

Stormwater Management Design Report

Pequot Apartments

908 Hartford Turnpike (Conn. Route 85)
Waterford, Connecticut

July 1, 2021

Prepared for:

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1.0 Introduction

This Stormwater Management Design Report has been prepared on behalf of Cohanzie Partners, LP who has submitted an application to the Town of Waterford Conservation Commission seeking approval to develop a portion of an approximate 16.5 acre land parcel located in the central portion of the Town on Hartford Turnpike (Conn. Route 85). The parcel is located on the west side of Hartford Turnpike approximately 0.5 miles southeast of its intersection with Cross Road (Figure 1).

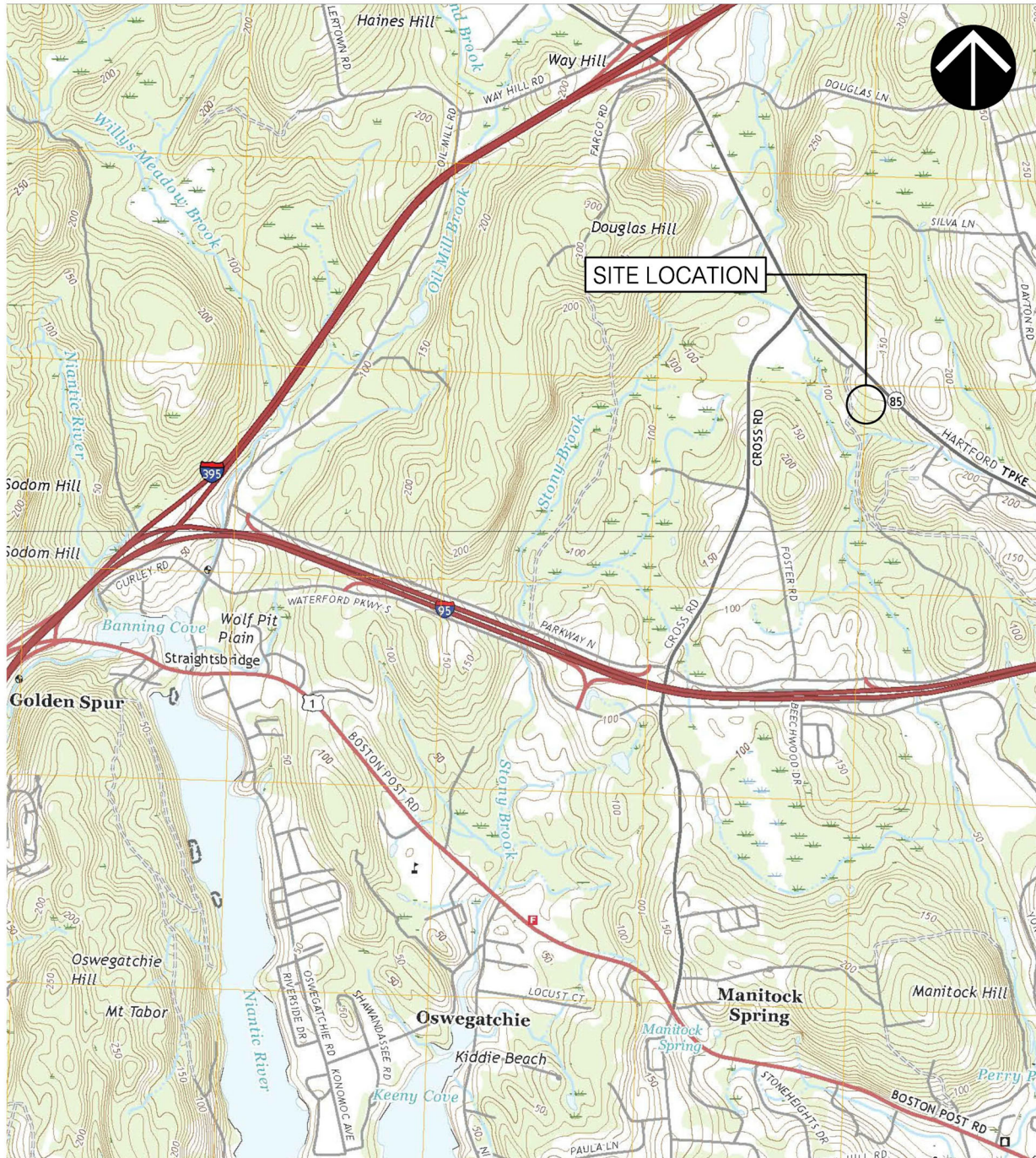


Figure 1. Project Location
U.S.G.S. Palmetown and Niantic Connecticut Quadrangles

The planned development proposal is a multi-family residential complex that will provide 40 - 1 and 2 bedroom rental apartments in two buildings. The proposal will also include a community building and driveway, parking area, sidewalk, lighting, and landscape improvements.

The site is located within an Industrial Multi-Family (I-MF) zoning district. The existing land uses adjacent to and in the vicinity of the site are commercial and retail. A single family residence and several out buildings are currently located on the site. The undeveloped portion of the site is wooded.

The site is served by the City of New London public water system, the Town of Waterford municipal sanitary sewer system, and public communication, electric, and gas utilities within the Hartford Turnpike highway.

The site is located within the Jordan Brook subregional drainage basin (HUC 2201). Jordan Brook flows through the southerly portion of the site and an un-named tributary to Jordan Brook is located on the site immediately south of the planned development area. Surface water runoff from the planned development area drains to an inland wetland associated with the un-named tributary which joins Jordan Brook approximately 600 feet south of the planned development area.

A special flood hazard area zone is located on the project site land parcel associated with Jordan Brook. The planned development portion of the site is not located within the special flood hazard area zone (Figure 2).

An identified Connecticut Department of Energy and Environmental Protection Natural Diversity Database Area associated with Jordan Brook and its tributaries is located on the site.

The Natural Resources Conservation Service Soil Survey of the State of Connecticut indicates that the upland surficial soil types on and in the near vicinity of the planned development portion of the site are classified as Canton and Charlton fine sandy loams (62D) and Charlton-Chatfield complex (73C).

The topography within the planned development area of the site is sloping and ground surface elevations range between 150 - 170 feet along the sites Hartford Turnpike frontage to 120 feet along the Jordan Brook Tributary,

2.0 Hydrologic Model Development

The site stormwater management system has been designed in accordance with standard hydrologic and hydraulic engineering practices.

HydroCAD Version 10.10 hydrologic modeling software (HydroCAD Software Solutions, LLC) was used to create the hydrologic models and estimates of peak rates of discharge of stormwater runoff. The U.S. Department of Agriculture Soil Conservation Service (now Natural Resources Conservation Service) Technical Release 20 Computer Program for Project Formulation Hydrology methodology was used within the HydroCAD software program. TR-20 is a single event, lumped parameter surface water hydrologic model that simulates the precipitation-runoff relationships of a drainage area. The model uses the Soil Conservation Service Curve Number and Unit-Hydrograph methods to represent infiltration losses and to transform excess precipitation into runoff, and the Modified Puls (Storage-Indication) method to perform reservoir routing.

NOAA Precipitation Frequency Atlas 14 for the Northeastern States 24-hour rainfall depths in the project site vicinity shown in Table 1 were accessed from the NOAA precipitation frequency data server and entered into the models.

Table 1. 24-Hour Rainfall Depths for the Project Site Vicinity

Recurrence Interval Year	Rainfall Depth Inches
2	3.45
5	4.37
10	5.13
25	6.18
50	6.96
100	7.79

Partial duration series precipitation frequency data was also accessed from the NOAA precipitation frequency data server and entered into the models to create a synthetic rainfall distribution specific to the project site vicinity.

Drainage area boundaries were delineated using the existing conditions mapping for the site. The delineations were checked and adjusted based on a field inspection.

Drainage area composite runoff curve numbers and times of concentration were computed using procedures and parameter values presented in the National Engineering Handbook, Section 4 - Hydrology (1985).

Antecedent moisture condition II was used to represent the soil moisture condition in the drainage areas prior to the modeled rainfall events.

3.0 Stormwater Management System

The site stormwater management system consists of a typical catch basin inlet structure and storm sewer collection and conveyance system that will direct stormwater runoff from the developed sites building roofs, sidewalks, driveway, and parking areas to both stormwater treatment and peak discharge control facilities.

The site stormwater collection and conveyance system has been designed in accordance with the procedures outlined in the Connecticut Department of Transportation Drainage Manual. Drainage structure inlets and storm sewers have been designed for peak discharges generated from a 25-year design frequency rainfall event computed using the Rational Method. Outlet protection measures were designed for the 25-year design frequency peak discharge and checked for the 100-year discharge. All times of concentration were assumed to be 5 minutes and the following runoff coefficients were used:

Pavements: $C = 0.90$

Lawn and landscaped areas: $C = 0.30$

Stormwater runoff will be directed from the conveyance and collection system to a stormwater infiltration basin designed to temporarily store stormwater runoff and allow it to infiltrate into the underlying natural soils. The elevation of the two basin riser outlets has been set such that the storage volume below the outlets exceeds both the computed water quality volume and annual groundwater recharge volume for the developed site. The top of berm elevation of each of the basin is 1.5 feet above the elevation of the riser outlets.

The stormwater infiltration basin has been designed to meet the water quality volume and annual groundwater recharge volume requirements of the Connecticut Department of Energy and Environmental Protection Stormwater Quality Manual. As noted above, the available storage volume within the basin below the riser outlets exceeds the computed design values for these hydrologic sizing criteria.

During less frequent, greater depth rainfall events, when the ponded water surface within the basin exceeds the elevation of the riser outlets, stormwater will be directed to a subsurface stormwater detention system located below the site parking area.

The subsurface stormwater detention system consists of multiple ADS StormTech MC-4500 manufactured chambers providing a storage reservoir and a precast concrete outlet control structure that will control the design rainfall events peak rates of stormwater discharge leaving the system such that they are equal to or less than the computed peak discharge rates for the design rainfall events in the existing condition. The discharges from the system will be directed to a stone riprap lined preformed scour hole at the discharge location from the outlet control structure before entering the adjacent tributary to Jordan Brook.

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A summary comparison of the rates of peak discharges and the reservoir routing results for the system is given below.

Table 2. Summary Comparison of Peak Discharges and Reservoir Routings

	Recurrence Interval					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Existing Condition (cfs)	0.1	0.5	0.9	1.5	2.0	2.6
Developed Condition (cfs)	5.7	8.1	10.2	13.0	15.1	17.4
Routed Outflow (cfs)	0.4	0.5	0.6	1.5	2.0	2.5
SWMB Peak Stage (ft)	138.4	139.1	139.7	140.4	140.9	141.6

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Summer Hill

Civil Engineers & Land Surveyors, P.C.

BY: MJO DATE: 7-1-21 SUBJECT: Pequot Apartments Waterford, Connecticut SHEET No.: 1 OF 2

CHECKED: LJM DATE: 7-1-21 Stormwater Management System Design Computations PROJECT No.: 21-07

1. Water quality volume computed using the CT Stormwater Quality Manual equation

$WQV = 1.0 \text{ in}(R)(A)/12$, where:

WQV, Water Quality Volume (Ac-ft)

R, Volumetric Runoff Coefficient = $0.05 + 0.009(I)$

I, Percent impervious cover

A Site area (Ac.)

$I = 56\%$

$R = 0.05 + 0.009(56) = 0.55$

$A = 117,230 \text{ ft}^2 = 2.69 \text{ Ac.}$

$WQV = 1 \text{ in}(R)(A)/12 = (1 \text{ in})(0.55)(2.69)/12 = 0.1233 \text{ Ac-ft} = 5,370 \text{ ft}^3$

2. Groundwater recharge volume computed using the CT Stormwater Quality Manual equation

$GRV = D(A)(I)/12$, where:

GRV, Groundwater Recharge Volume (Ac-ft)

D, Depth of runoff to be recharged (in)

A Site area (Ac.)

I, Net increase in percent of impervious cover

For Hydrologic Soil Group B, $D = 0.25 \text{ in}$

$A = 117,230 \text{ ft}^2 = 2.69 \text{ Ac.}$

$I \text{ (Existing)} = 0 \text{ ft}^2$ (neglect existing building structures)

$I \text{ (Proposed)} = 66,235 \text{ ft}^2 / 117,230 \text{ ft}^2 = 0.56$

Net increase = $0.56 - 0 = 0.56$

$GRV = (0.25 \text{ in} \times 2.69 \text{ Ac.} \times 0.56)/12 = 0.0314 \text{ Ac-ft} = 1,367 \text{ ft}^3$

3. Stormwater infiltration basin storage volume

Elevation ft	Area ft ²	Average Area ft ²	Stage-Storage		
			Incremental Volume ft ³	Cumulative Volume ft ³	Cumulative Volume Ac-ft
140.00	2,210	2,210	0	0	0.0000
141.00	2,735	2,473	2,473	2,473	0.0568
142.00	3,295	3,015	3,015	5,488	0.1260
142.50	3,680	3,488	1,744	7,231	0.1660
143.00	3,885	3,783	1,891	9,123	0.2094
144.00	4,495	4,190	4,190	13,313	0.3056

Storage volume at top riser elevation 142.50 = 7,231 ft³

Summer Hill

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BY: MJO DATE: 7-1-21 SUBJECT: Pequot Apartments Waterford, Connecticut SHEET No.: 2 OF 2
CHECKED: LJM DATE: 7-1-21 Stormwater Management System Design Computations PROJECT No.: 21-07

4. Outlet Protection Computations

Infiltration Basin Outlet

Riprap apron dimensions based on ConnDOT Drainage Manual design procedure:

Using critical depth (d_c) as tailwater depth (TW), d_c for design discharge (Q_{25}) = 7.6 ft³/s = 1.0 ft

$$1.0 \text{ ft} > 0.5R_p = 0.5(1.5) = 0.75 \text{ ft}$$

Type B Riprap Apron (maximum tailwater condition) dimensions:

$$L_a = (3.0(Q - 5)/S_p^{1.5}) + 10$$

$$W_1 = 3 S_p \text{ (min.)}$$

$$W_2 = 3 S_p + 0.4 L_a$$

Q Design Discharge (ft³/s)

S_p Pipe Span (ft)

R_p Pipe Rise (ft)

L_a Length of Apron (ft)

W_1 Width of Apron at Pipe Outlet (ft)

W_2 Width of Apron at Apron Outlet (ft)

$$Q_{100} = 7.4 \text{ ft}^3/\text{s}$$

$$S_p = 1.5 \text{ ft}$$

$$R_p = 1.5 \text{ ft}$$

$$L_a = 3.0(7.4 - 5)/1.5^{1.5} + 10 = 13.9 \text{ ft} - \text{Use } 14 \text{ ft}$$

$$W_1 = 3(1.5) = 4.5 \text{ ft}$$

$$W_2 = 3(1.5) + 0.4(14.0) = 10.1 \text{ ft} - \text{Use } 10 \text{ ft}$$

Use modified riprap ($D_{50} = 0.42 \text{ ft}$)

$$\text{Depth (d)} = 1.0 \text{ ft}$$

Subsurface Detention System Outlet

Type I Preformed Scour Hole dimensions based on ConnDOT Drainage Manual design procedure:

Q Design Discharge (ft³/s)

TW Tailwater Depth (ft)

$D_{50} = (0.0125R_p^2/TW) (Q/R_p^{2.5})^{1.333}$ Median Stable Stone Diameter (ft)

d Riprap Thickness (ft)

$B = 2S_p + 6F$ Width (ft)

$C = 3S_p + 6F$ Length (ft)

S_p Culvert Span (ft)

R_p Culvert Rise (ft)

$F = 0.5R_p$ Type I Scour Hole Depression (ft)

$$Q_{100} = 17.4 \text{ ft}^3/\text{s}$$

TW = 1.5 ft (using critical depth)

$$S_p = 2.0 \text{ ft}$$

$$R_p = 2.0 \text{ ft}$$

$$D_{50} = (0.0125(2.0^2)/1.5) (17.4/2.0^{2.5})^{1.333} = 0.10 \text{ ft} - \text{Use modified riprap (} D_{50} < 0.42 \text{ ft)}$$

$$d = 1.0 \text{ ft}$$

$$B = 2(2.0) + 6(1.00) = 10.0 \text{ ft}$$

$$C = 3(2.0) + 6(1.00) = 12 \text{ ft}$$

$$F = 0.5 (2.0) = 1.00 \text{ ft}$$

WEIGHTED RUNOFF COEFFICIENT COMPUTATION SHEET

PROJECT: Pequot Apartments
Waterford, Connecticut
PROJECT No.: 21-07

SHEET No.: 1 OF 2
DATE: 7-1-21
DESIGNED: MJO
CHECKED: LJM

Catchment Area CB 1

Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C	Runoff Coefficient (C)	Product A x C
Impervious	1,500	0.03	0.90	0.03	0.90	0.12
Lawn	<u>5,995</u> 7,495	<u>0.14</u> 0.17	0.30	<u>0.04</u> 0.07	0.30	<u>0.12</u> 0.24
Weighted Runoff Coefficient (C _w)				0.42	0.45	

