REPORT

FINAL

DRAINAGE INVESTIGATION
FOR
STORMWATER CONTROL
WITH GREEN ROOF

361-373-JFK Blvd
Bayonne, NJ

FOR
Bayonne Planning Board

Prepared By:

OPTIMIZED ENGINEERING ASSOCIATES
400 38TH ST. SUITE 307
Union City, NJ 07087
BY GUY LAGOMARSINO, P.E.
GE # 40534

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Introduction

Presented herein are the results of the drainage investigation conducted for the proposed new multi family house located at 361-373-JFK Blvd. The purpose of the investigation was to explore the pre and post development site conditions for rain runoff conditions. This study addresses pre-existing conditions, and the final post developed site conditions. In order to determine the necessary BMP requirements for the post development, the design used hydraulic software methods to achieve the post developed rain runoff storm-water requirements for the project site.

Project Description

The existing lot of 17498 sf had 100% site existing pervious coverage with weeds and vegetation covering most of the entire lot. The proposed construction has full increase in the imperious coverage a total of 96% for the new building to 16,853SF. The proposed runoff shall collect water in an ADS piping detention with an overflow weir and orifice at the exit to the street sanitary system. See attached plans for reference.

Existing Site Runoff Characteristics

The existing site had no detention of runoff from the site. All water on site flowed to the sidewalk gutters, then to the corner catch basins. The flows were moderate since the site did not have any major slopes.

During a significant storm event the existing site conditions did not contain the rain fall and flows onto Avenue C. The rain flows from a higher elevation and the flow continues onto the existing concrete front area to the street gutter.

Engineering Recommendations for (BMP) Best Management Practice

Proposed Site Characteristics

The proposed building is to be situated on the street with other residential building. The existing site pervious covers 100% of the lot. The proposed design has fulfilled the criteria set by the Bayonne MUA checklist. The new house criteria since our post

is equal to the pre-construction conditions. The placement of storage tanks will decrease the 2, 10, 25 and 100 yr. storm events are individually less than the precondition. Since the site was equal impervious area. This detention system allows for full storage up to a 2 yr. event and REDUCES flow during higher rain events. .The pipes will be placed under the garage floor with outlet and inlet tanks at the building's face

Design Hydrology for On-Site

The hydraulic analysis for the area focused on design the detention facility to meet the required hydrograph based Bayonne MUA requirements. See appendix for the hydraulic study calculations.

The permanent hydraulic and water quality features below have been designed, and the existing features checked on site for this project's work. This section contains the calculations and analyses needed to size detention pipes. Calculations were performed by hydrocad Software by Bentley Systems which include uniform flow spreadsheets, Hydraulic Grade Line (HGL) computations and layouts, software printouts, etc.

The Design Hydrology Software included:

- Analyze post developed conditions and pond sizes for 2, 10, and 100 years storm events.
- Compute outlet rating curves, pond infiltration, pond detention time, and analyzes the channel.
- Compute outlet rating curves, pond infiltration, pond detention time, and analyzes the channel Typical green roof growing media have a water retention capacity 4 in. of growing medium has a water-retention capacity of 0.76 gal/sf, water storage capacity found in the lightweight pre-grown mat system selected for this project.
- **ROOF TOP GARDEN STORAGE CAPACITY: Using the above formula straight conversion. The green roof storage capacity is**
  5062sfft x 0.76gal/sf = 3847gals to convert to cubic feet
  514Cubic Feet of Green roof storage capacity
-

- Rainfall data colleted from the Department of Commerce Precipitation Frequency Data. BASED ON NJDEP REQUIREMENTS FOR A DESIGN STORM OF 2" RAINFALL IN 60 minutes WITHOUT DISCHARGING TO THE STREET. Volume 16853sf ***of property impervious area * 2in/hr/12"/ft = 2808cf of storage required.***

360lf of 3'-0".ft dia. ADS solid piping is equivalent to 4065cf of storage PLUS ROOF GARDEN 514 CUBIC FEET is total of 4579cubic feet see hydrocad summary results

- Computed Hydrographs for multiple events, and routes them through multiple reaches and ponds.
- Accurate basin maps(s) prepared showing onsite, offsite contributing areas, Tc routes, for existing and developed conditions
- Time of concentration correctly calculated (Tc=max, sheet flow + channel/pipe flow). Minimum Tc=10 min.
- Appropriate methods used to calculate flow rates (rational method, Stormshed, & multiple regression)

Each feature together with calculations is provided in Appendix.

The control practices outlined here are designed to decrease rain event runoff impact.

Table 1 - Pre/Post Runoff Table

Point in Question (PIQ) Pre/Post Storm water Runoff for Property				
Storm Event	Existing Conditions (5S) Q, CFS	Proposed Conditions (5S to 2P) Q, CFS	Change, Q CFS	% reduction
2	1.08	0.00/ with orrifce 0.23	-1.08	100%
10	1.49	0.82	-0.67	70%
25	1.72	0.64	-1.08	65%
100	2.05	1.02	-1.03	51%

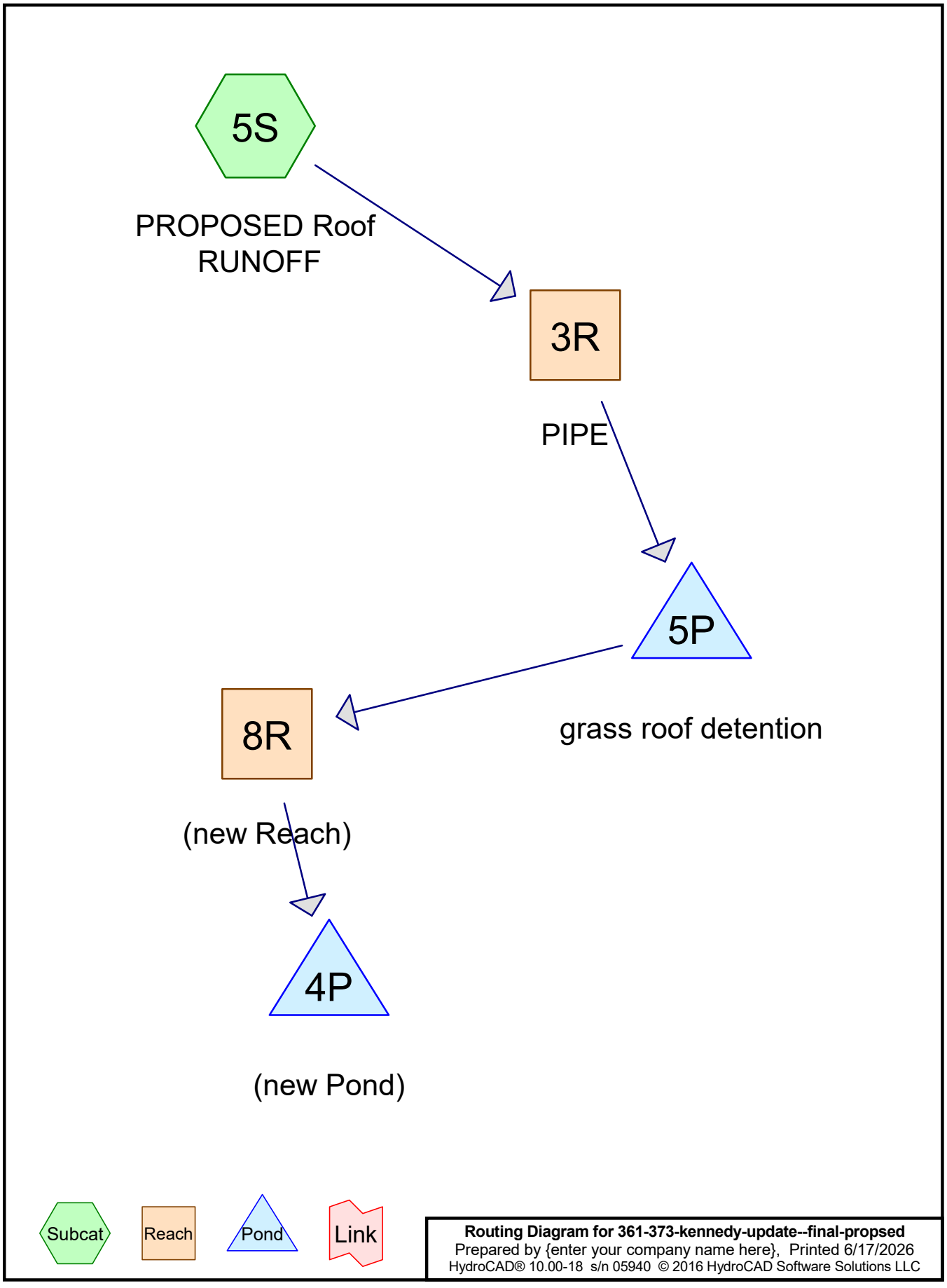
Conclusion

The existing site conditions of the site were substandard and don't effectively recharge precipitation due to impervious surface. The new building shall detain the water in a

collected pond before allowing the water to flow through the weir at a slow rate of discharge. The proposed site improvements will decrease the water runoff from the site for a 2yr storm event and moderately for higher rain events the contractor/owner for properly maintains of the system and will be responsible to adequately slope detention piping to the weir exit.

The proposed final site conditions do reflect the current NJ DEP stormwater Standards for the BMP.

PVC and CPVC Pipes - **Schedule 40**					
Nominal Pipe Size *(inches)*	Outside Diameter *(inches)*	Minimum Wall Thickness *(inches)*	Nominal Inside Diameter *(inches)*	Weight *(lb/ft)*	
				PVC	CPVC
1/2	0.840	0.109	0.622	0.16	0.17
3/4	1.050	0.113	0.824	0.21	0.23
1	1.315	0.133	1.049	0.32	0.34
1 1/4	1.660	0.140	1.380	0.43	0.46
1 1/2	1.900	0.145	1.610	0.51	0.55
2	2.375	0.154	2.067	0.68	0.74
2 1/2	2.875	0.203	2.469	1.07	1.18
3	3.500	0.216	3.068	1.41	1.54
4	4.500	0.237	4.026	2.01	2.20
5	5.563	0.258	5.047	2.73	
6	6.625	0.280	6.065	3.53	3.86
8	8.625	0.322	7.981	5.39	5.81
10	10.750	0.365	10.020	7.55	8.24
12	12.750	0.406	11.938	10.01	10.89
14	14.000	0.438	13.124	11.80	
16	16.000	0.500	15.000	15.43	



Routing Diagram for 361-373-kennedy-update--final-propsed
Prepared by {enter your company name here}, Printed 6/17/2026
HydroCAD® 10.00-18 s/n 05940 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.365	0.98	roof (5S)
0.365	**0.98**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.365	Other	5S
0.365		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.365	0.365	roof	5S
0.000	**0.000**	**0.000**	**0.000**	**0.365**	**0.365**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3R	0.88	-0.12	45.0	0.0222	0.010	10.0	0.0	0.0
2	8R	12.00	-0.70	56.0	0.2268	0.010	6.0	0.0	0.0

Time span=0.00-2.00 hrs, dt=0.01 hrs, 201 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 5S: PROPOSED Roof Runoff Area=15,909 sf 100.00% Impervious Runoff Depth=1.42"
Flow Length=123' Slope=0.0015 '/' Tc=10.0 min C=0.98 Runoff=0.52 cfs 0.043 af

Reach 3R: PIPE Avg. Flow Depth=0.20' Max Vel=5.29 fps Inflow=0.52 cfs 0.043 af
10.0" Round Pipe n=0.010 L=45.0' S=0.0222 '/' Capacity=4.25 cfs Outflow=0.52 cfs 0.043 af

Reach 8R: (new Reach) Avg. Flow Depth=0.13' Max Vel=12.40 fps Inflow=0.48 cfs 0.039 af
6.0" Round Pipe n=0.010 L=56.0' S=0.2268 '/' Capacity=3.47 cfs Outflow=0.48 cfs 0.039 af

Pond 4P: (new Pond) Peak Elev=-1.43' Storage=0.024 af Inflow=0.48 cfs 0.039 af
Primary=0.23 cfs 0.029 af Secondary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.029 af

Pond 5P: grass roof detention Peak Elev=-1.15' Storage=0.000 af Inflow=0.52 cfs 0.043 af
Discarded=0.05 cfs 0.004 af Primary=0.48 cfs 0.039 af Outflow=0.52 cfs 0.043 af

Total Runoff Area = 0.365 ac Runoff Volume = 0.043 af Average Runoff Depth = 1.42"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.365 ac

Summary for Subcatchment 5S: PROPOSED Roof RUNOFF

Exsiting Drainage area that picks up the PROPOSED runoff
WITH A 10 YEAR STORAGE CRITERA

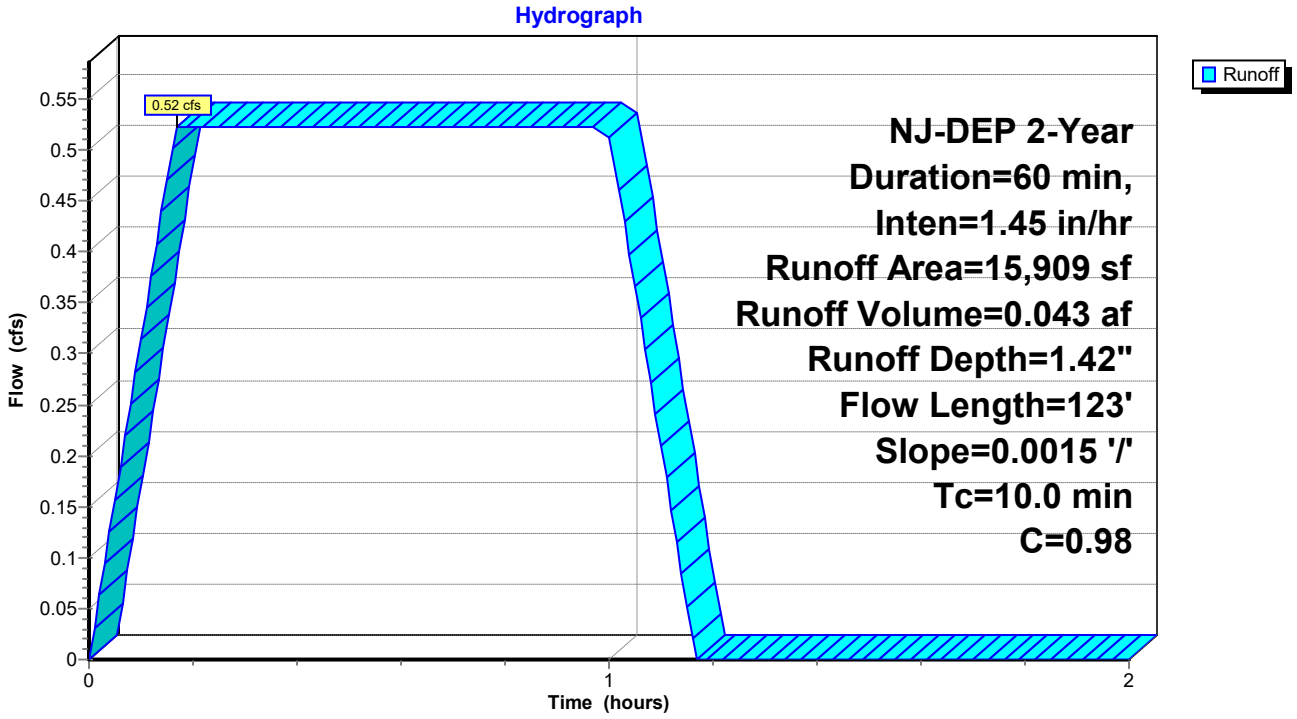
Runoff = 0.52 cfs @ 0.17 hrs, Volume= 0.043 af, Depth= 1.42"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
NJ-DEP 2-Year Duration=60 min, Inten=1.45 in/hr

Area (sf)	C	Description
15,909	0.98	roof
15,909		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	123	0.0015	0.21		**Shallow Concentrated Flow, SHEETFLOW** Kv= 5.3 fps

Subcatchment 5S: PROPOSED Roof RUNOFF



Hydrograph for Subcatchment 5S: PROPOSED Roof RUNOFF

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	0.52	0.52	1.04	0.40	1.56	0.00
0.01	0.03	0.53	0.52	1.05	0.37	1.57	0.00
0.02	0.06	0.54	0.52	1.06	0.33	1.58	0.00
0.03	0.09	0.55	0.52	1.07	0.30	1.59	0.00
0.04	0.13	0.56	0.52	1.08	0.27	1.60	0.00
0.05	0.16	0.57	0.52	1.09	0.24	1.61	0.00
0.06	0.19	0.58	0.52	1.10	0.21	1.62	0.00
0.07	0.22	0.59	0.52	1.11	0.18	1.63	0.00
0.08	0.25	0.60	0.52	1.12	0.15	1.64	0.00
0.09	0.28	0.61	0.52	1.13	0.12	1.65	0.00
0.10	0.31	0.62	0.52	1.14	0.08	1.66	0.00
0.11	0.35	0.63	0.52	1.15	0.05	1.67	0.00
0.12	0.38	0.64	0.52	1.16	0.02	1.68	0.00
0.13	0.41	0.65	0.52	1.17	0.00	1.69	0.00
0.14	0.44	0.66	0.52	1.18	0.00	1.70	0.00
0.15	0.47	0.67	0.52	1.19	0.00	1.71	0.00
0.16	0.50	0.68	0.52	1.20	0.00	1.72	0.00
0.17	**0.52**	0.69	0.52	1.21	0.00	1.73	0.00
0.18	0.52	0.70	0.52	1.22	0.00	1.74	0.00
0.19	0.52	0.71	0.52	1.23	0.00	1.75	0.00
0.20	0.52	0.72	0.52	1.24	0.00	1.76	0.00
0.21	0.52	0.73	0.52	1.25	0.00	1.77	0.00
0.22	0.52	0.74	0.52	1.26	0.00	1.78	0.00
0.23	0.52	0.75	0.52	1.27	0.00	1.79	0.00
0.24	0.52	0.76	0.52	1.28	0.00	1.80	0.00
0.25	0.52	0.77	0.52	1.29	0.00	1.81	0.00
0.26	0.52	0.78	0.52	1.30	0.00	1.82	0.00
0.27	0.52	0.79	0.52	1.31	0.00	1.83	0.00
0.28	0.52	0.80	0.52	1.32	0.00	1.84	0.00
0.29	0.52	0.81	0.52	1.33	0.00	1.85	0.00
0.30	0.52	0.82	0.52	1.34	0.00	1.86	0.00
0.31	0.52	0.83	0.52	1.35	0.00	1.87	0.00
0.32	0.52	0.84	0.52	1.36	0.00	1.88	0.00
0.33	0.52	0.85	0.52	1.37	0.00	1.89	0.00
0.34	0.52	0.86	0.52	1.38	0.00	1.90	0.00
0.35	0.52	0.87	0.52	1.39	0.00	1.91	0.00
0.36	0.52	0.88	0.52	1.40	0.00	1.92	0.00
0.37	0.52	0.89	0.52	1.41	0.00	1.93	0.00
0.38	0.52	0.90	0.52	1.42	0.00	1.94	0.00
0.39	0.52	0.91	0.52	1.43	0.00	1.95	0.00
0.40	0.52	0.92	0.52	1.44	0.00	1.96	0.00
0.41	0.52	0.93	0.52	1.45	0.00	1.97	0.00
0.42	0.52	0.94	0.52	1.46	0.00	1.98	0.00
0.43	0.52	0.95	0.52	1.47	0.00	1.99	0.00
0.44	0.52	0.96	0.52	1.48	0.00	2.00	0.00
0.45	0.52	0.97	0.52	1.49	0.00		
0.46	0.52	0.98	0.52	1.50	0.00		
0.47	0.52	0.99	0.52	1.51	0.00		
0.48	0.52	1.00	0.52	1.52	0.00		
0.49	0.52	1.01	0.49	1.53	0.00		
0.50	0.52	1.02	0.46	1.54	0.00		
0.51	0.52	1.03	0.43	1.55	0.00		

Summary for Reach 3R: PIPE

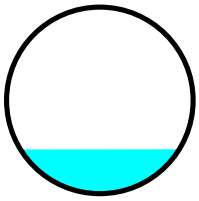
[52] Hint: Inlet/Outlet conditions not evaluated

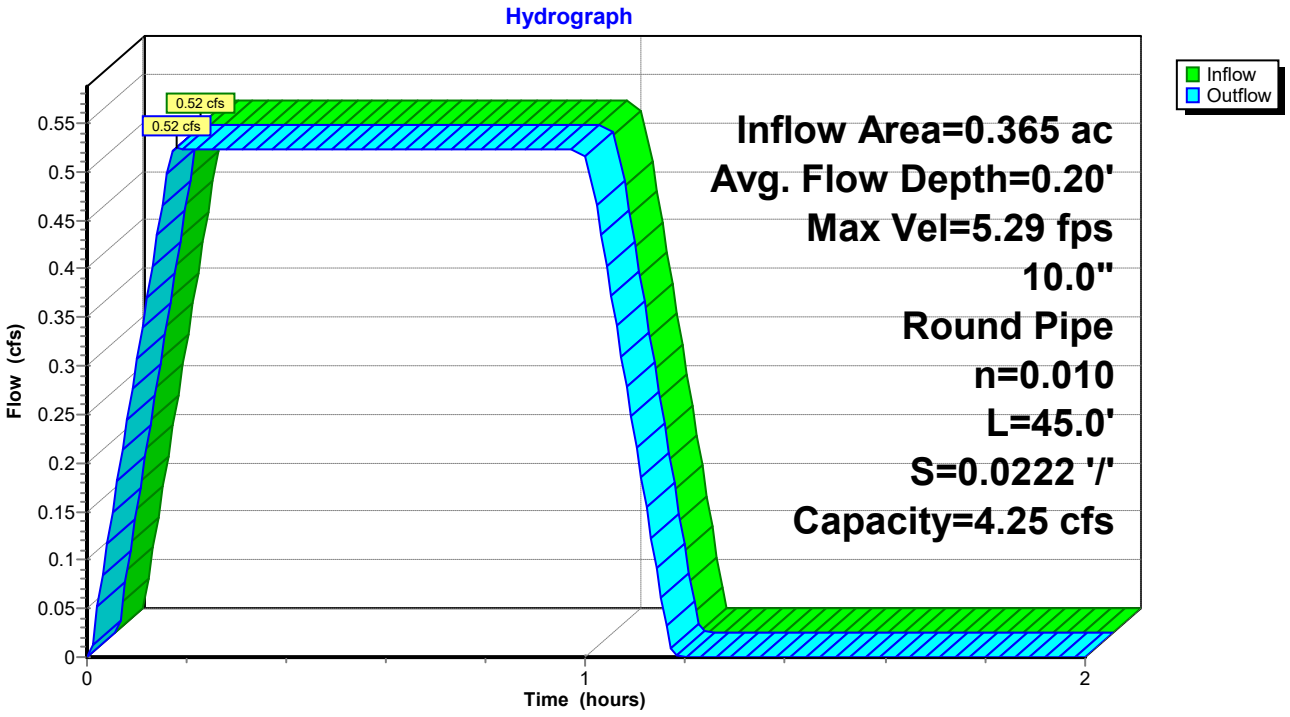
Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 1.42" for 2-Year event
Inflow = 0.52 cfs @ 0.17 hrs, Volume= 0.043 af
Outflow = 0.52 cfs @ 0.18 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.29 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.76 fps, Avg. Travel Time= 0.2 min

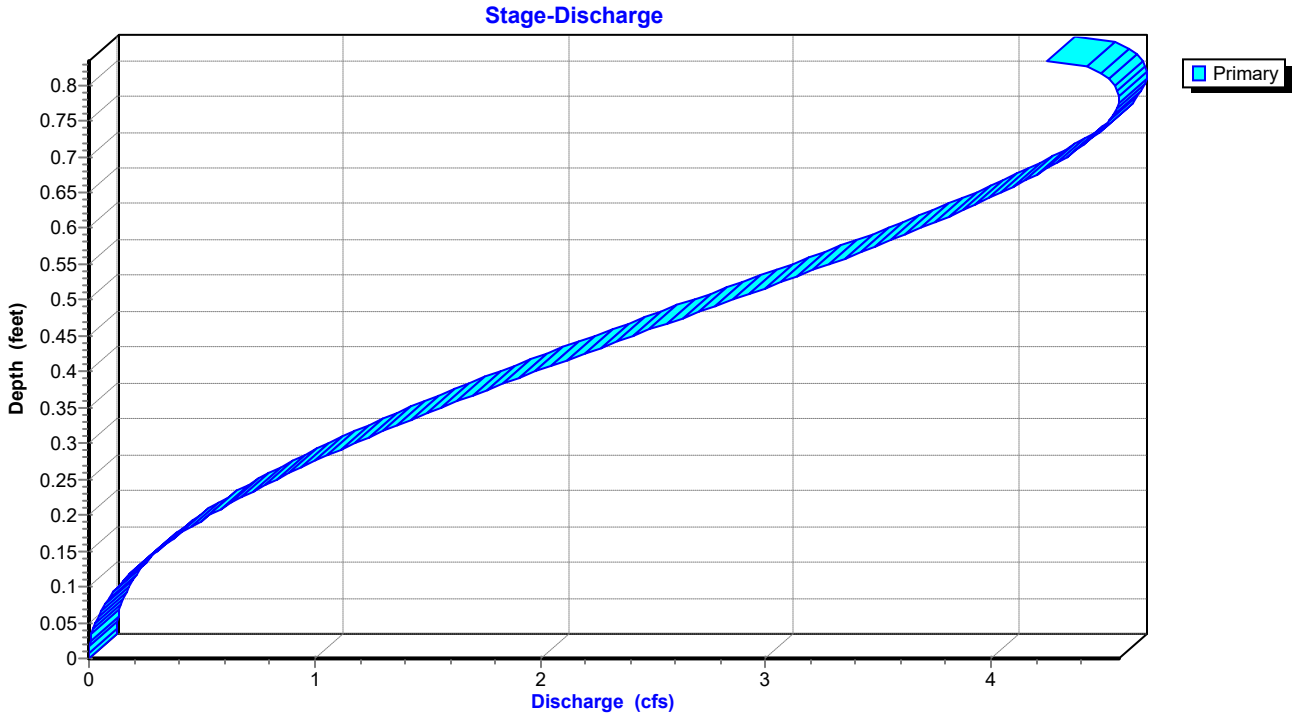
Peak Storage= 4 cf @ 0.18 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 4.25 cfs

10.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 45.0' Slope= 0.0222 '/'
Inlet Invert= 0.88', Outlet Invert= -0.12'

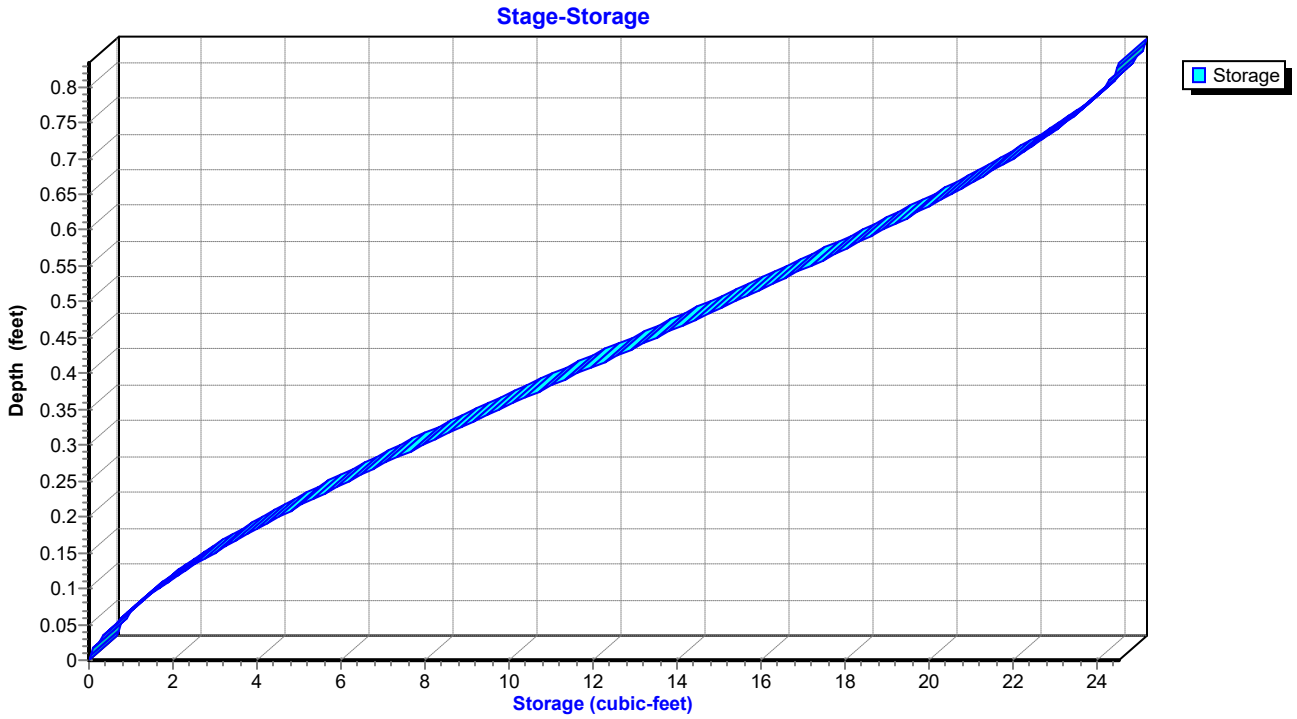




Reach 3R: PIPE



Reach 3R: PIPE



Hydrograph for Reach 3R: PIPE

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	0.88	0.00
0.05	0.16	2	0.99	0.15
0.10	0.31	3	1.03	0.31
0.15	**0.47**	**4**	**1.07**	**0.47**
0.20	**0.52**	**4**	**1.08**	**0.52**
0.25	0.52	4	1.08	0.52
0.30	0.52	4	1.08	0.52
0.35	0.52	4	1.08	0.52
0.40	0.52	4	1.08	0.52
0.45	0.52	4	1.08	0.52
0.50	0.52	4	1.08	0.52
0.55	0.52	4	1.08	0.52
0.60	0.52	4	1.08	0.52
0.65	0.52	4	1.08	0.52
0.70	0.52	4	1.08	0.52
0.75	0.52	4	1.08	0.52
0.80	0.52	4	1.08	0.52
0.85	0.52	4	1.08	0.52
0.90	0.52	4	1.08	0.52
0.95	0.52	4	1.08	0.52
1.00	0.52	4	1.08	0.52
1.05	0.37	3	1.05	0.37
1.10	0.21	2	1.01	0.22
1.15	0.05	1	0.95	0.06
1.20	0.00	0	0.88	0.00
1.25	0.00	0	0.88	0.00
1.30	0.00	0	0.88	0.00
1.35	0.00	0	0.88	0.00
1.40	0.00	0	0.88	0.00
1.45	0.00	0	0.88	0.00
1.50	0.00	0	0.88	0.00
1.55	0.00	0	0.88	0.00
1.60	0.00	0	0.88	0.00
1.65	0.00	0	0.88	0.00
1.70	0.00	0	0.88	0.00
1.75	0.00	0	0.88	0.00
1.80	0.00	0	0.88	0.00
1.85	0.00	0	0.88	0.00
1.90	0.00	0	0.88	0.00
1.95	0.00	0	0.88	0.00
2.00	0.00	0	0.88	0.00

