

Twin Diamond Plaza

4717, Covington Hwy,
Decatur, GA 30035.
DeKalb County

Stormwater Management Report

Prepared By:

Date : 23th August 2006

1.0 Introduction

The proposed Twin Diamond Plaza is located on the west side of Covington Highway, Decatur, near to Lamar Street. The property has approximately 218 frontage on Covington Highway and area is 2.23 acres. The property is rezoned from C1(cond) to C1. It was also decided during the rezoning, that the developer shall provide a 50 foot transitional zone along the west and south property line as well as a retaining wall to be installed on 3 sides so as to avoid removing too many trees.

2.0 Existing Conditions

The existing site is currently of 2.23 acres of which 1.48 acres is being disturbed. The total coverage shall be 1.25 Acres which is 55% of the total area.

The Predevelopment condition consists of the site having good amount of trees and covered with dense grass. There is natural channel observed starting from the North Easter corner and coming up to the South West corner. The difference in existing grade between the NE corner at the road and SW corner at the back is 29 feet.

3.0 Sizing Criteria

For the storm water management design, Section 2.3 of the Dekalb County Storm water Management Manual was referred.

Stormwater Management Facility	Design Frequency				
Culverts, Open Channels and Conveyance Systems	100-year				
Storage Facilities	All intensities up to and including the 100-year using reservoir routing techniques				
Inlets	10-year				
Erosion & Sediment Control	25-year				
Water Quality	1.2 inches of rain				
24-hour Volumes (inches)					
<u>2-year</u>	<u>5-year</u>	<u>10-year</u>	<u>25-year</u>	<u>50-year</u>	<u>100-year</u>
4.1	4.8	5.5	6.5	7.2	7.9

Note: All drainage system design shall be checked using the 100-year design rainfall frequency to be sure structures are not flooded or increased damage does not occur to the highway or adjacent property.

4.0 Post Development Stage

It was also decided during the rezoning, that the developer shall provide a 50 foot transitional zone along the west and south property line as well as a retaining wall to be installed on 3 sides so as to avoid removing too many trees. Also, sufficient landscaping is provided in the parking area. Since the existing natural channel is being disturbed, a 24" ADS pipe is proposed to take the Stormwater from the point where it is stopped to the point where the runoff can rejoin the existing channel. Sufficient care is taken to ensure no erosion takes place by having energy dissipaters and apron.

1 inlet structure from the road as well as 3 inlet structures in the parking area is provided. The run off is taken through a series of pipes, with size ranging from 15" ADS to 24" ADS, to a retention pond situated on the South West corner . The retention tank with vertical CMU retaining walls, has an area of approximately 2500 sft and ht of 6 ft total and retention ht of 2 feet.

Note: The runoff from adjacent lot, which was entering into the lot, is diverted using 24" ADS pipe as mentioned before. However this inflow is not taken into account as the discharge will remain same in both pre and post stage.

The routing and sizing is calculated using HydroCAD software. TR 20 method is adopted. The Rainfall taken is Type II 24 Hr.

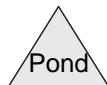
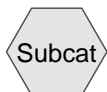
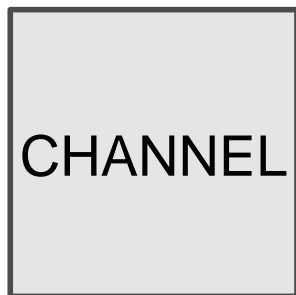
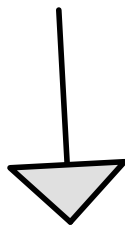
The reports of the HydroCAD calculations are provided.

5.0 Summary

This Site has been designed to meet all the requirements of Dekalb County, Georgia. The retention pond is designed for storing 1.2 inches of rainfall, as required for Water Quality and the reservoir routing was done for 100 year storm event. The end peak discharge in the Post Development is kept less than the Pre Development stage.

Pre Development Stage

Run off Calculations



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Type II 24-hr Rainfall=7.90"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment AREA 1: SETriangular Area of Site Runoff Area=62,533 sf Runoff Depth=3.93"
Length=200' Tc=12.6 min CN=69 Runoff= 8.52 cfs 0.470 af

Subcatchment AREA 2: NW Triangular Area of Site Runoff Area=34,605 sf Runoff Depth=3.93"
Length=150' Tc=10.0 min CN=69 Runoff= 5.12 cfs 0.260 af

Reach CHANNEL: R1 Peak Depth= 1.02' Max Vel= 7.8 fps Inflow= 13.50 cfs 0.731 af
n=0.025 L=451.0' S=0.0420 '/' Capacity=198.74 cfs Outflow= 13.08 cfs 0.730 af

Total Runoff Area = 2.230 ac Runoff Volume = 0.731 af Average Runoff Depth = 3.93"

Subcatchment AREA 1: SETriangular Area of Site

Runoff = 8.52 cfs @ 12.05 hrs, Volume= 0.470 af, Depth= 3.93"

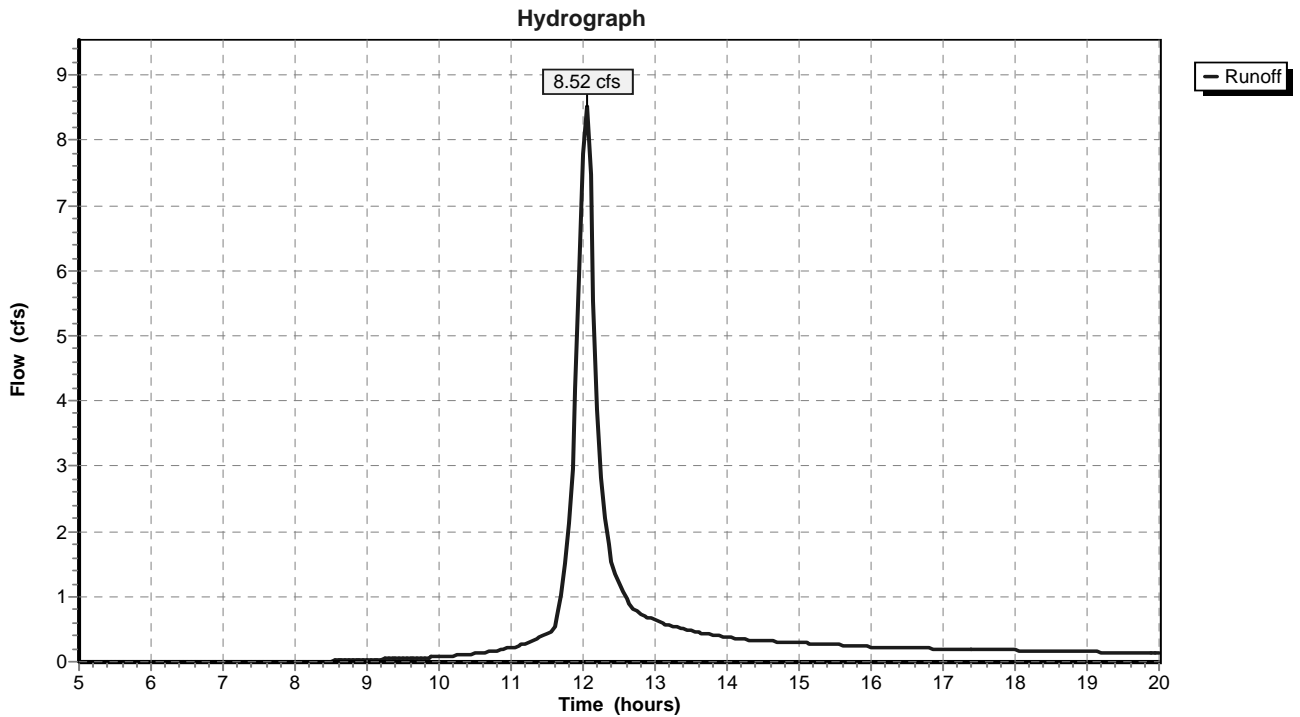
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
62,533	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	200	0.0800	0.3		

Sheet Flow, AREA1
 Grass: Dense n= 0.240 P2= 4.10"

Subcatchment AREA 1: SETriangular Area of Site



Subcatchment AREA 2: NW Triangular Area of Site

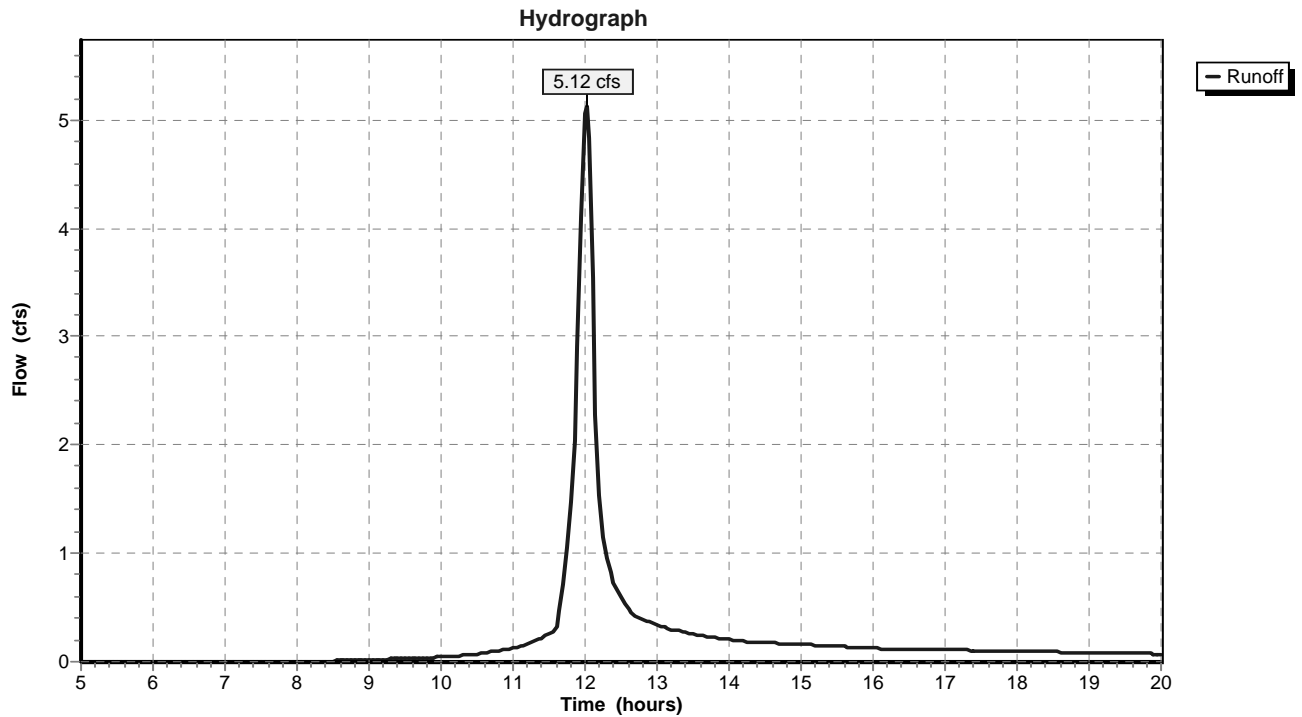
Runoff = 5.12 cfs @ 12.02 hrs, Volume= 0.260 af, Depth= 3.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
34,605	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	150	0.0800	0.2		Sheet Flow, AREA1 Grass: Dense n= 0.240 P2= 4.10"

