



34 School Street, Littleton, NH 03561 • Ph 603-444-4111 • Fax 603-444-1343 • www.horizonsengineering.com

STORMWATER SUMMARY

Project: Effingham Gas Station

Date: August 25, 2022

Applicant : Meena LLC

Project No : 220473

Location : 41 Route 25, Effingham, NH

PID : Map 401, Lot 5

Methodology : TR-20 using HydroCAD® 10.20-2f

Assumption(s):

- The “Existing Site Conditions” are the conditions that the site was in prior to the construction of the gas pumps, tank and canopy.
- Storm events have been used in these calculations under fully thawed ground conditions, antecedent moisture content two.

Approach:

- Review and verify, stormwater runoff flows from the concrete pads and parking lots.
- Identify potential oil spills and place catch basins and oil water separators to treat hydrocarbons.
- Note that the site is all within Champlain Soils that are considered excessively well drained, and a droughty soil per NRCS Soils Mapping and Classification. The Hydrologic Soils Group for Colton soils is group A.
- Stormwater analysis completed was to determine the amount of flow to the NHDOT right of way and design an infiltration trench to treat the runoff from the canopy.
- The analysis is limited to the watershed on the project site.

Summary of Analysis:

Analysis

<u>Point</u>	<u>2yr</u>	<u>10yr</u>	<u>25yr</u>
AP	0.32cfs	0.47cfs	0.58cfs

Conclusions:

- Stormwater runoff from the parking lot and buildings is directed to deep sump catch basins and an oil water separator. These are designed to capture the runoff and remove any hydrocarbons in the runoff. The runoff from the proposed canopy is directed to an infiltration trench, where the runoff will be captured, infiltrated and treated. There will be no increase in stormwater volume because there will be no increase in impervious area. Additionally, the construction of the infiltration trench, catch basins, and drainage basin will add a level of protection and treatment that was not previously available.

Horizons Engineering, Inc.

New London, NH • Newport, VT • Littleton, NH • Sharon, VT • Kennebunk, ME • Conway, NH • Newmarket, NH

Certification

This document contains engineering data including calculations of the post development surface drainage characteristics of this property. The engineering aspects of this document have been prepared by me and by those under my direct supervision; every such engineering aspect shown herein is based upon my best knowledge and opinion thereof.

2-year, 10-year, and 25- year storm events has been used in these calculations under fully thawed ground conditions, antecedent moisture content two. HydroCAD© 10.20-2f software has been used to perform the calculations.

This document does not constitute any guarantees but has been prepared with usual and customary standards of care. All references are submitted for general information and regulatory review purposes only.

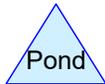
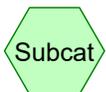
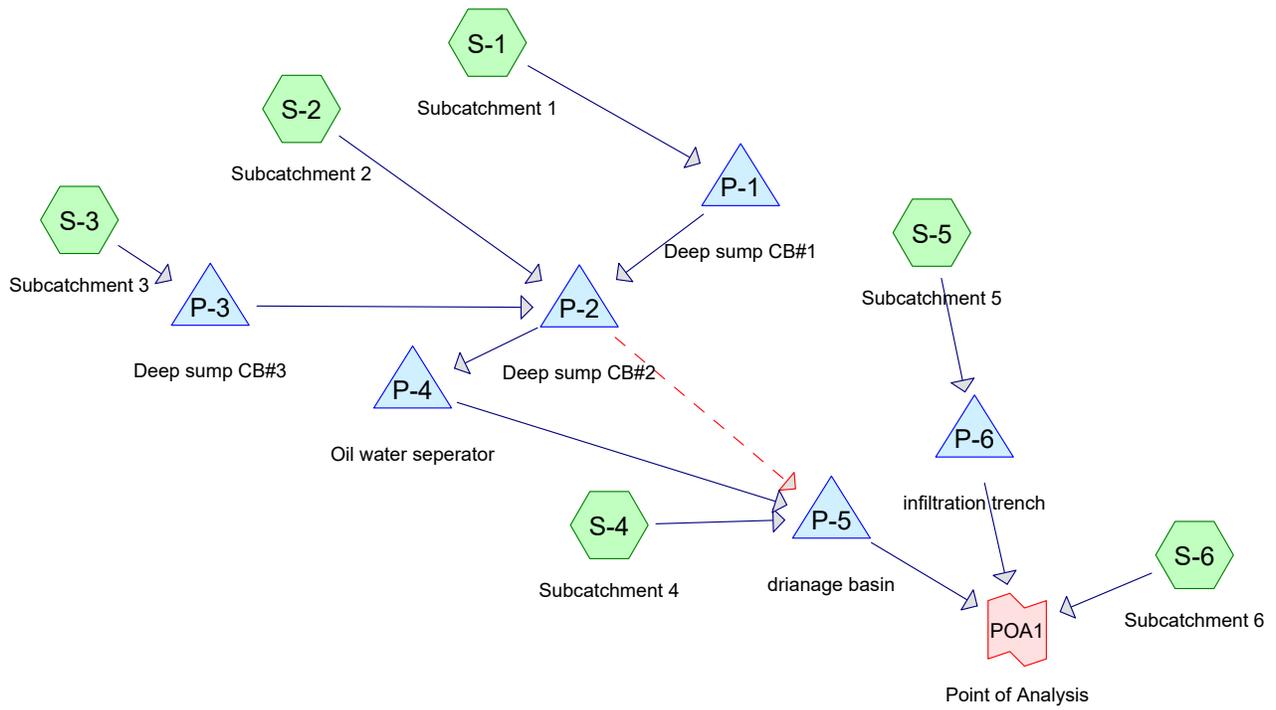
Date 08/12/2022

Mark Lucy, P.E., C.P.E.S.C.



Horizons Engineering, Inc.

New London, NH • Newport, VT • Littleton, NH • Sharon, VT • Kennebunk, ME • Conway, NH • Newmarket, NH



Routing Diagram for 220473 Meena LLC 03
 Prepared by {enter your company name here}, Printed 8/26/2022
 HydroCAD® 10.10-7a s/n 02765 © 2021 HydroCAD Software Solutions LLC

220473 Meena LLC 03

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 02765 © 2021 HydroCAD Software Solutions LLC

Printed 8/26/2022

Page 2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 Year	TYPE II 24-hr		Default	24.00	1	2.93	2
2	10 Year	TYPE II 24-hr		Default	24.00	1	4.25	2
3	25 Year	TYPE II 24-hr		Default	24.00	1	5.26	2

220473 Meena LLC 03

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 02765 © 2021 HydroCAD Software Solutions LLC

Printed 8/26/2022

Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.815	39	>75% Grass cover, Good, HSG A (S-3, S-4, S-6)
0.445	98	Paved parking, HSG A (S-1, S-2, S-3, S-4, S-6)
0.080	98	Roofs, HSG A (S-1, S-2, S-3, S-5)
0.017	30	Woods, Good, HSG A (S-4)
1.357	62	TOTAL AREA

220473 Meena LLC 03

Prepared by {enter your company name here}

Printed 8/26/2022

HydroCAD® 10.10-7a s/n 02765 © 2021 HydroCAD Software Solutions LLC

Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.357	HSG A	S-1, S-2, S-3, S-4, S-5, S-6
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.357		TOTAL AREA

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1 Runoff Area=1,569 sf 100.00% Impervious Runoff Depth=2.70"
Tc=6.0 min CN=WQ Runoff=0.15 cfs 0.008 af

Subcatchment S-2: Subcatchment 2 Runoff Area=3,935 sf 100.00% Impervious Runoff Depth=2.70"
Tc=6.0 min CN=WQ Runoff=0.37 cfs 0.020 af

Subcatchment S-3: Subcatchment 3 Runoff Area=7,865 sf 94.16% Impervious Runoff Depth=2.54"
Tc=6.0 min CN=WQ Runoff=0.70 cfs 0.038 af

Subcatchment S-4: Subcatchment 4 Runoff Area=28,349 sf 19.45% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=WQ Runoff=0.52 cfs 0.028 af

Subcatchment S-5: Subcatchment 5 Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=2.70"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.005 af

Subcatchment S-6: Subcatchment 6 Runoff Area=16,316 sf 20.70% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=WQ Runoff=0.32 cfs 0.017 af

Pond P-1: Deep sump CB#1 Peak Elev=420.31' Storage=3 cf Inflow=0.15 cfs 0.008 af
12.0" Round Culvert n=0.012 L=38.0' S=0.0079 '/' Outflow=0.15 cfs 0.008 af

Pond P-2: Deep sump CB#2 Peak Elev=419.78' Storage=15 cf Inflow=1.22 cfs 0.067 af
Primary=1.22 cfs 0.067 af Secondary=0.00 cfs 0.000 af Outflow=1.22 cfs 0.067 af

Pond P-3: Deep sump CB#3 Peak Elev=420.68' Storage=6 cf Inflow=0.70 cfs 0.038 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0087 '/' Outflow=0.70 cfs 0.038 af

Pond P-4: Oil water seperator Peak Elev=418.66' Storage=126 cf Inflow=1.22 cfs 0.067 af
12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0056 '/' Outflow=1.22 cfs 0.064 af

Pond P-5: drianage basin Peak Elev=419.11' Storage=4,039 cf Inflow=1.74 cfs 0.093 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond P-6: infiltration trench Peak Elev=419.49' Storage=89 cf Inflow=0.10 cfs 0.005 af
Discarded=0.01 cfs 0.005 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Link POA1: Point of Analysis Inflow=0.32 cfs 0.017 af
Primary=0.32 cfs 0.017 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.118 af Average Runoff Depth = 1.04"
61.32% Pervious = 0.832 ac 38.68% Impervious = 0.525 ac

Summary for Subcatchment S-1: Subcatchment 1

Runoff = 0.15 cfs @ 11.97 hrs, Volume= 0.008 af, Depth= 2.70"

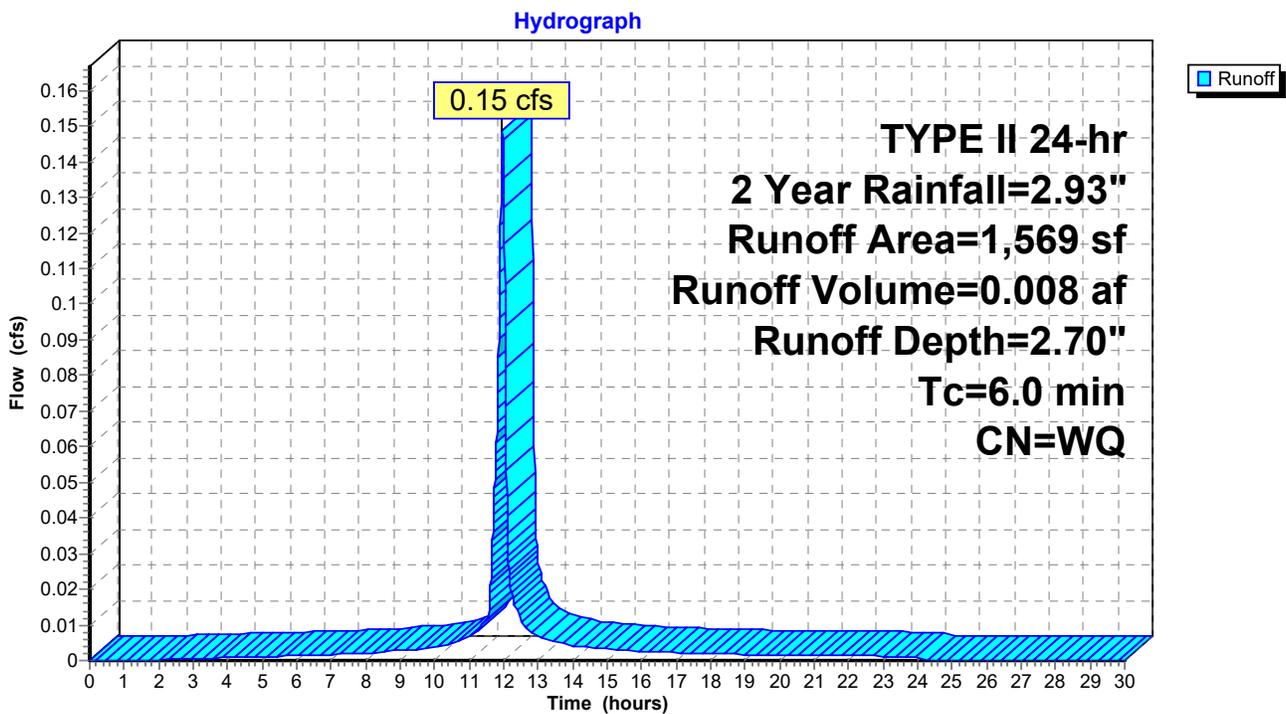
Routed to Pond P-1 : Deep sump CB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 2 Year Rainfall=2.93"

Area (sf)	CN	Description
623	98	Roofs, HSG A
946	98	Paved parking, HSG A
1,569		Weighted Average
1,569		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-1: Subcatchment 1



Summary for Subcatchment S-2: Subcatchment 2

Runoff = 0.37 cfs @ 11.97 hrs, Volume= 0.020 af, Depth= 2.70"

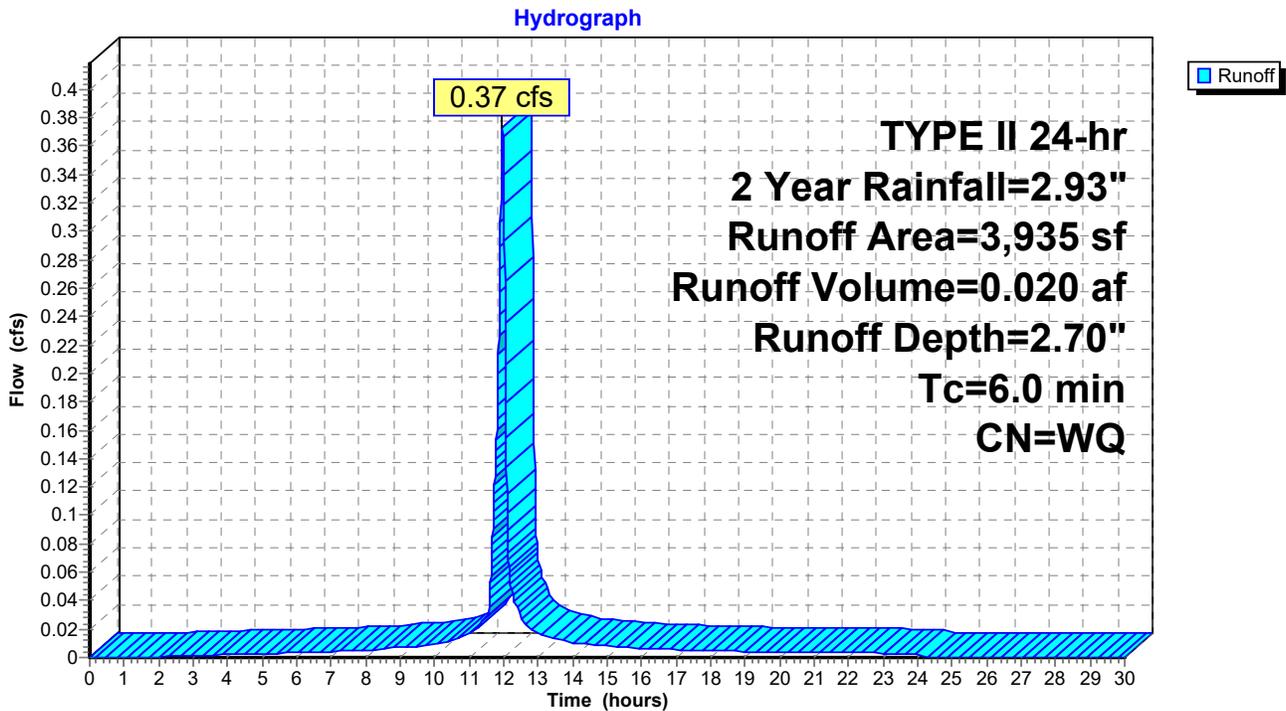
Routed to Pond P-2 : Deep sump CB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 2 Year Rainfall=2.93"

Area (sf)	CN	Description
548	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
3,935		Weighted Average
3,935		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-2: Subcatchment 2



Summary for Subcatchment S-3: Subcatchment 3

Runoff = 0.70 cfs @ 11.97 hrs, Volume= 0.038 af, Depth= 2.54"

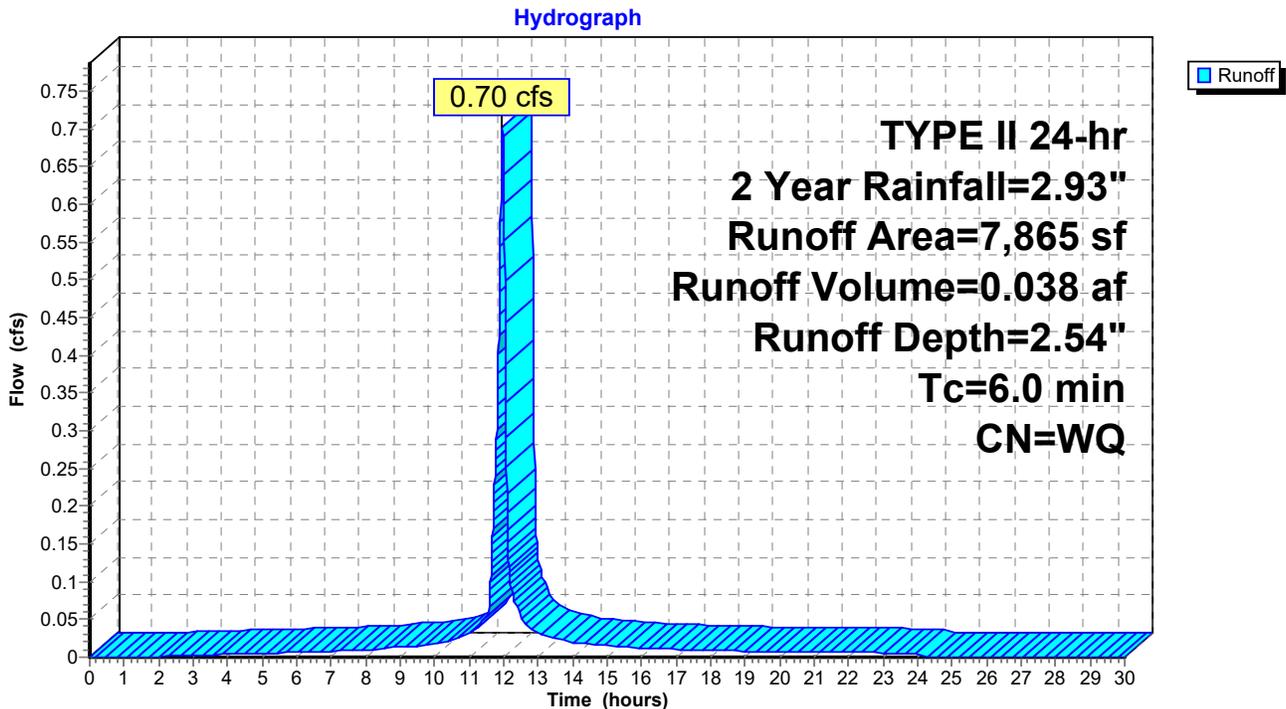
Routed to Pond P-3 : Deep sump CB#3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 2 Year Rainfall=2.93"

Area (sf)	CN	Description
1,258	98	Roofs, HSG A
6,148	98	Paved parking, HSG A
459	39	>75% Grass cover, Good, HSG A
7,865		Weighted Average
459		5.84% Pervious Area
7,406		94.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-3: Subcatchment 3



Summary for Subcatchment S-4: Subcatchment 4

Runoff = 0.52 cfs @ 11.97 hrs, Volume= 0.028 af, Depth= 0.52"

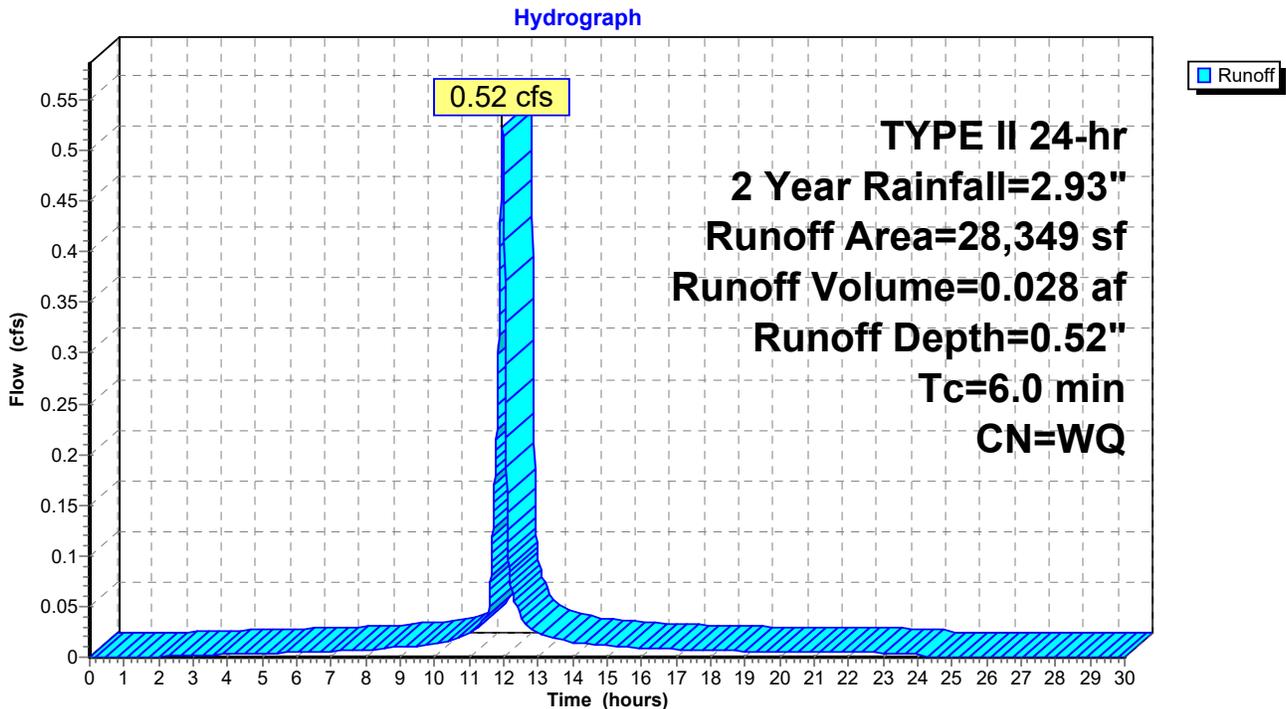
Routed to Pond P-5 : drianage basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 2 Year Rainfall=2.93"

