352 Turnpike Road
Southborough, MA 01772
508.480.9900

March 7, 2024

City of Worcester Planning Board
Division of Planning and Regulatory Services
City Hall Room 404
455 Main Street
Worcester, MA 01608

Attn: Stephen Cary, Senior Planner

Re: Request for Definitive Site Plan Amendment – Stormwater Memorandum
Salisbury Hill (PB-2019-047)
Salisbury Street
Worcester, MA 01608

Dear Members of the Board,

On behalf of the Applicant, Salisbury Holdings, LLC, Bohler is submitting updated stormwater calculations associated with the minor modifications proposed at Salisbury Hill. In particular, all building footprints have been slightly modified to provide a mix of unit styles based to better accommodate current market conditions. The change in unit styles resulted in a nominal 8,500±SF total increase of building area spread across the 117 residential units. Buildings will remain in the same general location, and grading modifications associated with the new footprints are minor in nature as shown on the enclosed revised "Proposed Site Development Plans". Drainage patterns remain consistent with the approved plans; therefore, no additional impacts are anticipated to the proposed stormwater system.

Below is a table summarizing the peak rates of runoff at each design point based upon the revised plans and subsequent nominal increased impervious area. As shown, all post development peak rates are at or below pre-development in accordance with stormwater standards.

Table 1: Design Point Peak Runoff Rate Summary

Point of Analysis	2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP1	18.6	17.5	**-1.1**	41.2	40.0	**-1.2**	60.8	57.1	**-3.7**	102.4	102.4	**0**
DP2	7.5	7.2	**-0.3**	16.8	16.4	**-0.4**	24.8	24.3	**-0.5**	41.8	40.4	**-1.4**
DP3	0.1	0.1	**0**	0.7	0.7	**0**	1.4	1.4	**0**	3.0	3.0	**0**
DP4	1.7	1.6	**-0.1**	4.2	3.5	**-0.7**	6.4	5.1	**-1.3**	11.3	8.6	**-2.7**

**Flows are represented in cubic feet per second (cfs)*

BOHLER

Enclosed are additional stormwater calculations that outline continued compliance with the stormwater standards.

- Revised pre- and post-development HydroCAD calculations, dated 3/6/2024;
- Revised Recharge Calculations, dated 3/6/2024; and
- Revised Water Quality Volume Calculations, dated 3/6/2024

Should you have any questions or require additional information regarding the above or attached calculations, please do not hesitate to contact us at (508) 480-9900.

Sincerely,

Bohler

John A. Kucich, P.E.

Nathaniel E. Mahonen, P.E.

Salisbury Hill
Salisbury Hill Boulevard
Worcester, MA
Bohler Job Number: W171219
June 22, 2020
Revised March 6, 2024

MA DEP Standard 3: Recharge Volume Calculations

Required Recharge Volume - A Soils (0.60 in.)	
Existing Site Impervious Area (ac)*	0.000
Proposed Site Impervious Area (ac)*	0.000
Proposed Increase in Site Impervious Area (ac)	0.000
Recharge Volume Required (cf)	**0**

Required Recharge Volume - B Soils (0.35 in.)	
Existing Site Impervious Area (ac)*	0.000
Proposed Site Impervious Area (ac)*	0.000
Proposed Increase in Site Impervious Area (ac)	0.000
Recharge Volume Required (cf)	**0**

Required Recharge Volume - C Soils (0.25 in.)	
Existing Site Impervious Area (ac)*	0.000
Proposed Site Impervious Area (ac)*	9.310
Proposed Increase in Site Impervious Area (ac)	9.310
Recharge Volume Required (cf)	**8,449**

Required Recharge Volume - D Soils (0.10 in.)	
Existing Site Impervious Area (ac)*	0.000
Proposed Site Impervious Area (ac)*	0.190
Proposed Increase in Site Impervious Area (ac)	0.190
Recharge Volume Required (cf)	**69**

* Excludes off-site impervious area

Total Recharge Volume Required (cf)	**8,518**

Recharge Volume Adjustment Factor	
Impervious Area Directed to Infiltration BMP (ac)	**8.060**
%Impervious Directed to Infiltration BMP	85%
Adjustment Factor	1.18
Adjusted Total Recharge Volume Required (cf)	**10,040**

Provided Recharge Volume**	
Basin 1	**18,683**
Basin 2	**4,383**
Total Recharge Volume Provided (cf)	**23,066**

Provided greater than or Equal to Required

**Volume provided below lowest outlet in cubic feet (cf)

Prepared By:
Bohler
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

Salisbury Hill
Salisbury Hill Boulevard
Worcester, MA
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MA DEP Standard 4: Water Quality Volume Calculations

Water Quality Volume Required	
Water Quality Volume runoff (in.)*	0.5
Total Post Development Impervious Area (sf)	413,820
Required Water Quality Volume (cf)	17,243

*Water Quality volume runoff is equal to 0.5 inches of runoff times the total impervious area of the post development project site.

Water Quality Volume Provided*	
Basin 1	18,683
Basin 2	4,383
Total Provided Water Quality Volume (cf)	23,066

Provided greater than or Equal to Required

*Volume provided below lowest outlet pipe in cubic feet (cf)

Prepared By:
Bohler
352 Turnpike Road
Southborough, MA 01772
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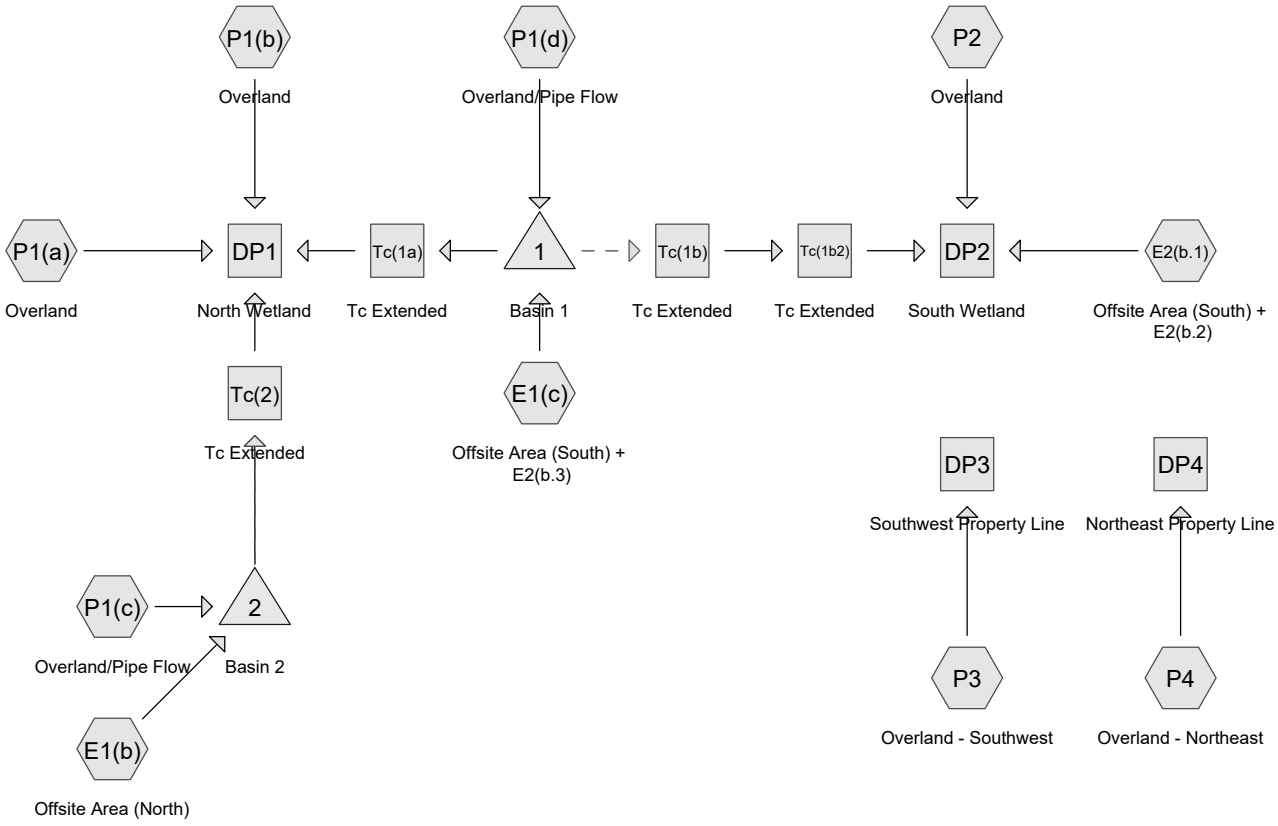


Subcat Reach Pond Link

Routing Diagram for W171219_Proposed-REV2
Prepared by Bohler Engineers, Printed 3/4/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	3.23	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.86	2
3	25-YR	Type III 24-hr		Default	24.00	1	6.14	2
4	100-YR	Type III 24-hr		Default	24.00	1	8.75	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.86	74	>75% Grass cover, Good, HSG C (P1(a), P1(b), P1(c), P1(d), P2, P4)
1.06	80	>75% Grass cover, Good, HSG D (P1(a), P1(c))
0.48	98	Basin Bottom, 0% imp, HSG C (P1(d))
0.07	98	Basin Bottom, 0% imp, HSG D (P1(c))
5.02	98	House, HSG C (P1(a), P1(b), P1(c), P1(d), P2, P4)
0.18	98	House, HSG D (P1(a), P1(c))
1.04	74	Offsite >75% Grass cover, Good, HSG C (E1(c), E2(b.1))
0.78	98	Offsite Paved parking, HSG C (E1(c))
0.48	98	Offsite Roof, HSG C (E1(c), E2(b.1))
3.41	70	Offsite Woods, Good, HSG C (E1(b), E2(b.1))
4.29	98	Paved parking, HSG C (P1(c), P1(d))
0.01	98	Paved parking, HSG D (P1(c))
3.37	55	Woods, Good, HSG B (P1(a), P3)
12.36	70	Woods, Good, HSG C (P1(a), P2, P3, P4)
2.89	77	Woods, Good, HSG D (P1(a), P2)
49.30	**77**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.00	HSG A	
3.37	HSG B	P1(a), P3
41.72	HSG C	E1(b), E1(c), E2(b.1), P1(a), P1(b), P1(c), P1(d), P2, P3, P4
4.21	HSG D	P1(a), P1(c), P2
0.00	Other	
49.30		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.00	0.00	13.86	1.06	0.00	14.92	>75% Grass cover, Good	P1(a), P1(b), P1(c), P1(d), P2, P4
0.00	0.00	0.48	0.07	0.00	0.55	Basin Bottom, 0% imp	P1(c), P1(d)
0.00	0.00	5.02	0.18	0.00	5.20	House	P1(a), P1(b), P1(c), P1(d), P2, P4
0.00	0.00	1.04	0.00	0.00	1.04	Offsite >75% Grass cover, Good	E1(c), E2(b.1)
0.00	0.00	0.78	0.00	0.00	0.78	Offsite Paved parking	E1(c)
0.00	0.00	0.48	0.00	0.00	0.48	Offsite Roof	E1(c), E2(b.1)
0.00	0.00	3.41	0.00	0.00	3.41	Offsite Woods, Good	E1(b), E2(b.1)
0.00	0.00	4.29	0.01	0.00	4.30	Paved parking	P1(c), P1(d)
0.00	3.37	12.36	2.89	0.00	18.62	Woods, Good	P1(a), P2, P3, P4
0.00	**3.37**	**41.72**	**4.21**	**0.00**	**49.30**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	P1(b)	0.00	0.00	257.0	0.0065	0.013	0.0	18.0	0.0	
2	P1(c)	0.00	0.00	110.0	0.0170	0.013	0.0	12.0	0.0	
3	P1(c)	0.00	0.00	188.0	0.0110	0.012	0.0	15.0	0.0	
4	P1(c)	0.00	0.00	107.0	0.0150	0.012	0.0	18.0	0.0	
5	P1(c)	0.00	0.00	231.0	0.0150	0.013	0.0	24.0	0.0	
6	P1(d)	0.00	0.00	178.0	0.0050	0.013	0.0	12.0	0.0	
7	P1(d)	0.00	0.00	204.0	0.0050	0.013	0.0	18.0	0.0	
8	P1(d)	0.00	0.00	217.0	0.0125	0.013	0.0	24.0	0.0	
9	P1(d)	0.00	0.00	21.0	0.0120	0.013	0.0	30.0	0.0	
10	P1(d)	0.00	0.00	65.0	0.0150	0.013	0.0	36.0	0.0	
11	P1(d)	0.00	0.00	210.0	0.0050	0.013	0.0	36.0	0.0	
12	1	858.25	858.00	38.8	0.0064	0.012	0.0	24.0	0.0	
13	1	859.00	858.75	40.4	0.0062	0.012	0.0	15.0	0.0	
14	2	853.50	853.00	36.0	0.0139	0.012	0.0	30.0	0.0	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1(b): Offsite Area (North) Runoff Area=0.33 ac 0.00% Impervious Runoff Depth=0.85"
Flow Length=232' Slope=0.0100 '/' Tc=22.3 min CN=70 Runoff=0.2 cfs 0.023 af

Subcatchment E1(c): Offsite Area (South) + Runoff Area=1.80 ac 62.22% Impervious Runoff Depth=2.11"
Tc=6.0 min CN=89 Runoff=4.4 cfs 0.316 af

Subcatchment E2(b.1): Offsite Area (South) + Runoff Area=3.58 ac 3.91% Impervious Runoff Depth=0.90"
Flow Length=616' Tc=20.1 min CN=71 Runoff=2.3 cfs 0.267 af

