

# 200 WEST GLORIA SWITCH

## PHASE 1 (BIG POPPA'S)

Drainage Calculations

City of Carencro  
(Lafayette Parish, LA)

TEI # 07-001-1015  
(Revision 1)

February 13, 2008



Prepared by:

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## I. Summary

The enclosed calculations compare the existing site drainage conditions to the proposed Phase 1 build-out condition. The peak storm water runoff from pre to post development for the 10 year storm event results in a net decrease of 3.37 cfs or 17.2%, which is summarized below:

### Undeveloped:

Subcatchment No. 1	17.02 cfs
<u>Subcatchment No. 2</u>	<u>2.52 cfs</u>
Total	19.54 cfs

### Developed

Subcatchment No. 1	10.45 cfs
<u>Pond No. 1</u>	<u>5.72 cfs</u>
Total	16.17 cfs

Net Reduction                      3.37 cfs (17.2%)

The Detention Pond included in Phase 1 consists of 46,617 cf of storage volume, a 15" diameter culvert outfall control device, and an emergency spillover weir. The pond was designed to reduce the overall peak flow for the 10 year storm event, and was also analyzed for a 100 year storm event. While this pond has an emergency spillway incorporated in the design, the high water elevation for the 100 year storm event is not anticipated to peak over the spillway under the Phase 1 build condition.

## **II. Undeveloped Condition**

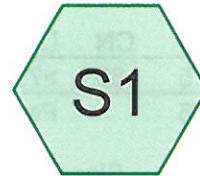
### **A. Introduction:**

The existing 5.99 acres undeveloped site consists of an open field with mowed grass. The majority of the site drains west into the existing ditch along the west property line, while a small portion drains onto the adjacent land to the east. The existing drainage patterns are illustrated on Sheet D-1.

### **B. Design Criteria:**

The existing site was modeled into 2 segments as described above, using the SCS method. The existing soils are classified as (9) Frost soils group, which are considered poorly draining soils. The soils map and the Frost group soils description can be found in the Appendix.

C.. Computer Model Calculations follow.



UNDEVELOPED



UNDEVELOPED



**Undeveloped**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment S1: UNDEVELOPED**

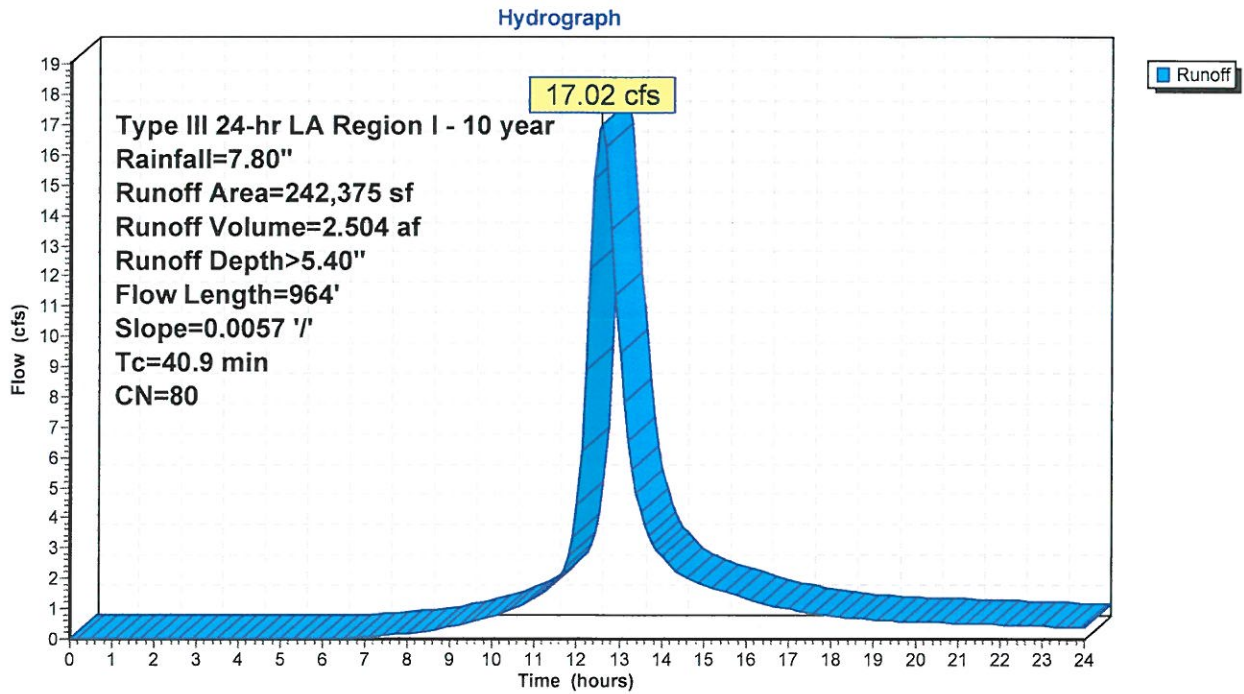
Runoff = 17.02 cfs @ 12.55 hrs, Volume= 2.504 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
242,375	80	>75% Grass cover, Good, HSG D
242,375		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.9	964	0.0057	0.39		Lag/CN Method, Open Field

**Subcatchment S1: UNDEVELOPED**



**Undeveloped**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment S2: UNDEVELOPED**

[49] Hint: Tc<2dt may require smaller dt

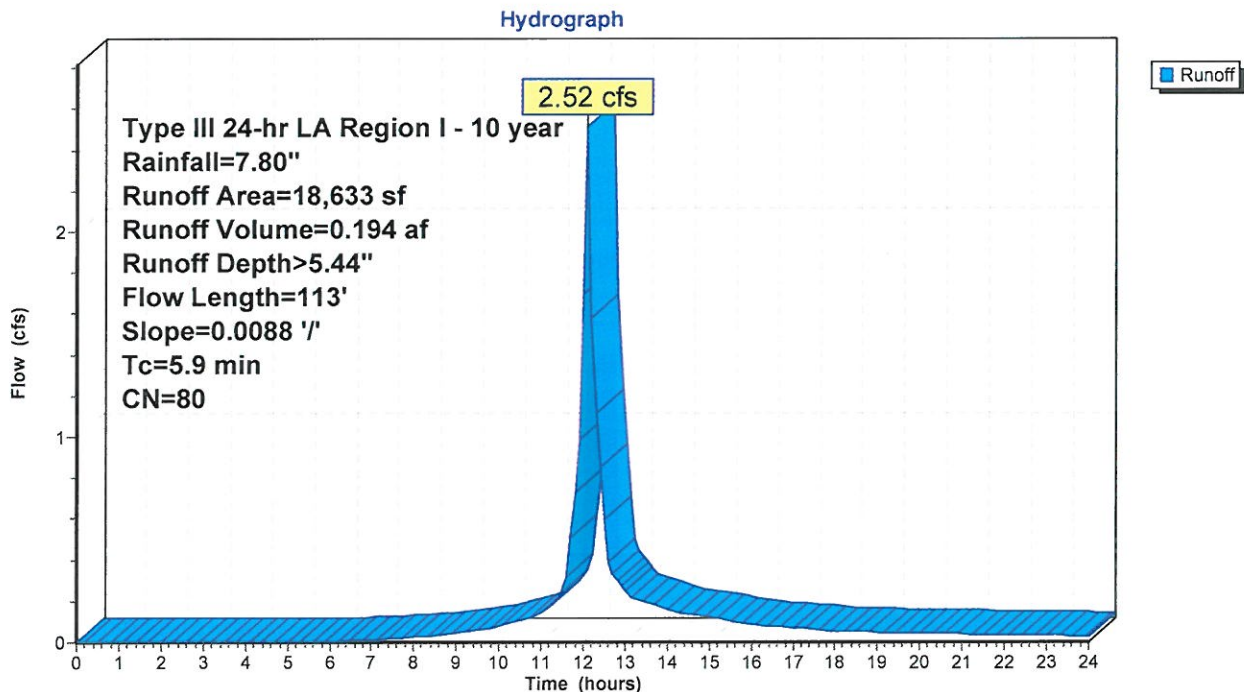
Runoff = 2.52 cfs @ 12.10 hrs, Volume= 0.194 af, Depth> 5.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
18,633	80	>75% Grass cover, Good, HSG D
18,633		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	113	0.0088	0.32		Lag/CN Method,

**Subcatchment S2: UNDEVELOPED**



### **III. Developed Condition**

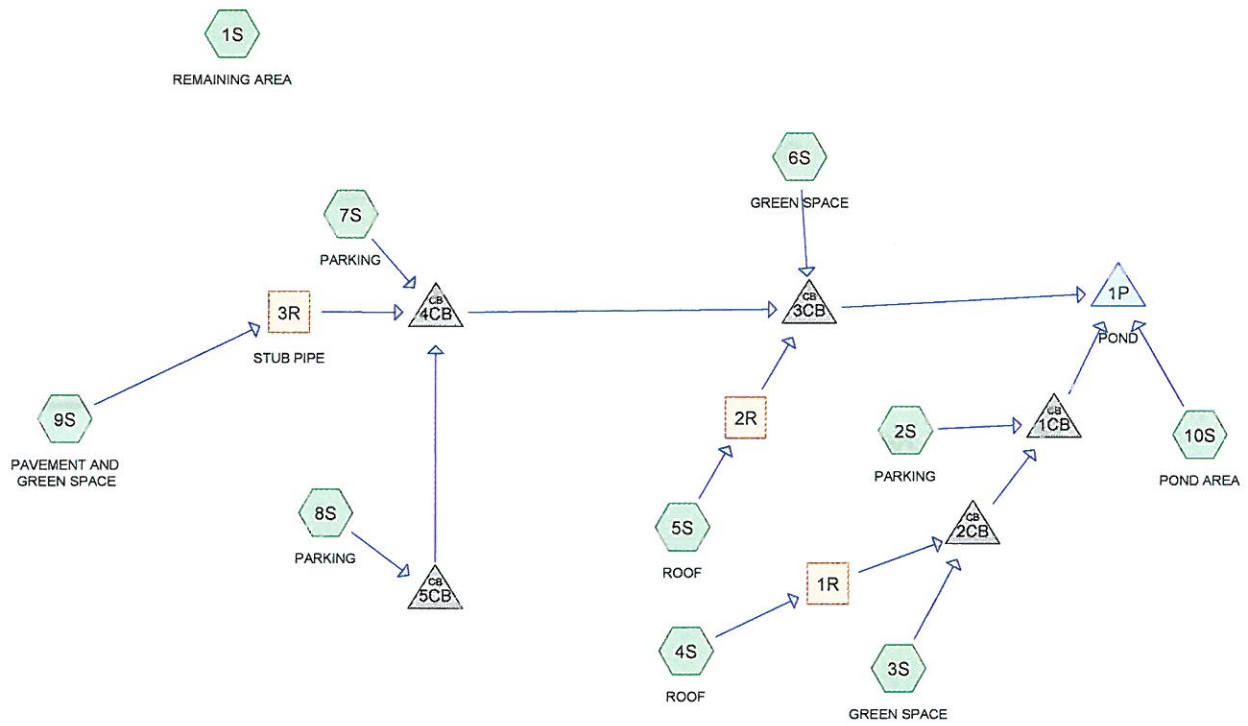
#### **A. Introduction:**

The proposed condition for Phase 1 consists of a 10,500 sf building with street access and parking. The proposed site layout may be found on Sheet D-2.

#### **B. Design Criteria:**

The proposed development was subdivided into smaller subcatchments and routed through a sub-surface drainage system, using the SCS method. A detention pond was incorporated to enable the reduction in peak flow for the 10 year storm event. The outfall control structure will be a 15" diameter pipe, with an emergency spillover wier to be utilized for much larger storm events. The tailwater elevation at the pond outfall was assumed at 2 feet depth. All parking and roof areas were keyed into the design program with a CN of 98. The undeveloped areas remained as the existing grass condition.

#### **C. Computer Model Calculations follow.**



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 1S: REMAINING AREA**

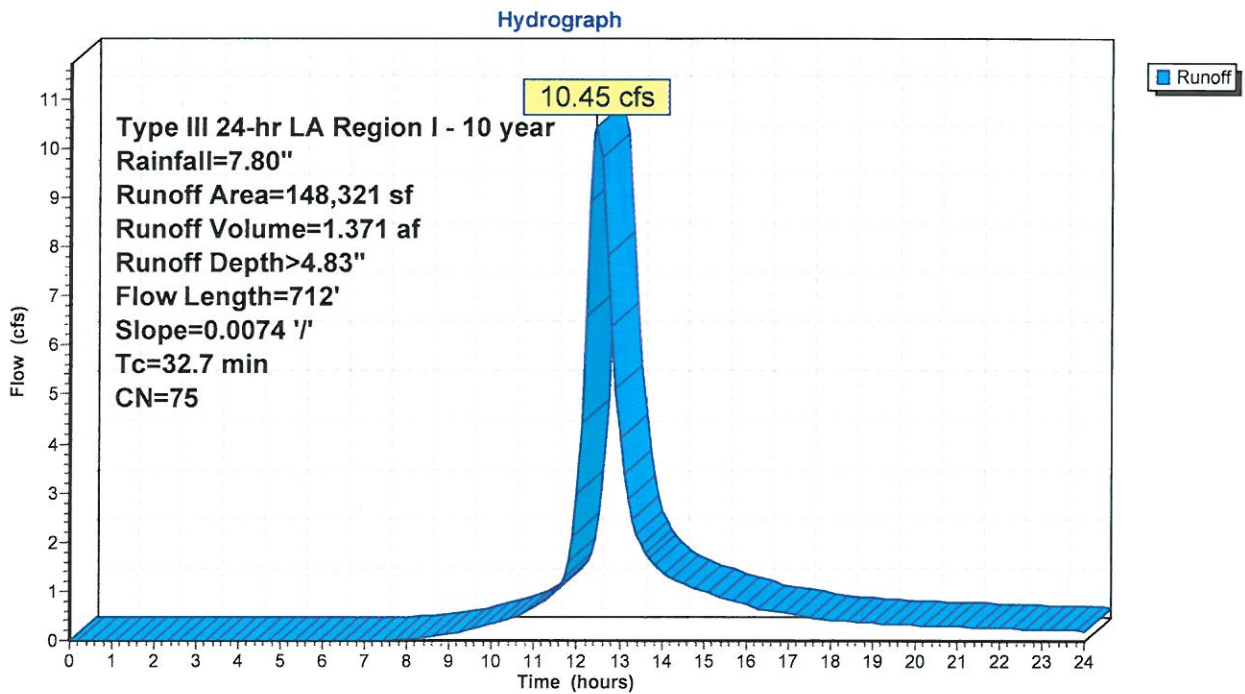
Runoff = 10.45 cfs @ 12.45 hrs, Volume= 1.371 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
139,767	74	>75% Grass cover, Good, HSG C
8,554	98	Paved roads w/curbs & sewers
148,321	75	Weighted Average
139,767		Pervious Area
8,554		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.7	712	0.0074	0.36		Lag/CN Method,

**Subcatchment 1S: REMAINING AREA**



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 2S: PARKING**

[49] Hint:  $T_c < 2dt$  may require smaller dt

Runoff = 1.26 cfs @ 12.02 hrs, Volume= 0.109 af, Depth> 7.56"

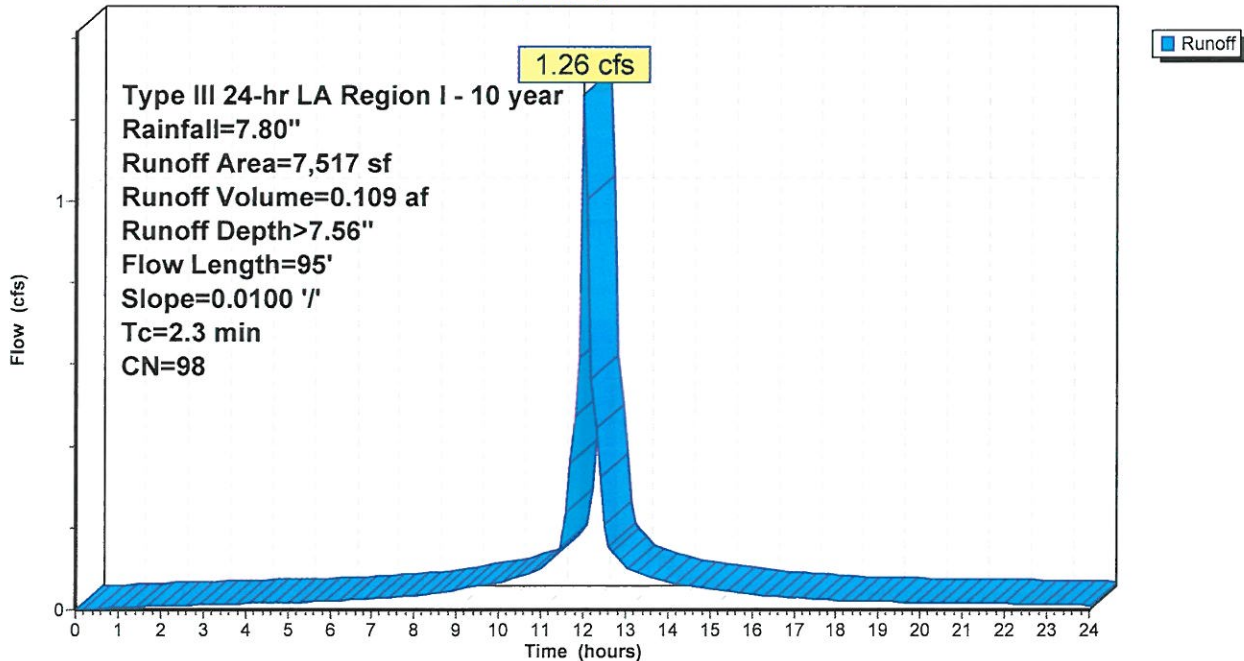
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
7,517	98	Paved parking & roofs
7,517		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	95	0.0100	0.69		Lag/CN Method,

