

**Stormwater Management Report
Hartford Truck Equipment
45, 95 John Fitch Boulevard & 542 King Street
South Windsor, Connecticut**

Prepared by:

**Design Professionals, Inc.
21 Jeffrey Drive
South Windsor, CT 06074**

June 13, 2022



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Introduction

Hartford Truck Equipment, Inc. (current site occupant and affiliate of property owner McGuire Road Associates, LLC) is proposing site improvements to a tract of land comprised of three properties located at 45 & 95 John Fitch Boulevard, & 542 King Street, South Windsor, Connecticut. The properties are referenced on the Town of South Windsor Tax Assessors map as GIS#:47700045, 47700095, & 50400542 respectively. The proposed site improvements will include the construction of a new 45,000± SF storage building and a 10,000± building addition to their existing facility. Associated site improvements will include but not be limited to: new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's.

The total combined tract area is 15.54 acres. 8.20± acres of this area are proposed to be disturbed during construction. For more information, please refer to the plans entitled "Hartford Truck Equipment ~ Site Plan Modification ~ 45, 95 John Fitch Boulevard & 542 King Street ~ South Windsor, CT ~ GIS#: 50400542, 47700095, & 47700045" prepared by Design Professionals, Inc., and dated June 13, 2021, as amended.

Pre-Development Site Conditions

Apart from the existing develop area to be modified for the building addition, the existing surficial characteristics of the area to be improved can be primarily classified as undisturbed meadow area with some grass and woodland areas around the site boundary. Review of offsite topology indicated that the site currently accepts runoff from some of its southerly property abutters today. A ridgeline spanning south-west to north-east across the site's midsection was also identified as the main drainage divide on the property. Offsite runoff from the property's southerly abutters and the portion of the site east of the drainage divide, drain to an existing catch basin onsite. Collected stormwater it is then conveyed to an existing Catch Basin in King Street via a 42" RCP culvert. The portion of the site to the west of the drainage divide flows overland to this same catch basin.

The catchbasin in King Street was selected as the design point for our drainage analysis. This catch basin ultimately drains to The Podunk River and is a part of local basin ID 4004-00-2-R1. Existing conditions watershed delineations are identified in the Existing Conditions Drainage Map located in **Appendix G**. Based on Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) mapping, soil types A, B, C, & D are located on site. See **Appendix C** for The NRCS Soil Map & Data.

An evaluation was performed to quantify the peak rate of stormwater discharge offsite to the design points identified. The Natural Resources Conservation Service's TR-55 Manual was followed in predicting the peak rates of runoff and volumes. HydroCAD computer modeling software was utilized.

Peak rates of stormwater runoff were evaluated for the 2-, 10-, 25-, 50- and 100-year storm events. Peak rates of stormwater runoff were evaluated for the 2-, 10-, 25-, 50- and 100-year storm events. Rainfall data from NOAA Atlas 14 Point Frequency Estimates was used to generate storm conditions. NOAA Atlas 14 rainfall data is included in **Appendix D** for reference. For more information, please refer to the enclosed Pre-Development Drainage HydroCAD Report located in **Appendix A**.

Post-Development Site Conditions

The proposed site improvements will include the construction of a new 45,000± SF storage building and a 10,000± building addition to their existing facility. Associated site improvements will include but not be limited to: new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's. An existing surface infiltration basin and new proposed underground infiltration system were design to attenuate stormwater discharge in the proposed site conditions and ensure that peak rates offsite are less than or equal to the existing site conditions.

Percolation test were conducted to determine the infiltration rate on site. Percolation test results indicated that the subsurface soil condition achieved an average perc rate of ~0.9 In/min or 54 in/hr. An infiltration rate of 27in/hr was used for the HydroCAD model for both infiltration areas considering a factor of safety of 2. See **Appendix B** for the Post Development Condition and Pond summary HydroCAD reports. The Proposed Conditions Drainage Map for the site can be found in **Appendix G**.

Analysis of Results

The pre-development and post-development conditions were analyzed using HydroCAD consistent with National Resource Conservation Service (NRCS) hydrology methods. One discharge location (**Design Point #1**) was identified as a point of interest for assessing downstream effects. The following table contains the data generated from the HydroCAD software:

Reach		2 year	10 year	25 year	50 year	100 year
DP#1 – Existing CB in King Street	Pre	4.12	13.42	20.47	25.94	32.32
	Post	3.77	13.38	20.47	25.67	32.31

As seen in the table above, storm events evaluated for the subject project will result in peak runoff rates in the proposed condition that are less than the peak runoff rates of the existing condition for 2-, 10-, 25-, 50- and 100-year design storms.

Storm Sewer Collection System

The proposed subsurface stormwater collection and conveyance system was designed to adequately convey proposed runoff under 10- year storm event conditions. The design of the storm sewers followed the guidelines set forth in the Connecticut Department of Transportation's Drainage Manual. It is estimated that during a 10-year storm event, all proposed subsurface culverts will convey storm runoff without resulting in any unacceptable flooding conditions. Storm Sewer calculation are included as **Appendix E** of this report.

Water Quality

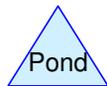
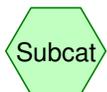
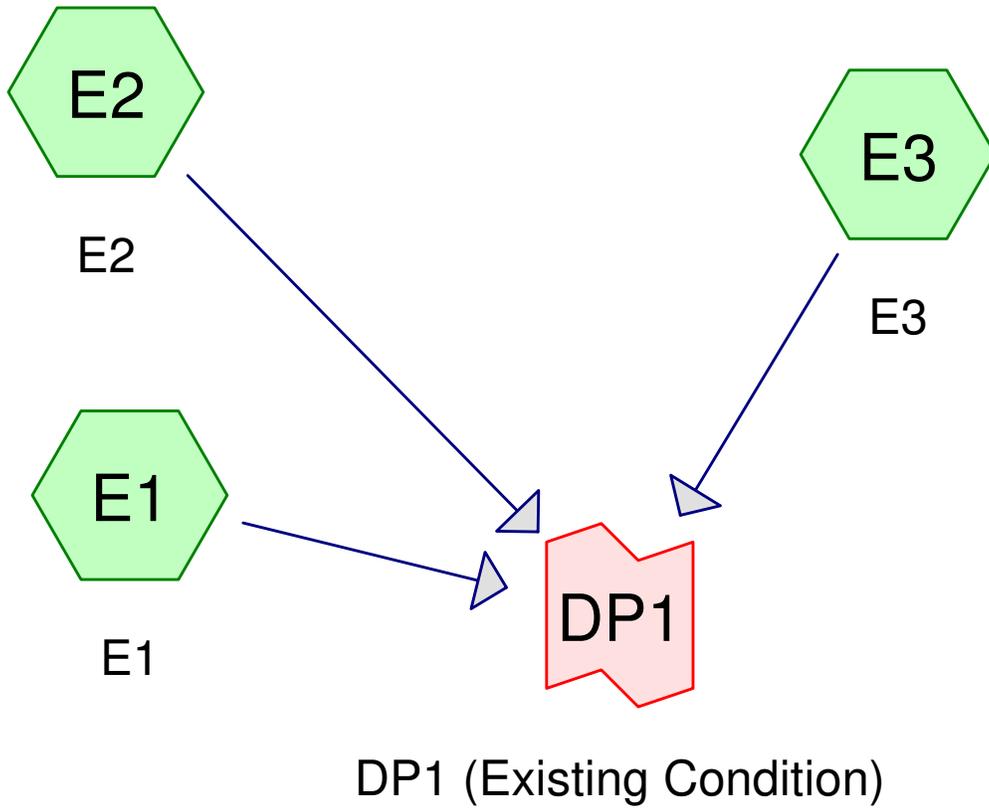
Stormtech Isolator rows will also be utilized to address water quality for all other areas draining to one of the proposed underground chamber systems and the two catchbasin to be located in the norther truck parking access drive. The number of isolator rows provided will be more than adequate to treat the required water quality flow rate based on the determined water quality flow and manufacture specs for

treated flow rate per chamber. The required water quality flow was also calculated considering recommended equations provided in the 2004 Connecticut Stormwater Quality Manual. Water Quality Flow calculations and isolation chamber specs are included as **Appendix F** of this report.

Conclusion

The proposed stormwater management system as discussed herein and shown on the referenced plans is appropriate for the proposed development on the subject site and should not pose any detrimental impacts to the environment.

APPENDIX A
Watershed Computations
(Pre-Development Drainage HydroCAD Report)



2482.H - HydroCAD

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Existing Condition
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1

Runoff Area=241,775 sf 8.69% Impervious Runoff Depth=0.33"
Flow Length=735' Tc=32.2 min CN=59 Runoff=0.68 cfs 0.153 af

Subcatchment E2: E2

Runoff Area=395,349 sf 28.72% Impervious Runoff Depth=0.71"
Flow Length=936' Tc=53.4 min CN=69 Runoff=2.74 cfs 0.539 af

Subcatchment E3: E3

Runoff Area=111,153 sf 35.12% Impervious Runoff Depth=0.96"
Flow Length=1,158' Tc=19.7 min CN=74 Runoff=1.81 cfs 0.204 af

Link DP1: DP1 (Existing Condition)

Inflow=4.12 cfs 0.896 af
Primary=4.12 cfs 0.896 af

Total Runoff Area = 17.178 ac Runoff Volume = 0.896 af Average Runoff Depth = 0.63"
76.80% Pervious = 13.193 ac 23.20% Impervious = 3.985 ac

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Existing Condition
Type III 24-hr 10-yr 24 hr Rainfall=4.88"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1

Runoff Area=241,775 sf 8.69% Impervious Runoff Depth=1.17"
Flow Length=735' Tc=32.2 min CN=59 Runoff=3.63 cfs 0.540 af

Subcatchment E2: E2

Runoff Area=395,349 sf 28.72% Impervious Runoff Depth=1.87"
Flow Length=936' Tc=53.4 min CN=69 Runoff=8.14 cfs 1.415 af

Subcatchment E3: E3

Runoff Area=111,153 sf 35.12% Impervious Runoff Depth=2.27"
Flow Length=1,158' Tc=19.7 min CN=74 Runoff=4.56 cfs 0.482 af

Link DP1: DP1 (Existing Condition)

Inflow=13.42 cfs 2.437 af
Primary=13.42 cfs 2.437 af

Total Runoff Area = 17.178 ac Runoff Volume = 2.437 af Average Runoff Depth = 1.70"
76.80% Pervious = 13.193 ac 23.20% Impervious = 3.985 ac

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Existing Condition
Type III 24-hr 25-yr 24 hr Rainfall=6.01"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1

Runoff Area=241,775 sf 8.69% Impervious Runoff Depth=1.85"
Flow Length=735' Tc=32.2 min CN=59 Runoff=6.14 cfs 0.853 af

Subcatchment E2: E2

Runoff Area=395,349 sf 28.72% Impervious Runoff Depth=2.72"
Flow Length=936' Tc=53.4 min CN=69 Runoff=12.07 cfs 2.057 af

Subcatchment E3: E3

Runoff Area=111,153 sf 35.12% Impervious Runoff Depth=3.19"
Flow Length=1,158' Tc=19.7 min CN=74 Runoff=6.47 cfs 0.679 af

Link DP1: DP1 (Existing Condition)

Inflow=20.47 cfs 3.590 af
Primary=20.47 cfs 3.590 af

Total Runoff Area = 17.178 ac Runoff Volume = 3.590 af Average Runoff Depth = 2.51"
76.80% Pervious = 13.193 ac 23.20% Impervious = 3.985 ac

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Existing Condition
Type III 24-hr 50-yr 24 hr Rainfall=6.83"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1

Runoff Area=241,775 sf 8.69% Impervious Runoff Depth=2.39"
Flow Length=735' Tc=32.2 min CN=59 Runoff=8.15 cfs 1.105 af

Subcatchment E2: E2

Runoff Area=395,349 sf 28.72% Impervious Runoff Depth=3.38"
Flow Length=936' Tc=53.4 min CN=69 Runoff=15.07 cfs 2.553 af

Subcatchment E3: E3

Runoff Area=111,153 sf 35.12% Impervious Runoff Depth=3.89"
Flow Length=1,158' Tc=19.7 min CN=74 Runoff=7.90 cfs 0.828 af

Link DP1: DP1 (Existing Condition)

Inflow=25.94 cfs 4.486 af
Primary=25.94 cfs 4.486 af

Total Runoff Area = 17.178 ac Runoff Volume = 4.486 af Average Runoff Depth = 3.13"
76.80% Pervious = 13.193 ac 23.20% Impervious = 3.985 ac

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Existing Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: E1

Runoff Area=241,775 sf 8.69% Impervious Runoff Depth=3.04"
Flow Length=735' Tc=32.2 min CN=59 Runoff=10.54 cfs 1.406 af

Subcatchment E2: E2

Runoff Area=395,349 sf 28.72% Impervious Runoff Depth=4.14"
Flow Length=936' Tc=53.4 min CN=69 Runoff=18.54 cfs 3.130 af

Subcatchment E3: E3

Runoff Area=111,153 sf 35.12% Impervious Runoff Depth=4.70"
Flow Length=1,158' Tc=19.7 min CN=74 Runoff=9.53 cfs 1.000 af

Link DP1: DP1 (Existing Condition)

Inflow=32.32 cfs 5.535 af
Primary=32.32 cfs 5.535 af

Total Runoff Area = 17.178 ac Runoff Volume = 5.535 af Average Runoff Depth = 3.87"
76.80% Pervious = 13.193 ac 23.20% Impervious = 3.985 ac

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Existing Condition
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Summary for Subcatchment E1: E1

Runoff = 0.68 cfs @ 12.64 hrs, Volume= 0.153 af, Depth= 0.33"
Routed to Link DP1 : DP1 (Existing Condition)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

Area (sf)	CN	Description
19,452	39	>75% Grass cover, Good, HSG A
5,573	61	>75% Grass cover, Good, HSG B
* 21,019	98	IMPERVIOUS
1,467	30	Meadow, non-grazed, HSG A
170,002	58	Meadow, non-grazed, HSG B
29	71	Meadow, non-grazed, HSG C
2,314	78	Meadow, non-grazed, HSG D
4,974	30	Woods, Good, HSG A
14,843	55	Woods, Good, HSG B
1,962	70	Woods, Good, HSG C
140	77	Woods, Good, HSG D
241,775	59	Weighted Average
220,756		91.31% Pervious Area
21,019		8.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	100	0.0520	0.11		Sheet Flow, Woods SF
17.3	635	0.0150	0.61		Woods: Light underbrush n= 0.400 P2= 3.08" Shallow Concentrated Flow, Woodland SCF
32.2	735	Total			Woodland Kv= 5.0 fps

Summary for Subcatchment E2: E2

Runoff = 2.74 cfs @ 12.82 hrs, Volume= 0.539 af, Depth= 0.71"
Routed to Link DP1 : DP1 (Existing Condition)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

Area (sf)	CN	Description
44,072	61	>75% Grass cover, Good, HSG B
* 113,537	98	IMPERVIOUS
165,668	58	Meadow, non-grazed, HSG B
72,072	55	Woods, Good, HSG B
395,349	69	Weighted Average
281,812		71.28% Pervious Area
113,537		28.72% Impervious Area

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Existing Condition
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	100	0.0080	0.05		Sheet Flow, Woods SF Woods: Light underbrush n= 0.400 P2= 3.08"
21.1	491	0.0060	0.39		Shallow Concentrated Flow, Woodland SCF Woodland Kv= 5.0 fps
0.7	345	0.0050	8.01	77.07	Pipe Channel, 42IN RCP 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.012 Concrete pipe, finished
53.4	936	Total			

Summary for Subcatchment E3: E3

Runoff = 1.81 cfs @ 12.30 hrs, Volume= 0.204 af, Depth= 0.96"
Routed to Link DP1 : DP1 (Existing Condition)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

Area (sf)	CN	Description
20,028	61	>75% Grass cover, Good, HSG B
144	80	>75% Grass cover, Good, HSG D
* 39,039	98	IMPERVIOUS
22,144	58	Meadow, non-grazed, HSG B
4,229	78	Meadow, non-grazed, HSG D
18,305	55	Woods, Good, HSG B
7,264	77	Woods, Good, HSG D
111,153	74	Weighted Average
72,114		64.88% Pervious Area
39,039		35.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0250	0.13		Sheet Flow, Grass SF Grass: Dense n= 0.240 P2= 3.08"
4.7	1,008	0.0310	3.57		Shallow Concentrated Flow, Paved SCF Paved Kv= 20.3 fps
0.7	50	0.0310	1.23		Shallow Concentrated Flow, Grass SCF Short Grass Pasture Kv= 7.0 fps
1.0					Direct Entry, Pipe flow to Design Point (approx)
19.7	1,158	Total			

Summary for Link DP1: DP1 (Existing Condition)

Inflow Area = 17.178 ac, 23.20% Impervious, Inflow Depth = 0.63" for 2-yr 24 hr event
Inflow = 4.12 cfs @ 12.67 hrs, Volume= 0.896 af
Primary = 4.12 cfs @ 12.67 hrs, Volume= 0.896 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

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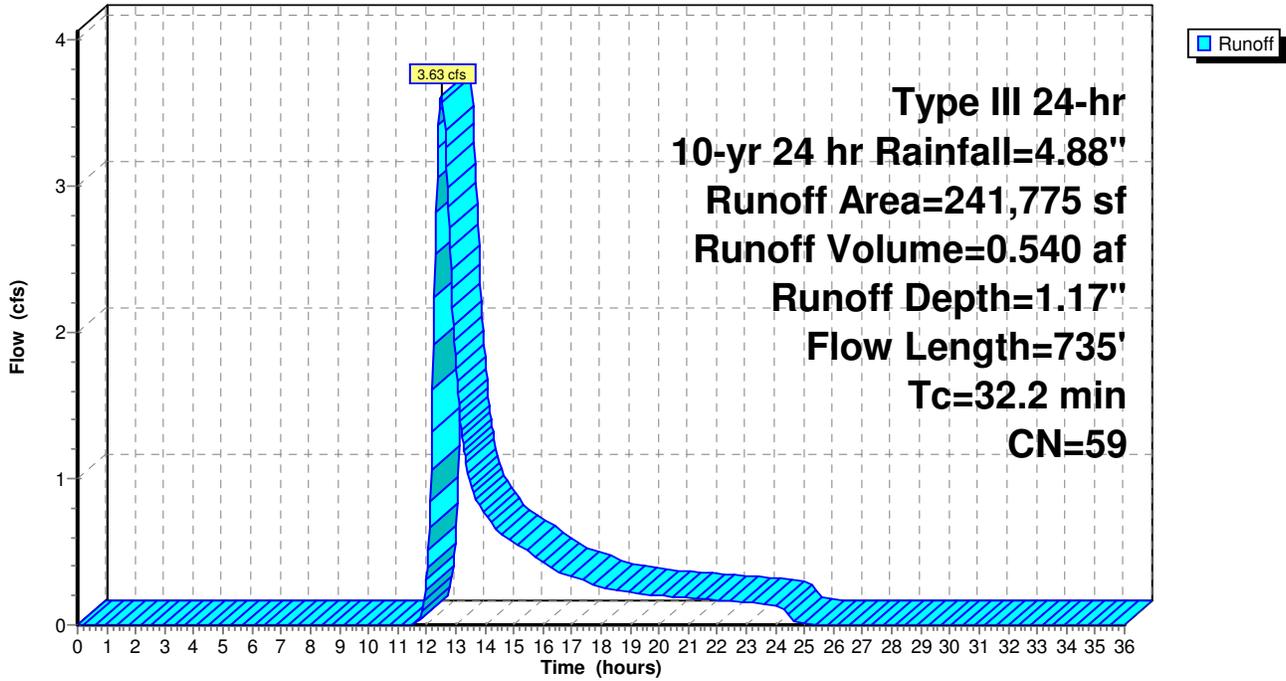
Existing Condition
Type III 24-hr 10-yr 24 hr Rainfall=4.88"

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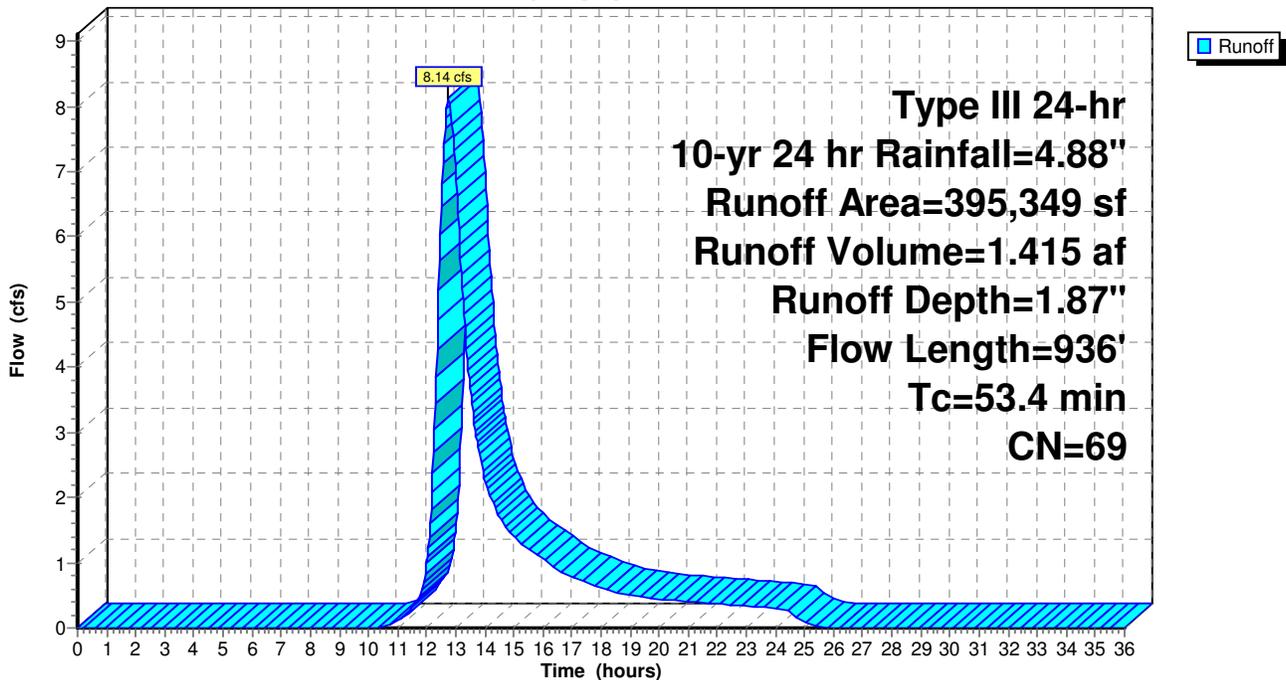
Subcatchment E1: E1

Hydrograph



Subcatchment E2: E2

Hydrograph



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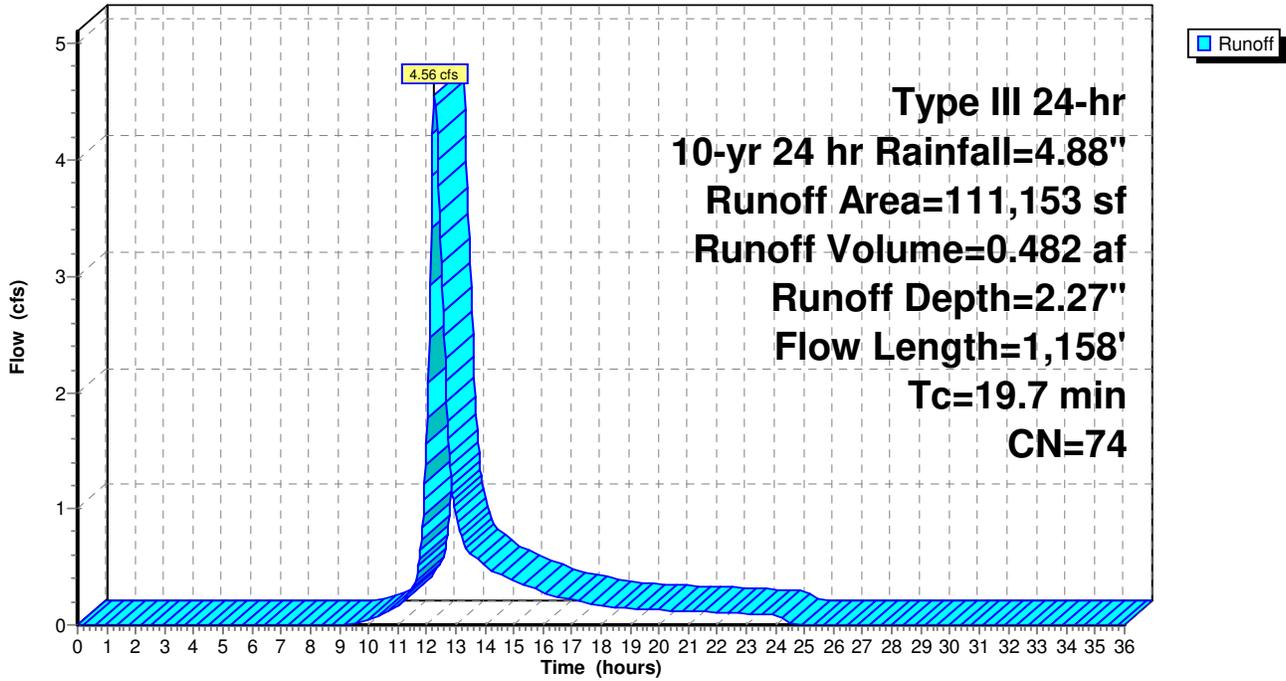
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Type III 24-hr 10-yr 24 hr Rainfall=4.88"

