



## DRAINAGE STUDY

Performing Arts Center



**PROJECT ADDRESS:**

31852 El Camino Real

APN: 124-160-11, -12

San Juan Capistrano Performing Arts  
Center, LLC

A California Limited Liability  
Company

31801 Paseo Adelanto

San Juan Capistrano, CA 92675

(949) 354-5600

**DATE: 1/25/2024**

C3 CIVIL ENGINEERING, LLC

10870 W FAIRVIEW AVE

STE 102-1187

BOISE, ID 83713

(208)918-0998



## Table of Contents

Section 1 – Project Description.....	3
Section 2 – Drainage Patterns.....	4
Section 3 – Methodology.....	6
Section 4 – Calculations.....	7
Section 5 – Summary.....	8
Appendix	



## Section 1 – Project Description

### Existing Conditions:

The project is located at 31852 El Camino Real in San Juan Capistrano. It is bound by Blas Aguilar Adobe Museum and a parking lot to the north, Historic Town Center Park to the west, In-N-Out Burger to the east and a future mixed-use project to the south.

The existing site improvements include an outdoor stage, restroom building and mature landscaping.

### Proposed Conditions:

The project proposes to redevelop the existing outdoor stage into a multi-story Performing Arts Center (PAC). The existing stage will be demolished and the landscaping at the rear (east side) of the park will be removed. The existing restroom for the park will be removed and relocated. The park area along El Camino Real will remain. A new drive entrance and loading/unloading zone will be constructed as part of the PAC. The a new drive entrance and aisle will be constructed on El Camino Real.

The project includes construction of one (1) new 3-story building. No direct access to El Camino Real or Del Obispo Street from the site. New landscaping will be provided in all areas that are not hardscaped. The total disturbed onsite area is 81,910 sf.

There are no offsite improvements proposed with this project, aside from frontage improvements.



## Section 2 – Drainage Patterns

### Existing Drainage Patterns:

The existing development has two storm water discharge locations from the site.

**DA 1** consists of 1.019 acres which has approximately 10% impervious land cover. This land area includes the majority of the existing park from El Camino Real to the outdoor stage. Runoff from this area sheet flows from east to west where it discharges into the right-of-way in El Camino Real. Runoff is conveyed in the curb and gutter to the south. Ultimately, runoff from El Camino Real is conveyed to Camino Capistrano further south where it is collected in a public catch basin at the intersection of Camino Capistrano and Del Obispo Street.

**DA 2** consists of 0.862 acres which has approximately 5% impervious land cover. This area includes the eastern portion of the park and part of the outdoor stage. Runoff from this area sheet flows from west to east and is captured in a concrete v-gutter along a portion of the northern and most of the eastern property lines. This v-gutter conveys runoff to the southeast corner of the site, where it is captured by a storm drain inlet on the adjacent property. This inlet conveys runoff with an underground pipe to the east to a storm drain system in Del Obispo Street. The storm drain main in Del Obispo St. slopes south to the intersection of Camino Capistrano and Del Obispo.

### Proposed Drainage Patterns:

Generally, the developed drainage pattern is consistent with the existing drainage pattern for the ultimate storm water path.

The proposed development has three storm water discharge locations from the site.

**DA 1** consists of 0.599 acres which has approximately 30% impervious land cover. This land area includes the frontage along El Camino Real and most of the green space of the park. This area includes the balance of the park area that is outside of the disturbed area. Portions of the northern drive aisle and the restroom building area are included in this subarea. Runoff in this DA sheet flows from east to west across the grass area of the park and collected in the five atrium grated inlets. The low flow will be infiltrated back into the native soils through perforated pipes. The high flow will spill from the proposed grated inlet located on El Camino Real and sheet flow via curb and gutter. Ultimately, runoff from El Camino Real is conveyed to Camino Capistrano further south where it is collected in a public catch basin at the intersection of Camino Capistrano and Del Obispo Street.

**DA 2** consists of 1.018 acres which has approximately 84% impervious land cover. This area includes the PAC building and the northwest corner of the property. Runoff from the building, sidewalk and a portion of the drive



isle will be collected to the nearest grated inlet then piped to a diversion manhole. The diversion manhole will convey lower flows to a Modular Wetlands System (MWS) for treatment via a weir within the manhole. Stormwater will be treated within the MWS and then piped to an underground storm drain detention system. High flow rates in the diversion manhole will be confluence with the treated flow rate from the MWS and then piped to the underground storm drain detention system directly. Once the underground detention system has reached maximum capacity, the storm water is piped out to daylight the landscape. Storm water is conveyed to the v-gutter behind the block wall and flows along the northern and eastern property lines. This v-gutter conveys runoff to the southeast corner of the site, as it does historically, where it is captured by a storm drain inlet. This inlet conveys runoff with an underground pipe to the east to a storm drain system in Del Obispo Street. The storm drains main in Del Obispo St. slopes south to the intersection of Camino Capistrano and Del Obispo.

**DA 3** consists of 0.264 acres which has approximately 69% impervious land cover. This area includes the sidewalk area on the south side of the PAC building, the drive entrance for drop-off and landscape. Runoff from this area sheet flows to the south to the Forster project drive aisle and ultimately is captured in proposed storm drain inlets at each end of the drive entrance. The proposed storm drains will daylight out of the existing curb in the adjacent property to the east. Storm water will then flow across the parking lot and capture in the Del Obispo Storm drain system. Since this flow will be added to the downstream project's BMP, the downstream BMP will be upsized to account for this additional design Q.

Ultimately, storm water from our site is conveyed to the south to the public storm drain system, which is tributary to San Juan Creek, which flows to the Pacific Ocean.

#### Run-On:

The site does include run-on from three properties to the north; the Playhouse property, the Taco Bell property and the adobe property immediately to the north of the park. The run-on from these properties is contained within the valley gutter along the northern and eastern property lines. The project's runoff comes with this run-on after treatment and detention onsite. There is no additional sheet flow run-on.

#### Hydromodification:

Ultimately, the project drainage is captured in a public storm drain system downstream of the property where storm water is conveyed to San Juan Creek. San Juan Creek is an engineered channel, therefore, HCOE is not a concern for the project. In addition, our project site is included in the Engineered Channels/Large River exemptions area as shown on the San Juan Capistrano Exemption Map.

#### Flood Zone:

This project is not in a flood zone.

## Section 3 – Methodology

### Runoff Determination Methods

The two primary methods used in the Orange County area to determine design discharges are the Rational Method and the Unit Hydrograph method. The Rational method is generally intended for use on small watersheds of less than 300 to 500-acres while the Synthetic Unit Hydrograph method is intended for use on watersheds in excess of these limits. For the purposes of this report, we will be using the Rational Method for the 25- and 100-year storm event.

### Rational Method

The Rational method is commonly used for determining peak discharge from relatively small drainage areas. The Rational method is based on the following equation:

$$Q = C I A$$

Where:

Q = peak discharge, in cubic feet per second (cfs)

C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)

I = average rainfall intensity for a duration equal to the T<sub>c</sub> for the area, in inches per hour (Note: If the computed T<sub>c</sub> is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)

$$I = A * (t)^B \text{ (in/hr)}$$

t = Time of Concentration (min.)

A&B = factors in the Intensity regression equation from the Orange County Hydrology Manual

A = 11.995 for 25-year storm

A = 15.56 for 100-year storm

B = -0.566 for 25-year storm

B = -0.573 for 100-year storm

a<sub>i</sub> = Impervious area percentage

a<sub>p</sub> = Pervious area percentage

F<sub>p</sub> = Loss rate for Soils Group D (in/hr) from O.C. Hydrology Manual (0.20 for soil group D)

$$F_m = a_p * F_p$$

A = drainage area contributing to the design location, in acres



## Section 4 – Calculations

Using HydroCAD software, the existing and proposed runoff for the project was calculated for the 25- & 100-Year Storm Events. A model was created based on the drainage areas for the existing and proposed conditions. The runoff calculations are shown in the reports in the Appendix.

## Section 5 – Summary

As shown in the calculations and table below, runoff from the project will be decreased with the development of the project for outlets 1 and 2. For outlet 3, the downstream detention system as part of the Forster Project includes detention and for the purposes of this report, is assumed to be mitigated as part of the Forster Project detention system.

Since the project is able to maintain a runoff less than that of the pre-developed conditions, no adverse effects will occur to the ultimate downstream conveyance system.

### 25-yr Storm Event

25-yr Storm	Outlet #1 El Camino Real Contribution (cfs)	Outlet #2 Del Obispo Contribution (cfs)	Outlet #3 Forster Contribution (cfs)	Totals (Outlet #1 & 2)
Existing Condition	0.80	0.80	-	1.60
Proposed Condition	0.56	0.50	0.27	1.33
Difference	-0.24	-0.30	-	0.27

### 100-yr Storm Event

100-yr Storm	Outlet #1 El Camino Real Contribution (cfs)	Outlet #2 Del Obispo Contribution (cfs)	Outlet #3 Forster Contribution (cfs)	Totals (Outlet #1 & 2)
Existing Condition	1.01	1.01	-	2.02
Proposed Condition	0.70	0.55	0.35	1.60
Difference	-0.31	-0.46	-	-0.42

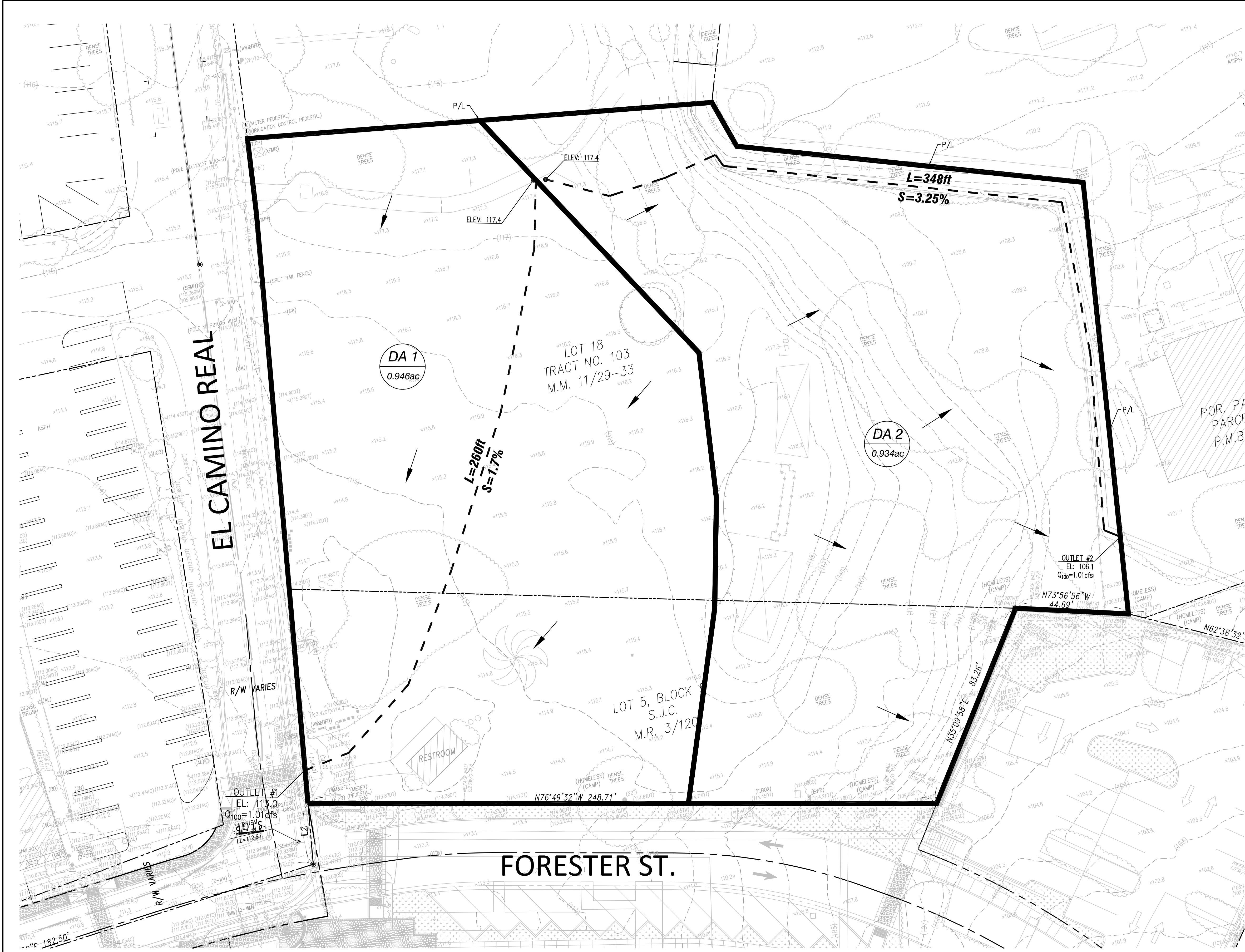




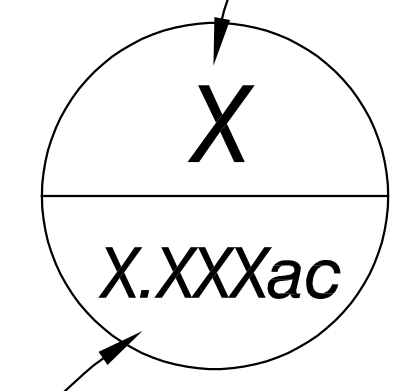
## Appendix



## Existing Development



SUBAREA DESIGNATION



AREA (ac)

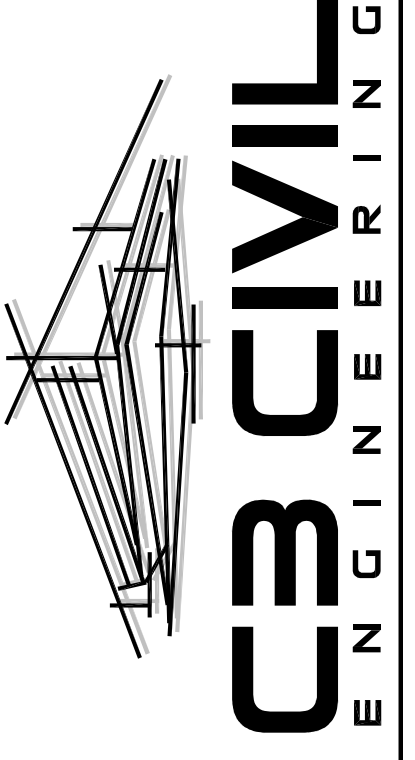
$T_c$  = TIME OF CONCENTRATION  
 $L$  = LENGTH OF SUBAREA FLOW PATH  
 $S$  = SLOPE

- BASIN LIMITS
- FLOW PATH
- FLOW DIRECTION

REVISION RECORD	
#	DESCRIPTION

PERFORMING ARTS CENTER  
 31872 EL CAMINO REAL  
 SAN JUAN CAPISTRANO, CA

10870 W. FAIRVIEW DR  
 STE 102-1187  
 BOISE, ID 83713  
 (208) 918-0928  
 thomas@cbcivileng.com  
 www.cbcivileng.com



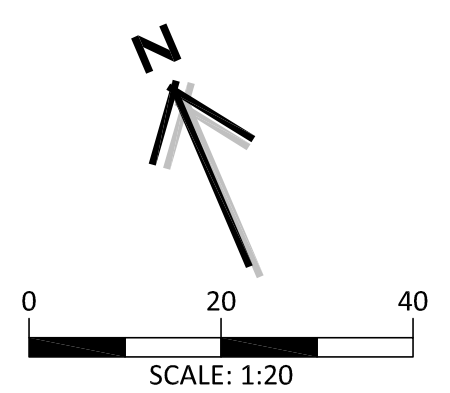
DATE: 01/25/2024  
 CS JOB NO: 22-019  
 DRAWN BY: NMY  
 CHECKED BY: TH

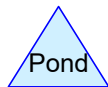
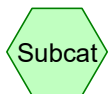
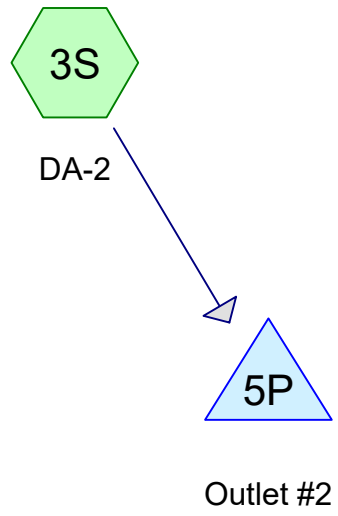
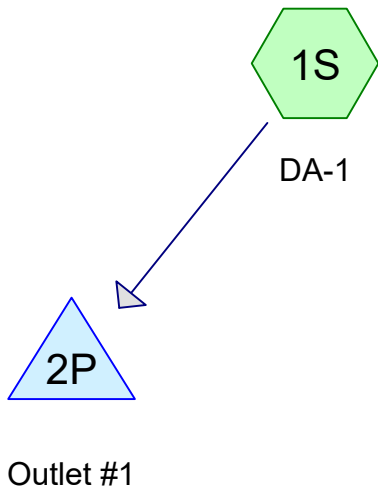
SHEET TITLE  
**EXISTING DRAINAGE MAP**

SHEET NUMBER  
**6 of 9**

**DIGALERT**

CALL BEFORE YOU DIG  
 1-800-227-2600  
 AT LEAST  
 2 WORKING DAY  
 NOTICE REQUIRED





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Page 2

**Area Listing (all nodes)**

Area (acres)	C	Description (subcatchment-numbers)
1.775	0.70	Landscape (1S, 3S)
0.036	0.95	Paved parking, HSG C (1S)
0.070	0.95	Unconnected pavement, HSG C (3S)
<b>1.880</b>	<b>0.71</b>	<b>TOTAL AREA</b>

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Page 3

**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.105	HSG C	1S, 3S
0.000	HSG D	
1.775	Other	1S, 3S
<b>1.880</b>		<b>TOTAL AREA</b>

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Page 4

**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.775	1.775	Landscape	1S, 3S
0.000	0.000	0.036	0.000	0.000	0.036	Paved parking	1S
0.000	0.000	0.070	0.000	0.000	0.070	Unconnected pavement	3S
<b>0.000</b>	<b>0.000</b>	<b>0.105</b>	<b>0.000</b>	<b>1.775</b>	<b>1.880</b>	<b>TOTAL AREA</b>	

**22019-EX-HYD**

22019- Hydro CAD- Existing Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 5

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points  
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: DA-1** Runoff Area=41,235 sf 3.79% Impervious Runoff Depth=0.84"  
Flow Length=260' Slope=0.0170 '/' Tc=26.1 min C=0.71 Runoff=0.80 cfs 0.066 af

**Subcatchment3S: DA-2** Runoff Area=40,675 sf 7.45% Impervious Runoff Depth=0.85"  
Flow Length=300' Slope=0.0325 '/' Tc=2.8 min C=0.72 Runoff=0.80 cfs 0.066 af

**Pond 2P: Outlet #1** Inflow=0.80 cfs 0.066 af  
Primary=0.80 cfs 0.066 af

**Pond 5P: Outlet #2** Inflow=0.80 cfs 0.066 af  
Primary=0.80 cfs 0.066 af

**Total Runoff Area = 1.880 ac Runoff Volume = 0.132 af Average Runoff Depth = 0.84"**  
**94.39% Pervious = 1.775 ac 5.61% Impervious = 0.105 ac**



**22019-EX-HYD**

**Summary for Subcatchment 1S: DA-1**

Runoff = 0.80 cfs @ 0.44 hrs, Volume= 0.066 af, Depth= 0.84"

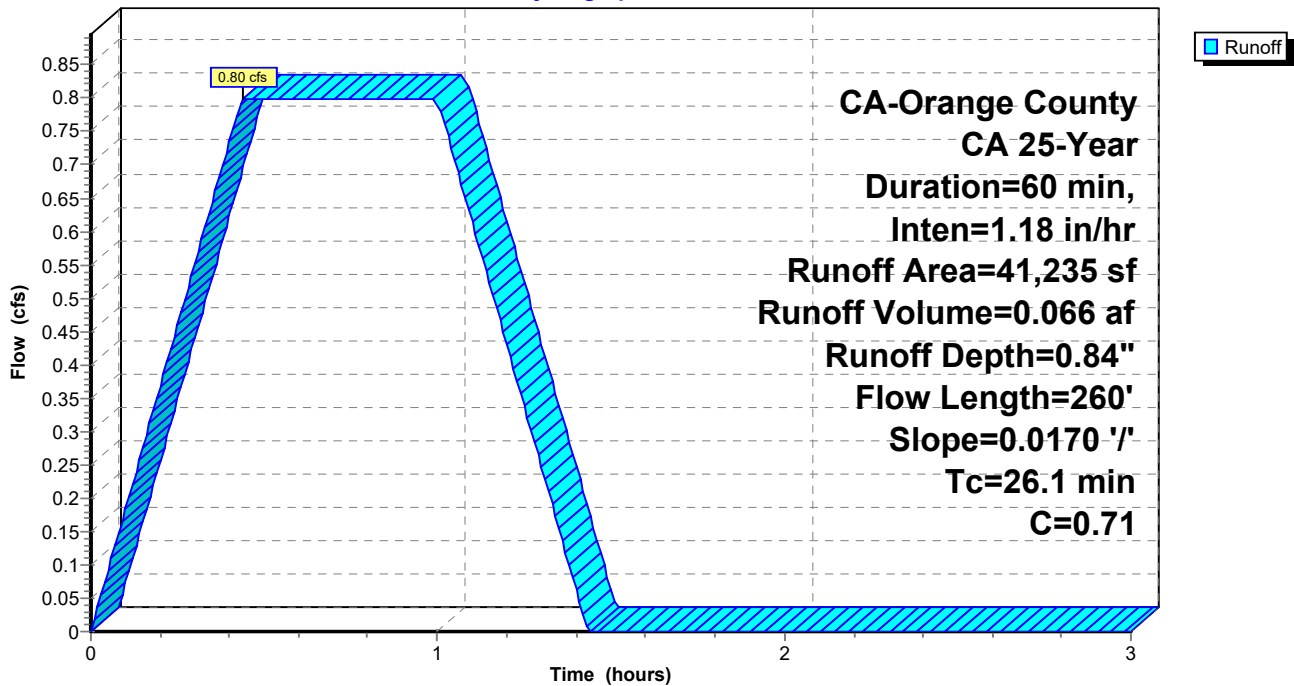
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

Area (sf)	C	Description
1,561	0.95	Paved parking, HSG C
39,674	0.70	Landscape
41,235	0.71	Weighted Average
39,674		96.21% Pervious Area
1,561		3.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	260	0.0170	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 2.37"

**Subcatchment 1S: DA-1**

Hydrograph



**22019-EX-HYD**22019- Hydro CAD- Existing Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 7

**Hydrograph for Subcatchment 1S: DA-1**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	1.02	0.76	2.04	0.00
0.02	0.04	1.04	0.73	2.06	0.00
0.04	0.07	1.06	0.69	2.08	0.00
0.06	0.11	1.08	0.65	2.10	0.00
0.08	0.15	1.10	0.62	2.12	0.00
0.10	0.18	1.12	0.58	2.14	0.00
0.12	0.22	1.14	0.54	2.16	0.00
0.14	0.26	1.16	0.51	2.18	0.00
0.16	0.29	1.18	0.47	2.20	0.00
0.18	0.33	1.20	0.43	2.22	0.00
0.20	0.37	1.22	0.40	2.24	0.00
0.22	0.40	1.24	0.36	2.26	0.00
0.24	0.44	1.26	0.32	2.28	0.00
0.26	0.48	1.28	0.28	2.30	0.00
0.28	0.51	1.30	0.25	2.32	0.00
0.30	0.55	1.32	0.21	2.34	0.00
0.32	0.59	1.34	0.17	2.36	0.00
0.34	0.63	1.36	0.14	2.38	0.00
0.36	0.66	1.38	0.10	2.40	0.00
0.38	0.70	1.40	0.06	2.42	0.00
0.40	0.74	1.42	0.03	2.44	0.00
0.42	0.77	1.44	0.00	2.46	0.00
0.44	<b>0.80</b>	1.46	0.00	2.48	0.00
0.46	0.80	1.48	0.00	2.50	0.00
0.48	0.80	1.50	0.00	2.52	0.00
0.50	0.80	1.52	0.00	2.54	0.00
0.52	0.80	1.54	0.00	2.56	0.00
0.54	0.80	1.56	0.00	2.58	0.00
0.56	0.80	1.58	0.00	2.60	0.00
0.58	0.80	1.60	0.00	2.62	0.00
0.60	0.80	1.62	0.00	2.64	0.00
0.62	0.80	1.64	0.00	2.66	0.00
0.64	0.80	1.66	0.00	2.68	0.00
0.66	0.80	1.68	0.00	2.70	0.00
0.68	0.80	1.70	0.00	2.72	0.00
0.70	0.80	1.72	0.00	2.74	0.00
0.72	0.80	1.74	0.00	2.76	0.00
0.74	0.80	1.76	0.00	2.78	0.00
0.76	0.80	1.78	0.00	2.80	0.00
0.78	0.80	1.80	0.00	2.82	0.00
0.80	0.80	1.82	0.00	2.84	0.00
0.82	0.80	1.84	0.00	2.86	0.00
0.84	0.80	1.86	0.00	2.88	0.00
0.86	0.80	1.88	0.00	2.90	0.00
0.88	0.80	1.90	0.00	2.92	0.00
0.90	0.80	1.92	0.00	2.94	0.00
0.92	0.80	1.94	0.00	2.96	0.00
0.94	0.80	1.96	0.00	2.98	0.00
0.96	0.80	1.98	0.00	3.00	0.00
0.98	0.80	2.00	0.00		
1.00	0.80	2.02	0.00		