Catchment Area CB 4

Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Impervious	5,720	0.13	0.90	0.12
Lawn	<u>17,385</u> 23,105	<u>0.40</u> 0.53	0.30	<u>0.12</u> 0.24
Weighted Runoff Coefficient (C _w)				0.45

Catchment Area CB 2

Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Impervious	3,609	0.08	0.90	0.07
Lawn	3,609	<u>0.00</u> 0.08	0.30	<u>0.00</u> 0.07
Weighted Runoff Coefficient (C _w)				0.90

Catchment Area CB 5

Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Impervious	920	0.02	0.90	0.02
Lawn	<u>960</u> 1,880	<u>0.02</u> 0.04	0.30	<u>0.01</u> 0.03
Weighted Runoff Coefficient (C _w)				0.59

Catchment Area CB 3

Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Impervious	1,418	0.03	0.90	0.03
Lawn	1,418	<u>0.00</u> 0.03	0.30	<u>0.00</u> 0.03
Weighted Runoff Coefficient (C _w)				0.90

Catchment Area CB 6

Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Impervious	1,260	0.03	0.90	0.03
Lawn	<u>1,300</u> 2,560	<u>0.03</u> 0.06	0.30	<u>0.01</u> 0.03
Weighted Runoff Coefficient (C _w)				0.60

WEIGHTED RUNOFF COEFFICIENT COMPUTATION SHEET

PROJECT: Pegquot Apartments
Waterford, Connecticut
PROJECT No.: 21-07

SHEET No.: 2 OF 2
DATE: 7-1-21
DESIGNED: MJO
CHECKED: LJM

Catchment Area CB 7					Catchment Area				
Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C	Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Impervious	14,660	0.34	0.90	0.30					
Lawn	<u>0</u>	<u>0.00</u>	0.30	<u>0.00</u>					
	14,660	0.34		0.30					
Weighted Runoff Coefficient (Cw)					Weighted Runoff Coefficient (Cw)				
Catchment Area CB 8					Catchment Area				
Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C	Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Impervious	15,015	0.34	0.90	0.31					
Lawn	<u>5,425</u>	<u>0.12</u>	0.30	<u>0.04</u>					
	20,440	0.47		0.35					
Weighted Runoff Coefficient (Cw)					Weighted Runoff Coefficient (Cw)				
Catchment Area					Catchment Area				
Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C	Cover Type	Area (A) Square Feet	Area (A) Acres	Runoff Coefficient (C)	Product A x C
Weighted Runoff Coefficient (Cw)					Weighted Runoff Coefficient (Cw)				

Worksheet 3: Time of Concentration (T_c) or Travel Time (T_t)

Project Pequot Apartments By MJO Date 7-1-21

Location Waterford, Connecticut Checked LJM Date 7-1-21

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

1. Surface Description (table 3-1)
2. Manning's roughness coeff., n (table 3-1)
3. Flow Length, L (total $L \leq 300$ ft)
4. Two-yr 24-hr rainfall, P_2
5. Land Slope, s

$$6. T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Compute T_t

Segment ID	AB		
	Woods		
	0.400		
ft	100		
in	3.45		
ft/ft	0.1300		
hr	0.16	+	= 0.16

Shallow concentrated flow

7. Surface description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s
10. Average velocity, V (figure 3-1)

$$11. T_t = \frac{L}{3600 V}$$

Compute T_t

Segment ID	BC		
	Unpaved		
ft	250		
ft/ft	0.0880		
ft/s	4.8		
hr	0.01	+	= 0.03

Channel flow

12. Cross sectional flow area, a
13. Wetted perimeter, p_w
14. Hydraulic radius, $r = \frac{a}{p_w}$
15. Channel slope, s
16. Manning's roughness coeff., n

$$17. V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

18. Flow length, L

$$19. T_t = \frac{L}{3600 V}$$

Compute T_t

Segment ID			
ft ²			
ft			
ft			
ft/ft			
ft/s			
ft			
hr		+	=

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)

hr = 0.19

Worksheet 2: Runoff curve number and runoff

Project Pequot Apartments By MJO Date 7-1-21
 Location Waterford, Connecticut Checked LJM Date 7-1-21
 Circle one: ☐ Present ☐ Developed EC 1

1. Runoff Curve Number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area x acres mi² %	Product of CN x area
		Table 2-2	Fig 2-3	Fig 2-4		
B	Woods (Good)	55			1.04	57.20
Totals =					1.04	57.20

^{1/} Use only one CN source per line.

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{57.20}{1.04} = 55.0$$

Use CN = 55

2. Runoff

Frequency yr

Rainfall, P (24-hour) in

Runoff, Q in

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3

Worksheet 2: Runoff curve number and runoff

Project Pequot Apartments By MJO Date 7-1-21
 Location Waterford, Connecticut Checked LJM Date 7-1-21
 Circle one: Present ☐ Developed ☒ DC 1

1. Runoff Curve Number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area x acres mi² %	Product of CN x area
		Table 2-2	Fig 2-3	Fig 2-4		
B	Lawn	61			0.92	56.12
-	Pavement, Building	98			1.48	145.04
Totals =					2.40	201.16

^{1/} Use only one CN source per line.

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{201.16}{2.40} = 83.8$$

Use CN = 84

2. Runoff

Frequency yr

Rainfall, P (24-hour) in

Runoff, Q in

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3

21-07 EC

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Waterford 24-hr S1	2-yr	Default	24.00	1	3.45	2
2	5-yr	Waterford 24-hr S1	5-yr	Default	24.00	1	4.37	2
3	10-yr	Waterford 24-hr S1	10-yr	Default	24.00	1	5.13	2
4	25-yr	Waterford 24-hr S1	25-yr	Default	24.00	1	6.18	2
5	50-yr	Waterford 24-hr S1	50-yr	Default	24.00	1	6.96	2
6	100-yr	Waterford 24-hr S1	100-yr	Default	24.00	1	7.79	2

21-07 EC*Waterford 24-hr S1 2-yr Rainfall=3.45"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC 1

Runoff Area=1.040 ac Runoff Depth=0.33"
Tc=11.0 min CN=55 Runoff=0.11 cfs 0.029 af

Total Runoff Area = 1.040 ac Runoff Volume = 0.029 af Average Runoff Depth = 0.33"

21-07 EC

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Waterford 24-hr S1 2-yr Rainfall=3.45"

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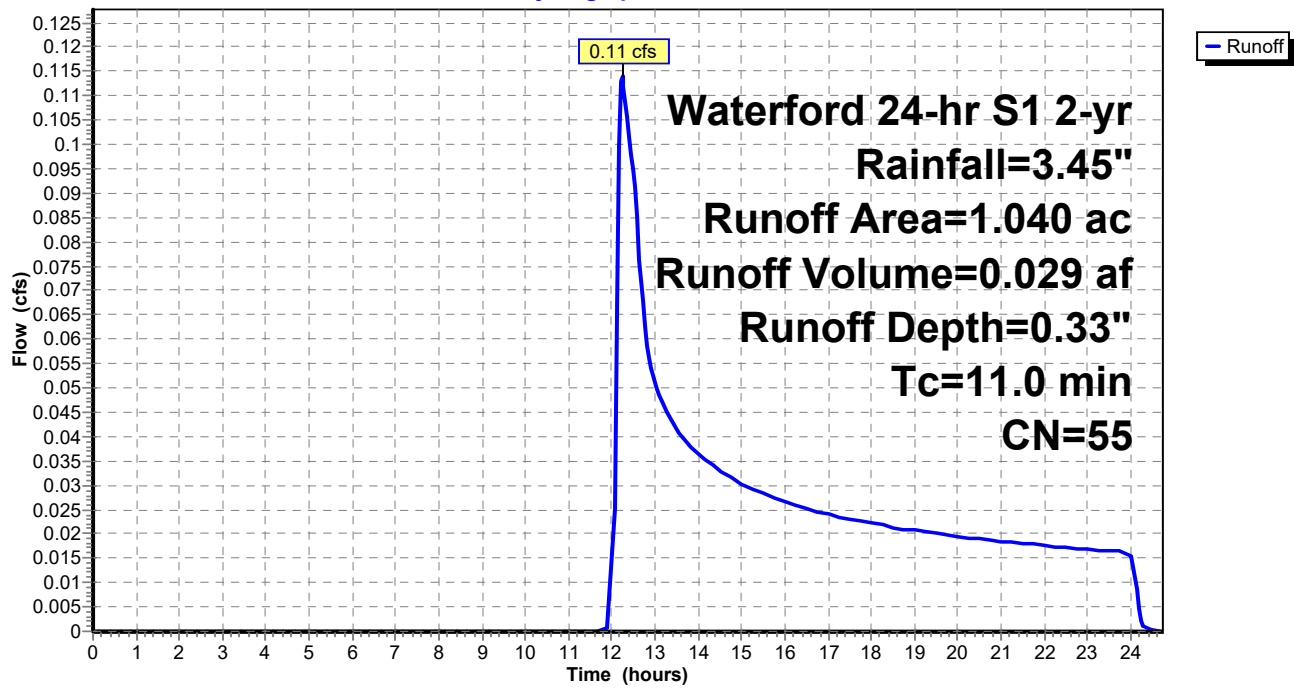
Summary for Subcatchment 10: EC 1

Runoff = 0.11 cfs @ 12.24 hrs, Volume= 0.029 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 2-yr Rainfall=3.45"

Area (ac)	CN	Description
* 1.040	55	

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

Subcatchment 10: EC 1**Hydrograph**

21-07 EC*Waterford 24-hr S1 5-yr Rainfall=4.37"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC 1

Runoff Area=1.040 ac Runoff Depth=0.68"
Tc=11.0 min CN=55 Runoff=0.45 cfs 0.059 af

Total Runoff Area = 1.040 ac Runoff Volume = 0.059 af Average Runoff Depth = 0.68"

21-07 EC

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Waterford 24-hr S1 5-yr Rainfall=4.37"

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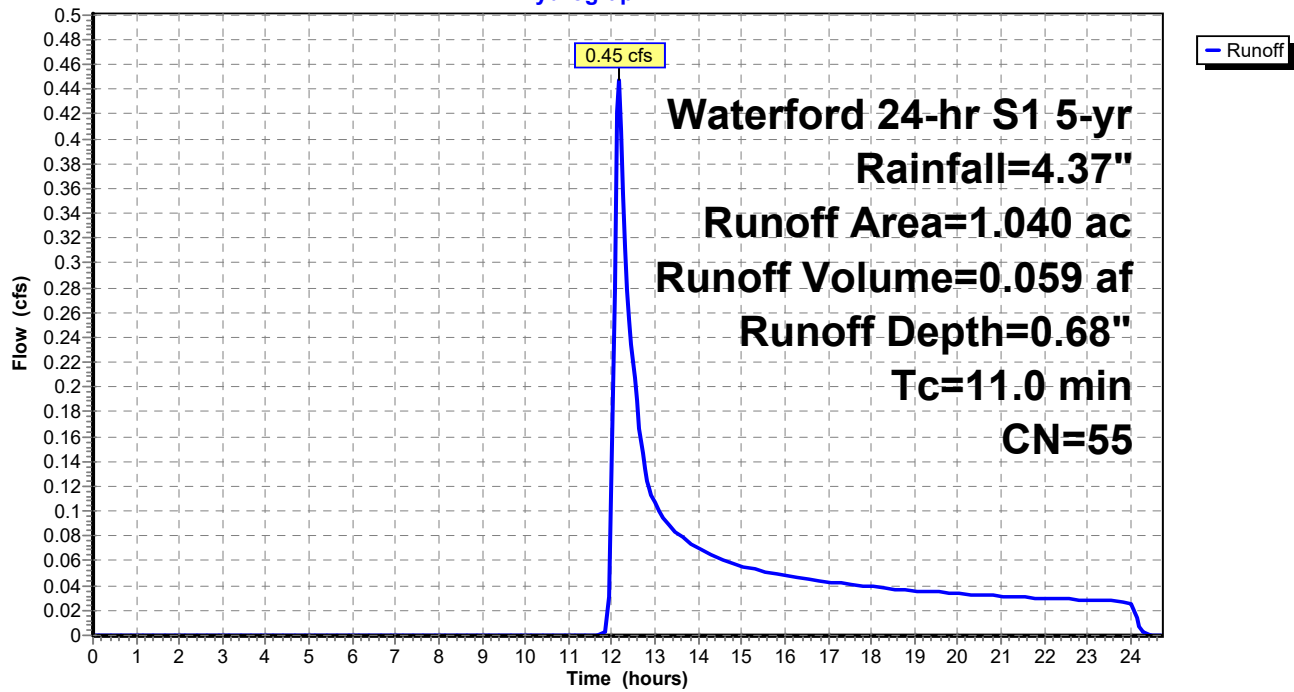
Summary for Subcatchment 10: EC 1

Runoff = 0.45 cfs @ 12.14 hrs, Volume= 0.059 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 5-yr Rainfall=4.37"

Area (ac)	CN	Description
* 1.040	55	

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

Subcatchment 10: EC 1**Hydrograph**

21-07 EC*Waterford 24-hr S1 10-yr Rainfall=5.13"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC 1

Runoff Area=1.040 ac Runoff Depth=1.05"
Tc=11.0 min CN=55 Runoff=0.85 cfs 0.091 af

Total Runoff Area = 1.040 ac Runoff Volume = 0.091 af Average Runoff Depth = 1.05"

21-07 EC

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Waterford 24-hr S1 10-yr Rainfall=5.13"

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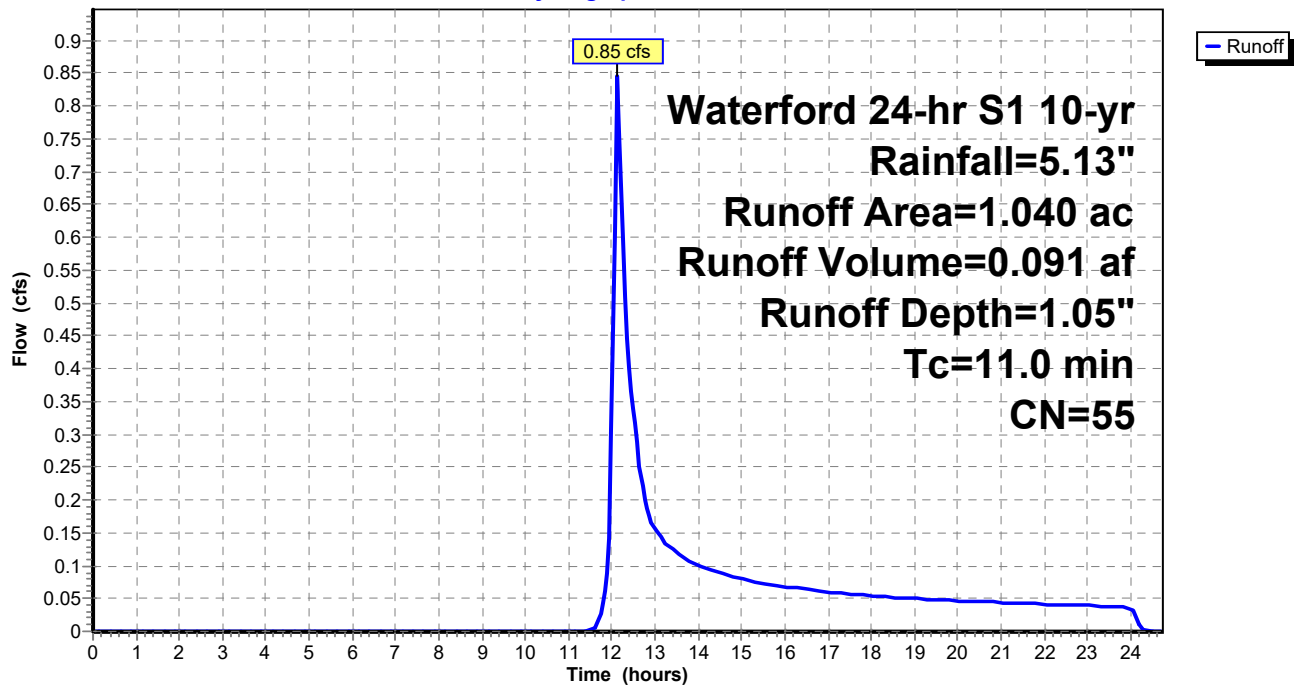
Summary for Subcatchment 10: EC 1

Runoff = 0.85 cfs @ 12.12 hrs, Volume= 0.091 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 10-yr Rainfall=5.13"

Area (ac)	CN	Description
* 1.040	55	

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

Subcatchment 10: EC 1**Hydrograph**

21-07 EC*Waterford 24-hr S1 25-yr Rainfall=6.18"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC 1

Runoff Area=1.040 ac Runoff Depth=1.62"
Tc=11.0 min CN=55 Runoff=1.48 cfs 0.141 af

Total Runoff Area = 1.040 ac Runoff Volume = 0.141 af Average Runoff Depth = 1.62"