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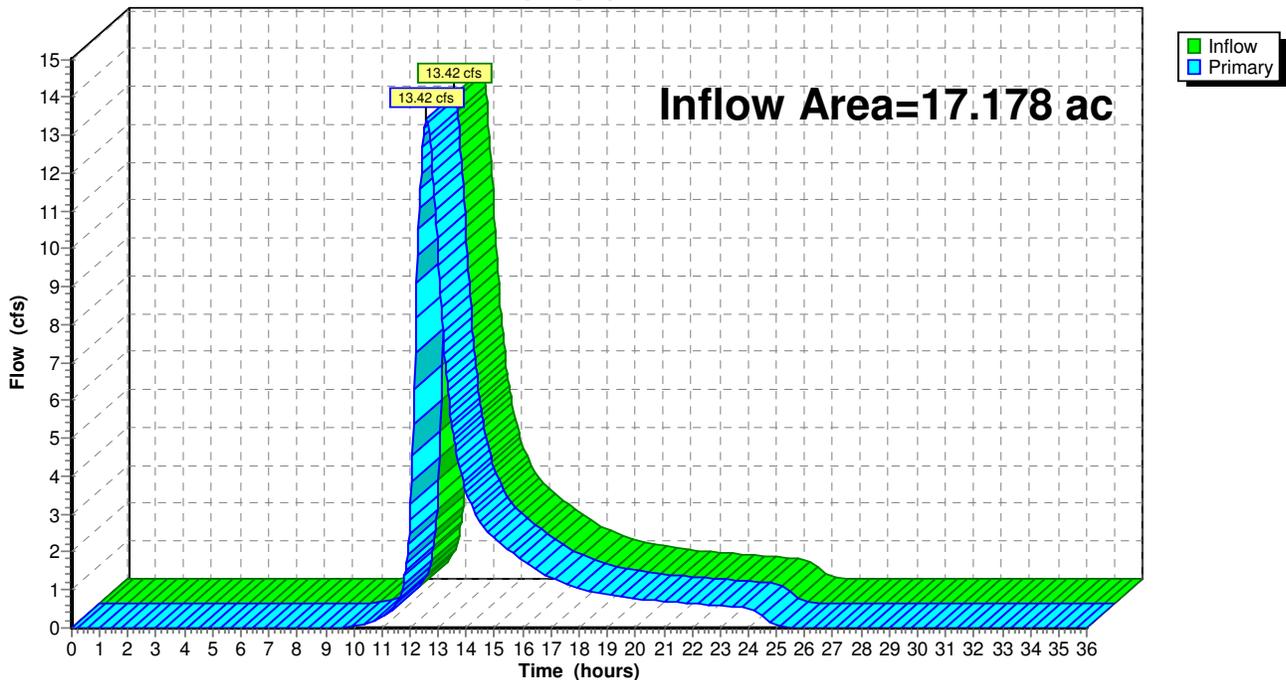
Subcatchment E3: E3

Hydrograph



Link DP1: DP1 (Existing Condition)

Hydrograph



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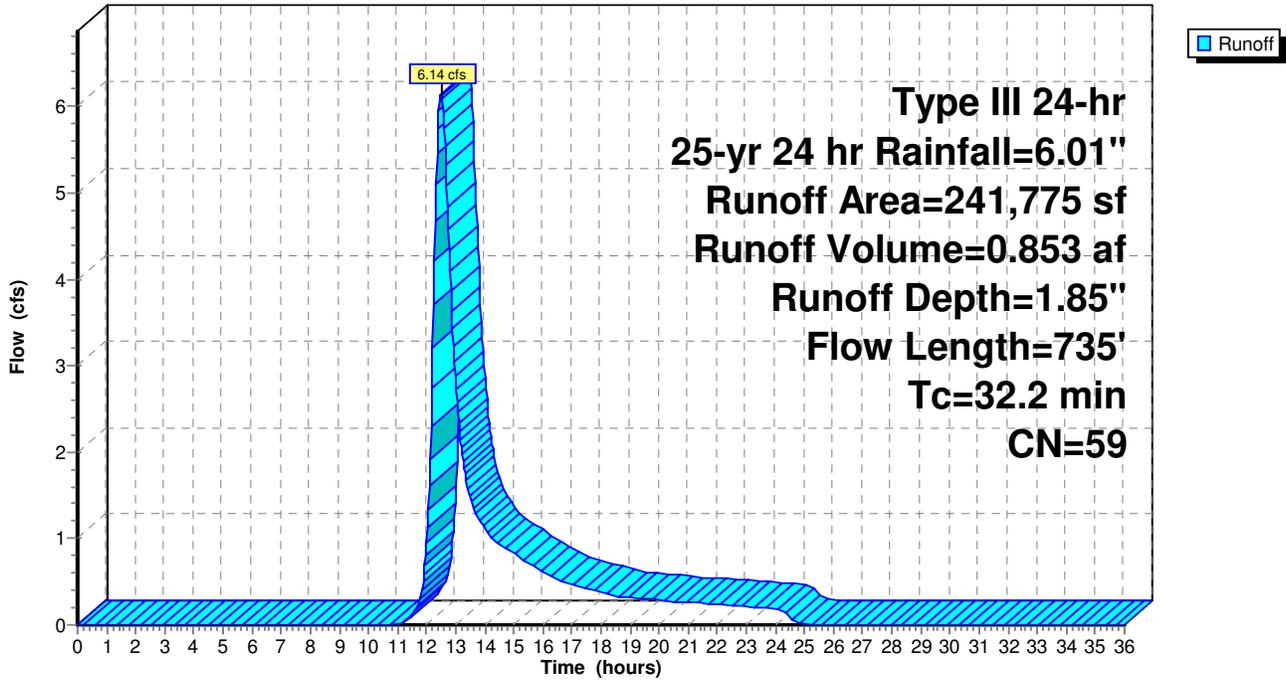
Existing Condition
Type III 24-hr 25-yr 24 hr Rainfall=6.01"

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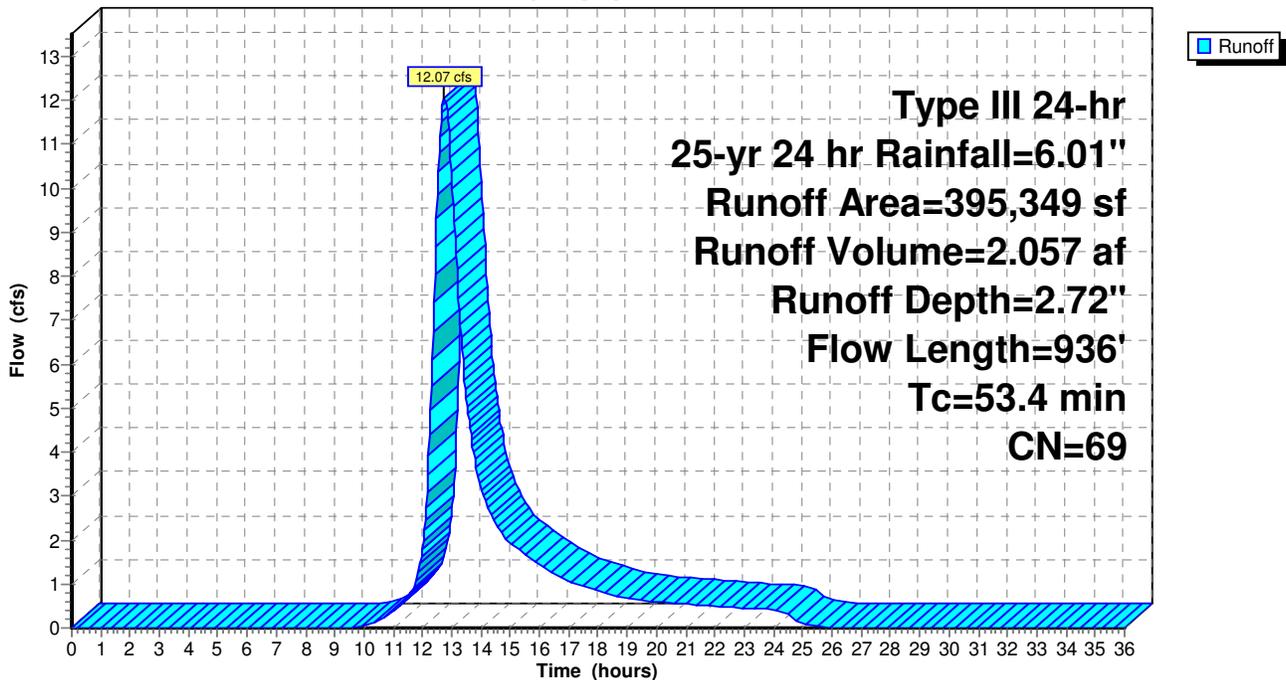
Subcatchment E1: E1

Hydrograph



Subcatchment E2: E2

Hydrograph



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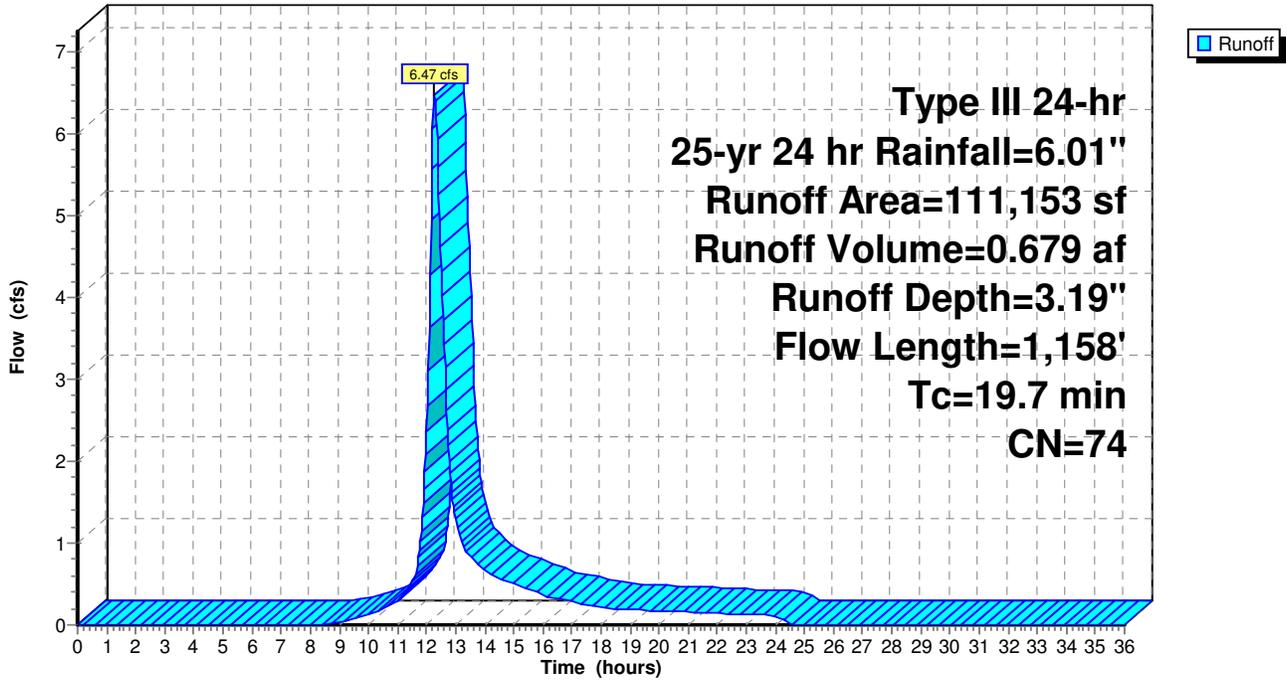
Existing Condition
Type III 24-hr 25-yr 24 hr Rainfall=6.01"

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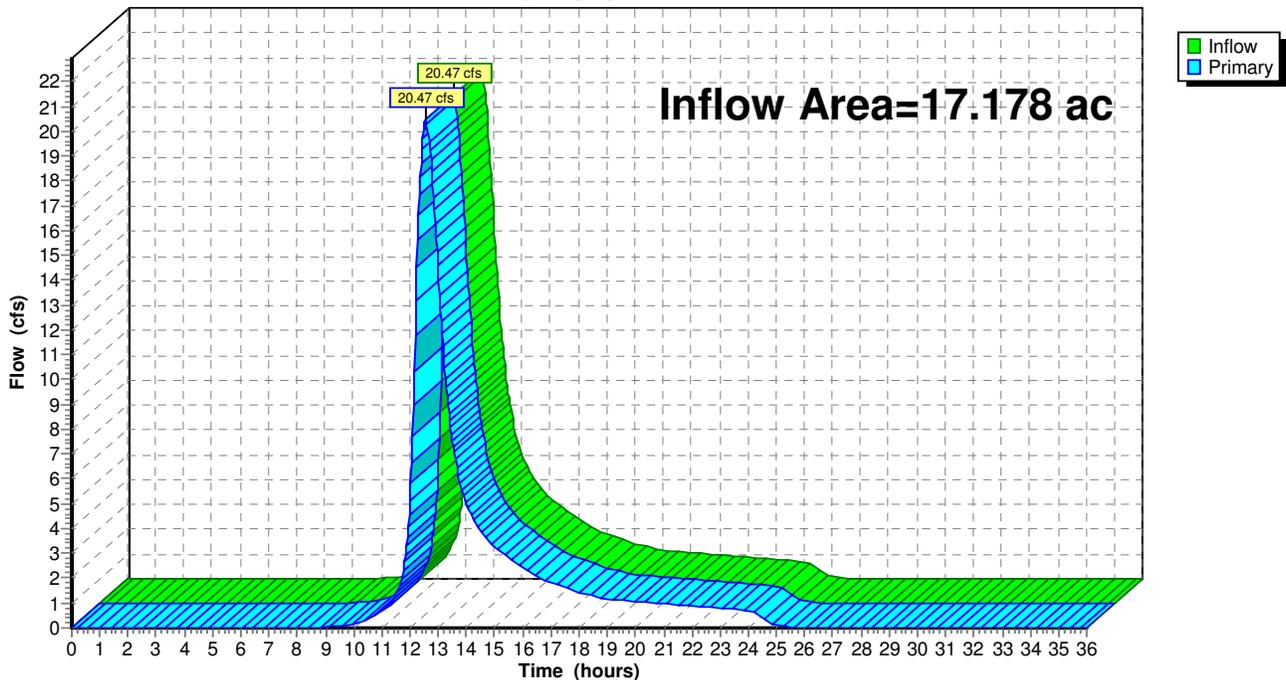
Subcatchment E3: E3

Hydrograph



Link DP1: DP1 (Existing Condition)

Hydrograph



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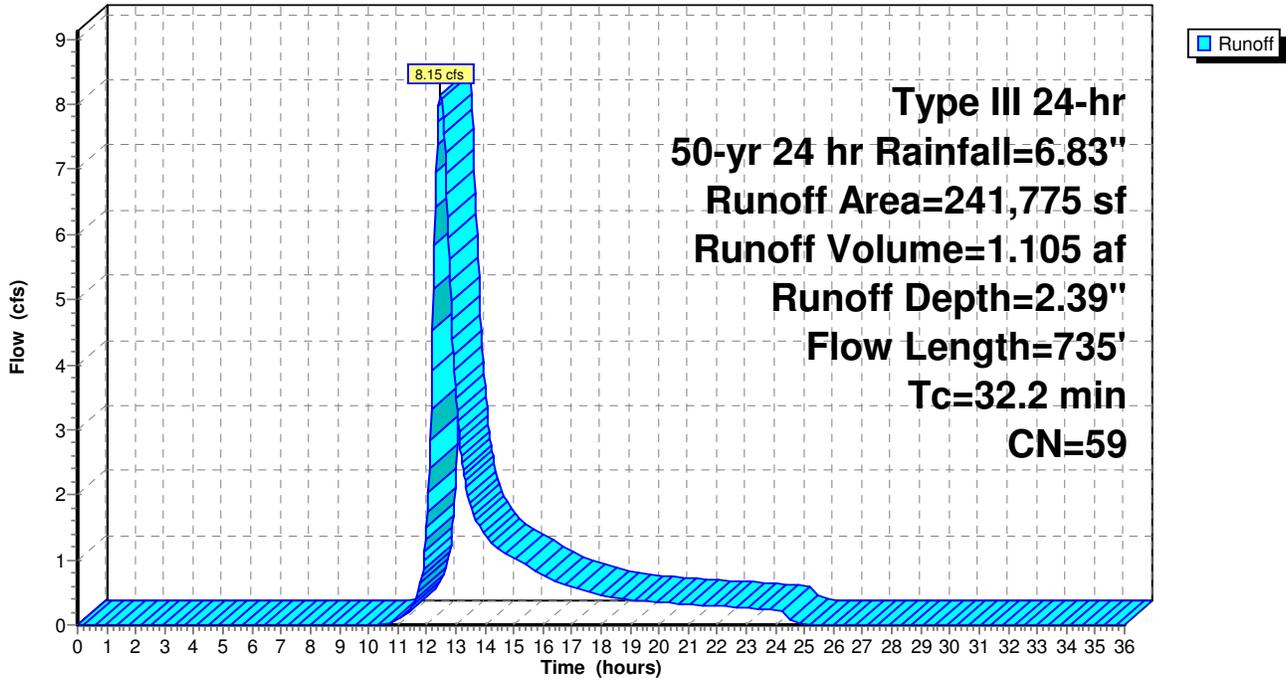
Existing Condition
Type III 24-hr 50-yr 24 hr Rainfall=6.83"

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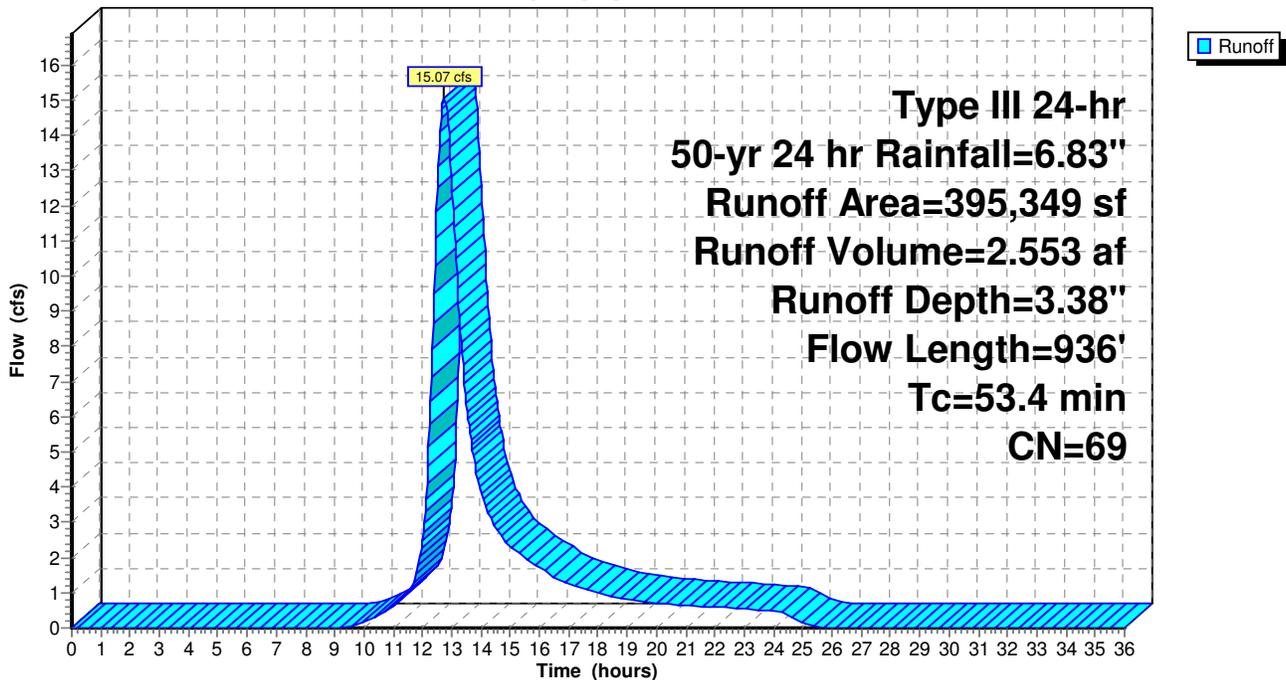
Subcatchment E1: E1

Hydrograph



Subcatchment E2: E2

Hydrograph



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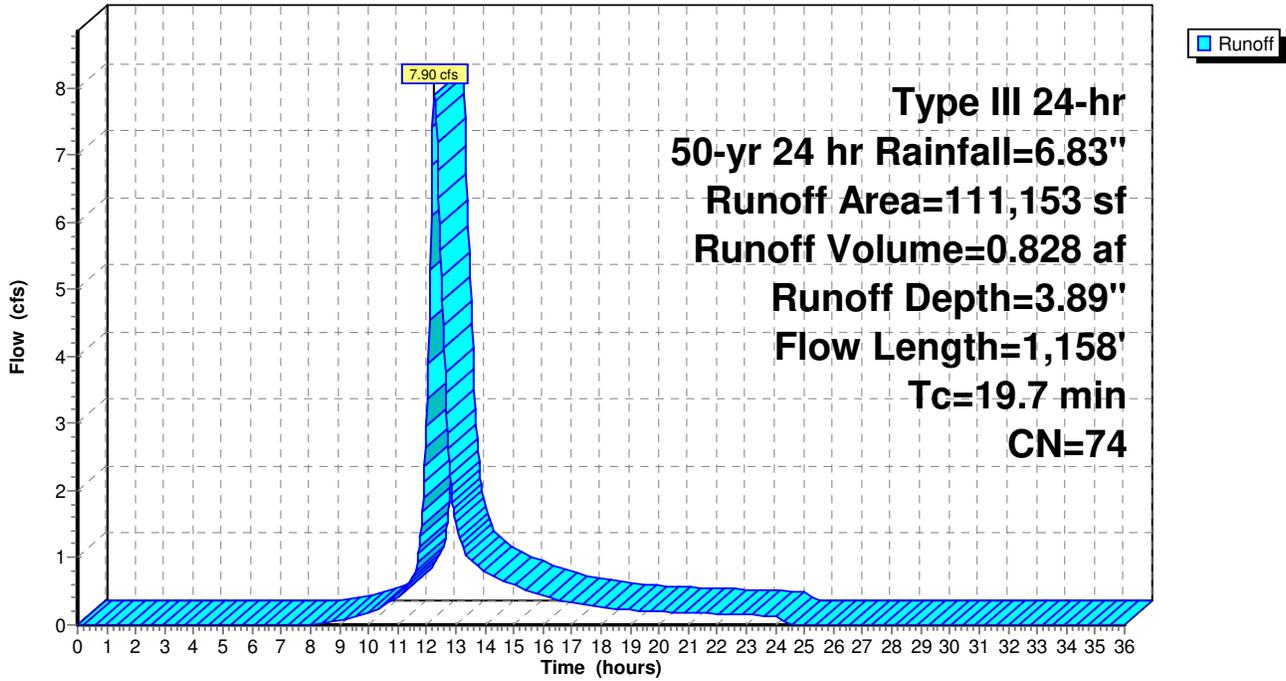
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Type III 24-hr 50-yr 24 hr Rainfall=6.83"