Subcatchment P1(a): Overland Runoff Area=17.33 ac 2.54% Impervious Runoff Depth=0.85"
Flow Length=967' Tc=45.7 min CN=70 Runoff=7.1 cfs 1.221 af

Subcatchment P1(b): Overland Runoff Area=2.97 ac 18.52% Impervious Runoff Depth=1.30"
Flow Length=1,704' Tc=36.2 min CN=78 Runoff=2.3 cfs 0.321 af

Subcatchment P1(c): Overland/Pipe Flow Runoff Area=5.14 ac 46.89% Impervious Runoff Depth=1.86"
Flow Length=802' Tc=7.5 min CN=86 Runoff=10.6 cfs 0.797 af

Subcatchment P1(d): Overland/Pipe Flow Runoff Area=10.70 ac 52.80% Impervious Runoff Depth=2.02"
Flow Length=1,047' Tc=10.2 min CN=88 Runoff=22.0 cfs 1.805 af

Subcatchment P2: Overland Runoff Area=4.72 ac 5.93% Impervious Runoff Depth=1.00"
Flow Length=410' Tc=19.7 min CN=73 Runoff=3.5 cfs 0.394 af

Subcatchment P3: Overland - Southwest Runoff Area=1.00 ac 0.00% Impervious Runoff Depth=0.29"
Flow Length=279' Tc=14.5 min CN=56 Runoff=0.1 cfs 0.024 af

Subcatchment P4: Overland - Northeast Runoff Area=1.73 ac 9.83% Impervious Runoff Depth=1.11"
Flow Length=280' Slope=0.0270 '/' Tc=15.6 min CN=75 Runoff=1.6 cfs 0.161 af

Reach DP1: North Wetland Inflow=17.5 cfs 3.736 af
Outflow=17.5 cfs 3.736 af

Reach DP2: South Wetland Inflow=7.2 cfs 0.877 af
Outflow=7.2 cfs 0.877 af

Reach DP3: Southwest Property Line Inflow=0.1 cfs 0.024 af
Outflow=0.1 cfs 0.024 af

Reach DP4: Northeast Property Line Inflow=1.6 cfs 0.161 af
Outflow=1.6 cfs 0.161 af

Reach Tc(1a): Tc Extended Avg. Flow Depth=0.16' Max Vel=1.49 fps Inflow=6.1 cfs 1.476 af
n=0.025 L=966.0' S=0.0124 '/' Capacity=303.3 cfs Outflow=5.7 cfs 1.476 af

Reach Tc(1b): Tc Extended Avg. Flow Depth=0.07' Max Vel=1.05 fps Inflow=1.8 cfs 0.216 af
n=0.025 L=150.0' S=0.0200 '/' Capacity=641.5 cfs Outflow=1.8 cfs 0.216 af

Reach Tc(1b2): Tc Extended Avg. Flow Depth=0.15' Max Vel=3.74 fps Inflow=1.8 cfs 0.216 af
n=0.025 L=132.0' S=0.0833 '/' Capacity=103.5 cfs Outflow=1.8 cfs 0.216 af

Reach Tc(2): Tc Extended Avg. Flow Depth=0.11' Max Vel=1.77 fps Inflow=9.3 cfs 0.718 af
n=0.025 L=216.0' S=0.0278 '/' Capacity=1,008.0 cfs Outflow=9.0 cfs 0.718 af

Pond 1: Basin 1 Peak Elev=859.83' Storage=41,848 cf Inflow=25.8 cfs 2.121 af
Primary=6.1 cfs 1.476 af Secondary=1.8 cfs 0.216 af Tertiary=0.0 cfs 0.000 af Outflow=7.9 cfs 1.691 af

Pond 2: Basin 2 Peak Elev=858.71' Storage=9,693 cf Inflow=10.7 cfs 0.820 af
Primary=9.3 cfs 0.718 af Secondary=0.0 cfs 0.000 af Outflow=9.3 cfs 0.718 af

Total Runoff Area = 49.30 ac Runoff Volume = 5.330 af Average Runoff Depth = 1.30"
78.17% Pervious = 38.54 ac 21.83% Impervious = 10.76 ac

Summary for Subcatchment E1(b): Offsite Area (North)

Runoff = 0.2 cfs @ 12.35 hrs, Volume= 0.023 af, Depth= 0.85"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.33	70	Offsite Woods, Good, HSG C
	0.33		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0100	0.05		**Sheet Flow, 897.5-897.0** Woods: Light underbrush n= 0.400 P2= 3.23"
6.1	182	0.0100	0.50		**Shallow Concentrated Flow, 897-895** Woodland Kv= 5.0 fps
22.3	232	Total			

Summary for Subcatchment E1(c): Offsite Area (South) + E2(b.3)

Runoff = 4.4 cfs @ 12.08 hrs, Volume= 0.316 af, Depth= 2.11"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.34	98	Offsite Roof, HSG C
*	0.68	74	Offsite >75% Grass cover, Good, HSG C
*	0.78	98	Offsite Paved parking, HSG C
	1.80	89	Weighted Average
	0.68		37.78% Pervious Area
	1.12		62.22% Impervious Area

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

Summary for Subcatchment E2(b.1): Offsite Area (South) + E2(b.2)

Runoff = 2.3 cfs @ 12.30 hrs, Volume= 0.267 af, Depth= 0.90"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	3.08	70	Offsite Woods, Good, HSG C
*	0.36	74	Offsite >75% Grass cover, Good, HSG C
*	0.14	98	Offsite Roof, HSG C
	3.58	71	Weighted Average
	3.44		96.09% Pervious Area
	0.14		3.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 909-908.25** Woods: Light underbrush n= 0.400 P2= 3.23"
6.3	566	0.0910	1.51		**Shallow Concentrated Flow, 908.25-857** Woodland Kv= 5.0 fps
20.1	616	Total			

Summary for Subcatchment P1(a): Overland

Runoff = 7.1 cfs @ 12.69 hrs, Volume= 1.221 af, Depth= 0.85"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.41	98	House, HSG C
	1.83	74	>75% Grass cover, Good, HSG C
	9.18	70	Woods, Good, HSG C
*	0.03	98	House, HSG D
	0.58	80	>75% Grass cover, Good, HSG D
	2.85	77	Woods, Good, HSG D
	0.00	61	>75% Grass cover, Good, HSG B
	2.45	55	Woods, Good, HSG B
	17.33	70	Weighted Average
	16.89		97.46% Pervious Area
	0.44		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, 862-861.4** Woods: Light underbrush n= 0.400 P2= 3.23"
30.6	917	0.0100	0.50		**Shallow Concentrated Flow, 861.4-852** Woodland Kv= 5.0 fps
45.7	967	Total			

Summary for Subcatchment P1(b): Overland

Runoff = 2.3 cfs @ 12.51 hrs, Volume= 0.321 af, Depth= 1.30"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.55	98	House, HSG C
	2.42	74	>75% Grass cover, Good, HSG C
	2.97	78	Weighted Average
	2.42		81.48% Pervious Area
	0.55		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 882-881** Grass: Short n= 0.150 P2= 3.23"
6.2	350	0.0180	0.94		**Shallow Concentrated Flow, 881-874.1** Short Grass Pasture Kv= 7.0 fps
0.9	257	0.0065	4.79	8.47	**Pipe Channel, 871-869** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
23.5	1,047	0.0220	0.74		**Shallow Concentrated Flow, 869-846** Woodland Kv= 5.0 fps
36.2	1,704	Total			

Summary for Subcatchment P1(c): Overland/Pipe Flow

Runoff = 10.6 cfs @ 12.10 hrs, Volume= 0.797 af, Depth= 1.86"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	1.07	98	House, HSG C
	1.18	98	Paved parking, HSG C
	2.18	74	>75% Grass cover, Good, HSG C
*	0.15	98	House, HSG D
	0.01	98	Paved parking, HSG D
	0.48	80	>75% Grass cover, Good, HSG D
*	0.07	98	Basin Bottom, 0% imp, HSG D
	5.14	86	Weighted Average
	2.73		53.11% Pervious Area
	2.41		46.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow, 896-893.8** Grass: Short n= 0.150 P2= 3.23"
1.9	116	0.0220	1.04		**Shallow Concentrated Flow, 893.8-891.25** Short Grass Pasture Kv= 7.0 fps
0.3	110	0.0170	5.91	4.65	**Pipe Channel, 887.75-882** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.5	188	0.0110	5.98	7.34	**Pipe Channel, 880-878.2** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.2	107	0.0150	7.89	13.94	**Pipe Channel, 878.1-876.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	231	0.0150	8.82	27.71	**Pipe Channel, 873.75-860** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
7.5	802	Total			

Summary for Subcatchment P1(d): Overland/Pipe Flow

Runoff = 22.0 cfs @ 12.14 hrs, Volume= 1.805 af, Depth= 2.02"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	2.54	98	House, HSG C
	3.11	98	Paved parking, HSG C
	4.57	74	>75% Grass cover, Good, HSG C
*	0.48	98	Basin Bottom, 0% imp, HSG C
	10.70	88	Weighted Average
	5.05		47.20% Pervious Area
	5.65		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 884-883** Grass: Short n= 0.150 P2= 3.23"
1.9	102	0.0170	0.91		**Shallow Concentrated Flow, 883-881.2** Short Grass Pasture Kv= 7.0 fps
0.9	178	0.0050	3.21	2.52	**Pipe Channel, 878-876.95** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.8	204	0.0050	4.20	7.43	**Pipe Channel, 876.85-875.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	217	0.0125	8.05	25.29	**Pipe Channel, 875.7-873** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
0.0	21	0.0120	9.15	44.93	**Pipe Channel, 872.7-872.45** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
0.1	65	0.0150	11.56	81.69	**Pipe Channel, 860.2-859.2** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
0.5	210	0.0050	6.67	47.16	**Pipe Channel, 859.2-858** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
10.2	1,047	Total			

Summary for Subcatchment P2: Overland

Runoff = 3.5 cfs @ 12.29 hrs, Volume= 0.394 af, Depth= 1.00"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.28	98	House, HSG C
	1.82	74	>75% Grass cover, Good, HSG C
	2.56	70	Woods, Good, HSG C
	0.02	74	>75% Grass cover, Good, HSG C
	0.04	77	Woods, Good, HSG D
	4.72	73	Weighted Average
	4.44		94.07% Pervious Area
	0.28		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 861-860.25** Woods: Light underbrush n= 0.400 P2= 3.23"
5.9	360	0.0420	1.02		**Shallow Concentrated Flow, 860.25-845** Woodland Kv= 5.0 fps
19.7	410	Total			

Summary for Subcatchment P3: Overland - Southwest

Runoff = 0.1 cfs @ 12.43 hrs, Volume= 0.024 af, Depth= 0.29"
Routed to Reach DP3 : Southwest Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.92	55	Woods, Good, HSG B
0.08	70	Woods, Good, HSG C
1.00	56	Weighted Average
1.00		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	50	0.0240	0.07		**Sheet Flow, 864.5-863.3** Woods: Light underbrush n= 0.400 P2= 3.23"
3.1	229	0.0610	1.23		**Shallow Concentrated Flow, 863.3-849.25** Woodland Kv= 5.0 fps
14.5	279	Total			

Summary for Subcatchment P4: Overland - Northeast

Runoff = 1.6 cfs @ 12.22 hrs, Volume= 0.161 af, Depth= 1.11"
Routed to Reach DP4 : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.17	98	House, HSG C
	1.02	74	>75% Grass cover, Good, HSG C
	0.54	70	Woods, Good, HSG C
	1.73	75	Weighted Average
	1.56		90.17% Pervious Area
	0.17		9.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0270	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
4.7	230	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	280	Total			

Summary for Reach DP1: North Wetland

Inflow Area = 38.27 ac, 26.57% Impervious, Inflow Depth = 1.17" for 2-YR event
Inflow = 17.5 cfs @ 12.58 hrs, Volume= 3.736 af
Outflow = 17.5 cfs @ 12.58 hrs, Volume= 3.736 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP2: South Wetland

Inflow Area = 8.30 ac, 5.06% Impervious, Inflow Depth = 1.27" for 2-YR event
Inflow = 7.2 cfs @ 12.33 hrs, Volume= 0.877 af
Outflow = 7.2 cfs @ 12.33 hrs, Volume= 0.877 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: Southwest Property Line

Inflow Area = 1.00 ac, 0.00% Impervious, Inflow Depth = 0.29" for 2-YR event
Inflow = 0.1 cfs @ 12.43 hrs, Volume= 0.024 af
Outflow = 0.1 cfs @ 12.43 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP4: Northeast Property Line

Inflow Area = 1.73 ac, 9.83% Impervious, Inflow Depth = 1.11" for 2-YR event
Inflow = 1.6 cfs @ 12.22 hrs, Volume= 0.161 af
Outflow = 1.6 cfs @ 12.22 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

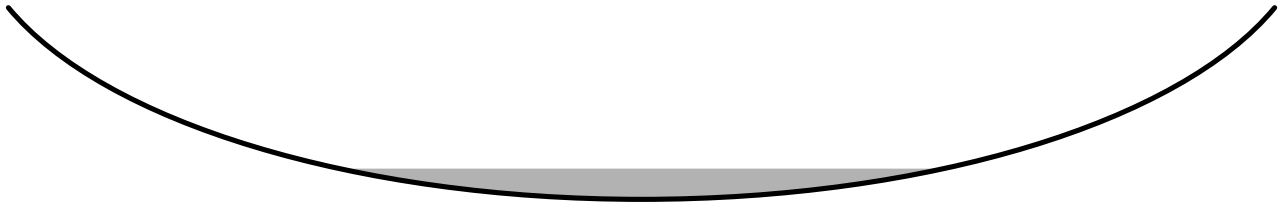
Summary for Reach Tc(1a): Tc Extended

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 1.42" for 2-YR event
Inflow = 6.1 cfs @ 12.51 hrs, Volume= 1.476 af
Outflow = 5.7 cfs @ 12.69 hrs, Volume= 1.476 af, Atten= 6%, Lag= 10.7 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.49 fps, Min. Travel Time= 10.8 min
Avg. Velocity = 0.40 fps, Avg. Travel Time= 40.6 min