Subcatchment AREA 2: NW Triangular Area of Site



Reach CHANNEL: R1

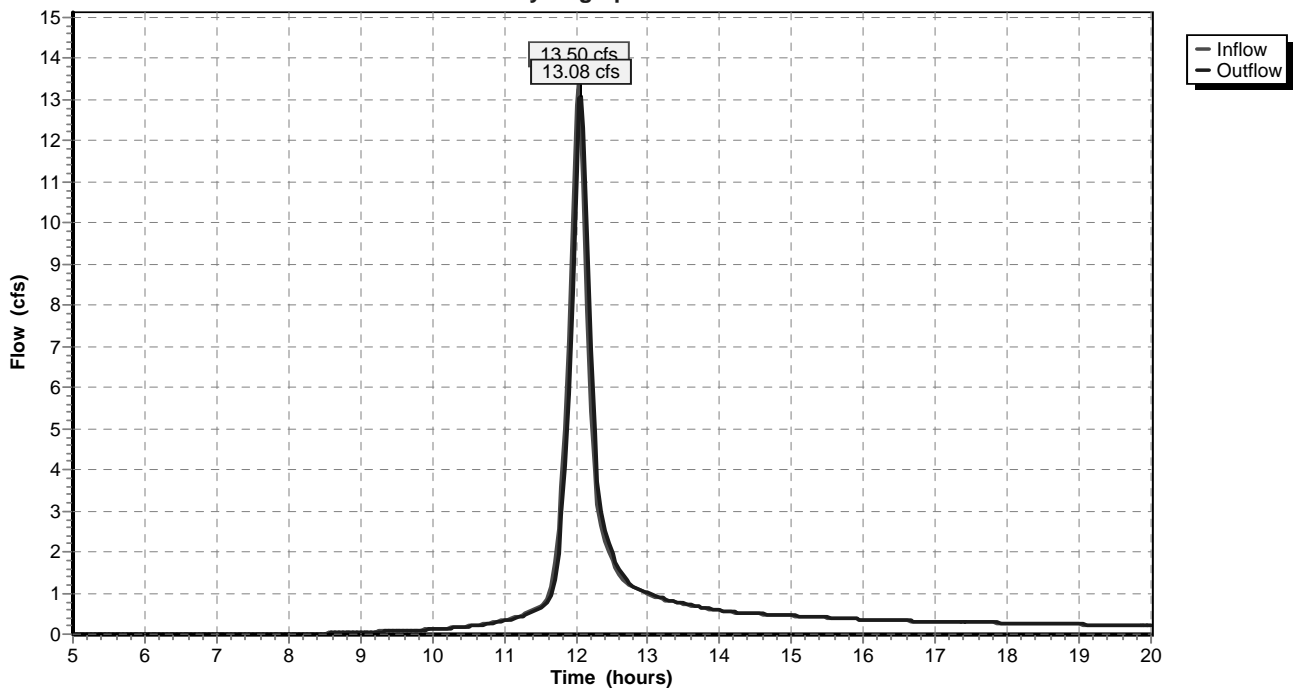
Inflow Area = 2.230 ac, Inflow Depth = 3.93"
Inflow = 13.50 cfs @ 12.03 hrs, Volume= 0.731 af
Outflow = 13.08 cfs @ 12.06 hrs, Volume= 0.730 af, Atten= 3%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.8 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 2.6 min

Peak Depth= 1.02'
Capacity at bank full= 198.74 cfs
Inlet Invert= 950.00', Outlet Invert= 931.06'
5.00' x 4.00' deep Parabolic Channel, n= 0.025 Length= 451.0' Slope= 0.0420 '/'

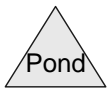
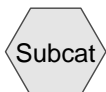
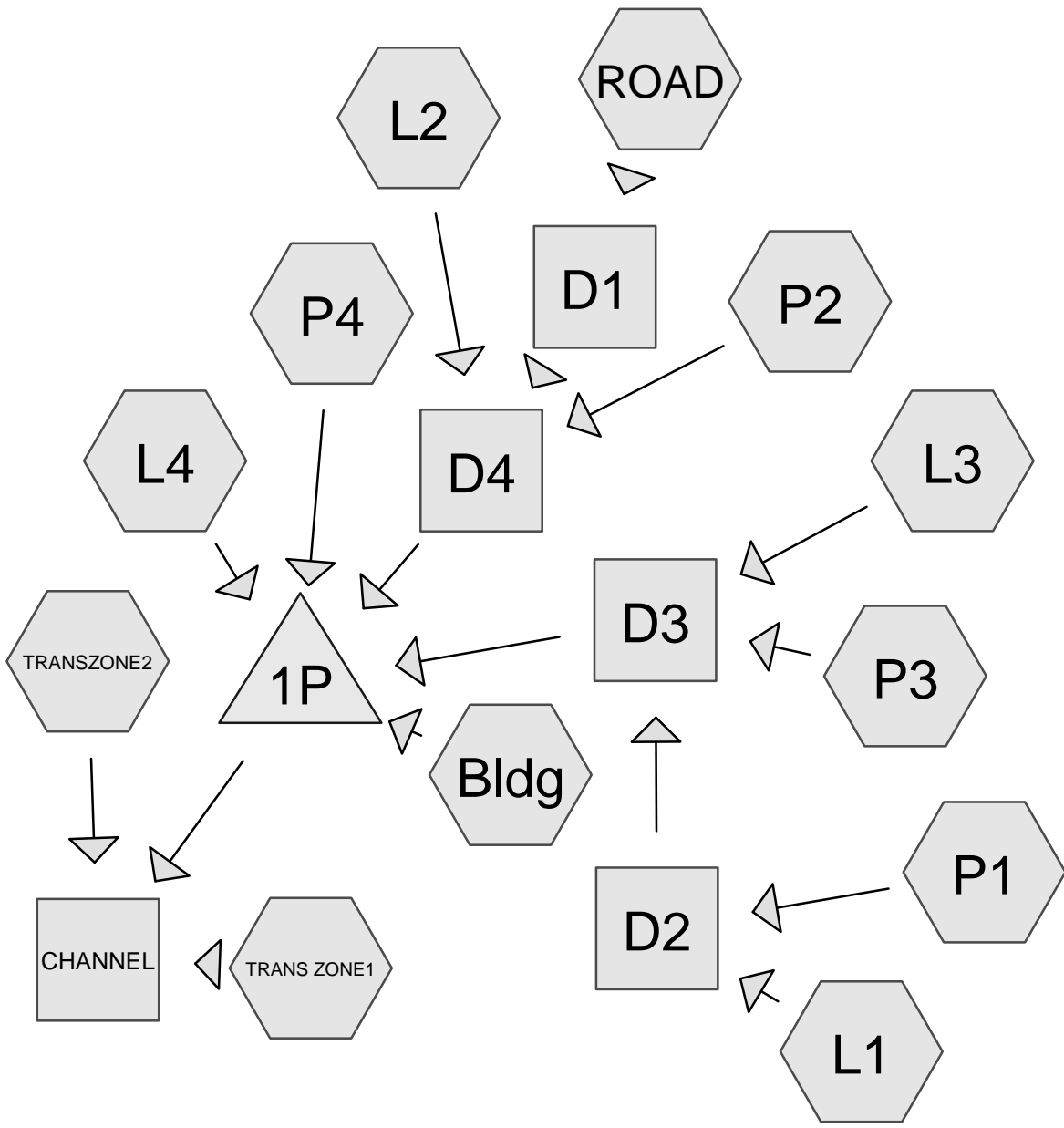
Reach CHANNEL: R1

Hydrograph



Post Development Stage

Run off Calculations



Drainage Diagram for KELLYS 100yr-Post
 Prepared by _____
 HydroCAD® 6.10 © 1986-2002 Applied Microcomputer Systems

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
 Runoff by SCS TR-20 method, UH=SCS, Type II 24-hr Rainfall=7.90"
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Bldg: From Building Roof	Runoff Area=10,780 sf	Runoff Depth=7.28"
Length=180'	Tc=2.3 min	CN=98
	Runoff= 3.13 cfs	0.150 af
Subcatchment L1: From 5' Landscape- South Boundary	Runoff Area=1,609 sf	Runoff Depth=3.94"
Length=200'	Tc=1.1 min	CN=69
	Runoff= 0.33 cfs	0.012 af
Subcatchment L2: 5' wide Grass Strip at Front	Runoff Area=2,545 sf	Runoff Depth=3.94"
Length=200'	Tc=1.1 min	CN=69
	Runoff= 0.53 cfs	0.019 af
Subcatchment L3: 5' Grass strip along Parking-South	Runoff Area=1,610 sf	Runoff Depth=3.94"
Length=120'	Tc=0.9 min	CN=69
	Runoff= 0.34 cfs	0.012 af
Subcatchment L4: 5' Landscape at Rear area	Runoff Area=3,398 sf	Runoff Depth=3.94"
Length=120'	Tc=1.2 min	CN=69
	Runoff= 0.70 cfs	0.026 af
Subcatchment P1: From Entrance Dway area	Runoff Area=9,708 sf	Runoff Depth=7.28"
Length=200'	Tc=1.1 min	CN=98
	Runoff= 2.91 cfs	0.135 af
Subcatchment P2: From Front parking area	Runoff Area=10,772 sf	Runoff Depth=7.28"
Length=200'	Tc=1.1 min	CN=98
	Runoff= 3.23 cfs	0.150 af
Subcatchment P3: From Mid-Parking area at S boundary	Runoff Area=12,990 sf	Runoff Depth=7.28"
Length=200'	Tc=1.6 min	CN=98
	Runoff= 3.85 cfs	0.181 af
Subcatchment P4: From paved Area around pond	Runoff Area=7,404 sf	Runoff Depth=7.28"
Length=150'	Tc=1.5 min	CN=98
	Runoff= 2.20 cfs	0.103 af
Subcatchment ROAD: From Curb Inlet at Road	Runoff Area=2,576 sf	Runoff Depth=7.28"
Length=170'	Tc=1.6 min	CN=98
	Runoff= 0.76 cfs	0.036 af
Subcatchment TRANS ZONE1: Along Trans.Zone from Hway	Runoff Area=23,178 sf	Runoff Depth=3.92"
Length=450'	Tc=19.7 min	CN=69
	Runoff= 2.55 cfs	0.174 af
Subcatchment TRANSZONE2: From NW Transitional Zone	Runoff Area=9,423 sf	Runoff Depth=3.93"
Length=200'	Tc=13.3 min	CN=69
	Runoff= 1.27 cfs	0.071 af
Reach CHANNEL: Natural Channel	Peak Depth= 0.65'	Max Vel= 7.9 fps
n=0.025	L=75.0'	S=0.0600 '/
	Capacity=834.29 cfs	Outflow= 12.30 cfs
		0.934 af
Reach D1: 15" Pipe From Road	Peak Depth= 0.21'	Max Vel= 5.5 fps
D=15.0"	n=0.019	L=200.0'
	S=0.0750 '/	Capacity=12.10 cfs
		Outflow= 0.75 cfs
		0.036 af
Reach D2: 18" from Dway Entrance area	Peak Depth= 1.08'	Max Vel= 2.3 fps
D=18.0"	n=0.019	L=115.0'
	S=0.0026 '/	Capacity=3.67 cfs
		Outflow= 3.15 cfs
		0.147 af