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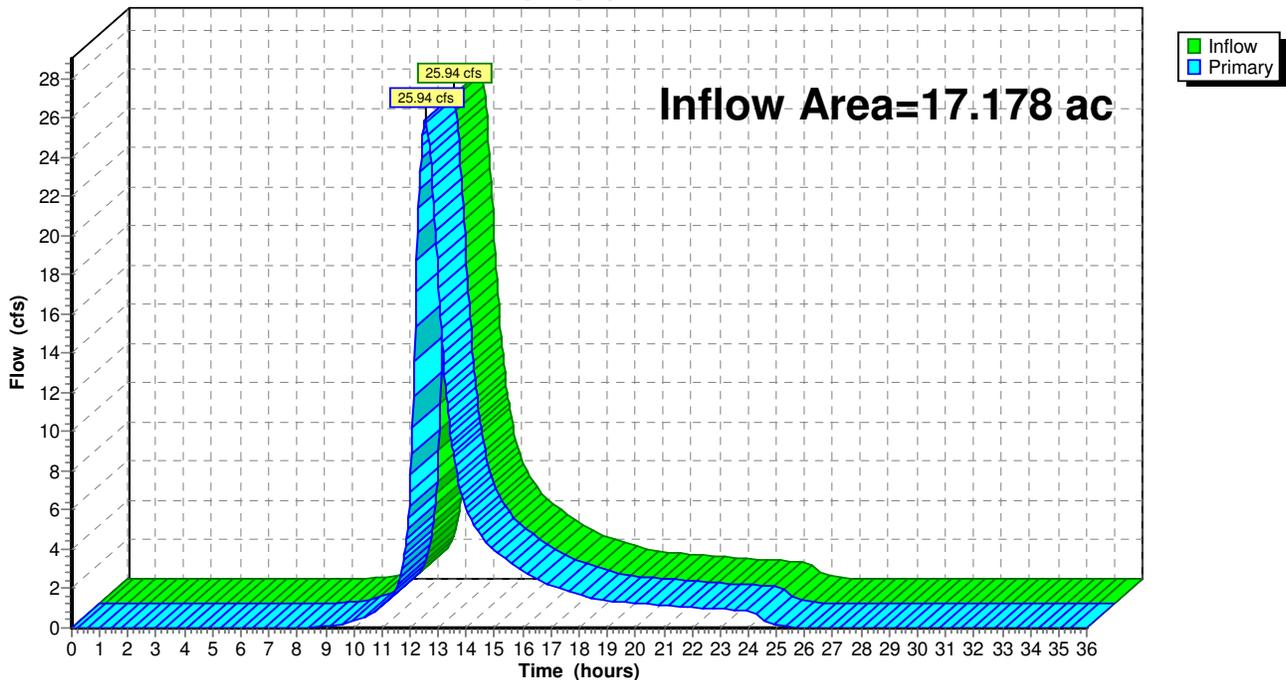
Subcatchment E3: E3

Hydrograph



Link DP1: DP1 (Existing Condition)

Hydrograph



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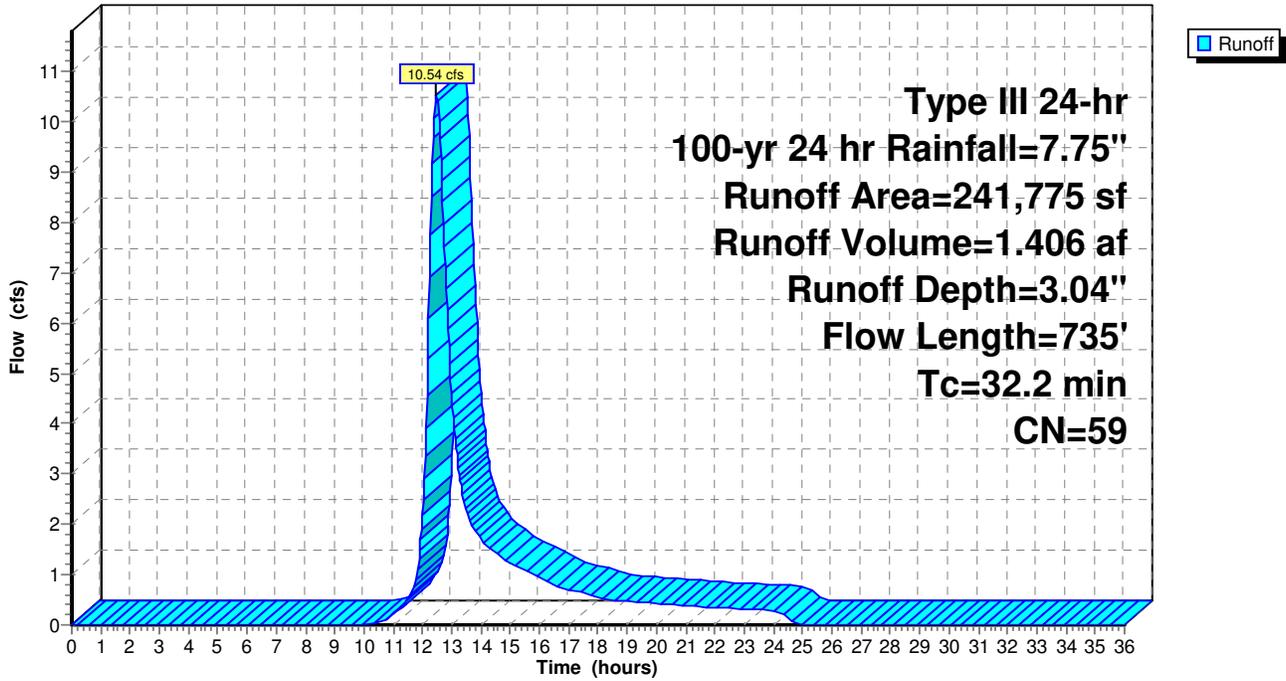
Existing Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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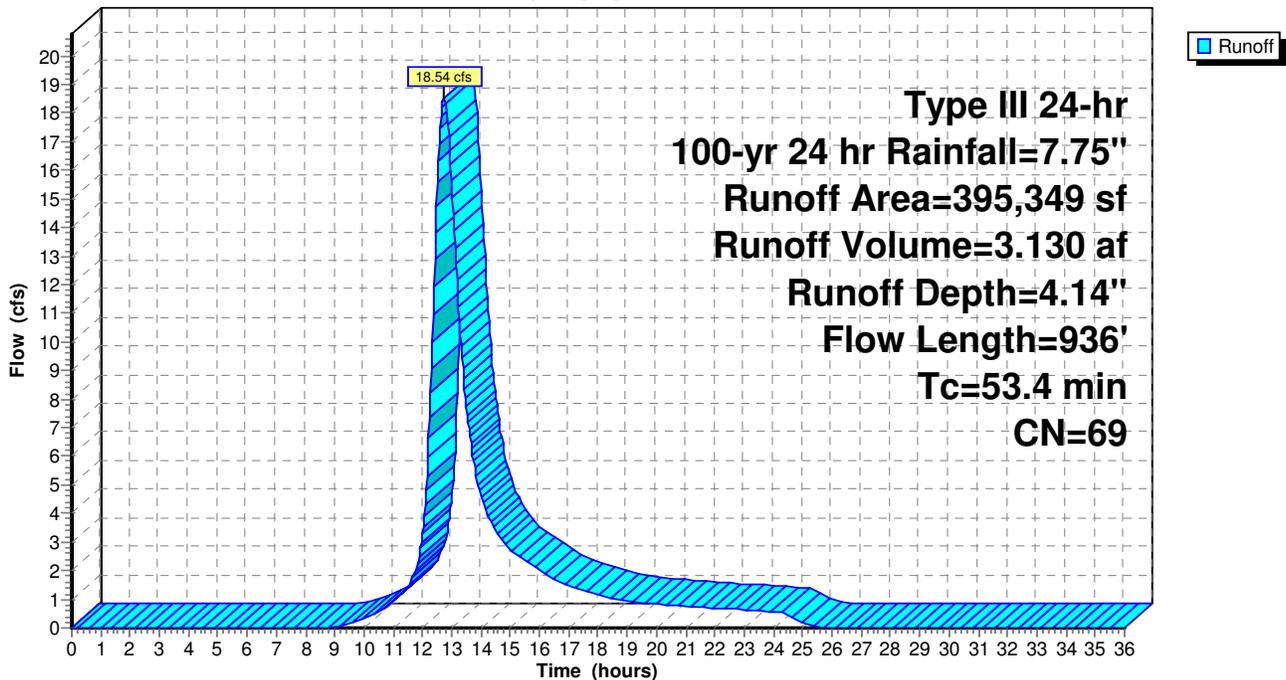
Subcatchment E1: E1

Hydrograph



Subcatchment E2: E2

Hydrograph



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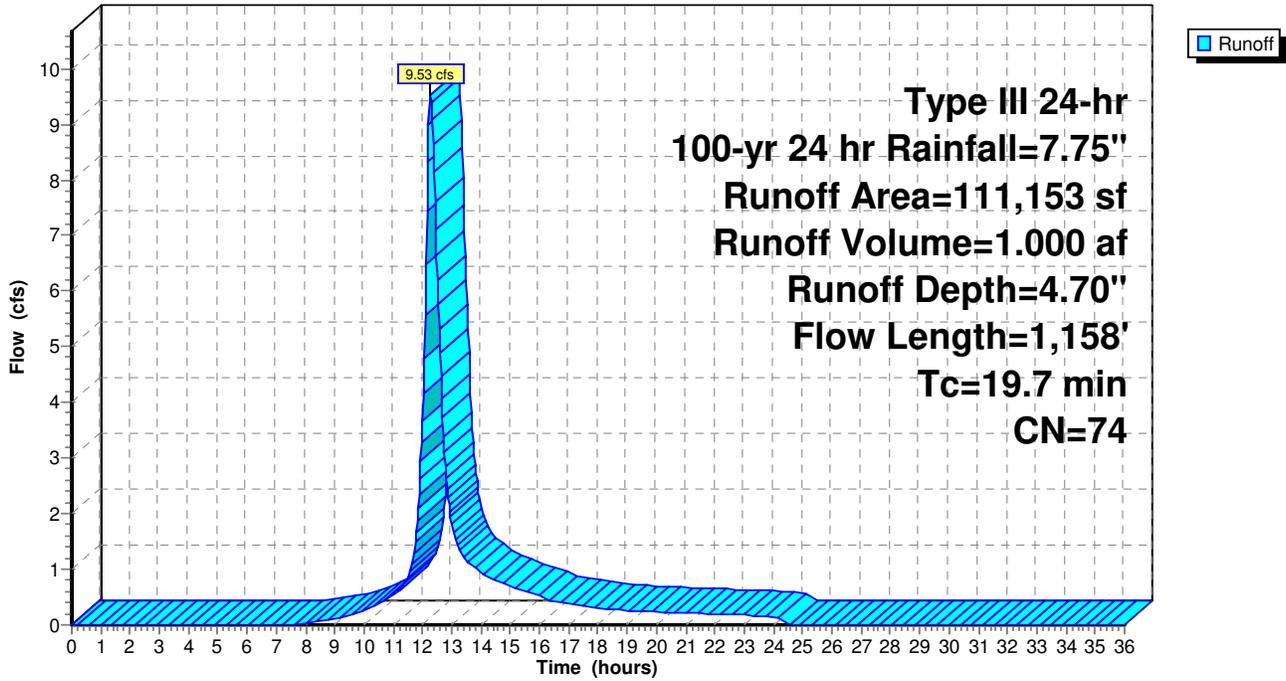
Existing Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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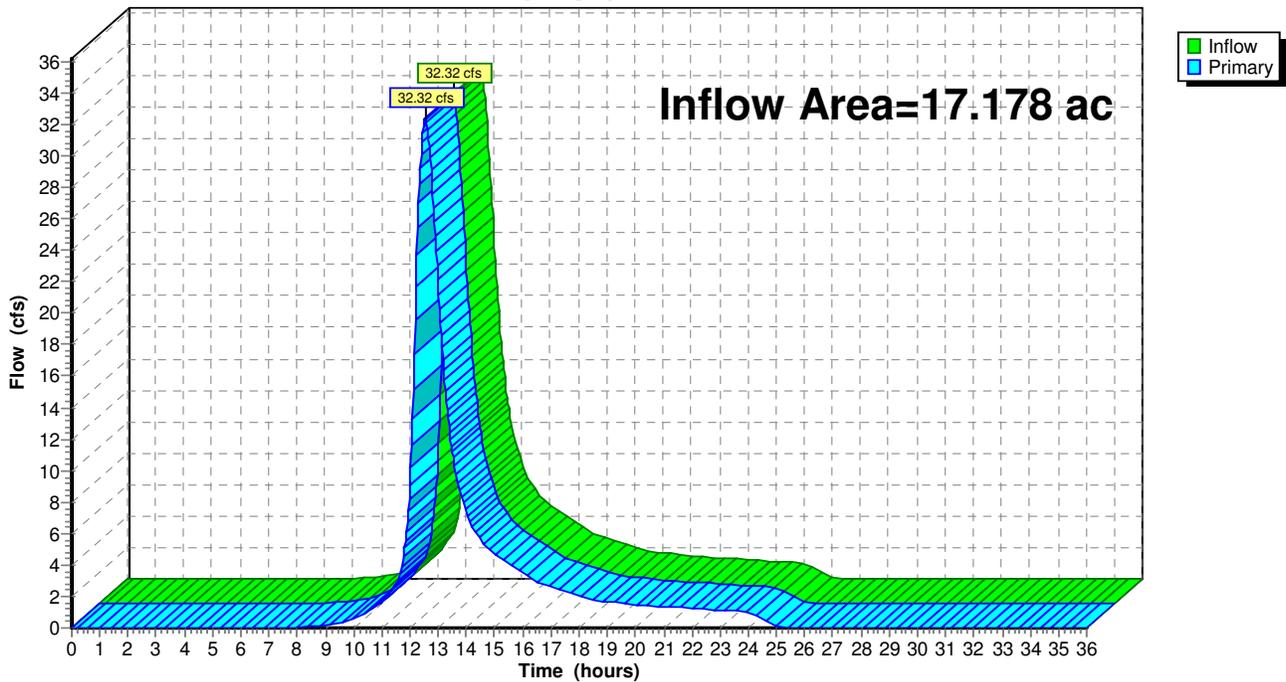
Subcatchment E3: E3

Hydrograph

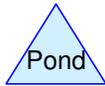
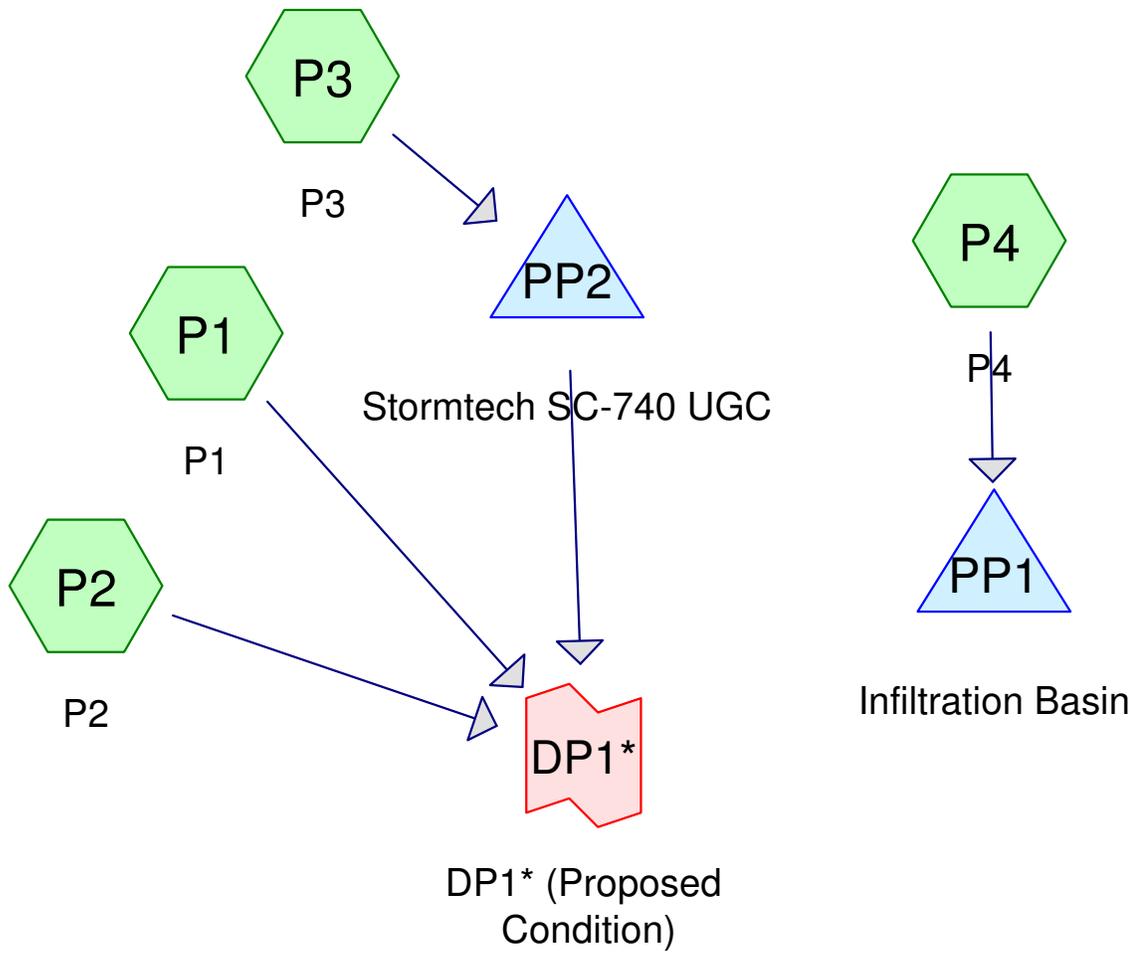


Link DP1: DP1 (Existing Condition)

Hydrograph



APPENDIX B
Watershed Computations
(Post-Development Drainage HydroCAD Report)



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Proposed Condition

Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: P1	Runoff Area=100,066 sf 20.78% Impervious Runoff Depth=0.47" Flow Length=642' Tc=17.2 min CN=63 Runoff=0.61 cfs 0.089 af
Subcatchment P2: P2	Runoff Area=252,718 sf 44.93% Impervious Runoff Depth=1.07" Flow Length=351' Slope=0.0080 '/' Tc=42.0 min CN=76 Runoff=3.34 cfs 0.517 af
Subcatchment P3: P3	Runoff Area=383,881 sf 83.39% Impervious Runoff Depth=2.24" Tc=20.0 min CN=92 Runoff=15.31 cfs 1.643 af
Subcatchment P4: P4	Runoff Area=121,706 sf 36.85% Impervious Runoff Depth=1.01" Tc=8.0 min CN=75 Runoff=2.93 cfs 0.236 af
Pond PP1: Infiltration Basin	Peak Elev=46.71' Storage=1,016 cf Inflow=2.93 cfs 0.236 af Outflow=1.93 cfs 0.236 af
Pond PP2: Stormtech SC-740 UGC	Peak Elev=44.63' Storage=3,855 cf Inflow=15.31 cfs 1.643 af Discarded=10.71 cfs 1.643 af Primary=0.00 cfs 0.000 af Outflow=10.72 cfs 1.643 af
Link DP1*: DP1* (Proposed Condition)	Inflow=3.77 cfs 0.606 af Primary=3.77 cfs 0.606 af
Total Runoff Area = 19.705 ac Runoff Volume = 2.485 af Average Runoff Depth = 1.51"	
41.83% Pervious = 8.243 ac 58.17% Impervious = 11.462 ac	

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Proposed Condition

Type III 24-hr 10-yr 24 hr Rainfall=4.88"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: P1	Runoff Area=100,066 sf 20.78% Impervious Runoff Depth=1.43" Flow Length=642' Tc=17.2 min CN=63 Runoff=2.54 cfs 0.274 af
Subcatchment P2: P2	Runoff Area=252,718 sf 44.93% Impervious Runoff Depth=2.44" Flow Length=351' Slope=0.0080 '/' Tc=42.0 min CN=76 Runoff=7.92 cfs 1.178 af
Subcatchment P3: P3	Runoff Area=383,881 sf 83.39% Impervious Runoff Depth=3.97" Tc=20.0 min CN=92 Runoff=26.49 cfs 2.917 af
Subcatchment P4: P4	Runoff Area=121,706 sf 36.85% Impervious Runoff Depth=2.35" Tc=8.0 min CN=75 Runoff=7.13 cfs 0.548 af
Pond PP1: Infiltration Basin	Peak Elev=47.23' Storage=3,801 cf Inflow=7.13 cfs 0.548 af Outflow=3.19 cfs 0.548 af
Pond PP2: Stormtech SC-740 UGC	Peak Elev=45.53' Storage=16,407 cf Inflow=26.49 cfs 2.917 af Discarded=11.01 cfs 2.752 af Primary=3.95 cfs 0.165 af Outflow=14.96 cfs 2.917 af
Link DP1*: DP1* (Proposed Condition)	Inflow=13.38 cfs 1.618 af Primary=13.38 cfs 1.618 af
Total Runoff Area = 19.705 ac Runoff Volume = 4.917 af Average Runoff Depth = 2.99"	
41.83% Pervious = 8.243 ac 58.17% Impervious = 11.462 ac	

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Proposed Condition

Type III 24-hr 25-yr 24 hr Rainfall=6.01"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: P1	Runoff Area=100,066 sf 20.78% Impervious Runoff Depth=2.18" Flow Length=642' Tc=17.2 min CN=63 Runoff=4.05 cfs 0.418 af
Subcatchment P2: P2	Runoff Area=252,718 sf 44.93% Impervious Runoff Depth=3.39" Flow Length=351' Slope=0.0080 '/' Tc=42.0 min CN=76 Runoff=11.07 cfs 1.638 af
Subcatchment P3: P3	Runoff Area=383,881 sf 83.39% Impervious Runoff Depth=5.08" Tc=20.0 min CN=92 Runoff=33.44 cfs 3.730 af
Subcatchment P4: P4	Runoff Area=121,706 sf 36.85% Impervious Runoff Depth=3.29" Tc=8.0 min CN=75 Runoff=10.01 cfs 0.766 af
Pond PP1: Infiltration Basin	Peak Elev=47.51' Storage=7,124 cf Inflow=10.01 cfs 0.766 af Outflow=3.19 cfs 0.766 af
Pond PP2: Stormtech SC-740 UGC	Peak Elev=46.14' Storage=24,081 cf Inflow=33.44 cfs 3.730 af Discarded=11.21 cfs 3.347 af Primary=7.11 cfs 0.384 af Outflow=18.31 cfs 3.730 af
Link DP1*: DP1* (Proposed Condition)	Inflow=20.47 cfs 2.440 af Primary=20.47 cfs 2.440 af
Total Runoff Area = 19.705 ac Runoff Volume = 6.553 af Average Runoff Depth = 3.99"	
41.83% Pervious = 8.243 ac 58.17% Impervious = 11.462 ac	

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Proposed Condition

Type III 24-hr 50-yr 24 hr Rainfall=6.83"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: P1	Runoff Area=100,066 sf 20.78% Impervious Runoff Depth=2.77" Flow Length=642' Tc=17.2 min CN=63 Runoff=5.23 cfs 0.531 af
Subcatchment P2: P2	Runoff Area=252,718 sf 44.93% Impervious Runoff Depth=4.11" Flow Length=351' Slope=0.0080 '/' Tc=42.0 min CN=76 Runoff=13.41 cfs 1.985 af
Subcatchment P3: P3	Runoff Area=383,881 sf 83.39% Impervious Runoff Depth=5.89" Tc=20.0 min CN=92 Runoff=38.45 cfs 4.323 af
Subcatchment P4: P4	Runoff Area=121,706 sf 36.85% Impervious Runoff Depth=4.00" Tc=8.0 min CN=75 Runoff=12.17 cfs 0.931 af
Pond PP1: Infiltration Basin	Peak Elev=47.69' Storage=9,926 cf Inflow=12.17 cfs 0.931 af Outflow=3.19 cfs 0.931 af
Pond PP2: Stormtech SC-740 UGC	Peak Elev=46.66' Storage=29,850 cf Inflow=38.45 cfs 4.323 af Discarded=11.38 cfs 3.757 af Primary=9.38 cfs 0.567 af Outflow=20.75 cfs 4.323 af
Link DP1*: DP1* (Proposed Condition)	Inflow=25.67 cfs 3.083 af Primary=25.67 cfs 3.083 af
Total Runoff Area = 19.705 ac Runoff Volume = 7.771 af Average Runoff Depth = 4.73"	
41.83% Pervious = 8.243 ac 58.17% Impervious = 11.462 ac	

