

**Received**  
**Planning Division**  
07/24/2024

EXHIBIT 3.14

# Land Use Stormwater Report

## For Cedar Hills Apartments

Beaverton, Oregon

Date: April 29, 2022

Revised: July 18, 2024

**Prepared for:**  
Trammel Crow

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### Engineer's Certification

The technical information and data contained in this report were prepared under the direction and supervision of the undersigned, whose seal, as a professional engineer licensed as such, is affixed below.

City File No:  
Humber Design Group, Inc. No: LRS032



EXPIRES 12-31-2024



**Humber  
Design  
Group, Inc.**

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## Project Overview

### Purpose of Report

This purpose of this report is to analyze the impact the proposed development will have on the existing downstream stormwater conveyance system, and document the criteria used to design the proposed stormwater facility. Source information used to define the different features of the site is also provided.

### Project Description and Location

The Cedar Hills Apartment project is located in the city of Beaverton, Oregon. The site is bound by SW Park Way to the north, Frontage Rd. to OR 217 to the east, SW Wilshire Street to the south, and retail development to the west. SE Wilshire St. and the western portion of SW Park Way are owned by Washington County. Frontage Road and the eastern portion of SW Park Way are owned by ODOT. The site address is 10100 SW Parkway. The total site area is 5.59 acres.

Approximately 4.56 acres of the 5.59-acre development area is impervious surface. This evaluation will demonstrate that the proposed water quality systems will adequately treat any on-site runoff, and the downstream stormwater facility will meet the code requirements for water conveyance outlined in the City of Beaverton Engineering Design Manual dated 01/01/19, the Clean Water Services (CWS) Design and Construction Standards/LIDA Handbook (2019 version), and the ODOT Hydraulics Manual (2014 version).

### Existing Conditions

Existing site currently consists of multiple businesses within the Cedars Hills Shopping Center and large parking lot area.

### Developed Conditions

The proposed development will be (3) apartment buildings with a total of 398 units along with ground level covered parking. A central parking lot will serve all 3 apartment buildings.

### Offsite

A 16.50-foot dedication will be made along SW Parkway with a 10-foot wide sidewalk to be constructed with (2) streetside Low Impact Development Alternative (LIDA) planters along the frontage. A 7-foot dedication will be made along SW Wilshire St. with a 10-foot wide shared bike/ped path to be constructed with (3) streetside LIDA planters along the frontage. An 11.50-foot dedication will be made along Frontage Road with a 5-foot furnishing zone and 12-foot shared bike/ped path, and a LIDA planter along the frontage.

### Downstream Conveyance

Stormwater leaving the site is conveyed to an existing 18-inch storm line in SW Wilshire, that then flows southwest and downstream CWS system.

## Regulatory Design Criteria

**Stormwater Quantity Management-Design Criteria**

All developments on sites one-half acre or greater in area shall be required to provide on-site detention per CWS Design Standards. Per the Hydromodification category table the project is considered a Developed category 2 large project with low risk level per CWS chapter (4.03.5). Storm detention facilities shall be designed with safe overflow conveyance of the 25-year storm. Storms to be evaluated shall include the 2, 5, and 10-year events per hydromodification peak flow matching detention per CWS chapter 4.08.6.

The design of the stormwater quantity facilities used the following criteria to analyze the performance of the system:

<u>Storm Event</u>	<u>Rainfall Depth (in)</u>
2-yr	2.5
5-yr	3.10
10-yr	3.45
25-yr	3.90
100-yr	4.5

- A Tc of 5 minutes was used in calculations involving the post-developed site conditions.
- The Santa Barbara Urban Hydrograph (SBUH) method was used to estimate the stormwater runoff for the site. See HydroCAD Calculations in Appendix E.
- All impervious, and pervious areas use runoff curve numbers (CN) of 98, and 75(redevelopment) respectively.

**Stormwater Quality Management-Design Criteria**

*CWS Requirements*

Stormwater quality on-site cartridge facility shall meet Section 4.05.6.3 of the CWS design standards in combination with off-site CWS vegetated water quality streetside LIDA planters. Stormwater quality approaches shall be designed to remove 65 percent of the total phosphorous from the runoff from the impervious area that is tributary to the facility. Offsite streetside LIDA planters were sized using CWS Standard sizing (4.08.5) for Water Quality with the water quality storm defined in subsection 4.08.2. The City of Beaverton EDM 0.36inch/3hr storm event was used for WQ calculations.

*ODOT*

Stormwater quality is considered to be met for all the runoff generated by the Water Quality Design Storm from the Contributing Impervious area using Best Management Practices, based on ODOT description's of new impervious surfaces area. ***This project's proposed improvements (5-foot planting strip and 12-foot sidewalk) is not considered a pollutant generating area and will not negatively impact ODOT drainage thus will not trigger water quality per ODOT standards. See attached email confirmation, appendix I.***

## Potential Site Pollutants

The Department of Environmental Quality (DEQ) recognizes sediments, metals, various petroleum products, nutrients, pesticides, herbicides, and fungicides as common pollutants found in residential developments.

## Low Impact Development (LID)

(5) streetside LIDA planters will be implemented to treat storm runoff from SW Park Way and SW Wilshire St per Beaverton/CWS stormwater standards.

## Maintenance Plan

All stormwater facilities on-site will be the responsibility of the property owner to maintain. The property owner will also agree to any maintenance standards set forth by the City of Beaverton/Clean Water Services. Refer to Appendix B for maintenance requirements.

## Design Methodology

### On-site (Beaverton/CWS)

Onsite stormwater and offsite stormwater will be designed to meet the Beaverton/CWS requirements for water quality and quantity per Chapter 4 of CWS Design and Construction Standards and City of Beaverton EDM. On site water quantity requirements will be met by an underground detention system consisting of (135) ADS MC-3500 chamber model.

### SW Park Way – SW Wilshire St (Washington County/CWS)

Offsite streetside LIDA planters were sized using CWS Standard sizing (4.08.5) for Water Quality with the water quality storm defined in subsection 4.08.2 and CoB EDM.

### Frontage Road (ODOT)

Offsite stormwater will be designed to meet requirements per ODOT Hydraulics Manual. This projects proposed improvements (5-foot planting strip and 12-foot sidewalk) is not considered a pollutant generating area and will not negatively impact ODOT drainage thus will not trigger water quality per ODOT standards chapter 14.5.1. LIDA planter will be installed to meet hydromodification peak flow matching detention standards per CWS chapter (4.08.6).

## Design Parameters

### Existing Site Conditions

The existing site is currently a large parking lot with multiple business buildings.

### Soil Type

According to the geotechnical report titled *Report of Geotechnical Engineering Services, dated July 13<sup>th</sup>, 2021 by NV5*, beneath the 3 to 4 inches of AC underlain by 6 to 9 inches of aggregate base, medium stiff clay was encountered at depths between 8 to 16 feet deep. Medium dense to dense gravel was encountered at depths between 14 and 26.5 feet. Medium dense to dense sand with varying amounts of silt was encountered beneath the gravel which extended to 26.5 feet BGS. Several borings found intact basalt bedrock at depths between 14 and 24.8 feet BGS.

## Calculation Methodology

HydroCAD version 10.00 was used to calculate all stormwater runoff quantities. The Santa Barbara Urban Hydrograph (SBUH) was used in conjunction with the SCS Type 1A 24- hour storm region.

### Proposed Stormwater Conduit Sizing and Inlet Placement

All stormwater line sizes will be calculated using Manning’s equation for a SBUH 25- year storm event.

### Proposed Stormwater Quantity Control Facility Design

#### Onsite

The 135 ADS MC-3500 chamber underground detention system will be installed with a flow control orifice manhole to convey the detained water at a controlled flowrate to the existing 18- inch storm system in SW Wilshire St. Post-developed outflow rates for the 50% of the 2-year, the 5-year, and the 10-year storm events to be equal to or less than the pre-developed outflow per CWS requirements for hydromodification (4.08.6) and CoB EDM. See Table 1 below. The facility will safely convey the overflow of the 100-year storm with 1-foot of freeboard from overflow elevation to top of system. Refer to Appendix D for water quantity calculations.

**Table 1. On-site Underground Detention Chamber**

	<b>2-year</b>	<b>5-year</b>	<b>10-year</b>	<b>25-year</b>	<b>100-year</b>
<b>Pre-Developed</b>	0.46 cfs	0.89 cfs	1.18 cfs	1.57 cfs	2.12 cfs
<b>Post Developed</b>	0.23 cfs	0.55 cfs	0.79 cfs	1.24 cfs	1.83 cfs

#### Public

Public stormwater will be conveyed through separate drainage basins along SW Park Way and SW Wilshire St. See Basin Map, Appendix C. The LIDA planters will be installed with an orifice device to control post-developed outflow rates for the 50% of the 2-year, the 5-year, and the 10- year storm events to be equal to or less than the pre-developed outflow per CWS requirements for hydromodification peak flow matching (4.08.6) and CoB EDM. SW Park Way will be conveyed through via two separate basins A and B. Basin A (5,956 sf) will be conveyed to the 375 sf streetside LIDA planter. Basin B (4,907 sf) will be conveyed to the 448 sf streetside LIDA planter. SW Wilshire St. will be conveyed through 3 separate basins C, D, and E. Basin C (3,968 sf) will be conveyed to the 324 sf streetside LIDA planter. Basin D (12,656 sf) will be conveyed to the 759 sf streetside LIDA planter. Basin E (4,141 sf) will be conveyed to the 486 sf streetside LIDA planter. Basin F (4,173 sf) will be conveyed to the 252 sf streetside LIDA Planter. See tables below.

**Table 2. Public Basin A (5,956 sf impervious)**

	<b>2-year</b>	<b>5-year</b>	<b>10-year</b>	<b>25-year</b>
<b>Pre-Developed</b>	0.015 cfs	0.029 cfs	0.036 cfs	0.048 cfs
<b>Post Developed</b>	0.007 cfs	0.018 cfs	0.025 cfs	0.044 cfs

**Table 3. Public Basin B (4,907 sf impervious)**

	<b>2-year</b>	<b>5-year</b>	<b>10-year</b>	<b>25-year</b>
<b>Pre-Developed</b>	0.013 cfs	0.024 cfs	0.03 cfs	0.039 cfs
<b>Post Developed</b>	0.004 cfs	0.009 cfs	0.013 cfs	0.018 cfs

**Table 4. Public Basin C (3,968 sf impervious)**

	<b>2-year</b>	<b>5-year</b>	<b>10-year</b>	<b>25-year</b>
<b>Pre-Developed</b>	0.010 cfs	0.019 cfs	0.024 cfs	0.032 cfs
<b>Post Developed</b>	0.004 cfs	0.009 cfs	0.011 cfs	0.017 cfs

**Table 5. Public Basin D (12,656 sf impervious)**

	<b>2-year</b>	<b>5-year</b>	<b>10-year</b>	<b>25-year</b>
<b>Pre-Developed</b>	0.032 cfs	0.061 cfs	0.077 cfs	0.101 cfs
<b>Post Developed</b>	0.016 cfs	0.041 cfs	0.059 cfs	0.099 cfs

**Table 6. Public Basin E (4,141 sf impervious)**

	<b>2-year</b>	<b>5-year</b>	<b>10-year</b>	<b>25-year</b>
<b>Pre-Developed</b>	0.011 cfs	0.020 cfs	0.025 cfs	0.033 cfs
<b>Post Developed</b>	0.004 cfs	0.008 cfs	0.011 cfs	0.015 cfs

**Table 7. Public Basin F (4,173 sf impervious)**

	<b>2-year</b>	<b>5-year</b>	<b>10-year</b>	<b>25-year</b>
<b>Pre-Developed</b>	0.011 cfs	0.020 cfs	0.025 cfs	0.033 cfs
<b>Post Developed</b>	0.005 cfs	0.011 cfs	0.017 cfs	0.028 cfs

Proposed Stormwater Quality Design

Onsite

The proposed 9 cartridge WQ vault (Bayfilter 530 Cartridges) will meet the City of Beaverton/CWS water quality requirements. The stormwater quality is designed for a dry weather storm event totaling 0.36 inches of precipitation falling in 3 hours with an average storm return period of 96 hours. See Appendix E for water quality calculations and details.

Public

Offsite streetside LIDA planters were sized using CWS Standard sizing (4.08.5) for Water Quality with the water quality storm defined in subsection 4.08.2. The water quality volume was calculated using 0.36 inches over 3 hours per City EDM Chapter 5. See Table Below.

**Table 8. Simplified LIDA Sizing**

<b>Public Basins</b>	<b>Basin A</b>	<b>Basin B</b>	<b>Basin C</b>	<b>Basin D</b>	<b>Basin E</b>	<b>Basin F</b>
<b>Contributing Impervious Area</b>	5,956 sf	4,907 sf	3,968 sf	12,656 sf	4,141 sf	4,173 sf
<b>LIDA Size</b>	375 sf	448 sf	324 sf	759 sf	486 sf	252 sf

***This projects proposed improvements on Frontage Road (5-foot planting strip and 12-foot sidewalk) is not considered a pollutant generating area and will not negatively impact ODOT drainage thus will not trigger water quality per ODOT standards.***



## Appendix A

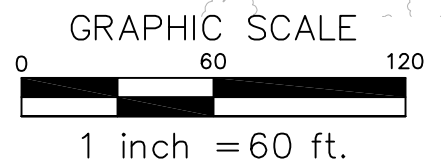
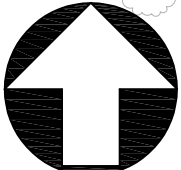
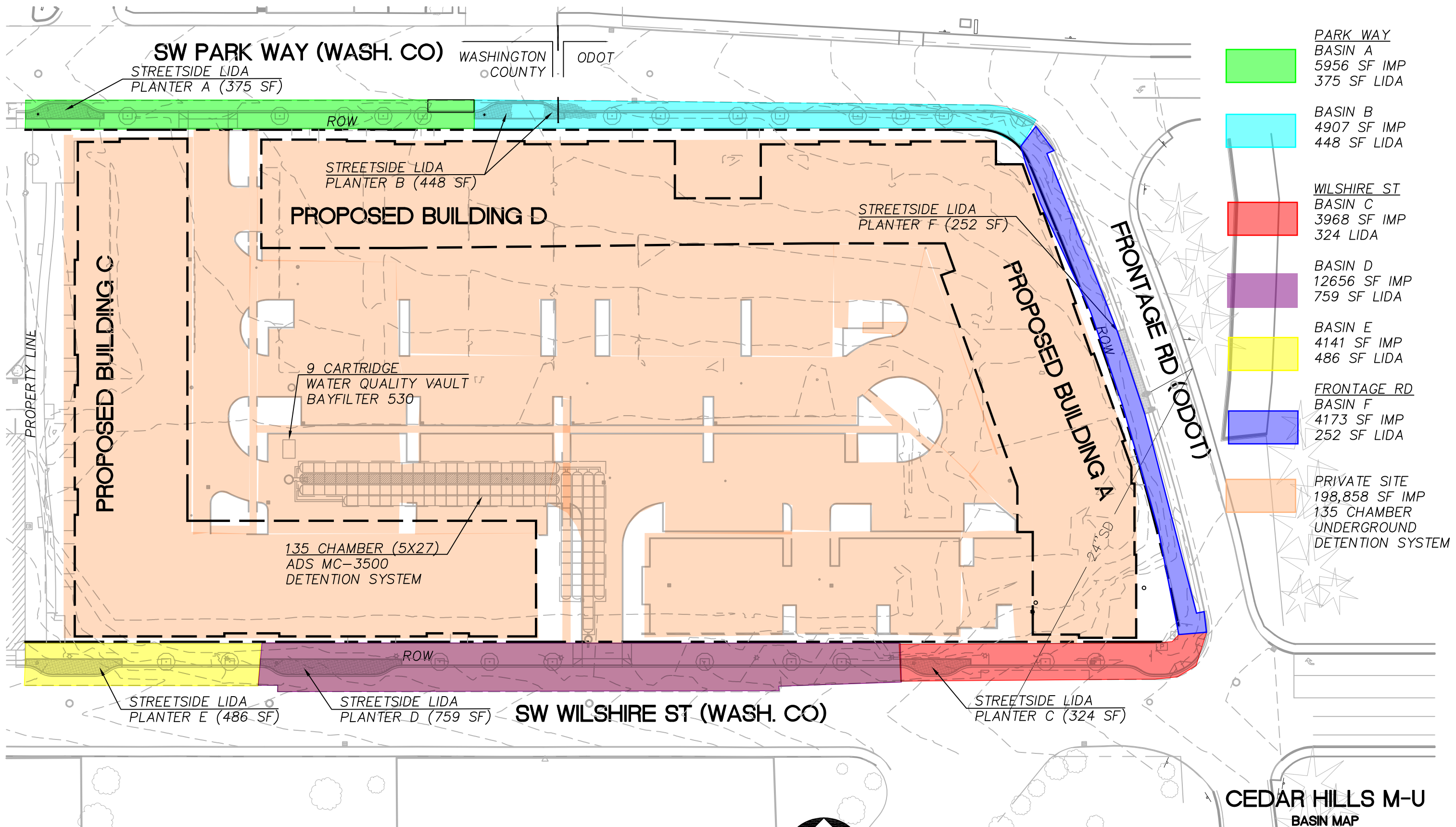
### Vicinity Map

Vicinity Map



## Appendix B

### Postdeveloped Basin Map



**CEDAR HILLS M-U**  
BASIN MAP

PROJECT NO.:	LRS032
DRAWN BY:	MCS
DESIGN BY:	AX
REVIEWED BY:	KAM
DATE:	06/20/2022

**Humber Design Group, Inc.**  
Civil Engineering • 503.946.6690 • hdgpd.com

## Appendix C

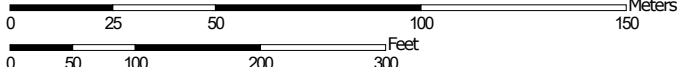
### Soils Information

Soil Map—Washington County, Oregon



Soil Map may not be valid at this scale.

Map Scale: 1:1,840 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84


## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Washington County, Oregon

Survey Area Data: Version 21, Oct 27, 2021

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

Date(s) aerial images were photographed: Aug 1, 2019—Sep 12, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

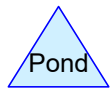
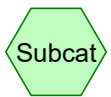
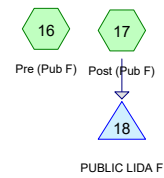
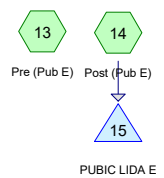
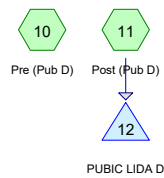
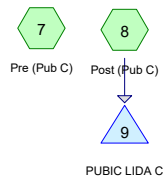
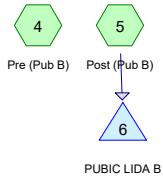
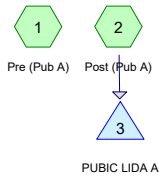
## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
11B	Cornelius and Kinton silt loams, 2 to 7 percent slopes	5.9	100.0%
<b>Totals for Area of Interest</b>		<b>5.9</b>	<b>100.0%</b>



## Appendix D

### Water Quantity Calculations



**Routing Diagram for LRS032 - Storm Calcs**  
Prepared by Hewlett-Packard Company, Printed 6/14/2022  
HydroCAD® 10.00-15 s/n 09142 © 2015 HydroCAD Software Solutions LLC

**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

HydroCAD® 10.00-15 s/n 09142 © 2015 HydroCAD Software Solutions LLC

Type IA 24-hr 2 year Rainfall=2.50"

Printed 6/14/2022

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**Summary for Subcatchment 1: Pre (Pub A)**

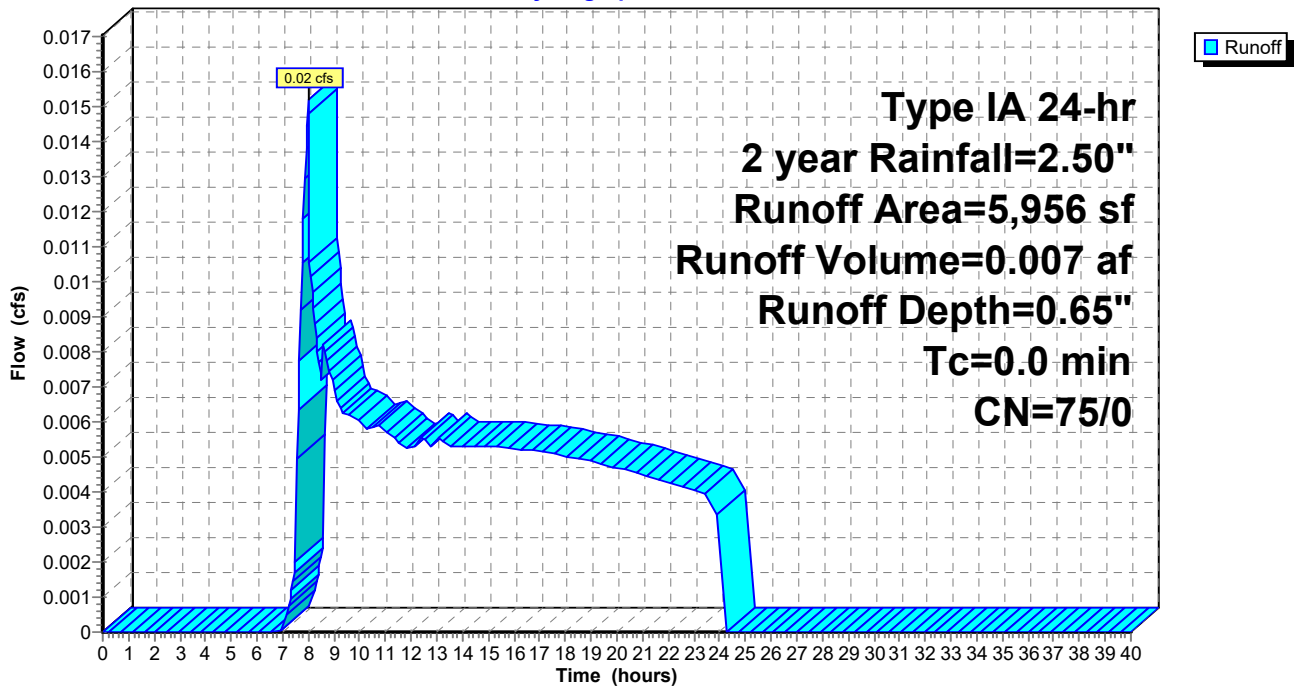
Runoff = 0.02 cfs @ 7.98 hrs, Volume= 0.007 af, Depth= 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	5,956	75	
	5,956		100.00% Pervious Area

**Subcatchment 1: Pre (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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Type IA 24-hr 2 year Rainfall=2.50"

Printed 6/14/2022

Page 3

**Summary for Subcatchment 2: Post (Pub A)**

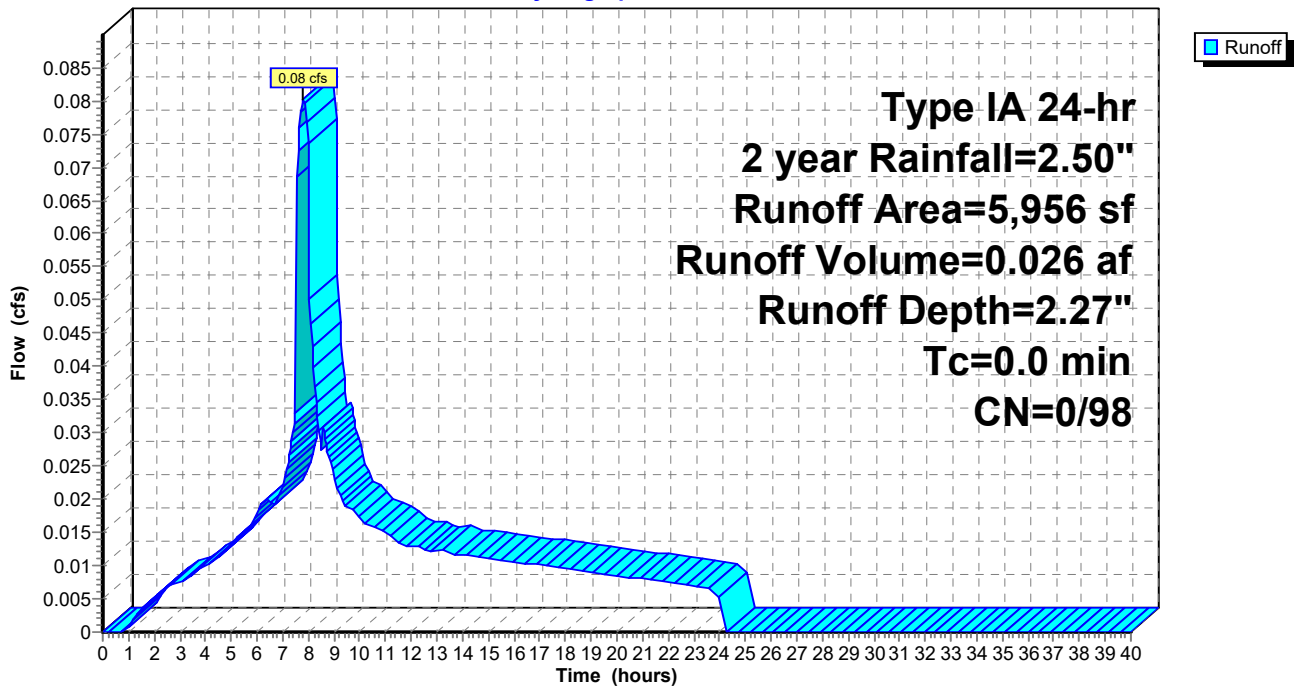
Runoff = 0.08 cfs @ 7.81 hrs, Volume= 0.026 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	5,956	98	
	5,956		100.00% Impervious Area

**Subcatchment 2: Post (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 2 year Rainfall=2.50"

Prepared by Hewlett-Packard Company

Printed 6/14/2022

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**Summary for Pond 3: PUBIC LIDA A**

Inflow Area = 0.137 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 year event  
 Inflow = 0.08 cfs @ 7.81 hrs, Volume= 0.026 af  
 Outflow = 0.01 cfs @ 14.44 hrs, Volume= 0.025 af, Atten= 86%, Lag= 397.8 min  
 Primary = 0.01 cfs @ 14.44 hrs, Volume= 0.025 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.03' @ 14.44 hrs Surf.Area= 374 sf Storage= 460 cf

Plug-Flow detention time= 528.1 min calculated for 0.025 af (98% of inflow)  
 Center-of-Mass det. time= 515.5 min ( 1,184.3 - 668.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 14.44 hrs HW=103.03' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 8.35 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

HydroCAD® 10.00-15 s/n 09142 © 2015 HydroCAD Software Solutions LLC

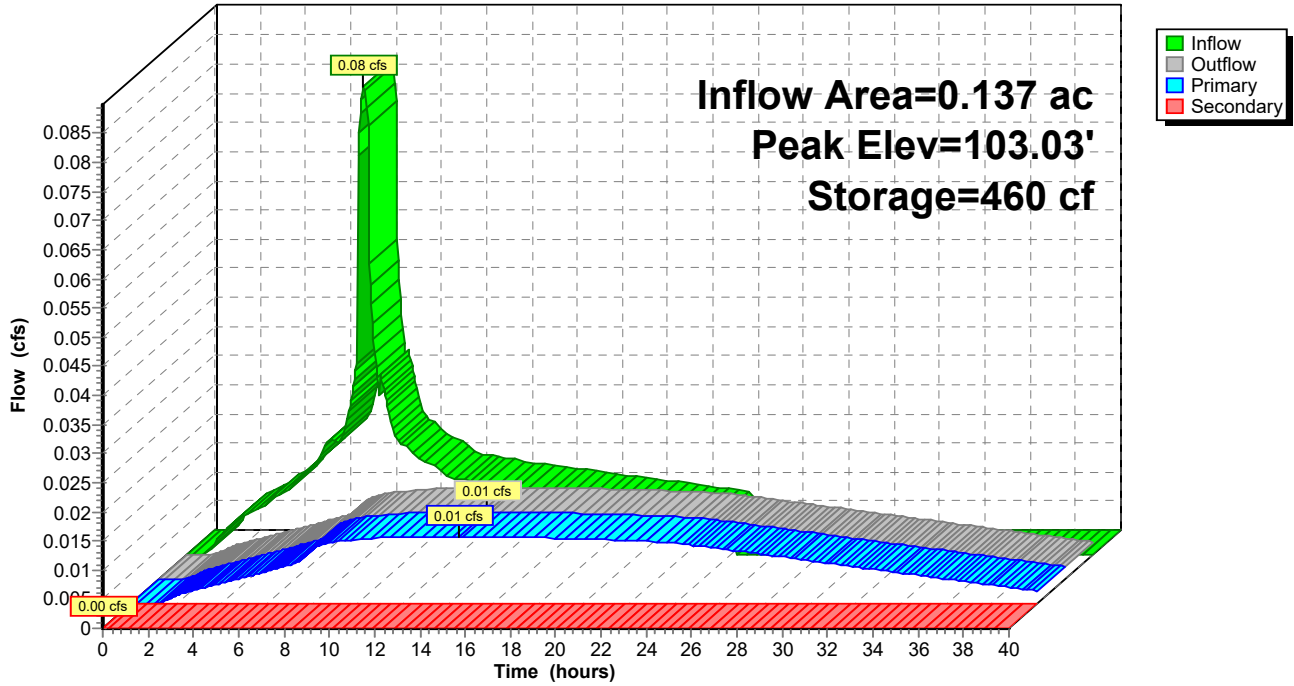
Type IA 24-hr 2 year Rainfall=2.50"

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**Pond 3: PUBIC LIDA A**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 4: Pre (Pub B)**

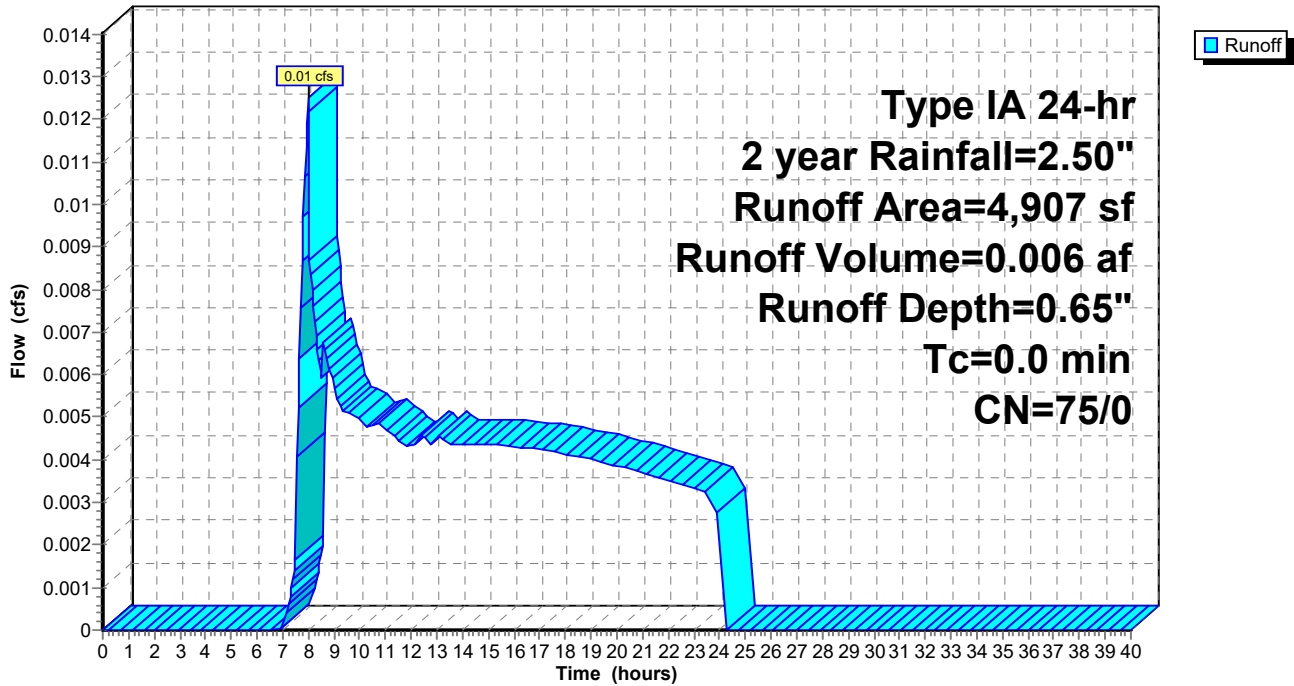
Runoff = 0.01 cfs @ 7.98 hrs, Volume= 0.006 af, Depth= 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	4,907	75	
	4,907		100.00% Pervious Area

**Subcatchment 4: Pre (Pub B)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 5: Post (Pub B)**

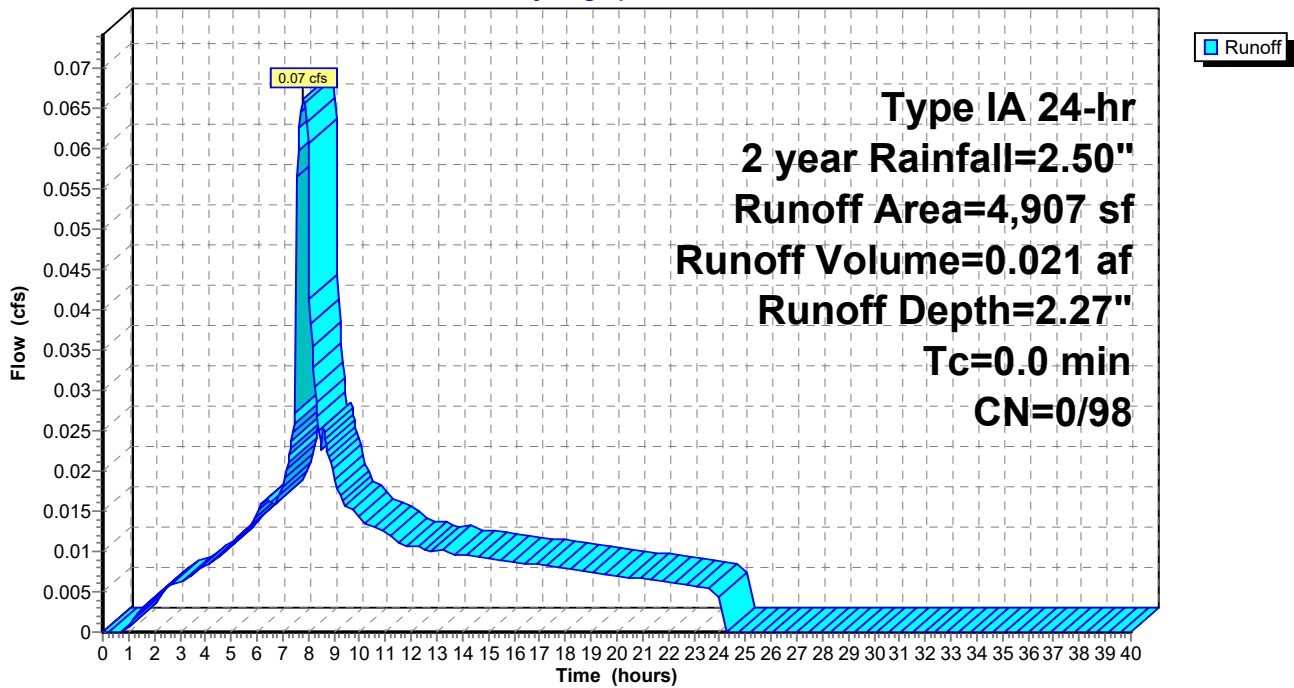
Runoff = 0.07 cfs @ 7.81 hrs, Volume= 0.021 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	4,907	98	
	4,907		100.00% Impervious Area

**Subcatchment 5: Post (Pub B)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Pond 6: PUBIC LIDA B**

Inflow Area = 0.113 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 year event  
 Inflow = 0.07 cfs @ 7.81 hrs, Volume= 0.021 af  
 Outflow = 0.01 cfs @ 11.05 hrs, Volume= 0.021 af, Atten= 81%, Lag= 194.3 min  
 Primary = 0.01 cfs @ 11.05 hrs, Volume= 0.021 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 101.71' @ 11.05 hrs Surf.Area= 448 sf Storage= 306 cf

Plug-Flow detention time= 331.3 min calculated for 0.021 af (100% of inflow)  
 Center-of-Mass det. time= 331.8 min ( 1,000.6 - 668.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	986 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	448	0.0	0	0
101.50	448	40.0	269	269
103.00	448	40.0	269	538
104.00	448	100.0	448	986

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 11.05 hrs HW=101.71' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 6.25 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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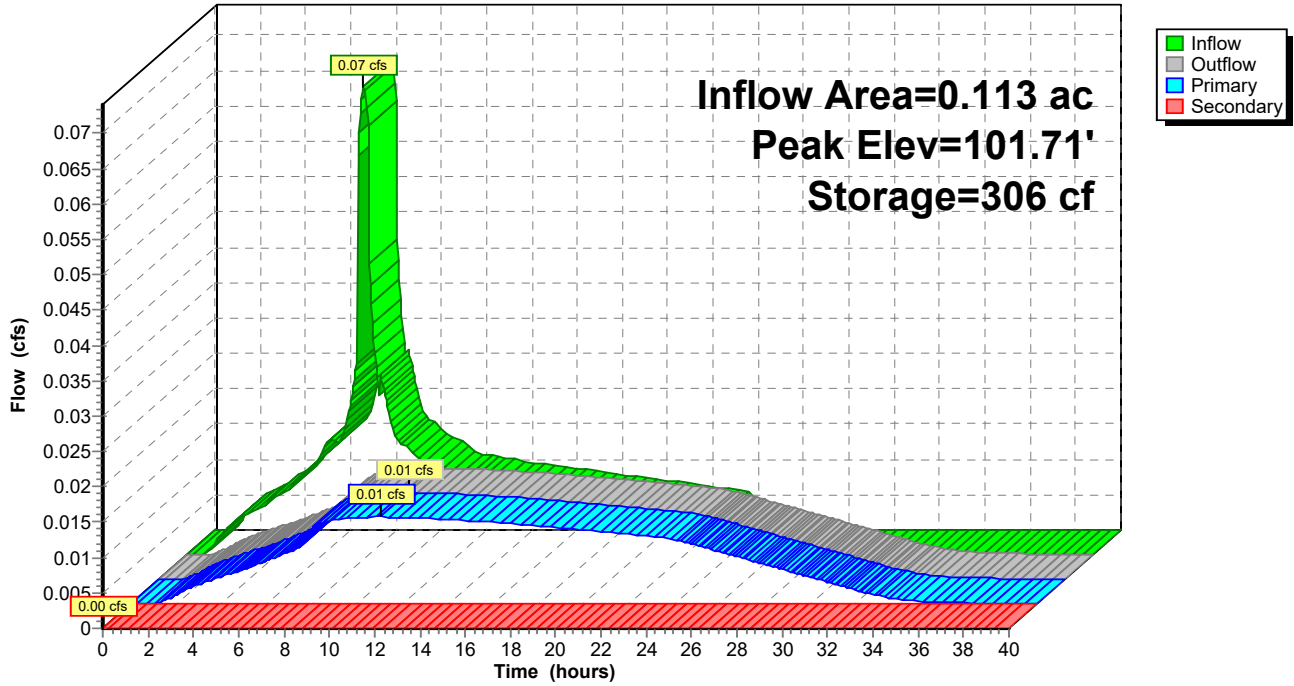
Type IA 24-hr 2 year Rainfall=2.50"

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**Pond 6: PUBIC LIDA B**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 7: Pre (Pub C)**

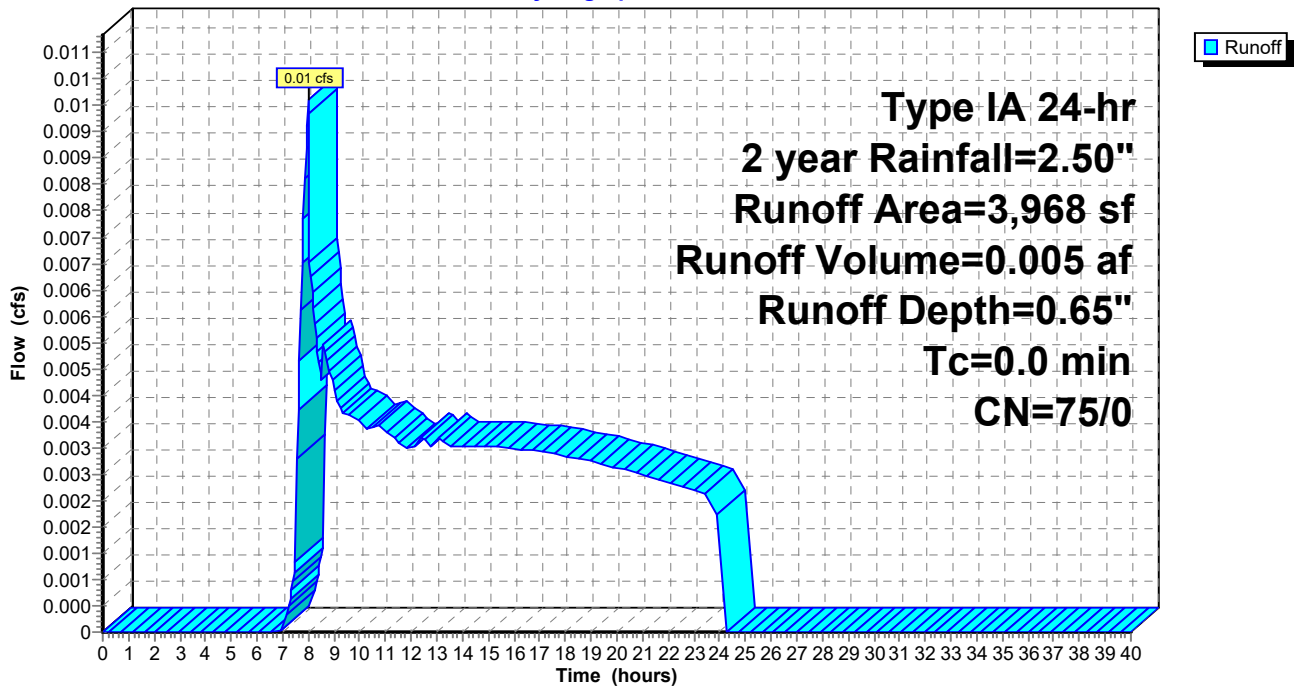
Runoff = 0.01 cfs @ 7.98 hrs, Volume= 0.005 af, Depth= 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	3,968	75	
	3,968		100.00% Pervious Area

**Subcatchment 7: Pre (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 8: Post (Pub C)**

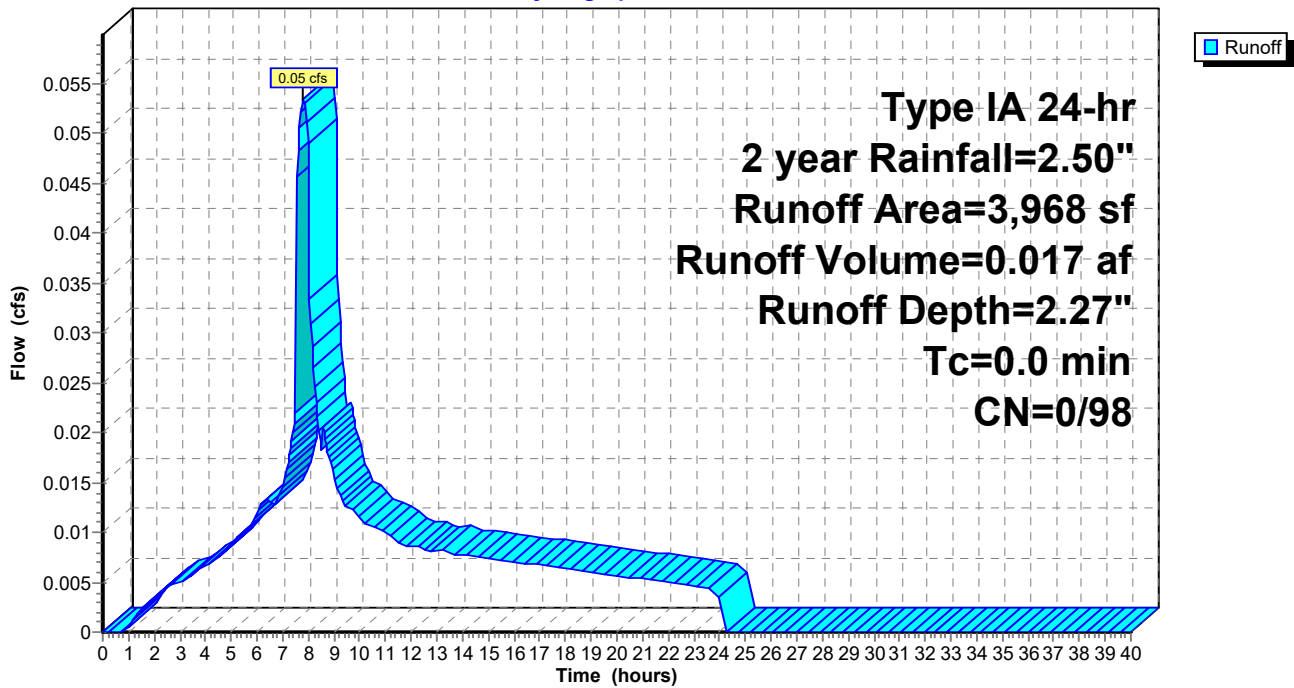
Runoff = 0.05 cfs @ 7.81 hrs, Volume= 0.017 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	3,968	98	
	3,968		100.00% Impervious Area

**Subcatchment 8: Post (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Pond 9: PUBIC LIDA C**

Inflow Area = 0.091 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 year event  
 Inflow = 0.05 cfs @ 7.81 hrs, Volume= 0.017 af  
 Outflow = 0.01 cfs @ 9.08 hrs, Volume= 0.017 af, Atten= 72%, Lag= 76.6 min  
 Primary = 0.01 cfs @ 9.08 hrs, Volume= 0.017 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 101.34' @ 9.08 hrs Surf.Area= 324 sf Storage= 174 cf

Plug-Flow detention time= 140.4 min calculated for 0.017 af (100% of inflow)  
 Center-of-Mass det. time= 140.0 min ( 808.8 - 668.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	713 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	324	0.0	0	0
101.50	324	40.0	194	194
103.00	324	40.0	194	389
104.00	324	100.0	324	713

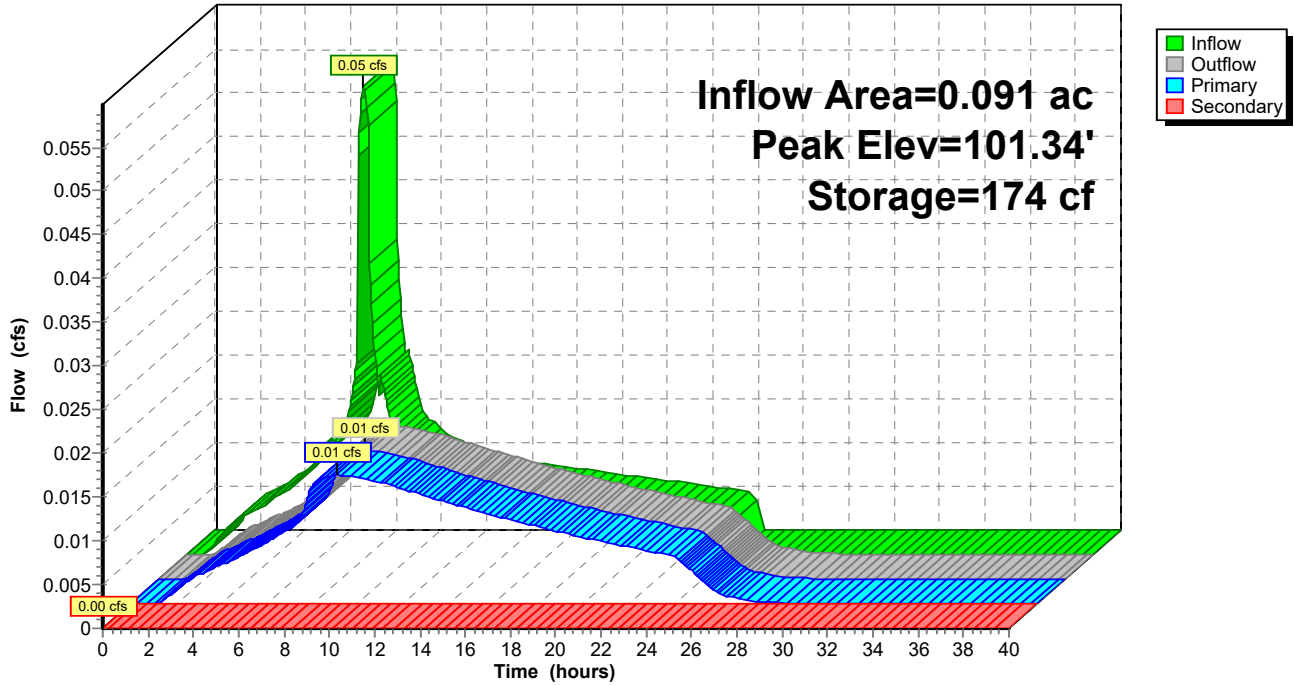
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.7" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 9.08 hrs HW=101.34' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 5.51 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

Pond 9: PUBIC LIDA C

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 10: Pre (Pub D)**

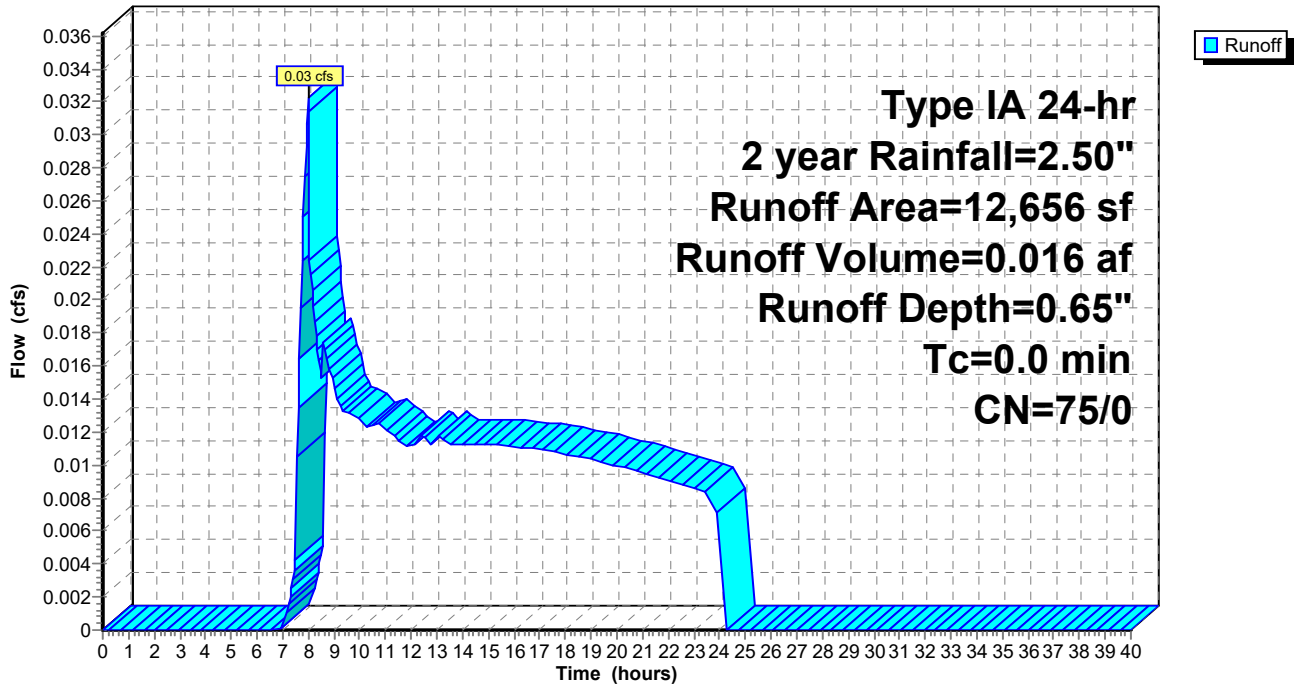
Runoff = 0.03 cfs @ 7.98 hrs, Volume= 0.016 af, Depth= 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	12,656	75	
	12,656		100.00% Pervious Area

**Subcatchment 10: Pre (Pub D)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 11: Post (Pub D)**

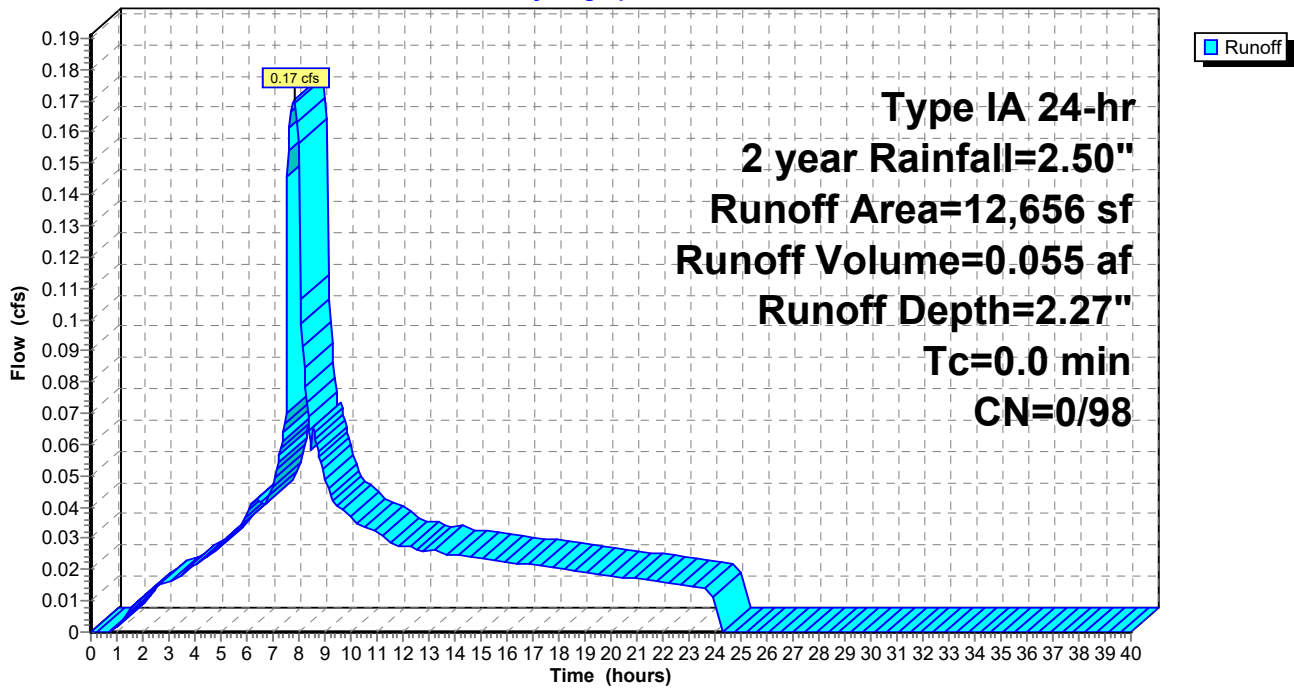
Runoff = 0.17 cfs @ 7.81 hrs, Volume= 0.055 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

Area (sf)	CN	Description
* 12,656	98	
12,656		100.00% Impervious Area

**Subcatchment 11: Post (Pub D)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Pond 12: PUBIC LIDA D**

Inflow Area = 0.291 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 year event  
 Inflow = 0.17 cfs @ 7.81 hrs, Volume= 0.055 af  
 Outflow = 0.02 cfs @ 20.52 hrs, Volume= 0.046 af, Atten= 90%, Lag= 762.9 min  
 Primary = 0.02 cfs @ 20.52 hrs, Volume= 0.046 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.47' @ 20.52 hrs Surf.Area= 759 sf Storage= 1,267 cf

Plug-Flow detention time= 748.0 min calculated for 0.046 af (83% of inflow)  
 Center-of-Mass det. time= 635.6 min ( 1,304.4 - 668.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	1,670 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	759	0.0	0	0
101.50	759	40.0	455	455
103.00	759	40.0	455	911
104.00	759	100.0	759	1,670

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 20.52 hrs HW=103.47' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 8.94 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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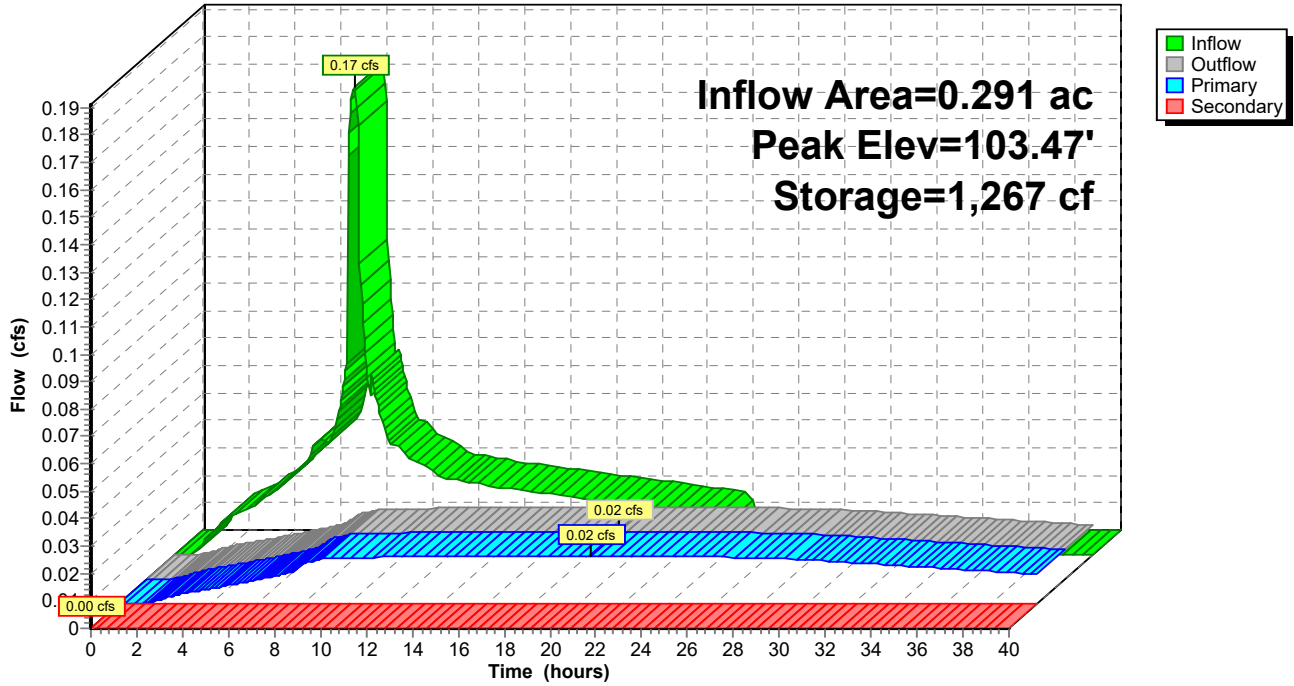
Type IA 24-hr 2 year Rainfall=2.50"

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**Pond 12: PUBIC LIDA D**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 13: Pre (Pub E)**

