CARMINA WOOD
DESIGN

ENGINEER'S REPORT

for

Amherst Youth Center

1350 Eggert Road
Town of Amherst, Erie County, New York

Prepared for

Ellicott Development

295 Main Street, Suite 700
Buffalo, NY 14203

Prepared by

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June 2025

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Section 1 - Location & Description

This project is a development of a greenspace on a existing developed 3.3 acre site located 1350 Eggert Road in the Town of Amherst for a new youth community center building. Construction will consist of a 7,780 sf community building with associated site, utility and landscaping improvements. Currently the site consists of a school building that was converted to residential apartments years prior, the community center is proposed to be constructed in an open greenspace on the west side of the property. The proposed site development area to be disturbed for this project is approximately 0.45 acres when construction is completed.

Section 2 - Water Service

Water service for the community building will be tapped off the existing on site water service downstream of the backflow preventer and meter. The service to the building will be a 2" polyethylene domestic service.

Section 3 - Sanitary Sewer Service

Proposed is 135 lf of 6" SDR-35 PVC private sanitary sewer lateral, connected to the existing public sanitary sewer main along the south side of Crosby Blvd.

Design Parameters
Students: 10 gal/day/student x 190 students = 1,900 gpd

1,900 gpd * 4.38 = 8,328 gpd *use peaking factor of 4.38

The hydraulic loading rate is per "Design Standards for Intermediate Sized Wastewater Treatment Systems" 2014, NYSDEC, number of students is based on maximum capacity of the proposed building.

Section 4 - Storm Sewer Service

The existing site currently sheet drains northwest towards an existing drive lane and eventually down a steep slope or stairway to the public park and Crosby Blvd below.

Stormwater runoff collected onsite as a result of the proposed development will be routed through the proposed storm sewer system consisting of an underground detention basin connected by a series of catch basins and smooth interior HDPE pipe. The underground detention field was designed to consist of ADS StormTech SC-310 chambers to allow for stormwater to be temporarily stored and discharged at a controlled rate. The chamber system is surrounded by stone and wrapped in geotextile fabric. Note that StormTech is one type of "chamber" system and there are several other by different manufacturers that may be used pending approval by the design engineer. Site specific shop drawings will be required from the contractor for approval by the engineer prior to construction of the specific system selected. An 8" outlet control pipe will be provided downstream of the underground detention field underdrain pipe. Discharge from the outlet pipe will outlet to the existing storm sewer manhole on site which ultimately connects down the slope to Crosby Blvd.

<u>Town of Amherst Requirement:</u>
The Town of Amherst requires that the 25-year proposed storm event be attenuated with detention and that the outlet be restricted to the 10-year existing storm event. This volume of 2,239 cf is accommodated in the detention basin at elevation 635.03. At this elevation, the outlet discharge will be restricted to 2.21 cfs, which is less than the existing 10-year peak runoff outflow of 3.68 cfs.

Detention: Comparison of the existing 10-year vs. the proposed 25-year runoff

RUNOFF SUMMARY

EVENT	EX. RUNOFF (cfs)	PRO. RUNOFF (cfs)	RESULT (cfs)
10-year	3.68	1.96	-1.72
25-year	4.78	2.21	-2.57

Appendix A

Sanitary Sewer and Water Demand Calculations

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Project No.: 25-4075 Date: 6/23/2025
Project Name: Amherst Youth Center
Project Address: 1350 Eggert Road Amherst, NY
Subject: Sanitary Sewer & Water Demand Calcs
Sheet: 1 of 1

Sanitary Sewage Demand Calculations:

10 gal/d/stu x 190 stu = 1,900 gpd *use 10 gallons per student per day

Total Site Sanitary Demand: = 1,900 gpd

Find Peak Sanitary Demand:

Peaking Factor based on Population:

Total demand: 1,900 gpd / 100 gpcd = 19 per capita

Population (P) = 19 people

Peaking Factor : (18 +√P) / (4 + √P) where P is in thousands

Peaking Factor = 4.38

Peak Sanitary Demand = 1,900 x 4.38 = 8,328 gpd
= 0.008 MGD
= 0.013 cfs

Required Infiltration and Inflow Mitigation:

