



Real People. Real Solutions.

1519 Baltimore Drive
Ames, IA 50010-8783

Ph: (515) 233-6100
Fax: (515) 233-4430
Bolton-Menk.com

May 28, 2025

RE: Legler Wetland Design Report
Site No. SAC873514C
Sac County, Iowa

A wetland enhancement is planned in Sac County to provide nutrient reduction benefits to a part of the watershed of Sac County DD #31. Nitrates will be converted to nitrogen gas through natural processes as the water passes through the wetland. Sediment with phosphorus will also be captured but will need to be removed from time to time.

The site was initially located and assessed by the INREC wetland locator project by using remote digital desktop information to see if a wetland at this location was feasible. Payment information was presented to the landowner who expressed interest in participating in this project. The site is located entirely within the Legler property several miles northeast of Lake View. It is bisected by several larger tiles including the DD #31 Main Branch, Branch B, and Branch C.

Bolton & Menk reviewed the soil survey data for the location and found primarily clay loam (Okoboji and Harps soils). After this review, it was determined that soil borings were unnecessary unless deep excavation work was determined to be needed. The watersheds contributing both directly and indirectly to the proposed wetland were then analyzed. The full watershed is agricultural crop land and pasture. A map of the contributing watersheds is included with this report. For conservancy of the design, all land was assumed as cultivated to develop an average CN for the project of 88 used in the hydraulic analysis.

This site is a newer Tile Zone (TZ) concept developed in cooperation with ISU and IDALS, as described in "Iowa Conservation Reserve Enhancement Program (CREP) 2019 Annual Performance report." Tile Zone wetlands divert flow from drainage tiles to the surface of a constructed or restored wetland within an existing pothole. The water is treated within the pothole and then released back to the drain tile system. The objective is to treat tile flows to the wetland, which are small in comparison to the flows expected during rainfall events. During rainfall events the majority of the flow coming to the wetland is overland, and the design of a tile zone wetland seeks to maintain the existing flow characteristics, while also maximizing the flow into the existing drain tiles.

This project is being proposed as a wetland enhancement, under NRCS CPS 659 dated July 2022, because it is in a topographically low point which is a former wetland. This project proposes to augment water quality improvement functions of the wetland.

The southern berm is designed to exceed the requirements of NRCS CPS Code 356. This dike manages the water level for a wetland. It is a Class IV dike since the high-water level is less than six feet above the natural grade at the centerline. The design of the dike exceeds the criteria set forth in CPS 356, providing 0.5 ft of freeboard above the 100-year storm, having a 10-foot top width, and having 10:1 side slopes and a wave berm.

The eastern berm and the water control structure are designed in accordance with NRCS CPS Code 587, structure for water control, as explained further below.

Water will be diverted from the Main Branch and Branches A, A on A, and E and carried through proposed tile intercepts to rectangular weir pond inlet structures. The proposed intercepts will be connected to the existing tile where its invert is 1.5' above the normal pool level and 1.0' above the inlet

weir elevation. This provides driving head to force water into the wetland. In the wetland, water will meander through the pool, directed in a serpentine pattern by submerged earthen berms to provide a longer retention time and hence, better nutrient reduction. The diversion berms are designed 3" below the normal water level, because placing them at the standard 6" below normal water level would result in a 3" height. Berms of that size would have limited effectiveness. Water will outlet over a combination v-notch/rectangular weir back into the Main Branch of the district tile.

Because the tile zone wetland is designed to maintain existing flow characteristics during rainfall events, the primary spillway is designed to maintain the permanent pool level and to fill the existing tile during rainfall events. The primary spillway for this wetland is designed in accordance with CPS 587 Structure for Water Control. This wetland has a v-notch weir sized to convey the expected base flow when the pool is at its normal water level and a 4-foot-wide rectangular weir intake structure that will fill the existing 24" tile during a rainfall event. This outlet will not provide sufficient capacity to convey rainfall events since it is limited by the capacity of the existing tile. Further details of the outlet design are provided in the attached hydrology & hydraulics report.

Many tile zone wetlands do not have a secondary spillway since they are constructed within existing potholes and are not designed to control or convey runoff from rainfall events. Likewise, this wetland is designed to maintain the existing function of the pothole. The small berm on the east side of the wetland is designed to contain the permanent pool within the easement, and to maintain the overflow elevation of the natural saddle located east of the easement. In this way, the natural storm response is replicated without any intent to contain the inflow from surrounding areas. For this reason, the eastern berm is not designed to meet the design criteria of a dike or pond embankment, such as NRCS CPS410 or CPS378. This berm is designed to meet the criteria of CPS 587, Structure for Water Control.

The Main Branch, Branch B, and Branch C will be re-routed around the wetland in such a manner as to maintain the existing flow capacities. A 36" surface intake riser will be added to Branch B so that the property south of the wetland will not be adversely affected by the construction of the wetland. The construction of the southern dike is intended to prevent the flow of water from the wetland into the depression south of the wetland, but it also inhibits the flow of surface water from the depression into the wetland, which would increase the flooding duration and adversely impact that property. To mitigate this effect, the tile re-route from the intake to the tile main has been sized to increase hydraulic capacity compared to the existing Branch B and C tile Laterals. It has been determined with the hydrologic model that a 24" pipe with a 36" surface intake provides capacity sufficient to drain the southern pothole in a timeframe similar to the existing condition.

The surface watershed of the wetland is 662 acres. The tile-drained watershed treated by the wetland is 513 acres. Six watersheds are shown and described on the following watershed map for the wetland. Four watersheds are included in the hydrology & hydraulics model showing the design storms. The watersheds are described below. The purpose of the hydrology & hydraulics model is to show that this project does not negatively impact the surrounding properties.

- Watershed A – Surface Drains to wetland, tile flow conveyed around wetland through tile re-routes. Included in Hydrology & hydraulics model, not in wetland treated area.
- Watershed B – Surface and tile flows are conveyed to the wetland. Included in Hydrology & hydraulics Model and wetland treated area.
- Watershed C – Surface and tile flows are conveyed to the wetland. Included in Hydrology & hydraulics Model (combined with Watershed D) and wetland treated area.

Name: Legler Wetland Design Report

Date: May 28, 2025

Page: 3

- Watershed D – Surface flows are conveyed northwest to the wetland. Tile flows are conveyed southwest to existing tiles which are intercepted and conveyed to the wetland. Included in Hydrology & hydraulics Model (Combined with Watershed C) and wetland treated area.
- Watershed E – Surface flows do not reach wetland. Tile flows are intercepted and conveyed to the wetland. Included in wetland treated area but not in Hydrology & hydraulics Model.
- Watershed F – Isolated from the wetland by the south berm and collected (along with groundwater from this area) by the re-routed tile as proposed. An intake with a backflow preventor is proposed south of the berm to remove water from this area and prevent backflow from the wetland into the area. Included in Hydrology & hydraulics Model but not wetland treated area.

The permanent easement for this project will be on the Legler property. IDALS-DSWQ is currently in the process of updating the abstracts and will have a signed easement recorded for the area as shown on the attached landowner drawing.

If a Section 401/404 permit application is required for this project, IDALS will complete it. A floodplain permit application is not needed for this project. An Archaeological Reconnaissance will be completed by IDALS-DSWQ before construction proceeds.

The list of materials and engineer's estimate is attached to this report.

Sincerely,

Bolton & Menk, Inc.

Jonathan P. Rosengren, PE

Project Manager | Associate

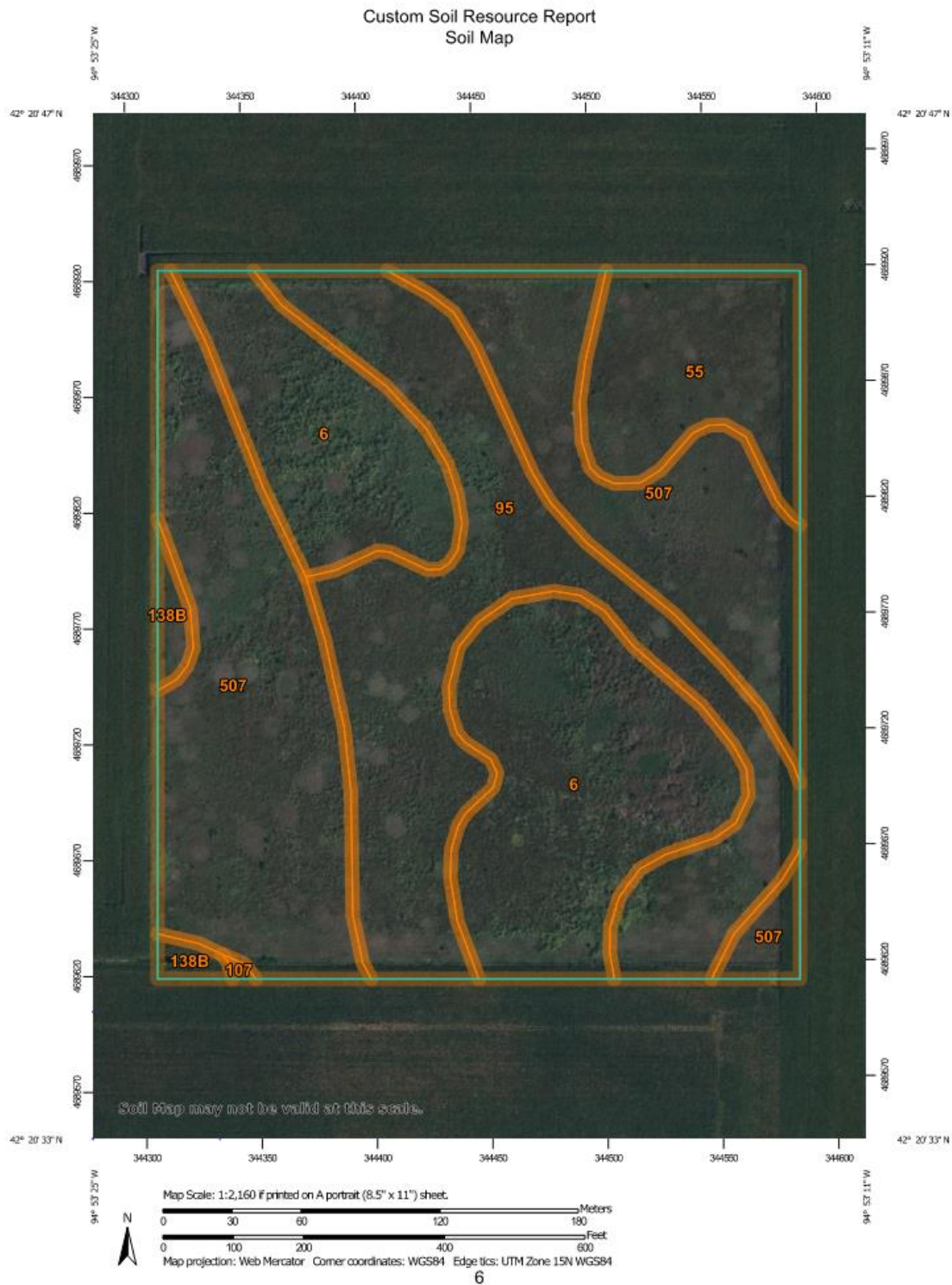
Encl: Soil Survey Map

Watershed and Land Use

Design Overview Map

Hydrology & hydraulics Report

Web Soil Survey Map



Watershed Map

Rose Legler Wetland

Sac County, IA

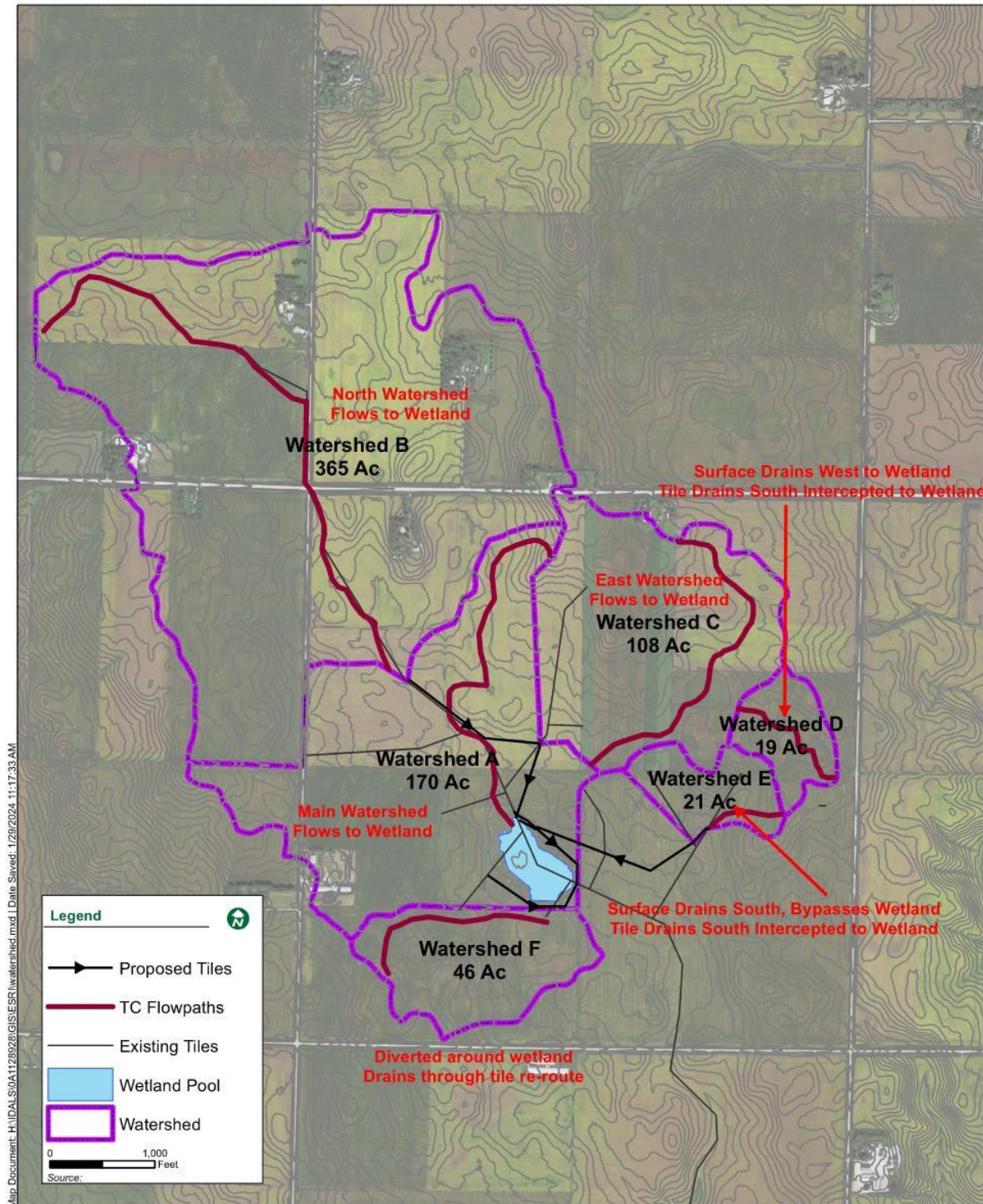
Watershed

January 2024



**BOLTON
& MENK**

Real People. Real Solutions.



Hydrology and Hydraulics Report for the Rose Legler Wetland Site

IDALS ID No.: SAC873514C

BMI Project No.: 0A1128928

Site Location: Sac County, Iowa NE 1/4 of the SW 1/4 of Section 14, T-87N, R-35W

Design Parameters and Procedures:

Design hydrology and hydraulic study of this site was completed. The drainage area was determined and a stage-area-storage curve was developed based on the topographic survey, Lidar data available from the Iowa Department of Natural Resources, and grading design for the wetland. Land use and treatment were determined through a site visit and aerial photo review and depression areas were found. Hydrologic data was compiled, sediment calculations were made, the structure was flood routed using the SCS method in Autodesk Storm and Sanitary Analysis (SSA) Software, and all the output was reviewed.

Rainfall events used for this site were MSE 3 distribution, 24-hour, 5-, 10-, 25-, and 100-year events. The primary spillway is an outlet structure with a four-foot wide opening that discharges to the existing drain tile main. The secondary spillway is a small berm which mimicks the existing overflow elevation for the pothole but moves it west, closer to the wetland. Values shown below for Q Out include overland flow and tile flow, including some flow that does not pass through the wetland.

Hydrology Analysis Summary

25-year Event: 5.6" 100-year Event: 7.8"

- * Hydrologic Soil Group: C/D
- * Runoff Curve Number: 88 (based on Land use shown in this report)
- * Primary Spillway Weir Coefficient = 3.1
- * Design life: 150 years for accumulated sediment
- * Tc = 1.7 hours determined by the sum of sheet, shallow concentrated and channel flow times.

Additional Site Analysis Data

- * Sediment delivery is 10%, with a trap efficiency of 76%.
- * The normal pool will contain 80% of the trapped sediment for the 150-year design life.
- * Aerated sediment deposited will reduce flood storage by 0.09 acre-feet
- * Normal Pool area is 6.67 acres; surface watershed area is approx. 662 acres or 1.03 square miles

Summary Table:

Overflow Elevation: 1235.75 (Data for Surface Flow)

	Q _{max} In (cfs)	Q _{max} Out (cfs)	Max Elev (ft)	Duration - Hours at elevation		
				1236.50	1236.00	1235.50
5-year	511.50	429.05	1236.86	2.4	11.3	23.5
10-year	682.60	588.75	1237.06	3.0	13.0	24.5
25-year	913.90	809.80	1237.29	3.6	14.1	25.9
100-year	1379.65	1251.01	1237.69	4.8	16.1	28.2



RAINFALL DATA

Surface-Drained DA = 662 ac

= 1.03 sq mi

Frequency	24-hr
yr	in ¹
2	3.0
5	3.7
10	4.5
25	5.6
50	6.6
100	7.8

TRIBUTARY WATERSHED DATA

Watershed	Area (ac)	Tile/Surface Drained
A	170	Surface
B	365	Surface & Tile
C	108	Surface & Tile
D	19	Surface (To North) & Tile (To South)
E	21	Tile
F	46	Does not drain to wetland
Surface Total	662	
Tile Total	513	
Assumed Base Flow	0.80	cfs (1 cfs/sq. mi.)

References

¹ IA210-650-H, 2nd Ed., Amend. 1



RUNOFF CURVE NUMBER

Surface-Drained DA = 662 ac

= 1.03 sq mi

Map Unit ¹	Soil Name ¹	Hydro. Group ¹	Cover and Treatment	Hydro. Cond.	Portion of W/S percent	CN ²	Product
--------------------------	---------------------------	------------------------------	------------------------	-----------------	------------------------------	-----------------	---------

PROPOSED CONDITION

55	Nicollet Clay Loam	C/D	Row crops, straight row, Good	Good	99.6	88	87.6
	Nicollet, Webster, clarion © Canisteo						
	CRP		Prairie Grasses and Forbes	Fair	0.1	70	0.1
		C	Roads & roofs		0.2	98	0.2
			Ponds		0.1	100	0.1
			(Wetland Pool and Potholes)				
			Sum		100.0		88.0
Use CN =						88	

References

¹ USDA - NRCS Soil Survey of Sac Co., Iowa.

² USDA - NRCS Technical Release 55, Chapter 2, June 1986.



STAGE STORAGE

Surface-Drained DA = 662 ac

= 1.03 sq mi

Contour Elev.	Area (sq ft)	Area (Acres)	Average Area (Arces)	Intermediate Volume (Ac-ft)	Cumulative Volume (Ac-ft)	Volume Above Weir (Ac-ft)	Allow for Aerated Sediment (Ac-ft)	Temporary Flood Storage (Ac-ft)
1234.00	838	0.02	0.02	0.00				
1234.50	219747	5.04	2.53	1.27	1.27	0.00	0.00	0.00
1235.00	290719	6.67	5.86	2.93	4.19	0.00	0.00	0.00
1235.50	388326	8.91	7.79	3.90	8.09	3.90	0.09	3.80
1235.75	457773	10.51	9.71	2.43	10.52	6.32	0.09	6.23
1236.00	527219	12.10	10.51	5.25	13.34	9.15	0.09	9.06
1236.50	754330	17.32	14.71	7.36	20.70	16.50	0.09	16.41
1237.00	924643	21.23	19.28	9.64	30.33	26.14	0.09	26.05
1237.50	1094309	25.12	23.18	11.59	41.92	37.73	0.09	37.64
1238.00	1247155	28.63	26.88	13.44	55.36	51.17	0.09	51.07

Storage at Normal Pool	4.19 Acre-feet
Elevation of weir =	1235.00
Storage at Overflow	10.52 Acre-feet
Elevation =	1235.75

Average Depth =	storage at normal pool area at normal pool
Average Depth =	0.63 feet

Notes: Storage areas include final earthwork borrow in pool area.



Weir and Tile Intercept Capacity Calculations

Proposed intercept capacities were calculated using Bernoulli's equation and represent the flow which can be captured 100% with no untreated bypass. This is defined as the Full Capture Flow Rate (Q_{FC}). Higher flows in the existing tiles will increase the flow of the proposed intercept but will not be captured and treated 100%.

Intercept Capacities								
Watershed Name	Watershed Area (ac)	Q_{FC} (cfs)	% of Existing Tile capacity	% of 1/2" Dc	Average Tile Flow Rate (cfs) ²	Percent Captured of Annual Flow ³	Average Hydraulic Residence Time (hr)	Full Flow HRT (hr) ⁴
Watershed B	365	1.08	14.2%	14.1%	0.312	95% ⁵		
Watershed C	108	0.81	26.2%	35.7%	0.115	95% ⁵		
Watershed D&E	40	0.69	17.6%	82.1%	0.054	95% ⁵		
Total	513	2.58	17.6%	23.9%	0.481	95% ⁵	106	20

¹ Calculated using Manning's Equation assuming pipes flowing full

² Average flow based on flow-duration data from the USGS StreamStats Application

³ Estimated by comparing QFC and flow-duration data from USGS StreamStats

⁴ Based on Q_{FC}

⁵ Calculated percent capture is higher. 95% is used as a conservative estimate

The outlet weir is designed to convey tile flows out of the wetland and is not intended to convey flows from rainfall events. The capacity of the outlet weir does exceed that of the existing tile and will maximize the flow out of the wetland during rainfall events.

Weir Capacities			
Assumed Base Flow (cfs)	0.80	=1 csm	
Base Flow V-Notch Height (ft)	0.59	*V-Notch passes 1 csm at top of notch	
Average Flow V-Notch Height (ft)	0.48	*V-Notch passes Average Tile flow at normal pool elevation	
Pool Elevation at Q_{FC} (ft)	1235.38	*Passes Q_{FC} minus base flow over 4' crest rectangular weir	
Inlet Weir 1 Head at Q_{FC} (ft)	0.29	*Watershed B&C, 1.89 cfs	
Inlet Weir 2 Head at Q_{FC} (ft)	0.15	*Watershed D&E, 0.69 cfs	
V-Notch Crest Elevation	1234.52		
Rectangular Weir Crest Elevation	1235.11		

Note: Additional flows into the wetland from the intercepted tiles will not exceed the capacity of the existing tile main. The tile main has the same capacity (pipe size and slope) at the location of the wetland as at the location where Branch A connects to the main. Therefore, no secondary relief line is needed to convey additional flows from Branch A.