Summary for Reach 8R: (new Reach)

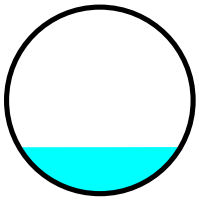
[52] Hint: Inlet/Outlet conditions not evaluated
[81] Warning: Exceeded Pond 5P by 13.30' @ 1.15 hrs

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 1.28" for 2-Year event
Inflow = 0.48 cfs @ 0.18 hrs, Volume= 0.039 af
Outflow = 0.48 cfs @ 0.19 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.6 min

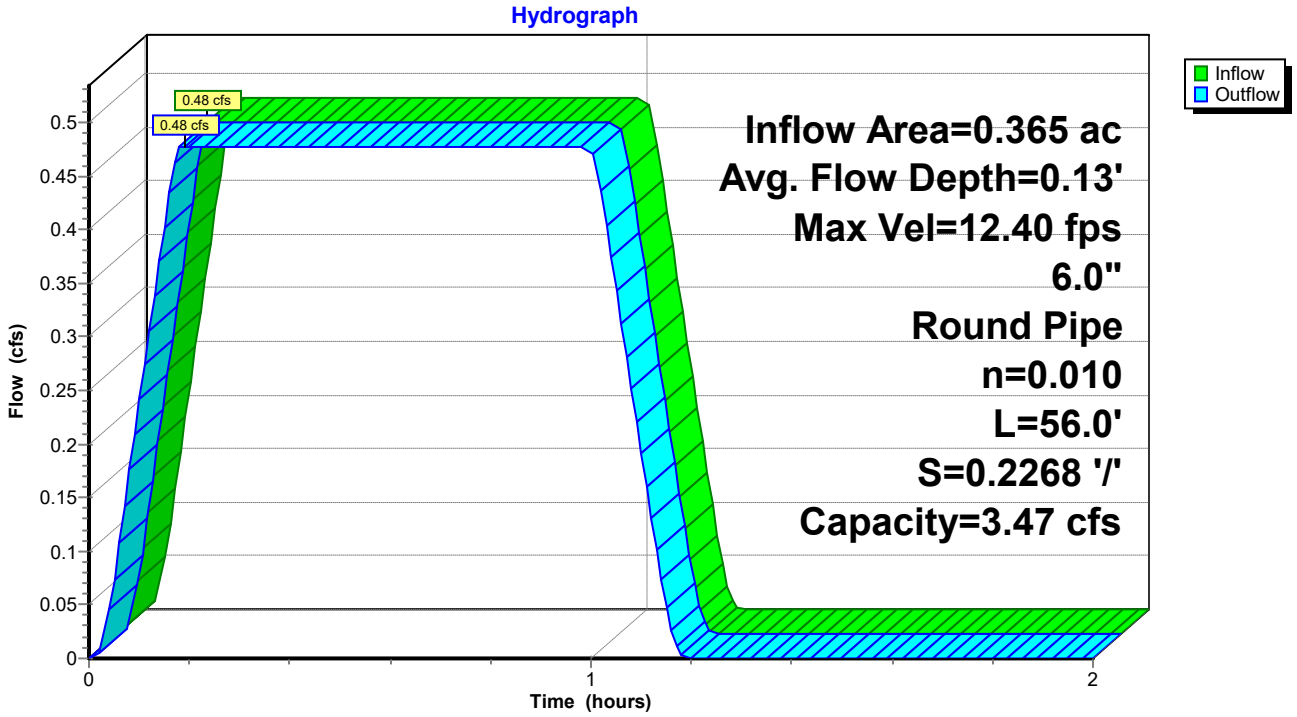
Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 12.40 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 11.34 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 0.19 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 3.47 cfs

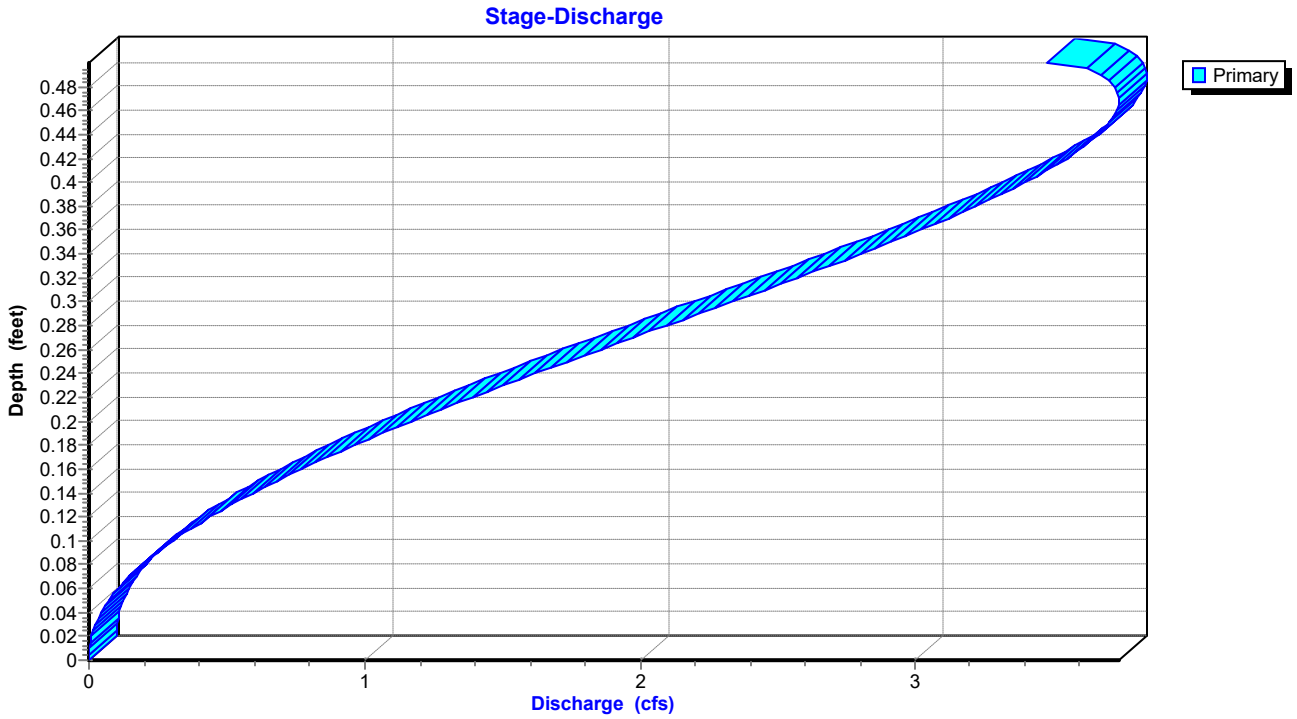
6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 56.0' Slope= 0.2268 '/'
Inlet Invert= 12.00', Outlet Invert= -0.70'



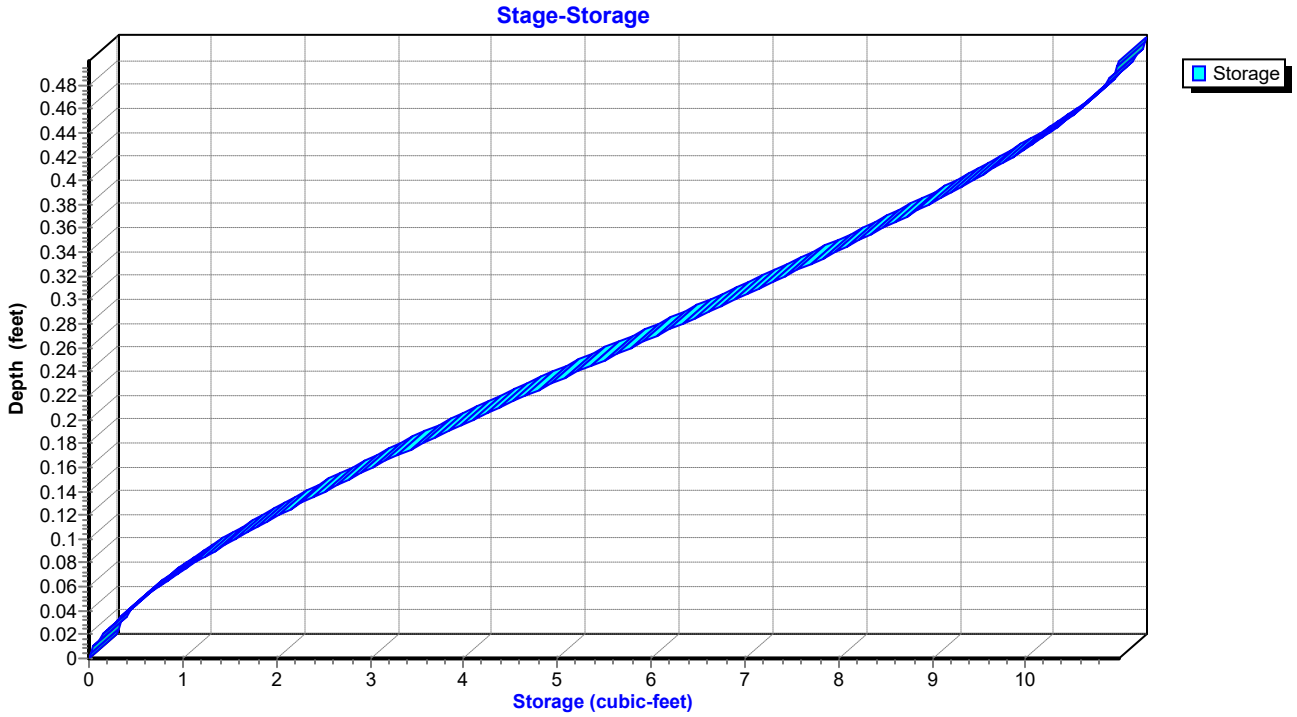
Reach 8R: (new Reach)



Reach 8R: (new Reach)



Reach 8R: (new Reach)



Hydrograph for Reach 8R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	12.00	0.00
0.05	0.08	1	12.05	0.07
0.10	0.25	1	12.09	0.24
0.15	**0.41**	**2**	**12.11**	**0.40**
0.20	**0.48**	**2**	**12.13**	**0.48**
0.25	0.48	2	12.13	0.48
0.30	0.48	2	12.13	0.48
0.35	0.48	2	12.13	0.48
0.40	0.48	2	12.13	0.48
0.45	0.48	2	12.13	0.48
0.50	0.48	2	12.13	0.48
0.55	0.48	2	12.13	0.48
0.60	0.48	2	12.13	0.48
0.65	0.48	2	12.13	0.48
0.70	0.48	2	12.13	0.48
0.75	0.48	2	12.13	0.48
0.80	0.48	2	12.13	0.48
0.85	0.48	2	12.13	0.48
0.90	0.48	2	12.13	0.48
0.95	0.48	2	12.13	0.48
1.00	0.48	2	12.13	0.48
1.05	0.34	2	12.11	0.34
1.10	0.19	1	12.08	0.19
1.15	0.04	0	12.04	0.05
1.20	0.00	0	12.00	0.00
1.25	0.00	0	12.00	0.00
1.30	0.00	0	12.00	0.00
1.35	0.00	0	12.00	0.00
1.40	0.00	0	12.00	0.00
1.45	0.00	0	12.00	0.00
1.50	0.00	0	12.00	0.00
1.55	0.00	0	12.00	0.00
1.60	0.00	0	12.00	0.00
1.65	0.00	0	12.00	0.00
1.70	0.00	0	12.00	0.00
1.75	0.00	0	12.00	0.00
1.80	0.00	0	12.00	0.00
1.85	0.00	0	12.00	0.00
1.90	0.00	0	12.00	0.00
1.95	0.00	0	12.00	0.00
2.00	0.00	0	12.00	0.00

Summary for Pond 4P: (new Pond)

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 1.28" for 2-Year event
Inflow = 0.48 cfs @ 0.19 hrs, Volume= 0.039 af
Outflow = 0.23 cfs @ 1.09 hrs, Volume= 0.029 af, Atten= 53%, Lag= 53.9 min
Primary = 0.23 cfs @ 1.09 hrs, Volume= 0.029 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -1.43' @ 1.09 hrs Surf.Area= 0.016 ac Storage= 0.024 af

Plug-Flow detention time= 38.7 min calculated for 0.029 af (74% of inflow)
Center-of-Mass det. time= 30.8 min (66.4 - 35.6)

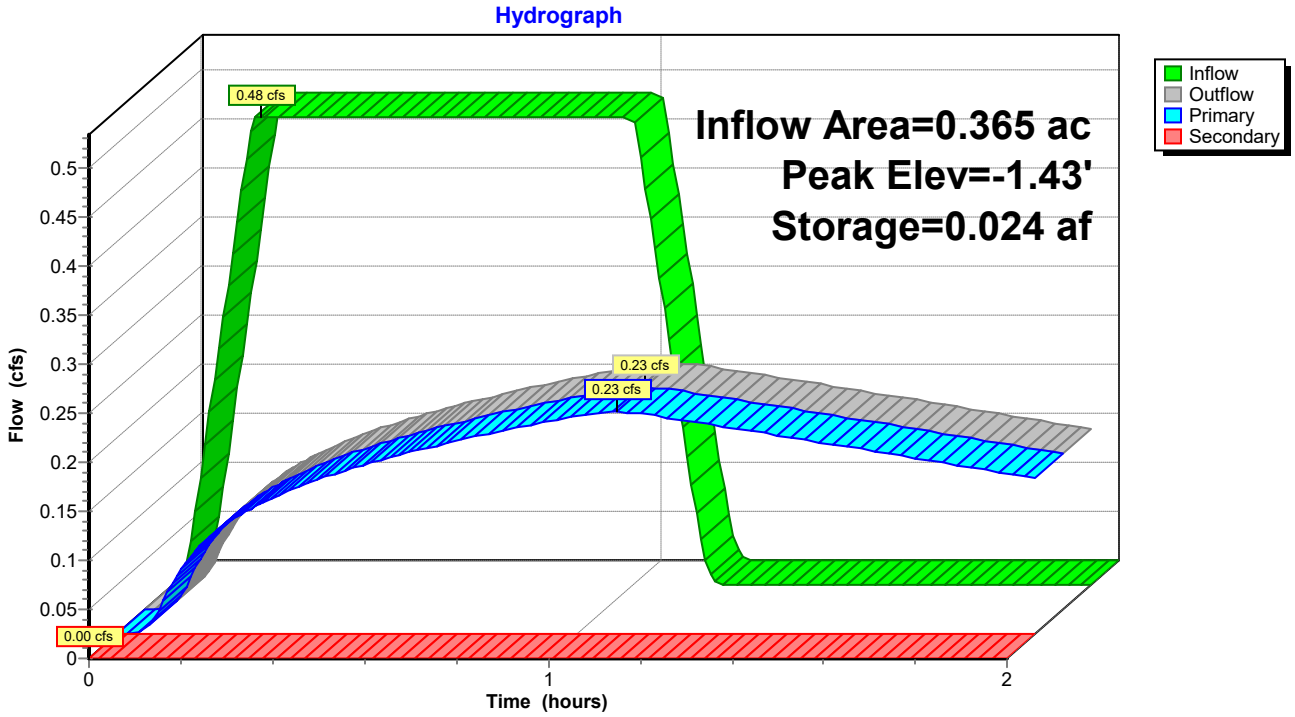
Volume	Invert	Avail.Storage	Storage Description
#1	-3.20'	0.039 af	**36.0" Round Pipe Storage** L= 243.0'

Device	Routing	Invert	Outlet Devices
#1	Secondary	-0.89'	**1.5' long Sharp-Crested Rectangular Weir** 1 End Contraction(s)
#2	Primary	-3.18'	**2.0" Vert. Orifice/Grate** C= 1.000

Primary OutFlow Max=0.23 cfs @ 1.09 hrs HW=-1.43' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.23 cfs @ 10.36 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-3.20' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: (new Pond)



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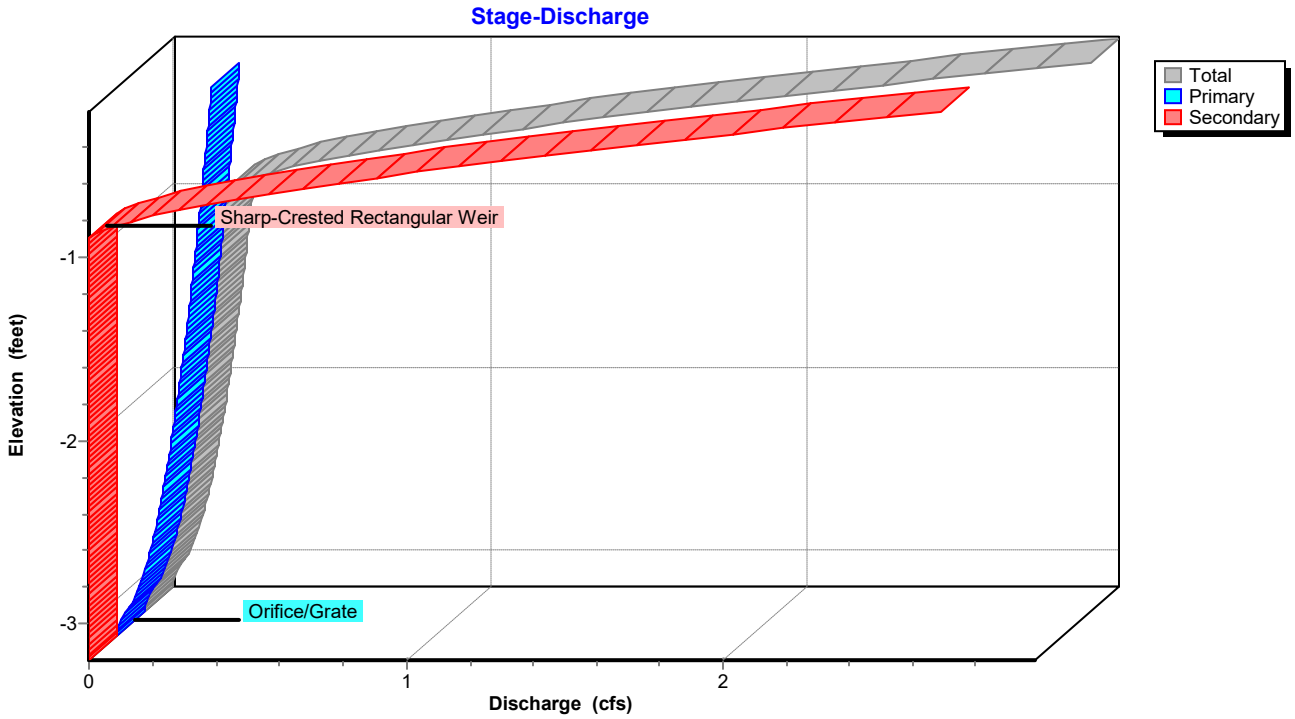
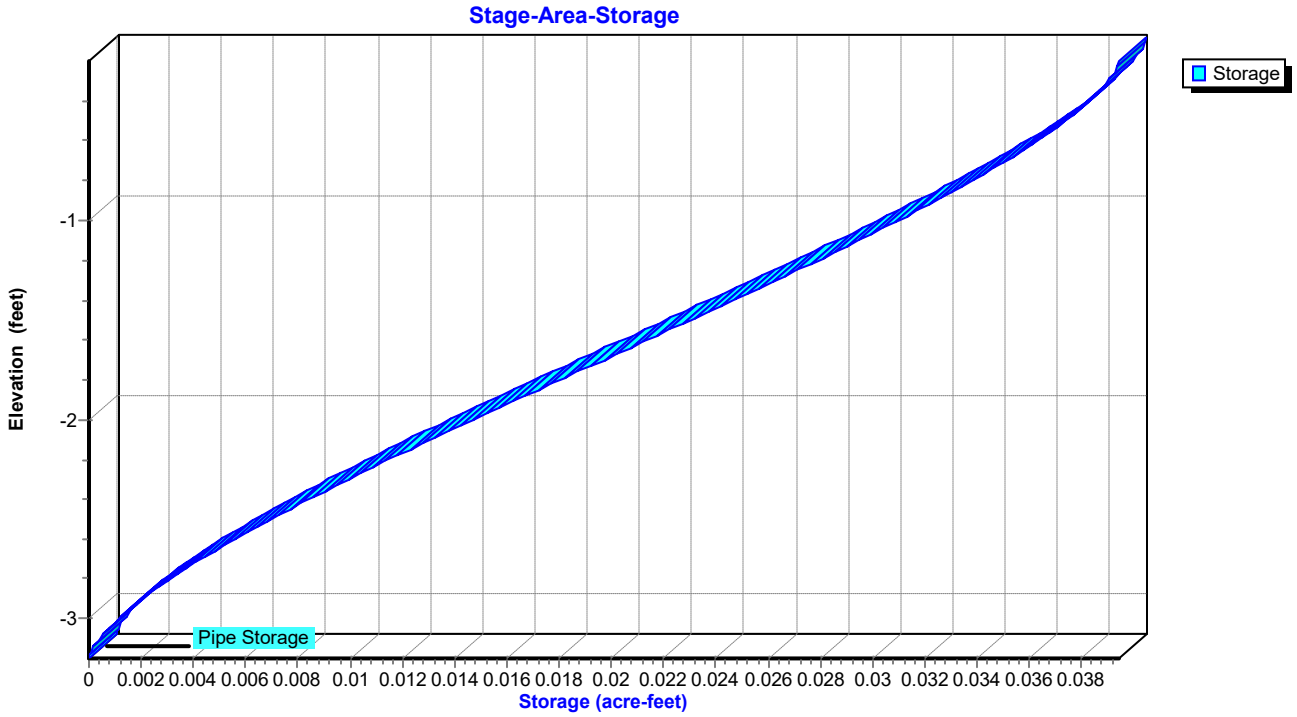


Pond 4P: (new Pond)



Hydrograph for Pond 4P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0.000	-3.20	0.00	0.00	**0.00**
0.05	0.07	0.000	-3.17	0.00	0.00	0.00
0.10	0.24	0.001	-3.06	0.03	0.03	0.00
0.15	**0.40**	0.002	-2.93	0.07	0.07	0.00
0.20	**0.48**	0.003	-2.78	0.10	0.10	0.00
0.25	0.48	0.005	-2.66	0.12	0.12	0.00
0.30	0.48	0.006	-2.55	0.13	0.13	0.00
0.35	0.48	0.008	-2.45	0.14	0.14	0.00
0.40	0.48	0.009	-2.36	0.15	0.15	0.00
0.45	0.48	0.010	-2.27	0.16	0.16	0.00
0.50	0.48	0.012	-2.19	0.17	0.17	0.00
0.55	0.48	0.013	-2.11	0.17	0.17	0.00
0.60	0.48	0.014	-2.03	0.18	0.18	0.00
0.65	0.48	0.015	-1.96	0.19	0.19	0.00
0.70	0.48	0.017	-1.89	0.19	0.19	0.00
0.75	0.48	0.018	-1.82	0.20	0.20	0.00
0.80	0.48	0.019	-1.75	0.20	0.20	0.00
0.85	0.48	0.020	-1.68	0.21	0.21	0.00
0.90	0.48	0.021	-1.62	0.21	0.21	0.00
0.95	0.48	0.022	-1.55	0.22	0.22	0.00
1.00	0.48	0.023	-1.49	0.22	0.22	0.00
1.05	0.34	**0.024**	**-1.44**	**0.23**	**0.23**	0.00
1.10	0.19	**0.024**	**-1.43**	**0.23**	**0.23**	0.00
1.15	0.05	0.024	-1.46	0.22	0.22	0.00
1.20	0.00	0.023	-1.51	0.22	0.22	0.00
1.25	0.00	0.022	-1.56	0.22	0.22	0.00
1.30	0.00	0.021	-1.62	0.21	0.21	0.00
1.35	0.00	0.020	-1.67	0.21	0.21	0.00
1.40	0.00	0.019	-1.72	0.21	0.21	0.00
1.45	0.00	0.019	-1.77	0.20	0.20	0.00
1.50	0.00	0.018	-1.82	0.20	0.20	0.00
1.55	0.00	0.017	-1.87	0.19	0.19	0.00
1.60	0.00	0.016	-1.92	0.19	0.19	0.00
1.65	0.00	0.015	-1.96	0.19	0.19	0.00
1.70	0.00	0.015	-2.01	0.18	0.18	0.00
1.75	0.00	0.014	-2.06	0.18	0.18	0.00
1.80	0.00	0.013	-2.10	0.17	0.17	0.00
1.85	0.00	0.012	-2.14	0.17	0.17	0.00
1.90	0.00	0.012	-2.19	0.17	0.17	0.00
1.95	0.00	0.011	-2.23	0.16	0.16	0.00
2.00	0.00	0.010	-2.27	0.16	0.16	0.00

Summary for Pond 5P: grass roof detention

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 1.42" for 2-Year event
Inflow = 0.52 cfs @ 0.18 hrs, Volume= 0.043 af
Outflow = 0.52 cfs @ 0.18 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.05 cfs @ 0.18 hrs, Volume= 0.004 af
Primary = 0.48 cfs @ 0.18 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -1.15' @ 0.18 hrs Surf.Area= 0.002 ac Storage= 0.000 af

Plug-Flow detention time= 0.4 min calculated for 0.043 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (35.5 - 35.1)

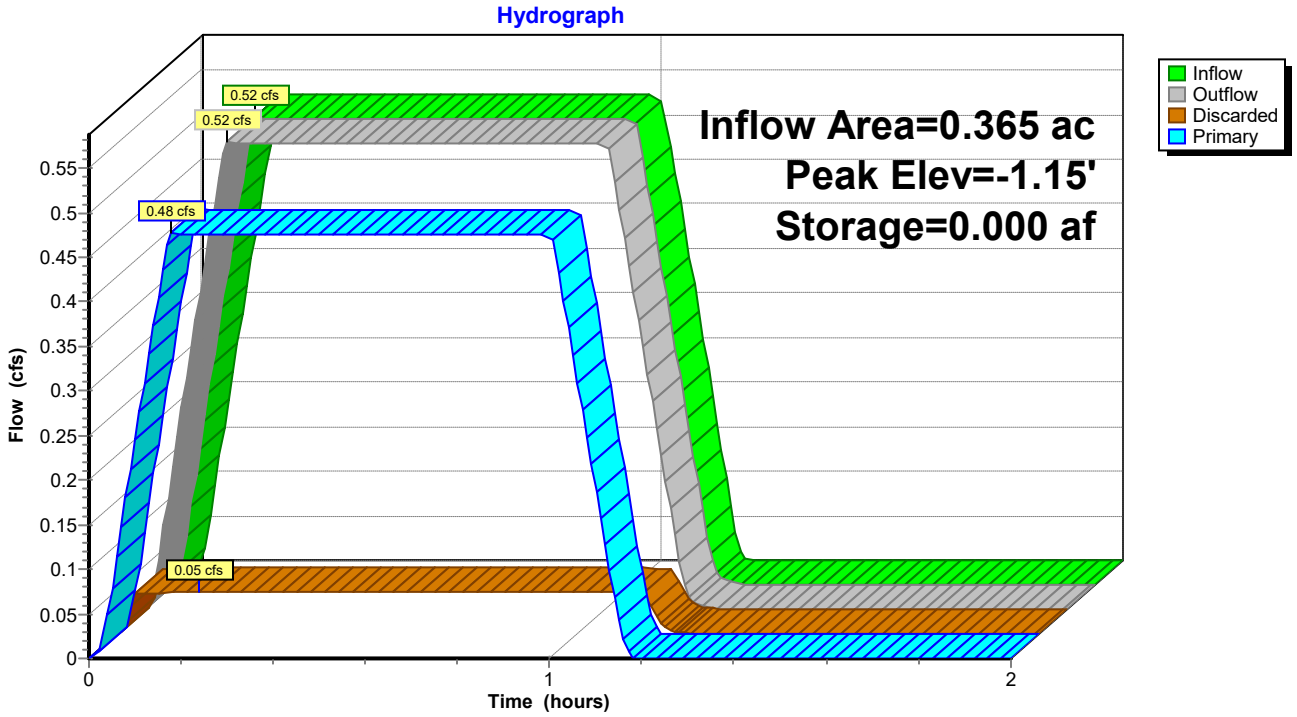
Volume	Invert	Avail.Storage	Storage Description
#1	-1.30'	0.002 af	**7.00'W x 11.00'L x 1.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.29'	**11.0" Horiz. Orifice/Grate** C= 1.000 Limited to weir flow at low heads
#2	Primary	-0.39'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	-1.30'	**25.000 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = -4.00' Phase-In= 0.04'

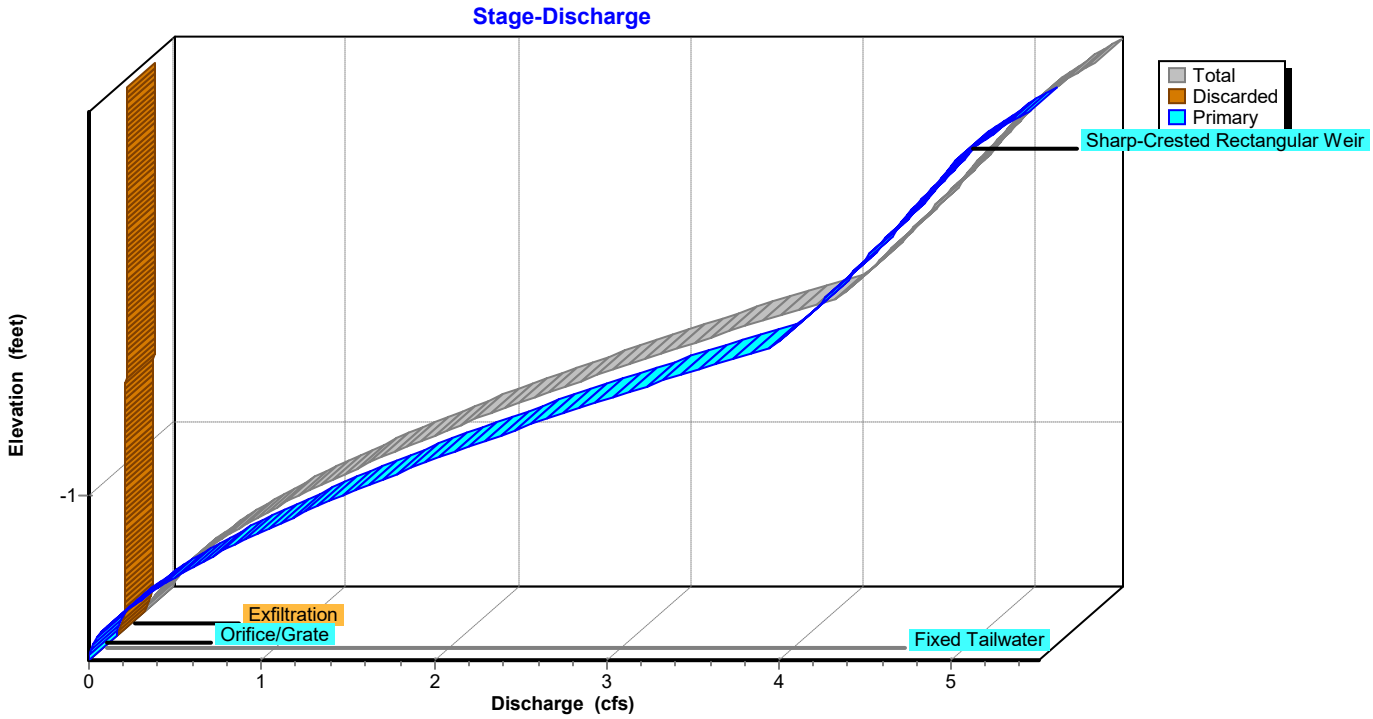
Discarded OutFlow Max=0.05 cfs @ 0.18 hrs HW=-1.15' (Free Discharge)
└**3=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.48 cfs @ 0.18 hrs HW=-1.15' TW=-1.30' (Fixed TW Elev= -1.30')
├**1=Orifice/Grate** (Weir Controls 0.48 cfs @ 1.21 fps)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