Area (sf)	CN	Description
5,514	98	Paved parking, HSG A
22,089	39	>75% Grass cover, Good, HSG A
746	30	Woods, Good, HSG A
28,349		Weighted Average
22,835		80.55% Pervious Area
5,514		19.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-4: Subcatchment 4



Summary for Subcatchment S-5: Subcatchment 5

Runoff = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af, Depth= 2.70"
 Routed to Pond P-6 : infiltration trench

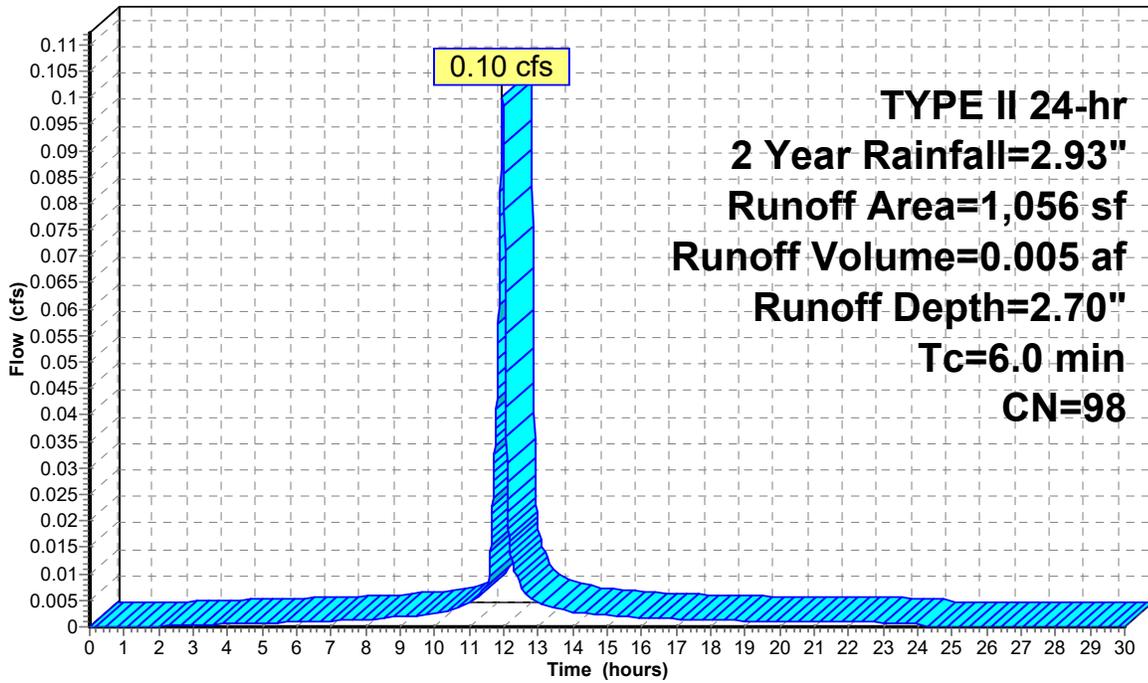
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 2 Year Rainfall=2.93"

Area (sf)	CN	Description
1,056	98	Roofs, HSG A
1,056		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-5: Subcatchment 5

Hydrograph



Summary for Subcatchment S-6: Subcatchment 6

Runoff = 0.32 cfs @ 11.97 hrs, Volume= 0.017 af, Depth= 0.56"

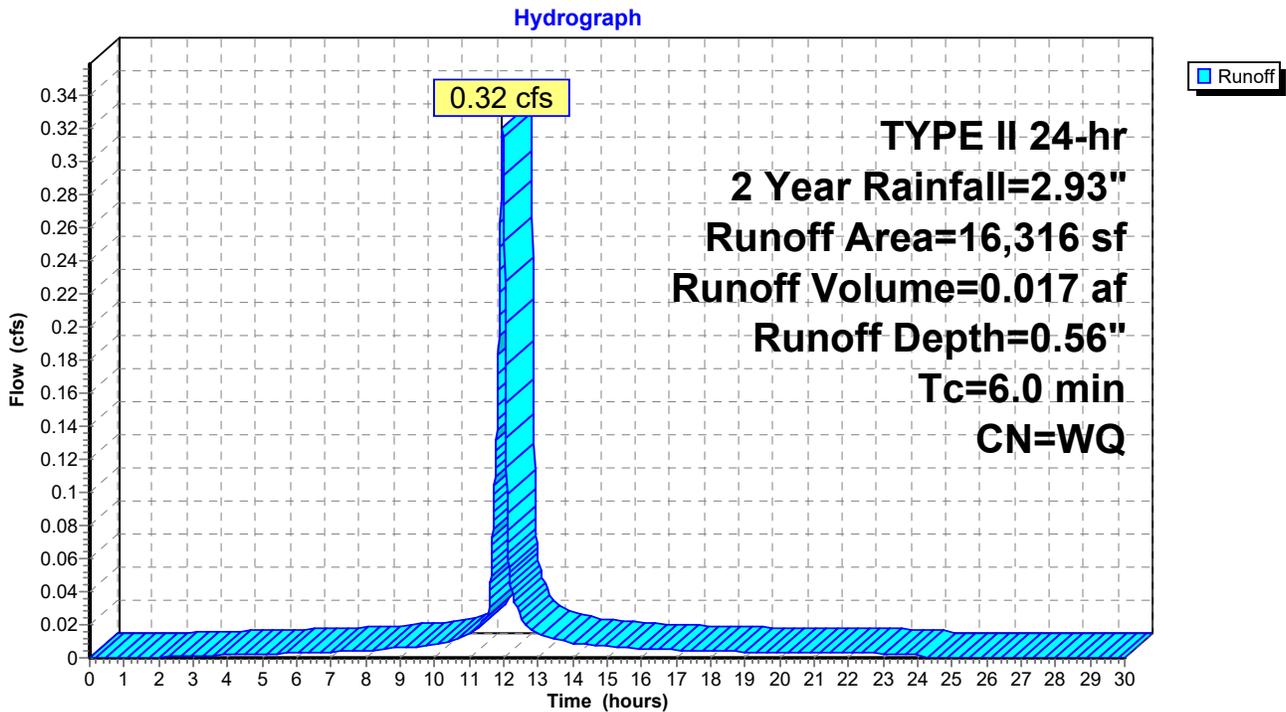
Routed to Link POA1 : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 2 Year Rainfall=2.93"

Area (sf)	CN	Description
3,377	98	Paved parking, HSG A
12,939	39	>75% Grass cover, Good, HSG A
16,316		Weighted Average
12,939		79.30% Pervious Area
3,377		20.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-6: Subcatchment 6



Summary for Pond P-1: Deep sump CB#1

Inflow Area = 0.036 ac, 100.00% Impervious, Inflow Depth = 2.70" for 2 Year event
 Inflow = 0.15 cfs @ 11.97 hrs, Volume= 0.008 af
 Outflow = 0.15 cfs @ 11.97 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.15 cfs @ 11.97 hrs, Volume= 0.008 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.31' @ 11.97 hrs Surf.Area= 13 sf Storage= 3 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 43 cf

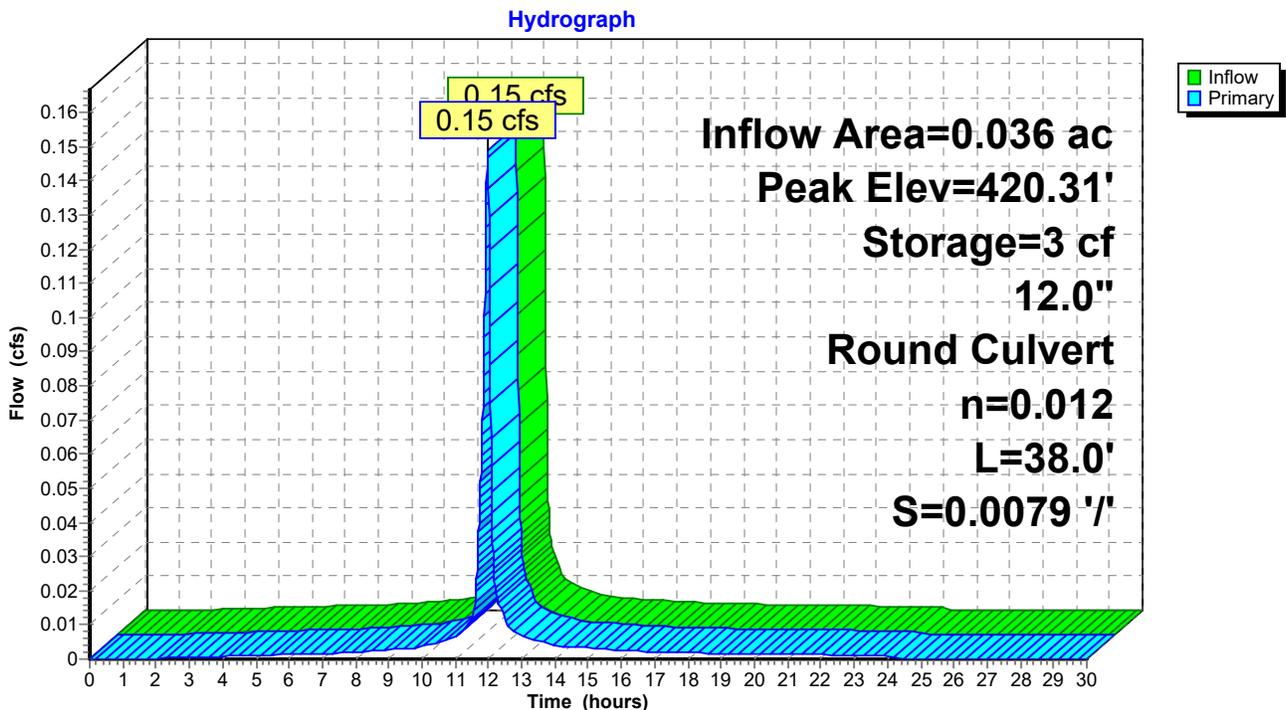
Plug-Flow detention time= 1.1 min calculated for 0.008 af (100% of inflow)
 Center-of-Mass det. time= 1.1 min (755.5 - 754.4)

Volume	Invert	Avail.Storage	Storage Description
#1	420.10'	43 cf	4.00'D x 3.40'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.10'	12.0" Round 12" hdpe L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.10' / 419.80' S= 0.0079 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.15 cfs @ 11.97 hrs HW=420.31' (Free Discharge)
 ←1=12" hdpe (Inlet Controls 0.15 cfs @ 1.23 fps)

Pond P-1: Deep sump CB#1



Summary for Pond P-2: Deep sump CB#2

Inflow Area = 0.307 ac, 96.57% Impervious, Inflow Depth = 2.61" for 2 Year event
 Inflow = 1.22 cfs @ 11.97 hrs, Volume= 0.067 af
 Outflow = 1.22 cfs @ 11.97 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.3 min
 Primary = 1.22 cfs @ 11.97 hrs, Volume= 0.067 af
 Routed to Pond P-4 : Oil water seperator
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond P-5 : drianage basin

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 419.78' @ 11.97 hrs Surf.Area= 13 sf Storage= 15 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 62 cf

Plug-Flow detention time= 0.6 min calculated for 0.067 af (100% of inflow)
 Center-of-Mass det. time= 0.6 min (755.5 - 754.9)

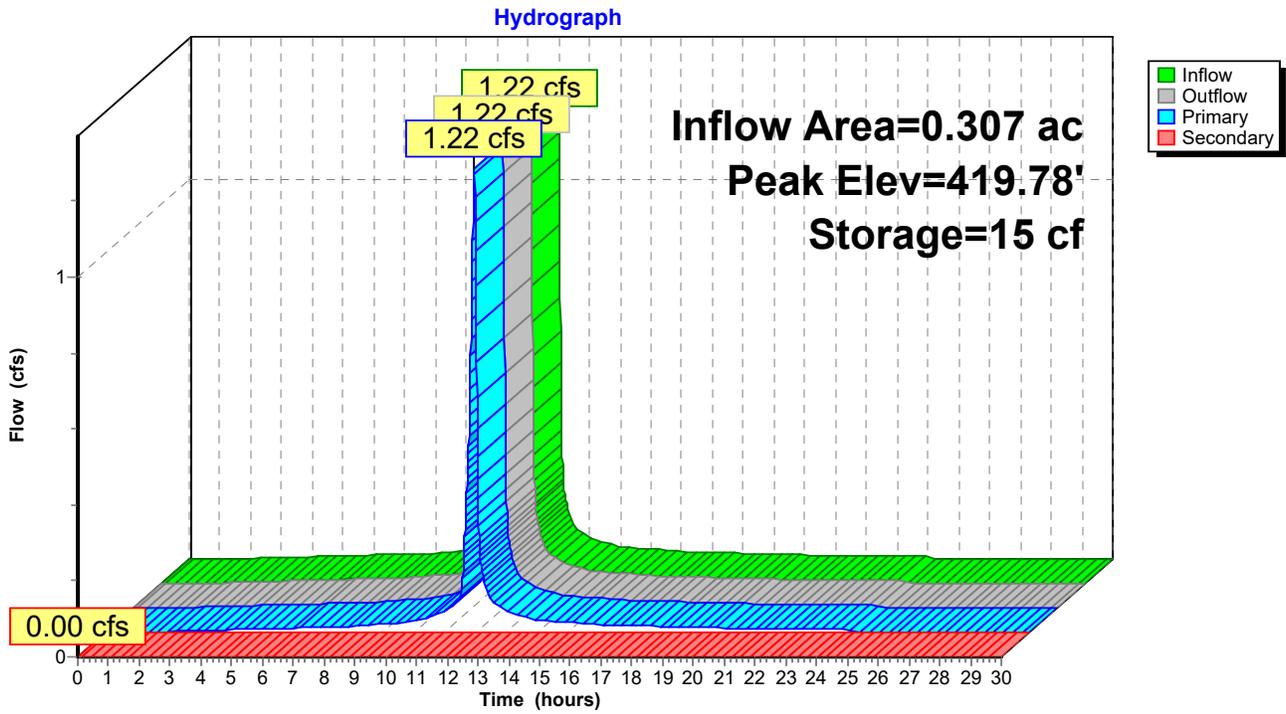
Volume	Invert	Avail.Storage	Storage Description
#1	418.60'	62 cf	4.00'D x 4.90'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	418.60'	8.0" Round 8" hdpe L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 418.60' / 418.55' S= 0.0071 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	420.80'	12.0" Round 12" hdpe L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.80' / 418.00' S= 0.0700 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.22 cfs @ 11.97 hrs HW=419.78' (Free Discharge)
 ↑1=8" hdpe (Inlet Controls 1.22 cfs @ 3.50 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=418.60' (Free Discharge)
 ↑2=12" hdpe (Controls 0.00 cfs)

Pond P-2: Deep sump CB#2



Summary for Pond P-3: Deep sump CB#3

Inflow Area = 0.181 ac, 94.16% Impervious, Inflow Depth = 2.54" for 2 Year event
 Inflow = 0.70 cfs @ 11.97 hrs, Volume= 0.038 af
 Outflow = 0.70 cfs @ 11.97 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.70 cfs @ 11.97 hrs, Volume= 0.038 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.68' @ 11.97 hrs Surf.Area= 13 sf Storage= 6 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 41 cf

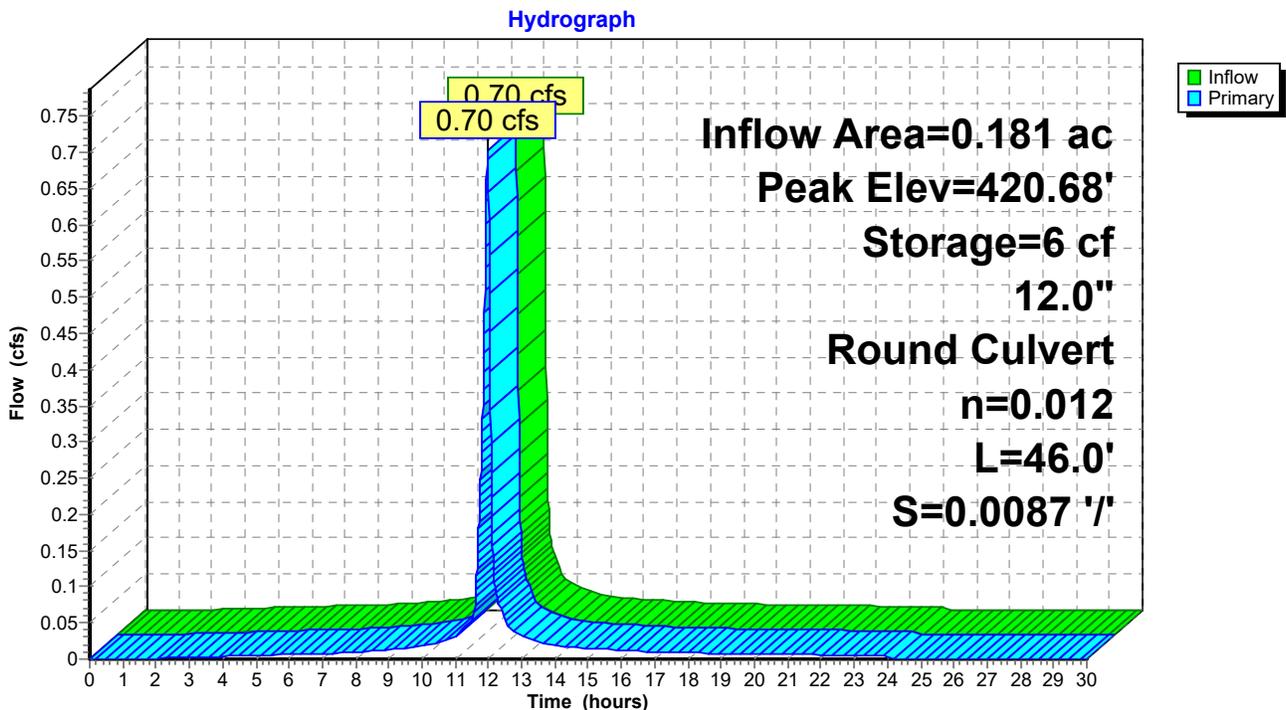
Plug-Flow detention time= 0.6 min calculated for 0.038 af (100% of inflow)
 Center-of-Mass det. time= 0.6 min (755.0 - 754.4)

Volume	Invert	Avail.Storage	Storage Description
#1	420.20'	41 cf	4.00'D x 3.30'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.20'	12.0" Round 12" hdpe L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.20' / 419.80' S= 0.0087 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.70 cfs @ 11.97 hrs HW=420.68' (Free Discharge)
 ←1=12" hdpe (Inlet Controls 0.70 cfs @ 1.87 fps)

Pond P-3: Deep sump CB#3



Summary for Pond P-4: Oil water seperator

Inflow Area = 0.307 ac, 96.57% Impervious, Inflow Depth = 2.61" for 2 Year event
 Inflow = 1.22 cfs @ 11.97 hrs, Volume= 0.067 af
 Outflow = 1.22 cfs @ 11.98 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.2 min
 Primary = 1.22 cfs @ 11.98 hrs, Volume= 0.064 af
 Routed to Pond P-5 : drianage basin

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 418.66' @ 11.98 hrs Surf.Area= 47 sf Storage= 126 cf
 Flood Elev= 424.00' Surf.Area= 47 sf Storage= 197 cf