Peak Sanitary Flow = 8,328 gpd = 5.78 gpm

4:1 offset flow per NYSDEC requirements = 5.78 x 4 = 23.13 gpm req'd

Mitigation Credit = $250 / gpm

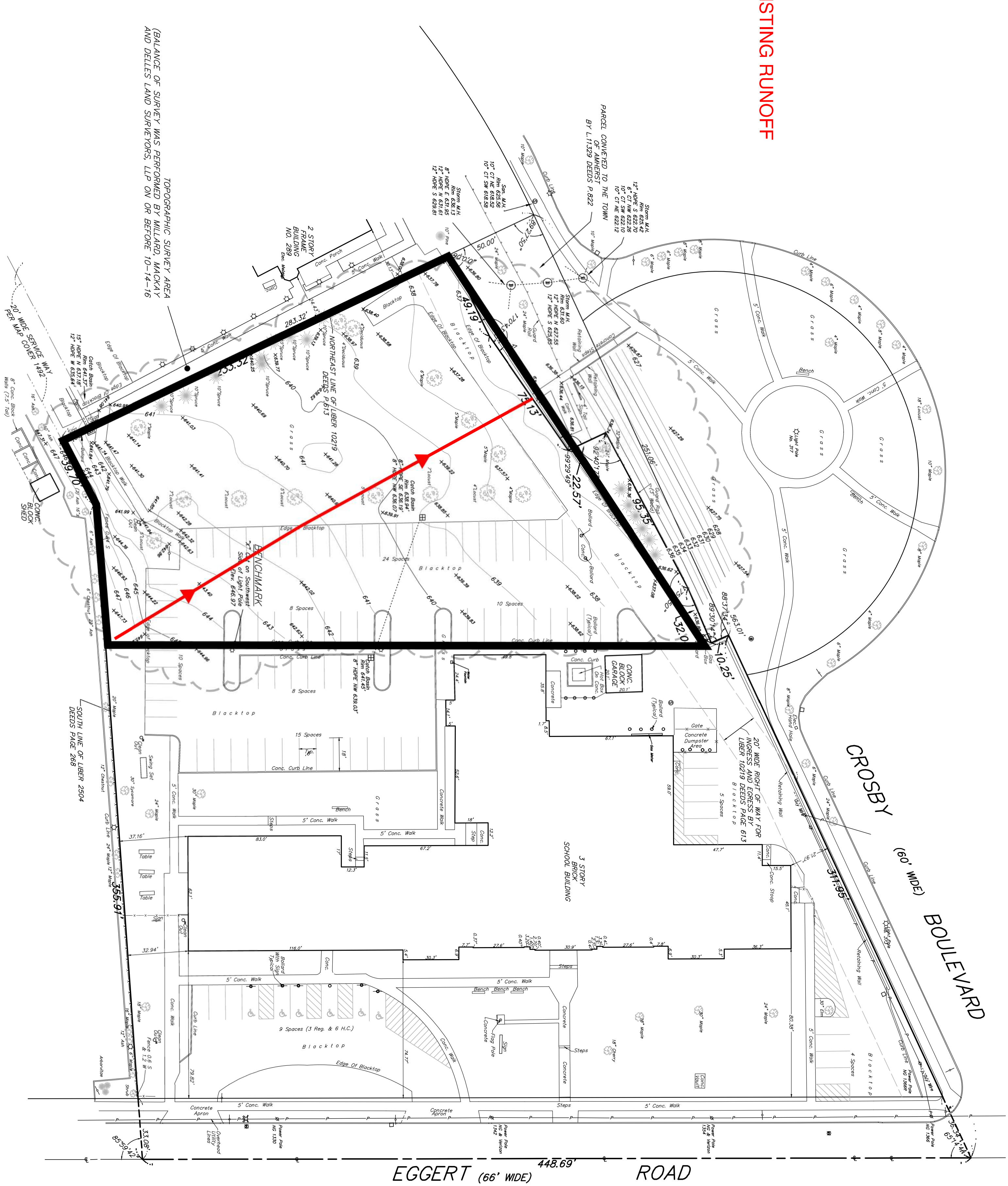
Mitigation Agreement Amount = $5,783.66

Appendix B

Storm Sewer System Drainage Calculations

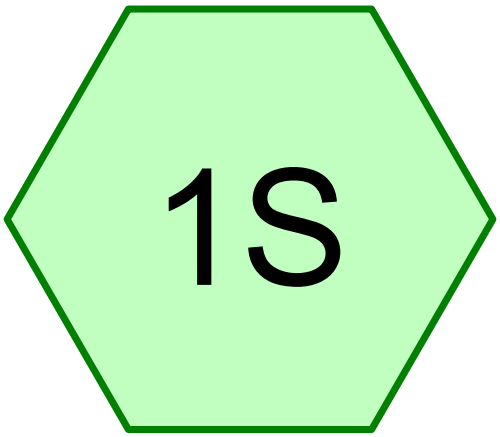
Existing Runoff

EXISTING RUNOFF



Events for Subcatchment 1S: Existing

Event	Rainfall (inches)	Runoff (cfs)	Volume (cubic-feet)	Depth (inches)
1-Year	1.87	1.72	3,344	0.92
2-Year	2.20	2.22	4,341	1.20
5-Year	2.69	2.97	5,888	1.62
10-Year	3.14	3.68	7,357	2.03
25-Year	3.84	4.78	9,704	2.67
50-Year	4.48	5.78	11,893	3.28
100-Year	**5.23**	**6.95**	**14,493**	**3.99**



Existing

Subcat Reach Pond Link

Routing Diagram for 25-4075 existing
Prepared by Carmina Wood Morris, PC, Printed 6/19/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
2	25-Year	Type II 24-hr		Default	24.00	1	3.84	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
21,780	80	>75% Grass cover, Good, HSG D (1S)
21,780	98	Paved parking, HSG D (1S)
43,560	**89**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
43,560	HSG D	1S
0	Other	
43,560		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	0	21,780	0	21,780	>75% Grass cover, Good	
0	0	0	21,780	0	21,780	Paved parking	
0	**0**	**0**	**43,560**	**0**	**43,560**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=1.000 ac 50.00% Impervious Runoff Depth=2.03"
Flow Length=240' Tc=4.8 min CN=89 Runoff=3.68 cfs 7,357 cf