Peak Storage= 3,717 cf @ 12.69 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 36.02'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 303.3 cfs

90.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 966.0' Slope= 0.0124 '/'
Inlet Invert= 858.00', Outlet Invert= 846.00'



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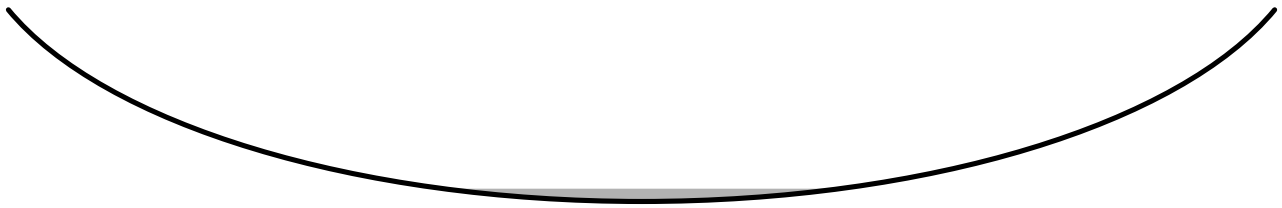
Summary for Reach Tc(1b): Tc Extended

Inflow = 1.8 cfs @ 12.51 hrs, Volume= 0.216 af
Outflow = 1.8 cfs @ 12.54 hrs, Volume= 0.216 af, Atten= 0%, Lag= 1.7 min
Routed to Reach Tc(1b2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.05 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 4.2 min

Peak Storage= 255 cf @ 12.54 hrs
Average Depth at Peak Storage= 0.07' , Surface Width= 38.54'
Bank-Full Depth= 1.00' Flow Area= 100.0 sf, Capacity= 641.5 cfs

150.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 150.0' Slope= 0.0200 '/'
Inlet Invert= 859.00', Outlet Invert= 856.00'



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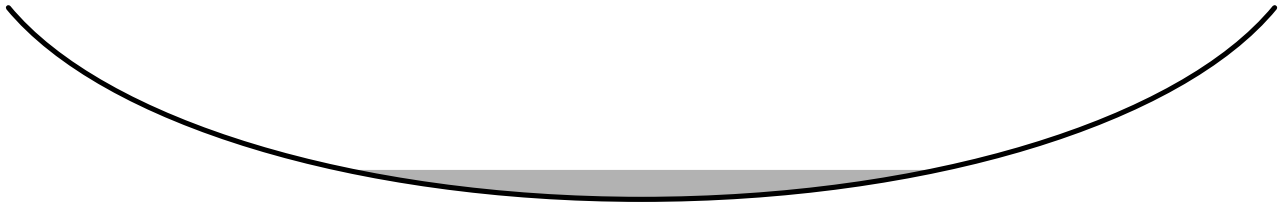
Summary for Reach Tc(1b2): Tc Extended

Inflow = 1.8 cfs @ 12.54 hrs, Volume= 0.216 af
Outflow = 1.8 cfs @ 12.55 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.4 min
Routed to Reach DP2 : South Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.74 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.05 fps, Avg. Travel Time= 1.1 min

Peak Storage= 63 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 4.69'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 103.5 cfs

12.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 132.0' Slope= 0.0833 '/'
Inlet Invert= 856.00', Outlet Invert= 845.00'



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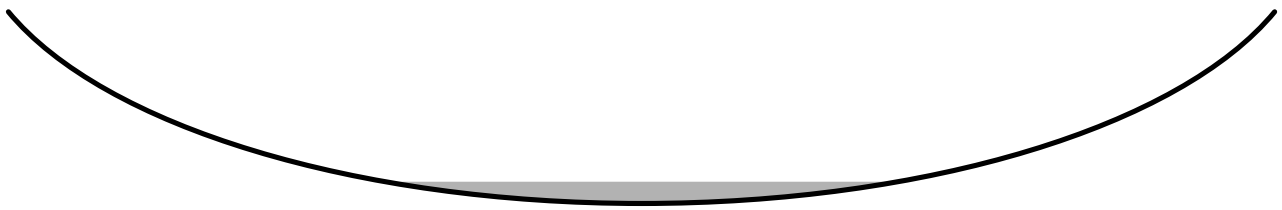
Summary for Reach Tc(2): Tc Extended

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 1.58" for 2-YR event
Inflow = 9.3 cfs @ 12.15 hrs, Volume= 0.718 af
Outflow = 9.0 cfs @ 12.18 hrs, Volume= 0.718 af, Atten= 4%, Lag= 1.8 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.77 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 8.3 min

Peak Storage= 1,094 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 67.21'
Bank-Full Depth= 1.00' Flow Area= 133.3 sf, Capacity= 1,008.0 cfs

200.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 216.0' Slope= 0.0278 '/'
Inlet Invert= 852.00', Outlet Invert= 846.00'



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Summary for Pond 1: Basin 1

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 2.04" for 2-YR event
Inflow = 25.8 cfs @ 12.13 hrs, Volume= 2.121 af
Outflow = 7.9 cfs @ 12.51 hrs, Volume= 1.691 af, Atten= 69%, Lag= 23.3 min
Primary = 6.1 cfs @ 12.51 hrs, Volume= 1.476 af
Routed to Reach Tc(1a) : Tc Extended
Secondary = 1.8 cfs @ 12.51 hrs, Volume= 0.216 af
Routed to Reach Tc(1b) : Tc Extended
Tertiary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(1b) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 859.83' @ 12.51 hrs Surf.Area= 24,467 sf Storage= 41,848 cf

Plug-Flow detention time= 203.1 min calculated for 1.691 af (80% of inflow)
Center-of-Mass det. time= 126.3 min (943.4 - 817.1)

Volume	Invert	Avail.Storage	Storage Description
#1	858.00'	149,774 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
858.00	21,228	0	0
860.00	24,765	45,993	45,993
862.00	30,390	55,155	101,148
863.00	32,521	31,456	132,604
863.50	36,162	17,171	149,774

Device	Routing	Invert	Outlet Devices
#1	Primary	858.25'	**24.0" Round Culvert X 2.00** L= 38.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 858.25' / 858.00' S= 0.0064 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	858.85'	**24.0" W x 7.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	859.45'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	860.25'	**36.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	861.90'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS100)** C= 0.600 Limited to weir flow at low heads
#6	Secondary	859.00'	**15.0" Round Culvert** L= 40.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 859.00' / 858.75' S= 0.0062 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#7	Device 6	859.15'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 6	860.75'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

#9	Device 6	862.30'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS101)** C= 0.600 Limited to weir flow at low heads
#10	Tertiary	862.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.1 cfs @ 12.51 hrs HW=859.83' TW=858.15' (Dynamic Tailwater)
- **1=Culvert** (Passes 6.1 cfs of 16.6 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 4.9 cfs @ 3.90 fps)
  - **3=Orifice/Grate** (Orifice Controls 1.2 cfs @ 2.41 fps)
  - **4=Orifice/Grate** (Controls 0.0 cfs)
  - **5=Orifice/Grate (OCS100)** (Controls 0.0 cfs)

Secondary OutFlow Max=1.8 cfs @ 12.51 hrs HW=859.83' TW=859.07' (Dynamic Tailwater)
- **6=Culvert** (Passes 1.8 cfs of 2.0 cfs potential flow)
  - **7=Orifice/Grate** (Orifice Controls 1.8 cfs @ 3.58 fps)
  - **8=Orifice/Grate** (Controls 0.0 cfs)
  - **9=Orifice/Grate (OCS101)** (Controls 0.0 cfs)

Tertiary OutFlow Max=0.0 cfs @ 0.00 hrs HW=858.00' TW=859.00' (Dynamic Tailwater)
- **10=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Summary for Pond 2: Basin 2

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 1.80" for 2-YR event
Inflow = 10.7 cfs @ 12.10 hrs, Volume= 0.820 af
Outflow = 9.3 cfs @ 12.15 hrs, Volume= 0.718 af, Atten= 13%, Lag= 3.1 min
Primary = 9.3 cfs @ 12.15 hrs, Volume= 0.718 af
Routed to Reach Tc(2) : Tc Extended
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 858.71' @ 12.15 hrs Surf.Area= 6,338 sf Storage= 9,693 cf

Plug-Flow detention time= 193.5 min calculated for 0.718 af (88% of inflow)
Center-of-Mass det. time= 136.8 min (961.9 - 825.1)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,142 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	2,737	0	0
857.00	3,135	1,468	1,468
858.00	5,140	4,138	5,606
859.00	6,822	5,981	11,587
860.25	10,067	10,556	22,142

Device	Routing	Invert	Outlet Devices
#1	Primary	853.50'	**30.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 853.50' / 853.00' S= 0.0139 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	857.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.40'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS200)** C= 0.600 Limited to weir flow at low heads
#4	Secondary	859.25'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.3 cfs @ 12.15 hrs HW=858.71' TW=852.11' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.3 cfs of 37.1 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.2 cfs @ 4.40 fps)
  └─**3=Orifice/Grate (OCS200)** (Weir Controls 9.1 cfs @ 1.83 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=856.50' TW=852.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1(b): Offsite Area (North) Runoff Area=0.33 ac 0.00% Impervious Runoff Depth=1.93"
Flow Length=232' Slope=0.0100 '/' Tc=22.3 min CN=70 Runoff=0.5 cfs 0.053 af

Subcatchment E1(c): Offsite Area (South) + Runoff Area=1.80 ac 62.22% Impervious Runoff Depth=3.64"
Tc=6.0 min CN=89 Runoff=7.5 cfs 0.546 af

Subcatchment E2(b.1): Offsite Area (South) + Runoff Area=3.58 ac 3.91% Impervious Runoff Depth=2.01"
Flow Length=616' Tc=20.1 min CN=71 Runoff=5.6 cfs 0.600 af

Subcatchment P1(a): Overland Runoff Area=17.33 ac 2.54% Impervious Runoff Depth=1.93"
Flow Length=967' Tc=45.7 min CN=70 Runoff=17.6 cfs 2.792 af

Subcatchment P1(b): Overland Runoff Area=2.97 ac 18.52% Impervious Runoff Depth=2.59"
Flow Length=1,704' Tc=36.2 min CN=78 Runoff=4.7 cfs 0.642 af

Subcatchment P1(c): Overland/Pipe Flow Runoff Area=5.14 ac 46.89% Impervious Runoff Depth=3.34"
Flow Length=802' Tc=7.5 min CN=86 Runoff=18.9 cfs 1.429 af

Subcatchment P1(d): Overland/Pipe Flow Runoff Area=10.70 ac 52.80% Impervious Runoff Depth=3.54"
Flow Length=1,047' Tc=10.2 min CN=88 Runoff=37.8 cfs 3.153 af

Subcatchment P2: Overland Runoff Area=4.72 ac 5.93% Impervious Runoff Depth=2.17"
Flow Length=410' Tc=19.7 min CN=73 Runoff=8.1 cfs 0.854 af

Subcatchment P3: Overland - Southwest Runoff Area=1.00 ac 0.00% Impervious Runoff Depth=0.97"
Flow Length=279' Tc=14.5 min CN=56 Runoff=0.7 cfs 0.081 af

Subcatchment P4: Overland - Northeast Runoff Area=1.73 ac 9.83% Impervious Runoff Depth=2.34"
Flow Length=280' Slope=0.0270 '/' Tc=15.6 min CN=75 Runoff=3.5 cfs 0.337 af

Reach DP1: North Wetland Inflow=40.0 cfs 7.567 af
Outflow=40.0 cfs 7.567 af

Reach DP2: South Wetland Inflow=16.4 cfs 1.970 af
Outflow=16.4 cfs 1.970 af

Reach DP3: Southwest Property Line Inflow=0.7 cfs 0.081 af
Outflow=0.7 cfs 0.081 af

Reach DP4: Northeast Property Line Inflow=3.5 cfs 0.337 af
Outflow=3.5 cfs 0.337 af

Reach Tc(1a): Tc Extended Avg. Flow Depth=0.23' Max Vel=1.91 fps Inflow=13.3 cfs 2.753 af
n=0.025 L=966.0' S=0.0124 '/' Capacity=303.3 cfs Outflow=12.9 cfs 2.753 af

Reach Tc(1b): Tc Extended Avg. Flow Depth=0.08' Max Vel=1.23 fps Inflow=3.0 cfs 0.516 af
n=0.025 L=150.0' S=0.0200 '/' Capacity=641.5 cfs Outflow=3.0 cfs 0.516 af

Reach Tc(1b2): Tc Extended Avg. Flow Depth=0.19' Max Vel=4.37 fps Inflow=3.0 cfs 0.516 af
n=0.025 L=132.0' S=0.0833 '/' Capacity=103.5 cfs Outflow=3.0 cfs 0.516 af

Reach Tc(2): Tc Extended Avg. Flow Depth=0.15' Max Vel=2.18 fps Inflow=18.0 cfs 1.380 af
n=0.025 L=216.0' S=0.0278 '/' Capacity=1,008.0 cfs Outflow=17.7 cfs 1.380 af

Pond 1: Basin 1 Peak Elev=860.79' Storage=66,565 cf Inflow=44.1 cfs 3.699 af
Primary=13.3 cfs 2.753 af Secondary=3.0 cfs 0.516 af Tertiary=0.0 cfs 0.000 af Outflow=16.2 cfs 3.269 af