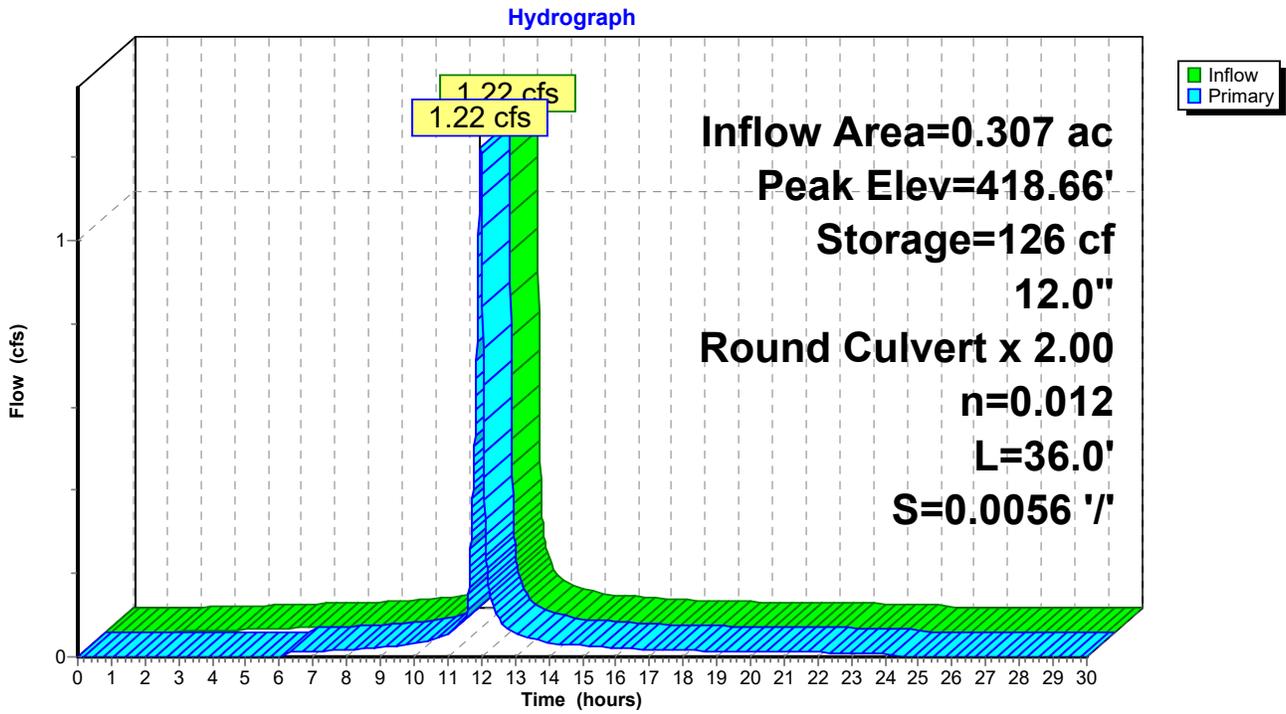
Plug-Flow detention time= 41.5 min calculated for 0.064 af (96% of inflow)
 Center-of-Mass det. time= 19.0 min (774.5 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	416.00'	90 cf	5.30'D x 4.10'H Chamber 1
#2	416.00'	90 cf	5.30'D x 4.10'H Chamber 2
#3	416.00'	16 cf	2.00'D x 5.10'H Chamber 3
		197 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	418.20'	12.0" Round 8" hdpe X 2.00 L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 418.20' / 418.00' S= 0.0056 ' S Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.22 cfs @ 11.98 hrs HW=418.66' (Free Discharge)
 ↖ **1=8" hdpe** (Barrel Controls 1.22 cfs @ 2.50 fps)

Pond P-4: Oil water seperator



Summary for Pond P-5: drianage basin

Inflow Area = 0.958 ac, 44.16% Impervious, Inflow Depth = 1.16" for 2 Year event
 Inflow = 1.74 cfs @ 11.97 hrs, Volume= 0.093 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 419.11' @ 25.56 hrs Surf.Area= 2,775 sf Storage= 4,039 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

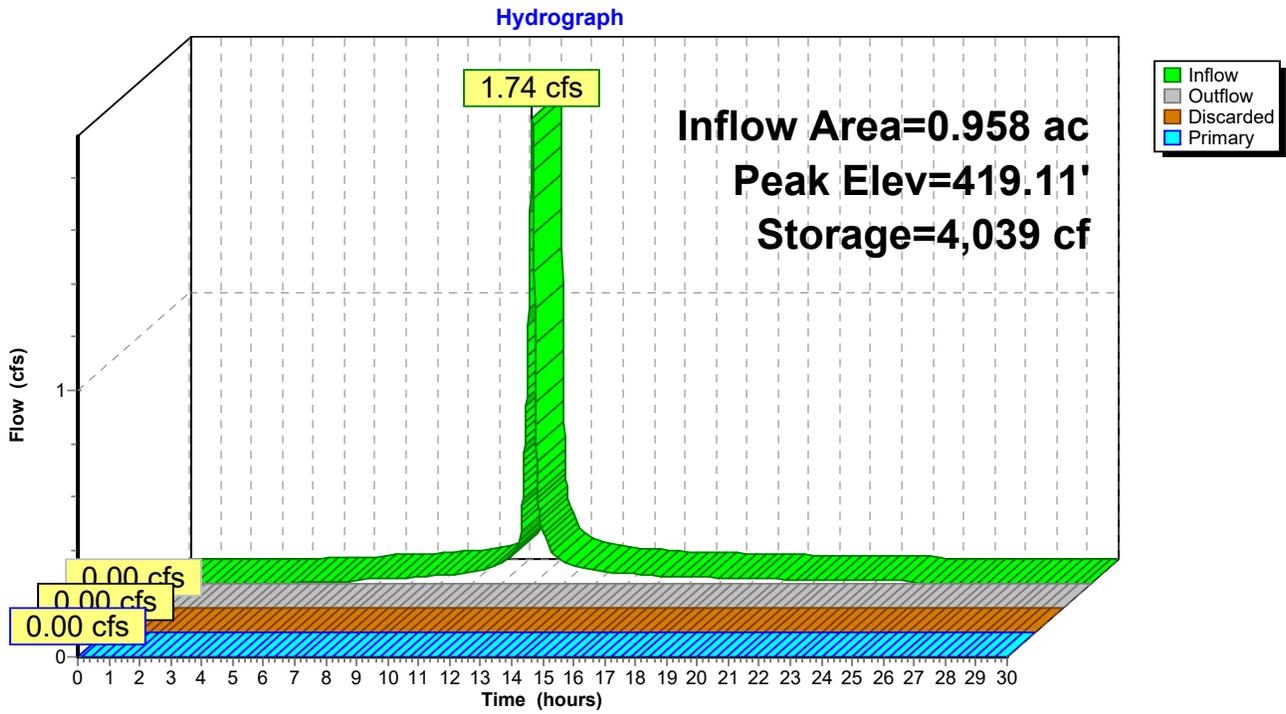
Volume	Invert	Avail.Storage	Storage Description			
#1	416.00'	8,908 cf	Open water storage (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
416.00	174	50.0	0	0	174	
418.00	1,678	276.0	1,595	1,595	6,046	
420.00	3,856	367.0	5,385	6,980	10,747	
420.50	3,856	367.0	1,928	8,908	10,930	

Device	Routing	Invert	Outlet Devices												
#1	Primary	420.40'	70.0' long x 4.0' breadth Broad-Crested Rectangular Weir												
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00												
			2.50 3.00 3.50 4.00 4.50 5.00 5.50												
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66												
			2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32												
#2	Discarded	420.00'	3.000 in/hr Exfiltration over Surface area above 420.00'												
			Excluded Surface area = 3,856 sf												

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=416.00' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=416.00' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P-5: drianage basin



Summary for Pond P-6: infiltration trench

Inflow Area = 0.024 ac, 100.00% Impervious, Inflow Depth = 2.70" for 2 Year event
 Inflow = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af
 Outflow = 0.01 cfs @ 11.72 hrs, Volume= 0.005 af, Atten= 90%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.72 hrs, Volume= 0.005 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 419.49' @ 12.37 hrs Surf.Area= 150 sf Storage= 89 cf
 Flood Elev= 423.50' Surf.Area= 150 sf Storage= 330 cf

Plug-Flow detention time= 66.7 min calculated for 0.005 af (100% of inflow)
 Center-of-Mass det. time= 66.6 min (821.1 - 754.4)

Volume	Invert	Avail.Storage	Storage Description
#1	418.00'	330 cf	Stone (Irregular) Listed below (Recalc) 825 cf Overall x 40.0% Voids

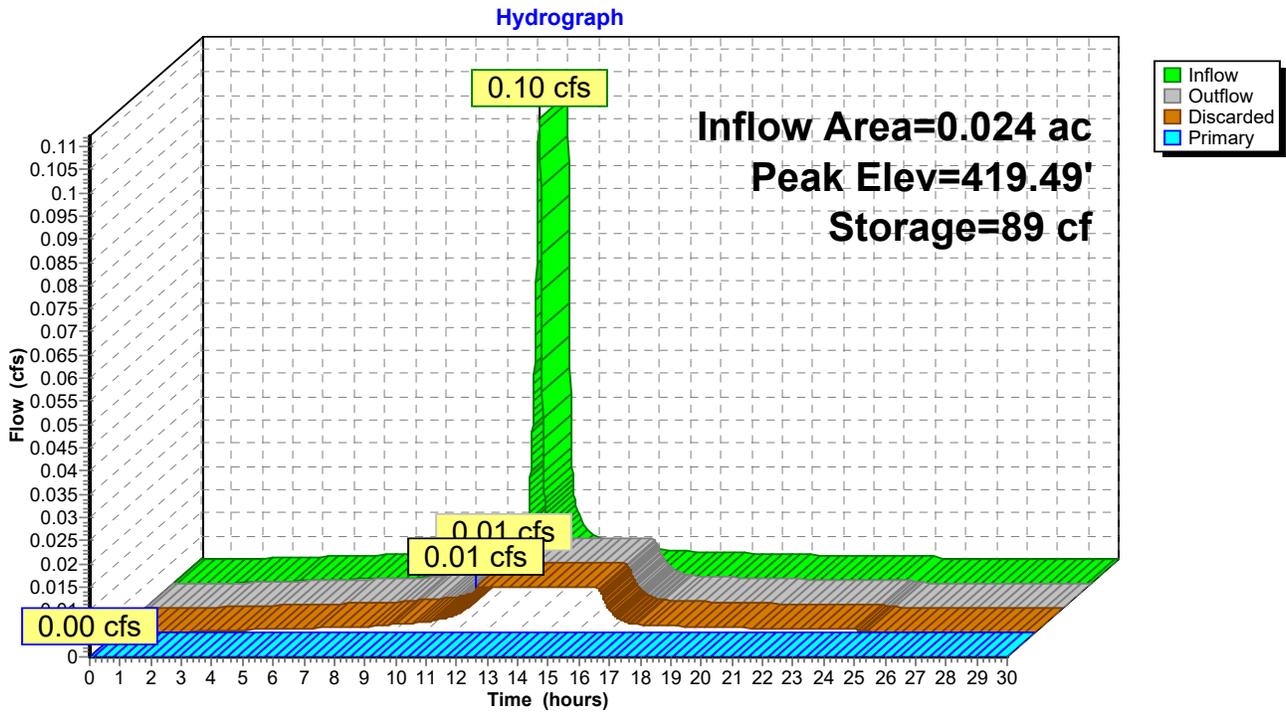
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
418.00	150	79.0	0	0	150
419.00	150	79.0	150	150	229
420.00	150	79.0	150	300	308
421.00	150	79.0	150	450	387
422.00	150	79.0	150	600	466
423.50	150	79.0	225	825	585

Device	Routing	Invert	Outlet Devices
#1	Discarded	418.00'	2.800 in/hr Exfiltration over Surface area Phase-In= 0.20'
#2	Primary	423.00'	40.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 11.72 hrs HW=418.22' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=418.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond P-6: infiltration trench

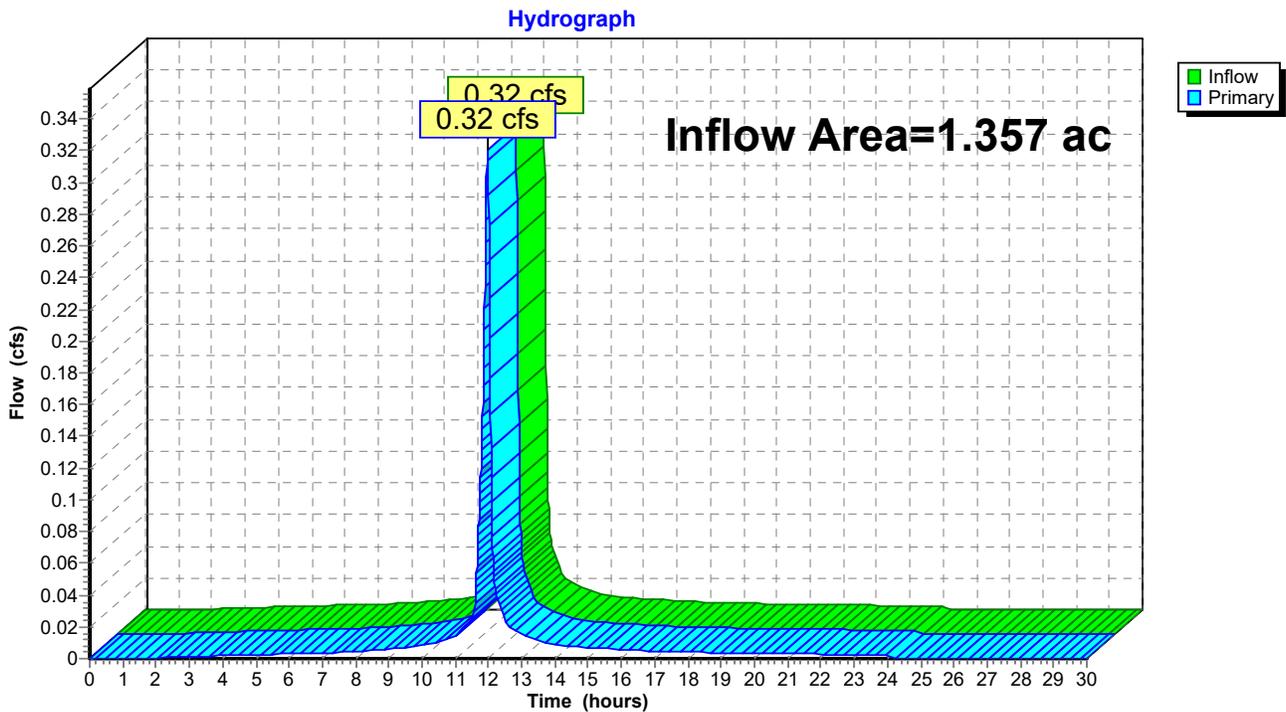


Summary for Link POA1: Point of Analysis

Inflow Area = 1.357 ac, 38.68% Impervious, Inflow Depth = 0.15" for 2 Year event
Inflow = 0.32 cfs @ 11.97 hrs, Volume= 0.017 af
Primary = 0.32 cfs @ 11.97 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link POA1: Point of Analysis



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1 Runoff Area=1,569 sf 100.00% Impervious Runoff Depth=4.01"
Tc=6.0 min CN=WQ Runoff=0.22 cfs 0.012 af

Subcatchment S-2: Subcatchment 2 Runoff Area=3,935 sf 100.00% Impervious Runoff Depth=4.01"
Tc=6.0 min CN=WQ Runoff=0.55 cfs 0.030 af

Subcatchment S-3: Subcatchment 3 Runoff Area=7,865 sf 94.16% Impervious Runoff Depth=3.78"
Tc=6.0 min CN=WQ Runoff=1.03 cfs 0.057 af

Subcatchment S-4: Subcatchment 4 Runoff Area=28,349 sf 19.45% Impervious Runoff Depth=0.84"
Tc=6.0 min CN=WQ Runoff=0.76 cfs 0.046 af

Subcatchment S-5: Subcatchment 5 Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=4.01"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.008 af

Subcatchment S-6: Subcatchment 6 Runoff Area=16,316 sf 20.70% Impervious Runoff Depth=0.89"
Tc=6.0 min CN=WQ Runoff=0.47 cfs 0.028 af

Pond P-1: Deep sump CB#1 Peak Elev=420.36' Storage=3 cf Inflow=0.22 cfs 0.012 af
12.0" Round Culvert n=0.012 L=38.0' S=0.0079 '/' Outflow=0.22 cfs 0.012 af

Pond P-2: Deep sump CB#2 Peak Elev=420.74' Storage=27 cf Inflow=1.79 cfs 0.099 af
Primary=1.78 cfs 0.099 af Secondary=0.00 cfs 0.000 af Outflow=1.78 cfs 0.099 af

Pond P-3: Deep sump CB#3 Peak Elev=420.80' Storage=8 cf Inflow=1.03 cfs 0.057 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0087 '/' Outflow=1.03 cfs 0.057 af

Pond P-4: Oil water seperator Peak Elev=418.78' Storage=131 cf Inflow=1.78 cfs 0.099 af
12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0056 '/' Outflow=1.78 cfs 0.097 af

Pond P-5: drianage basin Peak Elev=419.79' Storage=6,201 cf Inflow=2.54 cfs 0.142 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond P-6: infiltration trench Peak Elev=420.40' Storage=144 cf Inflow=0.15 cfs 0.008 af
Discarded=0.01 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Link POA1: Point of Analysis Inflow=0.47 cfs 0.028 af
Primary=0.47 cfs 0.028 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.181 af Average Runoff Depth = 1.60"
61.32% Pervious = 0.832 ac 38.68% Impervious = 0.525 ac

Summary for Subcatchment S-1: Subcatchment 1

Runoff = 0.22 cfs @ 11.97 hrs, Volume= 0.012 af, Depth= 4.01"

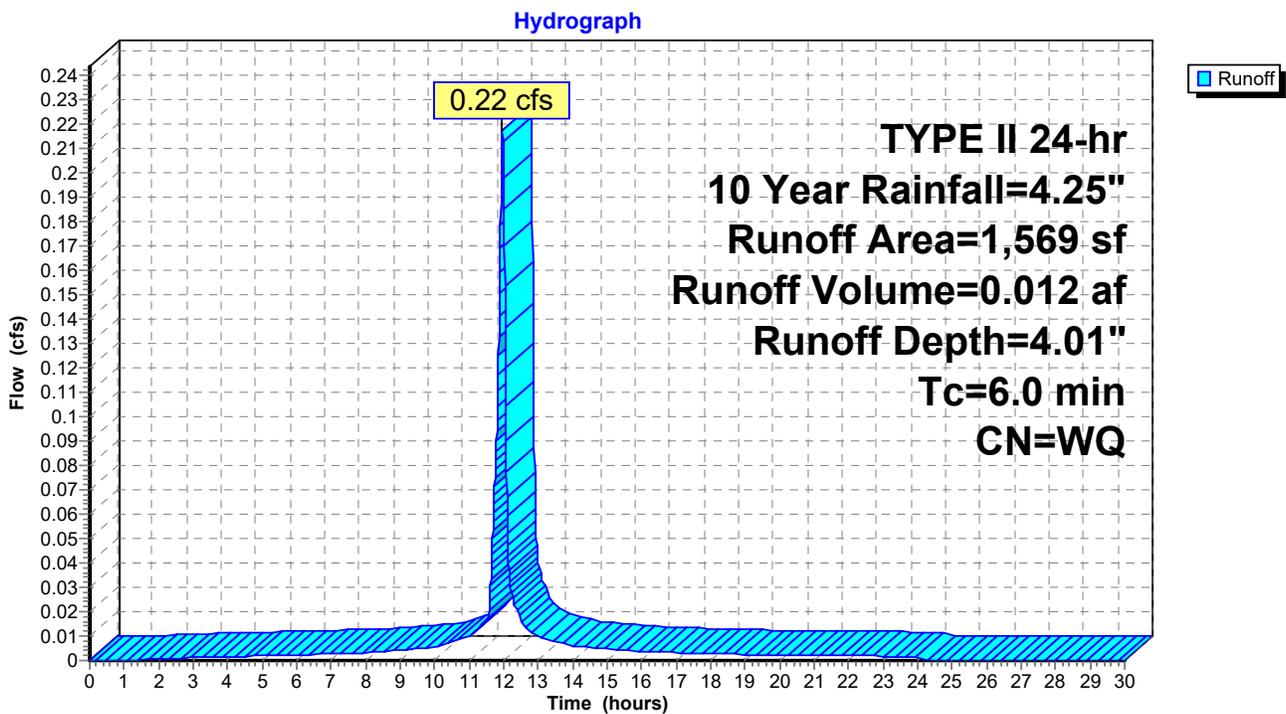
Routed to Pond P-1 : Deep sump CB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.25"

Area (sf)	CN	Description
623	98	Roofs, HSG A
946	98	Paved parking, HSG A
1,569		Weighted Average
1,569		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-1: Subcatchment 1



Summary for Subcatchment S-2: Subcatchment 2

Runoff = 0.55 cfs @ 11.97 hrs, Volume= 0.030 af, Depth= 4.01"