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Waterford 24-hr S1 25-yr Rainfall=6.18"

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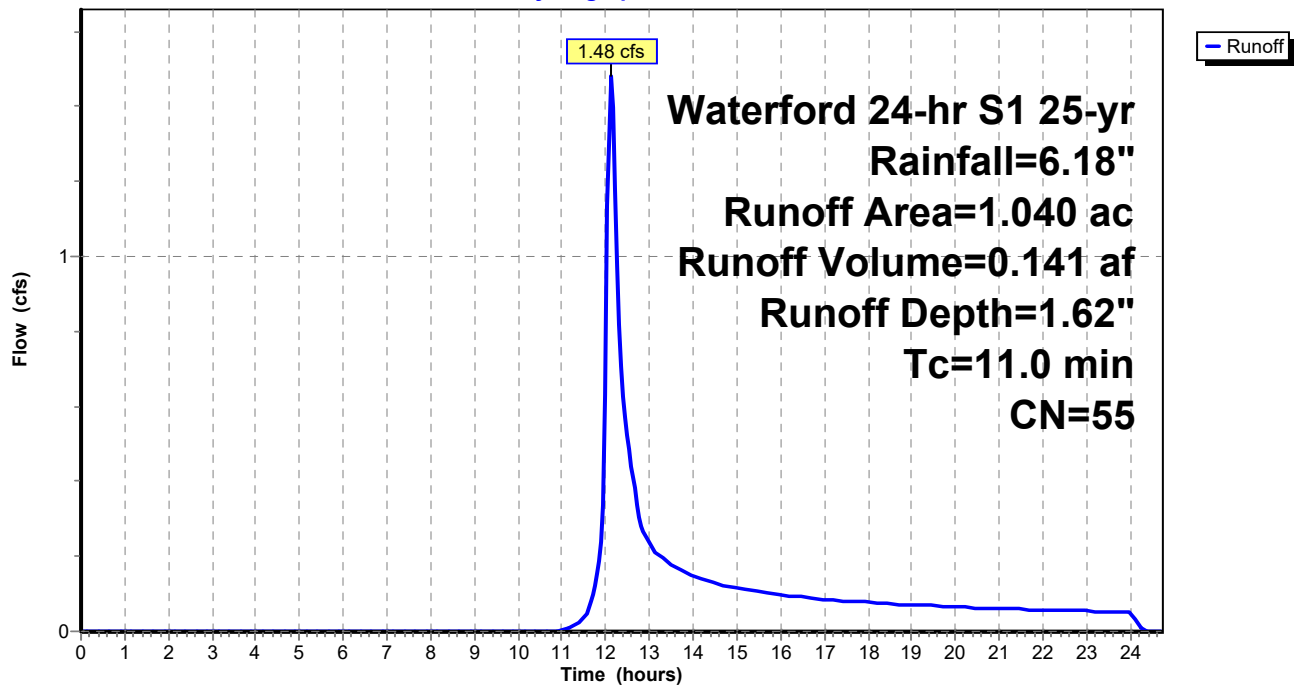
Summary for Subcatchment 10: EC 1

Runoff = 1.48 cfs @ 12.12 hrs, Volume= 0.141 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 25-yr Rainfall=6.18"

Area (ac)	CN	Description
* 1.040	55	

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

Subcatchment 10: EC 1**Hydrograph**

21-07 EC*Waterford 24-hr S1 50-yr Rainfall=6.96"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC 1

Runoff Area=1.040 ac Runoff Depth=2.10"
Tc=11.0 min CN=55 Runoff=2.01 cfs 0.182 af

Total Runoff Area = 1.040 ac Runoff Volume = 0.182 af Average Runoff Depth = 2.10"

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Waterford 24-hr S1 50-yr Rainfall=6.96"

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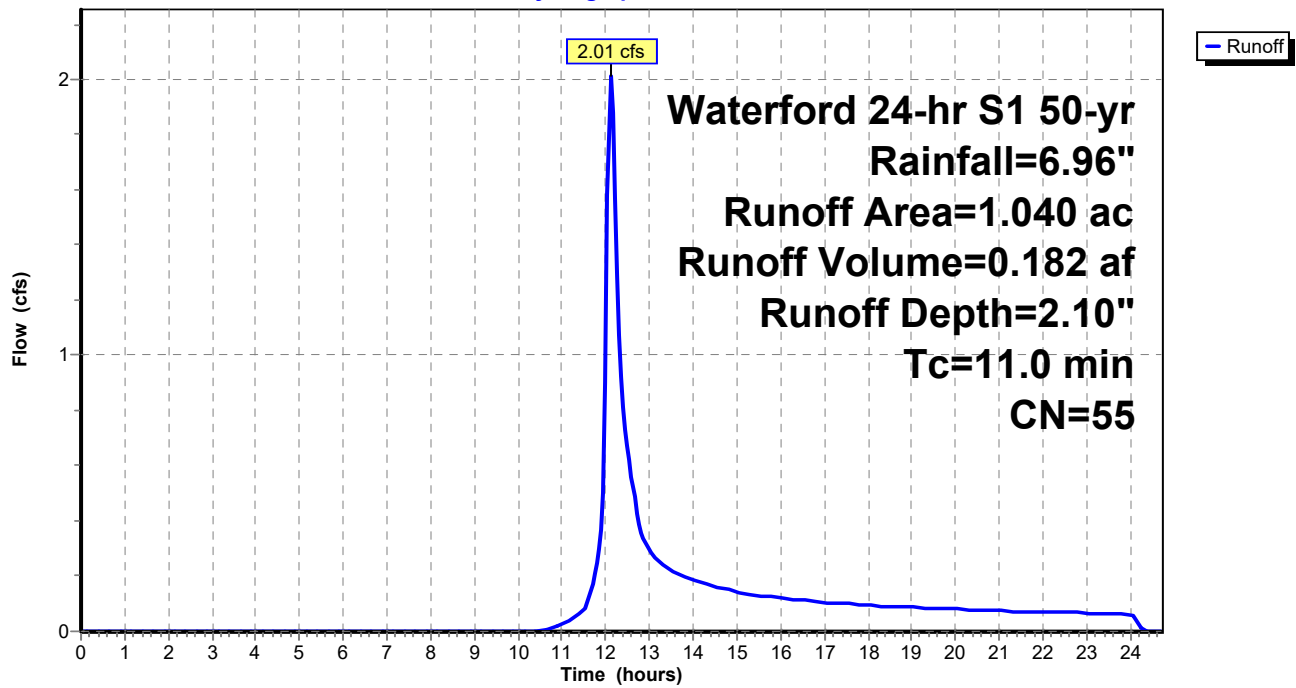
Summary for Subcatchment 10: EC 1

Runoff = 2.01 cfs @ 12.11 hrs, Volume= 0.182 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 50-yr Rainfall=6.96"

Area (ac)	CN	Description
* 1.040	55	

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

Subcatchment 10: EC 1**Hydrograph**

21-07 EC*Waterford 24-hr S1 100-yr Rainfall=7.79"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: EC 1

Runoff Area=1.040 ac Runoff Depth=2.64"
Tc=11.0 min CN=55 Runoff=2.61 cfs 0.229 af

Total Runoff Area = 1.040 ac Runoff Volume = 0.229 af Average Runoff Depth = 2.64"

21-07 EC

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Waterford 24-hr S1 100-yr Rainfall=7.79"

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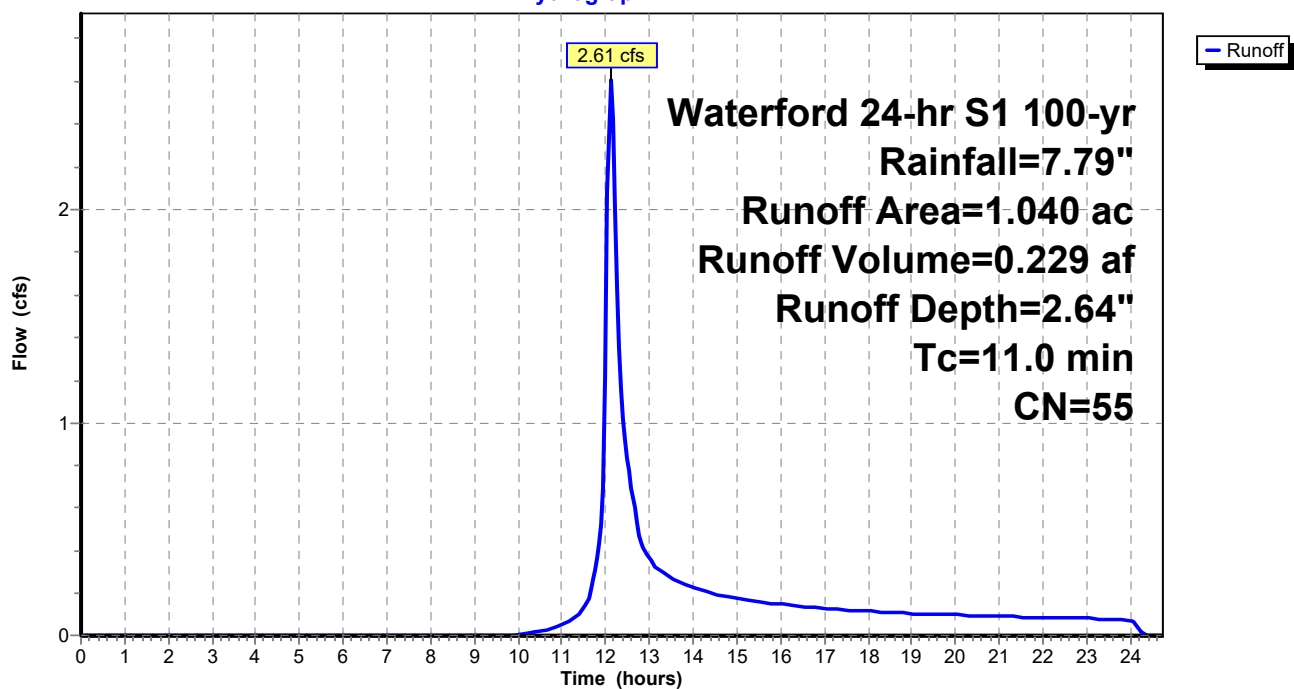
Summary for Subcatchment 10: EC 1

Runoff = 2.61 cfs @ 12.11 hrs, Volume= 0.229 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 100-yr Rainfall=7.79"

Area (ac)	CN	Description
* 1.040	55	

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

Subcatchment 10: EC 1**Hydrograph**

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Waterford 24-hr S1	2-yr	Default	24.00	1	3.45	2
2	5-yr	Waterford 24-hr S1	5-yr	Default	24.00	1	4.37	2
3	10-yr	Waterford 24-hr S1	10-yr	Default	24.00	1	5.13	2
4	25-yr	Waterford 24-hr S1	25-yr	Default	24.00	1	6.18	2
5	50-yr	Waterford 24-hr S1	50-yr	Default	24.00	1	6.96	2
6	100-yr	Waterford 24-hr S1	100-yr	Default	24.00	1	7.79	2

21-07 DC*Waterford 24-hr S1 2-yr Rainfall=3.45"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1

Runoff Area=2.400 ac Runoff Depth=1.89"
Tc=6.0 min CN=84 Runoff=5.71 cfs 0.379 af

Pond 25: SSDS

Peak Elev=138.35' Storage=0.192 af Inflow=5.71 cfs 0.379 af
Outflow=0.40 cfs 0.293 af

Total Runoff Area = 2.400 ac Runoff Volume = 0.379 af Average Runoff Depth = 1.89"

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Waterford 24-hr S1 2-yr Rainfall=3.45"

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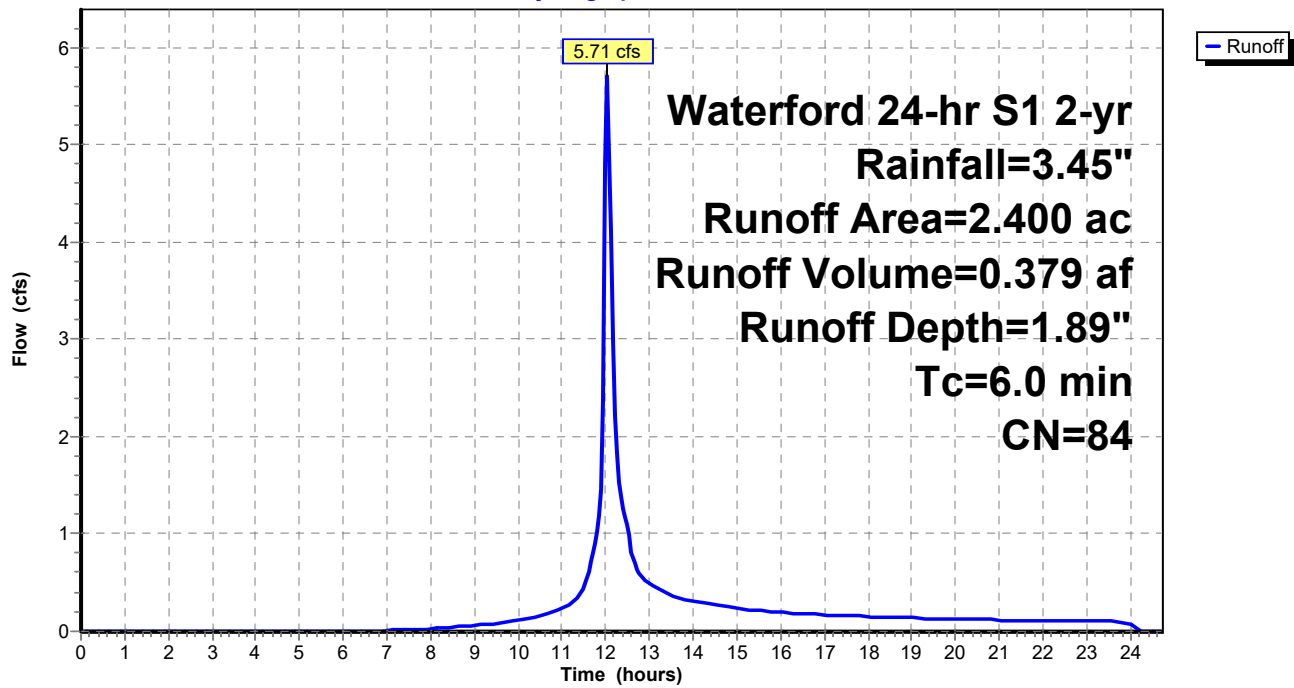
Summary for Subcatchment 20: DC 1

Runoff = 5.71 cfs @ 12.04 hrs, Volume= 0.379 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 2-yr Rainfall=3.45"

Area (ac)	CN	Description
* 2.400	84	

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

Subcatchment 20: DC 1**Hydrograph**

Summary for Pond 25: SSDS

Inflow Area = 2.400 ac, Inflow Depth = 1.89" for 2-yr event
 Inflow = 5.71 cfs @ 12.04 hrs, Volume= 0.379 af
 Outflow = 0.40 cfs @ 13.38 hrs, Volume= 0.293 af, Atten= 93%, Lag= 80.1 min
 Primary = 0.40 cfs @ 13.38 hrs, Volume= 0.293 af

Routing by Stor-Ind method, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
 Peak Elev= 138.35' @ 13.38 hrs Surf.Area= 0.155 ac Storage= 0.192 af

Plug-Flow detention time= 288.0 min calculated for 0.293 af (77% of inflow)
 Center-of-Mass det. time= 191.1 min (1,036.8 - 845.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	136.30'	0.230 af	46.67'W x 144.32'L x 7.00'H Field A 1.082 af Overall - 0.425 af Embedded = 0.658 af x 35.0% Voids
#2A	137.30'	0.425 af	ADS StormTech MC-4500 b +Cap x 170 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 170 Chambers in 5 Rows Cap Storage= +39.5 cf x 2 x 5 rows = 395.0 cf
		0.655 af	Total Available Storage