Twin Diamond Plaza_ 100yr-Post_Dev

Twin Diamond Plaza

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Reach D3: 24" pipe Near Ramp to Pond Peak Depth= 0.79' Max Vel= 6.2 fps Inflow= 7.23 cfs 0.340 af
D=24.0" n=0.019 L=140.0' S=0.0196 '/' Capacity=21.69 cfs Outflow= 7.17 cfs 0.340 af

Reach D4: 18" from mid-parkway on N- Boundary Peak Depth= 0.71' Max Vel= 4.4 fps Inflow= 4.46 cfs 0.205 af
D=24.0" n=0.019 L=250.0' S=0.0112 '/' Capacity=16.38 cfs Outflow= 4.35 cfs 0.205 af

Pond 1P: Detention Pond Peak Storage= 12,961 cf @ 951.28' Inflow= 17.35 cfs 0.824 af
Primary= 9.26 cfs 0.690 af Outflow= 9.26 cfs 0.690 af

Total Runoff Area = 2.204 ac Runoff Volume = 1.069 af Average Runoff Depth = 5.82"

Subcatchment Bldg: From Building Roof

Runoff = 3.13 cfs @ 11.93 hrs, Volume= 0.150 af, Depth= 7.28"

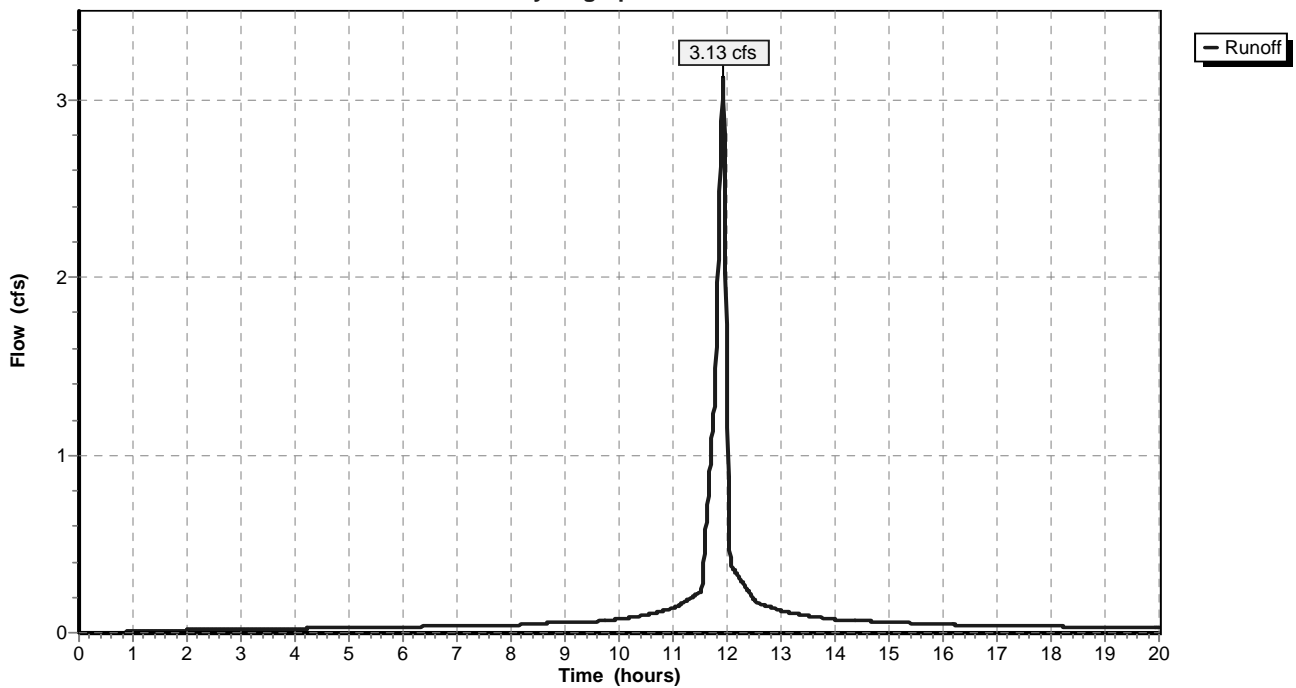
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
10,780	98	Paved roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	180	0.0100	1.3		Sheet Flow, From Roof Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment Bldg: From Building Roof

Hydrograph



Subcatchment L1: From 5' Landscape- South Boundary

Runoff = 0.33 cfs @ 11.91 hrs, Volume= 0.012 af, Depth= 3.94"

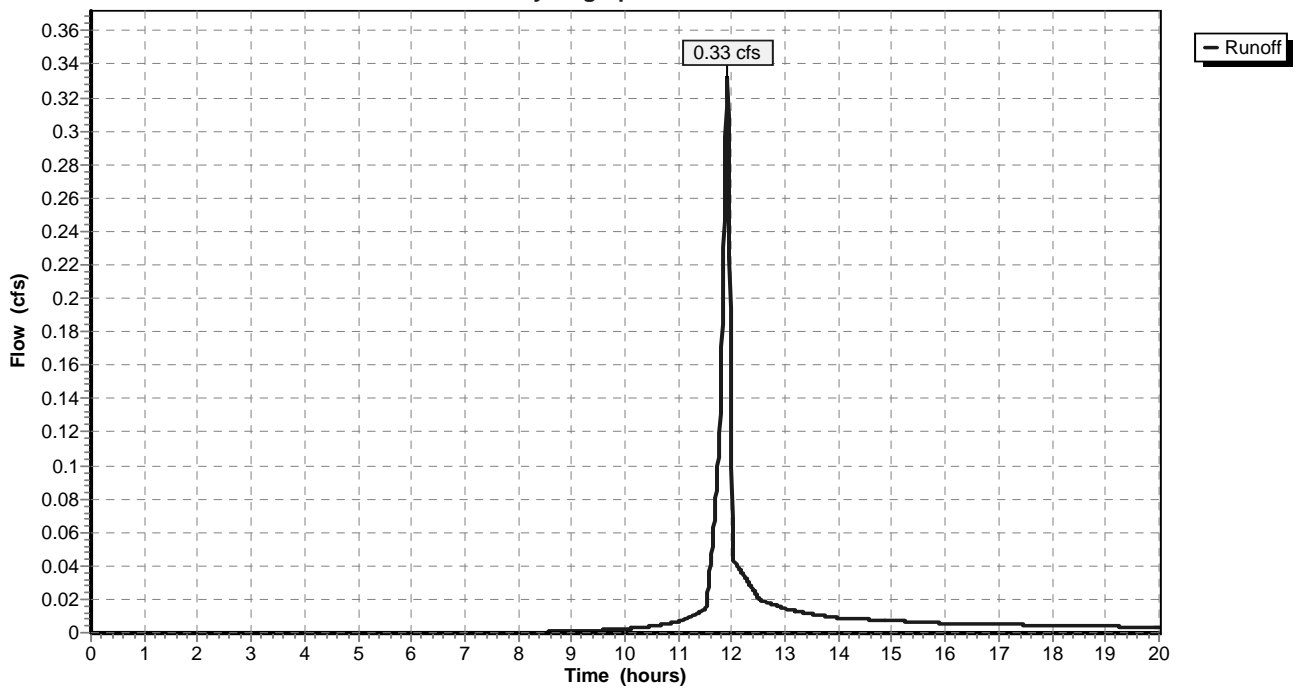
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
1,609	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	200	0.0700	3.0		Sheet Flow, L4 Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment L1: From 5' Landscape- South Boundary

Hydrograph



Subcatchment L2: 5' wide Grass Strip at Front

Runoff = 0.53 cfs @ 11.91 hrs, Volume= 0.019 af, Depth= 3.94"

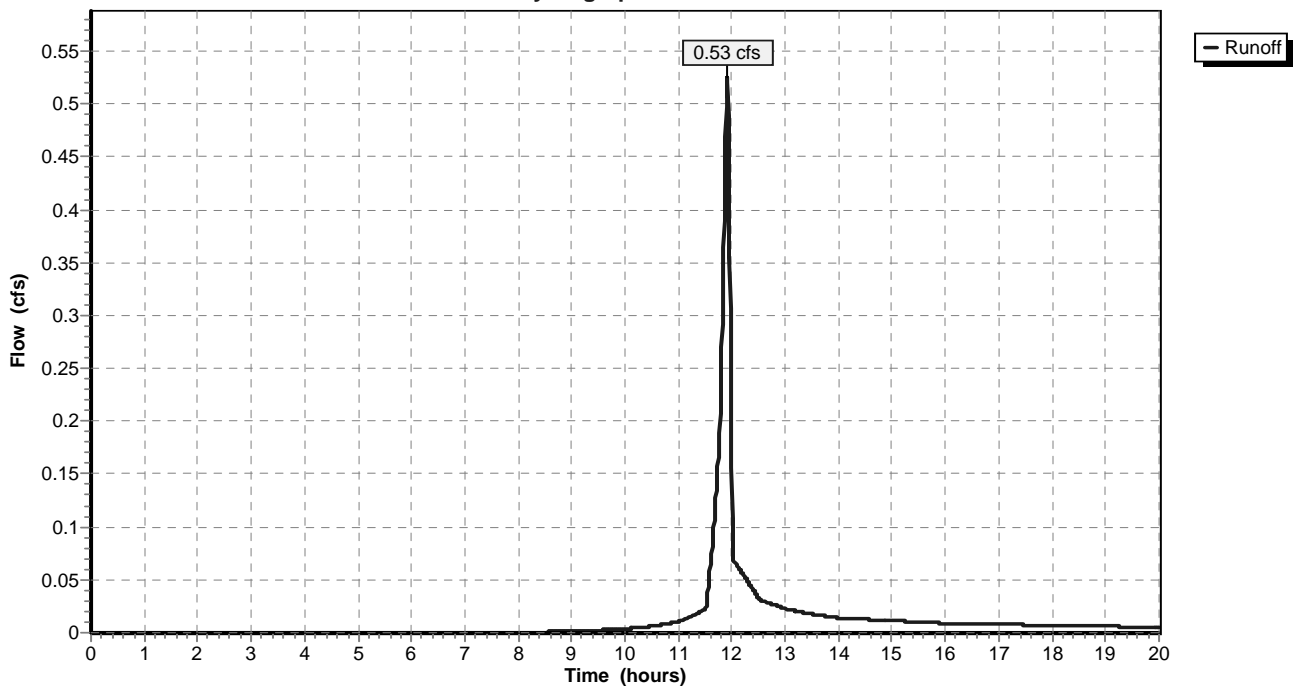
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
2,545	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	200	0.0750	3.0		Sheet Flow, L2 Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment L2: 5' wide Grass Strip at Front

