GOLDER
MEMBER OF WSP

INFLOW DESIGN FLOOD CONTROL PLAN – REVISION 01
40 C.F.R. SECTION 257.82
PLANT SMITH ASH POND
FLORIDA POWER & LIGHT COMPANY

This Inflow Design Flood Control System Plan was prepared for Florida Power & Light Company's Plant Smith Ash Pond, located in Southport, FL. United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments" Final Rule (40 C.F.R. Part 257, Subpart D), §257.82 requires the owner or operator of an existing CCR surface impoundment to design, construct, operate, and maintain an inflow design flood control system capable of adequately managing flow during and following the peak discharge of the specified inflow design flood. The owner or operator must prepare a written inflow design system plan documenting how the inflow design flood control system has been designed and constructed to meet the requirements of 40 C.F.R. §257.82. The original plan was prepared October 17, 2016 and is being revised in accordance with 40 C.F.R. §257.82(c)(4).

The Plant Smith Ash Pond is currently being consolidated and closed in place in accordance with 40 C.F.R. §257.102(d).

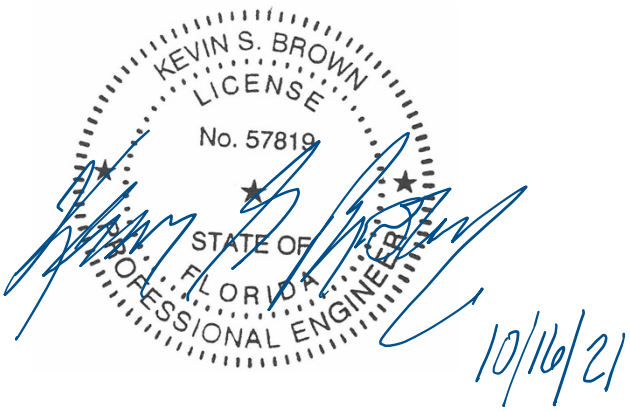
According to 40 C.F.R. §257.82(a)(3)(iii), a hazard potential rating of "Low" for the Plant Smith Ash Pond requires an evaluation of the 100-year, 24-hour storm event.

Engineering analysis of the ash pond in its current condition demonstrates that the unit meets the inflow design flood control system requirements as demonstrated in the attached calculation package. The hydrologic conditions of the Plant Smith Ash Pond in the interim condition were evaluated based on a survey conducted in June 2021. The topography analyzed represents construction conditions in progress towards the closure of the Plant Smith Ash Pond. Based on this analysis, the Plant Smith Ash Pond is capable of adequately managing the inflow from the 100-year, 24-hour storm event without overtopping any of the system's external embankments and has adequate capacity to manage the resulting outflow.

Golder Associates Inc.
5170 Peachtree Road Building 100 Suite 300, Atlanta, Georgia, USA 30341 T: +1 770 496-1893 F: +1 770 934-9476

CERTIFICATION

I certify that this Inflow Design Flood Control Plan for the Plant Smith Ash Pond was prepared in accordance with 40 C.F.R. §257.82(c).



Kevin S. Brown, P.E.
Florida Licensed Professional Engineer No. 57819
Golder Associates Inc.

Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

1.0 OBJECTIVE

The objective of this report is to demonstrate the hydraulic capacity of the Plant Smith Ash Pond interim condition systems in order to prepare an inflow design flood control plan as required by the United States Environmental Protection Agency's (EPA) final rule for Disposal of CCR from Electric Utilities. The hydrologic conditions of the Plant Smith Ash Pond in the interim condition were evaluated as were captured through a survey dated June 2021.

2.0 METHODOLOGY

The Plant Smith Ash Pond interim condition systems were modeled within the Autodesk Storm and Sanitary Analysis (SSA) 2019 program.

2.1 DESIGN CRITERIA

The Plant Smith Ash Pond is classified as a low hazard structure, per the Hazard Potential Classification Assessment for the Plant Smith Ash Pond (2021). The design storm for a low hazard structure is a 100-year rainfall event. A summary of the design storm parameters and rainfall distribution methodology for these calculations is summarized below in Table 1. Additional storm events from the NOAA Atlas 14 Precipitation Frequency Estimates are shown in the in Graphic 1. The 100 year, 24 hour storm event is highlighted.

Table 1. Plant Smith Ash Pond Storm Distribution

Hazard Classification	Return Period (years)	Storm Duration (hours)	Rainfall Total (inches)	Rainfall Source	Storm Distribution
Low	100	24	13.8	NOAA Atlas 14	SCS Type III

Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

Graphic 1. NOAA Atlas 14 Point Precipitation Frequency Estimates

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.531** (0.445-0.643)	**0.618** (0.516-0.748)	**0.756** (0.629-0.917)	**0.867** (0.717-1.06)	**1.02** (0.805-1.27)	**1.13** (0.872-1.43)	**1.24** (0.919-1.61)	**1.34** (0.952-1.80)	**1.48** (1.00-2.04)	**1.58** (1.04-2.22)
10-min	**0.778** (0.651-0.941)	**0.905** (0.756-1.10)	**1.11** (0.921-1.34)	**1.27** (1.05-1.55)	**1.49** (1.18-1.86)	**1.65** (1.28-2.10)	**1.81** (1.35-2.36)	**1.97** (1.39-2.63)	**2.16** (1.47-2.98)	**2.31** (1.53-3.25)
15-min	**0.949** (0.794-1.15)	**1.10** (0.922-1.34)	**1.35** (1.12-1.64)	**1.55** (1.28-1.89)	**1.81** (1.44-2.27)	**2.01** (1.56-2.56)	**2.21** (1.64-2.87)	**2.40** (1.70-3.21)	**2.64** (1.79-3.64)	**2.82** (1.86-3.96)
30-min	**1.42** (1.19-1.72)	**1.66** (1.39-2.01)	**2.04** (1.70-2.48)	**2.35** (1.94-2.87)	**2.76** (2.19-3.45)	**3.07** (2.37-3.90)	**3.37** (2.50-4.38)	**3.66** (2.60-4.90)	**4.03** (2.74-5.56)	**4.30** (2.85-6.06)
60-min	**2.01** (1.68-2.42)	**2.29** (1.92-2.77)	**2.77** (2.30-3.36)	**3.17** (2.62-3.86)	**3.73** (2.97-4.70)	**4.18** (3.24-5.33)	**4.63** (3.45-6.06)	**5.09** (3.62-6.85)	**5.71** (3.89-7.91)	**6.19** (4.09-8.71)
2-hr	**2.59** (2.18-3.11)	**2.92** (2.46-3.52)	**3.49** (2.92-4.21)	**3.99** (3.32-4.83)	**4.71** (3.78-5.91)	**5.28** (4.13-6.73)	**5.89** (4.42-7.68)	**6.52** (4.68-8.75)	**7.39** (5.07-10.2)	**8.08** (5.38-11.3)
3-hr	**3.00** (2.53-3.59)	**3.35** (2.82-4.01)	**3.97** (3.33-4.77)	**4.54** (3.78-5.47)	**5.38** (4.35-6.76)	**6.08** (4.78-7.74)	**6.82** (5.16-8.91)	**7.63** (5.50-10.2)	**8.76** (6.05-12.1)	**9.68** (6.46-13.5)
6-hr	**3.60** (3.05-4.28)	**4.05** (3.43-4.82)	**4.87** (4.10-5.81)	**5.62** (4.71-6.74)	**6.76** (5.51-8.49)	**7.73** (6.12-9.81)	**8.78** (6.68-11.4)	**9.91** (7.20-13.2)	**11.5** (8.02-15.8)	**12.9** (8.64-17.8)
12-hr	**4.04** (3.44-4.77)	**4.69** (3.99-5.55)	**5.86** (4.97-6.95)	**6.91** (5.82-8.23)	**8.49** (6.94-10.6)	**9.81** (7.79-12.4)	**11.2** (8.57-14.5)	**12.7** (9.28-16.9)	**14.9** (10.4-20.2)	**16.6** (11.2-22.8)
24-hr	**4.56** (3.90-5.35)	**5.40** (4.62-6.34)	**6.89** (5.87-8.12)	**8.24** (6.98-9.75)	**10.3** (8.45-12.7)	**12.0** (9.56-15.0)	**13.8** (10.6-17.7)	**15.7** (11.5-20.7)	**18.5** (13.0-25.0)	**20.7** (14.1-28.3)
2-day	**5.35** (4.60-6.24)	**6.26** (5.38-7.30)	**7.92** (6.78-9.27)	**9.48** (8.06-11.1)	**11.9** (9.86-14.7)	**13.9** (11.2-17.4)	**16.2** (12.5-20.7)	**18.6** (13.8-24.5)	**22.1** (15.7-29.8)	**25.0** (17.1-33.9)
3-day	**5.83** (5.03-6.77)	**6.78** (5.85-7.88)	**8.55** (7.34-9.96)	**10.2** (8.72-12.0)	**12.8** (10.7-15.9)	**15.1** (12.2-18.8)	**17.5** (13.7-22.4)	**20.2** (15.1-26.5)	**24.2** (17.2-32.5)	**27.4** (18.8-37.0)
4-day	**6.18** (5.35-7.16)	**7.17** (6.19-8.31)	**9.01** (7.75-10.5)	**10.8** (9.20-12.6)	**13.5** (11.3-16.6)	**15.9** (12.9-19.7)	**18.4** (14.4-23.5)	**21.3** (15.9-27.8)	**25.4** (18.1-34.1)	**28.8** (19.9-38.8)
7-day	**7.01** (6.08-8.07)	**8.07** (7.00-9.30)	**10.1** (8.68-11.6)	**11.9** (10.2-13.8)	**14.8** (12.4-18.1)	**17.3** (14.1-21.4)	**20.0** (15.7-25.3)	**23.0** (17.2-29.9)	**27.3** (19.6-36.4)	**30.9** (21.4-41.4)
10-day	**7.84** (6.82-8.99)	**8.98** (7.80-10.3)	**11.1** (9.58-12.7)	**13.0** (11.2-15.0)	**16.0** (13.4-19.4)	**18.5** (15.1-22.8)	**21.3** (16.7-26.8)	**24.3** (18.3-31.4)	**28.7** (20.6-38.0)	**32.2** (22.4-43.0)
20-day	**10.6** (9.28-12.1)	**12.0** (10.5-13.7)	**14.4** (12.6-16.5)	**16.6** (14.4-19.1)	**19.8** (16.7-23.7)	**22.5** (18.4-27.2)	**25.3** (19.9-31.4)	**28.3** (21.3-36.1)	**32.5** (23.5-42.7)	**35.9** (25.2-47.6)
30-day	**13.0** (11.4-14.8)	**14.7** (12.8-16.6)	**17.4** (15.2-19.8)	**19.8** (17.2-22.6)	**23.2** (19.5-27.4)	**25.9** (21.2-31.1)	**28.7** (22.6-35.3)	**31.6** (23.8-40.0)	**35.6** (25.8-46.3)	**38.7** (27.2-51.1)
45-day	**16.1** (14.1-18.2)	**18.0** (15.8-20.4)	**21.2** (18.6-24.0)	**23.8** (20.7-27.1)	**27.4** (23.0-32.1)	**30.1** (24.7-35.8)	**32.8** (26.0-40.1)	**35.6** (26.9-44.6)	**39.2** (28.4-50.6)	**41.8** (29.6-55.1)
60-day	**18.6** (16.4-21.0)	**20.9** (18.4-23.5)	**24.4** (21.4-27.6)	**27.2** (23.8-31.0)	**31.0** (26.0-36.0)	**33.7** (27.6-39.8)	**36.3** (28.7-44.0)	**38.8** (29.4-48.4)	**42.0** (30.5-53.9)	**44.2** (31.3-58.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

2.2 HYDROLOGIC ANALYSES

The drainage areas for the Plant Smith Ash Pond were deliniated based on the Cooper, Barnette & Page (CBP) June 2021 Digital Elevation Model (DEM). Runoff characteristics were developed based on the Soil Conservation Service (SCS) methodologies as outlined in TR-55. An overall SCS curve number for the drainage area was developed based on the National Engineering Handbook Part 630, Chapter 9 which provides a breakdown of curve numbers for each soil type and land use combination. Soil types were obtained from the USGS online soils database. Land use areas were delineated based on aerial photography. Time of Concentration calculations were developed based on the overland flow method as described in the National Engineering Handbook Part 630, Chapter 15. The curve numbers used for the different types of landuse on site are shown below in Table 2.

Table 2. Curve Numbers

Landuse Type	Curve Number
Ash	95
Grassy Ash	80
Dirt	79
Impervious	98
Closure Turf	95
Water	100

Pertinent characteristics of the deliniated basins are provided below.

North Edge Basin

Drainage Basin Area:	4.6	acres
Hydrologic Curve Number, CN:	95	
Time of Concentration:	6	minutes

Upper Northwest Basin

Drainage Basin Area:	15.8	acres
Hydrologic Curve Number, CN:	95	
Time of Concentration:	6.8	minutes

Upper Northeast Basin

Drainage Basin Area:	6.4	acres
Hydrologic Curve Number, CN:	95	
Time of Concentration:	11.3	minutes

Lower Northwest Basin- Right

Drainage Basin Area:	6.9	acres
Hydrologic Curve Number, CN:	95	
Time of Concentration:	8.5	minutes

Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

Lower Northwest Basin - Left

Drainage Basin Area:	8.8	acres
Hydrologic Curve Number, CN:	95	
Time of Concentration:	13.7	minutes

West Edge Basin

Drainage Basin Area:	2.5	acres
Hydrologic Curve Number, CN:	79	
Time of Concentration:	6	minutes

Lower Northeast Basin

Drainage Basin Area:	6.7	acres
Hydrologic Curve Number, CN:	95	
Time of Concentration:	15.7	minutes

East Lower Lined Basin

Drainage Basin Area:	26.6	acres
Hydrologic Curve Number, CN:	97.9	
Time of Concentration:	6	minutes

East Basin

Drainage Basin Area:	25.7	acres
Hydrologic Curve Number, CN:	83.8	
Time of Concentration:	6	minutes

South Edge Water Management Area

Drainage Basin Area:	16.0	acres
Hydrologic Curve Number, CN:	85.7	
Time of Concentration:	6	minutes

West Lower Lined Basin

Drainage Basin Area:	20.7	acres
Hydrologic Curve Number, CN:	99.5	
Time of Concentration:	6	minutes

Forebay

Drainage Basin Area:	0.7	acres
Hydrologic Curve Number, CN:	80	
Time of Concentration:	6	minutes

Note: Six minutes is the minimum allowable time of concentration as per the TR-55.

Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

2.3 HYDRAULIC ANALYSES

An arrangement of the basins is shown in the attached Figure 1. The Upper Northwest basin flows into the channel running along the length of the North Edge Basin. The channel leads into the East Basin through two 24-inch CMP culverts and a small roadway weir.

The stormwater from the Lower Northwest- Left Basin travels into the constructed channel running along the southern perimeter of the main ash stack. Flow travels along this channel and into the Lower Northeast Basin. The Lower Northwest- Right Basin flows into a 36-inch CMP culvert and into the Lower Northeast Basin following the channel toward the Upper Northeast Basin. There is some internal overtopping modeled from the Lower Northwest-Right Basin into the East Basin.

The Lower Northeast Basin flows into the Upper Northeast Basin through three 24-inch CMP culverts with some internal overtopping into the East Basin. The culverts travel under a small roadway and continue back into the constructed channel. The water then flows directly from the channel into the East Basin.

The stormwater from West Edge Basin flows through a constructed ditch that starts at the northwest area of the site and travels south to where it internally overtops into the the East Lower Lined Basin. The West Lower Lined Basin is a lined pond that receives a process water inflow of 21 cfs in addition to the modeled storm event. Any overtopping from this basin would travel over a low point in its east berm and into the East Lower Lined Basin. Any stormwater within the East Lower Lined Basin travels over the constructed roadway weir located on it's east berm into the East Basin.

The South Edge Water Management Area is self contained with any excess stormwater pumped out of the area. The pump was not modeled within SSA to account for the most conservative scenario of pump failure during the 100 year storm event. The area is subject to change due to the in progress construction efforts to remove both the ash located in this area and its southern berm.

The pond located on the east side of the East Basin continues to act as the final reservoir for the site. The East Basin outlet structure consists of an overflow weir structure which empties into the Forebay Basin that is in turn discharged into the north canal channel via a 48-inch pipe culvert. The outlet structure weir provides 25 feet of weir length at an elevation of 14.9 feet-msl (elevation of stop logs can vary but was measured at the reported value in September 2021). Based on this measurement, Golder assumed the initial water surface elevation for the East Basin pond to also be 14.9 feet-msl. A constant tailwater elevation of 9 feet-msl is assumed in the north canal. A summary of the modeled conveyance links including, channels, culverts, and weirs are shown below in Table 2.

Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

Table 3. Basin Connections

Link	Basin	US Invert Elevation (ft-msl)	DS Invert Elevation (ft-msl)	Dimension	Slope (ft/ft)	Length (ft)	Capacity (cfs)
Link-01 North Edge Channel	North Edge	24	18	Trapezoidal channel Bottom width: 10 feet Left Slope: 1V:4H Right Slope: 1V:3H	0.0032	1870	422.7
Weir-01 Internal Overtop-ping Weir	North Edge into East	22	NA	Trapezoidal weir Crest length: 15 feet Weir height: 4 feet Discharge coeff.: 2.8	NA	NA	NA
Link-03 Culvert	North Edge into East	18.3	16	24-inch diameter CMP culvert	0.046	50	42.1
Link-05 Culvert	North Edge into East	18.3	16	24-inch diameter CMP culvert	0.046	50	42.1
Link-18 Channel	Lower Northwest-Left into Lower Northeast	28.8	21.6	Open parabolic channel Top width: 19 feet	0.055	1300	155.6
Link-23 Culvert	Lower Northwest-Right into Lower Northeast	31	21.6	36-inch diameter CMP culvert	0.094	100	221.5
Link-13 Channel	Lower Northeast	21.6	19.8	Open parabolic channel Top width: 20 feet	0.002	900	127.1
Link-15 Culverts	Lower Northeast	20	18.8	Three 24-inch diameter CMP culverts	0.024	50	91.1
Link-14 Channel	Upper Northeast	18.8	15.7	Trapezoidal channel Bottom width: 15 feet Slope: 1V:3H	0.006	500	355.3
Weir-03 Internal Overtop-ping Weir	East Lower Lined into East	17	NA	Trapezoidal weir Crest length: 60 feet Weir height: 7 feet Discharge coeff.: 3	NA	NA	NA
Weir-05 Outlet Structure Weir	East into Forebay	11	NA	Rectangular weir Crest length: 25 feet Weir height: 9 feet Discharge coeff.: 3.3	NA	NA	NA

Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

Link-17 Outlet Culvert	Forebay into North Channel	7.8	7.45	48-inch diameter CMP culvert	0.0035	100	73.7

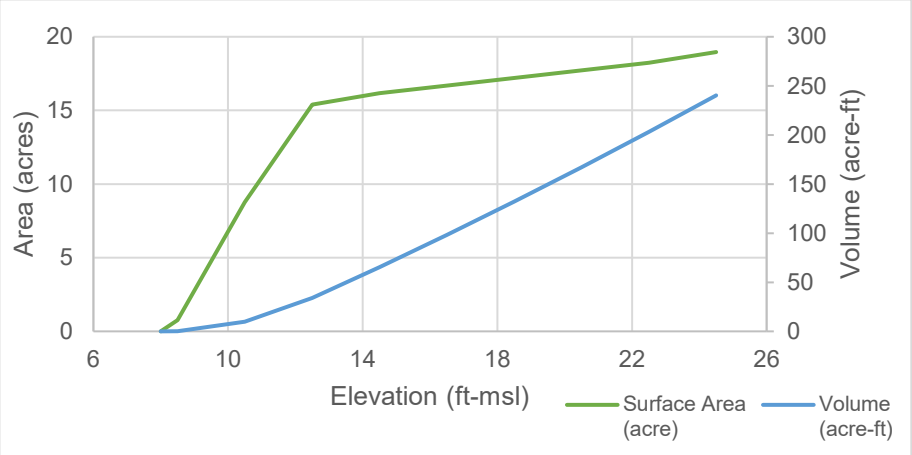
Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

2.4 STAGE-STORAGE

A stage-storage relationship was determined using the June 2021 DEM for the following basins: West Lower Lined Basin, East Lower Lined Basin, South Edge Water Management Area, East Basin, and the Forebay Area. These storage curves are shown below.

