

# STORMWATER REPORT

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**Definitive Subdivision  
333, 339 & 349 Summer Street  
Lynnfield, Massachusetts**

**November 16, 2018  
Revised March 26, 2019**

**Applicant**

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**W&S Project Data**

**LYNF-0100**

**Dsummer#339&349\_R3.dwg**

**Existing\_R1.hcp**

**Proposed\_R1.hcp**

**p:\lynf-0100(339 & 349 summer street)\drainage\stormwater\_report.docx**



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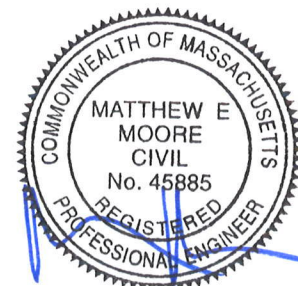
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3.29.2019



## ***1 | Mitigative Drainage Analysis***

### **1.1 Purpose**

The purpose of this analysis is to compare the pre-development watershed condition to the post development watershed condition for the project located at 333, 339 & 349 Summer Street, Lynnfield, MA. This is accomplished by analyzing the surface runoff rates to the limit of watershed analysis as shown on the accompanying watershed maps. The result of this analysis is presented below in the Peak Rate of Runoff tables.

### **1.2 Introduction**

The subject properties are three separate parcels located on the westerly side of Summer Street in the southerly portion of the town abutting the Reedy Meadow Conservation Area. The properties are bounded to the east by Summer Street between Todd Lane to the north and Walnut Street to the south. The properties are also bounded by residential properties on the westerly side of Summer Street.

The properties are located within the Single Residence B District (RB) zoning district. Portions of the three properties are also located within the Flood Plain District (FP) special zoning district and consequently within a FEMA flood hazard area to elevation 73, NAVD88 (Zone AE) as shown on flood insurance rate map number 25009C0393F effective date July 3, 2012.

The properties are currently occupied by single family homes (333, 339 & 349) with associated accessory structures, driveways and a pool. The properties are largely vegetated with deciduous and coniferous tree cover and lawn areas. The rear of the properties is occupied by Bordering Vegetated Wetlands (BVW) and an isolated vegetated wetland.

Site topography varies in elevation from approximately 110 near the front of 333 Summer Street to elevation 71 at the edge of the BVW at the rear of the site. Surficial flow is generally from Summer Street towards the southerly property line and rear of the property at the BVW.

The proposal is to further develop the site by razing all existing structures with appurtenances and their associated driveways and construct nine single family homes. Each lot will have a subsurface sanitary disposal system and subsurface roof recharge chambers. The main drainage system consists of catch basins, underground piping network and a surface infiltration basin for mitigating and treatment of stormwater runoff.

### **1.3 Existing Condition Soils Analysis**

In order to model the excess runoff for both the existing and proposed watershed condition, the parent soils on site were mapped using the Web Soil Survey (WSS) made available on the United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) website. The WSS provides vital soil data and information such as Hydrologic Soil Group (HSG), which is then input into a mathematical model to generate runoff curve numbers.

The user inputs soil cover type as well as the hydrologic soil group to generate a weighted curve number (CN) and also uses the topography of the land to generate a time of concentration (Tc) from which the stormwater runoff rate and volume can be calculated for a given watershed for comparison.

The soils present on site are comprised of Paxton, Paxton-Urban Land complex and Woodbridge. Soil boundaries have been adjusted slightly to coincide with the BVW. Paxton, Paxton-Urban Land complex and Woodbridge have an assigned HSG rating of C which is used in the hydraulic model.

### **1.4 Stormwater Modeling Methodology**

The mathematical model used in this analysis is computed using the stormwater modeling software HydroCAD, v10.00, developed by HydroCAD Software Solutions LLC. HydroCAD is a program used to model the hydrology and hydraulics of stormwater runoff and is based largely on programs and techniques developed by the NRCS, specifically TR-20 and TR-55 as well as other hydraulic calculation methods.

HydroCAD allows the user, for a given rainfall event, to generate runoff hydrographs for single or multiple watersheds and is used to determine if a given drainage system is adequate under the desired conditions and to predict flooding or other hydraulic impacts at specified locations such as erosion.

Four design storm events are analyzed and the results presented below for the 2 year, 10 year, 25 year and 100 year storm events for comparison.

### **1.5 Pre-Development Watershed**

The total pre-development watershed area is separated onto three subcatchments resulting from existing topography and for comparison with the post-development condition.

Comparison edge 1L represents surficial flow tributary towards the westerly (BVW) and southerly property boundaries of the project. The area tributary to this selected edge of comparison is 318,371 ft<sup>2</sup>.

Comparison edge 2L represents surficial flow tributary towards the northeasterly property boundary near 357 Summer Street. The area tributary to this selected edge of comparison is 88,117 ft<sup>2</sup>.

Comparison location 3L represents surficial flow tributary to a topographically low area to the north of 333 Summer Street. The area tributary to this selected comparison location is 28,107 ft<sup>2</sup>.

The total watershed area within the limit of watershed analysis is 434,595 ft<sup>2</sup>.

Using the methods described in the stormwater modeling methodology above, runoff curve numbers and times of concentration are generated for each watershed for the pre-development condition to be used for comparison with the post-development condition described below. A schematic of the mathematical model and the results of the calculations for the 2 year, 10 year, 25 year and 100 year Type III, 24-hour storm events are included in this analysis.

### **1.6 Post-Development Watershed**

Similar to the pre-development condition, the post-development watershed is separated into eighteen subcatchments.

Comparison edge 1L represents surficial flow tributary towards the westerly (BVW) and southerly property boundary of the project. The area tributary to this selected edge of comparison is 398,930 ft<sup>2</sup>.

Comparison edge 2L represents surficial flow tributary towards the northeasterly property boundary near 357 Summer Street. The area tributary to this selected edge of comparison is 35,665 ft<sup>2</sup>.

Comparison location 3L will be removed due to grading activities associated with construction of the single family homes.

The total watershed area within the limit of watershed analysis is 434,595 ft<sup>2</sup>.

Post-development provides for the construction of a surface infiltration basin and subsurface roof recharge chambers which will provide peak rate of runoff mitigation, water quality, groundwater recharge and phosphorus removal in the volume provided below the outlet devices.

Stormwater runoff from on-site paved areas will generally be collected by a deep sump catch basin with hood/trap and piped to a particle separator which discharges to a surface infiltration basin.

Stormwater runoff from portions of roof areas will be piped to subsurface roof recharge chambers.

Using the methods described in the stormwater modeling methodology above, runoff curve numbers and times of concentration were generated for each watershed for the proposed condition to be used for comparison with the existing condition. A schematic of the mathematical model and the results of the calculations for the 2 year, 10 year, and 100 year, Type III, 24-hour storm events are included in this analysis.

### **1.7 Compliance with DEP Stormwater Management Standards**

#### **Standard 1**

*No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

New stormwater runoff requiring treatment will be treated prior to being discharged towards the selected edge of comparison. New stormwater outfalls will discharge to a level spreader providing protection from scour/erosion.

#### **Standard 2**

*Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

See Table 1 below which demonstrate the post-development peak discharge rates are less than or equal to the pre-development peak discharge rates.

#### **Standard 3**

*Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.*

The project site is analyzed using Hydrologic Soil Group C for surficial stormwater runoff. Groundwater recharge is provided by a surface infiltration basin and subsurface roof recharge chambers which lie

within an area of loamy sand as determined by on-site soil testing performed by a certified soil evaluator from Williams & Sparages, LLC. Given the parent material of loamy sand the exfiltration rate used for recharge devices is based on a HSG rating of A.

Any unsuitable material encountered during construction of the surface infiltration basin will be removed and replaced with either on-site parent material or imported granular material.

**Standard 4**

*Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:*

- a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;*
- b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*
- c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook*

The project will utilize deep-sump catch basins with a hood/trap and a particle separator to collect and pre-treat stormwater runoff prior to discharging to the surface infiltration basin.

It should be noted that runoff from certain types of roof areas are considered “clean” by DEP and therefore do not require treatment. We have assumed that the roof types to be installed for this project will satisfy DEP’s criteria.

The project site is not a LUHPPL or within a Zone II or Interim Wellhead Protection Area. The project site/infiltration basin does discharge to an Outstanding Resource Water (ORW) (Saugus River) and consequently a critical area. The proposed infiltration basin is also considered to be within an area of rapid infiltration and therefore 44% TSS removal is required and water quality volume is based on a runoff of one inch.

**Standard 5**

*For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow melt, and stormwater runoff, the proponent shall use specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated there under at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

This project is not being considered a LUHPPL.

**Standard 6**

*Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A “storm water discharge” as defined in 314 CMR 3.04(2) (a) (1 or (b) to an*

*Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of public water supply.*

The project site is not a LUHPPL or within a Zone II or Interim Wellhead Protection Area. The project site/infiltration basin does discharge to an Outstanding Resource Water (ORW) (Saugus River) and consequently a critical area. A particle separator and infiltration basin are the specific structural stormwater best management practices selected to manage discharge.

**Standard 7**

*A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

This project is not considered a redevelopment.

**Standard 8**

*A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.*

Refer to Section 6 Stormwater Pollution Prevention Plan (SWPPP) and Construction Period Erosion, Sedimentation and Pollution Prevention Plan.

**Standard 9**

*A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

Refer to Section 4 Long Term Operation and Maintenance Plan (O&M).

**Standard 10**

*All illicit discharges to the stormwater management system are prohibited.*

**Illicit Discharge Compliance Statement**

No connection between the stormwater and wastewater management systems is proposed. Per requirements of Standard 10 it is herein stated that there are no proposed illicit discharges into the Stormwater Management System to be constructed as shown on the site plan.

**1.8 Conclusion**

Examining the following Peak Rate of Runoff Runoff and Basin Performance tables, the proposed stormwater management system is effective for mitigating the peak flow rates and volume of runoff from the limit of the watershed analysis for the 2, 10, 25 and 100 year storm events.

**Table 1.0: Peak Rate of Runoff | Comparison Location 1L**

Description	2 Year	10 Year	25 Year	50 Year	100 Year
Existing Peak Rate of Runoff (cfs)	4.08	8.91	13.14		16.76
Proposed Peak Rate of Runoff (cfs)	2.87	8.13	12.28		16.22
Difference	<b>-1.21</b>	<b>-0.78</b>	<b>-0.86</b>		<b>-0.54</b>

**Table 2.0: Peak Rate of Runoff | Comparison Location 2L**

Description	2 Year	10 Year	25 Year	50 Year	100 Year
Existing Peak Rate of Runoff (cfs)	1.87	3.82	5.48		6.89
Proposed Peak Rate of Runoff (cfs)	0.60	1.30	1.90		2.41
Difference	<b>-1.27</b>	<b>-2.52</b>	<b>-3.58</b>		<b>-4.48</b>

**Table 3.0: Peak Rate of Runoff | Comparison Location 3L**

Description	2 Year	10 Year	25 Year	50 Year	100 Year
Existing Peak Rate of Runoff (cfs)	0.00	0.00	0.00		0.00
Proposed Peak Rate of Runoff (cfs)	0.00	0.00	0.00		0.00
Difference	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>

**Table 4.0: Stormwater Management Area 1P | Infiltration Basin Performance Table**

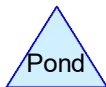
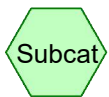
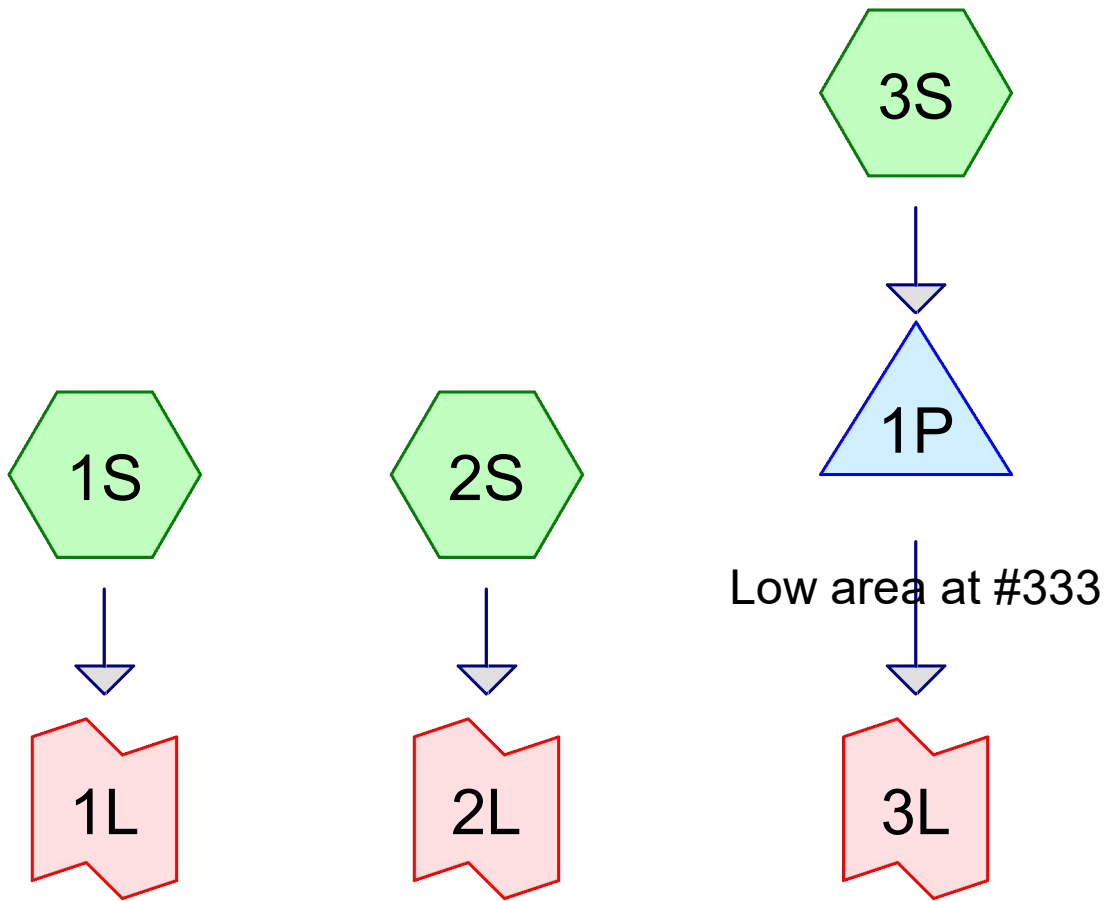
24 Hour Type III Storm event	Peak Rate of Inflow (cfs)	Peak Rates of runoff out (cfs)				Peak Water Level (ft)
		Total Outflow (cfs)	15" Outlet (cfs)	Spillway (cfs)	Exfiltration (cfs)	
<b>2 year</b>	7.53	1.07	0.64	0.00	0.42	77.89
<b>10 year</b>	13.69	4.12	3.65	0.00	0.47	78.60
<b>25 year</b>	18.72	6.26	5.75	0.00	0.51	79.19
<b>100 year</b>	22.88	8.74	7.20	0.99	0.54	79.61



*1.9 HydroCAD Data*



*Existing Condition*



**EXISTING\_R1**

**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
144,260	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S)
29,545	98	Paved parking, HSG C (1S, 2S, 3S)
11,814	98	Roofs, HSG C (1S, 2S, 3S)
248,976	70	Woods, Good, HSG C (1S, 2S, 3S)
<b>434,595</b>	<b>74</b>	<b>TOTAL AREA</b>

**EXISTING\_R1**

**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
434,595	HSG C	1S, 2S, 3S
0	HSG D	
0	Other	
<b>434,595</b>		<b>TOTAL AREA</b>

**EXISTING\_R1**

**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
0	0	144,260	0	0	144,260	>75% Grass cover, Good	
0	0	29,545	0	0	29,545	Paved parking	
0	0	11,814	0	0	11,814	Roofs	
0	0	248,976	0	0	248,976	Woods, Good	
<b>0</b>	<b>0</b>	<b>434,595</b>	<b>0</b>	<b>0</b>	<b>434,595</b>	<b>TOTAL AREA</b>	



**EXISTING\_R1**

Prepared by Williams & Sparages

HydroCAD® 10.00-22 s/n 06611 © 2018 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 3/29/2019

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Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S:** Runoff Area=318,372 sf 7.28% Impervious Runoff Depth=0.92"  
Flow Length=950' Tc=30.8 min CN=73 Runoff=4.08 cfs 24,394 cf

**Subcatchment 2S:** Runoff Area=88,116 sf 12.88% Impervious Runoff Depth=1.08"  
Flow Length=320' Tc=14.6 min CN=76 Runoff=1.87 cfs 7,952 cf

**Subcatchment 3S:** Runoff Area=28,107 sf 24.31% Impervious Runoff Depth=1.26"  
Tc=6.0 min CN=79 Runoff=0.92 cfs 2,956 cf

**Pond 1P: Low area at #333** Peak Elev=105.26' Storage=709 cf Inflow=0.92 cfs 2,956 cf  
Outflow=0.29 cfs 2,956 cf

**Link 1L:** Inflow=4.08 cfs 24,394 cf  
Primary=4.08 cfs 24,394 cf

**Link 2L:** Inflow=1.87 cfs 7,952 cf  
Primary=1.87 cfs 7,952 cf

**Link 3L:** Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf Runoff Volume = 35,302 cf Average Runoff Depth = 0.97"**  
**90.48% Pervious = 393,236 sf 9.52% Impervious = 41,359 sf**

**EXISTING\_R1**

Prepared by Williams & Sparages

HydroCAD® 10.00-22 s/n 06611 © 2018 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 1S:**

Runoff = 4.08 cfs @ 12.48 hrs, Volume= 24,394 cf, Depth= 0.92"

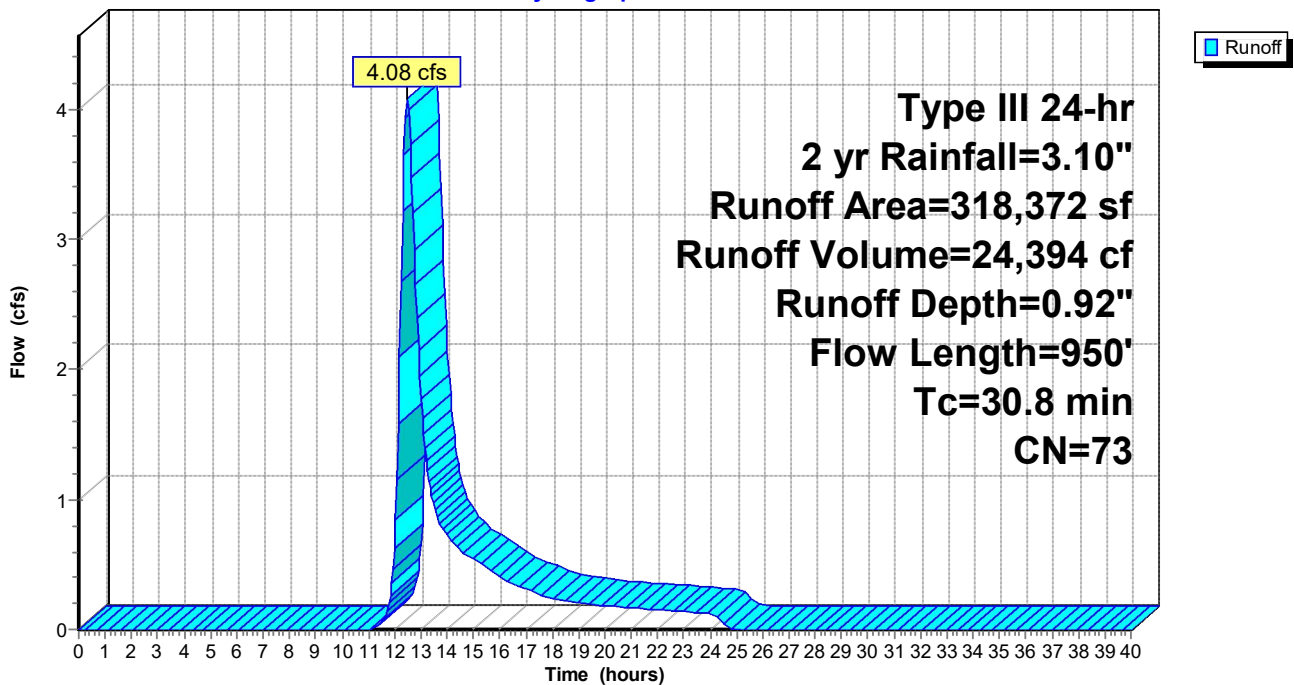
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
6,796	98	Roofs, HSG C
16,382	98	Paved parking, HSG C
209,022	70	Woods, Good, HSG C
86,172	74	>75% Grass cover, Good, HSG C
318,372	73	Weighted Average
295,194		92.72% Pervious Area
23,178		7.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	300	0.0360	0.18		<b>Sheet Flow,</b> Grass: Dense n= 0.240 P2= 3.10"
3.2	650	0.0440	3.38		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
30.8	950	Total			

**Subcatchment 1S:**

Hydrograph



**EXISTING\_R1**

Prepared by Williams & Sparages

HydroCAD® 10.00-22 s/n 06611 © 2018 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 2S:**

Runoff = 1.87 cfs @ 12.22 hrs, Volume= 7,952 cf, Depth= 1.08"

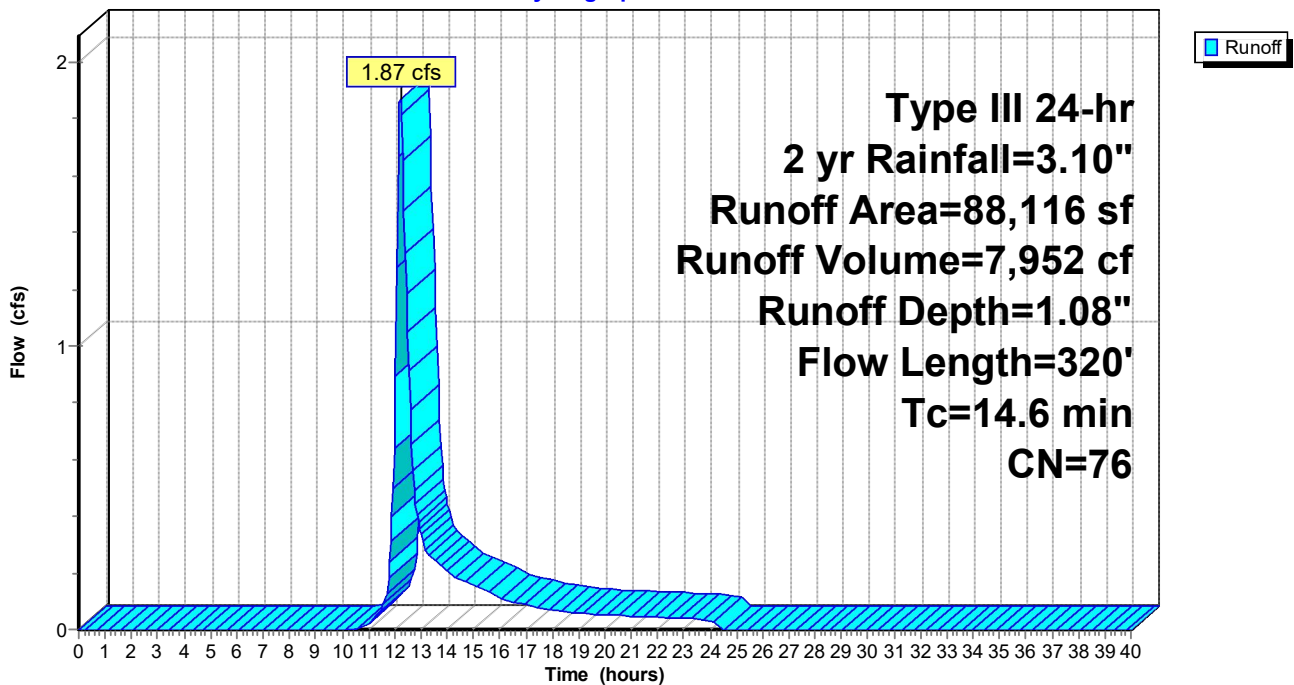
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
3,482	98	Roofs, HSG C
7,867	98	Paved parking, HSG C
32,888	70	Woods, Good, HSG C
43,879	74	>75% Grass cover, Good, HSG C
88,116	76	Weighted Average
76,767		87.12% Pervious Area
11,349		12.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0070	0.12		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.10"
1.1	220	0.0400	3.22		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
14.6	320	Total			

**Subcatchment 2S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 3S:**

Runoff = 0.92 cfs @ 12.10 hrs, Volume= 2,956 cf, Depth= 1.26"

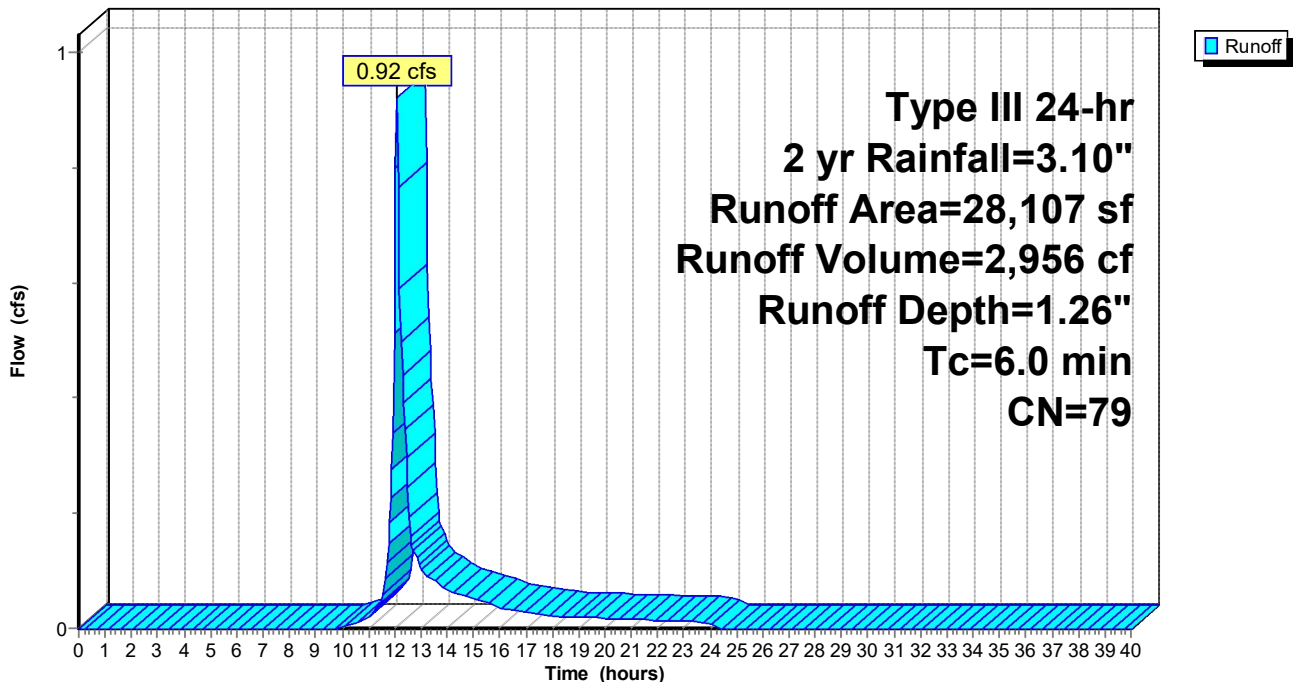
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
7,066	70	Woods, Good, HSG C
5,296	98	Paved parking, HSG C
1,536	98	Roofs, HSG C
14,209	74	>75% Grass cover, Good, HSG C
28,107	79	Weighted Average
21,275		75.69% Pervious Area
6,832		24.31% Impervious Area

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

**Subcatchment 3S:**

Hydrograph



**EXISTING\_R1**

**Summary for Pond 1P: Low area at #333**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 1.26" for 2 yr event  
 Inflow = 0.92 cfs @ 12.10 hrs, Volume= 2,956 cf  
 Outflow = 0.29 cfs @ 12.46 hrs, Volume= 2,956 cf, Atten= 69%, Lag= 21.8 min  
 Discarded = 0.29 cfs @ 12.46 hrs, Volume= 2,956 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 105.26' @ 12.46 hrs Surf.Area= 5,139 sf Storage= 709 cf

Plug-Flow detention time= 20.5 min calculated for 2,952 cf (100% of inflow)  
 Center-of-Mass det. time= 20.5 min ( 868.2 - 847.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	105.00'	5,914 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
105.00	97	0	0
105.25	5,070	646	646
105.50	6,459	1,441	2,087
105.75	7,628	1,761	3,848
106.00	8,899	2,066	5,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	105.00'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.29 cfs @ 12.46 hrs HW=105.26' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.29 cfs)

**EXISTING\_R1**

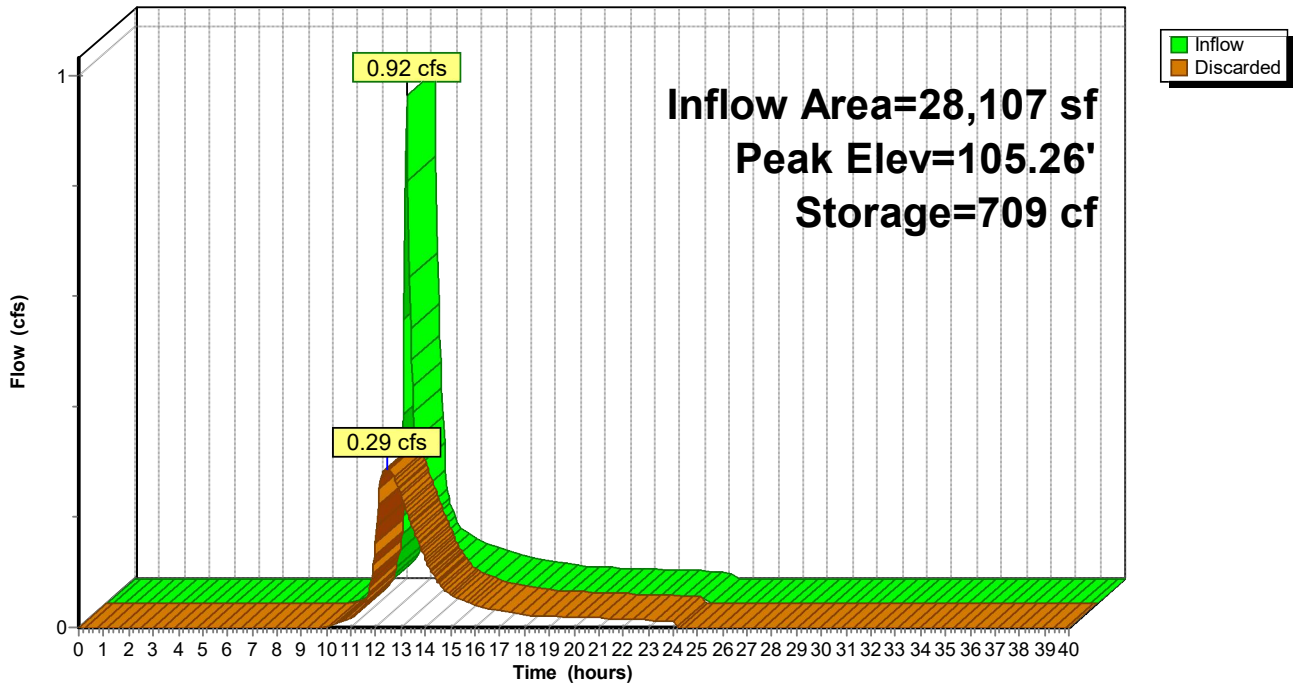
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**Pond 1P: Low area at #333**

Hydrograph





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Type III 24-hr 2 yr Rainfall=3.10"

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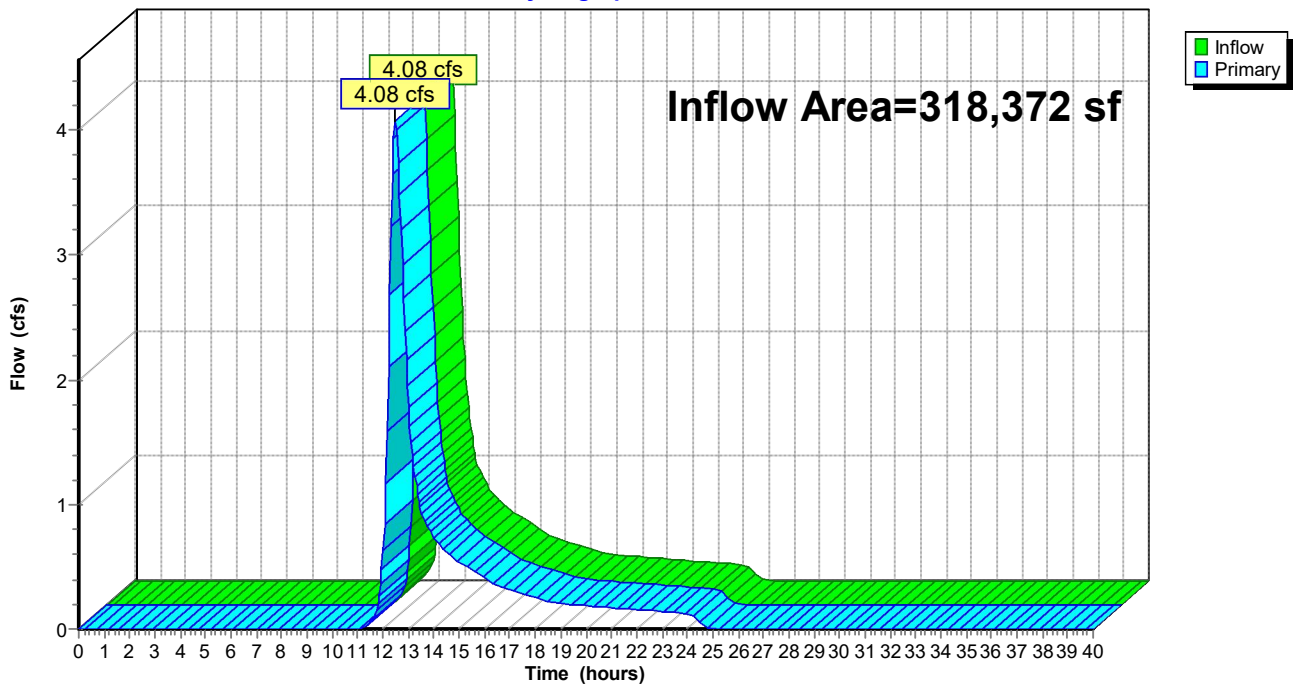
**Summary for Link 1L:**

Inflow Area = 318,372 sf, 7.28% Impervious, Inflow Depth = 0.92" for 2 yr event  
Inflow = 4.08 cfs @ 12.48 hrs, Volume= 24,394 cf  
Primary = 4.08 cfs @ 12.48 hrs, Volume= 24,394 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 1L:**

Hydrograph



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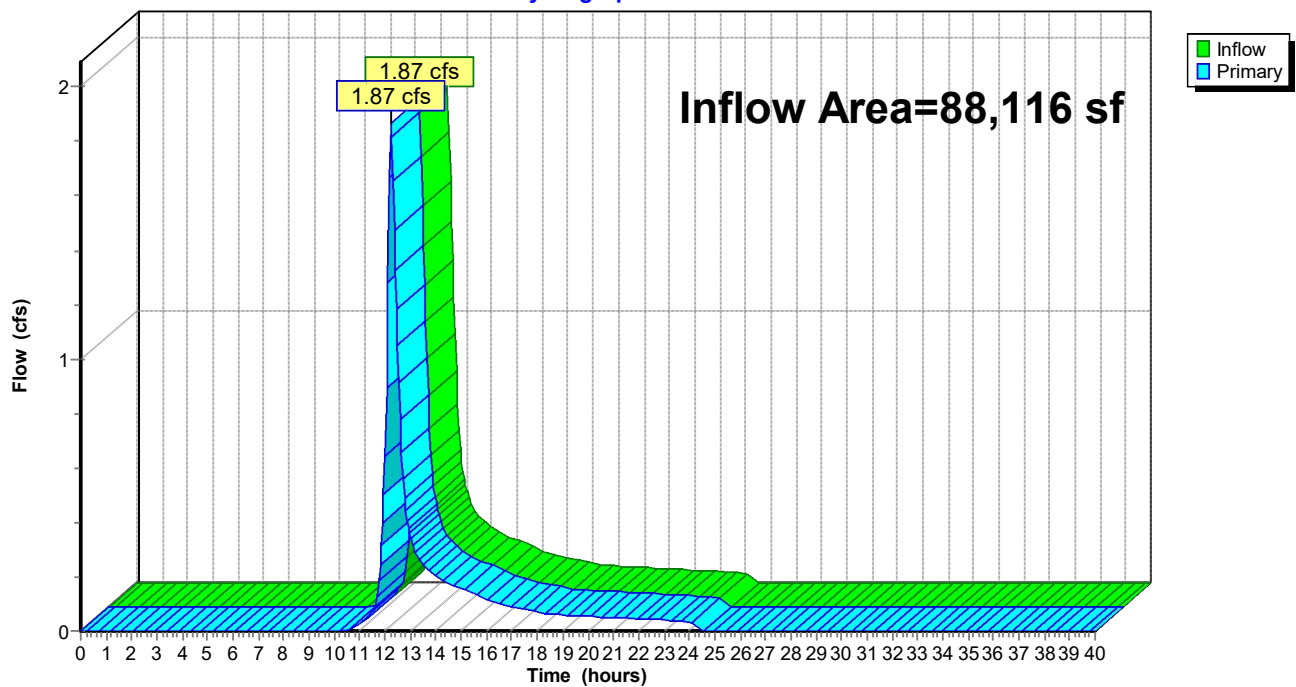
**Summary for Link 2L:**

Inflow Area = 88,116 sf, 12.88% Impervious, Inflow Depth = 1.08" for 2 yr event  
Inflow = 1.87 cfs @ 12.22 hrs, Volume= 7,952 cf  
Primary = 1.87 cfs @ 12.22 hrs, Volume= 7,952 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 2L:**

Hydrograph



**EXISTING\_R1**

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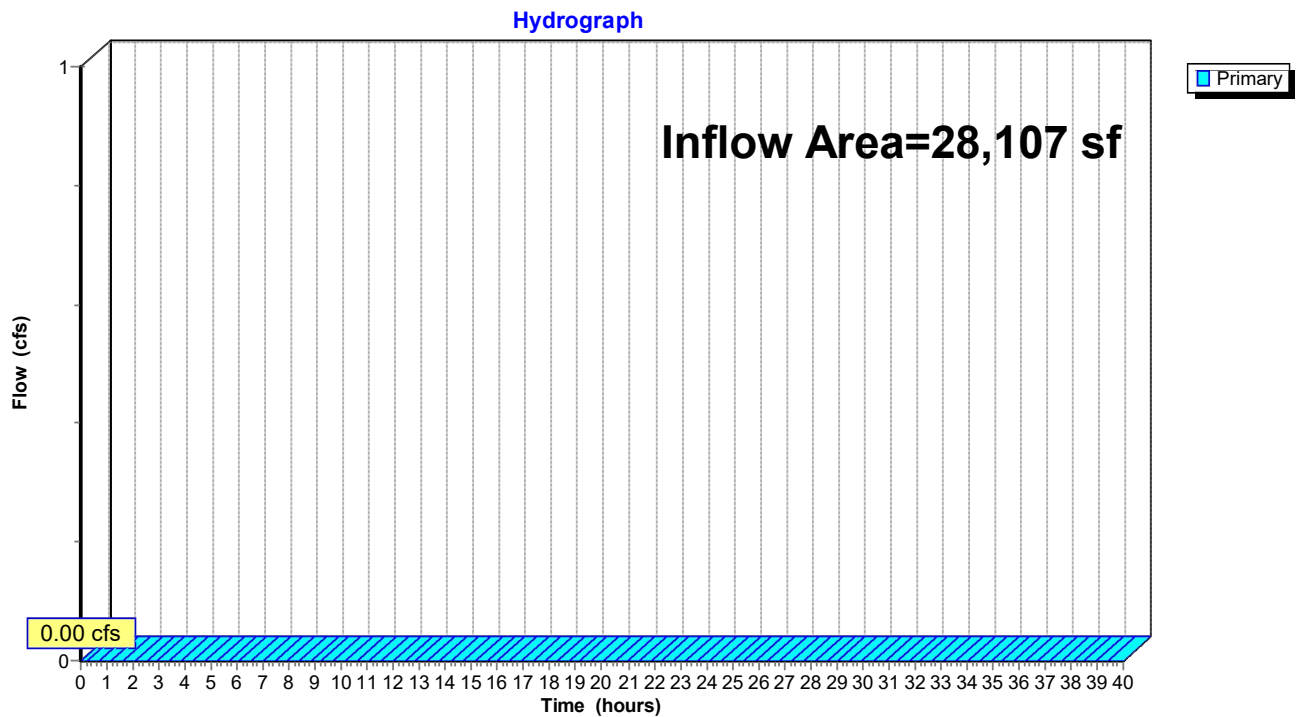
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**Summary for Link 3L:**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 0.00" for 2 yr event  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 3L:**



**EXISTING\_R1**

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Type III 24-hr 10 yr Rainfall=4.50"

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Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S:** Runoff Area=318,372 sf 7.28% Impervious Runoff Depth=1.90"  
Flow Length=950' Tc=30.8 min CN=73 Runoff=8.91 cfs 50,294 cf

**Subcatchment 2S:** Runoff Area=88,116 sf 12.88% Impervious Runoff Depth=2.13"  
Flow Length=320' Tc=14.6 min CN=76 Runoff=3.82 cfs 15,639 cf

**Subcatchment 3S:** Runoff Area=28,107 sf 24.31% Impervious Runoff Depth=2.38"  
Tc=6.0 min CN=79 Runoff=1.76 cfs 5,566 cf

**Pond 1P: Low area at #333** Peak Elev=105.45' Storage=1,765 cf Inflow=1.76 cfs 5,566 cf  
Outflow=0.34 cfs 5,566 cf

**Link 1L:** Inflow=8.91 cfs 50,294 cf  
Primary=8.91 cfs 50,294 cf

**Link 2L:** Inflow=3.82 cfs 15,639 cf  
Primary=3.82 cfs 15,639 cf

**Link 3L:** Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf Runoff Volume = 71,500 cf Average Runoff Depth = 1.97"**  
**90.48% Pervious = 393,236 sf 9.52% Impervious = 41,359 sf**

**EXISTING\_R1**

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Type III 24-hr 10 yr Rainfall=4.50"

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**Summary for Subcatchment 1S:**

Runoff = 8.91 cfs @ 12.45 hrs, Volume= 50,294 cf, Depth= 1.90"

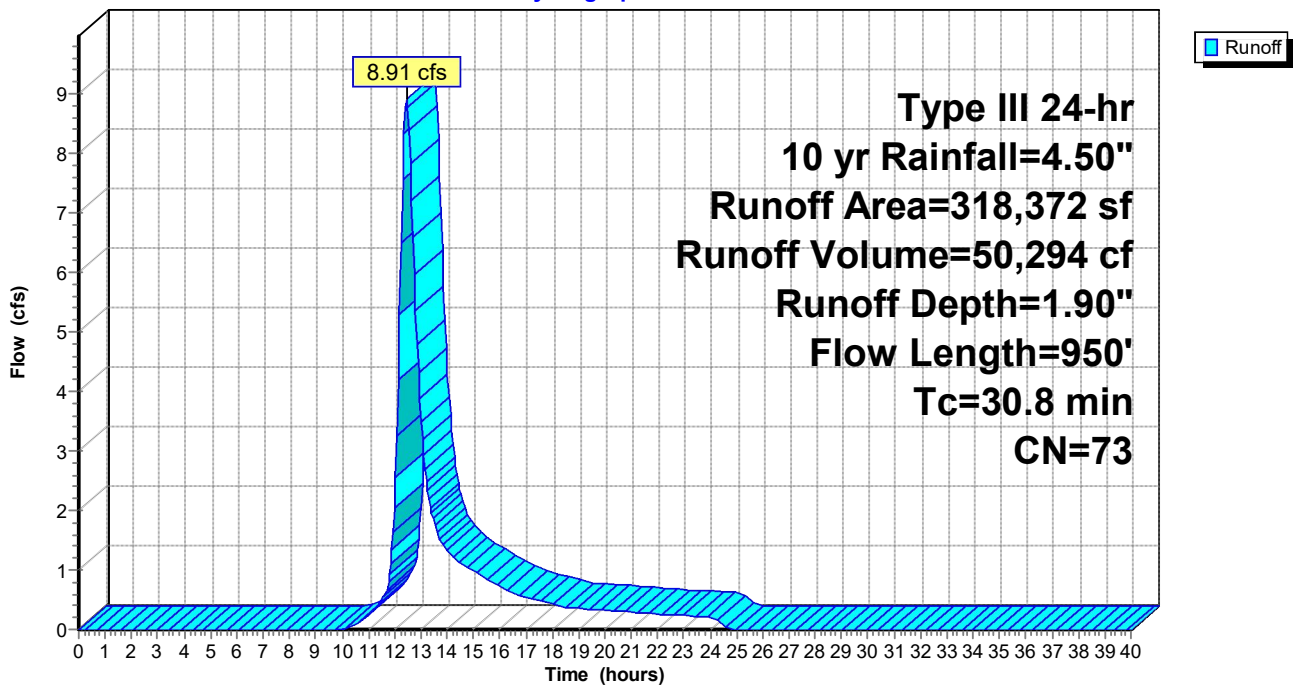
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
6,796	98	Roofs, HSG C
16,382	98	Paved parking, HSG C
209,022	70	Woods, Good, HSG C
86,172	74	>75% Grass cover, Good, HSG C
318,372	73	Weighted Average
295,194		92.72% Pervious Area
23,178		7.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	300	0.0360	0.18		<b>Sheet Flow,</b> Grass: Dense n= 0.240 P2= 3.10"
3.2	650	0.0440	3.38		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
30.8	950	Total			

**Subcatchment 1S:**

Hydrograph



**EXISTING\_R1**

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Type III 24-hr 10 yr Rainfall=4.50"

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**Summary for Subcatchment 2S:**

Runoff = 3.82 cfs @ 12.21 hrs, Volume= 15,639 cf, Depth= 2.13"

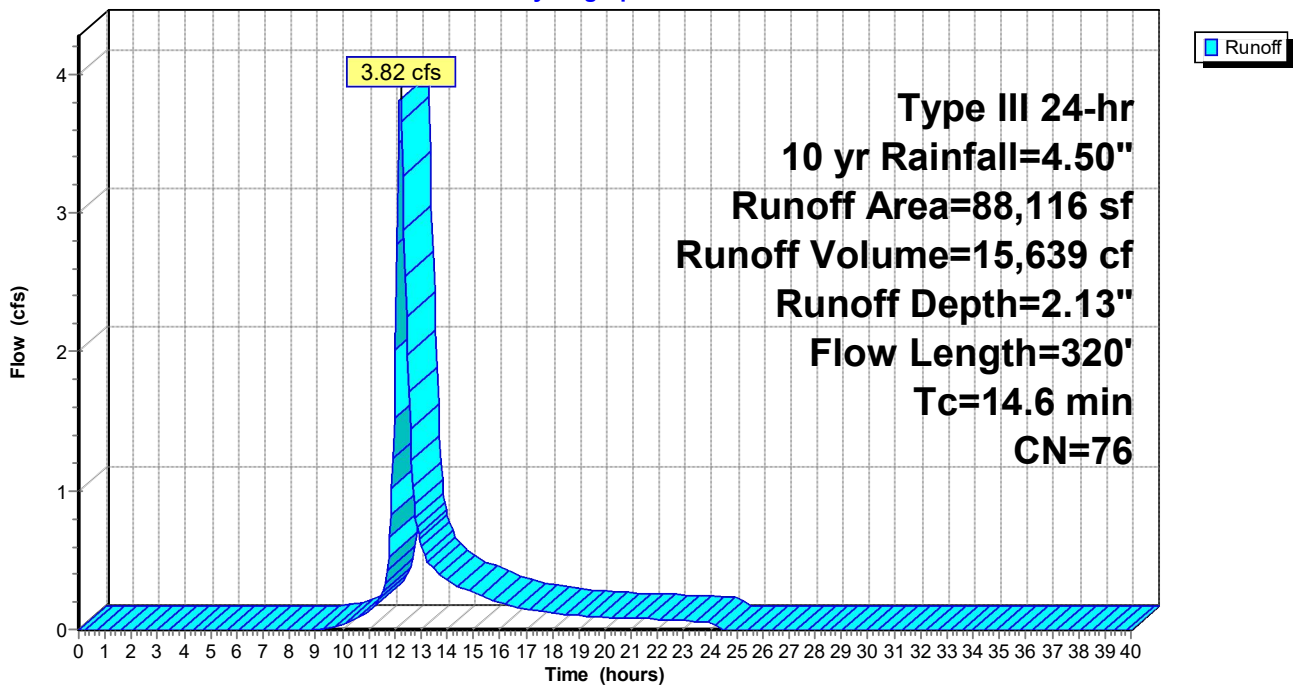
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
3,482	98	Roofs, HSG C
7,867	98	Paved parking, HSG C
32,888	70	Woods, Good, HSG C
43,879	74	>75% Grass cover, Good, HSG C
88,116	76	Weighted Average
76,767		87.12% Pervious Area
11,349		12.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0070	0.12		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.10"
1.1	220	0.0400	3.22		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
14.6	320	Total			

**Subcatchment 2S:**

Hydrograph





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Type III 24-hr 10 yr Rainfall=4.50"

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**Summary for Subcatchment 3S:**

Runoff = 1.76 cfs @ 12.09 hrs, Volume= 5,566 cf, Depth= 2.38"

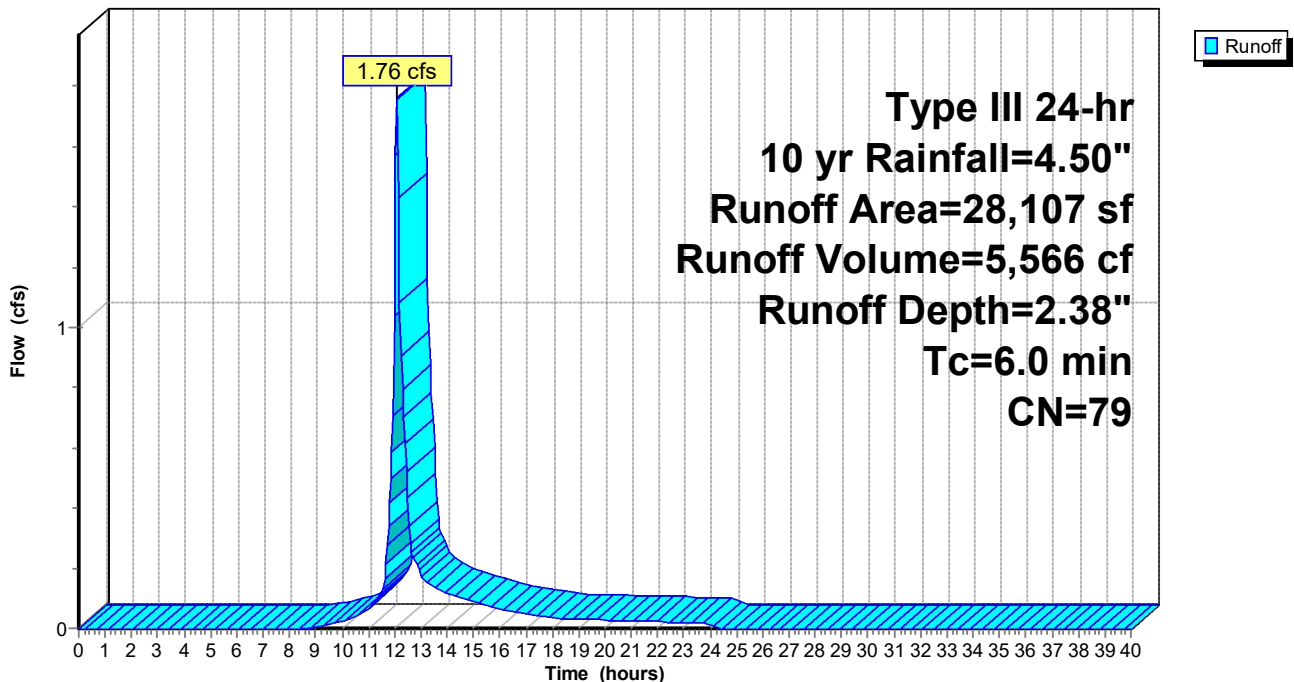
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
7,066	70	Woods, Good, HSG C
5,296	98	Paved parking, HSG C
1,536	98	Roofs, HSG C
14,209	74	>75% Grass cover, Good, HSG C
28,107	79	Weighted Average
21,275		75.69% Pervious Area
6,832		24.31% Impervious Area

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

**Subcatchment 3S:**

Hydrograph



**EXISTING\_R1**

**Summary for Pond 1P: Low area at #333**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 2.38" for 10 yr event  
 Inflow = 1.76 cfs @ 12.09 hrs, Volume= 5,566 cf  
 Outflow = 0.34 cfs @ 12.56 hrs, Volume= 5,566 cf, Atten= 80%, Lag= 27.7 min  
 Discarded = 0.34 cfs @ 12.56 hrs, Volume= 5,566 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 105.45' @ 12.56 hrs Surf.Area= 6,176 sf Storage= 1,765 cf

Plug-Flow detention time= 42.0 min calculated for 5,559 cf (100% of inflow)  
 Center-of-Mass det. time= 42.0 min ( 871.2 - 829.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	105.00'	5,914 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
105.00	97	0	0
105.25	5,070	646	646
105.50	6,459	1,441	2,087
105.75	7,628	1,761	3,848
106.00	8,899	2,066	5,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	105.00'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.34 cfs @ 12.56 hrs HW=105.45' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

**EXISTING\_R1**

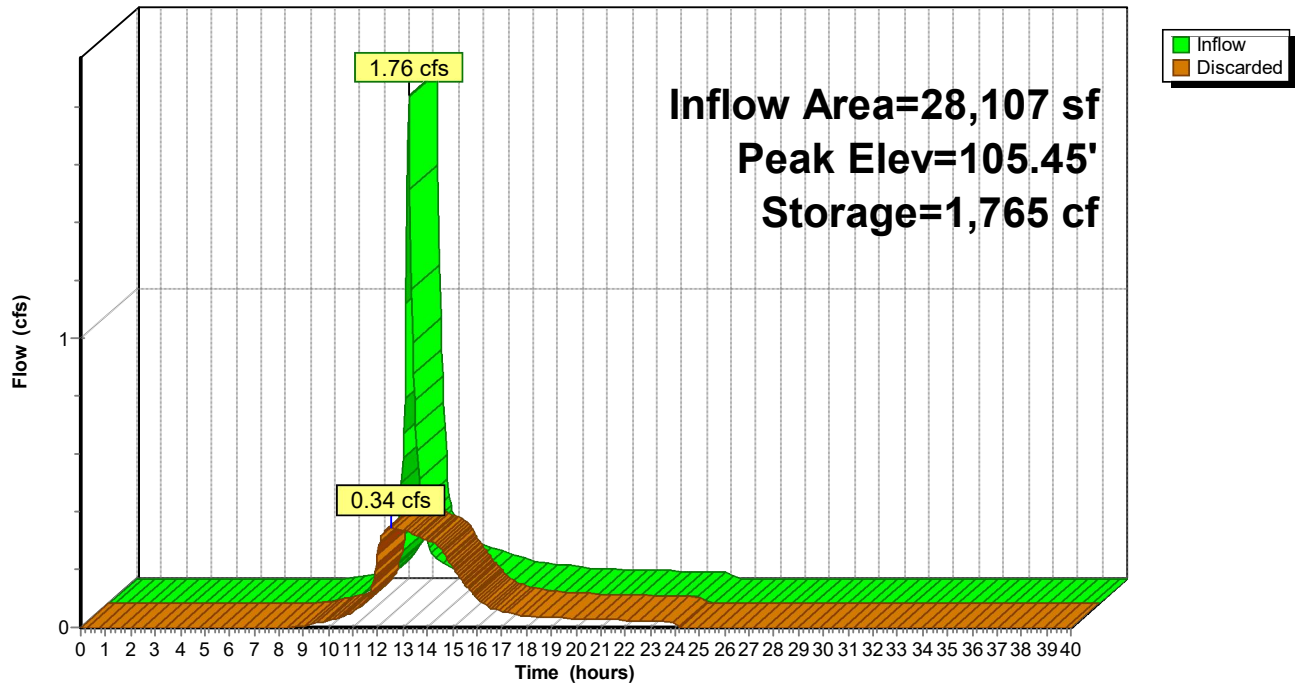
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**Pond 1P: Low area at #333**

Hydrograph



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Type III 24-hr 10 yr Rainfall=4.50"

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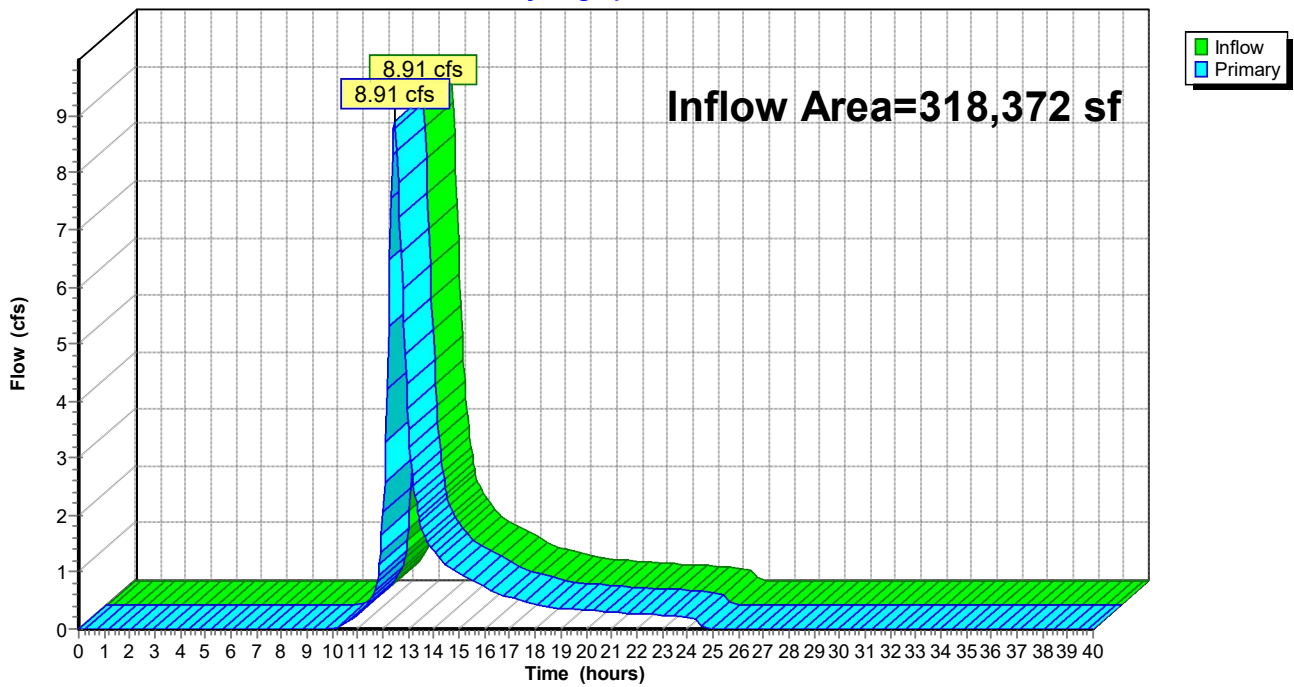
**Summary for Link 1L:**

Inflow Area = 318,372 sf, 7.28% Impervious, Inflow Depth = 1.90" for 10 yr event  
Inflow = 8.91 cfs @ 12.45 hrs, Volume= 50,294 cf  
Primary = 8.91 cfs @ 12.45 hrs, Volume= 50,294 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 1L:**

Hydrograph



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Type III 24-hr 10 yr Rainfall=4.50"

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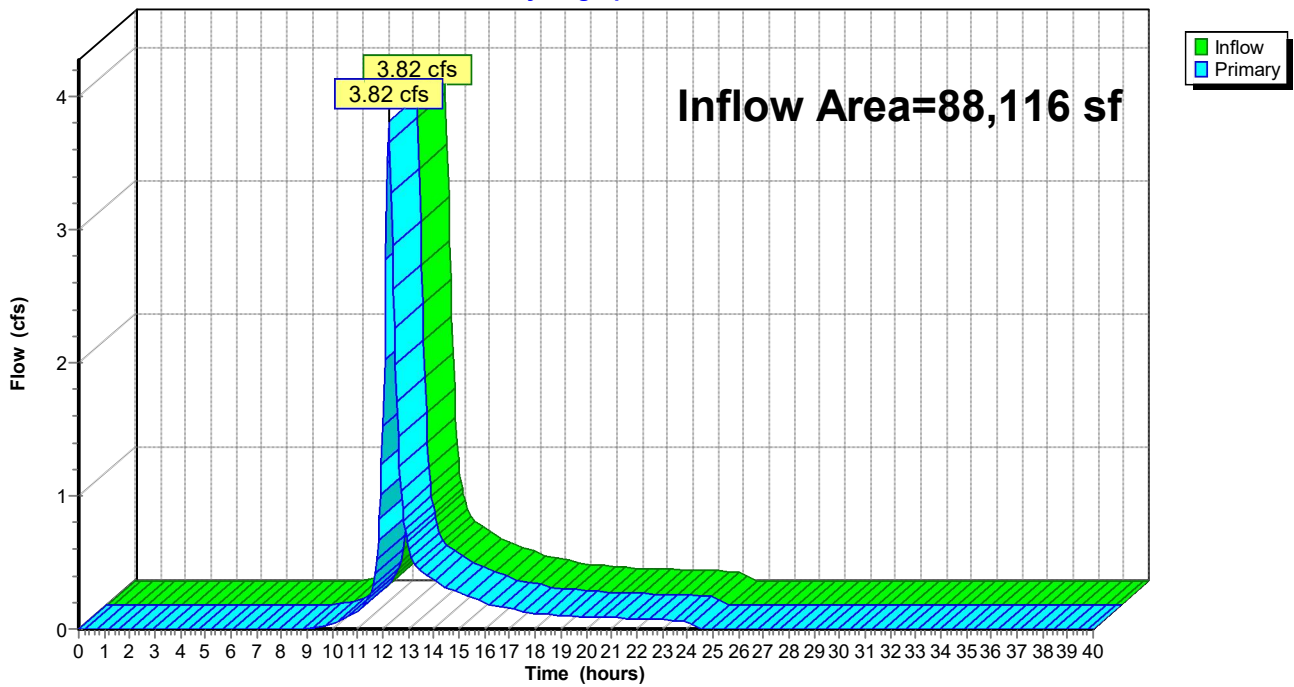
**Summary for Link 2L:**

Inflow Area = 88,116 sf, 12.88% Impervious, Inflow Depth = 2.13" for 10 yr event  
Inflow = 3.82 cfs @ 12.21 hrs, Volume= 15,639 cf  
Primary = 3.82 cfs @ 12.21 hrs, Volume= 15,639 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 2L:**

Hydrograph



**EXISTING\_R1**

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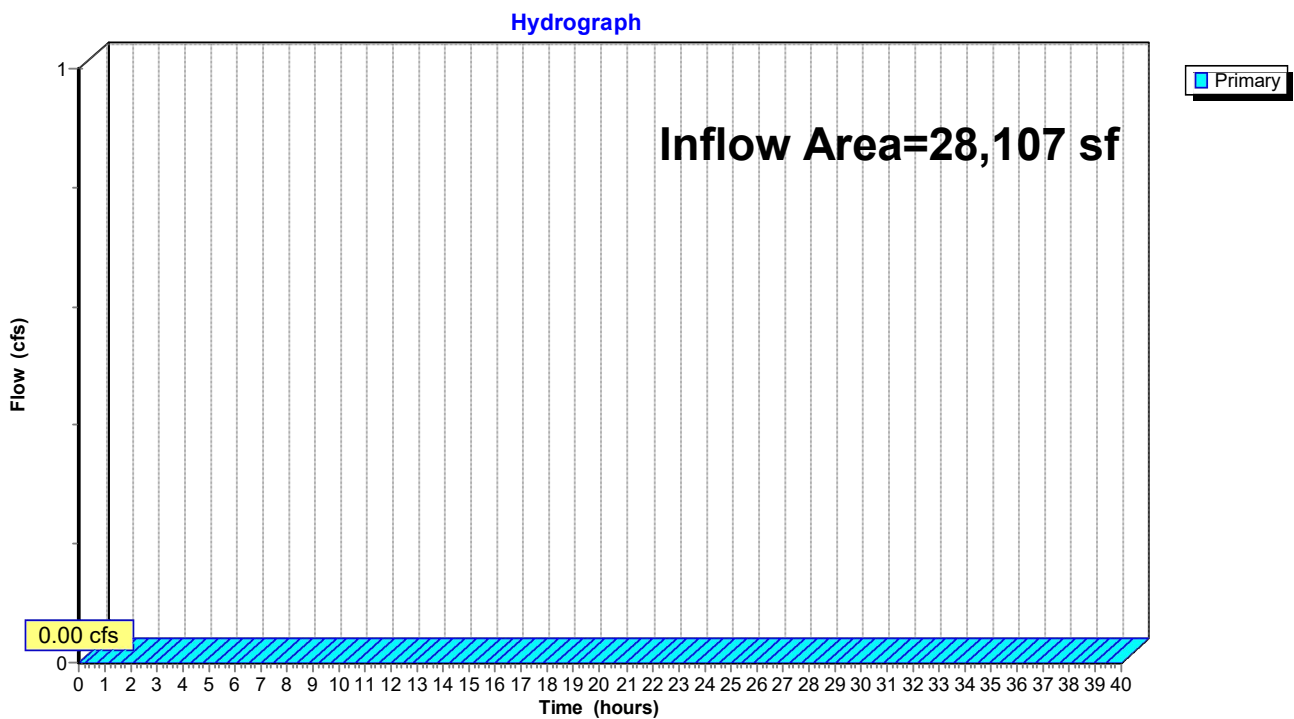
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**Summary for Link 3L:**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 0.00" for 10 yr event  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 3L:**



**EXISTING\_R1**

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Type III 24-hr 25 yr Rainfall=5.60"

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Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S:** Runoff Area=318,372 sf 7.28% Impervious Runoff Depth=2.76"  
Flow Length=950' Tc=30.8 min CN=73 Runoff=13.14 cfs 73,225 cf

**Subcatchment 2S:** Runoff Area=88,116 sf 12.88% Impervious Runoff Depth=3.04"  
Flow Length=320' Tc=14.6 min CN=76 Runoff=5.48 cfs 22,306 cf

**Subcatchment 3S:** Runoff Area=28,107 sf 24.31% Impervious Runoff Depth=3.32"  
Tc=6.0 min CN=79 Runoff=2.46 cfs 7,787 cf

**Pond 1P: Low area at #333** Peak Elev=105.60' Storage=2,742 cf Inflow=2.46 cfs 7,787 cf  
Outflow=0.39 cfs 7,787 cf

**Link 1L:** Inflow=13.14 cfs 73,225 cf  
Primary=13.14 cfs 73,225 cf

**Link 2L:** Inflow=5.48 cfs 22,306 cf  
Primary=5.48 cfs 22,306 cf

**Link 3L:** Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf Runoff Volume = 103,318 cf Average Runoff Depth = 2.85"**  
**90.48% Pervious = 393,236 sf 9.52% Impervious = 41,359 sf**

**EXISTING\_R1**

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Type III 24-hr 25 yr Rainfall=5.60"

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**Summary for Subcatchment 1S:**

Runoff = 13.14 cfs @ 12.44 hrs, Volume= 73,225 cf, Depth= 2.76"

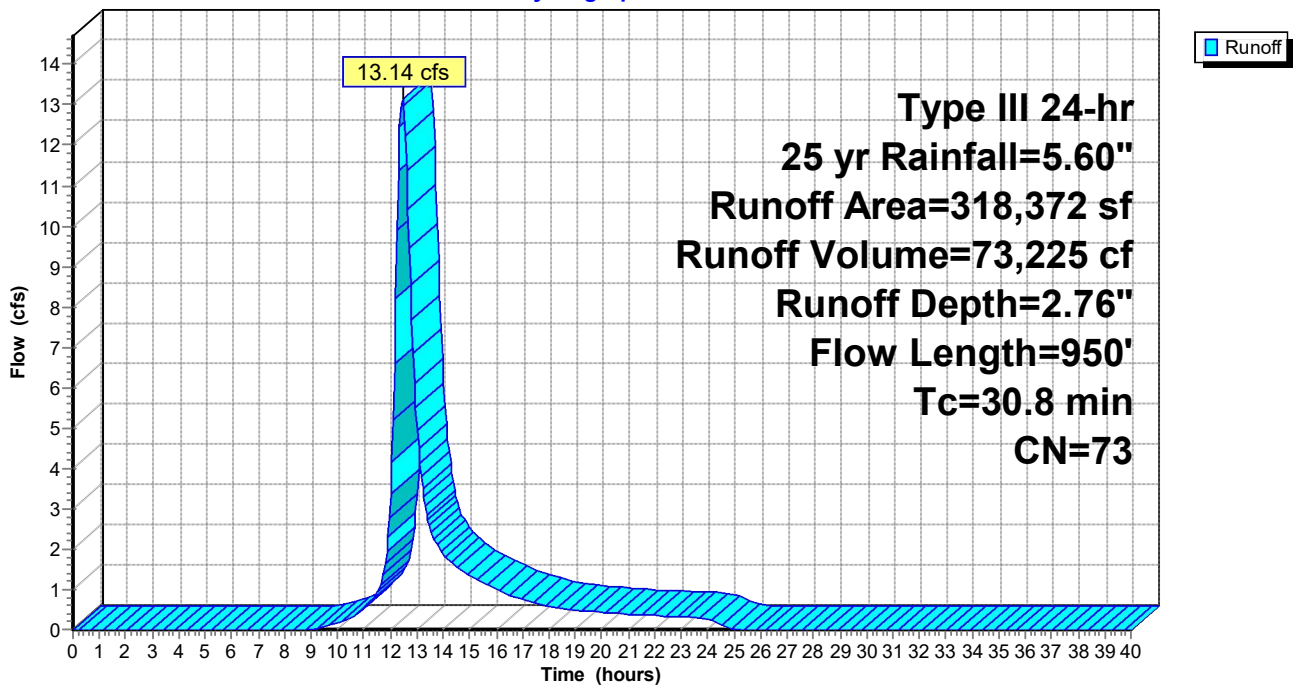
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25 yr Rainfall=5.60"

Area (sf)	CN	Description
6,796	98	Roofs, HSG C
16,382	98	Paved parking, HSG C
209,022	70	Woods, Good, HSG C
86,172	74	>75% Grass cover, Good, HSG C
318,372	73	Weighted Average
295,194		92.72% Pervious Area
23,178		7.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	300	0.0360	0.18		<b>Sheet Flow,</b> Grass: Dense n= 0.240 P2= 3.10"
3.2	650	0.0440	3.38		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
30.8	950	Total			

**Subcatchment 1S:**

Hydrograph





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Type III 24-hr 25 yr Rainfall=5.60"

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**Summary for Subcatchment 2S:**

Runoff = 5.48 cfs @ 12.21 hrs, Volume= 22,306 cf, Depth= 3.04"

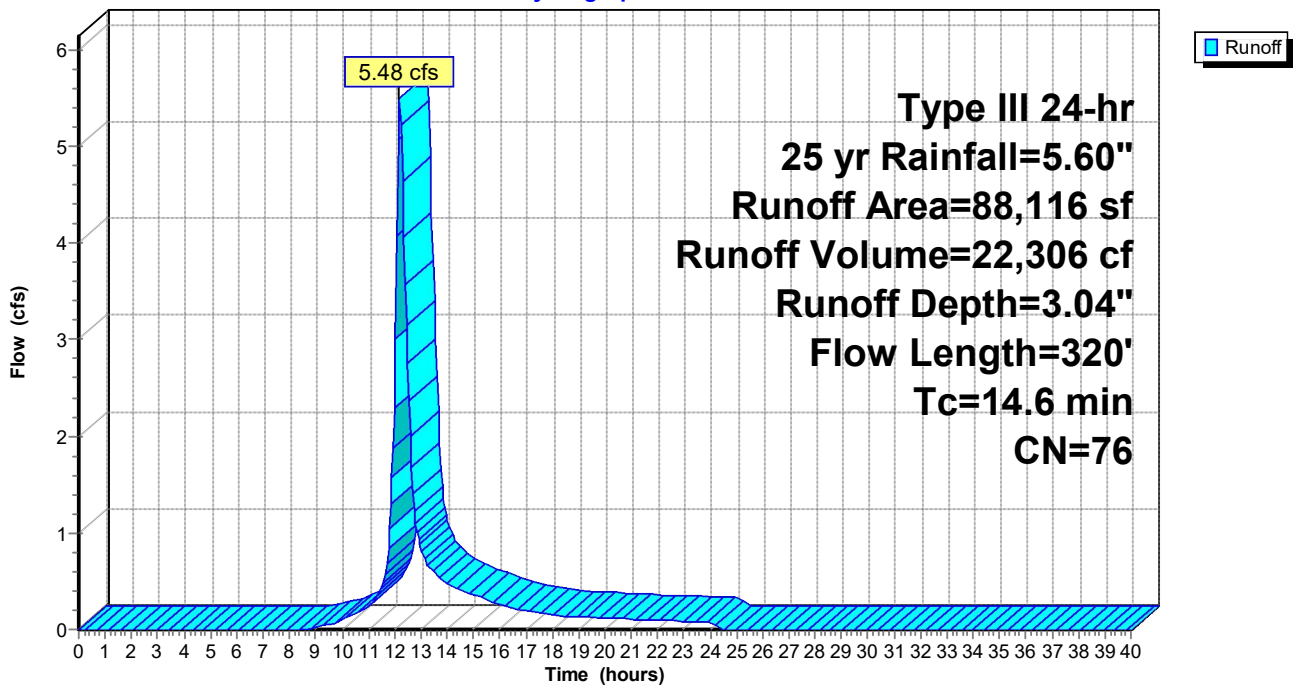
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 yr Rainfall=5.60"

Area (sf)	CN	Description
3,482	98	Roofs, HSG C
7,867	98	Paved parking, HSG C
32,888	70	Woods, Good, HSG C
43,879	74	>75% Grass cover, Good, HSG C
88,116	76	Weighted Average
76,767		87.12% Pervious Area
11,349		12.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0070	0.12		Sheet Flow, Range n= 0.130 P2= 3.10"
1.1	220	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
14.6	320	Total			

**Subcatchment 2S:**

Hydrograph



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Type III 24-hr 25 yr Rainfall=5.60"

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**Summary for Subcatchment 3S:**

Runoff = 2.46 cfs @ 12.09 hrs, Volume= 7,787 cf, Depth= 3.32"

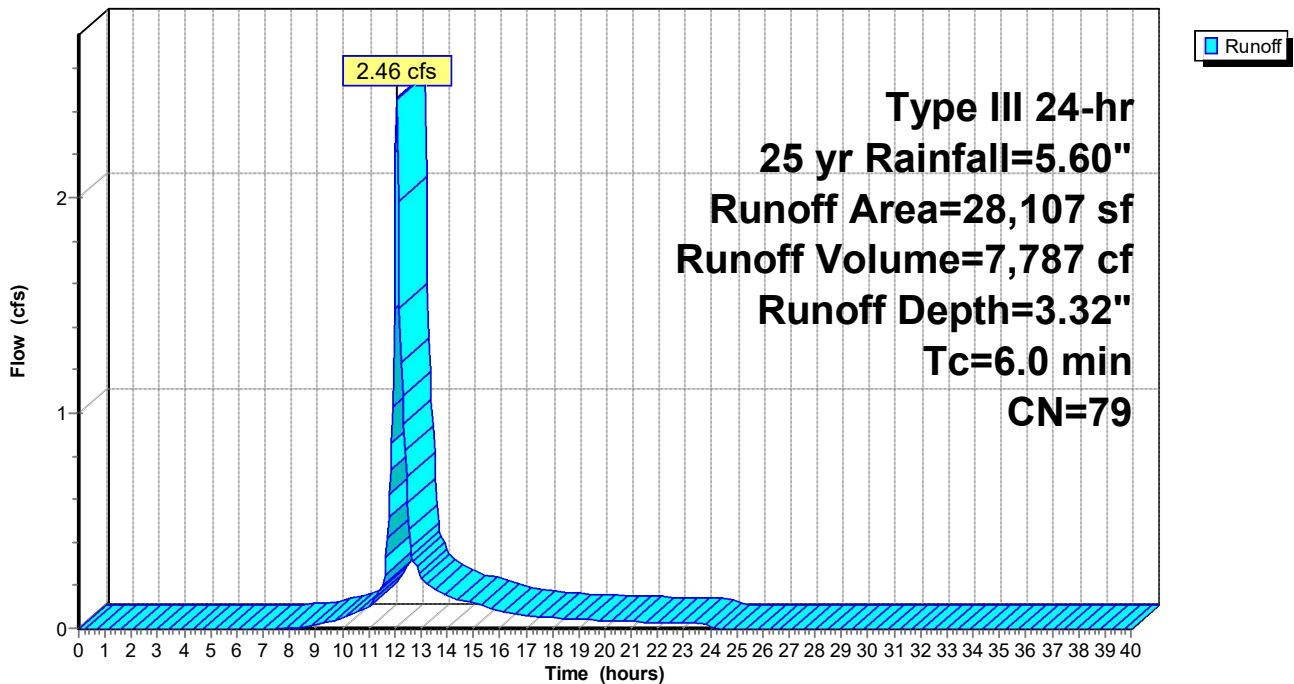
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25 yr Rainfall=5.60"

Area (sf)	CN	Description
7,066	70	Woods, Good, HSG C
5,296	98	Paved parking, HSG C
1,536	98	Roofs, HSG C
14,209	74	>75% Grass cover, Good, HSG C
28,107	79	Weighted Average
21,275		75.69% Pervious Area
6,832		24.31% Impervious Area

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

**Subcatchment 3S:**

Hydrograph



**EXISTING\_R1**

**Summary for Pond 1P: Low area at #333**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 3.32" for 25 yr event  
 Inflow = 2.46 cfs @ 12.09 hrs, Volume= 7,787 cf  
 Outflow = 0.39 cfs @ 12.61 hrs, Volume= 7,787 cf, Atten= 84%, Lag= 30.9 min  
 Discarded = 0.39 cfs @ 12.61 hrs, Volume= 7,787 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 105.60' @ 12.61 hrs Surf.Area= 6,917 sf Storage= 2,742 cf

Plug-Flow detention time= 61.4 min calculated for 7,777 cf (100% of inflow)  
 Center-of-Mass det. time= 61.3 min ( 880.9 - 819.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	105.00'	5,914 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
105.00	97	0	0
105.25	5,070	646	646
105.50	6,459	1,441	2,087
105.75	7,628	1,761	3,848
106.00	8,899	2,066	5,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	105.00'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.39 cfs @ 12.61 hrs HW=105.60' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

**EXISTING\_R1**

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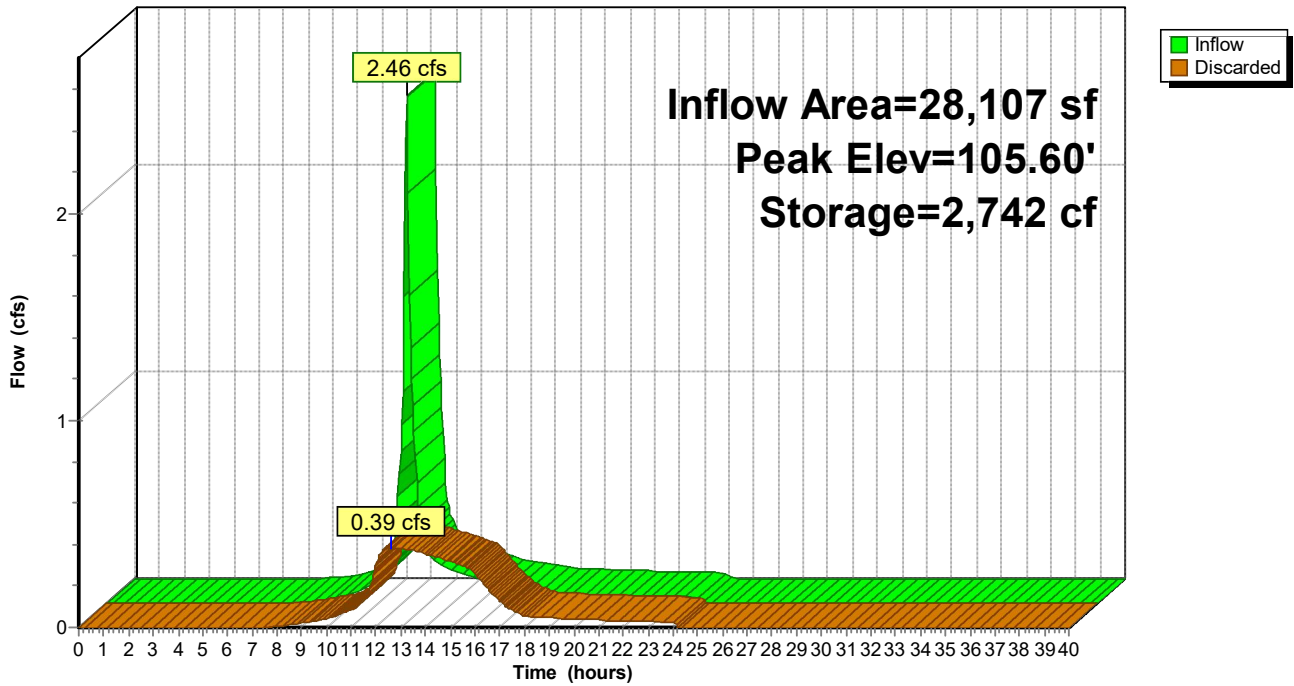
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**Pond 1P: Low area at #333**

Hydrograph



**EXISTING\_R1**

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Type III 24-hr 25 yr Rainfall=5.60"

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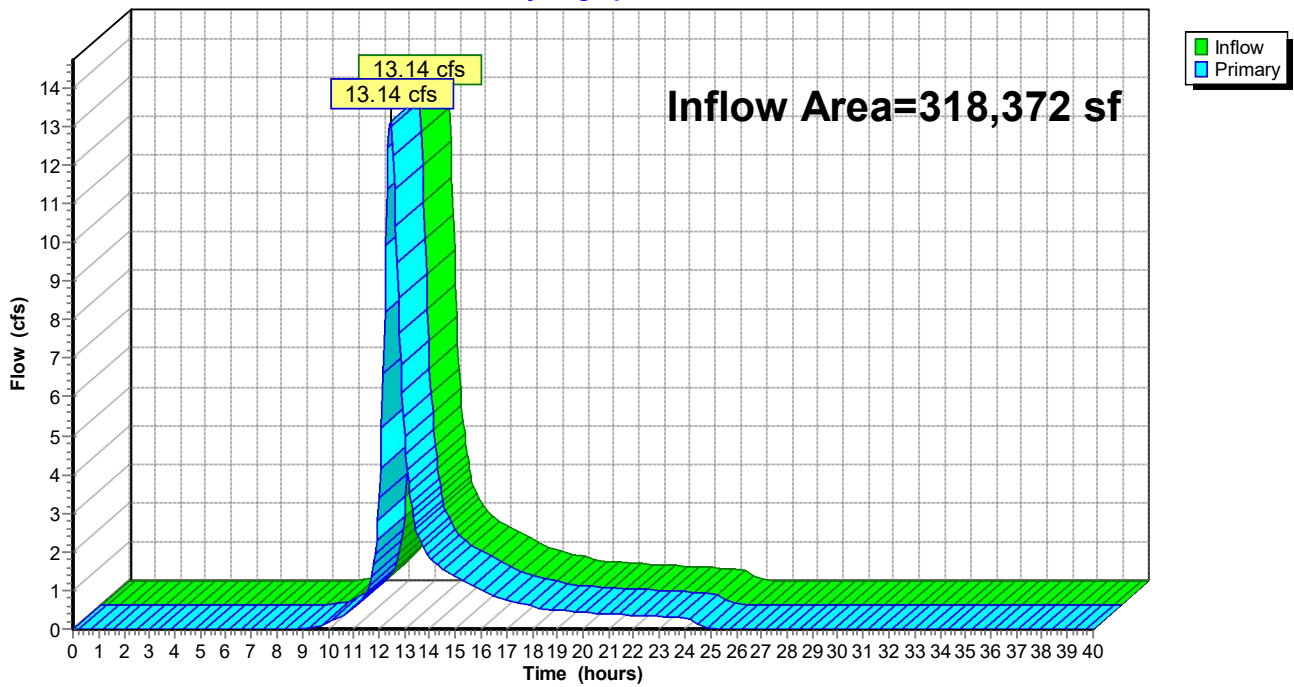
**Summary for Link 1L:**

