG A
9,784		Weighted Average
1,112	39.0	11.37% Pervious Area
8,672	98.0	88.63% Impervious Area

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

Summary for Subcatchment 9S: Flow to CB#30

Runoff = 0.54 cfs @ 12.08 hrs, Volume= 0.04 af, Depth> 6.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
3,575	98.0	Paved parking, HSG A
3,575	98.0	100.00% Impervious Area

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

Summary for Subcatchment 10S: Flow to CB#31

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.03 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type III 24-hr 50-YEAR Rainfall=6.72"

Area (sf)	CN	Description
4,938	39.0	>75% Grass cover, Good, HSG A
1,594	98.0	Paved parking, HSG A
6,532		Weighted Average
4,938	39.0	75.60% Pervious Area
1,594	98.0	24.40% Impervious Area

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

Summary for Pond 1P: CB#40

Inflow Area = 1.319 ac, 72.12% Impervious, Inflow Depth > 4.86" for 50-YEAR event
Inflow = 6.30 cfs @ 12.09 hrs, Volume= 0.53 af
Outflow = 6.30 cfs @ 12.09 hrs, Volume= 0.53 af, Atten= 0%, Lag= 0.0 min
Primary = 6.30 cfs @ 12.09 hrs, Volume= 0.53 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 138.24' @ 12.09 hrs
Flood Elev= 145.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	136.48'	**15.0" Round Culvert**

L= 31.0' CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 136.48' / 134.00' S= 0.0800 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.26 cfs @ 12.09 hrs HW=138.23' TW=133.37' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.26 cfs @ 5.10 fps)

Summary for Pond 2P: CB#41

Inflow Area = 1.010 ac, 66.11% Impervious, Inflow Depth > 4.51" for 50-YEAR event
Inflow = 4.44 cfs @ 12.09 hrs, Volume= 0.38 af
Outflow = 4.44 cfs @ 12.09 hrs, Volume= 0.38 af, Atten= 0%, Lag= 0.0 min
Primary = 4.44 cfs @ 12.09 hrs, Volume= 0.38 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 139.59' @ 12.09 hrs
Flood Elev= 145.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	137.71'	**12.0" Round Culvert** L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.71' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.38 cfs @ 12.09 hrs HW=139.57' TW=138.23' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.38 cfs @ 5.58 fps)

Summary for Pond 3P: CB#42

Inflow Area = 0.828 ac, 72.82% Impervious, Inflow Depth > 4.90" for 50-YEAR event
Inflow = 4.00 cfs @ 12.09 hrs, Volume= 0.34 af
Outflow = 4.00 cfs @ 12.09 hrs, Volume= 0.34 af, Atten= 0%, Lag= 0.0 min
Primary = 4.00 cfs @ 12.09 hrs, Volume= 0.34 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 142.12' @ 12.10 hrs
Flood Elev= 146.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.45'	**12.0" Round Culvert** L= 162.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.45' / 137.81' S= 0.0101 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.84 cfs @ 12.09 hrs HW=142.02' TW=139.57' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.84 cfs @ 4.89 fps)

Summary for Pond 4P: Bioretention Pond

Inflow Area = 1.762 ac, 60.71% Impervious, Inflow Depth > 4.19" for 50-YEAR event
Inflow = 7.15 cfs @ 12.09 hrs, Volume= 0.62 af
Outflow = 1.50 cfs @ 12.52 hrs, Volume= 0.62 af, Atten= 79%, Lag= 25.7 min
Primary = 1.50 cfs @ 12.52 hrs, Volume= 0.62 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.29' @ 12.52 hrs Surf.Area= 4,442 sf Storage= 8,266 cf
Flood Elev= 134.50' Surf.Area= 5,042 sf Storage= 9,278 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 59.9 min (815.1 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1	131.50'	9,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	132.00'	0 cf	**Sediment Forebay (No Storage) (Prismatic)** Listed below (Recalc) -Imperv 991 cf Overall x 0.0% Voids
		9,278 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.50	2,079	0	0
132.00	2,362	1,110	1,110
134.00	3,636	5,998	7,108
134.50	5,042	2,170	9,278

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	212	0	0
134.00	779	991	991

Device	Routing	Invert	Outlet Devices
#1	Device 4	131.50'	**8.000 in/hr Exfiltration over Surface area**
#2	Device 4	133.00'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Device 4	134.40'	**48.0" W x 48.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	129.00'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.00' / 128.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.50 cfs @ 12.52 hrs HW=134.29' TW=0.00' (Dynamic Tailwater)
└**4=Culvert** (Passes 1.50 cfs of 8.04 cfs potential flow)
  ├**1=Exfiltration** (Exfiltration Controls 0.82 cfs)
  ├**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 5.00 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 5P: DCB#43

