



**A C O R N**

**ENGINEERING, INC.**

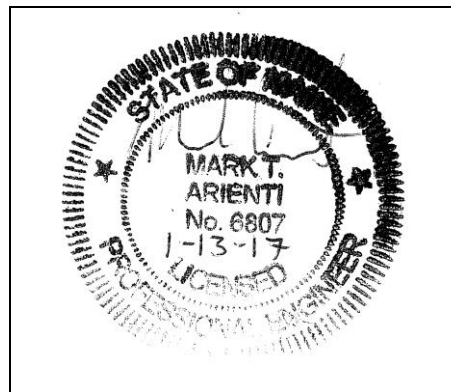
# **STORMWATER MANAGEMENT** **REPORT**

**Prepared For:**

**LQ Management LLC  
909 Hidden Ridge, Suite 600  
Irving, Texas 75038**

**Prepared By:**

**Acorn Engineering, Inc.  
PO Box 3372  
Portland, Maine 04104**



**January 2017**

## INTRODUCTION

Acorn Engineering, Inc. has been retained by La Quinta Inn & Suites (La Quinta) to provide civil engineering services for drainage improvements at La Quinta's hotel at 340 Park Avenue in Portland (Map 65 Lot 65 A-3). The existing 4-story hotel is to remain structurally unchanged, but some cosmetic changes will be made to the building envelope and a free-standing Porte Cohere (canopy) will be added at the existing entrance on the west side of the building. Other site changes that are proposed include:

- Installation of subsurface stormwater detention structures under the existing parking area on the west side of the hotel and slight raising of grade adjacent to the hotel to allow a flush entry and eliminate the existing entry ramp.
- Demolition of the existing garage on the south end of the property and installation of subsurface stormwater detention structures in this area and under a portion of the existing paved parking area on this side of the building

A stormwater analysis will be prepared to demonstrate that the project will meet the following requirements of the City of Portland (the City):

- City of Portland Land Use Ordinance Chapter 14, Article V. Site Plan Section 14-523. Required Approvals and Applicability (E) Level II Site Plan Review.
- City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management Amended January 11, 2015.

## EXISTING CONDITIONS

The proposed redevelopment project is located at 340 Park Avenue in Portland, Maine (the Property) bordered on the east by an abandoned rail line and on the west by Marston Street. There is a 4-story, 100-room hotel on the Property (La Quinta) which will remain and a garage on the south end of the Property that will be demolished as part of the project.

The property is in the B2 Community Business Zone. Abutting Uses include:

- |         |  |
|---------|--|
| ➤ North | IM Zone – Industrial                           |
| ➤ West  | R-6 Zone – Single and Multi-Family Residential |
| ➤ South | R-6 Zone – Single and Multi-Family Residential |
| ➤ East  | B-2 Zone – Community Business                  |

The existing Property consists of: a 4-story, roughly 11,700 ft<sup>2</sup> hotel building surrounded by paved parking on all sides; a 2400 ft<sup>2</sup> garage building on the south end of the property along with a small vegetated patch of ground adjacent to it; a swimming pool on the east side of the site and a narrow strip of vegetated ground along the west side adjacent to the abandoned railroad.

The Property is located in a topographically low area of Portland (approximately 15 feet above mean sea level) with a rail embankment on the east side and slightly higher land to the south and west as well (see Existing Conditions Plan, Sheet EX) Across Park Avenue to the north is the H.P. Hood plant (Hood) which is at slightly lower elevation than La Quinta. Other than the railroad



embankment to the east, the grades on the Property are relatively level. The area around the hotel is primarily asphalt. There are eight existing catch basins on the property that flow to an underground 4,500-gallon concrete tank (outlet structure) in the northwest corner of the property before discharging through a 10-inch orifice into the City's 48-inch by 44-inch brick combined sewer line that flows in a northeasterly direction toward Portland's East End Treatment Plant and Back Cove.

Based on the most recent survey data, surface runoff is collected in eight existing catch basins located in the paved parking areas around the hotel. Three of the catch basins are located on the west side the hotel, three are located on the east side, one on the north and two on the south. All the catch basins flow to the 4,500-gallon concrete tank (mentioned above) prior to discharging to the City sewer. Catch basin #5 (CB-5) in the southeasterly corner of the Property receives a large portion of its flow from the abutting property, a paved parking lot owned by Maine Medical Center. A catch basin in the western edge of this property is piped by culvert to CB-5 on La Quinta's property.

The project team is not aware of the presence of any existing significant natural features located on the site. Given the urban setting and existing impervious surfaces, a field inventory of significant natural features was not undertaken. The project is also not located within a watershed classified as an Urban Impaired Stream.

### **PROPOSED DEVELOPMENT**

The proposed project does not propose addition of any new structure other than those for stormwater detention except for the 300 ft<sup>2</sup> Porte Cohere entrance canopy. The proposed stormwater detention structures are proposed to be installed below grade in existing impervious areas. The layout for the detention structures is shown on Sheet C-30. They will be installed to a depth of approximately 9 to 10 feet below grade over the illustrated area.

### **GENERAL STANDARDS - WATER QUALITY**

It is our understanding that the project will not be required to meet the General Standards because of the exception set forth in the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and Maine DEP Chapter 500. The project involves the installation of detention structures under existing paved areas and under an existing building that will be demolished; less than 1,000 ft<sup>2</sup> of new impervious area will be created – conversely, over 3,500 ft<sup>2</sup> of pervious area will be created in the form of native landscaping and other green spaces. Installation of the subsurface detention will require removing approximately 14,000 ft<sup>2</sup> of existing asphalt pavement, which will be replaced at essentially the same grades to maintain the same overall drainage patterns. This work comes under the definition of maintenance under Ch. 500.

*“Maintenance” means an activity undertaken to maintain operating condition, original line and grade, hydraulic capacity, and original purpose of the project. Paving an impervious gravel surface at original line, grade and hydraulic capacity is considered maintenance.*

The project is anticipated to improve stormwater collection and drainage in the area as compared to the current situation in which the existing sewer system is not able to accommodate flows during large storm events. The requirements of Appendix D must still be met, if applicable.

Although additional stormwater treatment is not required, the project will improve upon the existing condition for the following reasons:

- The installation of a subsurface detention system with a capacity of approximately 750,000 gallons that will reduce the peak flow of stormwater into the combined sewer on Park Avenue and thereby minimize tail-water effects and associated flooding due to the capacity limitations of the sewer line.
- The installation of catch basins with catch basin hoods to mitigate transport of oil, floating debris, and larger suspended particles into the storm drain piping.
- The installation of catch basins which incorporate a deeper 3-ft (2 ft. typ.) sump to store items listed above until routine cleaning is performed.
- The increase in pervious area of over 3,500 ft<sup>2</sup> on site, reducing the overall runoff.

### **FLOODING STANDARD – WATER QUANTITY**

To evaluate the project with respect to the Section E. Flooding Standard, the proposed development was modeled using HydroCAD to verify that the post-development conditions do not exceed the pre-development conditions. A 24-hour SCS Type III storm distribution for the 2, 10, and 25-year storm events were used. The corresponding rainfall amounts for these storms are 3.10”, 4.60”, 5.80” respectively. For comparison purposes the 100-year storm, 8.1” for a 24-hr storm, was also modelled. Rainfall amounts are from the Northeast Regional Climate Center website (<http://precip.eas.cornell.edu>), Extreme Precipitation Tables.

#### *Pre-development Calculations*

The pre-development condition was modeled as two subcatchments, one which is comprised of drainage from the east and most of the south side of the building including portions of the abutting properties in these areas. The drainage in this subcatchment is collected in a series of five catch basins in the hotel parking lot that are connected by culverts that flow to the concrete outlet structure, which discharges to the City sewer line. A Pre-development Watershed Map developed for this project showing the subcatchments and flow paths used to calculate the times of concentration (T<sub>c</sub>) is included as Attachment A.

<b>Table 1. Subcatchment Characteristics</b>			
<b>Subcatchment</b>	<b>Area (sq.ft.)</b>	<b>% Impervious</b>	<b>Tributary to</b>
<b>1</b>	39,145	74	4500 gall tank/City Sewer
<b>2</b>	95,649	59	4500 gall tank/City Sewer

The peak flow rates for the 2, 10, 25 and 100-yr storm events at POI #1, Park Avenue are presented in Table 2 below, and a full copy of the HydroCAD calculations is included within Attachment D of this report.

**Table 2 – Pre-Development Peak Stormwater Flows in  
cubic feet per second (cfs)**

Subcatchment	2-yr Storm (cfs)	10-yr Storm (cfs)	25-yr Storm (cfs)	100-yr Storm (cfs)
<b>POI #1 (Park Ave)</b>	6.98	11.80	11.81	11.85

*Post-development Calculations:*

The post-development condition was modeled as five subcatchments including:

- Subcatchment 1 comprised of drainage from the parking area on the northwest side of the hotel to CB-A and CB-B that flow into the proposed subsurface detention system;
- Subcatchment 2, which is comprised of drainage from the parking area on the west side of the hotel to CB-C that flow into the proposed subsurface detention system;
- Subcatchment 3, which is comprised of the drainage from a portion of the parking area and vegetated/landscaped areas on the south side of the hotel that flow into the proposed subsurface detention system;
- Subcatchment 4, which is comprised of the drainage from the parking area and vegetated/landscaped area on the eastern side of the parking area on the south side of the hotel plus a relatively large off-site area (including part of Maine Medical Center’s satellite parking area) that flow into the proposed subsurface detention system; and
- Subcatchment 5, which is comprised of drainage on the east side of the hotel, including some abutting land along the unused rail line, which is collected in existing catch basins that flow around the north side of the hotel and into the proposed subsurface detention system.

A Post-development Watershed Map for this project showing the subcatchments and flow paths used to calculate the Tc’s is included as Attachment B.

**Table 3 - Subcatchment Characteristics - Post**

Subcatchment	Area (sq.ft.)	% Impervious	Tributary to
<b>1</b>	9,210	73	4500 gall tank/City Sewer
<b>2</b>	8,100	79	4500 gall tank/City Sewer
<b>3</b>	14,215	63	4500 gall tank/City Sewer
<b>4</b>	34,590	56	4500 gall tank/City Sewer
<b>5</b>	68,375	64	4500 gall tank/City Sewer

Post-development peak flow rates for the 2, 10, 25 and 100-yr storm events are summarized below for each of the subcatchments, and the HydroCAD calculations are included within Attachment D.

As shown in Table 4, the post development peak flows from the property are well below the predevelopment levels due to the attenuating effect of the proposed detention system. With the proposed detention system, the model for the 25-yr storm predicts a lag time of over 9 hours between the peak flow into the system and the peak flow out of the system into the City sewer on Park Avenue. A Post-Development Watershed Map developed for this project is included as Attachment B, and a copy of the HydroCAD calculations is included as part of Attachment D of this report.

Drainage Area	2 – Year Storm Event (cfs)		10 – Year Storm Event (cfs)		25 – Year Storm Event (cfs)		100 – Year Storm Event (cfs)	
	Prior	Post	Prior	Post				
POI #1	6.98	0.13	11.8	0.16	11.81	0.19	11.85	0.23

## **SOILS**

Onsite soil information includes the following:

- Summit Geoenvironmental Services – Soil Boring Logs, November 2016. A formal Geotechnical Report has also been prepared by Summit Geoenvironmental Services for the project, dated December 2016.
- Soil Conservation Service Medium Intensity Soil Survey for Cumberland County.

Given the soils information, listed above, and the fact that greater than 50% of the proposed development site is currently developed, it is Acorn Engineering’s professional opinion that a more intense hydric soil boundary delineation is not required because the waiver requirements set forth in the City of Portland Technical Manual – Section 7 – Soil Survey, Rev. 6/17/11 are met.

The area within and surrounding the project includes soils types listed in the table below. The susceptibility of soils to erosion is indicated on a relative “K” scale of values over a range of 0.02 to 0.69. Higher “K” values indicate more erodible soils.

Soils Type	Subsurface	Substratum
Au Gres Loamy Sand	0.15	0.15
Deerfield Loamy Sand	0.17	0.17

The soil “K” values for the soils, listed above, indicate a low susceptibility to erosion. The site’s susceptibility to erosion is from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County. The site’s soils map from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County is included as Attachment C.

## **Conclusion**

The proposed development was designed to meet the requirements implemented by the MDEP under the Stormwater Management Statute (38 M.R.S.A. § 420-D) as well as the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards. The proposed project as designed is anticipated to improve upon the existing stormwater management by providing 750,000 gallons of subsurface detention that will significantly reduce the peak flowrate into the existing combined sewer line in Park Ave during storm events. La Quinta’s investment in this project will improve on-site conditions but it will also result in regional benefits during large storms when the existing City collection system is overloaded.

## **Attachments**

Attachment A: Pre Development Watershed Map

Attachment B: Post Development Watershed Map

Attachment C: Soils Map

Attachment D: HydroCAD Calculations

Attachment E: Summit Geoengineering Services – Soil Boring Logs, dated November 2016

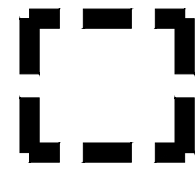


GENERAL NOTES:

- 1. REFER TO STORMWATER REPORT FOR MORE INFORMATION
- 2. GIVEN THE URBAN SETTING, SMALL WATERSHED AREA AND PREDOMINANCE OF IMPERVIOUS AREAS A 5 MINUTE TIME OF CONCENTRATION WAS USED FOR BOTH THE PRE-DEVELOPMENT AND POST-DEVELOPMENT CONDITIONS.

1

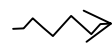
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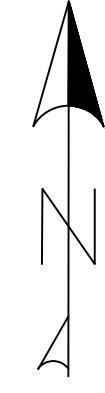
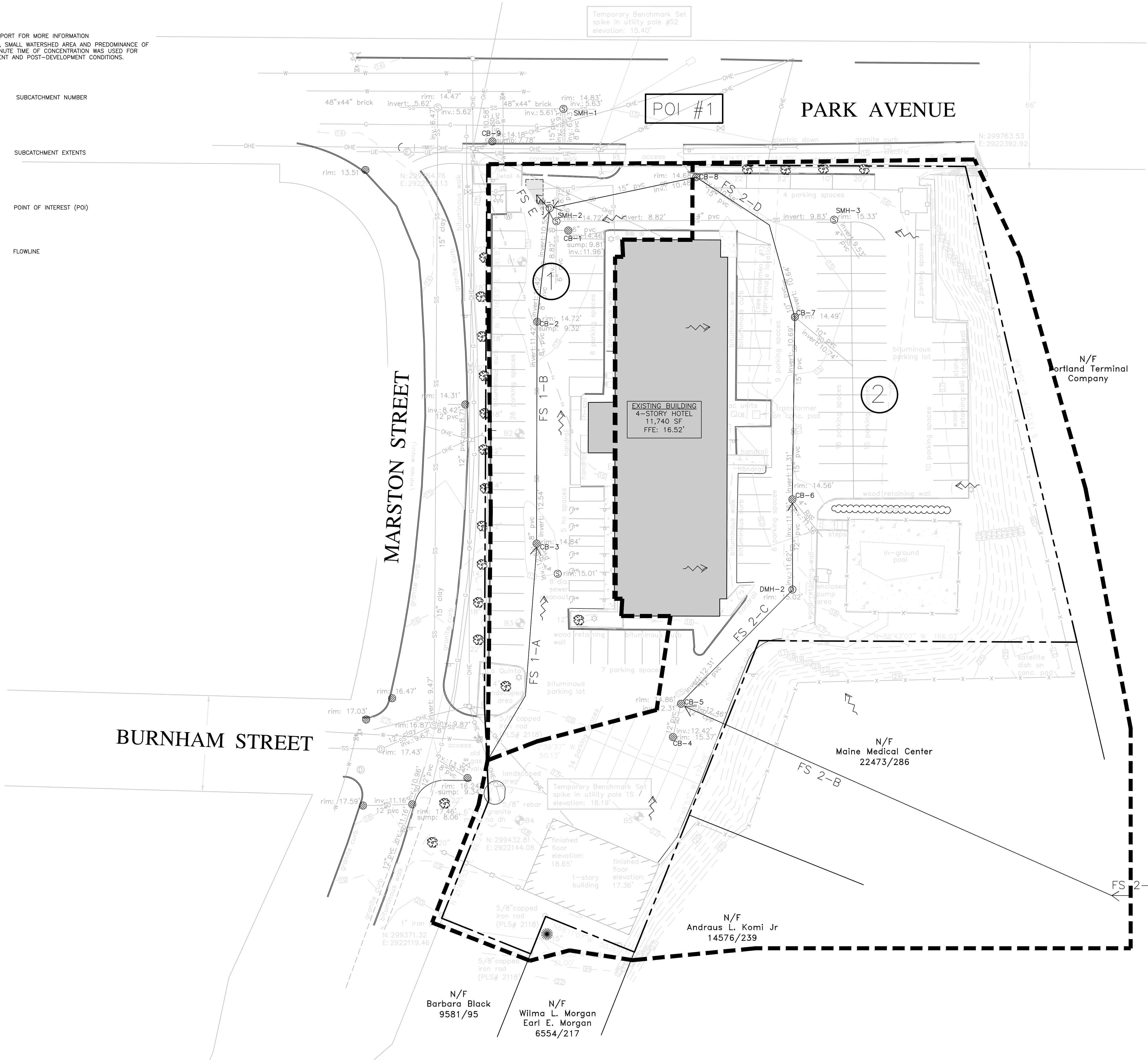
SUBCATCHMENT EXTENTS

POI #1

POINT OF INTEREST (POI)



FLOWLINE



PRELIMINARY  
NOT ISSUED FOR  
CONSTRUCTION

ISSUED FOR	BY
FINAL APP.	MTA
	1/13/17

DRAWING NAME	CLIENT
PRE - CONSTRUCTION STORMWATER PLAN	LQ MANAGEMENT, LLC
HOTEL RENOVATION & STORMWATER UPGRADES	909 HIDDEN RIDGE SUITE 600, IRVING, TEXAS 75038

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158 DANFORTH ST. PORTLAND, MAINE 04102  
(207) 775-2655

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SCALE:	NTS
DESIGNED BY:	MTA
DRAWN BY:	SJL
CHECKED BY:	MTA



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**PRE**

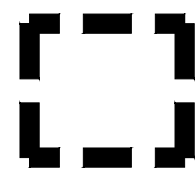


GENERAL NOTES:

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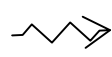
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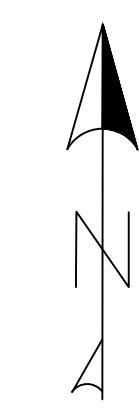
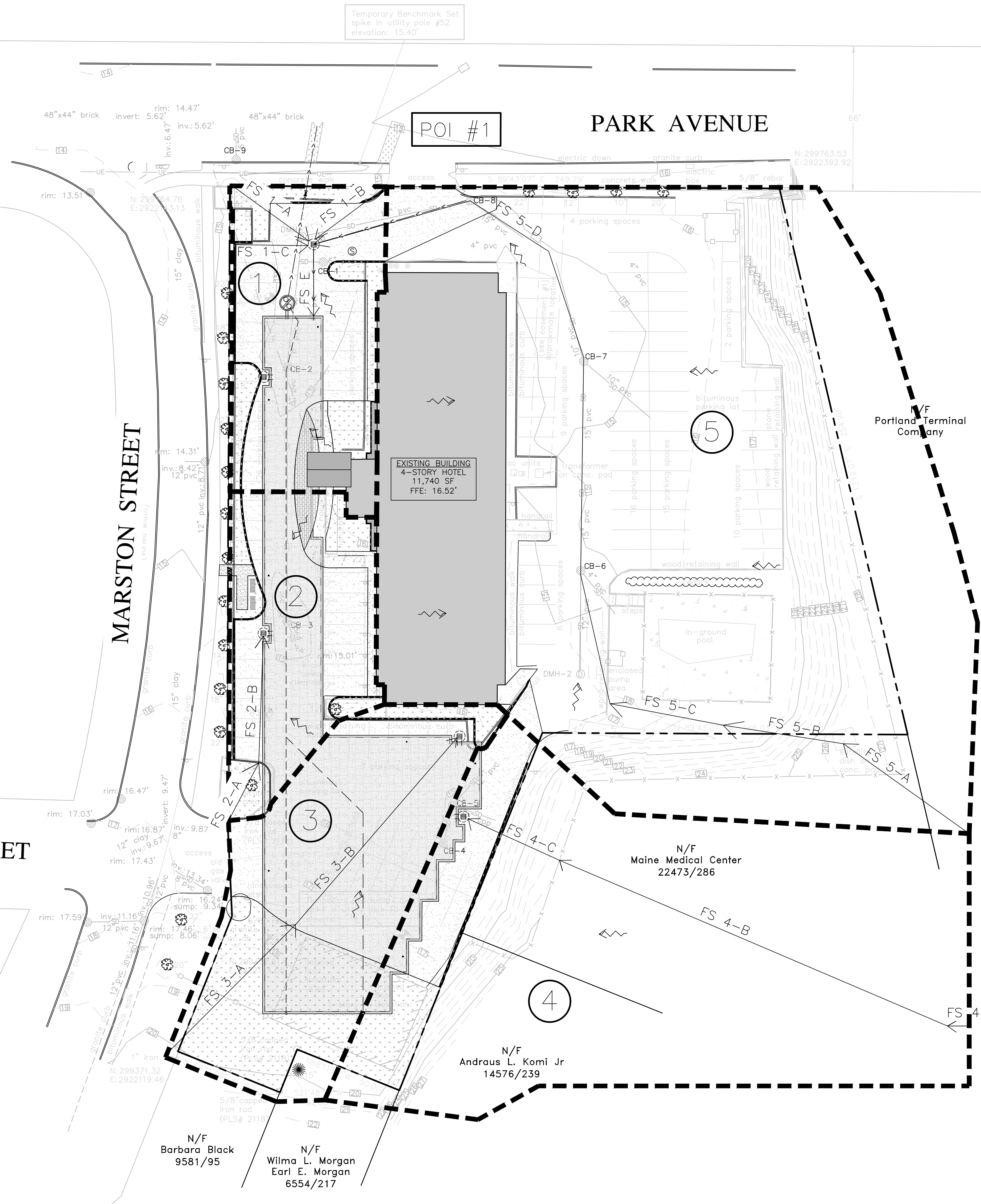
SUBCATCHMENT EXTENTS

POI #1

POINT OF INTEREST (POI)



FLOWLINE



PRELIMINARY  
NOT ISSUED FOR  
CONSTRUCTION

ISSUED FOR	BY
FINAL APP.	MTA
	7/13/17

DRAWING NAME:	POST - CONSTRUCTION STORMWATER PLAN
PROJECT NAME:	HOTEL RENOVATION & STORMWATER UPGRADES
CLIENT:	LQ MANAGEMENT, LLC 909 HIDDEN RIDGE SUITE 600, IRVING, TEXAS 75038

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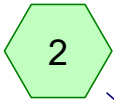
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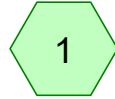


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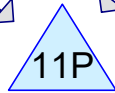




East and North



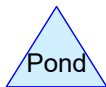
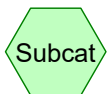
South and West side hotel



4500-gall outlet tank



Park Ave



**Drainage Diagram for La Quinta predev 01-05-17**  
Prepared by Acorn Engineering, Printed 1/13/2017  
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**La Quinta predev 01-05-17**

Prepared by Acorn Engineering

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Page 2

**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.233	61	>75% Grass cover, Good, HSG B (1)
0.903	73	Woods/grass comb., Poor, HSG B (2)
0.610	98	Paved parking, HSG B (1)
1.023	98	Paved parking, HSG C (2)
0.325	98	Roofs, HSG B (1, 2)
<b>3.094</b>		<b>TOTAL AREA</b>

**La Quinta predev 01-05-17**

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Page 3

**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.071	HSG B	1, 2
1.023	HSG C	2
0.000	HSG D	
0.000	Other	
<b>3.094</b>		<b>TOTAL AREA</b>

**La Quinta predev 01-05-17**

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Page 4

**Pipe Listing (all nodes)**

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	1	0.00	0.00	170.0	0.0100	0.013	8.0	0.0	0.0
2	1	0.00	0.00	6.0	0.0100	0.013	12.0	0.0	0.0
3	2	0.00	0.00	126.0	0.0100	0.013	12.0	0.0	0.0
4	2	0.00	0.00	270.0	0.0100	0.013	15.0	0.0	0.0
5	11P	7.50	5.70	30.0	0.0600	0.010	15.0	0.0	0.0

**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 2-year Rainfall=3.10"

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**Summary for Subcatchment 1: South and West side hotel**

Runoff = 2.19 cfs @ 12.05 hrs, Volume= 0.143 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.10"