Total Runoff Area = 43,560 sf Runoff Volume = 7,357 cf Average Runoff Depth = 2.03"
50.00% Pervious = 21,780 sf 50.00% Impervious = 21,780 sf

Summary for Subcatchment 1S: Existing

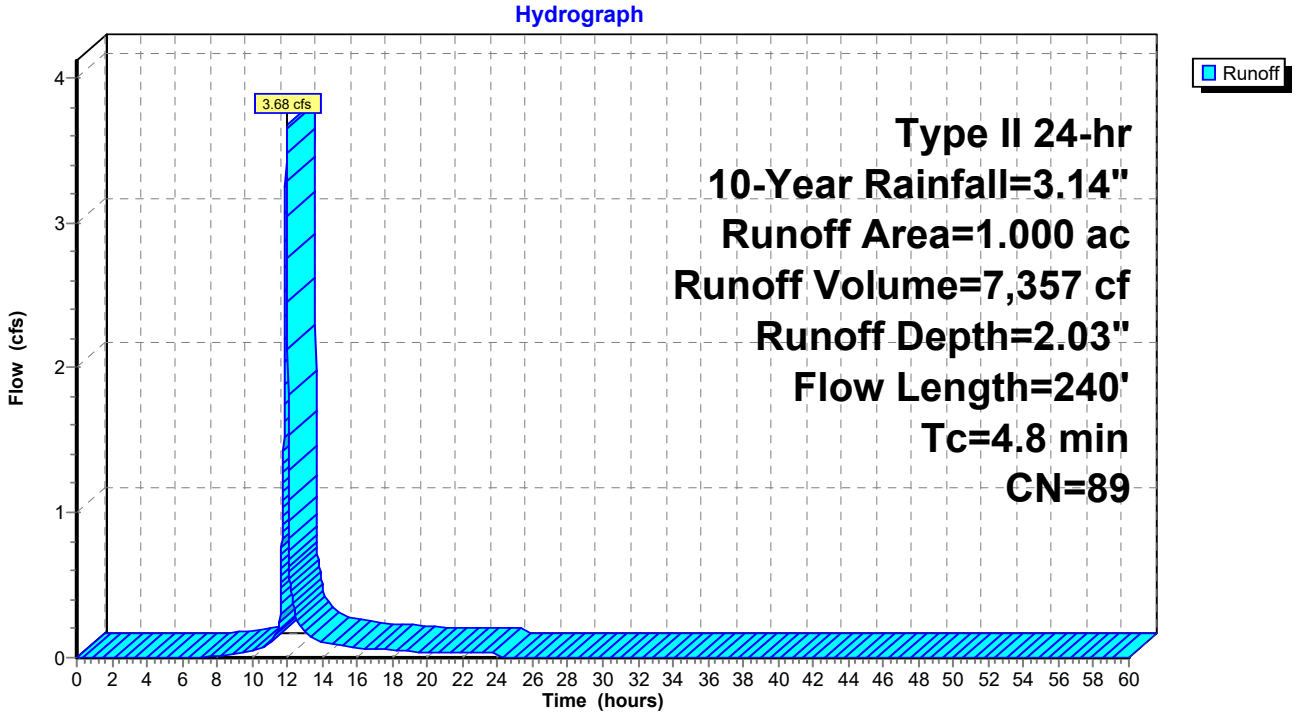
Runoff = 3.68 cfs @ 11.96 hrs, Volume= 7,357 cf, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
0.500	80	>75% Grass cover, Good, HSG D
1.000	89	Weighted Average
0.500		50.00% Pervious Area
0.500		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	110	0.0036	0.62		**Sheet Flow, pavement** Smooth surfaces n= 0.011 P2= 2.50"
1.8	110	0.0220	1.04		**Shallow Concentrated Flow, grass** Short Grass Pasture Kv= 7.0 fps
0.1	20	0.0200	2.87		**Shallow Concentrated Flow, pavement** Paved Kv= 20.3 fps
4.8	240	Total			

Subcatchment 1S: Existing



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=1.000 ac 50.00% Impervious Runoff Depth=2.67"
Flow Length=240' Tc=4.8 min CN=89 Runoff=4.78 cfs 9,704 cf

Total Runoff Area = 43,560 sf Runoff Volume = 9,704 cf Average Runoff Depth = 2.67"
50.00% Pervious = 21,780 sf 50.00% Impervious = 21,780 sf