Storage Group A created with Chamber Wizard

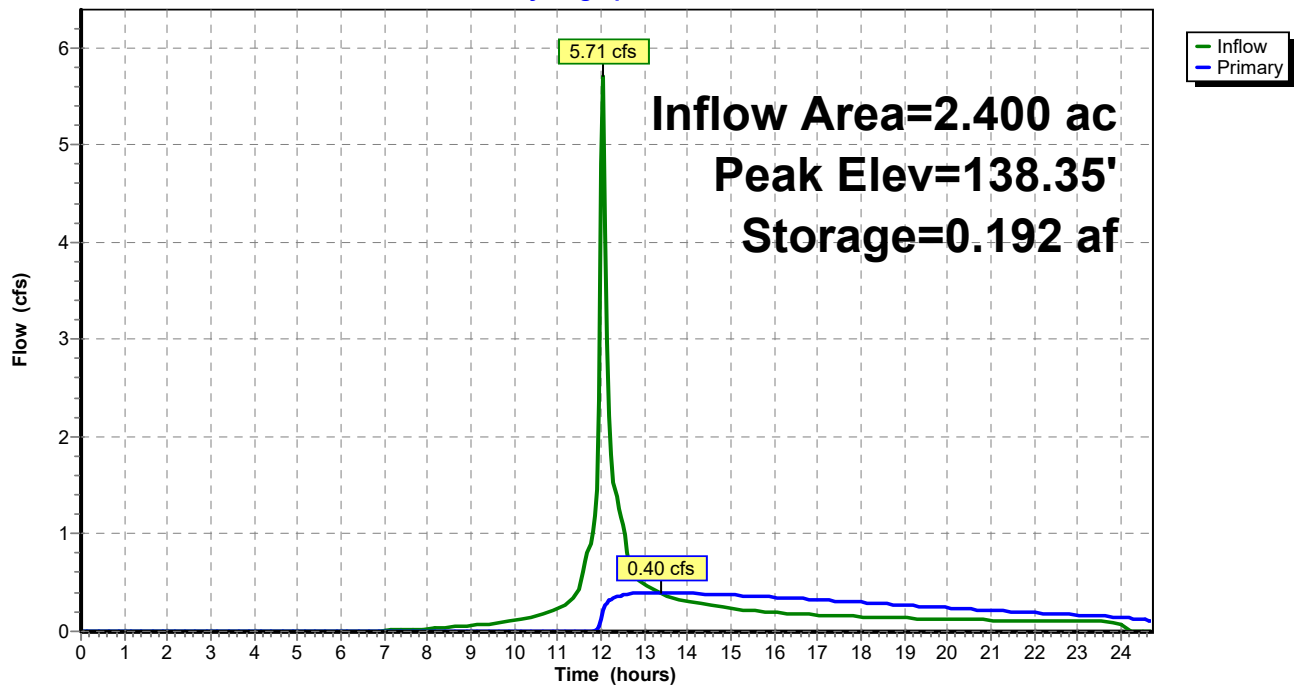
Device	Routing	Invert	Outlet Devices
#1	Primary	137.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	139.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	141.75'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.40 cfs @ 13.38 hrs HW=138.35' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.40 cfs @ 4.53 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 25: SSDS

Hydrograph



21-07 DC*Waterford 24-hr S1 5-yr Rainfall=4.37"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1

Runoff Area=2.400 ac Runoff Depth=2.70"
Tc=6.0 min CN=84 Runoff=8.13 cfs 0.540 af

Pond 25: SSDS

Peak Elev=139.07' Storage=0.283 af Inflow=8.13 cfs 0.540 af
Outflow=0.53 cfs 0.430 af

Total Runoff Area = 2.400 ac Runoff Volume = 0.540 af Average Runoff Depth = 2.70"

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Waterford 24-hr S1 5-yr Rainfall=4.37"

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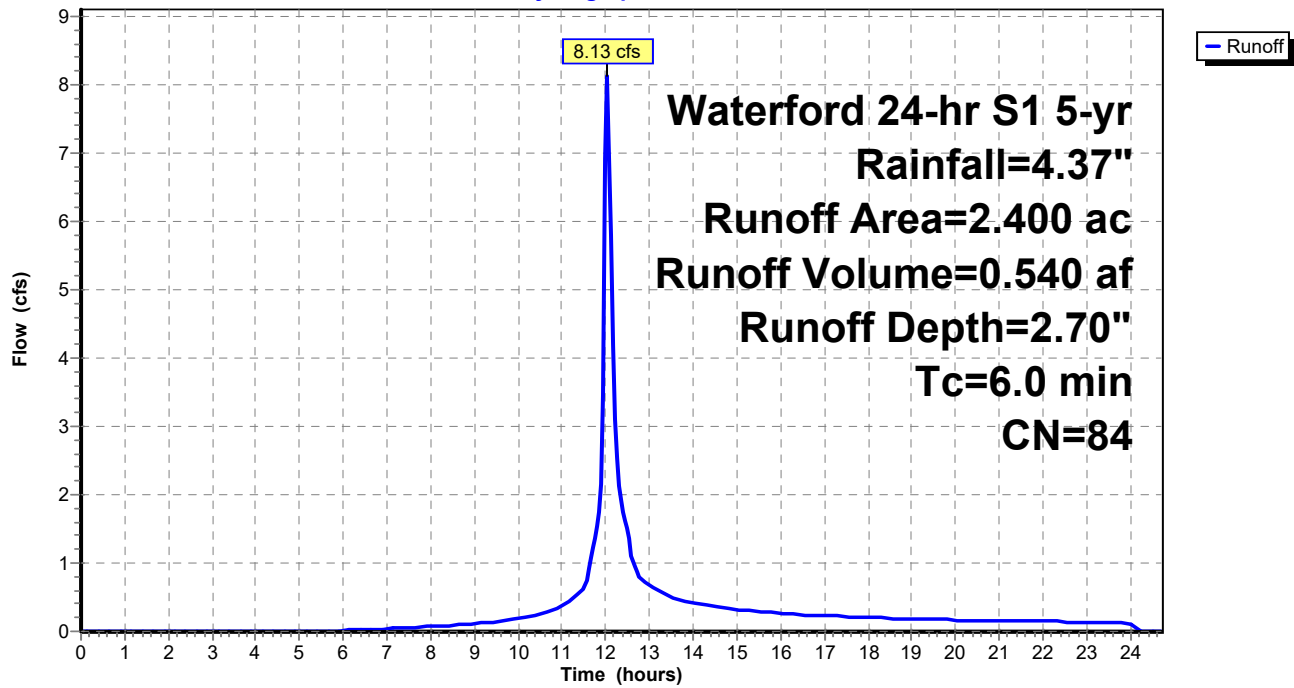
Summary for Subcatchment 20: DC 1

Runoff = 8.13 cfs @ 12.04 hrs, Volume= 0.540 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 5-yr Rainfall=4.37"

Area (ac)	CN	Description
* 2.400	84	

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

Subcatchment 20: DC 1**Hydrograph**

Summary for Pond 25: SSDS

Inflow Area = 2.400 ac, Inflow Depth = 2.70" for 5-yr event
 Inflow = 8.13 cfs @ 12.04 hrs, Volume= 0.540 af
 Outflow = 0.53 cfs @ 13.40 hrs, Volume= 0.430 af, Atten= 93%, Lag= 81.2 min
 Primary = 0.53 cfs @ 13.40 hrs, Volume= 0.430 af

Routing by Stor-Ind method, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
 Peak Elev= 139.07' @ 13.40 hrs Surf.Area= 0.155 ac Storage= 0.283 af

Plug-Flow detention time= 304.2 min calculated for 0.429 af (80% of inflow)
 Center-of-Mass det. time= 214.3 min (1,047.1 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	136.30'	0.230 af	46.67'W x 144.32'L x 7.00'H Field A 1.082 af Overall - 0.425 af Embedded = 0.658 af x 35.0% Voids
#2A	137.30'	0.425 af	ADS StormTech MC-4500 b +Cap x 170 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 170 Chambers in 5 Rows Cap Storage= +39.5 cf x 2 x 5 rows = 395.0 cf
		0.655 af	Total Available Storage

Storage Group A created with Chamber Wizard

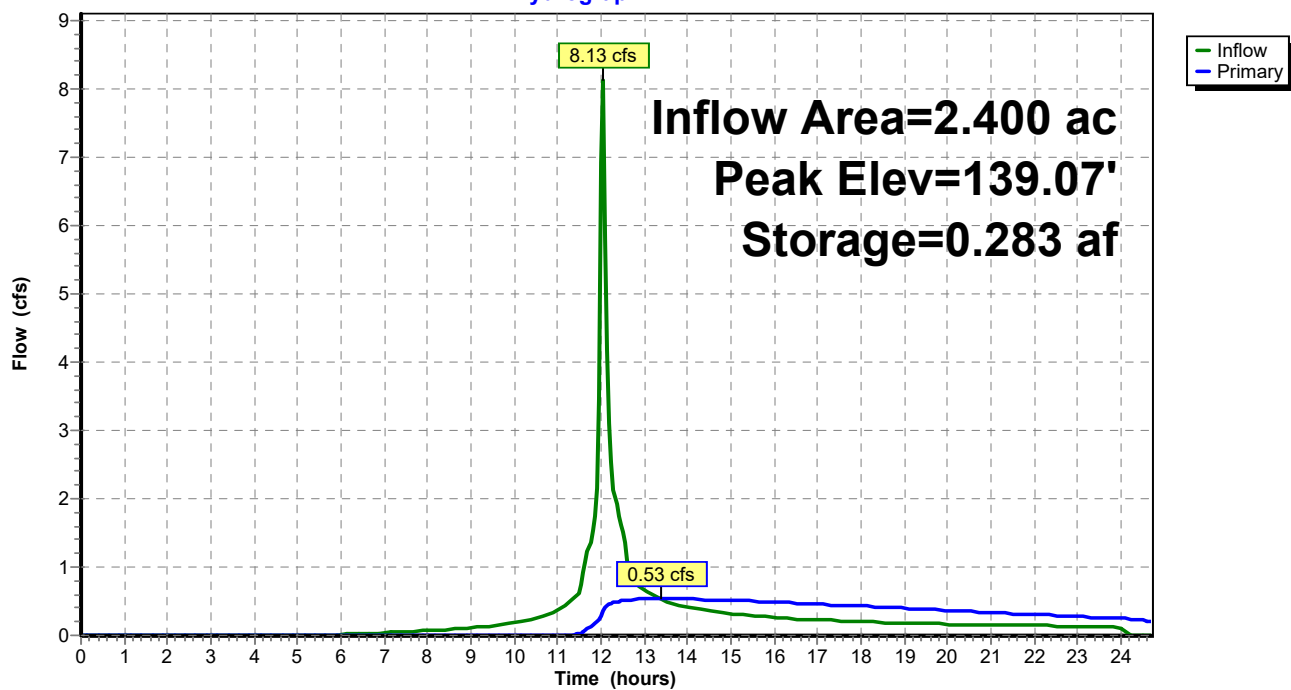
Device	Routing	Invert	Outlet Devices
#1	Primary	137.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	139.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	141.75'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.53 cfs @ 13.40 hrs HW=139.07' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.53 cfs @ 6.10 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 25: SSDS

Hydrograph



21-07 DC*Waterford 24-hr S1 10-yr Rainfall=5.13"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1

Runoff Area=2.400 ac Runoff Depth=3.39"
Tc=6.0 min CN=84 Runoff=10.18 cfs 0.678 af

Pond 25: SSDS

Peak Elev=139.72' Storage=0.361 af Inflow=10.18 cfs 0.678 af
Outflow=0.63 cfs 0.537 af

Total Runoff Area = 2.400 ac Runoff Volume = 0.678 af Average Runoff Depth = 3.39"

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Waterford 24-hr S1 10-yr Rainfall=5.13"

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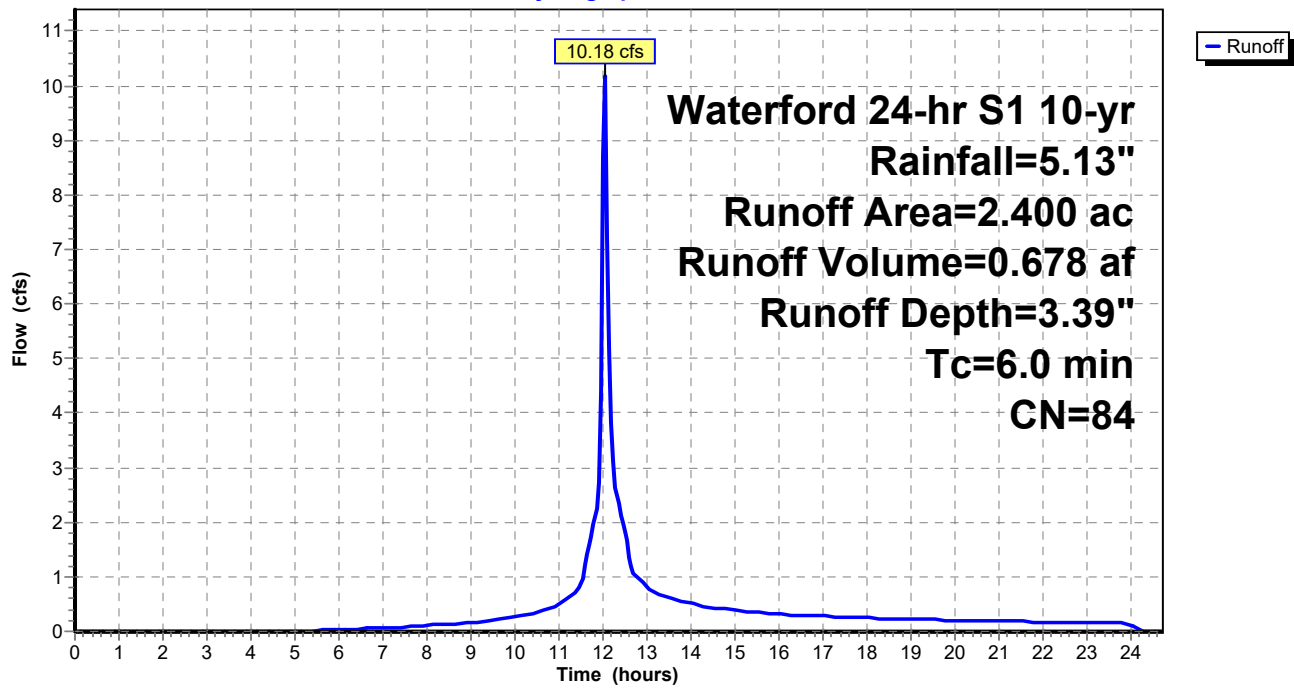
Summary for Subcatchment 20: DC 1

Runoff = 10.18 cfs @ 12.04 hrs, Volume= 0.678 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 10-yr Rainfall=5.13"

Area (ac)	CN	Description
* 2.400	84	

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

Subcatchment 20: DC 1**Hydrograph**

21-07 DC

Waterford 24-hr S1 10-yr Rainfall=5.13"

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Summary for Pond 25: SSDS

Inflow Area = 2.400 ac, Inflow Depth = 3.39" for 10-yr event
 Inflow = 10.18 cfs @ 12.04 hrs, Volume= 0.678 af
 Outflow = 0.63 cfs @ 13.45 hrs, Volume= 0.537 af, Atten= 94%, Lag= 84.6 min
 Primary = 0.63 cfs @ 13.45 hrs, Volume= 0.537 af

Routing by Stor-Ind method, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
 Peak Elev= 139.72' @ 13.45 hrs Surf.Area= 0.155 ac Storage= 0.361 af

Plug-Flow detention time= 316.7 min calculated for 0.536 af (79% of inflow)
 Center-of-Mass det. time= 225.4 min (1,050.0 - 824.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	136.30'	0.230 af	46.67'W x 144.32'L x 7.00'H Field A 1.082 af Overall - 0.425 af Embedded = 0.658 af x 35.0% Voids
#2A	137.30'	0.425 af	ADS StormTech MC-4500 b +Cap x 170 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 170 Chambers in 5 Rows Cap Storage= +39.5 cf x 2 x 5 rows = 395.0 cf
		0.655 af	Total Available Storage

Storage Group A created with Chamber Wizard

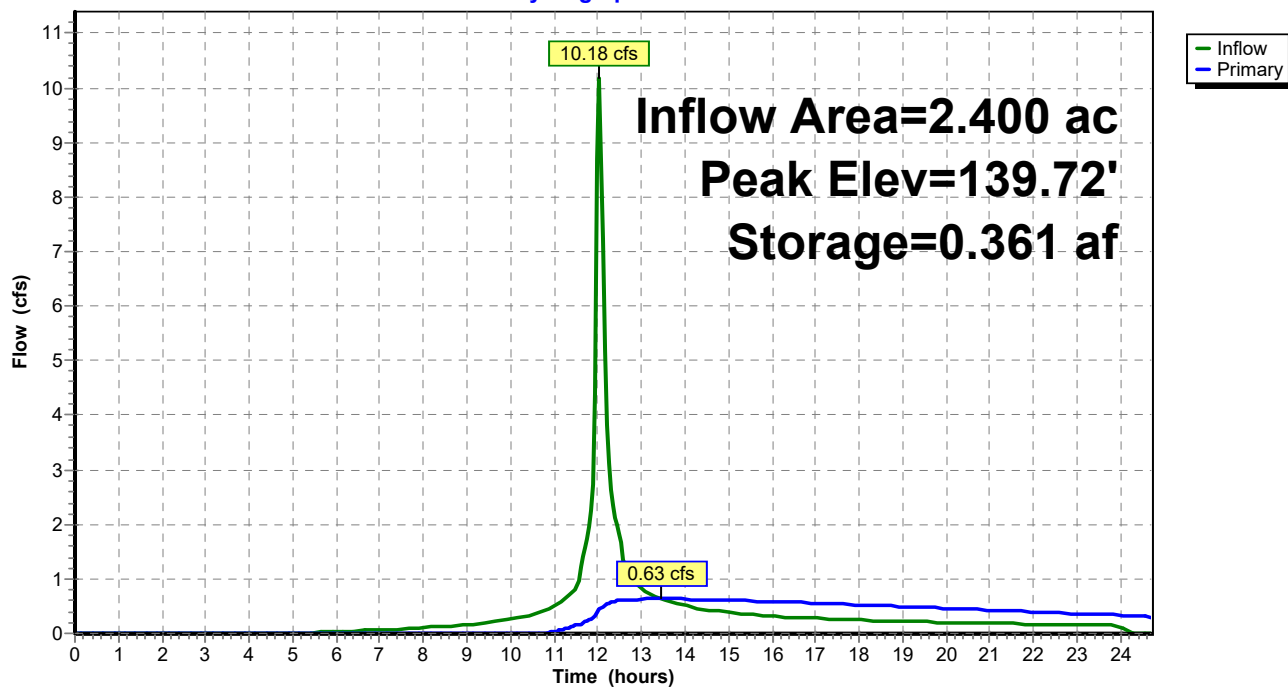
Device	Routing	Invert	Outlet Devices
#1	Primary	137.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	139.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	141.75'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.63 cfs @ 13.45 hrs HW=139.72' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.63 cfs @ 7.23 fps)
- 2=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.47 fps)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 25: SSDS