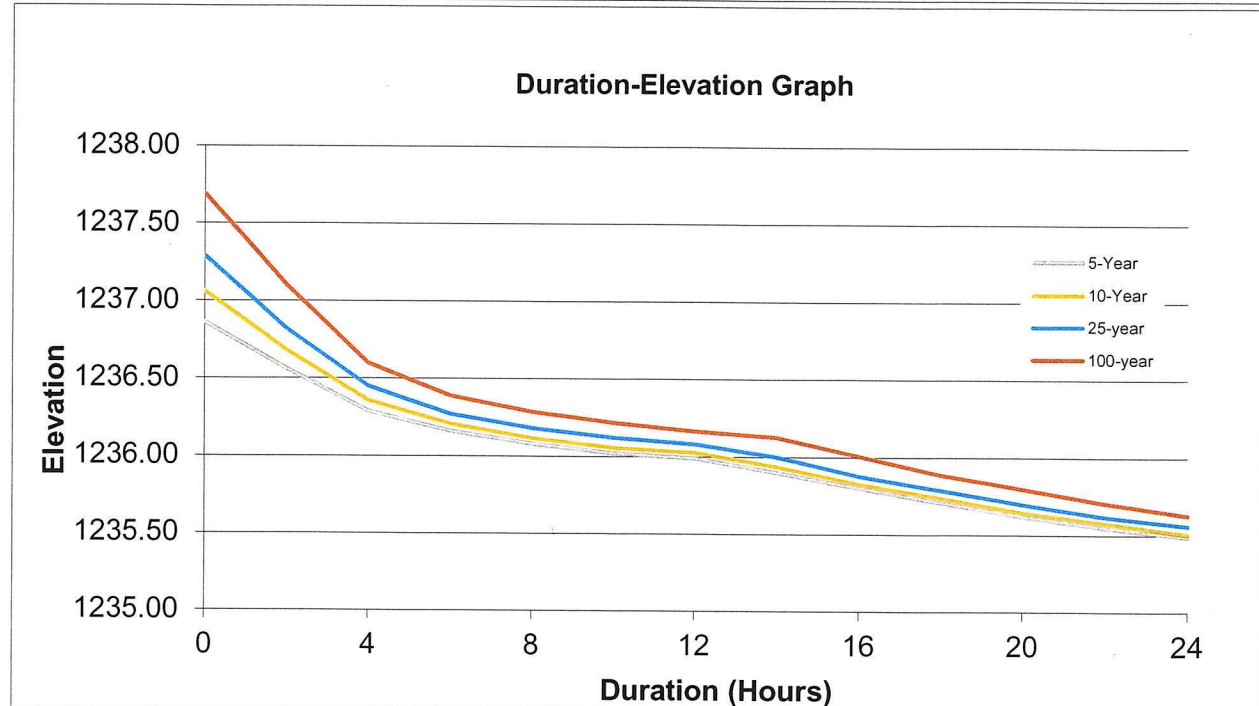
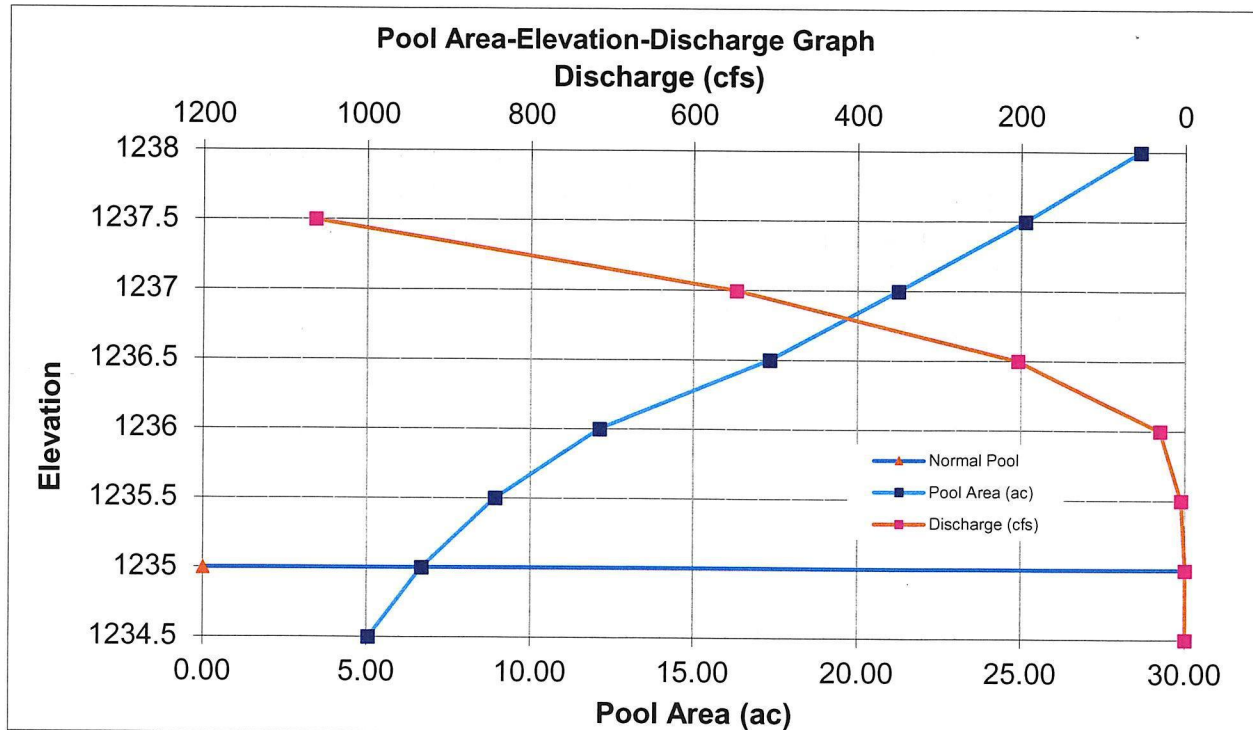


RESULTS

Surface-Drained DA = 662 ac

The following are based on surface flows and storm response. Discharge includes tile flow and overland flow.

= 1.03 sq mi





RESULTS

Surface-Drained DA = 662 ac

= 1.03 sq mi

The Elevation-Discharge table below shows tile and surface outflows from the wetland for various elevations. The tile discharge is very small compared to the surface discharge at higher elevations.

	Pool Area	Tile Discharge	Surface	Total Discharge
Elevation	(ac)	(cfs)	Discharge (cfs)	(cfs)
1234.50	5.04	0	0	0
1235.00	6.67	0	0	0
1235.50	8.91	4.8	0	4.8
1236.00	12.10	13.5	17	30.5
1236.50	17.32	19	185	204
1237.00	21.23	23	525	548
1237.50	25.12	26	1038	1064

The Duration-Elevation table below shows the duration that the pool is at each listed elevation during the design storms. This is based on surface inflows during the design storms listed. The design for the wetland is based on tile flows, but the entire watershed is analyzed, including surface flows, to show that the proposed wetland does not have adverse impacts on surrounding properties during rainfall events.

Duration-Elevation Table

5-year		10-year		25-year		100-year	
Duration	Elevation	Duration	Elevation	Duration	Elevation	Duration	Elevation
0	1236.86	0	1237.06	0	1237.29	0	1237.69
2	1236.56	2	1236.68	2	1236.82	2	1237.10
4	1236.29	4	1236.36	4	1236.45	4	1236.60
6	1236.16	6	1236.21	6	1236.27	6	1236.39
8	1236.08	8	1236.12	8	1236.18	8	1236.29
10	1236.02	10	1236.06	10	1236.12	10	1236.22
12	1235.99	12	1236.03	12	1236.08	12	1236.17
14	1235.90	14	1235.94	14	1236.00	14	1236.13
16	1235.80	16	1235.83	16	1235.88	16	1236.01
18	1235.71	18	1235.74	18	1235.79	18	1235.89
20	1235.62	20	1235.65	20	1235.70	20	1235.80
22	1235.55	22	1235.58	22	1235.62	22	1235.71
24	1235.49	24	1235.51	24	1235.56	24	1235.63

Project Description

File Name 128928_Proposed_Final.SPF

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method SCS TR-20
Time of Concentration (TOC) Method SCS TR-55
Link Routing Method Hydrodynamic
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On 00:00:00 0:00:00
End Analysis On 00:00:00 0:00:00
Start Reporting On 00:00:00 0:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:00:30 days hh:mm:ss
Routing Time Step 5 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins.....	4
Nodes.....	17
<i>Junctions</i>	11
<i>Outfalls</i>	2
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	4
Links.....	20
<i>Channels</i>	5
<i>Pipes</i>	12
<i>Pumps</i>	0
<i>Orifices</i>	1
<i>Weirs</i>	2
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	MSE3-005yr	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate	Weighted	Total	Total	Total	Peak	Time of
			Factor	Curve	Rainfall	Runoff	Runoff	Runoff	Concentration
		(ac)		Number	(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	East	127.00	484.00	88.00	3.70	2.45	311.40	131.99	0 01:39:45
2	Main	170.00	484.00	88.00	3.70	2.45	416.84	225.65	0 01:10:24
3	North	365.00	484.00	88.00	3.70	2.45	894.98	289.03	0 02:24:12
4	SouthSub	46.00	484.00	88.00	3.70	2.45	112.79	63.29	0 01:06:41

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft ²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1	4+00	Junction	1235.00	1241.00	0.00	6.00	500.00	0.88	1237.76	0.00	3.24	0 00:00	0.00	0.00
2	5+50	Junction	1234.00	1242.50	0.00	6.00	500.00	134.82	1236.87	0.00	5.63	0 00:00	0.00	0.00
3	63+00	Junction	1229.00	1231.00	0.00	6.00	0.00	46.85	1231.67	0.00	0.00	0 13:52	303.83	1060.00
4	68+00	Junction	1229.75	1235.75	0.00	6.00	0.00	21.97	1232.84	0.00	2.91	0 00:00	0.00	0.00
5	77+00	Junction	1231.00	1237.00	0.00	6.00	500.00	7.18	1236.90	0.00	0.10	0 00:00	0.00	0.00
6	79+50	Junction	1231.48	1237.48	0.00	6.00	500.00	7.95	1237.52	0.04	0.00	0 13:11	0.01	95.00
7	82+00	Junction	1231.85	1237.85	0.00	6.00	500.00	7.96	1238.32	0.47	0.00	0 11:38	0.09	766.00
8	86+00	Junction	1233.45	1239.45	0.00	6.00	500.00	7.98	1239.51	0.06	0.00	0 13:19	0.01	84.00
9	93+50	Junction	1235.00	1242.50	0.00	6.00	500.00	289.01	1242.99	0.00	4.01	0 00:00	0.00	0.00
10	10-Jun	Junction	1230.42	1234.50	0.00	0.00	500.00	17.82	1235.23	0.73	0.00	0 12:34	0.13	288.00
11	Manhole	Junction	1228.00	1234.50	0.00	0.00	500.00	1.20	1236.86	0.36	0.00	0 13:01	0.13	160.00
12	37+00	Outfall	1225.10					8.13	1227.10					
13	OverlandOutfall	Outfall	1235.00					407.15	1236.08					
14	DSPothole1	Storage Node	1235.05	1238.00	7.46		0.00	407.15	1236.83				0.00	0.00
15	DSPothole2	Storage Node	1234.45	1238.00	13.27		0.00	407.15	1236.39				0.00	0.00
16	South	Storage Node	1234.50	1238.00	0.00		0.00	63.28	1235.99				0.00	0.00
17	Wetland	Storage Node	1234.00	1238.00	1235.00		0.00	511.53	1236.86				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)
1	ExBrE1	Pipe	4+00	79+50	400.00	1235.00	1231.80	0.8000	12.000	0.0150	0.88	2.76	0.32	1.13	1.00
2	ExBrE2	Pipe	5+50	4+00	150.00	1236.50	1235.00	1.0000	12.000	0.0150	0.88	3.09	0.29	1.55	0.68
3	ExM1	Pipe	63+00	37+00	2600.00	1229.00	1225.10	0.1500	24.000	0.0150	8.13	7.59	1.07	2.73	2.00
4	ExM2	Pipe	77+00	63+00	1925.00	1231.00	1229.00	0.1000	21.000	0.0150	7.19	4.43	1.62	2.99	1.75
5	ExM3	Pipe	79+50	77+00	250.00	1231.48	1231.10	0.1500	22.000	0.0150	7.18	6.06	1.19	2.72	1.83
6	ExM4	Pipe	82+00	79+50	250.00	1231.85	1231.48	0.1500	22.000	0.0150	7.95	5.98	1.33	3.01	1.83
7	ExM5	Pipe	86+00	82+00	400.00	1233.45	1231.85	0.4000	22.000	0.0150	7.96	9.83	0.81	3.02	1.83
8	ExM6	Pipe	93+50	86+00	750.00	1236.50	1233.45	0.4100	20.000	0.0150	7.98	7.69	1.04	3.99	1.67
9	Intercept1	Pipe	5+50	Manhole	751.00	1233.00	1228.22	0.6400	15.000	0.0150	1.00	4.91	0.20	1.18	1.25
10	Intercept2	Pipe	93+50	5+50	1452.00	1235.24	1233.25	0.1400	12.000	0.0150	2.31	0.90	2.56	3.08	1.00
11	OutToMain	Pipe	68+00	63+00	32.50	1229.70	1229.67	0.0900	24.000	0.0150	21.97	9.73	2.26	6.99	2.00
12	PropBrC1	Pipe	10-Jun	63+00	370.00	1230.19	1229.65	0.1500	24.000	0.0150	17.82	8.94	1.99	5.67	2.00
13	BermB	Channel	Wetland	DSPothole1	30.00	1235.75	1235.50	0.8300	60.000	0.0300	407.15	26182.41	0.02	1.17	1.22
14	Surface1	Channel	DSPothole2	OverlandOutfall	30.00	1235.20	1235.00	0.6700	60.000	0.0320	407.15	11277.87	0.04	2.82	1.14
15	Surface2	Channel	DSPothole1	DSPothole2	30.00	1235.80	1235.60	0.6700	60.000	0.0320	407.15	14098.75	0.03	3.14	0.91
16	Surface3	Channel	93+50	Wetland	1750.00	1242.00	1235.00	0.4000	60.000	0.0300	278.25	9318.19	0.03	1.39	1.42
17	Surface4	Channel	5+50	Wetland	850.00	1234.00	1235.00	-0.1200	60.000	0.0300	110.81	5053.50	0.02	0.29	2.36
18	FieldIntake	Orifice	South	10-Jun		1234.50	1230.42		36.000		17.82				
19	InletWeir	Weir	Manhole	Wetland		1228.00	1234.00				1.24				
20	OutletWeir	Weir	Wetland	68+00		1234.00	1229.75				21.97				

Peak Flow	Total Time	Reported
Depth/	Surcharged	Condition
Total Depth		
Ratio		
	(min)	
1.00	793.00	SURCHARGED
0.68	0.00	Calculated
1.00	1183.00	SURCHARGED
1.00	855.00	SURCHARGED
1.00	859.00	SURCHARGED
1.00	856.00	SURCHARGED
1.00	830.00	SURCHARGED
1.00	816.00	SURCHARGED
1.00	2284.00	SURCHARGED
1.00	940.00	SURCHARGED
1.00	1016.00	SURCHARGED
1.00	341.00	SURCHARGED
0.24	0.00	
0.23	0.00	
0.18	0.00	
0.28	0.00	
0.47	0.00	

Subbasin Hydrology

Subbasin : East

Input Data

Area (ac)	127
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	110.94	-	88
Composite Area & Weighted CN	110.94		88

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

- Tc = Time of Concentration (hr)
- n = Manning's roughness
- Lf = Flow Length (ft)
- P = 2 yr, 24 hr Rainfall (inches)
- Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

- V = 16.1345 * (Sf^0.5) (unpaved surface)
- V = 20.3282 * (Sf^0.5) (paved surface)
- V = 15.0 * (Sf^0.5) (grassed waterway surface)
- V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
- V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
- V = 7.0 * (Sf^0.5) (short grass pasture surface)
- V = 5.0 * (Sf^0.5) (woodland surface)
- V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
- Tc = (Lf / V) / (3600 sec/hr)

Where:

- Tc = Time of Concentration (hr)
- Lf = Flow Length (ft)
- V = Velocity (ft/sec)
- Sf = Slope (ft/ft)

Channel Flow Equation :

- V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
- R = Aq / Wp
- Tc = (Lf / V) / (3600 sec/hr)

Where :

- Tc = Time of Concentration (hr)
- Lf = Flow Length (ft)
- R = Hydraulic Radius (ft)
- Aq = Flow Area (ft²)
- Wp = Wetted Perimeter (ft)
- V = Velocity (ft/sec)
- Sf = Slope (ft/ft)
- n = Manning's roughness

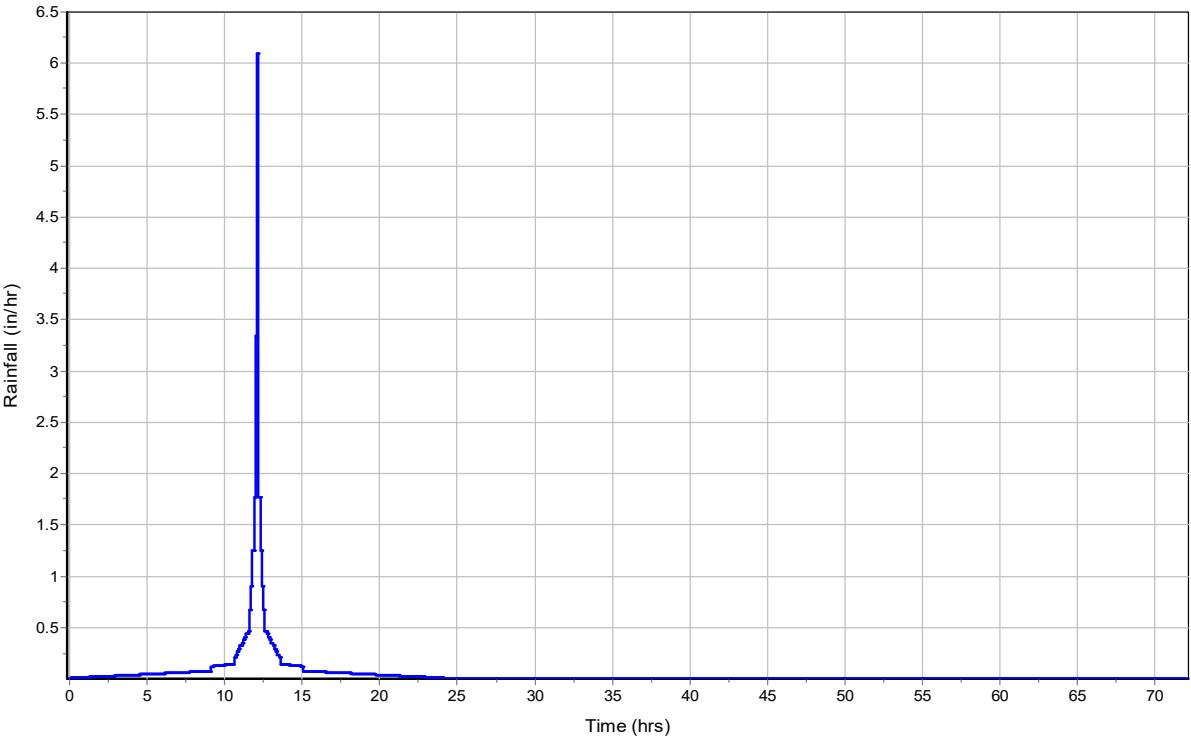
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.57	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.96	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3500	0	0
Slope (%) :	0.57	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.68	0	0
Computed Flow Time (min) :	85.78	0	0
Total TOC (min)	99.75		

Subbasin Runoff Results

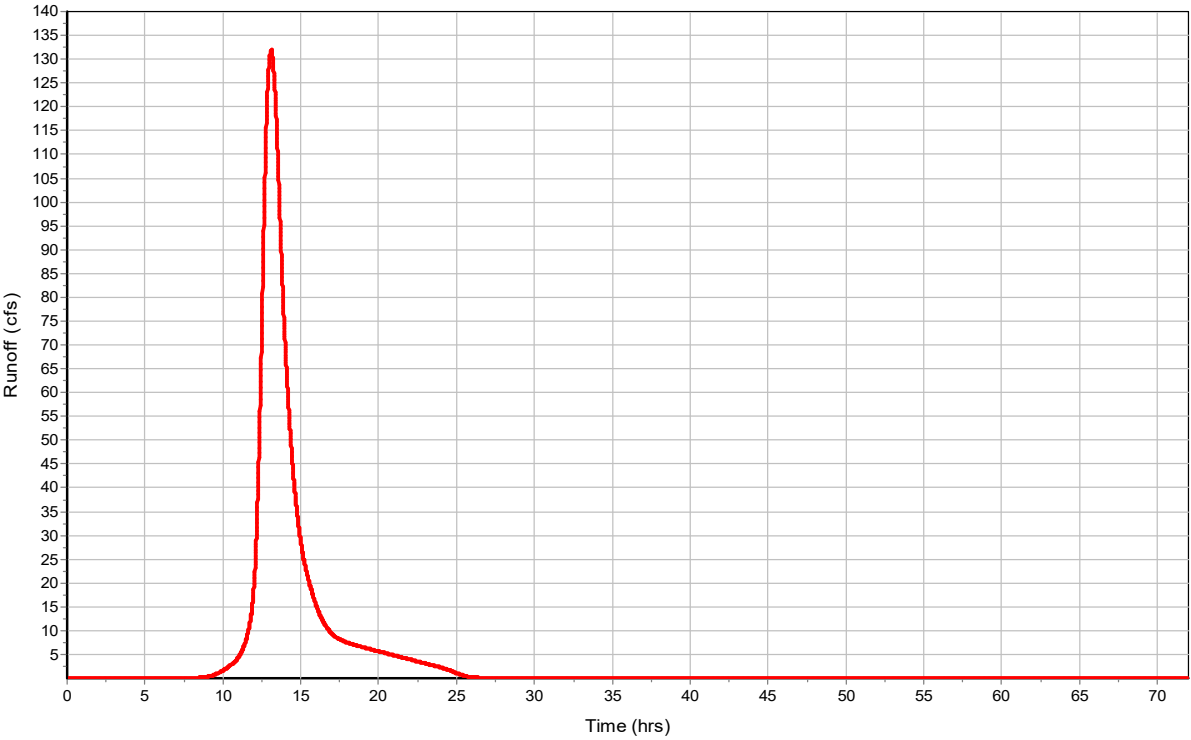
Total Rainfall (in)	3.7
Total Runoff (in)	2.45
Peak Runoff (cfs)	131.99
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:39:45

Subbasin : East

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Main

Input Data

Area (ac) 170
Peak Rate Factor 484
Weighted Curve Number 88
Rain Gage ID Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	176.62	-	88
Composite Area & Weighted CN	176.62		88

Time of Concentration

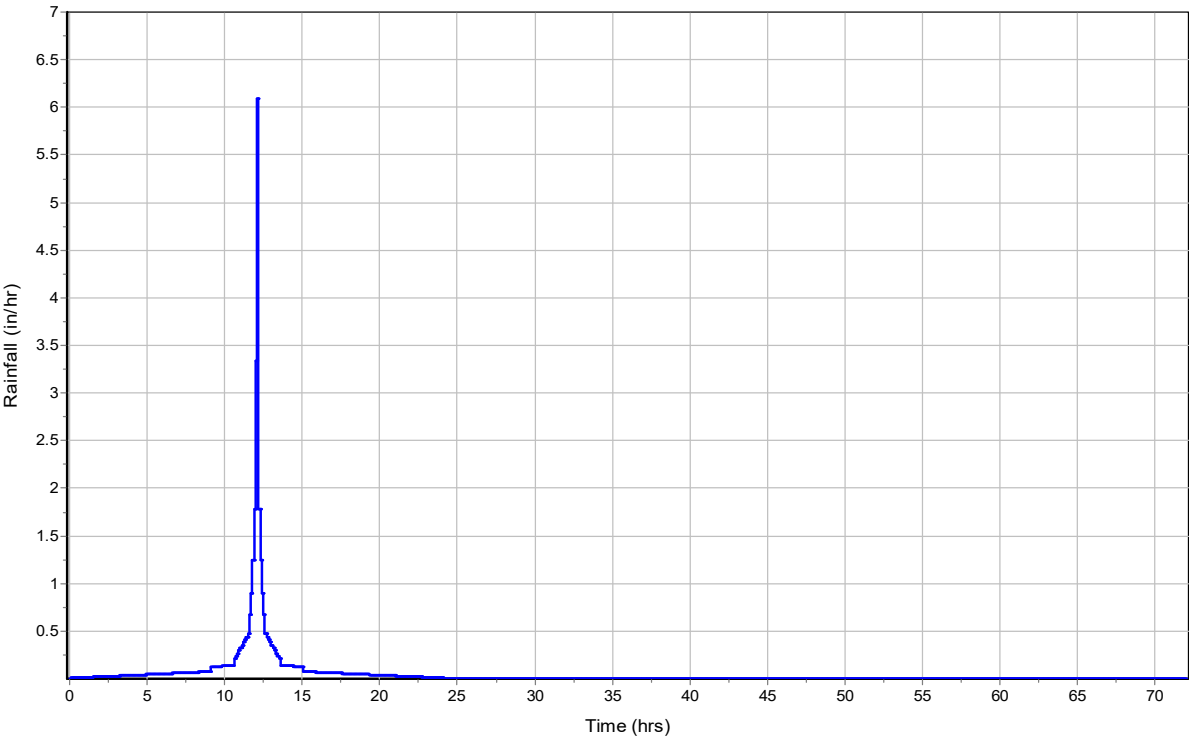
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	11.15	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3200	0	0
Slope (%) :	1	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.9	0	0
Computed Flow Time (min) :	59.26	0	0
Total TOC (min)	70.41		

Subbasin Runoff Results

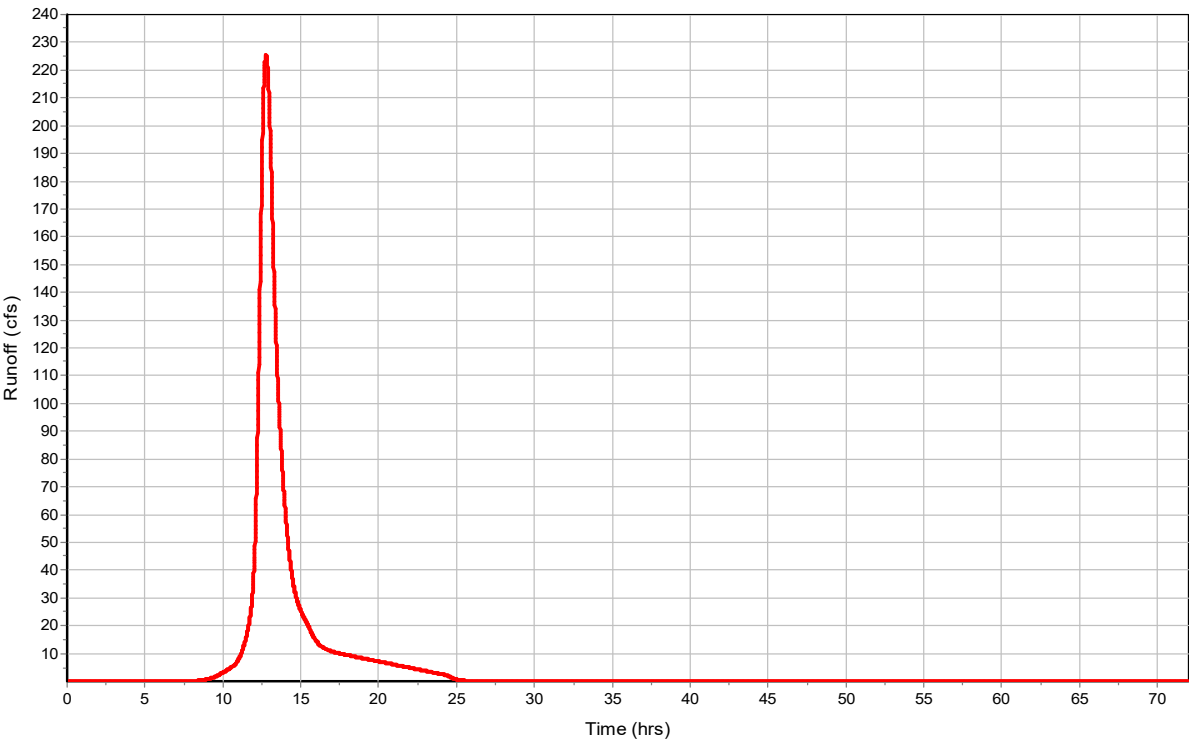
Total Rainfall (in) 3.7
Total Runoff (in) 2.45
Peak Runoff (cfs) 225.65
Weighted Curve Number 88
Time of Concentration (days hh:mm:ss) 0 01:10:25