Summary for Subcatchment 1S: Existing

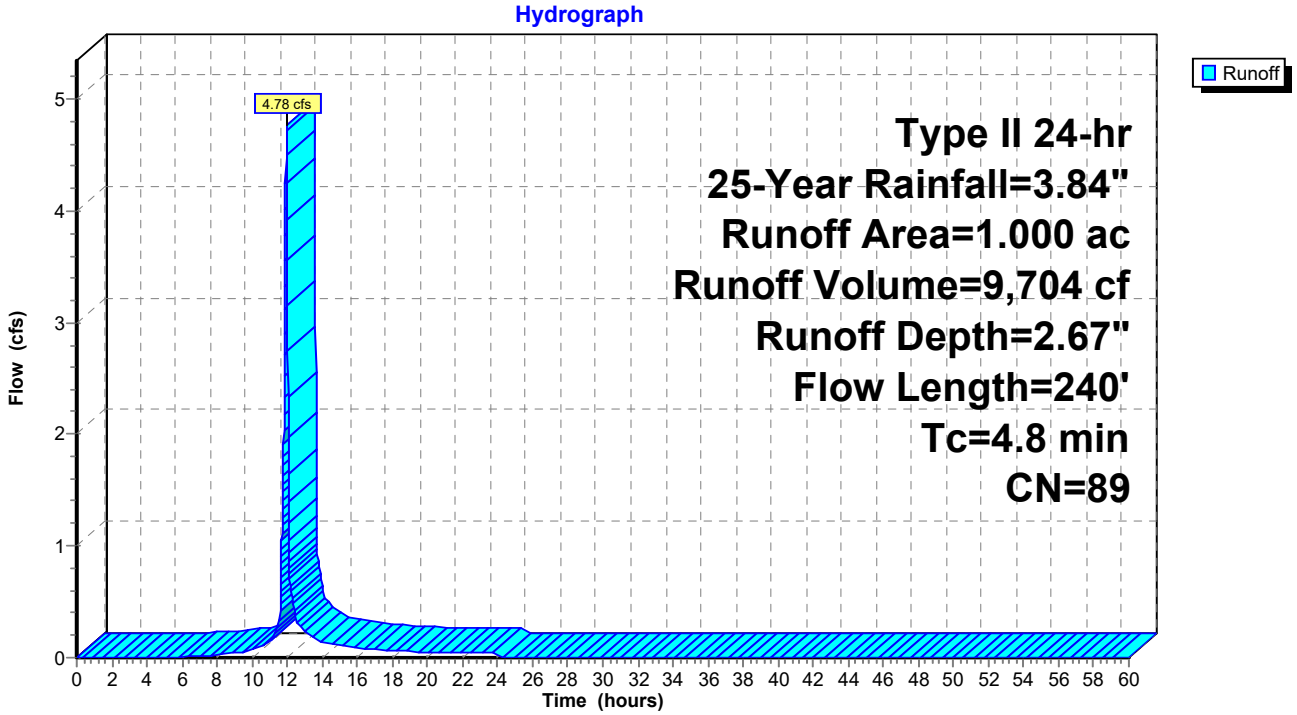
Runoff = 4.78 cfs @ 11.96 hrs, Volume= 9,704 cf, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=3.84"

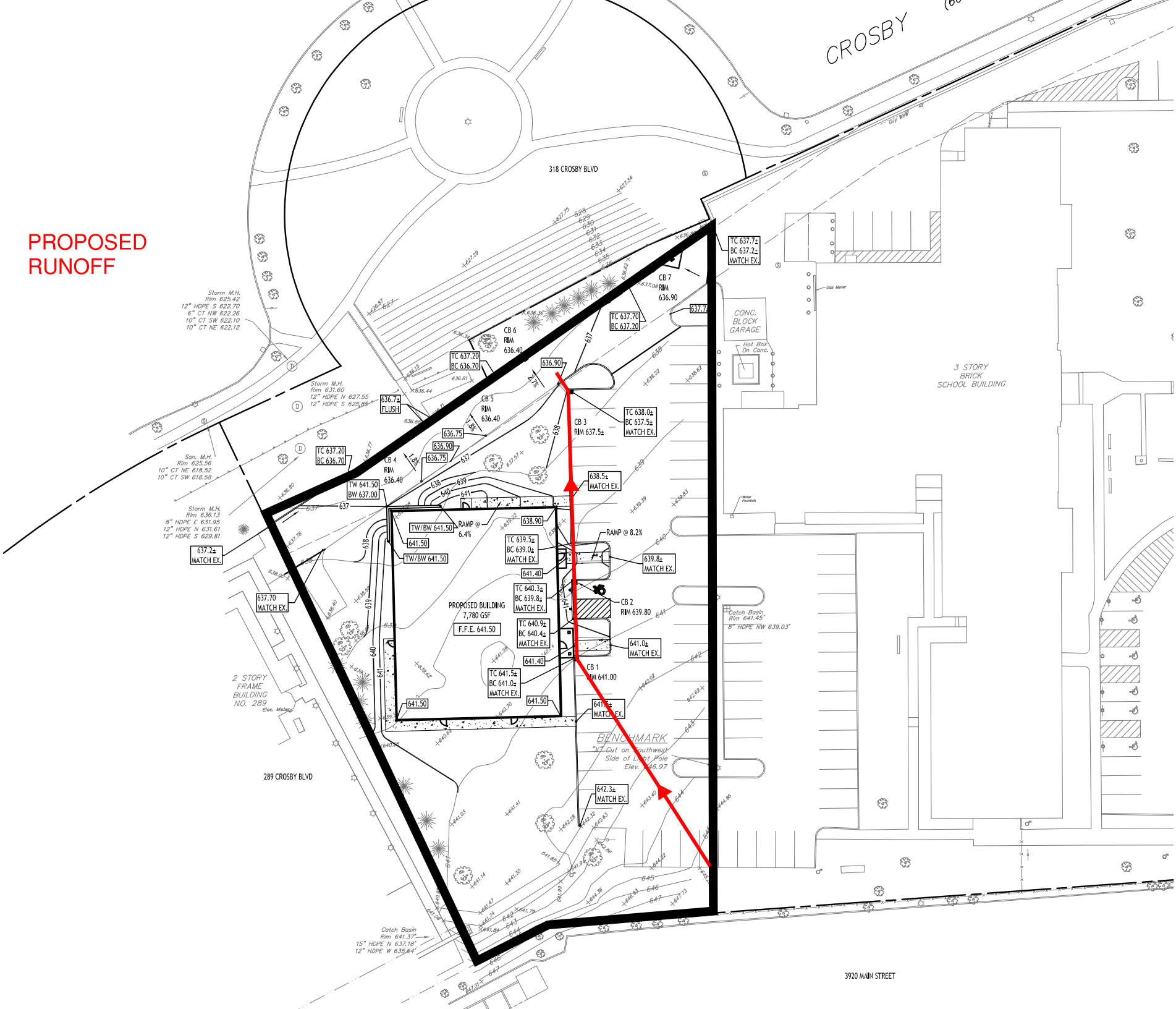
Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
0.500	80	>75% Grass cover, Good, HSG D
1.000	89	Weighted Average
0.500		50.00% Pervious Area
0.500		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	110	0.0036	0.62		**Sheet Flow, pavement** Smooth surfaces n= 0.011 P2= 2.50"
1.8	110	0.0220	1.04		**Shallow Concentrated Flow, grass** Short Grass Pasture Kv= 7.0 fps
0.1	20	0.0200	2.87		**Shallow Concentrated Flow, pavement** Paved Kv= 20.3 fps
4.8	240	Total			