Hydrograph



21-07 DC*Waterford 24-hr S1 25-yr Rainfall=6.18"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1

Runoff Area=2.400 ac Runoff Depth=4.37"
Tc=6.0 min CN=84 Runoff=13.01 cfs 0.873 af

Pond 25: SSDS

Peak Elev=140.35' Storage=0.432 af Inflow=13.01 cfs 0.873 af
Outflow=1.48 cfs 0.704 af

Total Runoff Area = 2.400 ac Runoff Volume = 0.873 af Average Runoff Depth = 4.37"

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Waterford 24-hr S1 25-yr Rainfall=6.18"

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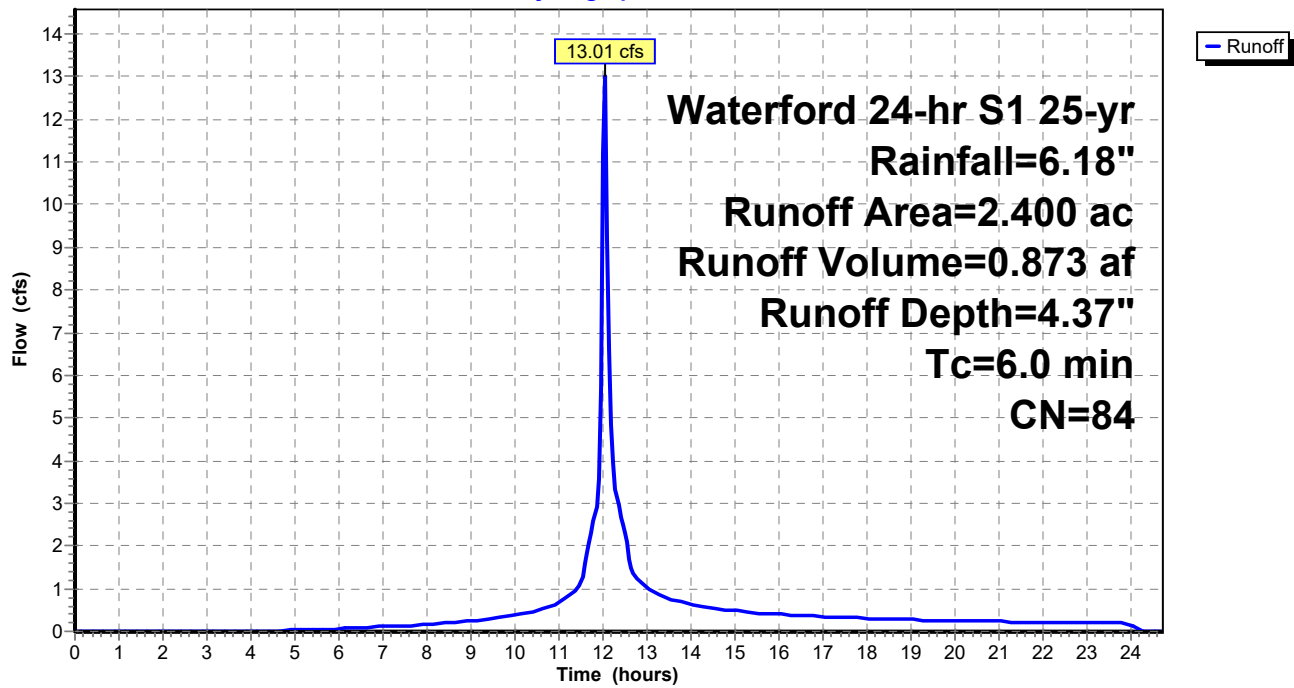
Summary for Subcatchment 20: DC 1

Runoff = 13.01 cfs @ 12.04 hrs, Volume= 0.873 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 25-yr Rainfall=6.18"

Area (ac)	CN	Description
* 2.400	84	

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

Subcatchment 20: DC 1**Hydrograph**

Summary for Pond 25: SSDS

Inflow Area = 2.400 ac, Inflow Depth = 4.37" for 25-yr event
 Inflow = 13.01 cfs @ 12.04 hrs, Volume= 0.873 af
 Outflow = 1.48 cfs @ 12.65 hrs, Volume= 0.704 af, Atten= 89%, Lag= 36.9 min
 Primary = 1.48 cfs @ 12.65 hrs, Volume= 0.704 af

Routing by Stor-Ind method, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
 Peak Elev= 140.35' @ 12.65 hrs Surf.Area= 0.155 ac Storage= 0.432 af

Plug-Flow detention time= 281.9 min calculated for 0.703 af (80% of inflow)
 Center-of-Mass det. time= 195.0 min (1,010.4 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	136.30'	0.230 af	46.67'W x 144.32'L x 7.00'H Field A 1.082 af Overall - 0.425 af Embedded = 0.658 af x 35.0% Voids
#2A	137.30'	0.425 af	ADS StormTech MC-4500 b +Cap x 170 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 170 Chambers in 5 Rows Cap Storage= +39.5 cf x 2 x 5 rows = 395.0 cf
		0.655 af	Total Available Storage

Storage Group A created with Chamber Wizard

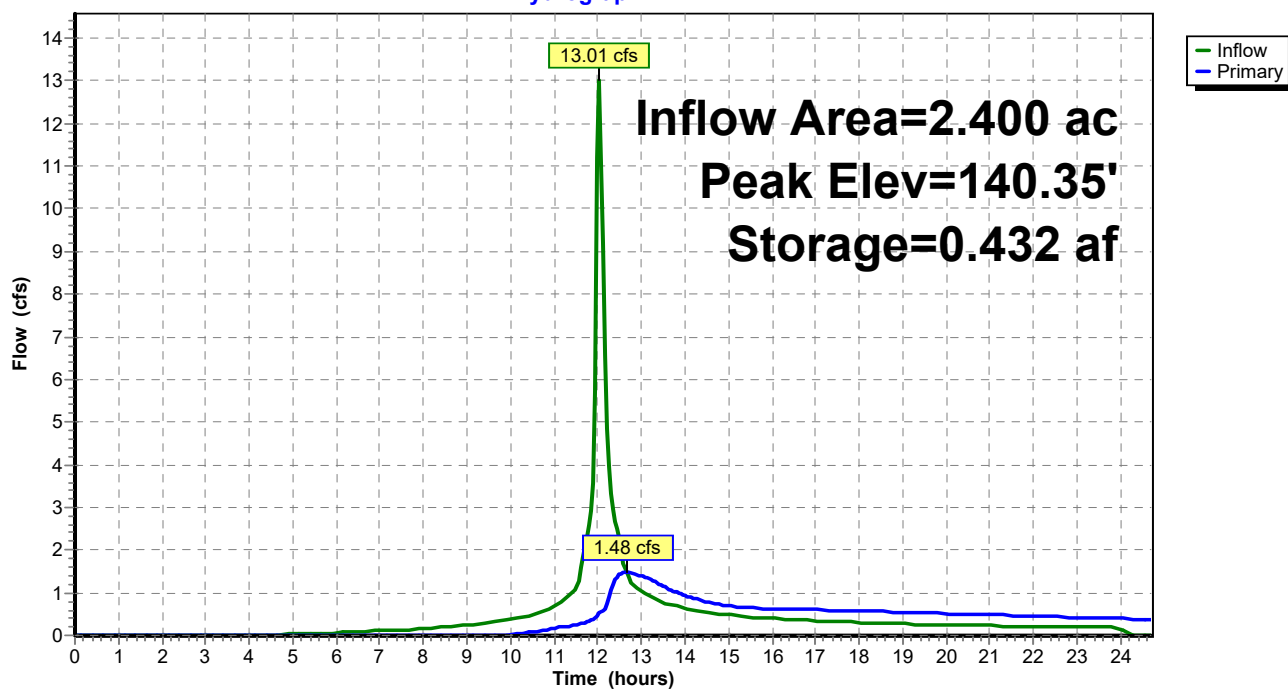
Device	Routing	Invert	Outlet Devices
#1	Primary	137.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	139.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	141.75'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.48 cfs @ 12.65 hrs HW=140.35' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.71 cfs @ 8.17 fps)
- 2=Orifice/Grate (Orifice Controls 0.77 cfs @ 2.87 fps)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 25: SSDS

Hydrograph



21-07 DC*Waterford 24-hr S1 50-yr Rainfall=6.96"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1

Runoff Area=2.400 ac Runoff Depth=5.10"
Tc=6.0 min CN=84 Runoff=15.13 cfs 1.020 af

Pond 25: SSDS

Peak Elev=140.87' Storage=0.487 af Inflow=15.13 cfs 1.020 af
Outflow=1.98 cfs 0.834 af

Total Runoff Area = 2.400 ac Runoff Volume = 1.020 af Average Runoff Depth = 5.10"

21-07 DC

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Waterford 24-hr S1 50-yr Rainfall=6.96"

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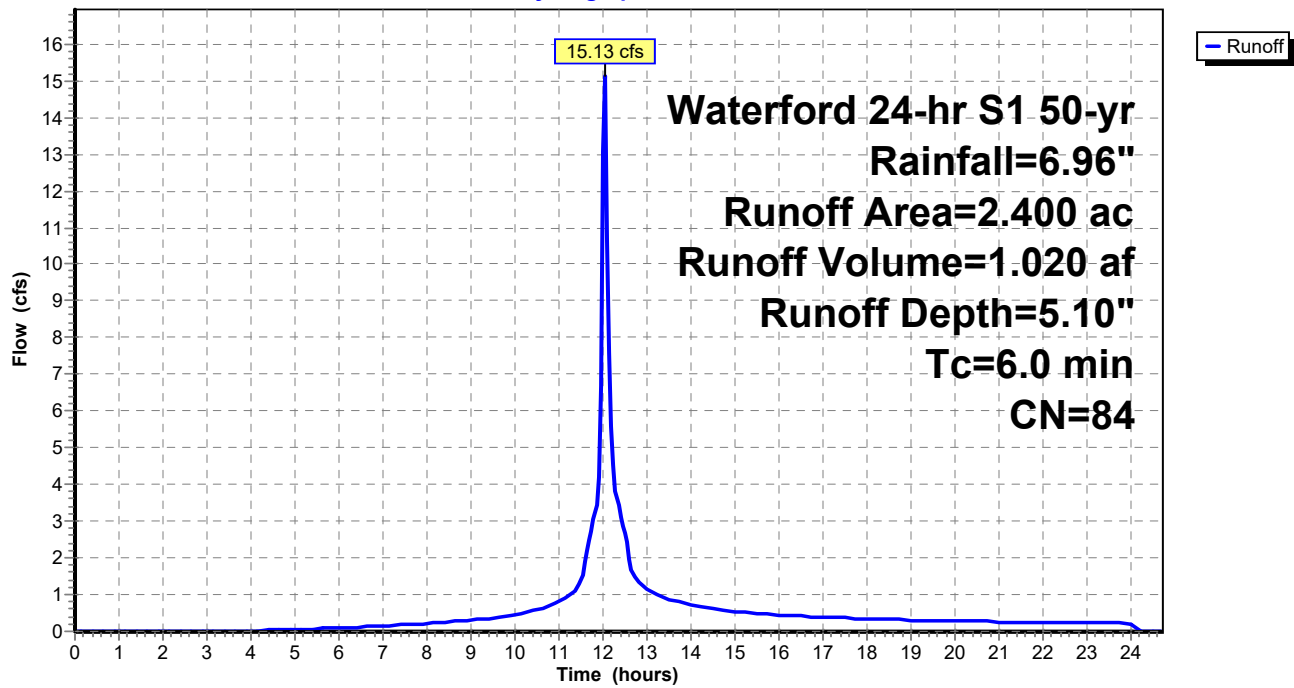
Summary for Subcatchment 20: DC 1

Runoff = 15.13 cfs @ 12.04 hrs, Volume= 1.020 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 50-yr Rainfall=6.96"

Area (ac)	CN	Description
* 2.400	84	

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

Subcatchment 20: DC 1**Hydrograph**

21-07 DC

Waterford 24-hr S1 50-yr Rainfall=6.96"

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Summary for Pond 25: SSDS

Inflow Area = 2.400 ac, Inflow Depth = 5.10" for 50-yr event
 Inflow = 15.13 cfs @ 12.04 hrs, Volume= 1.020 af
 Outflow = 1.98 cfs @ 12.60 hrs, Volume= 0.834 af, Atten= 87%, Lag= 33.8 min
 Primary = 1.98 cfs @ 12.60 hrs, Volume= 0.834 af

Routing by Stor-Ind method, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
 Peak Elev= 140.87' @ 12.60 hrs Surf.Area= 0.155 ac Storage= 0.487 af

Plug-Flow detention time= 258.4 min calculated for 0.832 af (82% of inflow)
 Center-of-Mass det. time= 174.9 min (984.8 - 809.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	136.30'	0.230 af	46.67'W x 144.32'L x 7.00'H Field A 1.082 af Overall - 0.425 af Embedded = 0.658 af x 35.0% Voids
#2A	137.30'	0.425 af	ADS StormTech MC-4500 b +Cap x 170 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 170 Chambers in 5 Rows Cap Storage= +39.5 cf x 2 x 5 rows = 395.0 cf
		0.655 af	Total Available Storage

Storage Group A created with Chamber Wizard

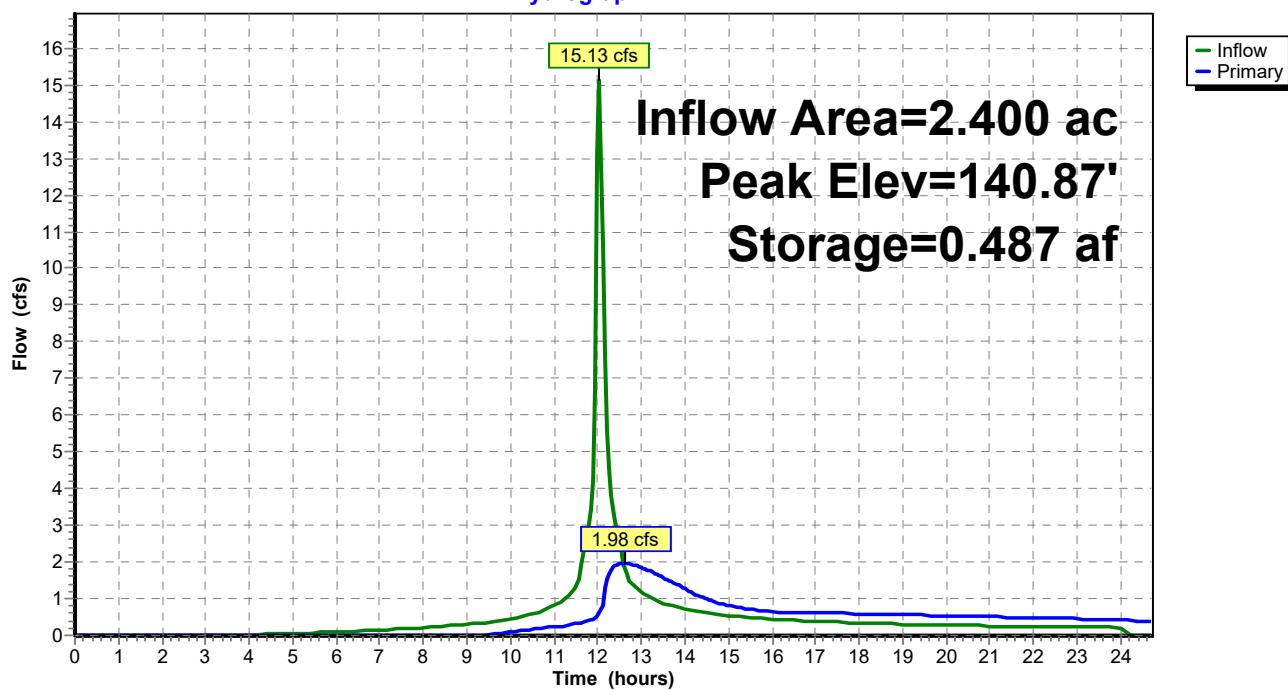
Device	Routing	Invert	Outlet Devices
#1	Primary	137.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	139.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	141.75'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.98 cfs @ 12.60 hrs HW=140.87' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.77 cfs @ 8.88 fps)
- 2=Orifice/Grate (Orifice Controls 1.20 cfs @ 4.50 fps)
- 3=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond 25: SSDS

