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STORM WATER MANAGEMENT REPORT

512-516 PLEASANT VALLEY WAY

**TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NJ**

Block 154.06, Lots 11 & 12

PROJECT # 1240815

DATE: August 11, 2025



MICHAEL LANZAFAMA, P.E. & P.L.S.
NJ REG. # GP30084

STORM WATER MANAGEMENT REPORT SUMMARY

PROJECT LOCATION

The project is located at 512-516 Pleasant Valley Way in the Township of West Orange, Essex County, New Jersey. The site is located across the intersection with Greenwood Avenue and about 560 feet to the intersection with the southerly line of Eagle Rock Avenue. The property lies within the Office Building Zoning District.

EXISTING CONDITIONS

The site is currently occupied by two commercial buildings. One is a One-Story frame dwelling with parking in the rear and the second building a Two story masonry building. This building has also a parking lot on the rear of the property.

The site area is 16,242 square feet in size or 0.373 acres. Its frontage on Pleasant Valley Way 124.99 feet, and it has a lot depth of 130.0 feet. It will be serviced with all basic utilities—water, gas, electric, sanitary sewer, and cable, which are provided from underground pipelines and conduits.

The area around the site is developed with residential and commercial uses. The property is not impacted by flood plains, and freshwater wetlands have not been observed.

TOPOGRAPHY

The site slopes from north to south.

The highest elevation is approximately 422.0 feet at the most northern corner of the property. The lowest elevation is at approximately 412.0 feet in the most southern corner of the property.

SOILS

The site contains two soil types. The Soil Survey of Essex County has identified the soils as Urban Land, Boonton, 0 to 8 percent slopes and Boonton - Urban Land, Boonton, 0 to 8 percent slopes. The Natural Resources Conservation Service has classified these soils as being in Hydrologic Soil Group "C".

IMPERVIOUS COVERAGE SUMMARY

IMPERVIOUS COVERAGE		
	EXISTING	PROPOSED
Buildings	2676 SF	3522 SF
Drive & Parking	7679 SF	6682 SF
Patio	0 SF	0 SF
Walk/step	794 SF	1136 SF
Total	11149 SF	11340 SF
Net Decrease		191 SF

STORMWATER MANAGEMENT

As with any construction project, stormwater management is an important part of the overall development process. Modern practice is a combination of the site designer's knowledge and goals in conjunction with the rules and regulations of the local municipality and the New Jersey Department of Environmental Protection (see *Hydrology* section below). Part of stormwater management is to minimize the use of artificial structures; however, practical considerations of most development sites require a combination of non-structural and structural components. A substantial portion of the existing site contains buildings and bituminous pavement.

The entire site drains to the south area where it runs thru a swale to the street on the rear and is collected by the storm system within Beasley Street. Stormwater hydrographs for both existing and proposed conditions for each drainage area, are included in this report.

The Township of West Orange requires that stormwater analyses be performed for the 2-year, 10-year, and 100-year storm events, applying reduction factors of 50%, 25%, and 20%, respectively, for major developments. Although this project does not qualify as a major development, these reductions were voluntarily applied to further enhance site performance. The "Natural Resources Conservation Service Method," as outlined in Technical Release 55 (TR-55), was utilized to size and route stormwater through the proposed drywell system.

DISCHARGE SUMMARY

The following table shows that the site would produce post-developed runoff rates and volumes that are lower than the site's existing rates of runoff.

The existing and proposed peak runoff rates (Q) from the site are summarized as follows:

Site Discharge

Summary Peak Detention Flow

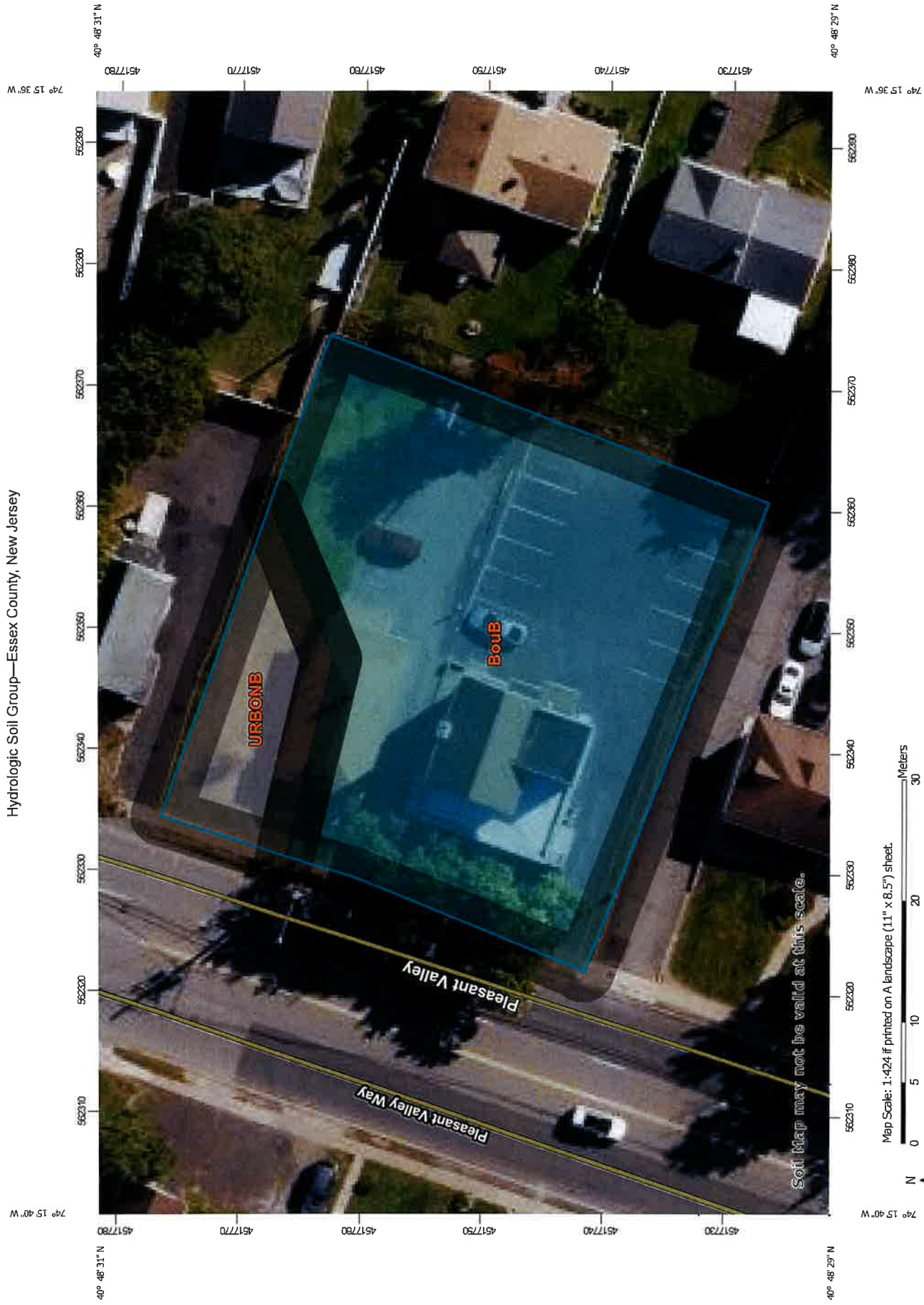
Frequency	Subject to Reduction Q	Reduction		Q Existing Non Disturb		Q Allowable	Total Q Proposed
2 - 2020	0.98	0.50	+	0.00	=	0.49	0.43
10 - 2020	1.63	0.25	+	0.00	=	1.22	0.70
100 - 2020	2.97	0.20	+	0.00	=	2.38	1.92

The Site Discharge table shows that the proposed project would result in post-developed runoff rates that are less than or equal to the site's existing runoff rates. The hydrographs for the 2-year, 10-year and 100-year storms do not exceed at any time the pre-developed hydrographs for the same events as required per West Orange's ordinance.

Based upon this analysis, it is our professional opinion that the proposed storm water management system would enhance the existing downstream conveyance systems and meet the required Municipal standards.

Calculations supporting these findings constitute the remainder of this report.

SOILS



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

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

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

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 20, Sep 3, 2024

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

Date(s) aerial images were photographed: Oct 10, 2022—Oct 16, 2022

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
BouB	Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes	C	0.3	86.4%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes		0.1	13.6%
Totals for Area of Interest			0.4	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.

HYDROLOGIC ANALYSIS EXISTING & PROPOSED



Existing



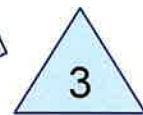
Parking Lot



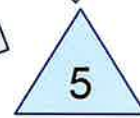
Proposed



Bypass



Pervious Pavers



Pipes



Proposed



Routing Diagram for 1240815-pipes
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1240815-pipes

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512-516 Pleasant Valley Way, West Orange
NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Exisiting

Runoff Area=16,242 sf 68.64% Impervious Runoff Depth=2.60"
Flow Length=141' Tc=5.9 min CN=74/98 Runoff=0.98 cfs 0.081 af

Subcatchment2: Parking Lot

Runoff Area=7,305 sf 91.47% Impervious Runoff Depth=3.06"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=0.58 cfs 0.043 af

Pond 3: Pervious Pavers

Peak Elev=414.05' Storage=358 cf Inflow=0.58 cfs 0.043 af
Discarded=0.11 cfs 0.043 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.043 af

Subcatchment4: Proposed

Runoff Area=8,392 sf 56.22% Impervious Runoff Depth=2.35"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=0.52 cfs 0.038 af

Pond 5: Pipes

Peak Elev=412.44' Storage=183 cf Inflow=0.52 cfs 0.038 af
Discarded=0.03 cfs 0.024 af Primary=0.41 cfs 0.014 af Outflow=0.44 cfs 0.038 af

Subcatchment6: Bypass

Runoff Area=605 sf 0.00% Impervious Runoff Depth=1.22"
Flow Length=128' Tc=6.0 min CN=74/0 Runoff=0.02 cfs 0.001 af

Link 7: Proposed

Inflow=0.43 cfs 0.015 af
Primary=0.43 cfs 0.015 af

Total Runoff Area = 0.747 ac Runoff Volume = 0.163 af Average Runoff Depth = 2.62"
30.71% Pervious = 0.229 ac 69.29% Impervious = 0.518 ac

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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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Summary for Subcatchment 1: Exisiting

Runoff = 0.98 cfs @ 12.13 hrs, Volume= 0.081 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

	Area (sf)	CN	Description
*	2,676	98	Buildings
*	794	98	Walks/Steps & Patio
	7,679	98	Paved parking, HSG C
	5,093	74	>75% Grass cover, Good, HSG C
	16,242	90	Weighted Average
	5,093	74	31.36% Pervious Area
	11,149	98	68.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	66	0.0680	0.27		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
1.4	21	0.0950	0.24		Sheet Flow, 2 Grass: Short n= 0.150 P2= 3.47"
0.2	13	0.0390	1.24		Sheet Flow, 3 Smooth surfaces n= 0.011 P2= 3.47"
0.1	13	0.0390	4.01		Shallow Concentrated Flow, 4 Paved Kv= 20.3 fps
0.1	28	0.0360	3.85		Shallow Concentrated Flow, 5 Paved Kv= 20.3 fps
5.9	141	Total			

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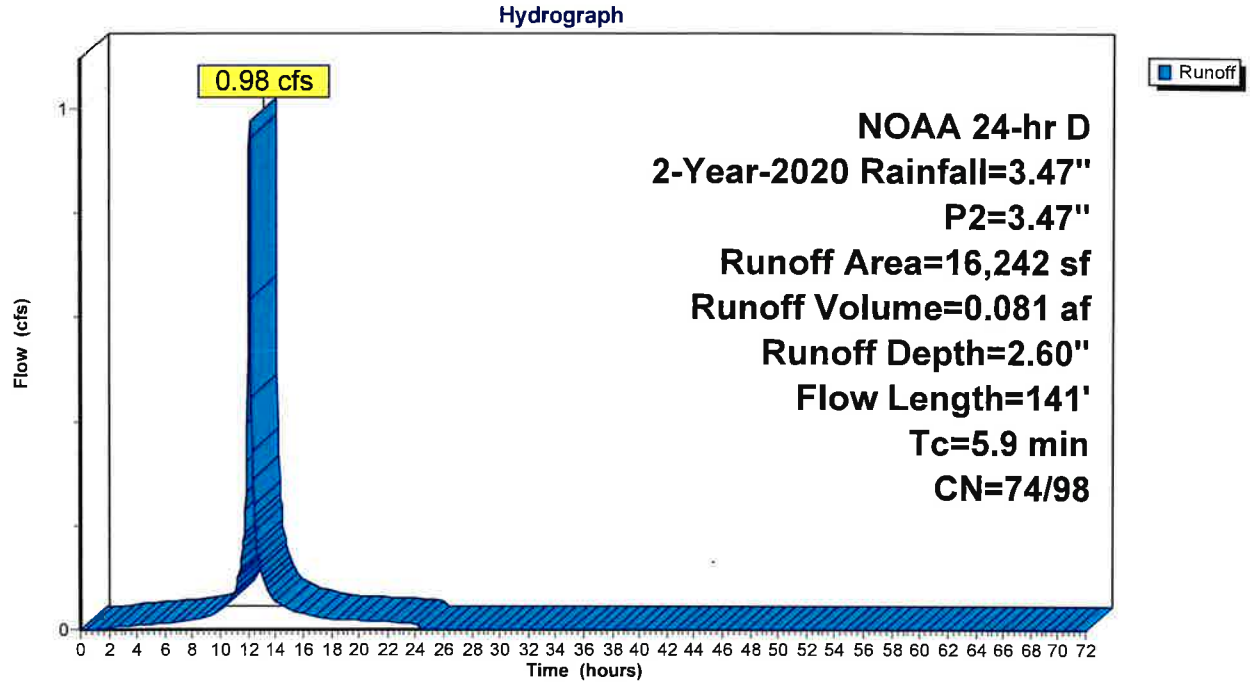
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Subcatchment 1: Existing



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Summary for Subcatchment 2: Parking Lot

Runoff = 0.58 cfs @ 12.06 hrs, Volume= 0.043 af, Depth= 3.06"
 Routed to Pond 3 : Pervious Pavers