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Page 8

**Summary for Subcatchment 3S: DA-2**

[70] Warning: Tc<8dt requires smaller dt

Runoff = 0.80 cfs @ 0.05 hrs, Volume= 0.066 af, Depth= 0.85"

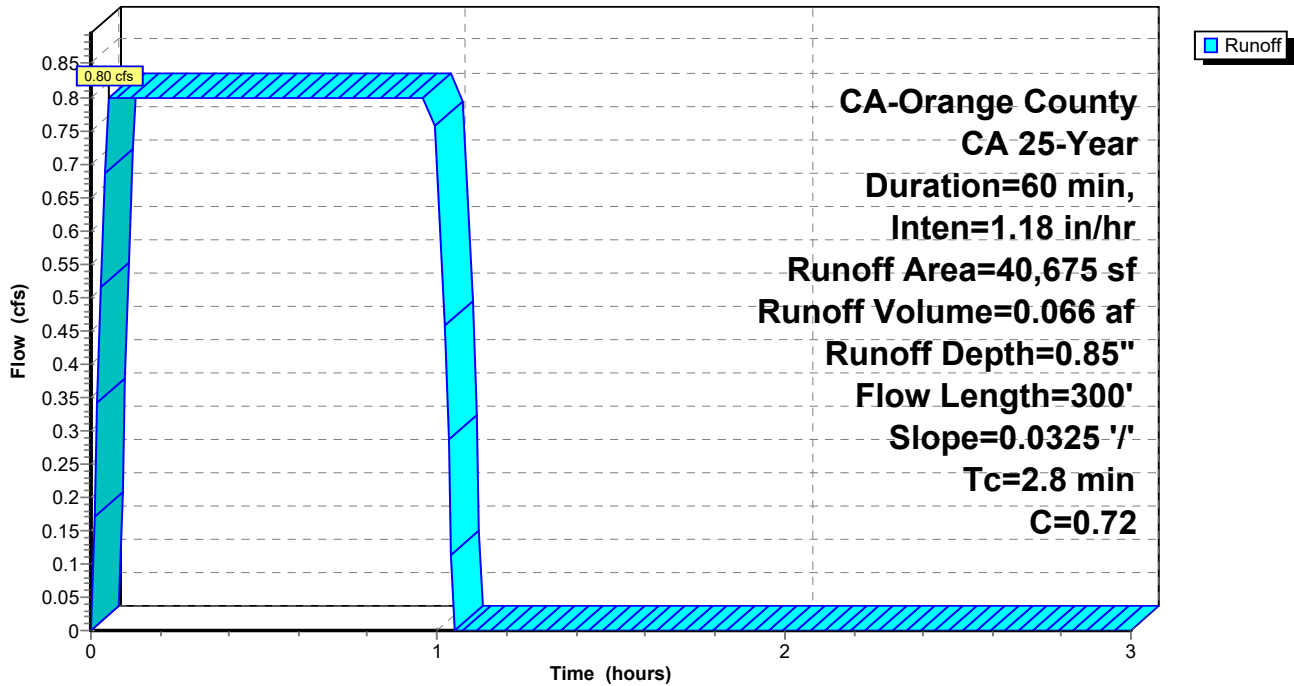
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

Area (sf)	C	Description
3,032	0.95	Unconnected pavement, HSG C
37,643	0.70	Landscape
40,675	0.72	Weighted Average
37,643		92.55% Pervious Area
3,032		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	300	0.0325	1.79		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 2.37"

**Subcatchment 3S: DA-2**

Hydrograph



**22019-EX-HYD**22019- Hydro CAD- Existing Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 9

**Hydrograph for Subcatchment 3S: DA-2**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	1.02	0.46	2.04	0.00
0.02	0.34	1.04	0.11	2.06	0.00
0.04	<b>0.69</b>	1.06	0.00	2.08	0.00
0.06	<b>0.80</b>	1.08	0.00	2.10	0.00
0.08	0.80	1.10	0.00	2.12	0.00
0.10	0.80	1.12	0.00	2.14	0.00
0.12	0.80	1.14	0.00	2.16	0.00
0.14	0.80	1.16	0.00	2.18	0.00
0.16	0.80	1.18	0.00	2.20	0.00
0.18	0.80	1.20	0.00	2.22	0.00
0.20	0.80	1.22	0.00	2.24	0.00
0.22	0.80	1.24	0.00	2.26	0.00
0.24	0.80	1.26	0.00	2.28	0.00
0.26	0.80	1.28	0.00	2.30	0.00
0.28	0.80	1.30	0.00	2.32	0.00
0.30	0.80	1.32	0.00	2.34	0.00
0.32	0.80	1.34	0.00	2.36	0.00
0.34	0.80	1.36	0.00	2.38	0.00
0.36	0.80	1.38	0.00	2.40	0.00
0.38	0.80	1.40	0.00	2.42	0.00
0.40	0.80	1.42	0.00	2.44	0.00
0.42	0.80	1.44	0.00	2.46	0.00
0.44	0.80	1.46	0.00	2.48	0.00
0.46	0.80	1.48	0.00	2.50	0.00
0.48	0.80	1.50	0.00	2.52	0.00
0.50	0.80	1.52	0.00	2.54	0.00
0.52	0.80	1.54	0.00	2.56	0.00
0.54	0.80	1.56	0.00	2.58	0.00
0.56	0.80	1.58	0.00	2.60	0.00
0.58	0.80	1.60	0.00	2.62	0.00
0.60	0.80	1.62	0.00	2.64	0.00
0.62	0.80	1.64	0.00	2.66	0.00
0.64	0.80	1.66	0.00	2.68	0.00
0.66	0.80	1.68	0.00	2.70	0.00
0.68	0.80	1.70	0.00	2.72	0.00
0.70	0.80	1.72	0.00	2.74	0.00
0.72	0.80	1.74	0.00	2.76	0.00
0.74	0.80	1.76	0.00	2.78	0.00
0.76	0.80	1.78	0.00	2.80	0.00
0.78	0.80	1.80	0.00	2.82	0.00
0.80	0.80	1.82	0.00	2.84	0.00
0.82	0.80	1.84	0.00	2.86	0.00
0.84	0.80	1.86	0.00	2.88	0.00
0.86	0.80	1.88	0.00	2.90	0.00
0.88	0.80	1.90	0.00	2.92	0.00
0.90	0.80	1.92	0.00	2.94	0.00
0.92	0.80	1.94	0.00	2.96	0.00
0.94	0.80	1.96	0.00	2.98	0.00
0.96	0.80	1.98	0.00	3.00	0.00
0.98	0.80	2.00	0.00		
1.00	0.80	2.02	0.00		

### Summary for Pond 2P: Outlet #1

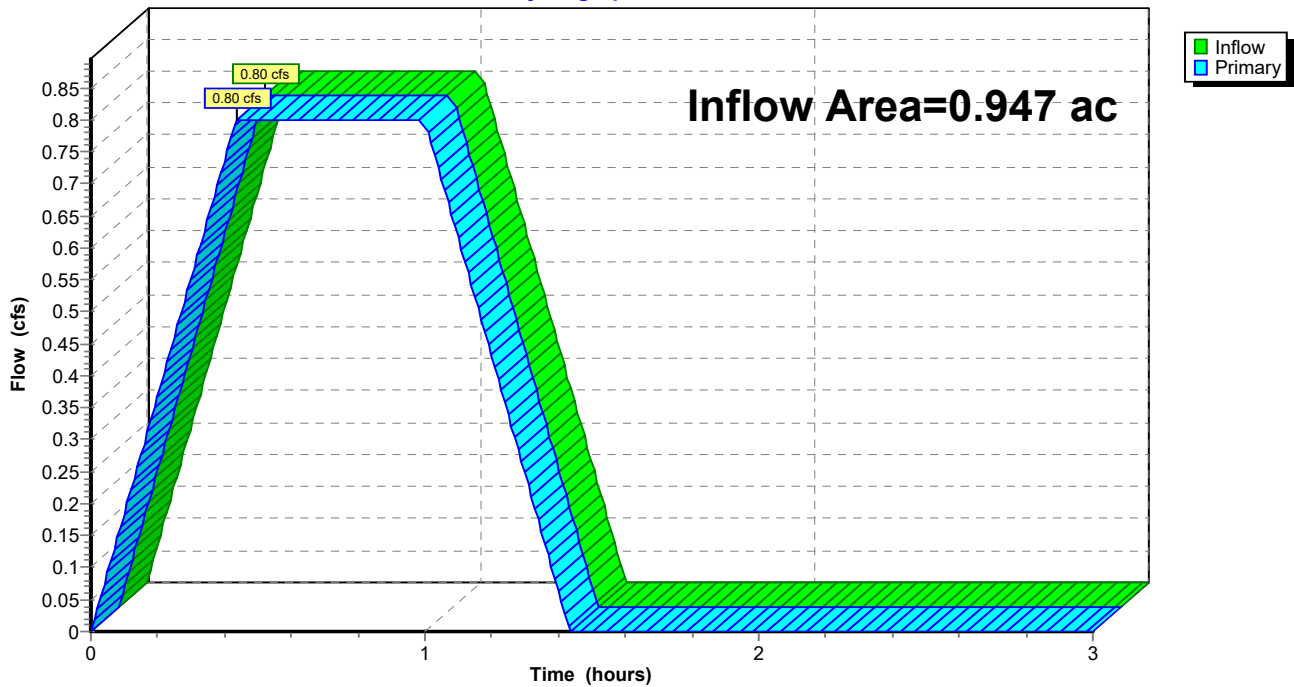
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.947 ac, 3.79% Impervious, Inflow Depth = 0.84" for 25-Year event  
Inflow = 0.80 cfs @ 0.44 hrs, Volume= 0.066 af  
Primary = 0.80 cfs @ 0.44 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

### Pond 2P: Outlet #1

Hydrograph



**22019-EX-HYD**

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CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 11

**Hydrograph for Pond 2P: Outlet #1**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00	2.55	0.00		0.00
0.05	0.09		0.09	2.60	0.00		0.00
0.10	0.18		0.18	2.65	0.00		0.00
0.15	0.28		0.28	2.70	0.00		0.00
0.20	0.37		0.37	2.75	0.00		0.00
0.25	0.46		0.46	2.80	0.00		0.00
0.30	0.55		0.55	2.85	0.00		0.00
0.35	0.64		0.64	2.90	0.00		0.00
0.40	<b>0.74</b>		<b>0.74</b>	2.95	0.00		0.00
0.45	<b>0.80</b>		<b>0.80</b>	3.00	0.00		0.00
0.50	0.80		0.80				
0.55	0.80		0.80				
0.60	0.80		0.80				
0.65	0.80		0.80				
0.70	0.80		0.80				
0.75	0.80		0.80				
0.80	0.80		0.80				
0.85	0.80		0.80				
0.90	0.80		0.80				
0.95	0.80		0.80				
1.00	0.80		0.80				
1.05	0.71		0.71				
1.10	0.62		0.62				
1.15	0.52		0.52				
1.20	0.43		0.43				
1.25	0.34		0.34				
1.30	0.25		0.25				
1.35	0.16		0.16				
1.40	0.06		0.06				
1.45	0.00		0.00				
1.50	0.00		0.00				
1.55	0.00		0.00				
1.60	0.00		0.00				
1.65	0.00		0.00				
1.70	0.00		0.00				
1.75	0.00		0.00				
1.80	0.00		0.00				
1.85	0.00		0.00				
1.90	0.00		0.00				
1.95	0.00		0.00				
2.00	0.00		0.00				
2.05	0.00		0.00				
2.10	0.00		0.00				
2.15	0.00		0.00				
2.20	0.00		0.00				
2.25	0.00		0.00				
2.30	0.00		0.00				
2.35	0.00		0.00				
2.40	0.00		0.00				
2.45	0.00		0.00				
2.50	0.00		0.00				

### Summary for Pond 5P: Outlet #2

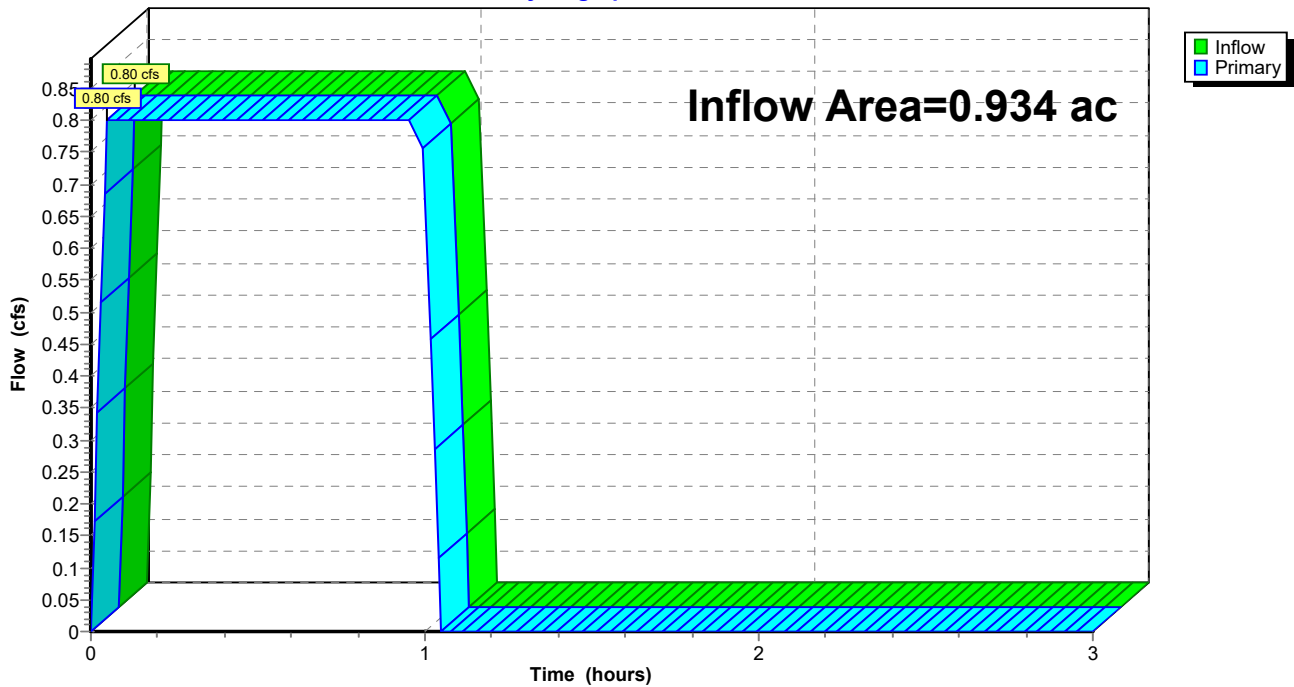
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.934 ac, 7.45% Impervious, Inflow Depth = 0.85" for 25-Year event  
Inflow = 0.80 cfs @ 0.05 hrs, Volume= 0.066 af  
Primary = 0.80 cfs @ 0.05 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

### Pond 5P: Outlet #2

Hydrograph



**22019-EX-HYD**22019- Hydro CAD- Existing Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 13

**Hydrograph for Pond 5P: Outlet #2**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00	2.55	0.00		0.00
0.05	<b>0.80</b>		<b>0.80</b>	2.60	0.00		0.00
0.10	0.80		0.80	2.65	0.00		0.00
0.15	0.80		0.80	2.70	0.00		0.00
0.20	0.80		0.80	2.75	0.00		0.00
0.25	0.80		0.80	2.80	0.00		0.00
0.30	0.80		0.80	2.85	0.00		0.00
0.35	0.80		0.80	2.90	0.00		0.00
0.40	0.80		0.80	2.95	0.00		0.00
0.45	0.80		0.80	3.00	0.00		0.00
0.50	0.80		0.80				
0.55	0.80		0.80				
0.60	0.80		0.80				
0.65	0.80		0.80				
0.70	0.80		0.80				
0.75	0.80		0.80				
0.80	0.80		0.80				
0.85	0.80		0.80				
0.90	0.80		0.80				
0.95	0.80		0.80				
1.00	0.80		0.80				
1.05	0.00		0.00				
1.10	0.00		0.00				
1.15	0.00		0.00				
1.20	0.00		0.00				
1.25	0.00		0.00				
1.30	0.00		0.00				
1.35	0.00		0.00				
1.40	0.00		0.00				
1.45	0.00		0.00				
1.50	0.00		0.00				
1.55	0.00		0.00				
1.60	0.00		0.00				
1.65	0.00		0.00				
1.70	0.00		0.00				
1.75	0.00		0.00				
1.80	0.00		0.00				
1.85	0.00		0.00				
1.90	0.00		0.00				
1.95	0.00		0.00				
2.00	0.00		0.00				
2.05	0.00		0.00				
2.10	0.00		0.00				
2.15	0.00		0.00				
2.20	0.00		0.00				
2.25	0.00		0.00				
2.30	0.00		0.00				
2.35	0.00		0.00				
2.40	0.00		0.00				
2.45	0.00		0.00				
2.50	0.00		0.00				



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points  
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: DA-1** Runoff Area=41,235 sf 3.79% Impervious Runoff Depth=1.06"  
Flow Length=260' Slope=0.0170 '/' Tc=26.1 min C=0.71 Runoff=1.01 cfs 0.083 af

**Subcatchment3S: DA-2** Runoff Area=40,675 sf 7.45% Impervious Runoff Depth=1.07"  
Flow Length=300' Slope=0.0325 '/' Tc=2.8 min C=0.72 Runoff=1.01 cfs 0.083 af

**Pond 2P: Outlet #1** Inflow=1.01 cfs 0.083 af  
Primary=1.01 cfs 0.083 af

**Pond 5P: Outlet #2** Inflow=1.01 cfs 0.083 af  
Primary=1.01 cfs 0.083 af

**Total Runoff Area = 1.880 ac Runoff Volume = 0.167 af Average Runoff Depth = 1.07"**  
**94.39% Pervious = 1.775 ac 5.61% Impervious = 0.105 ac**

**22019-EX-HYD**

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CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

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Page 15

**Summary for Subcatchment 1S: DA-1**

Runoff = 1.01 cfs @ 0.44 hrs, Volume= 0.083 af, Depth= 1.06"

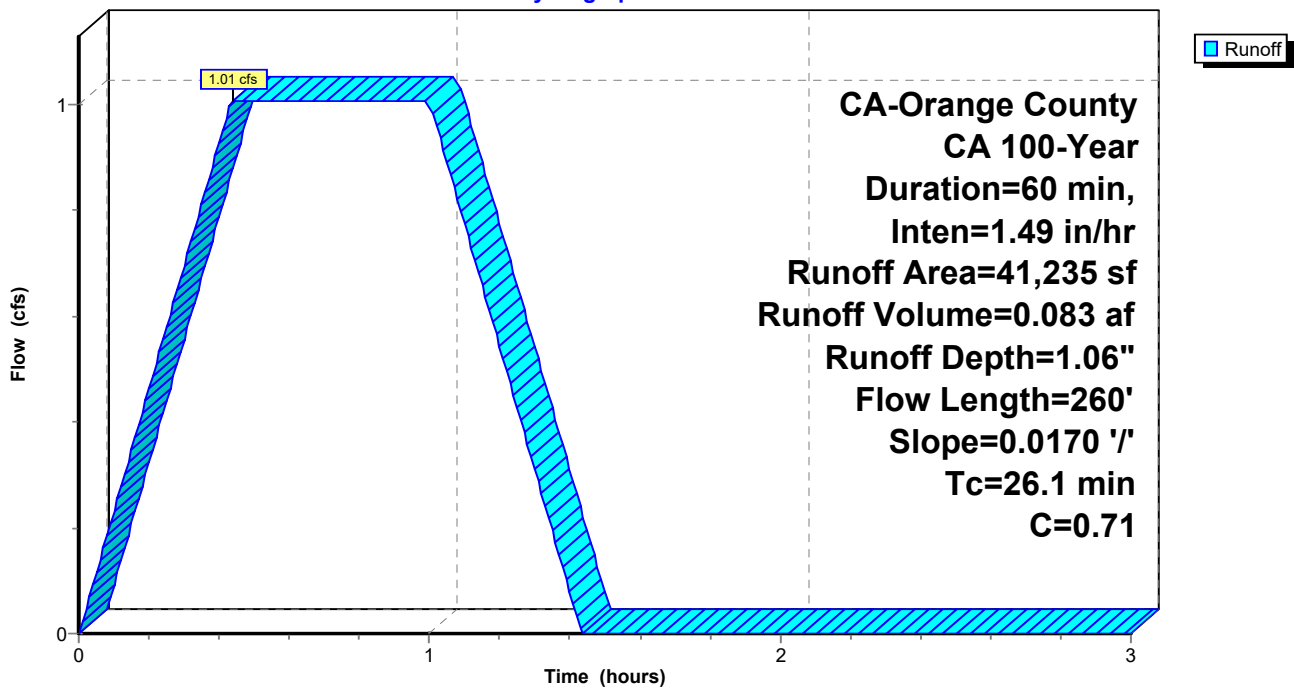
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

Area (sf)	C	Description
1,561	0.95	Paved parking, HSG C
39,674	0.70	Landscape
41,235	0.71	Weighted Average
39,674		96.21% Pervious Area
1,561		3.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	260	0.0170	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 2.37"

**Subcatchment 1S: DA-1**

Hydrograph



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CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

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Page 16

**Hydrograph for Subcatchment 1S: DA-1**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	1.02	0.96	2.04	0.00
0.02	0.05	1.04	0.92	2.06	0.00
0.04	0.09	1.06	0.87	2.08	0.00
0.06	0.14	1.08	0.82	2.10	0.00
0.08	0.19	1.10	0.78	2.12	0.00
0.10	0.23	1.12	0.73	2.14	0.00
0.12	0.28	1.14	0.68	2.16	0.00
0.14	0.32	1.16	0.64	2.18	0.00
0.16	0.37	1.18	0.59	2.20	0.00
0.18	0.42	1.20	0.55	2.22	0.00
0.20	0.46	1.22	0.50	2.24	0.00
0.22	0.51	1.24	0.45	2.26	0.00
0.24	0.56	1.26	0.41	2.28	0.00
0.26	0.60	1.28	0.36	2.30	0.00
0.28	0.65	1.30	0.31	2.32	0.00
0.30	0.70	1.32	0.27	2.34	0.00
0.32	0.74	1.34	0.22	2.36	0.00
0.34	0.79	1.36	0.17	2.38	0.00
0.36	0.84	1.38	0.13	2.40	0.00
0.38	0.88	1.40	0.08	2.42	0.00
0.40	0.93	1.42	0.03	2.44	0.00
0.42	0.97	1.44	0.00	2.46	0.00
0.44	<b>1.01</b>	1.46	0.00	2.48	0.00
0.46	1.01	1.48	0.00	2.50	0.00
0.48	1.01	1.50	0.00	2.52	0.00
0.50	1.01	1.52	0.00	2.54	0.00
0.52	1.01	1.54	0.00	2.56	0.00
0.54	1.01	1.56	0.00	2.58	0.00
0.56	1.01	1.58	0.00	2.60	0.00
0.58	1.01	1.60	0.00	2.62	0.00
0.60	1.01	1.62	0.00	2.64	0.00
0.62	1.01	1.64	0.00	2.66	0.00
0.64	1.01	1.66	0.00	2.68	0.00
0.66	1.01	1.68	0.00	2.70	0.00
0.68	1.01	1.70	0.00	2.72	0.00
0.70	1.01	1.72	0.00	2.74	0.00
0.72	1.01	1.74	0.00	2.76	0.00
0.74	1.01	1.76	0.00	2.78	0.00
0.76	1.01	1.78	0.00	2.80	0.00
0.78	1.01	1.80	0.00	2.82	0.00
0.80	1.01	1.82	0.00	2.84	0.00
0.82	1.01	1.84	0.00	2.86	0.00
0.84	1.01	1.86	0.00	2.88	0.00
0.86	1.01	1.88	0.00	2.90	0.00
0.88	1.01	1.90	0.00	2.92	0.00
0.90	1.01	1.92	0.00	2.94	0.00
0.92	1.01	1.94	0.00	2.96	0.00
0.94	1.01	1.96	0.00	2.98	0.00
0.96	1.01	1.98	0.00	3.00	0.00
0.98	1.01	2.00	0.00		
1.00	1.01	2.02	0.00		

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CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

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Page 17

**Summary for Subcatchment 3S: DA-2**

[70] Warning: Tc<8dt requires smaller dt

Runoff = 1.01 cfs @ 0.05 hrs, Volume= 0.083 af, Depth= 1.07"