Pond 2: Basin 2 Peak Elev=858.89' Storage=10,825 cf Inflow=19.1 cfs 1.482 af
Primary=18.0 cfs 1.380 af Secondary=0.0 cfs 0.000 af Outflow=18.0 cfs 1.380 af

Total Runoff Area = 49.30 ac Runoff Volume = 10.486 af Average Runoff Depth = 2.55"
78.17% Pervious = 38.54 ac 21.83% Impervious = 10.76 ac

Summary for Subcatchment E1(b): Offsite Area (North)

Runoff = 0.5 cfs @ 12.31 hrs, Volume= 0.053 af, Depth= 1.93"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.33	70	Offsite Woods, Good, HSG C
	0.33		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0100	0.05		**Sheet Flow, 897.5-897.0** Woods: Light underbrush n= 0.400 P2= 3.23"
6.1	182	0.0100	0.50		**Shallow Concentrated Flow, 897-895** Woodland Kv= 5.0 fps
22.3	232	Total			

Summary for Subcatchment E1(c): Offsite Area (South) + E2(b.3)

Runoff = 7.5 cfs @ 12.08 hrs, Volume= 0.546 af, Depth= 3.64"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.34	98	Offsite Roof, HSG C
*	0.68	74	Offsite >75% Grass cover, Good, HSG C
*	0.78	98	Offsite Paved parking, HSG C
	1.80	89	Weighted Average
	0.68		37.78% Pervious Area
	1.12		62.22% Impervious Area

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

Summary for Subcatchment E2(b.1): Offsite Area (South) + E2(b.2)

Runoff = 5.6 cfs @ 12.28 hrs, Volume= 0.600 af, Depth= 2.01"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	3.08	70	Offsite Woods, Good, HSG C
*	0.36	74	Offsite >75% Grass cover, Good, HSG C
*	0.14	98	Offsite Roof, HSG C
	3.58	71	Weighted Average
	3.44		96.09% Pervious Area
	0.14		3.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 909-908.25** Woods: Light underbrush n= 0.400 P2= 3.23"
6.3	566	0.0910	1.51		**Shallow Concentrated Flow, 908.25-857** Woodland Kv= 5.0 fps
20.1	616	Total			

Summary for Subcatchment P1(a): Overland

Runoff = 17.6 cfs @ 12.64 hrs, Volume= 2.792 af, Depth= 1.93"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.41	98	House, HSG C
	1.83	74	>75% Grass cover, Good, HSG C
	9.18	70	Woods, Good, HSG C
*	0.03	98	House, HSG D
	0.58	80	>75% Grass cover, Good, HSG D
	2.85	77	Woods, Good, HSG D
	0.00	61	>75% Grass cover, Good, HSG B
	2.45	55	Woods, Good, HSG B
	17.33	70	Weighted Average
	16.89		97.46% Pervious Area
	0.44		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, 862-861.4** Woods: Light underbrush n= 0.400 P2= 3.23"
30.6	917	0.0100	0.50		**Shallow Concentrated Flow, 861.4-852** Woodland Kv= 5.0 fps
45.7	967	Total			

Summary for Subcatchment P1(b): Overland

Runoff = 4.7 cfs @ 12.50 hrs, Volume= 0.642 af, Depth= 2.59"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.55	98	House, HSG C
	2.42	74	>75% Grass cover, Good, HSG C
	2.97	78	Weighted Average
	2.42		81.48% Pervious Area
	0.55		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 882-881** Grass: Short n= 0.150 P2= 3.23"
6.2	350	0.0180	0.94		**Shallow Concentrated Flow, 881-874.1** Short Grass Pasture Kv= 7.0 fps
0.9	257	0.0065	4.79	8.47	**Pipe Channel, 871-869** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
23.5	1,047	0.0220	0.74		**Shallow Concentrated Flow, 869-846** Woodland Kv= 5.0 fps
36.2	1,704	Total			

Summary for Subcatchment P1(c): Overland/Pipe Flow

Runoff = 18.9 cfs @ 12.10 hrs, Volume= 1.429 af, Depth= 3.34"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	1.07	98	House, HSG C
	1.18	98	Paved parking, HSG C
	2.18	74	>75% Grass cover, Good, HSG C
*	0.15	98	House, HSG D
	0.01	98	Paved parking, HSG D
	0.48	80	>75% Grass cover, Good, HSG D
*	0.07	98	Basin Bottom, 0% imp, HSG D
	5.14	86	Weighted Average
	2.73		53.11% Pervious Area
	2.41		46.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow, 896-893.8** Grass: Short n= 0.150 P2= 3.23"
1.9	116	0.0220	1.04		**Shallow Concentrated Flow, 893.8-891.25** Short Grass Pasture Kv= 7.0 fps
0.3	110	0.0170	5.91	4.65	**Pipe Channel, 887.75-882** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.5	188	0.0110	5.98	7.34	**Pipe Channel, 880-878.2** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.2	107	0.0150	7.89	13.94	**Pipe Channel, 878.1-876.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	231	0.0150	8.82	27.71	**Pipe Channel, 873.75-860** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
7.5	802	Total			

Summary for Subcatchment P1(d): Overland/Pipe Flow

Runoff = 37.8 cfs @ 12.13 hrs, Volume= 3.153 af, Depth= 3.54"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	2.54	98	House, HSG C
	3.11	98	Paved parking, HSG C
	4.57	74	>75% Grass cover, Good, HSG C
*	0.48	98	Basin Bottom, 0% imp, HSG C
	10.70	88	Weighted Average
	5.05		47.20% Pervious Area
	5.65		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 884-883** Grass: Short n= 0.150 P2= 3.23"
1.9	102	0.0170	0.91		**Shallow Concentrated Flow, 883-881.2** Short Grass Pasture Kv= 7.0 fps
0.9	178	0.0050	3.21	2.52	**Pipe Channel, 878-876.95** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.8	204	0.0050	4.20	7.43	**Pipe Channel, 876.85-875.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	217	0.0125	8.05	25.29	**Pipe Channel, 875.7-873** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
0.0	21	0.0120	9.15	44.93	**Pipe Channel, 872.7-872.45** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
0.1	65	0.0150	11.56	81.69	**Pipe Channel, 860.2-859.2** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
0.5	210	0.0050	6.67	47.16	**Pipe Channel, 859.2-858** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
10.2	1,047	Total			

Summary for Subcatchment P2: Overland

Runoff = 8.1 cfs @ 12.27 hrs, Volume= 0.854 af, Depth= 2.17"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.28	98	House, HSG C
	1.82	74	>75% Grass cover, Good, HSG C
	2.56	70	Woods, Good, HSG C
	0.02	74	>75% Grass cover, Good, HSG C
	0.04	77	Woods, Good, HSG D
	4.72	73	Weighted Average
	4.44		94.07% Pervious Area
	0.28		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 861-860.25** Woods: Light underbrush n= 0.400 P2= 3.23"
5.9	360	0.0420	1.02		**Shallow Concentrated Flow, 860.25-845** Woodland Kv= 5.0 fps
19.7	410	Total			

Summary for Subcatchment P3: Overland - Southwest

Runoff = 0.7 cfs @ 12.23 hrs, Volume= 0.081 af, Depth= 0.97"
Routed to Reach DP3 : Southwest Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.92	55	Woods, Good, HSG B
0.08	70	Woods, Good, HSG C
1.00	56	Weighted Average
1.00		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	50	0.0240	0.07		**Sheet Flow, 864.5-863.3** Woods: Light underbrush n= 0.400 P2= 3.23"
3.1	229	0.0610	1.23		**Shallow Concentrated Flow, 863.3-849.25** Woodland Kv= 5.0 fps
14.5	279	Total			

Summary for Subcatchment P4: Overland - Northeast

Runoff = 3.5 cfs @ 12.21 hrs, Volume= 0.337 af, Depth= 2.34"
Routed to Reach DP4 : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.17	98	House, HSG C
	1.02	74	>75% Grass cover, Good, HSG C
	0.54	70	Woods, Good, HSG C
	1.73	75	Weighted Average
	1.56		90.17% Pervious Area
	0.17		9.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0270	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
4.7	230	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	280	Total			

Summary for Reach DP1: North Wetland

Inflow Area = 38.27 ac, 26.57% Impervious, Inflow Depth = 2.37" for 10-YR event
Inflow = 40.0 cfs @ 12.53 hrs, Volume= 7.567 af
Outflow = 40.0 cfs @ 12.53 hrs, Volume= 7.567 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP2: South Wetland

Inflow Area = 8.30 ac, 5.06% Impervious, Inflow Depth = 2.85" for 10-YR event
Inflow = 16.4 cfs @ 12.28 hrs, Volume= 1.970 af
Outflow = 16.4 cfs @ 12.28 hrs, Volume= 1.970 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: Southwest Property Line

Inflow Area = 1.00 ac, 0.00% Impervious, Inflow Depth = 0.97" for 10-YR event
Inflow = 0.7 cfs @ 12.23 hrs, Volume= 0.081 af
Outflow = 0.7 cfs @ 12.23 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP4: Northeast Property Line

Inflow Area = 1.73 ac, 9.83% Impervious, Inflow Depth = 2.34" for 10-YR event
Inflow = 3.5 cfs @ 12.21 hrs, Volume= 0.337 af
Outflow = 3.5 cfs @ 12.21 hrs, Volume= 0.337 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

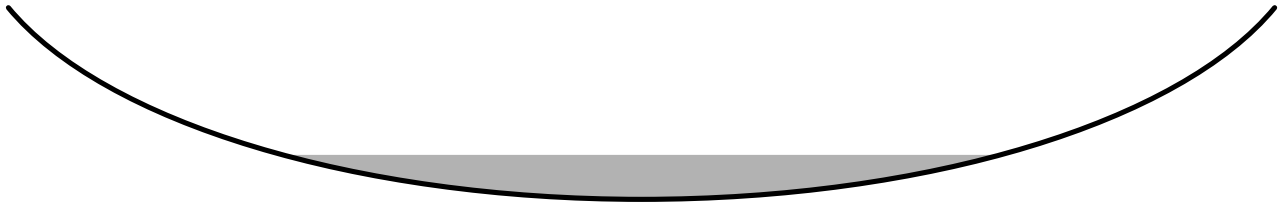
Summary for Reach Tc(1a): Tc Extended

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 2.64" for 10-YR event
Inflow = 13.3 cfs @ 12.45 hrs, Volume= 2.753 af
Outflow = 12.9 cfs @ 12.57 hrs, Volume= 2.753 af, Atten= 3%, Lag= 7.4 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.91 fps, Min. Travel Time= 8.4 min
Avg. Velocity = 0.44 fps, Avg. Travel Time= 36.9 min

Peak Storage= 6,513 cf @ 12.57 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 43.43'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 303.3 cfs

90.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 966.0' Slope= 0.0124 '/'
Inlet Invert= 858.00', Outlet Invert= 846.00'



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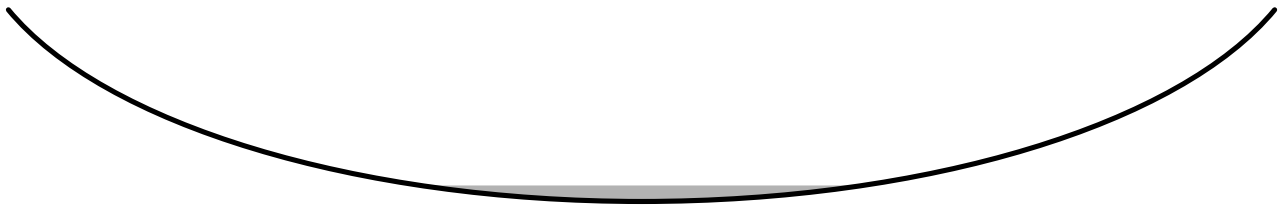
Summary for Reach Tc(1b): Tc Extended

Inflow = 3.0 cfs @ 12.45 hrs, Volume= 0.516 af
Outflow = 3.0 cfs @ 12.47 hrs, Volume= 0.516 af, Atten= 0%, Lag= 1.4 min
Routed to Reach Tc(1b2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.23 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 3.6 min

Peak Storage= 363 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 43.36'
Bank-Full Depth= 1.00' Flow Area= 100.0 sf, Capacity= 641.5 cfs

150.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 150.0' Slope= 0.0200 '/'
Inlet Invert= 859.00', Outlet Invert= 856.00'



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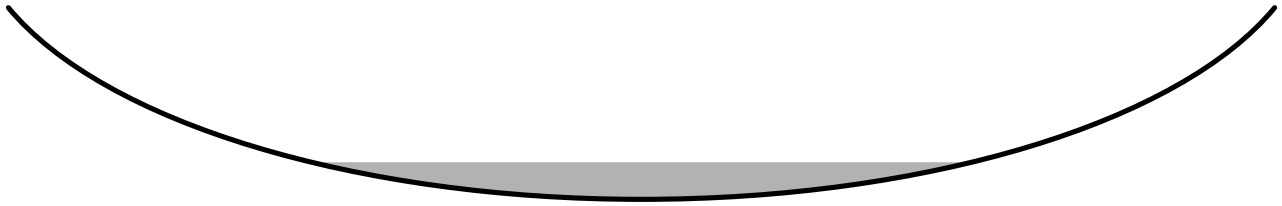
Summary for Reach Tc(1b2): Tc Extended

Inflow = 3.0 cfs @ 12.47 hrs, Volume= 0.516 af
Outflow = 3.0 cfs @ 12.48 hrs, Volume= 0.516 af, Atten= 0%, Lag= 0.3 min
Routed to Reach DP2 : South Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.37 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.39 fps, Avg. Travel Time= 0.9 min

Peak Storage= 90 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 5.28'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 103.5 cfs