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
6,682	98	Paved parking, HSG C
623	74	>75% Grass cover, Good, HSG C
7,305	96	Weighted Average
623	74	8.53% Pervious Area
6,682	98	91.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1
					Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2
					Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3
					Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4
					Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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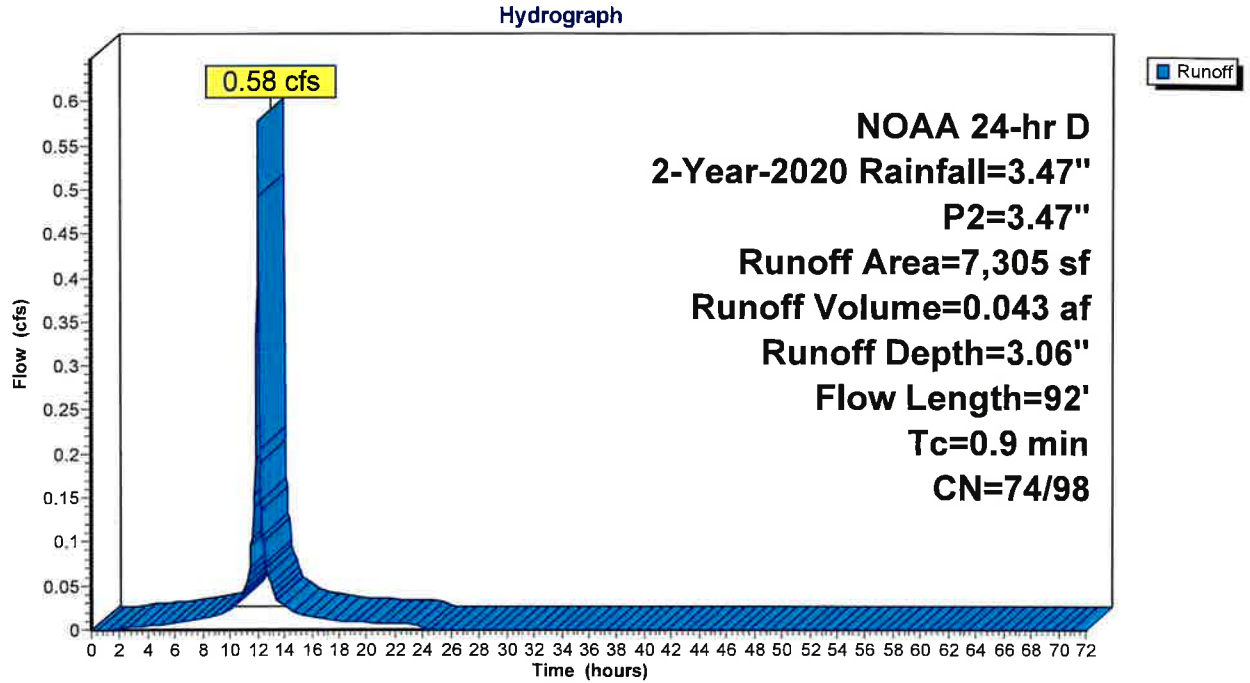
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Subcatchment 2: Parking Lot



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Summary for Pond 3: Pervious Pavers

Inflow Area = 0.168 ac, 91.47% Impervious, Inflow Depth = 3.06" for 2-Year-2020 event
 Inflow = 0.58 cfs @ 12.06 hrs, Volume= 0.043 af
 Outflow = 0.11 cfs @ 11.75 hrs, Volume= 0.043 af, Atten= 81%, Lag= 0.0 min
 Discarded = 0.11 cfs @ 11.75 hrs, Volume= 0.043 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 5 : Pipes

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 414.05' @ 12.37 hrs Surf.Area= 1,620 sf Storage= 358 cf

Plug-Flow detention time= 17.0 min calculated for 0.043 af (100% of inflow)
 Center-of-Mass det. time= 17.0 min (772.7 - 755.6)

Volume	Invert	Avail.Storage	Storage Description
#1	413.50'	1,730 cf	60.00'W x 27.00'L x 2.67'H Prismatic 4,325 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	413.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	414.50'	6.0" Round Culvert L= 50.0' Ke= 0.200 Inlet / Outlet Invert= 414.50' / 414.17' S= 0.0066 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 11.75 hrs HW=413.53' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=413.50' (Free Discharge)
 ↑2=Culvert (Controls 0.00 cfs)

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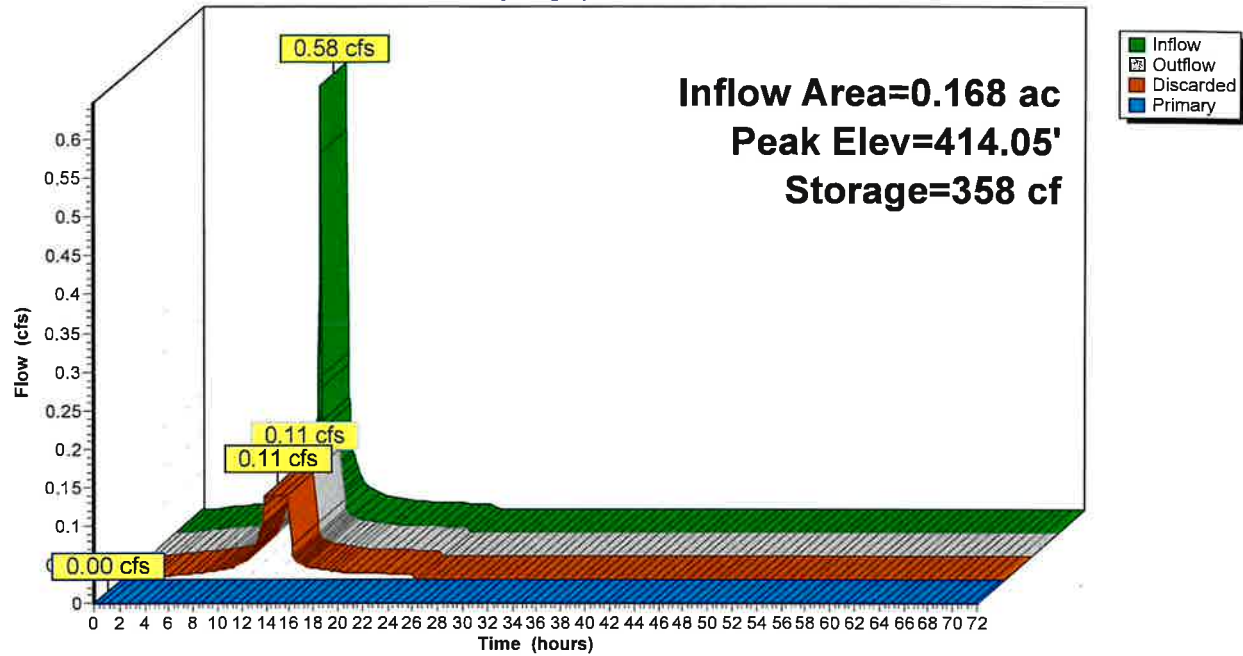
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Pond 3: Pervious Pavers

Hydrograph



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Summary for Subcatchment 4: Proposed

Runoff = 0.52 cfs @ 12.06 hrs, Volume= 0.038 af, Depth= 2.35"
 Routed to Pond 5 : Pipes

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
3,522	98	Roofs, HSG C
1,136	98	Paved parking, HSG C
3,674	74	>75% Grass cover, Good, HSG C
* 60	98	Areaway
8,392	87	Weighted Average
3,674	74	43.78% Pervious Area
4,718	98	56.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1 Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2 Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3 Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4 Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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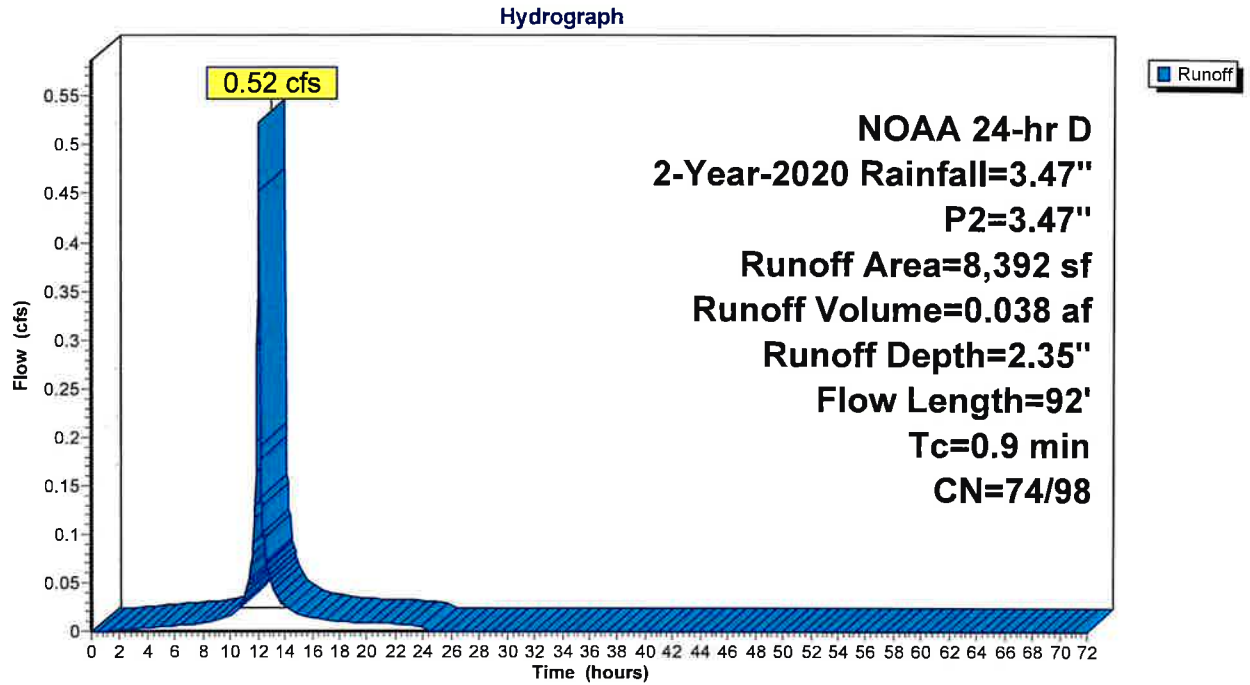
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Subcatchment 4: Proposed



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Summary for Pond 5: Pipes

Inflow Area = 0.360 ac, 72.63% Impervious, Inflow Depth = 1.26" for 2-Year-2020 event
 Inflow = 0.52 cfs @ 12.06 hrs, Volume= 0.038 af
 Outflow = 0.44 cfs @ 12.10 hrs, Volume= 0.038 af, Atten= 16%, Lag= 2.3 min
 Discarded = 0.03 cfs @ 10.80 hrs, Volume= 0.024 af
 Primary = 0.41 cfs @ 12.10 hrs, Volume= 0.014 af
 Routed to Link 7 : Proposed

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 412.44' @ 12.10 hrs Surf.Area= 400 sf Storage= 183 cf

Plug-Flow detention time= 15.6 min calculated for 0.038 af (100% of inflow)
 Center-of-Mass det. time= 15.6 min (793.1 - 777.5)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	329 cf	10.00'W x 40.00'L x 3.00'H Prismatic 1,200 cf Overall - 377 cf Embedded = 823 cf x 40.0% Voids
#2	412.00'	377 cf	24.0" Round Pipe Storage x 3 Inside #1 L= 40.0' S= 0.0020 ' /'
		706 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	411.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	412.00'	12.0" Round Culvert L= 14.0' Ke= 0.100 Inlet / Outlet Invert= 412.00' / 411.94' S= 0.0043 ' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	412.00'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	414.00'	24.0" x 24.0" Horiz. Gate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 10.80 hrs HW=411.53' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.41 cfs @ 12.10 hrs HW=412.44' (Free Discharge)
 ↑2=Culvert (Passes 0.41 cfs of 0.58 cfs potential flow)
 ↑3=Orifice (Orifice Controls 0.41 cfs @ 2.26 fps)
 ↑4=Gate (Controls 0.00 cfs)

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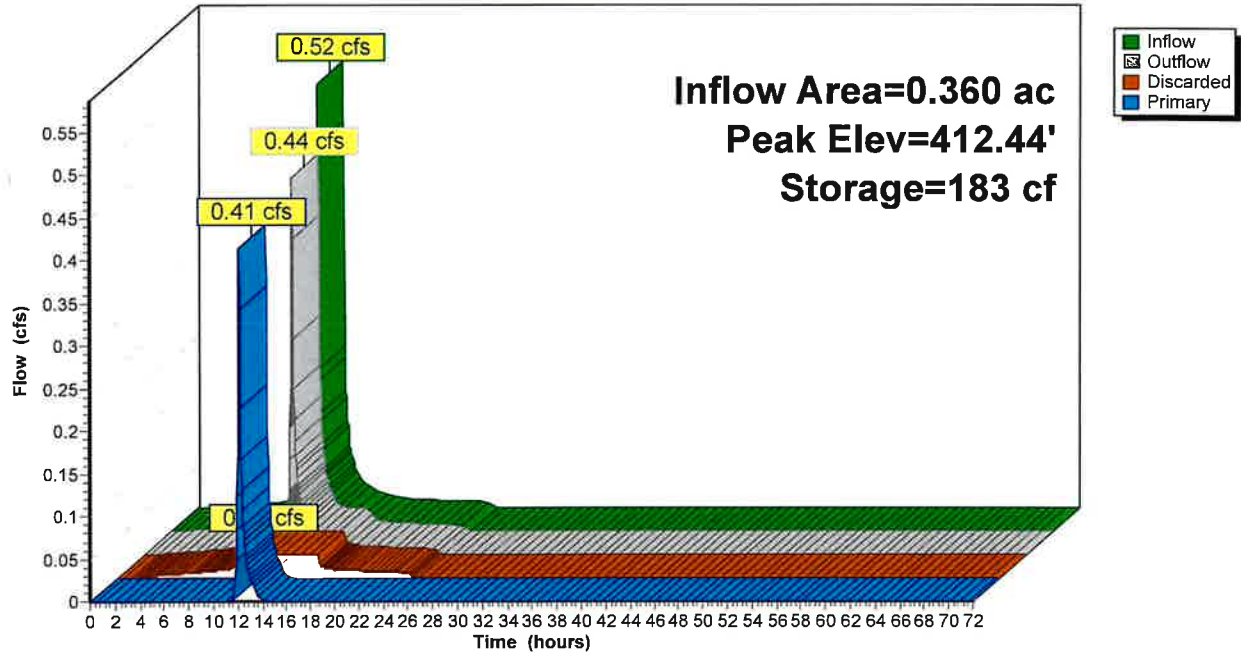
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Pond 5: Pipes

