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Drainage Analysis

Prepared for:

62 Riverglen Synagogue

Town of Haverstraw
Rockland County, New York

April 2021

Prepared by:

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METHODOLOGY

Brooker Engineering, PLLC has performed a hydraulic and hydrologic analysis for the 62 Riverglen Synagogue project to provide a zero-net increase in peak runoff rates as a result of the proposed development.

The 62 Riverglen Synagogue property is located along Riverglen Drive in the Town of Haverstraw, New York. The project site is comprised of one 1.22-acre tax parcel (1.0 acres after steep slope reductions), located on the westerly side, approximately 100 feet north of the intersection with Dunnigan Drive. The site is currently developed and comprised of a single-family home, macadam driveway, swimming pool, and wooded backyard with a 100 foot wide conservation easement. The existing ground cover on the site consists of woods and grass combination in fair condition with Hydrologic Soil Group C and impervious surfaces consisting of macadam pavement, swimming pool, and roof. The applicant is proposing to renovate and convert the existing structure to a neighborhood Synagogue and construct a 2,520 square foot addition in the rear with a parking lot adjacent to the existing structure and proposed addition.

As can be seen on the drainage maps on pages 6 and 7, the site drains towards the westerly end of the property onto the neighboring property which consists of a large wooded area. The overall drainage pattern will remain unchanged between the pre-development and post-development conditions. All additional runoff attributed from additional impervious surfaces will be captured and routed through the proposed underground stormwater detention facility prior to being discharged into the rear yard. Therefore, a direct comparison between hydrologic models can take place at a single point of interest located at the westerly end of the property.

To offset the increased runoff associated with the new impervious surfaces, an underground stormwater detention facility has been designed. Runoff from the proposed addition and parking lot will be routed to the detention facility via catch basin and pipe network, before it is outlet through an outlet control structure discharging to the rear yard. The detention facility is incorporated into the design to provide the attenuation of peak discharges for the 1, 2, 10, 25 and 100-year storms.

The proposed detention facility will be located southwest of the proposed addition underneath the proposed parking lot. An outlet structure has been designed as part of the detention system to optimize the provided storage and provide zero net increase in peak runoff rates for the proposed development. Deep sumps with pre-treatment hoods are proposed at all catch basins prior to entry to the detention facility to minimize the amount of debris, sediment, and trash entering the detention facility.

Proposed disturbance of 24,728+- square feet is under the threshold (1 acre) required to obtain a New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit for Stormwater Discharges from Construction. Therefore, design criteria such as Water Quality Volume and Runoff Reduction Volumes are not considered in this analysis.

This analysis utilized the HydroCAD Stormwater Modeling program. HydroCAD is a stormwater modeling program that utilizes TR-20 and TR-55 along with hydraulic software to generate accurate hydrologic reports in both small are large watershed areas.

The Soil Conservation Service (SCS), U.S. Department of Agriculture, has developed a soil classification system that relates various drainage characteristics of soil, such as cover type, land use type, and antecedent moisture conditions, to a curve number. Technical Release 55 (TR-55) presents a simplified procedure to calculate storm runoff volume, peak rate of discharge, and hydrographs utilizing the SCS curve numbers. This procedure is applicable in small watersheds, and it is the recommended procedure in the New York State Stormwater Management Design Manual. The HydroCAD Stormwater Modeling computer program incorporates the SCS curve number method outlined in TR-55 as one of the options for calculating runoff hydrographs. Soil restoration and de-compaction shall be performed in accordance with NYSDEC regulations and requirements for all areas that are cut, filled or subject to heavy vehicle traffic.

In this analysis, runoff hydrographs were generated for the 1, 2, 10, 25, and 100-year frequency storms. Times of concentration and composite curve numbers were calculated based upon the methodology contained in the aforementioned SCS publication TR-55, Urban Hydrology for Small Watersheds. Runoff hydrographs were then generated utilizing the SCS curve number method within the HydroCAD computer program, and the NRCC Extreme Precipitation Tables.

The attached tables summarize the results of the stormwater detention analysis. Also attached are backup calculations, input data, and HydroCAD computer output.

SUMMARY TABLE 1

PEAK DISCHARGE FROM THE PROJECT SITE

PEAK DISCHARGE (CFS)

FREQUENCY	EXISTING CONDITIONS	PROPOSED CONDITIONS	DIFFERENCE
1 YEAR	1.31	1.22	-0.09
2 YEAR	1.95	1.84	-0.11
10 YEAR	3.91	3.71	-0.20
25 YEAR	5.51	5.39	-0.12
100 YEAR	8.88	8.59	-0.29

NRCC 24 Hour Rainfall

Frequency	Rainfall (inches)
1 Year	2.75
2 Year	3.36
10 Year	5.03
25 Year	6.33
100 Year	9.00

Location Map

Hydro-CAD Input Data

Pre-Development Drainage Areas

Existing Drainage Area:

DA 1: Existing Conditions
Cover Type: Woods/Grass Combo, Fair, HSG C;
Impervious Areas; Roof, Paved Driveway, Paver Walk, Patio, and Swimming Pool
Area (A) = 1.22 acres
Hydrologic Soil Group: C
SCS curve number (CN) =78
Time of Concentration = 6 minutes = 0.1 hour

Total Area = 1.22 acres

Post-Development Drainage Areas

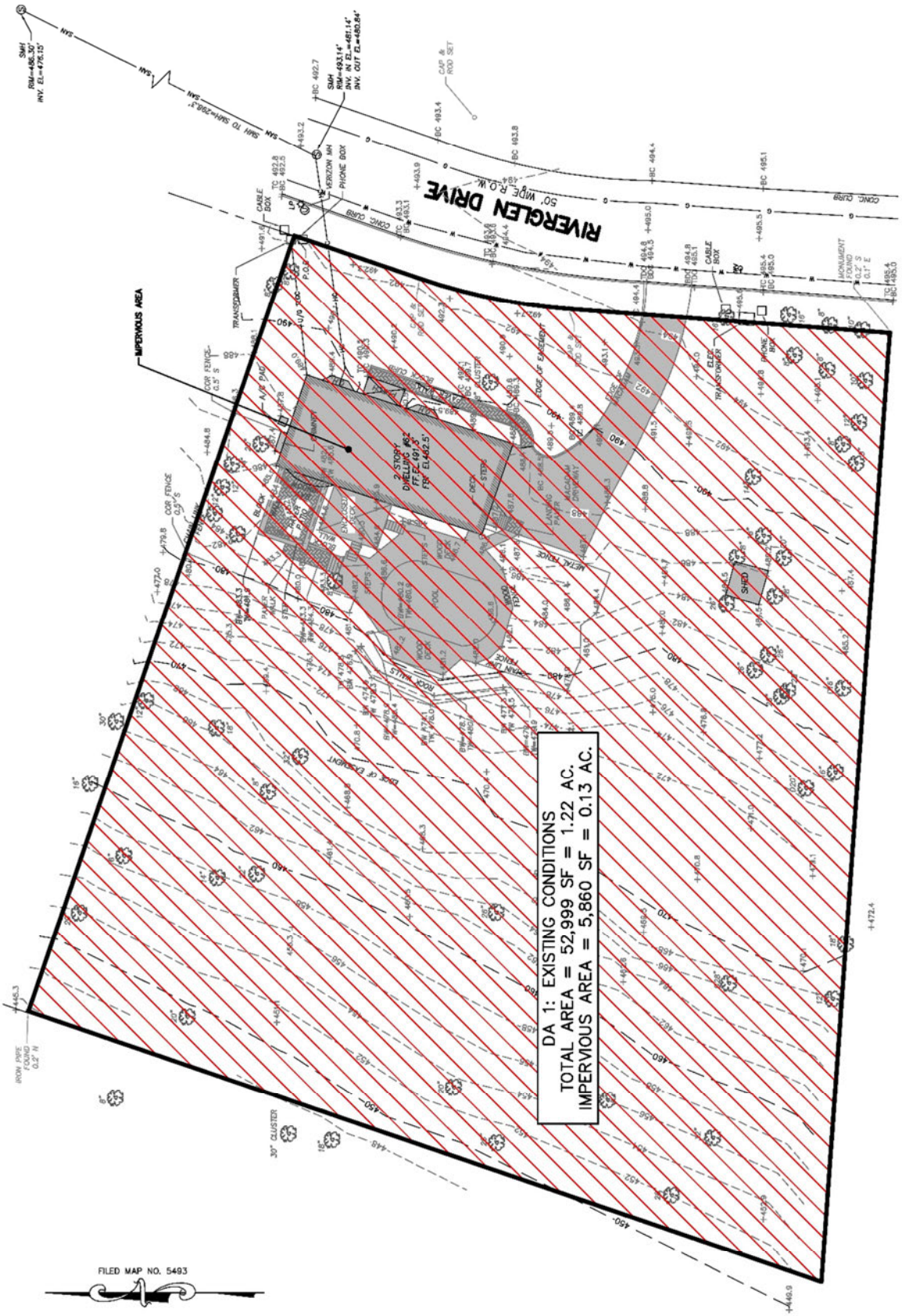
Detained Drainage Area A:

DA 1: Detained: To Detention Facility
Cover Type: Impervious Areas; Roof and Paved Parking
Area (A) = 0.25 acres
Hydrologic Soil Group: N/A
SCS curve number (CN) =98
Time of Concentration = 6 minutes = 0.1 hour

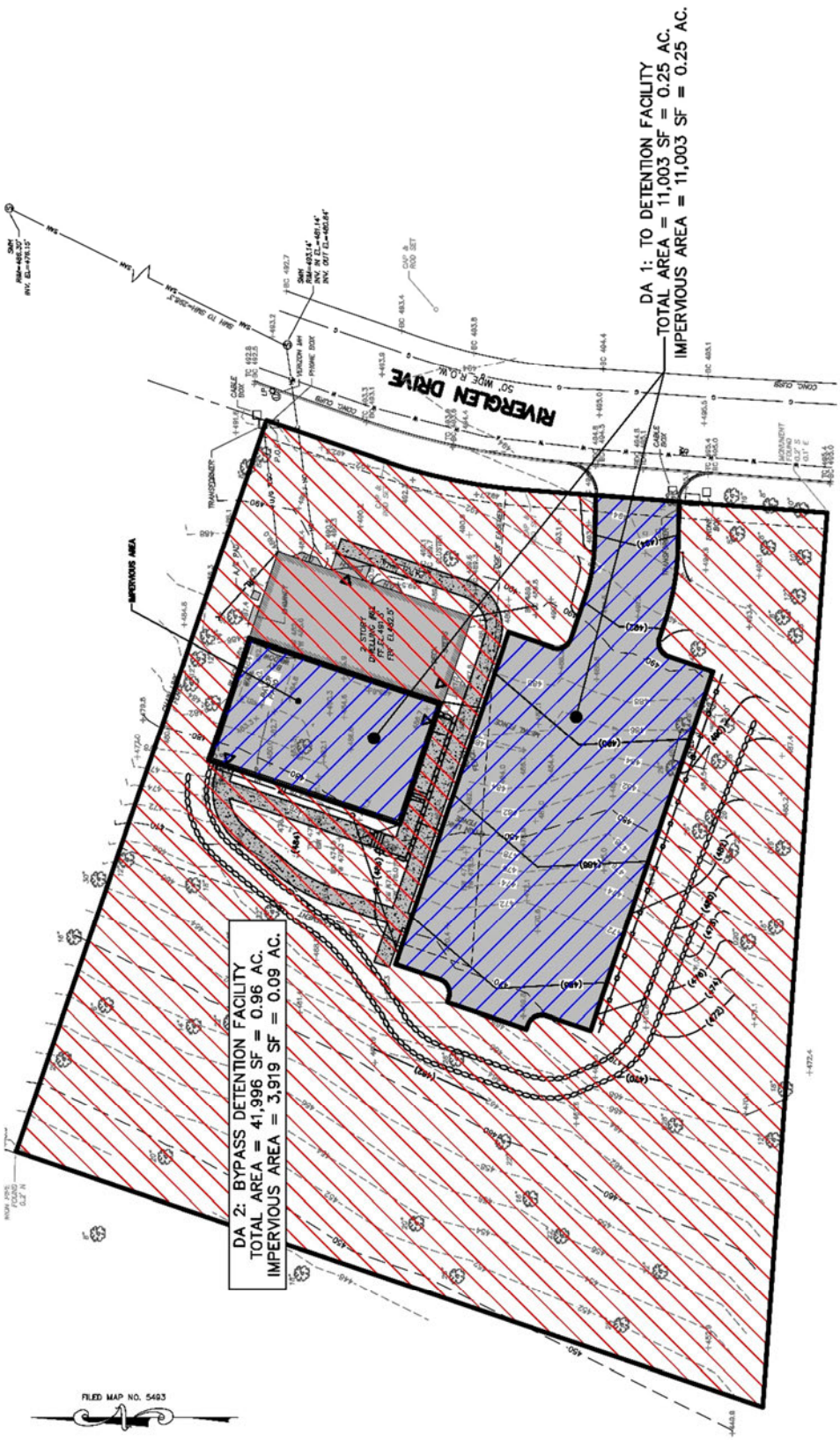
DA 2: Bypass Detention Facility
Cover Type: Woods/Grass Combo, Fair, HSG C;
Impervious Areas; Roof, and Concrete Walk
Area (A) = 0.96 acres
Hydrologic Soil Group: C
SCS curve number (CN) =78
Time of Concentration = 6 minutes = 0.1 hour

Total Area = 1.22 acres

EXISTING CONDITIONS DRAINAGE MAP

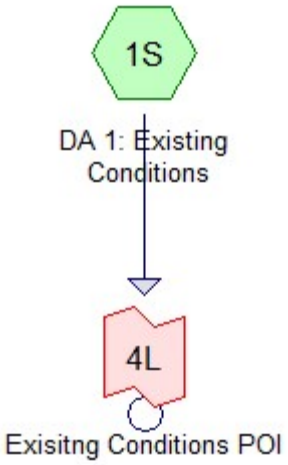


PROPOSED CONDITIONS DRAINAGE MAP

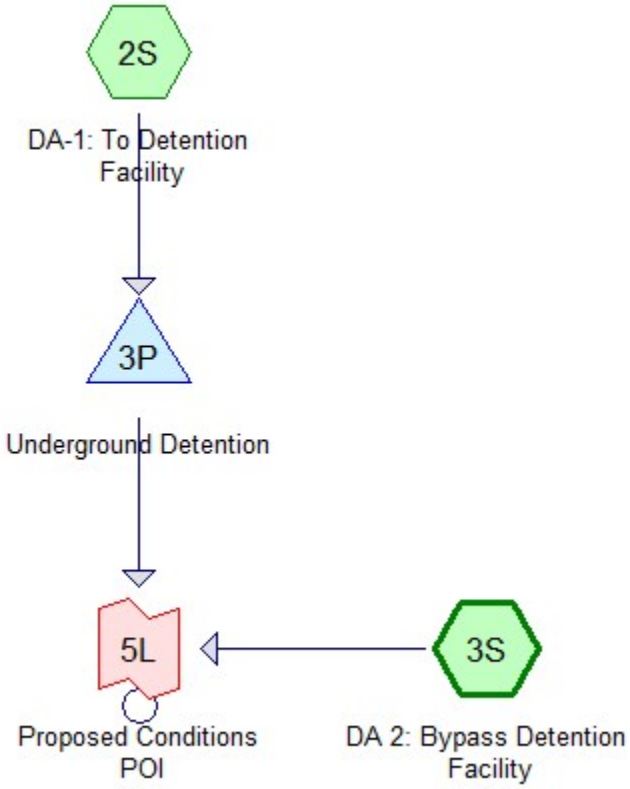


Routing Diagrams

Existing Conditions



Proposed Conditions



Proposed Stormwater Management System

ADS StormTech Detention:

The stormwater detention facility is comprised of 9 rows of 4 StormTech SC-310 arch chambers incased in a crushed stone envelope. The facility measures approximately 32.7’ x 32.5’ and provides approximately 1,310 cubic feet of stormwater storage. The system has been designed to mitigate peak runoff rates and does not provide water quality treatment capacity.

Storage Volumes provided from HydroCAD Output:

Storage Volume

Chamber Storage = 1,310 cf = 0.030 af
Overall System Size = 32.68' x 32.50’ x 2.33'

Outlet Structure

Orifice
(1) 5” diameter orifice @ invert 481.90
(1) 10”W x 4” H orifice @ invert 482.50

Check wall emergency overflow weir
Weir width = 4’ (48 inches)
Elevation = 483.23

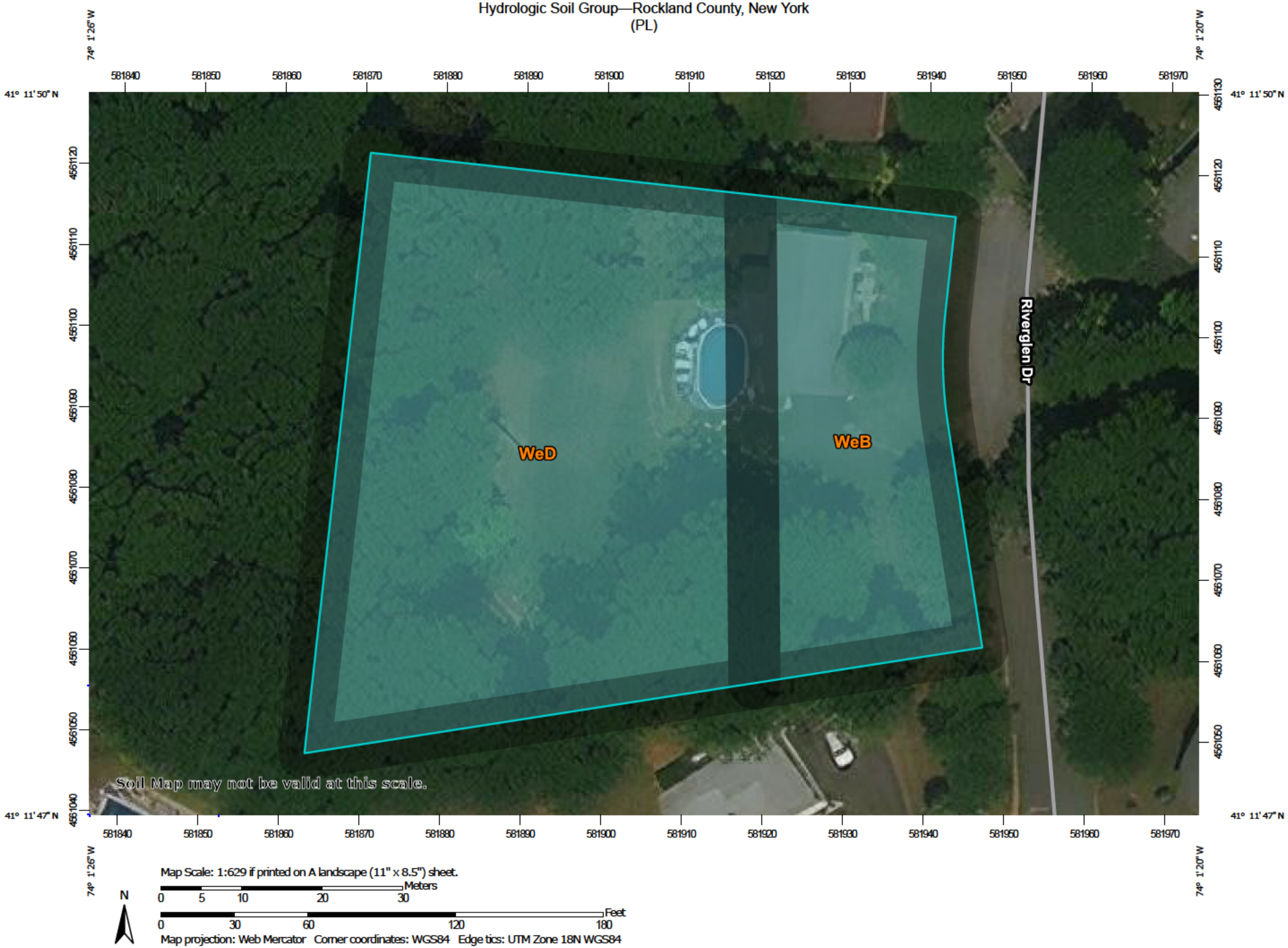
Soil Tests

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey of Rockland County, the soils on the project site are predominately Wethersfield gravelly silt loam, 3 to 8 percent slopes and 15-25 percent slopes, (WeB and WeD – Hydrologic Soil Group C).