12.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 132.0' Slope= 0.0833 '/'
Inlet Invert= 856.00', Outlet Invert= 845.00'



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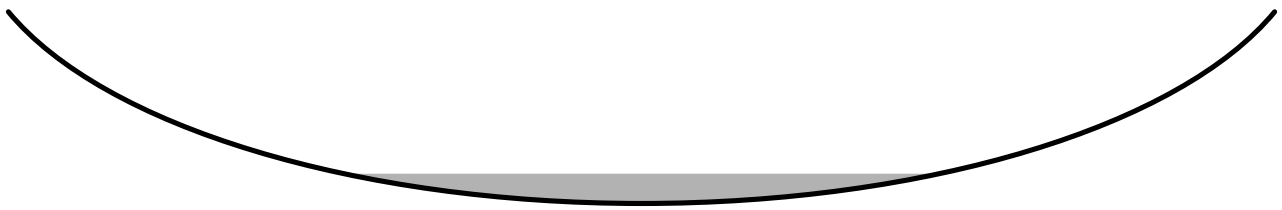
Summary for Reach Tc(2): Tc Extended

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 3.03" for 10-YR event
Inflow = 18.0 cfs @ 12.13 hrs, Volume= 1.380 af
Outflow = 17.7 cfs @ 12.15 hrs, Volume= 1.380 af, Atten= 2%, Lag= 1.2 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.18 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 7.8 min

Peak Storage= 1,752 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 78.64'
Bank-Full Depth= 1.00' Flow Area= 133.3 sf, Capacity= 1,008.0 cfs

200.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 216.0' Slope= 0.0278 '/'
Inlet Invert= 852.00', Outlet Invert= 846.00'



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Summary for Pond 1: Basin 1

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 3.55" for 10-YR event
Inflow = 44.1 cfs @ 12.12 hrs, Volume= 3.699 af
Outflow = 16.2 cfs @ 12.45 hrs, Volume= 3.269 af, Atten= 63%, Lag= 19.5 min
Primary = 13.3 cfs @ 12.45 hrs, Volume= 2.753 af
Routed to Reach Tc(1a) : Tc Extended
Secondary = 3.0 cfs @ 12.45 hrs, Volume= 0.516 af
Routed to Reach Tc(1b) : Tc Extended
Tertiary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(1b) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 860.79' @ 12.45 hrs Surf.Area= 27,000 sf Storage= 66,565 cf

Plug-Flow detention time= 153.1 min calculated for 3.269 af (88% of inflow)
Center-of-Mass det. time= 99.1 min (900.5 - 801.4)

Volume	Invert	Avail.Storage	Storage Description
#1	858.00'	149,774 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
858.00	21,228	0	0
860.00	24,765	45,993	45,993
862.00	30,390	55,155	101,148
863.00	32,521	31,456	132,604
863.50	36,162	17,171	149,774

Device	Routing	Invert	Outlet Devices
#1	Primary	858.25'	**24.0" Round Culvert X 2.00** L= 38.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 858.25' / 858.00' S= 0.0064 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	858.85'	**24.0" W x 7.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	859.45'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	860.25'	**36.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	861.90'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS100)** C= 0.600 Limited to weir flow at low heads
#6	Secondary	859.00'	**15.0" Round Culvert** L= 40.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 859.00' / 858.75' S= 0.0062 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#7	Device 6	859.15'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 6	860.75'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

#9	Device 6	862.30'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS101)** C= 0.600 Limited to weir flow at low heads
#10	Tertiary	862.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=13.3 cfs @ 12.45 hrs HW=860.79' TW=858.23' (Dynamic Tailwater)
- **1=Culvert** (Passes 13.3 cfs of 29.7 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 7.7 cfs @ 6.14 fps)
  - **3=Orifice/Grate** (Orifice Controls 2.7 cfs @ 5.32 fps)
  - **4=Orifice/Grate** (Orifice Controls 2.9 cfs @ 2.94 fps)
  - **5=Orifice/Grate (OCS100)** (Controls 0.0 cfs)

Secondary OutFlow Max=3.0 cfs @ 12.45 hrs HW=860.79' TW=859.08' (Dynamic Tailwater)
- **6=Culvert** (Passes 3.0 cfs of 5.0 cfs potential flow)
  - **7=Orifice/Grate** (Orifice Controls 3.0 cfs @ 5.93 fps)
  - **8=Orifice/Grate** (Orifice Controls 0.0 cfs @ 0.72 fps)
  - **9=Orifice/Grate (OCS101)** (Controls 0.0 cfs)

Tertiary OutFlow Max=0.0 cfs @ 0.00 hrs HW=858.00' TW=859.00' (Dynamic Tailwater)
- **10=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Summary for Pond 2: Basin 2

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 3.25" for 10-YR event
Inflow = 19.1 cfs @ 12.10 hrs, Volume= 1.482 af
Outflow = 18.0 cfs @ 12.13 hrs, Volume= 1.380 af, Atten= 6%, Lag= 1.9 min
Primary = 18.0 cfs @ 12.13 hrs, Volume= 1.380 af
Routed to Reach Tc(2) : Tc Extended
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 858.89' @ 12.13 hrs Surf.Area= 6,632 sf Storage= 10,825 cf

Plug-Flow detention time= 118.3 min calculated for 1.380 af (93% of inflow)
Center-of-Mass det. time= 82.3 min (891.0 - 808.7)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,142 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	2,737	0	0
857.00	3,135	1,468	1,468
858.00	5,140	4,138	5,606
859.00	6,822	5,981	11,587
860.25	10,067	10,556	22,142

Device	Routing	Invert	Outlet Devices
#1	Primary	853.50'	**30.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 853.50' / 853.00' S= 0.0139 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	857.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.40'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS200)** C= 0.600 Limited to weir flow at low heads
#4	Secondary	859.25'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=18.0 cfs @ 12.13 hrs HW=858.89' TW=852.15' (Dynamic Tailwater)
└─**1=Culvert** (Passes 18.0 cfs of 38.0 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.2 cfs @ 4.84 fps)
  └─**3=Orifice/Grate (OCS200)** (Weir Controls 17.8 cfs @ 2.28 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=856.50' TW=852.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1(b): Offsite Area (North) Runoff Area=0.33 ac 0.00% Impervious Runoff Depth=2.92"
Flow Length=232' Slope=0.0100 '/' Tc=22.3 min CN=70 Runoff=0.7 cfs 0.080 af

Subcatchment E1(c): Offsite Area (South) + Runoff Area=1.80 ac 62.22% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=89 Runoff=9.9 cfs 0.731 af

Subcatchment E2(b.1): Offsite Area (South) + Runoff Area=3.58 ac 3.91% Impervious Runoff Depth=3.01"
Flow Length=616' Tc=20.1 min CN=71 Runoff=8.5 cfs 0.899 af

Subcatchment P1(a): Overland Runoff Area=17.33 ac 2.54% Impervious Runoff Depth=2.92"
Flow Length=967' Tc=45.7 min CN=70 Runoff=27.1 cfs 4.212 af

Subcatchment P1(b): Overland Runoff Area=2.97 ac 18.52% Impervious Runoff Depth=3.70"
Flow Length=1,704' Tc=36.2 min CN=78 Runoff=6.7 cfs 0.916 af

Subcatchment P1(c): Overland/Pipe Flow Runoff Area=5.14 ac 46.89% Impervious Runoff Depth=4.54"
Flow Length=802' Tc=7.5 min CN=86 Runoff=25.4 cfs 1.946 af

Subcatchment P1(d): Overland/Pipe Flow Runoff Area=10.70 ac 52.80% Impervious Runoff Depth=4.76"
Flow Length=1,047' Tc=10.2 min CN=88 Runoff=50.2 cfs 4.245 af

Subcatchment P2: Overland Runoff Area=4.72 ac 5.93% Impervious Runoff Depth=3.21"
Flow Length=410' Tc=19.7 min CN=73 Runoff=12.0 cfs 1.261 af

Subcatchment P3: Overland - Southwest Runoff Area=1.00 ac 0.00% Impervious Runoff Depth=1.68"
Flow Length=279' Tc=14.5 min CN=56 Runoff=1.4 cfs 0.140 af

Subcatchment P4: Overland - Northeast Runoff Area=1.73 ac 9.83% Impervious Runoff Depth=3.40"
Flow Length=280' Slope=0.0270 '/' Tc=15.6 min CN=75 Runoff=5.1 cfs 0.490 af

Reach DP1: North Wetland Inflow=57.1 cfs 10.842 af
Outflow=57.1 cfs 10.842 af

Reach DP2: South Wetland Inflow=24.3 cfs 2.916 af
Outflow=24.3 cfs 2.916 af

Reach DP3: Southwest Property Line Inflow=1.4 cfs 0.140 af
Outflow=1.4 cfs 0.140 af

Reach DP4: Northeast Property Line Inflow=5.1 cfs 0.490 af
Outflow=5.1 cfs 0.490 af

Reach Tc(1a): Tc Extended Avg. Flow Depth=0.26' Max Vel=2.08 fps Inflow=17.2 cfs 3.789 af
n=0.025 L=966.0' S=0.0124 '/' Capacity=303.3 cfs Outflow=16.9 cfs 3.789 af

Reach Tc(1b): Tc Extended Avg. Flow Depth=0.10' Max Vel=1.36 fps Inflow=4.1 cfs 0.757 af
n=0.025 L=150.0' S=0.0200 '/' Capacity=641.5 cfs Outflow=4.1 cfs 0.757 af

Reach Tc(1b2): Tc Extended Avg. Flow Depth=0.23' Max Vel=4.84 fps Inflow=4.1 cfs 0.757 af
n=0.025 L=132.0' S=0.0833 '/' Capacity=103.5 cfs Outflow=4.1 cfs 0.757 af

Reach Tc(2): Tc Extended Avg. Flow Depth=0.18' Max Vel=2.40 fps Inflow=24.5 cfs 1.924 af
n=0.025 L=216.0' S=0.0278 '/' Capacity=1,008.0 cfs Outflow=24.1 cfs 1.924 af

Pond 1: Basin 1 Peak Elev=861.43' Storage=84,307 cf Inflow=58.6 cfs 4.976 af
Primary=17.2 cfs 3.789 af Secondary=4.1 cfs 0.757 af Tertiary=0.0 cfs 0.000 af Outflow=21.3 cfs 4.546 af

Pond 2: Basin 2 Peak Elev=859.00' Storage=11,575 cf Inflow=25.8 cfs 2.026 af
Primary=24.5 cfs 1.924 af Secondary=0.0 cfs 0.000 af Outflow=24.5 cfs 1.924 af

Total Runoff Area = 49.30 ac Runoff Volume = 14.920 af Average Runoff Depth = 3.63"
78.17% Pervious = 38.54 ac 21.83% Impervious = 10.76 ac

Summary for Subcatchment E1(b): Offsite Area (North)

Runoff = 0.7 cfs @ 12.31 hrs, Volume= 0.080 af, Depth= 2.92"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	0.33	70	Offsite Woods, Good, HSG C
	0.33		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0100	0.05		**Sheet Flow, 897.5-897.0** Woods: Light underbrush n= 0.400 P2= 3.23"
6.1	182	0.0100	0.50		**Shallow Concentrated Flow, 897-895** Woodland Kv= 5.0 fps
22.3	232	Total			

Summary for Subcatchment E1(c): Offsite Area (South) + E2(b.3)

Runoff = 9.9 cfs @ 12.08 hrs, Volume= 0.731 af, Depth= 4.87"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	0.34	98	Offsite Roof, HSG C
*	0.68	74	Offsite >75% Grass cover, Good, HSG C
*	0.78	98	Offsite Paved parking, HSG C
	1.80	89	Weighted Average
	0.68		37.78% Pervious Area
	1.12		62.22% Impervious Area

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

Summary for Subcatchment E2(b.1): Offsite Area (South) + E2(b.2)

Runoff = 8.5 cfs @ 12.28 hrs, Volume= 0.899 af, Depth= 3.01"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	3.08	70	Offsite Woods, Good, HSG C
*	0.36	74	Offsite >75% Grass cover, Good, HSG C
*	0.14	98	Offsite Roof, HSG C
	3.58	71	Weighted Average
	3.44		96.09% Pervious Area
	0.14		3.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 909-908.25** Woods: Light underbrush n= 0.400 P2= 3.23"
6.3	566	0.0910	1.51		**Shallow Concentrated Flow, 908.25-857** Woodland Kv= 5.0 fps
20.1	616	Total			

Summary for Subcatchment P1(a): Overland

Runoff = 27.1 cfs @ 12.64 hrs, Volume= 4.212 af, Depth= 2.92"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	0.41	98	House, HSG C
	1.83	74	>75% Grass cover, Good, HSG C
	9.18	70	Woods, Good, HSG C
*	0.03	98	House, HSG D
	0.58	80	>75% Grass cover, Good, HSG D
	2.85	77	Woods, Good, HSG D
	0.00	61	>75% Grass cover, Good, HSG B
	2.45	55	Woods, Good, HSG B
	17.33	70	Weighted Average
	16.89		97.46% Pervious Area
	0.44		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, 862-861.4** Woods: Light underbrush n= 0.400 P2= 3.23"
30.6	917	0.0100	0.50		**Shallow Concentrated Flow, 861.4-852** Woodland Kv= 5.0 fps
45.7	967	Total			

Summary for Subcatchment P1(b): Overland

Runoff = 6.7 cfs @ 12.50 hrs, Volume= 0.916 af, Depth= 3.70"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	0.55	98	House, HSG C
	2.42	74	>75% Grass cover, Good, HSG C
	2.97	78	Weighted Average
	2.42		81.48% Pervious Area
	0.55		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 882-881** Grass: Short n= 0.150 P2= 3.23"
6.2	350	0.0180	0.94		**Shallow Concentrated Flow, 881-874.1** Short Grass Pasture Kv= 7.0 fps
0.9	257	0.0065	4.79	8.47	**Pipe Channel, 871-869** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
23.5	1,047	0.0220	0.74		**Shallow Concentrated Flow, 869-846** Woodland Kv= 5.0 fps
36.2	1,704	Total			