Hydrograph



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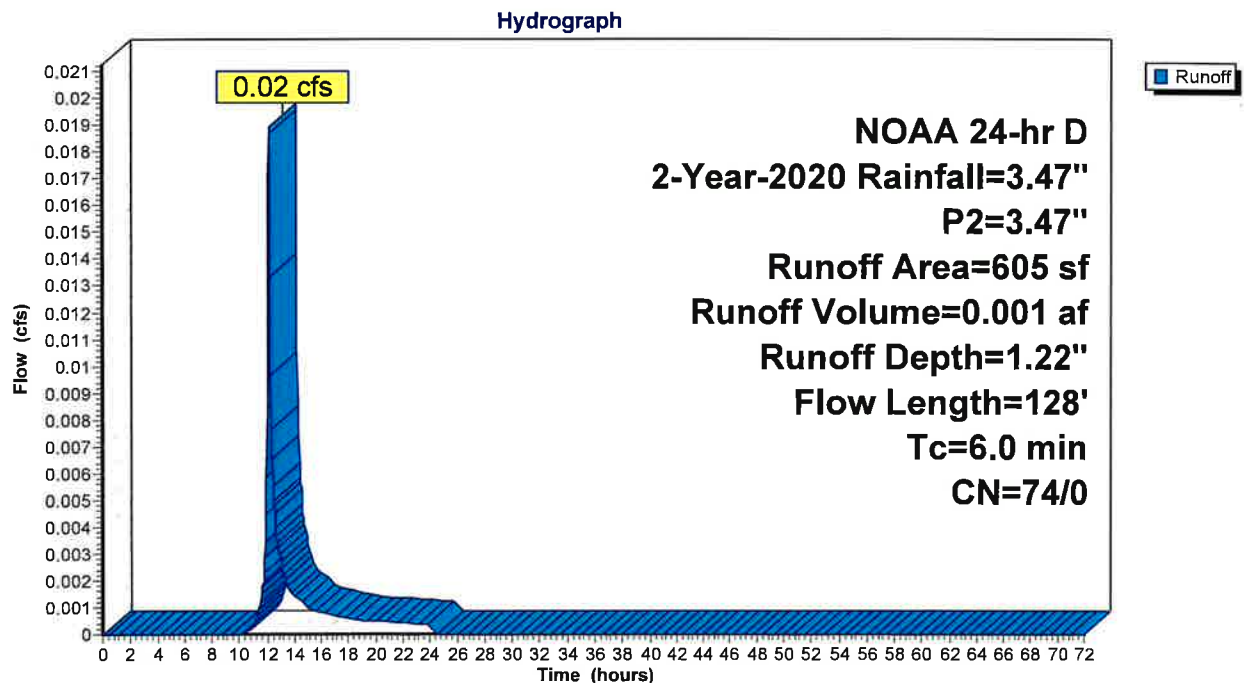
Summary for Subcatchment 6: Bypass

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.001 af, Depth= 1.22"
Routed to Link 7 : Proposed

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

Area (sf)	CN	Description
605	74	>75% Grass cover, Good, HSG C
605	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0650	0.28		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
0.1	28	0.0900	4.50		Shallow Concentrated Flow, 2 Grassed Waterway Kv= 15.0 fps
6.0	128	Total			

Subcatchment 6: Bypass

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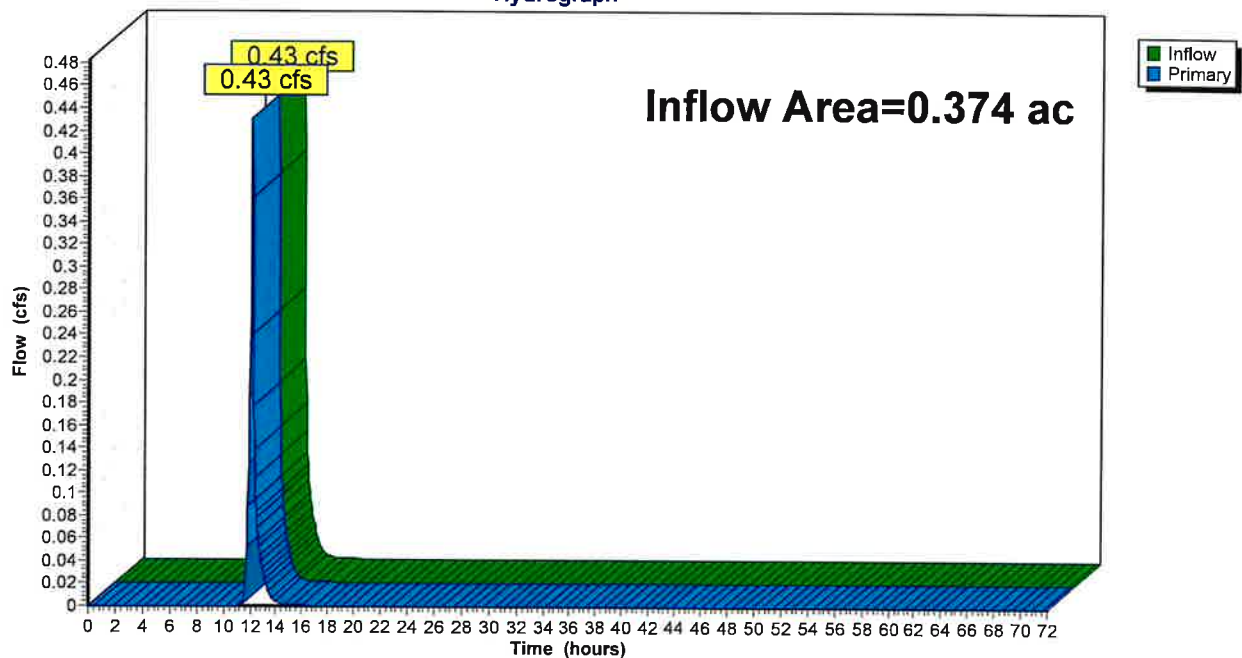
Summary for Link 7: Proposed

Inflow Area = 0.374 ac, 69.93% Impervious, Inflow Depth = 0.49" for 2-Year-2020 event
Inflow = 0.43 cfs @ 12.10 hrs, Volume= 0.015 af
Primary = 0.43 cfs @ 12.10 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7: Proposed

Hydrograph



1240815-pipes

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512-516 Pleasant Valley Way, West Orange
NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Exisiting

Runoff Area=16,242 sf 68.64% Impervious Runoff Depth=4.37"
Flow Length=141' Tc=5.9 min CN=74/98 Runoff=1.63 cfs 0.136 af

Subcatchment2: Parking Lot

Runoff Area=7,305 sf 91.47% Impervious Runoff Depth=4.93"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=0.92 cfs 0.069 af

Pond 3: Pervious Pavers

Peak Elev=414.63' Storage=733 cf Inflow=0.92 cfs 0.069 af
Discarded=0.11 cfs 0.067 af Primary=0.05 cfs 0.002 af Outflow=0.16 cfs 0.069 af

Subcatchment4: Proposed

Runoff Area=8,392 sf 56.22% Impervious Runoff Depth=4.06"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=0.91 cfs 0.065 af

Pond 5: Pipes

Peak Elev=412.74' Storage=268 cf Inflow=0.91 cfs 0.067 af
Discarded=0.03 cfs 0.033 af Primary=0.66 cfs 0.034 af Outflow=0.69 cfs 0.067 af

Subcatchment6: Bypass

Runoff Area=605 sf 0.00% Impervious Runoff Depth=2.67"
Flow Length=128' Tc=6.0 min CN=74/0 Runoff=0.04 cfs 0.003 af

Link 7: Proposed

Inflow=0.70 cfs 0.037 af
Primary=0.70 cfs 0.037 af

Total Runoff Area = 0.747 ac Runoff Volume = 0.273 af Average Runoff Depth = 4.38"
30.71% Pervious = 0.229 ac 69.29% Impervious = 0.518 ac

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Summary for Subcatchment 1: Exisiting

Runoff = 1.63 cfs @ 12.13 hrs, Volume= 0.136 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

	Area (sf)	CN	Description
*	2,676	98	Buildings
*	794	98	Walks/Steps & Patio
	7,679	98	Paved parking, HSG C
	5,093	74	>75% Grass cover, Good, HSG C
	16,242	90	Weighted Average
	5,093	74	31.36% Pervious Area
	11,149	98	68.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	66	0.0680	0.27		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
1.4	21	0.0950	0.24		Sheet Flow, 2 Grass: Short n= 0.150 P2= 3.47"
0.2	13	0.0390	1.24		Sheet Flow, 3 Smooth surfaces n= 0.011 P2= 3.47"
0.1	13	0.0390	4.01		Shallow Concentrated Flow, 4 Paved Kv= 20.3 fps
0.1	28	0.0360	3.85		Shallow Concentrated Flow, 5 Paved Kv= 20.3 fps
5.9	141	Total			

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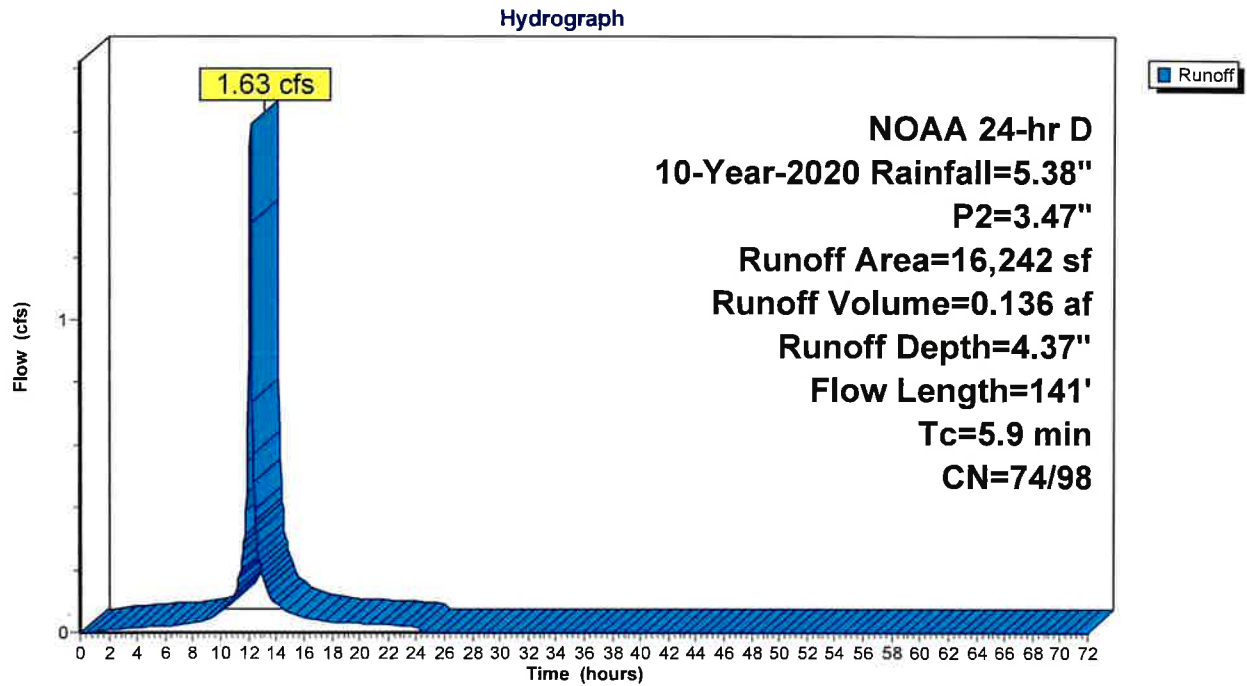
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Subcatchment 1: Existing



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Summary for Subcatchment 2: Parking Lot

Runoff = 0.92 cfs @ 12.06 hrs, Volume= 0.069 af, Depth= 4.93"
 Routed to Pond 3 : Pervious Pavers

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
6,682	98	Paved parking, HSG C
623	74	>75% Grass cover, Good, HSG C
7,305	96	Weighted Average
623	74	8.53% Pervious Area
6,682	98	91.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1
					Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2
					Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3
					Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4
					Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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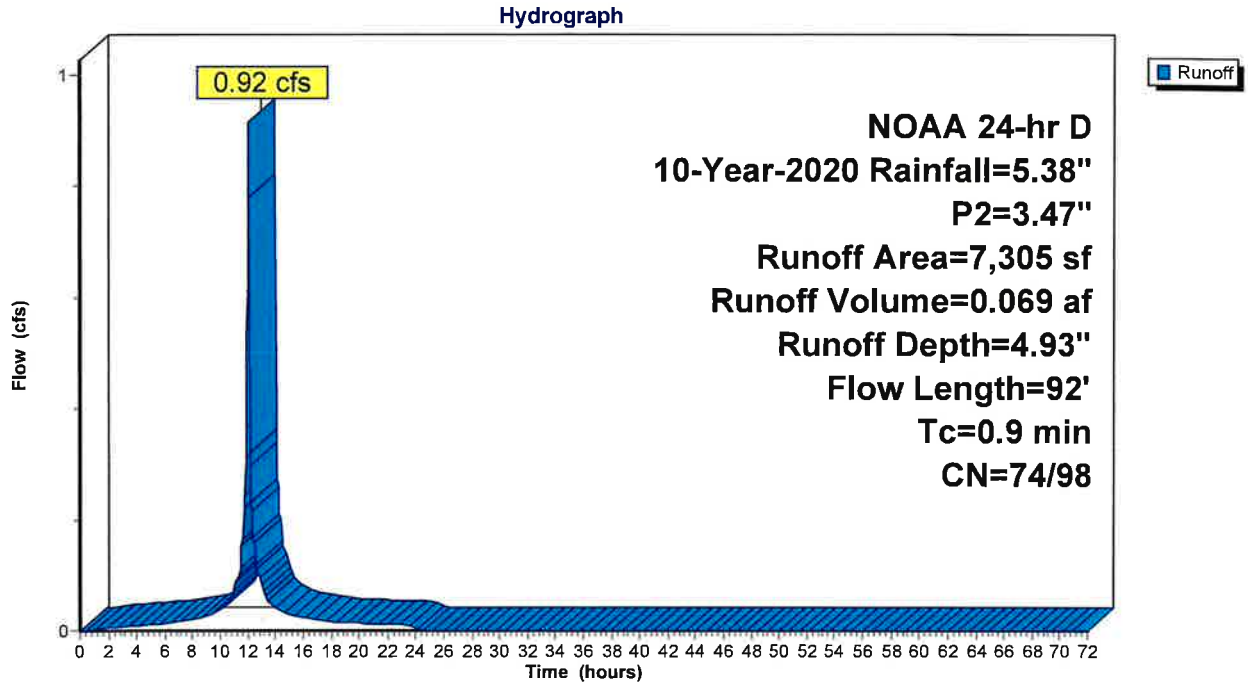
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Subcatchment 2: Parking Lot