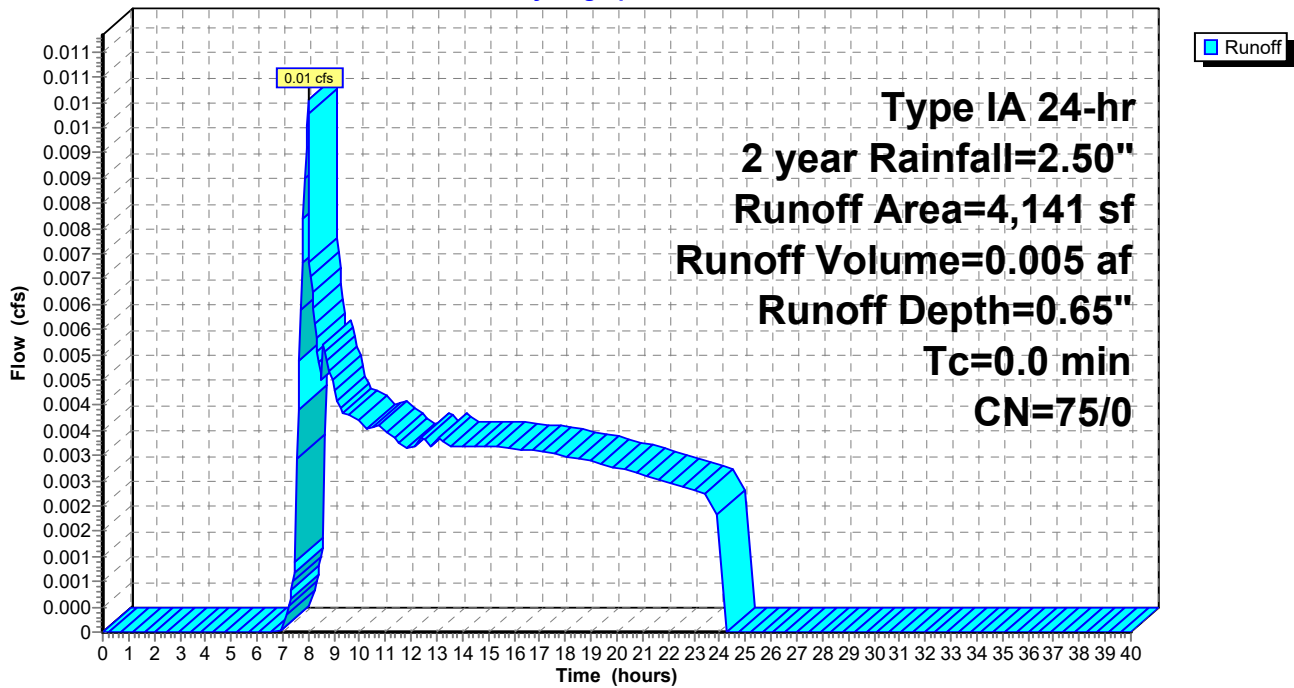
Runoff = 0.01 cfs @ 7.98 hrs, Volume= 0.005 af, Depth= 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	4,141	75	
	4,141		100.00% Pervious Area

**Subcatchment 13: Pre (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 14: Post (Pub E)**

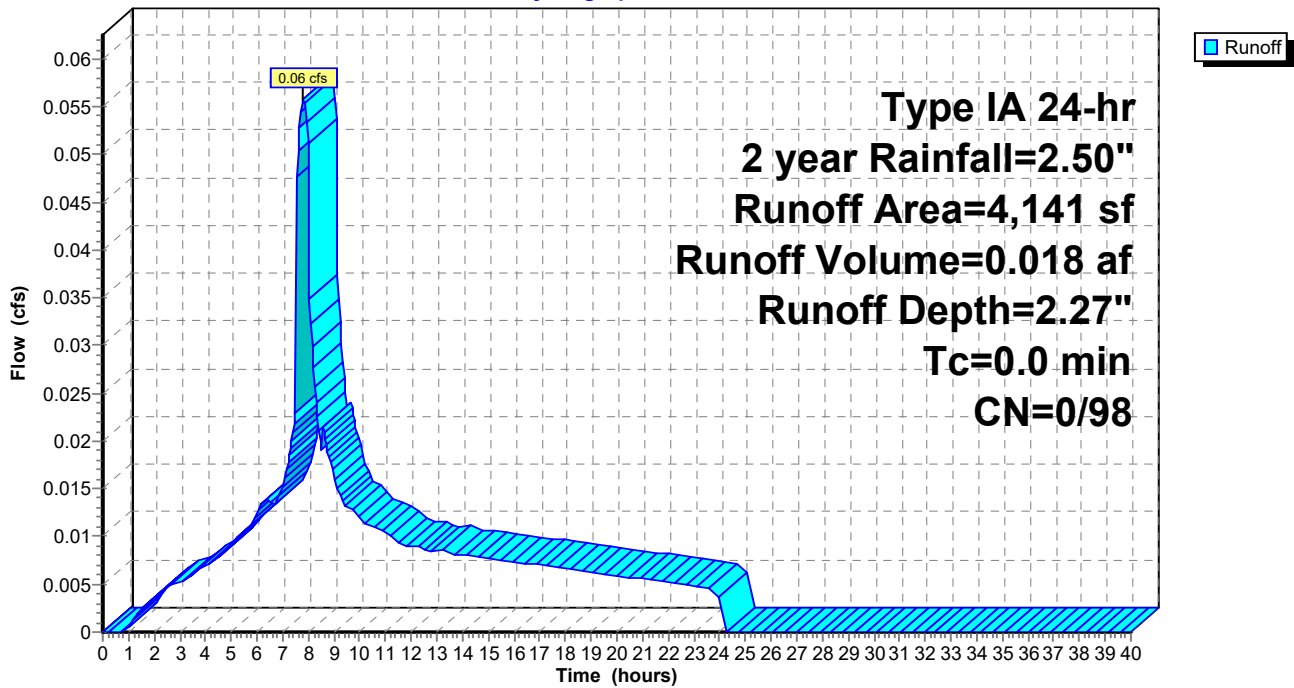
Runoff = 0.06 cfs @ 7.81 hrs, Volume= 0.018 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	4,141	98	
	4,141		100.00% Impervious Area

**Subcatchment 14: Post (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Pond 15: PUBIC LIDA E**

Inflow Area = 0.095 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 year event  
 Inflow = 0.06 cfs @ 7.81 hrs, Volume= 0.018 af  
 Outflow = 0.01 cfs @ 11.69 hrs, Volume= 0.018 af, Atten= 84%, Lag= 232.6 min  
 Primary = 0.01 cfs @ 11.69 hrs, Volume= 0.018 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 101.92' @ 11.69 hrs Surf.Area= 374 sf Storage= 287 cf

Plug-Flow detention time= 425.7 min calculated for 0.018 af (100% of inflow)  
 Center-of-Mass det. time= 425.1 min ( 1,094.0 - 668.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

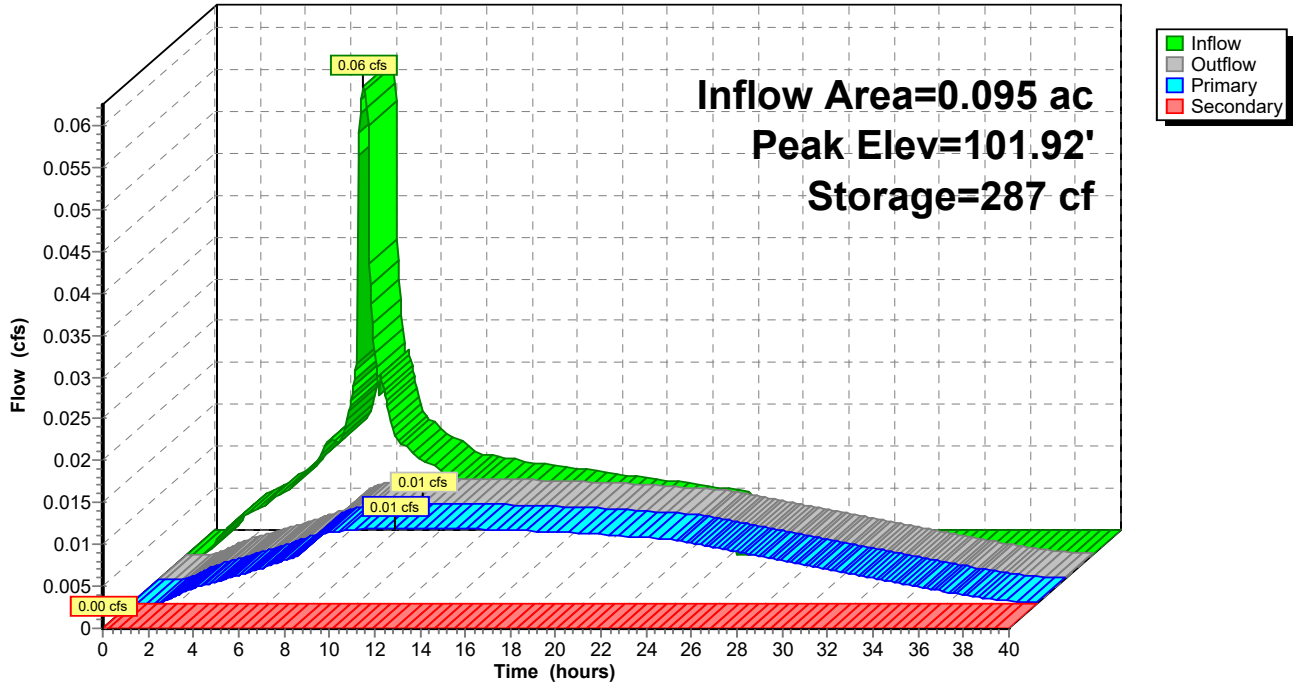
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 11.69 hrs HW=101.92' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 6.64 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

Pond 15: PUBIC LIDA E

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 16: Pre (Pub F)**

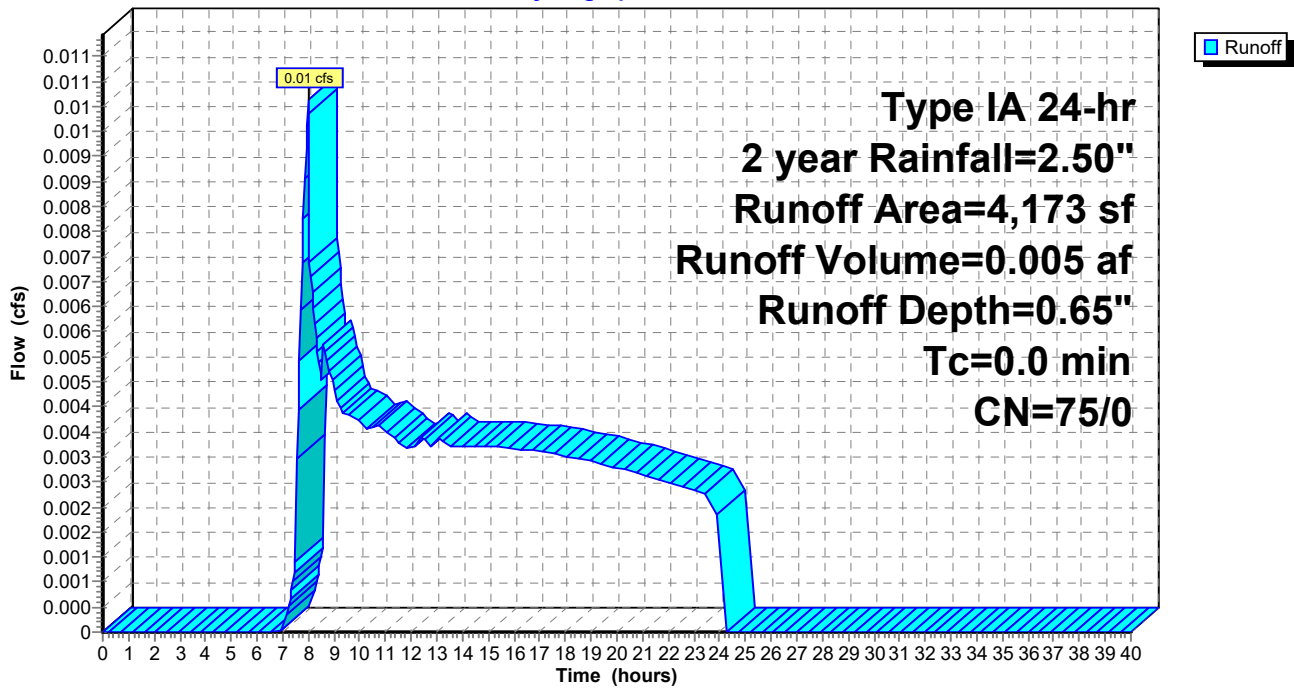
Runoff = 0.01 cfs @ 7.98 hrs, Volume= 0.005 af, Depth= 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	4,173	75	
	4,173		100.00% Pervious Area

**Subcatchment 16: Pre (Pub F)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 17: Post (Pub F)**

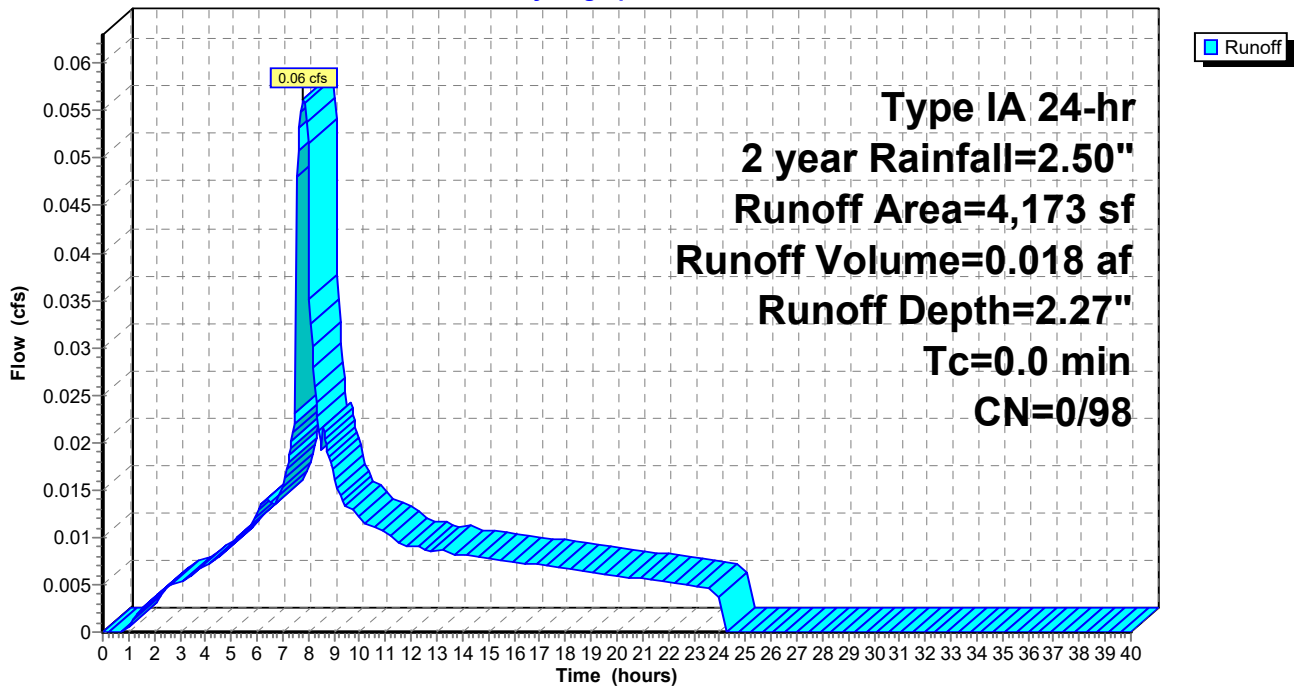
Runoff = 0.06 cfs @ 7.81 hrs, Volume= 0.018 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	4,173	98	
	4,173		100.00% Impervious Area

**Subcatchment 17: Post (Pub F)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Pond 18: PUBLIC LIDA F**

Inflow Area = 0.096 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 year event  
 Inflow = 0.06 cfs @ 7.81 hrs, Volume= 0.018 af  
 Outflow = 0.01 cfs @ 11.03 hrs, Volume= 0.018 af, Atten= 81%, Lag= 193.3 min  
 Primary = 0.01 cfs @ 11.03 hrs, Volume= 0.018 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 102.56' @ 11.03 hrs Surf.Area= 252 sf Storage= 258 cf

Plug-Flow detention time= 326.3 min calculated for 0.018 af (100% of inflow)  
 Center-of-Mass det. time= 326.2 min ( 995.0 - 668.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	554 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	252	0.0	0	0
101.50	252	40.0	151	151
103.00	252	40.0	151	302
104.00	252	100.0	252	554

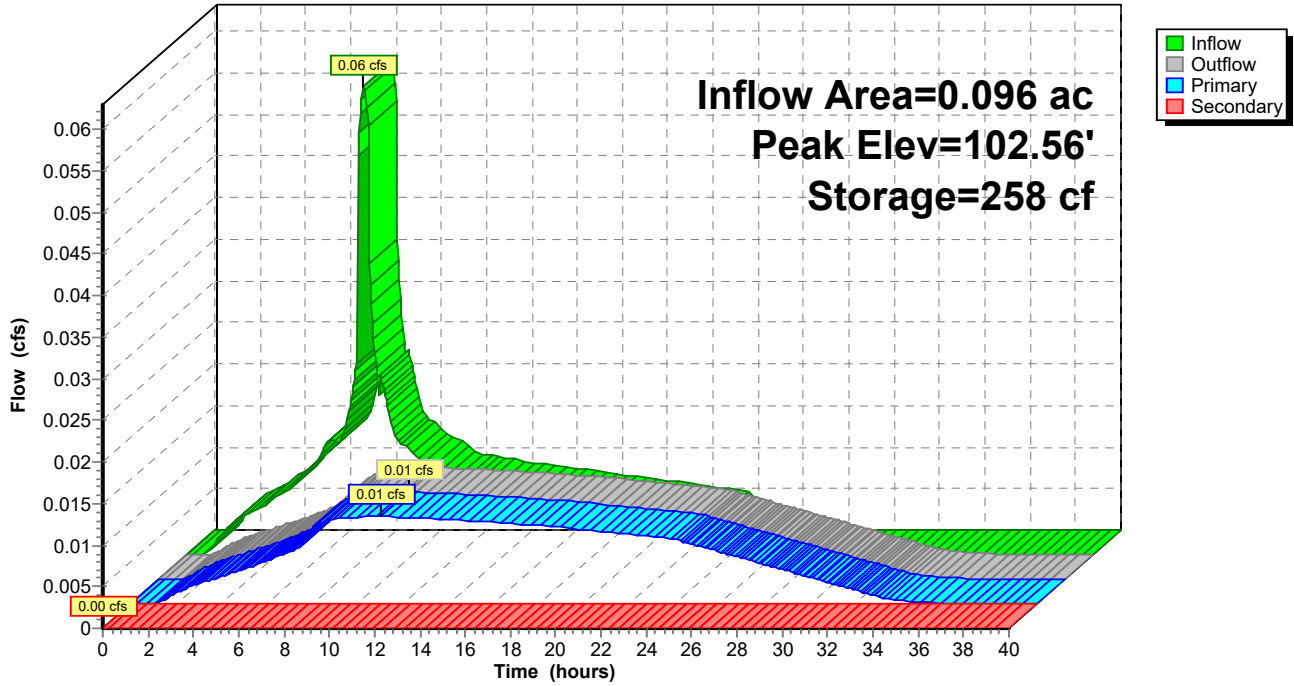
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 11.03 hrs HW=102.56' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.68 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

Pond 18: PUBLIC LIDA F

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 1: Pre (Pub A)**

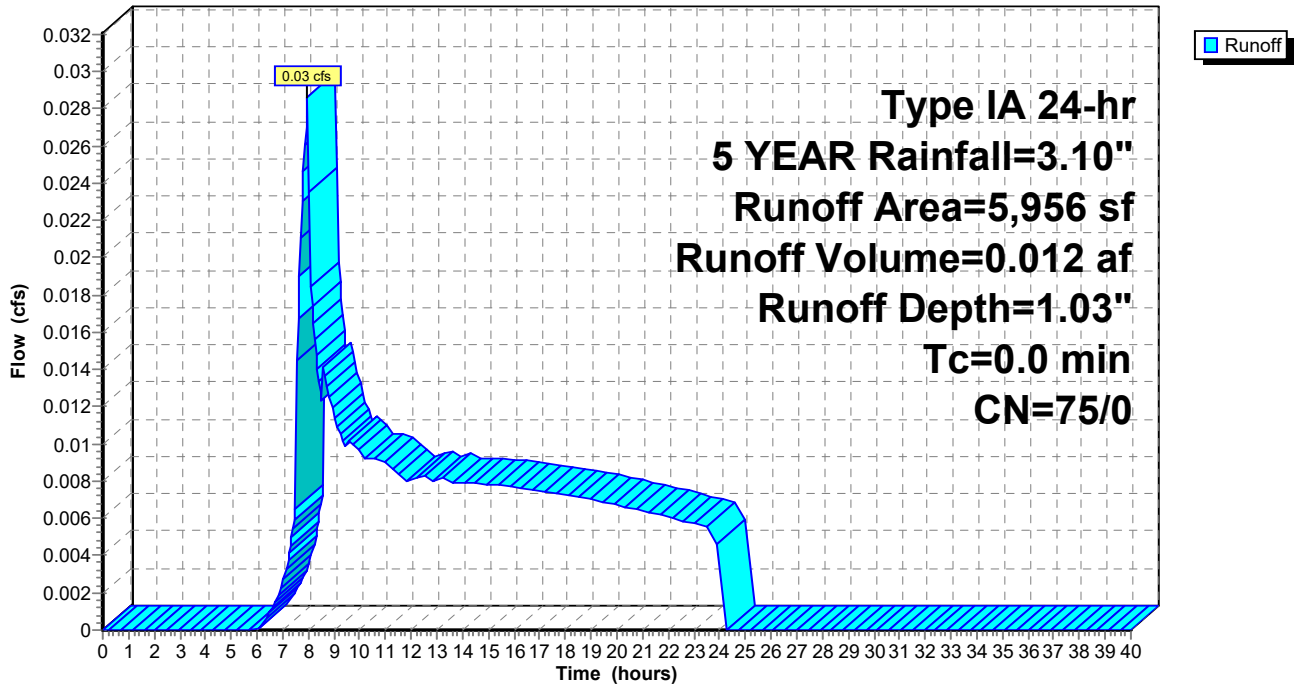
Runoff = 0.03 cfs @ 7.98 hrs, Volume= 0.012 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	5,956	75	
	5,956		100.00% Pervious Area

**Subcatchment 1: Pre (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 2: Post (Pub A)**

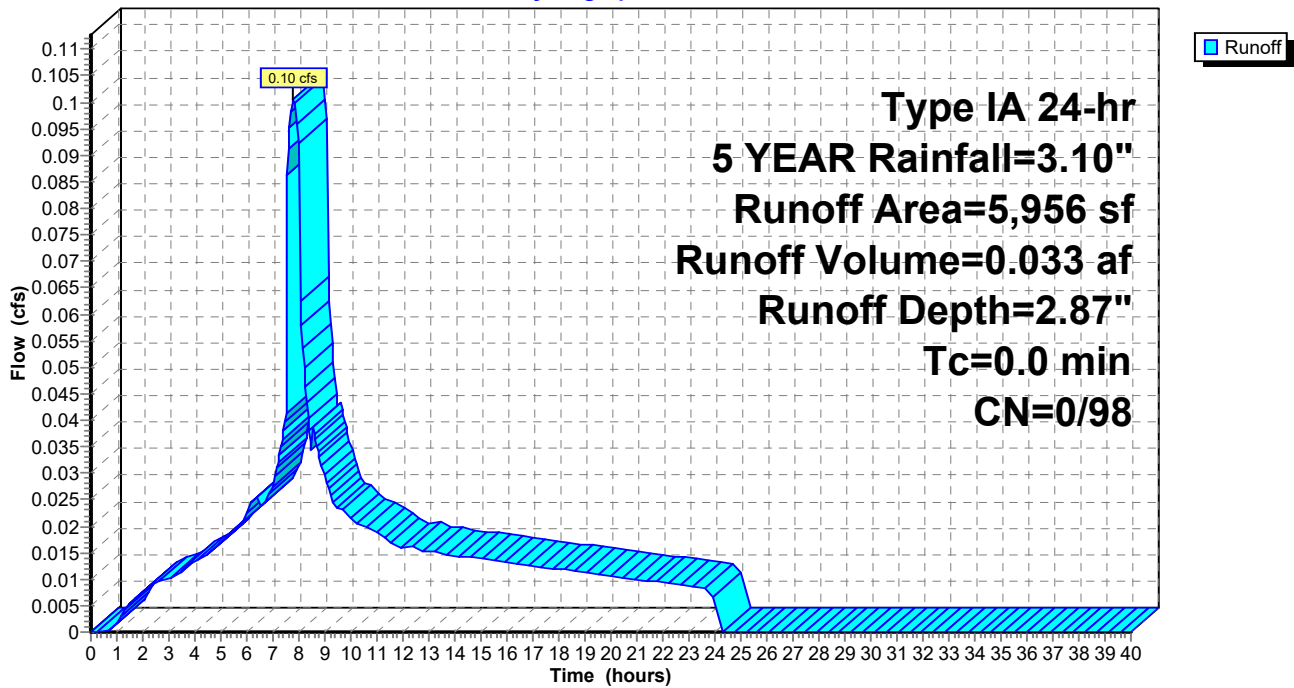
Runoff = 0.10 cfs @ 7.81 hrs, Volume= 0.033 af, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	5,956	98	
	5,956		100.00% Impervious Area

**Subcatchment 2: Post (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Pond 3: PUBIC LIDA A**

Inflow Area = 0.137 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event  
 Inflow = 0.10 cfs @ 7.81 hrs, Volume= 0.033 af  
 Outflow = 0.01 cfs @ 15.26 hrs, Volume= 0.031 af, Atten= 86%, Lag= 447.6 min  
 Primary = 0.01 cfs @ 15.26 hrs, Volume= 0.031 af  
 Secondary = 0.00 cfs @ 15.26 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.51' @ 15.26 hrs Surf.Area= 374 sf Storage= 639 cf

Plug-Flow detention time= 619.9 min calculated for 0.031 af (94% of inflow)  
 Center-of-Mass det. time= 577.4 min ( 1,239.7 - 662.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

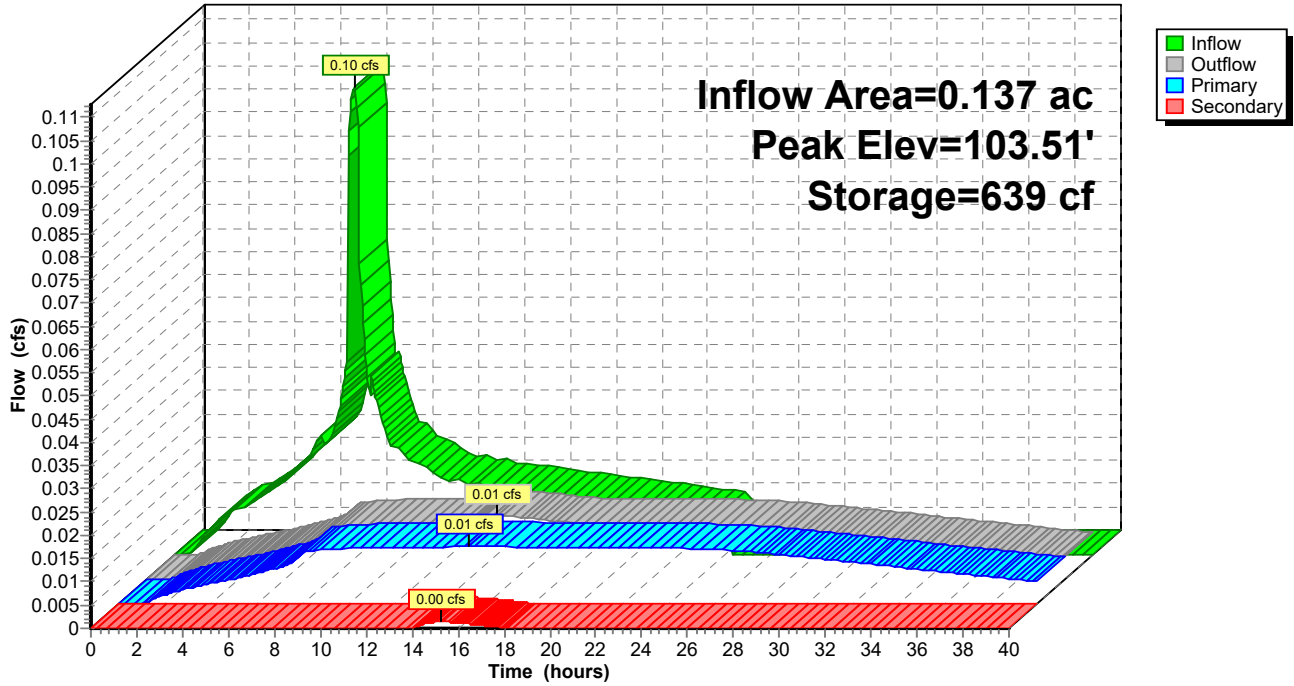
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 15.26 hrs HW=103.51' (Free Discharge)  
 ↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 8.99 fps)

**Secondary OutFlow** Max=0.00 cfs @ 15.26 hrs HW=103.51' (Free Discharge)  
 ↑**2=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.32 fps)

Pond 3: PUBIC LIDA A

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 4: Pre (Pub B)**

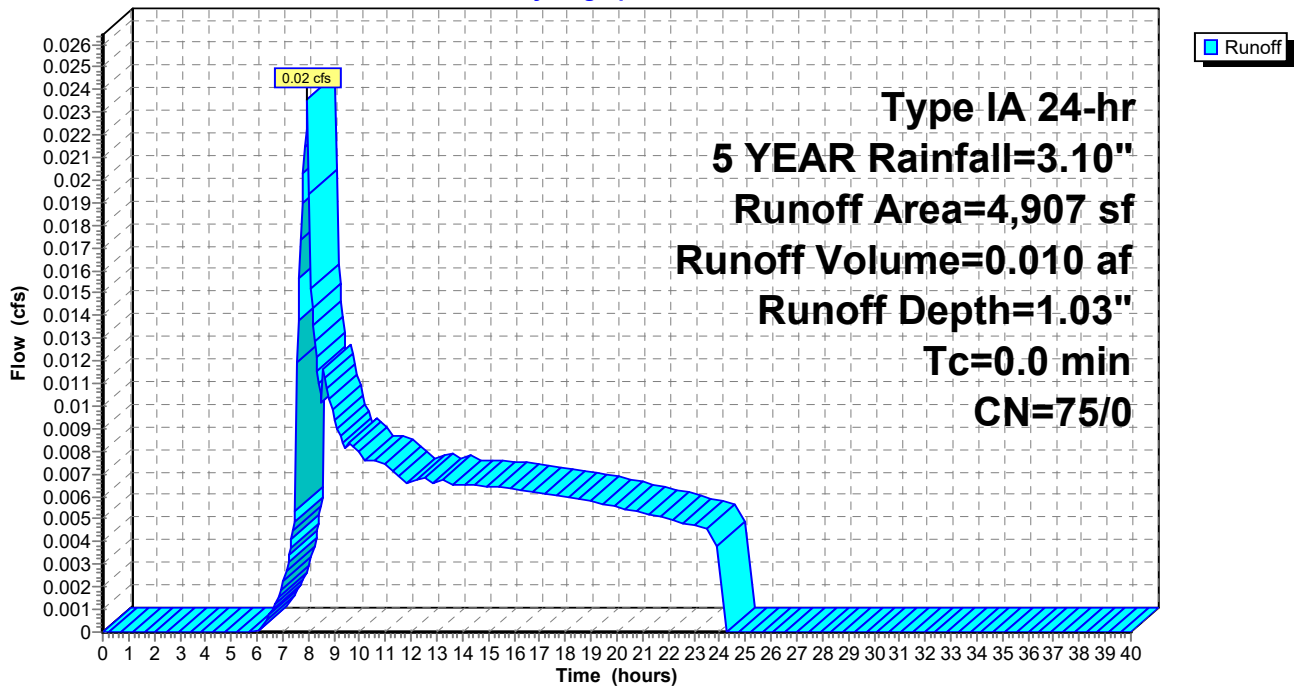
Runoff = 0.02 cfs @ 7.98 hrs, Volume= 0.010 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,907	75	
	4,907		100.00% Pervious Area

**Subcatchment 4: Pre (Pub B)**

Hydrograph



**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

HydroCAD® 10.00-15 s/n 09142 © 2015 HydroCAD Software Solutions LLC

Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 5: Post (Pub B)**

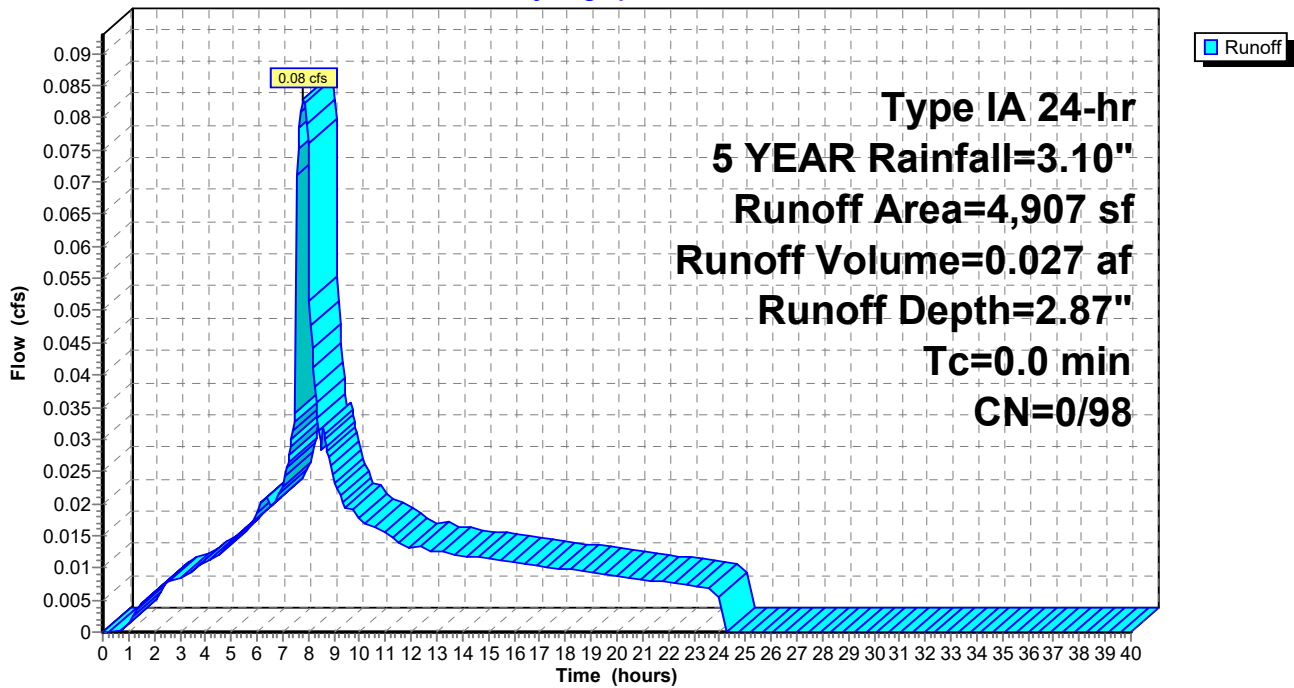
Runoff = 0.08 cfs @ 7.81 hrs, Volume= 0.027 af, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,907	98	
	4,907		100.00% Impervious Area

**Subcatchment 5: Post (Pub B)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Pond 6: PUBIC LIDA B**

Inflow Area = 0.113 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event  
 Inflow = 0.08 cfs @ 7.81 hrs, Volume= 0.027 af  
 Outflow = 0.01 cfs @ 11.41 hrs, Volume= 0.027 af, Atten= 83%, Lag= 216.2 min  
 Primary = 0.01 cfs @ 11.41 hrs, Volume= 0.027 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 102.31' @ 11.41 hrs Surf.Area= 448 sf Storage= 413 cf

Plug-Flow detention time= 385.3 min calculated for 0.027 af (100% of inflow)  
 Center-of-Mass det. time= 385.6 min ( 1,047.9 - 662.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	986 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	448	0.0	0	0
101.50	448	40.0	269	269
103.00	448	40.0	269	538
104.00	448	100.0	448	986

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 11.41 hrs HW=102.31' (Free Discharge)

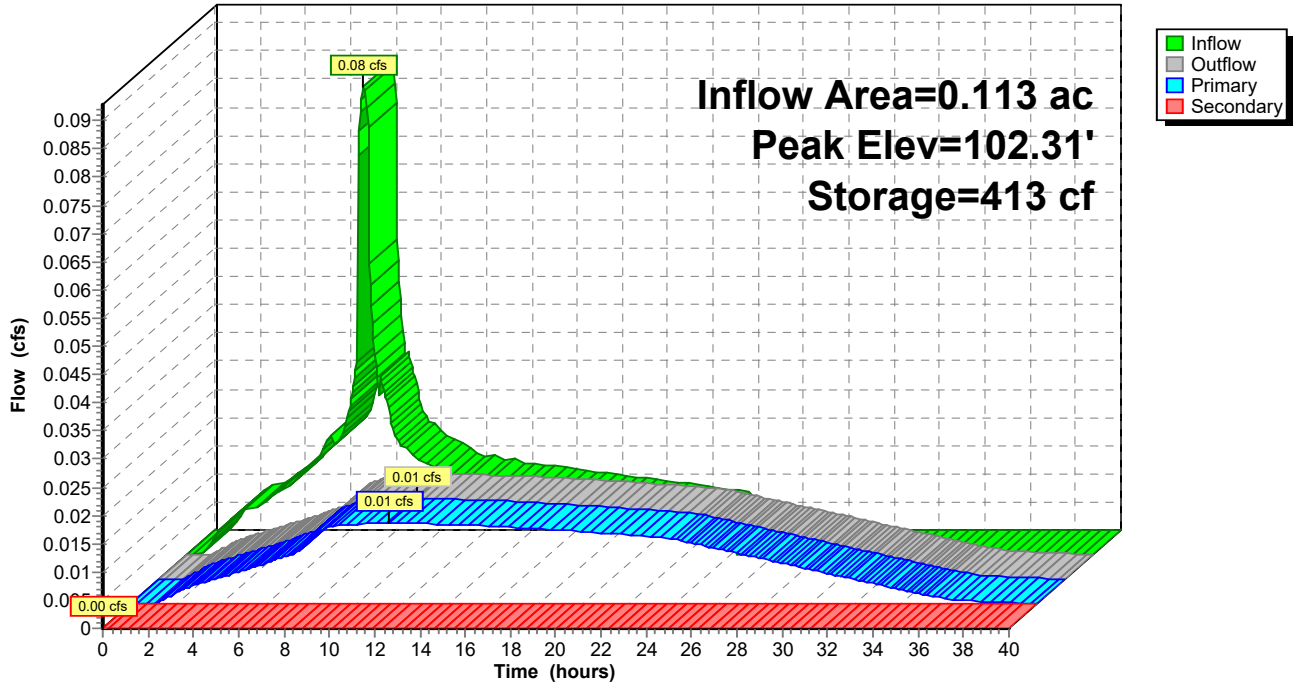
↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.27 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑2=Orifice/Grate ( Controls 0.00 cfs)

Pond 6: PUBIC LIDA B

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 7: Pre (Pub C)**

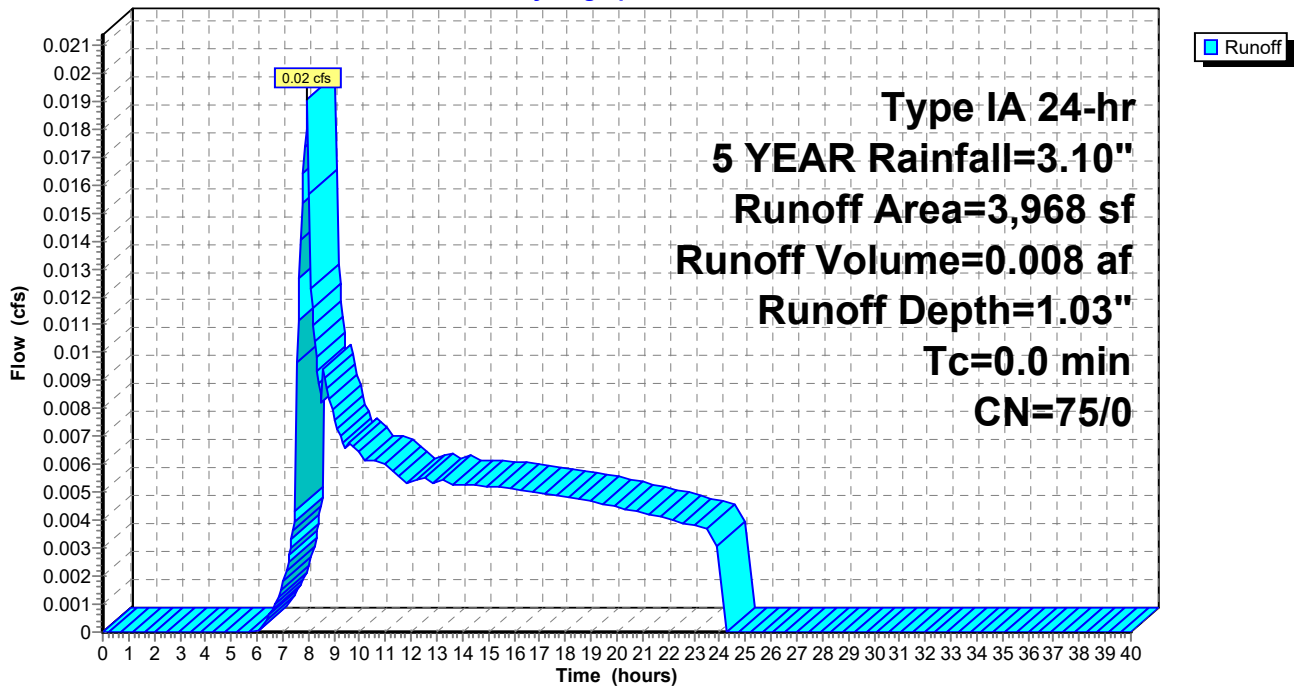
Runoff = 0.02 cfs @ 7.98 hrs, Volume= 0.008 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	3,968	75	
	3,968		100.00% Pervious Area

**Subcatchment 7: Pre (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 8: Post (Pub C)**

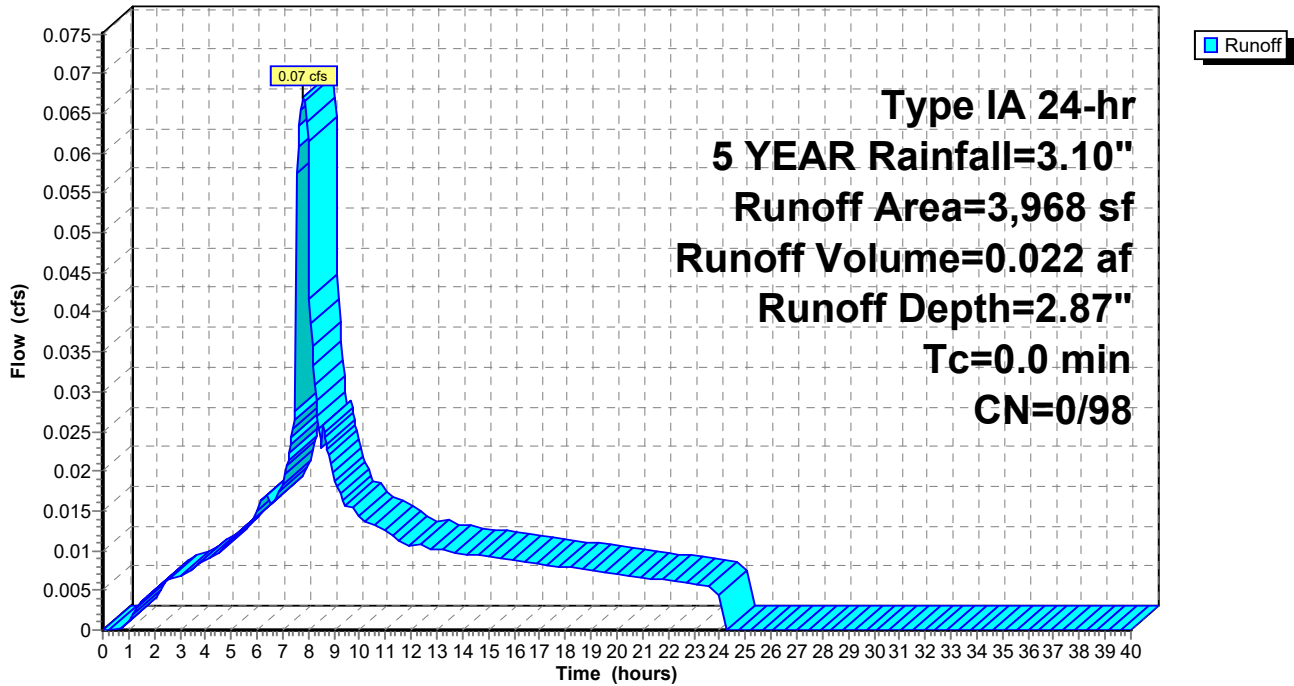
Runoff = 0.07 cfs @ 7.81 hrs, Volume= 0.022 af, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	3,968	98	
	3,968		100.00% Impervious Area

**Subcatchment 8: Post (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Pond 9: PUBIC LIDA C**

Inflow Area = 0.091 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event  
 Inflow = 0.07 cfs @ 7.81 hrs, Volume= 0.022 af  
 Outflow = 0.02 cfs @ 9.21 hrs, Volume= 0.022 af, Atten= 74%, Lag= 84.4 min  
 Primary = 0.02 cfs @ 9.21 hrs, Volume= 0.022 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 101.82' @ 9.21 hrs Surf.Area= 324 sf Storage= 235 cf

Plug-Flow detention time= 165.8 min calculated for 0.022 af (100% of inflow)  
 Center-of-Mass det. time= 166.0 min ( 828.3 - 662.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	713 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	324	0.0	0	0
101.50	324	40.0	194	194
103.00	324	40.0	194	389
104.00	324	100.0	324	713

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.7" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 9.21 hrs HW=101.82' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.44 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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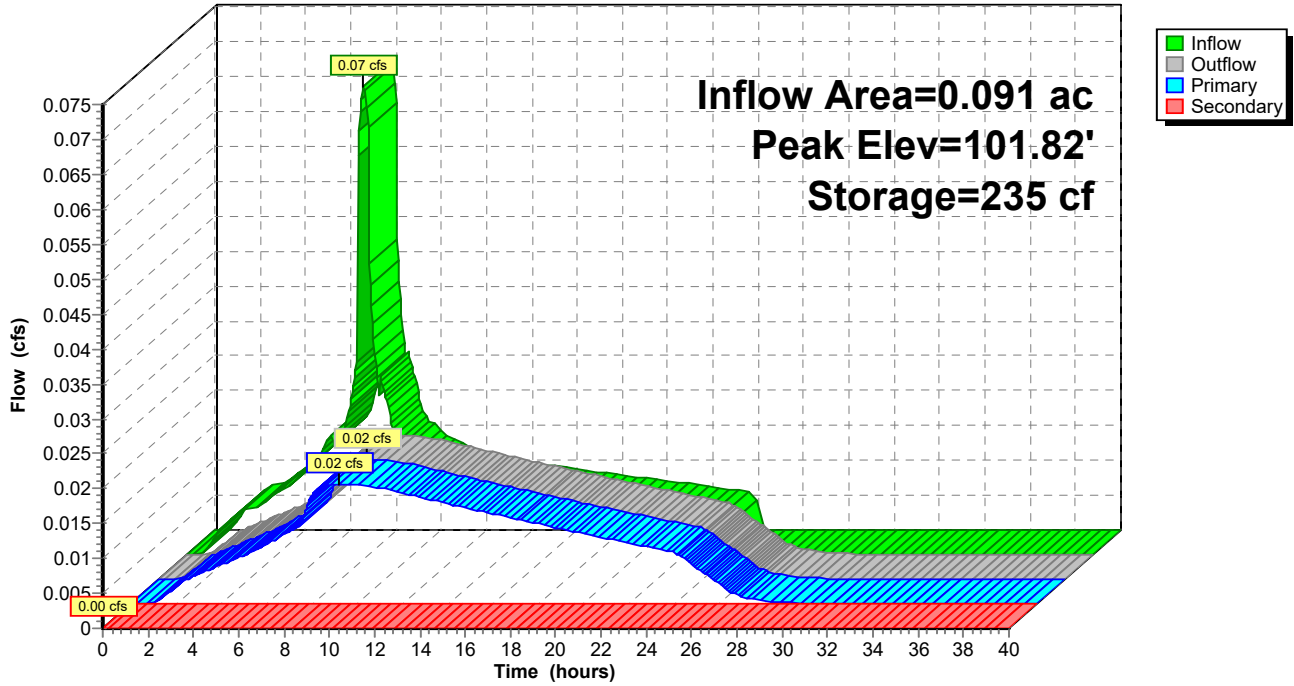
Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Pond 9: PUBIC LIDA C**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 10: Pre (Pub D)**

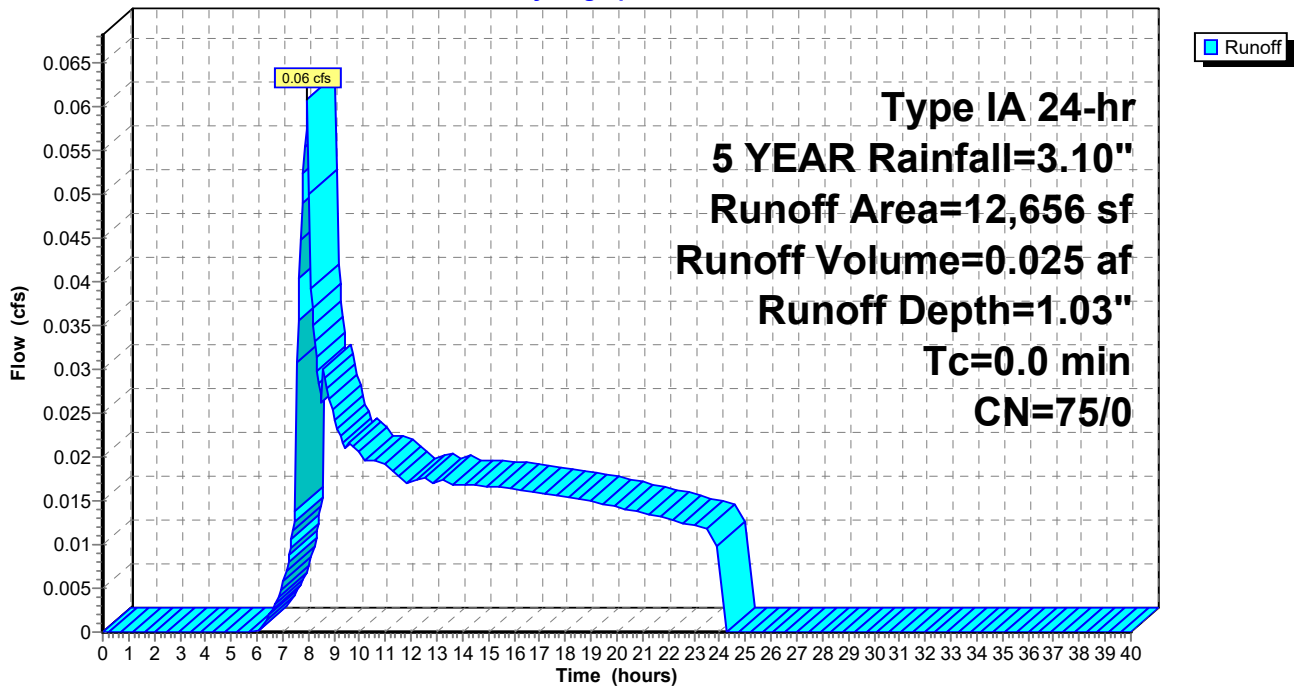
Runoff = 0.06 cfs @ 7.98 hrs, Volume= 0.025 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	12,656	75	
	12,656		100.00% Pervious Area

**Subcatchment 10: Pre (Pub D)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 11: Post (Pub D)**

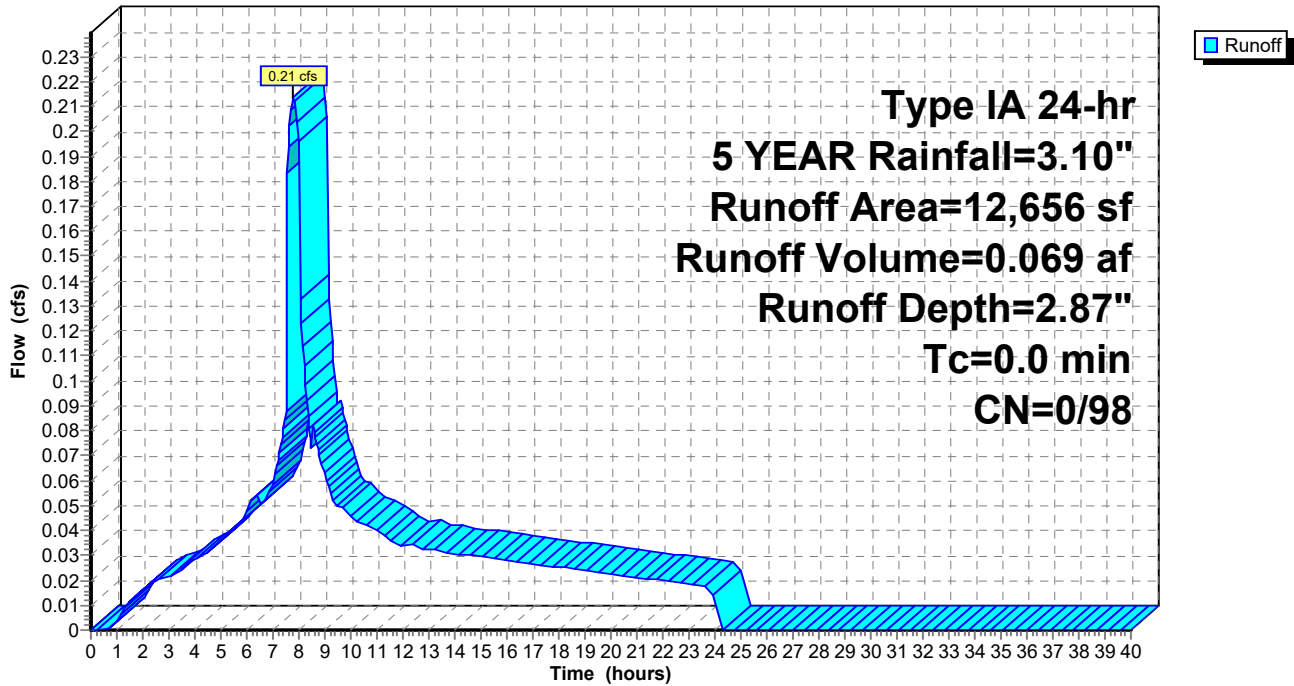
Runoff = 0.21 cfs @ 7.81 hrs, Volume= 0.069 af, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	12,656	98	
	12,656		100.00% Impervious Area

**Subcatchment 11: Post (Pub D)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Pond 12: PUBIC LIDA D**

Inflow Area = 0.291 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event  
 Inflow = 0.21 cfs @ 7.81 hrs, Volume= 0.069 af  
 Outflow = 0.04 cfs @ 11.00 hrs, Volume= 0.060 af, Atten= 81%, Lag= 191.8 min  
 Primary = 0.02 cfs @ 11.00 hrs, Volume= 0.048 af  
 Secondary = 0.02 cfs @ 11.00 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.58' @ 11.00 hrs Surf.Area= 759 sf Storage= 1,349 cf

Plug-Flow detention time= 645.1 min calculated for 0.060 af (86% of inflow)  
 Center-of-Mass det. time= 545.9 min ( 1,208.2 - 662.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	1,670 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	759	0.0	0	0
101.50	759	40.0	455	455
103.00	759	40.0	455	911
104.00	759	100.0	759	1,670

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 11.00 hrs HW=103.58' (Free Discharge)

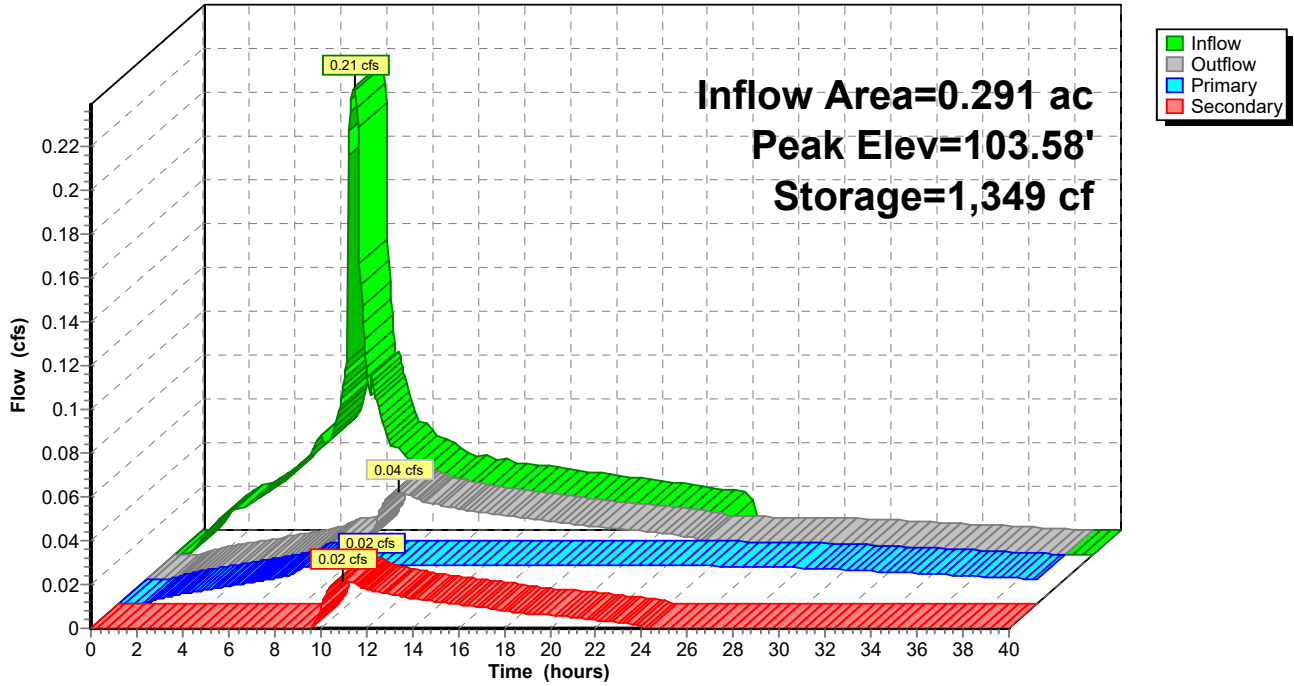
↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 9.07 fps)

**Secondary OutFlow** Max=0.02 cfs @ 11.00 hrs HW=103.58' (Free Discharge)

↑**2=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.94 fps)