Inflow Area = 0.645 ac, 79.60% Impervious, Inflow Depth > 5.29" for 50-YEAR event
Inflow = 3.39 cfs @ 12.09 hrs, Volume= 0.28 af
Outflow = 3.39 cfs @ 12.09 hrs, Volume= 0.28 af, Atten= 0%, Lag= 0.0 min
Primary = 3.39 cfs @ 12.09 hrs, Volume= 0.28 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 143.12' @ 12.12 hrs
Flood Elev= 144.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	140.40'	**12.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.40' / 139.55' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.25 cfs @ 12.09 hrs HW=142.54' TW=142.01' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 2.25 cfs @ 2.87 fps)

Summary for Pond 6P: CB#400

Inflow Area = 0.225 ac, 88.63% Impervious, Inflow Depth > 5.82" for 50-YEAR event
Inflow = 1.31 cfs @ 12.08 hrs, Volume= 0.11 af
Outflow = 1.31 cfs @ 12.08 hrs, Volume= 0.11 af, Atten= 0%, Lag= 0.0 min
Primary = 1.31 cfs @ 12.08 hrs, Volume= 0.11 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 139.75' @ 12.08 hrs
Flood Elev= 146.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	139.15'	**12.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.15' / 137.05' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.30 cfs @ 12.08 hrs HW=139.75' TW=138.22' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.30 cfs @ 2.64 fps)

Summary for Pond 7P: CB#31

Inflow Area = 0.150 ac, 24.40% Impervious, Inflow Depth > 2.09" for 50-YEAR event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.03 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.03 af, Atten= 0%, Lag= 0.0 min
Primary = 0.26 cfs @ 12.09 hrs, Volume= 0.03 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.80' @ 12.11 hrs
Flood Elev= 138.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.48'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.48' / 134.26' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 12.09 hrs HW=134.80' TW=134.65' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.25 cfs @ 1.78 fps)

Summary for Pond 8P: CB#30

Inflow Area = 0.232 ac, 51.14% Impervious, Inflow Depth > 3.64" for 50-YEAR event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.07 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.07 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.07 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Peak Elev= 134.65' @ 12.09 hrs
Flood Elev= 138.33'

Device	Routing	Invert	Outlet Devices
#1	Primary	134.14'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.14' / 134.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.09 hrs HW=134.65' TW=133.39' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.80 cfs @ 2.89 fps)

Summary for Link A: Central Street

Inflow Area = 0.496 ac, 17.10% Impervious, Inflow Depth > 1.66" for 50-YEAR event
Inflow = 0.65 cfs @ 12.10 hrs, Volume= 0.07 af
Primary = 0.65 cfs @ 12.10 hrs, Volume= 0.07 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Summary for Link B: First Brook

Inflow Area = 2.839 ac, 37.67% Impervious, Inflow Depth > 2.74" for 50-YEAR event
Inflow = 1.61 cfs @ 12.46 hrs, Volume= 0.65 af
Primary = 1.61 cfs @ 12.46 hrs, Volume= 0.65 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

APPENDIX

*STORMWATER OPERATION & MAINTENANCE PLAN
*PRE-DEVELOPMENT DRAINAGE AREA PLAN
*POST-DEVELOPMENT DRAINAGE AREA PLAN

STORMWATER

OPERATION & MAINTENANCE PLAN

Central Gas
77 Central Street
Hudson, New Hampshire

Map 182; Lot 217

July 10, 2023

Revised: September 18, 2023

KEACH-NORDSTROM ASSOCIATES, INC.

TABLE OF CONTENTS:

I. General

Introduction

The project owner or their assigned heirs will maintain the stormwater treatment facilities after construction is completed. The Applicant of the project is Sousa Realty who is located at 10 Lowell Road, Hudson, NH.

The subject property is referenced on Map 182; Lot 217 in Hudson, New Hampshire. Any transfer of responsibility for inspection and maintenance activities or transfer of ownership shall be documented to the Town of Hudson in writing. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction. Long-term operation and maintenance for the stormwater management facilities are presented below.

Maintenance will be performed as described unless and until the system is formally accepted by a municipality or quasi-municipal district or is placed under the jurisdiction of a legally created association that will be responsible for the maintenance of the system.

Post Construction:

The following standards will be met after construction is complete:

Documentation:

A maintenance log will be kept summarizing inspections, maintenance, and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. The log will be made accessible to department and/or Hudson staff and a copy provided upon request.