Subcatchment 1S: Existing

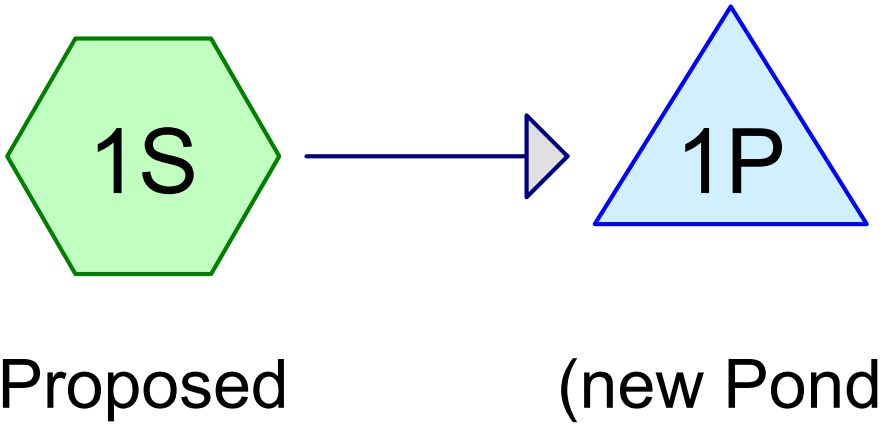


Proposed Runoff



Events for Pond 1P: (new Pond)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-Year	2.28	1.42	633.88	467
2-Year	2.82	1.55	634.02	714
5-Year	3.62	1.76	634.26	1,133
10-Year	4.36	1.96	634.52	1,548
25-Year	5.50	2.21	635.03	2,239
50-Year	6.53	3.96	640.37	**2,857**
100-Year	**7.73**	**8.23**	**664.41**	2,857



Subcat Reach Pond Link

Routing Diagram for 25-4075 proposed
Prepared by Carmina Wood Morris, PC, Printed 6/19/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
2	25-Year	Type II 24-hr		Default	24.00	1	3.84	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
13,068	80	>75% Grass cover, Good, HSG D (1S)
30,492	98	Paved parking, HSG D (1S)
43,560	**93**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
43,560	HSG D	1S
0	Other	
43,560		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	0	13,068	0	13,068	>75% Grass cover, Good	
0	0	0	30,492	0	30,492	Paved parking	
0	**0**	**0**	**43,560**	**0**	**43,560**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1S	0.00	0.00	134.0	0.0200	0.013	0.0	12.0	0.0
2	1P	632.83	631.95	44.0	0.0200	0.013	0.0	8.0	0.0

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=1.000 ac 70.00% Impervious Runoff Depth=2.39"
Flow Length=254' Tc=3.4 min CN=93 Runoff=4.36 cfs 8,669 cf

Pond 1P: (new Pond) Peak Elev=634.52' Storage=1,548 cf Inflow=4.36 cfs 8,669 cf
8.0" Round Culvert n=0.013 L=44.0' S=0.0200 '/' Outflow=1.96 cfs 8,669 cf

Total Runoff Area = 43,560 sf Runoff Volume = 8,669 cf Average Runoff Depth = 2.39"
30.00% Pervious = 13,068 sf 70.00% Impervious = 30,492 sf