Hydrograph



Subcatchment L3: 5' Grass strip along Parking-South

Runoff = 0.34 cfs @ 11.91 hrs, Volume= 0.012 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

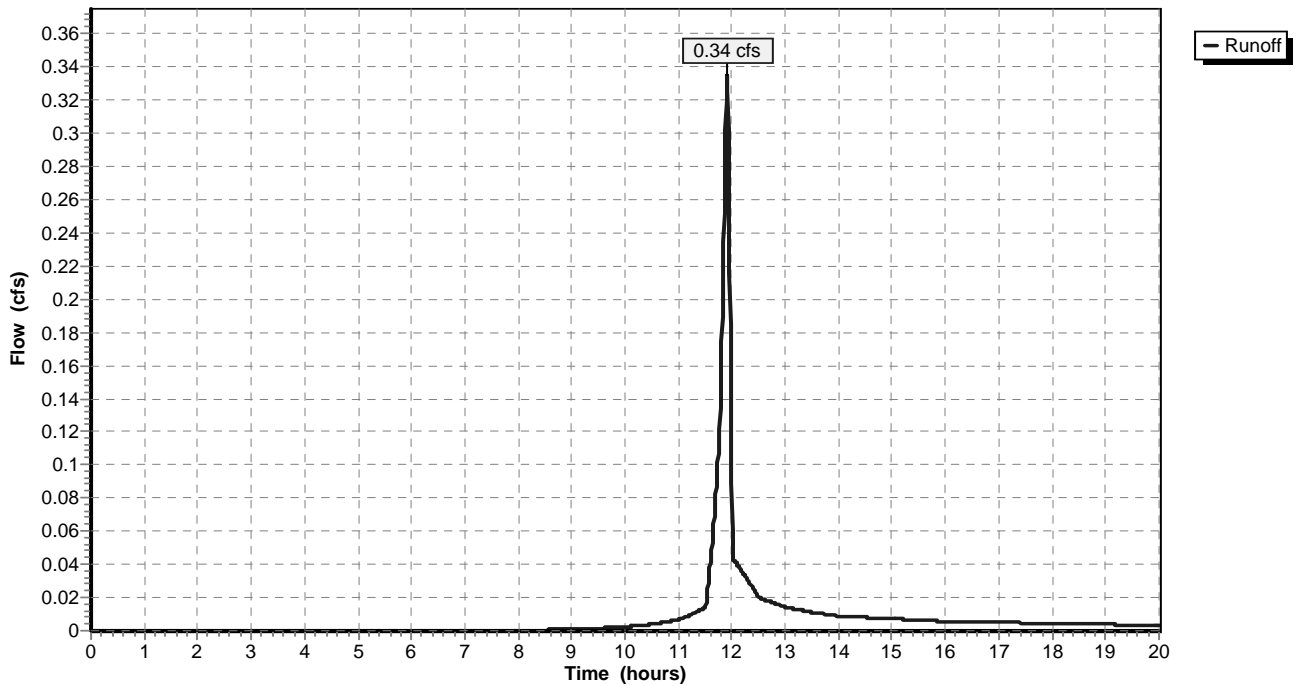
Area (sf)	CN	Description
1,610	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	120	0.0400	2.1		

Sheet Flow, L3
 Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment L3: 5' Grass strip along Parking-South

Hydrograph



Subcatchment L4: 5' Landscape at Rear area

Runoff = 0.70 cfs @ 11.92 hrs, Volume= 0.026 af, Depth= 3.94"

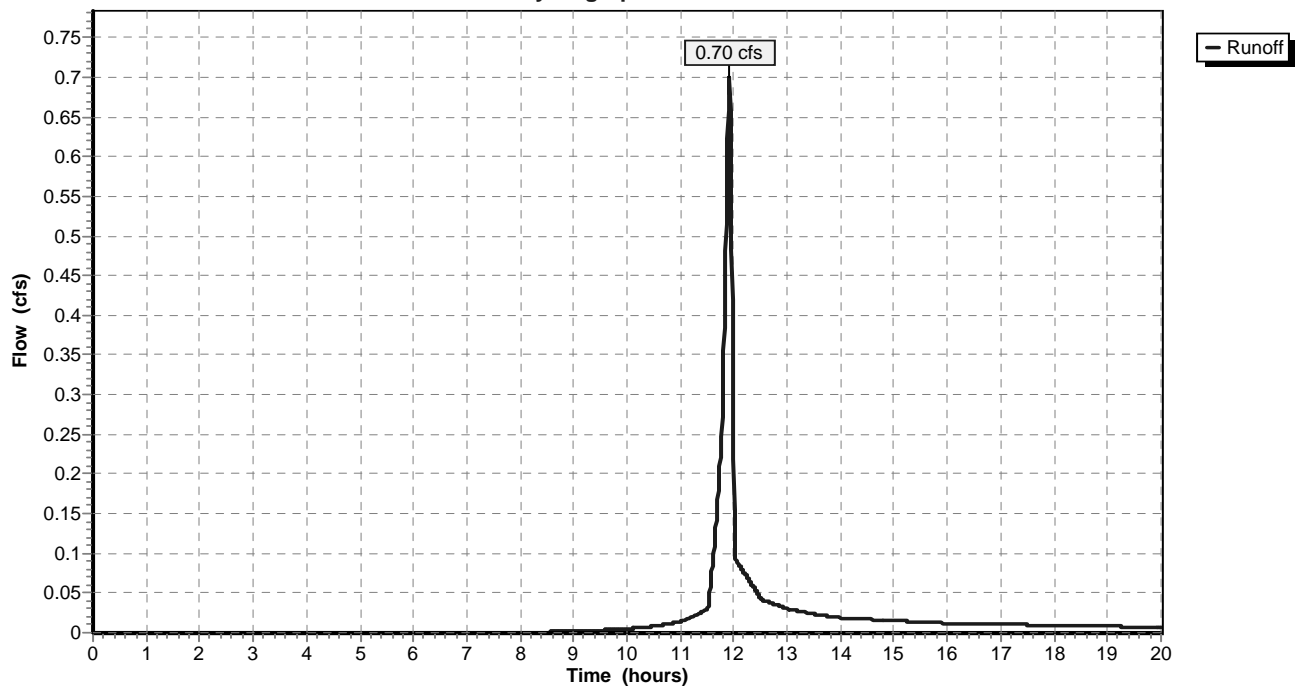
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
3,398	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	120	0.0200	1.6		Sheet Flow, L5 Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment L4: 5' Landscape at Rear area

Hydrograph



Subcatchment P1: From Entrance Dway area

Runoff = 2.91 cfs @ 11.91 hrs, Volume= 0.135 af, Depth= 7.28"

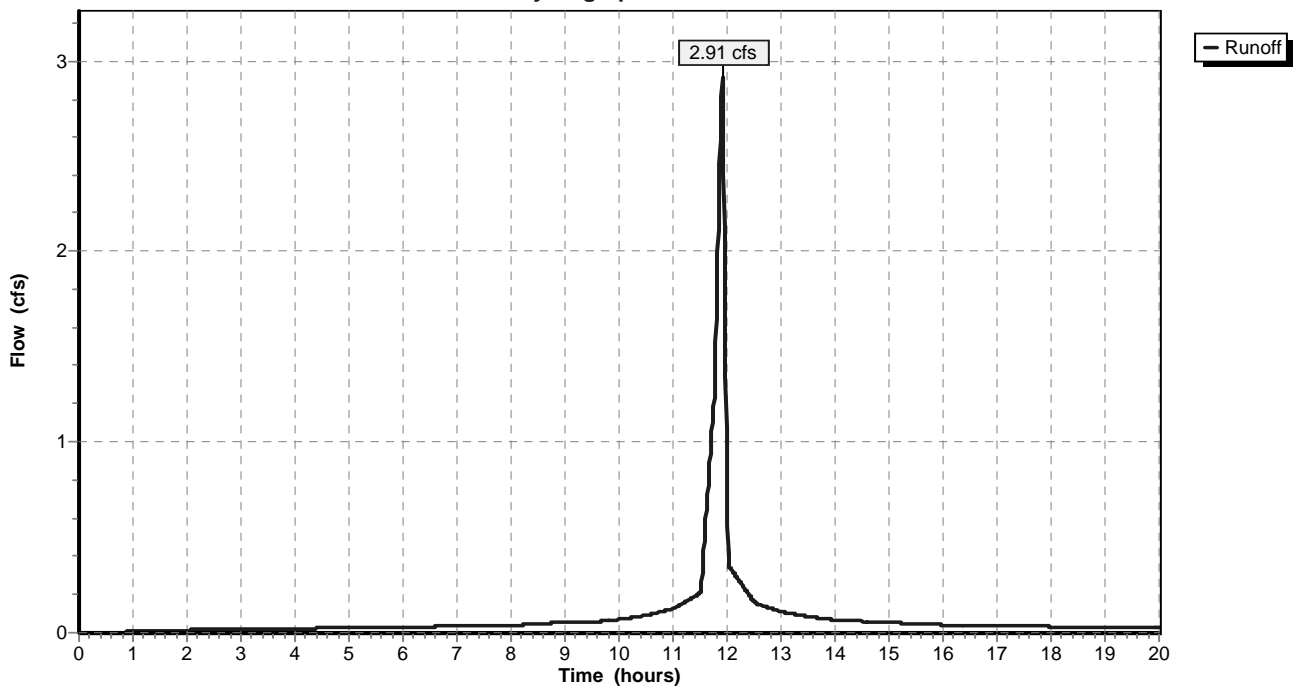
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
9,708	98	Paved parking

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	200	0.0750	3.0		Sheet Flow, P4 Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment P1: From Entrance Dway area

Hydrograph



Subcatchment P2: From Front parking area

Runoff = 3.23 cfs @ 11.91 hrs, Volume= 0.150 af, Depth= 7.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