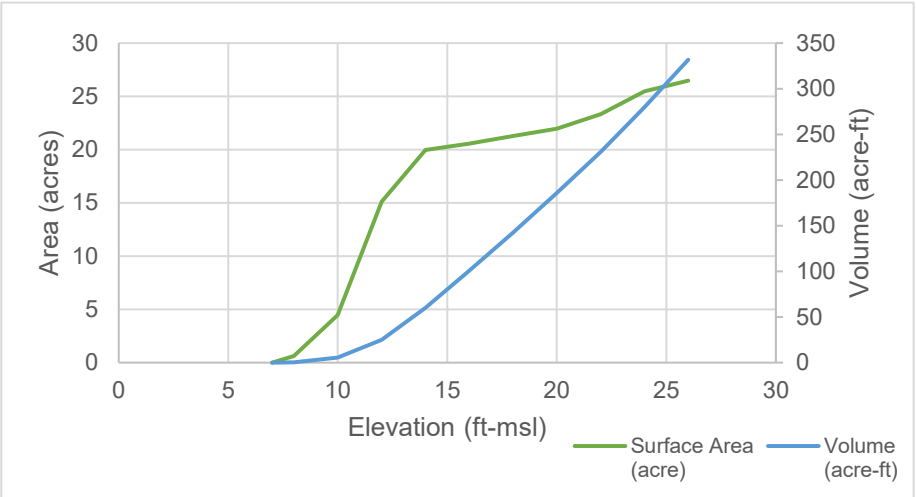
West Lower Lined Basin

Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
8	0.0	-
8.5	0.8	0.2
10.5	8.8	9.7
12.5	15.4	33.9
14.5	16.2	65.5
16.5	16.7	98.3
18.5	17.2	132.2
20.5	17.7	167.1
22.5	18.2	203.1
24.5	19.0	240.3



East Lower Lined Basin

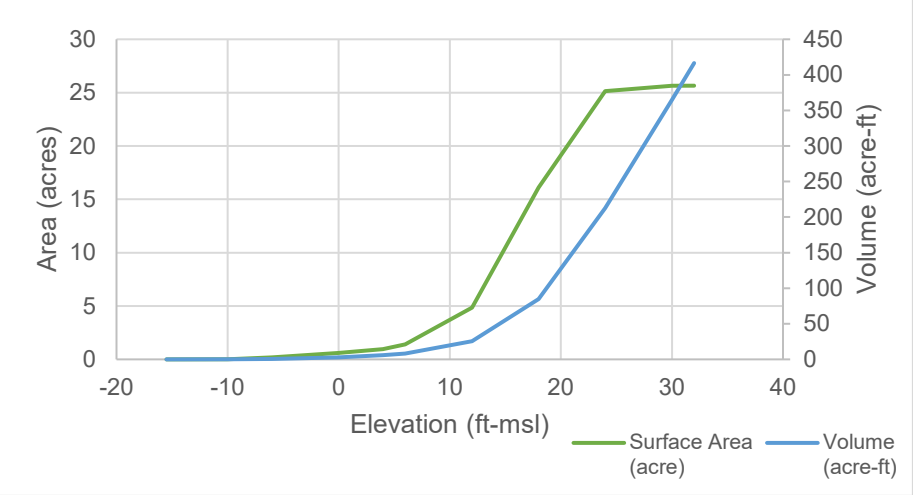
Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
7	0.0	0.0
8	0.6	0.3
10	4.5	5.4
12	15.1	25.0
14	20.0	60.1
16	20.6	100.6
18	21.3	142.4
20	22.0	185.6
22	23.3	231.0
24	25.5	279.8
26	26.5	331.7



Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

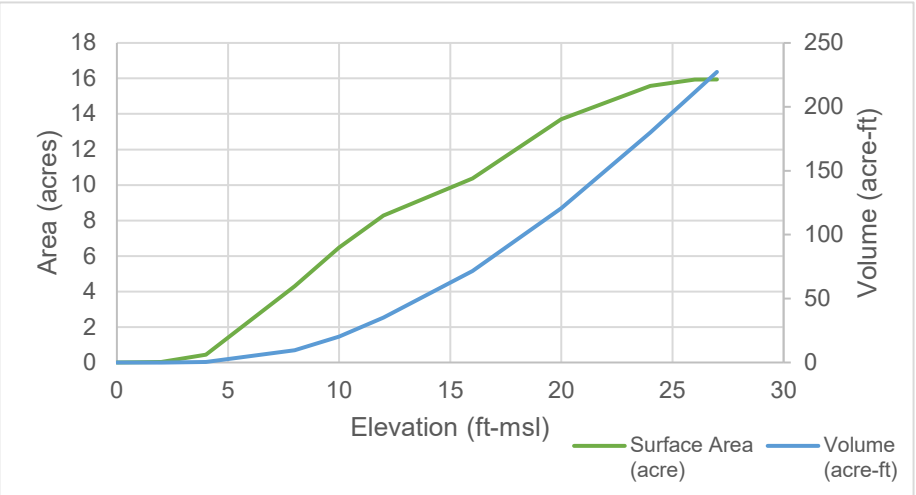
East Basin

Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
-15.5	0.0	0.0
-10	0.0	0.0
-6	0.2	0.4
0	0.6	2.7
4	1.0	5.8
6	1.4	8.2
12	4.8	25.7
18	16.1	84.8
24	25.1	212.9
30	25.6	365.3
32	25.7	416.5



South Edge Water Management Area

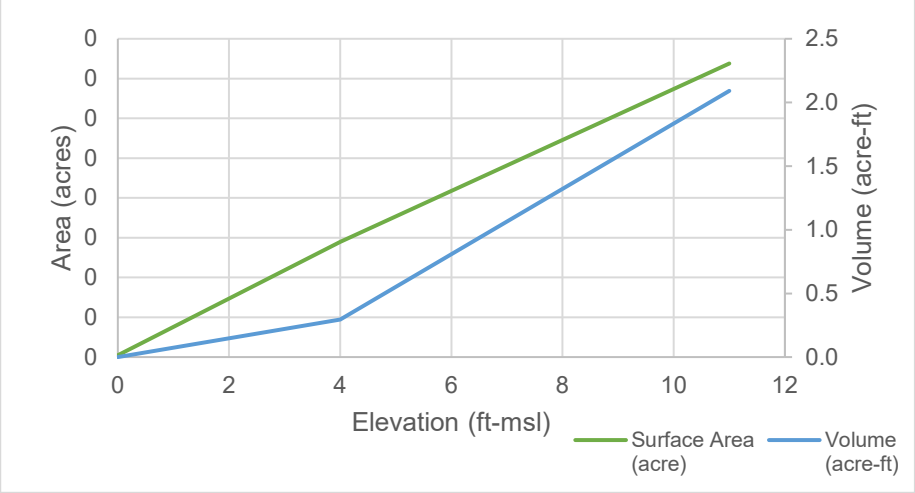
Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
0	0.0	0.0
2	0.0	0.0
4	0.4	0.5
8	4.3	9.6
10	6.5	20.3
12	8.3	35.1
16	10.4	71.5
20	13.7	120.7
24	15.6	179.8
26	15.9	211.4
27	15.9	227.3



Subject:	**PLANT SMITH 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN**		
Date:	October 16, 2021	**Made By:**	SEB
Project No.:	21470922	**Checked By:**	RAC
Project Short Title:	Florida Power & Light/Plant Smith/FL	**Reviewed By:**	JDG

Forebay

Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
0	0.0	0.0
4	0.1	0.3
11	0.4	2.1



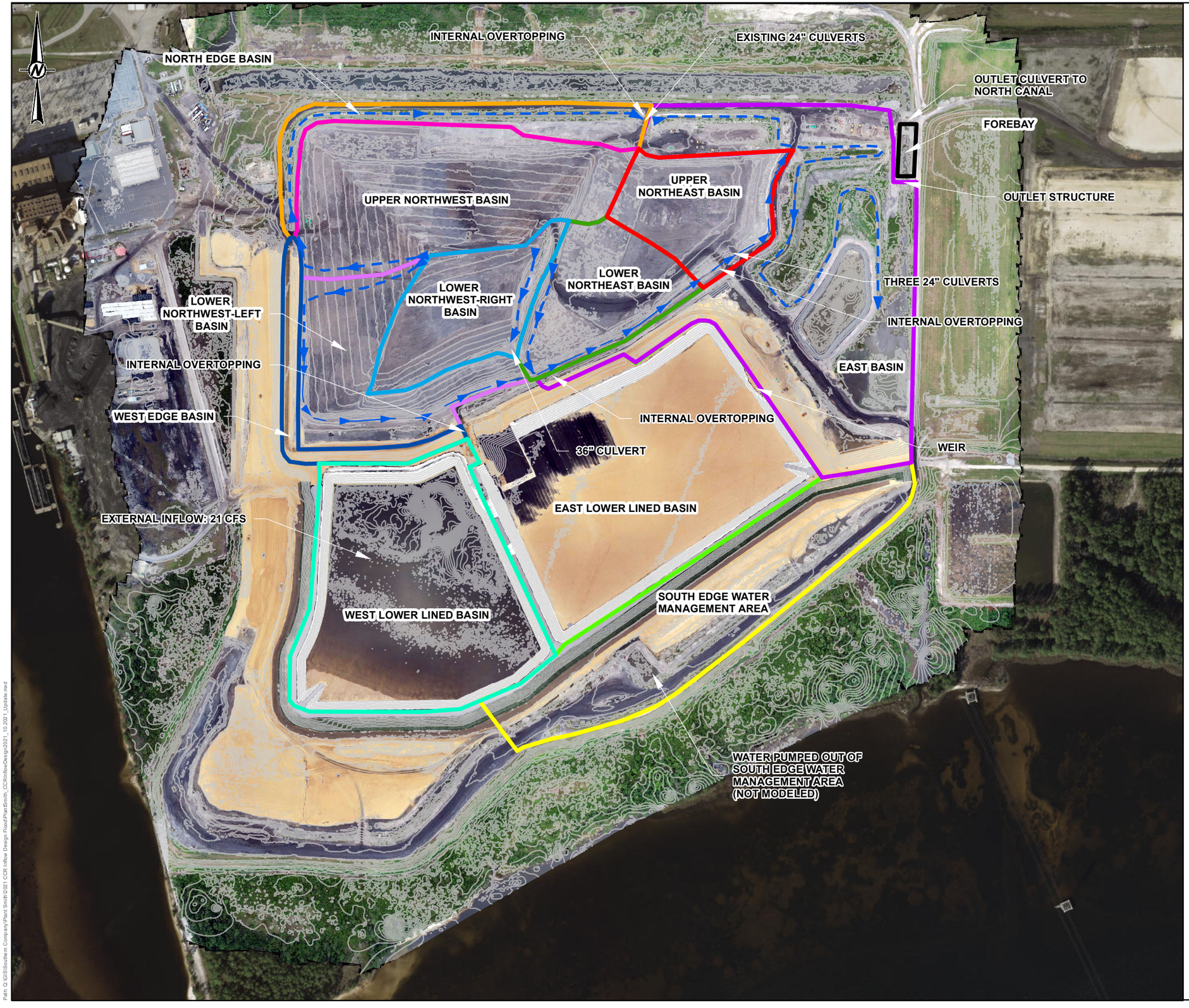
3.0 MODEL RESULTS

Table 3 shows the results from the SSA model. Additional outputs can be found in the attachments.

Table 3. Storage Pond Routing Results

Basin	Initial Pool Elevation (feet-msl)	Top of Embankment Elevation (feet-msl)	Peak Water Surface Elevation (feet-msl)	Freeboard (feet)	Peak Inflow (cfs)	Peak Outflow (cfs)
West Lower Lined	15.0	24.0	18.9	5.1	260	0
East Lower Lined	7.0	22.0	12.5	9.6	331	0
East	14.9	20.0	17.6	2.5	653	181
South Edge Water Mgmt.	0.0	10.0	9.3	0.7	177	0
Forebay	9.0	20.0	17.4	2.6	188	146

Note: Water pumped from South Edge Water Management Area was not modeled.



LEGEND

- EXISTING 2-FOOT CONTOUR PER JUNE 2021 SURVEY
- FLOWPATH
- EAST BASIN
- EAST LOWER LINED BASIN
- LOWER NORTHWEST-RIGHT BASIN
- LOWER NORTHWEST-LEFT BASIN
- NORTH EDGE BASIN
- UPPER NORTHEAST BASIN
- LOWER NORTHEAST BASIN
- SOUTH EDGE WATER MANAGEMENT AREA
- UPPER NORTHWEST BASIN
- WEST EDGE BASIN
- WEST LOWER LINED BASIN
- FOREBAY

REFERENCE

JUNE 2021 LIDAR SURVEY, CONTOURS, AND IMAGERY PROVIDED BY COOPER BARNETT PAGE.

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY

400 200 0 400

Feet

CLIENT
NEXTERA

PROJECT
PLANT SMITH ASH POND CLOSURE

TITLE
CCR INFLOW DESIGN FLOOD CONTROL PLAN 2021

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-10-15
PREPARED	SEB
DESIGN	SEB
REVIEW	JDG
APPROVED	KSB

PROJECT No. 1544251 CONTROL Rev. 0 FIGURE 1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM: ANSI B

Path: Q:\GIS\Southern Company\Plant Smith\2021 CCR Inflow Design Flood\Plant Smith_CCRInflowDesign2021_10.2021 Update.mxd

Project Description

File Name ..... Smith 2021 CCR Inflow Design Flood - 10.2021 Update.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-55
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 ..... Jan 14, 2021 00:00:00
End Analysis On ..... Jan 16, 2021 00:00:00
Start Reporting On ..... Jan 14, 2021 00:00:00
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 00:05:00 days hh:mm:ss
Routing Time Step ..... 1 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	12
Nodes	16
Junctions	10
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links	18
Channels	5
Pipes	6
Pumps	0
Orifices	0
Weirs	7
Outlets	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		Time Series	100-YR	Cumulative	inches	Florida	Bay	100	13.80	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EastBasin	25.69	83.79	13.80	11.72	301.14	283.20	0 00:06:00
2	EastLowerlLined	26.64	97.93	13.80	13.55	360.95	308.64	0 00:06:00
3	ForeBay	0.71	80.00	13.80	11.20	7.99	7.62	0 00:06:00
4	LowerNEBasin	6.71	95.00	13.80	13.19	88.50	66.60	0 00:15:42
5	LowerNW	8.76	95.00	13.80	13.19	115.57	90.30	0 00:13:40
6	North Edge Basins	4.56	95.94	13.80	13.31	60.67	52.73	0 00:06:00
7	SouthEdgeBasin	15.97	85.67	13.80	11.98	191.32	178.10	0 00:06:00
8	Sub-41	6.86	95.00	13.80	13.19	90.52	77.12	0 00:08:28
9	UpperNE	6.44	95.00	13.80	13.19	84.93	69.08	0 00:11:18
10	UpperNW Basin	15.79	95.00	13.80	13.19	208.24	180.97	0 00:06:45
11	WestEdge	2.47	79.00	13.80	11.05	27.30	26.31	0 00:06:00
12	WestLowerlLined	20.67	99.54	13.80	13.75	284.11	239.66	0 00:06:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	Junction	20.00	31.70	21.00	0.00	0.00	231.87	26.77	0.00	4.93	0 00:00	0.00	0.00
2	Jun-02	Junction	18.00	23.40	18.30	0.00	0.00	213.54	23.48	0.00	2.52	0 00:00	0.00	0.00
3	Jun-03	Junction	28.60	31.40	0.00	2.60	0.00	90.02	30.58	0.00	0.82	0 00:00	0.00	0.00
4	Jun-07	Junction	21.60	26.00	0.00	4.40	0.00	225.77	26.32	0.00	1.38	0 00:00	0.00	0.00
5	Jun-08	Junction	19.80	22.61	0.00	0.00	0.00	165.66	22.68	0.00	1.92	0 00:00	0.00	0.00
6	Jun-09	Junction	18.80	21.50	0.00	0.00	0.00	117.03	20.39	0.00	1.11	0 00:00	0.00	0.00
7	Jun-10	Junction	15.70	20.00	17.00	4.30	0.00	116.34	17.00	0.00	3.00	0 00:00	0.00	0.00
8	Jun-14	Junction	20.00	24.06	0.00	0.00	0.00	24.30	24.06	0.00	0.00	0 12:11	0.00	1.00
9	Jun-15	Junction	28.40	30.50	0.00	0.00	0.00	26.06	29.77	0.00	1.13	0 00:00	0.00	0.00
10	Jun-16	Junction	31.00	40.00	0.00	0.00	0.00	75.35	35.91	0.00	4.09	0 00:00	0.00	0.00
11	Out-03	Outfall	0.00					145.61	11.00					
12	East	Storage Node	-15.00	20.00	14.90		0.00	653.19	17.55				0.00	0.00
13	EastLowerLined	Storage Node	7.00	22.00	7.00		0.00	330.71	12.45				0.00	0.00
14	PipeBay	Storage Node	6.00	20.00	9.00		0.00	187.79	17.38				0.00	0.00
15	SouthEdge	Storage Node	0.00	10.00	0.00		0.00	176.92	9.27				0.00	0.00
16	WestLowerLined	Storage Node	8.00	24.00	15.00		0.00	259.51	18.89				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 Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-03	Pipe	Jun-02	East	50.00	18.30	16.00	4.6000	24.000	0.0150	27.19	42.05	0.65	10.18	1.77	0.89	0.00	Calculated
2	Link-05	Pipe	Jun-02	East	50.00	18.30	16.00	4.6000	24.000	0.0150	27.19	42.05	0.65	10.18	1.77	0.89	0.00	Calculated
3	Link-15	Pipe	Jun-08	Jun-09	50.00	20.00	18.80	2.4000	24.000	0.0150	49.94	91.12	0.55	6.10	1.79	0.90	0.00	Calculated
4	Link-16	Pipe	Jun-10	East	327.73	12.08	-2.00	4.3000	0.000	0.0320	116.34	0.00	0.55	0.00	1.79	0.90	0.00	Calculated
5	Link-17	Pipe	PipeBay	Out-03	100.00	7.80	7.45	0.3500	48.000	0.0150	145.61	73.65	1.98	11.85	3.78	0.94	0.00	> CAPACITY
6	Link-23	Pipe	Jun-16	Jun-07	100.00	31.00	21.60	9.4000	36.000	0.0120	84.26	221.53	0.38	11.92	3.00	1.00	11.00	SURCHARGED
7	Link-01	Channel	Jun-01	Jun-02	1870.00	24.00	18.00	0.3200	46.200	0.0320	213.54	423.23	0.50	2.99	3.29	0.86	0.00	
8	Link-13	Channel	Jun-07	Jun-08	900.00	21.60	19.80	0.2000	36.000	0.0320	165.66	127.07	1.30	4.27	2.94	0.98	0.00	
9	Link-14	Channel	Jun-09	Jun-10	500.00	18.80	15.70	0.6200	32.400	0.0320	116.34	355.28	0.33	4.16	1.45	0.54	0.00	
10	Link-18	Channel	Jun-03	Jun-07	1300.00	28.60	21.60	0.5400	25.800	0.0320	81.69	115.43	0.71	3.27	2.05	0.96	0.00	
11	Link-22	Channel	Jun-15	Jun-14	1500.00	28.20	20.00	0.5500	30.000	0.0320	24.30	60.72	0.40	2.29	1.92	0.77	0.00	
12	Weir-01	Weir	Jun-02	East		18.00	-15.00				144.36							
13	Weir-03	Weir	EastLowerLined	East		7.00	-15.00				0.00							
14	Weir-05	Weir	East	PipeBay		-15.00	6.00				181.49							
15	Weir-08	Weir	Jun-08	East		19.80	-15.00				115.69							
16	Weir-09	Weir	WestLowerLined	EastLowerLined		8.00	7.00				0.00							
17	Weir-10	Weir	Jun-14	EastLowerLined		20.00	7.00				24.22							
18	Weir-12	Weir	Jun-07	East		21.60	-15.00				28.13							