Appendix A

USDA Soil Report

Hydrologic Soil Group—Rockland County, New York
(PL)



Map Scale: 1:629 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 5 10 20 30

Feet
0 30 60 120 180

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
- 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 1:24,000.

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: Rockland County, New York
Survey Area Data: Version 18, Jun 11, 2020

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WeB	Wethersfield gravelly silt loam, 3 to 8 percent slopes	C	0.4	29.5%
WeD	Wethersfield gravelly silt loam, 15 to 25 percent slope s	C	0.9	70.5%
Totals for Area of Interest			**1.2**	**100.0%**

Description

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.

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.

Rating Options

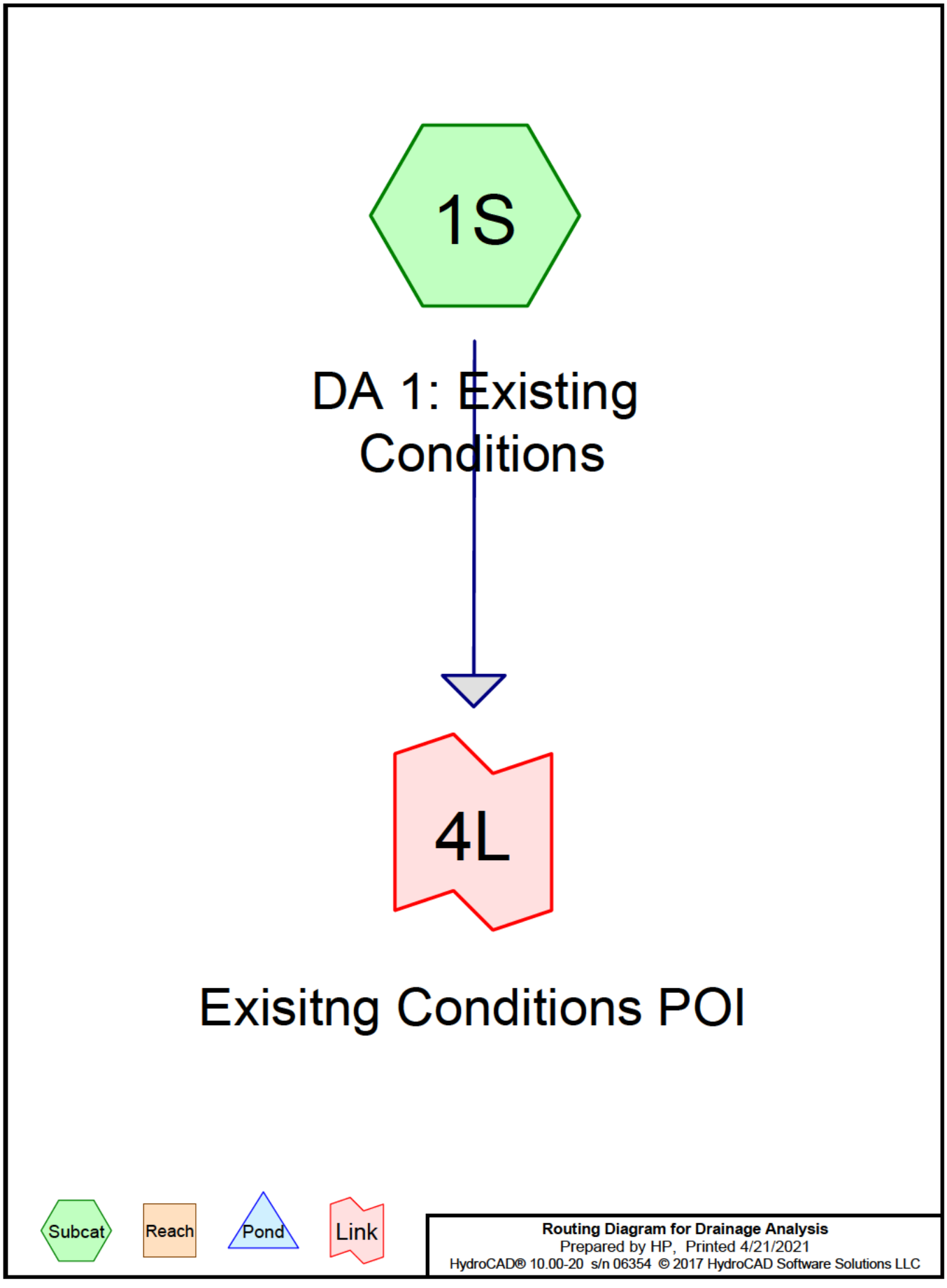
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix B

Existing Conditions
Detailed HydroCAD Output Report


1S
DA 1: Existing Conditions
4L
Exisitng Conditions POI
Subcat
Reach
Pond
Link
Routing Diagram for Drainage Analysis
Prepared by HP, Printed 4/21/2021
HydroCAD® 10.00-20 s/n 06354 © 2017 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.135	98	Impervious Areas; Roof, Paved Driveway, Paver Walk, Patios, and Swimming Pool (1S)
1.082	76	Woods/grass comb., Fair, HSG C (1S)
1.217	**78**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.082	HSG C	1S
0.000	HSG D	
0.135	Other	1S
1.217		**TOTAL AREA**

Summary for Subcatchment 1S: DA 1: Existing Conditions

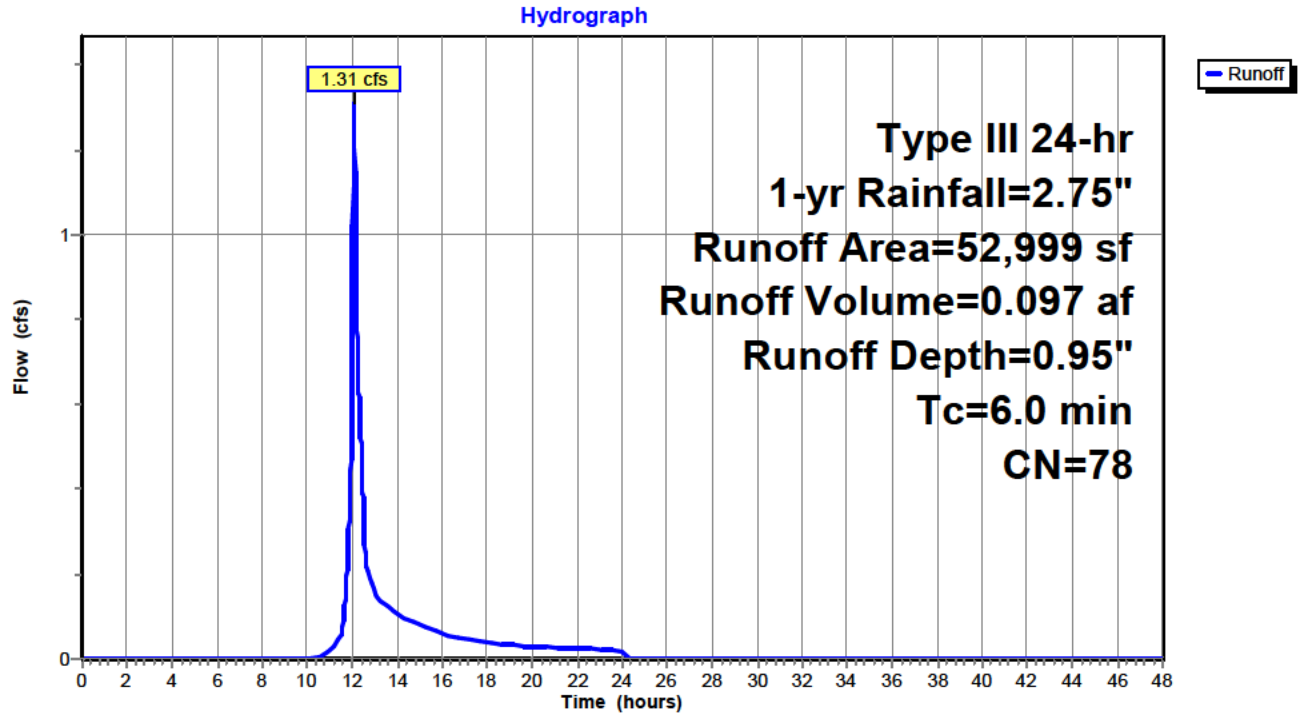
Runoff = 1.31 cfs @ 12.09 hrs, Volume= 0.097 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	5,860	98	Impervious Areas; Roof, Paved Driveway, Paver Walk, Patios, and Swimming Pool
	47,139	76	Woods/grass comb., Fair, HSG C
	52,999	78	Weighted Average
	47,139		88.94% Pervious Area
	5,860		11.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 1S: DA 1: Existing Conditions

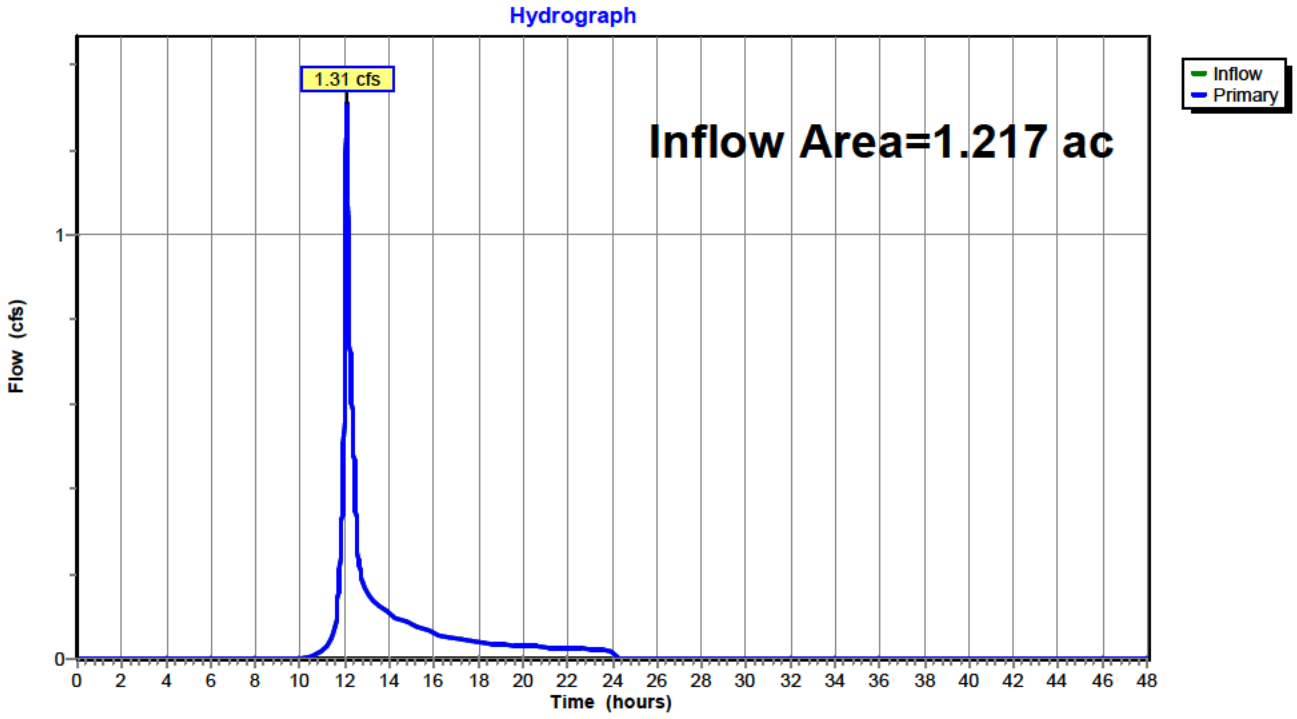


Summary for Link 4L: Exisitng Conditions POI

Inflow Area = 1.217 ac, 11.06% Impervious, Inflow Depth = 0.95" for 1-yr event
Inflow = 1.31 cfs @ 12.09 hrs, Volume= 0.097 af
Primary = 1.31 cfs @ 12.09 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 4L: Exisitng Conditions POI



Summary for Subcatchment 1S: DA 1: Existing Conditions

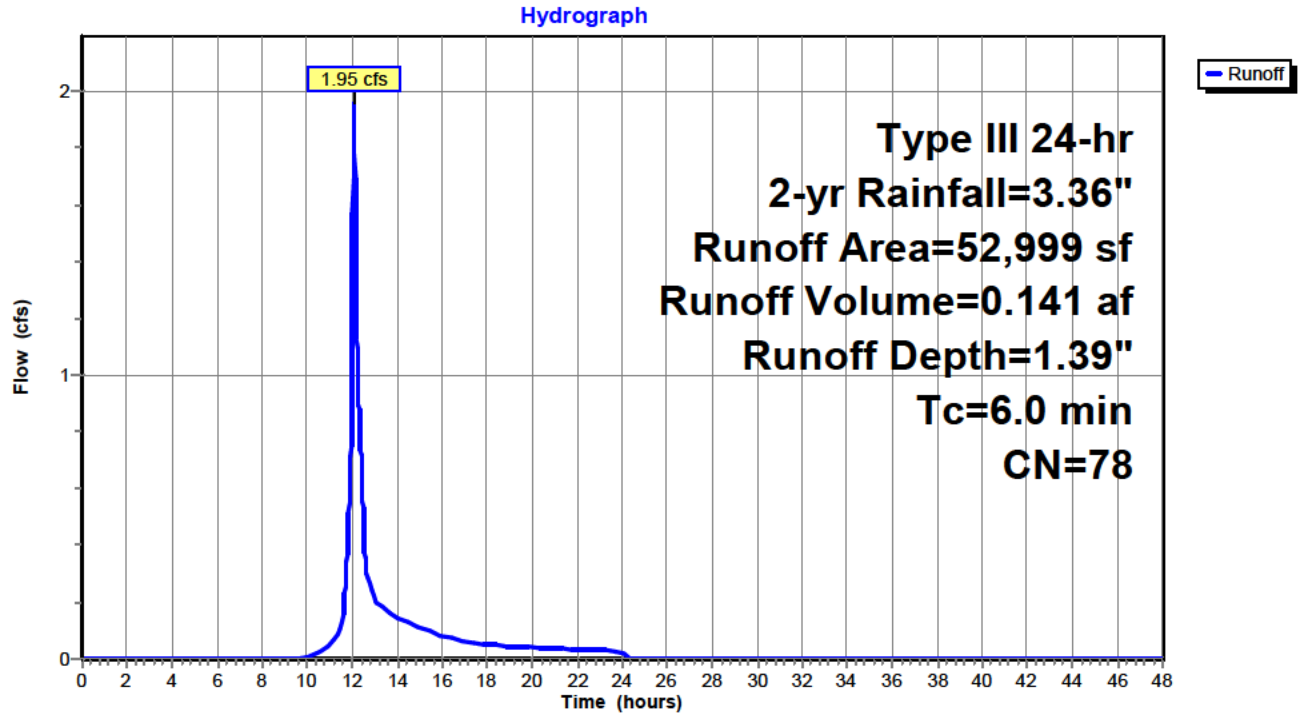
Runoff = 1.95 cfs @ 12.09 hrs, Volume= 0.141 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.36"

	Area (sf)	CN	Description
*	5,860	98	Impervious Areas; Roof, Paved Driveway, Paver Walk, Patios, and Swimming Pool
	47,139	76	Woods/grass comb., Fair, HSG C
	52,999	78	Weighted Average
	47,139		88.94% Pervious Area
	5,860		11.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 1S: DA 1: Existing Conditions