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Summary for Pond 3: Pervious Pavers

Inflow Area = 0.168 ac, 91.47% Impervious, Inflow Depth = 4.93" for 10-Year-2020 event
 Inflow = 0.92 cfs @ 12.06 hrs, Volume= 0.069 af
 Outflow = 0.16 cfs @ 12.47 hrs, Volume= 0.069 af, Atten= 83%, Lag= 24.5 min
 Discarded = 0.11 cfs @ 11.45 hrs, Volume= 0.067 af
 Primary = 0.05 cfs @ 12.47 hrs, Volume= 0.002 af
 Routed to Pond 5 : Pipes

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 414.63' @ 12.47 hrs Surf.Area= 1,620 sf Storage= 733 cf

Plug-Flow detention time= 36.2 min calculated for 0.069 af (100% of inflow)
 Center-of-Mass det. time= 36.2 min (784.0 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1	413.50'	1,730 cf	60.00'W x 27.00'L x 2.67'H Prismatic 4,325 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	413.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	414.50'	6.0" Round Culvert L= 50.0' Ke= 0.200 Inlet / Outlet Invert= 414.50' / 414.17' S= 0.0066 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 11.45 hrs HW=413.53' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.05 cfs @ 12.47 hrs HW=414.63' (Free Discharge)
 ↑ **2=Culvert** (Barrel Controls 0.05 cfs @ 1.76 fps)

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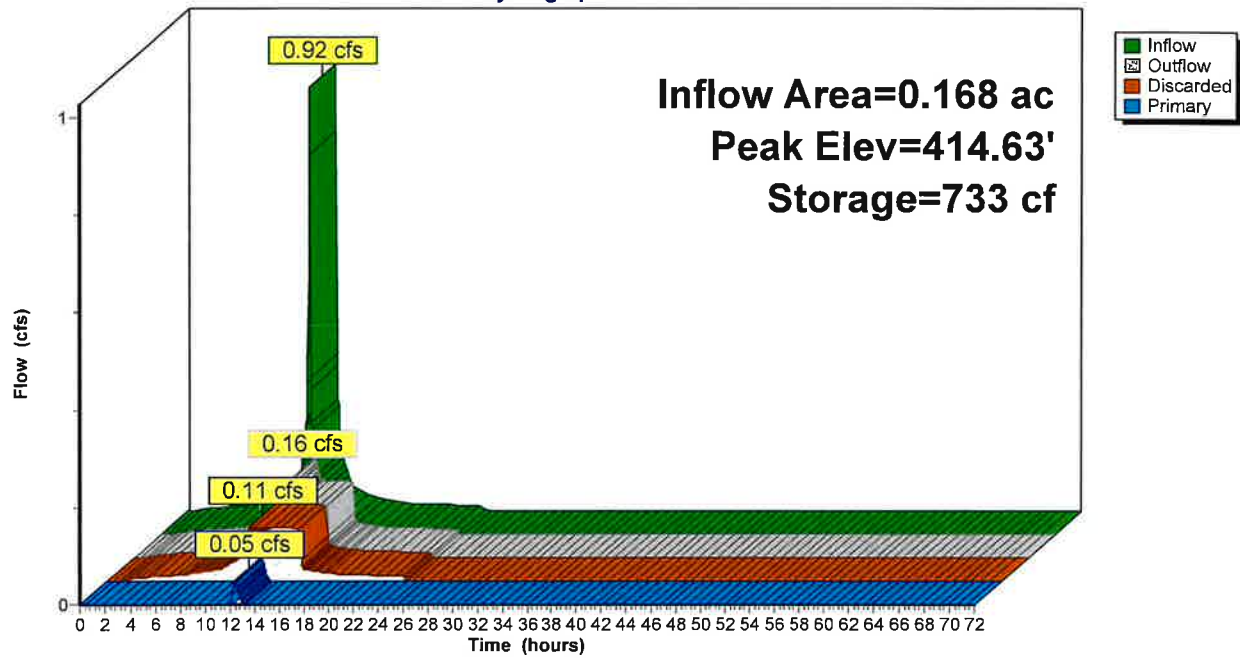
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Pond 3: Pervious Pavers

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Summary for Subcatchment 4: Proposed

Runoff = 0.91 cfs @ 12.06 hrs, Volume= 0.065 af, Depth= 4.06"
 Routed to Pond 5 : Pipes

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
3,522	98	Roofs, HSG C
1,136	98	Paved parking, HSG C
3,674	74	>75% Grass cover, Good, HSG C
* 60	98	Areaway
8,392	87	Weighted Average
3,674	74	43.78% Pervious Area
4,718	98	56.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1
					Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2
					Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3
					Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4
					Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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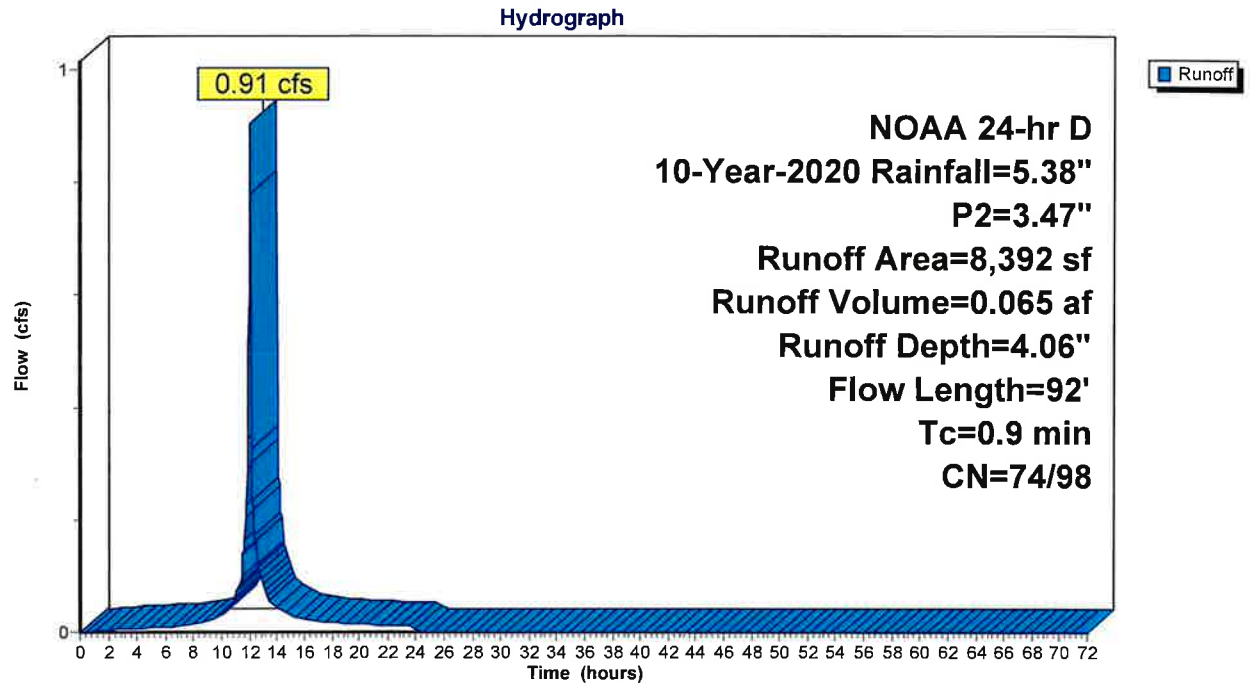
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Subcatchment 4: Proposed



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Summary for Pond 5: Pipes

Inflow Area = 0.360 ac, 72.63% Impervious, Inflow Depth = 2.24" for 10-Year-2020 event
 Inflow = 0.91 cfs @ 12.06 hrs, Volume= 0.067 af
 Outflow = 0.69 cfs @ 12.11 hrs, Volume= 0.067 af, Atten= 24%, Lag= 2.8 min
 Discarded = 0.03 cfs @ 9.75 hrs, Volume= 0.033 af
 Primary = 0.66 cfs @ 12.11 hrs, Volume= 0.034 af
 Routed to Link 7 : Proposed

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 412.74' @ 12.11 hrs Surf.Area= 400 sf Storage= 268 cf

Plug-Flow detention time= 15.3 min calculated for 0.067 af (100% of inflow)
 Center-of-Mass det. time= 15.3 min (785.8 - 770.4)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	329 cf	10.00'W x 40.00'L x 3.00'H Prismatic 1,200 cf Overall - 377 cf Embedded = 823 cf x 40.0% Voids
#2	412.00'	377 cf	24.0" Round Pipe Storage x 3 Inside #1 L= 40.0' S= 0.0020 '/'
		706 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	411.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	412.00'	12.0" Round Culvert L= 14.0' Ke= 0.100 Inlet / Outlet Invert= 412.00' / 411.94' S= 0.0043 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	412.00'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	414.00'	24.0" x 24.0" Horiz. Gate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 9.75 hrs HW=411.53' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.65 cfs @ 12.11 hrs HW=412.72' (Free Discharge)
 ↑2=Culvert (Passes 0.65 cfs of 1.43 cfs potential flow)
 ↑3=Orifice (Orifice Controls 0.65 cfs @ 3.32 fps)
 ↑4=Gate (Controls 0.00 cfs)

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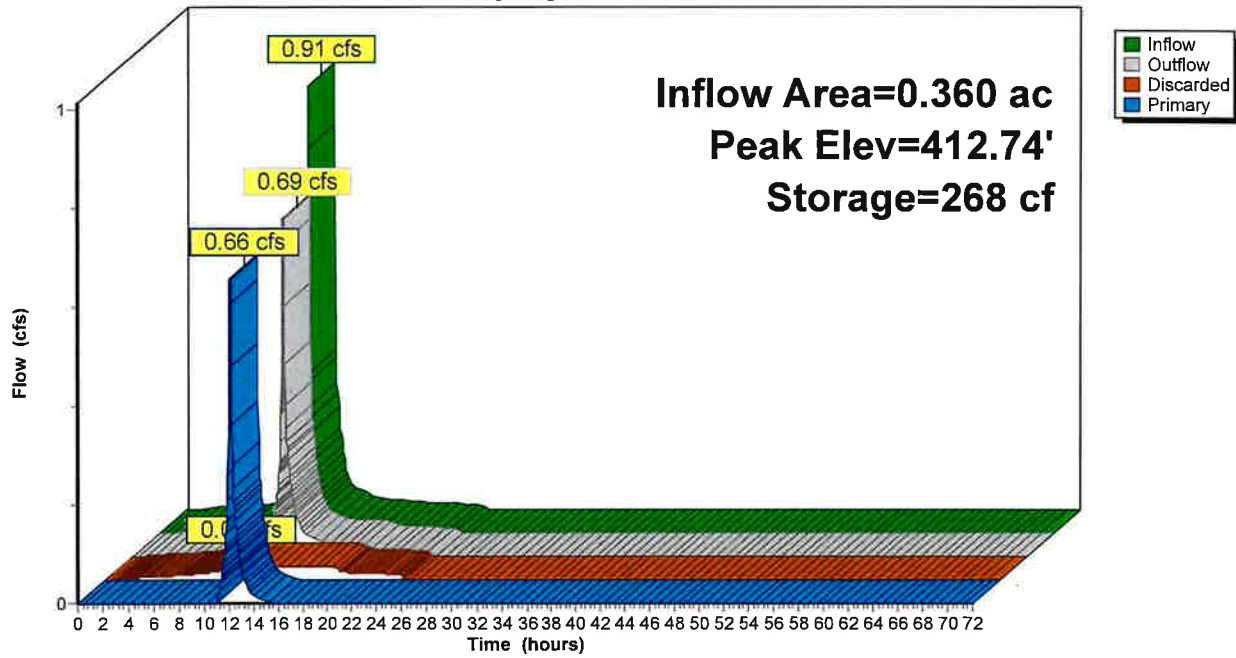
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Pond 5: Pipes

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Summary for Subcatchment 6: Bypass

Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.003 af, Depth= 2.67"
Routed to Link 7 : Proposed

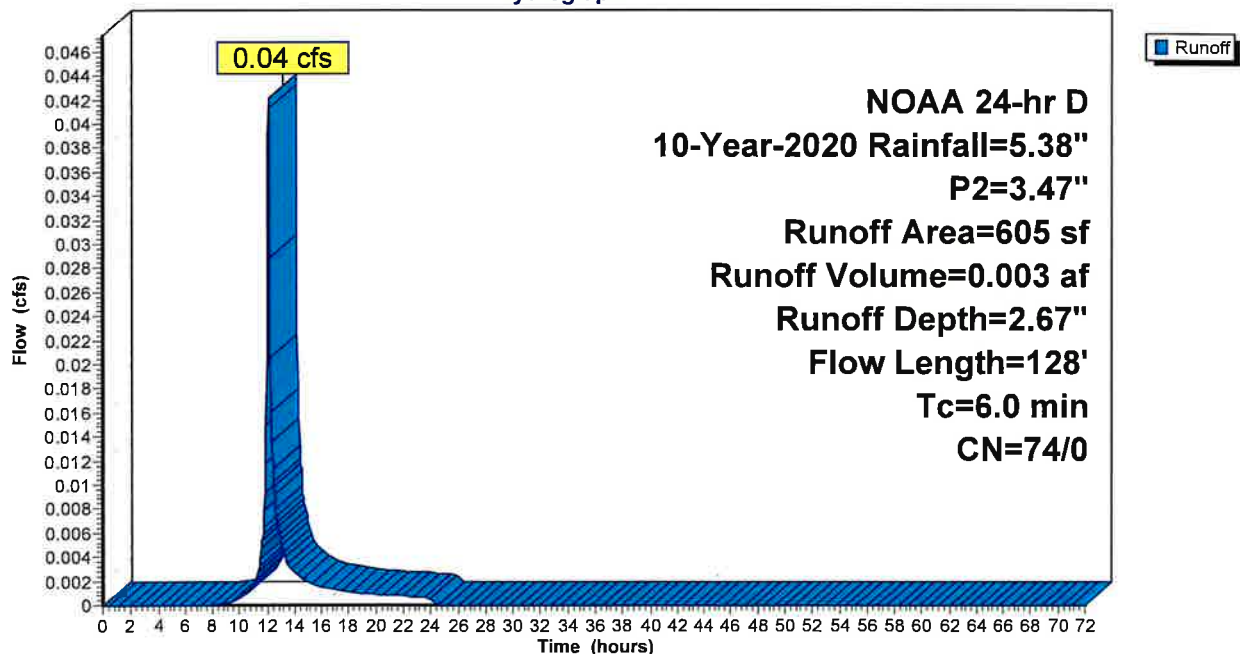
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