Subbasin Hydrology

Subbasin : EastBasin

Input Data

Area (ac) 25.69
Weighted Curve Number 83.79
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Ash&vegetation	15.65	-	80.00
Dirt	4.91	C	79.00
Water	5.11	A	100.00
Composite Area & Weighted CN	25.67		83.79

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

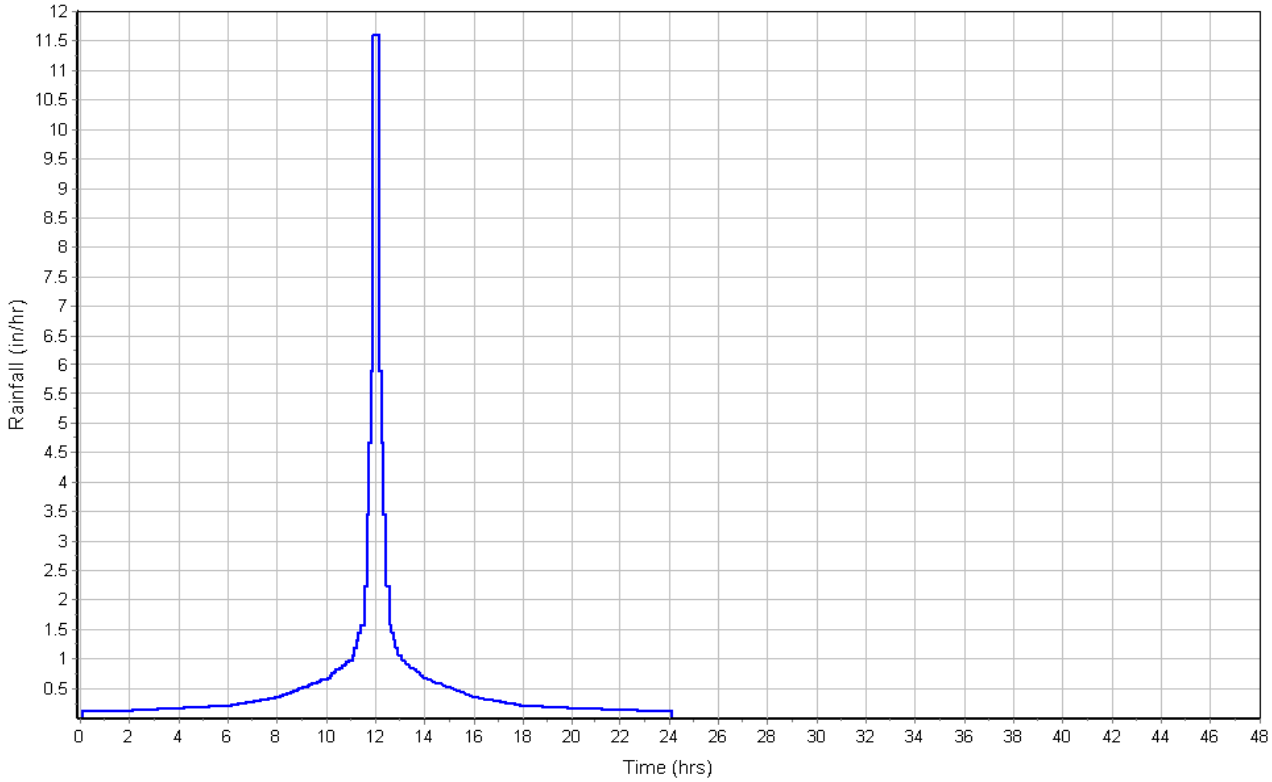
User-Defined TOC override (minutes): 6

Subbasin Runoff Results

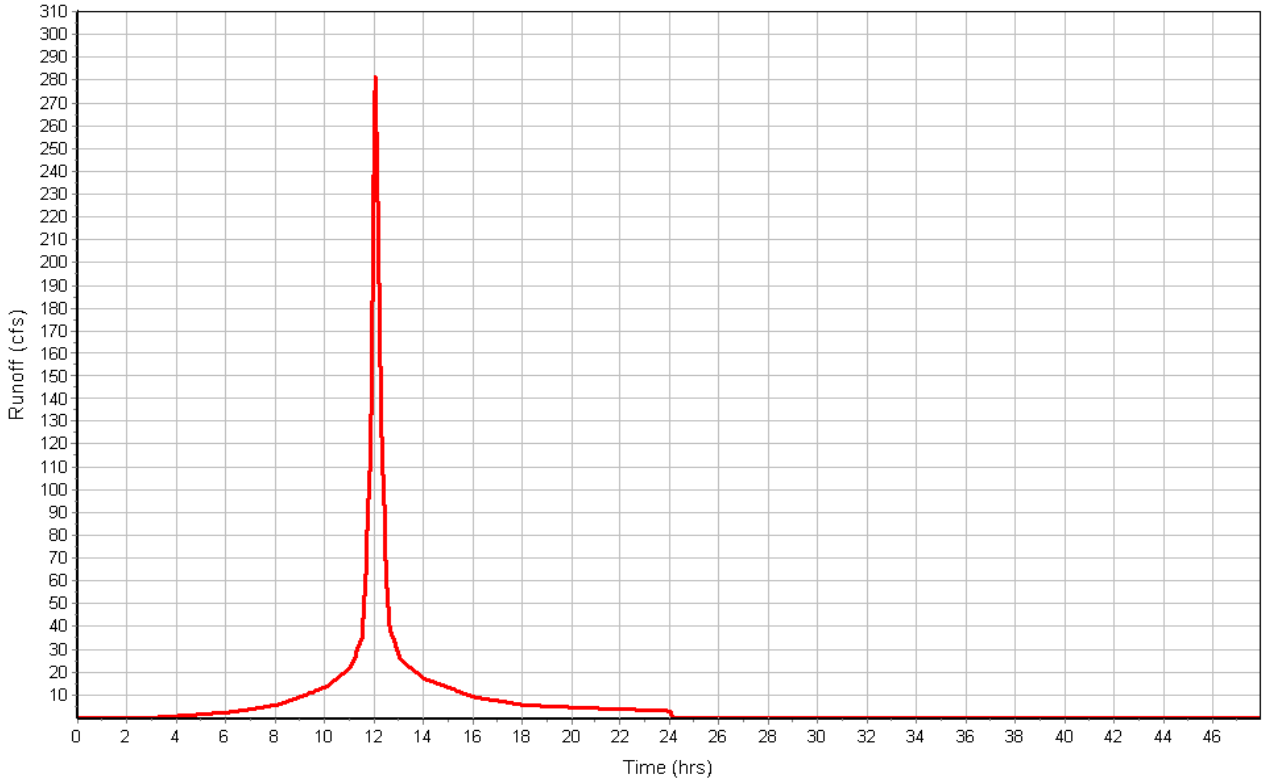
Total Rainfall (in) 13.80
Total Runoff (in) 11.72
Peak Runoff (cfs) 283.20
Weighted Curve Number 83.79
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : EastBasin

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : EastLowerlLined

Input Data

Area (ac) 26.64
Weighted Curve Number 97.93
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Impervious	26.03	-	98.00
Ash	0.59	-	95.00
Composite Area & Weighted CN	26.62		97.93

Time of Concentration

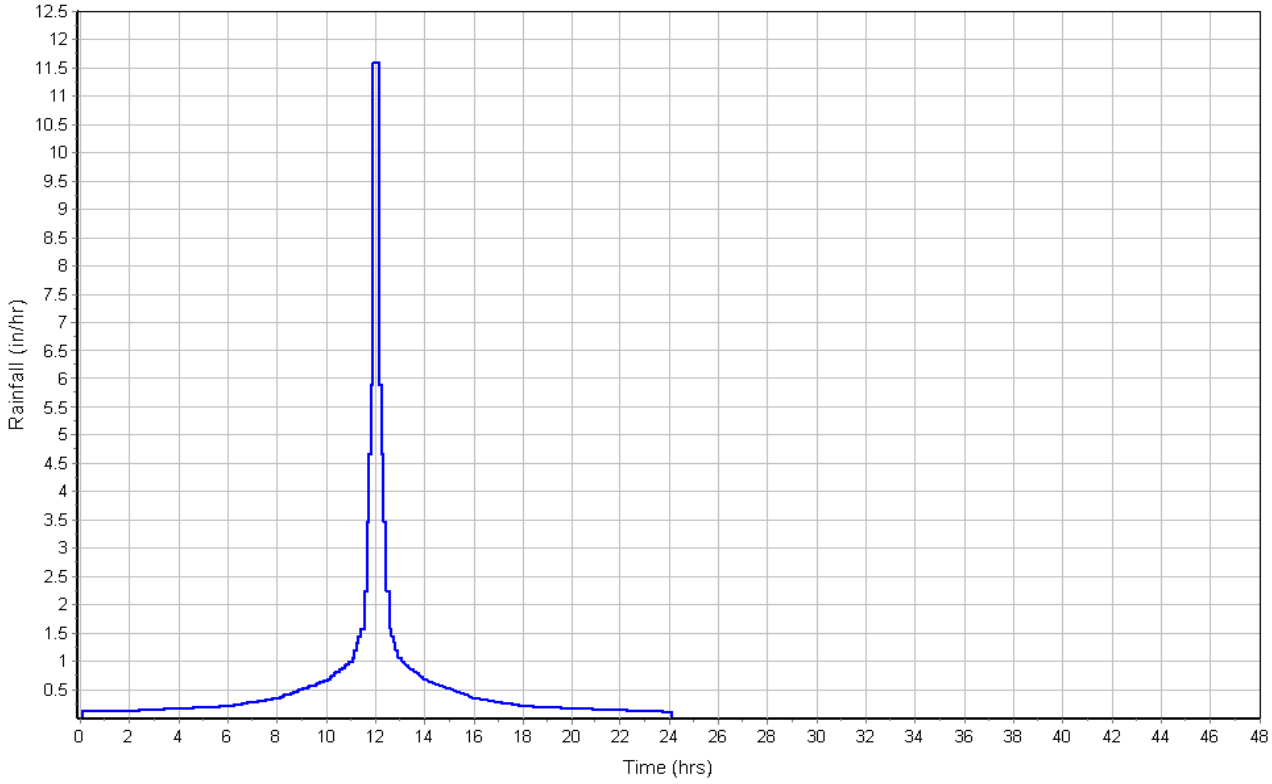
User-Defined TOC override (minutes): 6

Subbasin Runoff Results

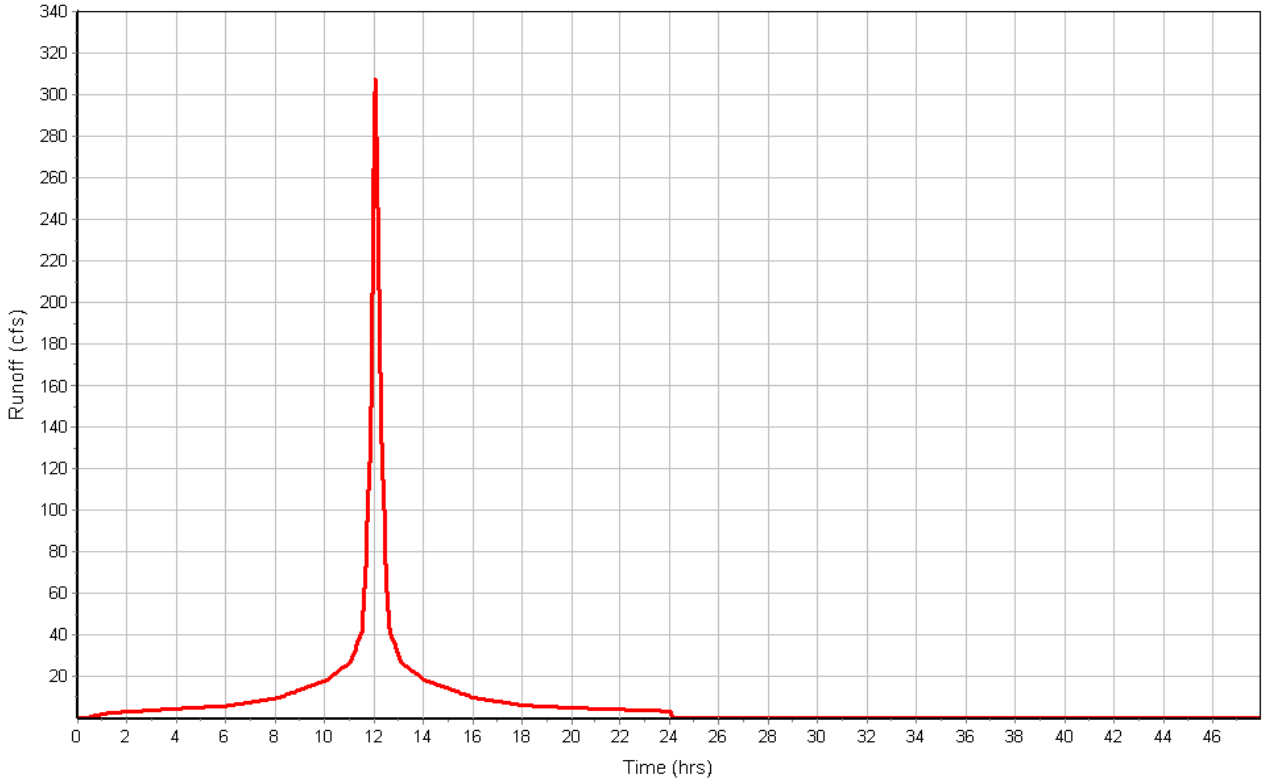
Total Rainfall (in) 13.80
Total Runoff (in) 13.55
Peak Runoff (cfs) 308.64
Weighted Curve Number 97.93
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : EastLowerlLined

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : ForeBay

Input Data

Area (ac) 0.71
Weighted Curve Number 80.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
GrassyAsh	0.71	-	80.00
Composite Area & Weighted CN	0.71		80.00

Time of Concentration

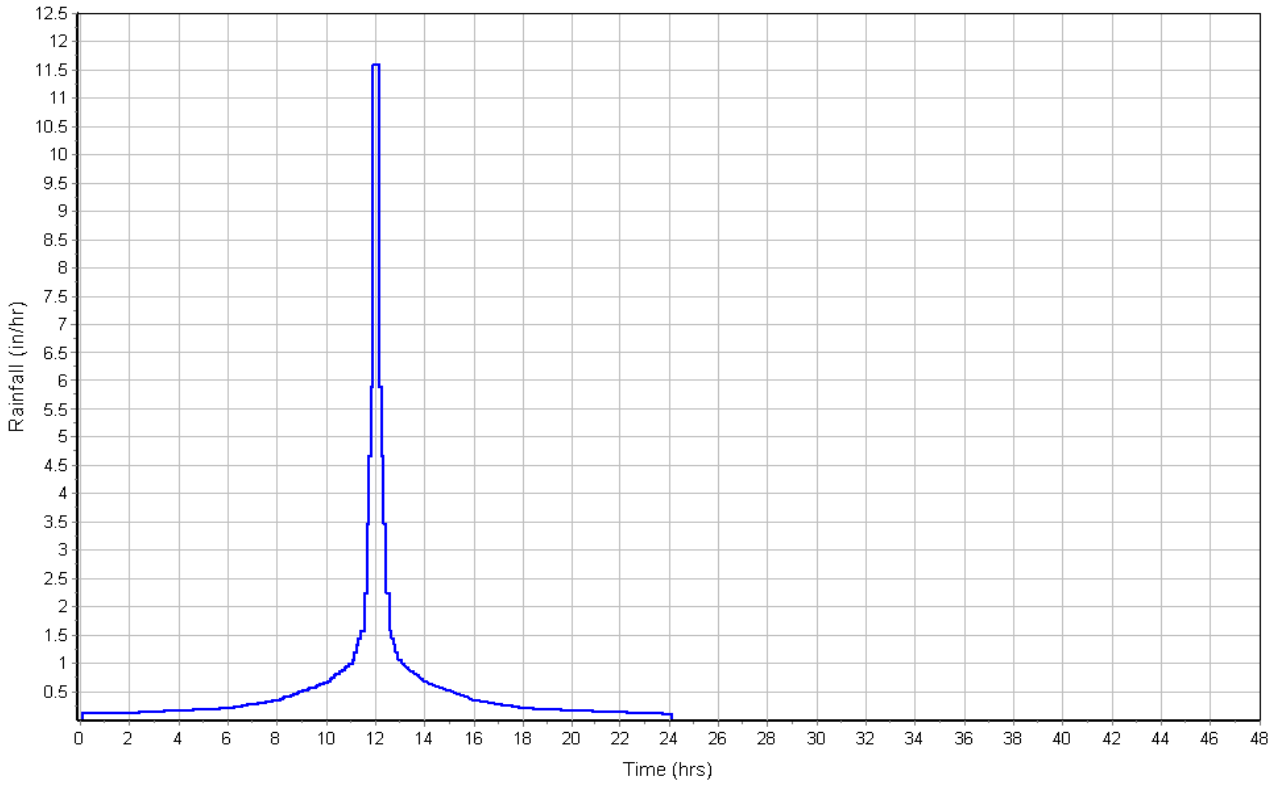
User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