Summary for Subcatchment 1S: Proposed

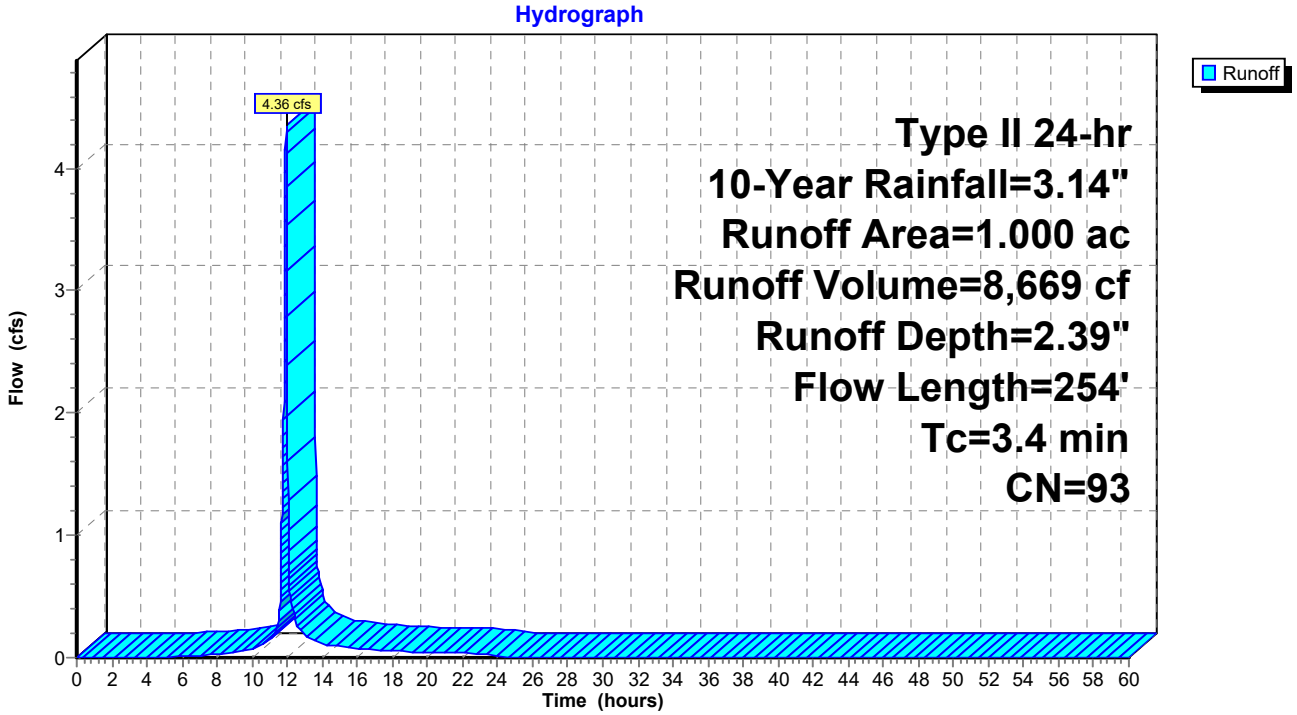
Runoff = 4.36 cfs @ 11.94 hrs, Volume= 8,669 cf, Depth= 2.39"
Routed to Pond 1P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.700	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
1.000	93	Weighted Average
0.300		30.00% Pervious Area
0.700		70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	120	0.0036	0.64		**Sheet Flow, pavement** Smooth surfaces n= 0.011 P2= 2.50"
0.3	134	0.0200	6.42	5.04	**Pipe Channel, 12" pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.4	254	Total			

Subcatchment 1S: Proposed



Summary for Pond 1P: (new Pond)

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 43,560 sf, 70.00% Impervious, Inflow Depth = 2.39" for 10-Year event
Inflow = 4.36 cfs @ 11.94 hrs, Volume= 8,669 cf
Outflow = 1.96 cfs @ 12.02 hrs, Volume= 8,669 cf, Atten= 55%, Lag= 4.9 min
Primary = 1.96 cfs @ 12.02 hrs, Volume= 8,669 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 634.52' @ 12.02 hrs Surf.Area= 2,265 sf Storage= 1,548 cf

Plug-Flow detention time= 3.9 min calculated for 8,668 cf (100% of inflow)
Center-of-Mass det. time= 3.9 min (791.7 - 787.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	633.37'	1,619 cf	**14.83'W x 152.72'L x 2.33'H Field A** 5,286 cf Overall - 1,238 cf Embedded = 4,047 cf x 40.0% Voids
#2A	633.87'	1,238 cf	**ADS_StormTech RC-310 +Cap** x 84 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 84 Chambers in 4 Rows
		2,857 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	632.83'	**8.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 632.83' / 631.95' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.96 cfs @ 12.02 hrs HW=634.52' (Free Discharge)
1=Culvert (Inlet Controls 1.96 cfs @ 5.61 fps)

Pond 1P: (new Pond) - Chamber Wizard Field A

Chamber Model = ADS_StormTechRC-310 +Cap (ADS StormTech®RC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

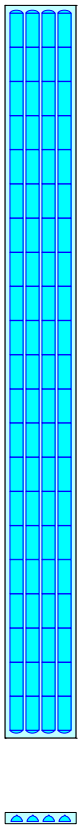
21 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 150.72' Row Length +12.0" End Stone x 2 = 152.72' Base Length
4 Rows x 34.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.83' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