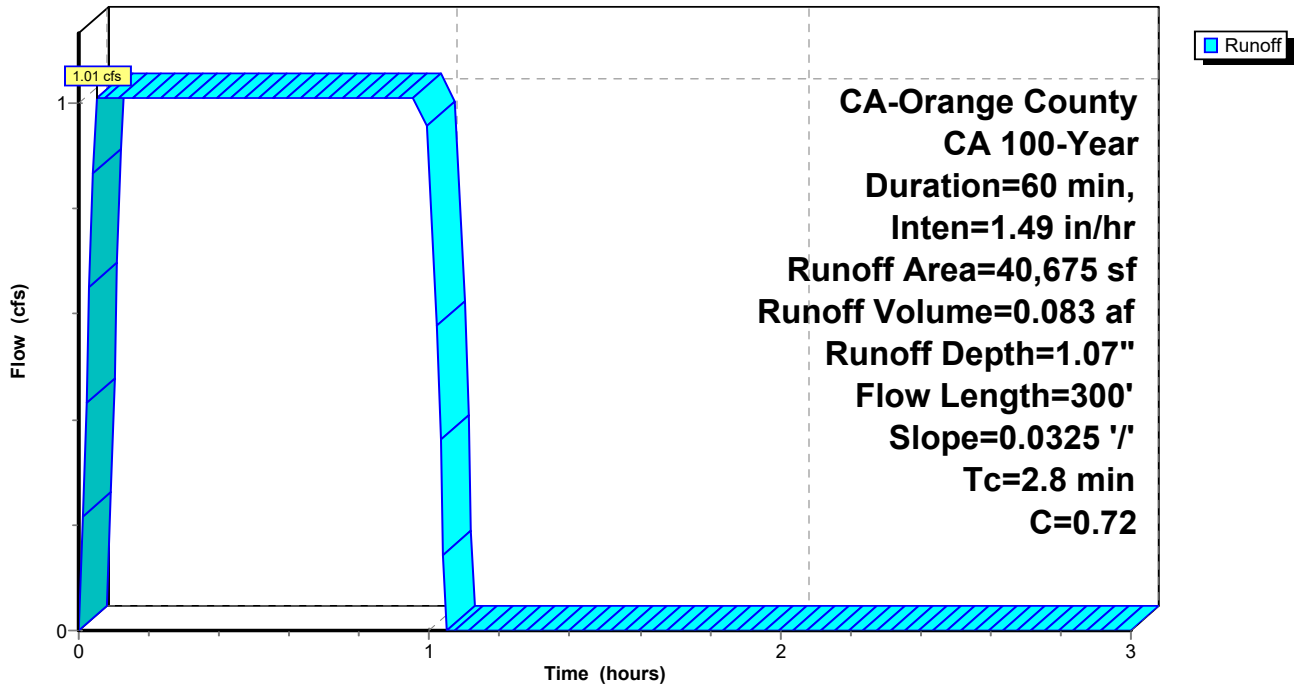
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

Area (sf)	C	Description
3,032	0.95	Unconnected pavement, HSG C
37,643	0.70	Landscape
40,675	0.72	Weighted Average
37,643		92.55% Pervious Area
3,032		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	300	0.0325	1.79		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 2.37"

**Subcatchment 3S: DA-2**

Hydrograph



**22019-EX-HYD**

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CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

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Page 18

**Hydrograph for Subcatchment 3S: DA-2**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	1.02	0.58	2.04	0.00
0.02	0.43	1.04	0.14	2.06	0.00
0.04	<b>0.87</b>	1.06	0.00	2.08	0.00
0.06	<b>1.01</b>	1.08	0.00	2.10	0.00
0.08	1.01	1.10	0.00	2.12	0.00
0.10	1.01	1.12	0.00	2.14	0.00
0.12	1.01	1.14	0.00	2.16	0.00
0.14	1.01	1.16	0.00	2.18	0.00
0.16	1.01	1.18	0.00	2.20	0.00
0.18	1.01	1.20	0.00	2.22	0.00
0.20	1.01	1.22	0.00	2.24	0.00
0.22	1.01	1.24	0.00	2.26	0.00
0.24	1.01	1.26	0.00	2.28	0.00
0.26	1.01	1.28	0.00	2.30	0.00
0.28	1.01	1.30	0.00	2.32	0.00
0.30	1.01	1.32	0.00	2.34	0.00
0.32	1.01	1.34	0.00	2.36	0.00
0.34	1.01	1.36	0.00	2.38	0.00
0.36	1.01	1.38	0.00	2.40	0.00
0.38	1.01	1.40	0.00	2.42	0.00
0.40	1.01	1.42	0.00	2.44	0.00
0.42	1.01	1.44	0.00	2.46	0.00
0.44	1.01	1.46	0.00	2.48	0.00
0.46	1.01	1.48	0.00	2.50	0.00
0.48	1.01	1.50	0.00	2.52	0.00
0.50	1.01	1.52	0.00	2.54	0.00
0.52	1.01	1.54	0.00	2.56	0.00
0.54	1.01	1.56	0.00	2.58	0.00
0.56	1.01	1.58	0.00	2.60	0.00
0.58	1.01	1.60	0.00	2.62	0.00
0.60	1.01	1.62	0.00	2.64	0.00
0.62	1.01	1.64	0.00	2.66	0.00
0.64	1.01	1.66	0.00	2.68	0.00
0.66	1.01	1.68	0.00	2.70	0.00
0.68	1.01	1.70	0.00	2.72	0.00
0.70	1.01	1.72	0.00	2.74	0.00
0.72	1.01	1.74	0.00	2.76	0.00
0.74	1.01	1.76	0.00	2.78	0.00
0.76	1.01	1.78	0.00	2.80	0.00
0.78	1.01	1.80	0.00	2.82	0.00
0.80	1.01	1.82	0.00	2.84	0.00
0.82	1.01	1.84	0.00	2.86	0.00
0.84	1.01	1.86	0.00	2.88	0.00
0.86	1.01	1.88	0.00	2.90	0.00
0.88	1.01	1.90	0.00	2.92	0.00
0.90	1.01	1.92	0.00	2.94	0.00
0.92	1.01	1.94	0.00	2.96	0.00
0.94	1.01	1.96	0.00	2.98	0.00
0.96	1.01	1.98	0.00	3.00	0.00
0.98	1.01	2.00	0.00		
1.00	1.01	2.02	0.00		

### Summary for Pond 2P: Outlet #1

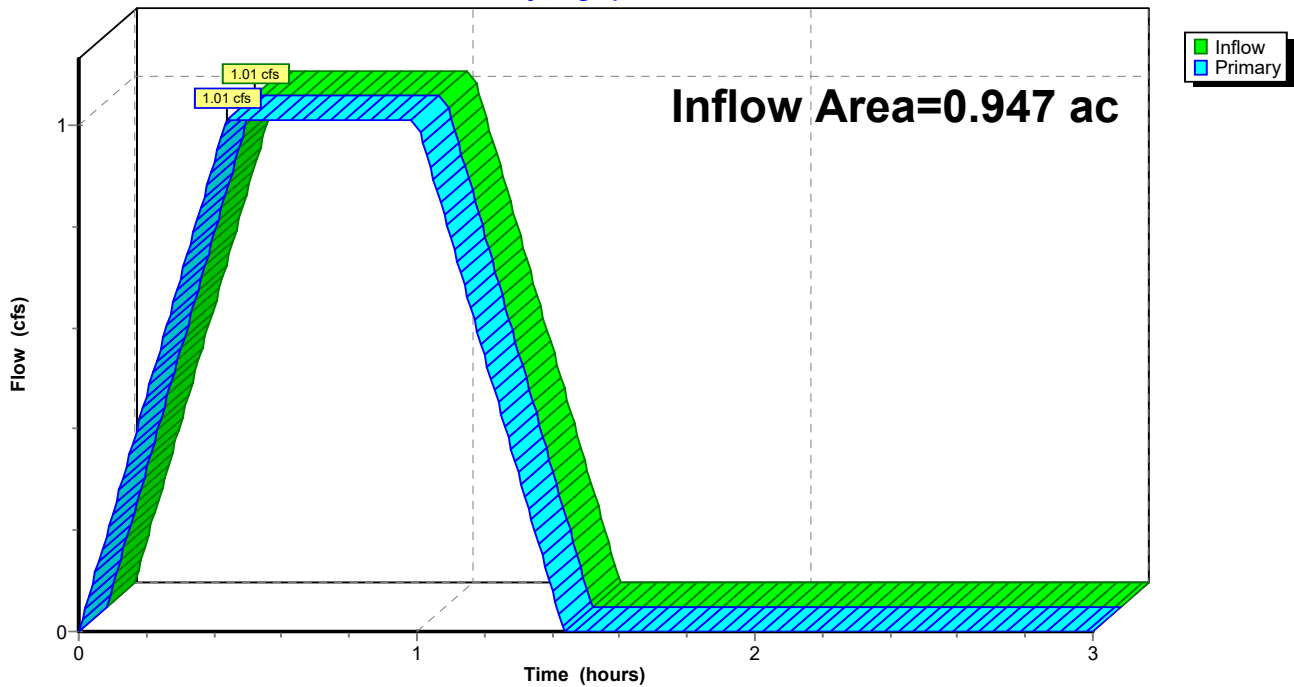
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.947 ac, 3.79% Impervious, Inflow Depth = 1.06" for 100-Year event  
Inflow = 1.01 cfs @ 0.44 hrs, Volume= 0.083 af  
Primary = 1.01 cfs @ 0.44 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

### Pond 2P: Outlet #1

Hydrograph



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CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

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Page 20

**Hydrograph for Pond 2P: Outlet #1**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00	2.55	0.00		0.00
0.05	0.12		0.12	2.60	0.00		0.00
0.10	0.23		0.23	2.65	0.00		0.00
0.15	0.35		0.35	2.70	0.00		0.00
0.20	0.46		0.46	2.75	0.00		0.00
0.25	0.58		0.58	2.80	0.00		0.00
0.30	0.70		0.70	2.85	0.00		0.00
0.35	0.81		0.81	2.90	0.00		0.00
0.40	<b>0.93</b>		<b>0.93</b>	2.95	0.00		0.00
0.45	<b>1.01</b>		<b>1.01</b>	3.00	0.00		0.00
0.50	1.01		1.01				
0.55	1.01		1.01				
0.60	1.01		1.01				
0.65	1.01		1.01				
0.70	1.01		1.01				
0.75	1.01		1.01				
0.80	1.01		1.01				
0.85	1.01		1.01				
0.90	1.01		1.01				
0.95	1.01		1.01				
1.00	1.01		1.01				
1.05	0.89		0.89				
1.10	0.78		0.78				
1.15	0.66		0.66				
1.20	0.55		0.55				
1.25	0.43		0.43				
1.30	0.31		0.31				
1.35	0.20		0.20				
1.40	0.08		0.08				
1.45	0.00		0.00				
1.50	0.00		0.00				
1.55	0.00		0.00				
1.60	0.00		0.00				
1.65	0.00		0.00				
1.70	0.00		0.00				
1.75	0.00		0.00				
1.80	0.00		0.00				
1.85	0.00		0.00				
1.90	0.00		0.00				
1.95	0.00		0.00				
2.00	0.00		0.00				
2.05	0.00		0.00				
2.10	0.00		0.00				
2.15	0.00		0.00				
2.20	0.00		0.00				
2.25	0.00		0.00				
2.30	0.00		0.00				
2.35	0.00		0.00				
2.40	0.00		0.00				
2.45	0.00		0.00				
2.50	0.00		0.00				

### Summary for Pond 5P: Outlet #2

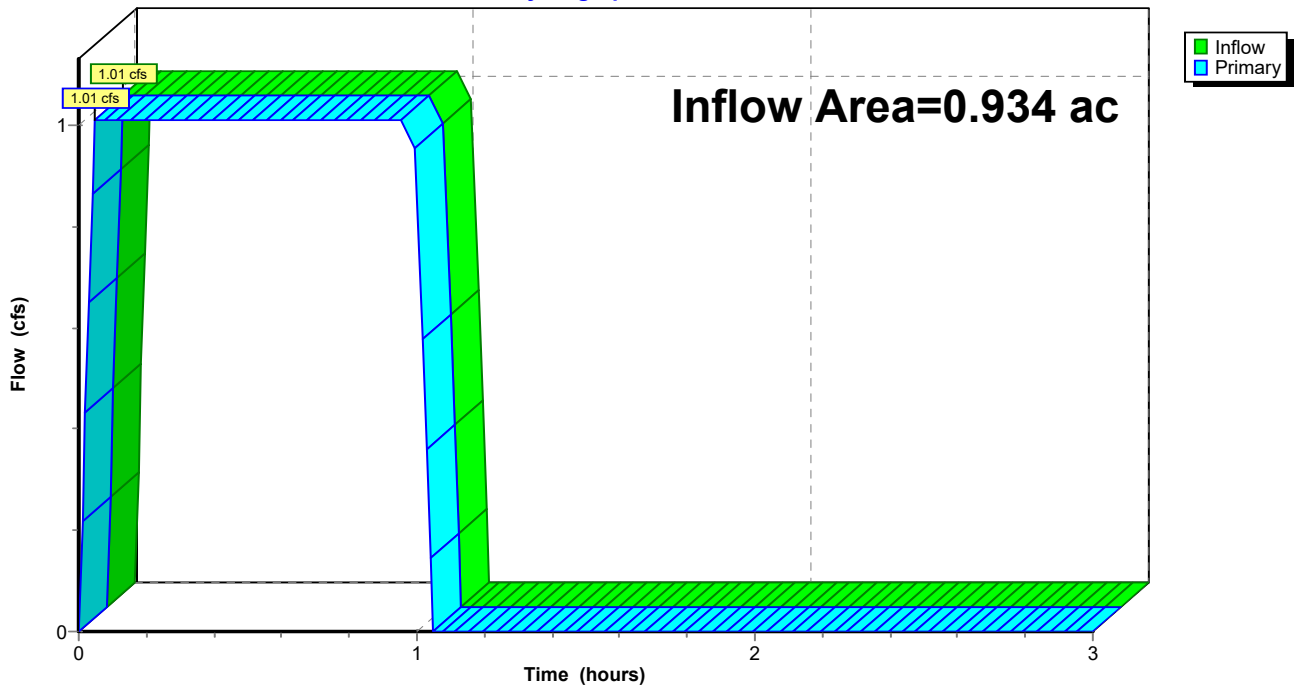
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.934 ac, 7.45% Impervious, Inflow Depth = 1.07" for 100-Year event  
Inflow = 1.01 cfs @ 0.05 hrs, Volume= 0.083 af  
Primary = 1.01 cfs @ 0.05 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

### Pond 5P: Outlet #2

Hydrograph





**22019-EX-HYD**

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22019- Hydro CAD- Existing Drainage Study -25 & 100 YR  
CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

Printed 1/22/2024

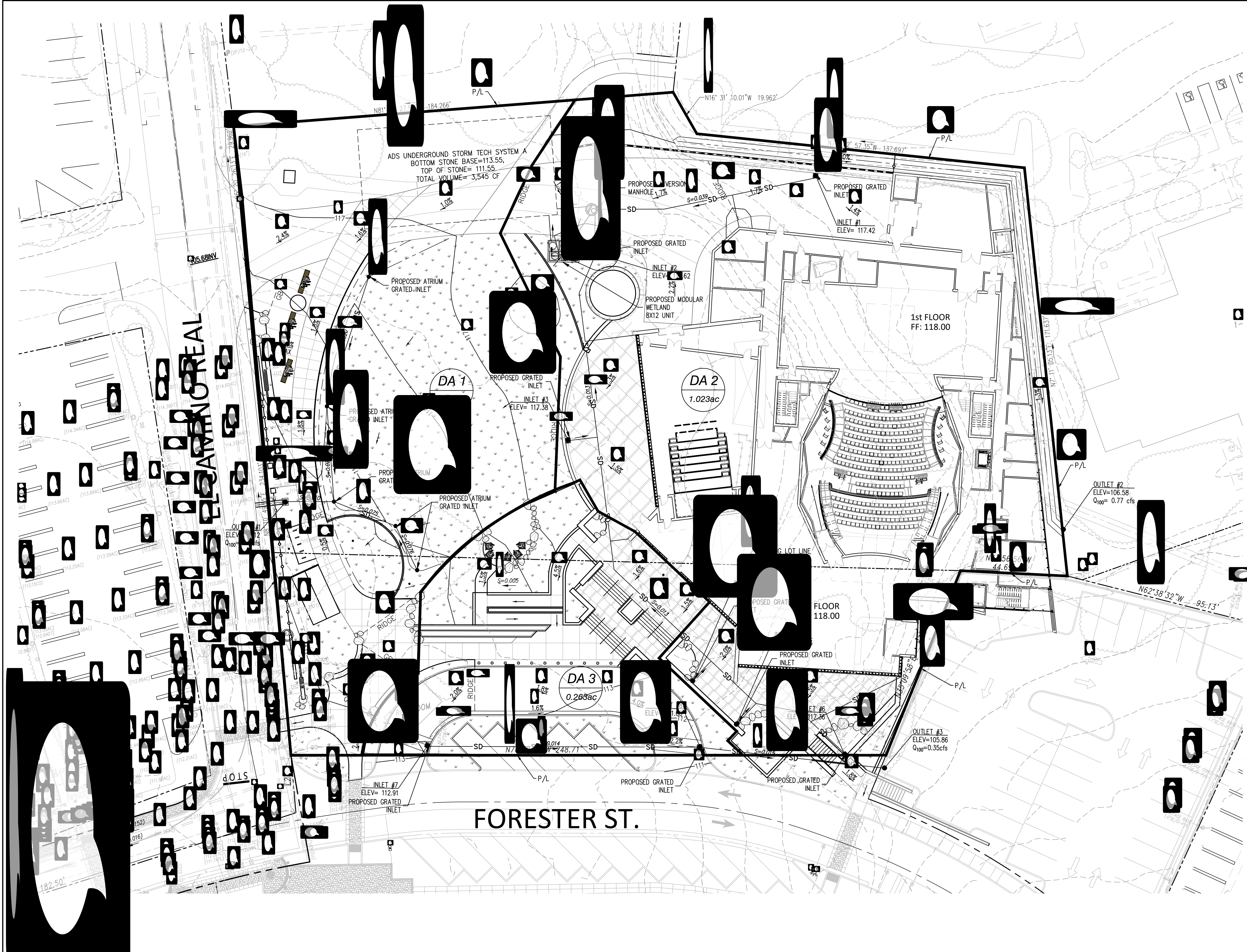
Page 22

**Hydrograph for Pond 5P: Outlet #2**

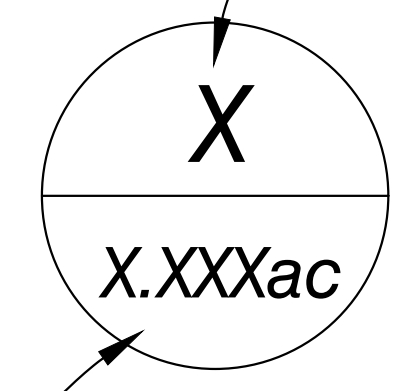
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00	2.55	0.00		0.00
0.05	1.01		1.01	2.60	0.00		0.00
0.10	1.01		1.01	2.65	0.00		0.00
0.15	1.01		1.01	2.70	0.00		0.00
0.20	1.01		1.01	2.75	0.00		0.00
0.25	1.01		1.01	2.80	0.00		0.00
0.30	1.01		1.01	2.85	0.00		0.00
0.35	1.01		1.01	2.90	0.00		0.00
0.40	1.01		1.01	2.95	0.00		0.00
0.45	1.01		1.01	3.00	0.00		0.00
0.50	1.01		1.01				
0.55	1.01		1.01				
0.60	1.01		1.01				
0.65	1.01		1.01				
0.70	1.01		1.01				
0.75	1.01		1.01				
0.80	1.01		1.01				
0.85	1.01		1.01				
0.90	1.01		1.01				
0.95	1.01		1.01				
1.00	1.01		1.01				
1.05	0.00		0.00				
1.10	0.00		0.00				
1.15	0.00		0.00				
1.20	0.00		0.00				
1.25	0.00		0.00				
1.30	0.00		0.00				
1.35	0.00		0.00				
1.40	0.00		0.00				
1.45	0.00		0.00				
1.50	0.00		0.00				
1.55	0.00		0.00				
1.60	0.00		0.00				
1.65	0.00		0.00				
1.70	0.00		0.00				
1.75	0.00		0.00				
1.80	0.00		0.00				
1.85	0.00		0.00				
1.90	0.00		0.00				
1.95	0.00		0.00				
2.00	0.00		0.00				
2.05	0.00		0.00				
2.10	0.00		0.00				
2.15	0.00		0.00				
2.20	0.00		0.00				
2.25	0.00		0.00				
2.30	0.00		0.00				
2.35	0.00		0.00				
2.40	0.00		0.00				
2.45	0.00		0.00				
2.50	0.00		0.00				



## Proposed Development



**SUBAREA DESIGNATION**



**AREA (ac)**

**Tc=TIME OF CONCENTRATION**  
**L=LENGTH OF SUBAREA FLOW PATH**

**S=SLOPE**

**— BASIN LIMITS**

**- - - FLOW PATH**

**→ FLOW DIRECTION**

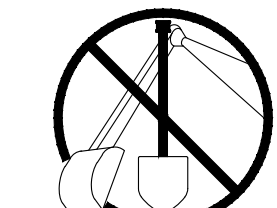
**NOTICE TO CONTRACTOR**

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN IN THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS, AND TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN, AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS, AND IS RESPONSIBLE FOR THE PROTECTION OF AND ANY DAMAGE TO THESE LINES OR STRUCTURES.

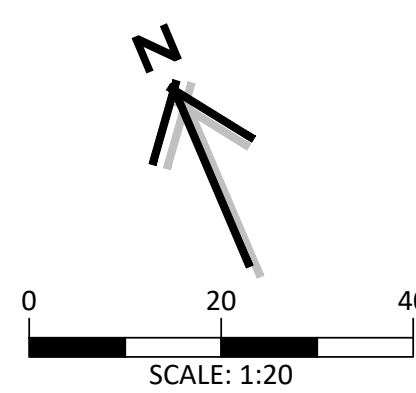
CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY, ITS EMPLOYEES, AND AGENTS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

THE CONTRACTOR SHALL BE RESPONSIBLE TO REPORT DISCREPANCIES IN PLANS AND/OR FIELD CONDITIONS IMMEDIATELY TO THE DESIGN ENGINEER FOR RESOLUTION PRIOR TO CONSTRUCTION, AND SHALL BE RESPONSIBLE FOR DISCREPANCIES NOT SO REPORTED AND RESOLVED.