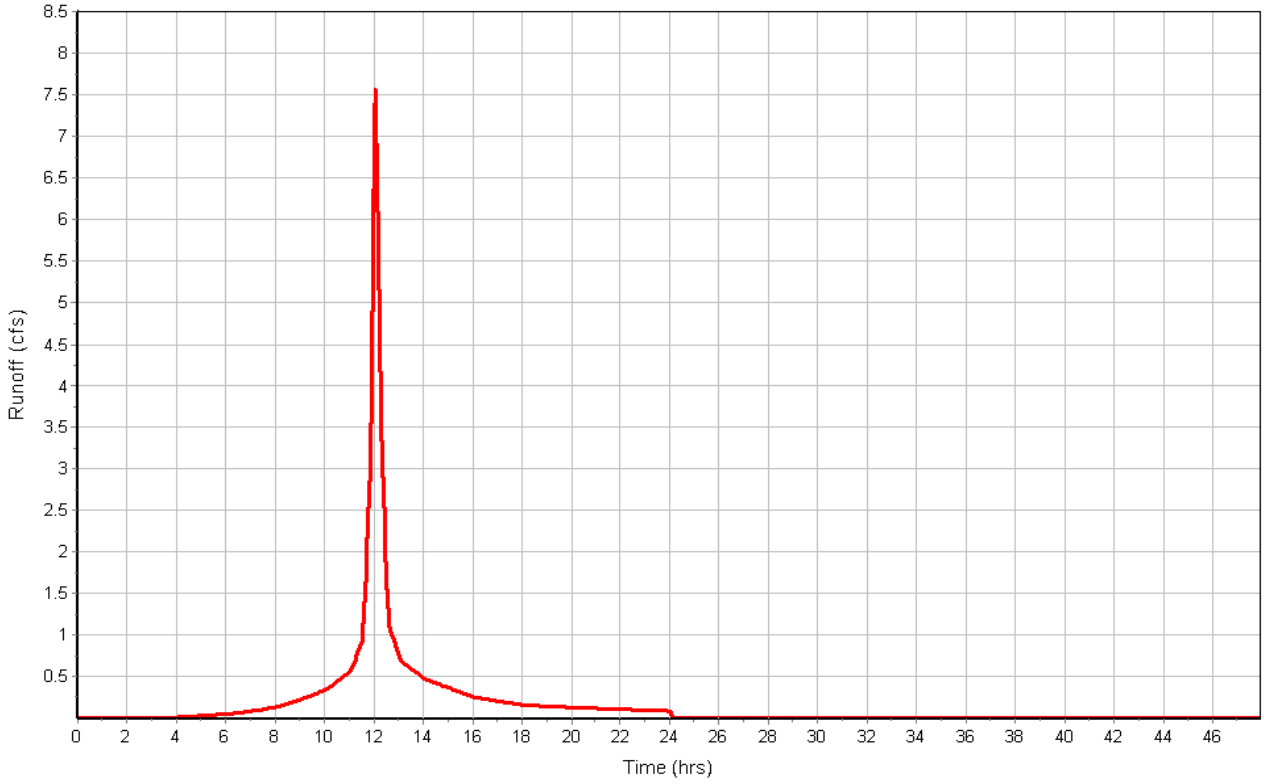
Total Rainfall (in) 13.80
Total Runoff (in) 11.20
Peak Runoff (cfs) 7.62
Weighted Curve Number 80.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : ForeBay

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : LowerNEBasin

Input Data

Area (ac) 6.71
Weighted Curve Number 95.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Ash	6.71	-	95.00
Composite Area & Weighted CN	6.71		95.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0.00	0.00
Flow Length (ft) :	90	0.00	0.00
Slope (%) :	4.3	0.00	0.00
2 yr, 24 hr Rainfall (in) :	5.4	0.00	0.00
Velocity (ft/sec) :	0.23	0.00	0.00
Computed Flow Time (min) :	6.43	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	362	0.00	0.00
Slope (%) :	0.16	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	0.65	0.00	0.00
Computed Flow Time (min) :	9.28	0.00	0.00

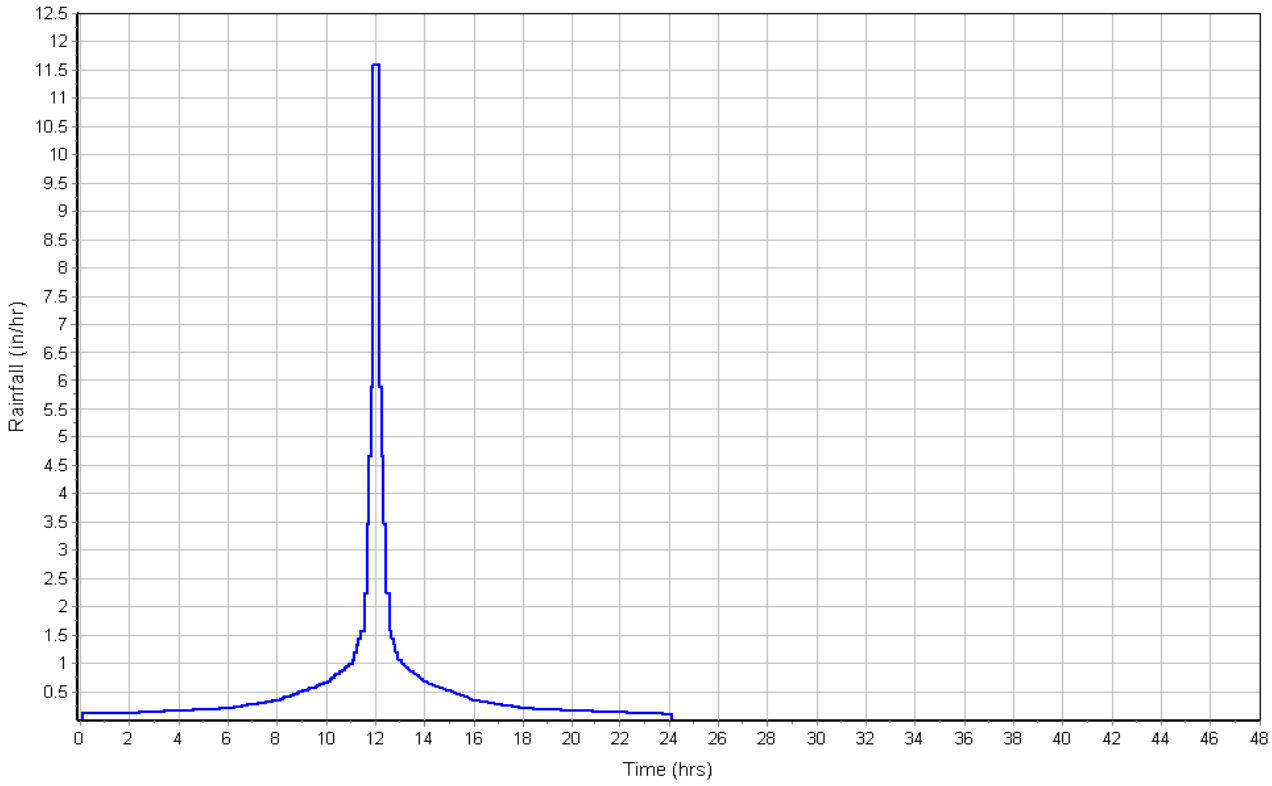
Total TOC (min) 15.71

Subbasin Runoff Results

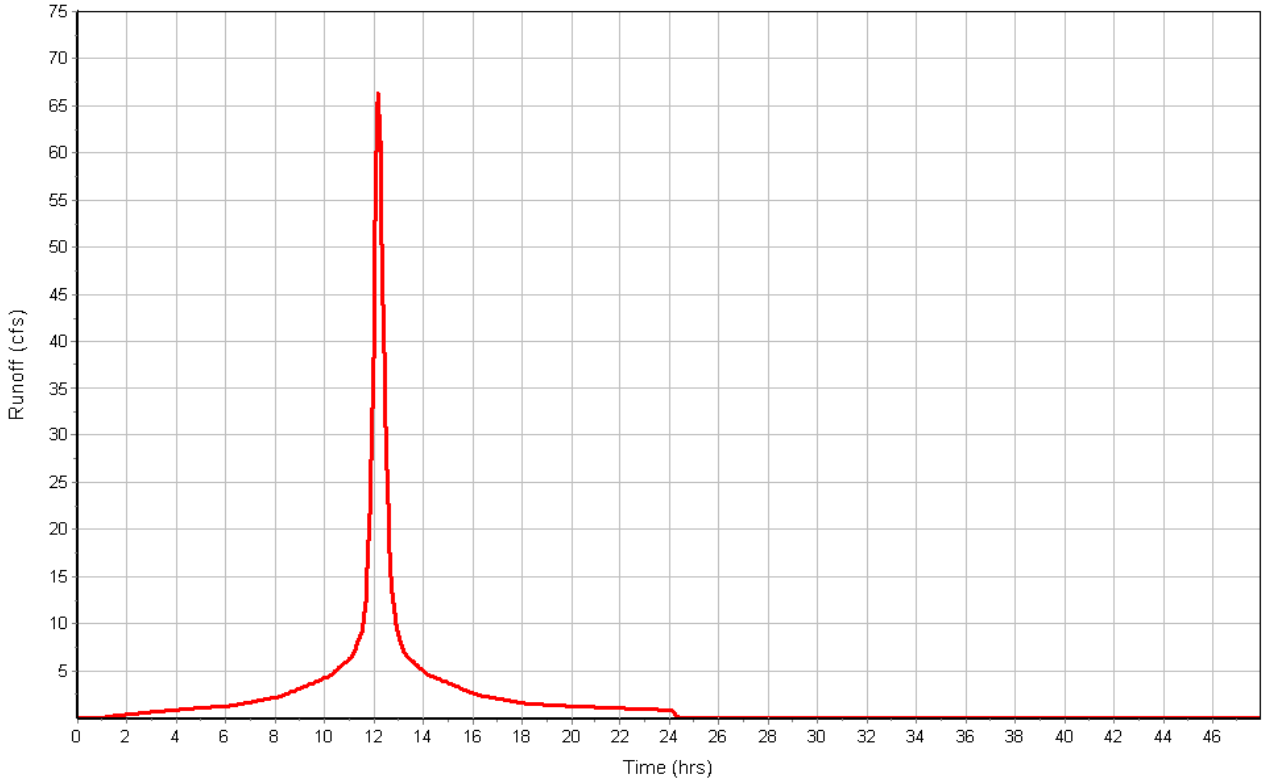
Total Rainfall (in) 13.80
Total Runoff (in) 13.19
Peak Runoff (cfs) 66.60
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:15:43

Subbasin : LowerNEBasin

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : LowerNW

Input Data

Area (ac) 8.76
Weighted Curve Number 95.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Ash	8.76	-	95.00
Composite Area & Weighted CN	8.76		95.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0.00	0.00
Flow Length (ft) :	60	0.00	0.00
Slope (%) :	0.5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	5.4	0.00	0.00
Velocity (ft/sec) :	0.09	0.00	0.00
Computed Flow Time (min) :	10.99	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	545	0.00	0.00
Slope (%) :	4.4	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	3.38	0.00	0.00
Computed Flow Time (min) :	2.69	0.00	0.00

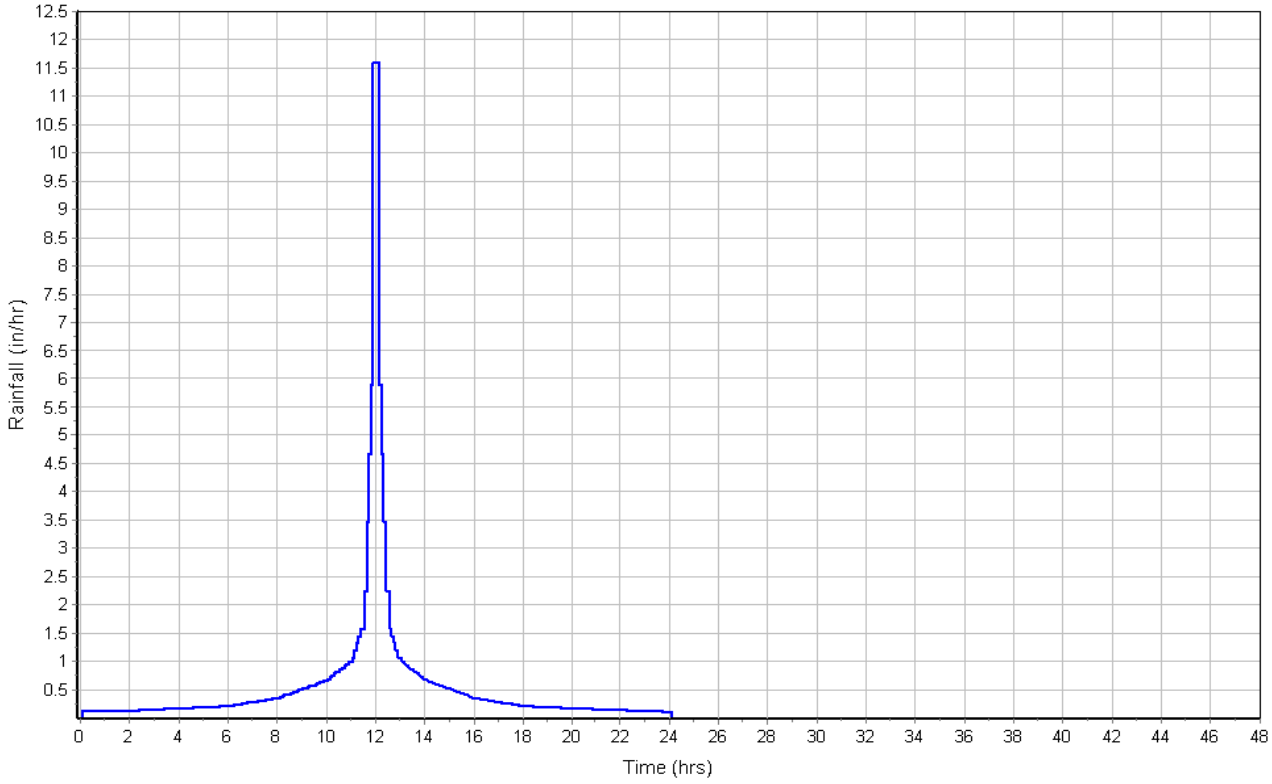
Total TOC (min) 13.67

Subbasin Runoff Results

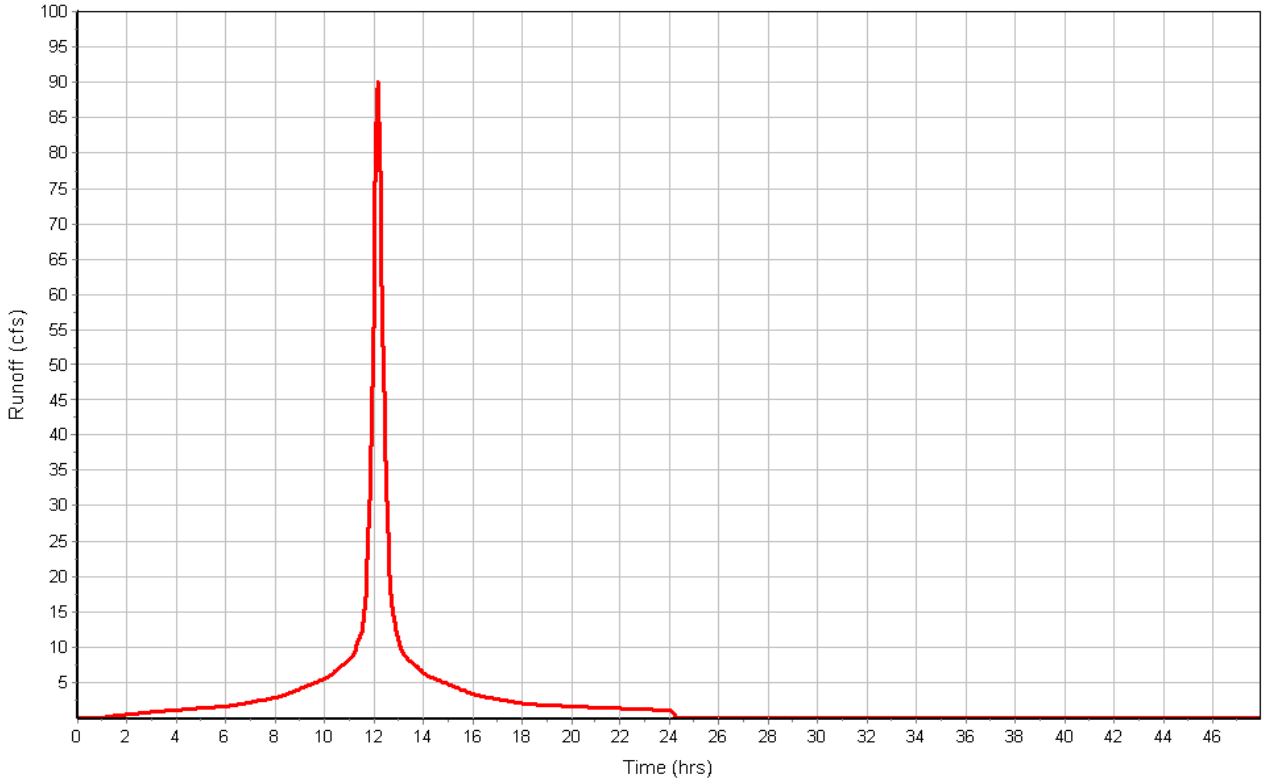
Total Rainfall (in) 13.80
Total Runoff (in) 13.19
Peak Runoff (cfs) 90.30
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:13:40

Subbasin : LowerNW

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : North Edge Basins

Input Data

Area (ac) 4.56
Weighted Curve Number 95.94
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Ash	2.23	-	95.00
Water	0.97	-	100.00
Impervious	1.10	-	98.00
GrassyAsh	0.26	-	80.00
Composite Area & Weighted CN	4.56		95.94