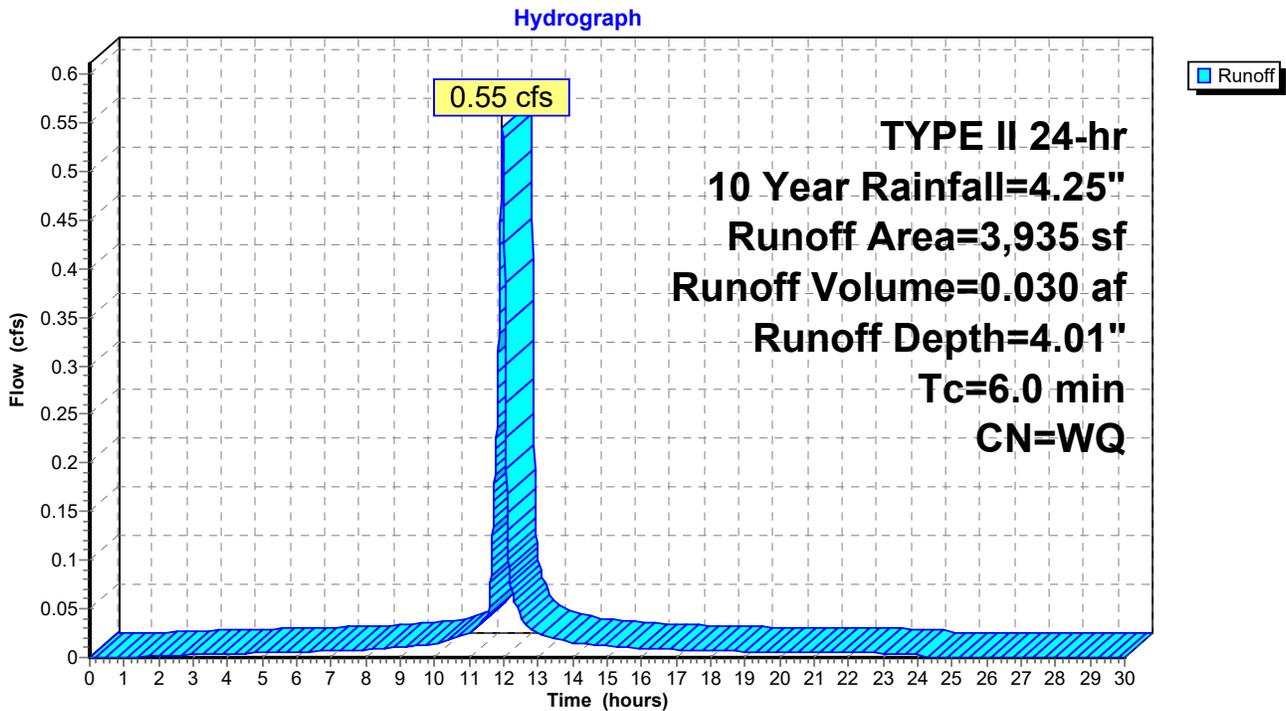
Routed to Pond P-2 : Deep sump CB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.25"

Area (sf)	CN	Description
548	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
3,935		Weighted Average
3,935		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-2: Subcatchment 2



Summary for Subcatchment S-3: Subcatchment 3

Runoff = 1.03 cfs @ 11.97 hrs, Volume= 0.057 af, Depth= 3.78"

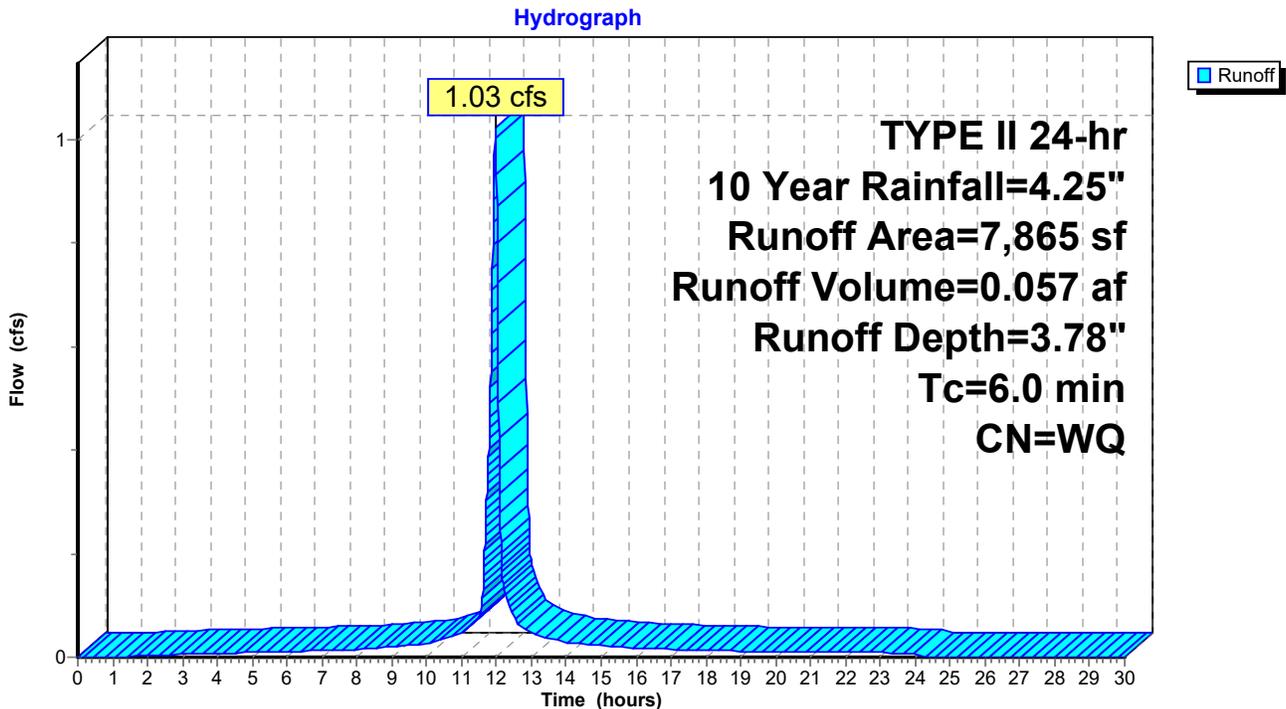
Routed to Pond P-3 : Deep sump CB#3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.25"

Area (sf)	CN	Description
1,258	98	Roofs, HSG A
6,148	98	Paved parking, HSG A
459	39	>75% Grass cover, Good, HSG A
7,865		Weighted Average
459		5.84% Pervious Area
7,406		94.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-3: Subcatchment 3



Summary for Subcatchment S-4: Subcatchment 4

Runoff = 0.76 cfs @ 11.97 hrs, Volume= 0.046 af, Depth= 0.84"

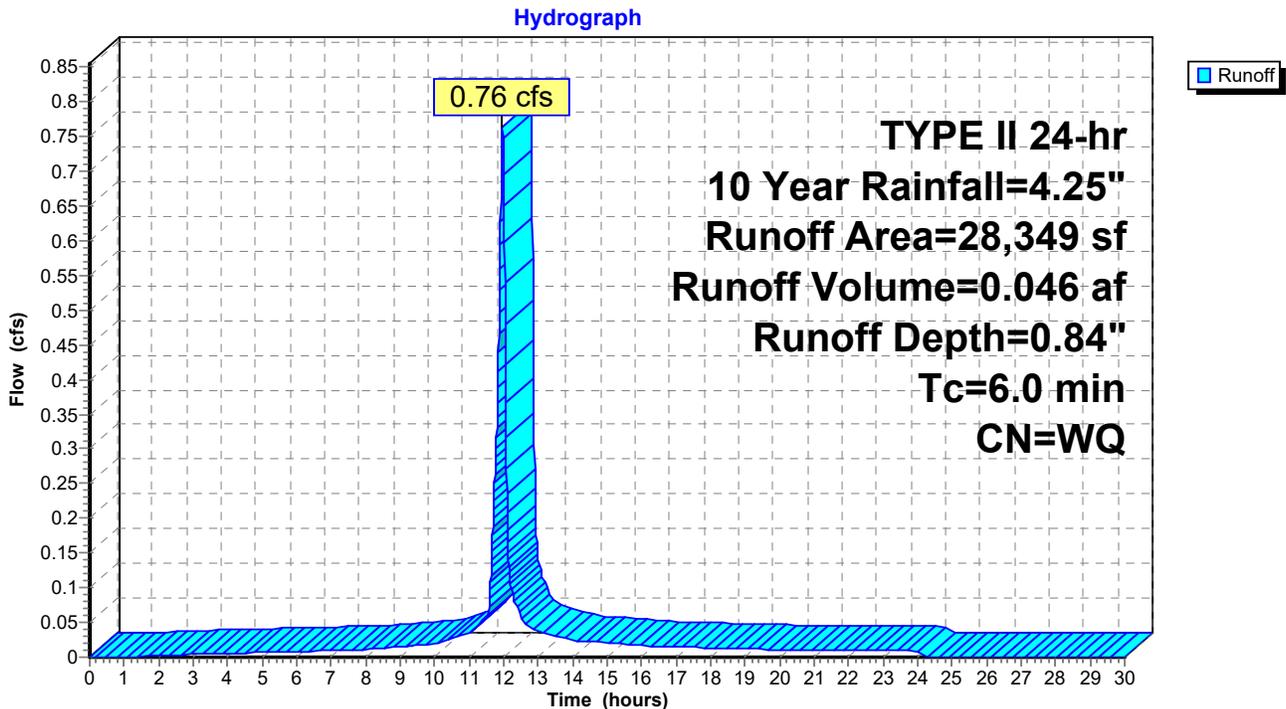
Routed to Pond P-5 : drianage basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.25"

Area (sf)	CN	Description
5,514	98	Paved parking, HSG A
22,089	39	>75% Grass cover, Good, HSG A
746	30	Woods, Good, HSG A
28,349		Weighted Average
22,835		80.55% Pervious Area
5,514		19.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-4: Subcatchment 4



Summary for Subcatchment S-5: Subcatchment 5

Runoff = 0.15 cfs @ 11.97 hrs, Volume= 0.008 af, Depth= 4.01"
 Routed to Pond P-6 : infiltration trench

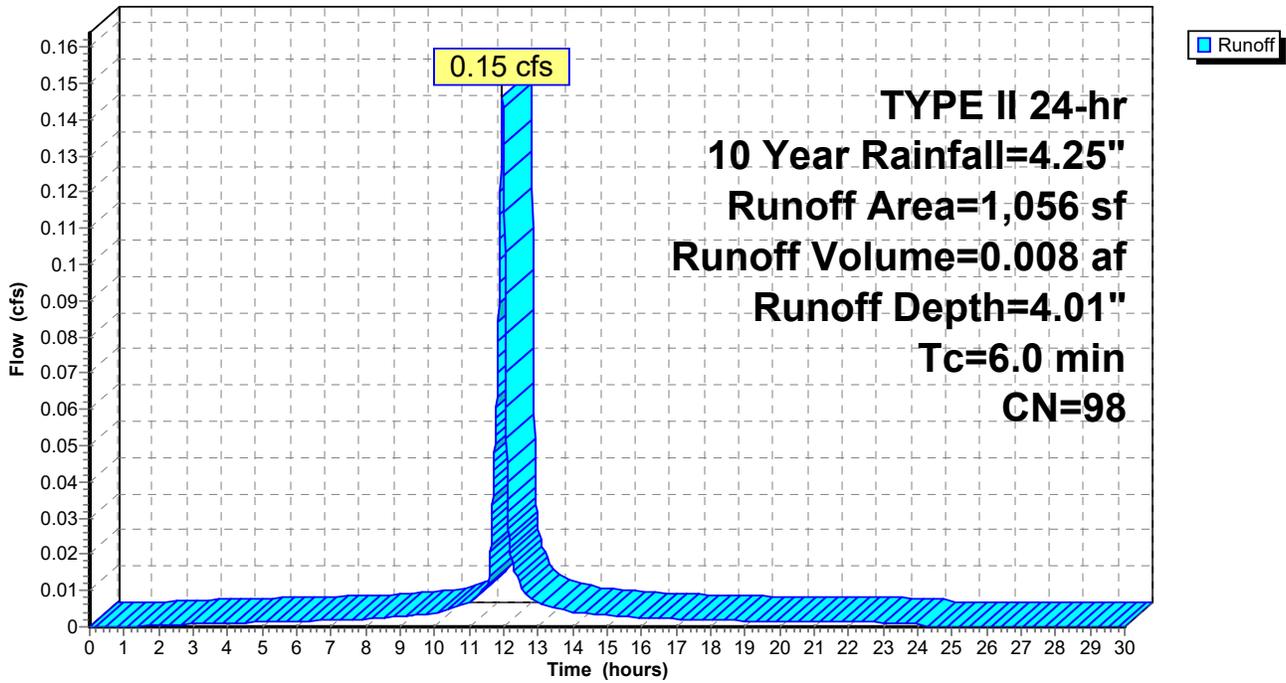
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.25"

Area (sf)	CN	Description
1,056	98	Roofs, HSG A
1,056		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-5: Subcatchment 5

Hydrograph



Summary for Subcatchment S-6: Subcatchment 6

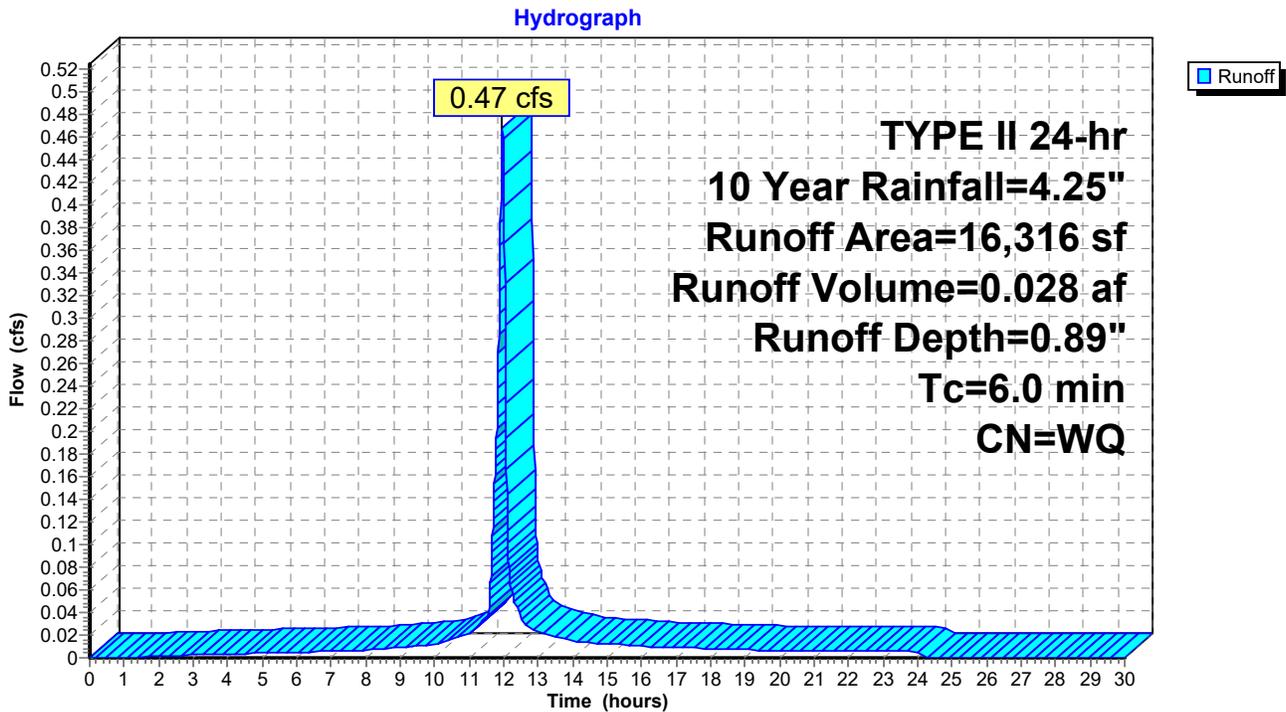
Runoff = 0.47 cfs @ 11.97 hrs, Volume= 0.028 af, Depth= 0.89"
 Routed to Link POA1 : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.25"

Area (sf)	CN	Description
3,377	98	Paved parking, HSG A
12,939	39	>75% Grass cover, Good, HSG A
16,316		Weighted Average
12,939		79.30% Pervious Area
3,377		20.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-6: Subcatchment 6



Summary for Pond P-1: Deep sump CB#1

Inflow Area = 0.036 ac, 100.00% Impervious, Inflow Depth = 4.01" for 10 Year event
 Inflow = 0.22 cfs @ 11.97 hrs, Volume= 0.012 af
 Outflow = 0.22 cfs @ 11.97 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.22 cfs @ 11.97 hrs, Volume= 0.012 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.36' @ 11.97 hrs Surf.Area= 13 sf Storage= 3 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 43 cf

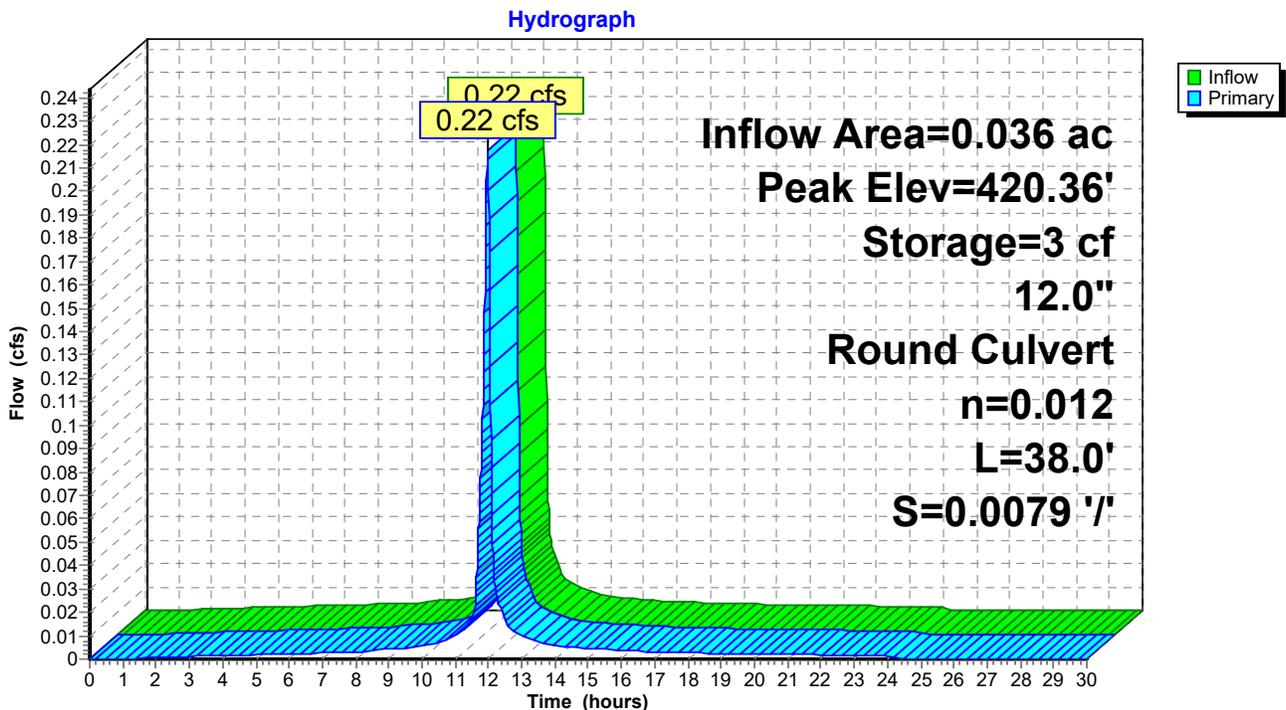
Plug-Flow detention time= 1.0 min calculated for 0.012 af (100% of inflow)
 Center-of-Mass det. time= 1.0 min (747.8 - 746.8)

Volume	Invert	Avail.Storage	Storage Description
#1	420.10'	43 cf	4.00'D x 3.40'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.10'	12.0" Round 12" hdpe L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.10' / 419.80' S= 0.0079 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 11.97 hrs HW=420.36' (Free Discharge)
 ←1=12" hdpe (Inlet Controls 0.22 cfs @ 1.36 fps)

Pond P-1: Deep sump CB#1



Summary for Pond P-2: Deep sump CB#2

Inflow Area = 0.307 ac, 96.57% Impervious, Inflow Depth = 3.88" for 10 Year event
 Inflow = 1.79 cfs @ 11.97 hrs, Volume= 0.099 af
 Outflow = 1.78 cfs @ 11.97 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.4 min
 Primary = 1.78 cfs @ 11.97 hrs, Volume= 0.099 af
 Routed to Pond P-4 : Oil water seperator
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond P-5 : drianage basin

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.74' @ 11.97 hrs Surf.Area= 13 sf Storage= 27 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 62 cf

Plug-Flow detention time= 0.5 min calculated for 0.099 af (100% of inflow)
 Center-of-Mass det. time= 0.5 min (747.9 - 747.5)