Summary for Subcatchment P1(c): Overland/Pipe Flow

Runoff = 25.4 cfs @ 12.10 hrs, Volume= 1.946 af, Depth= 4.54"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	1.07	98	House, HSG C
	1.18	98	Paved parking, HSG C
	2.18	74	>75% Grass cover, Good, HSG C
*	0.15	98	House, HSG D
	0.01	98	Paved parking, HSG D
	0.48	80	>75% Grass cover, Good, HSG D
*	0.07	98	Basin Bottom, 0% imp, HSG D
	5.14	86	Weighted Average
	2.73		53.11% Pervious Area
	2.41		46.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow, 896-893.8** Grass: Short n= 0.150 P2= 3.23"
1.9	116	0.0220	1.04		**Shallow Concentrated Flow, 893.8-891.25** Short Grass Pasture Kv= 7.0 fps
0.3	110	0.0170	5.91	4.65	**Pipe Channel, 887.75-882** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.5	188	0.0110	5.98	7.34	**Pipe Channel, 880-878.2** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.2	107	0.0150	7.89	13.94	**Pipe Channel, 878.1-876.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	231	0.0150	8.82	27.71	**Pipe Channel, 873.75-860** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
7.5	802	Total			

Summary for Subcatchment P1(d): Overland/Pipe Flow

Runoff = 50.2 cfs @ 12.13 hrs, Volume= 4.245 af, Depth= 4.76"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	2.54	98	House, HSG C
	3.11	98	Paved parking, HSG C
	4.57	74	>75% Grass cover, Good, HSG C
*	0.48	98	Basin Bottom, 0% imp, HSG C
	10.70	88	Weighted Average
	5.05		47.20% Pervious Area
	5.65		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 884-883** Grass: Short n= 0.150 P2= 3.23"
1.9	102	0.0170	0.91		**Shallow Concentrated Flow, 883-881.2** Short Grass Pasture Kv= 7.0 fps
0.9	178	0.0050	3.21	2.52	**Pipe Channel, 878-876.95** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.8	204	0.0050	4.20	7.43	**Pipe Channel, 876.85-875.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	217	0.0125	8.05	25.29	**Pipe Channel, 875.7-873** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
0.0	21	0.0120	9.15	44.93	**Pipe Channel, 872.7-872.45** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
0.1	65	0.0150	11.56	81.69	**Pipe Channel, 860.2-859.2** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
0.5	210	0.0050	6.67	47.16	**Pipe Channel, 859.2-858** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
10.2	1,047	Total			

Summary for Subcatchment P2: Overland

Runoff = 12.0 cfs @ 12.27 hrs, Volume= 1.261 af, Depth= 3.21"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	0.28	98	House, HSG C
	1.82	74	>75% Grass cover, Good, HSG C
	2.56	70	Woods, Good, HSG C
	0.02	74	>75% Grass cover, Good, HSG C
	0.04	77	Woods, Good, HSG D
	4.72	73	Weighted Average
	4.44		94.07% Pervious Area
	0.28		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 861-860.25** Woods: Light underbrush n= 0.400 P2= 3.23"
5.9	360	0.0420	1.02		**Shallow Concentrated Flow, 860.25-845** Woodland Kv= 5.0 fps
19.7	410	Total			

Summary for Subcatchment P3: Overland - Southwest

Runoff = 1.4 cfs @ 12.22 hrs, Volume= 0.140 af, Depth= 1.68"
Routed to Reach DP3 : Southwest Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

Area (ac)	CN	Description
0.92	55	Woods, Good, HSG B
0.08	70	Woods, Good, HSG C
1.00	56	Weighted Average
1.00		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	50	0.0240	0.07		**Sheet Flow, 864.5-863.3** Woods: Light underbrush n= 0.400 P2= 3.23"
3.1	229	0.0610	1.23		**Shallow Concentrated Flow, 863.3-849.25** Woodland Kv= 5.0 fps
14.5	279	Total			

Summary for Subcatchment P4: Overland - Northeast

Runoff = 5.1 cfs @ 12.21 hrs, Volume= 0.490 af, Depth= 3.40"
Routed to Reach DP4 : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.14"

	Area (ac)	CN	Description
*	0.17	98	House, HSG C
	1.02	74	>75% Grass cover, Good, HSG C
	0.54	70	Woods, Good, HSG C
	1.73	75	Weighted Average
	1.56		90.17% Pervious Area
	0.17		9.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0270	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
4.7	230	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	280	Total			

Summary for Reach DP1: North Wetland

Inflow Area = 38.27 ac, 26.57% Impervious, Inflow Depth = 3.40" for 25-YR event
Inflow = 57.1 cfs @ 12.53 hrs, Volume= 10.842 af
Outflow = 57.1 cfs @ 12.53 hrs, Volume= 10.842 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP2: South Wetland

Inflow Area = 8.30 ac, 5.06% Impervious, Inflow Depth = 4.22" for 25-YR event
Inflow = 24.3 cfs @ 12.28 hrs, Volume= 2.916 af
Outflow = 24.3 cfs @ 12.28 hrs, Volume= 2.916 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: Southwest Property Line

Inflow Area = 1.00 ac, 0.00% Impervious, Inflow Depth = 1.68" for 25-YR event
Inflow = 1.4 cfs @ 12.22 hrs, Volume= 0.140 af
Outflow = 1.4 cfs @ 12.22 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP4: Northeast Property Line

Inflow Area = 1.73 ac, 9.83% Impervious, Inflow Depth = 3.40" for 25-YR event
Inflow = 5.1 cfs @ 12.21 hrs, Volume= 0.490 af
Outflow = 5.1 cfs @ 12.21 hrs, Volume= 0.490 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

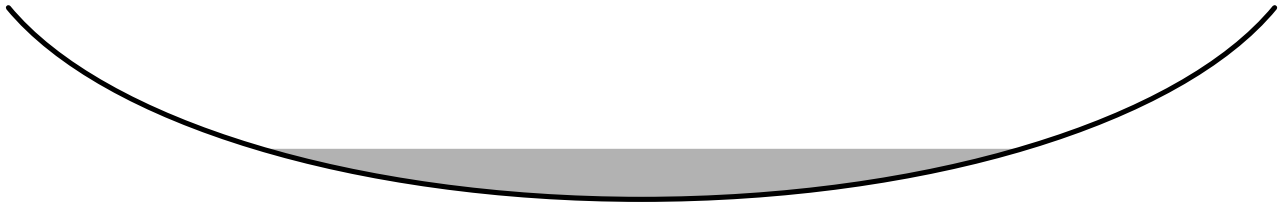
Summary for Reach Tc(1a): Tc Extended

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 3.64" for 25-YR event
Inflow = 17.2 cfs @ 12.45 hrs, Volume= 3.789 af
Outflow = 16.9 cfs @ 12.56 hrs, Volume= 3.789 af, Atten= 2%, Lag= 6.7 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.08 fps, Min. Travel Time= 7.7 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 34.7 min

Peak Storage= 7,855 cf @ 12.56 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 46.23'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 303.3 cfs

90.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 966.0' Slope= 0.0124 '/'
Inlet Invert= 858.00', Outlet Invert= 846.00'



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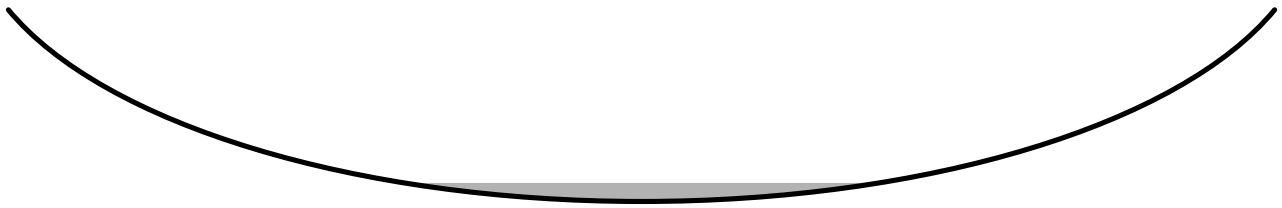
Summary for Reach Tc(1b): Tc Extended

Inflow = 4.1 cfs @ 12.45 hrs, Volume= 0.757 af
Outflow = 4.1 cfs @ 12.47 hrs, Volume= 0.757 af, Atten= 0%, Lag= 1.3 min
Routed to Reach Tc(1b2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.36 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 3.6 min

Peak Storage= 456 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 46.80'
Bank-Full Depth= 1.00' Flow Area= 100.0 sf, Capacity= 641.5 cfs

150.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 150.0' Slope= 0.0200 '/'
Inlet Invert= 859.00', Outlet Invert= 856.00'



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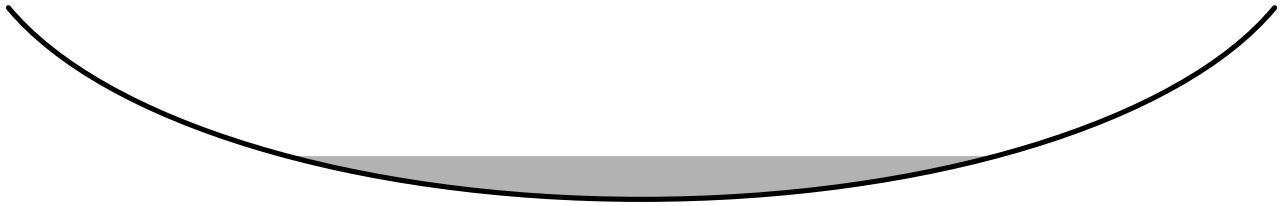
Summary for Reach Tc(1b2): Tc Extended

Inflow = 4.1 cfs @ 12.47 hrs, Volume= 0.757 af
Outflow = 4.1 cfs @ 12.48 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.3 min
Routed to Reach DP2 : South Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.84 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.43 fps, Avg. Travel Time= 0.9 min

Peak Storage= 113 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 5.69'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 103.5 cfs

12.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 132.0' Slope= 0.0833 '/'
Inlet Invert= 856.00', Outlet Invert= 845.00'



‡

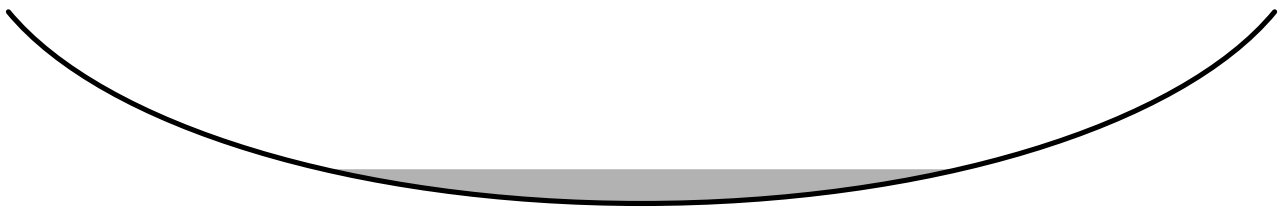
Summary for Reach Tc(2): Tc Extended

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 4.22" for 25-YR event
Inflow = 24.5 cfs @ 12.13 hrs, Volume= 1.924 af
Outflow = 24.1 cfs @ 12.15 hrs, Volume= 1.924 af, Atten= 2%, Lag= 1.1 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.40 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 7.4 min

Peak Storage= 2,170 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 84.47'
Bank-Full Depth= 1.00' Flow Area= 133.3 sf, Capacity= 1,008.0 cfs

200.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 216.0' Slope= 0.0278 '/'
Inlet Invert= 852.00', Outlet Invert= 846.00'



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Summary for Pond 1: Basin 1

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 4.78" for 25-YR event
Inflow = 58.6 cfs @ 12.12 hrs, Volume= 4.976 af
Outflow = 21.3 cfs @ 12.45 hrs, Volume= 4.546 af, Atten= 64%, Lag= 19.5 min
Primary = 17.2 cfs @ 12.45 hrs, Volume= 3.789 af
Routed to Reach Tc(1a) : Tc Extended
Secondary = 4.1 cfs @ 12.45 hrs, Volume= 0.757 af
Routed to Reach Tc(1b) : Tc Extended
Tertiary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(1b) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 861.43' @ 12.45 hrs Surf.Area= 28,789 sf Storage= 84,307 cf

Plug-Flow detention time= 134.2 min calculated for 4.546 af (91% of inflow)
Center-of-Mass det. time= 90.6 min (883.8 - 793.2)

Volume	Invert	Avail.Storage	Storage Description
#1	858.00'	149,774 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
858.00	21,228	0	0
860.00	24,765	45,993	45,993
862.00	30,390	55,155	101,148
863.00	32,521	31,456	132,604
863.50	36,162	17,171	149,774

Device	Routing	Invert	Outlet Devices
#1	Primary	858.25'	**24.0" Round Culvert X 2.00** L= 38.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 858.25' / 858.00' S= 0.0064 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	858.85'	**24.0" W x 7.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	859.45'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	860.25'	**36.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	861.90'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS100)** C= 0.600 Limited to weir flow at low heads
#6	Secondary	859.00'	**15.0" Round Culvert** L= 40.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 859.00' / 858.75' S= 0.0062 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#7	Device 6	859.15'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 6	860.75'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