Time of Concentration

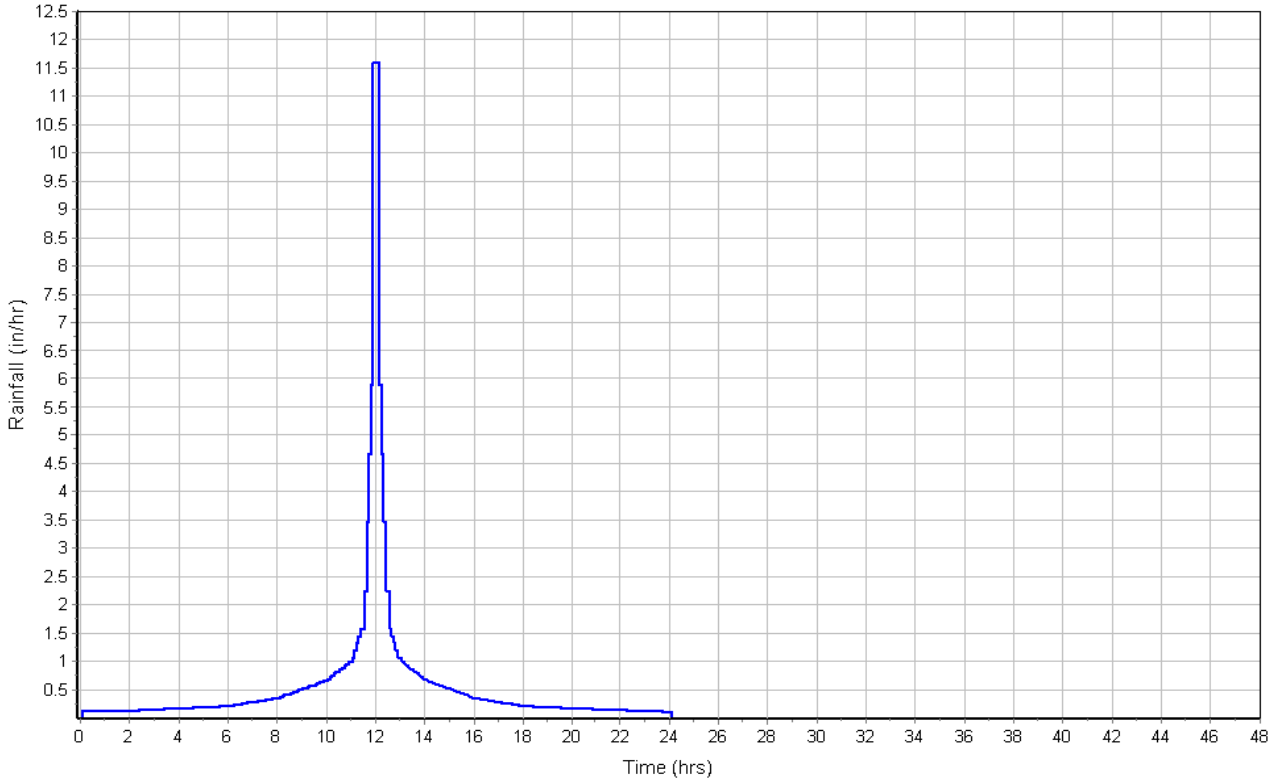
User-Defined TOC override (minutes): 6

Subbasin Runoff Results

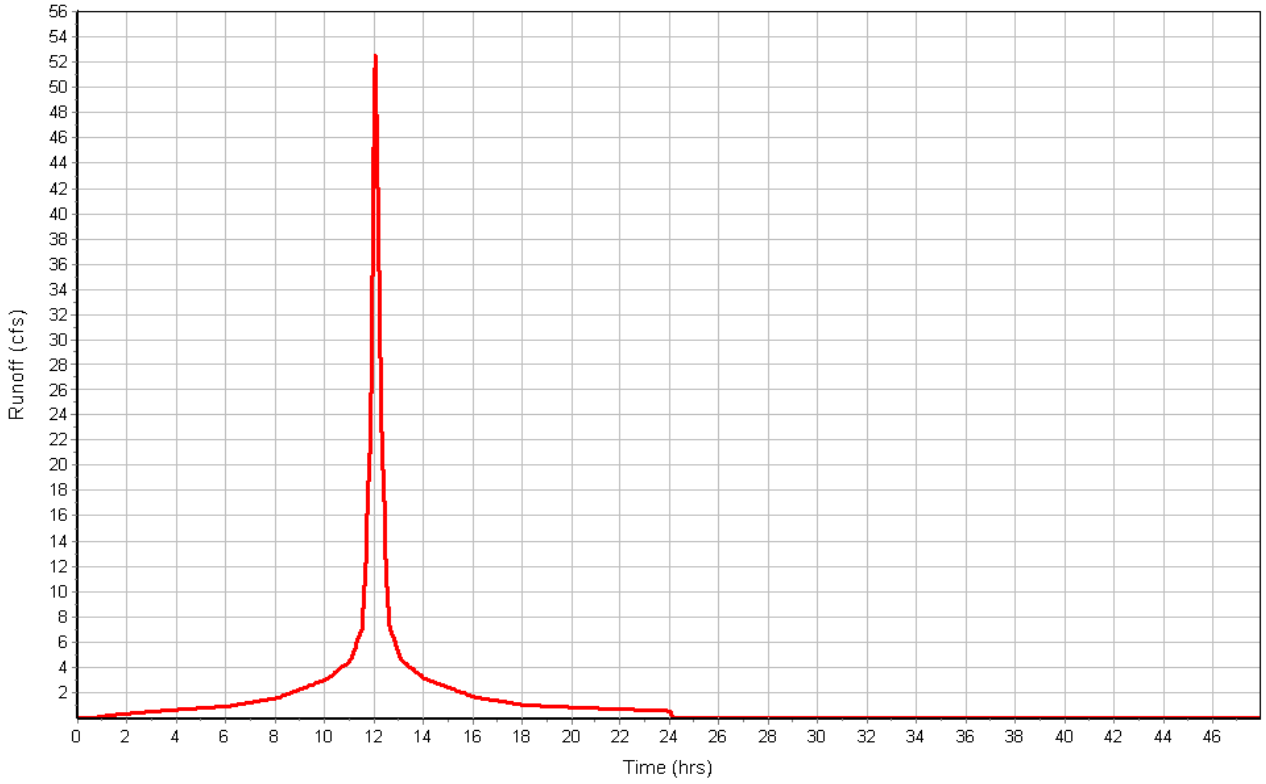
Total Rainfall (in) 13.80
Total Runoff (in) 13.31
Peak Runoff (cfs) 52.73
Weighted Curve Number 95.94
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : North Edge Basins

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SouthEdgeBasin

Input Data

Area (ac) 15.97
Weighted Curve Number 85.67
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
ClosureTurf	2.74	-	95.00
Dirt	9.79	C	79.00
Water	1.67	-	100.00
Ash	1.70	-	95.00
Composite Area & Weighted CN	15.90		85.67

Time of Concentration

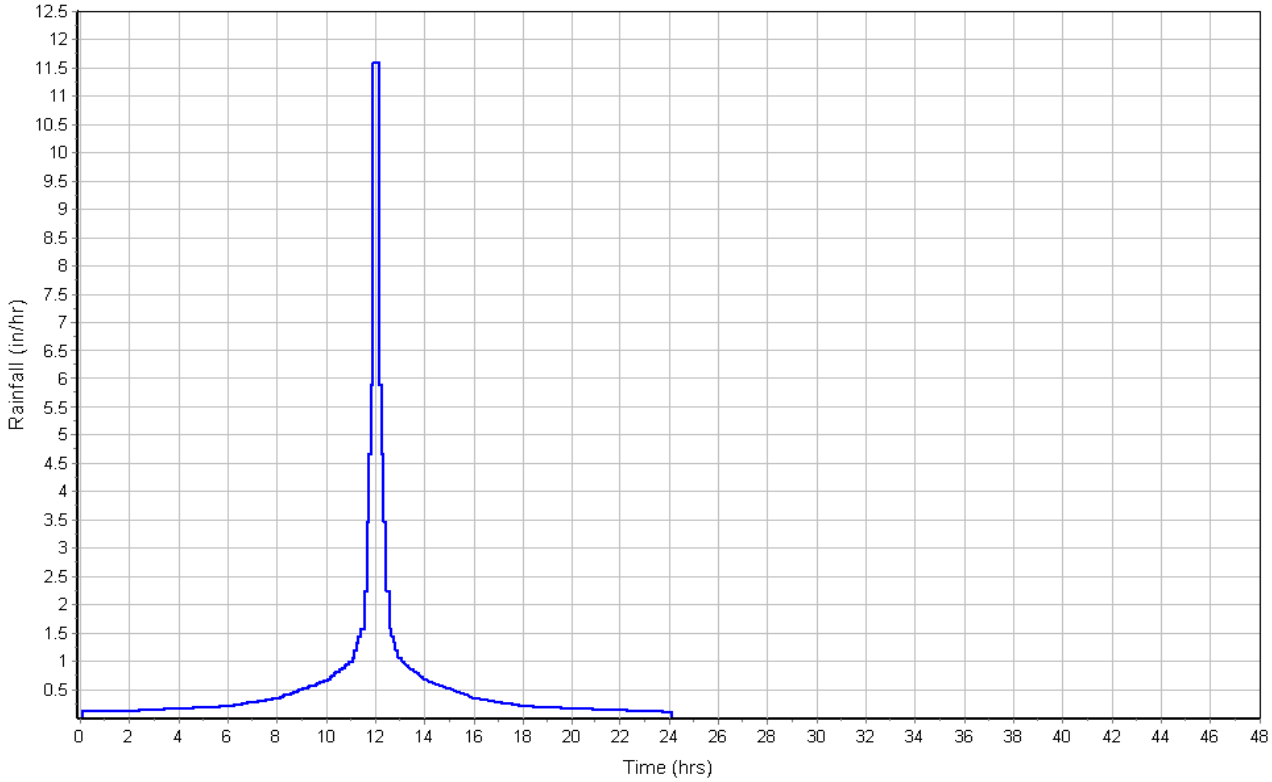
User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

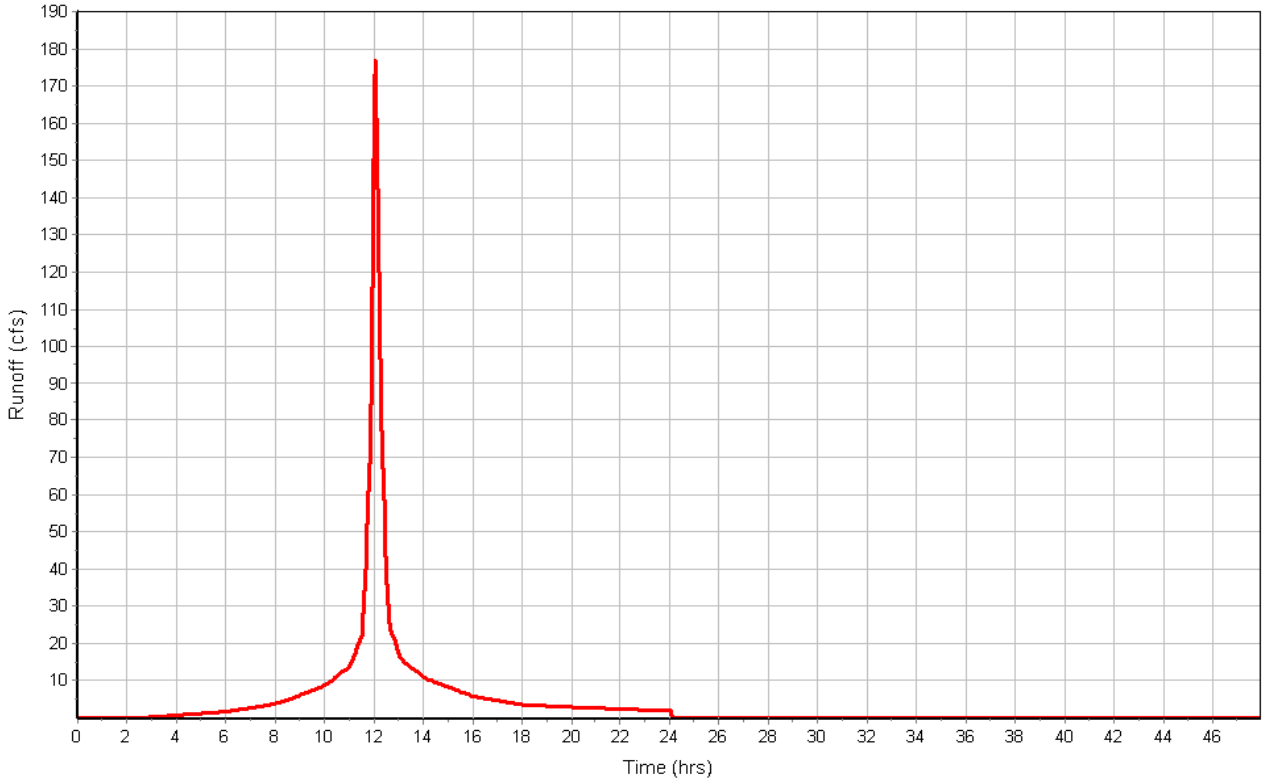
Total Rainfall (in) 13.80
Total Runoff (in) 11.98
Peak Runoff (cfs) 178.10
Weighted Curve Number 85.67
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SouthEdgeBasin

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-41

Input Data

Area (ac) 6.86
Weighted Curve Number 95.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Ash	6.86	-	95.00
Composite Area & Weighted CN	6.86		95.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.25	0.00	0.00
Flow Length (ft) :	54	0.00	0.00
Slope (%) :	2.2	0.00	0.00
2 yr, 24 hr Rainfall (in) :	5.4	0.00	0.00
Velocity (ft/sec) :	0.13	0.00	0.00
Computed Flow Time (min) :	6.67	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	310	0.00	0.00
Slope (%) :	3.19	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.88	0.00	0.00
Computed Flow Time (min) :	1.79	0.00	0.00

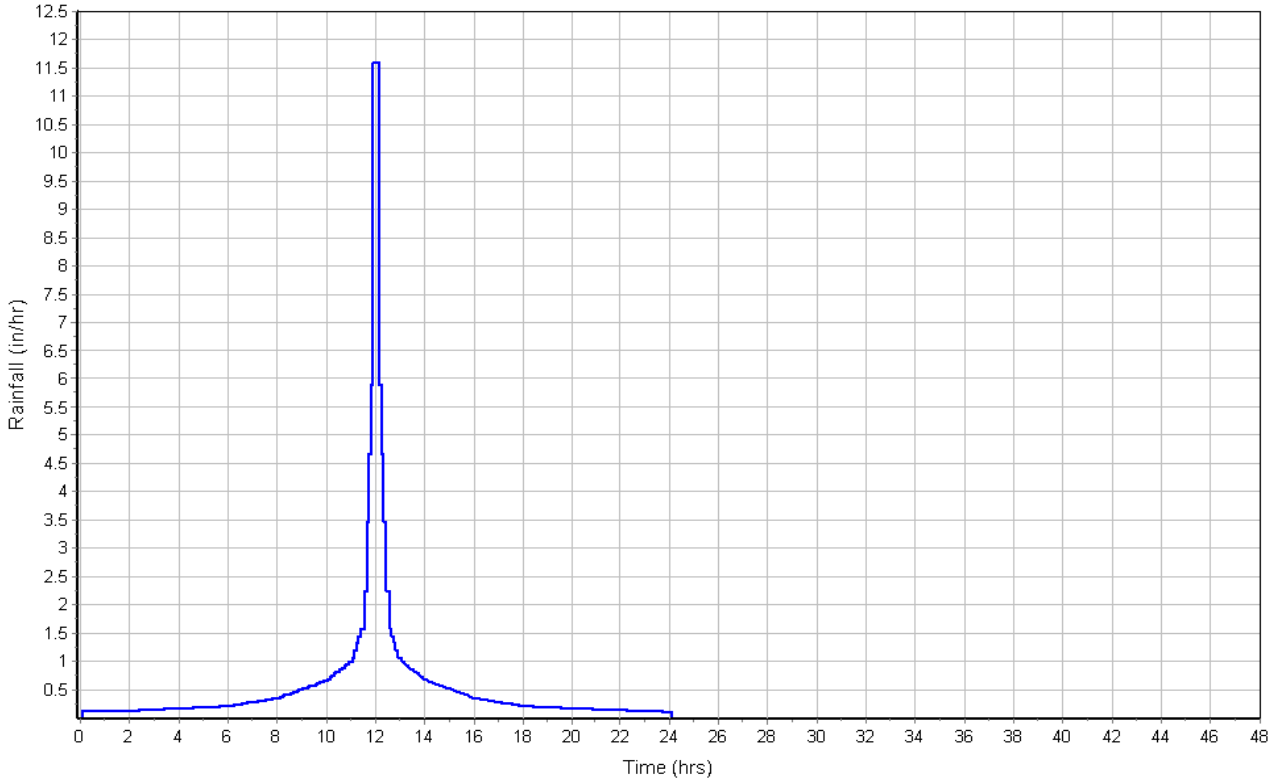
Total TOC (min) 8.47

Subbasin Runoff Results

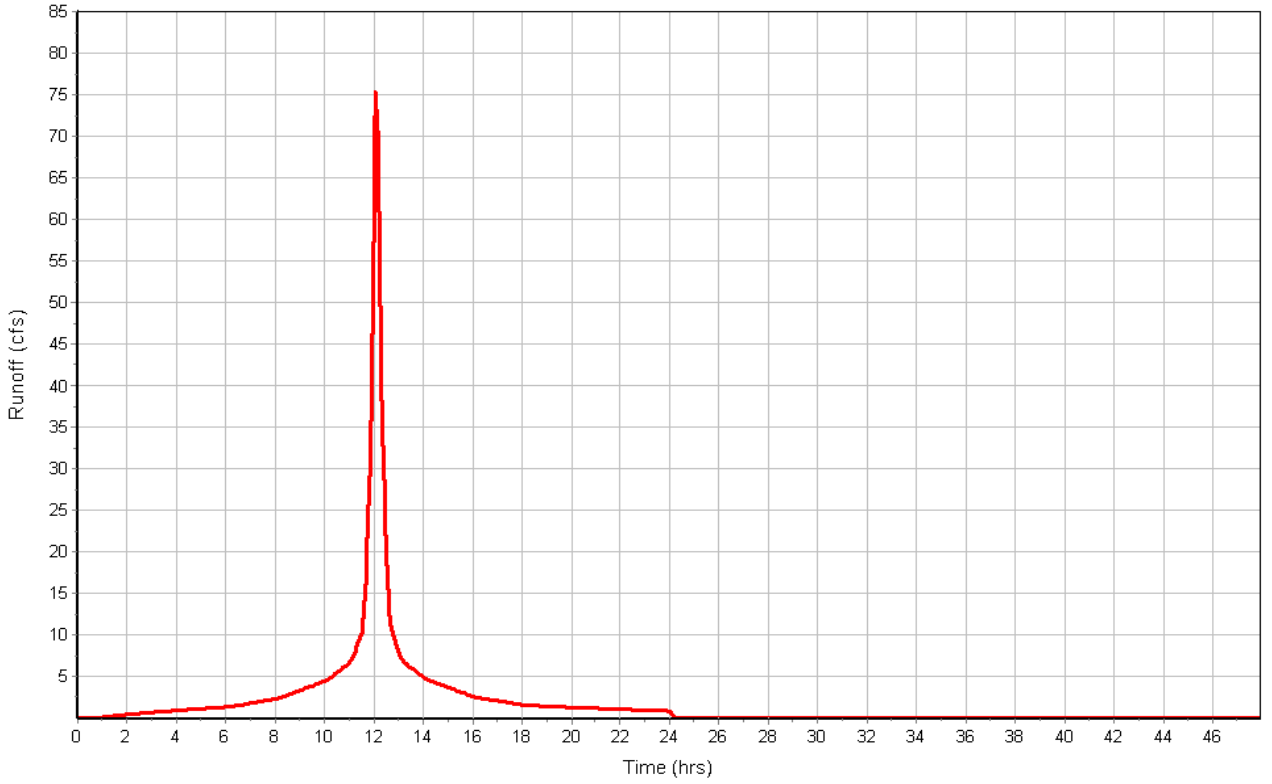
Total Rainfall (in) 13.80
Total Runoff (in) 13.19
Peak Runoff (cfs) 77.12
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:08:28

Subbasin : Sub-41

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UpperNE

Input Data

Area (ac) 6.44
Weighted Curve Number 95.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Ash	6.44	-	95.00
Composite Area & Weighted CN	6.44		95.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0.00	0.00
Flow Length (ft) :	87	0.00	0.00
Slope (%) :	1.1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	5.4	0.00	0.00
Velocity (ft/sec) :	0.13	0.00	0.00
Computed Flow Time (min) :	10.79	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	123	0.00	0.00
Slope (%) :	6.18	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	4.01	0.00	0.00
Computed Flow Time (min) :	0.51	0.00	0.00

