



- ◆ Civil Engineering
- ◆ Wastewater Treatment
- ◆ Environmental Engineering
- ◆ Construction Management
- ◆ Title 5 Services/Septic Design

Wallace Project
819 Aquidneck Avenue, Middletown

Storm Water Drainage Calculations

Prepared For:

John Wallace
819 Aquidneck Avenue
Middletown, RI 02842

October 29, 2020
Revised April 7, 2021

Job 2020-104

Storm Water Drainage Calculations

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DESCRIPTION AND LOCATION

John Wallace is proposing the demolition and reconstruction of the existing building and garage to their existing property at 819 Aquidneck Avenue in Middletown, Rhode Island. The project is an existing dwelling with an existing garage on the site. The owner intends to reconstruct the dwelling and a new garage building on the property for his use. The existing driveways which serve as the existing entrance and egress will remain unchanged at the site. The adjacent property to the north is an existing tradesman center with a large building and the property to the east and south is residential. An existing concrete and gravel drive and access area will be expanded to the proposed garage to allow access to and from the garage.

The existing project consists of Map 114, Lot 129, and totaling approximately 26,942 sf. The existing house is 1106 sf and the garage is 638 sf for a total building lot coverage of 1744 sf or 6.5%. The site plan shows the existing and proposed lot coverages with the total impervious surface existing on the lot being approximately 3,845 sf consisting of the existing house, garage and driveway. This will increase marginally by the addition of the 1,500 sf garage and associated parking areas. The watershed areas are shown on the subcatchment sketch plans and essentially include the large residential lot immediately uphill of the site to the east with a residential dwelling on that lot. Honeyman Avenue to the east serves as the crest of the ridge and divides the watershed at that point.

The existing lot 129 has the residential dwelling and garage with a dual drive serving the site and the south drive extending to the rear to serve the garage. The site entrance on the south side of the lot will remain unchanged with the existing curb opening to remain unchanged. The small grass area at the front of the site is to remain and will be graded to provide a shallow detention basin to serve the site. Drainage currently flows off the roof of the building and the driveway to the street and into the swale on the east side of Aquidneck Avenue. The 1,500 sf garage will have roof runoff collected and sent to the detention basin to have no net increase in the rate of runoff at the site. There is no net increase in volume or rate of runoff resulting from the work on lot 129.

The watershed for the project remains essentially unchanged with regard to grading and surface water flows. The watershed site is isolated to a large extent due to the existing grading around the east and north property lines which have been graded and controlled by previous development. Overall, the site is graded from the east to the west with a gentle slope across the site.

The property will be served by public water from the Newport Water Department. The utilities will be town water for public water supply and fire protection, wastewater disposal to the Town sewer, and electric supply from the local power company. Gas service to the site is also proposed from the gas main within Aquidneck Avenue.

The stormwater system is designed and will be maintained in compliance with the rules and regulations for the Town of Middletown and the State of RI Stormwater

Manual. The Town has reviewed the proposed plan in concept and has been approved by RI DOT and is under review by the Town. The project is similar to other adjacent development as can be seen.

The site has no wetlands present on the property.



DRAINAGE ANALYSIS DESCRIPTION AND SUMMARY

As discussed above, the drainage for lot 129 will remain essentially unchanged with no increase in volume and rates of runoff. Existing roof runoff is discharged to the ground and flows overland to the street. This will remain unchanged with no net increase in the rate of runoff. The small change in impervious area on lot 129 will be mitigated by the detention swale on the site. The shallow basin is designed to store flows with a minimum discharge during small storm events with a 0.38 cfs reduction in the rate during the 2 year storm and a 0.80 cfs reduction in the 10 year storm event. The basin has an outlet structure with minimal orifice flow to limit discharge during the storm events and to store the storm volume during the largest storm event of 25 years. This will allow for the rate of runoff to be reduced during storm events from that which exists today. Piping for the subject project will be SCH 40 PVC pipe for the one pipe which will connect the proposed shallow basin to the existing swale within the road layout. Existing piping under the paved roadway will be RCP as per the DOT and Town of Middletown's requirements. DOT has requested that the existing headwalls be rebuilt as part of this project. The total volume of runoff entering the drain line from this site is calculated and shown in the table below. The

proposed drainage basin will connect to the existing drainage network on Aquidneck Avenue in Middletown. This system flows through additional drainage network within the system and eventually to Bailey's Brook. There will be no significant net increase in runoff from the 2, 10, 25 and 100 year storm events. We have submitted the drainage calculations for the project. Volumes are also shown to not increase.

The rate of runoff calculations are as follows:

	Storm	Pre	Post
Design Point (swale in road)	2 year	1.35 cfs	0.97 cfs
	10 year	2.76 cfs	1.96 cfs
	25 year	3.88 cfs	2.75 cfs
	100 year	7.79 cfs	8.90 cfs

The volume of runoff calculations are as follows:

	Storm	Pre	Post
Design Point (swale in road)	2 year	0.127 AF	0.088 AF
	10 year	0.256 AF	0.174 AF
	25 year	0.361 AF	0.245 AF
	100 year	0.453 AF	0.433 AF

It can be seen that the rate of runoff will be decreased slightly with storage during the 2 year, 10 year and 25 year storms. Volumes can be seen to be decreased slightly as well in the pre and post development scenarios. The change in volume, expressed in acre feet in the model calculations, is to be stored within the shallow basin and released under control through the outlet structure. Volumes are calculated to be held in all of the storms under the model. By holding all of the storms, water quality standards are met and no TSS is discharged from the basin.

The minor change in the impervious surfaces has made any changes in runoff extremely small with no increases in rate and volume.

The drainage area is generally is made up from boundaries created by manmade development and existing roadways which border the east and west sides of the property. The north border is limited by existing retaining wall and controlled stormwater. The site has a stormwater pattern from east to west, with control structures entrapping stormwater from the proposed building on the site. Other portions of the site will continue to sheetflow to their currently locations.

The goal in this analysis is to achieve no net increase in peak runoff at each design point as well as providing pollutant removal through best management practices for stormwater.

In post development, a runoff analysis has been provided for the 2, 10, 25 and 100 year storms to indicate no net increase in runoff. By designing various means to detain and treat storm water, the objective of the regulations has been met. The post development rate of runoff will be slightly less or equal to the pre-existing rate of runoff for the site. The summary of data reveals that in the TR-55 method of calculating stormwater runoff, no net increase exists for all modeled storms.

Cost Estimate for Proposed Improvements

This serves as the construction cost estimates for the work to be performed for the above referenced project within the State right of way. Work within the DOT layout is extremely limited, with only a 8 inch line trenched to the existing swale on Aquidneck Avenue.

Drainage connection to existing swale	\$4,250
Clean/muck out existing swale	\$800
Total	\$5,250

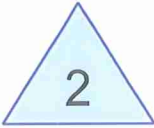
Details of the work are included on the drawings.

SCS TR-55

Stormwater Calculations



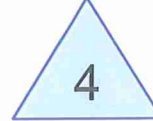
Pre-Development



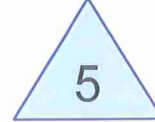
Existing Ditch w/Culverts



Post Dev 1



Shallow Basin



Existing Ditch w/Culverts



Routing Diagram for 2020-104

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.131	74	>75% Grass cover, Good, HSG C (1, 3)
0.081	89	Gravel roads, HSG C (1, 3)
0.079	98	Paved parking, HSG B (3)
0.045	98	Paved parking, HSG C (1)
0.021	98	Unconnected pavement, HSG C (1)
0.143	98	Unconnected roofs, HSG C (1, 3)
2.500	77	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.079	HSG B	3
2.422	HSG C	1, 3
0.000	HSG D	
0.000	Other	
2.500		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	2.131	0.000	0.000	2.131	>75% Grass cover, Good	1, 3
0.000	0.000	0.081	0.000	0.000	0.081	Gravel roads	1, 3
0.000	0.079	0.045	0.000	0.000	0.124	Paved parking	1, 3
0.000	0.000	0.021	0.000	0.000	0.021	Unconnected pavement	1
0.000	0.000	0.143	0.000	0.000	0.143	Unconnected roofs	1, 3
0.000	0.079	2.422	0.000	0.000	2.500	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2	139.97	139.87	27.0	0.0037	0.011	12.0	0.0	0.0
2	4	142.00	141.00	30.6	0.0327	0.010	8.0	0.0	0.0
3	5	139.97	139.87	27.0	0.0037	0.011	12.0	0.0	0.0

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Type III 24-hr 2 Rainfall=3.30"

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Time span=2.00-72.00 hrs, dt=0.05 hrs, 1401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Pre-Development Runoff Area=54,458 sf 10.16% Impervious Runoff Depth=1.22"
Flow Length=607' Tc=13.6 min UI Adjusted CN=76 Runoff=1.35 cfs 0.127 af

Subcatchment3: Post Dev 1 Runoff Area=54,458 sf 12.91% Impervious Runoff Depth=1.28"
Flow Length=599' Tc=12.2 min UI Adjusted CN=77 Runoff=1.47 cfs 0.134 af

Pond 2: Existing Ditch w/Culverts Peak Elev=140.68' Storage=71 cf Inflow=1.35 cfs 0.127 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/ Outflow=1.35 cfs 0.127 af

Pond 4: Shallow Basin Peak Elev=143.01' Storage=2 cf Inflow=1.47 cfs 0.134 af
Discarded=0.51 cfs 0.046 af Primary=0.97 cfs 0.088 af Outflow=1.48 cfs 0.134 af

Pond 5: Existing Ditch w/Culverts Peak Elev=140.56' Storage=54 cf Inflow=0.97 cfs 0.088 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/ Outflow=0.97 cfs 0.088 af

Total Runoff Area = 2.500 ac Runoff Volume = 0.261 af Average Runoff Depth = 1.25"
88.46% Pervious = 2.212 ac 11.54% Impervious = 0.289 ac

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Type III 24-hr 2 Rainfall=3.30"

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Summary for Subcatchment 1: Pre-Development

Runoff = 1.35 cfs @ 12.20 hrs, Volume= 0.127 af, Depth= 1.22"

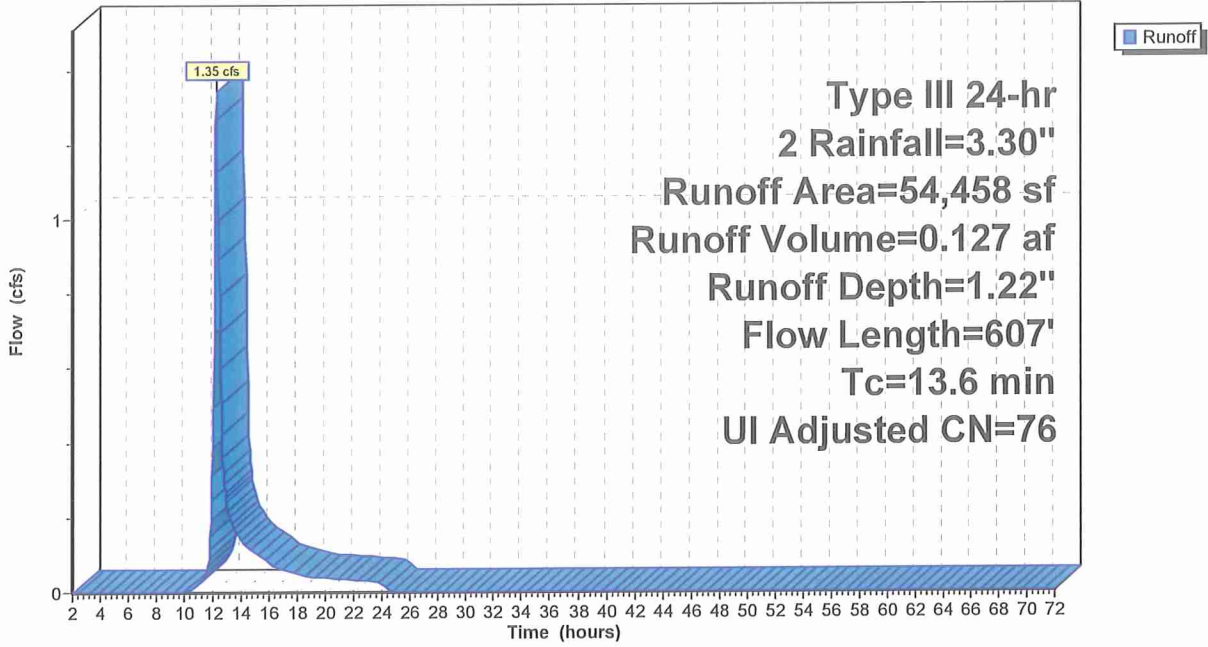
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 Rainfall=3.30"

Area (sf)	CN	Adj	Description
47,214	74		>75% Grass cover, Good, HSG C
935	98		Unconnected pavement, HSG C
1,709	89		Gravel roads, HSG C
1,953	98		Paved parking, HSG C
2,647	98		Unconnected roofs, HSG C
54,458	77	76	Weighted Average, UI Adjusted
48,923			89.84% Pervious Area
5,535			10.16% Impervious Area
3,582			64.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
3.0	332	0.0680	1.83		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.1	36	0.0056	0.52		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.3	139	0.0630	1.76		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
13.6	607	Total			

Subcatchment 1: Pre-Development

Hydrograph



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Type III 24-hr 2 Rainfall=3.30"

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Hydrograph for Subcatchment 1: Pre-Development

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.07	0.00	0.00	54.00	3.30	1.22	0.00
3.00	0.10	0.00	0.00	55.00	3.30	1.22	0.00
4.00	0.14	0.00	0.00	56.00	3.30	1.22	0.00
5.00	0.19	0.00	0.00	57.00	3.30	1.22	0.00
6.00	0.24	0.00	0.00	58.00	3.30	1.22	0.00
7.00	0.30	0.00	0.00	59.00	3.30	1.22	0.00
8.00	0.38	0.00	0.00	60.00	3.30	1.22	0.00
9.00	0.48	0.00	0.00	61.00	3.30	1.22	0.00
10.00	0.62	0.00	0.00	62.00	3.30	1.22	0.00
11.00	0.83	0.01	0.02	63.00	3.30	1.22	0.00
12.00	1.65	0.25	0.50	64.00	3.30	1.22	0.00
13.00	2.47	0.68	0.23	65.00	3.30	1.22	0.00
14.00	2.68	0.80	0.14	66.00	3.30	1.22	0.00
15.00	2.82	0.90	0.11	67.00	3.30	1.22	0.00
16.00	2.92	0.96	0.08	68.00	3.30	1.22	0.00
17.00	3.00	1.02	0.06	69.00	3.30	1.22	0.00
18.00	3.06	1.06	0.05	70.00	3.30	1.22	0.00
19.00	3.11	1.09	0.04	71.00	3.30	1.22	0.00
20.00	3.16	1.12	0.04	72.00	3.30	1.22	0.00
21.00	3.20	1.15	0.04				
22.00	3.24	1.18	0.03				
23.00	3.27	1.20	0.03				
24.00	3.30	1.22	0.03				
25.00	3.30	1.22	0.00				
26.00	3.30	1.22	0.00				
27.00	3.30	1.22	0.00				
28.00	3.30	1.22	0.00				
29.00	3.30	1.22	0.00				
30.00	3.30	1.22	0.00				
31.00	3.30	1.22	0.00				
32.00	3.30	1.22	0.00				
33.00	3.30	1.22	0.00				
34.00	3.30	1.22	0.00				
35.00	3.30	1.22	0.00				
36.00	3.30	1.22	0.00				
37.00	3.30	1.22	0.00				
38.00	3.30	1.22	0.00				
39.00	3.30	1.22	0.00				
40.00	3.30	1.22	0.00				
41.00	3.30	1.22	0.00				
42.00	3.30	1.22	0.00				
43.00	3.30	1.22	0.00				
44.00	3.30	1.22	0.00				
45.00	3.30	1.22	0.00				
46.00	3.30	1.22	0.00				
47.00	3.30	1.22	0.00				
48.00	3.30	1.22	0.00				
49.00	3.30	1.22	0.00				
50.00	3.30	1.22	0.00				
51.00	3.30	1.22	0.00				
52.00	3.30	1.22	0.00				
53.00	3.30	1.22	0.00				