**DIGALERT**



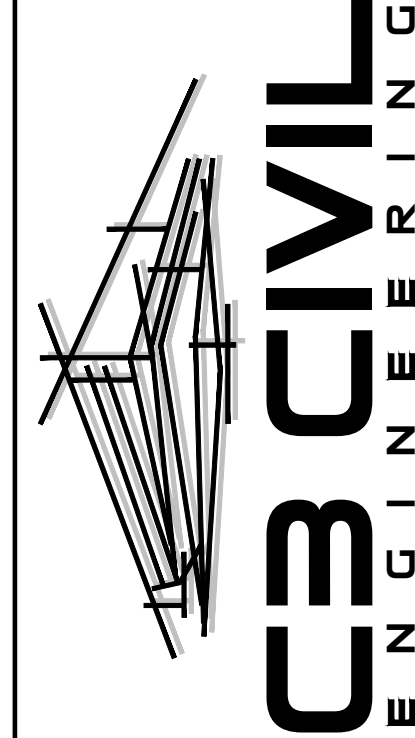
CALL BEFORE YOU DIG  
 1-800-227-2600  
 AT LEAST  
 2 WORKING DAY  
 NOTICE REQUIRED



REVISION RECORD	
#	DESCRIPTION

**PERFORMING ARTS CENTER**  
 31872 EL CAMINO REAL  
 SAN JUAN CAPISTRANO, CA  
 PRELIMINARY PLANS- NOT FOR CONSTRUCTION

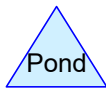
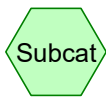
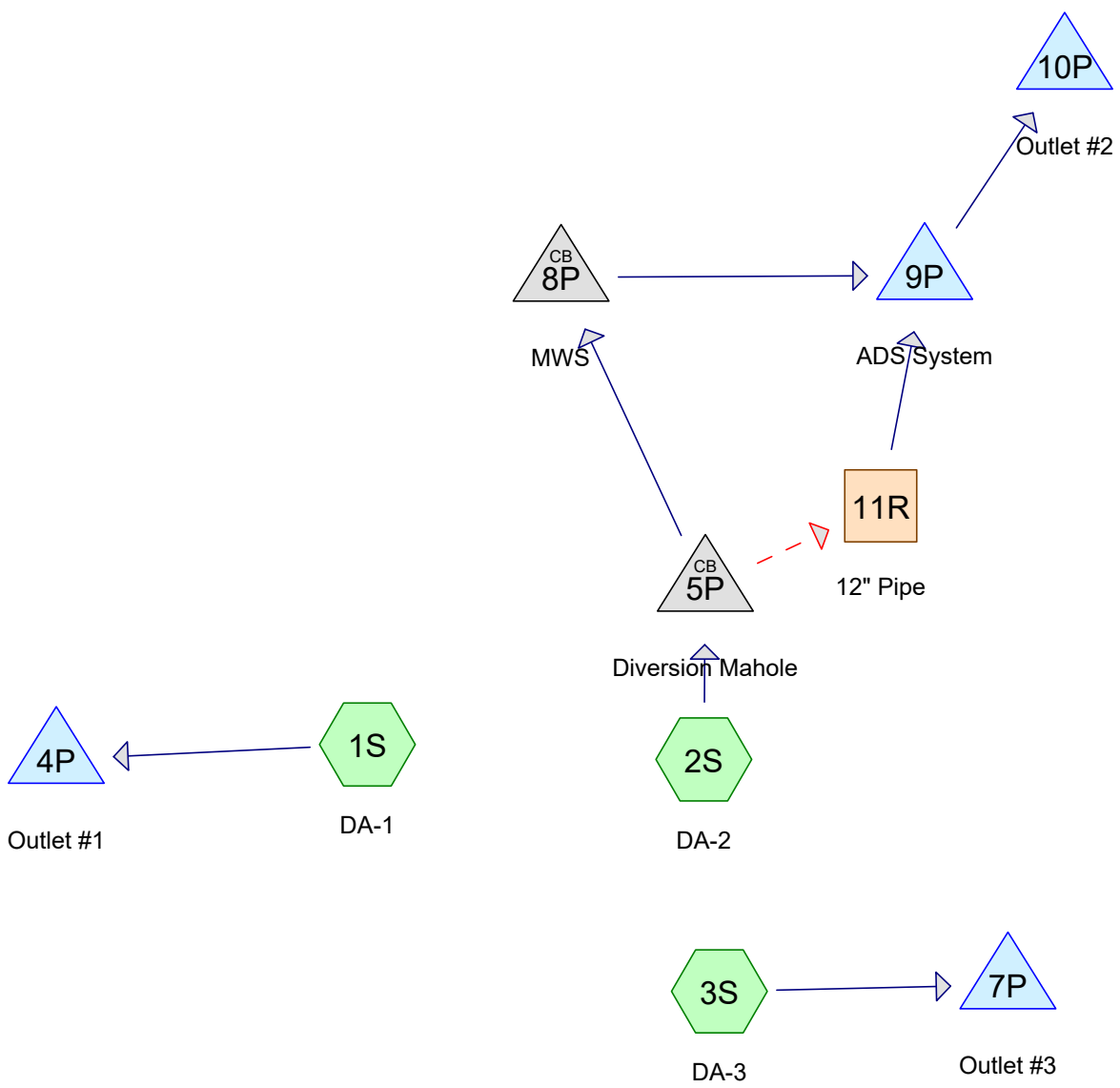
10870 W. FAIRVIEW DR  
 STE 102-187  
 BOISE, ID 83713  
 (208) 918-0928  
 thomas@cbcivileng.com  
 www.cbcivileng.com



DATE: 01/25/2024  
 CS JOB NO: 22-019  
 DRAWN BY: NM  
 CHECKED BY: TH

SHEET TITLE  
**PROPOSED DRAINAGE MAP**

SHEET NUMBER  
**8 of 9**



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Page 2

**Area Listing (all nodes)**

Area (acres)	C	Description (subcatchment-numbers)
1.223	0.95	Impervious Area (1S, 2S, 3S)
0.658	0.70	Pervious Area (1S, 2S, 3S)
<b>1.881</b>	<b>0.86</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
1.881	Other	1S, 2S, 3S
<b>1.881</b>		<b>TOTAL AREA</b>

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Page 4

**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.223	1.223	Impervious Area	1S, 2S, 3S
0.000	0.000	0.000	0.000	0.658	0.658	Pervious Area	1S, 2S, 3S
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>1.881</b>	<b>1.881</b>	<b>TOTAL AREA</b>	

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Page 5

**Pipe Listing (all nodes)**

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	11R	112.20	112.08	12.2	0.0098	0.010	0.0	12.0	0.0
2	5P	112.94	112.87	13.3	0.0053	0.012	0.0	4.0	0.0
3	8P	112.64	112.21	10.7	0.0402	0.010	0.0	4.0	0.0
4	9P	111.55	109.80	52.6	0.0333	0.010	0.0	4.0	0.0



**22019-PR-HYD**22019- Hydro CAD- Proposed Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 6

Time span=0.00-12.00 hrs, dt=0.01 hrs, 1201 points

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc

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

**Subcatchment1S: DA-1** Runoff Area=0.599 ac 30.55% Impervious Runoff Depth=0.92"  
Tc=5.0 min C=0.78 Runoff=0.56 cfs 0.046 af

**Subcatchment2S: DA-2** Runoff Area=1.018 ac 84.28% Impervious Runoff Depth=1.07"  
Tc=5.0 min C=0.91 Runoff=1.10 cfs 0.091 af

**Subcatchment3S: DA-3** Runoff Area=0.264 ac 68.94% Impervious Runoff Depth=1.03"  
Tc=5.0 min C=0.87 Runoff=0.27 cfs 0.023 af

**Reach 11R: 12" Pipe** Avg. Flow Depth=0.28' Max Vel=4.38 fps Inflow=0.79 cfs 0.064 af  
12.0" Round Pipe n=0.010 L=12.2' S=0.0098 '/' Capacity=4.59 cfs Outflow=0.79 cfs 0.064 af

**Pond 4P: Outlet #1** Inflow=0.56 cfs 0.046 af  
Primary=0.56 cfs 0.046 af

**Pond 5P: Diversion Mahole** Peak Elev=113.74' Inflow=1.10 cfs 0.091 af  
Primary=0.31 cfs 0.027 af Secondary=0.79 cfs 0.064 af Outflow=1.10 cfs 0.091 af

**Pond 7P: Outlet #3** Inflow=0.27 cfs 0.023 af  
Primary=0.27 cfs 0.023 af

**Pond 8P: MWS** Peak Elev=113.15' Inflow=0.31 cfs 0.027 af  
4.0" Round Culvert n=0.010 L=10.7' S=0.0402 '/' Outflow=0.31 cfs 0.027 af

**Pond 9P: ADS System** Peak Elev=112.85' Storage=0.059 af Inflow=1.10 cfs 0.091 af  
4.0" Round Culvert n=0.010 L=52.6' S=0.0333 '/' Outflow=0.50 cfs 0.091 af

**Pond 10P: Outlet #2** Inflow=0.50 cfs 0.091 af  
Primary=0.50 cfs 0.091 af

**Total Runoff Area = 1.881 ac Runoff Volume = 0.160 af Average Runoff Depth = 1.02"**  
**34.98% Pervious = 0.658 ac 65.02% Impervious = 1.223 ac**

**Summary for Subcatchment 1S: DA-1**

Runoff = 0.56 cfs @ 0.09 hrs, Volume= 0.046 af, Depth= 0.92"

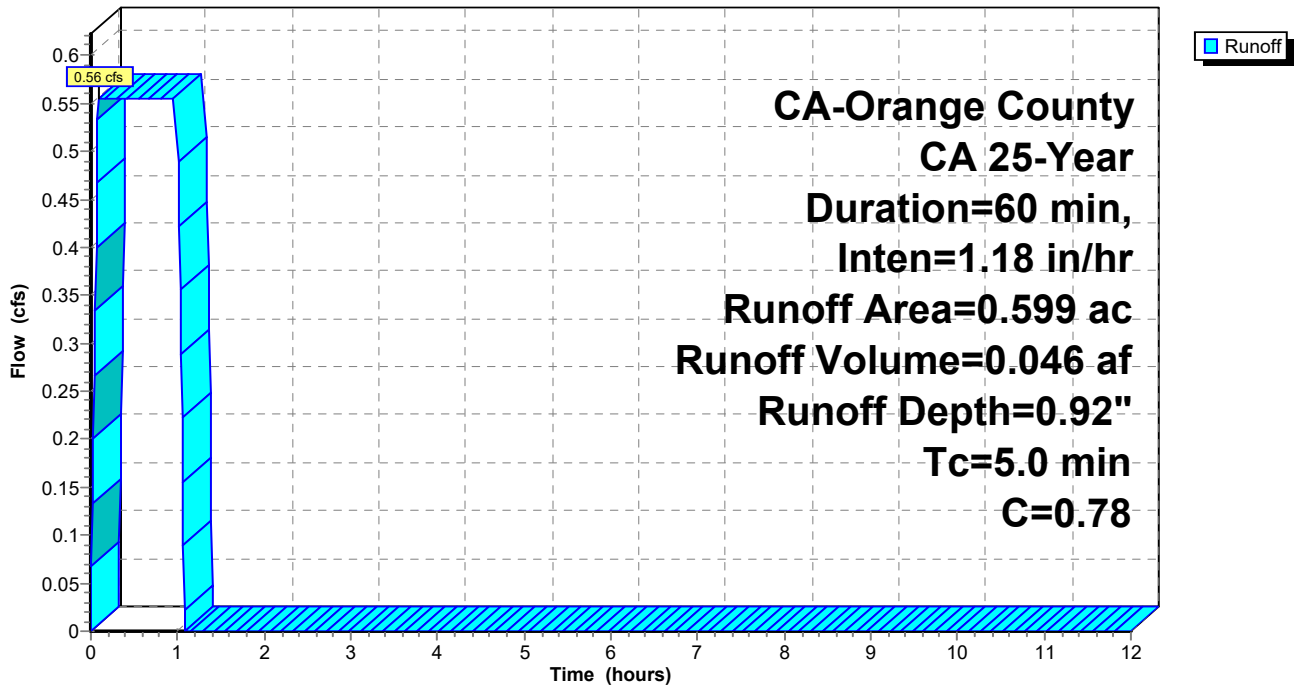
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

Area (ac)	C	Description
0.183	0.95	Impervious Area
0.416	0.70	Pervious Area
0.599	0.78	Weighted Average
0.416		69.45% Pervious Area
0.183		30.55% Impervious Area

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

**Subcatchment 1S: DA-1**

Hydrograph



**22019-PR-HYD**22019- Hydro CAD- Proposed Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 8

**Hydrograph for Subcatchment 1S: DA-1**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	<b>0.00</b>	5.10	0.00	10.20	0.00
0.10	<b>0.56</b>	5.20	0.00	10.30	0.00
0.20	0.56	5.30	0.00	10.40	0.00
0.30	0.56	5.40	0.00	10.50	0.00
0.40	0.56	5.50	0.00	10.60	0.00
0.50	0.56	5.60	0.00	10.70	0.00
0.60	0.56	5.70	0.00	10.80	0.00
0.70	0.56	5.80	0.00	10.90	0.00
0.80	0.56	5.90	0.00	11.00	0.00
0.90	0.56	6.00	0.00	11.10	0.00
1.00	0.56	6.10	0.00	11.20	0.00
1.10	0.00	6.20	0.00	11.30	0.00
1.20	0.00	6.30	0.00	11.40	0.00
1.30	0.00	6.40	0.00	11.50	0.00
1.40	0.00	6.50	0.00	11.60	0.00
1.50	0.00	6.60	0.00	11.70	0.00
1.60	0.00	6.70	0.00	11.80	0.00
1.70	0.00	6.80	0.00	11.90	0.00
1.80	0.00	6.90	0.00	12.00	0.00
1.90	0.00	7.00	0.00		
2.00	0.00	7.10	0.00		
2.10	0.00	7.20	0.00		
2.20	0.00	7.30	0.00		
2.30	0.00	7.40	0.00		
2.40	0.00	7.50	0.00		
2.50	0.00	7.60	0.00		
2.60	0.00	7.70	0.00		
2.70	0.00	7.80	0.00		
2.80	0.00	7.90	0.00		
2.90	0.00	8.00	0.00		
3.00	0.00	8.10	0.00		
3.10	0.00	8.20	0.00		
3.20	0.00	8.30	0.00		
3.30	0.00	8.40	0.00		
3.40	0.00	8.50	0.00		
3.50	0.00	8.60	0.00		
3.60	0.00	8.70	0.00		
3.70	0.00	8.80	0.00		
3.80	0.00	8.90	0.00		
3.90	0.00	9.00	0.00		
4.00	0.00	9.10	0.00		
4.10	0.00	9.20	0.00		
4.20	0.00	9.30	0.00		
4.30	0.00	9.40	0.00		
4.40	0.00	9.50	0.00		
4.50	0.00	9.60	0.00		
4.60	0.00	9.70	0.00		
4.70	0.00	9.80	0.00		
4.80	0.00	9.90	0.00		
4.90	0.00	10.00	0.00		
5.00	0.00	10.10	0.00		

**Summary for Subcatchment 2S: DA-2**

Runoff = 1.10 cfs @ 0.09 hrs, Volume= 0.091 af, Depth= 1.07"

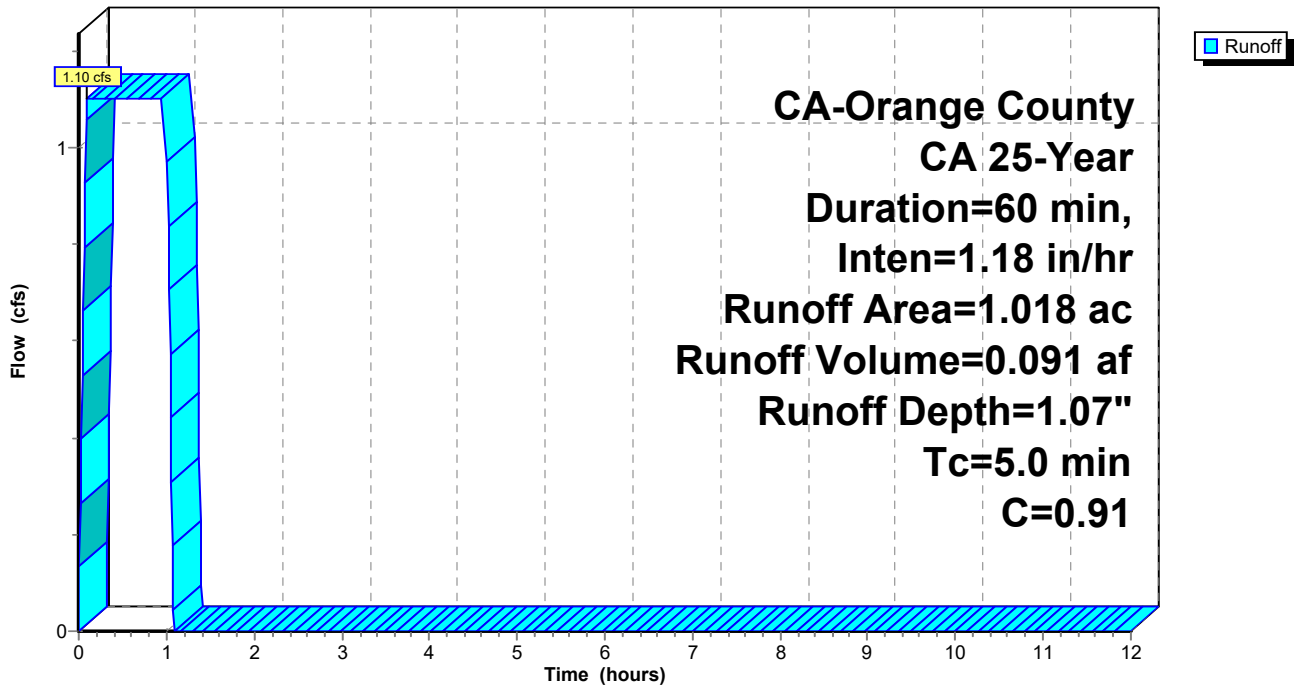
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

Area (ac)	C	Description
0.858	0.95	Impervious Area
0.160	0.70	Pervious Area
1.018	0.91	Weighted Average
0.160		15.72% Pervious Area
0.858		84.28% Impervious Area

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

**Subcatchment 2S: DA-2**

Hydrograph



**22019-PR-HYD**

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CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 10

**Hydrograph for Subcatchment 2S: DA-2**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	5.10	0.00	10.20	0.00
0.10	1.10	5.20	0.00	10.30	0.00
0.20	1.10	5.30	0.00	10.40	0.00
0.30	1.10	5.40	0.00	10.50	0.00
0.40	1.10	5.50	0.00	10.60	0.00
0.50	1.10	5.60	0.00	10.70	0.00
0.60	1.10	5.70	0.00	10.80	0.00
0.70	1.10	5.80	0.00	10.90	0.00
0.80	1.10	5.90	0.00	11.00	0.00
0.90	1.10	6.00	0.00	11.10	0.00
1.00	1.10	6.10	0.00	11.20	0.00
1.10	0.00	6.20	0.00	11.30	0.00
1.20	0.00	6.30	0.00	11.40	0.00
1.30	0.00	6.40	0.00	11.50	0.00
1.40	0.00	6.50	0.00	11.60	0.00
1.50	0.00	6.60	0.00	11.70	0.00
1.60	0.00	6.70	0.00	11.80	0.00
1.70	0.00	6.80	0.00	11.90	0.00
1.80	0.00	6.90	0.00	12.00	0.00
1.90	0.00	7.00	0.00		
2.00	0.00	7.10	0.00		
2.10	0.00	7.20	0.00		
2.20	0.00	7.30	0.00		
2.30	0.00	7.40	0.00		
2.40	0.00	7.50	0.00		
2.50	0.00	7.60	0.00		
2.60	0.00	7.70	0.00		
2.70	0.00	7.80	0.00		
2.80	0.00	7.90	0.00		
2.90	0.00	8.00	0.00		
3.00	0.00	8.10	0.00		
3.10	0.00	8.20	0.00		
3.20	0.00	8.30	0.00		
3.30	0.00	8.40	0.00		
3.40	0.00	8.50	0.00		
3.50	0.00	8.60	0.00		
3.60	0.00	8.70	0.00		
3.70	0.00	8.80	0.00		
3.80	0.00	8.90	0.00		
3.90	0.00	9.00	0.00		
4.00	0.00	9.10	0.00		
4.10	0.00	9.20	0.00		
4.20	0.00	9.30	0.00		
4.30	0.00	9.40	0.00		
4.40	0.00	9.50	0.00		
4.50	0.00	9.60	0.00		
4.60	0.00	9.70	0.00		
4.70	0.00	9.80	0.00		
4.80	0.00	9.90	0.00		
4.90	0.00	10.00	0.00		
5.00	0.00	10.10	0.00		

**Summary for Subcatchment 3S: DA-3**

Runoff = 0.27 cfs @ 0.09 hrs, Volume= 0.023 af, Depth= 1.03"

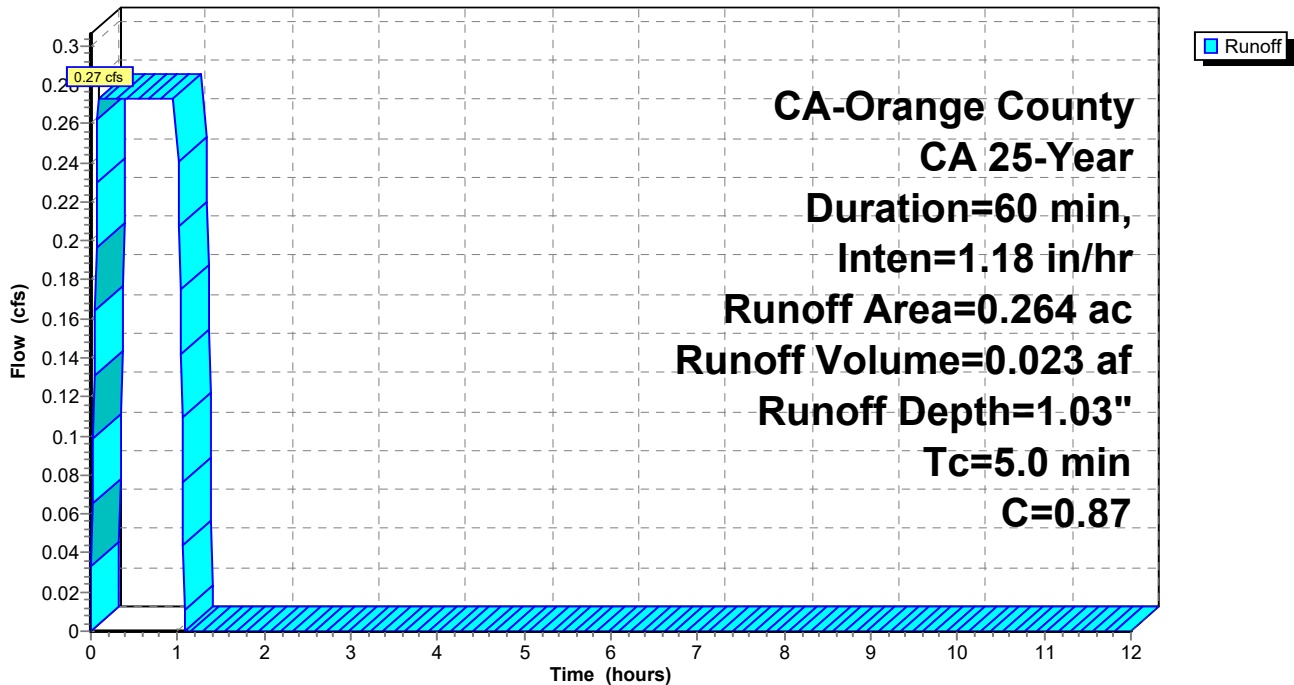
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

Area (ac)	C	Description
0.182	0.95	Impervious Area
0.082	0.70	Pervious Area
0.264	0.87	Weighted Average
0.082		31.06% Pervious Area
0.182		68.94% Impervious Area

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

**Subcatchment 3S: DA-3**

Hydrograph



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Page 12

**Hydrograph for Subcatchment 3S: DA-3**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	5.10	0.00	10.20	0.00
0.10	0.27	5.20	0.00	10.30	0.00
0.20	0.27	5.30	0.00	10.40	0.00
0.30	0.27	5.40	0.00	10.50	0.00
0.40	0.27	5.50	0.00	10.60	0.00
0.50	0.27	5.60	0.00	10.70	0.00
0.60	0.27	5.70	0.00	10.80	0.00
0.70	0.27	5.80	0.00	10.90	0.00
0.80	0.27	5.90	0.00	11.00	0.00
0.90	0.27	6.00	0.00	11.10	0.00
1.00	0.27	6.10	0.00	11.20	0.00
1.10	0.00	6.20	0.00	11.30	0.00
1.20	0.00	6.30	0.00	11.40	0.00
1.30	0.00	6.40	0.00	11.50	0.00
1.40	0.00	6.50	0.00	11.60	0.00
1.50	0.00	6.60	0.00	11.70	0.00
1.60	0.00	6.70	0.00	11.80	0.00
1.70	0.00	6.80	0.00	11.90	0.00
1.80	0.00	6.90	0.00	12.00	0.00
1.90	0.00	7.00	0.00		
2.00	0.00	7.10	0.00		
2.10	0.00	7.20	0.00		
2.20	0.00	7.30	0.00		
2.30	0.00	7.40	0.00		
2.40	0.00	7.50	0.00		
2.50	0.00	7.60	0.00		
2.60	0.00	7.70	0.00		
2.70	0.00	7.80	0.00		
2.80	0.00	7.90	0.00		
2.90	0.00	8.00	0.00		
3.00	0.00	8.10	0.00		
3.10	0.00	8.20	0.00		
3.20	0.00	8.30	0.00		
3.30	0.00	8.40	0.00		
3.40	0.00	8.50	0.00		
3.50	0.00	8.60	0.00		
3.60	0.00	8.70	0.00		
3.70	0.00	8.80	0.00		
3.80	0.00	8.90	0.00		
3.90	0.00	9.00	0.00		
4.00	0.00	9.10	0.00		
4.10	0.00	9.20	0.00		
4.20	0.00	9.30	0.00		
4.30	0.00	9.40	0.00		
4.40	0.00	9.50	0.00		
4.50	0.00	9.60	0.00		
4.60	0.00	9.70	0.00		
4.70	0.00	9.80	0.00		
4.80	0.00	9.90	0.00		
4.90	0.00	10.00	0.00		
5.00	0.00	10.10	0.00		

### Summary for Reach 11R: 12" Pipe

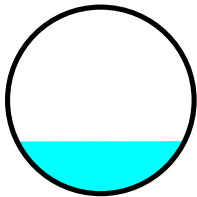
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow	=	0.79 cfs @	0.09 hrs,	Volume=	0.064 af
Outflow	=	0.79 cfs @	0.10 hrs,	Volume=	0.064 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 4.38 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 4.21 fps, Avg. Travel Time= 0.0 min