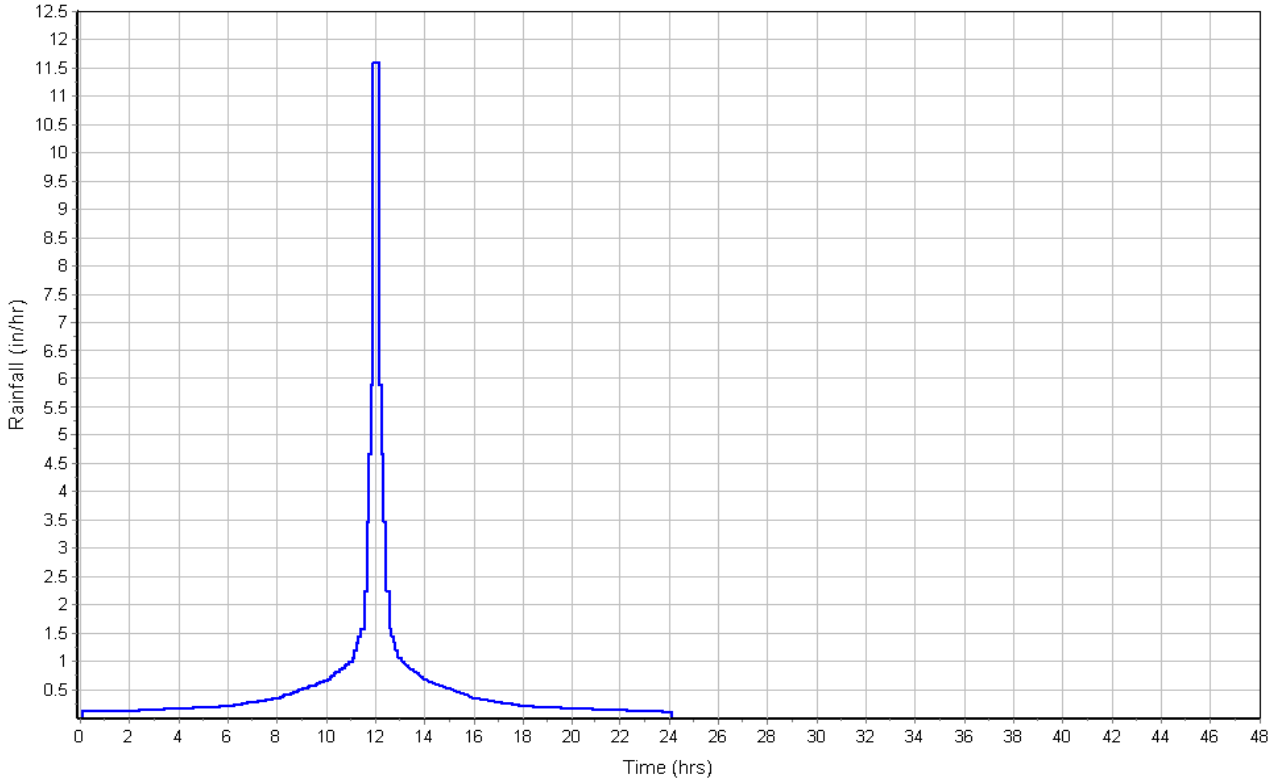
Total TOC (min) 11.30

Subbasin Runoff Results

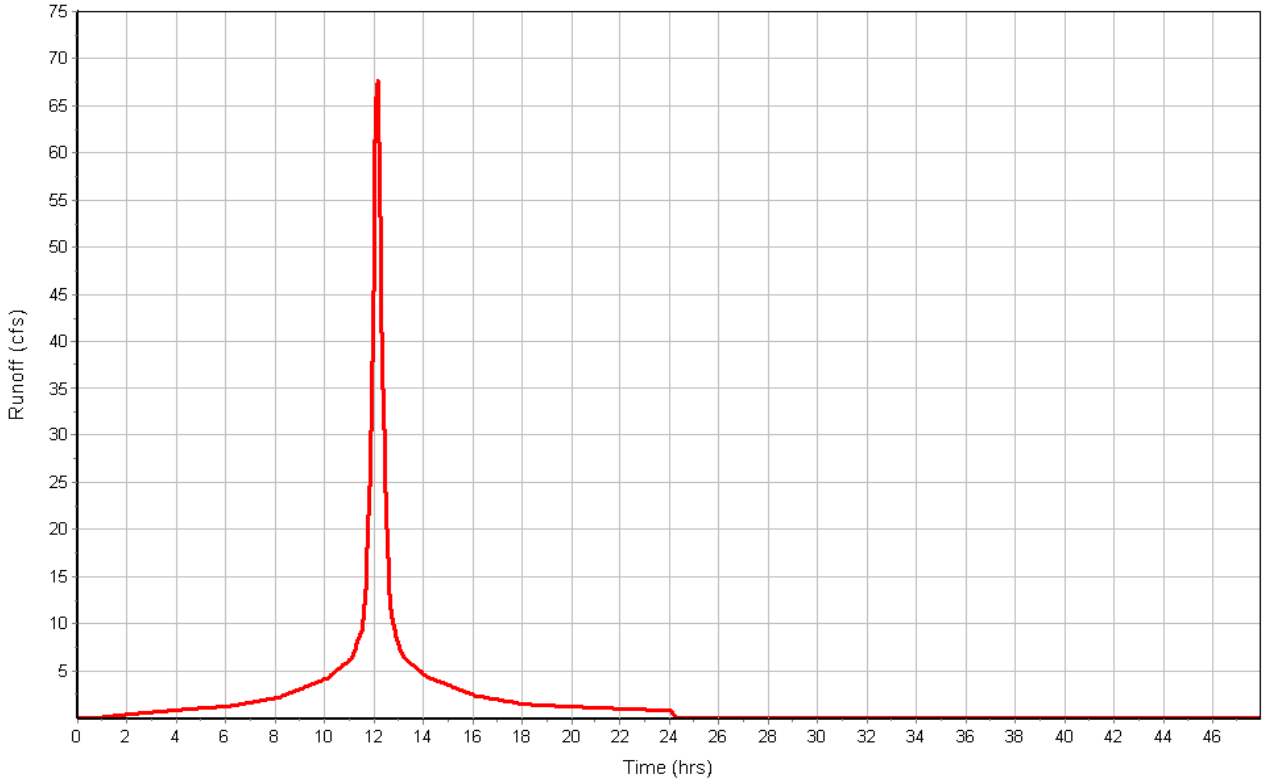
Total Rainfall (in) 13.80
Total Runoff (in) 13.19
Peak Runoff (cfs) 69.08
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:11:18

Subbasin : UpperNE

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : UpperNW Basin

Input Data

Area (ac) 15.79
Weighted Curve Number 95.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Ash	15.79	-	95.00
Composite Area & Weighted CN	15.79		95.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0.00	0.00
Flow Length (ft) :	58.8	0.00	0.00
Slope (%) :	4	0.00	0.00
2 yr, 24 hr Rainfall (in) :	5.4	0.00	0.00
Velocity (ft/sec) :	0.21	0.00	0.00
Computed Flow Time (min) :	4.70	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	443	0.00	0.00
Slope (%) :	5	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	3.61	0.00	0.00
Computed Flow Time (min) :	2.05	0.00	0.00

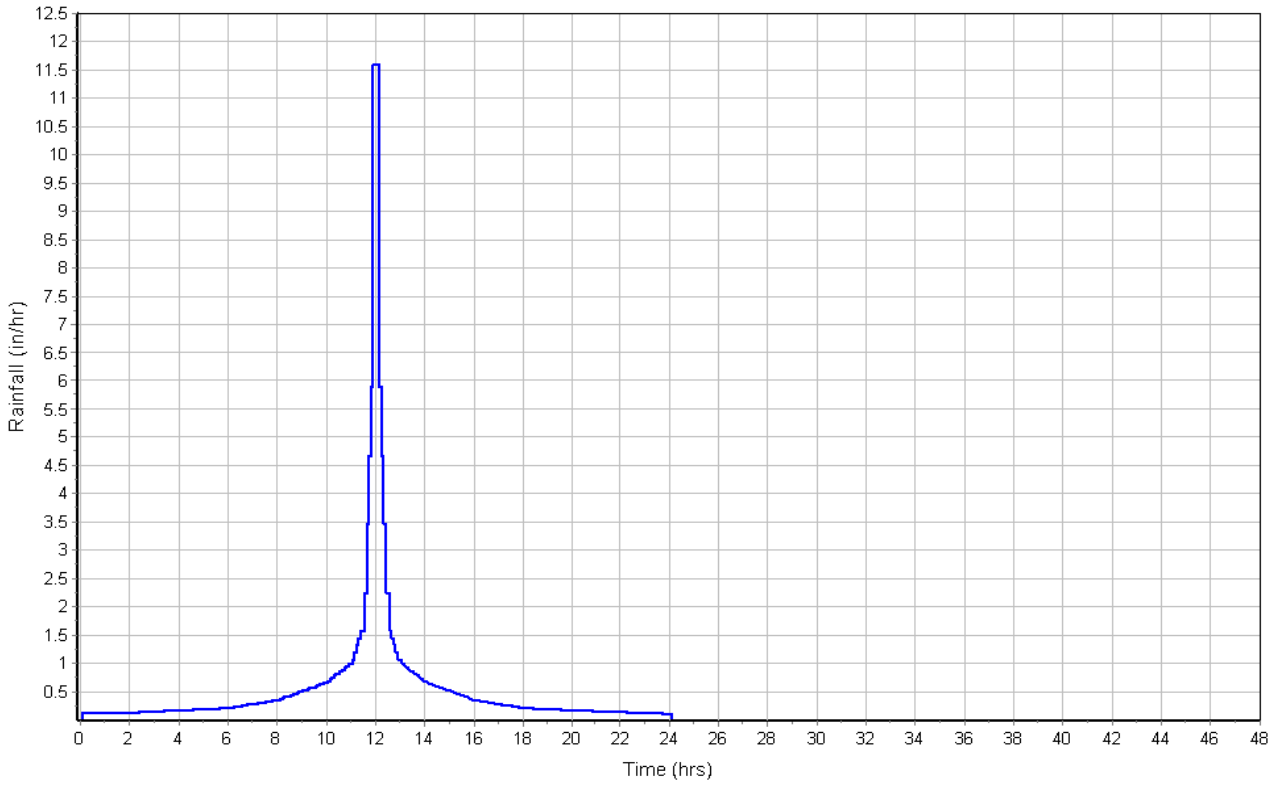
Total TOC (min) 6.75

Subbasin Runoff Results

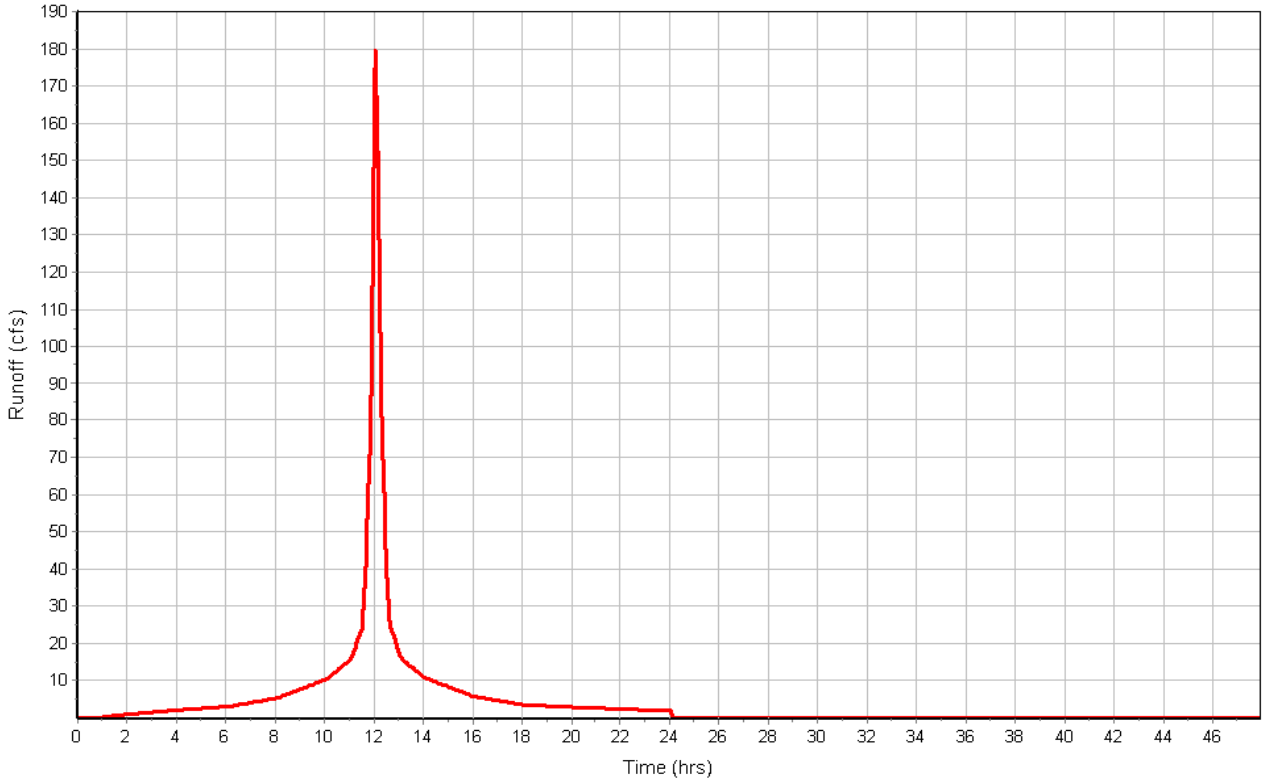
Total Rainfall (in) 13.80
Total Runoff (in) 13.19
Peak Runoff (cfs) 180.97
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:06:45

Subbasin : UpperNW Basin

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : WestEdge

Input Data

Area (ac) 2.47
Weighted Curve Number 79.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Dirt	2.47	C	79.00
Composite Area & Weighted CN	2.47		79.00

Time of Concentration

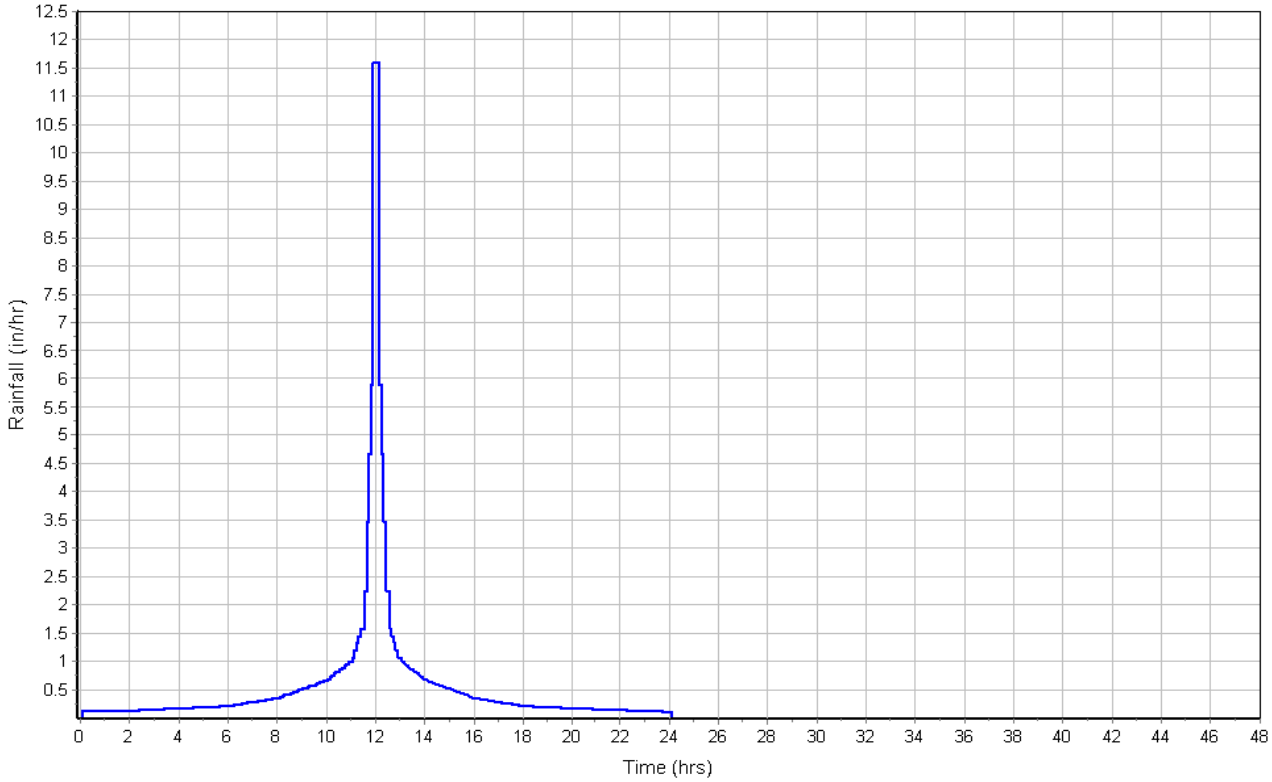
User-Defined TOC override (minutes): 6

Subbasin Runoff Results

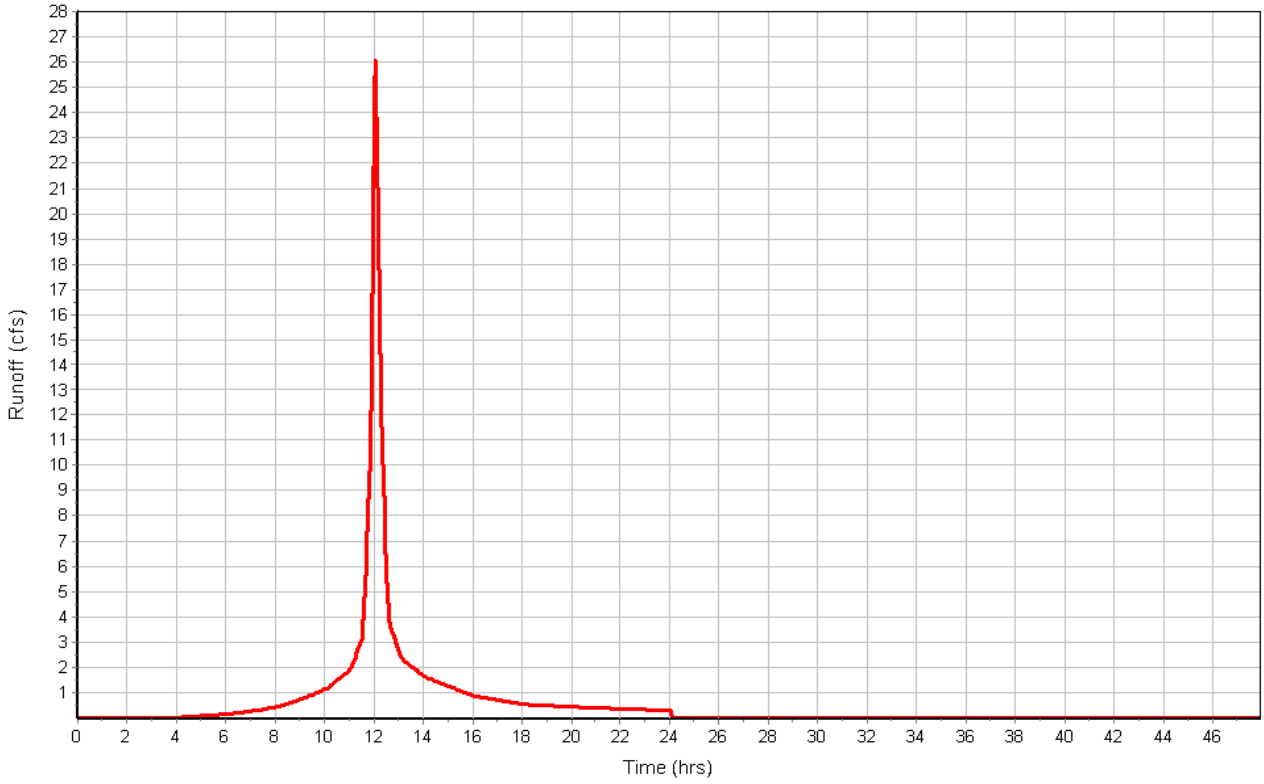
Total Rainfall (in) 13.80
Total Runoff (in) 11.05
Peak Runoff (cfs) 26.31
Weighted Curve Number 79.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : WestEdge