Summary for Subcatchment 3: Post Dev 1

Runoff = 1.47 cfs @ 12.18 hrs, Volume= 0.134 af, Depth= 1.28"

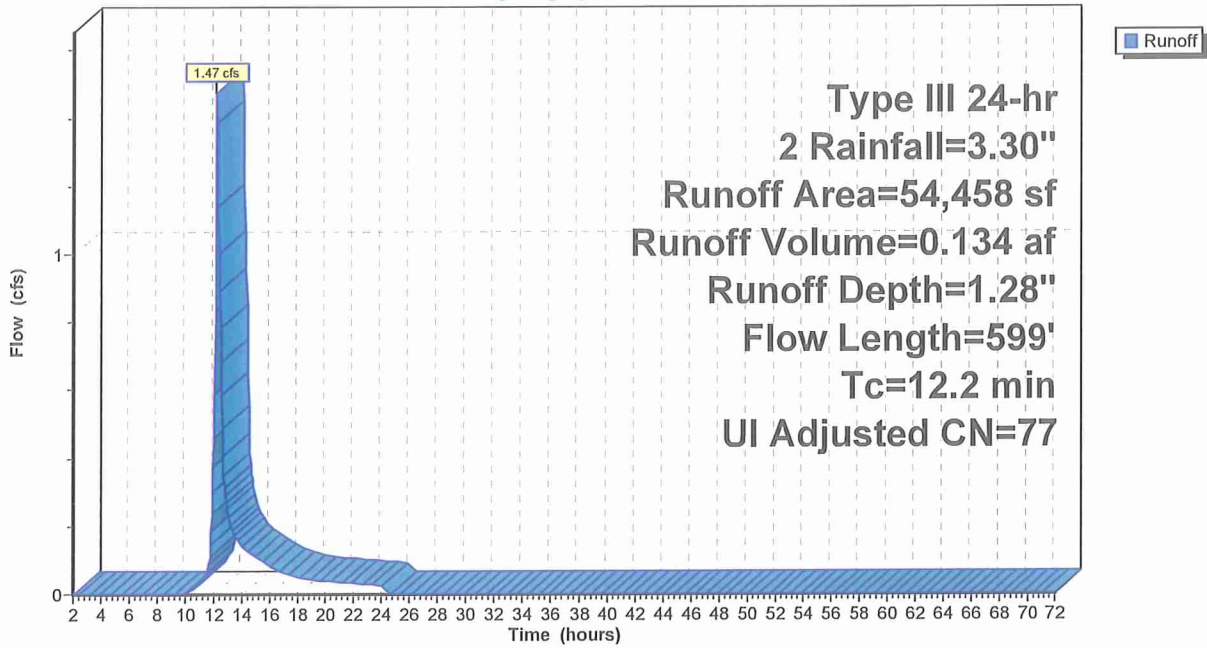
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 Rainfall=3.30"

Area (sf)	CN	Adj	Description
45,591	74		>75% Grass cover, Good, HSG C
3,430	98		Paved parking, HSG B
1,834	89		Gravel roads, HSG C
3,603	98		Unconnected roofs, HSG C
54,458	78	77	Weighted Average, UI Adjusted
47,425			87.09% Pervious Area
7,033			12.91% Impervious Area
3,603			51.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
2.9	315	0.0650	1.78		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.5	36	0.0280	1.17		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.4	96	0.0570	3.58		Shallow Concentrated Flow, Swale Grassed Waterway Kv= 15.0 fps
0.2	40	0.0375	3.12		Shallow Concentrated Flow, Gravel Parking Area Unpaved Kv= 16.1 fps
0.0	12		8.02		Lake or Reservoir, Shallow Basin Mean Depth= 2.00'
12.2	599	Total			

Subcatchment 3: Post Dev 1

Hydrograph



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Type III 24-hr 2 Rainfall=3.30"

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Hydrograph for Subcatchment 3: Post Dev 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.07	0.00	0.00	54.00	3.30	1.28	0.00
3.00	0.10	0.00	0.00	55.00	3.30	1.28	0.00
4.00	0.14	0.00	0.00	56.00	3.30	1.28	0.00
5.00	0.19	0.00	0.00	57.00	3.30	1.28	0.00
6.00	0.24	0.00	0.00	58.00	3.30	1.28	0.00
7.00	0.30	0.00	0.00	59.00	3.30	1.28	0.00
8.00	0.38	0.00	0.00	60.00	3.30	1.28	0.00
9.00	0.48	0.00	0.00	61.00	3.30	1.28	0.00
10.00	0.62	0.00	0.00	62.00	3.30	1.28	0.00
11.00	0.83	0.02	0.03	63.00	3.30	1.28	0.00
12.00	1.65	0.27	0.59	64.00	3.30	1.28	0.00
13.00	2.47	0.72	0.23	65.00	3.30	1.28	0.00
14.00	2.68	0.85	0.14	66.00	3.30	1.28	0.00
15.00	2.82	0.95	0.11	67.00	3.30	1.28	0.00
16.00	2.92	1.02	0.08	68.00	3.30	1.28	0.00
17.00	3.00	1.07	0.06	69.00	3.30	1.28	0.00
18.00	3.06	1.11	0.05	70.00	3.30	1.28	0.00
19.00	3.11	1.15	0.04	71.00	3.30	1.28	0.00
20.00	3.16	1.18	0.04	72.00	3.30	1.28	0.00
21.00	3.20	1.21	0.04				
22.00	3.24	1.24	0.03				
23.00	3.27	1.26	0.03				
24.00	3.30	1.28	0.03				
25.00	3.30	1.28	0.00				
26.00	3.30	1.28	0.00				
27.00	3.30	1.28	0.00				
28.00	3.30	1.28	0.00				
29.00	3.30	1.28	0.00				
30.00	3.30	1.28	0.00				
31.00	3.30	1.28	0.00				
32.00	3.30	1.28	0.00				
33.00	3.30	1.28	0.00				
34.00	3.30	1.28	0.00				
35.00	3.30	1.28	0.00				
36.00	3.30	1.28	0.00				
37.00	3.30	1.28	0.00				
38.00	3.30	1.28	0.00				
39.00	3.30	1.28	0.00				
40.00	3.30	1.28	0.00				
41.00	3.30	1.28	0.00				
42.00	3.30	1.28	0.00				
43.00	3.30	1.28	0.00				
44.00	3.30	1.28	0.00				
45.00	3.30	1.28	0.00				
46.00	3.30	1.28	0.00				
47.00	3.30	1.28	0.00				
48.00	3.30	1.28	0.00				
49.00	3.30	1.28	0.00				
50.00	3.30	1.28	0.00				
51.00	3.30	1.28	0.00				
52.00	3.30	1.28	0.00				
53.00	3.30	1.28	0.00				

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Type III 24-hr 2 Rainfall=3.30"

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Summary for Pond 2: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 10.16% Impervious, Inflow Depth = 1.22" for 2 event
 Inflow = 1.35 cfs @ 12.20 hrs, Volume= 0.127 af
 Outflow = 1.35 cfs @ 12.21 hrs, Volume= 0.127 af, Atten= 0%, Lag= 0.8 min
 Primary = 1.35 cfs @ 12.21 hrs, Volume= 0.127 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 140.68' @ 12.21 hrs Surf.Area= 150 sf Storage= 71 cf

Plug-Flow detention time= 1.5 min calculated for 0.127 af (100% of inflow)
 Center-of-Mass det. time= 1.5 min (862.3 - 860.8)

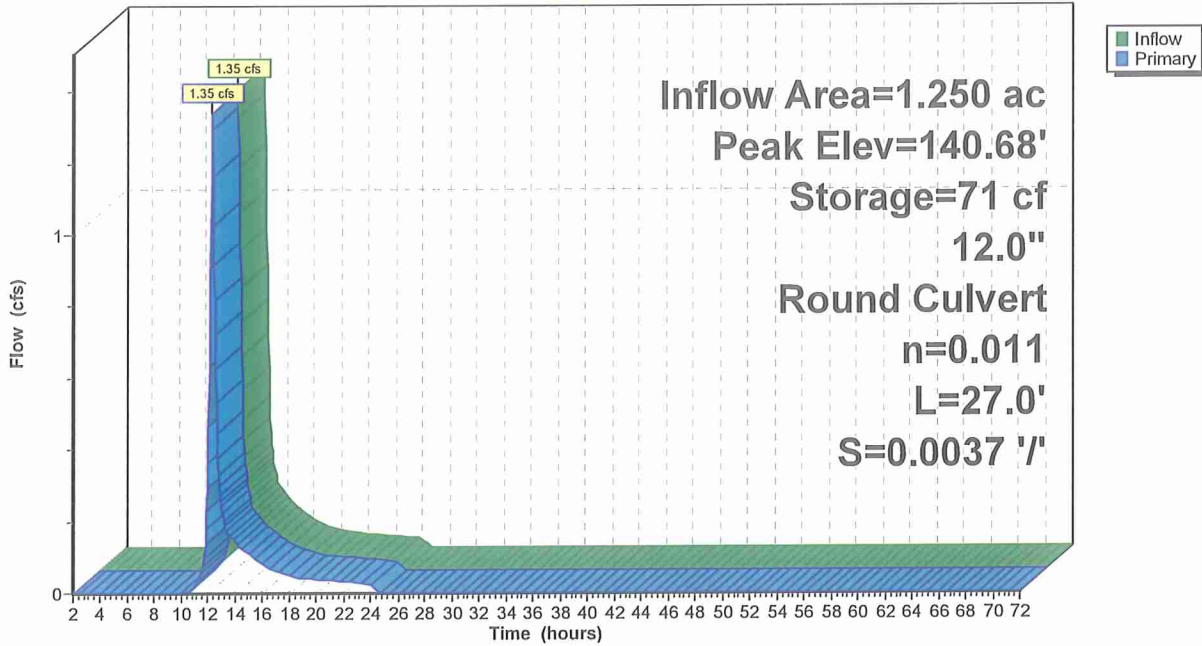
Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.33 cfs @ 12.21 hrs HW=140.67' (Free Discharge)
 ↑ **1=Culvert** (Barrel Controls 1.33 cfs @ 3.16 fps)

Pond 2: Existing Ditch w/Culverts

Hydrograph



2020-104

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Type III 24-hr 2 Rainfall=3.30"

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Hydrograph for Pond 2: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.00	0	140.00	0.00
9.50	0.00	0	140.00	0.00
12.00	0.50	31	140.36	0.47
14.50	0.12	12	140.17	0.12
17.00	0.06	8	140.11	0.06
19.50	0.04	6	140.09	0.04
22.00	0.03	5	140.07	0.03
24.50	0.00	0	140.00	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00

Summary for Pond 4: Shallow Basin

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 1.28" for 2 event
 Inflow = 1.47 cfs @ 12.18 hrs, Volume= 0.134 af
 Outflow = 1.48 cfs @ 12.18 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.51 cfs @ 12.18 hrs, Volume= 0.046 af
 Primary = 0.97 cfs @ 12.18 hrs, Volume= 0.088 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 143.01' @ 12.18 hrs Surf.Area= 238 sf Storage= 2 cf

Plug-Flow detention time= 0.0 min calculated for 0.134 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (856.4 - 856.4)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	977 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
143.00	236	0	0
144.00	474	355	355
145.00	770	622	977

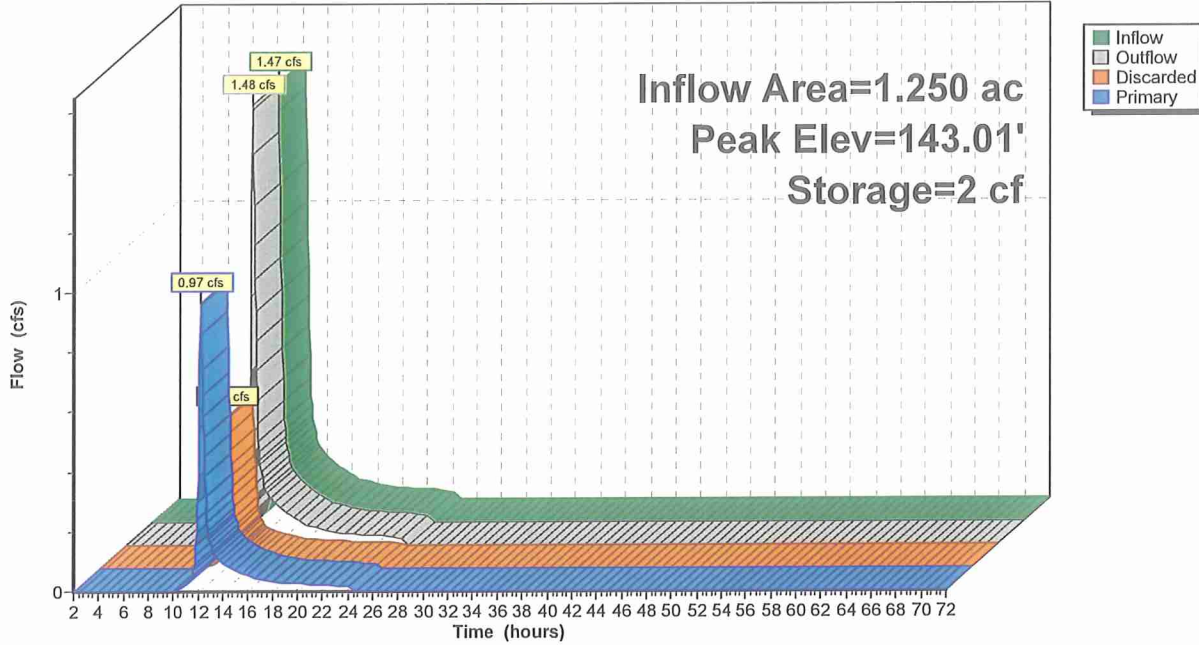
Device	Routing	Invert	Outlet Devices
#1	Discarded	143.00'	1.30 cfs Exfiltration at all elevations
#2	Primary	144.50'	0.3" x 6.0" Horiz. Grate X 25.00 C= 0.600 in 8.0" Grate (90% open area) Limited to weir flow at low heads
#3	Primary	142.00'	8.0" Vert. Pipe C= 0.600
#4	Primary	142.00'	8.0" Round Pipe L= 30.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.00' / 141.00' S= 0.0327 ' /' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=1.30 cfs @ 12.18 hrs HW=143.01' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 1.30 cfs)

Primary OutFlow Max=2.47 cfs @ 12.18 hrs HW=143.01' (Free Discharge)
 ↳ **2=Grate** (Controls 0.00 cfs)
 ↳ **3=Pipe** (Orifice Controls 1.38 cfs @ 3.95 fps)
 ↳ **4=Pipe** (Inlet Controls 1.09 cfs @ 3.12 fps)