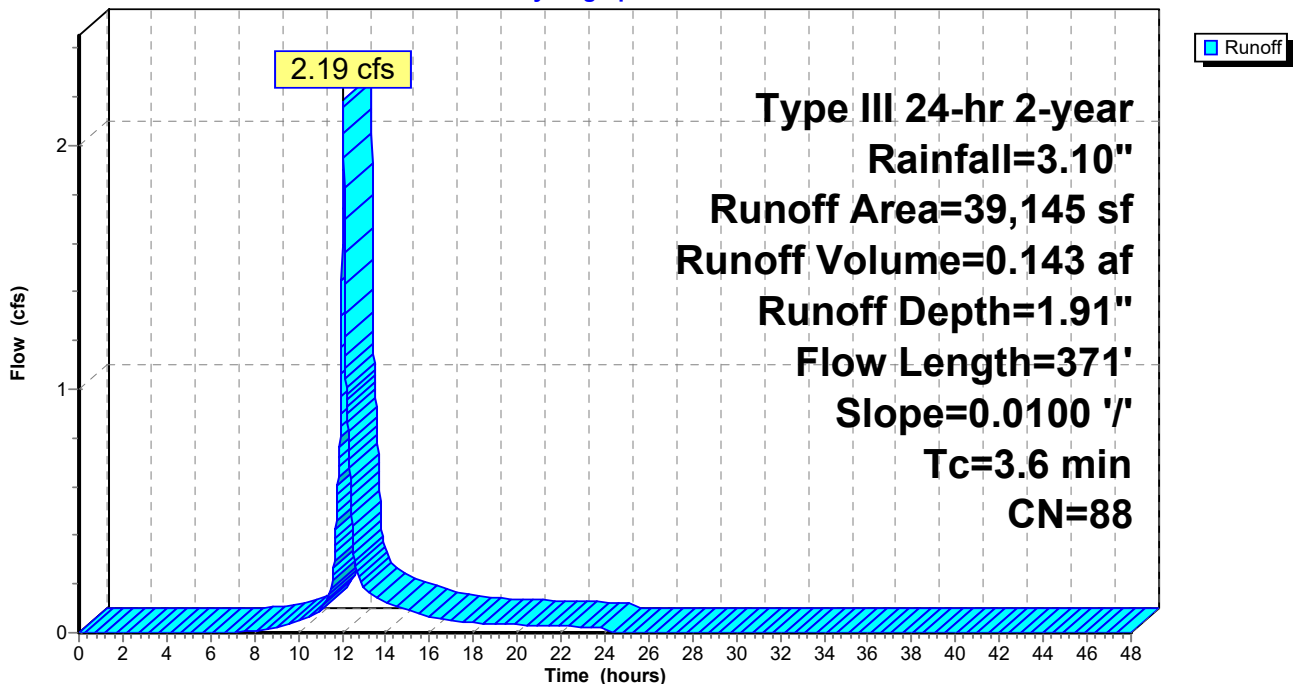
Area (sf)	CN	Description
10,140	61	>75% Grass cover, Good, HSG B
26,580	98	Paved parking, HSG B
2,425	98	Roofs, HSG B
39,145	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	195	0.0100	1.15		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
0.8	170	0.0100	3.46	1.21	<b>Pipe Channel,</b> 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.0	6	0.0100	4.54	3.56	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.6	371	Total			

**Subcatchment 1: South and West side hotel**

Hydrograph



**La Quinta predev 01-05-17**

Prepared by Acorn Engineering

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La Quinta

Type III 24-hr 2-year Rainfall=3.10"

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Page 6

**Summary for Subcatchment 2: East and North**

Runoff = 5.04 cfs @ 12.08 hrs, Volume= 0.349 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
44,560	98	Paved parking, HSG C
39,350	73	Woods/grass comb., Poor, HSG B
11,739	98	Roofs, HSG B
95,649	88	Weighted Average

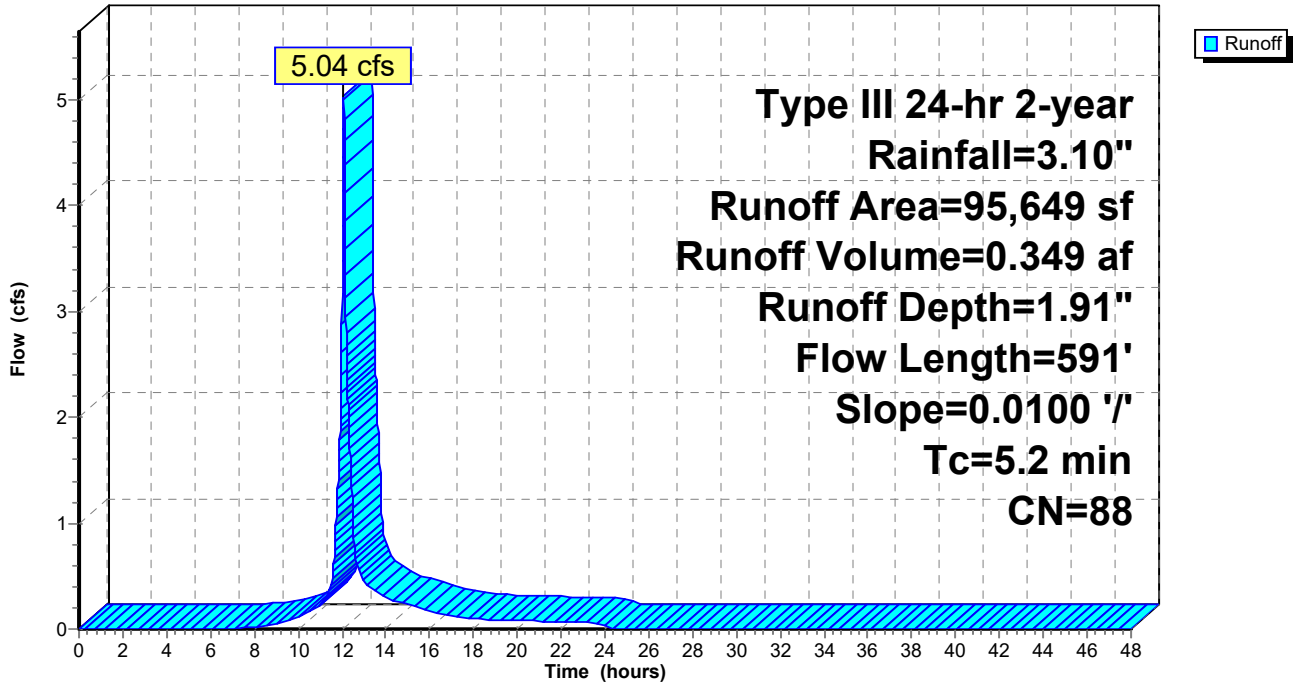
  

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	15	0.0100	0.21		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.6	180	0.0100	1.14		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.5	126	0.0100	4.54	3.56	<b>Pipe Channel, culvert</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.9	270	0.0100	5.26	6.46	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
5.2	591	Total			



Subcatchment 2: East and North

Hydrograph



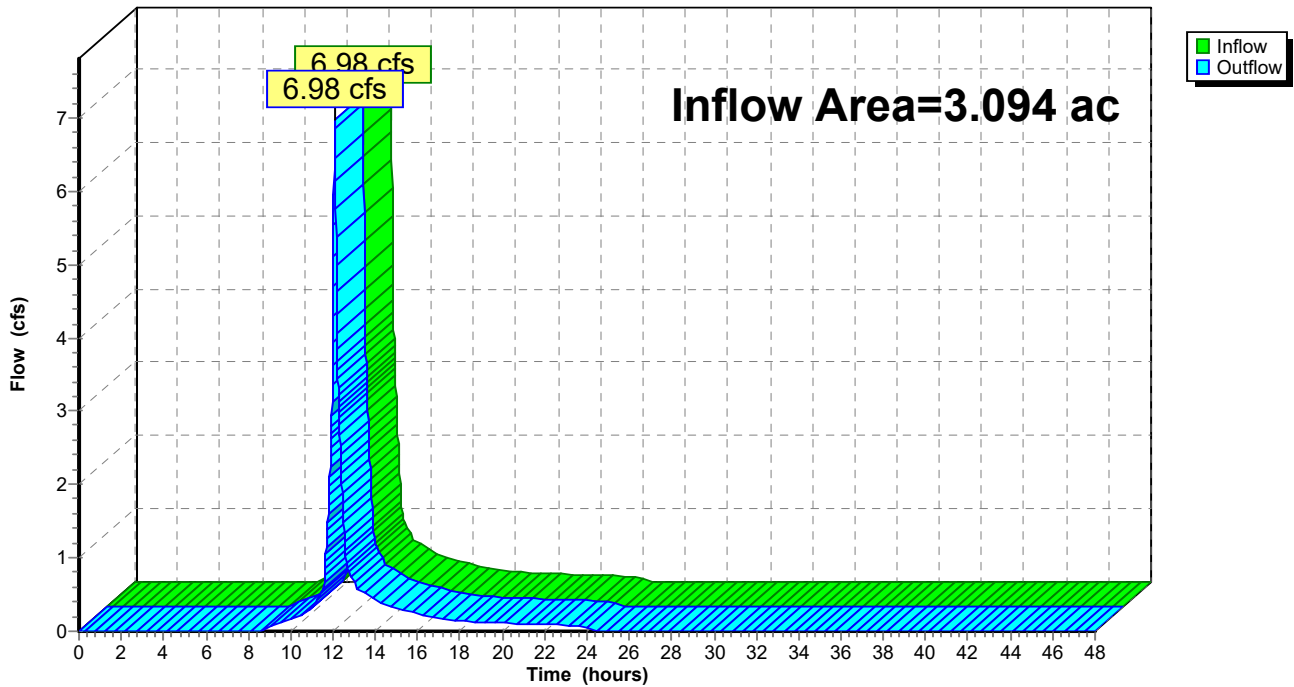
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.094 ac, Inflow Depth = 1.89" for 2-year event  
Inflow = 6.98 cfs @ 12.09 hrs, Volume= 0.488 af  
Outflow = 6.98 cfs @ 12.09 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 2-year Rainfall=3.10"

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**Summary for Pond 11P: 4500-gall outlet tank**

Inflow Area = 3.094 ac, Inflow Depth = 1.91" for 2-year event  
 Inflow = 7.15 cfs @ 12.07 hrs, Volume= 0.492 af  
 Outflow = 6.98 cfs @ 12.09 hrs, Volume= 0.488 af, Atten= 2%, Lag= 1.0 min  
 Primary = 6.98 cfs @ 12.09 hrs, Volume= 0.488 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 10.36' @ 12.09 hrs Surf.Area= 0.002 ac Storage= 0.011 af

Plug-Flow detention time= 8.3 min calculated for 0.488 af (99% of inflow)  
 Center-of-Mass det. time= 3.7 min ( 818.9 - 815.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	0.015 af	<b>8.50'W x 12.50'L x 6.00'H holding tank</b>
#2	14.52'	9.486 af	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)
		9.501 af	Total Available Storage

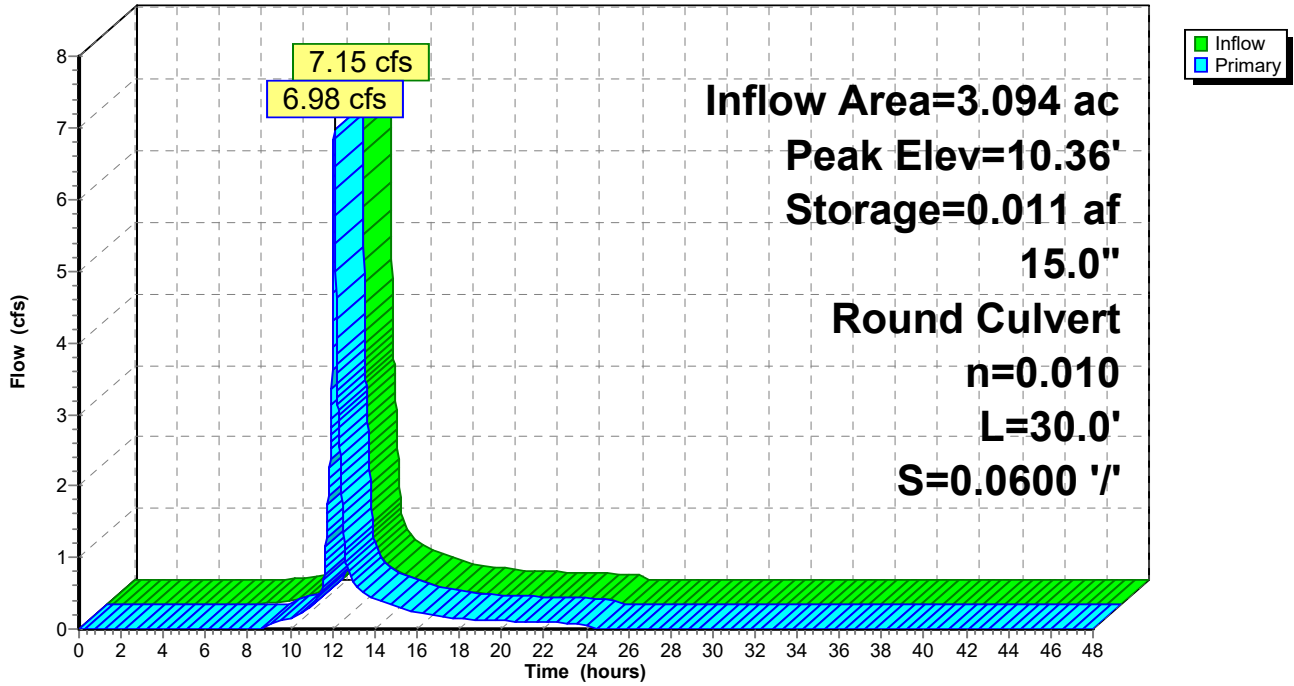
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
14.52	2.280	1,700.0	0.000	0.000	2.280
15.52	3.130	1,750.0	2.694	2.694	2.598
16.52	3.350	1,816.0	3.239	5.933	3.030
17.52	3.760	1,969.0	3.553	9.486	4.088

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	<b>15.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 7.50' / 5.70' S= 0.0600 '/ Cc= 0.900 n= 0.010 PVC, smooth interior

**Primary OutFlow** Max=6.97 cfs @ 12.09 hrs HW=10.36' TW=0.00' (Dynamic Tailwater)  
 ←1=Culvert (Inlet Controls 6.97 cfs @ 5.68 fps)

**Pond 11P: 4500-gall outlet tank**

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 10-year Rainfall=4.60"

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**Summary for Subcatchment 1: South and West side hotel**

Runoff = 3.71 cfs @ 12.05 hrs, Volume= 0.246 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.60"

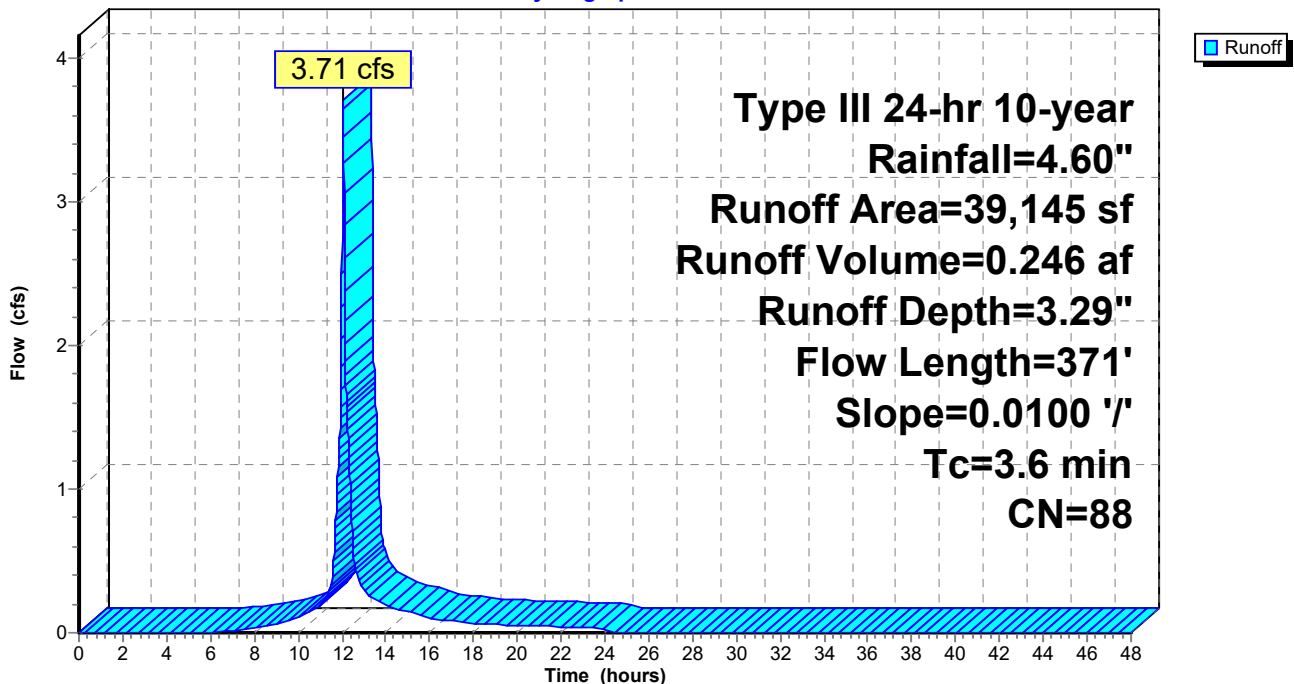
Area (sf)	CN	Description
10,140	61	>75% Grass cover, Good, HSG B
26,580	98	Paved parking, HSG B
2,425	98	Roofs, HSG B
39,145	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	195	0.0100	1.15		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
0.8	170	0.0100	3.46	1.21	<b>Pipe Channel,</b> 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.0	6	0.0100	4.54	3.56	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.6	371	Total			

**Subcatchment 1: South and West side hotel**

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 10-year Rainfall=4.60"

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**Summary for Subcatchment 2: East and North**

Runoff = 8.56 cfs @ 12.07 hrs, Volume= 0.602 af, Depth= 3.29"

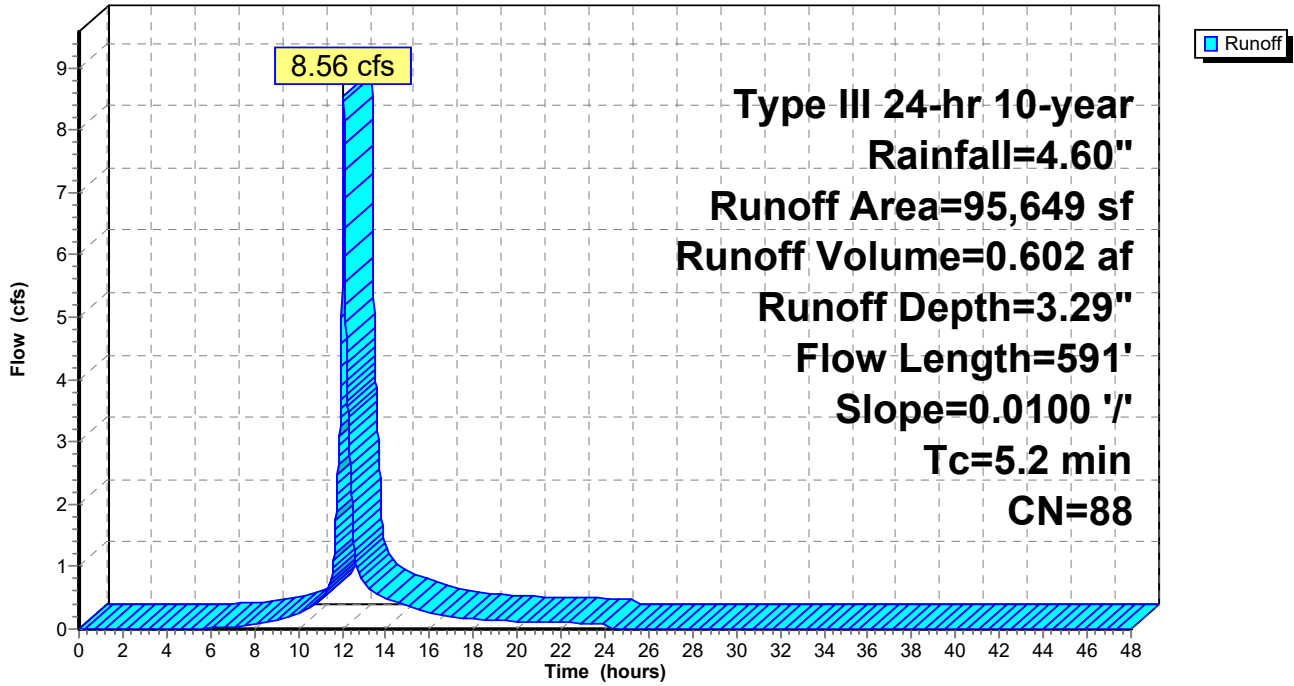
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
44,560	98	Paved parking, HSG C
39,350	73	Woods/grass comb., Poor, HSG B
11,739	98	Roofs, HSG B
95,649	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	15	0.0100	0.21		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.6	180	0.0100	1.14		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.5	126	0.0100	4.54	3.56	<b>Pipe Channel, culvert</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.9	270	0.0100	5.26	6.46	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
5.2	591	Total			

### Subcatchment 2: East and North

Hydrograph



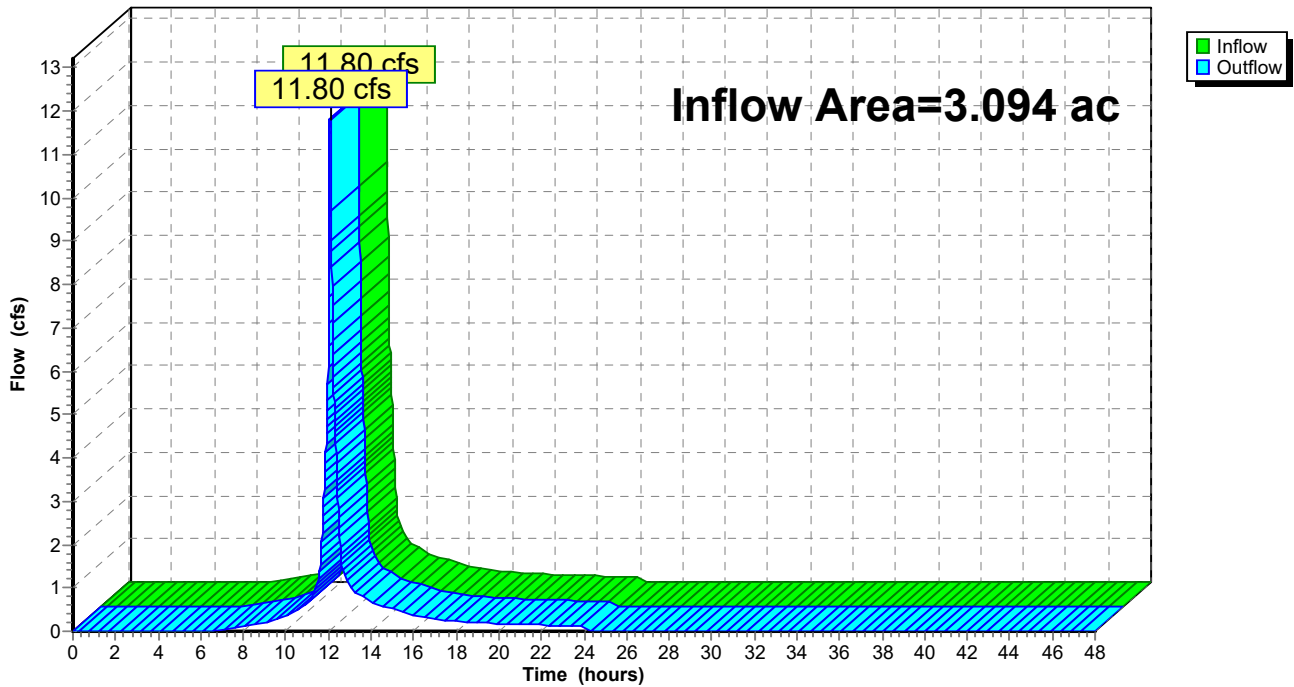
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.094 ac, Inflow Depth = 3.28" for 10-year event  
Inflow = 11.80 cfs @ 12.09 hrs, Volume= 0.845 af  
Outflow = 11.80 cfs @ 12.09 hrs, Volume= 0.845 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph





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Type III 24-hr 10-year Rainfall=4.60"

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**Summary for Pond 11P: 4500-gall outlet tank**

Inflow Area = 3.094 ac, Inflow Depth = 3.29" for 10-year event  
 Inflow = 12.13 cfs @ 12.07 hrs, Volume= 0.848 af  
 Outflow = 11.80 cfs @ 12.09 hrs, Volume= 0.845 af, Atten= 3%, Lag= 1.3 min  
 Primary = 11.80 cfs @ 12.09 hrs, Volume= 0.845 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 14.52' @ 12.09 hrs Surf.Area= 2.283 ac Storage= 0.015 af

Plug-Flow detention time= 5.8 min calculated for 0.845 af (100% of inflow)  
 Center-of-Mass det. time= 2.9 min ( 802.6 - 799.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	0.015 af	<b>8.50'W x 12.50'L x 6.00'H holding tank</b>
#2	14.52'	9.486 af	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)
		9.501 af	Total Available Storage

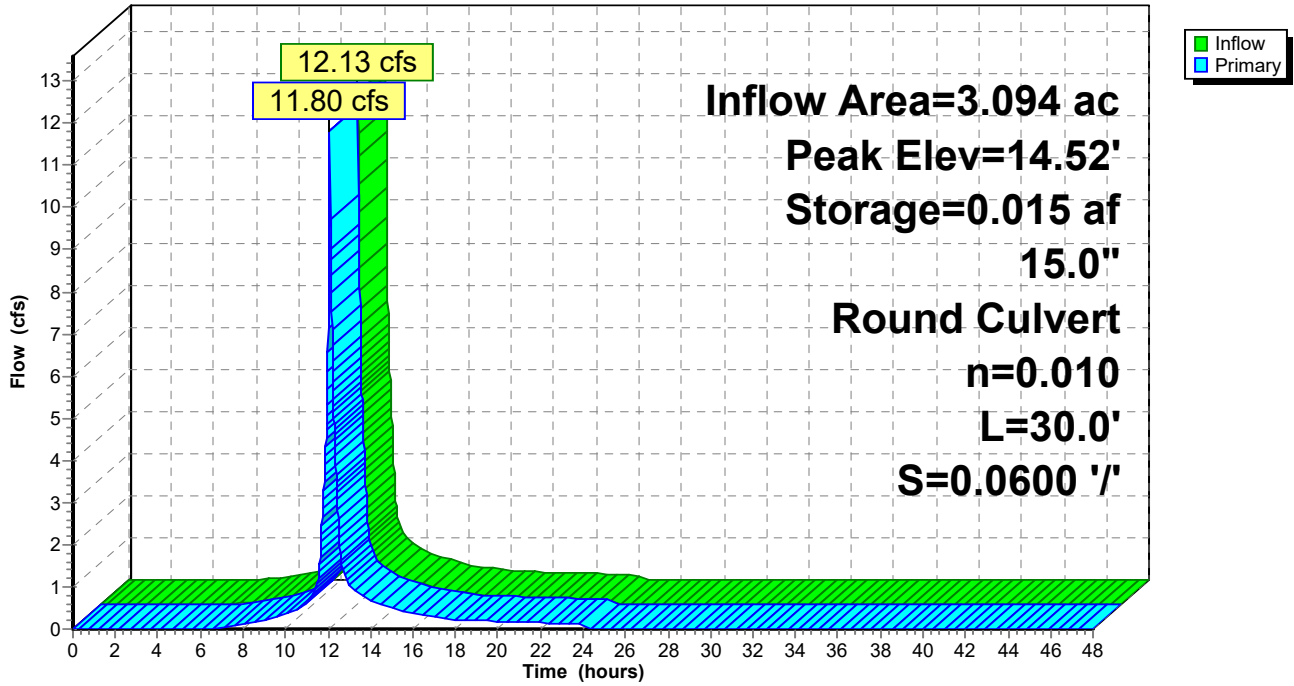
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
14.52	2.280	1,700.0	0.000	0.000	2.280
15.52	3.130	1,750.0	2.694	2.694	2.598
16.52	3.350	1,816.0	3.239	5.933	3.030
17.52	3.760	1,969.0	3.553	9.486	4.088