**Subcatchment 2S: PARKING**

Hydrograph



**Developed-Ph1**

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Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 3S: GREEN SPACE**

[49] Hint:  $T_c < 2dt$  may require smaller dt

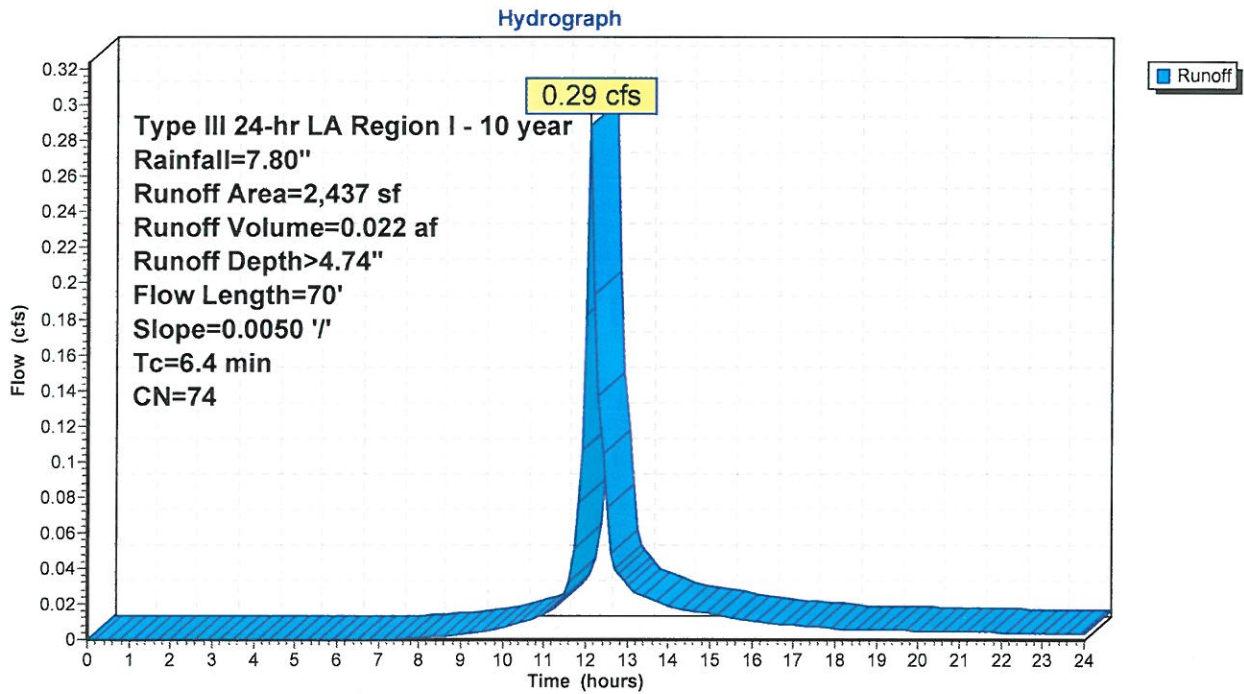
Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af, Depth> 4.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
2,437	74	>75% Grass cover, Good, HSG C
2,437		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	70	0.0050	0.18		Lag/CN Method,

**Subcatchment 3S: GREEN SPACE**



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 4S: ROOF**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.95 cfs @ 12.00 hrs, Volume= 0.075 af, Depth> 7.56"

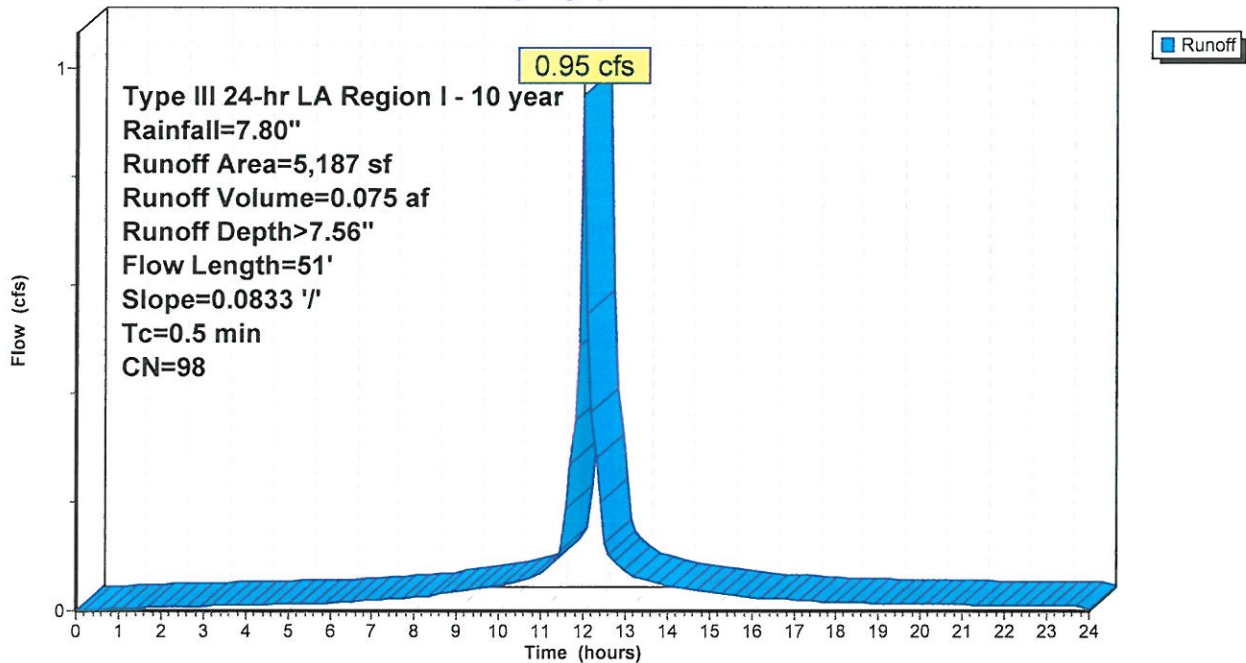
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
5,187	98	Paved parking & roofs
5,187		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	51	0.0833	1.76		Lag/CN Method,

**Subcatchment 4S: ROOF**

Hydrograph



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 5S: ROOF**

[49] Hint:  $T_c < 2dt$  may require smaller dt

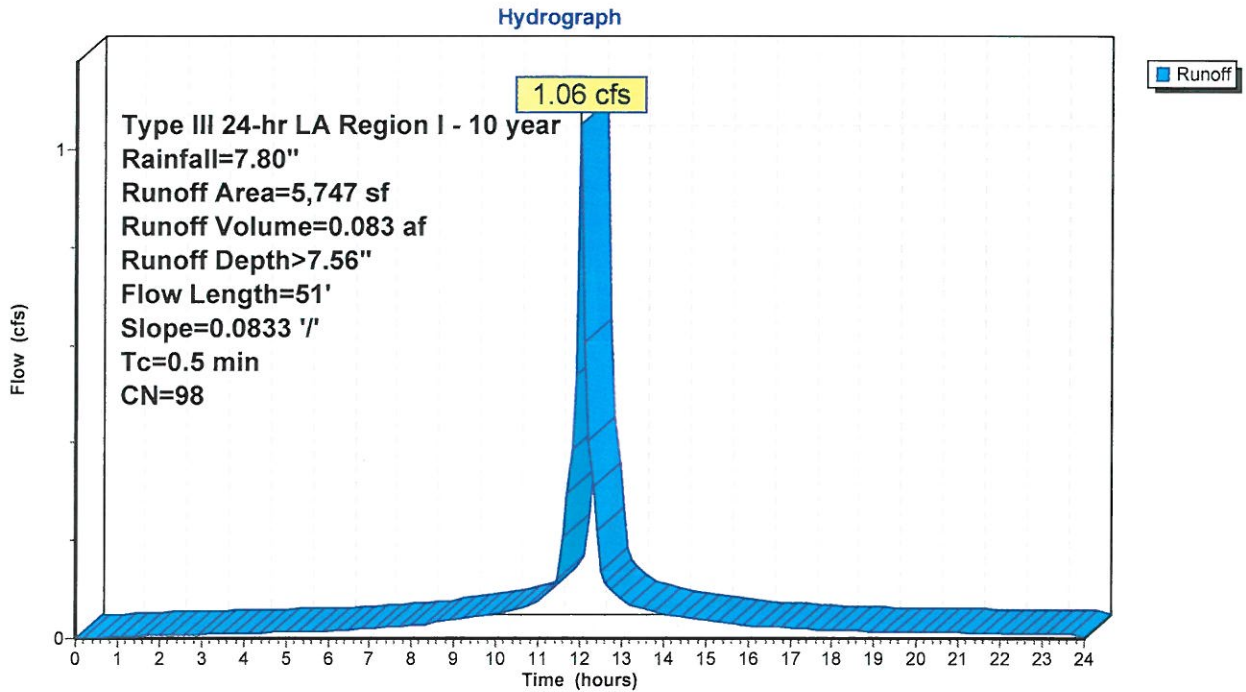
Runoff = 1.06 cfs @ 12.00 hrs, Volume= 0.083 af, Depth> 7.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
5,747	98	Paved parking & roofs
5,747		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	51	0.0833	1.76		Lag/CN Method,

**Subcatchment 5S: ROOF**



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 6S: GREEN SPACE**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.47 cfs @ 12.10 hrs, Volume= 0.036 af, Depth> 4.74"

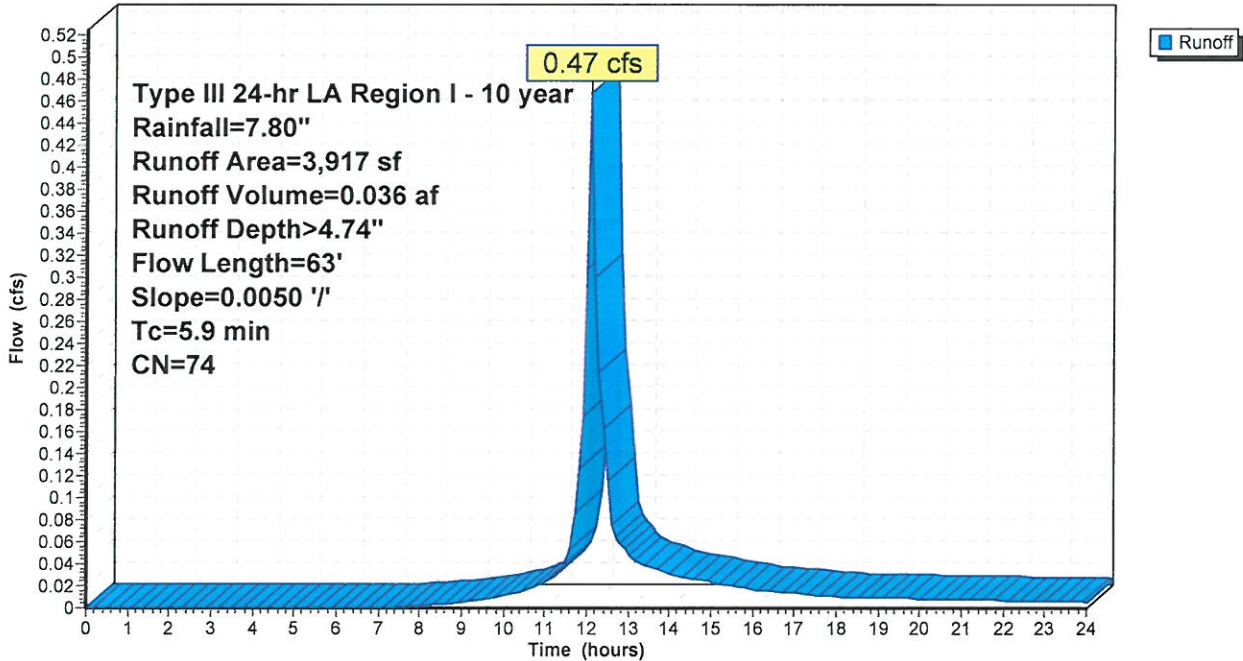
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
3,917	74	>75% Grass cover, Good, HSG C
3,917		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	63	0.0050	0.18		Lag/CN Method,

**Subcatchment 6S: GREEN SPACE**

Hydrograph



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 7S: PARKING**

[49] Hint: Tc<2dt may require smaller dt

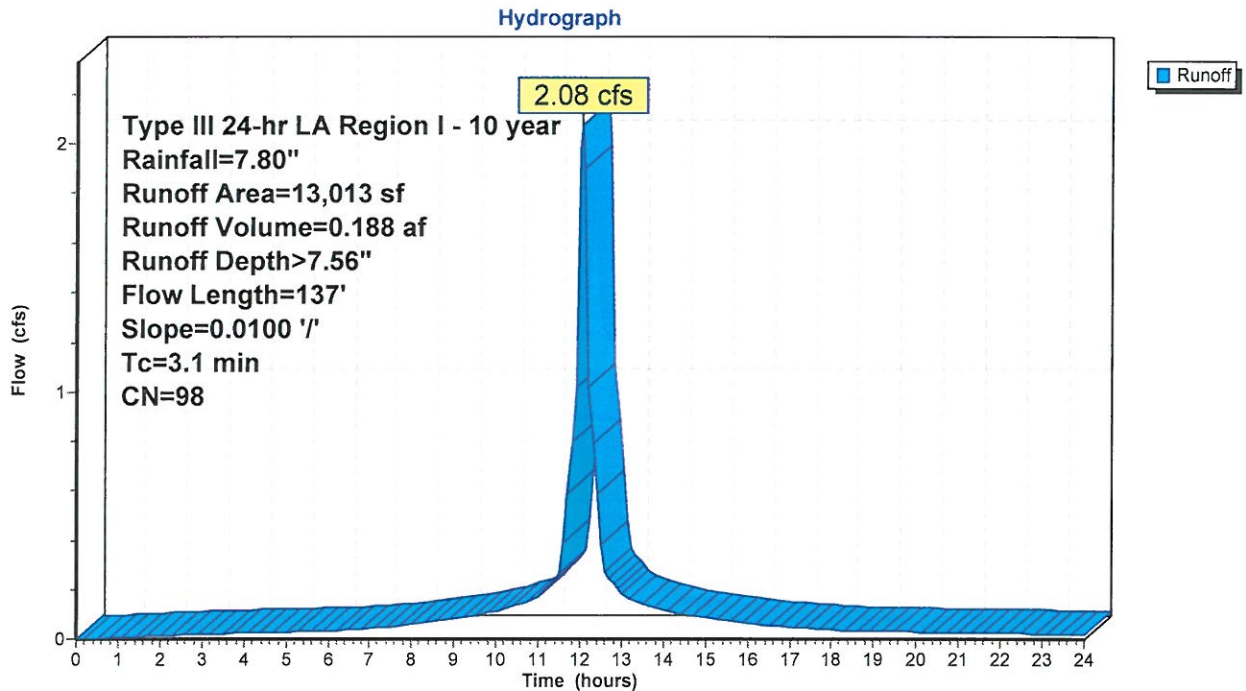
Runoff = 2.08 cfs @ 12.04 hrs, Volume= 0.188 af, Depth> 7.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
13,013	98	Paved parking & roofs
13,013		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	137	0.0100	0.74		Lag/CN Method,

**Subcatchment 7S: PARKING**



**Subcatchment 8S: PARKING**

[49] Hint:  $T_c < 2dt$  may require smaller  $dt$

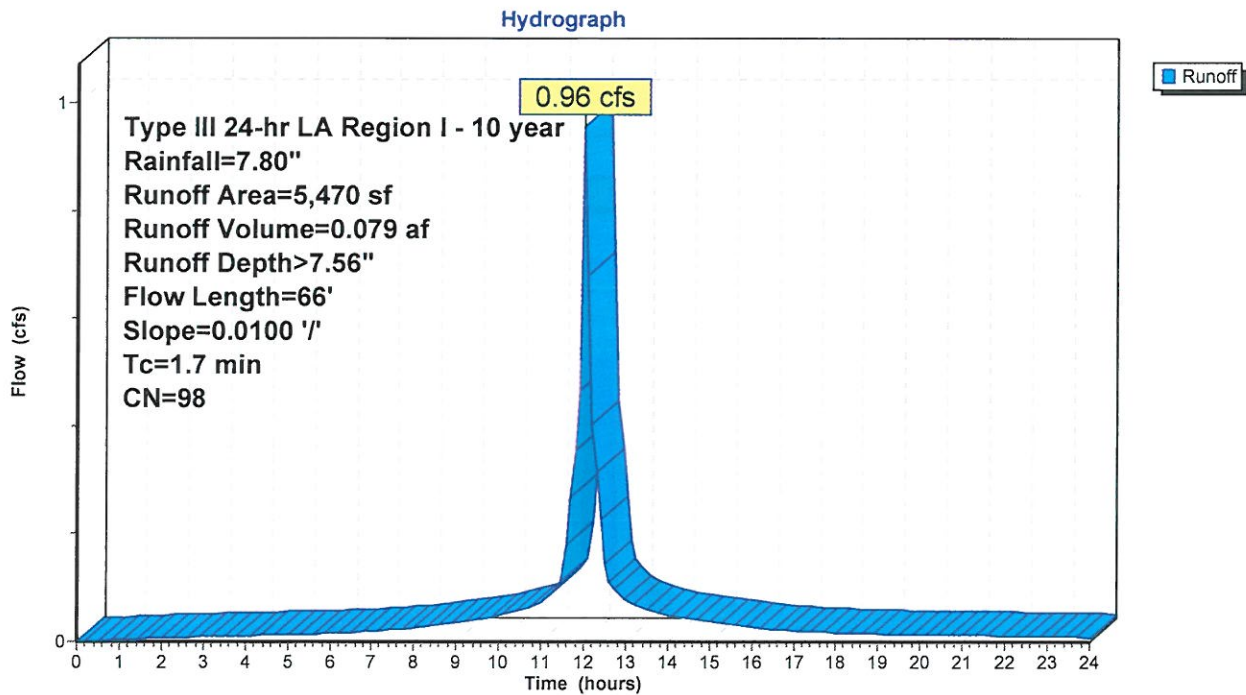
Runoff = 0.96 cfs @ 12.01 hrs, Volume= 0.079 af, Depth> 7.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs,  $dt= 0.10$  hrs  
 Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
5,470	98	Paved roads w/curbs & sewers
5,470		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	66	0.0100	0.64		Lag/CN Method,