84 Chambers x 14.7 cf = 1,238.3 cf Chamber Storage

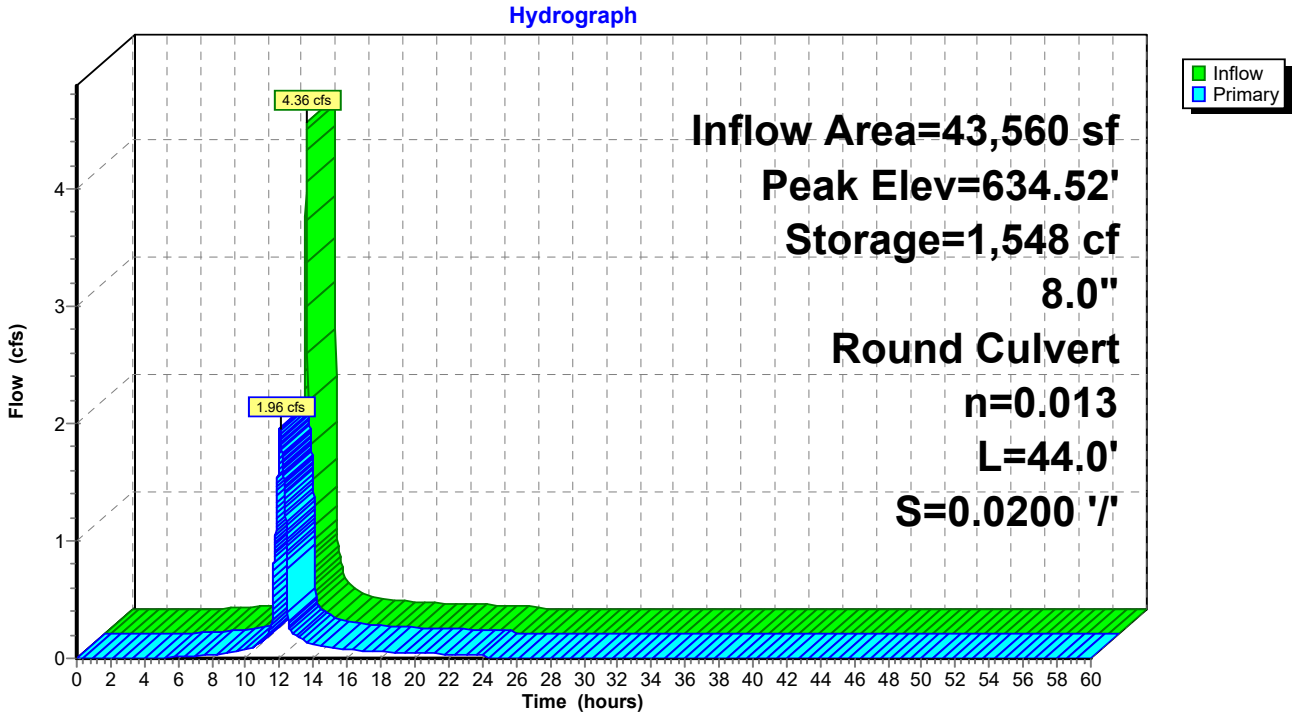
5,285.8 cf Field - 1,238.3 cf Chambers = 4,047.5 cf Stone x 40.0% Voids = 1,619.0 cf Stone Storage

Chamber Storage + Stone Storage = 2,857.3 cf = 0.066 af
Overall Storage Efficiency = 54.1%
Overall System Size = 152.72' x 14.83' x 2.33'

84 Chambers
195.8 cy Field
149.9 cy Stone



Pond 1P: (new Pond)



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=1.000 ac 70.00% Impervious Runoff Depth=3.06"
Flow Length=254' Tc=3.4 min CN=93 Runoff=5.50 cfs 11,123 cf

Pond 1P: (new Pond) Peak Elev=635.03' Storage=2,239 cf Inflow=5.50 cfs 11,123 cf
8.0" Round Culvert n=0.013 L=44.0' S=0.0200 '/' Outflow=2.21 cfs 11,123 cf

Total Runoff Area = 43,560 sf Runoff Volume = 11,123 cf Average Runoff Depth = 3.06"
30.00% Pervious = 13,068 sf 70.00% Impervious = 30,492 sf