Subbasin : Main

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : North

Input Data

Area (ac) 365
Peak Rate Factor 484
Weighted Curve Number 88
Rain Gage ID Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	348.09	-	88
Composite Area & Weighted CN	348.09		88

Time of Concentration

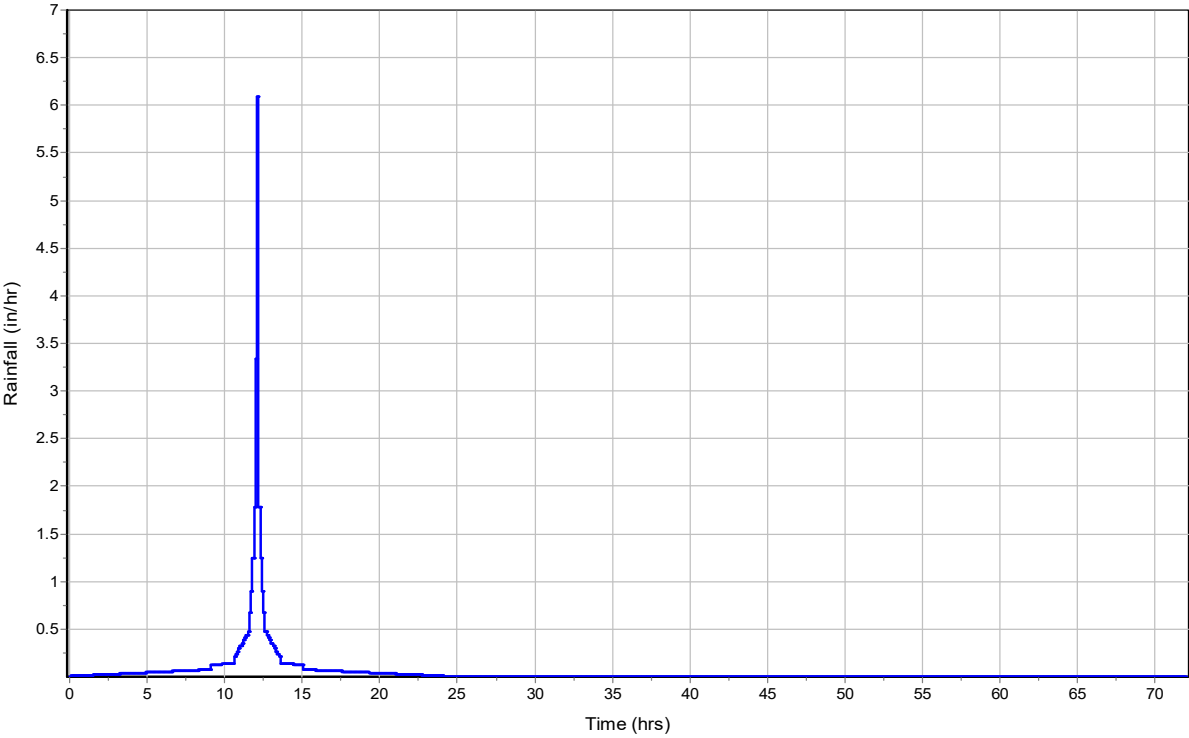
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.59	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.77	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	5400	0	0
Slope (%) :	0.59	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.69	0	0
Computed Flow Time (min) :	130.43	0	0
Total TOC (min)	144.21		

Subbasin Runoff Results

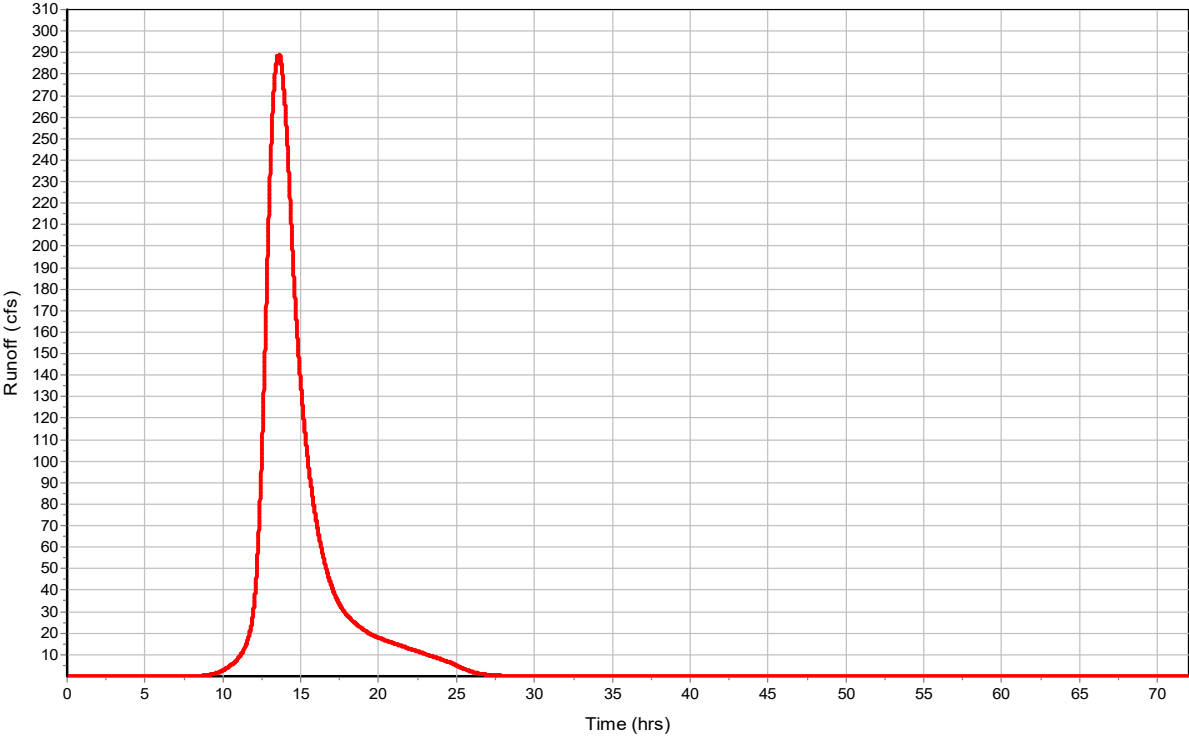
Total Rainfall (in) 3.7
Total Runoff (in) 2.45
Peak Runoff (cfs) 289.03
Weighted Curve Number 88
Time of Concentration (days hh:mm:ss) 0 02:24:13

Subbasin : North

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SouthSub

Input Data

Area (ac) 46
Peak Rate Factor 484
Weighted Curve Number 88
Rain Gage ID Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	41.1	-	88
Composite Area & Weighted CN	41.1		88

Time of Concentration

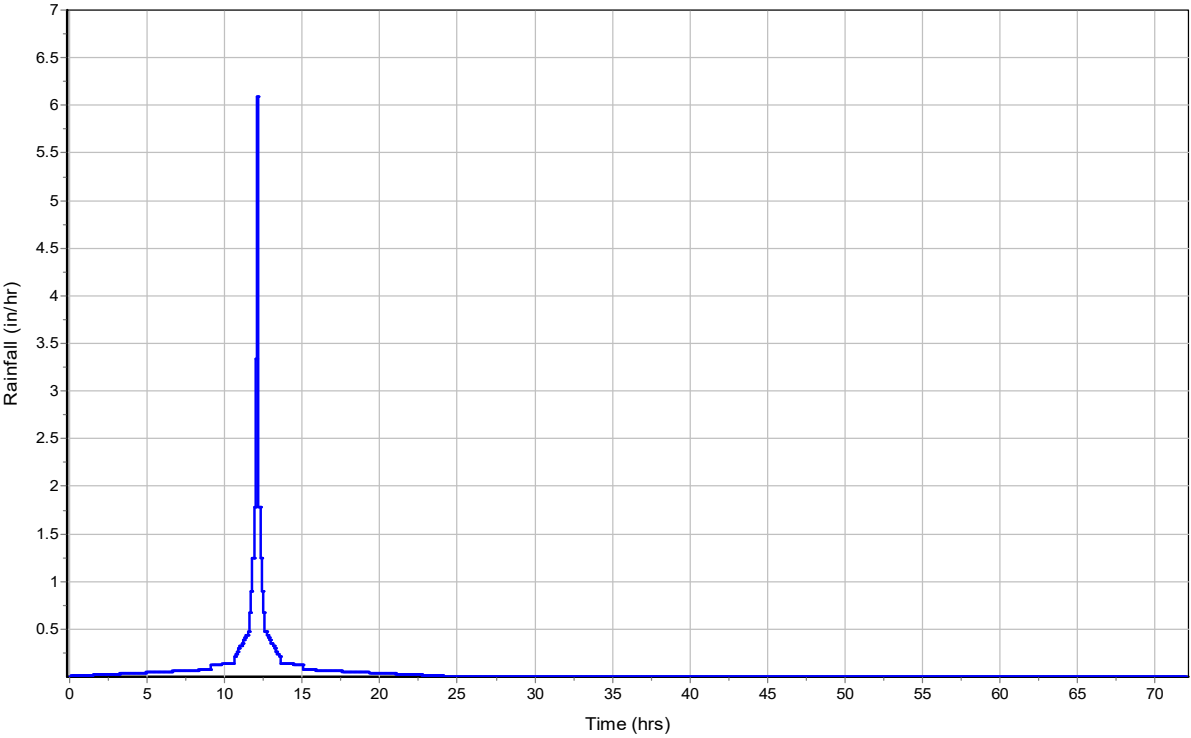
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.74	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	12.58	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	2500	0	0
Slope (%) :	0.74	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.77	0	0
Computed Flow Time (min) :	54.11	0	0
Total TOC (min)66.69			

Subbasin Runoff Results

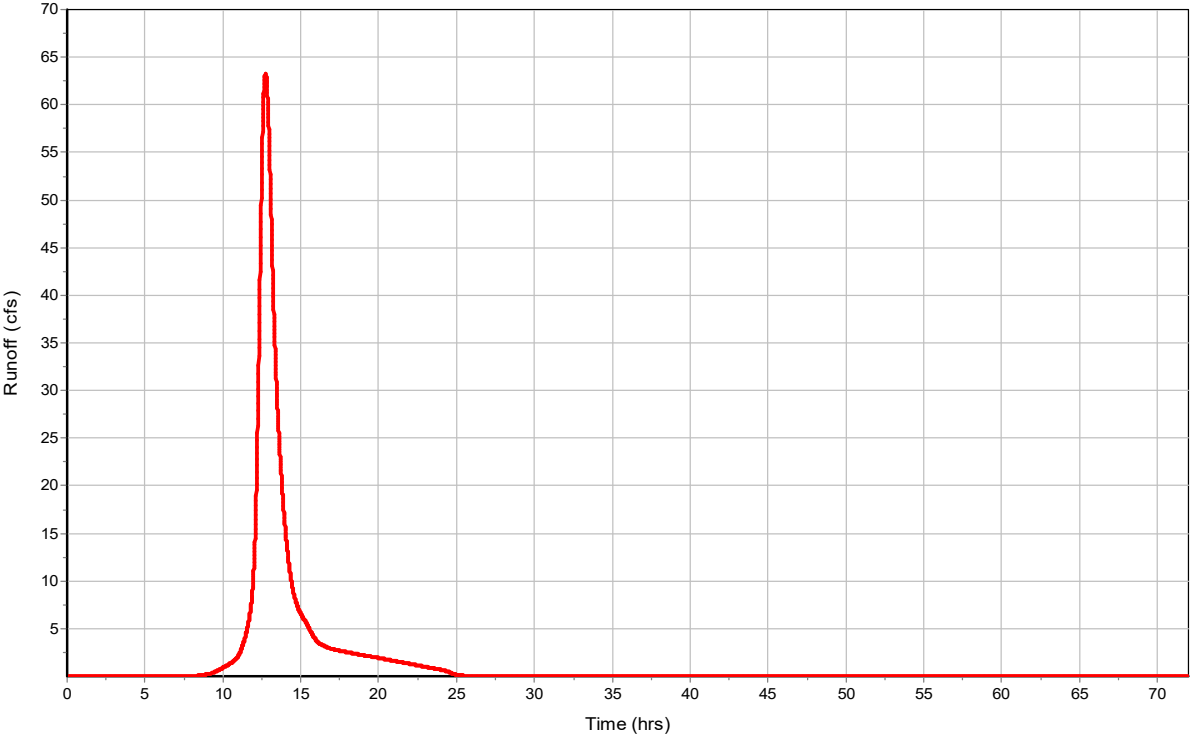
Total Rainfall (in) 3.7
Total Runoff (in) 2.45
Peak Runoff (cfs) 63.29
Weighted Curve Number 88
Time of Concentration (days hh:mm:ss) 0 01:06:41

Subbasin : SouthSub

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element	Invert	Ground/Rim	Ground/Rim	Initial	Initial	Surcharge	Surcharge	Ponded	Minimum
ID	Elevation	(Max)	(Max)	Water	Water	Elevation	Depth	Area	Pipe	
		Elevation	Offset	Elevation	Depth					Cover
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft ²)	(in)	
1	4+00	1235.00	1241.00	6.00	0.00	-1235.00	6.00	-1235.00	500.00	0.00
2	5+50	1234.00	1242.50	8.50	0.00	-1234.00	6.00	-1236.50	500.00	0.00
3	63+00	1229.00	1231.00	2.00	0.00	-1229.00	6.00	-1225.00	0.00	0.00
4	68+00	1229.75	1235.75	6.00	0.00	-1229.75	6.00	-1229.75	0.00	0.00
5	77+00	1231.00	1237.00	6.00	0.00	-1231.00	6.00	-1231.00	500.00	0.00
6	79+50	1231.48	1237.48	6.00	0.00	-1231.48	6.00	-1231.48	500.00	0.00
7	82+00	1231.85	1237.85	6.00	0.00	-1231.85	6.00	-1231.85	500.00	0.00
8	86+00	1233.45	1239.45	6.00	0.00	-1233.45	6.00	-1233.45	500.00	0.00
9	93+50	1235.00	1242.50	7.50	0.00	-1235.00	6.00	-1236.50	500.00	0.00
10	10-Jun	1230.42	1234.50	4.08	0.00	-1230.42	0.00	-1234.50	500.00	0.00
11	Manhole	1228.00	1234.50	6.50	0.00	-1228.00	0.00	-1234.50	500.00	0.00

Junction Results

SN	Element	Peak	Peak	Max HGL	Max HGL	Max	Min	Average HGL	Average HGL	Time of	Time of	Total	Total Time
	ID	Inflow	Lateral	Elevation	Depth	Surcharge	Freeboard	Elevation	Depth	Max HGL	Peak	Flooded	Flooded
			Inflow	Attained	Attained	Depth	Attained	Attained	Attained	Occurrence	Flooding	Volume	
		(cfs)	(cfs)	(ft)	(ft)	Attained	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1	4+00	0.88	0.00	1237.76	2.76	0.00	3.24	1235.35	0.35	0 11:22	0 00:00	0.00	0.00
2	5+50	134.82	131.96	1236.87	2.87	0.00	5.63	1235.33	1.33	0 13:50	0 00:00	0.00	0.00
3	63+00	46.85	0.00	1231.67	2.67	0.00	0.00	1230.24	1.24	0 11:38	0 13:52	303.83	1060.00
4	68+00	21.97	0.00	1232.84	3.09	0.00	2.91	1230.82	1.07	0 13:51	0 00:00	0.00	0.00
5	77+00	7.18	0.00	1236.90	5.90	0.00	0.10	1232.10	1.10	0 13:59	0 00:00	0.00	0.00
6	79+50	7.95	0.00	1237.52	6.04	0.04	0.00	1232.54	1.06	0 13:59	0 13:11	0.01	95.00
7	82+00	7.96	0.00	1238.32	6.47	0.47	0.00	1232.96	1.11	0 13:57	0 11:38	0.09	766.00
8	86+00	7.98	0.00	1239.51	6.06	0.06	0.00	1234.45	1.00	0 13:53	0 13:19	0.01	84.00
9	93+50	289.01	289.01	1242.99	7.99	0.00	4.01	1236.64	1.64	0 13:41	0 00:00	0.00	0.00
10	10-Jun	17.82	0.00	1235.23	4.81	0.73	0.00	1231.01	0.59	0 13:54	0 12:34	0.13	288.00
11	Manhole	1.20	0.00	1236.86	8.86	0.36	0.00	1234.66	6.66	0 13:51	0 13:01	0.13	160.00

Channel Input

SN	Element	Length	Inlet Invert	Inlet Offset	Outlet Invert	Outlet Offset	Total Drop	Average Slope	Shape	Height	Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	ID	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(ft)	(ft)					(cfs)	
1	BermB	30.00	1235.75	1.75	1235.50	0.45	0.25	0.8300	Trapezoidat	5.000	900.000	0.0300	0.5000	0.5000	0.0000	0.00	No
2	Surface1	30.00	1235.20	0.75	1235.00	0.00	0.20	0.6700	Parabolic	5.000	400.000	0.0320	0.5000	0.5000	0.0000	0.00	No
3	Surface2	30.00	1235.80	0.75	1235.60	1.15	0.20	0.6700	Parabolic	5.000	500.000	0.0320	0.5000	0.5000	0.0000	0.00	No
4	Surface3	1750.00	1242.00	7.00	1235.00	1.00	7.00	0.4000	Parabolic	5.000	400.000	0.0300	0.5000	0.5000	0.0000	0.00	No
5	Surface4	850.00	1234.00	0.00	1235.00	1.00	-1.00	-0.1200	Parabolic	5.000	400.000	0.0300	0.5000	0.5000	0.0000	0.00	No

Channel Results

SN	Element	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	BermB	407.15	0 13:51	26182.41	0.02	1.17	0.43	1.22	0.24	0.00		
2	Surface1	407.15	0 13:52	11277.87	0.04	2.82	0.18	1.14	0.23	0.00		
3	Surface2	407.15	0 13:51	14098.75	0.03	3.14	0.16	0.91	0.18	0.00		
4	Surface3	278.25	0 13:41	9318.19	0.03	1.39	20.98	1.42	0.28	0.00		
5	Surface4	110.81	0 13:16	5053.50	0.02	0.29	48.85	2.36	0.47	0.00		

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	ExBrE1	400.00	1235.00	0.00	1231.80	0.32	3.20	0.8000	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
2	ExBrE2	150.00	1236.50	2.50	1235.00	0.00	1.50	1.0000	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
3	ExM1	2600.00	1229.00	0.00	1225.10	0.00	3.90	0.1500	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
4	ExM2	1925.00	1231.00	0.00	1229.00	0.00	2.00	0.1000	CIRCULAR	21.000	21.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
5	ExM3	250.00	1231.48	0.00	1231.10	0.10	0.38	0.1500	CIRCULAR	21.960	21.960	0.0150	0.5000	0.5000	0.0000	0.00	No	1
6	ExM4	250.00	1231.85	0.00	1231.48	0.00	0.37	0.1500	CIRCULAR	21.960	21.960	0.0150	0.5000	0.5000	0.0000	0.00	No	1
7	ExM5	400.00	1233.45	0.00	1231.85	0.00	1.60	0.4000	CIRCULAR	21.960	21.960	0.0150	0.5000	0.5000	0.0000	0.00	No	1
8	ExM6	750.00	1236.50	1.50	1233.45	0.00	3.05	0.4100	CIRCULAR	20.040	20.040	0.0150	0.5000	0.5000	0.0000	0.00	No	1
9	Intercept1	751.00	1233.00	-1.00	1228.22	0.22	4.78	0.6400	CIRCULAR	15.000	15.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
10	Intercept2	1452.00	1235.24	0.24	1233.25	-0.75	1.99	0.1400	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
11	OutToMain	32.50	1229.70	-0.05	1229.67	0.67	0.03	0.0900	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
12	PropBrC1	370.00	1230.19	-0.23	1229.65	0.65	0.54	0.1500	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	ExBrE1	0.88	0 14:00	2.76	0.32	1.13	5.90	1.00	1.00	793.00		SURCHARGED
2	ExBrE2	0.88	0 14:00	3.09	0.29	1.55	1.61	0.68	0.68	0.00		Calculated
3	ExM1	8.13	0 11:52	7.59	1.07	2.73	15.87	2.00	1.00	1183.00		SURCHARGED
4	ExM2	7.19	0 11:25	4.43	1.62	2.99	10.73	1.75	1.00	855.00		SURCHARGED
5	ExM3	7.18	0 11:25	6.06	1.19	2.72	1.53	1.83	1.00	859.00		SURCHARGED
6	ExM4	7.95	0 13:49	5.98	1.33	3.01	1.38	1.83	1.00	856.00		SURCHARGED
7	ExM5	7.96	0 13:41	9.83	0.81	3.02	2.21	1.83	1.00	830.00		SURCHARGED
8	ExM6	7.98	0 13:29	7.69	1.04	3.99	3.13	1.67	1.00	816.00		SURCHARGED
9	Intercept1	1.00	0 10:32	4.91	0.20	1.18	10.61	1.25	1.00	2284.00		SURCHARGED
10	Intercept2	2.31	0 11:33	0.90	2.56	3.08	7.86	1.00	1.00	940.00		SURCHARGED
11	OutToMain	21.97	0 13:52	9.73	2.26	6.99	0.08	2.00	1.00	1016.00		SURCHARGED
12	PropBrC1	17.82	0 13:54	8.94	1.99	5.67	1.09	2.00	1.00	341.00		SURCHARGED

Storage Nodes

Storage Node : DSPothole1

Input Data

Invert Elevation (ft)	1235.05
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	2.95
Initial Water Elevation (ft)	7.46
Initial Water Depth (ft)	-1227.59
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	407.15
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	407.15
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1236.83
Max HGL Depth Attained (ft)	1.78
Average HGL Elevation Attained (ft)	1235.71
Average HGL Depth Attained (ft)	0.66
Time of Max HGL Occurrence (days hh:mm)	0 13:51
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : DSPothole2

Input Data

Invert Elevation (ft)	1234.45
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.55
Initial Water Elevation (ft)	13.27
Initial Water Depth (ft)	-1221.18
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	407.15
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	407.15
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1236.39
Max HGL Depth Attained (ft)	1.94
Average HGL Elevation Attained (ft)	1235.15
Average HGL Depth Attained (ft)	0.7
Time of Max HGL Occurrence (days hh:mm)	0 13:52
Total Exfiltration Volume (1000-ft ³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : South

Input Data

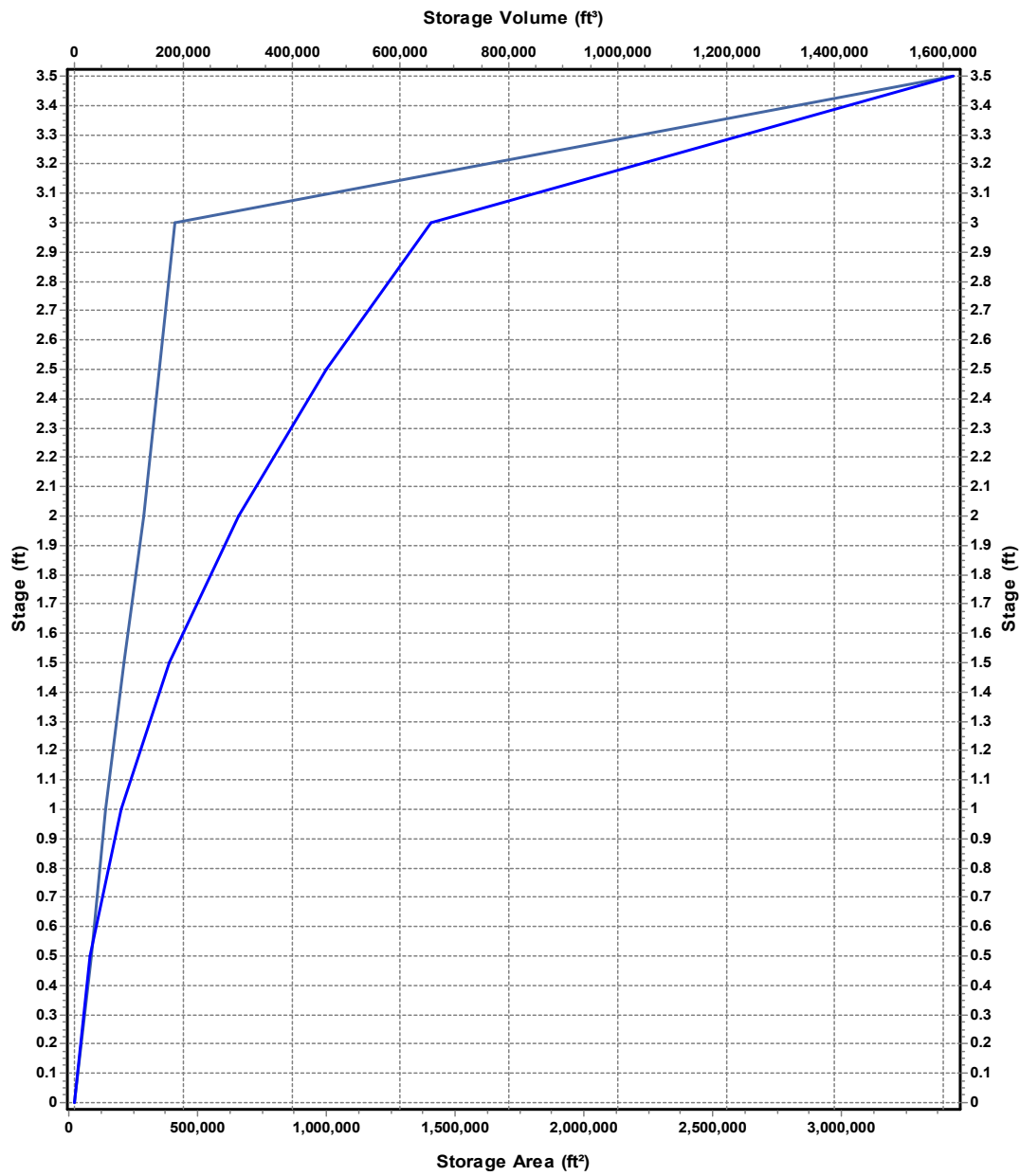
Invert Elevation (ft)	1234.50
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1234.50
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : South