Pond 4: Shallow Basin

Hydrograph



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Type III 24-hr 2 Rainfall=3.30"

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Hydrograph for Pond 4: Shallow Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
2.00	0.00	0	143.00	0.00	0.00	0.00
4.50	0.00	0	143.00	0.00	0.00	0.00
7.00	0.00	0	143.00	0.00	0.00	0.00
9.50	0.00	0	143.00	0.00	0.00	0.00
12.00	0.59	1	143.00	0.59	0.20	0.39
14.50	0.12	0	143.00	0.12	0.04	0.08
17.00	0.06	0	143.00	0.06	0.02	0.04
19.50	0.04	0	143.00	0.04	0.01	0.03
22.00	0.03	0	143.00	0.03	0.01	0.02
24.50	0.00	0	143.00	0.00	0.00	0.00
27.00	0.00	0	143.00	0.00	0.00	0.00
29.50	0.00	0	143.00	0.00	0.00	0.00
32.00	0.00	0	143.00	0.00	0.00	0.00
34.50	0.00	0	143.00	0.00	0.00	0.00
37.00	0.00	0	143.00	0.00	0.00	0.00
39.50	0.00	0	143.00	0.00	0.00	0.00
42.00	0.00	0	143.00	0.00	0.00	0.00
44.50	0.00	0	143.00	0.00	0.00	0.00
47.00	0.00	0	143.00	0.00	0.00	0.00
49.50	0.00	0	143.00	0.00	0.00	0.00
52.00	0.00	0	143.00	0.00	0.00	0.00
54.50	0.00	0	143.00	0.00	0.00	0.00
57.00	0.00	0	143.00	0.00	0.00	0.00
59.50	0.00	0	143.00	0.00	0.00	0.00
62.00	0.00	0	143.00	0.00	0.00	0.00
64.50	0.00	0	143.00	0.00	0.00	0.00
67.00	0.00	0	143.00	0.00	0.00	0.00
69.50	0.00	0	143.00	0.00	0.00	0.00
72.00	0.00	0	143.00	0.00	0.00	0.00

Summary for Pond 5: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 0.84" for 2 event
 Inflow = 0.97 cfs @ 12.18 hrs, Volume= 0.088 af
 Outflow = 0.97 cfs @ 12.20 hrs, Volume= 0.088 af, Atten= 0%, Lag= 1.0 min
 Primary = 0.97 cfs @ 12.20 hrs, Volume= 0.088 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 140.56' @ 12.20 hrs Surf.Area= 134 sf Storage= 54 cf

Plug-Flow detention time= 1.6 min calculated for 0.088 af (100% of inflow)
 Center-of-Mass det. time= 1.6 min (858.1 - 856.4)

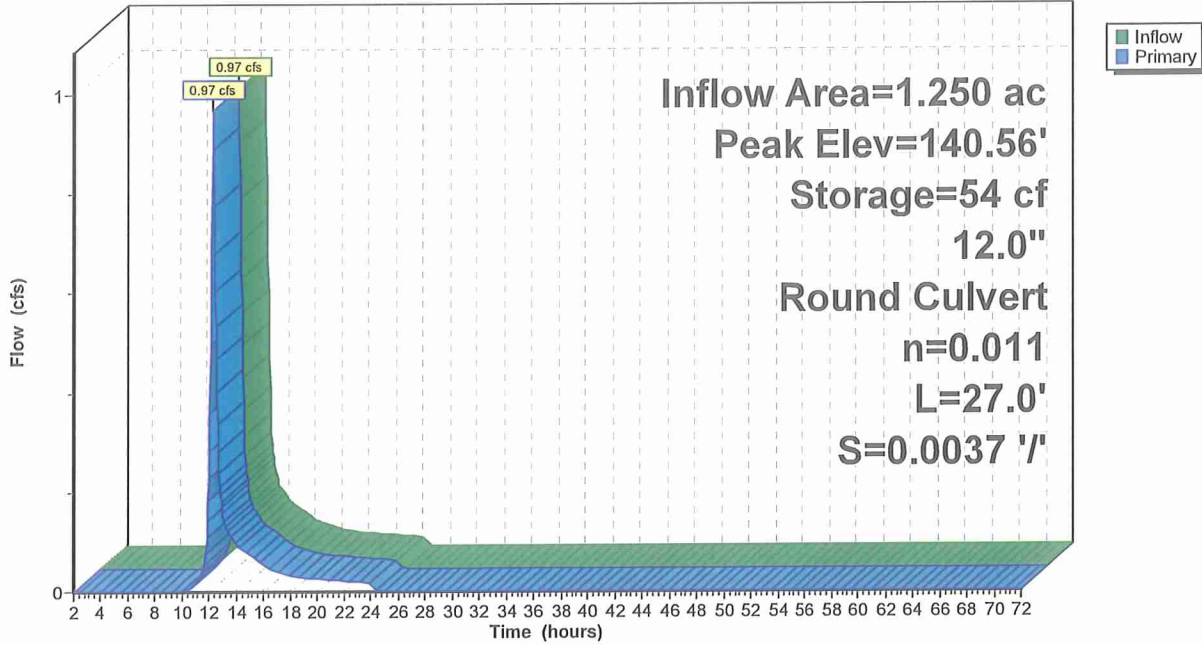
Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 12.20 hrs HW=140.56' (Free Discharge)
 ↑1=Culvert (Barrel Controls 0.96 cfs @ 2.90 fps)

Pond 5: Existing Ditch w/Culverts

Hydrograph



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Type III 24-hr 2 Rainfall=3.30"

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Hydrograph for Pond 5: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.00	0	140.00	0.00
9.50	0.00	0	140.00	0.00
12.00	0.39	25	140.31	0.36
14.50	0.08	9	140.13	0.08
17.00	0.04	6	140.09	0.04
19.50	0.03	4	140.07	0.03
22.00	0.02	4	140.06	0.02
24.50	0.00	0	140.00	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00

2020-104

Type III 24-hr 10 Rainfall=4.90"

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Time span=2.00-72.00 hrs, dt=0.05 hrs, 1401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Pre-Development Runoff Area=54,458 sf 10.16% Impervious Runoff Depth=2.45"
Flow Length=607' Tc=13.6 min UI Adjusted CN=76 Runoff=2.79 cfs 0.256 af

Subcatchment3: Post Dev 1 Runoff Area=54,458 sf 12.91% Impervious Runoff Depth=2.54"
Flow Length=599' Tc=12.2 min UI Adjusted CN=77 Runoff=3.02 cfs 0.265 af

Pond 2: Existing Ditch w/Culverts Peak Elev=141.11' Storage=150 cf Inflow=2.79 cfs 0.256 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/ Outflow=2.76 cfs 0.256 af

Pond 4: Shallow Basin Peak Elev=143.02' Storage=4 cf Inflow=3.02 cfs 0.265 af
Discarded=1.03 cfs 0.091 af Primary=1.98 cfs 0.174 af Outflow=3.02 cfs 0.265 af

Pond 5: Existing Ditch w/Culverts Peak Elev=140.86' Storage=101 cf Inflow=1.98 cfs 0.174 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/ Outflow=1.96 cfs 0.174 af

Total Runoff Area = 2.500 ac Runoff Volume = 0.520 af Average Runoff Depth = 2.50"
88.46% Pervious = 2.212 ac 11.54% Impervious = 0.289 ac

Summary for Subcatchment 1: Pre-Development

Runoff = 2.79 cfs @ 12.19 hrs, Volume= 0.256 af, Depth= 2.45"

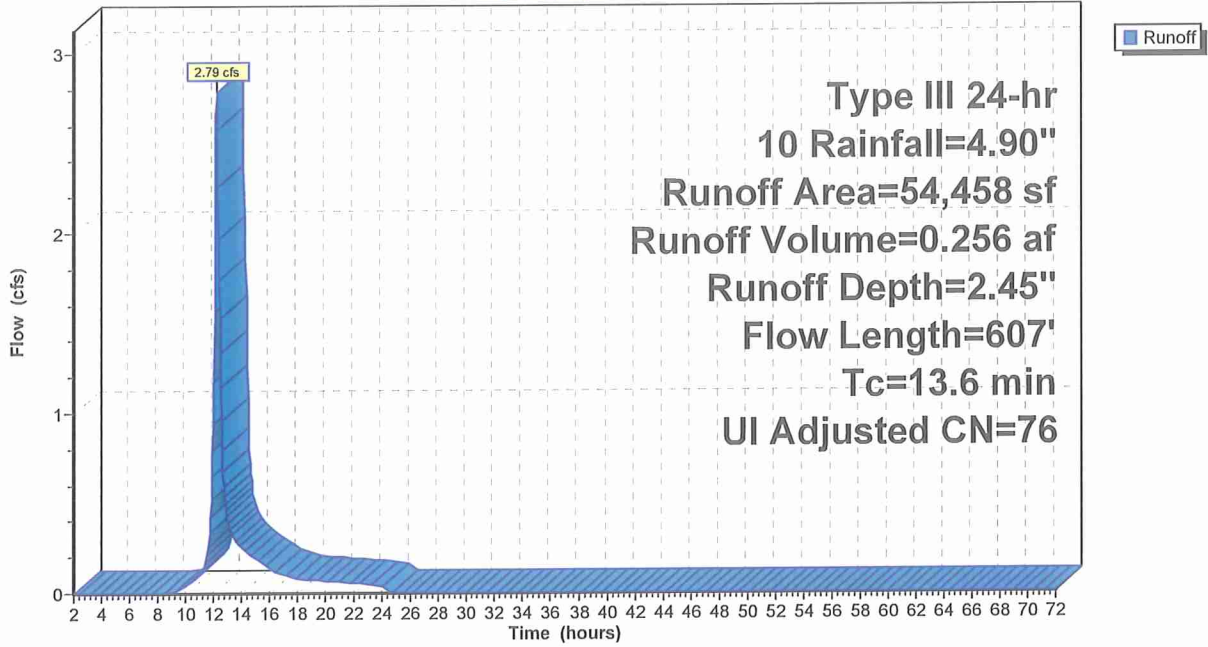
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10 Rainfall=4.90"

Area (sf)	CN	Adj	Description
47,214	74		>75% Grass cover, Good, HSG C
935	98		Unconnected pavement, HSG C
1,709	89		Gravel roads, HSG C
1,953	98		Paved parking, HSG C
2,647	98		Unconnected roofs, HSG C
54,458	77	76	Weighted Average, UI Adjusted
48,923			89.84% Pervious Area
5,535			10.16% Impervious Area
3,582			64.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
3.0	332	0.0680	1.83		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.1	36	0.0056	0.52		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.3	139	0.0630	1.76		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
13.6	607	Total			

Subcatchment 1: Pre-Development

Hydrograph



Hydrograph for Subcatchment 1: Pre-Development

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	54.00	4.90	2.45	0.00
3.00	0.15	0.00	0.00	55.00	4.90	2.45	0.00
4.00	0.21	0.00	0.00	56.00	4.90	2.45	0.00
5.00	0.28	0.00	0.00	57.00	4.90	2.45	0.00
6.00	0.35	0.00	0.00	58.00	4.90	2.45	0.00
7.00	0.44	0.00	0.00	59.00	4.90	2.45	0.00
8.00	0.56	0.00	0.00	60.00	4.90	2.45	0.00
9.00	0.71	0.00	0.01	61.00	4.90	2.45	0.00
10.00	0.93	0.03	0.04	62.00	4.90	2.45	0.00
11.00	1.22	0.09	0.11	63.00	4.90	2.45	0.00
12.00	2.45	0.66	1.17	64.00	4.90	2.45	0.00
13.00	3.67	1.49	0.42	65.00	4.90	2.45	0.00
14.00	3.97	1.72	0.25	66.00	4.90	2.45	0.00
15.00	4.19	1.88	0.19	67.00	4.90	2.45	0.00
16.00	4.34	2.00	0.14	68.00	4.90	2.45	0.00
17.00	4.46	2.10	0.11	69.00	4.90	2.45	0.00
18.00	4.55	2.17	0.08	70.00	4.90	2.45	0.00
19.00	4.62	2.23	0.07	71.00	4.90	2.45	0.00
20.00	4.69	2.28	0.07	72.00	4.90	2.45	0.00
21.00	4.75	2.33	0.06				
22.00	4.81	2.38	0.06				
23.00	4.86	2.42	0.05				
24.00	4.90	2.45	0.04				
25.00	4.90	2.45	0.00				
26.00	4.90	2.45	0.00				
27.00	4.90	2.45	0.00				
28.00	4.90	2.45	0.00				
29.00	4.90	2.45	0.00				
30.00	4.90	2.45	0.00				
31.00	4.90	2.45	0.00				
32.00	4.90	2.45	0.00				
33.00	4.90	2.45	0.00				
34.00	4.90	2.45	0.00				
35.00	4.90	2.45	0.00				
36.00	4.90	2.45	0.00				
37.00	4.90	2.45	0.00				
38.00	4.90	2.45	0.00				
39.00	4.90	2.45	0.00				
40.00	4.90	2.45	0.00				
41.00	4.90	2.45	0.00				
42.00	4.90	2.45	0.00				
43.00	4.90	2.45	0.00				
44.00	4.90	2.45	0.00				
45.00	4.90	2.45	0.00				
46.00	4.90	2.45	0.00				
47.00	4.90	2.45	0.00				
48.00	4.90	2.45	0.00				
49.00	4.90	2.45	0.00				
50.00	4.90	2.45	0.00				
51.00	4.90	2.45	0.00				
52.00	4.90	2.45	0.00				
53.00	4.90	2.45	0.00				

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Type III 24-hr 10 Rainfall=4.90"

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Summary for Subcatchment 3: Post Dev 1

Runoff = 3.02 cfs @ 12.17 hrs, Volume= 0.265 af, Depth= 2.54"

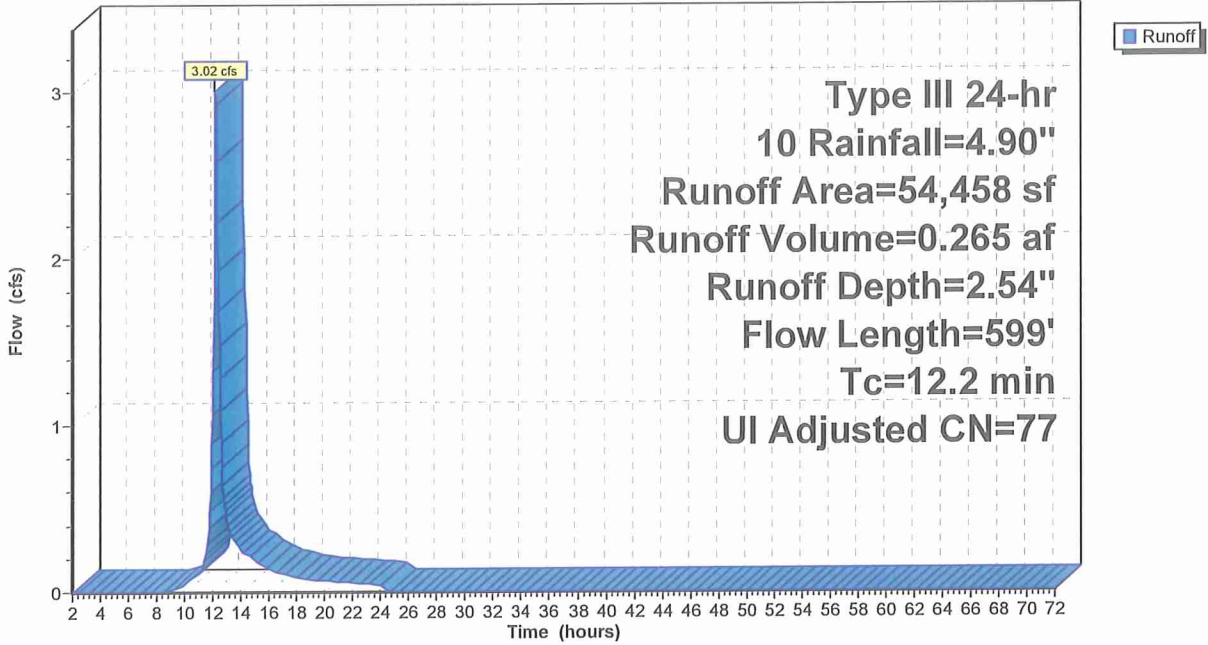
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Rainfall=4.90"