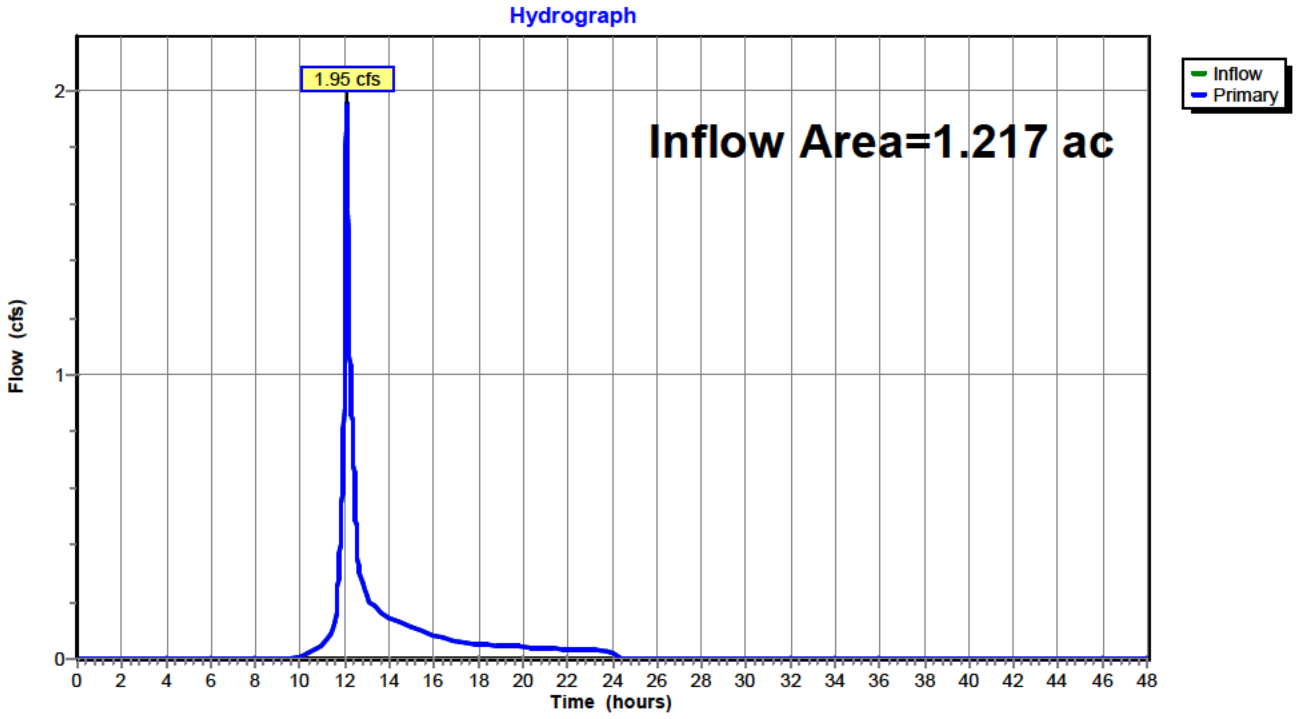


Summary for Link 4L: Exisitng Conditions POI

Inflow Area = 1.217 ac, 11.06% Impervious, Inflow Depth = 1.39" for 2-yr event
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 0.141 af
Primary = 1.95 cfs @ 12.09 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 4L: Exisitng Conditions POI



Summary for Subcatchment 1S: DA 1: Existing Conditions

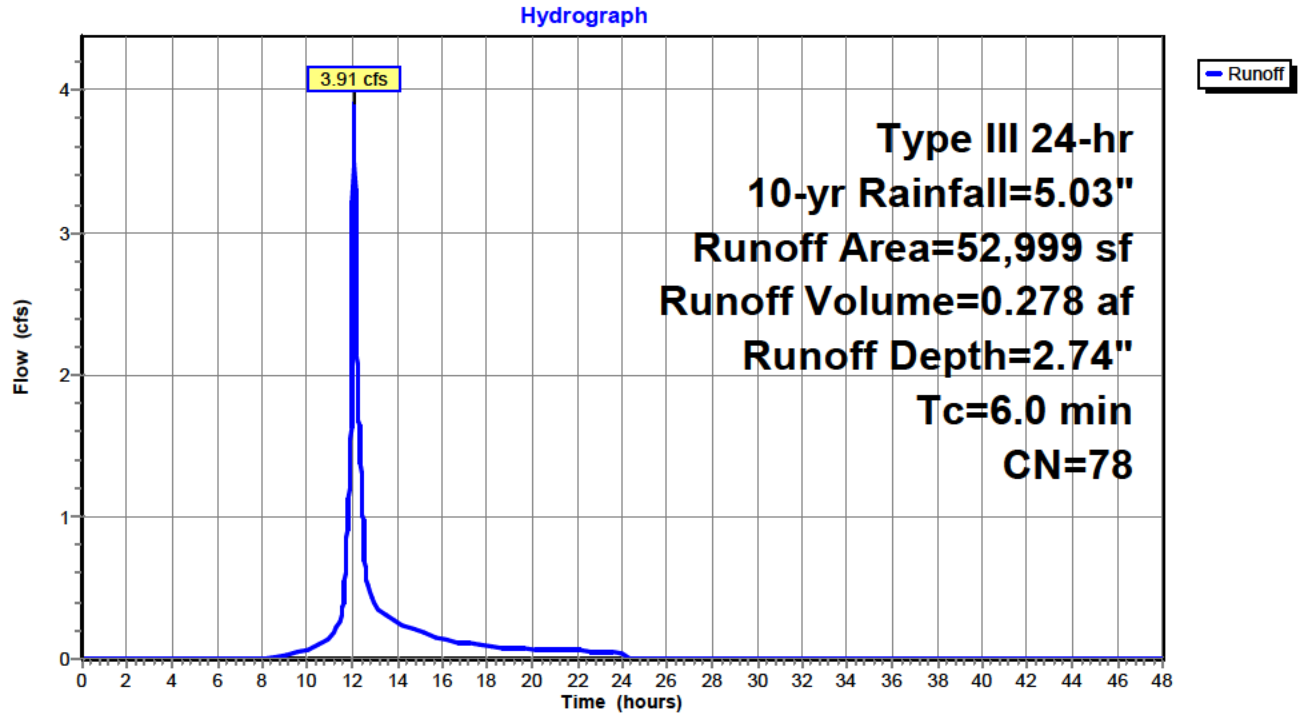
Runoff = 3.91 cfs @ 12.09 hrs, Volume= 0.278 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.03"

	Area (sf)	CN	Description
*	5,860	98	Impervious Areas; Roof, Paved Driveway, Paver Walk, Patios, and Swimming Pool
	47,139	76	Woods/grass comb., Fair, HSG C
	52,999	78	Weighted Average
	47,139		88.94% Pervious Area
	5,860		11.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 1S: DA 1: Existing Conditions

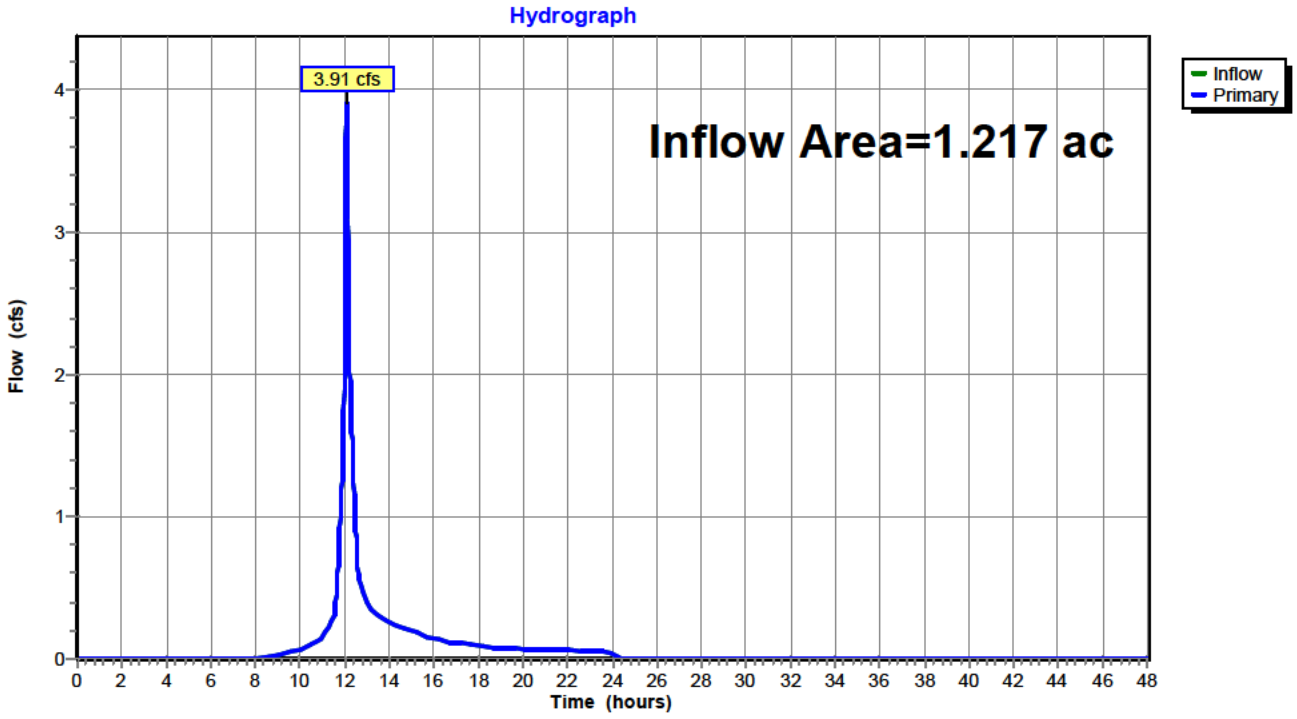


Summary for Link 4L: Exisitng Conditions POI

Inflow Area = 1.217 ac, 11.06% Impervious, Inflow Depth = 2.74" for 10-yr event
Inflow = 3.91 cfs @ 12.09 hrs, Volume= 0.278 af
Primary = 3.91 cfs @ 12.09 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 4L: Exisitng Conditions POI



Summary for Subcatchment 1S: DA 1: Existing Conditions

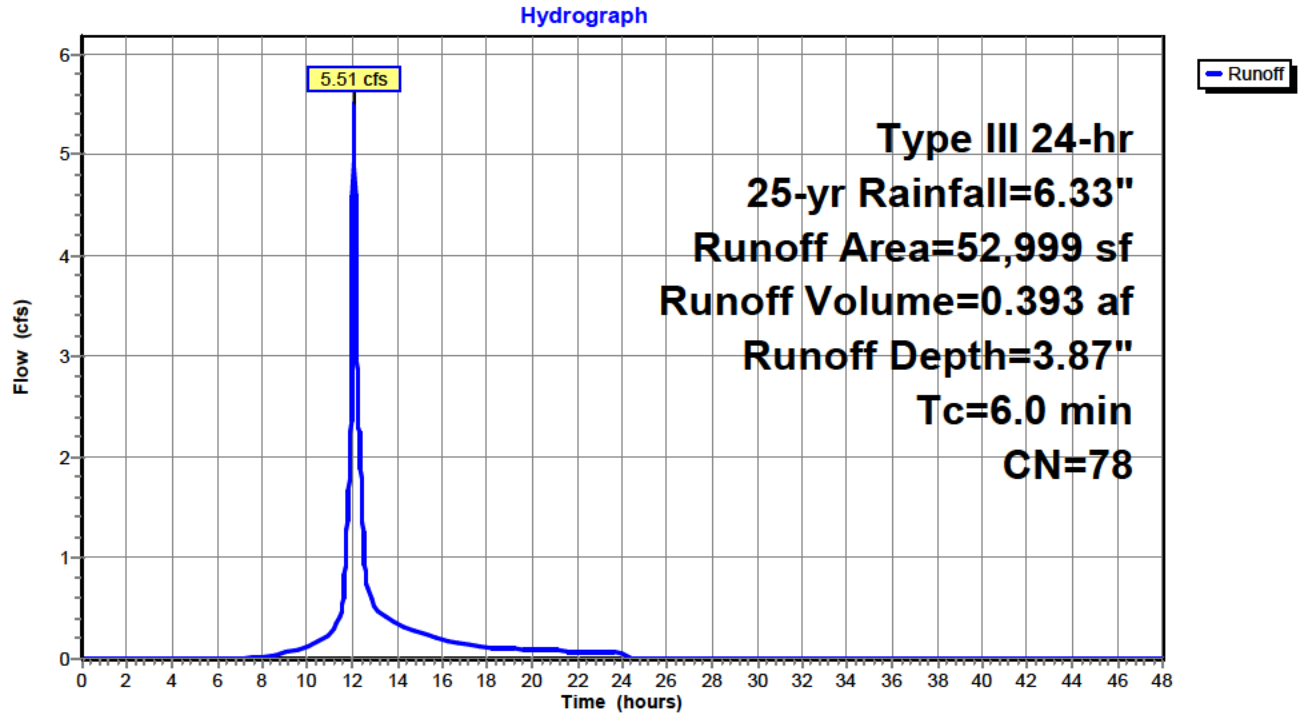
Runoff = 5.51 cfs @ 12.09 hrs, Volume= 0.393 af, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.33"

	Area (sf)	CN	Description
*	5,860	98	Impervious Areas; Roof, Paved Driveway, Paver Walk, Patios, and Swimming Pool
	47,139	76	Woods/grass comb., Fair, HSG C
	52,999	78	Weighted Average
	47,139		88.94% Pervious Area
	5,860		11.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 1S: DA 1: Existing Conditions

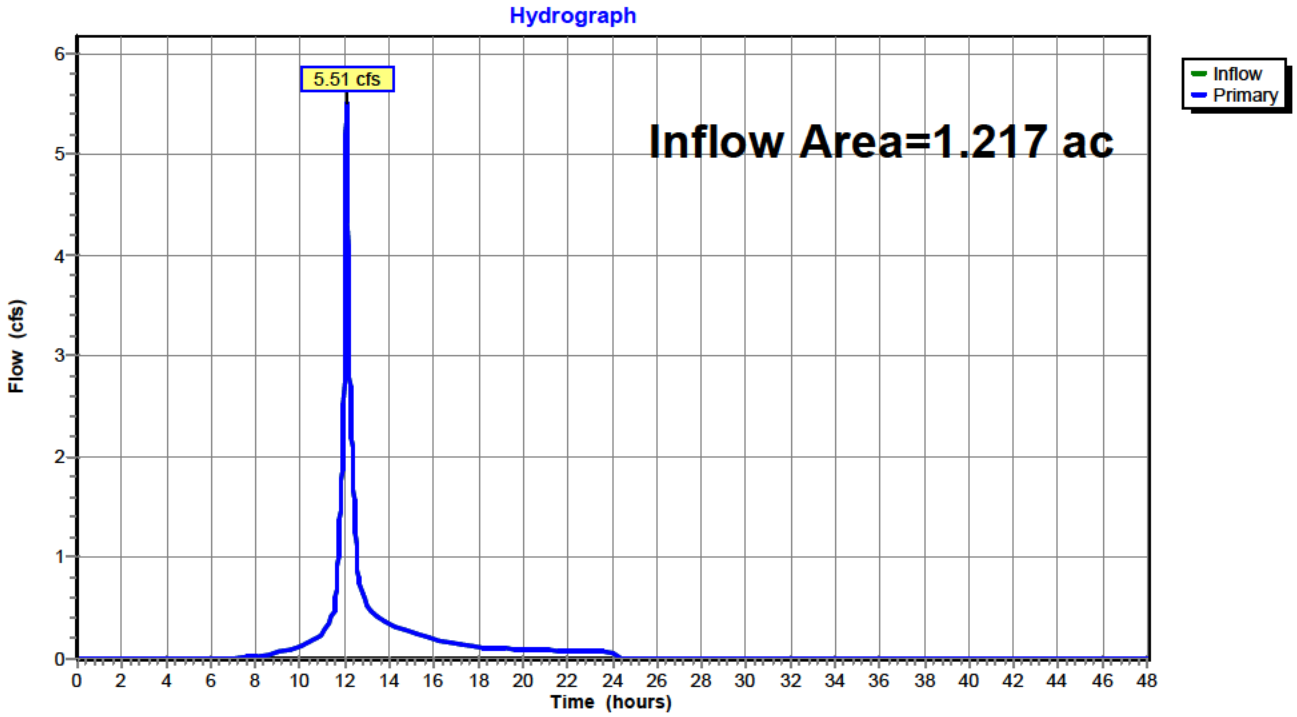


Summary for Link 4L: Exisitng Conditions POI

Inflow Area = 1.217 ac, 11.06% Impervious, Inflow Depth = 3.87" for 25-yr event
Inflow = 5.51 cfs @ 12.09 hrs, Volume= 0.393 af
Primary = 5.51 cfs @ 12.09 hrs, Volume= 0.393 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 4L: Exisitng Conditions POI



Summary for Subcatchment 1S: DA 1: Existing Conditions

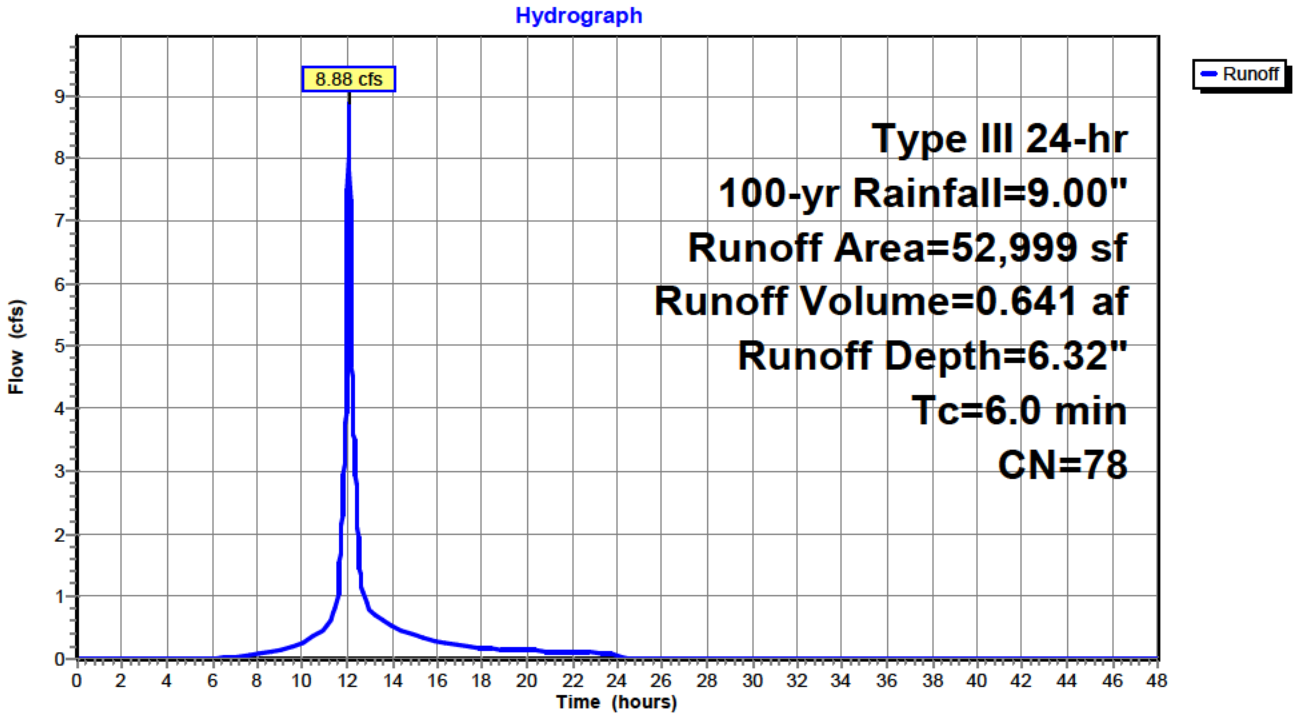
Runoff = 8.88 cfs @ 12.09 hrs, Volume= 0.641 af, Depth= 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.00"