Inflow Area = 318,372 sf, 7.28% Impervious, Inflow Depth = 2.76" for 25 yr event  
Inflow = 13.14 cfs @ 12.44 hrs, Volume= 73,225 cf  
Primary = 13.14 cfs @ 12.44 hrs, Volume= 73,225 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 1L:**

Hydrograph



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Type III 24-hr 25 yr Rainfall=5.60"

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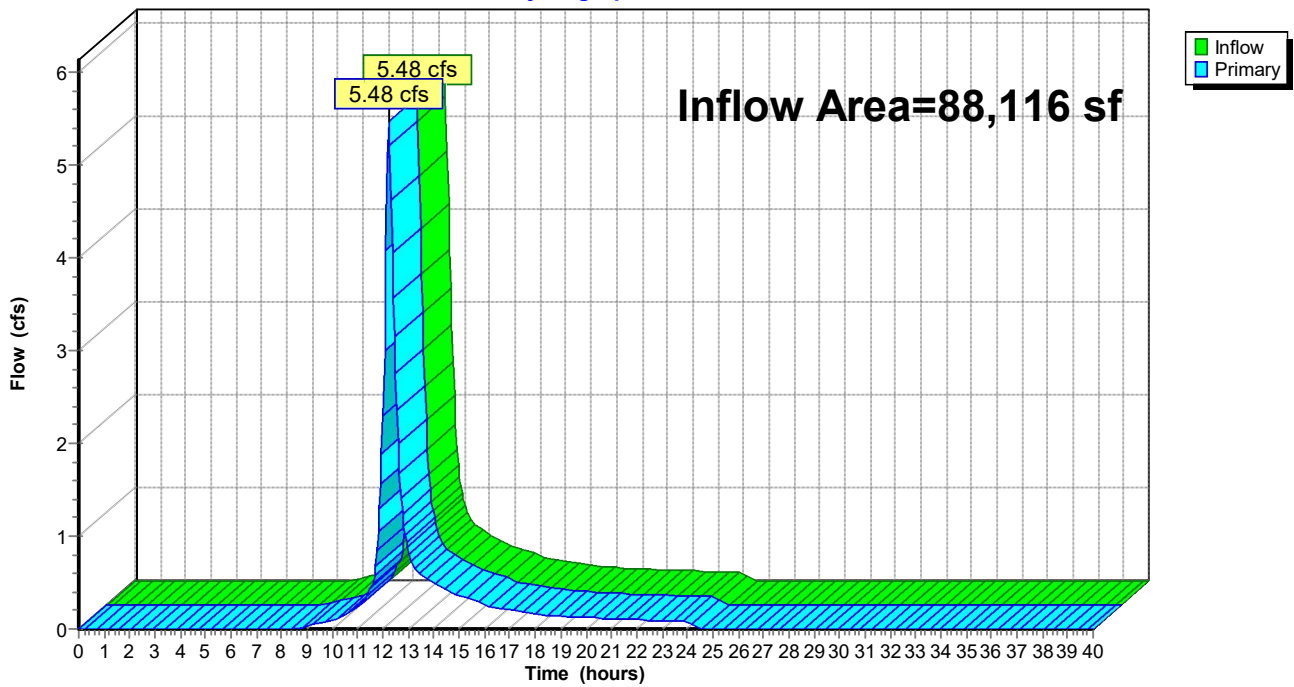
**Summary for Link 2L:**

Inflow Area = 88,116 sf, 12.88% Impervious, Inflow Depth = 3.04" for 25 yr event  
Inflow = 5.48 cfs @ 12.21 hrs, Volume= 22,306 cf  
Primary = 5.48 cfs @ 12.21 hrs, Volume= 22,306 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 2L:**

Hydrograph



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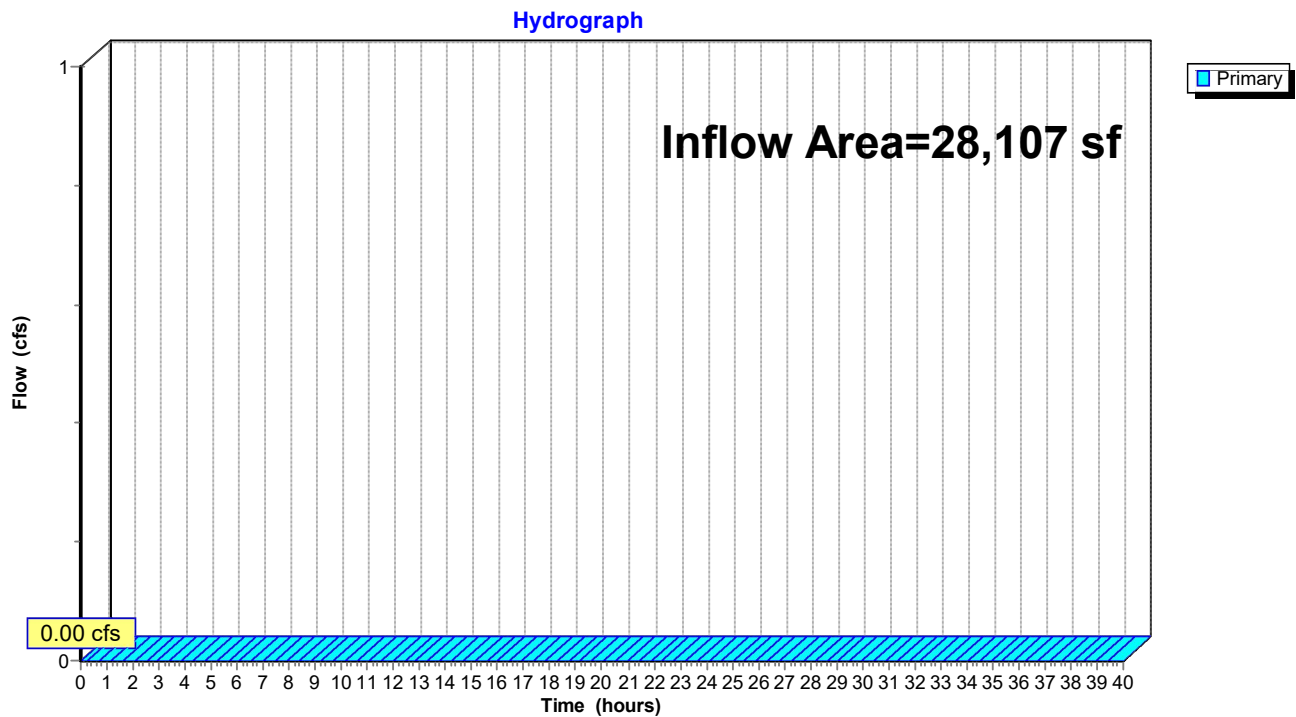
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**Summary for Link 3L:**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 0.00" for 25 yr event  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 3L:**



**EXISTING\_R1**

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Type III 24-hr 100 yr Rainfall=6.50"

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Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S:** Runoff Area=318,372 sf 7.28% Impervious Runoff Depth=3.51"  
Flow Length=950' Tc=30.8 min CN=73 Runoff=16.76 cfs 93,068 cf

**Subcatchment 2S:** Runoff Area=88,116 sf 12.88% Impervious Runoff Depth=3.82"  
Flow Length=320' Tc=14.6 min CN=76 Runoff=6.89 cfs 28,016 cf

**Subcatchment 3S:** Runoff Area=28,107 sf 24.31% Impervious Runoff Depth=4.13"  
Tc=6.0 min CN=79 Runoff=3.04 cfs 9,672 cf

**Pond 1P: Low area at #333** Peak Elev=105.72' Storage=3,607 cf Inflow=3.04 cfs 9,672 cf  
Outflow=0.42 cfs 9,672 cf

**Link 1L:** Inflow=16.76 cfs 93,068 cf  
Primary=16.76 cfs 93,068 cf

**Link 2L:** Inflow=6.89 cfs 28,016 cf  
Primary=6.89 cfs 28,016 cf

**Link 3L:** Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf Runoff Volume = 130,755 cf Average Runoff Depth = 3.61"**  
**90.48% Pervious = 393,236 sf 9.52% Impervious = 41,359 sf**



**EXISTING\_R1**

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Type III 24-hr 100 yr Rainfall=6.50"

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**Summary for Subcatchment 1S:**

Runoff = 16.76 cfs @ 12.43 hrs, Volume= 93,068 cf, Depth= 3.51"

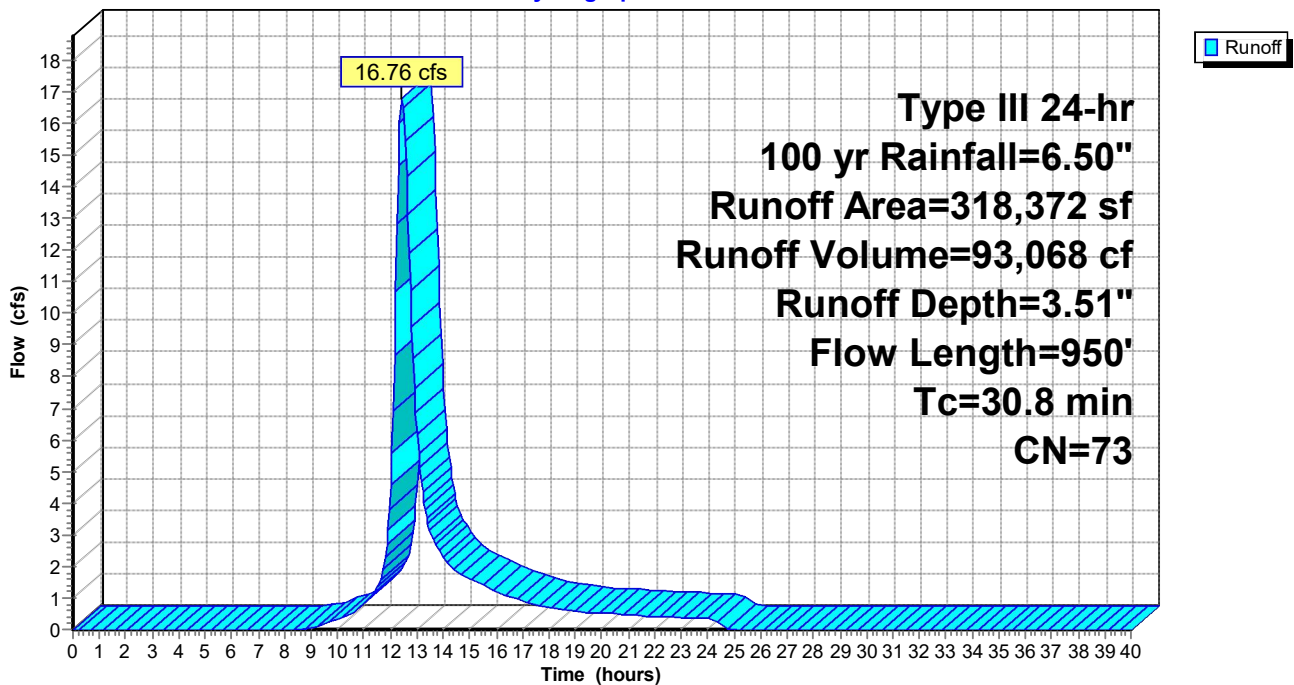
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
6,796	98	Roofs, HSG C
16,382	98	Paved parking, HSG C
209,022	70	Woods, Good, HSG C
86,172	74	>75% Grass cover, Good, HSG C
318,372	73	Weighted Average
295,194		92.72% Pervious Area
23,178		7.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	300	0.0360	0.18		<b>Sheet Flow,</b> Grass: Dense n= 0.240 P2= 3.10"
3.2	650	0.0440	3.38		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
30.8	950	Total			

**Subcatchment 1S:**

Hydrograph



**EXISTING\_R1**

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Type III 24-hr 100 yr Rainfall=6.50"

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**Summary for Subcatchment 2S:**

Runoff = 6.89 cfs @ 12.20 hrs, Volume= 28,016 cf, Depth= 3.82"

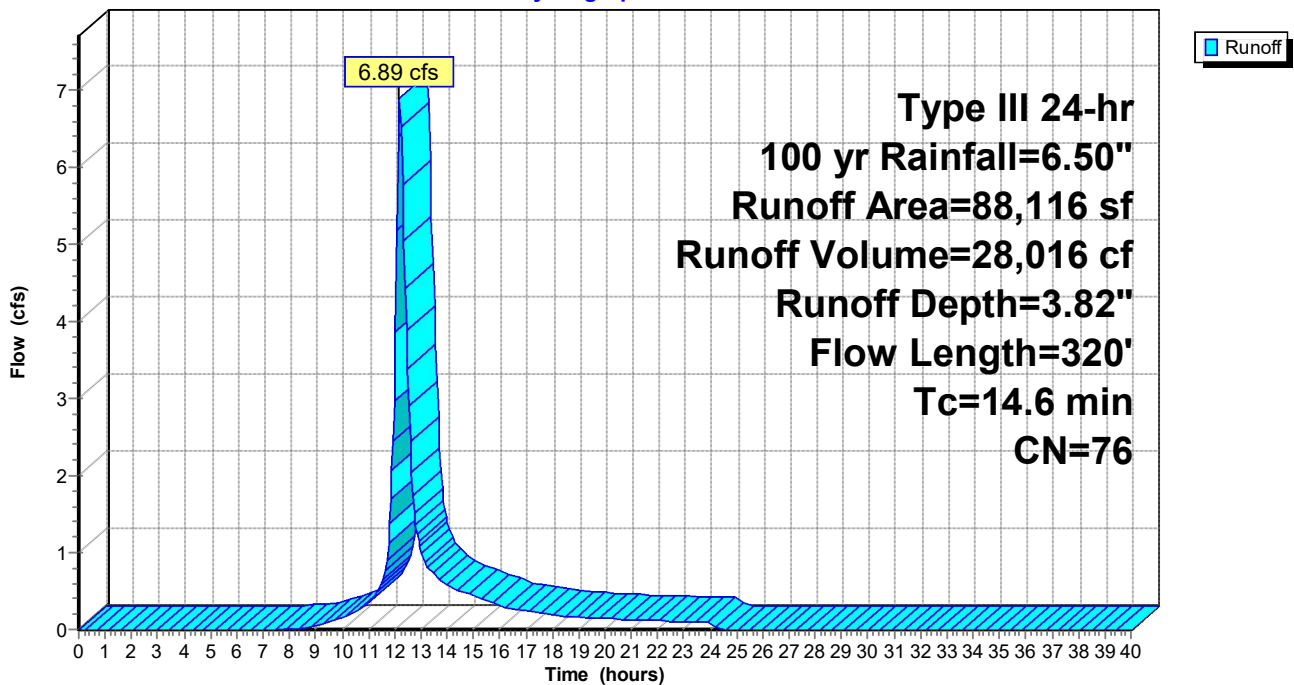
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
3,482	98	Roofs, HSG C
7,867	98	Paved parking, HSG C
32,888	70	Woods, Good, HSG C
43,879	74	>75% Grass cover, Good, HSG C
88,116	76	Weighted Average
76,767		87.12% Pervious Area
11,349		12.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0070	0.12		<b>Sheet Flow,</b> Range n= 0.130 P2= 3.10"
1.1	220	0.0400	3.22		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
14.6	320	Total			

**Subcatchment 2S:**

Hydrograph



**EXISTING\_R1**

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Type III 24-hr 100 yr Rainfall=6.50"

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**Summary for Subcatchment 3S:**

Runoff = 3.04 cfs @ 12.09 hrs, Volume= 9,672 cf, Depth= 4.13"

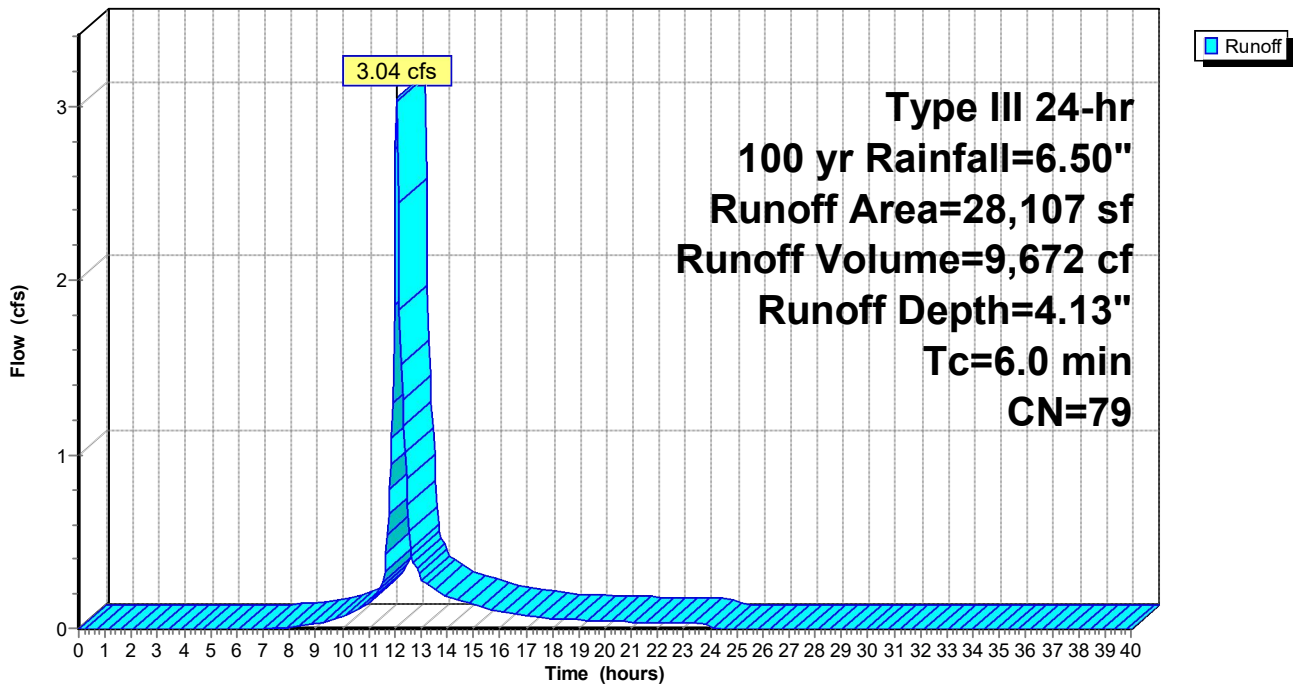
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
7,066	70	Woods, Good, HSG C
5,296	98	Paved parking, HSG C
1,536	98	Roofs, HSG C
14,209	74	>75% Grass cover, Good, HSG C
28,107	79	Weighted Average
21,275		75.69% Pervious Area
6,832		24.31% Impervious Area

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

**Subcatchment 3S:**

Hydrograph



**EXISTING\_R1**

**Summary for Pond 1P: Low area at #333**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 4.13" for 100 yr event  
 Inflow = 3.04 cfs @ 12.09 hrs, Volume= 9,672 cf  
 Outflow = 0.42 cfs @ 12.66 hrs, Volume= 9,672 cf, Atten= 86%, Lag= 34.0 min  
 Discarded = 0.42 cfs @ 12.66 hrs, Volume= 9,672 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 105.72' @ 12.66 hrs Surf.Area= 7,479 sf Storage= 3,607 cf

Plug-Flow detention time= 77.6 min calculated for 9,660 cf (100% of inflow)  
 Center-of-Mass det. time= 77.5 min ( 890.8 - 813.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	105.00'	5,914 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
105.00	97	0	0
105.25	5,070	646	646
105.50	6,459	1,441	2,087
105.75	7,628	1,761	3,848
106.00	8,899	2,066	5,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	105.00'	<b>2.410 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.42 cfs @ 12.66 hrs HW=105.72' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.42 cfs)

**EXISTING\_R1**

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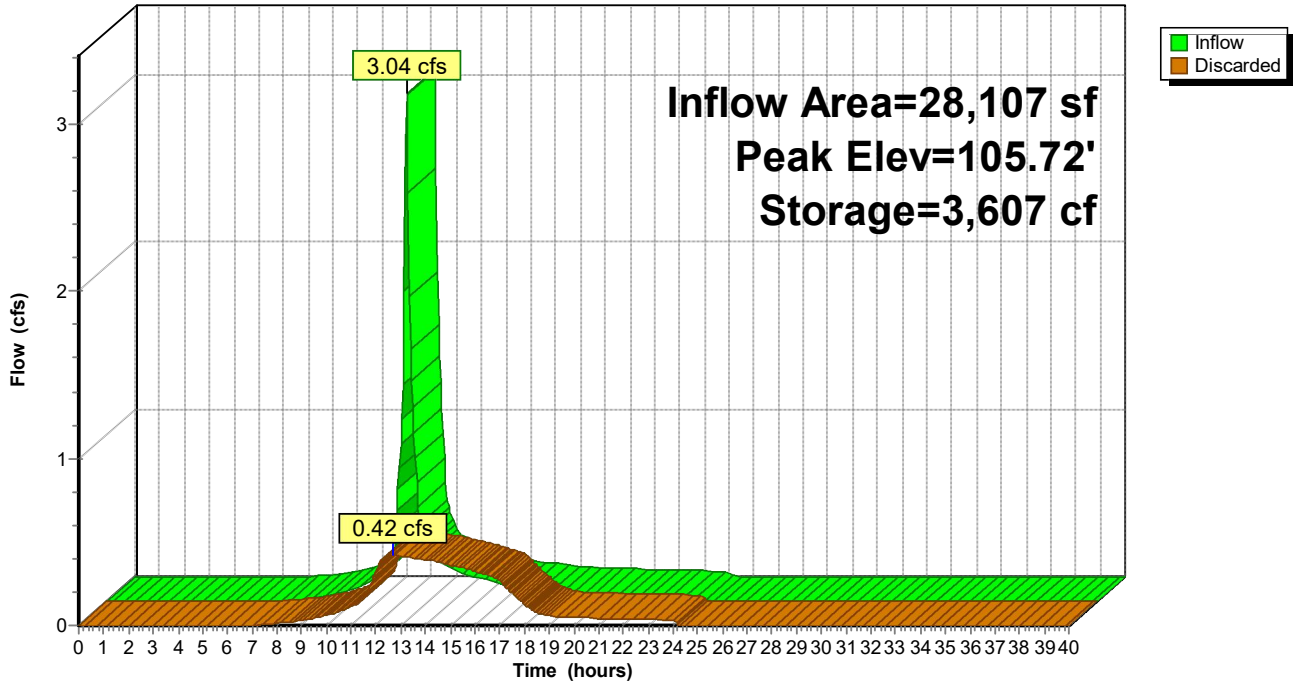
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**Pond 1P: Low area at #333**

Hydrograph



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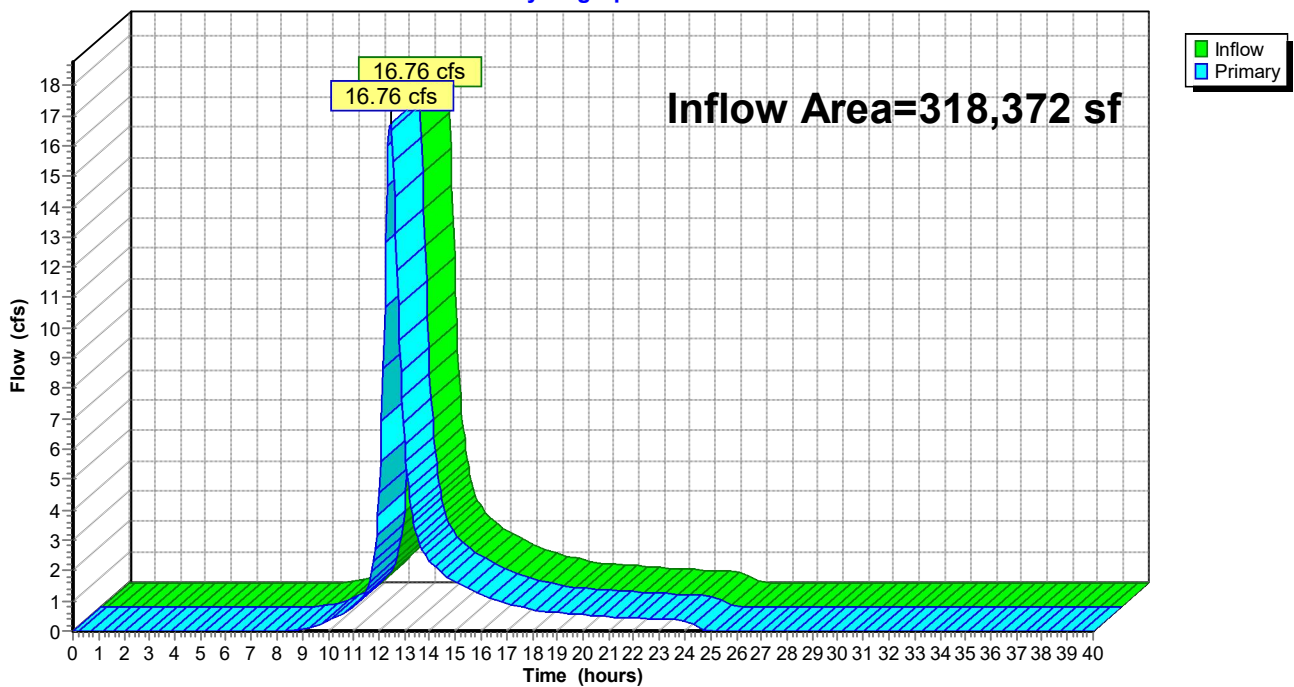
**Summary for Link 1L:**

Inflow Area = 318,372 sf, 7.28% Impervious, Inflow Depth = 3.51" for 100 yr event  
Inflow = 16.76 cfs @ 12.43 hrs, Volume= 93,068 cf  
Primary = 16.76 cfs @ 12.43 hrs, Volume= 93,068 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 1L:**

Hydrograph



**EXISTING\_R1**

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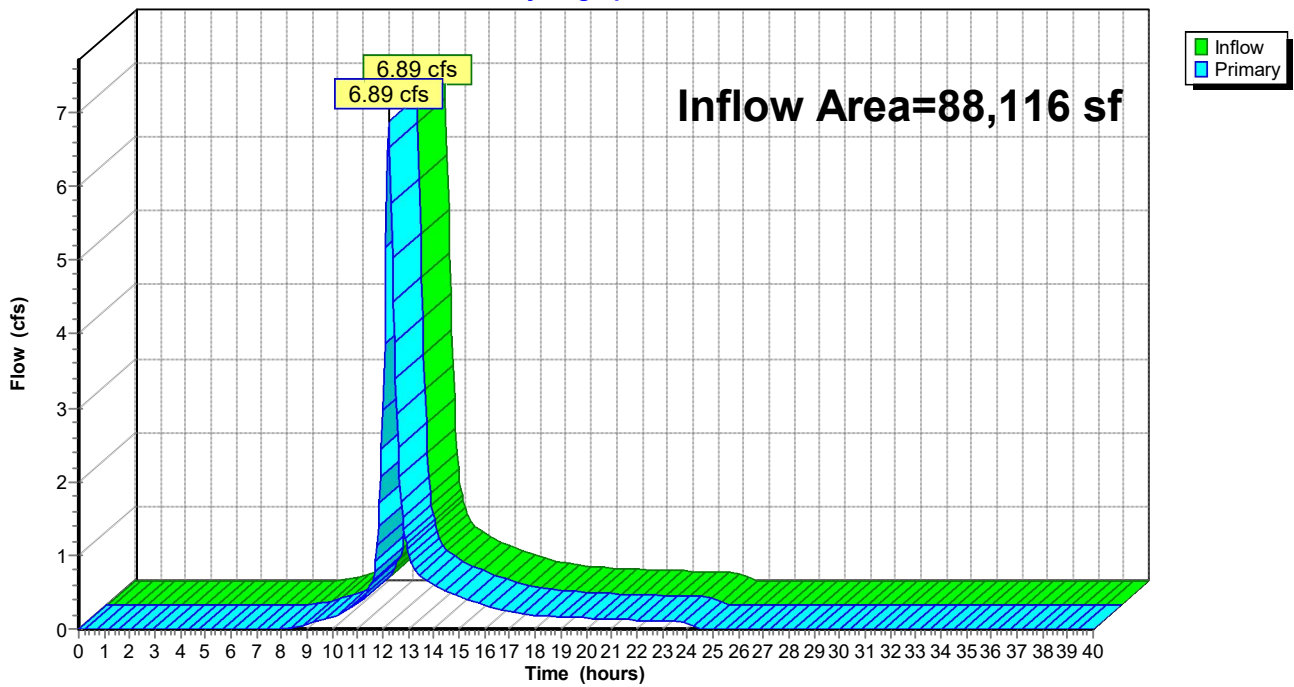
**Summary for Link 2L:**

Inflow Area = 88,116 sf, 12.88% Impervious, Inflow Depth = 3.82" for 100 yr event  
Inflow = 6.89 cfs @ 12.20 hrs, Volume= 28,016 cf  
Primary = 6.89 cfs @ 12.20 hrs, Volume= 28,016 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 2L:**

Hydrograph



**EXISTING\_R1**

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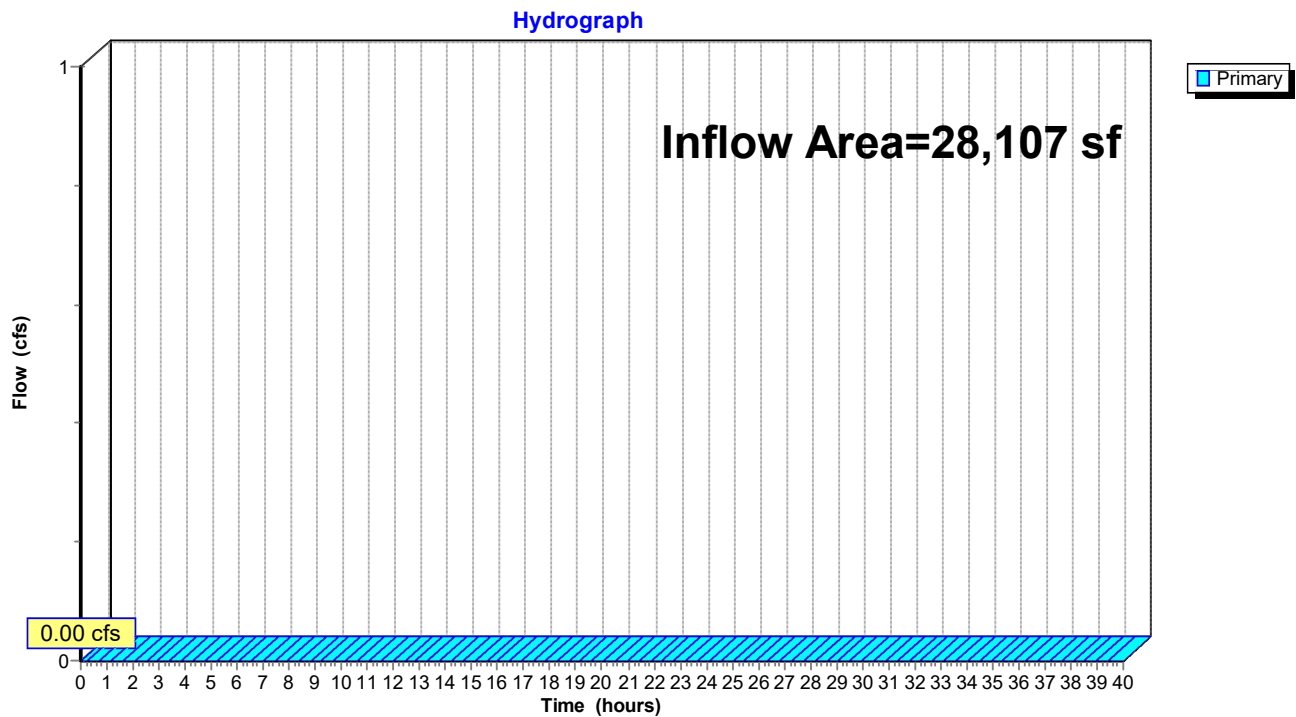
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**Summary for Link 3L:**

Inflow Area = 28,107 sf, 24.31% Impervious, Inflow Depth = 0.00" for 100 yr event  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

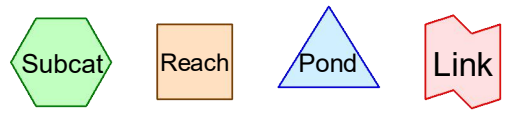
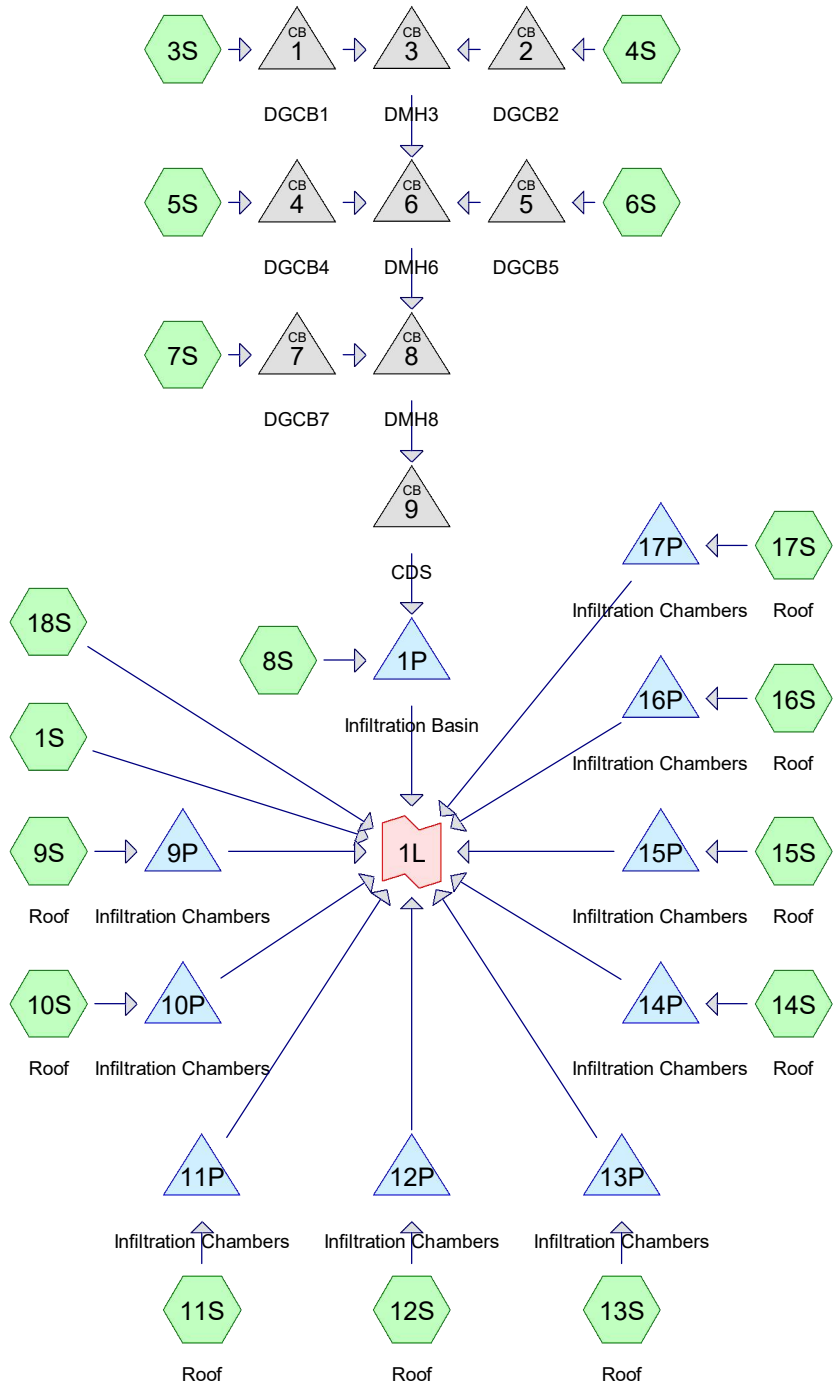
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 3L:**





*Proposed Condition*



**Routing Diagram for PROPOSED\_R1**  
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**PROPOSED\_R1**

**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
273,131	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 18S)
63,678	98	Paved parking, HSG C (1S, 3S, 4S, 5S, 6S, 7S, 8S)
35,622	98	Roofs, HSG C (1S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S)
62,164	70	Woods, Good, HSG C (1S, 2S, 8S, 18S)
<b>434,595</b>	<b>79</b>	<b>TOTAL AREA</b>

**PROPOSED\_R1**

**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
434,595	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S
0	HSG D	
0	Other	
<b>434,595</b>		<b>TOTAL AREA</b>

**PROPOSED\_R1**

**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
0	0	273,131	0	0	273,131	>75% Grass cover, Good	
0	0	63,678	0	0	63,678	Paved parking	
0	0	35,622	0	0	35,622	Roofs	
0	0	62,164	0	0	62,164	Woods, Good	
<b>0</b>	<b>0</b>	<b>434,595</b>	<b>0</b>	<b>0</b>	<b>434,595</b>	<b>TOTAL AREA</b>	

**PROPOSED\_R1**

**Pipe Listing (all nodes)**

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1	99.90	99.77	7.0	0.0186	0.012	12.0	0.0	0.0
2	1P	77.50	77.25	24.0	0.0104	0.012	15.0	0.0	0.0
3	2	99.90	99.77	13.0	0.0100	0.012	12.0	0.0	0.0
4	3	99.52	87.09	293.0	0.0424	0.012	15.0	0.0	0.0
5	4	87.44	87.34	10.0	0.0100	0.012	12.0	0.0	0.0
6	5	87.44	87.34	10.0	0.0100	0.012	12.0	0.0	0.0
7	6	85.52	80.85	182.0	0.0257	0.012	18.0	0.0	0.0
8	7	81.30	81.10	15.0	0.0133	0.012	15.0	0.0	0.0
9	8	78.75	78.63	12.0	0.0100	0.012	24.0	0.0	0.0
10	9	78.63	78.50	13.0	0.0100	0.012	24.0	0.0	0.0

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1S:</b>	Runoff Area=156,259 sf 13.70% Impervious Runoff Depth=1.08" Flow Length=1,103' Tc=41.3 min CN=76 Runoff=2.11 cfs 14,102 cf
<b>Subcatchment 2S:</b>	Runoff Area=35,665 sf 0.00% Impervious Runoff Depth=0.97" Flow Length=182' Slope=0.0360 '/' Tc=18.5 min CN=74 Runoff=0.60 cfs 2,890 cf
<b>Subcatchment 3S:</b>	Runoff Area=35,876 sf 37.52% Impervious Runoff Depth=1.53" Tc=6.0 min CN=83 Runoff=1.44 cfs 4,567 cf
<b>Subcatchment 4S:</b>	Runoff Area=21,716 sf 44.67% Impervious Runoff Depth=1.67" Tc=6.0 min CN=85 Runoff=0.96 cfs 3,027 cf
<b>Subcatchment 5S:</b>	Runoff Area=38,132 sf 7.47% Impervious Runoff Depth=1.08" Tc=6.0 min CN=76 Runoff=1.05 cfs 3,441 cf
<b>Subcatchment 6S:</b>	Runoff Area=25,548 sf 47.86% Impervious Runoff Depth=1.67" Tc=6.0 min CN=85 Runoff=1.13 cfs 3,561 cf
<b>Subcatchment 7S:</b>	Runoff Area=55,745 sf 39.22% Impervious Runoff Depth=1.53" Tc=6.0 min CN=83 Runoff=2.24 cfs 7,096 cf
<b>Subcatchment 8S:</b>	Runoff Area=22,935 sf 14.82% Impervious Runoff Depth=1.20" Tc=6.0 min CN=78 Runoff=0.71 cfs 2,295 cf
<b>Subcatchment 9S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf
<b>Subcatchment 10S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf
<b>Subcatchment 11S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf
<b>Subcatchment 12S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf
<b>Subcatchment 13S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf
<b>Subcatchment 14S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf
<b>Subcatchment 15S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf
<b>Subcatchment 16S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf

**PROPOSED\_R1**

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Type III 24-hr 2 yr Rainfall=3.10"

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**Subcatchment 17S: Roof** Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=2.87"  
Tc=6.0 min CN=98 Runoff=0.11 cfs 382 cf

**Subcatchment 18S:** Runoff Area=28,319 sf 0.00% Impervious Runoff Depth=0.92"  
Tc=6.0 min CN=73 Runoff=0.64 cfs 2,170 cf

**Pond 1: DGCB1** Peak Elev=100.60' Inflow=1.44 cfs 4,567 cf  
12.0" Round Culvert n=0.012 L=7.0' S=0.0186 ' / ' Outflow=1.44 cfs 4,567 cf

**Pond 1P: Infiltration Basin** Peak Elev=77.89' Storage=9,475 cf Inflow=7.53 cfs 23,986 cf  
Discarded=0.42 cfs 19,698 cf Primary=0.64 cfs 4,288 cf Outflow=1.07 cfs 23,986 cf

**Pond 2: DGCB2** Peak Elev=100.49' Inflow=0.96 cfs 3,027 cf  
12.0" Round Culvert n=0.012 L=13.0' S=0.0100 ' / ' Outflow=0.96 cfs 3,027 cf

**Pond 3: DMH3** Peak Elev=100.30' Inflow=2.40 cfs 7,593 cf  
15.0" Round Culvert n=0.012 L=293.0' S=0.0424 ' / ' Outflow=2.40 cfs 7,593 cf

**Pond 4: DGCB4** Peak Elev=88.05' Inflow=1.05 cfs 3,441 cf  
12.0" Round Culvert n=0.012 L=10.0' S=0.0100 ' / ' Outflow=1.05 cfs 3,441 cf

**Pond 5: DGCB5** Peak Elev=88.07' Inflow=1.13 cfs 3,561 cf  
12.0" Round Culvert n=0.012 L=10.0' S=0.0100 ' / ' Outflow=1.13 cfs 3,561 cf

**Pond 6: DMH6** Peak Elev=86.57' Inflow=4.58 cfs 14,596 cf  
18.0" Round Culvert n=0.012 L=182.0' S=0.0257 ' / ' Outflow=4.58 cfs 14,596 cf

**Pond 7: DGCB7** Peak Elev=82.11' Inflow=2.24 cfs 7,096 cf  
15.0" Round Culvert n=0.012 L=15.0' S=0.0133 ' / ' Outflow=2.24 cfs 7,096 cf

**Pond 8: DMH8** Peak Elev=80.26' Inflow=6.82 cfs 21,692 cf  
24.0" Round Culvert n=0.012 L=12.0' S=0.0100 ' / ' Outflow=6.82 cfs 21,692 cf

**Pond 9: CDS** Peak Elev=79.98' Inflow=6.82 cfs 21,692 cf  
24.0" Round Culvert n=0.012 L=13.0' S=0.0100 ' / ' Outflow=6.82 cfs 21,692 cf

**Pond 9P: Infiltration Chambers** Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 383 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 383 cf

**Pond 10P: Infiltration Chambers** Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf

**Pond 11P: Infiltration Chambers** Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf

**Pond 12P: Infiltration Chambers** Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf

**Pond 13P: Infiltration Chambers** Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf



**Pond 14P: Infiltration Chambers**

Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf

**Pond 15P: Infiltration Chambers**

Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf

**Pond 16P: Infiltration Chambers**

Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf

**Pond 17P: Infiltration Chambers**

Peak Elev=1.50' Storage=136 cf Inflow=0.11 cfs 382 cf  
Discarded=0.01 cfs 382 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 382 cf

**Link 1L:**

Inflow=2.87 cfs 20,559 cf  
Primary=2.87 cfs 20,559 cf

**Link 2L:**

Inflow=0.60 cfs 2,890 cf  
Primary=0.60 cfs 2,890 cf

**Link 3L:**

Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf Runoff Volume = 46,589 cf Average Runoff Depth = 1.29"**  
**77.15% Pervious = 335,295 sf 22.85% Impervious = 99,300 sf**

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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 1S:**

Runoff = 2.11 cfs @ 12.61 hrs, Volume= 14,102 cf, Depth= 1.08"

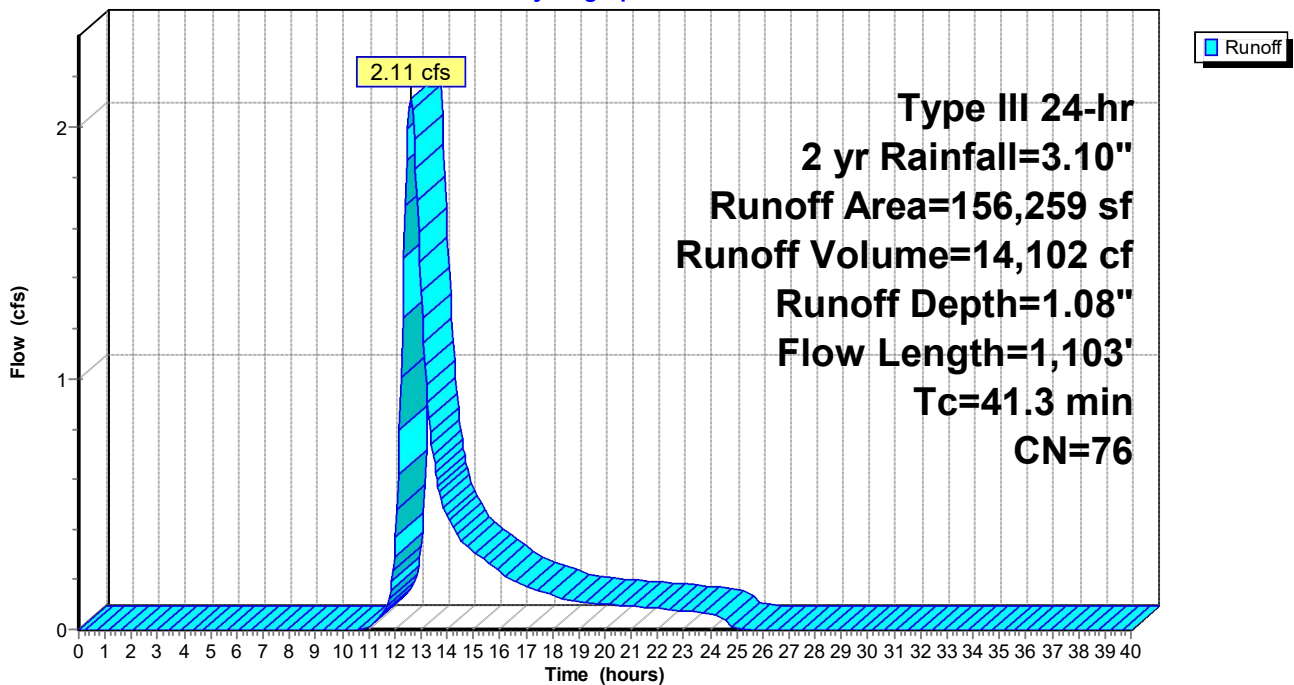
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
6,796	98	Roofs, HSG C
14,607	98	Paved parking, HSG C
54,924	70	Woods, Good, HSG C
79,932	74	>75% Grass cover, Good, HSG C
156,259	76	Weighted Average
134,856		86.30% Pervious Area
21,403		13.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.3	300	0.0170	0.13		<b>Sheet Flow,</b> Grass: Dense n= 0.240 P2= 3.10"
4.0	803	0.0430	3.34		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
41.3	1,103	Total			

**Subcatchment 1S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 2S:**

Runoff = 0.60 cfs @ 12.28 hrs, Volume= 2,890 cf, Depth= 0.97"

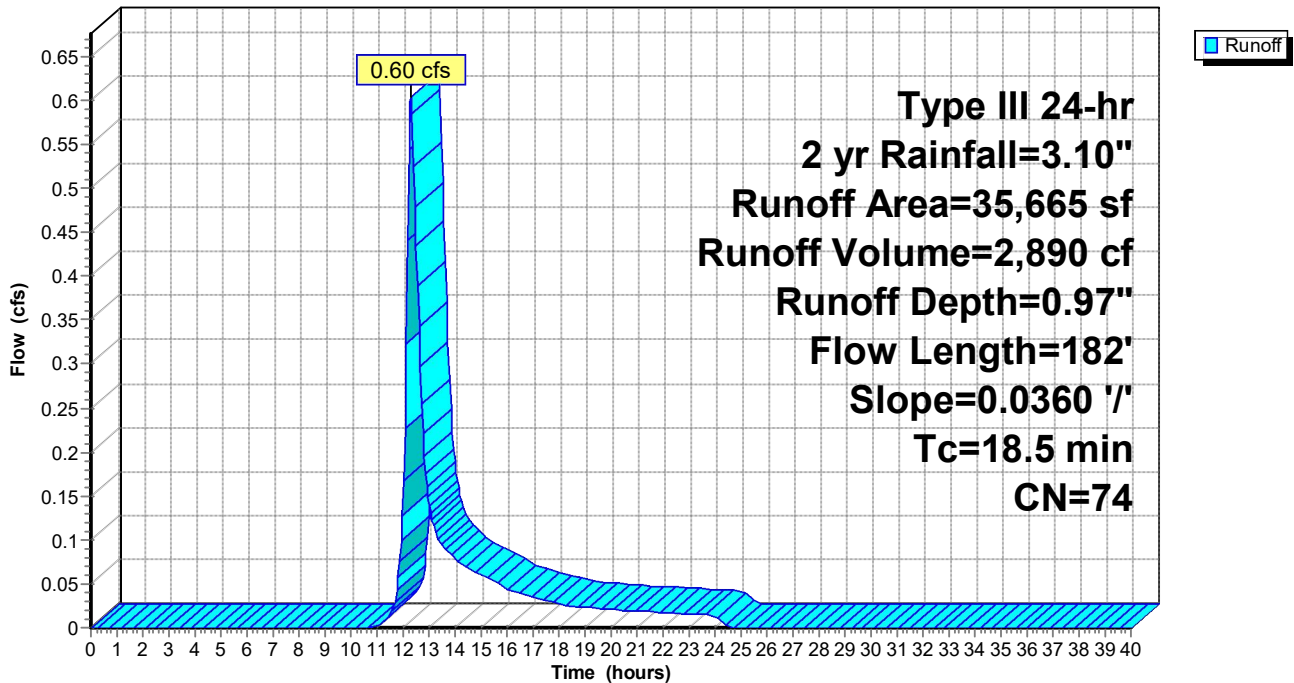
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,631	70	Woods, Good, HSG C
34,034	74	>75% Grass cover, Good, HSG C
35,665	74	Weighted Average
35,665		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.5	182	0.0360	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"

**Subcatchment 2S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 3S:**

Runoff = 1.44 cfs @ 12.09 hrs, Volume= 4,567 cf, Depth= 1.53"

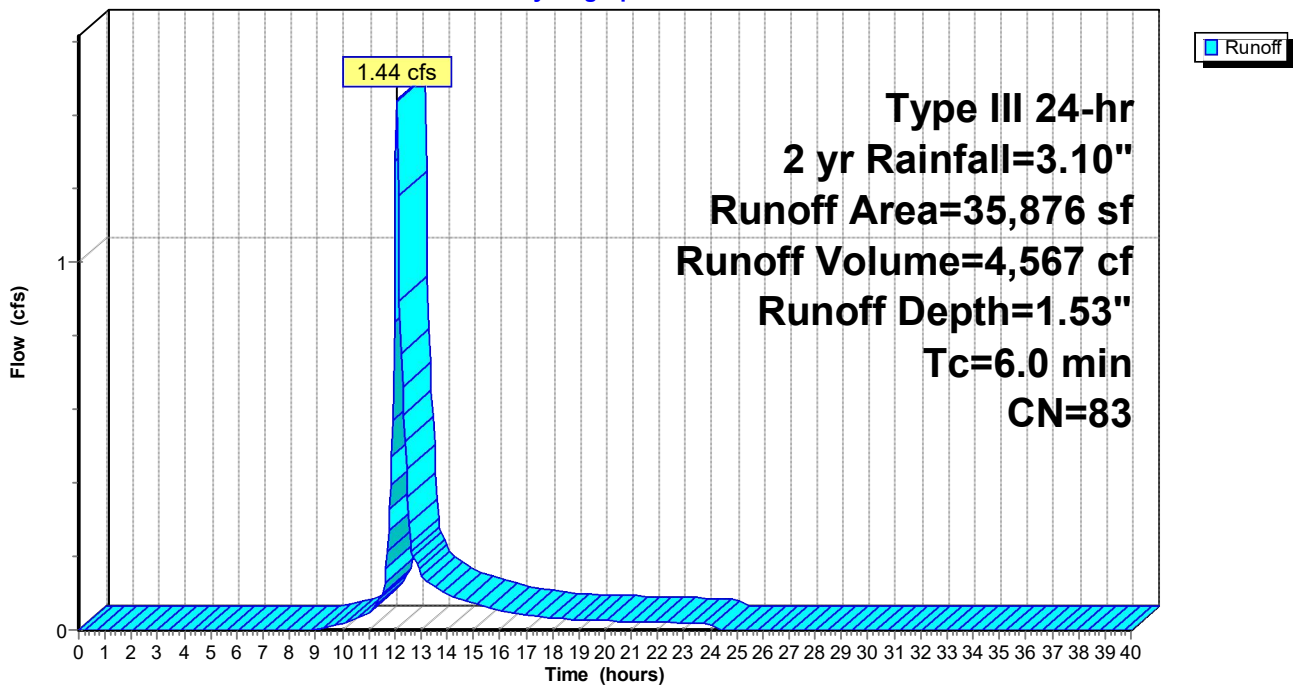
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
2,980	98	Roofs, HSG C
10,479	98	Paved parking, HSG C
22,417	74	>75% Grass cover, Good, HSG C
35,876	83	Weighted Average
22,417		62.48% Pervious Area
13,459		37.52% Impervious Area

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

**Subcatchment 3S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 4S:**

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 3,027 cf, Depth= 1.67"

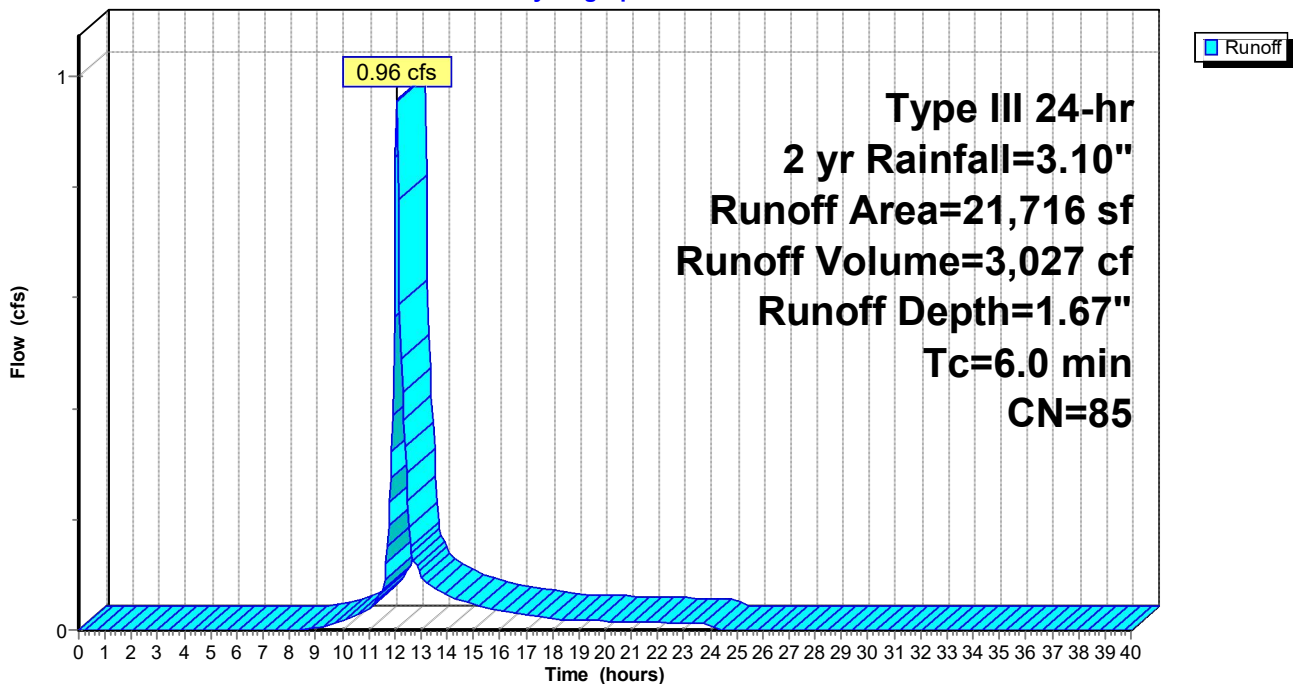
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
2,203	98	Roofs, HSG C
7,497	98	Paved parking, HSG C
12,016	74	>75% Grass cover, Good, HSG C
21,716	85	Weighted Average
12,016		55.33% Pervious Area
9,700		44.67% Impervious Area

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

**Subcatchment 4S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 5S:**

Runoff = 1.05 cfs @ 12.10 hrs, Volume= 3,441 cf, Depth= 1.08"

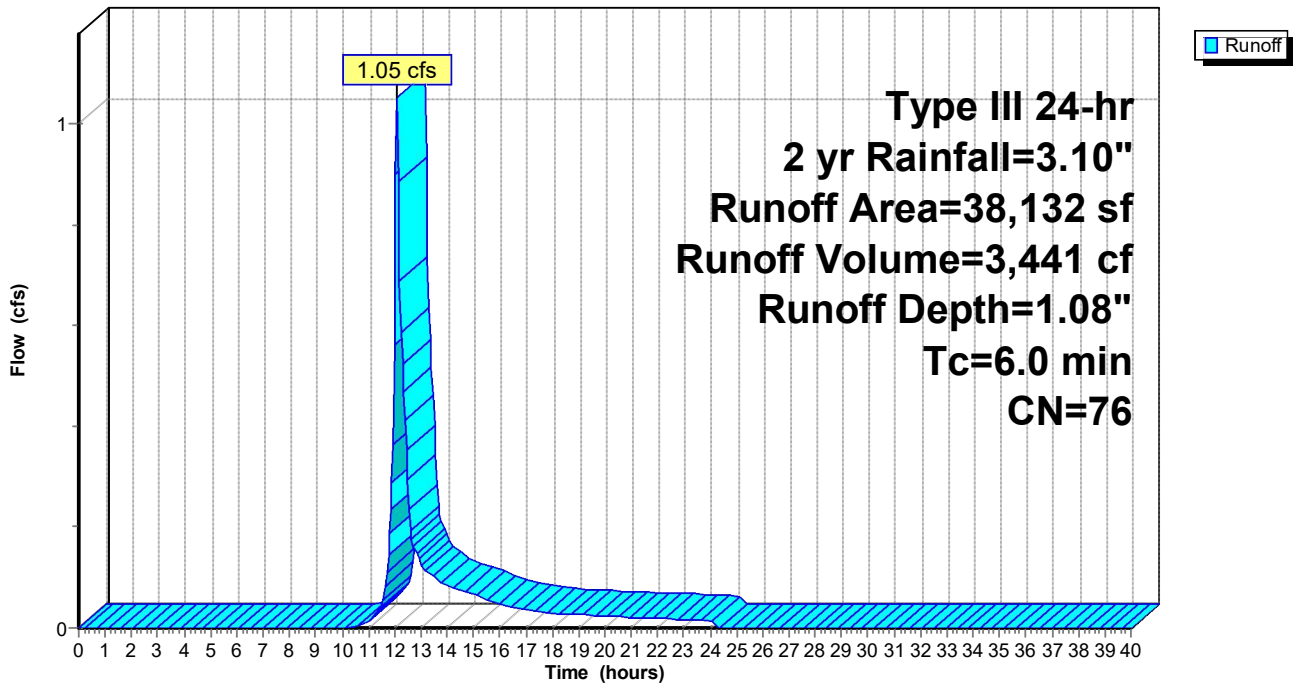
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,846	98	Roofs, HSG C
1,003	98	Paved parking, HSG C
35,283	74	>75% Grass cover, Good, HSG C
38,132	76	Weighted Average
35,283		92.53% Pervious Area
2,849		7.47% Impervious Area

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

**Subcatchment 5S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 6S:**

Runoff = 1.13 cfs @ 12.09 hrs, Volume= 3,561 cf, Depth= 1.67"

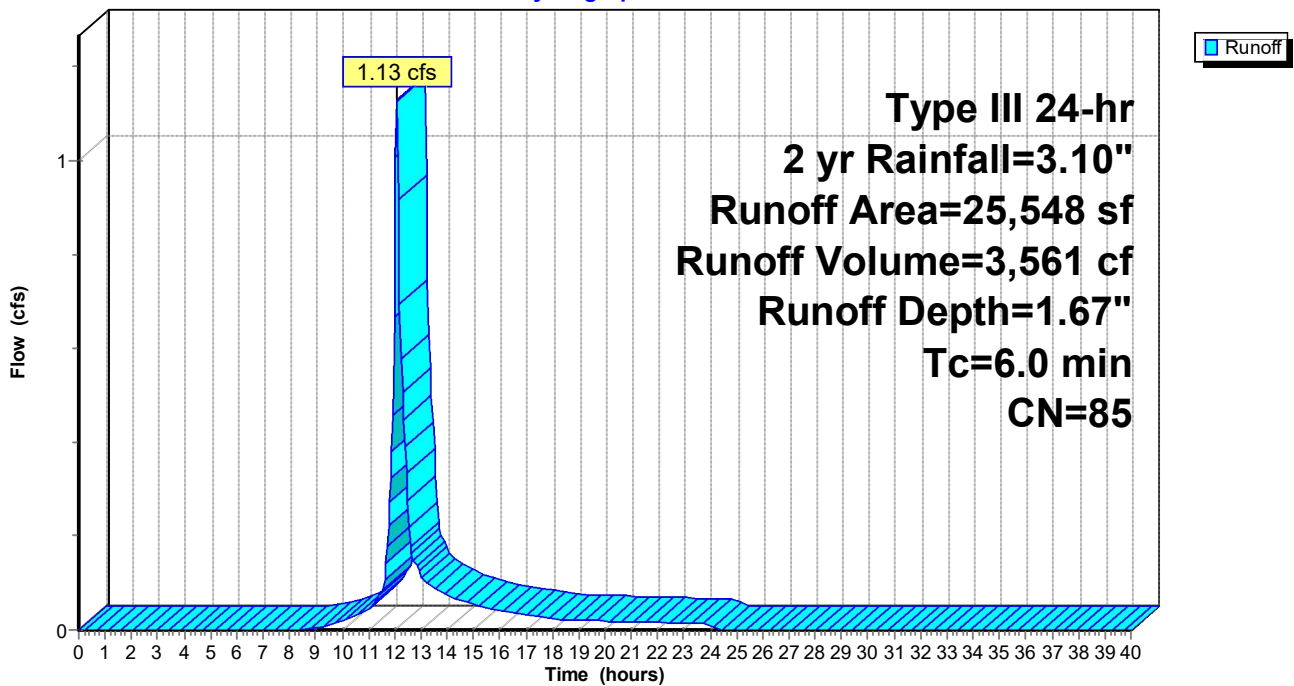
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
2,597	98	Roofs, HSG C
9,631	98	Paved parking, HSG C
13,320	74	>75% Grass cover, Good, HSG C
25,548	85	Weighted Average
13,320		52.14% Pervious Area
12,228		47.86% Impervious Area

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

**Subcatchment 6S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 7S:**

Runoff = 2.24 cfs @ 12.09 hrs, Volume= 7,096 cf, Depth= 1.53"

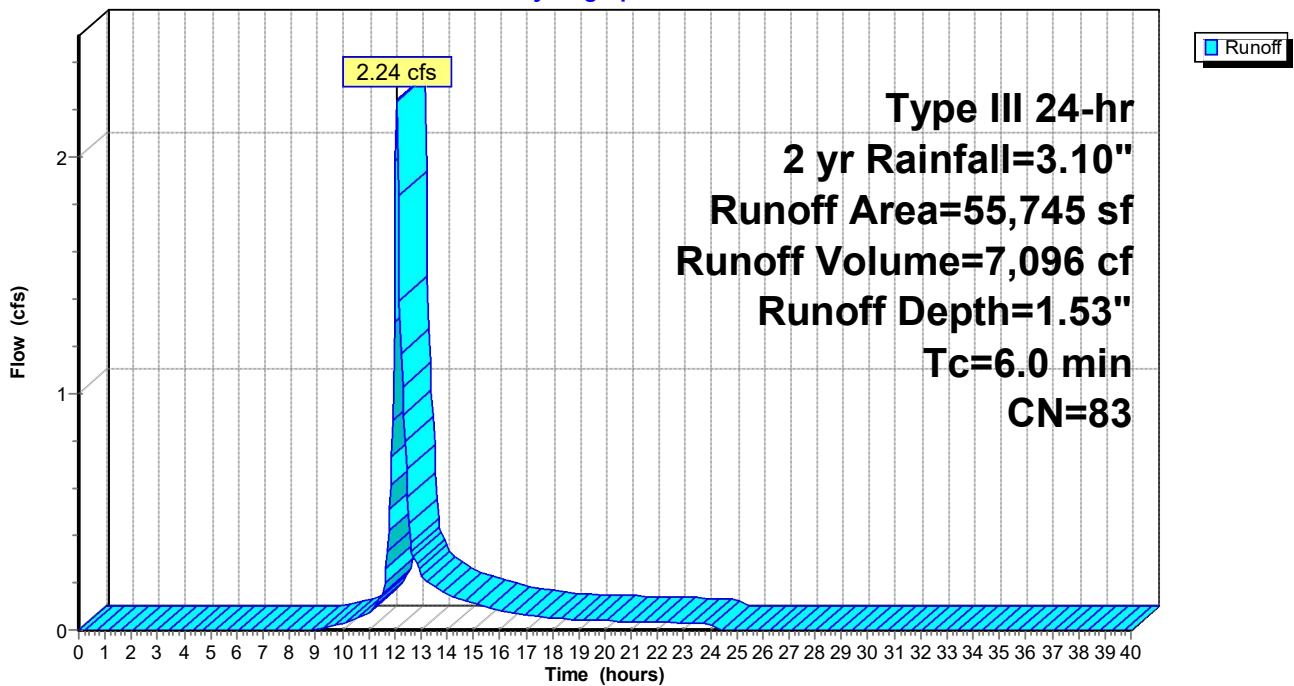
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
4,410	98	Roofs, HSG C
17,453	98	Paved parking, HSG C
33,882	74	>75% Grass cover, Good, HSG C
55,745	83	Weighted Average
33,882		60.78% Pervious Area
21,863		39.22% Impervious Area

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

**Subcatchment 7S:**

Hydrograph





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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 8S:**

Runoff = 0.71 cfs @ 12.10 hrs, Volume= 2,295 cf, Depth= 1.20"

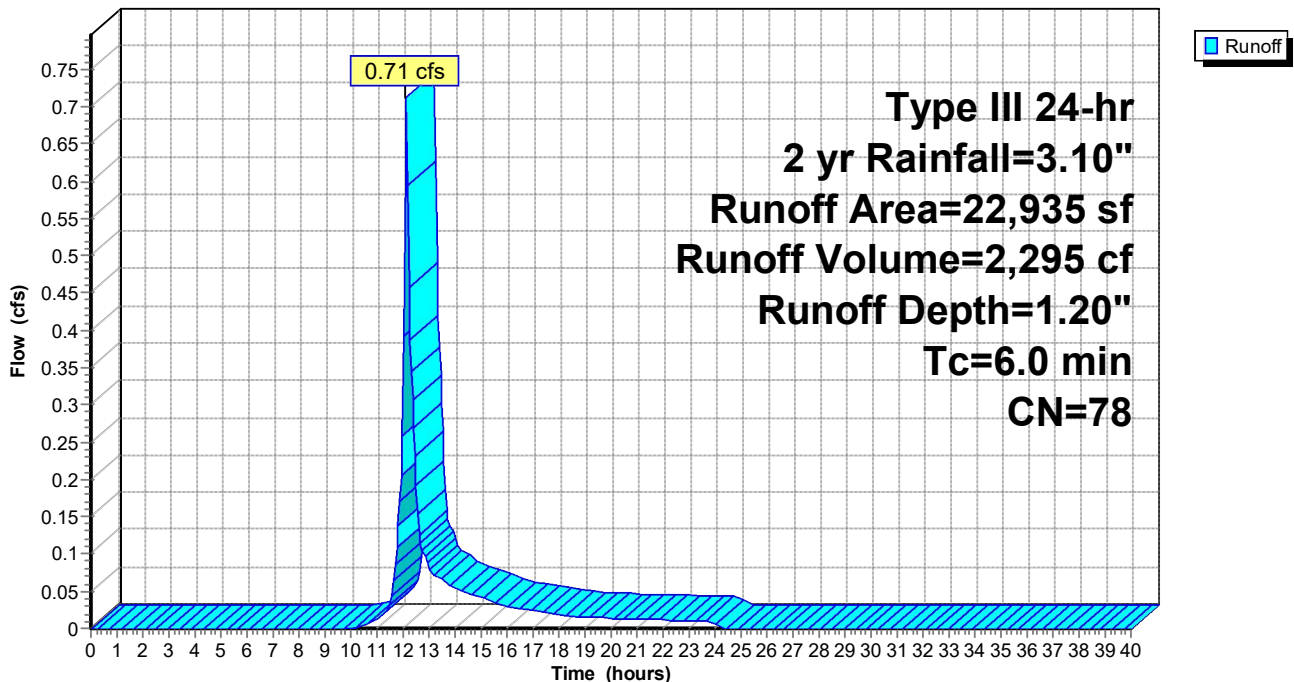
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
390	98	Roofs, HSG C
19,282	74	>75% Grass cover, Good, HSG C
255	70	Woods, Good, HSG C
3,008	98	Paved parking, HSG C
22,935	78	Weighted Average
19,537		85.18% Pervious Area
3,398		14.82% Impervious Area

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

**Subcatchment 8S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 9S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

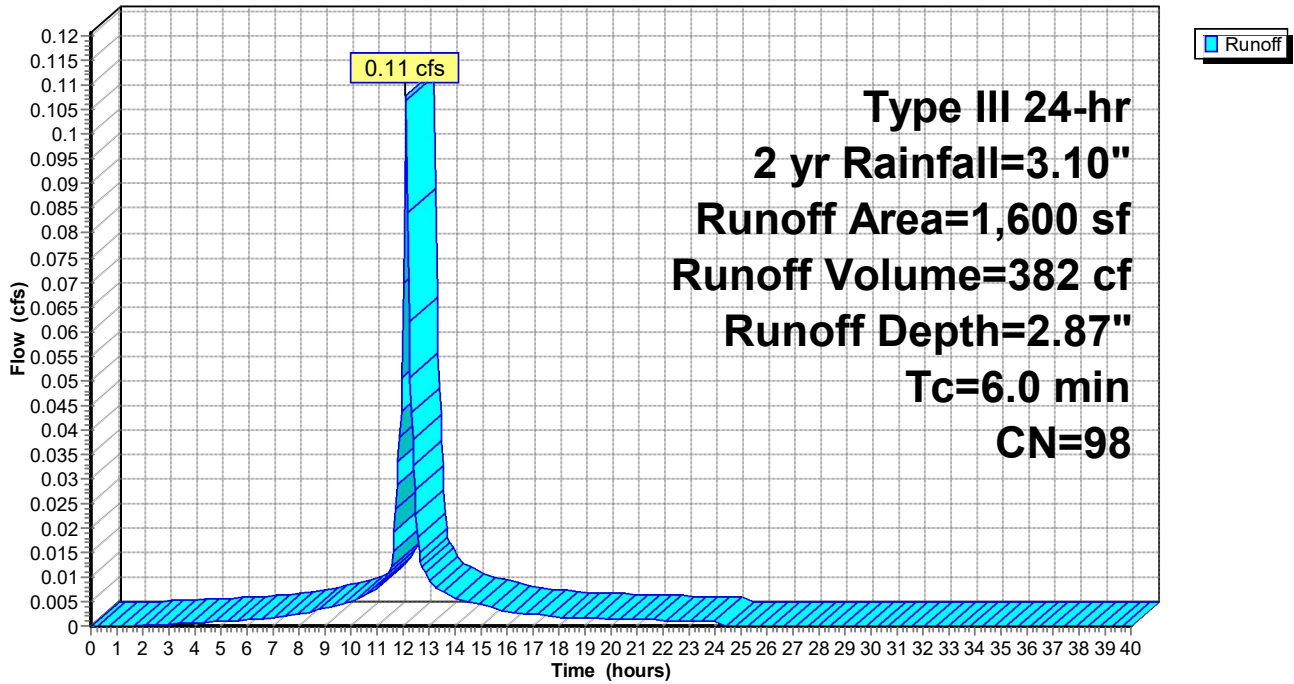
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 9S: Roof**

Hydrograph



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**Summary for Subcatchment 10S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

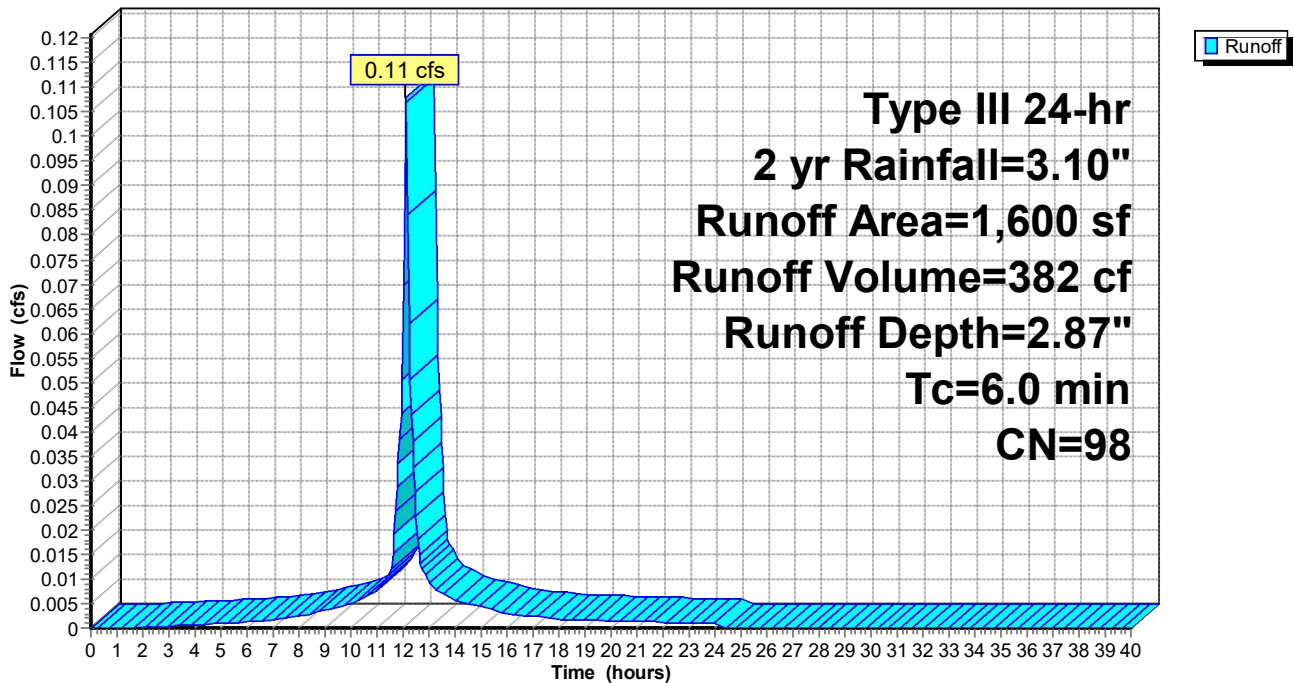
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 10S: Roof**

Hydrograph



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**Summary for Subcatchment 11S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

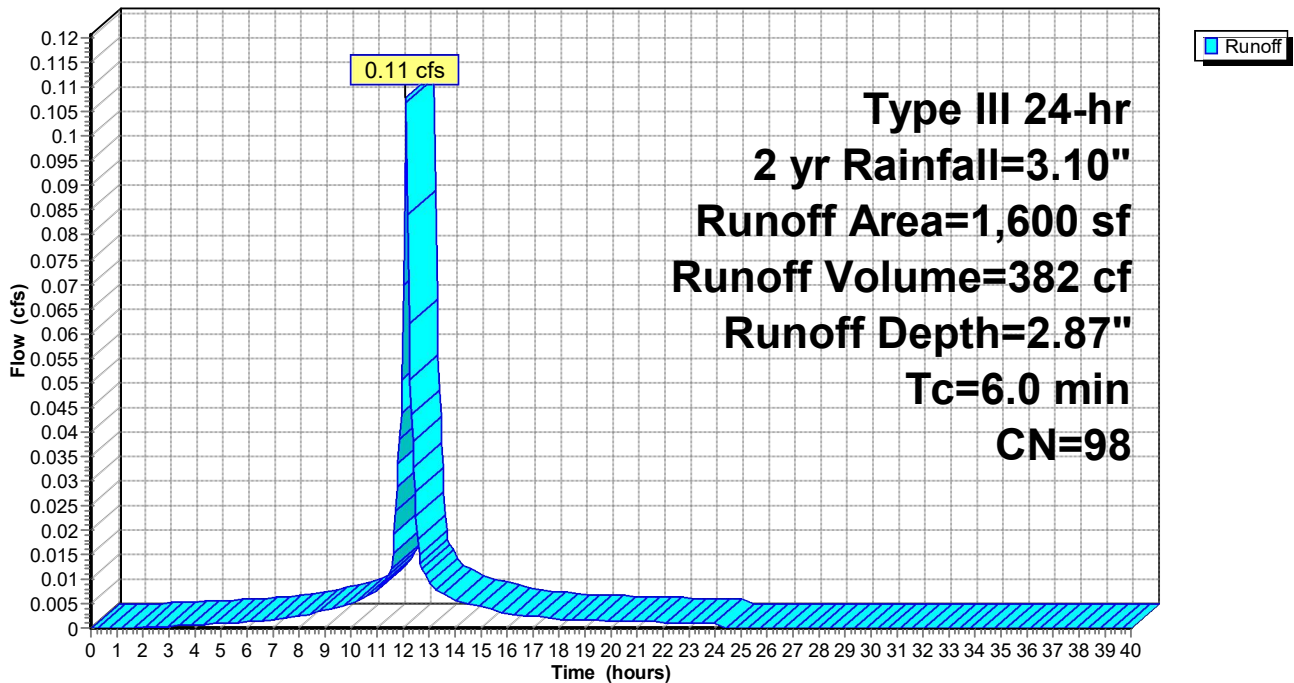
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 11S: Roof**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 12S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

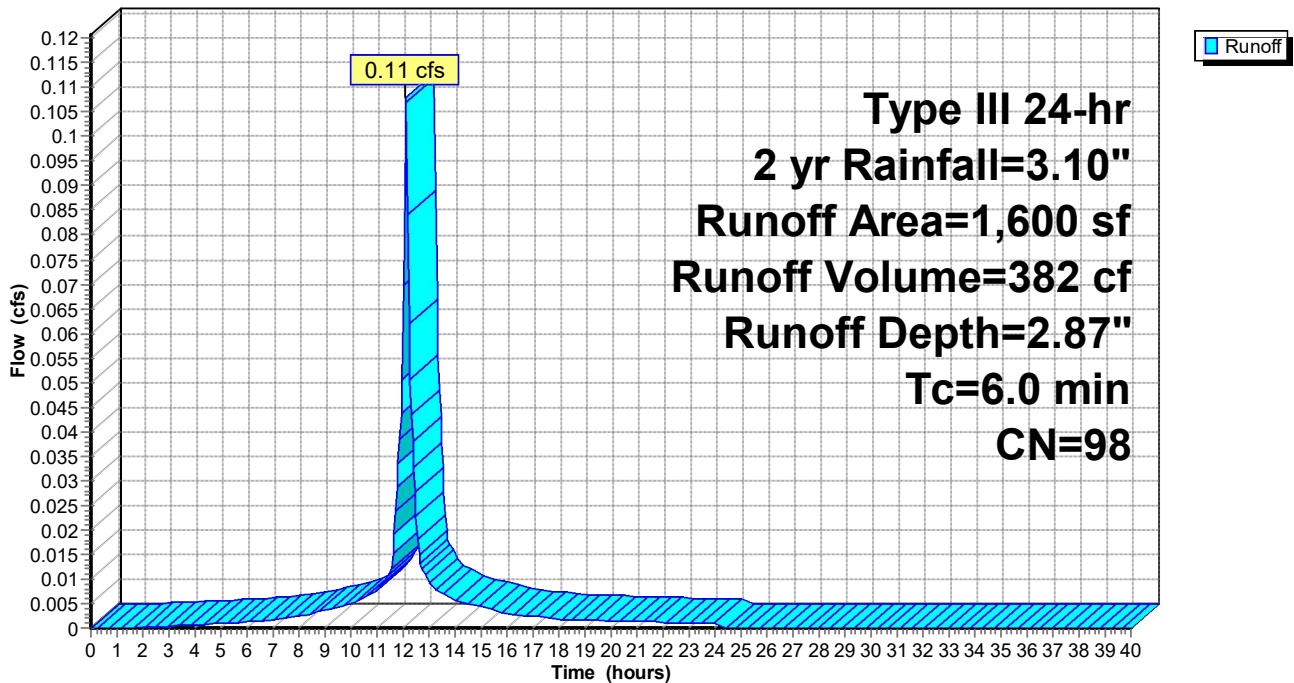
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 12S: Roof**

Hydrograph



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**Summary for Subcatchment 13S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

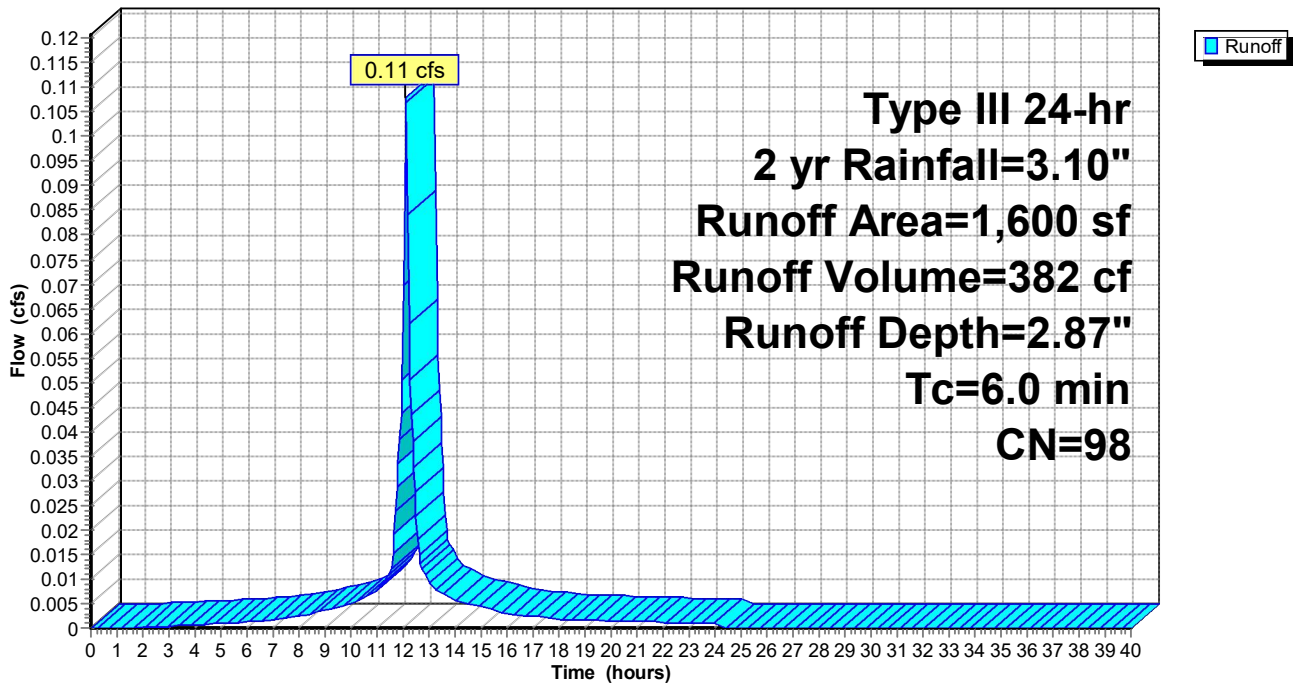
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 13S: Roof**

Hydrograph



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**Summary for Subcatchment 14S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