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Proposed Condition

Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: P1	Runoff Area=100,066 sf 20.78% Impervious Runoff Depth=3.47" Flow Length=642' Tc=17.2 min CN=63 Runoff=6.62 cfs 0.665 af
Subcatchment P2: P2	Runoff Area=252,718 sf 44.93% Impervious Runoff Depth=4.93" Flow Length=351' Slope=0.0080 '/' Tc=42.0 min CN=76 Runoff=16.07 cfs 2.384 af
Subcatchment P3: P3	Runoff Area=383,881 sf 83.39% Impervious Runoff Depth=6.80" Tc=20.0 min CN=92 Runoff=44.05 cfs 4.991 af
Subcatchment P4: P4	Runoff Area=121,706 sf 36.85% Impervious Runoff Depth=4.82" Tc=8.0 min CN=75 Runoff=14.61 cfs 1.121 af
Pond PP1: Infiltration Basin	Peak Elev=47.87' Storage=13,346 cf Inflow=14.61 cfs 1.121 af Outflow=3.19 cfs 1.121 af
Pond PP2: Stormtech SC-740 UGC	Peak Elev=47.44' Storage=35,782 cf Inflow=44.05 cfs 4.991 af Discarded=11.63 cfs 4.193 af Primary=12.61 cfs 0.798 af Outflow=24.25 cfs 4.991 af
Link DP1*: DP1* (Proposed Condition)	Inflow=32.31 cfs 3.847 af Primary=32.31 cfs 3.847 af
Total Runoff Area = 19.705 ac Runoff Volume = 9.161 af Average Runoff Depth = 5.58"	
41.83% Pervious = 8.243 ac 58.17% Impervious = 11.462 ac	

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Proposed Condition

Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Summary for Subcatchment P1: P1

Runoff = 0.61 cfs @ 12.33 hrs, Volume= 0.089 af, Depth= 0.47"
Routed to Link DP1* : DP1* (Proposed Condition)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

Area (sf)	CN	Description
23,422	39	>75% Grass cover, Good, HSG A
43,628	61	>75% Grass cover, Good, HSG B
636	74	>75% Grass cover, Good, HSG C
* 20,798	98	IMPERVIOUS
45	30	Meadow, non-grazed, HSG A
2,031	58	Meadow, non-grazed, HSG B
14	71	Meadow, non-grazed, HSG C
2,448	30	Woods, Good, HSG A
5,704	55	Woods, Good, HSG B
1,340	70	Woods, Good, HSG C
100,066	63	Weighted Average
79,268		79.22% Pervious Area
20,798		20.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0271	0.13		Sheet Flow, Grass SF
					Grass: Dense n= 0.240 P2= 3.08"
4.3	542	0.0200	2.12		Shallow Concentrated Flow, Woodland SCF
					Grassed Waterway Kv= 15.0 fps
17.2	642	Total			

Summary for Subcatchment P2: P2

Runoff = 3.34 cfs @ 12.62 hrs, Volume= 0.517 af, Depth= 1.07"
Routed to Link DP1* : DP1* (Proposed Condition)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

Area (sf)	CN	Description
80,731	61	>75% Grass cover, Good, HSG B
* 113,537	98	IMPERVIOUS
3,913	58	Meadow, non-grazed, HSG B
54,537	55	Woods, Good, HSG B
252,718	76	Weighted Average
139,181		55.07% Pervious Area
113,537		44.93% Impervious Area

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Proposed Condition
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	100	0.0080	0.05		Sheet Flow, Woodland SF Woods: Light underbrush n= 0.400 P2= 3.08"
9.4	251	0.0080	0.45		Shallow Concentrated Flow, Woodland Woodland Kv= 5.0 fps
1.0					Direct Entry, Pipe flow to Design Point (approx)
42.0	351	Total			

Summary for Subcatchment P3: P3

Runoff = 15.31 cfs @ 12.27 hrs, Volume= 1.643 af, Depth= 2.24"
Routed to Pond PP2 : Stormtech SC-740 UGC

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

Area (sf)	CN	Description
39,771	61	>75% Grass cover, Good, HSG B
6,221	80	>75% Grass cover, Good, HSG D
* 320,105	98	IMPERVIOUS
17,575	55	Woods, Good, HSG B
209	77	Woods, Good, HSG D
383,881	92	Weighted Average
63,776		16.61% Pervious Area
320,105		83.39% Impervious Area

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

Summary for Subcatchment P4: P4

Runoff = 2.93 cfs @ 12.12 hrs, Volume= 0.236 af, Depth= 1.01"
Routed to Pond PP1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

Area (sf)	CN	Description
76,856	61	>75% Grass cover, Good, HSG B
* 44,850	98	IMPERVIOUS
121,706	75	Weighted Average
76,856		63.15% Pervious Area
44,850		36.85% Impervious Area

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Proposed Condition
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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

Summary for Pond PP1: Infiltration Basin

*No infiltration accounted for in Volume #2

Inflow Area = 2.794 ac, 36.85% Impervious, Inflow Depth = 1.01" for 2-yr 24 hr event
 Inflow = 2.93 cfs @ 12.12 hrs, Volume= 0.236 af
 Outflow = 1.93 cfs @ 12.25 hrs, Volume= 0.236 af, Atten= 34%, Lag= 7.8 min
 Discarded = 1.93 cfs @ 12.25 hrs, Volume= 0.236 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
 Peak Elev= 46.71' @ 12.25 hrs Surf.Area= 3,087 sf Storage= 1,016 cf

Plug-Flow detention time= 4.1 min calculated for 0.236 af (100% of inflow)
 Center-of-Mass det. time= 4.1 min (867.1 - 863.0)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	2,189 cf	Custom Stage Data (Conic) Listed below (Recalc)
#2	47.00'	77,493 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
		79,682 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
46.00	277	0	0	277
47.00	5,101	2,189	2,189	5,104

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	5,101	0	0
48.00	22,964	14,033	14,033
49.00	27,625	25,295	39,327
50.00	48,707	38,166	77,493

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	27.000 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=1.93 cfs @ 12.25 hrs HW=46.71' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.93 cfs)

Summary for Pond PP2: Stormtech SC-740 UGC

Top of Pond 47.6

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Proposed Condition
Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Inflow Area = 8.813 ac, 83.39% Impervious, Inflow Depth = 2.24" for 2-yr 24 hr event
 Inflow = 15.31 cfs @ 12.27 hrs, Volume= 1.643 af
 Outflow = 10.72 cfs @ 12.47 hrs, Volume= 1.643 af, Atten= 30%, Lag= 12.3 min
 Discarded = 10.71 cfs @ 12.47 hrs, Volume= 1.643 af
 Primary = 0.00 cfs @ 12.47 hrs, Volume= 0.000 af
 Routed to Link DP1* : DP1* (Proposed Condition)

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
 Peak Elev= 44.63' @ 12.47 hrs Surf.Area= 16,865 sf Storage= 3,855 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.5 min (813.7 - 812.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	44.10'	14,790 cf	115.50'W x 146.02'L x 3.50'H Field A 59,027 cf Overall - 22,051 cf Embedded = 36,976 cf x 40.0% Voids
#2A	44.60'	22,051 cf	ADS_StormTech SC-740 +Cap x 480 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 480 Chambers in 24 Rows
		36,842 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.10'	27.000 in/hr Exfiltration over Wetted area
#2	Primary	44.61'	24.0" Round Culvert L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.61' / 44.32' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#3	Device 2	44.61'	34.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	45.55'	21.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 2	46.40'	12.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=10.71 cfs @ 12.47 hrs HW=44.63' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 10.71 cfs)

Primary OutFlow Max=0.00 cfs @ 12.47 hrs HW=44.63' (Free Discharge)
 ↳ **2=Culvert** (Barrel Controls 0.00 cfs @ 0.63 fps)
 ↳ **3=Orifice/Grate** (Passes 0.00 cfs of 0.03 cfs potential flow)
 ↳ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **5=Orifice/Grate** (Controls 0.00 cfs)

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Proposed Condition

Type III 24-hr 2-yr 24 hr Rainfall=3.08"

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Summary for Link DP1*: DP1* (Proposed Condition)

Inflow Area = 16.912 ac, 61.69% Impervious, Inflow Depth = 0.43" for 2-yr 24 hr event

Inflow = 3.77 cfs @ 12.58 hrs, Volume= 0.606 af

Primary = 3.77 cfs @ 12.58 hrs, Volume= 0.606 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

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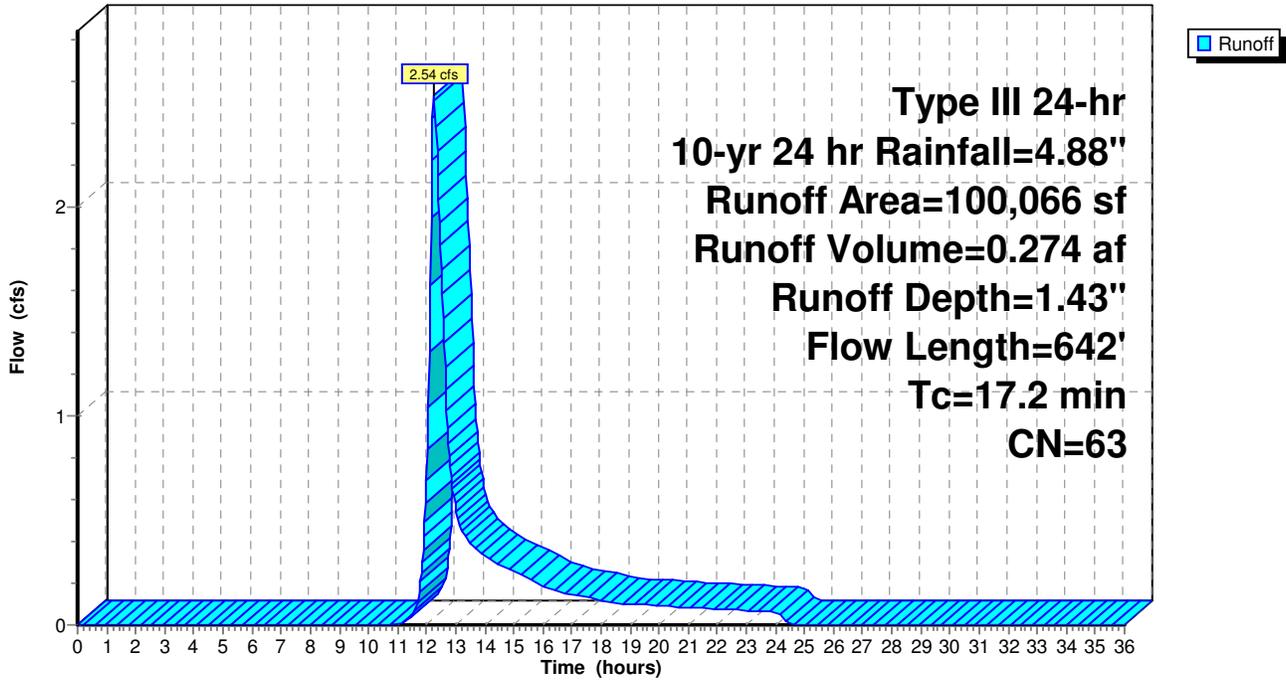
Proposed Condition
Type III 24-hr 10-yr 24 hr Rainfall=4.88"

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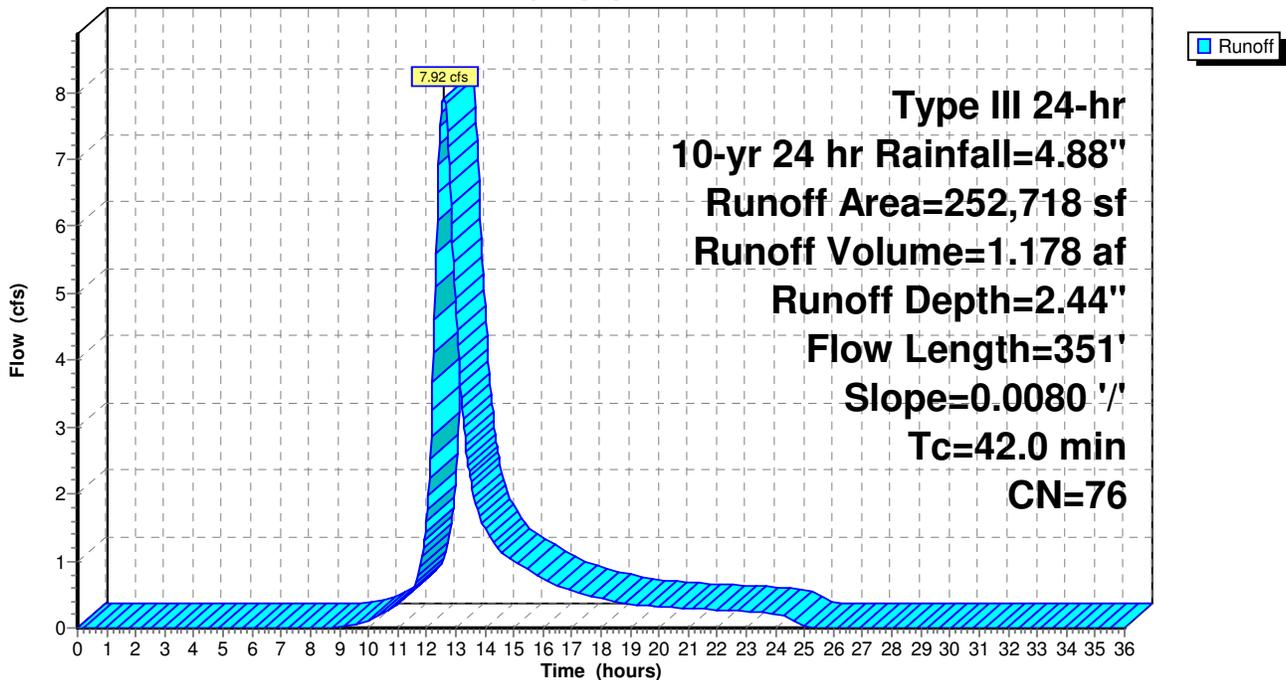
Subcatchment P1: P1

Hydrograph



Subcatchment P2: P2

Hydrograph



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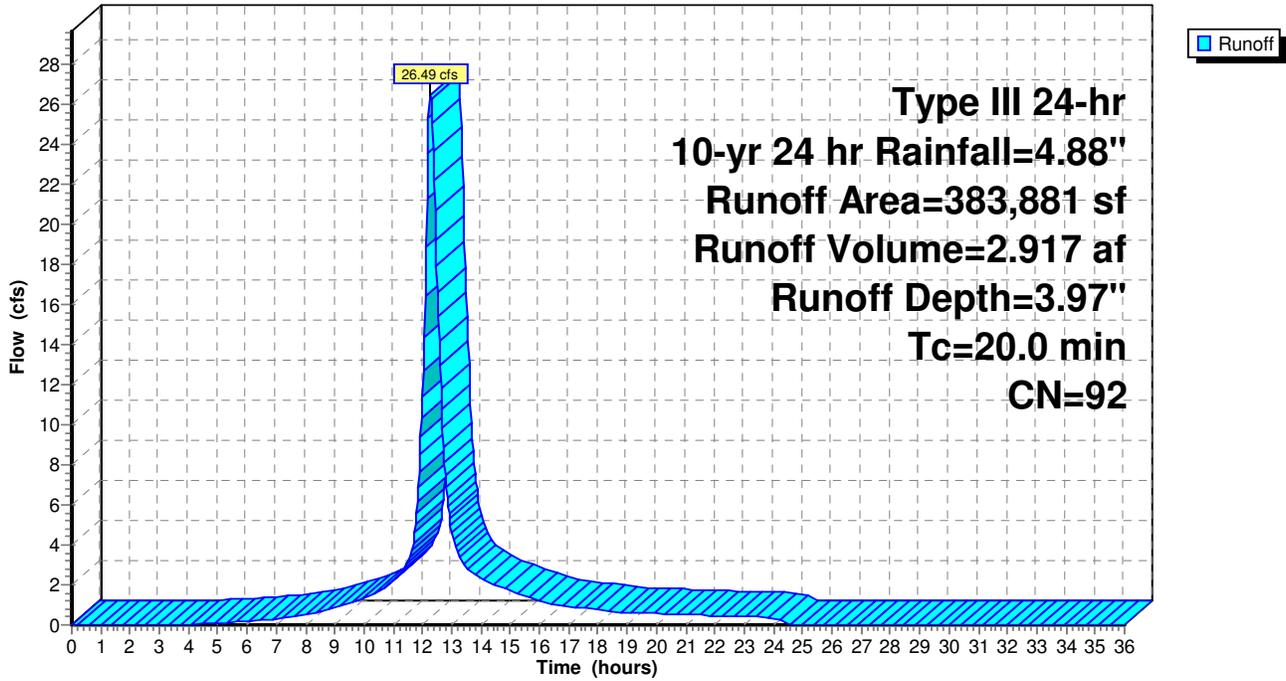
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Type III 24-hr 10-yr 24 hr Rainfall=4.88"

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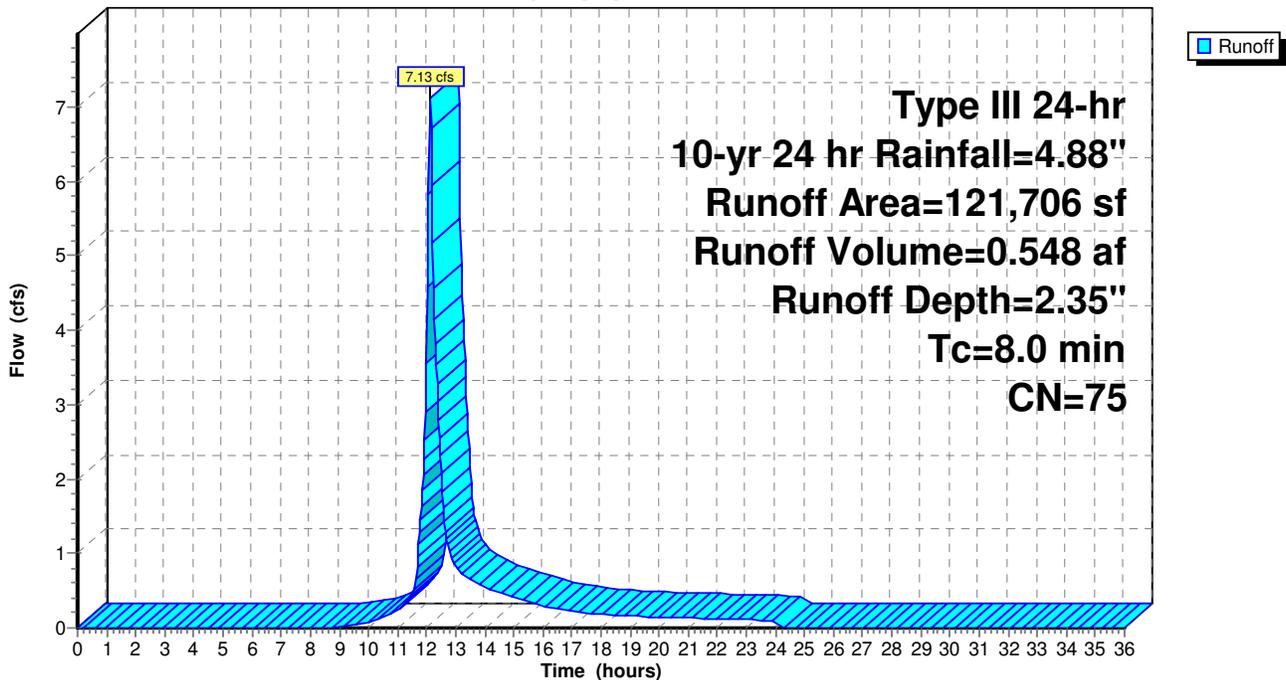
Subcatchment P3: P3

Hydrograph



Subcatchment P4: P4

Hydrograph



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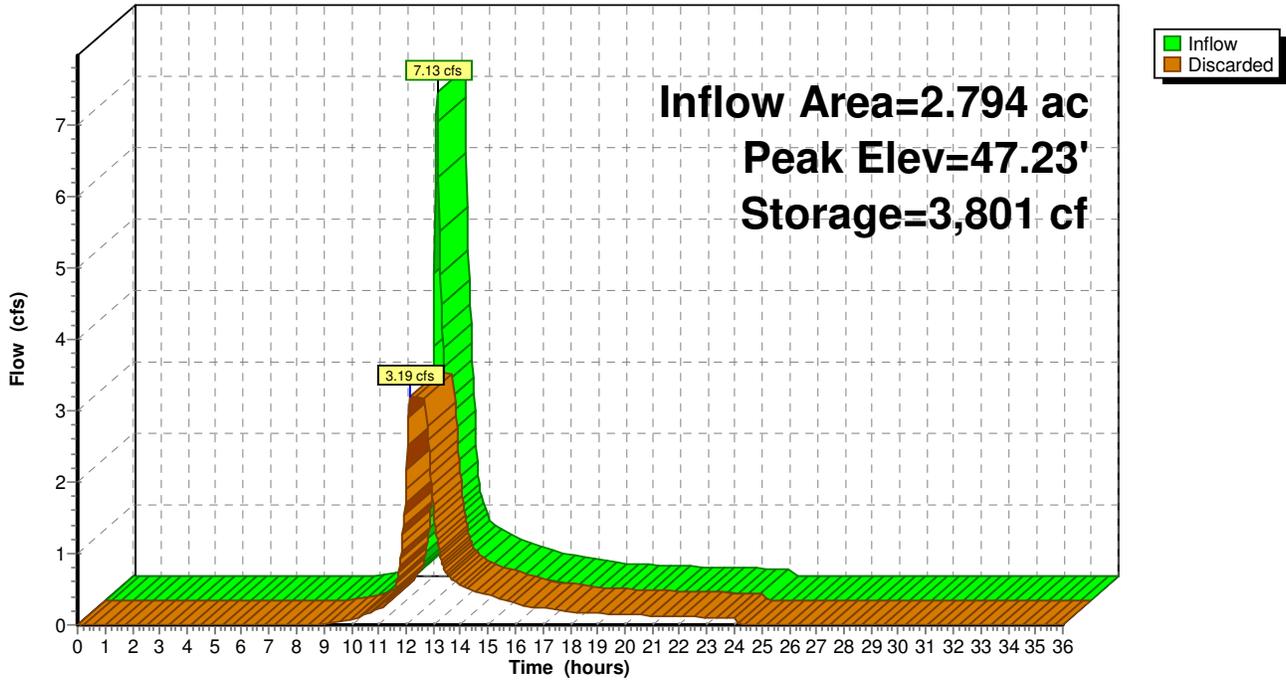
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Type III 24-hr 10-yr 24 hr Rainfall=4.88"

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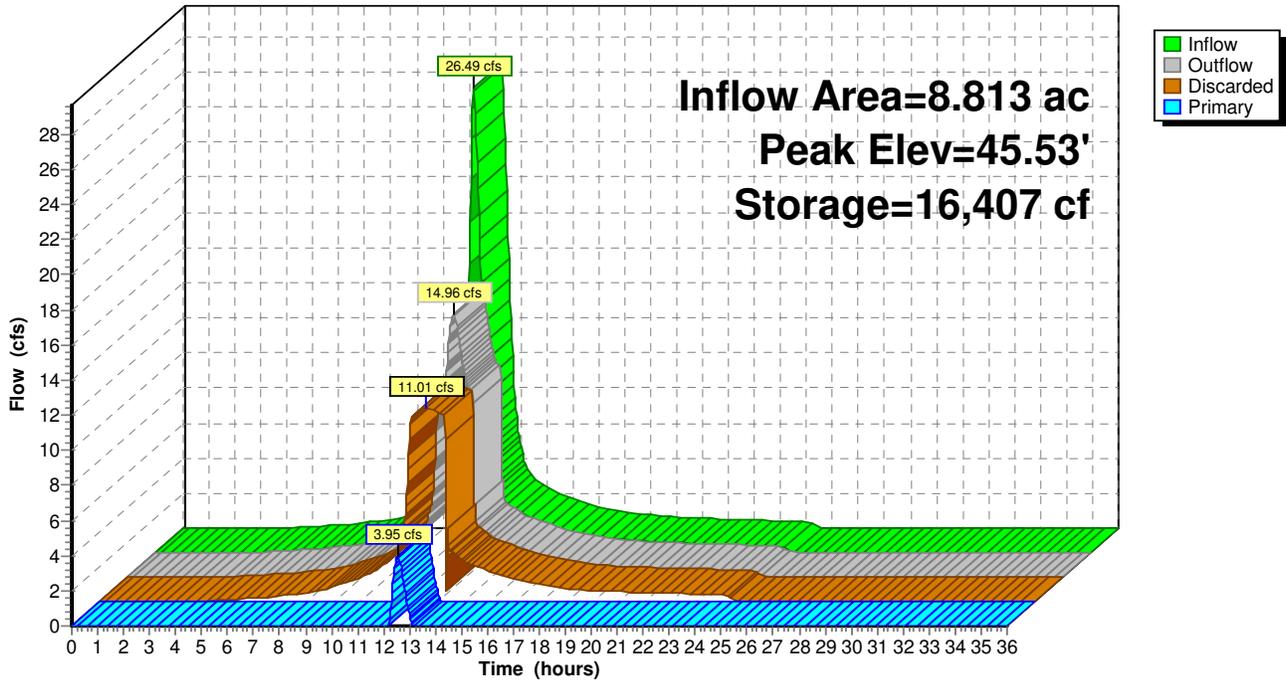
Pond PP1: Infiltration Basin