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : WestLowerlLined

Input Data

Area (ac) 20.67
Weighted Curve Number 99.54
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Water	15.84	-	100.00
Impervious	4.72	-	98.00
Composite Area & Weighted CN	20.56		99.54

Time of Concentration

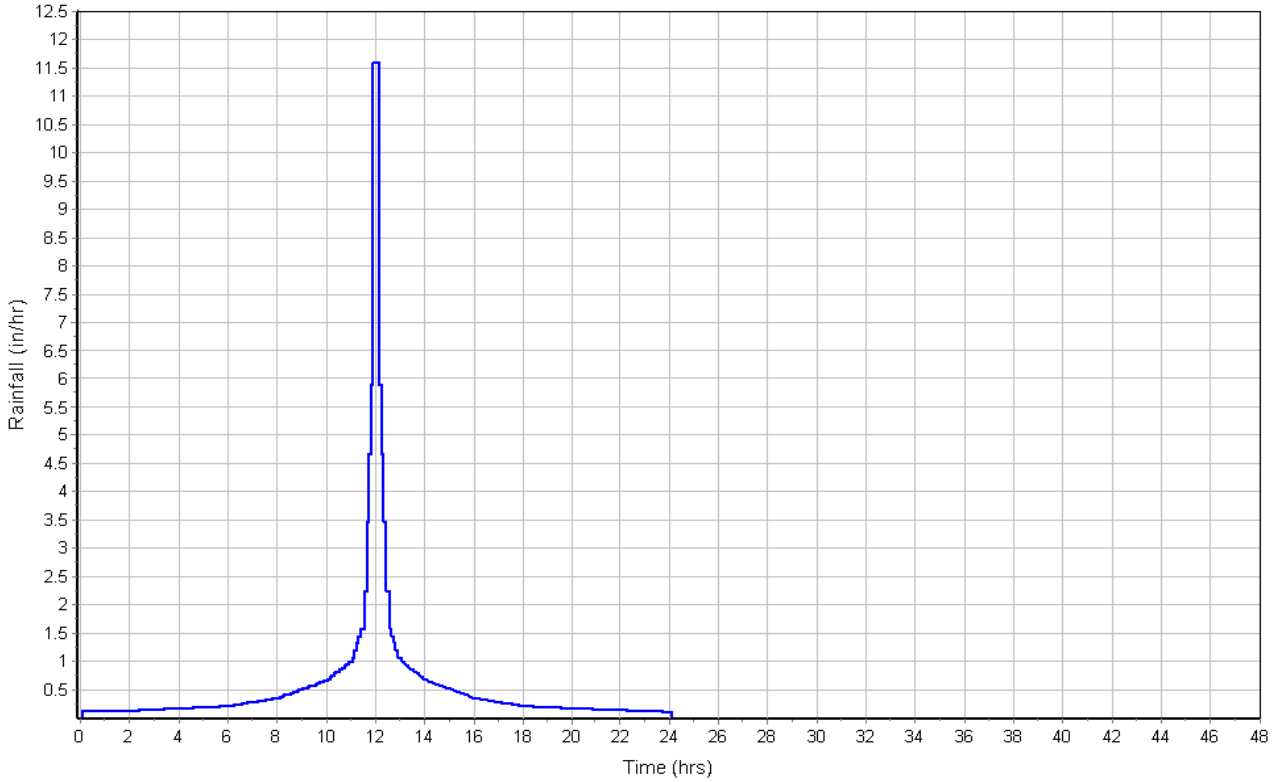
User-Defined TOC override (minutes): 6

Subbasin Runoff Results

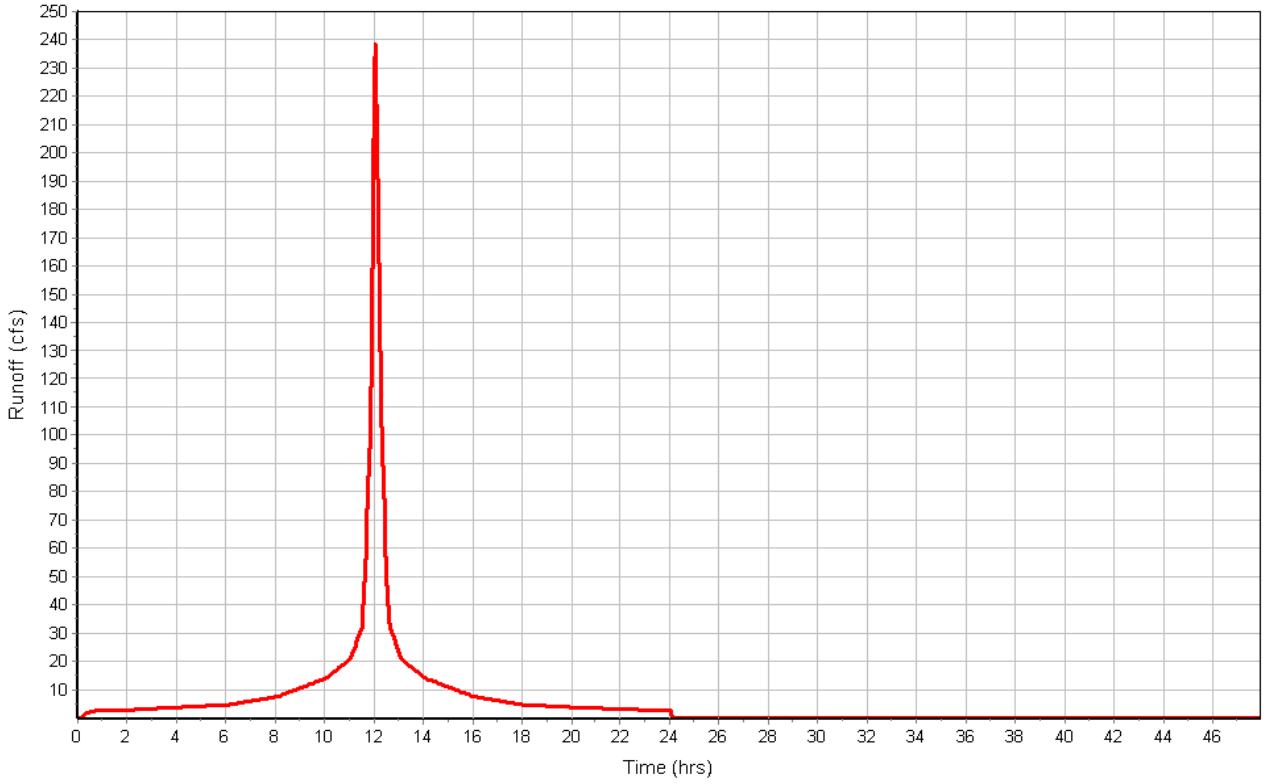
Total Rainfall (in) 13.80
Total Runoff (in) 13.75
Peak Runoff (cfs) 239.66
Weighted Curve Number 99.54
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : WestLowerlLined

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 (ft^2)	Minimum Pipe Cover (in)
1	Jun-01	20.00	31.70	11.70	21.00	1.00	0.00	-31.70	0.00	0.00
2	Jun-02	18.00	23.40	5.40	18.30	0.30	0.00	-23.40	0.00	0.00
3	Jun-03	28.60	31.40	2.80	0.00	-28.60	2.60	-28.80	0.00	0.00
4	Jun-07	21.60	26.00	4.40	0.00	-21.60	4.40	-21.60	0.00	0.00
5	Jun-08	19.80	22.61	2.81	0.00	-19.80	0.00	-22.61	0.00	0.00
6	Jun-09	18.80	21.50	2.70	0.00	-18.80	0.00	-21.50	0.00	0.00
7	Jun-10	15.70	20.00	4.30	17.00	1.30	4.30	-15.70	0.00	0.00
8	Jun-14	20.00	24.06	4.06	0.00	-20.00	0.00	-24.06	0.00	0.00
9	Jun-15	28.40	30.50	2.10	0.00	-28.40	0.00	-30.50	0.00	0.00
10	Jun-16	31.00	40.00	9.00	0.00	-31.00	0.00	-40.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	231.87	231.87	26.77	6.77	0.00	4.93	24.17	4.17	0 12:12	0 00:00	0.00	0.00
2	Jun-02	213.54	0.00	23.48	5.48	0.00	2.52	18.80	0.80	0 12:16	0 00:00	0.00	0.00
3	Jun-03	90.02	90.02	30.58	1.98	0.00	0.82	28.80	0.20	0 12:17	0 00:00	0.00	0.00
4	Jun-07	225.77	66.33	26.32	4.72	0.00	1.38	22.03	0.43	0 12:19	0 00:00	0.00	0.00
5	Jun-08	165.66	0.00	22.68	2.88	0.00	1.92	20.37	0.57	0 12:19	0 00:00	0.00	0.00
6	Jun-09	117.03	67.61	20.39	1.59	0.00	1.11	18.98	0.18	0 12:15	0 00:00	0.00	0.00
7	Jun-10	116.34	0.00	17.00	1.30	0.00	3.00	17.00	1.30	0 12:15	0 00:00	0.00	0.00
8	Jun-14	24.30	0.00	24.06	4.06	0.00	0.00	22.67	2.67	0 12:11	0 12:11	0.00	1.00
9	Jun-15	26.06	26.06	29.77	1.37	0.00	1.13	28.48	0.08	0 12:11	0 00:00	0.00	0.00
10	Jun-16	75.35	75.35	35.91	4.91	0.00	4.09	31.30	0.30	0 12:06	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	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	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	Link-01	1870.00	24.00	4.00	18.00	0.00	6.00	0.3200	Trapezoidal	3.850	36.950	0.0320	0.5000	0.5000	0.0000	0.00	No
2	Link-13	900.00	21.60	0.00	19.80	0.00	1.80	0.2000	Parabolic	3.000	20.000	0.0320	0.5000	0.5000	0.0000	0.00	No
3	Link-14	500.00	18.80	0.00	15.70	0.00	3.10	0.6200	Trapezoidal	2.700	31.200	0.0320	0.5000	0.5000	0.0000	0.00	No
4	Link-18	1300.00	28.60	0.00	21.60	0.00	7.00	0.5400	Parabolic	2.150	19.000	0.0320	0.5000	0.5000	0.0000	0.00	No
5	Link-22	1500.00	28.20	-0.20	20.00	0.00	8.20	0.5500	Trapezoidal	2.500	6.250	0.0320	0.5000	0.5000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-01	213.54	0 12:12	423.23	0.50	2.99	10.42	3.29	0.86	0.00		
2	Link-13	165.66	0 12:19	127.07	1.30	4.27	3.51	2.94	0.98	0.00		
3	Link-14	116.34	0 12:15	355.28	0.33	4.16	2.00	1.45	0.54	0.00		
4	Link-18	81.69	0 12:17	115.43	0.71	3.27	6.63	2.05	0.96	0.00		
5	Link-22	24.30	0 12:11	60.72	0.40	2.29	10.92	1.92	0.77	0.00		

Pipe Input

SN	Element ID	Length (ft)	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	Link-03	50.00	18.30	0.30	16.00	31.00	2.30	4.6000	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
2	Link-05	50.00	18.30	0.30	16.00	31.00	2.30	4.6000	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
3	Link-15	50.00	20.00	0.20	18.80	0.00	1.20	2.4000	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	3
4	Link-16	327.73	12.08	-3.62	-2.00	13.00	14.08	4.3000	Dummy	0.000	0.000	0.0320	0.5000	0.5000	0.0000	0.00	No	1
5	Link-17	100.00	7.80	1.80	7.45	7.45	0.35	0.3500	CIRCULAR	48.000	48.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
6	Link-23	100.00	31.00	0.00	21.60	0.00	9.40	9.4000	CIRCULAR	36.000	36.000	0.0120	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-03	27.19	0 12:16	42.05	0.65	10.18	0.08	1.77	0.89	0.00		Calculated
2	Link-05	27.19	0 12:16	42.05	0.65	10.18	0.08	1.77	0.89	0.00		Calculated
3	Link-15	49.94	0 12:19	91.12	0.55	6.10	0.14	1.79	0.90	0.00		Calculated
4	Link-16	116.34	0 12:15	0.00	0.55	0.00		1.79	0.90	0.00		Calculated
5	Link-17	145.61	0 12:53	73.65	1.98	11.85	0.14	3.78	0.94	0.00		> CAPACITY
6	Link-23	84.26	0 12:10	221.53	0.38	11.92	0.14	3.00	1.00	11.00		SURCHARGED

Storage Nodes

Storage Node : East

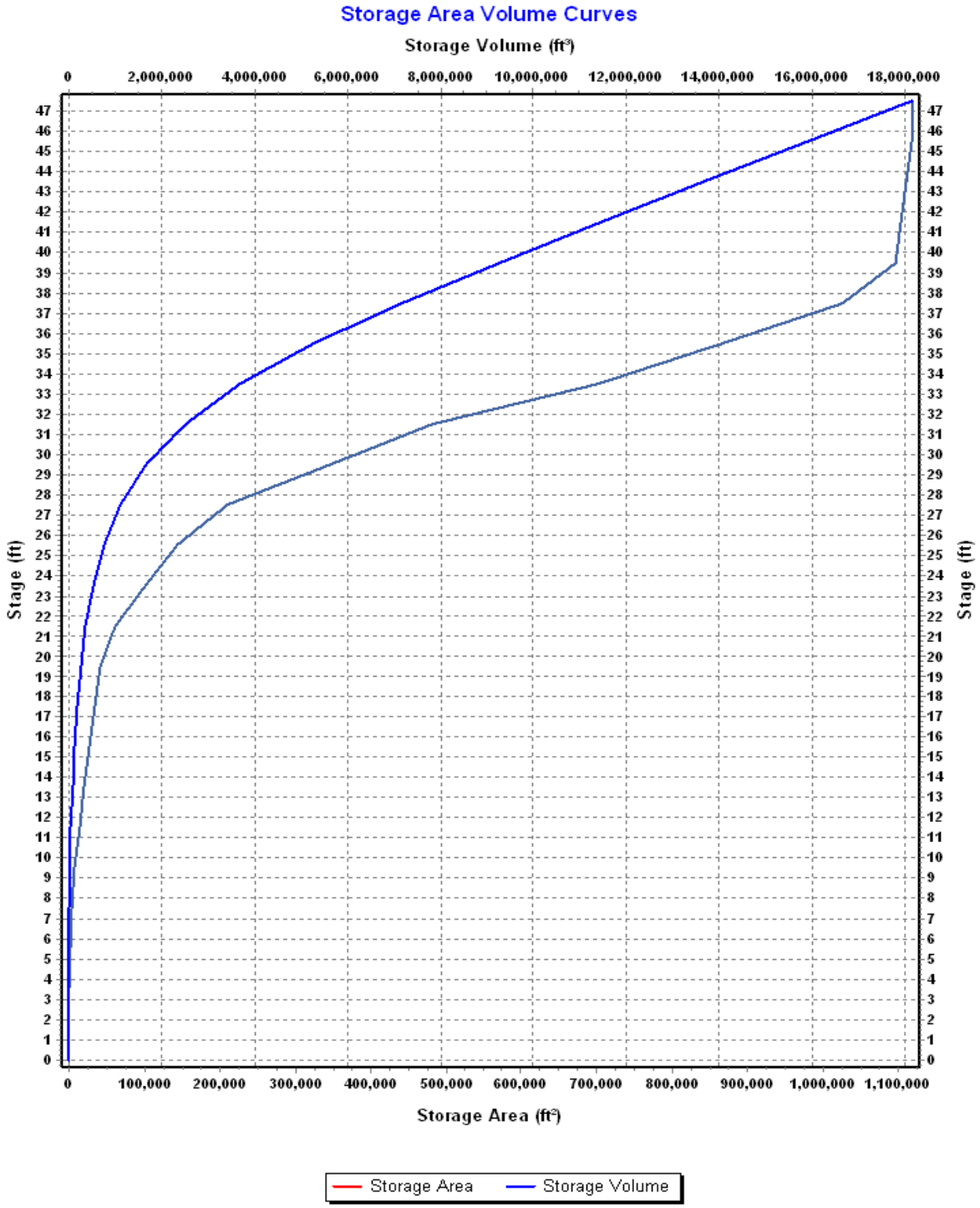
Input Data

Invert Elevation (ft)	-15.00
Max (Rim) Elevation (ft)	20.00
Max (Rim) Offset (ft)	35.00
Initial Water Elevation (ft)	14.90
Initial Water Depth (ft)	29.90
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : East

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	0.082511998	0.000
1.5	20.17964296	15.20
3.5	142.0408124	177.42
5.5	941.6347826	1261.10
7.5	3499.317188	5702.05
9.5	7897.702859	17099.07
11.5	14242.66595	39239.44
13.5	19927.67548	73409.78
15.5	26115.62956	119453.09
17.5	33448.07019	179016.79
19.5	41383.59831	253848.46
21.5	61525.2657	356757.32
23.5	99996.49991	518279.09
25.5	144694.5465	762970.14
27.5	210937.1563	1118601.84
29.5	347736.2308	1677275.23
31.5	482827.124	2507838.58
33.5	702374.4101	3693040.11
35.5	865365.4792	5260780.00
37.5	1025519.434	7151664.91
39.5	1095317.238	9272501.58
41.5	1103012.406	11470831.22
43.5	1109903.359	13683746.99
45.5	1116884.798	15910535.15
47.5	1117371.618	18144791.57


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000,000
4,000,000
6,000,000
8,000,000
10,000,000
12,000,000
14,000,000
16,000,000
18,000,000
Stage (ft)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
Storage Area (ft²)
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
1,100,000
Storage Area
Storage Volume

Storage Node : East (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	Weir-05	Rectangular	No	14.90	29.90	25.00	9.00	3.33

Output Summary Results

Peak Inflow (cfs)	653.19
Peak Lateral Inflow (cfs)	281.13
Peak Outflow (cfs)	181.49
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	17.55
Max HGL Depth Attained (ft)	32.55
Average HGL Elevation Attained (ft)	15.23
Average HGL Depth Attained (ft)	30.23
Time of Max HGL Occurrence (days hh:mm)	0 12:52
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : EastLowerLined