**Subcatchment 8S: PARKING**



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 9S: PAVEMENT AND GREEN SPACE**

[49] Hint:  $T_c < 2dt$  may require smaller dt

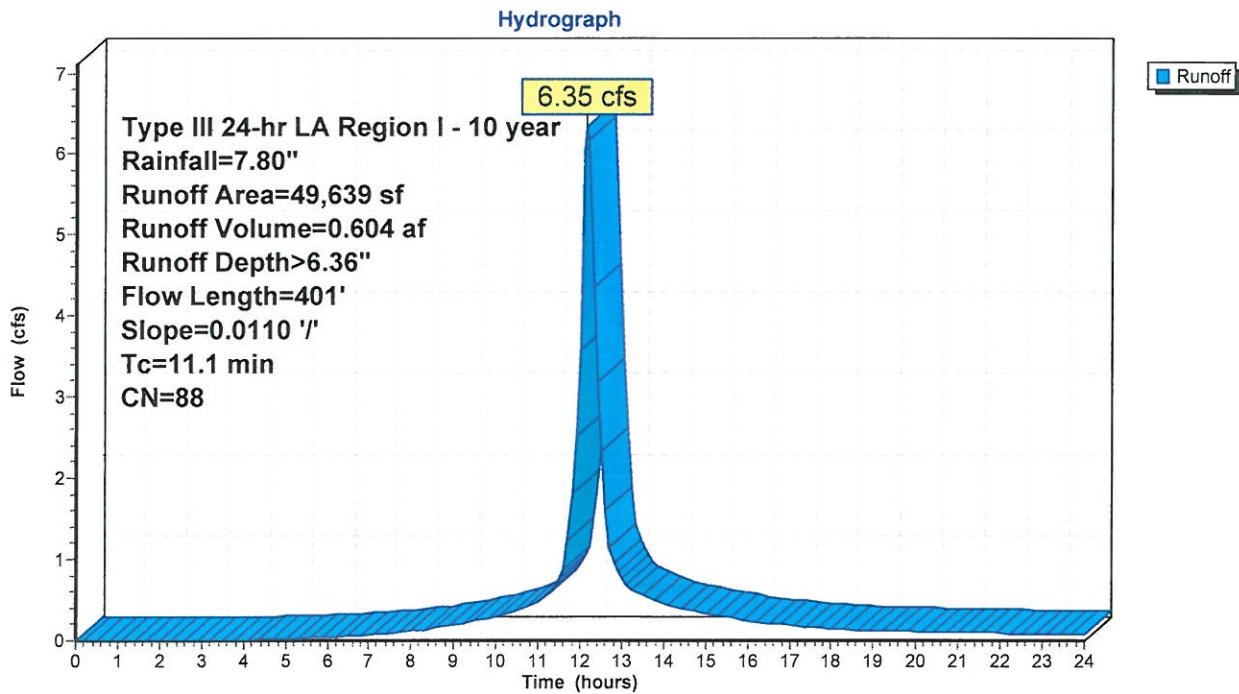
Runoff = 6.35 cfs @ 12.16 hrs, Volume= 0.604 af, Depth> 6.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
28,083	80	>75% Grass cover, Good, HSG D
21,556	98	Paved parking & roofs
49,639	88	Weighted Average
28,083		Pervious Area
21,556		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	401	0.0110	0.60		Lag/CN Method,

**Subcatchment 9S: PAVEMENT AND GREEN SPACE**



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Subcatchment 10S: POND AREA**

[49] Hint: Tc<2dt may require smaller dt

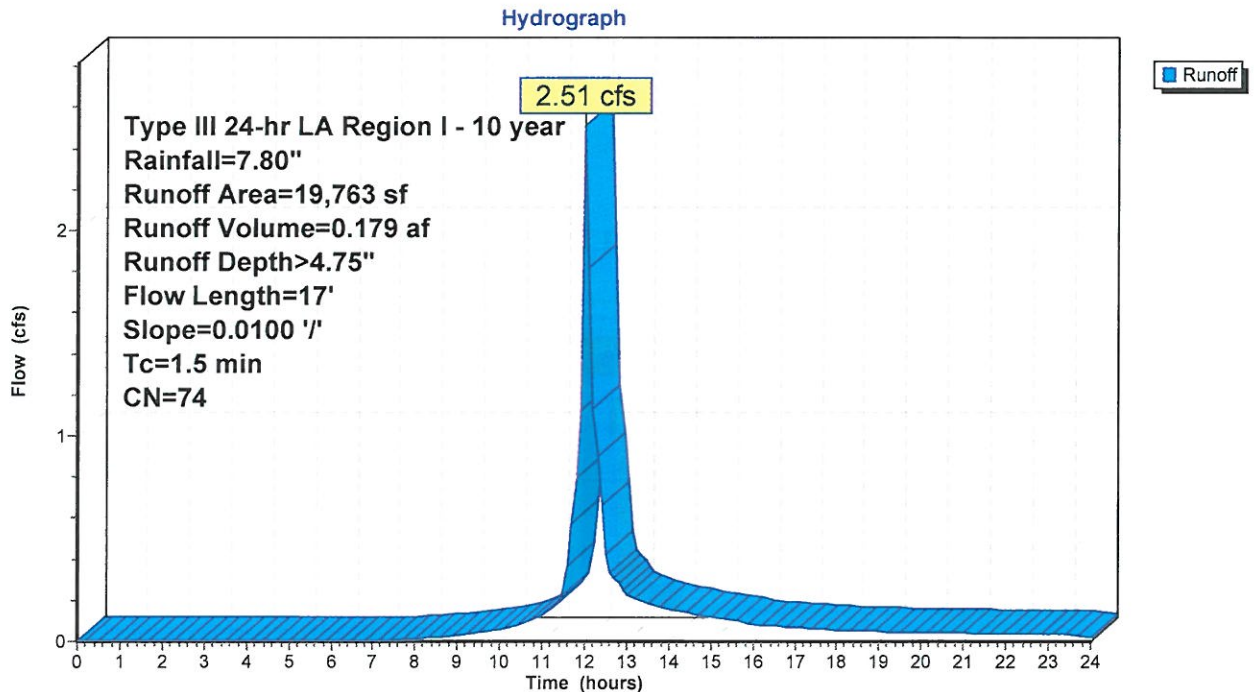
Runoff = 2.51 cfs @ 12.02 hrs, Volume= 0.179 af, Depth> 4.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Area (sf)	CN	Description
19,763	74	>75% Grass cover, Good, HSG C
19,763		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	17	0.0100	0.19		Lag/CN Method,

**Subcatchment 10S: POND AREA**



**Developed-Ph1**

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Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Reach 1R:**

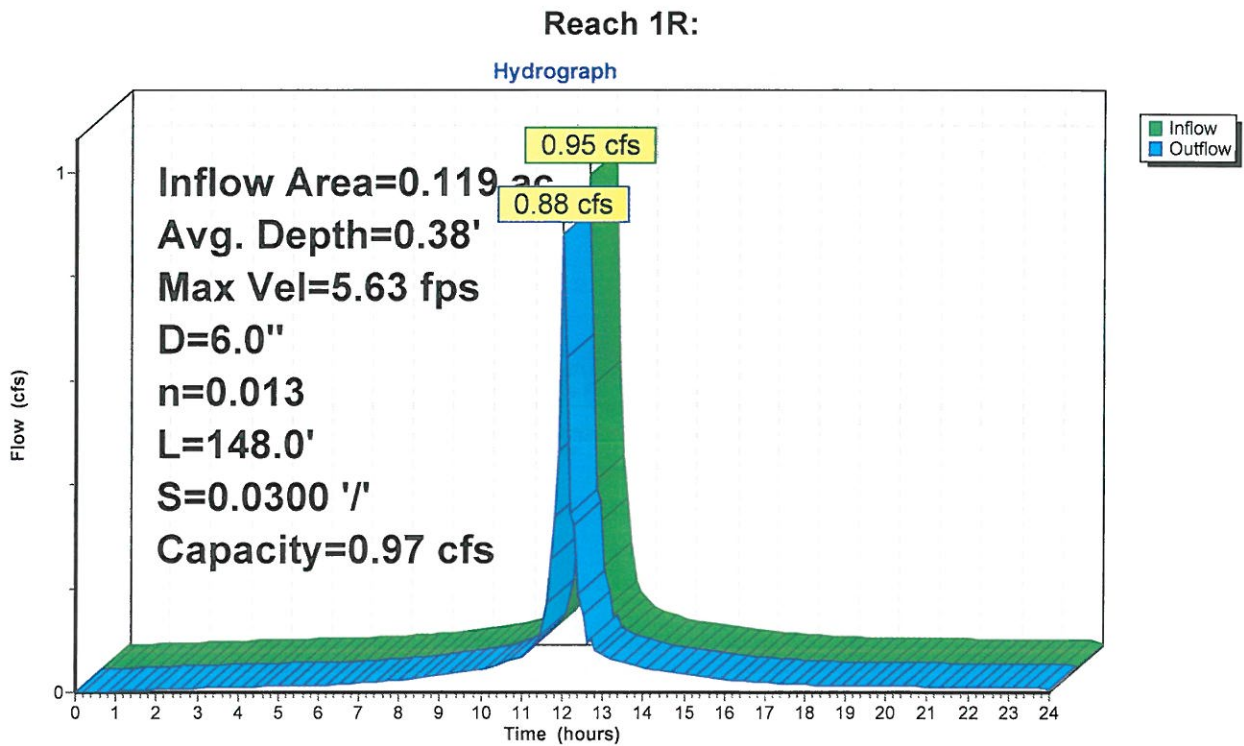
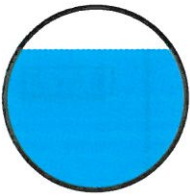
[52] Hint: Inlet conditions not evaluated

Inflow Area = 0.119 ac, Inflow Depth > 7.56" for LA Region I - 10 year event  
Inflow = 0.95 cfs @ 12.00 hrs, Volume= 0.075 af  
Outflow = 0.88 cfs @ 12.01 hrs, Volume= 0.075 af, Atten= 7%, Lag= 0.6 min

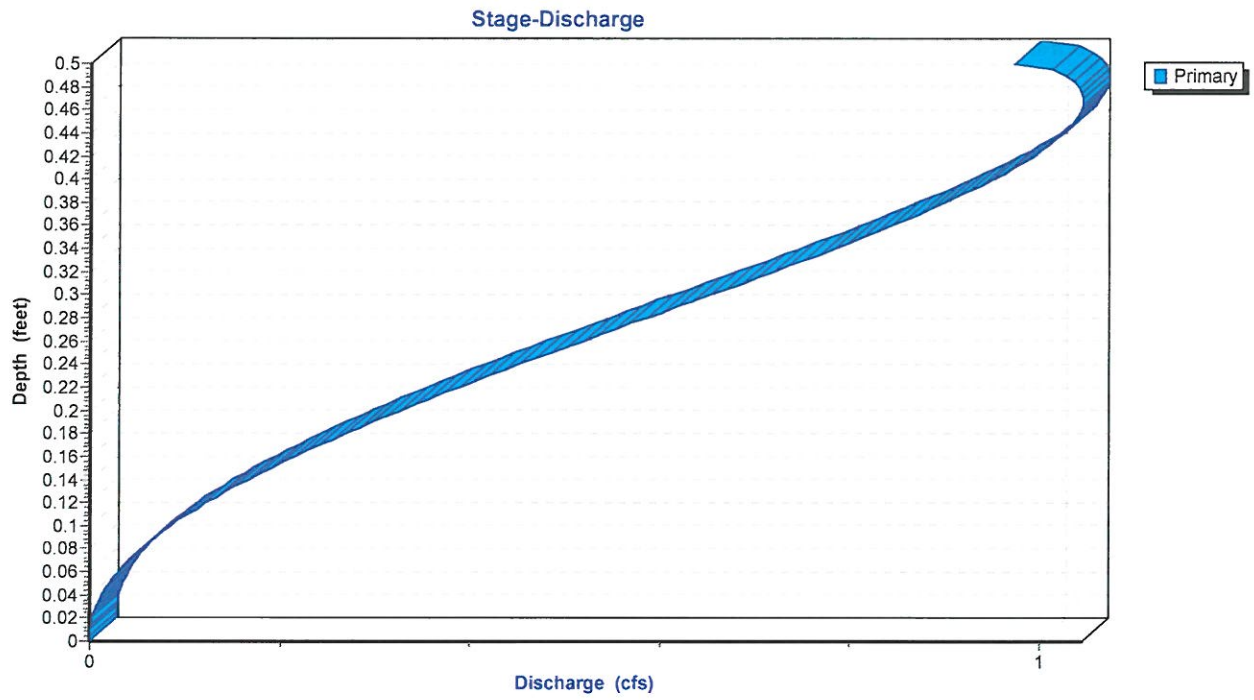
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 5.63 fps, Min. Travel Time= 0.4 min  
Avg. Velocity = 2.04 fps, Avg. Travel Time= 1.2 min

Peak Storage= 24 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.38'  
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.97 cfs

6.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior  
Length= 148.0' Slope= 0.0300 '/'  
Inlet Invert= 43.90', Outlet Invert= 39.46'



Reach 1R:



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Reach 2R:**

[52] Hint: Inlet conditions not evaluated

[55] Hint: Peak inflow is 109% of Manning's capacity

[85] Warning: Oscillations may require Finer Routing>1

Inflow Area =	0.132 ac,	Inflow Depth > 7.56"	for LA Region I - 10 year event
Inflow =	1.06 cfs @ 12.00 hrs,	Volume=	0.083 af
Outflow =	1.00 cfs @ 12.01 hrs,	Volume=	0.083 af, Atten= 5%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Max. Velocity= 5.61 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 2.11 fps, Avg. Travel Time= 0.8 min

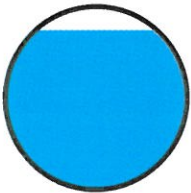
Peak Storage= 19 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.44'

Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.97 cfs

6.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior

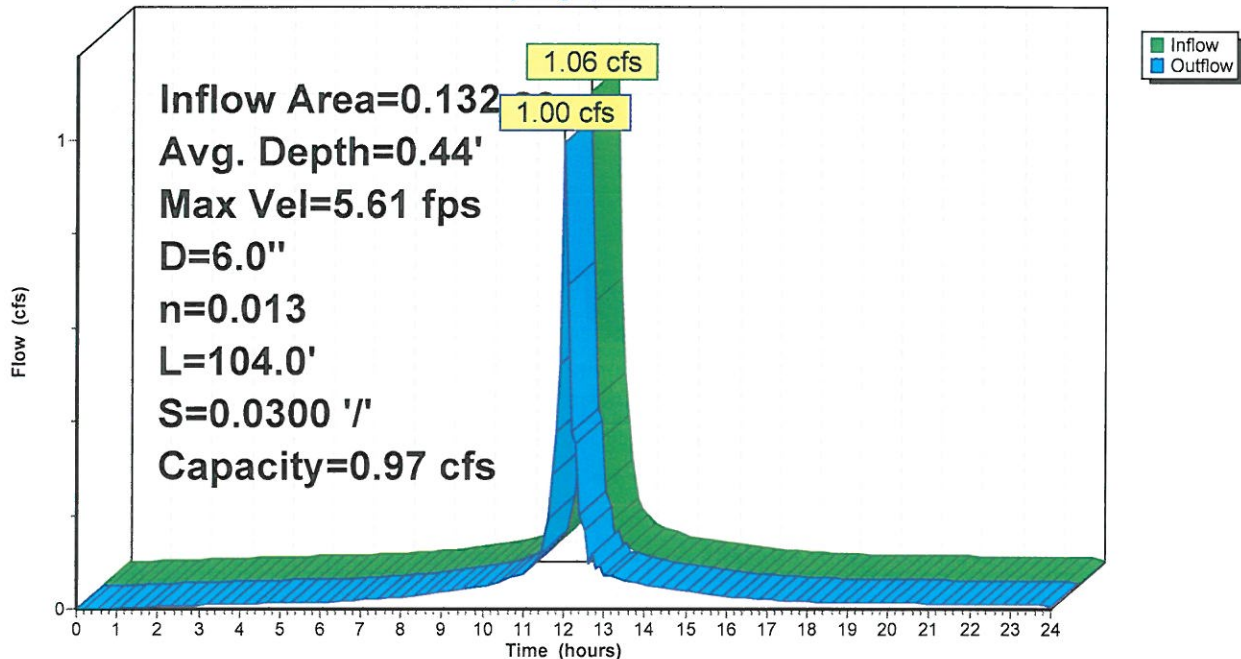
Length= 104.0' Slope= 0.0300 '/'