Hydrograph



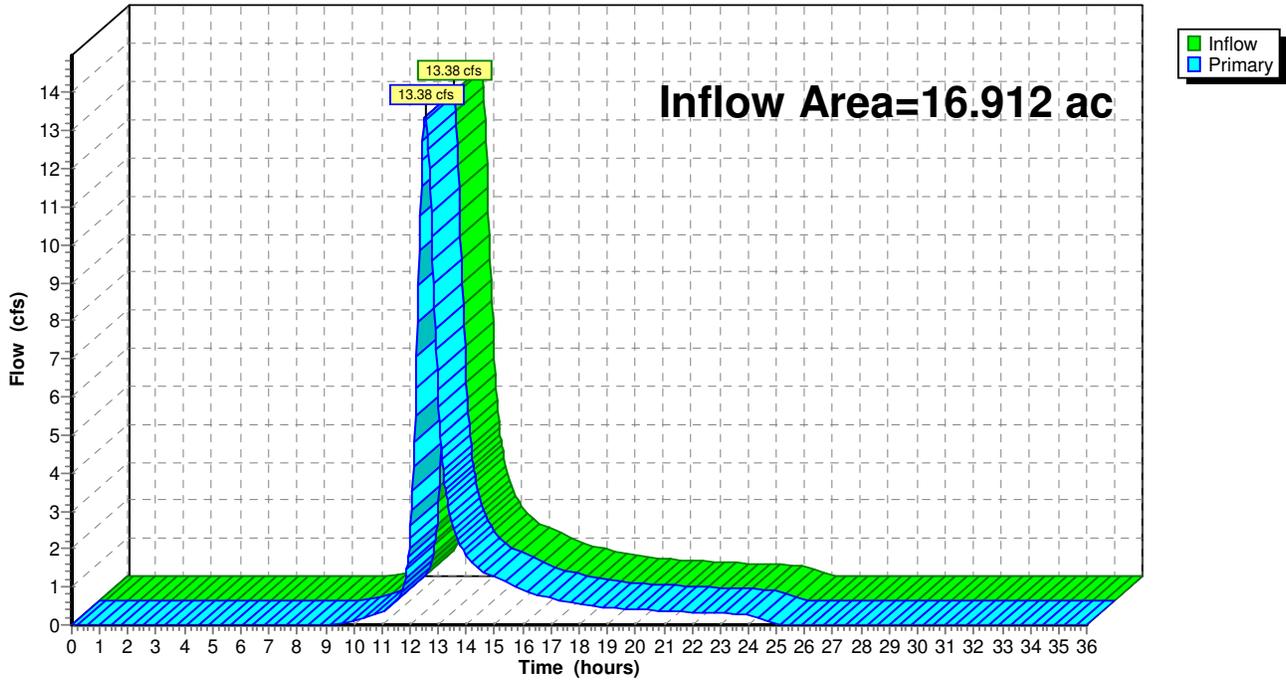
Pond PP2: Stormtech SC-740 UGC

Hydrograph



Link DP1*: DP1* (Proposed Condition)

Hydrograph



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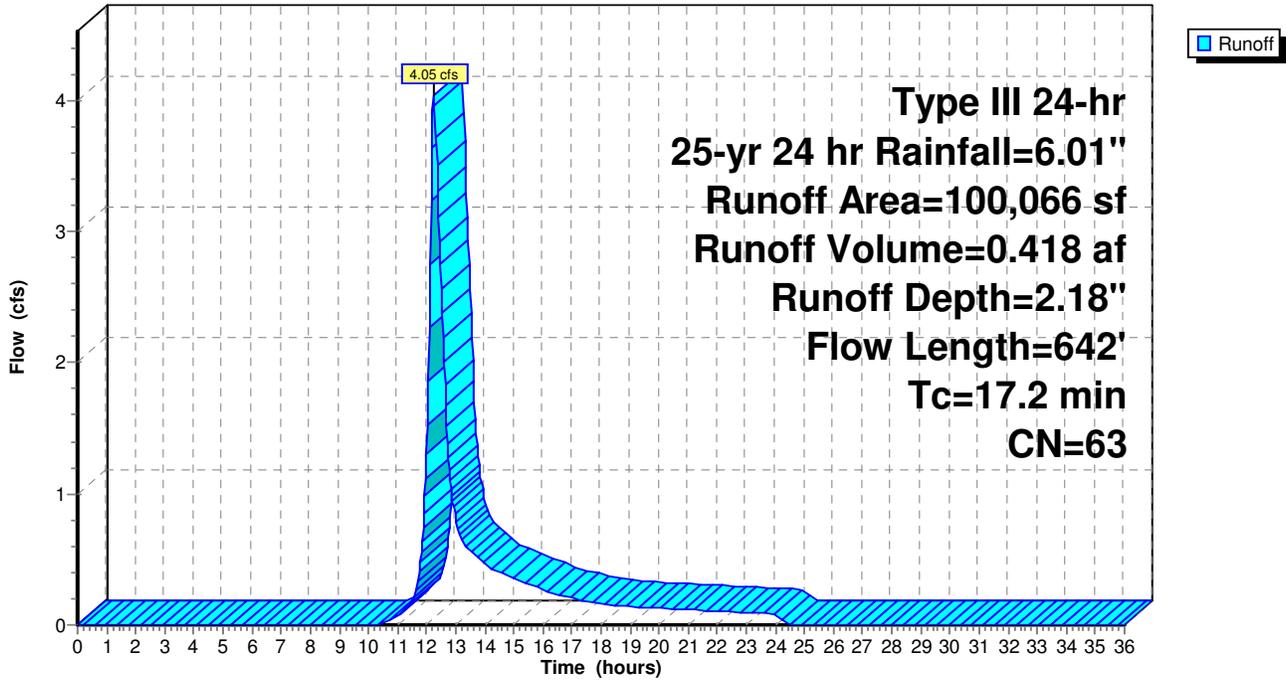
Proposed Condition
Type III 24-hr 25-yr 24 hr Rainfall=6.01"

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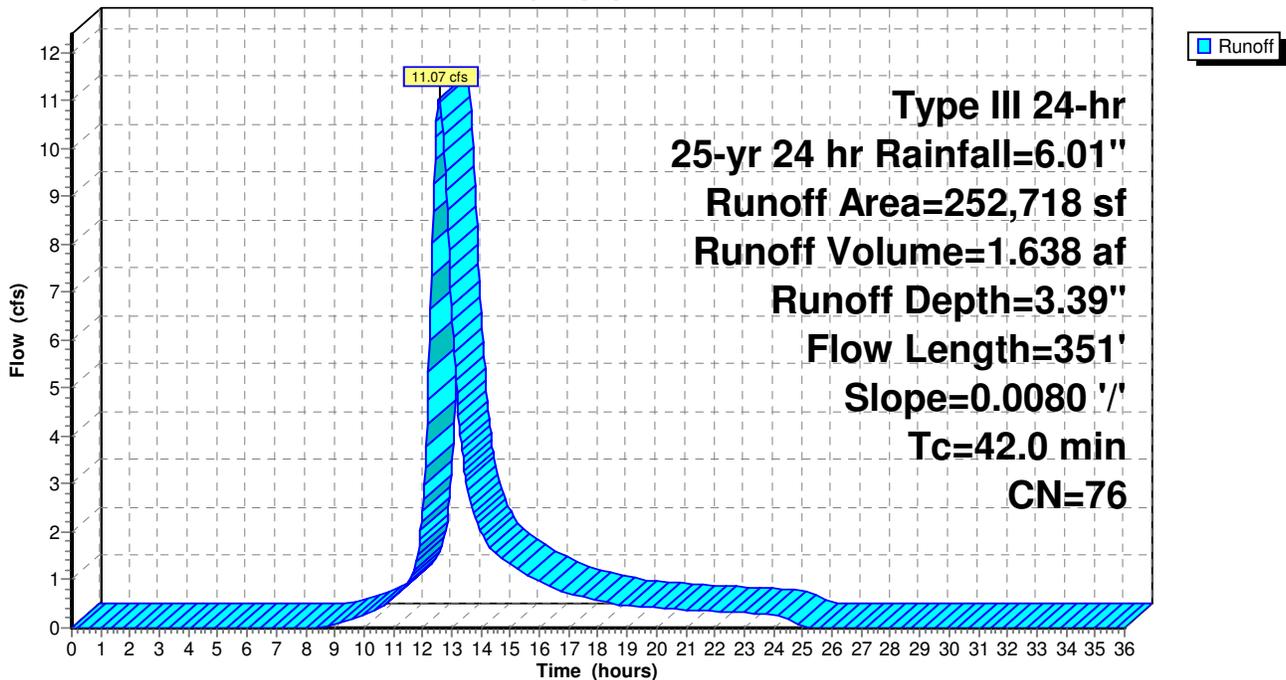
Subcatchment P1: P1

Hydrograph



Subcatchment P2: P2

Hydrograph



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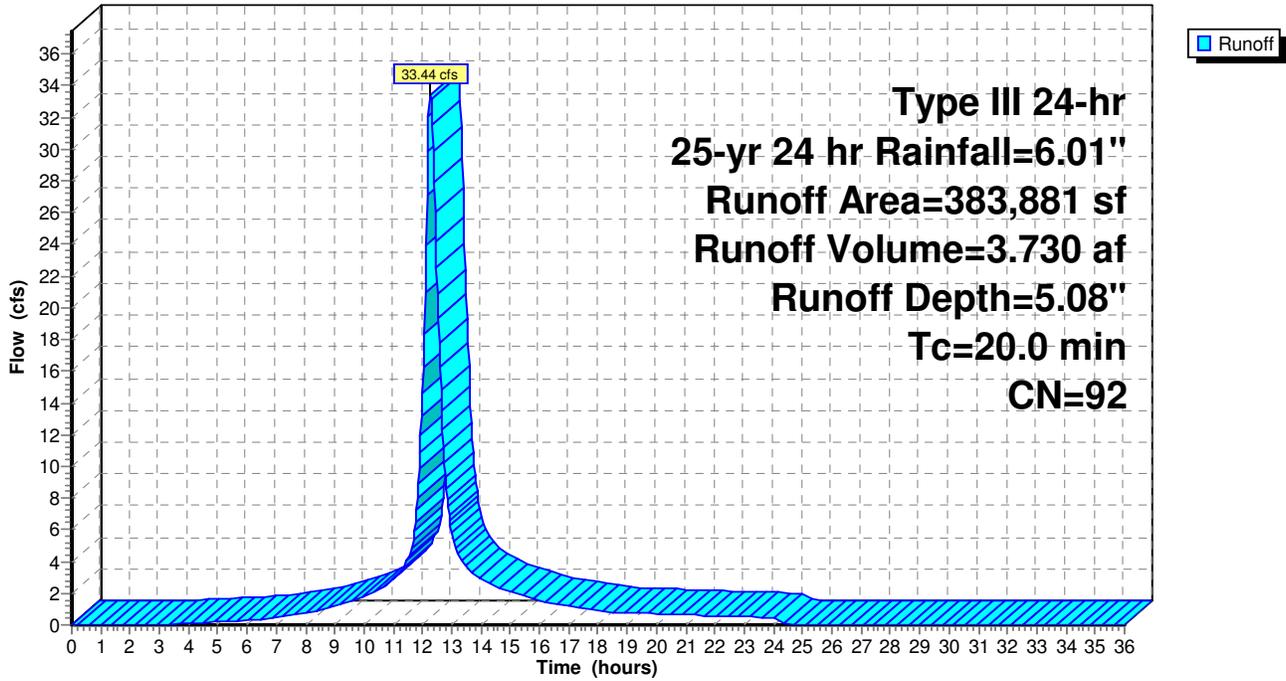
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Type III 24-hr 25-yr 24 hr Rainfall=6.01"

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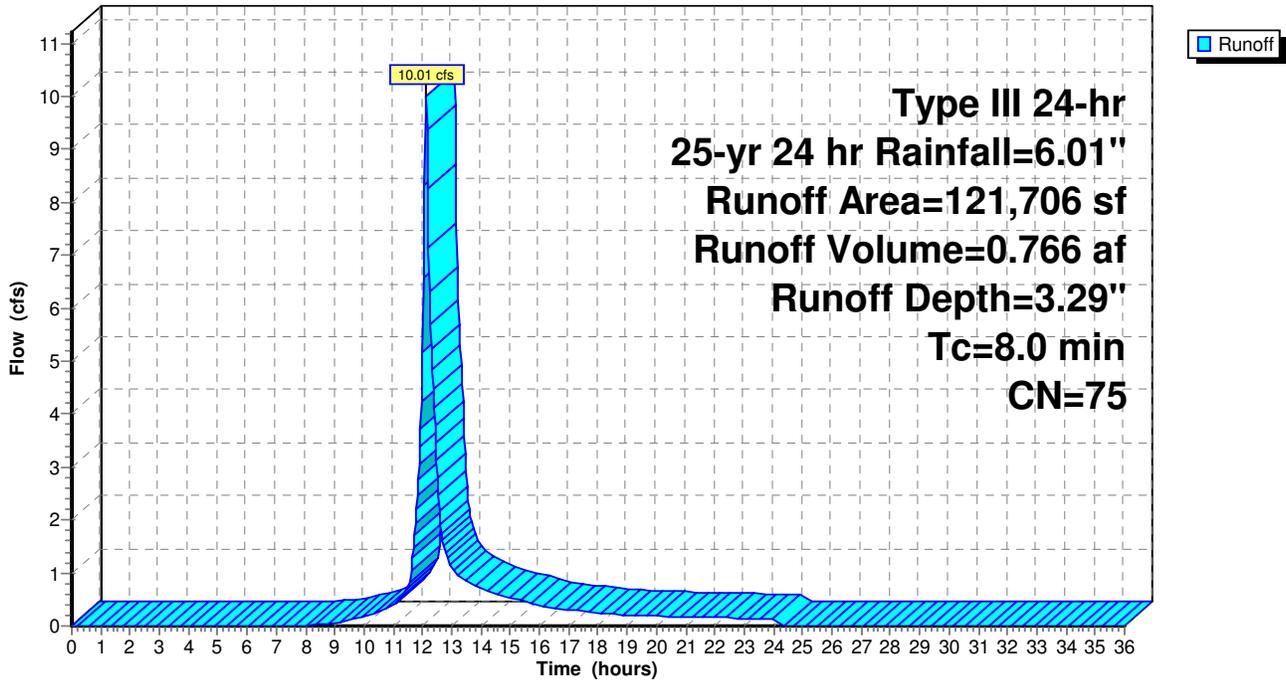
Subcatchment P3: P3

Hydrograph



Subcatchment P4: P4

Hydrograph



2482.H - HydroCAD

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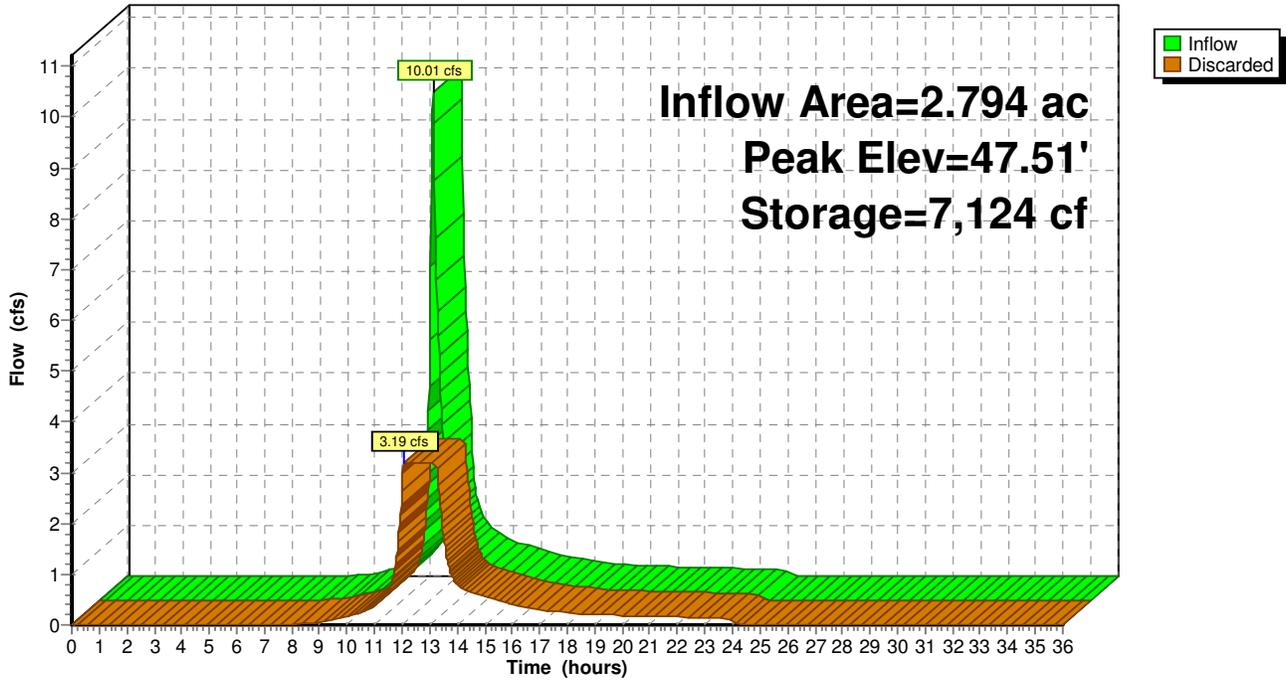
Proposed Condition
Type III 24-hr 25-yr 24 hr Rainfall=6.01"

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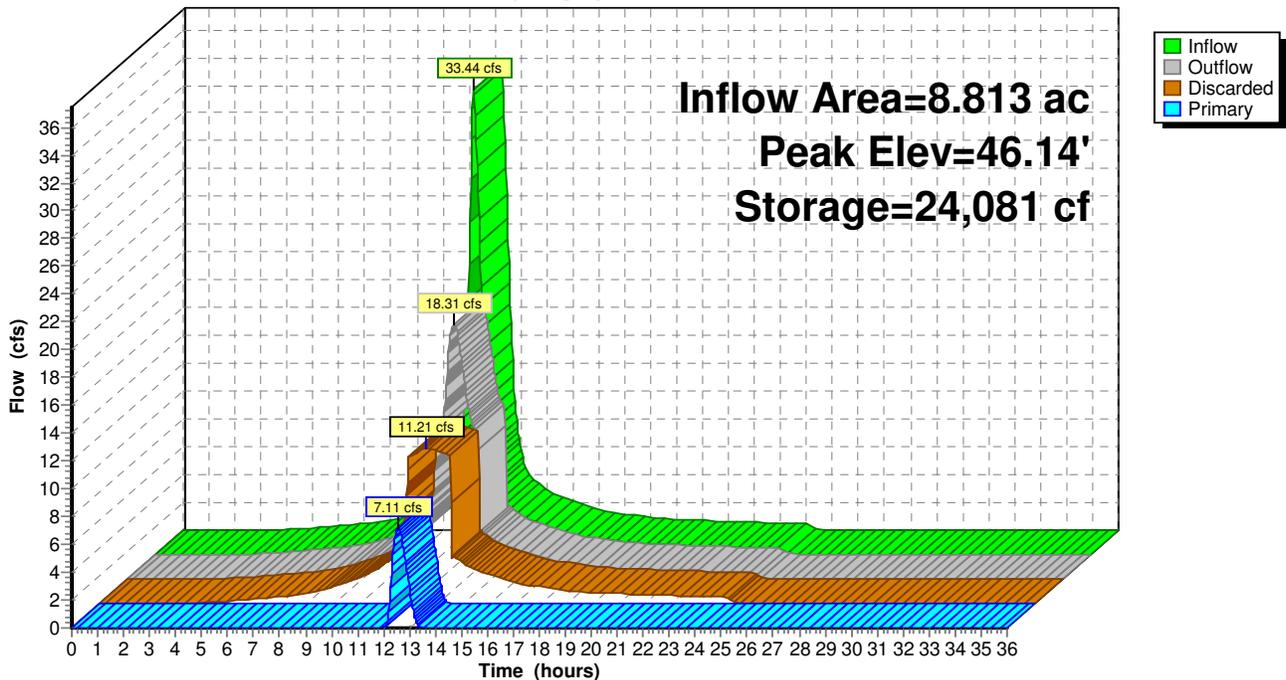
Pond PP1: Infiltration Basin

Hydrograph



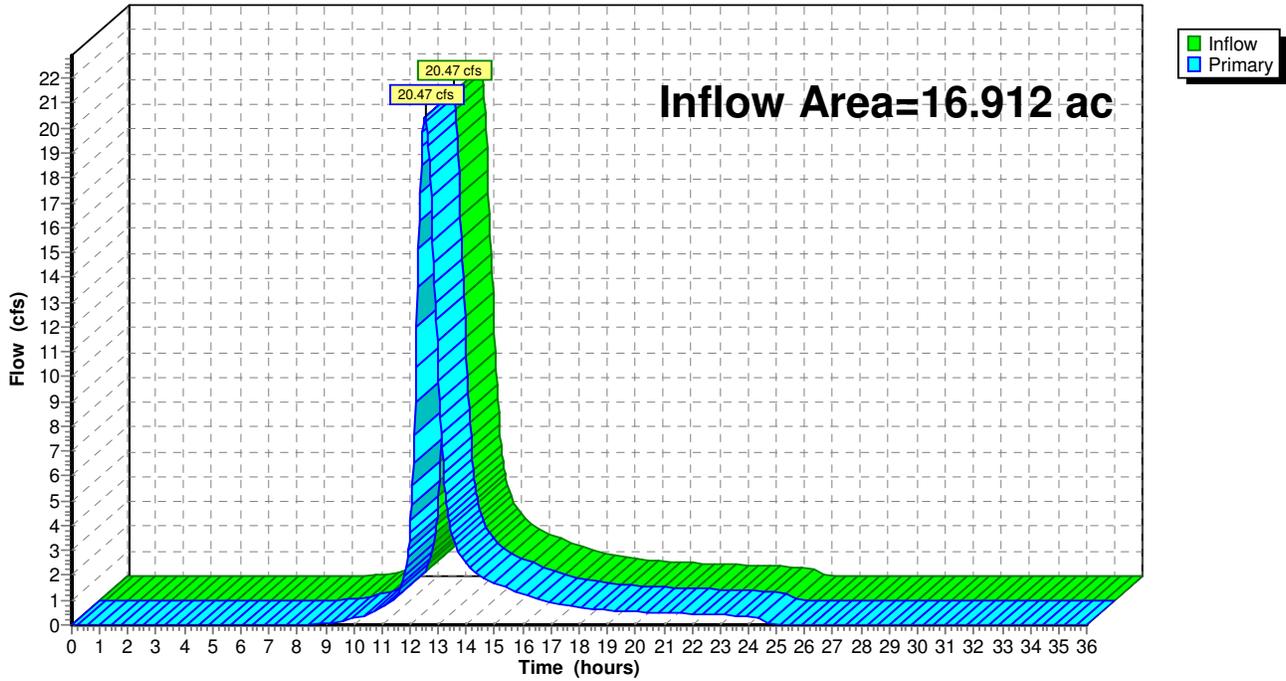
Pond PP2: Stormtech SC-740 UGC

Hydrograph



Link DP1*: DP1* (Proposed Condition)

Hydrograph



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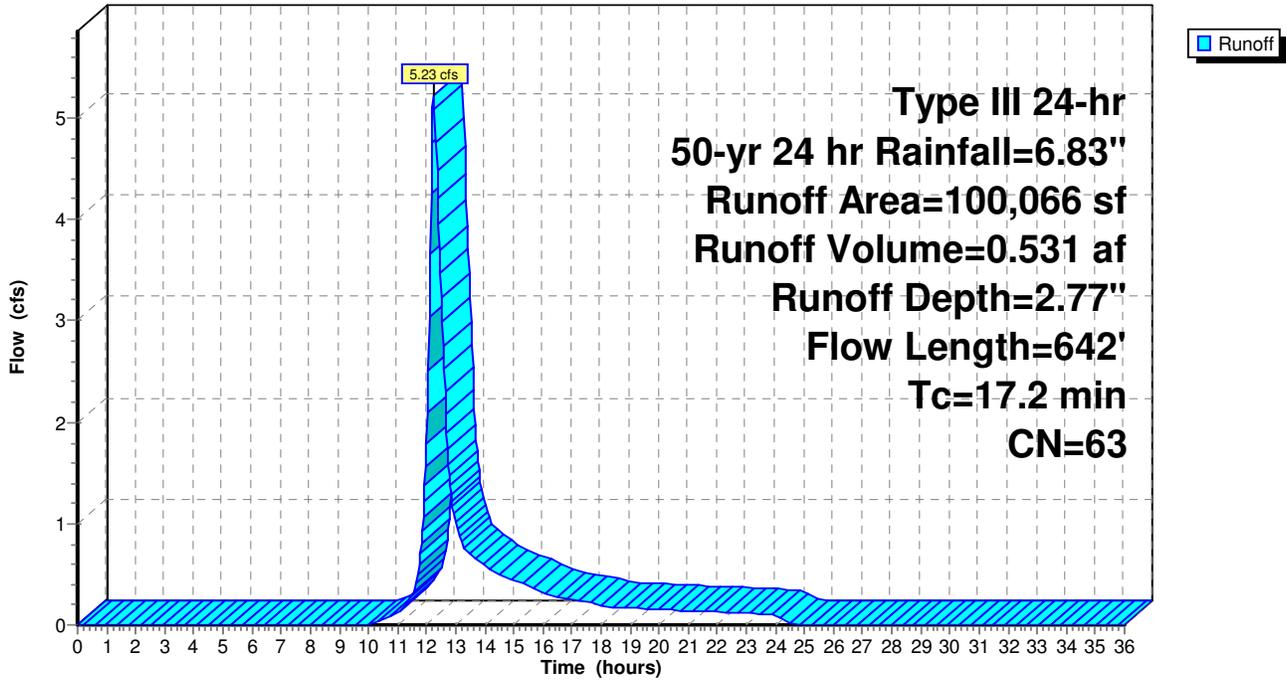
Proposed Condition
Type III 24-hr 50-yr 24 hr Rainfall=6.83"