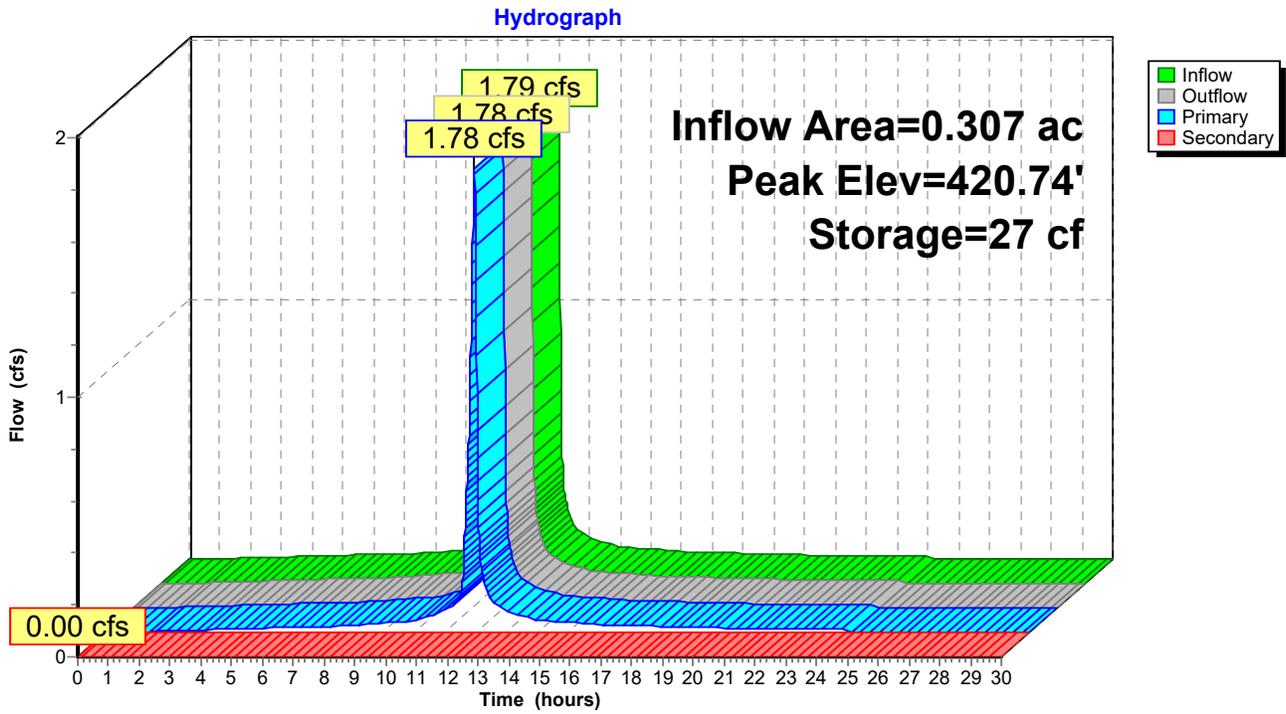
Volume	Invert	Avail.Storage	Storage Description
#1	418.60'	62 cf	4.00'D x 4.90'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	418.60'	8.0" Round 8" hdpe L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 418.60' / 418.55' S= 0.0071 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	420.80'	12.0" Round 12" hdpe L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.80' / 418.00' S= 0.0700 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 11.97 hrs HW=420.73' (Free Discharge)
 ↑1=8" hdpe (Inlet Controls 1.78 cfs @ 5.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=418.60' (Free Discharge)
 ↑2=12" hdpe (Controls 0.00 cfs)

Pond P-2: Deep sump CB#2



Summary for Pond P-3: Deep sump CB#3

Inflow Area = 0.181 ac, 94.16% Impervious, Inflow Depth = 3.78" for 10 Year event
 Inflow = 1.03 cfs @ 11.97 hrs, Volume= 0.057 af
 Outflow = 1.03 cfs @ 11.97 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.03 cfs @ 11.97 hrs, Volume= 0.057 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.80' @ 11.97 hrs Surf.Area= 13 sf Storage= 8 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 41 cf

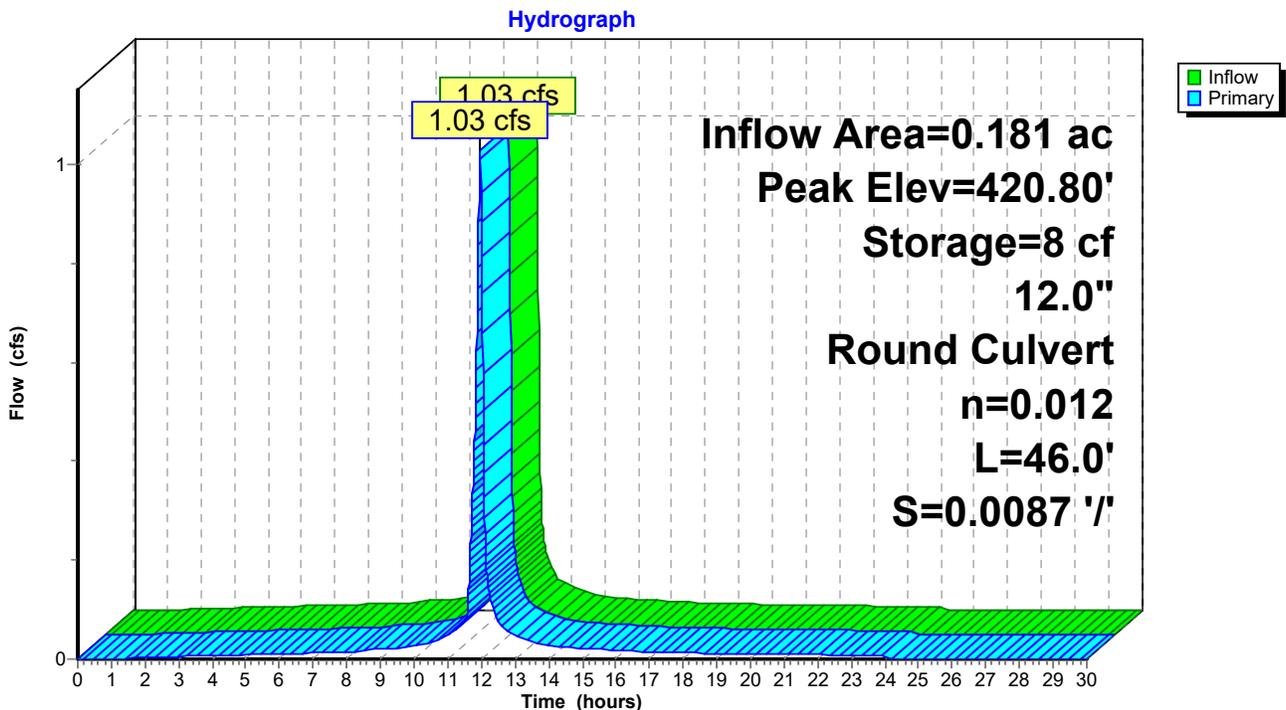
Plug-Flow detention time= 0.5 min calculated for 0.057 af (100% of inflow)
 Center-of-Mass det. time= 0.5 min (747.7 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1	420.20'	41 cf	4.00'D x 3.30'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.20'	12.0" Round 12" hdpe L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.20' / 419.80' S= 0.0087 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.02 cfs @ 11.97 hrs HW=420.80' (Free Discharge)
 ↳ 1=12" hdpe (Inlet Controls 1.02 cfs @ 2.08 fps)

Pond P-3: Deep sump CB#3



Summary for Pond P-4: Oil water seperator

Inflow Area = 0.307 ac, 96.57% Impervious, Inflow Depth = 3.88" for 10 Year event
 Inflow = 1.78 cfs @ 11.97 hrs, Volume= 0.099 af
 Outflow = 1.78 cfs @ 11.98 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.78 cfs @ 11.98 hrs, Volume= 0.097 af
 Routed to Pond P-5 : drianage basin

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 418.78' @ 11.98 hrs Surf.Area= 47 sf Storage= 131 cf
 Flood Elev= 424.00' Surf.Area= 47 sf Storage= 197 cf

Plug-Flow detention time= 30.1 min calculated for 0.097 af (98% of inflow)
 Center-of-Mass det. time= 14.4 min (762.4 - 747.9)

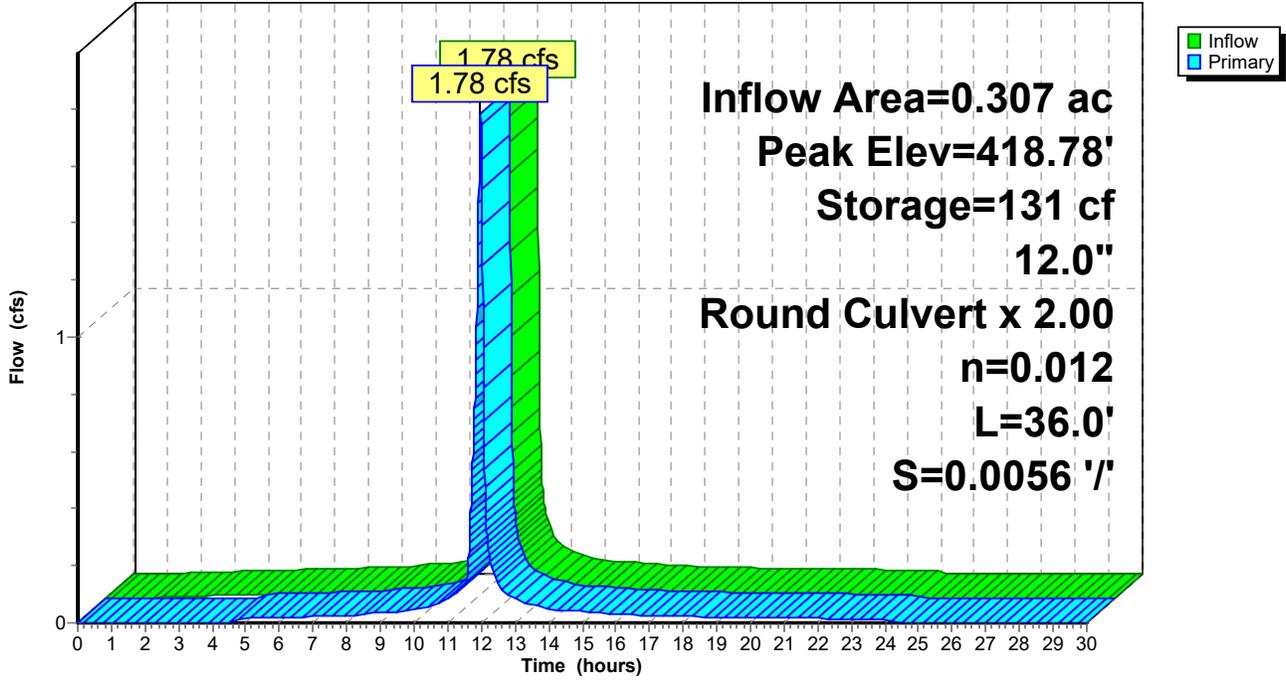
Volume	Invert	Avail.Storage	Storage Description
#1	416.00'	90 cf	5.30'D x 4.10'H Chamber 1
#2	416.00'	90 cf	5.30'D x 4.10'H Chamber 2
#3	416.00'	16 cf	2.00'D x 5.10'H Chamber 3
		197 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	418.20'	12.0" Round 8" hdpe X 2.00 L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 418.20' / 418.00' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 11.98 hrs HW=418.78' (Free Discharge)
 ↖1=8" hdpe (Barrel Controls 1.78 cfs @ 2.72 fps)

Pond P-4: Oil water seperator

Hydrograph



Summary for Pond P-5: drianage basin

Inflow Area = 0.958 ac, 44.16% Impervious, Inflow Depth = 1.78" for 10 Year event
 Inflow = 2.54 cfs @ 11.97 hrs, Volume= 0.142 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 419.79' @ 25.56 hrs Surf.Area= 3,586 sf Storage= 6,201 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

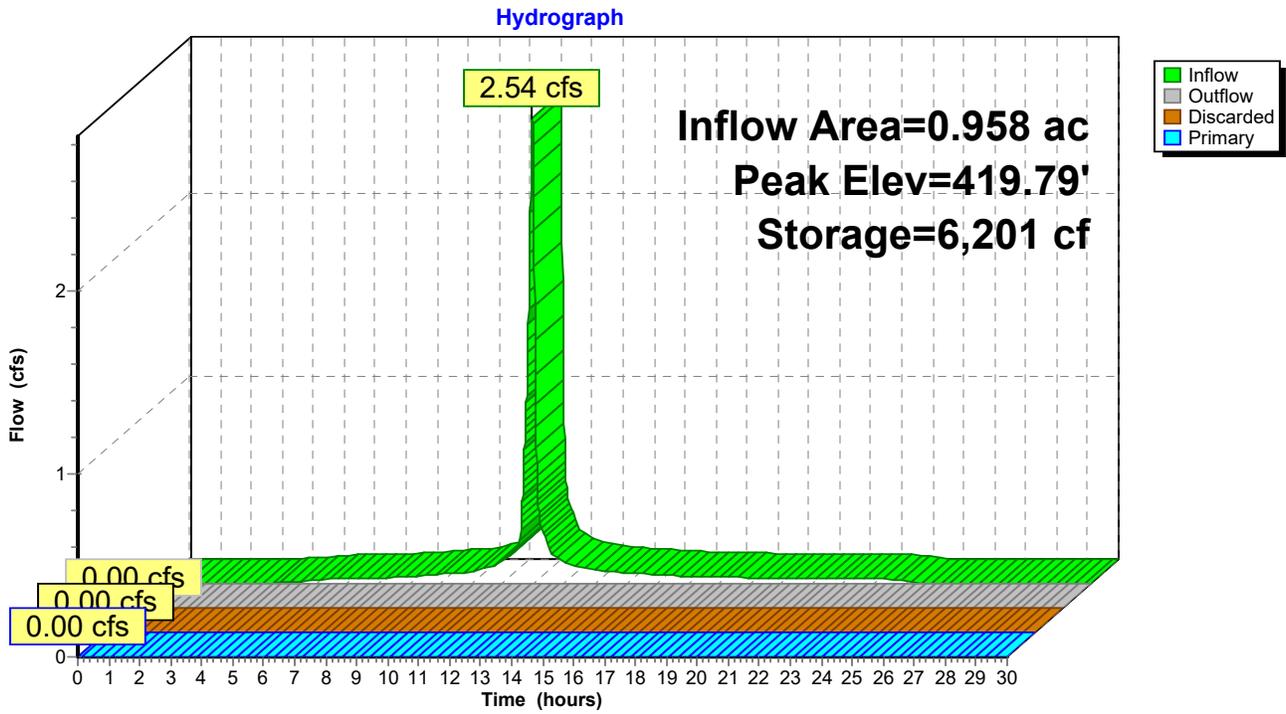
Volume	Invert	Avail.Storage	Storage Description			
#1	416.00'	8,908 cf	Open water storage (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
416.00	174	50.0	0	0	174	
418.00	1,678	276.0	1,595	1,595	6,046	
420.00	3,856	367.0	5,385	6,980	10,747	
420.50	3,856	367.0	1,928	8,908	10,930	

Device	Routing	Invert	Outlet Devices												
#1	Primary	420.40'	70.0' long x 4.0' breadth Broad-Crested Rectangular Weir												
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00												
			2.50 3.00 3.50 4.00 4.50 5.00 5.50												
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66												
			2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32												
#2	Discarded	420.00'	3.000 in/hr Exfiltration over Surface area above 420.00'												
			Excluded Surface area = 3,856 sf												

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=416.00' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=416.00' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P-5: drianage basin



Summary for Pond P-6: infiltration trench

Inflow Area = 0.024 ac, 100.00% Impervious, Inflow Depth = 4.01" for 10 Year event
 Inflow = 0.15 cfs @ 11.97 hrs, Volume= 0.008 af
 Outflow = 0.01 cfs @ 11.64 hrs, Volume= 0.008 af, Atten= 93%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.64 hrs, Volume= 0.008 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.40' @ 12.57 hrs Surf.Area= 150 sf Storage= 144 cf
 Flood Elev= 423.50' Surf.Area= 150 sf Storage= 330 cf

Plug-Flow detention time= 109.5 min calculated for 0.008 af (100% of inflow)
 Center-of-Mass det. time= 109.5 min (856.3 - 746.8)

Volume	Invert	Avail.Storage	Storage Description
#1	418.00'	330 cf	Stone (Irregular) Listed below (Recalc) 825 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
418.00	150	79.0	0	0	150
419.00	150	79.0	150	150	229
420.00	150	79.0	150	300	308
421.00	150	79.0	150	450	387
422.00	150	79.0	150	600	466
423.50	150	79.0	225	825	585

Device	Routing	Invert	Outlet Devices
#1	Discarded	418.00'	2.800 in/hr Exfiltration over Surface area Phase-In= 0.20'
#2	Primary	423.00'	40.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

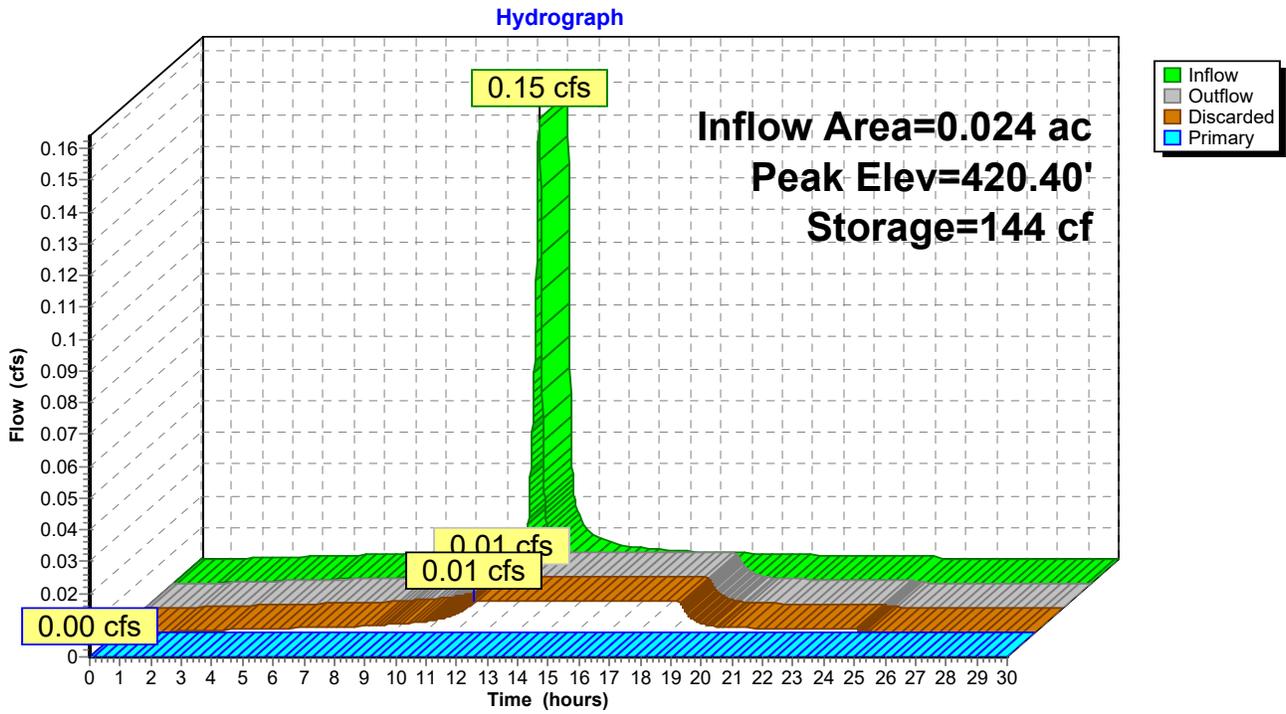
Discarded OutFlow Max=0.01 cfs @ 11.64 hrs HW=418.23' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=418.00' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond P-6: infiltration trench

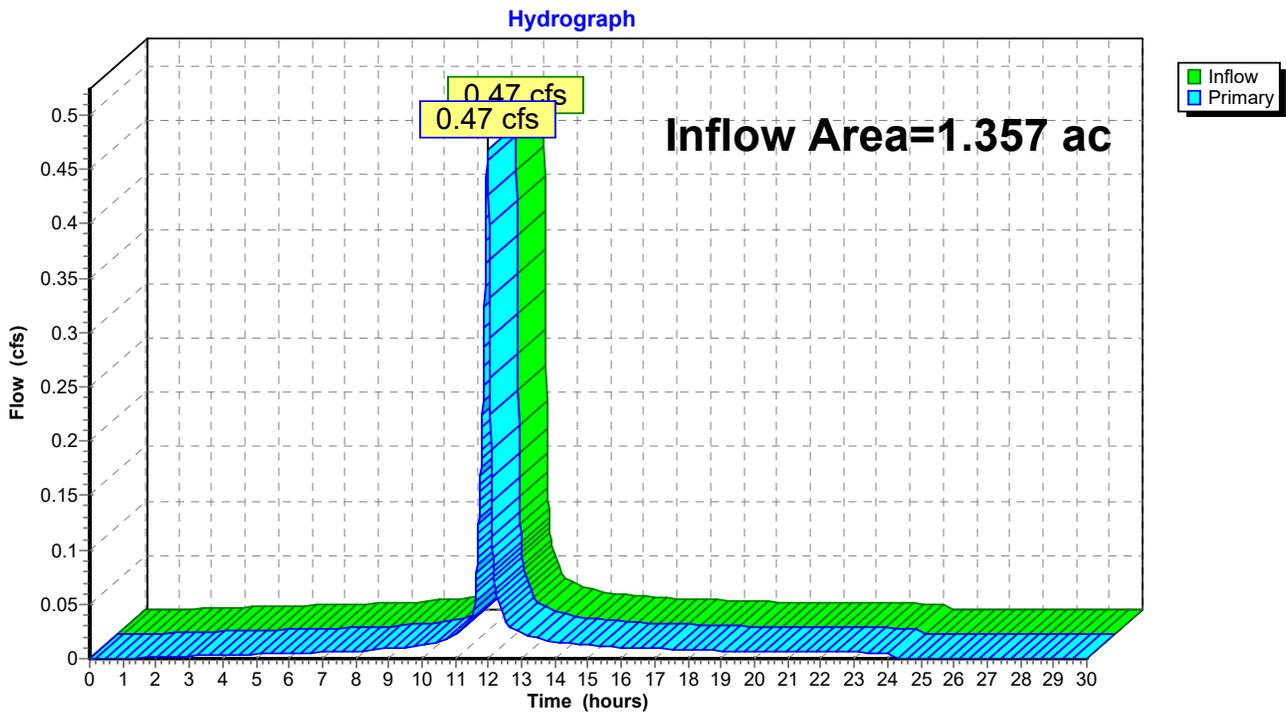


Summary for Link POA1: Point of Analysis

Inflow Area = 1.357 ac, 38.68% Impervious, Inflow Depth = 0.25" for 10 Year event
Inflow = 0.47 cfs @ 11.97 hrs, Volume= 0.028 af
Primary = 0.47 cfs @ 11.97 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link POA1: Point of Analysis