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	<b>15.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 7.50' / 5.70' S= 0.0600 '/ Cc= 0.900 n= 0.010 PVC, smooth interior

**Primary OutFlow** Max=11.80 cfs @ 12.09 hrs HW=14.52' TW=0.00' (Dynamic Tailwater)  
 ←1=Culvert (Inlet Controls 11.80 cfs @ 9.61 fps)

Pond 11P: 4500-gall outlet tank

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 25-year Rainfall=5.80"

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**Summary for Subcatchment 1: South and West side hotel**

Runoff = 4.93 cfs @ 12.05 hrs, Volume= 0.332 af, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.80"

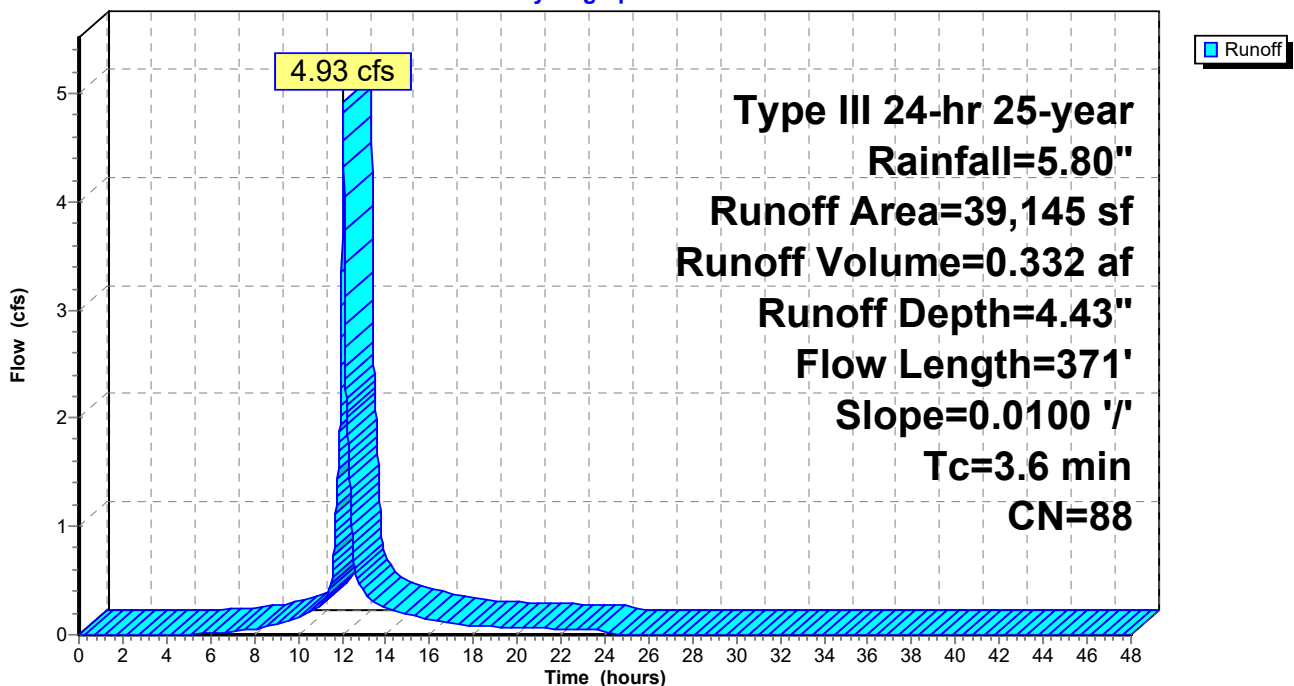
Area (sf)	CN	Description
10,140	61	>75% Grass cover, Good, HSG B
26,580	98	Paved parking, HSG B
2,425	98	Roofs, HSG B
39,145	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	195	0.0100	1.15		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
0.8	170	0.0100	3.46	1.21	<b>Pipe Channel,</b> 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.0	6	0.0100	4.54	3.56	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.6	371	Total			

**Subcatchment 1: South and West side hotel**

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 25-year Rainfall=5.80"

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**Summary for Subcatchment 2: East and North**

Runoff = 11.37 cfs @ 12.07 hrs, Volume= 0.811 af, Depth= 4.43"

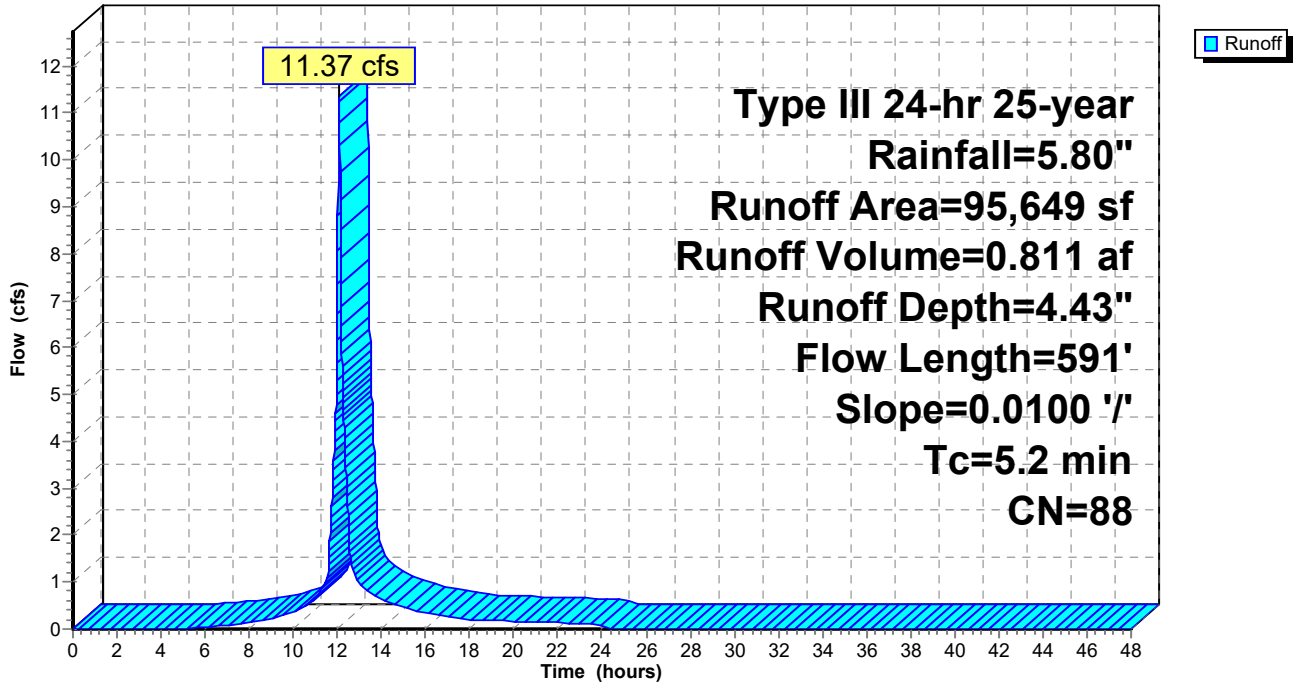
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
44,560	98	Paved parking, HSG C
39,350	73	Woods/grass comb., Poor, HSG B
11,739	98	Roofs, HSG B
95,649	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	15	0.0100	0.21		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.6	180	0.0100	1.14		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.5	126	0.0100	4.54	3.56	<b>Pipe Channel, culvert</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.9	270	0.0100	5.26	6.46	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
5.2	591	Total			

### Subcatchment 2: East and North

Hydrograph



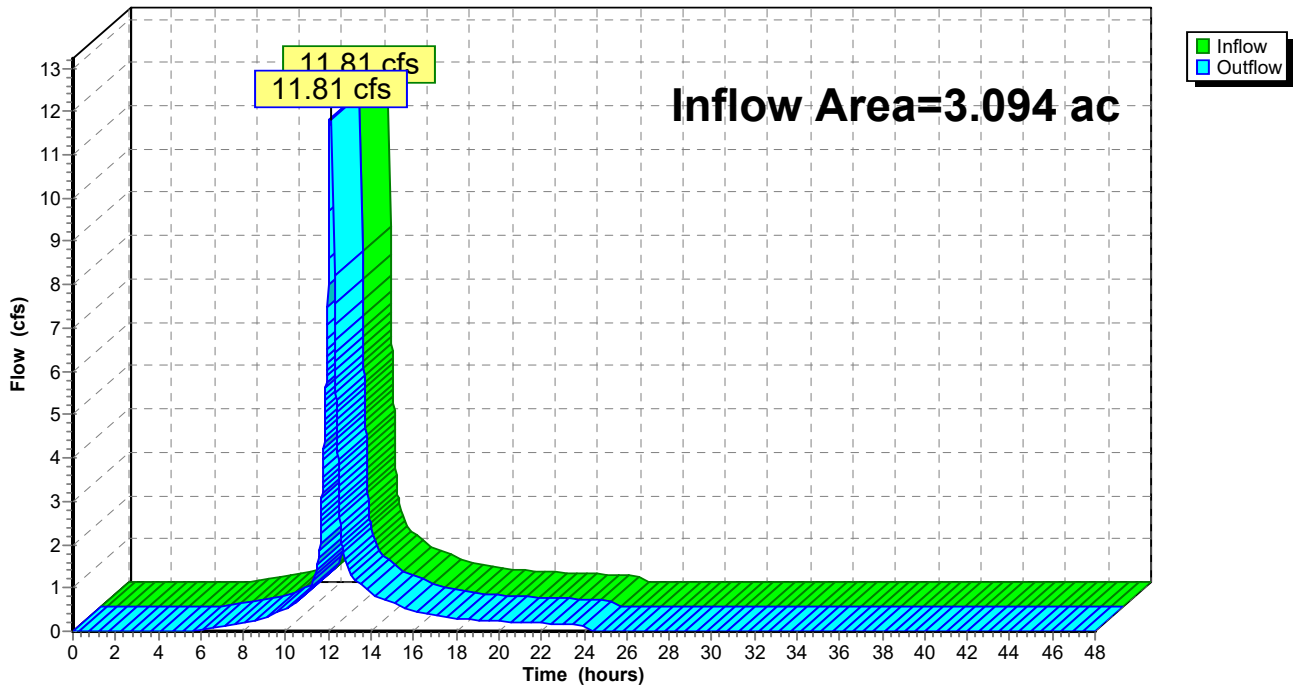
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.094 ac, Inflow Depth = 4.42" for 25-year event  
Inflow = 11.81 cfs @ 12.14 hrs, Volume= 1.140 af  
Outflow = 11.81 cfs @ 12.14 hrs, Volume= 1.140 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 25-year Rainfall=5.80"

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**Summary for Pond 11P: 4500-gall outlet tank**

Inflow Area = 3.094 ac, Inflow Depth = 4.43" for 25-year event  
 Inflow = 16.13 cfs @ 12.07 hrs, Volume= 1.143 af  
 Outflow = 11.81 cfs @ 12.14 hrs, Volume= 1.140 af, Atten= 27%, Lag= 4.1 min  
 Primary = 11.81 cfs @ 12.14 hrs, Volume= 1.140 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 14.53' @ 12.14 hrs Surf.Area= 2.292 ac Storage= 0.044 af

Plug-Flow detention time= 4.9 min calculated for 1.140 af (100% of inflow)  
 Center-of-Mass det. time= 2.7 min ( 794.2 - 791.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	0.015 af	<b>8.50'W x 12.50'L x 6.00'H holding tank</b>
#2	14.52'	9.486 af	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)
		9.501 af	Total Available Storage

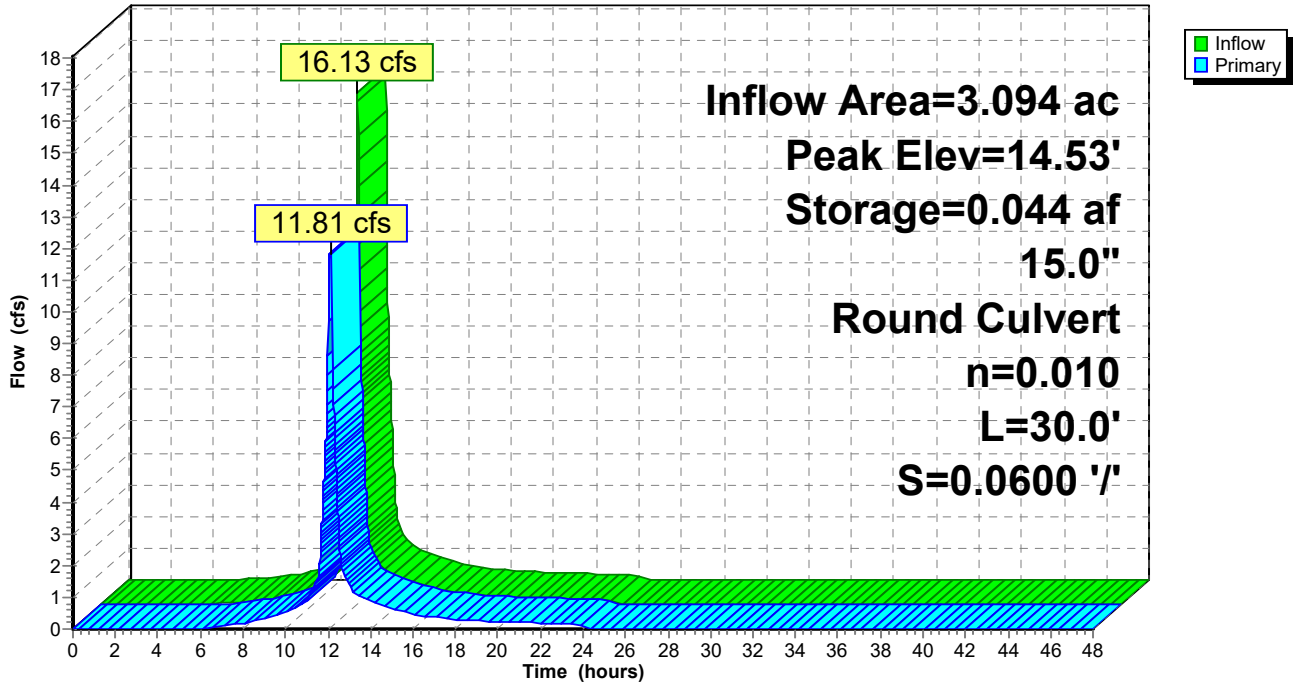
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
14.52	2.280	1,700.0	0.000	0.000	2.280
15.52	3.130	1,750.0	2.694	2.694	2.598
16.52	3.350	1,816.0	3.239	5.933	3.030
17.52	3.760	1,969.0	3.553	9.486	4.088

Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	<b>15.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 7.50' / 5.70' S= 0.0600 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

**Primary OutFlow** Max=11.81 cfs @ 12.14 hrs HW=14.53' TW=0.00' (Dynamic Tailwater)  
 ←1=Culvert (Inlet Controls 11.81 cfs @ 9.62 fps)

**Pond 11P: 4500-gall outlet tank**

Hydrograph





**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 100-year Rainfall=8.10"

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**Summary for Subcatchment 1: South and West side hotel**

Runoff = 7.25 cfs @ 12.05 hrs, Volume= 0.499 af, Depth= 6.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=8.10"

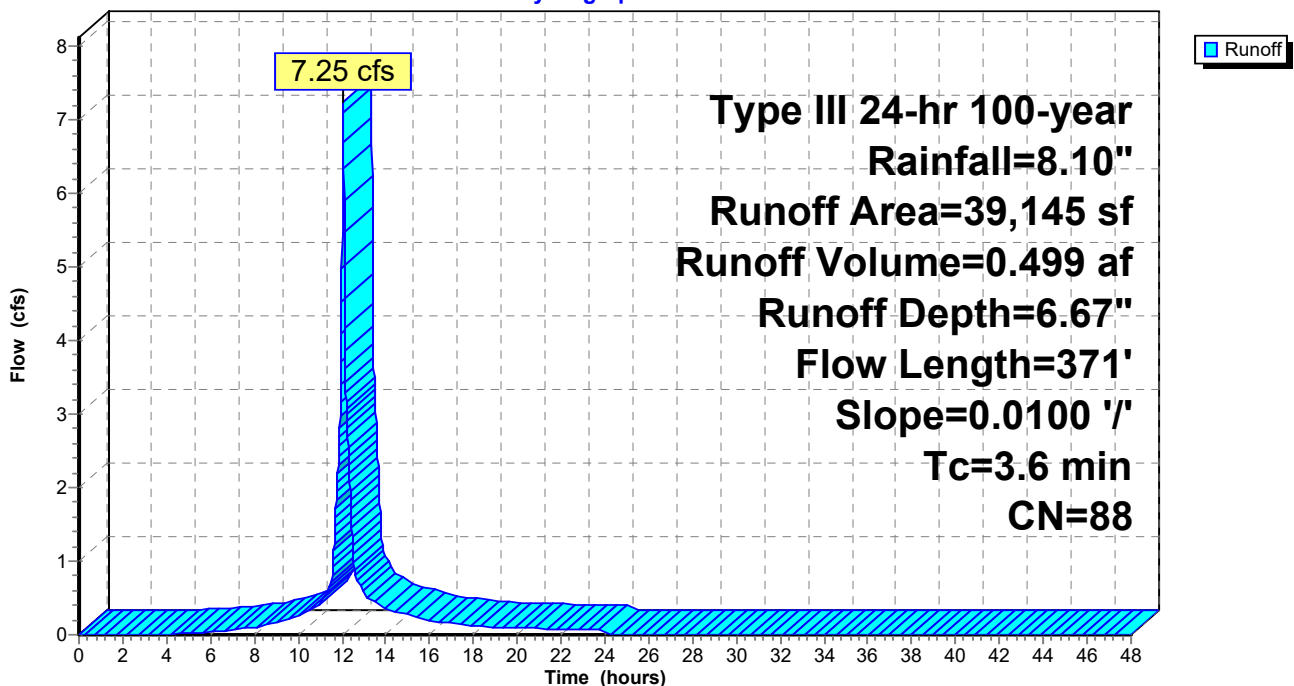
Area (sf)	CN	Description
10,140	61	>75% Grass cover, Good, HSG B
26,580	98	Paved parking, HSG B
2,425	98	Roofs, HSG B
39,145	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	195	0.0100	1.15		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
0.8	170	0.0100	3.46	1.21	<b>Pipe Channel,</b> 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
0.0	6	0.0100	4.54	3.56	<b>Pipe Channel,</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
3.6	371	Total			

**Subcatchment 1: South and West side hotel**

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta

Type III 24-hr 100-year Rainfall=8.10"

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**Summary for Subcatchment 2: East and North**

Runoff = 16.72 cfs @ 12.07 hrs, Volume= 1.220 af, Depth= 6.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=8.10"

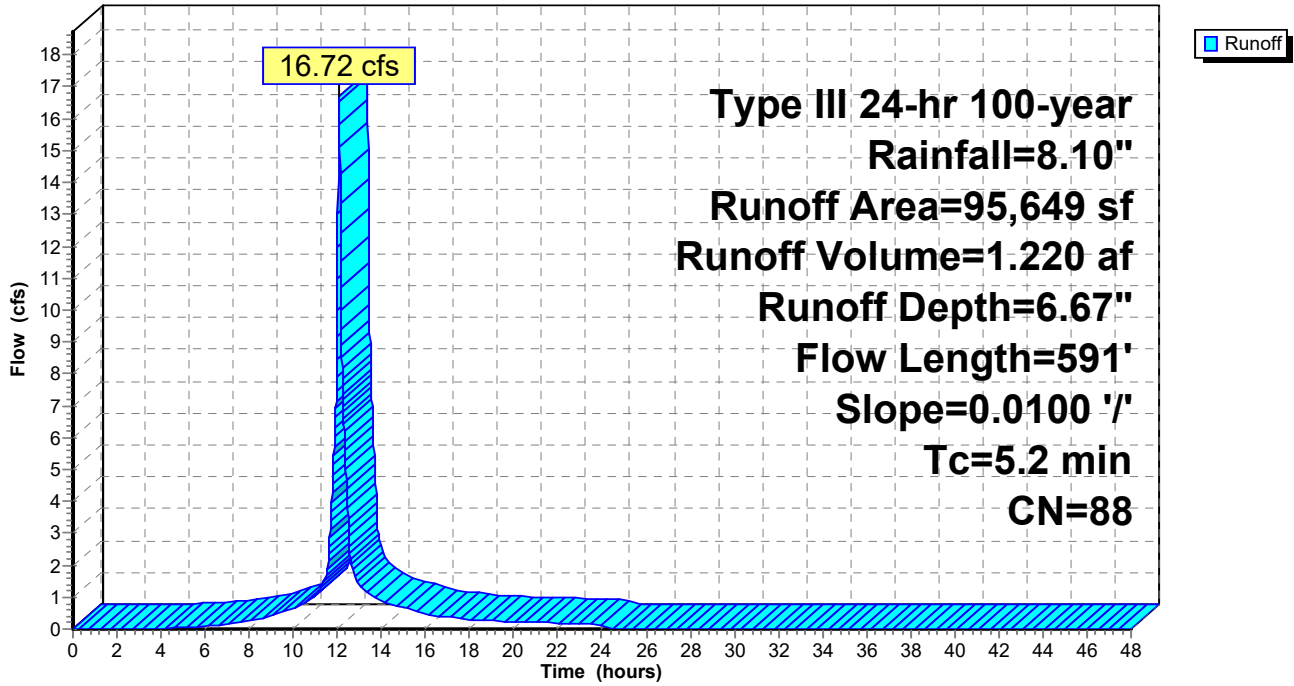
Area (sf)	CN	Description
44,560	98	Paved parking, HSG C
39,350	73	Woods/grass comb., Poor, HSG B
11,739	98	Roofs, HSG B
95,649	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	15	0.0100	0.21		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.6	180	0.0100	1.14		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.5	126	0.0100	4.54	3.56	<b>Pipe Channel, culvert</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.9	270	0.0100	5.26	6.46	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
5.2	591	Total			

### Subcatchment 2: East and North

Hydrograph



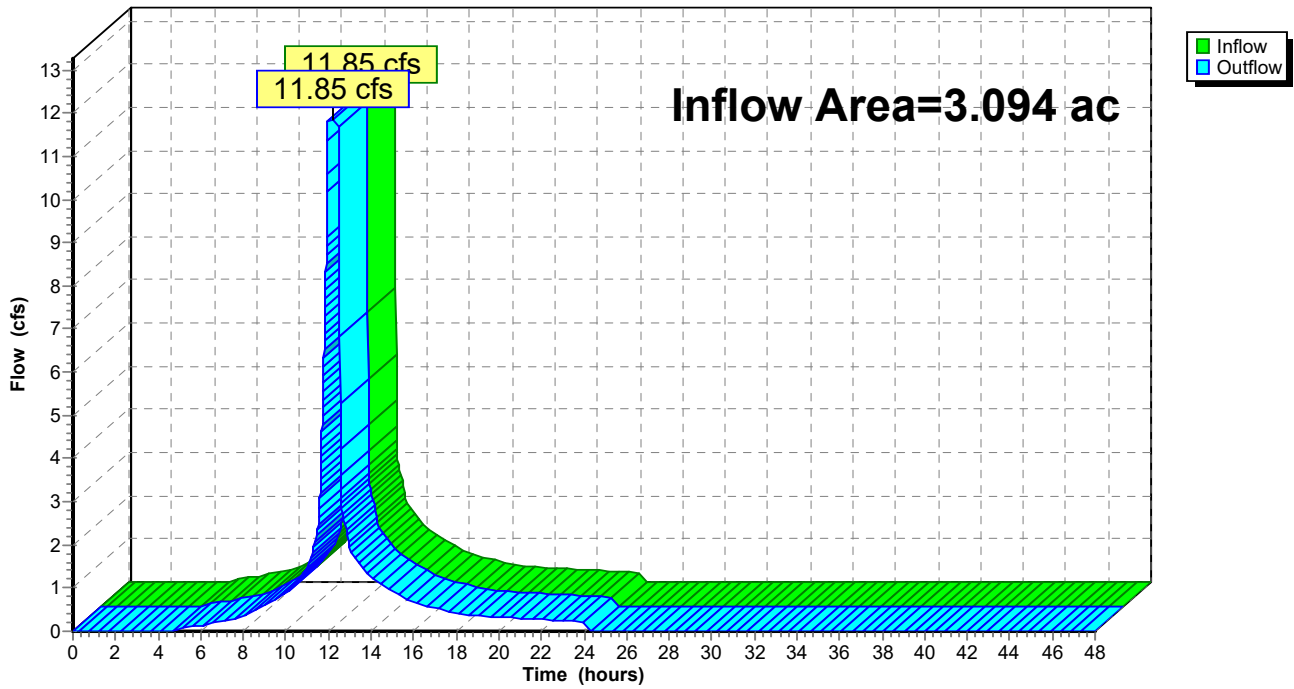
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.094 ac, Inflow Depth = 6.65" for 100-year event  
Inflow = 11.85 cfs @ 12.19 hrs, Volume= 1.715 af  
Outflow = 11.85 cfs @ 12.19 hrs, Volume= 1.715 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph



**La Quinta predev 01-05-17**

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La Quinta  
Type III 24-hr 100-year Rainfall=8.10"

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**Summary for Pond 11P: 4500-gall outlet tank**

Inflow Area = 3.094 ac, Inflow Depth = 6.67" for 100-year event  
 Inflow = 23.72 cfs @ 12.07 hrs, Volume= 1.719 af  
 Outflow = 11.85 cfs @ 12.19 hrs, Volume= 1.715 af, Atten= 50%, Lag= 7.7 min  
 Primary = 11.85 cfs @ 12.19 hrs, Volume= 1.715 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 14.57' @ 12.19 hrs Surf.Area= 2.324 ac Storage= 0.136 af

Plug-Flow detention time= 5.0 min calculated for 1.715 af (100% of inflow)  
 Center-of-Mass det. time= 3.5 min ( 784.0 - 780.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	0.015 af	<b>8.50'W x 12.50'L x 6.00'H holding tank</b>
#2	14.52'	9.486 af	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)
		9.501 af	Total Available Storage

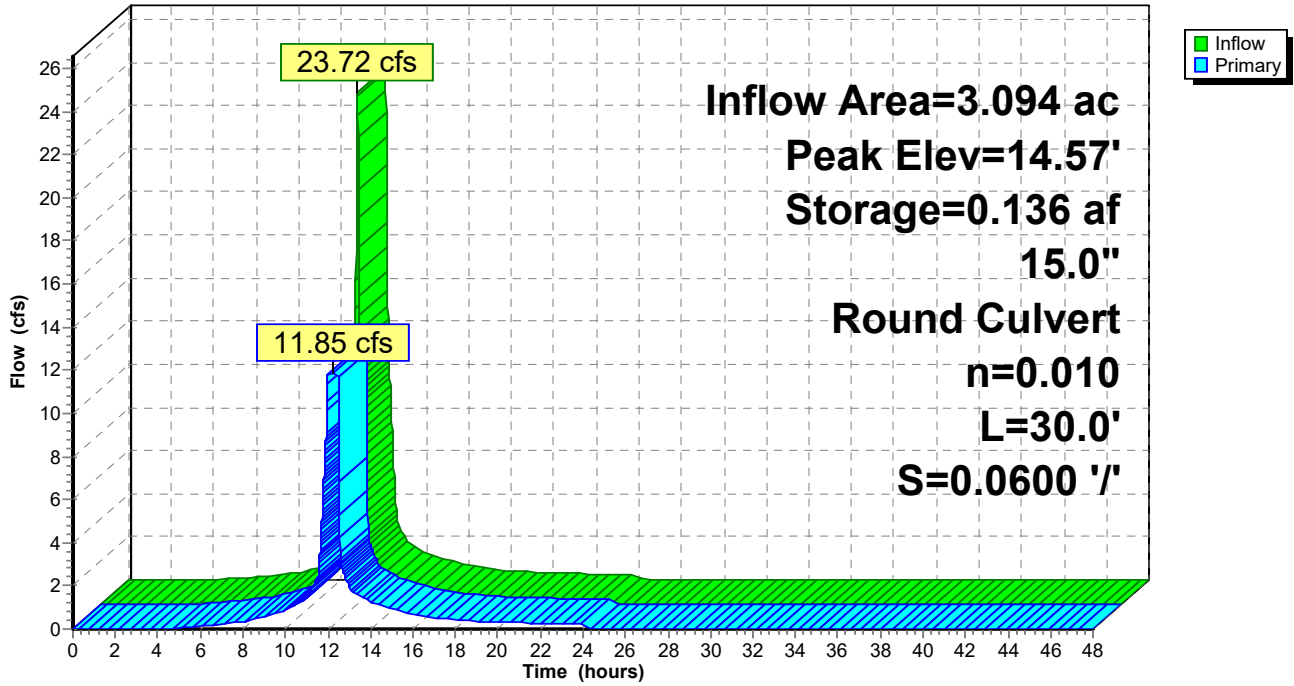
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
14.52	2.280	1,700.0	0.000	0.000	2.280
15.52	3.130	1,750.0	2.694	2.694	2.598
16.52	3.350	1,816.0	3.239	5.933	3.030
17.52	3.760	1,969.0	3.553	9.486	4.088

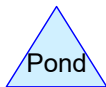
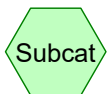
Device	Routing	Invert	Outlet Devices
#1	Primary	7.50'	<b>15.0" Round Culvert</b> L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 7.50' / 5.70' S= 0.0600 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

**Primary OutFlow** Max=11.85 cfs @ 12.19 hrs HW=14.57' TW=0.00' (Dynamic Tailwater)  
 ←1=Culvert (Inlet Controls 11.85 cfs @ 9.65 fps)

### Pond 11P: 4500-gall outlet tank

Hydrograph





**Drainage Diagram for La Quinta Postdev 01-05-17**  
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**La Quinta Postdev 01-05-17**

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.205	61	>75% Grass cover, Good, HSG B (3)
0.665	69	50-75% Grass cover, Fair, HSG B (1, 2, 5)
0.347	73	Woods/grass comb., Poor, HSG B (4)
1.155	98	Paved parking, HSG B (1, 2, 3, 5)
0.447	98	Paved parking, HSG C (4)
0.269	98	Roofs, HSG B (5)
<b>3.087</b>		<b>TOTAL AREA</b>



**La Quinta Postdev 01-05-17**

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.640	HSG B	1, 2, 3, 4, 5
0.447	HSG C	4
0.000	HSG D	
0.000	Other	
<b>3.087</b>		<b>TOTAL AREA</b>

**La Quinta Postdev 01-05-17**

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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)	Fill (inches)
1	1	0.00	0.00	33.0	0.0100	0.010	24.0	0.0	0.0
2	4	0.00	0.00	60.0	0.0100	0.013	24.0	0.0	0.0
3	5	0.00	0.00	270.0	0.0050	0.013	15.0	0.0	0.0
4	5	0.00	0.00	33.0	0.0050	0.013	24.0	0.0	0.0
5	13P	6.00	5.70	75.0	0.0040	0.010	12.0	0.0	0.0

**Summary for Subcatchment 1: Northwest Side**

Runoff = 0.53 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.10"

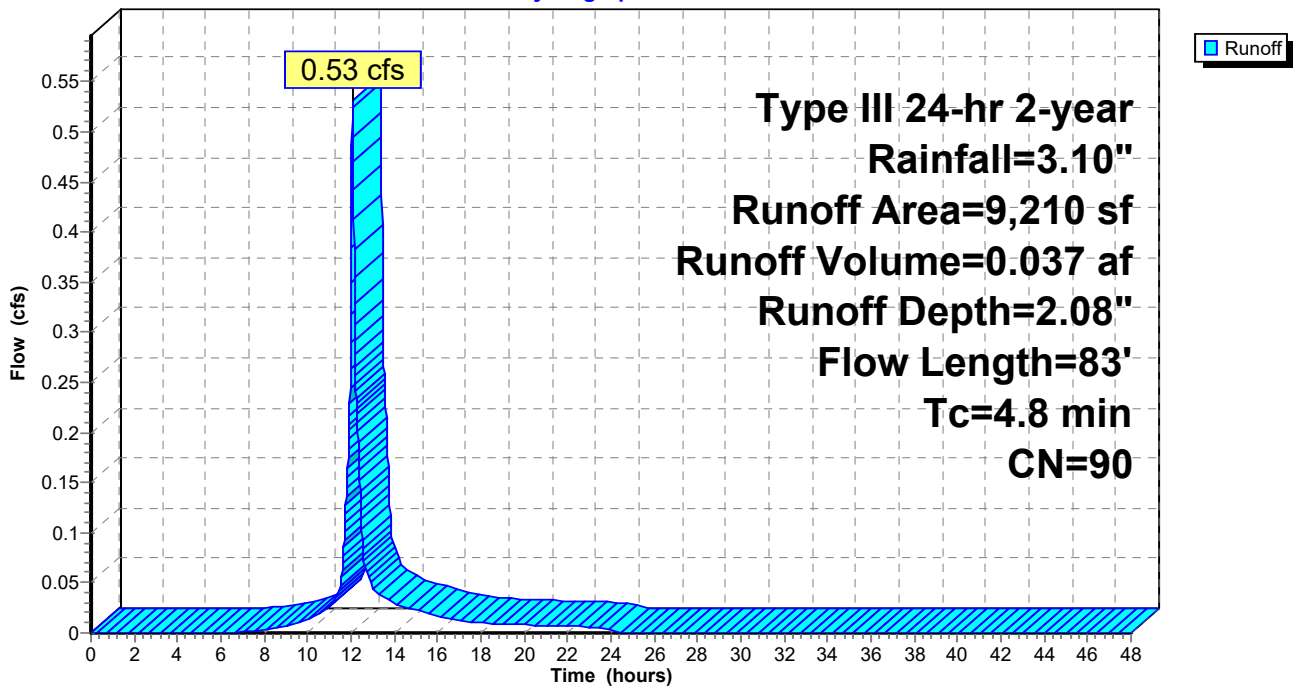
Area (sf)	CN	Description
6,730	98	Paved parking, HSG B
2,480	69	50-75% Grass cover, Fair, HSG B
9,210	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	30	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
0.5	20	0.0100	0.73		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	33	0.0100	9.36	29.41	<b>Pipe Channel, 24" culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
4.8	83	Total			

**Subcatchment 1: Northwest Side**

Hydrograph



**Summary for Subcatchment 2: Southwest**

Runoff = 0.49 cfs @ 12.08 hrs, Volume= 0.035 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.10"

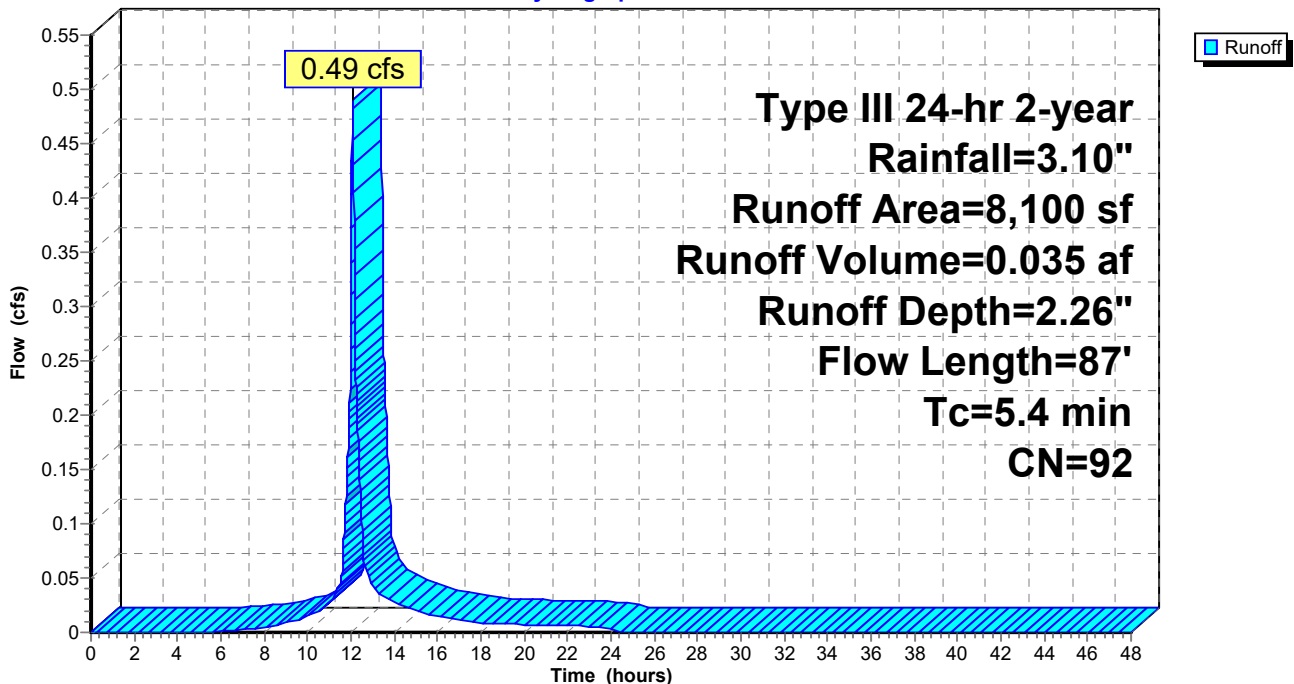
Area (sf)	CN	Description
6,400	98	Paved parking, HSG B
1,700	69	50-75% Grass cover, Fair, HSG B
8,100	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	32	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
5.4	87	Total			

**Subcatchment 2: Southwest**

Hydrograph



**Summary for Subcatchment 3: South Side**

Runoff = 0.30 cfs @ 12.18 hrs, Volume= 0.028 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.10"

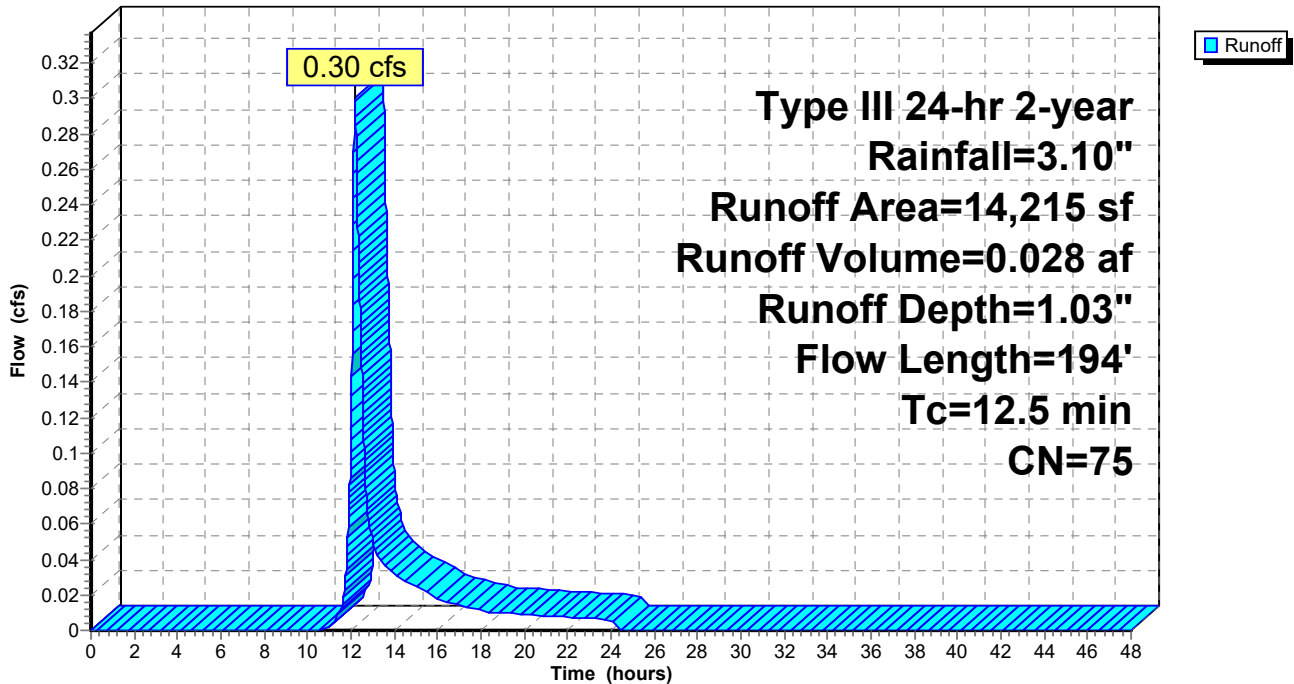
Area (sf)	CN	Description
8,925	61	>75% Grass cover, Good, HSG B
5,290	98	Paved parking, HSG B
14,215	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	82	0.0300	0.13		<b>Sheet Flow, Across Landscaping</b> Grass: Dense n= 0.240 P2= 3.00"
1.8	112	0.0100	1.03		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
12.5	194	Total			

**Subcatchment 3: South Side**

Hydrograph



**Summary for Subcatchment 4: Maine Med Parking**

Runoff = 1.75 cfs @ 12.08 hrs, Volume= 0.121 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.10"

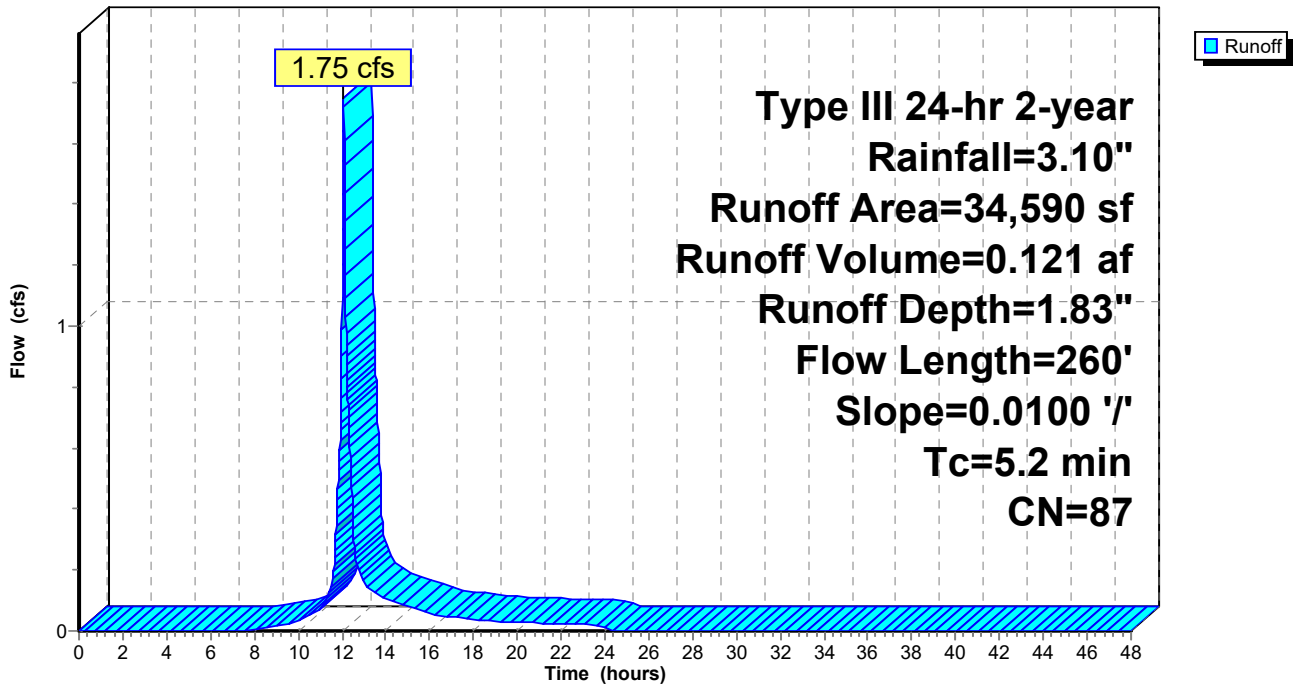
Area (sf)	CN	Description
19,480	98	Paved parking, HSG C
15,110	73	Woods/grass comb., Poor, HSG B
34,590	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	40	0.0100	0.25		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.4	160	0.0100	1.11		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	60	0.0100	7.20	22.62	<b>Pipe Channel, culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
5.2	260	Total			

**Subcatchment 4: Maine Med Parking**

Hydrograph



**Summary for Subcatchment 5: Northeast Side**

Runoff = 2.91 cfs @ 12.14 hrs, Volume= 0.239 af, Depth= 1.83"

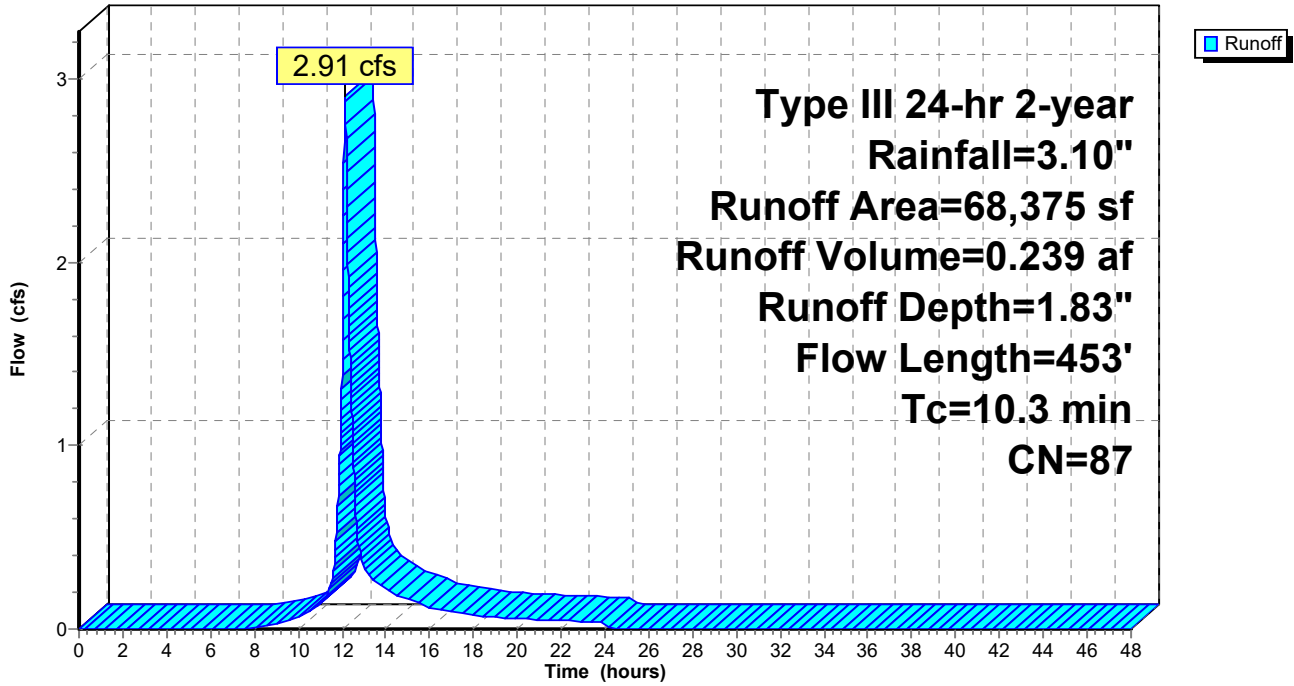
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
11,700	98	Roofs, HSG B
31,875	98	Paved parking, HSG B
24,800	69	50-75% Grass cover, Fair, HSG B
68,375	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0100	0.27		<b>Sheet Flow, gravel near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
4.3	35	0.1500	0.14		<b>Sheet Flow, Forested Slope</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
1.2	270	0.0050	3.72	4.57	<b>Pipe Channel, Culverts In East Parking Lots</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	33	0.0050	5.09	16.00	<b>Pipe Channel, Crate Inlet from DMH-1</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
10.3	453	Total			

Subcatchment 5: Northeast Side

Hydrograph





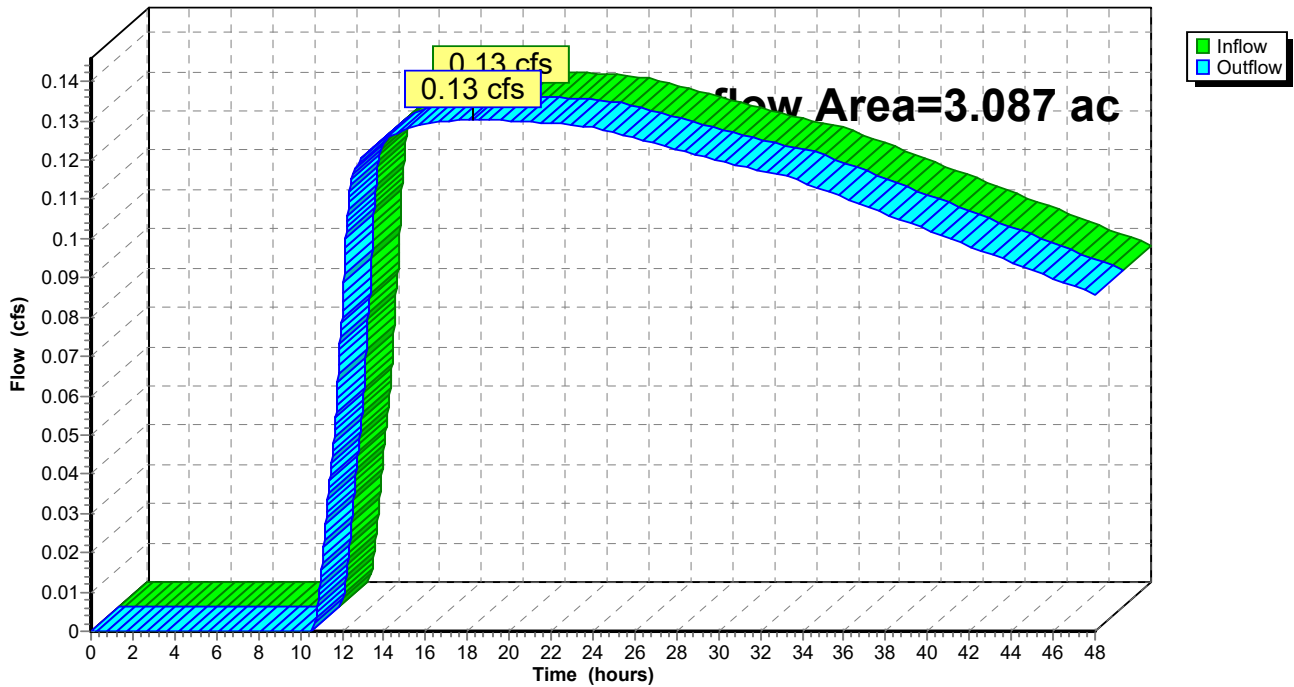
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.087 ac, Inflow Depth > 1.35" for 2-year event  
Inflow = 0.13 cfs @ 18.22 hrs, Volume= 0.346 af  
Outflow = 0.13 cfs @ 18.22 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph



**Summary for Pond 13P: Detention Crates**

Inflow Area = 3.087 ac, Inflow Depth = 1.79" for 2-year event  
 Inflow = 5.54 cfs @ 12.11 hrs, Volume= 0.459 af  
 Outflow = 0.13 cfs @ 18.22 hrs, Volume= 0.346 af, Atten= 98%, Lag= 367.0 min  
 Primary = 0.13 cfs @ 18.22 hrs, Volume= 0.346 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 7.67' @ 18.22 hrs Surf.Area= 0 sf Storage= 14,940 cf

Plug-Flow detention time= 987.3 min calculated for 0.346 af (75% of inflow)  
 Center-of-Mass det. time= 900.5 min ( 1,722.7 - 822.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.60'	12,722 cf	<b>Stone Around Crates</b> Listed below 118,158 cf Overall - 86,352 cf Embedded = 31,806 cf x 40.0% Voids
#2	7.35'	83,761 cf	<b>Brentwood</b> Listed below Inside #1 86,352 cf Overall x 97.0% Voids
#3	5.85'	6,074 cf	<b>Crushed Stone</b> Listed below 15,248 cf Overall - 63 cf Embedded = 15,185 cf x 40.0% Voids
#4	6.10'	63 cf	<b>6.0" D x 320.0'L Pipe Storage S= 0.0017 '/'</b> Inside #3
		102,621 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
6.60	0
14.81	118,158

Elevation (feet)	Cum.Store (cubic-feet)
7.35	0
10.35	43,176
13.35	86,352

Elevation (feet)	Cum.Store (cubic-feet)
5.85	0
7.40	15,248

Device	Routing	Invert	Outlet Devices
#1	Primary	6.00'	<b>12.0" Round Culvert</b> L= 75.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.00' / 5.70' S= 0.0040 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	6.05'	<b>2.0" Vert. Quantity Outlet</b> C= 0.600
#3	Device 1	12.50'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.13 cfs @ 18.22 hrs HW=7.67' TW=0.00' (Dynamic Tailwater)

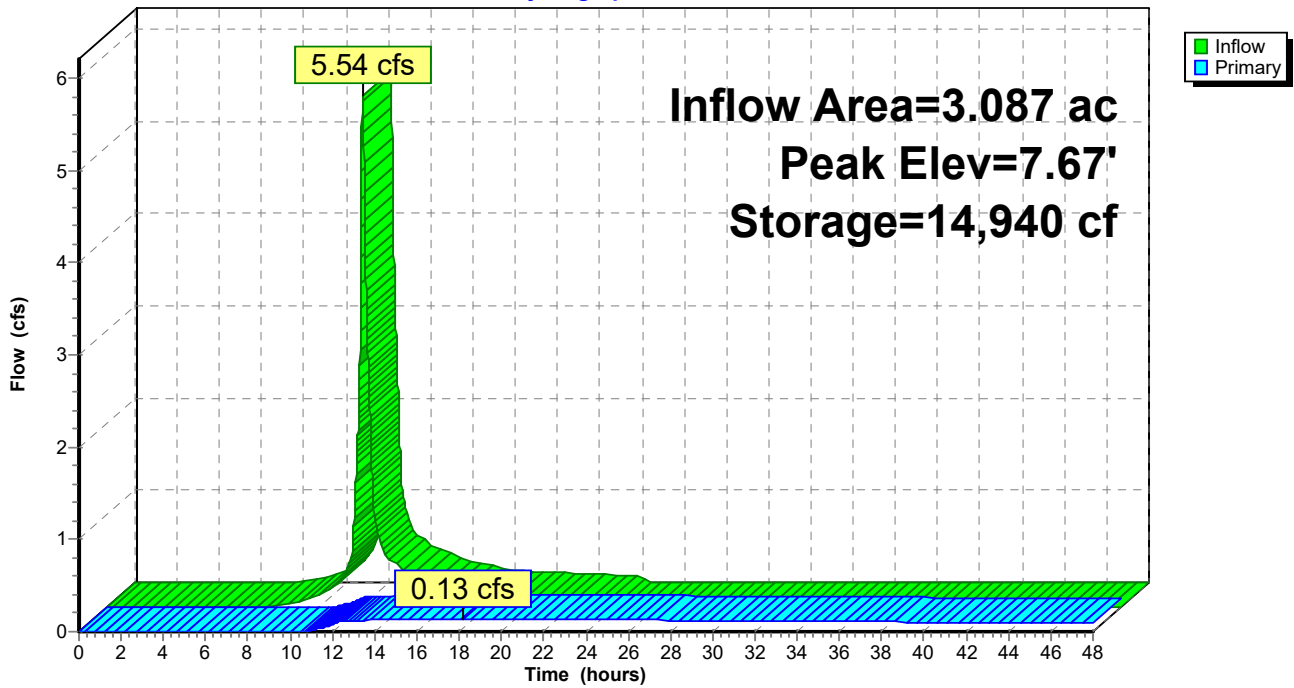
1=Culvert (Passes 0.13 cfs of 3.23 cfs potential flow)

2=Quantity Outlet (Orifice Controls 0.13 cfs @ 5.97 fps)

3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 13P: Detention Crates

Hydrograph



**Summary for Subcatchment 1: Northwest Side**

Runoff = 0.88 cfs @ 12.07 hrs, Volume= 0.062 af, Depth= 3.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.60"

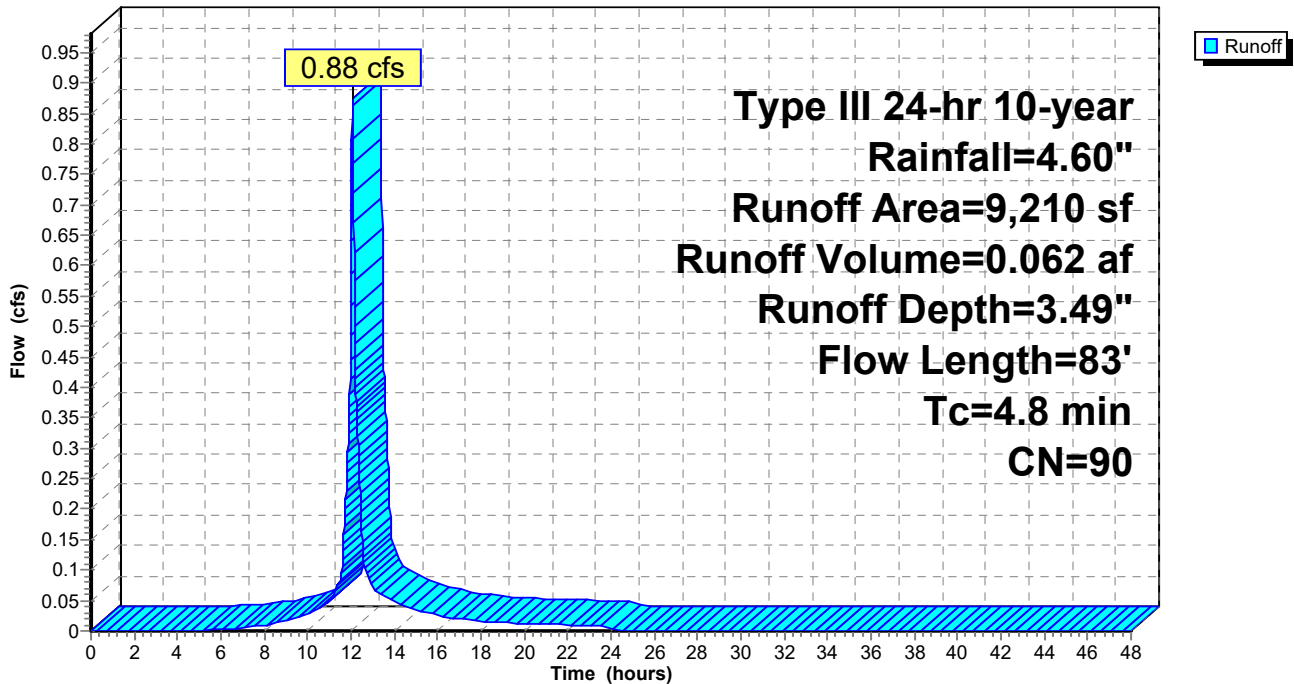
Area (sf)	CN	Description
6,730	98	Paved parking, HSG B
2,480	69	50-75% Grass cover, Fair, HSG B
9,210	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	30	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
0.5	20	0.0100	0.73		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	33	0.0100	9.36	29.41	<b>Pipe Channel, 24" culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
4.8	83	Total			

**Subcatchment 1: Northwest Side**

Hydrograph



**Summary for Subcatchment 2: Southwest**

Runoff = 0.79 cfs @ 12.08 hrs, Volume= 0.057 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.60"

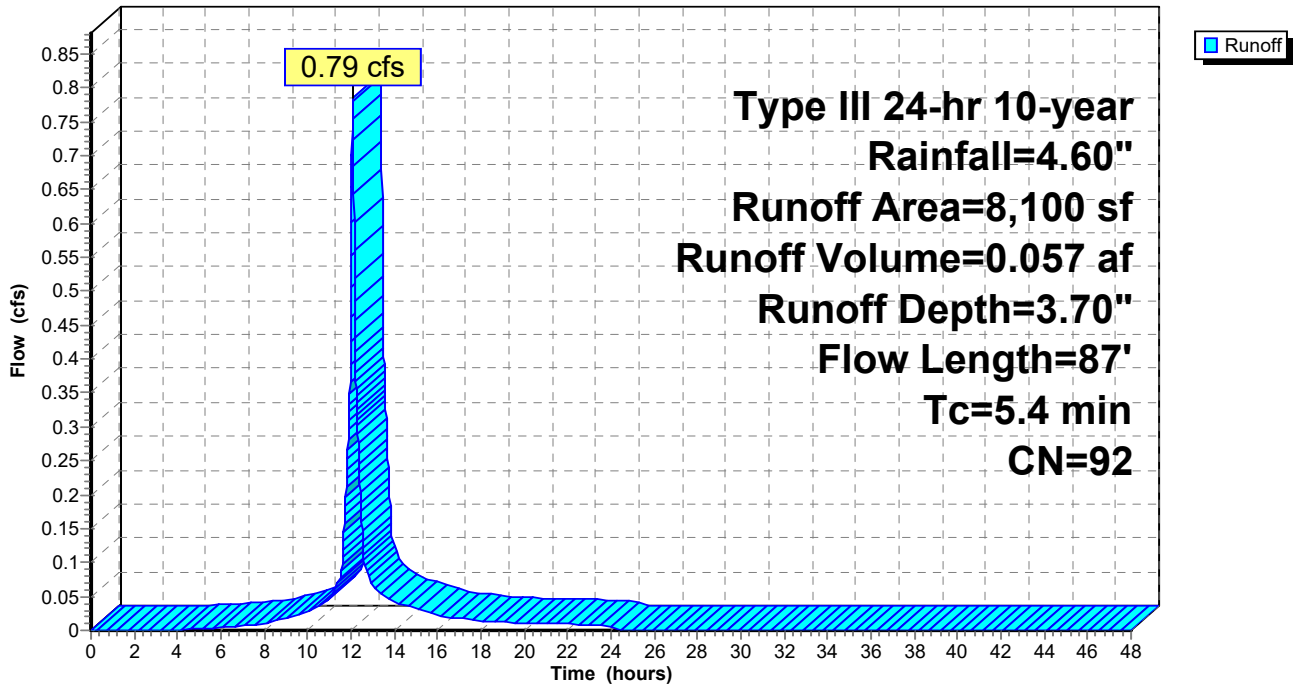
Area (sf)	CN	Description
6,400	98	Paved parking, HSG B
1,700	69	50-75% Grass cover, Fair, HSG B
8,100	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	32	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
5.4	87	Total			

**Subcatchment 2: Southwest**

Hydrograph



**Summary for Subcatchment 3: South Side**

Runoff = 0.65 cfs @ 12.18 hrs, Volume= 0.058 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.60"

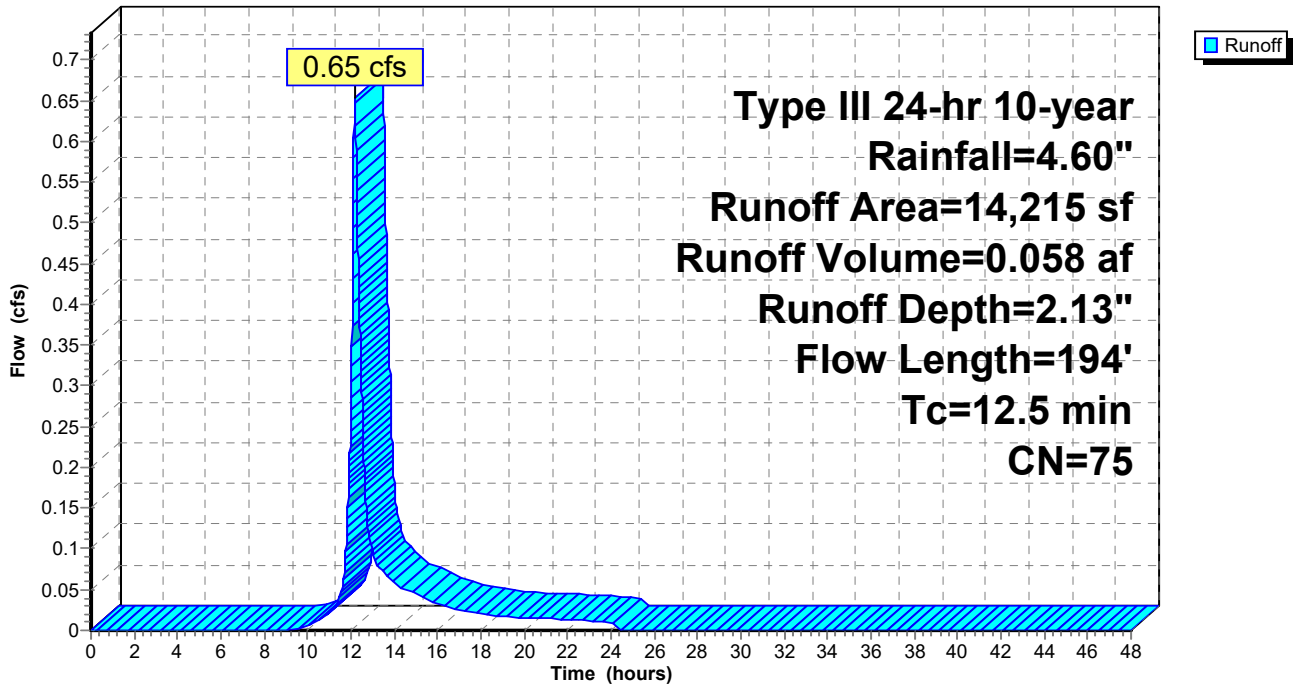
Area (sf)	CN	Description
8,925	61	>75% Grass cover, Good, HSG B
5,290	98	Paved parking, HSG B
14,215	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	82	0.0300	0.13		<b>Sheet Flow, Across Landscaping</b> Grass: Dense n= 0.240 P2= 3.00"
1.8	112	0.0100	1.03		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
12.5	194	Total			

**Subcatchment 3: South Side**

Hydrograph



**Summary for Subcatchment 4: Maine Med Parking**

Runoff = 3.02 cfs @ 12.08 hrs, Volume= 0.211 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.60"

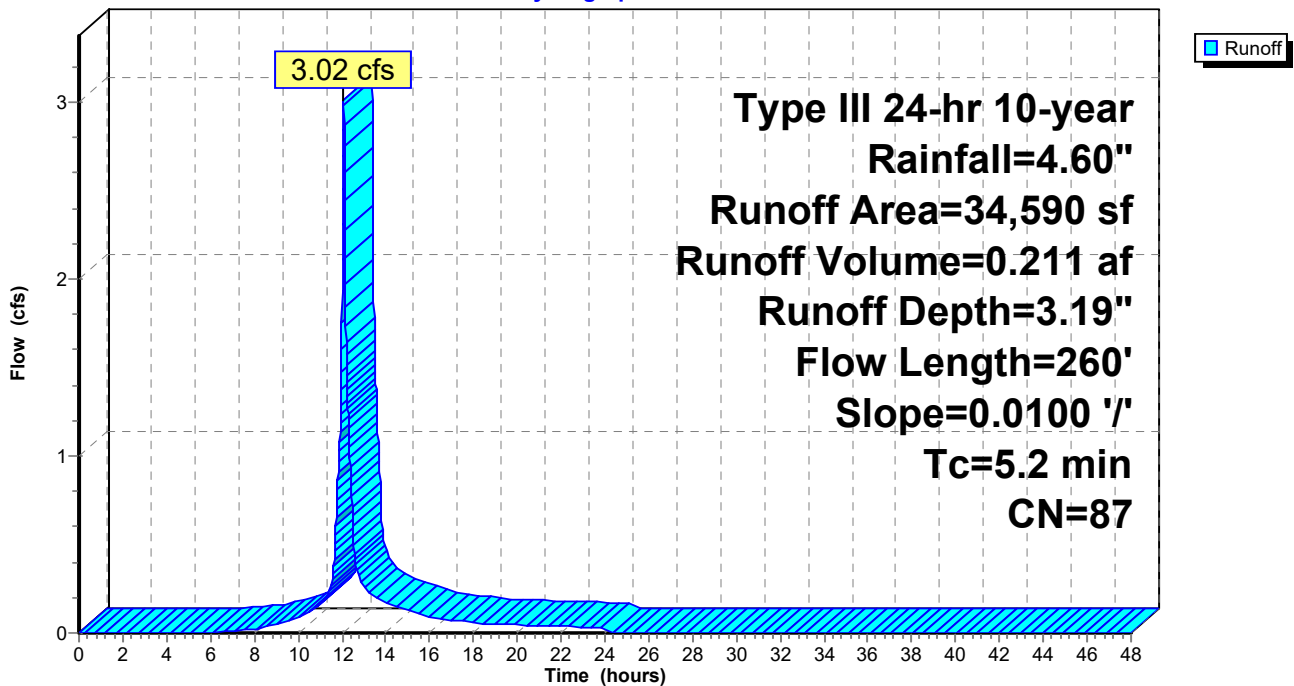
Area (sf)	CN	Description
19,480	98	Paved parking, HSG C
15,110	73	Woods/grass comb., Poor, HSG B
34,590	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	40	0.0100	0.25		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.4	160	0.0100	1.11		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	60	0.0100	7.20	22.62	<b>Pipe Channel, culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
5.2	260	Total			

**Subcatchment 4: Maine Med Parking**

Hydrograph



**La Quinta Postdev 01-05-17**

Prepared by Acorn Engineering

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La Quinta  
Type III 24-hr 10-year Rainfall=4.60"

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**Summary for Subcatchment 5: Northeast Side**

Runoff = 5.03 cfs @ 12.14 hrs, Volume= 0.418 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.60"

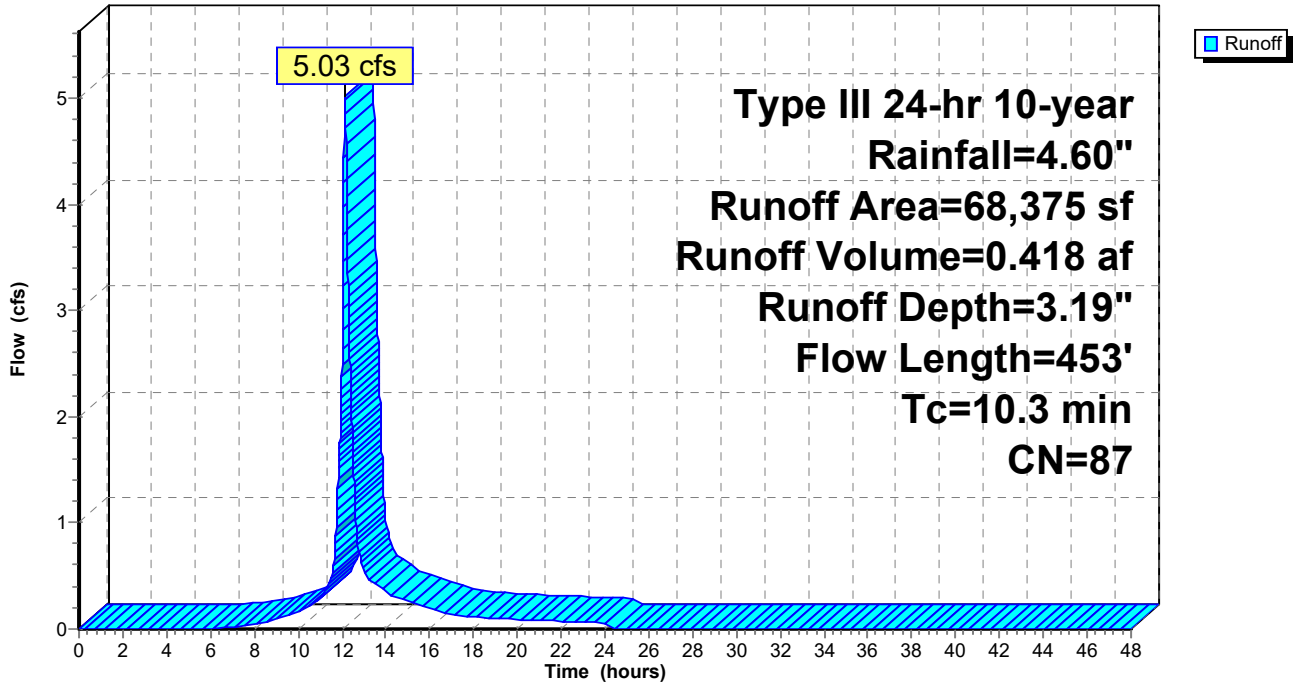
Area (sf)	CN	Description
11,700	98	Roofs, HSG B
31,875	98	Paved parking, HSG B
24,800	69	50-75% Grass cover, Fair, HSG B
68,375	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0100	0.27		<b>Sheet Flow, gravel near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
4.3	35	0.1500	0.14		<b>Sheet Flow, Forested Slope</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
1.2	270	0.0050	3.72	4.57	<b>Pipe Channel, Culverts In East Parking Lots</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	33	0.0050	5.09	16.00	<b>Pipe Channel, Crate Inlet from DMH-1</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
10.3	453	Total			



Subcatchment 5: Northeast Side

Hydrograph



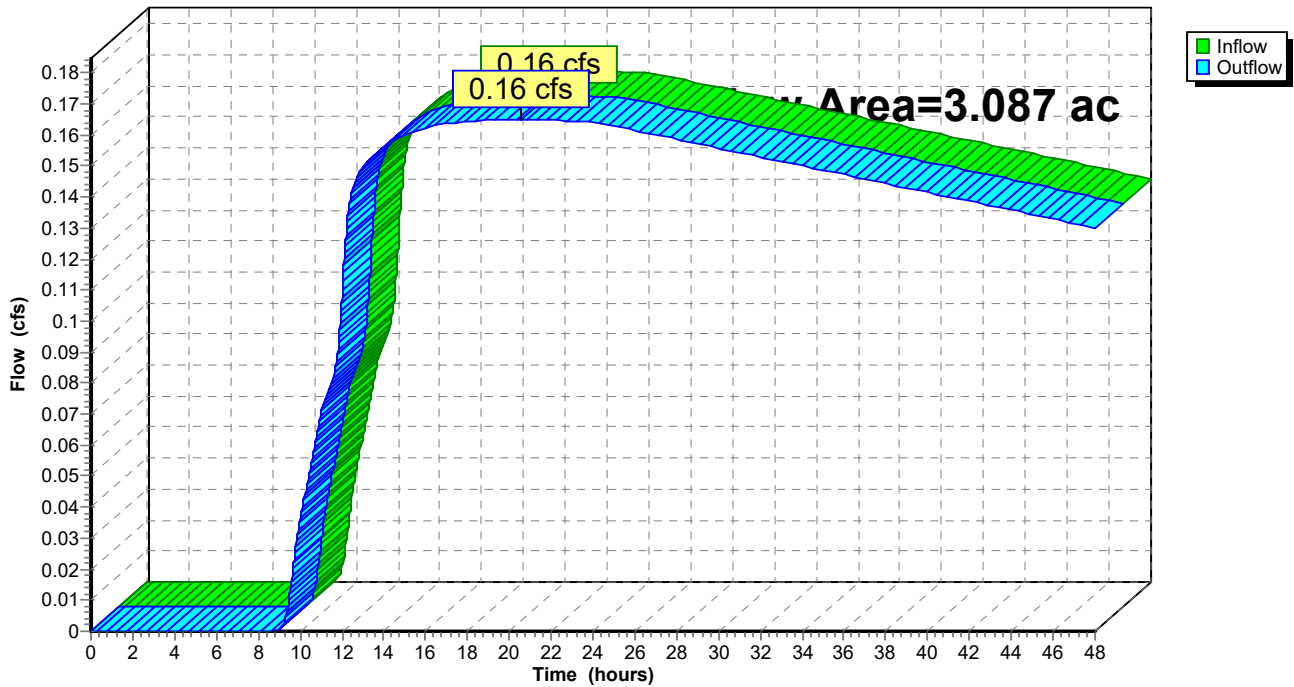
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.087 ac, Inflow Depth > 1.80" for 10-year event  
Inflow = 0.16 cfs @ 20.53 hrs, Volume= 0.464 af  
Outflow = 0.16 cfs @ 20.53 hrs, Volume= 0.464 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph



**Summary for Pond 13P: Detention Crates**

Inflow Area = 3.087 ac, Inflow Depth = 3.13" for 10-year event  
 Inflow = 9.61 cfs @ 12.10 hrs, Volume= 0.806 af  
 Outflow = 0.16 cfs @ 20.53 hrs, Volume= 0.464 af, Atten= 98%, Lag= 505.8 min  
 Primary = 0.16 cfs @ 20.53 hrs, Volume= 0.464 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 8.60' @ 20.53 hrs Surf.Area= 0 sf Storage= 27,874 cf