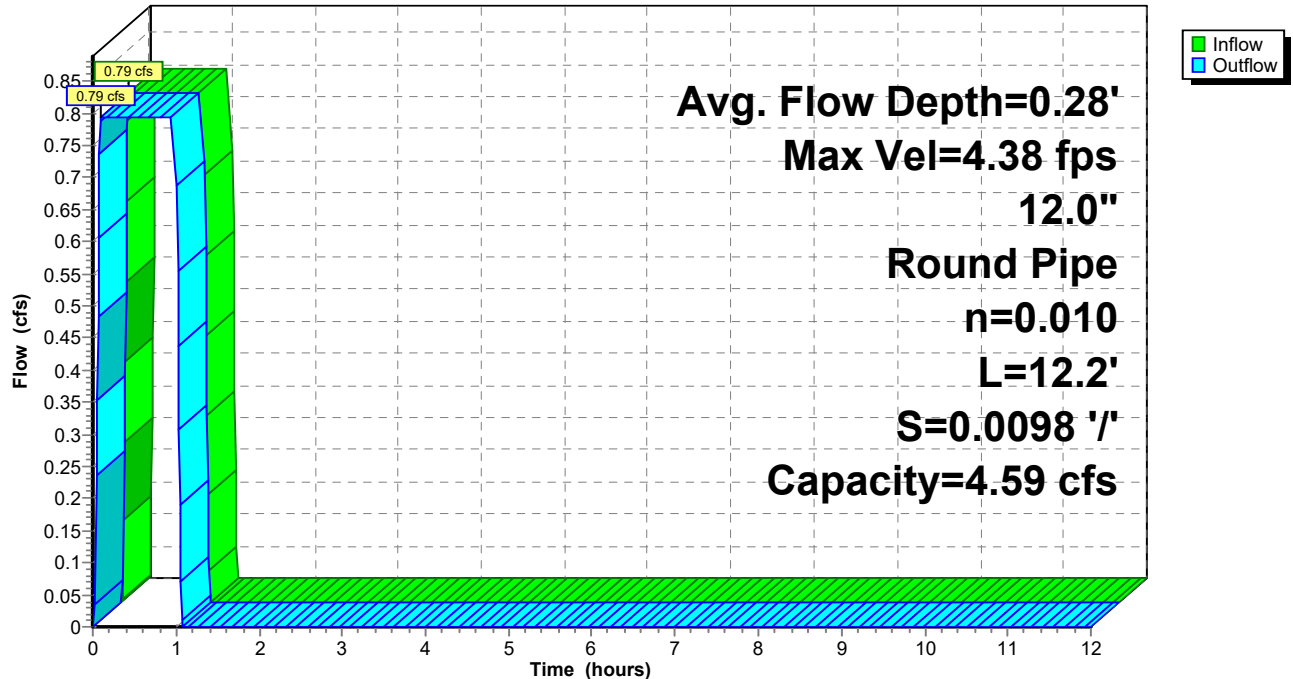
Peak Storage= 2 cf @ 0.10 hrs  
 Average Depth at Peak Storage= 0.28' , Surface Width= 0.90'  
 Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.59 cfs

12.0" Round Pipe  
 n= 0.010 PVC, smooth interior  
 Length= 12.2' Slope= 0.0098 '/'  
 Inlet Invert= 112.20', Outlet Invert= 112.08'



### Reach 11R: 12" Pipe

Hydrograph





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Page 14

**Hydrograph for Reach 11R: 12" Pipe**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	<b>0.00</b>	<b>0</b>	<b>112.20</b>	<b>0.00</b>
0.50	<b>0.79</b>	<b>2</b>	<b>112.48</b>	<b>0.79</b>
1.00	0.79	2	112.48	0.79
1.50	0.00	0	112.20	0.00
2.00	0.00	0	112.20	0.00
2.50	0.00	0	112.20	0.00
3.00	0.00	0	112.20	0.00
3.50	0.00	0	112.20	0.00
4.00	0.00	0	112.20	0.00
4.50	0.00	0	112.20	0.00
5.00	0.00	0	112.20	0.00
5.50	0.00	0	112.20	0.00
6.00	0.00	0	112.20	0.00
6.50	0.00	0	112.20	0.00
7.00	0.00	0	112.20	0.00
7.50	0.00	0	112.20	0.00
8.00	0.00	0	112.20	0.00
8.50	0.00	0	112.20	0.00
9.00	0.00	0	112.20	0.00
9.50	0.00	0	112.20	0.00
10.00	0.00	0	112.20	0.00
10.50	0.00	0	112.20	0.00
11.00	0.00	0	112.20	0.00
11.50	0.00	0	112.20	0.00
12.00	0.00	0	112.20	0.00

### Summary for Pond 4P: Outlet #1

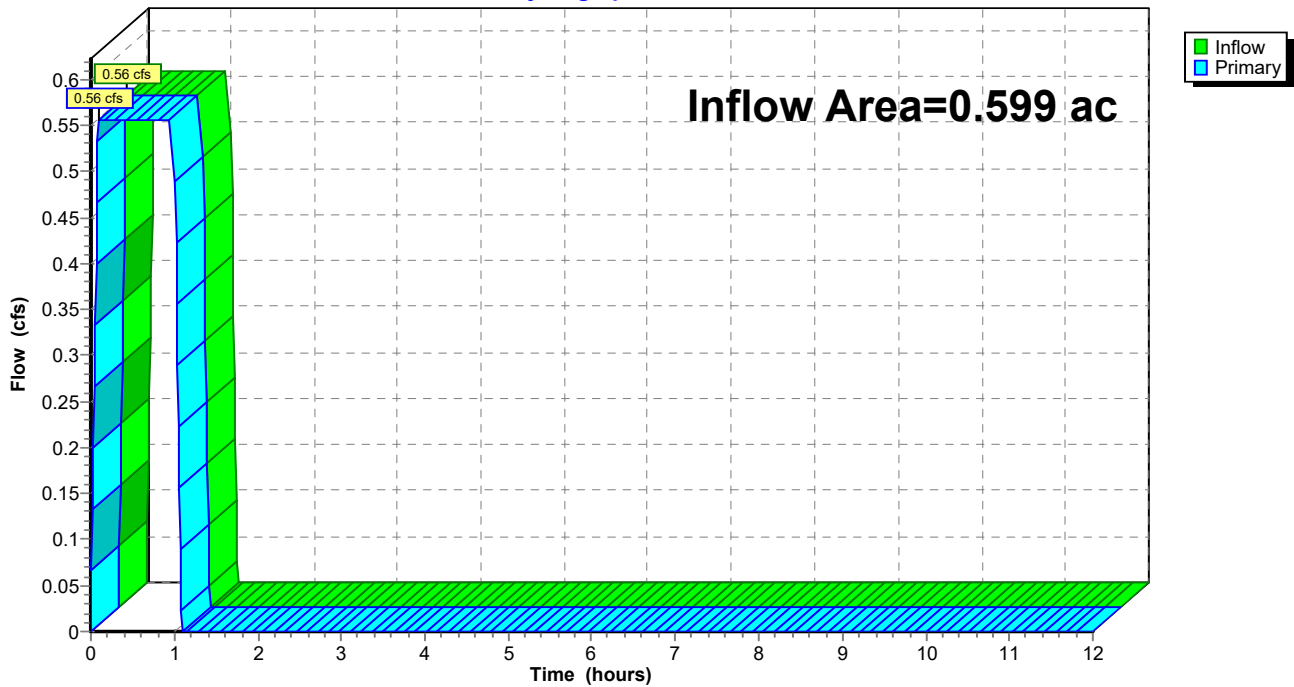
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.599 ac, 30.55% Impervious, Inflow Depth = 0.92" for 25-Year event  
Inflow = 0.56 cfs @ 0.09 hrs, Volume= 0.046 af  
Primary = 0.56 cfs @ 0.09 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs

### Pond 4P: Outlet #1

Hydrograph



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Page 16

**Hydrograph for Pond 4P: Outlet #1**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	<b>0.00</b>		<b>0.00</b>	10.20	0.00		0.00
0.20	<b>0.56</b>		<b>0.56</b>	10.40	0.00		0.00
0.40	0.56		0.56	10.60	0.00		0.00
0.60	0.56		0.56	10.80	0.00		0.00
0.80	0.56		0.56	11.00	0.00		0.00
1.00	0.56		0.56	11.20	0.00		0.00
1.20	0.00		0.00	11.40	0.00		0.00
1.40	0.00		0.00	11.60	0.00		0.00
1.60	0.00		0.00	11.80	0.00		0.00
1.80	0.00		0.00	12.00	0.00		0.00
2.00	0.00		0.00				
2.20	0.00		0.00				
2.40	0.00		0.00				
2.60	0.00		0.00				
2.80	0.00		0.00				
3.00	0.00		0.00				
3.20	0.00		0.00				
3.40	0.00		0.00				
3.60	0.00		0.00				
3.80	0.00		0.00				
4.00	0.00		0.00				
4.20	0.00		0.00				
4.40	0.00		0.00				
4.60	0.00		0.00				
4.80	0.00		0.00				
5.00	0.00		0.00				
5.20	0.00		0.00				
5.40	0.00		0.00				
5.60	0.00		0.00				
5.80	0.00		0.00				
6.00	0.00		0.00				
6.20	0.00		0.00				
6.40	0.00		0.00				
6.60	0.00		0.00				
6.80	0.00		0.00				
7.00	0.00		0.00				
7.20	0.00		0.00				
7.40	0.00		0.00				
7.60	0.00		0.00				
7.80	0.00		0.00				
8.00	0.00		0.00				
8.20	0.00		0.00				
8.40	0.00		0.00				
8.60	0.00		0.00				
8.80	0.00		0.00				
9.00	0.00		0.00				
9.20	0.00		0.00				
9.40	0.00		0.00				
9.60	0.00		0.00				
9.80	0.00		0.00				
10.00	0.00		0.00				

### Summary for Pond 5P: Diversion Mahole

[57] Hint: Peaked at 113.74' (Flood elevation advised)

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth = 1.07" for 25-Year event  
 Inflow = 1.10 cfs @ 0.09 hrs, Volume= 0.091 af  
 Outflow = 1.10 cfs @ 0.09 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.31 cfs @ 0.09 hrs, Volume= 0.027 af  
 Secondary = 0.79 cfs @ 0.09 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 Peak Elev= 113.74' @ 0.09 hrs

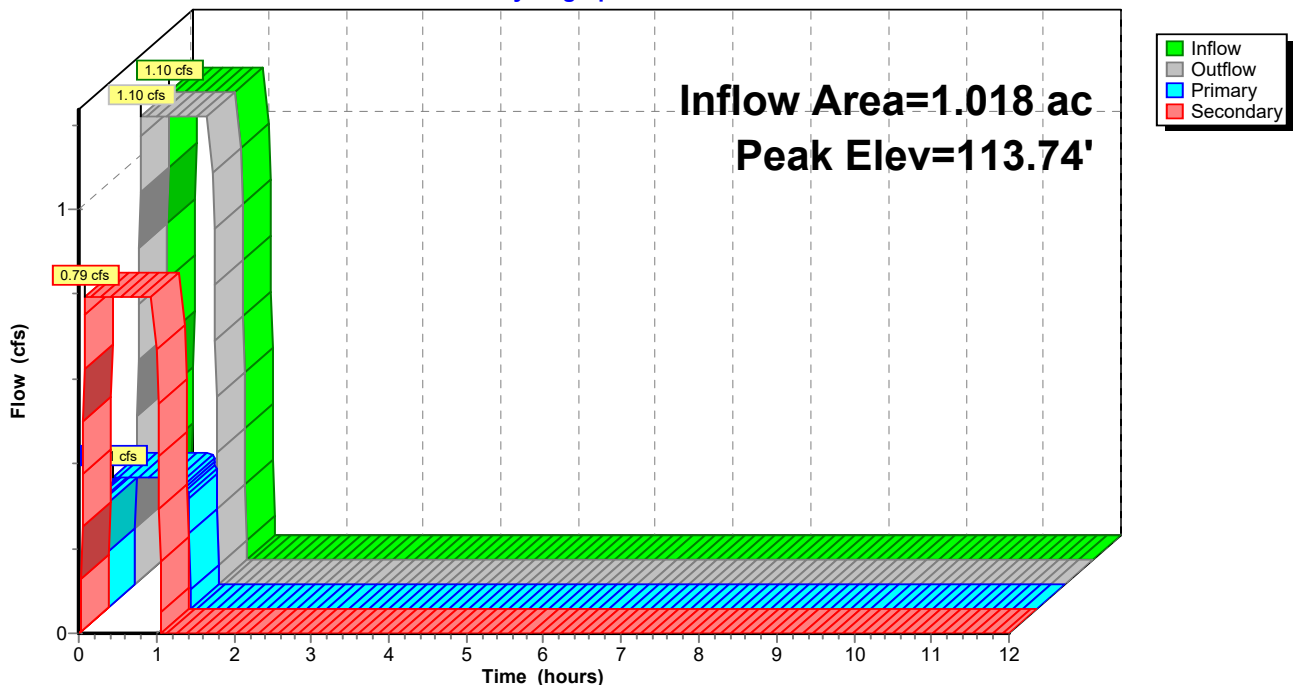
Device	Routing	Invert	Outlet Devices
#1	Primary	112.94'	<b>4.0" Round Diversion Manhole</b> L= 13.3' Ke= 0.200 Inlet / Outlet Invert= 112.94' / 112.87' S= 0.0053 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.09 sf
#2	Secondary	113.55'	<b>3.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 1.5' Crest Height

**Primary OutFlow** Max=0.31 cfs @ 0.09 hrs HW=113.74' (Free Discharge)  
 ↳1=Diversion Manhole (Barrel Controls 0.31 cfs @ 3.54 fps)

**Secondary OutFlow** Max=0.79 cfs @ 0.09 hrs HW=113.74' (Free Discharge)  
 ↳2=Sharp-Crested Rectangular Weir (Weir Controls 0.79 cfs @ 1.43 fps)

### Pond 5P: Diversion Mahole

Hydrograph



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Page 18

**Hydrograph for Pond 5P: Diversion Mahole**

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	<b>0.00</b>	<b>112.94</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
0.50	<b>1.10</b>	<b>113.74</b>	<b>1.10</b>	<b>0.31</b>	<b>0.79</b>
1.00	1.10	113.74	1.10	0.31	0.79
1.50	0.00	112.94	0.00	0.00	0.00
2.00	0.00	112.94	0.00	0.00	0.00
2.50	0.00	112.94	0.00	0.00	0.00
3.00	0.00	112.94	0.00	0.00	0.00
3.50	0.00	112.94	0.00	0.00	0.00
4.00	0.00	112.94	0.00	0.00	0.00
4.50	0.00	112.94	0.00	0.00	0.00
5.00	0.00	112.94	0.00	0.00	0.00
5.50	0.00	112.94	0.00	0.00	0.00
6.00	0.00	112.94	0.00	0.00	0.00
6.50	0.00	112.94	0.00	0.00	0.00
7.00	0.00	112.94	0.00	0.00	0.00
7.50	0.00	112.94	0.00	0.00	0.00
8.00	0.00	112.94	0.00	0.00	0.00
8.50	0.00	112.94	0.00	0.00	0.00
9.00	0.00	112.94	0.00	0.00	0.00
9.50	0.00	112.94	0.00	0.00	0.00
10.00	0.00	112.94	0.00	0.00	0.00
10.50	0.00	112.94	0.00	0.00	0.00
11.00	0.00	112.94	0.00	0.00	0.00
11.50	0.00	112.94	0.00	0.00	0.00
12.00	0.00	112.94	0.00	0.00	0.00

### Summary for Pond 7P: Outlet #3

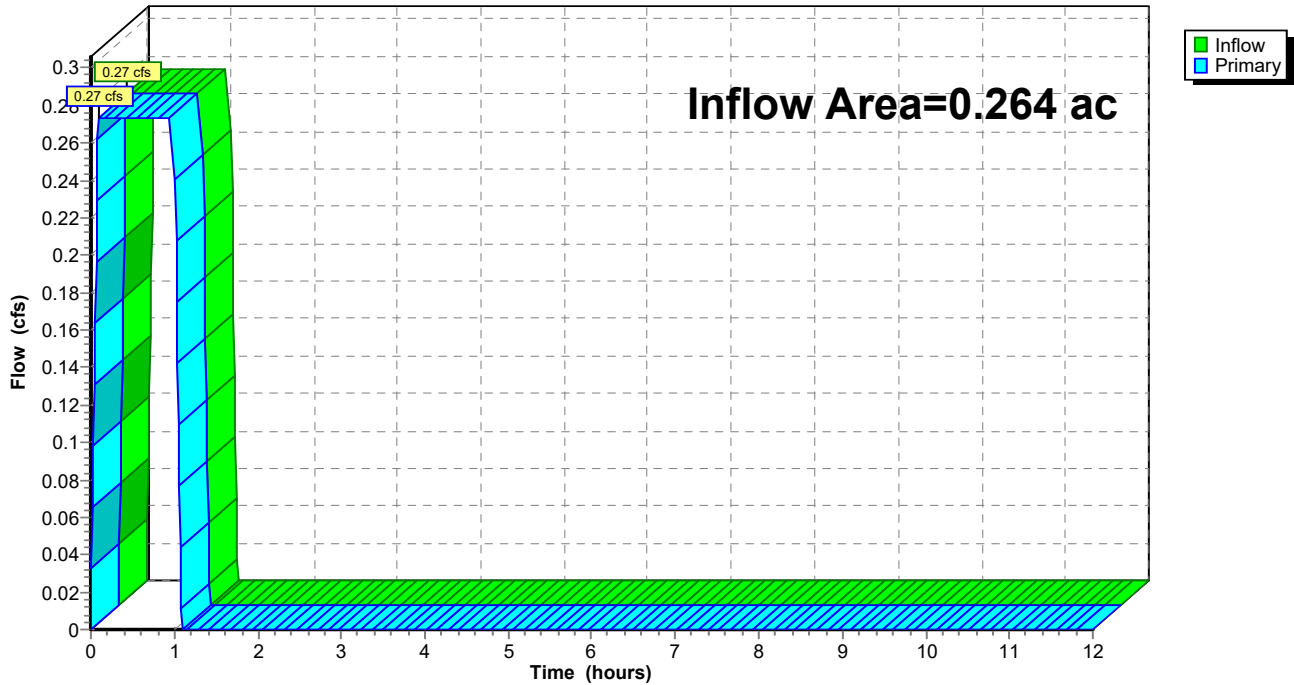
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.264 ac, 68.94% Impervious, Inflow Depth = 1.03" for 25-Year event  
Inflow = 0.27 cfs @ 0.09 hrs, Volume= 0.023 af  
Primary = 0.27 cfs @ 0.09 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs

### Pond 7P: Outlet #3

Hydrograph



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Page 20

**Hydrograph for Pond 7P: Outlet #3**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00	10.20	0.00		0.00
0.20	0.27		0.27	10.40	0.00		0.00
0.40	0.27		0.27	10.60	0.00		0.00
0.60	0.27		0.27	10.80	0.00		0.00
0.80	0.27		0.27	11.00	0.00		0.00
1.00	0.27		0.27	11.20	0.00		0.00
1.20	0.00		0.00	11.40	0.00		0.00
1.40	0.00		0.00	11.60	0.00		0.00
1.60	0.00		0.00	11.80	0.00		0.00
1.80	0.00		0.00	12.00	0.00		0.00
2.00	0.00		0.00				
2.20	0.00		0.00				
2.40	0.00		0.00				
2.60	0.00		0.00				
2.80	0.00		0.00				
3.00	0.00		0.00				
3.20	0.00		0.00				
3.40	0.00		0.00				
3.60	0.00		0.00				
3.80	0.00		0.00				
4.00	0.00		0.00				
4.20	0.00		0.00				
4.40	0.00		0.00				
4.60	0.00		0.00				
4.80	0.00		0.00				
5.00	0.00		0.00				
5.20	0.00		0.00				
5.40	0.00		0.00				
5.60	0.00		0.00				
5.80	0.00		0.00				
6.00	0.00		0.00				
6.20	0.00		0.00				
6.40	0.00		0.00				
6.60	0.00		0.00				
6.80	0.00		0.00				
7.00	0.00		0.00				
7.20	0.00		0.00				
7.40	0.00		0.00				
7.60	0.00		0.00				
7.80	0.00		0.00				
8.00	0.00		0.00				
8.20	0.00		0.00				
8.40	0.00		0.00				
8.60	0.00		0.00				
8.80	0.00		0.00				
9.00	0.00		0.00				
9.20	0.00		0.00				
9.40	0.00		0.00				
9.60	0.00		0.00				
9.80	0.00		0.00				
10.00	0.00		0.00				

**Summary for Pond 8P: MWS**

[57] Hint: Peaked at 113.15' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 1 INLET by 0.21'

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth = 0.32" for 25-Year event  
 Inflow = 0.31 cfs @ 0.09 hrs, Volume= 0.027 af  
 Outflow = 0.31 cfs @ 0.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.31 cfs @ 0.09 hrs, Volume= 0.027 af

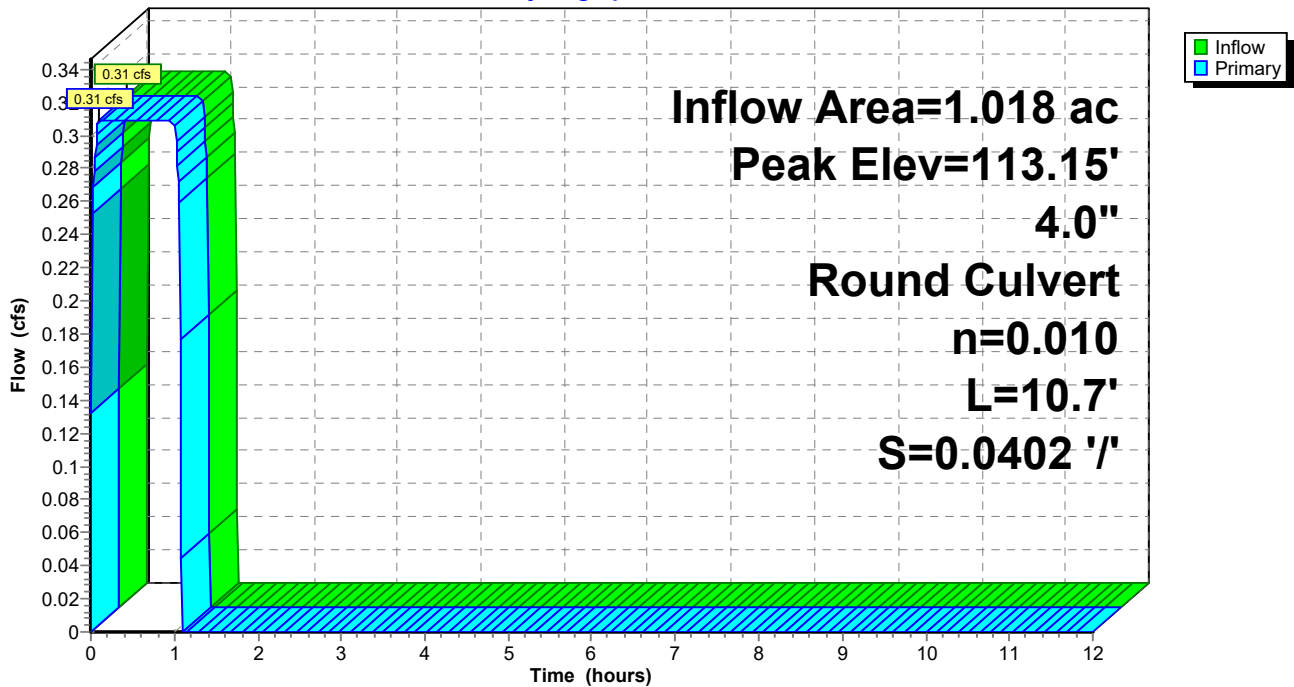
Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 Peak Elev= 113.15' @ 0.09 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	112.64'	<b>4.0" Round Culvert</b> L= 10.7' Ke= 0.200 Inlet / Outlet Invert= 112.64' / 112.21' S= 0.0402 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

**Primary OutFlow** Max=0.31 cfs @ 0.09 hrs HW=113.15' (Free Discharge)  
 ←1=Culvert (Inlet Controls 0.31 cfs @ 3.54 fps)