Pond 12: PUBIC LIDA D

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 13: Pre (Pub E)**

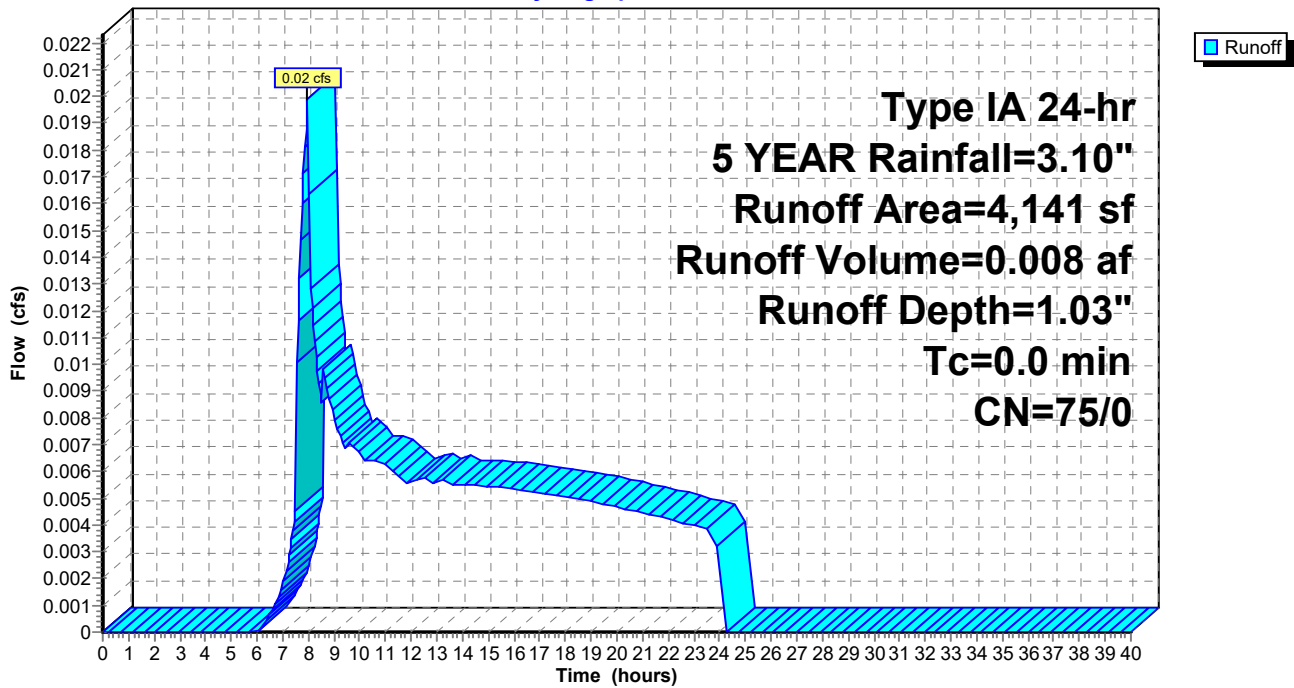
Runoff = 0.02 cfs @ 7.98 hrs, Volume= 0.008 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,141	75	
	4,141		100.00% Pervious Area

**Subcatchment 13: Pre (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 14: Post (Pub E)**

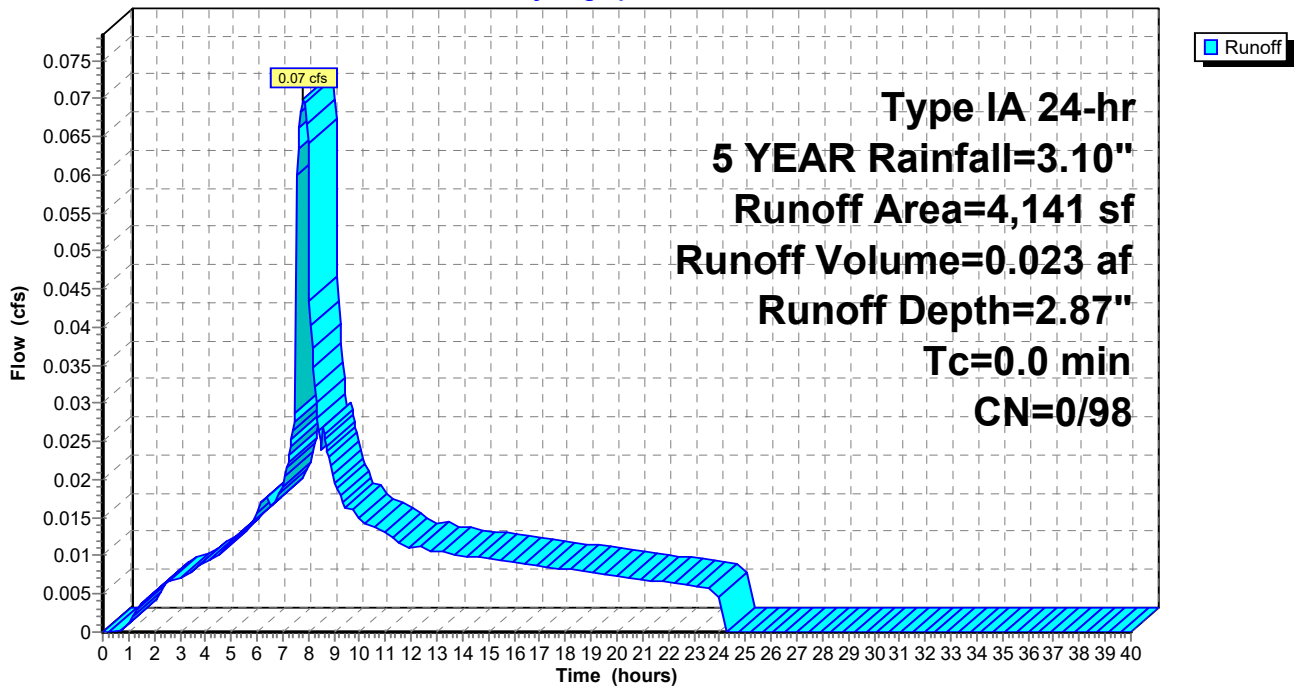
Runoff = 0.07 cfs @ 7.81 hrs, Volume= 0.023 af, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,141	98	
	4,141		100.00% Impervious Area

**Subcatchment 14: Post (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Pond 15: PUBIC LIDA E**

Inflow Area = 0.095 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event  
 Inflow = 0.07 cfs @ 7.81 hrs, Volume= 0.023 af  
 Outflow = 0.01 cfs @ 13.31 hrs, Volume= 0.023 af, Atten= 85%, Lag= 330.5 min  
 Primary = 0.01 cfs @ 13.31 hrs, Volume= 0.023 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 102.59' @ 13.31 hrs Surf.Area= 374 sf Storage= 388 cf

Plug-Flow detention time= 490.3 min calculated for 0.023 af (99% of inflow)  
 Center-of-Mass det. time= 484.9 min ( 1,147.2 - 662.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 13.31 hrs HW=102.59' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 7.72 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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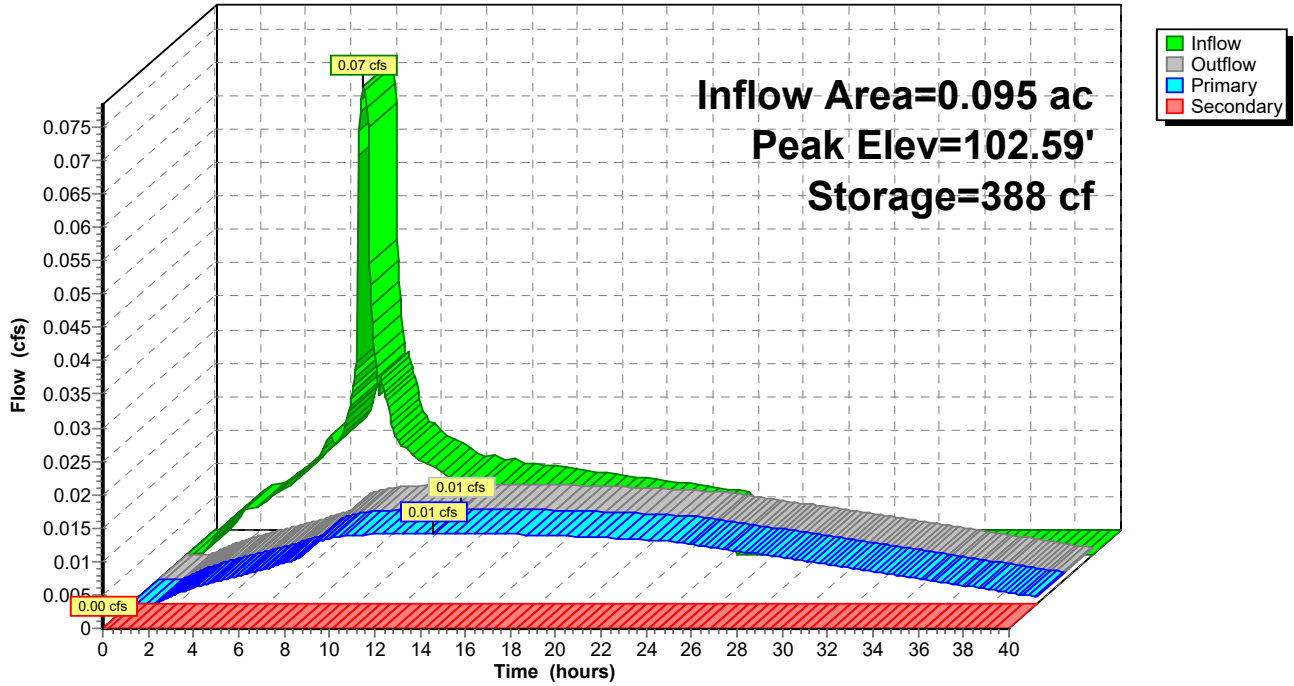
Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Pond 15: PUBIC LIDA E**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 16: Pre (Pub F)**

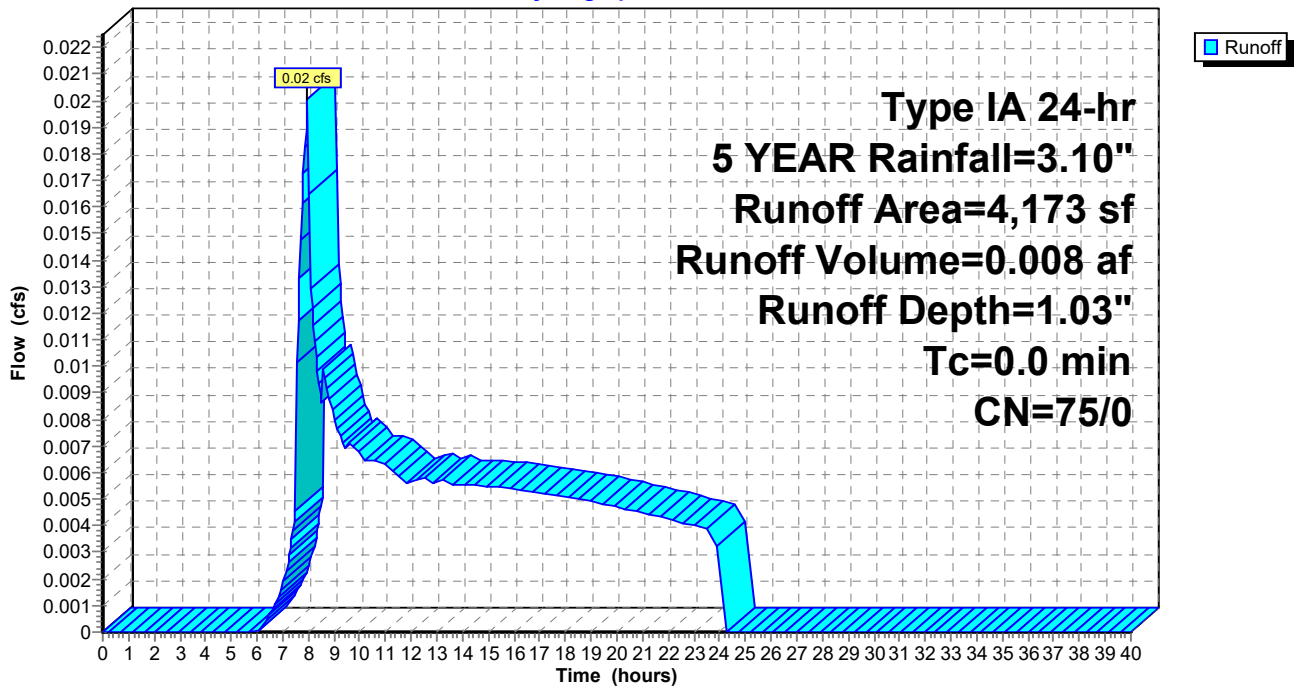
Runoff = 0.02 cfs @ 7.98 hrs, Volume= 0.008 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,173	75	
	4,173		100.00% Pervious Area

**Subcatchment 16: Pre (Pub F)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 17: Post (Pub F)**

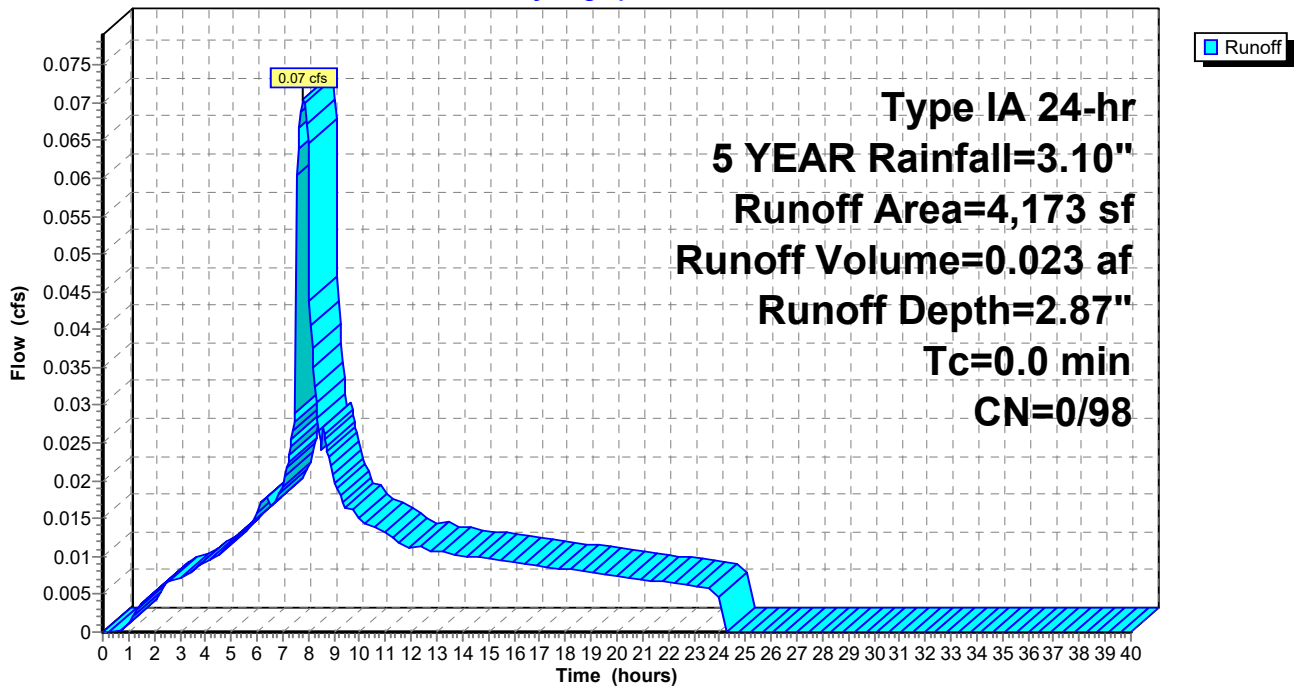
Runoff = 0.07 cfs @ 7.81 hrs, Volume= 0.023 af, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,173	98	
	4,173		100.00% Impervious Area

**Subcatchment 17: Post (Pub F)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Pond 18: PUBLIC LIDA F**

Inflow Area = 0.096 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event  
 Inflow = 0.07 cfs @ 7.81 hrs, Volume= 0.023 af  
 Outflow = 0.01 cfs @ 11.54 hrs, Volume= 0.023 af, Atten= 83%, Lag= 223.9 min  
 Primary = 0.01 cfs @ 11.54 hrs, Volume= 0.023 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.20' @ 11.54 hrs Surf.Area= 252 sf Storage= 353 cf

Plug-Flow detention time= 388.9 min calculated for 0.023 af (100% of inflow)  
 Center-of-Mass det. time= 389.4 min ( 1,051.7 - 662.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	554 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	252	0.0	0	0
101.50	252	40.0	151	151
103.00	252	40.0	151	302
104.00	252	100.0	252	554

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 11.54 hrs HW=103.20' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 8.59 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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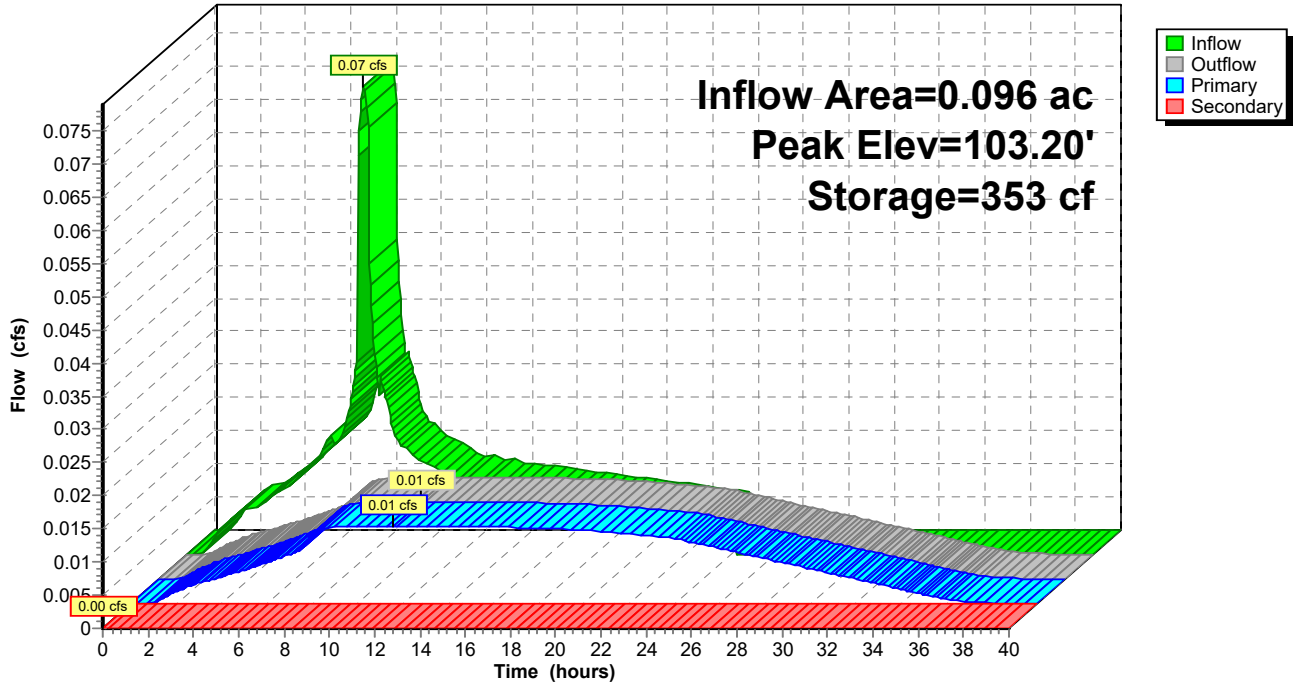
Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Pond 18: PUBLIC LIDA F**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 1: Pre (Pub A)**

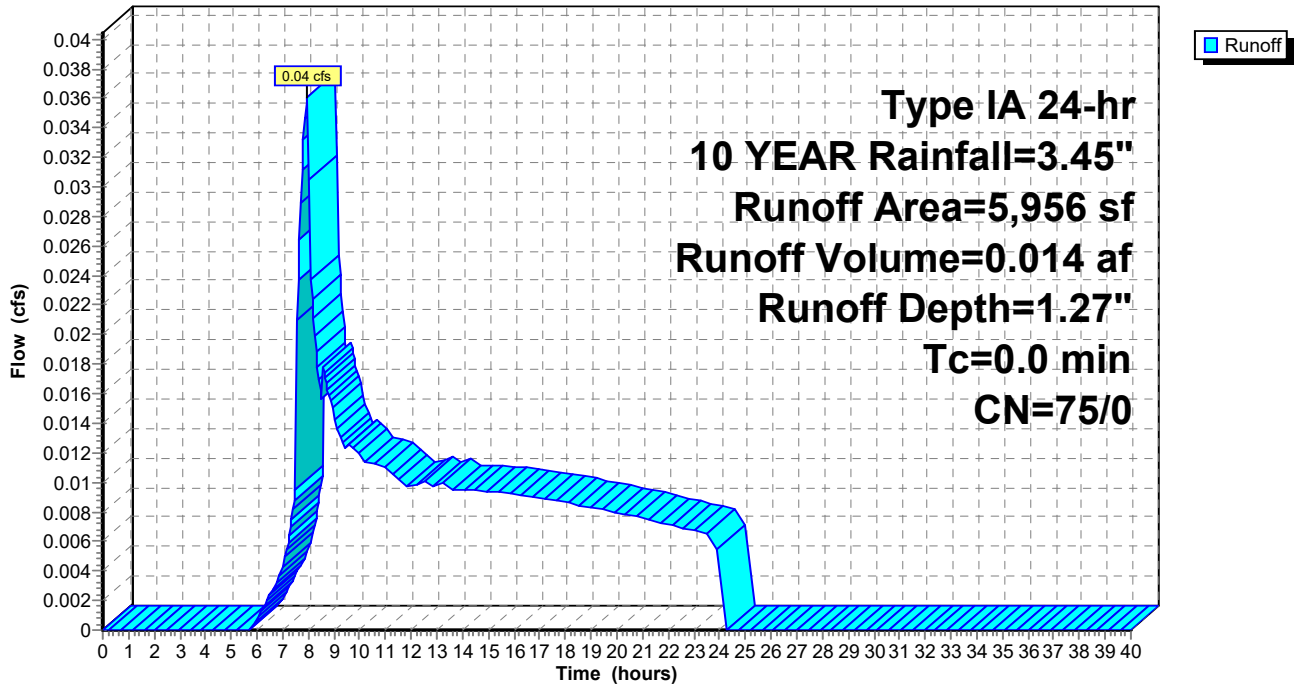
Runoff = 0.04 cfs @ 7.96 hrs, Volume= 0.014 af, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	5,956	75	
	5,956		100.00% Pervious Area

**Subcatchment 1: Pre (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 2: Post (Pub A)**

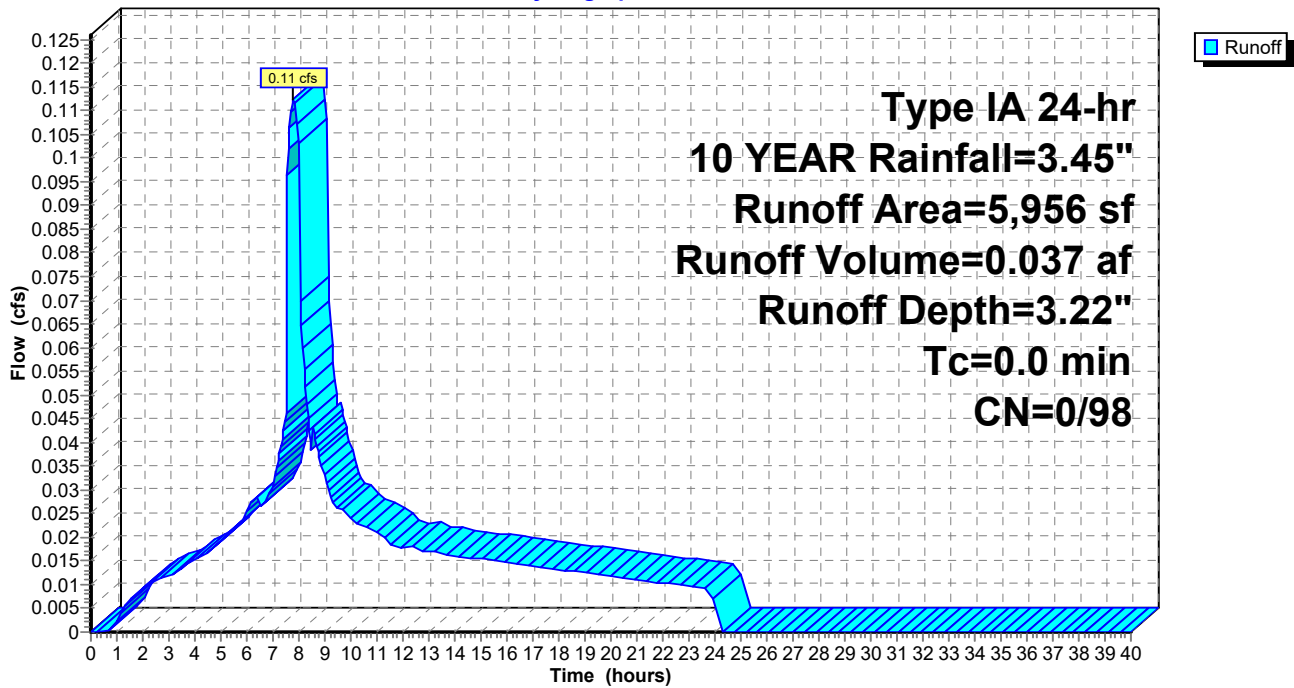
Runoff = 0.11 cfs @ 7.80 hrs, Volume= 0.037 af, Depth= 3.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	5,956	98	
	5,956		100.00% Impervious Area

**Subcatchment 2: Post (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Pond 3: PUBIC LIDA A**

Inflow Area = 0.137 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event  
 Inflow = 0.11 cfs @ 7.80 hrs, Volume= 0.037 af  
 Outflow = 0.02 cfs @ 10.73 hrs, Volume= 0.035 af, Atten= 81%, Lag= 175.4 min  
 Primary = 0.01 cfs @ 10.73 hrs, Volume= 0.031 af  
 Secondary = 0.01 cfs @ 10.73 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.55' @ 10.73 hrs Surf.Area= 374 sf Storage= 654 cf

Plug-Flow detention time= 577.7 min calculated for 0.035 af (94% of inflow)  
 Center-of-Mass det. time= 535.6 min ( 1,195.1 - 659.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 10.73 hrs HW=103.55' (Free Discharge)

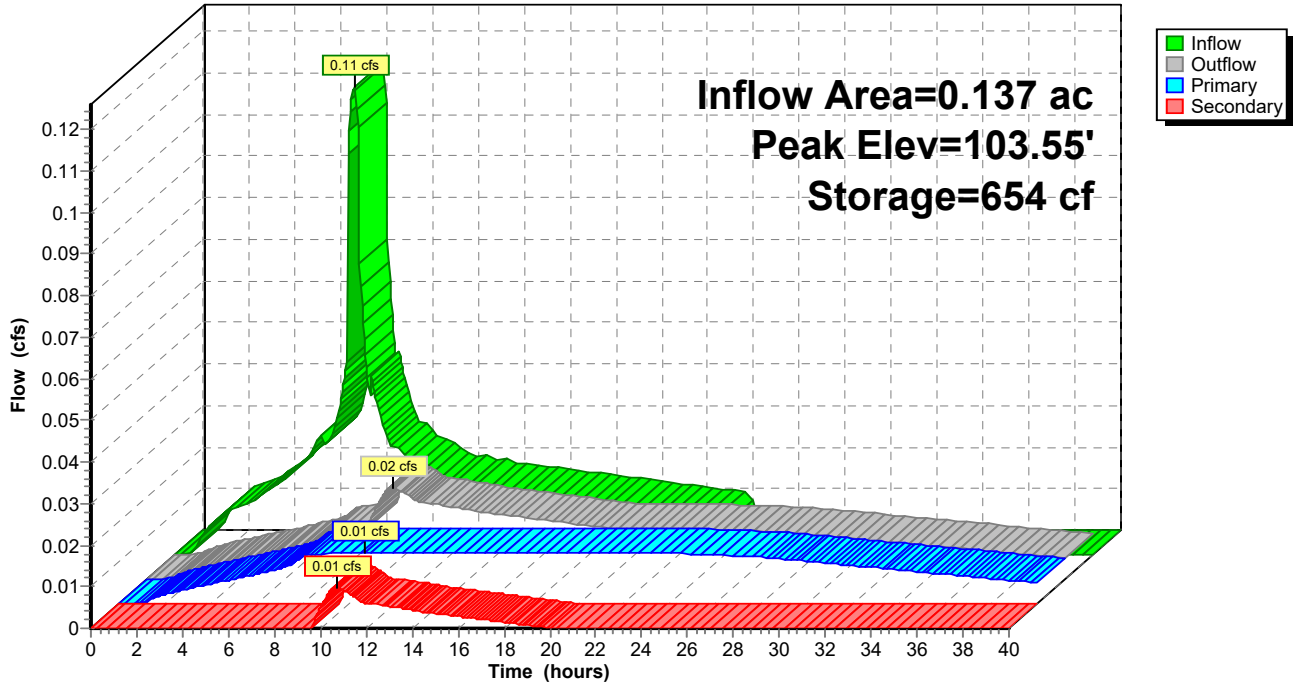
↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.04 fps)

**Secondary OutFlow** Max=0.01 cfs @ 10.73 hrs HW=103.55' (Free Discharge)

↑**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.75 fps)

Pond 3: PUBIC LIDA A

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 4: Pre (Pub B)**

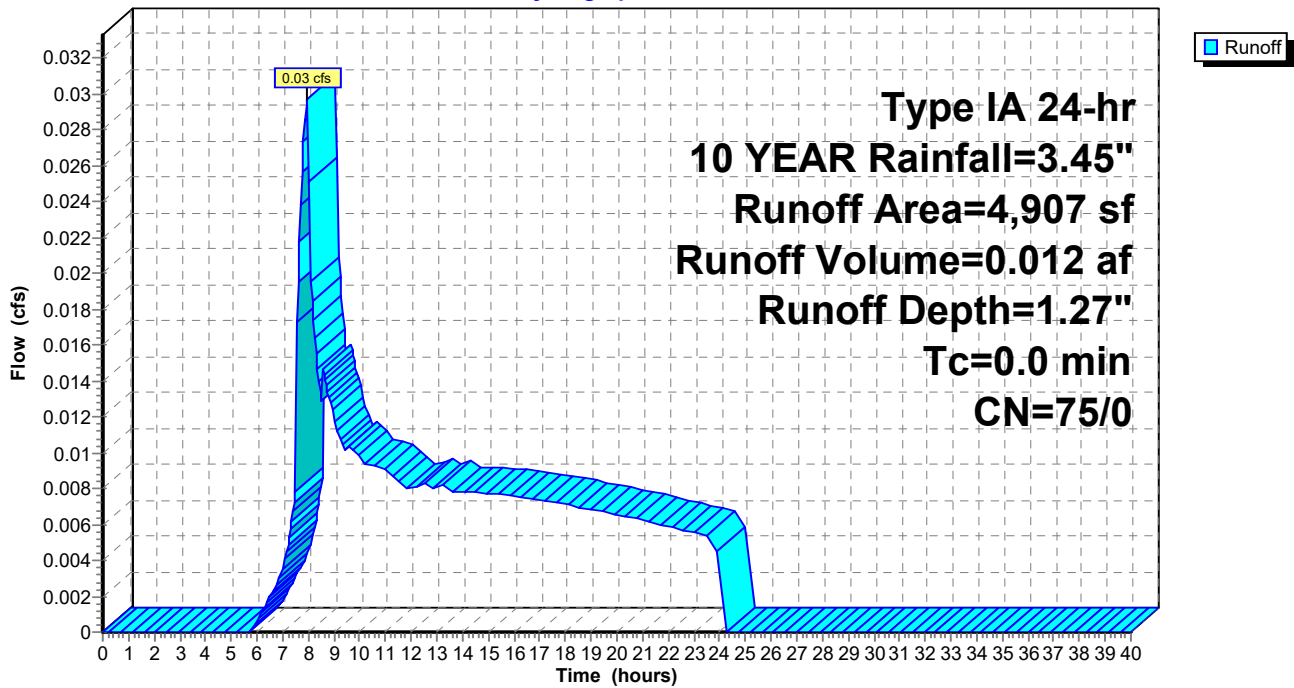
Runoff = 0.03 cfs @ 7.96 hrs, Volume= 0.012 af, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	4,907	75	
	4,907		100.00% Pervious Area

**Subcatchment 4: Pre (Pub B)**

Hydrograph



**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 5: Post (Pub B)**

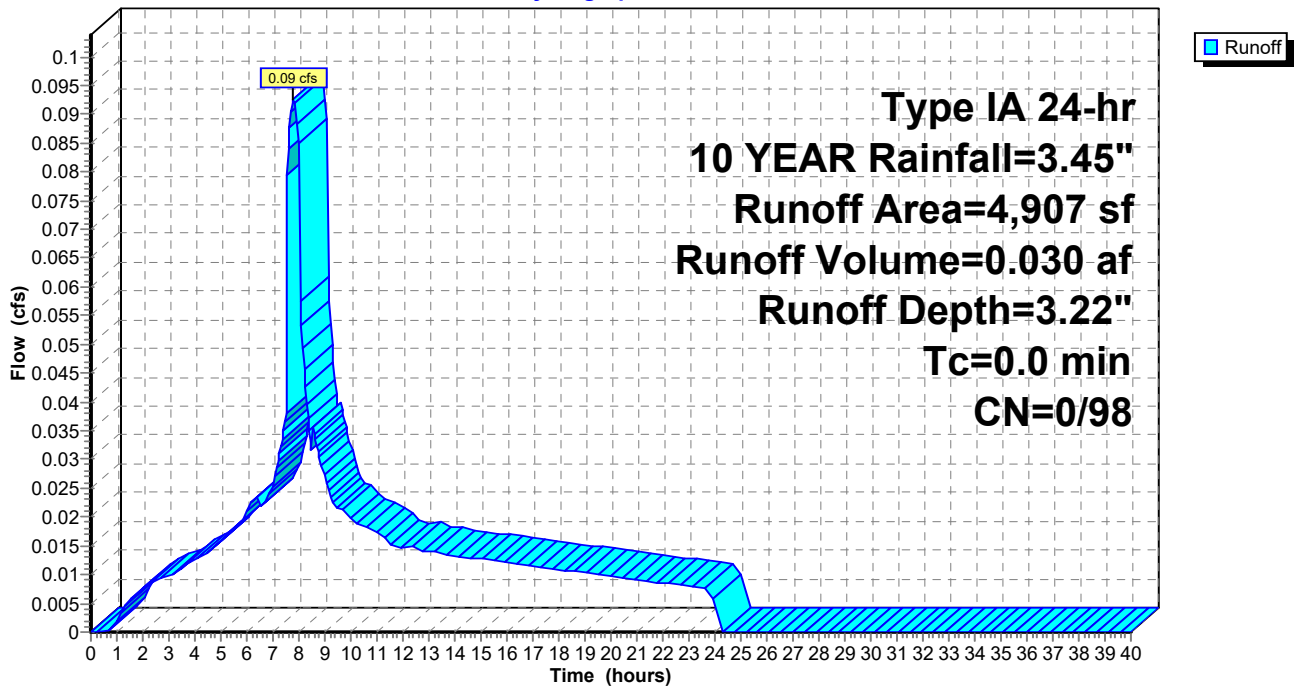
Runoff = 0.09 cfs @ 7.80 hrs, Volume= 0.030 af, Depth= 3.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	4,907	98	
	4,907		100.00% Impervious Area

**Subcatchment 5: Post (Pub B)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Pond 6: PUBIC LIDA B**

Inflow Area = 0.113 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event  
 Inflow = 0.09 cfs @ 7.80 hrs, Volume= 0.030 af  
 Outflow = 0.02 cfs @ 11.53 hrs, Volume= 0.030 af, Atten= 83%, Lag= 223.7 min  
 Primary = 0.02 cfs @ 11.53 hrs, Volume= 0.030 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 102.67' @ 11.53 hrs Surf.Area= 448 sf Storage= 478 cf

Plug-Flow detention time= 415.1 min calculated for 0.030 af (100% of inflow)  
 Center-of-Mass det. time= 414.4 min ( 1,073.8 - 659.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	986 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	448	0.0	0	0
101.50	448	40.0	269	269
103.00	448	40.0	269	538
104.00	448	100.0	448	986

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 11.53 hrs HW=102.67' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 7.83 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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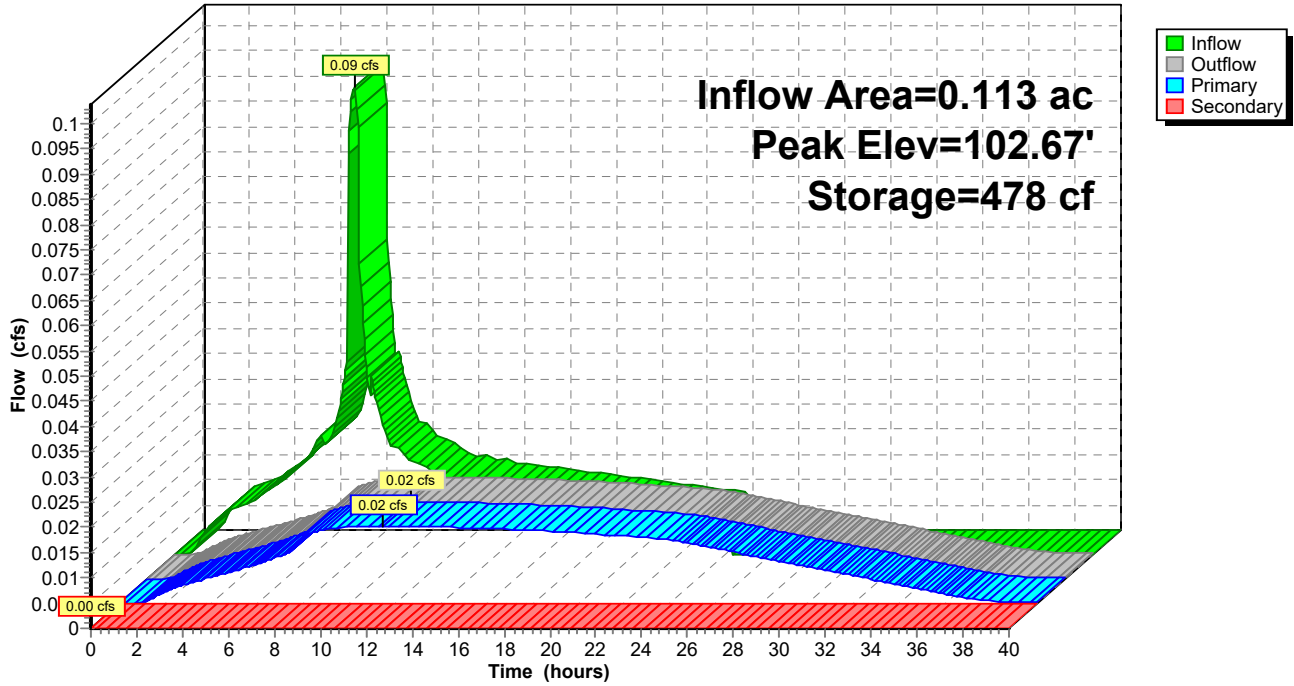
Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Pond 6: PUBIC LIDA B**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 7: Pre (Pub C)**

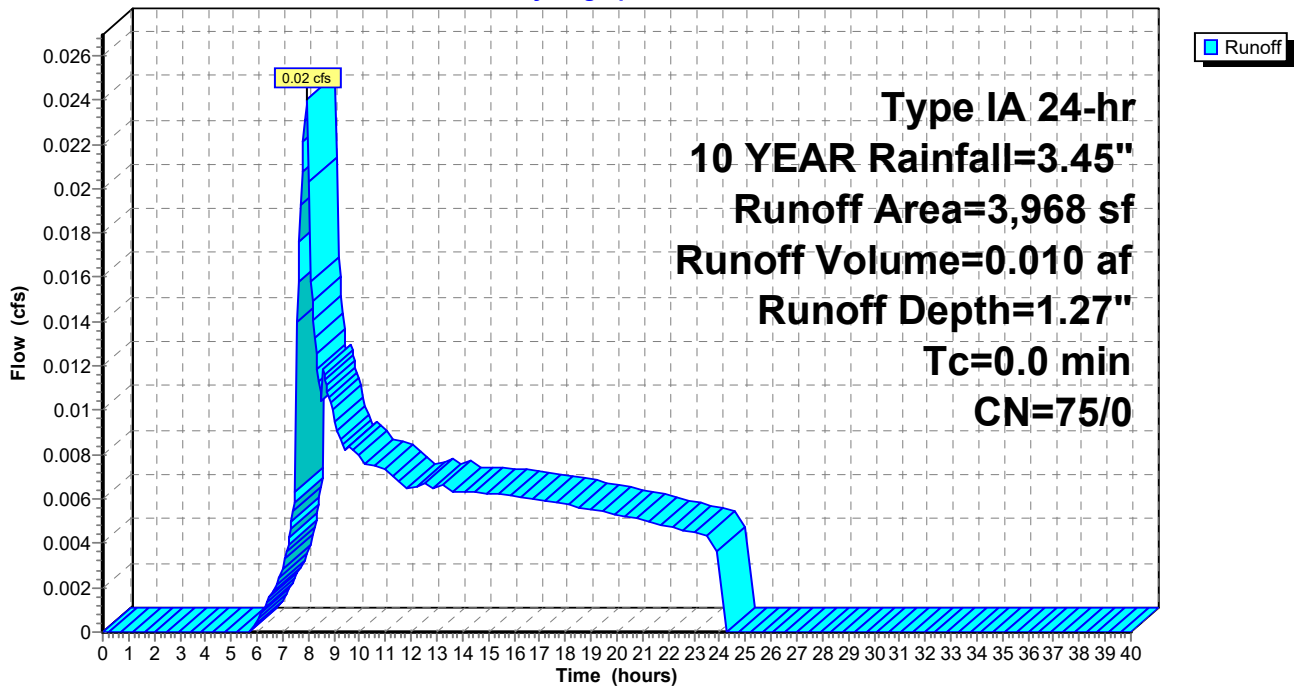
Runoff = 0.02 cfs @ 7.96 hrs, Volume= 0.010 af, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	3,968	75	
	3,968		100.00% Pervious Area

**Subcatchment 7: Pre (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 8: Post (Pub C)**

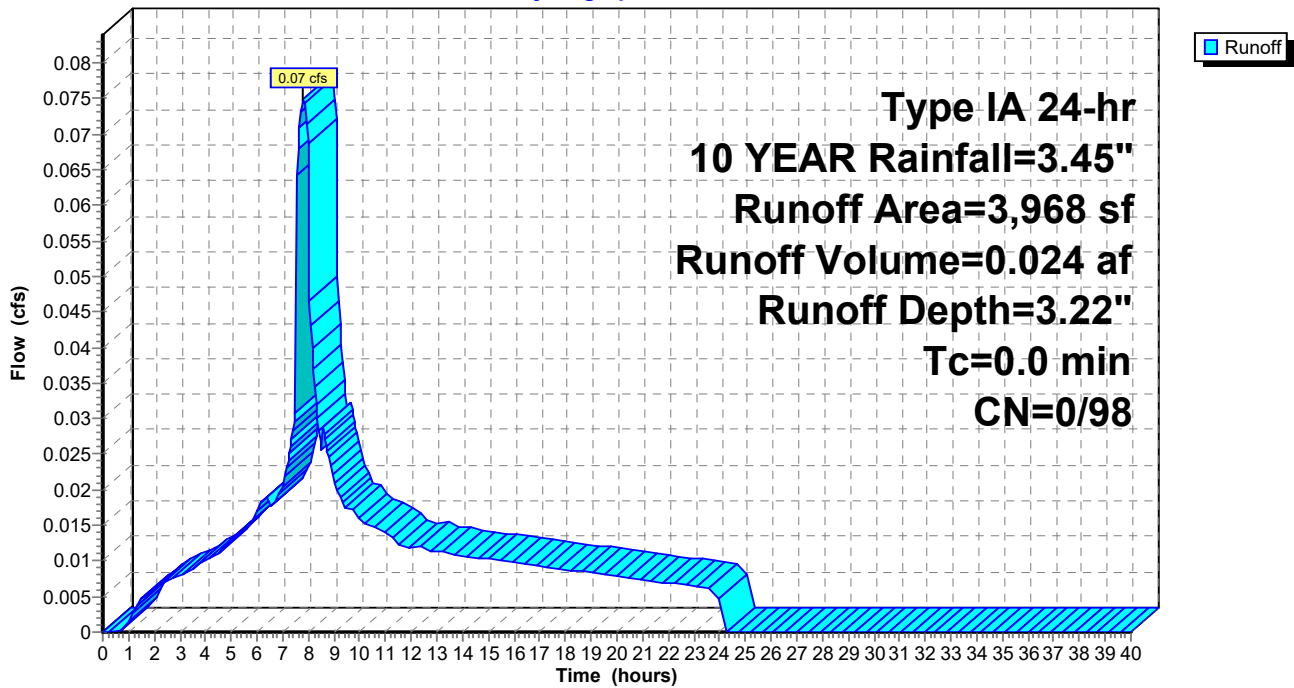
Runoff = 0.07 cfs @ 7.80 hrs, Volume= 0.024 af, Depth= 3.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	3,968	98	
	3,968		100.00% Impervious Area

**Subcatchment 8: Post (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Pond 9: PUBIC LIDA C**

Inflow Area = 0.091 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event  
 Inflow = 0.07 cfs @ 7.80 hrs, Volume= 0.024 af  
 Outflow = 0.02 cfs @ 9.29 hrs, Volume= 0.024 af, Atten= 75%, Lag= 88.9 min  
 Primary = 0.02 cfs @ 9.29 hrs, Volume= 0.024 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 102.11' @ 9.29 hrs Surf.Area= 324 sf Storage= 273 cf

Plug-Flow detention time= 180.9 min calculated for 0.024 af (100% of inflow)  
 Center-of-Mass det. time= 180.5 min ( 839.9 - 659.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	713 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	324	0.0	0	0
101.50	324	40.0	194	194
103.00	324	40.0	194	389
104.00	324	100.0	324	713

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.7" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 9.29 hrs HW=102.11' (Free Discharge)

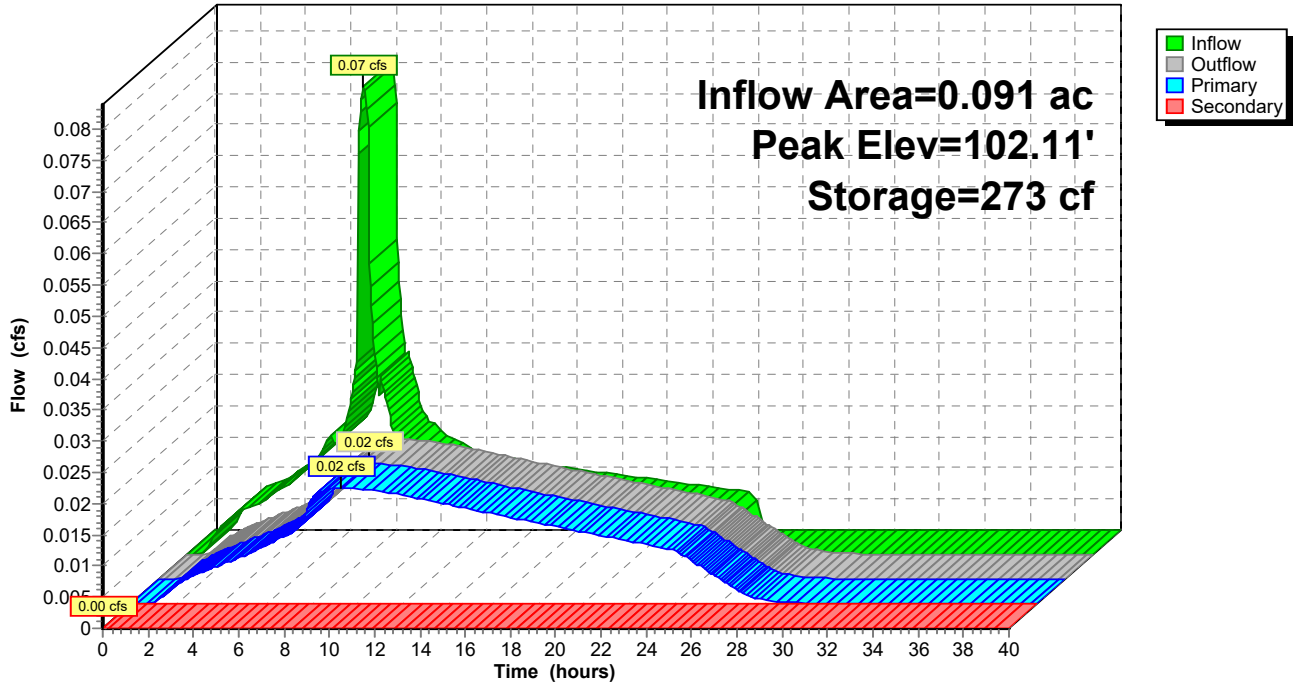
↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.94 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑2=Orifice/Grate ( Controls 0.00 cfs)

Pond 9: PUBIC LIDA C

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 10: Pre (Pub D)**

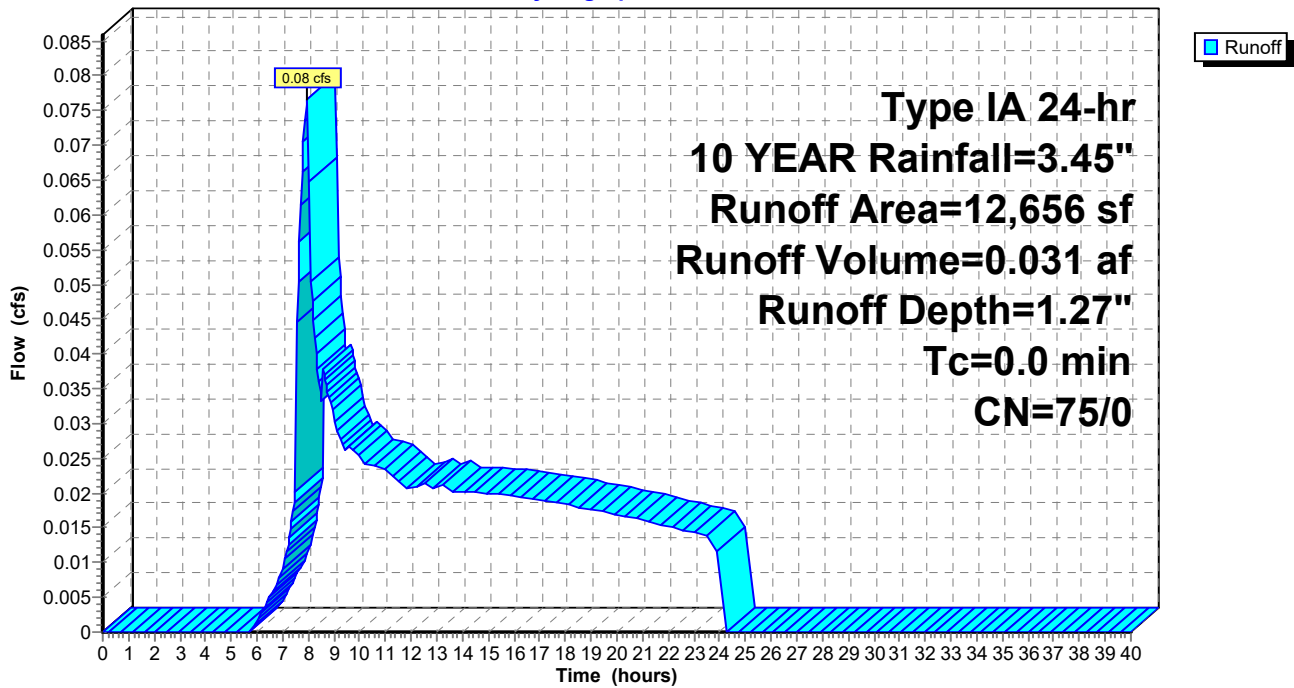
Runoff = 0.08 cfs @ 7.96 hrs, Volume= 0.031 af, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	12,656	75	
	12,656		100.00% Pervious Area

**Subcatchment 10: Pre (Pub D)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 11: Post (Pub D)**

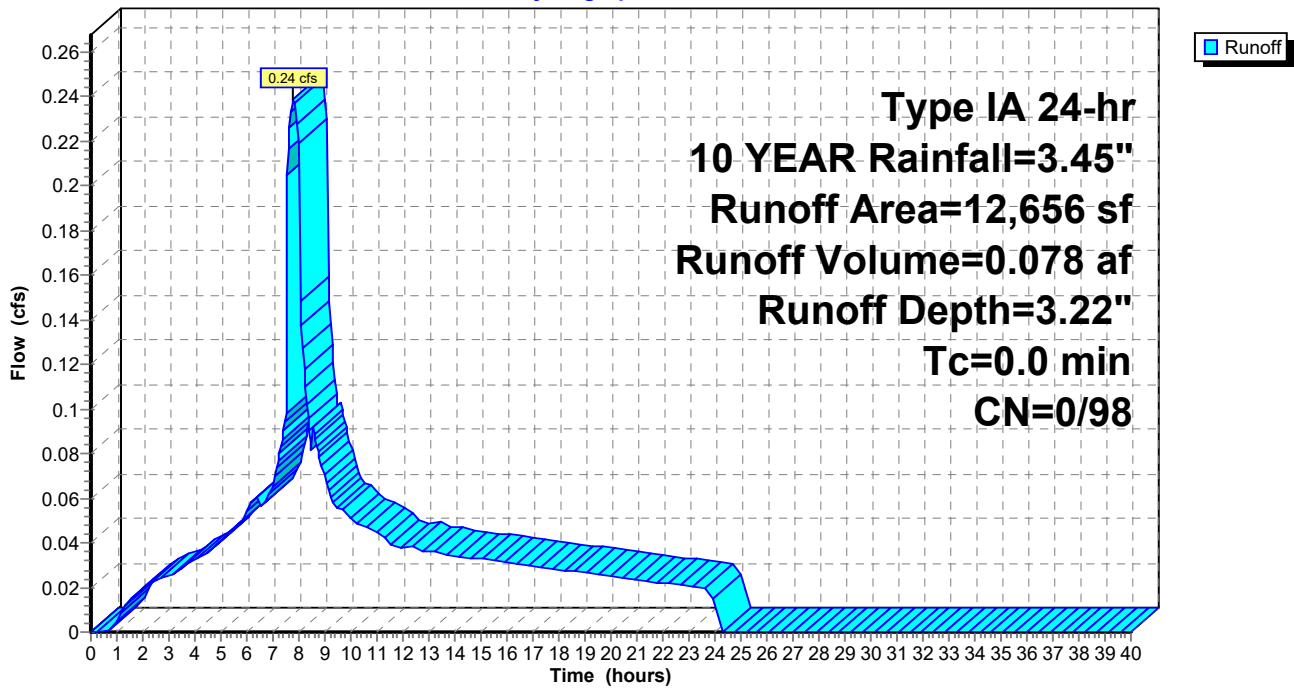
Runoff = 0.24 cfs @ 7.80 hrs, Volume= 0.078 af, Depth= 3.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	12,656	98	
	12,656		100.00% Impervious Area

**Subcatchment 11: Post (Pub D)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Pond 12: PUBIC LIDA D**

Inflow Area = 0.291 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event  
 Inflow = 0.24 cfs @ 7.80 hrs, Volume= 0.078 af  
 Outflow = 0.06 cfs @ 9.37 hrs, Volume= 0.068 af, Atten= 76%, Lag= 94.1 min  
 Primary = 0.02 cfs @ 9.37 hrs, Volume= 0.048 af  
 Secondary = 0.04 cfs @ 9.37 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.60' @ 9.37 hrs Surf.Area= 759 sf Storage= 1,369 cf

Plug-Flow detention time= 581.0 min calculated for 0.068 af (87% of inflow)  
 Center-of-Mass det. time= 491.1 min ( 1,150.5 - 659.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	1,670 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	759	0.0	0	0
101.50	759	40.0	455	455
103.00	759	40.0	455	911
104.00	759	100.0	759	1,670

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 9.37 hrs HW=103.60' (Free Discharge)

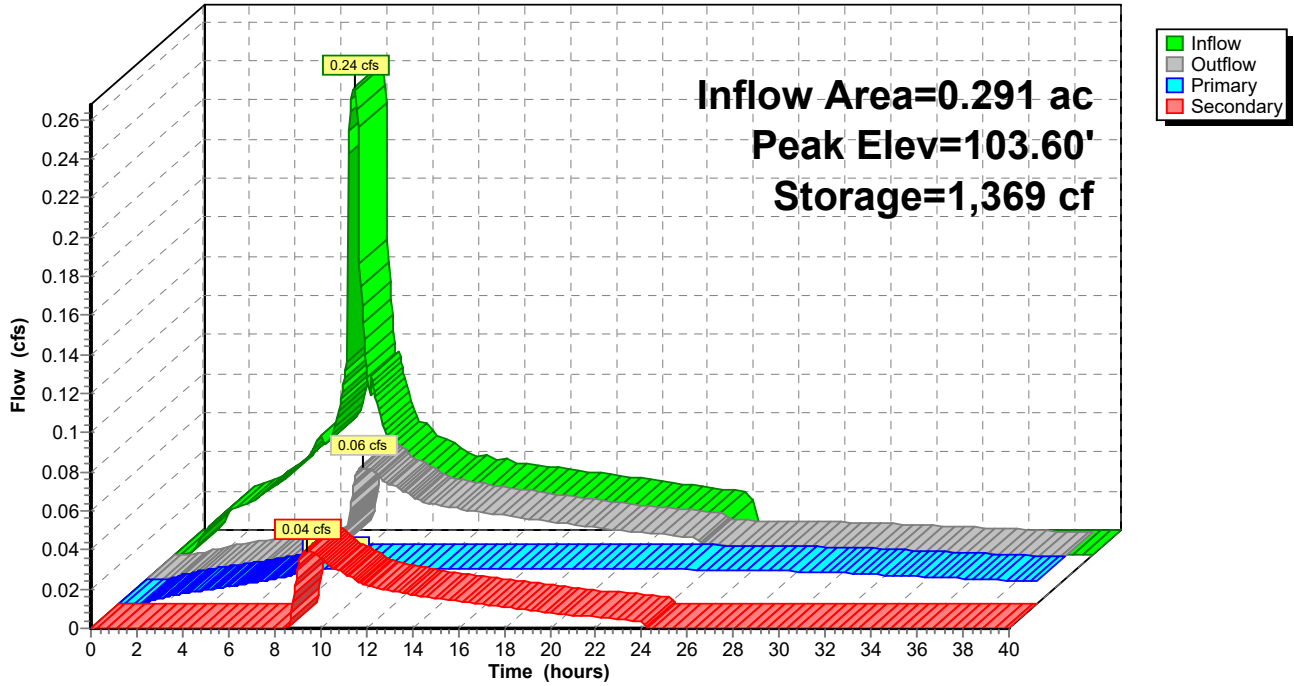
↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 9.11 fps)

**Secondary OutFlow** Max=0.04 cfs @ 9.37 hrs HW=103.60' (Free Discharge)

↑2=Orifice/Grate (Orifice Controls 0.04 cfs @ 1.10 fps)