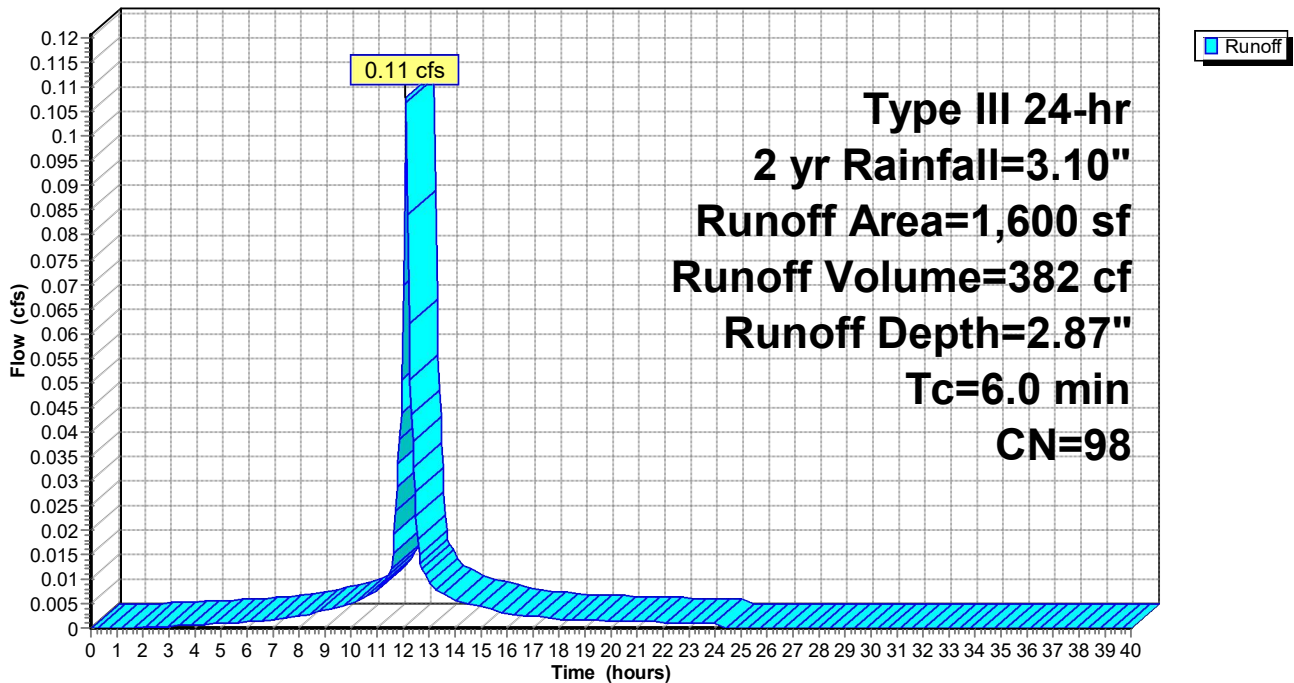
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 14S: Roof**

Hydrograph





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**Summary for Subcatchment 15S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

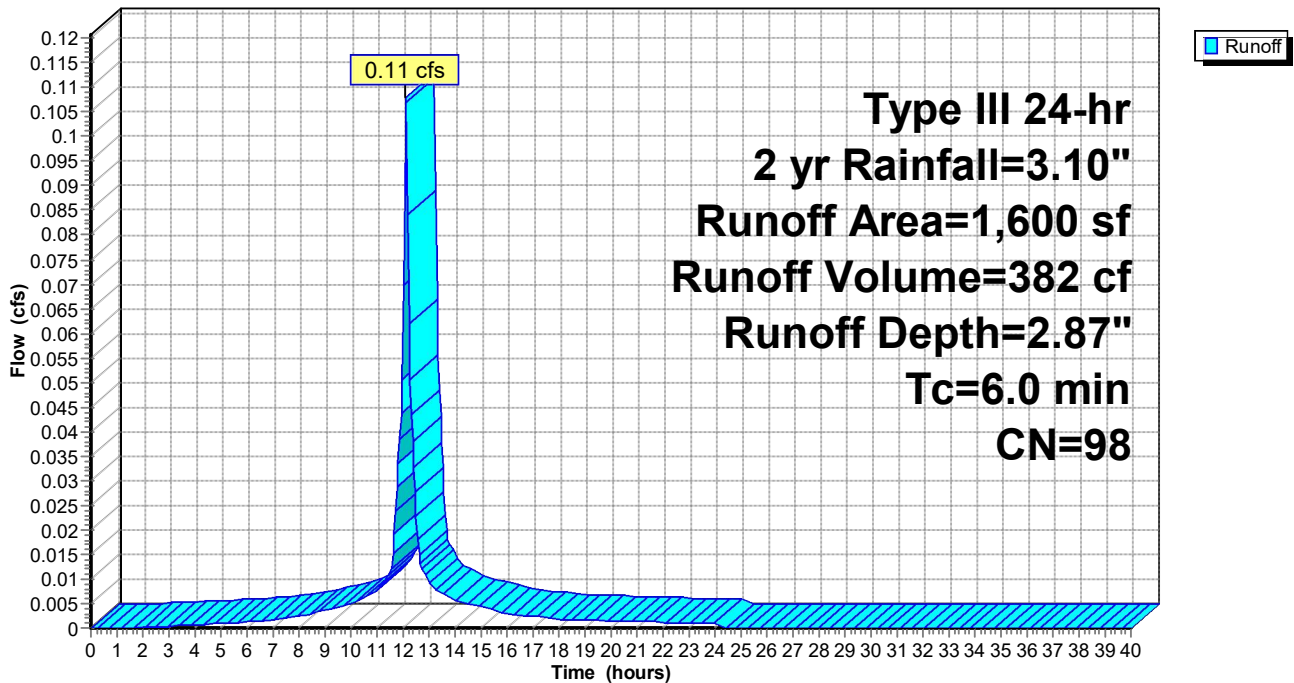
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 15S: Roof**

Hydrograph





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**Summary for Subcatchment 16S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

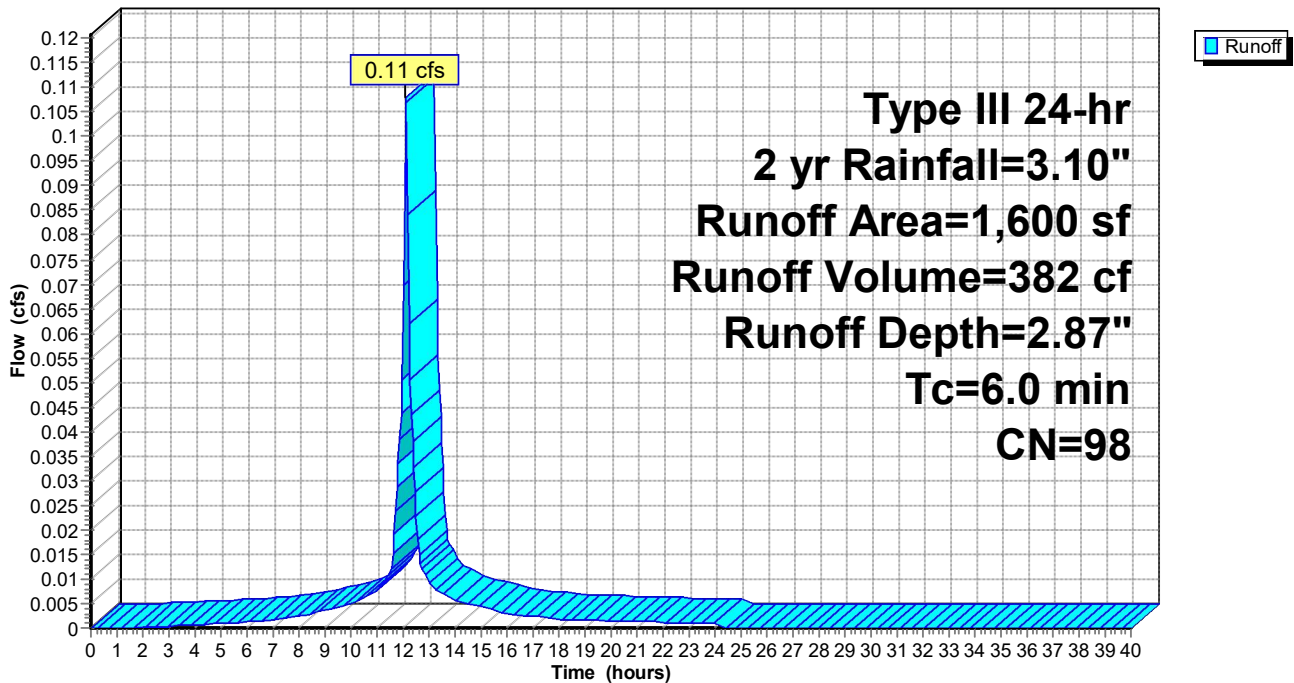
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 16S: Roof**

Hydrograph



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**Summary for Subcatchment 17S: Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 382 cf, Depth= 2.87"

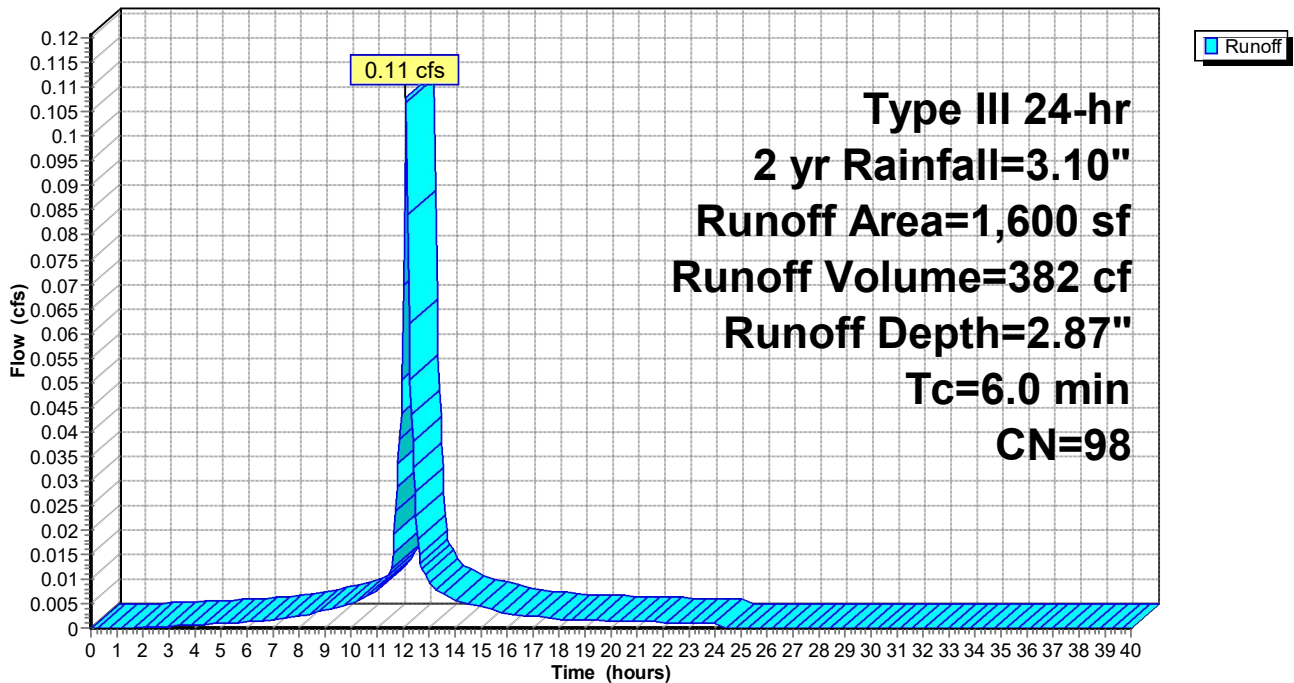
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,600	98	Roofs, HSG C
1,600		100.00% Impervious Area

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

**Subcatchment 17S: Roof**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Subcatchment 18S:**

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 2,170 cf, Depth= 0.92"

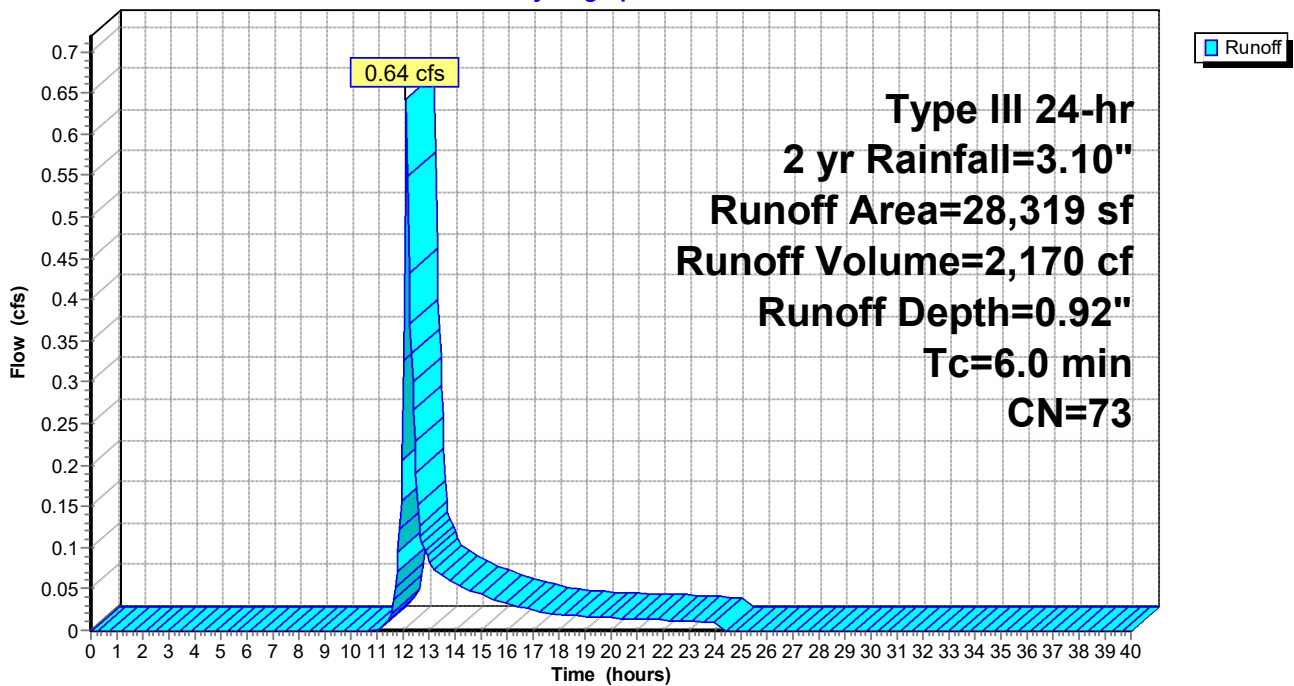
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
5,354	70	Woods, Good, HSG C
22,965	74	>75% Grass cover, Good, HSG C
28,319	73	Weighted Average
28,319		100.00% Pervious Area

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

**Subcatchment 18S:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Pond 1: DGCB1**

Inflow Area = 35,876 sf, 37.52% Impervious, Inflow Depth = 1.53" for 2 yr event  
 Inflow = 1.44 cfs @ 12.09 hrs, Volume= 4,567 cf  
 Outflow = 1.44 cfs @ 12.09 hrs, Volume= 4,567 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.44 cfs @ 12.09 hrs, Volume= 4,567 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 100.60' @ 12.10 hrs

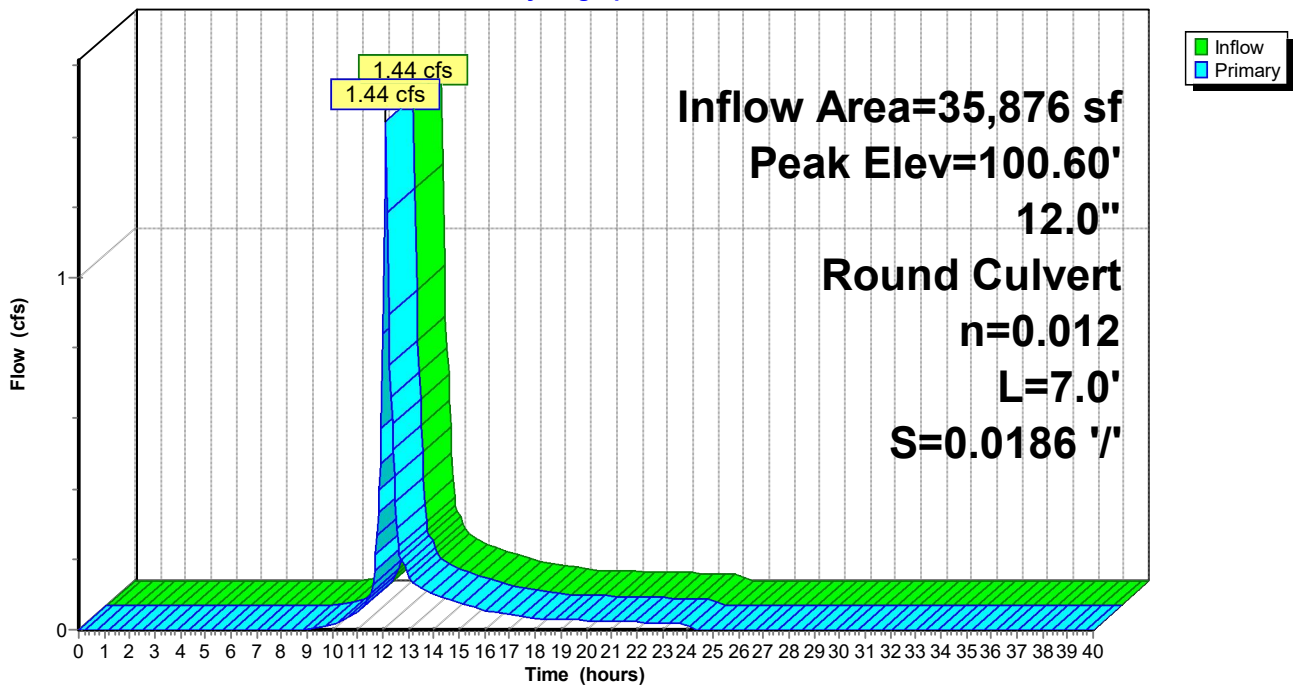
Flood Elev= 104.07'

Device	Routing	Invert	Outlet Devices
#1	Primary	99.90'	<b>12.0" Round Culvert</b> L= 7.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 99.90' / 99.77' S= 0.0186 1/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.42 cfs @ 12.09 hrs HW=100.60' TW=100.29' (Dynamic Tailwater)  
 ↑**1=Culvert** (Barrel Controls 1.42 cfs @ 3.42 fps)

**Pond 1: DGCB1**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Pond 1P: Infiltration Basin**

Inflow Area = 199,952 sf, 31.76% Impervious, Inflow Depth = 1.44" for 2 yr event  
 Inflow = 7.53 cfs @ 12.09 hrs, Volume= 23,986 cf  
 Outflow = 1.07 cfs @ 12.72 hrs, Volume= 23,986 cf, Atten= 86%, Lag= 37.2 min  
 Discarded = 0.42 cfs @ 12.72 hrs, Volume= 19,698 cf  
 Primary = 0.64 cfs @ 12.72 hrs, Volume= 4,288 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 77.89' @ 12.72 hrs Surf.Area= 7,615 sf Storage= 9,475 cf

Plug-Flow detention time= 171.8 min calculated for 23,956 cf (100% of inflow)  
 Center-of-Mass det. time= 171.6 min ( 1,009.1 - 837.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	33,515 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	6,047	0	0
77.00	6,599	3,162	3,162
78.00	7,743	7,171	10,333
79.00	8,945	8,344	18,677
80.00	10,203	9,574	28,251
80.50	10,853	5,264	33,515

Device	Routing	Invert	Outlet Devices
#1	Discarded	76.50'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	79.50'	<b>143.1 deg x 8.0' long Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)
#3	Primary	77.50'	<b>15.0" Round Culvert</b> L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 77.50' / 77.25' S= 0.0104 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

**Discarded OutFlow** Max=0.42 cfs @ 12.72 hrs HW=77.89' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.42 cfs)

**Primary OutFlow** Max=0.64 cfs @ 12.72 hrs HW=77.89' TW=0.00' (Dynamic Tailwater)

↑2=Sharp-Crested Vee/Trap Weir ( Controls 0.00 cfs)

↑3=Culvert (Barrel Controls 0.64 cfs @ 2.96 fps)

**PROPOSED\_R1**

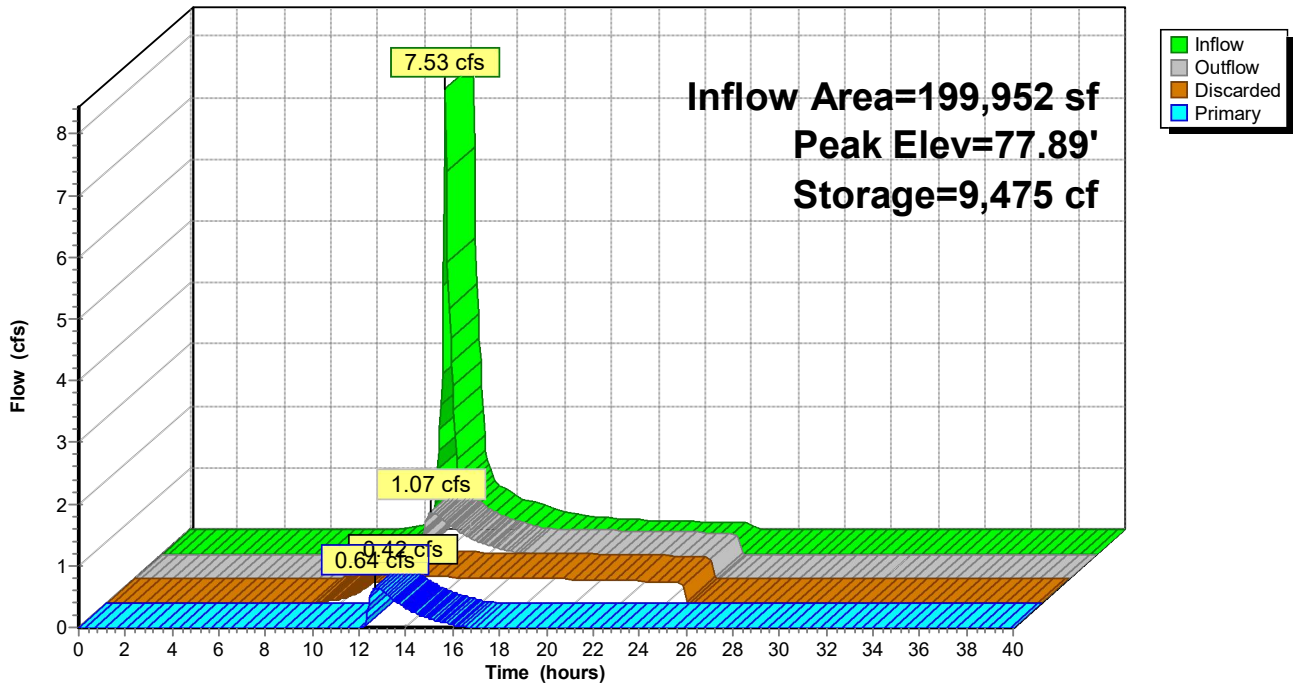
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**Pond 1P: Infiltration Basin**

Hydrograph



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**Summary for Pond 2: DGCB2**

Inflow Area = 21,716 sf, 44.67% Impervious, Inflow Depth = 1.67" for 2 yr event  
 Inflow = 0.96 cfs @ 12.09 hrs, Volume= 3,027 cf  
 Outflow = 0.96 cfs @ 12.09 hrs, Volume= 3,027 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.96 cfs @ 12.09 hrs, Volume= 3,027 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 100.49' @ 12.11 hrs

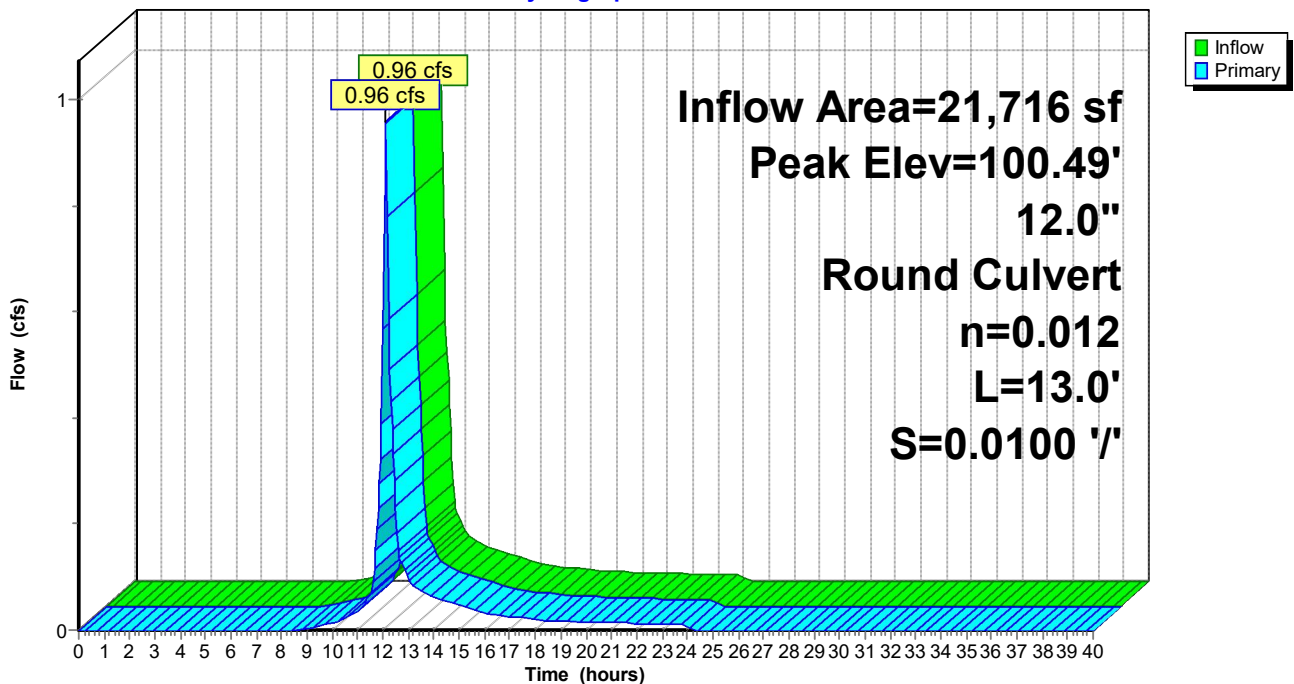
Flood Elev= 104.07'

Device	Routing	Invert	Outlet Devices
#1	Primary	99.90'	<b>12.0" Round Culvert</b> L= 13.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 99.90' / 99.77' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=0.83 cfs @ 12.09 hrs HW=100.48' TW=100.29' (Dynamic Tailwater)  
 ↑ **1=Culvert** (Outlet Controls 0.83 cfs @ 2.54 fps)

**Pond 2: DGCB2**

Hydrograph



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**Summary for Pond 3: DMH3**

Inflow Area = 57,592 sf, 40.21% Impervious, Inflow Depth = 1.58" for 2 yr event  
 Inflow = 2.40 cfs @ 12.09 hrs, Volume= 7,593 cf  
 Outflow = 2.40 cfs @ 12.09 hrs, Volume= 7,593 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 2.40 cfs @ 12.09 hrs, Volume= 7,593 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 100.30' @ 12.09 hrs

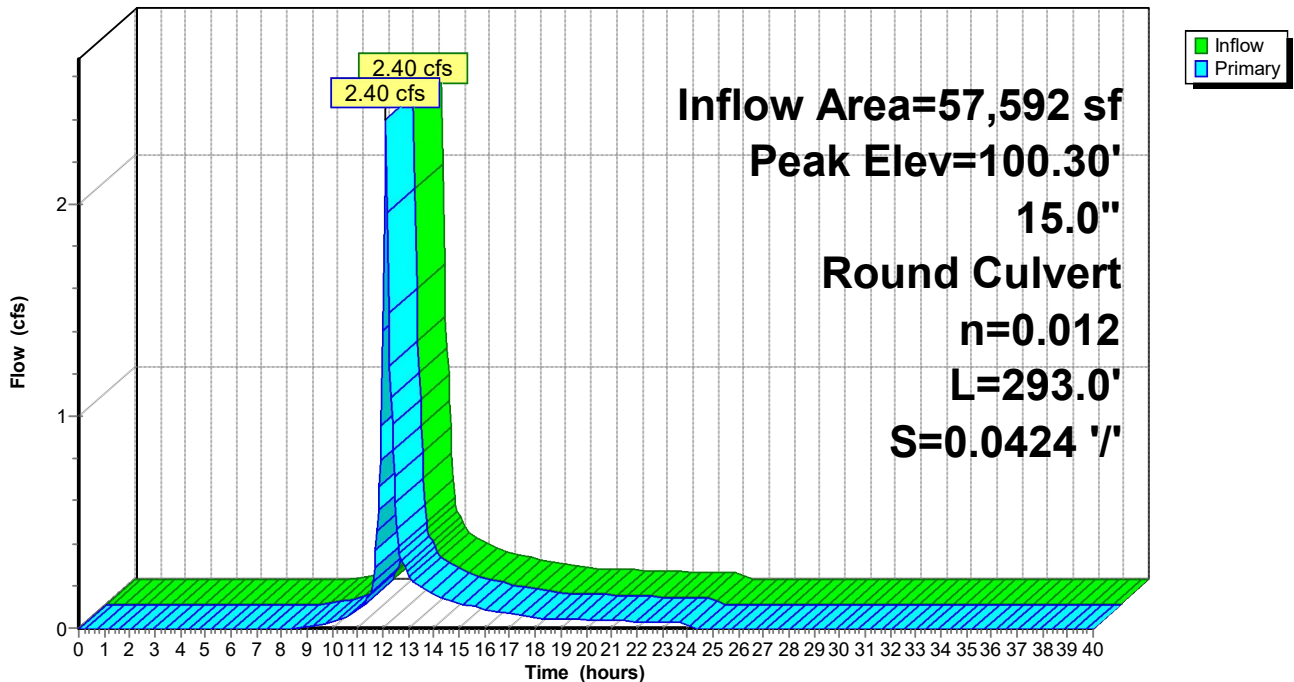
Flood Elev= 104.12'

Device #1	Routing Primary	Invert 99.52'	Outlet Devices
			<b>15.0" Round Culvert</b>
			L= 293.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 99.52' / 87.09' S= 0.0424 '/' Cc= 0.900
			n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.36 cfs @ 12.09 hrs HW=100.29' TW=86.56' (Dynamic Tailwater)  
 ↑ **1=Culvert** (Inlet Controls 2.36 cfs @ 2.99 fps)

**Pond 3: DMH3**

Hydrograph





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**Summary for Pond 4: DGCB4**

Inflow Area = 38,132 sf, 7.47% Impervious, Inflow Depth = 1.08" for 2 yr event  
 Inflow = 1.05 cfs @ 12.10 hrs, Volume= 3,441 cf  
 Outflow = 1.05 cfs @ 12.10 hrs, Volume= 3,441 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.05 cfs @ 12.10 hrs, Volume= 3,441 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 88.05' @ 12.10 hrs

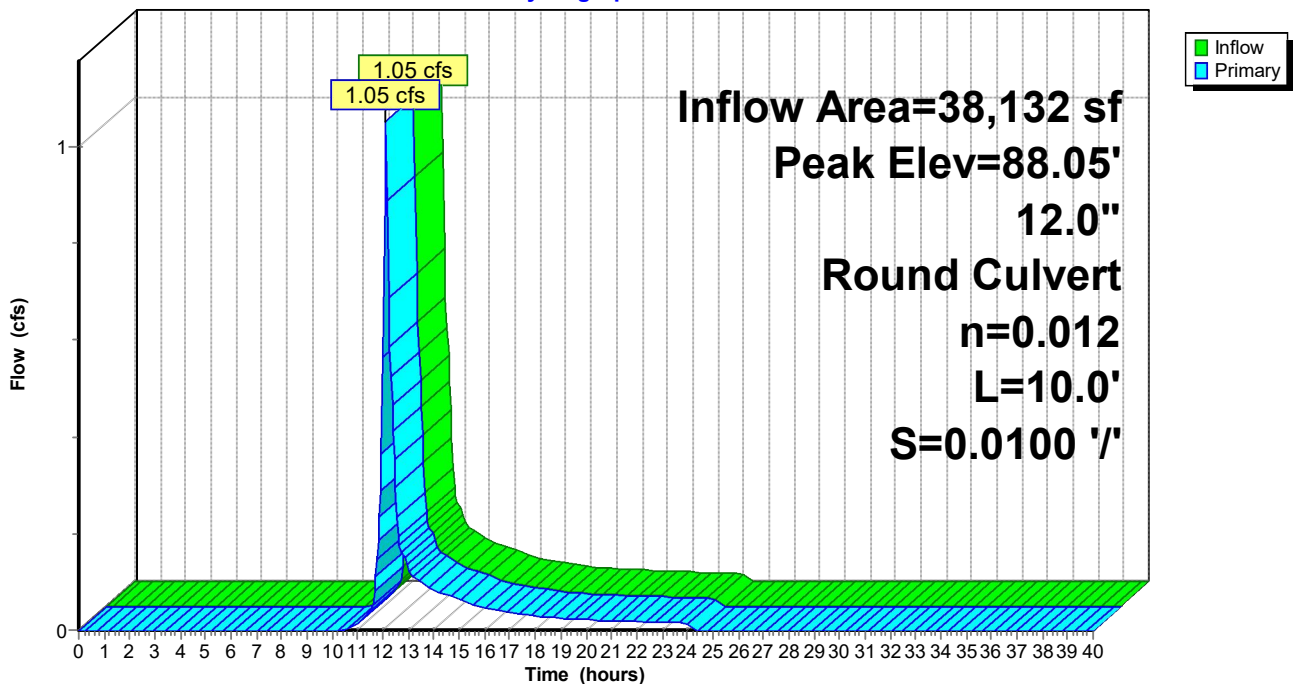
Flood Elev= 91.84'

Device #1	Routing	Invert	Outlet Devices
	Primary	87.44'	<b>12.0" Round Culvert</b> L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 87.44' / 87.34' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.05 cfs @ 12.10 hrs HW=88.05' TW=86.56' (Dynamic Tailwater)  
 ↑ **1=Culvert** (Barrel Controls 1.05 cfs @ 3.01 fps)

**Pond 4: DGCB4**

Hydrograph



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**Summary for Pond 5: DGCB5**

Inflow Area = 25,548 sf, 47.86% Impervious, Inflow Depth = 1.67" for 2 yr event  
 Inflow = 1.13 cfs @ 12.09 hrs, Volume= 3,561 cf  
 Outflow = 1.13 cfs @ 12.09 hrs, Volume= 3,561 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 1.13 cfs @ 12.09 hrs, Volume= 3,561 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 88.07' @ 12.09 hrs

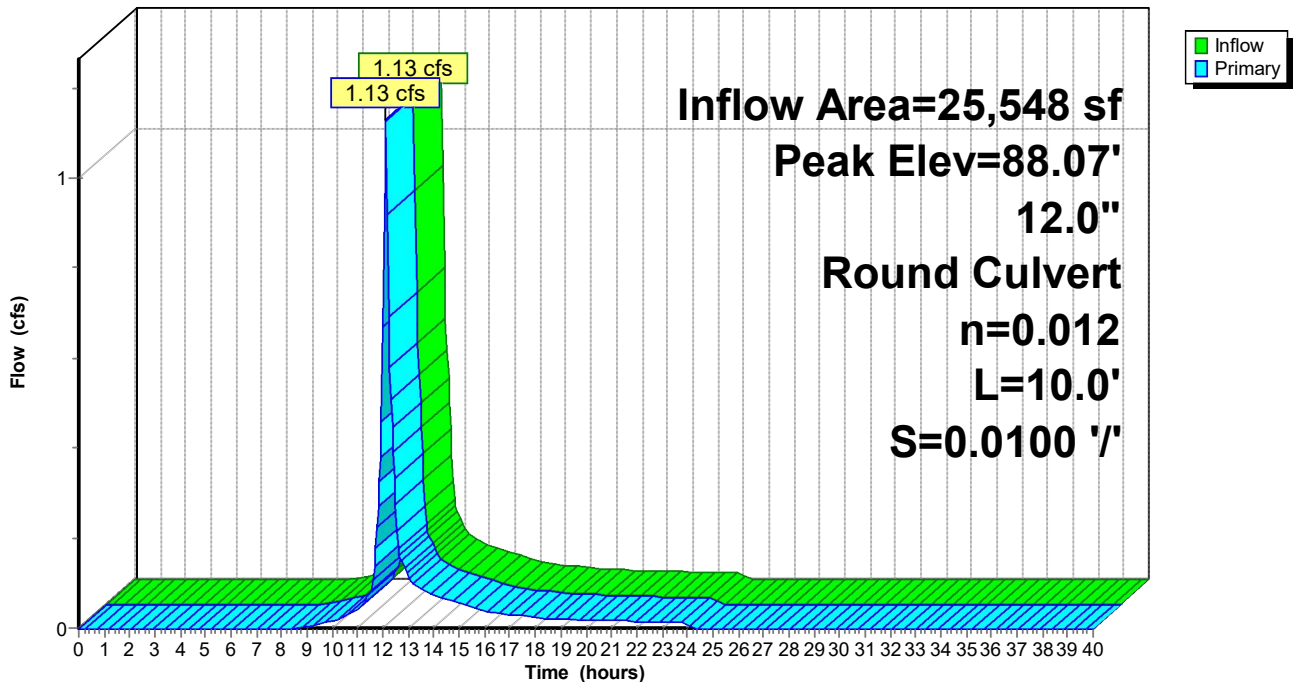
Flood Elev= 91.84'

Device #1	Routing Primary	Invert 87.44'	Outlet Devices
			<b>12.0" Round Culvert</b>
			L= 10.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 87.44' / 87.34' S= 0.0100 '/' Cc= 0.900
			n= 0.012, Flow Area= 0.79 sf

**Primary OutFlow** Max=1.11 cfs @ 12.09 hrs HW=88.07' TW=86.55' (Dynamic Tailwater)  
 ↑ **1=Culvert** (Barrel Controls 1.11 cfs @ 3.05 fps)

**Pond 5: DGCB5**

Hydrograph



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**Summary for Pond 6: DMH6**

Inflow Area = 121,272 sf, 31.53% Impervious, Inflow Depth = 1.44" for 2 yr event  
 Inflow = 4.58 cfs @ 12.09 hrs, Volume= 14,596 cf  
 Outflow = 4.58 cfs @ 12.09 hrs, Volume= 14,596 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 4.58 cfs @ 12.09 hrs, Volume= 14,596 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 86.57' @ 12.09 hrs

Flood Elev= 91.61'

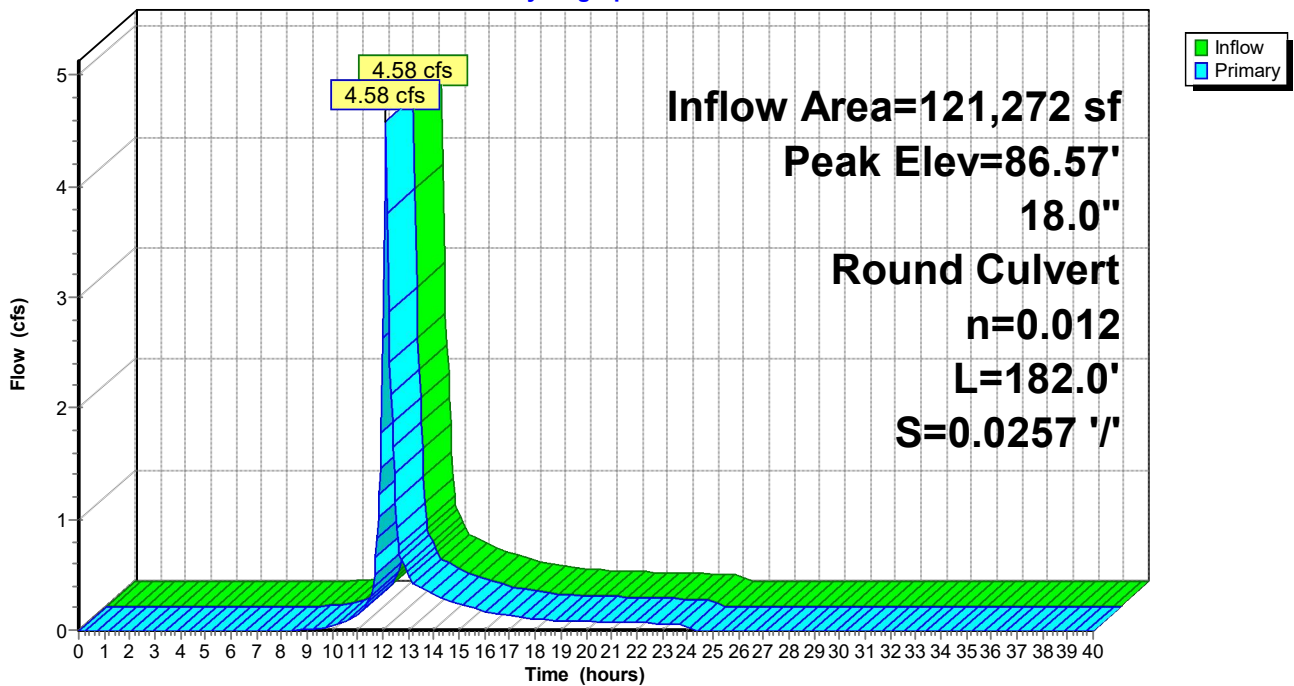
Device #1	Routing Primary	Invert 85.52'	Outlet Devices
			<b>18.0" Round Culvert</b>
			L= 182.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 85.52' / 80.85' S= 0.0257 '/' Cc= 0.900
			n= 0.012, Flow Area= 1.77 sf

**Primary OutFlow** Max=4.52 cfs @ 12.09 hrs HW=86.56' TW=80.22' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 4.52 cfs @ 3.47 fps)

**Pond 6: DMH6**

Hydrograph



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**Summary for Pond 7: DGCB7**

Inflow Area = 55,745 sf, 39.22% Impervious, Inflow Depth = 1.53" for 2 yr event  
 Inflow = 2.24 cfs @ 12.09 hrs, Volume= 7,096 cf  
 Outflow = 2.24 cfs @ 12.09 hrs, Volume= 7,096 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 2.24 cfs @ 12.09 hrs, Volume= 7,096 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 82.11' @ 12.09 hrs

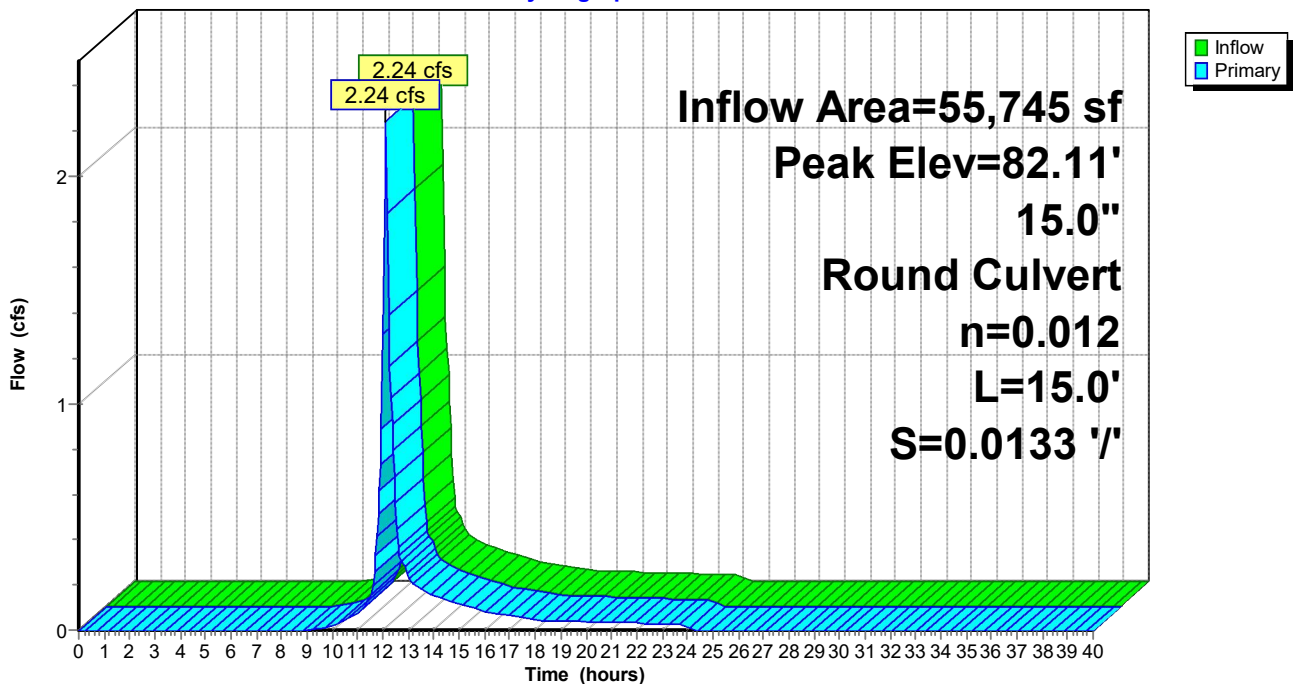
Flood Elev= 85.74'

Device #1	Routing Primary	Invert 81.30'	Outlet Devices
			<b>15.0" Round Culvert</b>
			L= 15.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 81.30' / 81.10' S= 0.0133 '/ Cc= 0.900
			n= 0.012, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.21 cfs @ 12.09 hrs HW=82.10' TW=80.21' (Dynamic Tailwater)  
 ↑ **1=Culvert** (Barrel Controls 2.21 cfs @ 3.78 fps)

**Pond 7: DGCB7**

Hydrograph



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**Summary for Pond 8: DMH8**

Inflow Area = 177,017 sf, 33.95% Impervious, Inflow Depth = 1.47" for 2 yr event  
 Inflow = 6.82 cfs @ 12.09 hrs, Volume= 21,692 cf  
 Outflow = 6.82 cfs @ 12.09 hrs, Volume= 21,692 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 6.82 cfs @ 12.09 hrs, Volume= 21,692 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 80.26' @ 12.12 hrs

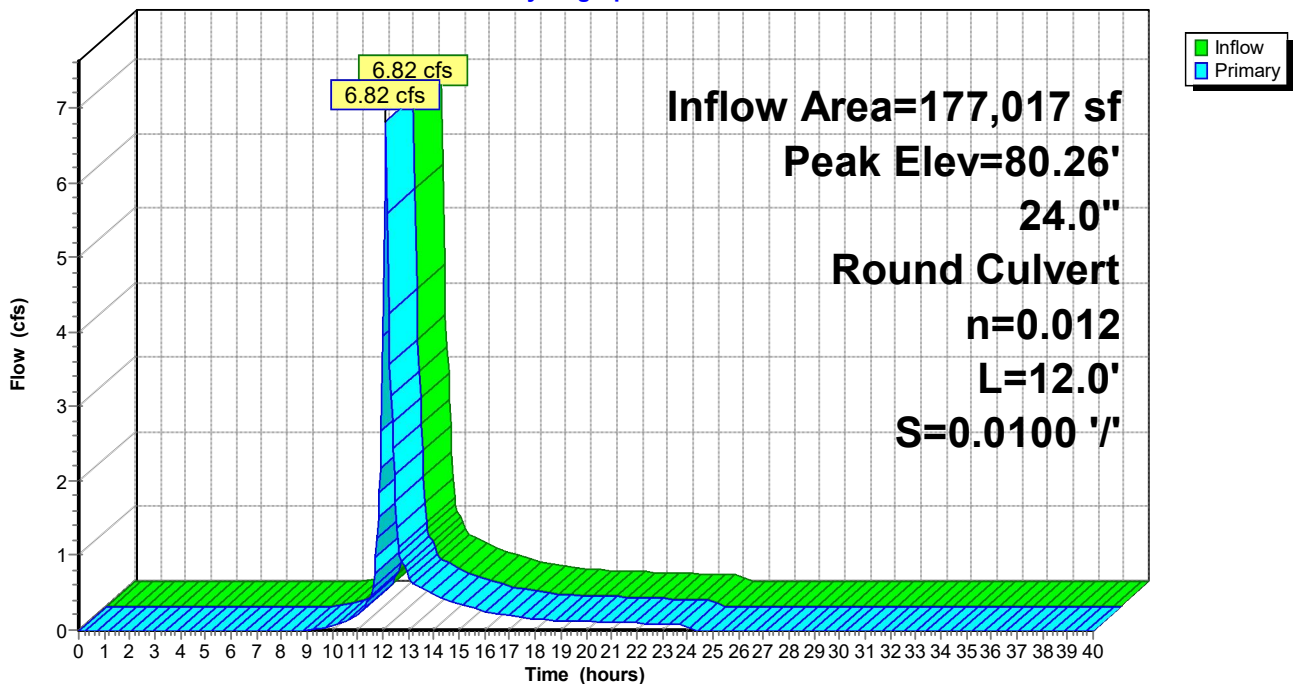
Flood Elev= 86.50'

Device #	Routing	Invert	Outlet Devices
#1	Primary	78.75'	<b>24.0" Round Culvert</b> L= 12.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 78.75' / 78.63' S= 0.0100 '/ Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

**Primary OutFlow** Max=5.59 cfs @ 12.09 hrs HW=80.22' TW=79.97' (Dynamic Tailwater)  
 ↑ **1=Culvert** (Outlet Controls 5.59 cfs @ 3.16 fps)

**Pond 8: DMH8**

Hydrograph



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**Summary for Pond 9: CDS**

Inflow Area = 177,017 sf, 33.95% Impervious, Inflow Depth = 1.47" for 2 yr event  
 Inflow = 6.82 cfs @ 12.09 hrs, Volume= 21,692 cf  
 Outflow = 6.82 cfs @ 12.09 hrs, Volume= 21,692 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 6.82 cfs @ 12.09 hrs, Volume= 21,692 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 79.98' @ 12.09 hrs

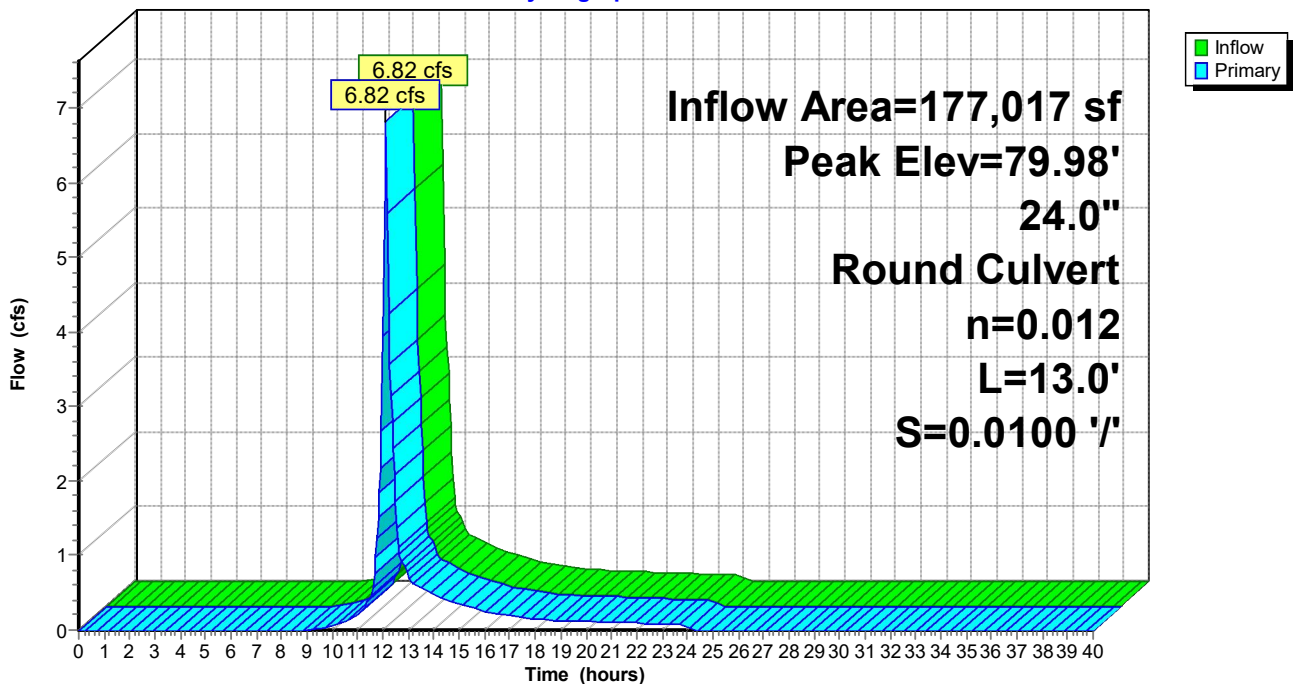
Flood Elev= 86.50'

Device #	Routing	Invert	Outlet Devices
#1	Primary	78.63'	<b>24.0" Round Culvert</b> L= 13.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 78.63' / 78.50' S= 0.0100 '/ Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

**Primary OutFlow** Max=6.73 cfs @ 12.09 hrs HW=79.97' TW=77.18' (Dynamic Tailwater)  
 ↑ **1=Culvert** (Barrel Controls 6.73 cfs @ 4.27 fps)

**Pond 9: CDS**

Hydrograph



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**Summary for Pond 9P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 383 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 383 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 101.2 min ( 858.3 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b>
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.06' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)



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**Pond 9P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

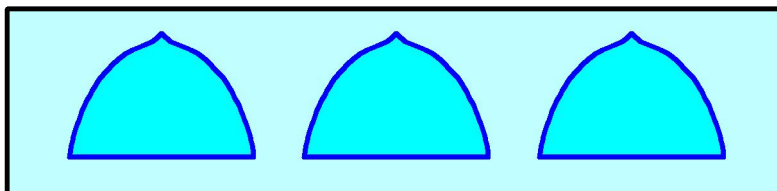
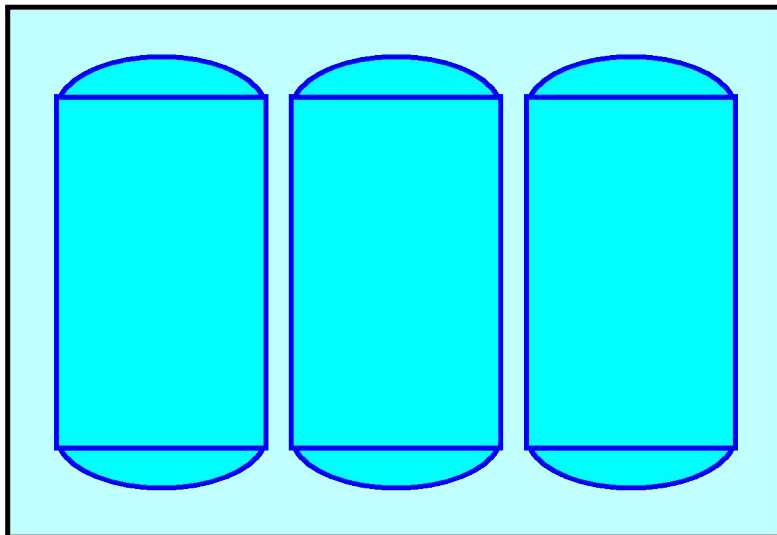
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone





**PROPOSED\_R1**

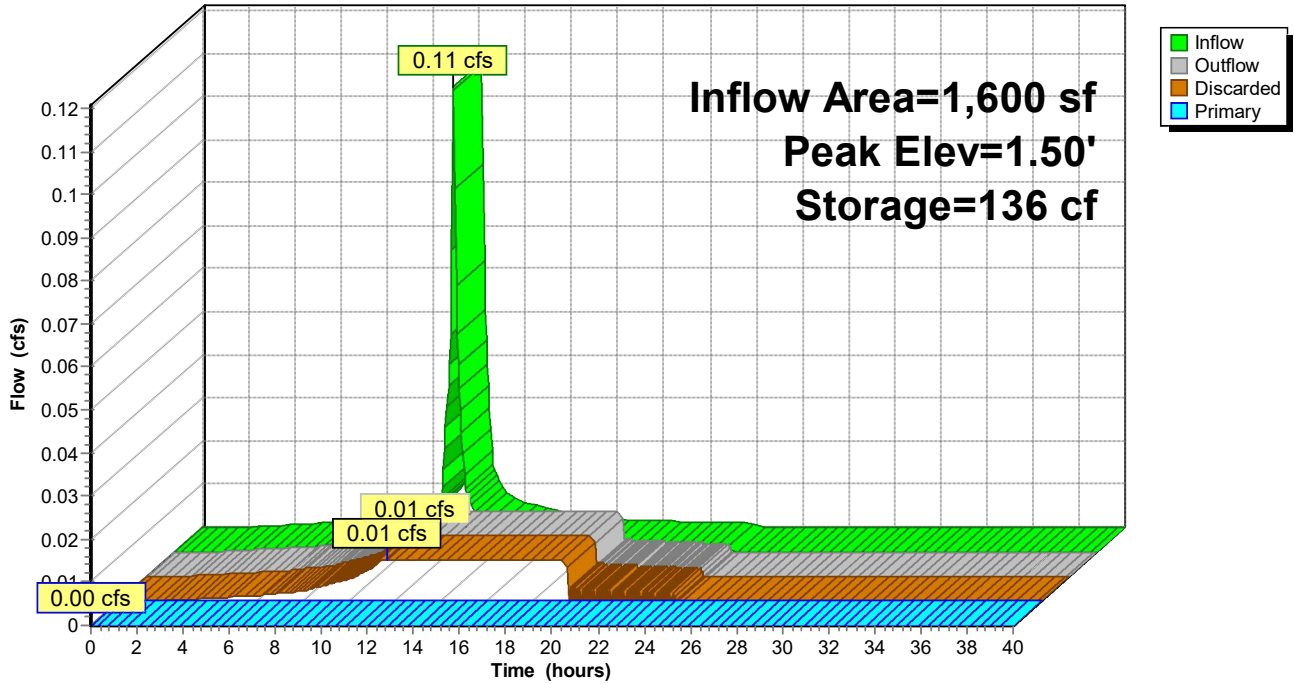
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**Pond 9P: Infiltration Chambers**

Hydrograph



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**Summary for Pond 10P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

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**Pond 10P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

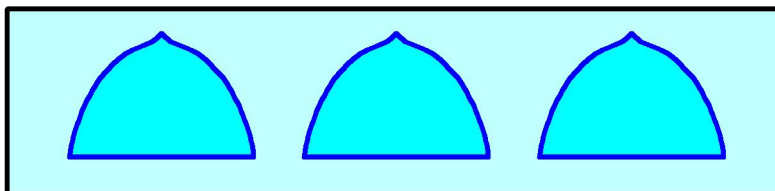
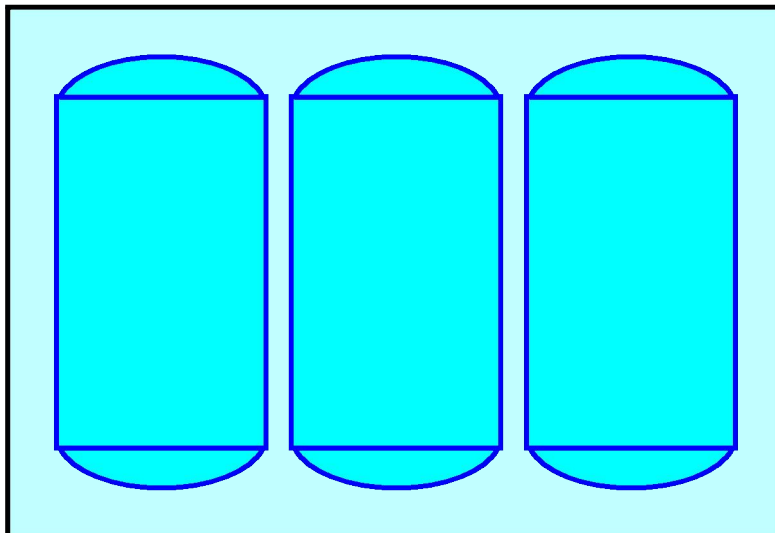
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone



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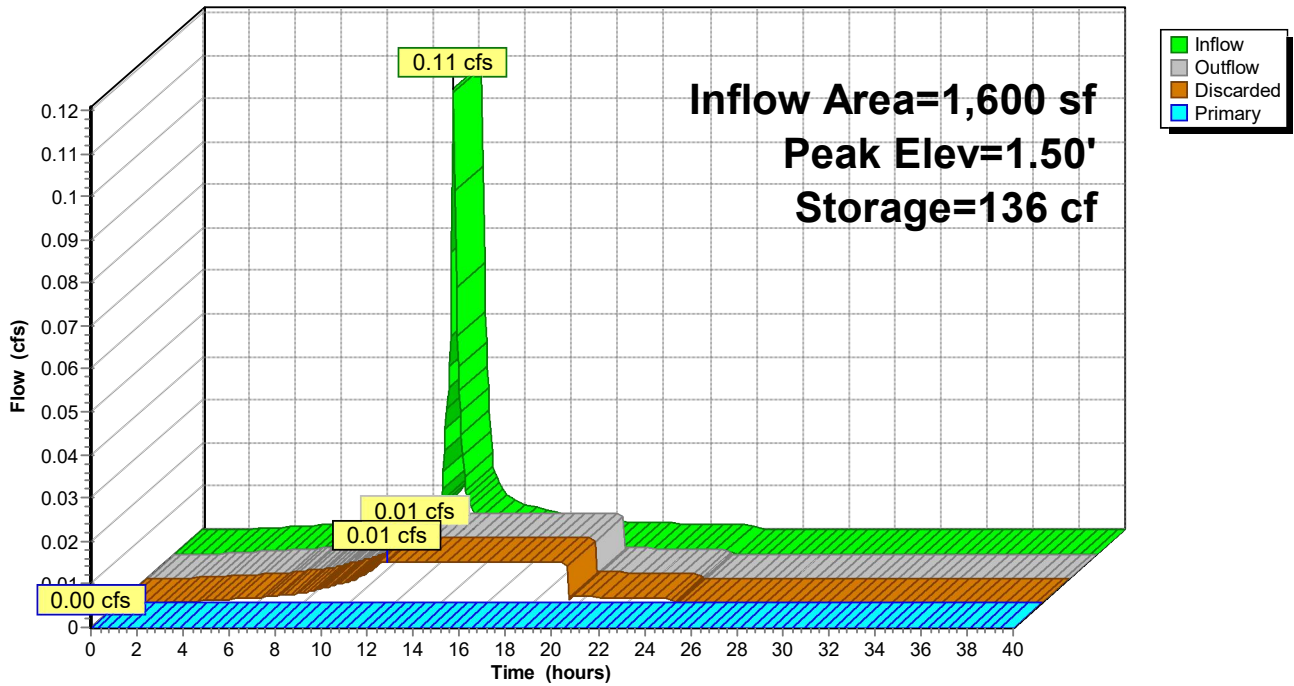
Type III 24-hr 2 yr Rainfall=3.10"

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**Pond 10P: Infiltration Chambers**

Hydrograph



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**Summary for Pond 11P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

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**Pond 11P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

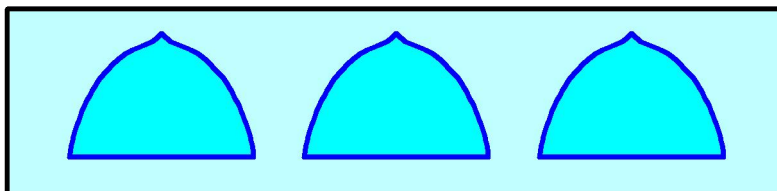
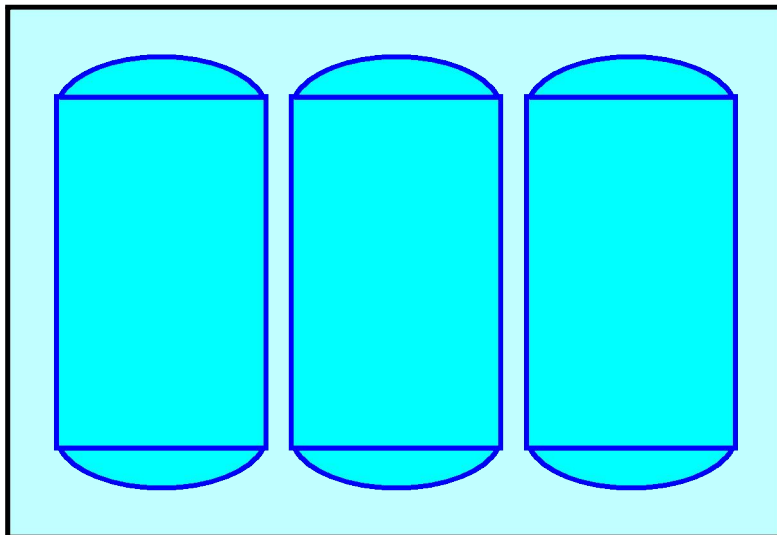
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone



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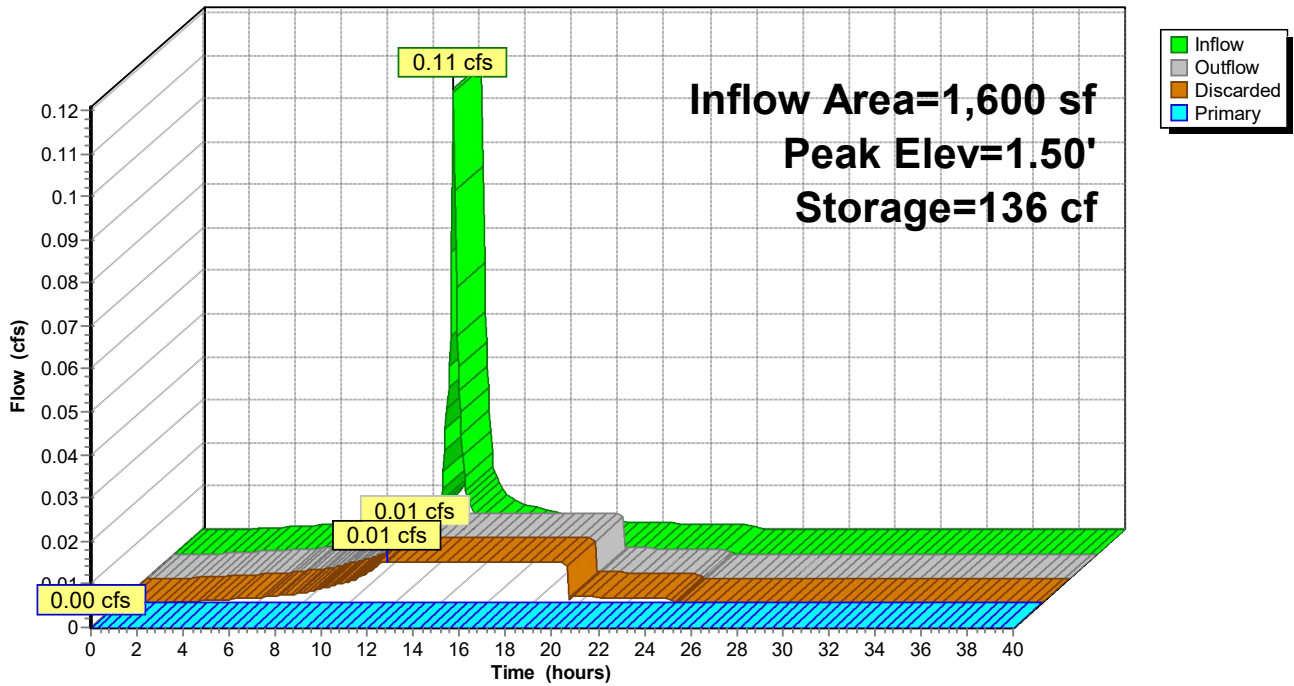
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**Pond 11P: Infiltration Chambers**

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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Pond 12P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)



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**Pond 12P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

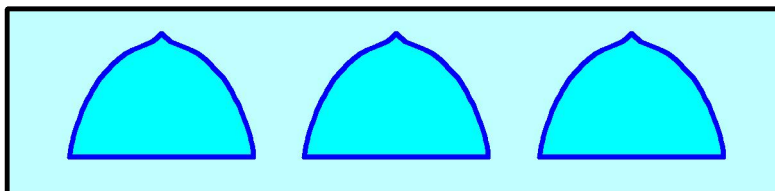
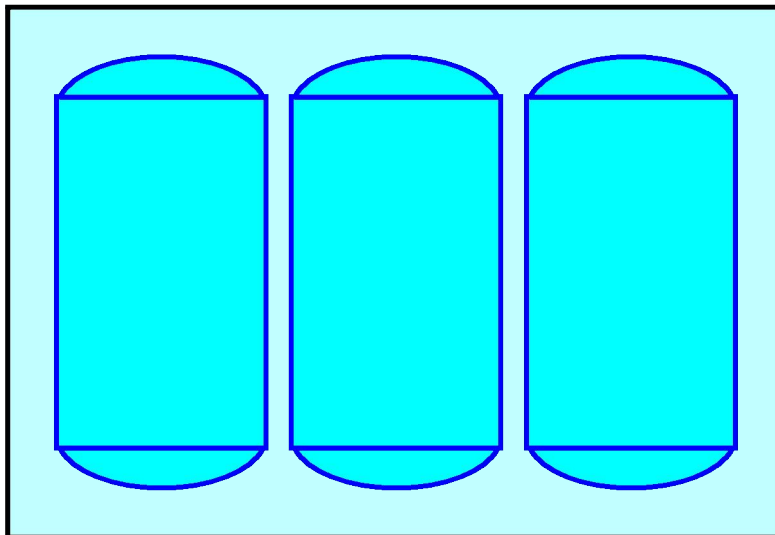
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone



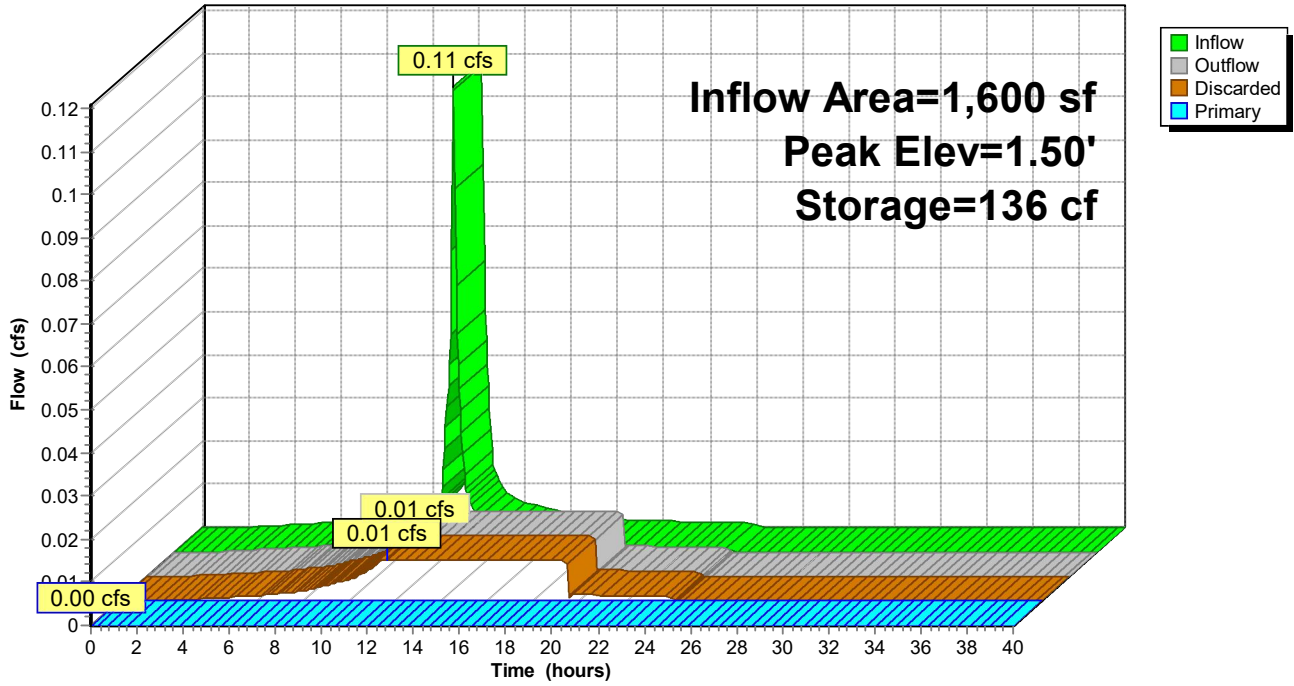
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**Pond 12P: Infiltration Chambers**

Hydrograph



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**Summary for Pond 13P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

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**Pond 13P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

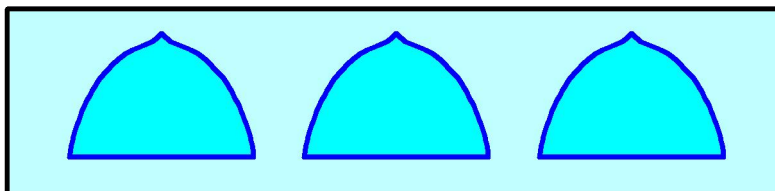
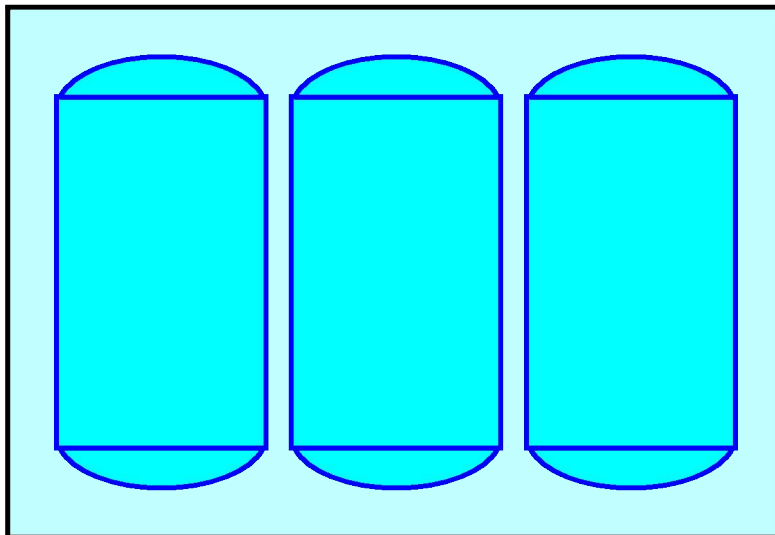
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone



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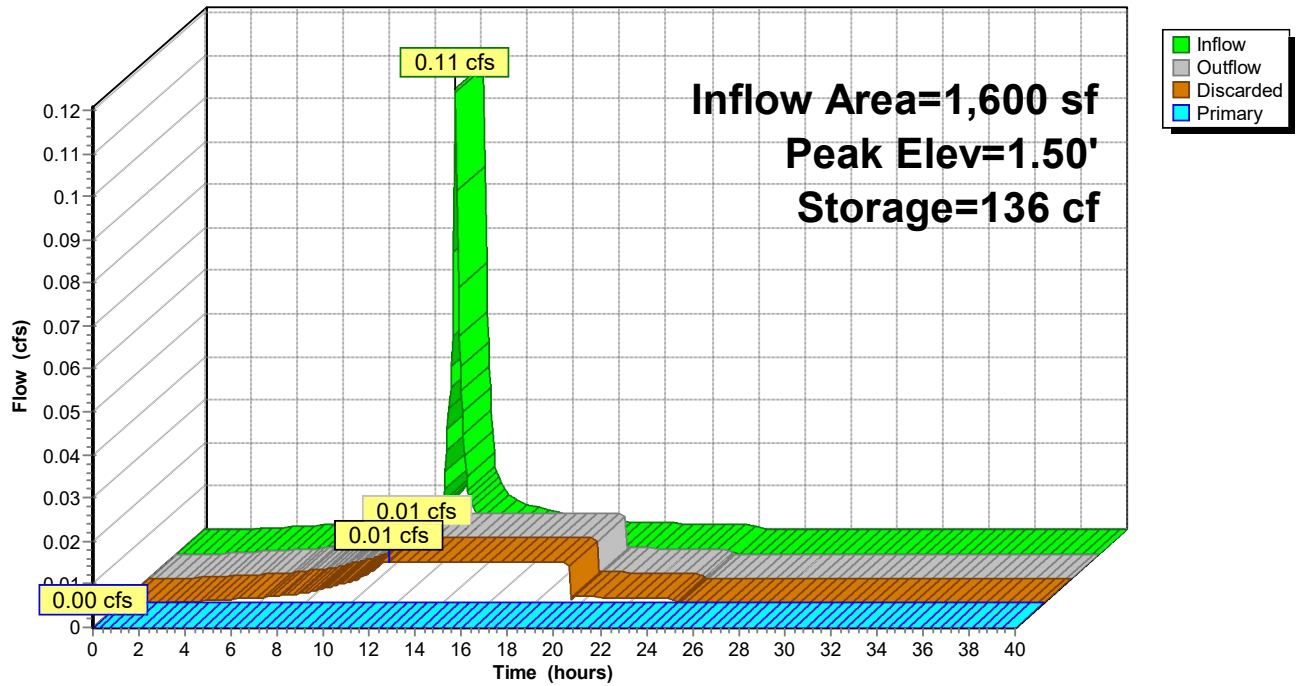
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**Pond 13P: Infiltration Chambers**

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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Pond 14P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

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**Pond 14P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

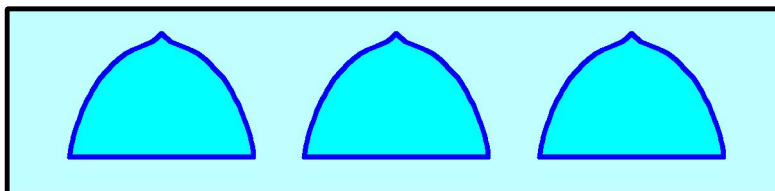
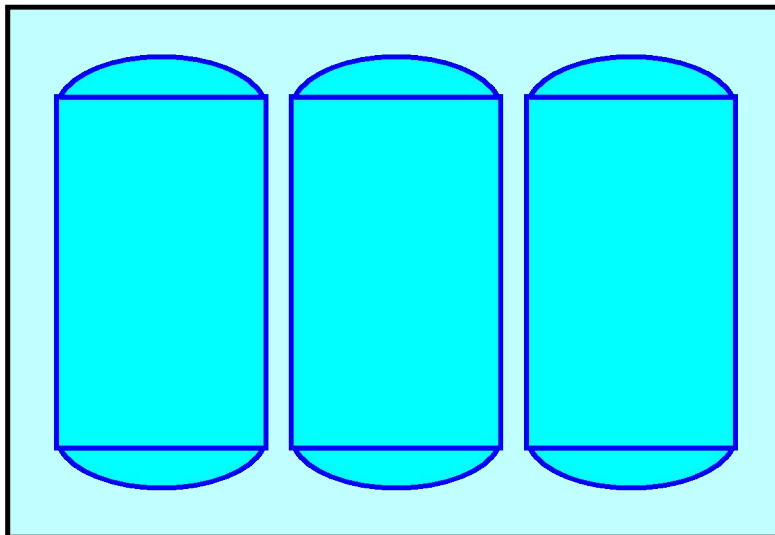
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone



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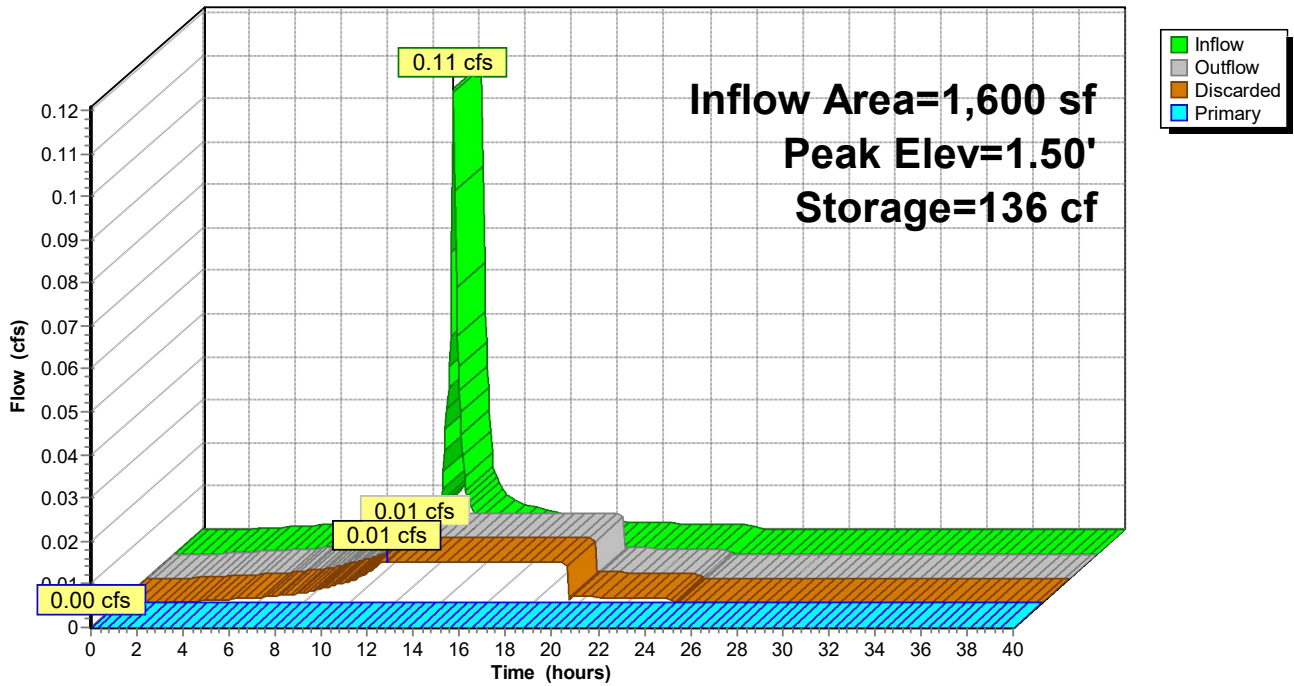
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**Pond 14P: Infiltration Chambers**

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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Pond 15P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

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**Pond 15P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

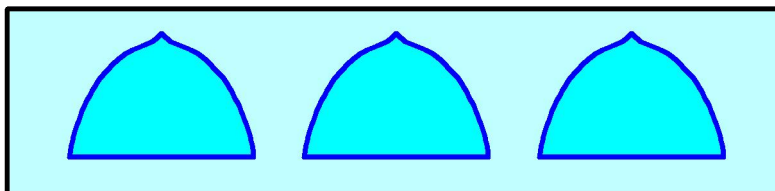
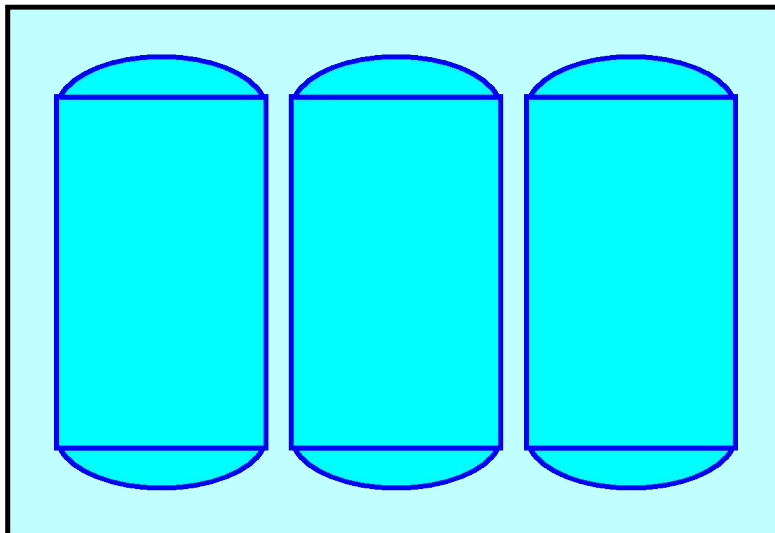
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone



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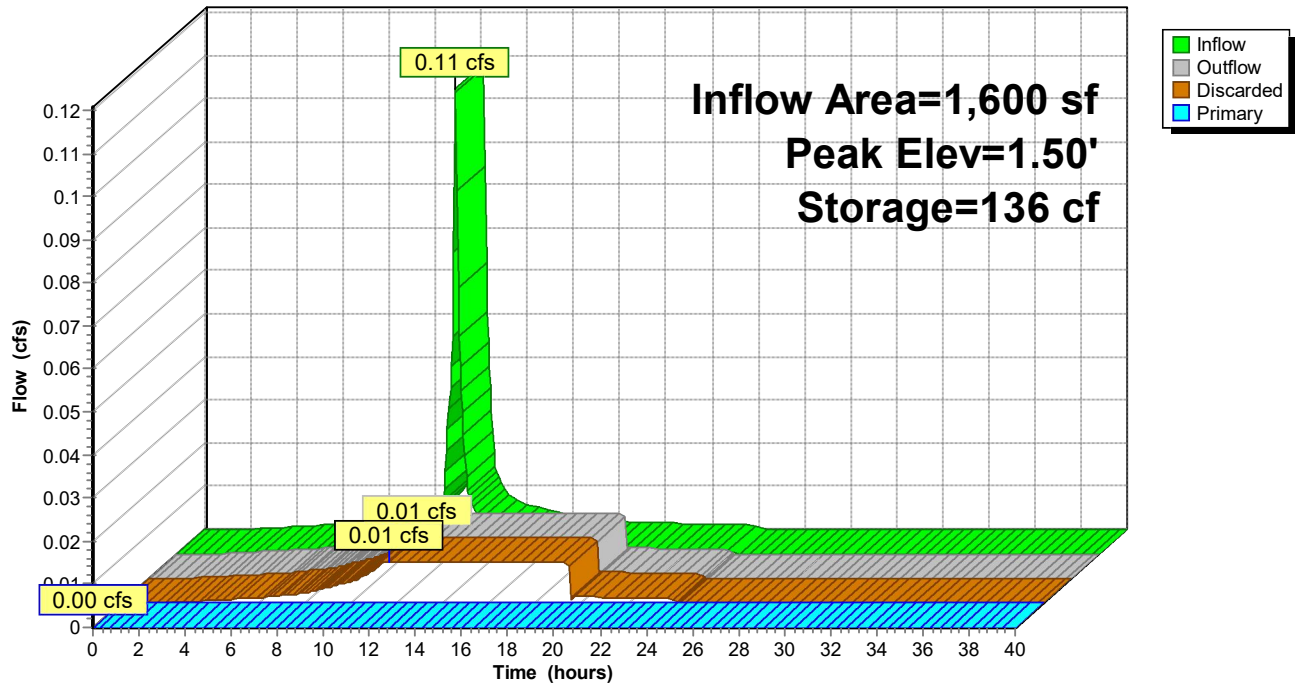
Type III 24-hr 2 yr Rainfall=3.10"