	Area (sf)	CN	Description
*	5,860	98	Impervious Areas; Roof, Paved Driveway, Paver Walk, Patios, and Swimming Pool
	47,139	76	Woods/grass comb., Fair, HSG C
	52,999	78	Weighted Average
	47,139		88.94% Pervious Area
	5,860		11.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 1S: DA 1: Existing Conditions

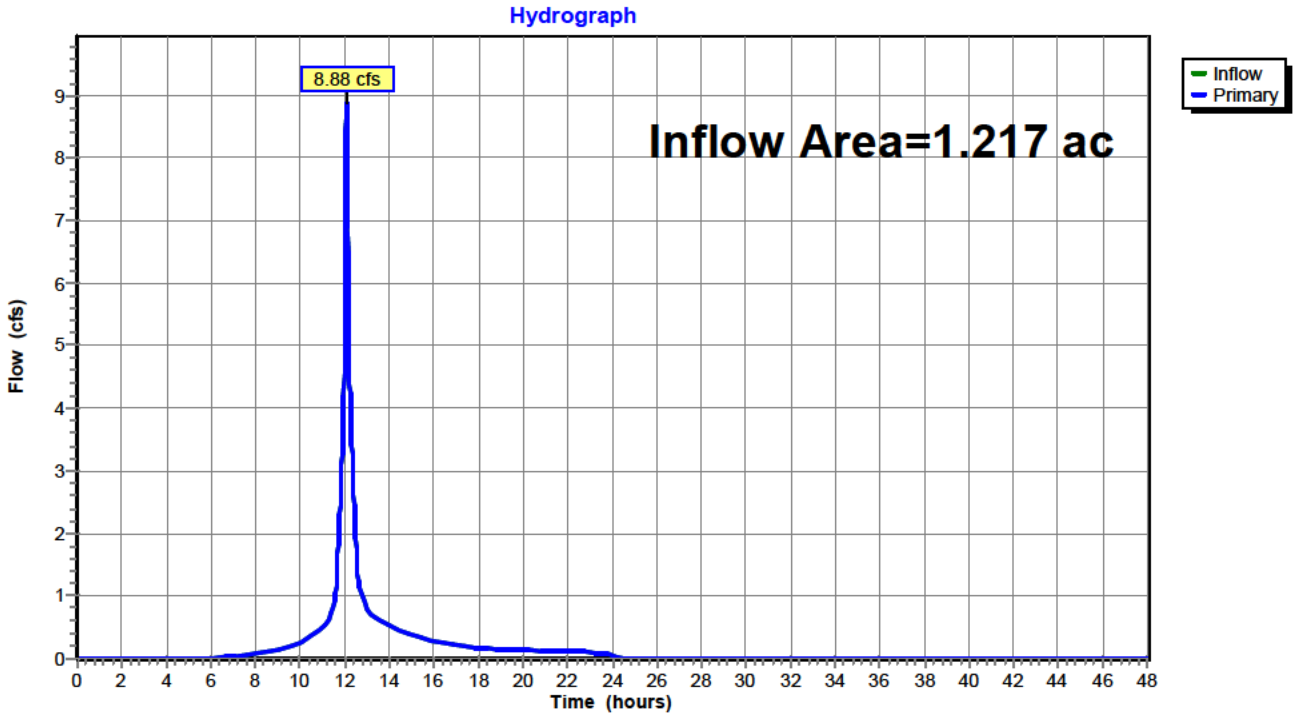


Summary for Link 4L: Exisitng Conditions POI

Inflow Area = 1.217 ac, 11.06% Impervious, Inflow Depth = 6.32" for 100-yr event
Inflow = 8.88 cfs @ 12.09 hrs, Volume= 0.641 af
Primary = 8.88 cfs @ 12.09 hrs, Volume= 0.641 af, Atten= 0%, Lag= 0.0 min

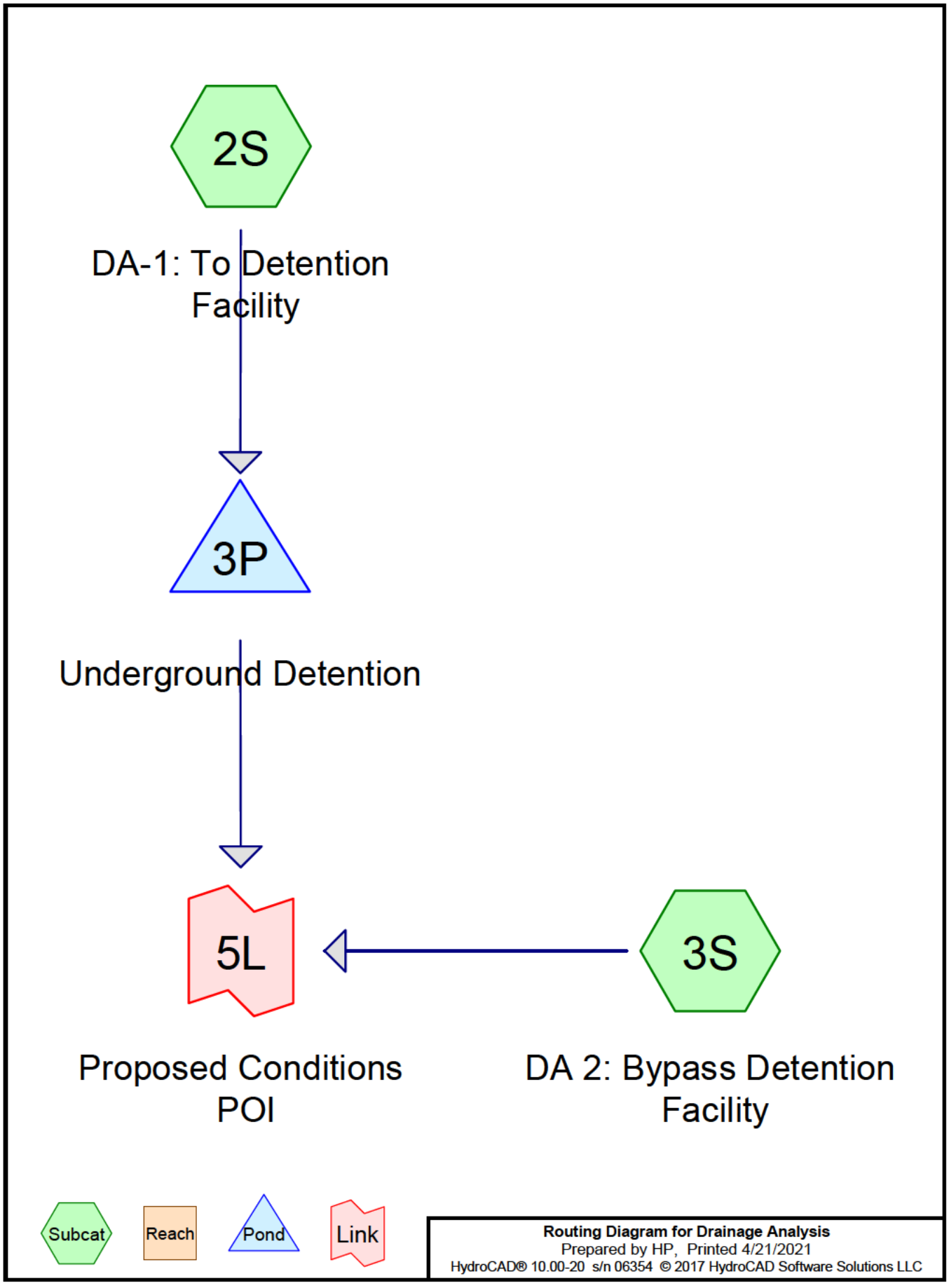
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 4L: Exisitng Conditions POI



Appendix C

Proposed Conditions
Detailed HydroCAD Output Report


2S
DA-1: To Detention Facility
3P
Underground Detention
5L
3S
Proposed Conditions POI
DA 2: Bypass Detention Facility
Subcat
Reach
Pond
Link
Routing Diagram for Drainage Analysis
Prepared by HP, Printed 4/21/2021
HydroCAD® 10.00-20 s/n 06354 © 2017 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.253	98	Impervious; Roof and Paved parking (2S)
0.090	98	Impervious; Roof, Concrete walk, and Paved parking (3S)
0.874	76	Woods/grass comb., Fair, HSG C (3S)
1.217	**82**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.874	HSG C	3S
0.000	HSG D	
0.343	Other	2S, 3S
1.217		**TOTAL AREA**

Summary for Subcatchment 2S: DA-1: To Detention Facility

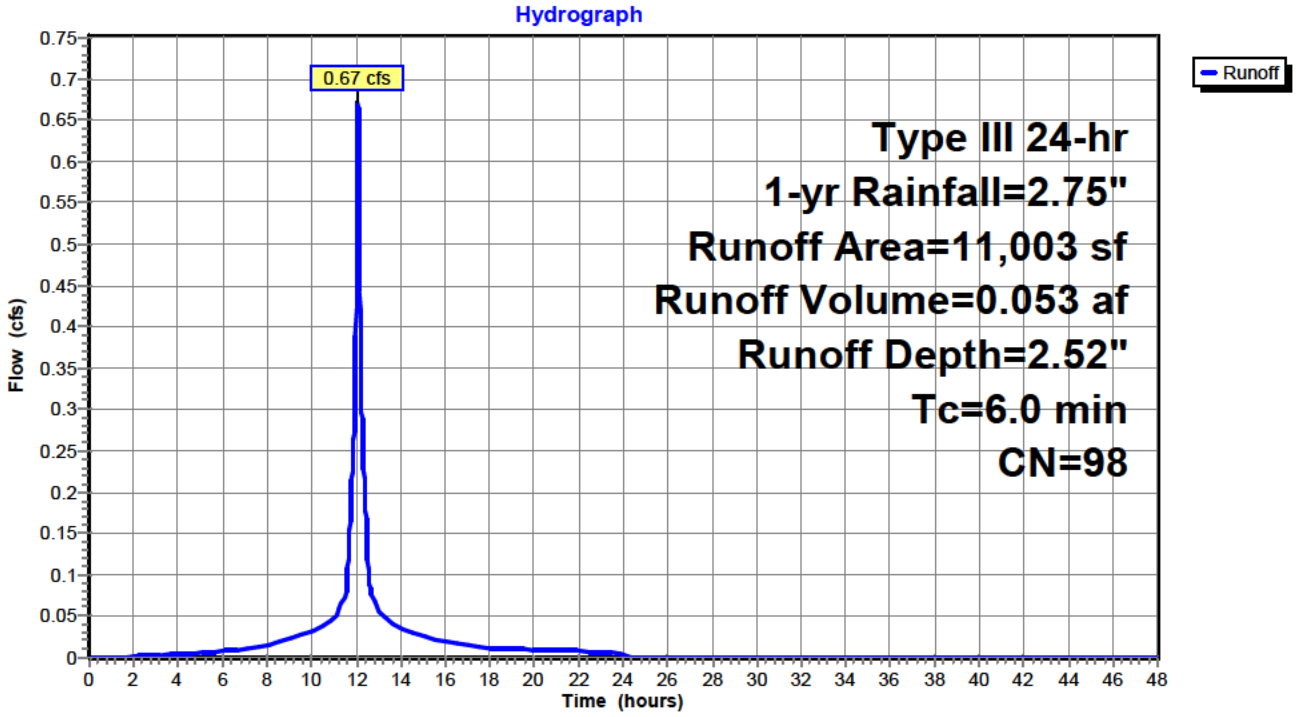
Runoff = 0.67 cfs @ 12.08 hrs, Volume= 0.053 af, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	11,003	98	Impervious; Roof and Paved parking
	11,003		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 2S: DA-1: To Detention Facility



Summary for Subcatchment 3S: DA 2: Bypass Detention Facility

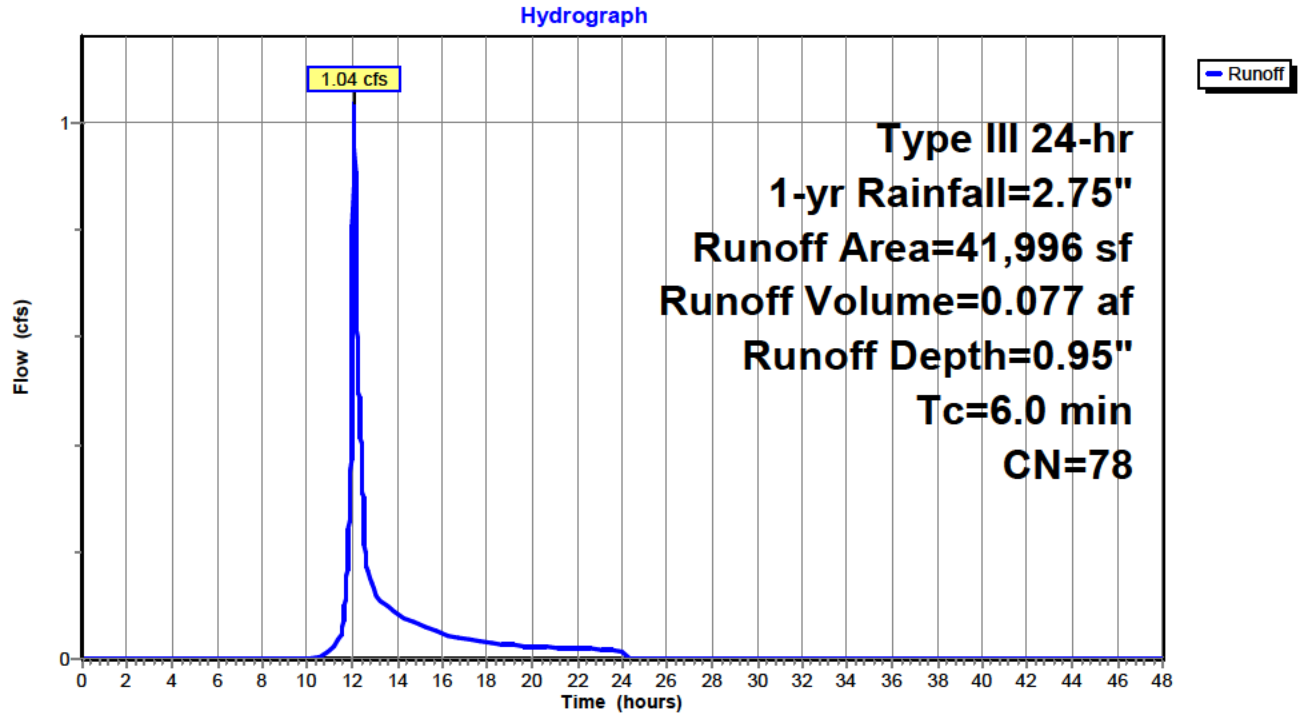
Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.077 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	3,919	98	Impervious; Roof, Concrete walk, and Paved parking
	38,077	76	Woods/grass comb., Fair, HSG C
	41,996	78	Weighted Average
	38,077		90.67% Pervious Area
	3,919		9.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 3S: DA 2: Bypass Detention Facility



Summary for Pond 3P: Underground Detention

Inflow Area = 0.253 ac,100.00% Impervious, Inflow Depth = 2.52" for 1-yr event
Inflow = 0.67 cfs @ 12.08 hrs, Volume= 0.053 af
Outflow = 0.33 cfs @ 12.22 hrs, Volume= 0.053 af, Atten= 50%, Lag= 8.5 min
Discarded = 0.05 cfs @ 12.22 hrs, Volume= 0.039 af
Primary = 0.28 cfs @ 12.22 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 482.29' @ 12.22 hrs Surf.Area= 0.024 ac Storage= 0.012 af

Plug-Flow detention time= 30.3 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 30.3 min (790.0 - 759.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	481.40'	0.018 af	**32.50'W x 32.68'L x 2.33'H Field A** 0.057 af Overall - 0.012 af Embedded = 0.045 af x 40.0% Voids
#2A	481.90'	0.012 af	**ADS_StormTech SC-310 +Cap** x 36 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 9 Rows of 4 Chambers
		0.030 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	481.40'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 470.00'
#2	Primary	481.90'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	482.50'	**10.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	483.23'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 4.00 Width (feet) 4.00 4.00

Discarded OutFlow Max=0.05 cfs @ 12.22 hrs HW=482.29' (Free Discharge)
└**1=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.28 cfs @ 12.22 hrs HW=482.29' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 2.13 fps)
├**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 3P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-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