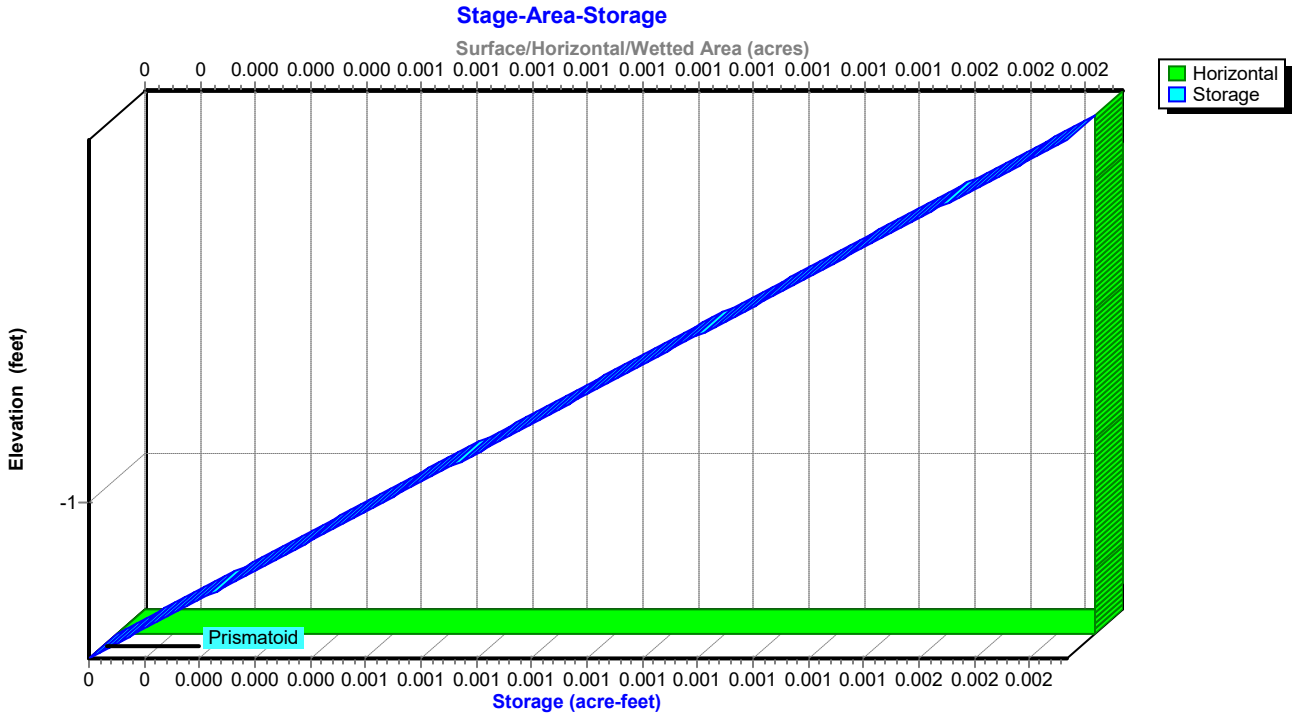
Pond 5P: grass roof detention



Pond 5P: grass roof detention



Pond 5P: grass roof detention



Hydrograph for Pond 5P: grass roof detention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	-1.30	0.00	0.00	0.00
0.05	0.15	0.000	-1.25	0.12	0.05	0.08
0.10	0.31	0.000	-1.20	0.29	0.05	0.25
0.15	**0.47**	**0.000**	**-1.17**	**0.45**	**0.05**	**0.41**
0.20	**0.52**	**0.000**	**-1.15**	**0.52**	**0.05**	**0.48**
0.25	0.52	0.000	-1.15	0.52	0.05	0.48
0.30	0.52	0.000	-1.15	0.52	0.05	0.48
0.35	0.52	0.000	-1.15	0.52	0.05	0.48
0.40	0.52	0.000	-1.15	0.52	0.05	0.48
0.45	0.52	0.000	-1.15	0.52	0.05	0.48
0.50	0.52	0.000	-1.15	0.52	0.05	0.48
0.55	0.52	0.000	-1.15	0.52	0.05	0.48
0.60	0.52	0.000	-1.15	0.52	0.05	0.48
0.65	0.52	0.000	-1.15	0.52	0.05	0.48
0.70	0.52	0.000	-1.15	0.52	0.05	0.48
0.75	0.52	0.000	-1.15	0.52	0.05	0.48
0.80	0.52	0.000	-1.15	0.52	0.05	0.48
0.85	0.52	0.000	-1.15	0.52	0.05	0.48
0.90	0.52	0.000	-1.15	0.52	0.05	0.48
0.95	0.52	0.000	-1.15	0.52	0.05	0.48
1.00	0.52	0.000	-1.15	0.52	0.05	0.48
1.05	0.37	0.000	-1.18	0.39	0.05	0.34
1.10	0.22	0.000	-1.22	0.23	0.05	0.19
1.15	0.06	0.000	-1.26	0.08	0.04	0.04
1.20	0.00	0.000	-1.30	0.00	0.00	0.00
1.25	0.00	0.000	-1.30	0.00	0.00	0.00
1.30	0.00	0.000	-1.30	0.00	0.00	0.00
1.35	0.00	0.000	-1.30	0.00	0.00	0.00
1.40	0.00	0.000	-1.30	0.00	0.00	0.00
1.45	0.00	0.000	-1.30	0.00	0.00	0.00
1.50	0.00	0.000	-1.30	0.00	0.00	0.00
1.55	0.00	0.000	-1.30	0.00	0.00	0.00
1.60	0.00	0.000	-1.30	0.00	0.00	0.00
1.65	0.00	0.000	-1.30	0.00	0.00	0.00
1.70	0.00	0.000	-1.30	0.00	0.00	0.00
1.75	0.00	0.000	-1.30	0.00	0.00	0.00
1.80	0.00	0.000	-1.30	0.00	0.00	0.00
1.85	0.00	0.000	-1.30	0.00	0.00	0.00
1.90	0.00	0.000	-1.30	0.00	0.00	0.00
1.95	0.00	0.000	-1.30	0.00	0.00	0.00
2.00	0.00	0.000	-1.30	0.00	0.00	0.00

Time span=0.00-2.00 hrs, dt=0.01 hrs, 201 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 5S: PROPOSED Roof Runoff Area=15,909 sf 100.00% Impervious Runoff Depth=2.01"
Flow Length=123' Slope=0.0015 '/' Tc=10.0 min C=0.98 Runoff=0.74 cfs 0.061 af

Reach 3R: PIPE Avg. Flow Depth=0.24' Max Vel=5.85 fps Inflow=0.74 cfs 0.061 af
10.0" Round Pipe n=0.010 L=45.0' S=0.0222 '/' Capacity=4.25 cfs Outflow=0.74 cfs 0.061 af

Reach 8R: (new Reach) Avg. Flow Depth=0.15' Max Vel=13.81 fps Inflow=0.69 cfs 0.057 af
6.0" Round Pipe n=0.010 L=56.0' S=0.2268 '/' Capacity=3.47 cfs Outflow=0.69 cfs 0.057 af

Pond 4P: (new Pond) Peak Elev=-0.71' Storage=0.035 af Inflow=0.69 cfs 0.057 af
Primary=0.27 cfs 0.034 af Secondary=0.37 cfs 0.005 af Outflow=0.64 cfs 0.039 af

Pond 5P: grass roof detention Peak Elev=-1.11' Storage=0.000 af Inflow=0.74 cfs 0.061 af
Discarded=0.05 cfs 0.005 af Primary=0.69 cfs 0.057 af Outflow=0.74 cfs 0.061 af

Total Runoff Area = 0.365 ac Runoff Volume = 0.061 af Average Runoff Depth = 2.01"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.365 ac

Summary for Subcatchment 5S: PROPOSED Roof RUNOFF

Exsiting Drainage area that picks up the PROPOSED runoff
WITH A 10 YEAR STORAGE CRITERA

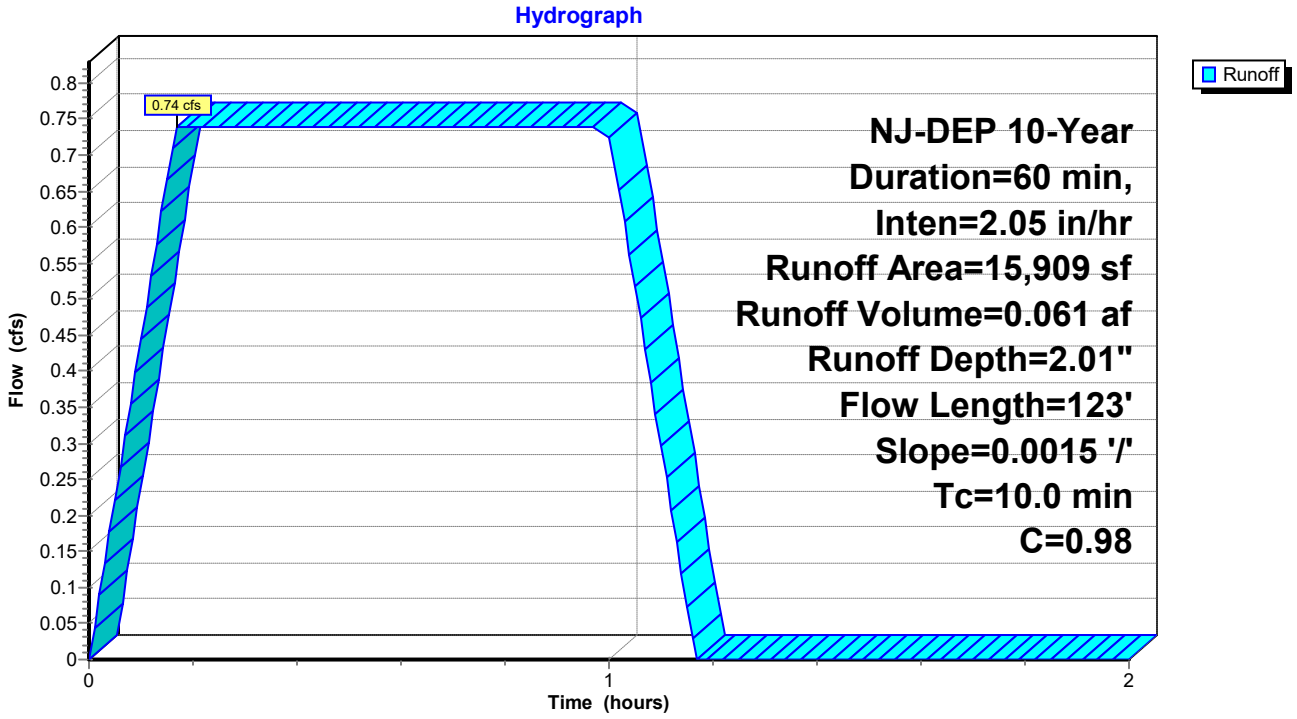
Runoff = 0.74 cfs @ 0.17 hrs, Volume= 0.061 af, Depth= 2.01"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
NJ-DEP 10-Year Duration=60 min, Inten=2.05 in/hr

Area (sf)	C	Description
15,909	0.98	roof
15,909		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	123	0.0015	0.21		**Shallow Concentrated Flow, SHEETFLOW** Kv= 5.3 fps

Subcatchment 5S: PROPOSED Roof RUNOFF



Hydrograph for Subcatchment 5S: PROPOSED Roof RUNOFF

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	0.52	0.74	1.04	0.56	1.56	0.00
0.01	0.04	0.53	0.74	1.05	0.52	1.57	0.00
0.02	0.09	0.54	0.74	1.06	0.47	1.58	0.00
0.03	0.13	0.55	0.74	1.07	0.43	1.59	0.00
0.04	0.18	0.56	0.74	1.08	0.38	1.60	0.00
0.05	0.22	0.57	0.74	1.09	0.34	1.61	0.00
0.06	0.27	0.58	0.74	1.10	0.30	1.62	0.00
0.07	0.31	0.59	0.74	1.11	0.25	1.63	0.00
0.08	0.36	0.60	0.74	1.12	0.21	1.64	0.00
0.09	0.40	0.61	0.74	1.13	0.16	1.65	0.00
0.10	0.44	0.62	0.74	1.14	0.12	1.66	0.00
0.11	0.49	0.63	0.74	1.15	0.07	1.67	0.00
0.12	0.53	0.64	0.74	1.16	0.03	1.68	0.00
0.13	0.58	0.65	0.74	1.17	0.00	1.69	0.00
0.14	0.62	0.66	0.74	1.18	0.00	1.70	0.00
0.15	0.67	0.67	0.74	1.19	0.00	1.71	0.00
0.16	0.71	0.68	0.74	1.20	0.00	1.72	0.00
0.17	**0.74**	0.69	0.74	1.21	0.00	1.73	0.00
0.18	0.74	0.70	0.74	1.22	0.00	1.74	0.00
0.19	0.74	0.71	0.74	1.23	0.00	1.75	0.00
0.20	0.74	0.72	0.74	1.24	0.00	1.76	0.00
0.21	0.74	0.73	0.74	1.25	0.00	1.77	0.00
0.22	0.74	0.74	0.74	1.26	0.00	1.78	0.00
0.23	0.74	0.75	0.74	1.27	0.00	1.79	0.00
0.24	0.74	0.76	0.74	1.28	0.00	1.80	0.00
0.25	0.74	0.77	0.74	1.29	0.00	1.81	0.00
0.26	0.74	0.78	0.74	1.30	0.00	1.82	0.00
0.27	0.74	0.79	0.74	1.31	0.00	1.83	0.00
0.28	0.74	0.80	0.74	1.32	0.00	1.84	0.00
0.29	0.74	0.81	0.74	1.33	0.00	1.85	0.00
0.30	0.74	0.82	0.74	1.34	0.00	1.86	0.00
0.31	0.74	0.83	0.74	1.35	0.00	1.87	0.00
0.32	0.74	0.84	0.74	1.36	0.00	1.88	0.00
0.33	0.74	0.85	0.74	1.37	0.00	1.89	0.00
0.34	0.74	0.86	0.74	1.38	0.00	1.90	0.00
0.35	0.74	0.87	0.74	1.39	0.00	1.91	0.00
0.36	0.74	0.88	0.74	1.40	0.00	1.92	0.00
0.37	0.74	0.89	0.74	1.41	0.00	1.93	0.00
0.38	0.74	0.90	0.74	1.42	0.00	1.94	0.00
0.39	0.74	0.91	0.74	1.43	0.00	1.95	0.00
0.40	0.74	0.92	0.74	1.44	0.00	1.96	0.00
0.41	0.74	0.93	0.74	1.45	0.00	1.97	0.00
0.42	0.74	0.94	0.74	1.46	0.00	1.98	0.00
0.43	0.74	0.95	0.74	1.47	0.00	1.99	0.00
0.44	0.74	0.96	0.74	1.48	0.00	2.00	0.00
0.45	0.74	0.97	0.74	1.49	0.00		
0.46	0.74	0.98	0.74	1.50	0.00		
0.47	0.74	0.99	0.74	1.51	0.00		
0.48	0.74	1.00	0.74	1.52	0.00		
0.49	0.74	1.01	0.70	1.53	0.00		
0.50	0.74	1.02	0.65	1.54	0.00		
0.51	0.74	1.03	0.61	1.55	0.00		

Summary for Reach 3R: PIPE

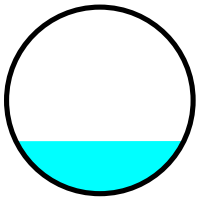
[52] Hint: Inlet/Outlet conditions not evaluated

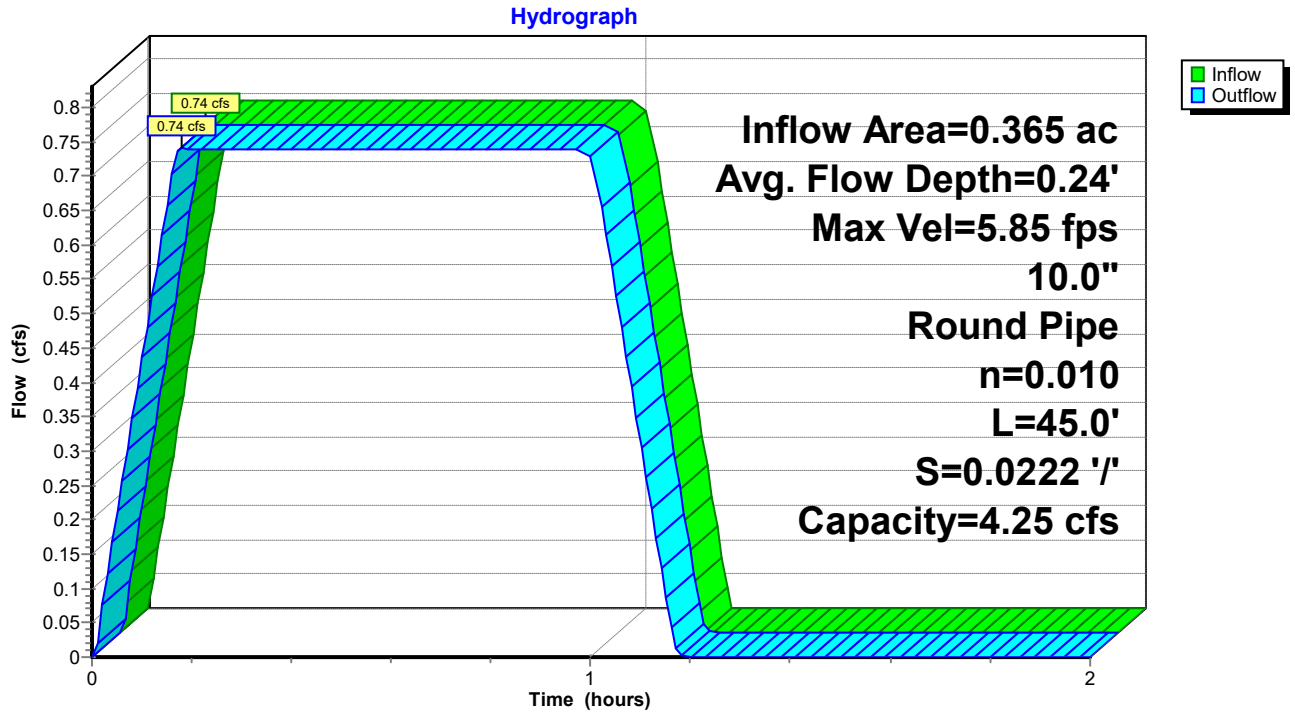
Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.01" for 10-Year event
Inflow = 0.74 cfs @ 0.17 hrs, Volume= 0.061 af
Outflow = 0.74 cfs @ 0.18 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.85 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.26 fps, Avg. Travel Time= 0.1 min

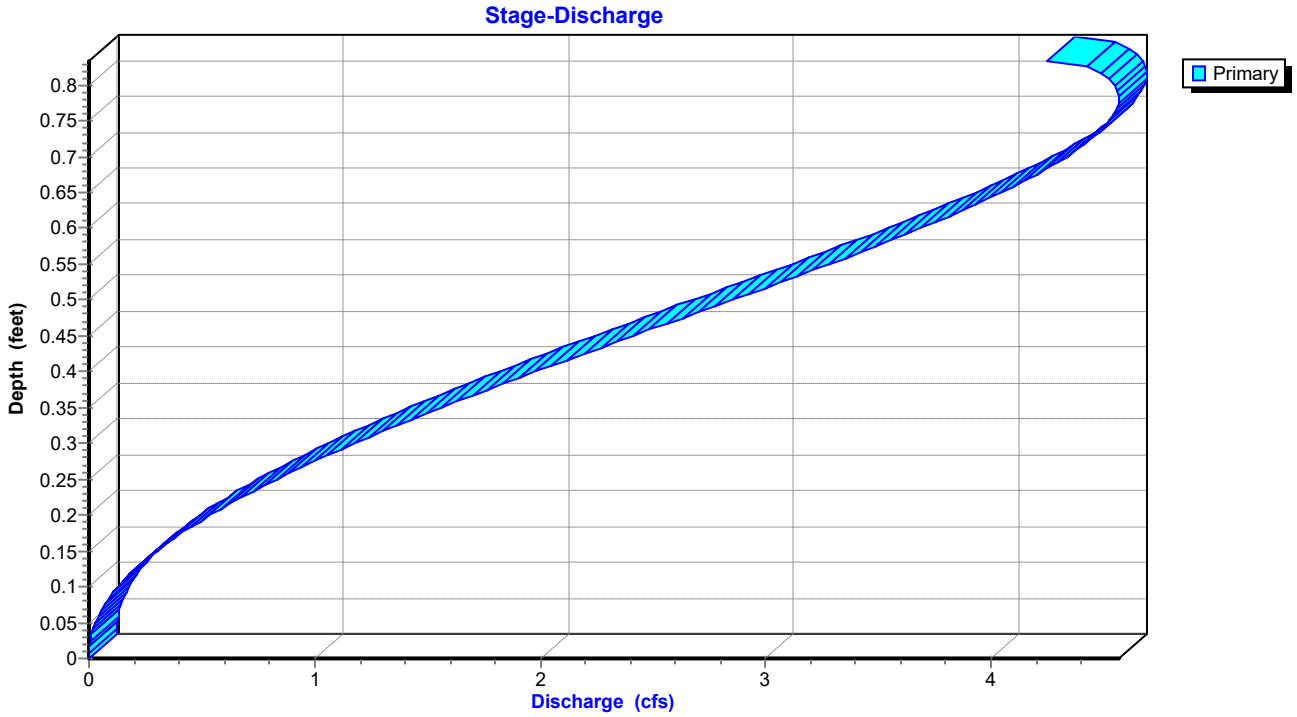
Peak Storage= 6 cf @ 0.18 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 4.25 cfs

10.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 45.0' Slope= 0.0222 '/'
Inlet Invert= 0.88', Outlet Invert= -0.12'

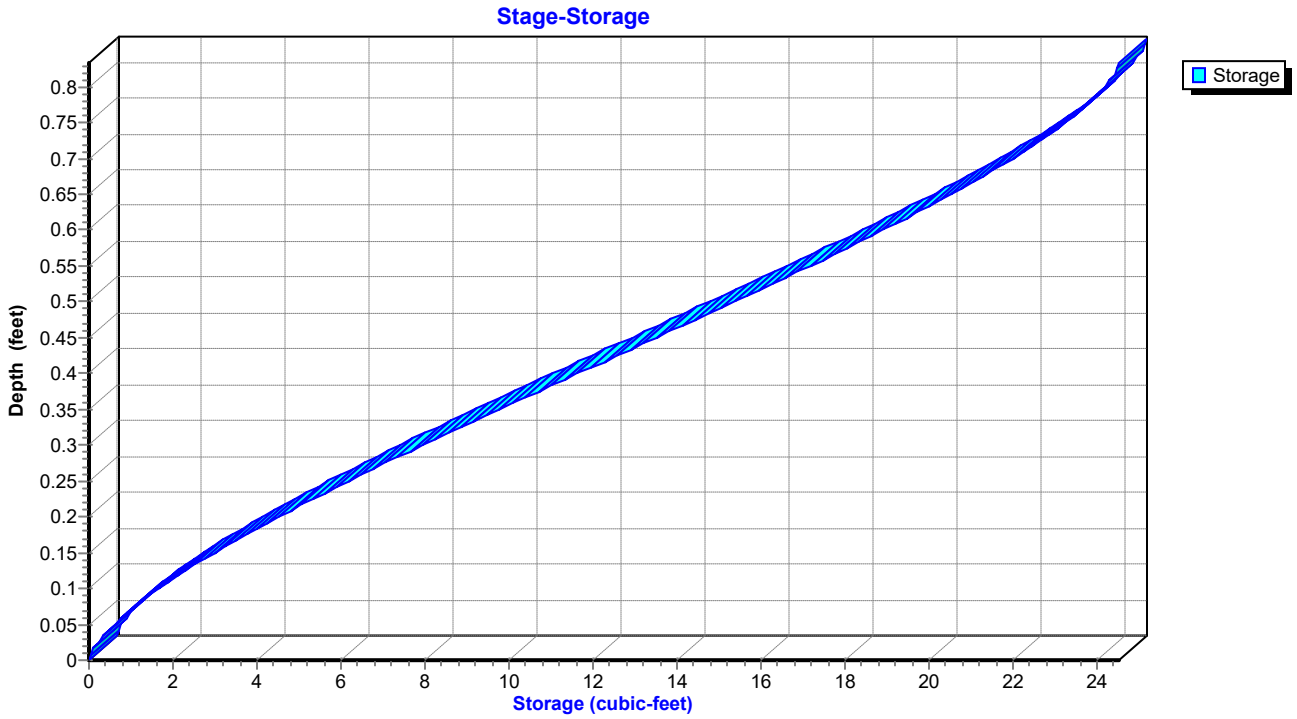




Reach 3R: PIPE



Reach 3R: PIPE



Hydrograph for Reach 3R: PIPE

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	0.88	0.00
0.05	0.22	2	1.01	0.21
0.10	0.44	4	1.06	0.44
0.15	**0.67**	**5**	**1.10**	**0.66**
0.20	**0.74**	**6**	**1.12**	**0.74**
0.25	0.74	6	1.12	0.74
0.30	0.74	6	1.12	0.74
0.35	0.74	6	1.12	0.74
0.40	0.74	6	1.12	0.74
0.45	0.74	6	1.12	0.74
0.50	0.74	6	1.12	0.74
0.55	0.74	6	1.12	0.74
0.60	0.74	6	1.12	0.74
0.65	0.74	6	1.12	0.74
0.70	0.74	6	1.12	0.74
0.75	0.74	6	1.12	0.74
0.80	0.74	6	1.12	0.74
0.85	0.74	6	1.12	0.74
0.90	0.74	6	1.12	0.74
0.95	0.74	6	1.12	0.74
1.00	0.74	6	1.12	0.74
1.05	0.52	4	1.08	0.53
1.10	0.30	3	1.03	0.30
1.15	0.07	1	0.96	0.09
1.20	0.00	0	0.88	0.00
1.25	0.00	0	0.88	0.00
1.30	0.00	0	0.88	0.00
1.35	0.00	0	0.88	0.00
1.40	0.00	0	0.88	0.00
1.45	0.00	0	0.88	0.00
1.50	0.00	0	0.88	0.00
1.55	0.00	0	0.88	0.00
1.60	0.00	0	0.88	0.00
1.65	0.00	0	0.88	0.00
1.70	0.00	0	0.88	0.00
1.75	0.00	0	0.88	0.00
1.80	0.00	0	0.88	0.00
1.85	0.00	0	0.88	0.00
1.90	0.00	0	0.88	0.00
1.95	0.00	0	0.88	0.00
2.00	0.00	0	0.88	0.00

Summary for Reach 8R: (new Reach)

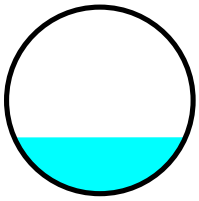
[52] Hint: Inlet/Outlet conditions not evaluated
[81] Warning: Exceeded Pond 5P by 13.30' @ 1.16 hrs

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 1.86" for 10-Year event
Inflow = 0.69 cfs @ 0.18 hrs, Volume= 0.057 af
Outflow = 0.69 cfs @ 0.18 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

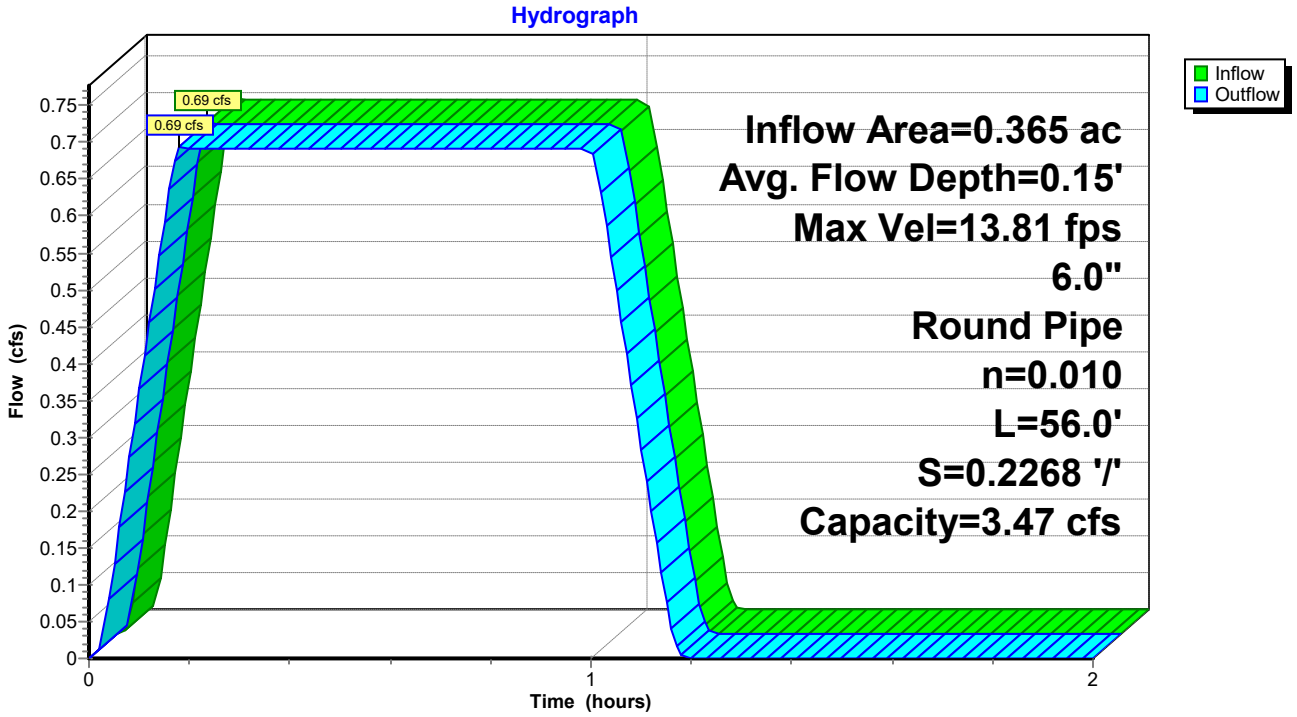
Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 13.81 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 12.58 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 0.18 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 3.47 cfs