Area (sf)	CN	Adj	Description
45,591	74		>75% Grass cover, Good, HSG C
3,430	98		Paved parking, HSG B
1,834	89		Gravel roads, HSG C
3,603	98		Unconnected roofs, HSG C
54,458	78	77	Weighted Average, UI Adjusted
47,425			87.09% Pervious Area
7,033			12.91% Impervious Area
3,603			51.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
2.9	315	0.0650	1.78		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.5	36	0.0280	1.17		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.4	96	0.0570	3.58		Shallow Concentrated Flow, Swale Grassed Waterway Kv= 15.0 fps
0.2	40	0.0375	3.12		Shallow Concentrated Flow, Gravel Parking Area Unpaved Kv= 16.1 fps
0.0	12		8.02		Lake or Reservoir, Shallow Basin Mean Depth= 2.00'
12.2	599	Total			

Subcatchment 3: Post Dev 1

Hydrograph



2020-104

Type III 24-hr 10 Rainfall=4.90"

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Hydrograph for Subcatchment 3: Post Dev 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	54.00	4.90	2.54	0.00
3.00	0.15	0.00	0.00	55.00	4.90	2.54	0.00
4.00	0.21	0.00	0.00	56.00	4.90	2.54	0.00
5.00	0.28	0.00	0.00	57.00	4.90	2.54	0.00
6.00	0.35	0.00	0.00	58.00	4.90	2.54	0.00
7.00	0.44	0.00	0.00	59.00	4.90	2.54	0.00
8.00	0.56	0.00	0.00	60.00	4.90	2.54	0.00
9.00	0.71	0.00	0.01	61.00	4.90	2.54	0.00
10.00	0.93	0.03	0.05	62.00	4.90	2.54	0.00
11.00	1.22	0.11	0.12	63.00	4.90	2.54	0.00
12.00	2.45	0.71	1.33	64.00	4.90	2.54	0.00
13.00	3.67	1.56	0.42	65.00	4.90	2.54	0.00
14.00	3.97	1.79	0.26	66.00	4.90	2.54	0.00
15.00	4.19	1.96	0.19	67.00	4.90	2.54	0.00
16.00	4.34	2.08	0.14	68.00	4.90	2.54	0.00
17.00	4.46	2.18	0.11	69.00	4.90	2.54	0.00
18.00	4.55	2.25	0.09	70.00	4.90	2.54	0.00
19.00	4.62	2.31	0.07	71.00	4.90	2.54	0.00
20.00	4.69	2.37	0.07	72.00	4.90	2.54	0.00
21.00	4.75	2.42	0.06				
22.00	4.81	2.46	0.06				
23.00	4.86	2.50	0.05				
24.00	4.90	2.54	0.04				
25.00	4.90	2.54	0.00				
26.00	4.90	2.54	0.00				
27.00	4.90	2.54	0.00				
28.00	4.90	2.54	0.00				
29.00	4.90	2.54	0.00				
30.00	4.90	2.54	0.00				
31.00	4.90	2.54	0.00				
32.00	4.90	2.54	0.00				
33.00	4.90	2.54	0.00				
34.00	4.90	2.54	0.00				
35.00	4.90	2.54	0.00				
36.00	4.90	2.54	0.00				
37.00	4.90	2.54	0.00				
38.00	4.90	2.54	0.00				
39.00	4.90	2.54	0.00				
40.00	4.90	2.54	0.00				
41.00	4.90	2.54	0.00				
42.00	4.90	2.54	0.00				
43.00	4.90	2.54	0.00				
44.00	4.90	2.54	0.00				
45.00	4.90	2.54	0.00				
46.00	4.90	2.54	0.00				
47.00	4.90	2.54	0.00				
48.00	4.90	2.54	0.00				
49.00	4.90	2.54	0.00				
50.00	4.90	2.54	0.00				
51.00	4.90	2.54	0.00				
52.00	4.90	2.54	0.00				
53.00	4.90	2.54	0.00				

Summary for Pond 2: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 10.16% Impervious, Inflow Depth = 2.45" for 10 event
 Inflow = 2.79 cfs @ 12.19 hrs, Volume= 0.256 af
 Outflow = 2.76 cfs @ 12.21 hrs, Volume= 0.256 af, Atten= 1%, Lag= 1.2 min
 Primary = 2.76 cfs @ 12.21 hrs, Volume= 0.256 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 141.11' @ 12.21 hrs Surf.Area= 225 sf Storage= 150 cf

Plug-Flow detention time= 1.3 min calculated for 0.255 af (100% of inflow)
 Center-of-Mass det. time= 1.3 min (841.6 - 840.3)

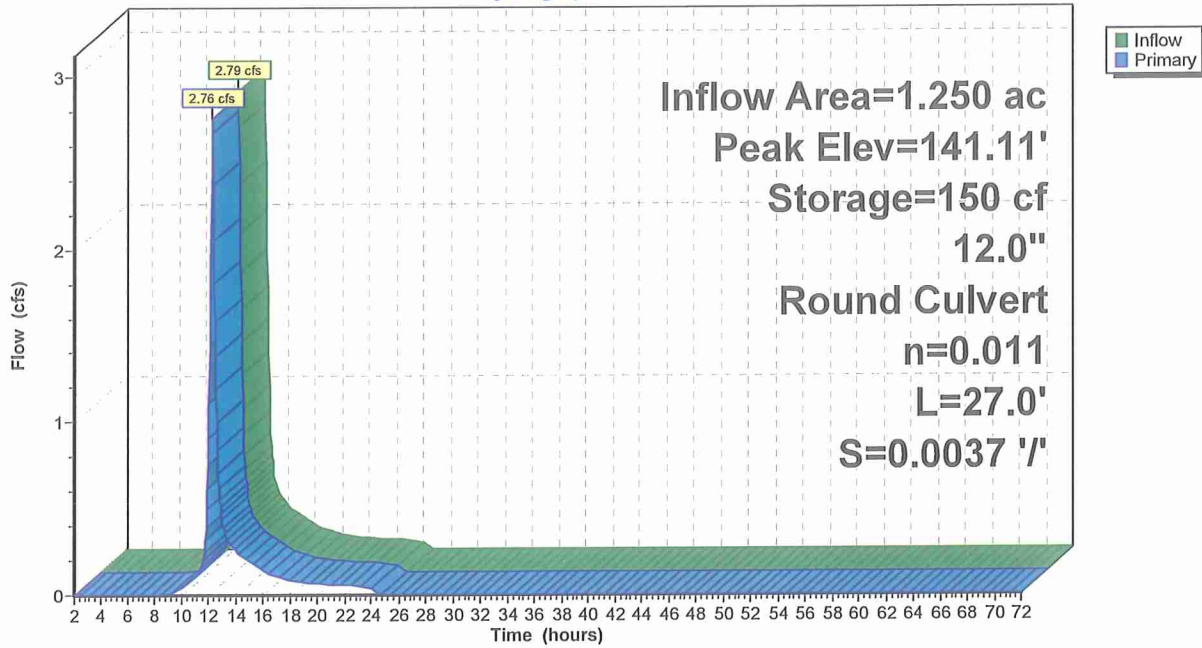
Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.73 cfs @ 12.21 hrs HW=141.10' (Free Discharge)
 ↑ **1=Culvert** (Barrel Controls 2.73 cfs @ 3.84 fps)

Pond 2: Existing Ditch w/Culverts

Hydrograph



2020-104

Type III 24-hr 10 Rainfall=4.90"

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Hydrograph for Pond 2: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.00	0	140.00	0.00
9.50	0.02	3	140.05	0.02
12.00	1.17	61	140.60	1.11
14.50	0.22	18	140.24	0.22
17.00	0.11	11	140.16	0.11
19.50	0.07	8	140.12	0.07
22.00	0.06	7	140.10	0.06
24.50	0.00	0	140.00	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00

Summary for Pond 4: Shallow Basin

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 2.54" for 10 event
 Inflow = 3.02 cfs @ 12.17 hrs, Volume= 0.265 af
 Outflow = 3.02 cfs @ 12.17 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min
 Discarded = 1.03 cfs @ 12.17 hrs, Volume= 0.091 af
 Primary = 1.98 cfs @ 12.17 hrs, Volume= 0.174 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 143.02' @ 12.17 hrs Surf.Area= 240 sf Storage= 4 cf

Plug-Flow detention time= 0.0 min calculated for 0.264 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (836.4 - 836.4)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	977 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
143.00	236	0	0
144.00	474	355	355
145.00	770	622	977

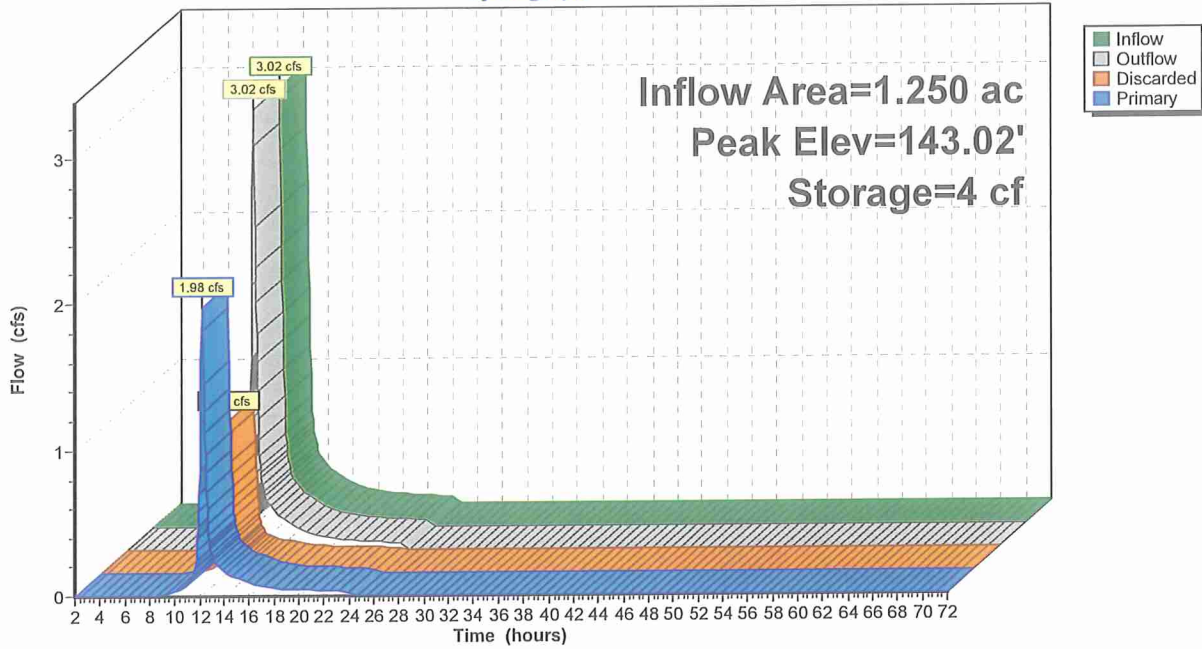
Device	Routing	Invert	Outlet Devices
#1	Discarded	143.00'	1.30 cfs Exfiltration at all elevations
#2	Primary	144.50'	0.3" x 6.0" Horiz. Grate X 25.00 C= 0.600 in 8.0" Grate (90% open area) Limited to weir flow at low heads
#3	Primary	142.00'	8.0" Vert. Pipe C= 0.600
#4	Primary	142.00'	8.0" Round Pipe L= 30.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.00' / 141.00' S= 0.0327 ' / ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=1.30 cfs @ 12.17 hrs HW=143.02' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 1.30 cfs)

Primary OutFlow Max=2.48 cfs @ 12.17 hrs HW=143.02' (Free Discharge)
 ↑2=**Grate** (Controls 0.00 cfs)
 ↑3=**Pipe** (Orifice Controls 1.39 cfs @ 3.98 fps)
 ↑4=**Pipe** (Inlet Controls 1.10 cfs @ 3.14 fps)

Pond 4: Shallow Basin

Hydrograph



2020-104

Type III 24-hr 10 Rainfall=4.90"

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Hydrograph for Pond 4: Shallow Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
2.00	0.00	0	143.00	0.00	0.00	0.00
4.50	0.00	0	143.00	0.00	0.00	0.00
7.00	0.00	0	143.00	0.00	0.00	0.00
9.50	0.03	0	143.00	0.03	0.01	0.02
12.00	1.33	2	143.01	1.33	0.45	0.87
14.50	0.22	0	143.00	0.22	0.08	0.14
17.00	0.11	0	143.00	0.11	0.04	0.07
19.50	0.07	0	143.00	0.07	0.02	0.05
22.00	0.06	0	143.00	0.06	0.02	0.04
24.50	0.00	0	143.00	0.00	0.00	0.00
27.00	0.00	0	143.00	0.00	0.00	0.00
29.50	0.00	0	143.00	0.00	0.00	0.00
32.00	0.00	0	143.00	0.00	0.00	0.00
34.50	0.00	0	143.00	0.00	0.00	0.00
37.00	0.00	0	143.00	0.00	0.00	0.00
39.50	0.00	0	143.00	0.00	0.00	0.00
42.00	0.00	0	143.00	0.00	0.00	0.00
44.50	0.00	0	143.00	0.00	0.00	0.00
47.00	0.00	0	143.00	0.00	0.00	0.00
49.50	0.00	0	143.00	0.00	0.00	0.00
52.00	0.00	0	143.00	0.00	0.00	0.00
54.50	0.00	0	143.00	0.00	0.00	0.00
57.00	0.00	0	143.00	0.00	0.00	0.00
59.50	0.00	0	143.00	0.00	0.00	0.00
62.00	0.00	0	143.00	0.00	0.00	0.00
64.50	0.00	0	143.00	0.00	0.00	0.00
67.00	0.00	0	143.00	0.00	0.00	0.00
69.50	0.00	0	143.00	0.00	0.00	0.00
72.00	0.00	0	143.00	0.00	0.00	0.00

Summary for Pond 5: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 1.67" for 10 event
 Inflow = 1.98 cfs @ 12.17 hrs, Volume= 0.174 af
 Outflow = 1.96 cfs @ 12.19 hrs, Volume= 0.174 af, Atten= 1%, Lag= 1.1 min
 Primary = 1.96 cfs @ 12.19 hrs, Volume= 0.174 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 140.86' @ 12.19 hrs Surf.Area= 175 sf Storage= 101 cf

Plug-Flow detention time= 1.4 min calculated for 0.174 af (100% of inflow)
 Center-of-Mass det. time= 1.4 min (837.8 - 836.4)