Maintenance Requirements

Bioretention Systems:

- Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Pre-treatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
- Trash and debris should be removed at each inspection.
- At least once annually, the system should be inspected for drawdown time. If the pond does not drain within 72-hours following a rainfall event, a qualified professional should assess the condition of the facility to determine measures required to restore filtration function or infiltration function (as applicable), including but not limited to the removal of accumulated sediments or reconstruction of the filter media.
- Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.
- Inspection outlet structure at least twice annually. Remove any trash or debris blocking the track rack and/or orifices. Remove any sediment inside the structure.

Sediment Forebays:

- Forebays help reduce the sediment load to downstream BMP's, and will therefore require more frequent cleaning.
- Systems should be inspected at least annually.
- Conduct periodic mowing of embankments (generally two times per year) to control growth of woody vegetation.
- Trash and debris should be removed at each inspection.
- Accumulated sediment should be removed as warranted by such inspection.
- Install and maintain a staff gage or other measuring device, to indicate depth of sediment accumulation and level at which clean-out is required.

Outlet Protection:

- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.

Catch Basins and Closed Drainage Network:

- Catch basins may require frequent maintenance. This may require several cleanings of the sumps each year. At a minimum, it is recommended that catch basins be inspected at least twice annually.

- Sediment should be removed when it approaches half of the sump depth.
- If floating hydrocarbons are observed during an inspection, the material should be removed immediately by skimming, absorbent materials, or other methods and disposed in conformance with the applicable state and federal regulations.

General:

- If any invasive species begin to grow in the stormwater management practices the species shall be disposed of in an appropriate manner that will not allow the pest to survive or spread. The disposal of such species shall be witnessed or approved by a state inspector. Methods for disposal may include, but not be limited to:
    - Encapsulating the plant(s) in plastic bags and disposing of the plant material in one of the following ways:
        - Trash pickup;
        - Discarding;
        - Open burning;
        - Incineration; or
        - Burial of infested nursery.

II. Supporting Documents

Annual Inspection and Maintenance Reporting Form
for
Central Gas
Hudson, New Hampshire

Date: _____

To: Sousa Realty

Re: Certification of Inspection and Maintenance; Submittal of Forms

Property Name: _____

Property Address: _____

Contact Name: _____

Contact Phone #: _____

Contact Email Address: _____

I verify that the required stormwater facility inspections and required maintenance have been completed in accordance with the Operation & Maintenance Plan associated with the above referenced property.

The required Long-Term Inspection & Maintenance Plan Checklist is attached to this form.

_____ _____

Name of Party Responsible for Inspection & Maintenance

Property Owner

_____ _____

Authorized Signature

Signature

Long-Term Inspection & Maintenance Plan Checklist
Central Gas – Hudson, NH

Current Owner Name:	Date:
Business Address:	Inspector:
Weather:	
Date of Last Rainfall:	Amount: Inches:

Best Management Practice				
Bioretention Systems	Reason for Inspection			
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐	
Maintenance Required?	Yes ☐	No ☐		
Corrective Action Needed & Notes:				
Sideslopes & berms need repair?	Yes ☐	No ☐		
Clean inlet & outlet structures?	Yes ☐	No ☐		
Visual inspection of drawdown time?	Yes ☐	No ☐		
Drawdown time less than 72 hours?	Yes ☐	No ☐		
(if no, call a qualified professional for inspection)				
Sediment Forebays	Reason for Inspection			
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐	
Maintenance Required?	Yes ☐	No ☐		
Corrective Action Needed & Notes:				
Catch Basins & Closed Drainage Network	Reason for Inspection			
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐	
Maintenance Required?	Yes ☐	No ☐		
Corrective Action Needed & Notes:				
Outlet Protection	Reason for Inspection			
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐	
Maintenance Required?	Yes ☐	No ☐		
Corrective Action Needed & Notes:				
General	Reason for Inspection			
	Spring ☐	Fall/Yearly ☐	After Major Storm ☐	
Maintenance Required?	Yes ☐	No ☐		
Corrective Action Needed & Notes:				

Long-Term Inspection & Maintenance Log
Central Gas – Hudson, NH

Date	Inspection (Yes or No)	Maintenance (Yes or No)	List BMPs Inspected and/or Provide Comments	Inspected By:

III. Control of Invasive Plants

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.

During maintenance activities, check for the presence of invasive plants and suitably remove according to the methods provided in the table below. The following table, based on the "Control of Invasive Plants" published by the New Hampshire Department of Agriculture, describes the most common invasive plants in this region and proper methods of disposal.