Stage	Storage	Storage
(ft)	Area	Volume
	(ft²)	(ft³)
0	23310	0
0.5	90698	28502
1	142584	86822.5
1.5	213336	175802.5
2	293892	302609.5
2.5	352900	464307.5
3	412854	655746
3.5	3436773	1618152.75

Storage Area Volume Curves



— Storage Area — Storage Volume

Storage Node : South (continued)

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	FieldIntake	Bottom	CIRCULAR	No	36.00			1234.50	0.61

Output Summary Results

Peak Inflow (cfs)	63.28
Peak Lateral Inflow (cfs)	63.28
Peak Outflow (cfs)	17.82
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1235.99
Max HGL Depth Attained (ft)	1.49
Average HGL Elevation Attained (ft)	1234.6
Average HGL Depth Attained (ft)	0.1
Time of Max HGL Occurrence (days hh:mm)	0 13:53
Total Exfiltration Volume (1000-ft ³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland

Input Data

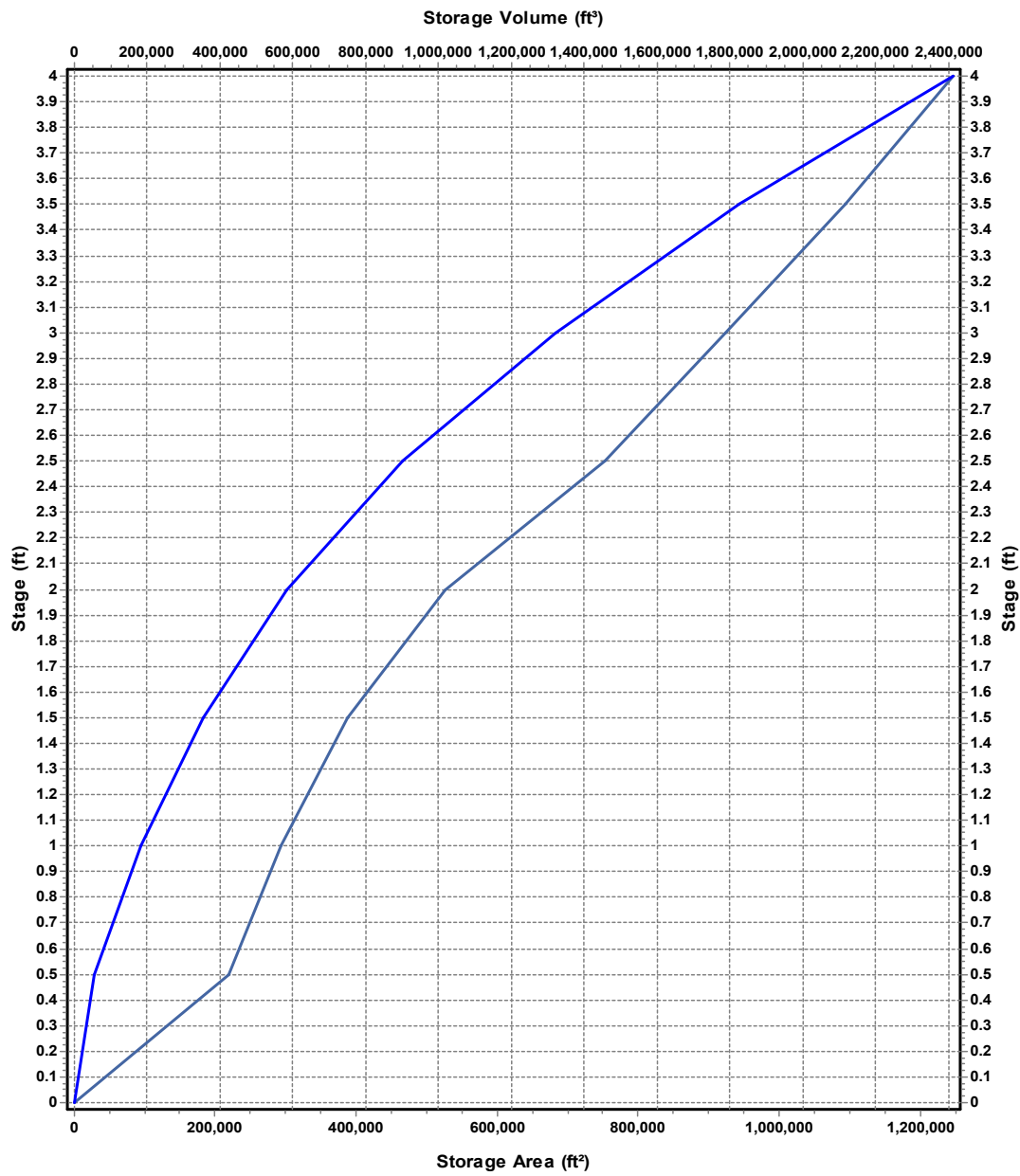
Invert Elevation (ft)	1234.00
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	4.00
Initial Water Elevation (ft)	1235.00
Initial Water Depth (ft)	1.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Wetland

Stage	Storage	Storage
(ft)	Area	Volume
	(ft²)	(ft³)
0	838.23	0
0.5	219747	55146.31
1	293589	183480.31
1.5	388326	353959.06
2	527219	582845.31
2.5	754330.87	903232.78
3	924643.26	1322976.31
3.5	1094309.91	1827714.6
4	1247155.1	2413080.85

Storage Area Volume Curves



Storage Node : Wetland (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	OutletWeir	Rectangular	No	1235.00	1.00	4.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs)	511.53
Peak Lateral Inflow (cfs)	225.59
Peak Outflow (cfs)	429.12
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1236.86
Max HGL Depth Attained (ft)	2.86
Average HGL Elevation Attained (ft)	1235.45
Average HGL Depth Attained (ft)	1.45
Time of Max HGL Occurrence (days hh:mm)	0 13:51
Total Exfiltration Volume (1000-ft ³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name 128928_Proposed_Final.SPF

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method SCS TR-20
Time of Concentration (TOC) Method SCS TR-55
Link Routing Method Hydrodynamic
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On 00:00:00 0:00:00
End Analysis On 00:00:00 0:00:00
Start Reporting On 00:00:00 0:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:00:30 days hh:mm:ss
Routing Time Step 5 seconds

Number of Elements

Qty
Rain Gages 1
Subbasins..... 4
Nodes..... 17
 Junctions 11
 Outfalls 2
 Flow Diversions 0
 Inlets 0
 Storage Nodes 4
Links..... 20
 Channels 5
 Pipes 12
 Pumps 0
 Orifices 1
 Weirs 2
 Outlets 0
Pollutants 0
Land Uses 0

-- -- -- -- --

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate	Weighted Curve Number	Total Rainfall	Total Runoff	Total Runoff	Peak Runoff	Time of Concentration
		(ac)	Factor		(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	East	127.00	484.00	88.00	4.50	3.20	405.89	171.26	0 01:39:45
2	Main	170.00	484.00	88.00	4.50	3.20	543.32	292.93	0 01:10:24
3	North	365.00	484.00	88.00	4.50	3.20	1166.54	376.41	0 02:24:12
4	SouthSub	46.00	484.00	88.00	4.50	3.20	147.02	82.23	0 01:06:41

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Fr
			(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	
1	4+00	Junction	1235.00	1241.00	0.00	6.00	500.00	0.90	1237.51	0.00	
2	5+50	Junction	1234.00	1242.50	0.00	6.00	500.00	174.12	1237.07	0.00	
3	63+00	Junction	1229.00	1231.00	0.00	6.00	0.00	49.09	1231.67	0.00	
4	68+00	Junction	1229.75	1235.75	0.00	6.00	0.00	23.50	1233.01	0.00	
5	77+00	Junction	1231.00	1237.00	0.00	6.00	500.00	7.15	1236.96	0.00	
6	79+50	Junction	1231.48	1237.48	0.00	6.00	500.00	7.99	1237.60	0.12	
7	82+00	Junction	1231.85	1237.85	0.00	6.00	500.00	8.01	1238.40	0.55	
8	86+00	Junction	1233.45	1239.45	0.00	6.00	500.00	8.05	1239.60	0.15	
9	93+50	Junction	1235.00	1242.50	0.00	6.00	500.00	376.33	1243.12	0.00	
10	10-Jun	Junction	1230.42	1234.50	0.00	0.00	500.00	18.52	1235.51	1.01	
11	Manhole	Junction	1228.00	1234.50	0.00	0.00	500.00	1.21	1237.06	0.56	
12	37+00	Outfall	1225.10					8.13	1227.10		
13	OverlandOutfall	Outfall	1235.00					565.31	1236.26		
14	DSPothole1	Storage Node	1235.05	1238.00	7.46		0.00	565.31	1237.02		
15	DSPothole2	Storage Node	1234.45	1238.00	13.27		0.00	565.31	1236.60		
16	South	Storage Node	1234.50	1238.00	0.00		0.00	82.19	1236.32		
17	Wetland	Storage Node	1234.00	1238.00	1235.00		0.00	682.82	1237.06		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness
					(ft)	(ft)	(ft)	(%)	(in)	
1	ExBrE1	Pipe	4+00	79+50	400.00	1235.00	1231.80	0.8000	12.000	0.0150
2	ExBrE2	Pipe	5+50	4+00	150.00	1236.50	1235.00	1.0000	12.000	0.0150
3	ExM1	Pipe	63+00	37+00	2600.00	1229.00	1225.10	0.1500	24.000	0.0150
4	ExM2	Pipe	77+00	63+00	1925.00	1231.00	1229.00	0.1000	21.000	0.0150
5	ExM3	Pipe	79+50	77+00	250.00	1231.48	1231.10	0.1500	22.000	0.0150
6	ExM4	Pipe	82+00	79+50	250.00	1231.85	1231.48	0.1500	22.000	0.0150
7	ExM5	Pipe	86+00	82+00	400.00	1233.45	1231.85	0.4000	22.000	0.0150
8	ExM6	Pipe	93+50	86+00	750.00	1236.50	1233.45	0.4100	20.000	0.0150
9	Intercept1	Pipe	5+50	Manhole	751.00	1233.00	1228.22	0.6400	15.000	0.0150
10	Intercept2	Pipe	93+50	5+50	1452.00	1235.24	1233.25	0.1400	12.000	0.0150
11	OutToMain	Pipe	68+00	63+00	32.50	1229.70	1229.67	0.0900	24.000	0.0150
12	PropBrC1	Pipe	10-Jun	63+00	370.00	1230.19	1229.65	0.1500	24.000	0.0150
13	BermB	Channel	Wetland	DSPothole1	30.00	1235.75	1235.50	0.8300	60.000	0.0300
14	Surface1	Channel	DSPothole2	OverlandOutfall	30.00	1235.20	1235.00	0.6700	60.000	0.0320
15	Surface2	Channel	DSPothole1	DSPothole2	30.00	1235.80	1235.60	0.6700	60.000	0.0320
16	Surface3	Channel	93+50	Wetland	1750.00	1242.00	1235.00	0.4000	60.000	0.0300
17	Surface4	Channel	5+50	Wetland	850.00	1234.00	1235.00	-0.1200	60.000	0.0300
18	FieldIntake	Orifice	South	10-Jun		1234.50	1230.42		36.000	
19	InletWeir	Weir	Manhole	Wetland		1228.00	1234.00			
20	OutletWeir	Weir	Wetland	68+00		1234.00	1229.75			

Total Time Reported
Surcharged Condition

(min)
865.00 SURCHARGED
0.00 Calculated
1254.00 SURCHARGED
909.00 SURCHARGED
918.00 SURCHARGED
915.00 SURCHARGED
894.00 SURCHARGED
884.00 SURCHARGED
2341.00 SURCHARGED
990.00 SURCHARGED
1061.00 SURCHARGED
454.00 SURCHARGED
0.00
0.00
0.00
0.00
0.00

Subbasin Hydrology

Subbasin : East

Input Data

Area (ac)	127
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	110.94	-	88
Composite Area & Weighted CN	110.94		88

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$T_c = (0.007 * ((n * L_f^{0.8})) / ((P^{0.5}) * (S_f^{0.4})))$

Where :

- Tc = Time of Concentration (hr)
- n = Manning's roughness
- Lf = Flow Length (ft)
- P = 2 yr, 24 hr Rainfall (inches)
- Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

- V = 16.1345 * (Sf^0.5) (unpaved surface)
- V = 20.3282 * (Sf^0.5) (paved surface)
- V = 15.0 * (Sf^0.5) (grassed waterway surface)
- V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
- V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
- V = 7.0 * (Sf^0.5) (short grass pasture surface)
- V = 5.0 * (Sf^0.5) (woodland surface)
- V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
- Tc = (Lf / V) / (3600 sec/hr)

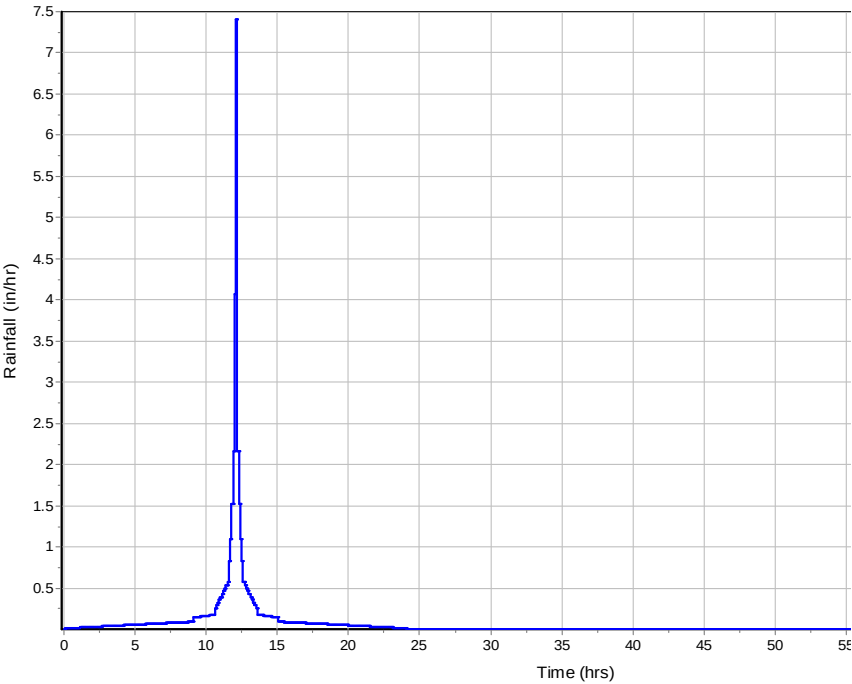
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.57	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.96	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3500	0	0
Slope (%) :	0.57	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.68	0	0
Computed Flow Time (min) :	85.78	0	0
Total TOC (min)	99.75		

Subbasin Runoff Results

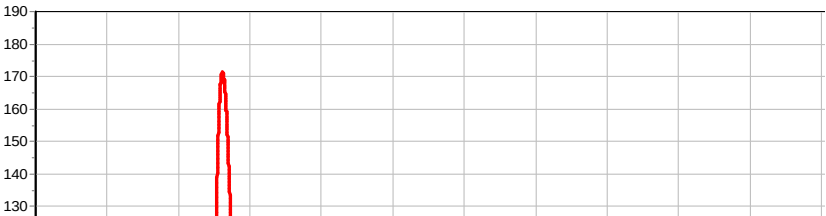
Total Rainfall (in)	4.5
Total Runoff (in)	3.2
Peak Runoff (cfs)	171.26
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:39:45

Subbasin : East

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Main

Input Data

Area (ac)	170
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	176.62	-	88
Composite Area & Weighted CN	176.62		88

Time of Concentration

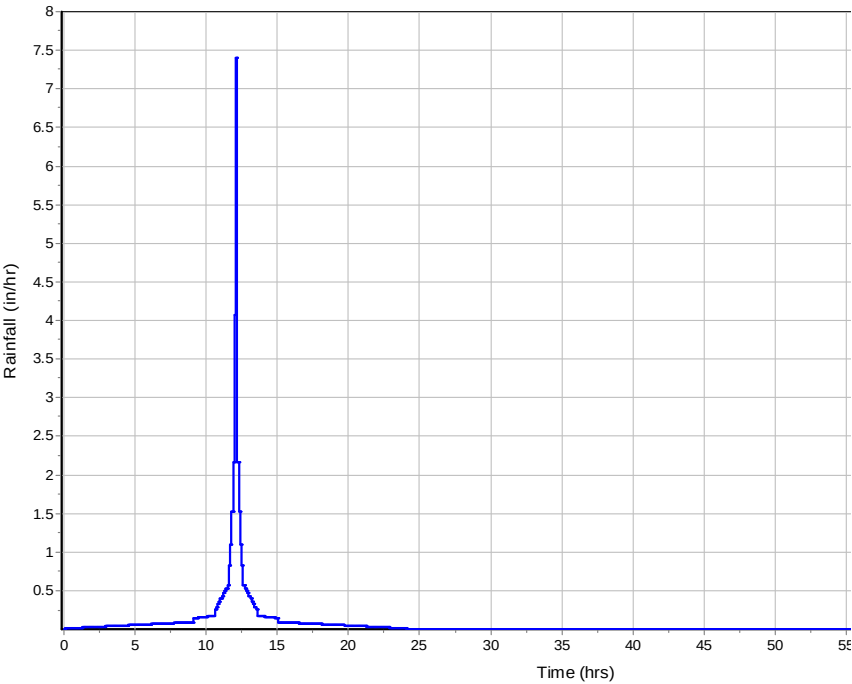
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr., 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	11.15	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3200	0	0
Slope (%) :	1	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.9	0	0
Computed Flow Time (min) :	59.26	0	0
Total TOC (min)	70.41		

Subbasin Runoff Results

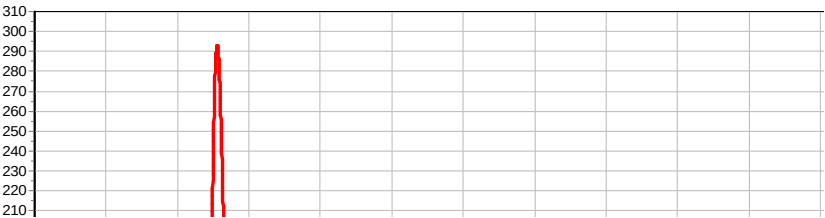
Total Rainfall (in)	4.5
Total Runoff (in)	3.2
Peak Runoff (cfs)	292.93
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:10:25

Subbasin : Main

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : North

Input Data

Area (ac)	365
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	348.09	-	88
Composite Area & Weighted CN	348.09		88

Time of Concentration

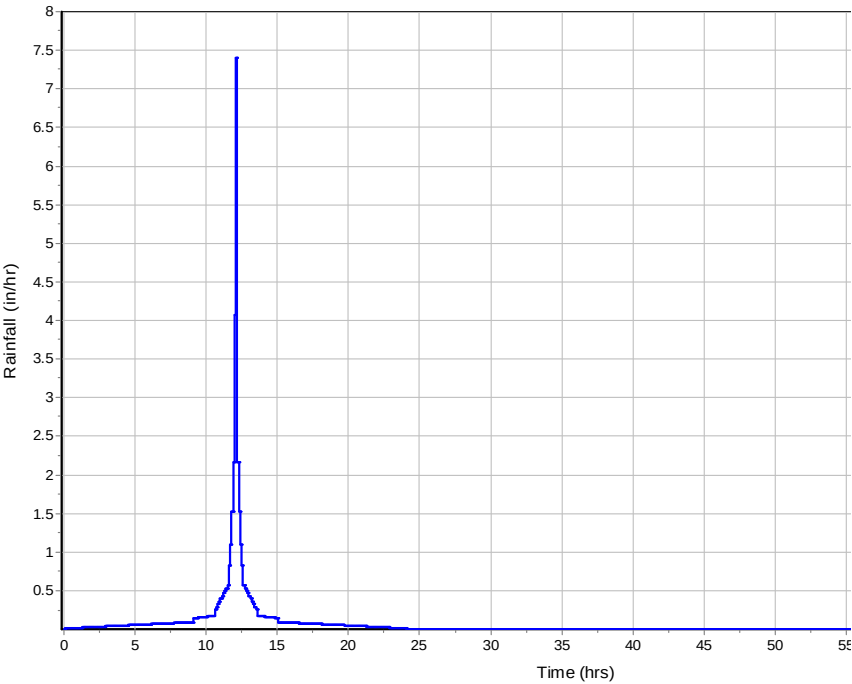
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.59	0	0
2 yr., 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.77	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	5400	0	0
Slope (%) :	0.59	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.69	0	0
Computed Flow Time (min) :	130.43	0	0
Total TOC (min)	144.21		

Subbasin Runoff Results

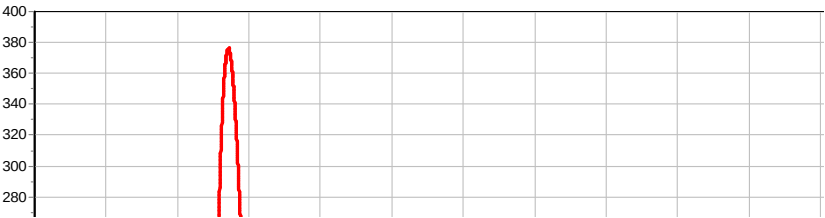
Total Rainfall (in)	4.5
Total Runoff (in)	3.2
Peak Runoff (cfs)	376.41
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 02:24:13

Subbasin : North

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SouthSub

Input Data

Area (ac)	46
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	41.1	-	88
Composite Area & Weighted CN	41.1		88

Time of Concentration

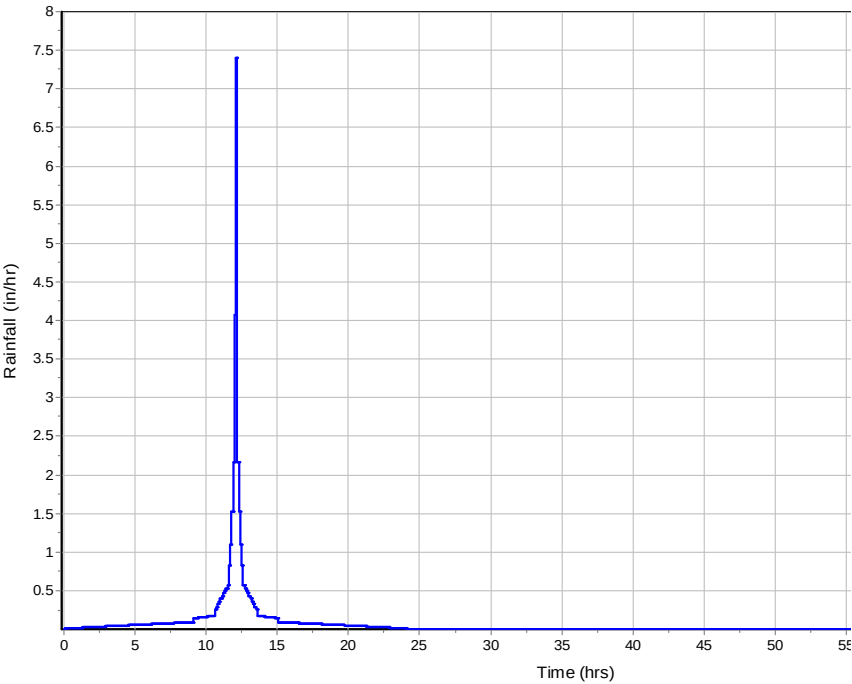
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.74	0	0
2 yr., 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	12.58	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	2500	0	0
Slope (%) :	0.74	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.77	0	0
Computed Flow Time (min) :	54.11	0	0
Total TOC (min)	66.69		

Subbasin Runoff Results

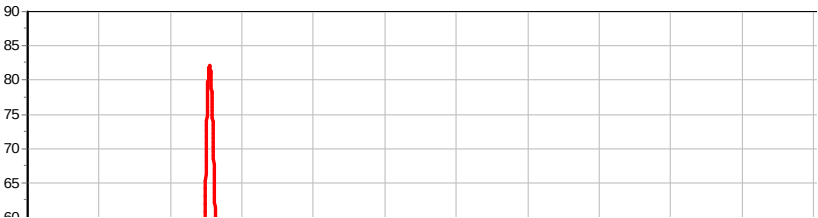
Total Rainfall (in)	4.5
Total Runoff (in)	3.2
Peak Runoff (cfs)	82.23
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:06:41