Inlet Invert= 42.45', Outlet Invert= 39.33'

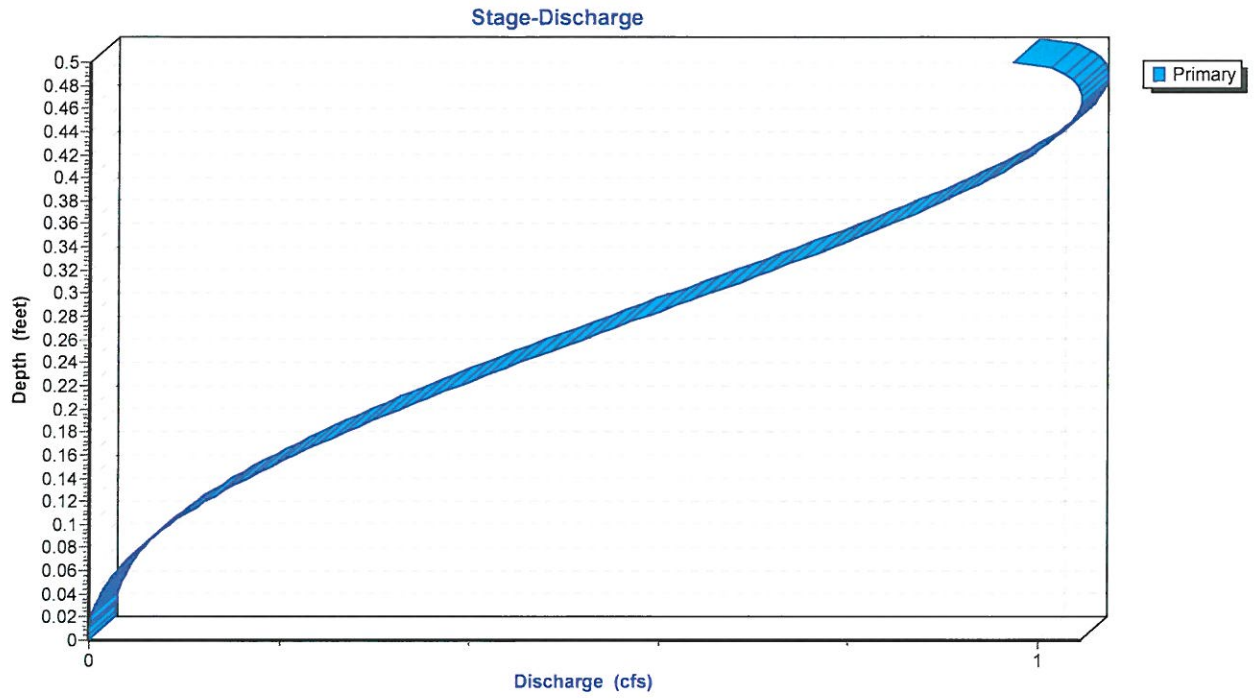


**Reach 2R:**

Hydrograph



Reach 2R:



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Reach 3R: STUB PIPE**

[52] Hint: Inlet conditions not evaluated

Inflow Area = 1.140 ac, Inflow Depth > 6.36" for LA Region I - 10 year event  
Inflow = 6.35 cfs @ 12.16 hrs, Volume= 0.604 af  
Outflow = 6.35 cfs @ 12.17 hrs, Volume= 0.604 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Max. Velocity= 3.95 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.7 min

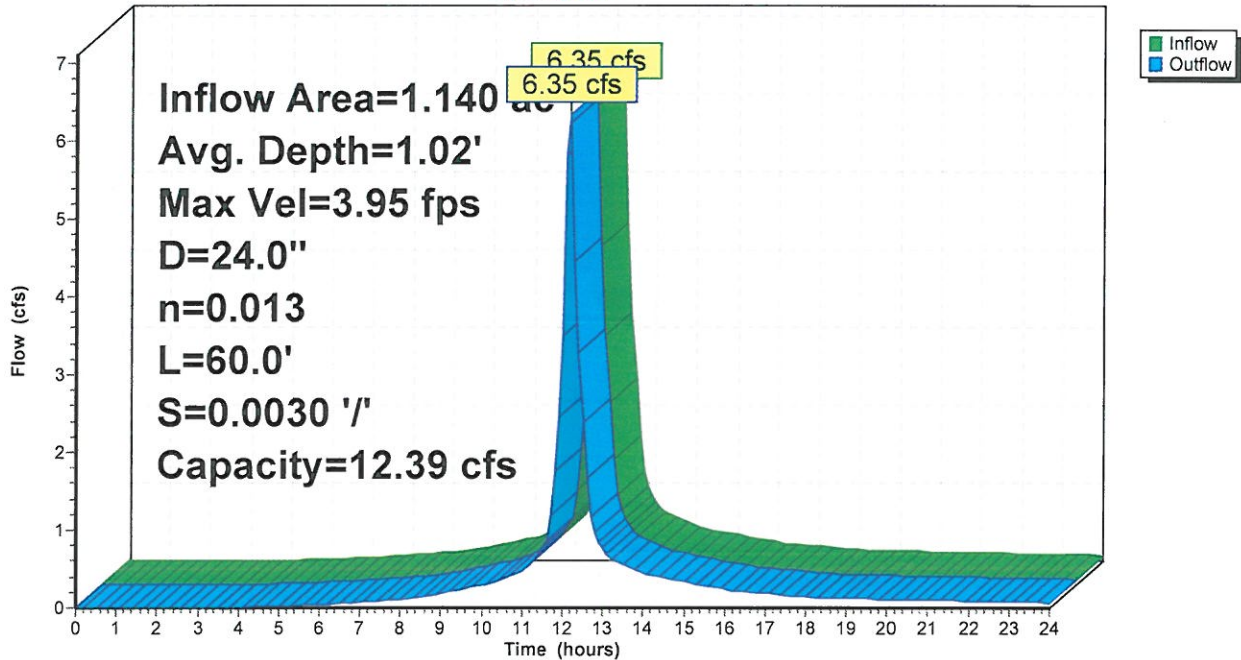
Peak Storage= 97 cf @ 12.16 hrs, Average Depth at Peak Storage= 1.02'  
Bank-Full Depth= 2.00', Capacity at Bank-Full= 12.39 cfs

24.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior  
Length= 60.0' Slope= 0.0030 '/'  
Inlet Invert= 39.87', Outlet Invert= 39.69'

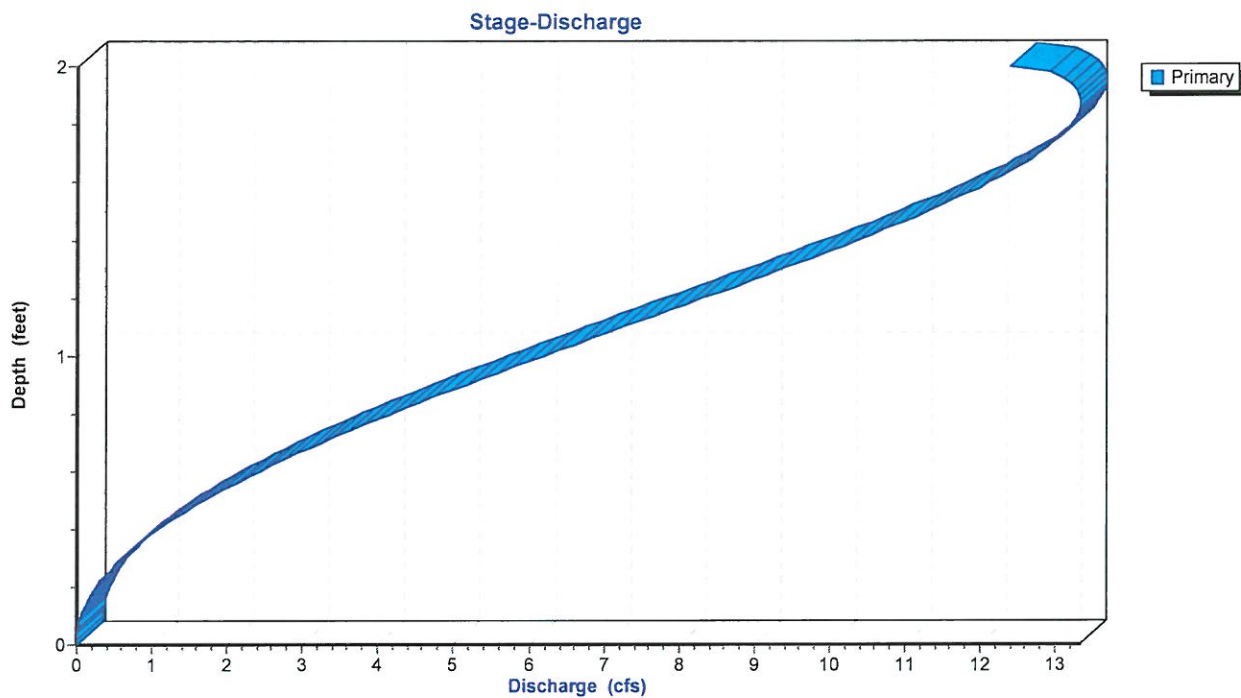


**Reach 3R: STUB PIPE**

Hydrograph



### Reach 3R: STUB PIPE



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Pond 1CB:**

[57] Hint: Peaked at 40.13' (Flood elevation advised)

[79] Warning: Submerged Pond 2CB Primary device # 1 INLET by 0.65'

Inflow Area = 0.348 ac, Inflow Depth > 7.11" for LA Region I - 10 year event  
 Inflow = 2.35 cfs @ 12.03 hrs, Volume= 0.206 af  
 Outflow = 2.35 cfs @ 12.03 hrs, Volume= 0.206 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.35 cfs @ 12.03 hrs, Volume= 0.206 af

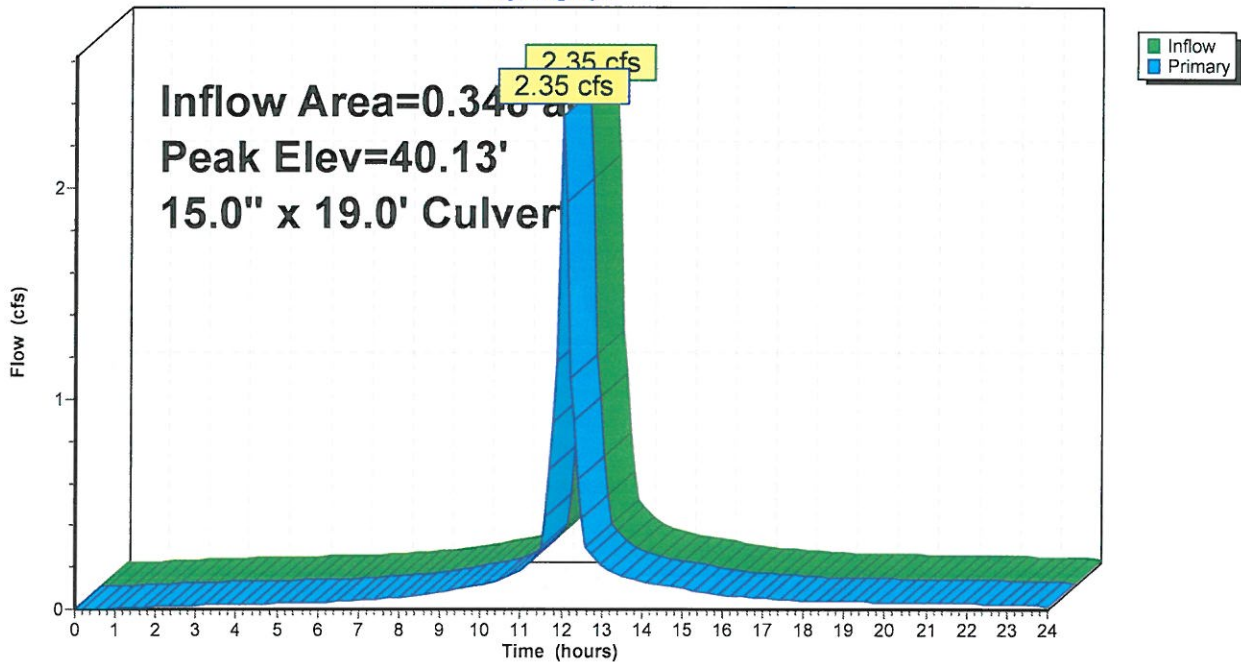
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
 Peak Elev= 40.13' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.16'	15.0" x 19.0' long Culvert RCP, square edge headwall, Ke= 0.500 Outlet Invert= 39.10' S= 0.0032 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

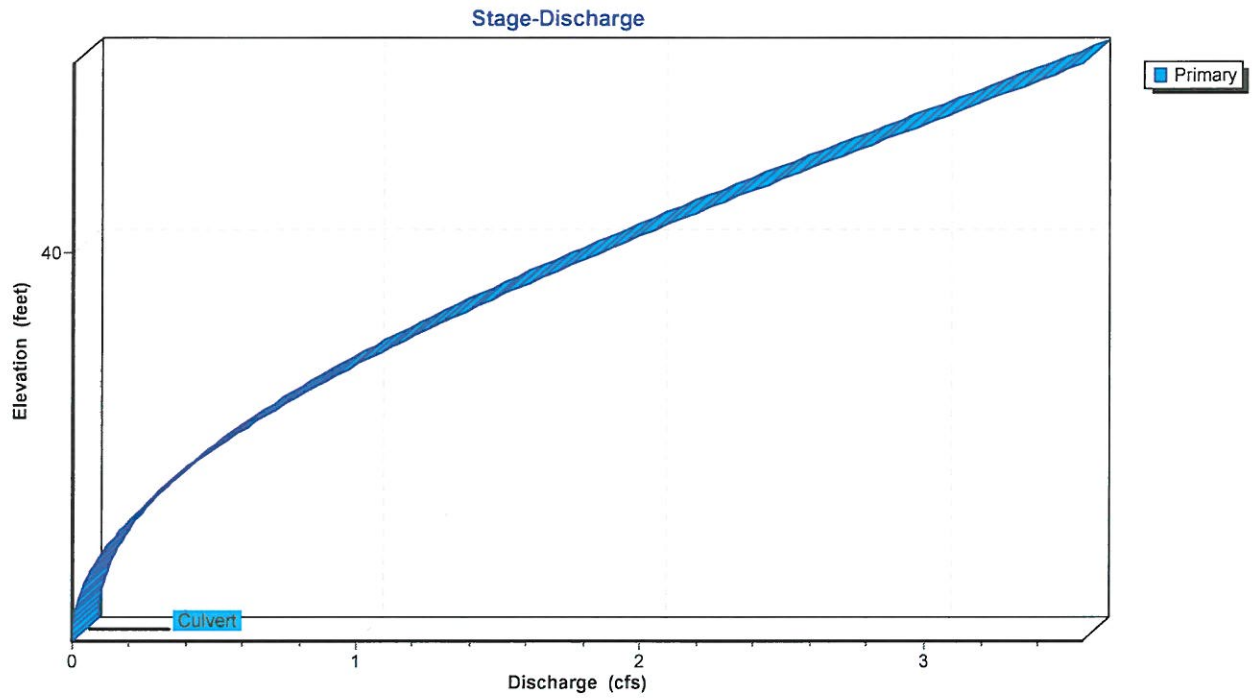
Primary OutFlow Max=2.21 cfs @ 12.03 hrs HW=40.09' (Free Discharge)  
 ←1=Culvert (Barrel Controls 2.21 cfs @ 3.14 fps)

**Pond 1CB:**

Hydrograph



### Pond 1CB:



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Pond 1P: POND**

[81] Warning: Exceeded Pond 1CB by 1.50' @ 12.60 hrs

[81] Warning: Exceeded Pond 3CB by 0.89' @ 12.70 hrs

Inflow Area = 2.587 ac, Inflow Depth > 6.38" for LA Region I - 10 year event  
 Inflow = 13.46 cfs @ 12.07 hrs, Volume= 1.376 af  
 Outflow = 5.72 cfs @ 12.41 hrs, Volume= 1.326 af, Atten= 58%, Lag= 20.3 min  
 Primary = 5.72 cfs @ 12.41 hrs, Volume= 1.326 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
 Peak Elev= 41.07' @ 12.41 hrs Surf.Area= 11,464 sf Storage= 18,750 cf

Plug-Flow detention time= 79.4 min calculated for 1.321 af (96% of inflow)  
 Center-of-Mass det. time= 58.7 min ( 831.5 - 772.8 )

Volume	Invert	Avail.Storage	Storage Description			
#1	39.10'	46,617 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
39.10	7,687	451.0	0	0	7,687	
43.10	16,138	580.0	46,617	46,617	18,470	