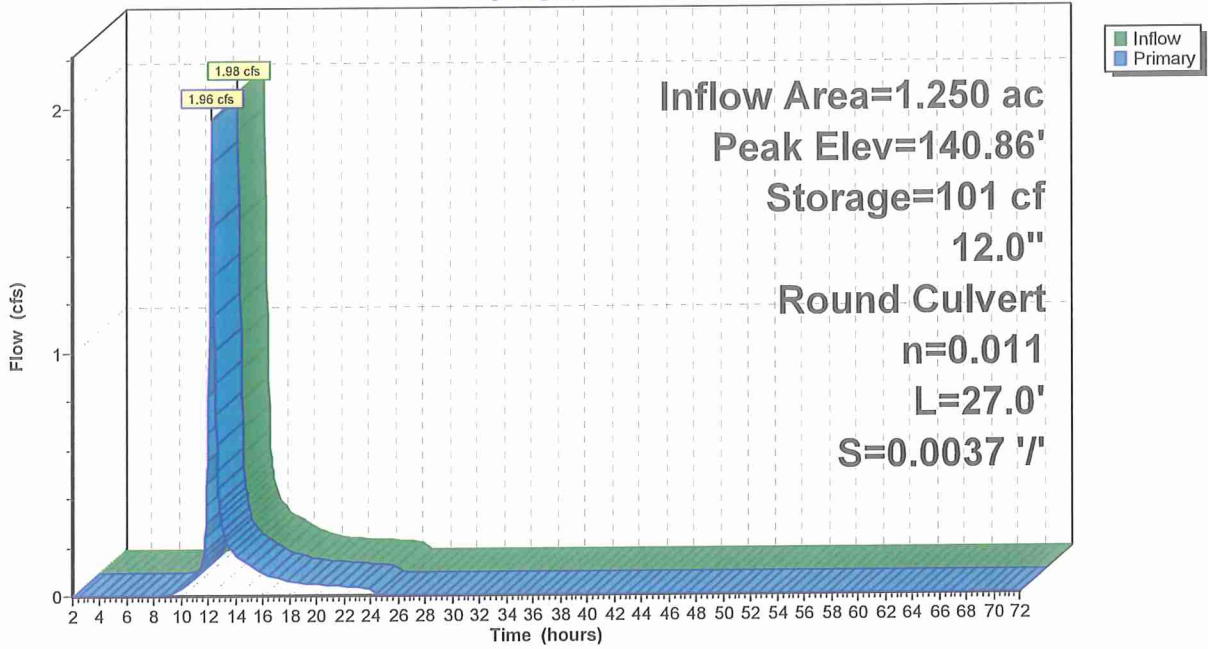
Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.94 cfs @ 12.19 hrs HW=140.86' (Free Discharge)
 ↑1=Culvert (Barrel Controls 1.94 cfs @ 3.50 fps)

Pond 5: Existing Ditch w/Culverts

Hydrograph



2020-104

Type III 24-hr 10 Rainfall=4.90"

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Hydrograph for Pond 5: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.00	0	140.00	0.00
9.50	0.02	3	140.05	0.02
12.00	0.87	47	140.51	0.82
14.50	0.14	14	140.19	0.15
17.00	0.07	8	140.12	0.07
19.50	0.05	6	140.09	0.05
22.00	0.04	5	140.08	0.04
24.50	0.00	0	140.00	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00

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Type III 24-hr 25 Rainfall=6.10"

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Time span=2.00-72.00 hrs, dt=0.05 hrs, 1401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Pre-Development Runoff Area=54,458 sf 10.16% Impervious Runoff Depth=3.47"
Flow Length=607' Tc=13.6 min UI Adjusted CN=76 Runoff=3.96 cfs 0.361 af

Subcatchment3: Post Dev 1 Runoff Area=54,458 sf 12.91% Impervious Runoff Depth=3.57"
Flow Length=599' Tc=12.2 min UI Adjusted CN=77 Runoff=4.24 cfs 0.372 af

Pond 2: Existing Ditch w/Culverts Peak Elev=141.55' Storage=276 cf Inflow=3.96 cfs 0.361 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/' Outflow=3.88 cfs 0.361 af

Pond 4: Shallow Basin Peak Elev=143.20' Storage=51 cf Inflow=4.24 cfs 0.372 af
Discarded=1.30 cfs 0.127 af Primary=2.79 cfs 0.245 af Outflow=4.09 cfs 0.372 af

Pond 5: Existing Ditch w/Culverts Peak Elev=141.11' Storage=149 cf Inflow=2.79 cfs 0.245 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/' Outflow=2.75 cfs 0.245 af

Total Runoff Area = 2.500 ac Runoff Volume = 0.733 af Average Runoff Depth = 3.52"
88.46% Pervious = 2.212 ac 11.54% Impervious = 0.289 ac

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Type III 24-hr 25 Rainfall=6.10"

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Summary for Subcatchment 1: Pre-Development

Runoff = 3.96 cfs @ 12.19 hrs, Volume= 0.361 af, Depth= 3.47"

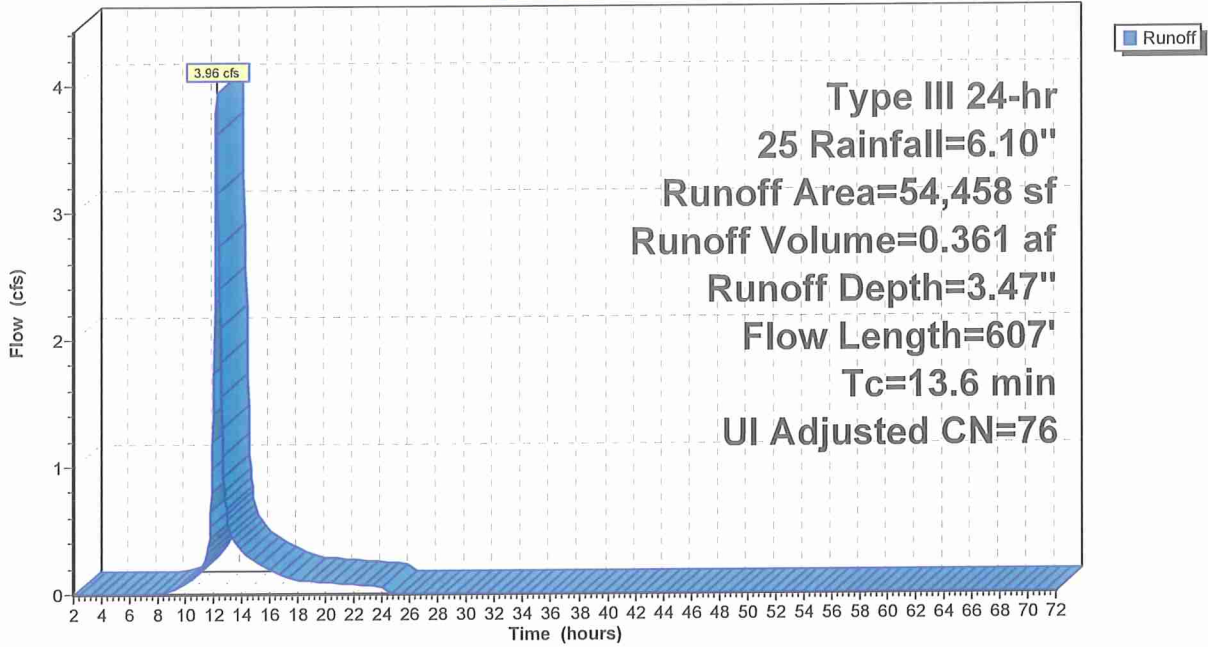
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 Rainfall=6.10"

Area (sf)	CN	Adj	Description
47,214	74		>75% Grass cover, Good, HSG C
935	98		Unconnected pavement, HSG C
1,709	89		Gravel roads, HSG C
1,953	98		Paved parking, HSG C
2,647	98		Unconnected roofs, HSG C
54,458	77	76	Weighted Average, UI Adjusted
48,923			89.84% Pervious Area
5,535			10.16% Impervious Area
3,582			64.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
3.0	332	0.0680	1.83		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.1	36	0.0056	0.52		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.3	139	0.0630	1.76		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
13.6	607	Total			

Subcatchment 1: Pre-Development

Hydrograph



2020-104

Type III 24-hr 25 Rainfall=6.10"

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Hydrograph for Subcatchment 1: Pre-Development

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.12	0.00	0.00	54.00	6.10	3.47	0.00
3.00	0.19	0.00	0.00	55.00	6.10	3.47	0.00
4.00	0.26	0.00	0.00	56.00	6.10	3.47	0.00
5.00	0.35	0.00	0.00	57.00	6.10	3.47	0.00
6.00	0.44	0.00	0.00	58.00	6.10	3.47	0.00
7.00	0.55	0.00	0.00	59.00	6.10	3.47	0.00
8.00	0.70	0.00	0.00	60.00	6.10	3.47	0.00
9.00	0.89	0.02	0.03	61.00	6.10	3.47	0.00
10.00	1.15	0.07	0.09	62.00	6.10	3.47	0.00
11.00	1.52	0.20	0.19	63.00	6.10	3.47	0.00
12.00	3.05	1.05	1.74	64.00	6.10	3.47	0.00
13.00	4.57	2.19	0.57	65.00	6.10	3.47	0.00
14.00	4.95	2.49	0.34	66.00	6.10	3.47	0.00
15.00	5.21	2.71	0.26	67.00	6.10	3.47	0.00
16.00	5.40	2.87	0.18	68.00	6.10	3.47	0.00
17.00	5.55	2.99	0.14	69.00	6.10	3.47	0.00
18.00	5.66	3.09	0.11	70.00	6.10	3.47	0.00
19.00	5.75	3.17	0.10	71.00	6.10	3.47	0.00
20.00	5.84	3.24	0.09	72.00	6.10	3.47	0.00
21.00	5.91	3.31	0.08				
22.00	5.98	3.37	0.07				
23.00	6.04	3.42	0.07				
24.00	6.10	3.47	0.06				
25.00	6.10	3.47	0.00				
26.00	6.10	3.47	0.00				
27.00	6.10	3.47	0.00				
28.00	6.10	3.47	0.00				
29.00	6.10	3.47	0.00				
30.00	6.10	3.47	0.00				
31.00	6.10	3.47	0.00				
32.00	6.10	3.47	0.00				
33.00	6.10	3.47	0.00				
34.00	6.10	3.47	0.00				
35.00	6.10	3.47	0.00				
36.00	6.10	3.47	0.00				
37.00	6.10	3.47	0.00				
38.00	6.10	3.47	0.00				
39.00	6.10	3.47	0.00				
40.00	6.10	3.47	0.00				
41.00	6.10	3.47	0.00				
42.00	6.10	3.47	0.00				
43.00	6.10	3.47	0.00				
44.00	6.10	3.47	0.00				
45.00	6.10	3.47	0.00				
46.00	6.10	3.47	0.00				
47.00	6.10	3.47	0.00				
48.00	6.10	3.47	0.00				
49.00	6.10	3.47	0.00				
50.00	6.10	3.47	0.00				
51.00	6.10	3.47	0.00				
52.00	6.10	3.47	0.00				
53.00	6.10	3.47	0.00				

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Type III 24-hr 25 Rainfall=6.10"

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Summary for Subcatchment 3: Post Dev 1

Runoff = 4.24 cfs @ 12.17 hrs, Volume= 0.372 af, Depth= 3.57"

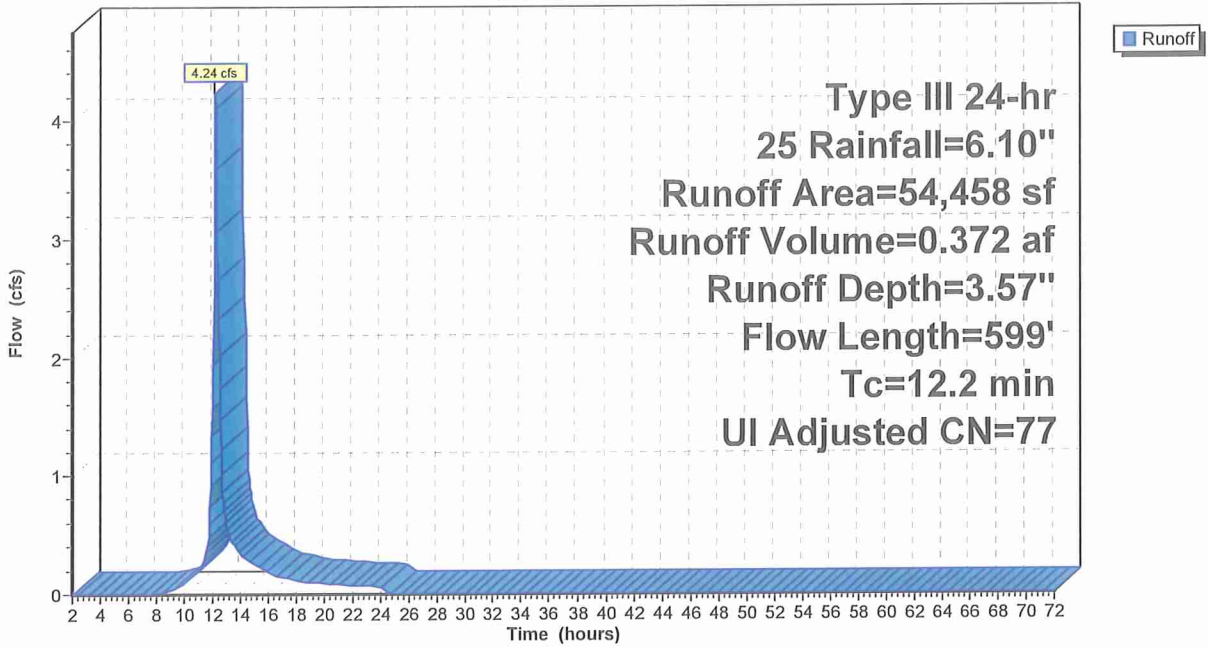
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 Rainfall=6.10"

Area (sf)	CN	Adj	Description
45,591	74		>75% Grass cover, Good, HSG C
3,430	98		Paved parking, HSG B
1,834	89		Gravel roads, HSG C
3,603	98		Unconnected roofs, HSG C
54,458	78	77	Weighted Average, UI Adjusted
47,425			87.09% Pervious Area
7,033			12.91% Impervious Area
3,603			51.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
2.9	315	0.0650	1.78		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.5	36	0.0280	1.17		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.4	96	0.0570	3.58		Shallow Concentrated Flow, Swale Grassed Waterway Kv= 15.0 fps
0.2	40	0.0375	3.12		Shallow Concentrated Flow, Gravel Parking Area Unpaved Kv= 16.1 fps
0.0	12		8.02		Lake or Reservoir, Shallow Basin Mean Depth= 2.00'
12.2	599	Total			

Subcatchment 3: Post Dev 1

Hydrograph



2020-104

Type III 24-hr 25 Rainfall=6.10"