Name	Description	Invasive Qualities	Control Methods
Invasive Trees			
Norway Maple	- Large leaves - Will exude milky white sap when leaves are broken - Leaves turn color in Late October (fall foliage is yellow)	- Suppresses growth of grass, garden plants, and forest understory -Wind-borne seeds can germinate and grow in deep shade	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out plants, including the root systems. Use a forked spade or weed wrench. - Cut down the tree. Grind out the stump, or clip off re-growth. - Girdle[1] - Frill[2] - Cut stem/ cut stump with glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray with glyphosate [3]* (mid-October to early November).
Tree of Heaven	- Long compound leaves with 11-25 lance shaped leaflets - Smell like peanut butter or burnt coffee when crushed	- Tough, can grow in poor conditions - Produces large quantities of wind-borne seeds - Grows rapidly - Secretes a toxin that kills other plants - Cannot be removed by mechanical means alone	- Pull seedlings when soil is moist. - Frill[2] (no more than 1" gap between cuts). Use Garlon 3a herbicide. - Cut stem/ cut stump with Garlon 3a. Follow label directions for cut stump application. Clip off sucker sprouts or paint with Garlon 3a.* - Foliar spray[3]* (on regrowth) - Paint bottom 12" of bark with Garlon 4 Ultra (February/March). Use maximum strength specified on label for all herbicide applications.
Invasive Shrubs			
Autumn Olive	- Formerly recommended for erosion control and wildlife value	- Highly invasive, diminishes the overall quality of wildlife habitat	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs (up to 4" diameter trunks). - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Bury stump - Do not mow

Invasive Shrubs (continued)			
Multiflora Rose	- Formerly recommended for erosion control, hedges, and wildlife habitat - Covered in white flowers in June - Very hard, curved thorns - Fringed edge to leaf stalk	- Huge shrub that chokes out all other vegetation - Too dense for most birds to nest in - Grows up trees like a vine in Shade	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems (at least 6" from the crown and 6" down). Use a forked spade or weed wrench for trees or shrubs. - Controlled burning[4] (on extensive infestations) - Cut stem/ cut stump with glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3]* (mix Rodeo with extra sticker-spreader, or use Roundup Sure Shot Foam on small plants) - Herbicide may be applied in winter when other plants are dormant.
Bush Honeysuckles	- Includes Belle, Amur, Morrow's, and Tatarian Honeysuckle	- Creates dense shade reducing plant diversity and eliminating nest sites in forest interior spaces	- Deadhead to prevent spread of seeds (on ornamentals). Cut off seeds or fruits before they ripen. Bag and burn, or send to a landfill. - Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year (on shady sites only, brush cut in early spring and fall). - Controlled burning[4] (during growing season) - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate (late in the growing season). Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.*

Invasive Shrubs (continued)			
Blunt-Leaved Privet	- Medium sized shrub - Simple, oblong, dark green leaves 1-2" in length - Fragrant white flowers (spring) - Blackish-purple fruit (late summer)	- Toxic to mammals - Loss of valuable habitat	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Trim off all flowers - Do not cut back or mow
Burning Bush, Winged Euonymus	- Wide, corky wings on the Branches - Brilliant red autumn leaves - Fruit	- High seed production	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Trim off all flowers
Japanese Barberry	- Spiny deciduous shrub - Small leaves	- Very dense, displaces native plants - Can change chemistry of soil	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Cut down the tree. Grind out the stump, or clip off re-growth. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Trim off all flowers

Invasive Woody Vines			
Japanese Honeysuckle	- Gold and White flowers - Heavy scent and sweet nectar in June	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle - Rampant grower - Spirals around trees, often strangling them	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3]* (fall or early spring when native vegetation is dormant) Plan to re-treat repeatedly
Oriental Bittersweet	- Bright orange seed capsules in clusters all along the stem - Flowers	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle	- Pull seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs. - Keep ornamental plants cut back, remove all fruits as soon as they open, and bag or burn fruits. - Cut stem/ cut stump with Garlon 3a. Follow label directions for cut stump application. Clip off sucker sprouts or paint with Garlon 3a.*
Japanese Knotweed, Mexican Bamboo	- The stems have knotty joints, similar to bamboo - Grows 6-10' tall - Large, pointed oval or triangular leaves	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle - Can grow in shade	- Cut stem/ cut stump with Glyphosate (at least 3 times each during growing season). Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3]* - Treat with Rodeo - In gardens, heavy mulch or dense shade may kill it.