### Pond 12: PUBIC LIDA D

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 13: Pre (Pub E)**

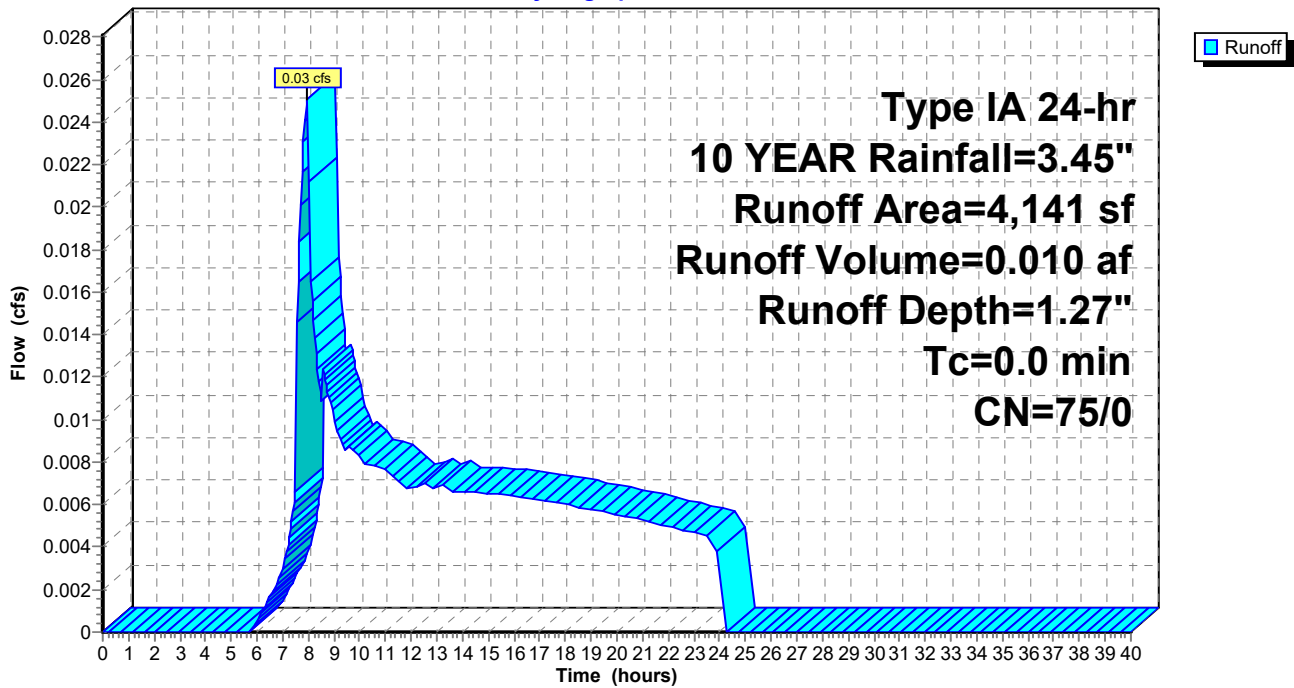
Runoff = 0.03 cfs @ 7.96 hrs, Volume= 0.010 af, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	4,141	75	
	4,141		100.00% Pervious Area

**Subcatchment 13: Pre (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 14: Post (Pub E)**

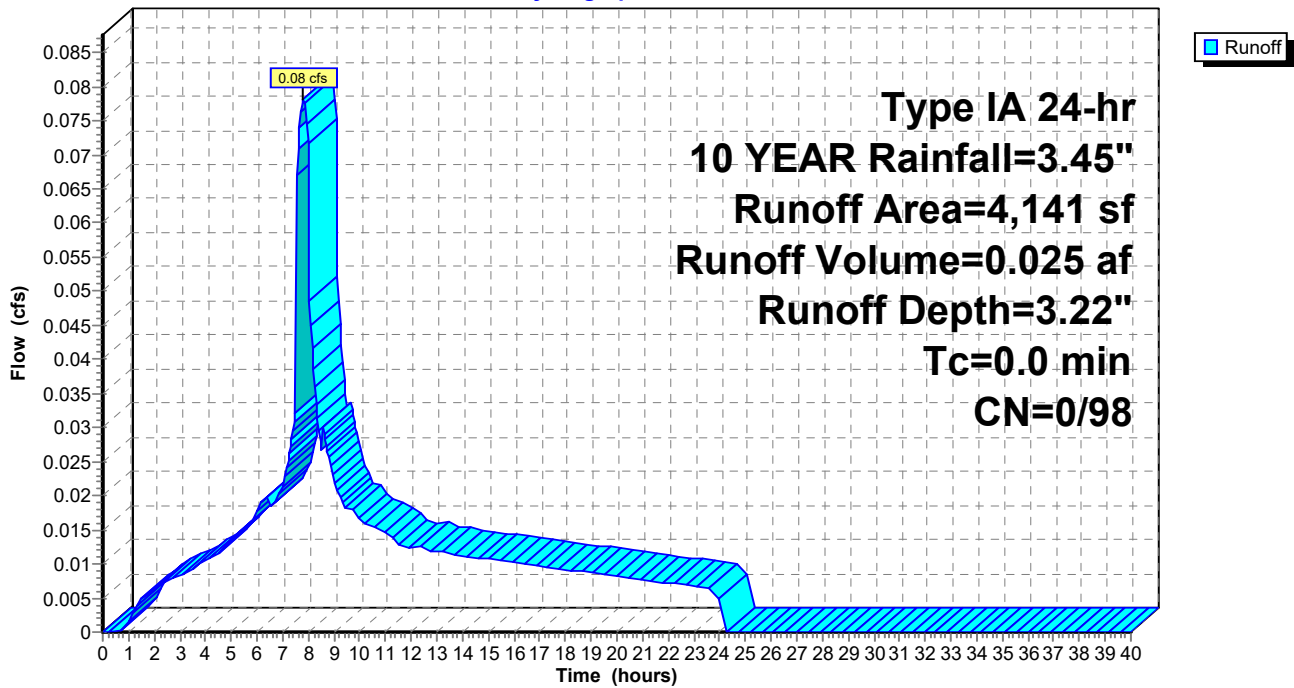
Runoff = 0.08 cfs @ 7.80 hrs, Volume= 0.025 af, Depth= 3.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	4,141	98	
	4,141		100.00% Impervious Area

**Subcatchment 14: Post (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Pond 15: PUBIC LIDA E**

Inflow Area = 0.095 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event  
 Inflow = 0.08 cfs @ 7.80 hrs, Volume= 0.025 af  
 Outflow = 0.01 cfs @ 13.57 hrs, Volume= 0.025 af, Atten= 86%, Lag= 346.2 min  
 Primary = 0.01 cfs @ 13.57 hrs, Volume= 0.025 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.00' @ 13.57 hrs Surf.Area= 374 sf Storage= 450 cf

Plug-Flow detention time= 521.7 min calculated for 0.025 af (98% of inflow)  
 Center-of-Mass det. time= 511.0 min ( 1,170.4 - 659.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 13.57 hrs HW=103.00' (Free Discharge)

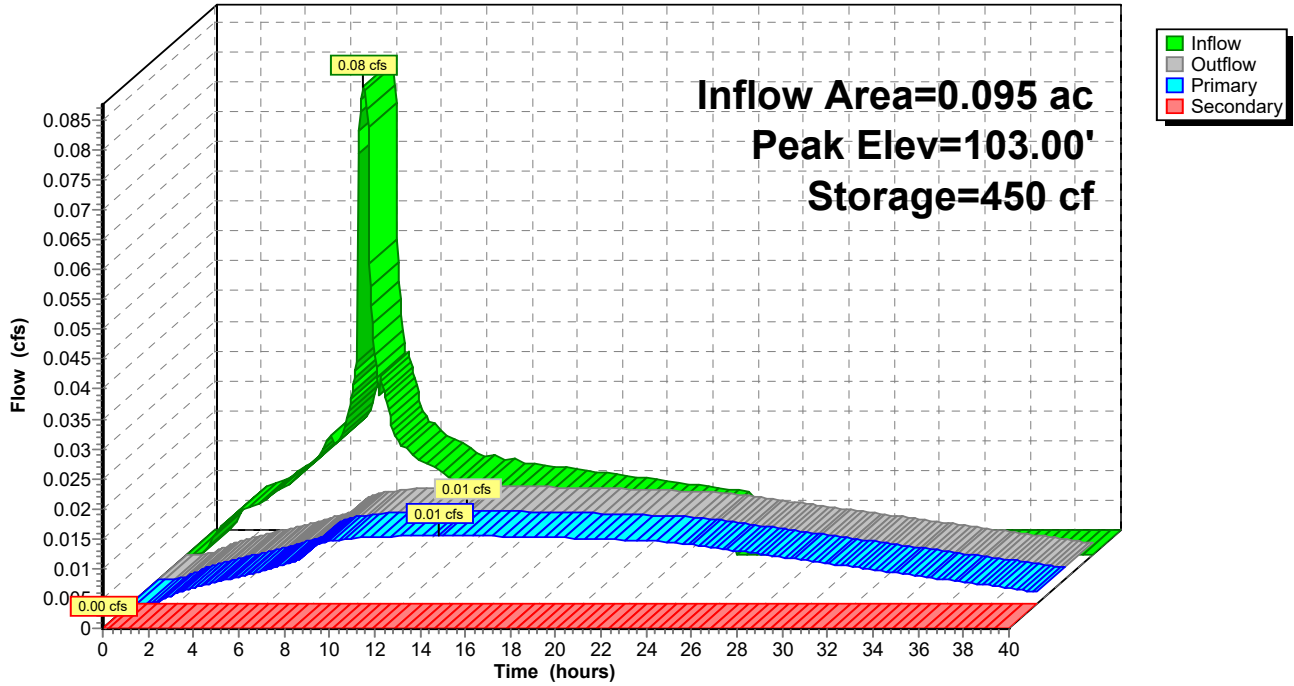
↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 8.31 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**Pond 15: PUBIC LIDA E**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 16: Pre (Pub F)**

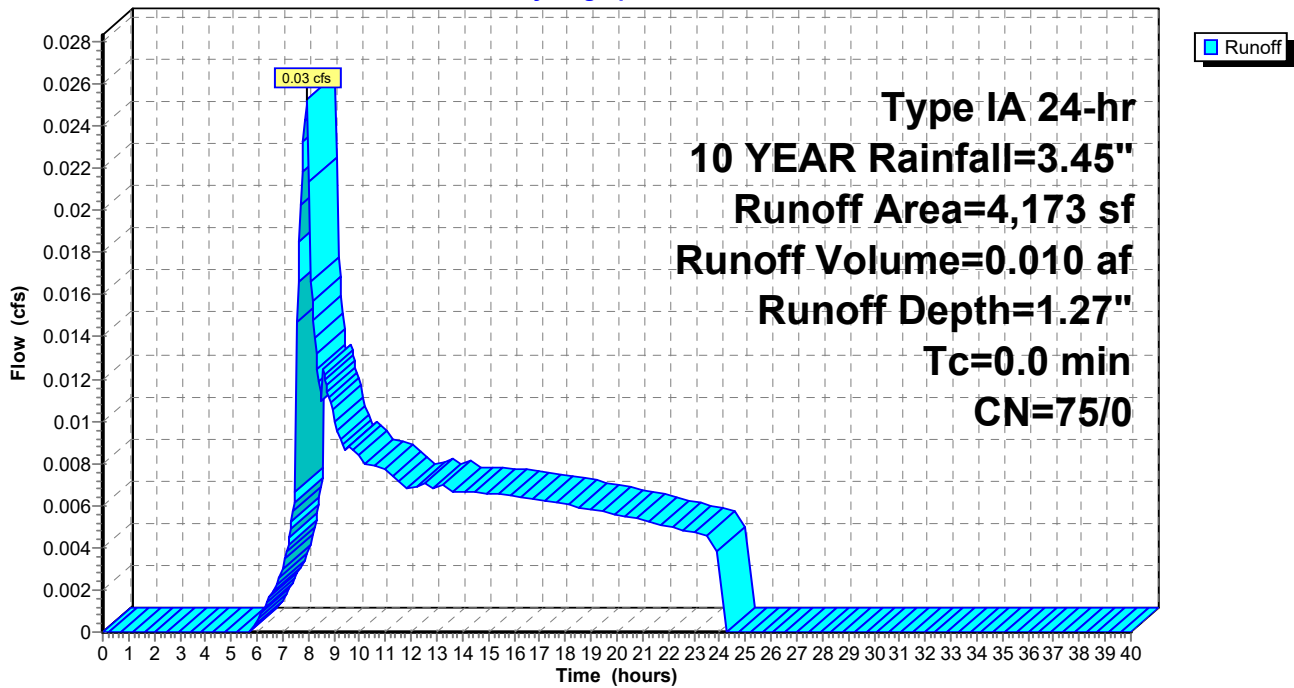
Runoff = 0.03 cfs @ 7.96 hrs, Volume= 0.010 af, Depth= 1.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	4,173	75	
	4,173		100.00% Pervious Area

**Subcatchment 16: Pre (Pub F)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 17: Post (Pub F)**

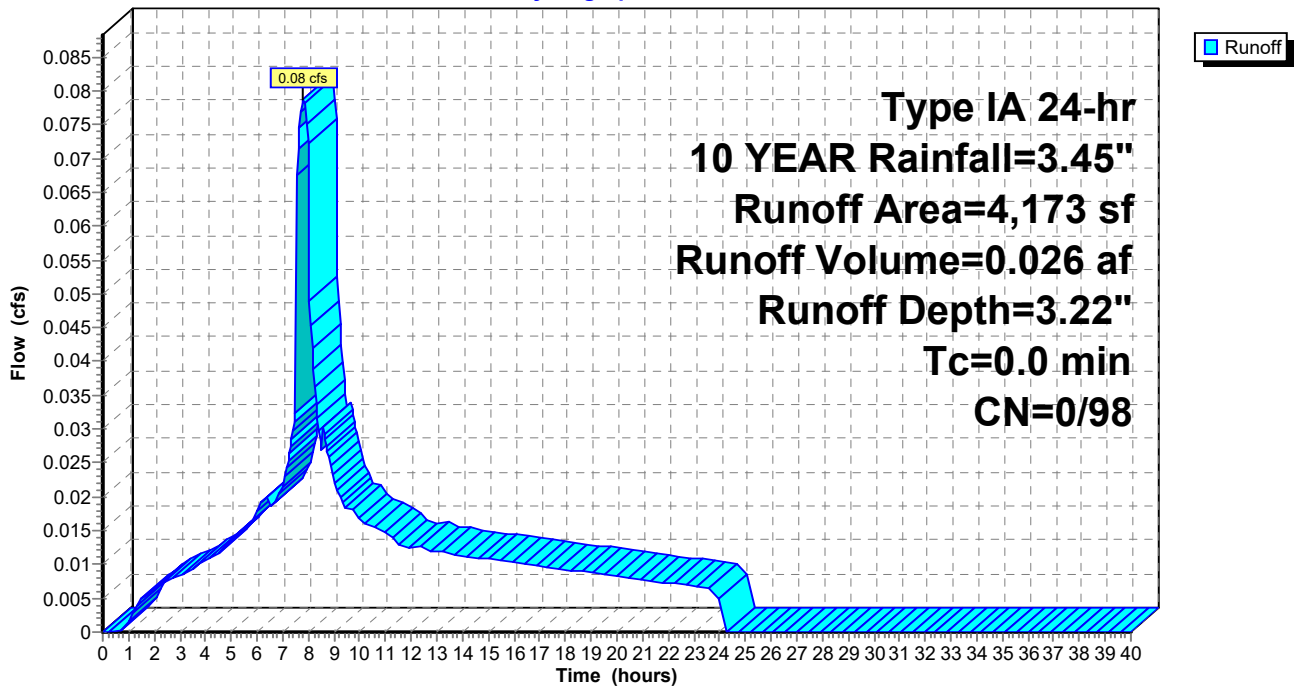
Runoff = 0.08 cfs @ 7.80 hrs, Volume= 0.026 af, Depth= 3.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	4,173	98	
	4,173		100.00% Impervious Area

**Subcatchment 17: Post (Pub F)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Pond 18: PUBLIC LIDA F**

Inflow Area = 0.096 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event  
 Inflow = 0.08 cfs @ 7.80 hrs, Volume= 0.026 af  
 Outflow = 0.01 cfs @ 12.57 hrs, Volume= 0.026 af, Atten= 85%, Lag= 285.8 min  
 Primary = 0.01 cfs @ 12.57 hrs, Volume= 0.026 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.45' @ 12.57 hrs Surf.Area= 252 sf Storage= 416 cf

Plug-Flow detention time= 437.4 min calculated for 0.026 af (100% of inflow)  
 Center-of-Mass det. time= 437.0 min ( 1,096.4 - 659.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	554 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	252	0.0	0	0
101.50	252	40.0	151	151
103.00	252	40.0	151	302
104.00	252	100.0	252	554

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 12.57 hrs HW=103.45' (Free Discharge)

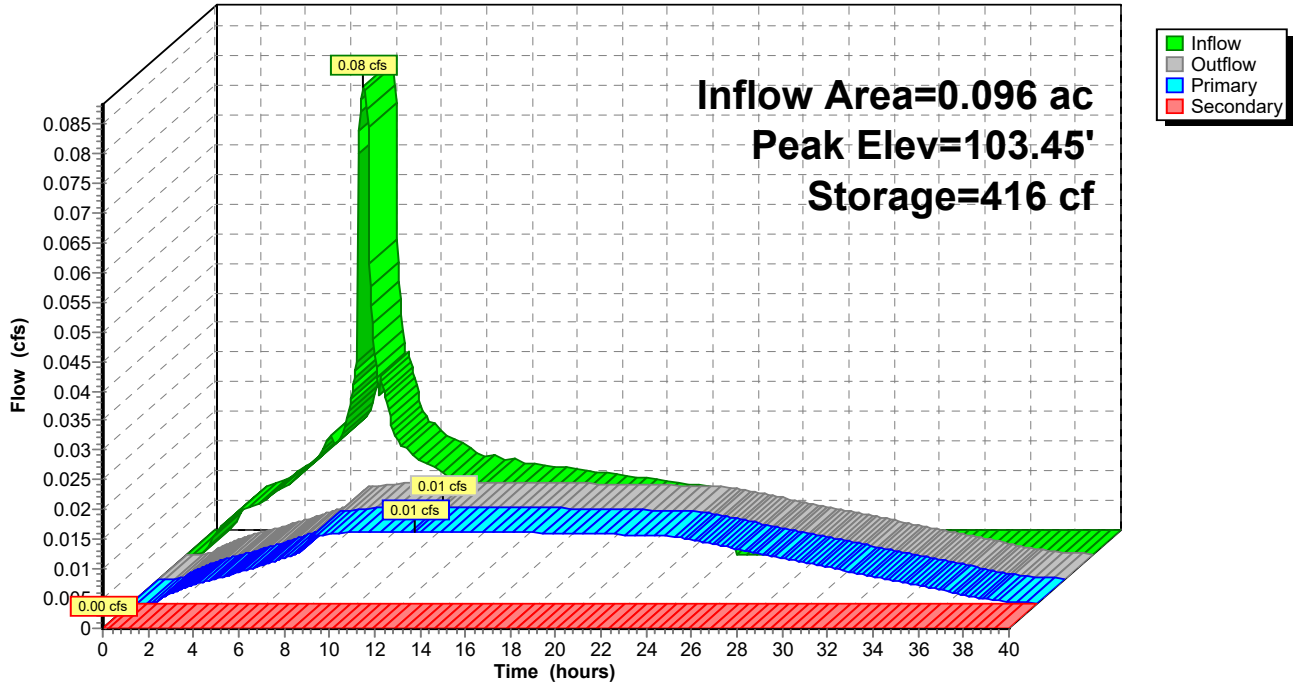
↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.92 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑2=Orifice/Grate ( Controls 0.00 cfs)

### Pond 18: PUBLIC LIDA F

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 1: Pre (Pub A)**

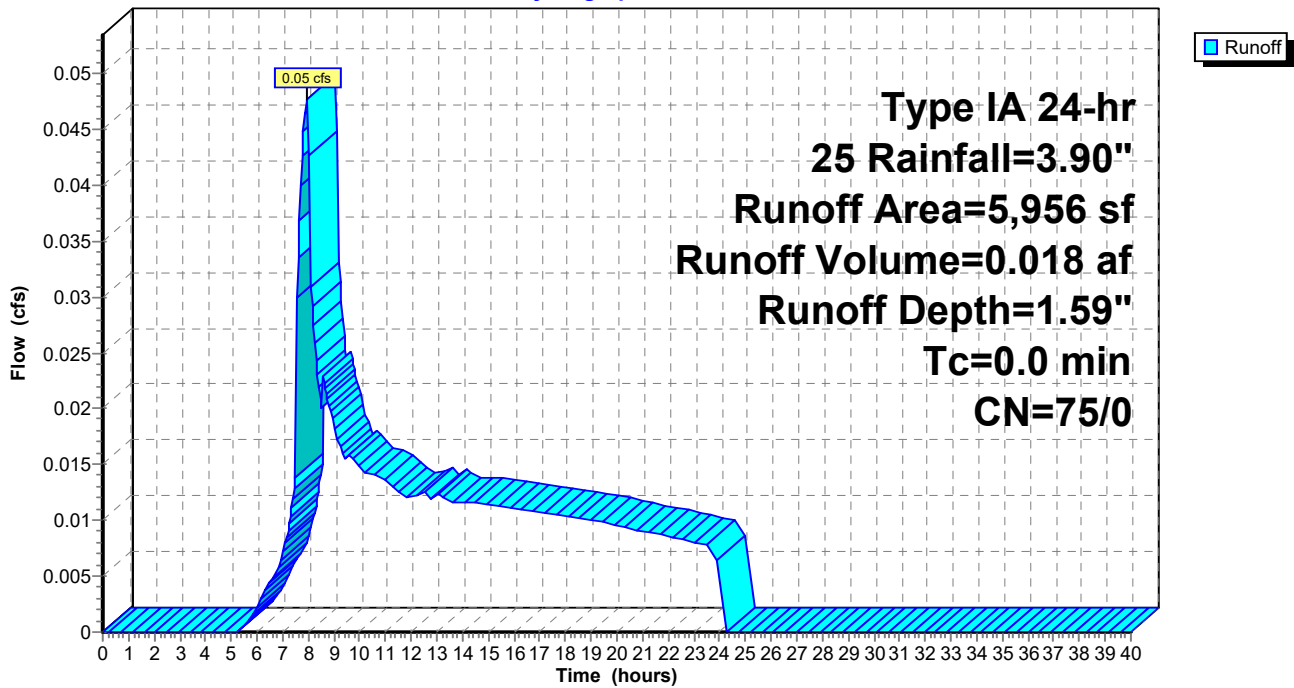
Runoff = 0.05 cfs @ 7.94 hrs, Volume= 0.018 af, Depth= 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	5,956	75	
	5,956		100.00% Pervious Area

**Subcatchment 1: Pre (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 2: Post (Pub A)**

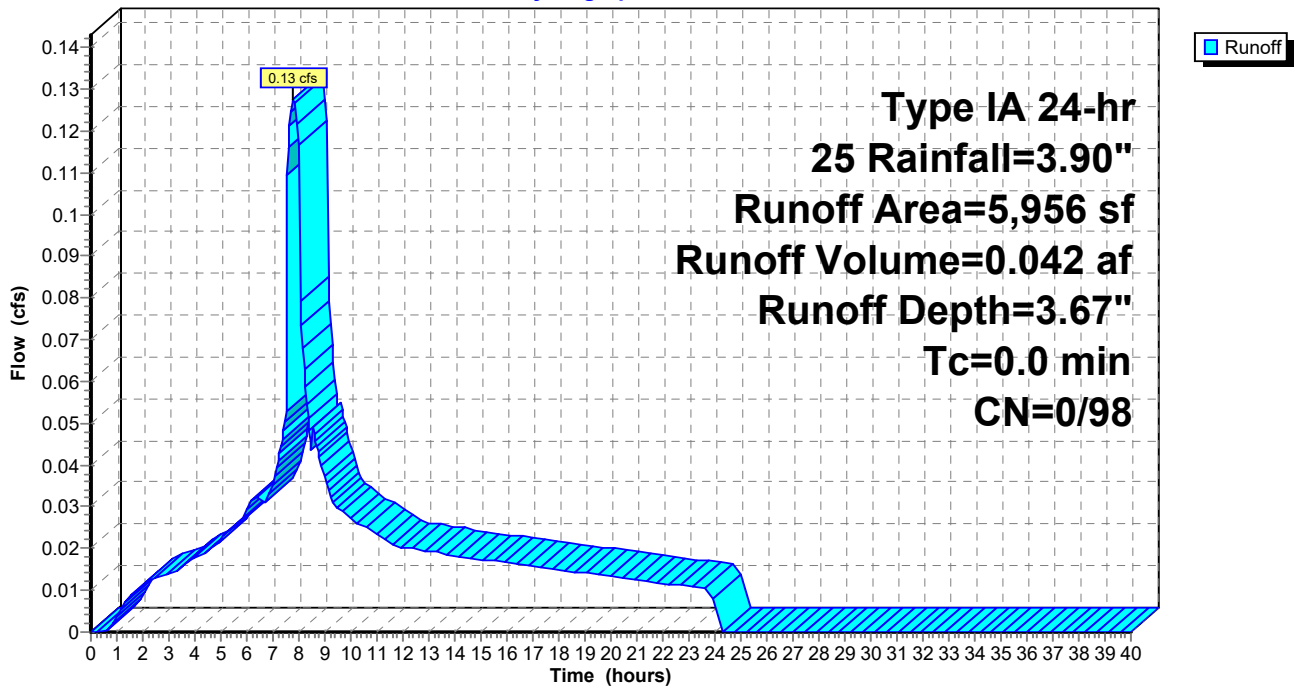
Runoff = 0.13 cfs @ 7.80 hrs, Volume= 0.042 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	5,956	98	
	5,956		100.00% Impervious Area

**Subcatchment 2: Post (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Pond 3: PUBIC LIDA A**

Inflow Area = 0.137 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25 event  
 Inflow = 0.13 cfs @ 7.80 hrs, Volume= 0.042 af  
 Outflow = 0.04 cfs @ 9.00 hrs, Volume= 0.040 af, Atten= 71%, Lag= 72.0 min  
 Primary = 0.01 cfs @ 9.00 hrs, Volume= 0.032 af  
 Secondary = 0.02 cfs @ 9.00 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.58' @ 9.00 hrs Surf.Area= 374 sf Storage= 667 cf

Plug-Flow detention time= 520.7 min calculated for 0.039 af (95% of inflow)  
 Center-of-Mass det. time= 481.4 min ( 1,137.7 - 656.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 9.00 hrs HW=103.58' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.09 fps)

**Secondary OutFlow** Max=0.02 cfs @ 9.00 hrs HW=103.58' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.02 cfs @ 0.98 fps)

**LRS032 - Storm Calcs**

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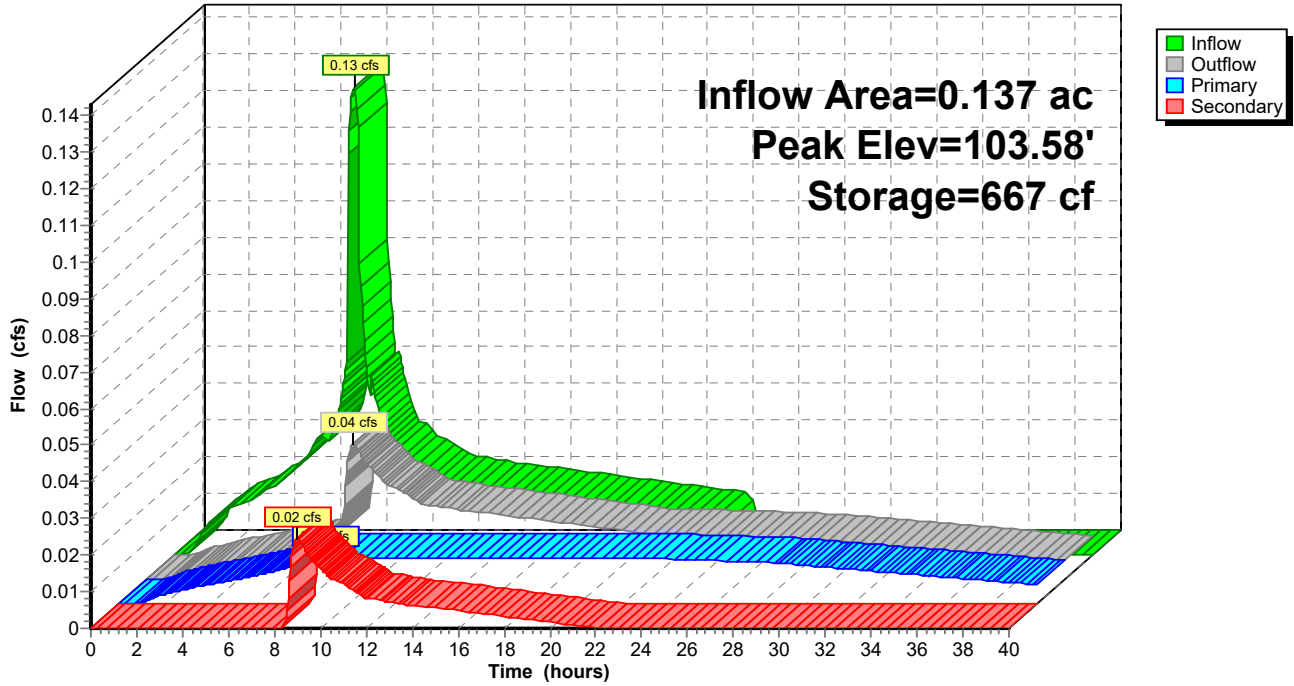
Type IA 24-hr 25 Rainfall=3.90"

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**Pond 3: PUBIC LIDA A**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 4: Pre (Pub B)**

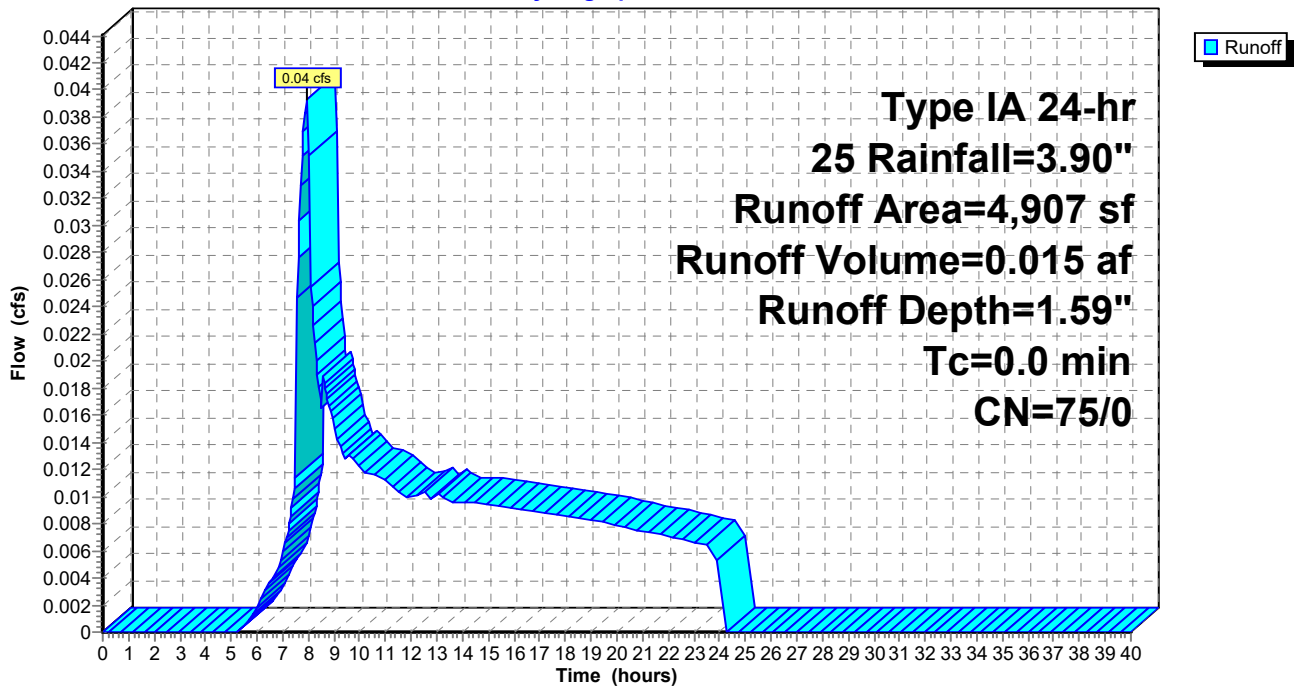
Runoff = 0.04 cfs @ 7.94 hrs, Volume= 0.015 af, Depth= 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	4,907	75	
	4,907		100.00% Pervious Area

**Subcatchment 4: Pre (Pub B)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 5: Post (Pub B)**

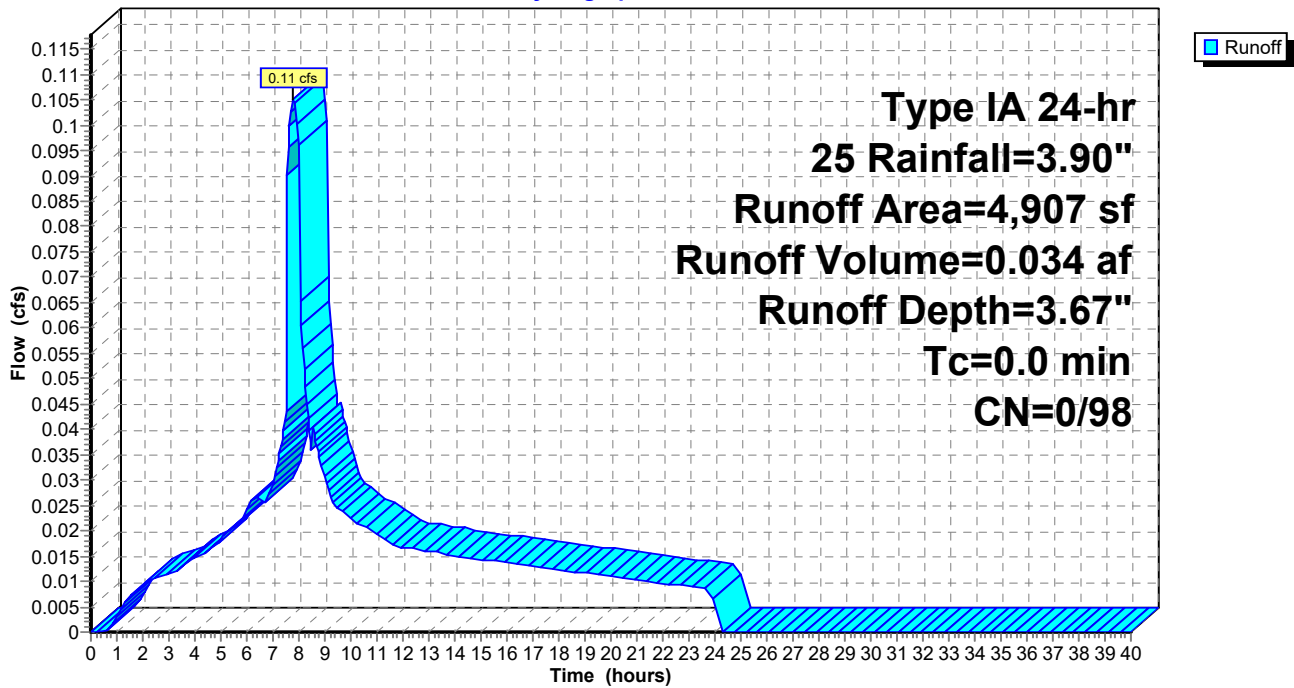
Runoff = 0.11 cfs @ 7.80 hrs, Volume= 0.034 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	4,907	98	
	4,907		100.00% Impervious Area

**Subcatchment 5: Post (Pub B)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Pond 6: PUBIC LIDA B**

Inflow Area = 0.113 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25 event  
 Inflow = 0.11 cfs @ 7.80 hrs, Volume= 0.034 af  
 Outflow = 0.02 cfs @ 12.54 hrs, Volume= 0.034 af, Atten= 84%, Lag= 284.4 min  
 Primary = 0.02 cfs @ 12.54 hrs, Volume= 0.034 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.06' @ 12.54 hrs Surf.Area= 448 sf Storage= 566 cf

Plug-Flow detention time= 452.0 min calculated for 0.034 af (100% of inflow)  
 Center-of-Mass det. time= 450.8 min ( 1,107.2 - 656.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	986 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	448	0.0	0	0
101.50	448	40.0	269	269
103.00	448	40.0	269	538
104.00	448	100.0	448	986

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 12.54 hrs HW=103.06' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 8.39 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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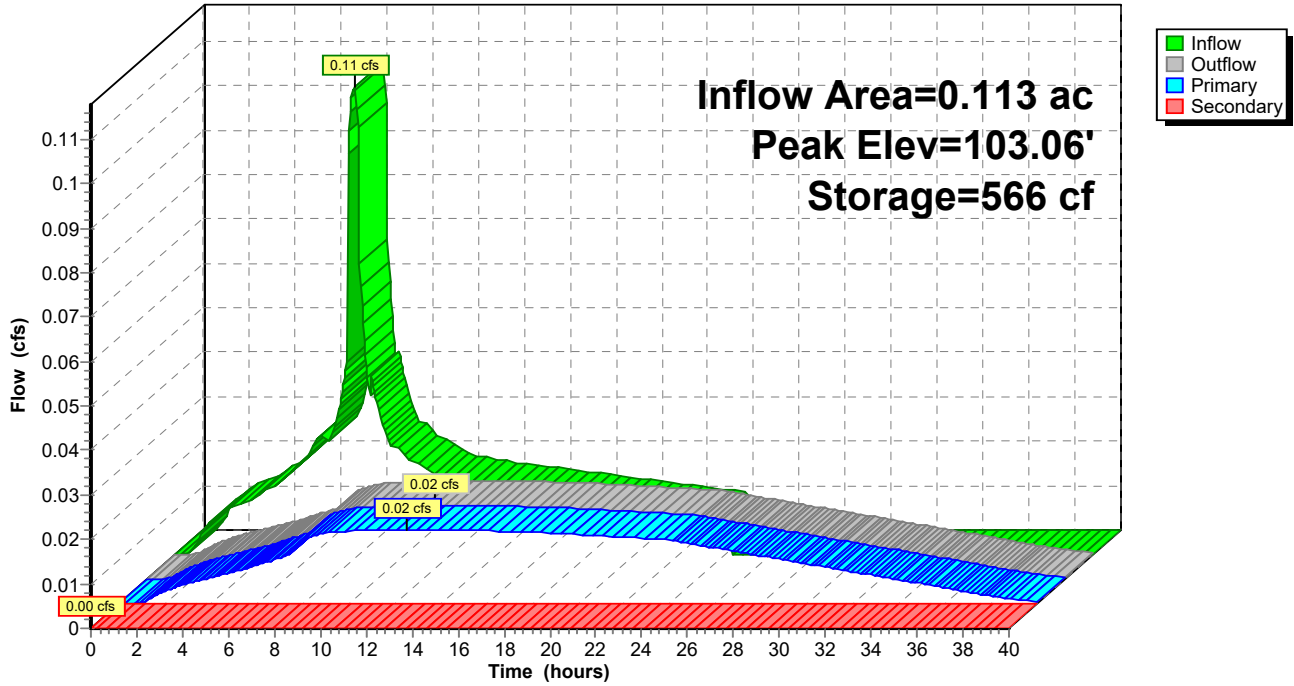
Type IA 24-hr 25 Rainfall=3.90"

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**Pond 6: PUBIC LIDA B**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 7: Pre (Pub C)**

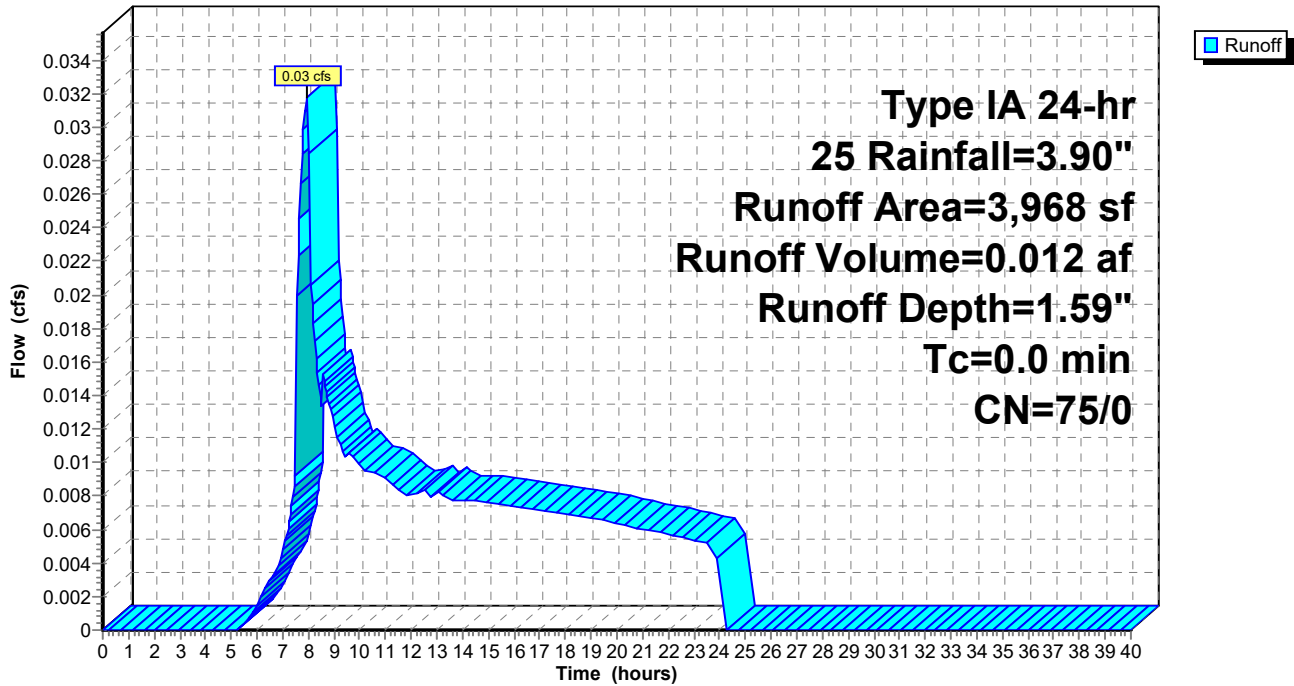
Runoff = 0.03 cfs @ 7.94 hrs, Volume= 0.012 af, Depth= 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	3,968	75	
	3,968		100.00% Pervious Area

**Subcatchment 7: Pre (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 8: Post (Pub C)**

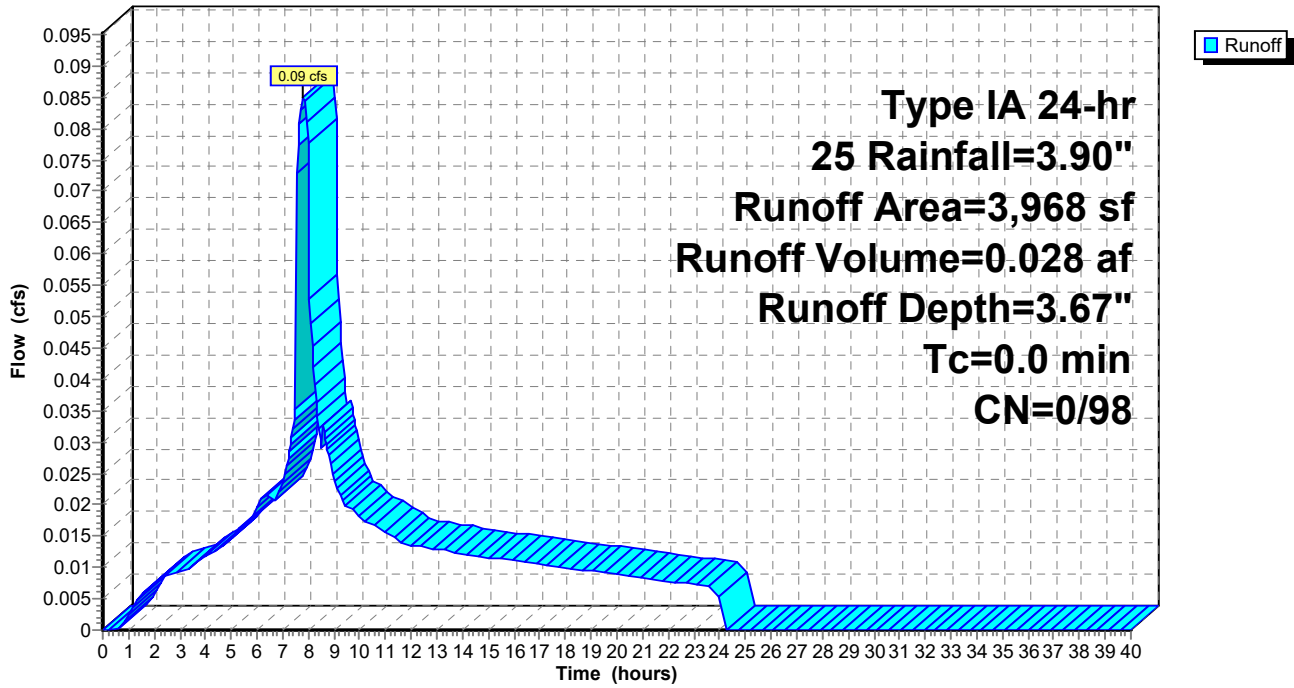
Runoff = 0.09 cfs @ 7.80 hrs, Volume= 0.028 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	3,968	98	
	3,968		100.00% Impervious Area

**Subcatchment 8: Post (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Pond 9: PUBIC LIDA C**

Inflow Area = 0.091 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25 event  
 Inflow = 0.09 cfs @ 7.80 hrs, Volume= 0.028 af  
 Outflow = 0.02 cfs @ 9.39 hrs, Volume= 0.028 af, Atten= 76%, Lag= 95.1 min  
 Primary = 0.02 cfs @ 9.39 hrs, Volume= 0.028 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 102.50' @ 9.39 hrs Surf.Area= 324 sf Storage= 323 cf

Plug-Flow detention time= 198.9 min calculated for 0.028 af (100% of inflow)  
 Center-of-Mass det. time= 198.6 min ( 855.0 - 656.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	713 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	324	0.0	0	0
101.50	324	40.0	194	194
103.00	324	40.0	194	389
104.00	324	100.0	324	713

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.7" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 9.39 hrs HW=102.50' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 7.56 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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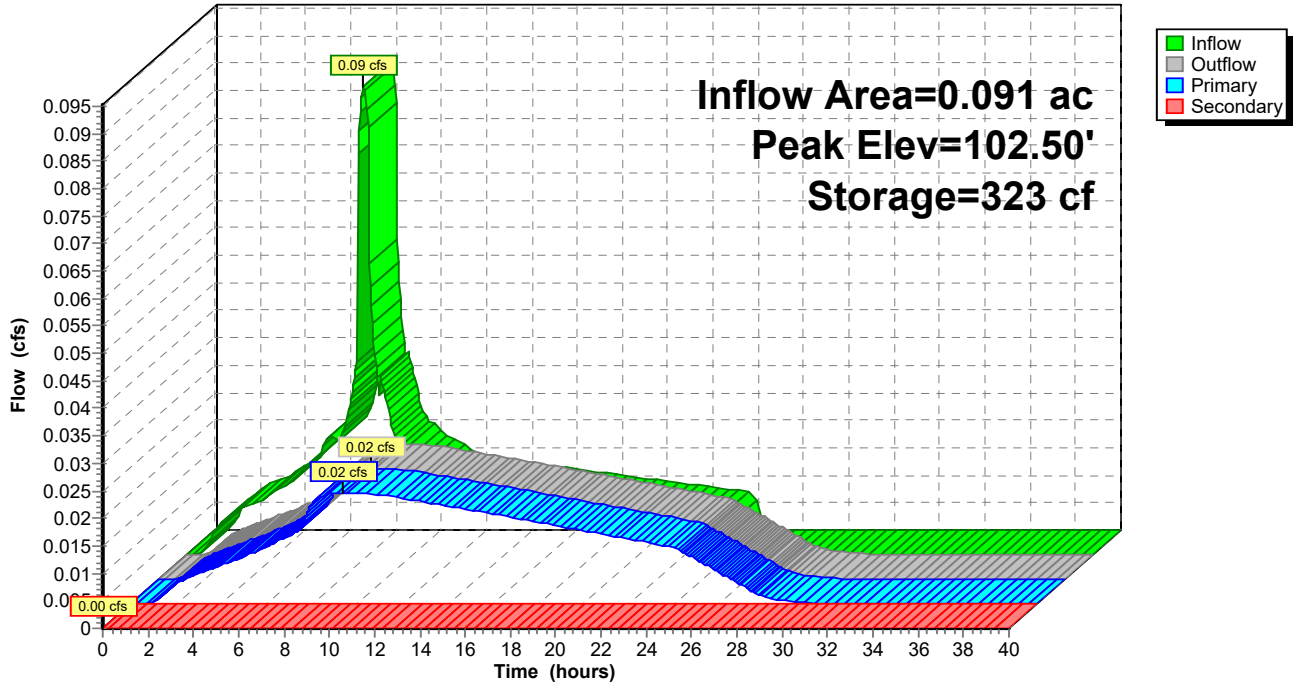
Type IA 24-hr 25 Rainfall=3.90"

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**Pond 9: PUBIC LIDA C**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 10: Pre (Pub D)**

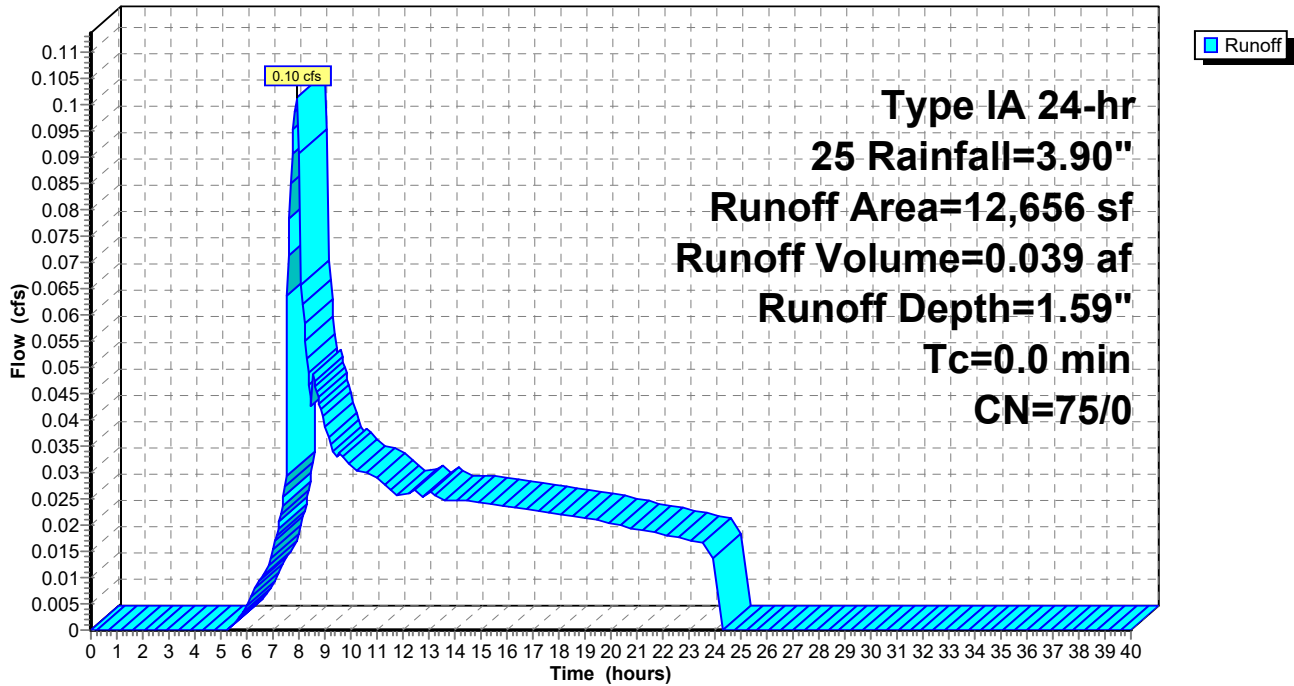
Runoff = 0.10 cfs @ 7.94 hrs, Volume= 0.039 af, Depth= 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	12,656	75	
	12,656		100.00% Pervious Area

**Subcatchment 10: Pre (Pub D)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 11: Post (Pub D)**

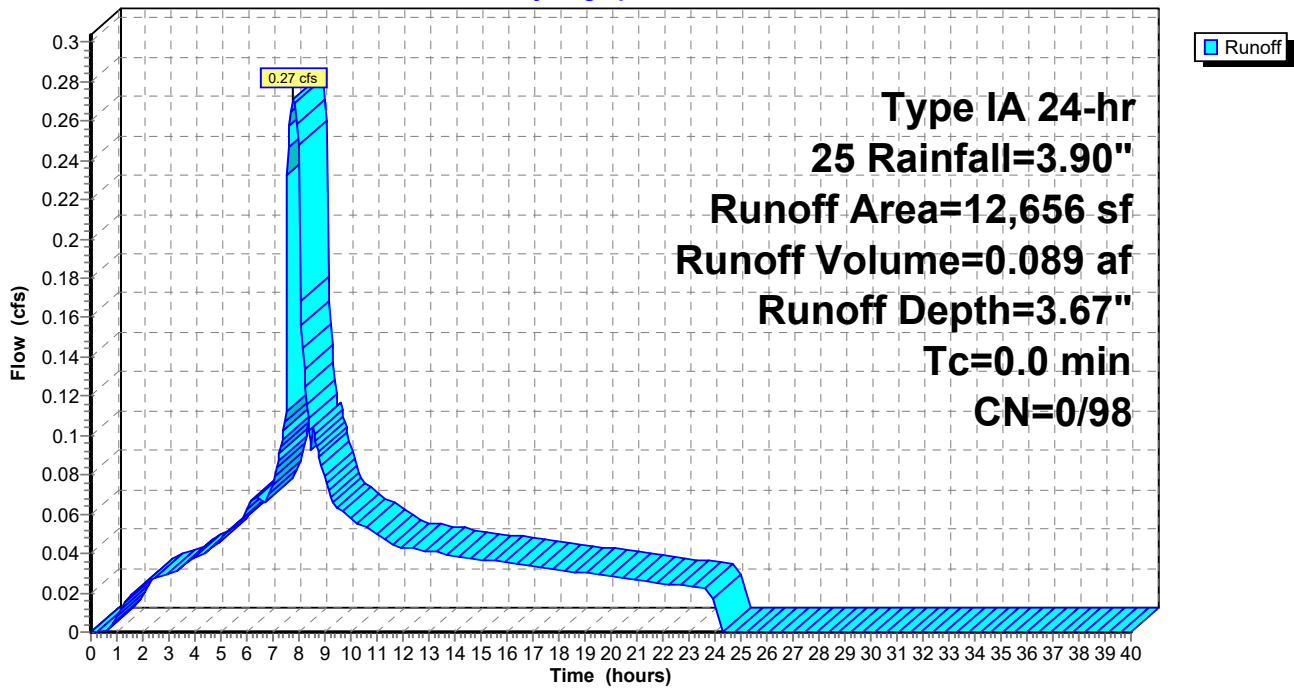
Runoff = 0.27 cfs @ 7.80 hrs, Volume= 0.089 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

Area (sf)	CN	Description
* 12,656	98	
12,656		100.00% Impervious Area

**Subcatchment 11: Post (Pub D)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Pond 12: PUBIC LIDA D**

Inflow Area = 0.291 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25 event  
 Inflow = 0.27 cfs @ 7.80 hrs, Volume= 0.089 af  
 Outflow = 0.09 cfs @ 8.70 hrs, Volume= 0.079 af, Atten= 65%, Lag= 53.8 min  
 Primary = 0.02 cfs @ 8.70 hrs, Volume= 0.049 af  
 Secondary = 0.08 cfs @ 8.70 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.65' @ 8.70 hrs Surf.Area= 759 sf Storage= 1,403 cf

Plug-Flow detention time= 515.0 min calculated for 0.078 af (88% of inflow)  
 Center-of-Mass det. time= 434.1 min ( 1,090.4 - 656.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	1,670 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	759	0.0	0	0
101.50	759	40.0	455	455
103.00	759	40.0	455	911
104.00	759	100.0	759	1,670

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 8.70 hrs HW=103.65' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 9.16 fps)

**Secondary OutFlow** Max=0.08 cfs @ 8.70 hrs HW=103.65' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.08 cfs @ 1.31 fps)

**LRS032 - Storm Calcs**

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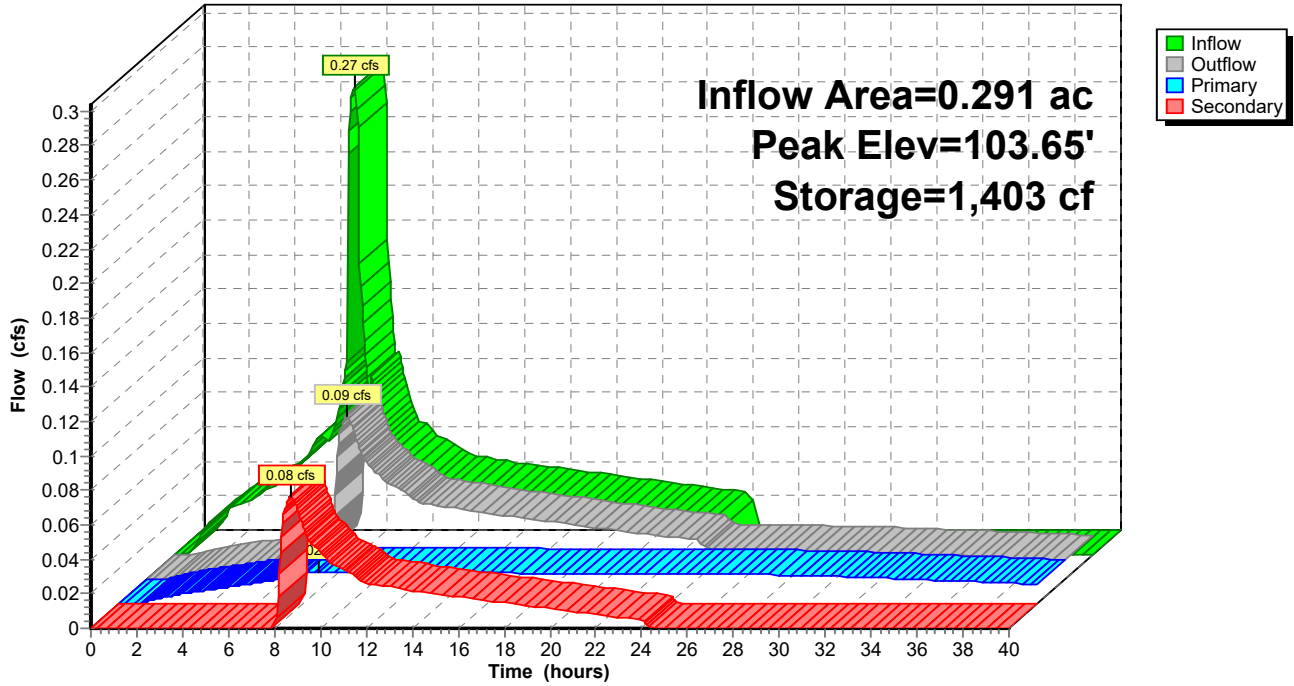
Type IA 24-hr 25 Rainfall=3.90"

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**Pond 12: PUBIC LIDA D**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 13: Pre (Pub E)**