Area (sf)	CN	Description
605	74	>75% Grass cover, Good, HSG C
605	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0650	0.28		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
0.1	28	0.0900	4.50		Shallow Concentrated Flow, 2 Grassed Waterway Kv= 15.0 fps
6.0	128	Total			

Subcatchment 6: Bypass

Hydrograph



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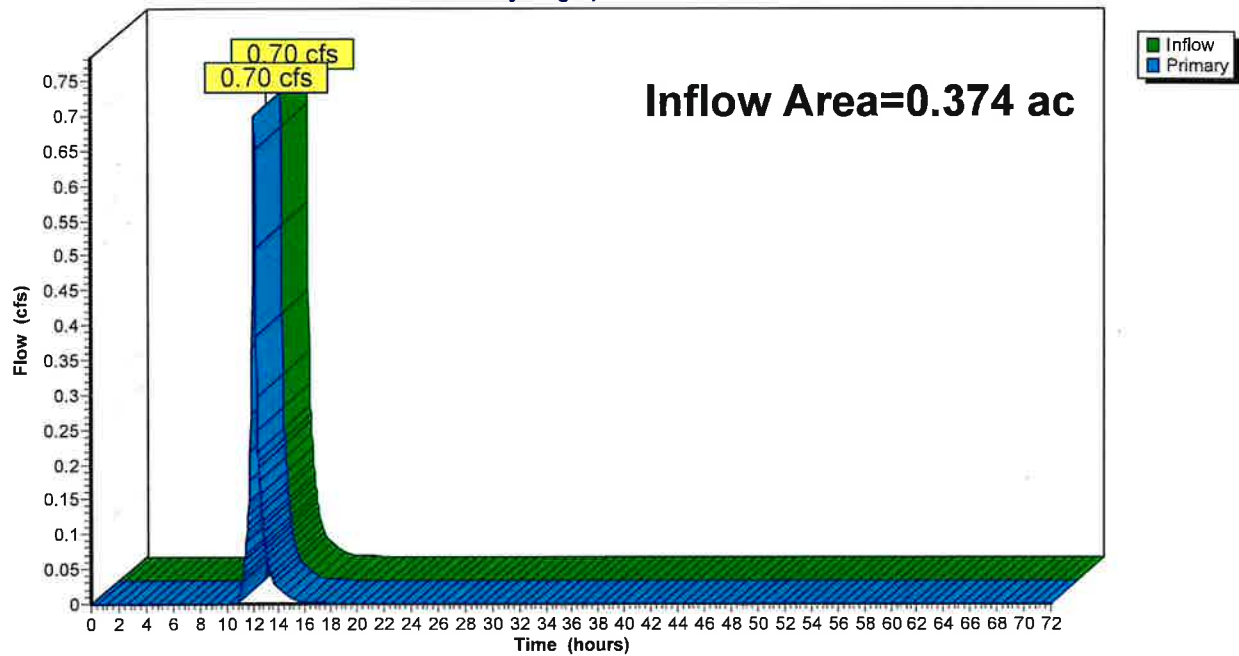
Summary for Link 7: Proposed

Inflow Area = 0.374 ac, 69.93% Impervious, Inflow Depth = 1.19" for 10-Year-2020 event
Inflow = 0.70 cfs @ 12.11 hrs, Volume= 0.037 af
Primary = 0.70 cfs @ 12.11 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7: Proposed

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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: ExistingRunoff Area=16,242 sf 68.64% Impervious Runoff Depth=8.02"
Flow Length=141' Tc=5.9 min CN=74/98 Runoff=2.97 cfs 0.249 af**Subcatchment2: Parking Lot**Runoff Area=7,305 sf 91.47% Impervious Runoff Depth=8.69"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=1.59 cfs 0.121 af**Pond 3: Pervious Pavers**Peak Elev=415.26' Storage=1,140 cf Inflow=1.59 cfs 0.121 af
Discarded=0.11 cfs 0.094 af Primary=0.64 cfs 0.027 af Outflow=0.75 cfs 0.121 af**Subcatchment4: Proposed**Runoff Area=8,392 sf 56.22% Impervious Runoff Depth=7.65"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=1.69 cfs 0.123 af**Pond 5: Pipes**Peak Elev=414.09' Storage=641 cf Inflow=2.21 cfs 0.150 af
Discarded=0.03 cfs 0.045 af Primary=1.83 cfs 0.105 af Outflow=1.86 cfs 0.150 af**Subcatchment6: Bypass**Runoff Area=605 sf 0.00% Impervious Runoff Depth=5.99"
Flow Length=128' Tc=6.0 min CN=74/0 Runoff=0.09 cfs 0.007 af**Link 7: Proposed**Inflow=1.92 cfs 0.112 af
Primary=1.92 cfs 0.112 af**Total Runoff Area = 0.747 ac Runoff Volume = 0.500 af Average Runoff Depth = 8.03"**
30.71% Pervious = 0.229 ac 69.29% Impervious = 0.518 ac

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Summary for Subcatchment 1: Exisiting

Runoff = 2.97 cfs @ 12.13 hrs, Volume= 0.249 af, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

	Area (sf)	CN	Description
*	2,676	98	Buildings
*	794	98	Walks/Steps & Patio
	7,679	98	Paved parking, HSG C
	5,093	74	>75% Grass cover, Good, HSG C
	16,242	90	Weighted Average
	5,093	74	31.36% Pervious Area
	11,149	98	68.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	66	0.0680	0.27		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
1.4	21	0.0950	0.24		Sheet Flow, 2 Grass: Short n= 0.150 P2= 3.47"
0.2	13	0.0390	1.24		Sheet Flow, 3 Smooth surfaces n= 0.011 P2= 3.47"
0.1	13	0.0390	4.01		Shallow Concentrated Flow, 4 Paved Kv= 20.3 fps
0.1	28	0.0360	3.85		Shallow Concentrated Flow, 5 Paved Kv= 20.3 fps
5.9	141	Total			

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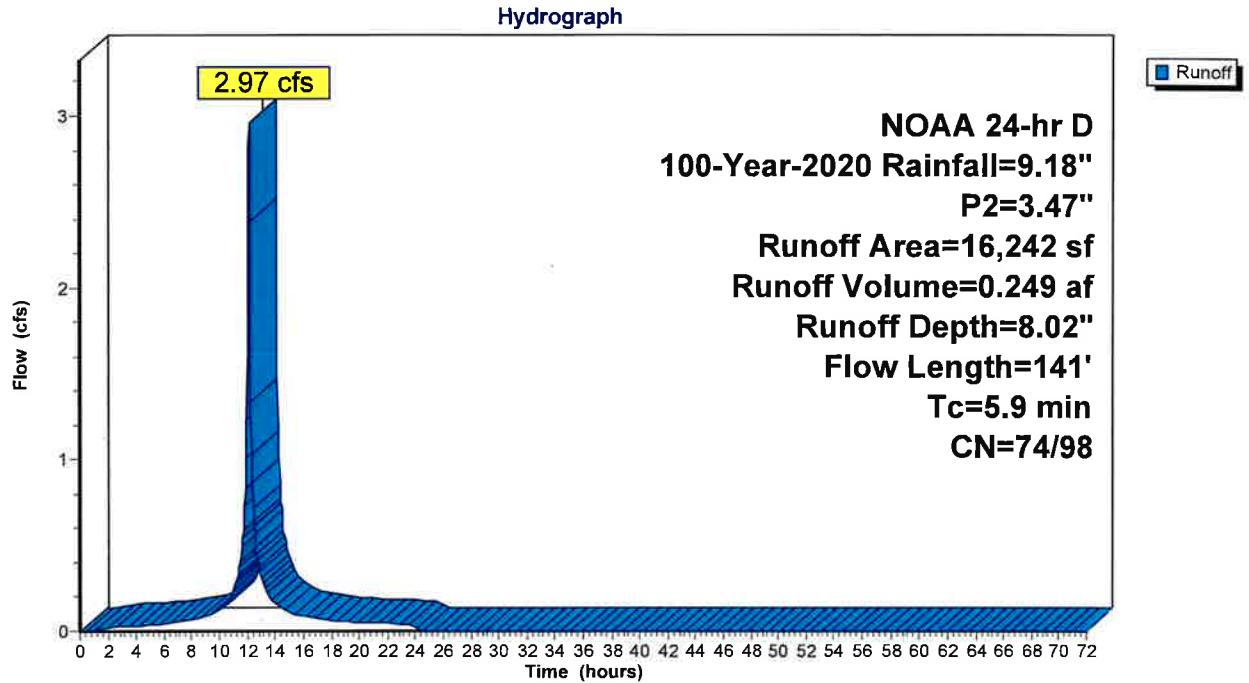
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Subcatchment 1: Existing



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Summary for Subcatchment 2: Parking Lot

Runoff = 1.59 cfs @ 12.06 hrs, Volume= 0.121 af, Depth= 8.69"
 Routed to Pond 3 : Pervious Pavers

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

Area (sf)	CN	Description
6,682	98	Paved parking, HSG C
623	74	>75% Grass cover, Good, HSG C
7,305	96	Weighted Average
623	74	8.53% Pervious Area
6,682	98	91.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1 Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2 Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3 Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4 Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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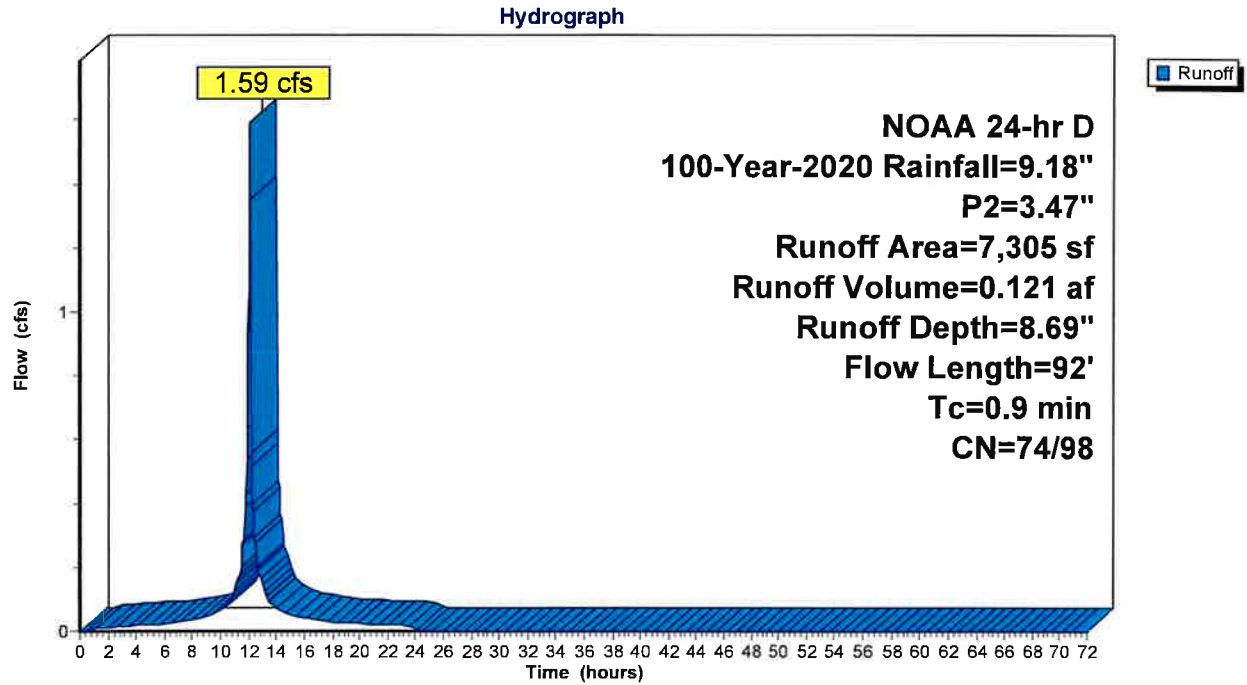
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Subcatchment 2: Parking Lot



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Summary for Pond 3: Pervious Pavers

Inflow Area = 0.168 ac, 91.47% Impervious, Inflow Depth = 8.69" for 100-Year-2020 event
 Inflow = 1.59 cfs @ 12.06 hrs, Volume= 0.121 af
 Outflow = 0.75 cfs @ 12.15 hrs, Volume= 0.121 af, Atten= 53%, Lag= 5.6 min
 Discarded = 0.11 cfs @ 10.85 hrs, Volume= 0.094 af
 Primary = 0.64 cfs @ 12.15 hrs, Volume= 0.027 af
 Routed to Pond 5 : Pipes

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 415.26' @ 12.15 hrs Surf.Area= 1,620 sf Storage= 1,140 cf

Plug-Flow detention time= 32.6 min calculated for 0.121 af (100% of inflow)
 Center-of-Mass det. time= 32.6 min (772.8 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1	413.50'	1,730 cf	60.00'W x 27.00'L x 2.67'H Prismatic 4,325 cf Overall x 40.0% Voids