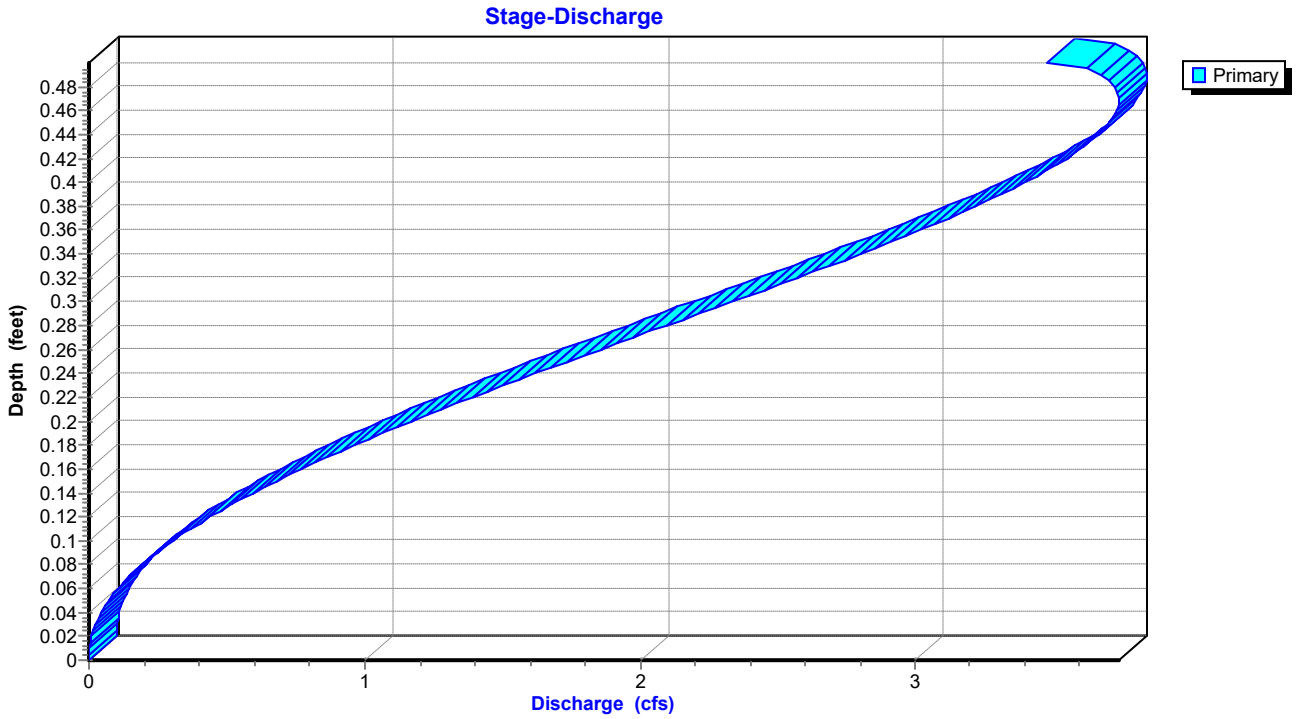
6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 56.0' Slope= 0.2268 '/'
Inlet Invert= 12.00', Outlet Invert= -0.70'



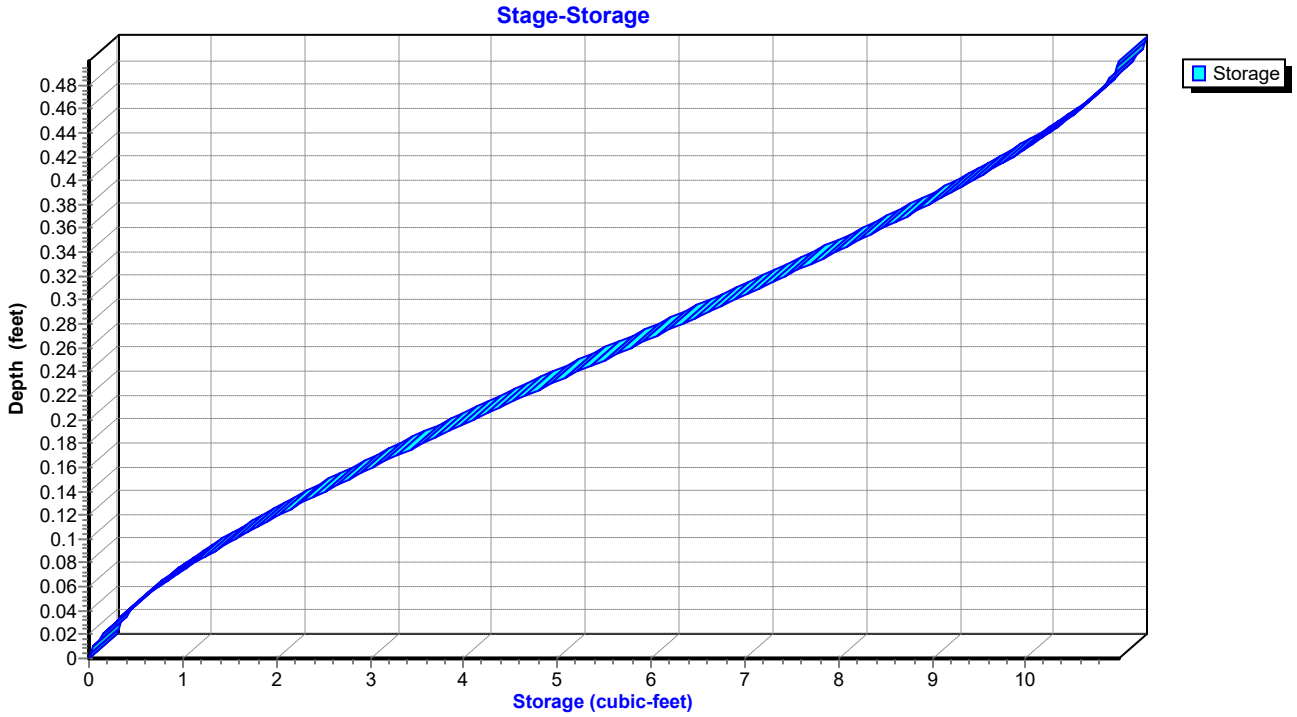
Reach 8R: (new Reach)



Reach 8R: (new Reach)



Reach 8R: (new Reach)



Hydrograph for Reach 8R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	12.00	0.00
0.05	0.14	1	12.07	0.13
0.10	0.37	2	12.11	0.36
0.15	**0.59**	**3**	**12.14**	**0.59**
0.20	**0.69**	**3**	**12.15**	**0.69**
0.25	0.69	3	12.15	0.69
0.30	0.69	3	12.15	0.69
0.35	0.69	3	12.15	0.69
0.40	0.69	3	12.15	0.69
0.45	0.69	3	12.15	0.69
0.50	0.69	3	12.15	0.69
0.55	0.69	3	12.15	0.69
0.60	0.69	3	12.15	0.69
0.65	0.69	3	12.15	0.69
0.70	0.69	3	12.15	0.69
0.75	0.69	3	12.15	0.69
0.80	0.69	3	12.15	0.69
0.85	0.69	3	12.15	0.69
0.90	0.69	3	12.15	0.69
0.95	0.69	3	12.15	0.69
1.00	0.69	3	12.15	0.69
1.05	0.50	2	12.13	0.50
1.10	0.28	1	12.10	0.28
1.15	0.07	1	12.05	0.08
1.20	0.00	0	12.00	0.00
1.25	0.00	0	12.00	0.00
1.30	0.00	0	12.00	0.00
1.35	0.00	0	12.00	0.00
1.40	0.00	0	12.00	0.00
1.45	0.00	0	12.00	0.00
1.50	0.00	0	12.00	0.00
1.55	0.00	0	12.00	0.00
1.60	0.00	0	12.00	0.00
1.65	0.00	0	12.00	0.00
1.70	0.00	0	12.00	0.00
1.75	0.00	0	12.00	0.00
1.80	0.00	0	12.00	0.00
1.85	0.00	0	12.00	0.00
1.90	0.00	0	12.00	0.00
1.95	0.00	0	12.00	0.00
2.00	0.00	0	12.00	0.00

Summary for Pond 4P: (new Pond)

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 1.86" for 10-Year event
Inflow = 0.69 cfs @ 0.18 hrs, Volume= 0.057 af
Outflow = 0.64 cfs @ 1.02 hrs, Volume= 0.039 af, Atten= 8%, Lag= 50.4 min
Primary = 0.27 cfs @ 1.02 hrs, Volume= 0.034 af
Secondary = 0.37 cfs @ 1.02 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -0.71' @ 1.02 hrs Surf.Area= 0.013 ac Storage= 0.035 af

Plug-Flow detention time= 39.2 min calculated for 0.039 af (70% of inflow)
Center-of-Mass det. time= 30.1 min (65.6 - 35.5)

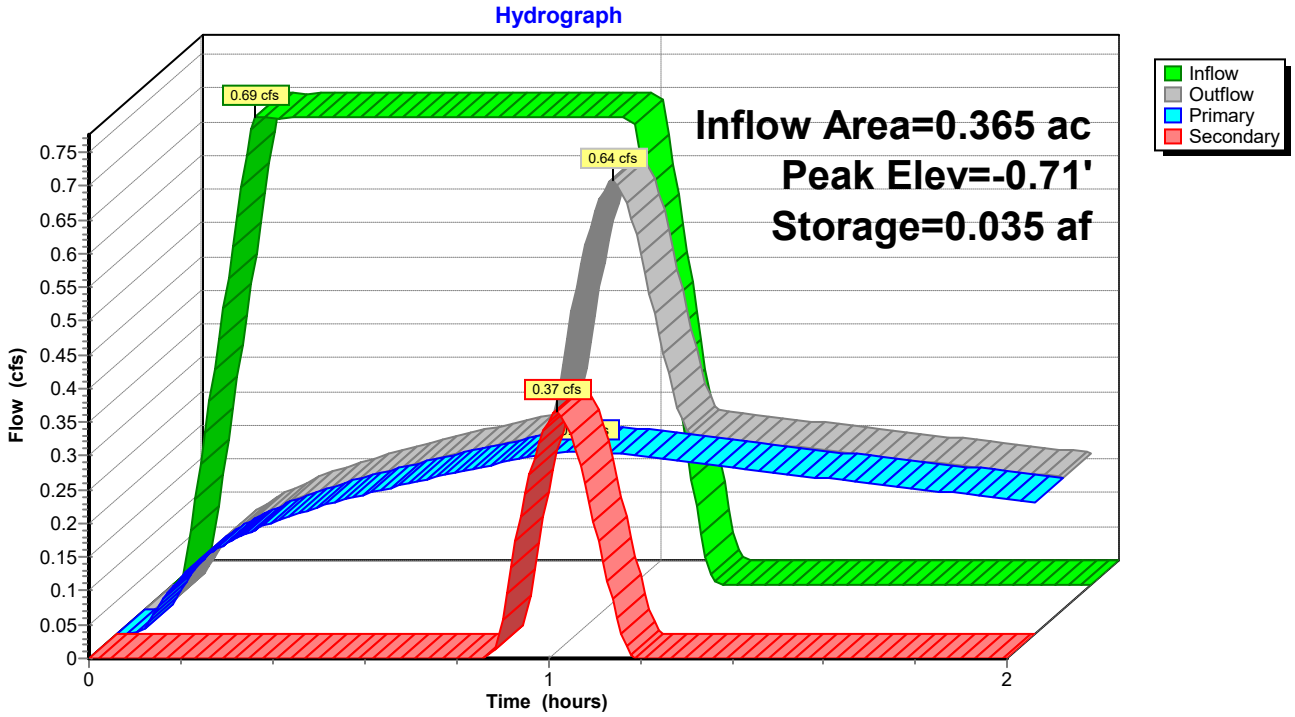
Volume	Invert	Avail.Storage	Storage Description
#1	-3.20'	0.039 af	**36.0" Round Pipe Storage** L= 243.0'

Device	Routing	Invert	Outlet Devices
#1	Secondary	-0.89'	**1.5' long Sharp-Crested Rectangular Weir** 1 End Contraction(s)
#2	Primary	-3.18'	**2.0" Vert. Orifice/Grate** C= 1.000

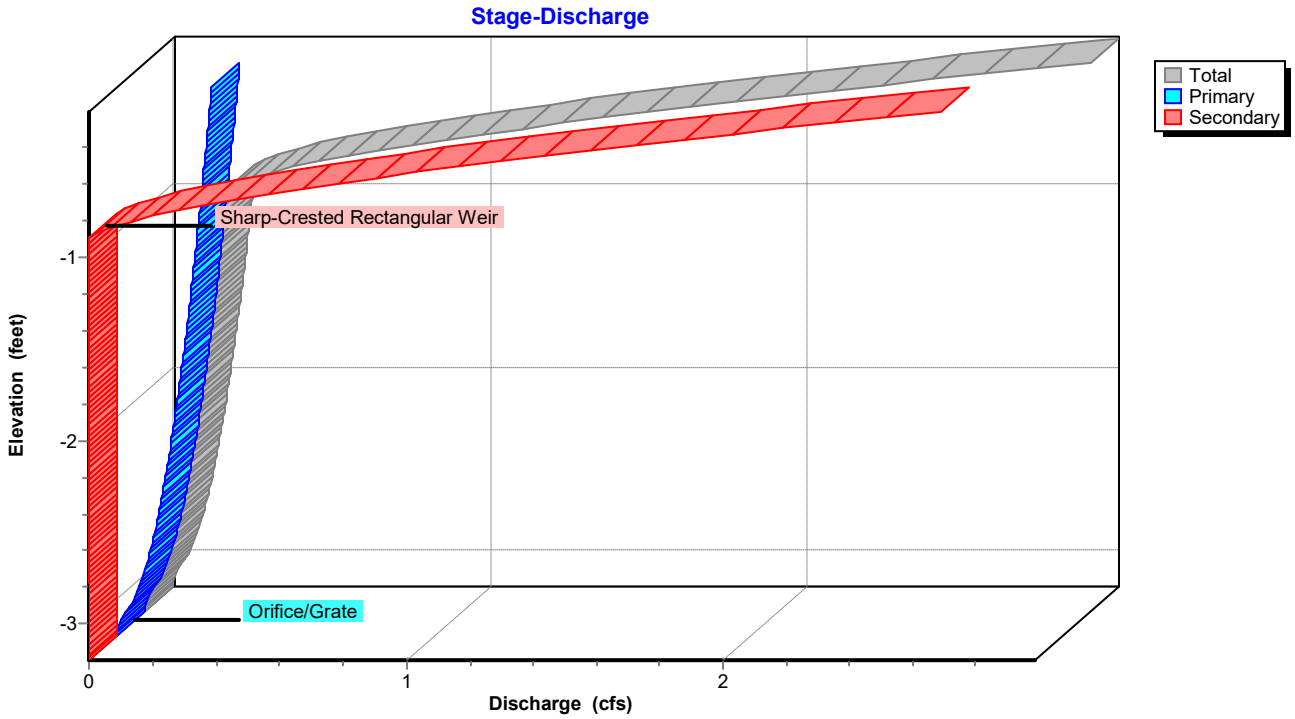
Primary OutFlow Max=0.27 cfs @ 1.02 hrs HW=-0.71' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 12.39 fps)

Secondary OutFlow Max=0.37 cfs @ 1.02 hrs HW=-0.71' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 0.37 cfs @ 1.38 fps)

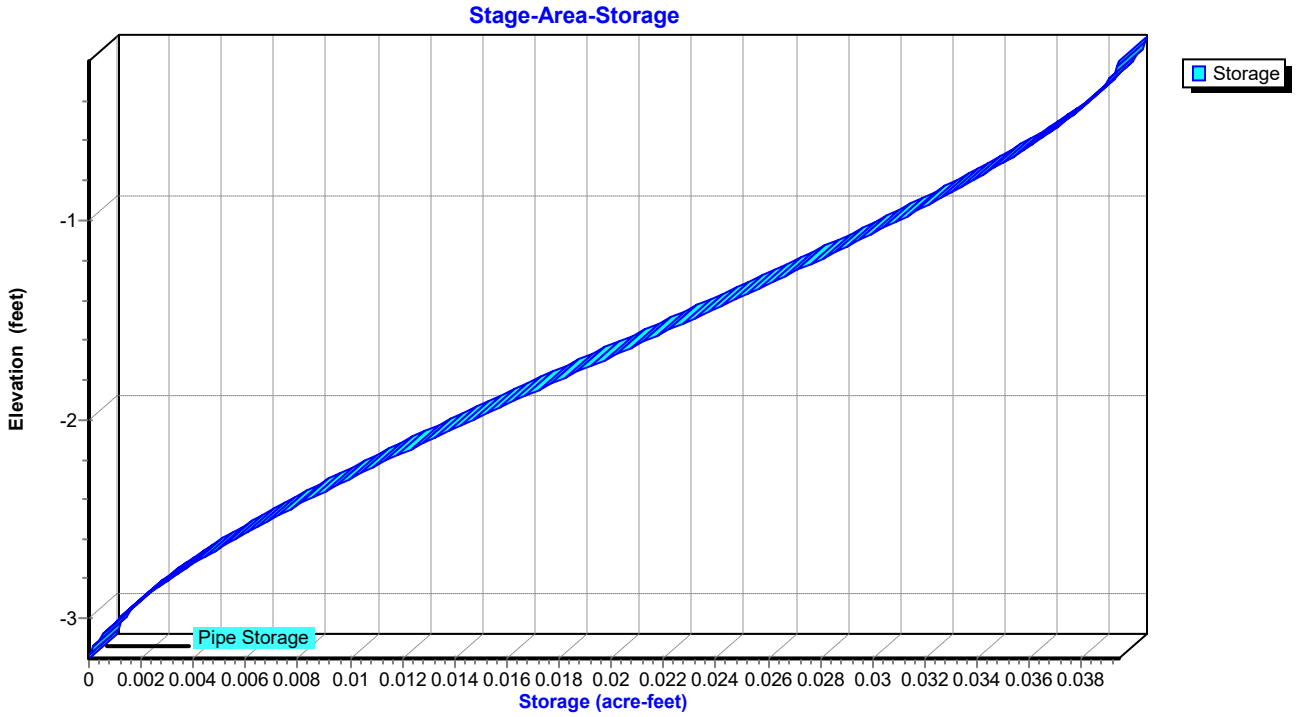
Pond 4P: (new Pond)



Pond 4P: (new Pond)



Pond 4P: (new Pond)



Hydrograph for Pond 4P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0.000	-3.20	0.00	0.00	0.00
0.05	0.13	0.000	-3.15	0.00	0.00	0.00
0.10	0.36	0.001	-3.01	0.05	0.05	0.00
0.15	**0.59**	0.003	-2.83	0.09	0.09	0.00
0.20	**0.69**	0.005	-2.64	0.12	0.12	0.00
0.25	0.69	0.007	-2.47	0.14	0.14	0.00
0.30	0.69	0.010	-2.32	0.15	0.15	0.00
0.35	0.69	0.012	-2.18	0.17	0.17	0.00
0.40	0.69	0.014	-2.04	0.18	0.18	0.00
0.45	0.69	0.016	-1.92	0.19	0.19	0.00
0.50	0.69	0.018	-1.79	0.20	0.20	0.00
0.55	0.69	0.020	-1.67	0.21	0.21	0.00
0.60	0.69	0.022	-1.55	0.22	0.22	0.00
0.65	0.69	0.024	-1.44	0.23	0.23	0.00
0.70	0.69	0.026	-1.32	0.23	0.23	0.00
0.75	0.69	0.028	-1.20	0.24	0.24	0.00
0.80	0.69	0.030	-1.08	0.25	0.25	0.00
0.85	0.69	0.032	-0.96	0.26	0.26	0.00
0.90	0.69	0.033	-0.84	0.32	0.26	0.06
0.95	0.69	0.034	-0.75	0.51	0.27	0.24
1.00	0.69	**0.035**	**-0.72**	**0.62**	**0.27**	**0.35**
1.05	0.50	**0.035**	**-0.72**	**0.60**	**0.27**	**0.33**
1.10	0.28	0.034	-0.77	0.47	0.27	0.20
1.15	0.08	0.033	-0.84	0.32	0.26	0.06
1.20	0.00	0.032	-0.91	0.26	0.26	0.00
1.25	0.00	0.031	-0.99	0.25	0.25	0.00
1.30	0.00	0.030	-1.06	0.25	0.25	0.00
1.35	0.00	0.029	-1.12	0.25	0.25	0.00
1.40	0.00	0.028	-1.19	0.24	0.24	0.00
1.45	0.00	0.027	-1.25	0.24	0.24	0.00
1.50	0.00	0.026	-1.31	0.23	0.23	0.00
1.55	0.00	0.025	-1.37	0.23	0.23	0.00
1.60	0.00	0.024	-1.43	0.23	0.23	0.00
1.65	0.00	0.023	-1.48	0.22	0.22	0.00
1.70	0.00	0.022	-1.54	0.22	0.22	0.00
1.75	0.00	0.022	-1.59	0.21	0.21	0.00
1.80	0.00	0.021	-1.65	0.21	0.21	0.00
1.85	0.00	0.020	-1.70	0.21	0.21	0.00
1.90	0.00	0.019	-1.75	0.20	0.20	0.00
1.95	0.00	0.018	-1.80	0.20	0.20	0.00
2.00	0.00	0.017	-1.85	0.20	0.20	0.00

Summary for Pond 5P: grass roof detention

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.01" for 10-Year event
Inflow = 0.74 cfs @ 0.18 hrs, Volume= 0.061 af
Outflow = 0.74 cfs @ 0.18 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.05 cfs @ 0.18 hrs, Volume= 0.005 af
Primary = 0.69 cfs @ 0.18 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -1.11' @ 0.18 hrs Surf.Area= 0.002 ac Storage= 0.000 af

Plug-Flow detention time= 0.3 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (35.5 - 35.1)

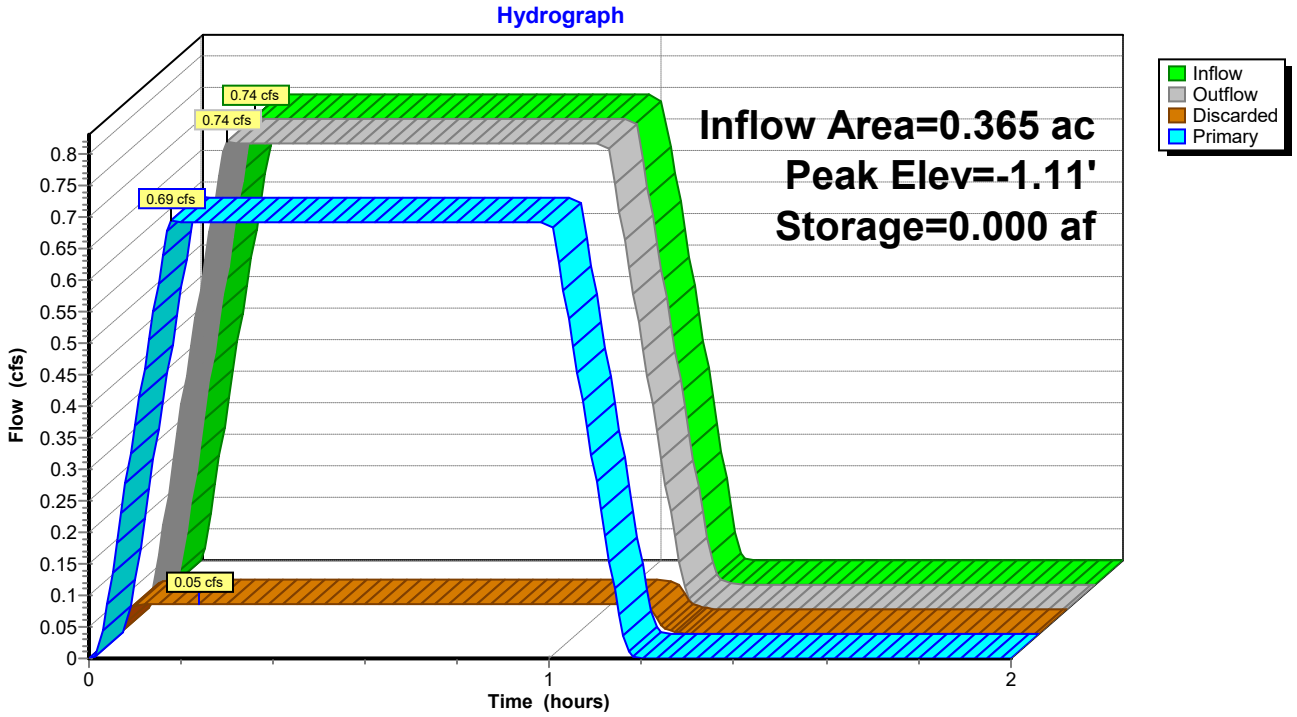
Volume	Invert	Avail.Storage	Storage Description
#1	-1.30'	0.002 af	**7.00'W x 11.00'L x 1.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.29'	**11.0" Horiz. Orifice/Grate** C= 1.000 Limited to weir flow at low heads
#2	Primary	-0.39'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	-1.30'	**25.000 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = -4.00' Phase-In= 0.04'

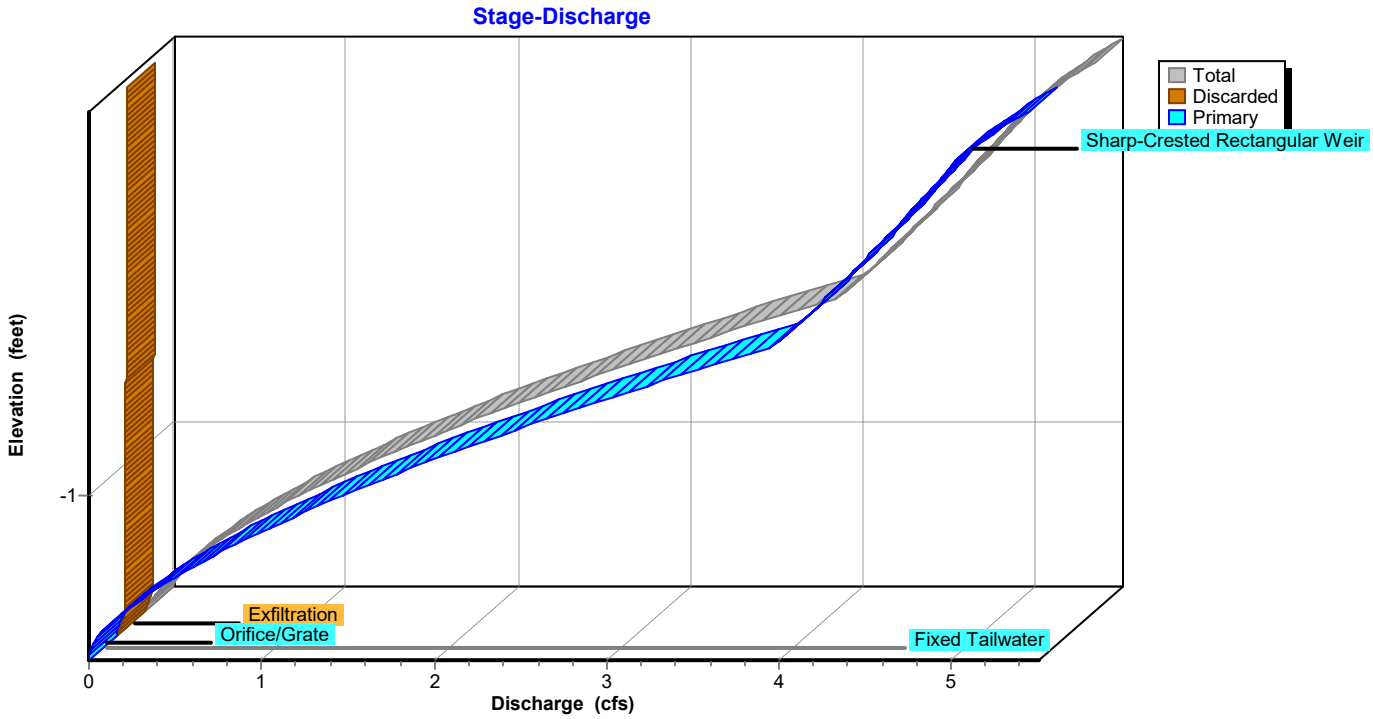
Discarded OutFlow Max=0.05 cfs @ 0.18 hrs HW=-1.11' (Free Discharge)
└**3=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.69 cfs @ 0.18 hrs HW=-1.11' TW=-1.30' (Fixed TW Elev= -1.30')
├**1=Orifice/Grate** (Weir Controls 0.69 cfs @ 1.37 fps)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