Hydrograph



21-07 DC*Waterford 24-hr S1 100-yr Rainfall=7.79"*

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Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1

Runoff Area=2.400 ac Runoff Depth=5.89"
Tc=6.0 min CN=84 Runoff=17.38 cfs 1.179 af

Pond 25: SSDS

Peak Elev=141.55' Storage=0.550 af Inflow=17.38 cfs 1.179 af
Outflow=2.45 cfs 0.975 af

Total Runoff Area = 2.400 ac Runoff Volume = 1.179 af Average Runoff Depth = 5.89"

21-07 DC

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Waterford 24-hr S1 100-yr Rainfall=7.79"

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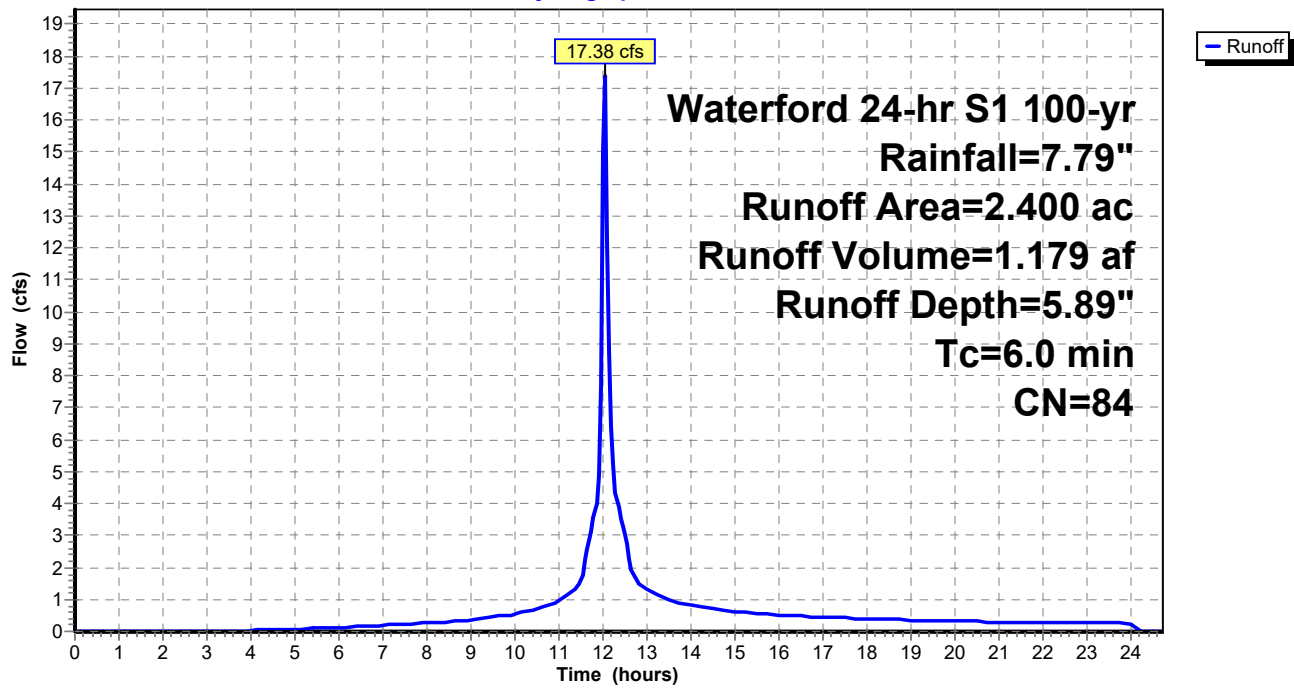
Summary for Subcatchment 20: DC 1

Runoff = 17.38 cfs @ 12.04 hrs, Volume= 1.179 af, Depth= 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 100-yr Rainfall=7.79"

Area (ac)	CN	Description
* 2.400	84	

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

Subcatchment 20: DC 1**Hydrograph**

21-07 DC

Waterford 24-hr S1 100-yr Rainfall=7.79"

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Summary for Pond 25: SSDS

Inflow Area = 2.400 ac, Inflow Depth = 5.89" for 100-yr event
 Inflow = 17.38 cfs @ 12.04 hrs, Volume= 1.179 af
 Outflow = 2.45 cfs @ 12.58 hrs, Volume= 0.975 af, Atten= 86%, Lag= 32.4 min
 Primary = 2.45 cfs @ 12.58 hrs, Volume= 0.975 af

Routing by Stor-Ind method, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
 Peak Elev= 141.55' @ 12.58 hrs Surf.Area= 0.155 ac Storage= 0.550 af

Plug-Flow detention time= 240.6 min calculated for 0.975 af (83% of inflow)
 Center-of-Mass det. time= 159.6 min (964.5 - 804.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	136.30'	0.230 af	46.67'W x 144.32'L x 7.00'H Field A 1.082 af Overall - 0.425 af Embedded = 0.658 af x 35.0% Voids
#2A	137.30'	0.425 af	ADS StormTech MC-4500 b +Cap x 170 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 170 Chambers in 5 Rows Cap Storage= +39.5 cf x 2 x 5 rows = 395.0 cf
		0.655 af	Total Available Storage

Storage Group A created with Chamber Wizard

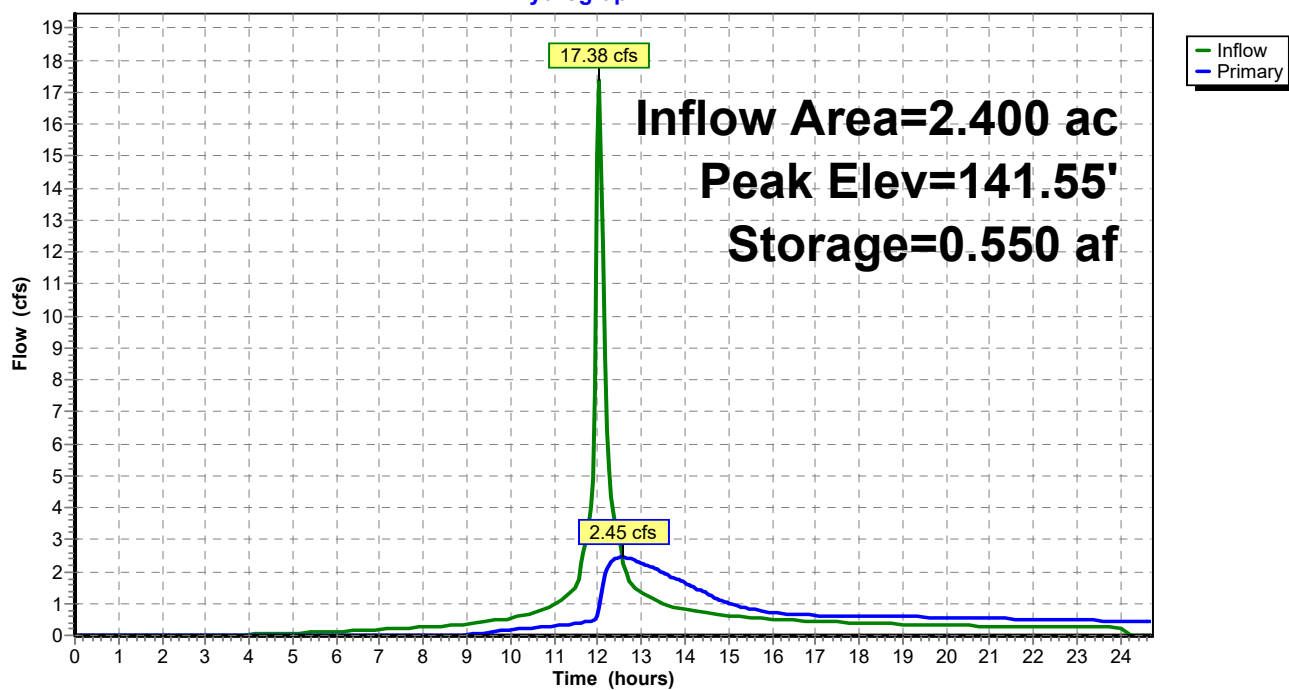
Device	Routing	Invert	Outlet Devices
#1	Primary	137.30'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	139.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	141.75'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.45 cfs @ 12.58 hrs HW=141.54' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.85 cfs @ 9.72 fps)
- 2=Orifice/Grate (Orifice Controls 1.60 cfs @ 6.00 fps)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 25: SSDS

Hydrograph



21-07 Emergency Spillway Routing

Waterford 24-hr S1 100-yr Rainfall=7.79"

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Page 1

Time span=0.00-24.70 hrs, dt=0.05 hrs, 495 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment20: DC 1

Runoff Area=2.400 ac Runoff Depth=5.89"
Tc=6.0 min CN=84 Runoff=17.38 cfs 1.179 af

Pond 25: SSDS

Peak Elev=142.27' Storage=0.599 af Inflow=17.38 cfs 1.179 af
Outflow=4.47 cfs 0.611 af

Total Runoff Area = 2.400 ac Runoff Volume = 1.179 af Average Runoff Depth = 5.89"

21-07 Emergency Spillway Routing

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Waterford 24-hr S1 100-yr Rainfall=7.79"

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Summary for Subcatchment 20: DC 1

Runoff = 17.38 cfs @ 12.04 hrs, Volume= 1.179 af, Depth= 5.89"

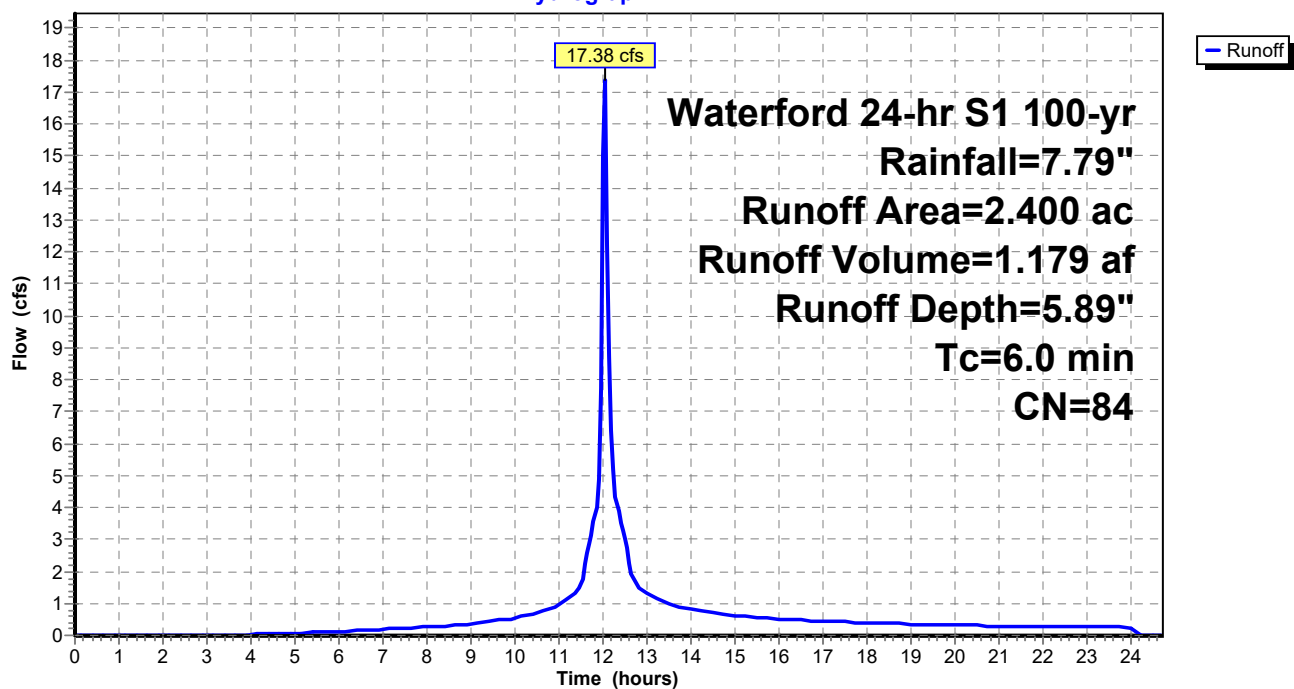
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Waterford 24-hr S1 100-yr Rainfall=7.79"

Area (ac)	CN	Description
* 2.400	84	

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

Subcatchment 20: DC 1

Hydrograph



21-07 Emergency Spillway Routing

Waterford 24-hr S1 100-yr Rainfall=7.79"

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Summary for Pond 25: SSDS

Inflow Area = 2.400 ac, Inflow Depth = 5.89" for 100-yr event
Inflow = 17.38 cfs @ 12.04 hrs, Volume= 1.179 af
Outflow = 4.47 cfs @ 12.31 hrs, Volume= 0.611 af, Atten= 74%, Lag= 16.3 min
Primary = 4.47 cfs @ 12.31 hrs, Volume= 0.611 af

Routing by Stor-Ind method, Time Span= 0.00-24.70 hrs, dt= 0.05 hrs
Peak Elev= 142.27' @ 12.31 hrs Surf.Area= 0.155 ac Storage= 0.599 af

Plug-Flow detention time= 280.9 min calculated for 0.611 af (52% of inflow)
Center-of-Mass det. time= 142.9 min (947.7 - 804.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	136.30'	0.230 af	46.67'W x 144.32'L x 7.00'H Field A 1.082 af Overall - 0.425 af Embedded = 0.658 af x 35.0% Voids
#2A	137.30'	0.425 af	ADS StormTech MC-4500 b +Cap x 170 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 170 Chambers in 5 Rows Cap Storage= +39.5 cf x 2 x 5 rows = 395.0 cf
		0.655 af	Total Available Storage

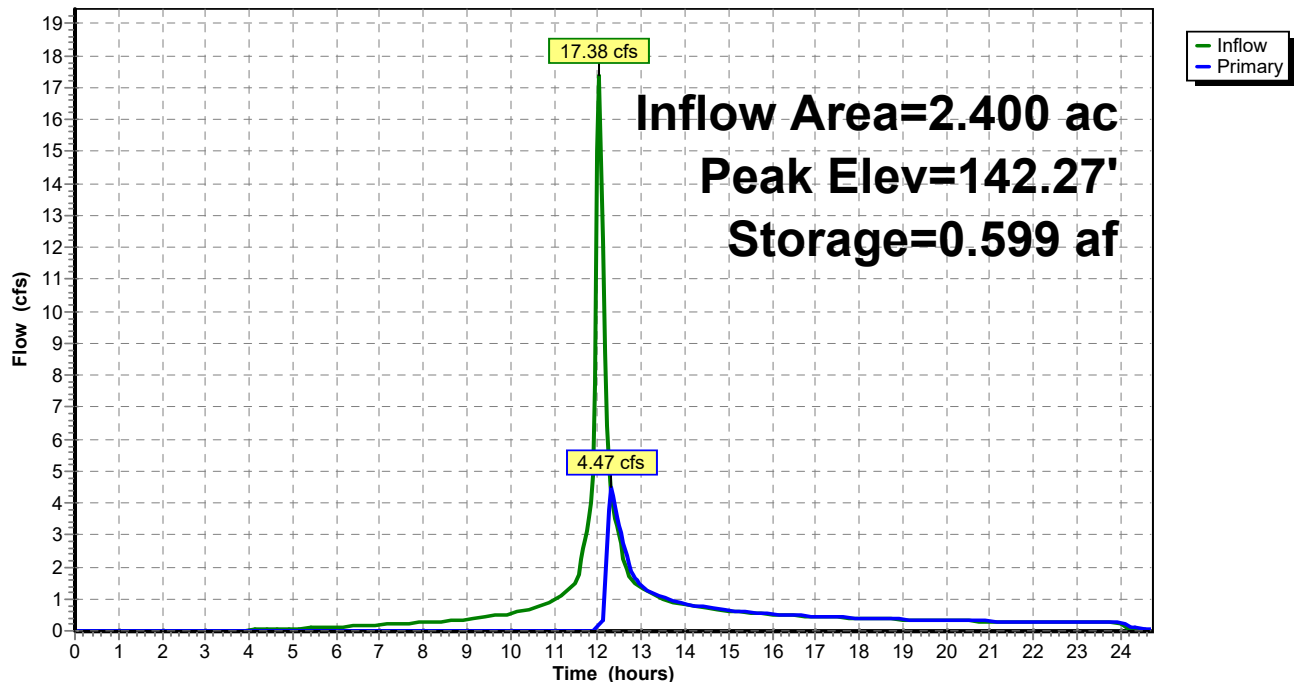
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	141.75'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