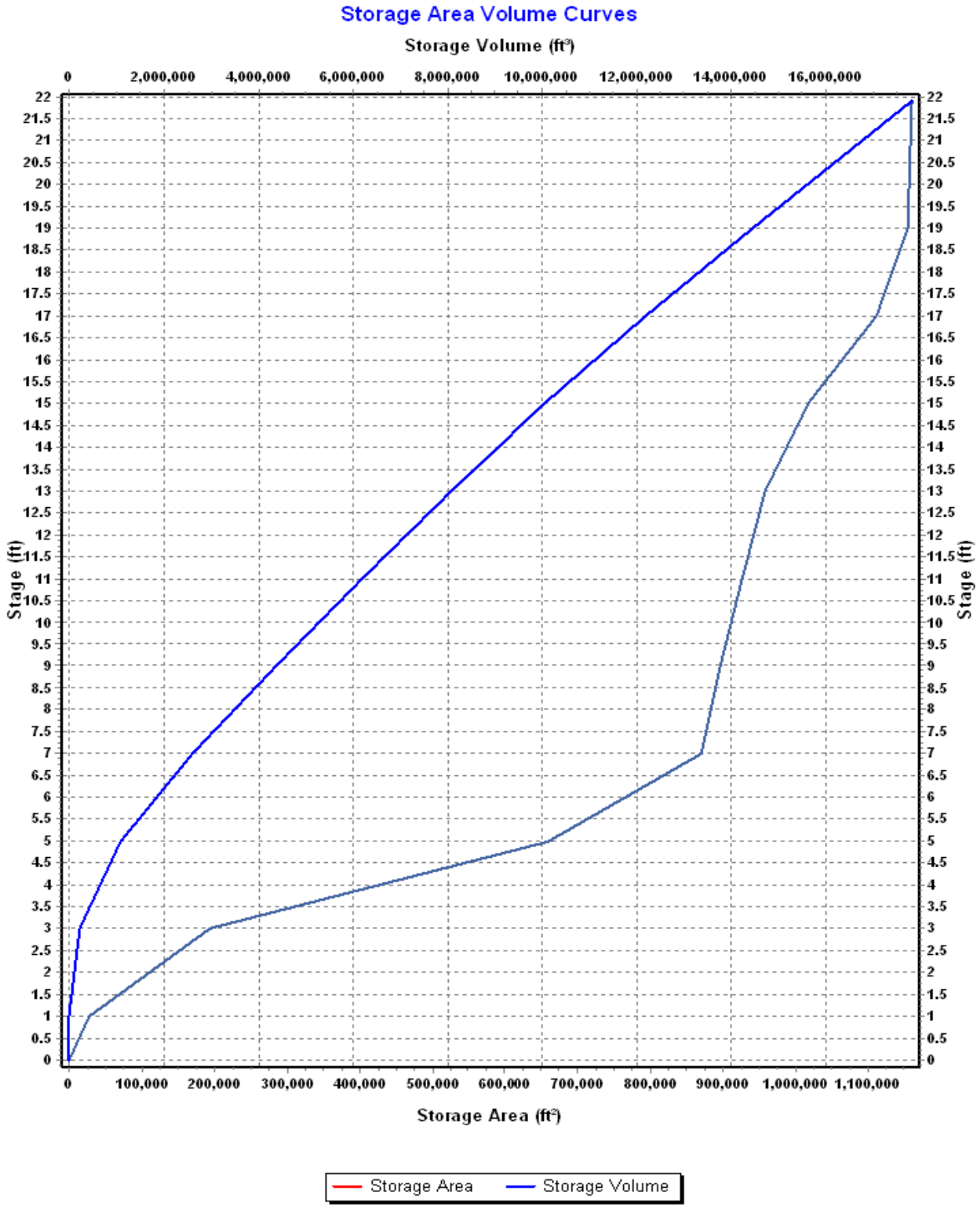
Input Data

Invert Elevation (ft) 7.00
Max (Rim) Elevation (ft) 22.00
Max (Rim) Offset (ft) 15.00
Initial Water Elevation (ft) 7.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : LowerLined-Right

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	0	0.000
1	27098.37614	13549.19
3	194419.3232	235066.89
5	658592.383	1088078.60
7	869360.7648	2616031.75
9	895944.5485	4381337.06
11	926161.234	6203442.84
13	957155.7188	8086759.79
15	1016633.949	10060549.46
17	1110134.271	12187317.68
19	1153195.638	14450647.59
21.9	1159360.728	17803854.32


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000,000
4,000,000
6,000,000
8,000,000
10,000,000
12,000,000
14,000,000
16,000,000
Stage (ft)
Stage (ft)
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
1,100,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : EastLowerLined (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	Weir-03	Trapezoidal	No	39.00	32.00	60.00	7.00	3.00

Output Summary Results

Peak Inflow (cfs)	330.71
Peak Lateral Inflow (cfs)	307.30
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	12.45
Max HGL Depth Attained (ft)	5.45
Average HGL Elevation Attained (ft)	11.50
Average HGL Depth Attained (ft)	4.5
Time of Max HGL Occurrence (days hh:mm)	2 00:00
Total Exfiltration Volume (1000-ft^3)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : PipeBay

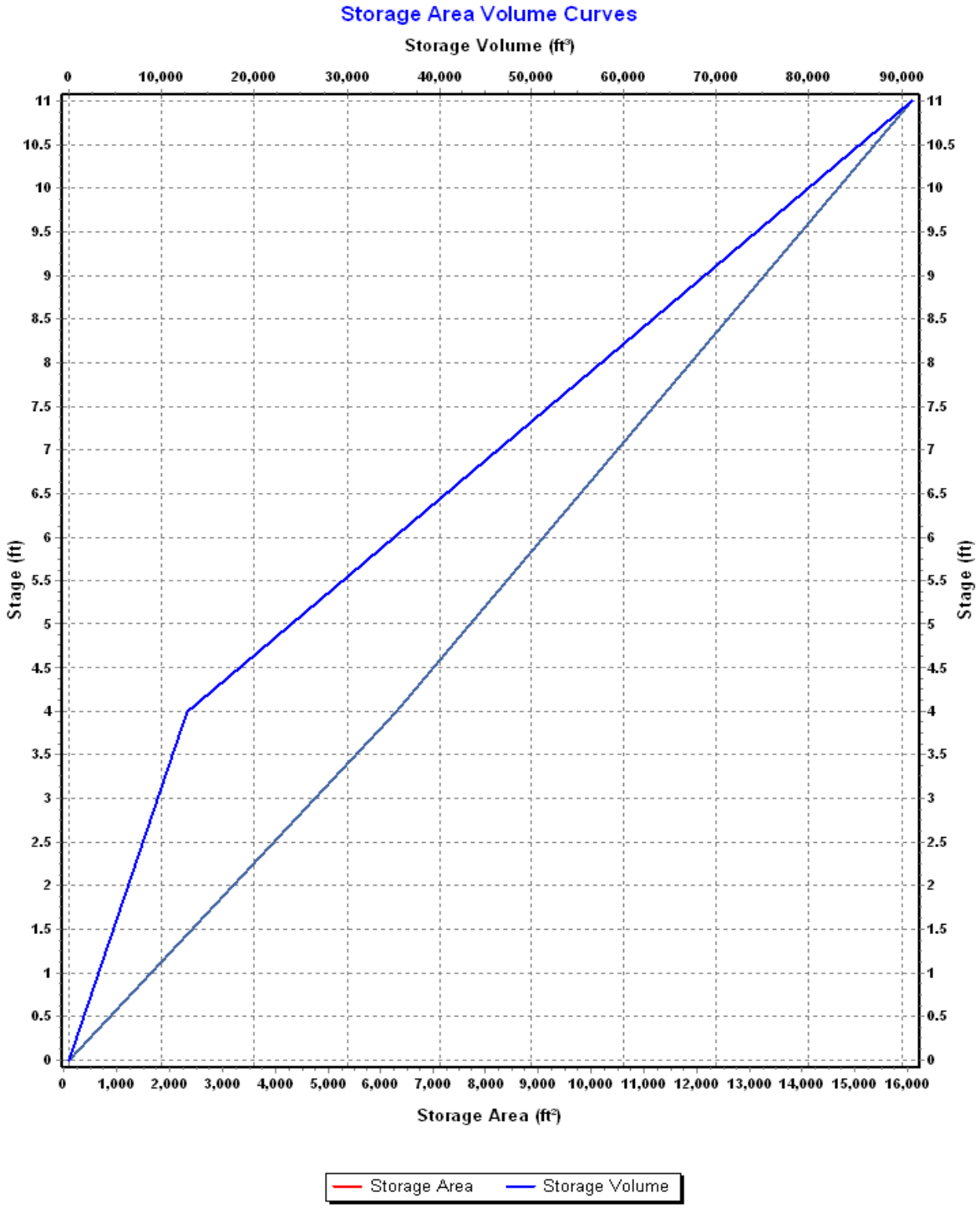
Input Data

Invert Elevation (ft) 6.00
Max (Rim) Elevation (ft) 20.00
Max (Rim) Offset (ft) 14.00
Initial Water Elevation (ft) 9.00
Initial Water Depth (ft) 3.00
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : Forebay

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	100	0.000
4	6297	12794.00
11	16071	91082.00


Storage Area Volume Curves
Storage Volume (ft³)
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
Stage (ft)
11
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
14,000
15,000
16,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : PipeBay (continued)

Output Summary Results

Peak Inflow (cfs)	187.79
Peak Lateral Inflow (cfs)	7.56
Peak Outflow (cfs)	145.61
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	17.38
Max HGL Depth Attained (ft)	11.38
Average HGL Elevation Attained (ft)	9.92
Average HGL Depth Attained (ft)	3.92
Time of Max HGL Occurrence (days hh:mm)	0 12:53
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SouthEdge

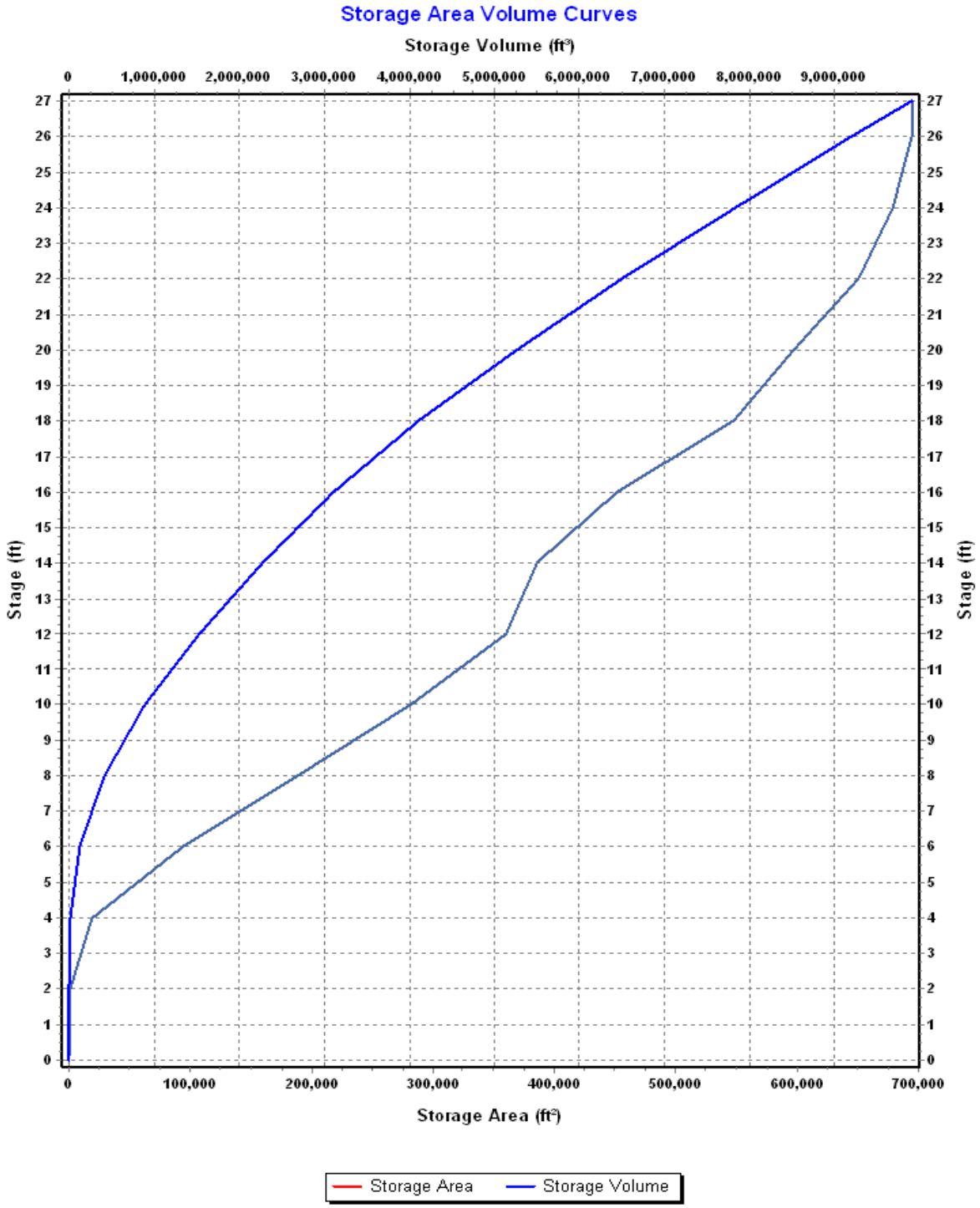
Input Data

Invert Elevation (ft) 0.00
Max (Rim) Elevation (ft) 10.00
Max (Rim) Offset (ft) 10.00
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) 0.00
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : SouthEdge

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	0.052053281	0.000
2	1186.753437	1186.81
4	19328.30369	21701.87
6	93986.78194	135016.96
8	187368.8162	416372.56
10	282247.2591	885988.64
12	360314.3294	1528550.23
14	386066.3636	2274930.92
16	451548.853	3112546.14
18	547815.6712	4111910.66
20	596876.5518	5256602.88
22	650841.8771	6504321.31
24	678860.915	7834024.10
26	694438.2776	9207323.29
27	694479.8848	9901782.37


Storage Area Volume Curves
Storage Volume (ft³)
0
1,000,000
2,000,000
3,000,000
4,000,000
5,000,000
6,000,000
7,000,000
8,000,000
9,000,000
Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
Storage Area (ft²)
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Storage Area
Storage Volume

Storage Node : SouthEdge (continued)

Output Summary Results

Peak Inflow (cfs)	176.92
Peak Lateral Inflow (cfs)	176.92
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	9.27
Max HGL Depth Attained (ft)	9.27
Average HGL Elevation Attained (ft)	7.61
Average HGL Depth Attained (ft)	7.61
Time of Max HGL Occurrence (days hh:mm)	1 00:25
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : WestLowerLined

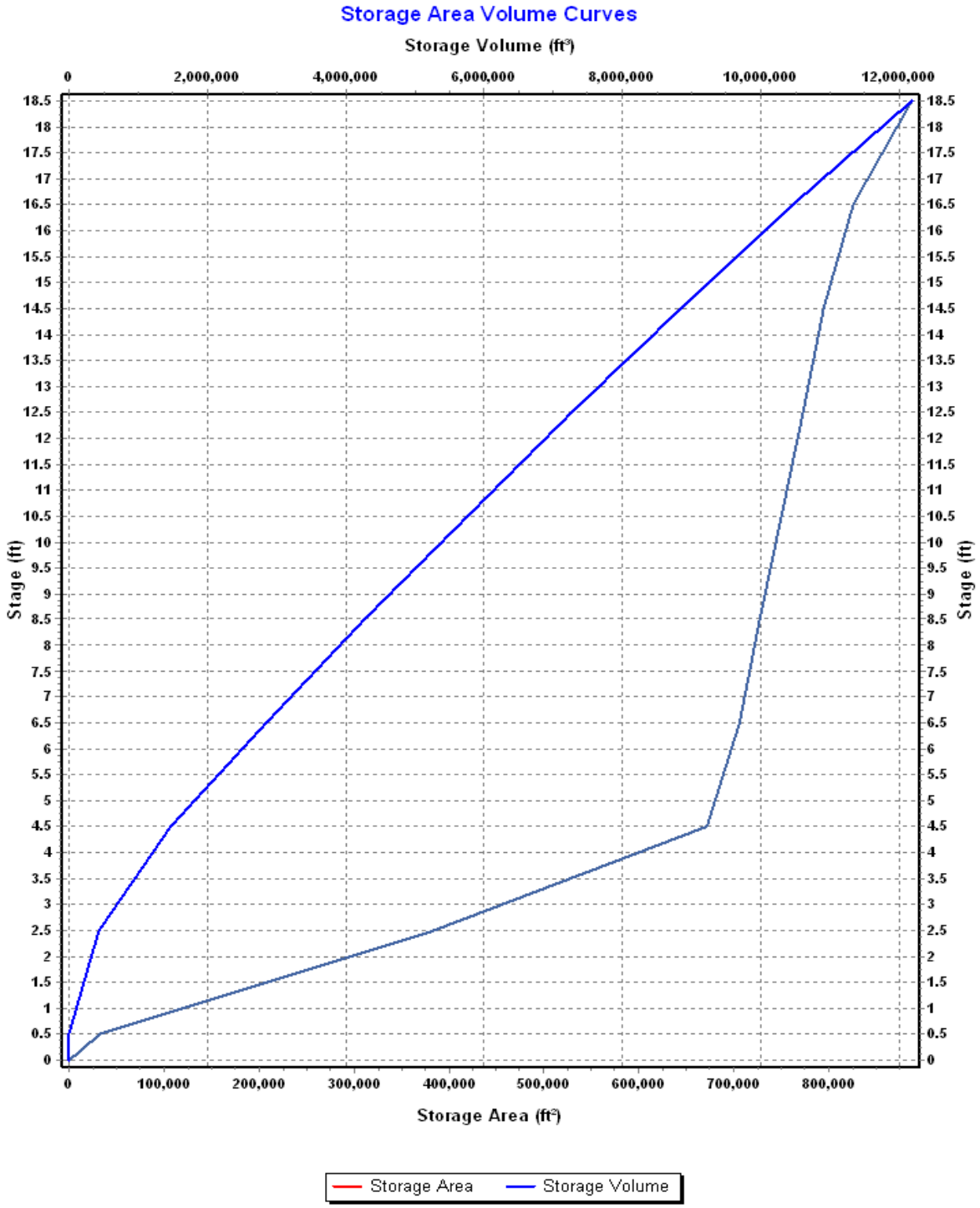
Input Data

Invert Elevation (ft) 8.00
Max (Rim) Elevation (ft) 24.00
Max (Rim) Offset (ft) 16.00
Initial Water Elevation (ft) 15.00
Initial Water Depth (ft) 7.00
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : LowerLined-Left

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	120.7522542	0.000
0.5	33006.71536	8281.87
2.5	382306.3058	423594.89
4.5	670539.0718	1476440.27
6.5	704808.1003	2851787.44
8.5	726904.7313	4283500.27
10.5	749242.1223	5759647.12
12.5	771764.5799	7280653.82
14.5	794437.1475	8846855.55
16.5	825980.3214	10467273.02
18.5	886685.0578	12179938.40


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000,000
4,000,000
6,000,000
8,000,000
10,000,000
12,000,000
Stage (ft)
Stage (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
10
10.5
11
11.5
12
12.5
13
13.5
14
14.5
15
15.5
16
16.5
17
17.5
18
18.5
0
100,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : WestLowerLined (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	Weir-09	Trapezoidal	No	24.50	16.50	18.00	1.30	2.80

Output Summary Results

Peak Inflow (cfs)	259.51
Peak Lateral Inflow (cfs)	259.51
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	18.89
Max HGL Depth Attained (ft)	10.89
Average HGL Elevation Attained (ft)	17.92
Average HGL Depth Attained (ft)	9.92
Time of Max HGL Occurrence (days hh:mm)	1 00:25
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00