Subbasin : SouthSub

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	4+00	1235.00	1241.00	6.00	0.00	-1235.00	6.00	-1235.00	500.00	0.00
2	5+50	1234.00	1242.50	8.50	0.00	-1234.00	6.00	-1236.50	500.00	0.00
3	63+00	1229.00	1231.00	2.00	0.00	-1229.00	6.00	-1225.00	0.00	0.00
4	68+00	1229.75	1235.75	6.00	0.00	-1229.75	6.00	-1229.75	0.00	0.00
5	77+00	1231.00	1237.00	6.00	0.00	-1231.00	6.00	-1231.00	500.00	0.00
6	79+50	1231.48	1237.48	6.00	0.00	-1231.48	6.00	-1231.48	500.00	0.00
7	82+00	1231.85	1237.85	6.00	0.00	-1231.85	6.00	-1231.85	500.00	0.00
8	86+00	1233.45	1239.45	6.00	0.00	-1233.45	6.00	-1233.45	500.00	0.00
9	93+50	1235.00	1242.50	7.50	0.00	-1235.00	6.00	-1236.50	500.00	0.00
10	10-Jun	1230.42	1234.50	4.08	0.00	-1230.42	0.00	-1234.50	500.00	0.00
11	Manhole	1228.00	1234.50	6.50	0.00	-1228.00	0.00	-1234.50	500.00	0.00

Junction Results

SN	Element	Peak	Peak	Max HGL	Max HGL	Max	Min	Average HGL	Average HGL	Time of	1
ID	Inflow	Lateral	Elevation	Depth	Surcharge	Freeboard	Elevation	Depth	Max HGL		
	Inflow	Attained	Attained	Depth	Attained	Attained	Attained	Attained	Occurrence	FI	
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days h	Occu
1	4+00	0.90	0.00	1237.51	2.51	0.00	3.49	1235.40	0.40	0 10:44	0
2	5+50	174.12	171.26	1237.07	3.07	0.00	5.43	1235.36	1.36	0 13:43	0
3	63+00	49.09	0.00	1231.67	2.67	0.00	0.00	1230.30	1.30	0 11:04	0
4	68+00	23.50	0.00	1233.01	3.26	0.00	2.74	1230.87	1.12	0 13:44	0
5	77+00	7.15	0.00	1236.96	5.96	0.00	0.04	1232.22	1.22	0 13:57	0
6	79+50	7.99	0.00	1237.60	6.12	0.12	0.00	1232.67	1.19	0 13:57	0
7	82+00	8.01	0.00	1238.40	6.55	0.55	0.00	1233.09	1.24	0 13:57	0
8	86+00	8.05	0.00	1239.60	6.15	0.15	0.00	1234.58	1.13	0 13:54	0
9	93+50	376.33	376.33	1243.12	8.12	0.00	3.88	1236.80	1.80	0 13:39	0
10	10-Jun	18.52	0.00	1235.51	5.09	1.01	0.00	1231.12	0.70	0 14:03	0
11	Manhole	1.21	0.00	1237.06	9.06	0.56	0.00	1234.75	6.75	0 13:44	0

Channel Input

SN	Element ID	Length	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Ent L
1	BermB	30.00	1235.75	1.75	1235.50	0.45	0.25	0.8300	Trapezoidal	5.000	900.000	0.0300	0
2	Surface1	30.00	1235.20	0.75	1235.00	0.00	0.20	0.6700	Parabolic	5.000	400.000	0.0320	0
3	Surface2	30.00	1235.80	0.75	1235.60	1.15	0.20	0.6700	Parabolic	5.000	500.000	0.0320	0
4	Surface3	1750.00	1242.00	7.00	1235.00	1.00	7.00	0.4000	Parabolic	5.000	400.000	0.0300	0
5	Surface4	850.00	1234.00	0.00	1235.00	1.00	-1.00	-0.1200	Parabolic	5.000	400.000	0.0300	0

Channel Results

SN	Element	Peak	Time of	Design Flow	Peak Flow/	Peak Flow	Travel	Peak Flow	Peak Flow	Total Time	Fr
	ID	Flow	Peak Flow	Capacity	Design Flow	Velocity	Time	Depth	Depth/	Surcharged	Nur
			Occurrence		Ratio				Total Depth		
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	BermB	565.31	0 13:44	26182.41	0.02	1.34	0.37	1.41	0.28	0.00	
2	Surface1	565.31	0 13:44	11277.87	0.05	3.10	0.16	1.33	0.27	0.00	
3	Surface2	565.31	0 13:44	14098.75	0.04	3.25	0.15	1.11	0.22	0.00	
4	Surface3	365.12	0 13:39	9318.19	0.04	1.53	19.06	1.59	0.32	0.00	
5	Surface4	150.98	0 13:12	5053.50	0.03	0.34	41.67	2.56	0.51	0.00	

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness
1	ExBrE1	400.00	1235.00	0.00	1231.80	0.32	3.20	0.8000	CIRCULAR	12.000	12.000	0.0150
2	ExBrE2	150.00	1236.50	2.50	1235.00	0.00	1.50	1.0000	CIRCULAR	12.000	12.000	0.0150
3	ExM1	2600.00	1229.00	0.00	1225.10	0.00	3.90	0.1500	CIRCULAR	24.000	24.000	0.0150
4	ExM2	1925.00	1231.00	0.00	1229.00	0.00	2.00	0.1000	CIRCULAR	21.000	21.000	0.0150
5	ExM3	250.00	1231.48	0.00	1231.10	0.10	0.38	0.1500	CIRCULAR	21.960	21.960	0.0150
6	ExM4	250.00	1231.85	0.00	1231.48	0.00	0.37	0.1500	CIRCULAR	21.960	21.960	0.0150
7	ExM5	400.00	1233.45	0.00	1231.85	0.00	1.60	0.4000	CIRCULAR	21.960	21.960	0.0150
8	ExM6	750.00	1236.50	1.50	1233.45	0.00	3.05	0.4100	CIRCULAR	20.040	20.040	0.0150
9	Intercept1	751.00	1233.00	-1.00	1228.22	0.22	4.78	0.6400	CIRCULAR	15.000	15.000	0.0150
10	Intercept2	1452.00	1235.24	0.24	1233.25	-0.75	1.99	0.1400	CIRCULAR	12.000	12.000	0.0150
11	OutToMain	32.50	1229.70	-0.05	1229.67	0.67	0.03	0.0900	CIRCULAR	24.000	24.000	0.0150
12	PropBrC1	370.00	1230.19	-0.23	1229.65	0.65	0.54	0.1500	CIRCULAR	24.000	24.000	0.0150

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	F Nu
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	ExBrE1	0.90	0 14:25	2.76	0.33	1.15	5.80	1.00	1.00	865.00	
2	ExBrE2	0.90	0 14:25	3.09	0.29	1.56	1.60	0.78	0.78	0.00	
3	ExM1	8.13	0 11:17	7.59	1.07	2.73	15.87	2.00	1.00	1254.00	
4	ExM2	7.15	0 10:50	4.43	1.62	2.97	10.80	1.75	1.00	909.00	
5	ExM3	7.15	0 10:49	6.06	1.18	2.71	1.54	1.83	1.00	918.00	
6	ExM4	7.99	0 13:58	5.98	1.34	3.03	1.38	1.83	1.00	915.00	
7	ExM5	8.01	0 13:30	9.83	0.81	3.03	2.20	1.83	1.00	894.00	
8	ExM6	8.05	0 13:21	7.69	1.05	3.98	3.14	1.67	1.00	884.00	
9	Intercept1	0.92	0 09:42	4.91	0.19	1.10	11.38	1.25	1.00	2341.00	
10	Intercept2	2.31	0 10:54	0.90	2.56	3.05	7.93	1.00	1.00	990.00	
11	OutToMain	23.50	0 13:44	9.73	2.42	7.48	0.07	2.00	1.00	1061.00	
12	PropBrC1	18.52	0 14:04	8.94	2.07	5.90	1.05	2.00	1.00	454.00	

Storage Nodes

Storage Node : DSPothole1

Input Data

Invert Elevation (ft)	1235.05
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	2.95
Initial Water Elevation (ft)	7.46
Initial Water Depth (ft)	-1227.59
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	565.31
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	565.31
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.02
Max HGL Depth Attained (ft)	1.97
Average HGL Elevation Attained (ft)	1235.72
Average HGL Depth Attained (ft)	0.67
Time of Max HGL Occurrence (days hh:mm)	0 13:44
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : DSPothole2

Input Data

Invert Elevation (ft)	1234.45
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.55
Initial Water Elevation (ft)	13.27
Initial Water Depth (ft)	-1221.18
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	565.31
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	565.31
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1236.6
Max HGL Depth Attained (ft)	2.15
Average HGL Elevation Attained (ft)	1235.16
Average HGL Depth Attained (ft)	0.71
Time of Max HGL Occurrence (days hh:mm)	0 13:44
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : South

Input Data

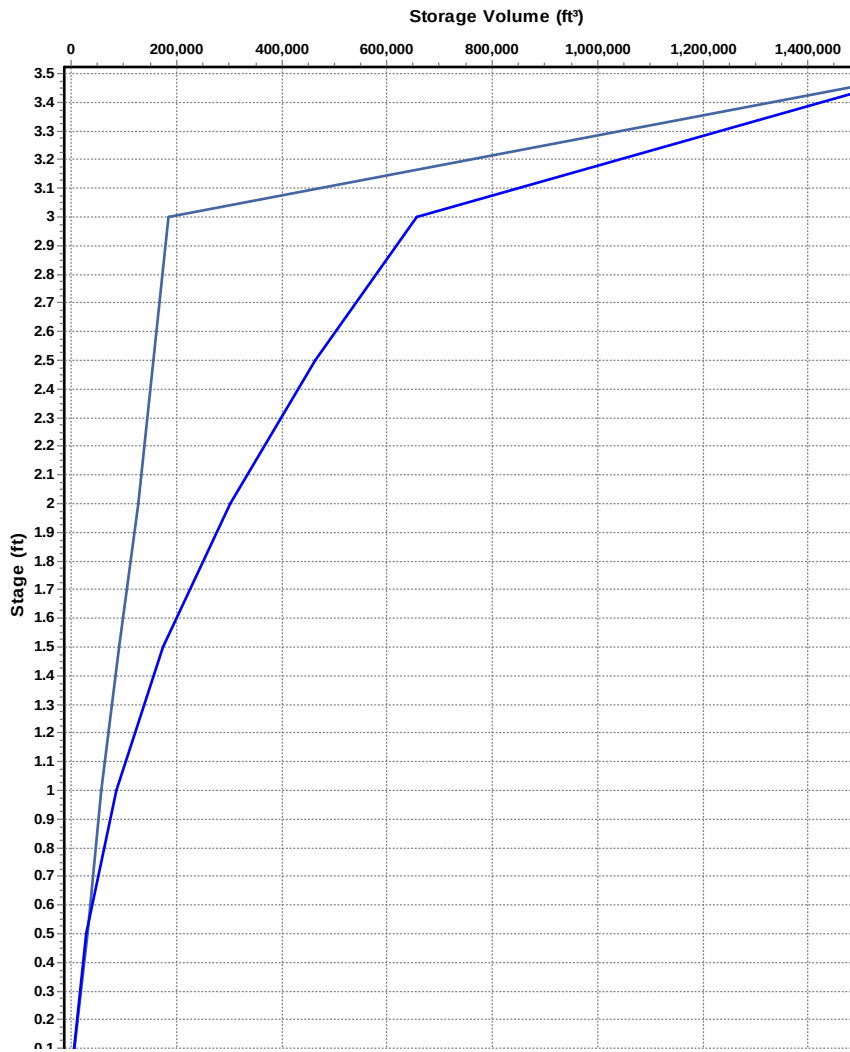
Invert Elevation (ft)	1234.50
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1234.50
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : South

Stage	Storage Area	Storage Volume
(ft)	(ft²)	(ft³)
0	23310	0
0.5	90698	28502
1	142584	86822.5
1.5	213336	175802.5
2	293892	302609.5
2.5	352900	464307.5
3	412854	655746
3.5	3436773	1618152.75

Storage Area Volume Curves



Storage Node : South (continued)

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Elevation
1	FieldIntake	Bottom	CIRCULAR	No	36.00			1

Output Summary Results

Peak Inflow (cfs)	82.19
Peak Lateral Inflow (cfs)	82.19
Peak Outflow (cfs)	18.52
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1236.32
Max HGL Depth Attained (ft)	1.82
Average HGL Elevation Attained (ft)	1234.64
Average HGL Depth Attained (ft)	0.14
Time of Max HGL Occurrence (days hh:mm)	0 14:03
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland

Input Data

Invert Elevation (ft)	1234.00
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	4.00
Initial Water Elevation (ft)	1235.00
Initial Water Depth (ft)	1.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

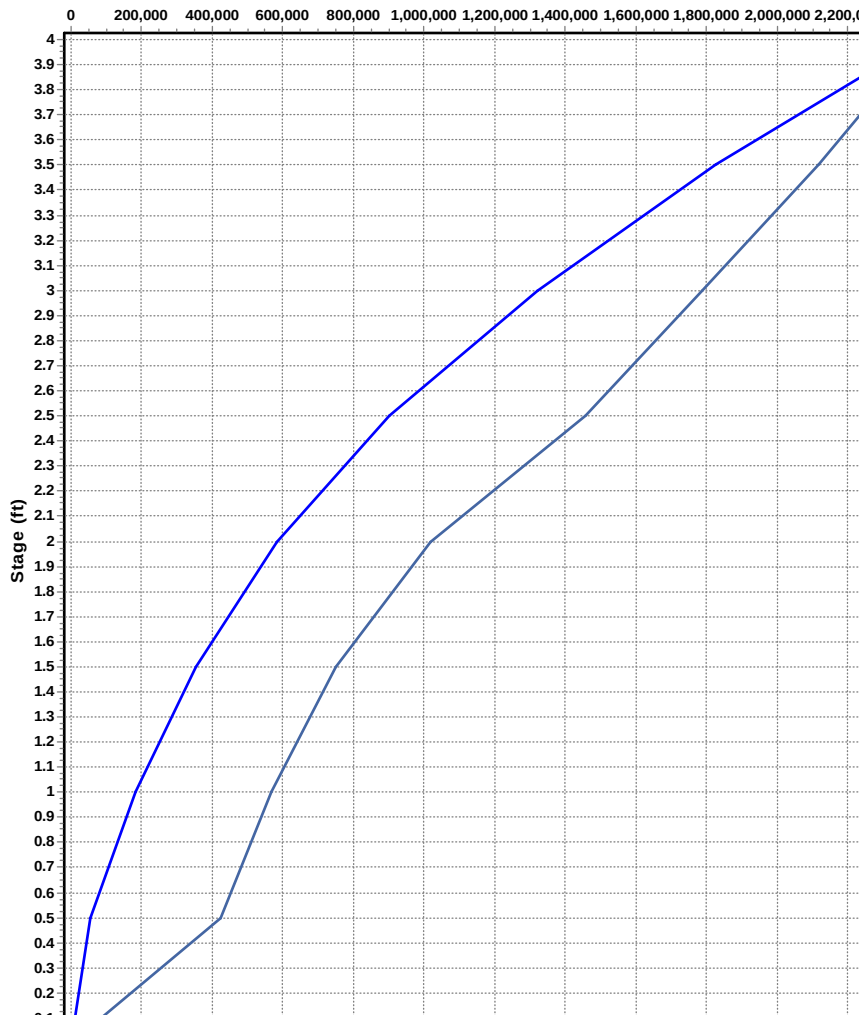
Storage Area Volume Curves

Storage Curve : Wetland

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	838.23	0
0.5	219747	55146.31
1	293589	183480.31
1.5	388326	353959.06
2	527219	582845.31
2.5	754330.87	903232.78
3	924643.26	1322976.31
3.5	1094309.91	1827714.6
4	1247155.1	2413080.85

Storage Area Volume Curves

Storage Volume (ft³)



Storage Node : Wetland (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Dis Coe
1	OutletWeir	Rectangular	No	1235.00	1.00	4.00	1.00	

Output Summary Results

Peak Inflow (cfs)	682.82
Peak Lateral Inflow (cfs)	292.86
Peak Outflow (cfs)	588.81
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.06
Max HGL Depth Attained (ft)	3.06
Average HGL Elevation Attained (ft)	1235.47
Average HGL Depth Attained (ft)	1.47
Time of Max HGL Occurrence (days hh:mm)	0 13:44
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name 128928_Proposed_Final.SPF

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method SCS TR-20
Time of Concentration (TOC) Method SCS TR-55
Link Routing Method Hydrodynamic
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On 00:00:00 0:00:00
End Analysis On 00:00:00 0:00:00
Start Reporting On 00:00:00 0:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:00:30 days hh:mm:ss
Routing Time Step 5 seconds

Number of Elements

Qty
Rain Gages 1
Subbasins..... 4
Nodes..... 17
 Junctions 11
 Outfalls 2
 Flow Diversions 0
 Inlets 0
 Storage Nodes 4
Links..... 20
 Channels 5
 Pipes 12
 Pumps 0
 Orifices 1
 Weirs 2
 Outlets 0
Pollutants 0
Land Uses 0

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate	Weighted Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)	Factor		(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	East	127.00	484.00	88.00	5.60	4.24	538.73	226.21	0 01:39:45
2	Main	170.00	484.00	88.00	5.60	4.24	721.14	384.93	0 01:10:24
3	North	365.00	484.00	88.00	5.60	4.24	1548.33	497.58	0 02:24:12
4	SouthSub	46.00	484.00	88.00	5.60	4.24	195.13	108.24	0 01:06:41

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Fr
			(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	
1	4+00	Junction	1235.00	1241.00	0.00	6.00	500.00	0.92	1237.42	0.00	
2	5+50	Junction	1234.00	1242.50	0.00	6.00	500.00	228.96	1237.31	0.00	
3	63+00	Junction	1229.00	1231.00	0.00	6.00	0.00	51.61	1231.67	0.00	
4	68+00	Junction	1229.75	1235.75	0.00	6.00	0.00	25.22	1233.21	0.00	
5	77+00	Junction	1231.00	1237.00	0.00	6.00	500.00	7.20	1237.06	0.06	
6	79+50	Junction	1231.48	1237.48	0.00	6.00	500.00	8.02	1237.71	0.23	
7	82+00	Junction	1231.85	1237.85	0.00	6.00	500.00	8.04	1238.52	0.67	
8	86+00	Junction	1233.45	1239.45	0.00	6.00	500.00	8.12	1239.72	0.27	
9	93+50	Junction	1235.00	1242.50	0.00	6.00	500.00	497.42	1243.28	0.00	
10	10-Jun	Junction	1230.42	1234.50	0.00	0.00	500.00	19.33	1235.85	1.35	
11	Manhole	Junction	1228.00	1234.50	0.00	0.00	500.00	0.95	1237.29	0.79	
12	37+00	Outfall	1225.10					8.13	1227.10		
13	OverlandOutfall	Outfall	1235.00					784.62	1236.46		
14	DSPothole1	Storage Node	1235.05	1238.00	7.46		0.00	784.63	1237.25		
15	DSPothole2	Storage Node	1234.45	1238.00	13.27		0.00	784.62	1236.84		
16	South	Storage Node	1234.50	1238.00	0.00		0.00	108.23	1236.71		
17	Wetland	Storage Node	1234.00	1238.00	1235.00		0.00	913.91	1237.29		

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness
					(ft)	(ft)	(ft)	(%)	(in)	
1	ExBrE1	Pipe	4+00	79+50	400.00	1235.00	1231.80	0.8000	12.000	0.0150
2	ExBrE2	Pipe	5+50	4+00	150.00	1236.50	1235.00	1.0000	12.000	0.0150
3	ExM1	Pipe	63+00	37+00	2600.00	1229.00	1225.10	0.1500	24.000	0.0150
4	ExM2	Pipe	77+00	63+00	1925.00	1231.00	1229.00	0.1000	21.000	0.0150
5	ExM3	Pipe	79+50	77+00	250.00	1231.48	1231.10	0.1500	22.000	0.0150
6	ExM4	Pipe	82+00	79+50	250.00	1231.85	1231.48	0.1500	22.000	0.0150
7	ExM5	Pipe	86+00	82+00	400.00	1233.45	1231.85	0.4000	22.000	0.0150
8	ExM6	Pipe	93+50	86+00	750.00	1236.50	1233.45	0.4100	20.000	0.0150
9	Intercept1	Pipe	5+50	Manhole	751.00	1233.00	1228.22	0.6400	15.000	0.0150
10	Intercept2	Pipe	93+50	5+50	1452.00	1235.24	1233.25	0.1400	12.000	0.0150
11	OutToMain	Pipe	68+00	63+00	32.50	1229.70	1229.67	0.0900	24.000	0.0150
12	PropBrC1	Pipe	10-Jun	63+00	370.00	1230.19	1229.65	0.1500	24.000	0.0150
13	BermB	Channel	Wetland	DSPothole1	30.00	1235.75	1235.50	0.8300	60.000	0.0300
14	Surface1	Channel	DSPothole2	OverlandOutfall	30.00	1235.20	1235.00	0.6700	60.000	0.0320
15	Surface2	Channel	DSPothole1	DSPothole2	30.00	1235.80	1235.60	0.6700	60.000	0.0320
16	Surface3	Channel	93+50	Wetland	1750.00	1242.00	1235.00	0.4000	60.000	0.0300
17	Surface4	Channel	5+50	Wetland	850.00	1234.00	1235.00	-0.1200	60.000	0.0300
18	FieldIntake	Orifice	South	10-Jun		1234.50	1230.42		36.000	
19	InletWeir	Weir	Manhole	Wetland		1228.00	1234.00			
20	OutletWeir	Weir	Wetland	68+00		1234.00	1229.75			

Total Time Reported
Surcharged Condition

(min)
936.00 SURCHARGED
0.00 Calculated
1331.00 SURCHARGED
972.00 SURCHARGED
985.00 SURCHARGED
983.00 SURCHARGED
964.00 SURCHARGED
954.00 SURCHARGED
2414.00 SURCHARGED
1052.00 SURCHARGED
1119.00 SURCHARGED
611.00 SURCHARGED
0.00
0.00
0.00
0.00
0.00

Subbasin Hydrology

Subbasin : East

Input Data

Area (ac)	127
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	110.94	-	88
Composite Area & Weighted CN	110.94		88

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$

Where :

- Tc = Time of Concentration (hr)
- n = Manning's roughness
- Lf = Flow Length (ft)
- P = 2 yr, 24 hr Rainfall (inches)
- Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

- V = 16.1345 * (Sf^0.5) (unpaved surface)
- V = 20.3282 * (Sf^0.5) (paved surface)
- V = 15.0 * (Sf^0.5) (grassed waterway surface)
- V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
- V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
- V = 7.0 * (Sf^0.5) (short grass pasture surface)
- V = 5.0 * (Sf^0.5) (woodland surface)
- V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
- Tc = (Lf / V) / (3600 sec/hr)

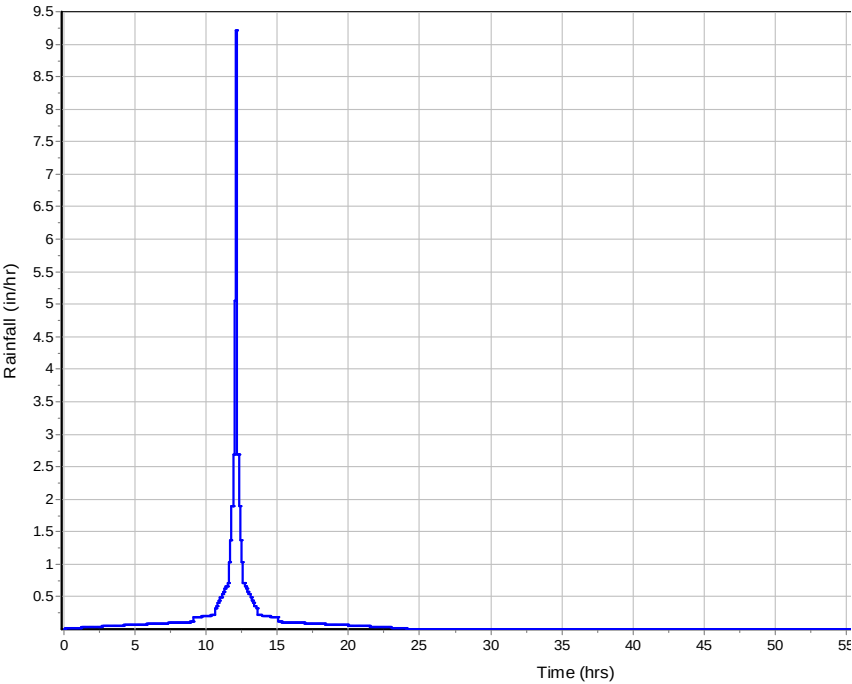
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.57	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.96	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3500	0	0
Slope (%) :	0.57	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.68	0	0
Computed Flow Time (min) :	85.78	0	0
Total TOC (min)	99.75		