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## Pond 15P: Infiltration Chambers

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**Summary for Pond 16P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

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Type III 24-hr 2 yr Rainfall=3.10"

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**Pond 16P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

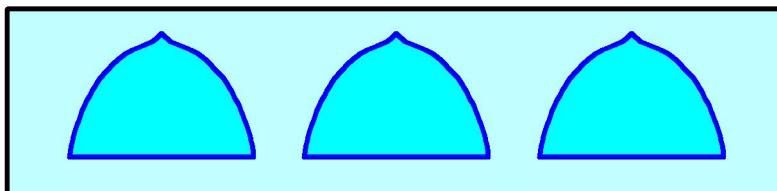
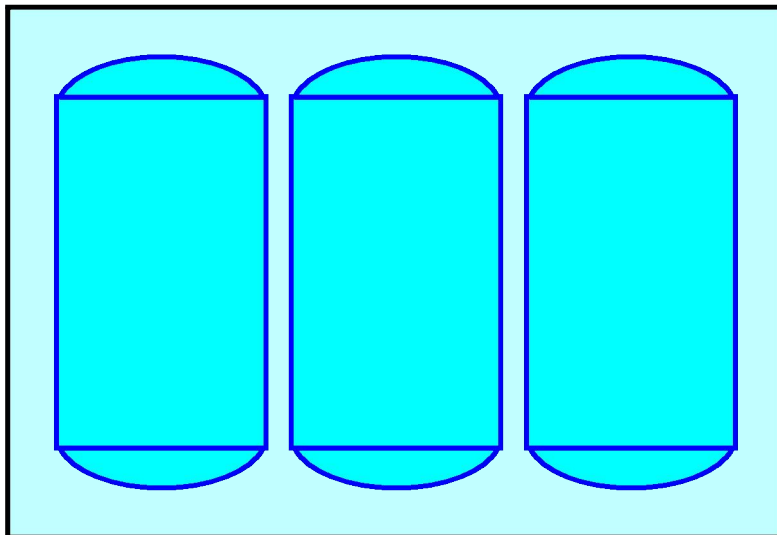
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone



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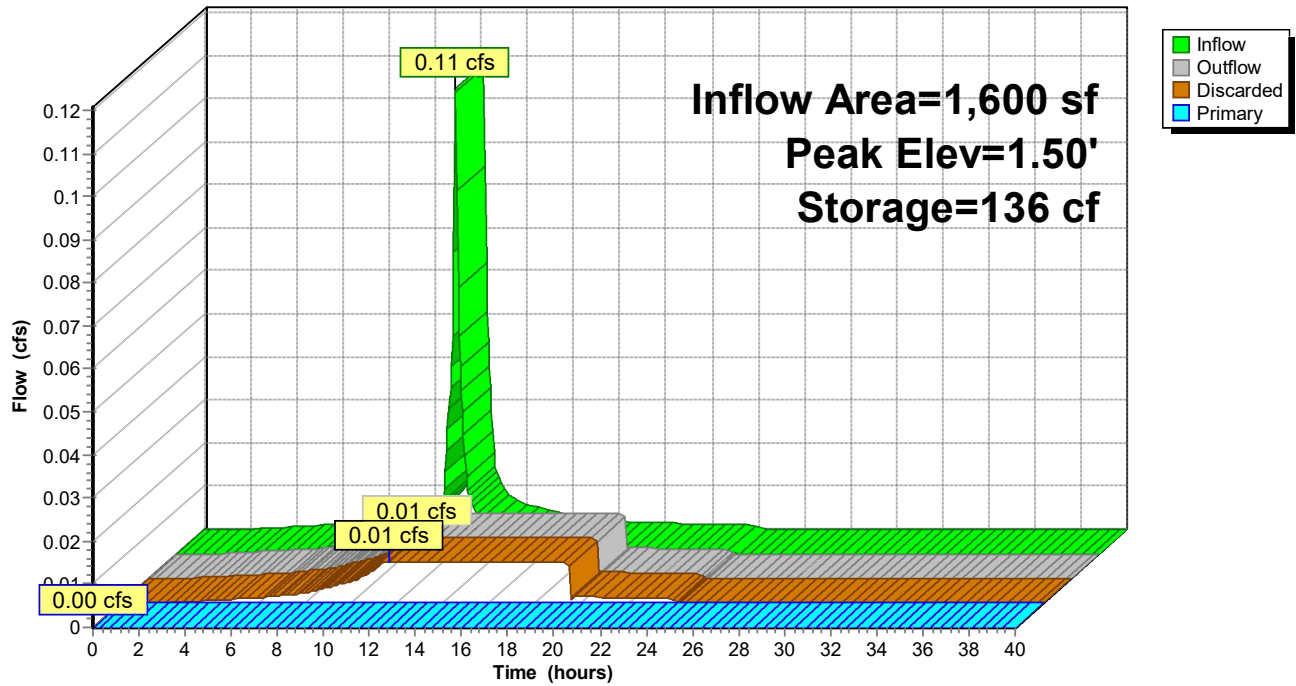
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**Pond 16P: Infiltration Chambers**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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**Summary for Pond 17P: Infiltration Chambers**

Inflow Area = 1,600 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 yr event  
 Inflow = 0.11 cfs @ 12.09 hrs, Volume= 382 cf  
 Outflow = 0.01 cfs @ 11.65 hrs, Volume= 382 cf, Atten= 91%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 11.65 hrs, Volume= 382 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1.50' @ 12.99 hrs Surf.Area= 169 sf Storage= 136 cf

Plug-Flow detention time= 102.1 min calculated for 382 cf (100% of inflow)  
 Center-of-Mass det. time= 102.0 min ( 859.0 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	199 cf	<b>15.75'W x 10.74'L x 3.75'H Field A</b> 634 cf Overall - 138 cf Embedded = 496 cf x 40.0% Voids
#2A	0.75'	138 cf	<b>ADS_StormTech SC-740 +Cap</b> x 3 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 1 Chambers
		336 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	<b>2.410 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'
#2	Primary	5.25'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.01 cfs @ 11.65 hrs HW=0.07' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

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Type III 24-hr 2 yr Rainfall=3.10"

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**Pond 17P: Infiltration Chambers - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length

3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width

9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

3 Chambers x 45.9 cf = 137.8 cf Chamber Storage

634.1 cf Field - 137.8 cf Chambers = 496.3 cf Stone x 40.0% Voids = 198.5 cf Stone Storage

Chamber Storage + Stone Storage = 336.3 cf = 0.008 af

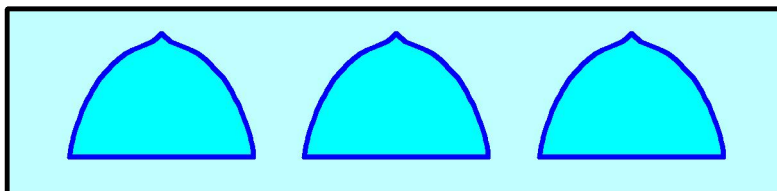
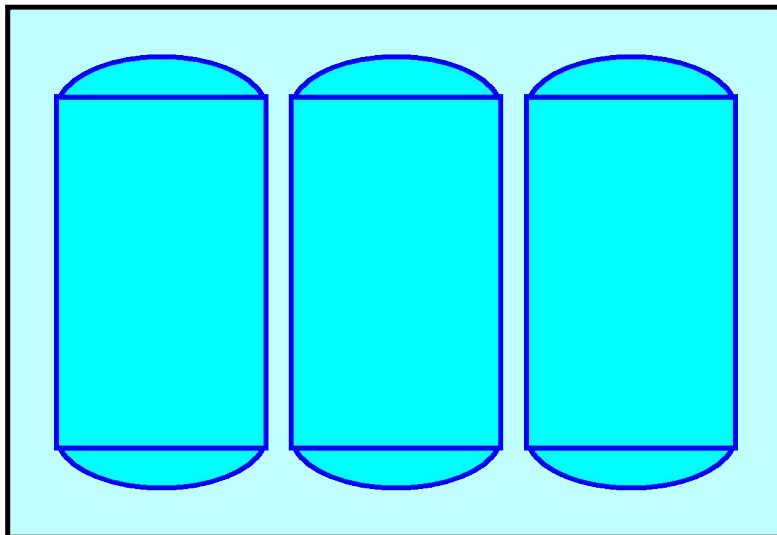
Overall Storage Efficiency = 53.0%

Overall System Size = 10.74' x 15.75' x 3.75'

3 Chambers

23.5 cy Field

18.4 cy Stone





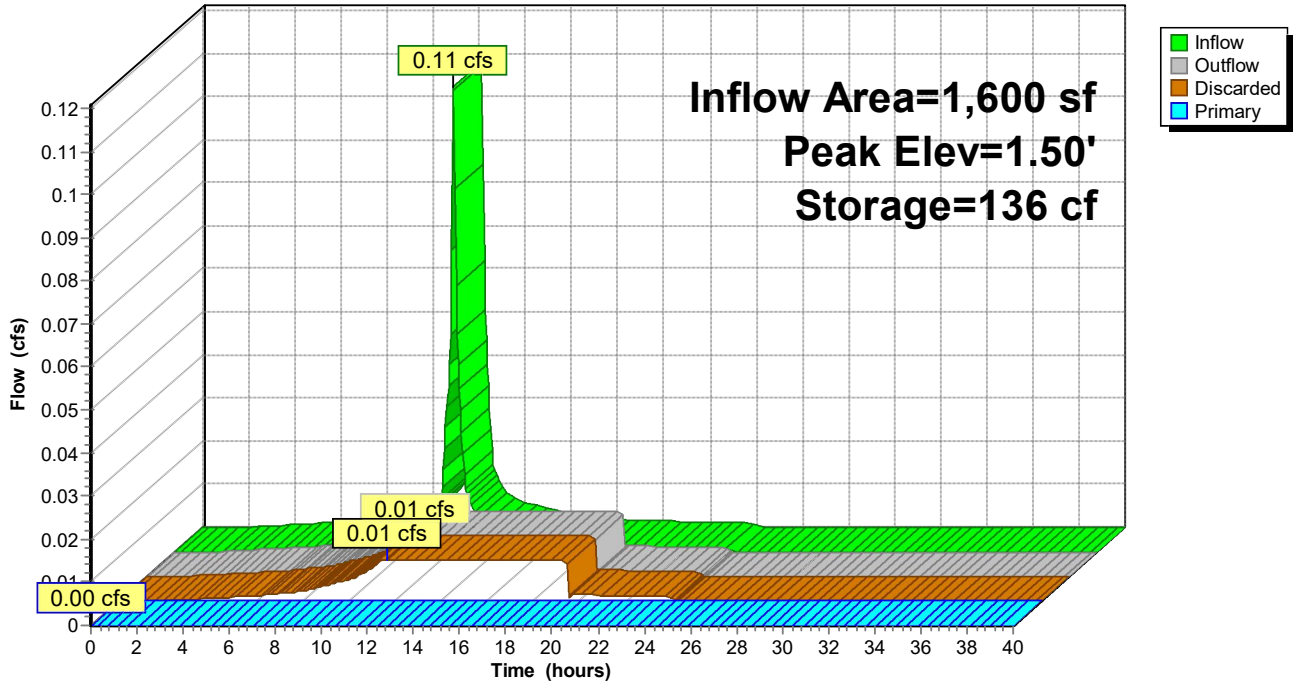
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**Pond 17P: Infiltration Chambers**

Hydrograph



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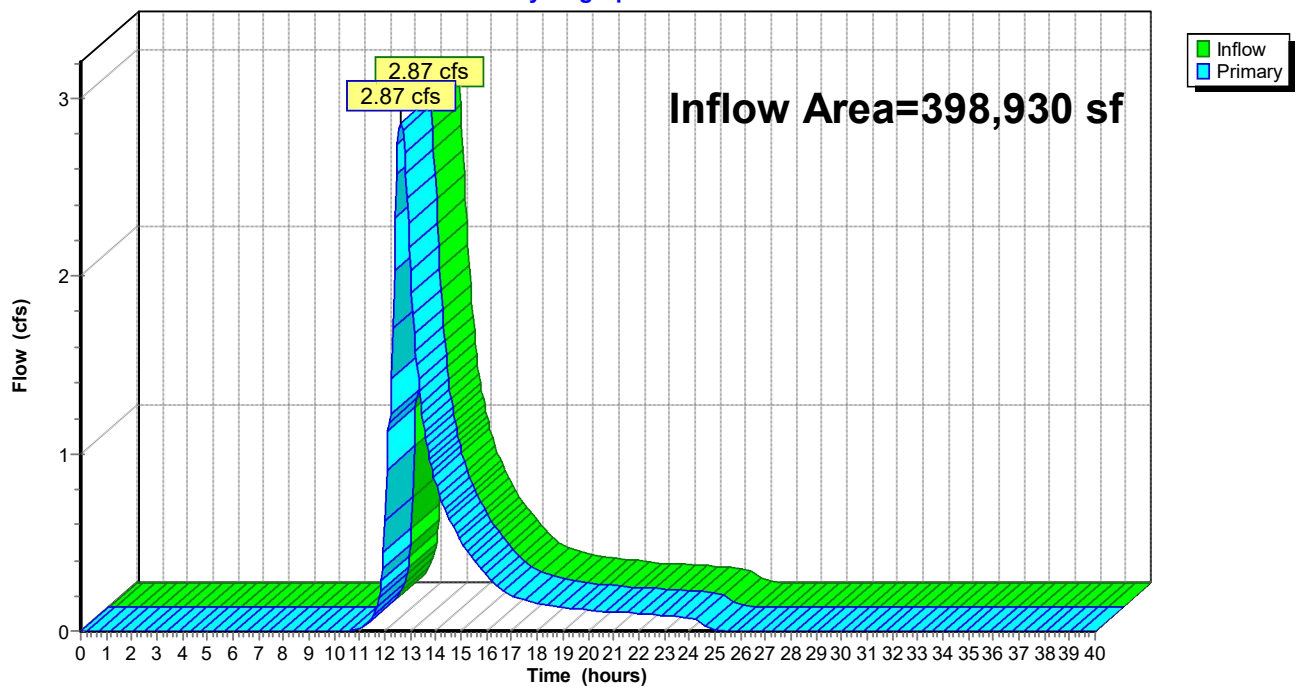
**Summary for Link 1L:**

Inflow Area = 398,930 sf, 24.89% Impervious, Inflow Depth = 0.62" for 2 yr event  
Inflow = 2.87 cfs @ 12.61 hrs, Volume= 20,559 cf  
Primary = 2.87 cfs @ 12.61 hrs, Volume= 20,559 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 1L:**

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.10"

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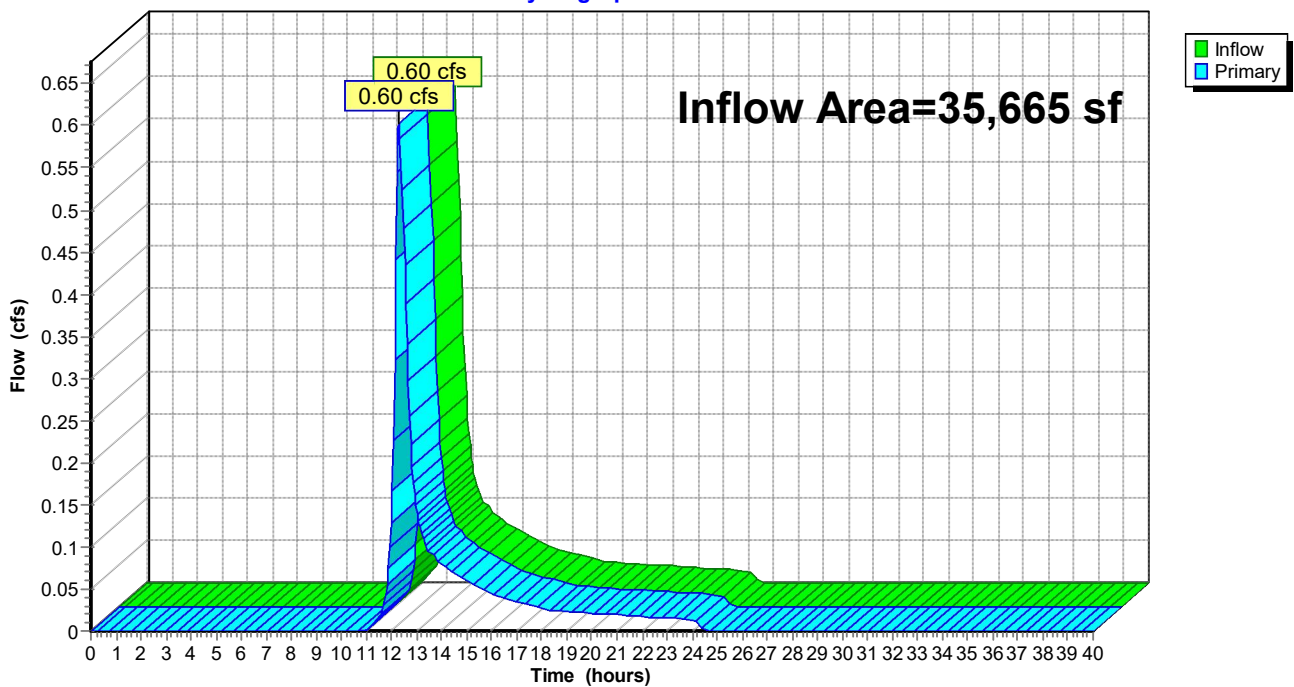
**Summary for Link 2L:**

Inflow Area = 35,665 sf, 0.00% Impervious, Inflow Depth = 0.97" for 2 yr event  
Inflow = 0.60 cfs @ 12.28 hrs, Volume= 2,890 cf  
Primary = 0.60 cfs @ 12.28 hrs, Volume= 2,890 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 2L:**

Hydrograph



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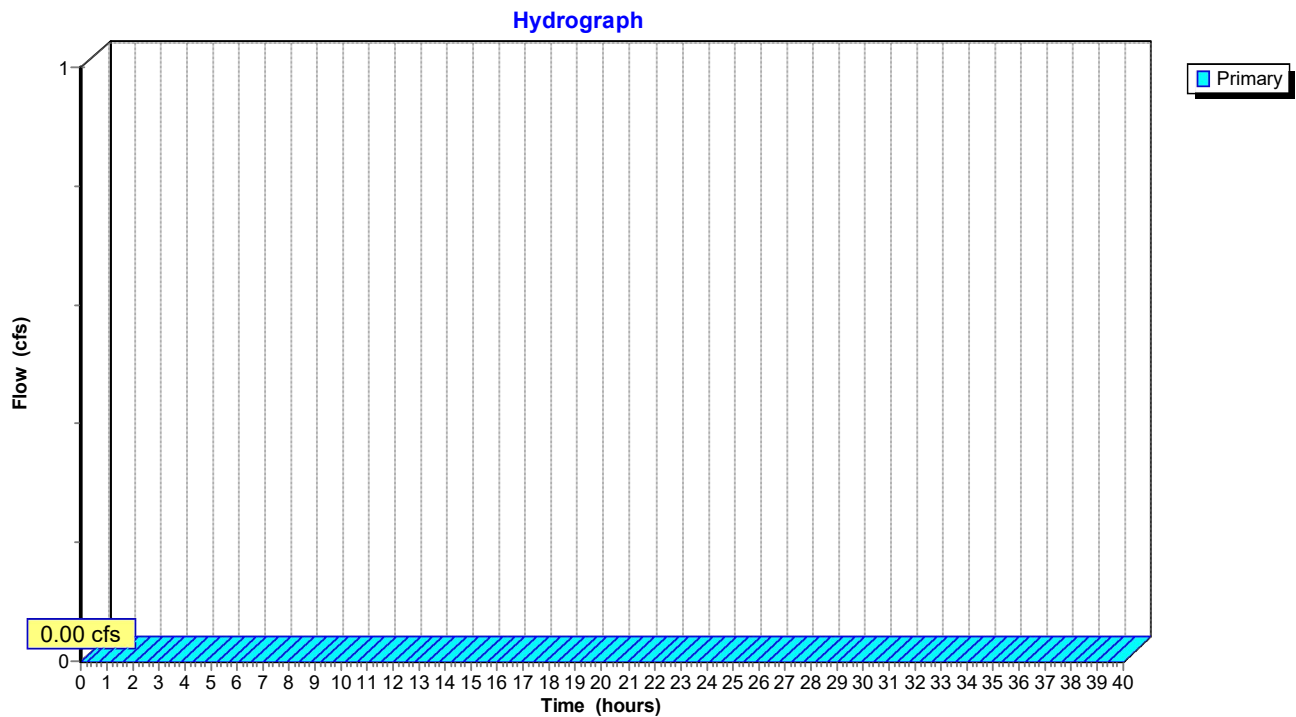
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**Summary for Link 3L:**

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

**Link 3L:**



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Type III 24-hr 10 yr Rainfall=4.50"

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Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1S:</b>	Runoff Area=156,259 sf 13.70% Impervious Runoff Depth=2.13" Flow Length=1,103' Tc=41.3 min CN=76 Runoff=4.30 cfs 27,733 cf
<b>Subcatchment 2S:</b>	Runoff Area=35,665 sf 0.00% Impervious Runoff Depth=1.97" Flow Length=182' Slope=0.0360 '/ Tc=18.5 min CN=74 Runoff=1.30 cfs 5,862 cf
<b>Subcatchment 3S:</b>	Runoff Area=35,876 sf 37.52% Impervious Runoff Depth=2.73" Tc=6.0 min CN=83 Runoff=2.57 cfs 8,149 cf
<b>Subcatchment 4S:</b>	Runoff Area=21,716 sf 44.67% Impervious Runoff Depth=2.91" Tc=6.0 min CN=85 Runoff=1.65 cfs 5,265 cf
<b>Subcatchment 5S:</b>	Runoff Area=38,132 sf 7.47% Impervious Runoff Depth=2.13" Tc=6.0 min CN=76 Runoff=2.14 cfs 6,768 cf
<b>Subcatchment 6S:</b>	Runoff Area=25,548 sf 47.86% Impervious Runoff Depth=2.91" Tc=6.0 min CN=85 Runoff=1.95 cfs 6,194 cf
<b>Subcatchment 7S:</b>	Runoff Area=55,745 sf 39.22% Impervious Runoff Depth=2.73" Tc=6.0 min CN=83 Runoff=4.00 cfs 12,661 cf
<b>Subcatchment 8S:</b>	Runoff Area=22,935 sf 14.82% Impervious Runoff Depth=2.29" Tc=6.0 min CN=78 Runoff=1.39 cfs 4,382 cf
<b>Subcatchment 9S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 10S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 11S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 12S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 13S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 14S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 15S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 16S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf

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Type III 24-hr 10 yr Rainfall=4.50"

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<b>Subcatchment 17S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.16 cfs 569 cf
<b>Subcatchment 18S:</b>	Runoff Area=28,319 sf 0.00% Impervious Runoff Depth=1.90" Tc=6.0 min CN=73 Runoff=1.40 cfs 4,474 cf
<b>Pond 1: DGCB1</b>	Peak Elev=101.03' Inflow=2.57 cfs 8,149 cf 12.0" Round Culvert n=0.012 L=7.0' S=0.0186 '/ Outflow=2.57 cfs 8,149 cf
<b>Pond 1P: Infiltration Basin</b>	Peak Elev=78.60' Storage=15,218 cf Inflow=13.69 cfs 43,418 cf Discarded=0.47 cfs 24,561 cf Primary=3.65 cfs 18,857 cf Outflow=4.12 cfs 43,418 cf
<b>Pond 2: DGCB2</b>	Peak Elev=100.82' Inflow=1.65 cfs 5,265 cf 12.0" Round Culvert n=0.012 L=13.0' S=0.0100 '/ Outflow=1.65 cfs 5,265 cf
<b>Pond 3: DMH3</b>	Peak Elev=100.65' Inflow=4.23 cfs 13,413 cf 15.0" Round Culvert n=0.012 L=293.0' S=0.0424 '/ Outflow=4.23 cfs 13,413 cf
<b>Pond 4: DGCB4</b>	Peak Elev=88.39' Inflow=2.14 cfs 6,768 cf 12.0" Round Culvert n=0.012 L=10.0' S=0.0100 '/ Outflow=2.14 cfs 6,768 cf
<b>Pond 5: DGCB5</b>	Peak Elev=88.33' Inflow=1.95 cfs 6,194 cf 12.0" Round Culvert n=0.012 L=10.0' S=0.0100 '/ Outflow=1.95 cfs 6,194 cf
<b>Pond 6: DMH6</b>	Peak Elev=87.22' Inflow=8.31 cfs 26,374 cf 18.0" Round Culvert n=0.012 L=182.0' S=0.0257 '/ Outflow=8.31 cfs 26,374 cf
<b>Pond 7: DGCB7</b>	Peak Elev=82.48' Inflow=4.00 cfs 12,661 cf 15.0" Round Culvert n=0.012 L=15.0' S=0.0133 '/ Outflow=4.00 cfs 12,661 cf
<b>Pond 8: DMH8</b>	Peak Elev=81.14' Inflow=12.31 cfs 39,036 cf 24.0" Round Culvert n=0.012 L=12.0' S=0.0100 '/ Outflow=12.31 cfs 39,036 cf
<b>Pond 9: CDS</b>	Peak Elev=80.59' Inflow=12.31 cfs 39,036 cf 24.0" Round Culvert n=0.012 L=13.0' S=0.0100 '/ Outflow=12.31 cfs 39,036 cf
<b>Pond 9P: Infiltration Chambers</b>	Peak Elev=2.45' Storage=235 cf Inflow=0.16 cfs 569 cf Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf
<b>Pond 10P: Infiltration Chambers</b>	Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf
<b>Pond 11P: Infiltration Chambers</b>	Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf
<b>Pond 12P: Infiltration Chambers</b>	Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf
<b>Pond 13P: Infiltration Chambers</b>	Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf

**Pond 14P: Infiltration Chambers**

Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf  
Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf

**Pond 15P: Infiltration Chambers**

Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf  
Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf

**Pond 16P: Infiltration Chambers**

Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf  
Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf

**Pond 17P: Infiltration Chambers**

Peak Elev=2.45' Storage=236 cf Inflow=0.16 cfs 569 cf  
Discarded=0.01 cfs 569 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 569 cf

**Link 1L:**

Inflow=8.13 cfs 51,064 cf  
Primary=8.13 cfs 51,064 cf

**Link 2L:**

Inflow=1.30 cfs 5,862 cf  
Primary=1.30 cfs 5,862 cf

**Link 3L:**

Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf Runoff Volume = 86,604 cf Average Runoff Depth = 2.39"**  
**77.15% Pervious = 335,295 sf 22.85% Impervious = 99,300 sf**

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Type III 24-hr 25 yr Rainfall=5.60"

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Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1S:</b>	Runoff Area=156,259 sf 13.70% Impervious Runoff Depth=3.04" Flow Length=1,103' Tc=41.3 min CN=76 Runoff=6.18 cfs 39,556 cf
<b>Subcatchment 2S:</b>	Runoff Area=35,665 sf 0.00% Impervious Runoff Depth=2.85" Flow Length=182' Slope=0.0360 '/ Tc=18.5 min CN=74 Runoff=1.90 cfs 8,475 cf
<b>Subcatchment 3S:</b>	Runoff Area=35,876 sf 37.52% Impervious Runoff Depth=3.72" Tc=6.0 min CN=83 Runoff=3.49 cfs 11,127 cf
<b>Subcatchment 4S:</b>	Runoff Area=21,716 sf 44.67% Impervious Runoff Depth=3.93" Tc=6.0 min CN=85 Runoff=2.21 cfs 7,106 cf
<b>Subcatchment 5S:</b>	Runoff Area=38,132 sf 7.47% Impervious Runoff Depth=3.04" Tc=6.0 min CN=76 Runoff=3.06 cfs 9,653 cf
<b>Subcatchment 6S:</b>	Runoff Area=25,548 sf 47.86% Impervious Runoff Depth=3.93" Tc=6.0 min CN=85 Runoff=2.60 cfs 8,359 cf
<b>Subcatchment 7S:</b>	Runoff Area=55,745 sf 39.22% Impervious Runoff Depth=3.72" Tc=6.0 min CN=83 Runoff=5.42 cfs 17,289 cf
<b>Subcatchment 8S:</b>	Runoff Area=22,935 sf 14.82% Impervious Runoff Depth=3.23" Tc=6.0 min CN=78 Runoff=1.95 cfs 6,169 cf
<b>Subcatchment 9S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf
<b>Subcatchment 10S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf
<b>Subcatchment 11S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf
<b>Subcatchment 12S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf
<b>Subcatchment 13S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf
<b>Subcatchment 14S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf
<b>Subcatchment 15S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf
<b>Subcatchment 16S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36" Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf



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Type III 24-hr 25 yr Rainfall=5.60"

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**Subcatchment 17S: Roof** Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.36"  
Tc=6.0 min CN=98 Runoff=0.20 cfs 715 cf

**Subcatchment 18S:** Runoff Area=28,319 sf 0.00% Impervious Runoff Depth=2.76"  
Tc=6.0 min CN=73 Runoff=2.06 cfs 6,513 cf

**Pond 1: DGCB1** Peak Elev=101.78' Inflow=3.49 cfs 11,127 cf  
12.0" Round Culvert n=0.012 L=7.0' S=0.0186 ' / ' Outflow=3.49 cfs 11,127 cf

**Pond 1P: Infiltration Basin** Peak Elev=79.17' Storage=20,199 cf Inflow=18.72 cfs 59,703 cf  
Discarded=0.51 cfs 27,516 cf Primary=5.75 cfs 32,187 cf Outflow=6.26 cfs 59,703 cf

**Pond 2: DGCB2** Peak Elev=101.32' Inflow=2.21 cfs 7,106 cf  
12.0" Round Culvert n=0.012 L=13.0' S=0.0100 ' / ' Outflow=2.21 cfs 7,106 cf

**Pond 3: DMH3** Peak Elev=101.07' Inflow=5.70 cfs 18,232 cf  
15.0" Round Culvert n=0.012 L=293.0' S=0.0424 ' / ' Outflow=5.70 cfs 18,232 cf

**Pond 4: DGCB4** Peak Elev=88.71' Inflow=3.06 cfs 9,653 cf  
12.0" Round Culvert n=0.012 L=10.0' S=0.0100 ' / ' Outflow=3.06 cfs 9,653 cf

**Pond 5: DGCB5** Peak Elev=88.54' Inflow=2.60 cfs 8,359 cf  
12.0" Round Culvert n=0.012 L=10.0' S=0.0100 ' / ' Outflow=2.60 cfs 8,359 cf

**Pond 6: DMH6** Peak Elev=88.05' Inflow=11.35 cfs 36,245 cf  
18.0" Round Culvert n=0.012 L=182.0' S=0.0257 ' / ' Outflow=11.35 cfs 36,245 cf

**Pond 7: DGCB7** Peak Elev=82.80' Inflow=5.42 cfs 17,289 cf  
15.0" Round Culvert n=0.012 L=15.0' S=0.0133 ' / ' Outflow=5.42 cfs 17,289 cf

**Pond 8: DMH8** Peak Elev=82.17' Inflow=16.77 cfs 53,534 cf  
24.0" Round Culvert n=0.012 L=12.0' S=0.0100 ' / ' Outflow=16.77 cfs 53,534 cf

**Pond 9: CDS** Peak Elev=81.12' Inflow=16.77 cfs 53,534 cf  
24.0" Round Culvert n=0.012 L=13.0' S=0.0100 ' / ' Outflow=16.77 cfs 53,534 cf

**Pond 9P: Infiltration Chambers** Peak Elev=3.59' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 10P: Infiltration Chambers** Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 11P: Infiltration Chambers** Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 12P: Infiltration Chambers** Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 13P: Infiltration Chambers** Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 14P: Infiltration Chambers**

Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 15P: Infiltration Chambers**

Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 16P: Infiltration Chambers**

Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Pond 17P: Infiltration Chambers**

Peak Elev=3.60' Storage=326 cf Inflow=0.20 cfs 715 cf  
Discarded=0.01 cfs 715 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 715 cf

**Link 1L:**

Inflow=12.28 cfs 78,256 cf  
Primary=12.28 cfs 78,256 cf

**Link 2L:**

Inflow=1.90 cfs 8,475 cf  
Primary=1.90 cfs 8,475 cf

**Link 3L:**

Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf   Runoff Volume = 120,681 cf   Average Runoff Depth = 3.33"**  
**77.15% Pervious = 335,295 sf   22.85% Impervious = 99,300 sf**

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Type III 24-hr 100 yr Rainfall=6.50"

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Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1S:</b>	Runoff Area=156,259 sf 13.70% Impervious Runoff Depth=3.82" Flow Length=1,103' Tc=41.3 min CN=76 Runoff=7.77 cfs 49,682 cf
<b>Subcatchment 2S:</b>	Runoff Area=35,665 sf 0.00% Impervious Runoff Depth=3.61" Flow Length=182' Slope=0.0360 '/' Tc=18.5 min CN=74 Runoff=2.41 cfs 10,728 cf
<b>Subcatchment 3S:</b>	Runoff Area=35,876 sf 37.52% Impervious Runoff Depth=4.56" Tc=6.0 min CN=83 Runoff=4.24 cfs 13,626 cf
<b>Subcatchment 4S:</b>	Runoff Area=21,716 sf 44.67% Impervious Runoff Depth=4.78" Tc=6.0 min CN=85 Runoff=2.67 cfs 8,643 cf
<b>Subcatchment 5S:</b>	Runoff Area=38,132 sf 7.47% Impervious Runoff Depth=3.82" Tc=6.0 min CN=76 Runoff=3.83 cfs 12,124 cf
<b>Subcatchment 6S:</b>	Runoff Area=25,548 sf 47.86% Impervious Runoff Depth=4.78" Tc=6.0 min CN=85 Runoff=3.14 cfs 10,168 cf
<b>Subcatchment 7S:</b>	Runoff Area=55,745 sf 39.22% Impervious Runoff Depth=4.56" Tc=6.0 min CN=83 Runoff=6.59 cfs 21,172 cf
<b>Subcatchment 8S:</b>	Runoff Area=22,935 sf 14.82% Impervious Runoff Depth=4.02" Tc=6.0 min CN=78 Runoff=2.43 cfs 7,691 cf
<b>Subcatchment 9S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf
<b>Subcatchment 10S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf
<b>Subcatchment 11S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf
<b>Subcatchment 12S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf
<b>Subcatchment 13S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf
<b>Subcatchment 14S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf
<b>Subcatchment 15S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf
<b>Subcatchment 16S: Roof</b>	Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26" Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf

**PROPOSED\_R1**

Prepared by Williams & Sparages

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Type III 24-hr 100 yr Rainfall=6.50"

Printed 3/29/2019

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**Subcatchment 17S: Roof** Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=6.26"  
Tc=6.0 min CN=98 Runoff=0.23 cfs 835 cf

**Subcatchment 18S:** Runoff Area=28,319 sf 0.00% Impervious Runoff Depth=3.51"  
Tc=6.0 min CN=73 Runoff=2.62 cfs 8,278 cf

**Pond 1: DGCB1** Peak Elev=102.56' Inflow=4.24 cfs 13,626 cf  
12.0" Round Culvert n=0.012 L=7.0' S=0.0186 '/ Outflow=4.24 cfs 13,626 cf

**Pond 1P: Infiltration Basin** Peak Elev=79.61' Storage=24,386 cf Inflow=22.88 cfs 73,423 cf  
Discarded=0.54 cfs 29,501 cf Primary=8.20 cfs 43,922 cf Outflow=8.74 cfs 73,423 cf

**Pond 2: DGCB2** Peak Elev=101.87' Inflow=2.67 cfs 8,643 cf  
12.0" Round Culvert n=0.012 L=13.0' S=0.0100 '/ Outflow=2.67 cfs 8,643 cf

**Pond 3: DMH3** Peak Elev=101.51' Inflow=6.90 cfs 22,269 cf  
15.0" Round Culvert n=0.012 L=293.0' S=0.0424 '/ Outflow=6.90 cfs 22,269 cf

**Pond 4: DGCB4** Peak Elev=89.68' Inflow=3.83 cfs 12,124 cf  
12.0" Round Culvert n=0.012 L=10.0' S=0.0100 '/ Outflow=3.83 cfs 12,124 cf

**Pond 5: DGCB5** Peak Elev=89.40' Inflow=3.14 cfs 10,168 cf  
12.0" Round Culvert n=0.012 L=10.0' S=0.0100 '/ Outflow=3.14 cfs 10,168 cf

**Pond 6: DMH6** Peak Elev=88.92' Inflow=13.87 cfs 44,561 cf  
18.0" Round Culvert n=0.012 L=182.0' S=0.0257 '/ Outflow=13.87 cfs 44,561 cf

**Pond 7: DGCB7** Peak Elev=83.99' Inflow=6.59 cfs 21,172 cf  
15.0" Round Culvert n=0.012 L=15.0' S=0.0133 '/ Outflow=6.59 cfs 21,172 cf

**Pond 8: DMH8** Peak Elev=83.23' Inflow=20.46 cfs 65,733 cf  
24.0" Round Culvert n=0.012 L=12.0' S=0.0100 '/ Outflow=20.46 cfs 65,733 cf

**Pond 9: CDS** Peak Elev=81.59' Inflow=20.46 cfs 65,733 cf  
24.0" Round Culvert n=0.012 L=13.0' S=0.0100 '/ Outflow=20.46 cfs 65,733 cf

**Pond 9P: Infiltration Chambers** Peak Elev=5.41' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 765 cf Primary=0.06 cfs 70 cf Outflow=0.07 cfs 835 cf

**Pond 10P: Infiltration Chambers** Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Pond 11P: Infiltration Chambers** Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Pond 12P: Infiltration Chambers** Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Pond 13P: Infiltration Chambers** Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Pond 14P: Infiltration Chambers**

Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Pond 15P: Infiltration Chambers**

Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Pond 16P: Infiltration Chambers**

Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Pond 17P: Infiltration Chambers**

Peak Elev=5.42' Storage=336 cf Inflow=0.23 cfs 835 cf  
Discarded=0.01 cfs 764 cf Primary=0.06 cfs 71 cf Outflow=0.07 cfs 835 cf

**Link 1L:**

Inflow=16.22 cfs 102,520 cf  
Primary=16.22 cfs 102,520 cf

**Link 2L:**

Inflow=2.41 cfs 10,728 cf  
Primary=2.41 cfs 10,728 cf

**Link 3L:**

Primary=0.00 cfs 0 cf

**Total Runoff Area = 434,595 sf   Runoff Volume = 149,625 cf   Average Runoff Depth = 4.13"**  
**77.15% Pervious = 335,295 sf   22.85% Impervious = 99,300 sf**

## 2 | Stormwater Report Compliance Calculations

### 2.1 Standard 1 | No Untreated Discharges Or Erosion To Wetlands

#### Untreated Discharges

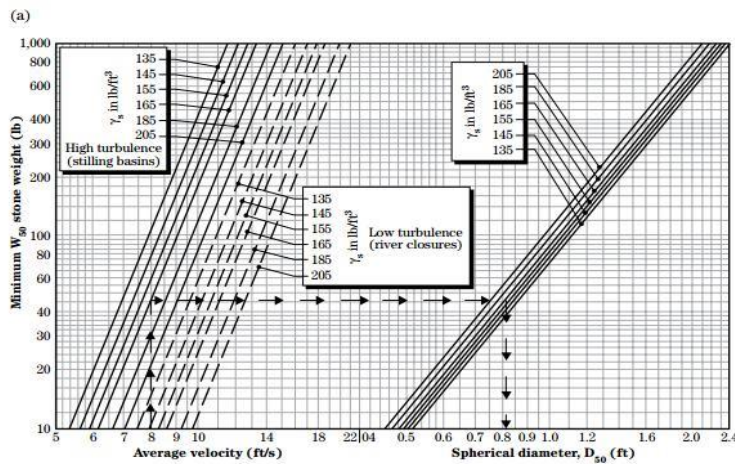
To document compliance that new discharges are adequately treated refer to calculations for DEP Stormwater Management Standards 4 through 6.

#### Erosion To Wetlands

Flow exiting the stormwater management areas discharge over a spillway or to a level spreader. For minimum stone size based on a maximum of  $Q_{100} = 7.20$  cfs,  $V_{max} = 5.87$  ft/s, see the following graphical solution to the Isbash Curve.

Given the velocity of 5.87 ft/s a  $D_{50}$  of 6 inches is recommended for a  $\gamma_s$  of 165 lb/ft<sup>3</sup>.

**Figure TS14C-6** Graphical solution for Isbash technique



Basic equations :

$$V_c = C \left[ 2g \left( \frac{\gamma_s - \gamma_w}{\gamma_w} \right) \right]^{\frac{1}{2}} (D_{50})^{\frac{1}{2}}$$

$$D_{50} = \left( \frac{8W_{50}}{\pi\gamma_s} \right)^{\frac{1}{3}}$$

where: V = Velocity, ft/s

$\gamma_s$  = Specific stone weight, lb/ft<sup>3</sup>

$\gamma_w$  = Specific weight of water, 62.5 lb/ft<sup>3</sup>

$W_{50}$  = Weight of stone, subscript denotes Percent of total weight of material containing stone of less weight

$D_{50}$  = Spherical diameter of stone having the same weight as  $W_{50}$

C = Isbash constant (0.86 for high turbulence level flow and 1.20 for low turbulence level flow)

g = Acceleration of gravity, ft/s<sup>2</sup>

**Stone stability velocity vs. stone diameter**

Hydraulic design chart 712-1 (Sheet 1 of 2)

## 2.2 Standard 2 | Peak Rate Attenuation

Refer to Peak Rate of Runoff tables below (see Mitigative Drainage Analysis)

**Table 1.0: Peak Rate of Runoff | Comparison Location 1L**

Description	2 Year	10 Year	25 Year	50 Year	100 Year
Existing Peak Rate of Runoff (cfs)	4.08	8.91	13.14		16.76
Proposed Peak Rate of Runoff (cfs)	2.87	8.13	12.28		16.22
Difference	-1.21	-0.78	-0.86		-0.54

**Table 2.0: Peak Rate of Runoff | Comparison Location 2L**

Description	2 Year	10 Year	25 Year	50 Year	100 Year
Existing Peak Rate of Runoff (cfs)	1.87	3.82	5.48		6.89
Proposed Peak Rate of Runoff (cfs)	0.60	1.30	1.90		2.41
Difference	-1.27	-2.52	-3.58		-4.48

**Table 3.0: Peak Rate of Runoff | Comparison Location 3L**

Description	2 Year	10 Year	25 Year	50 Year	100 Year
Existing Peak Rate of Runoff (cfs)	0.00	0.00	0.00		0.00
Proposed Peak Rate of Runoff (cfs)	0.00	0.00	0.00		0.00
Difference	0.00	0.00	0.00		0.00

## 2.3 Standard 3 | Stormwater Recharge

### **Recharge Volume:**

$$RV_{\text{required}} = (\text{Impervious Area})(F)$$

Site consists of Hydrologic Soils Group C:  $F_C = 0.25$  in.

### **Site Impervious Area Draining to Recharge Facilities:**

#### **Stormwater Management Area 1P**

$$A_{\text{imp C soils}} = 63497 \text{ ft}^2$$

$$RV_{\text{required}} = [(63497)(0.25)/12] = 1323 \text{ ft}^3$$

$$RV_{\text{provided}} = 6604 \text{ ft}^3 \text{ (volume below outlet)}$$

#### **Roof Recharge Areas**

$$A_{\text{imp C soils}} = 14400 \text{ ft}^2 \text{ (roof area)}$$

$$RV_{\text{required}} = [(14400)(0.25)/12] = 300 \text{ ft}^3$$
$$RV_{\text{provided}} = 3024 \text{ ft}^3 \text{ (total chamber storage volume)}$$

***Capture Area Adjustment***

Total impervious area: 77897 ft<sup>2</sup> (excludes 21403 ft<sup>2</sup> of offsite impervious area)

Site impervious areas draining to recharge facilities: 77897 ft<sup>2</sup>

Ratio of total impervious area to site impervious areas draining to recharge facilities: (77897/77897) = 1.00

***Total Recharge Volume Required***

$$A_{\text{imp total}} = 77897 \text{ ft}^2$$

$$RV_{\text{required}} = [(77897)(0.25)/12] = 1623 \text{ ft}^3$$

$$\text{Adjusted minimum required recharge volume} = [(1623)(1.00)] = 1623 \text{ ft}^3$$

***Total Recharge Volume Provided***

$$RV_{\text{provided}} = 6604 \text{ ft}^3 + 3024 \text{ ft}^3 = 9628 \text{ ft}^3$$

***Capture Area Percentage:***

Site impervious areas draining to recharge facilities: 77897 ft<sup>2</sup>

Total impervious area: 77897 ft<sup>2</sup>

Percent Captured: [(77897/77897)](100) = 100 > 65%

***Drawdown Within 72 Hours:***

$$T_{\text{drawdown}} = [RV_{\text{total}} / (K)(\text{Bottom Area})]$$

***Stormwater Management Area 1P***

$$RV_{1P} = 24386 \text{ ft}^3 \text{ (100 year water level)}$$

$$K = 2.41 \text{ in/hr (Rawls Rate)}$$

Bottom Area = 6048 ft<sup>2</sup> (see Mitigative Drainage Analysis)

$$T_{\text{drawdown}} = 24386 / [(2.41)(6048)/12] = 20 \text{ hours} < 72 \text{ hours}$$

**2.4 Standard 4 | Water Quality**

***Water Quality:***

Water quality is provided through three structural stormwater best management practices.

- 1) Deep Sump Catch Basin with Hood/Trap
- 2) CDS2015 (Particle separator)
- 3) Surface Infiltration Basin

***Water Quality Volume:***

$$V_{\text{wq required}} = (D_{\text{wq}})(A_{\text{imp}})$$

$$D_{\text{wq}} = 1.0 \text{ in}$$

***Stormwater Management Area 1P***

$$V_{\text{wq required}} = [(63497)(1.00)/12] = 5291 \text{ ft}^3$$

$$V_{\text{wq provided}} = 6604 \text{ ft}^3 \text{ (volume below outlet)}$$

Additional water quality is provided from a Contech CDS Model 2015-4 proprietary particle separator. Given the performance of this device is based on a flow rate metric and not volume, a conversion from volume to flow rate is necessary. The methodology given below is taken from the MassDEP "Standard



Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices".

**CDS2015 at Stormwater Management Area 1P:**

$Q_{\text{required}} = (q_u)(A)(WQV)$

$Q_{\text{required}} = (774 \text{ csm/in.})(1.13 \text{ ac.})(0.0015625 \text{ mi}^2/\text{ac.})(1 \text{ in.}) = 1.37 \text{ ft}^3/\text{s}$

$Q_{\text{provided}} = 1.4 \text{ ft}^3/\text{s}$  (see page 15)

**TSS Removal:**

Pretreatment Chain 1 SWMA1P = 86%

- Deep Sump Catch Basin = 25%
- CDS2015 = 81%

Treatment Chain 1 SWMA1P = 85%

- Deep Sump Catch Basin = 25%
- Surface Infiltration Basin = 80%

Location: Pretreatment Chain 1 (SWMA1P)

**TSS Removal Calculation Worksheet**

	B BMP <sup>1</sup>	C TSS Removal Rate <sup>1</sup>	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin		0.25	1.00	0.25	0.75
Proprietary Treatment Practice		0.81	0.75	0.61	0.14
		0.00	0.14	0.00	0.14
		0.00	0.14	0.00	0.14
		0.00	0.14	0.00	0.14

**Total TSS Removal =**

86%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: LYNF-0100  
 Prepared By: MEM  
 Date: 3/26/2019

\*Equals remaining load from previous BMP (E) which enters the BMP

Location:

**TSS Removal Calculation Worksheet**

B BMP <sup>1</sup>	C TSS Removal Rate <sup>1</sup>	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Infiltration Basin	0.80	1.00	0.80	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20

**Total TSS Removal =**

**Separate Form Needs to  
be Completed for Each  
Outlet or BMP Train**

Project:   
 Prepared By:   
 Date:

\*Equals remaining load from previous BMP (E)  
which enters the BMP





**CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION  
BASED ON THE RATIONAL RAINFALL METHOD**

**PROPOSED RESIDENTIAL SUBDIVISION  
LYNNFIELD, MA**

Area	1.13 ac	Unit Site Designation	CDS
Weighted C	0.9	Rainfall Station #	69
t <sub>c</sub>	6 min		
CDS Model	2015-4	CDS Treatment Capacity	1.4 cfs

<u>Rainfall Intensity<sup>1</sup></u> (in/hr)	<u>Percent Rainfall Volume<sup>1</sup></u>	<u>Cumulative Rainfall Volume</u>	<u>Total Flowrate (cfs)</u>	<u>Treated Flowrate (cfs)</u>	<u>Incremental Removal (%)</u>
0.02	10.2%	10.2%	0.02	0.02	9.8
0.04	9.6%	19.8%	0.04	0.04	9.2
0.06	9.4%	29.3%	0.06	0.06	8.9
0.08	7.7%	37.0%	0.08	0.08	7.2
0.10	8.6%	45.6%	0.10	0.10	7.9
0.12	6.3%	51.9%	0.12	0.12	5.7
0.14	4.7%	56.5%	0.14	0.14	4.2
0.16	4.6%	61.2%	0.16	0.16	4.1
0.18	3.5%	64.7%	0.18	0.18	3.1
0.20	4.3%	69.1%	0.20	0.20	3.8
0.25	8.0%	77.1%	0.25	0.25	6.8
0.30	5.6%	82.7%	0.31	0.31	4.6
0.35	4.4%	87.0%	0.36	0.36	3.5
0.40	2.5%	89.5%	0.41	0.41	2.0
0.45	2.5%	92.1%	0.46	0.46	1.9
0.50	1.4%	93.5%	0.51	0.51	1.0
0.75	5.0%	98.5%	0.76	0.76	3.0
1.00	1.0%	99.5%	1.02	1.02	0.5
1.50	0.0%	99.5%	1.53	1.40	0.0
2.00	0.0%	99.5%	2.03	1.40	0.0
3.00	0.5%	100.0%	3.05	1.40	0.1
					87.3

Removal Efficiency Adjustment<sup>2</sup> = 6.5%  
Predicted % Annual Rainfall Treated = 93.3%

**Predicted Net Annual Load Removal Efficiency = 80.9%**

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA  
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.



**Phosphorus Load Reduction:**

The Phosphorous Load Reduction calculation is limited to watershed boundaries tributary to stormwater management areas.

**Stormwater Management Area 1P**

IA - Impervious Area Characteristics			
Subcatchment	Land Use	Area ft <sup>2</sup>	HSG
3S	HDR	13459	C
4S	HDR	9700	C
5S	HDR	2849	C
6S	HDR	12228	C
7S	HDR	21863	C
8S	HDR	3398	C
Total		63497	

PA - Pervious Area Characteristics			
Subcatchment	Land Use	Area ft <sup>2</sup>	HSG
3S	HDR	22417	C
4S	HDR	12016	C
5S	HDR	35283	C
6S	HDR	13320	C
7S	HDR	33882	C
8S	HDR	19537	C
Total		136455	

BMP Volume = 6604 ft<sup>3</sup> (provided below lowest hydraulic outlet device)

$$\text{BMP Volume}_{(IA-in)1} = [(6604 \text{ ft}^3)(12 \text{ in/ft})] / (63497 \text{ ft}^2) = 1.25 \text{ in}$$

Interpolated runoff depth for C soils = 0.17

$$\text{BMP Volume}_{(PA-ft^3)1} = [(136455 \text{ ft}^3)(0.17 \text{ in}) / (12 \text{ in/ft})] = 1933 \text{ ft}^3$$

$$\text{BMP Volume}_{(IA-ft^3)1} = (6604 \text{ ft}^3 - 1933 \text{ ft}^3) = 4671 \text{ ft}^3$$

$$\text{BMP Volume}_{(IA-in)2} = [(4671 \text{ ft}^3)(12 \text{ in/ft})] / (63497 \text{ ft}^2) = 0.88 \text{ in}$$

$$\% \text{ Difference} = (1.25 \text{ in} - 0.88 \text{ in}) / (0.88 \text{ in}) = 42.0 \% > 5\%$$

Interpolated runoff depth for C soils = 0.10

$$\text{BMP Volume}_{(PA-ft^3)2} = [(136455 \text{ ft}^3)(0.10 \text{ in}) / (12 \text{ in/ft})] = 1137 \text{ ft}^3$$

$$\text{BMP Volume}_{(IA-ft^3)2} = (6604 \text{ ft}^3 - 1137 \text{ ft}^3) = 5467 \text{ ft}^3$$

$$\text{BMP Volume}_{(IA-in)3} = [(5467 \text{ ft}^3)(12 \text{ in/ft})] / (63497 \text{ ft}^2) = 1.03 \text{ in}$$

$$\% \text{ Difference} = (1.03 \text{ in} - 0.88 \text{ in}) / (0.88 \text{ in}) = 17.0 \% > 5\%$$

Interpolated runoff depth for C soils = 0.12

$$\text{BMP Volume}_{(PA-ft^3)3} = [(136455 \text{ ft}^3)(0.12 \text{ in}) / (12 \text{ in/ft})] = 1365 \text{ ft}^3$$

$$\text{BMP Volume}_{(IA-ft^3)3} = (6604 \text{ ft}^3 - 1365 \text{ ft}^3) = 5239 \text{ ft}^3$$

$$\text{BMP Volume}_{(IA-in)4} = [(5239 \text{ ft}^3)(12 \text{ in/ft})] / (63497 \text{ ft}^2) = 0.99 \text{ in}$$

$$\% \text{ Difference} = (1.03 \text{ in} - 0.99 \text{ in}) / (0.99 \text{ in}) = 4.0 \% < 5\%$$

BMP Reduction<sub>(%-P)</sub> = 96% (from Table 3-14, Appendix F of the MA MS4 General Permit)

$$\text{BMP Load} = [(63497 \text{ ft}^2) / (43560 \text{ ft}^2/\text{acre})](2.32 \text{ lbs/acre/year}) + [(136455 \text{ ft}^2) / (43560 \text{ ft}^2/\text{acre})](0.03 \text{ lbs/acre/year}) = 3.48 \text{ lbs/year}$$

$$\text{BMP Reduction}_{(lbs-P)} = (3.48 \text{ lbs/year})(0.96) = 3.34 \text{ lbs/year}$$

### **2.5 Standard 5 | Land Uses With Higher Potential Pollutant Loading**

This project is not considered a LUHPPL.

### **2.6 Standard 6 | Critical Areas**

The project site is not a LUHPPL or within a Zone II or Interim Wellhead Protection Area. The project site/infiltration basin does discharge to an Outstanding Resource Water (ORW) (Saugus River) and consequently a critical area. Specific structural stormwater best management practices are selected to manage this discharge. These practices consist of deep sump catch basins with hood/trap, proprietary particle separator, surface infiltration basin and subsurface infiltration chambers.

### **2.7 Standard 7 | Redevelopment**

This project is not considered a redevelopment.

### **2.8 Standard 8 | Construction Period Controls**

Refer to Section 6 Stormwater Pollution Prevention Plan (SWPPP) and Construction Period Erosion, Sedimentation and Pollution Prevention Plan.

### **2.9 Standard 9 | Long Term Operation And Maintenance Plan**

Refer to Section 4 Long Term Operation and Maintenance Plan.

### **2.10 Standard 10 | Illicit Discharges To Drainage System**

There are no proposed illicit discharges into the Stormwater Management Systems to be constructed as shown on the site plan.

### 3 | *MassDEP Stormwater Checklist*



**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection - Wetlands Program

## **Checklist for Stormwater Report**

---

### **A. Introduction**

A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.



<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

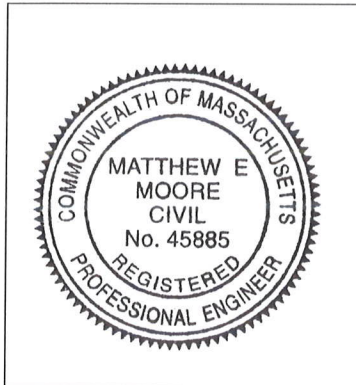
A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

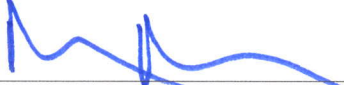
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### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



 3.29.2019  
Signature and Date

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### Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
  - Credit 1
  - Credit 2
  - Credit 3
- Use of “country drainage” versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): \_\_\_\_\_

**Standard 1: No New Untreated Discharges**

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

**Standard 2: Peak Rate Attenuation**

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that



post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

**Standard 3: Recharge**

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static                       Simple Dynamic                       Dynamic Field<sup>1</sup>
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - Site is comprised solely of C and D soils and/or bedrock at the land surface
  - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - Solid Waste Landfill pursuant to 310 CMR 19.000
  - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.
- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

**Standard 4: Water Quality**

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;  
List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
- Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
- is within the Zone II or Interim Wellhead Protection Area
  - is near or to other critical areas
  - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
  - involves runoff from land uses with higher potential pollutant loads.
- The Required Water Quality Volume is reduced through use of the LID site Design Credits.
- Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.
- The BMP is sized (and calculations provided) based on:
- The ½” or 1” Water Quality Volume or
  - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided. (see Massachusetts Stormwater Handbook, Volume 2, Chapter 2, page 86)

**Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)**

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

**Standard 6: Critical Areas**

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.

**Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable**

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - Limited Project
  - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - Bike Path and/or Foot Path
  - Redevelopment Project
  - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment

and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

**Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control**

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.
- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

**Standard 9: Operation and Maintenance Plan**

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
- Name of the stormwater management system owners;
  - Party responsible for operation and maintenance;
  - Schedule for implementation of routine and non-routine maintenance tasks;
  - Plan showing the location of all stormwater BMPs maintenance access areas; (See Definitive/SWPPP plan set)
  - Description and delineation of public safety features;

- Estimated operation and maintenance budget; and
- Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

**Standard 10: Prohibition of Illicit Discharges**

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached; (See section 1.7 of the Mitigative Drainage Analysis)
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

## **4 | Long Term Operation & Maintenance Plan**

This Operation & Maintenance Plan is prepared to comply with provisions set forth in the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards.

Structural Best Management Practices (BMPs) require periodic maintenance to ensure proper function and efficiency in pollutant removal from stormwater discharges that would otherwise reach wetland resource areas untreated. Maintenance schedules found below are as recommended in MassDEP's Massachusetts Stormwater Handbook and as recommended in the manufacturer's specifications.

The stormwater management system owner and the party responsible for maintenance of the stormwater management system shall be HPI, LLC and its designated employees.

### **4.1 The following BMPs provide pollutant removal and groundwater recharge**

- 1) Deep Sump Catch Basin with Hood/Trap
- 2) CDS2015 (Particle separator)
- 3) Surface Infiltration Basin
- 4) Roof recharge chambers

#### ***Deep-Sump Catch Basin with Hood/Trap***

Inspect and/or clean at least four times per year with special consideration given to the end of foliage and snow removal seasons.

Sediments must also be removed once per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the sump or one half the depth of the invert of the outlet pipe.

Clamshell buckets and/or vacuum trucks are typically used to remove sediment in Massachusetts.

Cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste without any prior approval by MassDEP. However, some landfills require catch basin cleanings to be tested before they are accepted. For information on all of the MassDEP requirements pertaining to the disposal of catch basin cleanings go to

<http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html>

#### ***Contech CDS 2015-4 Particle Separator***

Inspect and/or clean at least four times per year with special consideration given to the end of foliage and snow removal seasons.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. When the distance from the water surface to the top of the sediment pile reached less than 3 feet the system should be cleaned. The CDS system shall be cleaned a minimum of twice per year. One cleaning shall occur prior to April 15<sup>th</sup> and one prior to September 15<sup>th</sup> of each year. Cleaning a CDS systems should be done during dry weather conditions when no flow is entering the system. The system should be completely drained down

and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

Clamshell buckets and/or vacuum trucks are typically used to remove sediment in Massachusetts.

### ***Surface Infiltration Basin***

Infiltration basins are prone to clogging and failure so it is imperative to develop and implement aggressive maintenance plans and schedules. If required, installing the required pretreatment BMPs, e.g. deep-sump catch basins and sediment forebays, will significantly reduce the maintenance requirements for the basin.

Inspections and preventative maintenance shall be performed at least twice a year, and after every time drainage discharges through the high outlet orifice or a major storm event which is defined as a storm that is equal to or greater than the 2-year, 24-hour storm (3.1 inches in a 24 hour storm).

After the basin is on line, inspect it after every major storm for the first few months to ensure that it is stabilized and functioning properly. Take corrective action if necessary.

Note the time that water remains standing in the basin after a storm event. Standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity of the basin may have been overestimated or the bottom has been clogged.

If the reason is clogging, determine the cause, e.g. erosion, excessive compaction, or low spots and take the necessary corrective action. Thereafter, inspect the infiltration basin at least twice per year.

Important items to check during the inspections include:

1. Signs of differential settlement,
2. Cracking,
3. Erosion,
4. Leakage in the embankments,
5. Tree growth on the embankments,
6. Condition of riprap,
7. Sediment accumulation and,
8. Health of the turf.

At least twice a year the buffer area, side slopes, and basin bottom shall be mowed. Remove the grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at this time as well as using deep tilling to break up any clogged surfaces, revegetate immediately.

Remove sediment from the basin as necessary only when the floor of the basin is completely dry. Use light equipment to remove the top layer to prevent compacting the underlying soil. Deep till the remaining soil and revegetate as soon as possible.

### ***Roof Recharge Chambers***

Chamber maintenance is not generally required. However, recharge systems are prone to failure due to clogging. Regulating the sediment and petroleum product input into the proposed recharge system is the priority maintenance activity. Sediments and any oil spillage should be trapped and removed before they reach the chambers. Any upstream devices connected to the infiltration system (catch basins, deep sump



manholes, proprietary devices) shall be inspected and cleaned at least twice per year to prevent sediments and debris from entering and clogging the recharge system.

Sediments must also be removed whenever the depth of deposits is greater than or equal to 3".

The contractor shall verify that the required washed crushed stone and geotechnical fabric materials are clean and free of sediments and petroleum residue prior to, during and after chamber system installation.

Inspections of the chamber system shall be made by after every major storm for the first few months after construction to verify that proper functioning has been achieved. During the initial inspection the water level should be measured and recorded in a permanent log over several days to check the drainage duration and verify that sediments are not accumulating. If ponded water is present after 24 hours or an accumulation of sediment or debris is noted within the chambers the owner or designated property manager and engineer shall determine the cause for this condition and devise an action plan to improve system functionality.

Once the chamber system has been verified to perform as designed, interior chamber conditions shall be inspected at least twice per year. Post construction inspections (to be conducted through inspection ports) shall consist of documenting interior and stone bed conditions, measured water depth and presence of sediment. Should inspection indicate that the system is clogged (ponding water present after 24 hours and/or sediment accumulations) replacement or major repair actions may be required. Should the system require replacement or major repair actions the owner or designated property manager and engineer shall determine the cause for this condition and devise an action plan

The inspection and maintenance of the subsurface infiltration system shall belong to the owner or designated property manager.

#### **4.2 The following BMPs are utilized to minimize impacts to wetland resource areas**

##### ***Street Lot Sweeping***

Street sweeping will be conducted four times annually within the parking lot area. Special attention will be given to the spring (March or April) and late fall (November or December).

##### ***Snow Removal***

Snow will be removed from street parking areas and sidewalks during snow events. Snow will be stockpiled within the right of way. Snow disposal/removal shall be in compliance with MassDEP's Bureau of Water Resources guidelines, effective December 21, 2015. See Section 8 Snow Disposal Guidelines.

Provisions will be made to remove snow from the site when the designated areas have reached their capacity.

##### ***Rip Rap Level Spreader/Emergency Spillway***

The level spreader will be inspected during and after several storms (e.g. 0.5-inch or greater) and maintenance performed if necessary during the first year of operation. Thereafter, inspections and preventative maintenance shall be performed at least twice a year, and after every time drainage discharges through the high outlet orifice or a major storm event which is defined as a storm that is equal to or greater than the 2-year, 24-hour storm (3.1 inches in a 24 hour storm).

Any detrimental sediment accumulation shall be removed.



If rilling is present downgradient or adjacent to the emergency spillway or level spreader the cause shall be identified and corrected and damage shall be repaired.

Leaf litter shall be removed from the emergency spillway or level spreader area.

Vegetation in the vicinity of the emergency spillway and level spreader shall be inspected periodically and if needed, fertilized to maintain healthy, dense growth.

### ***4.3 Permanent Seeding***

#### ***Permanent Seeding & Plantings***

Once final grades have been established and the weather permits, every effort shall be made to establish permanent vegetation on disturbed and exposed areas no later than September of that year, otherwise temporary seeding practices shall be used until permanent seeding practices can resume the following spring, April 1<sup>st</sup> through May 31<sup>st</sup>.

In addition to grass seed, tree and shrub plantings shall be an integral part of the permanent stabilization plan. Care shall be taken by the owner, builder, and/or site contractor to select trees, shrubs, and seed mixes that are best suited to the soil conditions on the site. Soil moisture, depth to seasonal groundwater, and exposure to sunlight shall be carefully considered when selecting species. In recent years, the emphasis on using plant species native to Massachusetts has grown. Information on the use of non-native and native species can be found on the web and in many local nursery catalogs.

Permanent seeding shall be performed in accordance with the guidelines set forth in the "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, May 2003, prepared by Franklin, Hampden, and Hampshire Conservation Districts."

***Inspection and Maintenance Form***

Refer to Sections above for frequency of inspection

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

Inspector Title: \_\_\_\_\_

Days since last rainfall: \_\_\_\_\_ Amount of last rainfall: \_\_\_\_\_

***Structural Controls: Catch Basins / Grates***

<b>Structure Identification</b>	<b>Location</b>	<b>Catch basin at grade</b>	<b>Hood/trap installed</b>	<b>Sediment buildup (in.)</b>	<b>Overall condition</b>
DGCB1	STA 3+00 RT	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
DGCB2	STA 3+00 LT	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
DGCB4	STA 6+00 RT	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
DGCB5	STA 6+00 LT	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
DGCB7	STA 8+06 End	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>

Maintenance required \_\_\_\_\_  
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To be performed by: \_\_\_\_\_ On or before: \_\_\_\_\_

*Inspection and Maintenance Form*

Refer to Sections above for frequency of inspection

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

Inspector Title: \_\_\_\_\_

Days since last rainfall: \_\_\_\_\_ Amount of last rainfall: \_\_\_\_\_

*Structural Controls: Level Spreader*

Structure Identification	Location	Installed at grade	Granite curb installed	Sediment buildup (in.)	Overall condition
LSP1	Outlet to SWMA1P Lot 5	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>		Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>

Maintenance required  
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To be performed by: \_\_\_\_\_ On or before: \_\_\_\_\_

**Inspection and Maintenance Form**

Refer to Sections above for frequency of inspection

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

Inspector Title: \_\_\_\_\_

Days since last rainfall: \_\_\_\_\_ Amount of last rainfall: \_\_\_\_\_

**Structural Controls: Surface Infiltration Basin**

Structure Identification	Location	Condition of side slope % vegetated	Sediment buildup in basin % accumulation	Rilling or gullyng Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
SWMA1P	End road Lot 5			Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
				Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
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				Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>

Maintenance required

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To be performed by: \_\_\_\_\_ On or before: \_\_\_\_\_

*Inspection and Maintenance Form*

Refer to Sections above for frequency of inspection

Inspector:

Date:

Inspector Title:

Days since last rainfall:

Amount of last rainfall:

*Structural Controls: Rip-Rap Outlet/Spillway*

<b>Structure Identification</b>	<b>Location</b>	<b>Installed at grade</b>	<b>Maintenance required</b>	<b>Corrective action taken</b>
SWMA1P	End road Lot 5	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	

Maintenance required

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To be performed by:

On or before:

***Inspection and Maintenance Form***

Refer to Sections above for frequency of inspection

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

Inspector Title: \_\_\_\_\_

Days since last rainfall: \_\_\_\_\_ Amount of last rainfall: \_\_\_\_\_

**Structural Controls: Contech CDS 2015-4**

<b>Structure Identification</b>	<b>Location</b>	<b>Water depth to sediment (ft.)</b>	<b>Floatable layer thickness (in.)</b>	<b>Overall condition</b>
CDS2015	End road Lot 5			Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
				Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
				Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
				Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
				Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>
				Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/>

Maintenance required/performed

\_\_\_\_\_

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To be performed by: \_\_\_\_\_ On or before: \_\_\_\_\_

## ***5 | Long Term Pollution Prevention Plan***

This Long Term Pollution Prevention Plan is prepared to comply with the provisions set forth in the Massachusetts Department of Environmental Protection (DEP) Stormwater Management Standards. Structural Best Management Practices (BMPs) require periodic maintenance to ensure proper function and efficiency in pollutant removal from stormwater discharges that would otherwise reach wetland resource areas untreated.

Maintenance schedules found below are as recommended in Department of Environmental Protection's Massachusetts Stormwater Handbook and as recommended in manufacturer's specifications.

### ***5.1 Street Sweeping***

Street shall be swept on a monthly average with special attention given to spring (March/April) and late fall (November/December).

### ***5.2 Trash and Litter Cleanup***

Home owner(s) shall perform trash and litter cleanup once per month in and around the site.

### ***5.3 Ownership and Maintenance Responsibilities***

After project completion and street acceptance the Town of Lynnfield shall assume full responsibility of continuing the operation and maintenance of the street stormwater management system as well as the long term pollution prevention plan outlined below. The exception would be if a legal agreement is made with another party to perform such duties for the owner(s).

After project completion property owner(s) will assume full responsibility of continuing the operation and maintenance of the roof recharge chamber system. The exception would be if a legal agreement is made with another party to perform such duties for the owner(s).

### ***5.4 DEP Standard 4 Water Quality***

The Long Term Pollution Prevention Plan includes the following:

#### ***Good housekeeping practices***

Prevent or reduce pollutant runoff from reaching the wetland resource areas through street sweeping, stabilizing all disturbed areas with vegetative cover and catch basin cleaning.

#### ***Provisions for storing materials and waste products inside or under cover***

All materials on site are to be stored in a neat and orderly fashion in their appropriate containers and, if possible, under a roof or other secure enclosure. All waste products are to be placed in secure receptacles until they are emptied by a solid waste management company licensed in the Commonwealth of Massachusetts.

#### ***Vehicle washing controls***

Home owners shall wash their vehicles on lawn or gravel areas so the ground can filter the water naturally. This will prevent soap, dirt and oil from reaching the storm drains and ultimately wetlands, streams, rivers or marine waters. Encourage home owners to wash their vehicles at commercial car

washes which recycle water and use approximately 60% on average of the amount of water used in a home wash.

***Requirements for routine inspections and maintenance of Stormwater BMP's***

Follow the procedures outlined in Section 4 Long Term Operation and Maintenance Plan and the provided Inspection and Maintenance Forms.

***Spill prevention and response plans***

Spill Prevention: As mentioned previously, all materials on site are to be stored in a neat and orderly fashion in their appropriate containers and, if possible, under a roof or other secure enclosure. Products shall be kept in their original containers with the original manufacturer's label. Products should not be mixed unless recommended by the manufacturer. The manufacturer's recommendations for proper use, storage and disposal shall be followed at all times and, if possible, all of the product should be used up before proper disposal.

Response: The manufacturer's recommended methods for cleanup must be followed and spills cleaned up immediately after discovery. Spills shall be kept well ventilated and personnel must wear appropriate protective gear to prevent injury from contact with hazardous substances. Spills of toxic or hazardous material must be reported to the appropriate local and/or State agencies in accordance with the local and/or Commonwealth of Massachusetts regulations.

***Requirements for storage and use of fertilizers, herbicides and pesticides***

Consult the Town of Lynnfield, MA Conservation Commission for any questions regarding these materials.

Fertilizers: Fertilizers are to be applied at the minimum amounts recommended by the manufacturer and once applied shall be worked into the soil to limit the possibility of entering the storm drains. Storage procedures are to be followed as previously stated and the contents of any partially used bags should be transferred to a sealable container, either bag or bin to avoid spilling.

Herbicides and Pesticides: Storage of these materials are to be as outlined previously and especially out of the reach of pets and children, away from damp areas where their containers may succumb to moisture or rust and should not be stored near food. These materials must not be placed in the trash or washed down the drain. Handle using rubber gloves and use an appropriate mask when using these products for extensive periods of time.

***Provisions for maintenance of lawns, gardens, and other landscaped areas***

These activities are left to the individual home owner(s) to schedule and perform.

***Pet waste management provisions***

These activities are left to the individual home owner(s) to schedule and perform.

***Provisions for solid waste management***

All waste products are to be placed in secure receptacles until they are emptied by a solid waste management company licensed in the Commonwealth of Massachusetts.

***Snow disposal and plowing plans relative to Wetland Resource Areas***

Snow disposal/removal shall be in compliance with MassDEP's Bureau of Water Resources guidelines, effective December 21, 2015. See Section 8 Snow Disposal Guidelines.



***Winter Road Salt and/or Sand Use and Storage restrictions***

Road Salt use must be in compliance with the Guidelines on Deicing Chemical (Road Salt) Storage effective date December 19, 1997, Guideline No. DWSG97-1 found in the BRP's Drinking Water Program. Sand Use: Encourage the use of environmentally friendly alternatives such as calcium chloride and/or sand instead of road salt for melting ice whenever possible.

***Street Sweeping schedules***

As mentioned previously, street sweeping should be performed twice a year in the spring and fall in order to minimize the amount of Total Suspended Solids load on the deep-sump catch basins and other Best Management Practices tributary thereto.

***Provisions for prevention of illicit discharges to the stormwater management systems***

According to Standard 10 in the Massachusetts Stormwater Handbook, Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

***Documentation that Stormwater BMP's are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from land uses with higher potential pollutant loads (LUHPPL)***

Not applicable as this project does not meet the criteria for a LUHPPL.

***Training for staff or personnel involved with implementing LTPPP***

This responsibility lies with the Town of Lynnfield and individual home owner(s) unless a legally-binding agreement is made with another party to perform such duties for the owner(s).

***List of Emergency contacts for implementing Long-Term Pollution Prevention Plan***

This responsibility lies with the Town of Lynnfield and individual home owner(s) unless a legally-binding agreement is made with another party to perform such duties for the owner(s).

## ***6 | Stormwater Pollution Prevention Plan (SWPPP) & Construction Period Erosion, Sedimentation and Pollution Prevention Plan***

This Stormwater Pollution Prevention Plan (SWPPP) and Construction Period Erosion, Sedimentation and Pollution Prevention Plan is prepared to comply with the provisions set forth in the EPA's Construction General Permit (CGP) and the Massachusetts Department of Environmental Protection's (DEP) Stormwater Management Standard 8. As allowed under Standard 8 these documents may be combined to avoid duplication of effort.



# STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

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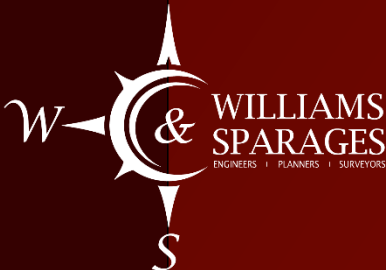
**For Construction Activities At**  
Definitive Subdivision  
333, 339 & 349 Summer Street  
Lynnfield, MA 01940

**SWPPP Prepared For**  
HPI, LLC  
Michael Hannon  
23 Stiles Road, Suite 104  
Salem, NH 03079  
Ph: 603-893-7668

**SWPP Prepared By**  
Williams & Sparages, LLC  
189 North Main Street, Suite 101  
Middleton, MA 01949  
Ph: 978-539-8088  
Fax: 978-539-8200  
[www.wsengineers.com](http://www.wsengineers.com)

**SWPPP Preparation Date**  
November 16, 2018

**Estimated Project Dates**  
Project Start Date: May 1, 2019  
Project Completion Date: May 1, 2023



**6.1 | Contact Information/Responsible Parties**

**6.1.1 | Operator(s)/Subcontractor(s)**

**Operator(s):**

HPI, LLC

Michael Hannon

23 Stiles Road, Suite 104

Salem, NH 03079

603 893 7668

mhannon@salemradnh.com

Insert area of control (if more than one operator at site)

**Subcontractor(s):**

Insert Company or Organization Name

Insert Name

Insert Address

Insert City, State, Zip Code

Insert Telephone Number

Insert Fax/Email

Insert area of control (if more than one operator at site)

**Emergency 24-Hour Contact:**

HPI, LLC

Michael Hannon

603 893 7668

**6.1.2 | Stormwater Team**

<b>Stormwater Team</b>		
Name and/or position, and contact	Responsibilities	I Have Read the CGP and Understand the Applicable Requirements
HPI, LLC Michael Hannon 603 893 7668 mhannon@salemradnh.com	Operator	Yes Date:



**6.2 | Site Evaluation, Assessment, and Planning**

**6.2.1 | Project/Site Information**

Project Name and Address: 333, 339 & 349 Summer Street

Project/Site Name: Definitive Subdivision

Project Street/Location: 333, 339 & 349 Summer Street

City: Lynnfield

State: Massachusetts

ZIP Code: 01949

County or Similar Subdivision: Essex

Business days and hours for the project: Monday through Friday 9 am to 5 pm

Project Latitude/Longitude

Latitude: 42.530995° N Longitude: -71.039621° W (decimal degrees)  
(decimal degrees)

Latitude/longitude data source: Google Maps

Map       GPS      Other (please specify):

Horizontal Reference Datum:

NAD 27       NAD 83       WGS 84

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**Additional Project Information**

Are you requesting permit coverage as a “federal operator” as defined in  Yes  No  
[Appendix A](#) of the 2017 CGP?

Is the project/site located on Indian country lands, or located on a property  Yes  No of  
religious or cultural significance to an Indian tribe?

If yes, provide the name of the Indian tribe associated with the area of Indian country (including the  
name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian  
tribe associated with the property:

If you are conducting earth-disturbing activities in response to a public emergency, document the cause  
of the public emergency (e.g., natural disaster, extreme flooding conditions), information substantiating  
its occurrence (e.g., state disaster declaration), and a description of the construction  
necessary to reestablish effective public services:

**6.2.2 | Discharge Information**

Does your project/site discharge stormwater into a Municipal Separate Storm  Yes  No  
Sewer System (MS4)?

Are there any waters of the U.S. within 50 feet of your project’s earth  Yes  No  
disturbances?

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For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to, and the following receiving water information, if applicable:

Point of Discharge ID	Name of receiving water:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Has a TMDL been completed for this receiving waterbody?	If yes, list TMDL Name and ID:	Pollutant(s) for which there is a TMDL:	Is this receiving water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If yes, specify which Tier (2, 2.5, or 3)?
001	Saugus River	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Aquatic plants; Algal Growth; Fecal coliform; Nitrogen; Phosphorus; Turbidity	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	North Coastal Pathogen TMDL. 50120	E. Coli	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Tier 2.5

**6.2.3 | Nature of the Construction Activities**

**General Description of Project**

Provide a general description of the nature of your construction activities, including the age dates of past renovations for structures that are undergoing demolition:

Construction activities include razing all existing structures with appurtenances and their associated driveways and construct nine single family homes. Each lot will have a subsurface sanitary disposal system and subsurface roof recharge chambers. The main drainage system consists of catch basins, underground piping network, sediment forebay and a surface infiltration basin for mitigating and treatment of stormwater runoff.

**Size of Construction Site**

Size of Property 8.6 Acres  
 Total Area Expected to be Disturbed by Construction Activities 7.64 Acres  
 Maximum Area Expected to be Disturbed at Any One Time 4.5+/- Acres

**Type of Construction Site (check all that apply):**

Single-Family Residential     Multi-Family Residential     Commercial     Industrial  
 Institutional     Highway or Road     Utility     Other \_\_\_\_\_

Will there be demolition of any structure built or renovated before January 1, 1980?     Yes     No

If yes, do any of the structures being demolished have at least 10,000 square feet of floor space?    Yes     No     N/A

Was the pre-development land use used for agriculture (see [Appendix A](#) for definition of "agricultural land")?    Yes     No

**Pollutant-Generating Activities**

List and describe all pollutant-generating activities and indicate for each activity the type of pollutant that will be generated. Take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed during construction.

<b>Pollutant-Generating Activity</b> (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations)	<b>Pollutants or Pollutant Constituents</b> (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels)
Fueling activities/equipment maintenance/storage	Benzene, ethyl benzene, toluene, xylene, MBTE, petroleum distillate, oil and grease, naphthalene, ethylene glycol, propylene glycol, heavy metals, mineral oil
Sanitary facilities	Bacteria, parasites, viruses
Dewatering	Sediment
Clearing and grubbing operations, grading and site excavation, vehicle tracking, topsoil stripping and stockpiling and landscaping operations	Sediment, chlorinated hydrocarbons, organophosphates, carbamates, arsenic, nitrogen, phosphorus
Paving/sidewalk operations	Oil, petroleum distillates
Concrete pouring/mortar/stucco	Limestone, sand, pH, chromium
Painting/painting washout	Metal oxides, stoddard solvent, talc, calcium carbonate, arsenic Stoddard solvent, petroleum distillates, arsenic, copper, chromium, polymers, epoxies, calcium sulphate, calcium carbonate, sulfuric acid
Building construction	

**Construction Support Activities** *(only provide if applicable)*

Describe any construction support activities for the project (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas): On-site equipment staging area, On-site material storage areas and excavated material disposal areas.

Contact information for construction support activity:

**6.2.4 | Sequence and Estimated Dates of Construction Activities**

**Phase I**

Construction of entire project

Estimated Start Date of Construction Activities for this Phase 5/1/2019

Phase

Estimated End Date of Construction Activities for this Phase 5/1/2023

Phase

Estimated Date(s) of Application of Stabilization Measures 11/1/2019

for Areas of the Site Required to be Stabilized



Estimated Date(s) when Stormwater Controls will be Removed 5/1/2023

**6.2.5 | Authorized Non-Stormwater Discharges**

**List of Authorized Non-Stormwater Discharges Present at the Site**

Type of Authorized Non-Stormwater Discharge	Likely to be Present at Your Site?
Discharges from emergency fire-fighting activities	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Fire hydrant flushings <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Landscape irrigation	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Waters used to wash vehicles and equipment	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water used to control dust	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Potable water including uncontaminated water line flushings	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
External building washdown (soaps/solvents are not used and external surfaces do not contain hazardous substances)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Pavement wash waters	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Uncontaminated air conditioning or compressor condensate	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Uncontaminated, non-turbid discharges of ground water or spring water	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Foundation or footing drains	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Construction dewatering water	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

**6.2.6 | Site Maps**

See Appendix B



6.3 | Documentation of Compliance With Other Federal Requirements

6.3.1 | Endangered Species Protection

Eligibility Criterion

Under which criterion listed in [Appendix D](#) are you eligible for coverage under this permit?

- Criterion A:** No ESA-listed species and/or designated critical habitat present in action area. Using the process outlined in Appendix D of this permit, you certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site’s “action area” as defined in Appendix A of this permit.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion A should identify the USFWS and NMFS information sources used. Attaching aerial image(s) of the site to your NOI is helpful to EPA, USFWS, and NMFS in confirming eligibility under this criterion. Please Note: NMFS’ jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers. Check the applicable source(s) of information you relied upon:

- Specific communication with staff of the USFWS and/or NMFS. [INSERT DATE OF COMMUNICATION AND WHO YOU SPOKE WITH](#)
- Species list from USFWS and/or NMFS. See the [CGP ESA webpage, Step 2](#) for available websites. [INSERT SPECIFIC DOCUMENT AND/OR WEBSITE RELIED UPON](#)

- Criterion B:** Eligibility requirements met by another operator under the 2017 CGP. The construction site’s discharges and discharge-related activities were already addressed in another operator’s valid certification of eligibility for your “action area” under eligibility Criterion A, C, D, E, or F of the 2017 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the that certification may be present or located in the “action area.” To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other CGP operator’s certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator’s certification was based. You must include in your NOI the NPDES ID from the other 2017CGP operator’s notification of authorization under this permit. If your certification is based on another 2017 CGP operator’s certification under criterion C, you must provide EPA with the relevant supporting information required of existing dischargers in criterion C in your NOI form.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion B should identify the eligibility criterion of the other CGP NOI, the authorization date, and confirmation that the authorization is effective.