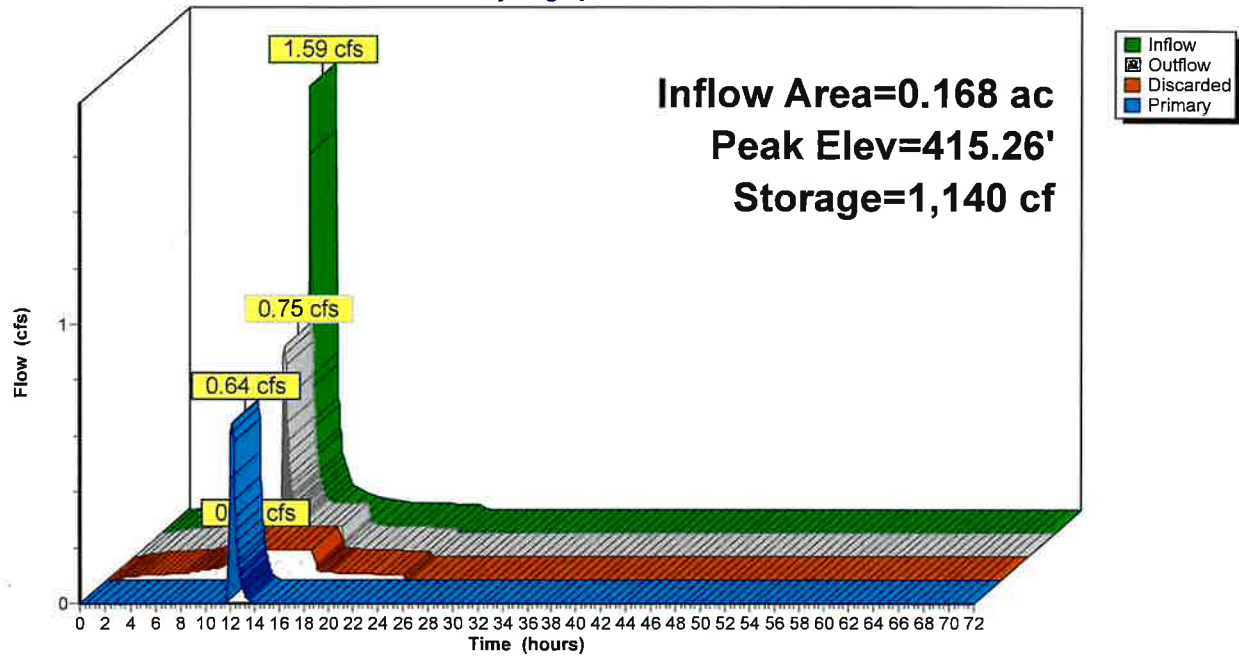
Device	Routing	Invert	Outlet Devices
#1	Discarded	413.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	414.50'	6.0" Round Culvert L= 50.0' Ke= 0.200 Inlet / Outlet Invert= 414.50' / 414.17' S= 0.0066 ' / Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 10.85 hrs HW=413.53' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.64 cfs @ 12.15 hrs HW=415.26' (Free Discharge)
 ↑2=Culvert (Barrel Controls 0.64 cfs @ 3.27 fps)

Pond 3: Pervious Pavers

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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Summary for Subcatchment 4: Proposed

Runoff = 1.69 cfs @ 12.06 hrs, Volume= 0.123 af, Depth= 7.65"
 Routed to Pond 5 : Pipes

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

Area (sf)	CN	Description
3,522	98	Roofs, HSG C
1,136	98	Paved parking, HSG C
3,674	74	>75% Grass cover, Good, HSG C
* 60	98	Areaway
8,392	87	Weighted Average
3,674	74	43.78% Pervious Area
4,718	98	56.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1 Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2 Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3 Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4 Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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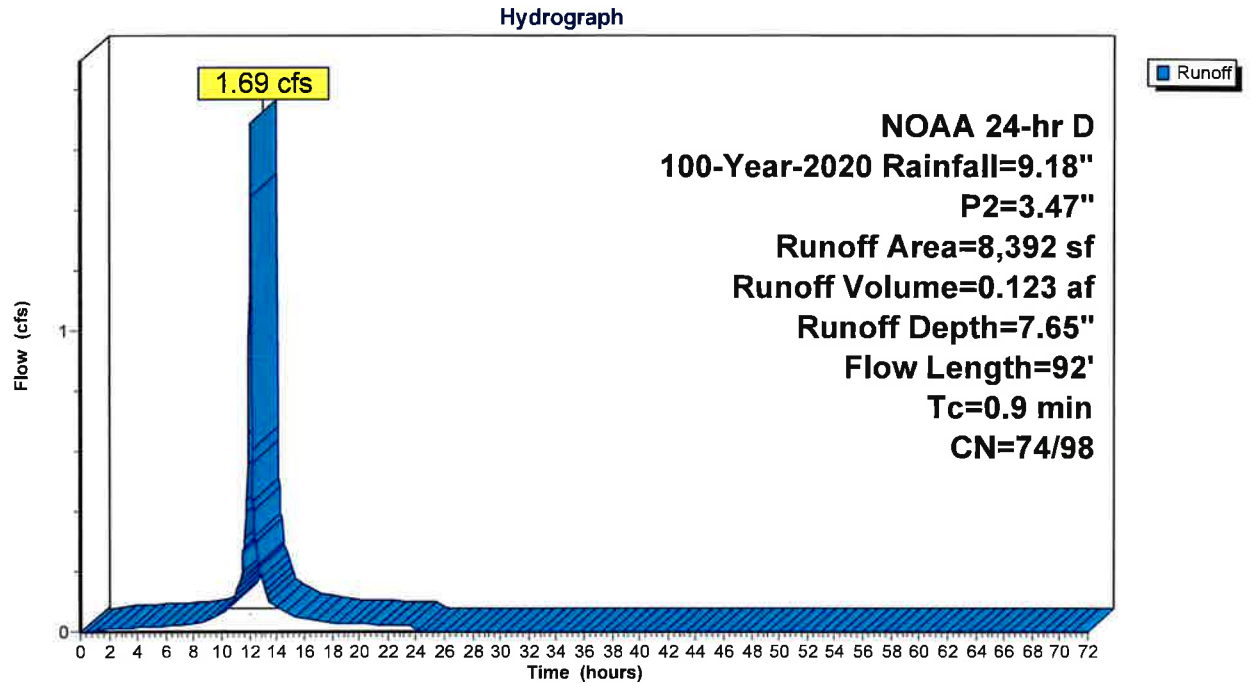
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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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Subcatchment 4: Proposed



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Summary for Pond 5: Pipes

Inflow Area = 0.360 ac, 72.63% Impervious, Inflow Depth = 4.99" for 100-Year-2020 event
 Inflow = 2.21 cfs @ 12.07 hrs, Volume= 0.150 af
 Outflow = 1.86 cfs @ 12.15 hrs, Volume= 0.150 af, Atten= 16%, Lag= 4.6 min
 Discarded = 0.03 cfs @ 7.55 hrs, Volume= 0.045 af
 Primary = 1.83 cfs @ 12.15 hrs, Volume= 0.105 af
 Routed to Link 7 : Proposed

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 414.09' @ 12.13 hrs Surf.Area= 400 sf Storage= 641 cf

Plug-Flow detention time= 14.9 min calculated for 0.150 af (100% of inflow)
 Center-of-Mass det. time= 14.9 min (773.8 - 758.9)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	329 cf	10.00'W x 40.00'L x 3.00'H Prismatoid 1,200 cf Overall - 377 cf Embedded = 823 cf x 40.0% Voids
#2	412.00'	377 cf	24.0" Round Pipe Storage x 3 Inside #1 L= 40.0' S= 0.0020 '/
		706 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	411.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	412.00'	12.0" Round Culvert L= 14.0' Ke= 0.100 Inlet / Outlet Invert= 412.00' / 411.94' S= 0.0043 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	412.00'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	414.00'	24.0" x 24.0" Horiz. Gate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 7.55 hrs HW=411.53' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.79 cfs @ 12.15 hrs HW=414.07' (Free Discharge)
 ↳2=Culvert (Passes 1.79 cfs of 5.52 cfs potential flow)
 ↳3=Orifice (Orifice Controls 1.28 cfs @ 6.50 fps)
 ↳4=Grate (Weir Controls 0.51 cfs @ 0.88 fps)

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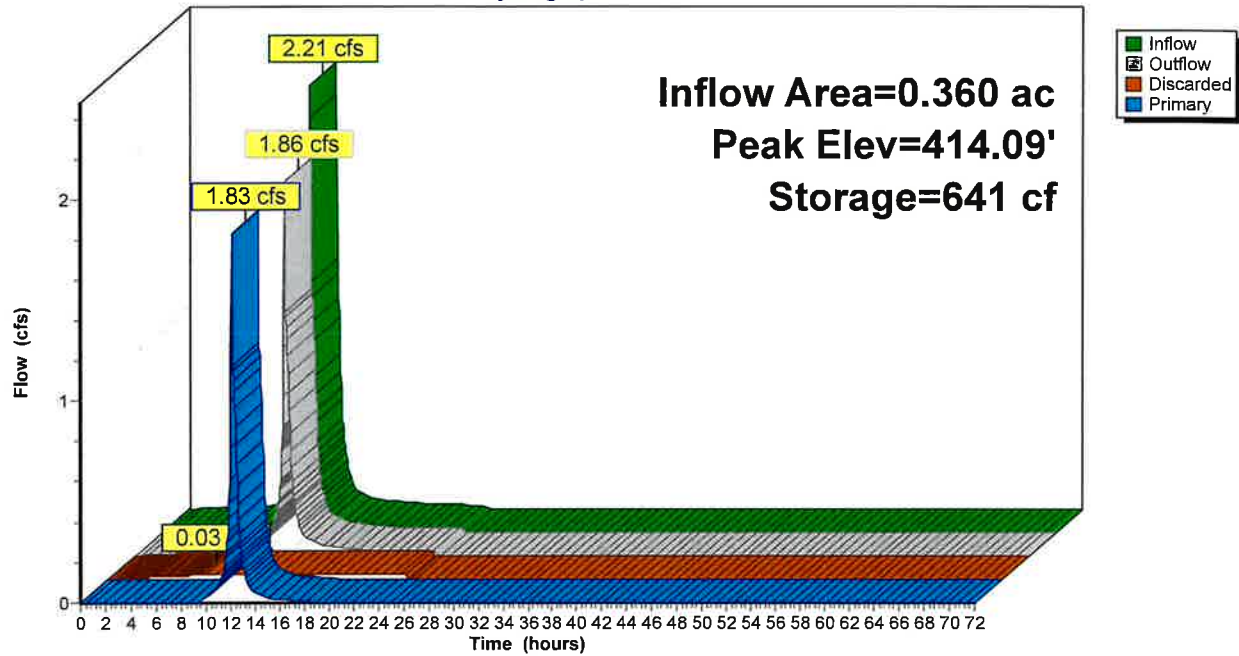
NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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Pond 5: Pipes

Hydrograph



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Summary for Subcatchment 6: Bypass

Runoff = 0.09 cfs @ 12.13 hrs, Volume= 0.007 af, Depth= 5.99"
 Routed to Link 7 : Proposed

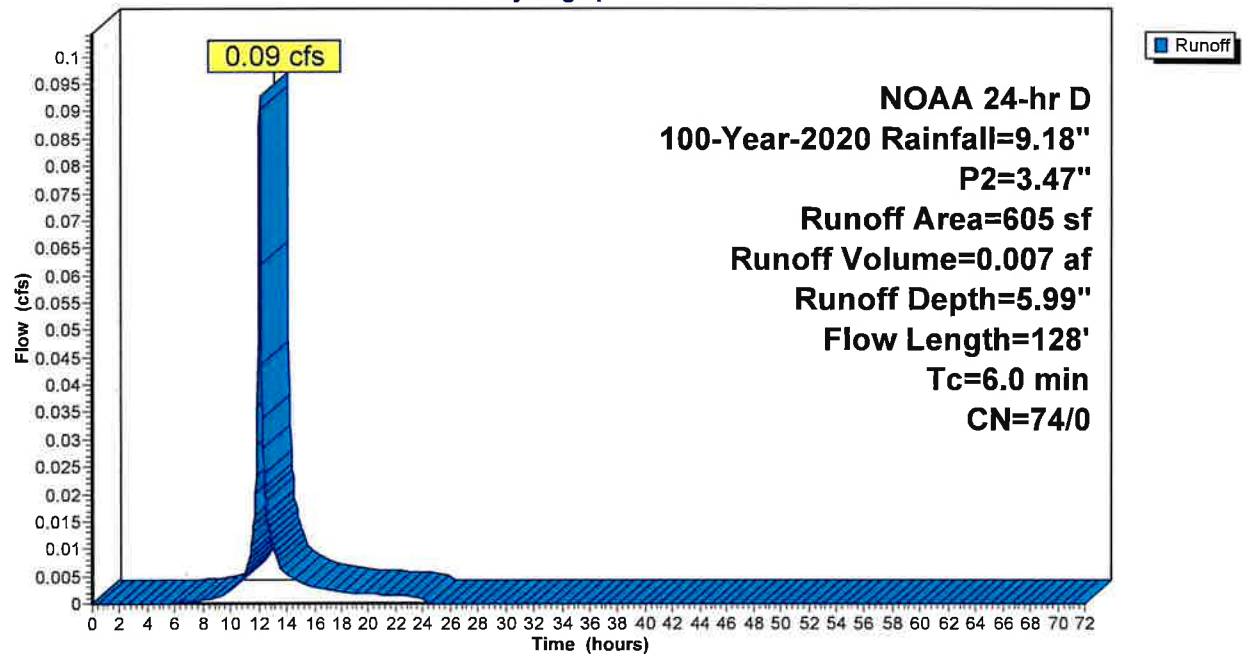
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

Area (sf)	CN	Description
605	74	>75% Grass cover, Good, HSG C
605	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0650	0.28		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
0.1	28	0.0900	4.50		Shallow Concentrated Flow, 2 Grassed Waterway Kv= 15.0 fps
6.0	128	Total			