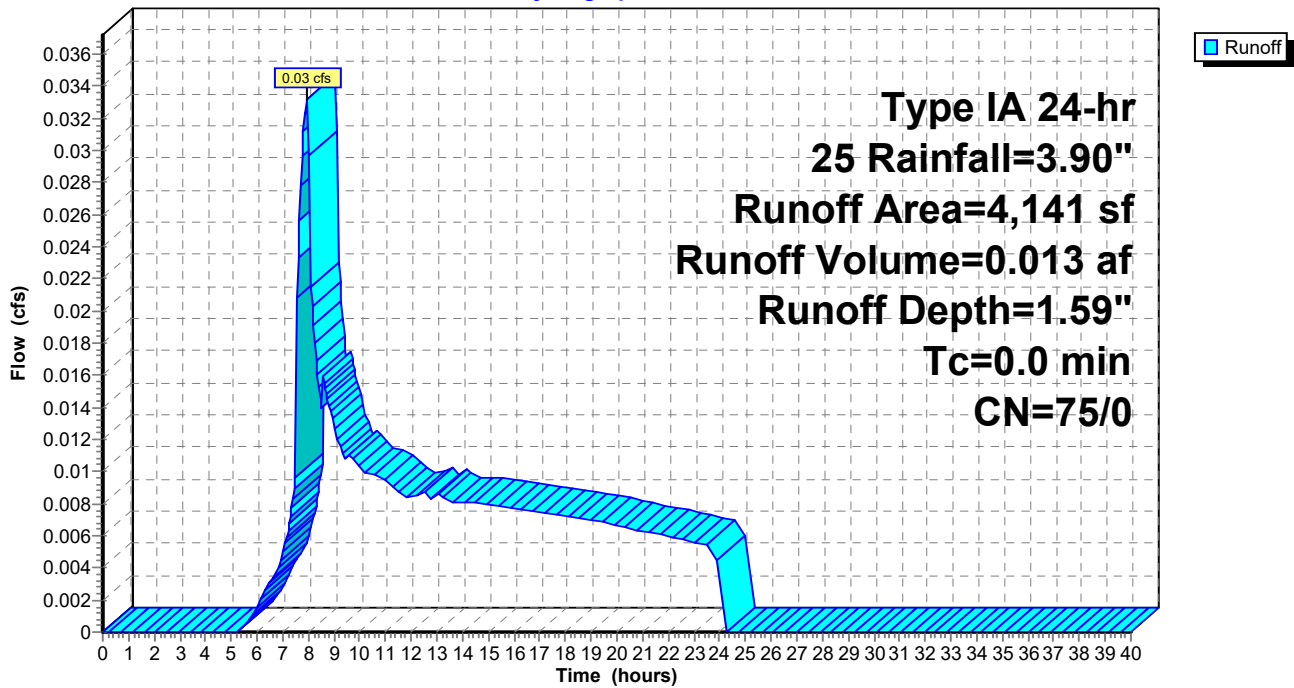
Runoff = 0.03 cfs @ 7.94 hrs, Volume= 0.013 af, Depth= 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	4,141	75	
	4,141		100.00% Pervious Area

**Subcatchment 13: Pre (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 14: Post (Pub E)**

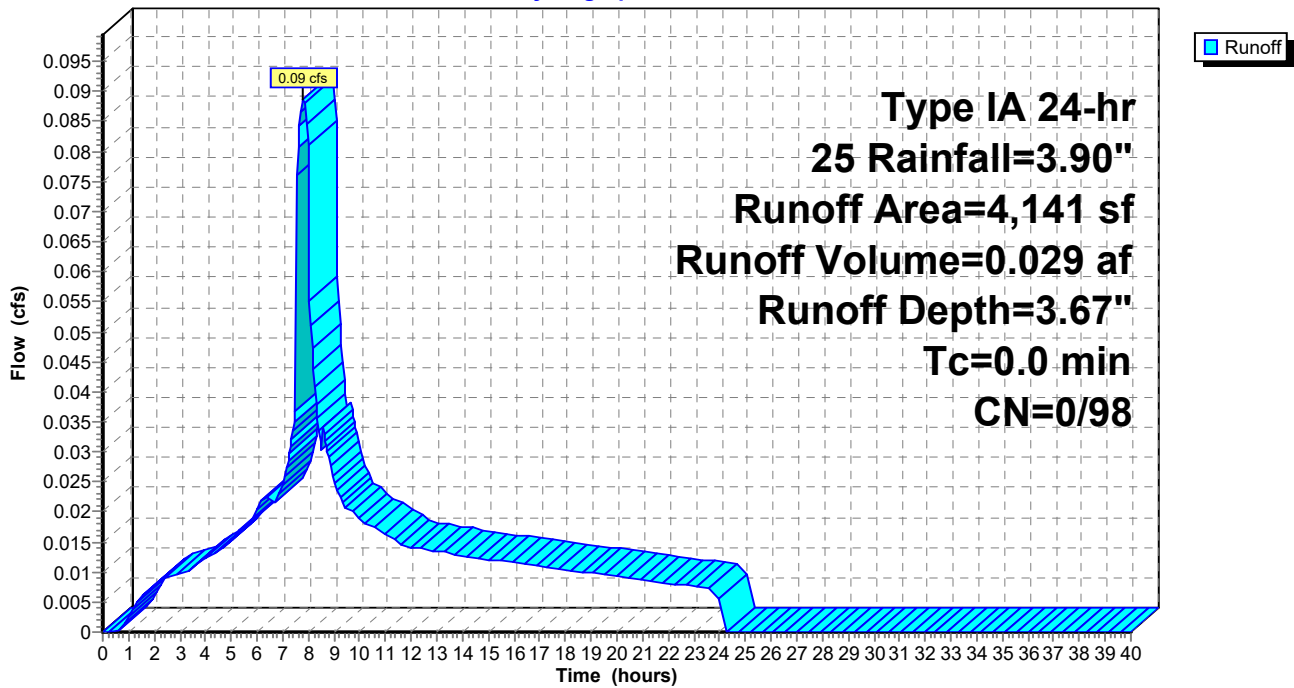
Runoff = 0.09 cfs @ 7.80 hrs, Volume= 0.029 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	4,141	98	
	4,141		100.00% Impervious Area

**Subcatchment 14: Post (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Pond 15: PUBIC LIDA E**

Inflow Area = 0.095 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25 event  
 Inflow = 0.09 cfs @ 7.80 hrs, Volume= 0.029 af  
 Outflow = 0.01 cfs @ 15.55 hrs, Volume= 0.028 af, Atten= 87%, Lag= 464.9 min  
 Primary = 0.01 cfs @ 15.55 hrs, Volume= 0.028 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.25' @ 15.55 hrs Surf.Area= 374 sf Storage= 542 cf

Plug-Flow detention time= 575.0 min calculated for 0.028 af (97% of inflow)  
 Center-of-Mass det. time= 549.8 min ( 1,206.2 - 656.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 15.55 hrs HW=103.25' (Free Discharge)

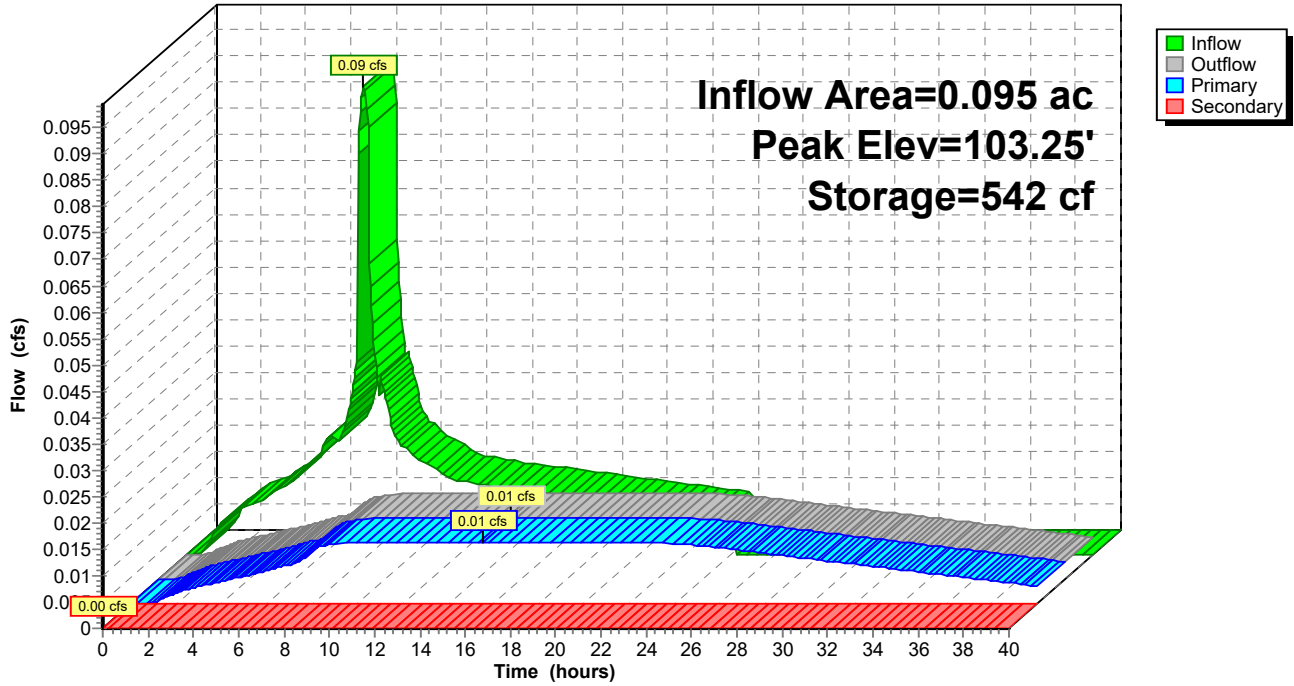
↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.65 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑2=Orifice/Grate ( Controls 0.00 cfs)

Pond 15: PUBIC LIDA E

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 16: Pre (Pub F)**

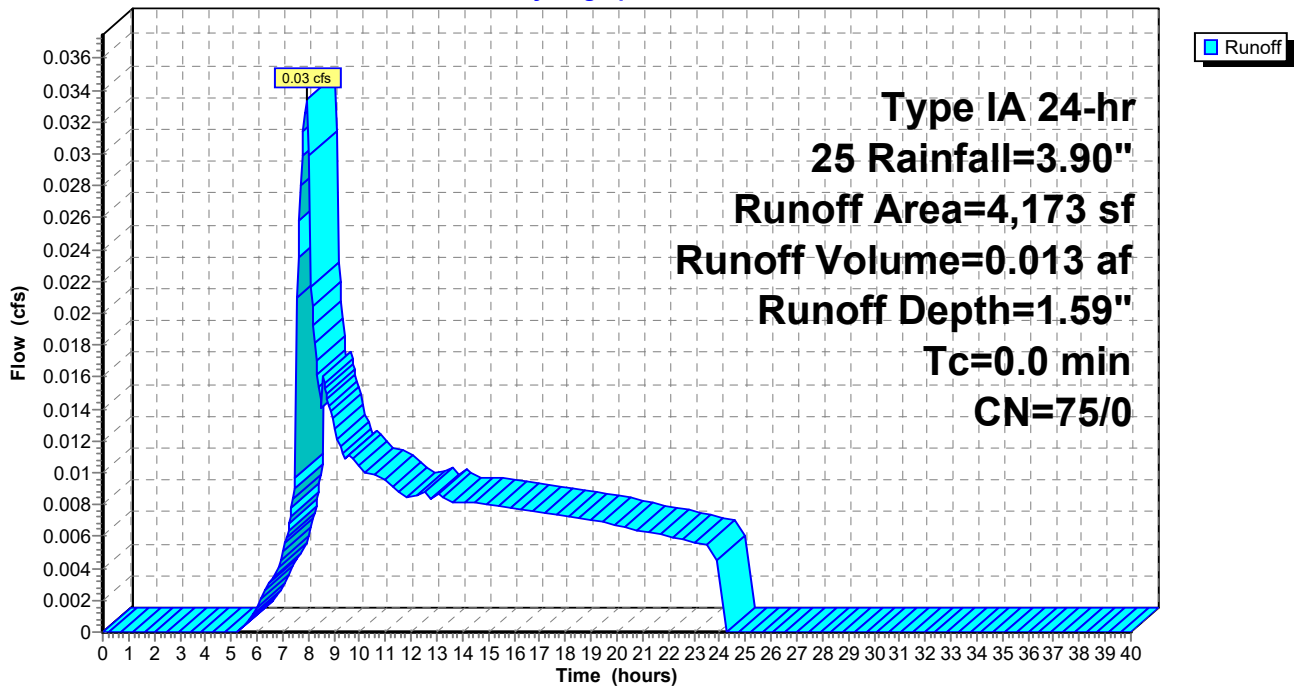
Runoff = 0.03 cfs @ 7.94 hrs, Volume= 0.013 af, Depth= 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	4,173	75	
	4,173		100.00% Pervious Area

**Subcatchment 16: Pre (Pub F)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 17: Post (Pub F)**

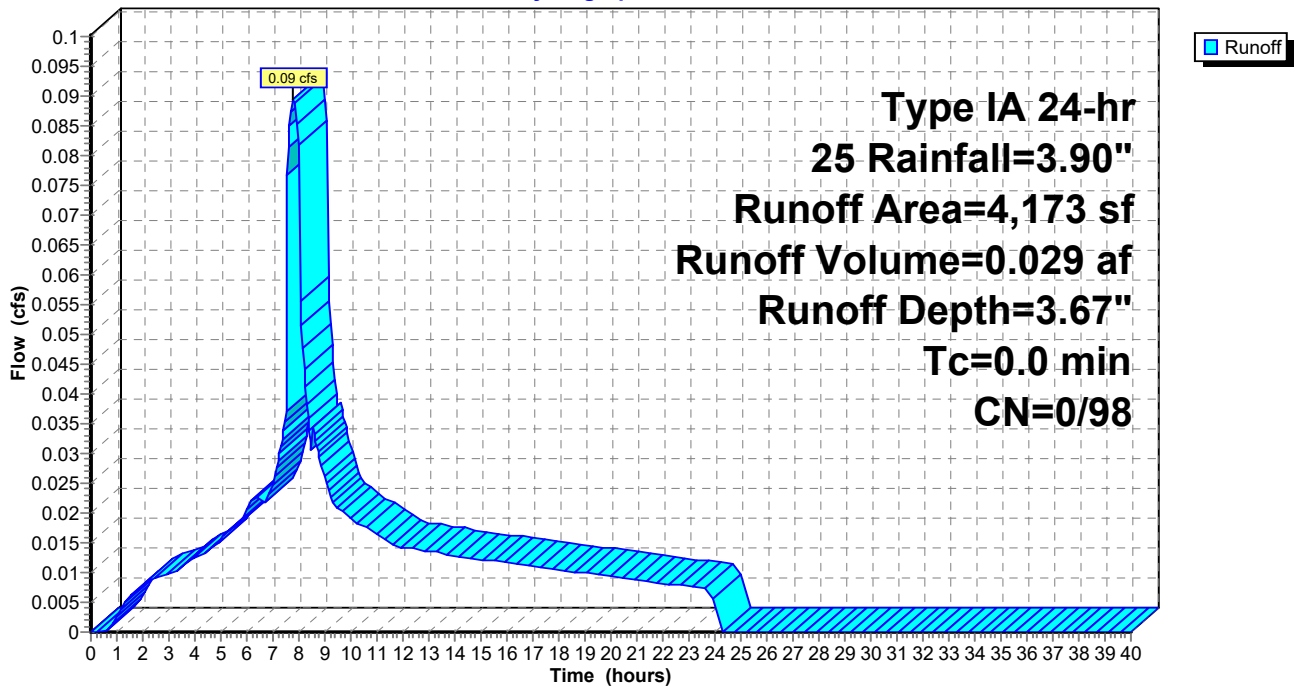
Runoff = 0.09 cfs @ 7.80 hrs, Volume= 0.029 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	4,173	98	
	4,173		100.00% Impervious Area

**Subcatchment 17: Post (Pub F)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Pond 18: PUBLIC LIDA F**

Inflow Area = 0.096 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25 event  
 Inflow = 0.09 cfs @ 7.80 hrs, Volume= 0.029 af  
 Outflow = 0.02 cfs @ 9.34 hrs, Volume= 0.029 af, Atten= 76%, Lag= 92.0 min  
 Primary = 0.01 cfs @ 9.34 hrs, Volume= 0.027 af  
 Secondary = 0.01 cfs @ 9.34 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.55' @ 9.34 hrs Surf.Area= 252 sf Storage= 441 cf

Plug-Flow detention time= 431.3 min calculated for 0.029 af (100% of inflow)  
 Center-of-Mass det. time= 430.5 min ( 1,086.8 - 656.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	554 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	252	0.0	0	0
101.50	252	40.0	151	151
103.00	252	40.0	151	302
104.00	252	100.0	252	554

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 9.34 hrs HW=103.55' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.04 fps)

**Secondary OutFlow** Max=0.01 cfs @ 9.34 hrs HW=103.55' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.75 fps)

**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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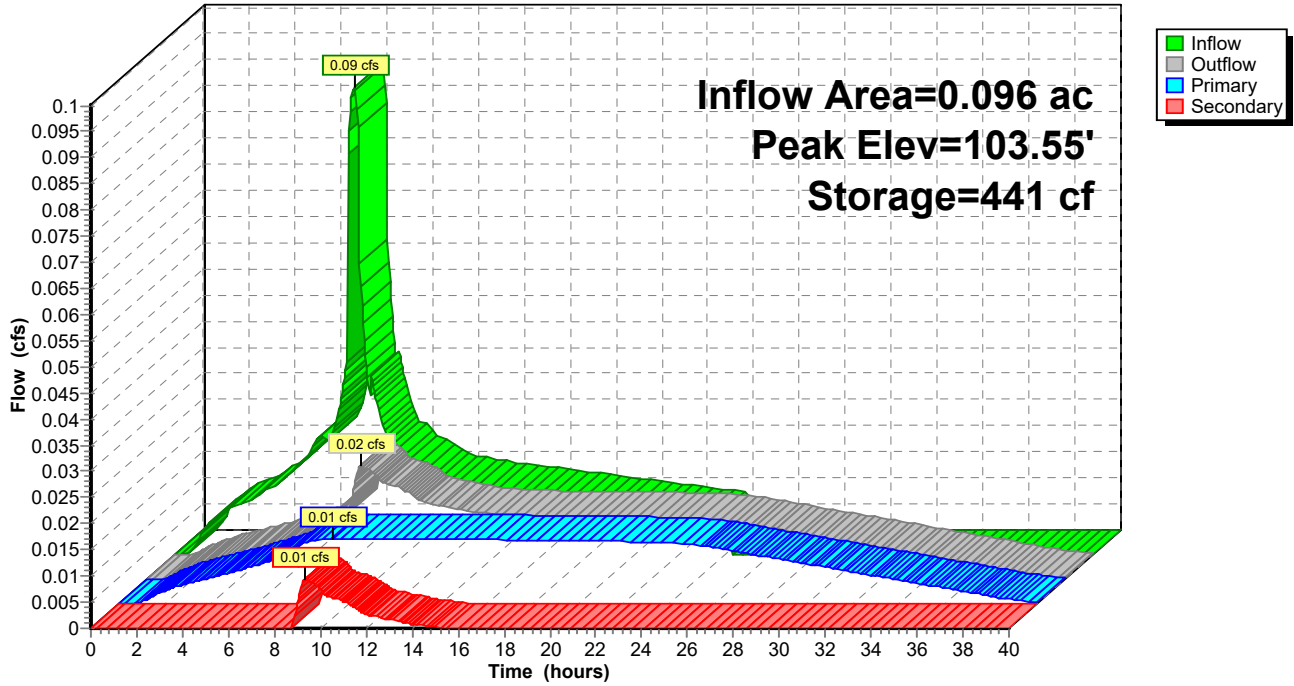
Type IA 24-hr 25 Rainfall=3.90"

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**Pond 18: PUBLIC LIDA F**

Hydrograph



**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 1: Pre (Pub A)**

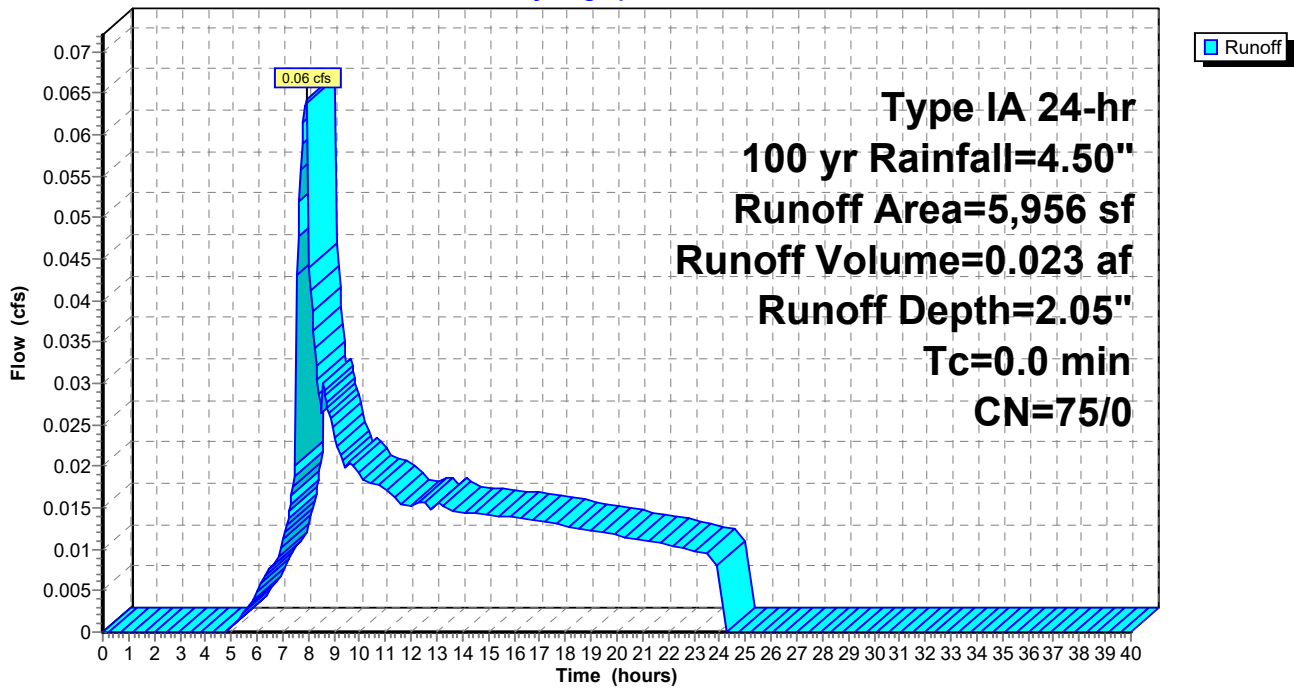
Runoff = 0.06 cfs @ 7.95 hrs, Volume= 0.023 af, Depth= 2.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	5,956	75	
	5,956		100.00% Pervious Area

**Subcatchment 1: Pre (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 2: Post (Pub A)**

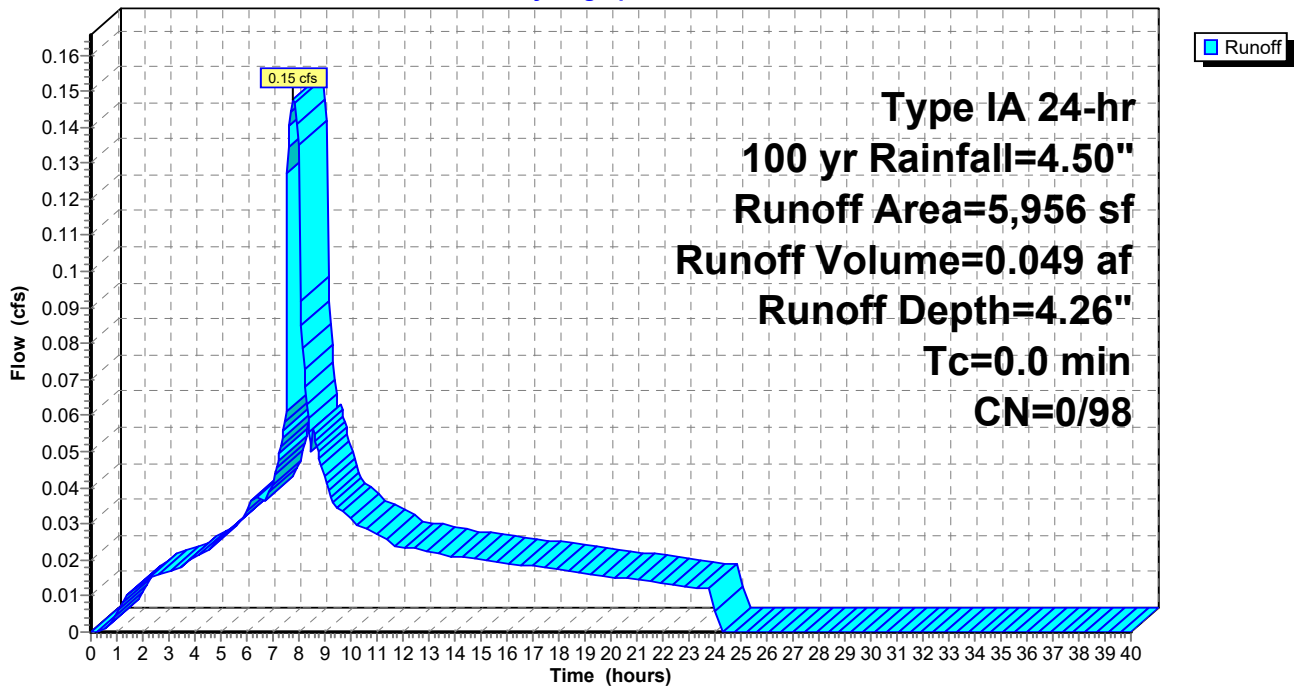
Runoff = 0.15 cfs @ 7.80 hrs, Volume= 0.049 af, Depth= 4.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	5,956	98	
	5,956		100.00% Impervious Area

**Subcatchment 2: Post (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Pond 3: PUBIC LIDA A**

Inflow Area = 0.137 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100 yr event  
 Inflow = 0.15 cfs @ 7.80 hrs, Volume= 0.049 af  
 Outflow = 0.07 cfs @ 8.24 hrs, Volume= 0.046 af, Atten= 53%, Lag= 26.2 min  
 Primary = 0.01 cfs @ 8.24 hrs, Volume= 0.032 af  
 Secondary = 0.06 cfs @ 8.24 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.63' @ 8.24 hrs Surf.Area= 374 sf Storage= 683 cf

Plug-Flow detention time= 457.1 min calculated for 0.046 af (95% of inflow)  
 Center-of-Mass det. time= 421.7 min ( 1,074.8 - 653.1 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 8.24 hrs HW=103.63' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.14 fps)

**Secondary OutFlow** Max=0.06 cfs @ 8.24 hrs HW=103.63' (Free Discharge)

↑2=Orifice/Grate (Orifice Controls 0.06 cfs @ 1.21 fps)

**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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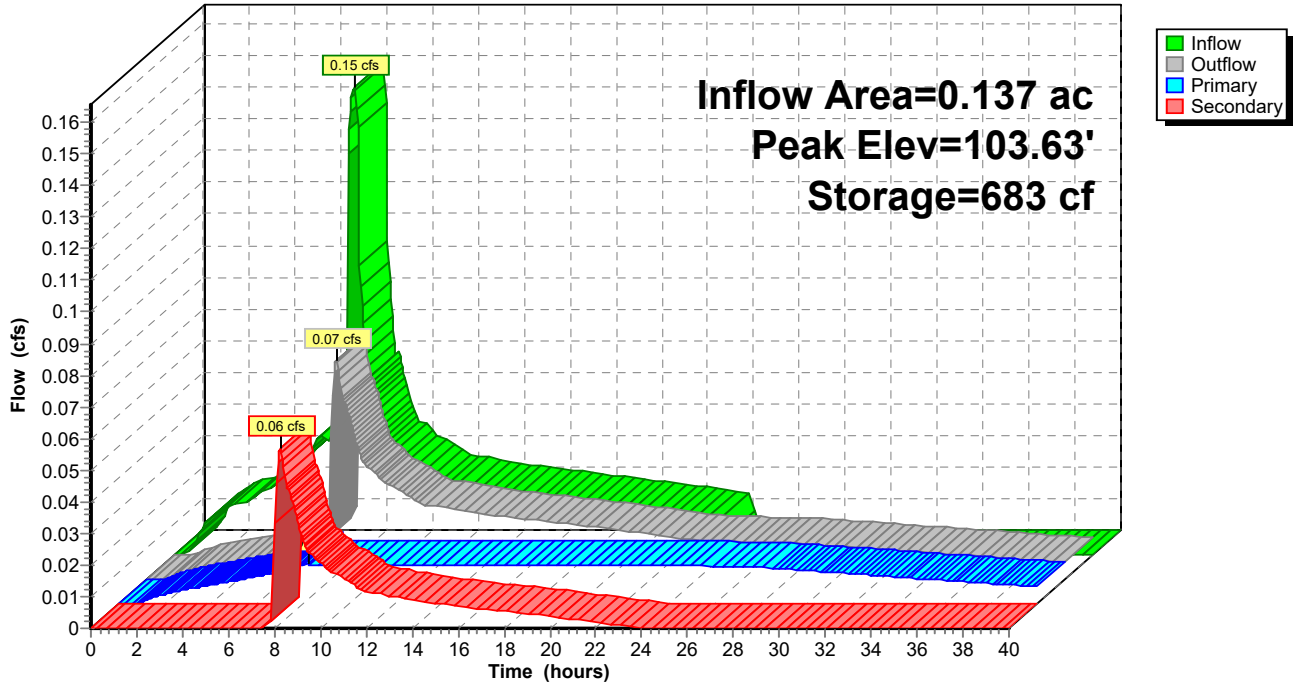
Type IA 24-hr 100 yr Rainfall=4.50"

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**Pond 3: PUBIC LIDA A**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 4: Pre (Pub B)**

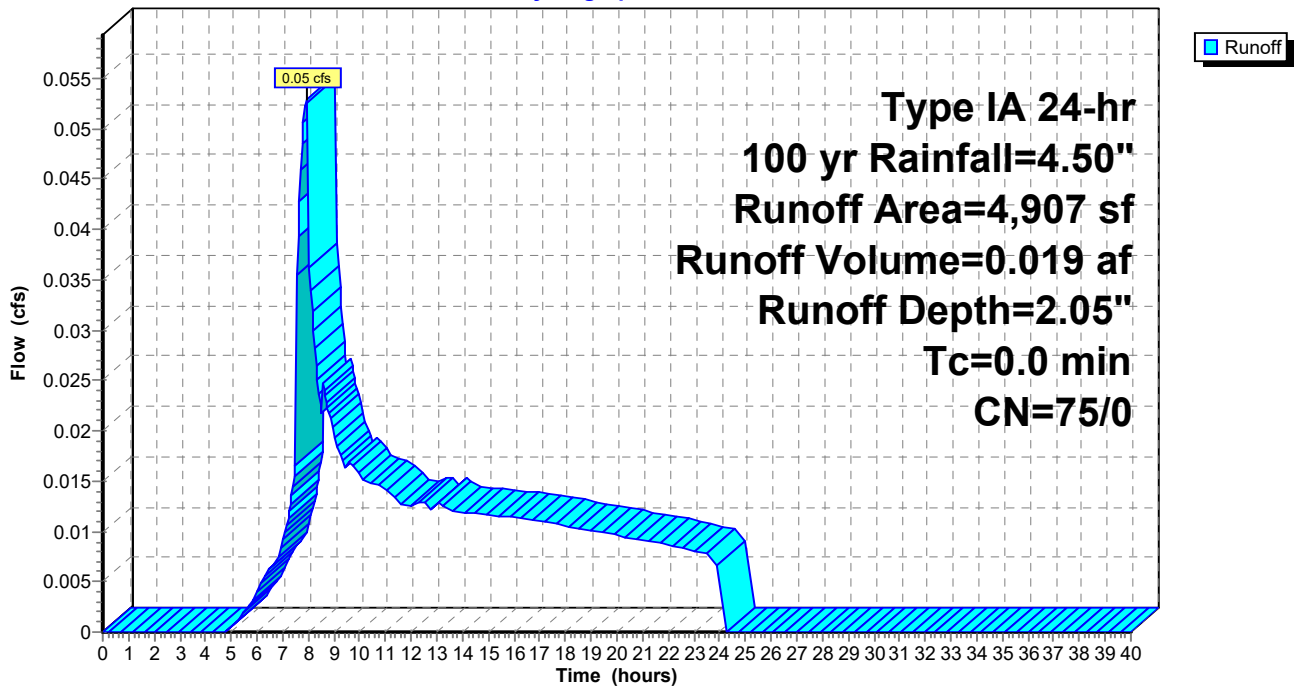
Runoff = 0.05 cfs @ 7.95 hrs, Volume= 0.019 af, Depth= 2.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	4,907	75	
	4,907		100.00% Pervious Area

**Subcatchment 4: Pre (Pub B)**

Hydrograph



**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 5: Post (Pub B)**

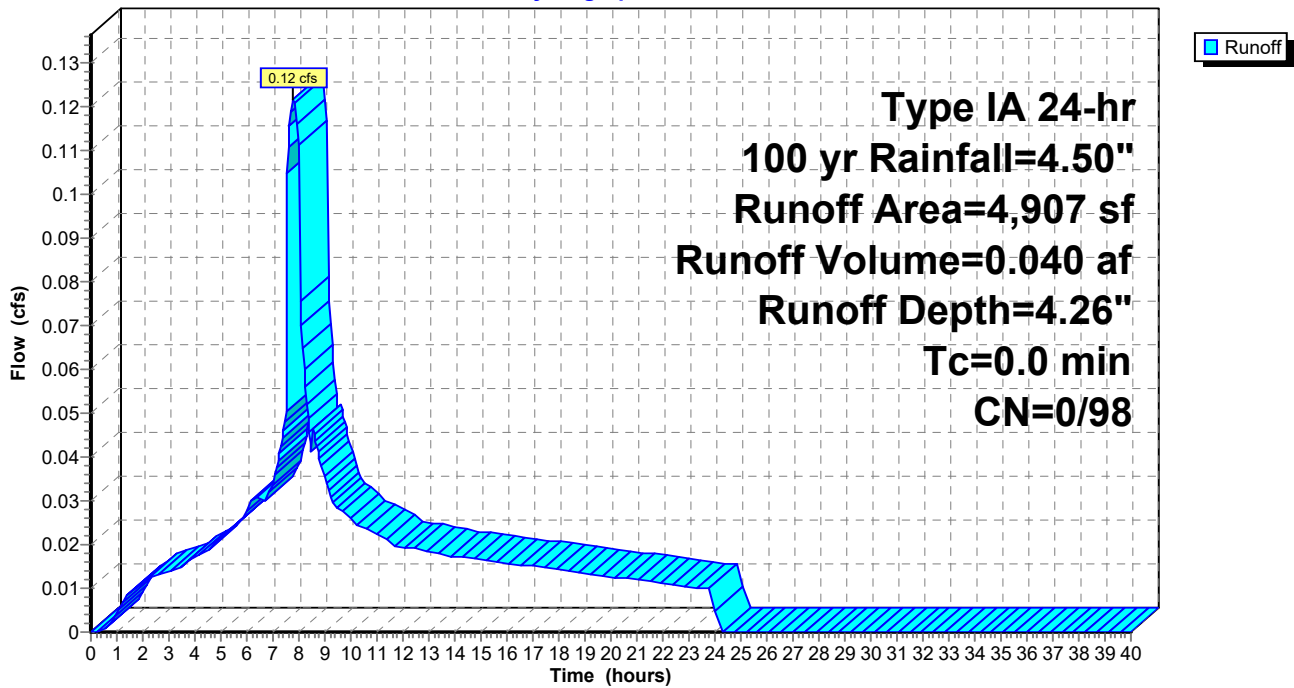
Runoff = 0.12 cfs @ 7.80 hrs, Volume= 0.040 af, Depth= 4.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	4,907	98	
	4,907		100.00% Impervious Area

**Subcatchment 5: Post (Pub B)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Pond 6: PUBIC LIDA B**

Inflow Area = 0.113 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100 yr event  
 Inflow = 0.12 cfs @ 7.80 hrs, Volume= 0.040 af  
 Outflow = 0.02 cfs @ 13.76 hrs, Volume= 0.040 af, Atten= 86%, Lag= 357.7 min  
 Primary = 0.02 cfs @ 13.76 hrs, Volume= 0.040 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.37' @ 13.76 hrs Surf.Area= 448 sf Storage= 703 cf

Plug-Flow detention time= 517.3 min calculated for 0.040 af (99% of inflow)  
 Center-of-Mass det. time= 510.3 min ( 1,163.4 - 653.1 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	986 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	448	0.0	0	0
101.50	448	40.0	269	269
103.00	448	40.0	269	538
104.00	448	100.0	448	986

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 13.76 hrs HW=103.37' (Free Discharge)

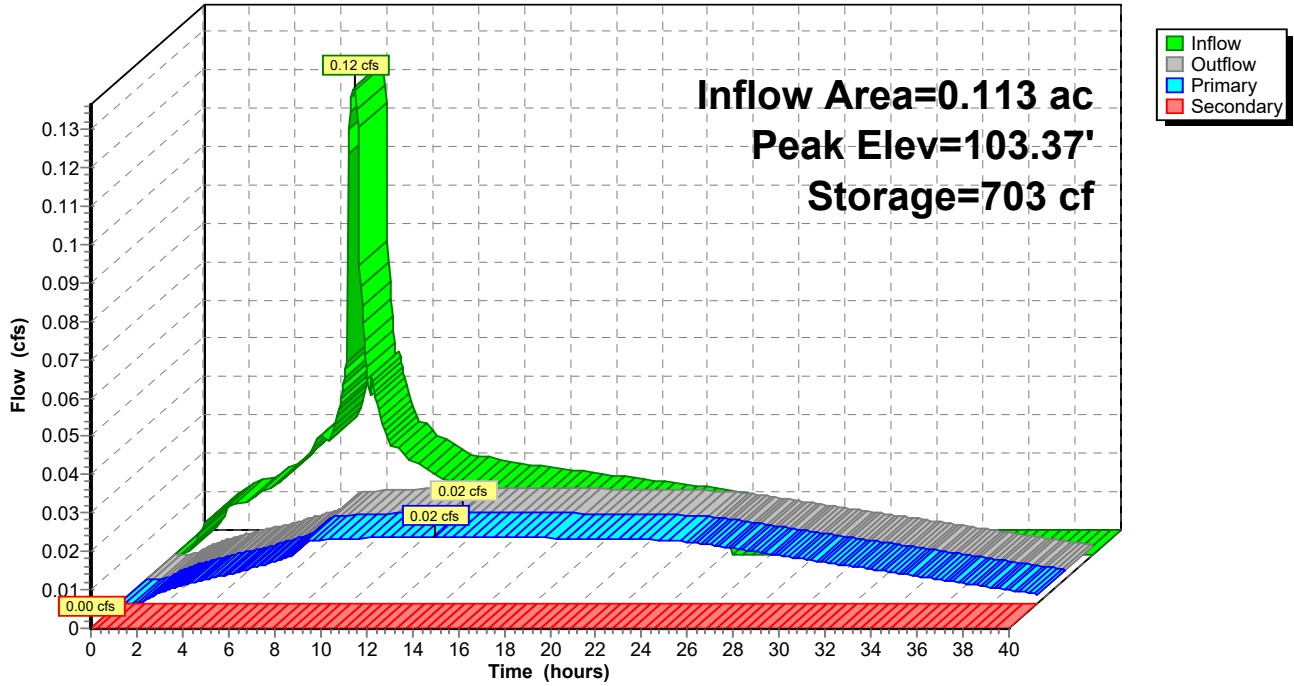
↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 8.80 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

Pond 6: PUBIC LIDA B

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 7: Pre (Pub C)**

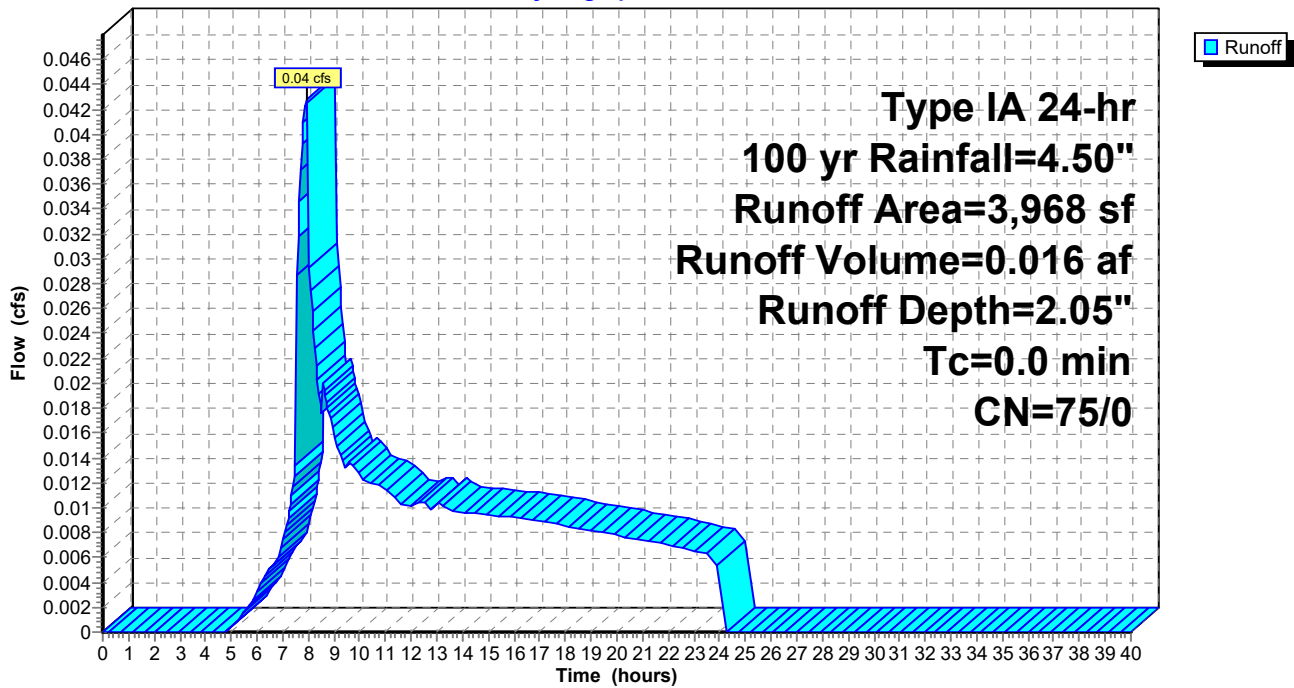
Runoff = 0.04 cfs @ 7.95 hrs, Volume= 0.016 af, Depth= 2.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	3,968	75	
	3,968		100.00% Pervious Area

**Subcatchment 7: Pre (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 8: Post (Pub C)**

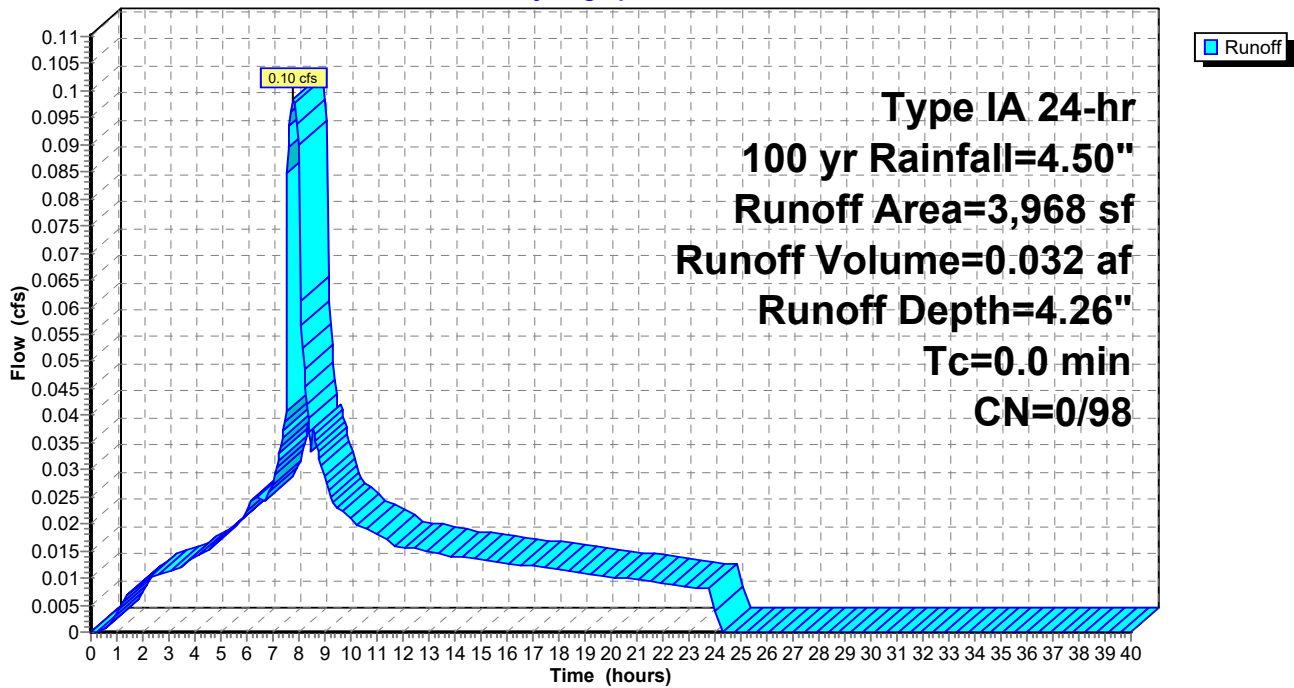
Runoff = 0.10 cfs @ 7.80 hrs, Volume= 0.032 af, Depth= 4.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	3,968	98	
	3,968		100.00% Impervious Area

**Subcatchment 8: Post (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Pond 9: PUBIC LIDA C**

Inflow Area = 0.091 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100 yr event  
 Inflow = 0.10 cfs @ 7.80 hrs, Volume= 0.032 af  
 Outflow = 0.02 cfs @ 9.77 hrs, Volume= 0.032 af, Atten= 77%, Lag= 117.8 min  
 Primary = 0.02 cfs @ 9.77 hrs, Volume= 0.032 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.02' @ 9.77 hrs Surf.Area= 324 sf Storage= 394 cf

Plug-Flow detention time= 222.1 min calculated for 0.032 af (100% of inflow)  
 Center-of-Mass det. time= 221.8 min ( 874.9 - 653.1 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	713 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	324	0.0	0	0
101.50	324	40.0	194	194
103.00	324	40.0	194	389
104.00	324	100.0	324	713

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.7" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 9.77 hrs HW=103.02' (Free Discharge)

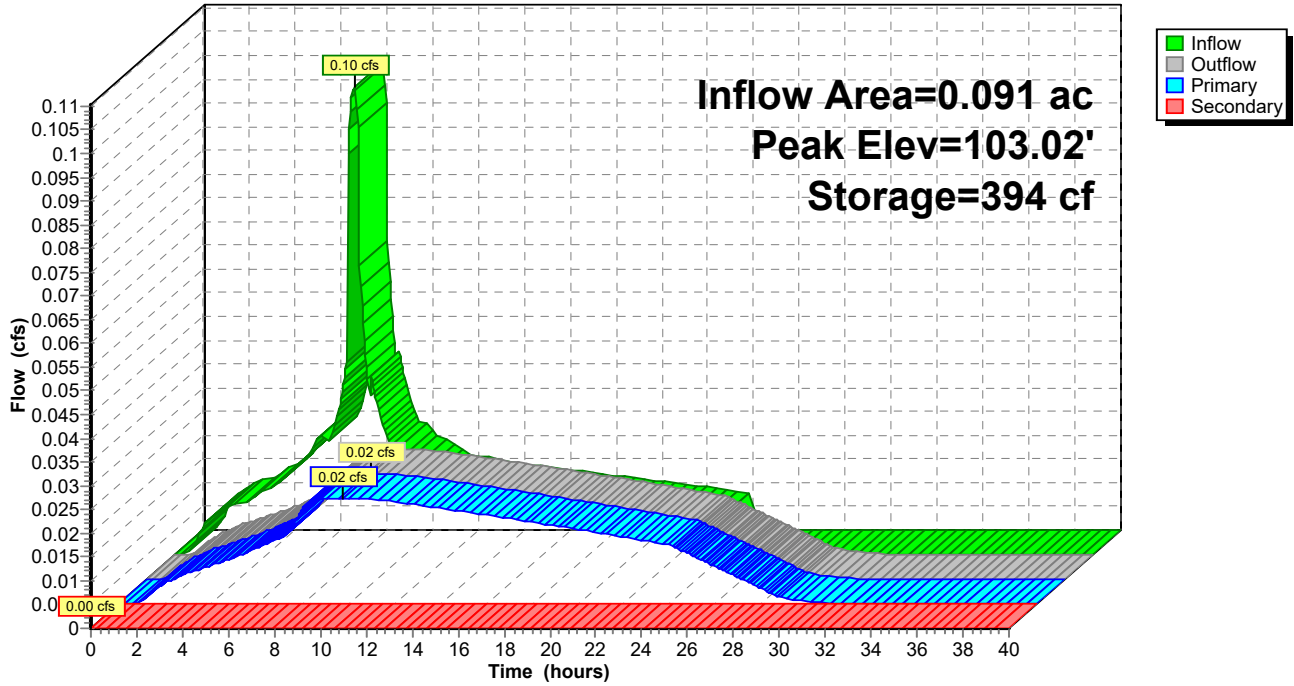
↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 8.32 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

Pond 9: PUBIC LIDA C

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 10: Pre (Pub D)**

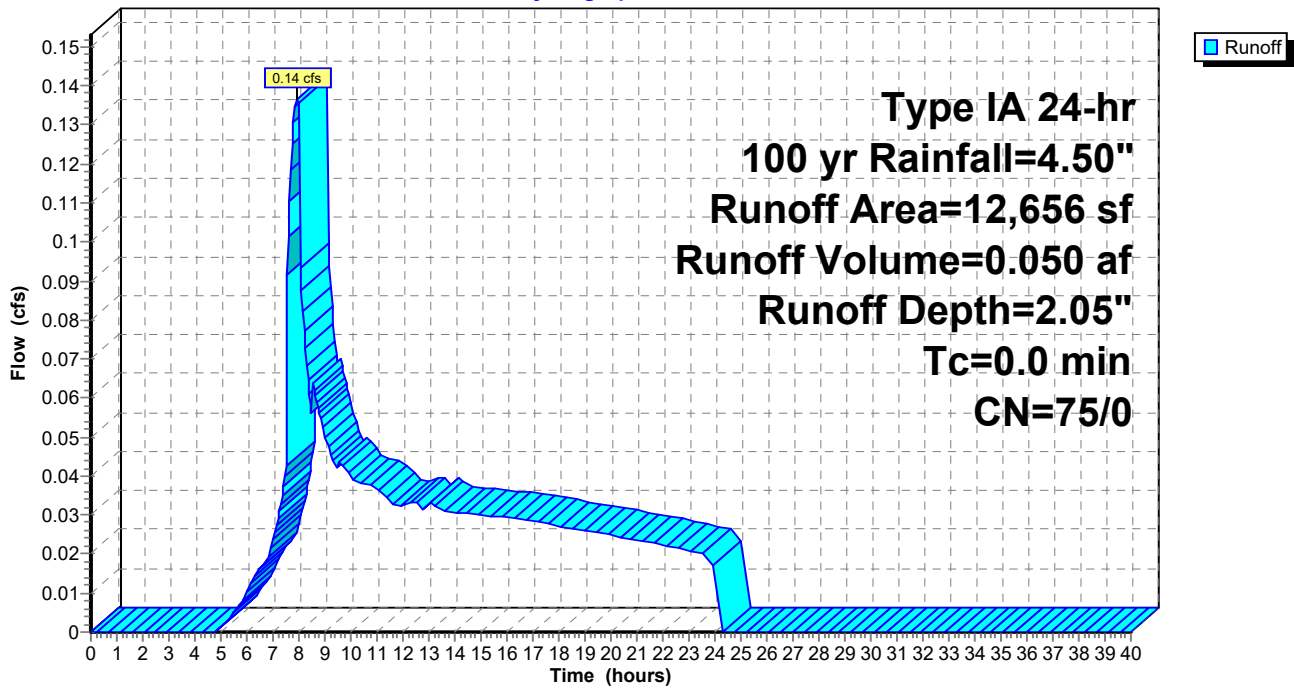
Runoff = 0.14 cfs @ 7.95 hrs, Volume= 0.050 af, Depth= 2.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

Area (sf)	CN	Description
* 12,656	75	
12,656		100.00% Pervious Area

**Subcatchment 10: Pre (Pub D)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 11: Post (Pub D)**

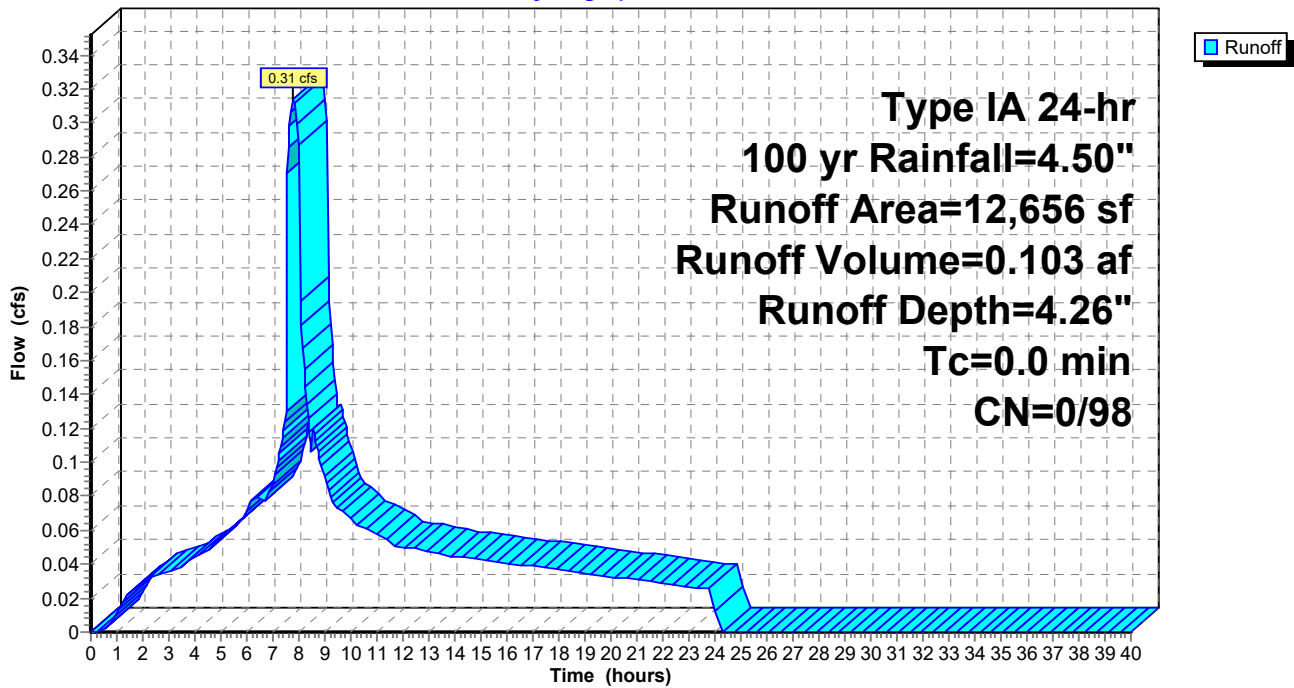
Runoff = 0.31 cfs @ 7.80 hrs, Volume= 0.103 af, Depth= 4.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	12,656	98	
	12,656		100.00% Impervious Area

**Subcatchment 11: Post (Pub D)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Pond 12: PUBIC LIDA D**

Inflow Area = 0.291 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100 yr event  
 Inflow = 0.31 cfs @ 7.80 hrs, Volume= 0.103 af  
 Outflow = 0.19 cfs @ 8.07 hrs, Volume= 0.093 af, Atten= 39%, Lag= 16.2 min  
 Primary = 0.02 cfs @ 8.07 hrs, Volume= 0.050 af  
 Secondary = 0.17 cfs @ 8.07 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.73' @ 8.07 hrs Surf.Area= 759 sf Storage= 1,464 cf

Plug-Flow detention time= 447.8 min calculated for 0.093 af (90% of inflow)  
 Center-of-Mass det. time= 376.8 min ( 1,029.9 - 653.1 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	1,670 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	759	0.0	0	0
101.50	759	40.0	455	455
103.00	759	40.0	455	911
104.00	759	100.0	759	1,670

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.02 cfs @ 8.07 hrs HW=103.73' (Free Discharge)

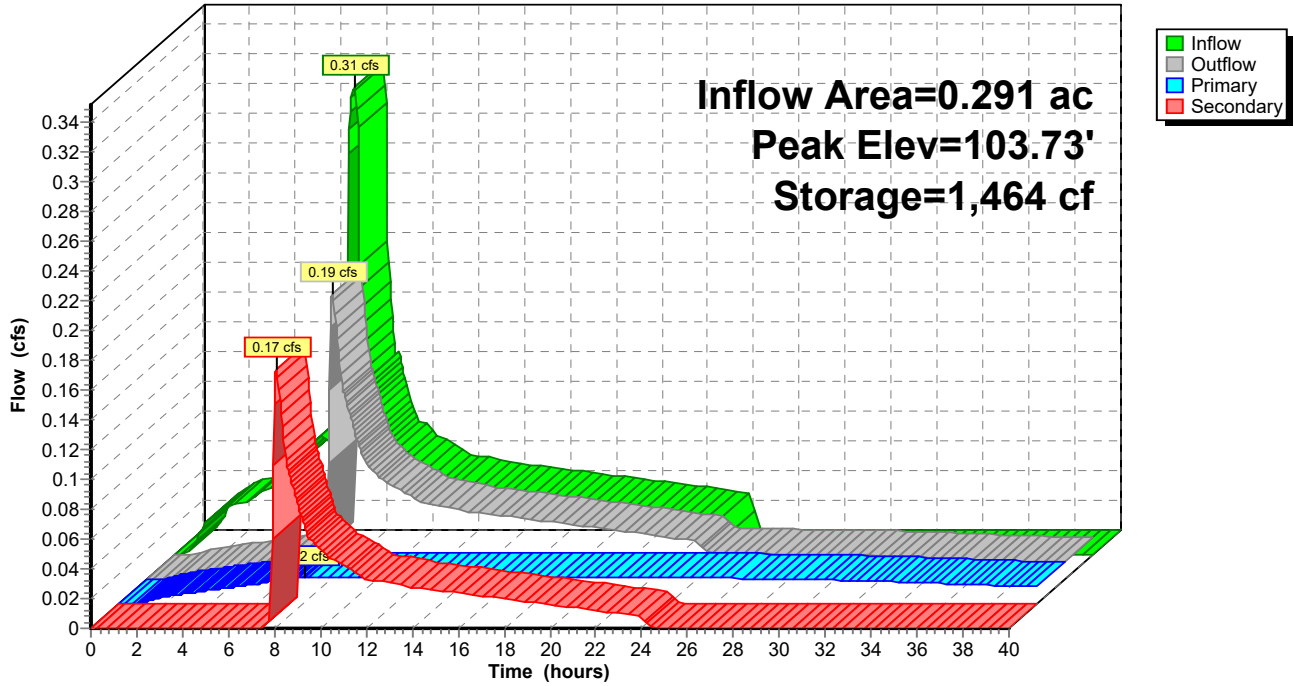
↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 9.26 fps)

**Secondary OutFlow** Max=0.17 cfs @ 8.07 hrs HW=103.73' (Free Discharge)

↑**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 1.62 fps)