- ✓ Provide the 9-digit NPDES ID number from the other operator’s NOI under the 2017 CGP: \_\_\_\_\_
- ✓ Authorization date of the other 2017 CGP operator: [INSERT AUTHORIZATION DATE OF OTHER OPERATOR](#)
- ✓ Eligibility criterion of the other 2017 CGP operator: A C D E F
- ✓ Provide a brief summary of the basis the other operator used for selecting criterion A, C, D, E, or F: [INSERT TEXT HERE](#)

- Criterion C:** Discharges not likely to adversely affect ESA-listed species and/or designated critical habitat. ESA-listed species and/or designated critical habitat(s) under the jurisdiction of the USFWS and/or NMFS are likely to occur in or near your site’s “action area,” and you certify to EPA that your site’s discharges and discharge-related activities are not likely to adversely affect ESA-listed threatened or endangered species and/or designated critical habitat. This certification may include consideration of any stormwater controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-listed species and/or designated habitat located in your “action area” using the process outlined in Appendix D of this permit; 2) the distance between the site and the listed species and/or designated critical habitat in the action area (in miles); and 3) a rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharges and discharge-related activities. You must also include a copy of your site map from your SWPPP showing the upland and in-water extent of your “action area” with this NOI.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion C should identify the information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in the evaluation.

- ✓ Resources used to make determination: **INSERT RESOURCES YOU USED TO DETERMINE THAT DISCHARGES ARE NOT LIKELY TO ADVERSELY AFFECT ESA-LISTED SPECIES OR DESIGNATED CRITICAL HABITAT**
- ✓ ESA-listed Species/Critical Habitat in action area: **INSERT LIST OF ESA-LISTED SPECIES OR DESIGNATED CRITICAL HABITAT LOCATED IN YOUR ACTION AREA**
- ✓ Distance between site and ESA-listed Species/Critical Habitat: **INSERT DISTANCE BETWEEN YOUR SITE AND THE ESA-LISTED SPECIES OR CRITICAL HABITAT (in miles)**
- ✓ How adverse effects will be avoided: **DESCRIBE SPECIFICALLY HOW ADVERSE EFFECTS TO ESA-LISTED SPECIES WILL BE AVOIDED FROM THE DISCHARGES AND DISCHARGE-RELATED ACTIVITIES**

- 
- Criterion D:** Coordination with USFWS and/or NMFS has successfully concluded. Coordination between you and the USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site’s discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written concurrence from USFWS and/or NMFS that your site’s discharges and discharge-related activities are not likely to adversely affect listed species and/or critical habitat. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion D should identify whether USFWS or NMFS or both agencies participated in coordination, the field office/regional office(s) providing that coordination, and the date that coordination concluded.

- ✓ Agency coordinated with: USFWS  NMFS
- ✓ Field/regional office(s) providing coordination: Northeast Regional Offices (Region 5)
- ✓ Date coordination concluded: 7/5/2018
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding coordination activities.

- **Criterion E: ESA Section 7 consultation has successfully concluded.** Consultation between a Federal Agency and the USFWS and/or NMFS under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site’s discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, Indicate the result of the consultation:
  - Biological opinion from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site’s discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species, nor the destruction or adverse modification of critical habitat; or
  - Written concurrence from USFWS and/or NMFS with a finding that the site’s discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and this NOI.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion E should identify the federal action agency(ies) involved, the field office/regional office(s) providing that consultation, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the consultation was completed.

- ✓ Federal agency(ies) involved: [INSERT FEDERAL AGENCY\(IES\) INVOLVED](#)
- ✓ Field/regional office(s) providing consultation: [INSERT FIELD/REGIONAL OFFICE\(S\) PROVIDING CONSULTATION](#)
- ✓ Tracking numbers associated with consultation: [INSERT CONSULTATION TRACKING NUMBER\(S\)](#)
- ✓ Date consultation completed: [INSERT DATE CONSULTATION COMPLETED](#)
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding consultation.

- **Criterion F: Issuance of section 10 permit.** Potential take is authorized through the issuance of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization addresses the effects of the site’s discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion F should identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field office/regional office(s) providing permit(s), any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the permit was granted.

- ✓ Agency providing section 10 permit: USFWS NMFS
- ✓ Field/regional office(s) providing permit: [INSERT FIELD/REGIONAL OFFICE\(S\) PROVIDING PERMIT](#)
- ✓ Tracking numbers associated with consultation: [INSERT CONSULTATION TRACKING NUMBER\(S\)](#)
- ✓ Date permit granted: [INSERT DATE PERMIT GRANTED](#)
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service.

**6.3.2 | *Historic Preservation***

**Appendix E, Step 1**

Do you plan on installing any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

- Dike
- Berm
- Catch Basin
- Pond
- Stormwater Conveyance Channel (e.g., ditch, trench, perimeter drain, swale, etc.)
- Culvert
- Other type of ground-disturbing stormwater control:

**Appendix E, Step 2**

If you answered yes in Step 1, have prior surveys or evaluations conducted on the site already determined that historic properties do not exist, or that prior disturbances at the site have precluded the existence of historic properties?  YES  NO

- If yes, no further documentation is required for Section 3.2 of the Template.
- If no, proceed to Appendix E, Step 3.

**Appendix E, Step 3**

If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties?  YES  NO

If yes, provide documentation of the basis for your determination.

<https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466>

<https://www.nps.gov/subjects/nationalregister/upload/national-register-listed-20181017.xlsx>

If no, proceed to Appendix E, Step 4.

**Appendix E, Step 4**

If you answered no in Step 3, did the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Office (THPO), or other tribal representative (whichever applies) respond to you within 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties?  YES  NO

If no, no further documentation is required for Section 3.2 of the Template.

If yes, describe the nature of their response:

- Written indication that no historic properties will be affected by the installation of stormwater controls.
- Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions.
  
- No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls.
- Other:

**6.3.3 | Safe Drinking Water Act Underground Injection Control Requirements**

Do you plan to install any of the following controls? Check all that apply below.

- Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)
- Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow
- Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

**6.4 | Erosion and Sediment Controls**

The proposed erosion and sediment control to be installed and maintained is silt fence or approved equal.

Silt fence (or approved equal) shall be installed around the limits of construction on site. Silt fence shall be installed by excavating a 12-inch-deep trench along the line of proposed installation. Wooden posts supporting the silt fence shall be spaced 4 to 6 feet apart and driven securely into the ground; a minimum of 18 to 20 inches deep. The silt fence shall be fastened securely to the wooden posts with wire ties spaced every 24 inches at the top, mid-section, and bottom of the wooden post. The bottom edge of the silt fence shall extend across the bottom of the trench and the trench shall be backfilled and compacted to prevent stormwater and sediment from discharging underneath the silt fence. See Stormwater Pollution Prevention Plan Details plan in Appendix B.

Silt fence shall be inspected weekly and immediately after storm events to ensure it is intact and there are no gaps where the fence meets the ground or tears along the length of the fence. If gaps or tears are found during the inspection the fabric shall be repaired or replaced immediately. Accumulated sediment shall be removed from the fence base if it reaches one-third the height of the silt fence and hauled off-site for disposal. If accumulated sediment is creating noticeable strain on the fabric and it appears the fence may fail from a sudden storm event the sediment shall be removed more frequently. Prior to silt fence removal accumulated sediment shall be removed. The anticipated life span of the silt fence is 6 months and will likely need to be replaced after this period.

Silt fence shall be installed prior to on-site construction.

**6.4.1 | Natural Buffers or Equivalent Sediment Controls**

**Buffer Compliance Alternatives**

Are there any waters of the U.S. within 50 feet of your project’s earth disturbances?  YES  NO

Check the compliance alternative that you have chosen:

- (i) I will provide and maintain a 50-foot undisturbed natural buffer.

- (ii) I will provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.
- (iii) It is infeasible to provide and maintain an undisturbed natural buffer of any size, therefore I will implement erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.
- I qualify for one of the exceptions in Part 2.2.1.b. (If you have checked this box, provide information on the applicable buffer exception that applies, below.)

**Buffer Exceptions**

Which of the following exceptions to the buffer requirements applies to your site?

- There is no discharge of stormwater to the water of the U.S. that is located 50 feet from my construction disturbances.
- No natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for this project.
- For a “linear construction sites” (defined in Appendix A), site constraints (e.g., limited right-of-way) make it infeasible to meet any of the CGP Part 2.2.1.a compliance alternatives.
- The project qualifies as “small residential lot” construction (defined in Appendix A) (see Appendix G, Part G.3.2).
  - For Alternative 1:
  - For Alternative 2:
- Buffer disturbances are authorized under a CWA Section 404 permit
- Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail).

**6.4.2 | Perimeter Controls**

General

A silt fence or approved equal shall be installed along the perimeter of the site to control pollutant discharge.

Specific Perimeter Controls

**Silt fence**

**Description:** Silt fence (or approved equal) shall be installed around the limits of construction on site. Silt fence shall be installed by excavating a 12-inch-deep trench along the line of proposed installation. Wooden posts supporting the silt fence shall be spaced 4 to 6 feet apart and driven securely into the ground; a minimum of 18 to 20 inches deep. The silt fence shall be fastened securely to the wooden posts with wire ties spaced every 24 inches at the top, mid-section, and bottom of the wooden post. The bottom edge of the silt fence shall extend across the bottom of the trench and the trench shall be backfilled and compacted to prevent stormwater and sediment from discharging underneath the silt fence.

<b>Installation</b>	Perimeter silt fence shall be installed prior to major construction.
<b>Maintenance Requirements</b>	Silt fence shall be inspected weekly and immediately after storm events to ensure it is intact and there are no gaps where the fence meets the ground or tears along the length of the fence. If gaps or tears are found during the inspection the fabric shall be repaired or replaced immediately. Accumulated sediment shall be removed from the fence base if it reaches one-third the height of the silt fence and hauled off-site for disposal. If accumulated sediment is creating noticeable strain on the fabric and it appears the fence



may fail from a sudden storm event the sediment shall be removed more frequently. Prior to silt fence removal accumulated sediment shall be removed. The anticipated life span of the silt fence is 6 months and shall likely need to be replaced after this period.

**Design Specifications** See silt fence detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

**6.4.3 | Sediment Track-Out**

General

Stone tracking pads shall be installed to control sediment track out.

*Specific Track-Out Controls*

**Stone tracking pad**

**Description:** A stone tracking pad shall be installed at Summer Street as shown on the site map to prevent off-site transport of sediment by construction vehicles. The stabilized exit shall 50 feet long, 24 feet wide, flared ends at the paved road and shall provide a 6 inch thick layer of No. 3 crushed stone. The crushed stone should be placed over a layer of geotextile filter fabric to reduce the mitigation of sediment from the underlying soil. Tracking pad shall remain in place until pavement base course is installed.

**Installation** Stabilized exit shall be installed prior to major construction.

**Maintenance Requirements** The stabilized exit shall be inspected weekly and after storm events or heavy use. The construction exit shall be maintained in a condition that shall prevent sediment tracking offsite, this may require adding additional crushed stone. All sediment tracked, spilled, dropped, or washed onto Summer Street shall be swept immediately and hauled off-site for disposal. Should sediment clog the stone voids and the effectiveness of the anti-tracking pad is no longer trapping sediment on site, the pad shall be top dressed with new crushed stone. Replacement of the entire pad may be necessary when the pad becomes filled with sediment. The pad shall be reshaped as needed for drainage and runoff control.

**Design Specifications** See vehicle tracking pad detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

**Stone tracking Pad**

**Description:** A stone tracking pad shall be installed at each house lot to prevent off-site transport of sediment by construction vehicles. The stabilized exit shall 30 feet long, 12 feet wide, flared ends at the paved road and shall provide a 6 inch thick layer of No. 3 crushed stone. The crushed stone should be placed over a layer of geotextile filter fabric to reduce the mitigation of sediment from the underlying soil. Tracking pad shall remain in place until pavement base course is installed.

**Installation** Stabilized exit shall be installed prior to major construction.

**Maintenance Requirements** The stabilized exit shall be inspected weekly and after storm events or heavy use. The construction exit shall be maintained in a condition that shall prevent sediment tracking offsite, this may require adding additional crushed stone. All sediment tracked, spilled, dropped, or washed onto Summer Street shall be swept immediately and hauled off-site for disposal. Should sediment clog the stone voids and the effectiveness of the anti-tracking pad is no longer trapping sediment on site, the pad shall be top dressed with new crushed stone. Replacement of the entire pad may be necessary when the pad becomes filled with sediment. The pad shall be reshaped as needed for drainage and runoff control.

**Design Specifications** See vehicle tracking pad detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

**6.4.4 | Stockpiled Sediment or Soil**

*General*

A silt fence or approved equal shall be installed, at a minimum, along the downstream portion of the perimeter of stockpiled sediment or soil.

*Specific Stockpile Controls*

**Silt fence**

**Description:** Silt fence (or approved equal) shall be installed around the limits of stockpiled material on site. Silt fence shall be installed by excavating a 12-inch-deep trench along the line of proposed installation. Wooden posts supporting the silt fence shall be spaced 4 to 6 feet apart and driven securely into the ground; a minimum of 18 to 20 inches deep. The silt fence shall be fastened securely to the wooden posts with wire ties spaced every 24 inches at the top, mid-section, and bottom of the wooden post. The bottom edge of the silt fence shall extend across the bottom of the trench and the trench shall be backfilled and compacted to prevent stormwater and sediment from discharging underneath the silt fence.

**Installation** Silt fence shall be installed prior to major construction.

**Maintenance Requirements** Silt fence shall be inspected weekly and immediately after storm events to ensure it is intact and there are no gaps where the fence meets the ground or tears along the length of the fence. If gaps or tears are found during the inspection the fabric shall be repaired or replaced immediately. Accumulated sediment shall be removed from the fence base if it reaches one-third the height of the silt fence and hauled off-site for disposal. If accumulated sediment is creating noticeable strain on the fabric and it appears the fence may fail from a sudden storm event the sediment shall be removed more frequently. Prior to silt fence removal accumulated sediment shall be removed. The anticipated life span of the silt fence is 6 months and shall likely need to be replaced after this period.

**Design Specifications** See silt fence detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

**6.4.5 | Minimize Dust**

*General*

Dust from the site shall be controlled by using on-site water or a mobile pressure-type distributor truck.

*Specific Dust Controls*

**On-site water or water trucks**

**Description:** Dust from the site shall be controlled by using a mobile pressure-type distributor truck to apply potable water to disturbed areas. The mobile unit shall apply water at a rate of 300 gallons per acre and minimized as necessary to prevent runoff and ponding.

**Installation** Dust control shall be implemented as needed once site grading has been initiated and during windy conditions (forecasted or actual wind conditions of 20 mph or greater) while site grading is occurring. Spraying of potable water shall be performed no more than three times a day during the months of May-September and once per day during the months October-April or whenever the dryness of the soil warrants it.



<b>Maintenance Requirements</b>	At least one mobile unit shall be available at all times to distribute potable water to control dust on the project area. Each mobile unit shall be equipped with a positive shutoff valve to prevent over watering of the disturbed area.
<b>Design Specifications</b>	N/A

**6.4.6 | Minimize Steep Slope Disturbances**

*General*

It may be necessary to install geotextile erosion control blankets on steeper slopes after topsoil and seed have been placed. It is recommended that erosion control blankets be used on all proposed grass slopes steeper than 3:1 (horizontal:vertical).

*Specific Steep Slope Controls*

**Geotextile erosion control blanket**

**Description:** Geotextile erosion control blankets should be used to provide stabilization for all slopes steeper than 3:1. The blanket shall cover the entire area of the graded slope. The bottom and side slopes shall be seeded and mulched before blanket is applied. The blanket should be installed by digging a small trench on the upside of the slope, 6 inches wide by 6 inches deep, and stapling the leading edge of the blanket in the trench. The blanket shall be rolled down the slope slowly to maintain soil contact and stapled in 12-inch intervals. If the blanket cannot cover the entire slope, the blankets shall be overlapped (2-5 inches) and stapled at the overlapped edge. The erosion control blanket shall always be installed according to manufacturer’s instructions and specifications.

**Installation** Erosion control blankets shall be installed once slopes steeper than 3:1 have reached final grade.

**Maintenance Requirements** The erosion control blanket shall be inspected weekly and immediately after storm events to determine if cracks, tears, or breaches have formed in the fabric; if so, the blanket shall be repaired or replaced immediately. Sufficient contact with the soil shall be maintained to prevent erosion. Any areas where the blanket is not in close contact with the ground shall be repaired or replaced.

**Design Specifications** See erosion control blanket detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

**6.4.7 | Topsoil**

*General*

The existing topsoil within the proposed areas of work shall be stripped and stockpiled as necessary. Any stockpiled topsoil may be repurposed for site grading activities. The intent is to keep all topsoil on-site to the extent practicable. Should excess or unusable topsoil be present it shall be removed from the site.

**6.4.8 | Soil Compaction**

*General*

Given the pedestrian nature of the project the site contractor should be cognizant of operating heavy machinery in the area of the infiltration basin. Subcontractors shall be made aware of this and instructed accordingly.

6.4.9 | Storm Drain Inlets

General

Mulch sock or siltsack protection or approved equal shall be installed at all stormwater inlets.

Specific Storm Drain Inlet Controls

Mulch Sock

Description: A mulch sock barrier shall be constructed around all stormwater inlets. Wooden posts upporting the mulch sock shall be installed and driven securely into the ground; a minimum of 12 inches deep.

Installation

Once stormwater inlets are installed a mulch sock shall be immediately placed around the inlet. Mulch sock surrounding catch basin grates on a roadway shall be removed and replaced with silt sack inserts once pavement base course is installed.

Maintenance Requirements

Mulch sock shall be inspected weekly and immediately after storm events to ensure it is intact and that there are no gaps where the mulch sock meets the ground or between adjacent mulch socks. Check for proper arrangement and displacement. Should gaps or damage be found during the inspection the mulch sock and/or wooden post shall be repaired or replaced immediately. Accumulated sediment shall be removed if it reaches one-half the effective height of the mulch sock and hauled off-site for disposal. Mulch socks surrounding catch basin grates on a roadway shall be removed and replaced with silt sack barrier inserts once pavement base course is installed.

Design Specifications

See mulch sock detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

Siltsack

Description: Siltsack sediment capture device shall be installed at all on-site catch basins and three off-site catch basins on Summer Street.

Installation

Siltsack barriers shall be installed at all identified catch basins once pavement subgrade is installed. Siltsack barriers on Summer Street shall be installed when perimeter silt fence is installed or prior to major construction. Siltsack barrier insert shall be removed prior to final paving activities.

Maintenance Requirements

Inspect all Siltsack barriers weekly and immediately after storm events for holes, tears, and snags. Check barriers for proper arrangement and displacement. Siltsack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this yellow cord is also a visual means of indicating when the sack should be emptied. Once the cord is covered with sediment, Siltsack should be emptied, cleaned and placed back into the basin. Removed sediments shall be hauled off-site. Make immediate repairs if barrier has been damaged.

Design Specifications

See Siltsack detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

6.4.10 | Stormwater Conveyance Channels

General

No construction period stormwater conveyance channels are proposed.

**6.4.11 | Sediment Basins**

*General*

No construction period or temporary sediment basin is proposed. Should the use of a construction period sediment basin be required the contractor shall coordinate with the design engineer for size and location.

**6.4.12 | Chemical Treatment**

*General*

No treatment chemicals are proposed or anticipated. Should the use of treatment chemicals be needed the contractor shall coordinate with the appropriate design professional and address the items below.

*Soil Types*

List all the soil types (including soil types expected to be found in fill material) that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems:

*Treatment Chemicals*

List all treatment chemicals that will be used at the site and explain why these chemicals are suited to the soil characteristics:

Describe the dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage:

Provide information from any applicable Safety Data Sheets (SDS): Describe how each of the chemicals will stored:

Include references to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer’s specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems:

*Special Controls for Cationic Treatment Chemicals (if applicable)*

If the applicable EPA Regional Office authorized you to use cationic treatment chemicals, include the official EPA authorization letter or other communication, and identify the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards:

*Schematic Drawings of Stormwater Controls/Chemical Treatment Systems*

Provide schematic drawings of any chemically-enhanced stormwater controls or chemical treatment systems to be used for application of treatment chemicals:

*Training*

Describe the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to the use of treatment chemicals:

**6.4.13 | Dewatering Practices**

*General*

No significant dewatering is anticipated. Should dewatering be needed a dewatering system shall be constructed in accordance with the Lynnfield Conservation Commission and outside of the 25’ natural buffer area.

*Specific Dewatering Practices*

**Haybales with silt fence and crushed stone**

**Description:** A ringed hay bale barrier of appropriate size with wooden posts supporting the hay bales shall be installed (2 per hay bale) and driven securely into the ground a minimum of 12 inches deep. Inside ring of haybales install silt fence and 12" of 3/4" washed crushed stone.

**Installation** Dewatering systems shall be installed at the contractor’s discretion when unwanted water prevents or impedes construction activities.

**Maintenance Requirements** Inspect dewatering system weekly and immediately after storm events for holes, breaks or tears. Check barriers for proper arrangement and displacement. Should gaps or damage be found during inspection repairs shall be made immediately or item replaced. Accumulated sediment shall be removed when it reaches approximately three-quarters the height of the hay bale and hauled off-site for disposal.

**Design Specifications** See Dewatering detail on Stormwater Pollution Prevention Plan Details plan in Appendix B.

**6.4.14 | Other Stormwater Controls**

*General*

On-site and off-site street sweeping activities shall be performed should debris from construction activities become problematic or a nuisance.

*Specific Stormwater Control Practices*

**Street sweeping**

**Description:** Street sweeping shall be performed on the subdivision roadway and Summer Street.

**Installation** As needed or required by the Town of Lynnfield.

**Maintenance Requirements** All materials collected during street sweeping shall be disposed of at an off-site location.

**Design** N/A

**Specifications**

**6.4.15 | Site Stabilization**

**Total Amount of Land Disturbance Occurring at Any One Time**

- Five Acres or less
- More than Five Acres

**Hydro seeding**

- Vegetative  Non-Vegetative
- Temporary  Permanent

**Description:** Temporary vegetative cover should be established using hydro seeding for exposed soil areas including stockpiles. Hydro seeding shall consist of wood fibers, native seed, fertilizer, and stabilizing emulsion and applied at a rate of 8 pounds per acre. Seeding shall be conducted during periods of the year when vegetation is more likely to be established.

**Installation** Temporary stabilization measures shall be applied to portions of the site where construction activities shall temporarily cease for more than 14 days. Stabilization should preferably be done between April 1 and June 30.

**Completion** September 1 through September 30.

**Maintenance Requirements** Stabilized areas shall be inspected within six (6) weeks of planting and after storm events until a dense cover of vegetation becomes established. Should failure occur the area shall be reseeded, fertilized, and mulched immediately. Watering shall be performed as needed.

**Design Specifications** Seeding shall be performed in accordance with the guidelines set forth in the attached Temporary Seeding Guidance, an excerpt from the publication entitled, "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, May 2003, prepared by Franklin, Hampden, and Hampshire Conservation Districts." See Appendix N.

**Hydro seeding/Planting**

- Vegetative  Non-Vegetative
- Temporary  Permanent

**Description:** Permanent stabilization should begin immediately after final design grades are achieved but no later than 14 days after construction ceases. Native species of plants shall be used to establish vegetative cover on exposed soils.

**Installation** Portions of the site where construction activities have ceased shall be stabilized as soon as possible but no later than 14 days after construction ceases. Stabilization should preferably be done between April 1-May 31 and August 1 - September 10.

**Completion** November 1 - December 15.

**Maintenance Requirements** All seeded areas shall be inspected weekly during construction activities for failure and after storm events until a dense cover of vegetation is established. Should failure occur the area shall be reseeded, fertilized, and mulched immediately. After construction is completed permanently stabilized areas shall be monitored until final stabilization is reached.

**Design Specifications** Seeding shall be performed in accordance with the guidelines set forth in the attached Permanent Seeding Guidance, which is an excerpt from the publication entitled, "Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, May 2003, prepared by Franklin, Hampden, and Hampshire Conservation Districts." See Appendix N.

**Permanent Seeding**

Vegetative  Non-Vegetative

Temporary  Permanent

**Description:** Permanent seeding shall be applied immediately after the final design grades are achieved but no later than 14 days after construction activities have ceased. After site is stabilized any accumulated sediment shall be removed and hauled off-site for disposal. Construction debris, trash and temporary BMPs (including silt fencing, material storage areas, sanitary toilets, and inlet protection) shall also be removed and any areas disturbed during removal shall be seeded immediately.

**Seedbed Preparation**

In areas where disturbance results in subsoil being the final grade surface, topsoil shall be spread over the finished area at minimum depth of 2 to 6 inches.

The seedbed shall be free of large clods, rocks, woody debris and other objectionable materials.

Fertilizer and lime shall be applied to the seedbed according to the manufacturer’s recommendations.

The top layer of soil shall be loosened by raking, tilling, disking or other suitable means.

**Grass Selection/Application**

Common areas at the site shall be stabilized with a mixture of Tall Fescue, Creeping Red Fescue and Redtop at an application rate of 30 pounds per acre or 0.69 pounds per 1,000 square feet. Lawns shall be stabilized with a mixture of Kentucky Blue Grass and Creeping Red Fescue at an application rate of 100 pounds per acre or 2.3 pounds per 1,000 square feet.

Seed shall be applied uniformly by hydroseeding or broadcasting. Where broadcasting is used, the seed shall be covered with 0.25 inches of soil or less, by cultipacking or raking.

**Mulching**

a. Hydromulch shall be applied immediately following seeding at an application rate of 90-100 pounds (2-3 bales) per 1,000 square feet.

**Installation** Portions of the site where construction activities have permanently ceased shall be stabilized as soon as possible but no later than 14 days after construction ceases. Stabilization should preferably be done between April 1 and June 30.

**Completion** September 1 through September 30.

**Maintenance Requirements** All seeded areas shall be inspected weekly during construction activities for failure and after storm events until a dense cover of vegetation is established. Should failure occur the area shall be reseeded, fertilized, and mulched immediately. After construction is completed permanently stabilized areas shall be monitored until final stabilization is reached.

**Design Specifications** Seeding shall be performed in accordance with the guidelines set forth in the attached Permanent Seeding Guidance, which is an excerpt from the publication entitled, “Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, May 2003, prepared by Franklin, Hampden, and Hampshire Conservation Districts.” See Appendix N.

**6.5 | Pollution Prevention Standards**

**6.5.1 | Potential Sources of Pollution**

**Construction Site Pollutants**

<b>Pollutant-Generating Activity</b>	<b>Pollutants or Pollutant Constituents</b> (that could be discharged if exposed to stormwater)	<b>Location on Site</b> (or reference SWPPP site map where this is shown)
Fueling activities/equipment maintenance/storage	Benzene, ethyl benzene, toluene, xylene, MBTE, petroleum distillate, oil and grease, naphthalene, ethylene glycol, propylene glycol, heavy metals, mineral oil	Contractor staging area
Sanitary facilities	Bacteria, parasites, viruses	Contractor staging area
Dewatering	Sediment	Where necessary
Clearing and grubbing operations, grading and site excavation, vehicle tracking, topsoil stripping and stockpiling and landscaping operations	Sediment, chlorinated hydrocarbons, organophosphates, carbamates, arsenic, nitrogen, phosphorus	Proposed roadway, individual house lots, Refer to SWPPP site map
Paving/sidewalk operations	Oil, petroleum distillates	Along proposed roadway
Concrete pouring/mortar/stucco	Limestone, sand, pH, chromium	Individual house lots
Painting/painting washout	Metal oxides, stoddard solvent, talc, calcium carbonate, arsenic	Individual house lots
Building construction	Stoddard solvent, petroleum distillates, arsenic, copper, chromium, polymers, epoxies, calcium sulphate, calcium carbonate, sulfuric acid	Individual house lots

**6.5.2 | Spill Prevention and Response**

1. Employee Training: All employees shall be trained via biweekly tailgate sessions as detailed in Section 7.
2. Vehicle Maintenance: Vehicles shall be maintained off-site. All vehicles including subcontractor vehicles shall be checked for leaking oil and fluids. Vehicles leaking fluids shall not be allowed on-site. Drip pans shall be placed under all vehicles and equipment parked overnight.
3. Hazardous Material Storage: All waste materials shall be collected and disposed of into metal trash dumpsters in the combined staging area. Dumpsters shall be placed away from stormwater conveyances and drains and meet all local and state solid-waste management regulations. Only trash and construction debris from the site shall be deposited in the dumpsters. All personnel shall be instructed, during tailgate training sessions, regarding the correct procedure for disposal of trash and construction debris.
4. Spill Kits: Spill kits shall be within the materials storage area and concrete washout areas.



5. Spills: All spills shall be cleaned up immediately after discovery. The spill area shall be kept well ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with the hazardous substances. The project manager and the Engineer of Record shall be notified immediately. Spills of toxic or hazardous materials shall be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill. The Lynnfield Fire Department shall be contacted: Call 911 and the National Response Center at 1-800-424-8802. If the spill exceeds a Reportable Quantity, the SWPPP must be modified within seven (7) calendar days of knowledge of the discharge to provide a description of the release, the circumstances leading to the release, and the date of the release. The plans must identify measures to prevent the recurrence of such releases and to respond to such releases.
6. Material safety data sheets, a material inventory, and emergency contact information shall be maintained at the on-site project trailer.

**6.5.3 | Fueling and Maintenance of Equipment or Vehicles**

*General*

Minor fueling and maintenance of equipment or vehicles shall occur in the contractor staging area. All major equipment/vehicle maintenance shall be performed off-site.

*Specific Pollution Prevention Practices*

**Equipment Maintenance**

**Description:** Several types of vehicles and equipment shall be used on-site throughout the project, including graders, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes, and forklifts. All major equipment/vehicle maintenance shall be performed off-site. A small, 20-gallon pickup bed fuel tank shall be kept on-site in the staging area. When vehicle fueling must occur on-site, the fueling activity shall occur in the staging area. Only minor equipment maintenance shall occur on-site. All equipment fluids generated from maintenance activities shall be disposed of into designated drums stored on spill pallets in accordance with Section 6.5.2. Absorbent, spill-cleanup materials and spill kits shall be available at the staging and materials storage area. Drip pans shall be placed under all equipment receiving maintenance.

**Installation** Equipment and vehicle maintenance and fueling practices shall be implemented at the beginning of construction on-site.

**Maintenance Requirements** Inspect equipment/vehicle storage areas and fuel tank weekly and after storm events. Vehicles and equipment shall be inspected on each day of use. Leaks shall be repaired immediately, or the problem vehicle(s) or equipment shall be removed from the project site. Keep ample supply of spill-cleanup materials on-site and immediately clean up spills and dispose of materials properly.

**Design Specifications** N/A

**6.5.4 | Washing of Equipment and Vehicles**

*General*

All equipment and vehicle washing shall be performed off-site.



### **6.5.5 | Storage, Handling, and Disposal of Building Products, Materials, and Wastes**

#### **6.5.5.1 Building Products**

##### **General**

The project will result in construction and domestic debris and waste. Contractor shall provide facilities to properly handle and dispose of waste with considerations for health and safety of the employees and adjacent uses.

##### **Pollution Prevention Practices**

1. All waste materials shall be collected and stored in secure metal dumpsters rented from a licensed solid waste management company in Massachusetts.
2. The dumpsters shall meet all local and state solid waste management regulations as outlined in 310 CMR 19.00. All trash and construction debris generated on site shall be disposed of in the dumpsters.
3. The dumpsters shall be emptied as often as necessary during construction and transferred to an approved solid waste facility licensed to accept municipal solid waste and/or construction and demolition debris.
4. No construction waste shall be buried on site.
5. All personnel shall be instructed regarding the correct procedure for waste disposal.

#### **6.5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials General**

##### **General**

The use of fertilizers and pesticides on-site are limited to the proposed landscaped areas and the outlying grass areas that are disturbed during construction.

##### **Pollution Prevention Practices**

1. Follow all federal, state, and local regulations that apply to the use, handling, or disposal of pesticides and fertilizers.
2. Do not handle the materials any more than necessary.
3. Store pesticides and fertilizers in a dry, covered area.
4. Construct berms or dikes to contain stored pesticides and fertilizers in case of spillage.
5. Follow the recommended application rates and methods.
6. Have equipment and absorbent materials available in storage and application areas to contain and clean up any spills that occur.

#### **6.5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals**

##### **General**

Minor fueling and maintenance of equipment or vehicles shall occur in the contractor staging area. All major equipment/vehicle maintenance shall be performed off-site.

##### **Pollution Prevention Practices**

1. Store new and used petroleum products for vehicles in covered areas with berms or dikes in place to contain any spills.
2. Immediately contain and clean up any spills with absorbent materials.
3. Have equipment available in contractor staging area and in vehicles to contain and clean up any spills that occur.

#### **6.5.5.4 Hazardous or Toxic Waste General**

**General**

It is anticipated that the project will result in minimal amounts of toxic or hazardous waste.

**Pollution Prevention Practices**

In the event hazardous or toxic materials are present, the contractor shall:

1. Consult with local waste management authorities about the requirements for disposing of hazardous materials.
2. To prevent leaks, empty and clean hazardous waste containers before disposing of them.
3. Never remove the original product label from the container because it contains important safety information. Follow the manufacturer’s recommended method of disposal, which should be printed on the label.
4. Never mix excess products when disposing of them, unless specifically recommended by the manufacturer.
5. To ensure the proper disposal of contaminated soils that have been exposed to and still contain hazardous substances, consult with state or local solid waste regulatory agencies or private firms. Some landfills might accept contaminated soils, but they require laboratory tests first. Any disposal of contaminated soils shall be coordinated with the Project Engineer, LSP and shall conform to all State and Local Regulations.

**6.5.5.5 Construction and Domestic Waste General**

**General**

The project will result in construction and domestic debris and waste. Contractor shall provide facilities to properly handle and dispose of waste with considerations for health and safety of the employees and adjacent uses.

**Pollution Prevention Practices**

1. Designate a waste collection area on site that does not receive a substantial amount of runoff from upland areas and does not drain directly to a water body.
2. Ensure that containers have lids so they can be covered before periods of rain, and keep containers in a covered area whenever possible.
3. Schedule waste collection to prevent the containers from overflowing.
4. Clean up spills immediately. For hazardous materials, follow cleanup instructions on the package. Use an absorbent material such as sawdust or kitty litter to contain the spill.
5. During the demolition phase of construction, provide extra containers and schedule more frequent pickups.
6. Collect, remove and dispose of all construction site wastes at authorized disposal areas. Contact a local environmental agency to identify these disposal sites.

**6.5.5.6 Sanitary Waste**

**General**

Temporary facilities shall be provided by the contractor for on-site use by employees. Facilities shall be located in areas to minimize the potential for impacting stormwater runoff quality. The facilities shall have routine inspections and shall be scheduled for waste collection as needed. All sanitary shall be collected from portable units, as needed, by a licensed septage hauler in Massachusetts, in accordance with the requirements of the local Board of Health.

**6.5.6 | Washing of Applicators and Containers used for Paint, Concrete or Other Materials**

**General**

Minimal washout is anticipated on the project site.

**Pollution Prevention Practices**

1. Direct all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation.
2. Do not dump liquid wastes in storm sewers.
3. Dispose of liquid wastes in accordance with applicable requirements in section 5.5.
4. Remove and dispose of hardened concrete waste consistent with handling of other construction wastes in section 5.5 and locate any washout or cleanout activities as far away as possible from surface waters and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

**6.5.7 | Fertilizers**

**General**

Fertilizers shall be applied at a rate and amount consistent with manufacturer’s specifications. Once applied, fertilizers shall be worked into the soil to limit exposure to stormwater.

**Pollution Prevention Practices**

1. Fertilizers shall be applied at a time during the year recommended by the manufacturer.
2. Avoid applying fertilizers during periods of heavy rainfall.
3. Avoid applying fertilizers to frozen ground.
4. Avoid applying fertilizers to stormwater conveyance channels.
5. Fertilizers shall be applied according to all applicable federal, state, and local requirements.

**6.5.8 | Other Pollution Prevention Practices**

**General**

Contractor shall provide information below regarding additional pollution prevention practices that are implemented during construction that are not described above.

**6.6 | Inspection, Maintenance, and Corrective Action**

**6.6.1 | Inspection Personnel and Procedures**

**Personnel Responsible for Inspections**

TBD

**Inspection Schedule**

Select the inspection frequency(ies) that applies, based on CGP Parts 4.2, 4.3, or 4.4

**Standard Frequency:**

- Every 7 days
- Every 14 days and within 24 hours of a 0.25” rain or the occurrence of runoff from snowmelt sufficient to cause a discharge

**Increased Frequency (if applicable):**

For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3

Every 7 days and within 24 hours of a 0.25" rain

**Reduced Frequency (if applicable)**

For stabilized areas

Twice during first month, no more than 14 calendar days apart; then once per month after first month;

**For stabilized areas on "linear construction sites"**

Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain

**For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought**

Once per month and within 24 hours of a 0.25" rain

Insert beginning and ending dates of the seasonally-defined dry period for your area or the valid period of drought:

Beginning date of seasonally dry period:

Ending date of seasonally dry period:

**For frozen conditions where earth-disturbing activities are being conducted**

Once per month

Rain Gauge Location (if applicable)

**Inspection Report Forms**

See Appendix F

**6.6.2 | Corrective Action**

**Personnel Responsible for Corrective Actions**

**Corrective Action Forms**

See Appendix G

**6.6.3 | Delegation of Authority**

**Duly Authorized Representative(s) or Position(s):**

HPI, LLC

Michael Hannon

23 Stiles Road, Suite 104

Salem, NH 03079

603 893 7668

mhannon@salemradnh.com

**6.7 | Training**

**Table 7-1: Documentation for Completion of Training**

Name	Describe Training	Date Training Completed

**6.8 | Certification and Notification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## 7 | NRCS Web Soil Survey

# Soil Information for All Uses

---

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

## Hydrologic Soil Group

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.



Custom Soil Resource Report

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.





Custom Soil Resource Report  
Map—Hydrologic Soil Group





### 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

**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 1:15,800.

**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: [www.nrcs.usda.gov/wss](http://www.nrcs.usda.gov/wss)  
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: Essex County, Massachusetts, Southern Part  
Survey Area Data: Version 15, Sep 7, 2018

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

Date(s) aerial images were photographed: Aug 29, 2014—Sep 19, 2014

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.



Custom Soil Resource Report

**Table—Hydrologic Soil Group**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
52A	Freetown muck, 0 to 1 percent slopes	B/D	0.5	3.2%
306B	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	C	0.4	2.8%
306C	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	C	3.7	25.2%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	C/D	7.5	51.7%
622C	Paxton-Urban land complex, 3 to 15 percent slopes	C	2.5	17.1%
<b>Totals for Area of Interest</b>			<b>14.5</b>	<b>100.0%</b>

**Rating Options—Hydrologic Soil Group**

*Aggregation Method: Dominant Condition*  
*Component Percent Cutoff: None Specified*  
*Tie-break Rule: Higher*



## 8 | *Snow Disposal Guidelines*

The following Snow Disposal Guidance is reproduced from the Mass.gov website:

<https://www.mass.gov/guides/snow-disposal-guidance>

The Massachusetts Department of Environmental Protection's Snow Disposal Guidance offers information on the proper steps to take when locating sites for the disposal of snow. Finding a place to dispose of collected snow poses a challenge to municipalities and businesses as they clear roads, parking lots, bridges, and sidewalks. Public safety is of the utmost importance. However, care must be taken to ensure that collected snow, which may be contaminated with road salt, sand, litter, and automotive pollutants such as oil, is disposed of in a manner that will minimize threats to nearby sensitive resource areas.

In order to avoid potential contamination to wetlands, water supplies, and waterbodies, MassDEP recommends that municipalities and businesses identify and map appropriate upland snow disposal locations. To assist municipalities and businesses in this planning effort, and to avoid use of snow disposal at sites which compromise wetlands resources or public water supplies, MassDEP has developed this snow disposal mapping tool:

<https://maps.env.state.ma.us/dep/arcgis/js/templates/PSF/>

If a community or business demonstrates that there is no remaining capacity at upland snow disposal locations, local conservation commissions are authorized to issue Emergency Certifications under the Massachusetts Wetlands Protection Act for snow disposal in certain wetland resource areas. In such cases, Emergency Certifications can only be issued at the request of a public agency or by order of a public agency for the protection of the health or safety of citizens, and are limited to those activities necessary to abate the emergency.

In the event of a regional or statewide severe weather event, MassDEP may also issue a broader Emergency Declaration under the Wetlands Protect Act which allows greater flexibility in snow disposal practices. Details of this approval process are found below.

### **Snow Disposal Guidance**

**Effective Date:** December 21, 2015

**Applicability:** Applies to all federal, state, regional and local agencies, as well as to private businesses.

**Supersedes:** BRP Snow Disposal Guideline No. BRPG01-01 issued March 8, 2001, and all previous snow disposal guidance.

**Approved by:** Douglas Fine, Assistant Commissioner for Water

**PURPOSE:** To provide guidelines to all government agencies and private businesses regarding snow disposal site selection, site preparation and maintenance, and emergency snow disposal options that are protective of wetlands, drinking water, and water bodies, and are acceptable to the Massachusetts Department of Environmental Protection (MassDEP), Bureau of Water Resources.

**APPLICABILITY:** These Guidelines are issued by MassDEP’s Bureau of Water Resources on behalf of all Bureau Programs (including Drinking Water Supply, Wetlands and Waterways, Wastewater Management, and Watershed Planning and Permitting). They apply to public agencies and private businesses disposing of snow in the Commonwealth of Massachusetts.

## **INTRODUCTION**

Finding a place to dispose of collected snow poses a challenge to municipalities and businesses as they clear roads, parking lots, bridges, and sidewalks. While we are all aware of the threats to public safety caused by snow, collected snow that is contaminated with road salt, sand, litter, and automotive pollutants such as oil also threatens public health and the environment.

As snow melts, road salt, sand, litter, and other pollutants are transported into surface water or through the soil where they may eventually reach the groundwater. Road salt and other pollutants can contaminate water supplies and are toxic to aquatic life at certain levels. Sand washed into waterbodies can create sand bars or fill in wetlands and ponds, impacting aquatic life, causing flooding, and affecting our use of these resources.

There are several steps that communities can take to minimize the impacts of snow disposal on public health and the environment. These steps will help communities avoid the costs of a contaminated water supply, degraded waterbodies, and flooding. Everything we do on the land has the potential to impact our water resources. Given the authority of local government over the use of the land, municipal officials and staff have a critically important role to play in protecting our water resources.

The purpose of these guidelines is to help municipalities and businesses select, prepare, and maintain appropriate snow disposal sites before the snow begins to accumulate through the winter. Following these guidelines and obtaining the necessary approvals may also help municipalities in cases when seeking reimbursement for snow disposal costs from the Federal Emergency Management Agency is possible.

## **RECOMMENDED GUIDELINES**

These snow disposal guidelines address: (1) site selection; (2) site preparation and maintenance; and (3) emergency snow disposal.

### **1. SITE SELECTION**

The key to selecting effective snow disposal sites is to locate them adjacent to or on pervious surfaces in upland areas or upland locations on impervious surfaces that have functioning and maintained storm water management systems away from water resources and drinking water wells. At these locations, the snow meltwater can filter in to the soil, leaving behind sand and debris which can be removed in the springtime. The following areas should be avoided:

- Avoid importing snow from outside a Zone II or Interim Wellhead Protection Area (IWPA) of a public water supply well or within 75 feet of a private well, where road salt may contaminate water supplies. Only snow from within the Zone II or IWPA should be disposed of within this resource area so as not to increase the potential for pollution of water supplies.

- Avoid dumping of snow into any waterbody, including rivers, the ocean, reservoirs, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid dumping snow on MassDEP-designated high and medium-yield aquifers where it may contaminate groundwater.
- Avoid dumping snow in sanitary landfills and gravel pits. Snow meltwater will create more contaminated leachate in landfills posing a greater risk to groundwater, and in gravel pits, there is little opportunity for pollutants to be filtered out of the meltwater because groundwater is close to the land surface.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

### *Recommended Site Selection Procedures*

It is important that the municipal Department of Public Works or Highway Department, Conservation Commission, and Board of Health work together to select appropriate snow disposal sites. The following steps should be taken:

1. Estimate how much snow disposal capacity may be needed for the season so that an adequate number of disposal sites can be selected and prepared.
2. Identify sites that could potentially be used for snow disposal, such as municipal open space (e.g., parking lots or parks).
3. Sites located in upland locations that are not likely to impact sensitive environmental resources should be selected first.
4. If more storage space is still needed, prioritize the sites with the least environmental impact (using the site selection criteria, and local or MassGIS maps as a guide).

### *Snow Disposal Mapping Assistance*

MassDEP has an online mapping tool to assist municipalities and businesses in identifying possible locations to potentially dispose of snow, should the need arise. The disposal locations depicted on these maps will also aid MassDEP and the Massachusetts Emergency Management Agency assist communities with snow disposal in the event of severe winter storm emergencies. The tool identifies wetland resource areas, public drinking water supplies and other sensitive locations where snow should not be disposed. The tool may be accessed through the Internet at the following web address:

<https://maps.env.state.ma.us/dep/arcgis/js/templates/PSE/>.

By clicking on the link for the OLIVER Online Data Viewer, communities can select your town and overlay different resource areas. The MassGIS site includes MassDEP orthophoto maps depicting local wetland resources, hard copies of which were mailed to each Conservation Commission in the past.

## **2. SITE PREPARATION AND MAINTENANCE**

In addition to carefully selecting disposal sites before the winter begins, it is important to prepare and maintain these sites to maximize their effectiveness. The following maintenance measures should be undertaken for all snow disposal sites:

- A silt fence or equivalent barrier should be placed securely on the downgradient side of the snow disposal site.
- To filter pollutants out of the meltwater, wherever possible a 50-foot vegetative buffer strip should be maintained during the growth season between the disposal site and adjacent waterbodies.
- Debris should be cleared from the site prior to using the site for snow disposal.

Debris should be cleared from the site and properly disposed of at the end of the snow season and no later than May 15.

### 3. SNOW DISPOSAL APPROVALS

Proper snow disposal may be undertaken through one of the following approval procedures:

1. Routine snow disposal – Minimal, if any, administrative review is required in these cases when upland and pervious snow disposal locations or upland locations on impervious surfaces that have functioning and maintained storm water management systems have been identified, mapped, and used for snow disposal following ordinary snowfalls. Use of upland and pervious snow disposal sites avoids wetland resource areas and allows snow meltwater to recharge groundwater and will help filter pollutants, sand, and other debris. This process will address the majority of snow removal efforts until a community exhausts all available upland snow disposal sites. The location and mapping of snow disposal sites will help facilitate each municipality’s routine snow management efforts.
2. Emergency Certifications – If a community or business demonstrates that there is no remaining capacity at upland snow disposal locations, local conservation commissions are authorized to issue Emergency Certifications under the Massachusetts Wetlands Protection Act for snow disposal in buffer zones to wetlands, certain open water areas, and certain wetland resource areas, i.e. within flood plains. In such cases, Emergency Certifications can only be issued at the request of a public agency for the protection of the health or safety of citizens or by order of a public agency, and limited to those activities necessary to abate the emergency. Use the following guidelines in these emergency situations:
  - a. Dispose of snow in open water with adequate flow and mixing to prevent ice dams from forming.
  - b. Do not dispose of snow in salt marshes, vegetated wetlands, certified vernal pools, shellfish beds, mudflats, drinking water reservoirs and their tributaries, Zone IIs or IWPA’s of public water supply wells, Outstanding Resource Waters, or Areas of Critical Environmental Concern.
  - c. Do not dispose of snow where trucks may cause shoreline damage or erosion.
  - d. Consult with the municipal Conservation Commission to ensure that snow disposal in open water complies with local ordinances and bylaws.
3. Emergency Declarations – In the event of a large-scale severe weather event, MassDEP may issue a broader Emergency Declaration under the Wetlands Protection Act which allows municipalities greater flexibility in snow disposal practices. Emergency Declarations typically authorize greater snow disposal options while protecting especially sensitive resources such as public drinking water supplies, vernal pools, land containing shellfish, FEMA designated floodways, coastal dunes, and salt marsh. In the event of severe winter storm emergencies, the snow disposal site maps created by municipalities will assist MassDEP and the Massachusetts Emergency



Management Agency in helping communities identify appropriate snow disposal locations.

If upland disposal sites have been exhausted, the Emergency Declaration issued by MassDEP allows for snow disposal near water bodies. A buffer of at least 50 feet, preferably vegetated, should still be maintained between the site and the waterbody in these situations. Furthermore, it is essential that the other guidelines for preparing and maintaining snow disposal sites be followed to minimize the threat to adjacent waterbodies.

Under extraordinary conditions, when all land-based snow disposal options are exhausted, the Emergency Declaration issued by MassDEP may allow disposal of snow in certain waterbodies under certain conditions. *A municipality seeking to dispose of snow in a waterbody should take the following steps:*

- a. Call the emergency contact phone number - 1-888-304-1133 - and notify the MEMA bunker personnel of the municipality's intent.
- b. The MEMA bunker personnel will ask for some information about where the requested disposal will take place.
- c. The MEMA bunker personnel will confirm that the disposal is consistent with MassDEP's Emergency Declaration and these guidelines and is therefore approved.

During declared statewide snow emergency events, MassDEP's website will also highlight the emergency contact phone number (1-888-304-1133) for authorizations and inquiries. For further non-emergency information about this Guidance you may contact your MassDEP Regional Office Service Center:

**Northeast Regional Office, Wilmington, 978-694-3249**  
**Southeast Regional Office, Lakeville, 508-946-2714**  
**Central Regional Office, Worcester, 508-767-2722**  
**Western Regional Office, Springfield, 413-784-1100**





## 9 | *Deicing Chemical (Road Salt) Storage*

The following Snow Disposal Guidance is reproduced from the Mass.gov website:

<https://www.mass.gov/guides/guidelines-on-road-salt-storage>

Effective Date: December 19, 1997

Guideline No. DWSG97-1

Applicability: Applies to all parties storing road salt or other chemical deicing agents.

Supersedes: Fact Sheet: DEICING CHEMICAL (ROAD SALT) STORAGE (January 1996)

Approved by: Arleen O'Donnell, Asst. Commissioner for Resource Protection

**PURPOSE:** To summarize salt storage prohibition standards around drinking water supplies and current salt storage practices.

**APPLICABILITY:** These guidelines are issued on behalf of the Bureau of Resource Protection's Drinking Water Program. They apply to all parties storing road salt or other chemical deicing agents.

### **The Road Salt Problem**

Historically, there have been incidents in Massachusetts where improperly stored road salt has polluted public and private drinking water supplies. Recognizing the problem, state and local governments have taken steps in recent years to remediate impacted water supplies and to protect water supplies from future contamination. As a result of properly designing storage sheds, new incidents are uncommon. These guidelines summarize salt storage prohibition standards around drinking water supplies and current salt storage practices.

### **Salt Pile Restrictions in Water Supply Protection Areas**

Uncovered storage of salt is forbidden by Massachusetts General Law Chapter 85, section 7A in areas that would threaten water supplies. The Drinking Water Regulations, 310 CMR 22.21(2)(b), also restrict deicing chemical storage within wellhead protection areas (Zone I and Zone II) for public water supply wells, as follows: "storage of sodium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads [are prohibited], unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate." For drinking water reservoirs, 310 CMR 22.20C prohibits, through local bylaw, uncovered or uncontained storage of road or parking lot de-icing and sanding materials within Zone A at new reservoirs and at those reservoirs increasing their withdrawals under MGL Chapter 21G, the Water Management Act.

For people on a low-sodium diet, 20 mg/L of sodium in drinking water is consistent with the bottled water regulations' meaning of "sodium free." At 20 mg/L, sodium contributes 10% or less to the sodium level in people on a sodium-restricted diet.

### **Salt Storage Best Management Practices**

Components of an "environment-friendly" roadway deicing salt storage facility include:  
the right site = a flat site;  
adequate space for salt piles;



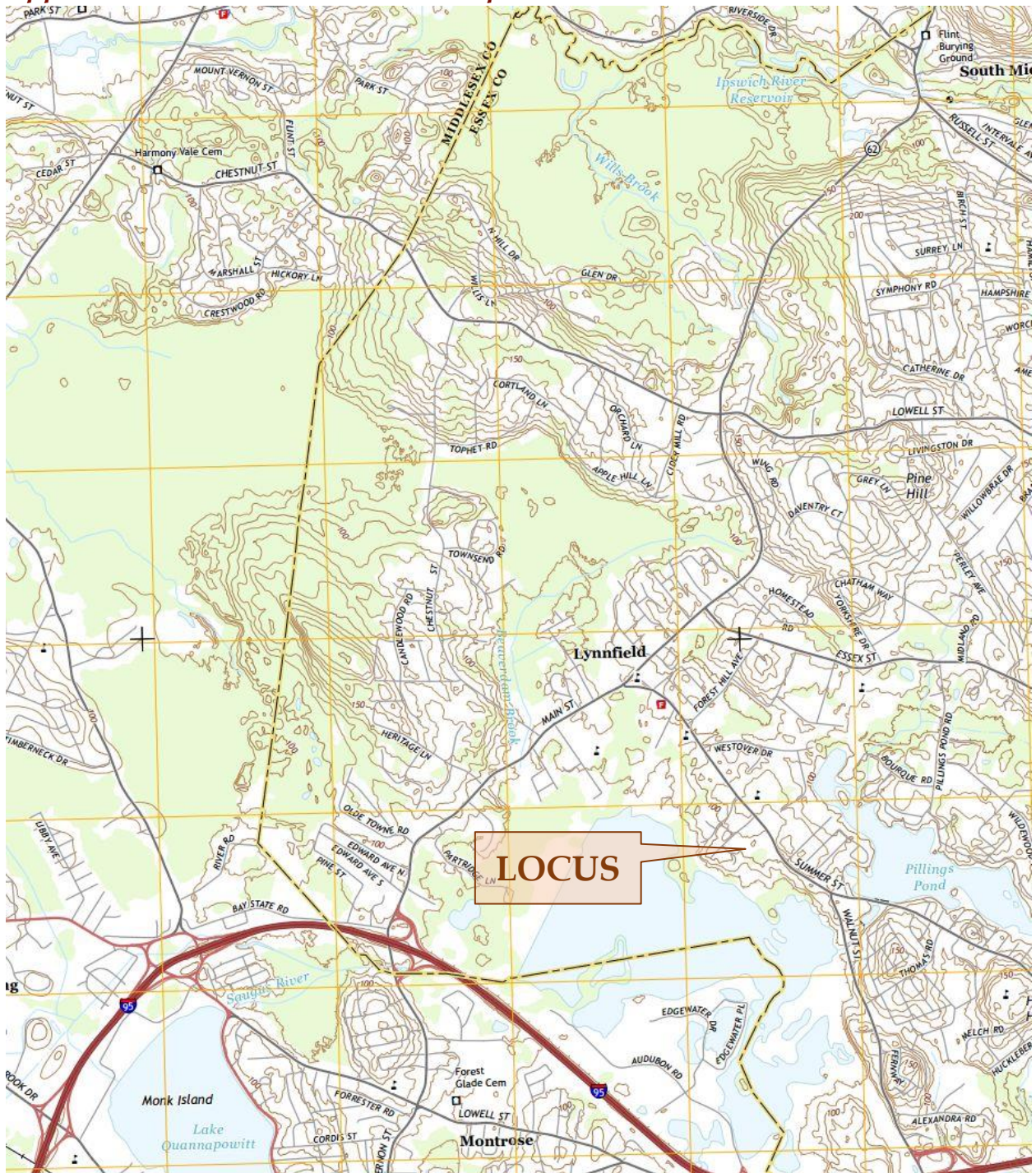
storage on a pad (impervious/paved area);  
storage under a roof; and  
runoff collection/containment.

For more information, see *The Salt Storage Handbook*, 6th ed. Virginia: Salt Institute, 2006.

### **Salt Storage Practices of the Massachusetts Highway Department**

The Massachusetts Highway Department (MHD) has 216 permanent salt storage sheds at 109 locations in the state. On leased land and state land under arteries and ramps, where the MHD cannot build sheds, salt piles are stored under impermeable material. This accounts for an additional 15 sites. The MHD also administers a program to assist municipalities with the construction of salt storage sheds. Of 351 communities, 201 municipalities have used state funds for salt storage facilities.

### Appendix A - General Location Map



USGS Locus Map  
333, 339 & 349 Summer Street  
Lynnfield, MA  
Reading Quadrangle  
10' contour interval NAVD88

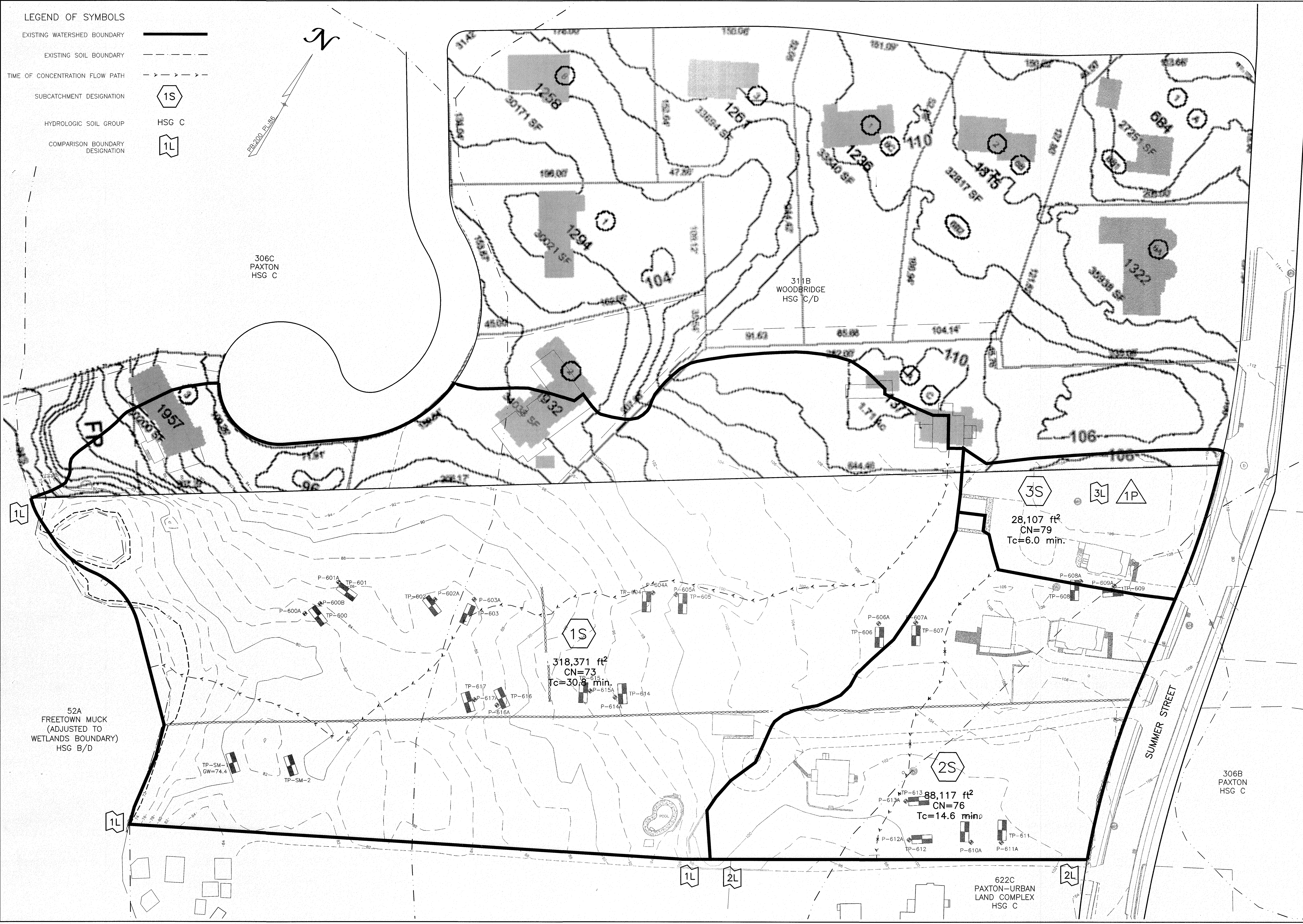
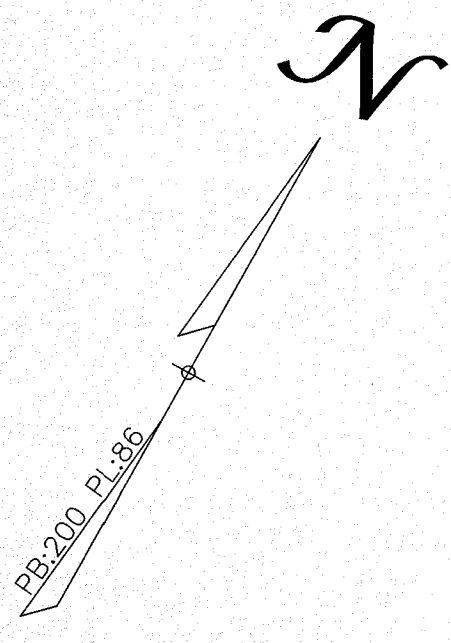


*Appendix B - Site Maps*



LEGEND OF SYMBOLS

- EXISTING WATERSHED BOUNDARY
- EXISTING SOIL BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- SUBCATCHMENT DESIGNATION
- HYDROLOGIC SOIL GROUP HSG C
- COMPARISON BOUNDARY DESIGNATION



**WILLIAMS & SPARAGES**  
 150 WOODVILLE AVENUE  
 SUITE 101  
 MIDDLETON, MA 01948  
 TEL: (978) 339-8200  
 FAX: (978) 339-8200  
 WSDSIGNERS.COM

Owner: See Subdivision Plan Sheet Set  
 Applicant: HDI, LLC  
 23 Stiles Road, Suite 104  
 Salem, NH 03079

Designed By: MEM  
 Drawn By: MEM  
 Reviewed By: CPS  
 Project Manager: LYNF-0100  
 Job File Number: LYNF100  
 Drawing File Folder: LYNF100

Drawing Issued for Review Only  
 Drawing Issued for Permit  
 Drawing Issued for Construction

SEAL

3-29-2019

**EXISTING CONDITION WATERSHED MAP**  
**ROAD A**  
 #333, 339 & 357 SUMMER STREET, LYNNFIELD, MA

DRAWING: W1  
 SHEET 1 OF 1

SCALE: 1"=40'

NOVEMBER 21, 2018

TOWN COMMENTS/PEER REVIEW

6	80'
5	40'
4	
3	
2	
1	

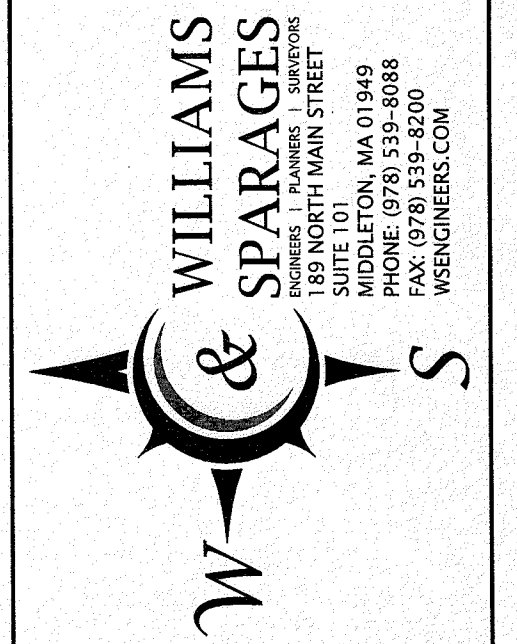
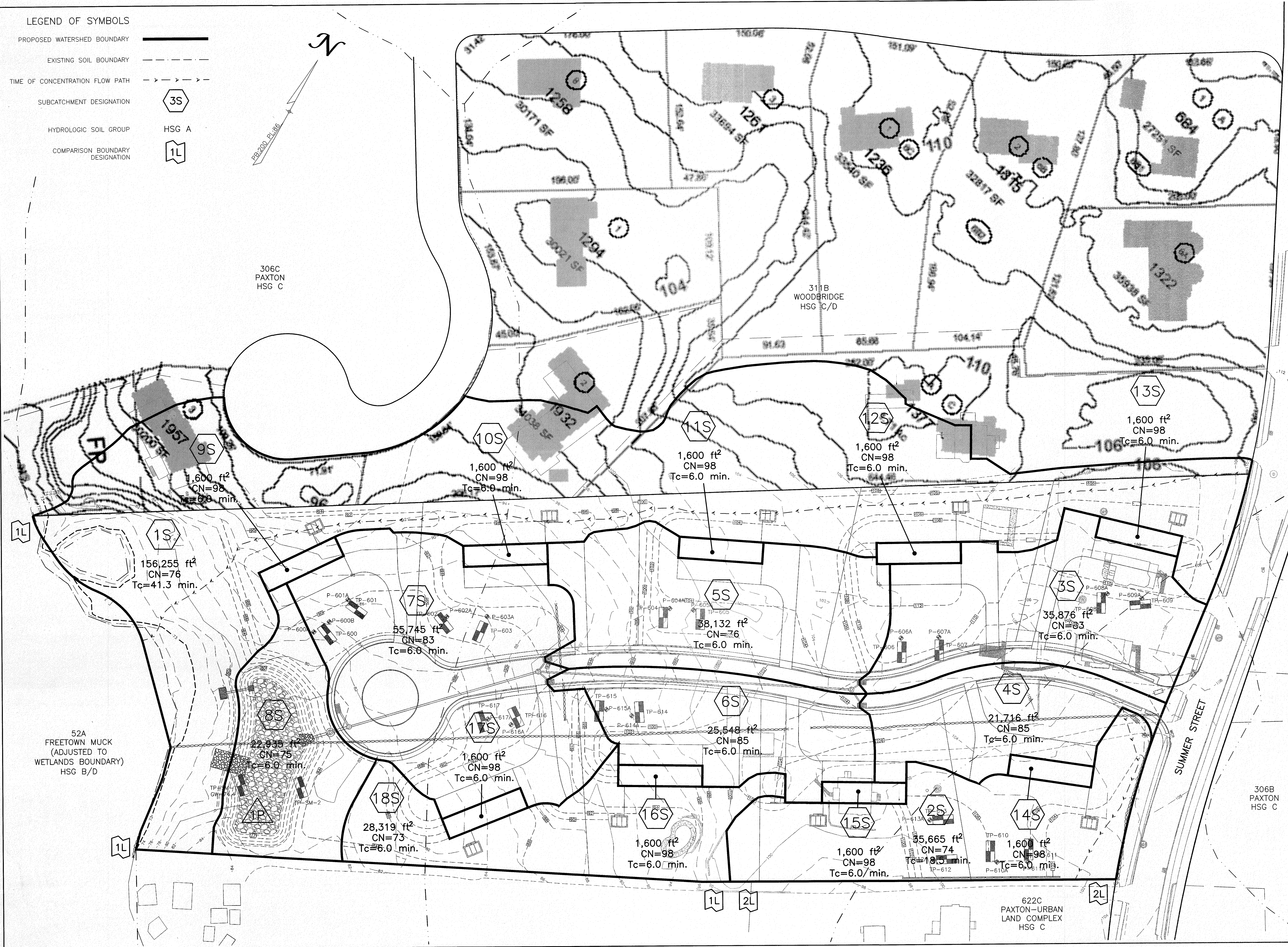
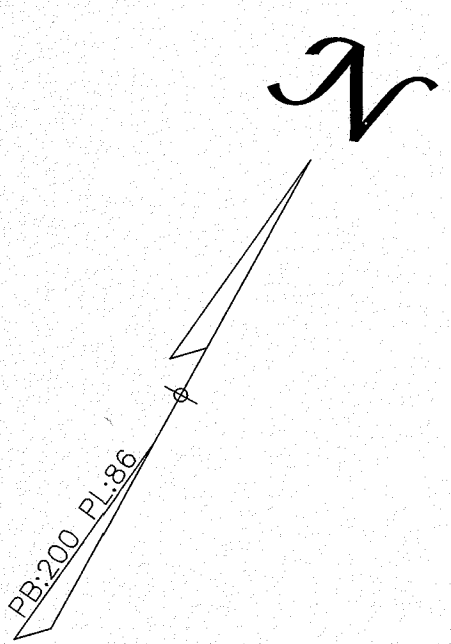
3/28/2019

PLYNF-0100339 & 349 Summer Street\Drawings\Drawings\339349\_357\0100339\_357.dwg, 3/20/2019 6:52:36 AM, MEM



LEGEND OF SYMBOLS

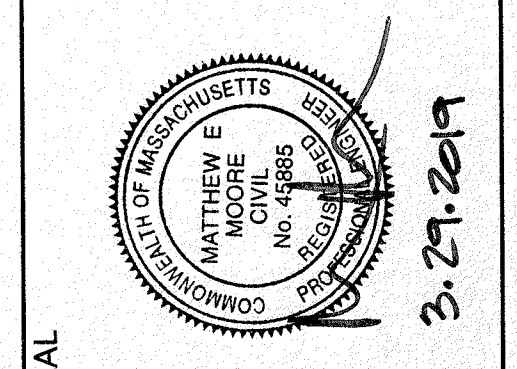
- PROPOSED WATERSHED BOUNDARY
- EXISTING SOIL BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- SUBCATCHMENT DESIGNATION
- HYDROLOGIC SOIL GROUP
- COMPARISON BOUNDARY DESIGNATION



Owner: See Subdivision Plan Sheet Set  
 Applicant: HDI, LLC  
 23 Stiles Road, Suite 104  
 Salem, NH 03079

Designed By: MEM  
 Drawn By: MEM  
 Reviewed By: CFS  
 Project Manager: LYNF-0100  
 Job File Number: LYNF100  
 Drawing File Folder: LYNF100

Drawing Issued for Review Only  
 Drawing Issued for Permit  
 Drawing Issued for Construction



SEAL

**PROPOSED CONDITION WATERSHED MAP**  
**ROAD A**  
 #333, 339 & 357 SUMMER STREET, LYNNFIELD, MA

DRAWING: W2  
 SHEET 1 OF 1

NOVEMBER 21, 2018

SCALE: 1"=40'

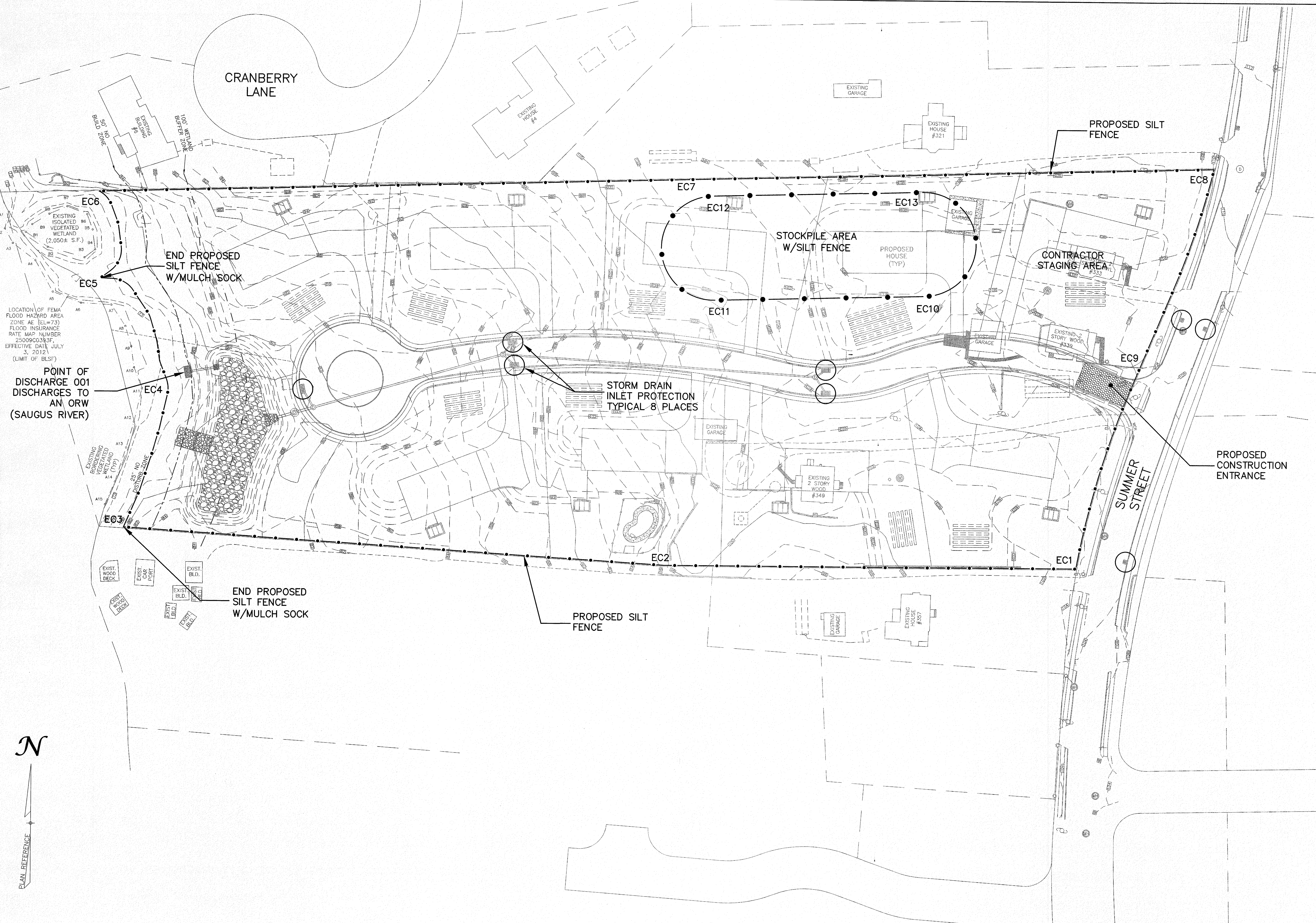
TOWN COMMENTS/FEED REVIEW

6	80'
5	40'
4	20'
3	
2	
1	

3/28/2019

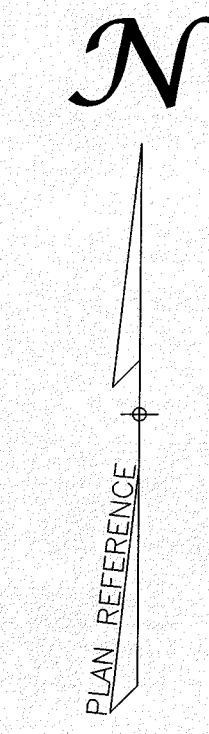
P:\NF-0100010018 & 340 Summer Street\Drawings\Drawings\333,339, & 357 Summer Street\333,339, & 357 Summer Street.dwg, 1/26/2019 10:52:58 AM, MEM





LOCATION OF FEMA FLOOD HAZARD AREA ZONE AE (1=73) FLOOD INSURANCE RATE MAP NUMBER 2500900393F EFFECTIVE DATE JULY 3, 2012 (LIMIT OF BLSF)

POINT OF DISCHARGE 001 DISCHARGES TO AN ORW (SAUGUS RIVER)



**STORMWATER POLLUTION PREVENTION PLAN SITE MAP**

**ROAD A**

333, 339 & 349 SUMMER STREET, LYNNFIELD, MA

NOVEMBER 21, 2018

SCALE: 1"=40'

0' 20' 40' 80'

DRAWING: E1.1

SHEET 1 OF 2

3/28/2019

TOWN COMMENTS/PEER REVIEW

SEAL

MATTHEW E. HARRIS

CIVIL ENGINEER

NO. 4886

3/29/2019

Designed By: MEM  
 Drawn By: MEM  
 Reviewed By: CFS  
 Project Manager: LYBF-0100  
 Job File Number: LYBF-0100  
 Drawing File Folder: LYNF100

Drawing Issued for Review Only  
 Drawing Issued for Permit  
 Drawing Issued for Construction