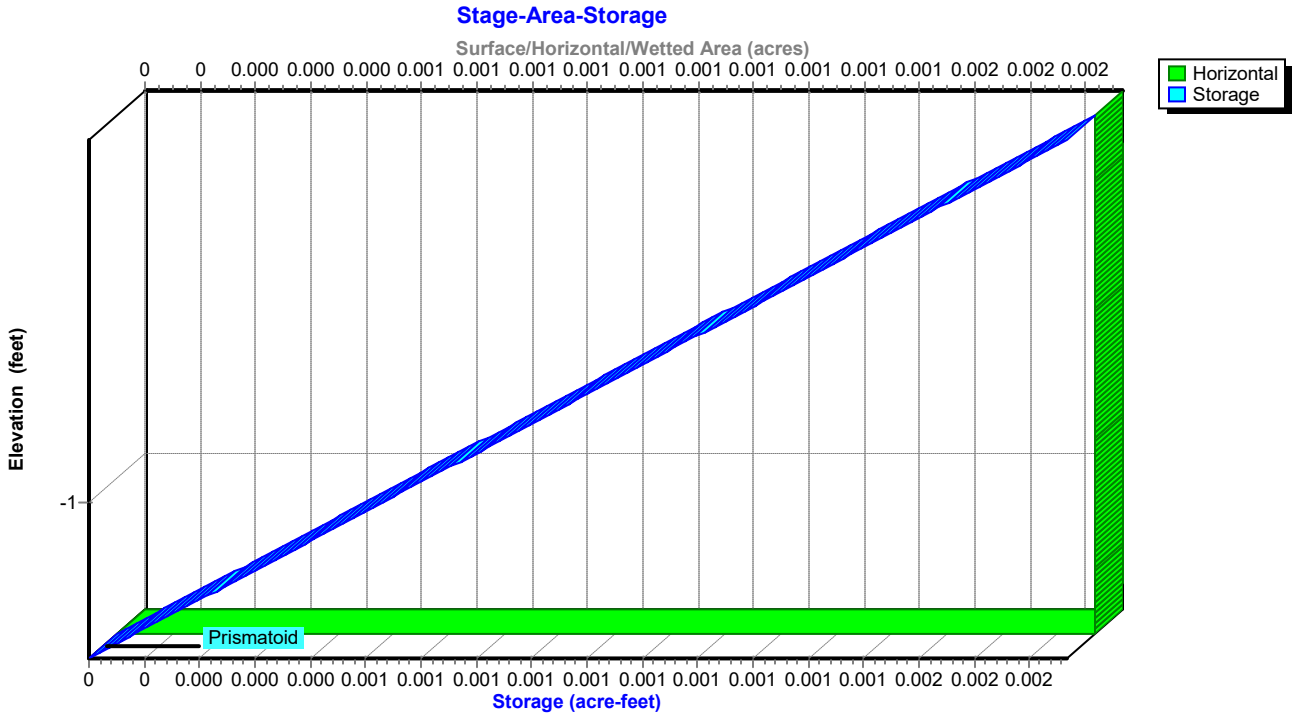
Pond 5P: grass roof detention



Pond 5P: grass roof detention



Pond 5P: grass roof detention



Hydrograph for Pond 5P: grass roof detention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	-1.30	0.00	0.00	0.00
0.05	0.21	0.000	-1.23	0.18	0.05	0.14
0.10	0.44	0.000	-1.17	0.42	0.05	0.37
0.15	**0.66**	**0.000**	**-1.13**	**0.64**	**0.05**	**0.59**
0.20	**0.74**	**0.000**	**-1.11**	**0.74**	**0.05**	**0.69**
0.25	0.74	0.000	-1.11	0.74	0.05	0.69
0.30	0.74	0.000	-1.11	0.74	0.05	0.69
0.35	0.74	0.000	-1.11	0.74	0.05	0.69
0.40	0.74	0.000	-1.11	0.74	0.05	0.69
0.45	0.74	0.000	-1.11	0.74	0.05	0.69
0.50	0.74	0.000	-1.11	0.74	0.05	0.69
0.55	0.74	0.000	-1.11	0.74	0.05	0.69
0.60	0.74	0.000	-1.11	0.74	0.05	0.69
0.65	0.74	0.000	-1.11	0.74	0.05	0.69
0.70	0.74	0.000	-1.11	0.74	0.05	0.69
0.75	0.74	0.000	-1.11	0.74	0.05	0.69
0.80	0.74	0.000	-1.11	0.74	0.05	0.69
0.85	0.74	0.000	-1.11	0.74	0.05	0.69
0.90	0.74	0.000	-1.11	0.74	0.05	0.69
0.95	0.74	0.000	-1.11	0.74	0.05	0.69
1.00	0.74	0.000	-1.11	0.74	0.05	0.69
1.05	0.53	0.000	-1.15	0.54	0.05	0.50
1.10	0.30	0.000	-1.19	0.33	0.05	0.28
1.15	0.09	0.000	-1.25	0.12	0.05	0.07
1.20	0.00	0.000	-1.30	0.00	0.00	0.00
1.25	0.00	0.000	-1.30	0.00	0.00	0.00
1.30	0.00	0.000	-1.30	0.00	0.00	0.00
1.35	0.00	0.000	-1.30	0.00	0.00	0.00
1.40	0.00	0.000	-1.30	0.00	0.00	0.00
1.45	0.00	0.000	-1.30	0.00	0.00	0.00
1.50	0.00	0.000	-1.30	0.00	0.00	0.00
1.55	0.00	0.000	-1.30	0.00	0.00	0.00
1.60	0.00	0.000	-1.30	0.00	0.00	0.00
1.65	0.00	0.000	-1.30	0.00	0.00	0.00
1.70	0.00	0.000	-1.30	0.00	0.00	0.00
1.75	0.00	0.000	-1.30	0.00	0.00	0.00
1.80	0.00	0.000	-1.30	0.00	0.00	0.00
1.85	0.00	0.000	-1.30	0.00	0.00	0.00
1.90	0.00	0.000	-1.30	0.00	0.00	0.00
1.95	0.00	0.000	-1.30	0.00	0.00	0.00
2.00	0.00	0.000	-1.30	0.00	0.00	0.00

Time span=0.00-2.00 hrs, dt=0.01 hrs, 201 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 5S: PROPOSED Roof Runoff Area=15,909 sf 100.00% Impervious Runoff Depth=2.35"
Flow Length=123' Slope=0.0015 '/' Tc=10.0 min C=0.98 Runoff=0.87 cfs 0.072 af

Reach 3R: PIPE Avg. Flow Depth=0.26' Max Vel=6.12 fps Inflow=0.87 cfs 0.072 af
10.0" Round Pipe n=0.010 L=45.0' S=0.0222 '/' Capacity=4.25 cfs Outflow=0.87 cfs 0.072 af

Reach 8R: (new Reach) Avg. Flow Depth=0.17' Max Vel=14.47 fps Inflow=0.82 cfs 0.067 af
6.0" Round Pipe n=0.010 L=56.0' S=0.2268 '/' Capacity=3.47 cfs Outflow=0.82 cfs 0.067 af

Pond 4P: (new Pond) Peak Elev=-0.66' Storage=0.036 af Inflow=0.82 cfs 0.067 af
Primary=0.27 cfs 0.036 af Secondary=0.54 cfs 0.014 af Outflow=0.82 cfs 0.050 af

Pond 5P: grass roof detention Peak Elev=-1.09' Storage=0.000 af Inflow=0.87 cfs 0.072 af
Discarded=0.05 cfs 0.005 af Primary=0.82 cfs 0.067 af Outflow=0.87 cfs 0.072 af

Total Runoff Area = 0.365 ac Runoff Volume = 0.072 af Average Runoff Depth = 2.35"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.365 ac

Summary for Subcatchment 5S: PROPOSED Roof RUNOFF

Exsiting Drainage area that picks up the PROPOSED runoff
WITH A 10 YEAR STORAGE CRITERA

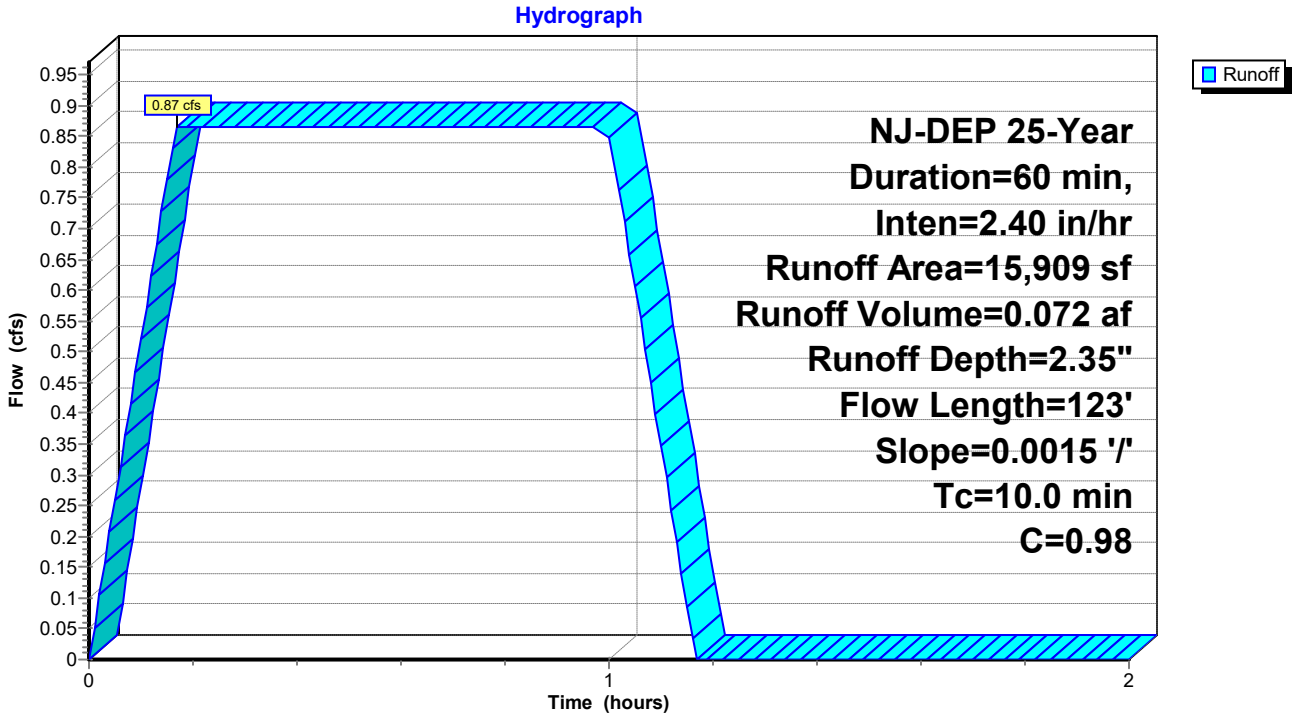
Runoff = 0.87 cfs @ 0.17 hrs, Volume= 0.072 af, Depth= 2.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
NJ-DEP 25-Year Duration=60 min, Inten=2.40 in/hr

Area (sf)	C	Description
15,909	0.98	roof
15,909		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	123	0.0015	0.21		**Shallow Concentrated Flow, SHEETFLOW** Kv= 5.3 fps

Subcatchment 5S: PROPOSED Roof RUNOFF



Hydrograph for Subcatchment 5S: PROPOSED Roof RUNOFF

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	0.52	0.87	1.04	0.66	1.56	0.00
0.01	0.05	0.53	0.87	1.05	0.61	1.57	0.00
0.02	0.10	0.54	0.87	1.06	0.55	1.58	0.00
0.03	0.16	0.55	0.87	1.07	0.50	1.59	0.00
0.04	0.21	0.56	0.87	1.08	0.45	1.60	0.00
0.05	0.26	0.57	0.87	1.09	0.40	1.61	0.00
0.06	0.31	0.58	0.87	1.10	0.35	1.62	0.00
0.07	0.36	0.59	0.87	1.11	0.29	1.63	0.00
0.08	0.42	0.60	0.87	1.12	0.24	1.64	0.00
0.09	0.47	0.61	0.87	1.13	0.19	1.65	0.00
0.10	0.52	0.62	0.87	1.14	0.14	1.66	0.00
0.11	0.57	0.63	0.87	1.15	0.09	1.67	0.00
0.12	0.62	0.64	0.87	1.16	0.03	1.68	0.00
0.13	0.68	0.65	0.87	1.17	0.00	1.69	0.00
0.14	0.73	0.66	0.87	1.18	0.00	1.70	0.00
0.15	0.78	0.67	0.87	1.19	0.00	1.71	0.00
0.16	0.83	0.68	0.87	1.20	0.00	1.72	0.00
0.17	**0.87**	0.69	0.87	1.21	0.00	1.73	0.00
0.18	0.87	0.70	0.87	1.22	0.00	1.74	0.00
0.19	0.87	0.71	0.87	1.23	0.00	1.75	0.00
0.20	0.87	0.72	0.87	1.24	0.00	1.76	0.00
0.21	0.87	0.73	0.87	1.25	0.00	1.77	0.00
0.22	0.87	0.74	0.87	1.26	0.00	1.78	0.00
0.23	0.87	0.75	0.87	1.27	0.00	1.79	0.00
0.24	0.87	0.76	0.87	1.28	0.00	1.80	0.00
0.25	0.87	0.77	0.87	1.29	0.00	1.81	0.00
0.26	0.87	0.78	0.87	1.30	0.00	1.82	0.00
0.27	0.87	0.79	0.87	1.31	0.00	1.83	0.00
0.28	0.87	0.80	0.87	1.32	0.00	1.84	0.00
0.29	0.87	0.81	0.87	1.33	0.00	1.85	0.00
0.30	0.87	0.82	0.87	1.34	0.00	1.86	0.00
0.31	0.87	0.83	0.87	1.35	0.00	1.87	0.00
0.32	0.87	0.84	0.87	1.36	0.00	1.88	0.00
0.33	0.87	0.85	0.87	1.37	0.00	1.89	0.00
0.34	0.87	0.86	0.87	1.38	0.00	1.90	0.00
0.35	0.87	0.87	0.87	1.39	0.00	1.91	0.00
0.36	0.87	0.88	0.87	1.40	0.00	1.92	0.00
0.37	0.87	0.89	0.87	1.41	0.00	1.93	0.00
0.38	0.87	0.90	0.87	1.42	0.00	1.94	0.00
0.39	0.87	0.91	0.87	1.43	0.00	1.95	0.00
0.40	0.87	0.92	0.87	1.44	0.00	1.96	0.00
0.41	0.87	0.93	0.87	1.45	0.00	1.97	0.00
0.42	0.87	0.94	0.87	1.46	0.00	1.98	0.00
0.43	0.87	0.95	0.87	1.47	0.00	1.99	0.00
0.44	0.87	0.96	0.87	1.48	0.00	2.00	0.00
0.45	0.87	0.97	0.87	1.49	0.00		
0.46	0.87	0.98	0.87	1.50	0.00		
0.47	0.87	0.99	0.87	1.51	0.00		
0.48	0.87	1.00	0.87	1.52	0.00		
0.49	0.87	1.01	0.81	1.53	0.00		
0.50	0.87	1.02	0.76	1.54	0.00		
0.51	0.87	1.03	0.71	1.55	0.00		

Summary for Reach 3R: PIPE

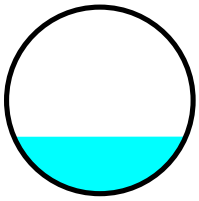
[52] Hint: Inlet/Outlet conditions not evaluated
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.35" for 25-Year event
Inflow = 0.87 cfs @ 0.17 hrs, Volume= 0.072 af
Outflow = 0.87 cfs @ 0.18 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.6 min

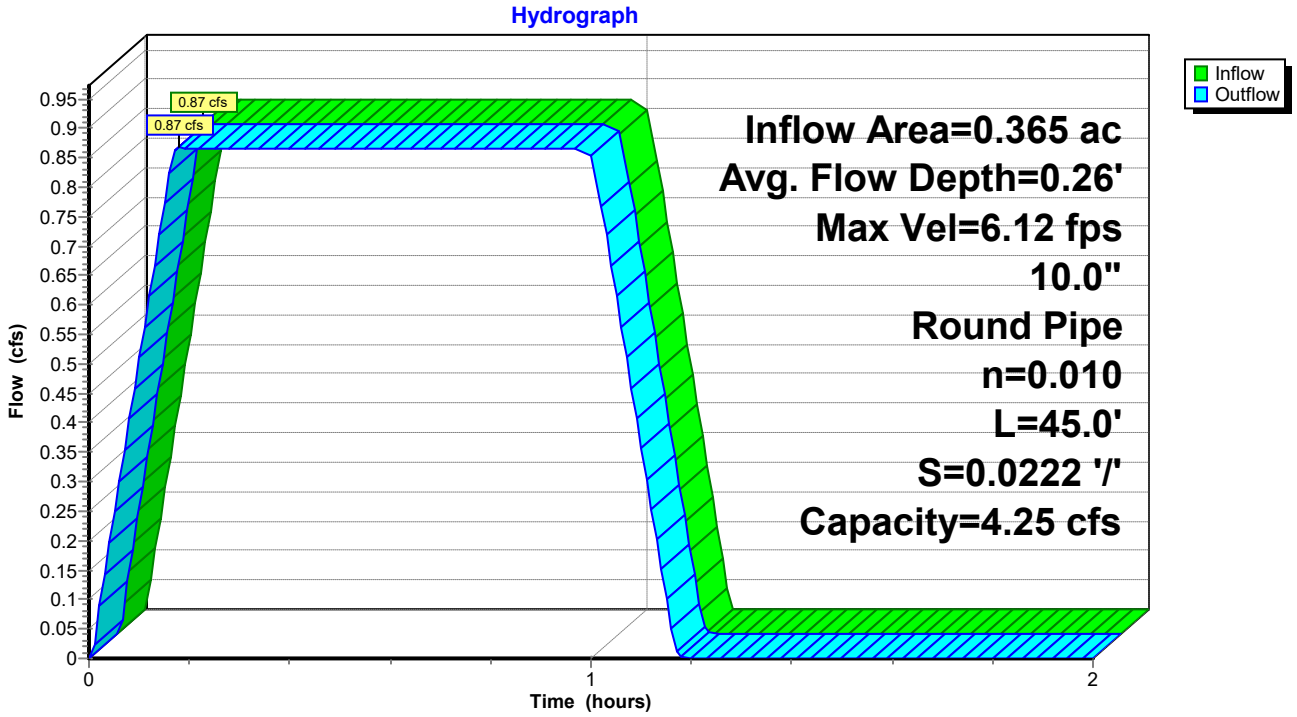
Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.12 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.50 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 0.18 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 4.25 cfs

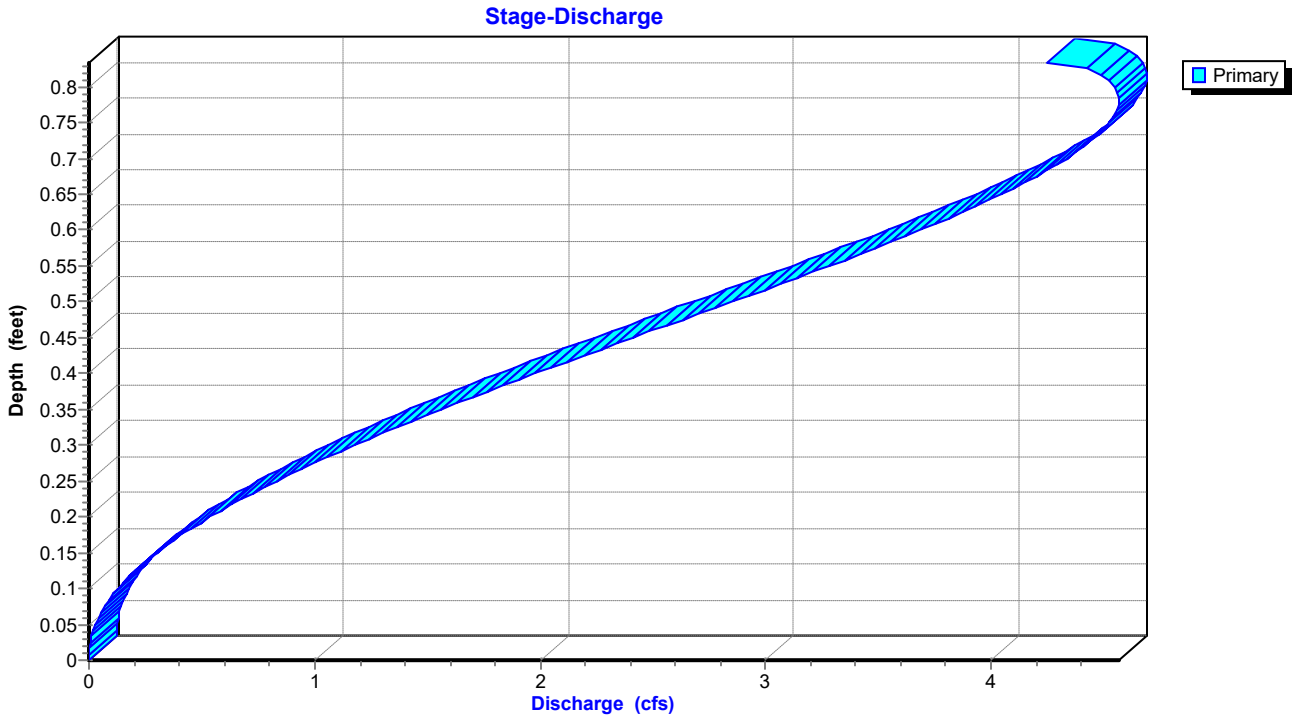
10.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 45.0' Slope= 0.0222 '/'
Inlet Invert= 0.88', Outlet Invert= -0.12'



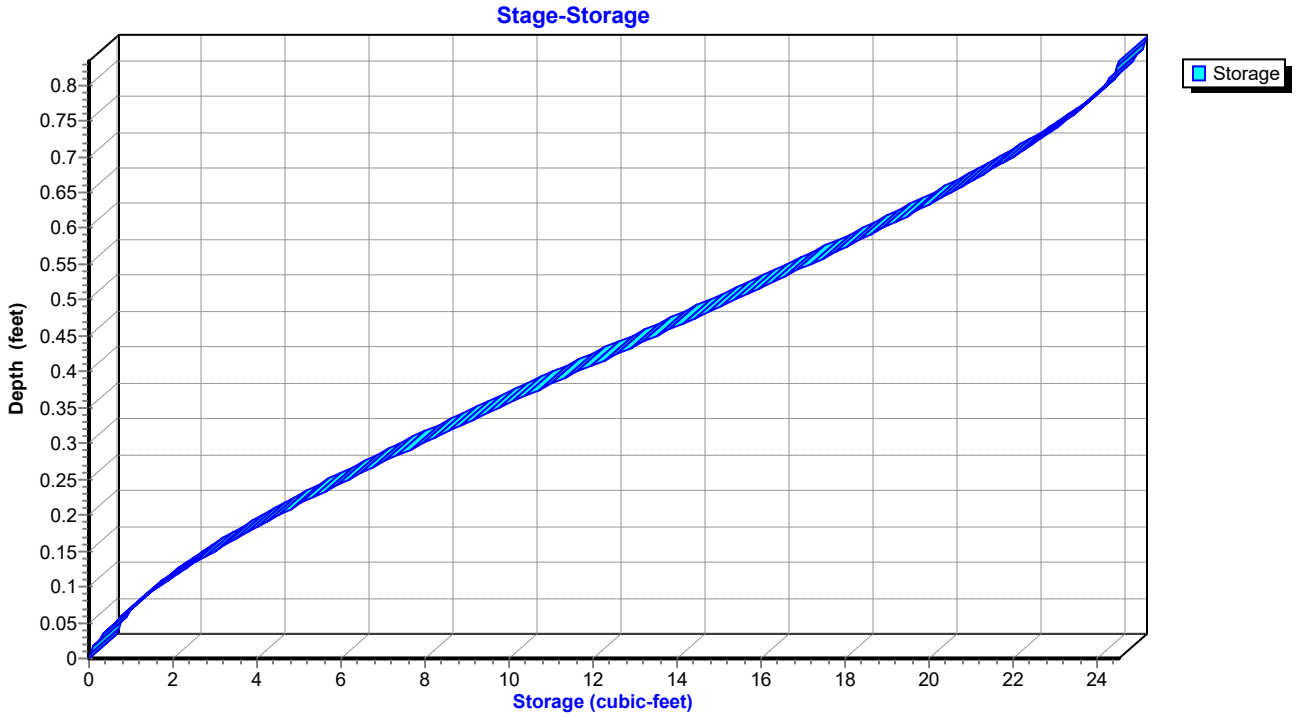
Reach 3R: PIPE



Reach 3R: PIPE



Reach 3R: PIPE



Hydrograph for Reach 3R: PIPE

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	0.88	0.00
0.05	0.26	3	1.02	0.25
0.10	0.52	4	1.08	0.51
0.15	**0.78**	**6**	**1.12**	**0.77**
0.20	**0.87**	**6**	**1.14**	**0.87**
0.25	0.87	6	1.14	0.87
0.30	0.87	6	1.14	0.87
0.35	0.87	6	1.14	0.87
0.40	0.87	6	1.14	0.87
0.45	0.87	6	1.14	0.87
0.50	0.87	6	1.14	0.87
0.55	0.87	6	1.14	0.87
0.60	0.87	6	1.14	0.87
0.65	0.87	6	1.14	0.87
0.70	0.87	6	1.14	0.87
0.75	0.87	6	1.14	0.87
0.80	0.87	6	1.14	0.87
0.85	0.87	6	1.14	0.87
0.90	0.87	6	1.14	0.87
0.95	0.87	6	1.14	0.87
1.00	0.87	6	1.14	0.87
1.05	0.61	5	1.09	0.61
1.10	0.35	3	1.04	0.36
1.15	0.09	1	0.97	0.10
1.20	0.00	0	0.88	0.00
1.25	0.00	0	0.88	0.00
1.30	0.00	0	0.88	0.00
1.35	0.00	0	0.88	0.00
1.40	0.00	0	0.88	0.00
1.45	0.00	0	0.88	0.00
1.50	0.00	0	0.88	0.00
1.55	0.00	0	0.88	0.00
1.60	0.00	0	0.88	0.00
1.65	0.00	0	0.88	0.00
1.70	0.00	0	0.88	0.00
1.75	0.00	0	0.88	0.00
1.80	0.00	0	0.88	0.00
1.85	0.00	0	0.88	0.00
1.90	0.00	0	0.88	0.00
1.95	0.00	0	0.88	0.00
2.00	0.00	0	0.88	0.00

Summary for Reach 8R: (new Reach)

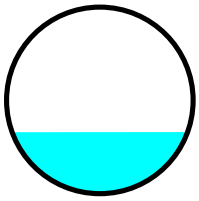
[52] Hint: Inlet/Outlet conditions not evaluated
[81] Warning: Exceeded Pond 5P by 13.30' @ 1.16 hrs

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.20" for 25-Year event
Inflow = 0.82 cfs @ 0.18 hrs, Volume= 0.067 af
Outflow = 0.82 cfs @ 0.18 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

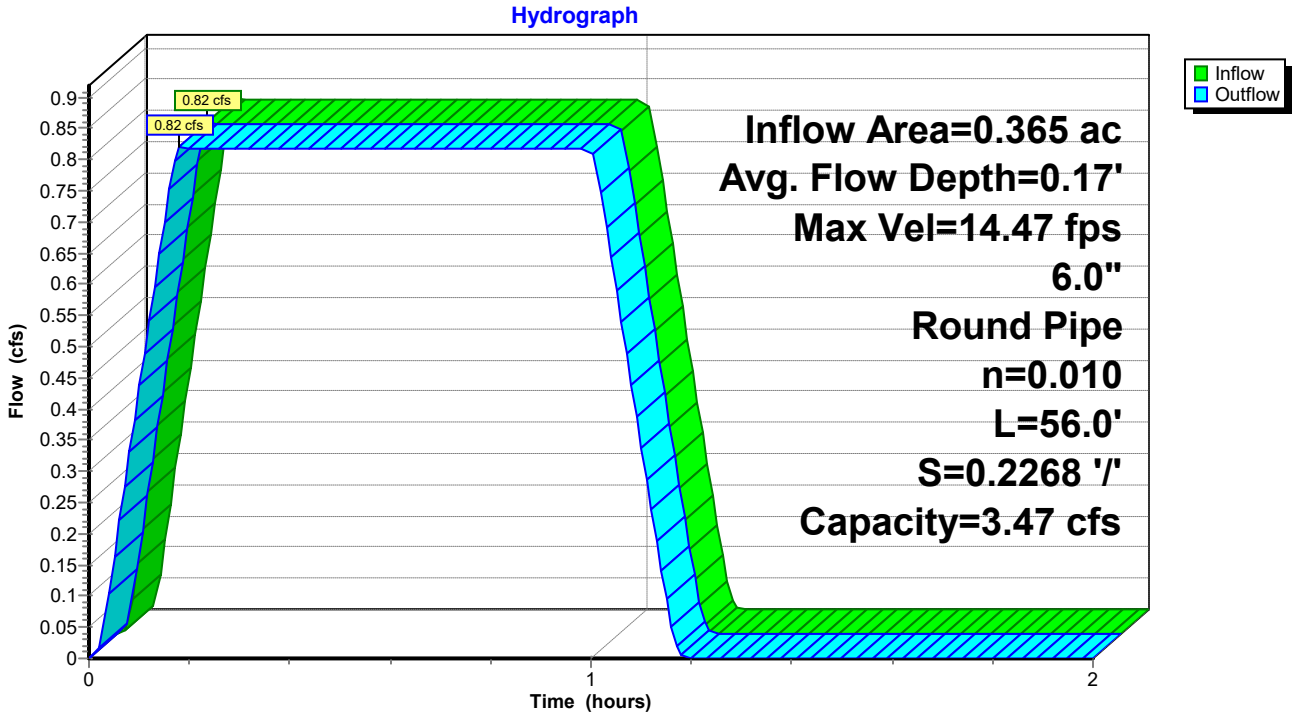
Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.47 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 13.20 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 0.18 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 3.47 cfs

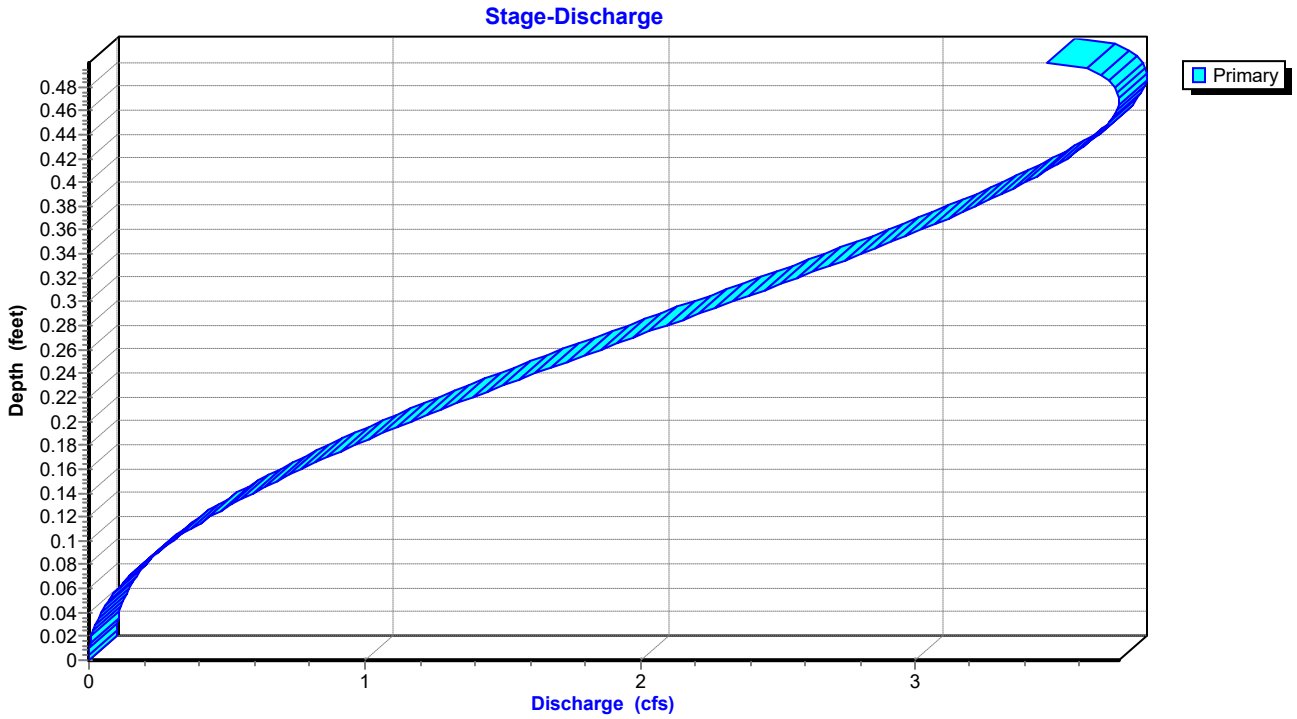
6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 56.0' Slope= 0.2268 '/'
Inlet Invert= 12.00', Outlet Invert= -0.70'