Pond 12: PUBIC LIDA D

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 13: Pre (Pub E)**

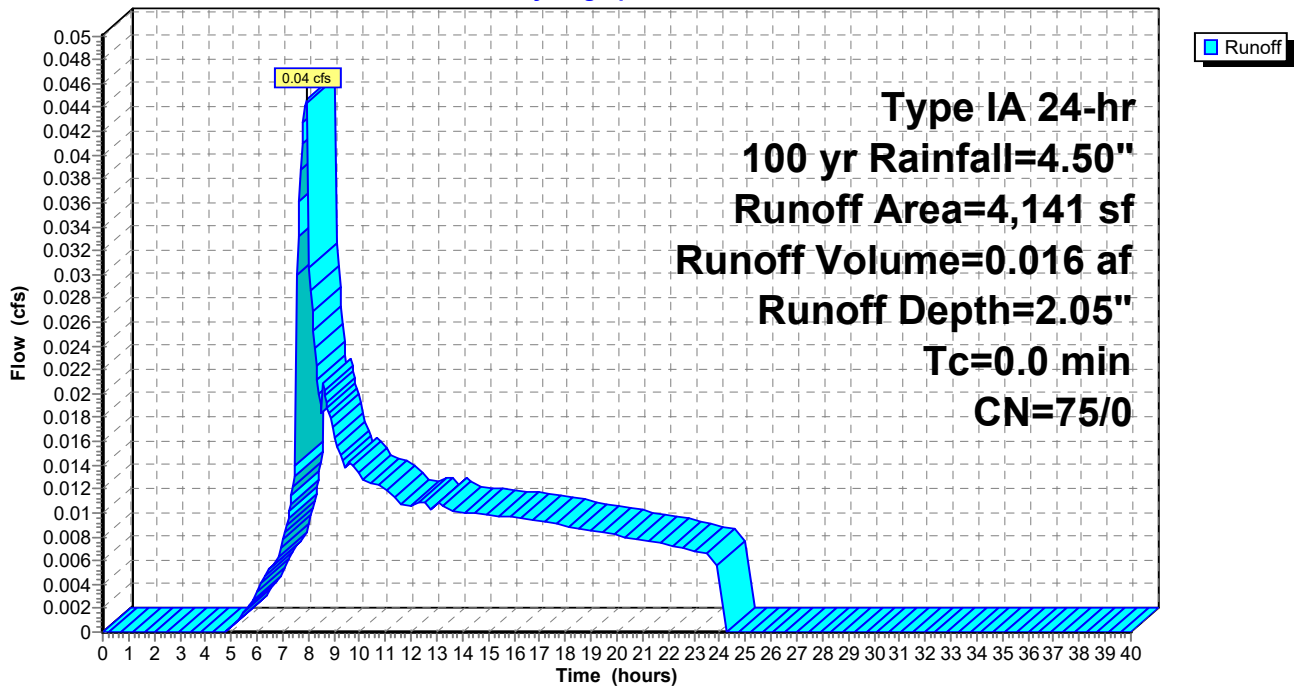
Runoff = 0.04 cfs @ 7.95 hrs, Volume= 0.016 af, Depth= 2.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	4,141	75	
	4,141		100.00% Pervious Area

**Subcatchment 13: Pre (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 14: Post (Pub E)**

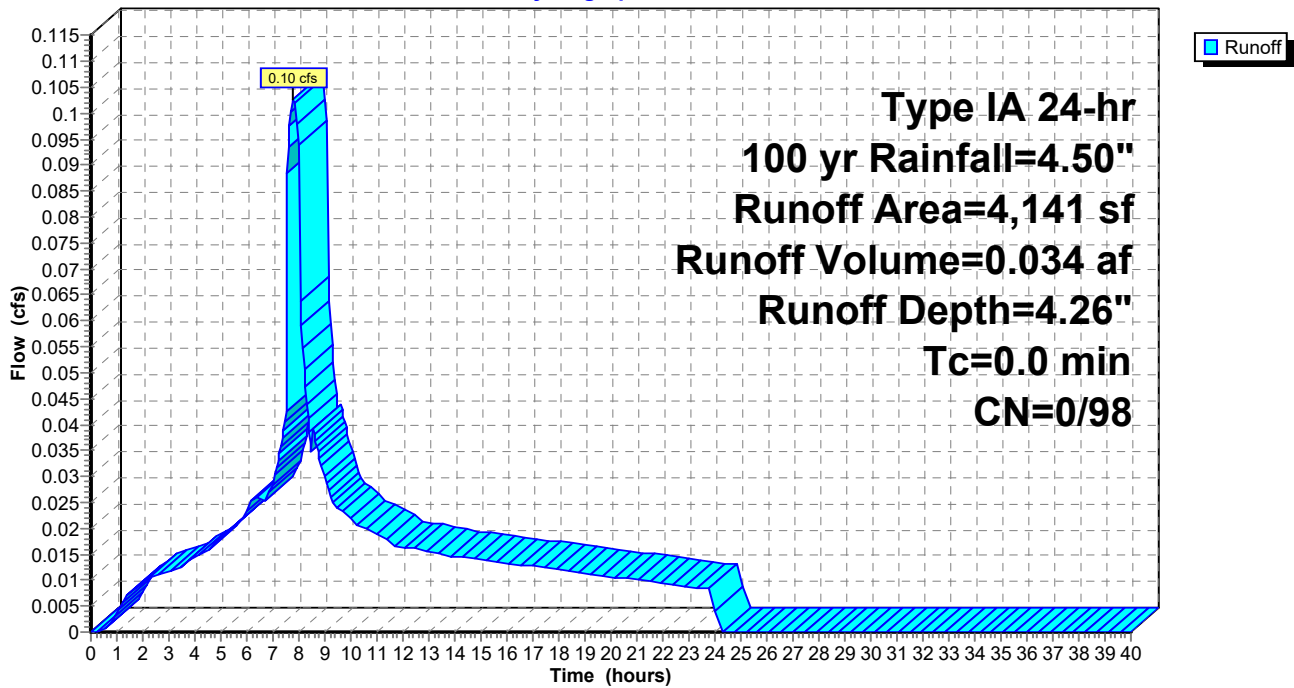
Runoff = 0.10 cfs @ 7.80 hrs, Volume= 0.034 af, Depth= 4.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	4,141	98	
	4,141		100.00% Impervious Area

**Subcatchment 14: Post (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Pond 15: PUBIC LIDA E**

Inflow Area = 0.095 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100 yr event  
 Inflow = 0.10 cfs @ 7.80 hrs, Volume= 0.034 af  
 Outflow = 0.02 cfs @ 13.25 hrs, Volume= 0.032 af, Atten= 85%, Lag= 327.0 min  
 Primary = 0.01 cfs @ 13.25 hrs, Volume= 0.031 af  
 Secondary = 0.00 cfs @ 13.25 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.52' @ 13.25 hrs Surf.Area= 374 sf Storage= 644 cf

Plug-Flow detention time= 610.8 min calculated for 0.032 af (94% of inflow)  
 Center-of-Mass det. time= 568.7 min ( 1,221.8 - 653.1 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 13.25 hrs HW=103.52' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.01 fps)

**Secondary OutFlow** Max=0.00 cfs @ 13.25 hrs HW=103.52' (Free Discharge)

↑**2=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.50 fps)

**LRS032 - Storm Calcs**

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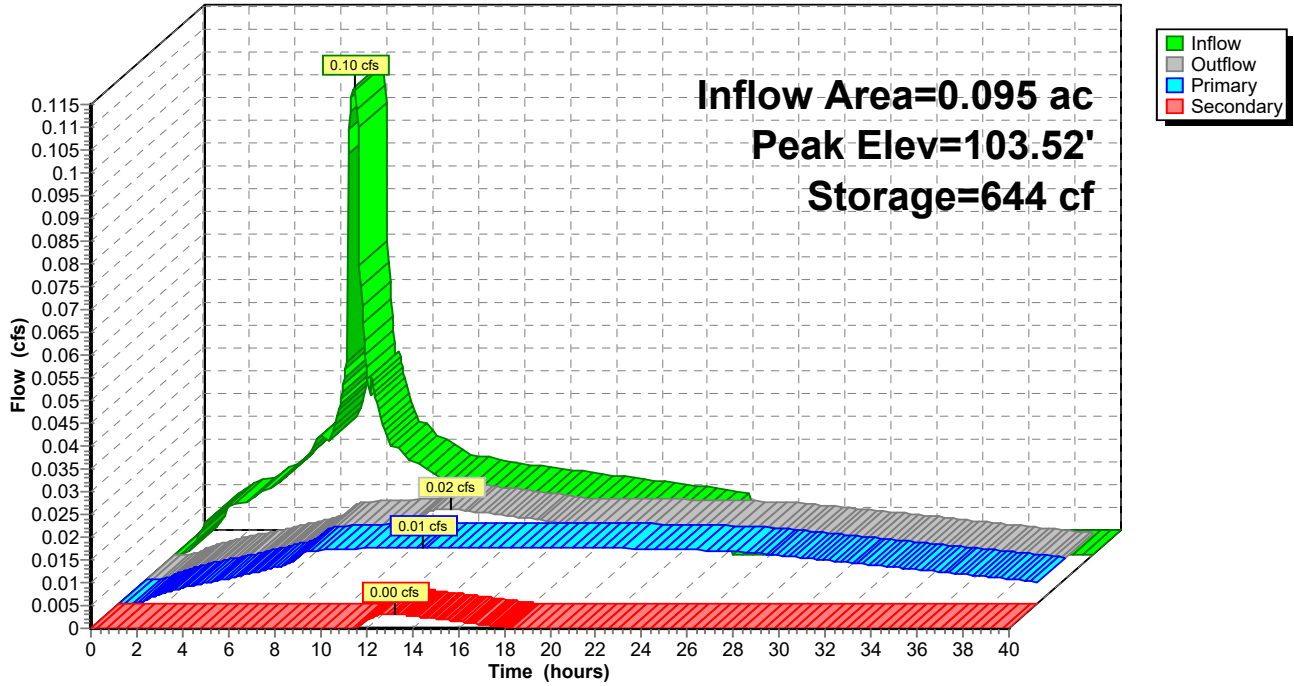
Type IA 24-hr 100 yr Rainfall=4.50"

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**Pond 15: PUBIC LIDA E**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 16: Pre (Pub F)**

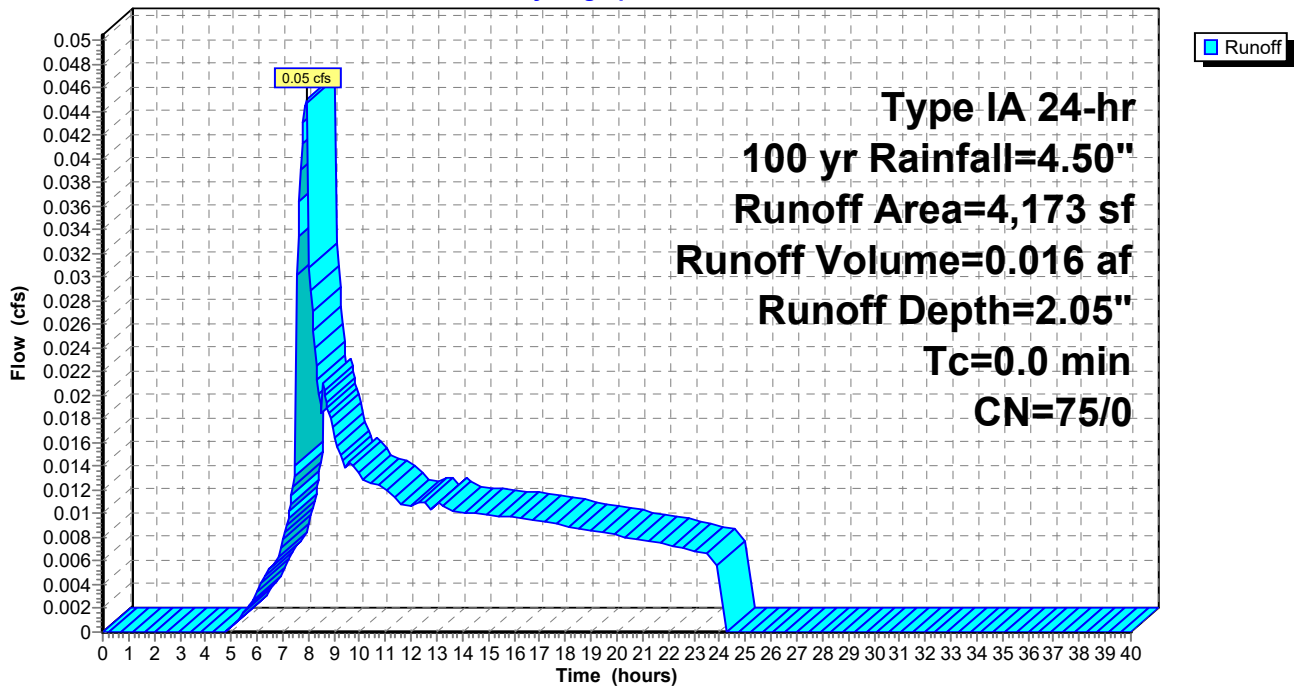
Runoff = 0.05 cfs @ 7.95 hrs, Volume= 0.016 af, Depth= 2.05"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	4,173	75	
	4,173		100.00% Pervious Area

**Subcatchment 16: Pre (Pub F)**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 17: Post (Pub F)**

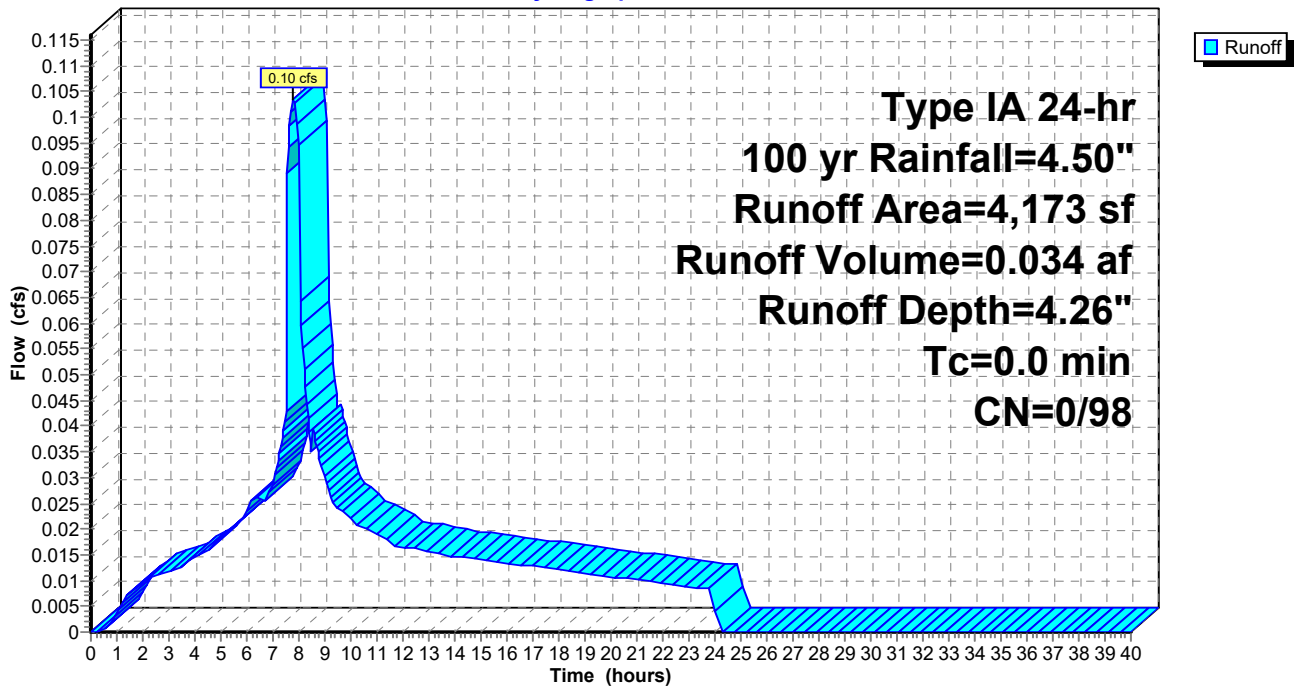
Runoff = 0.10 cfs @ 7.80 hrs, Volume= 0.034 af, Depth= 4.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	4,173	98	
	4,173		100.00% Impervious Area

**Subcatchment 17: Post (Pub F)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 100 yr Rainfall=4.50"

Prepared by Hewlett-Packard Company

Printed 6/14/2022

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**Summary for Pond 18: PUBLIC LIDA F**

Inflow Area = 0.096 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100 yr event  
 Inflow = 0.10 cfs @ 7.80 hrs, Volume= 0.034 af  
 Outflow = 0.04 cfs @ 8.33 hrs, Volume= 0.034 af, Atten= 59%, Lag= 31.5 min  
 Primary = 0.01 cfs @ 8.33 hrs, Volume= 0.029 af  
 Secondary = 0.03 cfs @ 8.33 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.59' @ 8.33 hrs Surf.Area= 252 sf Storage= 451 cf

Plug-Flow detention time= 397.7 min calculated for 0.034 af (100% of inflow)  
 Center-of-Mass det. time= 396.2 min ( 1,049.3 - 653.1 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	554 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	252	0.0	0	0
101.50	252	40.0	151	151
103.00	252	40.0	151	302
104.00	252	100.0	252	554

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 8.33 hrs HW=103.59' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.10 fps)

**Secondary OutFlow** Max=0.03 cfs @ 8.33 hrs HW=103.59' (Free Discharge)

↑**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.03 fps)

**LRS032 - Storm Calcs**

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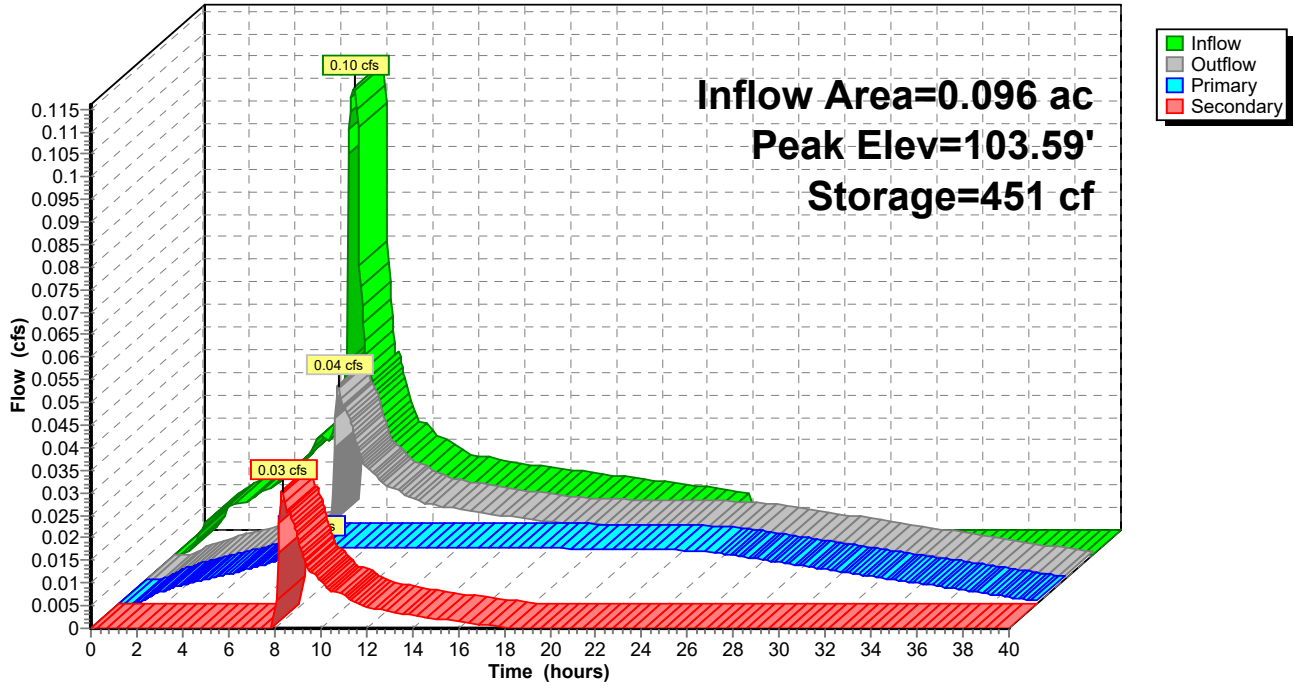
Type IA 24-hr 100 yr Rainfall=4.50"

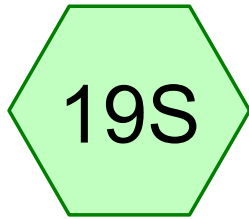
Printed 6/14/2022

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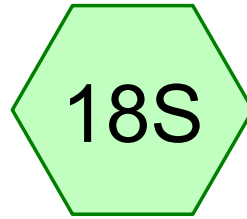
**Pond 18: PUBLIC LIDA F**

Hydrograph

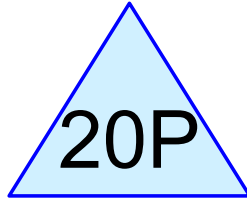




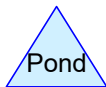
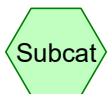
Pre Developed



Imp



ADS Stormtech MC3500



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 18S: Imp**

Runoff = 2.63 cfs @ 7.90 hrs, Volume= 0.864 af, Depth= 2.27"

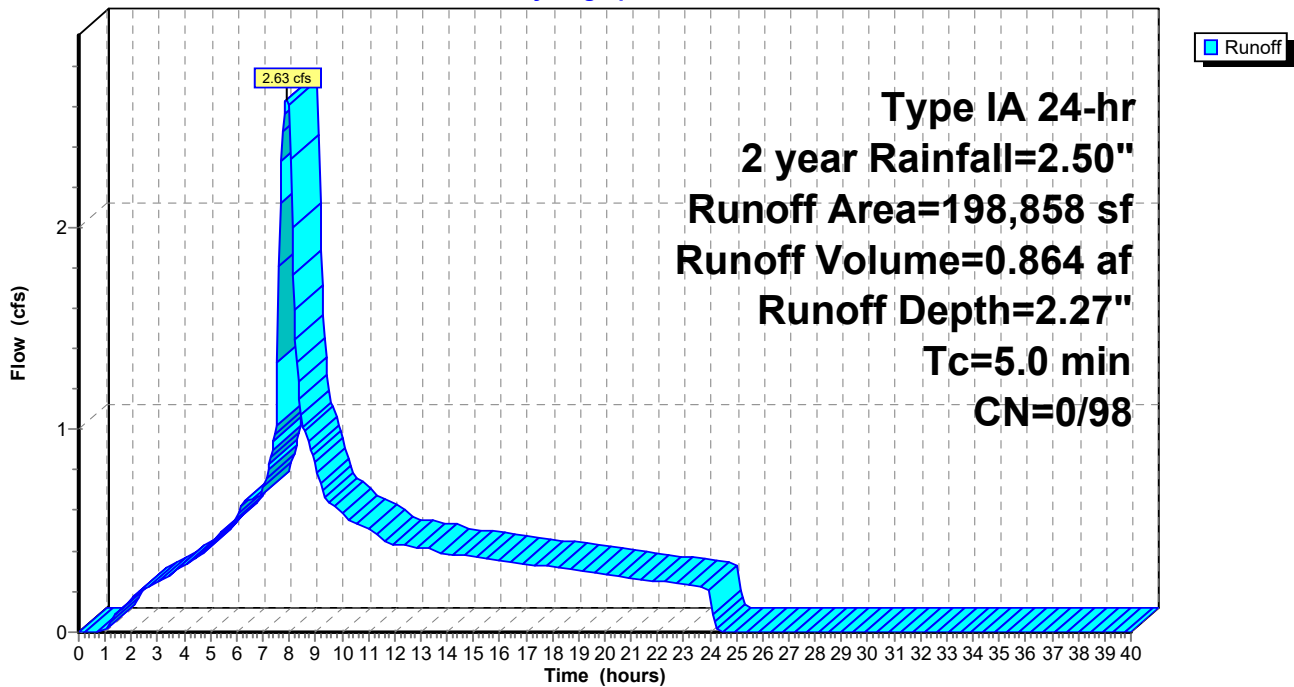
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 2 year Rainfall=2.50"

Area (sf)	CN	Description
* 198,858	98	
198,858		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 18S: Imp**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Subcatchment 19S: Pre Developed**

Runoff = 0.46 cfs @ 8.01 hrs, Volume= 0.247 af, Depth= 0.65"

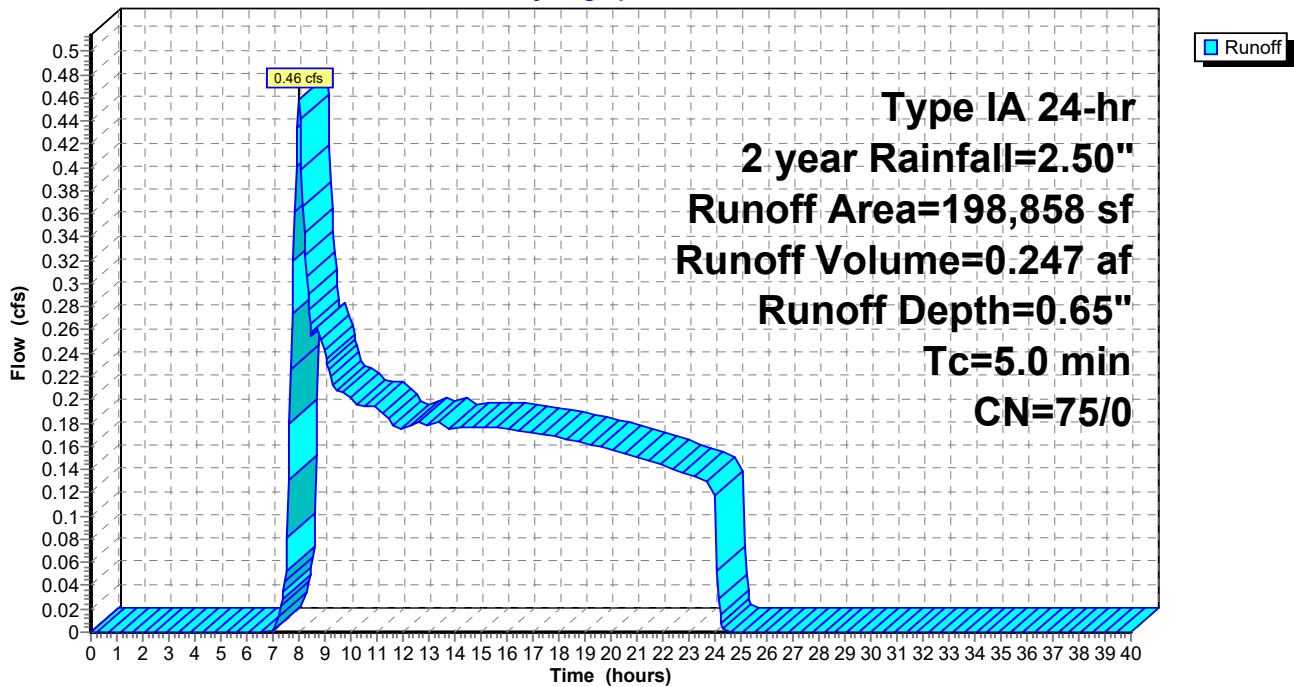
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 2 year Rainfall=2.50"

Area (sf)	CN	Description
* 198,858	75	
198,858		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 19S: Pre Developed**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 2 year Rainfall=2.50"

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**Summary for Pond 20P: ADS Stormtech MC3500**

Inflow Area = 4.565 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 year event  
 Inflow = 2.63 cfs @ 7.90 hrs, Volume= 0.864 af  
 Outflow = 0.26 cfs @ 21.34 hrs, Volume= 0.684 af, Atten= 90%, Lag= 806.4 min  
 Discarded = 0.03 cfs @ 1.75 hrs, Volume= 0.109 af  
 Primary = 0.23 cfs @ 21.34 hrs, Volume= 0.575 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 103.99' @ 21.34 hrs Surf.Area= 7,390 sf Storage= 20,563 cf

Plug-Flow detention time= 764.3 min calculated for 0.683 af (79% of inflow)  
 Center-of-Mass det. time= 627.9 min ( 1,301.7 - 673.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	10,262 cf	<b>37.08'W x 199.29'L x 5.50'H Field A</b> 40,647 cf Overall - 14,993 cf Embedded = 25,654 cf x 40.0% Voids
#2A	100.75'	14,993 cf	<b>ADS_StormTech MC-3500 d +Cap</b> x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 27 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		25,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>0.200 in/hr Exfiltration over Surface area</b>
#2	Primary	100.00'	<b>2.1" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	104.00'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.03 cfs @ 1.75 hrs HW=100.06' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.23 cfs @ 21.34 hrs HW=103.99' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.23 cfs @ 9.51 fps)  
 ↑3=Orifice/Grate ( Controls 0.00 cfs)

**LRS032 - Storm Calcs**

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Type IA 24-hr 2 year Rainfall=2.50"

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**Pond 20P: ADS Stormtech MC3500 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap storage)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

27 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 197.29' Row Length +12.0" End Stone x 2 = 199.29' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 14,992.5 cf Chamber Storage

40,646.9 cf Field - 14,992.5 cf Chambers = 25,654.3 cf Stone x 40.0% Voids = 10,261.7 cf Stone Storage

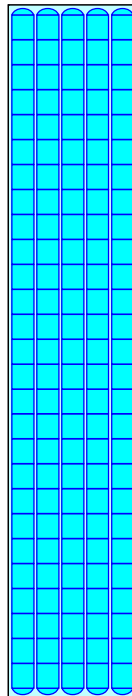
Chamber Storage + Stone Storage = 25,254.3 cf = 0.580 af

Overall Storage Efficiency = 62.1%

135 Chambers

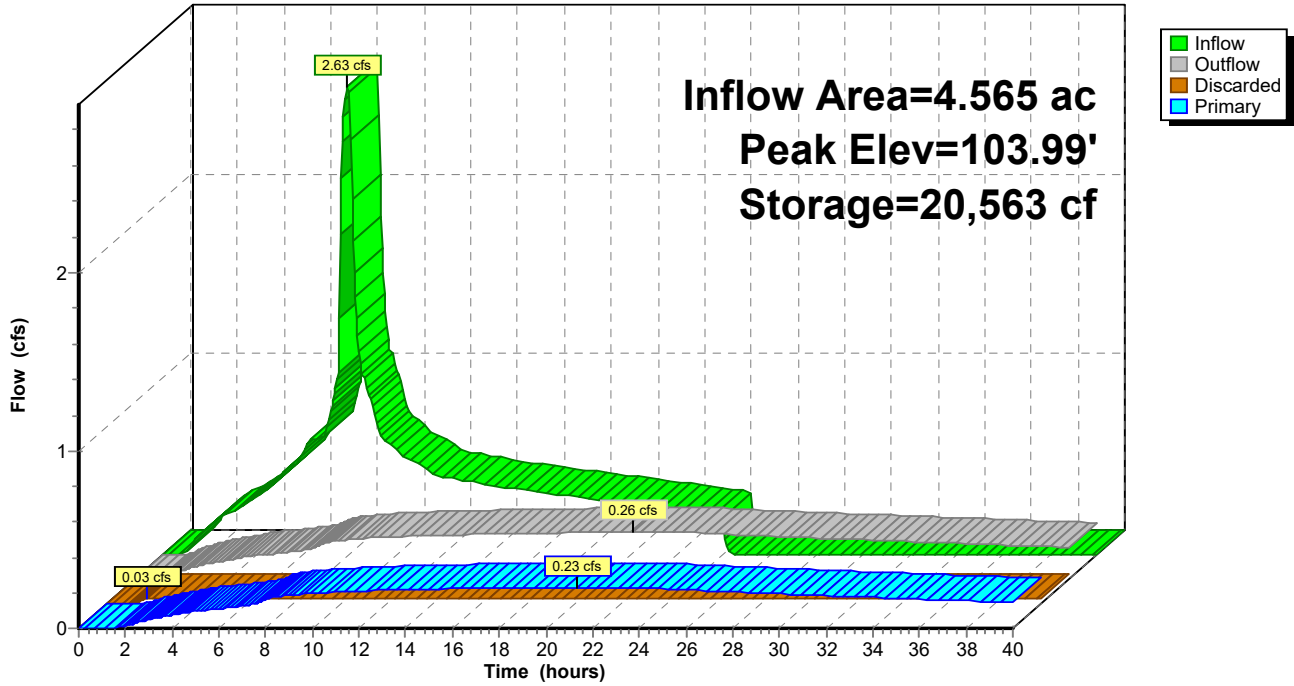
1,505.4 cy Field

950.2 cy Stone



Pond 20P: ADS Stormtech MC3500

Hydrograph





**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 18S: Imp**

Runoff = 3.30 cfs @ 7.90 hrs, Volume= 1.091 af, Depth= 2.87"

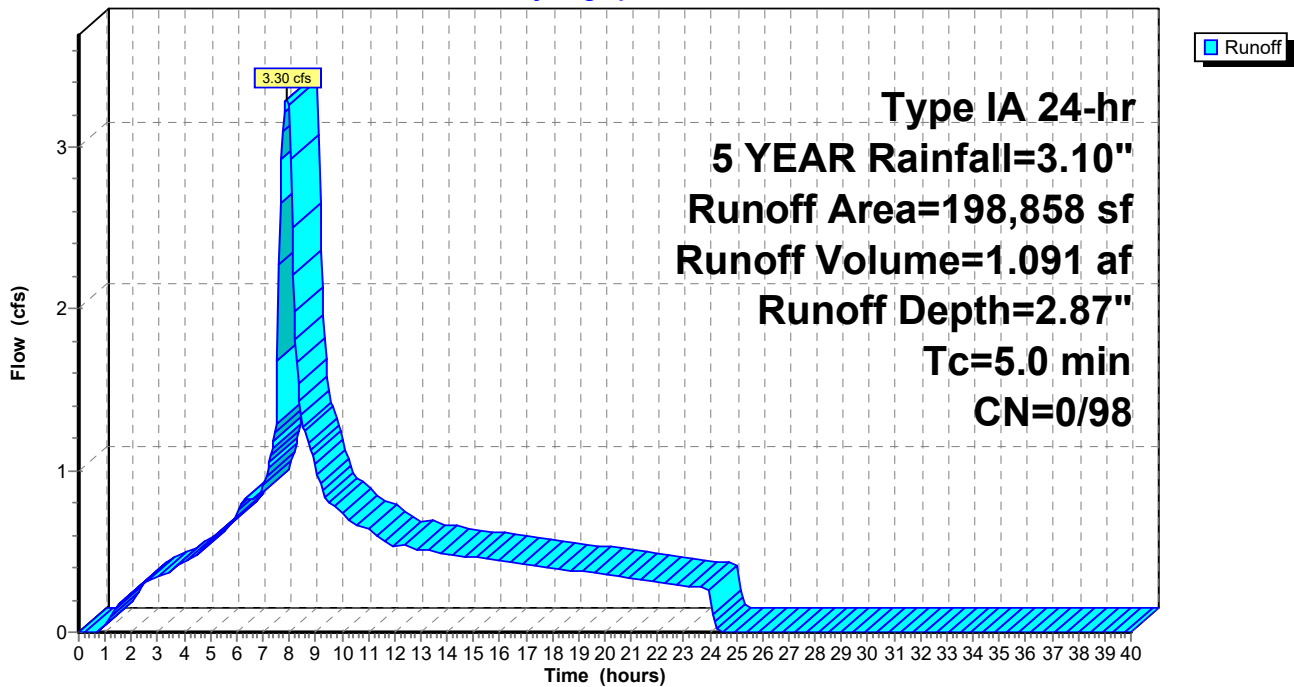
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 5 YEAR Rainfall=3.10"

Area (sf)	CN	Description
* 198,858	98	
198,858		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 18S: Imp**

Hydrograph



**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Summary for Subcatchment 19S: Pre Developed**

Runoff = 0.89 cfs @ 7.99 hrs, Volume= 0.391 af, Depth= 1.03"

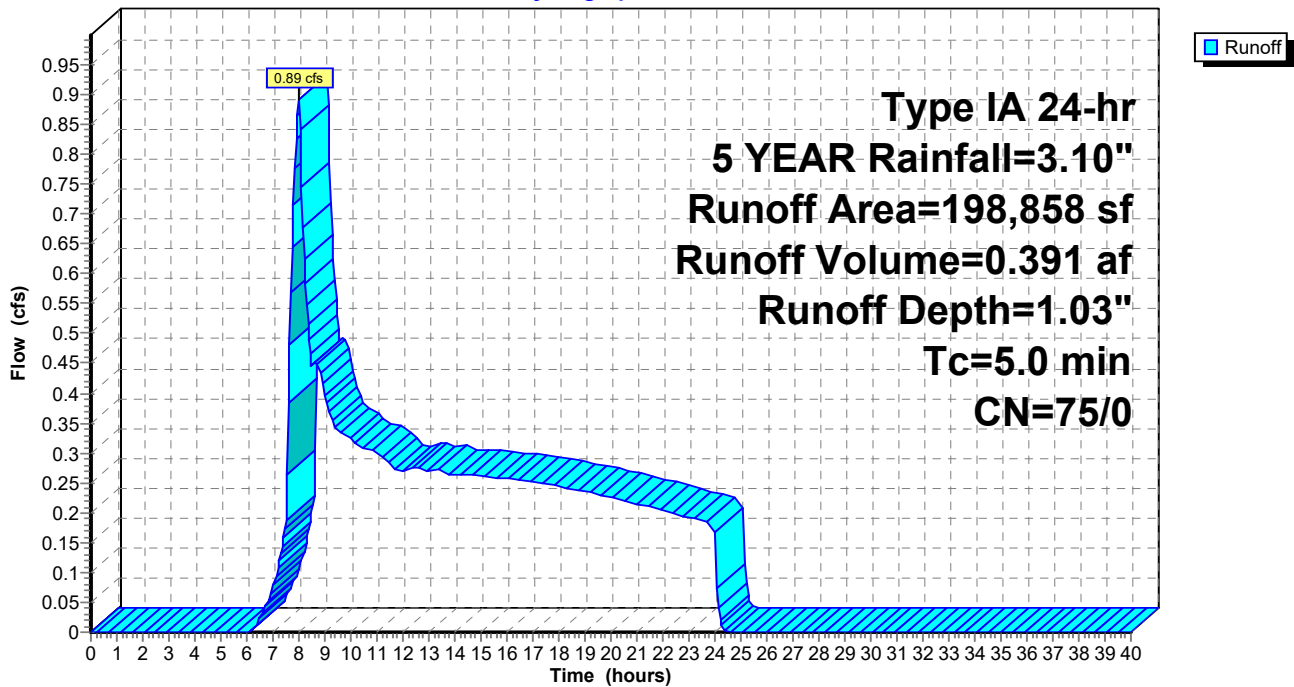
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 5 YEAR Rainfall=3.10"

Area (sf)	CN	Description
* 198,858	75	
198,858		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 19S: Pre Developed**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 5 YEAR Rainfall=3.10"

Prepared by Hewlett-Packard Company

Printed 6/14/2022

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**Summary for Pond 20P: ADS Stormtech MC3500**

Inflow Area = 4.565 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event  
 Inflow = 3.30 cfs @ 7.90 hrs, Volume= 1.091 af  
 Outflow = 0.58 cfs @ 11.46 hrs, Volume= 0.902 af, Atten= 82%, Lag= 213.8 min  
 Discarded = 0.03 cfs @ 1.50 hrs, Volume= 0.110 af  
 Primary = 0.55 cfs @ 11.46 hrs, Volume= 0.792 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 104.31' @ 11.46 hrs Surf.Area= 7,390 sf Storage= 21,725 cf

Plug-Flow detention time= 655.4 min calculated for 0.902 af (83% of inflow)  
 Center-of-Mass det. time= 537.4 min ( 1,204.7 - 667.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	10,262 cf	<b>37.08'W x 199.29'L x 5.50'H Field A</b> 40,647 cf Overall - 14,993 cf Embedded = 25,654 cf x 40.0% Voids
#2A	100.75'	14,993 cf	<b>ADS_StormTech MC-3500 d +Cap</b> x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 27 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		25,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>0.200 in/hr Exfiltration over Surface area</b>
#2	Primary	100.00'	<b>2.1" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	104.00'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.03 cfs @ 1.50 hrs HW=100.06' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.55 cfs @ 11.46 hrs HW=104.31' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.24 cfs @ 9.90 fps)  
 ↑3=Orifice/Grate (Orifice Controls 0.31 cfs @ 1.91 fps)

**LRS032 - Storm Calcs**

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Type IA 24-hr 5 YEAR Rainfall=3.10"

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**Pond 20P: ADS Stormtech MC3500 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap storage)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

27 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 197.29' Row Length +12.0" End Stone x 2 = 199.29' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 14,992.5 cf Chamber Storage

40,646.9 cf Field - 14,992.5 cf Chambers = 25,654.3 cf Stone x 40.0% Voids = 10,261.7 cf Stone Storage

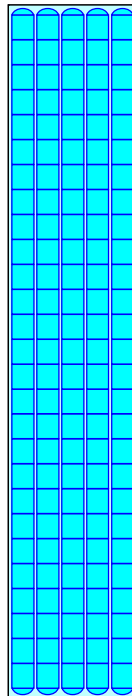
Chamber Storage + Stone Storage = 25,254.3 cf = 0.580 af

Overall Storage Efficiency = 62.1%

135 Chambers

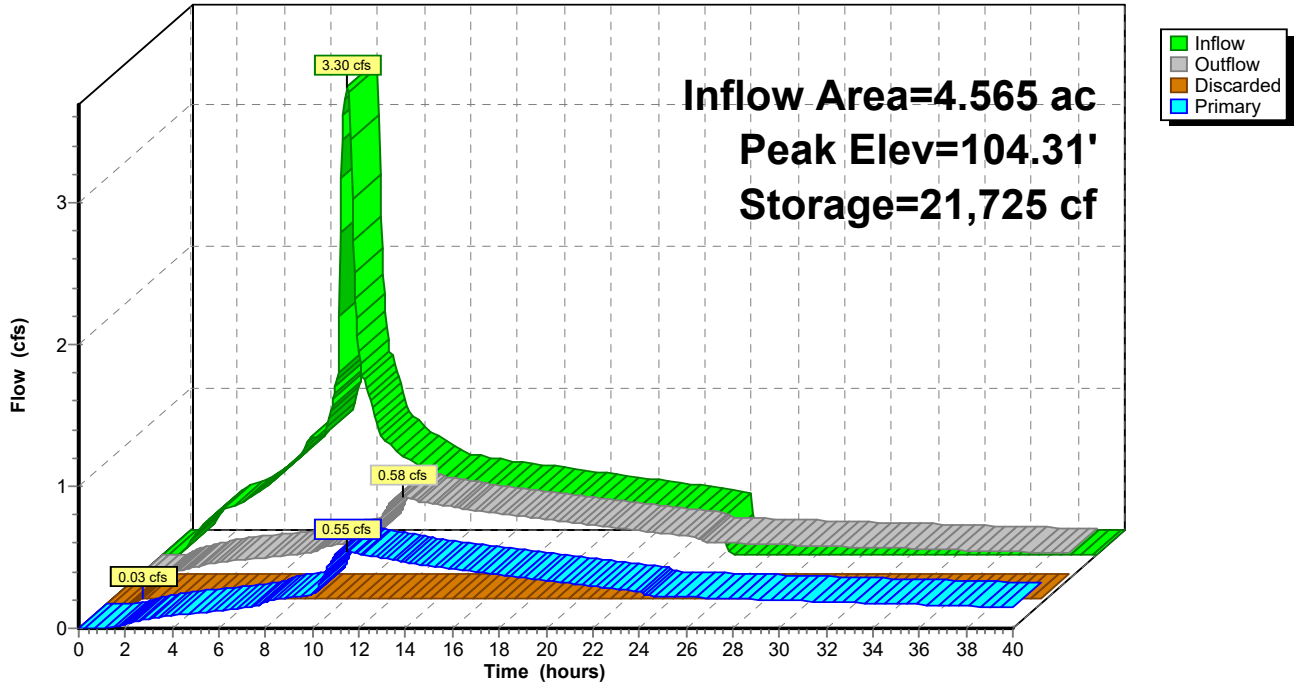
1,505.4 cy Field

950.2 cy Stone



Pond 20P: ADS Stormtech MC3500

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 18S: Imp**

Runoff = 3.69 cfs @ 7.90 hrs, Volume= 1.224 af, Depth= 3.22"

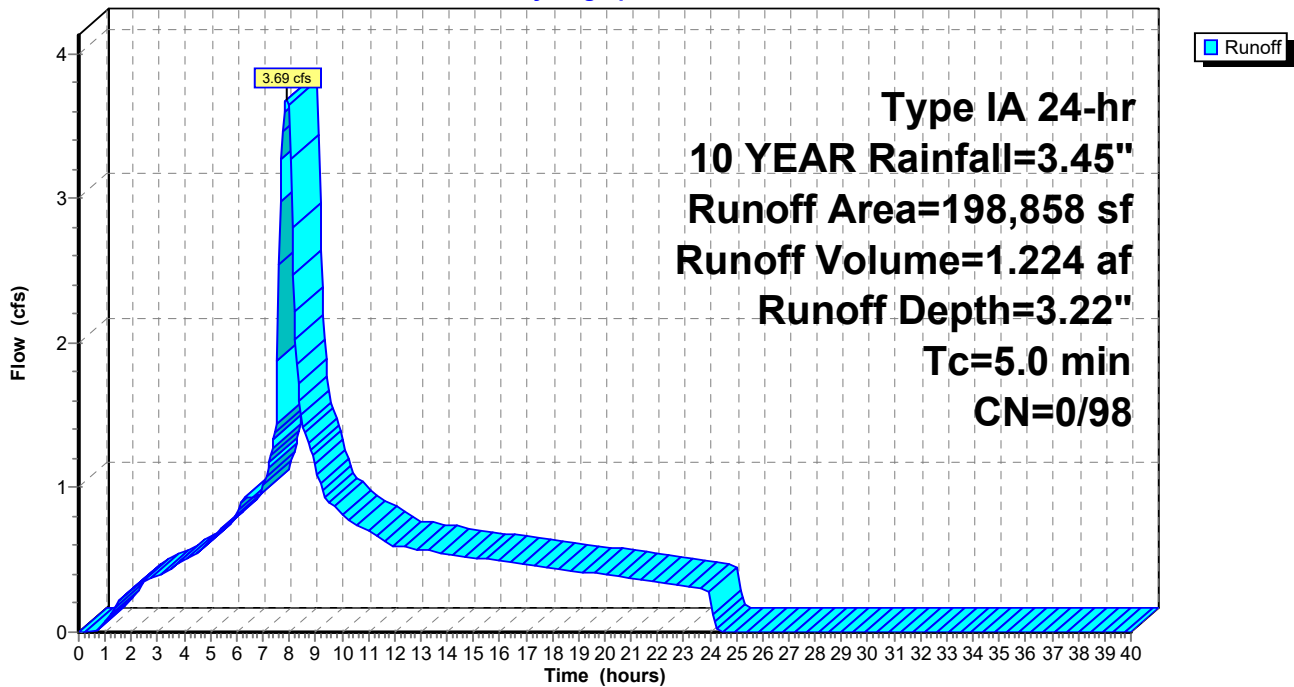
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 10 YEAR Rainfall=3.45"

Area (sf)	CN	Description
* 198,858	98	
198,858		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 18S: Imp**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Summary for Subcatchment 19S: Pre Developed**

Runoff = 1.18 cfs @ 7.99 hrs, Volume= 0.482 af, Depth= 1.27"

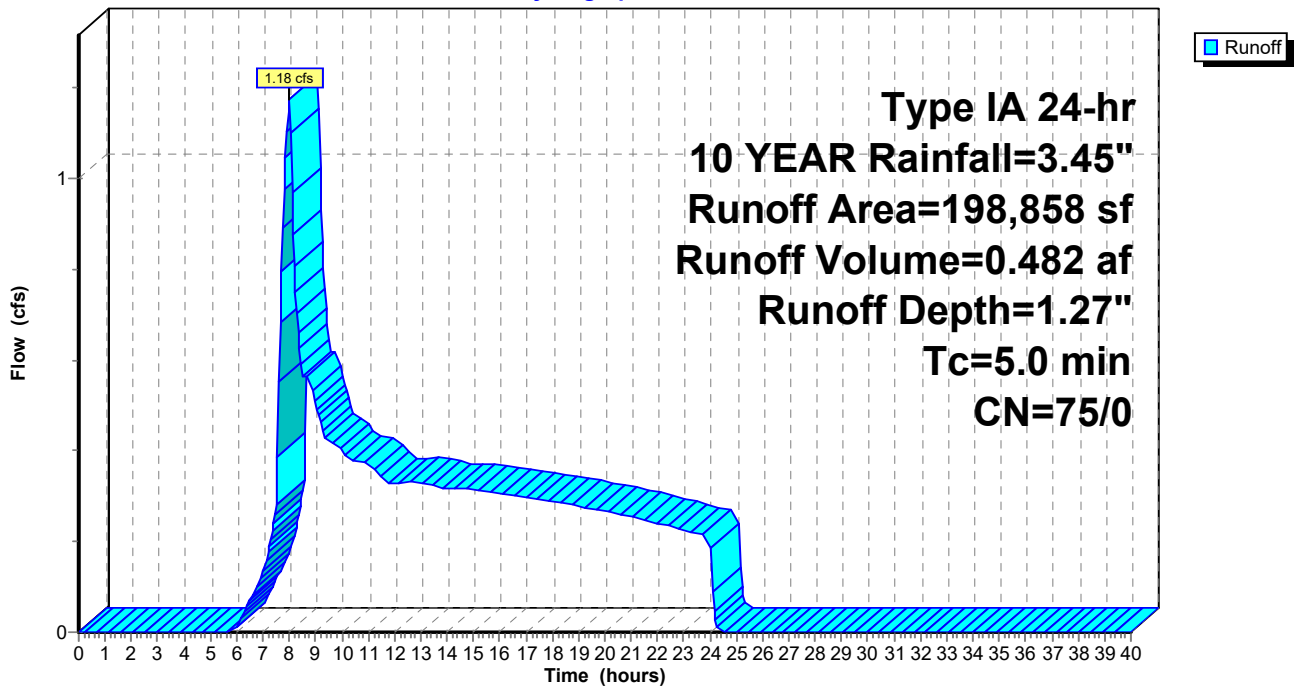
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10 YEAR Rainfall=3.45"

Area (sf)	CN	Description
* 198,858	75	
198,858		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 19S: Pre Developed**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

Prepared by Hewlett-Packard Company

Printed 6/14/2022

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**Summary for Pond 20P: ADS Stormtech MC3500**

Inflow Area = 4.565 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event  
 Inflow = 3.69 cfs @ 7.90 hrs, Volume= 1.224 af  
 Outflow = 0.82 cfs @ 9.99 hrs, Volume= 1.033 af, Atten= 78%, Lag= 125.9 min  
 Discarded = 0.03 cfs @ 1.40 hrs, Volume= 0.110 af  
 Primary = 0.79 cfs @ 9.99 hrs, Volume= 0.923 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 104.44' @ 9.99 hrs Surf.Area= 7,390 sf Storage= 22,112 cf

Plug-Flow detention time= 591.1 min calculated for 1.033 af (84% of inflow)  
 Center-of-Mass det. time= 483.3 min ( 1,147.7 - 664.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	10,262 cf	<b>37.08'W x 199.29'L x 5.50'H Field A</b> 40,647 cf Overall - 14,993 cf Embedded = 25,654 cf x 40.0% Voids
#2A	100.75'	14,993 cf	<b>ADS_StormTech MC-3500 d +Cap</b> x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 27 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		25,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>0.200 in/hr Exfiltration over Surface area</b>
#2	Primary	100.00'	<b>2.1" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	104.00'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.03 cfs @ 1.40 hrs HW=100.06' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.79 cfs @ 9.99 hrs HW=104.44' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.24 cfs @ 10.04 fps)  
 ↑3=Orifice/Grate (Orifice Controls 0.55 cfs @ 2.25 fps)



**LRS032 - Storm Calcs**

Type IA 24-hr 10 YEAR Rainfall=3.45"

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**Pond 20P: ADS Stormtech MC3500 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap storage)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

27 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 197.29' Row Length +12.0" End Stone x 2 = 199.29' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 14,992.5 cf Chamber Storage

40,646.9 cf Field - 14,992.5 cf Chambers = 25,654.3 cf Stone x 40.0% Voids = 10,261.7 cf Stone Storage

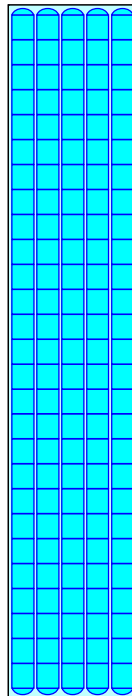
Chamber Storage + Stone Storage = 25,254.3 cf = 0.580 af

Overall Storage Efficiency = 62.1%

135 Chambers

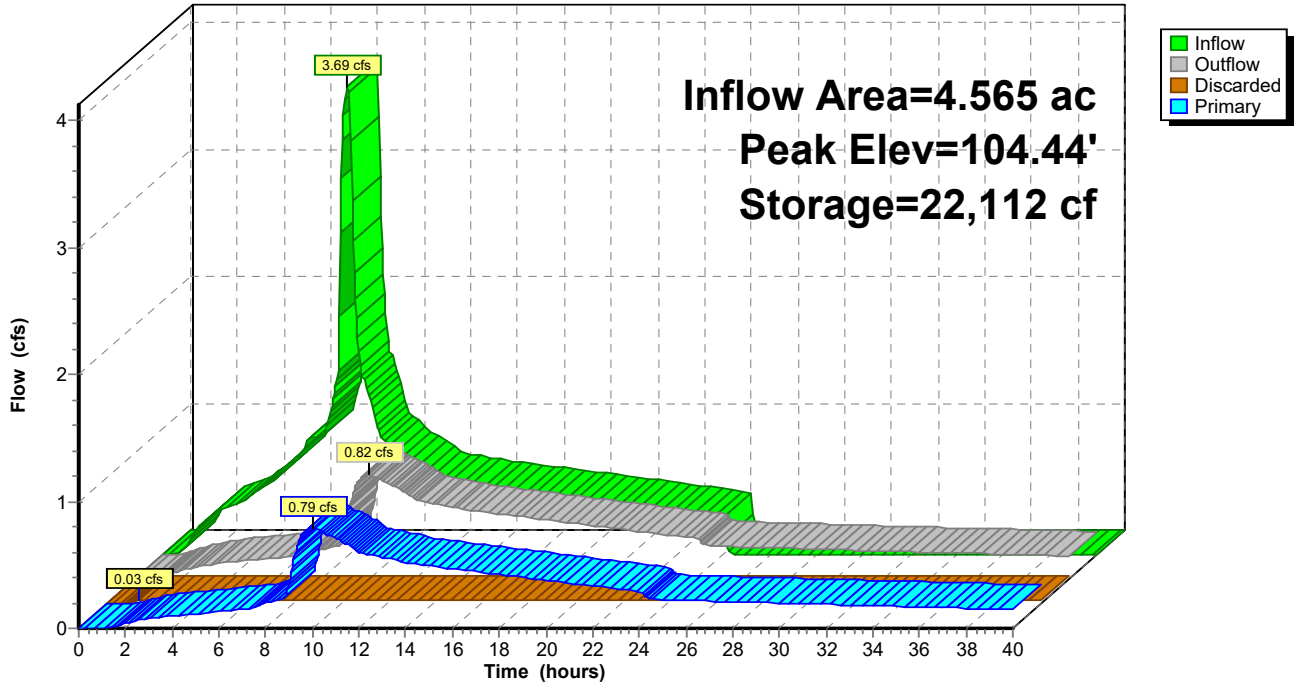
1,505.4 cy Field

950.2 cy Stone



Pond 20P: ADS Stormtech MC3500

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 18S: Imp**

Runoff = 4.18 cfs @ 7.90 hrs, Volume= 1.394 af, Depth= 3.67"

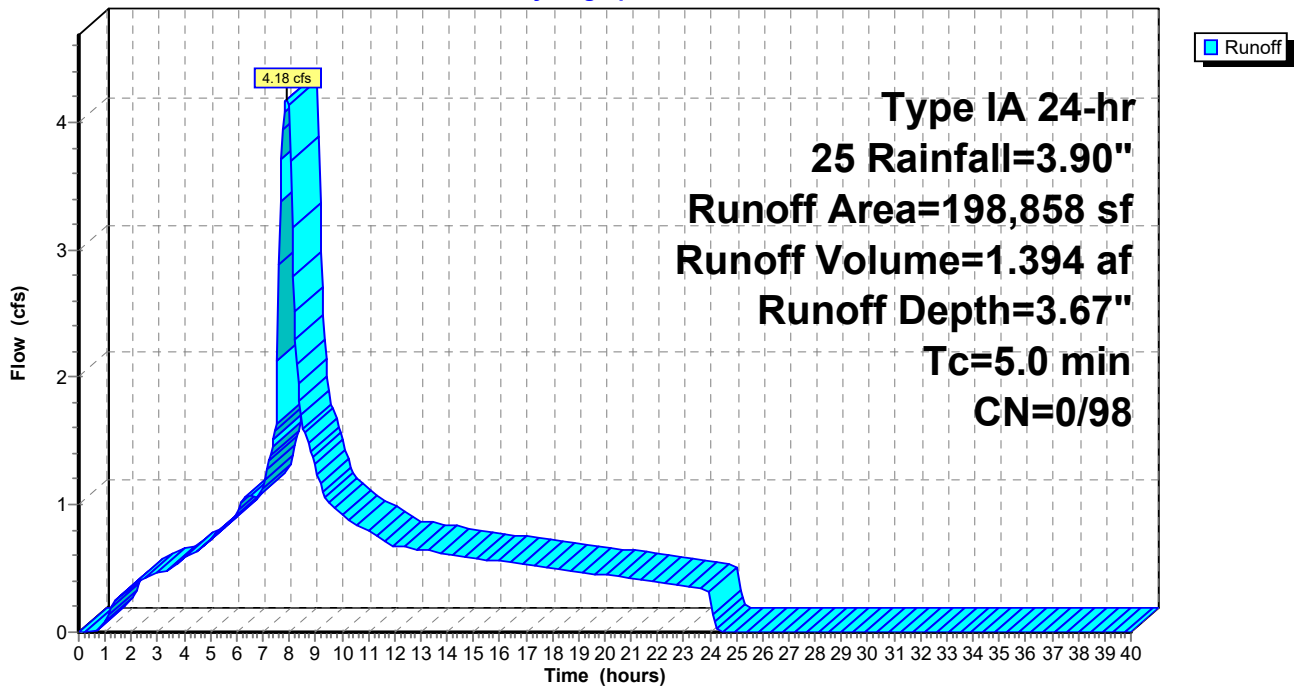
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 25 Rainfall=3.90"

Area (sf)	CN	Description
* 198,858	98	
198,858		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 18S: Imp**

Hydrograph



**LRS032 - Storm Calcs**

Prepared by Hewlett-Packard Company

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Type IA 24-hr 25 Rainfall=3.90"

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**Summary for Subcatchment 19S: Pre Developed**

Runoff = 1.57 cfs @ 7.98 hrs, Volume= 0.606 af, Depth= 1.59"

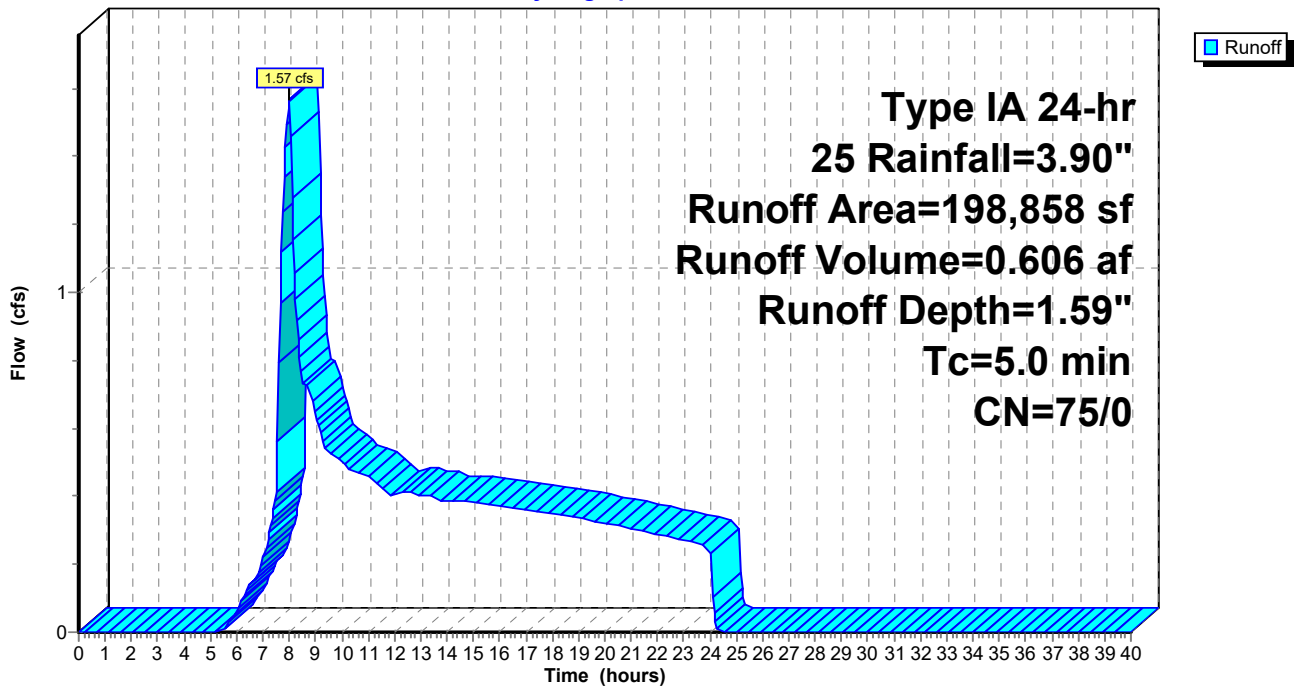
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 25 Rainfall=3.90"