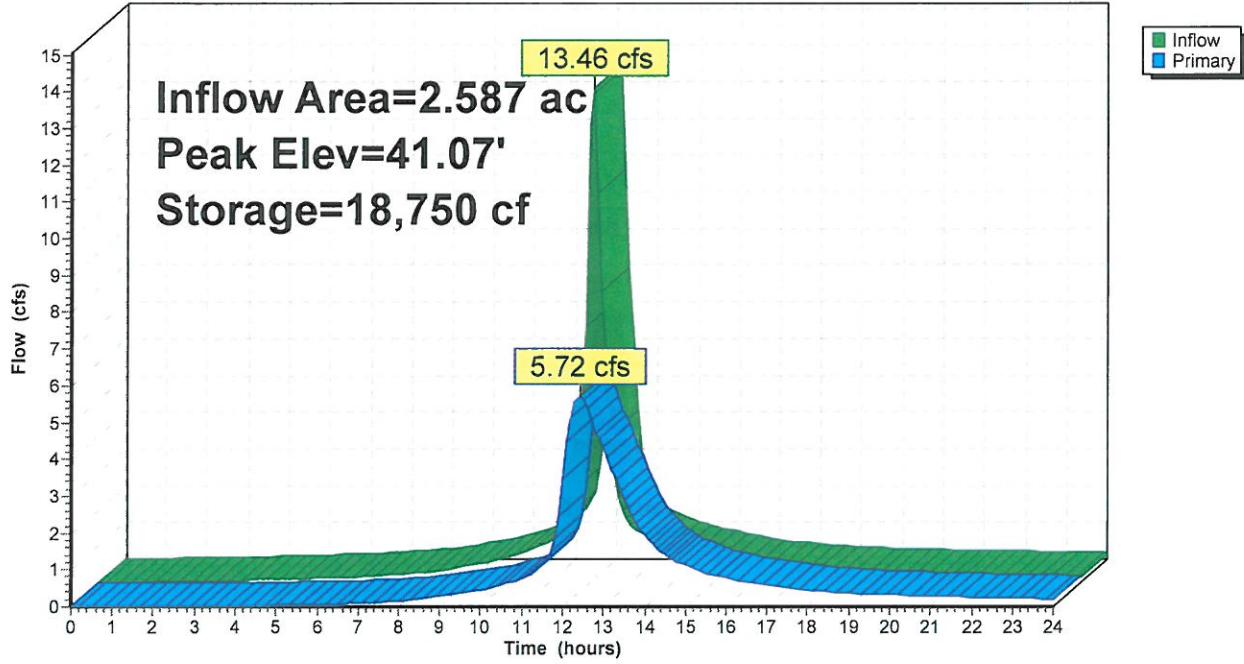
Device	Routing	Invert	Outlet Devices															
#1	Primary	39.10'	<b>15.0" x 40.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 39.00' S= 0.0025 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior															
#2	Primary	42.25'	<b>25.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88															

**Primary OutFlow** Max=5.71 cfs @ 12.41 hrs HW=41.07' TW=2.00' (Fixed TW Elev= 2.00')

- 1=Culvert (Barrel Controls 5.71 cfs @ 4.65 fps)
- 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

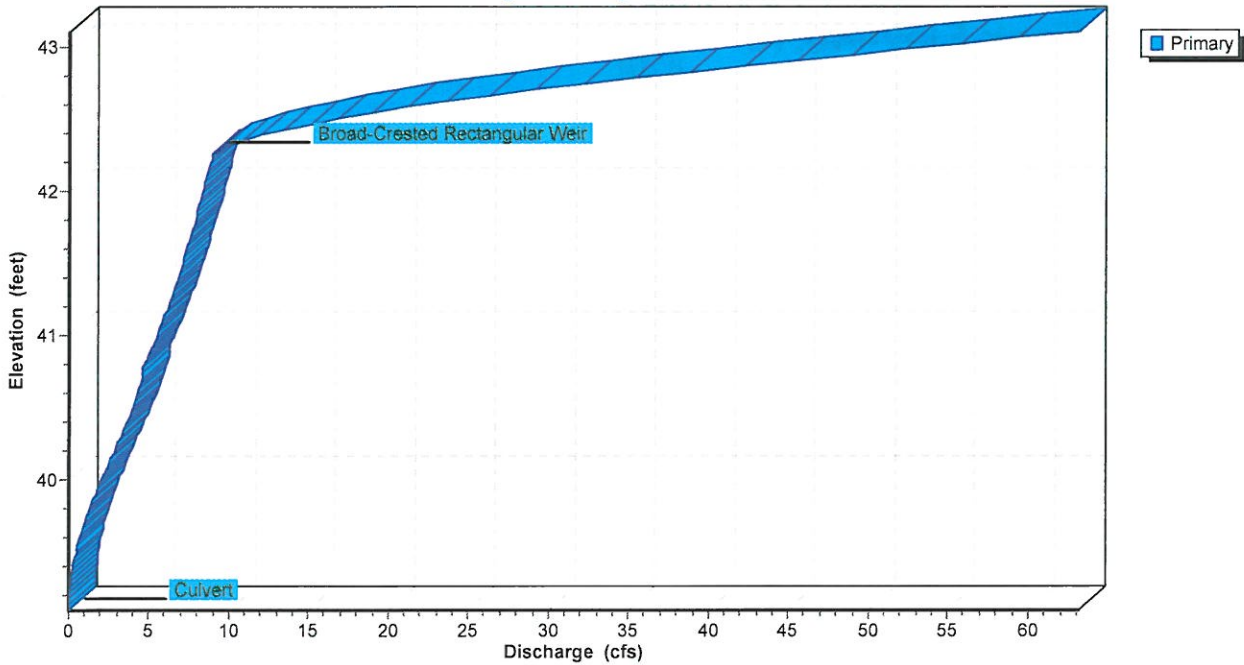
### Pond 1P: POND

Hydrograph



### Pond 1P: POND

Stage-Discharge



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Pond 2CB:**

[61] Hint: Submerged 16% of Reach 1R bottom

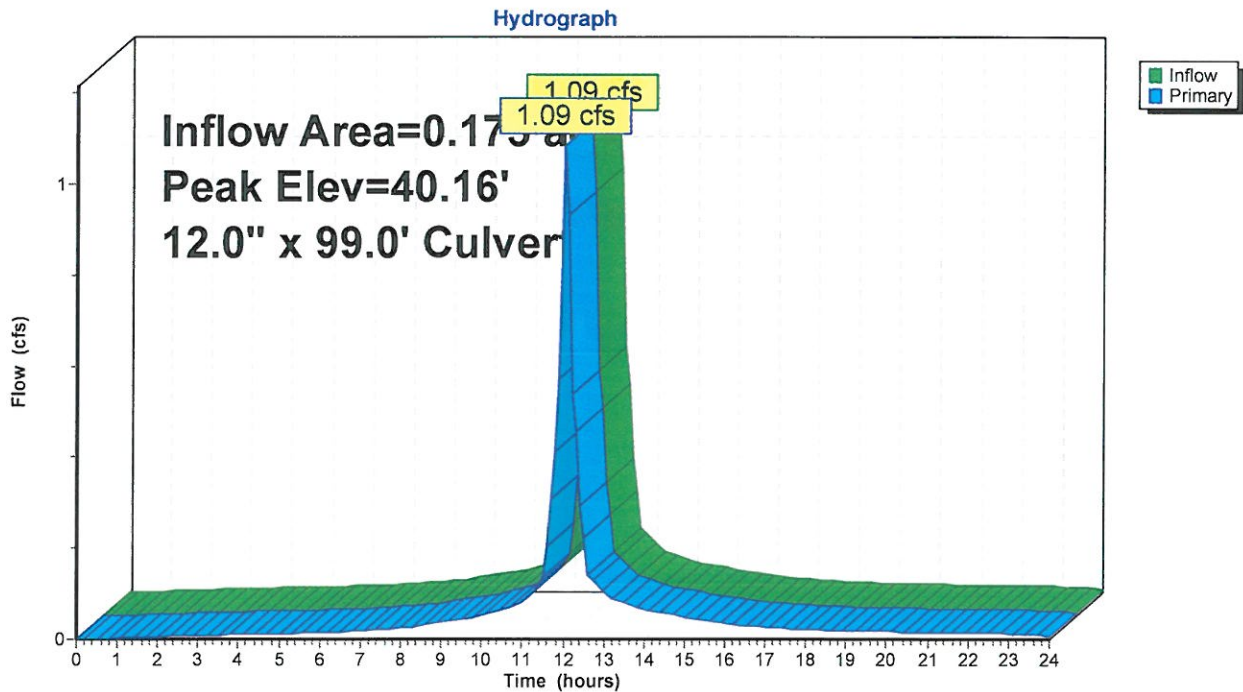
Inflow Area = 0.175 ac, Inflow Depth > 6.66" for LA Region I - 10 year event  
Inflow = 1.09 cfs @ 12.03 hrs, Volume= 0.097 af  
Outflow = 1.09 cfs @ 12.03 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.09 cfs @ 12.03 hrs, Volume= 0.097 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Peak Elev= 40.16' @ 12.03 hrs  
Flood Elev= 43.00'

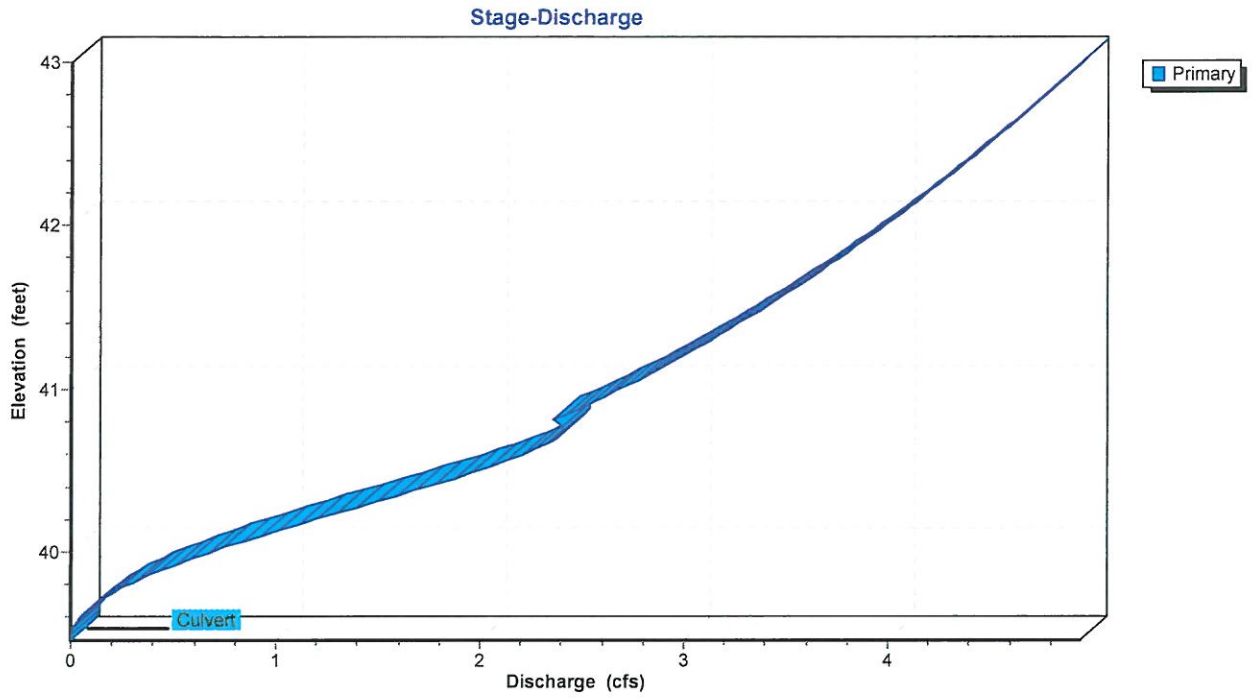
Device	Routing	Invert	Outlet Devices
#1	Primary	39.46'	12.0" x 99.0' long Culvert RCP, square edge headwall, Ke= 0.500 Outlet Invert= 39.16' S= 0.0030 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.02 cfs @ 12.03 hrs HW=40.13' (Free Discharge)  
1=Culvert (Barrel Controls 1.02 cfs @ 2.57 fps)

**Pond 2CB:**



### Pond 2CB:



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

Prepared by Tower Engineering, Inc.

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**Pond 3CB:**

[61] Hint: Submerged 56% of Reach 2R bottom

[79] Warning: Submerged Pond 4CB Primary device # 1 INLET by 1.40'

Inflow Area = 1.786 ac, Inflow Depth > 6.65" for LA Region I - 10 year event  
 Inflow = 9.59 cfs @ 12.11 hrs, Volume= 0.990 af  
 Outflow = 9.59 cfs @ 12.11 hrs, Volume= 0.990 af, Atten= 0%, Lag= 0.0 min  
 Primary = 9.59 cfs @ 12.11 hrs, Volume= 0.990 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Peak Elev= 41.09' @ 12.11 hrs

Flood Elev= 43.00'

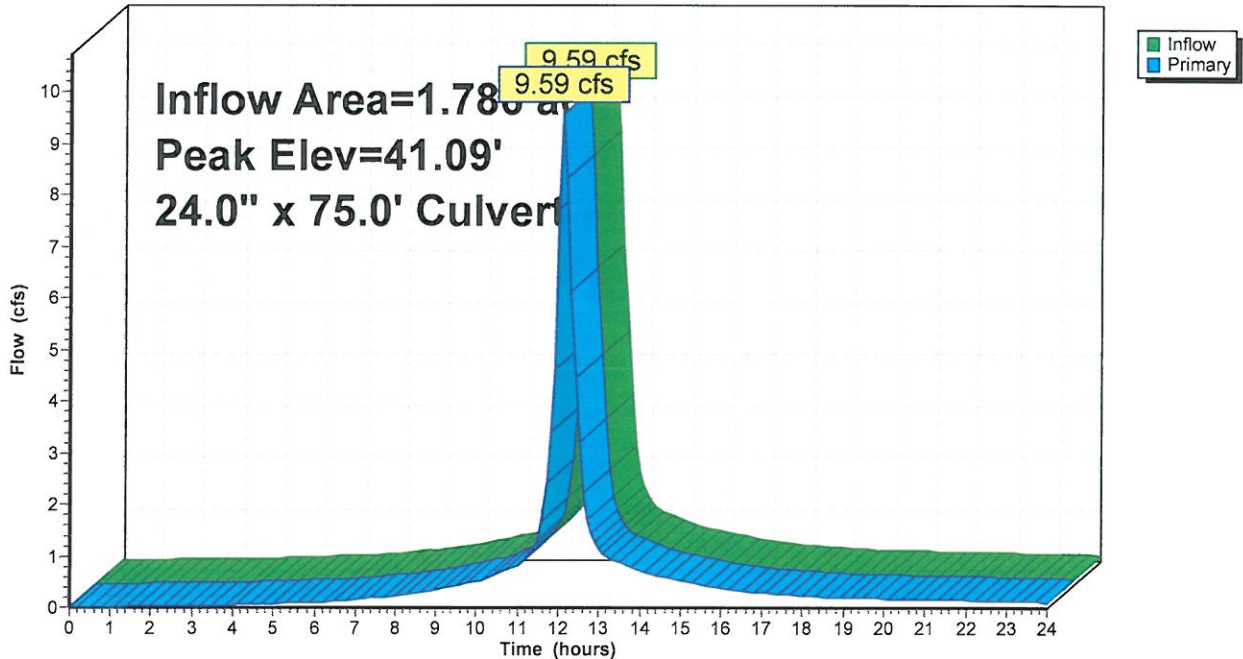
Device	Routing	Invert	Outlet Devices
#1	Primary	39.33'	<b>24.0" x 75.0' long Culvert</b> RCP, square edge headwall, Ke= 0.500 Outlet Invert= 39.10' S= 0.0031 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=9.45 cfs @ 12.11 hrs HW=41.07' (Free Discharge)

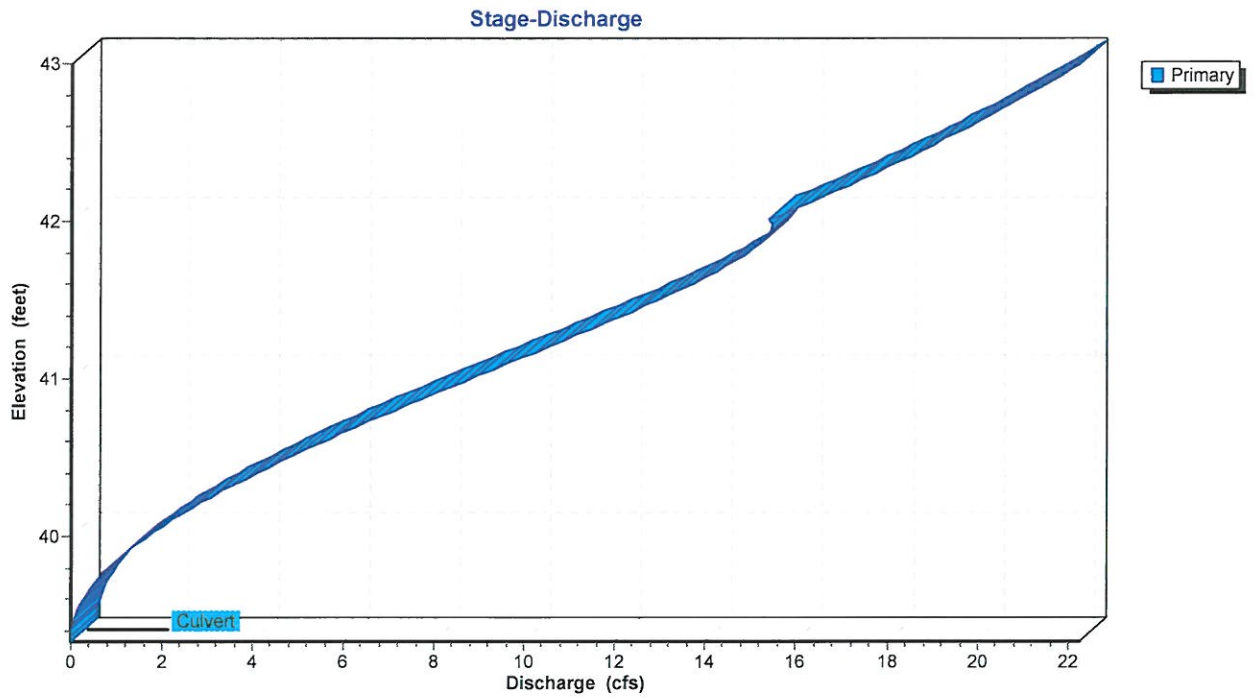
↑1=Culvert (Barrel Controls 9.45 cfs @ 4.34 fps)