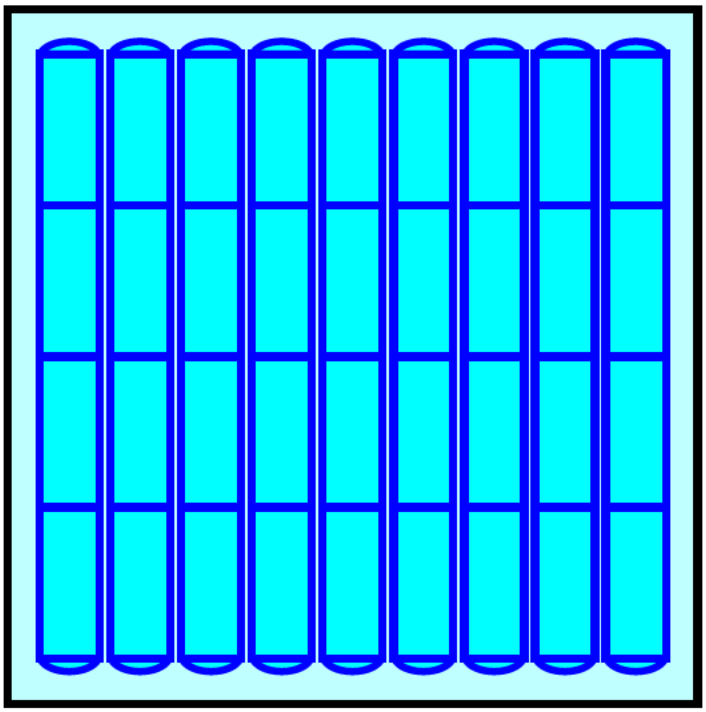
4 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 29.68' Row Length +18.0" End Stone x 2 = 32.68' Base Length
9 Rows x 34.0" Wide + 6.0" Spacing x 8 + 18.0" Side Stone x 2 = 32.50' Base Width
6.0" Base + 16.0" Chamber Height + 6.0" Cover = 2.33' Field Height

36 Chambers x 14.7 cf = 530.7 cf Chamber Storage

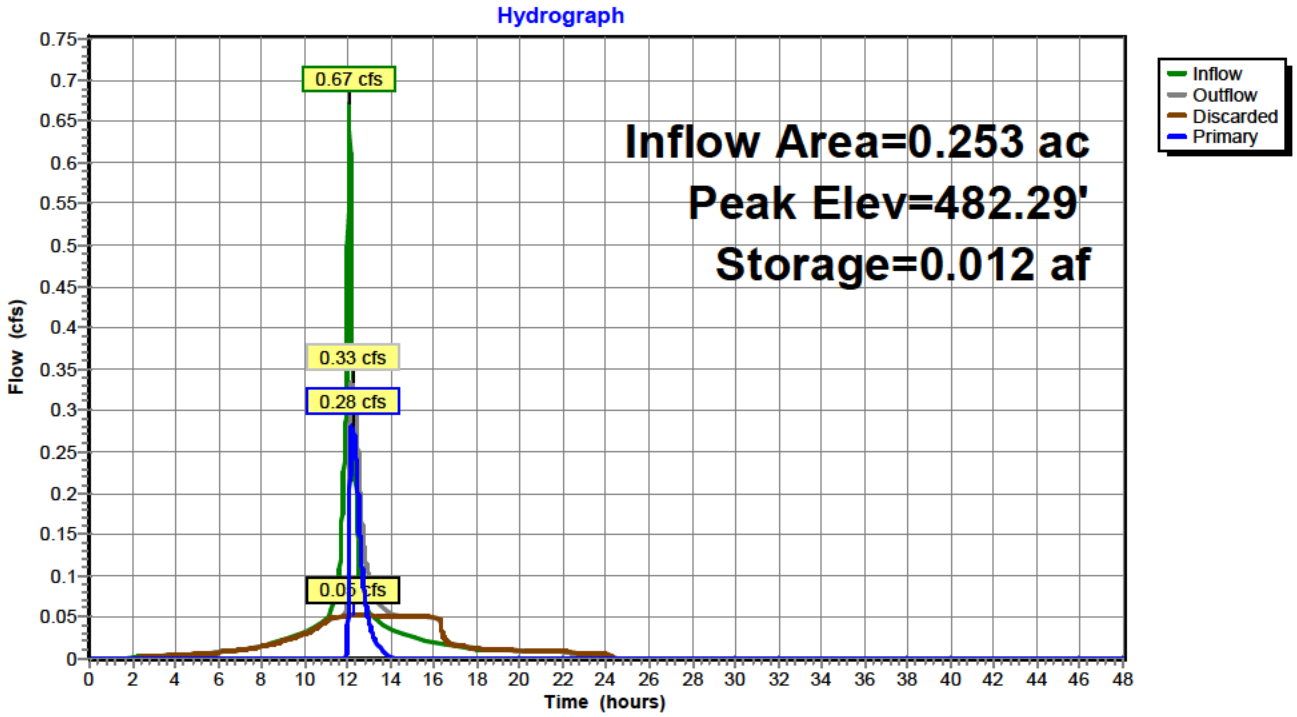
2,478.2 cf Field - 530.7 cf Chambers = 1,947.5 cf Stone x 40.0% Voids = 779.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,309.7 cf = 0.030 af
Overall Storage Efficiency = 52.8%
Overall System Size = 32.68' x 32.50' x 2.33'

36 Chambers
91.8 cy Field
72.1 cy Stone



Pond 3P: Underground Detention

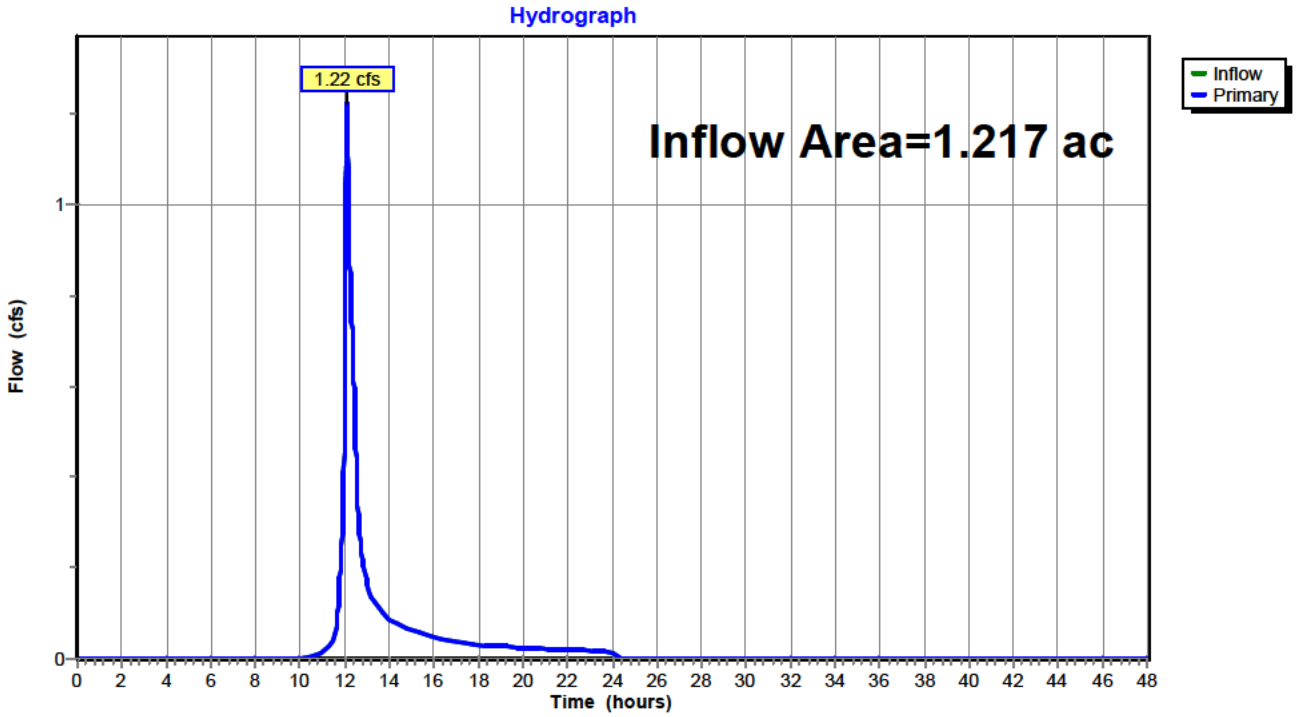


Summary for Link 5L: Proposed Conditions POI

Inflow Area = 1.217 ac, 28.16% Impervious, Inflow Depth = 0.90" for 1-yr event
Inflow = 1.22 cfs @ 12.11 hrs, Volume= 0.091 af
Primary = 1.22 cfs @ 12.11 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 5L: Proposed Conditions POI



Summary for Subcatchment 2S: DA-1: To Detention Facility

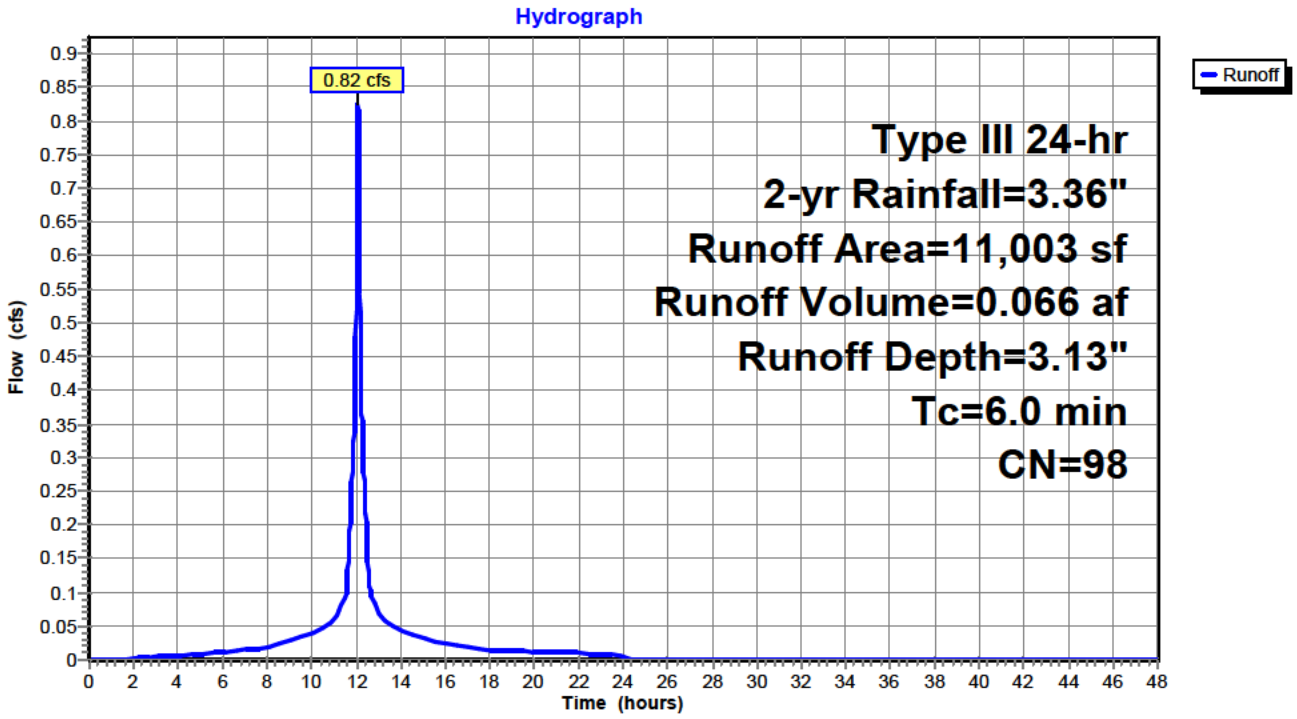
Runoff = 0.82 cfs @ 12.08 hrs, Volume= 0.066 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.36"

	Area (sf)	CN	Description
*	11,003	98	Impervious; Roof and Paved parking
	11,003		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 2S: DA-1: To Detention Facility



Summary for Subcatchment 3S: DA 2: Bypass Detention Facility

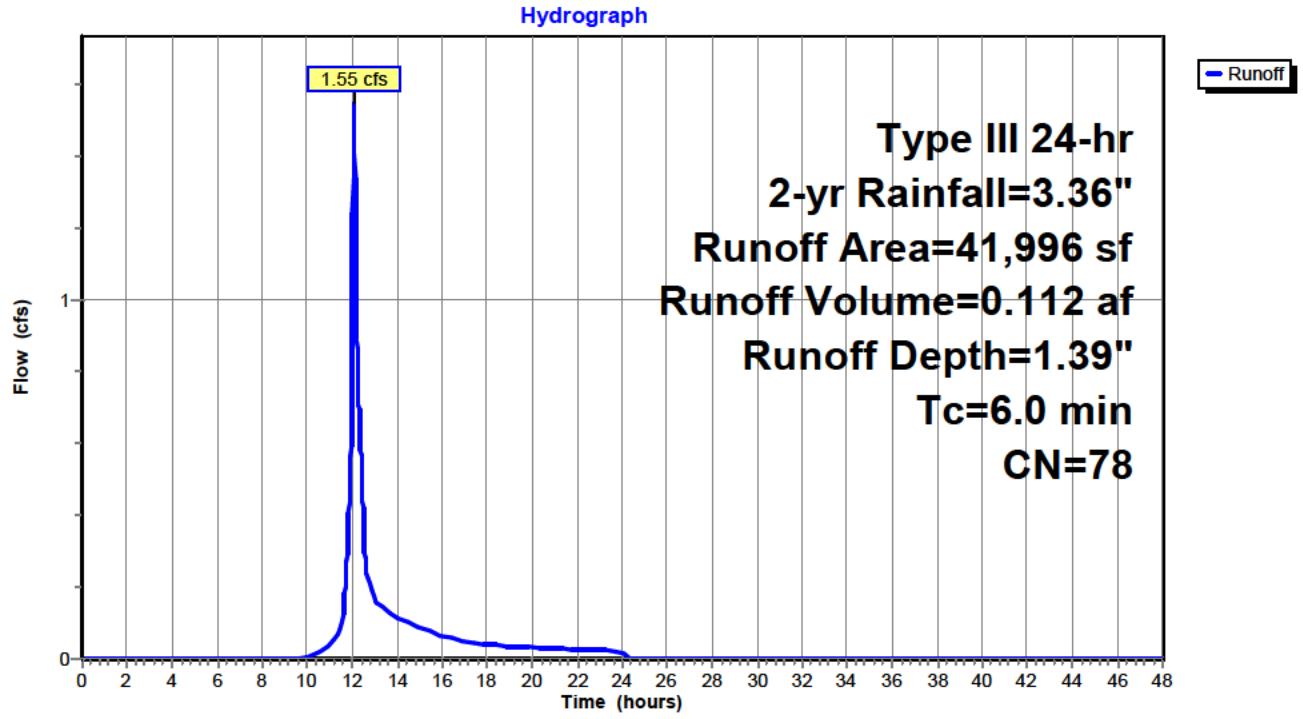
Runoff = 1.55 cfs @ 12.09 hrs, Volume= 0.112 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.36"

	Area (sf)	CN	Description
*	3,919	98	Impervious; Roof, Concrete walk, and Paved parking
	38,077	76	Woods/grass comb., Fair, HSG C
	41,996	78	Weighted Average
	38,077		90.67% Pervious Area
	3,919		9.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 3S: DA 2: Bypass Detention Facility



Summary for Pond 3P: Underground Detention

Inflow Area = 0.253 ac,100.00% Impervious, Inflow Depth = 3.13" for 2-yr event
Inflow = 0.82 cfs @ 12.08 hrs, Volume= 0.066 af
Outflow = 0.43 cfs @ 12.22 hrs, Volume= 0.066 af, Atten= 48%, Lag= 7.9 min
Discarded = 0.05 cfs @ 12.22 hrs, Volume= 0.044 af
Primary = 0.37 cfs @ 12.22 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 482.43' @ 12.22 hrs Surf.Area= 0.024 ac Storage= 0.014 af

Plug-Flow detention time= 30.0 min calculated for 0.066 af (100% of inflow)
Center-of-Mass det. time= 30.0 min (785.4 - 755.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	481.40'	0.018 af	**32.50'W x 32.68'L x 2.33'H Field A** 0.057 af Overall - 0.012 af Embedded = 0.045 af x 40.0% Voids
#2A	481.90'	0.012 af	**ADS_StormTech SC-310 +Cap** x 36 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 9 Rows of 4 Chambers
		0.030 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	481.40'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 470.00'
#2	Primary	481.90'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	482.50'	**10.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	483.23'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 4.00 Width (feet) 4.00 4.00

Discarded OutFlow Max=0.05 cfs @ 12.22 hrs HW=482.43' (Free Discharge)
└**1=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.37 cfs @ 12.22 hrs HW=482.43' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 2.74 fps)
├**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 3P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-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

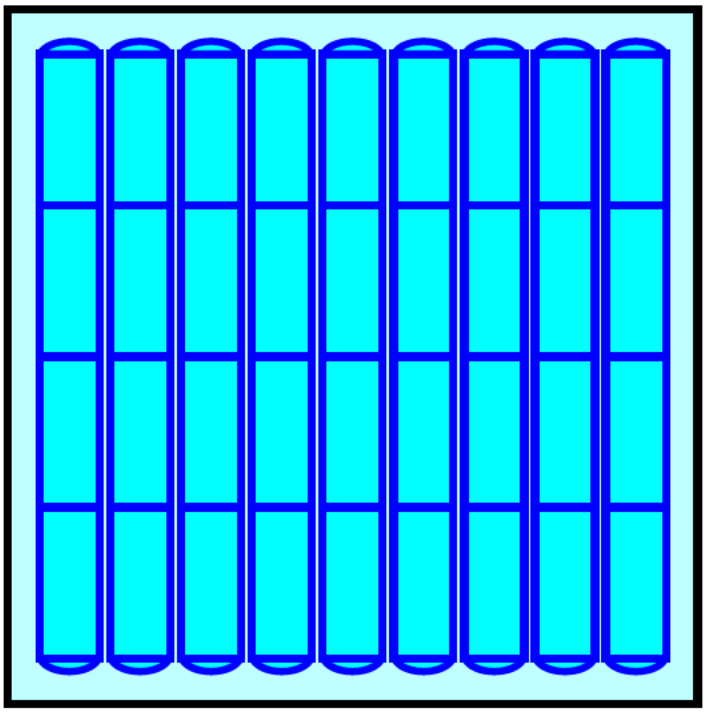
4 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 29.68' Row Length +18.0" End Stone x 2 = 32.68' Base Length
9 Rows x 34.0" Wide + 6.0" Spacing x 8 + 18.0" Side Stone x 2 = 32.50' Base Width
6.0" Base + 16.0" Chamber Height + 6.0" Cover = 2.33' Field Height