Area (sf)	CN	Description
* 198,858	75	
198,858		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 19S: Pre Developed**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 25 Rainfall=3.90"

Prepared by Hewlett-Packard Company

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**Summary for Pond 20P: ADS Stormtech MC3500**

Inflow Area = 4.565 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25 event  
 Inflow = 4.18 cfs @ 7.90 hrs, Volume= 1.394 af  
 Outflow = 1.27 cfs @ 9.03 hrs, Volume= 1.202 af, Atten= 70%, Lag= 68.3 min  
 Discarded = 0.03 cfs @ 1.30 hrs, Volume= 0.110 af  
 Primary = 1.24 cfs @ 9.03 hrs, Volume= 1.092 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 104.68' @ 9.03 hrs Surf.Area= 7,390 sf Storage= 22,829 cf

Plug-Flow detention time= 524.1 min calculated for 1.202 af (86% of inflow)  
 Center-of-Mass det. time= 427.1 min ( 1,088.4 - 661.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	10,262 cf	<b>37.08'W x 199.29'L x 5.50'H Field A</b> 40,647 cf Overall - 14,993 cf Embedded = 25,654 cf x 40.0% Voids
#2A	100.75'	14,993 cf	<b>ADS_StormTech MC-3500 d +Cap</b> x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 27 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		25,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>0.200 in/hr Exfiltration over Surface area</b>
#2	Primary	100.00'	<b>2.1" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	104.00'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.03 cfs @ 1.30 hrs HW=100.06' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=1.24 cfs @ 9.03 hrs HW=104.68' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.25 cfs @ 10.32 fps)  
 ↑3=Orifice/Grate (Orifice Controls 0.99 cfs @ 2.83 fps)

**LRS032 - Storm Calcs**

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Type IA 24-hr 25 Rainfall=3.90"

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**Pond 20P: ADS Stormtech MC3500 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap storage)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

27 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 197.29' Row Length +12.0" End Stone x 2 = 199.29' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 14,992.5 cf Chamber Storage

40,646.9 cf Field - 14,992.5 cf Chambers = 25,654.3 cf Stone x 40.0% Voids = 10,261.7 cf Stone Storage

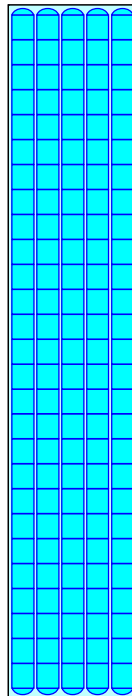
Chamber Storage + Stone Storage = 25,254.3 cf = 0.580 af

Overall Storage Efficiency = 62.1%

135 Chambers

1,505.4 cy Field

950.2 cy Stone



**LRS032 - Storm Calcs**

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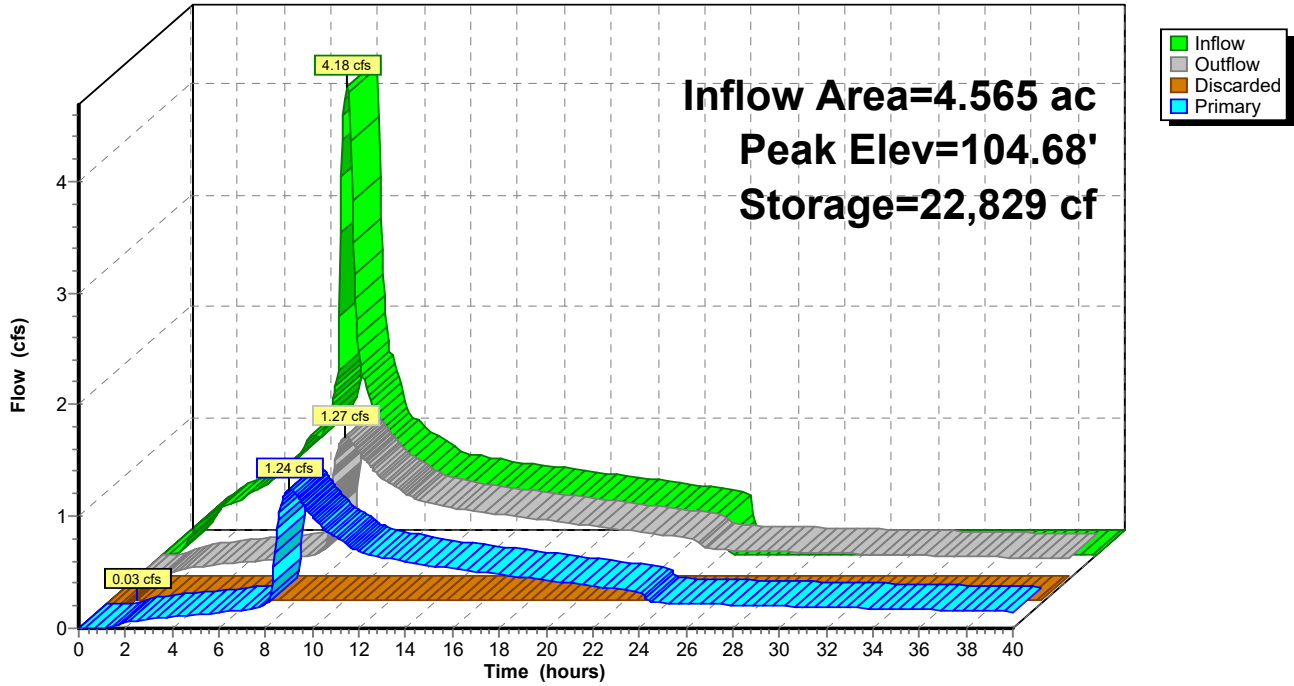
Type IA 24-hr 25 Rainfall=3.90"

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**Pond 20P: ADS Stormtech MC3500**

Hydrograph



**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 18S: Imp**

Runoff = 4.84 cfs @ 7.90 hrs, Volume= 1.622 af, Depth= 4.26"

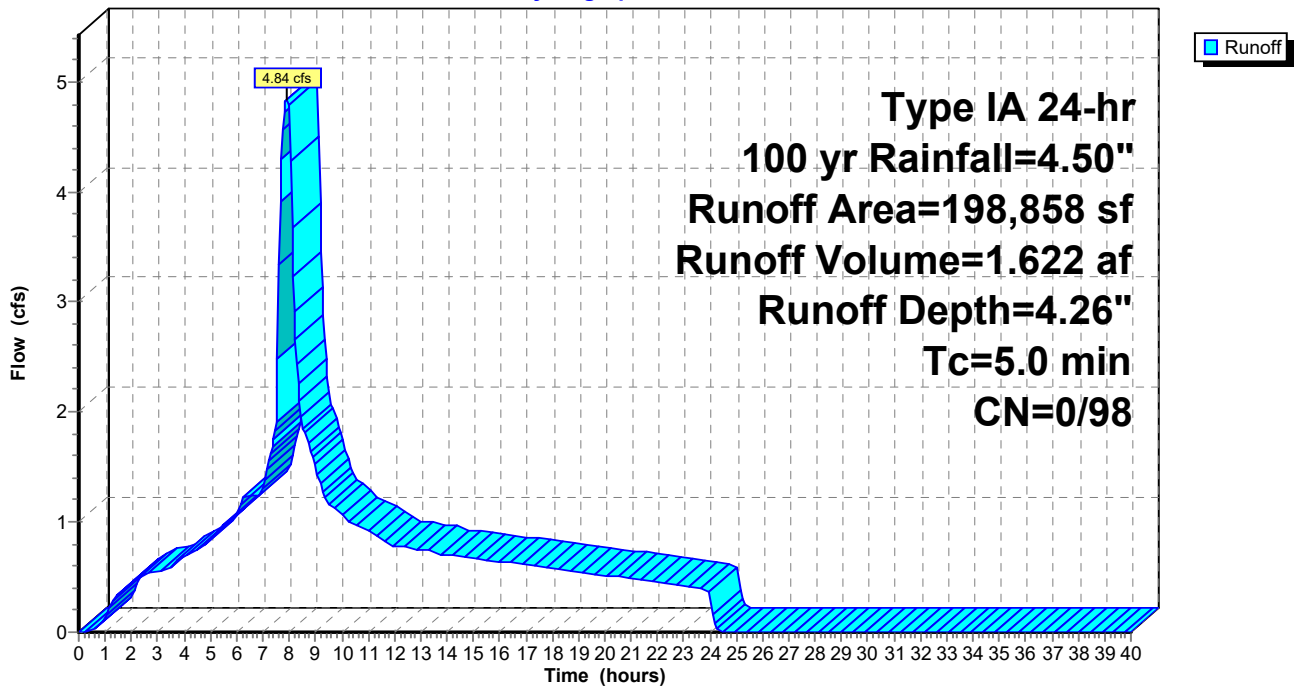
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 100 yr Rainfall=4.50"

Area (sf)	CN	Description
* 198,858	98	
198,858		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 18S: Imp**

Hydrograph





**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Subcatchment 19S: Pre Developed**

Runoff = 2.12 cfs @ 7.98 hrs, Volume= 0.780 af, Depth= 2.05"

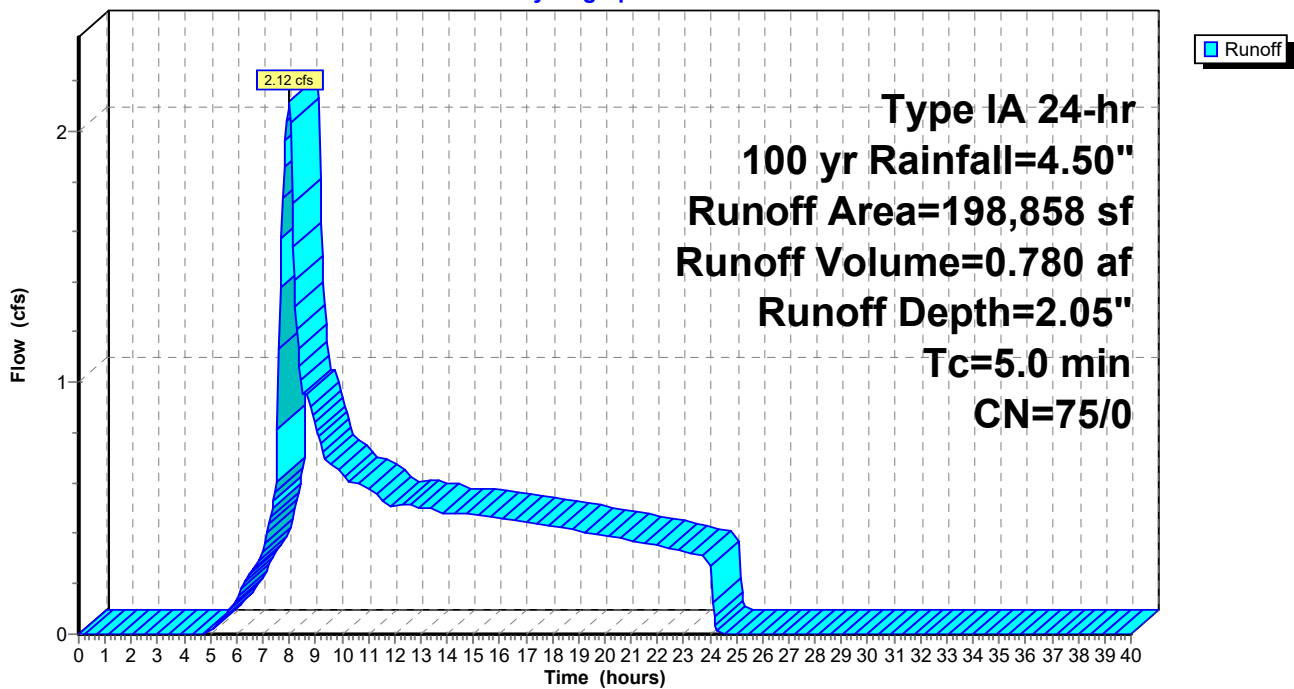
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 100 yr Rainfall=4.50"

Area (sf)	CN	Description
* 198,858	75	
198,858		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 19S: Pre Developed**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 100 yr Rainfall=4.50"

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**Summary for Pond 20P: ADS Stormtech MC3500**

Inflow Area = 4.565 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100 yr event  
 Inflow = 4.84 cfs @ 7.90 hrs, Volume= 1.622 af  
 Outflow = 1.86 cfs @ 8.51 hrs, Volume= 1.428 af, Atten= 62%, Lag= 36.7 min  
 Discarded = 0.03 cfs @ 1.15 hrs, Volume= 0.111 af  
 Primary = 1.83 cfs @ 8.51 hrs, Volume= 1.317 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 105.20' @ 8.51 hrs Surf.Area= 7,390 sf Storage= 24,367 cf

Plug-Flow detention time= 457.5 min calculated for 1.428 af (88% of inflow)  
 Center-of-Mass det. time= 371.9 min ( 1,030.0 - 658.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	10,262 cf	<b>37.08'W x 199.29'L x 5.50'H Field A</b> 40,647 cf Overall - 14,993 cf Embedded = 25,654 cf x 40.0% Voids
#2A	100.75'	14,993 cf	<b>ADS_StormTech MC-3500 d +Cap</b> x 135 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 27 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		25,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>0.200 in/hr Exfiltration over Surface area</b>
#2	Primary	100.00'	<b>2.1" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	104.00'	<b>8.0" Vert. Orifice/Grate</b> C= 0.600

**Discarded OutFlow** Max=0.03 cfs @ 1.15 hrs HW=100.06' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=1.83 cfs @ 8.51 hrs HW=105.20' (Free Discharge)  
 ↑2=Orifice/Grate (Orifice Controls 0.26 cfs @ 10.89 fps)  
 ↑3=Orifice/Grate (Orifice Controls 1.56 cfs @ 4.48 fps)

**LRS032 - Storm Calcs**

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Type IA 24-hr 100 yr Rainfall=4.50"

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**Pond 20P: ADS Stormtech MC3500 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap storage)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

27 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 197.29' Row Length +12.0" End Stone x 2 = 199.29' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

135 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 14,992.5 cf Chamber Storage

40,646.9 cf Field - 14,992.5 cf Chambers = 25,654.3 cf Stone x 40.0% Voids = 10,261.7 cf Stone Storage

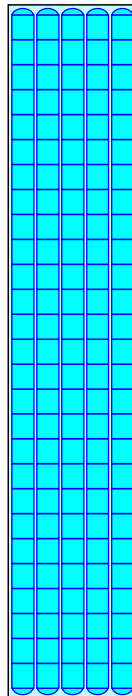
Chamber Storage + Stone Storage = 25,254.3 cf = 0.580 af

Overall Storage Efficiency = 62.1%

135 Chambers

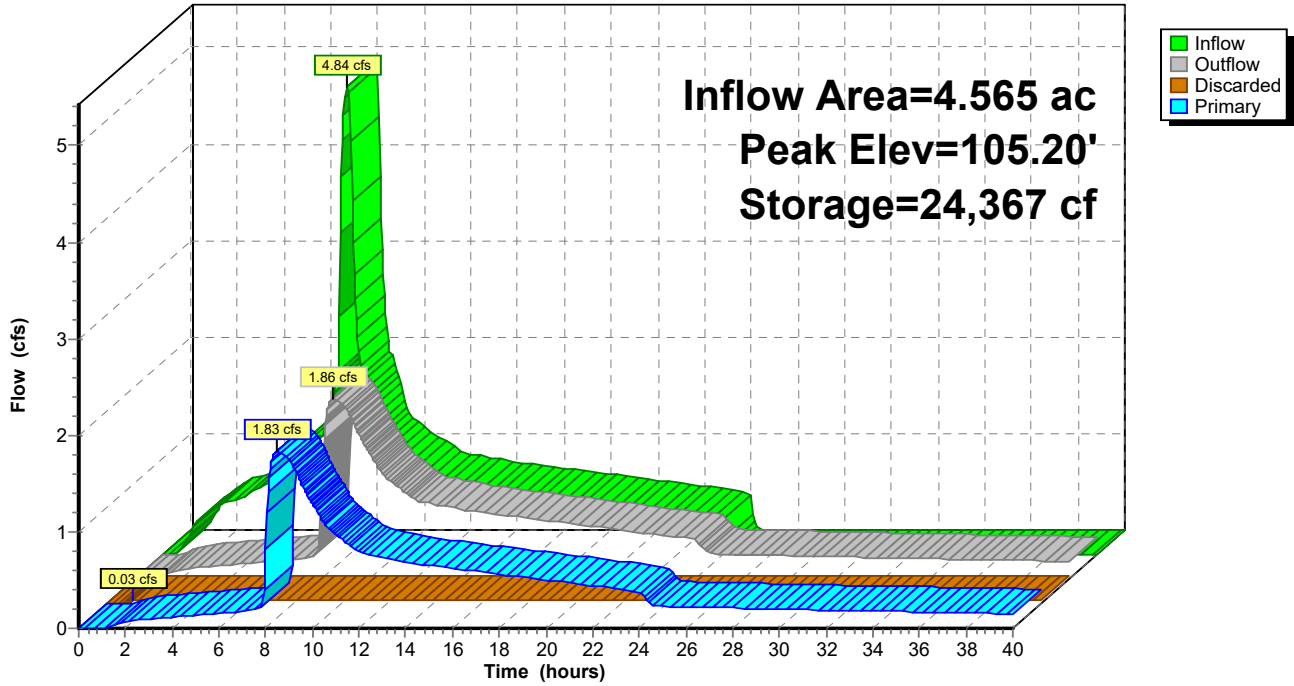
1,505.4 cy Field

950.2 cy Stone



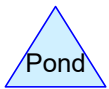
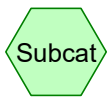
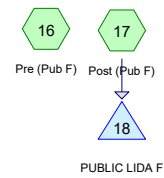
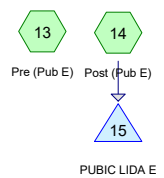
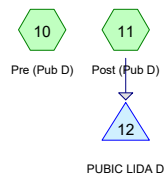
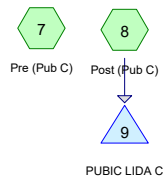
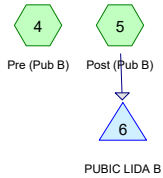
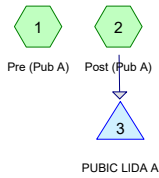
Pond 20P: ADS Stormtech MC3500

Hydrograph



## Appendix E

### Water Quality Calculations



**Routing Diagram for LRS032 - Storm Calcs**  
Prepared by Hewlett-Packard Company, Printed 6/14/2022  
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**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

Prepared by Hewlett-Packard Company

Printed 6/14/2022

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**Summary for Subcatchment 1: Pre (Pub A)**

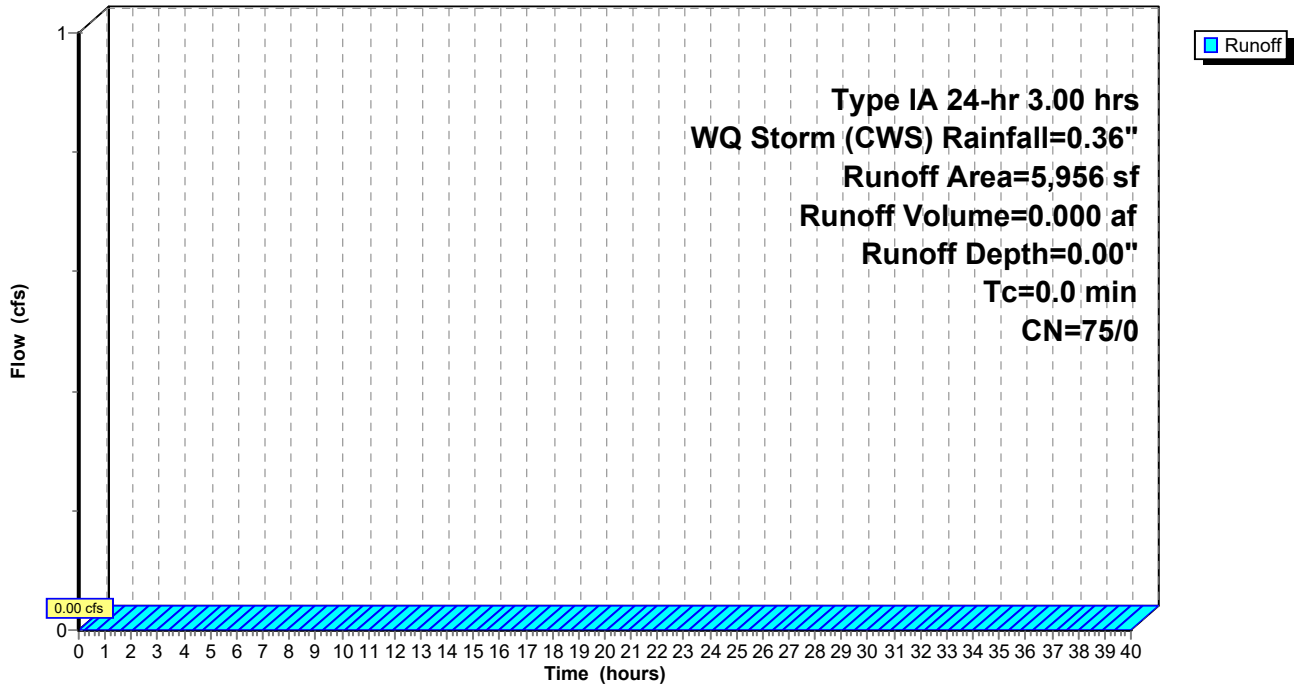
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	5,956	75	
	5,956		100.00% Pervious Area

**Subcatchment 1: Pre (Pub A)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 2: Post (Pub A)**

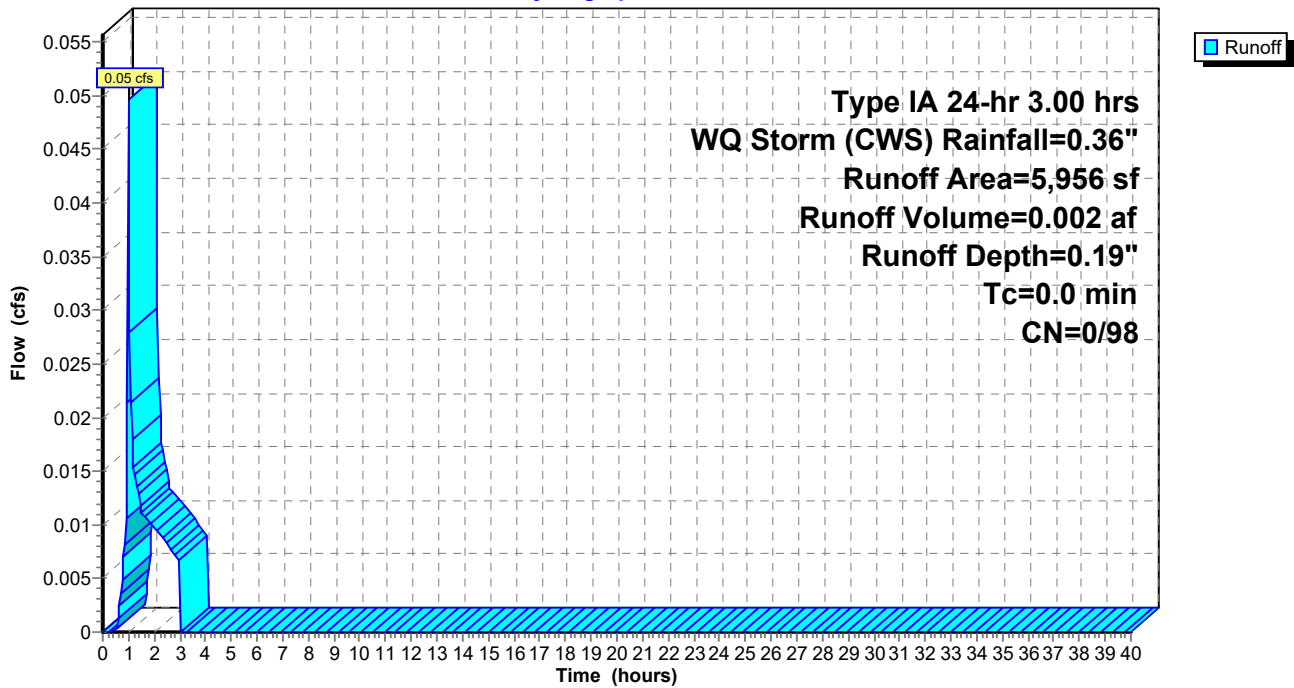
Runoff = 0.05 cfs @ 1.00 hrs, Volume= 0.002 af, Depth= 0.19"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	5,956	98	
	5,956		100.00% Impervious Area

**Subcatchment 2: Post (Pub A)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Pond 3: PUBIC LIDA A**

Inflow Area = 0.137 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ Storm (CWS) event  
 Inflow = 0.05 cfs @ 1.00 hrs, Volume= 0.002 af  
 Outflow = 0.00 cfs @ 3.01 hrs, Volume= 0.002 af, Atten= 91%, Lag= 120.3 min  
 Primary = 0.00 cfs @ 3.01 hrs, Volume= 0.002 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 100.46' @ 3.01 hrs Surf.Area= 374 sf Storage= 69 cf

Plug-Flow detention time= 198.1 min calculated for 0.002 af (100% of inflow)  
 Center-of-Mass det. time= 199.0 min ( 298.3 - 99.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.00 cfs @ 3.01 hrs HW=100.46' (Free Discharge)

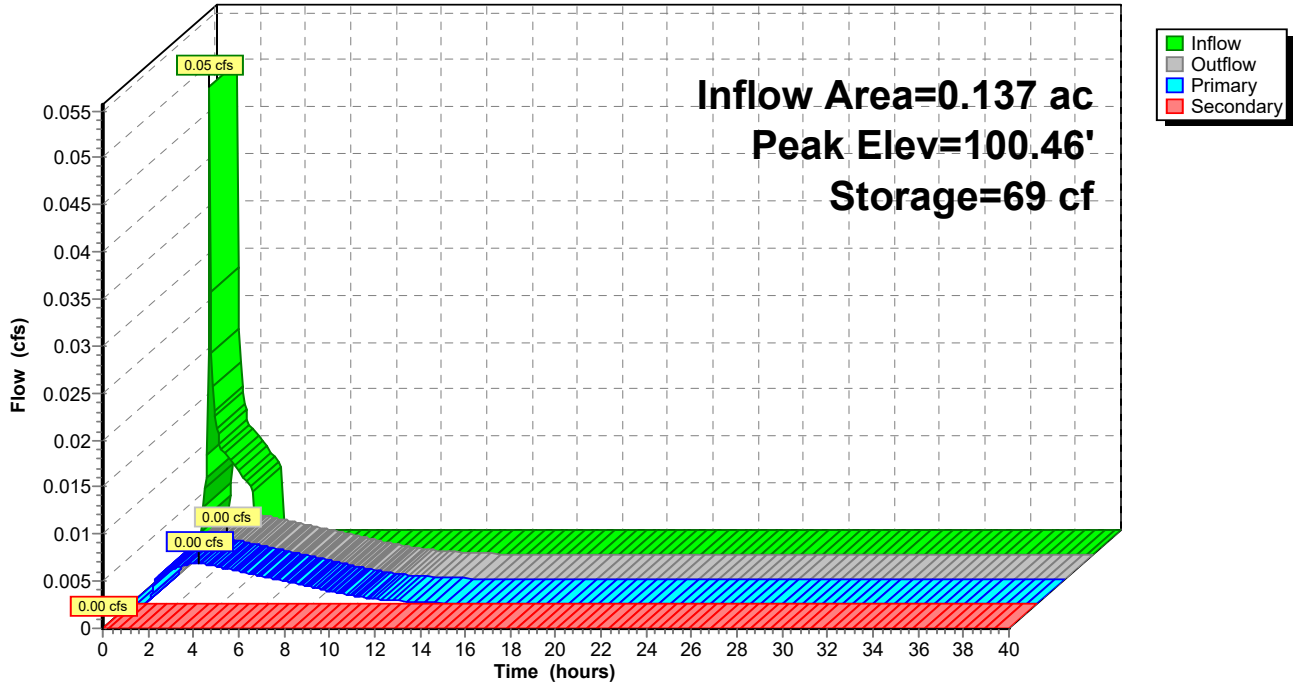
↑**1=Orifice/Grate** (Orifice Controls 0.00 cfs @ 3.19 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

Pond 3: PUBIC LIDA A

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 4: Pre (Pub B)**

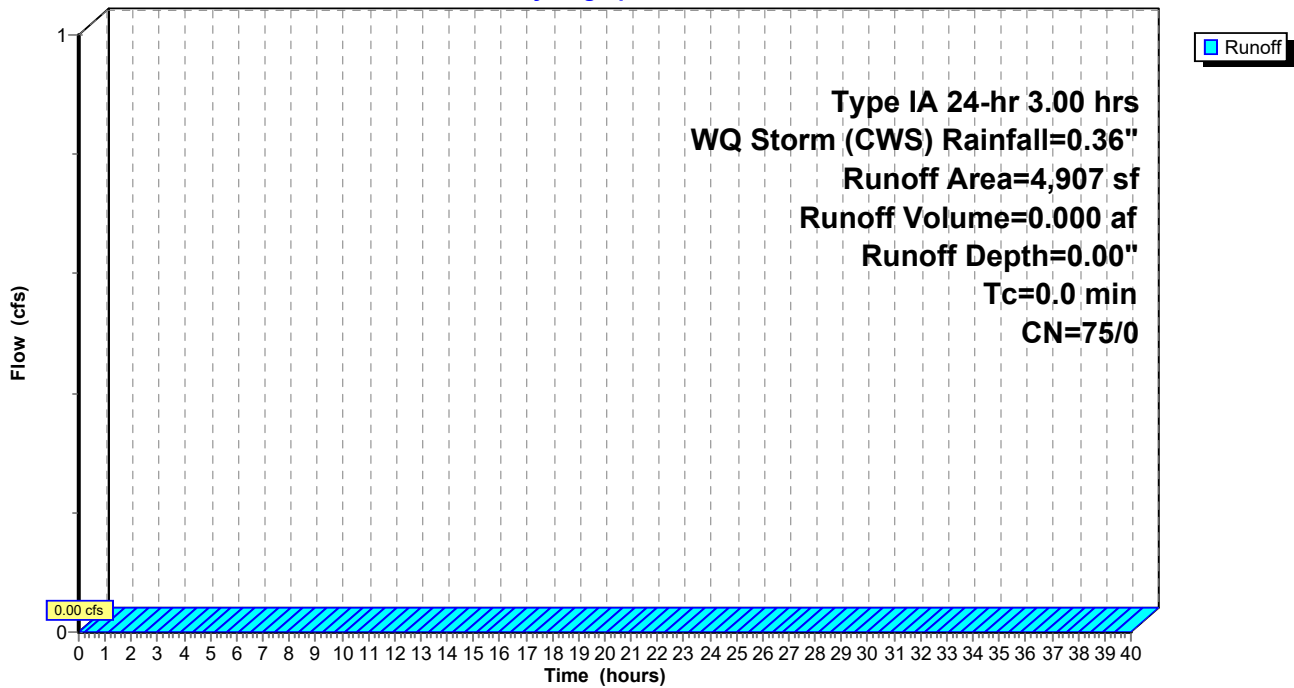
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	4,907	75	
	4,907		100.00% Pervious Area

**Subcatchment 4: Pre (Pub B)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 5: Post (Pub B)**

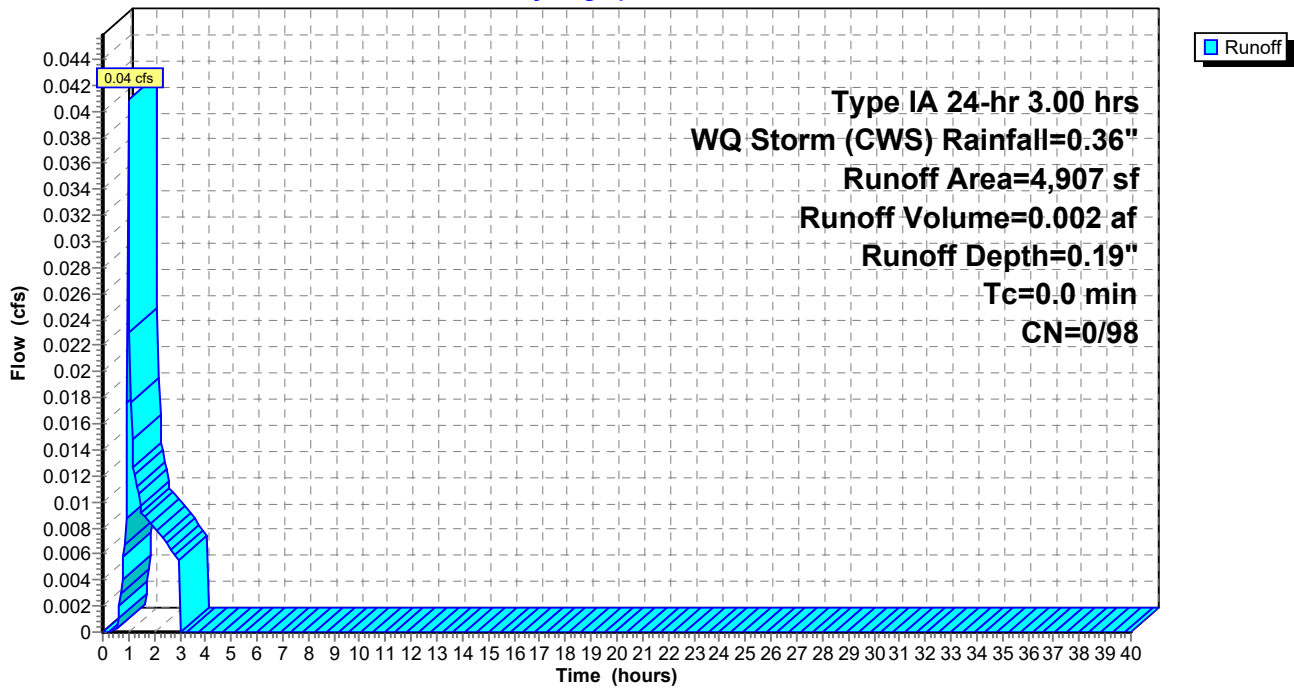
Runoff = 0.04 cfs @ 1.00 hrs, Volume= 0.002 af, Depth= 0.19"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	4,907	98	
	4,907		100.00% Impervious Area

**Subcatchment 5: Post (Pub B)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

Prepared by Hewlett-Packard Company

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**Summary for Pond 6: PUBIC LIDA B**

Inflow Area = 0.113 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ Storm (CWS) event  
 Inflow = 0.04 cfs @ 1.00 hrs, Volume= 0.002 af  
 Outflow = 0.00 cfs @ 2.99 hrs, Volume= 0.002 af, Atten= 88%, Lag= 119.0 min  
 Primary = 0.00 cfs @ 2.99 hrs, Volume= 0.002 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 100.27' @ 2.99 hrs Surf.Area= 448 sf Storage= 49 cf

Plug-Flow detention time= 142.0 min calculated for 0.002 af (100% of inflow)  
 Center-of-Mass det. time= 141.2 min ( 240.5 - 99.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	986 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	448	0.0	0	0
101.50	448	40.0	269	269
103.00	448	40.0	269	538
104.00	448	100.0	448	986

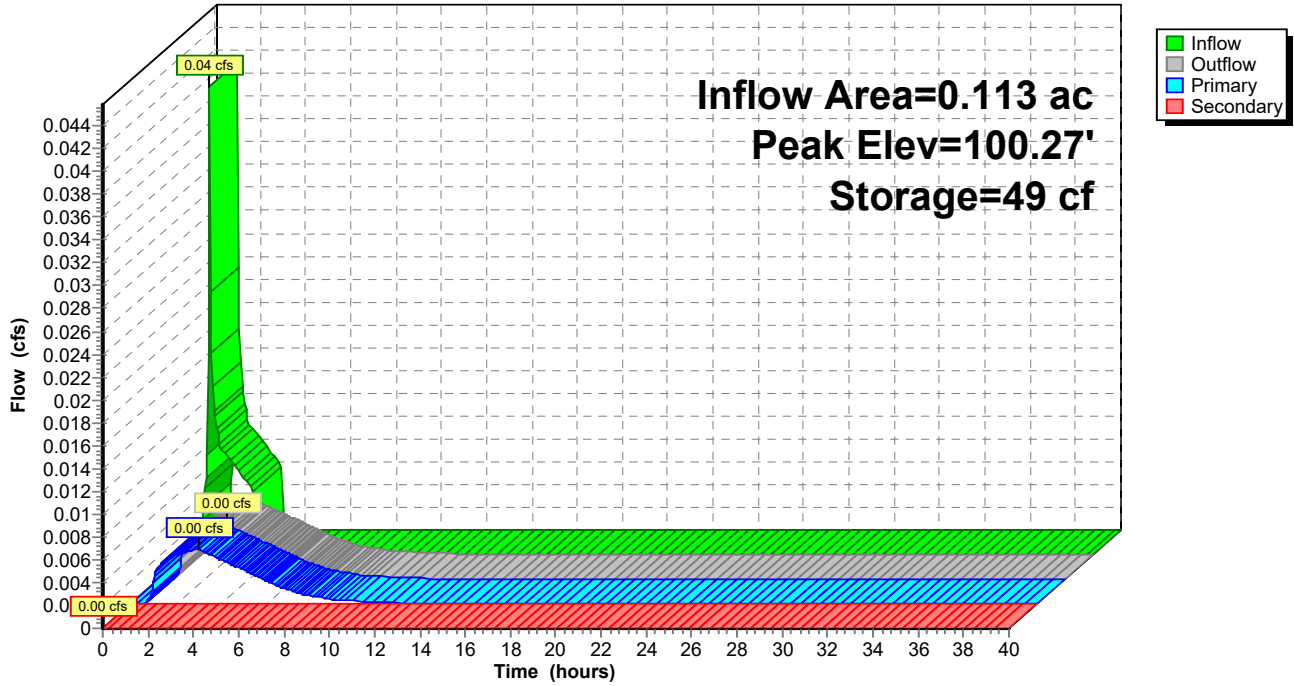
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.00 cfs @ 2.99 hrs HW=100.27' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.00 cfs @ 2.40 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

### Pond 6: PUBIC LIDA B

#### Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 7: Pre (Pub C)**

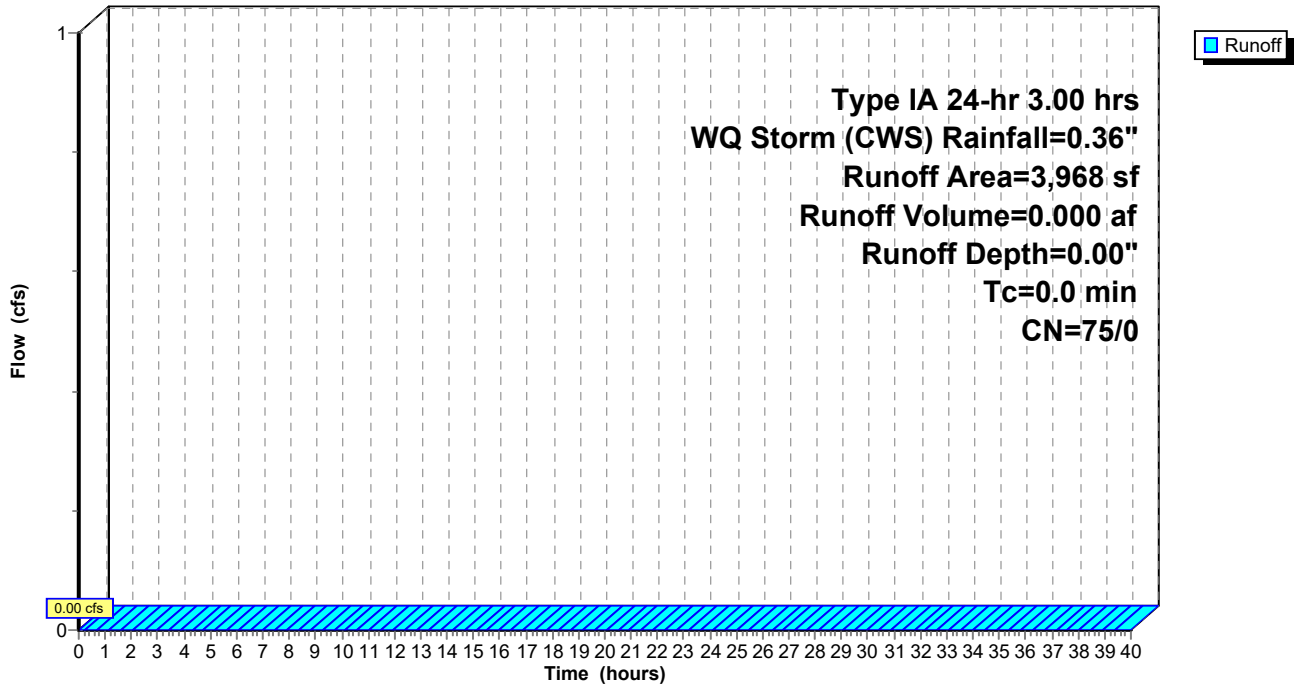
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	3,968	75	
	3,968		100.00% Pervious Area

**Subcatchment 7: Pre (Pub C)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 8: Post (Pub C)**

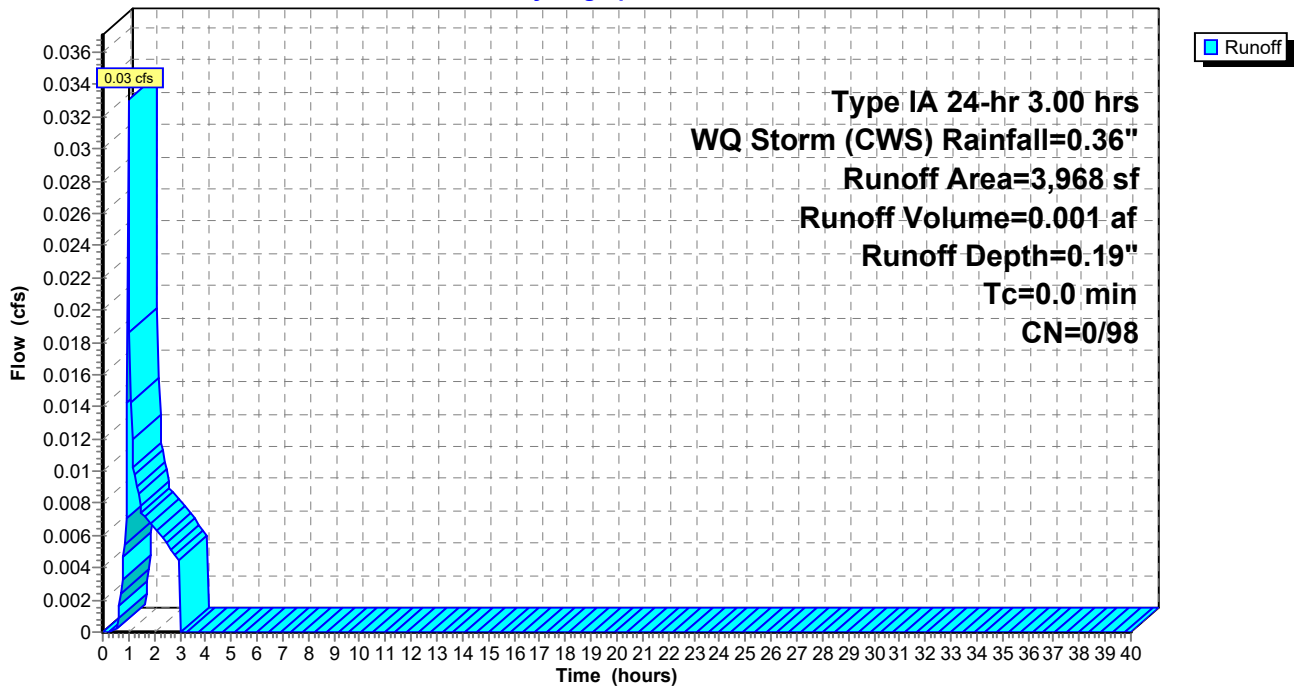
Runoff = 0.03 cfs @ 1.00 hrs, Volume= 0.001 af, Depth= 0.19"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	3,968	98	
	3,968		100.00% Impervious Area

**Subcatchment 8: Post (Pub C)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Pond 9: PUBIC LIDA C**

Inflow Area = 0.091 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ Storm (CWS) event  
 Inflow = 0.03 cfs @ 1.00 hrs, Volume= 0.001 af  
 Outflow = 0.01 cfs @ 2.51 hrs, Volume= 0.001 af, Atten= 83%, Lag= 90.3 min  
 Primary = 0.01 cfs @ 2.51 hrs, Volume= 0.001 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 100.21' @ 2.51 hrs Surf.Area= 324 sf Storage= 27 cf

Plug-Flow detention time= 75.5 min calculated for 0.001 af (100% of inflow)  
 Center-of-Mass det. time= 74.6 min ( 173.9 - 99.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	713 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	324	0.0	0	0
101.50	324	40.0	194	194
103.00	324	40.0	194	389
104.00	324	100.0	324	713

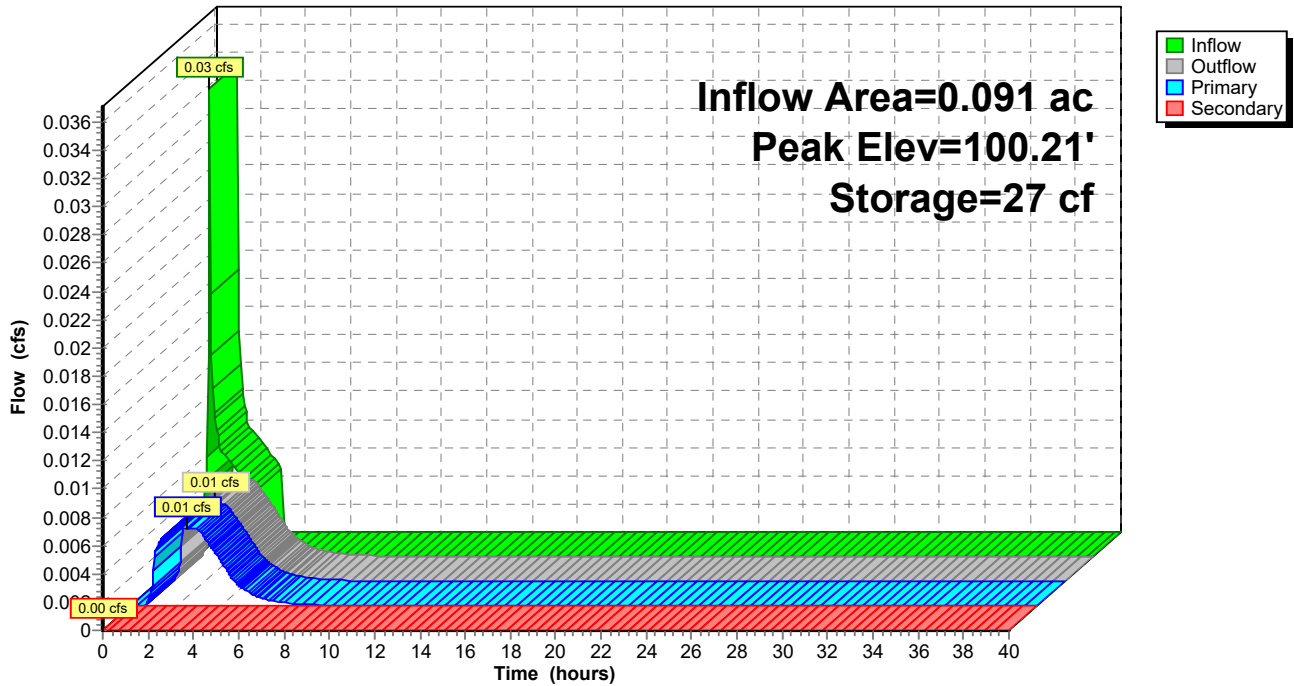
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.7" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 2.51 hrs HW=100.21' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.01 cfs @ 2.05 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

### Pond 9: PUBIC LIDA C

#### Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 10: Pre (Pub D)**

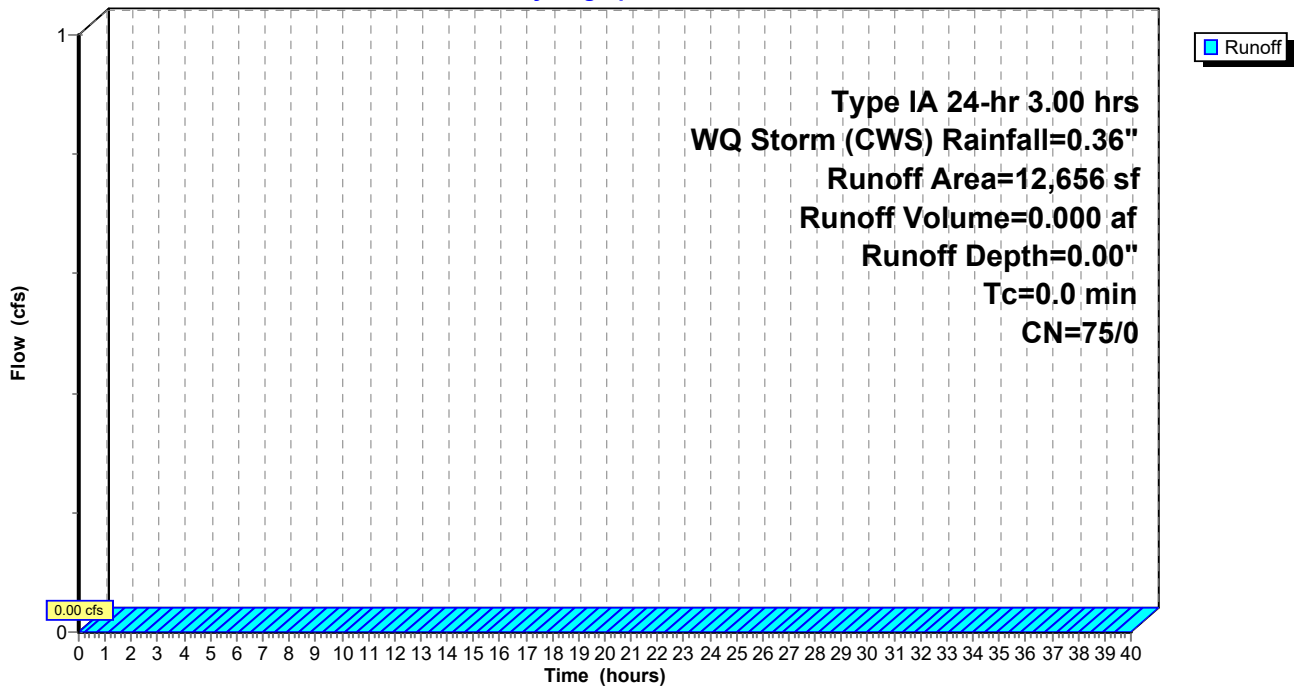
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

Area (sf)	CN	Description
* 12,656	75	
12,656		100.00% Pervious Area

**Subcatchment 10: Pre (Pub D)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 11: Post (Pub D)**

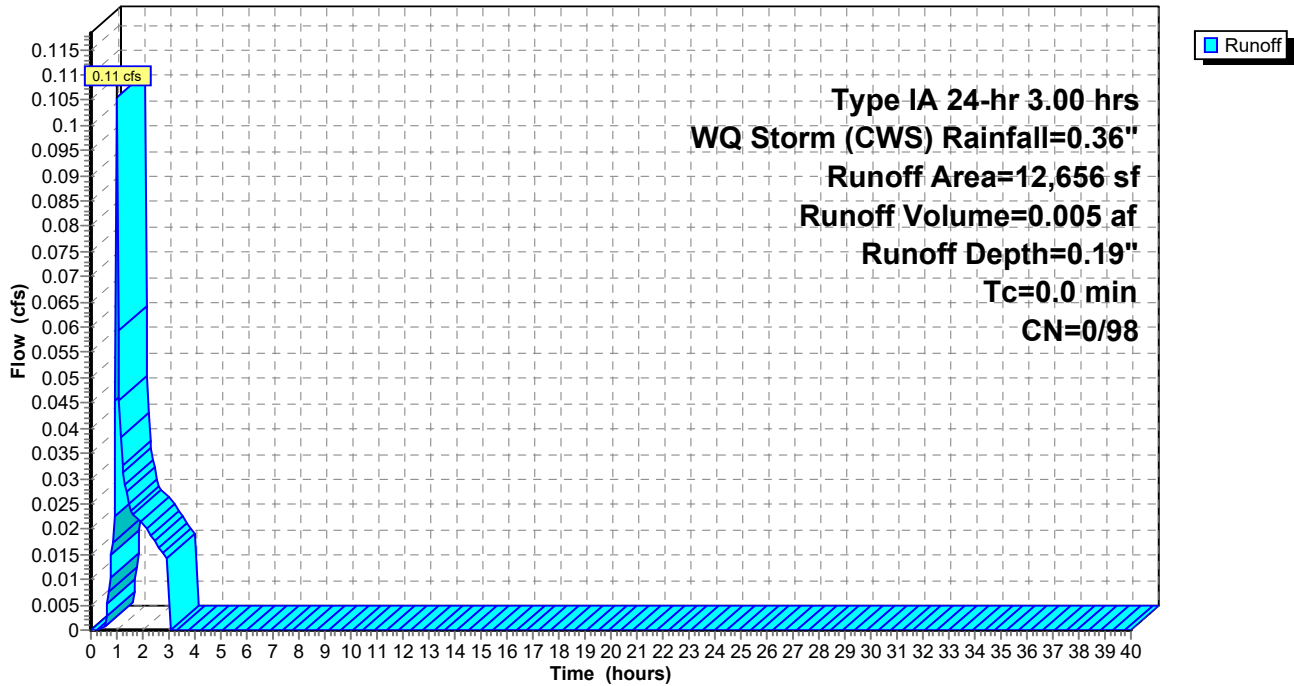
Runoff = 0.11 cfs @ 1.00 hrs, Volume= 0.005 af, Depth= 0.19"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	12,656	98	
	12,656		100.00% Impervious Area

**Subcatchment 11: Post (Pub D)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Pond 12: PUBIC LIDA D**

Inflow Area = 0.291 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ Storm (CWS) event  
 Inflow = 0.11 cfs @ 1.00 hrs, Volume= 0.005 af  
 Outflow = 0.01 cfs @ 3.03 hrs, Volume= 0.005 af, Atten= 94%, Lag= 121.3 min  
 Primary = 0.01 cfs @ 3.03 hrs, Volume= 0.005 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 100.54' @ 3.03 hrs Surf.Area= 759 sf Storage= 163 cf

Plug-Flow detention time= 298.1 min calculated for 0.005 af (100% of inflow)  
 Center-of-Mass det. time= 297.7 min ( 397.0 - 99.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	1,670 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	759	0.0	0	0
101.50	759	40.0	455	455
103.00	759	40.0	455	911
104.00	759	100.0	759	1,670

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.6" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.01 cfs @ 3.03 hrs HW=100.54' (Free Discharge)

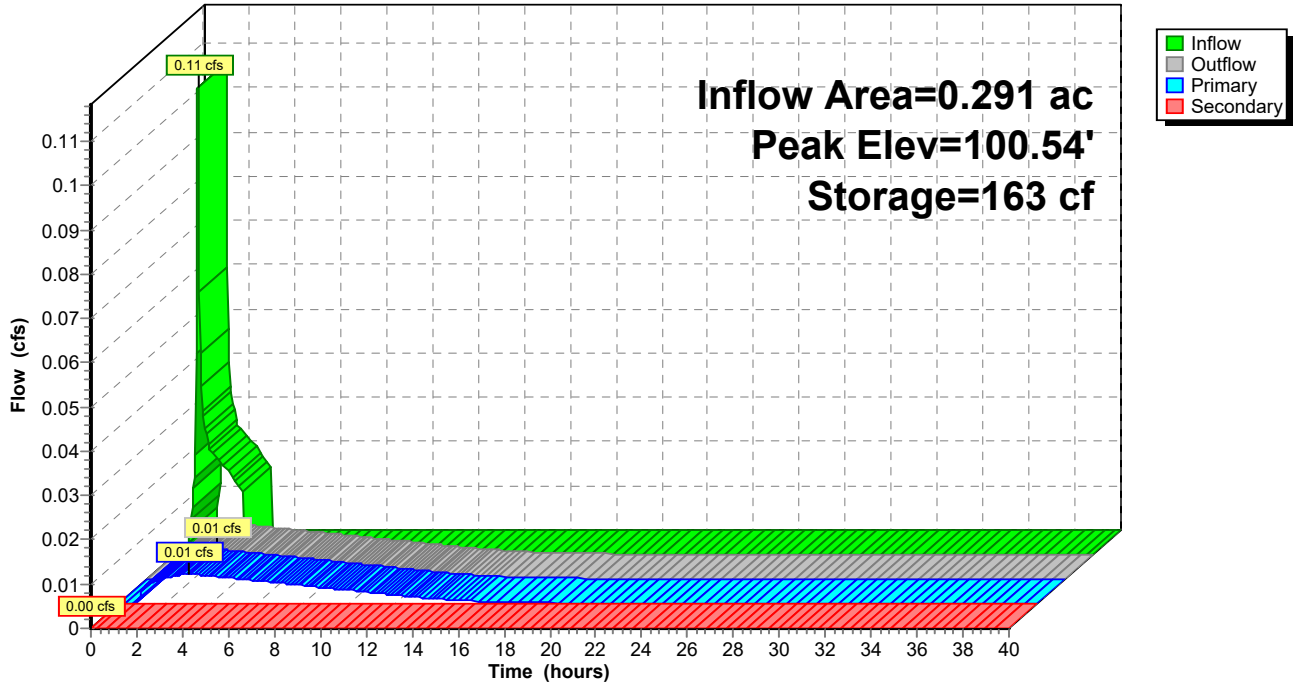
↑**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 3.44 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