Plug-Flow detention time= 1,034.3 min calculated for 0.464 af (58% of inflow)  
 Center-of-Mass det. time= 927.4 min ( 1,734.2 - 806.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.60'	12,722 cf	<b>Stone Around Crates</b> Listed below 118,158 cf Overall - 86,352 cf Embedded = 31,806 cf x 40.0% Voids
#2	7.35'	83,761 cf	<b>Brentwood</b> Listed below Inside #1 86,352 cf Overall x 97.0% Voids
#3	5.85'	6,074 cf	<b>Crushed Stone</b> Listed below 15,248 cf Overall - 63 cf Embedded = 15,185 cf x 40.0% Voids
#4	6.10'	63 cf	<b>6.0" D x 320.0'L Pipe Storage S= 0.0017 ' / ' Inside #3</b>
		102,621 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
6.60	0
14.81	118,158

Elevation (feet)	Cum.Store (cubic-feet)
7.35	0
10.35	43,176
13.35	86,352

Elevation (feet)	Cum.Store (cubic-feet)
5.85	0
7.40	15,248

Device	Routing	Invert	Outlet Devices
#1	Primary	6.00'	<b>12.0" Round Culvert</b> L= 75.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.00' / 5.70' S= 0.0040 ' / ' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	6.05'	<b>2.0" Vert. Quantity Outlet</b> C= 0.600
#3	Device 1	12.50'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.16 cfs @ 20.53 hrs HW=8.60' TW=0.00' (Dynamic Tailwater)

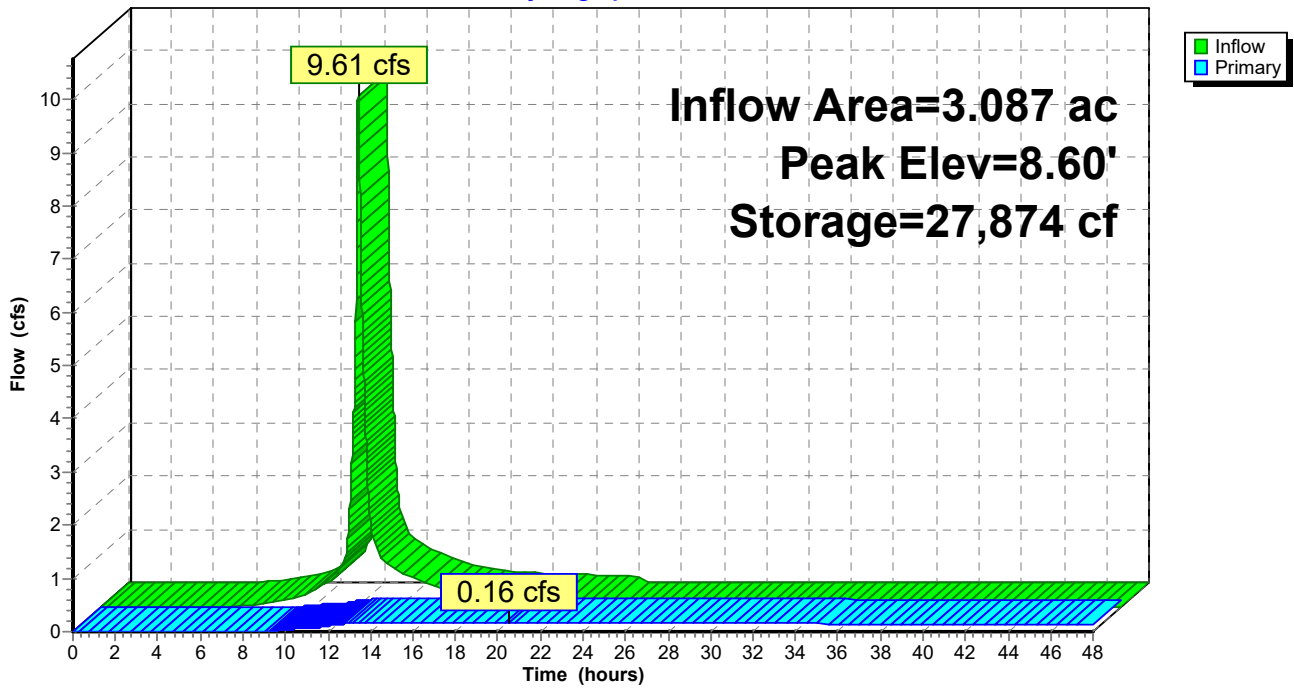
1=Culvert (Passes 0.16 cfs of 4.32 cfs potential flow)

2=Quantity Outlet (Orifice Controls 0.16 cfs @ 7.56 fps)

3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 13P: Detention Crates

Hydrograph



**Summary for Subcatchment 1: Northwest Side**

Runoff = 1.15 cfs @ 12.07 hrs, Volume= 0.082 af, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-year Rainfall=5.80"

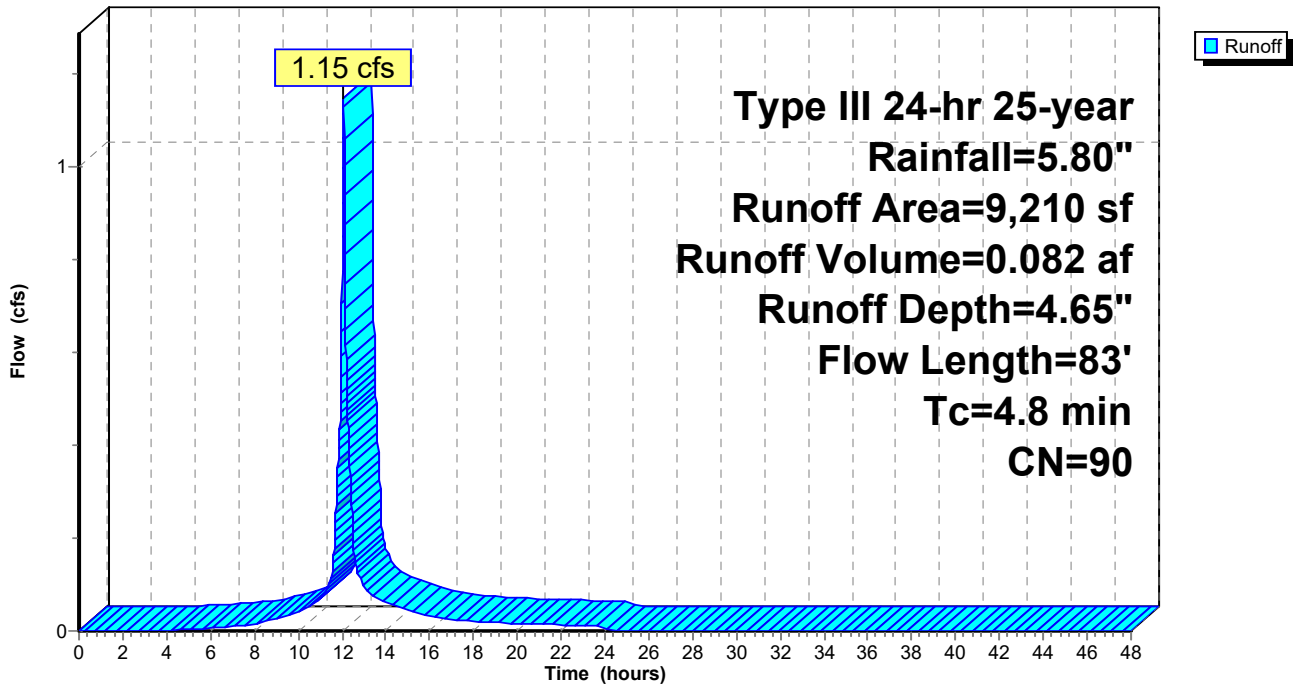
Area (sf)	CN	Description
6,730	98	Paved parking, HSG B
2,480	69	50-75% Grass cover, Fair, HSG B
9,210	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	30	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
0.5	20	0.0100	0.73		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	33	0.0100	9.36	29.41	<b>Pipe Channel, 24" culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
4.8	83	Total			

**Subcatchment 1: Northwest Side**

Hydrograph



**Summary for Subcatchment 2: Southwest**

Runoff = 1.02 cfs @ 12.08 hrs, Volume= 0.076 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.80"

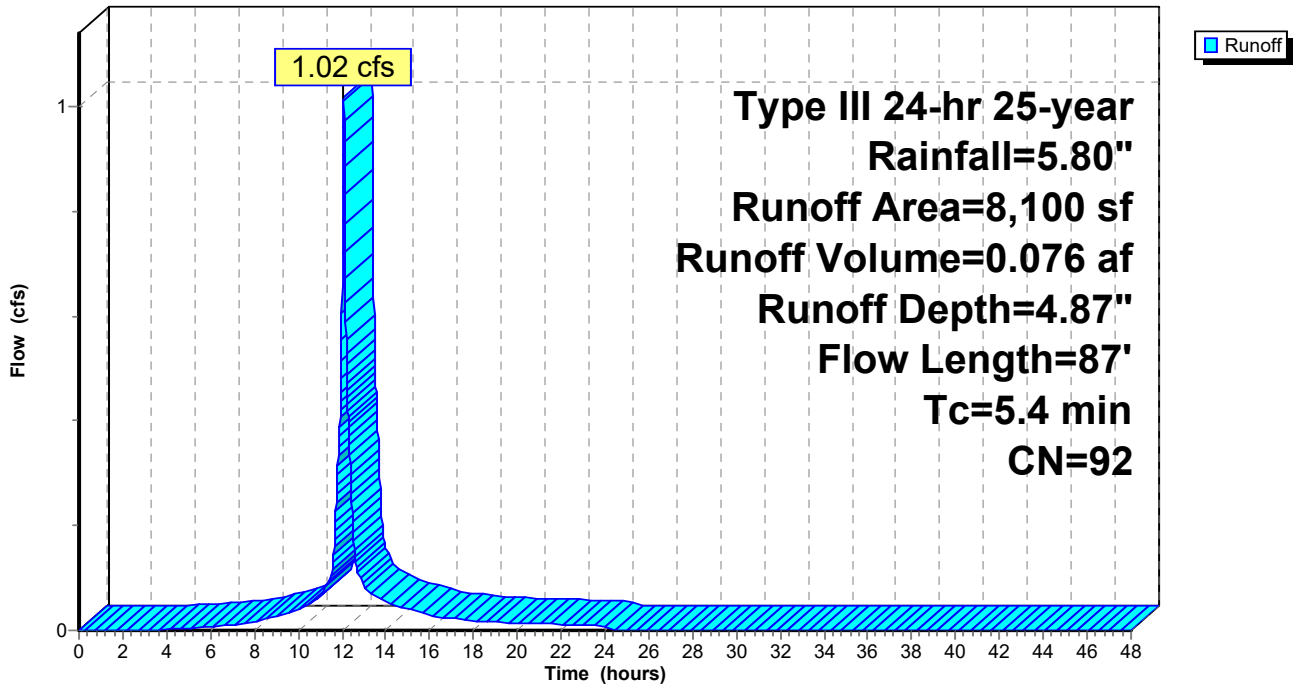
Area (sf)	CN	Description
6,400	98	Paved parking, HSG B
1,700	69	50-75% Grass cover, Fair, HSG B
8,100	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	32	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
5.4	87	Total			

**Subcatchment 2: Southwest**

Hydrograph



**Summary for Subcatchment 3: South Side**

Runoff = 0.96 cfs @ 12.18 hrs, Volume= 0.085 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.80"

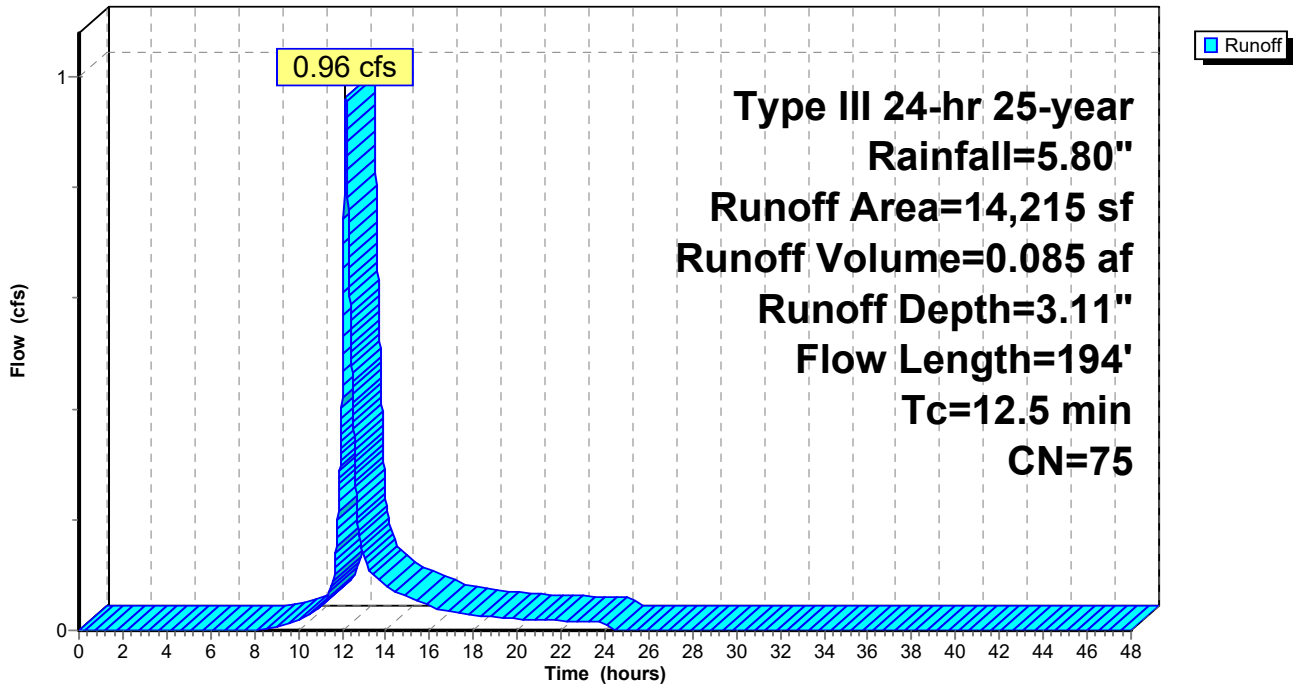
Area (sf)	CN	Description
8,925	61	>75% Grass cover, Good, HSG B
5,290	98	Paved parking, HSG B
14,215	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	82	0.0300	0.13		<b>Sheet Flow, Across Landscaping</b> Grass: Dense n= 0.240 P2= 3.00"
1.8	112	0.0100	1.03		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
12.5	194	Total			

**Subcatchment 3: South Side**

Hydrograph



**Summary for Subcatchment 4: Maine Med Parking**

Runoff = 4.04 cfs @ 12.07 hrs, Volume= 0.286 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.80"

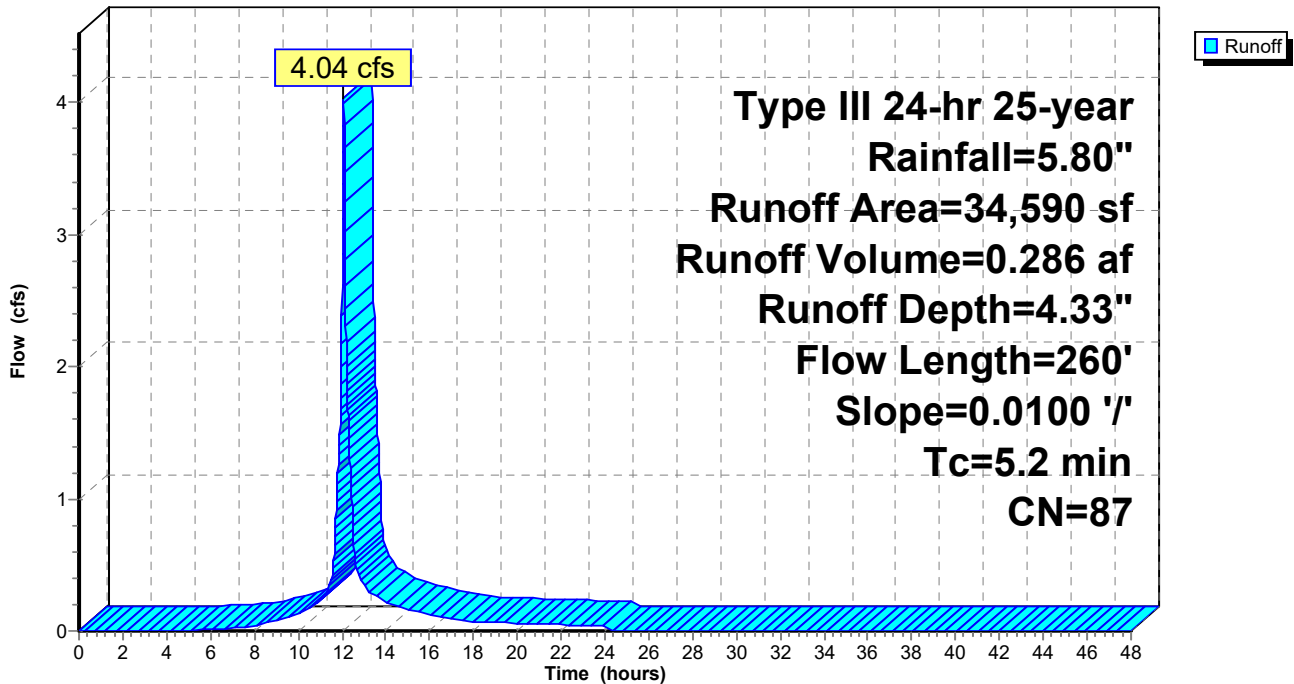
Area (sf)	CN	Description
19,480	98	Paved parking, HSG C
15,110	73	Woods/grass comb., Poor, HSG B
34,590	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	40	0.0100	0.25		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.4	160	0.0100	1.11		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	60	0.0100	7.20	22.62	<b>Pipe Channel, culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
5.2	260	Total			

**Subcatchment 4: Maine Med Parking**

Hydrograph





**La Quinta Postdev 01-05-17**

Prepared by Acorn Engineering

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La Quinta  
Type III 24-hr 25-year Rainfall=5.80"

Printed 1/13/2017

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**Summary for Subcatchment 5: Northeast Side**

Runoff = 6.73 cfs @ 12.14 hrs, Volume= 0.566 af, Depth= 4.33"

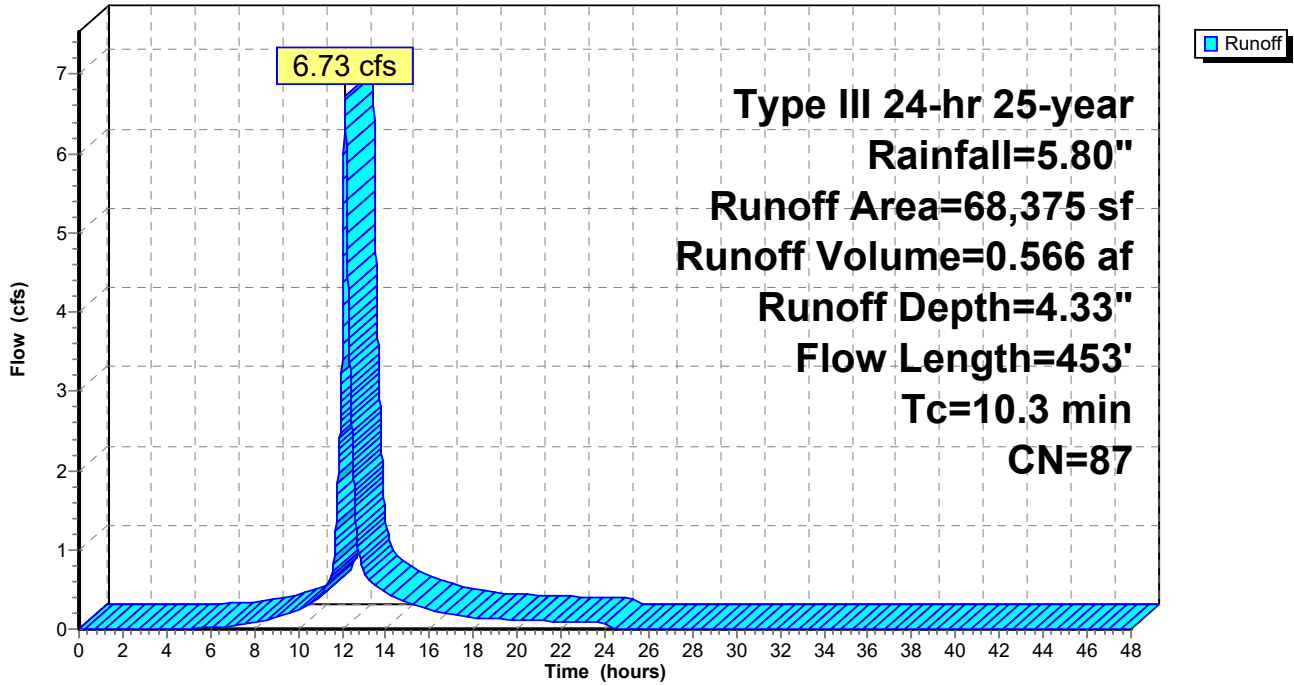
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
11,700	98	Roofs, HSG B
31,875	98	Paved parking, HSG B
24,800	69	50-75% Grass cover, Fair, HSG B
68,375	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0100	0.27		<b>Sheet Flow, gravel near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
4.3	35	0.1500	0.14		<b>Sheet Flow, Forested Slope</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
1.2	270	0.0050	3.72	4.57	<b>Pipe Channel, Culverts In East Parking Lots</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	33	0.0050	5.09	16.00	<b>Pipe Channel, Crate Inlet from DMH-1</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
10.3	453	Total			

Subcatchment 5: Northeast Side

Hydrograph



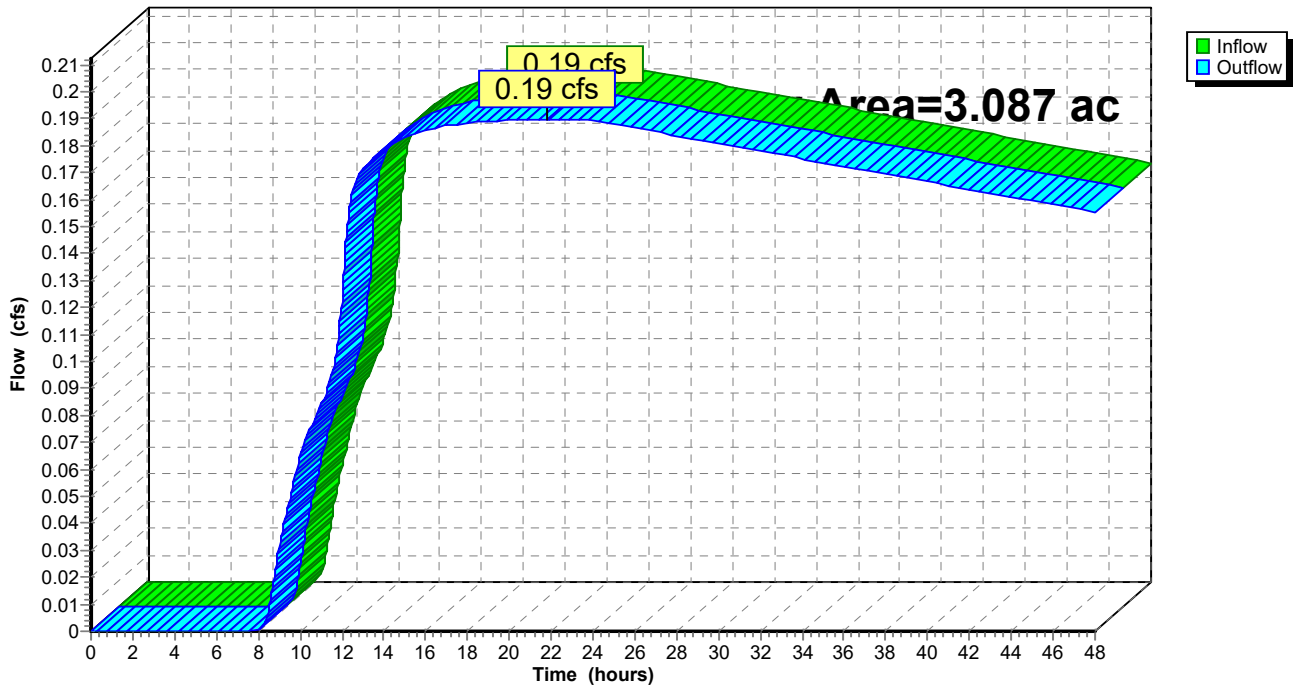
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.087 ac, Inflow Depth > 2.11" for 25-year event  
Inflow = 0.19 cfs @ 21.79 hrs, Volume= 0.544 af  
Outflow = 0.19 cfs @ 21.79 hrs, Volume= 0.544 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph



**Summary for Pond 13P: Detention Crates**

Inflow Area = 3.087 ac, Inflow Depth = 4.25" for 25-year event  
 Inflow = 12.91 cfs @ 12.10 hrs, Volume= 1.094 af  
 Outflow = 0.19 cfs @ 21.79 hrs, Volume= 0.544 af, Atten= 99%, Lag= 581.4 min  
 Primary = 0.19 cfs @ 21.79 hrs, Volume= 0.544 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 9.39' @ 21.79 hrs Surf.Area= 0 sf Storage= 38,974 cf

Plug-Flow detention time= 1,047.1 min calculated for 0.544 af (50% of inflow)  
 Center-of-Mass det. time= 933.0 min ( 1,731.5 - 798.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.60'	12,722 cf	<b>Stone Around Crates</b> Listed below 118,158 cf Overall - 86,352 cf Embedded = 31,806 cf x 40.0% Voids
#2	7.35'	83,761 cf	<b>Brentwood</b> Listed below Inside #1 86,352 cf Overall x 97.0% Voids
#3	5.85'	6,074 cf	<b>Crushed Stone</b> Listed below 15,248 cf Overall - 63 cf Embedded = 15,185 cf x 40.0% Voids
#4	6.10'	63 cf	<b>6.0" D x 320.0'L Pipe Storage S= 0.0017 ' /' Inside #3</b>
		102,621 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
6.60	0
14.81	118,158