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Hydrograph for Subcatchment 3: Post Dev 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.12	0.00	0.00	54.00	6.10	3.57	0.00
3.00	0.19	0.00	0.00	55.00	6.10	3.57	0.00
4.00	0.26	0.00	0.00	56.00	6.10	3.57	0.00
5.00	0.35	0.00	0.00	57.00	6.10	3.57	0.00
6.00	0.44	0.00	0.00	58.00	6.10	3.57	0.00
7.00	0.55	0.00	0.00	59.00	6.10	3.57	0.00
8.00	0.70	0.00	0.01	60.00	6.10	3.57	0.00
9.00	0.89	0.03	0.04	61.00	6.10	3.57	0.00
10.00	1.15	0.09	0.10	62.00	6.10	3.57	0.00
11.00	1.52	0.22	0.21	63.00	6.10	3.57	0.00
12.00	3.05	1.11	1.94	64.00	6.10	3.57	0.00
13.00	4.57	2.27	0.57	65.00	6.10	3.57	0.00
14.00	4.95	2.58	0.34	66.00	6.10	3.57	0.00
15.00	5.21	2.80	0.26	67.00	6.10	3.57	0.00
16.00	5.40	2.96	0.18	68.00	6.10	3.57	0.00
17.00	5.55	3.09	0.14	69.00	6.10	3.57	0.00
18.00	5.66	3.18	0.11	70.00	6.10	3.57	0.00
19.00	5.75	3.27	0.10	71.00	6.10	3.57	0.00
20.00	5.84	3.34	0.09	72.00	6.10	3.57	0.00
21.00	5.91	3.40	0.08				
22.00	5.98	3.46	0.07				
23.00	6.04	3.52	0.07				
24.00	6.10	3.57	0.06				
25.00	6.10	3.57	0.00				
26.00	6.10	3.57	0.00				
27.00	6.10	3.57	0.00				
28.00	6.10	3.57	0.00				
29.00	6.10	3.57	0.00				
30.00	6.10	3.57	0.00				
31.00	6.10	3.57	0.00				
32.00	6.10	3.57	0.00				
33.00	6.10	3.57	0.00				
34.00	6.10	3.57	0.00				
35.00	6.10	3.57	0.00				
36.00	6.10	3.57	0.00				
37.00	6.10	3.57	0.00				
38.00	6.10	3.57	0.00				
39.00	6.10	3.57	0.00				
40.00	6.10	3.57	0.00				
41.00	6.10	3.57	0.00				
42.00	6.10	3.57	0.00				
43.00	6.10	3.57	0.00				
44.00	6.10	3.57	0.00				
45.00	6.10	3.57	0.00				
46.00	6.10	3.57	0.00				
47.00	6.10	3.57	0.00				
48.00	6.10	3.57	0.00				
49.00	6.10	3.57	0.00				
50.00	6.10	3.57	0.00				
51.00	6.10	3.57	0.00				
52.00	6.10	3.57	0.00				
53.00	6.10	3.57	0.00				

Summary for Pond 2: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 10.16% Impervious, Inflow Depth = 3.47" for 25 event
 Inflow = 3.96 cfs @ 12.19 hrs, Volume= 0.361 af
 Outflow = 3.88 cfs @ 12.22 hrs, Volume= 0.361 af, Atten= 2%, Lag= 1.8 min
 Primary = 3.88 cfs @ 12.22 hrs, Volume= 0.361 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 141.55' @ 12.22 hrs Surf.Area= 348 sf Storage= 276 cf

Plug-Flow detention time= 1.2 min calculated for 0.361 af (100% of inflow)
 Center-of-Mass det. time= 1.2 min (831.6 - 830.3)

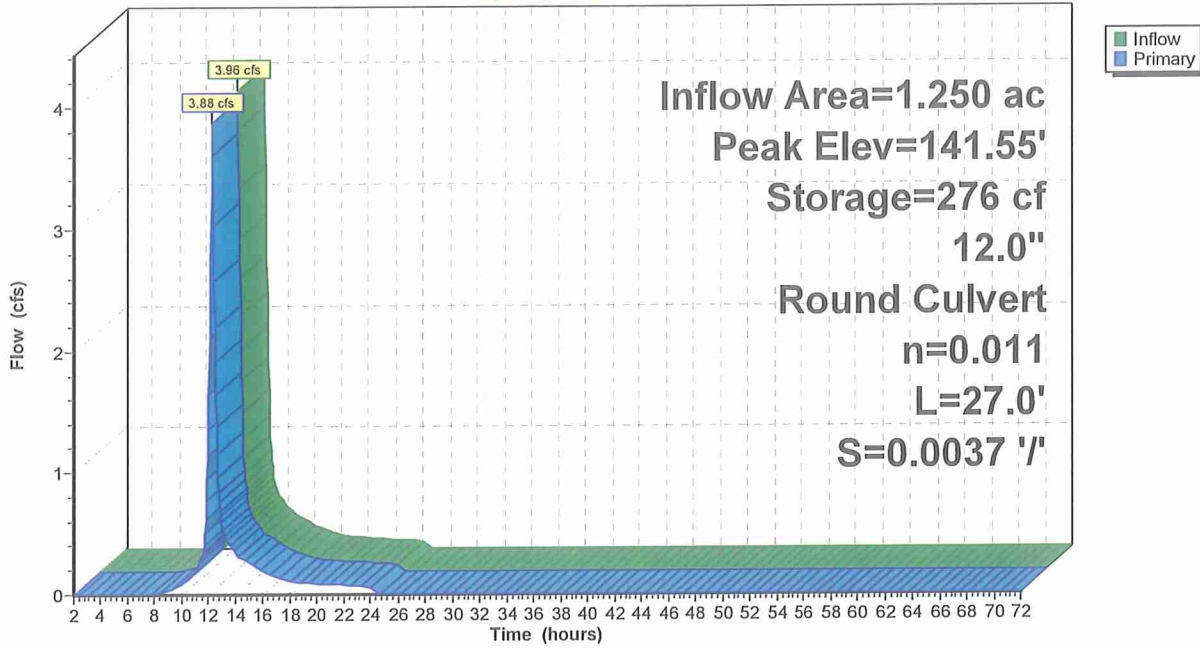
Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.82 cfs @ 12.22 hrs HW=141.53' (Free Discharge)
 ↑1=Culvert (Barrel Controls 3.82 cfs @ 4.86 fps)

Pond 2: Existing Ditch w/Culverts

Hydrograph



2020-104

Type III 24-hr 25 Rainfall=6.10"

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Hydrograph for Pond 2: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.00	0	140.00	0.00
9.50	0.06	7	140.10	0.06
12.00	1.74	86	140.77	1.65
14.50	0.29	22	140.28	0.29
17.00	0.14	13	140.19	0.14
19.50	0.09	10	140.14	0.09
22.00	0.07	9	140.12	0.07
24.50	0.00	0	140.01	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00

Summary for Pond 4: Shallow Basin

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 3.57" for 25 event
 Inflow = 4.24 cfs @ 12.17 hrs, Volume= 0.372 af
 Outflow = 4.09 cfs @ 12.20 hrs, Volume= 0.372 af, Atten= 4%, Lag= 1.7 min
 Discarded = 1.30 cfs @ 12.15 hrs, Volume= 0.127 af
 Primary = 2.79 cfs @ 12.20 hrs, Volume= 0.245 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 143.20' @ 12.20 hrs Surf.Area= 283 sf Storage= 51 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (826.7 - 826.6)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	977 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
143.00	236	0	0
144.00	474	355	355
145.00	770	622	977

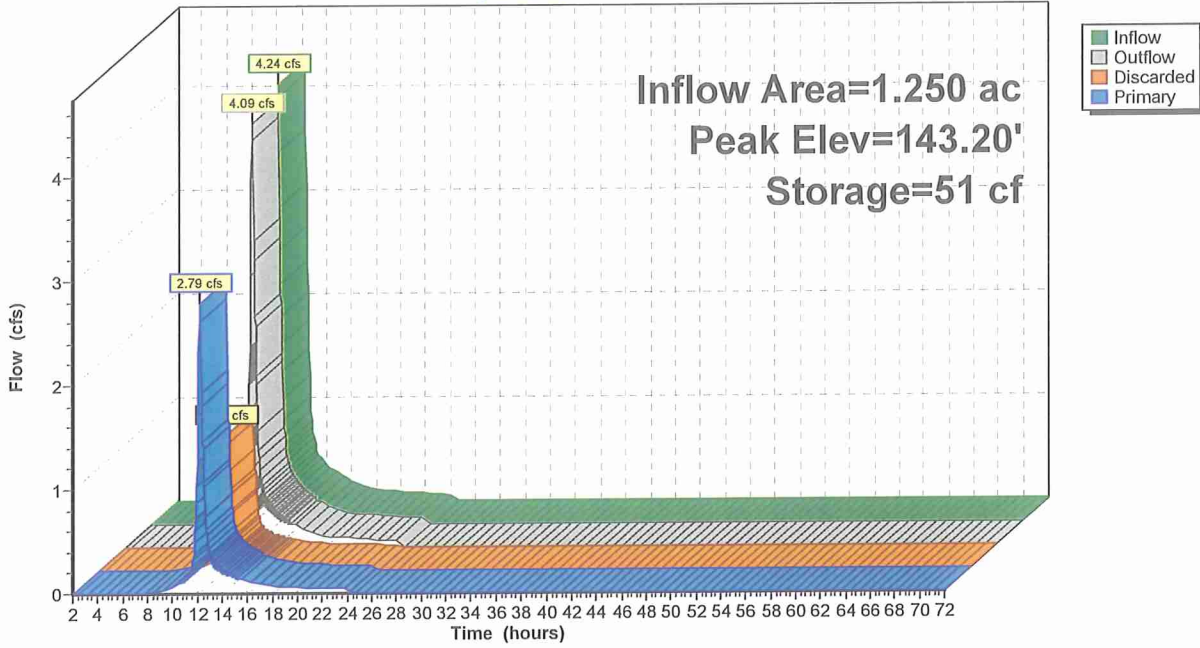
Device	Routing	Invert	Outlet Devices
#1	Discarded	143.00'	1.30 cfs Exfiltration at all elevations
#2	Primary	144.50'	0.3" x 6.0" Horiz. Grate X 25.00 C= 0.600 in 8.0" Grate (90% open area) Limited to weir flow at low heads
#3	Primary	142.00'	8.0" Vert. Pipe C= 0.600
#4	Primary	142.00'	8.0" Round Pipe L= 30.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.00' / 141.00' S= 0.0327 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=1.30 cfs @ 12.15 hrs HW=143.11' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.30 cfs)

Primary OutFlow Max=2.79 cfs @ 12.20 hrs HW=143.19' (Free Discharge)
 ↑2=Grate (Controls 0.00 cfs)
 ↑3=Pipe (Orifice Controls 1.56 cfs @ 4.46 fps)
 ↑4=Pipe (Inlet Controls 1.23 cfs @ 3.52 fps)

Pond 4: Shallow Basin

Hydrograph



2020-104

Type III 24-hr 25 Rainfall=6.10"

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Hydrograph for Pond 4: Shallow Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
2.00	0.00	0	143.00	0.00	0.00	0.00
4.50	0.00	0	143.00	0.00	0.00	0.00
7.00	0.00	0	143.00	0.00	0.00	0.00
9.50	0.07	0	143.00	0.07	0.02	0.04
12.00	1.94	2	143.01	1.94	0.66	1.27
14.50	0.29	0	143.00	0.26	0.09	0.17
17.00	0.14	0	143.00	0.14	0.05	0.09
19.50	0.09	0	143.00	0.09	0.03	0.06
22.00	0.07	0	143.00	0.07	0.03	0.05
24.50	0.00	0	143.00	0.00	0.00	0.00
27.00	0.00	0	143.00	0.00	0.00	0.00
29.50	0.00	0	143.00	0.00	0.00	0.00
32.00	0.00	0	143.00	0.00	0.00	0.00
34.50	0.00	0	143.00	0.00	0.00	0.00
37.00	0.00	0	143.00	0.00	0.00	0.00
39.50	0.00	0	143.00	0.00	0.00	0.00
42.00	0.00	0	143.00	0.00	0.00	0.00
44.50	0.00	0	143.00	0.00	0.00	0.00
47.00	0.00	0	143.00	0.00	0.00	0.00
49.50	0.00	0	143.00	0.00	0.00	0.00
52.00	0.00	0	143.00	0.00	0.00	0.00
54.50	0.00	0	143.00	0.00	0.00	0.00
57.00	0.00	0	143.00	0.00	0.00	0.00
59.50	0.00	0	143.00	0.00	0.00	0.00
62.00	0.00	0	143.00	0.00	0.00	0.00
64.50	0.00	0	143.00	0.00	0.00	0.00
67.00	0.00	0	143.00	0.00	0.00	0.00
69.50	0.00	0	143.00	0.00	0.00	0.00
72.00	0.00	0	143.00	0.00	0.00	0.00

2020-104

Type III 24-hr 25 Rainfall=6.10"

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Summary for Pond 5: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 2.35" for 25 event
 Inflow = 2.79 cfs @ 12.20 hrs, Volume= 0.245 af
 Outflow = 2.75 cfs @ 12.22 hrs, Volume= 0.245 af, Atten= 2%, Lag= 1.1 min
 Primary = 2.75 cfs @ 12.22 hrs, Volume= 0.245 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 141.11' @ 12.22 hrs Surf.Area= 223 sf Storage= 149 cf

Plug-Flow detention time= 1.3 min calculated for 0.245 af (100% of inflow)
 Center-of-Mass det. time= 1.3 min (827.6 - 826.4)

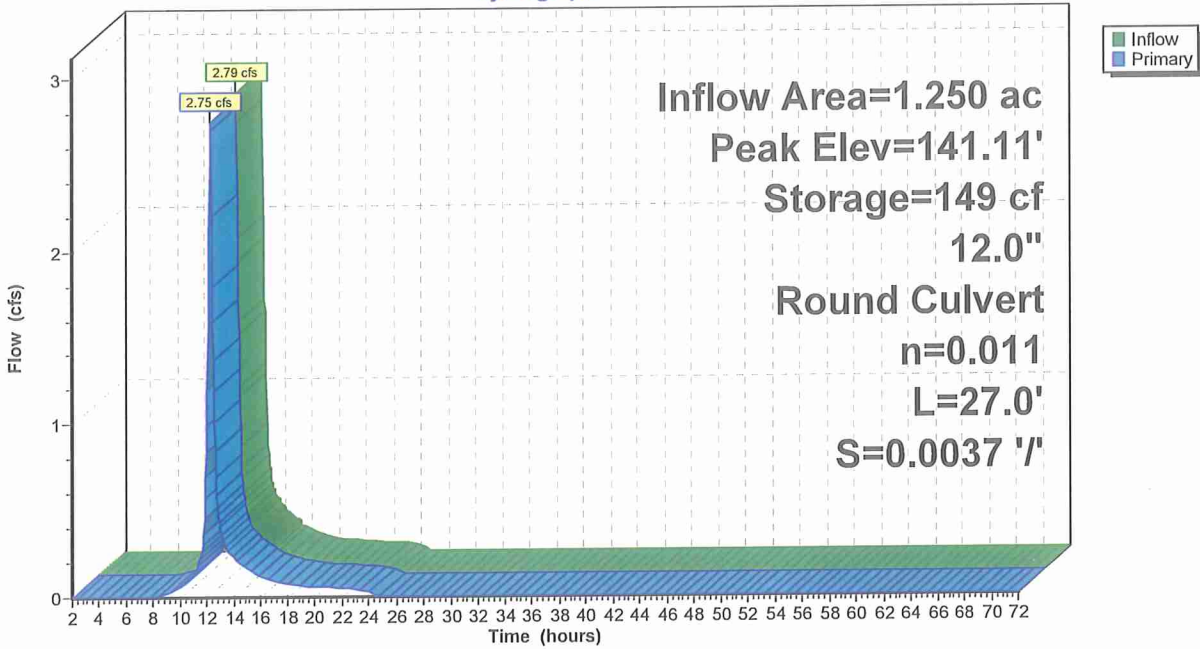
Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.73 cfs @ 12.22 hrs HW=141.10' (Free Discharge)
 ←1=Culvert (Barrel Controls 2.73 cfs @ 3.84 fps)