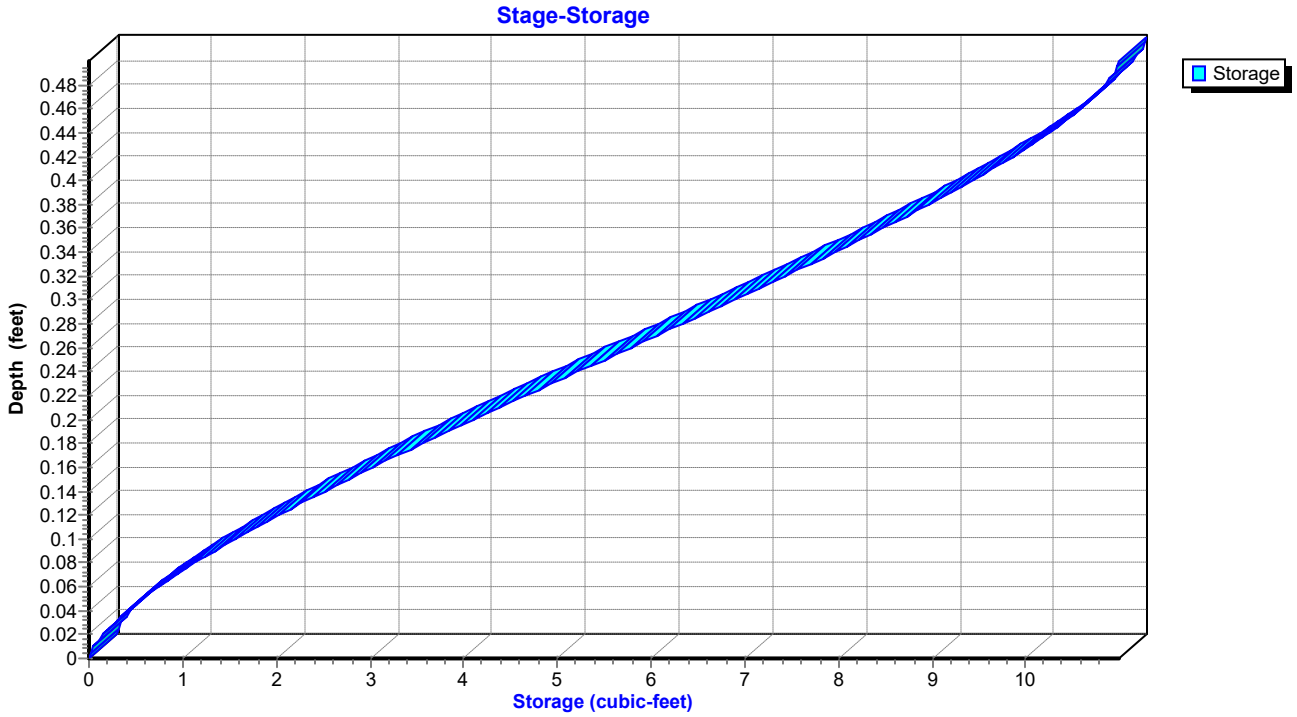
Reach 8R: (new Reach)



Reach 8R: (new Reach)



Reach 8R: (new Reach)



Hydrograph for Reach 8R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	12.00	0.00
0.05	0.17	1	12.07	0.16
0.10	0.44	2	12.12	0.44
0.15	**0.71**	**3**	**12.15**	**0.70**
0.20	**0.82**	**3**	**12.17**	**0.82**
0.25	0.82	3	12.17	0.82
0.30	0.82	3	12.17	0.82
0.35	0.82	3	12.17	0.82
0.40	0.82	3	12.17	0.82
0.45	0.82	3	12.17	0.82
0.50	0.82	3	12.17	0.82
0.55	0.82	3	12.17	0.82
0.60	0.82	3	12.17	0.82
0.65	0.82	3	12.17	0.82
0.70	0.82	3	12.17	0.82
0.75	0.82	3	12.17	0.82
0.80	0.82	3	12.17	0.82
0.85	0.82	3	12.17	0.82
0.90	0.82	3	12.17	0.82
0.95	0.82	3	12.17	0.82
1.00	0.82	3	12.17	0.82
1.05	0.59	3	12.14	0.59
1.10	0.33	2	12.11	0.34
1.15	0.09	1	12.06	0.09
1.20	0.00	0	12.00	0.00
1.25	0.00	0	12.00	0.00
1.30	0.00	0	12.00	0.00
1.35	0.00	0	12.00	0.00
1.40	0.00	0	12.00	0.00
1.45	0.00	0	12.00	0.00
1.50	0.00	0	12.00	0.00
1.55	0.00	0	12.00	0.00
1.60	0.00	0	12.00	0.00
1.65	0.00	0	12.00	0.00
1.70	0.00	0	12.00	0.00
1.75	0.00	0	12.00	0.00
1.80	0.00	0	12.00	0.00
1.85	0.00	0	12.00	0.00
1.90	0.00	0	12.00	0.00
1.95	0.00	0	12.00	0.00
2.00	0.00	0	12.00	0.00

Summary for Pond 4P: (new Pond)

[61] Hint: Exceeded Reach 8R outlet invert by 0.04' @ 1.00 hrs

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.20" for 25-Year event
Inflow = 0.82 cfs @ 0.18 hrs, Volume= 0.067 af
Outflow = 0.82 cfs @ 1.00 hrs, Volume= 0.050 af, Atten= 0%, Lag= 49.0 min
Primary = 0.27 cfs @ 1.00 hrs, Volume= 0.036 af
Secondary = 0.54 cfs @ 1.00 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -0.66' @ 1.00 hrs Surf.Area= 0.012 ac Storage= 0.036 af

Plug-Flow detention time= 35.1 min calculated for 0.050 af (74% of inflow)
Center-of-Mass det. time= 27.3 min (62.8 - 35.5)

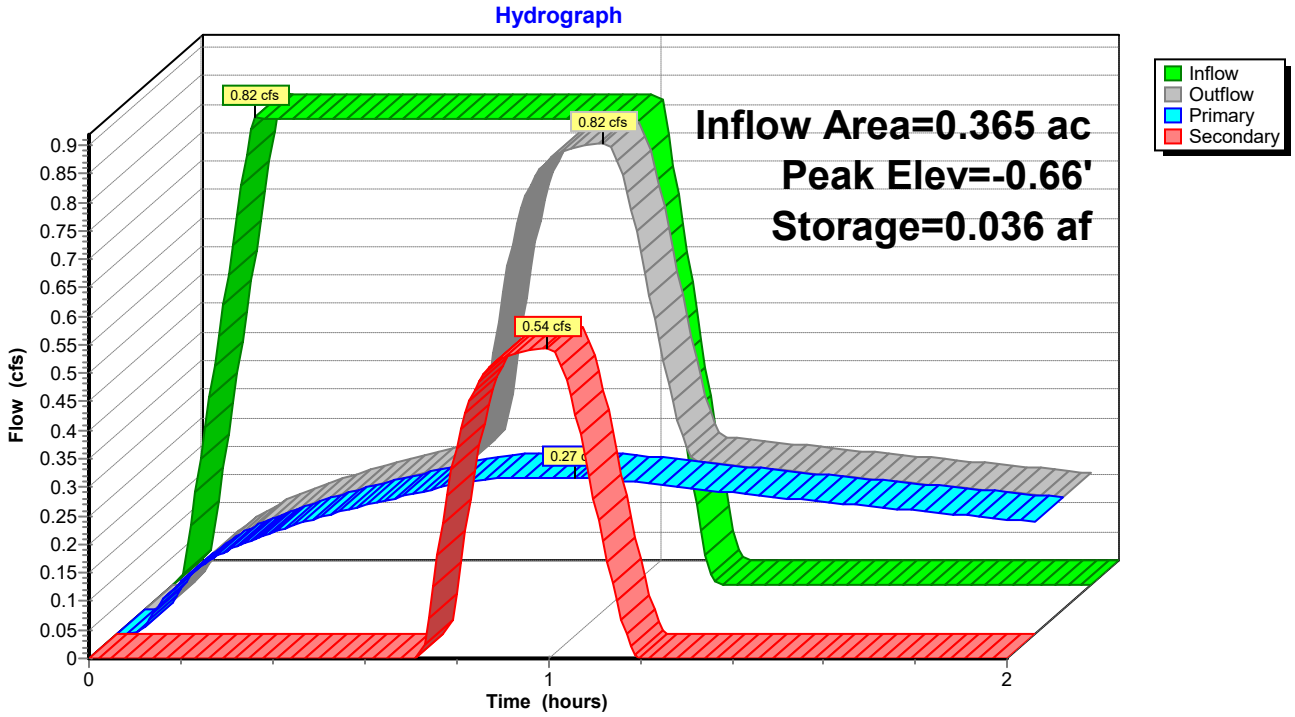
Volume	Invert	Avail.Storage	Storage Description
#1	-3.20'	0.039 af	**36.0" Round Pipe Storage** L= 243.0'

Device	Routing	Invert	Outlet Devices
#1	Secondary	-0.89'	**1.5' long Sharp-Crested Rectangular Weir** 1 End Contraction(s)
#2	Primary	-3.18'	**2.0" Vert. Orifice/Grate** C= 1.000

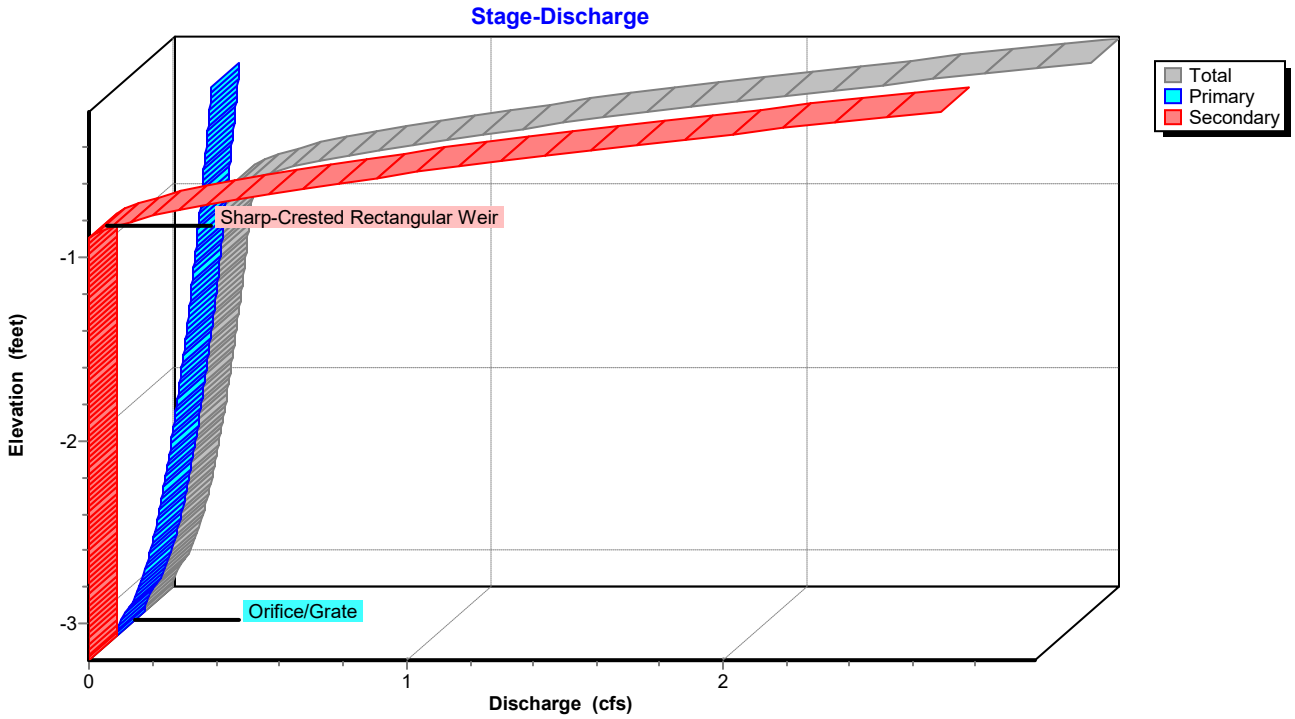
Primary OutFlow Max=0.27 cfs @ 1.00 hrs HW=-0.66' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 12.53 fps)

Secondary OutFlow Max=0.54 cfs @ 1.00 hrs HW=-0.66' (Free Discharge)
↑**1=Sharp-Crested Rectangular Weir** (Weir Controls 0.54 cfs @ 1.58 fps)

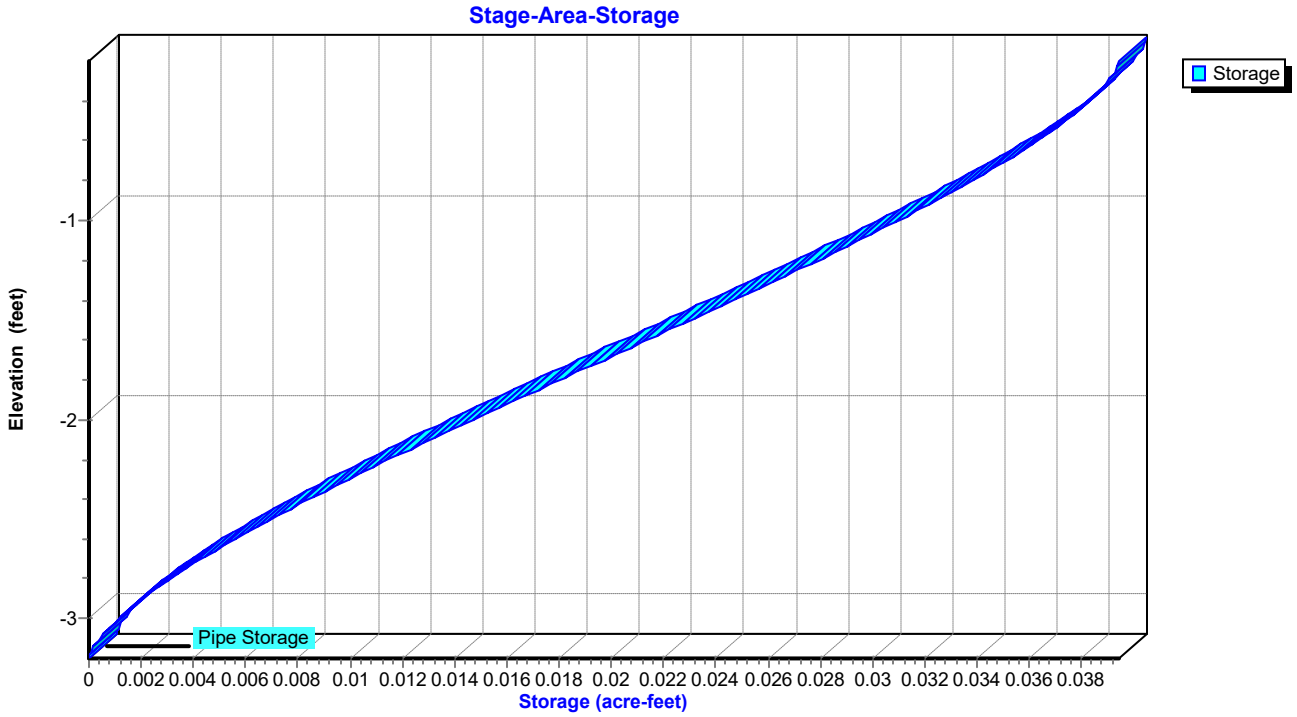
Pond 4P: (new Pond)



Pond 4P: (new Pond)



Pond 4P: (new Pond)



Hydrograph for Pond 4P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0.000	-3.20	0.00	0.00	0.00
0.05	0.16	0.000	-3.14	0.00	0.00	0.00
0.10	0.44	0.001	-2.98	0.06	0.06	0.00
0.15	**0.70**	0.003	-2.78	0.10	0.10	0.00
0.20	**0.82**	0.006	-2.56	0.13	0.13	0.00
0.25	0.82	0.009	-2.37	0.15	0.15	0.00
0.30	0.82	0.012	-2.19	0.17	0.17	0.00
0.35	0.82	0.014	-2.03	0.18	0.18	0.00
0.40	0.82	0.017	-1.87	0.19	0.19	0.00
0.45	0.82	0.019	-1.71	0.21	0.21	0.00
0.50	0.82	0.022	-1.56	0.22	0.22	0.00
0.55	0.82	0.024	-1.42	0.23	0.23	0.00
0.60	0.82	0.027	-1.27	0.24	0.24	0.00
0.65	0.82	0.029	-1.11	0.25	0.25	0.00
0.70	0.82	0.032	-0.96	0.26	0.26	0.00
0.75	0.82	0.034	-0.80	0.39	0.27	0.12
0.80	0.82	0.035	-0.71	0.64	0.27	0.37
0.85	0.82	0.035	-0.67	0.76	0.27	0.49
0.90	0.82	0.036	-0.66	0.80	0.27	0.53
0.95	0.82	0.036	-0.66	0.81	0.27	0.54
1.00	0.82	**0.036**	**-0.66**	**0.82**	**0.27**	**0.54**
1.05	0.59	0.035	-0.68	0.73	0.27	0.46
1.10	0.34	0.035	-0.74	0.55	0.27	0.28
1.15	0.09	0.034	-0.82	0.36	0.26	0.10
1.20	0.00	0.032	-0.90	0.26	0.26	0.00
1.25	0.00	0.031	-0.97	0.26	0.26	0.00
1.30	0.00	0.030	-1.04	0.25	0.25	0.00
1.35	0.00	0.029	-1.11	0.25	0.25	0.00
1.40	0.00	0.028	-1.17	0.24	0.24	0.00
1.45	0.00	0.027	-1.24	0.24	0.24	0.00
1.50	0.00	0.026	-1.30	0.23	0.23	0.00
1.55	0.00	0.025	-1.36	0.23	0.23	0.00
1.60	0.00	0.024	-1.42	0.23	0.23	0.00
1.65	0.00	0.024	-1.47	0.22	0.22	0.00
1.70	0.00	0.023	-1.53	0.22	0.22	0.00
1.75	0.00	0.022	-1.58	0.22	0.22	0.00
1.80	0.00	0.021	-1.63	0.21	0.21	0.00
1.85	0.00	0.020	-1.69	0.21	0.21	0.00
1.90	0.00	0.019	-1.74	0.20	0.20	0.00
1.95	0.00	0.018	-1.79	0.20	0.20	0.00
2.00	0.00	0.017	-1.84	0.20	0.20	0.00

Summary for Pond 5P: grass roof detention

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.35" for 25-Year event
Inflow = 0.87 cfs @ 0.18 hrs, Volume= 0.072 af
Outflow = 0.87 cfs @ 0.18 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.05 cfs @ 0.18 hrs, Volume= 0.005 af
Primary = 0.82 cfs @ 0.18 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -1.09' @ 0.18 hrs Surf.Area= 0.002 ac Storage= 0.000 af

Plug-Flow detention time= 0.3 min calculated for 0.072 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (35.4 - 35.1)

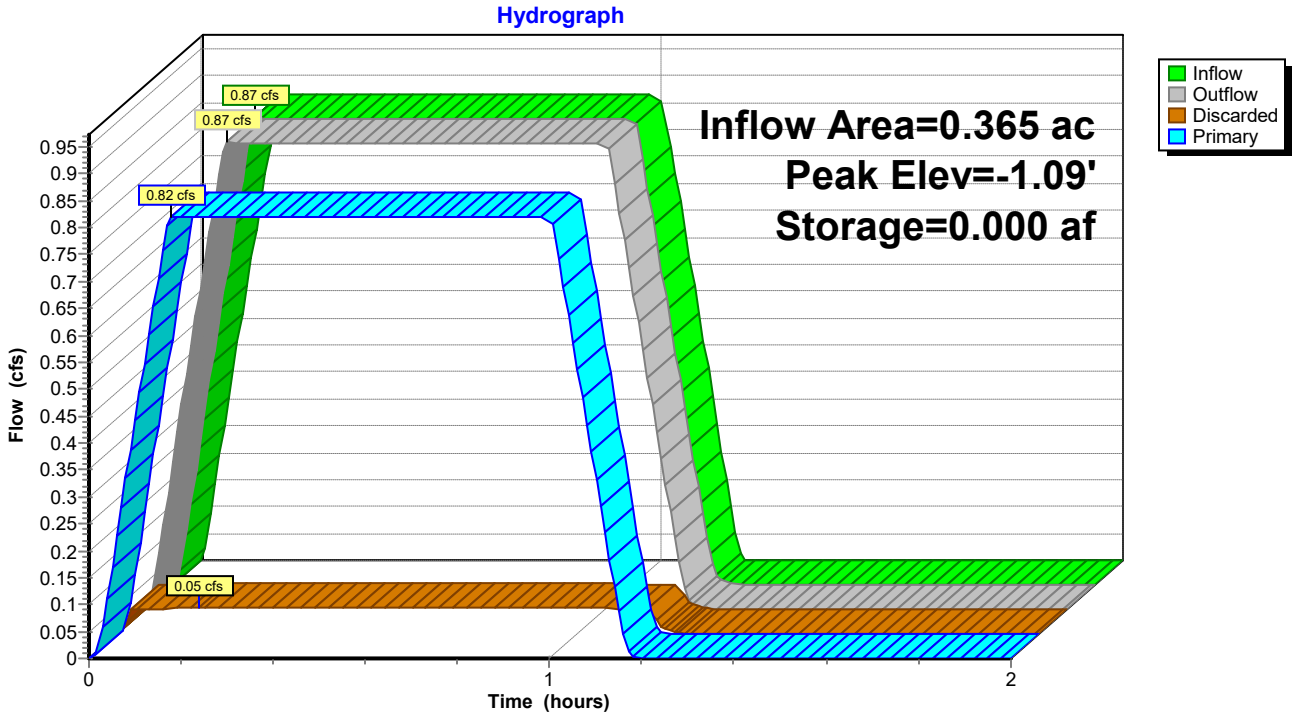
Volume	Invert	Avail.Storage	Storage Description
#1	-1.30'	0.002 af	**7.00'W x 11.00'L x 1.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.29'	**11.0" Horiz. Orifice/Grate** C= 1.000 Limited to weir flow at low heads
#2	Primary	-0.39'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	-1.30'	**25.000 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = -4.00' Phase-In= 0.04'

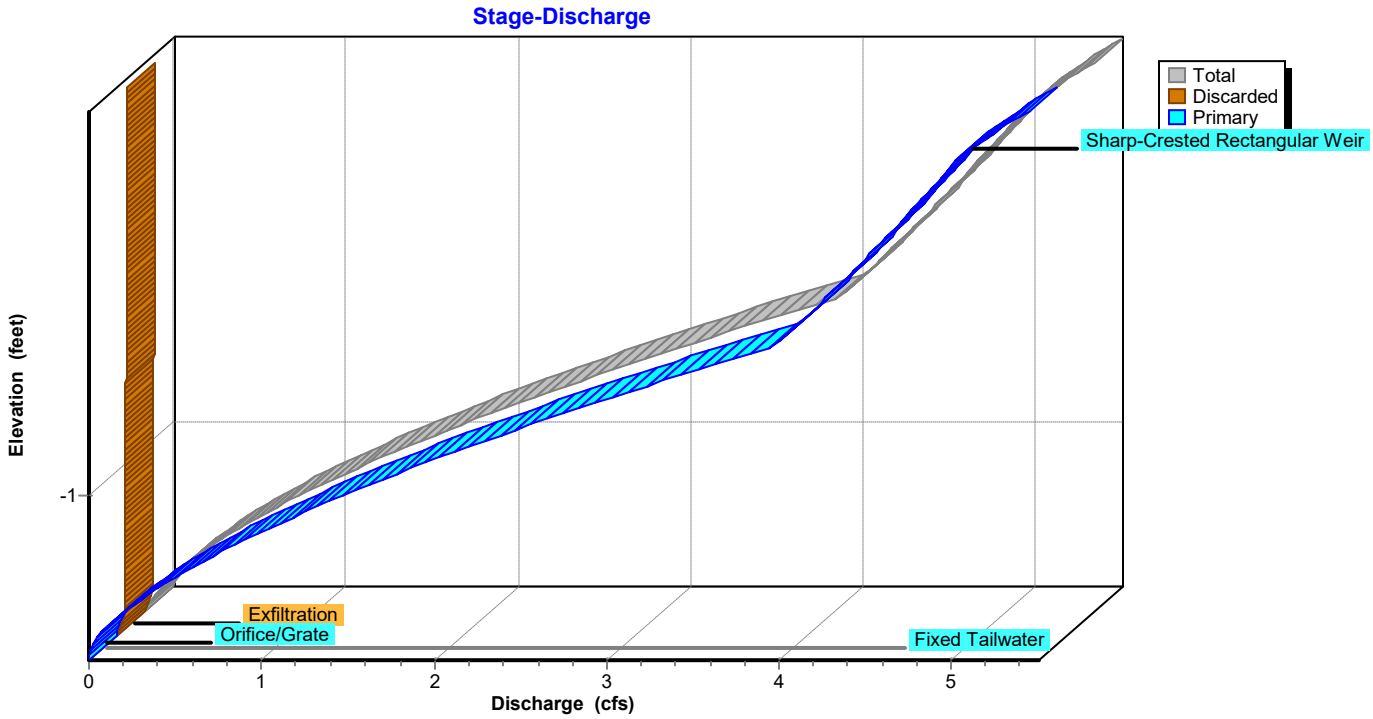
Discarded OutFlow Max=0.05 cfs @ 0.18 hrs HW=-1.09' (Free Discharge)
└**3=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.82 cfs @ 0.18 hrs HW=-1.09' TW=-1.30' (Fixed TW Elev= -1.30')
├**1=Orifice/Grate** (Weir Controls 0.82 cfs @ 1.45 fps)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

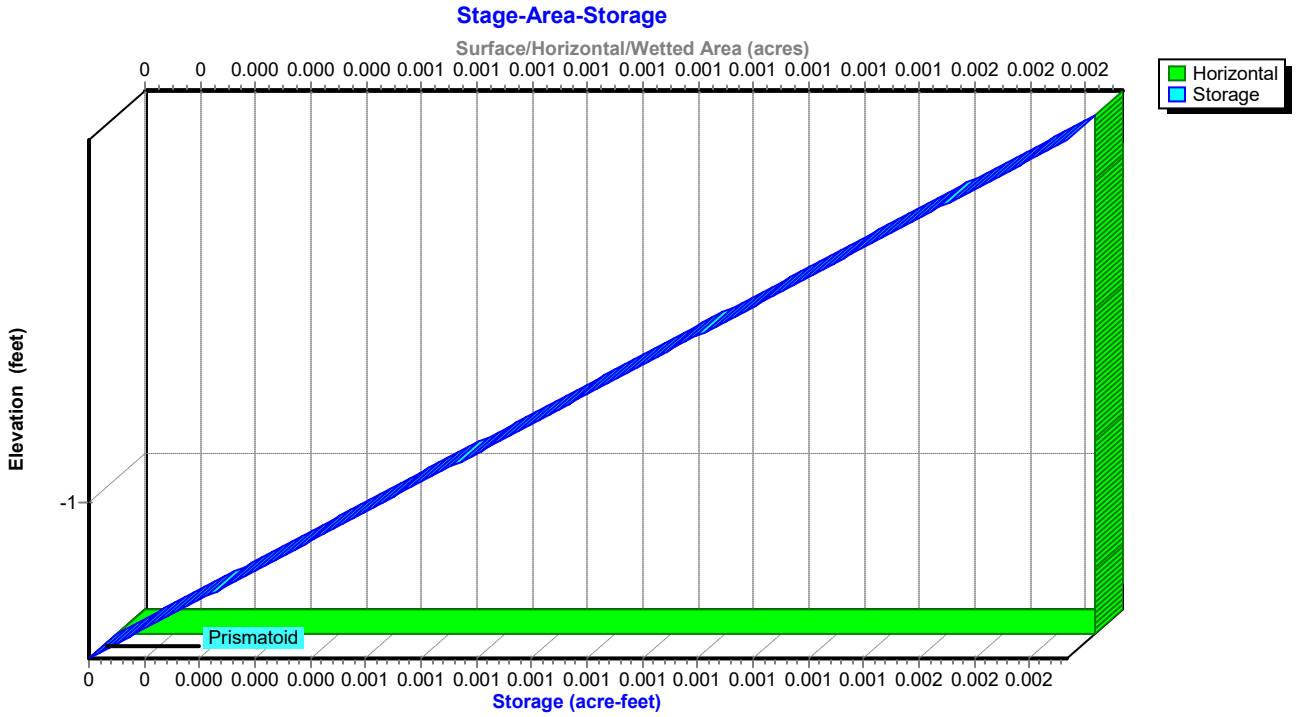
Pond 5P: grass roof detention



Pond 5P: grass roof detention



Pond 5P: grass roof detention



Hydrograph for Pond 5P: grass roof detention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	-1.30	0.00	0.00	0.00
0.05	0.25	0.000	-1.22	0.22	0.05	0.17
0.10	0.51	0.000	-1.16	0.49	0.05	0.44
0.15	**0.77**	**0.000**	**-1.11**	**0.75**	**0.05**	**0.71**
0.20	**0.87**	**0.000**	**-1.09**	**0.87**	**0.05**	**0.82**
0.25	0.87	0.000	-1.09	0.87	0.05	0.82
0.30	0.87	0.000	-1.09	0.87	0.05	0.82
0.35	0.87	0.000	-1.09	0.87	0.05	0.82
0.40	0.87	0.000	-1.09	0.87	0.05	0.82
0.45	0.87	0.000	-1.09	0.87	0.05	0.82
0.50	0.87	0.000	-1.09	0.87	0.05	0.82
0.55	0.87	0.000	-1.09	0.87	0.05	0.82
0.60	0.87	0.000	-1.09	0.87	0.05	0.82
0.65	0.87	0.000	-1.09	0.87	0.05	0.82
0.70	0.87	0.000	-1.09	0.87	0.05	0.82
0.75	0.87	0.000	-1.09	0.87	0.05	0.82
0.80	0.87	0.000	-1.09	0.87	0.05	0.82
0.85	0.87	0.000	-1.09	0.87	0.05	0.82
0.90	0.87	0.000	-1.09	0.87	0.05	0.82
0.95	0.87	0.000	-1.09	0.87	0.05	0.82
1.00	0.87	0.000	-1.09	0.87	0.05	0.82
1.05	0.61	0.000	-1.13	0.63	0.05	0.59
1.10	0.36	0.000	-1.18	0.38	0.05	0.33
1.15	0.10	0.000	-1.25	0.13	0.05	0.09
1.20	0.00	0.000	-1.30	0.01	0.01	0.00
1.25	0.00	0.000	-1.30	0.00	0.00	0.00
1.30	0.00	0.000	-1.30	0.00	0.00	0.00
1.35	0.00	0.000	-1.30	0.00	0.00	0.00
1.40	0.00	0.000	-1.30	0.00	0.00	0.00
1.45	0.00	0.000	-1.30	0.00	0.00	0.00
1.50	0.00	0.000	-1.30	0.00	0.00	0.00
1.55	0.00	0.000	-1.30	0.00	0.00	0.00
1.60	0.00	0.000	-1.30	0.00	0.00	0.00
1.65	0.00	0.000	-1.30	0.00	0.00	0.00
1.70	0.00	0.000	-1.30	0.00	0.00	0.00
1.75	0.00	0.000	-1.30	0.00	0.00	0.00
1.80	0.00	0.000	-1.30	0.00	0.00	0.00
1.85	0.00	0.000	-1.30	0.00	0.00	0.00
1.90	0.00	0.000	-1.30	0.00	0.00	0.00
1.95	0.00	0.000	-1.30	0.00	0.00	0.00
2.00	0.00	0.000	-1.30	0.00	0.00	0.00