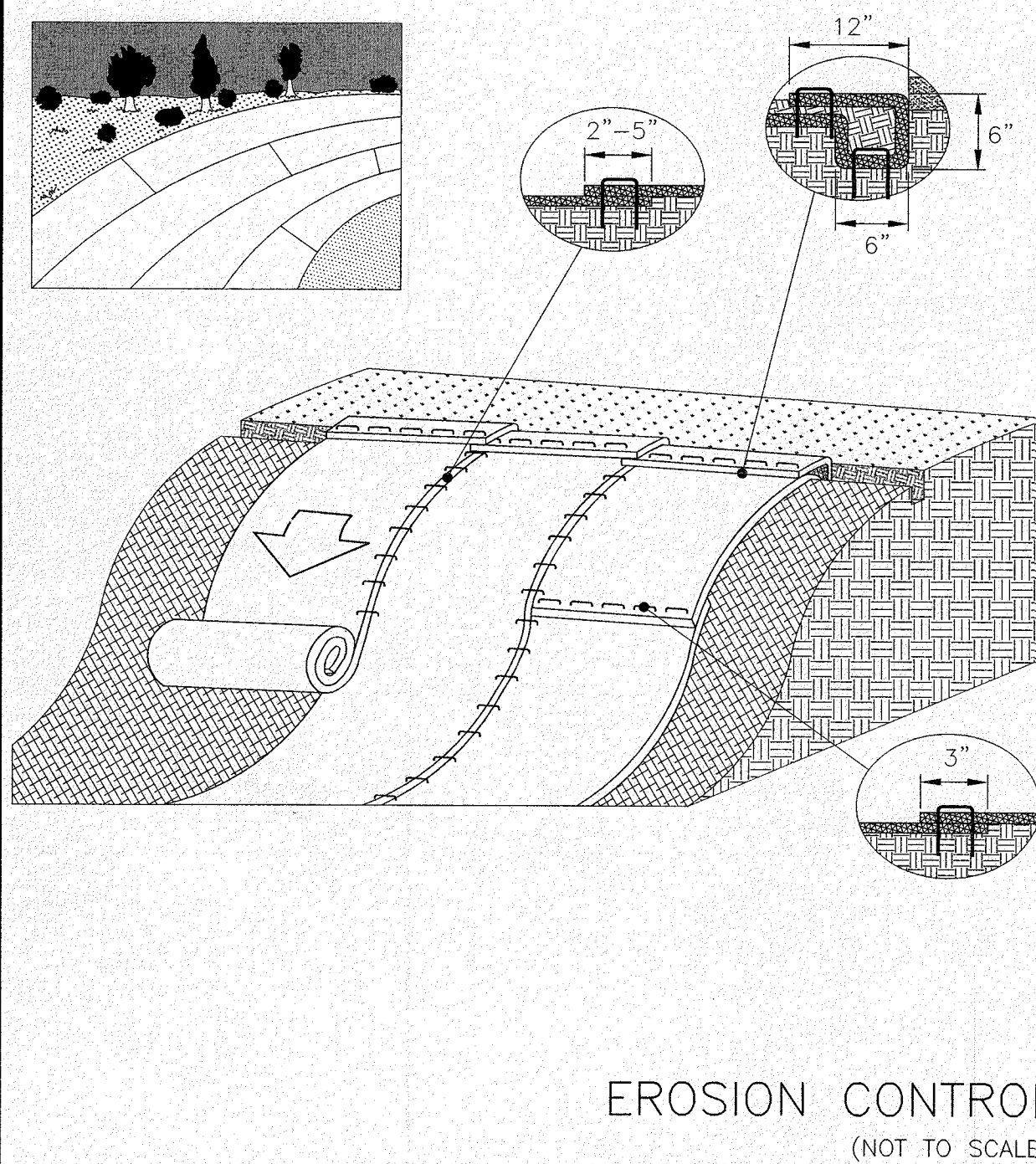
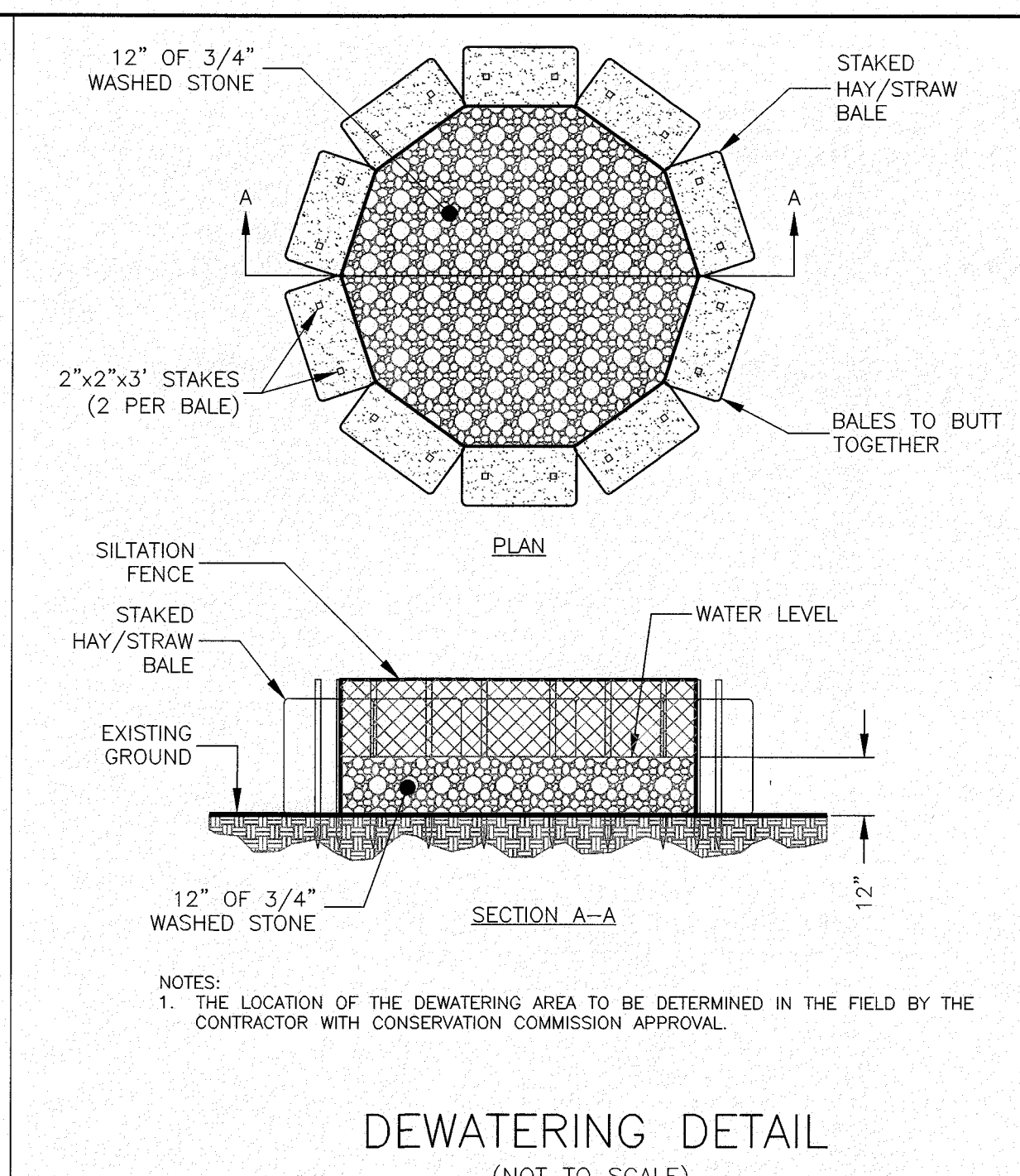
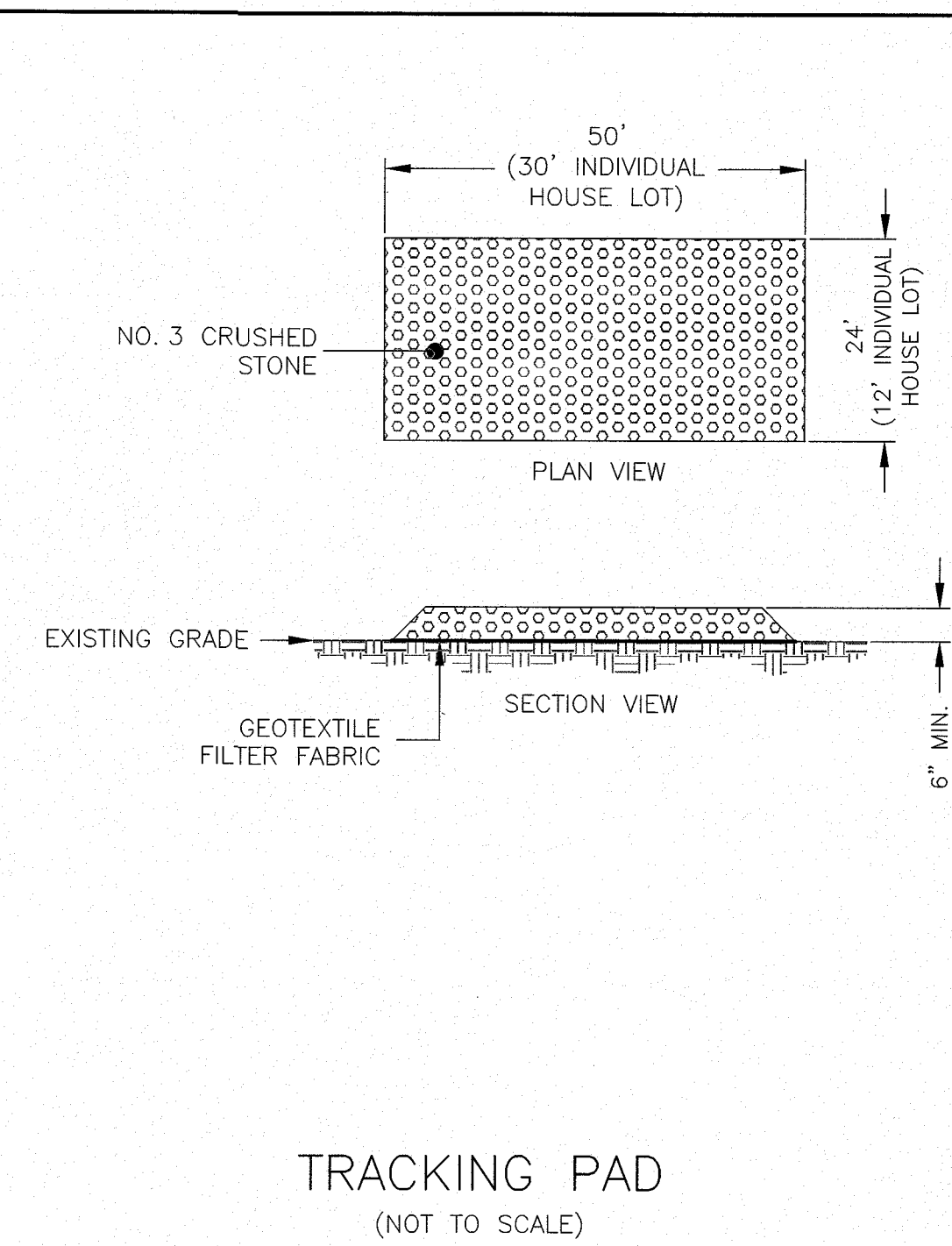
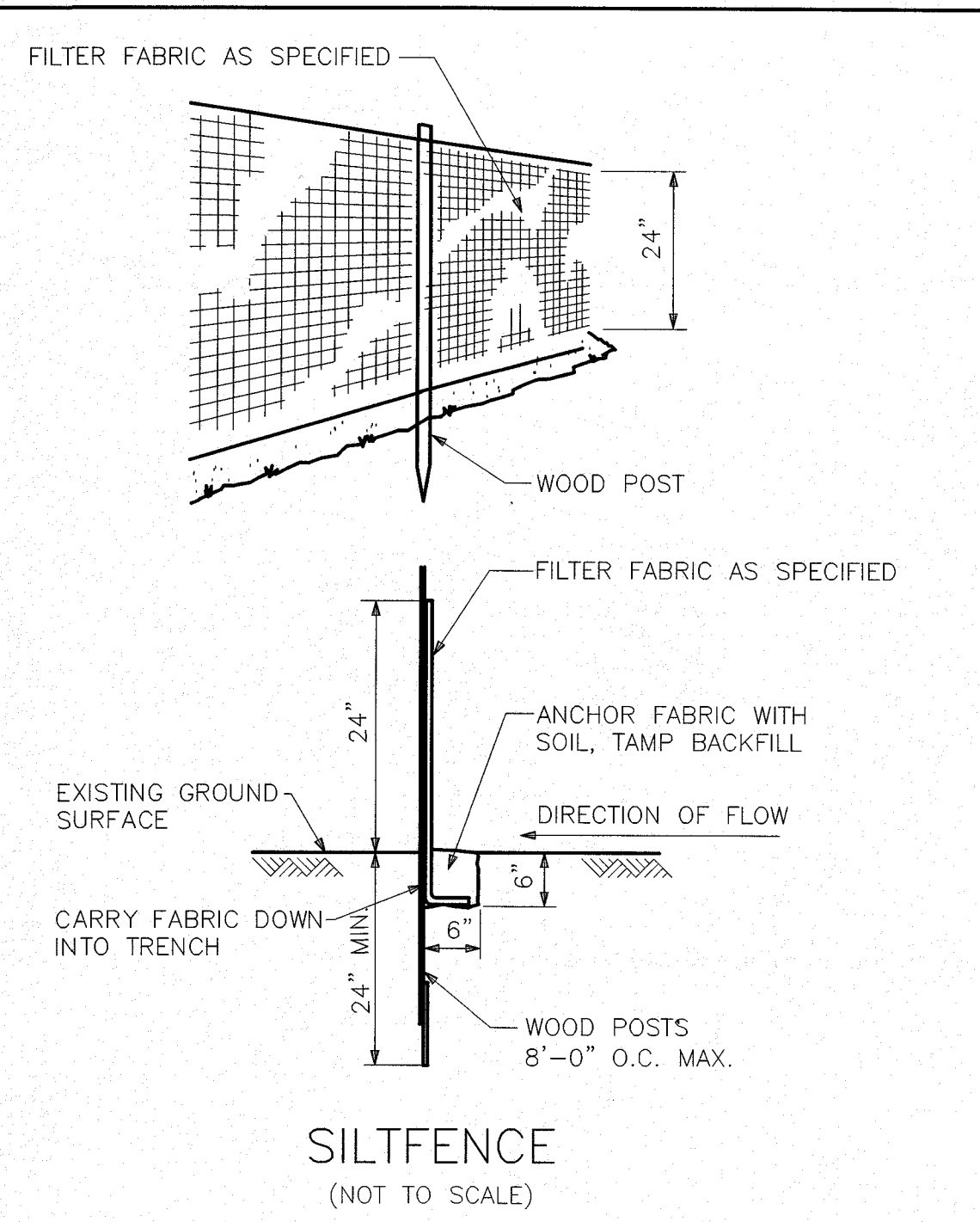
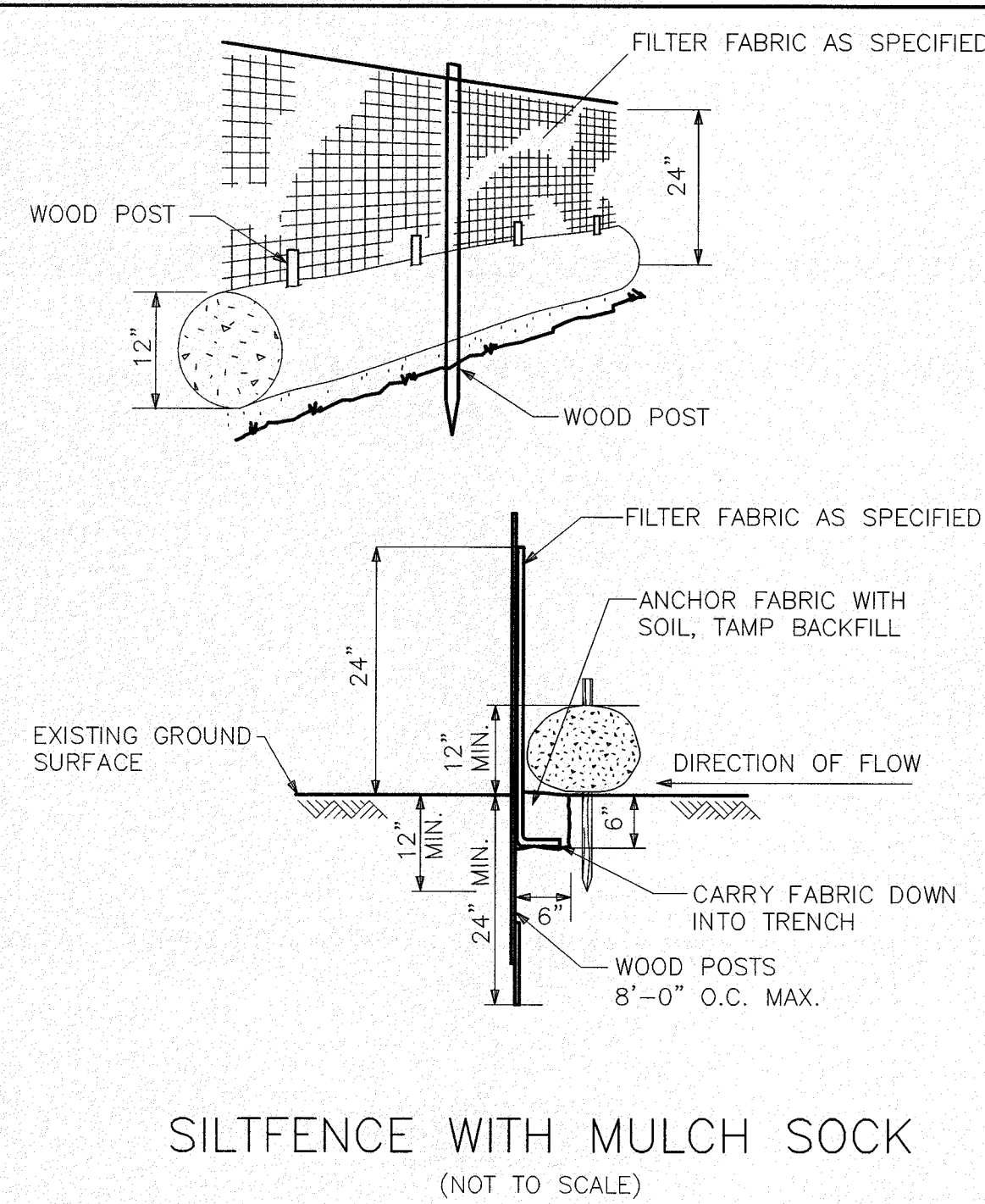
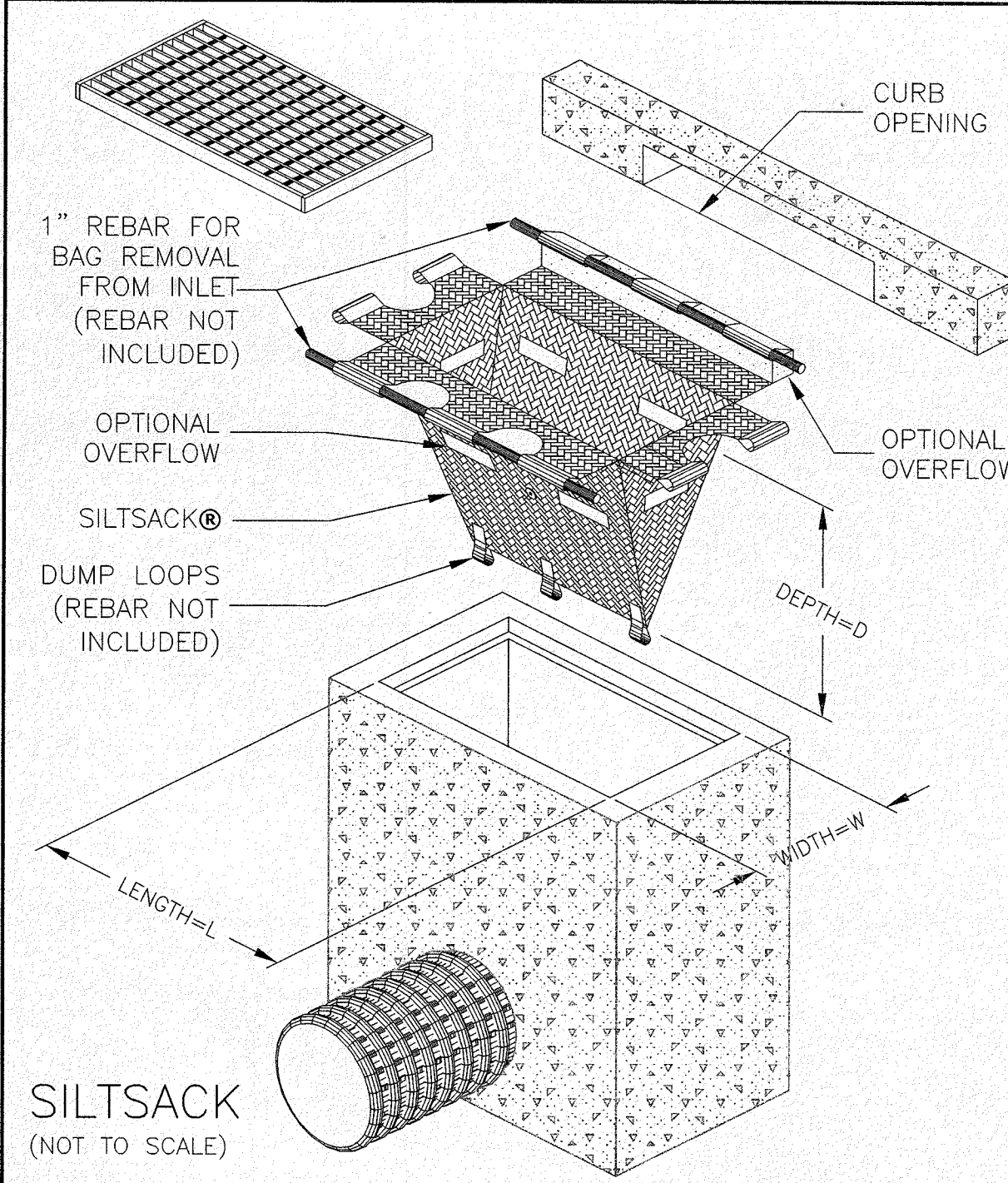
Owner: See subdivision plan set

Applicant: HPI, LLC  
 23 Stiles Road, Suite 104  
 Salem, NH 03079

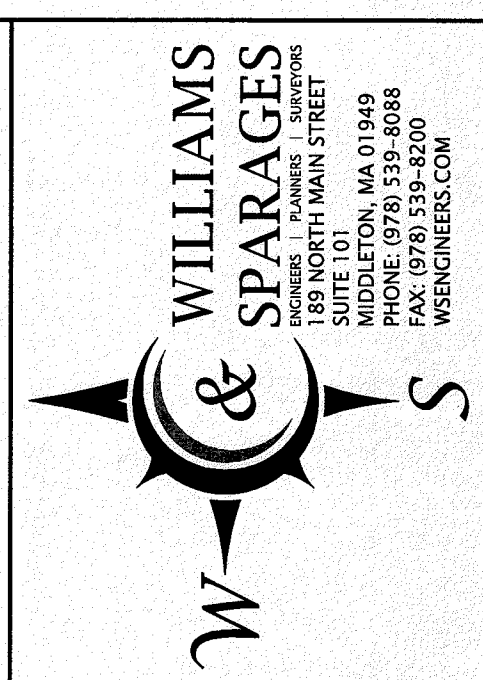
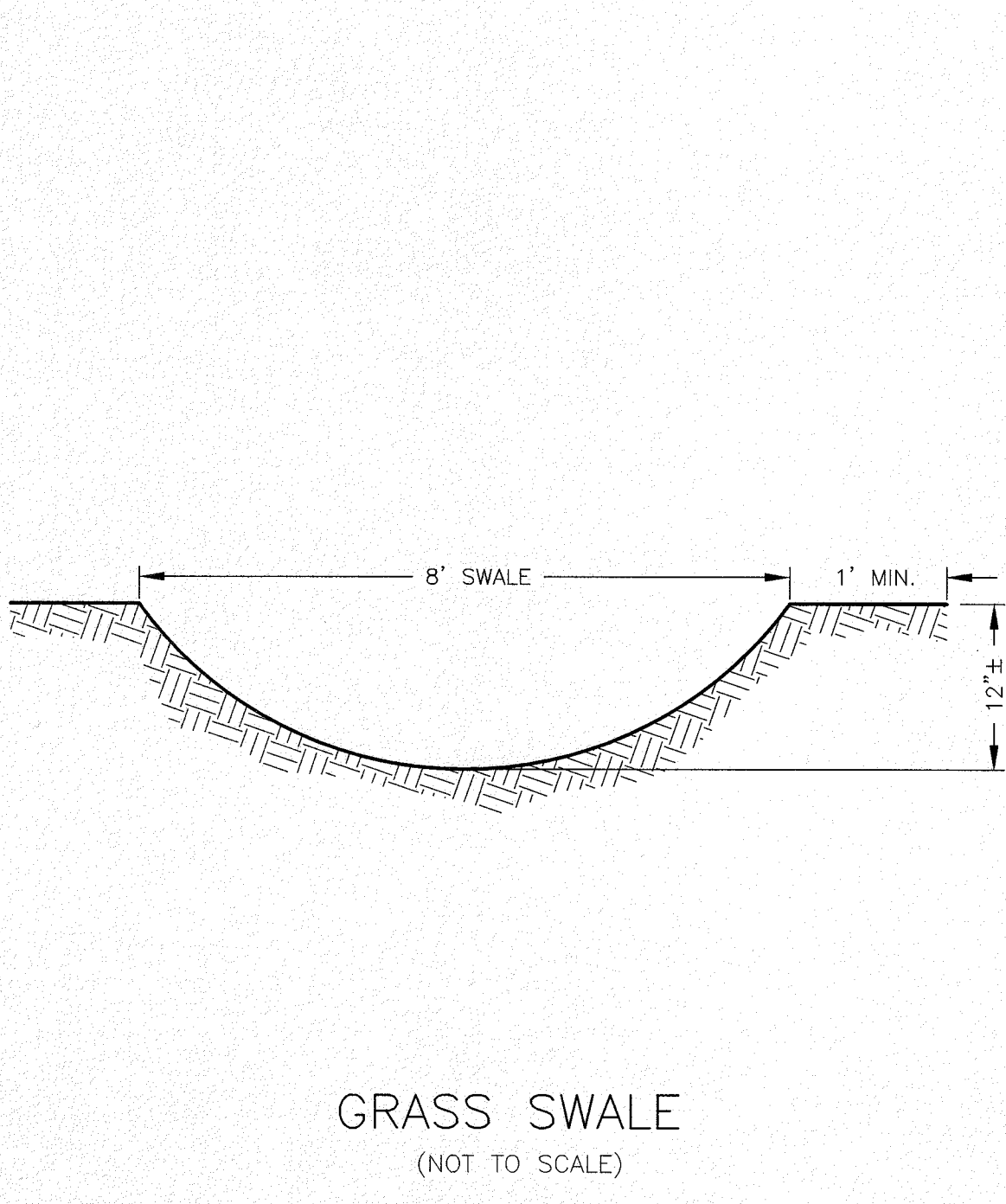
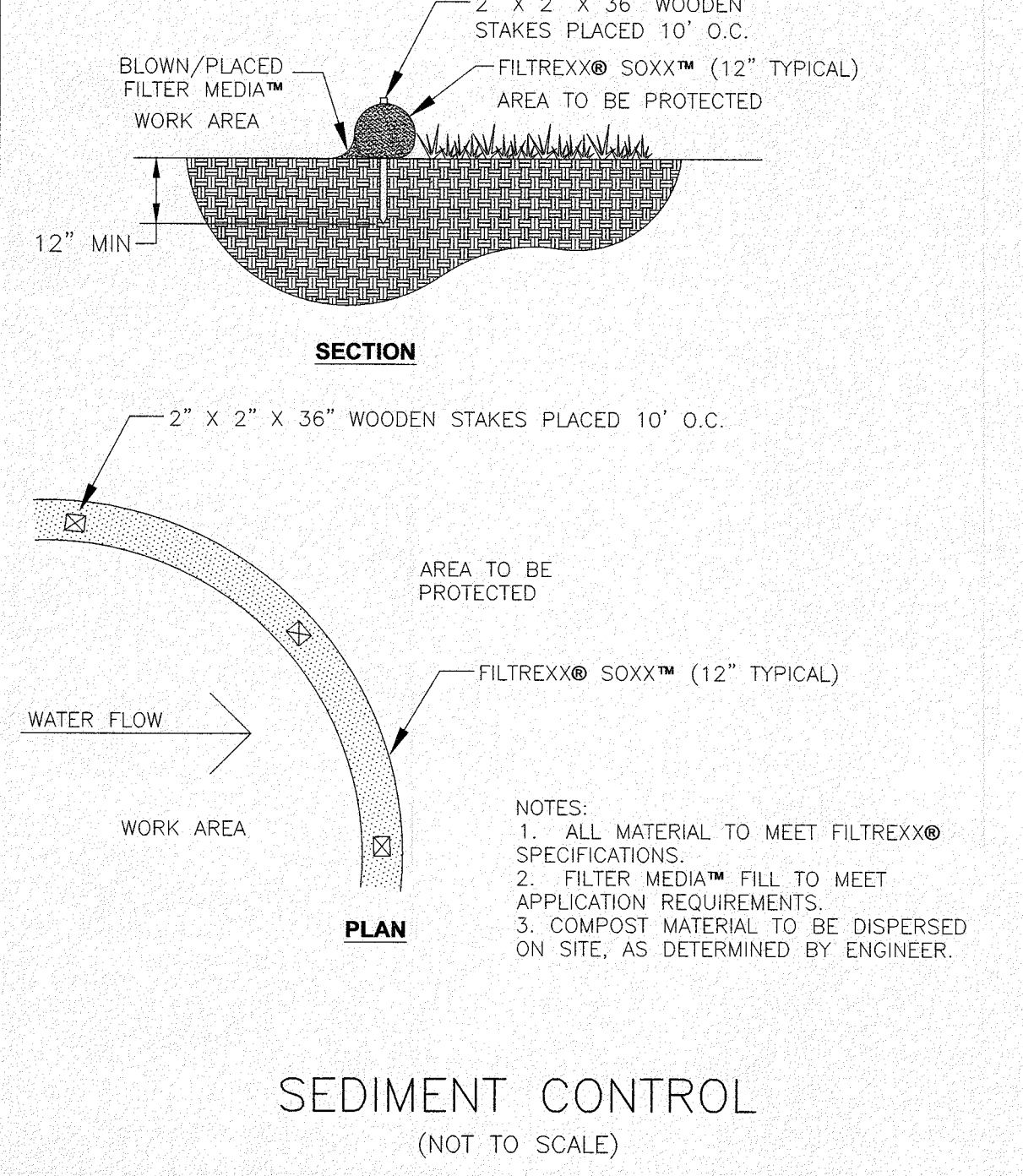
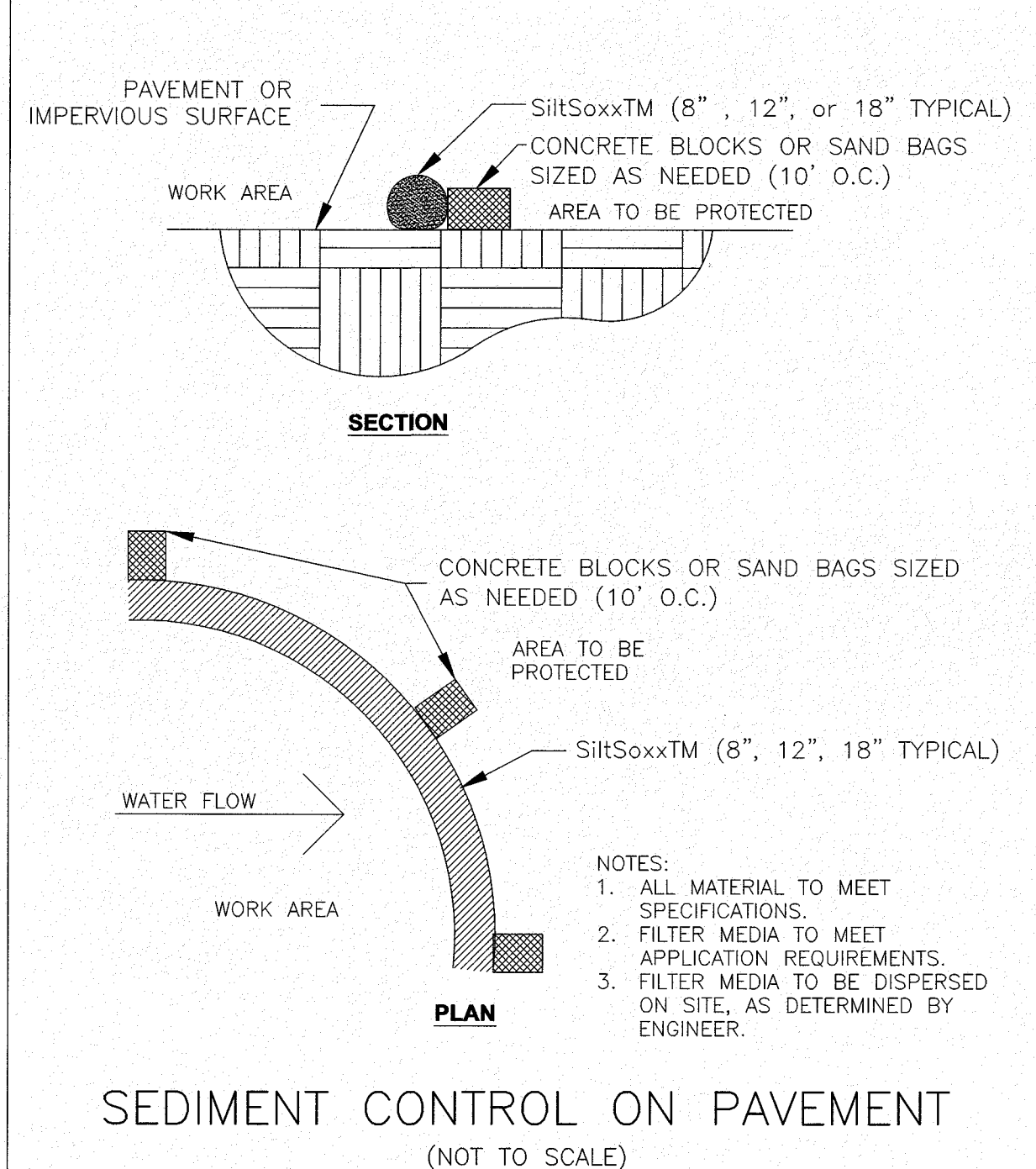
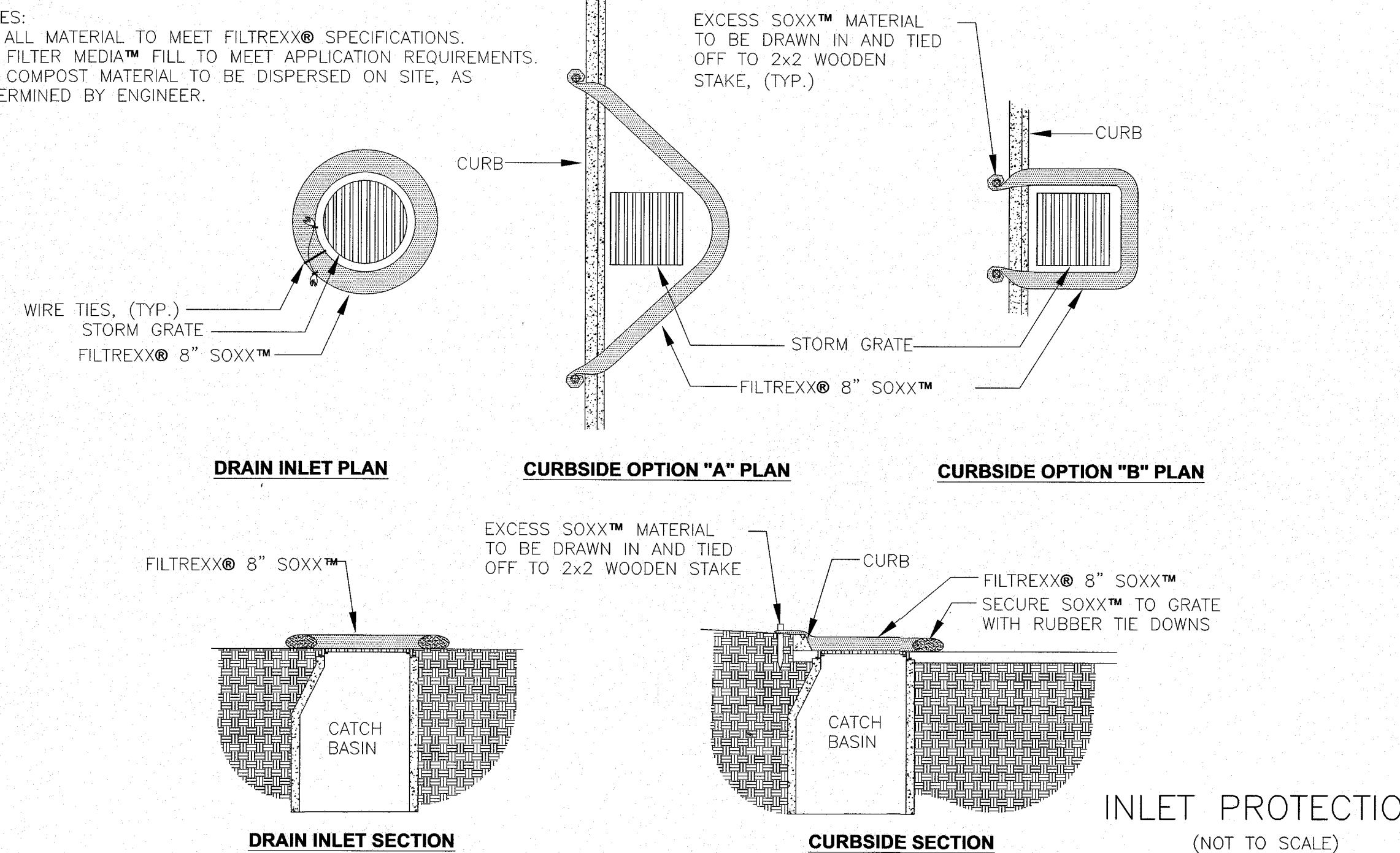
WILLIAMS & SPARAGES

INCORPORATED IN MASSACHUSETTS  
 100 MAIN STREET  
 MIDDLETON, MA 01949  
 PHONE: (978) 332-8200  
 FAX: (978) 332-8200  
 WEBSITE: WWW.WSINCENR.COM



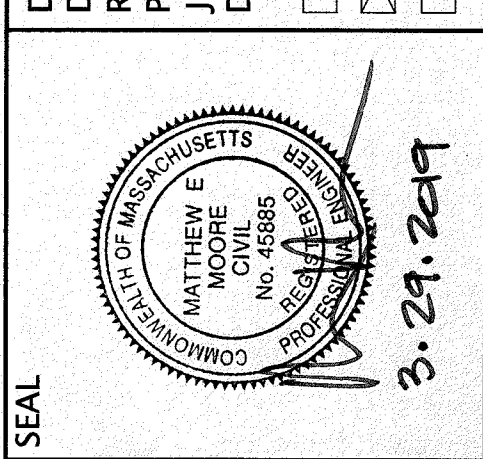


1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECPS), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECPS IN A 6"(15CM) DEEP X 6"(15CM) WIDE TRENCH WITH APPROXIMATELY 12"(30CM) OF RECPS EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECPS WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12"(30CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO THE COMPACTED SOIL AND FOLD THE REMAINING 12"(30CM) PORTION OF RECPS BACK OVER THE SEED AND COMPACTED SOIL. SECURE RECPS OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12"(30CM) APART ACROSS THE WIDTH OF THE RECPS.
3. ROLL THE RECPS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. RECPS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECPS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
4. THE EDGES OF PARALLEL RECPS MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5-12.5CM) OVERLAP DEPENDING ON THE RECPS TYPE.
5. CONSECUTIVE RECPS SPICED DOWN THE SLOPE MUST BE END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3"(7.5CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12"(30CM) APART ACROSS ENTIRE RECPS WIDTH.
6. IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6"(15CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECPS.



Owner: See subdivision plan set  
 Applicant: HPI, LLC  
 23 Siles Road, Suite 104  
 Salem, NH 03079

Designed By: MEM  
 Drawn By: MEM  
 Reviewed By: CPS  
 Project Manager: LYBF-0100  
 Job File Number: LYBF100  
 Drawing File Folder: LYNF100



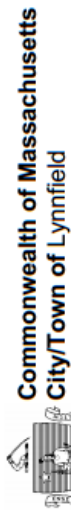
3-29-2019

**STORMWATER POLLUTION PREVENTION PLAN DETAILS**  
**ROAD A**  
 333, 339 & 349 SUMMER STREET, LYNNFIELD, MA  
 SCALE: NONE  
 DRAWING: E1.2  
 SHEET 2 OF 2  
 NOVEMBER 21, 2018  
 TOWN COMMENTS/PEER REVIEW

P:\UNL\01001039 & 248 Summer Street\Drawings\Stormwater\1338346.dwg, 3/20/2018 6:51:41 AM, MEM



Appendix C - Soil Logs



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: SM-1 Hole # 5/16/2018 Date 2:00PM Time Sunny, 70 Weather 42.531290 Latitude -71.039670 Longitude  
 Land Use (e.g., woodland, agricultural field, vacant lot, etc.) Minimal Surface Stones (e.g., cobbles, stones, boulders, etc.) 3-5% Slope (%)

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) Minimal Surface Stones (e.g., cobbles, stones, boulders, etc.)
2. Soil Parent Material: Coarse-loamy lodgment till overlying Outwash Plain Landform BS Position on Landscape (SU, SH, BS, FS, TS)
3. Distances from: Open Water Body 100+ feet Drainage Way 100+ feet Wetlands 100+ feet  
 Property Line 10+ feet Drinking Water Well 100+ feet Other \_\_\_\_\_ feet
4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock
5. Groundwater Observed:  Yes  No If yes: 95" Depth Weeping from Pit 95" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
				Depth	Color	Percent	Gravel			
0-11	A	FSL	10YR 3/2							
11-24	Bw	FSL	10YR 5/6							
24-105+	C	LS	2.5Y 5/4	73"						

Additional Notes:  
ESHGW 73"





Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

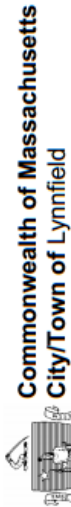
**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: SM-2 Hole # 5/16/18 Date 2:00PM Time Sunny, 70 Weather 42.531290 Latitude -71.039670 Longitude  
 Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) Minimal Surface Stones (e.g., cobbles, stones, boulders, etc.) 3-5% Slope (%)  
 Description of Location: Trees/shrubs Vegetation Minimal Surface Stones (e.g., cobbles, stones, boulders, etc.)

- Soil Parent Material: Coarse-loamy lodgment till overlying otuwash material Outwash plain Landform BS Position on Landscape (SU, SH, BS, FS, TS)
- Distances from: Open Water Body 100+ feet Drainage Way 100+ feet Wetlands 100+ feet  
 Property Line 10+ feet Drinking Water Well 100+ feet Other \_\_\_\_\_ feet
- Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock  
 Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume			Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones	Soil Structure		
0-12	A	FSL	10YR 3/2								
12-24	Bw	FSL	10YR 5/6								
24-130+	C	LS	2.5Y 5/4								



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-600 Hole # 5/14/2018 Date 9:30AM Time Sunny, 65 Weather 42.53 Latitude -71.04 Longitude: 5% Slope (%)

Woodland/Lawn Woodland/Lawn Vegetation of woodland None Surface Stones (e.g., cobbles, stones, boulders, etc.)

- Description of Location: \_\_\_\_\_
1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) \_\_\_\_\_
2. Soil Parent Material: Coarse-loamy lodgment till overlying \_\_\_\_\_ Outwash plain \_\_\_\_\_ FS Position on Landscape (SU, SH, BS, FS, TS) \_\_\_\_\_  
outwash material \_\_\_\_\_
3. Distances from: Open Water Body NA feet Drainage Way >100 feet Wetlands >100 feet  
Property Line >10 feet Drinking Water Well NA feet Other \_\_\_\_\_ feet
4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock
5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
2-0	O									
0-9	A	FSL	10YR 3/2			0%	0%	Granular	Friable	
9-30	Bw	FSL	7.5YR 6/8			0%	0%	Massive	Friable	
30-106	C	LS	2.5Y 5/2	42"	7.5 YR 5/8	10%	12%	Massive	Friable	

Additional Notes:  
ESHGW 42", Roots to 80"



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-601 Sunny, 65 -71.04  
 Hide # 8 10:00 42.53 Longitude:  
 Date 5/14/201 Time Latitude  
 Woodland/Lawn None Surface Stones (e.g., cobbles, stones, boulders, etc.)  
 (e.g., woodland, agricultural field, vacant lot, etc.) Lawn/edge of woodland Slope (%)  
 Edge of wooded area along lawn on 333 Summer St. 5%

Description of Location: \_\_\_\_\_  
 Coarse-loamy lodgment till overlying outwash FS  
 material Landform Position on Landscape (SU, SH, BS, FS, TS)

1. Land Use: \_\_\_\_\_  
 Woodland/Lawn Sunny, 65 -71.04  
 (e.g., woodland, agricultural field, vacant lot, etc.) Lawn/edge of woodland Slope (%)  
 Edge of wooded area along lawn on 333 Summer St. 5%

2. Soil Parent Material: \_\_\_\_\_  
 Coarse-loamy lodgment till overlying outwash FS  
 material Landform Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body NA feet Wetlands >100 feet  
 Property Line >10 feet Drainage Way >100 feet  
 Drinking Water Well NA feet Other \_\_\_\_\_ feet

4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
4-0	O									
0-7	A	FSL	10YR 3/2		0%				Friable	
7-31	Bw	FSL	7.5YR 6/8		0%				Friable	
31-115	C	gLS	2.5Y 5/2	52"	7.5 YR 5/8	5-10%	15%	10%	Very Friable	



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

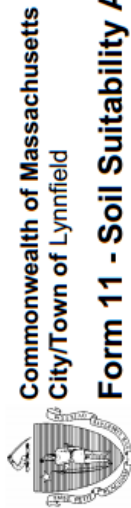
C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-602, Date: 5/14/2018, Time: 11:00AM, Sunny, 70, 42.53, -71.04, Longitude: 5%, Slope (%): ...

Soil Log

Table with columns: Depth (in), Soil Horizon /Layer, Soil Texture (USDA), Soil Matrix: Color-Moist (Munsell), Redoximorphic Features, Coarse Fragments % by Volume, Soil Structure, Soil Consistence (Moist), Other.

Additional Notes: ESHGW 42", Roots to 65" - C1 most restrictive layer



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-603 Hide # 5/14/18 Date 11:30AM Time Sunny, 7 Weather 42.53 Latitude -71.04 Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) None Surface Stones (e.g., cobbles, stones, boulders, etc.) 5% Slope (%)

Description of Location: Just inside wooded area still on 333 Summer St

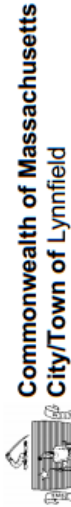
2. Soil Parent Material: Coarse-loamy lodgment till overlying outwash material Outwash plain Landform FS Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body NA feet Drainage Way >100 feet Wetlands >100 feet Property Line >10 feet Drinking Water Well NA feet Other \_\_\_\_\_ feet

4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock  Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
4-0	O									
0-9	A	FSL	10YR 3/2			0%		Granular	Friable	
9-30	Bw	FSL	10YR 6/8			0%		Massive	Friable	
30-120	C	gLS	2.5Y 5/2	45"	7.5 YR 5/8	10-15%	20%	Single Grain	Very Friable	



**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-604    Hole # \_\_\_\_\_    Date: 5/15/2018    Time: 8:30AM    Sunny, 65    Latitude: 42.53    Longitude: -71.04  
 Woodland/Lawn    (e.g., woodland, agricultural field, vacant lot, etc.)    Trees, vines, small plants    None    Surface Stones (e.g., cobbles, stones, boulders, etc.)    Slope (%)  
 Description of Location: \_\_\_\_\_

1. Land Use: \_\_\_\_\_    Outwash plain    Landform: \_\_\_\_\_    SH    Position on Landscape (SU, SH, BS, FS, TS)  
 Coarse-loamy lodgment till overlying outwash material    Drainage Way >100 feet    Wetlands >100 feet

2. Distances from: \_\_\_\_\_    Open Water Body NA feet    Property Line >10 feet    Drinking Water Well NA feet    Other \_\_\_\_\_ feet

3. Unsuitable Materials Present:  Yes  No    If Yes:  Disturbed Soil     Fill Material     Weathered/Fractured Rock     Bedrock

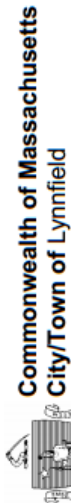
4. Groundwater Observed:  Yes  No    If yes: \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
4-0	O									
0-15	A	FSL	10YR 3/2			0%	0%	Granular	Friable	
15-30	Bw	FSL	10YR 6/8			0%	0%	Massive	Friable	
30-122	C	gLS	7.5YR 5/2			20%	10%	Single Grain	Friable	

Additional Notes:  
 No ESGHW noted. Roots to 75"





**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

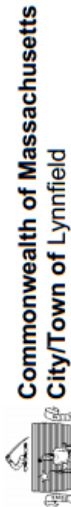
**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

**Deep Observation Hole Number:** TP-605 Hole # 5/15/18 Date 9:15 Time Sunny, 65 Weather 42.53 Latitude -71.04 Longitude: 5% Slope (%)  
**1. Land Use:** Woodland/Lawn (e.g., woodland, agricultural field, vacant lot, etc.) Trees, vines, small plants None Surface Stones (e.g., cobbles, stones, boulders, etc.)  
 Description of Location: Wooded area just inside lawn on 333 Summer St  
**2. Soil Parent Material:** Coarse-loamy lodgment till overlying outwash material Outwash plain Landform SH Position on Landscape (SU, SH, BS, FS, TS)  
**3. Distances from:** Open Water Body NA feet Drainage Way >100 feet Wetlands >100 feet  
 Property Line >10 feet Drinking Water Well NA feet Other \_\_\_\_\_ feet  
**4. Unsuitable Materials Present:**  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock  
**5. Groundwater Observed:**  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
0-14	A	FSL	10YR 3/2					Granular	Friable	
14-35	Bw	FSL	10YR 6/8			0%	0%	Massive	Friable	
35-120	C	gLS	7.5 YR 5/2	70"	7.5YR 5/8	10-15%	20%	Single Grain	Friable	





**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-606    Hole # \_\_\_\_\_    Date: 5/15/2018    Time: 10:30AM    Sunny, 75    Latitude: 42.53    Longitude: -71.04  
 Slope (%): 0-2%  
 Land Use: Lawn    Vegetation: Lawn    Surface Stones (e.g., cobbles, stones, boulders, etc.): None

Description of Location: \_\_\_\_\_

1. Soil Parent Material: Coarse-loamy lodgment till overlying outwash material    Outwash plain    Landform: \_\_\_\_\_    SH    Position on Landscape (SU, SH, BS, FS, TS)

2. Distances from: Open Water Body NA feet    Drainage Way >100 feet    Wetlands >100 feet  
 Property Line >10 feet    Drinking Water Well NA feet    Other \_\_\_\_\_ feet

3. Unsuitable Materials Present:  Yes  No    If Yes:  Disturbed Soil     Fill Material     Weathered/Fractured Rock     Bedrock

4. Groundwater Observed:  Yes  No    If yes: \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-11	A	FSL	10YR 3/2			0%	0%	0%	Granular	Friable	
11-27	Bw	FSL	10YR 6/8			0%	0%	0%	Massive	Friable	
27-87	C1	gSL	10YR 6/1	50"	7.5YR 6/8	15%	15%	5%	Massive	Friable	Firm in place
87-124	C2	gLS	7.5YR 5/2			20%	20%	15%	Single grain	Friable	Loose

Additional Notes:  
 ESGHW 50". Roots to 84". C1 most restrictive layer



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

**Deep Observation Hole Number:** TP-607    5/15/18    11:00    Sunny, 75    42.53    -71.04  
 Hole #    Date    Time    Weather    Latitude    Longitude

1. Land Use: Lawn (e.g., woodland, agricultural field, vacant lot, etc.)    None    Slope (%): 0-2%  
 Lawn area behind outbuilding on lot 339    Surface Stones (e.g., cobbles, stones, boulders, etc.)

Description of Location: \_\_\_\_\_

2. Soil Parent Material: Coarse-loamy lodgment till overlying outwash    SH  
 material    Landform    Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body NA feet    Drainage Way >100 feet    Wetlands >100 feet  
 Property Line >10 feet    Drinking Water Well NA feet    Other \_\_\_\_\_ feet

4. Unsuitable Materials Present:  Yes  No    If Yes:  Disturbed Soil     Fill Material     Weathered/Fractured Rock     Bedrock

5. Groundwater Observed:  Yes  No    If yes: \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
0-10	A	FSL	10YR 3/2					Granular	Friable	
10-25	Bw	FSL	10YR 6/8			0%		Massive	Friable	
25-90	C1	SL	2.5Y 5/2	40"	7.5YR 5/8	10-15%	20%	Massive	Friable	Firm in place
90-124	C2	gLS	2.5Y 4/2					Single Grain	Friable	Loose



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

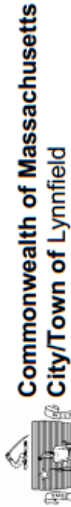
**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-608    Date: 5/14/18    Time: 1:30PM    Sunny, 75    Latitude: 42.53    Longitude: -71.04  
 Hole #    Date    Time    Weather    Latitude    Longitude  
 1. Land Use: Lawn    Lawn/grass    None    Surface Stones (e.g., cobbles, stones, boulders, etc.)    Slope (%):  
 (e.g., woodland, agricultural field, vacant lot, etc.)    Vegetation    Surface Stones (e.g., cobbles, stones, boulders, etc.)    Slope (%)  
 Description of Location: \_\_\_\_\_  
 2. Soil Parent Material: Coarse-loamy lodgment till overlying outwash material    Outwash plain    FS    Position on Landscape (SU, SH, BS, FS, TS)  
 outwash material    Landform    FS    Position on Landscape (SU, SH, BS, FS, TS)  
 3. Distances from: Open Water Body NA feet    Drainage Way >100 feet    Wetlands >100 feet  
Property Line >10 feet    Drinking Water Well NA feet    Other \_\_\_\_\_ feet  
 If Yes:  No    If Yes:  Disturbed Soil     Fill Material     Weathered/Fractured Rock     Bedrock  
 4. Unsuitable Materials Present:  Yes     No    If Yes:  Disturbed Soil     Fill Material     Weathered/Fractured Rock     Bedrock  
 5. Groundwater Observed:  Yes     No    If yes: \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-28	AFill	FSL	10YR 3/2			0%	0%	0%	Granular	Friable	
28-39	Bw	FSL	10YR 6/8			0%	0%	0%	Massive	Friable	
39-77	C1	LS	10YR 6/1	77"	7.5YR 5/8	10%	15%	5%	Massive	Friable	
77-127	C2	gLS	7.5YR 5/2	77"	5Y 7/1	5-10%	15%	10%	Massive	Friable	

Additional Notes: ESHGW 77". B-layer deeper on perc side - top of perc hole in bottom of Bw layer and top of C1 (most restrictive layer).



**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-609 Hole # 5/14/18 Date 2:30PM Time Sunny, 75 Weather 42.53 Latitude -71.04 Longitude

1. Land Use: Lawn (e.g., woodland, agricultural field, vacant lot, etc.) None Surface Stones (e.g., cobbles, stones, boulders, etc.) 0-2%  
 Wooded area in center of three lots

Description of Location: \_\_\_\_\_

2. Soil Parent Material: Coarse-loamy lodgment till overlying outwash material Landform Outwash plain FS Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body NA feet Drainage Way >100 feet Wetlands >100 feet  
 Property Line >10 feet Drinking Water Well NA feet Other \_\_\_\_\_ feet

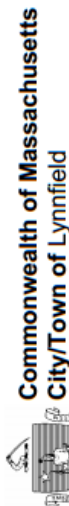
4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: 107" Depth Weeping from Pit 113" Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
0-19	Fill								Friable	
19-28	Bw (fill)									
28-39	Ab	FSL	10YR 3/2						Friable	
39-60	Bwb	FSL	7.5YR 6/8			0%		0%	Friable	
60-120	C	gLS	7.5YR 5/2	62"	7.5YR 5/8	10%	15%	10%	Friable	
					5Y 7/1	5-10%				





**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-610 Hole # 5/16/18 Date 11:00AM Time Sunny, 65 Weather 42.53 Latitude -71.04 Longitude  
 0-2% Slope (%)

1. Land Use Lawn/woodland mostly/scattered trees Lawn/grass None Surface Stones (e.g., cobbles, stones, boulders, etc.)

Description of Location: \_\_\_\_\_

2. Soil Parent Material: Coarse-loamy lodgment till overlying \_\_\_\_\_ Outwash plain \_\_\_\_\_ SH \_\_\_\_\_  
 outwash material \_\_\_\_\_ Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body NA feet Drainage Way >100 feet Wetlands >100 feet  
 Property Line >10 feet Drinking Water Well NA feet Other \_\_\_\_\_ feet

4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
0-8	A	FSL	10YR 3/2			0%	0%	Granular	Friable	
8-20	Bw	FSL	7.5YR 5/8			0%	0%	Massive	Friable	
20-50	C1	SL	10YR 4/3	41"	5YR 4/6	10%	10%	Massive	Friable	C1 T.B.R.
50-115	C2	gLS	7.5YR 4/3	41"	5Y 6/1	5-10%	20%	Loose		Stratified

Additional Notes:  
 ESHGW 41"



**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-611 Hole # 5/16/18 Date 11:30AM Time Sunny, 65 Weather 42.53 Latitude -71.04 Longitude

1. Land Use: Lawn/woodland (e.g., woodland, agricultural field, vacant lot, etc.) Lawn area in front of 349 Summer Street  
 Lawn/grass mostly/scattered trees None Surface Stones (e.g., cobbles, stones, boulders, etc.) 0-2% Slope (%)

Description of Location: \_\_\_\_\_  
 2. Soil Parent Material: Coarse-loamy lodgment till overlying outwash material Outwash plain Landform SH Position on Landscape (SU, SH, BS, FS, TS)

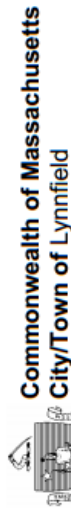
3. Distances from: Open Water Body NA feet Property Line >10 feet Drainage Way >100 feet Wetlands >100 feet  
 Drinking Water Well NA feet Other \_\_\_\_\_ feet

4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock  
 5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-11	A	FSL	10YR 3/2			0%	0%	Granular	Friable		
11-30	Bw	FSL	7.5YR 5/8			0%	0%	Massive	Friable		
30-55	C1	SL	10YR 4/3	37"	5Y 6/1	5-10%	10%	Massive	Friable	C1 T.B.R.	
55-121	C2	gLS	2.5Y 5/2	37"	5YR 4/6	10%	20%	Loose	Friable		





Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-612 Hole # 5/16/18 Date 9:00AM Time Sunny, 65 Weather 42.53 Latitude -71.04 Longitude  
 0-2% Slope (%)

1. Land Use Lawn (e.g., woodland, agricultural field, vacant lot, etc.) Lawn/grass mostly Vegetation None Surface Stones (e.g., cobbles, stones, boulders, etc.)

Description of Location: \_\_\_\_\_

2. Soil Parent Material: Coarse-loamy lodgment till overlying Outwash plain Landform SH Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body NA feet Drainage Way >100 feet Wetlands >100 feet  
 Property Line >10 feet Drinking Water Well NA feet Other \_\_\_\_\_ feet

4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	A	FSL	10YR 3/2			0%	0%	0%	Granular	Friable	
12-21	Bw	FSL	7.5YR 5/8			0%	0%	0%	Massive	Friable	
21-44	C1	SL	10YR 4/3	42"	5YR 4/6	10%	10%	0%	Massive	Friable	C1 T.B.R.
44-120	C2	gLS	7.5YR 4/3	42"	5Y 6/1	5-10%	20%	15%	Loose		

Additional Notes:  
ESHGW 42". Roots to 55"





**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

**Deep Observation Hole Number:** TP-613    Hole # \_\_\_\_\_    Date 5/16/18    Time 9:30AM    Weather Sunny, 65    Latitude 42.53    Longitude -71.04  
 (e.g., woodland, agricultural field, vacant lot, etc.)    Lawn area in front of 349 Summer Street    Lawn/grass    Vegetation    Surface Stones (e.g., cobbles, stones, boulders, etc.)    Slope (%)  
 0-2%

**1. Land Use:** Lawn    Description of Location: \_\_\_\_\_    Outwash plain    SH  
 (e.g., woodland, agricultural field, vacant lot, etc.)    Lawn area in front of 349 Summer Street    Landform    Position on Landscape (SU, SH, BS, FS, TS)

**2. Soil Parent Material:** Coarse-loamy lodgment till overlying outwash material    Drainage Way >100 feet    Wetlands >100 feet  
 Property Line >10 feet    Drinking Water Well NA feet    Other \_\_\_\_\_ feet

**3. Distances from:** Open Water Body NA feet    Drainage Way >100 feet    Wetlands >100 feet  
 Property Line >10 feet    Drinking Water Well NA feet    Other \_\_\_\_\_ feet

**4. Unsuitable Materials Present:**  Yes  No    If Yes:  Disturbed Soil     Fill Material     Weathered/Fractured Rock     Bedrock

**5. Groundwater Observed:**  Yes  No    If yes: \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
0-11	A	FSL	10YR 3/2			0%	0%	0%	Friable	
11-21	Bw	FSL	7.5YR 5/8			0%	0%	0%	Friable	
21-45	C1	SL	10YR 4/3	38"	5Y 7/1	5-10%	10%	5%	Friable	C1 T.B.R.
45-112	C2	gLS	2.5Y 5/2	38"	5YR 4/6	10%	20%	10%	Friable	



Commonwealth of Massachusetts  
City/Town of Lynnfield

### Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

#### C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

**Deep Observation Hole Number:** TP-614    **Date:** 5/14/18    **Time:** 3:15PM    **Weather:** Sunny, 75    **Latitude:** 42.53    **Longitude:** -71.04

**1. Land Use:** Woodland    **Vegetation:** Trees/wooded    **Surface Stones (e.g., cobbles, stones, boulders, etc.):** None    **Slope (%):** 5%

**Description of Location:** Wooded area in center of three lots

**2. Soil Parent Material:** Coarse-loamy lodgment till overlying outwash material    **Outwash plain**    **Landform:** FS    **Position on Landscape (SU, SH, BS, FS, TS):** FS

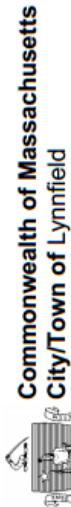
**3. Distances from:** Open Water Body NA feet    **Drainage Way** >100 feet    **Wellands** >100 feet  
 Property Line >10 feet    **Drinking Water Well** NA feet    **Other** \_\_\_\_\_ feet

**4. Unsuitable Materials Present:**  Yes  No    **Fill Material:**  Weathered/Fractured Rock     Bedrock

**5. Groundwater Observed:**  Yes  No    **Depth Weeping from Pit:** \_\_\_\_\_    **Depth Standing Water in Hole:** \_\_\_\_\_

#### Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
0-14	A	FSL	10YR 3/2			0%	0%	0%	Friable	
14-30	Bw	FSL	7.5YR 6/8			0%	0%	0%	Friable	
30-105	C	gLS	2.5Y 5/2	55"	7.5YR 5/8	10%	25%	5%	Friable	



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

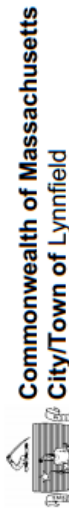
Deep Observation Hole Number: TP-615    5/14/18    3:00PM    Sunny, 75    42.53    -71.04  
 Hole #    Date    Time    Weather    Latitude    Longitude:  
 Woodland    Trees/wooded    None    Surface Stones (e.g., cobbles, stones, boulders, etc.)    Slope (%)  
 (e.g., woodland, agricultural field, vacant lot, etc.)    Vegetation

- Description of Location: \_\_\_\_\_
- Soil Parent Material: Coarse-loamy lodgment till overlying outwash plain    FS    Position on Landscape (SU, SH, BS, FS, TS)  
 outwash material    Landform    Drainage Way >100 feet    Wetlands >100 feet
  - Distances from: Open Water Body NA feet    Drinking Water Well NA feet    Other \_\_\_\_\_ feet  
 Property Line >10 feet    If Yes:  Disturbed Soil     Fill Material     Weathered/Fractured Rock     Bedrock
  - Unsuitable Materials Present:  Yes     No    If Yes: \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole
  - Groundwater Observed:  Yes     No    If yes: \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
2-0	O									
0-10	A	FSL	10YR 3/2			0%		Granular	Friable	
10-30	Bw	FSL	7.5YR 6/8			0%		Massive	Friable	
30-120	C	gLS	2.5Y 5/2	50"	7.5YR 5/8	10%	20%	Single Grain	Friable	

Additional Notes:  
ESHGW 50". Roots to 60"



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: TP-616 Hole # 5/14/18 Date 1:30PM Time Sunny, 75 Weather 42.53 Latitude -71.04 Longitude: 5% Slope (%)

1. Land Use Woodland (e.g., woodland, agricultural field, vacant lot, etc.) Trees/wooded Vegetation None Surface Stones (e.g., cobbles, stones, boulders, etc.)

Description of Location: \_\_\_\_\_

2. Soil Parent Material: Coarse-loamy lodgment till overlying Outwash plain Landform FS Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body NA feet Drainage Way >100 feet Wetlands >100 feet  
Property Line >10 feet Drinking Water Well NA feet Other \_\_\_\_\_ feet

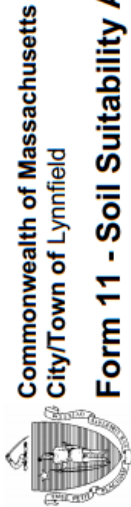
4. Unsuitable Materials Present:  Yes  No If Yes:  Disturbed Soil  Fill Material  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
2-0	O									
0-12	A	FSL	10YR 3/2			0%	0%	Granular	Friable	
12-33	Bw	FSL	7.5YR 6/8			0%	0%	Massive	Friable	
33-123	C	gLS	2.5Y 5/2	50"	7.5YR 5/6	10%	20%	Single Grain	Friable	

Additional Notes:  
ESHGW 50".



Commonwealth of Massachusetts  
City/Town of Lynnfield

**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (minimum of two holes required at every proposed primary and reserve disposal area)

**Deep Observation Hole Number:** TP-617    **Date:** 5/14/18    **Time:** 2:00PM    **Weather:** Sunny, 75    **Latitude:** 42.53    **Longitude:** -71.04

**1. Land Use:** Woodland (e.g., woodland, agricultural field, vacant lot, etc.)    **Vegetation:** Trees/wooded    **Surface Stones (e.g., cobbles, stones, boulders, etc.):** None    **Slope (%):** 5%

**Description of Location:**    **Coarse-loamy lodgment till overlying outwash material:**    **Outwash plain**    **Landform:**    **Position on Landscape (SU, SH, BS, FS, TS):** FS

**2. Soil Parent Material:**    **Drainage Way:** >100 feet    **Wetlands:** >100 feet

**3. Distances from:** Open Water Body NA feet    **Drinking Water Well:** NA feet    **Other:** \_\_\_\_\_ feet

**4. Unsuitable Materials Present:**  Yes  No    **Fill Material:**  Weathered/Fractured Rock     Bedrock

**5. Groundwater Observed:**  Yes  No    **If yes:** \_\_\_\_\_ Depth Weeping from Pit    \_\_\_\_\_ Depth Standing Water in Hole

**Soil Log**

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume			Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
3-0	O									
0-10	A	FSL	10YR 3/2			0%			Friable	
10-38	Bw	FSL	7.5YR 6/8			0%			Friable	
38-121	C	gLS	2.5Y 5/2	44"	7.5YR 5/6	10%	20%	10%	Friable	



**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/14/18 Date	11:00 Time	5/14/18 Date	11:00 Time
Observation Hole #	P-600A		P-600B	
Depth of Perc	26"+18" = 44" (B-layer)		46"+18"=64" (C-layer)	
Start Pre-Soak	11:04		11:08	
End Pre-Soak	11:20		11:23	
Time at 12"	11:20		11:23	
Time at 9"	11:29		11:32	
Time at 6"	11:42		11:46	
Time (9"-6")	13 mins		14 mins	
Rate (Min./Inch)	5 MPI		5 MPI	
	Test Passed:	<input checked="" type="checkbox"/>	Test Passed:	<input checked="" type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

Thorsen Akerley, Greg Hochmuth  
 Test Performed By:  
 Kristin McRae, R.S.  
 Board of Health Witness

Comments:  
 B-layer deeper on perc side which allowed us to perc B







**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
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**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	Date	Time	Date	Time
Observation Hole #	5/14/18	1:30		
Depth of Perc	P-601A			
Start Pre-Soak	62"+20" = 82" (C-layer)			
End Pre-Soak	1:46			
Time at 12"	2:01			
Time at 9"	2:01			
Time at 6"	2:13			
Time (9"-6")	2:31			
Rate (Min./Inch)	18 mins			
	6 MPI			
	Test Passed: <input checked="" type="checkbox"/>	Test Failed: <input type="checkbox"/>	Test Passed: <input type="checkbox"/>	Test Failed: <input type="checkbox"/>

Thorsen Akerley, Greg Hochmuth  
 Test Performed By:  
 Kristin McRae, R.S.  
 Board of Health Witness

Comments:  
 Had to dig deeper to perc the C as B-layer deeper on perc side of hole. Re-perc'd this hole due to missing 6" mark.







**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

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**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/14/18 Date	12:00 Time	5/14/18 Date	12:30 Time
Observation Hole #	P-602A		P-603A	
Depth of Perc	43"+18" = 61"		40"+18"	
Start Pre-Soak	12:18 (25 gallons, unable to saturate)		12:56 (25 gallons, unable to saturate)	
End Pre-Soak	12:28		1:06	
Time at 12"	12:28		1:06	
Time at 9"	12:29		1:07	
Time at 6"	12:32		1:09	
Time (9"-6")	3 mins		2 mins	
Rate (Min./Inch)	<2 MPI		<2 MPI	

Test Passed:  Test Failed:       Test Passed:  Test Failed:

Greg Hochmuth  
 Test Performed By:  
 Kristin McRae, R.S.  
 Board of Health Witness

Comments:  
 \_\_\_\_\_  
 \_\_\_\_\_





**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

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**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/15/18 Date	9:30 Time	5/15/18 Date	10:00 Time
Observation Hole #	P-604A		P-605A	
Depth of Perc	35"+18"= 53"		46"+18"= 64"	
Start Pre-Soak	9:23 (unable to saturate - 25 gals)		9:49:35 (unable to saturate - 25 gals)	
End Pre-Soak	9:27:47		9:49:35	
Time at 12"	9:27:47		9:56:18	
Time at 9"	9:29:25		9:58:04	
Time at 6"	9:31:44		10:01:14	
Time (9"-6")	2 mins 19 seconds		3 mins 10 seconds	
Rate (Min./Inch)	<2 MPI		<2 MPI	
	Test Passed:	<input checked="" type="checkbox"/>	Test Passed:	<input checked="" type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

Greg Hochmuth  
 Test Performed By:  
 Leo Cormier, R.S.  
 Board of Health Witness

Comments:  
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**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

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**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/15/18 Date	11:00 Time	5/15/18 Date	12:00 Time
Observation Hole #	P-606A		P-607A	
Depth of Perc	36"+19"= 55"		33"+18"= 51"	
Start Pre-Soak	10:56:40		11:48	
End Pre-Soak	11:11:40		12:03	
Time at 12"	11:11:40		12:03	
Time at 9"	11:52:50		12:56	
Time at 6"	1:15		2:24	
Time (9"-6")	82 mins 10 seconds		88 minutes	
Rate (Min./Inch)	28 MPI		30 MPI	

Test Passed:  Test Failed:       Test Passed:  Test Failed:

Greg Hochmuth  
 Test Performed By:  
 Leo Cormier, R.S.  
 Board of Health Witness

Comments:  
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 \_\_\_\_\_





**Commonwealth of Massachusetts  
City/Town of Lynnfield  
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**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/15/18 Date	2:00 Time	5/15/18 Date	1:30 Time
Observation Hole #	P-608A		P-609A	
Depth of Perc	63"+18"=81" (C1 layer)		52"+23"=75" (C layer)	
Start Pre-Soak	1:42		1:25	
End Pre-Soak	1:57		1:40	
Time at 12"	1:57		1:40	
Time at 9"	2:12		1:56	
Time at 6"	2:35		2:19	
Time (9"-6")	23 mins		23 mins	
Rate (Min./Inch)	8 MPI		8 MPI	
	Test Passed: <input checked="" type="checkbox"/>	Test Failed: <input type="checkbox"/>	Test Passed: <input checked="" type="checkbox"/>	Test Failed: <input type="checkbox"/>

Greg Hochmuth  
 Test Performed By:  
 Leo Cormier, R.S.  
 Board of Health Witness

Comments:  
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**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

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**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod		
Owner Name		
333, 339, 349 Summer Street		
Street Address or Lot #		
Lynnfield	MA	01940
City/Town	State	Zip Code
Williams & Sparages, LLC	(978) 539-8088	
Contact Person (if different from Owner)	Telephone Number	

**B. Test Results**

	5/16/18 Date	11:30 Time	5/16/18 Date	11:00 Time
Observation Hole #	P-610A		P-611A	
Depth of Perc	49"+18"=67" (C2 layer)		50"+18"=68" (C2 layer)	
Start Pre-Soak	11:23		11:00	
End Pre-Soak	11:28 (unable to saturate - 25 gals)		11:07 (unable to saturate - 25 gals)	
Time at 12"	11:28		11:07	
Time at 9"	11:28		11:07	
Time at 6"	11:29		11:08	
Time (9"-6")	1 min		1 min	
Rate (Min./Inch)	<2 MPI		<2 MPI	
	Test Passed:	<input checked="" type="checkbox"/>	Test Passed:	<input checked="" type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

Greg Hochmuth  
Test Performed By:  
Leo Cormier, R.S.  
Board of Health Witness

Comments:  
  
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**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

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**A. Site Information**

Brian Hannon  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/16/18 Date	9:30 Time	5/16/18 Date	10:30 Time
Observation Hole #	P-612A		P-613A	
Depth of Perc	34"+22"= 56" (C2 layer)		33"+18"= 51" (C2 layer)	
Start Pre-Soak	9:33:59		10:18:59	
End Pre-Soak	9:34:20 (unable to saturate - 25 gallons)		10:25:00 (unable to saturate - 25 gals)	
Time at 12"	9:34:20		10:25:00	
Time at 9"	9:35:42		10:28:17	
Time at 6"	9:37:42		10:34:08	
Time (9"-6")	2 mins		5 mins 51 seconds	
Rate (Min./Inch)	<2 MPI		<2 MPI	
	Test Passed:	<input checked="" type="checkbox"/>	Test Passed:	<input checked="" type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

Greg Hochmuth  
 Test Performed By:  
 Leo Cormier, R.S.  
 Board of Health Witness

Comments:  
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**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

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**A. Site Information**

Degiovanni Family Trust, Single Living Trust, Jane Coonrod  
 Owner Name  
 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/14/18 Date	3:30 Time	5/14/18 Date	3:30 Time
Observation Hole #	P-615A		P-614A	
Depth of Perc	41"+18"= 59"		53"+18+= 71"	
Start Pre-Soak	3:26		3:30	
End Pre-Soak	3:41		3:45	
Time at 12"	3:41		3:45	
Time at 9"	3:43		3:50	
Time at 6"	3:47		3:57	
Time (9"-6")	4 mins		7 mins	
Rate (Min./Inch)	<2 MPI		3 MPI	
	Test Passed: <input checked="" type="checkbox"/>	Test Failed: <input type="checkbox"/>	Test Passed: <input checked="" type="checkbox"/>	Test Failed: <input type="checkbox"/>

Greg Hochmuth, Thor Akerley  
 Test Performed By:  
 Kristin McRae, R.S.  
 Board of Health Witness

Comments:  
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 \_\_\_\_\_







**Commonwealth of Massachusetts  
City/Town of Lynnfield  
Percolation Test  
Form 12**

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**A. Site Information**

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 333, 339, 349 Summer Street  
 Street Address or Lot #  
 Lynnfield MA 01940  
 City/Town State Zip Code  
 Williams & Sparages, LLC (978) 539-8088  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	5/14/18 Date	2:30 Time	5/14/18 Date	2:00 Time
Observation Hole #	P-616A		P-617A	
Depth of Perc	56"+18" = 76"		58"+18" = 74"	
Start Pre-Soak	2:34		2:17	
End Pre-Soak	2:49		2:32	
Time at 12"	2:49		2:32	
Time at 9"	2:58		2:43	
Time at 6"	3:10		2:57	
Time (9"-6")	12 mins		14 mins	
Rate (Min./Inch)	4 MPO		5 MPI	
	Test Passed: <input checked="" type="checkbox"/>	Test Failed: <input type="checkbox"/>	Test Passed: <input checked="" type="checkbox"/>	Test Failed: <input type="checkbox"/>

Greg Hochmuth  
 Test Performed By:  
 Kristin McRae, R.S.  
 Board of Health Witness

**Comments:**

We missed 9" mark at perc at TP-616 so the reading at 9" there is actually at 8" and the reading at 6" is actually at 5" shown above



*Appendix D - Copy of 2017 CGP*

**National Pollutant Discharge Elimination System  
General Permit for Discharges from  
Construction Activities**

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA), as amended by the Water Quality Act of 1987, P.L. 100-4, "operators" of construction activities (defined in Appendix A) that meet the requirements of Part 1.1 of this National Pollutant Discharge Elimination System (NPDES) general permit, are authorized to discharge pollutants in accordance with the effluent limitations and conditions set forth herein. Permit coverage is required from the "commencement of construction activities" (see Appendix A) until one of the conditions for terminating CGP coverage has been met (see Part 8.2).

This permit becomes effective on **February 16, 2017**.

This permit and the authorization to discharge expire at 11:59pm, **February 16, 2022**.

Signed and issued this 11<sup>th</sup> day of January 2017

Deborah Szaro,  
Acting Regional Administrator, EPA Region 1

Signed and issued this 11<sup>th</sup> day of January 2017

Javier Laureano, Ph.D.,  
Director, Clean Water Division, EPA Region 2

Signed and issued this 11<sup>th</sup> day of January 2017

Jose C. Font,  
Acting Director, Caribbean Environmental  
Protection Division, EPA Region 2.

Signed and issued this 11<sup>th</sup> day of January 2017

Dominique Lueckenhoff,  
Acting Director, Water Protection Division, EPA  
Region 3

Signed and issued this 11<sup>th</sup> day of January 2017

César A. Zapata,  
Deputy Director, Water Protection Division, EPA  
Region 4

Signed and issued this 11<sup>th</sup> day of January 2017

Christopher Korleski,  
Director, Water Division, EPA Region 5

Signed and issued this 11<sup>th</sup> day of January 2017

William K. Honker, P.E.,  
Director, Water Division, EPA Region 6

Signed and issued this 11<sup>th</sup> day of January 2017

Karen Flournoy,  
Director, Water, Wetlands, and Pesticides Division,  
EPA Region 7

Signed and issued this 11<sup>th</sup> day of January 2017

Darcy O'Connor,  
Assistant Regional Administrator, Office of Water  
Protection, EPA Region 8

Signed and issued this 11<sup>th</sup> day of January 2017

Kristin Gullatt  
Deputy Director, Water Division, EPA Region 9

Signed and issued this 11<sup>th</sup> day of January 2017

Daniel D. Opalski,  
Director, Office of Water and Watersheds, EPA  
Region 10

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## **1 HOW TO OBTAIN COVERAGE UNDER THE CONSTRUCTION GENERAL PERMIT (CGP)**

To be covered under this permit, you must meet the eligibility conditions and follow the requirements for obtaining permit coverage in this Part.

### **1.1 ELIGIBILITY CONDITIONS**

- 1.1.1** You are an “operator” of a construction site for which discharges will be covered under this permit. For the purposes of this permit and in the context of stormwater discharges associated with construction activity, an “operator” is any party associated with a construction project that meets either of the following two criteria:
- a. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (*e.g., in most cases this is the owner of the site*); or
  - b. The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions (*e.g., they are authorized to direct workers at a site to carry out activities required by the permit; in most cases this is the general contractor (as defined in Appendix A) of the project*).

Where there are multiple operators associated with the same project, all operators must obtain permit coverage.<sup>1</sup> Subcontractors generally are not considered operators for the purposes of this permit.

- 1.1.2** Your site's construction activities:
- a. Will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale that will ultimately disturb one or more acres of land; or
  - b. Have been designated by EPA as needing permit coverage under 40 CFR 122.26(a)(1)(v) or 40 CFR 122.26(b)(15)(ii);
- 1.1.3** Your site is located in an area where EPA is the permitting authority (see Appendix B);
- 1.1.4** Discharges from your site are not:
- a. Already covered by a different NPDES permit for the same discharge; or
  - b. In the process of having coverage under a different NPDES permit for the same discharge denied, terminated, or revoked.<sup>2,3</sup>
- 1.1.5** You are able to demonstrate that you meet one of the criteria listed in Appendix D with respect to the protection of species that are federally listed as endangered or threatened under the Endangered Species Act (ESA) and federally designated critical habitat;

---

<sup>1</sup> If the operator of a “construction support activity” (see Part 1.2.1c) is different than the operator of the main site, that operator must also obtain permit coverage. See Part 7.1 for clarification on the sharing of liability between and among operators on the same site and for conditions that apply to developing a SWPPP for multiple operators associated with the same site.

<sup>2</sup> Parts 1.1.4a and 1.1.4b do not include sites currently covered under the 2012 CGP that are in the process of obtaining coverage under this permit, nor sites covered under this permit that are transferring coverage to a different operator.

<sup>3</sup> Notwithstanding a site being made ineligible for coverage under this permit because it falls under the description of Parts 1.1.4a or 1.1.4b, above, EPA may waive the applicable eligibility requirement after specific review if it determines that coverage under this permit is appropriate.

- 1.1.6** You have completed the screening process in Appendix E relating to the protection of historic properties; and
- 1.1.7** You have complied with all requirements in Part 9 imposed by the applicable state, Indian tribe, or territory in which your construction activities and/or discharge will occur.
- 1.1.8** For "new sources" (as defined in Appendix A) only:
- a. EPA has not, prior to authorization under this permit, determined that discharges from your site will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures designed to bring your discharge into compliance with this permit, specifically the requirement to meet water quality standards. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3, will result in discharges that will not cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard.
  - b. Discharges from your site to a Tier 2, Tier 2.5, or Tier 3 water<sup>4</sup> will not lower the water quality of the applicable water. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3.2, will result in discharges that will not lower the water quality of such waters.
- 1.1.9** If you plan to add "cationic treatment chemicals" (as defined in Appendix A) to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your Notice of Intent (NOI) unless and until you notify your applicable EPA Regional Office (see Appendix L) in advance and the EPA Regional Office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to discharges that cause an exceedance of water quality standards.

## **1.2 TYPES OF DISCHARGES AUTHORIZED<sup>5</sup>**

- 1.2.1** The following stormwater discharges are authorized under this permit provided that appropriate stormwater controls are designed, installed, and maintained (see Parts 2 and 3):
- a. Stormwater discharges, including stormwater runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activity under 40 CFR 122.26(b)(14) or 122.26(b)(15)(i);

---

<sup>4</sup> Note: Your site will be considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water to which you discharge is identified by a state, tribe, or EPA as a Tier 2, Tier 2.5, or Tier 3 water. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F.

<sup>5</sup> See "Discharge" as defined in Appendix A. Note: Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, state, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the SWPPP, or during an inspection.



- b. Stormwater discharges designated by EPA as needing a permit under 40 CFR 122.26(a)(1)(v) or 122.26(b)(15)(ii);
- c. Stormwater discharges from construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that:
  - i. The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
  - ii. The support activity is not a commercial operation, nor does it serve multiple unrelated construction sites;
  - iii. The support activity does not continue to operate beyond the completion of the construction activity at the site it supports; and
  - iv. Stormwater controls are implemented in accordance with Part 2 and Part 3 for discharges from the support activity areas.
- d. Stormwater discharges from earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining.

**1.2.2** The following non-stormwater discharges associated with your construction activity are authorized under this permit provided that, with the exception of water used to control dust and to irrigate vegetation in stabilized areas, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Parts 2 and 3:

- a. Discharges from emergency fire-fighting activities;
- b. Fire hydrant flushings;
- c. Landscape irrigation;
- d. Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;
- e. Water used to control dust;
- f. Potable water including uncontaminated water line flushings;
- g. External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A) (e.g., paint or caulk containing polychlorinated biphenyls (PCBs));
- h. Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. You are prohibited from directing pavement wash waters directly into any water of the U.S., storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;
- i. Uncontaminated air conditioning or compressor condensate;
- j. Uncontaminated, non-turbid discharges of ground water or spring water;
- k. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and
- l. Construction dewatering water discharged in accordance with Part 2.4.

- 1.2.3** Also authorized under this permit are discharges of stormwater listed above in Part 1.2.1, or authorized non-stormwater discharges listed above in Part 1.2.2, commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

### **1.3 PROHIBITED DISCHARGES<sup>6</sup>**

- 1.3.1** Wastewater from washout of concrete, unless managed by an appropriate control as described in Part 2.3.4;
- 1.3.2** Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;
- 1.3.3** Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
- 1.3.4** Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and
- 1.3.5** Toxic or hazardous substances from a spill or other release.

To prevent the above-listed prohibited non-stormwater discharges, operators must comply with the applicable pollution prevention requirements in Part 2.3.

### **1.4 SUBMITTING YOUR NOTICE OF INTENT (NOI)**

All “operators” (as defined in Appendix A) associated with your construction site, who meet the Part 1.1 eligibility requirements, and who seek coverage under this permit, must submit to EPA a complete and accurate NOI in accordance with the deadlines in **Table 1** prior to commencing construction activities.

**Exception:** If you are conducting construction activities in response to a public emergency (*e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services*), and the related work requires immediate authorization to avoid imminent endangerment to human health, public safety, or the environment, or to reestablish essential public services, you may discharge on the condition that a complete and accurate NOI is submitted within 30 calendar days after commencing construction activities (see Table 1) establishing that you are eligible for coverage under this permit. You must also provide documentation in your Stormwater Pollution Prevention Plan (SWPPP) to substantiate the occurrence of the public emergency.

#### **1.4.1 Prerequisite for Submitting Your NOI**

You must develop a SWPPP consistent with Part 7 before submitting your NOI for coverage under this permit.

#### **1.4.2 How to Submit Your NOI**

You must use EPA’s NPDES eReporting Tool (NeT) to electronically prepare and submit your NOI for coverage under the 2017 CGP, unless you received a waiver from your EPA Regional Office.

To access NeT, go to <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting>.

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<sup>6</sup> EPA includes these prohibited non-stormwater discharges here as a reminder to the operator that the only non-stormwater discharges authorized by this permit are at Part 1.2.2. Any unauthorized non-stormwater discharges must be covered under an individual permit or alternative general permit.

Waivers from electronic reporting may be granted based on one of the following conditions:

- a. If your operational headquarters is physically located in a geographic area (*i.e.*, ZIP code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission; or
- b. If you have limitations regarding available computer access or computer capability.

If the EPA Regional Office grants you approval to use a paper NOI, and you elect to use it, you must complete the form in Appendix J.

**1.4.3 Deadlines for Submitting Your NOI and Your Official Date of Permit Coverage**

Table 1 provides the deadlines for submitting your NOI and the official start date of your permit coverage, which differ depending on when you commence construction activities.

**Table 1 NOI Submittal Deadlines and Official Start Date for Permit Coverage.**

Type of Operator	NOI Submittal Deadline <sup>7</sup>	Permit Authorization Date <sup>8</sup>
<b>Operator of a new site</b> ( <i>i.e.</i> , a site where construction activities commence on or after February 16, 2017)	At least 14 calendar days before commencing construction activities.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.
<b>Operator of an existing site</b> ( <i>i.e.</i> , a site with 2012 CGP coverage where construction activities commenced prior to February 16, 2017)	No later than <b>May 17, 2017</b> .	
<b>New operator of a permitted site</b> ( <i>i.e.</i> , an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site")	At least 14 calendar days before the date the transfer to the new operator will take place.	
<b>Operator of an "emergency-related project"</b> ( <i>i.e.</i> , a project initiated in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services)	No later than 30 calendar days after commencing construction activities.	You are considered provisionally covered under the terms and conditions of this permit immediately, and fully covered 14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.

<sup>7</sup> If you miss the deadline to submit your NOI, any and all discharges from your construction activities will continue to be unauthorized under the CWA until they are covered by this or a different NPDES permit. EPA may take enforcement action for any unpermitted discharges that occur between the commencement of construction activities and discharge authorization.

<sup>8</sup> Discharges are not authorized if your NOI is incomplete or inaccurate or if you are not eligible for permit coverage.

#### 1.4.4 Modifying your NOI

If after submitting your NOI you need to correct or update any fields, you may do so by submitting a "Change NOI" form using NeT. Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office has granted you approval to submit a paper NOI modification, you may indicate any NOI changes on the same NOI form in Appendix J.

When there is a change to the site's operator, the new operator must submit a new NOI, and the previous operator must submit a Notice of Termination (NOT) form as specified in Part 8.3.

#### 1.4.5 Your Official End Date of Permit Coverage

Once covered under this permit, your coverage will last until the date that:

- a. You terminate permit coverage consistent with Part 8; or
- b. You receive permit coverage under a different NPDES permit or a reissued or replacement version of this permit after expiring on February 16, 2022; or
- c. You fail to submit an NOI for coverage under a revised or replacement version of this permit before the deadline for existing construction sites where construction activities continue after this permit has expired.

### 1.5 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE

You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right-of-way.<sup>9</sup> At a minimum, the notice must include:

- a. The NPDES ID (*i.e.*, *permit tracking number assigned to your NOI*);
- b. A contact name and phone number for obtaining additional construction site information;
- c. The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [*include the appropriate CGP Regional Office contact information found at <https://www.epa.gov/npdes/contact-us-stormwater#regional>*];" and
- d. The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: <https://www.epa.gov/enforcement/report-environmental-violations>."

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<sup>9</sup> If the active part of the construction site is not visible from a public road, then place the notice of permit coverage in a position that is visible from the nearest public road and as close as possible to the construction site.

## **2 TECHNOLOGY-BASED EFFLUENT LIMITATIONS**

You must comply with the following technology-based effluent limitations in this Part for all authorized discharges.<sup>10</sup>

### **2.1 GENERAL STORMWATER CONTROL DESIGN, INSTALLATION, AND MAINTENANCE REQUIREMENTS**

You must design, install, and maintain stormwater controls required in Parts 2.2 and 2.3 to minimize the discharge of pollutants in stormwater from construction activities. To meet this requirement, you must:

#### **2.1.1 Account for the following factors in designing your stormwater controls:**

- a. The expected amount, frequency, intensity, and duration of precipitation;
- b. The nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design stormwater controls to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points; and
- c. The soil type and range of soil particle sizes expected to be present on the site.

#### **2.1.2 Design and install all stormwater controls in accordance with good engineering practices, including applicable design specifications.<sup>11</sup>**

#### **2.1.3 Complete installation of stormwater controls by the time each phase of construction activities has begun.**

- a. By the time construction activity in any given portion of the site begins, install and make operational any downgradient sediment controls (*e.g., buffers, perimeter controls, exit point controls, storm drain inlet protection*) that control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities.<sup>12</sup>
- b. Following the installation of these initial controls, install and make operational all stormwater controls needed to control discharges prior to subsequent earth-disturbing activities.

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<sup>10</sup> For each of the effluent limits in Part 2, as applicable to your site, you must include in your SWPPP (1) a description of the specific control(s) to be implemented to meet the effluent limit; (2) any applicable design specifications; (3) routine maintenance specifications; and (4) the projected schedule for its (their) installation/implementation. See Part 7.2.6.

<sup>11</sup> Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practices and must be explained in your SWPPP. You must also comply with any additional design and installation requirements specified for the effluent limits in Parts 2.2 and 2.3.

<sup>12</sup> Note that the requirement to install stormwater controls prior to each phase of construction activities for the site does not apply to the earth disturbance associated with the actual installation of these controls. Operators should take all reasonable actions to minimize the discharges of pollutants during the installation of stormwater controls.

**2.1.4 Ensure that all stormwater controls are maintained and remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.**

- a. Comply with any specific maintenance requirements for the stormwater controls listed in this permit, as well as any recommended by the manufacturer.<sup>13</sup>
- b. If at any time you find that a stormwater control needs routine maintenance, you must immediately initiate the needed maintenance work, and complete such work by the close of the next business day.
- c. If at any time you find that a stormwater control needs repair or replacement, you must comply with the corrective action requirements in Part 5.

**2.2 EROSION AND SEDIMENT CONTROL REQUIREMENTS**

You must implement erosion and sediment controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater from construction activities.