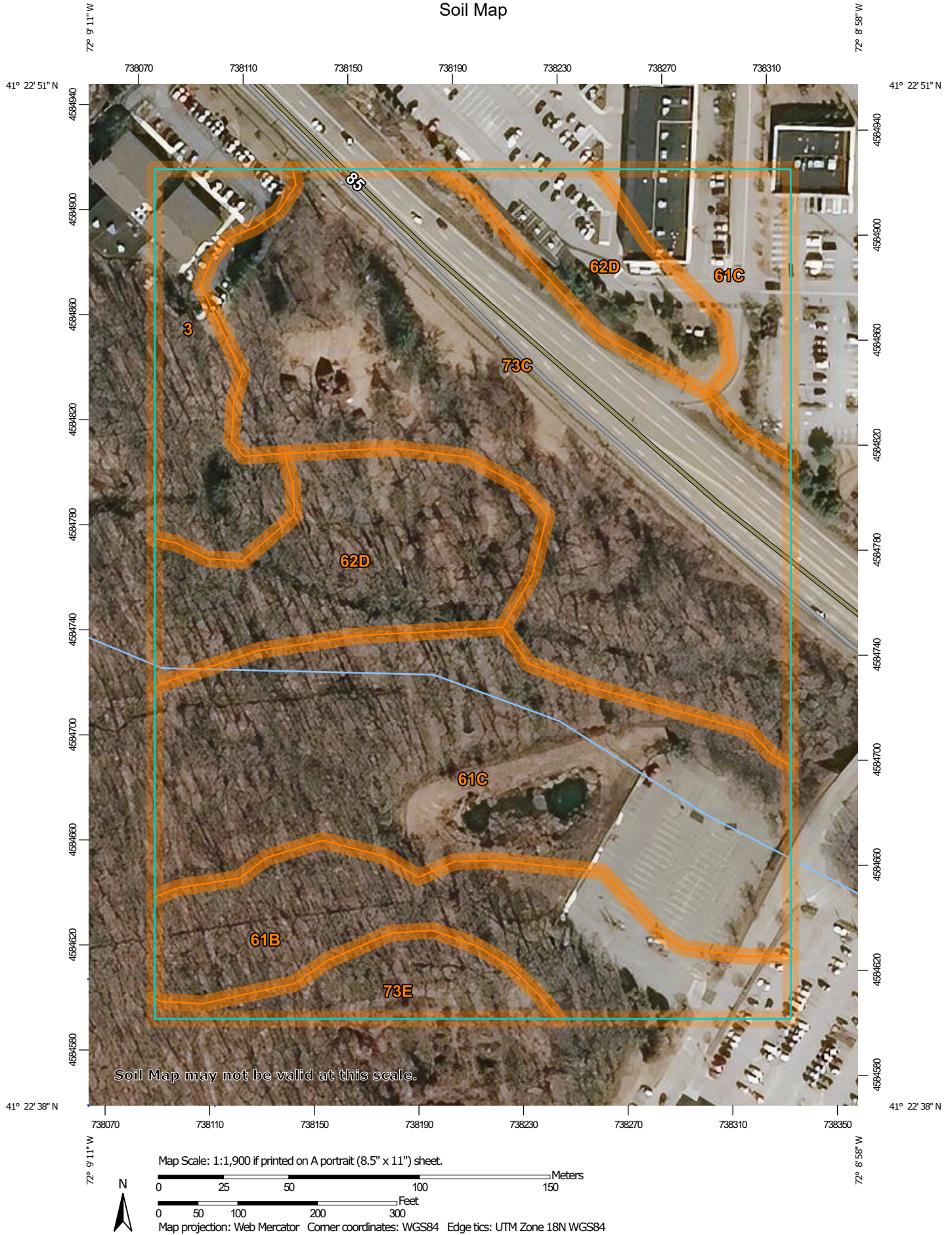
Primary OutFlow Max=4.39 cfs @ 12.31 hrs HW=142.26' (Free Discharge)
1=Broad-Crested Rectangular Weir(Weir Controls 4.39 cfs @ 2.15 fps)

Pond 25: SSDS

Hydrograph



Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

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 1:12,000.

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Mar 20, 2019—Mar 27, 2019

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	1.3	6.7%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	2.3	11.9%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	6.0	30.6%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	3.1	15.7%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	6.1	31.4%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	0.7	3.7%
Totals for Area of Interest		19.5	100.0%

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas

are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qt

Elevation: 0 to 1,480 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 40 percent

Leicester, extremely stony, and similar soils: 35 percent

Whitman, extremely stony, and similar soils: 17 percent

Minor components: 8 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Drumlins, depressions, drainageways, hills, ground moraines

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope, head slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 6 inches: fine sandy loam

Bw - 6 to 10 inches: sandy loam

Bg - 10 to 19 inches: gravelly sandy loam

Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 15 to 35 inches to densic material

Drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Custom Soil Resource Report

Hydrologic Soil Group: D

Ecological site: F144AY009CT - Wet Till Depressions

Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Ground moraines, depressions, drainageways, hills

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear

Across-slope shape: Concave

Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 7 inches: fine sandy loam

Bg - 7 to 18 inches: fine sandy loam

BC - 18 to 24 inches: fine sandy loam

C1 - 24 to 39 inches: gravelly fine sandy loam

C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.14 to 14.17 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B/D

Ecological site: F144AY009CT - Wet Till Depressions

Hydric soil rating: Yes

Description of Whitman, Extremely Stony

Setting

Landform: Depressions, drainageways, hills, ground moraines, drumlins

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat

Custom Soil Resource Report

A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Swansea

Percent of map unit: 2 percent
Landform: Swamps, bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

61B—Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w81v

Custom Soil Resource Report

Elevation: 0 to 1,480 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Canton, very stony, and similar soils: 50 percent

Charlton, very stony, and similar soils: 35 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Ridges, hills, moraines

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Crest, nose slope, side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 5 inches: fine sandy loam

Bw1 - 5 to 16 inches: fine sandy loam

Bw2 - 16 to 22 inches: gravelly fine sandy loam

2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Charlton, Very Stony

Setting

Landform: Hills, ground moraines, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Custom Soil Resource Report

Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Leicester, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, depressions, drainageways, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Chatfield, very stony

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Nose slope, crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Sutton, very stony

Percent of map unit: 5 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

61C—Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w820
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, very stony, and similar soils: 50 percent
Charlton, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Ridges, hills, moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton, Very Stony

Setting

Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Chatfield, very stony

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit

Custom Soil Resource Report

Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 5 percent
Landform: Hills, ground moraines, depressions, drainageways
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton, very stony

Percent of map unit: 5 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

62D—Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w81r
Elevation: 0 to 1,640 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 55 percent
Charlton, extremely stony, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Ridges, hills, moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex

Custom Soil Resource Report

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton, Extremely Stony

Setting

Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Hollis, extremely stony

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Sutton, extremely stony

Percent of map unit: 5 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2w698
Elevation: 0 to 1,550 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days

Custom Soil Resource Report

Farmland classification: Not prime farmland

Map Unit Composition

Charlton, very stony, and similar soils: 50 percent

Chatfield, very stony, and similar soils: 30 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

Landform: Hills, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Linear, convex

Across-slope shape: Convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material

A - 2 to 4 inches: fine sandy loam

Bw - 4 to 27 inches: gravelly fine sandy loam

C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Chatfield, Very Stony

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Linear, convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

Hollis, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 9lql
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 45 percent
Chatfield and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Custom Soil Resource Report

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Chatfield

Setting

Landform: Hills, ridges

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material

A - 1 to 6 inches: gravelly fine sandy loam

Bw1 - 6 to 15 inches: gravelly fine sandy loam

Bw2 - 15 to 29 inches: gravelly fine sandy loam

2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent

Hydric soil rating: No

Sutton

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Leicester

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: Yes

Custom Soil Resource Report

Hollis

Percent of map unit: 3 percent

Landform: Hills, ridges

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Unnamed, sandy subsoil

Percent of map unit: 1 percent

Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 1 percent

Hydric soil rating: No



NOAA Atlas 14, Volume 10, Version 3
Location name: Waterford, Connecticut, USA*
Latitude: 41.3805°, Longitude: -72.1521°
Elevation: 144.7 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.338 (0.263-0.423)	0.404 (0.314-0.506)	0.512 (0.397-0.643)	0.602 (0.464-0.759)	0.725 (0.542-0.950)	0.817 (0.599-1.09)	0.915 (0.652-1.26)	1.03 (0.692-1.43)	1.19 (0.771-1.71)	1.33 (0.840-1.94)
10-min	0.479 (0.373-0.600)	0.572 (0.445-0.717)	0.725 (0.562-0.912)	0.852 (0.657-1.08)	1.03 (0.767-1.35)	1.16 (0.848-1.55)	1.30 (0.923-1.79)	1.46 (0.980-2.03)	1.69 (1.09-2.42)	1.88 (1.19-2.74)
15-min	0.563 (0.438-0.705)	0.673 (0.523-0.844)	0.853 (0.660-1.07)	1.00 (0.773-1.27)	1.21 (0.903-1.58)	1.36 (0.998-1.82)	1.53 (1.09-2.10)	1.71 (1.15-2.39)	1.99 (1.29-2.85)	2.21 (1.40-3.23)
30-min	0.798 (0.621-0.999)	0.954 (0.741-1.20)	1.21 (0.936-1.52)	1.42 (1.09-1.79)	1.71 (1.28-2.24)	1.93 (1.41-2.57)	2.16 (1.54-2.97)	2.42 (1.63-3.37)	2.80 (1.82-4.02)	3.12 (1.97-4.55)
60-min	1.03 (0.804-1.29)	1.23 (0.959-1.55)	1.56 (1.21-1.96)	1.83 (1.41-2.32)	2.21 (1.65-2.89)	2.49 (1.82-3.32)	2.79 (1.98-3.84)	3.13 (2.10-4.36)	3.62 (2.35-5.19)	4.03 (2.55-5.87)
2-hr	1.36 (1.07-1.69)	1.62 (1.27-2.02)	2.05 (1.61-2.56)	2.41 (1.87-3.02)	2.90 (2.19-3.77)	3.27 (2.41-4.33)	3.66 (2.63-5.00)	4.11 (2.79-5.68)	4.78 (3.11-6.79)	5.34 (3.39-7.71)
3-hr	1.58 (1.25-1.95)	1.88 (1.49-2.33)	2.38 (1.87-2.95)	2.79 (2.18-3.48)	3.36 (2.55-4.35)	3.79 (2.81-4.99)	4.24 (3.06-5.76)	4.77 (3.24-6.55)	5.54 (3.62-7.83)	6.19 (3.95-8.89)
6-hr	2.00 (1.60-2.46)	2.38 (1.90-2.93)	3.01 (2.38-3.70)	3.52 (2.78-4.35)	4.23 (3.23-5.43)	4.76 (3.56-6.21)	5.33 (3.87-7.18)	5.99 (4.09-8.14)	6.95 (4.56-9.72)	7.76 (4.97-11.0)
12-hr	2.47 (1.99-3.01)	2.94 (2.36-3.58)	3.70 (2.96-4.51)	4.33 (3.44-5.30)	5.19 (3.99-6.59)	5.84 (4.40-7.55)	6.53 (4.77-8.70)	7.32 (5.03-9.86)	8.49 (5.60-11.7)	9.46 (6.08-13.3)
24-hr	2.89 (2.35-3.49)	3.45 (2.80-4.17)	4.37 (3.53-5.29)	5.13 (4.12-6.24)	6.18 (4.79-7.78)	6.96 (5.28-8.92)	7.79 (5.74-10.3)	8.76 (6.06-11.7)	10.2 (6.77-14.0)	11.4 (7.38-15.9)
2-day	3.23 (2.65-3.86)	3.90 (3.19-4.67)	4.99 (4.07-5.99)	5.89 (4.78-7.10)	7.14 (5.59-8.93)	8.06 (6.18-10.3)	9.06 (6.75-11.9)	10.3 (7.13-13.5)	12.1 (8.04-16.4)	13.6 (8.84-18.7)
3-day	3.50 (2.89-4.17)	4.22 (3.47-5.03)	5.39 (4.43-6.45)	6.37 (5.19-7.64)	7.72 (6.08-9.60)	8.71 (6.71-11.0)	9.79 (7.32-12.8)	11.1 (7.73-14.6)	13.0 (8.72-17.6)	14.7 (9.59-20.1)
4-day	3.75 (3.11-4.45)	4.51 (3.73-5.35)	5.74 (4.72-6.83)	6.76 (5.53-8.08)	8.17 (6.45-10.1)	9.21 (7.12-11.6)	10.3 (7.75-13.5)	11.7 (8.18-15.3)	13.7 (9.19-18.4)	15.5 (10.1-21.0)
7-day	4.47 (3.73-5.27)	5.29 (4.41-6.24)	6.62 (5.50-7.83)	7.73 (6.38-9.18)	9.26 (7.36-11.4)	10.4 (8.08-13.0)	11.6 (8.73-15.0)	13.0 (9.18-16.9)	15.2 (10.2-20.2)	17.0 (11.1-22.9)
10-day	5.18 (4.34-6.08)	6.03 (5.05-7.09)	7.43 (6.20-8.74)	8.59 (7.11-10.1)	10.2 (8.12-12.4)	11.4 (8.86-14.1)	12.6 (9.51-16.1)	14.1 (9.95-18.2)	16.2 (10.9-21.4)	18.0 (11.8-24.1)
20-day	7.36 (6.23-8.56)	8.27 (6.99-9.63)	9.76 (8.22-11.4)	11.0 (9.20-12.9)	12.7 (10.2-15.3)	14.0 (11.0-17.1)	15.3 (11.5-19.1)	16.7 (11.9-21.3)	18.6 (12.7-24.3)	20.1 (13.3-26.6)
30-day	9.17 (7.81-10.6)	10.1 (8.61-11.7)	11.7 (9.90-13.6)	13.0 (10.9-15.1)	14.8 (11.9-17.6)	16.1 (12.7-19.5)	17.5 (13.1-21.5)	18.8 (13.5-23.8)	20.5 (14.0-26.6)	21.8 (14.4-28.7)
45-day	11.4 (9.78-13.2)	12.4 (10.6-14.3)	14.1 (12.0-16.3)	15.4 (13.1-17.9)	17.3 (14.0-20.5)	18.8 (14.8-22.5)	20.2 (15.2-24.6)	21.5 (15.5-27.0)	23.0 (15.8-29.7)	24.1 (16.0-31.5)
60-day	13.3 (11.4-15.3)	14.3 (12.3-16.5)	16.1 (13.8-18.5)	17.5 (14.9-20.2)	19.5 (15.9-23.0)	21.1 (16.6-25.1)	22.6 (17.0-27.3)	23.8 (17.2-29.8)	25.3 (17.4-32.4)	26.2 (17.5-34.1)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

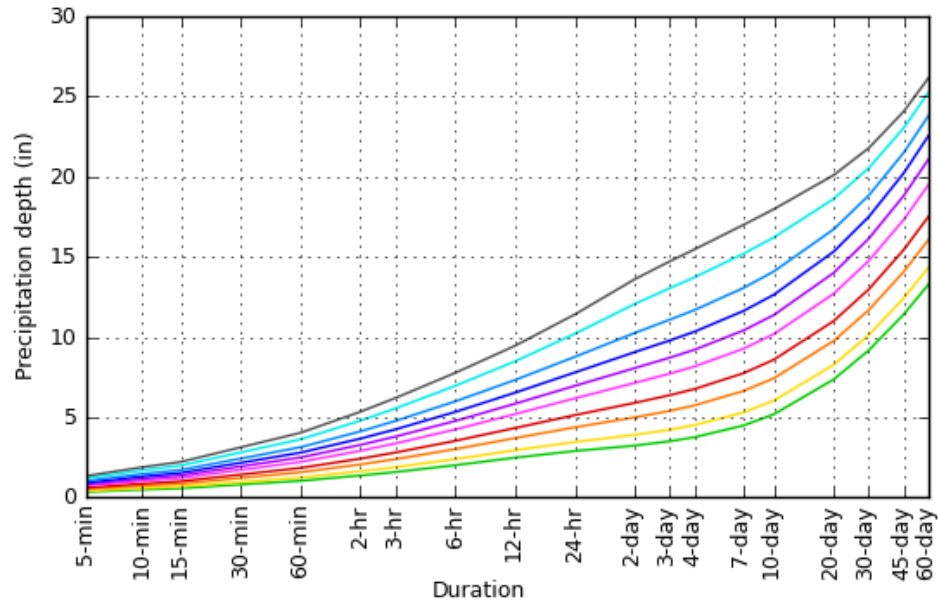
Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