### Pond 12: PUBIC LIDA D

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 13: Pre (Pub E)**

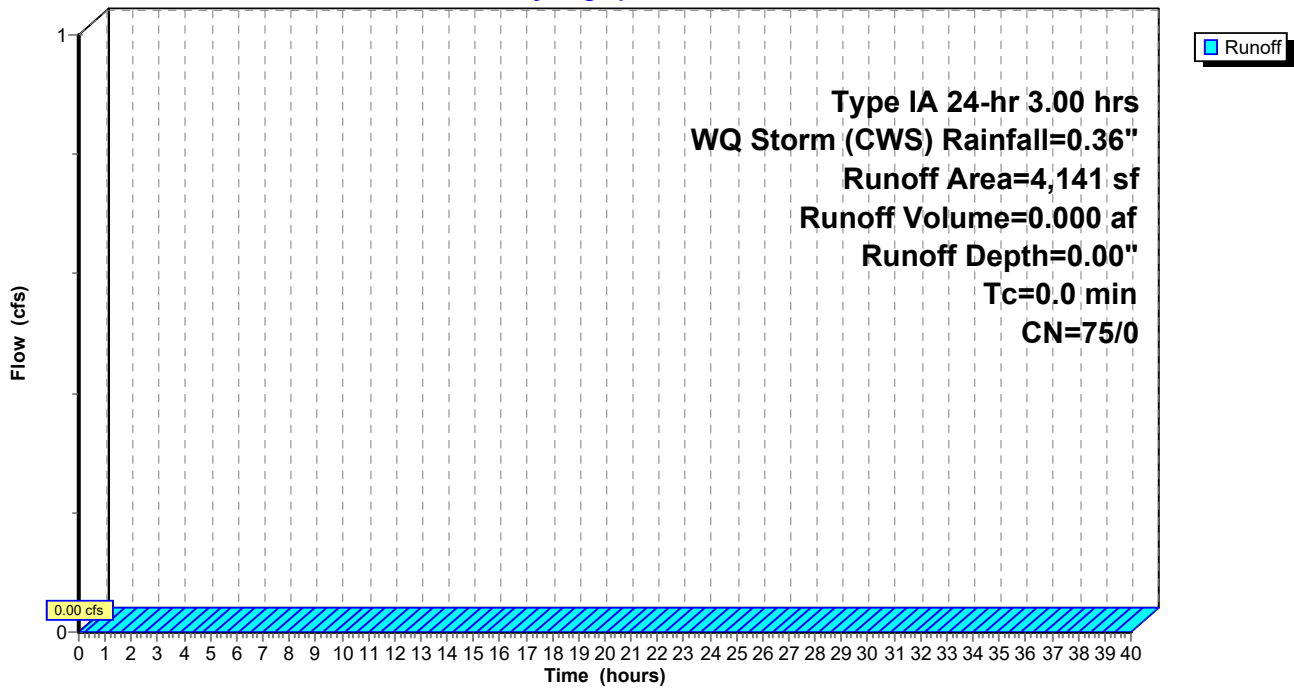
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	4,141	75	
	4,141		100.00% Pervious Area

**Subcatchment 13: Pre (Pub E)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 14: Post (Pub E)**

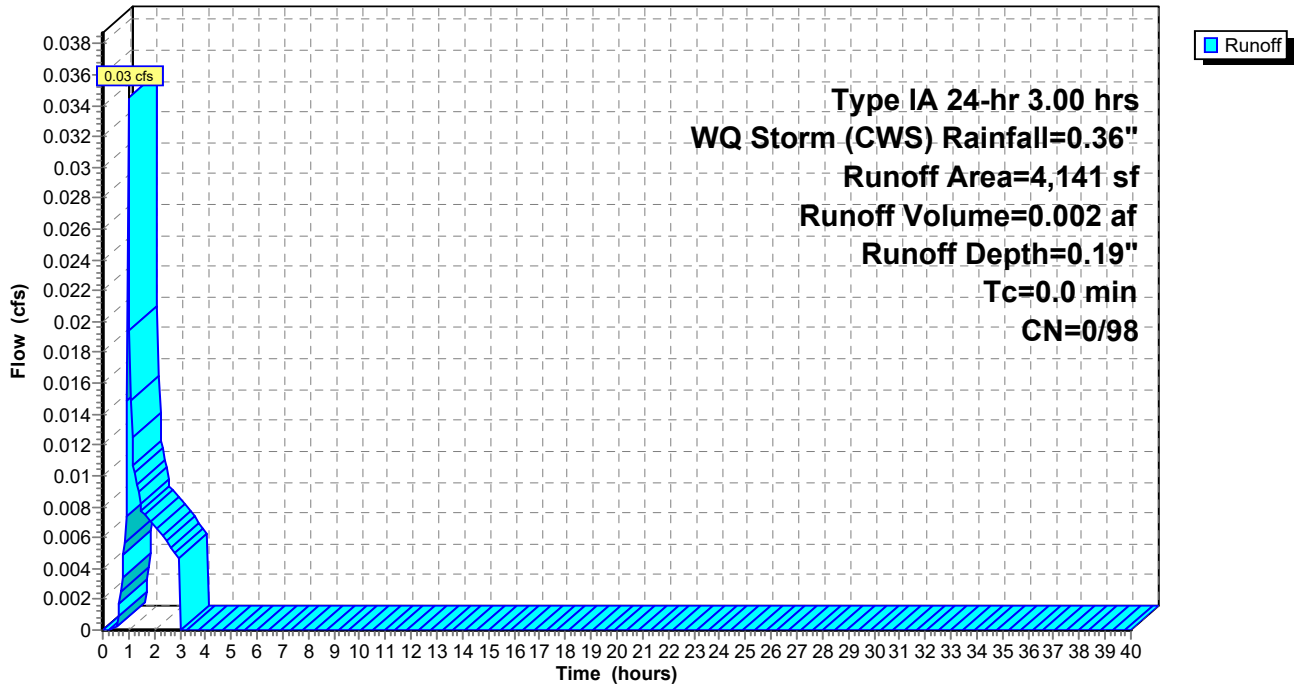
Runoff = 0.03 cfs @ 1.00 hrs, Volume= 0.002 af, Depth= 0.19"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	4,141	98	
	4,141		100.00% Impervious Area

**Subcatchment 14: Post (Pub E)**

Hydrograph





**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Pond 15: PUBIC LIDA E**

Inflow Area = 0.095 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ Storm (CWS) event  
 Inflow = 0.03 cfs @ 1.00 hrs, Volume= 0.002 af  
 Outflow = 0.00 cfs @ 3.00 hrs, Volume= 0.002 af, Atten= 90%, Lag= 119.7 min  
 Primary = 0.00 cfs @ 3.00 hrs, Volume= 0.002 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 100.30' @ 3.00 hrs Surf.Area= 374 sf Storage= 45 cf

Plug-Flow detention time= 169.9 min calculated for 0.002 af (100% of inflow)  
 Center-of-Mass det. time= 169.1 min ( 268.5 - 99.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	823 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	374	0.0	0	0
101.50	374	40.0	224	224
103.00	374	40.0	224	449
104.00	374	100.0	374	823

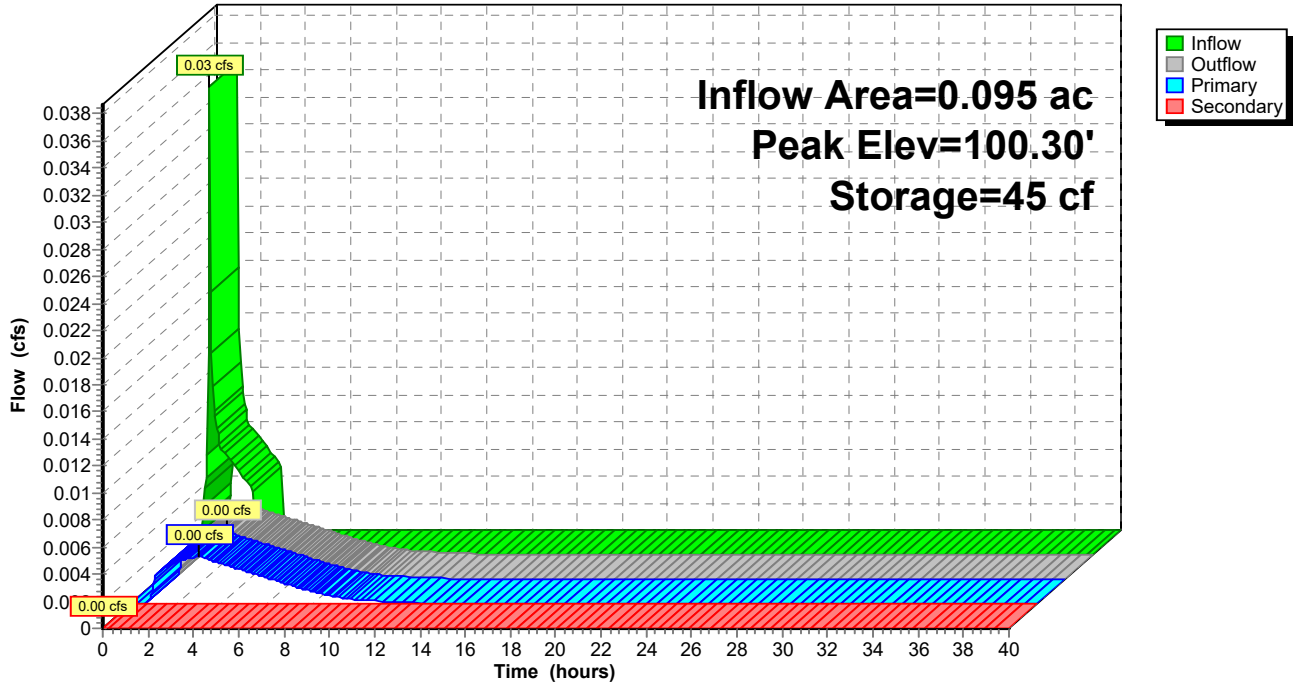
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.00 cfs @ 3.00 hrs HW=100.30' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.00 cfs @ 2.54 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

### Pond 15: PUBIC LIDA E

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 16: Pre (Pub F)**

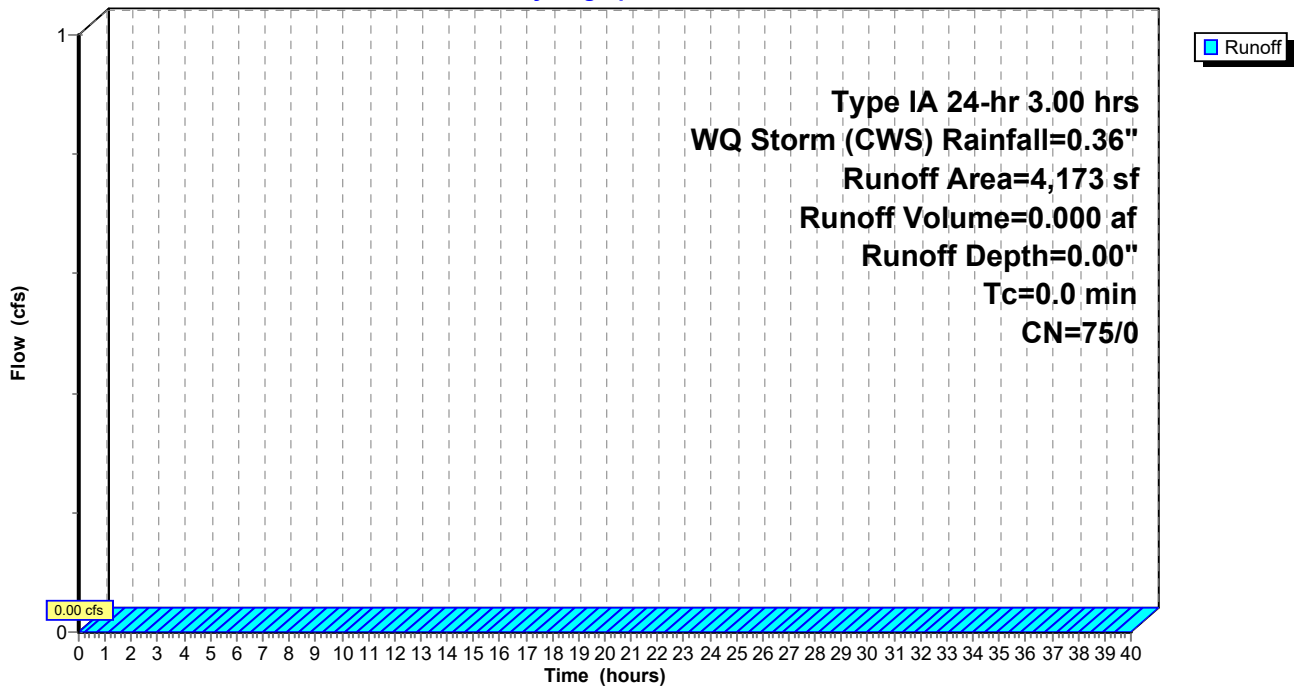
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	4,173	75	
	4,173		100.00% Pervious Area

**Subcatchment 16: Pre (Pub F)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Subcatchment 17: Post (Pub F)**

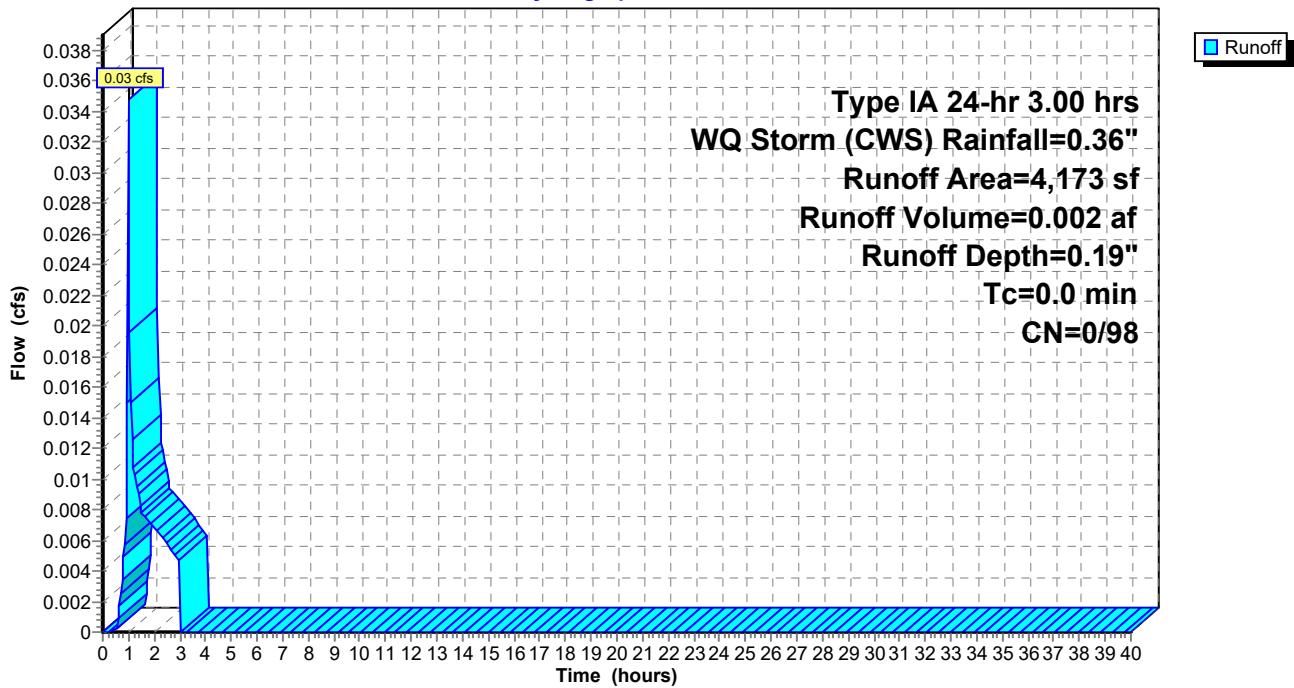
Runoff = 0.03 cfs @ 1.00 hrs, Volume= 0.002 af, Depth= 0.19"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

	Area (sf)	CN	Description
*	4,173	98	
	4,173		100.00% Impervious Area

**Subcatchment 17: Post (Pub F)**

Hydrograph



**LRS032 - Storm Calcs**

Type IA 24-hr 3.00 hrs WQ Storm (CWS) Rainfall=0.36"

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**Summary for Pond 18: PUBLIC LIDA F**

Inflow Area = 0.096 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ Storm (CWS) event  
 Inflow = 0.03 cfs @ 1.00 hrs, Volume= 0.002 af  
 Outflow = 0.00 cfs @ 2.99 hrs, Volume= 0.002 af, Atten= 88%, Lag= 119.0 min  
 Primary = 0.00 cfs @ 2.99 hrs, Volume= 0.002 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs  
 Peak Elev= 100.41' @ 2.99 hrs Surf.Area= 252 sf Storage= 41 cf

Plug-Flow detention time= 130.7 min calculated for 0.002 af (100% of inflow)  
 Center-of-Mass det. time= 131.3 min ( 230.6 - 99.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	554 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	252	0.0	0	0
101.50	252	40.0	151	151
103.00	252	40.0	151	302
104.00	252	100.0	252	554

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	<b>0.5" Vert. Orifice/Grate</b>	C= 0.600
#2	Secondary	103.50'	<b>8.0" Vert. Orifice/Grate</b>	C= 0.600

**Primary OutFlow** Max=0.00 cfs @ 2.99 hrs HW=100.41' (Free Discharge)

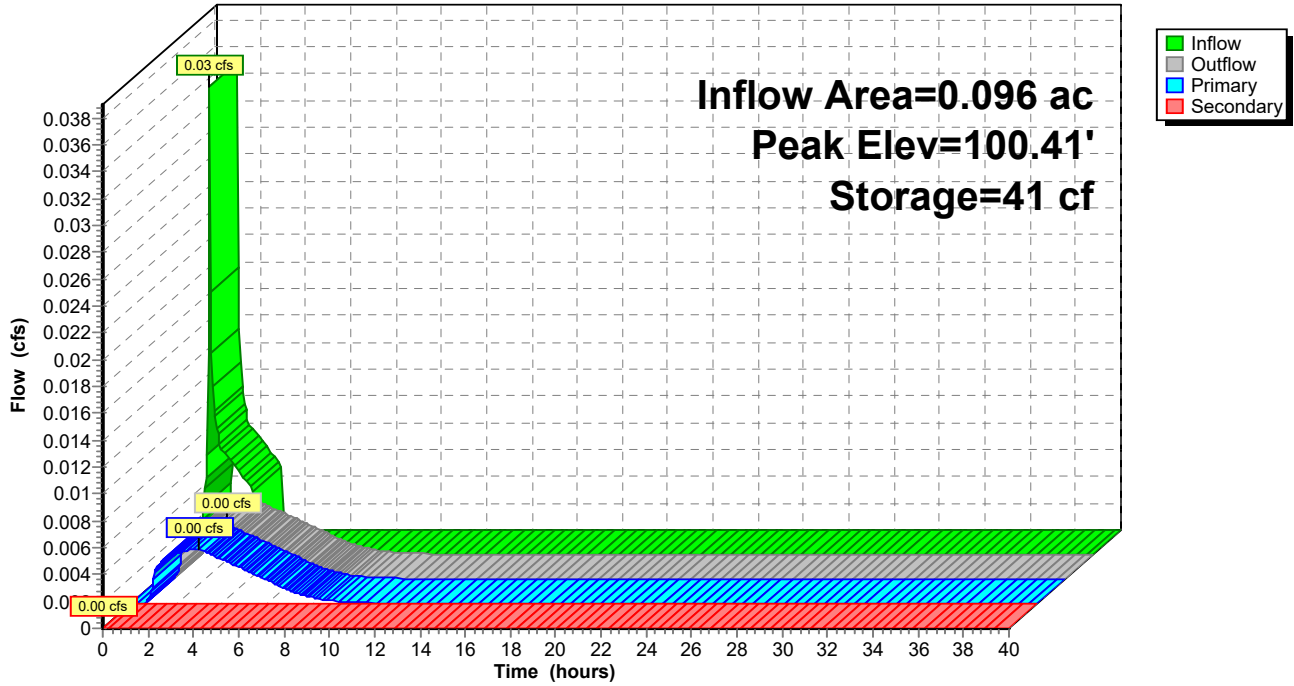
↑**1=Orifice/Grate** (Orifice Controls 0.00 cfs @ 2.99 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

### Pond 18: PUBLIC LIDA F

Hydrograph





Humber  
Design  
Group, Inc.

### Cedar Hills M-U

#### CWS Water Quality Calculations

Basin	A	
WQ Storm	0.36	in
Acres	4.565151515	AC
Acres/SF Conversion	198858	SF
Hours	3	HR
WQ storm	0.552383333	cfs

#### Bayfilter 530 Water Quality Calculations

Basin	A	
Max WQ Runoff	0.552383333	cfs
Q cartridge	30	gpm
gpm/cfs conversion	449	gpm/cfs
Number of Cartridges Required	9	Cartridges

## Appendix F

Utility Plan  
Grading Plan



## Appendix G

### Detail Drawings

# BayFilter™ Stormwater Filtration System

BayFilter is the most efficient, effective and economical stormwater treatment filters on the market. A BayFilter system may be a single cartridge or multiple cartridges to satisfy any treatment flow requirement.

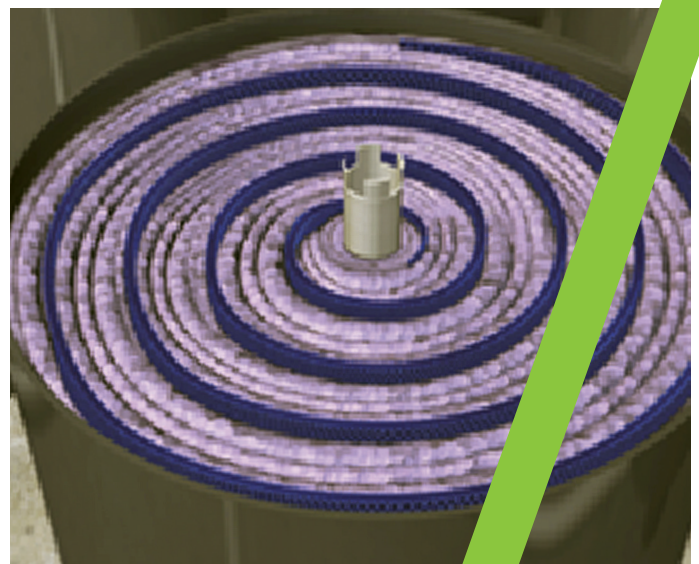
BayFilter removes fine sediments, nutrients, heavy metals and other pollutants at a maximum flow of 45 gpm (2.8 L/sec) per cartridge. The vertically spiralled layered design maximizes surface loading rate and filter media area for the most effective stormwater treatment, while up-flow filtration allows for BayFilter's unique hydrodynamic backwash cleansing process. This process dislodges pollutants and restores the porosity of the mixed media filter.

## Features

- Most effective filtration offers enhanced pollution prevention
- System removes greater than 80% Total Suspended Solids (TSS) and 65% of turbidity
- Available in different configurations (manhole filter, precast vault filter and cast-in-place vault filter)
- With enhanced media is capable of removing 65% of total phosphorous load
- Optional drain-down cartridge feature is built into the filters, minimizing stand water even after siphon has broken and cartridges are not engaged

## Benefits

- Easy to specify, install and maintain
- Systems are fully customizable to meet the needs of each specific project
- Cartridges may be recycled
- Reduced life cycle cost
- Low maintenance costs
- Prevents system from becoming anaerobic during dry periods
- Excellent abrasion and corrosion resistance



# BayFilter Stormwater Filtration System Specification

## Products

- All internal components, including concrete structure(s), PVC manifold piping and filter cartridges, shall be provided by BaySaver Technologies at 800-229-7283.
- All internal PVC manifold pipe and fittings shall meet ASTM D1785. Manifold piping shall be provided to the contractor partially pre-cut.
- External shell of the filter cartridges shall be substantially constructed of polyethylene or equivalent material acceptable to the manufacturer. Filtration media shall be arranged in a spiral layered fashion to maximize available filtration area. An orifice plate shall be supplied with each cartridge to restrict the flow rate to a maximum of 45 gpm (2.8 L/sec).
- Filter media shall be blend of one or more of the following: silica sand, zeolite, perlite, activated alumina and granuly activated carbon.
- Precast concrete vault structures shall be provided according to ASTM C. The materials and structural design of the devices shall be per ASTM C478, C857 and C858. Precast concrete shall be provided by BaySaver Technologies LLC.

## Performance

- The stormwater filter system is capable of treating 100% of the required treatment flow at full sediment load conditions.
- The stormwater filter system's cartridge units shall have no moving parts.
- The stormwater treatment unit shall be designed to remove a minimum of 80% of Total Suspended Solids (TSS), 60% of total phosphorous, 50% of turbidity, 40% of total copper and 40% of total zinc. All filter designs shall comply with local regulations.
- The stormwater filtration system shall reduce incoming turbidity (measured as NTUs) by 65% or more and shall not have any components that leach nitrates or phosphates.
- The stormwater filtration cartridge shall be equipped with a hydrodynamic backwash mechanism to extend the filter's life and optimize its performance.
- The stormwater filtration system shall be designed to remove a minimum of 65% of the incoming Total Phosphorous (TP) load.
- The stormwater filtration system's cartridge units shall have a treated sediment capacity for 80% TSS removal

Filter Cartridge	Treatment Flow Rate gpm (L/sec)	Treatment Volume ft <sup>3</sup> (m <sup>3</sup> )	Filter Surface Area ft <sup>2</sup> (m <sup>2</sup> )
BayFilter 522	22.5 (1.42)	1250 (35.4)	45 (4.2)
BayFilter 530	30 (1.89)	2500 (70.8)	90 (8.4)
BayFilter 545	45 (2.84)	2500 (70.8)	90 (8.4)
BayFilter 622	22.5 (1.42)	1250 (35.4)	45 (4.2)
BayFilter 630	30 (1.89)	2500 (70.8)	90 (8.4)
BayFilter 645	45 (2.84)	2500 (70.8)	90 (8.4)

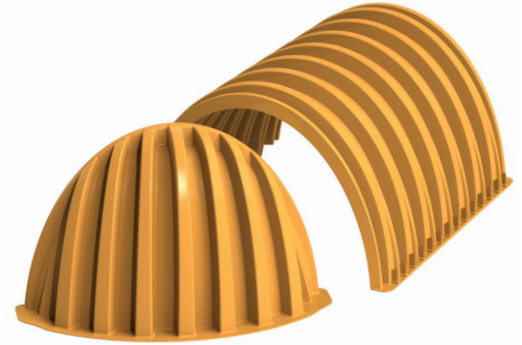
## Installation

Installation of the BayFilter System(s) shall be performed per manufacturer's installation instructions.



# StormTech<sup>®</sup> MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



## Nominal Chamber Specifications (not to scale)

**Size (L x W x H)**  
90" x 77" x 45"  
2286 mm x 1956 mm x 1143 mm

**Chamber Storage**  
109.9 ft<sup>3</sup> (3.11 m<sup>3</sup>)

**Min. Installed Storage\***  
175.0 ft<sup>3</sup> (4.96 m<sup>3</sup>)

**Weight**  
134 lbs (60.8 kg)

**Shipping**  
15 chambers/pallet  
7 end caps/pallet  
7 pallets/truck

\*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 6" (150 mm) of stone between chambers/ end caps and 40% stone porosity.

## Nominal End Cap Specifications (not to scale)

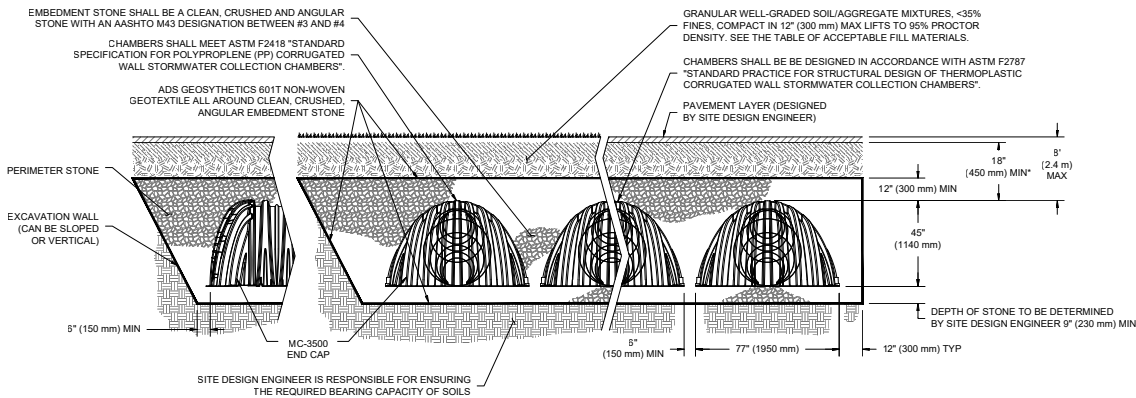
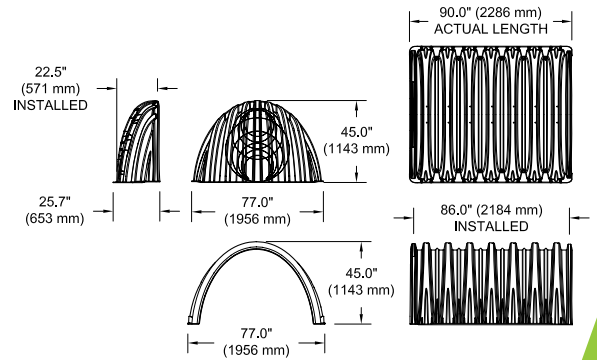
**Size (L x W x H)**  
26.5" x 71" x 45.1"  
673 mm x 1803 mm x 1145 mm

**End Cap Storage**  
14.9 ft<sup>3</sup> (0.42 m<sup>3</sup>)

**Min. Installed Storage\***  
45.1 ft<sup>3</sup> (1.28 m<sup>3</sup>)

**Weight**  
49 lbs (22.2 kg)

\*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 6" (150 mm) of stone between chambers/ end caps and 40% stone porosity.



\*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

# StormTech MC-3500 Specifications

## Storage Volume Per Chamber

	Bare Chamber Storage ft <sup>3</sup> (m <sup>3</sup> )	Chamber and Stone Foundation Depth in. (mm)			
		9 in (230 mm)	12 in (300 mm)	15 in (375 mm)	18 in (450 mm)
Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

**Note:** Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

## Amount of Stone Per Chamber

English Tons (yds <sup>3</sup> )	Stone Foundation Depth			
	9 in	12 in	15 in	18 in
Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
Metric Kilograms (m <sup>3</sup> )	230 mm	300 mm	375 mm	450 mm
Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

**Note:** Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

## Volume Excavation Per Chamber yd<sup>3</sup> (m<sup>3</sup>)

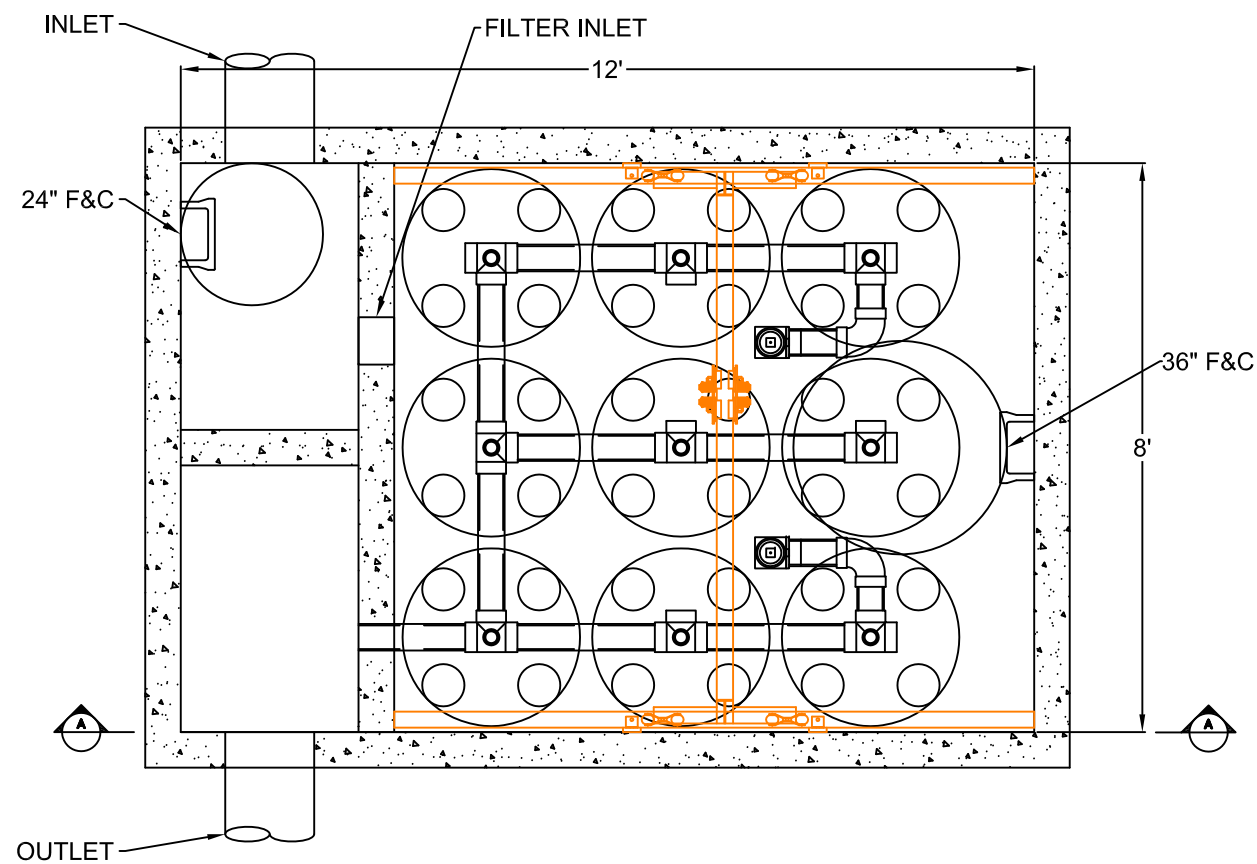
	Stone Foundation Depth			
	9 in (230 mm)	12 in (300 mm)	15 in (375mm)	18 in (450 mm)
Chamber	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.3)	4.3 (3.3)	4.4 (3.4)

**Note:** Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

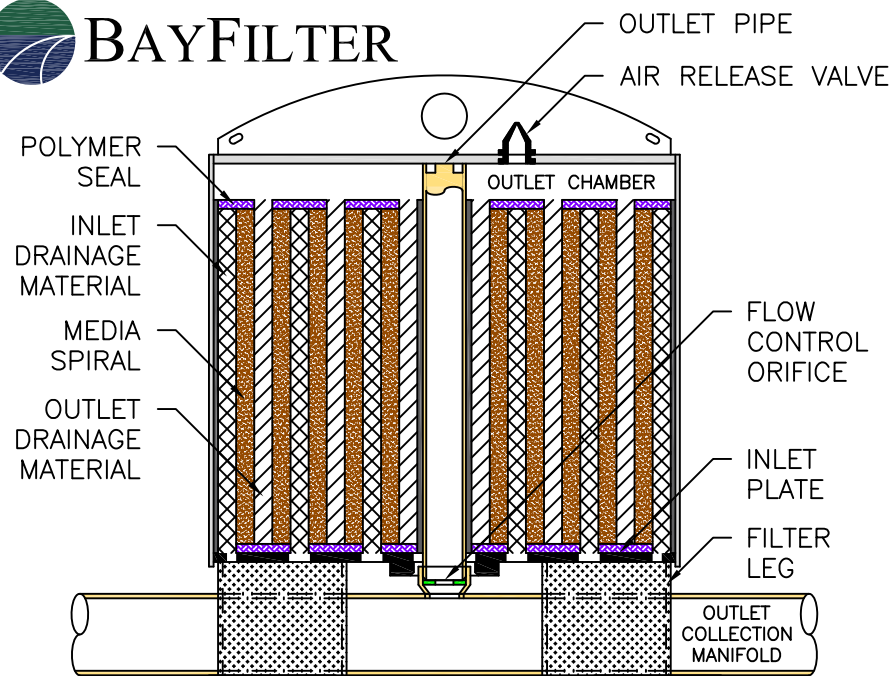
**Working on a project?**

Visit us at [www.stormtech.com](http://www.stormtech.com) and utilize the Design Tool





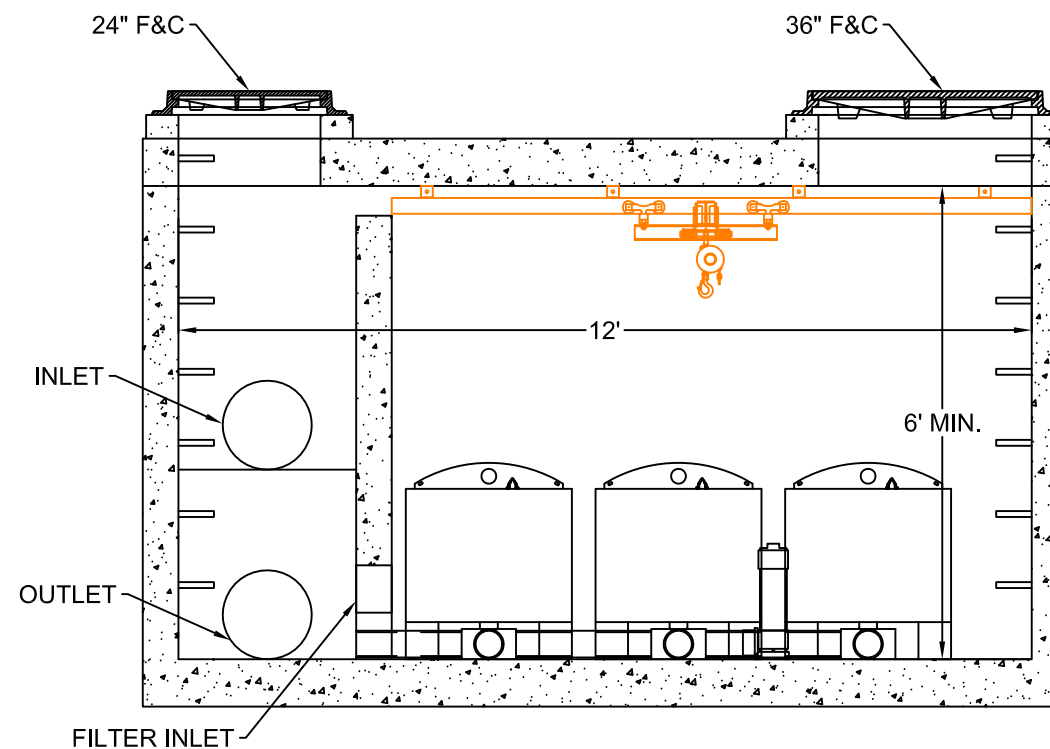
PLANVIEW  
OVERLAY  
HERE



**SINGLE BAYFILTER 530  
8-12-9 VAULT**

PROJECT	
LOCATION	
WATER QUALITY FLOW	0.60 CFS
DRAINAGE AREA	
CARTRIDGE DESIGN FLOW RATE	30 GPM
# BAYFILTER CARTRIDGES	9
TREATED SEDIMENT CAPACITY	3150 LBS

THE BAYFILTER STORMWATER MANAGEMENT SYSTEM IS A STORMWATER FILTRATION DEVICE DESIGNED TO REMOVE FINE SEDIMENTS, HEAVY METALS, AND PHOSPORUS. THE BAYFILTER SYSTEM RELIES ON A SPIRAL WOUND MEDIA FILTER CARTRIDGE WITH APPROXIMATELY 90 SQUARE FEET OF FILTRATION AREA. THE FILTER CARTRIDGES ARE HOUSED IN A CONCRETE STRUCTURE THAT EVENLY DISTRIBUTES THE FLOW BETWEEN CARTRIDGES. THE SYSTEM IS OFFLINE WITH AN EXTERNAL BYPASS THAT ROUTES HIGH INTENSITY STORMS AROUND THE SYSTEM. THE FILTER CARTRIDGES REMOVE POLLUTANTS FROM RUNOFF BY FILTRATION (INTERCEPTION/ATTACHMENT) AND ADSORPTION.



REV	DRW	CHK	DESCRIPTION

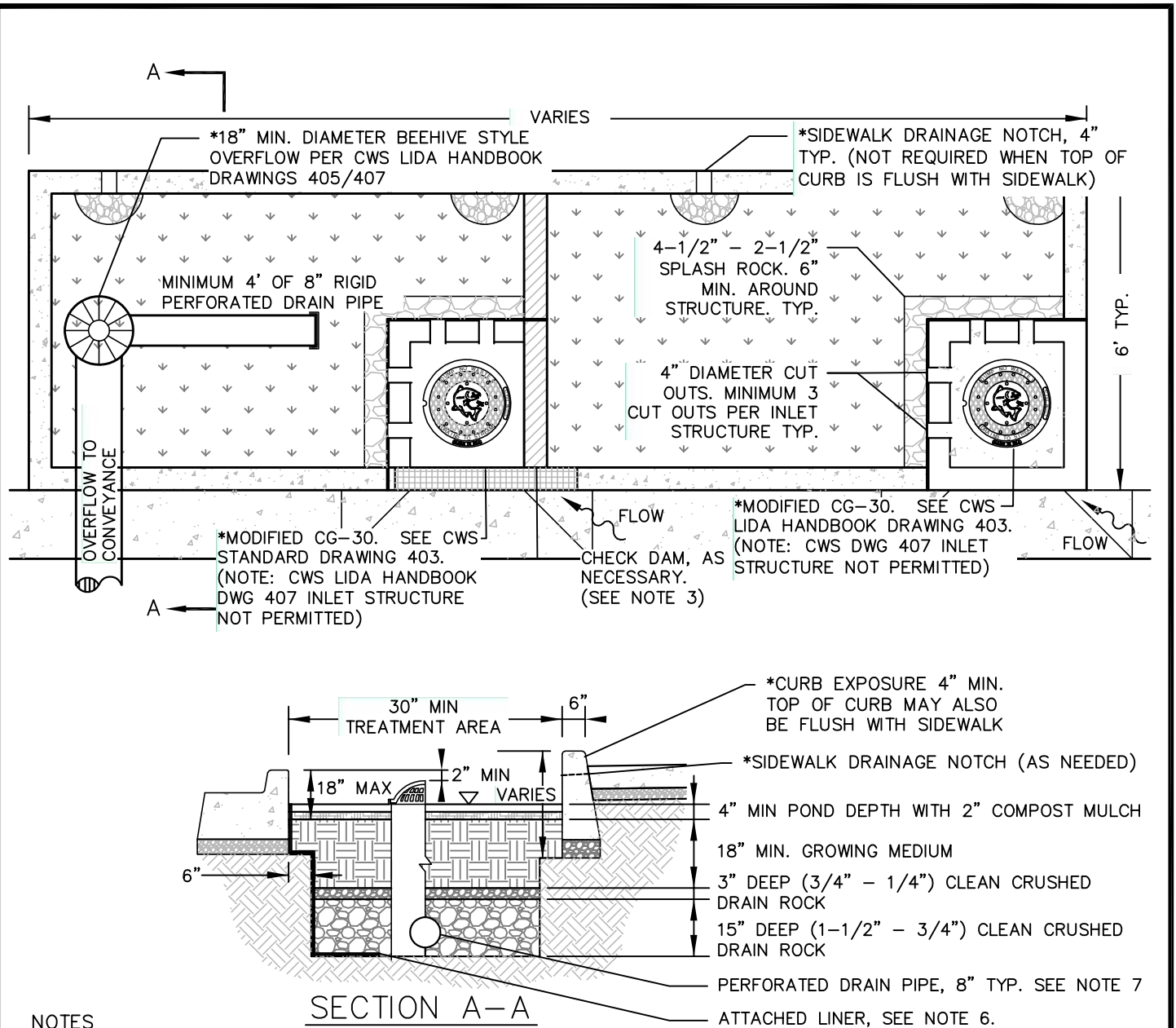
DATE: ---  
PROJECT #: ---  
DRAWN: ---  
CHECKED: ---



1030 Deer Hollow Drive  
Mount Airy, MD 21771  
1-800-BAYSAYER  
1-800-229-7283

4640 TRUEMAN BLVD  
HILLIARD, OH 43026  
1-800-733-7473  
ADVANCED DRAINAGE SYSTEMS, INC.

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



**NOTES**

1. PROVIDE PROTECTION FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC IN PROPOSED FACILITY AREAS PRIOR TO, DURING, AND AFTER CONSTRUCTION.
2. SIDEWALK ELEVATION MUST BE SET ABOVE CHECK DAM AND INLET/OUTLET ELEVATIONS TO ALLOW OVERFLOW TO DRAIN TO STREET OR PIPED OVERFLOW SYSTEM AS APPLICABLE.
3. PLANTER SHALL BE FLAT BOTTOM IN ALL DIRECTIONS TO WITHIN 1 INCH. CHECK DAMS SHALL BE PLACED ACCORDING TO INDIVIDUAL PROJECT PLANS PER CWS LIDA HANDBOOK DRAWING 406. PROVIDE 2" MIN FREEBOARD.
4. STREET SIDE CURB NOTCHES TO BE LOCATED AS IDENTIFIED ON PROJECT PLANS.
5. SIDEWALK CURB NOTCH: 1" LOWER THAN SIDEWALK, SLOPED TO FACILITY. SIDEWALK DRAINAGE NOTCHES SHALL ALIGN WITH SIDEWALK CONTRACTION JOINTS AND LOW POINTS.
6. \*STREET SIDE LIDA PLANTER SHALL BE DESIGNED TO PERMANENTLY IMPEDE THE POSSIBILITY OF WATER FLOW FROM THE SWALE TO THE ADJACENT ROADWAY SUBGRADE WITHOUT THE USE OF FLEXIBLE LINERS AS WELL AS BE DESIGNED TO WITHSTAND A DYNAMIC 40 TON WHEEL LOAD ON THE ADJACENT ROADWAY LOCATED BETWEEN 6 TO 24 INCHES FROM THE ROADSIDE CURB FACE.
7. PERFORATED PIPE IN UNLINED FACILITIES: BOTTOM OF PIPE SHALL BE SET AT 2 1/2" ABOVE SUBGRADE. PERFORATED PIPE IN LINED FACILITIES: BOTTOM OF PIPE SHALL BE SET AT BASE OF DRAIN ROCK LAYER
8. HYDRANTS, UTILITY POLES, OR ANY UTILITY BOXES PLACED WITHIN PLANTER MUST BE APPROVED BY JURISDICTION IN WRITING.
9. ACTUAL ELEVATIONS AND DIMENSIONS TO BE CONSTRUCTED AS IDENTIFIED ON PROJECT PLANS.
10. ENSURE THAT A DOWNSTREAM CATCH BASIN IS IN PLACE FOR EMERGENCY OVERFLOW.



**CWS STREETSIDE LIDA PLANTER  
(NO STREET PARKING) WITH  
C.O.B. MODIFICATIONS**

**SCALE: NONE**

**DATE: JUNE 2018**

**370**

## Appendix H

### Maintenance Requirements



# Isolator<sup>®</sup> Row

## O&M Manual

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# The Isolator<sup>®</sup> Row

## Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

## The Isolator Row

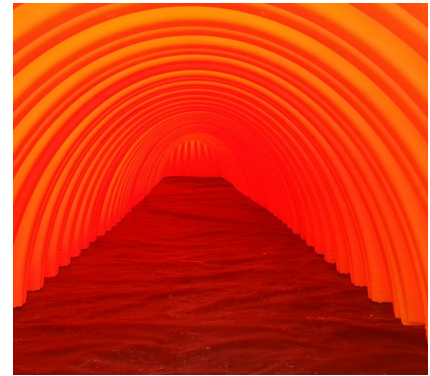
The Isolator Row is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

The Isolator Row is designed to capture the "first flush" runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row. After Stormwater flows through the Isolator Row and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row to minimize maintenance requirements and maintenance costs.

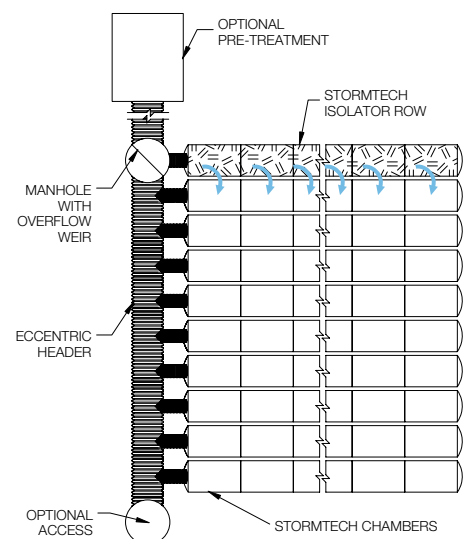
**Note:** See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.



Looking down the Isolator Row from the manhole opening, woven geotextile fabric is shown between the chamber and stone base.



StormTech Isolator Row with Overflow Spillway (not to scale)



# Isolator Row Inspection/Maintenance

## Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the **actual frequency of inspection and maintenance practices**.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

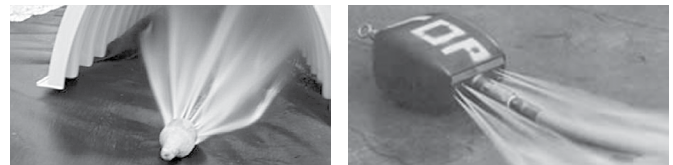
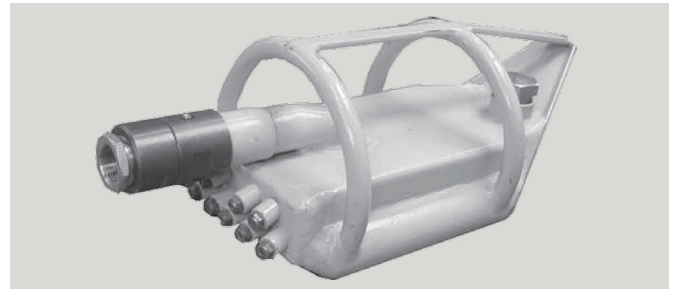
If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

## Maintenance

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided

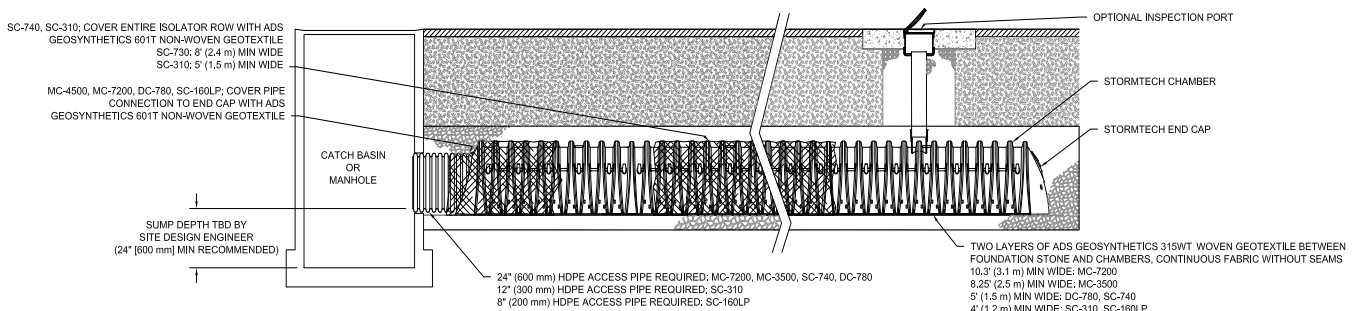
via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row lengths up to 200" (61 m). **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**



## StormTech Isolator Row (not to scale)

**Note:** Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row.



# Isolator Row Step By Step Maintenance Procedures

## Step 1

Inspect Isolator Row for sediment.

- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.
  - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Row
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
    - 1. Mirrors on poles or cameras may be used to avoid a confined space entry
    - 2. Follow OSHA regulations for confined space entry if entering manhole
  - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

## Step 2

Clean out Isolator Row using the JetVac process.

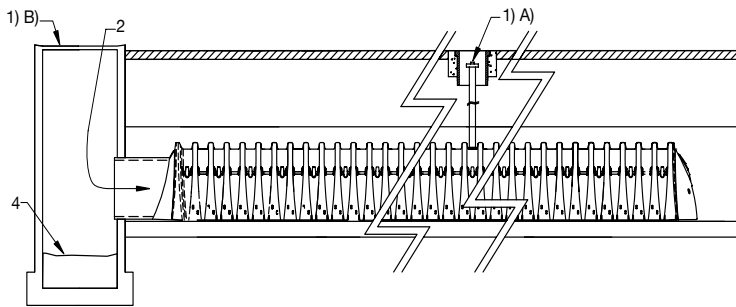
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

## Step 3

Replace all caps, lids and covers, record observations and actions.

## Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



## Sample Maintenance Log

Date	Stadia Rod Readings		Sedi-ment Depth (1)-(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com

800-821-6710

## Appendix I

Geotechnical Report (Separate PDF



Cell (503) 704-5427

Currently Teleworking M-F (8am-5pm)

---

**From:** Andrew Xu <andrew.xu@hdgpdx.com>

**Sent:** Monday, April 25, 2022 2:58 PM

**To:** POWERS Diana <Diana.POWERS@ODOT.Oregon.gov>; Kristian McCombs <kristian.mccombs@hdgpdx.com>; MCDONALD David L <David.L.MCDONALD@odot.oregon.gov>; GRANADOS Alex <Alex.GRANADOS@odot.oregon.gov>

**Subject:** RE: Cedar Hills Apartments/ODOT Coordination Meeting

This message was sent from outside the organization. Treat attachments, links and requests with caution. Be conscious of the information you share if you respond.

Hi Diana/Team,

We just have two quick questions (hopefully) on Water Treatment requirements. In our Pre app notes for the project there isn't a lineitem/statement that treatment will be required along Frontage Road.

Can you confirm that since the proposed additions along Frontage Road will be adding new detached sidewalk and landscape strip We would not be required to treat for water quality? The project wouldn't produce any new impervious surface area as the detached sidewalk is considered a non-pollutant generating area.

- Producing new impervious surface area. Does not include:
  - Minor actions such as constructing sign or signal post pads, etc., or
  - Non-pollutant generating areas such as detached bike paths and detached sidewalks
- Changing the total Contributing Impervious Area. In situations where the CIA is decreased, there may be a possibility for "banking" of treatment provided.
- Re-constructing a roadway from the subgrade. Does not include pavement overlays or

Per recent conversations ODOT seems to own the eastern section of SW Park Way Since the existing storm in SW Park is tied into and conveyed downstream to the City's system, would ODOTs standards still apply?

Best Regards,

Andrew Xu

Senior Project Designer

D: 503.946.9533

**Humber Design Group, Inc.**

*Urban Civil Engineering*

110 SE Main Street, Suite 200, Portland, OR 97214

www.hdgpdx.com

*100 Best Companies in Oregon 2019 and 2020*

*100 Best Green Workplaces in Oregon 2019*

*City of Portland Sustainability at Work Silver Certified*

---

**From:** POWERS Diana <[Diana.POWERS@ODOT.Oregon.gov](mailto:Diana.POWERS@ODOT.Oregon.gov)>

**Sent:** Monday, April 25, 2022 1:59 PM

**To:** Kristian McCombs <[kristian.mccombs@hdgpdx.com](mailto:kristian.mccombs@hdgpdx.com)>; MCDONALD David L <[David.L.MCDONALD@odot.oregon.gov](mailto:David.L.MCDONALD@odot.oregon.gov)>; GRANADOS Alex <[Alex.GRANADOS@odot.oregon.gov](mailto:Alex.GRANADOS@odot.oregon.gov)>; Andrew Xu <[andrew.xu@hdgpdx.com](mailto:andrew.xu@hdgpdx.com)>

**Subject:** RE: Cedar Hills Apartments/ODOT Coordination Meeting

Hi Kristian,

I understand, thanks for your flexibility. Roadway & Hydro/Drainage- are you able to provide a quick cursory review of the plans and provide initial comments by this Friday 4/29?

Best,

**Diana Powers (she/they)**

Associate Transportation Planner

[diana.powers@odot.oregon.gov](mailto:diana.powers@odot.oregon.gov)

**Development Review Program- ODOT Region 1**

[ODOT\\_R1\\_DevRev@odot.oregon.gov](mailto:ODOT_R1_DevRev@odot.oregon.gov) ← NOTE NEW EMAIL

---

**From:** Kristian McCombs <[kristian.mccombs@hdgpx.com](mailto:kristian.mccombs@hdgpx.com)>

**Sent:** Monday, April 25, 2022 12:41 PM

**To:** POWERS Diana <[Diana.POWERS@ODOT.Oregon.gov](mailto:Diana.POWERS@ODOT.Oregon.gov)>; MCDONALD David L <[David.L.MCDONALD@odot.oregon.gov](mailto:David.L.MCDONALD@odot.oregon.gov)>; GRANADOS Alex <[Alex.GRANADOS@odot.oregon.gov](mailto:Alex.GRANADOS@odot.oregon.gov)>; Andrew Xu <[andrew.xu@hdgpx.com](mailto:andrew.xu@hdgpx.com)>

**Subject:** RE: Cedar Hills Apartments/ODOT Coordination Meeting

This message was sent from outside the organization. Treat attachments, links and requests with caution. Be conscious of the information you share if you respond.

Hi Diana,

We were hoping to have this meeting before we submitted Land Use plans to the City of Beaverton on Friday this week. I can attend any of the available times except for Wednesday. In the meantime, would we be able to send a conceptual design for stormwater management along Frontage Rd that ODOT could provide comment on?

Kristian McCombs, PE

Associate, Project Engineer

D: 503.946.5358 | O: 503.946.6690

**Humber Design Group, Inc.**

*Urban Civil Engineering*

---

**From:** POWERS Diana <[Diana.POWERS@ODOT.Oregon.gov](mailto:Diana.POWERS@ODOT.Oregon.gov)>

**Sent:** Monday, April 25, 2022 12:29 PM

**To:** MCDONALD David L <[David.L.MCDONALD@odot.oregon.gov](mailto:David.L.MCDONALD@odot.oregon.gov)>; GRANADOS Alex <[Alex.GRANADOS@odot.oregon.gov](mailto:Alex.GRANADOS@odot.oregon.gov)>; Andrew Xu <[andrew.xu@hdgpx.com](mailto:andrew.xu@hdgpx.com)>; Kristian McCombs <[kristian.mccombs@hdgpx.com](mailto:kristian.mccombs@hdgpx.com)>

**Subject:** RE: Cedar Hills Apartments/ODOT Coordination Meeting

Good afternoon all,

Our ODOT Drainage and Roadway staff need to reschedule this coordination meeting for next week.



ODOT staff are available to meet during the following times:

Monday May 2<sup>nd</sup> 10 to 11AM or 3:30 to 4:30PM

Tuesday May 3<sup>rd</sup> 2 to 3PM

Wednesday May 4<sup>th</sup> 10 to 11AM

Please let me know what time works best for your team and I will re-schedule this meeting. Alex and David, please let me know if any of these times do not work for you.

Thank you for your understanding as we coordinate our schedules.

Best,

**Diana Powers (she/they)**

Associate Transportation Planner

[diana.powers@odot.oregon.gov](mailto:diana.powers@odot.oregon.gov)

**Development Review Program- ODOT Region 1**

[ODOT\\_R1\\_DevRev@odot.oregon.gov](mailto:ODOT_R1_DevRev@odot.oregon.gov) ← NOTE NEW EMAIL

-----Original Appointment-----

**From:** POWERS Diana

**Sent:** Friday, April 22, 2022 10:36 AM

**To:** POWERS Diana; MCDONALD David L; GRANADOS Alex; Andrew Xu; Kristian McCombs

**Subject:** Cedar Hills Apartments/ODOT Coordination Meeting

**When:** Monday, April 25, 2022 2:00 PM-3:00 PM (UTC-08:00) Pacific Time (US & Canada).

**Where:** Microsoft Teams Meeting

Meeting to discuss drainage issues relating to the ODOT frontage road with David McDonald (GeoHydro) and Alex Granados (Preliminary Design). The Cedar Hills Apartments development is located at 10326 SW Park Way. Attached are background documents for reference.

Please let me know if you have a conflict with the proposed time.

Thanks and see you all then,

Diana Powers

ODOT Development Review Planner

[diana.powers@odot.oregon.gov](mailto:diana.powers@odot.oregon.gov)

---

## Microsoft Teams meeting

**Join on your computer or mobile app**

[Click here to join the meeting](#)

**Or call in (audio only)**

[+1 971-277-1965,352555446#](tel:+1971-277-1965,352555446#) United States, Portland