**2.2.1 Provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the U.S. is located within 50 feet of the site's earth disturbances.**

- a. **Compliance Alternatives.** For any discharges to waters of the U.S. located within 50 feet of your site's earth disturbances, you must comply with one of the following alternatives:
  - i. Provide and maintain a 50-foot undisturbed natural buffer; or
  - ii. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or
  - iii. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

See Appendix G, Part G.2 for additional conditions applicable to each compliance alternative.

- b. **Exceptions.** See Appendix G, Part G.2 for exceptions to the compliance alternatives.

**2.2.2 Direct stormwater to vegetated areas and maximize stormwater infiltration and filtering to reduce pollutant discharges, unless infeasible.**

**2.2.3 Install sediment controls along any perimeter areas of the site that will receive pollutant discharges.<sup>14</sup>**

- a. Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- b. **Exception.** For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible (*e.g., due to a limited or restricted right-of-way*),

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<sup>13</sup> Any departures from such maintenance recommendations made by the manufacturer must reflect good engineering practices and must be explained in your SWPPP.

<sup>14</sup> Examples of perimeter controls include filter berms, silt fences, vegetative strips, and temporary diversion dikes.

implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

#### **2.2.4 Minimize sediment track-out.**

- a. **Restrict vehicle use to properly designated exit points;**
- b. Use appropriate stabilization techniques<sup>15</sup> at all points that exit onto paved roads.
  - i. **Exception:** Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls<sup>16</sup> are implemented to minimize sediment track-out;
- c. Implement additional track-out controls<sup>17</sup> as necessary to ensure that sediment removal occurs prior to vehicle exit; and
- d. Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance, storm drain inlet, or water of the U.S.<sup>18</sup>

#### **2.2.5 Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil:**

- a. Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any stormwater conveyances, drain inlets, and areas where stormwater flow is concentrated;
- b. Install a sediment barrier along all downgradient perimeter areas;<sup>19</sup>
- c. For piles that will be unused for 14 or more days, provide cover<sup>20</sup> or appropriate temporary stabilization (consistent with Part 2.2.14);
- d. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the U.S.

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<sup>15</sup> Examples of appropriate stabilization techniques include the use of aggregate stone with an underlying geotextile or non-woven filter fabric, and turf mats.

<sup>16</sup> Examples of other exit point controls include preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles on site to the extent possible; limiting exit point size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas (e.g., karst areas; steep slopes).

<sup>17</sup> Examples of additional track-out controls include the use of wheel washing, rumble strips, and rattle plates.

<sup>18</sup> Fine grains that remain visible (i.e., staining) on the surfaces of off-site streets, other paved areas, and sidewalks after you have implemented sediment removal practices are not a violation of Part 2.2.4.

<sup>19</sup> Examples of sediment barriers include berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale.

<sup>20</sup> Examples of cover include tarps, blown straw and hydroseeding.



- 2.2.6 Minimize dust.** On areas of exposed soil, minimize the generation of dust through the appropriate application of water or other dust suppression techniques.
- 2.2.7 Minimize steep slope disturbances.** Minimize the disturbance of "steep slopes" (as defined in Appendix A).
- 2.2.8 Preserve native topsoil, unless infeasible.**<sup>21</sup>
- 2.2.9 Minimize soil compaction.**<sup>22</sup> In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed:
- Restrict vehicle and equipment use in these locations to avoid soil compaction; and
  - Before seeding or planting areas of exposed soil that have been compacted, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth.
- 2.2.10 Protect storm drain inlets.**
- Install inlet protection measures that remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater flow from your site to a water of the U.S., provided you have authority to access the storm drain inlet;<sup>23</sup> and
  - Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.
- 2.2.11 Minimize erosion of stormwater conveyance channels and their embankments, outlets, adjacent streambanks, slopes, and downstream waters.** Use erosion controls and velocity dissipation devices<sup>24</sup> within and along the length of any stormwater conveyance channel and at any outlet to slow down runoff to minimize erosion.
- 2.2.12 If you install a sediment basin or similar impoundment:**
- Situate the basin or impoundment outside of any water of the U.S. and any natural buffers established under Part 2.2.1;
  - Design the basin or impoundment to avoid collecting water from wetlands;
  - Design the basin or impoundment to provide storage for either:

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<sup>21</sup> Stockpiling topsoil at off-site locations, or transferring topsoil to other locations, is an example of a practice that is consistent with the requirements in Part 2.2.8. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. For example, some sites may be designed to be highly impervious after construction, and therefore little or no vegetation is intended to remain, or may not have space to stockpile native topsoil on site for later use, in which case, it may not be feasible to preserve topsoil.

<sup>22</sup> Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted.

<sup>23</sup> Inlet protection measures can be removed in the event of flood conditions or to prevent erosion.

<sup>24</sup> Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.

- ii. The calculated volume of runoff from a 2-year, 24-hour storm (see Appendix H); or
  - iii. 3,600 cubic feet per acre drained.
- d. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;<sup>25</sup>
  - e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and
  - f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

**2.2.13 If using treatment chemicals (e.g., polymers, flocculants, coagulants):**

- a. **Use conventional erosion and sediment controls before and after the application of treatment chemicals.** Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g., *sediment basin, perimeter control*) before discharge.
- b. **Select appropriate treatment chemicals.** Chemicals must be appropriately suited to the types of soils likely to be exposed during construction and present in the discharges being treated (i.e., *the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or area*).
- c. **Minimize discharge risk from stored chemicals.** Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures (e.g., *spill berms, decks, spill containment pallets*), or provide equivalent measures designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means (e.g., *storing chemicals in a covered area, having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill*).
- d. **Comply with state/local requirements.** Comply with applicable state and local requirements regarding the use of treatment chemicals.
- e. **Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier.** Use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the provider/supplier of the applicable chemicals, or document in your SWPPP specific departures from these specifications and how they reflect good engineering practice.
- f. **Ensure proper training.** Ensure that all persons who handle and use treatment chemicals at the construction site are provided with appropriate, product-specific training. Among other things, the training must cover proper dosing requirements.
- g. **Perform additional measures specified by the EPA Regional Office for the authorized use of cationic chemicals.** If you have been authorized to use cationic chemicals at your site pursuant to Part 1.1.9, you must perform all additional measures as

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<sup>25</sup> The circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include areas with extended cold weather, where using surface outlets may not be feasible during certain time periods (although they must be used during other periods). If you determine that it is infeasible to meet this requirement, you must provide documentation in your SWPPP to support your determination, including the specific conditions or time periods when this exception will apply.

conditioned by your authorization to ensure that the use of such chemicals will not cause an exceedance of water quality standards.

**2.2.14** Stabilize exposed portions of the site. Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) that minimize erosion from exposed portions of the site in accordance with Parts 2.2.14a and 2.2.14b.

**a. Stabilization Deadlines:**<sup>26</sup>

Total Amount of Land Disturbance Occurring At Any One Time <sup>27</sup>	Deadline
<p><b>i. Five acres or less (≤5.0)</b>  <b>Note: this includes sites disturbing more than five acres (&gt;5.0) total over the course of a project, but that limit disturbance at any one time (i.e., phase the disturbance) to five acres or less (≤5.0)</b></p>	<ul style="list-style-type: none"> <li>• Initiate the installation of stabilization measures immediately<sup>28</sup> in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;<sup>29</sup> and</li> <li>• Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.<sup>30</sup></li> </ul>

<sup>26</sup> EPA may determine, based on an inspection carried out under Part 4.8 and corrective actions required under Part 5.3, that the level of sediment discharge on the site makes it necessary to require a faster schedule for completing stabilization. For instance, if sediment discharges from an area of exposed soil that is required to be stabilized are compromising the performance of existing stormwater controls, EPA may require stabilization to correct this problem.

<sup>27</sup> Limiting disturbances to five (5) acres or less at any one time means that at no time during the project do the cumulative earth disturbances exceed five (5) acres. The following examples would qualify as limiting disturbances at any one time to five (5) acres or less:

1. The total area of disturbance for a project is five (5) acres or less.
2. The total area of disturbance for a project will exceed five (5) acres, but the operator ensures that no more than five (5) acres will be disturbed at any one time through implementation of stabilization measures. In this way, site stabilization can be used to "free up" land that can be disturbed without exceeding the five (5)-acre cap to qualify for the 14-day stabilization deadline. For instance, if an operator completes stabilization of two (2) acres of land on a five (5)-acre disturbance, then two (2) additional acres could be disturbed while still qualifying for the longer 14-day stabilization deadline.

<sup>28</sup> The following are examples of activities that would constitute the immediate initiation of stabilization:

1. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable, but no later than one (1) calendar day of completing soil preparation;
2. Applying mulch or other non-vegetative product to the exposed area;
3. Seeding or planting the exposed area;
4. Starting any of the activities in # 1 – 3 on a portion of the entire area that will be stabilized; and
5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

<sup>29</sup> The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days, or as soon as you know that construction work is permanently ceased. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

<sup>30</sup> If vegetative stabilization measures are being implemented, stabilization is considered "installed" when all activities necessary to seed or plant the area are completed. If non-vegetative stabilization measures are being implemented, stabilization is considered "installed" when all such measures are implemented or applied.

Total Amount of Land Disturbance Occurring At Any One Time <sup>27</sup>	Deadline
ii. <b>More than five acres (&gt;5.0)</b>	<ul style="list-style-type: none"> <li>• Initiate the installation of stabilization measures immediately<sup>31</sup> in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;<sup>32</sup> and</li> <li>• Complete the installation of stabilization measures as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.<sup>33</sup></li> </ul>

iii. **Exceptions:**

**(a) Arid, semi-arid, and drought-stricken areas** (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, and vegetative stabilization measures are being used:

- (i) Immediately initiate and, within 14 calendar days of a temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;
- (ii) As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and
- (iii) If construction is occurring during the seasonally dry period, indicate in your SWPPP the beginning and ending dates of the seasonally dry period and your site conditions. Also include the schedule you will follow for initiating and completing vegetative stabilization.

**(b) Operators that are affected by unforeseen circumstances<sup>34</sup> that delay the initiation and/or completion of vegetative stabilization:**

- (i) Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion;
- (ii) Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and
- (iii) Document in the SWPPP the circumstances that prevent you from meeting the deadlines in Part 2.2.14a and the schedule you will follow for initiating and completing stabilization.

**(c) Discharges to a sediment- or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes.** Complete stabilization as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.

<sup>31</sup> See footnote 27

<sup>32</sup> See footnote 28

<sup>33</sup> See footnote 29

<sup>34</sup> Examples include problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding.

- b. **Final Stabilization Criteria** (for any areas not covered by permanent structures):
- i. Establish uniform, perennial vegetation (*i.e.*, *evenly distributed, without large bare areas*) that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas; and/or
  - ii. Implement permanent non-vegetative stabilization measures<sup>35</sup> to provide effective cover.
  - iii. **Exceptions:**
    - (a) **Arid, semi-arid, and drought-stricken areas** (as defined in Appendix A). Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas within three (3) years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied that provide cover for at least three years without active maintenance.
    - (b) **Disturbed areas on agricultural land that are restored to their preconstruction agricultural use.** The Part 2.2.14b final stabilization criteria does not apply.
    - (c) **Areas that need to remain disturbed.** In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed (*e.g.*, *dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials*).

## 2.3 POLLUTION PREVENTION REQUIREMENTS<sup>36</sup>

You must implement pollution prevention controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater and to prevent the discharge of pollutants from spilled or leaked materials from construction activities.

### 2.3.1 For equipment and vehicle fueling and maintenance:

- a. Provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities;<sup>37</sup>

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<sup>35</sup> Examples of permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles.

<sup>36</sup> Under this permit, you are not required to minimize exposure for any products or materials where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

<sup>37</sup> Examples of effective means include:

- Locating activities away from waters of the U.S. and stormwater inlets or conveyances so that stormwater coming into contact with these activities cannot reach waters of the U.S.;
- Providing secondary containment (*e.g.*, *spill berms, decks, spill containment pallets*) and cover where appropriate; and
- Having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill.

- b. If applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR part 112 and Section 311 of the CWA;
- c. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;
- d. Use drip pans and absorbents under or around leaky vehicles;
- e. Dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements; and
- f. Clean up spills or contaminated surfaces immediately, using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

### **2.3.2 For equipment and vehicle washing:**

- a. Provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters;<sup>38</sup>
- b. Ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and
- c. For storage of soaps, detergents, or solvents, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these detergents to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

### **2.3.3 For storage, handling, and disposal of building products, materials, and wastes:**

- a. *For building materials and building products*<sup>39</sup>, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these products to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.
- b. *For pesticides, herbicides, insecticides, fertilizers, and landscape materials:*
  - i. In storage areas, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these chemicals to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas; and
  - ii. Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label (see also Part 2.3.5).
- c. *For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals:*
  - i. Store chemicals in water-tight containers, and provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these containers to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas (e.g., *having a spill kit available on site and ensuring personnel are available to respond expeditiously in*

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<sup>38</sup> Examples of effective means include locating activities away from waters of the U.S. and stormwater inlets or conveyances and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

<sup>39</sup> Examples of building materials and building products typically present at construction sites include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.

- the event of a leak or spill*), or provide secondary containment (*e.g., spill berms, decks, spill containment pallets*); and
- ii. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.
- d. *For hazardous or toxic wastes:*<sup>40</sup>
- i. Separate hazardous or toxic waste from construction and domestic waste;
  - ii. Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements;
  - iii. Store all outside containers within appropriately-sized secondary containment (*e.g., spill berms, decks, spill containment pallets*) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (*e.g., storing chemicals in a covered area, having a spill kit available on site*);
  - iv. Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirements;
  - v. Clean up spills immediately, using dry clean-up methods, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and
  - vi. Follow all other federal, state, tribal, and local requirements regarding hazardous or toxic waste.
- e. *For construction and domestic wastes:*<sup>41</sup>
- i. Provide waste containers (*e.g., dumpster, trash receptacle*) of sufficient size and number to contain construction and domestic wastes;
  - ii. Keep waste container lids closed when not in use and close lids at the end of the business day for those containers that are actively used throughout the day. For waste containers that do not have lids, provide either (1) cover (*e.g., a tarp, plastic sheeting, temporary roof*) to minimize exposure of wastes to precipitation, or (2) a similarly effective means designed to minimize the discharge of pollutants (*e.g., secondary containment*);
  - iii. On business days, clean up and dispose of waste in designated waste containers; and
  - iv. Clean up immediately if containers overflow.

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<sup>40</sup> Examples of hazardous or toxic waste that may be present at construction sites include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.

<sup>41</sup> Examples of construction and domestic waste include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris; and other trash or building materials.



- f. *For sanitary waste*, position portable toilets so that they are secure and will not be tipped or knocked over, and located away from waters of the U.S. and stormwater inlets or conveyances.

**2.3.4 For washing applicators and containers used for stucco, paint, concrete, form release oils, curing compounds, or other materials:**

- a. Direct wash water into a leak-proof container or leak-proof and lined pit designed so that no overflows can occur due to inadequate sizing or precipitation;
- b. Handle washout or cleanout wastes as follows:
  - i. Do not dump liquid wastes in storm sewers or waters of the U.S.;
  - ii. Dispose of liquid wastes in accordance with applicable requirements in Part 2.3.3; and
  - iii. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Part 2.3.3; and
- c. Locate any washout or cleanout activities as far away as possible from waters of the U.S. and stormwater inlets or conveyances, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

**2.3.5 For the application of fertilizers:**

- a. Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer specifications where appropriate in accordance with Part 7.2.6.b.ix;
- b. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
- c. Avoid applying before heavy rains that could cause excess nutrients to be discharged;
- d. Never apply to frozen ground;
- e. Never apply to stormwater conveyance channels; and
- f. Follow all other federal, state, tribal, and local requirements regarding fertilizer application.

**2.3.6 Emergency Spill Notification Requirements**

Discharges of toxic or hazardous substances from a spill or other release are prohibited, consistent with Part 1.3.5. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302 occurs during a 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302 as soon as you have knowledge of the release. You must also, within seven (7) calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. State, tribal, or local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.

## 2.4 CONSTRUCTION DEWATERING REQUIREMENTS

Comply with the following requirements to minimize the discharge of pollutants in ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, in accordance with Part 1.2.2.<sup>42</sup>

- 2.4.1 Treat dewatering discharges with controls to minimize discharges of pollutants;<sup>43</sup>
- 2.4.2 Do not discharge visible floating solids or foam;
- 2.4.3 Use an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products if dewatering water is found to contain these materials;
- 2.4.4 To the extent feasible, use vegetated, upland areas of the site to infiltrate dewatering water before discharge. You are prohibited from using waters of the U.S. as part of the treatment area;
- 2.4.5 At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11;
- 2.4.6 With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and
- 2.4.7 Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

## 3 WATER QUALITY-BASED EFFLUENT LIMITATIONS

### 3.1 GENERAL EFFLUENT LIMITATION TO MEET APPLICABLE WATER QUALITY STANDARDS

Discharges must be controlled as necessary to meet applicable water quality standards. Discharges must also comply with any additional state or tribal requirements that are in Part 9.

In the absence of information demonstrating otherwise, EPA expects that compliance with the conditions in this permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards. If at any time you become aware, or EPA determines, that discharges are not being controlled as necessary to meet applicable water quality standards, you must take corrective action as required in Parts 5.1 and 5.2, and document the corrective actions as required in Part 5.4.

EPA may insist that you install additional controls (to meet the narrative water quality-based effluent limit above) on a site-specific basis, or require you to obtain coverage under an individual permit, if information in your NOI or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality

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<sup>42</sup> Uncontaminated, clear (non-turbid) dewatering water can be discharged without being routed to a control.

<sup>43</sup> Appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, filtration systems (e.g., *bag or sand filters*), and passive treatment systems that are designed to remove sediment. Appropriate controls to use downstream of dewatering controls to minimize erosion include vegetated buffers, check dams, riprap, and grouted riprap at outlets.

standards. This includes situations where additional controls are necessary to comply with a wasteload allocation in an EPA-established or approved TMDL.

If during your coverage under a previous permit, you were required to install and maintain stormwater controls specifically to meet the assumptions and requirements of an EPA-approved or established TMDL (for any parameter) or to otherwise control your discharge to meet water quality standards, you must continue to implement such controls as part of your coverage under this permit.

### 3.2 DISCHARGE LIMITATIONS FOR SITES DISCHARGING TO SENSITIVE WATERS<sup>44</sup>

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, you must comply with the inspection frequency specified in 4.3 and you must comply with the stabilization deadline specified in Part 2.2.14.a.iii.(c).<sup>45</sup>

If you discharge to a water that is impaired for a parameter other than a sediment-related parameter or nutrients, EPA will inform you if any additional controls are necessary for your discharge to be controlled as necessary to meet water quality standards, including for it to be consistent with the assumptions of any available wasteload allocation in any applicable TMDL, or if coverage under an individual permit is necessary.

In addition, on a case-by-case basis, EPA may notify operators of new sites or operators of existing sites with increased discharges that additional analyses, stormwater controls, or other measures are necessary to comply with the applicable antidegradation requirements, or notify you that an individual permit application is necessary.

If you discharge to a water that is impaired for polychlorinated biphenyls (PCBs) and are engaging in demolition of any structure with at least 10,000 square feet of floor space built or renovated before January 1, 1980, you must:

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<sup>44</sup> Sensitive waters include waters that are impaired and Tier 2, Tier 2.5, and Tier 3 waters.

"Impaired waters" are those waters identified by the state, tribe, or EPA as not meeting an applicable water quality standard and (1) requires development of a TMDL (pursuant to section 303(d) of the CWA; or (2) is addressed by an EPA-approved or established TMDL; or (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1). Your construction site will be considered to discharge to an impaired water if the first water of the U.S. to which you discharge is an impaired water for the pollutants contained in the discharge from your site. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. For assistance in determining whether your site discharges to impaired waters, EPA has developed a tool that is available both within the electronic NOI form in NeT, and at <https://www.epa.gov/npdes/epas-stormwater-discharge-mapping-tools>.

Tiers 2, 2.5 and 3 refer to waters either identified by the state as high quality waters or Outstanding National Resource Waters under 40 CFR 131.12(a)(2) and (3). For the purposes of this permit, you are considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water of the U.S. to which you discharge is identified by a state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3. For discharges that enter a storm sewer system prior to discharge, the water of the U.S. to which you discharge is the first water of the U.S. that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F. EPA may determine on a case-by-case basis that a site discharges to a sensitive water.

<sup>45</sup> If you qualify for any of the reduced inspection frequencies in Part 4.4, you may conduct inspections in accordance with Part 4.4 for any portion of your site that discharges to a sensitive water.

- a. Implement controls<sup>46</sup> to minimize the exposure of PCB-containing building materials, including paint, caulk, and pre-1980 fluorescent lighting fixtures, to precipitation and to stormwater; and
- b. Ensure that disposal of such materials is performed in compliance with applicable state, federal, and local laws.

## **4 SITE INSPECTION REQUIREMENTS**

### **4.1 PERSON(S) RESPONSIBLE FOR INSPECTING SITE**

The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that the person who conducts inspections is a "qualified person."<sup>47</sup>

### **4.2 FREQUENCY OF INSPECTIONS.<sup>48</sup>**

At a minimum, you must conduct a site inspection in accordance with one of the two schedules listed below, unless you are subject to the Part 4.3 site inspection frequency for discharges to sensitive waters or qualify for a Part 4.4 reduction in the inspection frequency:

**4.2.1** At least once every seven (7) calendar days; or

**4.2.2** Once every 14 calendar days *and* within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge.<sup>49</sup> To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1 d.

### **4.3 INCREASE IN INSPECTION FREQUENCY FOR SITES DISCHARGING TO SENSITIVE WATERS.**

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes (see Part 3.2), instead of the inspection frequency specified in

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<sup>46</sup> Examples of controls to minimize exposure of PCBs to precipitation and stormwater include separating work areas from non-work areas and selecting appropriate personal protective equipment and tools, constructing a containment area so that all dust or debris generated by the work remains within the protected area, using tools that minimize dust and heat (<212°F). For additional information, refer to Part 2.3.3 of the CGP Fact Sheet.

<sup>47</sup> A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

<sup>48</sup> Inspections are only required during the site's normal working hours.

<sup>49</sup> "Within 24 hours of the occurrence of a storm event" means that you must conduct an inspection within 24 hours once a storm event has produced 0.25 inches within a 24-hour period, even if the storm event is still continuing. Thus, if you have elected to inspect bi-weekly in accordance with Part 4.2.2 and there is a storm event at your site that continues for multiple days, and each day of the storm produces 0.25 inches or more of rain, you must conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the end of the storm.

Part 4.2, you must conduct inspections in accordance with the following inspection frequencies:

Once every seven (7) calendar days *and* within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

#### **4.4 REDUCTIONS IN INSPECTION FREQUENCY**

##### **4.4.1 Stabilized areas.**

- a. You may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, then once per month in any area of your site where the stabilization steps in 2.2.14a have been completed. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable. You must document the beginning and ending dates of this period in your SWPPP.
- b. **Exception.** For "linear construction sites" (as defined in Appendix A) where disturbed portions have undergone final stabilization at the same time active construction continues on others, you may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, in any area of your site where the stabilization steps in 2.2.14a have been completed. After the first month, inspect once more within 24 hours of the occurrence of a storm event of 0.25 inches or greater. If there are no issues or evidence of stabilization problems, you may suspend further inspections. If "wash-out" of stabilization materials and/or sediment is observed, following re-stabilization, inspections must resume at the inspection frequency required in Part 4.4.1a. Inspections must continue until final stabilization is visually confirmed following a storm event of 0.25 inches or greater.

**4.4.2 Arid, semi-arid, or drought-stricken areas** (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, you may reduce the frequency of inspections to once per month and within 24 hours of the occurrence of a storm event of 0.25 inches or greater. You must document that you are using this reduced schedule and the beginning and ending dates of the seasonally dry period in your SWPPP. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

##### **4.4.3 Frozen conditions:**

- a. If you are suspending construction activities due to frozen conditions, you may temporarily suspend inspections on your site until thawing conditions (as defined in Appendix A) begin to occur if:

- i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable;
  - ii. Land disturbances have been suspended; and
  - iii. All disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.
- b. If you are still conducting construction activities during frozen conditions, you may reduce your inspection frequency to once per month if:
- i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable; and
  - ii. Except for areas in which you are actively conducting construction activities, disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

You must document the beginning and ending dates of this period in your SWPPP.

#### **4.5 AREAS THAT MUST BE INSPECTED**

During your site inspection, you must at a minimum inspect the following areas of your site:

- 4.5.1** All areas that have been cleared, graded, or excavated and that have not yet completed stabilization consistent with Part 2.2.14a;
- 4.5.2** All stormwater controls (including pollution prevention controls) installed at the site to comply with this permit;<sup>50</sup>
- 4.5.3** Material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit;
- 4.5.4** All areas where stormwater typically flows within the site, including drainageways designed to divert, convey, and/or treat stormwater;
- 4.5.5** All points of discharge from the site; and
- 4.5.6** All locations where stabilization measures have been implemented.

You are not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

#### **4.6 REQUIREMENTS FOR INSPECTIONS**

During your site inspection, you must at a minimum:

- 4.6.1** Check whether all stormwater controls (*i.e., erosion and sediment controls and pollution prevention controls*) are properly installed, appear to be operational, and are working as intended to minimize pollutant discharges;

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<sup>50</sup> This includes the requirement to inspect for sediment that has been tracked out from the site onto paved roads, sidewalks, or other paved areas consistent with Part 2.2.4.

- 4.6.2** Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
- 4.6.3** Identify any locations where new or modified stormwater controls are necessary to meet the requirements of Parts 2 and/or 3;
- 4.6.4** Check for signs of visible erosion and sedimentation (*i.e., sediment deposits*) that have occurred and are attributable to your discharge at points of discharge and, if applicable, the banks of any waters of the U.S. flowing within or immediately adjacent to the site;
- 4.6.5** Identify any incidents of noncompliance observed;
- 4.6.6** If a discharge is occurring during your inspection:
  - a. Identify all discharge points at the site; and
  - b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants.
- 4.6.7** Based on the results of your inspection, complete any necessary maintenance under Part 2.1.4 and corrective action under Part 5.

#### **4.7 INSPECTION REPORT**

- 4.7.1** You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:
  - a. The inspection date;
  - b. Names and titles of personnel making the inspection;
  - c. A summary of your inspection findings, covering at a minimum the observations you made in accordance with Part 4.6, including any necessary maintenance or corrective actions;
  - d. If you are inspecting your site at the frequency specified in Part 4.2.2, Part 4.3, or Part 4.4.1b, and you conducted an inspection because of rainfall measuring 0.25 inches or greater, you must include the applicable rain gauge or weather station readings that triggered the inspection; and
  - e. If you determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.
- 4.7.2** Each inspection report must be signed in accordance with Appendix I, Part I.11 of this permit.
- 4.7.3** You must keep a copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.
- 4.7.4** You must retain all inspection reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.



#### **4.8 INSPECTIONS BY EPA**

You must allow EPA, or an authorized representative of EPA, to conduct the following activities at reasonable times. To the extent that you are utilizing shared controls that are not on site to comply with this permit, you must make arrangements for EPA to have access at all reasonable times to those areas where the shared controls are located.

- 4.8.1** Enter onto all areas of the site, including any construction support activity areas covered by this permit, any off-site areas where shared controls are utilized to comply with this permit, discharge locations, adjoining waterbodies, and locations where records are kept under the conditions of this permit;
- 4.8.2** Access and copy any records that must be kept under the conditions of this permit;
- 4.8.3** Inspect your construction site, including any construction support activity areas covered by this permit (see Part 1.2.1c), any stormwater controls installed and maintained at the site, and any off-site shared controls utilized to comply with this permit; and
- 4.8.4** Sample or monitor for the purpose of ensuring compliance.

#### **5 CORRECTIVE ACTIONS**

##### **5.1 CONDITIONS TRIGGERING CORRECTIVE ACTION.**

You must take corrective action to address any of the following conditions identified at your site:

- 5.1.1** A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); or
- 5.1.2** A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
- 5.1.3** Your discharges are causing an exceedance of applicable water quality standards; or
- 5.1.4** A prohibited discharge has occurred (see Part 1.3).

##### **5.2 CORRECTIVE ACTION DEADLINES**

For any corrective action triggering conditions in Part 5.1, you must:

- 5.2.1** Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events;
- 5.2.2** When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day;
- 5.2.3** When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP,

you must modify your SWPPP accordingly within seven (7) calendar days of completing this work.

### **5.3 CORRECTIVE ACTION REQUIRED BY EPA**

You must comply with any corrective actions required by EPA as a result of permit violations found during an inspection carried out under Part 4.8.

### **5.4 CORRECTIVE ACTION REPORT**

For each corrective action taken in accordance with this Part, you must complete a report in accordance with the following:

- 5.4.1** Within 24 hours of identifying the corrective action condition, document the specific condition and the date and time it was identified.
- 5.4.2** Within 24 hours of completing the corrective action (in accordance with the deadlines in Part 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.
- 5.4.3** Each corrective action report must be signed in accordance with Appendix I, Part I.11 of this permit.
- 5.4.4** You must keep a copy of all corrective action reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.
- 5.4.5** You must retain all corrective action reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

## **6 STAFF TRAINING REQUIREMENTS**

Each operator, or group of multiple operators, must assemble a "stormwater team" to carry out compliance activities associated with the requirements in this permit.

- 6.1** Prior to the commencement of construction activities, you must ensure that the following personnel<sup>51</sup> on the stormwater team understand the requirements of this permit and their specific responsibilities with respect to those requirements:
  - a. Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention controls);
  - b. Personnel responsible for the application and storage of treatment chemicals (if applicable);
  - c. Personnel who are responsible for conducting inspections as required in Part 4.1; and
  - d. Personnel who are responsible for taking corrective actions as required in Part 5.

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<sup>51</sup> If the person requiring training is a new employee who starts after you commence construction activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit.

For emergency-related projects, the requirement to train personnel prior to commencement of construction activities does not apply, however, such personnel must have the required training prior to NOI submission.

- 6.2** You are responsible for ensuring that all activities on the site comply with the requirements of this permit. You are not required to provide or document formal training for subcontractors or other outside service providers, but you must ensure that such personnel understand any requirements of this permit that may be affected by the work they are subcontracted to perform.
- 6.3** At a minimum, members of the stormwater team must be trained to understand the following if related to the scope of their job duties (*e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections*):
- a. The permit deadlines associated with installation, maintenance, and removal of stormwater controls and with stabilization;
  - b. The location of all stormwater controls on the site required by this permit and how they are to be maintained;
  - c. The proper procedures to follow with respect to the permit's pollution prevention requirements; and
  - d. When and how to conduct inspections, record applicable findings, and take corrective actions.
- 6.4** Each member of the stormwater team must have easy access to an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWPPP, and other relevant documents or information that must be kept with the SWPPP.

## **7 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)**

### **7.1 GENERAL REQUIREMENTS**

All operators associated with a construction site under this permit must develop a SWPPP consistent with the requirements in Part 7 prior to their submittal of the NOI.<sup>52, 53</sup> The SWPPP must be kept up-to-date throughout coverage under this permit.

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<sup>52</sup> The SWPPP does not establish the effluent limits that apply to your site's discharges; these limits are established in this permit in Parts 2 and 3.

<sup>53</sup> You have the option of developing a group SWPPP where you are one of several operators at your site. For instance, if both the owner and the general contractor of the construction site are operators and thus are both required to obtain a permit, the owner may be the party undertaking SWPPP development, and the general contractor (or any other operator at the site) can choose to use this same SWPPP, as long as the SWPPP addresses the general contractor's (or other operator's) scope of construction work and functions to be performed under the SWPPP. Regardless of whether there is a group SWPPP or several individual SWPPPs, all operators would be jointly and severally liable for compliance with the permit.

Where there are multiple operators associated with the same site through a common plan of development or sale, operators may assign to themselves various permit-related functions under the SWPPP provided that each SWPPP, or a group SWPPP, documents which operator will perform each function under the SWPPP. However, dividing the functions to be performed under each SWPPP, or a single group SWPPP, does not relieve an individual operator from liability for complying with the permit should another operator fail to implement any measures that are necessary for that individual operator to comply with the permit, e.g., the installation and maintenance of any shared controls. In addition, all operators must ensure, either directly or through coordination with other operators, that their activities do not cause a violation and/or render any other operators' controls and/or any shared controls ineffective. All operators who rely on a shared control to comply with the permit are jointly and severally liable for violations of the permit resulting from the failure to properly install, operate and/or maintain the shared control.

If a SWPPP was prepared under a previous version of this permit, the operator must review and update the SWPPP to ensure that this permit's requirements are addressed prior to submitting an NOI for coverage under this permit.

## 7.2 SWPPP CONTENTS

At a minimum, the SWPPP must include the information specified in this Part and as specified in other parts of this permit.

**7.2.1 All Site Operators.** Include a list of all other operators who will be engaged in construction activities at the site, and the areas of the site over which each operator has control.

**7.2.2 Stormwater Team.** Identify the personnel (by name or position) that are part of the stormwater team, as well as their individual responsibilities, including which members are responsible for conducting inspections.

**7.2.3 Nature of Construction Activities.**<sup>54</sup> Include the following:

- a. A description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition;
- b. The size of the property (in acres or length in miles if a linear construction site);
- c. The total area expected to be disturbed by the construction activities (to the nearest quarter acre or nearest quarter mile if a linear construction site);
- d. A description of any on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c);
- e. The maximum area expected to be disturbed at any one time, including on-site and off-site construction support activity areas;
- f. A description and projected schedule for the following:
  - i. Commencement of construction activities in each portion of the site, including clearing and grubbing, mass grading, demolition activities, site preparation (*i.e.*, *excavating, cutting and filling*), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
  - ii. Temporary or permanent cessation of construction activities in each portion of the site;
  - iii. Temporary or final stabilization of exposed areas for each portion of the site; and
  - iv. Removal of temporary stormwater controls and construction equipment or vehicles, and the cessation of construction-related pollutant-generating activities.
- g. A list and description of all pollutant-generating activities<sup>55</sup> on the site. For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents (*e.g.*, *sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels*) associated with that activity, which could be discharged in stormwater from your construction site. You must take

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<sup>54</sup> If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to "lock in" the operator to meeting these dates. When departures from initial projections are necessary, this should be documented in the SWPPP itself, or in associated records, as appropriate.

<sup>55</sup> Examples of pollutant-generating activities include paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations.

- into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction;
- h. Business days and hours for the project;
  - i. If you are conducting construction activities in response to a public emergency (see Part 1.4), a description of the cause of the public emergency (*e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services*), information substantiating its occurrence (*e.g., state disaster declaration or similar state or local declaration*), and a description of the construction necessary to reestablish affected public services.

**7.2.4 Site Map.** Include a legible map, or series of maps, showing the following features of the site:

- a. Boundaries of the property;
- b. Locations where construction activities will occur, including:
  - i. Locations where earth-disturbing activities will occur (note any phasing), including any demolition activities;
  - ii. Approximate slopes before and after major grading activities (note any steep slopes (as defined in Appendix A));
  - iii. Locations where sediment, soil, or other construction materials will be stockpiled;
  - iv. Any water of the U.S. crossings;
  - v. Designated points where vehicles will exit onto paved roads;
  - vi. Locations of structures and other impervious surfaces upon completion of construction; and
  - vii. Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c).
- c. Locations of all waters of the U.S. within and one mile downstream of the site's discharge point. Also identify if any are listed as impaired, or are identified as a Tier 2, Tier 2.5, or Tier 3 water;
- d. Areas of federally listed critical habitat within the site and/or at discharge locations;
- e. Type and extent of pre-construction cover on the site (*e.g., vegetative cover, forest, pasture, pavement, structures*);
- f. Drainage patterns of stormwater and authorized non-stormwater before and after major grading activities;
- g. Stormwater and authorized non-stormwater discharge locations, including:
  - i. Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets;<sup>56</sup> and
  - ii. Locations where stormwater or authorized non-stormwater will be discharged directly to waters of the U.S.
- h. Locations of all potential pollutant-generating activities identified in Part 7.2.3g;

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<sup>56</sup> The requirement to show storm drain inlets in the immediate vicinity of the site on your site map only applies to those inlets that are easily identifiable from your site or from a publicly accessible area immediately adjacent to your site.

- i. Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with this permit; and
- j. Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

**7.2.5 Non-Stormwater Discharges.** Identify all authorized non-stormwater discharges in Part 1.2.2 that will or may occur.

**7.2.6 Description of Stormwater Controls.**

- a. For each of the Part 2.2 erosion and sediment control effluent limits, Part 2.3 pollution prevention effluent limits, and Part 2.4 construction dewatering effluent limits, as applicable to your site, you must include the following:
  - i. A description of the specific control(s) to be implemented to meet the effluent limit;
  - ii. Any applicable stormwater control design specifications (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon);<sup>57</sup>
  - iii. Routine stormwater control maintenance specifications; and
  - iv. The projected schedule for stormwater control installation/implementation.
- b. You must also include any of the following additional information as applicable.
  - i. **Natural buffers and/or equivalent sediment controls** (see Part 2.2.1 and Appendix G). You must include the following:
    - (a) The compliance alternative to be implemented;
    - (b) If complying with alternative 2, the width of natural buffer retained;
    - (c) If complying with alternative 2 or 3, the erosion and sediment control(s) you will use to achieve an equivalent sediment reduction, and any information you relied upon to demonstrate the equivalency;
    - (d) If complying with alternative 3, a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size;
    - (e) For "linear construction sites" where it is infeasible to implement compliance alternative 1, 2, or 3, a rationale for this determination, and a description of any buffer width retained and/or supplemental erosion and sediment controls installed; and
    - (f) A description of any disturbances that are exempt under Part 2.2.1 that occur within 50 feet of a water of the U.S.
  - ii. **Perimeter controls for a "linear construction site"** (see Part 2.2.3). For areas where perimeter controls are not feasible, include documentation to support this determination and a description of the other practices that will be implemented to minimize discharges of pollutants in stormwater associated with construction activities.

Note: Routine maintenance specifications for perimeter controls documented in the SWPPP must include the Part 2.2.3a requirement that sediment be removed

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<sup>57</sup> Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practice and must be explained in the SWPPP.

before it has accumulated to one-half of the above-ground height of any perimeter control.

- iii. **Sediment track-out controls** (see Parts 2.2.4b and 2.2.4c). Document the specific stabilization techniques and/or controls that will be implemented to remove sediment prior to vehicle exit.
- iv. **Sediment basins** (see Part 2.2.12). In circumstances where it is infeasible to utilize outlet structures that withdraw water from the surface, include documentation to support this determination, including the specific conditions or time periods when this exception will apply.
- v. **Treatment chemicals** (see Part 2.2.13), you must include the following:
  - (a) A listing of the soil types that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems. Also include a listing of soil types expected to be found in fill material to be used in these same areas, to the extent you have this information prior to construction;
  - (b) A listing of all treatment chemicals to be used at the site and why the selection of these chemicals is suited to the soil characteristics of your site;
  - (c) If the applicable EPA Regional Office authorized you to use cationic treatment chemicals for sediment control, include the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards;
  - (d) The dosage of all treatment chemicals to be used at the site or the methodology to be used to determine dosage;
  - (e) Information from any applicable Safety Data Sheet (SDS);
  - (f) Schematic drawings of any chemically enhanced stormwater controls or chemical treatment systems to be used for application of the treatment chemicals;
  - (g) A description of how chemicals will be stored consistent with Part 2.2.13c;
  - (h) References to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems; and
  - (i) A description of the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to use of the treatment chemicals at your site.
- vi. **Stabilization measures** (see Part 2.2.14). You must include the following:
  - (a) The specific vegetative and/or non-vegetative practices that will be used;
  - (b) The stabilization deadline that will be met in accordance with Part 2.2.14.a.i-ii;
  - (c) If complying with the deadlines for sites in arid, semi-arid, or drought-stricken areas, the beginning and ending dates of the seasonally dry period and the schedule you will follow for initiating and completing vegetative stabilization; and
  - (d) If complying with deadlines for sites affected by unforeseen circumstances that delay the initiation and/or completion of vegetative stabilization, document the circumstances and the schedule for initiating and completing stabilization.



- vii. **Spill prevention and response procedures** (see Part 1.3.5 and Part 2.3). You must include the following:
- (a) Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employee(s) responsible for detection and response of spills or leaks; and
  - (b) Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available to all employees.
- You may also reference the existence of Spill Prevention Control and Countermeasure (SPCC) plans developed for the construction activity under Part 311 of the CWA, or spill control programs otherwise required by an NPDES permit for the construction activity, provided that you keep a copy of that other plan on site.<sup>58</sup>
- viii. **Waste management procedures** (see Part 2.3.3). Describe the procedures you will follow for handling, storing and disposing of all wastes generated at your site consistent with all applicable federal, state, tribal, and local requirements, including clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste.
- ix. **Application of fertilizers** (see Part 2.3.5). Document any departures from the manufacturer specifications where appropriate.

- 7.2.7** Procedures for Inspection, Maintenance, and Corrective Action. Describe the procedures you will follow for maintaining your stormwater controls, conducting site inspections, and, where necessary, taking corrective actions, in accordance with Part 2.1.4, Part 4, and Part 5 of this permit. Also include:
- a. The inspection schedule you will follow, which is based on whether your site is subject to Part 4.2 or Part 4.3, or whether your site qualifies for any of the reduced inspection frequencies in Part 4.4;
  - b. If you will be conducting inspections in accordance with the inspection schedule in Part 4.2.2, Part 4.3, or Part 4.4.1b, the location of the rain gauge or the address of the weather station you will be using to obtain rainfall data;
  - c. If you will be reducing your inspection frequency in accordance with Part 4.4.1b, the beginning and ending dates of the seasonally defined arid period for your area or the valid period of drought;
  - d. If you will be reducing your inspection frequency in accordance with Part 4.4.3, the beginning and ending dates of frozen conditions on your site; and
  - e. Any maintenance or inspection checklists or other forms that will be used.

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<sup>58</sup> Even if you already have an SPCC or other spill prevention plan in existence, your plans will only be considered adequate if they meet all of the requirements of this Part, either as part of your existing plan or supplemented as part of the SWPPP.

**7.2.8 Staff Training.** Include documentation that the required personnel were, or will be, trained in accordance with Part 6.

**7.2.9 Compliance with Other Requirements.**

- a. **Threatened and Endangered Species Protection.** Include documentation required in Appendix D supporting your eligibility with regard to the protection of threatened and endangered species and designated critical habitat.
- b. **Historic Properties.** Include documentation required in Appendix E supporting your eligibility with regard to the protection of historic properties.
- c. **Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Stormwater Controls.** If you are using any of the following stormwater controls at your site, document any contact you have had with the applicable state agency<sup>59</sup> or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing regulations at 40 CFR 144 -147. Such controls would generally be considered Class V UIC wells:
  - i. Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);
  - ii. Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and
  - iii. Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system).

**7.2.10 SWPPP Certification.** You must sign and date your SWPPP in accordance with Appendix I, Part I.11.

**7.2.11 Post-Authorization Additions to the SWPPP.** Once you are authorized for coverage under this permit, you must include the following documents as part of your SWPPP:

- a. A copy of your NOI submitted to EPA along with any correspondence exchanged between you and EPA related to coverage under this permit;
- b. A copy of the acknowledgment letter you receive from NeT assigning your NPDES ID (*i.e.*, *permit tracking number*);
- c. A copy of this permit (an electronic copy easily available to the stormwater team is also acceptable).

**7.3 ON-SITE AVAILABILITY OF YOUR SWPPP**

You must keep a current copy of your SWPPP at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA; a state, tribal, or local agency approving stormwater management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

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<sup>59</sup> For state UIC program contacts, refer to the following EPA website: <https://www.epa.gov/uic>.

EPA may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) will be withheld from the public, but may not be withheld from EPA, USFWS, or NMFS.<sup>60</sup>

If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

## **7.4 SWPPP MODIFICATIONS**

- 7.4.1** You must modify your SWPPP, including the site map(s), within seven (7) days of any of the following conditions:
- a. Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions triggered under Part 5. You do not need to modify your SWPPP if the estimated dates in Part 7.2.3f change during the course of construction;
  - b. To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
  - c. If inspections or investigations by EPA or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit;
  - d. Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet the requirements of this permit, the following must be included in your SWPPP:
    - i. A copy of any correspondence describing such measures and requirements; and
    - ii. A description of the controls that will be used to meet such requirements.
  - e. To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater controls implemented at the site; and
  - f. If applicable, if a change in chemical treatment systems or chemically enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.
- 7.4.2** You must maintain records showing the dates of all SWPPP modifications. The records must include the name of the person authorizing each change (see Part 7.2.10 above) and a brief summary of all changes.
- 7.4.3** All modifications made to the SWPPP consistent with Part 7.4 must be authorized by a person identified in Appendix I, Part I.11.b.
- 7.4.4** Upon determining that a modification to your SWPPP is required, if there are multiple operators covered under this permit, you must immediately notify any operators who may be impacted by the change to the SWPPP.

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<sup>60</sup> Information covered by a claim of confidentiality will be disclosed by EPA only to the extent of, and by means of, the procedures set forth in 40 CFR Part 2, Subpart B. In general, submitted information protected by a business confidentiality claim may be disclosed to other employees, officers, or authorized representatives of the United States concerned with implementing the CWA. The authorized representatives, including employees of other executive branch agencies, may review CBI during the course of reviewing draft regulations.

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## 8 HOW TO TERMINATE COVERAGE

Until you terminate coverage under this permit, you must comply with all conditions and effluent limitations in the permit. To terminate permit coverage, you must submit to EPA a complete and accurate Notice of Termination (NOT), which certifies that you have met the requirements for terminating in Part 8.

### 8.1 MINIMUM INFORMATION REQUIRED IN NOT

**8.1.1** NPDES ID (*i.e.*, *permit tracking number*) provided by EPA when you received coverage under this permit;

**8.1.2** Basis for submission of the NOT (see Part 8.2);

**8.1.3** Operator contact information;

**8.1.4** Name of site and address (or a description of location if no street address is available); and

**8.1.5** **NOT certification.**

### 8.2 CONDITIONS FOR TERMINATING CGP COVERAGE

You must terminate CGP coverage only if one or more of the following conditions has occurred:

**8.2.1** You have completed all construction activities at your site and, if applicable, construction support activities covered by this permit (see Part 1.2.1c), and you have met the following requirements:

- a. For any areas that (1) were disturbed during construction, (2) are not covered over by permanent structures, and (3) over which you had control during the construction activities, you have met the requirements for final vegetative or non-vegetative stabilization in Part 2.2.14b;
- b. You have removed and properly disposed of all construction materials, waste and waste handling devices, and have removed all equipment and vehicles that were used during construction, unless intended for long-term use following your termination of permit coverage;
- c. You have removed all stormwater controls that were installed and maintained during construction, except those that are intended for long-term use following your termination of permit coverage or those that are biodegradable; and
- d. You have removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long-term use following your termination of permit coverage; or

**8.2.2** You have transferred control of all areas of the site for which you are responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit; or

**8.2.3** Coverage under an individual or alternative general NPDES permit has been obtained.

### 8.3 HOW TO SUBMIT YOUR NOT

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOT for the 2017 CGP.

To access NeT, go to <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting>.

Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office grants you approval to use a paper NOT, and you elect to use it, you must complete the form in Appendix K.

#### **8.4 DEADLINE FOR SUBMITTING THE NOT**

You must submit your NOT within 30 calendar days after any one of the conditions in Part 8.2 occurs.

#### **8.5 EFFECTIVE DATE OF TERMINATION OF COVERAGE**

Your authorization to discharge under this permit terminates at midnight of the calendar day that a complete NOT is submitted to EPA.

### **9 PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY LANDS, OR TERRITORIES**

The provisions in this Part provide modifications or additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the state or tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific states, Indian country, and areas in certain states subject to construction projects by Federal Operators. States, Indian country, and areas subject to construction by Federal Operators not included in this Part do not have any modifications or additions to the applicable conditions of this permit.

#### **9.1 EPA REGION 1**

##### **9.1.1 NHR100000 State of New Hampshire**

- a. If you disturb 100,000 square feet or more of contiguous area, you must also apply for an Alteration of Terrain (AoT) permit from DES pursuant to RSA 485- A:17 and Env-Wq 1500. This requirement also applies to a lower disturbance threshold of 50,000 square feet or more when construction occurs within the protected shoreline under the Shoreland Water Quality Protection Act (see RSA 483-B and Env-Wq 1400). A permit application must also be filed if your project disturbs an area of greater than 2,500 square feet, is within 50 feet of any surface water, and has a flow path of 50 feet or longer disturbing a grade of 25 percent or greater. Project sites with disturbances smaller than those discussed above, that have the potential to adversely affect state surface waters, are subject to the conditions of an AoT General Permit by Rule.
- b. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-stormwater discharge under this permit (see Part 1.2.2). The water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the groundwater dewatering location. Information on groundwater contamination can be generated over the Internet via the NHDES web site <http://des.nh.gov/> by using the One Stop Data Mapper at <http://des.nh.gov/onestop/gis.htm>. If it is determined that the groundwater to be dewatered is near a remediation or other waste site you must

- apply for the Remediation General Permit (see <https://www3.epa.gov/region1/npdes/rgp.html>.)
- c. You must treat any uncontaminated excavation dewatering discharges as necessary to remove suspended solids and turbidity. The discharges must be sampled at least once per week during weeks when discharges occur. Samples must be analyzed for total suspended solids (TSS) or turbidity and must meet monthly average and daily maximum limits of 50 milligrams per liter (mg/L) and 100 mg/L, respectively for TSS or 33 mg/l and 67 mg/l, respectively for turbidity. TSS (a.k.a. Residue, Nonfilterable) or turbidity sampling and analysis must be performed in accordance with Tables IB and II in 40 CFR 136.3 ([http://www.ecfr.gov/cgi-bin/text-idx?SID=0243e3c4283cbd7d8257eb6afc7ce9a2&mc=true&node=se40.25.136\\_13&rgn=div8](http://www.ecfr.gov/cgi-bin/text-idx?SID=0243e3c4283cbd7d8257eb6afc7ce9a2&mc=true&node=se40.25.136_13&rgn=div8)). Records of any sampling and analysis must be maintained and kept with the SWPPP for at least three years after final site stabilization.
  - d. Construction site owners and operators must consider opportunities for post-construction groundwater recharge using infiltration best management practices (BMPs) during site design and preparation of the SWPPP. If your construction site is in a town that is required to obtain coverage under the NPDES General Permit for discharges from Municipal Separate Storm Sewer Systems (MS4) you may be required to use such practices. The SWPPP must include a description of any on-site infiltration that will be installed as a post-construction stormwater management measure or reasons for not employing such measures such as 1) The facility is located in a wellhead protection area as defined in RSA 485- C:2; or 2) The facility is located in an area where groundwater has been reclassified to GAA, GAI or GA2 pursuant to RSA 485-C and Env-DW 901; or 3) Any areas that would be exempt from the groundwater recharge requirements contained in Env-Wq 1507.04(e), including all land uses or activities considered to be a "High-load Area" (see Env-Wq 1502.26). For design considerations for infiltration measures see Volume II of the NH Stormwater Manual.
  - e. Appendix F contains a list of Tier 2, or high quality waters. Although there is no official list of tier 2 waters, it can be assumed that all NH surface waters are tier 2 for turbidity unless 1) the surface water that you are proposing to discharge into is listed as impaired for turbidity in the states listing of impaired waters (see Surface Water Quality - Watershed Report Cards at [http://des.nh.gov/organization/divisions/water/wmb/swqa/report\\_cards.htm](http://des.nh.gov/organization/divisions/water/wmb/swqa/report_cards.htm)) or 2) sampling upstream of the proposed discharge location shows turbidity values greater than 10 NTU. A single grab sample collected during dry weather (no precipitation within 48 hours) is acceptable.
  - f. To ensure compliance with RSA 485-C, RSA 485-A, RSA 485-A:13, I(a), Env-Wq 1700 and Env-Wq 302, the following information may be requested by NHDES. This information must be kept on site unless you receive a written request from NHDES that it be sent to the address shown in Part 9.1.4 (g).
    - i. A site map required in Part 7.2.4, showing the type and location of all post-construction infiltration BMPs utilized at the facility or the reason(s) why none were installed;
    - ii. A list of all non-stormwater discharges that occur at the facility, including their source locations and the control measures being used (see Part 1.2.2).

- iii. Records of sampling and analysis of TSS required for construction dewatering discharges (see Part 9.1.4 (c)).
- g. All required or requested documents must be sent to:
  - NH Department of Environmental Services, Wastewater Engineering Bureau,
  - Permits & Compliance Section
  - P.O. Box 95
  - Concord, NH 03302-0095

## 9.2 EPA REGION 3

### 9.2.1 DCR100000 District of Columbia

- a. The permittee must comply with the District of Columbia Water Pollution Control Act of 1984, as amended, (D.C. Official Code §8-103.01 *et seq.*) and its implementing regulations in Title 21, Chapters 11 and 19 of the District of Columbia Municipal Regulations. Nothing in this permit will be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to District of Columbia laws and regulations.
- b. The permittee must comply with the District of Columbia Stormwater Management, and Soil Erosion and Sediment Control in Chapter 5 of Title 21 of the District of Columbia Municipal Regulations.
- c. The permittee must comply with the District of Columbia Flood Management control in Chapter 31 of Title 20 of the District of Columbia Municipal Regulations.
- d. The Department may request a copy of the Stormwater Pollution Prevention Plan (SWPPP) and the permittee is required to submit the SWPPP to the Department with 14 days of such request. The Department may conduct an inspection of any facility covered by this permit to ensure compliance with District's law requirements including water quality.

### 9.2.2 DER10F000 Areas in the State of Delaware subject to construction by a Federal Operator

- a. Federal agencies engaging in construction activities must submit, to DNREC, a sediment and stormwater management (S&S) plan and obtain approval from DNREC in accordance with 7 Del. C. §4010, 7 DE Admin. Code 5101, and 7 DE Admin. Code 7201.
- b. Federal agencies engaging in construction activities must provide for construction review by a certified construction reviewer in accordance with 7 Del. C. §§4010 & 4013 and 7 DE Admin. Code 5101, subsection 6.1.6.
- c. Federal agencies engaging in construction activities must certify that all responsible personnel involved in the construction project will have attended the blue card training prior to initiation of any land disturbing activity – see 7 Del. C. §§ 4002 & 4014 and 7 DE Admin. Code 5101.

## 9.3 EPA REGION 5

### 9.3.1 MNR10I000 Indian country within the State of Minnesota

- 9.3.1.1 **Fond du Lac Band of Lake Superior Chippewa.** The following conditions apply only to discharges on the Fond du Lac Band of Lake Superior Chippewa Reservation:



- a. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted to the Office of Water Protection at least fifteen (15) days in advance of sending the Notice of Intent (NOI) to EPA. The SWPPP can be submitted electronically to [richardgitar@FDLREZ.com](mailto:richardgitar@FDLREZ.com) or by hardcopy sent to:

Fond du Lac Reservation  
Office of Water Protection  
1720 Big Lake Road  
Cloquet, MN 55720

CGP applicants are encouraged to work with the FDL Office of Water Protection in the identification of all proposed receiving.

- b. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA.
- c. The turbidity limit shall NOT exceed 10% of natural background within the receiving water(s) as determined by Office of Water Protection staff.
- d. Turbidity sampling must take place within 24 hours of a ½-inch or greater rainfall event. The results of the sampling must be reported to the Office of Water Protection within 7 days of the sample collection. All sample reporting must include the date and time, location (GPS: UTM/Zone 15), and NTU. CGP applicants are encouraged to work with the Office of Water Protection in determining the most appropriate location(s) for sampling.
- e. Receiving waters with open water must be sampled for turbidity prior to any authorized discharge as determined by Office of Water Protection staff. This requirement only applies to receiving waters in which no ambient turbidity data exists.
- f. This Certification does not pertain to any new discharge to Outstanding Reservation Resource Waters (ORRW) as described in §105 b.3. of the Fond du Lac Water Quality Standards (Ordinance #12/98, as amended). Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake, and Jaskari Lake are designated as ORRWs. New dischargers wishing to discharge to an ORRW must obtain an individual permit from EPA for stormwater discharges from large and small construction activities.
- g. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance 12/98, as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm water fisheries, cold water fisheries, subsistence fishing (netting), primary contact recreation, secondary contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation, and commercial.
- h. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management

agency (National Response Center AND the State Duty Officer), and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac Reservation, including groundwater. The Fond du Lac Office of Water Protection must also be notified immediately of any spill regardless of size.

- i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.

**9.3.1.2 Grand Portage Band of Lake Superior Chippewa.** The following conditions apply only to discharges on the Grand Portage Band of Lake Superior Chippewa Reservation:

- a. The CGP authorization is for construction activities that may occur within the exterior boundaries of the Grand Portage Reservation in accordance to the Grand Portage Land Use Ordinance. The CGP regulates stormwater discharges associated with construction sites of one acre or more in size. Only those activities specifically authorized by the CGP are authorized by this certification (the "Certification"). This Certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for listing as such.
- b. All construction stormwater discharges authorized by the CGP must comply with the Water Quality Standards and Water Resources Ordinance, as well as Applicable Federal Standards (as defined in the Water Resources Ordinance). As such, appropriate steps must be taken to ensure that petroleum products or other chemical pollutants are prevented from entering the Waters of the Reservation (as defined in the Water Resources Ordinance). All spills must be reported to the appropriate emergency-management agency, and measures must be taken to prevent the pollution of the Waters of the Reservation, including groundwater.
- c. The 2017 CGP requires inspections and monitoring reports of the construction site stormwater discharges by a qualified person. Monitoring and inspection reports must comply with the minimum requirements contained in the 2017 CGP. The monitoring plan must be prepared and incorporated into the Stormwater Pollution Prevention Plan (the "SWPPP"). A copy of the SWPPP must be submitted to the Board at least 30 days in advance of sending the requisite Notice of Intent to EPA. The SWPPP should be sent to:

Grand Portage Environmental Resources Board  
P.O. Box 428  
Grand Portage, MN 55605

Copies of the Notice of Intent and Notice of Termination required under the CGP must be submitted to the Board at the address above at the same time they are submitted to the EPA.

- d. If requested by the Grand Portage Environmental Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Water Quality Standards and any Applicable Federal Standards.
- e. Discharges that the Board has determined to be or that may reasonably be expected to be contributing to a violation of Water Quality Standards or Applicable Federal Standards are not authorized by this Certification.

- f. The Board retains full authority provided by the Water Resources Ordinance to ensure compliance with and to enforce the provisions of the Water Resource Ordinance and Water Quality Standards, Applicable Federal Standards, and these Certification conditions.
- g. Appeals related to Board actions taken in accordance with any of the preceding conditions may be heard by the Grand Portage Tribal Court.

**9.3.2 WIR10I000 Indian country within the State of Wisconsin, except the Sokaogon Chippewa (Mole Lake) Community**

**9.3.2.1 Bad River Band of Lake Superior Tribe of Chippewa Indians:** The following conditions apply only to discharges on the Bad River Band of the Lake Superior Tribe of Chippewa Indians Reservation:

- a. Only those activities specifically authorized by the CGP are authorized by this Certification. This Certification does not authorize impacts to cultural properties, or historical sites, or properties that may be eligible for listing as such.<sup>61, 62</sup>
- b. Operators are not eligible to obtain authorization under the CGP for all new discharges to an Outstanding Tribal Resource Water (or Tier 3 water).<sup>63</sup> Outstanding Tribal Resource Waters, or Tier 3 waters, include the following: Kakagon Slough and the lower wetland reaches of its tributaries that support wild rice, Kakagon River, Bad River Slough, Honest John Lake, Bog Lake, a portion of Bad River, from where it enters the Reservation through the confluence with the White River, and Potato River.<sup>64</sup>
- c. Projects utilizing cationic treatment chemicals<sup>65</sup> within the Bad River Reservation boundaries are not eligible for coverage under the CGP.<sup>66</sup>
- d. All projects which are eligible for coverage under the CGP and are located within the exterior boundaries of the Bad River Reservation shall be implemented in such a manner that is consistent with the Tribe's Water Quality Standards (WQS).<sup>67</sup>
- e. An operator proposing to discharge to an Outstanding Resource Water (or Tier 2.5 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Outstanding Resource Waters, or Tier 2.5 waters, include the following: a portion of Bad River, from downstream the confluence with the White River to Lake Superior, White River, Marengo River, Graveyard Creek, Bear Trap Creek, Wood Creek, Brunsweller River, Tyler Forks, Bell Creek, and Vaughn Creek.<sup>68</sup> The antidegradation

<sup>61</sup> Bad River Band of Lake Superior Tribe of Chippewa Indians Water Quality Standards adopted by Resolution No. 7-6-11-441 (hereafter, Tribe's WQS).

<sup>62</sup> 36 C.F.R. § 800.16(l)(2).

<sup>63</sup> Tribe's WQS: See provisions E.3.ii. and E.4.iv.

<sup>64</sup> Tribe's WQS: See provision E.2.iii.

<sup>65</sup> See definition of cationic treatment chemicals in Appendix A of the CGP.

<sup>66</sup> Tribe's WQS: See provisions E.6.ii.a. and E.6.ii.c.

<sup>67</sup> See footnote 61.

<sup>68</sup> Tribe's WQS: See provision E.2.ii.

demonstration materials described in provision E.4.iii. must be submitted to the following address:

Bad River Tribe's Natural Resources Department  
Attn: Water Resources Specialist  
P.O. Box 39  
Odanah, WI 54861

- f. An operator proposing to discharge to an Exceptional Resource Water (or Tier 2 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Exceptional Resource Waters, or Tier 2 waters, include the following: any surface water within the exterior boundaries of the Reservation that is not specifically classified as an Outstanding Resource Water (Tier 2.5 water) or an Outstanding Tribal Resource Water (Tier 3 water).<sup>69</sup> The antidegradation demonstration materials described in provision E.4.ii. must be submitted to the following address:

Bad River Tribe's Natural Resources Department  
Attn: Water Resources Specialist  
P.O. Box 39  
Odanah, WI 54861

- g. A discharge to a surface water within the Bad River Reservation boundaries shall not cause or contribute to an exceedance of the turbidity criterion included in the Tribe's WQS, which states: Turbidity shall not exceed 5 NTU over natural background turbidity when the background turbidity is 50 NTU or less, or turbidity shall not increase more than 10% when the background turbidity is more than 50 NTU.<sup>70</sup>
- h. All projects which are eligible for coverage under the CGP within the exterior boundaries of the Bad River Reservation must comply with the Bad River Reservation Wetland and Watercourse Protection Ordinance, or Chapter 323 of the Bad River Tribal Ordinances, including the erosion and sedimentation control, natural buffer, and stabilization requirements. Questions regarding Chapter 323 and requests for permit applications can be directed to the Wetlands Specialist in the Tribe's Natural Resources Department at (715) 682-7123 or [wetlands@badriver-nsn.gov](mailto:wetlands@badriver-nsn.gov).
- i. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must notify the Tribe prior to the commencing earth-disturbing activities.<sup>71, 72</sup> The operator must submit a copy of the Notice of Intent (NOI) to the following addresses at the same time it is submitted to the U.S. EPA:

Bad River Tribe's Natural Resources Department  
Attn: Water Resources Specialist  
P.O. Box 39  
Odanah, WI 54861

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<sup>69</sup> Tribe's WQS: See provision E.2.i.

<sup>70</sup> Tribe's WQS: See provision E.7.iii.

<sup>71</sup> See footnote 61.

<sup>72</sup> See footnote 62.

Bad River Tribe's Natural Resources Department  
Attn: Tribal Historic Preservation Officer (THPO)  
P.O. Box 39  
Odanah, WI 54861

The operator must also submit a copy of the Notice of Termination (NOT) to the above addresses at the same time it is submitted to the U.S. EPA.

- j. The THPO must be provided 30 days to comment on the project.<sup>73</sup>
- k. The operator must obtain THPO concurrence in writing. This written concurrence will outline measures to be taken to prevent or mitigate effects to historic properties. For more information regarding the specifics of the cultural resources process, see 36 CFR Part 800. A best practice for an operator is to consult with the THPO during the planning stages of an undertaking.<sup>74</sup>
- l. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the following address at the same time as submitting the NOI:<sup>75</sup>

Bad River Tribe's Natural Resources Department  
Attn: Water Resources Specialist  
P.O. Box 39  
Odanah, WI 54861

- m. Any corrective action reports that are required under the CGP must be submitted to the following address within one (1) working day of the report completion:<sup>76</sup>

Bad River Tribe's Natural Resources Department  
P.O. Box 39  
Odanah, WI 54861

- n. An operator shall be responsible for meeting any additional permit requirements imposed by the U.S. EPA necessary to comply with the Tribe's antidegradation policies if the discharge point is located upstream of waters designated by the Tribe.<sup>77</sup>

**9.3.2.2 Lac du Flambeau Band of Lake Superior Tribe of Chippewa Indians:** The following conditions apply only to discharges on the Lac du Flambeau Band of the Lake Superior Tribe of Chippewa Indians Reservation:

- a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office, for the Traival environmental review process, at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

Lac du Flambeau  
Tribal Land Management

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<sup>73</sup> 36 C.F.R. § 800.3(c)(4).

<sup>74</sup> 36 C.F.R. § 800.3(b).

<sup>75</sup> See footnote 61.

<sup>76</sup> See footnote 61.

<sup>77</sup> See footnote 61.

P.O. Box 279  
Lac du Flambeau, WI 54538

CGP applicants are encouraged to work with the LdF Water Resources Program in the identification of all proposed receiving waters.

- b. Copies of the NOI and the Notice of Termination (NOT) must be sent to the LdF Water Resources Program at the same time they are submitted to EPA.
- c. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Lac du Flambeau Reservation. This includes, but is not limited to, the prevention of any discharge that cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Lac du Flambeau Reservation for any of the uses designated in the Water Quality Standards of the Lac du Flambeau Reservation.
- d. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Lac du Flambeau Reservation. All spills must be reported to the appropriate emergency management agency, and measures shall be taken immediately to prevent the pollution of waters of the Lac du Flambeau reservation, including groundwater.
- e. This certification does not authorize impacts to cultural, historical, or archeological features or sties, or properties that may be eligible for such listing.
- f. Due to the significant ecological and cultural importance of the Lac du Flambeau Reservation, any operator requesting a permit for a point source discharge of pollutants (i.e., discharge) associated with the Stormwater Discharge will need a stormwater pollution prevention plan in place that does not violate Lac du Flambeau Water Quality Standards to protect Reservation Waters.

**9.4 EPA REGION 6**

**9.4.1 NMR100000 State of New Mexico, except Indian country**

- a. If construction dewatering activities are anticipated at a site, permittees must complete the following steps:
  - i. Investigative information must be documented in the facility SWPPP.
  - ii. Refer to the GWQB Mapper at <https://gis.web.env.nm.gov/GWQB/> AND the PSTB Mapper (Go Mapper) at <https://gis.web.env.nm.gov/GoNM/> and check if the following sources are located within the noted distance from your anticipated construct site groundwater dewatering activity:

<b>Project Location Relative to a Source of Potential Groundwater Contamination</b>	<b>Constituents likely to be required for testing</b>
<i>Within 0.5 mile of an open Leaking Underground Storage Tank (LUST) site</i>	<i>BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) plus additional parameters depending on site conditions.*</i>

<b>Project Location Relative to a Source of Potential Groundwater Contamination</b>	<b>Constituents likely to be required for testing</b>
Within 0.5 mile of an open Voluntary Remediation site	All parameters listed in Appendix A (or an alternate list approved by the NMED SWQB)**
Within 0.5 mile of an open RCRA Corrective Action Site	
Within 0.5 mile of an open Abatement Site	
Within 0.5 mile of an open Brownfield Site	
Within 1.0 mile or more of a Superfund site or National Priorities List (NPL) site with associated groundwater contamination.	

\*For further assistance determining whether dewatering may encounter impacted groundwater, the permittee may contact the NMED Ground Water Quality Bureau at: 505-827-2965.

\*\*EPA approved-sufficiently sensitive methods must be used - approved methods are listed in 40 CFR Part 136.3.

- iii. If dewatering activities are anticipated, information on flow and potential to encounter impacted groundwater must be provided directly to NMED at the following address:
    - Program Manager, Point Source Regulation Section
    - NMED Surface Water Quality Bureau
    - PO Box 5469, Santa Fe, NM 87502

Information may also be emailed - the contact information for the program manager is located on the website at: [www.env.nm.gov/swqb/PSR](http://www.env.nm.gov/swqb/PSR).
  - iv. Permittee must test the quality of the water being considered for discharge. Permittees must contact the Point Source Regulation Section Program Manager for information on constituents that must be monitored.
  - v. Permittee must send test result data to EPA Region 6 and the NMED Surface Water Quality Bureau. If the test data exceed standards, it cannot be discharged from the construction site into surface waters under this permit. Discharge to surface waters must be conducted under a separate NPDES individual permit to ensure proper treatment and disposal.
  - vi. If disposal will be to the ground surface or in an unlined pond, the permittee must submit an NOI/ to the NMED Ground Water Quality Bureau.
- b. Operators are not eligible to obtain authorization under this permit for all new and existing storm water discharges to outstanding national resource waters (ONRWs) (also referred to as "Tier 3" waters.)
    - i. Although state WQS provide for temporary and short-term degradation of water quality in an ONRW under very limited circumstances if approved by the Water Quality Control Commission as specified at 20.6.4.8.A NMAC, the approval process required for these activities does not lend itself for use for projects covered under this general permit. This condition is necessary to ensure that no degradation is allowed in ONRWs by requiring proposed storm water discharges to be reviewed under the individual permit process. Tier 3 waters are defined in Appendix F of the proposed permit.



- c. Operators who intend to obtain authorization under this permit for new and existing storm water discharges from construction sites must satisfy the following condition: The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from pre-construction, pre-development conditions to assure that applicable standards in 20.6.4.NMAC, including the antidegradation policy, or TMDL waste load allocations (WLAs) are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long term maintenance plan), criteria for inspections, and expected performance and longevity of these BMPs. For sites greater than 5 acres in size, BMP selection must be made based on the use of appropriate soil loss prediction models (i.e. SEDCAD, RUSLE, SEDIMOT, MULTISED, etc.) OR equivalent generally accepted (by professional erosion control specialists) soil loss prediction tools.
- i. For all sites, the operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will assure that the applicable standards or TMDL WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from preconstruction, pre-development conditions.
  - ii. All SWPPPs must be prepared in accordance with good engineering practices by qualified (e.g. CPESC certified, engineers with appropriate training) erosion control specialists familiar with the use of soil loss prediction models and design of erosion and sediment control systems based on these models (or equivalent soil loss prediction tools). Qualifications of the preparer (e.g., professional certifications, description of appropriate training) must be documented in the SWPPP. The operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.
- d. State regulations at 20.6.2.1203 NMAC state: *With respect to any discharge from any facility of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, the following notifications and corrective actions are required:*
- i. As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, any person in charge of the facility shall orally notify the Chief of the Ground Water Quality Bureau of the department, or his counterpart in any constituent agency delegated responsibility for enforcement of these rules as to any facility subject to such delegation.

Permittees can call 505-827-9329 for emergencies at any time and 505-476-6000 for non-emergencies during business hours from 5am-5pm, Monday through Friday.

- e. NMED does not allow permittees to use the Equivalent Analysis Waiver.

**9.4.2 NMR10I000 Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I.**

**9.4.2.1 Pueblo of Isleta.** The following conditions apply only to discharges on the Pueblo of Isleta Reservation:

- a. CGP at 1.3 Prohibited discharges: Stormwater discharges associated with construction activity that EPA or the Pueblo of Isleta, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or may reasonably be expected to contribute to a violation or excursion of any applicable water quality standard, including the antidegradation policy, or the impairment of a designated use of receiving waters are not authorized by this permit.
- b. CGP at 1.4.1 How to Submit Your NOI: The operator shall provide a copy of the Notice of Intent ("NOI") to the Pueblo of Isleta at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of the Pueblo of Isleta. The operator shall also notify the Pueblo of Isleta when it has submitted the Notice of Termination ("NOT"). The NOI and NOT shall be sent to the Pueblo of Isleta at the following address:

Water Quality Control Officer  
Pueblo of Isleta  
Environment Division  
PO Box 1270  
Isleta, NM 87022  
(505) 869-7565  
E-mail: [POI36871@isletapueblo.com](mailto:POI36871@isletapueblo.com)

Overnight/Express Mail Delivery  
Pueblo of Isleta  
Environment Division  
6 Sagebrush St.  
Albuquerque, NM 87105

- c. CGP at 1.5 Requirement to post a notice of your permit coverage: Amend to read: "You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road or tribal road that is nearest to the active part of the construction site..."
- d. CGP at 7.2.6 Description of stormwater controls: The SWPPP will be considered to be incomplete if the operator has not coordinated requirements under this Part with the Pueblo of Isleta Public Services Department.
- e. CGP I.12.6.1 at pg.I-6 of 8. The Pueblo of Isleta requests notification within 10 hours (rather than 24 hrs.) if health or the environment become endangered.
- f. CGP at I.12.2 Anticipated noncompliance: Amend to read: "You must give advance notice to EPA and the Pueblo of Isleta at the address indicated in 1.4.1 (a) of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements."
- g. CGP at I.12.6.1: Any noncompliance for projects within the exterior boundaries of the Pueblo of Isleta which may endanger health or the environment shall be reported directly to the EPA Regional Office [(see contacts at <https://www.epa.gov/npdes/contact-us-stormwater#regional>)] and to the Pueblo of Isleta Water Quality Control Officer. Any information must be provided orally within 12 hours of the time you become aware of the circumstances. Other requirements of

this Part for a written submission apply. Electronic communication (E-mail) shall be provided as soon as practical. Verbal notice shall be provided to:

Water Quality Control Officer  
Pueblo of Isleta  
E-mail: [POI36871@isletapueblo.com](mailto:POI36871@isletapueblo.com)  
(505) 869-7565  
(505) 263-5425 cellular  
(505) 869-3030 Police Dispatch

- h. CGP at 2.2 Erosion and sediment control requirements: Erosion and sediment controls shall be designed to retain sediment on-site.
- i. CGP at 2.2 Under Sediment control requirements, Standard Permit Condition Duty to Mitigate Volumes of sediment at or over (five) 5 cubic yards must be removed and placed for disposal within a tribally approved sediment Disposal Site, located on Pueblo of Isleta lands. CGP 2.2 at pg. 8.
- j. Under Minimize erosion, a permittee must secure permission from the Pueblo or affected Pueblo of Isleta land assignment owner if a dissipation device needs to be placed up- or down- elevation of a given construction site. CGP 2.2.11 at pg. 11.
- k. CGP at 2.3.6 Emergency spill notification requirements: You must notify the Pueblo of Isleta Water Quality Control Officer and National Response Center (NRC) [at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302] as soon as you have knowledge of the release. Verbal and electronic notice shall be provided as specified in I.12.6.1
- l. CGP at C.3 Equivalent analysis waiver: Parties wishing to apply for an Equivalent Analysis Waiver (see Appendix D, Section C) must provide a copy of the waiver analysis to the Pueblo of Isleta Water Quality Control Officer at the address indicated in 1.4.1 (a).

**9.4.2.2 Pueblo of Sandia.** The following conditions apply only to discharges on the Pueblo of Sandia Reservation:

- a. Only those activities specifically authorized by the CGP are authorized by the Pueblo of Sandia's Water Quality certification. The Pueblo of Sandia's Water Quality Certification does not authorize impact to cultural properties, historical sites or properties that may be eligible as such.
- b. Copies of all Notices of Intent (NOI) submitted to the EPA must also be sent concurrently to the Pueblo of Sandia at the following address. Discharges are not authorized by this permit unless an accurate and complete NOI has been submitted to the Pueblo of Sandia, either by mail or electronically.

Regular U.S. Delivery Mail:  
Pueblo of Sandia Environment Department  
Attention: Scott Bulgrin, Water Quality Manager  
481 Sandia Loop  
Bernalillo, New Mexico 87004

Electronically:  
[sbulgrin@sandiapueblo.nsn.us](mailto:sbulgrin@sandiapueblo.nsn.us)

- c. Any correspondences between the applicant and EPA related to analytical data, written reports, corrective action, enforcement, monitoring, or an adverse incident written reports should likewise be routed to the Pueblo of Sandia at the above address.
- d. The Stormwater Pollution Prevention Plan (SWPPP) must be available to the Pueblo of Sandia Environment Department either electronically or hard copy upon request for review. The SWPPP must be made available at least fourteen (14) days before construction begins. The fourteen (14) day period will give Pueblo staff time to become familiar with the project site, prepare for construction site inspections, and determine compliance with the Pueblo of Sandia Water Quality Standards. Failure to provide a SWPPP to the Pueblo of Sandia may result in the delay or denial of the construction project.
- e. If requested by the Pueblo of Sandia Environment Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Pueblo of Sandia Water Quality Standards and/or applicable Federal Standards not authorized by this certification.
- f. An "Authorization to Proceed Letter" with site specific mitigation requirements may be sent out to the permittee when a review of the NOI and SWPPP, on a case-by-case basis is completed by the Pueblo of Sandia Environment Department. This approval will allow the application to proceed if all mitigation requirements are met.
- g. The Pueblo of Sandia will not allow Small construction Waivers (Appendix C) or the Rainfall Erosivity Waiver (Appendix C.1) to be granted for any small construction activities.
- h. Before submitting a Notice of Termination (NOT) to the EPA, permittees must clearly demonstrate to the Pueblo of Sandia Environment Department through a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed. A short letter stating the NOT is acceptable and all requirements have been met will be sent to the permittee to add to the permittee's NOT submission to EPA.
- i. Copies of all NOT submitted to the EPA must also be sent concurrently to the Pueblo of Sandia through the mail or electronically.
  - Regular U.S. Delivery Mail:  
Pueblo of Sandia Environment Department  
Attention: Scott Bulgrin, Water Quality Manager 481 Sandia Loop  
Bernalillo, New Mexico 87004
  - Electronically:  
[sbulgrin@sandiapueblo.nsn.us](mailto:sbulgrin@sandiapueblo.nsn.us)
- j. The Pueblo of Sandia may require the permittee to perform water quality monitoring for pH, turbidity, and total suspended solids (TSS) during the permit term if the discharge is to a surface water leading to the Rio Grande for the protection of public health and the environment.

**9.4.2.3 Pueblo of Santa Ana.** The following conditions apply only to discharges on the Pueblo of Santa Ana Reservation:

- a. The operator shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Santa Ana (the Pueblo), at the same time it is submitted to the U.S. Environmental Protection Agency (EPA), for projects with discharges onto the lands of the Pueblo as defined in the Pueblo of Santa Ana Water Quality Standards.

- b. The operator shall provide a copy of the Stormwater Pollution Prevention Plan (SWPPP), at the same time that an NOI is submitted to the EPA, to the Pueblo for projects with discharges onto the lands of the Pueblo as defined in the Pueblo of Santa Ana Water Quality Standards.
- c. The operator shall provide a copy of the SWPPP, copies of inspections reports, and copies of corrective action reports to the Pueblo at the address below for review, upon request.
- d. The NOI, SWPPP and Notice of Termination (NOT) shall be sent to the Pueblo at the following address:
  - Pueblo of Santa Ana Department of Natural Resources,
  - Attention: Water Quality Program Specialist
  - 2 Dove Road
  - Santa Ana Pueblo, NM, 87004
- e. Discharges are not authorized by this permit unless an accurate and complete NOI and SWPPP have been submitted to the Pueblo. Failure to provide an accurate and complete NOI and SWPPP may result in a denial of the discharge permit or groundbreaking or construction delay.
- f. The operator will not proceed with site work until authorized by the Pueblo. The Pueblo requires review of the complete and final SWPPP by the Pueblo before authorization to proceed. The Pueblo will provide an "authorization to proceed" notice after review and approval of the SWPPP.
- g. Before submitting a NOT, permittees must certify to the Pueblo's Department of Natural Resources in writing that requirements for site stabilization have been met, and any temporary erosion control structures have been removed. Documentation of the Pueblo's review that such requirements have been reviewed and met will be provided for the permittee to add to the permittee's NOT submission to EPA. Copies of all NOT submitted to the EPA must also be sent to the Pueblo at the address provided above.

**9.4.2.4 Pueblo of Santa Clara.** The following conditions apply only to discharges on the Pueblo of Santa Clara Reservation:

- a. The operator must provide a copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Santa Clara Pueblo Governor's Office at the same time it is provided to the US Environmental Protection Agency.
- b. A copy of the Storm water Pollution Prevention Plan shall be made available to the Pueblo of Santa Clara staff upon request.

**9.4.2.5 Pueblo of Tesuque.** The following conditions apply only to discharges on the Pueblo of Tesuque Reservation:

- a. The operator shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Tesuque Governor's Office and Environment Department at same time it is submitted to the Environmental Protection Agency, for projects occurring within the exterior boundaries of our tribal lands. The operator shall also notify the Pueblo of Tesuque Governor's Office and Environment Department when it submitted the Notice of Termination. The NOI and NOT shall be sent to the Pueblo of Tesuque Governor's Office and Environment Department at the following address:

Pueblo of Tesuque  
Office of the Governor  
Route 42 Box 360-T  
Santa Fe, NM 87506 or  
email: [governor@pueblooftesuque.org](mailto:governor@pueblooftesuque.org)

- b. The operator shall also provide a copy of the Stormwater Pollution Prevention Plan, copies of inspections reports, and copies of corrective action reports to staff in the Pueblo of Tesuque Environment Department.

**9.4.2.6 Taos Pueblo.** The following conditions apply only to discharges on the Taos Pueblo Reservation:

- a. The operator shall provide a copy of the Notice of Intent (NOI) to the Taos Pueblo Governor's Office, War Chief's Office and Environmental Office, at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of Taos Pueblo. The operator shall also notify Taos Pueblo when it has submitted the Notice of Termination (NOT). The NOI and NOT shall be sent to the Taos Pueblo at the following addresses:
  - i. Taos Pueblo Governor's Office  
P.O. Box 1846  
Taos NM 87571
  - ii. Taos Pueblo War Chief's Office  
P.O. Box 2596  
Taos NM 87571
  - iii. Environmental Office  
Attn: Program Manger  
P.O. Box 1846  
Taos NM 87571
- b. Taos Pueblo requests that in the event Indian artifacts or human remains are inadvertently discovered on projects occurring near or on Taos Pueblo lands that consultation with the tribal Governor's Office occur at the earliest possible time.
- c. The operator shall provide a copy of the Stormwater Pollution Prevention Plan, copies of inspections reports, and copies of corrective action reports to staff in the Taos Pueblo Environmental Office for review and copy, upon request.

**9.4.2.7 Ohkay Owingeh.** The following conditions apply only to discharges on the Ohkay Owingeh Reservation:

- a. Prior to commencement of any construction activity on Ohkay Owingeh Lands requiring permit coverage under EPA's Construction General Permit, the operator(s) shall submit to Ohkay Owingeh Office of Environmental Affairs, a copy of the electronic "Notice of Intent," submitted to the Environmental Protection Agency, immediately following EPA's electronic notification that the NOI has been received. A copy of the Stormwater Pollution Prevention Plan(s) must be made available to the Ohkay Owingeh Office of Environmental Affairs upon the tribe's request either electronically or hard copy. Operator(s) shall also submit to Ohkay Owingeh Office of Environmental Affairs a copy of the electronic Notice of Termination (NOT) submitted to the Environmental Protection Agency. Documents shall be submitted to Ohkay Owingeh at the following address:

Ohkay Owingeh Office of Environment Affairs  
Attention: Environmental Programs Manager  
P.O. Box 717  
Ohkay Owingeh, New Mexico 87566  
Office # 505.852.4212  
Fax # 505.852.1432  
Electronic mail: [naomi.archuleta@ohkay.org](mailto:naomi.archuleta@ohkay.org)

- b. Ohkay Owingeh will not allow the Rainfall Erosivity Waivers (see Appendix C) to be granted for any small construction activities.
- c. All vegetation used to prevent soil loss, seeding or planting of the disturbed area(s) to meet the vegetative stabilization requirements must utilize native seeds/vegetation commonly known to the area. All temporary erosion control structures, such as silt fences must be removed as soon as stabilization requirements are met.

**9.4.3 OKR10I000 Indian country within the State of Oklahoma**

**9.4.3.1 Pawnee Nation.** The following conditions apply only to discharges within Pawnee Indian country:

- a. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time it is submitted to the Environmental Protection Agency to the following address:

Pawnee Nation Department of Environmental Conservation and Safety  
P.O. Box 470  
Pawnee, OK 74058  
Or email to [mmatlock@pawneenation.org](mailto:mmatlock@pawneenation.org)

- b. The Storm Water Pollution Prevention Plan must be available to Departmental inspectors upon request.
- c. The Department must be notified at 918.762.3655 immediately upon discovery of any noncompliance with any provision of the permit conditions.

**9.4.4 OKR10F000 Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).**

- a. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Certification is denied for any on-going activities such as sand and gravel mining or any other mineral mining.
- b. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, certification is denied for any discharges originating from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas.