**Pond 8P: MWS**

Hydrograph





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Page 22

**Hydrograph for Pond 8P: MWS**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	<b>0.00</b>	<b>112.64</b>	<b>0.00</b>	10.20	0.00	112.64	0.00
0.20	<b>0.31</b>	<b>113.15</b>	<b>0.31</b>	10.40	0.00	112.64	0.00
0.40	0.31	113.15	0.31	10.60	0.00	112.64	0.00
0.60	0.31	113.15	0.31	10.80	0.00	112.64	0.00
0.80	0.31	113.15	0.31	11.00	0.00	112.64	0.00
1.00	0.31	113.15	0.31	11.20	0.00	112.64	0.00
1.20	0.00	112.64	0.00	11.40	0.00	112.64	0.00
1.40	0.00	112.64	0.00	11.60	0.00	112.64	0.00
1.60	0.00	112.64	0.00	11.80	0.00	112.64	0.00
1.80	0.00	112.64	0.00	12.00	0.00	112.64	0.00
2.00	0.00	112.64	0.00				
2.20	0.00	112.64	0.00				
2.40	0.00	112.64	0.00				
2.60	0.00	112.64	0.00				
2.80	0.00	112.64	0.00				
3.00	0.00	112.64	0.00				
3.20	0.00	112.64	0.00				
3.40	0.00	112.64	0.00				
3.60	0.00	112.64	0.00				
3.80	0.00	112.64	0.00				
4.00	0.00	112.64	0.00				
4.20	0.00	112.64	0.00				
4.40	0.00	112.64	0.00				
4.60	0.00	112.64	0.00				
4.80	0.00	112.64	0.00				
5.00	0.00	112.64	0.00				
5.20	0.00	112.64	0.00				
5.40	0.00	112.64	0.00				
5.60	0.00	112.64	0.00				
5.80	0.00	112.64	0.00				
6.00	0.00	112.64	0.00				
6.20	0.00	112.64	0.00				
6.40	0.00	112.64	0.00				
6.60	0.00	112.64	0.00				
6.80	0.00	112.64	0.00				
7.00	0.00	112.64	0.00				
7.20	0.00	112.64	0.00				
7.40	0.00	112.64	0.00				
7.60	0.00	112.64	0.00				
7.80	0.00	112.64	0.00				
8.00	0.00	112.64	0.00				
8.20	0.00	112.64	0.00				
8.40	0.00	112.64	0.00				
8.60	0.00	112.64	0.00				
8.80	0.00	112.64	0.00				
9.00	0.00	112.64	0.00				
9.20	0.00	112.64	0.00				
9.40	0.00	112.64	0.00				
9.60	0.00	112.64	0.00				
9.80	0.00	112.64	0.00				
10.00	0.00	112.64	0.00				

**22019-PR-HYD**

**Summary for Pond 9P: ADS System**

[63] Warning: Exceeded Reach 11R INLET depth by 0.64' @ 1.08 hrs  
[81] Warning: Exceeded Pond 8P by 0.19' @ 1.09 hrs

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth = 1.07" for 25-Year event  
Inflow = 1.10 cfs @ 0.10 hrs, Volume= 0.091 af  
Outflow = 0.50 cfs @ 1.05 hrs, Volume= 0.091 af, Atten= 55%, Lag= 56.8 min  
Primary = 0.50 cfs @ 1.05 hrs, Volume= 0.091 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
Peak Elev= 112.85' @ 1.05 hrs Surf.Area= 0.077 ac Storage= 0.059 af

Plug-Flow detention time= 60.2 min calculated for 0.091 af (100% of inflow)  
Center-of-Mass det. time= 60.5 min ( 93.1 - 32.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	111.55'	0.049 af	<b>41.58"W x 80.79"L x 2.00'H Field A</b> 0.154 af Overall - 0.033 af Embedded = 0.121 af x 40.0% Voids
#2A	112.05'	0.033 af	<b>ADS_StormTech SC-160LP +Cap</b> x 209 Inside #1 Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap 209 Chambers in 19 Rows
		0.081 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	111.55'	<b>4.0" Round Culvert</b> L= 52.6' Ke= 0.200 Inlet / Outlet Invert= 111.55' / 109.80' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

**Primary OutFlow** Max=0.50 cfs @ 1.05 hrs HW=112.85' (Free Discharge)  
↑**1=Culvert** (Barrel Controls 0.50 cfs @ 5.68 fps)

### Pond 9P: ADS System - Chamber Wizard Field A

**Chamber Model = ADS\_StormTechSC-160LP +Cap (ADS StormTech®SC-160LP with cap length)**

Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf

Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap

11 Chambers/Row x 7.12' Long +0.23' Cap Length x 2 = 78.79' Row Length +12.0" End Stone x 2 = 80.79' Base Length

19 Rows x 25.0" Wide + 12.0" Side Stone x 2 = 41.58' Base Width

6.0" Stone Base + 12.0" Chamber Height + 6.0" Stone Cover = 2.00' Field Height

209 Chambers x 6.8 cf = 1,428.9 cf Chamber Storage

6,718.8 cf Field - 1,428.9 cf Chambers = 5,289.8 cf Stone x 40.0% Voids = 2,115.9 cf Stone Storage

Chamber Storage + Stone Storage = 3,544.9 cf = 0.081 af

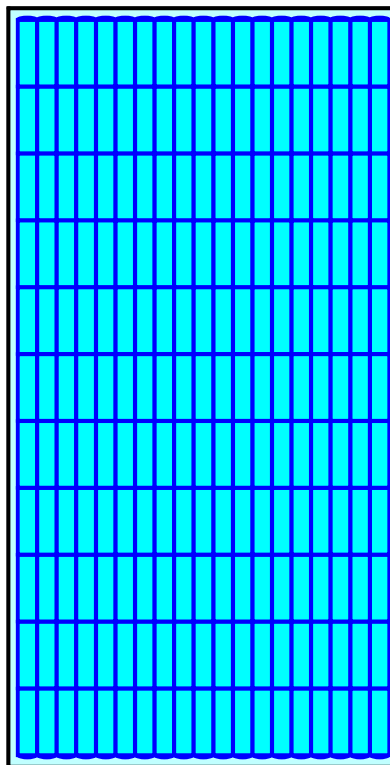
Overall Storage Efficiency = 52.8%

Overall System Size = 80.79' x 41.58' x 2.00'

209 Chambers

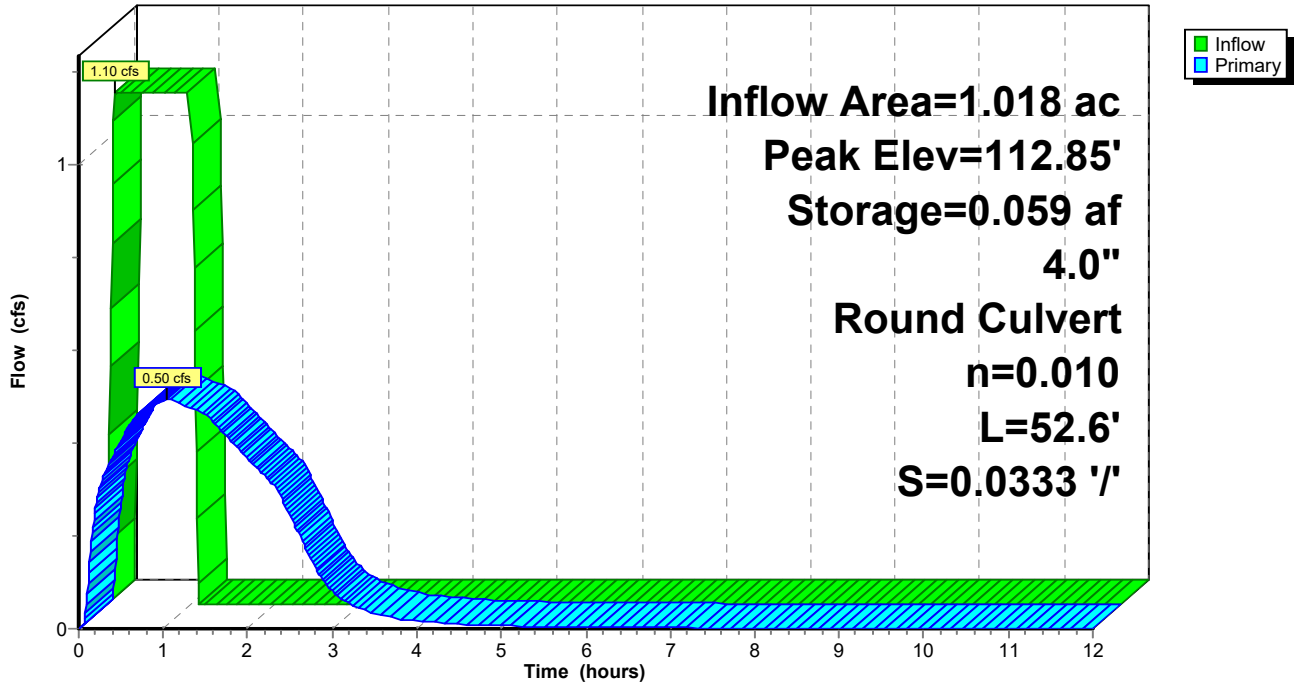
248.8 cy Field

195.9 cy Stone



### Pond 9P: ADS System

Hydrograph



**22019-PR-HYD**22019- Hydro CAD- Proposed Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 26

**Hydrograph for Pond 9P: ADS System**

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	<b>0.00</b>	0.000	111.55	0.00
0.50	<b>1.10</b>	0.031	112.31	0.41
1.00	1.10	<b>0.058</b>	<b>112.82</b>	<b>0.49</b>
1.50	0.00	<b>0.042</b>	<b>112.50</b>	<b>0.46</b>
2.00	0.00	0.025	112.20	0.37
2.50	0.00	0.012	111.93	0.24
3.00	0.00	0.005	111.72	0.08
3.50	0.00	0.003	111.65	0.03
4.00	0.00	0.002	111.62	0.02
4.50	0.00	0.002	111.61	0.01
5.00	0.00	0.001	111.60	0.01
5.50	0.00	0.001	111.59	0.00
6.00	0.00	0.001	111.58	0.00
6.50	0.00	0.001	111.58	0.00
7.00	0.00	0.001	111.57	0.00
7.50	0.00	0.001	111.57	0.00
8.00	0.00	0.001	111.57	0.00
8.50	0.00	0.001	111.57	0.00
9.00	0.00	0.001	111.57	0.00
9.50	0.00	0.000	111.57	0.00
10.00	0.00	0.000	111.56	0.00
10.50	0.00	0.000	111.56	0.00
11.00	0.00	0.000	111.56	0.00
11.50	0.00	0.000	111.56	0.00
12.00	0.00	0.000	111.56	0.00

### Summary for Pond 10P: Outlet #2

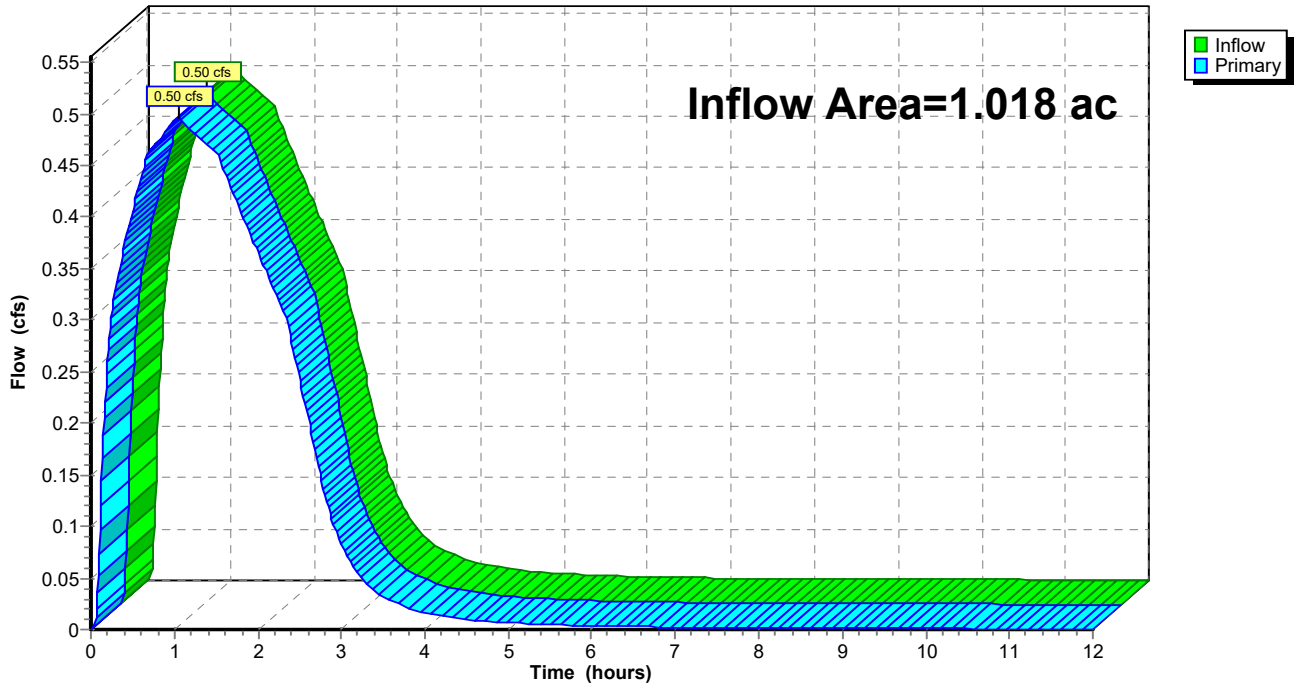
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth > 1.07" for 25-Year event  
Inflow = 0.50 cfs @ 1.05 hrs, Volume= 0.091 af  
Primary = 0.50 cfs @ 1.05 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs

### Pond 10P: Outlet #2

Hydrograph



**22019-PR-HYD**

22019- Hydro CAD- Proposed Drainage Study -25 & 100 YR  
CA-Orange County, CA 25-Year Duration=60 min, Inten=1.18 in/hr

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Page 28

**Hydrograph for Pond 10P: Outlet #2**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00	10.20	0.00		0.00
0.20	0.26		0.26	10.40	0.00		0.00
0.40	0.37		0.37	10.60	0.00		0.00
0.60	0.44		0.44	10.80	0.00		0.00
0.80	0.47		0.47	11.00	0.00		0.00
1.00	<b>0.49</b>		<b>0.49</b>	11.20	0.00		0.00
1.20	<b>0.48</b>		<b>0.48</b>	11.40	0.00		0.00
1.40	0.47		0.47	11.60	0.00		0.00
1.60	0.44		0.44	11.80	0.00		0.00
1.80	0.40		0.40	12.00	0.00		0.00
2.00	0.37		0.37				
2.20	0.33		0.33				
2.40	0.28		0.28				
2.60	0.21		0.21				
2.80	0.13		0.13				
3.00	0.08		0.08				
3.20	0.05		0.05				
3.40	0.04		0.04				
3.60	0.03		0.03				
3.80	0.02		0.02				
4.00	0.02		0.02				
4.20	0.01		0.01				
4.40	0.01		0.01				
4.60	0.01		0.01				
4.80	0.01		0.01				
5.00	0.01		0.01				
5.20	0.01		0.01				
5.40	0.00		0.00				
5.60	0.00		0.00				
5.80	0.00		0.00				
6.00	0.00		0.00				
6.20	0.00		0.00				
6.40	0.00		0.00				
6.60	0.00		0.00				
6.80	0.00		0.00				
7.00	0.00		0.00				
7.20	0.00		0.00				
7.40	0.00		0.00				
7.60	0.00		0.00				
7.80	0.00		0.00				
8.00	0.00		0.00				
8.20	0.00		0.00				
8.40	0.00		0.00				
8.60	0.00		0.00				
8.80	0.00		0.00				
9.00	0.00		0.00				
9.20	0.00		0.00				
9.40	0.00		0.00				
9.60	0.00		0.00				
9.80	0.00		0.00				
10.00	0.00		0.00				

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Page 29

Time span=0.00-12.00 hrs, dt=0.01 hrs, 1201 points

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc

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

**Subcatchment1S: DA-1** Runoff Area=0.599 ac 30.55% Impervious Runoff Depth=1.16"  
Tc=5.0 min C=0.78 Runoff=0.70 cfs 0.058 af

**Subcatchment2S: DA-2** Runoff Area=1.018 ac 84.28% Impervious Runoff Depth=1.36"  
Tc=5.0 min C=0.91 Runoff=1.39 cfs 0.115 af

**Subcatchment3S: DA-3** Runoff Area=0.264 ac 68.94% Impervious Runoff Depth=1.30"  
Tc=5.0 min C=0.87 Runoff=0.35 cfs 0.029 af

**Reach 11R: 12" Pipe** Avg. Flow Depth=0.33' Max Vel=4.77 fps Inflow=1.07 cfs 0.087 af  
12.0" Round Pipe n=0.010 L=12.2' S=0.0098 '/' Capacity=4.59 cfs Outflow=1.07 cfs 0.087 af

**Pond 4P: Outlet #1** Inflow=0.70 cfs 0.058 af  
Primary=0.70 cfs 0.058 af

**Pond 5P: Diversion Mahole** Peak Elev=113.78' Inflow=1.39 cfs 0.115 af  
Primary=0.32 cfs 0.028 af Secondary=1.07 cfs 0.087 af Outflow=1.39 cfs 0.115 af

**Pond 7P: Outlet #3** Inflow=0.35 cfs 0.029 af  
Primary=0.35 cfs 0.029 af

**Pond 8P: MWS** Peak Elev=113.18' Inflow=0.32 cfs 0.028 af  
4.0" Round Culvert n=0.010 L=10.7' S=0.0402 '/' Outflow=0.32 cfs 0.028 af

**Pond 9P: ADS System** Peak Elev=113.49' Storage=0.080 af Inflow=1.39 cfs 0.115 af  
4.0" Round Culvert n=0.010 L=52.6' S=0.0333 '/' Outflow=0.55 cfs 0.115 af

**Pond 10P: Outlet #2** Inflow=0.55 cfs 0.115 af  
Primary=0.55 cfs 0.115 af

**Total Runoff Area = 1.881 ac Runoff Volume = 0.202 af Average Runoff Depth = 1.29"**  
**34.98% Pervious = 0.658 ac 65.02% Impervious = 1.223 ac**



**Summary for Subcatchment 1S: DA-1**

Runoff = 0.70 cfs @ 0.09 hrs, Volume= 0.058 af, Depth= 1.16"

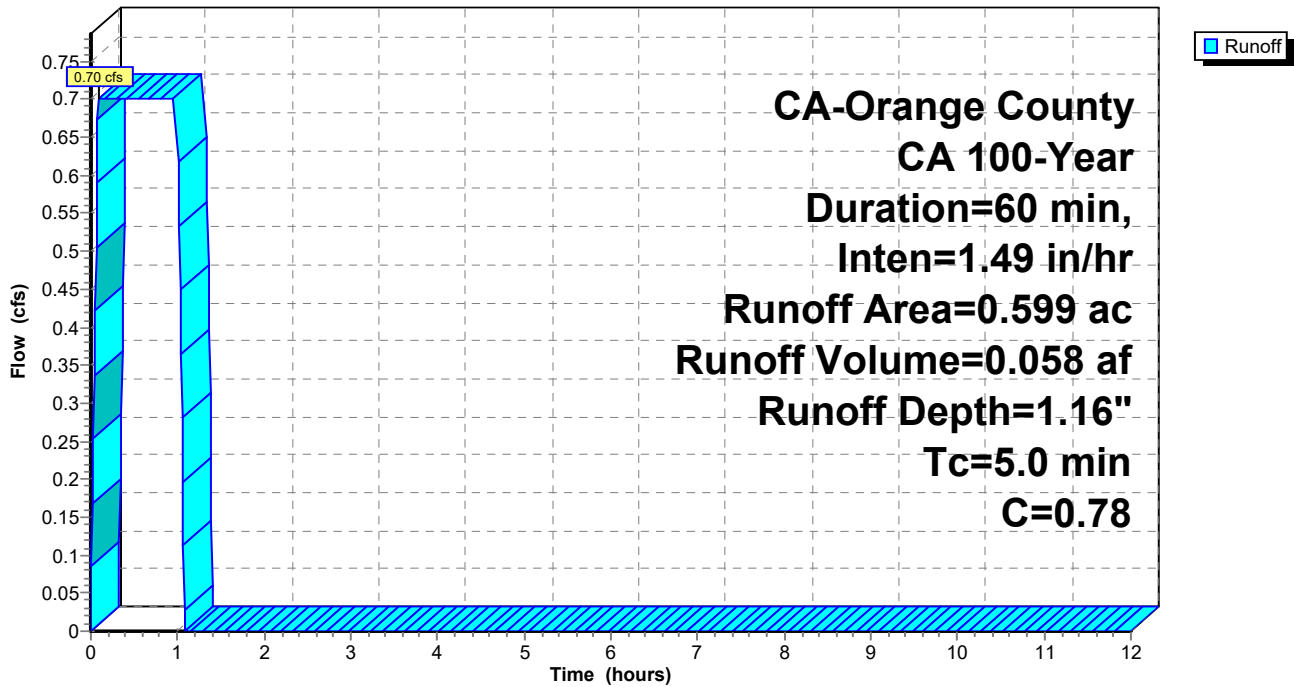
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

Area (ac)	C	Description
0.183	0.95	Impervious Area
0.416	0.70	Pervious Area
0.599	0.78	Weighted Average
0.416		69.45% Pervious Area
0.183		30.55% Impervious Area

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

**Subcatchment 1S: DA-1**

Hydrograph



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Page 31

**Hydrograph for Subcatchment 1S: DA-1**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	5.10	0.00	10.20	0.00
0.10	0.70	5.20	0.00	10.30	0.00
0.20	0.70	5.30	0.00	10.40	0.00
0.30	0.70	5.40	0.00	10.50	0.00
0.40	0.70	5.50	0.00	10.60	0.00
0.50	0.70	5.60	0.00	10.70	0.00
0.60	0.70	5.70	0.00	10.80	0.00
0.70	0.70	5.80	0.00	10.90	0.00
0.80	0.70	5.90	0.00	11.00	0.00
0.90	0.70	6.00	0.00	11.10	0.00
1.00	0.70	6.10	0.00	11.20	0.00
1.10	0.00	6.20	0.00	11.30	0.00
1.20	0.00	6.30	0.00	11.40	0.00
1.30	0.00	6.40	0.00	11.50	0.00
1.40	0.00	6.50	0.00	11.60	0.00
1.50	0.00	6.60	0.00	11.70	0.00
1.60	0.00	6.70	0.00	11.80	0.00
1.70	0.00	6.80	0.00	11.90	0.00
1.80	0.00	6.90	0.00	12.00	0.00
1.90	0.00	7.00	0.00		
2.00	0.00	7.10	0.00		
2.10	0.00	7.20	0.00		
2.20	0.00	7.30	0.00		
2.30	0.00	7.40	0.00		
2.40	0.00	7.50	0.00		
2.50	0.00	7.60	0.00		
2.60	0.00	7.70	0.00		
2.70	0.00	7.80	0.00		
2.80	0.00	7.90	0.00		
2.90	0.00	8.00	0.00		
3.00	0.00	8.10	0.00		
3.10	0.00	8.20	0.00		
3.20	0.00	8.30	0.00		
3.30	0.00	8.40	0.00		
3.40	0.00	8.50	0.00		
3.50	0.00	8.60	0.00		
3.60	0.00	8.70	0.00		
3.70	0.00	8.80	0.00		
3.80	0.00	8.90	0.00		
3.90	0.00	9.00	0.00		
4.00	0.00	9.10	0.00		
4.10	0.00	9.20	0.00		
4.20	0.00	9.30	0.00		
4.30	0.00	9.40	0.00		
4.40	0.00	9.50	0.00		
4.50	0.00	9.60	0.00		
4.60	0.00	9.70	0.00		
4.70	0.00	9.80	0.00		
4.80	0.00	9.90	0.00		
4.90	0.00	10.00	0.00		
5.00	0.00	10.10	0.00		

**Summary for Subcatchment 2S: DA-2**

Runoff = 1.39 cfs @ 0.09 hrs, Volume= 0.115 af, Depth= 1.36"

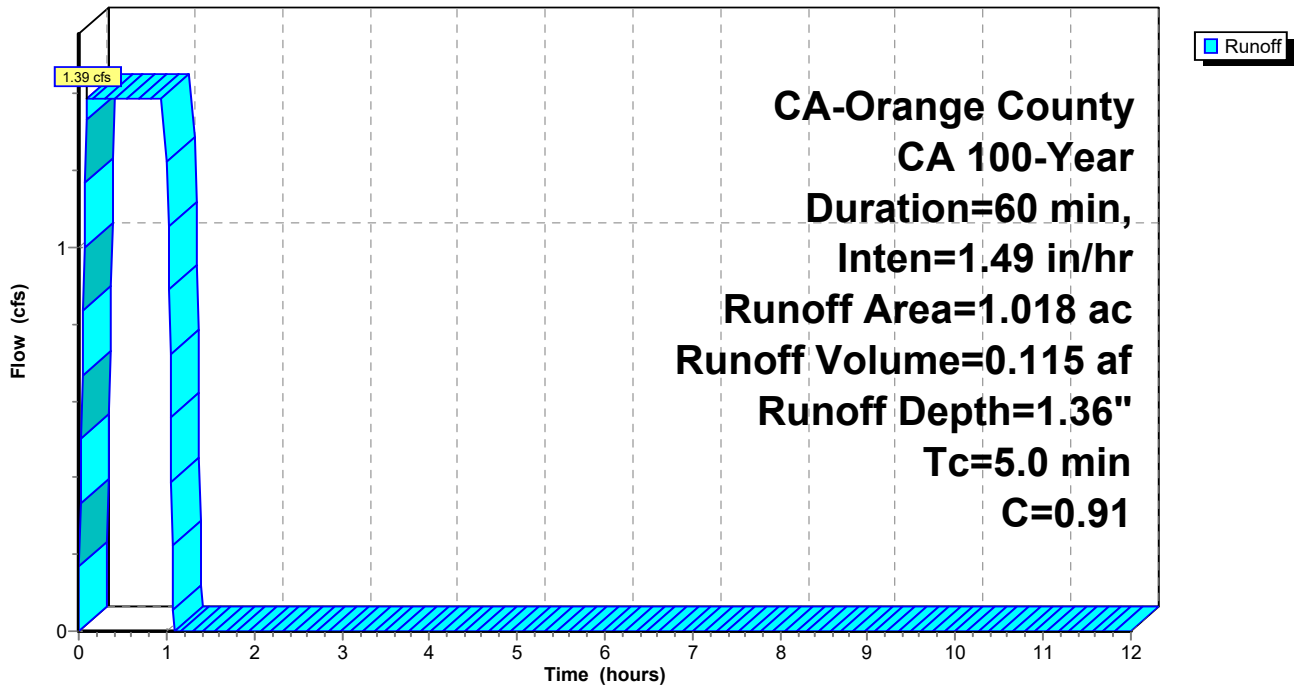
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