36 Chambers x 14.7 cf = 530.7 cf Chamber Storage

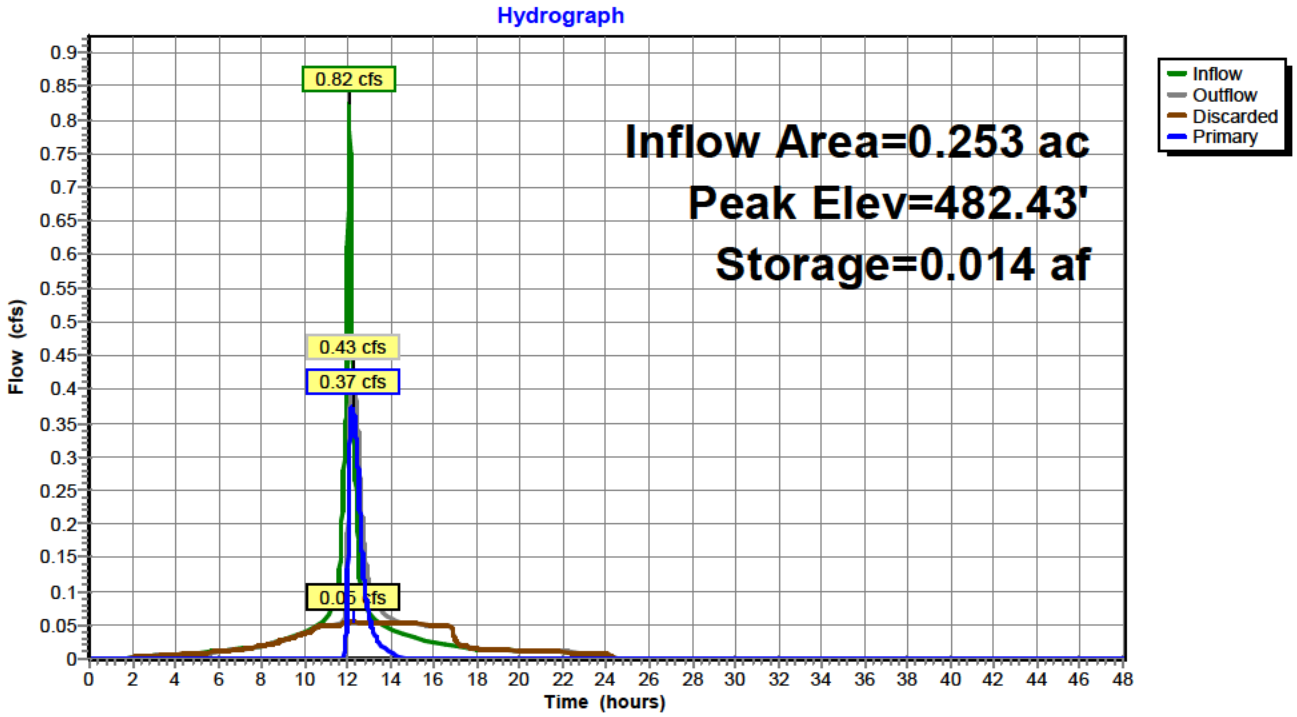
2,478.2 cf Field - 530.7 cf Chambers = 1,947.5 cf Stone x 40.0% Voids = 779.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,309.7 cf = 0.030 af
Overall Storage Efficiency = 52.8%
Overall System Size = 32.68' x 32.50' x 2.33'

36 Chambers
91.8 cy Field
72.1 cy Stone



Pond 3P: Underground Detention

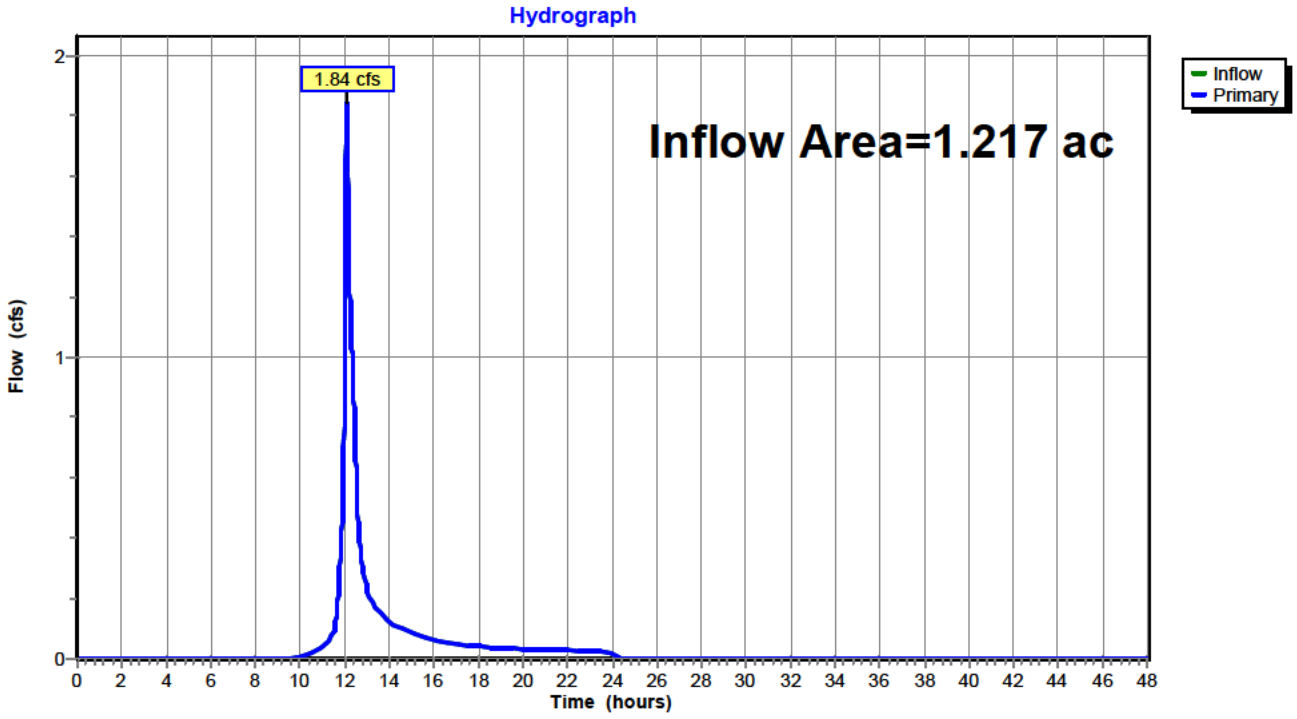


Summary for Link 5L: Proposed Conditions POI

Inflow Area = 1.217 ac, 28.16% Impervious, Inflow Depth = 1.32" for 2-yr event
Inflow = 1.84 cfs @ 12.10 hrs, Volume= 0.133 af
Primary = 1.84 cfs @ 12.10 hrs, Volume= 0.133 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 5L: Proposed Conditions POI



Summary for Subcatchment 2S: DA-1: To Detention Facility

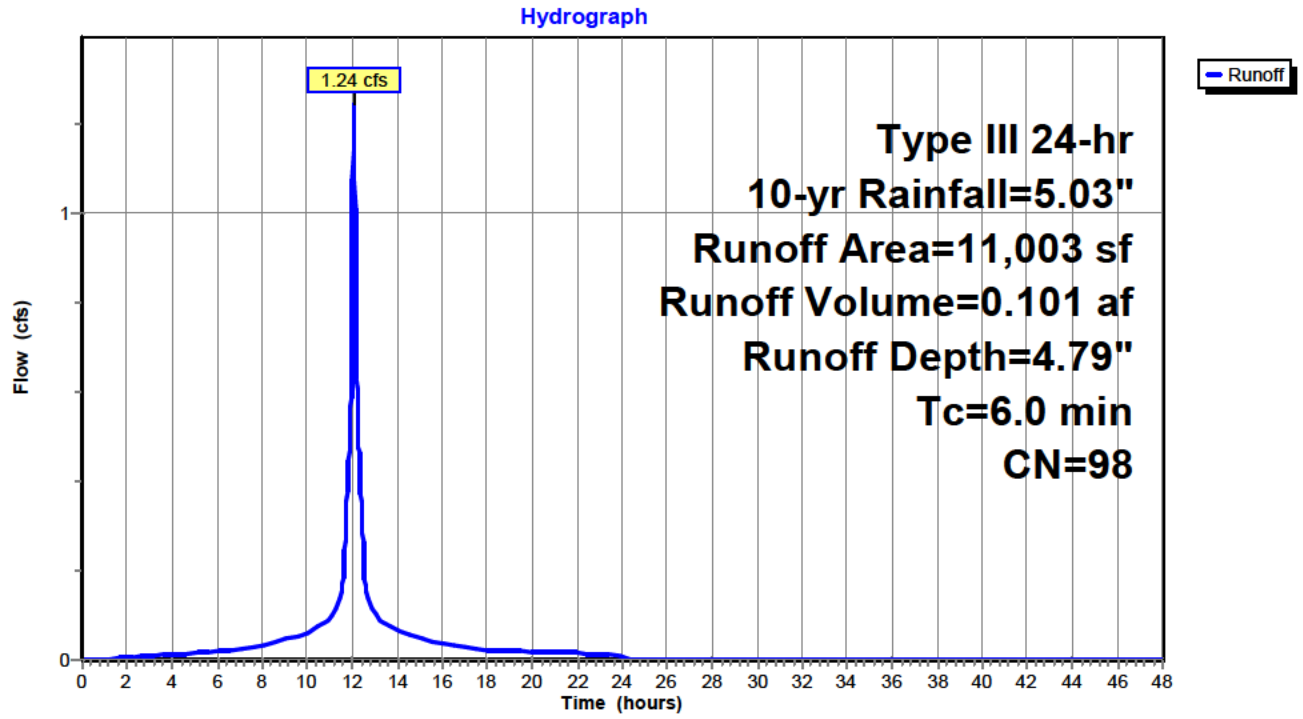
Runoff = 1.24 cfs @ 12.08 hrs, Volume= 0.101 af, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.03"

	Area (sf)	CN	Description
*	11,003	98	Impervious; Roof and Paved parking
	11,003		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 2S: DA-1: To Detention Facility



Summary for Subcatchment 3S: DA 2: Bypass Detention Facility

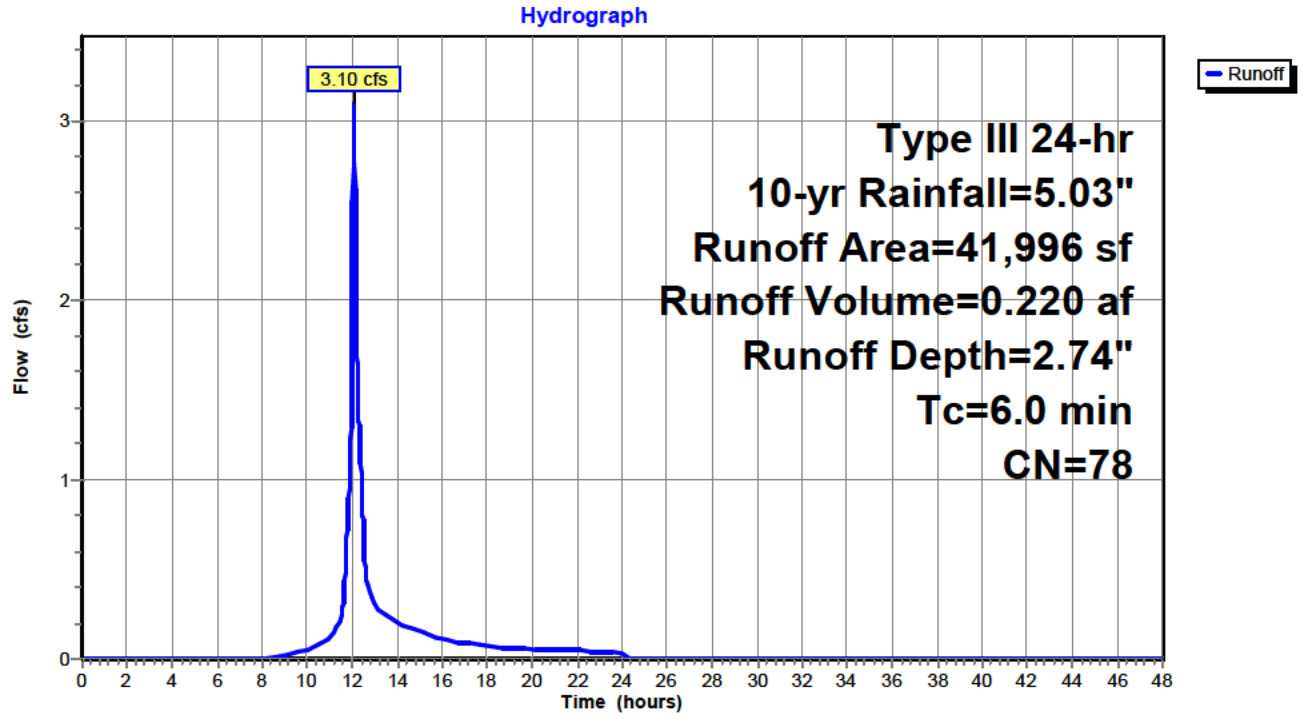
Runoff = 3.10 cfs @ 12.09 hrs, Volume= 0.220 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.03"

	Area (sf)	CN	Description
*	3,919	98	Impervious; Roof, Concrete walk, and Paved parking
	38,077	76	Woods/grass comb., Fair, HSG C
	41,996	78	Weighted Average
	38,077		90.67% Pervious Area
	3,919		9.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 3S: DA 2: Bypass Detention Facility



Summary for Pond 3P: Underground Detention

Inflow Area = 0.253 ac,100.00% Impervious, Inflow Depth = 4.79" for 10-yr event
Inflow = 1.24 cfs @ 12.08 hrs, Volume= 0.101 af
Outflow = 0.88 cfs @ 12.16 hrs, Volume= 0.101 af, Atten= 30%, Lag= 4.7 min
Discarded = 0.05 cfs @ 12.16 hrs, Volume= 0.057 af
Primary = 0.82 cfs @ 12.16 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 482.73' @ 12.16 hrs Surf.Area= 0.024 ac Storage= 0.019 af

Plug-Flow detention time= 29.6 min calculated for 0.101 af (100% of inflow)
Center-of-Mass det. time= 29.6 min (777.6 - 747.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	481.40'	0.018 af	**32.50'W x 32.68'L x 2.33'H Field A** 0.057 af Overall - 0.012 af Embedded = 0.045 af x 40.0% Voids
#2A	481.90'	0.012 af	**ADS_StormTech SC-310 +Cap** x 36 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 9 Rows of 4 Chambers
		0.030 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	481.40'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 470.00'
#2	Primary	481.90'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	482.50'	**10.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	483.23'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 4.00 Width (feet) 4.00 4.00

Discarded OutFlow Max=0.05 cfs @ 12.16 hrs HW=482.73' (Free Discharge)
└**1=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.82 cfs @ 12.16 hrs HW=482.73' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.52 cfs @ 3.81 fps)
├**3=Orifice/Grate** (Orifice Controls 0.30 cfs @ 1.55 fps)
└**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 3P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-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

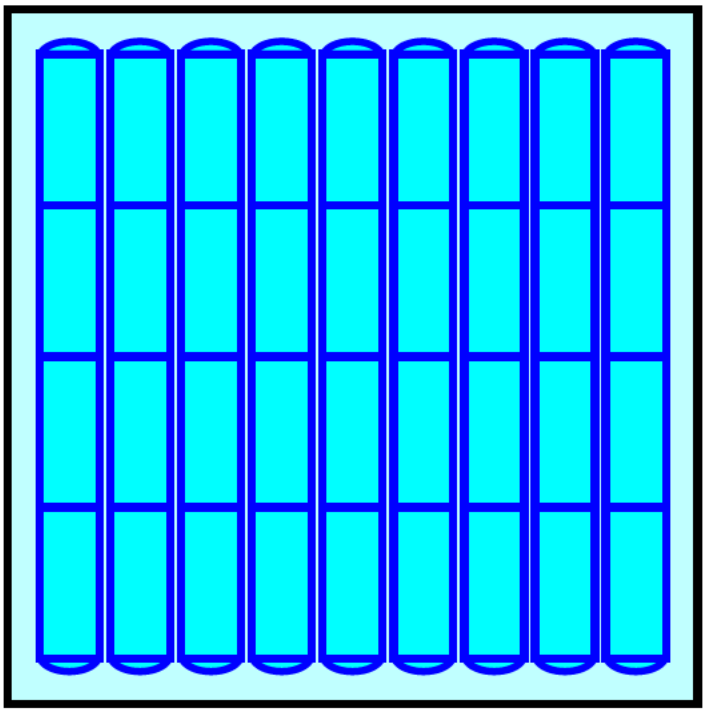
4 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 29.68' Row Length +18.0" End Stone x 2 = 32.68' Base Length
9 Rows x 34.0" Wide + 6.0" Spacing x 8 + 18.0" Side Stone x 2 = 32.50' Base Width
6.0" Base + 16.0" Chamber Height + 6.0" Cover = 2.33' Field Height