Subbasin Runoff Results

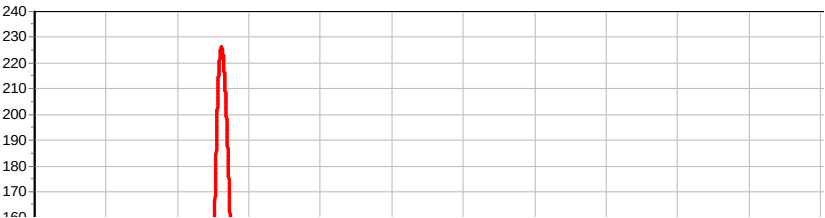
Total Rainfall (in)	5.6
Total Runoff (in)	4.24
Peak Runoff (cfs)	226.21
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:39:45

Subbasin : East

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Main

Input Data

Area (ac)	170
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	176.62	-	88
Composite Area & Weighted CN	176.62		88

Time of Concentration

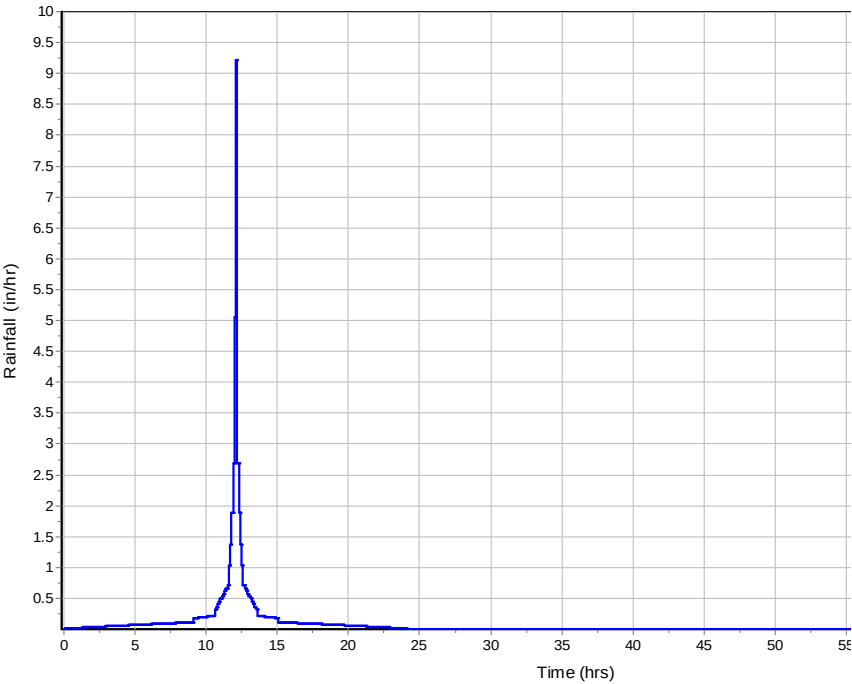
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr., 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	11.15	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3200	0	0
Slope (%) :	1	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.9	0	0
Computed Flow Time (min) :	59.26	0	0
Total TOC (min)	70.41		

Subbasin Runoff Results

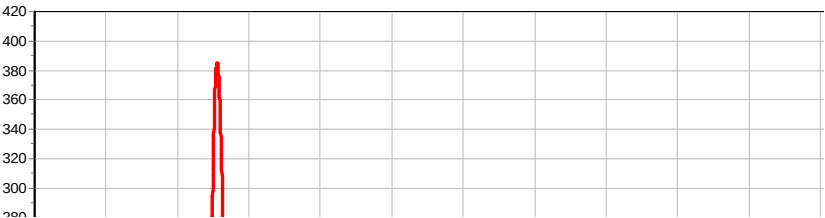
Total Rainfall (in)	5.6
Total Runoff (in)	4.24
Peak Runoff (cfs)	384.93
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:10:25

Subbasin : Main

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : North

Input Data

Area (ac)	365
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	348.09	-	88
Composite Area & Weighted CN	348.09		88

Time of Concentration

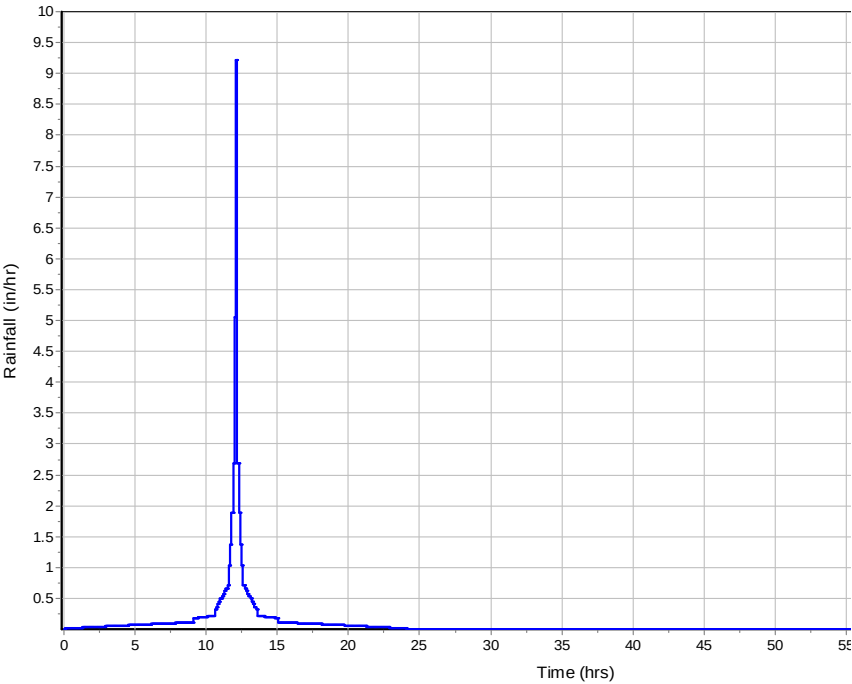
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.59	0	0
2 yr., 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.77	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	5400	0	0
Slope (%) :	0.59	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.69	0	0
Computed Flow Time (min) :	130.43	0	0
Total TOC (min)	144.21		

Subbasin Runoff Results

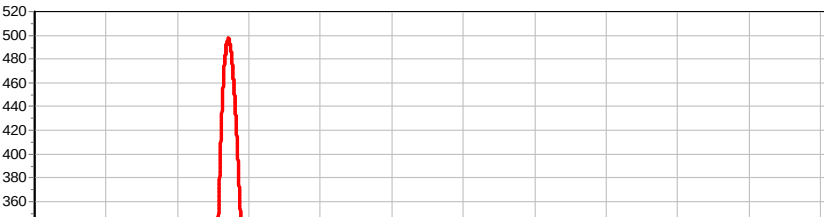
Total Rainfall (in)	5.6
Total Runoff (in)	4.24
Peak Runoff (cfs)	497.58
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 02:24:13

Subbasin : North

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SouthSub

Input Data

Area (ac)	46
Peak Rate Factor	484
Weighted Curve Number	88
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	41.1	-	88
Composite Area & Weighted CN	41.1		88

Time of Concentration

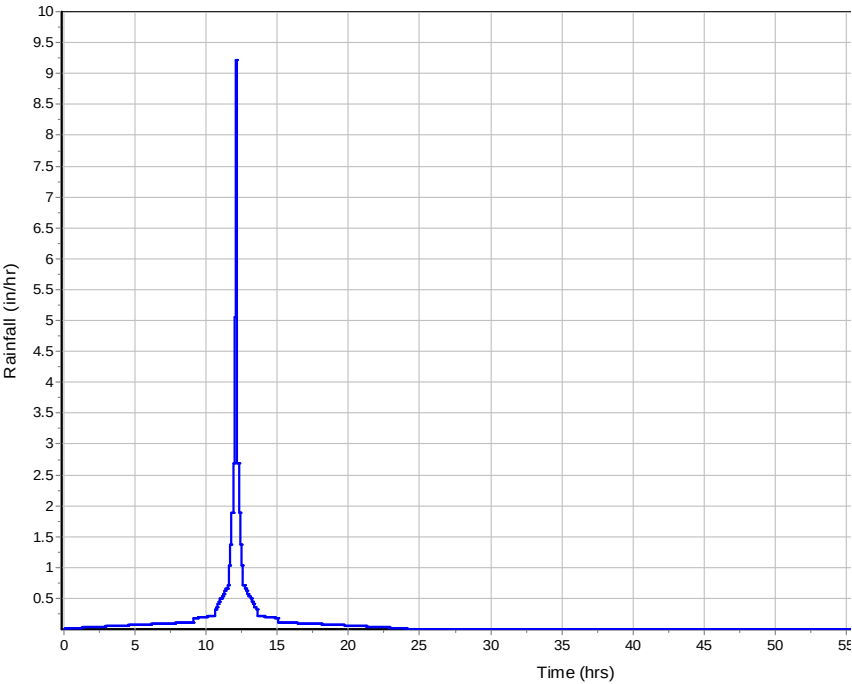
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.74	0	0
2 yr., 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	12.58	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	2500	0	0
Slope (%) :	0.74	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.77	0	0
Computed Flow Time (min) :	54.11	0	0
Total TOC (min)	66.69		

Subbasin Runoff Results

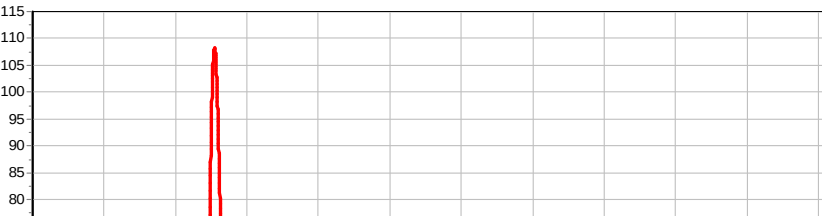
Total Rainfall (in)	5.6
Total Runoff (in)	4.24
Peak Runoff (cfs)	108.24
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:06:41

Subbasin : SouthSub

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	4+00	1235.00	1241.00	6.00	0.00	-1235.00	6.00	-1235.00	500.00	0.00
2	5+50	1234.00	1242.50	8.50	0.00	-1234.00	6.00	-1236.50	500.00	0.00
3	63+00	1229.00	1231.00	2.00	0.00	-1229.00	6.00	-1225.00	0.00	0.00
4	68+00	1229.75	1235.75	6.00	0.00	-1229.75	6.00	-1229.75	0.00	0.00
5	77+00	1231.00	1237.00	6.00	0.00	-1231.00	6.00	-1231.00	500.00	0.00
6	79+50	1231.48	1237.48	6.00	0.00	-1231.48	6.00	-1231.48	500.00	0.00
7	82+00	1231.85	1237.85	6.00	0.00	-1231.85	6.00	-1231.85	500.00	0.00
8	86+00	1233.45	1239.45	6.00	0.00	-1233.45	6.00	-1233.45	500.00	0.00
9	93+50	1235.00	1242.50	7.50	0.00	-1235.00	6.00	-1236.50	500.00	0.00
10	10-Jun	1230.42	1234.50	4.08	0.00	-1230.42	0.00	-1234.50	500.00	0.00
11	Manhole	1228.00	1234.50	6.50	0.00	-1228.00	0.00	-1234.50	500.00	0.00

Junction Results

SN	Element	Peak	Peak	Max HGL	Max HGL	Max	Min	Average HGL	Average HGL	Time of	1
ID	Inflow	Lateral	Elevation	Depth	Surcharge	Freeboard	Elevation	Depth	Max HGL		
	Inflow	Attained	Attained	Depth	Attained	Attained	Attained	Attained	Occurrence	FI	
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days h	
1	4+00	0.92	0.00	1237.42	2.42	0.00	3.58	1235.48	0.48	0 13:40	0
2	5+50	228.96	226.19	1237.31	3.31	0.00	5.19	1235.42	1.42	0 13:37	0
3	63+00	51.61	0.00	1231.67	2.67	0.00	0.00	1230.37	1.37	0 10:19	0
4	68+00	25.22	0.00	1233.21	3.46	0.00	2.54	1230.95	1.20	0 13:39	0
5	77+00	7.20	0.00	1237.06	6.06	0.06	0.00	1232.42	1.42	0 14:01	0
6	79+50	8.02	0.00	1237.71	6.23	0.23	0.00	1232.87	1.39	0 13:57	0
7	82+00	8.04	0.00	1238.52	6.67	0.67	0.00	1233.31	1.46	0 13:57	0
8	86+00	8.12	0.00	1239.72	6.27	0.27	0.00	1234.79	1.34	0 13:54	0
9	93+50	497.42	497.42	1243.28	8.28	0.00	3.72	1237.06	2.06	0 13:37	0
10	10-Jun	19.33	0.00	1235.85	5.43	1.35	0.00	1231.33	0.91	0 14:14	0
11	Manhole	0.95	0.00	1237.29	9.29	0.79	0.00	1234.89	6.89	0 13:39	0

Channel Input

SN	Element ID	Length	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Ent L
1	BermB	30.00	1235.75	1.75	1235.50	0.45	0.25	0.8300	Trapezoidal	5.000	900.000	0.0300	0
2	Surface1	30.00	1235.20	0.75	1235.00	0.00	0.20	0.6700	Parabolic	5.000	400.000	0.0320	0
3	Surface2	30.00	1235.80	0.75	1235.60	1.15	0.20	0.6700	Parabolic	5.000	500.000	0.0320	0
4	Surface3	1750.00	1242.00	7.00	1235.00	1.00	7.00	0.4000	Parabolic	5.000	400.000	0.0300	0
5	Surface4	850.00	1234.00	0.00	1235.00	1.00	-1.00	-0.1200	Parabolic	5.000	400.000	0.0300	0

Channel Results

SN	Element	Peak	Time of	Design Flow	Peak Flow/	Peak Flow	Travel	Peak Flow	Peak Flow	Total Time	Fr
	ID	Flow	Peak Flow	Capacity	Design Flow	Velocity	Time	Depth	Depth/	Surcharged	Nur
			Occurrence		Ratio				Total Depth		
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	BermB	784.63	0 13:39	26182.41	0.03	1.51	0.33	1.64	0.33	0.00	
2	Surface1	784.62	0 13:39	11277.87	0.07	3.41	0.15	1.55	0.31	0.00	
3	Surface2	784.62	0 13:39	14098.75	0.06	3.38	0.15	1.34	0.27	0.00	
4	Surface3	485.53	0 13:37	9318.19	0.05	1.71	17.06	1.79	0.36	0.00	
5	Surface4	205.67	0 13:13	5053.50	0.04	0.40	35.42	2.80	0.56	0.00	

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness
1	ExBrE1	400.00	1235.00	0.00	1231.80	0.32	3.20	0.8000	CIRCULAR	12.000	12.000	0.0150
2	ExBrE2	150.00	1236.50	2.50	1235.00	0.00	1.50	1.0000	CIRCULAR	12.000	12.000	0.0150
3	ExM1	2600.00	1229.00	0.00	1225.10	0.00	3.90	0.1500	CIRCULAR	24.000	24.000	0.0150
4	ExM2	1925.00	1231.00	0.00	1229.00	0.00	2.00	0.1000	CIRCULAR	21.000	21.000	0.0150
5	ExM3	250.00	1231.48	0.00	1231.10	0.10	0.38	0.1500	CIRCULAR	21.960	21.960	0.0150
6	ExM4	250.00	1231.85	0.00	1231.48	0.00	0.37	0.1500	CIRCULAR	21.960	21.960	0.0150
7	ExM5	400.00	1233.45	0.00	1231.85	0.00	1.60	0.4000	CIRCULAR	21.960	21.960	0.0150
8	ExM6	750.00	1236.50	1.50	1233.45	0.00	3.05	0.4100	CIRCULAR	20.040	20.040	0.0150
9	Intercept1	751.00	1233.00	-1.00	1228.22	0.22	4.78	0.6400	CIRCULAR	15.000	15.000	0.0150
10	Intercept2	1452.00	1235.24	0.24	1233.25	-0.75	1.99	0.1400	CIRCULAR	12.000	12.000	0.0150
11	OutToMain	32.50	1229.70	-0.05	1229.67	0.67	0.03	0.0900	CIRCULAR	24.000	24.000	0.0150
12	PropBrC1	370.00	1230.19	-0.23	1229.65	0.65	0.54	0.1500	CIRCULAR	24.000	24.000	0.0150

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	F Nu
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)	
1	ExBrE1	0.92	0 14:42	2.76	0.33	1.17	5.70	1.00	1.00	936.00	
2	ExBrE2	0.92	0 14:42	3.09	0.30	1.57	1.59	0.90	0.90	0.00	
3	ExM1	8.13	0 10:34	7.59	1.07	2.73	15.87	2.00	1.00	1331.00	
4	ExM2	7.17	0 14:01	4.43	1.62	2.98	10.77	1.75	1.00	972.00	
5	ExM3	7.20	0 13:37	6.06	1.19	2.73	1.53	1.83	1.00	985.00	
6	ExM4	8.02	0 13:57	5.98	1.34	3.04	1.37	1.83	1.00	983.00	
7	ExM5	8.04	0 13:33	9.83	0.82	3.05	2.19	1.83	1.00	964.00	
8	ExM6	8.12	0 13:11	7.69	1.06	3.96	3.16	1.67	1.00	954.00	
9	Intercept1	0.95	0 08:45	4.91	0.19	1.13	11.08	1.25	1.00	2414.00	
10	Intercept2	2.30	0 10:05	0.90	2.55	3.00	8.07	1.00	1.00	1052.00	
11	OutToMain	25.22	0 13:39	9.73	2.59	8.03	0.07	2.00	1.00	1119.00	
12	PropBrC1	19.33	0 14:14	8.94	2.16	6.15	1.00	2.00	1.00	611.00	

Storage Nodes

Storage Node : DSPothole1

Input Data

Invert Elevation (ft)	1235.05
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	2.95
Initial Water Elevation (ft)	7.46
Initial Water Depth (ft)	-1227.59
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	784.63
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	784.62
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.25
Max HGL Depth Attained (ft)	2.2
Average HGL Elevation Attained (ft)	1235.75
Average HGL Depth Attained (ft)	0.7
Time of Max HGL Occurrence (days hh:mm)	0 13:39
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : DSPothole2

Input Data

Invert Elevation (ft)	1234.45
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.55
Initial Water Elevation (ft)	13.27
Initial Water Depth (ft)	-1221.18
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	784.62
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	784.62
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1236.84
Max HGL Depth Attained (ft)	2.39
Average HGL Elevation Attained (ft)	1235.19
Average HGL Depth Attained (ft)	0.74
Time of Max HGL Occurrence (days hh:mm)	0 13:39
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : South

Input Data

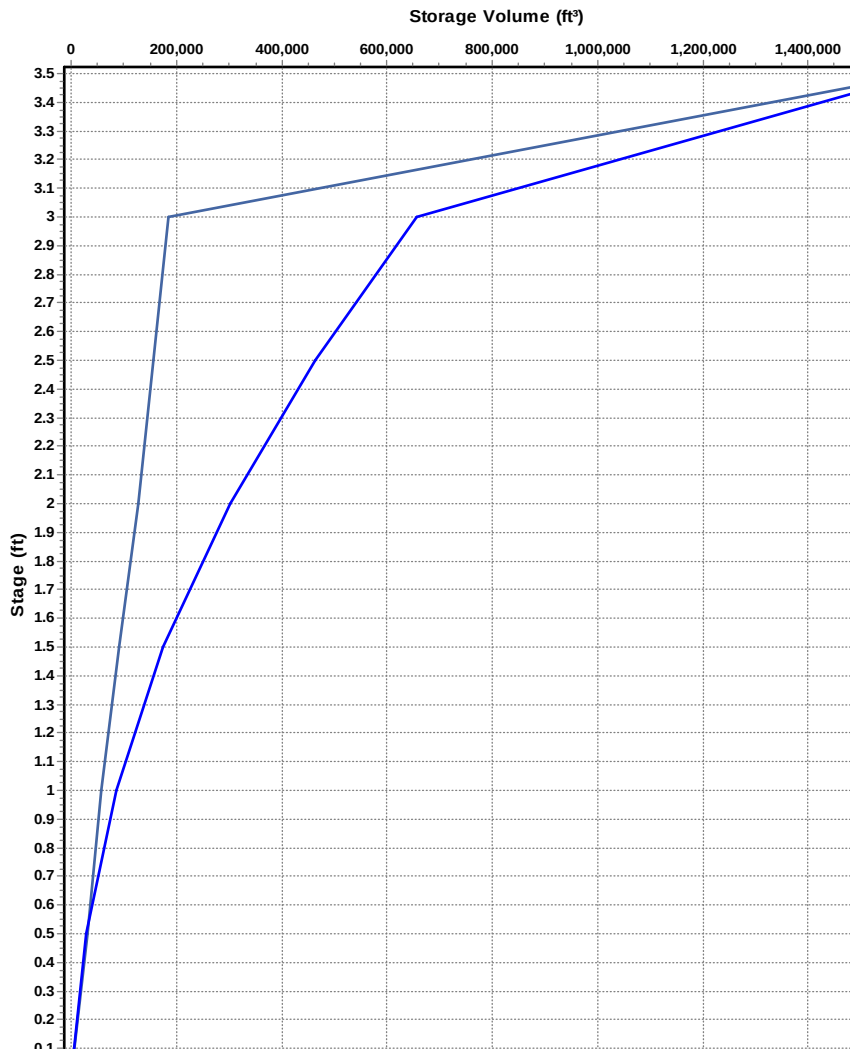
Invert Elevation (ft)	1234.50
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1234.50
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : South

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	23310	0
0.5	90698	28502
1	142584	86822.5
1.5	213336	175802.5
2	293892	302609.5
2.5	352900	464307.5
3	412854	655746
3.5	3436773	1618152.75

Storage Area Volume Curves



Storage Node : South (continued)

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Elevation
1	FieldIntake	Bottom	CIRCULAR	No	36.00			1

Output Summary Results

Peak Inflow (cfs)	108.23
Peak Lateral Inflow (cfs)	108.23
Peak Outflow (cfs)	19.33
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1236.71
Max HGL Depth Attained (ft)	2.21
Average HGL Elevation Attained (ft)	1234.73
Average HGL Depth Attained (ft)	0.23
Time of Max HGL Occurrence (days hh:mm)	0 14:14
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland

Input Data

Invert Elevation (ft)	1234.00
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	4.00
Initial Water Elevation (ft)	1235.00
Initial Water Depth (ft)	1.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

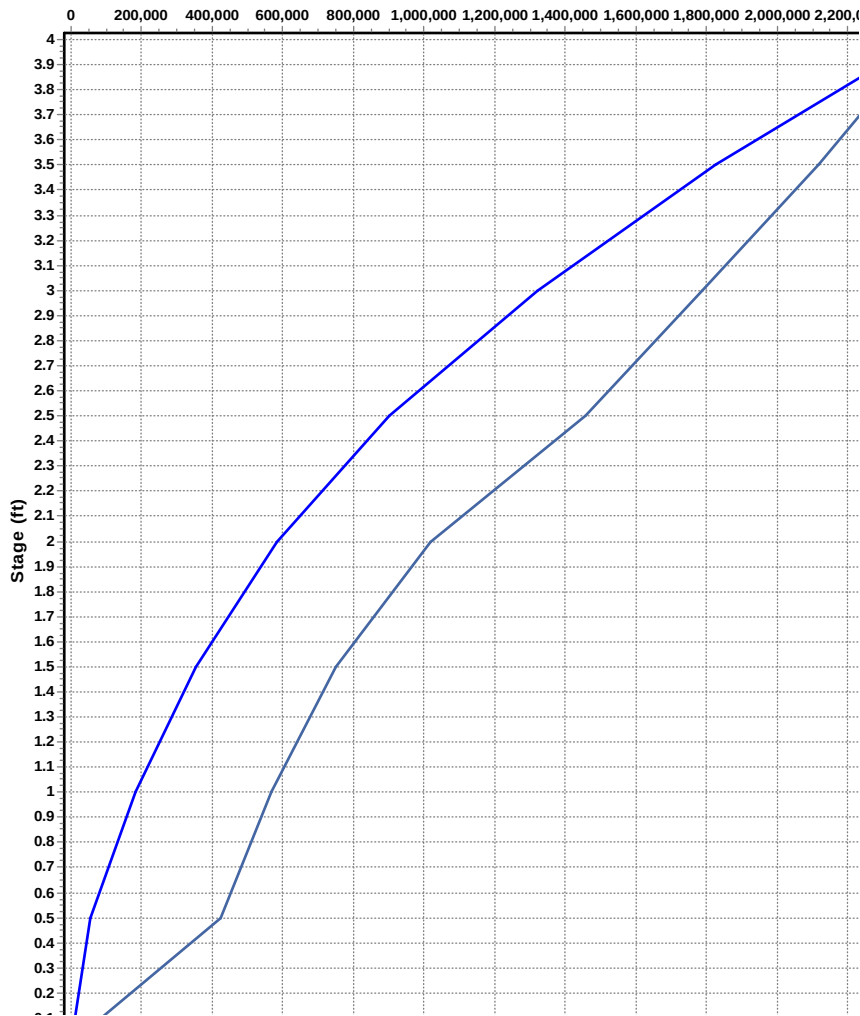
Storage Area Volume Curves

Storage Curve : Wetland

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	838.23	0
0.5	219747	55146.31
1	293589	183480.31
1.5	388326	353959.06
2	527219	582845.31
2.5	754330.87	903232.78
3	924643.26	1322976.31
3.5	1094309.91	1827714.6
4	1247155.1	2413080.85

Storage Area Volume Curves

Storage Volume (ft³)



Storage Node : Wetland (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Dis Coe
1	OutletWeir	Rectangular	No	1235.00	1.00	4.00	1.00	

Output Summary Results

Peak Inflow (cfs)	913.91
Peak Lateral Inflow (cfs)	384.93
Peak Outflow (cfs)	809.85
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.29
Max HGL Depth Attained (ft)	3.29
Average HGL Elevation Attained (ft)	1235.52
Average HGL Depth Attained (ft)	1.52
Time of Max HGL Occurrence (days hh:mm)	0 13:39
Total Exfiltration Volume (1000-ft³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name 128928_Proposed_Final.SPF