**Pond 3CB:**

Hydrograph



### Pond 3CB:



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Pond 4CB:**

[63] Warning: Exceeded Reach 3R inflow depth by 0.47' @ 12.00 hrs

[81] Warning: Exceeded Pond 5CB by 0.85' @ 12.20 hrs

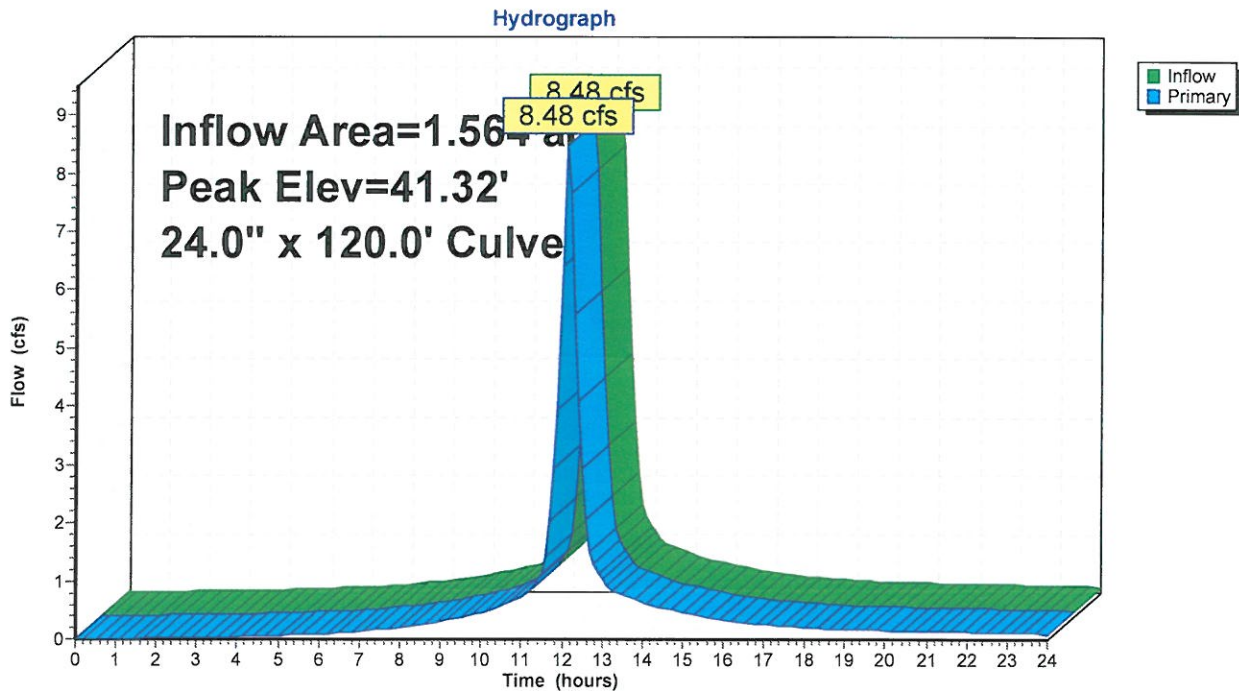
Inflow Area = 1.564 ac, Inflow Depth > 6.69" for LA Region I - 10 year event  
Inflow = 8.48 cfs @ 12.12 hrs, Volume= 0.872 af  
Outflow = 8.48 cfs @ 12.12 hrs, Volume= 0.872 af, Atten= 0%, Lag= 0.0 min  
Primary = 8.48 cfs @ 12.12 hrs, Volume= 0.872 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
Peak Elev= 41.32' @ 12.12 hrs  
Flood Elev= 43.00'

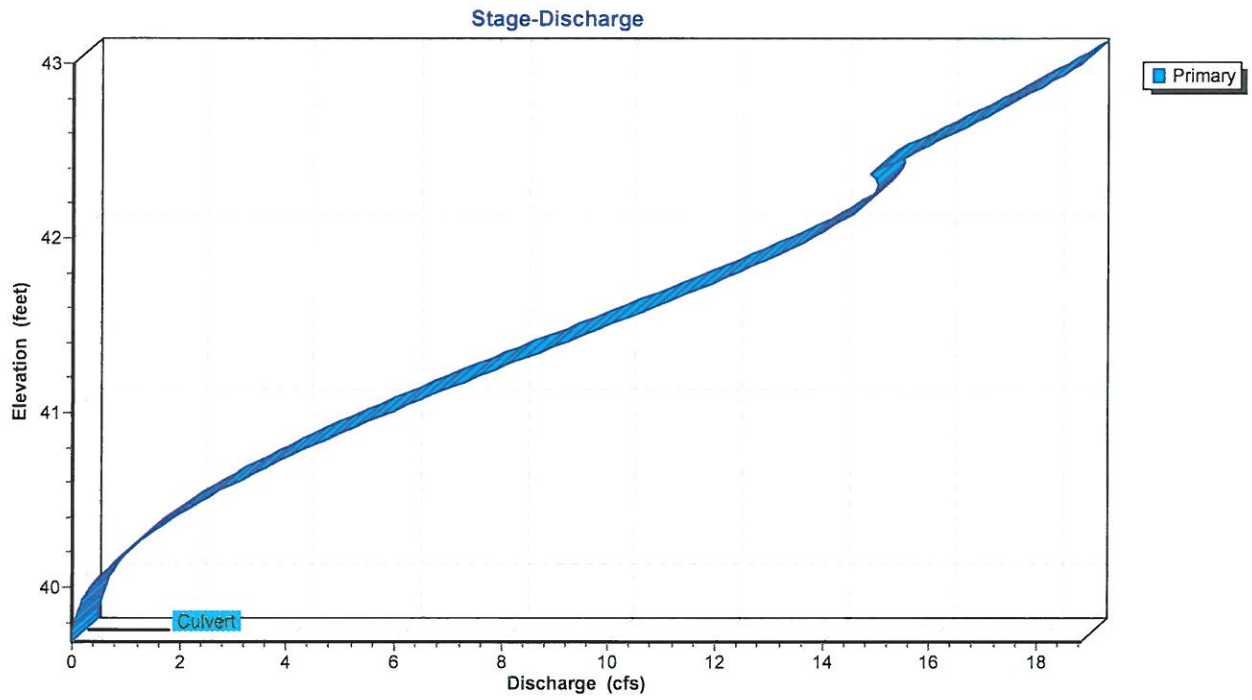
Device	Routing	Invert	Outlet Devices
#1	Primary	39.69'	24.0" x 120.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 39.33' S= 0.0030 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=8.24 cfs @ 12.12 hrs HW=41.29' (Free Discharge)  
1=Culvert (Barrel Controls 8.24 cfs @ 4.18 fps)

**Pond 4CB:**



Pond 4CB:



**Developed-Ph1**

Type III 24-hr LA Region I - 10 year Rainfall=7.80"

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**Pond 5CB:**

Inflow Area = 0.126 ac, Inflow Depth > 7.56" for LA Region I - 10 year event  
 Inflow = 0.96 cfs @ 12.01 hrs, Volume= 0.079 af  
 Outflow = 0.96 cfs @ 12.01 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.96 cfs @ 12.01 hrs, Volume= 0.079 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Peak Elev= 40.62' @ 12.02 hrs

Flood Elev= 43.90'

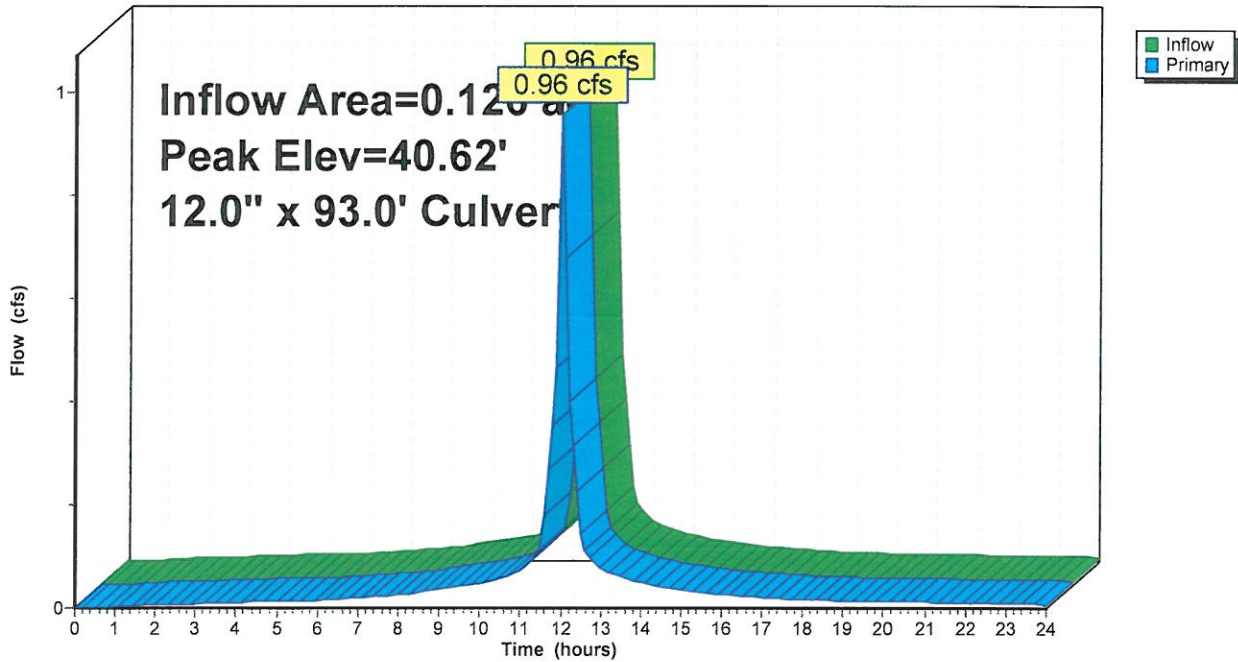
Device	Routing	Invert	Outlet Devices
#1	Primary	39.97'	12.0" x 93.0' long Culvert RCP, square edge headwall, Ke= 0.500 Outlet Invert= 39.69' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.91 cfs @ 12.01 hrs HW=40.60' (Free Discharge)

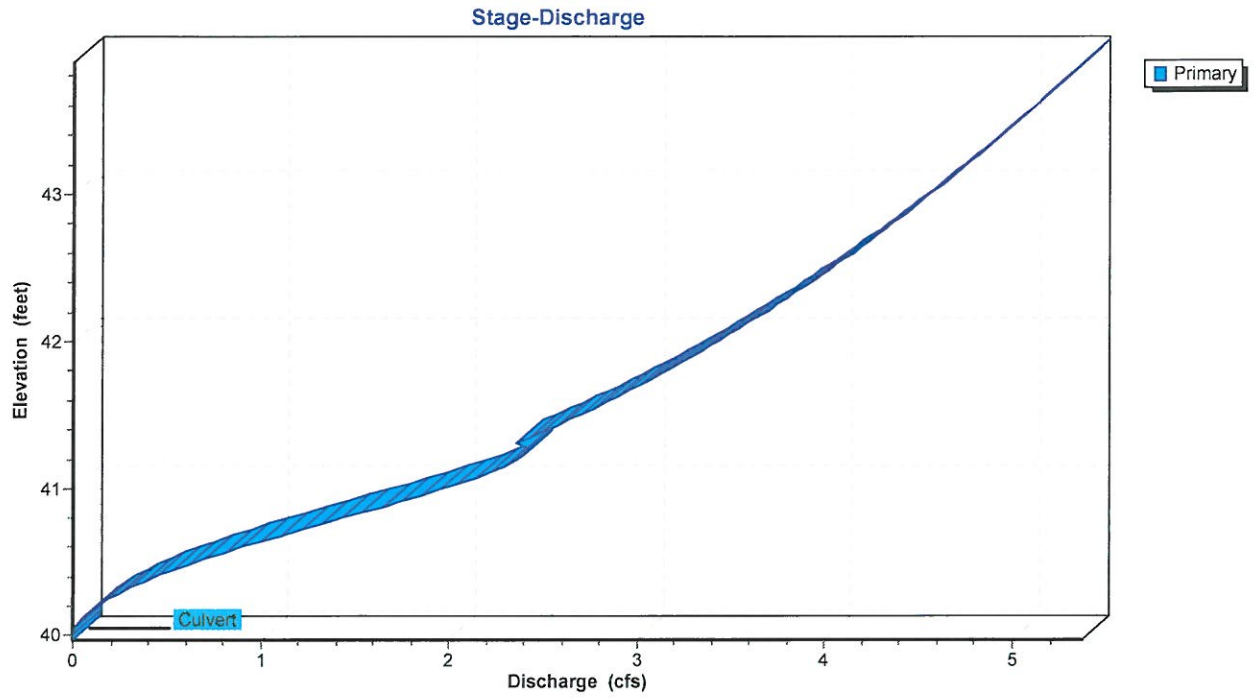
1=Culvert (Barrel Controls 0.91 cfs @ 2.48 fps)

**Pond 5CB:**

Hydrograph



### Pond 5CB:



#### **IV. Detention Pond – Additional Analysis**

The detention pond was analyzed for a 100 storm event. The top of the pond is set at 43.10 ft, while the emergency spillover weir invert elevation is 42.25 ft. The peak water elevation is anticipated to reach 42.13 ft for the 100 year storm event under the Phase 1 condition, which is below the invert of the spillover weir.

**Developed-Ph1**

Type III 24-hr LA Region I - 100 year Rainfall=12.60"

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Page 1

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**Pond 1P: POND**

[81] Warning: Exceeded Pond 1CB by 2.47' @ 12.60 hrs

[81] Warning: Exceeded Pond 3CB by 1.73' @ 12.70 hrs

Inflow Area = 2.587 ac, Inflow Depth > 11.06" for LA Region I - 100 year event  
 Inflow = 22.53 cfs @ 12.09 hrs, Volume= 2.385 af  
 Outflow = 8.65 cfs @ 12.44 hrs, Volume= 2.322 af, Atten= 62%, Lag= 21.2 min  
 Primary = 8.65 cfs @ 12.44 hrs, Volume= 2.322 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs  
 Peak Elev= 42.13' @ 12.44 hrs Surf.Area= 13,793 sf Storage= 32,046 cf

Plug-Flow detention time= 70.7 min calculated for 2.312 af (97% of inflow)  
 Center-of-Mass det. time= 55.0 min ( 817.8 - 762.9 )

Volume	Invert	Avail.Storage	Storage Description			
#1	39.10'	46,617 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
39.10	7,687	451.0	0	0	7,687	
43.10	16,138	580.0	46,617	46,617	18,470	

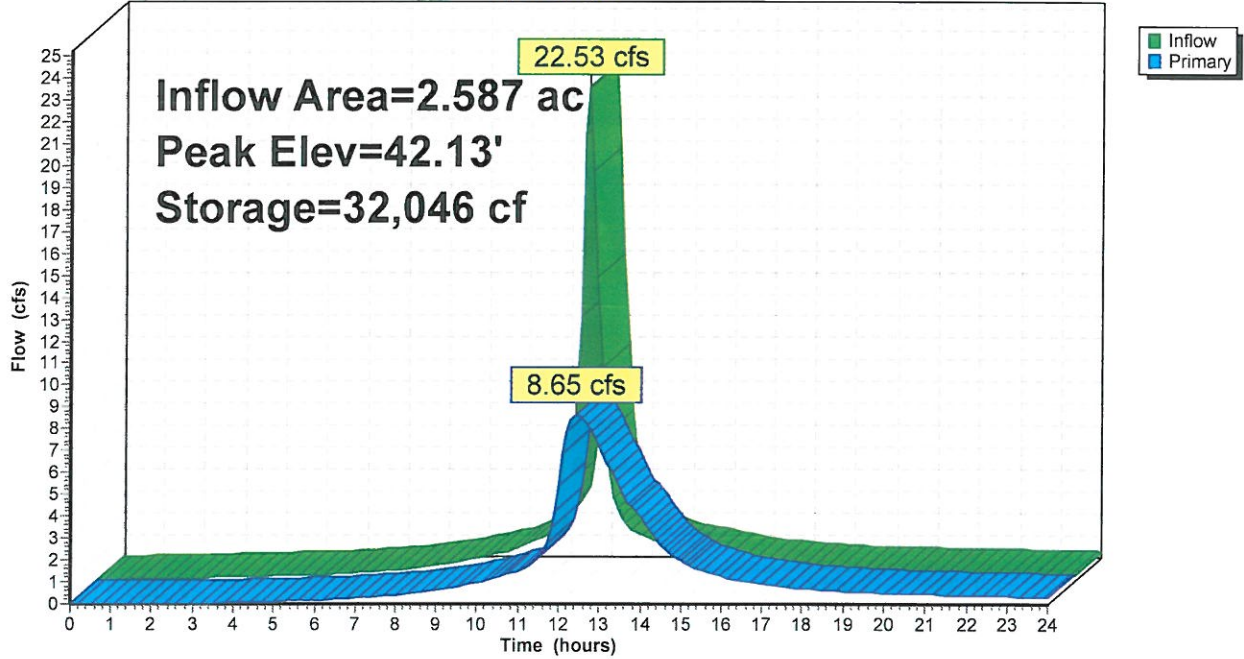
Device	Routing	Invert	Outlet Devices											
#1	Primary	39.10'	<b>15.0" x 40.0' long Culvert</b> RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 39.00' S= 0.0025 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior											
#2	Primary	42.25'	<b>25.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88											