Elevation (feet)	Cum.Store (cubic-feet)
7.35	0
10.35	43,176
13.35	86,352

Elevation (feet)	Cum.Store (cubic-feet)
5.85	0
7.40	15,248

Device	Routing	Invert	Outlet Devices
#1	Primary	6.00'	<b>12.0" Round Culvert</b> L= 75.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.00' / 5.70' S= 0.0040 ' /' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	6.05'	<b>2.0" Vert. Quantity Outlet</b> C= 0.600
#3	Device 1	12.50'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.19 cfs @ 21.79 hrs HW=9.39' TW=0.00' (Dynamic Tailwater)

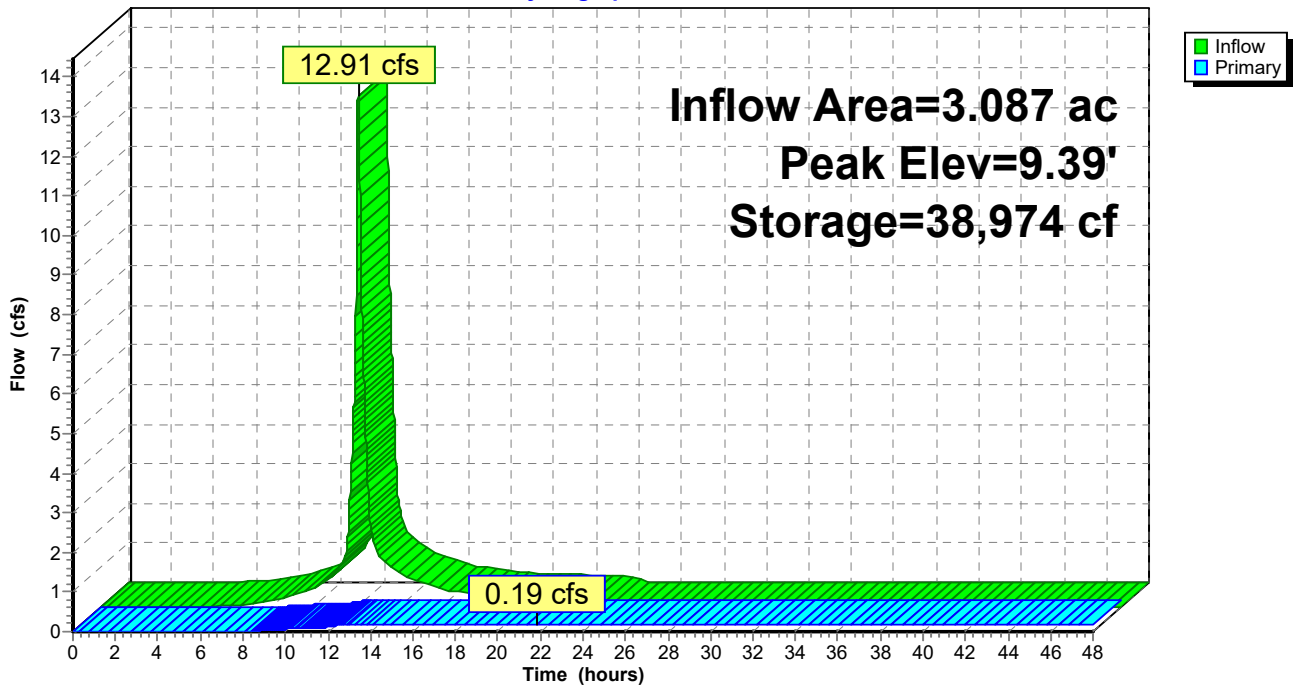
1=Culvert (Passes 0.19 cfs of 5.08 cfs potential flow)

2=Quantity Outlet (Orifice Controls 0.19 cfs @ 8.69 fps)

3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 13P: Detention Crates

Hydrograph



**Summary for Subcatchment 1: Northwest Side**

Runoff = 1.67 cfs @ 12.07 hrs, Volume= 0.122 af, Depth= 6.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=8.10"

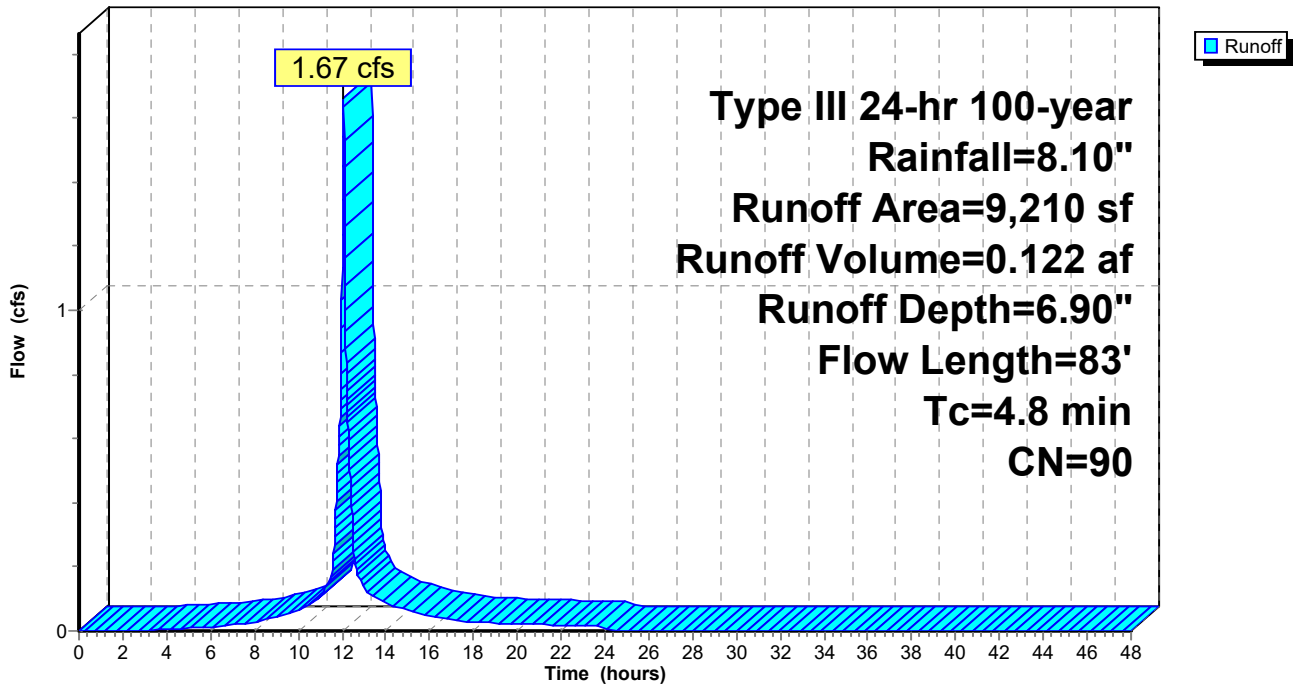
Area (sf)	CN	Description
6,730	98	Paved parking, HSG B
2,480	69	50-75% Grass cover, Fair, HSG B
9,210	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	30	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
0.5	20	0.0100	0.73		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	33	0.0100	9.36	29.41	<b>Pipe Channel, 24" culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
4.8	83	Total			

**Subcatchment 1: Northwest Side**

Hydrograph



**Summary for Subcatchment 2: Southwest**

Runoff = 1.46 cfs @ 12.08 hrs, Volume= 0.111 af, Depth= 7.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=8.10"

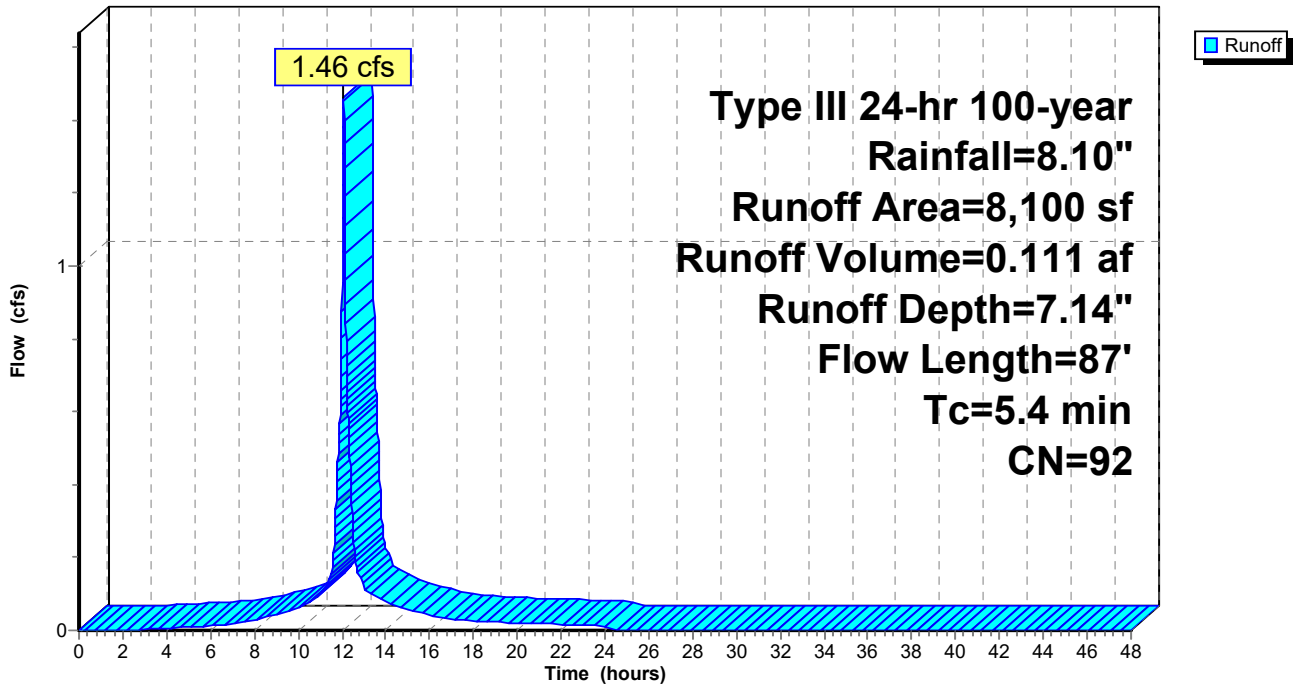
Area (sf)	CN	Description
6,400	98	Paved parking, HSG B
1,700	69	50-75% Grass cover, Fair, HSG B
8,100	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	32	0.0167	0.12		<b>Sheet Flow, Landscaping</b> Grass: Short n= 0.150 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, pavement</b> Smooth surfaces n= 0.011 P2= 3.00"
5.4	87	Total			

**Subcatchment 2: Southwest**

Hydrograph



**Summary for Subcatchment 3: South Side**

Runoff = 1.58 cfs @ 12.17 hrs, Volume= 0.140 af, Depth= 5.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-year Rainfall=8.10"

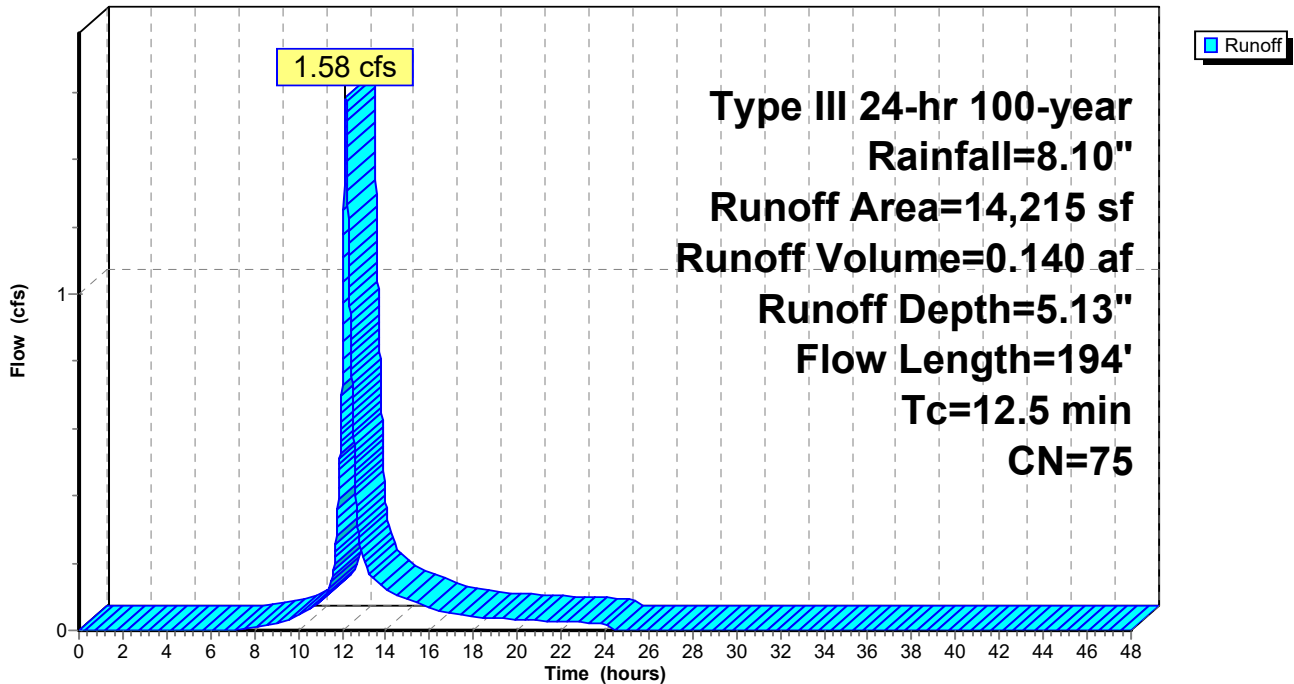
Area (sf)	CN	Description
8,925	61	>75% Grass cover, Good, HSG B
5,290	98	Paved parking, HSG B
14,215	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	82	0.0300	0.13		<b>Sheet Flow, Across Landscaping</b> Grass: Dense n= 0.240 P2= 3.00"
1.8	112	0.0100	1.03		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
12.5	194	Total			

**Subcatchment 3: South Side**

Hydrograph





**Summary for Subcatchment 4: Maine Med Parking**

Runoff = 5.98 cfs @ 12.07 hrs, Volume= 0.433 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=8.10"

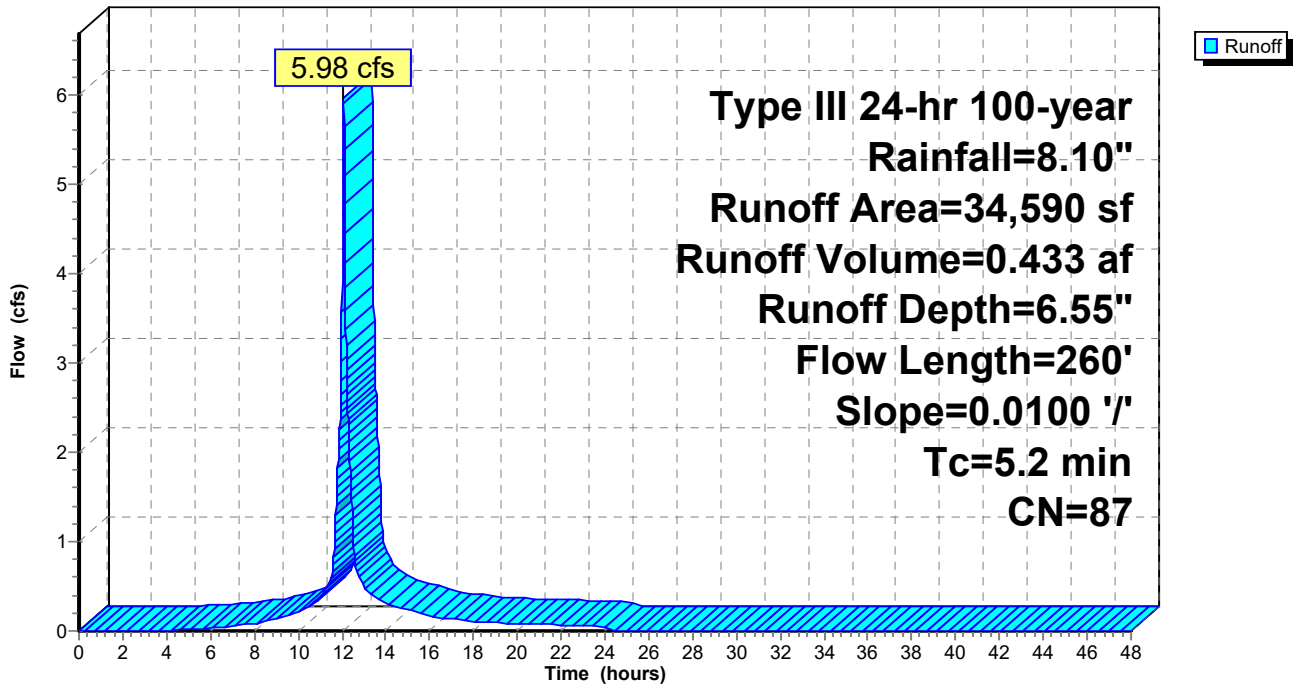
Area (sf)	CN	Description
19,480	98	Paved parking, HSG C
15,110	73	Woods/grass comb., Poor, HSG B
34,590	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	40	0.0100	0.25		<b>Sheet Flow, Gravel Near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
2.4	160	0.0100	1.11		<b>Sheet Flow, Maine Med Parking</b> Smooth surfaces n= 0.011 P2= 3.00"
0.1	60	0.0100	7.20	22.62	<b>Pipe Channel, culvert</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
5.2	260	Total			

**Subcatchment 4: Maine Med Parking**

Hydrograph



**La Quinta Postdev 01-05-17**

Prepared by Acorn Engineering

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La Quinta  
Type III 24-hr 100-year Rainfall=8.10"

Printed 1/13/2017

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**Summary for Subcatchment 5: Northeast Side**

Runoff = 9.98 cfs @ 12.14 hrs, Volume= 0.856 af, Depth= 6.55"

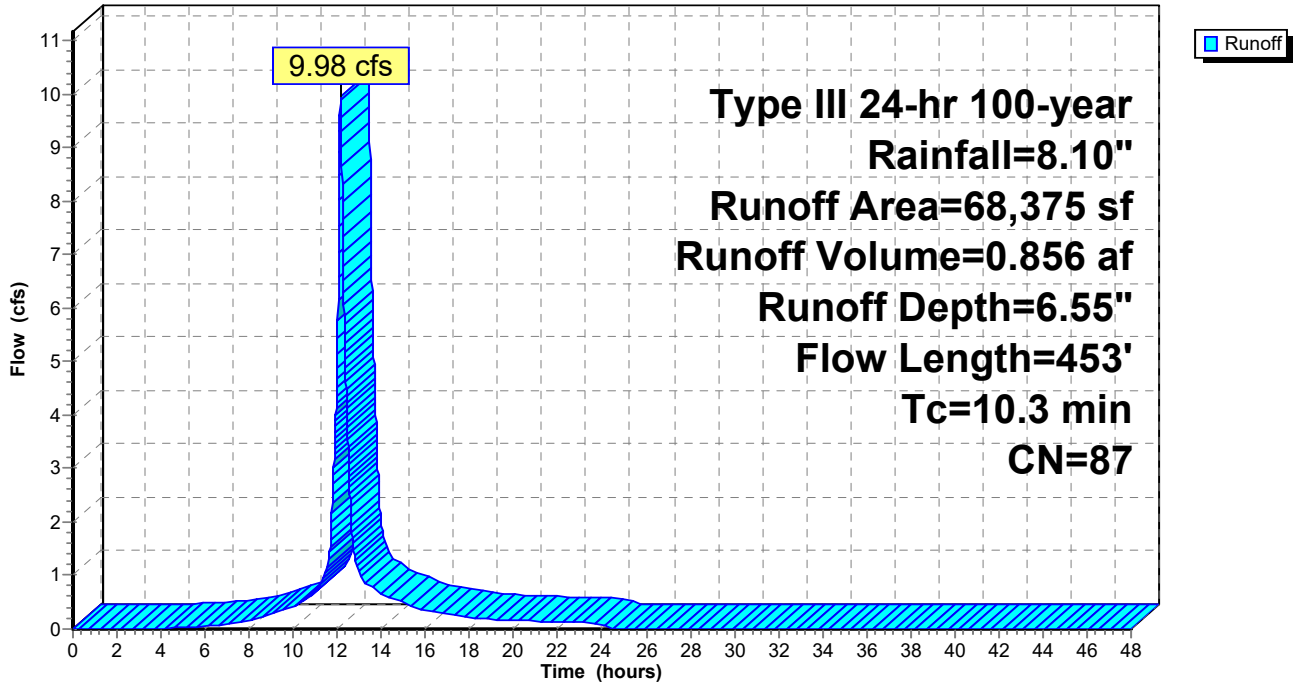
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=8.10"

Area (sf)	CN	Description
11,700	98	Roofs, HSG B
31,875	98	Paved parking, HSG B
24,800	69	50-75% Grass cover, Fair, HSG B
68,375	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0100	0.27		<b>Sheet Flow, gravel near RR Tracks</b> Fallow n= 0.050 P2= 3.00"
4.3	35	0.1500	0.14		<b>Sheet Flow, Forested Slope</b> Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	55	0.0100	0.90		<b>Sheet Flow, Parking Lot</b> Smooth surfaces n= 0.011 P2= 3.00"
1.2	270	0.0050	3.72	4.57	<b>Pipe Channel, Culverts In East Parking Lots</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.1	33	0.0050	5.09	16.00	<b>Pipe Channel, Crate Inlet from DMH-1</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
10.3	453	Total			

Subcatchment 5: Northeast Side

Hydrograph



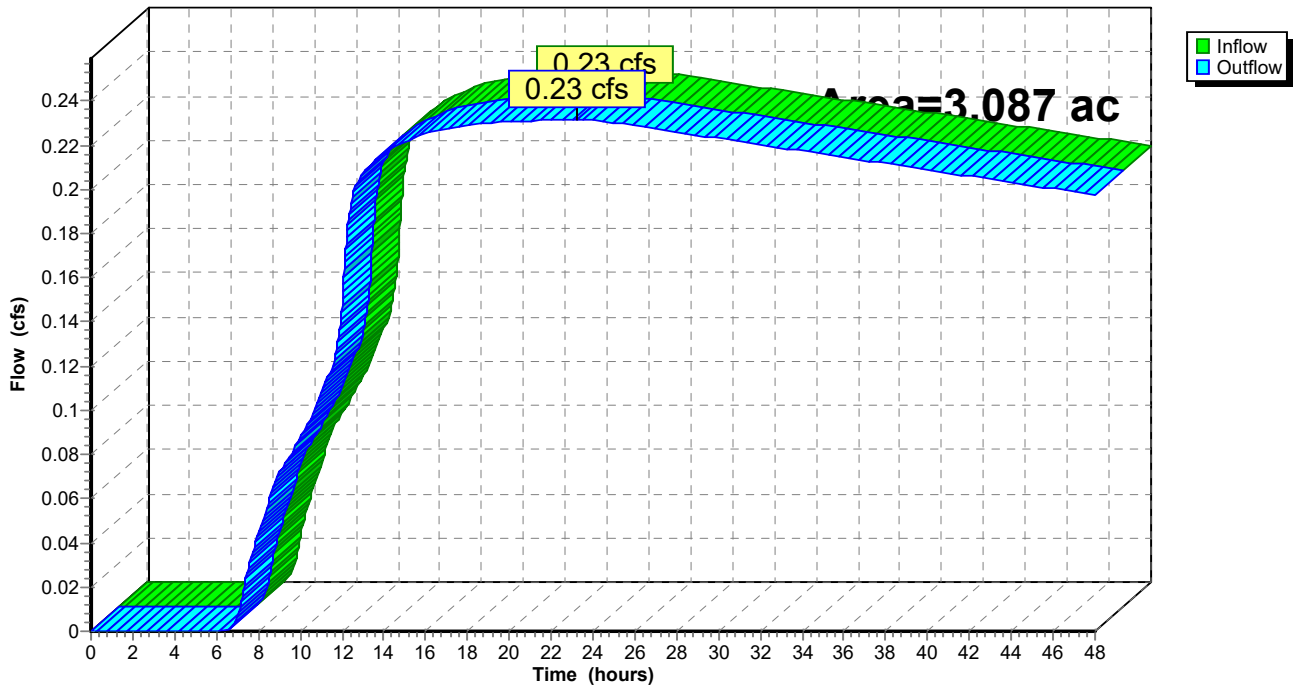
### Summary for Reach POI#1: Park Ave

Inflow Area = 3.087 ac, Inflow Depth > 2.64" for 100-year event  
Inflow = 0.23 cfs @ 23.26 hrs, Volume= 0.679 af  
Outflow = 0.23 cfs @ 23.26 hrs, Volume= 0.679 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

### Reach POI#1: Park Ave

Hydrograph



**Summary for Pond 13P: Detention Crates**

Inflow Area = 3.087 ac, Inflow Depth = 6.46" for 100-year event  
 Inflow = 19.21 cfs @ 12.10 hrs, Volume= 1.662 af  
 Outflow = 0.23 cfs @ 23.26 hrs, Volume= 0.679 af, Atten= 99%, Lag= 669.2 min  
 Primary = 0.23 cfs @ 23.26 hrs, Volume= 0.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3  
 Peak Elev= 10.99' @ 23.26 hrs Surf.Area= 0 sf Storage= 61,265 cf

Plug-Flow detention time= 1,066.4 min calculated for 0.679 af (41% of inflow)  
 Center-of-Mass det. time= 938.3 min ( 1,725.9 - 787.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	6.60'	12,722 cf	<b>Stone Around Crates</b> Listed below 118,158 cf Overall - 86,352 cf Embedded = 31,806 cf x 40.0% Voids
#2	7.35'	83,761 cf	<b>Brentwood</b> Listed below Inside #1 86,352 cf Overall x 97.0% Voids
#3	5.85'	6,074 cf	<b>Crushed Stone</b> Listed below 15,248 cf Overall - 63 cf Embedded = 15,185 cf x 40.0% Voids
#4	6.10'	63 cf	<b>6.0" D x 320.0'L Pipe Storage S= 0.0017 ' /' Inside #3</b>
		102,621 cf	Total Available Storage