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method SCS TR-20
Time of Concentration (TOC) Method SCS TR-55
Link Routing Method Hydrodynamic
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On 00:00:00 0:00:00
End Analysis On 00:00:00 0:00:00
Start Reporting On 00:00:00 0:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:00:30 days hh:mm:ss
Routing Time Step 5 seconds

Number of Elements

Qty
Rain Gages 1
Subbasins..... 4
Nodes..... 17
 Junctions 11
 Outfalls 2
 Flow Diversions 0
 Inlets 0
 Storage Nodes 4
Links..... 20
 Channels 5
 Pipes 12
 Pumps 0
 Orifices 1
 Weirs 2
 Outlets 0
Pollutants 0
Land Uses 0

Rainfall Details

SN	Rain Gage	Data	Data Source	Rainfall	Rain	State	County	Return	Rainfall	Rainfall
	ID	Source	ID	Type	Units			Period	Depth	Distribution
								(years)	(inches)	
1	Rain Gage-01	Time Series	MSE3-100yr	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate	Weighted	Total	Total	Total	Peak	Time of
			Factor	Curve	Rainfall	Runoff	Runoff	Runoff	Concentration
		(ac)		Number	(in)	(in)	Volume	(cfs)	(days hh:mm:ss)
							(ac-in)		
1	East	127.00	484.00	88.00	7.80	6.37	809.37	335.56	0 01:39:45
2	Main	170.00	484.00	88.00	7.80	6.37	1083.41	570.54	0 01:10:24
3	North	365.00	484.00	88.00	7.80	6.37	2326.15	738.74	0 02:24:12
4	SouthSub	46.00	484.00	88.00	7.80	6.37	293.16	160.27	0 01:06:41

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft ²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1	4+00	Junction	1235.00	1241.00	0.00	6.00	500.00	0.94	1237.78	0.00	3.22	0 00:00	0.00	0.00
2	5+50	Junction	1234.00	1242.50	0.00	6.00	500.00	337.87	1237.72	0.00	4.78	0 00:00	0.00	0.00
3	63+00	Junction	1229.00	1231.00	0.00	6.00	0.00	55.60	1231.67	0.00	0.00	0 13:40	558.92	1337.00
4	68+00	Junction	1229.75	1235.75	0.00	6.00	0.00	27.89	1233.55	0.00	2.20	0 00:00	0.00	0.00
5	77+00	Junction	1231.00	1237.00	0.00	6.00	500.00	7.38	1237.28	0.28	0.00	0 13:08	0.10	149.00
6	79+50	Junction	1231.48	1237.48	0.00	6.00	500.00	8.03	1237.96	0.48	0.00	0 12:54	0.10	216.00
7	82+00	Junction	1231.85	1237.85	0.00	6.00	500.00	8.05	1238.77	0.92	0.00	0 12:54	0.19	1032.00
8	86+00	Junction	1233.45	1239.45	0.00	6.00	500.00	8.18	1239.98	0.53	0.00	0 12:56	0.13	208.00
9	93+50	Junction	1235.00	1242.50	0.00	6.00	500.00	738.60	1243.54	0.00	3.46	0 00:00	0.00	0.00
10	10-Jun	Junction	1230.42	1234.50	0.00	0.00	500.00	20.67	1236.45	1.95	0.00	0 12:31	0.35	830.00
11	Manhole	Junction	1228.00	1234.50	0.00	0.00	500.00	1.04	1237.69	1.19	0.00	0 12:40	0.26	291.00
12	37+00	Outfall	1225.10					8.13	1227.10					
13	OverlandOutfall	Outfall	1235.00					1223.14	1236.79					
14	DSPothole1	Storage Node	1235.05	1238.00	7.46		0.00	1223.15	1237.63				0.00	0.00
15	DSPothole2	Storage Node	1234.45	1238.00	13.27		0.00	1223.14	1237.24				0.00	0.00
16	South	Storage Node	1234.50	1238.00	0.00		0.00	160.25	1237.39				0.00	0.00
17	Wetland	Storage Node	1234.00	1238.00	1235.00		0.00	1379.66	1237.69				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged	Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	ExBrE1	Pipe	4+00	79+50	400.00	1235.00	1231.80	0.8000	12.000	0.0150	0.94	2.76	0.34	1.21	1.00	1.00	1056.00	SURCHARGED
2	ExBrE2	Pipe	5+50	4+00	150.00	1236.50	1235.00	1.0000	12.000	0.0150	0.94	3.09	0.31	1.57	1.00	1.00	77.00	SURCHARGED
3	ExM1	Pipe	63+00	37+00	2600.00	1229.00	1225.10	0.1500	24.000	0.0150	8.13	7.59	1.07	2.73	2.00	1.00	1464.00	SURCHARGED
4	ExM2	Pipe	77+00	63+00	1925.00	1231.00	1229.00	0.1000	21.000	0.0150	7.32	4.43	1.65	3.04	1.75	1.00	1087.00	SURCHARGED
5	ExM3	Pipe	79+50	77+00	250.00	1231.48	1231.10	0.1500	22.000	0.0150	7.38	6.06	1.22	2.80	1.83	1.00	1103.00	SURCHARGED
6	ExM4	Pipe	82+00	79+50	250.00	1231.85	1231.48	0.1500	22.000	0.0150	8.03	5.98	1.34	3.04	1.83	1.00	1101.00	SURCHARGED
7	ExM5	Pipe	86+00	82+00	400.00	1233.45	1231.85	0.4000	22.000	0.0150	8.05	9.83	0.82	3.05	1.83	1.00	1084.00	SURCHARGED
8	ExM6	Pipe	93+50	86+00	750.00	1236.50	1233.45	0.4100	20.000	0.0150	8.18	7.69	1.06	3.96	1.67	1.00	1075.00	SURCHARGED
9	Intercept1	Pipe	5+50	Manhole	751.00	1233.00	1228.22	0.6400	15.000	0.0150	1.04	4.91	0.21	1.22	1.25	1.00	2533.00	SURCHARGED
10	Intercept2	Pipe	93+50	5+50	1452.00	1235.24	1233.25	0.1400	12.000	0.0150	2.30	0.90	2.55	3.04	1.00	1.00	1156.00	SURCHARGED
11	OutToMain	Pipe	68+00	63+00	32.50	1229.70	1229.67	0.0900	24.000	0.0150	27.89	9.73	2.87	8.88	2.00	1.00	1224.00	SURCHARGED
12	PropBrC1	Pipe	10-Jun	63+00	370.00	1230.19	1229.65	0.1500	24.000	0.0150	20.67	8.94	2.31	6.58	2.00	1.00	898.00	SURCHARGED
13	BermB	Channel	Wetland	DSPothole1	30.00	1235.75	1235.50	0.8300	60.000	0.0300	1223.15	26182.41	0.05	1.75	2.04	0.41	0.00	
14	Surface1	Channel	DSPOthole2	OverlandOutfall	30.00	1235.20	1235.00	0.6700	60.000	0.0320	1223.14	11277.87	0.11	3.87	1.92	0.38	0.00	
15	Surface2	Channel	DSPOthole1	DSPOthole2	30.00	1235.80	1235.60	0.6700	60.000	0.0320	1223.14	14098.75	0.09	3.59	1.74	0.35	0.00	
16	Surface3	Channel	93+50	Wetland	1750.00	1242.00	1235.00	0.4000	60.000	0.0300	727.06	9318.19	0.08	1.98	2.12	0.42	0.00	
17	Surface4	Channel	5+50	Wetland	850.00	1234.00	1235.00	-0.1200	60.000	0.0300	312.51	5053.50	0.06	0.49	3.20	0.64	0.00	
18	FieldIntake	Orifice	South	10-Jun		1234.50	1230.42		36.000		20.67							
19	InletWeir	Weir	Manhole	Wetland		1228.00	1234.00				0.89							
20	OutletWeir	Weir	Wetland	68+00		1234.00	1229.75				27.89							

Subbasin Hydrology

Subbasin : East

Input Data

Area (ac) 127
Peak Rate Factor 484
Weighted Curve Number 88
Rain Gage ID Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	110.94	-	88
Composite Area & Weighted CN	110.94		88

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8}) / ((P^{0.5}) * (S_f^{0.4})))$$

Where :

T_c = Time of Concentration (hr)
 n = Manning's roughness
 L_f = Flow Length (ft)
 P = 2 yr, 24 hr Rainfall (inches)
 S_f = Slope (ft/ft)

Shallow Concentrated Flow Equation :

$V = 16.1345 * (S_f^{0.5})$ (unpaved surface)
 $V = 20.3282 * (S_f^{0.5})$ (paved surface)
 $V = 15.0 * (S_f^{0.5})$ (grassed waterway surface)
 $V = 10.0 * (S_f^{0.5})$ (nearly bare & untilled surface)
 $V = 9.0 * (S_f^{0.5})$ (cultivated straight rows surface)
 $V = 7.0 * (S_f^{0.5})$ (short grass pasture surface)
 $V = 5.0 * (S_f^{0.5})$ (woodland surface)
 $V = 2.5 * (S_f^{0.5})$ (forest w/heavy litter surface)
 $T_c = (L_f / V) / (3600 \text{ sec/hr})$

Where:

T_c = Time of Concentration (hr)
 L_f = Flow Length (ft)
 V = Velocity (ft/sec)
 S_f = Slope (ft/ft)

Channel Flow Equation :

$V = (1.49 * (R^{(2/3)}) * (S_f^{0.5})) / n$
 $R = A_q / W_p$
 $T_c = (L_f / V) / (3600 \text{ sec/hr})$

Where :

T_c = Time of Concentration (hr)
 L_f = Flow Length (ft)
 R = Hydraulic Radius (ft)
 A_q = Flow Area (ft^2)
 W_p = Wetted Perimeter (ft)
 V = Velocity (ft/sec)
 S_f = Slope (ft/ft)
 n = Manning's roughness

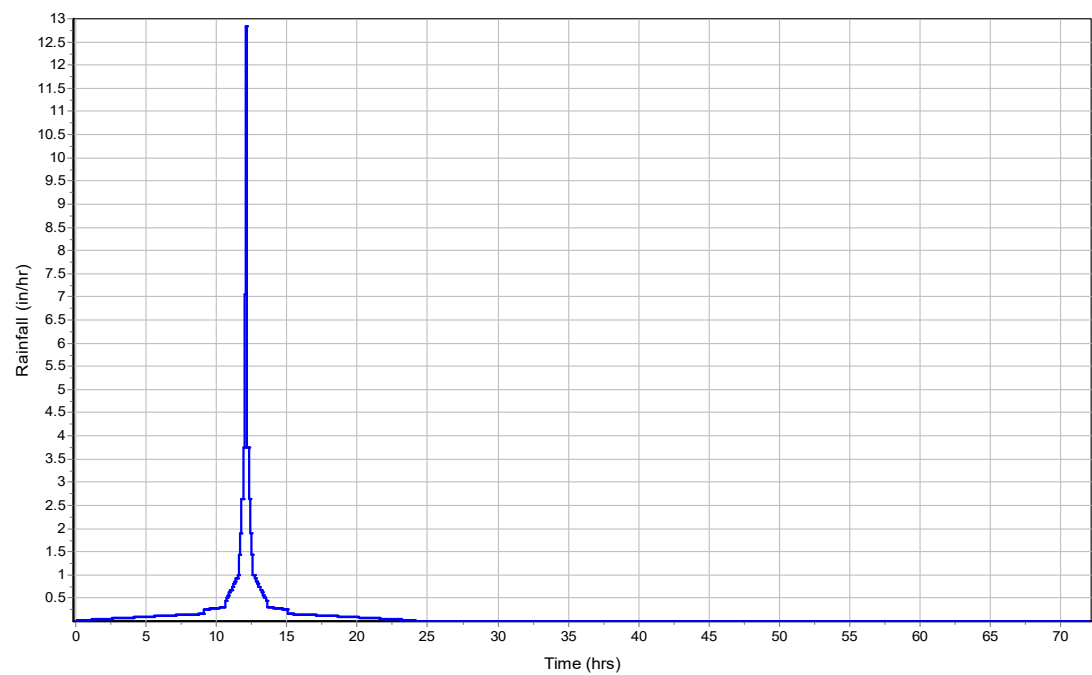
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.57	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.96	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3500	0	0
Slope (%) :	0.57	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.68	0	0
Computed Flow Time (min) :	85.78	0	0
Total TOC (min)	99.75		

Subbasin Runoff Results

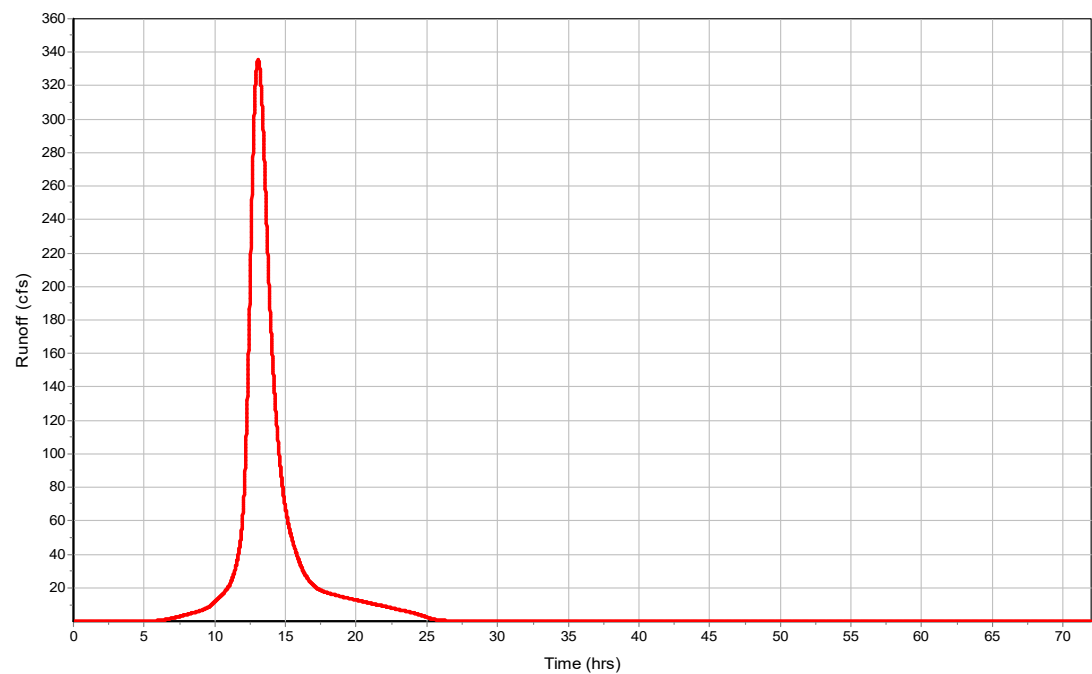
Total Rainfall (in)	7.8
Total Runoff (in)	6.37
Peak Runoff (cfs)	335.56
Weighted Curve Number	88
Time of Concentration (days hh:mm:ss)	0 01:39:45

Subbasin : East

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Main

Input Data

Area (ac) 170
Peak Rate Factor 484
Weighted Curve Number 88
Rain Gage ID Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	176.62	-	88
Composite Area & Weighted CN	176.62		88

Time of Concentration

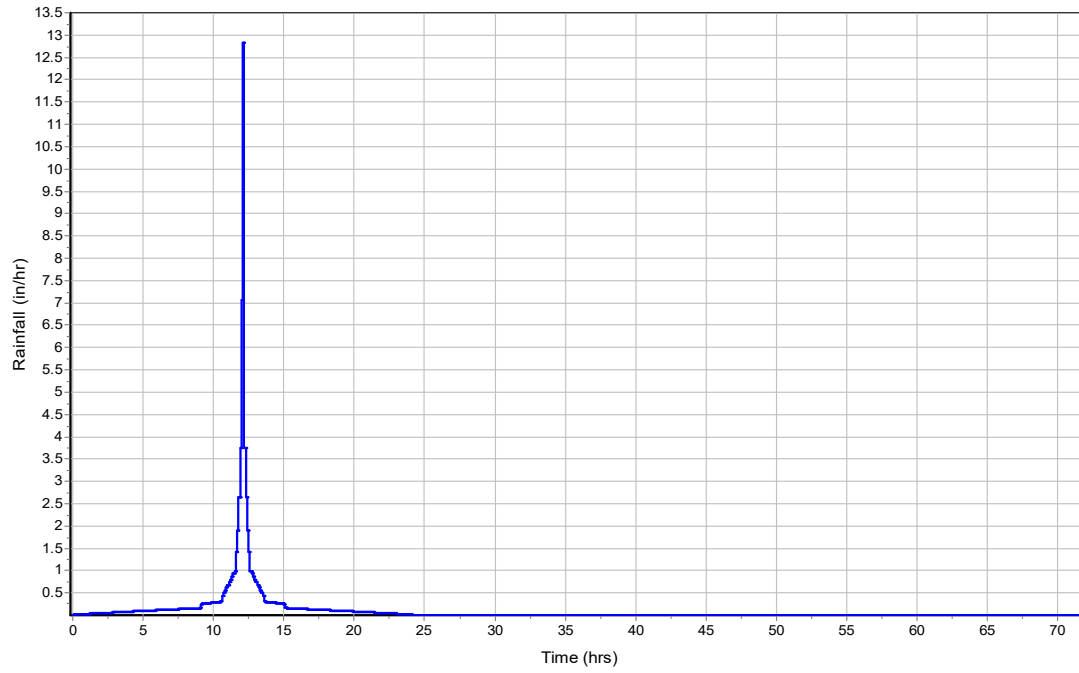
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.15	0	0
Computed Flow Time (min) :	11.15	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	3200	0	0
Slope (%) :	1	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.9	0	0
Computed Flow Time (min) :	59.26	0	0
Total TOC (min)70.41			

Subbasin Runoff Results

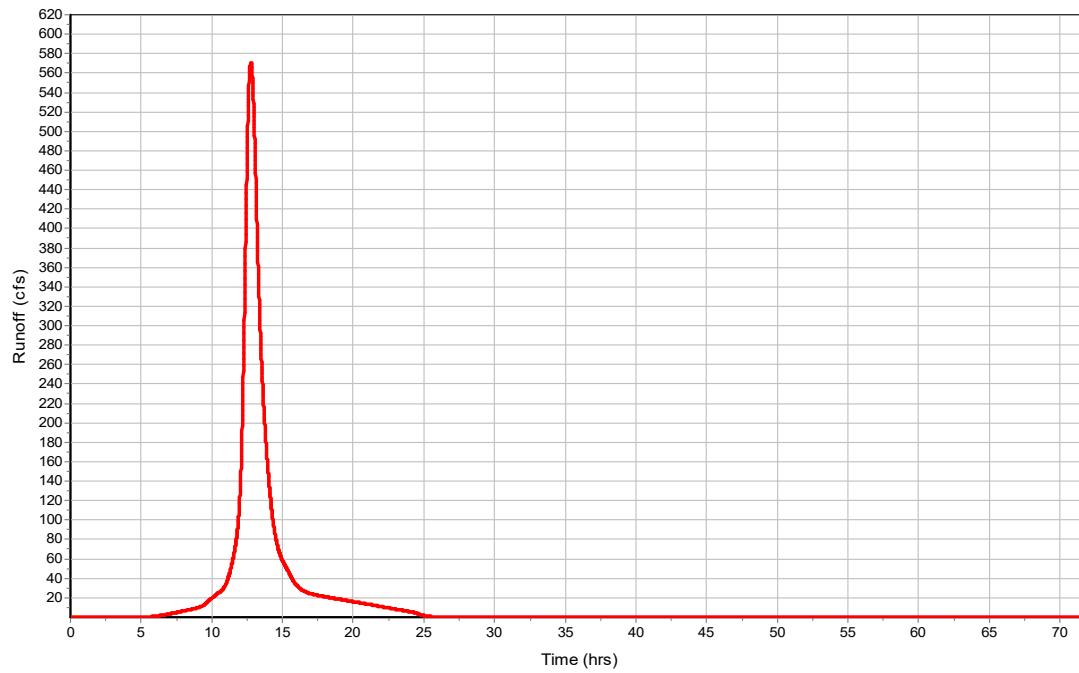
Total Rainfall (in) 7.8
Total Runoff (in) 6.37
Peak Runoff (cfs) 570.54
Weighted Curve Number 88
Time of Concentration (days hh:mm:ss) 0 01:10:25

Subbasin : Main

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : North

Input Data

Area (ac) 365
Peak Rate Factor 484
Weighted Curve Number 88
Rain Gage ID Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	348.09	-	88
Composite Area & Weighted CN	348.09		88

Time of Concentration

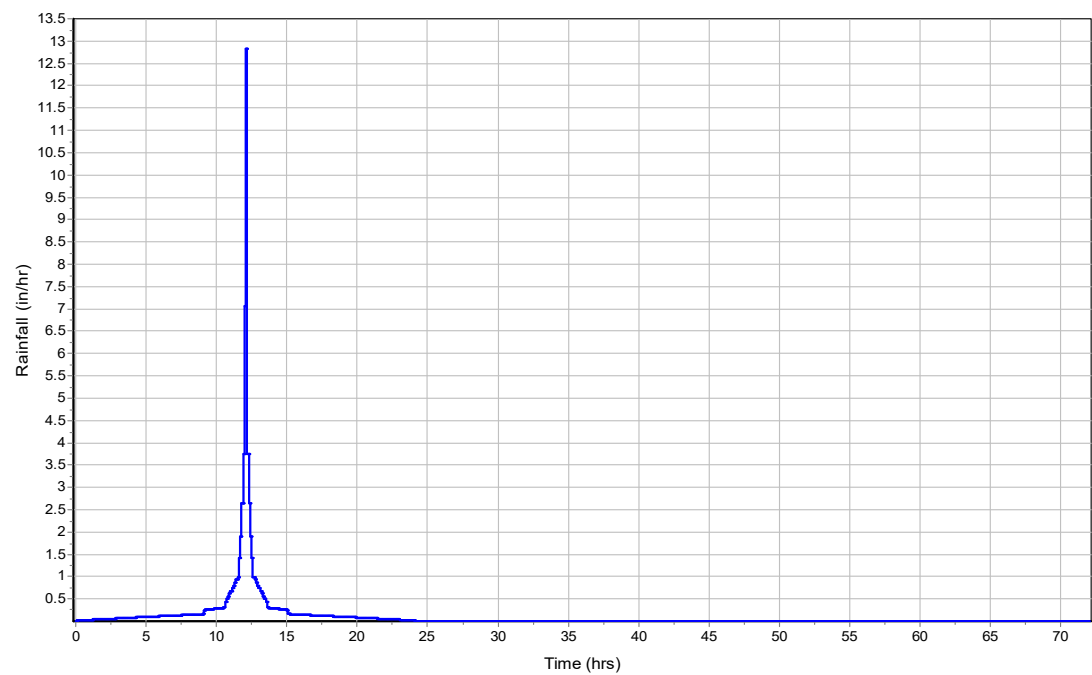
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.59	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.12	0	0
Computed Flow Time (min) :	13.77	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	5400	0	0
Slope (%) :	0.59	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.69	0	0
Computed Flow Time (min) :	130.43	0	0
Total TOC (min)	144.21		

Subbasin Runoff Results

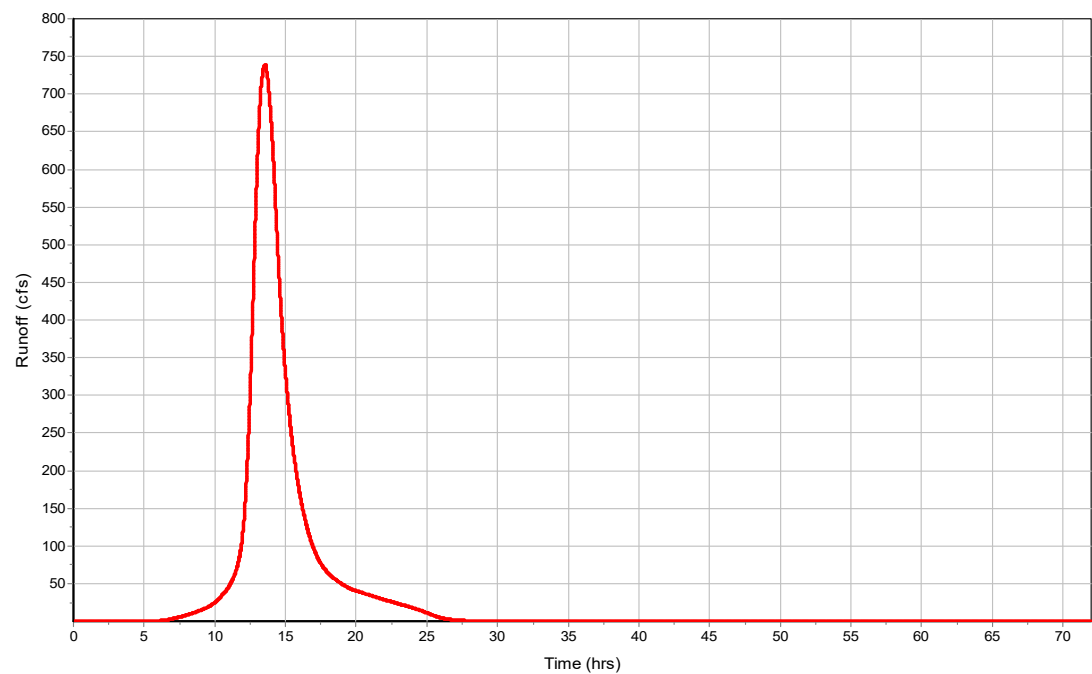
Total Rainfall (in) 7.8
Total Runoff (in) 6.37
Peak Runoff (cfs) 738.74
Weighted Curve Number 88
Time of Concentration (days hh:mm:ss) 0 02:24:13