Time span=0.00-2.00 hrs, dt=0.01 hrs, 201 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 5S: PROPOSED Roof Runoff Area=15,909 sf 100.00% Impervious Runoff Depth=2.89"
Flow Length=123' Slope=0.0015 '/' Tc=10.0 min C=0.98 Runoff=1.06 cfs 0.088 af

Reach 3R: PIPE Avg. Flow Depth=0.28' Max Vel=6.48 fps Inflow=1.06 cfs 0.088 af
10.0" Round Pipe n=0.010 L=45.0' S=0.0222 '/' Capacity=4.25 cfs Outflow=1.07 cfs 0.088 af

Reach 8R: (new Reach) Avg. Flow Depth=0.19' Max Vel=15.37 fps Inflow=1.02 cfs 0.083 af
6.0" Round Pipe n=0.010 L=56.0' S=0.2268 '/' Capacity=3.47 cfs Outflow=1.02 cfs 0.083 af

Pond 4P: (new Pond) Peak Elev=-0.60' Storage=0.036 af Inflow=1.02 cfs 0.083 af
Primary=0.28 cfs 0.037 af Secondary=0.74 cfs 0.029 af Outflow=1.02 cfs 0.066 af

Pond 5P: grass roof detention Peak Elev=-1.06' Storage=0.000 af Inflow=1.07 cfs 0.088 af
Discarded=0.05 cfs 0.005 af Primary=1.02 cfs 0.083 af Outflow=1.07 cfs 0.088 af

Total Runoff Area = 0.365 ac Runoff Volume = 0.088 af Average Runoff Depth = 2.89"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.365 ac

Summary for Subcatchment 5S: PROPOSED Roof RUNOFF

Exsiting Drainage area that picks up the PROPOSED runoff
WITH A 10 YEAR STORAGE CRITERA

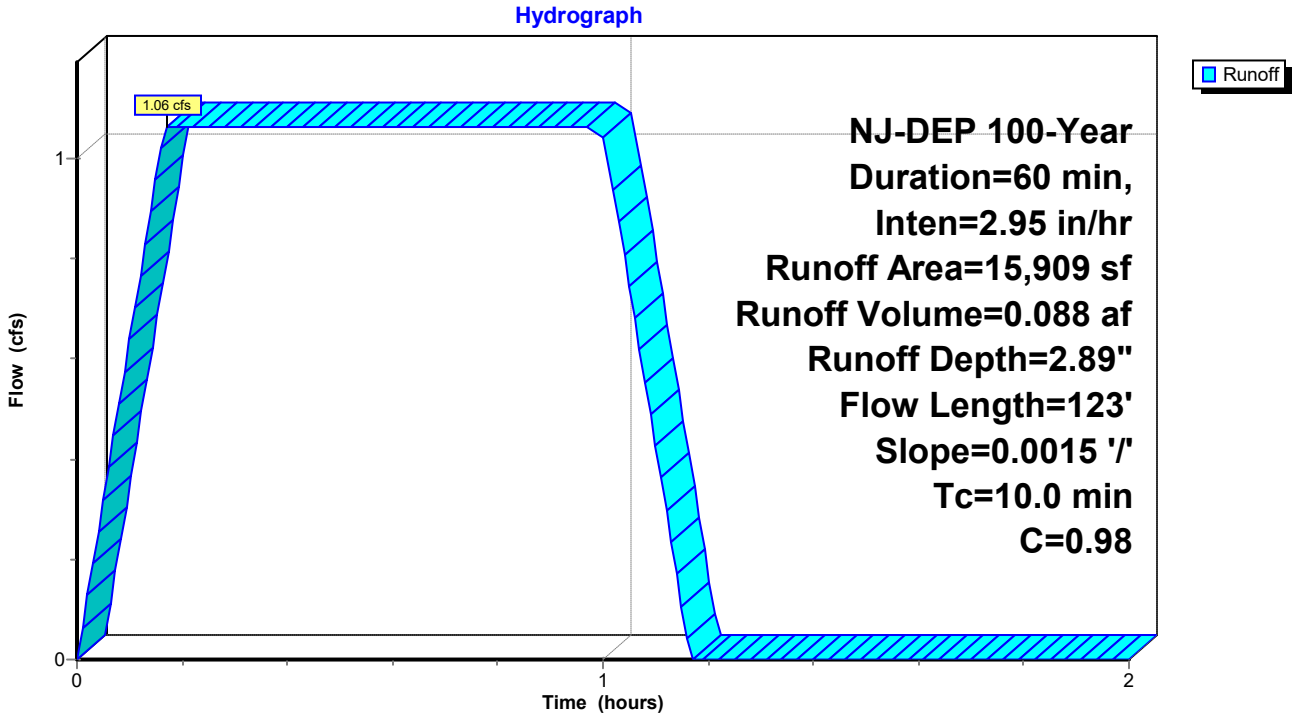
Runoff = 1.06 cfs @ 0.17 hrs, Volume= 0.088 af, Depth= 2.89"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
NJ-DEP 100-Year Duration=60 min, Inten=2.95 in/hr

Area (sf)	C	Description
15,909	0.98	roof
15,909		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	123	0.0015	0.21		**Shallow Concentrated Flow, SHEETFLOW** Kv= 5.3 fps

Subcatchment 5S: PROPOSED Roof RUNOFF



Hydrograph for Subcatchment 5S: PROPOSED Roof RUNOFF

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	0.52	1.06	1.04	0.81	1.56	0.00
0.01	0.06	0.53	1.06	1.05	0.75	1.57	0.00
0.02	0.13	0.54	1.06	1.06	0.68	1.58	0.00
0.03	0.19	0.55	1.06	1.07	0.62	1.59	0.00
0.04	0.26	0.56	1.06	1.08	0.55	1.60	0.00
0.05	0.32	0.57	1.06	1.09	0.49	1.61	0.00
0.06	0.38	0.58	1.06	1.10	0.43	1.62	0.00
0.07	0.45	0.59	1.06	1.11	0.36	1.63	0.00
0.08	0.51	0.60	1.06	1.12	0.30	1.64	0.00
0.09	0.57	0.61	1.06	1.13	0.23	1.65	0.00
0.10	0.64	0.62	1.06	1.14	0.17	1.66	0.00
0.11	0.70	0.63	1.06	1.15	0.11	1.67	0.00
0.12	0.77	0.64	1.06	1.16	0.04	1.68	0.00
0.13	0.83	0.65	1.06	1.17	0.00	1.69	0.00
0.14	0.89	0.66	1.06	1.18	0.00	1.70	0.00
0.15	0.96	0.67	1.06	1.19	0.00	1.71	0.00
0.16	1.02	0.68	1.06	1.20	0.00	1.72	0.00
0.17	**1.06**	0.69	1.06	1.21	0.00	1.73	0.00
0.18	1.06	0.70	1.06	1.22	0.00	1.74	0.00
0.19	1.06	0.71	1.06	1.23	0.00	1.75	0.00
0.20	1.06	0.72	1.06	1.24	0.00	1.76	0.00
0.21	1.06	0.73	1.06	1.25	0.00	1.77	0.00
0.22	1.06	0.74	1.06	1.26	0.00	1.78	0.00
0.23	1.06	0.75	1.06	1.27	0.00	1.79	0.00
0.24	1.06	0.76	1.06	1.28	0.00	1.80	0.00
0.25	1.06	0.77	1.06	1.29	0.00	1.81	0.00
0.26	1.06	0.78	1.06	1.30	0.00	1.82	0.00
0.27	1.06	0.79	1.06	1.31	0.00	1.83	0.00
0.28	1.06	0.80	1.06	1.32	0.00	1.84	0.00
0.29	1.06	0.81	1.06	1.33	0.00	1.85	0.00
0.30	1.06	0.82	1.06	1.34	0.00	1.86	0.00
0.31	1.06	0.83	1.06	1.35	0.00	1.87	0.00
0.32	1.06	0.84	1.06	1.36	0.00	1.88	0.00
0.33	1.06	0.85	1.06	1.37	0.00	1.89	0.00
0.34	1.06	0.86	1.06	1.38	0.00	1.90	0.00
0.35	1.06	0.87	1.06	1.39	0.00	1.91	0.00
0.36	1.06	0.88	1.06	1.40	0.00	1.92	0.00
0.37	1.06	0.89	1.06	1.41	0.00	1.93	0.00
0.38	1.06	0.90	1.06	1.42	0.00	1.94	0.00
0.39	1.06	0.91	1.06	1.43	0.00	1.95	0.00
0.40	1.06	0.92	1.06	1.44	0.00	1.96	0.00
0.41	1.06	0.93	1.06	1.45	0.00	1.97	0.00
0.42	1.06	0.94	1.06	1.46	0.00	1.98	0.00
0.43	1.06	0.95	1.06	1.47	0.00	1.99	0.00
0.44	1.06	0.96	1.06	1.48	0.00	2.00	0.00
0.45	1.06	0.97	1.06	1.49	0.00		
0.46	1.06	0.98	1.06	1.50	0.00		
0.47	1.06	0.99	1.06	1.51	0.00		
0.48	1.06	1.00	1.06	1.52	0.00		
0.49	1.06	1.01	1.00	1.53	0.00		
0.50	1.06	1.02	0.94	1.54	0.00		
0.51	1.06	1.03	0.87	1.55	0.00		

Summary for Reach 3R: PIPE

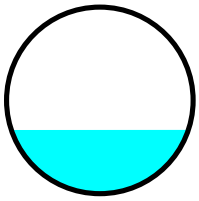
[52] Hint: Inlet/Outlet conditions not evaluated
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.89" for 100-Year event
Inflow = 1.06 cfs @ 0.17 hrs, Volume= 0.088 af
Outflow = 1.07 cfs @ 0.18 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.6 min

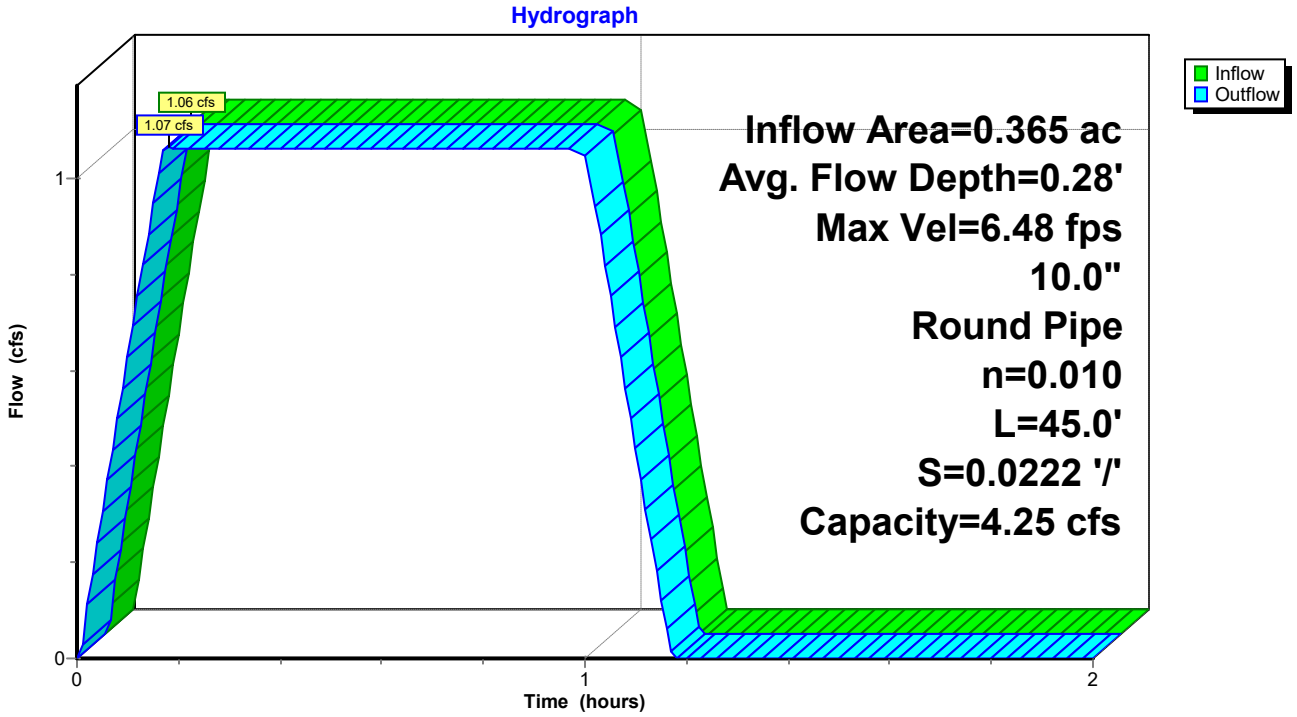
Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.48 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.83 fps, Avg. Travel Time= 0.1 min

Peak Storage= 7 cf @ 0.18 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 4.25 cfs

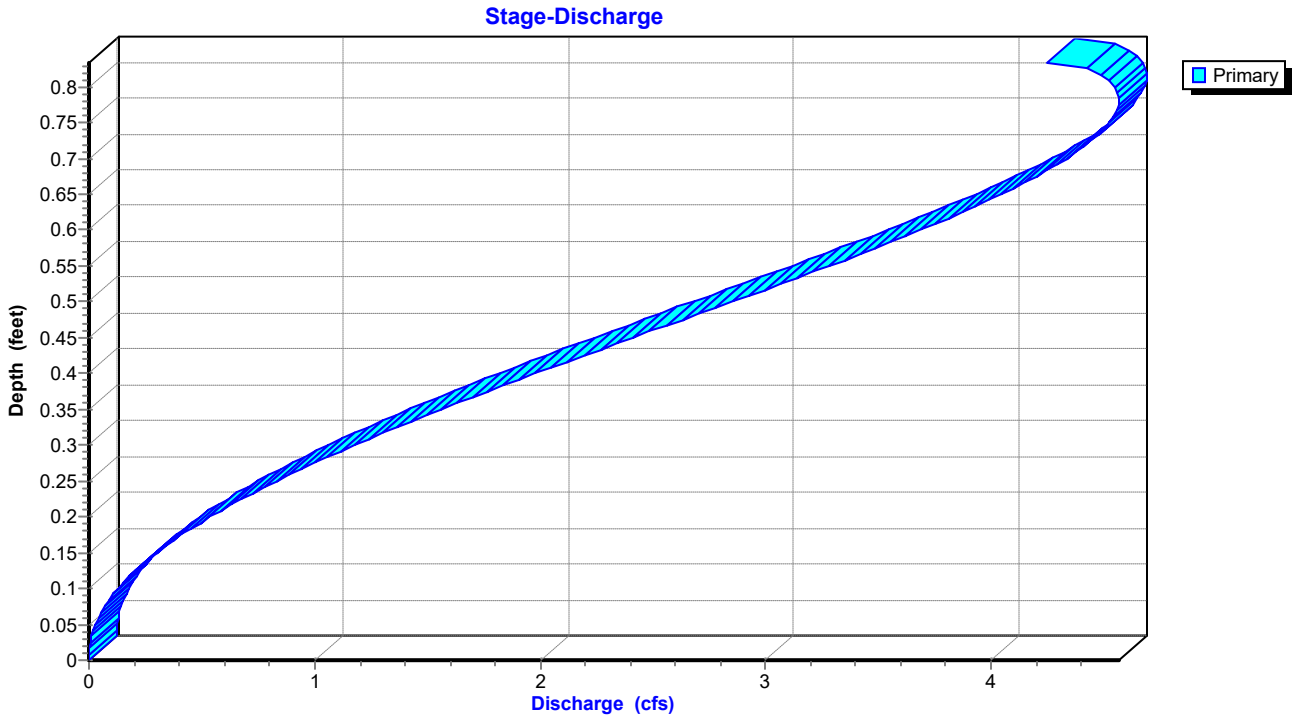
10.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 45.0' Slope= 0.0222 '/'
Inlet Invert= 0.88', Outlet Invert= -0.12'



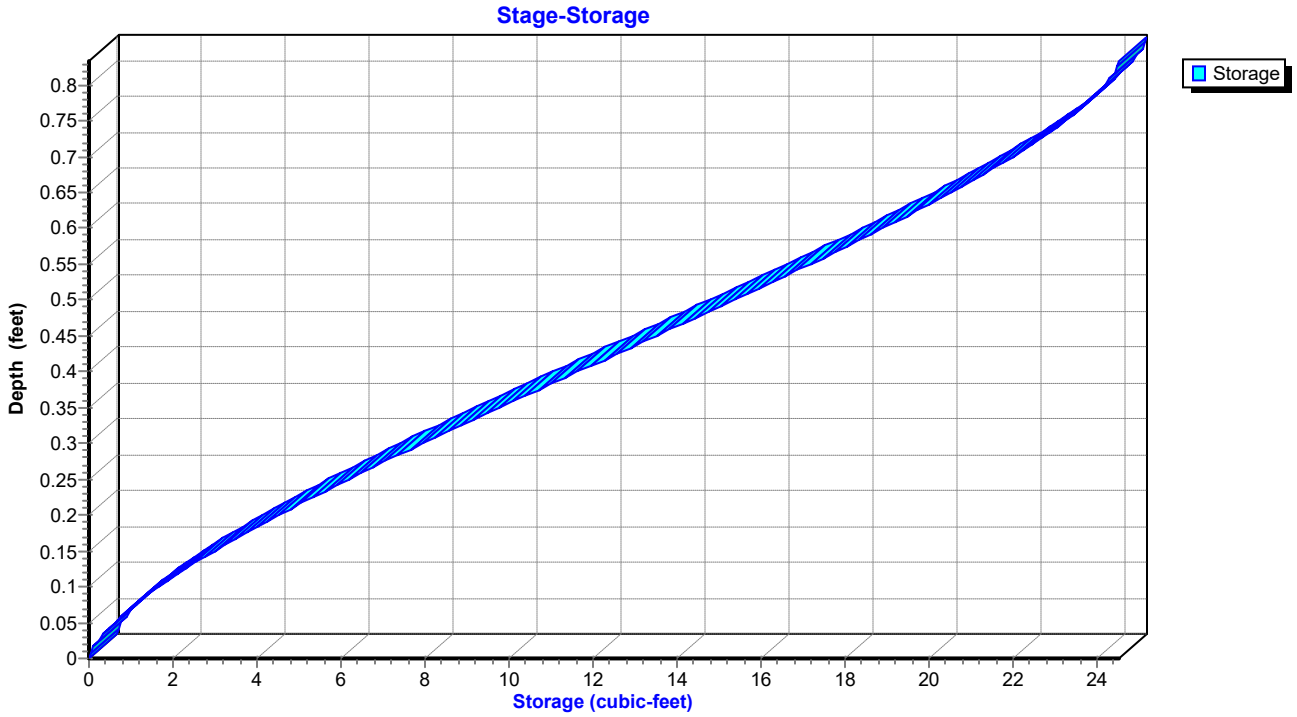
Reach 3R: PIPE



Reach 3R: PIPE



Reach 3R: PIPE



Hydrograph for Reach 3R: PIPE

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	0.88	0.00
0.05	0.32	3	1.03	0.31
0.10	0.64	5	1.10	0.63
0.15	**0.96**	**7**	**1.15**	**0.95**
0.20	**1.06**	**7**	**1.16**	**1.07**
0.25	1.06	7	1.16	1.06
0.30	1.06	7	1.16	1.06
0.35	1.06	7	1.16	1.06
0.40	1.06	7	1.16	1.06
0.45	1.06	7	1.16	1.06
0.50	1.06	7	1.16	1.06
0.55	1.06	7	1.16	1.06
0.60	1.06	7	1.16	1.06
0.65	1.06	7	1.16	1.06
0.70	1.06	7	1.16	1.06
0.75	1.06	7	1.16	1.06
0.80	1.06	7	1.16	1.06
0.85	1.06	7	1.16	1.06
0.90	1.06	7	1.16	1.06
0.95	1.06	7	1.16	1.06
1.00	1.06	7	1.16	1.06
1.05	0.75	6	1.12	0.76
1.10	0.43	4	1.06	0.44
1.15	0.11	2	0.98	0.12
1.20	0.00	0	0.88	0.00
1.25	0.00	0	0.88	0.00
1.30	0.00	0	0.88	0.00
1.35	0.00	0	0.88	0.00
1.40	0.00	0	0.88	0.00
1.45	0.00	0	0.88	0.00
1.50	0.00	0	0.88	0.00
1.55	0.00	0	0.88	0.00
1.60	0.00	0	0.88	0.00
1.65	0.00	0	0.88	0.00
1.70	0.00	0	0.88	0.00
1.75	0.00	0	0.88	0.00
1.80	0.00	0	0.88	0.00
1.85	0.00	0	0.88	0.00
1.90	0.00	0	0.88	0.00
1.95	0.00	0	0.88	0.00
2.00	0.00	0	0.88	0.00

Summary for Reach 8R: (new Reach)

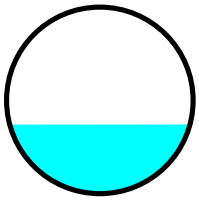
[52] Hint: Inlet/Outlet conditions not evaluated
[81] Warning: Exceeded Pond 5P by 13.30' @ 1.17 hrs

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.74" for 100-Year event
Inflow = 1.02 cfs @ 0.18 hrs, Volume= 0.083 af
Outflow = 1.02 cfs @ 0.18 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

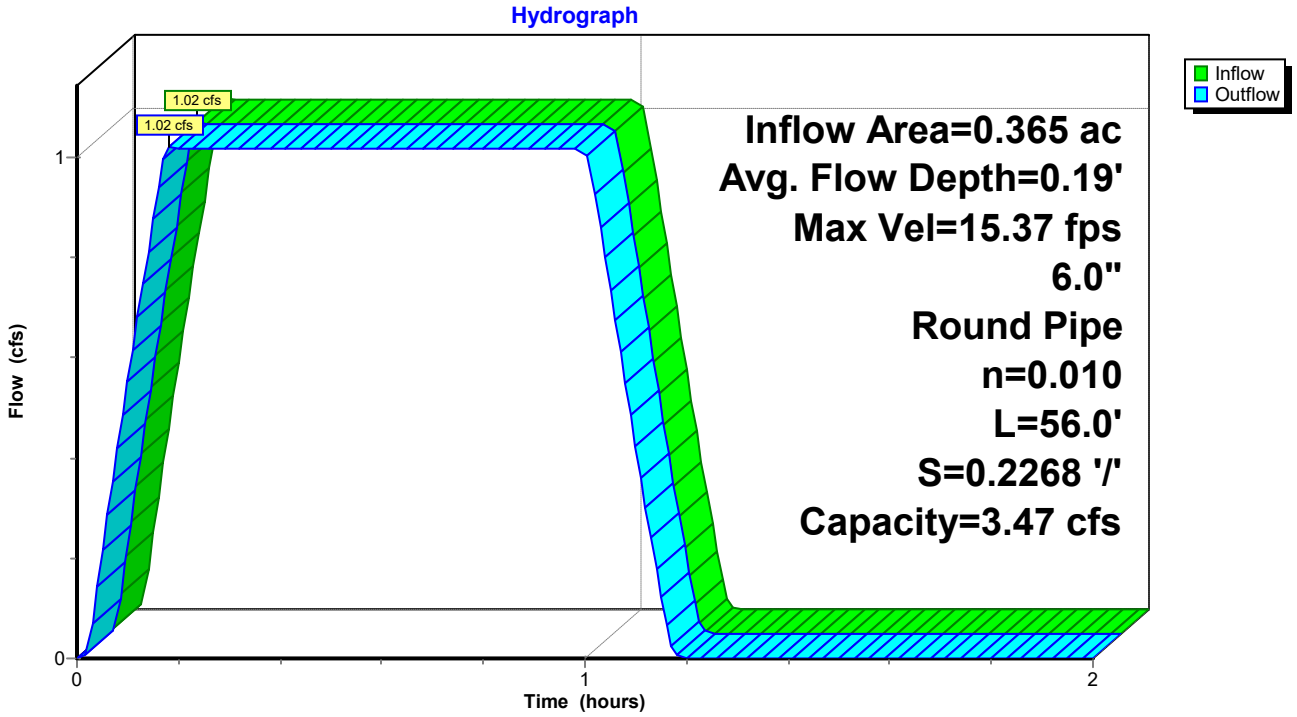
Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Max. Velocity= 15.37 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 14.05 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 0.18 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 3.47 cfs

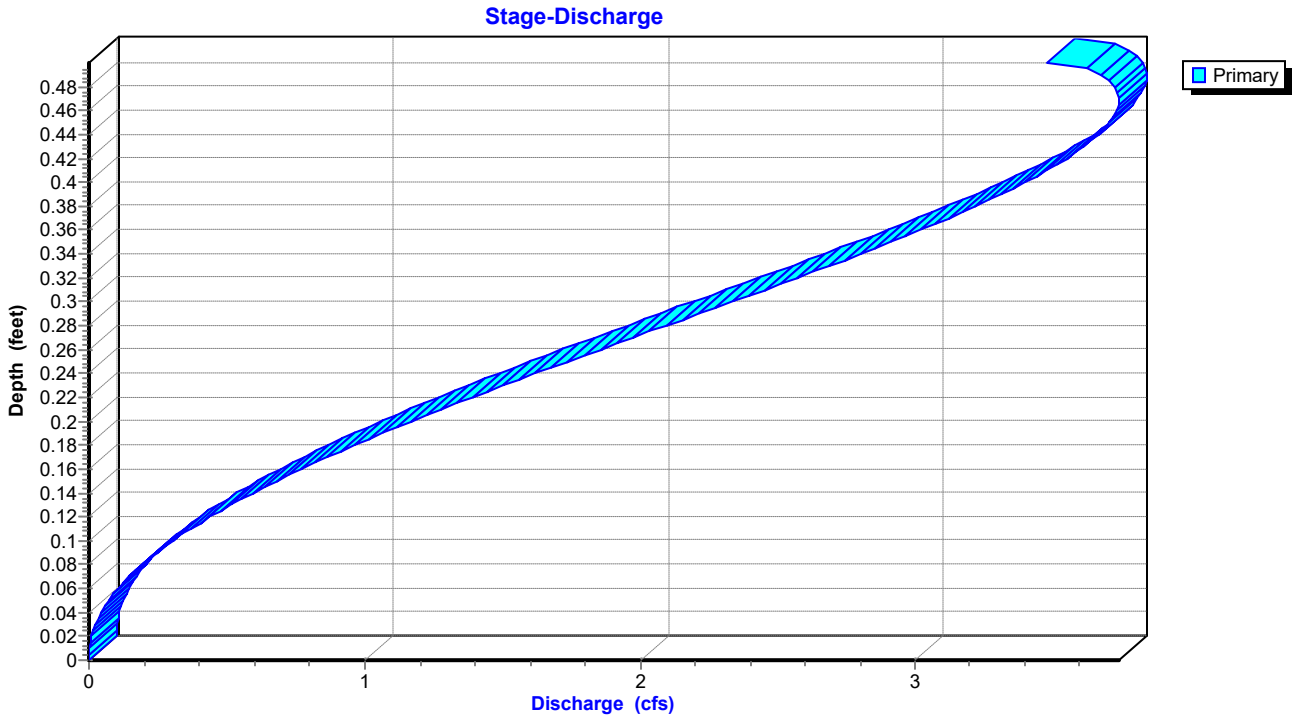
6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 56.0' Slope= 0.2268 '/'
Inlet Invert= 12.00', Outlet Invert= -0.70'