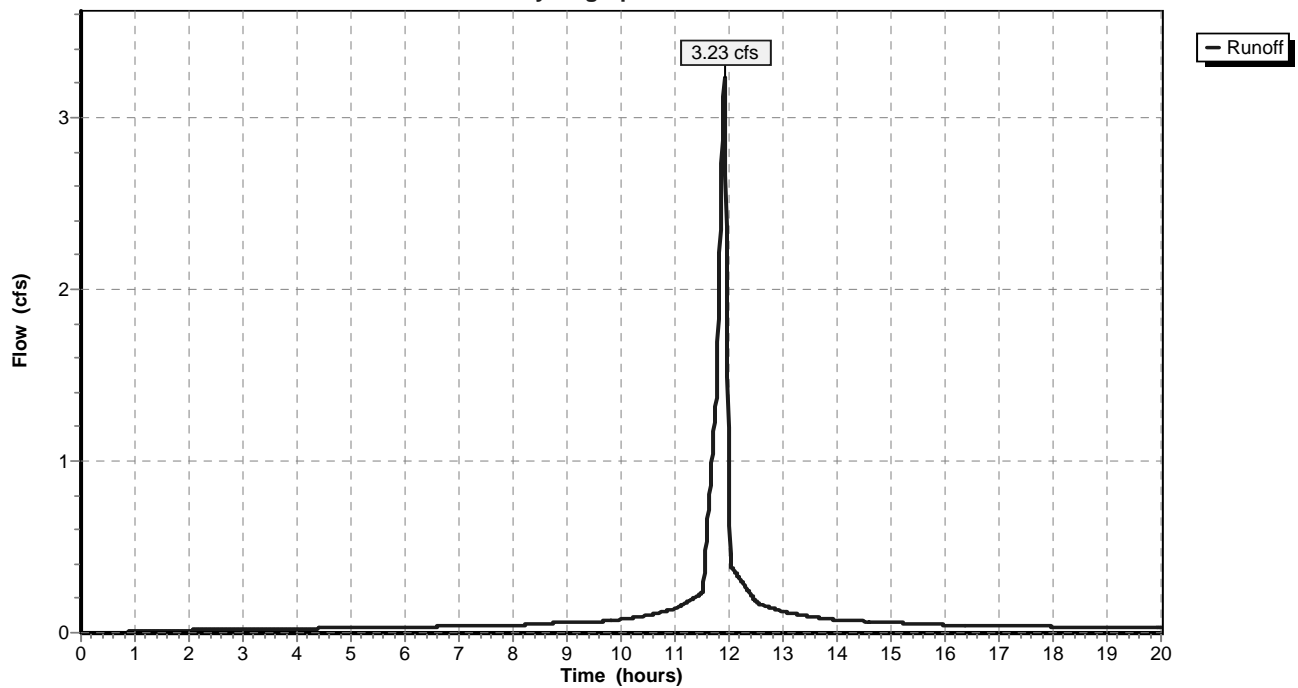
Area (sf)	CN	Description
10,772	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	200	0.0750	3.0		

Sheet Flow, P2
 Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment P2: From Front parking area

Hydrograph



Subcatchment P3: From Mid-Parking area at S boundary

Runoff = 3.85 cfs @ 11.92 hrs, Volume= 0.181 af, Depth= 7.28"

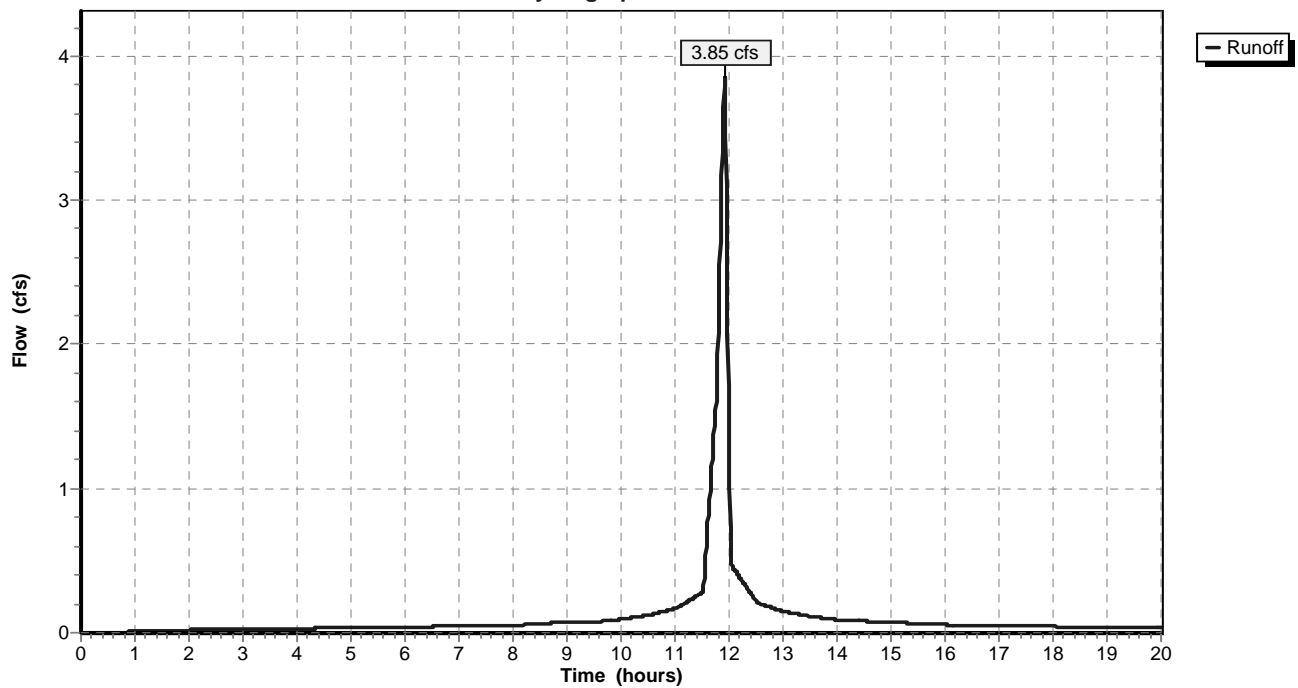
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
12,990	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	200	0.0300	2.1		Sheet Flow, P3 Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment P3: From Mid-Parking area at S boundary

Hydrograph



Subcatchment P4: From paved Area around pond

Runoff = 2.20 cfs @ 11.92 hrs, Volume= 0.103 af, Depth= 7.28"

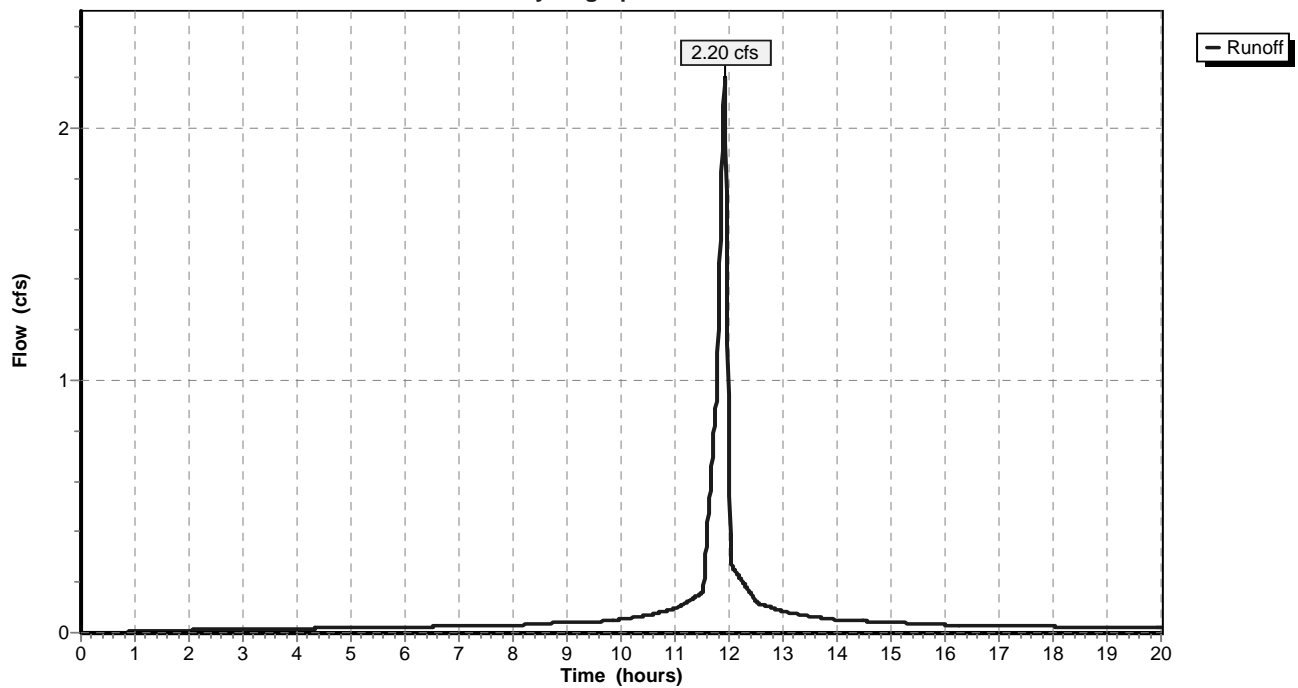
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
7,404	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	150	0.0200	1.7		Sheet Flow, Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment P4: From paved Area around pond

Hydrograph



Subcatchment ROAD: From Curb Inlet at Road

Runoff = 0.76 cfs @ 11.92 hrs, Volume= 0.036 af, Depth= 7.28"

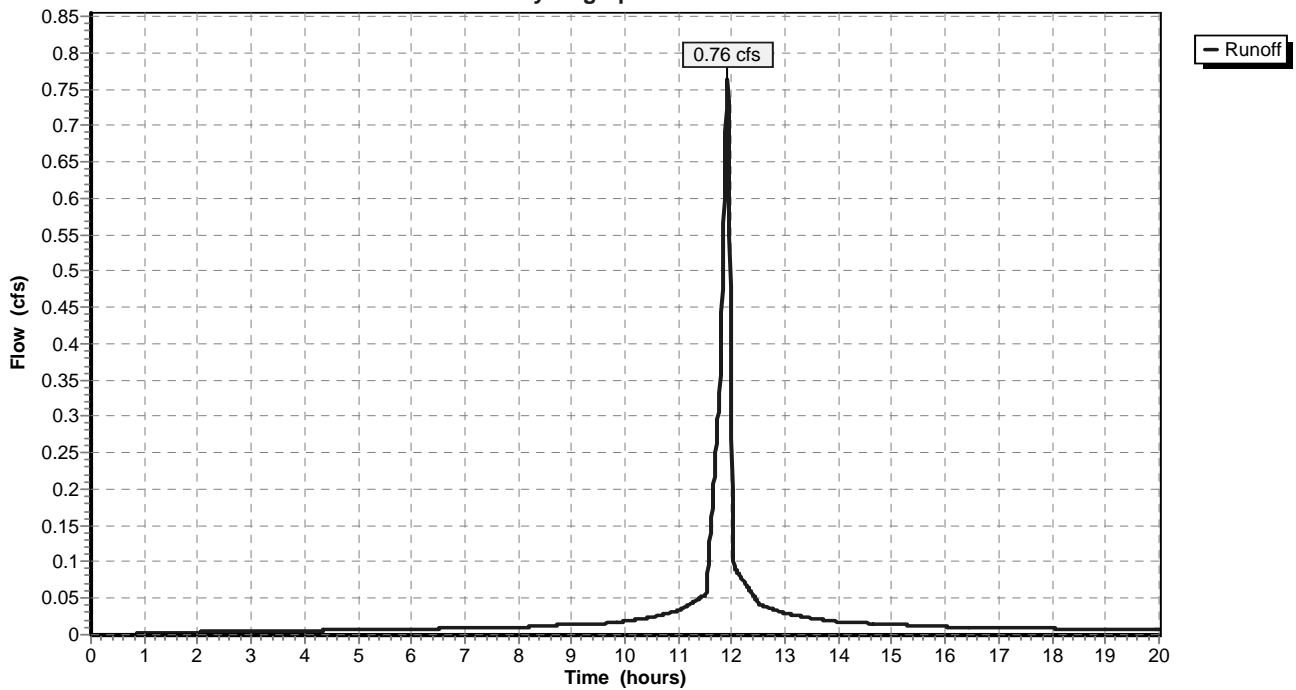
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
2,576	98	Paved roads w/curbs & sewers