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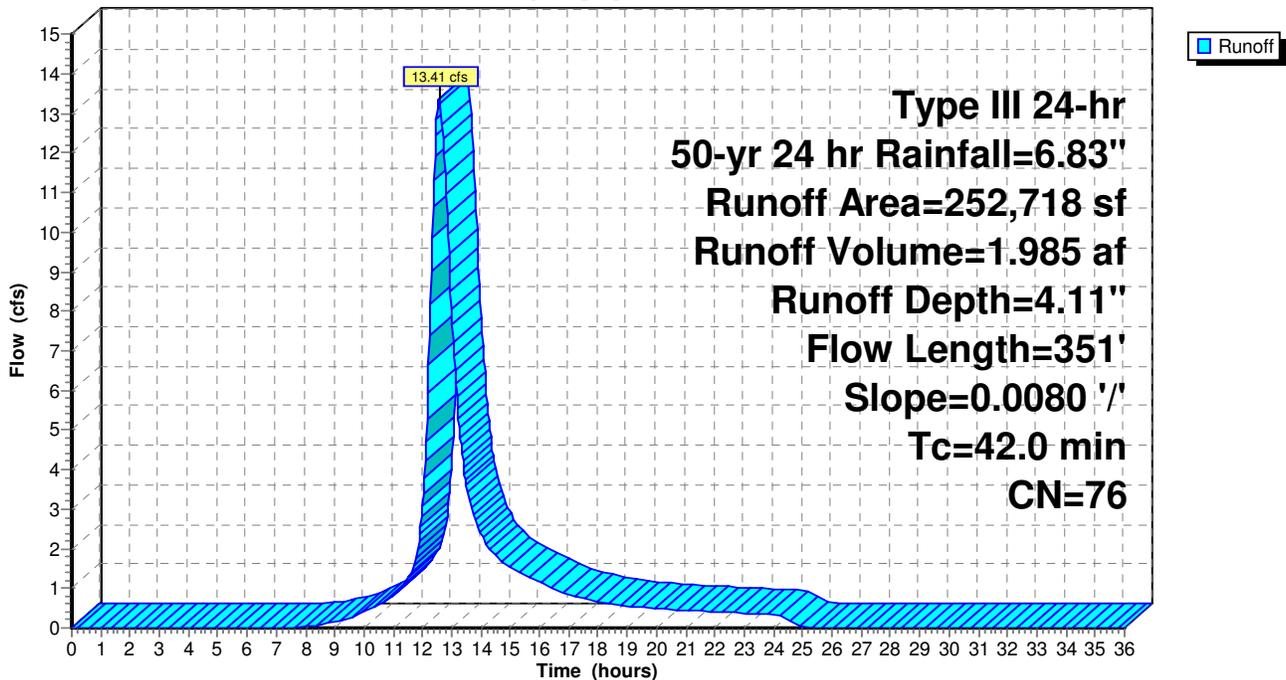
Subcatchment P1: P1

Hydrograph



Subcatchment P2: P2

Hydrograph



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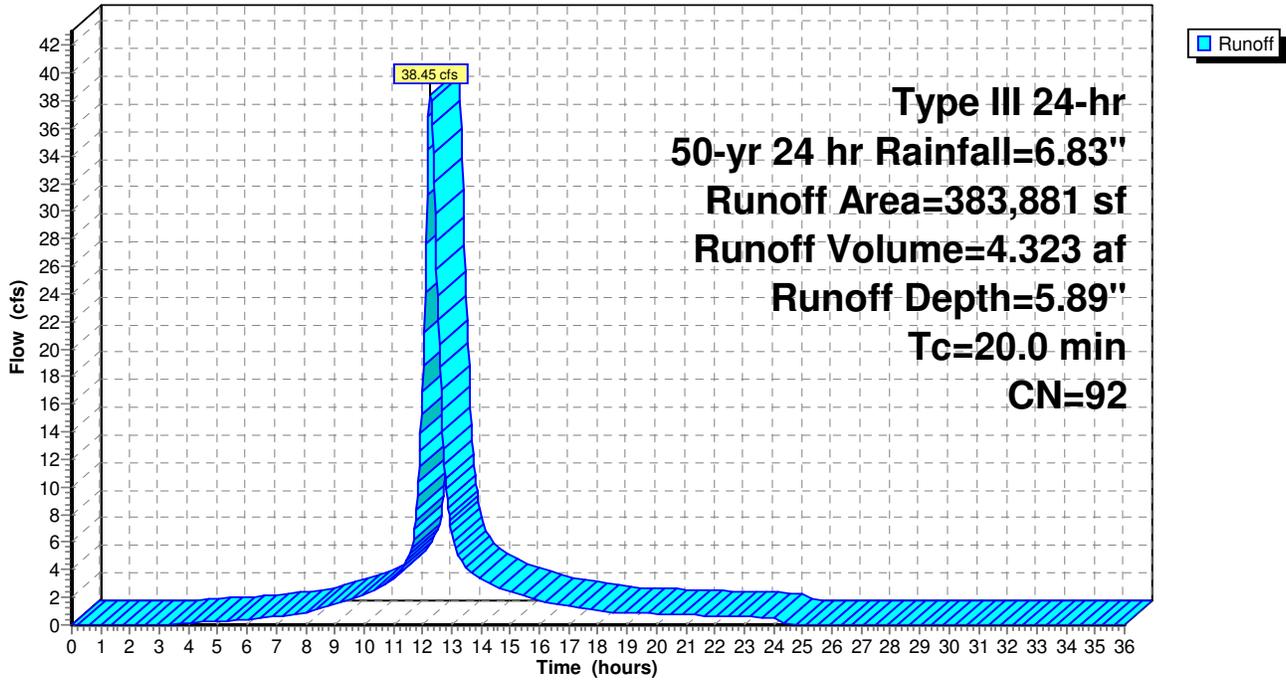
Proposed Condition
Type III 24-hr 50-yr 24 hr Rainfall=6.83"

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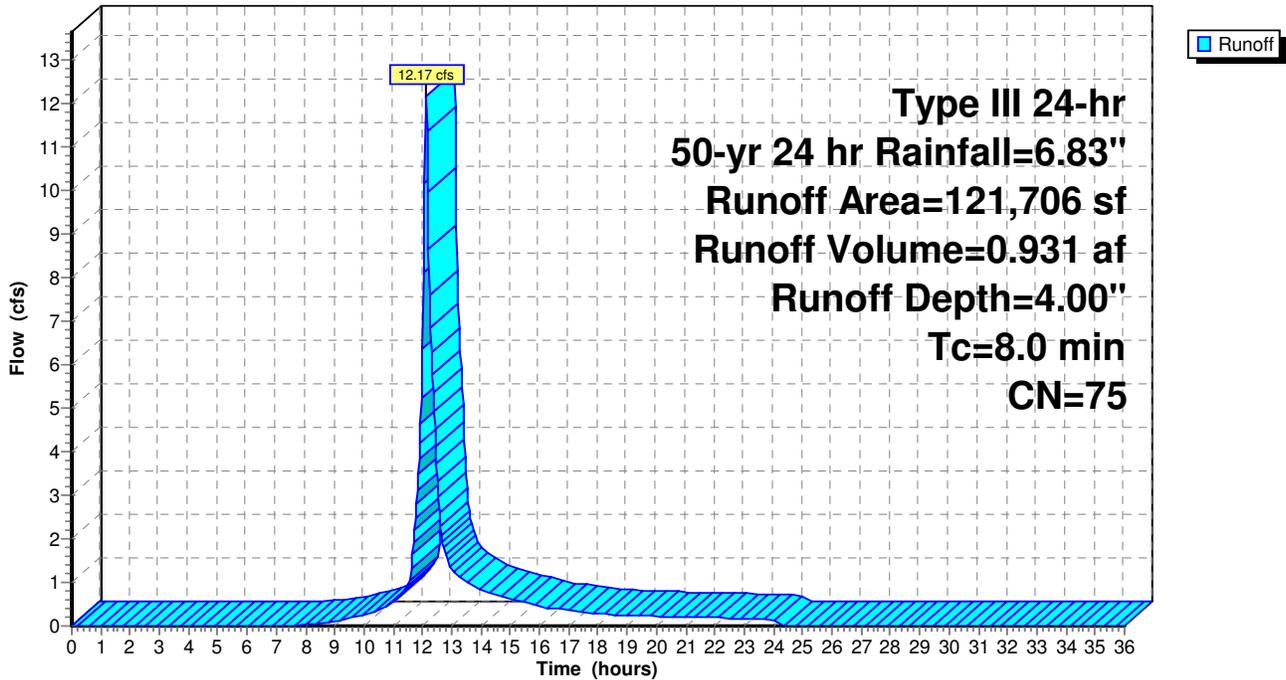
Subcatchment P3: P3

Hydrograph



Subcatchment P4: P4

Hydrograph



2482.H - HydroCAD

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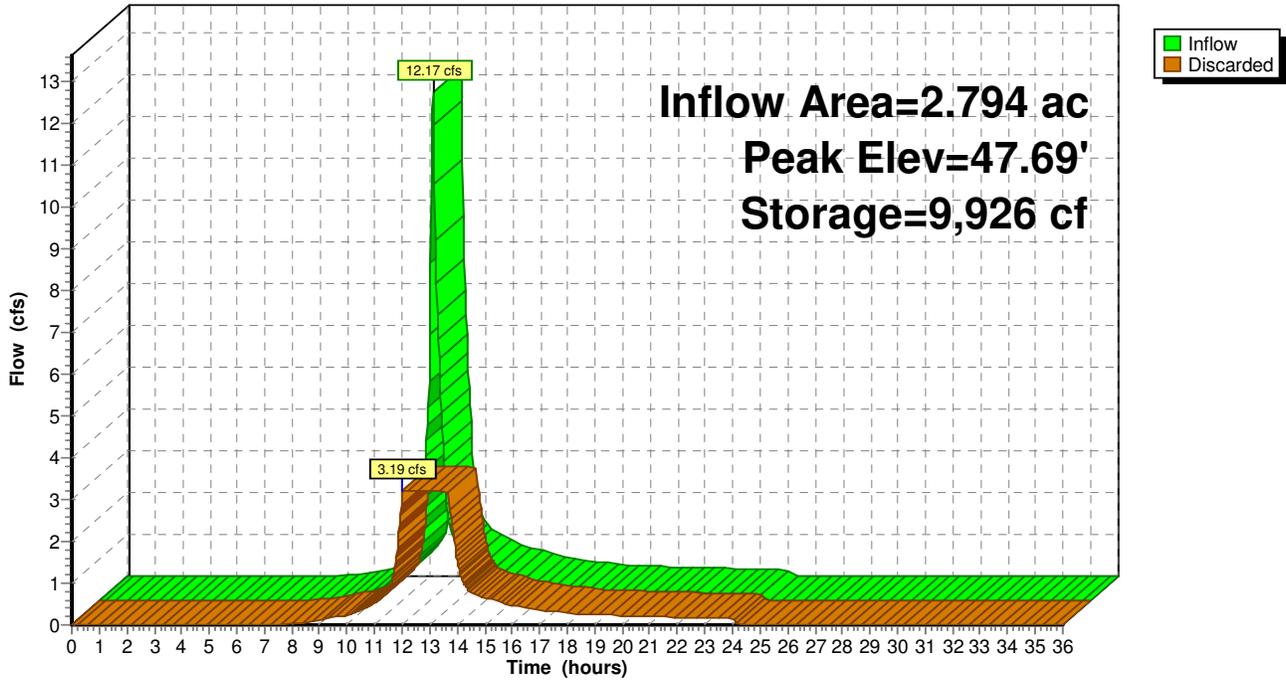
Proposed Condition
Type III 24-hr 50-yr 24 hr Rainfall=6.83"

Printed 6/13/2022

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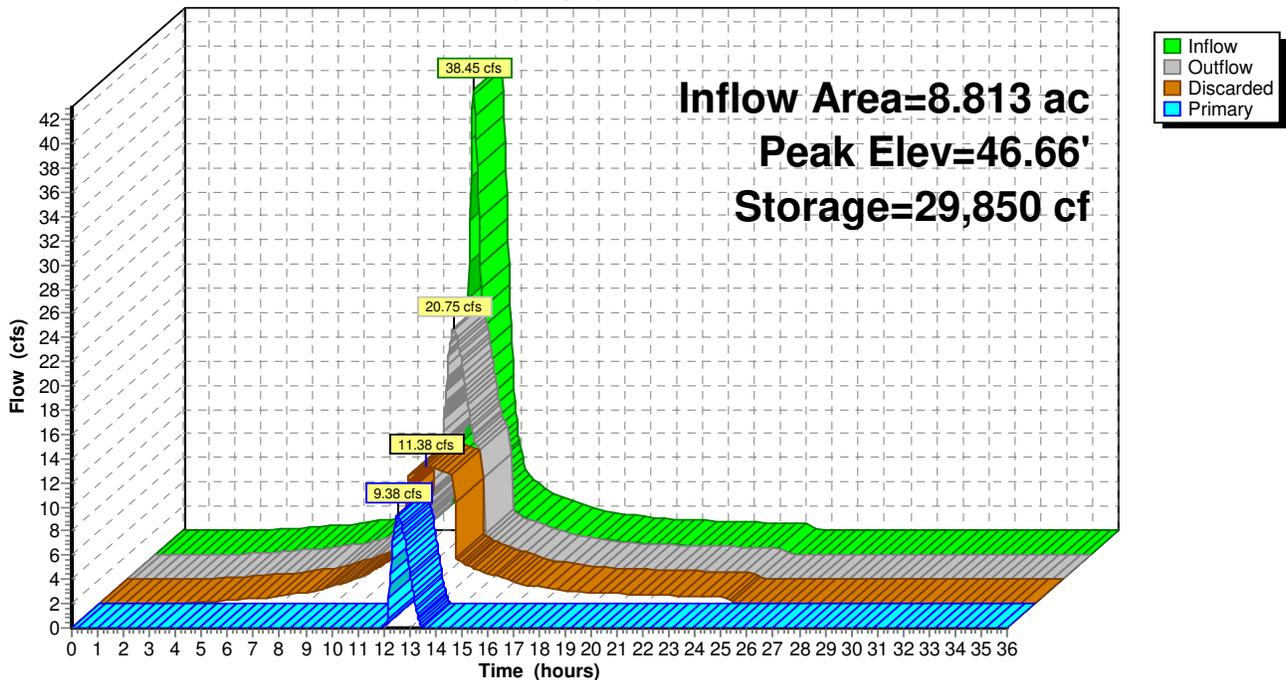
Pond PP1: Infiltration Basin

Hydrograph



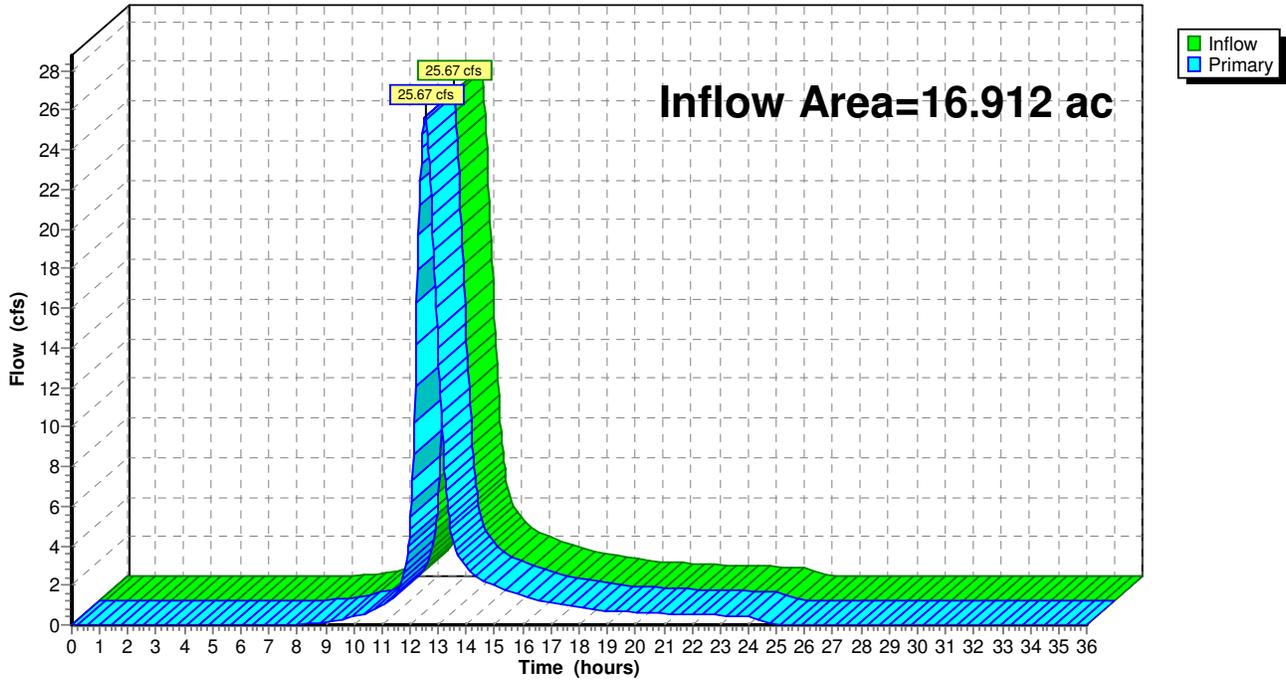
Pond PP2: Stormtech SC-740 UGC

Hydrograph



Link DP1*: DP1* (Proposed Condition)

Hydrograph



2482.H - HydroCAD

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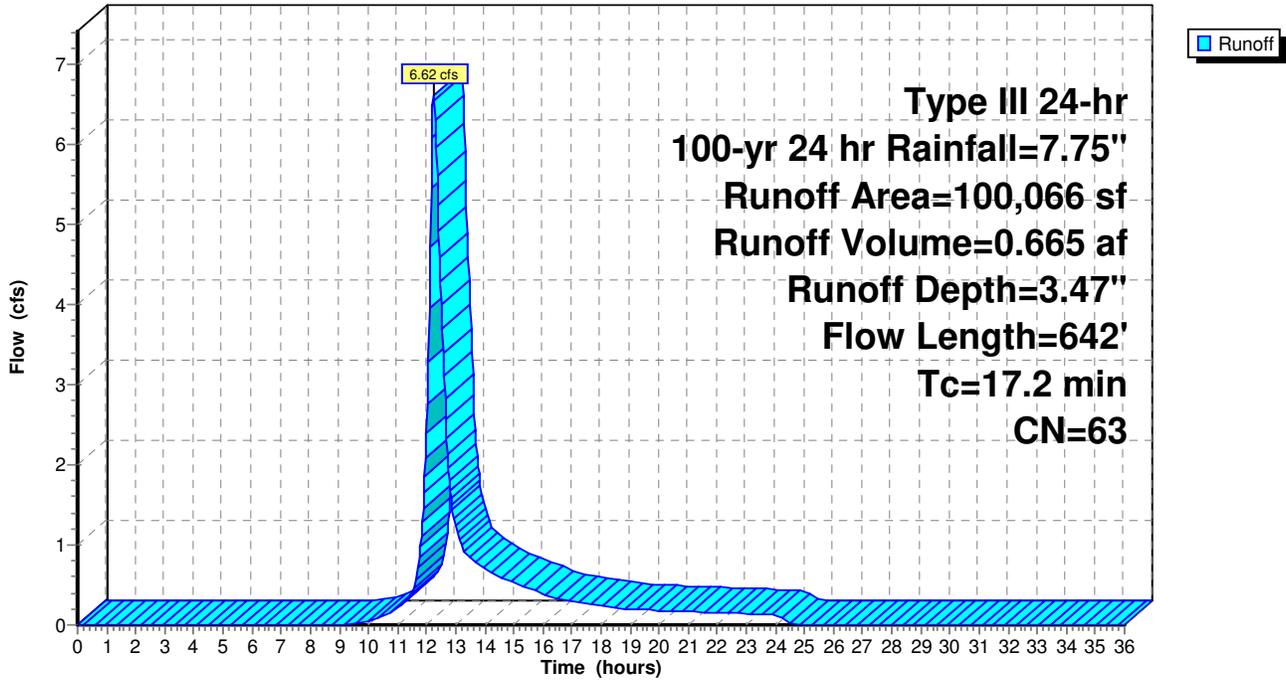
Proposed Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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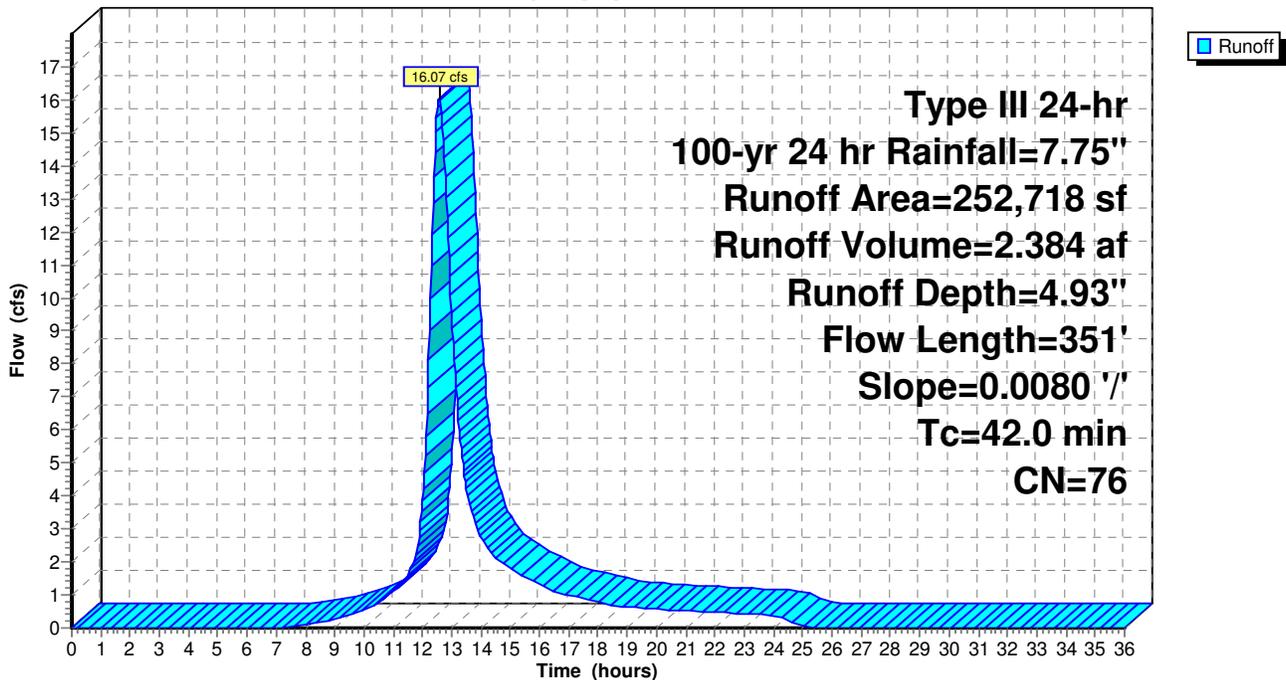
Subcatchment P1: P1