Primary OutFlow Max=8.62 cfs @ 12.44 hrs HW=42.11' TW=2.00' (Fixed TW Elev= 2.00')

- 1=Culvert (Barrel Controls 8.62 cfs @ 7.02 fps)
- 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

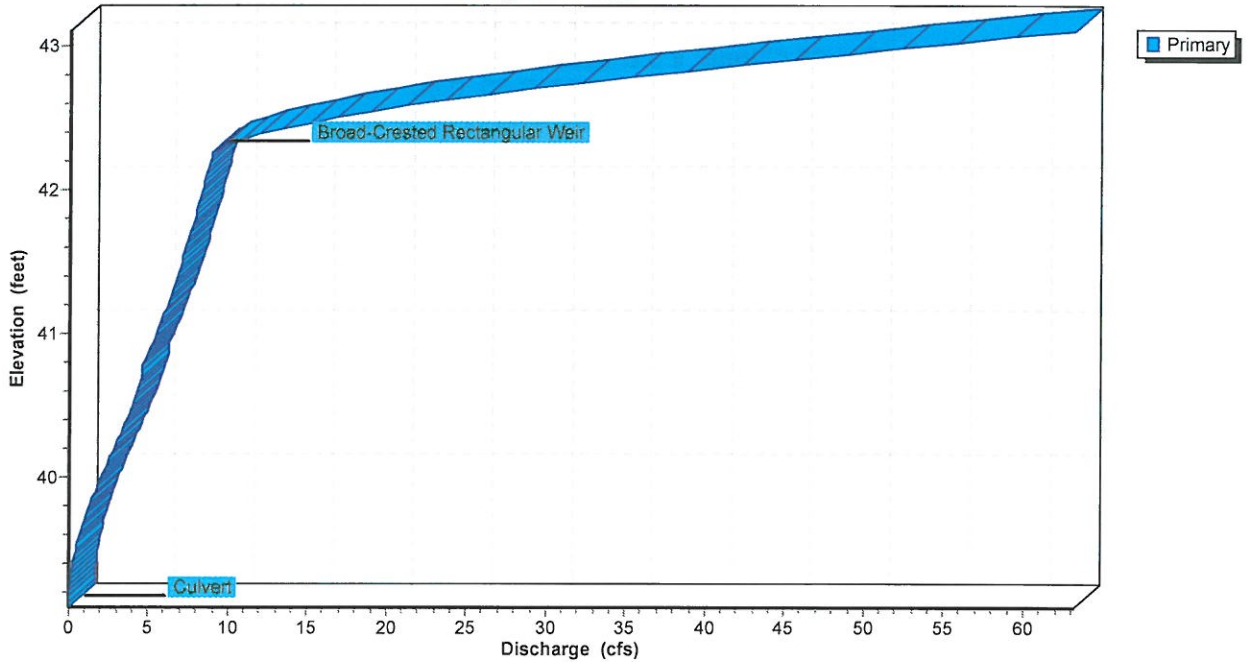
### Pond 1P: POND

Hydrograph



### Pond 1P: POND

Stage-Discharge



## V. Appendix



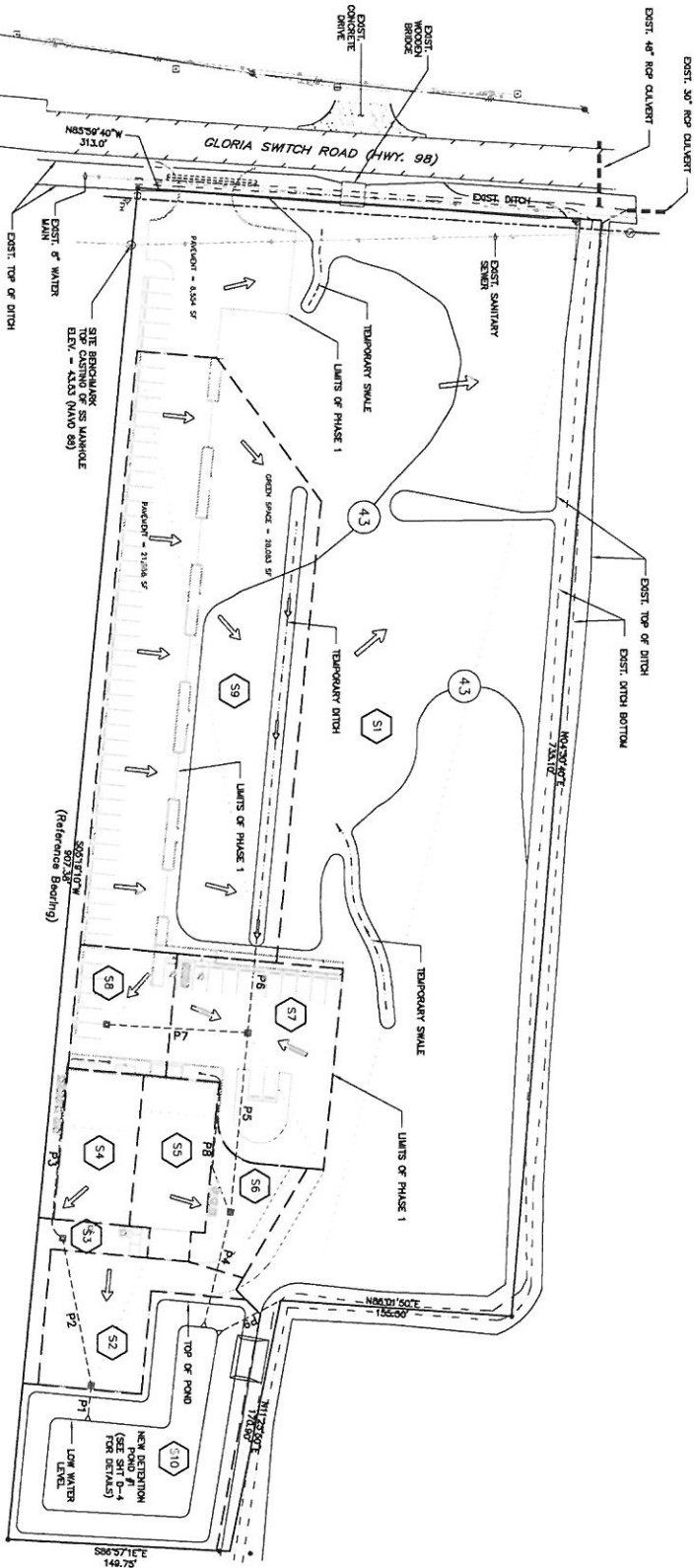
SECTION 1, T9S-R4E AND  
SECTION 132, T8S-R4E  
LAFAYETTE PARISH, LOUISIANA

SUBCATCHMENT AREA NO.	AREA (SF)	HYDRAULIC LENGTH (FT)	SLOPE	WEIGHTED CN
S1	14,321	712	0.74%	75
S2	7,917	83	1.00%	98
S3	2,437	70	0.50%	74
S4	5,187	51	0.33%	98
S5	5,747	51	0.33%	98
S6	3,917	63	0.50%	74
S7	13,013	137	1.00%	98
S8	5,475	66	1.00%	98
S9	40,839	401	1.00%	98
S10	19,733	17	1.00%	74



PIPE NO.	PIPE DESCRIPTION
P1	12" x 18' @ 0.33%
P2	12" x 90' @ 0.33%
P3	4" x 140' @ 3.00%
P4	24" x 120' @ 0.33%
P5	24" x 120' @ 0.33%
P6	24" x 60' @ 0.33%
P7	12" x 51' @ 0.33%
P8	4" x 60' @ 0.33%
P9	12" x 40' @ 0.33%

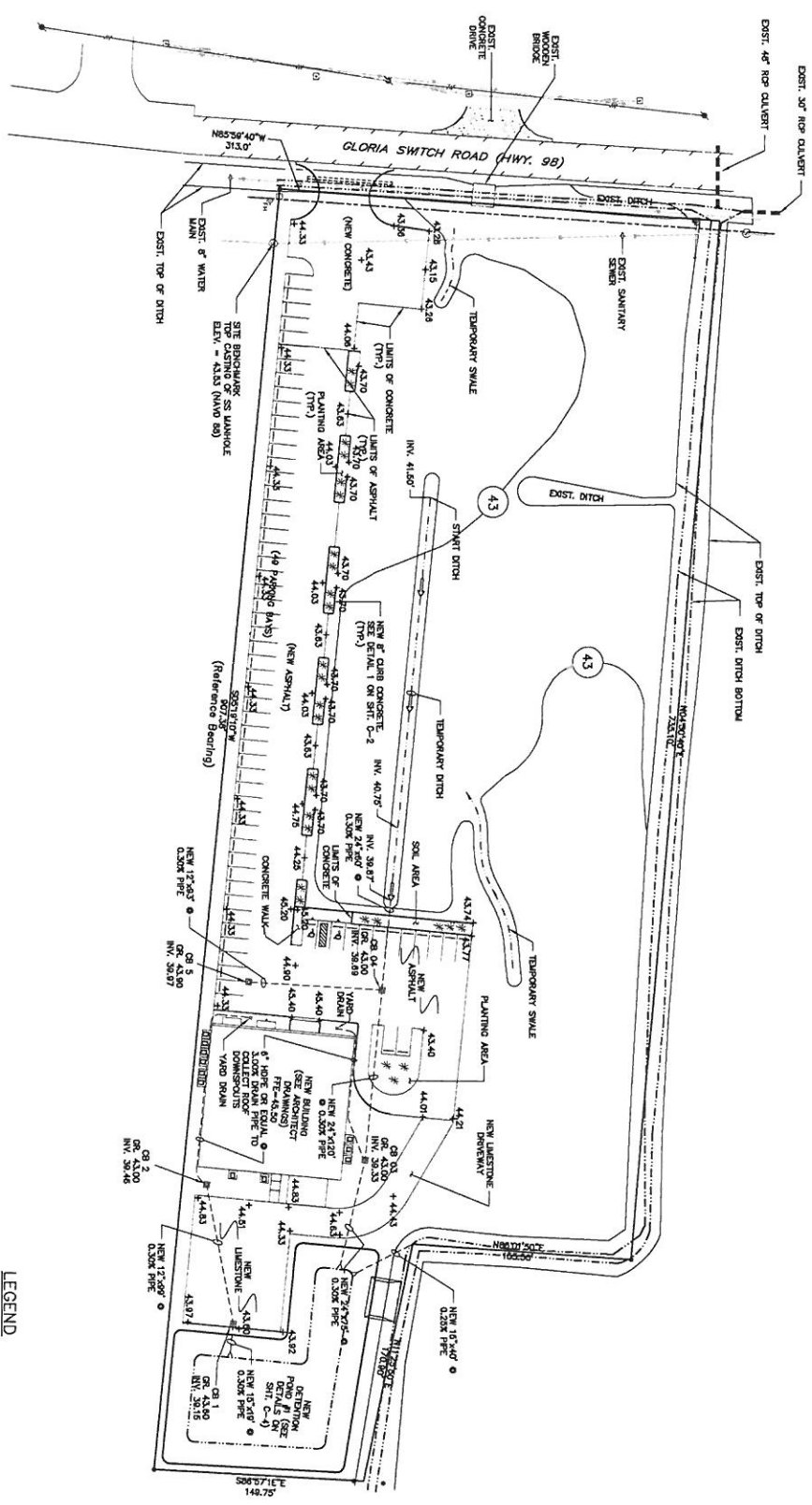
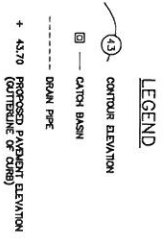
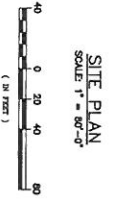
- LEGEND**
- (1) CONTAIN. ELEVATION
  - EXISTING DRAINAGE DIRECTION
  - (S1) SUBCATCHMENT DRAINAGE AREA
  - SUBCATCHMENT BREAKLINE
  - ..... HYDRAULIC LENGTH
  - CATCH BASIN
  - DRAIN PIPE



<p><b>TOWER ENGINEERING, INC.</b> 119 W. Main Street Lafayette, LA 70502 (337) 886-7176 Tel. (337) 886-6683 Fax 1704 Jullien Road Molokou, LA 70001 (504) 556-6128 Tel. (504) 556-6125 Fax</p>	<p>NO. DESCRIPTION BY DATE PERM. ASS'Y JAE 12/11/02</p>	<p>REVISION BY DATE</p>	<p><b>200 GLORIA SWITCH PHASE I</b> SITE NUMBER: 207-001-1015 SITE NAME:</p> <p>SITE ADDRESS: 200 W. GLORIA SWITCH ROAD CARENCRO, LA 70507</p> <p>STAMP HERE:</p>
<p>DESIGNED BY: G.S.G. DATE DRAWN: 12/11/02 TD JOB NO.: 2107-001-1015 SHEET TITLE:</p>	<p><b>PROPOSED DRAINAGE PATTERNS</b></p>		
<p>SHEET NUMBER: <b>D-2</b></p>	<p>REV. /</p>		

SECTION 1, T9S-R4E AND  
SECTION 132, T8S-R4E  
LAFAYETTE PARISH, LOUISIANA

NOTES:  
1. CONSULTING TO CHECK WITH THE STATE WATER POLLUTION PREVENTION  
PLAN AS REQUIRED BY THE CITY OF MONROE.



DATE	12/11/07
CHECKED BY	C.S.C.
DESIGNED BY	C.S.C.
TITLE	2107-001-1015
SHEET NUMBER	D-3

**GRADING PLAN**

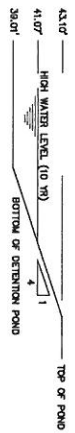
**200 GLORIA SWITCH PHASE I**  
SITE ADDRESS:  
200 W. GLORIA SWITCH ROAD  
CARENCRO, LA 70507  
STAMP HERE:

SITE NUMBER:  
**2107-001-1015**  
SITE NAME:

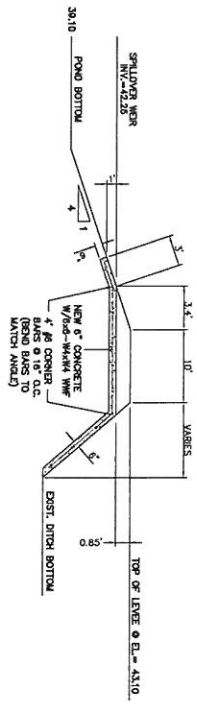
NO.	REVISION	DATE
1	PRELIMINARY	12/11/07
2	FINAL ISSUE	12/11/07

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(504) 556-6125 Tel.  
(504) 556-6125 Fax

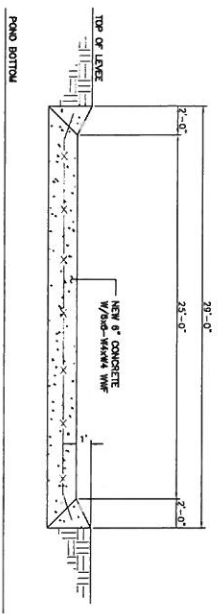
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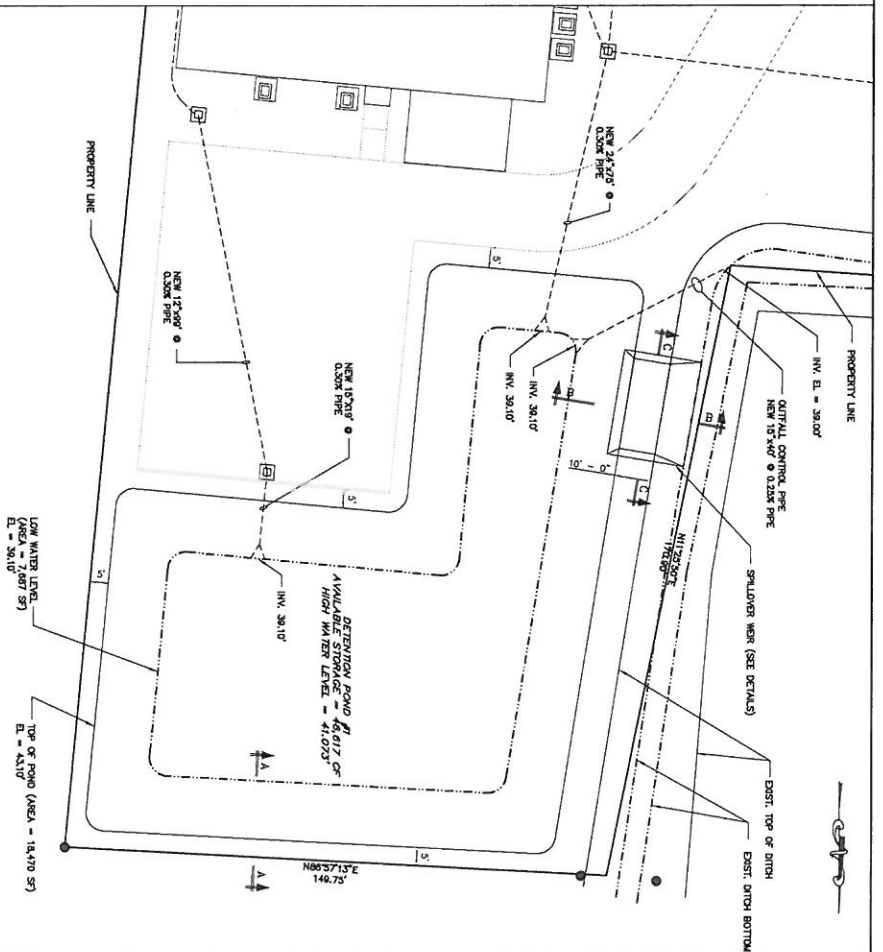
SECTION A-A  
SCALE: NTS