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	170	0.0200	1.7		Sheet Flow, From ROad Smooth surfaces n= 0.011 P2= 4.10"

Subcatchment ROAD: From Curb Inlet at Road

Hydrograph



Subcatchment TRANS_ZONE1: Along Trans.Zone from Hwy

Runoff = 2.55 cfs @ 12.12 hrs, Volume= 0.174 af, Depth= 3.92"

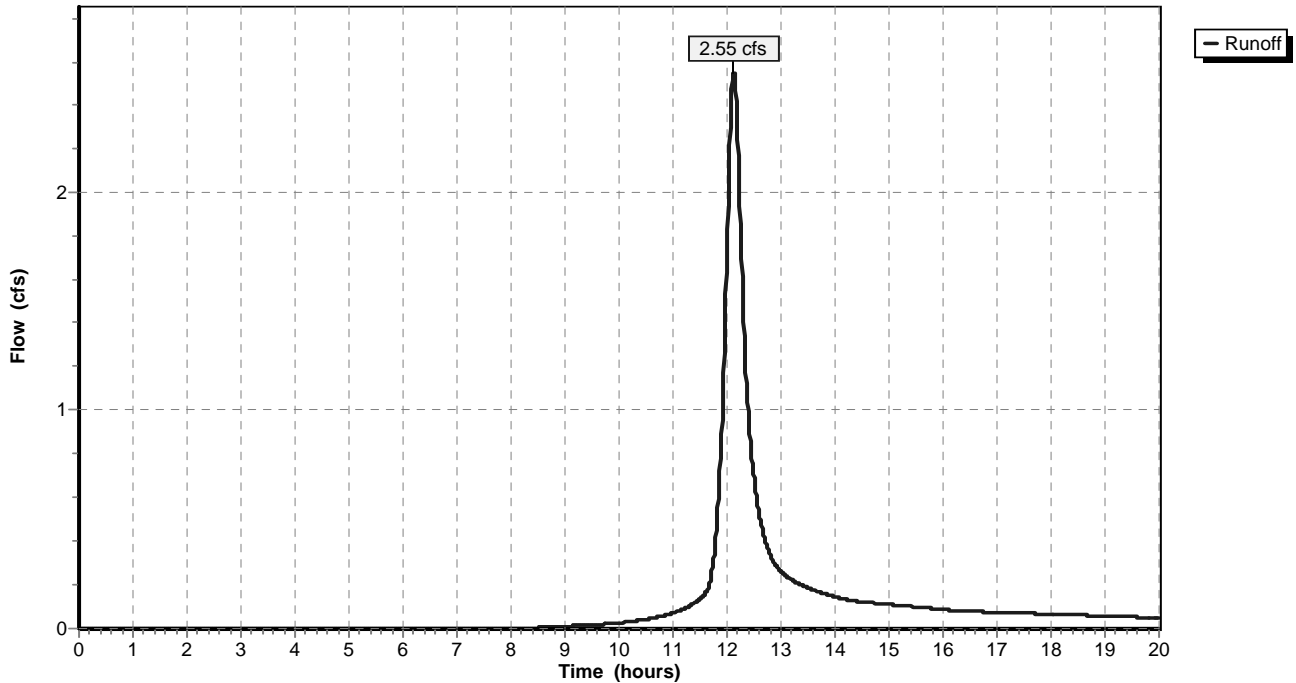
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
23,178	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	300	0.0700	0.3		Sheet Flow, From Hwy Entrance Grass: Dense n= 0.240 P2= 4.10"
1.3	150	0.0700	1.9		Shallow Concentrated Flow, Mid of Souther Trans.zone Short Grass Pasture Kv= 7.0 fps
19.7	450	Total			

Subcatchment TRANS_ZONE1: Along Trans.Zone from Hwy

Hydrograph



Subcatchment TRANSZONE2: From NW Transitional Zone

Runoff = 1.27 cfs @ 12.05 hrs, Volume= 0.071 af, Depth= 3.93"

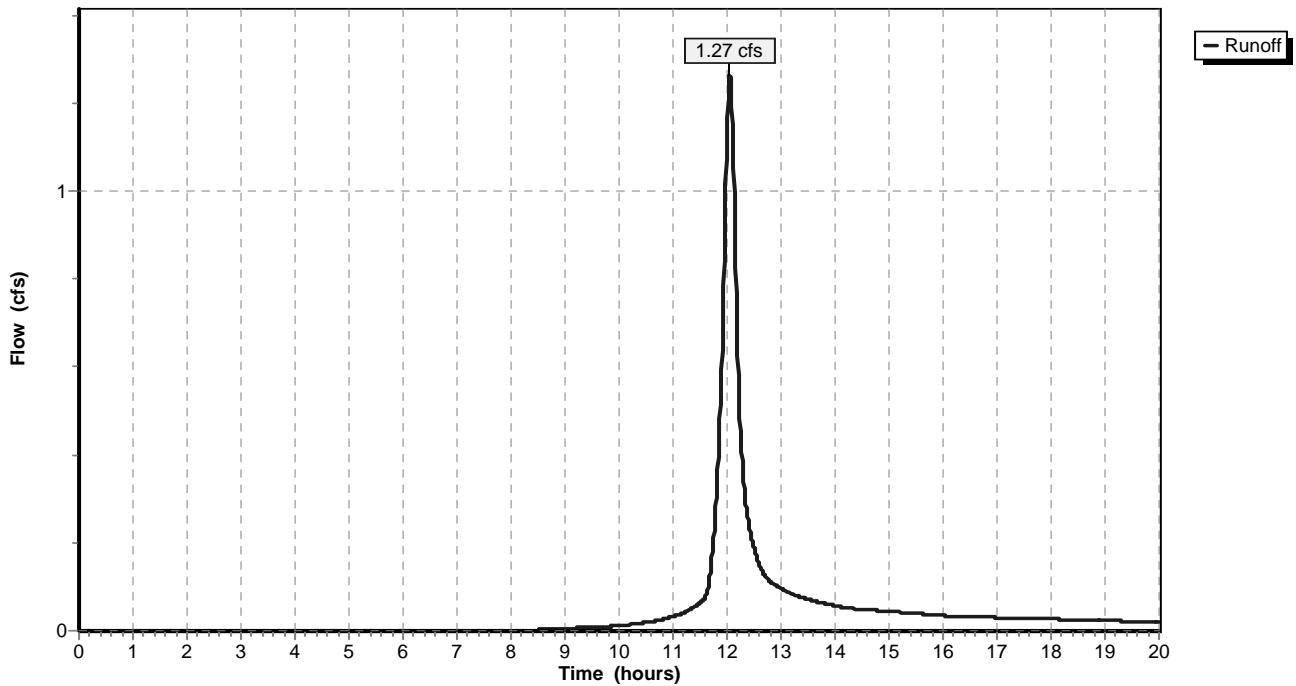
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
 Type II 24-hr Rainfall=7.90"

Area (sf)	CN	Description
9,423	69	50-75% Grass cover, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	200	0.0700	0.3		Sheet Flow, ZONE Grass: Dense n= 0.240 P2= 4.10"

Subcatchment TRANSZONE2: From NW Transitional Zone

Hydrograph



Reach CHANNEL: Natural Channel

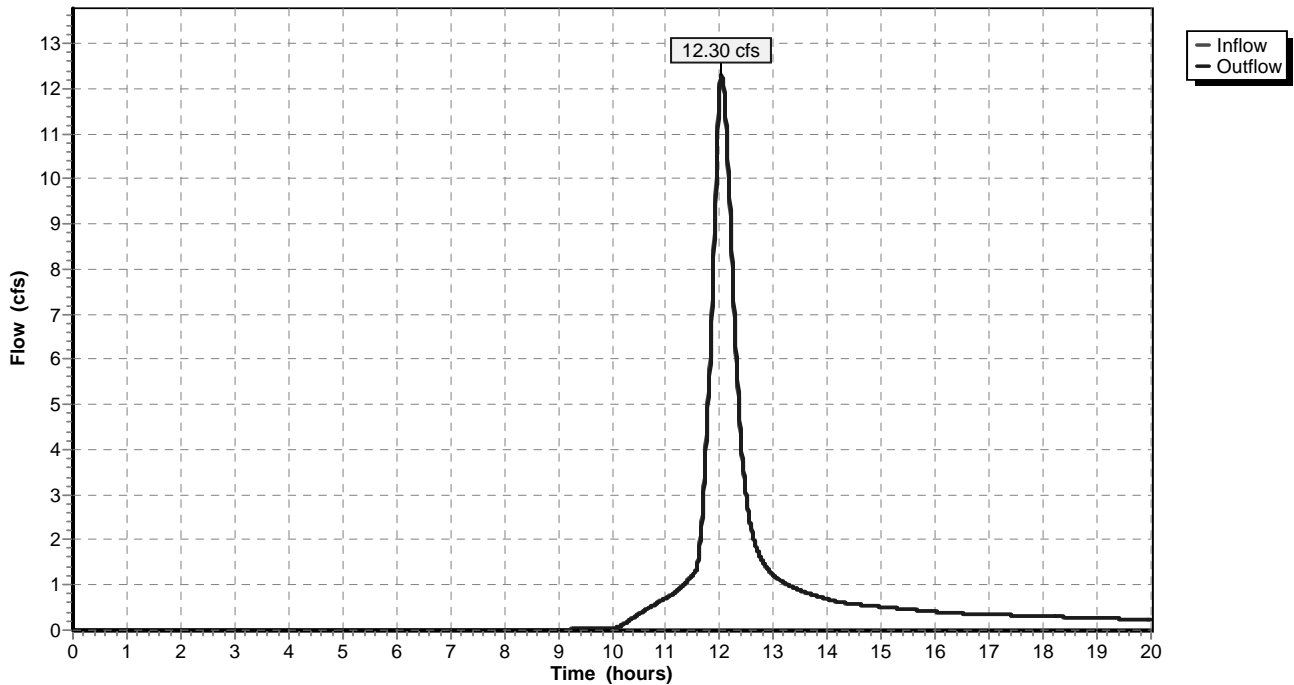
Inflow Area = 2.204 ac, Inflow Depth = 5.09"
Inflow = 12.31 cfs @ 12.03 hrs, Volume= 0.934 af
Outflow = 12.30 cfs @ 12.03 hrs, Volume= 0.934 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.65'
Capacity at bank full= 834.29 cfs
Inlet Invert= 944.00', Outlet Invert= 939.50'
10.00' x 5.00' deep Parabolic Channel, n= 0.025 Length= 75.0' Slope= 0.0600 '/'