Subbasin : North

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SouthSub

Input Data

Area (ac) 46
Peak Rate Factor 484
Weighted Curve Number 88
Rain Gage ID Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	41.1	-	88
Composite Area & Weighted CN	41.1		88

Time of Concentration

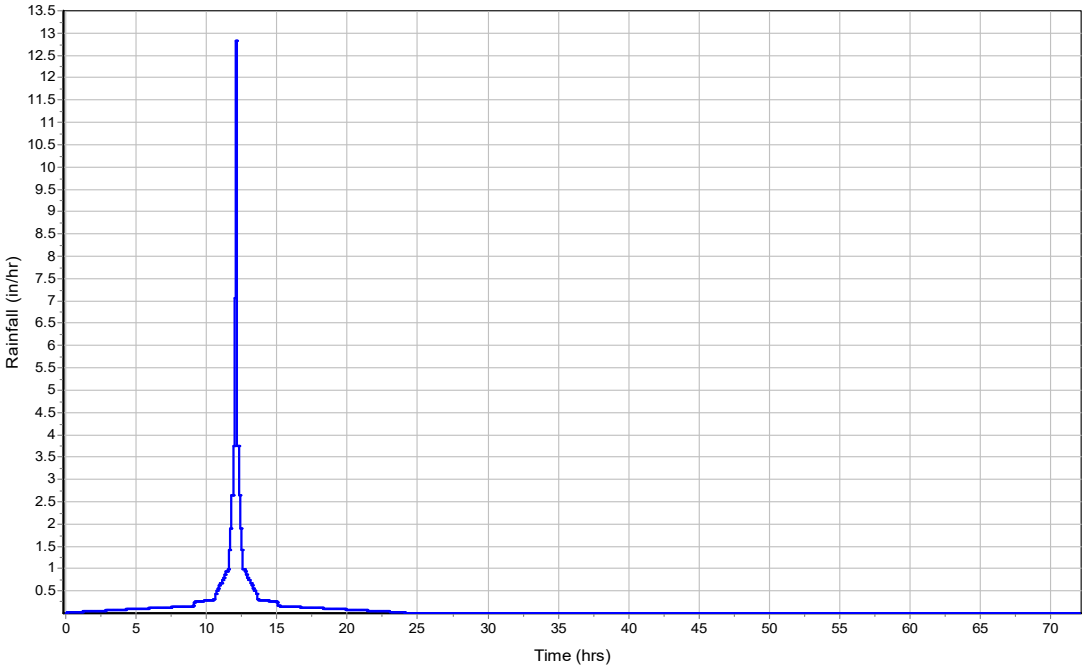
	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	0.12	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	0.74	0	0
2 yr, 24 hr Rainfall (in) :	3.01	0	0
Velocity (ft/sec) :	0.13	0	0
Computed Flow Time (min) :	12.58	0	0
	Subarea	Subarea	Subarea
	A	B	C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	2500	0	0
Slope (%) :	0.74	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.77	0	0
Computed Flow Time (min) :	54.11	0	0
Total TOC (min)66.69			

Subbasin Runoff Results

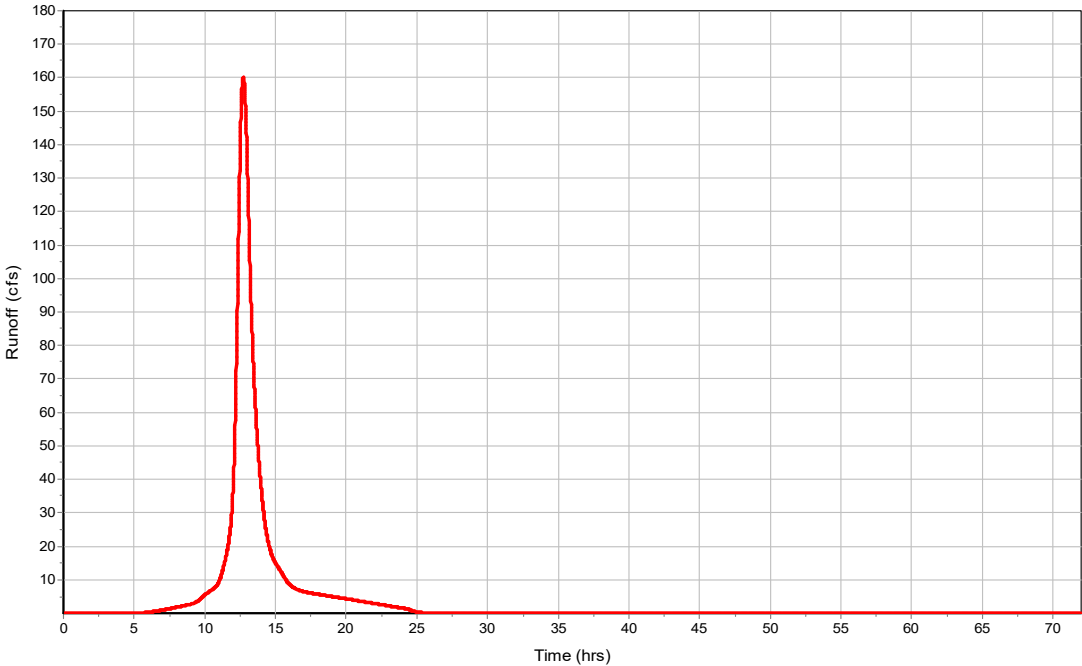
Total Rainfall (in) 7.8
Total Runoff (in) 6.37
Peak Runoff (cfs) 160.27
Weighted Curve Number 88
Time of Concentration (days hh:mm:ss) 0 01:06:41

Subbasin : SouthSub

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element	Invert	Ground/Rim	Ground/Rim	Initial	Initial	Surcharge	Surcharge	Ponded	Minimum
ID	Elevation	(Max)	(Max)	Water	Water	Elevation	Depth	Area	Pipe	
		Elevation	Offset	Elevation	Depth				Cover	
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft ²)	(in)	
1	4+00	1235.00	1241.00	6.00	0.00	-1235.00	6.00	-1235.00	500.00	0.00
2	5+50	1234.00	1242.50	8.50	0.00	-1234.00	6.00	-1236.50	500.00	0.00
3	63+00	1229.00	1231.00	2.00	0.00	-1229.00	6.00	-1225.00	0.00	0.00
4	68+00	1229.75	1235.75	6.00	0.00	-1229.75	6.00	-1229.75	0.00	0.00
5	77+00	1231.00	1237.00	6.00	0.00	-1231.00	6.00	-1231.00	500.00	0.00
6	79+50	1231.48	1237.48	6.00	0.00	-1231.48	6.00	-1231.48	500.00	0.00
7	82+00	1231.85	1237.85	6.00	0.00	-1231.85	6.00	-1231.85	500.00	0.00
8	86+00	1233.45	1239.45	6.00	0.00	-1233.45	6.00	-1233.45	500.00	0.00
9	93+50	1235.00	1242.50	7.50	0.00	-1235.00	6.00	-1236.50	500.00	0.00
10	10-Jun	1230.42	1234.50	4.08	0.00	-1230.42	0.00	-1234.50	500.00	0.00
11	Manhole	1228.00	1234.50	6.50	0.00	-1228.00	0.00	-1234.50	500.00	0.00

Junction Results

SN	Element	Peak	Peak	Max HGL	Max HGL	Max	Min	Average HGL	Average HGL	Time of	Time of	Total	Total Time
ID	Inflow	Lateral	Elevation	Depth	Surcharge	Freeboard	Elevation	Depth	Max HGL	Max HGL	Peak	Flooded	Total Time
	Inflow	Attained	Attained	Depth	Attained	Attained	Attained	Attained	Occurrence	Occurrence	Volume		
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)	
1	4+00	0.94	0.00	1237.78	2.78	0.00	3.22	1235.58	0.58	0 13:36	0 00:00	0.00	0.00
2	5+50	337.87	335.42	1237.72	3.72	0.00	4.78	1235.51	1.51	0 13:31	0 00:00	0.00	0.00
3	63+00	55.60	0.00	1231.67	2.67	0.00	0.00	1230.46	1.46	0 08:51	0 13:40	558.92	1337.00
4	68+00	27.89	0.00	1233.55	3.80	0.00	2.20	1231.07	1.32	0 13:33	0 00:00	0.00	0.00
5	77+00	7.38	0.00	1237.28	6.28	0.28	0.00	1232.67	1.67	0 13:57	0 13:08	0.10	149.00
6	79+50	8.03	0.00	1237.96	6.48	0.48	0.00	1233.13	1.65	0 13:53	0 12:54	0.10	216.00
7	82+00	8.05	0.00	1238.77	6.92	0.92	0.00	1233.59	1.74	0 13:54	0 12:54	0.19	1032.00
8	86+00	8.18	0.00	1239.98	6.53	0.53	0.00	1235.04	1.59	0 13:52	0 12:56	0.13	208.00
9	93+50	738.60	738.60	1243.54	8.54	0.00	3.46	1237.38	2.38	0 13:36	0 00:00	0.00	0.00
10	10-Jun	20.67	0.00	1236.45	6.03	1.95	0.00	1231.68	1.26	0 14:31	0 12:31	0.35	830.00
11	Manhole	1.04	0.00	1237.69	9.69	1.19	0.00	1235.06	7.06	0 13:33	0 12:40	0.26	291.00

Channel Input

SN	Element	Length	Inlet Invert	Inlet Invert	Outlet Invert	Outlet Invert	Total Drop	Average Slope	Shape	Height	Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	ID	(ft)	Elevation (ft)	Offset (ft)	Elevation (ft)	Offset (ft)	(ft)	(%)		(ft)	(ft)					(cfs)	
1	BermB	30.00	1235.75	1.75	1235.50	0.45	0.25	0.8300	Trapezoidal	5.000	900.000	0.0300	0.5000	0.5000	0.0000	0.00	No
2	Surface1	30.00	1235.20	0.75	1235.00	0.00	0.20	0.6700	Parabolic	5.000	400.000	0.0320	0.5000	0.5000	0.0000	0.00	No
3	Surface2	30.00	1235.80	0.75	1235.60	1.15	0.20	0.6700	Parabolic	5.000	500.000	0.0320	0.5000	0.5000	0.0000	0.00	No
4	Surface3	1750.00	1242.00	7.00	1235.00	1.00	7.00	0.4000	Parabolic	5.000	400.000	0.0300	0.5000	0.5000	0.0000	0.00	No
5	Surface4	850.00	1234.00	0.00	1235.00	1.00	-1.00	-0.1200	Parabolic	5.000	400.000	0.0300	0.5000	0.5000	0.0000	0.00	No

Channel Results

SN	Element	Peak	Time of	Design Flow	Peak Flow/	Peak Flow	Travel	Peak Flow	Peak Flow	Total Time	Froude	Reported
ID	Flow	Peak Flow	Peak Flow	Capacity	Design Flow	Velocity	Time	Depth	Depth/	Surcharged	Number	Condition
		Occurrence			Ratio				Total Depth			
	(cfs)	(days hh:mm)		(cfs)		(ft/sec)	(min)	(ft)	Ratio			(min)
1	BermB	1223.15	0 13:33	26182.41	0.05	1.75	0.29	2.04	0.41	0.00		
2	Surface1	1223.14	0 13:33	11277.87	0.11	3.87	0.13	1.92	0.38	0.00		
3	Surface2	1223.14	0 13:33	14098.75	0.09	3.59	0.14	1.74	0.35	0.00		
4	Surface3	727.06	0 13:36	9318.19	0.08	1.98	14.73	2.12	0.42	0.00		
5	Surface4	312.51	0 13:12	5053.50	0.06	0.49	28.91	3.20	0.64	0.00		

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	ExBrE1	400.00	1235.00	0.00	1231.80	0.32	3.20	0.8000	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
2	ExBrE2	150.00	1236.50	2.50	1235.00	0.00	1.50	1.0000	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
3	ExM1	2600.00	1229.00	0.00	1225.10	0.00	3.90	0.1500	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
4	ExM2	1925.00	1231.00	0.00	1229.00	0.00	2.00	0.1000	CIRCULAR	21.000	21.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
5	ExM3	250.00	1231.48	0.00	1231.10	0.10	0.38	0.1500	CIRCULAR	21.960	21.960	0.0150	0.5000	0.5000	0.0000	0.00	No	1
6	ExM4	250.00	1231.85	0.00	1231.48	0.00	0.37	0.1500	CIRCULAR	21.960	21.960	0.0150	0.5000	0.5000	0.0000	0.00	No	1
7	ExM5	400.00	1233.45	0.00	1231.85	0.00	1.60	0.4000	CIRCULAR	21.960	21.960	0.0150	0.5000	0.5000	0.0000	0.00	No	1
8	ExM6	750.00	1236.50	1.50	1233.45	0.00	3.05	0.4100	CIRCULAR	20.040	20.040	0.0150	0.5000	0.5000	0.0000	0.00	No	1
9	Intercept1	751.00	1233.00	-1.00	1228.22	0.22	4.78	0.6400	CIRCULAR	15.000	15.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
10	Intercept2	1452.00	1235.24	0.24	1233.25	-0.75	1.99	0.1400	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
11	OutToMain	32.50	1229.70	-0.05	1229.67	0.67	0.03	0.0900	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
12	PropBrC1	370.00	1230.19	-0.23	1229.65	0.65	0.54	0.1500	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	ExBrE1	0.94	0 15:08	2.76	0.34	1.21	5.51	1.00	1.00	1056.00		SURCHARGED
2	ExBrE2	0.94	0 15:08	3.09	0.31	1.57	1.59	1.00	1.00	77.00		SURCHARGED
3	ExM1	8.13	0 09:13	7.59	1.07	2.73	15.87	2.00	1.00	1464.00		SURCHARGED
4	ExM2	7.32	0 13:57	4.43	1.65	3.04	10.55	1.75	1.00	1087.00		SURCHARGED
5	ExM3	7.38	0 13:24	6.06	1.22	2.80	1.49	1.83	1.00	1103.00		SURCHARGED
6	ExM4	8.03	0 14:10	5.98	1.34	3.04	1.37	1.83	1.00	1101.00		SURCHARGED
7	ExM5	8.05	0 13:13	9.83	0.82	3.05	2.19	1.83	1.00	1084.00		SURCHARGED
8	ExM6	8.18	0 13:03	7.69	1.06	3.96	3.16	1.67	1.00	1075.00		SURCHARGED
9	Intercept1	1.04	0 07:30	4.91	0.21	1.22	10.26	1.25	1.00	2533.00		SURCHARGED
10	Intercept2	2.30	0 08:39	0.90	2.55	3.04	7.96	1.00	1.00	1156.00		SURCHARGED
11	OutToMain	27.89	0 13:33	9.73	2.87	8.88	0.06	2.00	1.00	1224.00		SURCHARGED
12	PropBrC1	20.67	0 14:31	8.94	2.31	6.58	0.94	2.00	1.00	898.00		SURCHARGED

Storage Nodes

Storage Node : DSPothole1

Input Data

Invert Elevation (ft)	1235.05
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	2.95
Initial Water Elevation (ft)	7.46
Initial Water Depth (ft)	-1227.59
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	1223.15
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	1223.14
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.63
Max HGL Depth Attained (ft)	2.58
Average HGL Elevation Attained (ft)	1235.8
Average HGL Depth Attained (ft)	0.75
Time of Max HGL Occurrence (days hh:mm)	0 13:33
Total Exfiltration Volume (1000-ft ³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : DSPothole2

Input Data

Invert Elevation (ft)	1234.45
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.55
Initial Water Elevation (ft)	13.27
Initial Water Depth (ft)	-1221.18
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Output Summary Results

Peak Inflow (cfs)	1223.14
Peak Lateral Inflow (cfs)	0
Peak Outflow (cfs)	1223.14
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.24
Max HGL Depth Attained (ft)	2.79
Average HGL Elevation Attained (ft)	1235.24
Average HGL Depth Attained (ft)	0.79
Time of Max HGL Occurrence (days hh:mm)	0 13:33
Total Exfiltration Volume (1000-ft ³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : South

Input Data

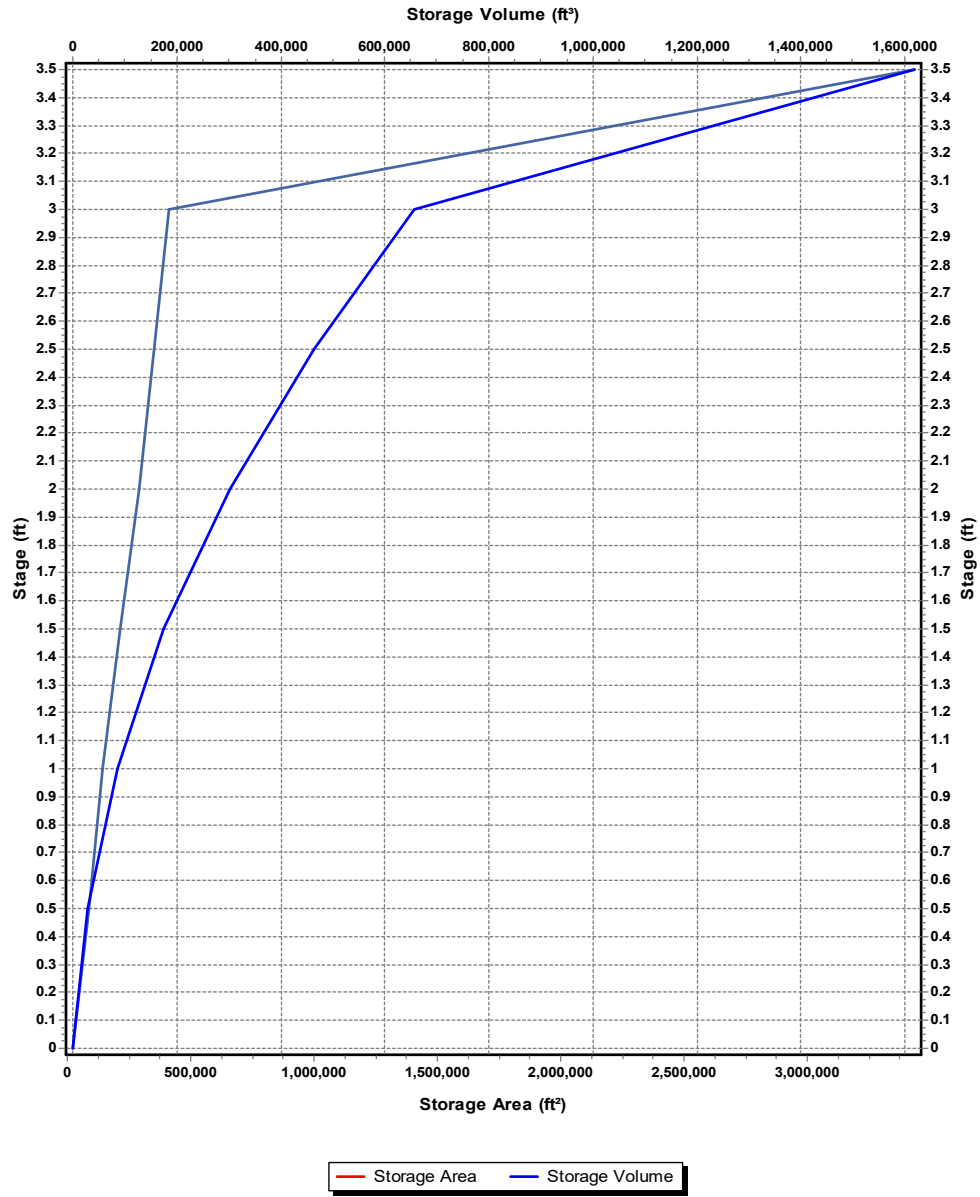
Invert Elevation (ft)	1234.50
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1234.50
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : South

Stage	Storage Area	Storage Volume
(ft)	(ft ²)	(ft ³)
0	23310	0
0.5	90698	28502
1	142584	86822.5
1.5	213336	175802.5
2	293892	302609.5
2.5	352900	464307.5
3	412854	655746
3.5	3436773	1618152.75

Storage Area Volume Curves



Storage Node : South (continued)

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	FieldIntake	Bottom	CIRCULAR	No	36.00			1234.50	0.61

Output Summary Results

Peak Inflow (cfs)	160.25
Peak Lateral Inflow (cfs)	160.25
Peak Outflow (cfs)	20.67
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.39
Max HGL Depth Attained (ft)	2.89
Average HGL Elevation Attained (ft)	1234.92
Average HGL Depth Attained (ft)	0.42
Time of Max HGL Occurrence (days hh:mm)	0 14:31
Total Exfiltration Volume (1000-ft ³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland

Input Data

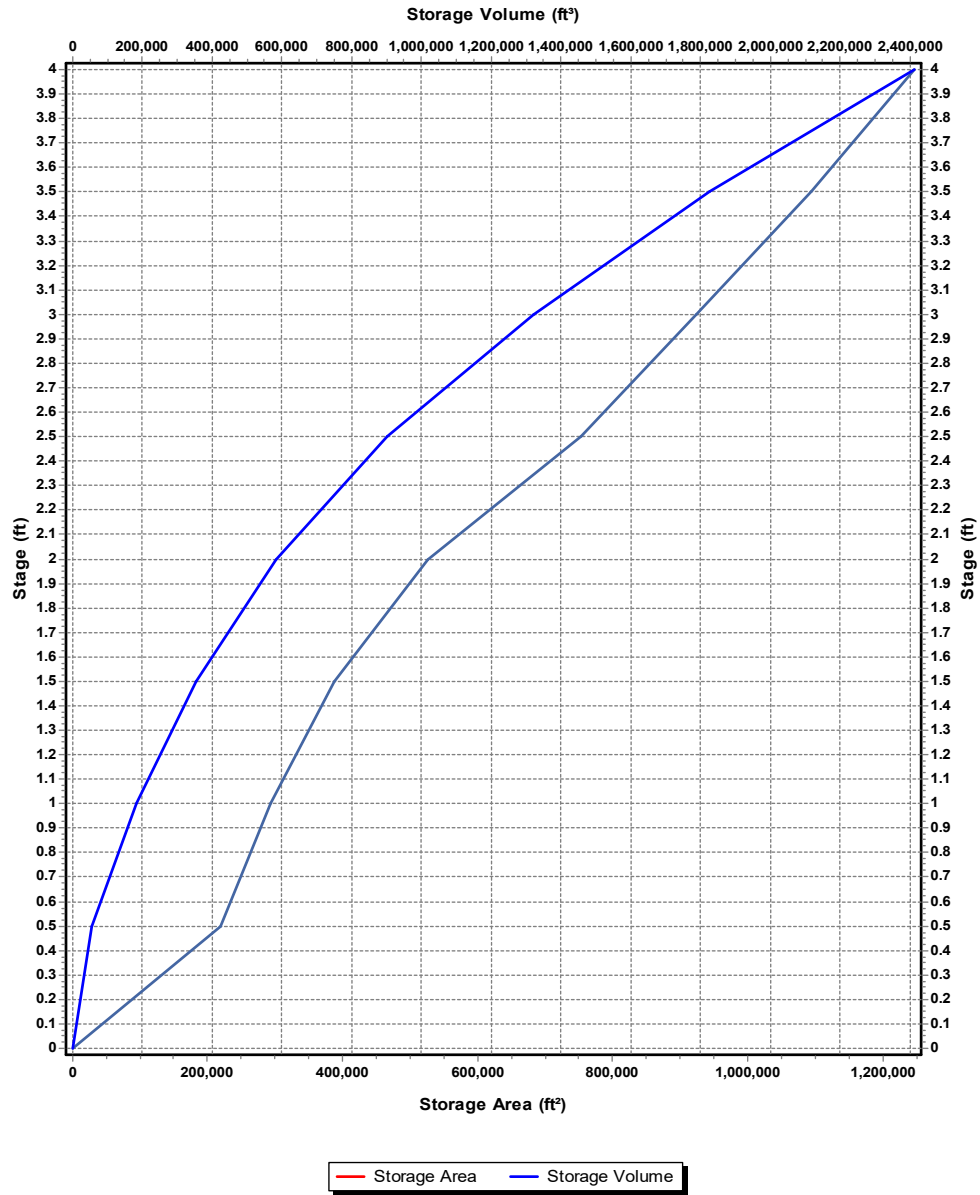
Invert Elevation (ft)	1234.00
Max (Rim) Elevation (ft)	1238.00
Max (Rim) Offset (ft)	4.00
Initial Water Elevation (ft)	1235.00
Initial Water Depth (ft)	1.00
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Wetland

Stage	Storage Area	Storage Volume
(ft)	(ft ²)	(ft ³)
0	838.23	0
0.5	219747	55146.31
1	293589	183480.31
1.5	388326	353959.06
2	527219	582845.31
2.5	754330.87	903232.78
3	924643.26	1322976.31
3.5	1094309.91	1827714.6
4	1247155.1	2413080.85

Storage Area Volume Curves



Storage Node : Wetland (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	OutletWeir	Rectangular	No	1235.00	1.00	4.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs)	1379.66
Peak Lateral Inflow (cfs)	570.47
Peak Outflow (cfs)	1251.04
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1237.69
Max HGL Depth Attained (ft)	3.69
Average HGL Elevation Attained (ft)	1235.59
Average HGL Depth Attained (ft)	1.59
Time of Max HGL Occurrence (days hh:mm)	0 13:33
Total Exfiltration Volume (1000-ft ³)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0