36 Chambers x 14.7 cf = 530.7 cf Chamber Storage

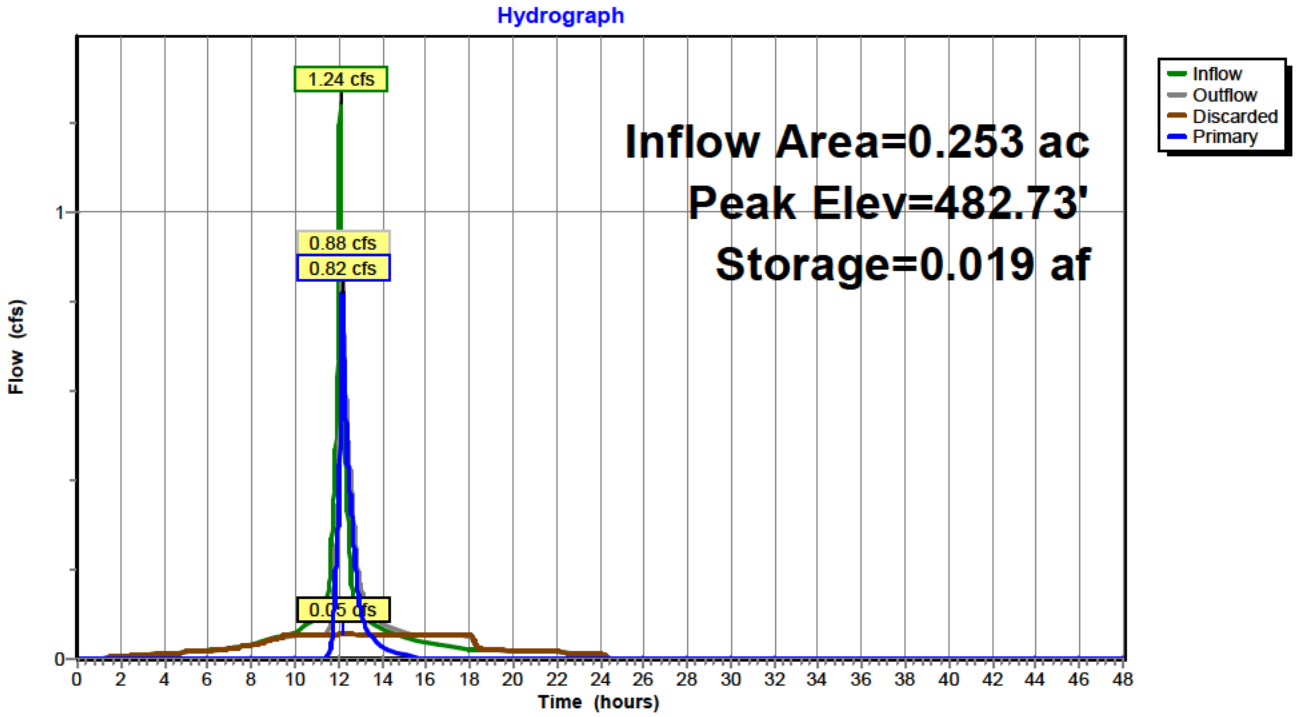
2,478.2 cf Field - 530.7 cf Chambers = 1,947.5 cf Stone x 40.0% Voids = 779.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,309.7 cf = 0.030 af
Overall Storage Efficiency = 52.8%
Overall System Size = 32.68' x 32.50' x 2.33'

36 Chambers
91.8 cy Field
72.1 cy Stone



Pond 3P: Underground Detention

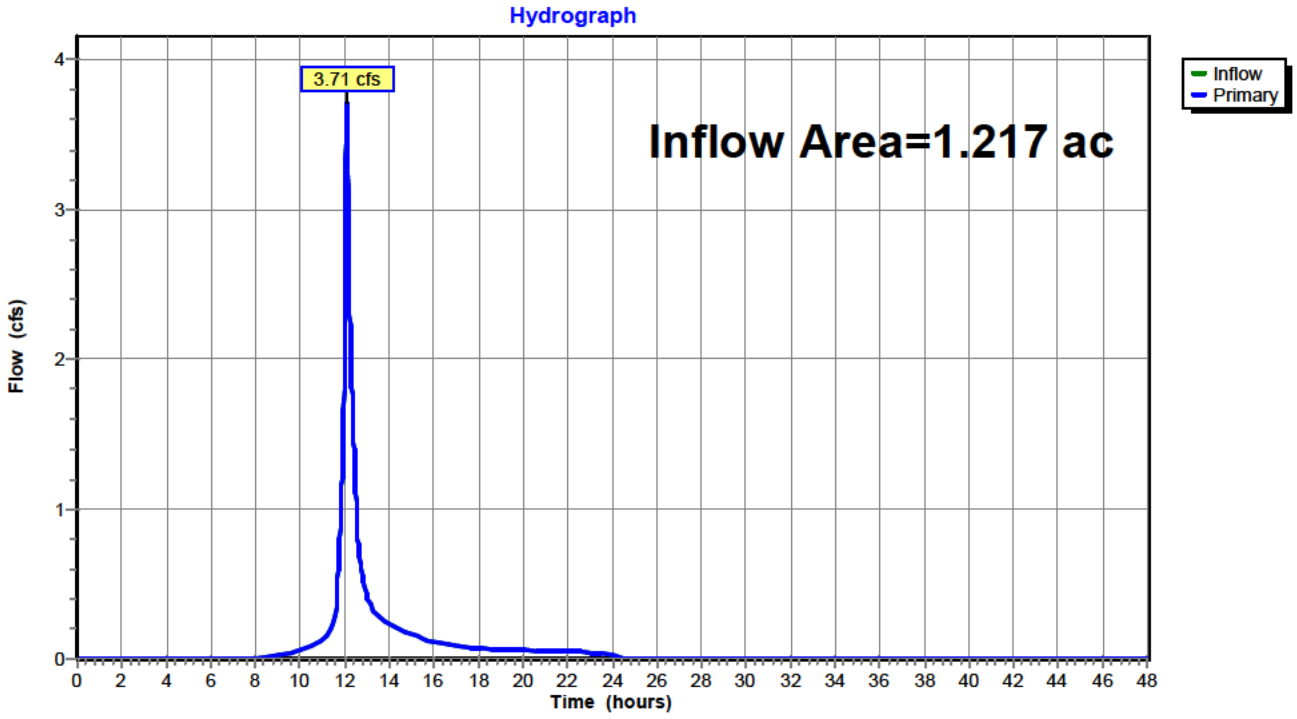


Summary for Link 5L: Proposed Conditions POI

Inflow Area = 1.217 ac, 28.16% Impervious, Inflow Depth = 2.60" for 10-yr event
Inflow = 3.71 cfs @ 12.10 hrs, Volume= 0.264 af
Primary = 3.71 cfs @ 12.10 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 5L: Proposed Conditions POI



Summary for Subcatchment 2S: DA-1: To Detention Facility

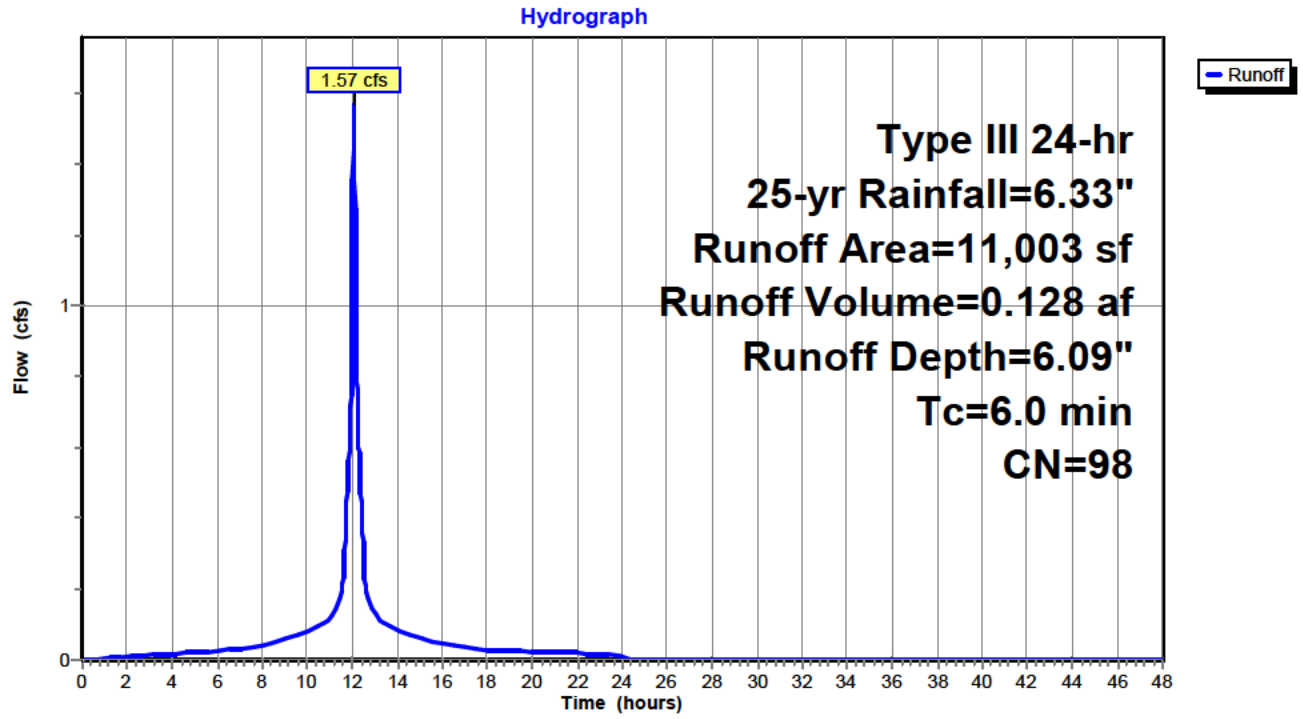
Runoff = 1.57 cfs @ 12.08 hrs, Volume= 0.128 af, Depth= 6.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.33"

	Area (sf)	CN	Description
*	11,003	98	Impervious; Roof and Paved parking
	11,003		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 2S: DA-1: To Detention Facility



Summary for Subcatchment 3S: DA 2: Bypass Detention Facility

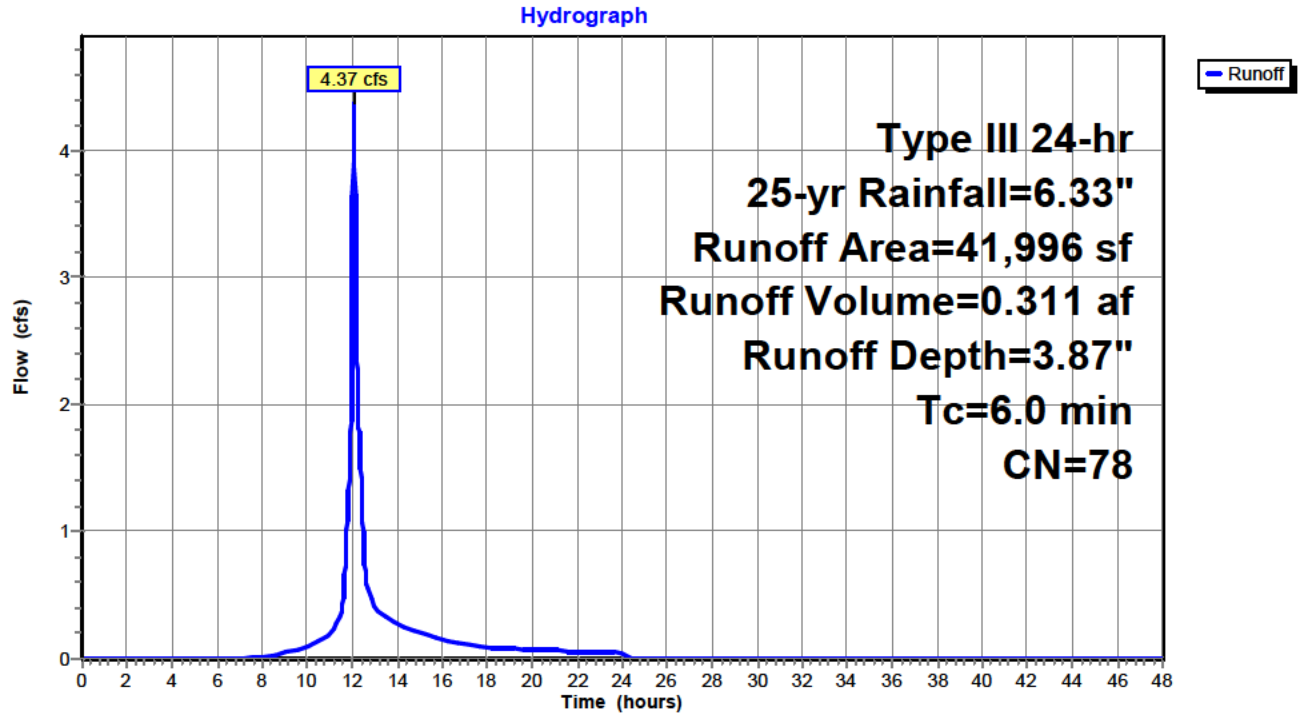
Runoff = 4.37 cfs @ 12.09 hrs, Volume= 0.311 af, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.33"

	Area (sf)	CN	Description
*	3,919	98	Impervious; Roof, Concrete walk, and Paved parking
	38,077	76	Woods/grass comb., Fair, HSG C
	41,996	78	Weighted Average
	38,077		90.67% Pervious Area
	3,919		9.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 3S: DA 2: Bypass Detention Facility



Summary for Pond 3P: Underground Detention

Inflow Area = 0.253 ac,100.00% Impervious, Inflow Depth = 6.09" for 25-yr event
Inflow = 1.57 cfs @ 12.08 hrs, Volume= 0.128 af
Outflow = 1.24 cfs @ 12.14 hrs, Volume= 0.128 af, Atten= 21%, Lag= 3.6 min
Discarded = 0.06 cfs @ 12.14 hrs, Volume= 0.065 af
Primary = 1.19 cfs @ 12.14 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 482.89' @ 12.14 hrs Surf.Area= 0.024 ac Storage= 0.021 af

Plug-Flow detention time= 29.3 min calculated for 0.128 af (100% of inflow)
Center-of-Mass det. time= 29.3 min (773.7 - 744.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	481.40'	0.018 af	**32.50'W x 32.68'L x 2.33'H Field A** 0.057 af Overall - 0.012 af Embedded = 0.045 af x 40.0% Voids
#2A	481.90'	0.012 af	**ADS_StormTech SC-310 +Cap** x 36 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 9 Rows of 4 Chambers
		0.030 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	481.40'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 470.00'
#2	Primary	481.90'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	482.50'	**10.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	483.23'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 4.00 Width (feet) 4.00 4.00

Discarded OutFlow Max=0.06 cfs @ 12.14 hrs HW=482.88' (Free Discharge)
└**1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=1.19 cfs @ 12.14 hrs HW=482.88' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.58 cfs @ 4.24 fps)
├**3=Orifice/Grate** (Orifice Controls 0.61 cfs @ 2.19 fps)
└**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 3P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-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

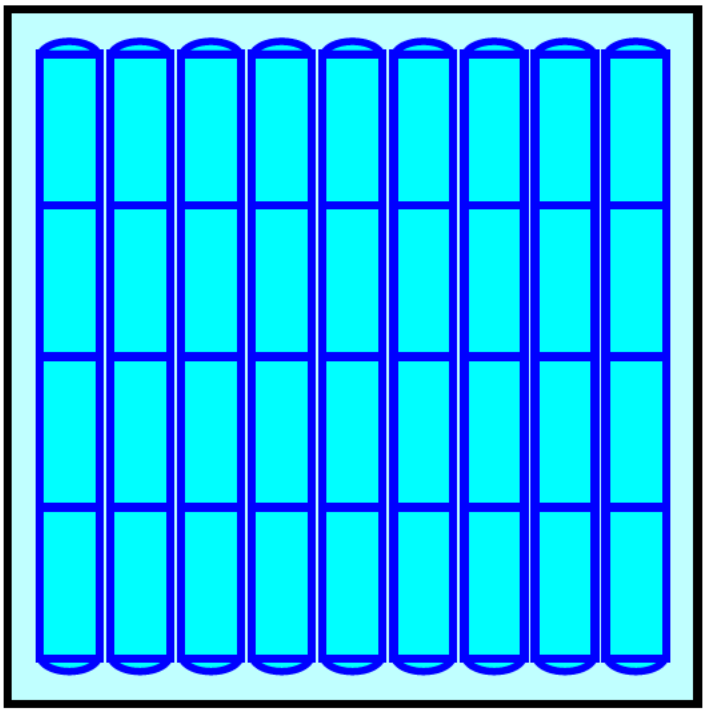
4 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 29.68' Row Length +18.0" End Stone x 2 = 32.68' Base Length
9 Rows x 34.0" Wide + 6.0" Spacing x 8 + 18.0" Side Stone x 2 = 32.50' Base Width
6.0" Base + 16.0" Chamber Height + 6.0" Cover = 2.33' Field Height

36 Chambers x 14.7 cf = 530.7 cf Chamber Storage

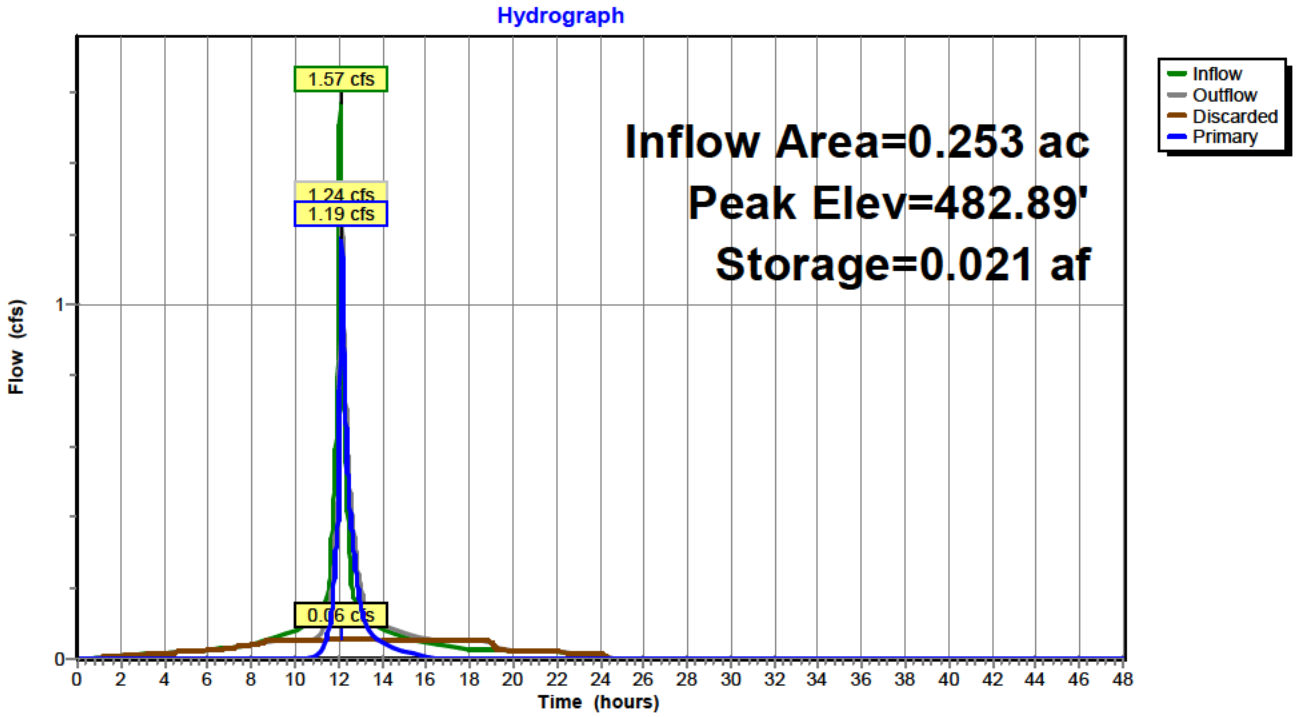
2,478.2 cf Field - 530.7 cf Chambers = 1,947.5 cf Stone x 40.0% Voids = 779.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,309.7 cf = 0.030 af
Overall Storage Efficiency = 52.8%
Overall System Size = 32.68' x 32.50' x 2.33'