#9	Device 6	862.30'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS101)** C= 0.600 Limited to weir flow at low heads
#10	Tertiary	862.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=17.2 cfs @ 12.45 hrs HW=861.43' TW=858.26' (Dynamic Tailwater)
- **1=Culvert** (Passes 17.2 cfs of 35.3 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 9.1 cfs @ 7.25 fps)
  - **3=Orifice/Grate** (Orifice Controls 3.3 cfs @ 6.56 fps)
  - **4=Orifice/Grate** (Orifice Controls 4.8 cfs @ 4.84 fps)
  - **5=Orifice/Grate (OCS100)** (Controls 0.0 cfs)

Secondary OutFlow Max=4.1 cfs @ 12.45 hrs HW=861.43' TW=859.10' (Dynamic Tailwater)
- **6=Culvert** (Passes 4.1 cfs of 6.3 cfs potential flow)
  - **7=Orifice/Grate** (Orifice Controls 3.5 cfs @ 7.07 fps)
  - **8=Orifice/Grate** (Orifice Controls 0.6 cfs @ 3.45 fps)
  - **9=Orifice/Grate (OCS101)** (Controls 0.0 cfs)

Tertiary OutFlow Max=0.0 cfs @ 0.00 hrs HW=858.00' TW=859.00' (Dynamic Tailwater)
- **10=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Summary for Pond 2: Basin 2

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 4.44" for 25-YR event
Inflow = 25.8 cfs @ 12.10 hrs, Volume= 2.026 af
Outflow = 24.5 cfs @ 12.13 hrs, Volume= 1.924 af, Atten= 5%, Lag= 1.8 min
Primary = 24.5 cfs @ 12.13 hrs, Volume= 1.924 af
Routed to Reach Tc(2) : Tc Extended
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 859.00' @ 12.13 hrs Surf.Area= 6,819 sf Storage= 11,575 cf

Plug-Flow detention time= 92.5 min calculated for 1.924 af (95% of inflow)
Center-of-Mass det. time= 64.8 min (864.9 - 800.1)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,142 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	2,737	0	0
857.00	3,135	1,468	1,468
858.00	5,140	4,138	5,606
859.00	6,822	5,981	11,587
860.25	10,067	10,556	22,142

Device	Routing	Invert	Outlet Devices
#1	Primary	853.50'	**30.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 853.50' / 853.00' S= 0.0139 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	857.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.40'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS200)** C= 0.600 Limited to weir flow at low heads
#4	Secondary	859.25'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=24.5 cfs @ 12.13 hrs HW=859.00' TW=852.18' (Dynamic Tailwater)
└─**1=Culvert** (Passes 24.5 cfs of 38.5 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.3 cfs @ 5.10 fps)
  └─**3=Orifice/Grate (OCS200)** (Weir Controls 24.2 cfs @ 2.53 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=856.50' TW=852.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1(b): Offsite Area (North) Runoff Area=0.33 ac 0.00% Impervious Runoff Depth=5.12"
Flow Length=232' Slope=0.0100 '/' Tc=22.3 min CN=70 Runoff=1.3 cfs 0.141 af

Subcatchment E1(c): Offsite Area (South) + Runoff Area=1.80 ac 62.22% Impervious Runoff Depth=7.42"
Tc=6.0 min CN=89 Runoff=14.7 cfs 1.114 af

Subcatchment E2(b.1): Offsite Area (South) + Runoff Area=3.58 ac 3.91% Impervious Runoff Depth=5.24"
Flow Length=616' Tc=20.1 min CN=71 Runoff=14.8 cfs 1.562 af

Subcatchment P1(a): Overland Runoff Area=17.33 ac 2.54% Impervious Runoff Depth=5.12"
Flow Length=967' Tc=45.7 min CN=70 Runoff=47.8 cfs 7.387 af

Subcatchment P1(b): Overland Runoff Area=2.97 ac 18.52% Impervious Runoff Depth=6.09"
Flow Length=1,704' Tc=36.2 min CN=78 Runoff=10.9 cfs 1.507 af

Subcatchment P1(c): Overland/Pipe Flow Runoff Area=5.14 ac 46.89% Impervious Runoff Depth=7.06"
Flow Length=802' Tc=7.5 min CN=86 Runoff=38.6 cfs 3.024 af

Subcatchment P1(d): Overland/Pipe Flow Runoff Area=10.70 ac 52.80% Impervious Runoff Depth=7.30"
Flow Length=1,047' Tc=10.2 min CN=88 Runoff=75.3 cfs 6.511 af

Subcatchment P2: Overland Runoff Area=4.72 ac 5.93% Impervious Runoff Depth=5.48"
Flow Length=410' Tc=19.7 min CN=73 Runoff=20.5 cfs 2.155 af

Subcatchment P3: Overland - Southwest Runoff Area=1.00 ac 0.00% Impervious Runoff Depth=3.43"
Flow Length=279' Tc=14.5 min CN=56 Runoff=3.0 cfs 0.286 af

Subcatchment P4: Overland - Northeast Runoff Area=1.73 ac 9.83% Impervious Runoff Depth=5.72"
Flow Length=280' Slope=0.0270 '/' Tc=15.6 min CN=75 Runoff=8.6 cfs 0.825 af

Reach DP1: North Wetland Inflow=102.4 cfs 17.935 af
Outflow=102.4 cfs 17.935 af

Reach DP2: South Wetland Inflow=40.4 cfs 4.935 af
Outflow=40.4 cfs 4.935 af

Reach DP3: Southwest Property Line Inflow=3.0 cfs 0.286 af
Outflow=3.0 cfs 0.286 af

Reach DP4: Northeast Property Line Inflow=8.6 cfs 0.825 af
Outflow=8.6 cfs 0.825 af

Reach Tc(1a): Tc Extended Avg. Flow Depth=0.37' Max Vel=2.60 fps Inflow=37.1 cfs 5.978 af
n=0.025 L=966.0' S=0.0124 '/' Capacity=303.3 cfs Outflow=34.9 cfs 5.978 af

Reach Tc(1b): Tc Extended Avg. Flow Depth=0.11' Max Vel=1.50 fps Inflow=5.8 cfs 1.217 af
n=0.025 L=150.0' S=0.0200 '/' Capacity=641.5 cfs Outflow=5.7 cfs 1.217 af

Reach Tc(1b2): Tc Extended Avg. Flow Depth=0.26' Max Vel=5.34 fps Inflow=5.7 cfs 1.217 af
n=0.025 L=132.0' S=0.0833 '/' Capacity=103.5 cfs Outflow=5.7 cfs 1.217 af

Reach Tc(2): Tc Extended Avg. Flow Depth=0.22' Max Vel=2.74 fps Inflow=37.6 cfs 3.063 af
n=0.025 L=216.0' S=0.0278 '/' Capacity=1,008.0 cfs Outflow=37.1 cfs 3.063 af

Pond 1: Basin 1 Peak Elev=862.35' Storage=111,859 cf Inflow=87.8 cfs 7.625 af
Primary=37.1 cfs 5.978 af Secondary=5.8 cfs 1.217 af Tertiary=0.0 cfs 0.000 af Outflow=42.9 cfs 7.195 af

Pond 2: Basin 2 Peak Elev=859.20' Storage=12,988 cf Inflow=39.3 cfs 3.165 af
Primary=37.6 cfs 3.063 af Secondary=0.0 cfs 0.000 af Outflow=37.6 cfs 3.063 af

Total Runoff Area = 49.30 ac Runoff Volume = 24.512 af Average Runoff Depth = 5.97"
78.17% Pervious = 38.54 ac 21.83% Impervious = 10.76 ac

Summary for Subcatchment E1(b): Offsite Area (North)

Runoff = 1.3 cfs @ 12.31 hrs, Volume= 0.141 af, Depth= 5.12"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	0.33	70	Offsite Woods, Good, HSG C
	0.33		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	50	0.0100	0.05		**Sheet Flow, 897.5-897.0** Woods: Light underbrush n= 0.400 P2= 3.23"
6.1	182	0.0100	0.50		**Shallow Concentrated Flow, 897-895** Woodland Kv= 5.0 fps
22.3	232	Total			

Summary for Subcatchment E1(c): Offsite Area (South) + E2(b.3)

Runoff = 14.7 cfs @ 12.08 hrs, Volume= 1.114 af, Depth= 7.42"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	0.34	98	Offsite Roof, HSG C
*	0.68	74	Offsite >75% Grass cover, Good, HSG C
*	0.78	98	Offsite Paved parking, HSG C
	1.80	89	Weighted Average
	0.68		37.78% Pervious Area
	1.12		62.22% Impervious Area

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

Summary for Subcatchment E2(b.1): Offsite Area (South) + E2(b.2)

Runoff = 14.8 cfs @ 12.26 hrs, Volume= 1.562 af, Depth= 5.24"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	3.08	70	Offsite Woods, Good, HSG C
*	0.36	74	Offsite >75% Grass cover, Good, HSG C
*	0.14	98	Offsite Roof, HSG C
	3.58	71	Weighted Average
	3.44		96.09% Pervious Area
	0.14		3.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 909-908.25** Woods: Light underbrush n= 0.400 P2= 3.23"
6.3	566	0.0910	1.51		**Shallow Concentrated Flow, 908.25-857** Woodland Kv= 5.0 fps
20.1	616	Total			

Summary for Subcatchment P1(a): Overland

Runoff = 47.8 cfs @ 12.64 hrs, Volume= 7.387 af, Depth= 5.12"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	0.41	98	House, HSG C
	1.83	74	>75% Grass cover, Good, HSG C
	9.18	70	Woods, Good, HSG C
*	0.03	98	House, HSG D
	0.58	80	>75% Grass cover, Good, HSG D
	2.85	77	Woods, Good, HSG D
	0.00	61	>75% Grass cover, Good, HSG B
	2.45	55	Woods, Good, HSG B
	17.33	70	Weighted Average
	16.89		97.46% Pervious Area
	0.44		2.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0120	0.06		**Sheet Flow, 862-861.4** Woods: Light underbrush n= 0.400 P2= 3.23"
30.6	917	0.0100	0.50		**Shallow Concentrated Flow, 861.4-852** Woodland Kv= 5.0 fps
45.7	967	Total			

Summary for Subcatchment P1(b): Overland

Runoff = 10.9 cfs @ 12.50 hrs, Volume= 1.507 af, Depth= 6.09"
Routed to Reach DP1 : North Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	0.55	98	House, HSG C
	2.42	74	>75% Grass cover, Good, HSG C
	2.97	78	Weighted Average
	2.42		81.48% Pervious Area
	0.55		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 882-881** Grass: Short n= 0.150 P2= 3.23"
6.2	350	0.0180	0.94		**Shallow Concentrated Flow, 881-874.1** Short Grass Pasture Kv= 7.0 fps
0.9	257	0.0065	4.79	8.47	**Pipe Channel, 871-869** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
23.5	1,047	0.0220	0.74		**Shallow Concentrated Flow, 869-846** Woodland Kv= 5.0 fps
36.2	1,704	Total			

Summary for Subcatchment P1(c): Overland/Pipe Flow

Runoff = 38.6 cfs @ 12.10 hrs, Volume= 3.024 af, Depth= 7.06"
Routed to Pond 2 : Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	1.07	98	House, HSG C
	1.18	98	Paved parking, HSG C
	2.18	74	>75% Grass cover, Good, HSG C
*	0.15	98	House, HSG D
	0.01	98	Paved parking, HSG D
	0.48	80	>75% Grass cover, Good, HSG D
*	0.07	98	Basin Bottom, 0% imp, HSG D
	5.14	86	Weighted Average
	2.73		53.11% Pervious Area
	2.41		46.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0400	0.20		**Sheet Flow, 896-893.8** Grass: Short n= 0.150 P2= 3.23"
1.9	116	0.0220	1.04		**Shallow Concentrated Flow, 893.8-891.25** Short Grass Pasture Kv= 7.0 fps
0.3	110	0.0170	5.91	4.65	**Pipe Channel, 887.75-882** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.5	188	0.0110	5.98	7.34	**Pipe Channel, 880-878.2** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.2	107	0.0150	7.89	13.94	**Pipe Channel, 878.1-876.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	231	0.0150	8.82	27.71	**Pipe Channel, 873.75-860** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
7.5	802	Total			

Summary for Subcatchment P1(d): Overland/Pipe Flow

Runoff = 75.3 cfs @ 12.13 hrs, Volume= 6.511 af, Depth= 7.30"
Routed to Pond 1 : Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	2.54	98	House, HSG C
	3.11	98	Paved parking, HSG C
	4.57	74	>75% Grass cover, Good, HSG C
*	0.48	98	Basin Bottom, 0% imp, HSG C
	10.70	88	Weighted Average
	5.05		47.20% Pervious Area
	5.65		52.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, 884-883** Grass: Short n= 0.150 P2= 3.23"
1.9	102	0.0170	0.91		**Shallow Concentrated Flow, 883-881.2** Short Grass Pasture Kv= 7.0 fps
0.9	178	0.0050	3.21	2.52	**Pipe Channel, 878-876.95** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.8	204	0.0050	4.20	7.43	**Pipe Channel, 876.85-875.8** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	217	0.0125	8.05	25.29	**Pipe Channel, 875.7-873** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
0.0	21	0.0120	9.15	44.93	**Pipe Channel, 872.7-872.45** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
0.1	65	0.0150	11.56	81.69	**Pipe Channel, 860.2-859.2** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
0.5	210	0.0050	6.67	47.16	**Pipe Channel, 859.2-858** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
10.2	1,047	Total			