Subcatchment 6: Bypass

Hydrograph



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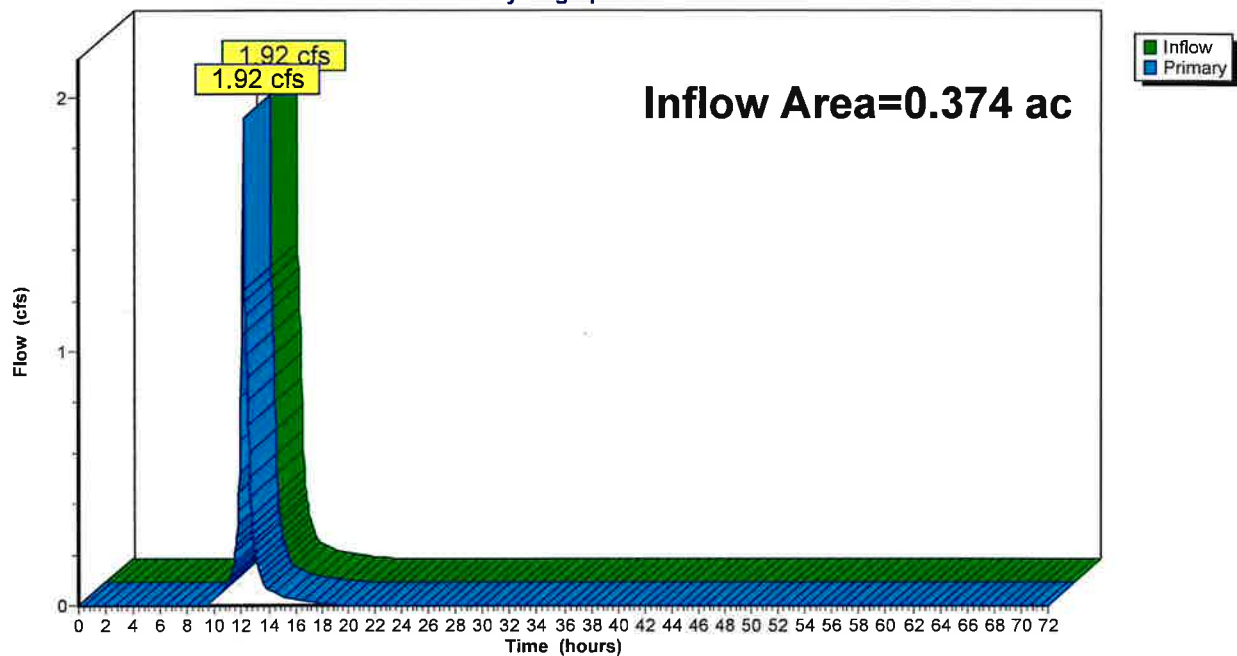
Summary for Link 7: Proposed

Inflow Area = 0.374 ac, 69.93% Impervious, Inflow Depth = 3.59" for 100-Year-2020 event
Inflow = 1.92 cfs @ 12.15 hrs, Volume= 0.112 af
Primary = 1.92 cfs @ 12.15 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7: Proposed

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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Existing

Runoff Area=16,242 sf 68.64% Impervious Runoff Depth=0.73"
Flow Length=141' Tc=5.9 min CN=74/98 Runoff=0.73 cfs 0.023 af

Subcatchment2: Parking Lot

Runoff Area=7,305 sf 91.47% Impervious Runoff Depth=0.95"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=0.47 cfs 0.013 af

Pond 3: Pervious Pavers

Peak Elev=413.90' Storage=257 cf Inflow=0.47 cfs 0.013 af
Discarded=0.11 cfs 0.013 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.013 af

Subcatchment4: Proposed

Runoff Area=8,392 sf 56.22% Impervious Runoff Depth=0.61"
Flow Length=92' Tc=0.9 min CN=74/98 Runoff=0.33 cfs 0.010 af

Pond 5: Pipes

Peak Elev=412.30' Storage=145 cf Inflow=0.33 cfs 0.010 af
Discarded=0.03 cfs 0.005 af Primary=0.23 cfs 0.005 af Outflow=0.26 cfs 0.010 af

Subcatchment6: Bypass

Runoff Area=605 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=128' Tc=6.0 min CN=74/0 Runoff=0.00 cfs 0.000 af

Link 7: Proposed

Inflow=0.23 cfs 0.005 af
Primary=0.23 cfs 0.005 af

Total Runoff Area = 0.747 ac Runoff Volume = 0.046 af Average Runoff Depth = 0.74"
30.71% Pervious = 0.229 ac 69.29% Impervious = 0.518 ac

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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Summary for Subcatchment 1: Exisiting

Runoff = 0.73 cfs @ 1.14 hrs, Volume= 0.023 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

Area (sf)	CN	Description
* 2,676	98	Buildings
* 794	98	Walks/Steps & Patio
7,679	98	Paved parking, HSG C
5,093	74	>75% Grass cover, Good, HSG C
16,242	90	Weighted Average
5,093	74	31.36% Pervious Area
11,149	98	68.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	66	0.0680	0.27		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
1.4	21	0.0950	0.24		Sheet Flow, 2 Grass: Short n= 0.150 P2= 3.47"
0.2	13	0.0390	1.24		Sheet Flow, 3 Smooth surfaces n= 0.011 P2= 3.47"
0.1	13	0.0390	4.01		Shallow Concentrated Flow, 4 Paved Kv= 20.3 fps
0.1	28	0.0360	3.85		Shallow Concentrated Flow, 5 Paved Kv= 20.3 fps
5.9	141	Total			

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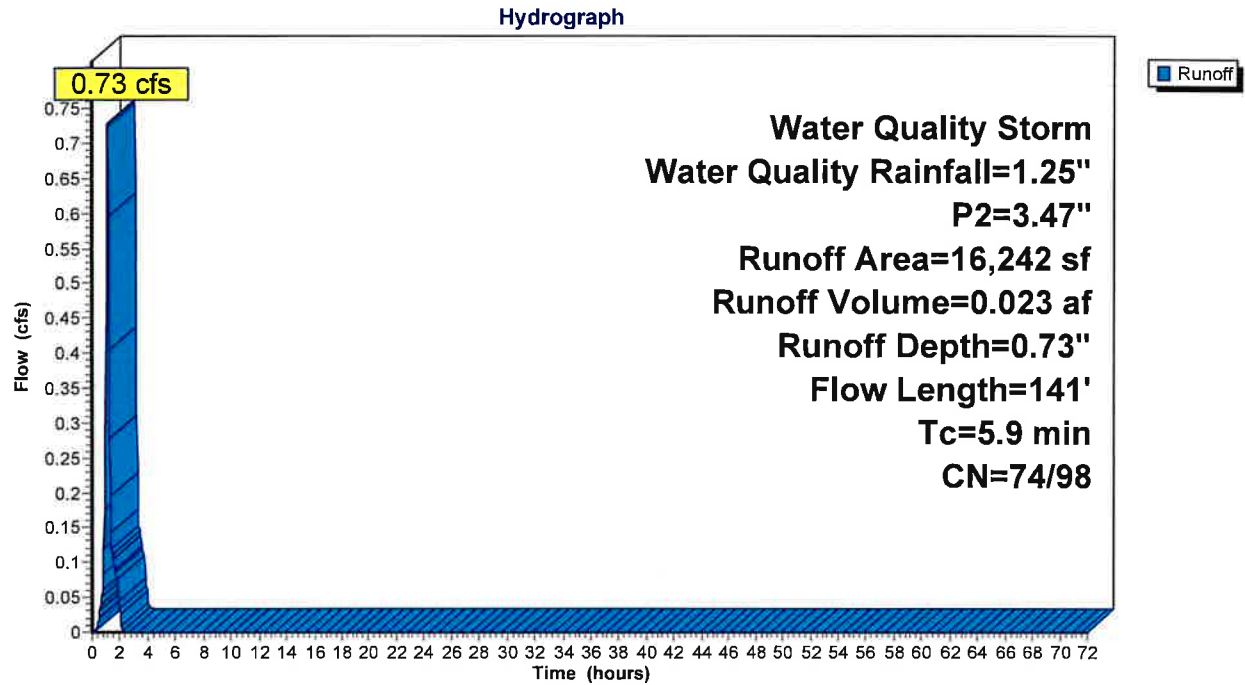
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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Subcatchment 1: Existing



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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Summary for Subcatchment 2: Parking Lot

Runoff = 0.47 cfs @ 1.07 hrs, Volume= 0.013 af, Depth= 0.95"
 Routed to Pond 3 : Pervious Pavers

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

Area (sf)	CN	Description
6,682	98	Paved parking, HSG C
623	74	>75% Grass cover, Good, HSG C
7,305	96	Weighted Average
623	74	8.53% Pervious Area
6,682	98	91.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1
					Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2
					Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3
					Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4
					Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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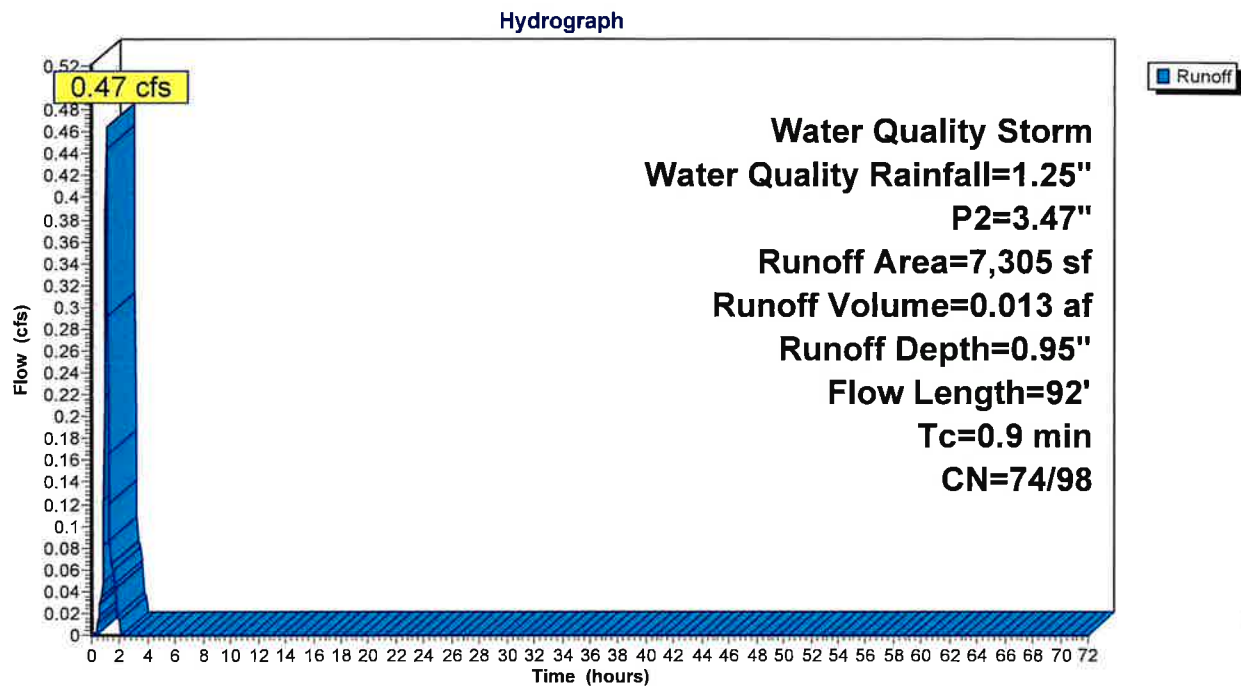
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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Subcatchment 2: Parking Lot



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Summary for Pond 3: Pervious Pavers

Inflow Area = 0.168 ac, 91.47% Impervious, Inflow Depth = 0.95" for Water Quality event
 Inflow = 0.47 cfs @ 1.07 hrs, Volume= 0.013 af
 Outflow = 0.11 cfs @ 0.95 hrs, Volume= 0.013 af, Atten= 77%, Lag= 0.0 min
 Discarded = 0.11 cfs @ 0.95 hrs, Volume= 0.013 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Pond 5 : Pipes

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 413.90' @ 1.27 hrs Surf.Area= 1,620 sf Storage= 257 cf

Plug-Flow detention time= 21.6 min calculated for 0.013 af (100% of inflow)
 Center-of-Mass det. time= 21.6 min (89.6 - 68.0)

Volume	Invert	Avail.Storage	Storage Description
#1	413.50'	1,730 cf	60.00'W x 27.00'L x 2.67'H Prismatic 4,325 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	413.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	414.50'	6.0" Round Culvert L= 50.0' Ke= 0.200 Inlet / Outlet Invert= 414.50' / 414.17' S= 0.0066 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.11 cfs @ 0.95 hrs HW=413.54' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=413.50' (Free Discharge)
 ↑2=Culvert (Controls 0.00 cfs)

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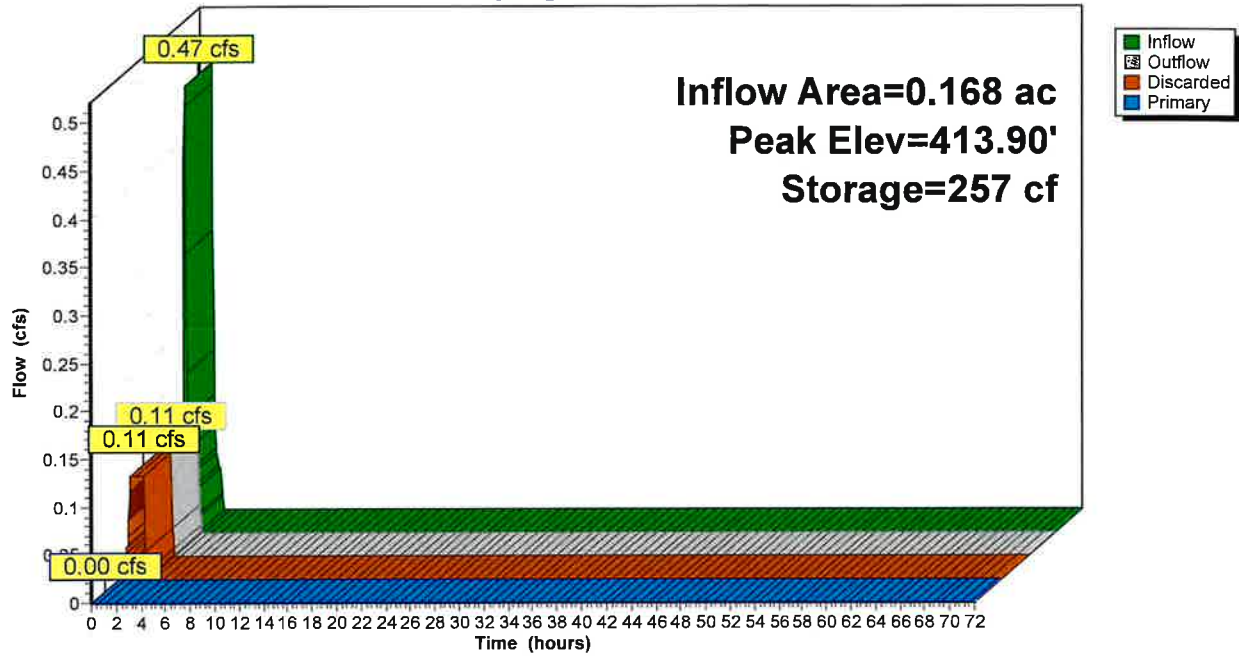
Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Pond 3: Pervious Pavers

Hydrograph



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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Summary for Subcatchment 4: Proposed