36 Chambers
91.8 cy Field
72.1 cy Stone



Pond 3P: Underground Detention

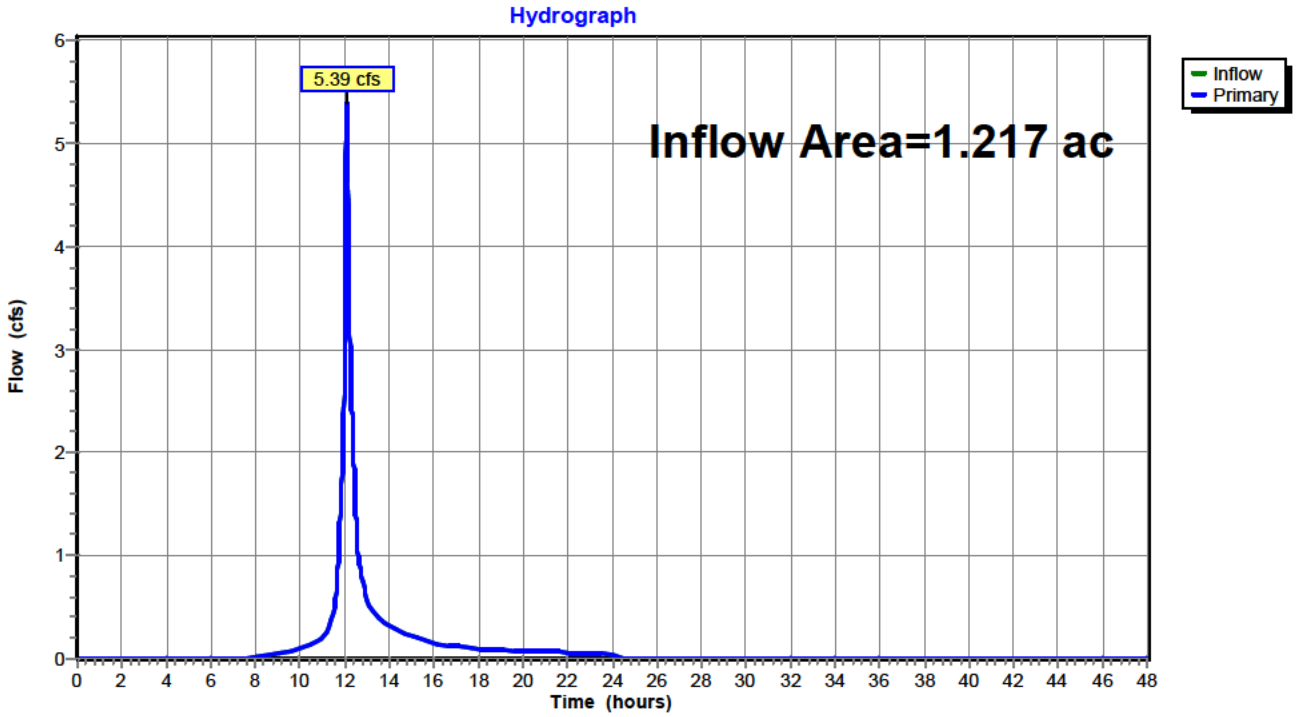


Summary for Link 5L: Proposed Conditions POI

Inflow Area = 1.217 ac, 28.16% Impervious, Inflow Depth = 3.69" for 25-yr event
Inflow = 5.39 cfs @ 12.10 hrs, Volume= 0.374 af
Primary = 5.39 cfs @ 12.10 hrs, Volume= 0.374 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 5L: Proposed Conditions POI



Summary for Subcatchment 2S: DA-1: To Detention Facility

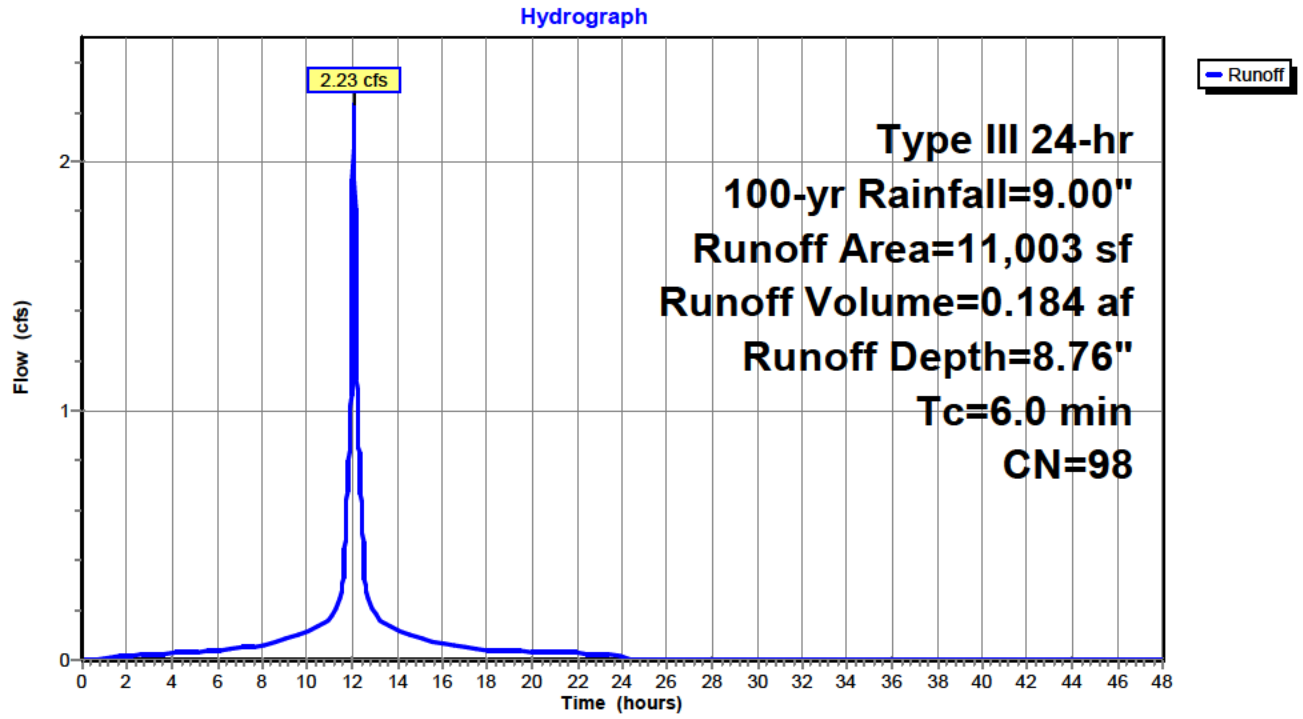
Runoff = 2.23 cfs @ 12.08 hrs, Volume= 0.184 af, Depth= 8.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.00"

	Area (sf)	CN	Description
*	11,003	98	Impervious; Roof and Paved parking
	11,003		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 2S: DA-1: To Detention Facility



Summary for Subcatchment 3S: DA 2: Bypass Detention Facility

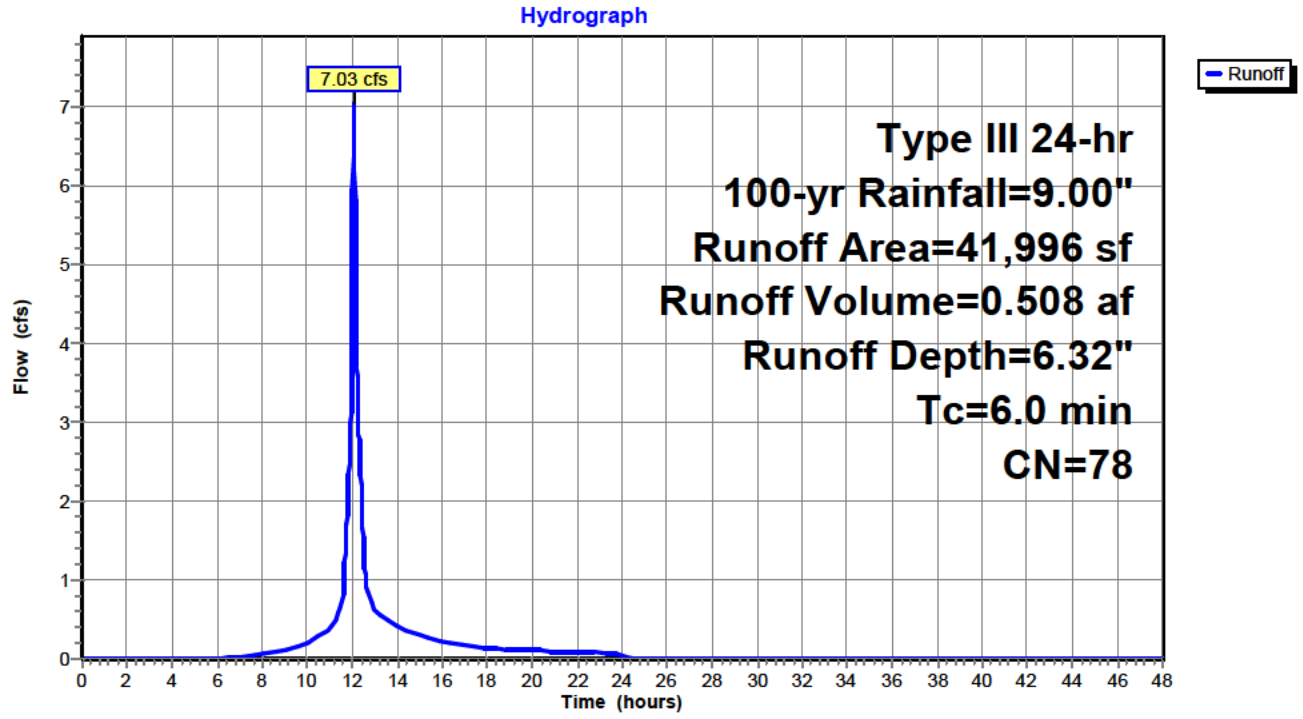
Runoff = 7.03 cfs @ 12.09 hrs, Volume= 0.508 af, Depth= 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.00"

	Area (sf)	CN	Description
*	3,919	98	Impervious; Roof, Concrete walk, and Paved parking
	38,077	76	Woods/grass comb., Fair, HSG C
	41,996	78	Weighted Average
	38,077		90.67% Pervious Area
	3,919		9.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum per TR-55**

Subcatchment 3S: DA 2: Bypass Detention Facility



Summary for Pond 3P: Underground Detention

Inflow Area = 0.253 ac,100.00% Impervious, Inflow Depth = 8.76" for 100-yr event
Inflow = 2.23 cfs @ 12.08 hrs, Volume= 0.184 af
Outflow = 1.84 cfs @ 12.14 hrs, Volume= 0.184 af, Atten= 18%, Lag= 3.3 min
Discarded = 0.06 cfs @ 12.14 hrs, Volume= 0.078 af
Primary = 1.78 cfs @ 12.14 hrs, Volume= 0.107 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 483.25' @ 12.14 hrs Surf.Area= 0.024 ac Storage= 0.025 af

Plug-Flow detention time= 28.4 min calculated for 0.184 af (100% of inflow)
Center-of-Mass det. time= 28.3 min (768.1 - 739.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	481.40'	0.018 af	**32.50'W x 32.68'L x 2.33'H Field A** 0.057 af Overall - 0.012 af Embedded = 0.045 af x 40.0% Voids
#2A	481.90'	0.012 af	**ADS_StormTech SC-310 +Cap** x 36 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 9 Rows of 4 Chambers
		0.030 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	481.40'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 470.00'
#2	Primary	481.90'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	482.50'	**10.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	483.23'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 4.00 Width (feet) 4.00 4.00

Discarded OutFlow Max=0.06 cfs @ 12.14 hrs HW=483.25' (Free Discharge)
└**1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=1.77 cfs @ 12.14 hrs HW=483.25' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.70 cfs @ 5.15 fps)
├**3=Orifice/Grate** (Orifice Controls 1.02 cfs @ 3.68 fps)
└**4=Custom Weir/Orifice** (Weir Controls 0.05 cfs @ 0.50 fps)

Pond 3P: Underground Detention - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-310 +Cap (ADS StormTech® SC-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

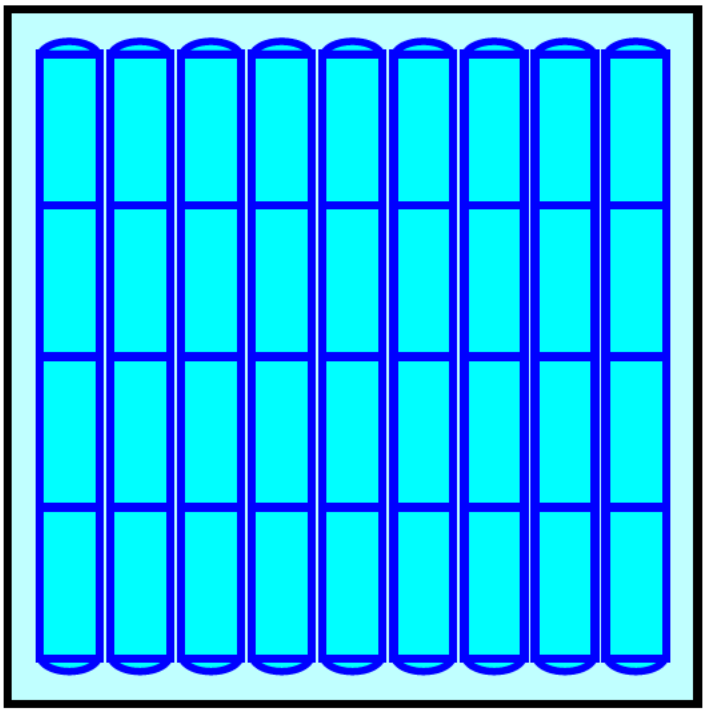
4 Chambers/Row x 7.12' Long +0.60' Cap Length x 2 = 29.68' Row Length +18.0" End Stone x 2 = 32.68' Base Length
9 Rows x 34.0" Wide + 6.0" Spacing x 8 + 18.0" Side Stone x 2 = 32.50' Base Width
6.0" Base + 16.0" Chamber Height + 6.0" Cover = 2.33' Field Height

36 Chambers x 14.7 cf = 530.7 cf Chamber Storage

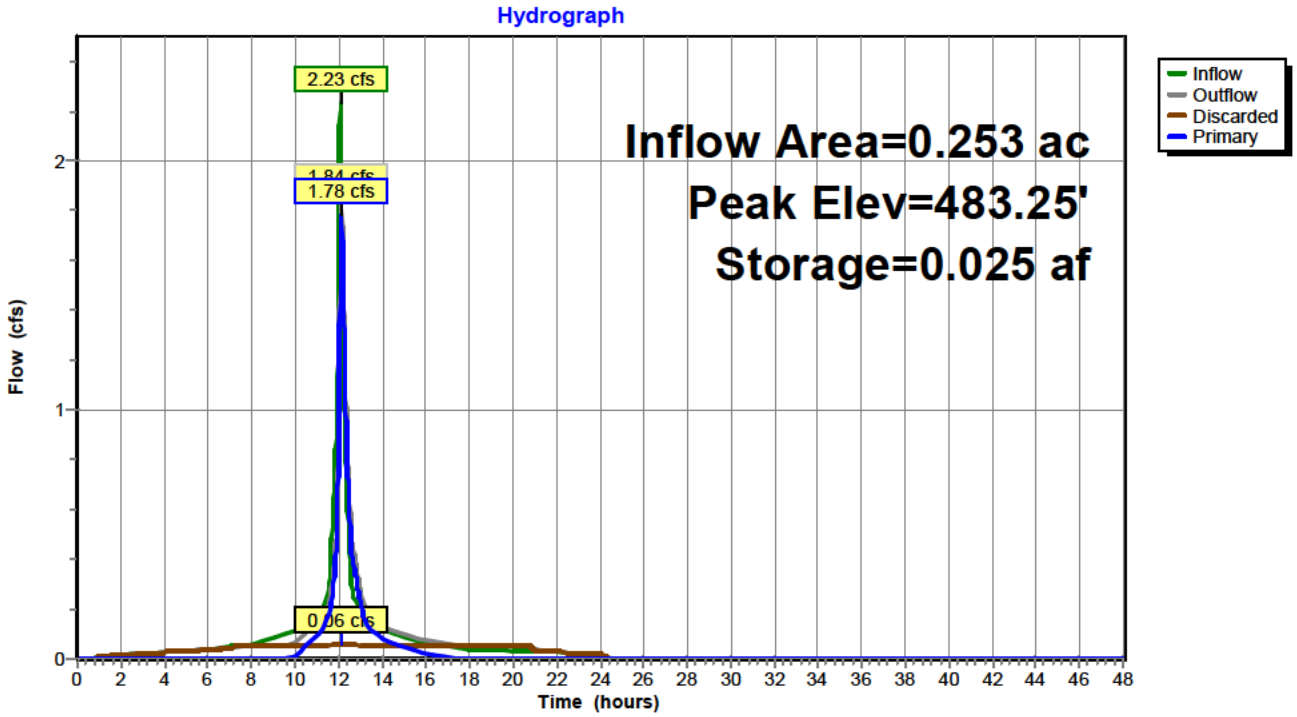
2,478.2 cf Field - 530.7 cf Chambers = 1,947.5 cf Stone x 40.0% Voids = 779.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,309.7 cf = 0.030 af
Overall Storage Efficiency = 52.8%
Overall System Size = 32.68' x 32.50' x 2.33'

36 Chambers
91.8 cy Field
72.1 cy Stone



Pond 3P: Underground Detention



Summary for Link 5L: Proposed Conditions POI

Inflow Area = 1.217 ac, 28.16% Impervious, Inflow Depth = 6.06" for 100-yr event
Inflow = 8.59 cfs @ 12.09 hrs, Volume= 0.615 af
Primary = 8.59 cfs @ 12.09 hrs, Volume= 0.615 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 5L: Proposed Conditions POI