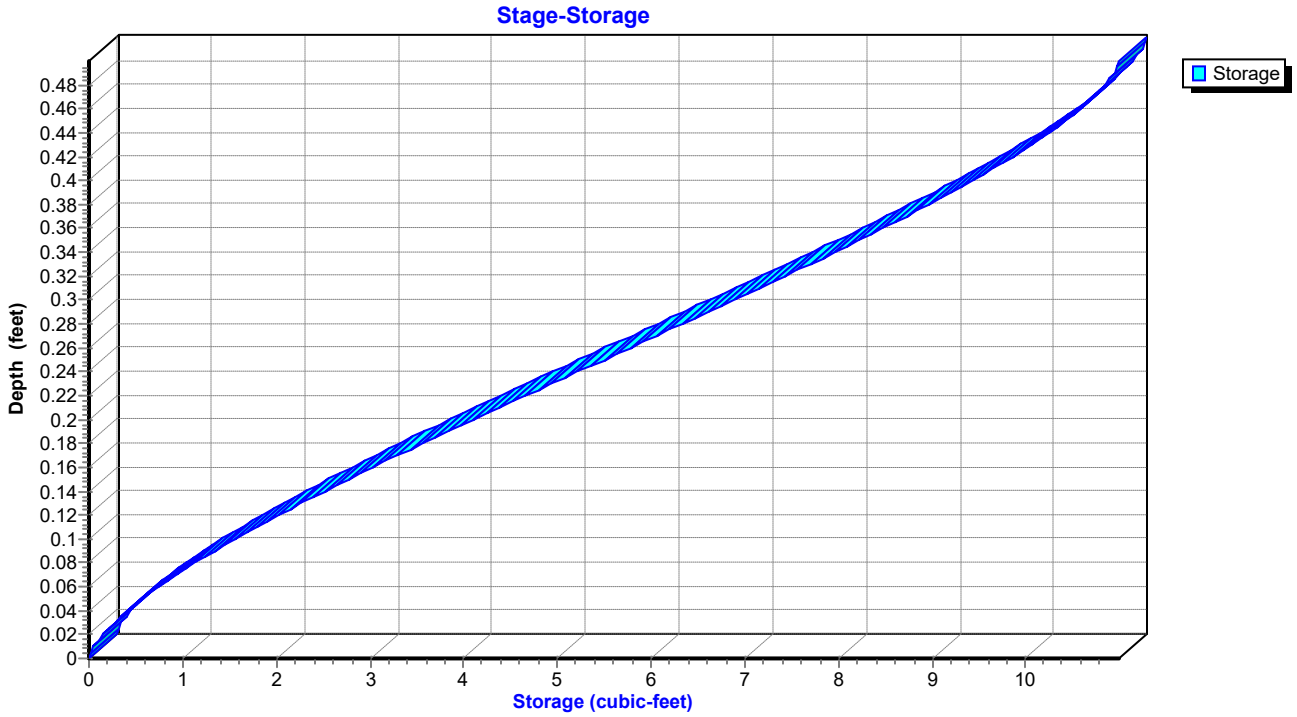
Reach 8R: (new Reach)



Reach 8R: (new Reach)



Reach 8R: (new Reach)



Hydrograph for Reach 8R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	12.00	0.00
0.05	0.22	1	12.08	0.22
0.10	0.56	2	12.13	0.55
0.15	**0.88**	**3**	**12.17**	**0.87**
0.20	**1.02**	**4**	**12.19**	**1.02**
0.25	1.02	4	12.19	1.02
0.30	1.02	4	12.19	1.02
0.35	1.02	4	12.19	1.02
0.40	1.02	4	12.19	1.02
0.45	1.02	4	12.19	1.02
0.50	1.02	4	12.19	1.02
0.55	1.02	4	12.19	1.02
0.60	1.02	4	12.19	1.02
0.65	1.02	4	12.19	1.02
0.70	1.02	4	12.19	1.02
0.75	1.02	4	12.19	1.02
0.80	1.02	4	12.19	1.02
0.85	1.02	4	12.19	1.02
0.90	1.02	4	12.19	1.02
0.95	1.02	4	12.19	1.02
1.00	1.02	4	12.19	1.02
1.05	0.73	3	12.16	0.73
1.10	0.42	2	12.12	0.42
1.15	0.11	1	12.06	0.12
1.20	0.00	0	12.00	0.00
1.25	0.00	0	12.00	0.00
1.30	0.00	0	12.00	0.00
1.35	0.00	0	12.00	0.00
1.40	0.00	0	12.00	0.00
1.45	0.00	0	12.00	0.00
1.50	0.00	0	12.00	0.00
1.55	0.00	0	12.00	0.00
1.60	0.00	0	12.00	0.00
1.65	0.00	0	12.00	0.00
1.70	0.00	0	12.00	0.00
1.75	0.00	0	12.00	0.00
1.80	0.00	0	12.00	0.00
1.85	0.00	0	12.00	0.00
1.90	0.00	0	12.00	0.00
1.95	0.00	0	12.00	0.00
2.00	0.00	0	12.00	0.00

Summary for Pond 4P: (new Pond)

[61] Hint: Exceeded Reach 8R outlet invert by 0.10' @ 1.00 hrs

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.74" for 100-Year event
Inflow = 1.02 cfs @ 0.18 hrs, Volume= 0.083 af
Outflow = 1.02 cfs @ 1.00 hrs, Volume= 0.066 af, Atten= 0%, Lag= 49.2 min
Primary = 0.28 cfs @ 1.00 hrs, Volume= 0.037 af
Secondary = 0.74 cfs @ 1.00 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -0.60' @ 1.00 hrs Surf.Area= 0.011 ac Storage= 0.036 af

Plug-Flow detention time= 29.5 min calculated for 0.066 af (79% of inflow)
Center-of-Mass det. time= 23.3 min (58.8 - 35.5)

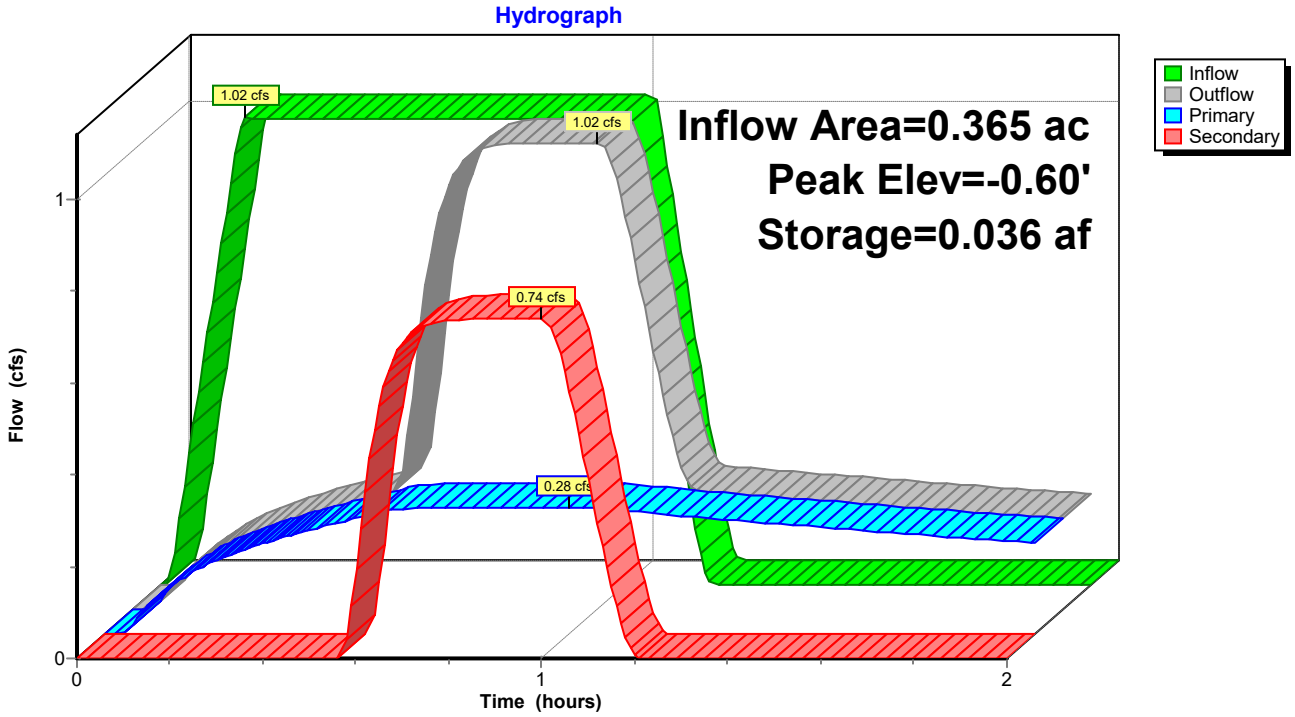
Volume	Invert	Avail.Storage	Storage Description
#1	-3.20'	0.039 af	**36.0" Round Pipe Storage** L= 243.0'

Device	Routing	Invert	Outlet Devices
#1	Secondary	-0.89'	**1.5' long Sharp-Crested Rectangular Weir** 1 End Contraction(s)
#2	Primary	-3.18'	**2.0" Vert. Orifice/Grate** C= 1.000

Primary OutFlow Max=0.28 cfs @ 1.00 hrs HW=-0.60' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 12.67 fps)

Secondary OutFlow Max=0.74 cfs @ 1.00 hrs HW=-0.60' (Free Discharge)
↑**1=Sharp-Crested Rectangular Weir** (Weir Controls 0.74 cfs @ 1.75 fps)

Pond 4P: (new Pond)



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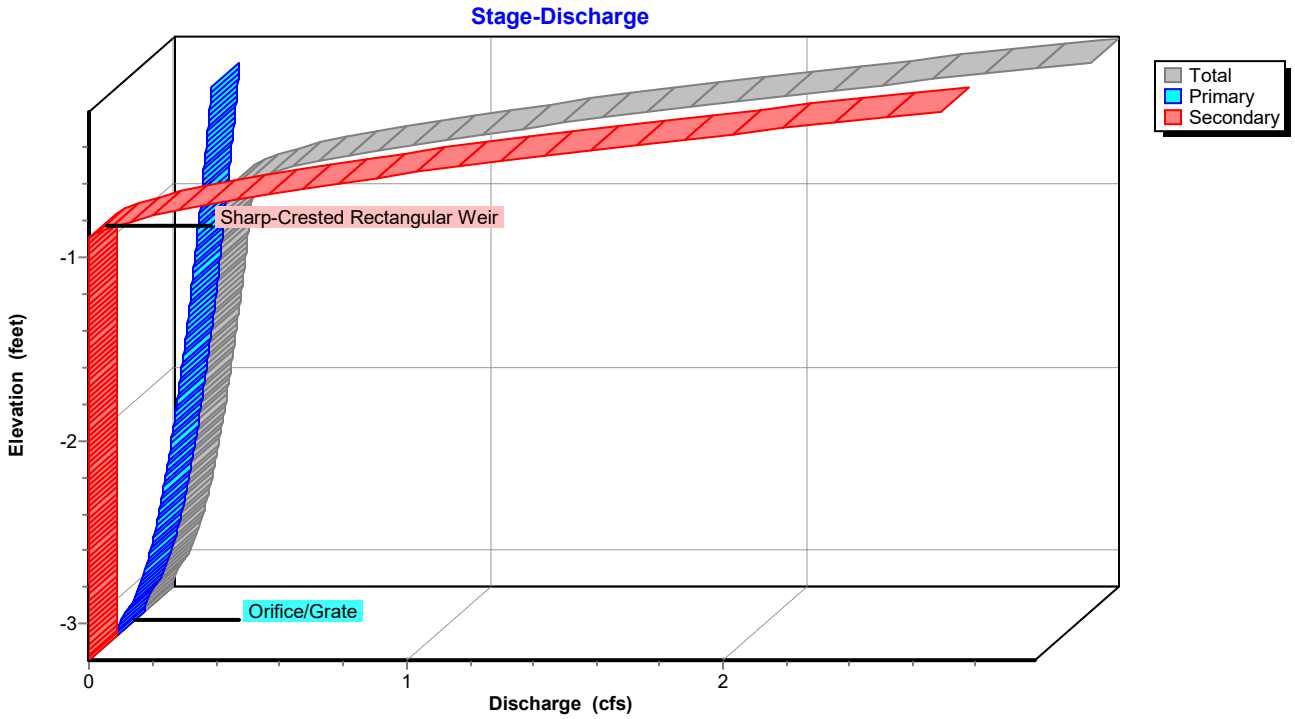
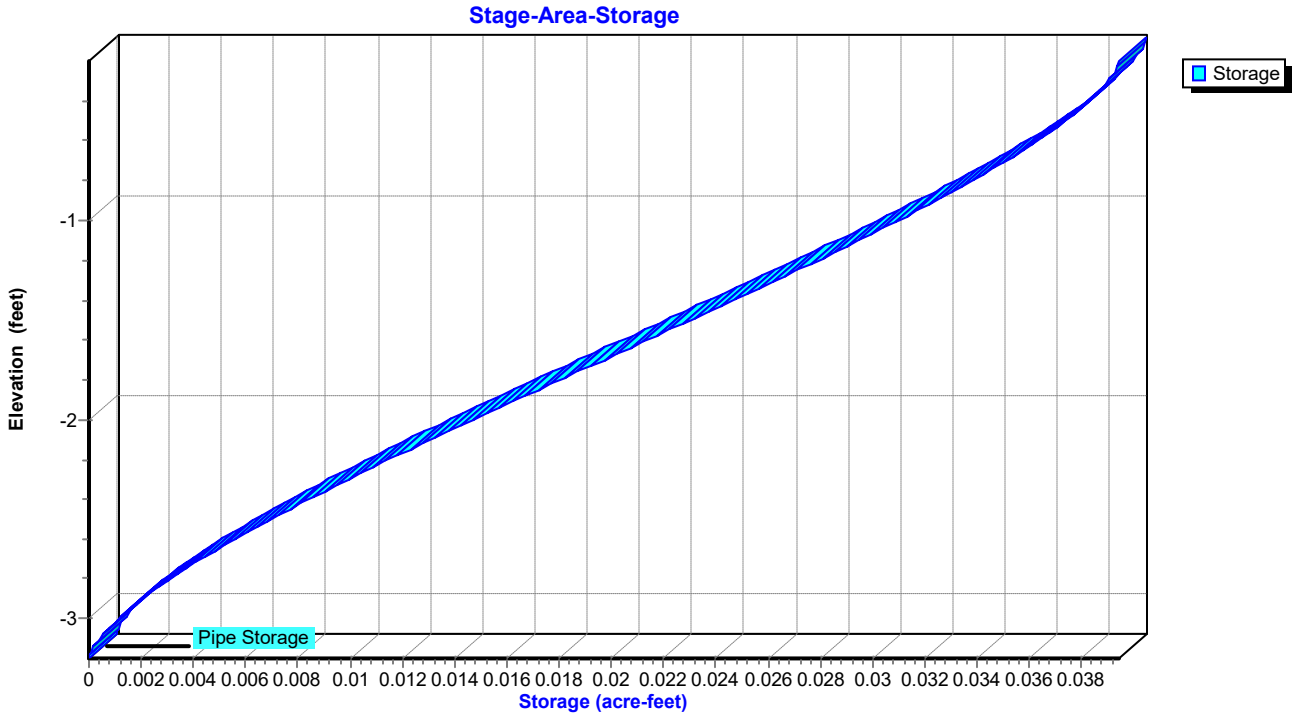


Pond 4P: (new Pond)



Hydrograph for Pond 4P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0.000	-3.20	0.00	0.00	0.00
0.05	0.22	0.000	-3.12	0.01	0.01	0.00
0.10	0.55	0.002	-2.94	0.07	0.07	0.00
0.15	**0.87**	0.004	-2.70	0.11	0.11	0.00
0.20	**1.02**	0.008	-2.44	0.14	0.14	0.00
0.25	1.02	0.011	-2.21	0.16	0.16	0.00
0.30	1.02	0.015	-1.99	0.18	0.18	0.00
0.35	1.02	0.018	-1.79	0.20	0.20	0.00
0.40	1.02	0.022	-1.59	0.22	0.22	0.00
0.45	1.02	0.025	-1.39	0.23	0.23	0.00
0.50	1.02	0.028	-1.19	0.24	0.24	0.00
0.55	1.02	0.031	-0.98	0.25	0.25	0.00
0.60	1.02	0.034	-0.77	0.46	0.27	0.20
0.65	1.02	0.036	-0.66	0.82	0.27	0.55
0.70	1.02	0.036	-0.62	0.96	0.28	0.69
0.75	1.02	0.036	-0.61	1.00	0.28	0.73
0.80	1.02	0.036	-0.60	1.01	0.28	0.74
0.85	1.02	0.036	-0.60	1.02	0.28	0.74
0.90	1.02	0.036	-0.60	1.02	0.28	0.74
0.95	1.02	0.036	-0.60	1.02	0.28	0.74
1.00	1.02	**0.036**	**-0.60**	**1.02**	**0.28**	**0.74**
1.05	0.73	0.036	-0.63	0.90	0.27	0.62
1.10	0.42	0.035	-0.70	0.66	0.27	0.39
1.15	0.12	0.034	-0.79	0.42	0.27	0.16
1.20	0.00	0.033	-0.88	0.27	0.26	0.01
1.25	0.00	0.032	-0.96	0.26	0.26	0.00
1.30	0.00	0.031	-1.03	0.25	0.25	0.00
1.35	0.00	0.030	-1.09	0.25	0.25	0.00
1.40	0.00	0.029	-1.16	0.24	0.24	0.00
1.45	0.00	0.028	-1.22	0.24	0.24	0.00
1.50	0.00	0.027	-1.29	0.24	0.24	0.00
1.55	0.00	0.026	-1.34	0.23	0.23	0.00
1.60	0.00	0.025	-1.40	0.23	0.23	0.00
1.65	0.00	0.024	-1.46	0.22	0.22	0.00
1.70	0.00	0.023	-1.52	0.22	0.22	0.00
1.75	0.00	0.022	-1.57	0.22	0.22	0.00
1.80	0.00	0.021	-1.62	0.21	0.21	0.00
1.85	0.00	0.020	-1.67	0.21	0.21	0.00
1.90	0.00	0.019	-1.73	0.21	0.21	0.00
1.95	0.00	0.018	-1.78	0.20	0.20	0.00
2.00	0.00	0.018	-1.83	0.20	0.20	0.00

Summary for Pond 5P: grass roof detention

Inflow Area = 0.365 ac,100.00% Impervious, Inflow Depth = 2.89" for 100-Year event
Inflow = 1.07 cfs @ 0.18 hrs, Volume= 0.088 af
Outflow = 1.07 cfs @ 0.18 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.05 cfs @ 0.18 hrs, Volume= 0.005 af
Primary = 1.02 cfs @ 0.18 hrs, Volume= 0.083 af

Routing by Stor-Ind method, Time Span= 0.00-2.00 hrs, dt= 0.01 hrs
Peak Elev= -1.06' @ 0.18 hrs Surf.Area= 0.002 ac Storage= 0.000 af

Plug-Flow detention time= 0.3 min calculated for 0.088 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (35.4 - 35.1)

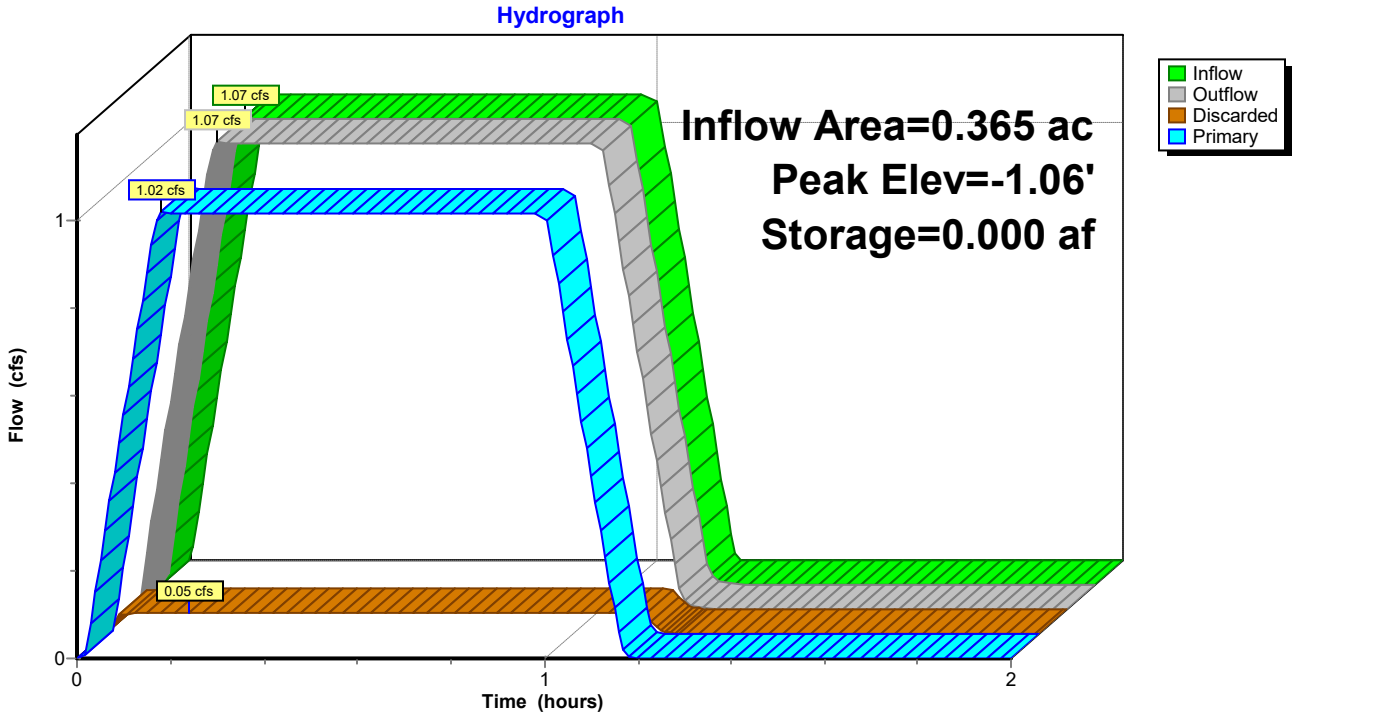
Volume	Invert	Avail.Storage	Storage Description
#1	-1.30'	0.002 af	**7.00'W x 11.00'L x 1.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.29'	**11.0" Horiz. Orifice/Grate** C= 1.000 Limited to weir flow at low heads
#2	Primary	-0.39'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	-1.30'	**25.000 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = -4.00' Phase-In= 0.04'

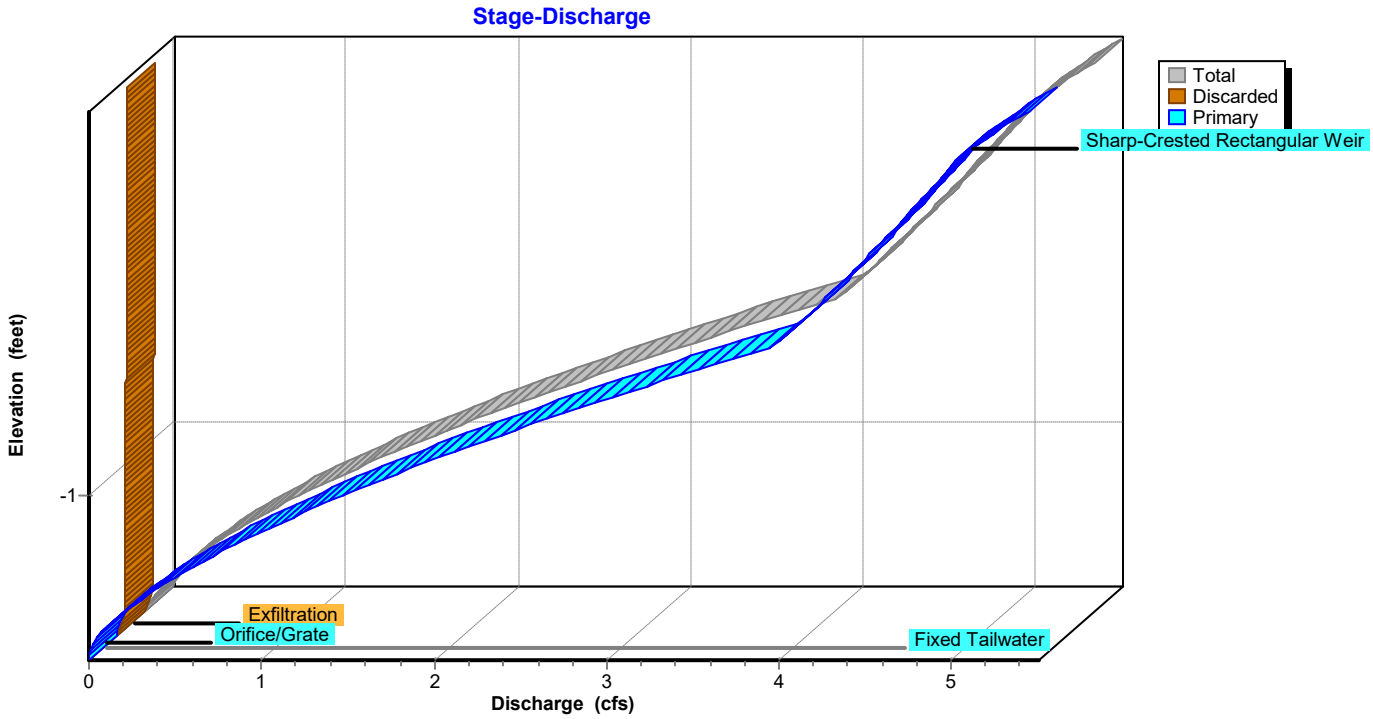
Discarded OutFlow Max=0.05 cfs @ 0.18 hrs HW=-1.06' (Free Discharge)
└**3=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=1.02 cfs @ 0.18 hrs HW=-1.06' TW=-1.30' (Fixed TW Elev= -1.30')
└**1=Orifice/Grate** (Weir Controls 1.02 cfs @ 1.56 fps)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

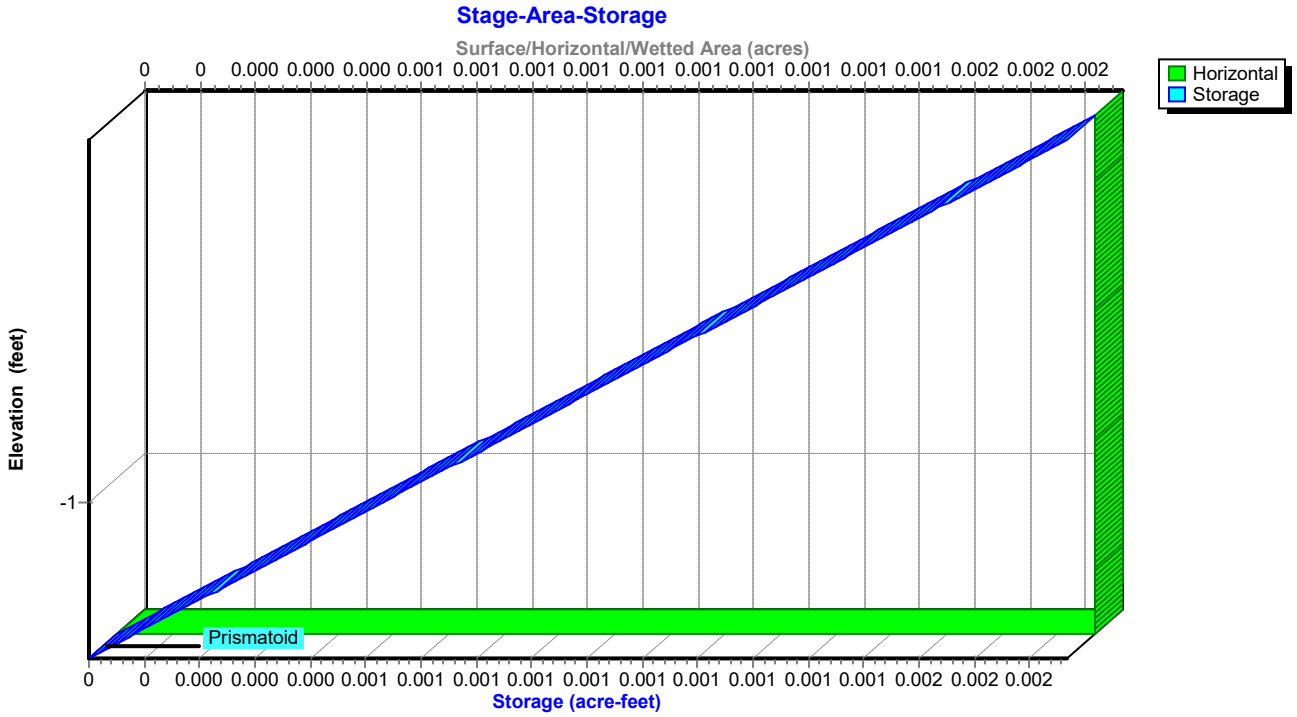
Pond 5P: grass roof detention



Pond 5P: grass roof detention



Pond 5P: grass roof detention



Hydrograph for Pond 5P: grass roof detention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	-1.30	0.00	0.00	0.00
0.05	0.31	0.000	-1.21	0.27	0.05	0.22
0.10	0.63	0.000	-1.14	0.60	0.05	0.56
0.15	**0.95**	**0.000**	**-1.08**	**0.93**	**0.05**	**0.88**
0.20	**1.07**	**0.000**	**-1.06**	**1.06**	**0.05**	**1.02**
0.25	1.06	0.000	-1.06	1.06	0.05	1.02
0.30	1.06	0.000	-1.06	1.06	0.05	1.02
0.35	1.06	0.000	-1.06	1.06	0.05	1.02
0.40	1.06	0.000	-1.06	1.06	0.05	1.02
0.45	1.06	0.000	-1.06	1.06	0.05	1.02
0.50	1.06	0.000	-1.06	1.06	0.05	1.02
0.55	1.06	0.000	-1.06	1.06	0.05	1.02
0.60	1.06	0.000	-1.06	1.06	0.05	1.02
0.65	1.06	0.000	-1.06	1.06	0.05	1.02
0.70	1.06	0.000	-1.06	1.06	0.05	1.02
0.75	1.06	0.000	-1.06	1.06	0.05	1.02
0.80	1.06	0.000	-1.06	1.06	0.05	1.02
0.85	1.06	0.000	-1.06	1.06	0.05	1.02
0.90	1.06	0.000	-1.06	1.06	0.05	1.02
0.95	1.06	0.000	-1.06	1.06	0.05	1.02
1.00	1.06	0.000	-1.06	1.06	0.05	1.02
1.05	0.76	0.000	-1.11	0.78	0.05	0.73
1.10	0.44	0.000	-1.16	0.46	0.05	0.42
1.15	0.12	0.000	-1.24	0.16	0.05	0.11
1.20	0.00	0.000	-1.30	0.01	0.01	0.00
1.25	0.00	0.000	-1.30	0.00	0.00	0.00
1.30	0.00	0.000	-1.30	0.00	0.00	0.00
1.35	0.00	0.000	-1.30	0.00	0.00	0.00
1.40	0.00	0.000	-1.30	0.00	0.00	0.00
1.45	0.00	0.000	-1.30	0.00	0.00	0.00
1.50	0.00	0.000	-1.30	0.00	0.00	0.00
1.55	0.00	0.000	-1.30	0.00	0.00	0.00
1.60	0.00	0.000	-1.30	0.00	0.00	0.00
1.65	0.00	0.000	-1.30	0.00	0.00	0.00
1.70	0.00	0.000	-1.30	0.00	0.00	0.00
1.75	0.00	0.000	-1.30	0.00	0.00	0.00
1.80	0.00	0.000	-1.30	0.00	0.00	0.00
1.85	0.00	0.000	-1.30	0.00	0.00	0.00
1.90	0.00	0.000	-1.30	0.00	0.00	0.00
1.95	0.00	0.000	-1.30	0.00	0.00	0.00
2.00	0.00	0.000	-1.30	0.00	0.00	0.00