Invasive Herbaceous Plants			
Garlic Mustard	- White-flowered biennial - Rough scalloped leaves (kidney, heart, or arrow shaped) - Garlic smell, mustard taste when its leaves are crushed	- Shade shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle - Rampant grower - Spirals around trees, often strangling them	- Pull seedlings and small or shallow-rooted plants when soil is moist (before it flowers in spring). Dig out larger plants, including the crown and root systems. Use a forked spade or weed wrench for trees or shrubs. Tamp down soil afterwards. - Deadhead to prevent spread of seeds. Cut off seeds or fruits before they ripen. Bag and burn or send to a landfill. - Foliar spray[3]* (may be appropriate in some settings)
Japanese Stilt Grass	- Lime green color - Line of silvery hairs down the middle of the 2-3" long blade	- Tolerates sun or dense shade -Quickly invades areas left bare or disturbed by tilling or flooding - Builds a large seed bank in the soil	- Pull seedlings and small or shallow-rooted plants when soil is moist (pulled easily in early to mid-summer).Dig out larger plants, including root systems. Use a forked spade or weed wrench for trees or shrubs. Be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to a landfill. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year. Mowing weekly or when it has just begun to flower may prevent it from setting seed. - Foliar spray[3]* (use glyphosate or herbicidal soap on large infestations. - Use a corn-based pre-emergence herbicide on annual weeds (spring). This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.

Invasive Herbaceous Plants (continued)			
Mile-A-Minute Vine, Devil's Tail Tearthumb	- Triangular leaves - Barbed stems - Turquoise berries	- Rapid growth - Quickly covers and shades out herbaceous plants	- Pull seedlings and small or shallow-rooted plants when soil is moist (pulled easily in early to mid-summer).Dig out larger plants, including root systems. Use a forked spade or weed wrench for trees or shrubs. Be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to a landfill. - Mow or cutting at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year. Mowing weekly or when it has just begun to flower may prevent it from setting seed. - Foliar spray[3]* (use glyphosate or herbicidal soap on large infestations. - Use a corn-based pre-emergence herbicide on annual weeds (spring). This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.
Spotted Knapweed	- Thistle-like flowers	- Dense, crowds out native species	- Do not pull unless the plant is young and the ground is very soft. The root will break and produce several new plants. - Wear sturdy gloves - Deadhead to prevent spread of seeds. Cut off seeds or fruits before they ripen. Bag and burn, or send to a landfill. - In lawns, spot treat with broad-leaf weed killer. Good lawn care practices (test soil; use lime and fertilizer only when soil test shows a need; mow high and frequently; leave clippings on lawn) reduce weed infestations. - Cut stem/ cut stump with Glyphosate. Follow label directions for cut stump application. Clip off sucker sprouts or paint with glyphosate.* - Foliar spray[3]*

[1]Girdle: Cut through the bark and growing layer all around the trunk, about 6" above the ground. Girdling is most effective in spring (when the sap is rising) & middle-late summer (when the tree is sending food to the roots). Clip off sucker sprouts.

[2]Frill: Using a machete, hatchet, or similar device, hack scars (several holes in larger trees) downward into the growing layer, and squirt in glyphosate (or triclopyr if specified in table). Follow label directions for injection and frill applications. This is most effective from middle to late summer. Clip off any sucker sprouts or treat with glyphosate.

[3]Foliar Spray: Use a backpack or garden sprayer or mist blower, following label directions. Avoid overspray and/or dripping onto non-target plants, because glyphosate kills most plants except moss. If it rolls off waxy or grass-like foliage, use additional sticker-spreader. Deciduous trees, shrubs, and perennials move nutrients down to the roots in late summer. Glyphosate is particularly effective at this time and when plants have just gone out of flowering. Several invasive species retain their foliage after native plants have lost theirs, and resume growth earlier in spring than most natives. This allows you to treat them without harming the natives. However, the plant must be actively growing for the herbicide to work. Retreatments may be necessary the following year if suckering occurs or the plant hasn't been entirely killed.

[4]Controlled Burning: Burning during the spring (repeated over several years) will allow native vegetation to compete more effectively with the invasive species. This requires a permit. Spot treatment with glyphosate in late fall can be used to make this method more effective

*Herbicides: It is highly recommended that small populations try to be controlled using non-chemical methods where feasible. However, for large infestations, and for a few plants herbicide use is essential. Apply herbicides carefully to avoid non-target plants, glyphosate is the least environmentally damaging herbicide in most cases. Add food coloring for visibility, and a soap-based sticker such as Cide-Kick. Glyphosate is ineffective on some plants; for these, triclopyr or Garlon 3a may be indicated. When using herbicides read the entire label and observe all precautions listed, including proper disposal. If in doubt, call your local Cooperative Extension Service.

IV. Stormwater Practice Location Plan