Elevation (feet)	Cum.Store (cubic-feet)
6.60	0
14.81	118,158

Elevation (feet)	Cum.Store (cubic-feet)
7.35	0
10.35	43,176
13.35	86,352

Elevation (feet)	Cum.Store (cubic-feet)
5.85	0
7.40	15,248

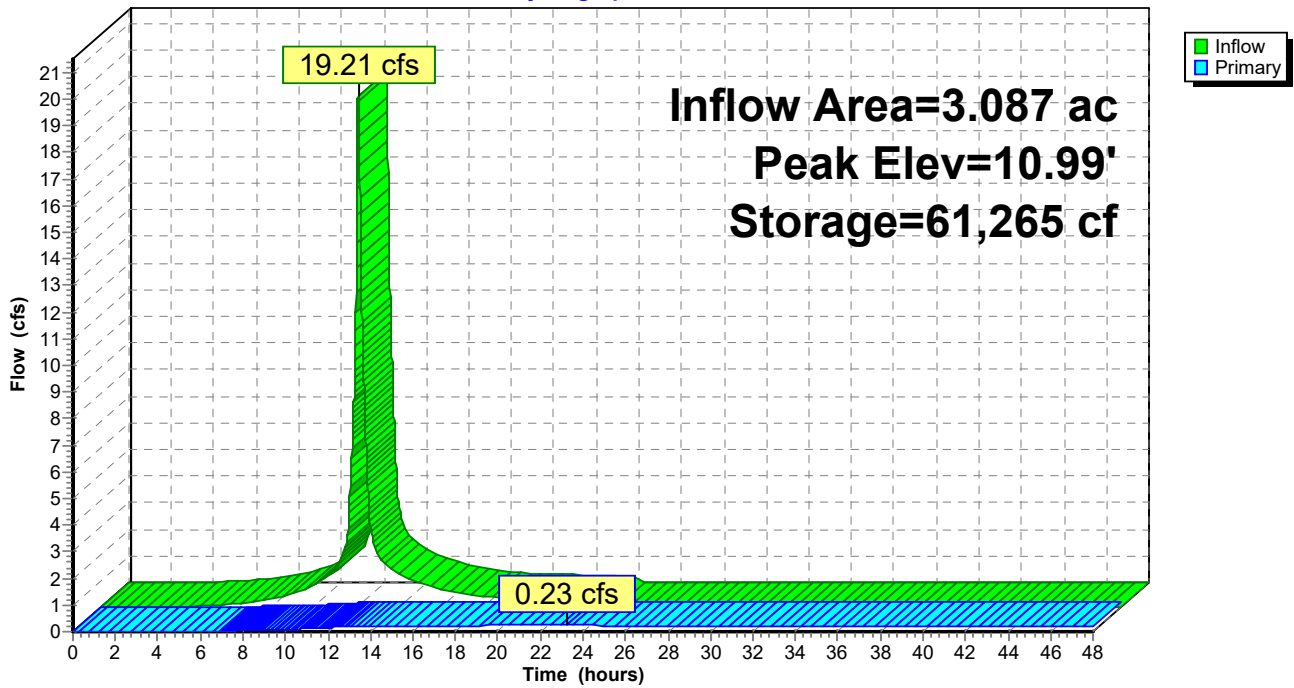
Device	Routing	Invert	Outlet Devices
#1	Primary	6.00'	<b>12.0" Round Culvert</b> L= 75.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.00' / 5.70' S= 0.0040 ' /' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	6.05'	<b>2.0" Vert. Quantity Outlet</b> C= 0.600
#3	Device 1	12.50'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.23 cfs @ 23.26 hrs HW=10.99' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.23 cfs of 6.33 cfs potential flow)
- 2=Quantity Outlet (Orifice Controls 0.23 cfs @ 10.61 fps)
- 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 13P: Detention Crates

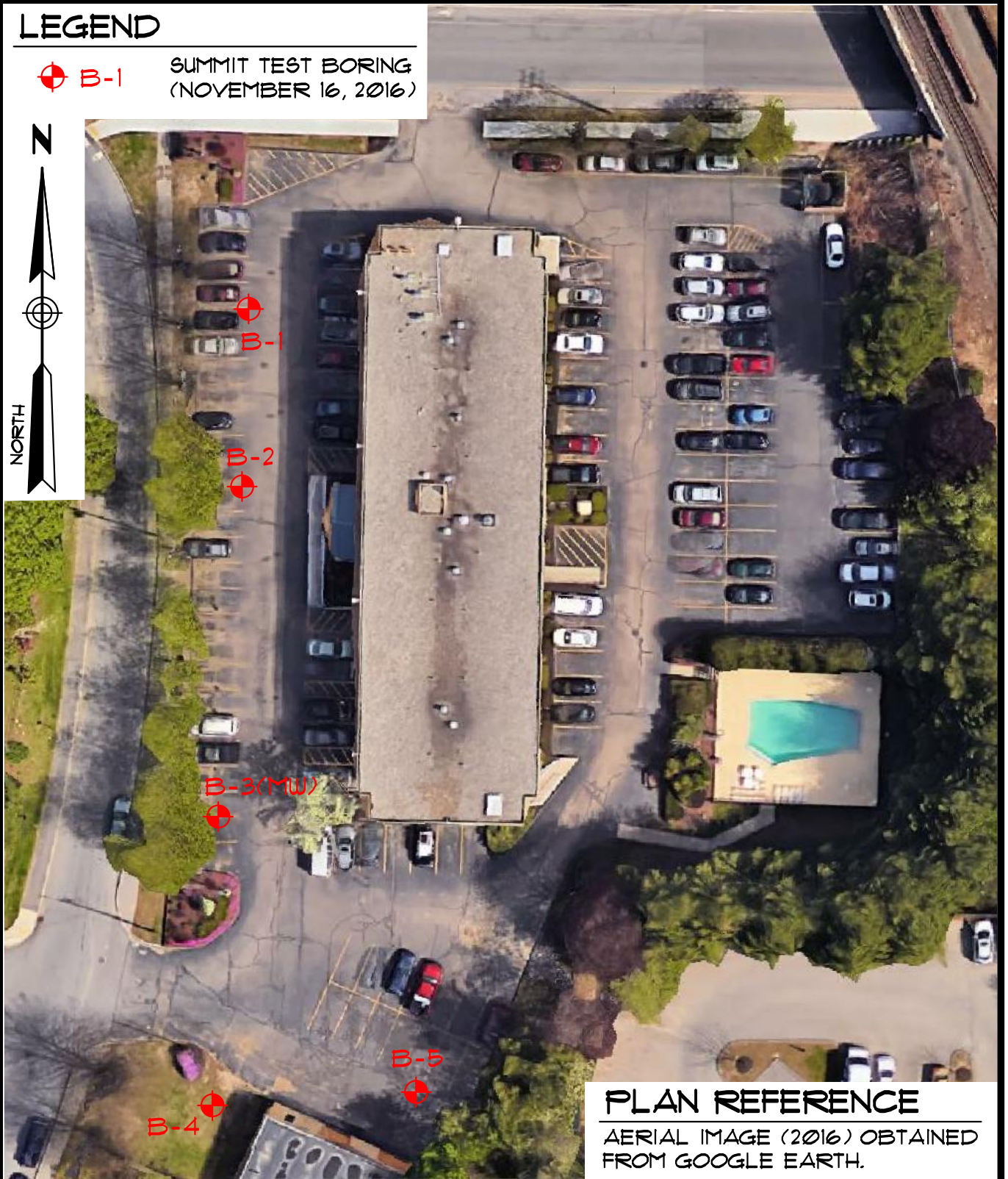
Hydrograph



# LEGEND



SUMMIT TEST BORING  
(NOVEMBER 16, 2016)



## PLAN REFERENCE

AERIAL IMAGE (2016) OBTAINED  
FROM GOOGLE EARTH.

### TEST BORING LOCATION PLAN STORMWATER DETENTION INVESTIGATION

340 PARK AVENUE - PORTLAND, MAINE

PREPARED FOR

**ACORN ENGINEERING**

145 LISBON ST. - SUITE 601  
LEWISTON, ME 04240  
Tel.: (207) 576-3313

173 PLEASANT STREET  
ROCKLAND, ME 04841  
Tel.: (207) 318-1161

# SUMMIT

GEOENGINEERING SERVICES  
[www.summitgeoeng.com](http://www.summitgeoeng.com)

DATE: 11-21-2016	DRAWN BY: KRF	CHECKED BY: UMP
JOB: 16253	SCALE: 1" = 50'	FILE: 16253 BOR



### SOIL BORING LOG

Boring #: **B-1**  
 Project #: 16253  
 Sheet: 1 of 1  
 Chkd by:

Project: La Quinta Stormwater Detention  
 Location: 340 Park Avenue  
 City, State: Portland, Maine

Drilling Co: Summit Geoenengineering Services  
 Driller: C. Coolidge, P.E.  
 Boring Elevation: 16 ft. +/-  
 Reference: City of Portland GIS Contour Mapping  
 Date started: 11/16/2016 Date Completed: 11/16/2016

DRILLING METHOD		SAMPLER		ESTIMATED GROUND WATER DEPTH			
Vehicle: Tracked	Length: 24" SS	Date	Depth	Elevation	Reference		
Model: AMS Power Probe	Diameter: 2"OD/1.5"ID	11/16/2016	5.9 ft.	10.1 ft. +/-	Measured in hole after casing pulled		
Method: 3" Casing	Hammer: 140 lb						
Hammer Style: Auto	Method: ASTM D1586						

Depth (ft.)	SAMPLE DESCRIPTION				Elev. (ft.)	Geological/ Test Data	Geological Stratum
	No.	Pen/Rec (in)	Depth (ft)	blows/6"			
1	S-1	24/1	0.5 to 2.5	16	10.0'	Groundwater	PAVEMENT  FILL
				17			
2				11			
				9			
3							
4							
5							
6	S-2	24/8	5 to 7	7	6.5'		GLACIAL MARINE (Presumpscot Clay)
				3			
				WH			
7				1			
	S-3	24/2	7 to 9	WR			
8				WR			
				WR			
9				WR			
10							
11	S-4	24/16	10 to 12	2	1.5'	PP = 1,000 psf to 1,500 psf MC = 44.4%	GLACIAL MARINE (Presumpscot Clay)
				1			
				1			
12				2			
13							
14							
15							
16	S-5	24/20	15 to 17	5	-1.0'		MARINE FAN (Sand)
				9			
				9			
17				11			
18							
19							
20							
21							
22							

Granular Soils		Cohesive Soils		% Composition ASTM D2487	NOTES:	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency			
0-4	V. Loose	<2	V. soft	< 5% Trace 5-15% Little 15-30% Some > 30% With	PP = Pocket Penetrometer, MC = Moisture Content LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength Bedrock Joints Shallow = 0 to 35 degrees Dipping = 35 to 55 degrees Steep = 55 to 90 degrees Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200	Dry: S = 0% Humid: S = 1 to 25% Damp: S = 26 to 50% Moist: S = 51 to 75% Wet: S = 76 to 99% Saturated: S = 100%
5-10	Loose	2-4	Soft			
11-30	Compact	5-8	Firm			
31-50	Dense	9-15	Stiff			
>50	V. Dense	16-30 >30	V. Stiff Hard			





### SOIL BORING LOG

Boring #: **B-2**  
 Project #: 16253  
 Sheet: 1 of 2  
 Chkd by:

Project: La Quinta Stormwater Detention  
 Location: 340 Park Avenue  
 City, State: Portland, Maine

Drilling Co: Summit Geoengineering Services      Boring Elevation: 16 ft. +/-  
 Driller: C. Coolidge, P.E.      Reference: City of Portland GIS Contour Mapping  
 Summit Staff: M. Hardison, E.I.      Date started: 11/16/2016      Date Completed: 11/16/2016

DRILLING METHOD		SAMPLER		ESTIMATED GROUND WATER DEPTH			
Vehicle: Tracked	Length: 24" SS	Date	Depth	Elevation	Reference		
Model: AMS Power Probe	Diameter: 2"OD/1.5"ID	11/16/2016	4.8 ft.	11.2 ft. +/-	Measured in hole after casing pulled		
Method: 3" Casing	Hammer: 140 lb						
Hammer Style: Auto	Method: ASTM D1586						

Depth (ft.)					Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum				
	No.	Pen/Rec (in)	Depth (ft)	blows/6"								
						3.5" Pavement		PAVEMENT				
1	S-1	24/18	0.5 to 2.5	8		Light Brown fine to coarse SAND, little Silt and Gravel, humid, compact, SP-SM	▽ Groundwater	FILL				
				9								
2				9								
				7								
3												
4												
5												
	S-2	24/0	5 to 7	5								
6				3	8.0'	No recovery, likely similar to above. Brick marks on side of spoon sampler		GLACIAL MARINE (Presumpscot Clay)				
				3								
7				3								
8												
9												
10												
	S-3	24/24	10 to 12	6								
11				7					Olive brown Silty CLAY, heavily blocky and mottled, stiff to very stiff, wet, CL	PP = 3,500 psf to 6,000 psf MC = 28.4%		GLACIAL MARINE (Presumpscot Clay)
				8								
12				11								
13												
14												
15												
	S-4	24/24	15 to 17	2								
16				4	Same as above, stiff	PP = 2,500 psf to 3,500 psf MC = 32.5%		GLACIAL MARINE (Presumpscot Clay)				
				5								
17				5								
18												
19												
20												
	S-5	24/24	20 to 22	2								
21				3					Same as above, firm, slightly mottled and blocky, frequent fine Sand seams, CL	PP = 1,000 psf to 2,000 psf MC = 36.1%		GLACIAL MARINE (Presumpscot Clay)
				3								
22				3								

Granular Soils		Cohesive Soils		% Composition ASTM D2487	NOTES: PP = Pocket Penetrometer, MC = Moisture Content LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test <u>Bedrock Joints</u> Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength Shallow = 0 to 35 degrees Dipping = 35 to 55 degrees Steep = 55 to 90 degrees  Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200	Soil Moisture Condition Dry: S = 0% Humid: S = 1 to 25% Damp: S = 26 to 50% Moist: S = 51 to 75% Wet: S = 76 to 99% Saturated: S = 100%
Blows/ft.	Density	Blows/ft.	Consistency			
0-4	V. Loose	<2	V. soft			
5-10	Loose	2-4	Soft	< 5% Trace		
11-30	Compact	5-8	Firm	5-15% Little		
31-50	Dense	9-15	Stiff	15-30% Some		
>50	V. Dense	16-30	V. Stiff	> 30% With		
		>30	Hard			



### SOIL BORING LOG

Boring #: **B-2**

Project: La Quinta Stormwater Detention  
 Location: 340 Park Avenue  
 City, State: Portland, Maine

Project #: 16253  
 Sheet: 2 of 2  
 Chkd by:

Drilling Co: Summit Geoengineering Services      Boring Elevation: 16 ft. +/-  
 Driller: C. Coolidge, P.E.      Reference: City of Portland GIS Contour Mapping  
 Summit Staff: M. Hardison, E.I.      Date started: 11/16/2016      Date Completed: 11/16/2016

DRILLING METHOD		SAMPLER		ESTIMATED GROUND WATER DEPTH			
Vehicle:	Tracked	Length:	24" SS	Date	Depth	Elevation	Reference
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID	11/16/2016	4.8 ft.	11.2 ft. +/-	Measured in hole after casing pulled
Method:	3" Casing	Hammer:	140 lb				
Hammer Style:	Auto	Method:	ASTM D1586				

Depth (ft.)	SAMPLER				Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	No.	Pen/Rec (in)	Depth (ft)	blows/6"				
23					-7.5'			GLACIAL MARINE (Presumpscot Clay)
24								MARINE FAN (Sand)
25	S-6	24/16	25 to 27	1		Gray Silty fine to medium SAND, wet, loose, SP		
26				3				
27				4				
28				6				
29								
30								
31	S-7	24/22	30 to 32	17		Brown to reddish brown Silty fine to medium SAND, little Gravel, compact, wet, SM		
32				11				
33				7				
34	S-8	24/20	32 to 34	10		same as above		
35				14				
36				10				
37	S-9	24/22	35 to 37	7		same as above, increasing Gravel content		
38				10				
39				11				
40				11	-21.0	End of Boring at 37', no refusal		
41								
42								
43								
44								

Granular Soils		Cohesive Soils		% Composition ASTM D2487	NOTES: PP = Pocket Penetrometer, MC = Moisture Content LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength Shallow = 0 to 35 degrees Dipping = 35 to 55 degrees Steep = 55 to 90 degrees Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200	Soil Moisture Condition Dry: S = 0% Humid: S = 1 to 25% Damp: S = 26 to 50% Moist: S = 51 to 75% Wet: S = 76 to 99% Saturated: S = 100%
Blows/ft.	Density	Blows/ft.	Consistency			
0-4	V. Loose	<2	V. soft			
5-10	Loose	2-4	Soft	< 5% Trace		
11-30	Compact	5-8	Firm	5-15% Little		
31-50	Dense	9-15	Stiff	15-30% Some		
>50	V. Dense	16-30	V. Stiff	> 30% With		
		>30	Hard			



**SOIL BORING LOG**

Boring #: **B-3 (MW)**

Project: La Quinta Stormwater Detention  
 Location: 340 Park Avenue  
 City, State: Portland, Maine

Project #: 16253  
 Sheet: 1 of 1  
 Chkd by:

Drilling Co: Summit Geoengineering Services Boring Elevation: 16 ft. +/-  
 Driller: C. Coolidge, P.E. Reference: City of Portland GIS Contour Mapping  
 Summit Staff: M. Hardison, E.I. Date started: 11/16/2016 Date Completed: 11/16/2016

DRILLING METHOD		SAMPLER		ESTIMATED GROUND WATER DEPTH			
Vehicle:	Tracked	Length:	24" SS	Date	Depth	Elevation	Reference
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID	11/16/2016	14.7 ft.	1.3 ft. +/-	Measured in the hole after casing pulled
Method:	3" Casing	Hammer:	140 lb				
Hammer Style:	Auto	Method:	ASTM D1586				

Depth (ft.)	SAMPLER				Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	No.	Pen/Rec (in)	Depth (ft)	blows/6"				
						3.5" Pavement		PAVEMENT
1	S-1	24/10	0.5 to 2.5	6	13.5'	Brown Gravelly SAND, little Silt, humid, compact, SM		FILL
				4				
2				3				
				2				
3					2.0'	Olive gray Silty CLAY, slightly mottled and blocky, soft to firm, damp, CL	PP = 4,000 psf to 6,000 psf	GLACIAL MARINE (Presumpscot Clay)
4								
5								
6	S-2	24/18	5 to 7	1				
7				2				
8				3				
9				4				
10								
11	S-3	24/20	10 to 12	2				
12				4				
13				6				
14				7				
15					-1.0'	Clay Becomes Soft	▽ Groundwater PP = 0 psf	
16	S-4	24/24	15 to 17	WH				
17				WH				
18				WH				
19						End of Boring at 17', no refusal		
20						Installed Monitoring Well in Hole		
21						1" Dia. PVC Screen from 14' depth up to 4'		
22						1" Dia. PVC Riser from 4' depth to ground surface		

Granular Soils		Cohesive Soils		% Composition ASTM D2487	NOTES: PP = Pocket Penetrometer, MC = Moisture Content LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength Shallow = 0 to 35 degrees Dipping = 35 to 55 degrees Steep = 55 to 90 degrees Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200	Soil Moisture Condition Dry: S = 0% Humid: S = 1 to 25% Damp: S = 26 to 50% Moist: S = 51 to 75% Wet: S = 76 to 99% Saturated: S = 100%
Blows/ft.	Density	Blows/ft.	Consistency			
0-4	V. Loose	<2	V. soft			
5-10	Loose	2-4	Soft	< 5% Trace		
11-30	Compact	5-8	Firm	5-15% Little		
31-50	Dense	9-15	Stiff	15-30% Some		
>50	V. Dense	16-30	V. Stiff	> 30% With		
		>30	Hard			



### SOIL BORING LOG

Boring #: **B-4**

Project: La Quinta Stormwater Detention  
 Location: 340 Park Avenue  
 City, State: Portland, Maine

Project #: 16253  
 Sheet: 1 of 1  
 Chkd by:

Drilling Co: Summit Geoengineering Services      Boring Elevation: 17 ft. +/-  
 Driller: C. Coolidge, P.E.      Reference: City of Portland GIS Contour Mapping  
 Summit Staff: M. Hardison, E.I.      Date started: 11/16/2016      Date Completed: 11/16/2016

DRILLING METHOD		SAMPLER		ESTIMATED GROUND WATER DEPTH			
Vehicle:	Tracked	Length:	24" SS	Date	Depth	Elevation	Reference
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID	11/16/2016	8.5 ft.	8.5 ft. +/-	Measured in hole after casing pulled
Method:	3" Casing	Hammer:	140 lb	11/16/2016	3.3 ft.	13.7 ft. +/-	Measured in hole 6 hrs. after casing pulled
Hammer Style:	Auto	Method:	ASTM D1586				

Depth (ft.)					Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum	
	No.	Pen/Rec (in)	Depth (ft)	blows/6"					
1	S-1	24/20	0 to 2	4		3" Dark brown Sandy SILT, loose, moist, ML		TOPSOIL	
				5		Brown Silty SAND, little Gravel, moist, loose, SM	PP = 3,000 psf  ▽ Groundwater	FILL	
				4					
	2				4				
6	S-2	24/20	5 to 7	4		Light brown SILT, little fine Sand and Clay, moderately mottled, loose to compact, damp, ML	PP = 4,000 psf to 2,500 psf (decrease w/ depth)	(Reworked Native)	
				6					
				4					
				4					
11	S-3	24/24	10 to 12	WH		Gray Silty CLAY, very soft, wet, Sand seam from 11' to 11.5', CL	PP = 500 psf MC = 42.3%	GLACIAL MARINE (Presumpscot Clay)	
				WH					
				WH					
				WH					
16	S-4	24/24	15 to 17	WH		same as above, trace black organic streaking	PP = 0 psf MC = 45.4%		
				WH					
				WH					
				WH					
18						End of Boring at 17', no refusal			

Granular Soils		Cohesive Soils		% Composition ASTM D2487	NOTES: PP = Pocket Penetrometer, MC = Moisture Content LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test <u>Bedrock Joints</u> Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength Shallow = 0 to 35 degrees Dipping = 35 to 55 degrees Steep = 55 to 90 degrees  Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200	Soil Moisture Condition Dry: S = 0% Humid: S = 1 to 25% Damp: S = 26 to 50% Moist: S = 51 to 75% Wet: S = 76 to 99% Saturated: S = 100%
Blows/ft.	Density	Blows/ft.	Consistency			
0-4	V. Loose	<2	V. soft			
5-10	Loose	2-4	Soft	< 5% Trace		
11-30	Compact	5-8	Firm	5-15% Little		
31-50	Dense	9-15	Stiff	15-30% Some		
>50	V. Dense	16-30	V. Stiff	> 30% With		
		>30	Hard			



### SOIL BORING LOG

Boring #: **B-5**

Project: La Quinta Stormwater Detention  
 Location: 340 Park Avenue  
 City, State: Portland, Maine

Project #: 16253  
 Sheet: 1 of 1  
 Chkd by:

Drilling Co: Summit Geoengineering Services Boring Elevation: 16 ft. +/-  
 Driller: C. Coolidge, P.E. Reference: City of Portland GIS Contour Mapping  
 Summit Staff: M. Hardison, E.I. Date started: 11/16/2016 Date Completed: 11/16/2016

DRILLING METHOD		SAMPLER		ESTIMATED GROUND WATER DEPTH			
Vehicle:	Tracked	Length:	24" SS	Date	Depth	Elevation	Reference
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID	11/16/2016	2.6 ft.	13.4 ft. +/-	Measured in hole after casing pulled
Method:	3" Casing	Hammer:	140 lb				
Hammer Style:	Auto	Method:	ASTM D1586				

Depth (ft.)					Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	No.	Pen/Rec (in)	Depth (ft)	blows/6"				
						3.5" Pavement		PAVEMENT
1	S-1	24/3	0.5 to 2.5	6		Dark brown SAND, little Gravel and Silt, Brick fragments in spoon tip, humid, SP  NOTE: Boring relocated 2 times due to rubble refusal at an approximate depth of 1.2' in Fill layer, possible concrete	▽ Groundwater	FILL
				4				
2				6				
				7				
3								
4								
5	S-2	24/10	5 to 7	WH		Olive green-gray SILT with frequent Organics (likely previous ground surface), little Clay, trace fine Sand, very soft, wet, ML		GLACIAL MARINE (Presumpscot Clay)
6				WH				
7				2				
8								
9								
10	S-3	24/24	10 to 12	WH		Gray Silty CLAY, wet, very soft, occasional Sand seams, CL	PP = 0 psf MC = 38.9%	
11				WH				
12				WH				
				WH				
13								
14								
15								
16	S-4	24/24	15 to 17	WH		same as above, black organic streaking	PP = 0 psf MC = 42.7%	
17				WH				
				WH				
				WH				
18						End of Boring at 17', no refusal		
19								
20								
21								
22								

Granular Soils		Cohesive Soils		% Composition ASTM D2487	NOTES: PP = Pocket Penetrometer, MC = Moisture Content LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength Shallow = 0 to 35 degrees Dipping = 35 to 55 degrees Steep = 55 to 90 degrees  Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200	Soil Moisture Condition Dry: S = 0% Humid: S = 1 to 25% Damp: S = 26 to 50% Moist: S = 51 to 75% Wet: S = 76 to 99% Saturated: S = 100%
Blows/ft.	Density	Blows/ft.	Consistency			
0-4	V. Loose	<2	V. soft			
5-10	Loose	2-4	Soft	< 5% Trace		
11-30	Compact	5-8	Firm	5-15% Little		
31-50	Dense	9-15	Stiff	15-30% Some		
>50	V. Dense	16-30	V. Stiff	> 30% With		
		>30	Hard			