Hydrograph



Subcatchment P2: P2

Hydrograph



2482.H - HydroCAD

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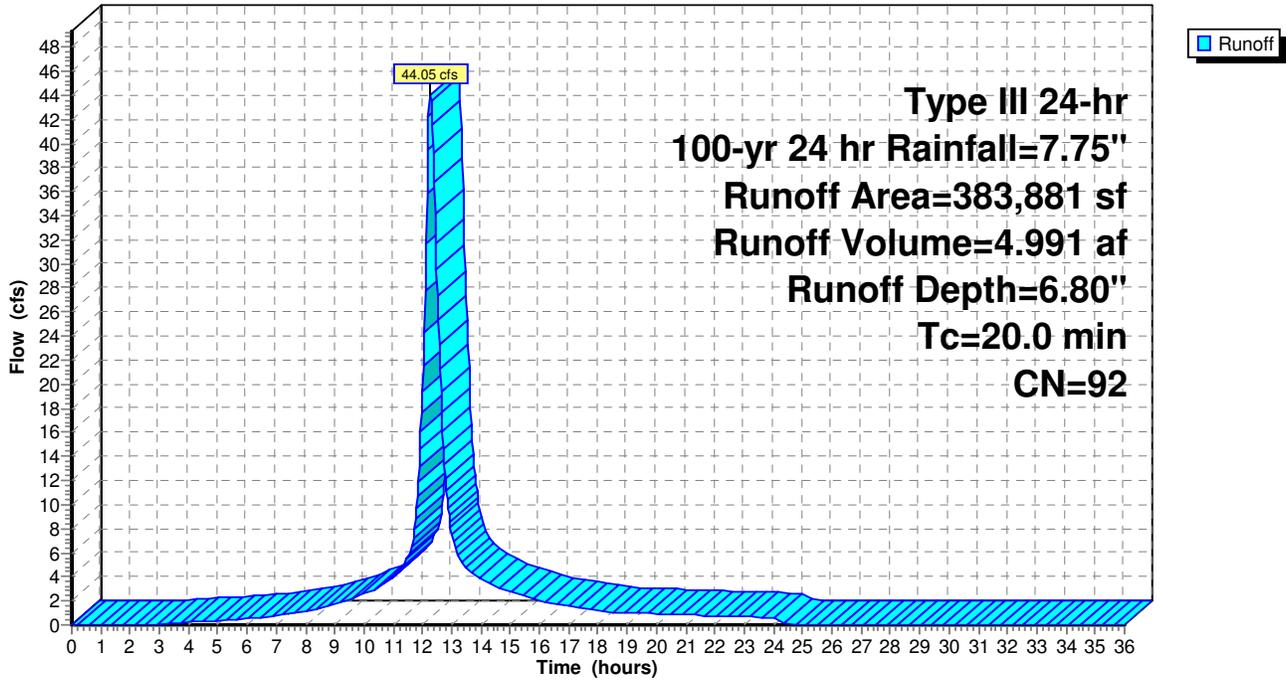
Proposed Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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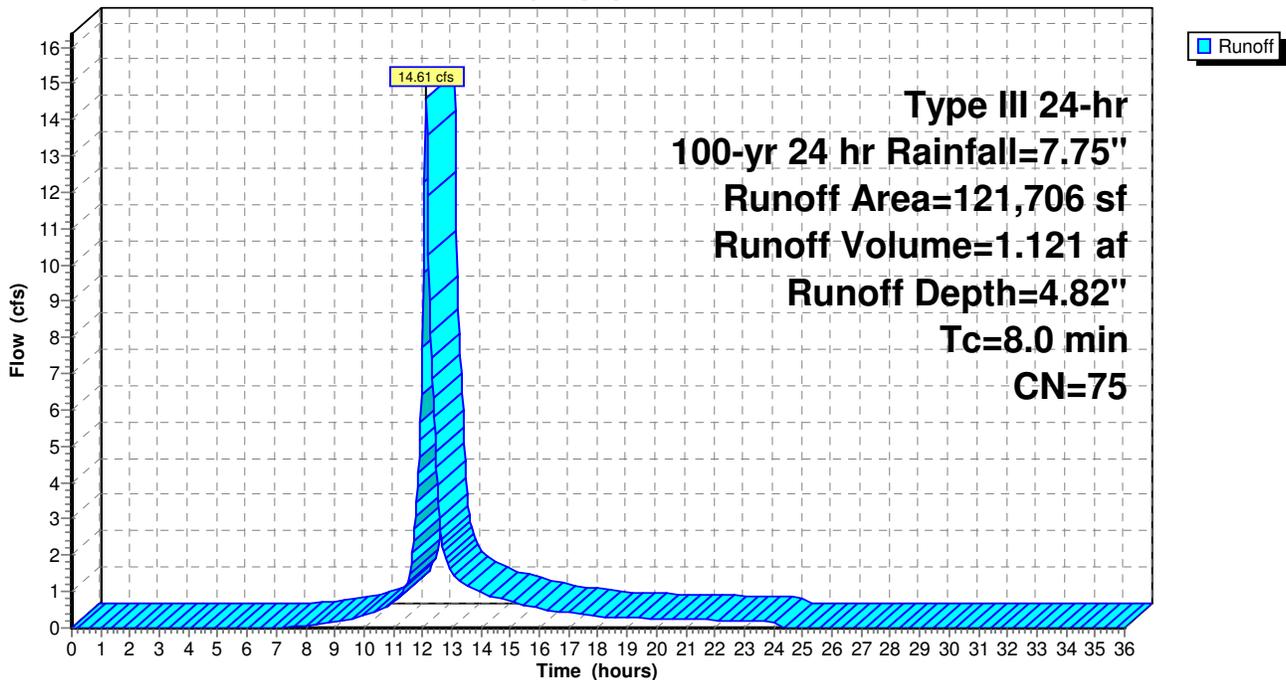
Subcatchment P3: P3

Hydrograph



Subcatchment P4: P4

Hydrograph



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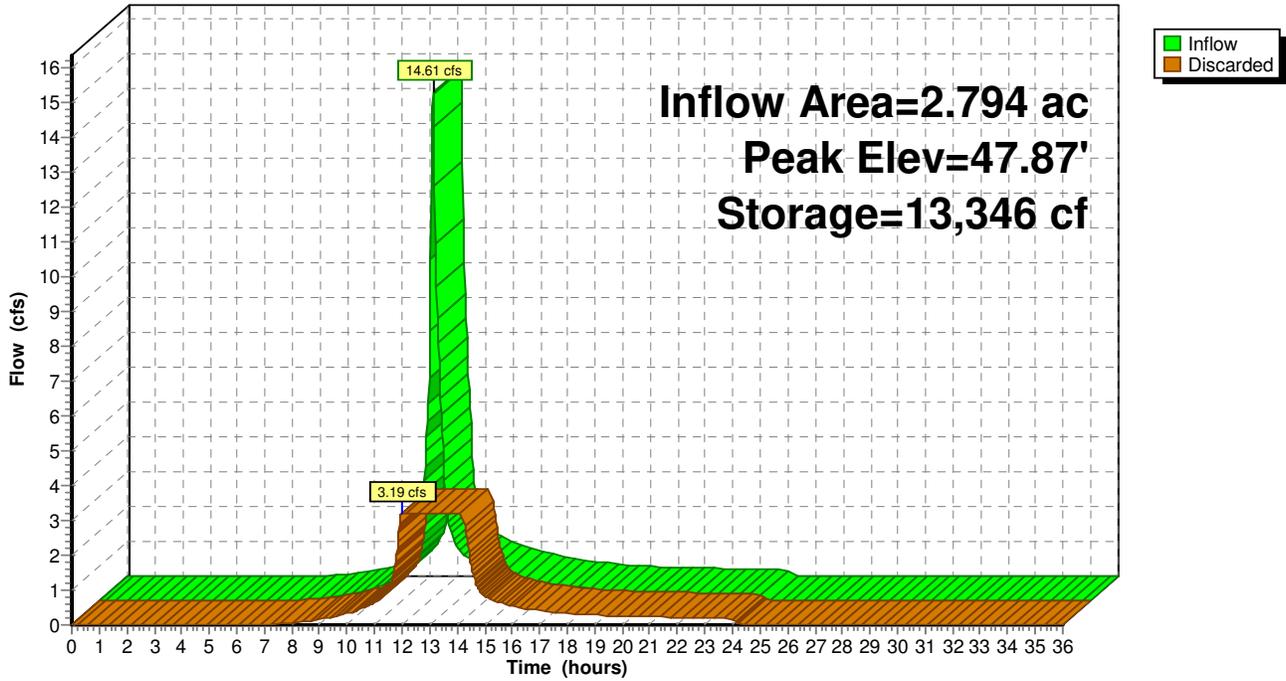
Proposed Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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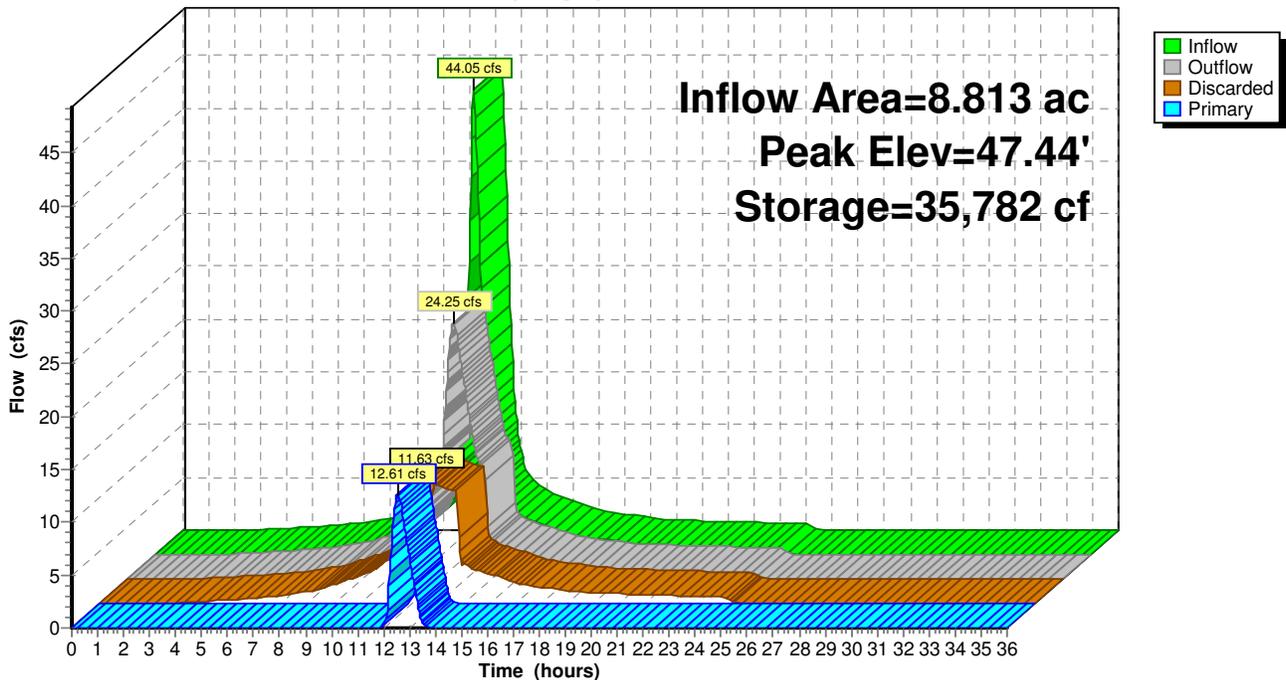
Pond PP1: Infiltration Basin

Hydrograph



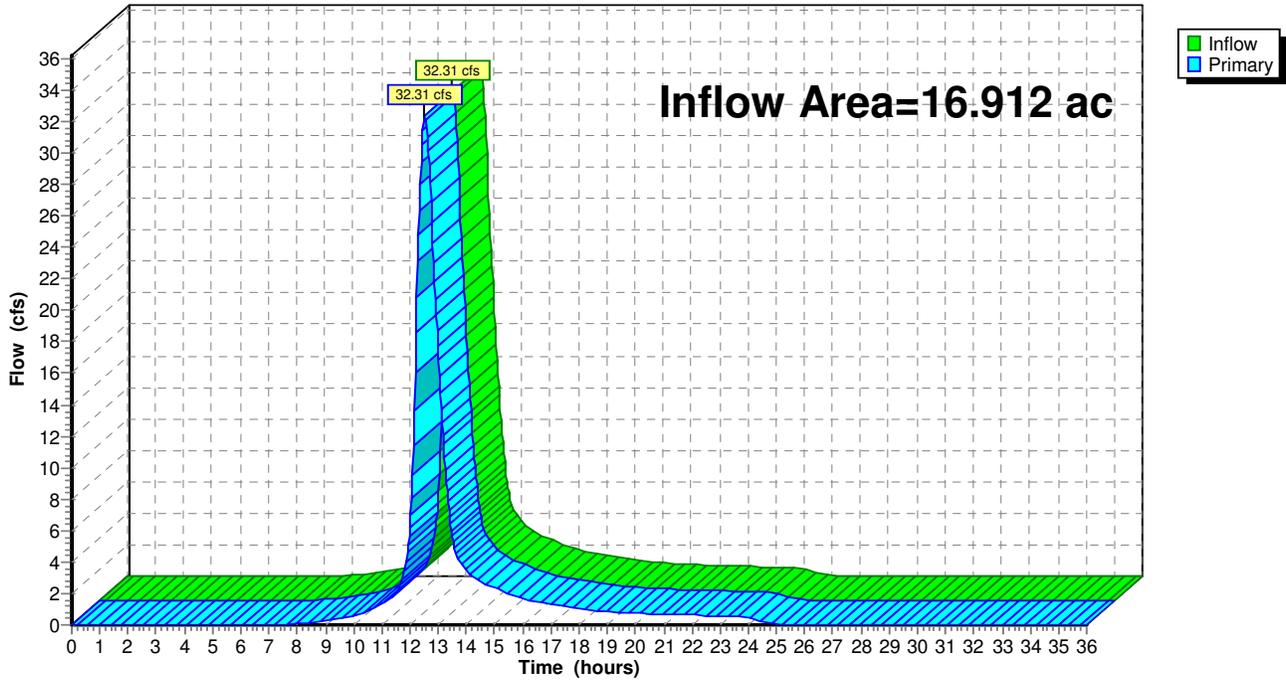
Pond PP2: Stormtech SC-740 UGC

Hydrograph



Link DP1*: DP1* (Proposed Condition)

Hydrograph



2482.H - HydroCAD

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Proposed Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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Summary for Pond PP1: Infiltration Basin

*No infiltration accounted for in Volume #2

Inflow Area = 2.794 ac, 36.85% Impervious, Inflow Depth = 4.82" for 100-yr 24 hr event
Inflow = 14.61 cfs @ 12.11 hrs, Volume= 1.121 af
Outflow = 3.19 cfs @ 11.97 hrs, Volume= 1.121 af, Atten= 78%, Lag= 0.0 min
Discarded = 3.19 cfs @ 11.97 hrs, Volume= 1.121 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 47.87' @ 12.56 hrs Surf.Area= 5,101 sf Storage= 13,346 cf

Plug-Flow detention time= 26.9 min calculated for 1.121 af (100% of inflow)
Center-of-Mass det. time= 26.9 min (844.2 - 817.3)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	2,189 cf	Custom Stage Data (Conic) Listed below (Recalc)
#2	47.00'	77,493 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
		79,682 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
46.00	277	0	0	277
47.00	5,101	2,189	2,189	5,104

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	5,101	0	0
48.00	22,964	14,033	14,033
49.00	27,625	25,295	39,327
50.00	48,707	38,166	77,493

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.00'	27.000 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=3.19 cfs @ 11.97 hrs HW=47.05' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 3.19 cfs)

Summary for Pond PP2: Stormtech SC-740 UGC

Top of Pond 47.6

Inflow Area = 8.813 ac, 83.39% Impervious, Inflow Depth = 6.80" for 100-yr 24 hr event
Inflow = 44.05 cfs @ 12.26 hrs, Volume= 4.991 af
Outflow = 24.25 cfs @ 12.56 hrs, Volume= 4.991 af, Atten= 45%, Lag= 17.6 min
Discarded = 11.63 cfs @ 12.56 hrs, Volume= 4.193 af
Primary = 12.61 cfs @ 12.56 hrs, Volume= 0.798 af
Routed to Link DP1* : DP1* (Proposed Condition)

2482.H - HydroCAD

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Proposed Condition
Type III 24-hr 100-yr 24 hr Rainfall=7.75"

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Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 47.44' @ 12.56 hrs Surf.Area= 16,865 sf Storage= 35,782 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.7 min (792.7 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	44.10'	14,790 cf	115.50'W x 146.02'L x 3.50'H Field A 59,027 cf Overall - 22,051 cf Embedded = 36,976 cf x 40.0% Voids
#2A	44.60'	22,051 cf	ADS_StormTech SC-740 +Cap x 480 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 480 Chambers in 24 Rows
		36,842 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.10'	27.000 in/hr Exfiltration over Wetted area
#2	Primary	44.61'	24.0" Round Culvert L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.61' / 44.32' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#3	Device 2	44.61'	34.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	45.55'	21.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 2	46.40'	12.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=11.63 cfs @ 12.56 hrs HW=47.44' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 11.63 cfs)

Primary OutFlow Max=12.60 cfs @ 12.56 hrs HW=47.44' (Free Discharge)

↳ **2=Culvert** (Passes 12.60 cfs of 19.84 cfs potential flow)

↳ **3=Orifice/Grate** (Orifice Controls 7.42 cfs @ 7.86 fps)

↳ **4=Orifice/Grate** (Orifice Controls 3.68 cfs @ 6.32 fps)

↳ **5=Orifice/Grate** (Orifice Controls 1.50 cfs @ 4.49 fps)

APPENDIX C
NRCS Soil Map & Data



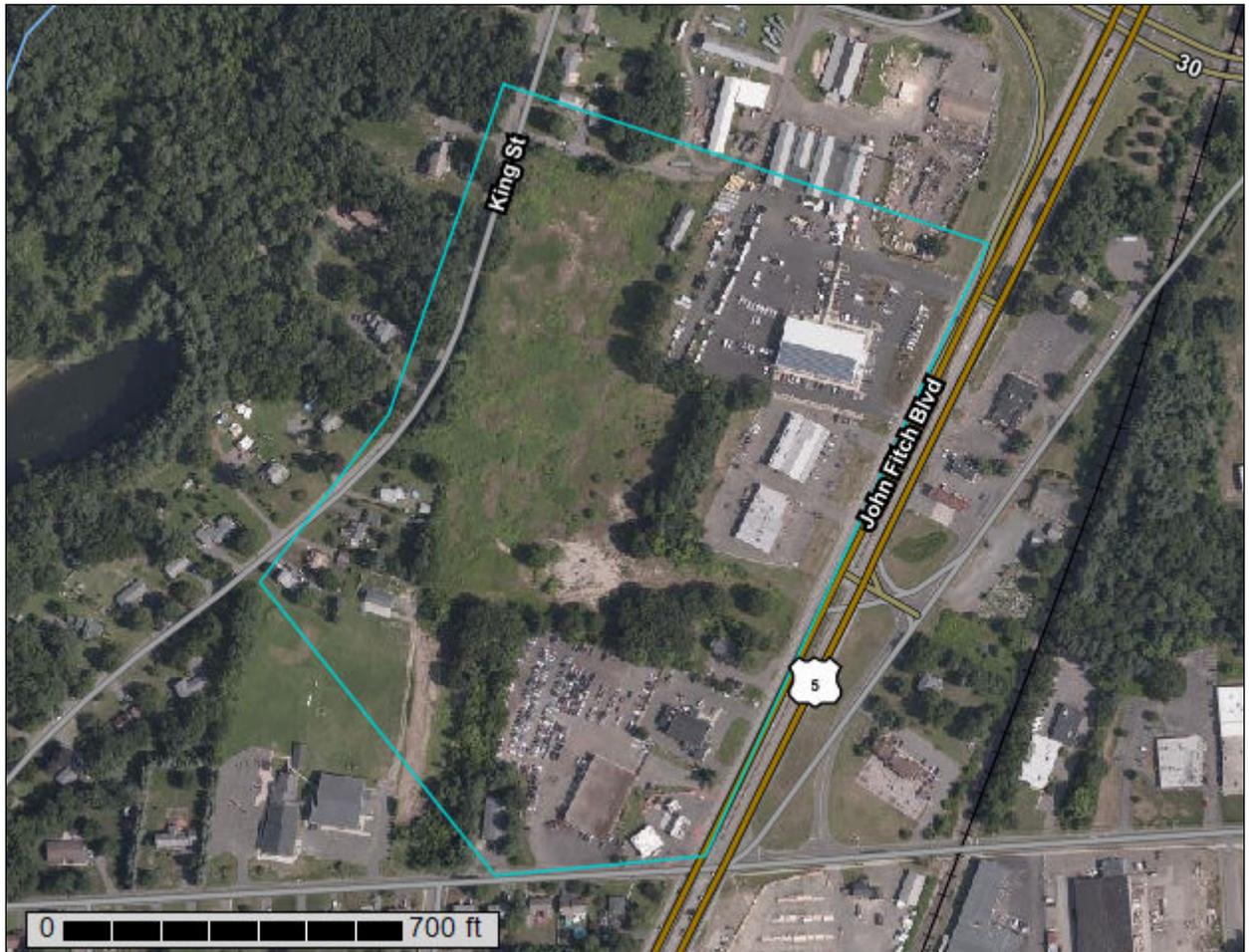
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for State of Connecticut



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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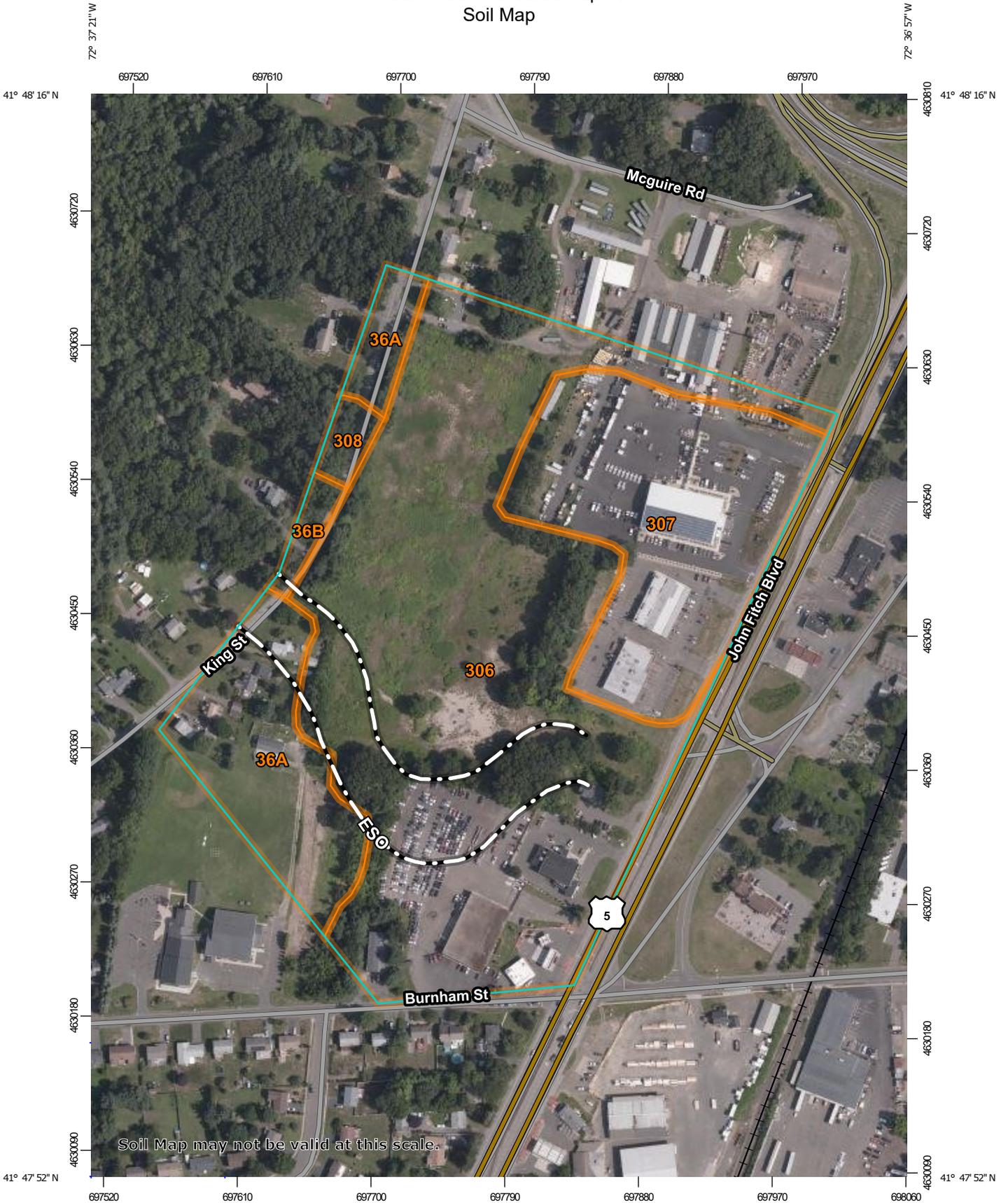
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Soil Map

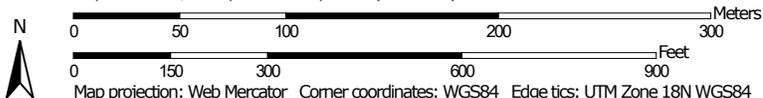
The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.