Runoff = 0.33 cfs @ 1.07 hrs, Volume= 0.010 af, Depth= 0.61"
 Routed to Pond 5 : Pipes

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
 Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

Area (sf)	CN	Description
3,522	98	Roofs, HSG C
1,136	98	Paved parking, HSG C
3,674	74	>75% Grass cover, Good, HSG C
* 60	98	Areaway
8,392	87	Weighted Average
3,674	74	43.78% Pervious Area
4,718	98	56.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	8	0.0650	1.38		Sheet Flow, 1
					Smooth surfaces n= 0.011 P2= 3.47"
0.1	15	0.6700	3.99		Sheet Flow, 2
					Smooth surfaces n= 0.011 P2= 3.47"
0.5	59	0.0500	1.86		Sheet Flow, 3
					Smooth surfaces n= 0.011 P2= 3.47"
0.2	10	0.0250	0.99		Sheet Flow, 4
					Smooth surfaces n= 0.011 P2= 3.47"
0.9	92	Total			

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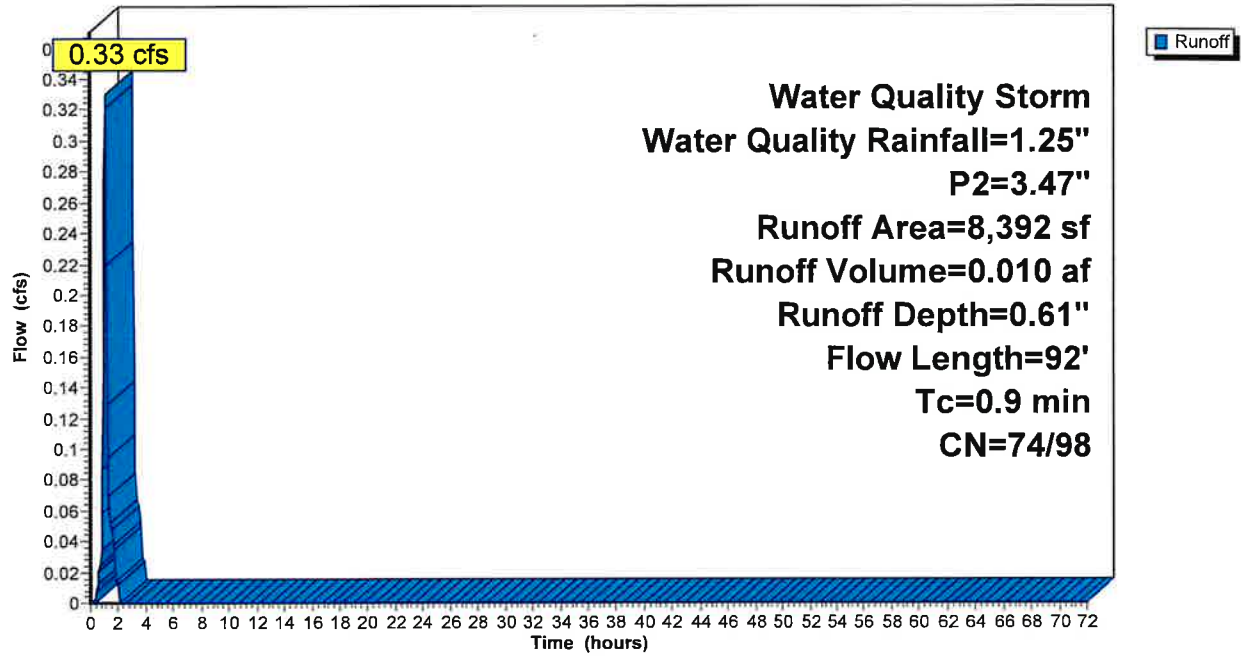
Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Subcatchment 4: Proposed

Hydrograph



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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Summary for Pond 5: Pipes

Inflow Area = 0.360 ac, 72.63% Impervious, Inflow Depth = 0.33" for Water Quality event
 Inflow = 0.33 cfs @ 1.07 hrs, Volume= 0.010 af
 Outflow = 0.26 cfs @ 1.14 hrs, Volume= 0.010 af, Atten= 22%, Lag= 4.2 min
 Discarded = 0.03 cfs @ 0.80 hrs, Volume= 0.005 af
 Primary = 0.23 cfs @ 1.14 hrs, Volume= 0.005 af
 Routed to Link 7 : Proposed

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 412.30' @ 1.14 hrs Surf.Area= 400 sf Storage= 145 cf

Plug-Flow detention time= 19.9 min calculated for 0.010 af (100% of inflow)
 Center-of-Mass det. time= 19.9 min (88.7 - 68.8)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	329 cf	10.00'W x 40.00'L x 3.00'H Prismatoid 1,200 cf Overall - 377 cf Embedded = 823 cf x 40.0% Voids
#2	412.00'	377 cf	24.0" Round Pipe Storage x 3 Inside #1 L= 40.0' S= 0.0020 '/'
			706 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	411.50'	2.900 in/hr Exfiltration over Surface area
#2	Primary	412.00'	12.0" Round Culvert L= 14.0' Ke= 0.100 Inlet / Outlet Invert= 412.00' / 411.94' S= 0.0043 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	412.00'	6.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 2	414.00'	24.0" x 24.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 0.80 hrs HW=411.54' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.22 cfs @ 1.14 hrs HW=412.30' (Free Discharge)

↑2=Culvert (Passes 0.22 cfs of 0.27 cfs potential flow)

↑3=Orifice (Orifice Controls 0.22 cfs @ 1.85 fps)

↑4=Grate (Controls 0.00 cfs)

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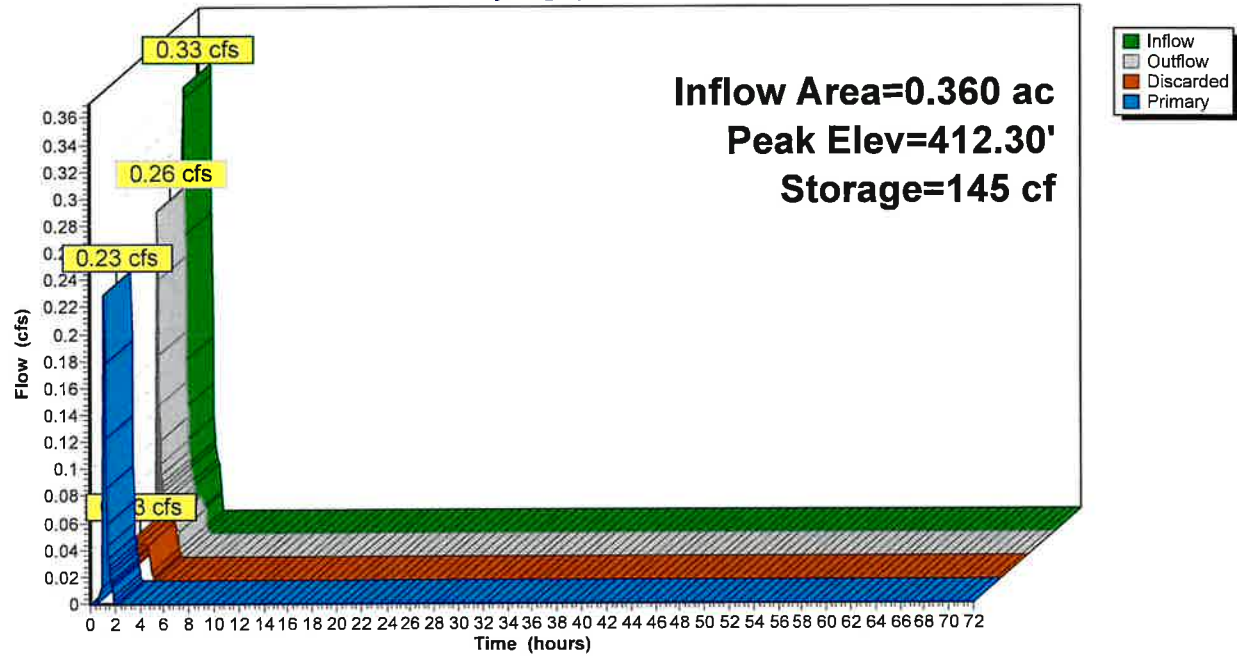
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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Pond 5: Pipes

Hydrograph



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Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

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Summary for Subcatchment 6: Bypass

Runoff = 0.00 cfs @ 1.25 hrs, Volume= 0.000 af, Depth= 0.07"
Routed to Link 7 : Proposed

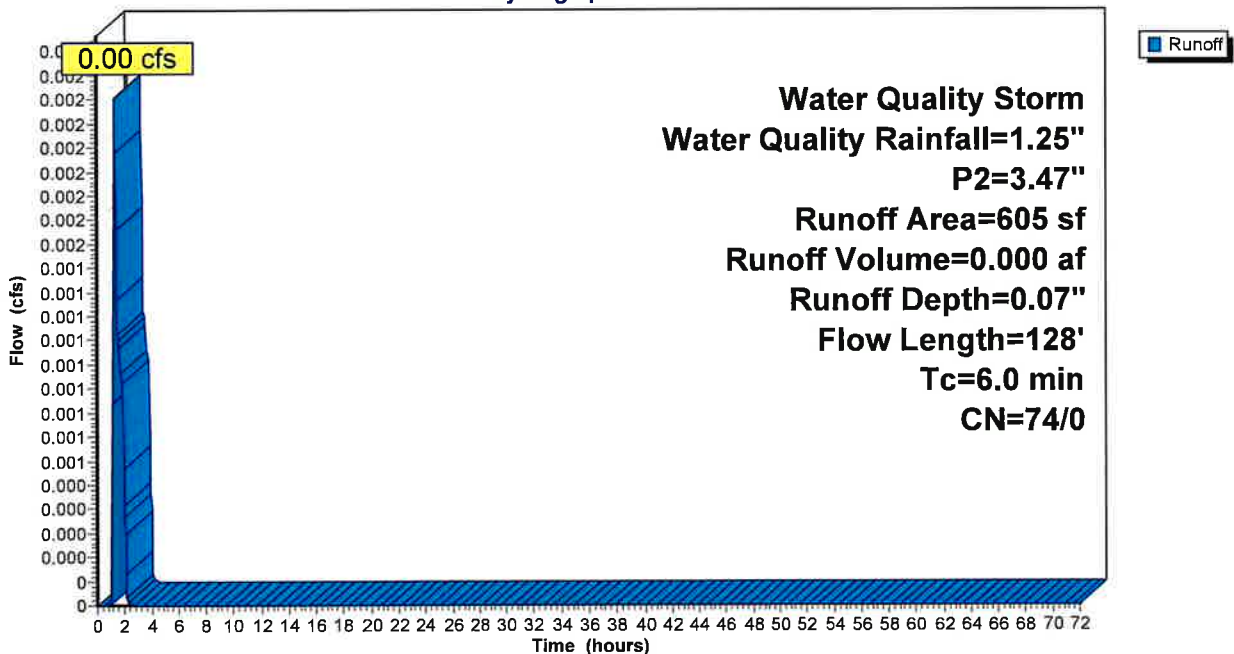
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-72.00 hrs, dt= 0.05
Water Quality Storm Water Quality Rainfall=1.25", P2=3.47"

Area (sf)	CN	Description
605	74	>75% Grass cover, Good, HSG C
605	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.0650	0.28		Sheet Flow, 1 Grass: Short n= 0.150 P2= 3.47"
0.1	28	0.0900	4.50		Shallow Concentrated Flow, 2 Grassed Waterway Kv= 15.0 fps
6.0	128	Total			

Subcatchment 6: Bypass

Hydrograph



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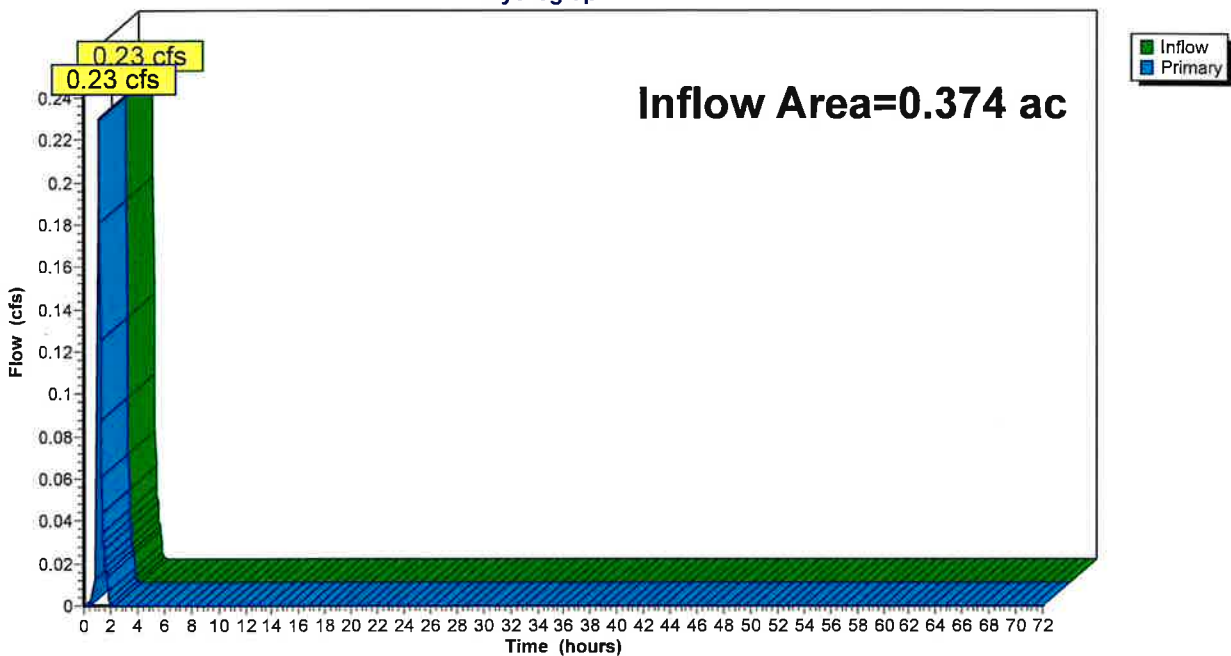
Summary for Link 7: Proposed

Inflow Area = 0.374 ac, 69.93% Impervious, Inflow Depth = 0.16" for Water Quality event
Inflow = 0.23 cfs @ 1.14 hrs, Volume= 0.005 af
Primary = 0.23 cfs @ 1.14 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 7: Proposed

Hydrograph



DRAINAGE AREA MAPS