SECTION B-B  
SCALE: NTS



SECTION C-C  
SCALE: NTS



NEW DETENTION POND #1  
SCALE: 1" = 40'

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(321) 885-7176 Tel.  
(321) 885-6653 Fax  
1704 Justin Road  
Maitland, FL 70001  
(504) 558-6128 Tel.  
(504) 558-6125 Fax

NO.	DESCRIPTION BY DATE

SITE NUMBER:  
**2107-001-1015**  
SITE NAME:  
**200 GLORIA SWITCH PHASE I**  
SITE ADDRESS:  
200 W. GLORIA SWITCH ROAD  
CARENCRO, LA 70507  
STAMP HERE

DESIGN BY	HC
CHECKED BY	C.S.G.
DATE DRAWN	12/11/02
TEL. JOB NO.	2107-001-1015
SHEET TITLE	

**ENLARGED RETENTION POND**

SHEET NUMBER: **D-4** REV: 1



4 Park Road

West Gloria Switch Road

© 2007 Tele Atlas

Image © 2007 DigitalGlobe

Google™

Pointer: 30°17'49.55" N 92°01'42.74" W elev 39 ft

Streaming [|||||] 100%

Eye alt 1427 ft

Exhibit A - Aerial Photograph



APPROXIMATE SCALE



NATIONAL FLOOD INSURANCE PROGRAM

# FIRM FLOOD INSURANCE RATE MAP LAFAYETTE PARISH, LOUISIANA AND INCORPORATED AREAS

PANEL 25 OF 80

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

NUMBER	PANEL	SUFFIX
CARENCRO, CITY OF	220103	0025 G
LAFAYETTE, CITY OF	220105	0025 G
SCOTT, CITY OF	220106	0025 G
UNINCORPORATED AREAS	220101	0025 G



PANEL LOCATION

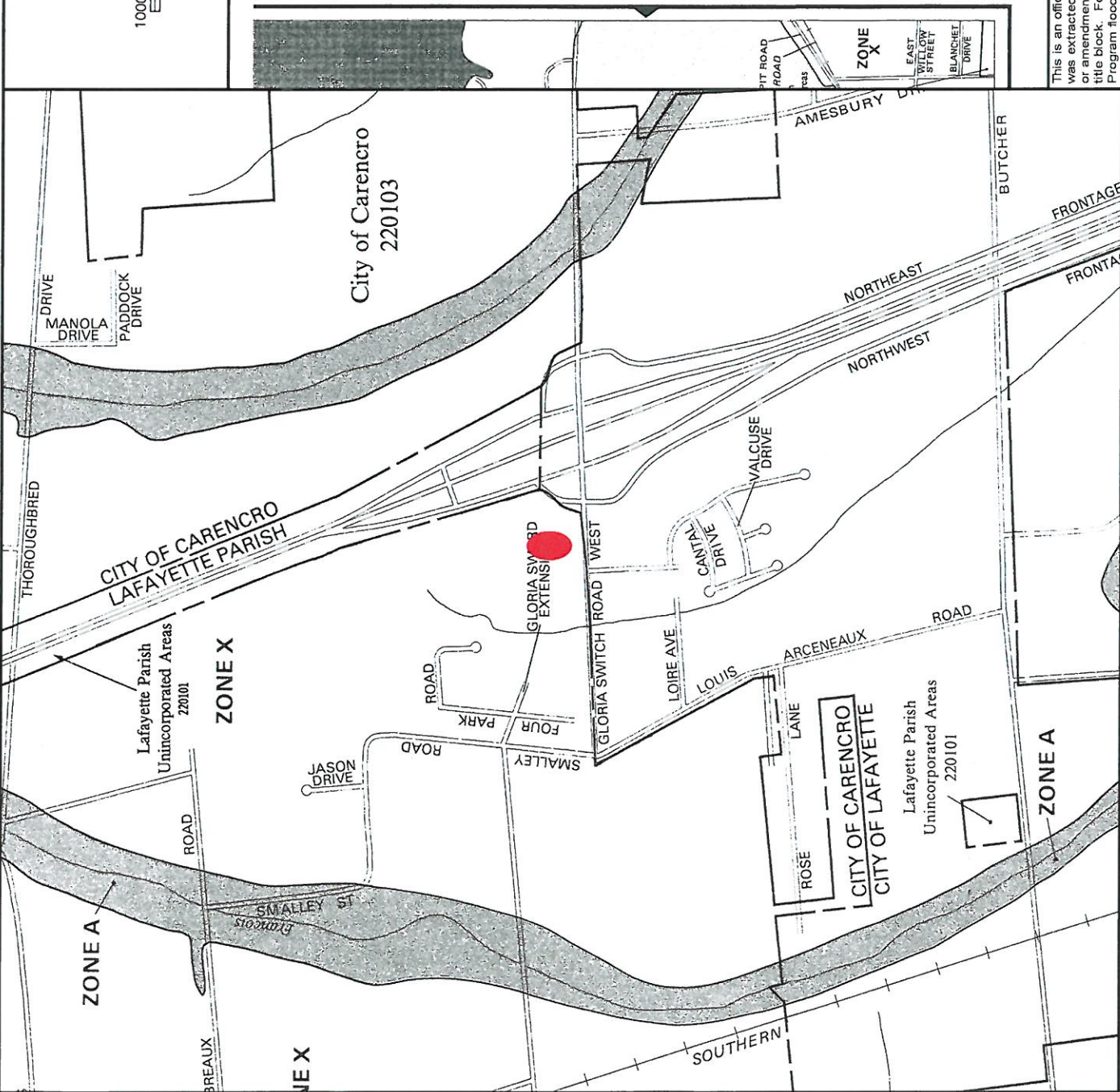
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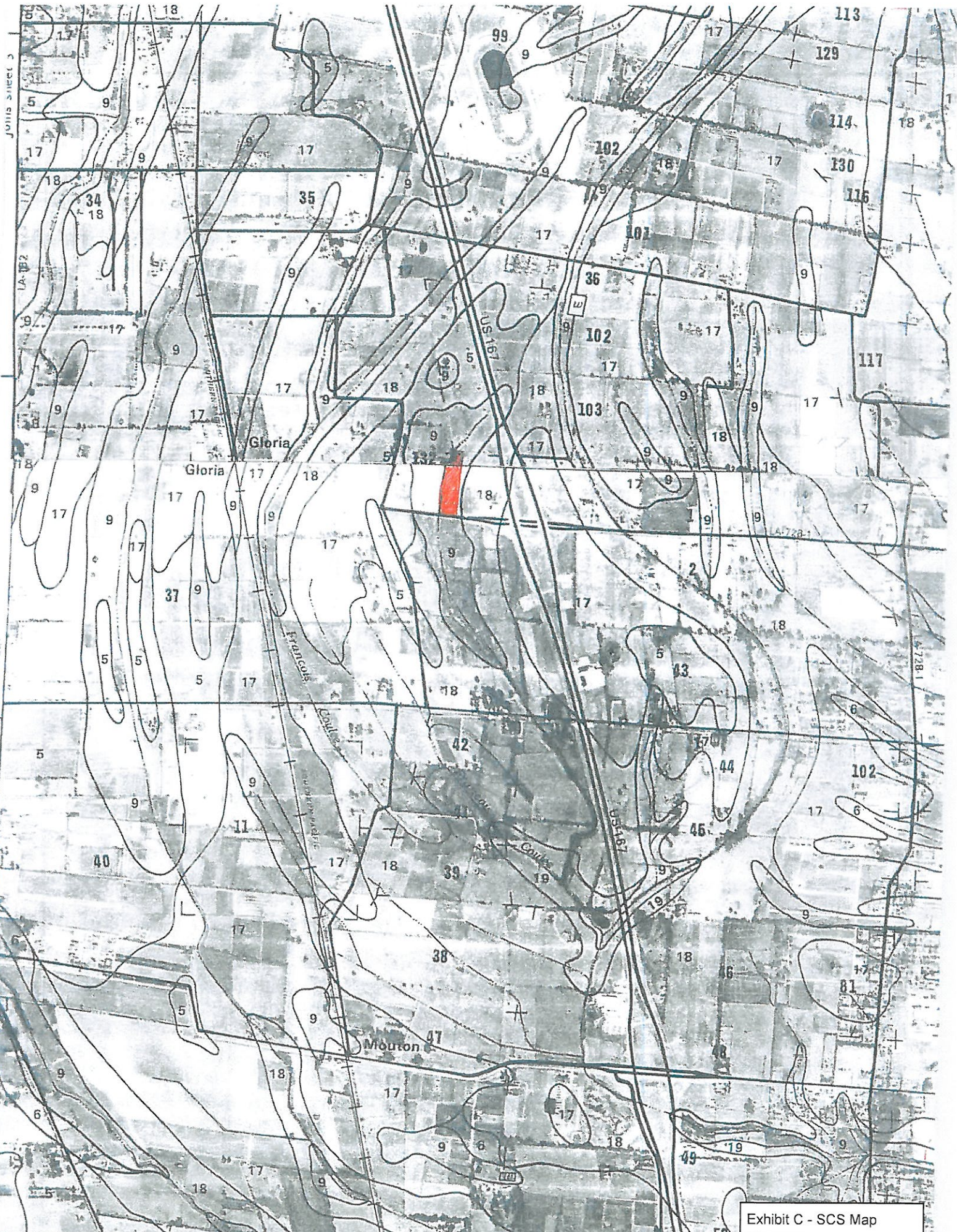
EFFECTIVE DATE:  
JANUARY 19, 1996



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)





Julius sheet 5

Exhibit C - SCS Map

SOIL LEGEND

SYMBOL	NAME
1	Acy silt loam
2	Baldwin silty clay loam
3	Basile soils, frequently flooded
4	Coteau-Frost complex
5	Coteau silt loam, 0 to 1 percent slopes
6	Coteau silt loam, 1 to 3 percent slopes
7	Crowley silt loam
8	Fausse association 1/
9	Frost silt loam
10	Frost soils, occasionally flooded
11	Gallion silt loam
12	Iberia silty clay
13	Jeannerette silt loam
14	Haplauquils, occasionally flooded
17	Memphis silt loam, 0 to 1 percent slopes
18	Memphis silt loam, 1 to 5 percent slopes
19	Memphis silt loam, 5 to 8 percent slopes
21	Judice silty clay loam
22	Mowata-Frost complex
23	Patouville silt loam

1/ Delineations of this unit were not examined as closely as those of other units in the survey. Mapping, however, was controlled well enough to be interpreted for the expected uses of the soils.

CULTURAL F

- BOUNDARIES
  - National, state or province
  - County or parish
  - Minor civil division
  - Reservation (national forest, state forest or park, and large airport)
  - Land grant
  - Limit of soil survey (label)
  - Field sheet matchline & neat
  - AD-HOC BOUNDARY (label)
  - Small airport, airfield, park, cemetery, or flood pool
  - STATE COORDINATE TICK
  - LAND DIVISION CORNERS (boundaries and land grants)
  - Median (median shown and permits)
  - Roads
  - EMBLEMS & DESIGNATIONS
  - Farm or ranch
  - TRANSMISSION LINE (not shown)
  - (not shown)
  - (not shown)
  - Scale)
  - Small
  - Harry

The B3 horizon has hue of 10YR, 2.5Y, or 5Y; value of 5 or 6; and chroma of 1 or 2. Mottles are in shades of brown. The horizon is silty clay loam or silty clay.

### Fausse series

The Fausse series consists of very poorly drained, very slowly permeable soils that formed in clayey alluvium in the eastern part of the parish. These soils are in low, depressional areas on the alluvial plain. Slopes are less than 0.25 percent.

Fausse soils are geographically closely associated with Sharkey soils, which have vertic properties and are slightly higher in elevation.

Typical pedon of Fausse clay from an area of Fausse association in a wooded area, 3.5 miles northeast of Carencro, 0.5 mile west of Bayou Vermilion, Spanish Land Grant sec. 72, T. 8 S., R. 5 E.:

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) clay; weak medium angular blocky structure; plastic; many fine and medium roots and partially decayed woody material; medium acid; clear wavy boundary.

B21g—7 to 21 inches; dark gray (10YR 4/1) clay; weak medium angular blocky structure; plastic; neutral; gradual wavy boundary.

B22g—21 to 37 inches; dark gray (5Y 4/1) clay; massive; few medium distinct brown (10YR 4/3) mottles; weak medium subangular blocky structure; plastic; neutral; gradual wavy boundary.

Cg—37 to 60 inches; dark greenish gray (5G 4/1) clay; common medium faint grayish green (5G 4/2) mottles; massive; plastic; neutral.

Reaction ranges from medium acid to neutral in the A horizon and from neutral to moderately alkaline in the Bg and Cg horizons.

The A horizon has hue of 10YR or 5Y, value of 3 or 4, and chroma of 1 or 2.

The Bg horizon has hue of 10YR or 5Y, value of 4 or 5, and chroma of 1. Mottles are in shades of brown.

The Cg horizon has hue of 5Y or 5G, value of 4 or 5, and chroma of 1. Mottles are in shades of gray and green.

### Frost series

The Frost series consists of poorly drained, slowly permeable soils that formed in loess or in mixed loess and alluvial sediments. These soils are on broad flats and in long, narrow depressions along drainageways on the terrace upland and on low terraces throughout the parish. Slopes are dominantly less than 1 percent.

Frost soils are geographically closely associated with Acy, Coteau, Crowley, Memphis, Mowata, Patoutville, and Jeanerette soils. Acy, Coteau, Crowley, and Patoutville soils, on higher lying ridges, are somewhat poorly drained. Memphis soils, also on convex, higher lying ridges, are well drained. Mowata soils have a fine control section. Jeanerette soils have a mollic epipedon.

Typical pedon of Frost silt loam in a cultivated field, 2.0 miles south of Carencro on Louisiana Highway 182, 1.5 miles west on asphalt road, 100 feet south of road, NW1/4SW1/4 sec. 4, T. 9 S., R. 4 E.:

Ap—0 to 7 inches; dark gray (10YR 4/1) silt loam; common medium distinct dark brown (10YR 3/3) mottles; weak fine granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

A2—7 to 14 inches; gray (10YR 6/1) silt loam; common medium distinct dark grayish brown (10YR 4/2) mottles; massive; friable; common fine roots; few medium black concretions; strongly acid; clear irregular boundary.

B21t—14 to 22 inches; dark gray (10YR 4/1) silty clay loam; moderate medium subangular blocky structure; firm; thick continuous very dark gray clay films on surfaces of peds; tongues of A2 material; few fine black concretions; very strongly acid; clear wavy boundary.

B22t—22 to 33 inches; gray (10YR 5/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; thick continuous dark gray clay films on surfaces of peds; tongues of A2 material extend to a depth of 32 inches; common fine black concretions; very strongly acid; gradual wavy boundary.

B23t—33 to 46 inches; gray (5Y 5/1) silty clay loam; common medium prominent dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure that parts to weak medium subangular blocky; firm; thick; continuous gray clay films on surfaces of peds; common gray silt coatings on surfaces of prisms; few fine black concretions; medium acid; clear wavy boundary.

B3t—46 to 60 inches; gray (10YR 6/1) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure; firm; distinct discontinuous clay films on surfaces of peds; common fine black concretions; slightly acid.

Reaction ranges from strongly acid to slightly acid in the A1 and Ap horizons and from very strongly acid to slightly acid in the A2 horizon. Reaction ranges from very strongly acid to neutral in the Bt horizon.

The A1 and Ap horizons have hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The A2 horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The Bt horizon has hue of 10YR, 2.5Y, or 5Y; value of 5 or 6; and chroma of 1 or 2. Texture is silty clay loam or silty loam. Mottles are in shades of brown. Ped coatings are black, dark gray, or very dark gray.

### Gallion series

The Gallion series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on very narrow natural levees of Bayou Vermilion on the alluvial plain in the eastern part of the parish. Slopes are less than 1 percent.

Gallion soils are geographically closely associated with Baldwin and Iberia soils. Iberia soils, at lower elevations, have a mollic epipedon. Baldwin soils, also at lower elevations, have vertic properties.

Typical pedon of Gallion silt loam in a cultivated field, 0.5 mile south of bridge over Bayou Vermilion on Louisiana Highway 726, 175 feet east of bayou; Spanish Land Grant sec. 89, T. 8 S., R. 5 E.:

Ap—0 to 7 inches; brown (7.5YR 5/2) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

B21t—7 to 19 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium prismatic structure that parts to weak fine subangular blocky; thin patchy clay films on surfaces of peds; firm; neutral; clear wavy boundary.

B31—19 to 32 inches; yellowish red (5YR 4/6) very fine sandy loam; weak medium subangular blocky structure; friable; common fine black stains; moderately alkaline; clear wavy boundary.

B32—32 to 46 inches; yellowish red (5YR 4/6) silt loam; weak medium subangular blocky structure; firm; moderately alkaline; gradual wavy boundary.

HC—46 to 60 inches; dark gray (10YR 4/1) silty clay loam; common fine distinct yellowish brown mottles; weak coarse prismatic structure; firm; moderately alkaline.