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1 Runoff Area=1,569 sf 100.00% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=WQ Runoff=0.27 cfs 0.015 af

Subcatchment S-2: Subcatchment 2 Runoff Area=3,935 sf 100.00% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=WQ Runoff=0.68 cfs 0.038 af

Subcatchment S-3: Subcatchment 3 Runoff Area=7,865 sf 94.16% Impervious Runoff Depth=4.74"
Tc=6.0 min CN=WQ Runoff=1.27 cfs 0.071 af

Subcatchment S-4: Subcatchment 4 Runoff Area=28,349 sf 19.45% Impervious Runoff Depth=1.18"
Tc=6.0 min CN=WQ Runoff=0.95 cfs 0.064 af

Subcatchment S-5: Subcatchment 5 Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.010 af

Subcatchment S-6: Subcatchment 6 Runoff Area=16,316 sf 20.70% Impervious Runoff Depth=1.24"
Tc=6.0 min CN=WQ Runoff=0.58 cfs 0.039 af

Pond P-1: Deep sump CB#1 Peak Elev=420.39' Storage=4 cf Inflow=0.27 cfs 0.015 af
12.0" Round Culvert n=0.012 L=38.0' S=0.0079 '/' Outflow=0.27 cfs 0.015 af

Pond P-2: Deep sump CB#2 Peak Elev=421.09' Storage=31 cf Inflow=2.22 cfs 0.124 af
Primary=1.95 cfs 0.123 af Secondary=0.27 cfs 0.001 af Outflow=2.22 cfs 0.124 af

Pond P-3: Deep sump CB#3 Peak Elev=420.88' Storage=9 cf Inflow=1.27 cfs 0.071 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0087 '/' Outflow=1.27 cfs 0.071 af

Pond P-4: Oil water seperator Peak Elev=418.81' Storage=133 cf Inflow=1.95 cfs 0.123 af
12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0056 '/' Outflow=1.95 cfs 0.120 af

Pond P-5: drianage basin Peak Elev=420.29' Storage=8,089 cf Inflow=3.17 cfs 0.186 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond P-6: infiltration trench Peak Elev=421.14' Storage=189 cf Inflow=0.18 cfs 0.010 af
Discarded=0.01 cfs 0.010 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.010 af

Link POA1: Point of Analysis Inflow=0.58 cfs 0.039 af
Primary=0.58 cfs 0.039 af

Total Runoff Area = 1.357 ac Runoff Volume = 0.237 af Average Runoff Depth = 2.10"
61.32% Pervious = 0.832 ac 38.68% Impervious = 0.525 ac

Summary for Subcatchment S-1: Subcatchment 1

Runoff = 0.27 cfs @ 11.97 hrs, Volume= 0.015 af, Depth= 5.02"

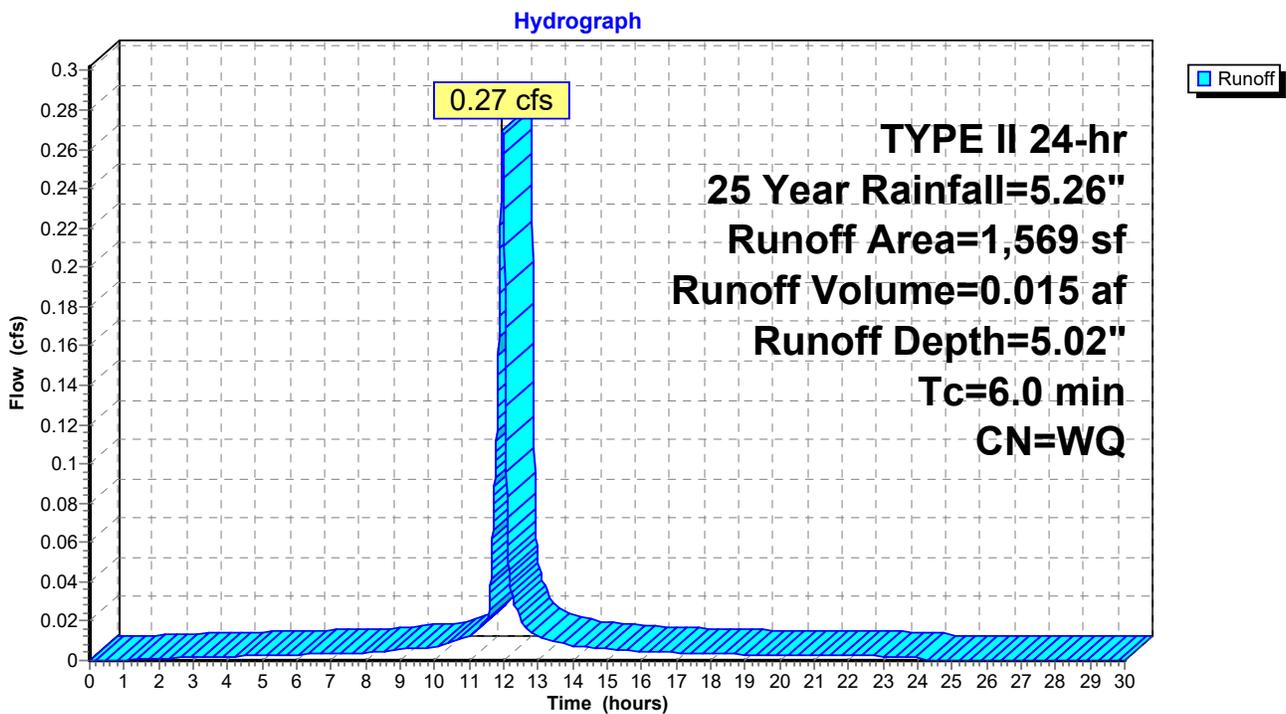
Routed to Pond P-1 : Deep sump CB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 25 Year Rainfall=5.26"

Area (sf)	CN	Description
623	98	Roofs, HSG A
946	98	Paved parking, HSG A
1,569		Weighted Average
1,569		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-1: Subcatchment 1



Summary for Subcatchment S-2: Subcatchment 2

Runoff = 0.68 cfs @ 11.97 hrs, Volume= 0.038 af, Depth= 5.02"

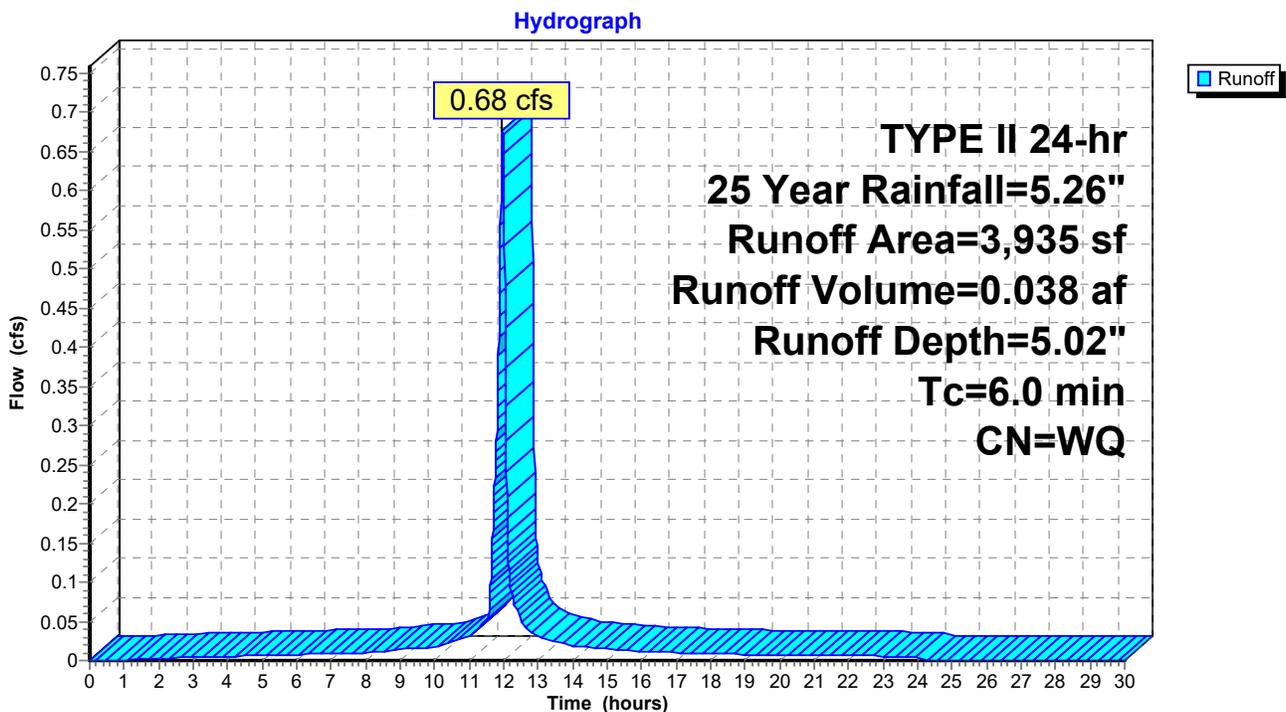
Routed to Pond P-2 : Deep sump CB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 25 Year Rainfall=5.26"

Area (sf)	CN	Description
548	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
3,935		Weighted Average
3,935		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-2: Subcatchment 2



Summary for Subcatchment S-3: Subcatchment 3

Runoff = 1.27 cfs @ 11.97 hrs, Volume= 0.071 af, Depth= 4.74"

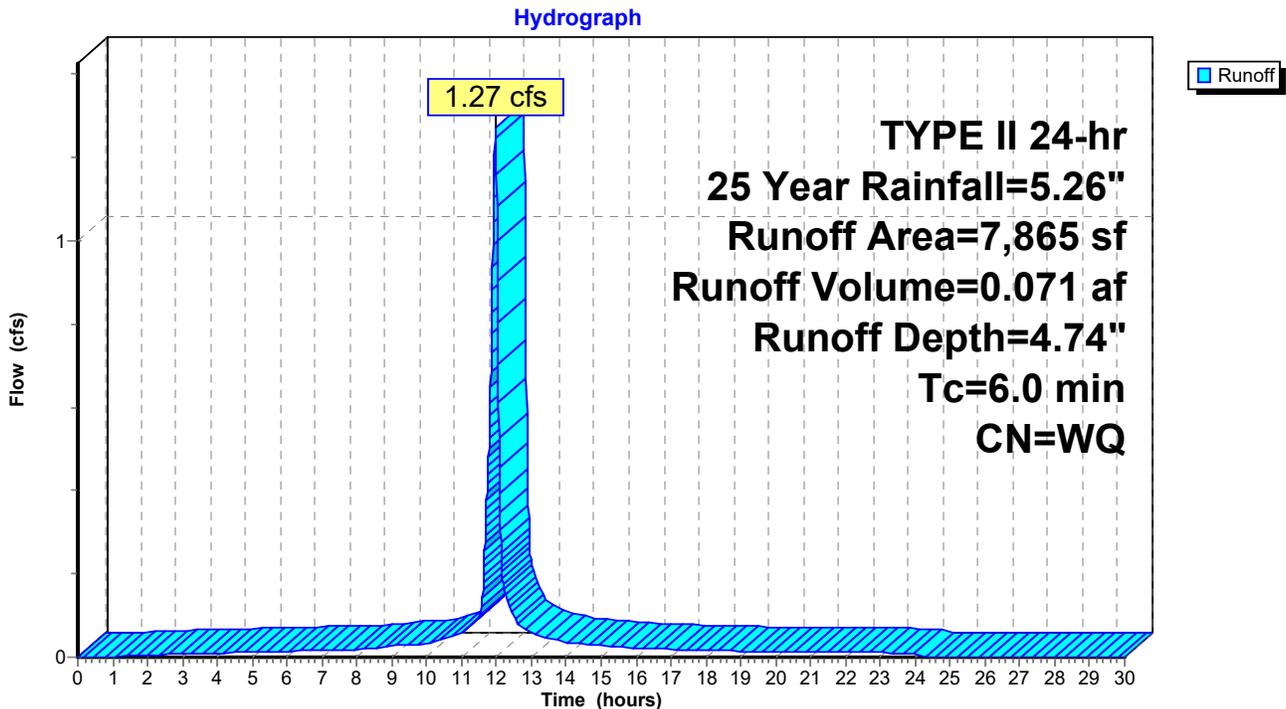
Routed to Pond P-3 : Deep sump CB#3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 25 Year Rainfall=5.26"

Area (sf)	CN	Description
1,258	98	Roofs, HSG A
6,148	98	Paved parking, HSG A
459	39	>75% Grass cover, Good, HSG A
7,865		Weighted Average
459		5.84% Pervious Area
7,406		94.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-3: Subcatchment 3



Summary for Subcatchment S-4: Subcatchment 4

Runoff = 0.95 cfs @ 11.97 hrs, Volume= 0.064 af, Depth= 1.18"

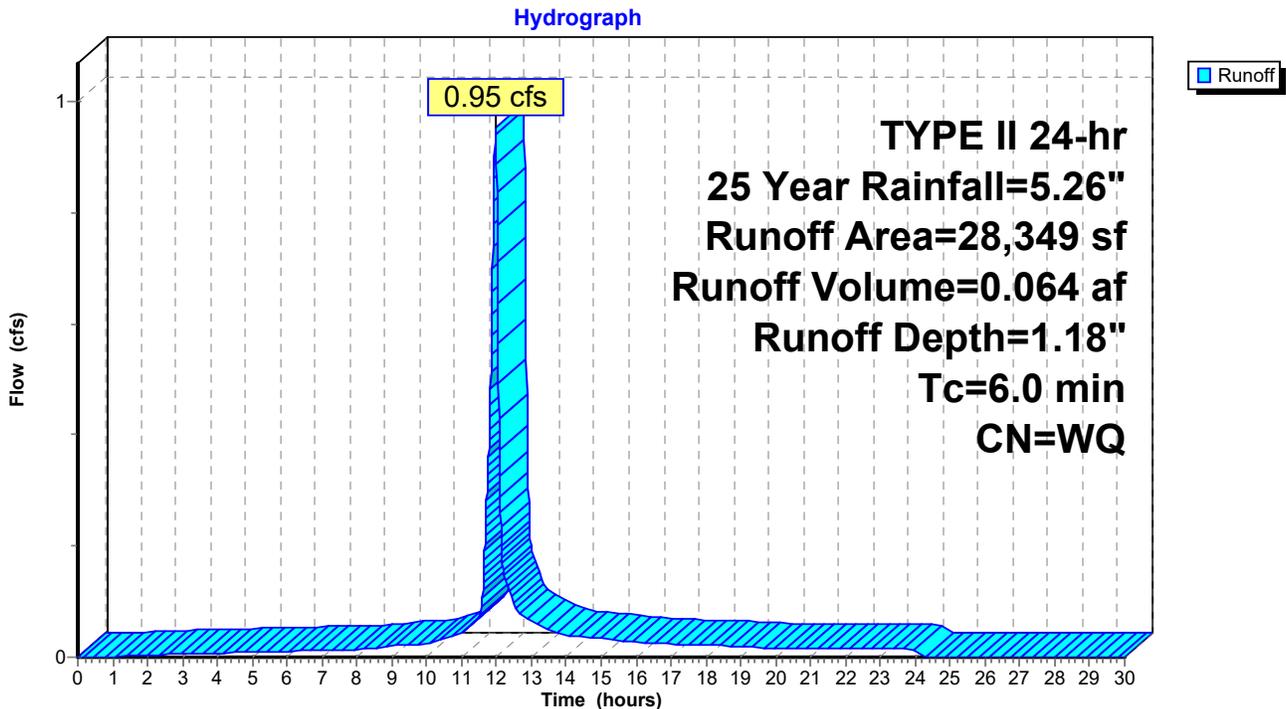
Routed to Pond P-5 : drianage basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 25 Year Rainfall=5.26"

Area (sf)	CN	Description
5,514	98	Paved parking, HSG A
22,089	39	>75% Grass cover, Good, HSG A
746	30	Woods, Good, HSG A
28,349		Weighted Average
22,835		80.55% Pervious Area
5,514		19.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-4: Subcatchment 4



Summary for Subcatchment S-5: Subcatchment 5

Runoff = 0.18 cfs @ 11.97 hrs, Volume= 0.010 af, Depth= 5.02"
 Routed to Pond P-6 : infiltration trench

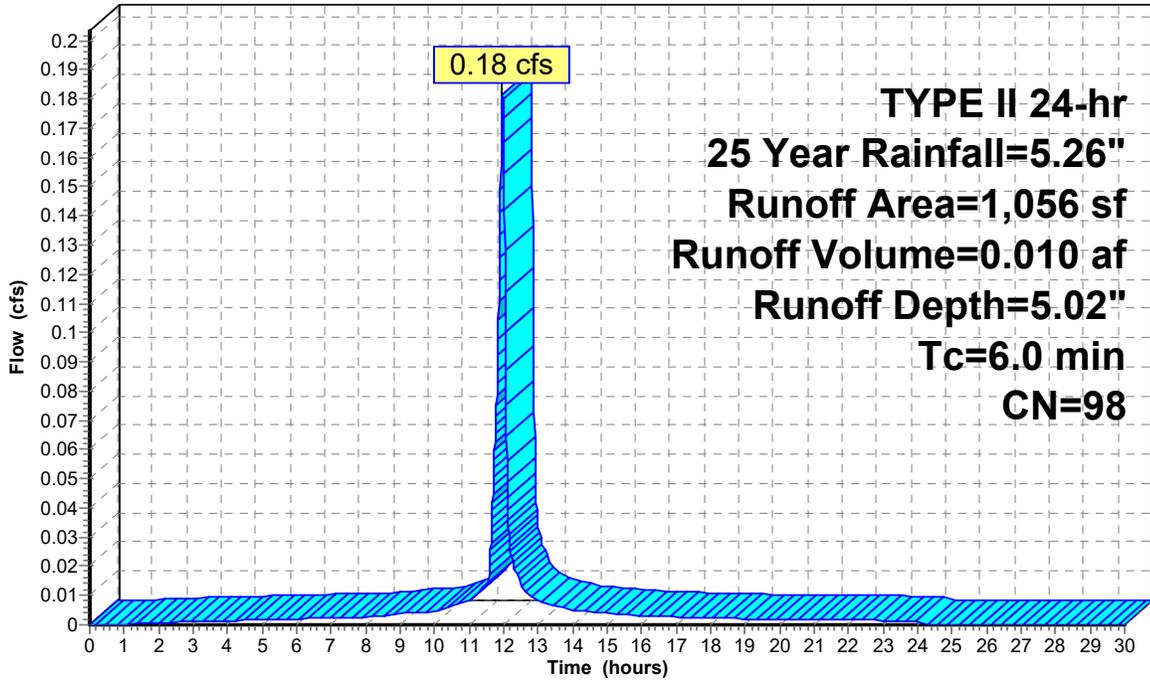
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 25 Year Rainfall=5.26"

Area (sf)	CN	Description
1,056	98	Roofs, HSG A
1,056		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-5: Subcatchment 5

Hydrograph



Summary for Subcatchment S-6: Subcatchment 6

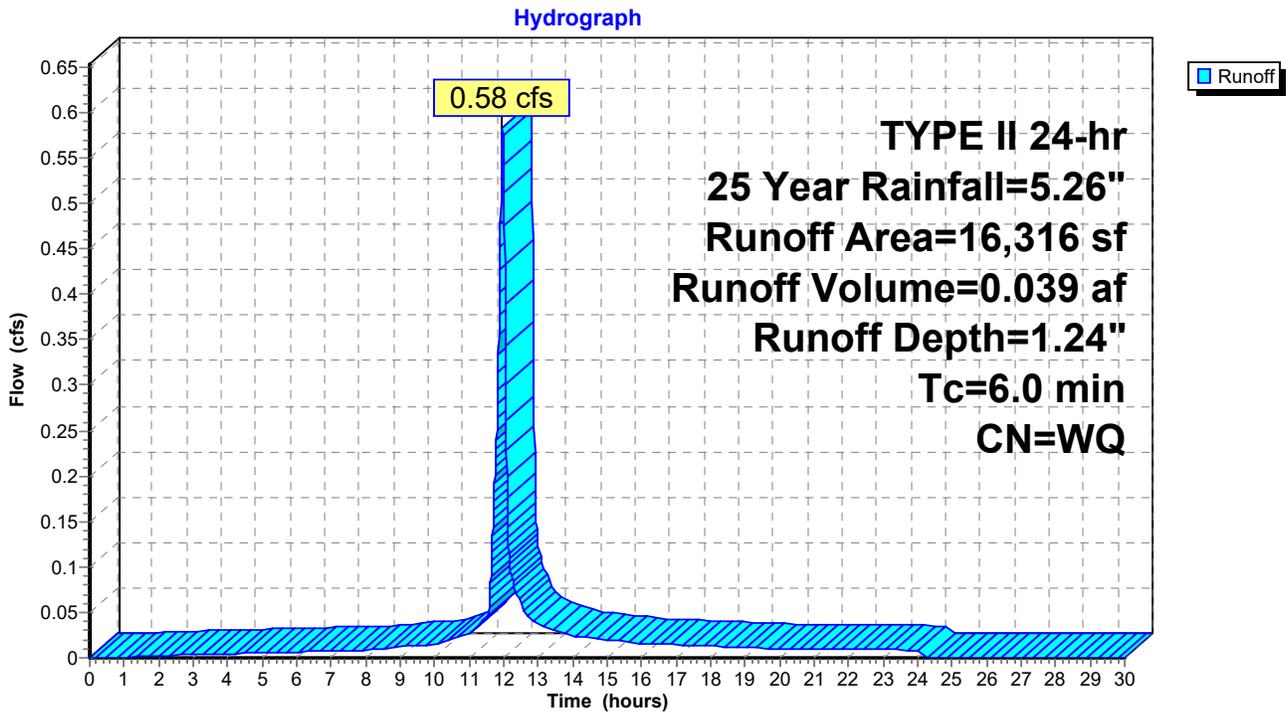
Runoff = 0.58 cfs @ 11.97 hrs, Volume= 0.039 af, Depth= 1.24"
 Routed to Link POA1 : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 25 Year Rainfall=5.26"