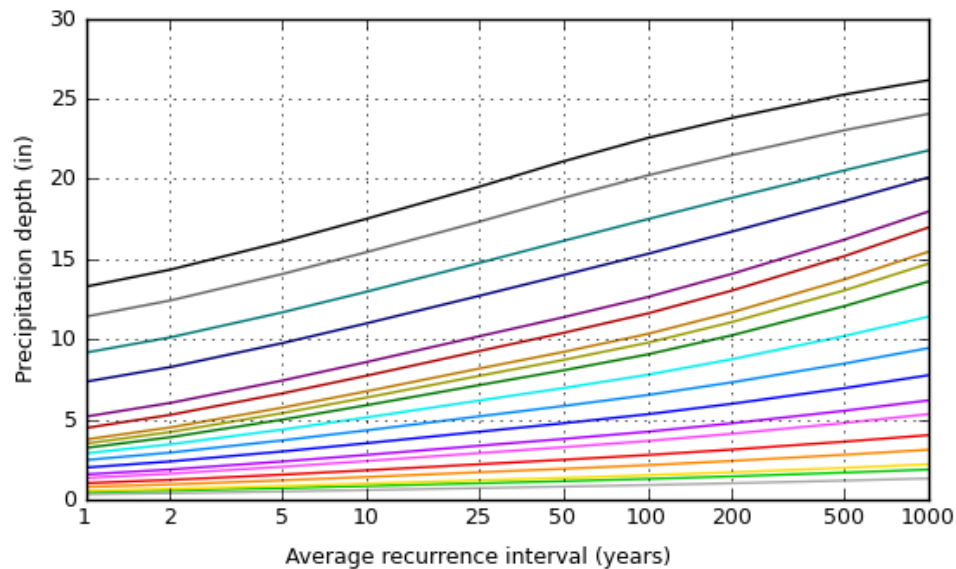
PF graphical

PDS-based depth-duration-frequency (DDF) curves

Latitude: 41.3805°, Longitude: -72.1521°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

Maps & aerials

Small scale terrain

General Site Operation and Maintenance Plan

Pequot Apartments Waterford, Connecticut

- This Site Operation and Maintenance Plan outlines practices and procedures intended to minimize stormwater pollution resulting from the developed sites operation and its infrastructure. The site is located within the Jordan Brook watershed and stormwater runoff from the site is discharged directly to a tributary to Jordan Brook, therefore the minimization of stormwater pollution from the site and the protection of surface and groundwater resources is of particular importance.
- The plan includes typical standard of practice best management and good housekeeping practices and pollution prevention measures and procedures for the sites operation and infrastructure including driveways, vehicle parking areas, stormwater management system, and maintained lawn and landscaped areas.
- The responsible party for implementation of the best management and good housekeeping practices and pollution prevention measures and procedures should be the site owner or its designated agent.
- The responsible party should maintain a copy of this plan and the site development plans for the site that depict the sites infrastructure including its stormwater management system.
- The responsible party should also maintain records of site inspections and maintenance actions completed and response actions for spills of potentially harmful materials that may occur.

1. Spill Response and Clean-up

Maintain spill response and clean-up materials on-site for accidental spills of vehicle related fuels, oils and other liquids.

Spill response materials should include barriers to prevent the entry of spilled materials into the stormwater management system catch basin inlets and prevent spilled materials from entering the adjoining State highway right-of-way or adjoining properties.

Should a spill occur, the Town of Waterford Fire Marshalls Office (860-440-0544) should be notified.

2. Vehicle Washing and Maintenance

Washing and maintenance of vehicles should be prohibited on this site.

3. Routine Site Inspections and Good Housekeeping Practices

The minimum frequency of routine site inspections should be twice annually after foliage season and in the spring after winter season snow and ice control operations have ceased. In addition, routine site inspections should be completed after significant rainfall events.

Other than refuse and recyclable containers, do not store any materials outdoors that may be exposed to stormwater and introduce pollutants into stormwater runoff.

Hazardous, toxic, or contaminated materials stored within the sites building shall be stored in containers or vessels constructed of non-porous materials.

Containers or vessels storing liquid hazardous, toxic, or contaminated materials within the sites building shall provide secondary containment adequate to store the full volume of the container or vessel.

General Site Operation and Maintenance Plan

Pequot Apartments Waterford, Connecticut

Ensure that all refuse and recyclables are stored within proper receptacles.

Ensure that receptacle tops are operational and remain in the closed position.

Ensure that drain hole plugs are installed on all receptacles.

Routinely pick up trash and debris and dispose of properly.

Repair eroded slopes and lawn areas.

Adjust and maintain irrigation system sprinkler heads to minimize overspray onto pavements and runoff.

Monitor system run times to maximize soil absorption and minimize runoff.

Install drip irrigation where feasible to increase efficiency and minimize water loss due to over-spray and wind.

Ensure that exterior water spigots are not leaking.

4. Lawn Care and Landscaping Practices

Perform properly timed routine maintenance of all lawn and planted areas.

Use only slow release fertilizers and use fertilizers and pesticides judiciously and in accordance with manufacturer's instructions.

5. Pavement Sweeping

Sweep driveways and vehicle parking areas annually at a minimum and periodically as required to remove sediment and debris, reduce exposure of these materials to stormwater and reduce the potential for sediment to leave the paved surfaces in stormwater runoff.

Typically, sweeping operations should be performed in the spring after winter snow and ice control operations have ceased.

Dispose of sweepings off-site properly in accordance with applicable regulations.

6. Winter Season Snow and Ice Control

The use of sodium chloride based anti-icing or de-icing chemicals on this site should be prohibited.

The preferred method of snow and ice removal for driveways and vehicle parking areas should be mechanical removal.

Apply non sodium chloride based anti-icing and de-icing chemicals for use on building entrances in accordance with manufacturer's instructions and minimize their use as is practicable.

Do not store anti-icing or de-icing chemicals outdoors.

Store snow removed from pavements in lawn areas where melt waters will not drain to catch basin inlets, the stormwater infiltration basin, or off site to the adjoining State highway right-of-way or adjoining properties.

General Site Operation and Maintenance Plan

Pequot Apartments Waterford, Connecticut

7. Stormwater Management System

A. Collection and Conveyance System

Clear leaves, trash and other debris from catch basin inlet grates routinely.

Remove sediment from catch basin sumps periodically as required. Sediment removal should be performed when accumulated sediment in the catch basin sumps reaches one-half of the sump depth. Sediment removal should typically be performed in the Spring after Winter Season snow and ice control operations have ceased.

Dispose of sediment off-site properly in accordance with applicable regulations.

Inspect the interior of catch basin and manhole structures to ensure that they are free flowing and in good structural condition and perform any debris removal or maintenance required.

Inspect storm sewers to ensure that they are free flowing and in good structural condition and perform any debris removal or maintenance required.

B. Stormwater Infiltration Basin

Clear leaves, trash, and other debris from the stormwater infiltration basin and the outlet riser grates routinely.

Ensure that all stormwater infiltration basin slopes and the top of berm have adequate vegetation cover. Seed low percentage cover areas and establish adequate cover.

Mow the stormwater infiltration basin slopes and top of berm twice per year to prevent the establishment of woody vegetation.

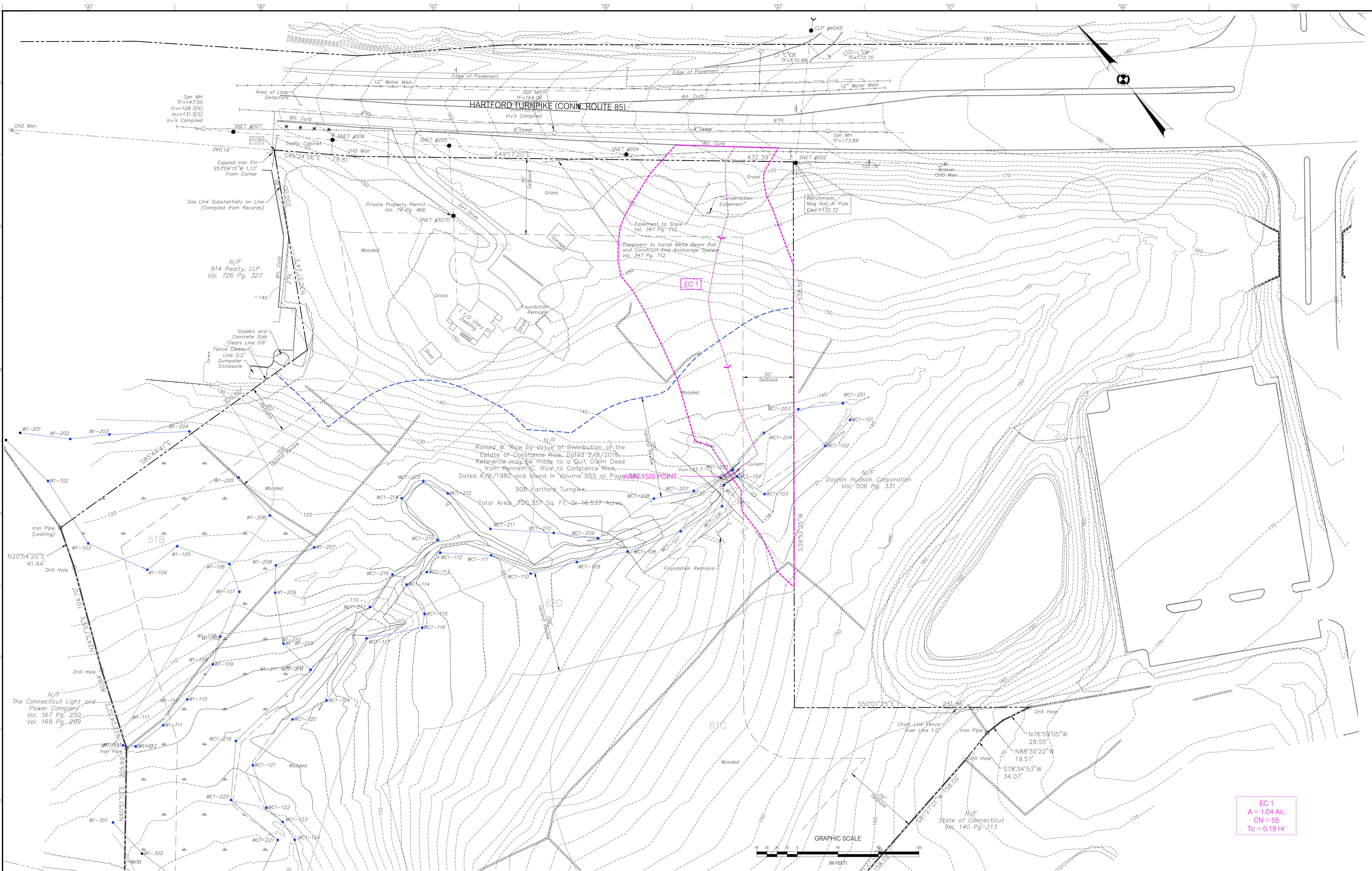
Inspect stone riprap outlet protection to ensure they are free of accumulated debris and that there is no settlement of the stone, displaced stones, or erosion. Perform any debris removal or maintenance required.

C. Subsurface Stormwater Detention System

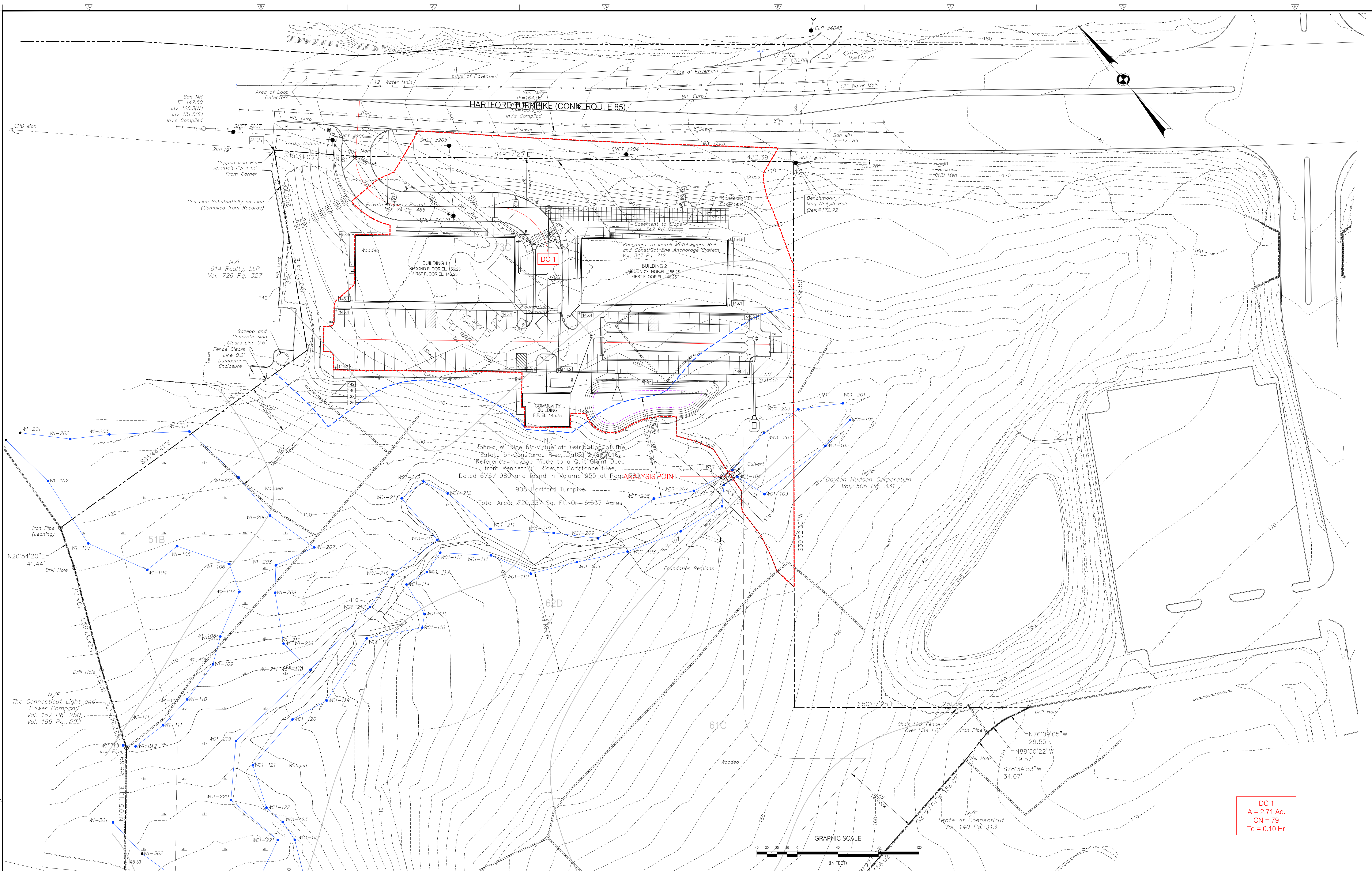
Inspect the subsurface storage reservoir at its access ports periodically to ensure that the system is draining and that there is no long term ponding of stormwater runoff.

Inspect the outlet control structure to ensure that all water ports and the structure outlet pipe are free flowing and in good structural condition and perform any debris removal or maintenance required.

Inspect the stone riprap outlet protection to ensure that it is free of accumulated debris and that there is no settlement of the stone, displaced stones, or erosion. Perform any debris removal or maintenance required.



REVISIONS		TITLE		LAND OF ESTATE OF CONSTANCE RICE 908 HARTFORD TURNPIKE (CONN. ROUTE 85) WATERFORD, CONNECTICUT		SEAL		PREPARED BY Summer Hill Civil Engineers & Land Surveyors, P.C. 60 Wall Street P.O. Box 708 Madison, Connecticut 06443-0708 Telephone: (203) 245-0722		PROJECT: PEQUOT APARTMENTS 908 HARTFORD TURNPIKE (CONN. ROUTE 85) WATERFORD, CONNECTICUT		SHEET: EXISTING CONDITION DRAINAGE AREA MAP		SHEET NO. DA 1	
NO.	DATE	DESCRIPTION								DATE: 7-1-21		SCALE: 1"=40'			
REVISIONS										DESIGNED: MJO		CHECKED: LJM		FIELD BOOK:	
										PROJECT NO.: 21-07					



REVISIONS:			TITLE:										SEAL:	PREPARED BY:	PROJECT:			
			LAND OF ESTATE OF CONSTANCE RICE 908 HARTFORD TURNPIKE (CONN. ROUTE 85) WATERFORD, CONNECTICUT											Summer Hill Civil Engineers & Land Surveyors, P.C. 60 Wall Street P.O. Box 708 Madison, Connecticut 06443-0708 Telephone: (203) 245-0722	PEQUOT APARTMENTS 908 HARTFORD TURNPIKE (CONN. ROUTE 85) WATERFORD, CONNECTICUT			
NO. DATE DESCRIPTION															DATE: 7-1-21	SHEET: DEVELOPED CONDITION DRAINAGE AREA MAP	SHEET NO.: DA 2	
															SCALE: 1"=40'			
REVISIONS															DESIGNED: MJG			
															CHECKED: LJM	FIELD BOOK: -	PROJECT NO.: 21-07	