Summary for Subcatchment 1S: Proposed

[47] Hint: Peak is 109% of capacity of segment #2

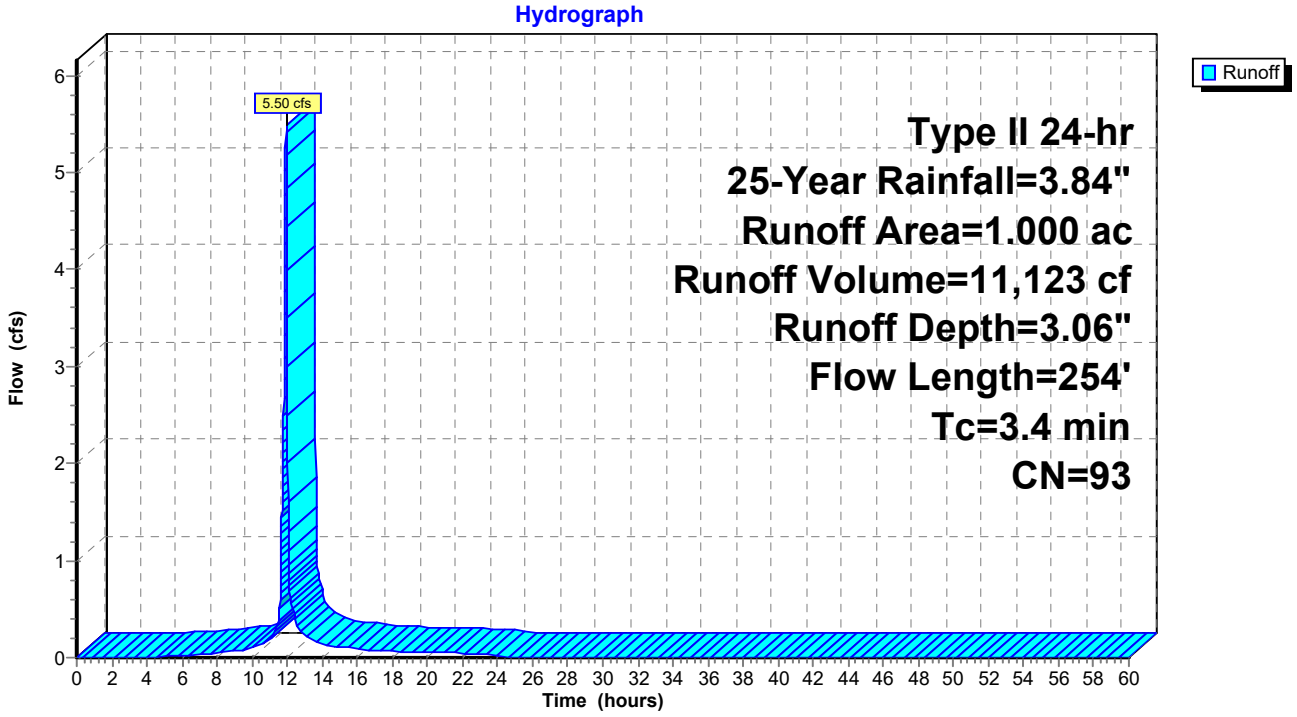
Runoff = 5.50 cfs @ 11.94 hrs, Volume= 11,123 cf, Depth= 3.06"
Routed to Pond 1P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (ac)	CN	Description
0.700	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
1.000	93	Weighted Average
0.300		30.00% Pervious Area
0.700		70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	120	0.0036	0.64		**Sheet Flow, pavement** Smooth surfaces n= 0.011 P2= 2.50"
0.3	134	0.0200	6.42	5.04	**Pipe Channel, 12" pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.4	254	Total			

Subcatchment 1S: Proposed



Summary for Pond 1P: (new Pond)

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 43,560 sf, 70.00% Impervious, Inflow Depth = 3.06" for 25-Year event
Inflow = 5.50 cfs @ 11.94 hrs, Volume= 11,123 cf
Outflow = 2.21 cfs @ 12.03 hrs, Volume= 11,123 cf, Atten= 60%, Lag= 5.2 min
Primary = 2.21 cfs @ 12.03 hrs, Volume= 11,123 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 635.03' @ 12.03 hrs Surf.Area= 2,265 sf Storage= 2,239 cf

Plug-Flow detention time= 5.2 min calculated for 11,122 cf (100% of inflow)
Center-of-Mass det. time= 5.2 min (786.1 - 780.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	633.37'	1,619 cf	**14.83'W x 152.72'L x 2.33'H Field A** 5,286 cf Overall - 1,238 cf Embedded = 4,047 cf x 40.0% Voids
#2A	633.87'	1,238 cf	**ADS_StormTech RC-310 +Cap** x 84 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 84 Chambers in 4 Rows
		2,857 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	632.83'	**8.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 632.83' / 631.95' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=2.21 cfs @ 12.03 hrs HW=635.03' (Free Discharge)
1=Culvert (Barrel Controls 2.21 cfs @ 6.34 fps)

Pond 1P: (new Pond) - Chamber Wizard Field A

Chamber Model = ADS_StormTechRC-310 +Cap (ADS StormTech®RC-310 with cap length)
Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap

34.0" Wide + 6.0" Spacing = 40.0" C-C Row Spacing

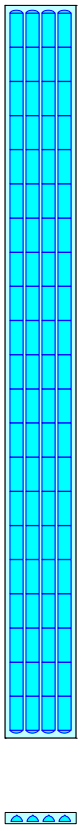
21 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 150.72' Row Length +12.0" End Stone x 2 = 152.72' Base Length
4 Rows x 34.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.83' Base Width
6.0" Stone Base + 16.0" Chamber Height + 6.0" Stone Cover = 2.33' Field Height

84 Chambers x 14.7 cf = 1,238.3 cf Chamber Storage

5,285.8 cf Field - 1,238.3 cf Chambers = 4,047.5 cf Stone x 40.0% Voids = 1,619.0 cf Stone Storage

Chamber Storage + Stone Storage = 2,857.3 cf = 0.066 af
Overall Storage Efficiency = 54.1%
Overall System Size = 152.72' x 14.83' x 2.33'

84 Chambers
195.8 cy Field
149.9 cy Stone



Pond 1P: (new Pond)