Area (ac)	C	Description
0.858	0.95	Impervious Area
0.160	0.70	Pervious Area
1.018	0.91	Weighted Average
0.160		15.72% Pervious Area
0.858		84.28% Impervious Area

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

**Subcatchment 2S: DA-2**

Hydrograph



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Page 33

**Hydrograph for Subcatchment 2S: DA-2**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	<b>0.00</b>	5.10	0.00	10.20	0.00
0.10	<b>1.39</b>	5.20	0.00	10.30	0.00
0.20	1.39	5.30	0.00	10.40	0.00
0.30	1.39	5.40	0.00	10.50	0.00
0.40	1.39	5.50	0.00	10.60	0.00
0.50	1.39	5.60	0.00	10.70	0.00
0.60	1.39	5.70	0.00	10.80	0.00
0.70	1.39	5.80	0.00	10.90	0.00
0.80	1.39	5.90	0.00	11.00	0.00
0.90	1.39	6.00	0.00	11.10	0.00
1.00	1.39	6.10	0.00	11.20	0.00
1.10	0.00	6.20	0.00	11.30	0.00
1.20	0.00	6.30	0.00	11.40	0.00
1.30	0.00	6.40	0.00	11.50	0.00
1.40	0.00	6.50	0.00	11.60	0.00
1.50	0.00	6.60	0.00	11.70	0.00
1.60	0.00	6.70	0.00	11.80	0.00
1.70	0.00	6.80	0.00	11.90	0.00
1.80	0.00	6.90	0.00	12.00	0.00
1.90	0.00	7.00	0.00		
2.00	0.00	7.10	0.00		
2.10	0.00	7.20	0.00		
2.20	0.00	7.30	0.00		
2.30	0.00	7.40	0.00		
2.40	0.00	7.50	0.00		
2.50	0.00	7.60	0.00		
2.60	0.00	7.70	0.00		
2.70	0.00	7.80	0.00		
2.80	0.00	7.90	0.00		
2.90	0.00	8.00	0.00		
3.00	0.00	8.10	0.00		
3.10	0.00	8.20	0.00		
3.20	0.00	8.30	0.00		
3.30	0.00	8.40	0.00		
3.40	0.00	8.50	0.00		
3.50	0.00	8.60	0.00		
3.60	0.00	8.70	0.00		
3.70	0.00	8.80	0.00		
3.80	0.00	8.90	0.00		
3.90	0.00	9.00	0.00		
4.00	0.00	9.10	0.00		
4.10	0.00	9.20	0.00		
4.20	0.00	9.30	0.00		
4.30	0.00	9.40	0.00		
4.40	0.00	9.50	0.00		
4.50	0.00	9.60	0.00		
4.60	0.00	9.70	0.00		
4.70	0.00	9.80	0.00		
4.80	0.00	9.90	0.00		
4.90	0.00	10.00	0.00		
5.00	0.00	10.10	0.00		

**Summary for Subcatchment 3S: DA-3**

Runoff = 0.35 cfs @ 0.09 hrs, Volume= 0.029 af, Depth= 1.30"

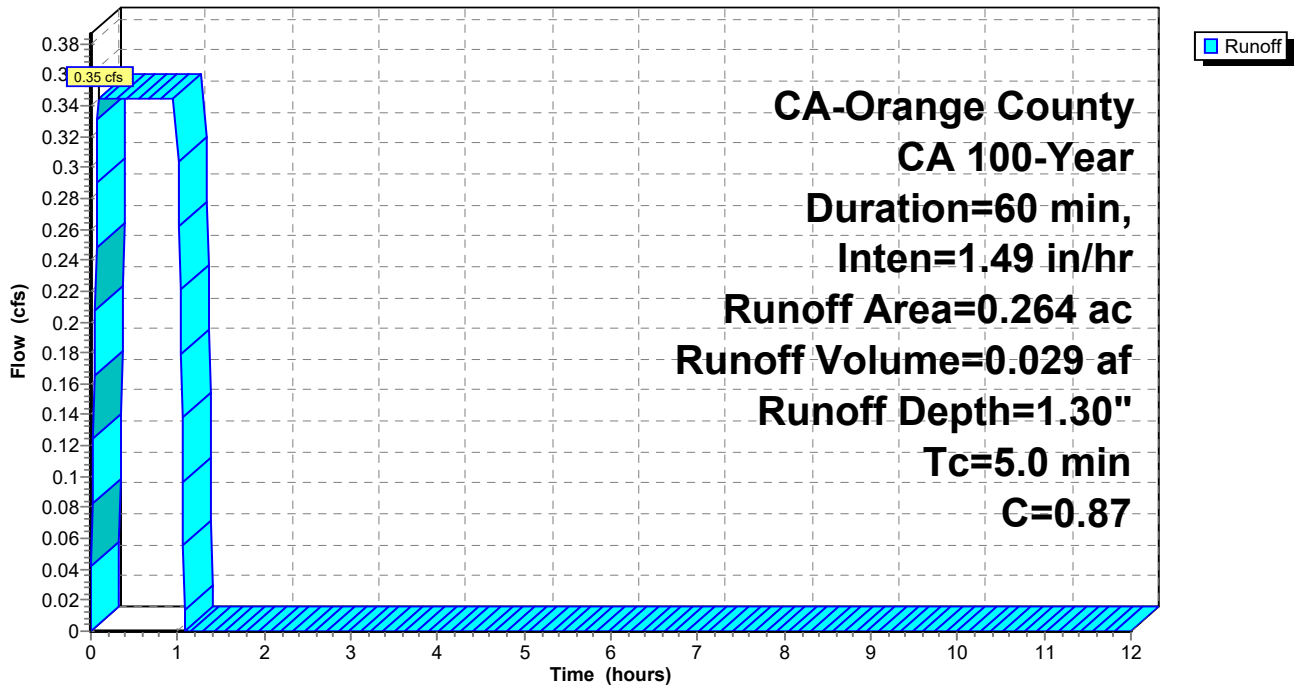
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

Area (ac)	C	Description
0.182	0.95	Impervious Area
0.082	0.70	Pervious Area
0.264	0.87	Weighted Average
0.082		31.06% Pervious Area
0.182		68.94% Impervious Area

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

**Subcatchment 3S: DA-3**

Hydrograph



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Page 35

**Hydrograph for Subcatchment 3S: DA-3**

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	<b>0.00</b>	5.10	0.00	10.20	0.00
0.10	<b>0.35</b>	5.20	0.00	10.30	0.00
0.20	0.35	5.30	0.00	10.40	0.00
0.30	0.35	5.40	0.00	10.50	0.00
0.40	0.35	5.50	0.00	10.60	0.00
0.50	0.35	5.60	0.00	10.70	0.00
0.60	0.35	5.70	0.00	10.80	0.00
0.70	0.35	5.80	0.00	10.90	0.00
0.80	0.35	5.90	0.00	11.00	0.00
0.90	0.35	6.00	0.00	11.10	0.00
1.00	0.35	6.10	0.00	11.20	0.00
1.10	0.00	6.20	0.00	11.30	0.00
1.20	0.00	6.30	0.00	11.40	0.00
1.30	0.00	6.40	0.00	11.50	0.00
1.40	0.00	6.50	0.00	11.60	0.00
1.50	0.00	6.60	0.00	11.70	0.00
1.60	0.00	6.70	0.00	11.80	0.00
1.70	0.00	6.80	0.00	11.90	0.00
1.80	0.00	6.90	0.00	12.00	0.00
1.90	0.00	7.00	0.00		
2.00	0.00	7.10	0.00		
2.10	0.00	7.20	0.00		
2.20	0.00	7.30	0.00		
2.30	0.00	7.40	0.00		
2.40	0.00	7.50	0.00		
2.50	0.00	7.60	0.00		
2.60	0.00	7.70	0.00		
2.70	0.00	7.80	0.00		
2.80	0.00	7.90	0.00		
2.90	0.00	8.00	0.00		
3.00	0.00	8.10	0.00		
3.10	0.00	8.20	0.00		
3.20	0.00	8.30	0.00		
3.30	0.00	8.40	0.00		
3.40	0.00	8.50	0.00		
3.50	0.00	8.60	0.00		
3.60	0.00	8.70	0.00		
3.70	0.00	8.80	0.00		
3.80	0.00	8.90	0.00		
3.90	0.00	9.00	0.00		
4.00	0.00	9.10	0.00		
4.10	0.00	9.20	0.00		
4.20	0.00	9.30	0.00		
4.30	0.00	9.40	0.00		
4.40	0.00	9.50	0.00		
4.50	0.00	9.60	0.00		
4.60	0.00	9.70	0.00		
4.70	0.00	9.80	0.00		
4.80	0.00	9.90	0.00		
4.90	0.00	10.00	0.00		
5.00	0.00	10.10	0.00		

### Summary for Reach 11R: 12" Pipe

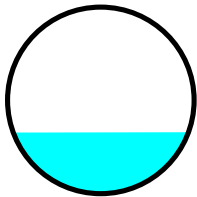
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow	=	1.07 cfs @	0.09 hrs,	Volume=	0.087 af
Outflow	=	1.07 cfs @	0.11 hrs,	Volume=	0.087 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 4.77 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 4.61 fps, Avg. Travel Time= 0.0 min

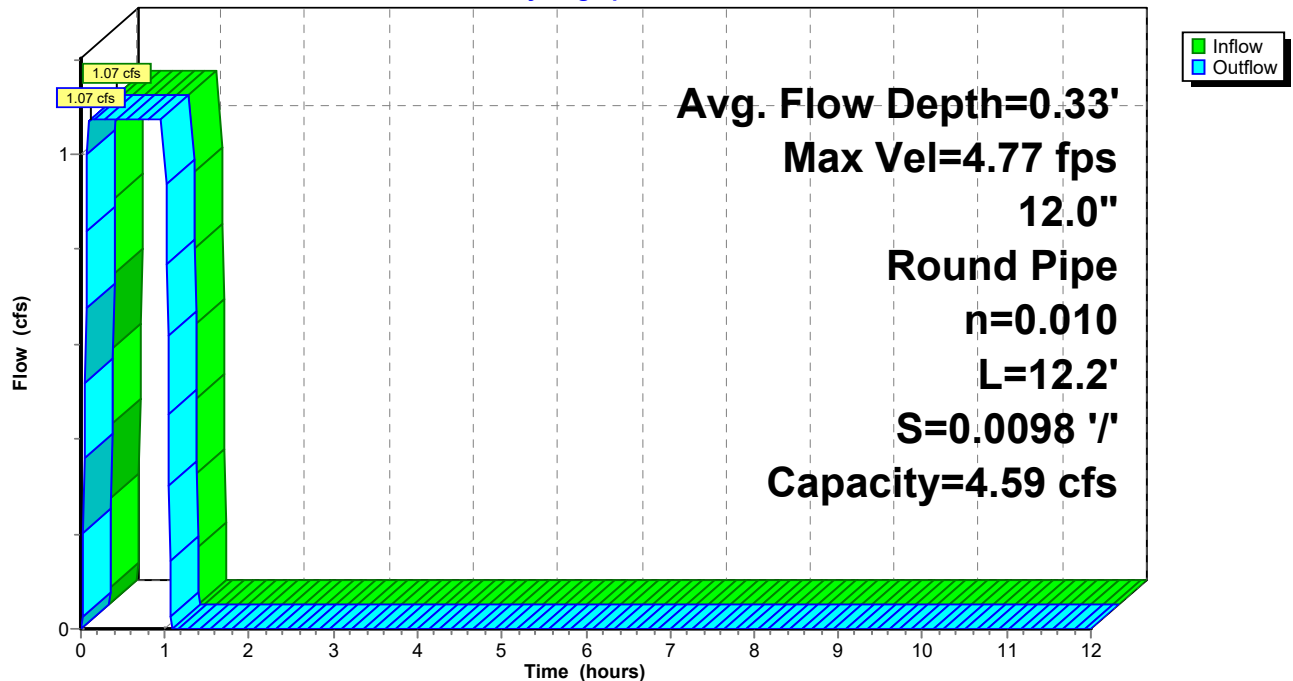
Peak Storage= 3 cf @ 0.09 hrs  
 Average Depth at Peak Storage= 0.33' , Surface Width= 0.94'  
 Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.59 cfs

12.0" Round Pipe  
 n= 0.010 PVC, smooth interior  
 Length= 12.2' Slope= 0.0098 '/'  
 Inlet Invert= 112.20', Outlet Invert= 112.08'



### Reach 11R: 12" Pipe

Hydrograph



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Page 37

**Hydrograph for Reach 11R: 12" Pipe**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	<b>0.00</b>	<b>0</b>	<b>112.20</b>	<b>0.00</b>
0.50	<b>1.07</b>	<b>3</b>	<b>112.53</b>	<b>1.07</b>
1.00	1.07	3	112.53	1.07
1.50	0.00	0	112.20	0.00
2.00	0.00	0	112.20	0.00
2.50	0.00	0	112.20	0.00
3.00	0.00	0	112.20	0.00
3.50	0.00	0	112.20	0.00
4.00	0.00	0	112.20	0.00
4.50	0.00	0	112.20	0.00
5.00	0.00	0	112.20	0.00
5.50	0.00	0	112.20	0.00
6.00	0.00	0	112.20	0.00
6.50	0.00	0	112.20	0.00
7.00	0.00	0	112.20	0.00
7.50	0.00	0	112.20	0.00
8.00	0.00	0	112.20	0.00
8.50	0.00	0	112.20	0.00
9.00	0.00	0	112.20	0.00
9.50	0.00	0	112.20	0.00
10.00	0.00	0	112.20	0.00
10.50	0.00	0	112.20	0.00
11.00	0.00	0	112.20	0.00
11.50	0.00	0	112.20	0.00
12.00	0.00	0	112.20	0.00



### Summary for Pond 4P: Outlet #1

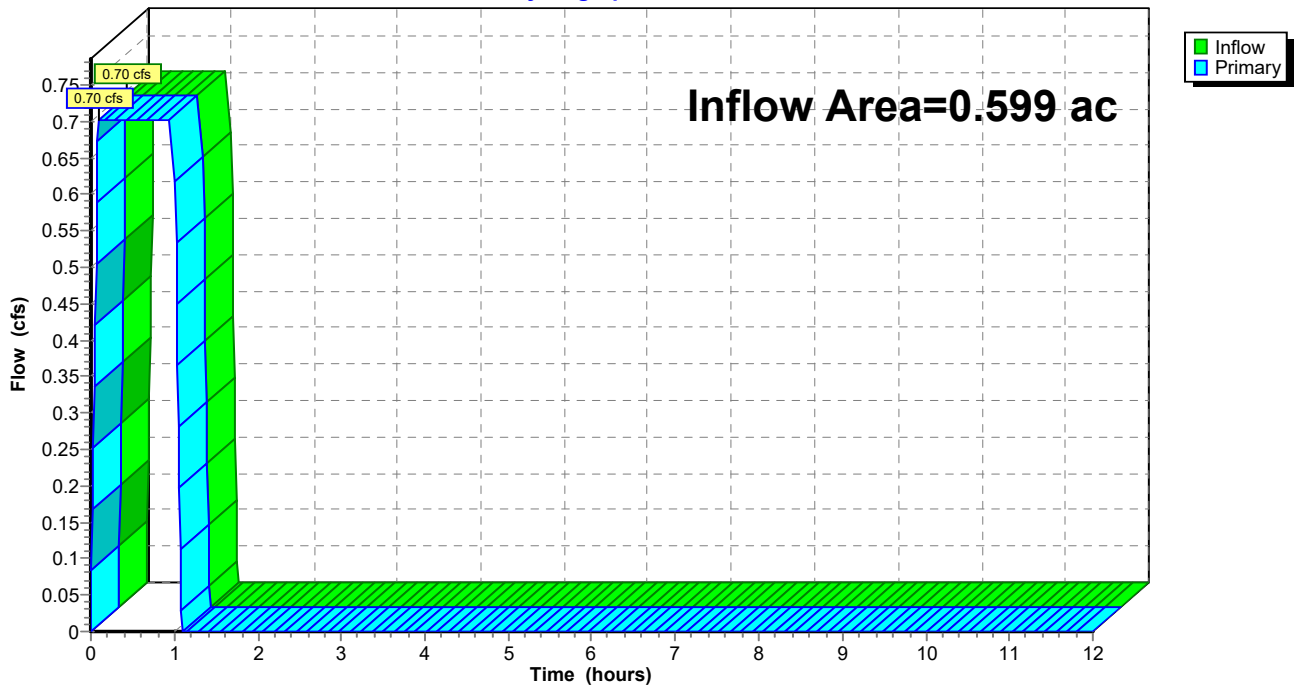
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.599 ac, 30.55% Impervious, Inflow Depth = 1.16" for 100-Year event  
Inflow = 0.70 cfs @ 0.09 hrs, Volume= 0.058 af  
Primary = 0.70 cfs @ 0.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs

### Pond 4P: Outlet #1

Hydrograph



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Page 39

**Hydrograph for Pond 4P: Outlet #1**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	<b>0.00</b>		<b>0.00</b>	10.20	0.00		0.00
0.20	<b>0.70</b>		<b>0.70</b>	10.40	0.00		0.00
0.40	0.70		0.70	10.60	0.00		0.00
0.60	0.70		0.70	10.80	0.00		0.00
0.80	0.70		0.70	11.00	0.00		0.00
1.00	0.70		0.70	11.20	0.00		0.00
1.20	0.00		0.00	11.40	0.00		0.00
1.40	0.00		0.00	11.60	0.00		0.00
1.60	0.00		0.00	11.80	0.00		0.00
1.80	0.00		0.00	12.00	0.00		0.00
2.00	0.00		0.00				
2.20	0.00		0.00				
2.40	0.00		0.00				
2.60	0.00		0.00				
2.80	0.00		0.00				
3.00	0.00		0.00				
3.20	0.00		0.00				
3.40	0.00		0.00				
3.60	0.00		0.00				
3.80	0.00		0.00				
4.00	0.00		0.00				
4.20	0.00		0.00				
4.40	0.00		0.00				
4.60	0.00		0.00				
4.80	0.00		0.00				
5.00	0.00		0.00				
5.20	0.00		0.00				
5.40	0.00		0.00				
5.60	0.00		0.00				
5.80	0.00		0.00				
6.00	0.00		0.00				
6.20	0.00		0.00				
6.40	0.00		0.00				
6.60	0.00		0.00				
6.80	0.00		0.00				
7.00	0.00		0.00				
7.20	0.00		0.00				
7.40	0.00		0.00				
7.60	0.00		0.00				
7.80	0.00		0.00				
8.00	0.00		0.00				
8.20	0.00		0.00				
8.40	0.00		0.00				
8.60	0.00		0.00				
8.80	0.00		0.00				
9.00	0.00		0.00				
9.20	0.00		0.00				
9.40	0.00		0.00				
9.60	0.00		0.00				
9.80	0.00		0.00				
10.00	0.00		0.00				

### Summary for Pond 5P: Diversion Mahole

[57] Hint: Peaked at 113.78' (Flood elevation advised)

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth = 1.36" for 100-Year event  
 Inflow = 1.39 cfs @ 0.09 hrs, Volume= 0.115 af  
 Outflow = 1.39 cfs @ 0.09 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.32 cfs @ 0.09 hrs, Volume= 0.028 af  
 Secondary = 1.07 cfs @ 0.09 hrs, Volume= 0.087 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 Peak Elev= 113.78' @ 0.09 hrs

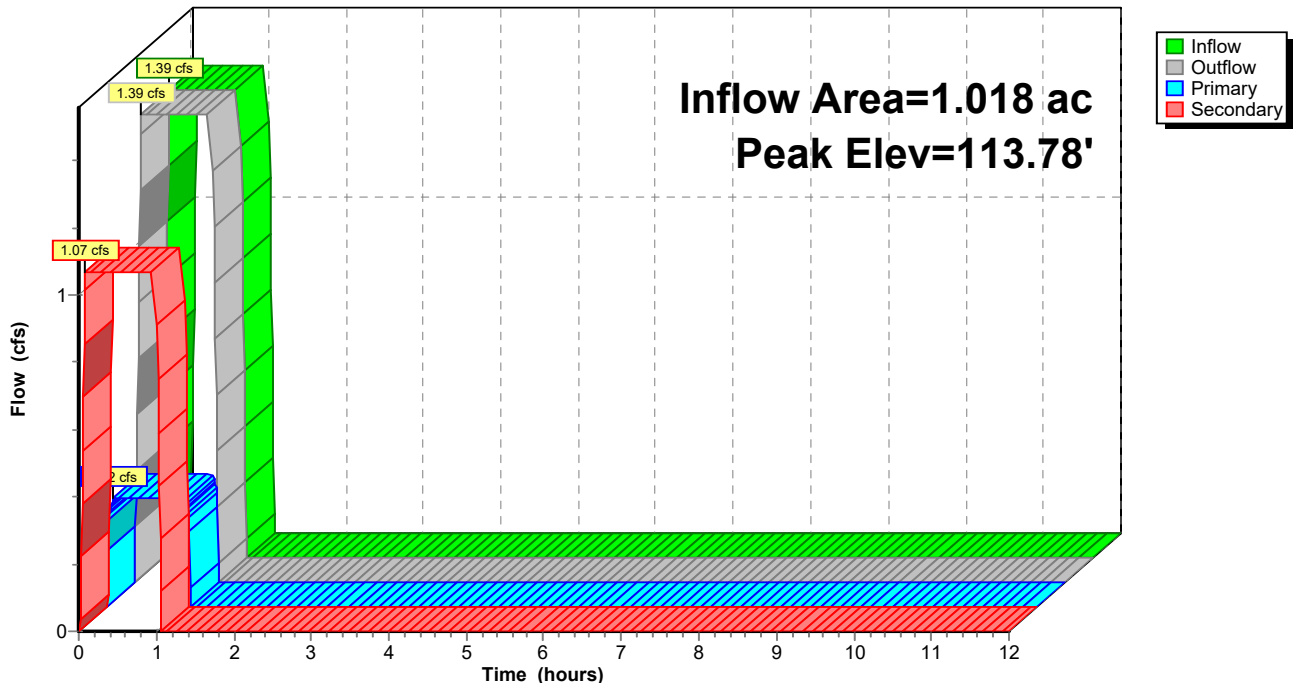
Device	Routing	Invert	Outlet Devices
#1	Primary	112.94'	<b>4.0" Round Diversion Manhole</b> L= 13.3' Ke= 0.200 Inlet / Outlet Invert= 112.94' / 112.87' S= 0.0053 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.09 sf
#2	Secondary	113.55'	<b>3.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 1.5' Crest Height

**Primary OutFlow** Max=0.32 cfs @ 0.09 hrs HW=113.78' (Free Discharge)  
 ↳1=Diversion Manhole (Barrel Controls 0.32 cfs @ 3.68 fps)

**Secondary OutFlow** Max=1.07 cfs @ 0.09 hrs HW=113.78' (Free Discharge)  
 ↳2=Sharp-Crested Rectangular Weir (Weir Controls 1.07 cfs @ 1.59 fps)

### Pond 5P: Diversion Mahole

Hydrograph



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Page 41

**Hydrograph for Pond 5P: Diversion Mahole**

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	<b>0.00</b>	<b>112.94</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
0.50	<b>1.39</b>	<b>113.78</b>	<b>1.39</b>	<b>0.32</b>	<b>1.07</b>
1.00	1.39	113.78	1.39	0.32	1.07
1.50	0.00	112.94	0.00	0.00	0.00
2.00	0.00	112.94	0.00	0.00	0.00
2.50	0.00	112.94	0.00	0.00	0.00
3.00	0.00	112.94	0.00	0.00	0.00
3.50	0.00	112.94	0.00	0.00	0.00
4.00	0.00	112.94	0.00	0.00	0.00
4.50	0.00	112.94	0.00	0.00	0.00
5.00	0.00	112.94	0.00	0.00	0.00
5.50	0.00	112.94	0.00	0.00	0.00
6.00	0.00	112.94	0.00	0.00	0.00
6.50	0.00	112.94	0.00	0.00	0.00
7.00	0.00	112.94	0.00	0.00	0.00
7.50	0.00	112.94	0.00	0.00	0.00
8.00	0.00	112.94	0.00	0.00	0.00
8.50	0.00	112.94	0.00	0.00	0.00
9.00	0.00	112.94	0.00	0.00	0.00
9.50	0.00	112.94	0.00	0.00	0.00
10.00	0.00	112.94	0.00	0.00	0.00
10.50	0.00	112.94	0.00	0.00	0.00
11.00	0.00	112.94	0.00	0.00	0.00
11.50	0.00	112.94	0.00	0.00	0.00
12.00	0.00	112.94	0.00	0.00	0.00