Area (sf)	CN	Description
3,377	98	Paved parking, HSG A
12,939	39	>75% Grass cover, Good, HSG A
16,316		Weighted Average
12,939		79.30% Pervious Area
3,377		20.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-6: Subcatchment 6



Summary for Pond P-1: Deep sump CB#1

Inflow Area = 0.036 ac, 100.00% Impervious, Inflow Depth = 5.02" for 25 Year event
 Inflow = 0.27 cfs @ 11.97 hrs, Volume= 0.015 af
 Outflow = 0.27 cfs @ 11.97 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.27 cfs @ 11.97 hrs, Volume= 0.015 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.39' @ 11.97 hrs Surf.Area= 13 sf Storage= 4 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 43 cf

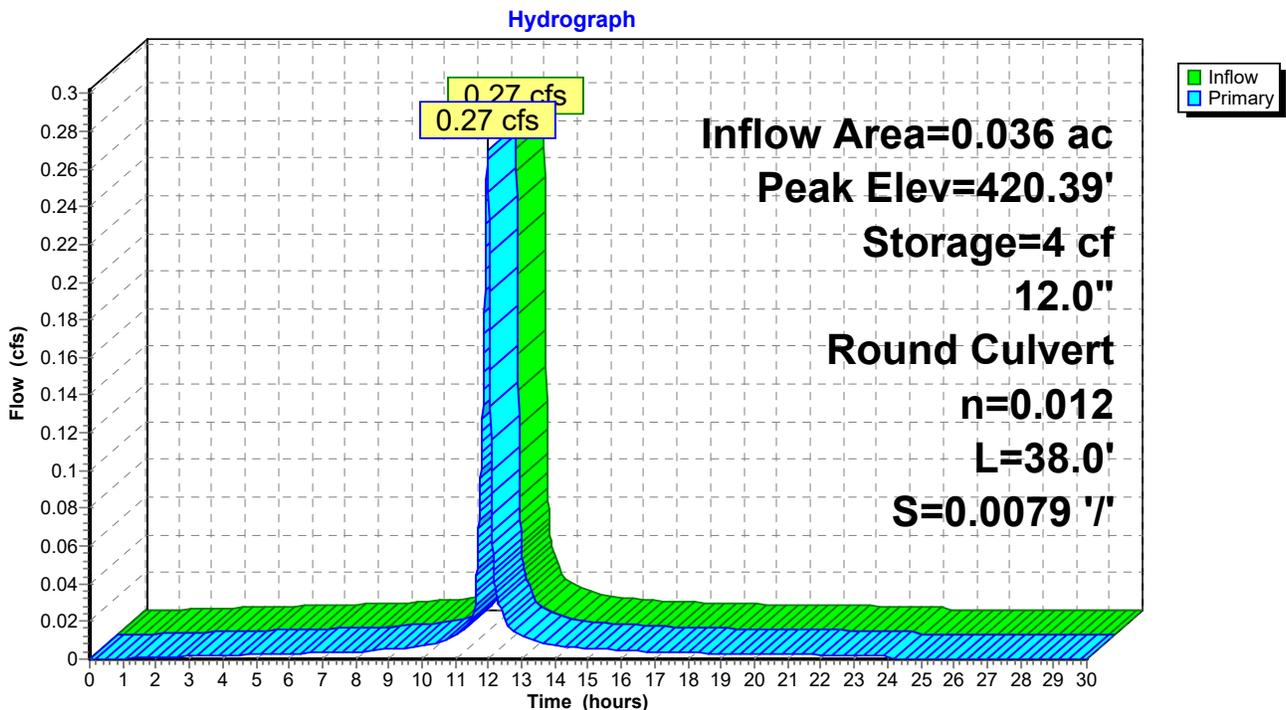
Plug-Flow detention time= 0.9 min calculated for 0.015 af (100% of inflow)
 Center-of-Mass det. time= 0.9 min (744.0 - 743.1)

Volume	Invert	Avail.Storage	Storage Description
#1	420.10'	43 cf	4.00'D x 3.40'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.10'	12.0" Round 12" hdpe L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.10' / 419.80' S= 0.0079 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 11.97 hrs HW=420.39' (Free Discharge)
 ←1=12" hdpe (Inlet Controls 0.27 cfs @ 1.44 fps)

Pond P-1: Deep sump CB#1



Summary for Pond P-2: Deep sump CB#2

Inflow Area = 0.307 ac, 96.57% Impervious, Inflow Depth = 4.86" for 25 Year event
 Inflow = 2.22 cfs @ 11.97 hrs, Volume= 0.124 af
 Outflow = 2.22 cfs @ 11.97 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.95 cfs @ 11.97 hrs, Volume= 0.123 af
 Routed to Pond P-4 : Oil water seperator
 Secondary = 0.27 cfs @ 11.97 hrs, Volume= 0.001 af
 Routed to Pond P-5 : drianage basin

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 421.09' @ 11.97 hrs Surf.Area= 13 sf Storage= 31 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 62 cf

Plug-Flow detention time= 0.5 min calculated for 0.124 af (100% of inflow)
 Center-of-Mass det. time= 0.5 min (744.4 - 743.9)

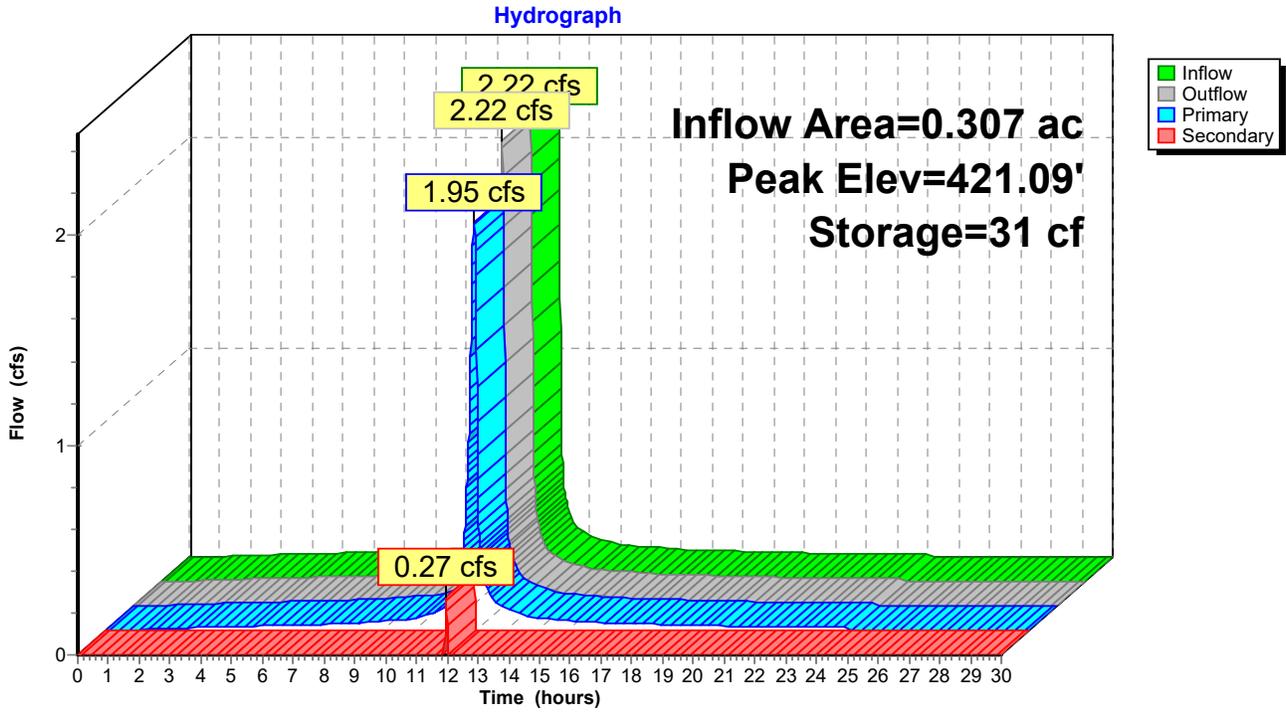
Volume	Invert	Avail.Storage	Storage Description
#1	418.60'	62 cf	4.00'D x 4.90'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	418.60'	8.0" Round 8" hdpe L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 418.60' / 418.55' S= 0.0071 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	420.80'	12.0" Round 12" hdpe L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.80' / 418.00' S= 0.0700 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.95 cfs @ 11.97 hrs HW=421.09' (Free Discharge)
 ↳1=8" hdpe (Inlet Controls 1.95 cfs @ 5.58 fps)

Secondary OutFlow Max=0.27 cfs @ 11.97 hrs HW=421.09' (Free Discharge)
 ↳2=12" hdpe (Inlet Controls 0.27 cfs @ 1.44 fps)

Pond P-2: Deep sump CB#2



Summary for Pond P-3: Deep sump CB#3

Inflow Area = 0.181 ac, 94.16% Impervious, Inflow Depth = 4.74" for 25 Year event
 Inflow = 1.27 cfs @ 11.97 hrs, Volume= 0.071 af
 Outflow = 1.27 cfs @ 11.97 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.27 cfs @ 11.97 hrs, Volume= 0.071 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.88' @ 11.97 hrs Surf.Area= 13 sf Storage= 9 cf
 Flood Elev= 423.50' Surf.Area= 13 sf Storage= 41 cf

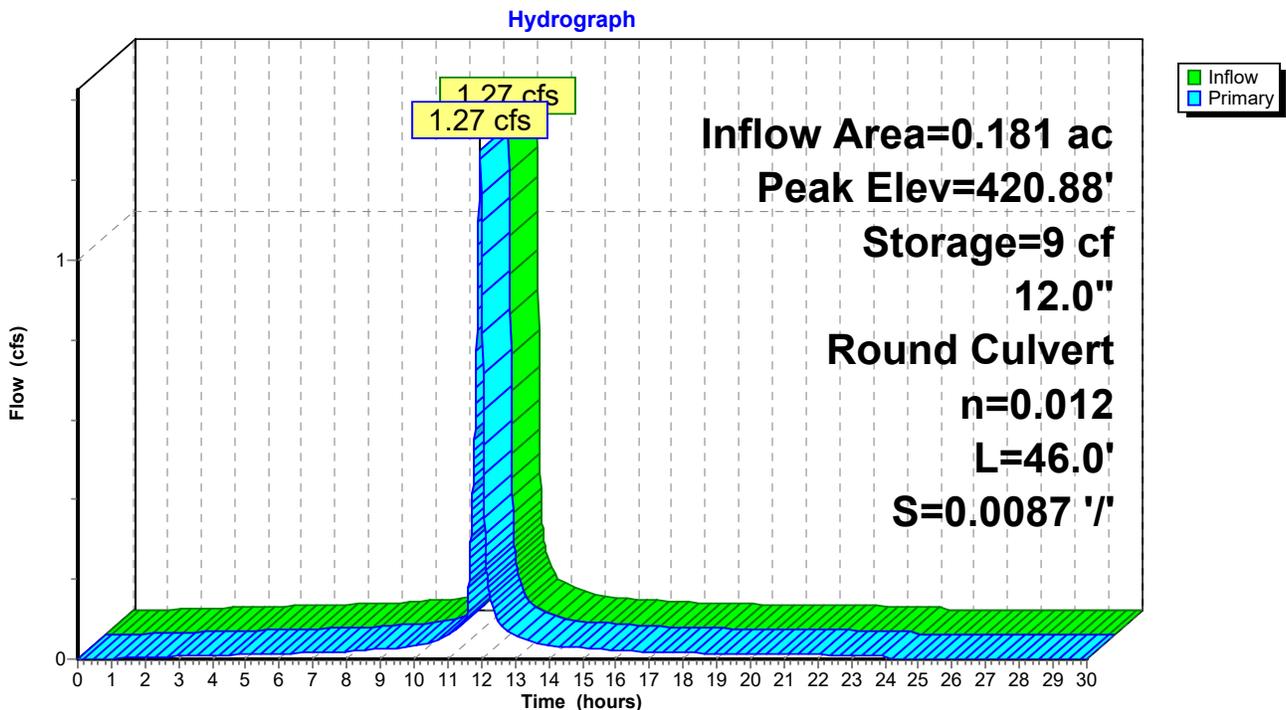
Plug-Flow detention time= 0.5 min calculated for 0.071 af (100% of inflow)
 Center-of-Mass det. time= 0.5 min (744.3 - 743.9)

Volume	Invert	Avail.Storage	Storage Description
#1	420.20'	41 cf	4.00'D x 3.30'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.20'	12.0" Round 12" hdpe L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.20' / 419.80' S= 0.0087 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.27 cfs @ 11.97 hrs HW=420.88' (Free Discharge)
 ↳ 1=12" hdpe (Inlet Controls 1.27 cfs @ 2.22 fps)

Pond P-3: Deep sump CB#3



Summary for Pond P-4: Oil water seperator

Inflow Area = 0.307 ac, 96.57% Impervious, Inflow Depth = 4.80" for 25 Year event
 Inflow = 1.95 cfs @ 11.97 hrs, Volume= 0.123 af
 Outflow = 1.95 cfs @ 11.97 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.95 cfs @ 11.97 hrs, Volume= 0.120 af
 Routed to Pond P-5 : drianage basin

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 418.81' @ 11.97 hrs Surf.Area= 47 sf Storage= 133 cf
 Flood Elev= 424.00' Surf.Area= 47 sf Storage= 197 cf

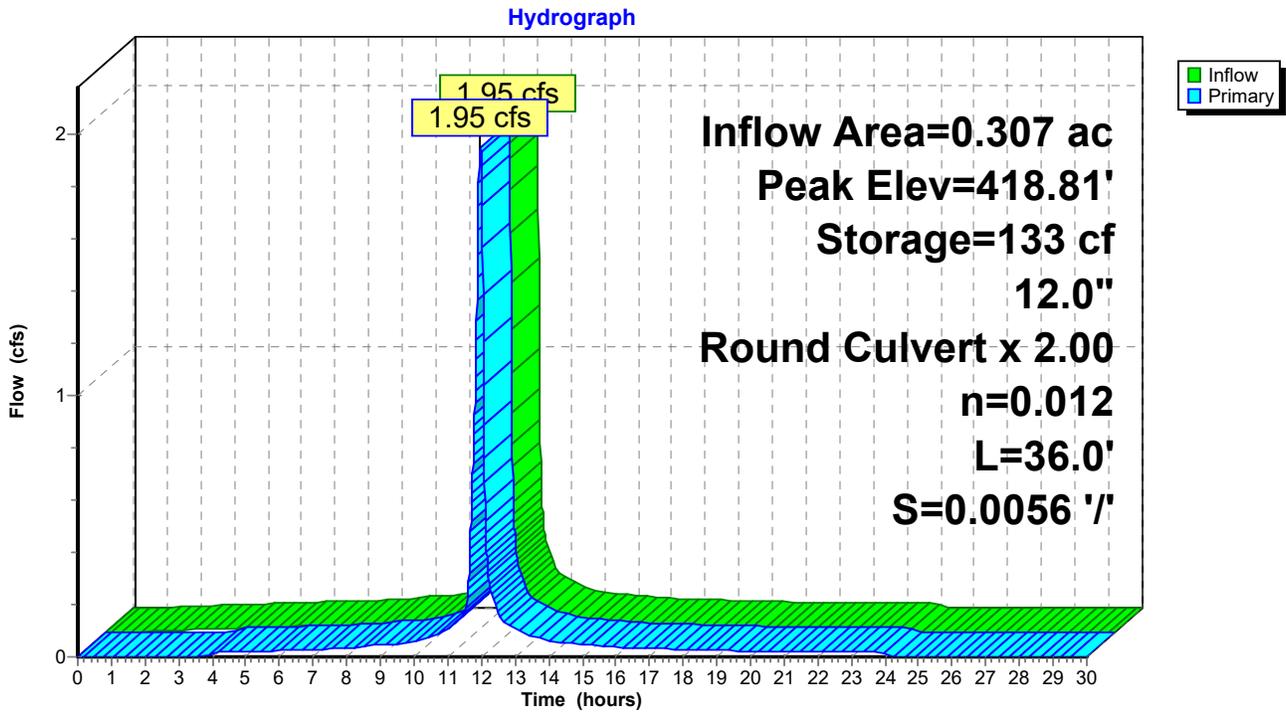
Plug-Flow detention time= 25.2 min calculated for 0.120 af (98% of inflow)
 Center-of-Mass det. time= 12.3 min (757.0 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	416.00'	90 cf	5.30'D x 4.10'H Chamber 1
#2	416.00'	90 cf	5.30'D x 4.10'H Chamber 2
#3	416.00'	16 cf	2.00'D x 5.10'H Chamber 3
		197 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	418.20'	12.0" Round 8" hdpe X 2.00 L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 418.20' / 418.00' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.95 cfs @ 11.97 hrs HW=418.81' (Free Discharge)
 ↖ **1=8" hdpe** (Barrel Controls 1.95 cfs @ 2.78 fps)

Pond P-4: Oil water seperator



Summary for Pond P-5: drianage basin

Inflow Area = 0.958 ac, 44.16% Impervious, Inflow Depth = 2.33" for 25 Year event
 Inflow = 3.17 cfs @ 11.97 hrs, Volume= 0.186 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 420.29' @ 25.53 hrs Surf.Area= 3,856 sf Storage= 8,089 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

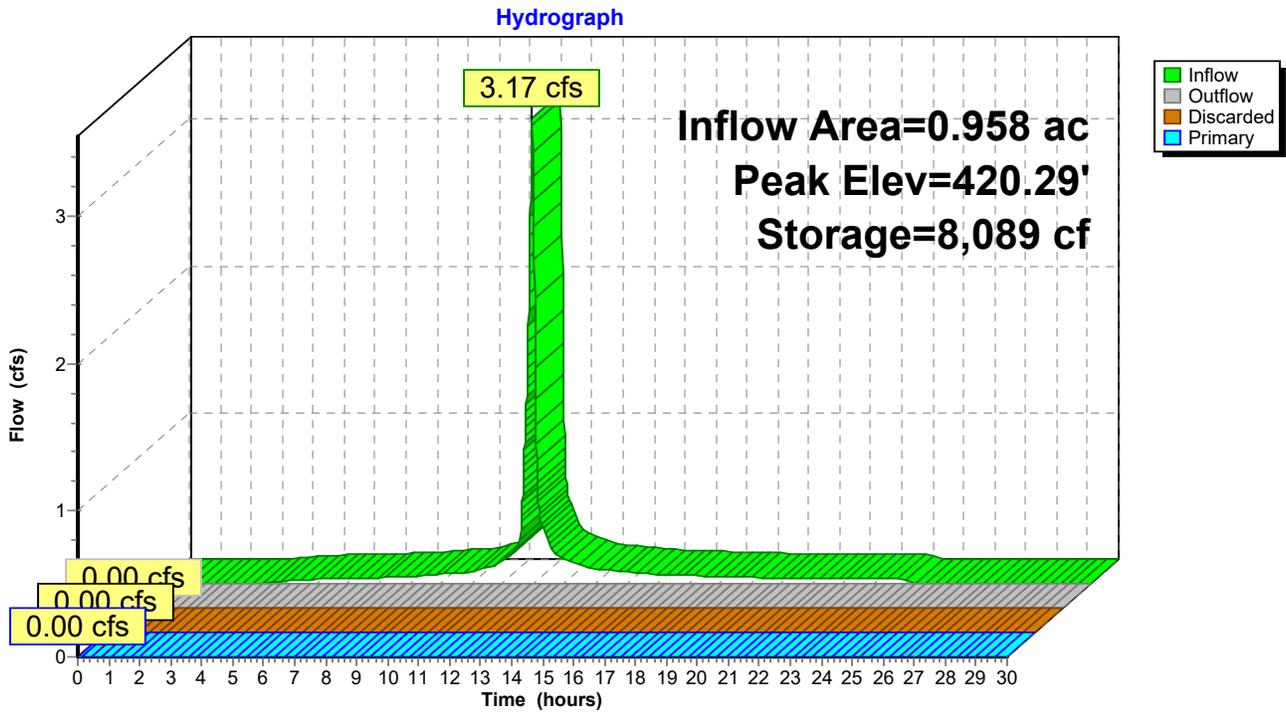
Volume	Invert	Avail.Storage	Storage Description			
#1	416.00'	8,908 cf	Open water storage (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
416.00	174	50.0	0	0	174	
418.00	1,678	276.0	1,595	1,595	6,046	
420.00	3,856	367.0	5,385	6,980	10,747	
420.50	3,856	367.0	1,928	8,908	10,930	