Reach CHANNEL: Natural Channel

Hydrograph



Reach D1: 15" Pipe From Road

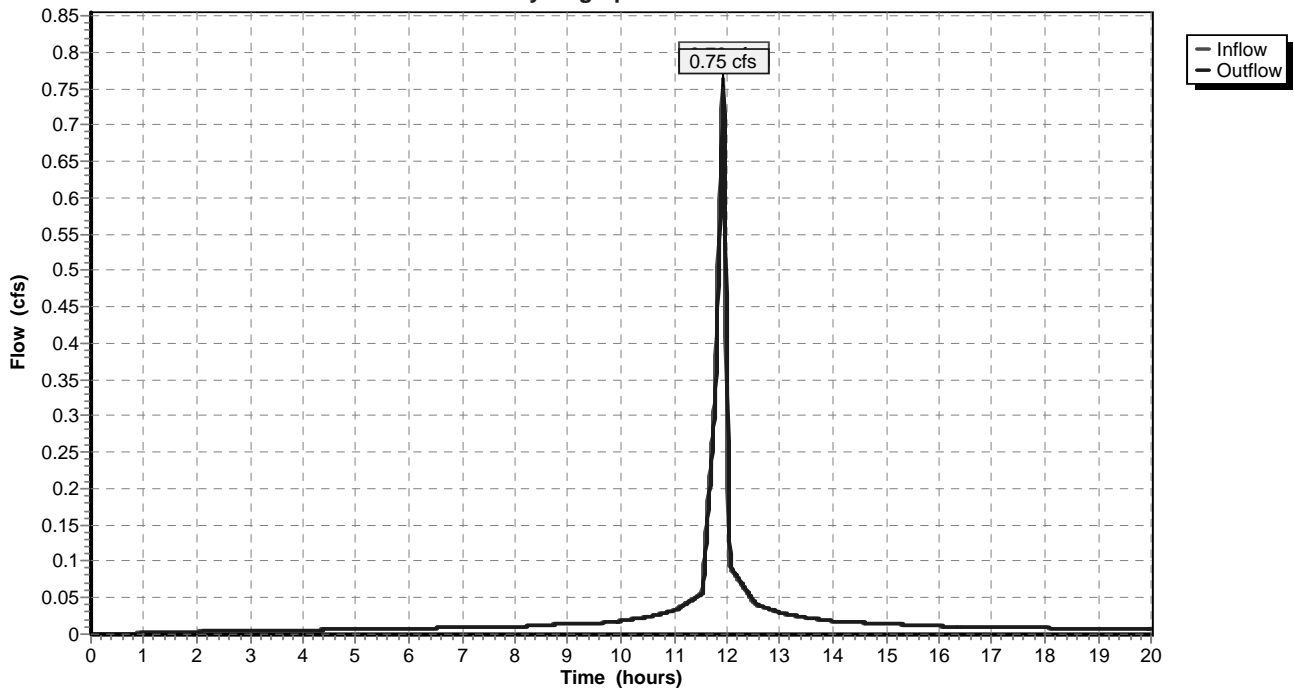
Inflow Area = 0.059 ac, Inflow Depth = 7.28"
Inflow = 0.76 cfs @ 11.92 hrs, Volume= 0.036 af
Outflow = 0.75 cfs @ 11.93 hrs, Volume= 0.036 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.5 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 2.1 min

Peak Depth= 0.21'
Capacity at bank full= 12.10 cfs
Inlet Invert= 968.00', Outlet Invert= 953.00'
15.0" Diameter Pipe n= 0.019 Length= 200.0' Slope= 0.0750 '/'

Reach D1: 15" Pipe From Road

Hydrograph



Reach D2: 18" from Dway Entrance area

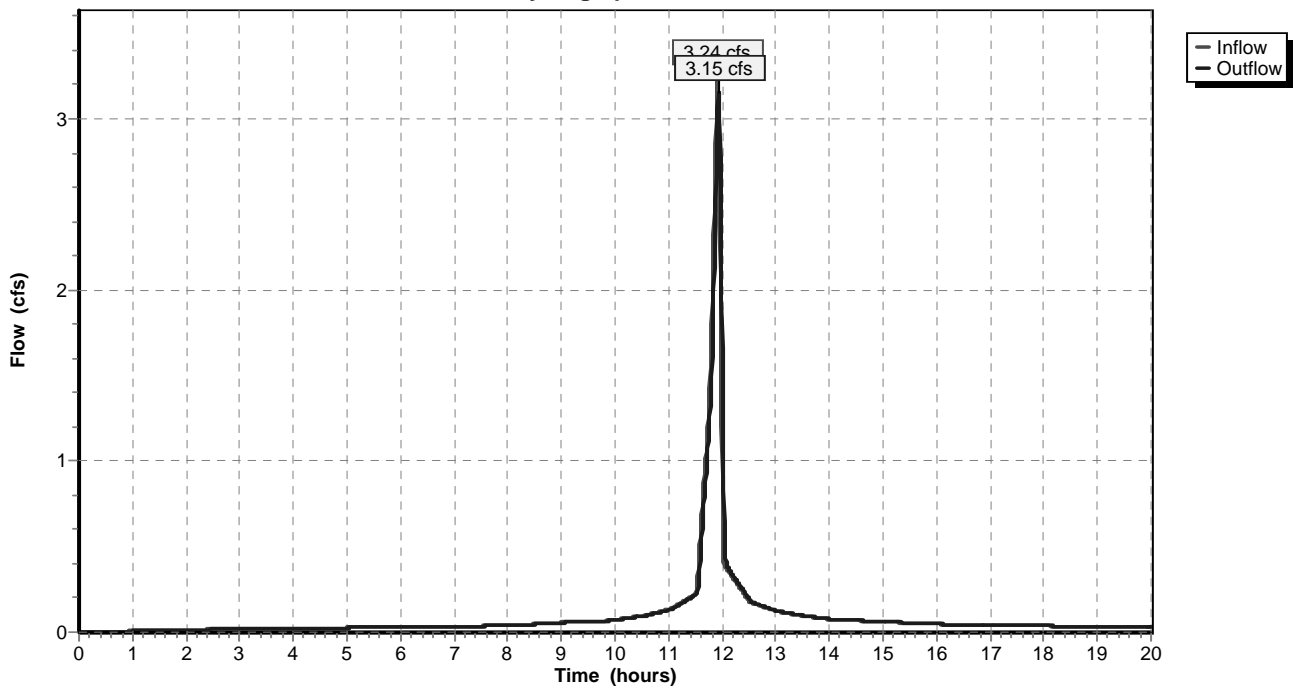
Inflow Area = 0.260 ac, Inflow Depth = 6.81"
Inflow = 3.24 cfs @ 11.91 hrs, Volume= 0.147 af
Outflow = 3.15 cfs @ 11.93 hrs, Volume= 0.147 af, Atten= 3%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 2.6 min

Peak Depth= 1.08'
Capacity at bank full= 3.67 cfs
Inlet Invert= 953.50', Outlet Invert= 953.20'
18.0" Diameter Pipe n= 0.019 Length= 115.0' Slope= 0.0026 '/

Reach D2: 18" from Dway Entrance area

Hydrograph



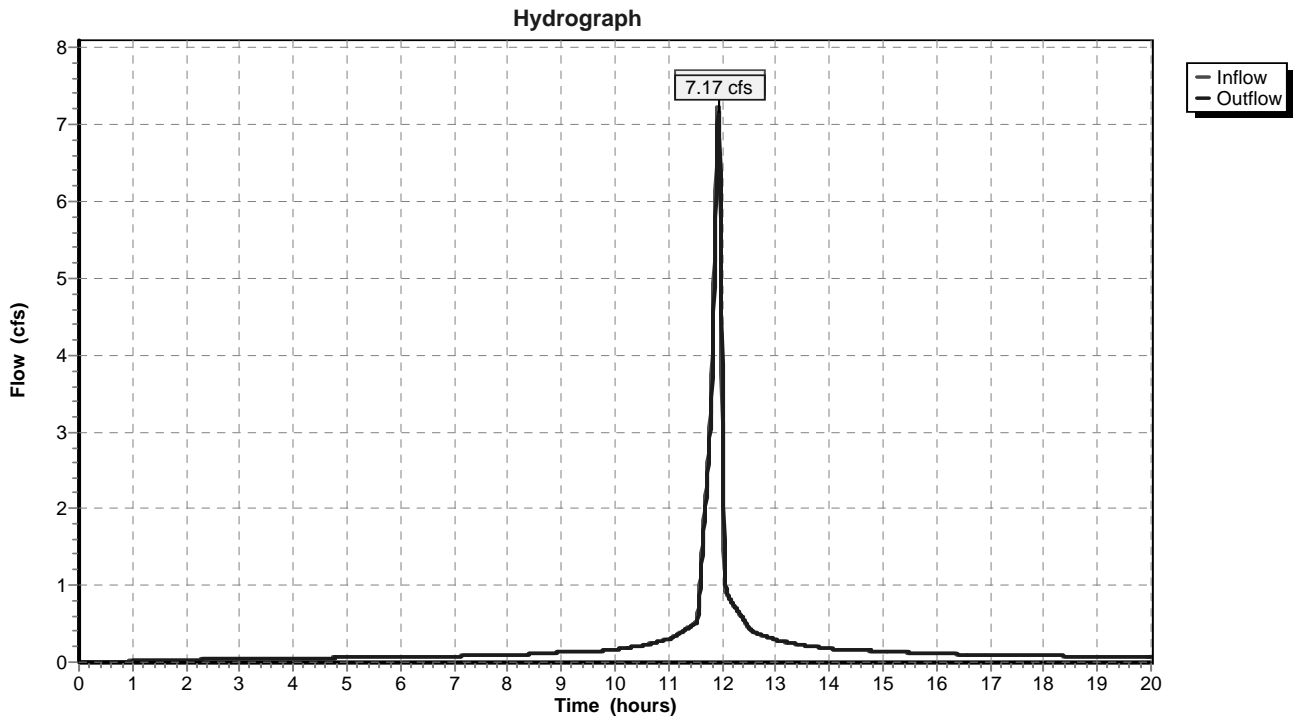
Reach D3: 24" pipe Near Ramp to Pond

Inflow Area = 0.595 ac, Inflow Depth = 6.86"
Inflow = 7.23 cfs @ 11.92 hrs, Volume= 0.340 af
Outflow = 7.17 cfs @ 11.93 hrs, Volume= 0.340 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.2 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.79'
Capacity at bank full= 21.69 cfs
Inlet Invert= 951.75', Outlet Invert= 949.00'
24.0" Diameter Pipe n= 0.019 Length= 140.0' Slope= 0.0196 '/'