### Summary for Pond 7P: Outlet #3

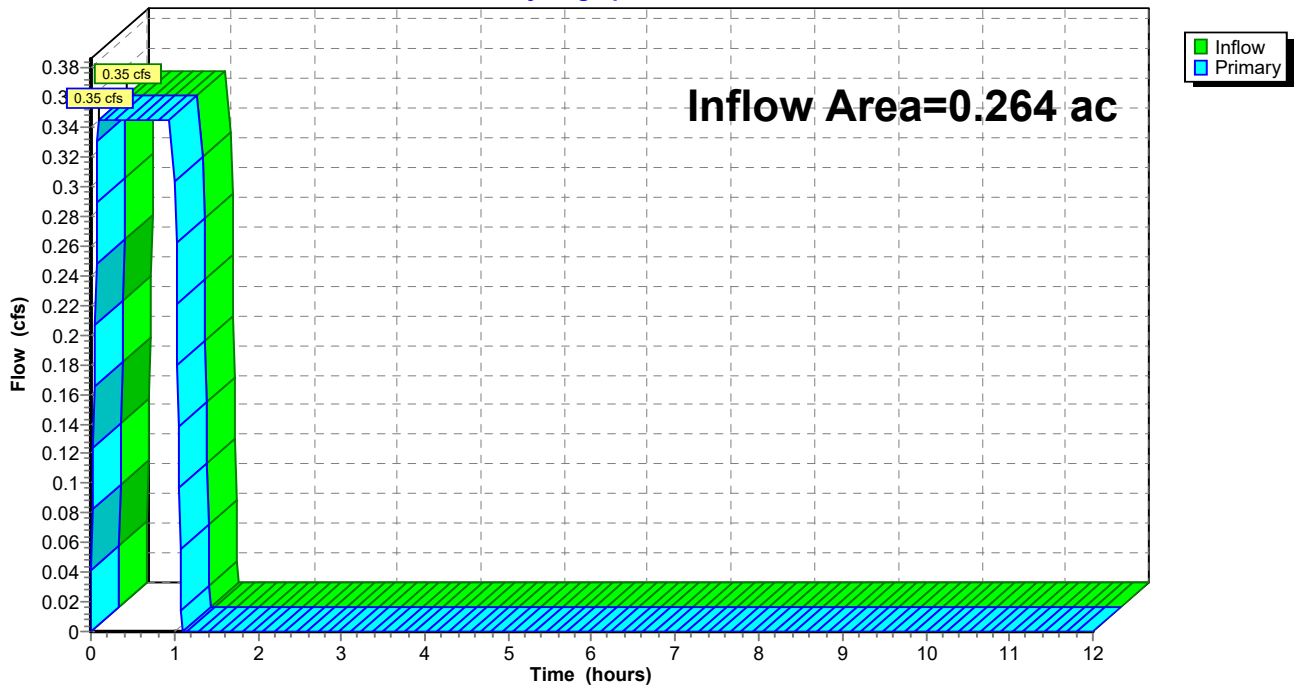
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.264 ac, 68.94% Impervious, Inflow Depth = 1.30" for 100-Year event  
Inflow = 0.35 cfs @ 0.09 hrs, Volume= 0.029 af  
Primary = 0.35 cfs @ 0.09 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs

### Pond 7P: Outlet #3

Hydrograph



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Page 43

**Hydrograph for Pond 7P: Outlet #3**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	<b>0.00</b>		<b>0.00</b>	10.20	0.00		0.00
0.20	<b>0.35</b>		<b>0.35</b>	10.40	0.00		0.00
0.40	0.35		0.35	10.60	0.00		0.00
0.60	0.35		0.35	10.80	0.00		0.00
0.80	0.35		0.35	11.00	0.00		0.00
1.00	0.35		0.35	11.20	0.00		0.00
1.20	0.00		0.00	11.40	0.00		0.00
1.40	0.00		0.00	11.60	0.00		0.00
1.60	0.00		0.00	11.80	0.00		0.00
1.80	0.00		0.00	12.00	0.00		0.00
2.00	0.00		0.00				
2.20	0.00		0.00				
2.40	0.00		0.00				
2.60	0.00		0.00				
2.80	0.00		0.00				
3.00	0.00		0.00				
3.20	0.00		0.00				
3.40	0.00		0.00				
3.60	0.00		0.00				
3.80	0.00		0.00				
4.00	0.00		0.00				
4.20	0.00		0.00				
4.40	0.00		0.00				
4.60	0.00		0.00				
4.80	0.00		0.00				
5.00	0.00		0.00				
5.20	0.00		0.00				
5.40	0.00		0.00				
5.60	0.00		0.00				
5.80	0.00		0.00				
6.00	0.00		0.00				
6.20	0.00		0.00				
6.40	0.00		0.00				
6.60	0.00		0.00				
6.80	0.00		0.00				
7.00	0.00		0.00				
7.20	0.00		0.00				
7.40	0.00		0.00				
7.60	0.00		0.00				
7.80	0.00		0.00				
8.00	0.00		0.00				
8.20	0.00		0.00				
8.40	0.00		0.00				
8.60	0.00		0.00				
8.80	0.00		0.00				
9.00	0.00		0.00				
9.20	0.00		0.00				
9.40	0.00		0.00				
9.60	0.00		0.00				
9.80	0.00		0.00				
10.00	0.00		0.00				

**Summary for Pond 8P: MWS**

[57] Hint: Peaked at 113.18' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 1 INLET by 0.24'

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth = 0.33" for 100-Year event  
 Inflow = 0.32 cfs @ 0.09 hrs, Volume= 0.028 af  
 Outflow = 0.32 cfs @ 0.09 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.32 cfs @ 0.09 hrs, Volume= 0.028 af

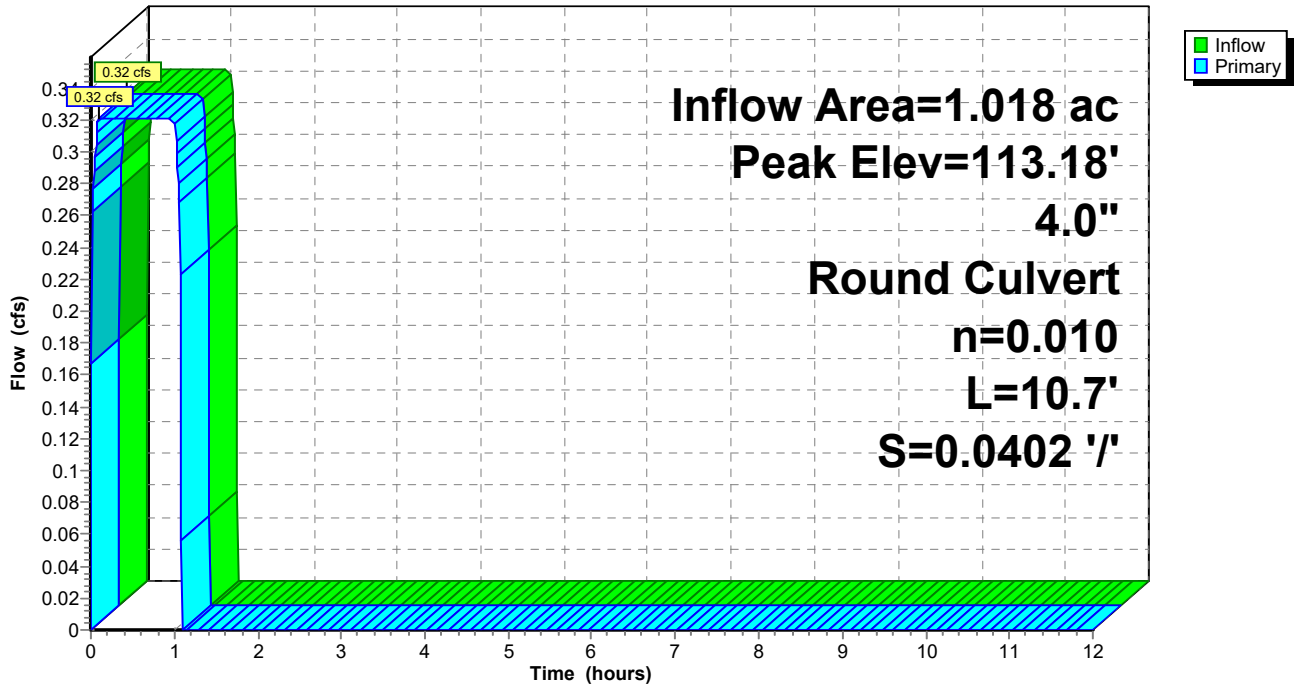
Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
 Peak Elev= 113.18' @ 0.09 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	112.64'	<b>4.0" Round Culvert</b> L= 10.7' Ke= 0.200 Inlet / Outlet Invert= 112.64' / 112.21' S= 0.0402 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

**Primary OutFlow** Max=0.32 cfs @ 0.09 hrs HW=113.18' (Free Discharge)  
 ←1=Culvert (Inlet Controls 0.32 cfs @ 3.68 fps)

**Pond 8P: MWS**

Hydrograph



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Page 45

**Hydrograph for Pond 8P: MWS**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	112.64	0.00	10.20	0.00	112.64	0.00
0.20	0.32	113.18	0.32	10.40	0.00	112.64	0.00
0.40	0.32	113.18	0.32	10.60	0.00	112.64	0.00
0.60	0.32	113.18	0.32	10.80	0.00	112.64	0.00
0.80	0.32	113.18	0.32	11.00	0.00	112.64	0.00
1.00	0.32	113.18	0.32	11.20	0.00	112.64	0.00
1.20	0.00	112.64	0.00	11.40	0.00	112.64	0.00
1.40	0.00	112.64	0.00	11.60	0.00	112.64	0.00
1.60	0.00	112.64	0.00	11.80	0.00	112.64	0.00
1.80	0.00	112.64	0.00	12.00	0.00	112.64	0.00
2.00	0.00	112.64	0.00				
2.20	0.00	112.64	0.00				
2.40	0.00	112.64	0.00				
2.60	0.00	112.64	0.00				
2.80	0.00	112.64	0.00				
3.00	0.00	112.64	0.00				
3.20	0.00	112.64	0.00				
3.40	0.00	112.64	0.00				
3.60	0.00	112.64	0.00				
3.80	0.00	112.64	0.00				
4.00	0.00	112.64	0.00				
4.20	0.00	112.64	0.00				
4.40	0.00	112.64	0.00				
4.60	0.00	112.64	0.00				
4.80	0.00	112.64	0.00				
5.00	0.00	112.64	0.00				
5.20	0.00	112.64	0.00				
5.40	0.00	112.64	0.00				
5.60	0.00	112.64	0.00				
5.80	0.00	112.64	0.00				
6.00	0.00	112.64	0.00				
6.20	0.00	112.64	0.00				
6.40	0.00	112.64	0.00				
6.60	0.00	112.64	0.00				
6.80	0.00	112.64	0.00				
7.00	0.00	112.64	0.00				
7.20	0.00	112.64	0.00				
7.40	0.00	112.64	0.00				
7.60	0.00	112.64	0.00				
7.80	0.00	112.64	0.00				
8.00	0.00	112.64	0.00				
8.20	0.00	112.64	0.00				
8.40	0.00	112.64	0.00				
8.60	0.00	112.64	0.00				
8.80	0.00	112.64	0.00				
9.00	0.00	112.64	0.00				
9.20	0.00	112.64	0.00				
9.40	0.00	112.64	0.00				
9.60	0.00	112.64	0.00				
9.80	0.00	112.64	0.00				
10.00	0.00	112.64	0.00				



**22019-PR-HYD**

**Summary for Pond 9P: ADS System**

[63] Warning: Exceeded Reach 11R INLET depth by 1.27' @ 1.08 hrs  
[81] Warning: Exceeded Pond 8P by 0.82' @ 1.09 hrs

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth = 1.36" for 100-Year event  
Inflow = 1.39 cfs @ 0.11 hrs, Volume= 0.115 af  
Outflow = 0.55 cfs @ 1.05 hrs, Volume= 0.115 af, Atten= 60%, Lag= 56.5 min  
Primary = 0.55 cfs @ 1.05 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs  
Peak Elev= 113.49' @ 1.05 hrs Surf.Area= 0.077 ac Storage= 0.080 af

Plug-Flow detention time= 70.7 min calculated for 0.115 af (100% of inflow)  
Center-of-Mass det. time= 70.6 min ( 103.2 - 32.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	111.55'	0.049 af	<b>41.58"W x 80.79"L x 2.00'H Field A</b> 0.154 af Overall - 0.033 af Embedded = 0.121 af x 40.0% Voids
#2A	112.05'	0.033 af	<b>ADS_StormTech SC-160LP +Cap</b> x 209 Inside #1 Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap 209 Chambers in 19 Rows
		0.081 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	111.55'	<b>4.0" Round Culvert</b> L= 52.6' Ke= 0.200 Inlet / Outlet Invert= 111.55' / 109.80' S= 0.0333 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

**Primary OutFlow** Max=0.55 cfs @ 1.05 hrs HW=113.49' (Free Discharge)  
↑**1=Culvert** (Barrel Controls 0.55 cfs @ 6.31 fps)

**Pond 9P: ADS System - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechSC-160LP +Cap (ADS StormTech®SC-160LP with cap length)**

Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf

Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap

11 Chambers/Row x 7.12' Long +0.23' Cap Length x 2 = 78.79' Row Length +12.0" End Stone x 2 = 80.79' Base Length

19 Rows x 25.0" Wide + 12.0" Side Stone x 2 = 41.58' Base Width

6.0" Stone Base + 12.0" Chamber Height + 6.0" Stone Cover = 2.00' Field Height

209 Chambers x 6.8 cf = 1,428.9 cf Chamber Storage

6,718.8 cf Field - 1,428.9 cf Chambers = 5,289.8 cf Stone x 40.0% Voids = 2,115.9 cf Stone Storage

Chamber Storage + Stone Storage = 3,544.9 cf = 0.081 af

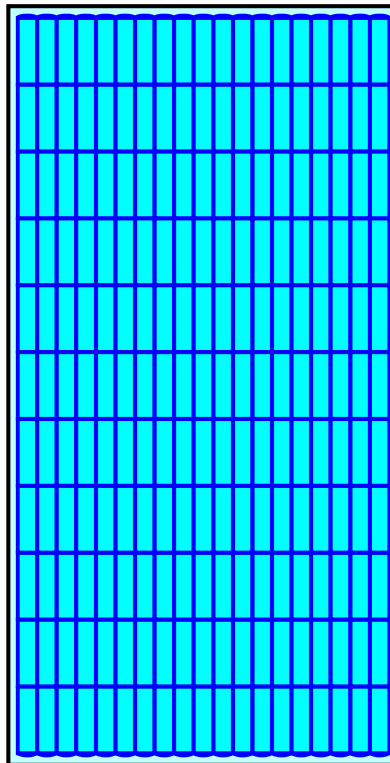
Overall Storage Efficiency = 52.8%

Overall System Size = 80.79' x 41.58' x 2.00'

209 Chambers

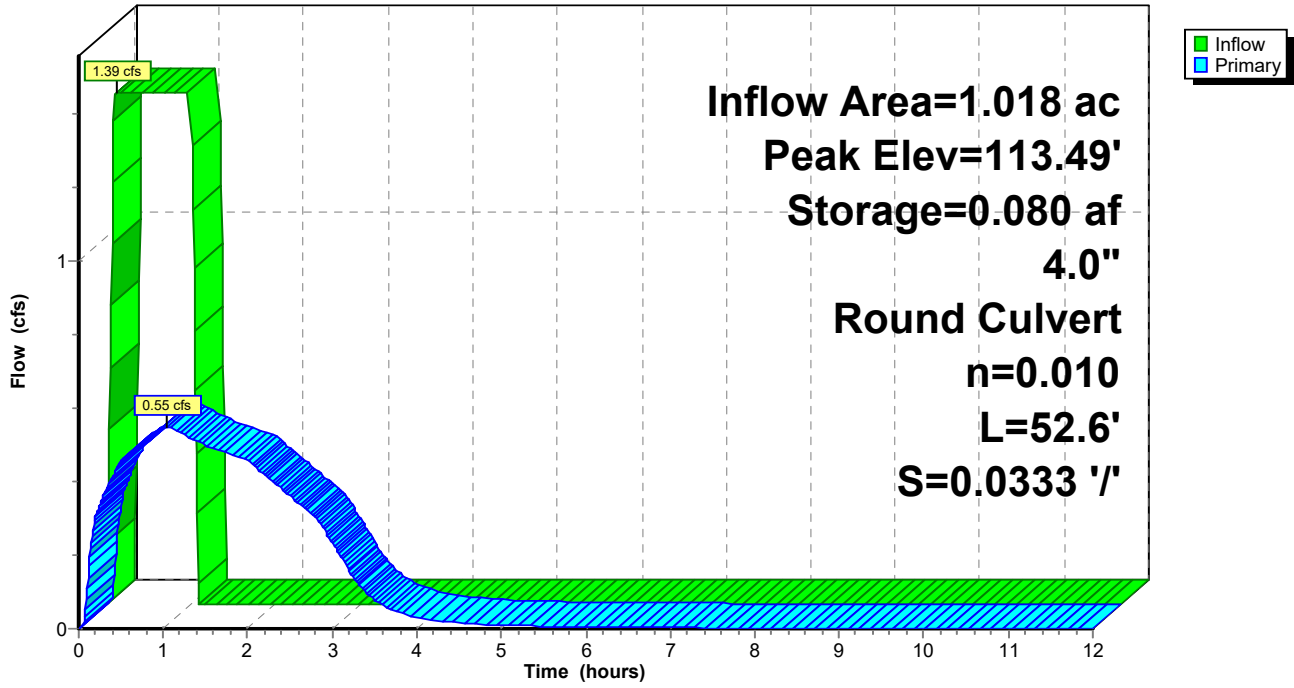
248.8 cy Field

195.9 cy Stone



### Pond 9P: ADS System

Hydrograph



**22019-PR-HYD**

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CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

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Page 49

**Hydrograph for Pond 9P: ADS System**

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	<b>0.00</b>	0.000	111.55	0.00
0.50	<b>1.39</b>	0.041	112.48	0.46
1.00	1.39	<b>0.078</b>	<b>113.43</b>	<b>0.55</b>
1.50	0.00	<b>0.061</b>	<b>112.90</b>	<b>0.50</b>
2.00	0.00	0.041	112.48	0.46
2.50	0.00	0.024	112.19	0.36
3.00	0.00	0.011	111.92	0.23
3.50	0.00	0.005	111.72	0.08
4.00	0.00	0.003	111.65	0.03
4.50	0.00	0.002	111.62	0.02
5.00	0.00	0.002	111.61	0.01
5.50	0.00	0.001	111.59	0.01
6.00	0.00	0.001	111.59	0.00
6.50	0.00	0.001	111.58	0.00
7.00	0.00	0.001	111.58	0.00
7.50	0.00	0.001	111.57	0.00
8.00	0.00	0.001	111.57	0.00
8.50	0.00	0.001	111.57	0.00
9.00	0.00	0.001	111.57	0.00
9.50	0.00	0.001	111.57	0.00
10.00	0.00	0.000	111.57	0.00
10.50	0.00	0.000	111.56	0.00
11.00	0.00	0.000	111.56	0.00
11.50	0.00	0.000	111.56	0.00
12.00	0.00	0.000	111.56	0.00

### Summary for Pond 10P: Outlet #2

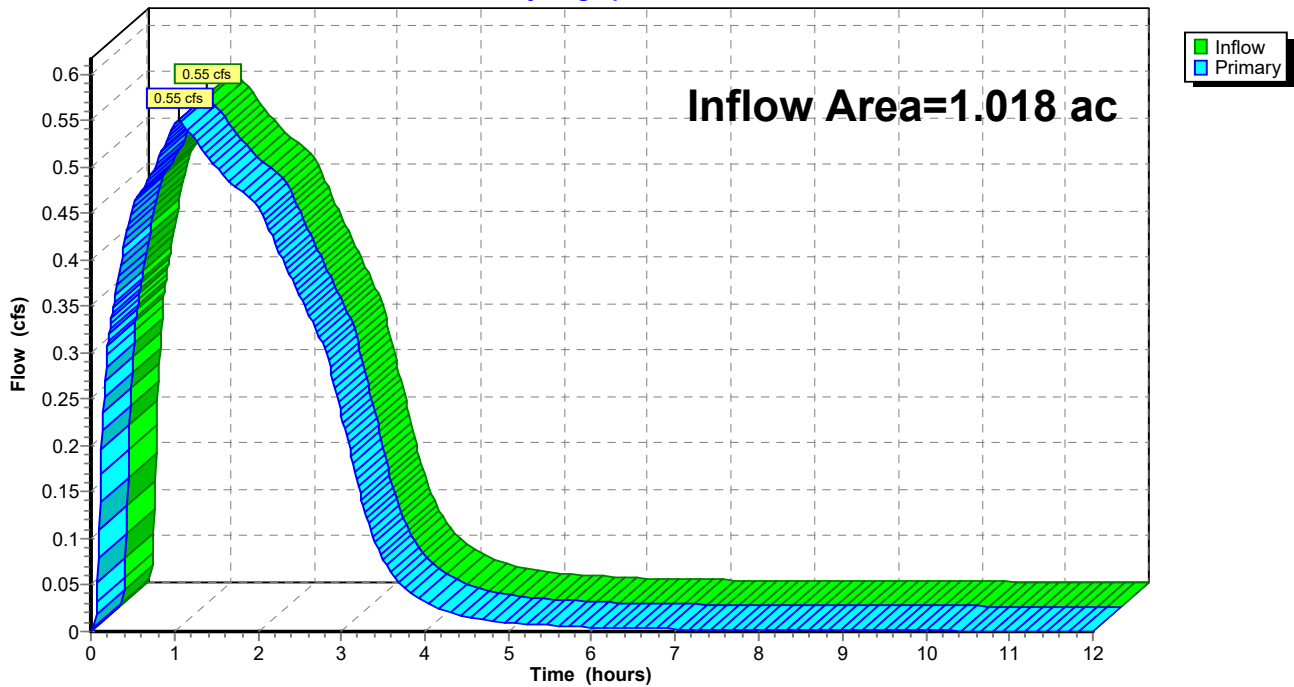
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.018 ac, 84.28% Impervious, Inflow Depth > 1.35" for 100-Year event  
Inflow = 0.55 cfs @ 1.05 hrs, Volume= 0.115 af  
Primary = 0.55 cfs @ 1.05 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs

### Pond 10P: Outlet #2

Hydrograph



**22019-PR-HYD**

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CA-Orange County, CA 100-Year Duration=60 min, Inten=1.49 in/hr

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Page 51

**Hydrograph for Pond 10P: Outlet #2**

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00		0.00	10.20	0.00		0.00
0.20	0.31		0.31	10.40	0.00		0.00
0.40	0.42		0.42	10.60	0.00		0.00
0.60	0.47		0.47	10.80	0.00		0.00
0.80	0.51		0.51	11.00	0.00		0.00
1.00	<b>0.55</b>		<b>0.55</b>	11.20	0.00		0.00
1.20	<b>0.53</b>		<b>0.53</b>	11.40	0.00		0.00
1.40	0.51		0.51	11.60	0.00		0.00
1.60	0.49		0.49	11.80	0.00		0.00
1.80	0.48		0.48	12.00	0.00		0.00
2.00	0.46		0.46				
2.20	0.42		0.42				
2.40	0.38		0.38				
2.60	0.34		0.34				
2.80	0.31		0.31				
3.00	0.23		0.23				
3.20	0.16		0.16				
3.40	0.10		0.10				
3.60	0.06		0.06				
3.80	0.04		0.04				
4.00	0.03		0.03				
4.20	0.02		0.02				
4.40	0.02		0.02				
4.60	0.01		0.01				
4.80	0.01		0.01				
5.00	0.01		0.01				
5.20	0.01		0.01				
5.40	0.01		0.01				
5.60	0.01		0.01				
5.80	0.01		0.01				
6.00	0.00		0.00				
6.20	0.00		0.00				
6.40	0.00		0.00				
6.60	0.00		0.00				
6.80	0.00		0.00				
7.00	0.00		0.00				
7.20	0.00		0.00				
7.40	0.00		0.00				
7.60	0.00		0.00				
7.80	0.00		0.00				
8.00	0.00		0.00				
8.20	0.00		0.00				
8.40	0.00		0.00				
8.60	0.00		0.00				
8.80	0.00		0.00				
9.00	0.00		0.00				
9.20	0.00		0.00				
9.40	0.00		0.00				
9.60	0.00		0.00				
9.80	0.00		0.00				
10.00	0.00		0.00				