Device	Routing	Invert	Outlet Devices												
#1	Primary	420.40'	70.0' long x 4.0' breadth Broad-Crested Rectangular Weir												
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00												
			2.50 3.00 3.50 4.00 4.50 5.00 5.50												
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66												
			2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32												
#2	Discarded	420.00'	3.000 in/hr Exfiltration over Surface area above 420.00'												
			Excluded Surface area = 3,856 sf												

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=416.00' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=416.00' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P-5: drianage basin



Summary for Pond P-6: infiltration trench

Inflow Area = 0.024 ac, 100.00% Impervious, Inflow Depth = 5.02" for 25 Year event
 Inflow = 0.18 cfs @ 11.97 hrs, Volume= 0.010 af
 Outflow = 0.01 cfs @ 11.48 hrs, Volume= 0.010 af, Atten= 95%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.48 hrs, Volume= 0.010 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 421.14' @ 12.81 hrs Surf.Area= 150 sf Storage= 189 cf
 Flood Elev= 423.50' Surf.Area= 150 sf Storage= 330 cf

Plug-Flow detention time= 147.9 min calculated for 0.010 af (100% of inflow)
 Center-of-Mass det. time= 147.9 min (891.0 - 743.1)

Volume	Invert	Avail.Storage	Storage Description
#1	418.00'	330 cf	Stone (Irregular) Listed below (Recalc) 825 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
418.00	150	79.0	0	0	150
419.00	150	79.0	150	150	229
420.00	150	79.0	150	300	308
421.00	150	79.0	150	450	387
422.00	150	79.0	150	600	466
423.50	150	79.0	225	825	585

Device	Routing	Invert	Outlet Devices
#1	Discarded	418.00'	2.800 in/hr Exfiltration over Surface area Phase-In= 0.20'
#2	Primary	423.00'	40.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

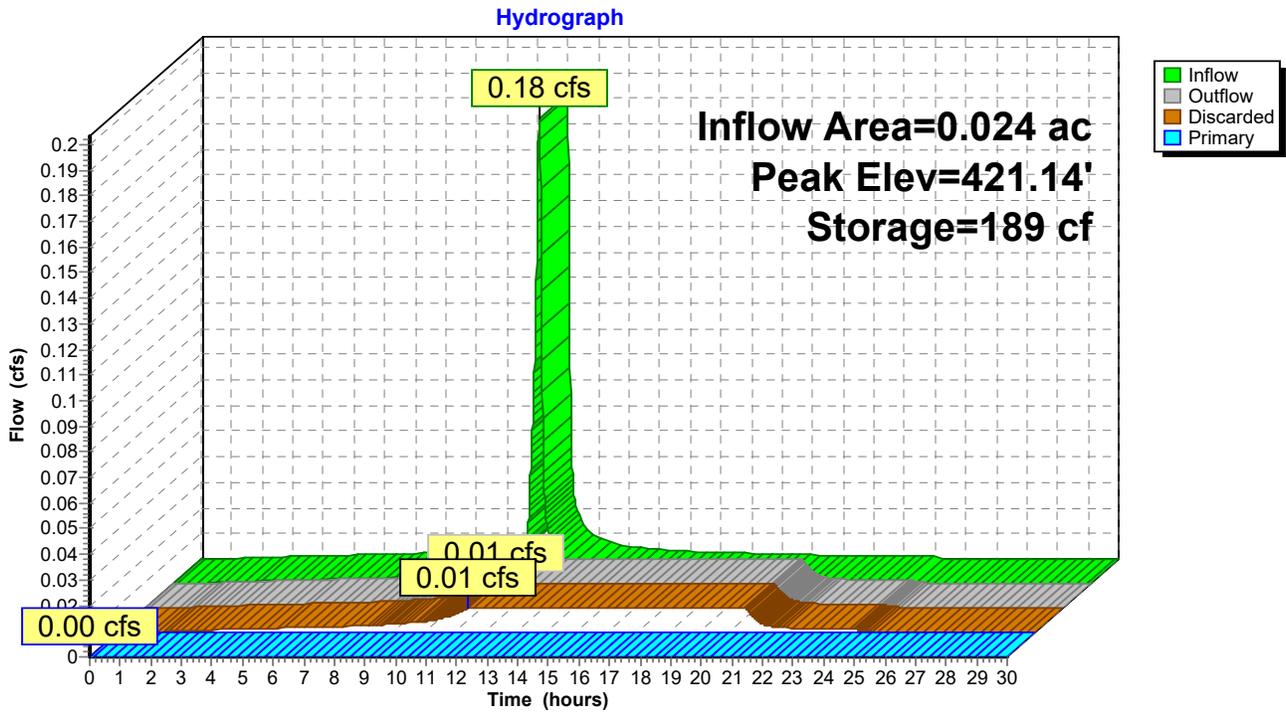
Discarded OutFlow Max=0.01 cfs @ 11.48 hrs HW=418.22' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=418.00' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond P-6: infiltration trench

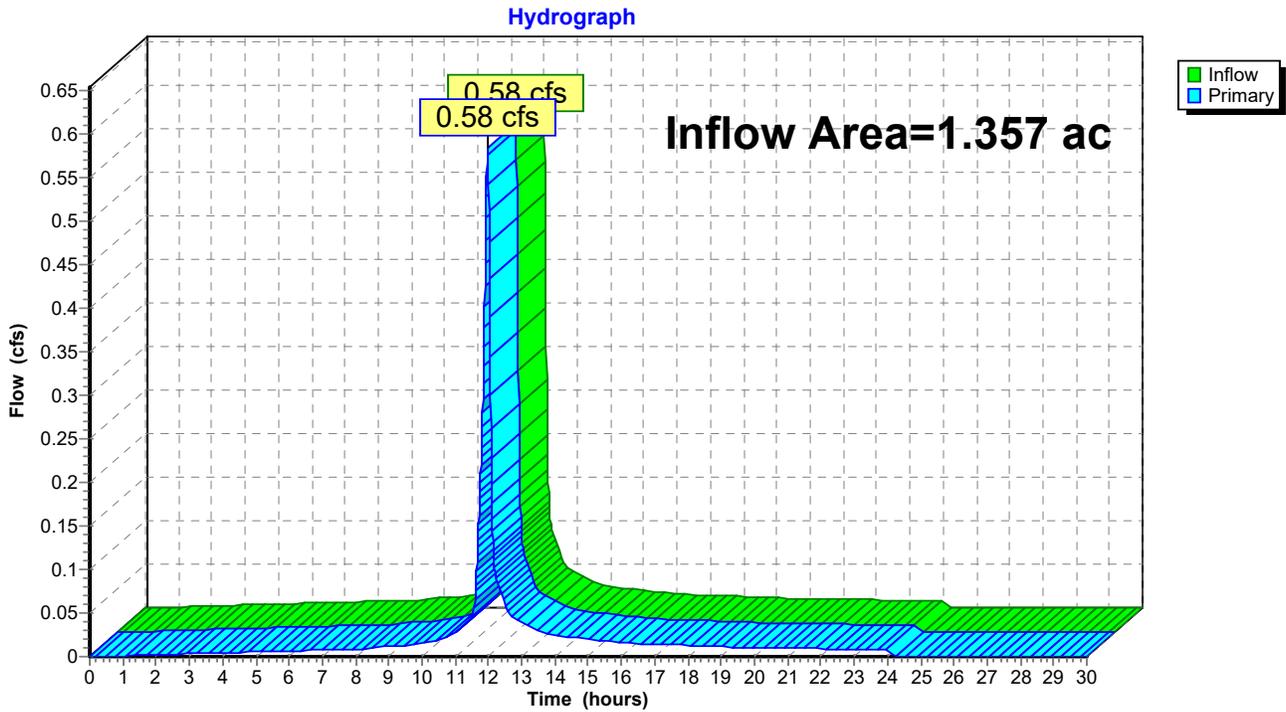


Summary for Link POA1: Point of Analysis

Inflow Area = 1.357 ac, 38.68% Impervious, Inflow Depth = 0.34" for 25 Year event
Inflow = 0.58 cfs @ 11.97 hrs, Volume= 0.039 af
Primary = 0.58 cfs @ 11.97 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link POA1: Point of Analysis



22-1217 S

August 8, 2022

Horizons Engineering, Inc.
Attention: Don Bouchard
5 Railroad Street
Newmarket, New Hampshire

Subject: Field Infiltration Testing Services
41 New Hampshire Route 25
Effingham, New Hampshire

Dear Don:

We have performed field infiltration testing for the subject project. This report summarizes our findings, and its contents are subject to the limitations set forth in Appendix A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to perform field infiltration testing and to report the testing results. Our scope of services has included field infiltration testing using a Guelph Permeameter in accordance with the NHDES analysis method, and preparation of this letter.

Our scope of services was to perform field infiltration testing at two locations. We understand test pits were performed in the vicinity at an earlier date.

2.0 TESTING

2.1 Field Testing

On August 1, 2022, S. W. Cole Engineering, Inc. (S.W.COLE) performed field infiltration testing using a Guelph Permeameter at two locations specified by Horizons Engineering, Inc. at the existing ground surface.

The first infiltration test (INF-1) was performed in the southwest corner of the vacant lot across the access road from the gas station and the second infiltration test (INF-2) was performed in the northeast corner of the same lot. The approximate testing locations are shown on the “Exploration Location Plan” attached in Appendix B.

The following table depicts the testing results:

INFILTRATION TEST RESULTS	
Test	Rate (in/hour)
INF-1 @ Existing Ground Surface	1.0
INF-2 @ Existing Ground Surface	2.6

The results above are the direct value from the field testing and no safety factor has been applied. Infiltration results may vary during construction depending on material gradation and compaction effort on the material.

2.2 Laboratory Testing

A sample of soil taken from the area directly adjacent to where INF-1 was performed was returned to our laboratory for grain size analyses testing. The test results show that the soil present at approximately 0.5-1.0 feet at INF-1 classifies as a poorly graded sand with silt (SP-ML). The laboratory test result is attached in Appendix C.

3.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project.

Sincerely,

S. W. Cole Engineering, Inc.

Courtney W. Mattson, P.E.
Project Geotechnical Engineer

CWM:rec

APPENDIX A

Limitations

This report has been prepared for the exclusive use of Horizons Engineering, Inc. for specific application to the project at 41 New Hampshire Route 25 in Effingham, New Hampshire. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The infiltration test results only represent the specific test location. Variations in subsurface conditions such as soil composition and density may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it may be necessary to evaluate their nature and provide supplemental infiltration testing to reflect the differing conditions.

S. W. Cole Engineering, Inc.'s scope of work was limited to conducting and providing field infiltration results. It is the responsibility of the design engineer to appropriately incorporate the test results into the design and follow applicable local and federal permitting and design regulations.

APPENDIX B

Figure

R:\2022\22-1217\ArcProject\22-1217.aprx, 8/8/2022 3:10 PM 22-1217 Sheet 1 - ELP, Scale: 1:600, CMORRISON, S. W. COLE ENGINEERING, INC.



Esri, Maxar, Earthstar Geographics, CNES/Airbus DS, and the GIS User Community



LEGEND

 APPROXIMATE INFILTRATION TEST LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN PREPARED FROM IMAGERY PROVIDED BY ESRI.
2. THE INFILTRATION TEST LOCATIONS WERE SELECTED BY HORIZONS ENGINEERING, INC. AND SUBSEQUENTLY LOCATED IN THE FIELD BY S. W. COLE ENGINEERING, INC. USING A RECREATIONAL GRADE GPS RECEIVER.
3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. REPORT.
4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE INFILTRATION TESTS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

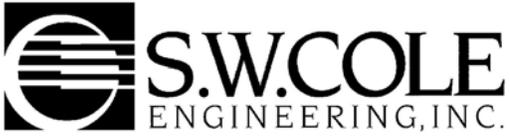


HORIZONS ENGINEERING, INC.
EXPLORATION LOCATION PLAN
 FIELD INFILTRATION TESTING SERVICES
 41 NEW HAMPSHIRE ROUTE 25
 EFFINGHAM, NEW HAMPSHIRE

Job No.	22-1217	Scale	1" = 50'
Date:	08/08/2022	Sheet	1

APPENDIX C

Laboratory Test Result



Report of Gradation

ASTM C-117 & C-136

Project Name EFFINGHAM NH - FIELD INFILTRATION TESTING SERVICES

Project Number 22-1217

Client HORIZONS ENGINEERING, INC.

Lab ID 6748M

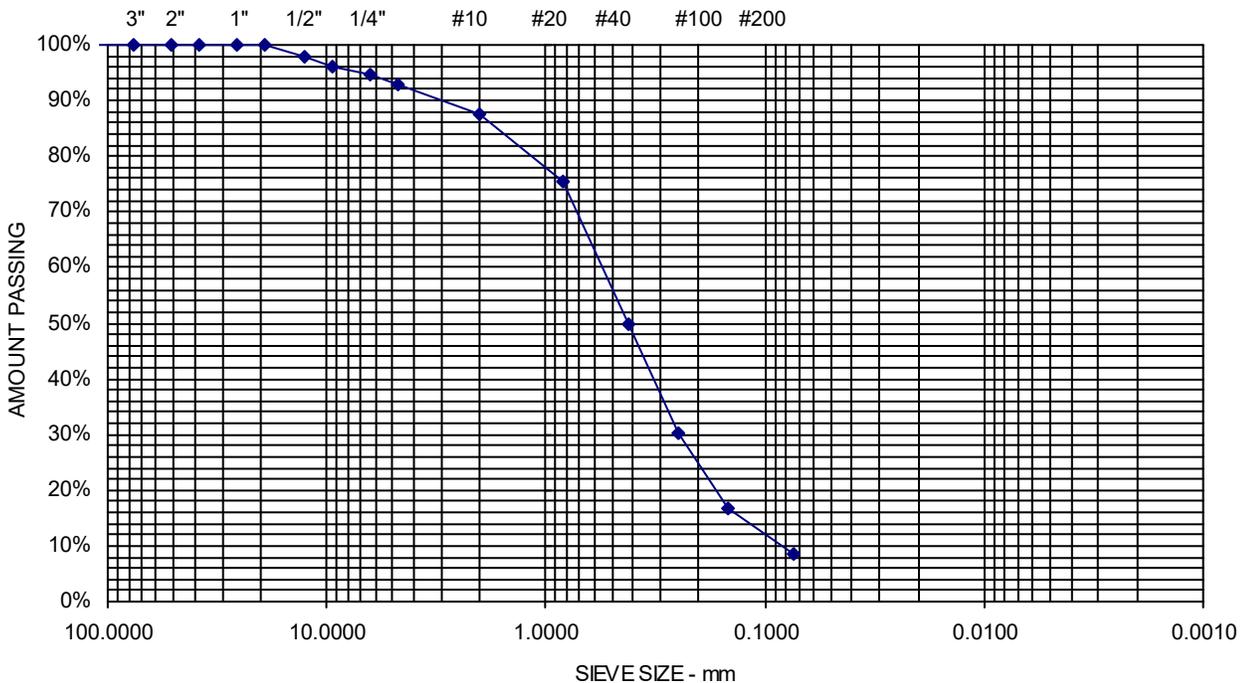
Date Received 8/1/2022

Date Completed 8/3/2022

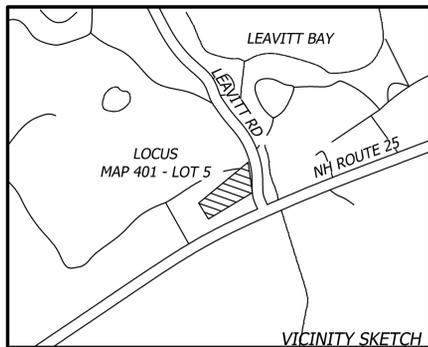
Material Source **INF-1: 0.5-1.0'**

Tested By DANIEL JACK

<u>STANDARD DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
150 mm	6"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	98	
9.5 mm	3/8"	96	
6.3 mm	1/4"	95	
4.75 mm	No. 4	93	7.1% Gravel
2.00 mm	No. 10	87	
850 μm	No. 20	76	
425 μm	No. 40	50	84.3% Sand
250 μm	No. 60	30	
150 μm	No. 100	17	
75 μm	No. 200	8.7	8.7% Fines

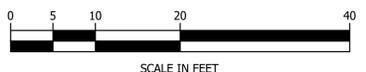
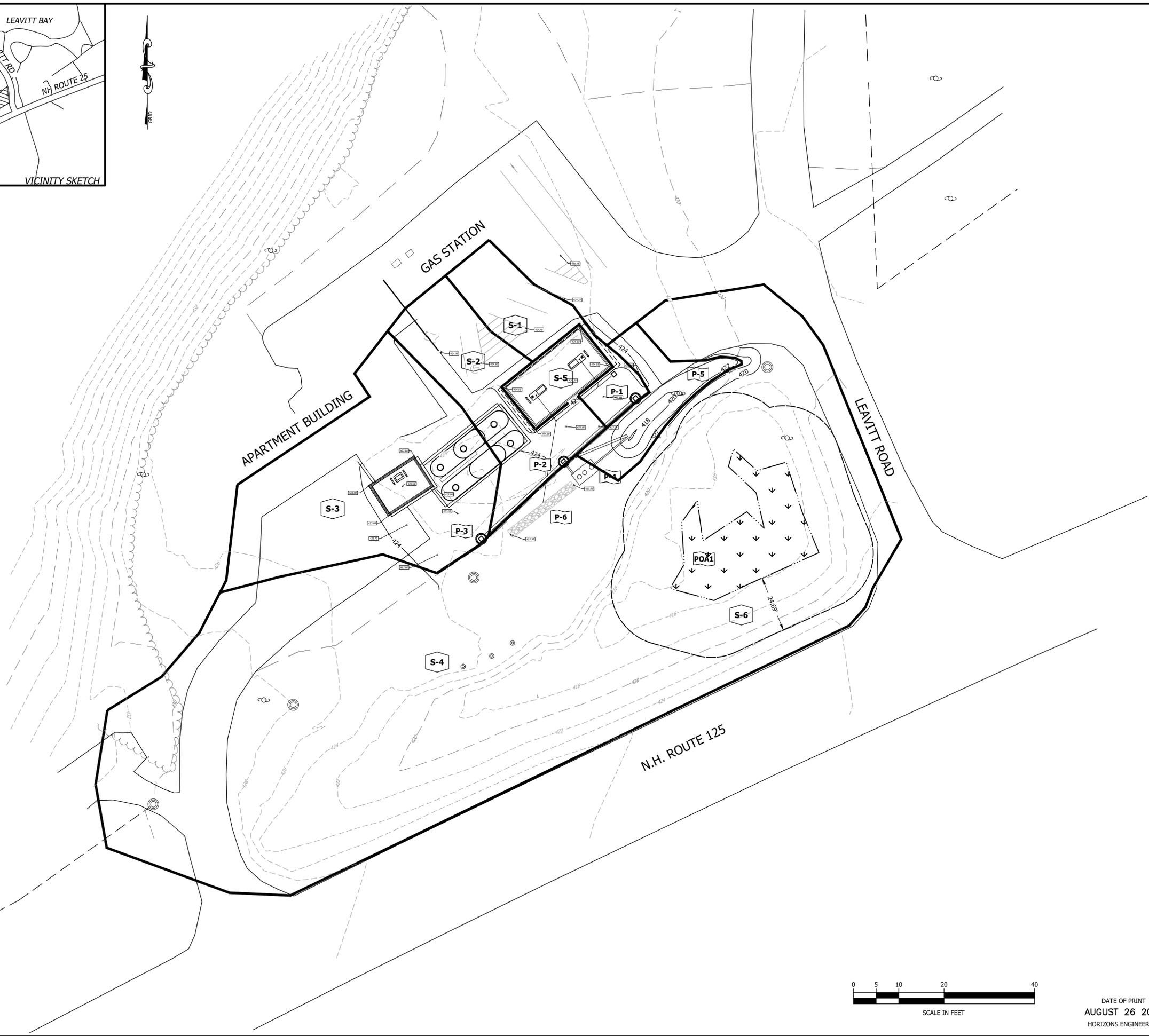


Comments:



LEGEND

	SUBCATCHMENT
	POND
	POINT OF ANALYSIS
	DRAINAGE AREA BOUNDARY



DATE OF PRINT
AUGUST 26 2022
HORIZONS ENGINEERING

© 2022
Horizons
Engineering
All rights reserved

horizons
Engineering

Civil and Structural Engineering
Land Surveying and Environmental Consulting

MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

MEENA LLC

41 NH ROUTE 25

EFFINGHAM, NEW HAMPSHIRE

DRAINAGE PLAN

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	8/12/22	REVISED PER TOWN COMMENTS	JH	JH

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DATE:</td> <td>7/7/22</td> <td>PROJECT #:</td> <td>220473</td> </tr> <tr> <td>ENG'ND BY:</td> <td>JFH</td> <td>DRAWN BY:</td> <td>JFH</td> </tr> <tr> <td>CHECK'D BY:</td> <td>ML</td> <td>ARCHIVE #:</td> <td>H-___</td> </tr> </table>	DATE:	7/7/22	PROJECT #:	220473	ENG'ND BY:	JFH	DRAWN BY:	JFH	CHECK'D BY:	ML	ARCHIVE #:	H-___
DATE:	7/7/22	PROJECT #:	220473										
ENG'ND BY:	JFH	DRAWN BY:	JFH										
CHECK'D BY:	ML	ARCHIVE #:	H-___										

DR 1.01