- c. In order to comply with Oklahoma's Water Quality Standards, these conditions and restrictions also apply to any construction projects located wholly or partially on Indian Country lands within the State of Oklahoma.

**9.5 EPA REGION 8**

**9.5.1 MTR10I000 Indian country within the State of Montana**

**9.5.1.1 The Confederated Salish and Kootenai Tribes of the Flathead Nation.** The following conditions apply only to discharges on the Confederated Salish and Kootenai Tribes of the Flathead Nation Reservation:

- a. Permittees must submit the Stormwater Pollution Prevention Plan (SWPPP) to the Confederated Salish and Kootenai Tribes at least 30 days before construction starts.
- b. Before submitting the Notice of Termination (NOT), permittees must clearly demonstrate to an appointed Tribal staff person during an onsite inspection that requirements for site stabilization have been met.
- c. The permittee must send a copy of the Notice of Intent (NOI) and the NOT to CSKT.
- d. Permittees may submit their SWPPPs, NOIs and NOTs electronically to: [clintf@cskt.org](mailto:clintf@cskt.org).
- e. Written SWPPPs, NOIs and NOTs may be mailed to:

Clint Folden, Water Quality Regulatory Specialist  
Confederated Salish and Kootenai Tribes  
Natural Resources Department  
P.O. Box 278  
Pablo, MT 59855

**9.6 EPA REGION 9**

**9.6.1 CAR10I000 Indian country within the State of California**

**9.6.1.1 Twenty-Nine Palms Band of Mission Indians.** The following conditions apply only to discharges on the Twenty-Nine Palms Band of Mission Indians Reservation:

- a. At the time the applicant submits its Notice of Intent (NOI) to the EPA, the applicant must concurrently submit written notification of the NOI and a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Twenty-Nine Palms Band of Mission Indians at the address below:

Tribal Environmental Coordinator  
Twenty-Nine Palms Band of Mission Indians  
46-200 Harrison Place  
Coachella, CA 92236

- b. The applicant must also concurrently submit to the Tribal Environmental Coordinator written notification of any other forms or information submitted to the EPA, including waivers, reporting, and Notice of Termination (NOT).
- c. Permitted entities under the CGP must keep the Tribal EPA informed of authorized discharges under the CGP by submitting written information about the type, quantity, frequency and location, intended purpose, and potential human health and/or environmental effects of their activities. These requirements are pursuant to Section 4 of the Twenty-Nine Palms Band of Mission Indians Water Pollution Control Ordinance (022405A). This information may be submitted to Tribal EPA in the form of Stormwater Pollution Prevention Plans (SWPPPs), monitoring reports, or other reports as required



under the CGP. Spills, leaks, or unpermitted discharges must be reported in writing to Tribal EPA within 24 hours of the incident.

**9.6.2 GUR100000 Island of Guam.** The following conditions apply only to discharges on the Island of Guam:

- a. Any earth-moving operations which require a permit must be obtained from the Department of Public Works (DPW) with clearance approval from various Government of Guam Agencies including Guam EPA prior to the start of any earth-moving activity.
- b. In the event that the construction sites are within the Guam Sole Source Aquifer, the construction site owner and operator must consider opportunities to facilitate groundwater recharge for construction and post-construction implementing infiltration Best Management Practices. Stormwater disposal systems shall be designed and operated within the boundaries of the project. Stormwater systems shall not be permitted within any Wellhead Protection Zone unless the discharge meets the Guam Water Quality Standards within the zone. Waters discharged within the identified category G-2 recharge zone shall receive treatment to the degree required to protect the drinking water quality prior to it entering the category G-1 resource zone.
- c. All conditions and requirements set forth in the 22 Guam Administrative Rules and Regulations (GARR), Division II, Water Control, Chapter 10, Guam Soil Erosion and Sediment Control Regulations (GSESCR) that are more protective than the CGP regarding construction activities must be complied with.
- d. All standards and requirements set forth in the 22 GARR, Division II, Water Control, Chapter 5, *Guam Water Quality Standards (GWQS) 2001 Revisions*, must be complied with to include reporting GWQS exceedance to Guam EPA.
- e. All operators/owners of any property development or earth moving activities shall comply with the erosion control pre-construction and post-construction BMP design performance standards and criteria set forth in the 2006 CNMI and Guam Stormwater Management Manual.
- f. All conditions and requirements regarding dewatering activities set forth in 22 Guam Administrative Rules and Regulations Chapter 7, Water Resources Development and Operating Regulations must be complied with to include securing permits with Guam EPA prior to the start of any dewatering activities.
- g. If a project to be developed is covered under the Federal Stormwater Regulations (40 CFR Parts 122 & 123), a Notice of Intent (NOI) to discharge stormwater to the surface and marine waters of Guam must be submitted to the U.S. EPA and a copy furnished to Guam EPA, pursuant to Section 10, 104(B)(5)(d) 22GAR, Division II, Chapter 10.
- h. Guam EPA shall apply the Buffer Requirements listed in Appendix G of the CGP NPDES Permit for construction activities as it pertains to Waters of the U.S. in Guam. Guam EPA shall also apply the same buffer requirements for sinkholes in Guam.
- i. When Guam EPA, through its permit review process, identifies that the proposed construction activity is close proximity to marine waters, contractors and owners will be informed that any activity that may impair water quality are required to stop

during peak coral spawning periods as per the Guam Coral Spawning Construction Moratoriums.

- j. The Proposed Construction General Permit must set appropriate measures and conditions to protect Guam's Threatened and Endangered Species and Outstanding Resource Waters of exceptional recreational or ecological significance as determined by the Guam EPA Administrator as per *Guam Water Quality Standards 2001 Revisions*, §5102, Categories of Waters, D. Outstanding Resource Waters.
- k. When Guam EPA through its permit review process identifies that proposed construction activity is in close proximity to any Section 303d impaired waters, which includes marine waters and surface waters, shall ensure that construction activity does not increase the impaired water's ambient parameters.
- l. When Rainfall Erosivity and TMDL Waivers reflected in the CGP, Appendix C, are submitted to the U.S. EPA, Guam EPA will review waivers on a project by project basis.
- m. Prior to submission of the Notice of Termination (NOT) to the U.S. EPA, permittees must clearly demonstrate to Guam EPA that the project site has met all soil stabilization requirements and removal of any temporary erosion control as outlined in the GSESCR.

## 9.7 EPA REGION 10

### 9.7.1 IDR100000 State of Idaho, except Indian country

- a. Idaho's Antidegradation Policy. The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).
  1. Tier I Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier I review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.05).
  2. Tier II Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).
  3. Tier III Protection. The third level of protection applies to water bodies that have been designated outstanding resource waters and requires that activities not cause a lowering of water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).  
 DEQ is employing a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use, unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).
- b. Pollutants of Concern. The primary pollutants of concern associated with stormwater discharges from construction activities are sediment, typically measured as total suspended solids and turbidity. Other potential pollutants include the following:

phosphorus, nitrogen, pesticides, organics, metals, PCBs, petroleum products, construction chemicals, and solid wastes.

- c. Receiving Water Body Level of Protection. The CGP provides coverage to construction activities throughout the entire State of Idaho. Because of the statewide applicability, all of the jurisdictional waters within Idaho could potentially receive discharges either directly or indirectly from activities covered under the CGP. DEQ applies a water body by water body approach to determine the level of antidegradation a water body will receive.

All waters in Idaho that receive discharges from activities authorized under the CGP will receive, at minimum Tier I antidegradation protection because Idaho's antidegradation policy applies to all waters of the state. Water bodies that fully support their aquatic life or recreational uses are considered to be *high quality waters* and will receive Tier II antidegradation protection.

Although Idaho does not currently have any Tier III designated outstanding resource waters (ORWs) designated, it is possible for a water body to be designated as an ORW during the life of the CGP. Because of this potential, the antidegradation review also assesses whether the permit complies with the outstanding resource water requirements of Idaho's antidegradation policy.

To determine the support status of the receiving water body, persons filing a Notice of Intent (NOI) for coverage under this general permit must use the most recent EPA-approved Integrated Report, available on Idaho DEQ's website:

<http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report/>.

High quality waters are identified in Categories 1 and 2 of the Integrated Report. If a water body is in either Category 1 or 2, it is a Tier II water body.

Unassessed waters are identified as Category 3 of DEQ's Integrated Report. These waters require a case-by-case determination to be made by DEQ based on available information at the time of the application for permit coverage. If a water body is unassessed, the applicant is directed to contact DEQ for assistance in filing the NOI.

Impaired waters are identified in Categories 4 and 5 of the Integrated Report. Category 4(a) contains impaired waters for which a TMDL has been approved by EPA. Category 4(b) contains impaired waters for which controls other than a TMDL have been approved by EPA. Category 5 contains waters which have been identified as "impaired," for which a TMDL is needed. These waters are Tier I waters, for the use which is impaired. With the exception, if the aquatic life uses are impaired for any of these three pollutants—dissolved oxygen, pH, or temperature—and the biological or aquatic habitat parameters show a health, balanced biological community, then the water body shall receive Tier II protection, in addition to Tier I protection, for aquatic life uses (IDAPA 58.01.02.052.05.c.i.).

DEQ's webpage also has a link to the state's map-based Integrated Report which presents information from the Integrated Report in a searchable, map-based format: <http://www.deq.idaho.gov/assistance-resources/maps-data/>.

Water bodies can be in multiple categories for different causes. If assistance is needed in using these tools, or if additional information/clarification regarding the

support status of the receiving water body is desired, the operator is directed to make contact with the appropriate DEQ regional office of the State office in the table below:

Regional and State Office	Address	Phone Number	Email
Boise	1445 N. Orchard Rd., Boise 83706	208-373-0550	<a href="mailto:Kati.carberry@deq.idaho.gov">Kati.carberry@deq.idaho.gov</a>
Coeur d'Alene	2110 Ironwood Parkway, Coeur D'Alene 83814	208-769-1422	<a href="mailto:June.bergquist@deq.idaho.gov">June.bergquist@deq.idaho.gov</a>
Idaho Falls	900 N. Skyline, Suite B., Idaho Falls 83402	208-528-2650	<a href="mailto:Troy.saffle@deq.idaho.gov">Troy.saffle@deq.idaho.gov</a>
Lewiston	1118 "F" St., Lewiston 83501	208-799-4370	<a href="mailto:Mark.sellet@deq.idaho.gov">Mark.sellet@deq.idaho.gov</a>
Pocatello	444 Hospital way, #300 Pocatello 83201	208-236-6160	<a href="mailto:Lynn.vanevery@deq.idaho.gov">Lynn.vanevery@deq.idaho.gov</a>
Twin Falls	650 Addison Ave., W., Suite 110, Twin Falls 83301	208-736-2190	<a href="mailto:Balthasar.buhidar@deq.idaho.gov">Balthasar.buhidar@deq.idaho.gov</a>
State Office	1410 N. Hilton Rd., Boise 83706	208-373-0502	<a href="mailto:Nicole.deinarowicz@deq.idaho.gov">Nicole.deinarowicz@deq.idaho.gov</a>

- d. *Turbidity Monitoring.* The permittee must conduct turbidity monitoring during construction activities and thereafter on days where there is a direct discharge of pollutants from an unstabilized portion of the site which is causing a visible plume to a water of the U.S.

A properly and regularly calibrated turbidimeter is required for measurements analyzed in the field (preferred method), but grab samples may be collected and taken to a laboratory for analysis. If the permittee can demonstrate that there will be no direct discharge from the construction site, then turbidity monitoring is not required. When monitoring is required, a sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels for the monitoring event. Background turbidity, location, date and time must be recorded prior to monitoring downstream of the project area. A sample must also be taken immediately downstream from any point of discharge and *within* any visible plume. The turbidity, location, date and time must be recorded. The downstream sample must be taken immediately following the upstream sample in order to obtain meaningful and representative results.

Results from the compliance point sampling or observation<sup>78</sup> must be compared to the background levels to determine whether project activities are causing an exceedance of state WQS. If the downstream turbidity is 50 NTUs or more than the upstream turbidity, then the project is causing an exceedance of WQS. *Any exceedance of the turbidity standard must be reporting to the appropriate DEQ regional office within 24 hours. The following six (6) steps should be followed to ensure compliance with the turbidity standard:*

1. If a visible plume is observed, quantify the plume by collecting turbidity measurements from within the plume and compare the results to Idaho's instantaneous numeric turbidity criterion (50 NTU over the background).
2. If turbidity is less than 50 NTU instantaneously over the background turbidity; continue monitoring as long as the plume is visible. If turbidity exceeds background turbidity by more than 50 NTU instantaneously then stop all earth disturbing construction activities and proceed to step 3.
3. Take immediate action to address the cause of the exceedance. That may include inspection the condition of project BMPs. If the BMPs are functioning to their fullest capability, then the permittee must modify project activities and/or BMPs to correct the exceedance.
4. Notify the appropriate DEQ regional office within 24 hours.
5. Possibly increase monitoring frequency until state water quality standards are met.
6. Continue earth disturbing construction activities once turbidity readings return to within 50 NTU instantaneously and 25 NTU for more than ten consecutive days over the background turbidity.

Copies of daily logs for turbidity monitoring must be available to DEQ upon request. The report must describe all exceedances and subsequent actions taken, including the effectiveness of the action.

- e. Reporting of Discharges Containing Hazardous Materials or Petroleum Products. All spills of hazardous material, deleterious material or petroleum products which may impact waters (ground and surface) of the state shall be immediately reported. Call 911 if immediate assistance is required to control, contain or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office in the table below during normal working hours or Idaho State Communications Center after normal working hours. If the spilled volume is above federal reportable quantities, contact the National Repose Center.

For immediate assistance: Call 911

National Response Center: (800) 424-8802

Idaho State Communications Center: (800) 632-8000

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<sup>78</sup> A visual observation is only acceptable to determine whether BMPs are functioning properly. If a plume is observed, the project may be causing an exceedance of WQS and the permittee must collect turbidity data and inspect the condition of the projects BMPs. If the BMPs appear to be functioning to their fullest capability and the turbidity is 50 NTUs or more than the upstream turbidity, then the permittee must modify the activity or implement additional BMPs (this may also include modifying existing BMPs).

Regional office	Toll Free Phone Number	Phone Number
Boise	888-800-3480	208-373-0550
Coeur d'Alene	877-370-0017	208-769-1422
Idaho Falls	800-232-4635	208-528-2650
Lewiston	977-547-3304	208-799-4370
Pocatello	888-655-6160	208-236-6160
Twin Falls	800-270-1663	208-736-2190

**9.7.2 IDR10I000 Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)**

**9.7.2.1 Shoshone-Bannock Tribes.** The following conditions apply only to discharges on the Shoshone-Bannock Reservation:

- f. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Shoshone-Bannock Tribes Water Resources Department at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Shoshone-Bannock Tribes Water Resources Department the acknowledgement of receipt of the NOI from the EPA within 7 calendar days of receipt from the EPA.

**9.7.3 WAR10F000 Areas in the State of Washington, except those located on Indian country, subject to construction activity by a Federal Operator.** The following conditions apply only to discharges on federal facilities in the State of Washington:

- a. Discharges shall not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), groundwater quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges that are not in compliance with these standards are not authorized.
- b. Prior to the discharge of stormwater and non-storm water to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.
- c. Permittees who discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, phosphorus, or pH must comply with the following numeric effluent limits:

Parameter Identified in 303(d) Listing	Parameter Sampled	Unit	Analytical Method	Numeric Effluent Limit
<ul style="list-style-type: none"> <li>• Turbidity</li> <li>• Fine Sediment</li> <li>• Phosphorus</li> </ul>	Turbidity	NTU	SM2130 or EPA 180.1	25 NTUs at the point where the stormwater is discharged from the site.
High pH	pH	Su	pH meter	In the range of 6.5 – 8.5

- d. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current EPA approved listing of impaired waters that exists on February 16, 2017, or the date when the operator's complete permit application is received by EPA, whichever is later.
- e. Discharges to waterbodies subject to an applicable Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus, shall be consistent with the assumptions and requirements of the TMDL.
  - i. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements establish by the applicable TMDL.
  - ii. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.
  - iii. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.
  - iv. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.
  - v. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which has been completed and approved by EPA prior to February 16, 2017, or prior to the date the operator's complete NOI is received by EPA, whichever is later.

**9.7.4 WAR10I000 Indian country within the State of Washington**

**9.7.4.1 Confederated Tribes of the Colville Reservation.** The following conditions apply only to discharges on the Colville Indian Reservation (CIR) and on other Tribal trust lands or allotments of the Confederated Tribes of the Colville Reservation:

- a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:
  - Environmental Trust Department
  - Confederated Tribes of the Colville Reservation
  - PO Box 150
  - Nespelem, WA 99155
- b. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be sent to the ETD at the same time they are submitted to EPA.
- c. Discharges to Omak Creek, the Okanogan River, and Columbia River downstream of Chief Joseph Dam may affect threatened or endangered species, and shall only be permitted in adherence with Appendix D of the CGP.
- d. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in Chapter 4-8 Water Quality Standards of the Colville Law and Order Code, as amended.

- e. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the CIR. All spills must be reported to the appropriate emergency management agency and the ETD, and measures shall be taken immediately to prevent the pollution of waters of the CIR, including groundwater.
- f. Stormwater site inspections shall be conducted at least once every 7 calendar days, within 24-hours of the occurrence of a rain event of 0.25 inches or greater in a 24-hour period, and daily during periods of saturated ground surface or snowmelt with accompanying surface runoff.
- g. Results of discharge sampling must be reported to the ETD within 7 days of sample collection. All sample reporting must include the date and time, location, and individual performing the sampling.
- h. Any corrective action reports that are required under the CGP must be submitted to the ETD at the above address within one (1) working day of the report completion.
- i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.

**9.7.4.2 Lummi Nation.** The following conditions apply only to discharges on the Lummi Reservation:

- a. The Lummi Nation reserves the right to modify this 401 certification if the final version of the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (CGP) on tribal lands in the State of Washington (Permit No. WAR10I000) is substantively different than the draft version of the proposed permit that was made available for public comments during April 2016. The Lummi Nation will determine if the final version of the NPDES CGP is substantively different than the draft version following review of the final version once the EPA makes it available.
- b. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Lummi tribal agencies. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must also obtain a land use permit from the Lummi Planning Department as provided in Title 15 of the Lummi Code of Laws and regulations adopted thereunder.
- c. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm Water Pollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.
- d. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210 together with supplements and amendments thereto).
- e. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Lummi Water Resources Division at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Lummi Water Resources Division the acknowledgement of receipt of the NOI from the EPA and the associated NPDES tracking number provided by the EPA within 7 calendar days of receipt from the EPA.



- f. Each operator shall submit a signed hard copy of the Notice of Termination (NOT) to the Lummi Water Resources Division at the same time it is submitted electronically to the EPA and shall provide the Lummi Water Resources Division the EPA acknowledgement of receipt of the NOT.
- g. Storm Water Pollution Prevention Plans, Notice of Intent, Notice of Termination and associated correspondence with the EPA shall be submitted to:

Lummi Natural Resources Department  
ATTN: Water Resources Manager  
2665 Kwina Road  
Bellingham, WA 98226-9298

**9.7.4.3 Makah Tribe.** The following conditions apply only to discharges on the Makah Reservation:

- a. The operator shall be responsible for achieving compliance with the Makah Tribe's Water Quality Standards.
- b. The operator shall submit a Storm Water Pollution Prevention Plan to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division for review and approval at least thirty (30) days prior to beginning any discharge activities.
- c. The operator shall submit a copy of the Notice of Intent to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division at the same time it is submitted to EPA.
- d. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Aaron Parker  
Makah Fisheries Management Water Quality Specialist  
(360) 645-3162  
Cell 206-356-0319  
[Aaron.parker@makah.com](mailto:Aaron.parker@makah.com)  
PO Box 115  
Neah Bay WA 98357

**9.7.4.4 Puyallup Tribe of Indians.** The following conditions apply only to discharges on the Puyallup Tribe of Indians Reservation:

- a. Each permittee shall be responsible for achieving compliance with the Puyallup Tribe's Water Quality Standards, including antidegradation provisions. The Puyallup Natural Resources Department will conduct an antidegradation review for permitted activities that have the potential to lower water quality. The antidegradation review will be consistent with the Tribe's Antidegradation Implementation Procedures. The Tribe may also impose additional controls on a site-specific basis, or request EPA to require the operator obtain coverage under an individual permit, if information in the NOI or from other sources indicates that the operator's discharges are not controlled as necessary to meet applicable water quality standards.
- b. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation policies if the discharge point is located within 1 linear mile upstream of waters designated by the Tribe.

- c. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Char Naylor ([char.naylor@puyalluptribe.com](mailto:char.naylor@puyalluptribe.com)) and Russ Ladley ([russ.ladley@puyalluptribe.com](mailto:russ.ladley@puyalluptribe.com)) by email or at the address listed below at the same time it is submitted to EPA.

Puyallup Tribe of Indians  
3009 E. Portland Avenue  
Tacoma, WA 98404  
ATTN: Russ Ladley and Char Naylor

- d. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Tribe's Resource Protection Manager ([russ.ladley@puyalluptribe.com](mailto:russ.ladley@puyalluptribe.com)) and Char Naylor ([char.naylor@puyalluptribe.com](mailto:char.naylor@puyalluptribe.com)) for review.
- e. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Russ Ladley and Char Naylor at the address listed above.
- f. The permittee shall submit all stormwater pollution prevention plans to Char Naylor for review and approval prior to beginning any activities resulting in a discharge to tribal waters.
- g. The permittee shall conduct benchmark monitoring for turbidity (or transparency) and, in the event of significant concrete work or engineered soils, pH monitoring as well. Monitoring, benchmarks, and reporting requirements contained in Condition S.4. (pp.13-20) of the Washington State Construction Stormwater General Permit, effective January 1, 2016, shall apply, as applicable.
- h. The permittee shall notify Char Naylor (253-680-5520) and Russ Ladley (253-680-5560) prior to conducting inspections at construction sites generating storm water discharged to tribal waters.
- i. Treat dewatering discharges with controls necessary to minimize discharges of pollutants in order to minimize the discharge of pollutants to groundwater or surface waters from stormwater that is removed from excavations, trenches, foundations, vaults, or other storage areas. Examples of appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, and filtration systems (e.g., bag or sand filters) that are designed to remove sediment.
- To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11 of EPA's 2016 General Construction Stormwater Permit. Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.
- j. The permittee shall provide and maintain natural buffers to the maximum extent possible (and/or equivalent erosion and sediment controls) when tribal waters are located within 100 feet of the site's earth disturbances. If infeasible to provide and maintain an undisturbed 100 foot natural buffer, erosion and sediment controls to achieve the sediment load reduction equivalent to a 100-foot undisturbed natural buffer shall be required.

**9.7.4.5 Spokane Tribe of Indians.** The following conditions apply only to discharges on the Spokane Tribe Reservation:

- a. Pursuant to Tribal Law and Order Code (TLOC) Chapter 30 each operator shall be responsible for achieving compliance with the Surface Water Quality Standards of the Spokane Tribe. The operator shall notify the Spokane Tribe, Water Control Board (WCB) of any spills of hazardous material and;
- b. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the WCB at the same time it is submitted to EPA.
- c. The permittee shall allow the Tribal Water Control Board or its designee to inspect and sample at the construction site as needed.
- d. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the WCB at the same time it is submitted to EPA.

The correspondence address for the Spokane Tribe Water Control Board is:

Water Control Board  
c/o. Brian Crossley  
PO Box 480  
Wellpinit WA 99040  
(509)626-4409  
[crossley@spokanetribe.com](mailto:crossley@spokanetribe.com)

**9.7.4.6 Swinomish Indian Tribal Community.** The following conditions apply only to discharges on the Swinomish Reservation:

- a. Owners and operators seeking coverage under this permit who intend to discharge to Regulated Surface Waters must submit a copy of the Notice of Intent (NOI) to the DEP at the same time the NOI is submitted to EPA.
- b. Owners and operators seeking coverage under this permit must also submit a Stormwater Pollution Prevention Plan to the DEP for review and approval by DEP prior to beginning any discharge activities.
- c. Owners and operators must also submit to the DEP Changes in NOI and/or Notices of Termination at the same time they are submitted to EPA.

**9.7.4.7 Tulalip Tribes.** The following conditions apply only to discharges on the Tulalip Reservation:

- a. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Tulalip tribal agencies. Pursuant to Tulalip Tribes code of law, the operator must also obtain a land use permit from the Tulalip Tribes Planning Department as provided in Title 7 of the Tulalip Tribal Code (<http://www.codepublishing.com/WA/Tulalip/?Tulalip02/Tulalip0205.html>).
- b. Each CGP operator shall be responsible for achieving compliance with Tulalip Tribes Water Quality Standards.
- c. Each CGP operator shall submit their Stormwater Pollution Prevention Plan (SWPPP) to the:

Tulalip Natural & Cultural Resources Department  
Tulalip Tribes  
6406 Marine Drive  
Tulalip, WA 98271

*Appendix E - NOI and EPA Authorization Email*

## *Appendix F - Inspection Form*

### **Purpose**

This Inspection Report Template (or “template”) is to assist you in preparing inspection reports for EPA’s 2017 Construction General Permit (CGP). If you are covered under the 2017 CGP, you can use this template to create an inspection report form that is customized to the specific circumstances of your site and that complies with the minimum reporting requirements of Part 4.7 of the permit. Note that the use of this form is optional; you may use your own inspection report form provided it includes the minimum information required in Part 4.7 of the CGP.

If you are covered under a state CGP, this template may be helpful in developing a form that can be used for that permit; however, it will need to be modified to meet the specific requirements of that permit. If your permitting authority requires you to use a specific inspection report form, you should not use this form.

### **Notes:**

While EPA has made every effort to ensure the accuracy of all instructions contained in the Inspection Report Template, it is the permit, not the template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between the Inspection Report Template and any corresponding provision of the 2017 CGP, you must abide by the requirements in the permit. EPA welcomes comments on the Inspection Report Template at any time and will consider those comments in any future revision of this document. You may contact EPA for CGP-related inquiries at [cgp@epa.gov](mailto:cgp@epa.gov).

### **Overview of Inspection Requirements (see CGP Part 4)**

Construction operators covered under the 2017 CGP are subject to the following inspection requirements:

#### *Person(s) Responsible for Inspecting the Site (see Part 4.1)*

The person(s) inspecting your site must be a “qualified person” who may be either on your staff or a third party you hire to conduct such inspections.

- A “qualified person” is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

#### *Inspection Frequency (see Part 4.2)*

You are required to conduct inspections either:

- Once every 7 calendar days; or
- Once every 14 calendar days and within 24 hours of a storm event of 0.25 inches or greater or the occurrence of runoff from snowmelt sufficient to cause a discharge.

Your inspection frequency is increased if the site discharges to a sensitive water. See Part 4.3. Your inspection frequency may be decreased to account for stabilized areas, or for arid, semi-arid, or drought-stricken conditions, or for frozen conditions. See Part 4.4.

#### *Areas That Need to Be Inspected (see Part 4.5)*

During each inspection, you must inspect the following areas of your site:

- Cleared, graded, or excavated areas of the site;
- Stormwater controls (e.g., perimeter controls, sediment basins, inlets, exit points etc.) and pollution prevention practices (e.g., pollution prevention practices for vehicle fueling/maintenance and washing, construction product storage, handling, and disposal, etc.) at the site;



- Material, waste, or borrow areas covered by the permit, and equipment storage and maintenance areas;
- Areas where stormwater flows within the site;
- Stormwater discharge points; and
- Areas where stabilization has been implemented.

*What to Check For During Your Inspection (see Part 4.6)*

During your site inspection, you are required to check:

- Whether stormwater controls or pollution prevention practices are properly installed, require maintenance or corrective action, or whether new or modified controls are required;
- For the presence of conditions that could lead to spills, leaks, or other pollutant accumulations and discharges;
- For locations where new or modified stormwater controls are necessary to meet requirements of the permit;
- Whether there are visible signs of erosion and sediment accumulation at points of discharge and to the channels and streambanks that are in the immediate vicinity of the discharge;
- If a stormwater discharge is occurring at the time of the inspection, whether there are obvious, visual signs of pollutant discharges; and
- If any permit violations have occurred on the site.

*Inspection Reports (see Part 4.7)*

Within 24 hours of completing each inspection, you are required to complete an inspection report that includes:

- Date of inspection;
- Names and titles of person(s) conducting the inspection;
- Summary of inspection findings;
- Rain gauge or weather station readings if your inspection is triggered by the 0.25-inch storm threshold; and
- If you determine that a portion of your site is unsafe to access for the inspection, documentation of what conditions prevented the inspection and where these conditions occurred on the site

**Instructions for Using This Template**

This Field Version of the Inspection Report Template is intended to be used in the field and filled out by hand. If you will be filling out the Inspection Report Template electronically (i.e., you will be typing in your findings), please use the Electronic Version of the Inspection Report Template available at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. The Electronic Version includes text fields with instructions for what to enter.

Keep in mind that this document is a template and not an “off-the-shelf” inspection report that is ready to use without some modification. You must first customize this form to include the specifics of your project in order for it to be useable for your inspection reports. Once you have entered all of your site-specific information into these fields, you may print out this form for use in the field to complete inspection reports.

*The following tips for using this template will help you ensure that the minimum permit requirements are met:*

- **Review the inspection requirements.** Before you start developing your inspection report form, read the CGP’s Part 4 inspection requirements. This will ensure that you have a working understanding of the permit’s underlying inspection requirements.
- **Complete all required text fields.** Fill out all text fields. Only by filling out all fields will the template be compliant with the requirements of the permit. (Note: Where you do not need the



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number of rows provided in the template form for your inspection, you may leave those rows blank. Or, if you need more space to document your findings, you may add an additional sheet.)

- **Use your site map to document inspection findings.** In several places in the template, you are directed to specify the location of certain features of your site, including where stormwater controls are installed and where you will be stabilizing exposed soil. You are also asked to fill in location information for unsafe conditions and the locations of any discharges occurring during your inspections. Where you are asked for location information, EPA encourages you to reference the point on your SWPPP site map that corresponds to the requested location on the inspection form. Using the site map as a tool in this way will help you conduct efficient inspections, will assist you in evaluating problems found, and will ensure proper documentation.
- **Sign and certify each inspection report.** The operator or a duly authorized representative (see Appendix I, Part I.11.2) must sign and certify each inspection report for it to be considered complete. Where a contractor or subcontractor carries out your inspections, it is recommended that you also have the inspector sign and certify the form, in addition to the signature and certification required of the permitted operator. The template includes a signature block for both parties.
- **Include the inspection form with your SWPPP.** Once your form is complete, make sure to include a copy of the inspection form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all inspection reports with your records.** You must also retain in your records copies of all inspection reports in accordance with the requirements in Part 4.7.3 of the 2017 CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated.

### Section-by-Section Instructions

You will find specific instructions corresponding to each section of the report form on the reverse side of each page. These instructions provide you with more details in terms of what EPA expects to be documented in these reports.









***Inspection and Maintenance Form***

Refer to Sections above for frequency of inspection

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

Inspector Title: \_\_\_\_\_

Days since last rainfall: \_\_\_\_\_ Amount of last rainfall: \_\_\_\_\_

***Structural Controls: Surface Infiltration Basin***

Structure Identification	Location	Condition of side slope % vegetated	Sediment buildup in basin % accumulation	Rilling or gullyng Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
SWMA1P	End road Lot 5			Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
				Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
				Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
				Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
				Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>
				Minor <input type="checkbox"/> Moderate <input type="checkbox"/> Major <input type="checkbox"/>

Maintenance required

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

To be performed by: \_\_\_\_\_ On or before: \_\_\_\_\_





General Information (see reverse for instructions)			
Name of Project	NPDES ID No.	Inspection Date	Inspection end time
Weather conditions during inspection	Inspection start time		
Inspector Name, Title & Contact Information			
Present Phase of Construction			
Inspection Location (if multiple inspections are required, specify location where this inspection is being conducted)			
<p><b>Inspection Frequency</b> (Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply)</p> <p><b>Standard Frequency:</b></p> <input type="checkbox"/> Every 7 days <input type="checkbox"/> Every 14 days and within 24 hours of a 0.25" rain or the occurrence of runoff from snowmelt sufficient to cause a discharge <p><b>Increased Frequency:</b></p> <input type="checkbox"/> Every 7 days and within 24 hours of a 0.25" rain (for areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3) <p><b>Reduced Frequency:</b></p> <input type="checkbox"/> Twice during first month, no more than 14 calendar days apart; then once per month after first month; (for stabilized areas) <input type="checkbox"/> Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain (for stabilized areas on "linear construction sites") <input type="checkbox"/> Once per month and within 24 hours of a 0.25" rain (for arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought) <input type="checkbox"/> Once per month, for frozen conditions where earth-disturbing activities are being conducted)			
<p><b>Was this inspection triggered by a 0.25" storm event?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><b>If yes, how did you determine whether a 0.25" storm event has occurred?</b></p> <input type="checkbox"/> Rain gauge on site <input type="checkbox"/> Weather station representative of site. Specify weather station source:			
<p><b>Total rainfall amount that triggered the inspection</b> (in inches):</p>			
<p><b>Was this inspection triggered by the occurrence of runoff from snowmelt sufficient to cause a discharge?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><b>Unsafe Conditions for Inspection</b></p> <p><b>Did you determine that any portion of your site was unsafe for inspection per CGP Part 4.5?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><b>If "yes", complete the following:</b></p> <ul style="list-style-type: none"> <li>- Describe the conditions that prevented you from conducting the inspection in this location:</li> <li>- Location(s) where conditions were found:</li> </ul>			



**Instructions for Filling Out "General Information" Section**

**Name of Project**

Enter the name for the project.

**NPDES ID No.**

Enter the NPDES ID number that was assigned to your NOI for permit coverage.

**Inspection Date**

Enter the date you conducted the inspection.

**Weather Conditions During Inspection**

Enter the weather conditions occurring during the inspection, e.g., sunny, overcast, light rain, heavy rain, snowing, icy, windy.

**Inspection start and end times**

Enter the time you started and ended the inspection.

**Inspector Name, Title & Contact Information**

Provide the name of the person(s) (either a member of your company's staff or a contractor or subcontractor) that conducted this inspection. Provide the inspector's name, title, and contact information as directed in the form.

**Present Phase of Construction**

If this project is being completed in more than one phase, indicate which phase it is currently in.

**Inspection Location**

If your project has multiple locations where you conduct separate inspections, specify the location where this inspection is being conducted. If only one inspection is conducted for your entire project, enter "Entire Site." If necessary, complete additional inspection report forms for each separate inspection location.

**Inspection Frequency**

Check the box that describes the inspection frequency that applies to you. Note that you may be subject to different inspection frequencies in different areas of your site. If your project does not discharge to a "sensitive water" (i.e., a water impaired for sediment or nutrients, or listed as Tier 2, 2.5, or 3 by your state or tribe) and you are not affected by any of the circumstances described in CGP Part 4.4, then you can choose your frequency based on CGP Part 4.2 – either every 7 calendar days, or every 14 calendar days and within 24 hours of a 0.25-inch storm event. For any portion of your site that discharges to a sensitive water, your inspection frequency for that area is fixed under CGP Part 4.3 at every 7 calendar days and within 24 hours of a 0.25-inch storm event. If portions of your site are stabilized, are located in arid, semi-arid, or drought-stricken areas, or are subject to frozen conditions, consult CGP Part 4.4 for the applicable inspection frequency. Check all the inspection frequencies that apply to your project.

**Was This Inspection Triggered by a 0.25 Inch Storm Event or the occurrence of runoff from snowmelt sufficient to cause a discharge?**

If you were required to conduct this inspection because of a 0.25-inch (or greater) rain event, indicate whether you relied on an on-site rain gauge or a nearby weather station (and where the weather station is located). Also, specify the total amount of rainfall for this specific storm event. If you were required to conduct this inspection because of the occurrence of runoff from snowmelt, then check the appropriate box.

**Unsafe Conditions for Inspection**

Inspections are not required where a portion of the site or the entire site is subject to unsafe conditions. See CGP Part 4.5. These conditions should not regularly occur, and should not be consistently present on a site. Generally, unsafe conditions are those that render the site (or a portion of it) inaccessible or that would pose a significant probability of injury to applicable personnel. Examples could include severe storm or flood conditions, high winds, and downed electrical wires.

If your site, or a portion of it, is affected by unsafe conditions during the time of your inspection, provide a description of the conditions that prevented you from conducting the inspection and what parts of the site were affected. If the entire site was considered unsafe, specify the location as "Entire site"



Condition and Effectiveness of Erosion and Sediment (E&S) Controls (CGP Part 2.2) <small>(see reverse for instructions)</small>				
Type/Location of E&S Control <small>[Add an additional sheet if necessary]</small>	Maintenance Needed?*	Corrective Action Required?*	Date on Which Maintenance or Corrective Action First Identified?	Notes
1.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
2.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
7.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
8.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
9.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

\* **Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. See Part 5 of the permit for more information.



**Instructions for Filling Out the "Erosion and Sediment Control" Table**

**Type and Location of E&S Controls**

Provide a list of all erosion and sediment (E&S) controls that your SWPPP indicates will be installed and implemented at your site. This list must include at a minimum all E&S controls required by CGP Part 2.2. Include also any natural buffers established under CGP Part 2.2.1. Buffer requirements apply if your project's earth-disturbing activities will occur within 50 feet of a water of the U.S. You may group your E&S controls on your form if you have several of the same type of controls (e.g., you may group "Inlet Protection Measures", "Perimeter Controls", and "Stockpile Controls" together on one line), but if there are any problems with a specific control, you must separately identify the location of the control, whether maintenance or corrective action is necessary, and in the notes section you must describe the specifics about the problem you observed.

**Maintenance Needed?**

Answer "yes" if the E&S control requires maintenance due to normal wear and tear in order for the control to continue operating effectively. At a minimum, maintenance is required in the following specific instances: (1) for perimeter controls, whenever sediment has accumulated to half or more the above-ground height of the control (CGP Part 2.2.3.a); (2) where sediment has been tracked-out onto the surface of off-site streets or other paved areas (CGP Part 2.2.4); (3) for inlet protection measures, when sediment accumulates, the filter becomes clogged, and/or performance is compromised (CGP Part 2.2.10); and (4) for sediment basins, as necessary to maintain at least half of the design capacity of the basin (CGP Part 2.2.12.f). Note: In many cases, "yes" answers are expected and indicate a project with an active operation and maintenance program. You should also answer "yes" if work to fix the problem is still ongoing from the previous inspection.

**Corrective Action Needed?**

Answer "yes" if during your inspection you found any of the following conditions to be present (CGP, Part 5.1): (1) a required E&S control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); (2) a required E&S control was never installed or was installed incorrectly; (3) you become aware that the inadequacy of the E&S control has led to an exceedance of an applicable water quality standard; (4) one of the prohibited discharges in Part 1.3 is occurring or has occurred; or (5) EPA requires corrective action for an E&S control as a result of a permit violation found during an inspection carried out under Part 4.8. If you answer "yes", you must take corrective action and complete a corrective action report, found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. Note: You should answer "yes" if work to fix the problem from a previous inspection is still ongoing.

**Date on Which Maintenance or Corrective Action First Identified?**

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

**Notes**

For each E&S control and the area immediately surrounding it, note whether the control is properly installed and whether it appears to be working to minimize sediment discharge. Describe any problem conditions you observed such as the following, and why you think they occurred as well as actions (e.g., maintenance or corrective action) you will take or have taken to fix the problem:

1. Failure to install or to properly install a required E&S control
2. Damage or destruction to an E&S control caused by vehicles, equipment, or personnel, a storm event, or other event
3. Mud or sediment deposits found downslope from E&S controls
4. Sediment tracked out onto paved areas by vehicles leaving construction site
5. Noticeable erosion at discharge outlets or at adjacent streambanks or channels
6. Erosion of the site's sloped areas (e.g., formation of rills or gullies)
7. E&S control is no longer working due to lack of maintenance

For buffer areas, make note of whether they are marked off as required, whether there are signs of construction disturbance within the buffer, which is prohibited under the CGP, and whether there are visible signs of erosion resulting from discharges through the area.

If maintenance or corrective action is required, briefly note the reason. If maintenance or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*





Condition and Effectiveness of Pollution Prevention (P2) Practices (CGP Part 2.3)				
Type/Location of P2 Practices (Add an additional sheet if necessary)	Maintenance Needed?*	Corrective Action Required?*	Date on Which Maintenance or Corrective Action First Identified?	Notes <small>(see reverse for instructions)</small>
1.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
2.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
7.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
8.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
9.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

\* **Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. See Part 5 of the permit for more information.



**Instructions for Filling Out the "Pollution Prevention (P2) Practice" Table**

**Type and Location of P2 Controls**

Provide a list of all pollution prevention (P2) practices that are implemented at your site. This list must include all P2 practices required by Part 2.3, and those that are described in your SWPPP.

**Maintenance Needed?**

Answer "yes" if the P2 practice requires maintenance due to normal wear and tear in order for the control to continue operating effectively. Note: In many cases, "yes" answers are expected and indicate a project with an active operation and maintenance program.

**Corrective Action Needed?**

Answer "yes" if during your inspection you found any of the following conditions to be present (CGP, Part 5.1): (1) a required P2 practice needs repair or replacement (beyond routine maintenance required under Part 2.1.4); (2) a required P2 practice was never installed or was installed incorrectly; (3) you became aware that the inadequacy of the P2 practice has led to an exceedance of an applicable water quality standard; (4) one of the "prohibited discharges" listed in CGP Part 1.3 is occurring or has occurred, or (5) EPA requires corrective action for a P2 practice as a result of a permit violation found during an inspection carried out under Part 4.8. If you answer "yes", you must take corrective action and complete a corrective action report (see <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>). Note: You should answer "yes" if work to fix the problem from a previous inspection is still ongoing.

**Date on Which Maintenance or Corrective Action First Identified?**

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

**Notes**

For each P2 control and the area immediately surrounding it, note whether the control is properly installed, whether it appears to be working to minimize or eliminate pollutant discharges, and whether maintenance or corrective action is required. Describe problem conditions you observed such as the following, and why you think they occurred, as well as actions you will take or have taken to fix the problem:

1. Failure to install or to properly install a required P2 control
2. Damage or destruction to a P2 control caused by vehicles, equipment, or personnel, or a storm event
3. Evidence of a spill, leak, or other type of pollutant discharge, or failure to have properly cleaned up a previous spill, leak, or other type of pollutant discharge
4. Spill response supplies are absent, insufficient, or not where they are supposed to be located
5. Improper storage, handling, or disposal of chemicals, building materials or products, fuels, or wastes
6. P2 practice is no longer working due to lack of maintenance

If maintenance or corrective action is required, briefly note the reason. If maintenance or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*



Stabilization of Exposed Soil (CGP Part 2.2.14) <small>(see reverse for instructions)</small>		
Stabilization Area <small>[Add an additional sheet if necessary]</small>	Stabilization Method	Notes
1.	Have You Initiated Stabilization? <input type="checkbox"/> YES If yes, provide date:	<input type="checkbox"/> NO
2.	<input type="checkbox"/> YES If yes, provide date:	<input type="checkbox"/> NO
3.	<input type="checkbox"/> YES If yes, provide date:	<input type="checkbox"/> NO
4.	<input type="checkbox"/> YES If yes, provide date:	<input type="checkbox"/> NO
5.	<input type="checkbox"/> YES If yes, provide date:	<input type="checkbox"/> NO

Description of Discharges (CGP Part 4.6.6) <small>(see reverse for instructions)</small>	
Was a stormwater discharge or other discharge occurring from any part of your site at the time of the inspection? If "yes", provide the following information for each point of discharge:	Notes <input type="checkbox"/> Yes <input type="checkbox"/> No
Discharge Location <small>[Add an additional sheet if necessary]</small>	
1. Observations Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:	
2. Observations Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:	



**Instructions for Filling Out the "Stabilization of Exposed Soil" Table**

**Stabilization Area**

List all areas where soil stabilization is required to begin because construction work in that area has permanently stopped or temporarily stopped (i.e., work will stop for 14 or more days), and all areas where stabilization has been implemented.

**Stabilization Method**

For each area, specify the method of stabilization (e.g., hydroseed, sod, planted vegetation, erosion control blanket, mulch, rock).

**Have You Initiated Stabilization**

For each area, indicate whether stabilization has been initiated.

**Notes**

For each area where stabilization has been initiated, describe the progress that has been made, and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated, and the date it is to be completed.

**Instructions for Filling Out the "Description of Discharges" Table**

You are only required to complete this section if a discharge is occurring at the time of the inspection.

**Was a Stormwater Discharge Occurring From Any Part of Your Site At The Time of the Inspection?**

During your inspection, examine all points of discharge from your site, and determine whether a discharge is occurring. If there is a discharge, answer "yes" and complete the questions below regarding the specific discharge. If there is not a discharge, answer "no" and skip to the next page.

**Discharge Location** (repeat as necessary if there are multiple points of discharge)

Location of discharge. Specify the location on your site where the discharge is occurring. The location may be an outlet from a stormwater control or constructed stormwater channel, a discharge into a storm sewer inlet, or a specific point on the site. Be as specific as possible; it is recommended that you refer to a precise point on your site map.

Describe the discharge. Include a specific description of any noteworthy characteristics of the discharge such as color; odor; floating, settled, or suspended solids; foam; oil sheen; and other obvious pollution indicators.

Are there visible signs of erosion or sediment accumulation? At each point of discharge and the channel and streambank in the immediate vicinity, visually assess whether there are any obvious signs of erosion and/or sediment accumulation that can be attributed to your discharge. If you answer "yes", include a description in the space provided of the erosion and sediment deposition that you have found, specify where on the site or in the water of the U.S. it is found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue.





**Contractor or Subcontractor Signature and Certification**  
(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

**Signature of Contractor or Subcontractor:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Printed Name and Affiliation:** \_\_\_\_\_

**Operator Signature and Certification**  
(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

**Signature of Operator or "Duly Authorized Representative":** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Printed Name and Affiliation:** \_\_\_\_\_

**Instructions for Signature/Certification**

Each inspection report must be signed and certified to be considered complete.

**Contractor or Subcontractor Signature and Certification**

Where you rely on a contractor or subcontractor to carry out the inspection and complete the inspection report, you should require the inspector to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the inspection report as well.

**Operator Signature and Certification**

At a minimum, the inspection report must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation:* A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship:* A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency:* Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.



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## *Appendix G – Corrective Action Form 2017 Construction General Permit Corrective Action Report Form – Field Version*

### **Purpose**

This Corrective Action Report Form is to assist you in preparing corrective action reports for EPA’s 2017 Construction General Permit (CGP). If you are covered under EPA’s 2017 CGP, you can use this form to create a corrective action report that complies with the minimum reporting requirements of Part 5.4 of the permit.

You are only required to fill out this form if one of the conditions triggering corrective action in Part 5.1 or 5.3 occurs on your site. Routine maintenance is generally not considered to trigger corrective action. Corrective actions are triggered only for specific conditions that are identified below in the “Overview of Corrective Action Requirements.”

If you are covered under a state CGP, this form may be helpful in developing a report that can be used for that permit; however, it will need to be modified to meet the specific requirements of the permit. If your permitting authority requires you to use a specific corrective action report form, you should not use this form.

### **Notes**

While EPA has made every effort to ensure the accuracy of all instructions contained in the Corrective Action Report Form, it is the permit, not the form, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between the Corrective Action Report Form and any corresponding provision of the 2017 CGP, you must abide by the requirements in the permit. EPA welcomes comments on the Corrective Action Report Form at any time and will consider those comments in any future revision of this document. You may contact EPA for CGP-related inquiries at [cgp@epa.gov](mailto:cgp@epa.gov).

### **Overview of Corrective Action Requirements**

Construction operators covered under the 2017 CGP are required to conduct corrective actions and report on progress made in correcting the problem condition(s) in accordance with the following requirements:

#### *Conditions Triggering Corrective Action (Parts 5.1 and 5.3)*

Corrective action is required whenever any of the following conditions occur at your site:

- A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); or
- A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
- Discharges are causing an exceedance of applicable water quality standards; or
- A Part 1.3 prohibited discharge has occurred; or
- EPA requires corrective action as a result of permit violations found during an inspection carried out under Part 4.8.

#### *Deadlines for Completing Corrective Actions (Part 5.2)*

For any condition triggering corrective action:

- You must immediately take all reasonable steps to address the condition (e.g. cleaning up contaminated surfaces so the material(s) is not discharged in subsequent storm events);
- If the problem does not require a new or replacement control or significant repair, you must complete the corrective action by the close of the next business day
- If the problem does require a new or replacement control or significant repair, you must complete corrective action (e.g., installing and making operational any new or modified



control, completing repairs) by no later than 7 calendar days from the time of discovery of the condition. If infeasible to complete the installation or repair within 7 calendar days, you must document why it is infeasible and document your schedule for completing the corrective action as soon as practicable. If any of these actions result in changes to the stormwater controls documented in your SWPPP, you must modify your SWPPP within 7 calendar days.

*Deadlines for Documenting Corrective Actions in a Report (Part 5.4)*

You are required to complete a corrective action report for each corrective action you take in accordance with the following deadlines.

- Within 24 hours of identifying the corrective action condition, you must document the following:
  - The condition identified at your site; and
  - The date and time you identified the condition
  
- Within 24 hours of completing the corrective action, you must document the following:
  - The actions you took to address the condition, and
  - Whether any SWPPP modifications are required.

**Instructions for Using This Report Form**

This Field Version of the Corrective Action Report Form is intended to be used in the field and filled out by hand. If you will be filling out the Corrective Action Report Form electronically (i.e., you will be typing in your findings), please use the Electronic Version of the Corrective Action Report Form available at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. The Electronic Version includes text fields with instructions for what to enter.

*The following tips for using this form will help you ensure that the minimum permit requirements are met:*

- **Review the corrective action requirements.** Before you fill out this corrective action report form, read the CGP’s Part 5 corrective action requirements. This will ensure that you have a working understanding of the permit’s underlying corrective action requirements.
  
- **Complete a separate report for each condition that triggers corrective action.** For each triggering condition on your site, you will need to fill out a separate corrective action report form.
  
- **Complete all required text fields.** Fill out all text fields. Only by filling out all fields will the form be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the corrective action report form, you may leave those rows blank. Or, if you need more space to document your findings, you may add an additional sheet.)
  
- **Sign and certify each corrective action report.** The operator or a duly authorized representative (see Appendix I, Part I.11.2) must sign and certify each corrective action report form for it to be considered complete. Where a contractor or subcontractor carries out your corrective actions, it is recommended that you also have that individual sign and certify the form, in addition to the signature and certification required of the permitted operator. The form includes a signature block for both parties.
  
- **Include the corrective action report form with your SWPPP.** Once your form is complete, make sure to include a copy of the corrective action report form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
  
- **Retain copies of all corrective action reports with your records.** You must retain copies of your corrective action reports in your records in accordance with the requirements in Part 5.4.4 of the





2017 CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated.

**Section-by-Section Instructions**

You will find specific instructions corresponding to each section of the report form on the reverse side of each page. These instructions were written in order to provide you with more details in terms of what EPA expects to be documented in these reports.



Section A – Initial Report (CGP Part 5.4.1)			
(Complete this section within 24 hours of identifying the condition that triggered corrective action)			
Name of Project		NPDES ID No.	Today's Date
Date Problem First Discovered		Time Problem First Discovered	
Name and Contact Information of Individual Completing this Form			
<p><b>What site conditions triggered the requirement to conduct corrective action</b> <i>(check the box that applies):</i></p> <p><input type="checkbox"/> A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4)</p> <p><input type="checkbox"/> A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly</p> <p><input type="checkbox"/> A discharge is causing an exceedance of applicable water quality standards</p> <p><input type="checkbox"/> A Part 1.3 prohibited discharge has occurred</p> <p><input type="checkbox"/> EPA requires corrective action as a result of permit violations found during an EPA inspection carried out under Part 4.8</p> <p><b>Provide a description of the problem:</b></p> <p><b>Deadline for completing corrective action</b> <i>(check the box that applies):</i></p> <p><input type="checkbox"/> Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events</p> <p><input type="checkbox"/> Complete by close of the next business day when problem does not require a new or replacement control or significant repair</p> <p><input type="checkbox"/> No later than 7 calendar days from the time of discovery for problems that require a new or replacement control or significant repair</p> <p><input type="checkbox"/> Infeasible to complete the installation or repair within 7 calendar days. Explain why it is infeasible and document schedule for installing control:</p> <p>Enter date of corrective action completion: _____</p>			
Section B – Corrective Action Completion (CGP Part 5.4.2)			
(Complete this section no later than 24 hours after completing the corrective action)			
Section B.1 – Why the Problem Occurred			
Cause(s) of Problem <i>(Add an additional sheet if necessary)</i>		How You Determined the Cause and the Date You Determined the Cause	
1.		1.	
2.		2.	
Section B.2 – Stormwater Control Modifications Implemented to Correct the Problem			
List of Stormwater Control Modification(s) Needed to Correct Problem <i>(Add an additional sheet if necessary)</i>	Date of Completion	SWPPP Update Necessary?	Notes
1.		<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide date SWPPP modified:	
2.		<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide date SWPPP modified:	



### **Instructions for Filling Out the Initial Report (Section A)**

You must complete Section A of the report form within 24 hours of discovering the condition that triggered corrective action

**Name of Project**

Enter the name for the project.

**NPDES ID No.**

Enter the NPDES ID number that was assigned to your NOI for permit coverage.

**Today's Date**

Enter the date you completed this form.

**Date/Time Problem First Discovered**

Specify the date on which the triggering condition was first discovered. Also specify the time of the discovery.

**Name/Contact Information**

Provide the individual's name, title, and contact information as directed in the form.

**Site Condition That Triggered Corrective Action**

Under the CGP, corrective action is required when one of 4 triggering conditions occurs at your site or when EPA requires a corrective action as a result of a permit violation found during an EPA inspection. See CGP Parts 5.1 and 5.3. Check the box that corresponds to the condition that triggered this corrective action.

**Description of the Site Condition**

Provide a summary description of the condition you found that triggered corrective action under CGP Part 5.1 and the specific location where it was found. Be as specific as possible about the location; it is recommended that you refer to a precise point on your site map. If you have already provided this explanation in an inspection report, you can refer to that report.

**Deadline for Completing Corrective Action**

This deadline is fixed in CGP Part 5.2. For all projects, the deadlines are: (1) immediately take all reasonable steps; (2) by the close of the next business day when the problem does not require significant repair or replacement; (3) no more than 7 calendar days after the date you discovered the problem when the problem does require significant repair or replacement, or (4) if it is infeasible to complete work within the first 7 days, as soon as practicable following the 7th day. If your estimated date of completion falls after the 7-day deadline consistent with (3), above, explain (a) why you believe it is infeasible to complete work within 7 days, and (b) why the date you have established for making the new or modified stormwater control operational is the soonest practicable timeframe.

### **Instructions for Filling Out the Corrective Action Completion Table (Section B)**

You must complete Section B of the report form no later than 24 hours after completing the correction action.

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**Section B.1 – Why the Problem Occurred**

After you have had the opportunity to examine the problem more closely, provide details as to what you believe to be the cause of the problem, and specify the follow-up actions you took (along with the dates of such actions) to diagnose the problem. This is consistent with CGP Part 5.4.2.

**Section B.2 – Stormwater Control Modifications Implemented**

Provide a list of modifications you made to your stormwater controls to correct the problem and the date you completed such work. Keep in mind that your work must be completed within the timeline specified in Section A for the completion of corrective action work.

Also, if a SWPPP modification is necessary consistent with Part 7.4.1.a in order to reflect changes implemented at your site, indicate the date you modified your SWPPP. Keep in mind that SWPPP changes must be made within 7 days of discovering the problem that triggered this corrective action.

Space is provided for you to include additional notes or observations regarding the change that you implemented at your site to correct the problem.

**Section C –Signature and Certification (CGP Part 5.4.3)**

**Section C.1 – Contractor or Subcontractor Signature and Certification**

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

**Signature of Contractor or Subcontractor:** \_\_\_\_\_

**Date:**

**Printed Name and Affiliation:** \_\_\_\_\_

**Section C.2 – Operator Signature and Certification**

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

**Signature of Operator or "Duly Authorized Representative":** \_\_\_\_\_

**Date:**

**Printed Name and Affiliation:** \_\_\_\_\_



### **Instructions for Signature and Certification (Section C)**

Each corrective action report must be signed and certified to be considered complete.

#### **Section C.1 - Contractor or Subcontractor Signature and Certification**

Where you rely on a contractor or subcontractor to complete this report and the associated corrective action, you should require the individual(s) to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the report as well.

#### **Section C.2 - Operator Signature and Certification**

At a minimum, the corrective action report form must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation:* A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship:* A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency:* Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

*Appendix H - SWPPP Amendment Log*

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]



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**Appendix I – Subcontractor Certifications/Agreements**

**SUBCONTRACTOR CERTIFICATION  
STORMWATER POLLUTION PREVENTION PLAN**

Project Number: \_\_\_\_\_

Project Title: \_\_\_\_\_

Operator(s): \_\_\_\_\_

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

**I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.**

This certification is hereby signed in reference to the above named project:

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Type of construction service to be provided: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**Appendix J - Grading and Stabilization Activities Log**

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		
		<input type="checkbox"/> Temporary <input type="checkbox"/> Permanent		

**Appendix K – SWPPP Training Log**  
**Stormwater Pollution Prevention Training Log**

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Instructor's Name(s): \_\_\_\_\_

Instructor's Title(s): \_\_\_\_\_

Course Location: \_\_\_\_\_ Date: \_\_\_\_\_

Course Length (hours): \_\_\_\_\_

Stormwater Training Topic: *(check as appropriate)*

- Erosion Control BMPs       Emergency Procedures
- Sediment Control BMPs       Good Housekeeping BMPs
- Non-Stormwater BMPs

Specific Training Objective: \_\_\_\_\_  
\_\_\_\_\_

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

---

## Appendix L - Delegation of Authority

### Delegation of Authority

I, \_\_\_\_\_ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the \_\_\_\_\_ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

\_\_\_\_\_ (name of person or position)  
\_\_\_\_\_ (company)  
\_\_\_\_\_ (address)  
\_\_\_\_\_ (city, state, zip)  
\_\_\_\_\_ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in \_\_\_\_\_ (Reference State Permit), and that the designee above meets the definition of a "duly authorized representative" as set forth in \_\_\_\_\_ (Reference State Permit).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix M – Endangered Species Documentation



### DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581  
p: (508) 389-6300 | f: (508) 389-7890  
MASS.GOV/MASSWILDLIFE

July 05, 2018

Brian Hannon  
HPI, LLC  
23 Stiles Rd- Suite 104  
Salem NH 03079

RE: Project Location: 333, 339, 349 Summer Street, Lynnfield  
Project Description: Subdivision  
NHESP File No.: 18-37420

Dear Applicant:

Thank you for submitting the MESA Project Review Checklist, site plans (dated 6/14/18) and other required materials to the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

Based on a review of the information that was provided and the information that is currently contained in our database, the Division has determined that this project, as currently proposed, **will not result in a prohibited Take** of state-listed rare species. This determination is a final decision of the Division of Fisheries & Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Melany Cheeseman, Endangered Species Review Assistant, at (508) 389-6357.

Sincerely,

A handwritten signature in black ink that reads "Thomas W. French".

Thomas W. French, Ph.D.  
Assistant Director

cc: Greg Hochmuth, Williams & Sparages LLC  
Janet M. Tobin & Annmarie Pendola, Degiovanni Family Trust  
Stephen Wallace and Laura Singleton Wallace, Singleton Living Trust  
Jane Coonrod

MASSWILDLIFE



## Appendix N – Permanent and Temporary Seeding Guidelines

### Seeding, Permanent

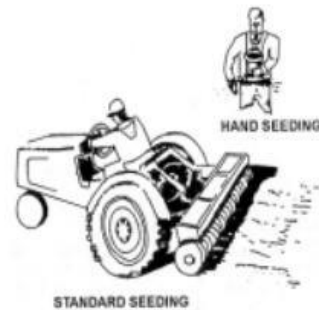
The establishment of perennial vegetative cover on disturbed areas.

#### Purpose

Permanent seeding of grass and planting trees and shrubs provides stabilization to the soil by holding soil particles in place.

Vegetation reduces sediments and runoff to downstream areas by slowing the velocity of runoff and permitting greater infiltration of the runoff.

Vegetation also filters sediments, helps the soil absorb water, improves wildlife habitats, and enhances the aesthetics of a site.



#### Where Practice Applies

- Permanent seeding and planting is appropriate for any graded or cleared area where long-lived plant cover is needed to stabilize the soil.
- Areas which will not be brought to final grade for a year or more.
- Some areas where permanent seeding is especially important are filter strips, buffer areas, vegetated swales, steep slopes, and stream banks.
- This practice is effective on areas where soils are unstable because of their texture or structure, high water table, winds, or steep slope.

#### Advantages

Advantages of seeding over other means of establishing plants include the small initial establishment cost, the wide variety of grasses and legumes available, low labor requirement, and ease of establishment in difficult areas.

Seeding is usually the most economical way to stabilize large areas.

Well established grass and ground covers can give an aesthetically pleasing, finished look to a development.

Once established, the vegetation will serve to prevent erosion and retard the velocity of runoff.

#### Disadvantages/Problems

Disadvantages which must be dealt with are the potential for erosion during the establishment stage, a need to reseed areas that fail to establish, limited periods during the year suitable for seeding, and a need for water and appropriate climatic conditions during germination. Vegetation and mulch cannot prevent soil slippage and erosion if soil is not inherently stable.





Coarse, high grasses that are not mowed can create a fire hazard in some locales. Very short mowed grass, however, provides less stability and sediment filtering capacity.

Grass planted to the edge of a watercourse may encourage fertilizing and mowing near the water's edge and increase nutrient and pesticide contamination.

Depends initially on climate and weather for success.

May require regular irrigation to establish and maintain.

### **Planning considerations**

Selection of the right plant materials for the site, good seedbed preparation, timing, and conscientious maintenance are important. Whenever possible, native species of plants should be used for landscaping. These plants are already adapted to the locale and survivability should be higher than with "introduced" species.

Native species are also less likely to require irrigation, which can be a large maintenance burden and is neither cost-effective nor ecologically sound.

If non-native plant species are used, they should be tolerant of a large range of growing conditions, as low-maintenance as possible, and not invasive.

Consider the microclimate within the development area. Low areas may be frost pockets and require hardier vegetation since cold air tends to sink and flow towards low spots. South-facing slopes may be more difficult to re-vegetate because they tend to be sunnier and drier.

Divert as much surface water as possible from the area to be planted.

Remove seepage water that would continue to have adverse effects on soil stability or the protecting vegetation. Subsurface drainage or other engineering practices may be needed. In this situation, a permit may be needed from the local Conservation Commission: check ahead of time to avoid construction delays.

Provide protection from equipment, trampling and other destructive agents.

Vegetation cannot be expected to supply an erosion control cover and prevent slippage on a soil that is not stable due to its texture, structure, water movement, or excessive slope.





## Seeding Grasses and Legumes

Install needed surface runoff control measures such as gradient terraces, berms, dikes, level spreaders, waterways, and sediment basins prior to seeding or planting.

### Seedbed Preparation

If infertile or coarse-textured subsoil will be exposed during land shaping, it is best to stockpile topsoil and respread it over the finished slope at a minimum 2- to 6-inch depth and roll it to provide a firm seedbed. If construction fill operations have left soil exposed with a loose, rough, or irregular surface, smooth with blade and roll.

Loosen the soil to a depth of 3-5 inches with suitable agricultural or construction equipment.

Areas not to receive top soil shall be treated to firm the seedbed after incorporation of the lime and fertilizer so that it is depressed no more than ½ - 1 inch when stepped on with a shoe. Areas to receive topsoil shall not be firmed until after topsoiling and lime and fertilizer is applied and incorporated, at which time it shall be treated to firm the seedbed as described above. This can be done by rolling or cultipacking.

### Cool Season Grasses

Cool Season Grasses grow rapidly in the cool weather of spring and fall, and set seed in June and July. Cool season grasses become dormant when summer temperatures persist above 85 degrees and moisture is scarce.

### Lime and Fertilizer

Apply lime and fertilizer according to soil test and current Extension Service recommendations. In absence of a soil test, apply lime (a pH of 5.5 - 6.0 is desired) at a rate of 2.5 tons per acre and 10-20-20 analysis fertilizer at a rate of 500 pounds per acre (40 % of N to be in an organic or slow release form). Incorporate lime and fertilizer into the top 2-3 inches of soil.

### Seeding Dates

Seeding operations should be performed within one of the following periods:

- ☞ April 1 - May 31,
- ☞ August 1 - September 10,
- ☞ November 1 - December 15 as a dormant seeding (seeding rates shall be increased by 50% for dormant seedings).

### Seeding Methods

Seeding should be performed by one of the following methods. Seed should be planted to a depth of ¼ to ½ inches.

- ☞ Drill seedings,
- ☞ Broadcast and rolled, cultipacked or tracked with a small track piece of construction equipment,
- ☞ Hydroseeding, with subsequent tracking.



**Mulch**

Mulch the seedings with straw applied at the rate of ½ tons per acre. Anchor the mulch with erosion control netting or fabric on sloping areas.

**Warm Season Grasses**

Warm Season Grasses begin growth slowly in the spring, grow rapidly in the hot summer months and set seed in the fall. Many warm season grasses are sensitive to frost in the fall, and the top growth may die back. Growth begins from the plant base the following spring.

**Lime and Fertilizer**

Lime to attain a pH of at least 5.5. Apply a 0-10-10 analysis fertilizer at the rate of 600 lbs./acre.

Incorporate both into the top 2-3 inches of soil. (30 lbs. of slow release nitrogen should be applied after emergence of grass in the late spring.)

**Seeding Dates**

Seeding operations should be performed as an early spring seeding (April 1-May 15) with the use of cold treated seed. A late fall early winter dormant seeding (November 1 - December 15) can also be made, however the seeding rate will need to be increased by 50%.

**Seeding Methods**

Seeding should be performed by one of the following methods:

- ☞ Drill seedings (de-awned or de-bearded seed should be used unless the drill is equipped with special features to accept awned seed).
- ☞ Broadcast seeding with subsequent rolling, cultipacking or tracking the seeding with small track construction equipment. Tracking should be oriented up and down the slope.
- ☞ Hydroseeding with subsequent tracking. If wood fiber mulch is used, it should be applied as a separate operation after seeding and tracking to assure good seed to soil contact.

**Mulch**

Mulch the seedings with straw applied at the rate of ½ tons per acre. Anchor the mulch with erosion control netting or fabric on sloping areas.

**Seed Mixtures for Permanent Cover**

Recommended mixtures for permanent seeding are provided on the following pages. Select plant species which are suited to the site conditions and planned use. Soil moisture conditions, often the major limiting site factor, are usually classified as follows:

**Dry** - Sands and gravels to sandy loams. No effective moisture supply from seepage or a high water table.

**Moist** - Well drained to moderately well drained sandy loams, loams, and finer; or coarser textured material with moderate influence on root zone from seepage or a high water table.

**Wet** - All textures with a water table at or very near the soil surface, or with enduring seepage.

When other factors strongly influence site conditions, the plants selected must also be tolerant of these conditions.





Permanent Seeding Mixtures					
Mix	Site	Seed Mixture	Seed, Pounds per:		Remarks
			Acre	1,000 sf	
1	Dry	Little Bluestem	10	0.25	* Use Warm Season planting procedure. * Roadsides * Sand and Gravel Stabilization * Clover requires inoculation with nitrogen-fixing bacteria  * Rates for this mix are for PLS.
		or Broomsedge			
		Tumble Lovegrass*	1	0.10	
		Switchgrass	10	0.25	
		Bush Clover*	2	0.10	
Red Top	1	0.10			
2	Dry	Deertongue	15	0.35	* Use Warm Season planting procedures. * Acid sites/Mine spoil * Clover requires inoculation with nitrogen-fixing bacteria.  *Rates for this mix are for PLS.
		Broomsedge	10	0.25	
		Bush Clover*	2	0.10	
		Red Top	1	0.10	
3	Dry	Big Bluestem	10	0.25	* Use Warm Season planting procedures. * Eastern Prairie appearance * Sand and Gravel pits. * Golf Course Wild Areas * Sanitary Landfill Cover seeding * Wildlife Areas *OK to substitute Poverty Dropseed in place of Red Top/Ryegrass. *Rates for this mix are for PLS.
		Indian Grass	10	0.25	
		Switchgrass	10	0.25	
		Little Bluestem	10	0.25	
		Red Top or	1	0.10	
		Perennial Ryegrass	10	0.25	
4	Dry	Flat Pea	25	0.60	* Use Cool Season planting procedures * Utility Rights-of-Ways (tends to suppress woody growth)
		Red Top or	2	0.10	
		Perennial Ryegrass	15	0.35	
5	Dry	Little Bluestem	5	0.10	* Use Warm Season planting procedures. * Coastal sites * Rates for Bluestein and Switchgrass are for PLS.
		Switchgrass	10	0.25	
		Beach Pea*	20	0.45	
		Perennial Ryegrass	10	0.25	
6	Dry - Moist	Red Fescue	10	0.25	* Use Cool Season planting procedure. * Provides quick cover but is non-aggressive; will tend to allow indigenous plant colonization. * General erosion control on variety of sites, including forest roads, skid trails and landings.
		Canada Bluegrass	10	0.25	
		Perennial Ryegrass	10	0.25	
		Red Top	1	0.10	
7	Moist-Wet	Switchgrass	10	0.25	* Use Warm Season planting procedure. * Coastal plain/flood plain * Rates for Bluestem and Switchgrass are for PLS.
		Virginia Wild Rye	5	0.10	
		Big Bluestem	15	0.35	
		Red Top	1	0.10	



Permanent Seeding Mixtures					
Mix	Site	Seed Mixture	Seed, Pounds per:		Remarks
			Acre	1,000 sf	
8	Moist	Creeping Bentgrass	5	0.10	* Use Cool Season planting procedures. * Pond Banks * Waterways/ditch banks
	Wet	Fringed Bromegrass	5	0.10	
		Fowl Meadowgrass	5	0.10	
		Bluejoint Reedgrass or Rice Cutgrass	2	0.10	
		Perennial Ryegrass	10	0.25	
9	Moist	Red Fescue	5	0.10	*Salt Tolerant * Fescue and Bentgrass provide low growing appearance, while Switchgrass provides tall cover for wildlife.
	Wet	Creeping Bentgrass	2	0.10	
		Switchgrass	8	0.20	
		Perennial Ryegrass	10	0.25	
10	Moist	Red Fescue	5	0.10	* Use Cool Season planting procedure. * Trefoil requires inoculation with nitrogen fixing bacteria. * Suitable for forest access roads, skid trails and other partial shade situations.
	Wet	Creeping Bentgrass	5	0.10	
		Virginia Wild Rye	8	0.20	
		Wood Reed Grass*	1	0.10	
		Showy Tick Trefoil*	1	0.10	
11	Moist	Creeping Bentgrass	5	0.10	* Use Cool Season planting procedure. * Suitable for waterways, pond or ditch banks. * Trefoil requires inoculation with nitrogen fixing bacteria.
	Wet	Bluejoint Reed Grass	1	0.10	
		Virginia Wild Rye	3	0.10	
		Fowl Meadow Grass	10	0.25	
		Showy Tick Trefoil*	1	0.10	
		Red Top	1	0.10	
12	Wet	Blue Joint Reed Grass	1	0.10	* Use Cool Season planting procedure. * OK to seed in saturated soil conditions, but not in standing water. * Suitable as stabilization seeding for created wetland. * All species in this mix are native to Massachusetts.
		Canada Manna Grass	1	0.10	
	Rice Cut Grass	1	0.10		
	Creeping Bent Grass	5	0.10		
	Fowl Meadow Grass	5	0.10		
13	Dry -	American Beachgrass	18"	18'	*Vegetative planting with dormant culms, 3-5 culms per planting
	Moist		centers	centers	
14	Inter-	Smooth Cordgrass	12-18"	12-18"	* Vegetative planting with transplants.
	Tidal	Saltmeadow Cordgrass	centers	centers	



**Notes:**

\* Species such as Tumble Lovegrass, Fringed Bromegrass, Wood Reedgrass, Bush Clover and Beach Pea, while known to be commercially available from specific seed suppliers, may not always be available from your particular seed suppliers. The local Natural Resources Conservation Service office may be able to help with a source of supply. In the event a particular species listed in a mix can not be obtained, however, it may be possible to substitute another species.

*Seed mixtures by courtesy of Natural Resources Conservation Service, Amherst, MA.*

**(PLS) Pure Live Seed**

Warm Season grass seed is sold and planted on the basis of pure live seed. An adjustment is made to the bulk rate of the seed to compensate for inert material and non-viable seed. Percent of pure live seed is calculated by multiplying the percent purity by the percent germination; **(% purity) x (% germination) = percent PLS.**

For example, if the seeding rate calls for 10 lbs./acre PLS and the seed lot has a purity of 70% and germination of 75%, the PLS factor is:

$$(.70 \times .75) = .53$$

$$10 \text{ lbs. divided by } .53 = \text{approx. } 19 \text{ lbs.}$$

Therefore, 19 lbs of seed from the particular lot will need to be applied to obtain 10 lbs. of pure live seed.

**Special Note**

Tall Fescue, Reed Canary Grass, Crownvetch and Birdsfoot Trefoil are no longer recommended for general erosion control use in Massachusetts due to the invasive characteristics of each. If these species are used, it is recommended that the ecosystem of the site be analyzed for the effects species invasiveness may impose. The mixes listed in the above mixtures include either species native to Massachusetts or non-native species that are not perceived to be invasive, as per the Massachusetts Native Plant Advisory Committee.





**Wetlands Seed Mixtures**

For newly created wetlands, a wetlands specialist should design plantings to provide the best chance of success. Do not use introduced, invasive plants like reed canarygrass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Using plants such as these will cause many more problems than they will solve.

The following grasses all thrive in wetland situations:

- ☞ Fresh Water Cordgrass (*Spartina pectinata*)
- ☞ Marsh/Creeping Bentgrass (*Agrostis stolonifera, var. Palustris*)
- ☞ Broomsedge (*Andropogon virginicus*)
- ☞ Fringed Bromegrass (*Bromus ciliatus*)
- ☞ Blue Joint Reed Grass (*Calamagrostis canadensis*)
- ☞ Fowl Meadow Grass (*Glyceria striata*)
- ☞ Riverbank Wild Rye (*Elymus riparius*)
- ☞ Rice Cutgrass (*Leersia oryzoides*)
- ☞ Stout Wood Reed (*Cinna arundinacea*)
- ☞ Canada Manna Grass (*Glyceria canadensis*)

A sample wetlands seed mix developed by The New England Environmental Wetland Plant Nursery is shown on the following page.

**Wetland Seed Mixture**

The New England Environmental Wetland Plant Nursery has developed a seed mixture which is specifically designed to be used in wetland replication projects and stormwater detention basins. It is composed of seeds from a variety of indigenous wetland species. Establishing a native wetland plant understory in these areas provides quick erosion control, wildlife food and cover, and helps to reduce the establishment of undesirable invasive species such as Phragmites and purple loosestrife (*Lythrum salicaria*). The species have been selected to represent varying degrees of drought tolerance, and will establish themselves based upon microtopography and the resulting variation in soil moisture.



<b>Common Name</b> ( <i>Scientific Name</i> )	<b>% in Mix</b>	<b>Comments</b>
<b>Lurid Sedge</b> ( <i>Carex lurida</i> )	30	A low ground cover that tolerates mesic sites in addition to saturated areas; prolific seeder in second growing season.
<b>Fowl Meadow Grass</b> ( <i>Glyceria Canadensis</i> )	25	Prolific seed producer that is a valuable wildlife food source.
<b>Fringed Sedge</b> ( <i>Carex crinita</i> )	10	A medium to large sedge that tolerates saturated areas; good seed producer.
<b>Joe-Pye Weed</b> ( <i>Eupatoriadelphus maculatus</i> )	10	Flowering plant that is valuable for wildlife cover. Grows to 4 feet.
<b>Brook Sedge</b> ( <i>Carex spp., Ovales group</i> )	10	Tolerates a wide range of hydrologic conditions.
<b>Woolgrass</b> ( <i>Scirpus cyperinus</i> )	5	Tolerates fluctuating hydrology.
<b>Boneset</b> ( <i>Eupatorium perfoliatum</i> )	5	Flowering Plant that is valuable for wildlife cover. Grows to 3 feet.
<b>Tussock Sedge</b> ( <i>Carex stricta</i> )	<5	Grows in elevated hummocks on wet sites, may grow rhizomonously on drier sites.
<b>Blue Vervain</b> ( <i>Verbena hastata</i> )	<5	A native plant that bears attractive, blue flowers.

The recommended application rate is one pound per 5,000 square feet when used as an understory cover. This rate should be increased to one pound per 2,500 square feet for detention basins and other sites which require a very dense cover. For best results, a late fall application is recommended. This mix is not recommended for standing water.





**Maintenance**

Inspect seeded areas for failure and make necessary repairs and reseed immediately. Conduct or follow-up survey after one year and replace failed plants where necessary.

If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

If a stand has less than 40% cover, reevaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. If the season prevents resewing, mulch or jute netting is an effective temporary cover.

Seeded areas should be fertilized during the second growing season. Lime and fertilize thereafter at periodic intervals, as needed.

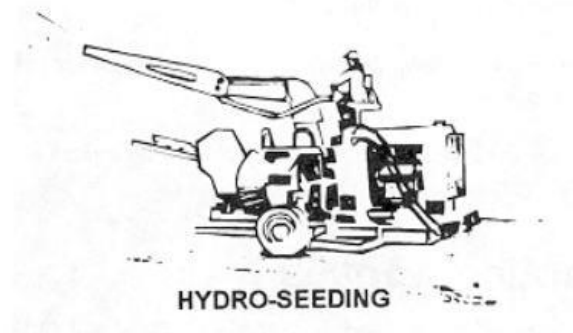
**References**

North Carolina Department of Environment, Health, and Natural Resources, *Erosion and Sediment Control Field Manual*, Raleigh, NC, February 1991.

Personal communication, Richard J. DeVergilio, USDA, Natural Resources Conservation Service, Amherst, MA.

U.S. Environmental Protection Agency, *Storm Water Management For Construction Activities*, EPA-832-R-92-005, Washington, DC, September, 1992.

Washington State Department of Ecology, *Stormwater Management Manual for the Puget Sound Basin*, Olympia, WA, February, 1992.



### Seeding, Temporary

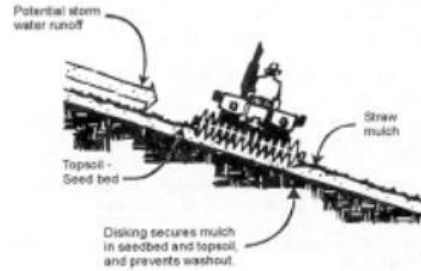
Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.

#### Purpose

To temporarily stabilize areas that will not be brought to final grade for a period of more than 30 working days.

To stabilize disturbed areas before final grading or in a season not suitable for permanent seeding.

Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established. Root systems hold down the soils so that they are less apt to be carried offsite by storm water runoff or wind. Temporary seeding also reduces the problems associated with mud and dust from bare soil surfaces during construction.



#### Where Practice Applies

On any cleared, unvegetated, or sparsely vegetated soil surface where vegetative cover is needed for less than one year. Applications of this practice include diversions, dams, temporary sediment basins, temporary road banks, and topsoil stockpiles.

Where permanent structures are to be installed or extensive re-grading of the area will occur prior to the establishment of permanent vegetation.

Areas which will not be subjected to heavy wear by construction traffic.

Areas sloping up to 10% for 100 feet or less, where temporary seeding is the only practice used.

#### Advantages

This is a relatively inexpensive form of erosion control but should only be used on sites awaiting permanent planting or grading. Those sites should have permanent measures used.

Vegetation will not only prevent erosion from occurring, but will also trap sediment in runoff from other parts of the site.

Temporary seeding offers fairly rapid protection to exposed areas.

### Disadvantages/Problems

Temporary seeding is only viable when there is a sufficient window in time for plants to grow and establish cover. It depends heavily on the season and rainfall rate for success.

If sown on subsoil, growth will be poor unless heavily fertilized and limed. Because overfertilization can cause pollution of stormwater runoff, other practices such as mulching alone may be more appropriate. The potential for over-fertilization is an even worse problem in or near aquatic systems.

Once seeded, areas should not be travelled over.

Irrigation may be needed for successful growth. Regular irrigation is not encouraged because of the expense and the potential for erosion in areas that are not regularly inspected.

### Planning Considerations

Temporary seedings provide protective cover for less than one year. Areas must be reseeded annual or planted with perennial vegetation.

Temporary seeding is used to protect earthen sediment control practices and to stabilize denuded areas that will not be brought into final grade for several weeks or months. Temporary seeding can provide a nurse crop for permanent vegetation, provide residue for soil protection and seedbed preparation, and help prevent dust production during construction.

Use low-maintenance native species wherever possible.

Planting should be timed to minimize the need for irrigation.

Sheet erosion, caused by the impact of rain on bare soil, is the source of most fine particles in sediment. To reduce this sediment load in runoff, the soil surface itself should be protected. The most efficient and economical means of controlling sheet and rill erosion is to establish vegetative cover. Annual plants which sprout rapidly and survive for only one growing season are suitable for establishing temporary vegetative cover. Temporary seeding is effective when combined with construction phasing so bare areas of the site are minimized at all times.

Temporary seeding may prevent costly maintenance operations on other erosion control systems. For example, sediment basin clean-outs will be reduced if the drainage area of the basin is seeded where grading and construction are not taking place. Perimeter dikes will be more effective if not choked with sediment.

Proper seedbed preparation and the use of quality seed are important in this practice just as in permanent seeding. Failure to carefully follow sound agronomic recommendations will often result in an inadequate stand of vegetation that provides little or no erosion control.

Soil that has been compacted by heavy traffic or machinery may need to be loosened. Successful growth usually requires that the soil be tilled before the seed is applied. Topsoiling is not necessary for temporary seeding; however, it may improve the chances of establishing temporary vegetation in an area.





## Planting Procedures

### Time of Planting

Planting should preferably be done between April 1 and June 30, and September 1 through September 30. If planting is done in the months of July and August, irrigation may be required. If planting is done between October 1 and March 31, mulching should be applied immediately after planting. If seeding is done during the summer months, irrigation of some sort will probably be necessary.

### Site Preparation

Before seeding, install needed surface runoff control measures such as gradient terraces, interceptor dike/swales, level spreaders, and sediment basins.

### Seedbed Preparation

The seedbed should be firm with a fairly fine surface.

Perform all cultural operations across or at right angles to the slope. See **Topsoiling** and **Surface Roughening** for more information on seedbed preparation. A minimum of 2 to 4 inches of tilled topsoil is required.

### Liming and Fertilization

Apply uniformly 2 tons of ground limestone per acre (100 lbs. per 1,000 Sq. Ft.) or according to soil test.

Apply uniformly 10-10-10 analysis fertilizer at the rate of 400 lbs. per acre (14 lbs. per 1,000 Sq. Ft.) or as indicated by soil test. Forty percent of the nitrogen should be in organic form.

Work in lime and fertilizer to a depth of 4 inches using any suitable equipment.

Species	Seedings for Temporary Cover		Recommended Seeding Dates
	Seeding Rates lbs/sq.ft. 1,000 Sq.Ft.	Acre	
Annual Ryegrass	1	40	April 1 to June 1 Aug. 15 to Sept. 15
Foxtail Millet	0.7	30	May 1 to June 30
Oats	2	80	April 1 to July 1 August 15 to Sept. 15
Winter Rye	3	120	Aug. 15 to Oct. 15

“Hydro-seeding” applications with appropriate seed-mulch-fertilizer mixtures may also be used.



**Seeding**

Select adapted species from the accompanying table.

Apply seed uniformly according to the rate indicated in the table by broadcasting, drilling or hydraulic application.

Cover seeds with suitable equipment as follows:

☞ Rye grass	¼ inch
☞ Millet	½ to ¾ inch
☞ Oats	1 to 1-1/2 inches
☞ Winter rye	1 to 1-1/2 inches.

**Mulch**

Use an effective mulch, such as clean grain straw; tacked and/or tied down with netting to protect seedbed and encourage plant growth.

**Common Trouble Points**

**Lime and fertilizer not incorporated to at least 4 inches**

May be lost to runoff or remain concentrated near the surface where they may inhibit germination.

**Mulch rate inadequate or straw mulch not tacked down**

Results in poor germination or failure, and erosion damage. Repair damaged areas, reseed and mulch.

**Annual ryegrass used for temporary seeding**

Ryegrass reseeds itself and makes it difficult to establish a good cover of permanent vegetation.

**Seed not broadcast evenly or rate too low**

Results in patchy growth and erosion.

**Maintenance**

Inspect within 6 weeks of planting to see if stands are adequate. Check for damage after heavy rains. Stands should be uniform and dense. Fertilize, reseed, and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary.

Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather or on adverse sites. Water application rates should be controlled to prevent runoff.