Map Scale: 1:3,540 if printed on A portrait (8.5" x 11") sheet.



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 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 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
36A	Windsor loamy sand, 0 to 3 percent slopes	4.5	13.7%
36B	Windsor loamy sand, 3 to 8 percent slopes	0.4	1.2%
306	Udorthents-Urban land complex	20.1	61.3%
307	Urban land	7.4	22.6%
308	Udorthents, smoothed	0.4	1.2%
Totals for Area of Interest		32.8	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

Custom Soil Resource Report

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

36A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg

Elevation: 0 to 990 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: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent

Minor components: 15 percent

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

Description of Windsor, Loamy Sand

Setting

Landform: Outwash plains, outwash terraces, deltas, dunes

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 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 supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, tal
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest,
rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

36B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 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: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or
loose sandy glaciofluvial deposits derived from schist and/or loose sandy
glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand

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Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 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 supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent

Landform: Deltas, kames, eskers, outwash plains

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

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Deerfield, loamy sand

Percent of map unit: 5 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg

Elevation: 0 to 2,000 feet

Mean annual precipitation: 43 to 56 inches

Mean annual air temperature: 45 to 55 degrees F

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Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent
Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

307—Urban land

Map Unit Setting

National map unit symbol: 9lmh
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Udorthents, wet substratum

Percent of map unit: 10 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, undisturbed soils

Percent of map unit: 10 percent
Hydric soil rating: No

308—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9lmj
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 24 to 54 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Udorthents, wet substratum

Percent of map unit: 7 percent
Hydric soil rating: No

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Unnamed, undisturbed soils

Percent of map unit: 7 percent

Hydric soil rating: No

Urban land

Percent of map unit: 5 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent

Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

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

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

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

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

Custom Soil Resource Report Map—Hydrologic Soil Group



Map Scale: 1:3,540 if printed on a portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points

-  A
-  A/D
-  B
-  B/D

Soils

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

-  Streams and Canals

Transportation

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

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
36A	Windsor loamy sand, 0 to 3 percent slopes	A	4.5	13.7%
36B	Windsor loamy sand, 3 to 8 percent slopes	A	0.4	1.2%
306	Udorthents-Urban land complex	B	20.1	61.3%
307	Urban land	D	7.4	22.6%
308	Udorthents, smoothed	C	0.4	1.2%
Totals for Area of Interest			32.8	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX D
NOAA Rainfall Data



NOAA Atlas 14, Volume 10, Version 3
Location name: South Windsor, Connecticut, USA*
Latitude: 41.8019°, Longitude: -72.6202°
Elevation: 54.7 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

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PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.01 (3.14-5.11)	4.87 (3.82-6.22)	6.28 (4.90-8.03)	7.44 (5.77-9.58)	9.04 (6.78-12.2)	10.2 (7.54-14.1)	11.5 (8.21-16.5)	12.9 (8.72-19.0)	15.0 (9.71-22.8)	16.6 (10.5-25.9)
10-min	2.84 (2.23-3.62)	3.45 (2.70-4.40)	4.44 (3.47-5.69)	5.27 (4.09-6.78)	6.40 (4.80-8.63)	7.25 (5.33-10.0)	8.15 (5.81-11.7)	9.16 (6.17-13.5)	10.6 (6.87-16.2)	11.8 (7.46-18.3)
15-min	2.23 (1.75-2.84)	2.71 (2.12-3.45)	3.49 (2.72-4.46)	4.13 (3.20-5.32)	5.02 (3.76-6.77)	5.69 (4.18-7.85)	6.39 (4.56-9.17)	7.18 (4.84-10.6)	8.31 (5.39-12.7)	9.24 (5.85-14.4)
30-min	1.49 (1.17-1.90)	1.82 (1.42-2.32)	2.34 (1.83-3.00)	2.78 (2.16-3.58)	3.39 (2.54-4.57)	3.85 (2.82-5.31)	4.32 (3.08-6.20)	4.86 (3.28-7.14)	5.62 (3.65-8.57)	6.25 (3.96-9.73)
60-min	0.936 (0.733-1.19)	1.14 (0.893-1.45)	1.48 (1.15-1.89)	1.75 (1.36-2.26)	2.13 (1.60-2.88)	2.42 (1.78-3.34)	2.72 (1.94-3.91)	3.06 (2.07-4.50)	3.55 (2.30-5.40)	3.94 (2.49-6.14)
2-hr	0.608 (0.479-0.769)	0.736 (0.580-0.932)	0.946 (0.742-1.20)	1.12 (0.874-1.43)	1.36 (1.03-1.83)	1.54 (1.14-2.12)	1.73 (1.25-2.48)	1.96 (1.32-2.86)	2.29 (1.49-3.47)	2.57 (1.63-3.98)
3-hr	0.466 (0.369-0.588)	0.564 (0.446-0.713)	0.725 (0.570-0.919)	0.858 (0.671-1.09)	1.04 (0.790-1.40)	1.18 (0.875-1.62)	1.32 (0.958-1.90)	1.50 (1.02-2.18)	1.77 (1.15-2.67)	1.99 (1.27-3.07)
6-hr	0.292 (0.232-0.366)	0.355 (0.282-0.445)	0.457 (0.362-0.576)	0.542 (0.427-0.687)	0.659 (0.503-0.879)	0.745 (0.558-1.02)	0.839 (0.612-1.20)	0.954 (0.649-1.38)	1.13 (0.739-1.70)	1.29 (0.820-1.97)
12-hr	0.176 (0.141-0.220)	0.216 (0.173-0.269)	0.281 (0.224-0.352)	0.335 (0.265-0.422)	0.409 (0.314-0.543)	0.464 (0.349-0.632)	0.523 (0.384-0.746)	0.598 (0.408-0.859)	0.713 (0.467-1.06)	0.812 (0.520-1.24)
24-hr	0.103 (0.083-0.128)	0.128 (0.103-0.159)	0.169 (0.136-0.211)	0.203 (0.162-0.255)	0.250 (0.194-0.331)	0.285 (0.216-0.387)	0.323 (0.239-0.460)	0.371 (0.254-0.531)	0.448 (0.295-0.664)	0.516 (0.331-0.779)
2-day	0.058 (0.047-0.072)	0.074 (0.060-0.091)	0.099 (0.080-0.122)	0.120 (0.096-0.149)	0.148 (0.116-0.196)	0.169 (0.129-0.230)	0.192 (0.144-0.275)	0.224 (0.154-0.318)	0.275 (0.181-0.405)	0.321 (0.206-0.481)
3-day	0.042 (0.034-0.052)	0.054 (0.044-0.066)	0.072 (0.058-0.089)	0.087 (0.070-0.108)	0.108 (0.085-0.143)	0.123 (0.095-0.167)	0.141 (0.106-0.201)	0.164 (0.113-0.232)	0.202 (0.133-0.297)	0.237 (0.153-0.354)
4-day	0.034 (0.028-0.042)	0.043 (0.035-0.053)	0.058 (0.047-0.071)	0.070 (0.056-0.086)	0.087 (0.068-0.114)	0.099 (0.076-0.133)	0.112 (0.085-0.160)	0.131 (0.090-0.185)	0.162 (0.107-0.236)	0.189 (0.122-0.282)
7-day	0.023 (0.019-0.028)	0.029 (0.023-0.035)	0.038 (0.031-0.046)	0.046 (0.037-0.056)	0.056 (0.044-0.074)	0.064 (0.050-0.086)	0.073 (0.055-0.103)	0.085 (0.059-0.119)	0.104 (0.069-0.151)	0.121 (0.078-0.179)
10-day	0.019 (0.015-0.022)	0.023 (0.019-0.028)	0.030 (0.024-0.036)	0.035 (0.029-0.043)	0.043 (0.034-0.056)	0.049 (0.038-0.065)	0.056 (0.042-0.078)	0.064 (0.044-0.089)	0.077 (0.051-0.112)	0.089 (0.058-0.132)
20-day	0.013 (0.011-0.016)	0.016 (0.013-0.019)	0.019 (0.016-0.023)	0.022 (0.018-0.027)	0.026 (0.021-0.034)	0.030 (0.023-0.039)	0.033 (0.025-0.045)	0.037 (0.026-0.051)	0.043 (0.029-0.062)	0.048 (0.032-0.071)
30-day	0.011 (0.009-0.013)	0.013 (0.011-0.015)	0.015 (0.013-0.018)	0.017 (0.014-0.021)	0.020 (0.016-0.026)	0.022 (0.017-0.029)	0.025 (0.018-0.033)	0.027 (0.019-0.037)	0.031 (0.021-0.044)	0.034 (0.022-0.049)
45-day	0.009 (0.008-0.011)	0.011 (0.009-0.013)	0.012 (0.010-0.015)	0.014 (0.011-0.017)	0.016 (0.012-0.020)	0.017 (0.013-0.022)	0.019 (0.014-0.025)	0.020 (0.014-0.028)	0.022 (0.015-0.032)	0.024 (0.016-0.035)
60-day	0.008 (0.007-0.010)	0.009 (0.008-0.011)	0.010 (0.009-0.013)	0.012 (0.010-0.014)	0.013 (0.010-0.016)	0.014 (0.011-0.018)	0.015 (0.011-0.020)	0.017 (0.012-0.023)	0.018 (0.012-0.025)	0.019 (0.012-0.028)

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.

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PF graphical



NOAA Atlas 14, Volume 10, Version 3
Location name: South Windsor, Connecticut, USA*
Latitude: 41.8019°, Longitude: -72.6202°
Elevation: 54.7 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

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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	0.334 (0.262-0.426)	0.406 (0.318-0.518)	0.523 (0.408-0.669)	0.620 (0.481-0.798)	0.753 (0.565-1.02)	0.854 (0.628-1.18)	0.959 (0.684-1.38)	1.08 (0.727-1.58)	1.25 (0.809-1.90)	1.39 (0.877-2.16)
10-min	0.474 (0.371-0.604)	0.575 (0.450-0.733)	0.740 (0.578-0.949)	0.878 (0.681-1.13)	1.07 (0.800-1.44)	1.21 (0.889-1.67)	1.36 (0.968-1.95)	1.53 (1.03-2.24)	1.77 (1.15-2.69)	1.96 (1.24-3.06)
15-min	0.557 (0.437-0.710)	0.677 (0.530-0.863)	0.872 (0.681-1.12)	1.03 (0.801-1.33)	1.25 (0.941-1.69)	1.42 (1.05-1.96)	1.60 (1.14-2.29)	1.80 (1.21-2.64)	2.08 (1.35-3.17)	2.31 (1.46-3.60)
30-min	0.747 (0.585-0.951)	0.908 (0.711-1.16)	1.17 (0.915-1.50)	1.39 (1.08-1.79)	1.70 (1.27-2.29)	1.92 (1.41-2.65)	2.16 (1.54-3.10)	2.43 (1.64-3.57)	2.81 (1.82-4.29)	3.13 (1.98-4.87)
60-min	0.936 (0.733-1.19)	1.14 (0.893-1.45)	1.48 (1.15-1.89)	1.75 (1.36-2.26)	2.13 (1.60-2.88)	2.42 (1.78-3.34)	2.72 (1.94-3.91)	3.06 (2.07-4.50)	3.55 (2.30-5.40)	3.94 (2.49-6.14)
2-hr	1.22 (0.958-1.54)	1.47 (1.16-1.87)	1.89 (1.49-2.41)	2.24 (1.75-2.87)	2.72 (2.06-3.66)	3.08 (2.28-4.24)	3.46 (2.49-4.97)	3.91 (2.65-5.71)	4.58 (2.98-6.94)	5.14 (3.26-7.96)
3-hr	1.40 (1.11-1.77)	1.70 (1.34-2.14)	2.18 (1.71-2.76)	2.58 (2.02-3.29)	3.13 (2.37-4.19)	3.53 (2.63-4.86)	3.97 (2.88-5.70)	4.50 (3.05-6.55)	5.30 (3.45-8.01)	5.99 (3.81-9.22)
6-hr	1.75 (1.39-2.19)	2.12 (1.69-2.67)	2.74 (2.17-3.45)	3.25 (2.56-4.11)	3.94 (3.01-5.27)	4.46 (3.34-6.11)	5.02 (3.66-7.19)	5.71 (3.89-8.27)	6.78 (4.43-10.2)	7.69 (4.91-11.8)
12-hr	2.12 (1.70-2.65)	2.60 (2.08-3.25)	3.39 (2.70-4.24)	4.04 (3.20-5.08)	4.93 (3.79-6.55)	5.59 (4.21-7.61)	6.31 (4.63-8.99)	7.20 (4.92-10.4)	8.59 (5.63-12.8)	9.79 (6.26-14.9)
24-hr	2.47 (1.99-3.06)	3.08 (2.48-3.81)	4.06 (3.26-5.06)	4.88 (3.89-6.11)	6.01 (4.65-7.95)	6.83 (5.19-9.29)	7.75 (5.74-11.0)	8.91 (6.10-12.7)	10.8 (7.07-15.9)	12.4 (7.95-18.7)
2-day	2.80 (2.27-3.44)	3.53 (2.86-4.35)	4.74 (3.82-5.86)	5.74 (4.60-7.14)	7.12 (5.55-9.40)	8.11 (6.21-11.0)	9.24 (6.93-13.2)	10.7 (7.37-15.3)	13.2 (8.70-19.4)	15.4 (9.91-23.1)
3-day	3.04 (2.48-3.73)	3.86 (3.13-4.73)	5.18 (4.19-6.38)	6.28 (5.05-7.78)	7.79 (6.10-10.3)	8.89 (6.83-12.0)	10.1 (7.63-14.5)	11.8 (8.12-16.7)	14.6 (9.61-21.4)	17.0 (11.0-25.5)
4-day	3.26 (2.66-3.99)	4.12 (3.36-5.05)	5.53 (4.49-6.80)	6.70 (5.40-8.28)	8.31 (6.52-10.9)	9.47 (7.30-12.8)	10.8 (8.15-15.4)	12.6 (8.66-17.8)	15.5 (10.3-22.7)	18.2 (11.7-27.1)
7-day	3.85 (3.16-4.68)	4.81 (3.94-5.86)	6.39 (5.21-7.81)	7.69 (6.23-9.46)	9.49 (7.47-12.4)	10.8 (8.34-14.5)	12.3 (9.26-17.3)	14.2 (9.83-20.0)	17.4 (11.5-25.3)	20.3 (13.1-30.0)
10-day	4.45 (3.66-5.40)	5.47 (4.49-6.64)	7.13 (5.83-8.68)	8.50 (6.91-10.4)	10.4 (8.20-13.5)	11.8 (9.11-15.7)	13.3 (10.0-18.6)	15.3 (10.6-21.4)	18.6 (12.3-26.9)	21.4 (13.9-31.7)
20-day	6.41 (5.30-7.72)	7.48 (6.18-9.02)	9.23 (7.60-11.2)	10.7 (8.74-13.0)	12.7 (10.0-16.2)	14.2 (10.9-18.6)	15.8 (11.8-21.6)	17.7 (12.4-24.6)	20.7 (13.8-29.8)	23.3 (15.1-34.1)
30-day	8.09 (6.72-9.72)	9.19 (7.62-11.0)	11.0 (9.08-13.3)	12.5 (10.2-15.1)	14.5 (11.5-18.4)	16.1 (12.4-20.8)	17.7 (13.2-23.8)	19.5 (13.7-26.9)	22.2 (14.9-31.7)	24.4 (15.9-35.7)
45-day	10.2 (8.52-12.2)	11.4 (9.45-13.6)	13.2 (11.0-15.9)	14.8 (12.2-17.8)	16.9 (13.4-21.2)	18.5 (14.3-23.7)	20.1 (14.9-26.7)	21.8 (15.4-30.0)	24.1 (16.2-34.3)	25.9 (16.9-37.7)
60-day	12.0 (10.0-14.3)	13.2 (11.0-15.8)	15.1 (12.6-18.1)	16.7 (13.8-20.1)	18.9 (15.0-23.6)	20.6 (15.9-26.3)	22.3 (16.5-29.3)	23.9 (16.9-32.7)	25.9 (17.5-36.7)	27.3 (17.9-39.7)

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.

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PF graphical

APPENDIX E
Storm Sewer Analysis

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	20	0.70	6.73	0.90	0.63	5.01	6.0	22.0	3.4	16.96	18.17	6.66	24	0.55	44.87	44.98	46.35	46.52	47.38	50.00	CB4-DMH2
2	1	130	0.61	0.61	0.90	0.55	0.55	6.0	6.0	6.9	3.77	4.95	4.40	15	0.50	46.95	47.60	47.81	48.39	50.00	50.10	CB5-CB4
3	1	222	0.61	2.94	0.90	0.55	1.74	6.0	20.9	3.5	6.06	7.97	3.43	18	0.49	45.53	46.62	47.81	48.44	50.00	50.10	CB6-CB4
4	3	196	2.33	2.33	0.51	1.19	1.19	20.0	20.0	3.6	4.27	4.57	3.48	15	0.50	46.62	47.60	48.62	49.47	50.10	50.10	CB7-CB6
5	1	102	0.00	2.48	0.00	0.00	2.10	0.0	7.8	6.1	12.71	17.49	4.05	24	0.51	44.98	45.50	47.81	48.08	50.00	51.40	DMH5-CB4
6	5	130	0.44	0.44	0.73	0.32	0.32	7.0	7.0	6.4	2.06	2.77	2.62	12	0.52	46.33	47.00	48.31	48.68	51.40	49.50	CB9-DMH5
7	5	148	2.04	2.04	0.87	1.77	1.77	6.0	6.0	6.9	12.20	12.33	4.97	15(2b)	0.78	45.50	46.65	48.31	49.44	51.40	49.35	CB8-DMH5
8	End	9	0.26	0.26	0.90	0.23	0.23	6.0	6.0	6.9	1.61	29.95	3.50	15	18.33	45.35	47.00	45.85	47.50	-1.99	50.00	CB1-UGC
9	End	100	0.22	0.22	0.90	0.20	0.20	6.0	6.0	6.9	1.36	10.59	3.32	15	2.29	44.71	47.00	45.17	47.46	47.65	49.50	CB2-UGC
10	End	26	1.56	1.56	0.90	1.40	1.40	6.0	6.0	6.9	9.65	16.35	8.07	15	5.46	44.71	46.13	45.88	47.30	47.59	49.00	CB3-UGC
11	End	35	3.60	5.80	0.48	1.73	2.83	53.0	53.0	1.9	5.39	8.38	4.32	18	0.54	42.29	42.48	43.43	43.37	49.64	47.70	YD2-EXDMH
12	11	87	0.00	2.20	0.00	0.00	1.10	0.0	7.6	6.2	6.77	8.18	5.17	18	0.52	42.48	42.93	43.52	43.97	47.70	50.50	DMH1-YD2
13	12	170	2.20	2.20	0.50	1.10	1.10	7.0	7.0	6.4	7.04	8.14	4.78	18	0.51	42.93	43.80	44.26	44.85	50.50	46.50	YD1-DMH1

Project File: 2482.H - Storm Sewer.stm

Number of lines: 13

Run Date: 6/13/2022

NOTES: Intensity = 35.85 / (Inlet time + 3.70) ^ 0.73; Return period = Yrs. 10 ; c = cir e = ellip b = box

APPENDIX F
Water Quality Flow Calculations and Data

45, 95 John Fitch Boulevard and 542 King Street- DPI No. 2482.H

June 13, 2022

WQF To Underground Chamber System – Watershed P3

To find Unit Peak Discharge q_u with Exhibit 4-III, the following is needed:

Time of Concentration (T_c):

$$20 \text{ mins} = 0.33 \text{ hours}$$

Initial Abstraction (I_a) in inches / Design Precipitation (P) in inches:

Initial abstraction (I_a) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

$$CN = 92$$

$$I_a = 0.174 \text{ inches}$$

Design Precipitation (P) = 1" for water quality storms per Appendix B

$$I_a/P = 0.174$$

Unit Peak Discharge $q_u = 435 \text{ cfs/mi}^2/\text{inch}$

Drainage Area $A = 383,881 \text{ sf} = 8.813 \text{ acres} = 0.0138 \text{ mi}^2$

Runoff Depth $Q = \text{WQV (acre-feet)} \times 12 / \text{drainage area (acres)}$

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = volumetric runoff coefficient

$$= 0.05 + 0.009(I), \text{ where } I = \text{percent impervious cover} = 83.39\%$$

$$R = 0.05 + 0.009(I)$$

$$R = 0.05 + 0.009(83.39)$$

$$R = 0.801$$

$$A = \text{drainage area in acres} = 0.547 \text{ acres}$$

$$\text{WQV} = (1")(R)(A)/12$$

$$\text{WQV} = (1")(0.801)(8.813 \text{ acres}) / 12 \text{ in/ft}$$

$$\text{WQV} = 0.5883 \text{ acre-feet}$$

$$Q = (\text{WQV} \times 12 \text{ in/ft}) / \text{Drainage Area}$$

$$Q = (0.5883 \text{ acre-feet} \times 12 \text{ in/ft}) / 8.813 \text{ acres}$$

$$Q = 0.801 \text{ in}$$

$$\text{WQF} = q_u \times A \times Q$$

$$\text{WQF} = 435 \text{ cfs/mi}^2/\text{inch} \times 0.0138 \text{ mi}^2 \times 0.801 \text{ in}$$

$$\text{WQF} = \mathbf{4.81 \text{ cfs required}}$$

Proposed BMP

As shown on the enclosed water quality per unit sizing report, the proposed ADS Stormtech row (utilizing at least **34 ~ SC-740** chambers @ **0.15 cfs** treated flow rate per chamber) is rated for 80% TSS removal efficiency for the required **4.81 cfs** water quality flow. The current design plan proposes **40** isolator row chambers for the subject area, providing **6.0 cfs** of WQF. See isolator row sizing chart included in the appendix.



STORMTECH ISOLATOR ROW SIZING CHART

	SC-160LP	SC-310	SC-740	DC-780	MC-3500	MC-4500
Chamber Area (Sq.Ft.)	11.4	20	27.8	27.8	43.2	30.1
Treated Flow Rate per chamber (CFS)	0.055	0.11	0.15	0.15	0.24	0.17
NOTE: Testing of the Isolator Row verified by NJCAT. It has shown to have a TSS removal efficiency of 84% for SIL-CO-SIL 250. MASTEP verification of up to 83% TSS of the OK-110.						
NJCAT verified Treated Flow Rate (GPM / Sq.Ft.)			2.5			



For more information contact ADS at 800-821-6710 or visit www.ads-pipe.com

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APPENDIX G
Drainage Area Maps



REFERENCES:
 THIS PLAN REFERS TO THE FOLLOWING:
 1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY, HARTFORD TRUCK ~ 45 & 95 JOHN FITCH BOULEVARD & 542 KING STREET ~ SOUTH WINDSOR CT" DATED 07/02/2021 PREPARED BY DESIGN PROFESSIONALS INC.
 2. PLAN ENTITLED "HARTFORD TRUCK EQUIPMENT ~ SITE PLAN APPLICATION ~ 45 JOHN FITCH BOULEVARD & 542 KING STREET ~ SOUTH WINDSOR, CT" DATED 07/22/2021 PREPARED BY DESIGN PROFESSIONALS, INC.
 3. OFFSITE CONTOURS ACQUIRED ONLINE: UCONN CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION CONNECTICUT ENVIRONMENTAL CONDITIONS ONLINE MAPS AND GEOSPATIAL DATA FOR EVERYONE (<http://cteco.uconn.edu/viewers/index.htm>)

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PREPARED FOR:
 Hartford Truck
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 C/o Mr. Blake Brammon
 95 John Fitch Boulevard
 South Windsor, CT 06074
 860-290-9324 T

PROJECT NO.:
 2482-H
 DATE:
 06/13/22
 DRAWN BY:
 DJH
 CHECKED BY:
 SPC

**HARTFORD TRUCK
 EQUIPMENT**
 45 JOHN FITCH BOULEVARD & 542 KING STREET
 SOUTH WINDSOR, CONNECTICUT
 GIS Nos. 47700045, & 50400542

NO.	DATE	REVISIONS	BY

**EXISTING CONDITION
 DRAINAGE AREA MAP**

SCALE: 0' 40' 80' 160'
 T. = 80'

SHEET
C-DA1
 SHEET 1 OF 2