Summary for Subcatchment P2: Overland

Runoff = 20.5 cfs @ 12.27 hrs, Volume= 2.155 af, Depth= 5.48"
Routed to Reach DP2 : South Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	0.28	98	House, HSG C
	1.82	74	>75% Grass cover, Good, HSG C
	2.56	70	Woods, Good, HSG C
	0.02	74	>75% Grass cover, Good, HSG C
	0.04	77	Woods, Good, HSG D
	4.72	73	Weighted Average
	4.44		94.07% Pervious Area
	0.28		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.06		**Sheet Flow, 861-860.25** Woods: Light underbrush n= 0.400 P2= 3.23"
5.9	360	0.0420	1.02		**Shallow Concentrated Flow, 860.25-845** Woodland Kv= 5.0 fps
19.7	410	Total			

Summary for Subcatchment P3: Overland - Southwest

Runoff = 3.0 cfs @ 12.20 hrs, Volume= 0.286 af, Depth= 3.43"
Routed to Reach DP3 : Southwest Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

Area (ac)	CN	Description
0.92	55	Woods, Good, HSG B
0.08	70	Woods, Good, HSG C
1.00	56	Weighted Average
1.00		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	50	0.0240	0.07		**Sheet Flow, 864.5-863.3** Woods: Light underbrush n= 0.400 P2= 3.23"
3.1	229	0.0610	1.23		**Shallow Concentrated Flow, 863.3-849.25** Woodland Kv= 5.0 fps
14.5	279	Total			

Summary for Subcatchment P4: Overland - Northeast

Runoff = 8.6 cfs @ 12.21 hrs, Volume= 0.825 af, Depth= 5.72"
Routed to Reach DP4 : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.75"

	Area (ac)	CN	Description
*	0.17	98	House, HSG C
	1.02	74	>75% Grass cover, Good, HSG C
	0.54	70	Woods, Good, HSG C
	1.73	75	Weighted Average
	1.56		90.17% Pervious Area
	0.17		9.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0270	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.23"
4.7	230	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	280	Total			

Summary for Reach DP1: North Wetland

Inflow Area = 38.27 ac, 26.57% Impervious, Inflow Depth = 5.62" for 100-YR event
Inflow = 102.4 cfs @ 12.47 hrs, Volume= 17.935 af
Outflow = 102.4 cfs @ 12.47 hrs, Volume= 17.935 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP2: South Wetland

Inflow Area = 8.30 ac, 5.06% Impervious, Inflow Depth = 7.13" for 100-YR event
Inflow = 40.4 cfs @ 12.27 hrs, Volume= 4.935 af
Outflow = 40.4 cfs @ 12.27 hrs, Volume= 4.935 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: Southwest Property Line

Inflow Area = 1.00 ac, 0.00% Impervious, Inflow Depth = 3.43" for 100-YR event
Inflow = 3.0 cfs @ 12.20 hrs, Volume= 0.286 af
Outflow = 3.0 cfs @ 12.20 hrs, Volume= 0.286 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP4: Northeast Property Line

Inflow Area = 1.73 ac, 9.83% Impervious, Inflow Depth = 5.72" for 100-YR event
Inflow = 8.6 cfs @ 12.21 hrs, Volume= 0.825 af
Outflow = 8.6 cfs @ 12.21 hrs, Volume= 0.825 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

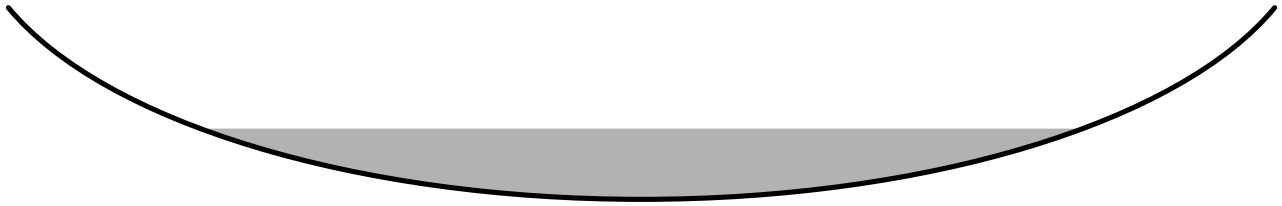
Summary for Reach Tc(1a): Tc Extended

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 5.74" for 100-YR event
Inflow = 37.1 cfs @ 12.34 hrs, Volume= 5.978 af
Outflow = 34.9 cfs @ 12.43 hrs, Volume= 5.978 af, Atten= 6%, Lag= 5.3 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.60 fps, Min. Travel Time= 6.2 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 31.5 min

Peak Storage= 12,961 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.37' , Surface Width= 54.63'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 303.3 cfs

90.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 966.0' Slope= 0.0124 '/'
Inlet Invert= 858.00', Outlet Invert= 846.00'



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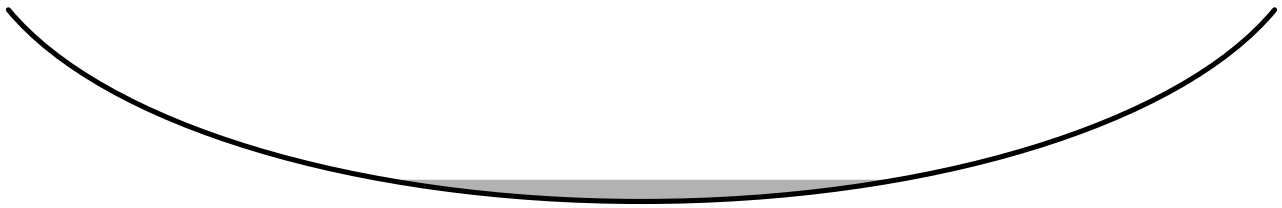
Summary for Reach Tc(1b): Tc Extended

Inflow = 5.8 cfs @ 12.34 hrs, Volume= 1.217 af
Outflow = 5.7 cfs @ 12.36 hrs, Volume= 1.217 af, Atten= 1%, Lag= 1.2 min
Routed to Reach Tc(1b2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.50 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 3.5 min

Peak Storage= 572 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 50.48'
Bank-Full Depth= 1.00' Flow Area= 100.0 sf, Capacity= 641.5 cfs

150.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 150.0' Slope= 0.0200 '/'
Inlet Invert= 859.00', Outlet Invert= 856.00'



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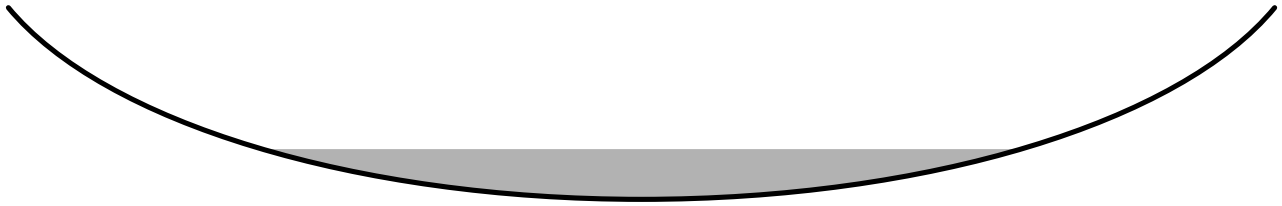
Summary for Reach Tc(1b2): Tc Extended

Inflow = 5.7 cfs @ 12.36 hrs, Volume= 1.217 af
Outflow = 5.7 cfs @ 12.37 hrs, Volume= 1.217 af, Atten= 0%, Lag= 0.3 min
Routed to Reach DP2 : South Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.34 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.49 fps, Avg. Travel Time= 0.9 min

Peak Storage= 142 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 6.14'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 103.5 cfs

12.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 132.0' Slope= 0.0833 '/'
Inlet Invert= 856.00', Outlet Invert= 845.00'



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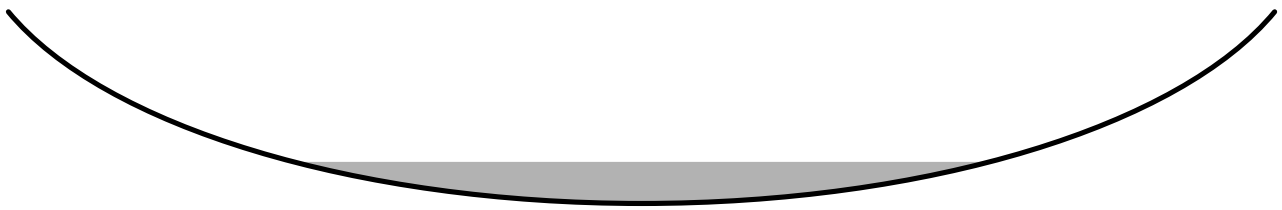
Summary for Reach Tc(2): Tc Extended

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 6.72" for 100-YR event
Inflow = 37.6 cfs @ 12.13 hrs, Volume= 3.063 af
Outflow = 37.1 cfs @ 12.14 hrs, Volume= 3.063 af, Atten= 1%, Lag= 0.9 min
Routed to Reach DP1 : North Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.74 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 6.9 min

Peak Storage= 2,928 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.22' , Surface Width= 93.34'
Bank-Full Depth= 1.00' Flow Area= 133.3 sf, Capacity= 1,008.0 cfs

200.00' x 1.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 216.0' Slope= 0.0278 '/'
Inlet Invert= 852.00', Outlet Invert= 846.00'



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Summary for Pond 1: Basin 1

Inflow Area = 12.50 ac, 54.16% Impervious, Inflow Depth = 7.32" for 100-YR event
Inflow = 87.8 cfs @ 12.12 hrs, Volume= 7.625 af
Outflow = 42.9 cfs @ 12.34 hrs, Volume= 7.195 af, Atten= 51%, Lag= 13.2 min
Primary = 37.1 cfs @ 12.34 hrs, Volume= 5.978 af
Routed to Reach Tc(1a) : Tc Extended
Secondary = 5.8 cfs @ 12.34 hrs, Volume= 1.217 af
Routed to Reach Tc(1b) : Tc Extended
Tertiary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(1b) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 862.35' @ 12.34 hrs Surf.Area= 31,132 sf Storage= 111,859 cf

Plug-Flow detention time= 110.0 min calculated for 7.194 af (94% of inflow)
Center-of-Mass det. time= 79.0 min (860.9 - 781.9)

Volume	Invert	Avail.Storage	Storage Description
#1	858.00'	149,774 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
858.00	21,228	0	0
860.00	24,765	45,993	45,993
862.00	30,390	55,155	101,148
863.00	32,521	31,456	132,604
863.50	36,162	17,171	149,774

Device	Routing	Invert	Outlet Devices
#1	Primary	858.25'	**24.0" Round Culvert X 2.00** L= 38.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 858.25' / 858.00' S= 0.0064 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	858.85'	**24.0" W x 7.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	859.45'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	860.25'	**36.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	861.90'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS100)** C= 0.600 Limited to weir flow at low heads
#6	Secondary	859.00'	**15.0" Round Culvert** L= 40.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 859.00' / 858.75' S= 0.0062 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#7	Device 6	859.15'	**24.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 6	860.75'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

#9	Device 6	862.30'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS101)** C= 0.600 Limited to weir flow at low heads
#10	Tertiary	862.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=37.1 cfs @ 12.34 hrs HW=862.35' TW=858.35' (Dynamic Tailwater)
- **1=Culvert** (Passes 37.1 cfs of 42.0 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 10.7 cfs @ 8.59 fps)
  - **3=Orifice/Grate** (Orifice Controls 4.0 cfs @ 8.02 fps)
  - **4=Orifice/Grate** (Orifice Controls 6.7 cfs @ 6.69 fps)
  - **5=Orifice/Grate (OCS100)** (Weir Controls 15.7 cfs @ 2.19 fps)

Secondary OutFlow Max=5.8 cfs @ 12.34 hrs HW=862.35' TW=859.11' (Dynamic Tailwater)
- **6=Culvert** (Passes 5.8 cfs of 7.7 cfs potential flow)
  - **7=Orifice/Grate** (Orifice Controls 4.2 cfs @ 8.44 fps)
  - **8=Orifice/Grate** (Orifice Controls 1.0 cfs @ 5.76 fps)
  - **9=Orifice/Grate (OCS101)** (Weir Controls 0.6 cfs @ 0.72 fps)

Tertiary OutFlow Max=0.0 cfs @ 0.00 hrs HW=858.00' TW=859.00' (Dynamic Tailwater)
- **10=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Summary for Pond 2: Basin 2

Inflow Area = 5.47 ac, 44.06% Impervious, Inflow Depth = 6.94" for 100-YR event
Inflow = 39.3 cfs @ 12.10 hrs, Volume= 3.165 af
Outflow = 37.6 cfs @ 12.13 hrs, Volume= 3.063 af, Atten= 4%, Lag= 1.7 min
Primary = 37.6 cfs @ 12.13 hrs, Volume= 3.063 af
Routed to Reach Tc(2) : Tc Extended
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach Tc(2) : Tc Extended

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 859.20' @ 12.13 hrs Surf.Area= 7,336 sf Storage= 12,988 cf

Plug-Flow detention time= 65.5 min calculated for 3.062 af (97% of inflow)
Center-of-Mass det. time= 46.7 min (834.9 - 788.2)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,142 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	2,737	0	0
857.00	3,135	1,468	1,468
858.00	5,140	4,138	5,606
859.00	6,822	5,981	11,587
860.25	10,067	10,556	22,142

Device	Routing	Invert	Outlet Devices
#1	Primary	853.50'	**30.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 853.50' / 853.00' S= 0.0139 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	857.75'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.40'	**48.0" x 48.0" Horiz. Orifice/Grate (OCS200)** C= 0.600 Limited to weir flow at low heads
#4	Secondary	859.25'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=37.5 cfs @ 12.13 hrs HW=859.20' TW=852.22' (Dynamic Tailwater)
└─**1=Culvert** (Passes 37.5 cfs of 39.4 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.3 cfs @ 5.54 fps)
  └─**3=Orifice/Grate (OCS200)** (Weir Controls 37.3 cfs @ 2.92 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=856.50' TW=852.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)