Pond 5: Existing Ditch w/Culverts

Hydrograph



2020-104

Type III 24-hr 25 Rainfall=6.10"

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Hydrograph for Pond 5: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.00	0	140.00	0.00
9.50	0.04	6	140.09	0.04
12.00	1.27	65	140.64	1.21
14.50	0.17	16	140.22	0.19
17.00	0.09	10	140.15	0.10
19.50	0.06	8	140.11	0.06
22.00	0.05	6	140.10	0.05
24.50	0.00	0	140.00	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00

2020-104

Type II 24-hr 100 Rainfall=8.60"

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Time span=2.00-72.00 hrs, dt=0.05 hrs, 1401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Pre-Development Runoff Area=54,458 sf 10.16% Impervious Runoff Depth=5.71"
Flow Length=607' Tc=13.6 min UI Adjusted CN=76 Runoff=9.48 cfs 0.595 af

Subcatchment3: Post Dev 1 Runoff Area=54,458 sf 12.91% Impervious Runoff Depth=5.83"
Flow Length=599' Tc=12.2 min UI Adjusted CN=77 Runoff=10.07 cfs 0.607 af

Pond 2: Existing Ditch w/Culverts Peak Elev=145.90' Storage=719 cf Inflow=9.48 cfs 0.595 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/ Outflow=10.52 cfs 0.595 af

Pond 4: Shallow Basin Peak Elev=147.86' Storage=977 cf Inflow=10.07 cfs 0.607 af
Discarded=1.30 cfs 0.174 af Primary=9.84 cfs 0.433 af Outflow=11.14 cfs 0.607 af

Pond 5: Existing Ditch w/Culverts Peak Elev=144.45' Storage=719 cf Inflow=9.84 cfs 0.433 af
12.0" Round Culvert n=0.011 L=27.0' S=0.0037 '/ Outflow=8.90 cfs 0.433 af

Total Runoff Area = 2.500 ac Runoff Volume = 1.202 af Average Runoff Depth = 5.77"
88.46% Pervious = 2.212 ac 11.54% Impervious = 0.289 ac

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Type II 24-hr 100 Rainfall=8.60"

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Summary for Subcatchment 1: Pre-Development

Runoff = 9.48 cfs @ 12.05 hrs, Volume= 0.595 af, Depth= 5.71"

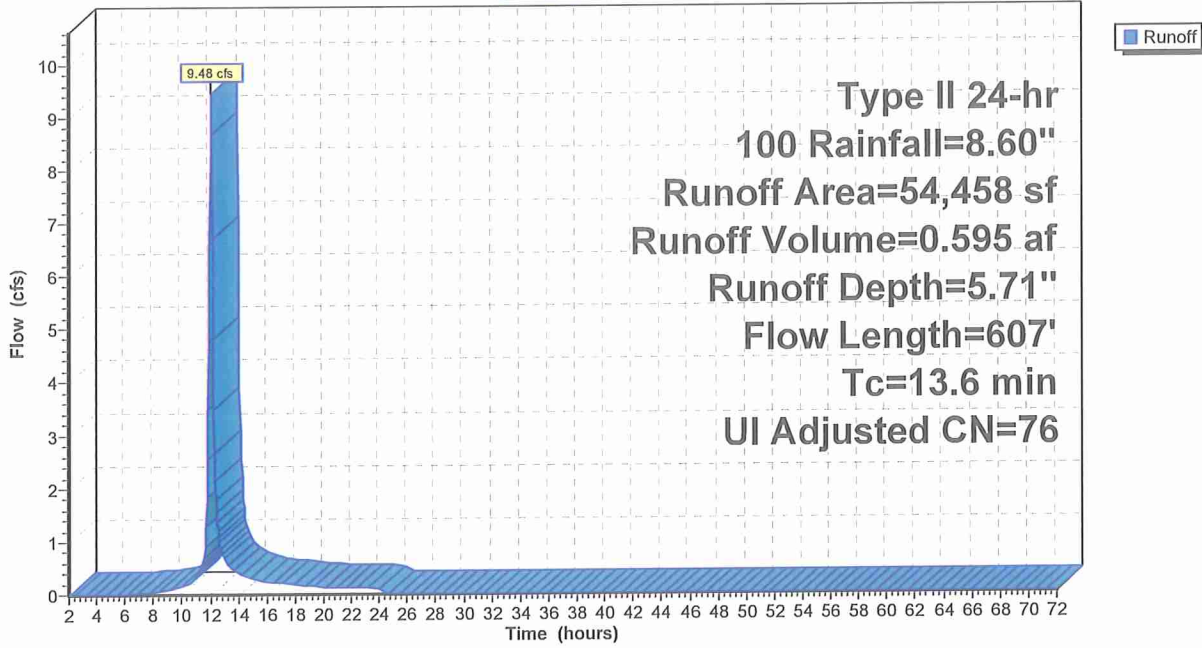
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Rainfall=8.60"

Area (sf)	CN	Adj	Description
47,214	74		>75% Grass cover, Good, HSG C
935	98		Unconnected pavement, HSG C
1,709	89		Gravel roads, HSG C
1,953	98		Paved parking, HSG C
2,647	98		Unconnected roofs, HSG C
54,458	77	76	Weighted Average, UI Adjusted
48,923			89.84% Pervious Area
5,535			10.16% Impervious Area
3,582			64.72% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
3.0	332	0.0680	1.83		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.1	36	0.0056	0.52		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
1.3	139	0.0630	1.76		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
13.6	607	Total			

Subcatchment 1: Pre-Development

Hydrograph



2020-104

Type II 24-hr 100 Rainfall=8.60"

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Hydrograph for Subcatchment 1: Pre-Development

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.19	0.00	0.00	54.00	8.60	5.71	0.00
3.00	0.30	0.00	0.00	55.00	8.60	5.71	0.00
4.00	0.41	0.00	0.00	56.00	8.60	5.71	0.00
5.00	0.54	0.00	0.00	57.00	8.60	5.71	0.00
6.00	0.69	0.00	0.00	58.00	8.60	5.71	0.00
7.00	0.85	0.01	0.02	59.00	8.60	5.71	0.00
8.00	1.03	0.05	0.05	60.00	8.60	5.71	0.00
9.00	1.26	0.11	0.09	61.00	8.60	5.71	0.00
10.00	1.56	0.21	0.15	62.00	8.60	5.71	0.00
11.00	2.02	0.42	0.34	63.00	8.60	5.71	0.00
12.00	5.70	3.12	8.52	64.00	8.60	5.71	0.00
13.00	6.64	3.94	0.69	65.00	8.60	5.71	0.00
14.00	7.05	4.30	0.40	66.00	8.60	5.71	0.00
15.00	7.34	4.56	0.31	67.00	8.60	5.71	0.00
16.00	7.57	4.77	0.24	68.00	8.60	5.71	0.00
17.00	7.76	4.94	0.21	69.00	8.60	5.71	0.00
18.00	7.92	5.09	0.18	70.00	8.60	5.71	0.00
19.00	8.06	5.22	0.16	71.00	8.60	5.71	0.00
20.00	8.19	5.33	0.13	72.00	8.60	5.71	0.00
21.00	8.30	5.43	0.12				
22.00	8.40	5.53	0.12				
23.00	8.50	5.62	0.12				
24.00	8.60	5.71	0.11				
25.00	8.60	5.71	0.00				
26.00	8.60	5.71	0.00				
27.00	8.60	5.71	0.00				
28.00	8.60	5.71	0.00				
29.00	8.60	5.71	0.00				
30.00	8.60	5.71	0.00				
31.00	8.60	5.71	0.00				
32.00	8.60	5.71	0.00				
33.00	8.60	5.71	0.00				
34.00	8.60	5.71	0.00				
35.00	8.60	5.71	0.00				
36.00	8.60	5.71	0.00				
37.00	8.60	5.71	0.00				
38.00	8.60	5.71	0.00				
39.00	8.60	5.71	0.00				
40.00	8.60	5.71	0.00				
41.00	8.60	5.71	0.00				
42.00	8.60	5.71	0.00				
43.00	8.60	5.71	0.00				
44.00	8.60	5.71	0.00				
45.00	8.60	5.71	0.00				
46.00	8.60	5.71	0.00				
47.00	8.60	5.71	0.00				
48.00	8.60	5.71	0.00				
49.00	8.60	5.71	0.00				
50.00	8.60	5.71	0.00				
51.00	8.60	5.71	0.00				
52.00	8.60	5.71	0.00				
53.00	8.60	5.71	0.00				

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Type II 24-hr 100 Rainfall=8.60"

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Summary for Subcatchment 3: Post Dev 1

Runoff = 10.07 cfs @ 12.04 hrs, Volume= 0.607 af, Depth= 5.83"

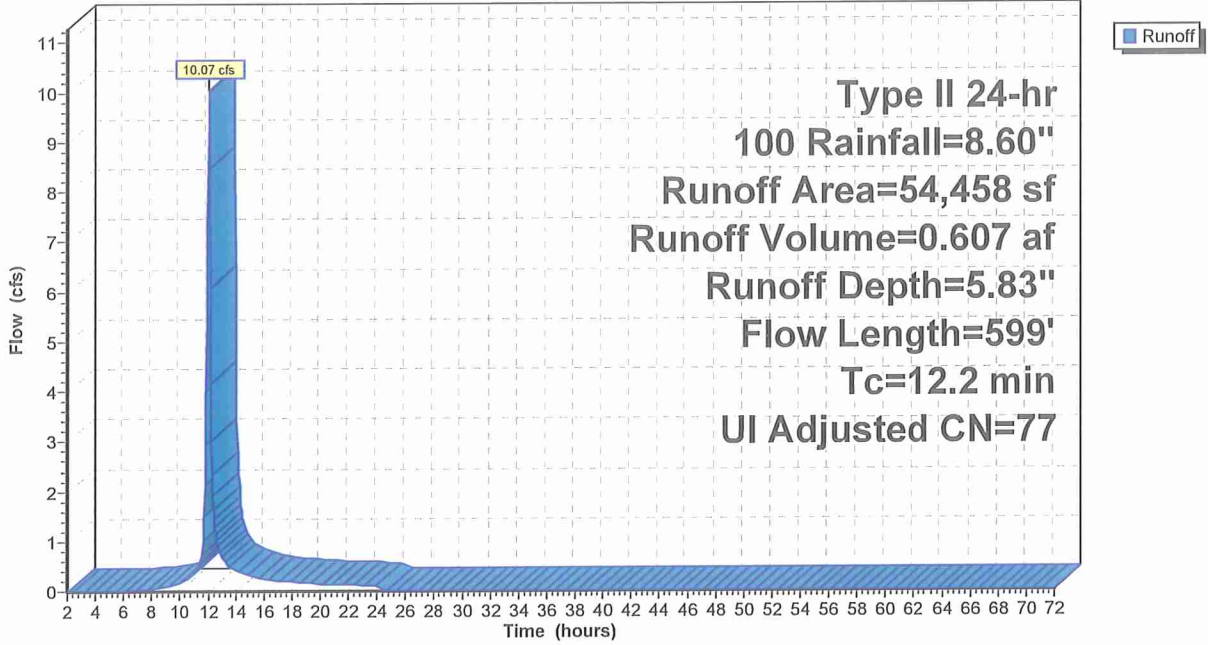
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Rainfall=8.60"

Area (sf)	CN	Adj	Description
45,591	74		>75% Grass cover, Good, HSG C
3,430	98		Paved parking, HSG B
1,834	89		Gravel roads, HSG C
3,603	98		Unconnected roofs, HSG C
54,458	78	77	Weighted Average, UI Adjusted
47,425			87.09% Pervious Area
7,033			12.91% Impervious Area
3,603			51.23% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		Sheet Flow, Grass-Sheet Grass: Short n= 0.150 P2= 3.30"
2.9	315	0.0650	1.78		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.5	36	0.0280	1.17		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.4	96	0.0570	3.58		Shallow Concentrated Flow, Swale Grassed Waterway Kv= 15.0 fps
0.2	40	0.0375	3.12		Shallow Concentrated Flow, Gravel Parking Area Unpaved Kv= 16.1 fps
0.0	12		8.02		Lake or Reservoir, Shallow Basin Mean Depth= 2.00'
12.2	599	Total			

Subcatchment 3: Post Dev 1

Hydrograph



2020-104

Type II 24-hr 100 Rainfall=8.60"

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Hydrograph for Subcatchment 3: Post Dev 1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.19	0.00	0.00	54.00	8.60	5.83	0.00
3.00	0.30	0.00	0.00	55.00	8.60	5.83	0.00
4.00	0.41	0.00	0.00	56.00	8.60	5.83	0.00
5.00	0.54	0.00	0.00	57.00	8.60	5.83	0.00
6.00	0.69	0.00	0.01	58.00	8.60	5.83	0.00
7.00	0.85	0.02	0.03	59.00	8.60	5.83	0.00
8.00	1.03	0.06	0.05	60.00	8.60	5.83	0.00
9.00	1.26	0.12	0.10	61.00	8.60	5.83	0.00
10.00	1.56	0.23	0.16	62.00	8.60	5.83	0.00
11.00	2.02	0.46	0.36	63.00	8.60	5.83	0.00
12.00	5.70	3.22	9.50	64.00	8.60	5.83	0.00
13.00	6.64	4.04	0.68	65.00	8.60	5.83	0.00
14.00	7.05	4.41	0.40	66.00	8.60	5.83	0.00
15.00	7.34	4.67	0.31	67.00	8.60	5.83	0.00
16.00	7.57	4.88	0.24	68.00	8.60	5.83	0.00
17.00	7.76	5.05	0.21	69.00	8.60	5.83	0.00
18.00	7.92	5.20	0.18	70.00	8.60	5.83	0.00
19.00	8.06	5.33	0.16	71.00	8.60	5.83	0.00
20.00	8.19	5.45	0.13	72.00	8.60	5.83	0.00
21.00	8.30	5.55	0.13				
22.00	8.40	5.64	0.12				
23.00	8.50	5.74	0.12				
24.00	8.60	5.83	0.11				
25.00	8.60	5.83	0.00				
26.00	8.60	5.83	0.00				
27.00	8.60	5.83	0.00				
28.00	8.60	5.83	0.00				
29.00	8.60	5.83	0.00				
30.00	8.60	5.83	0.00				
31.00	8.60	5.83	0.00				
32.00	8.60	5.83	0.00				
33.00	8.60	5.83	0.00				
34.00	8.60	5.83	0.00				
35.00	8.60	5.83	0.00				
36.00	8.60	5.83	0.00				
37.00	8.60	5.83	0.00				
38.00	8.60	5.83	0.00				
39.00	8.60	5.83	0.00				
40.00	8.60	5.83	0.00				
41.00	8.60	5.83	0.00				
42.00	8.60	5.83	0.00				
43.00	8.60	5.83	0.00				
44.00	8.60	5.83	0.00				
45.00	8.60	5.83	0.00				
46.00	8.60	5.83	0.00				
47.00	8.60	5.83	0.00				
48.00	8.60	5.83	0.00				
49.00	8.60	5.83	0.00				
50.00	8.60	5.83	0.00				
51.00	8.60	5.83	0.00				
52.00	8.60	5.83	0.00				
53.00	8.60	5.83	0.00				