Reach D3: 24" pipe Near Ramp to Pond



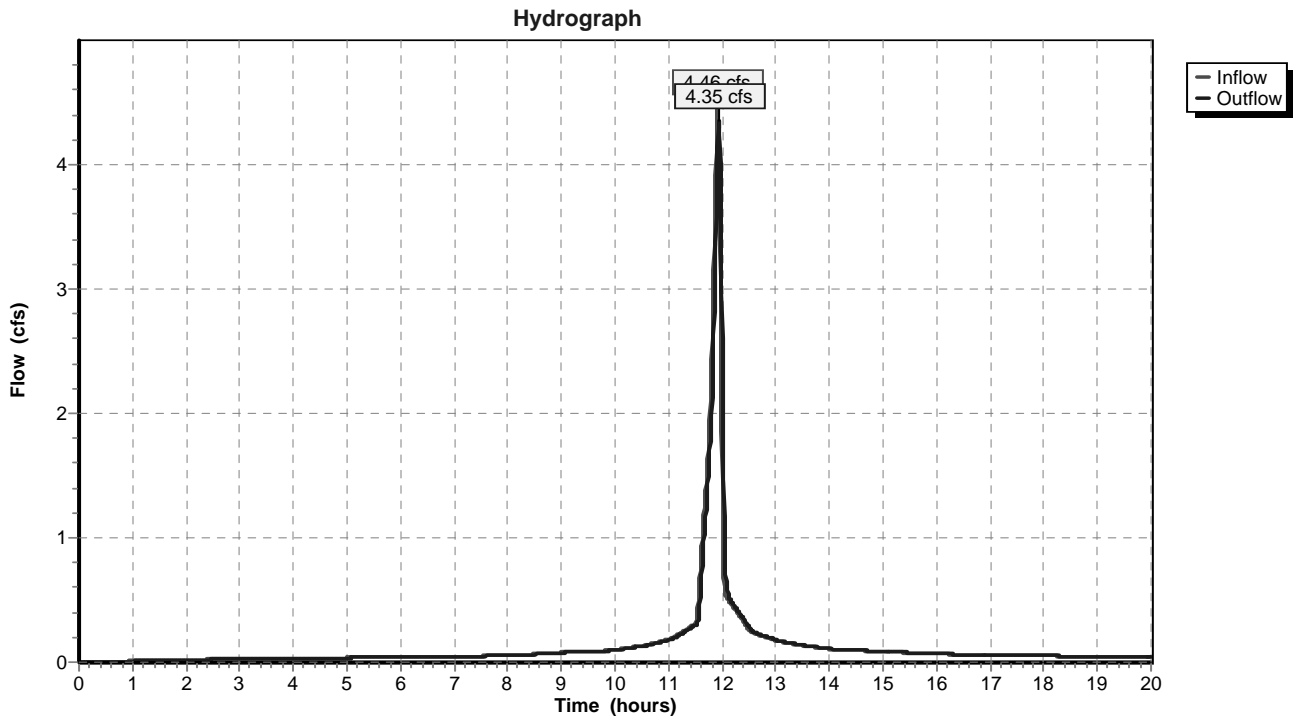
Reach D4: 18" from mid-parkway on N- Boundary

Inflow Area = 0.365 ac, Inflow Depth = 6.74"
Inflow = 4.46 cfs @ 11.91 hrs, Volume= 0.205 af
Outflow = 4.35 cfs @ 11.94 hrs, Volume= 0.205 af, Atten= 3%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.4 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 3.2 min

Peak Depth= 0.71'
Capacity at bank full= 16.38 cfs
Inlet Invert= 951.80', Outlet Invert= 949.00'
24.0" Diameter Pipe n= 0.019 Length= 250.0' Slope= 0.0112 '/'

Reach D4: 18" from mid-parkway on N- Boundary



Pond 1P: Detention Pond

Inflow Area = 1.455 ac, Inflow Depth = 6.79"
 Inflow = 17.35 cfs @ 11.93 hrs, Volume= 0.824 af
 Outflow = 9.26 cfs @ 12.00 hrs, Volume= 0.690 af, Atten= 47%, Lag= 4.1 min
 Primary = 9.26 cfs @ 12.00 hrs, Volume= 0.690 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 951.28' Surf.Area= 2,455 sf Storage= 12,961 cf
 Plug-Flow detention time= 119.2 min calculated for 0.689 af (84% of inflow)
 Storage and wetted areas determined by Prismatic sections

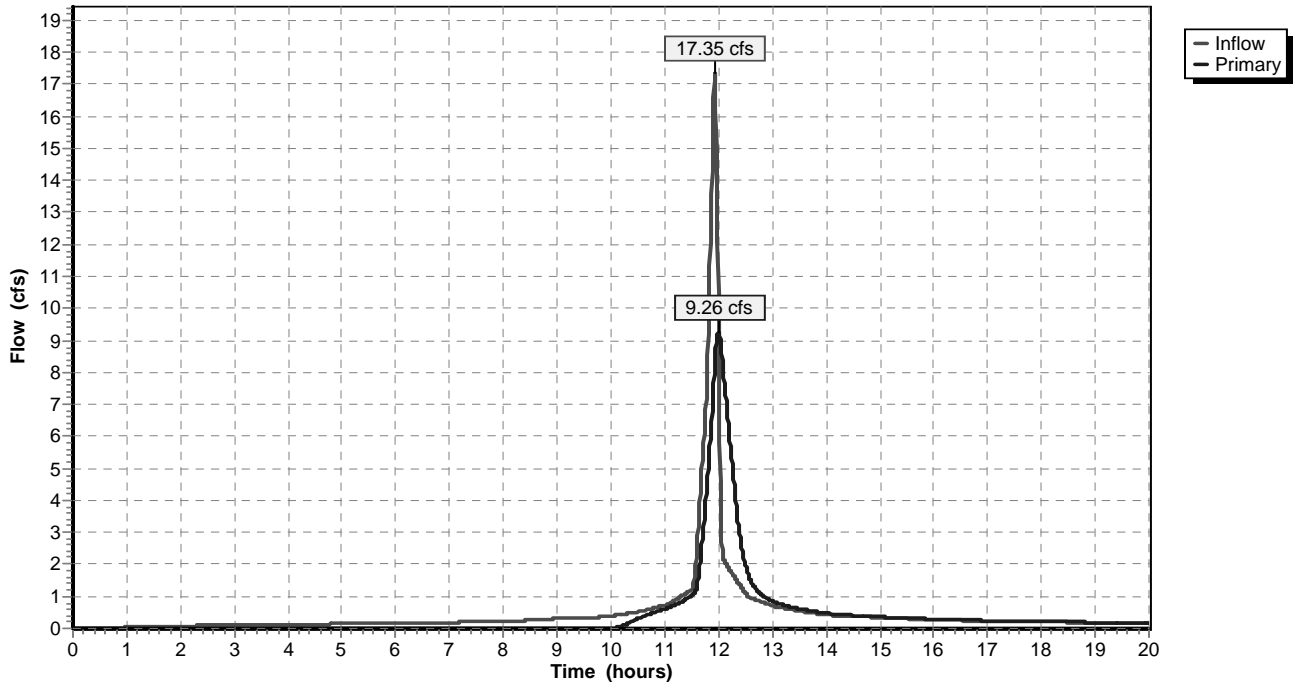
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
946.00	2,455	0	0
952.00	2,455	14,730	14,730

Primary OutFlow Max=9.25 cfs @ 12.00 hrs HW=951.28' (Free Discharge)
 ↳ 1=15" Pipe (Controls 9.25 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	948.20'	15.0" Vert. 15" Pipe C= 0.600

Pond 1P: Detention Pond

Hydrograph



Summary of the Calculations

The peak discharge from the site onto the existing channel
in the Pre- Development Stage = **13.50 cfs**

The peak discharge from the site onto the existing channel
in the Post- Development Stage = **12.31 cfs**

Twin Diamond Plaza_ 100yr-Pre_Dev

Twin Diamond Plaza

Prepared by _____
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Reach CHANNEL: R1

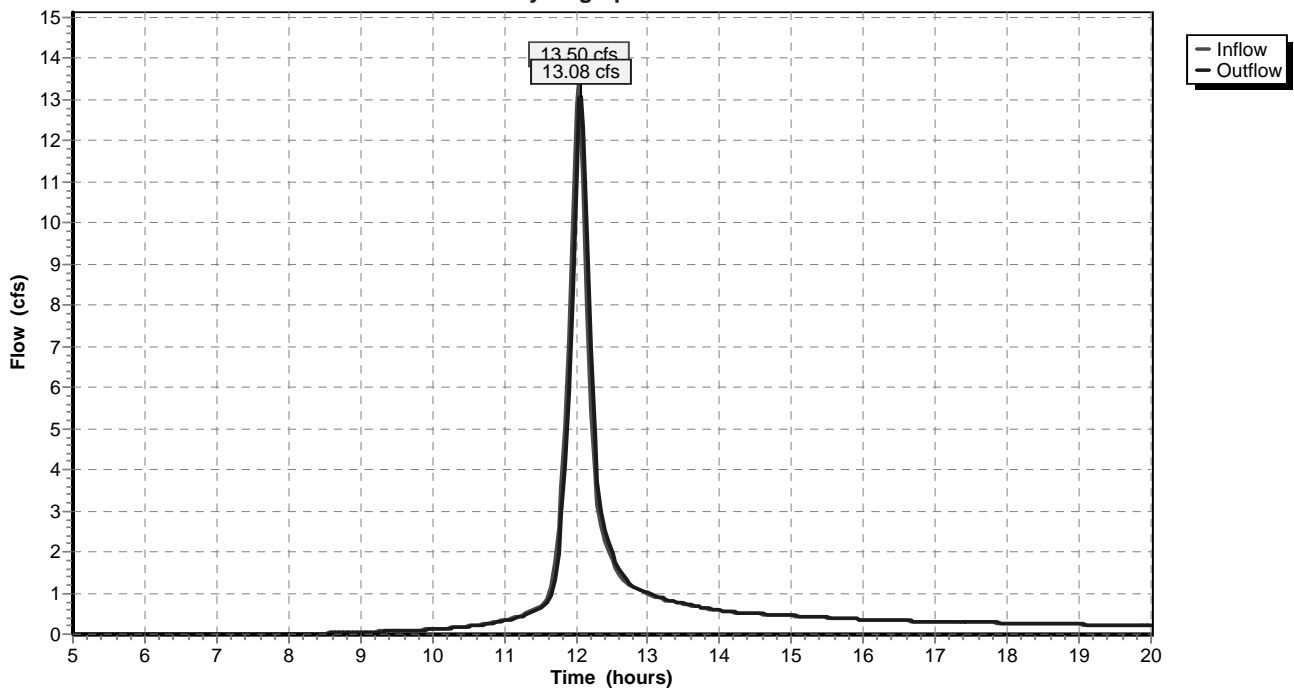
Inflow Area = 2.230 ac, Inflow Depth = 3.93"
Inflow = 13.50 cfs @ 12.03 hrs, Volume= 0.731 af
Outflow = 13.08 cfs @ 12.06 hrs, Volume= 0.730 af, Atten= 3%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.8 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 2.6 min

Peak Depth= 1.02'
Capacity at bank full= 198.74 cfs
Inlet Invert= 950.00', Outlet Invert= 931.06'
5.00' x 4.00' deep Parabolic Channel, n= 0.025 Length= 451.0' Slope= 0.0420 '/'

Reach CHANNEL: R1

Hydrograph



Twin Diamond Plaza_ 100yr-Post_Dev

TWIN DIAMOND PLAZA

Prepared by _____

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Reach CHANNEL: Natural Channel

Inflow Area = 2.204 ac, Inflow Depth = 5.09"
Inflow = 12.31 cfs @ 12.03 hrs, Volume= 0.934 af
Outflow = 12.30 cfs @ 12.03 hrs, Volume= 0.934 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.65'
Capacity at bank full= 834.29 cfs
Inlet Invert= 944.00', Outlet Invert= 939.50'
10.00' x 5.00' deep Parabolic Channel, n= 0.025 Length= 75.0' Slope= 0.0600 '/'

Reach CHANNEL: Natural Channel

Hydrograph