Summary for Pond 2: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 10.16% Impervious, Inflow Depth = 5.71" for 100 event
 Inflow = 9.48 cfs @ 12.05 hrs, Volume= 0.595 af
 Outflow = 10.52 cfs @ 12.05 hrs, Volume= 0.595 af, Atten= 0%, Lag= 0.0 min
 Primary = 10.52 cfs @ 12.05 hrs, Volume= 0.595 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 145.90' @ 12.05 hrs Surf.Area= 567 sf Storage= 719 cf

Plug-Flow detention time= 1.3 min calculated for 0.594 af (100% of inflow)
 Center-of-Mass det. time= 1.3 min (814.4 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

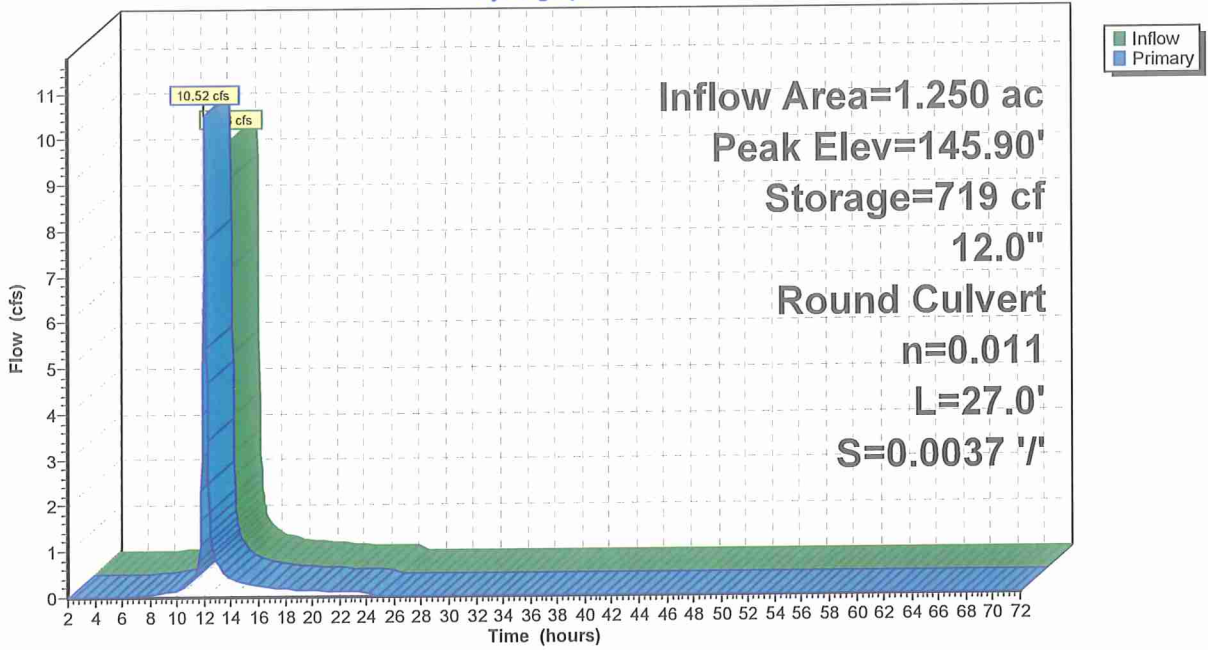
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 ' / ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=10.49 cfs @ 12.05 hrs HW=145.87' (Free Discharge)
 ↑1=Culvert (Barrel Controls 10.49 cfs @ 13.35 fps)

Pond 2: Existing Ditch w/Culverts

Hydrograph



2020-104

Type II 24-hr 100 Rainfall=8.60"

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Hydrograph for Pond 2: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.02	4	140.06	0.02
9.50	0.12	12	140.16	0.12
12.00	8.52	719	143.41	7.48
14.50	0.34	24	140.30	0.34
17.00	0.21	17	140.23	0.21
19.50	0.15	14	140.19	0.15
22.00	0.12	12	140.17	0.12
24.50	0.00	1	140.01	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00

Summary for Pond 4: Shallow Basin

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 5.83" for 100 event
 Inflow = 10.07 cfs @ 12.04 hrs, Volume= 0.607 af
 Outflow = 11.14 cfs @ 12.05 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.8 min
 Discarded = 1.30 cfs @ 11.85 hrs, Volume= 0.174 af
 Primary = 9.84 cfs @ 12.05 hrs, Volume= 0.433 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 147.86' @ 12.05 hrs Surf.Area= 770 sf Storage= 977 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.6 min (810.2 - 809.6)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	977 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
143.00	236	0	0
144.00	474	355	355
145.00	770	622	977

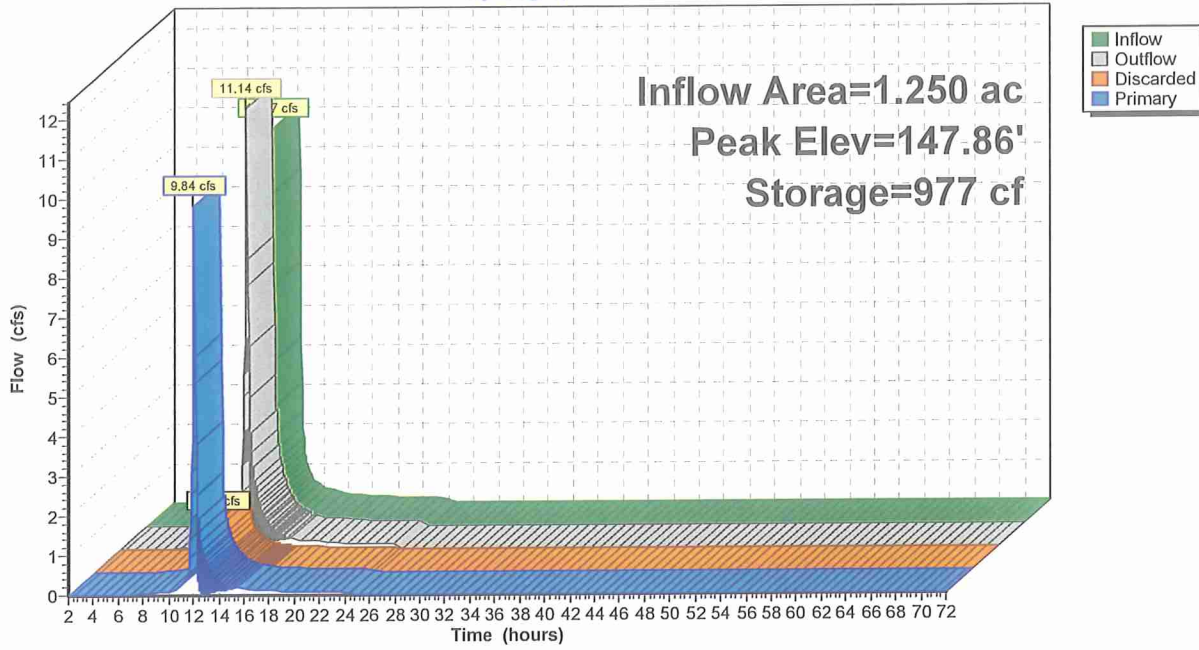
Device	Routing	Invert	Outlet Devices
#1	Discarded	143.00'	1.30 cfs Exfiltration at all elevations
#2	Primary	144.50'	0.3" x 6.0" Horiz. Grate X 25.00 C= 0.600 in 8.0" Grate (90% open area) Limited to weir flow at low heads
#3	Primary	142.00'	8.0" Vert. Pipe C= 0.600
#4	Primary	142.00'	8.0" Round Pipe L= 30.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 142.00' / 141.00' S= 0.0327 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=1.30 cfs @ 11.85 hrs HW=143.07' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 1.30 cfs)

Primary OutFlow Max=9.75 cfs @ 12.05 hrs HW=147.78' (Free Discharge)
 ↑2=**Grate** (Orifice Controls 2.73 cfs @ 8.72 fps)
 ↑3=**Pipe** (Orifice Controls 3.92 cfs @ 11.24 fps)
 ↑4=**Pipe** (Inlet Controls 3.10 cfs @ 8.87 fps)

Pond 4: Shallow Basin

Hydrograph



2020-104

Type II 24-hr 100 Rainfall=8.60"

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Hydrograph for Pond 4: Shallow Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
2.00	0.00	0	143.00	0.00	0.00	0.00
4.50	0.00	0	143.00	0.00	0.00	0.00
7.00	0.03	0	143.00	0.03	0.01	0.02
9.50	0.13	0	143.00	0.13	0.04	0.08
12.00	9.50	844	144.82	6.90	1.30	5.60
14.50	0.34	1	143.00	0.46	0.16	0.30
17.00	0.21	1	143.00	0.21	0.07	0.14
19.50	0.15	0	143.00	0.15	0.05	0.10
22.00	0.12	0	143.00	0.12	0.04	0.08
24.50	0.00	0	143.00	0.00	0.00	0.00
27.00	0.00	0	143.00	0.00	0.00	0.00
29.50	0.00	0	143.00	0.00	0.00	0.00
32.00	0.00	0	143.00	0.00	0.00	0.00
34.50	0.00	0	143.00	0.00	0.00	0.00
37.00	0.00	0	143.00	0.00	0.00	0.00
39.50	0.00	0	143.00	0.00	0.00	0.00
42.00	0.00	0	143.00	0.00	0.00	0.00
44.50	0.00	0	143.00	0.00	0.00	0.00
47.00	0.00	0	143.00	0.00	0.00	0.00
49.50	0.00	0	143.00	0.00	0.00	0.00
52.00	0.00	0	143.00	0.00	0.00	0.00
54.50	0.00	0	143.00	0.00	0.00	0.00
57.00	0.00	0	143.00	0.00	0.00	0.00
59.50	0.00	0	143.00	0.00	0.00	0.00
62.00	0.00	0	143.00	0.00	0.00	0.00
64.50	0.00	0	143.00	0.00	0.00	0.00
67.00	0.00	0	143.00	0.00	0.00	0.00
69.50	0.00	0	143.00	0.00	0.00	0.00
72.00	0.00	0	143.00	0.00	0.00	0.00

2020-104

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Summary for Pond 5: Existing Ditch w/Culverts

Inflow Area = 1.250 ac, 12.91% Impervious, Inflow Depth = 4.16" for 100 event
 Inflow = 9.84 cfs @ 12.05 hrs, Volume= 0.433 af
 Outflow = 8.90 cfs @ 12.09 hrs, Volume= 0.433 af, Atten= 10%, Lag= 2.4 min
 Primary = 8.90 cfs @ 12.09 hrs, Volume= 0.433 af

Routing by Stor-Ind method, Time Span= 2.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 144.45' @ 12.09 hrs Surf.Area= 567 sf Storage= 719 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.4 min (805.2 - 803.8)

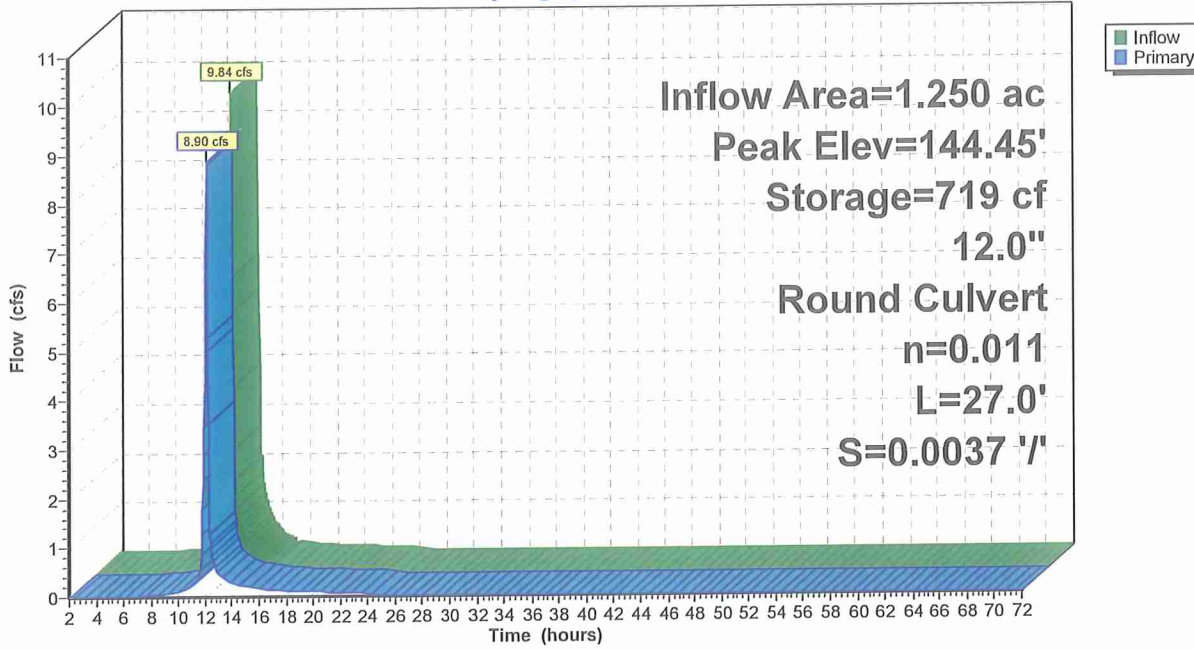
Volume	Invert	Avail.Storage	Storage Description
#1	140.00'	719 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
140.00	60	0	0
141.00	193	127	127
142.00	472	333	459
142.50	567	260	719

Device	Routing	Invert	Outlet Devices
#1	Primary	139.97'	12.0" Round Culvert L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 139.97' / 139.87' S= 0.0037 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=8.56 cfs @ 12.09 hrs HW=144.20' (Free Discharge)
 ↑1=Culvert (Barrel Controls 8.56 cfs @ 10.90 fps)

Pond 5: Existing Ditch w/Culverts

Hydrograph



2020-104

Type II 24-hr 100 Rainfall=8.60"

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Hydrograph for Pond 5: Existing Ditch w/Culverts

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	140.00	0.00
4.50	0.00	0	140.00	0.00
7.00	0.02	3	140.05	0.02
9.50	0.08	9	140.13	0.08
12.00	5.60	375	141.81	4.55
14.50	0.30	18	140.24	0.22
17.00	0.14	13	140.18	0.14
19.50	0.10	10	140.15	0.10
22.00	0.08	9	140.13	0.08
24.50	0.00	0	140.01	0.00
27.00	0.00	0	140.00	0.00
29.50	0.00	0	140.00	0.00
32.00	0.00	0	140.00	0.00
34.50	0.00	0	140.00	0.00
37.00	0.00	0	140.00	0.00
39.50	0.00	0	140.00	0.00
42.00	0.00	0	140.00	0.00
44.50	0.00	0	140.00	0.00
47.00	0.00	0	140.00	0.00
49.50	0.00	0	140.00	0.00
52.00	0.00	0	140.00	0.00
54.50	0.00	0	140.00	0.00
57.00	0.00	0	140.00	0.00
59.50	0.00	0	140.00	0.00
62.00	0.00	0	140.00	0.00
64.50	0.00	0	140.00	0.00
67.00	0.00	0	140.00	0.00
69.50	0.00	0	140.00	0.00
72.00	0.00	0	140.00	0.00