Appendix H:
Hydrology and Water Quality Supporting Information

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H-1: Hydrology Report–Travel Stop

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HYDROLOGY REPORT

New Travel Center
BAKER BLVD
BAKER, CA 92307

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LANE PROJECT NO. 20270

TABLE OF CONTENTS

Executive Summary

This storm drainage modeling, analysis, and report has been completed to document and support the proposed design and storm drain system showing there is a reduction in stormwater runoff from the pre-development condition to compared to the post-development condition

The reduced runoff is accomplished by incorporating several bioretention areas throughout the entire development, which are underlain by a bioretention soil media and gravel layer. A representative cross-section of a bioretention area is shown in Figure 3-1.

The proposed project was modeled in Autodesk Storm and Sanitary Analysis with multiple rainfall events simulated. The hydrology model utilized was NRCS (SCS) TR-55, which is appropriate for small urban watersheds.

The storm simulations reveal an overall net decrease in both the volume of runoff and peak discharge when comparing the pre-development condition to the post-development condition. Therefore, the overall post-development impacts to downstream drainage facilities and drainage ways will be less than the impacts in the pre-development condition. The analysis and findings are more thoroughly detailed in Section 3 of this report.

Section 1.0 – Introduction

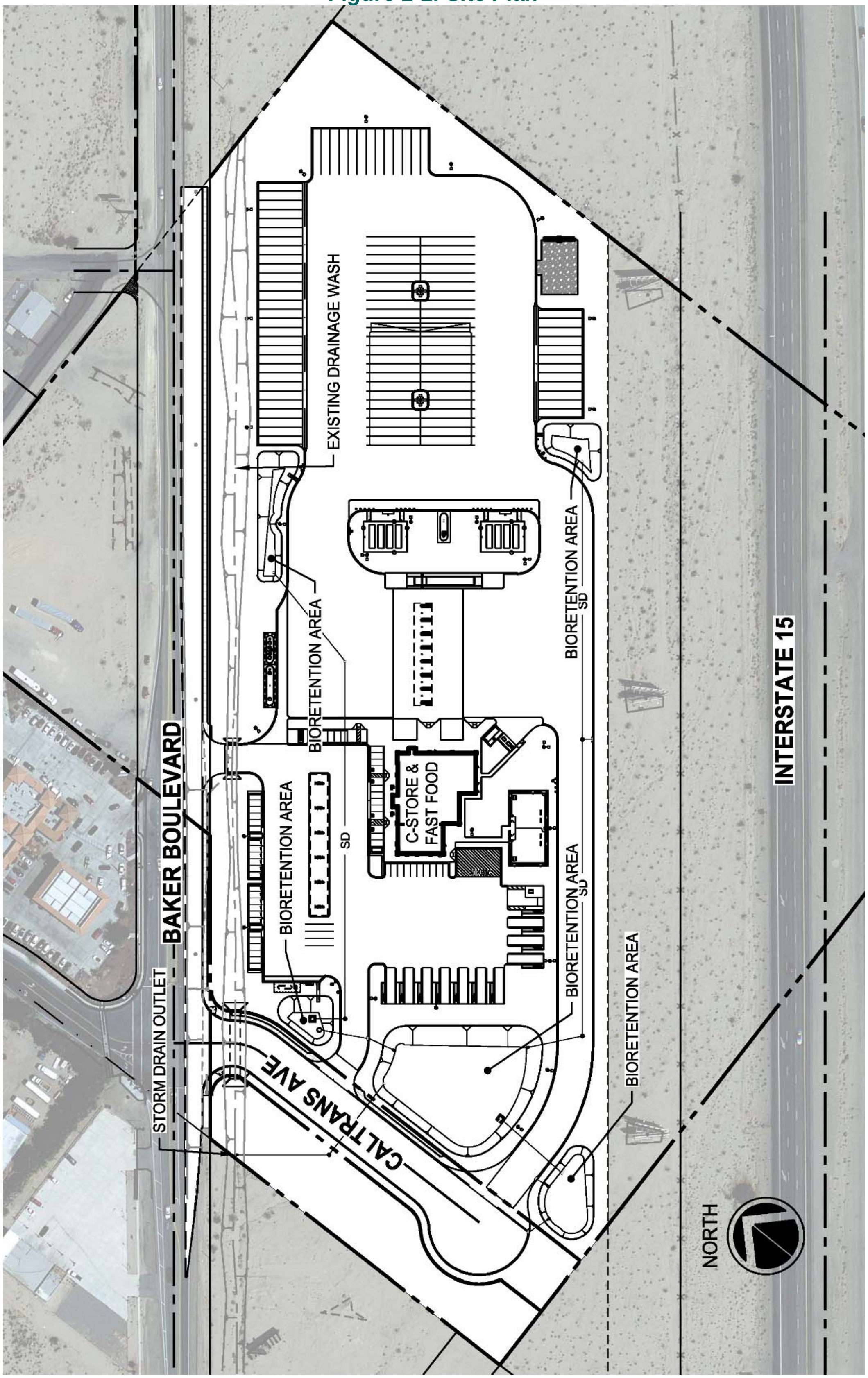
1.1 - Project Description

The proposed project is a travel stop which will sell fuel to the motoring public including cars, motorcycles, recreation vehicles and trucks. It will consist of multiple uses including fueling (19 total fueling positions; 12 auto fueling positions and 7 truck fueling positions), an approximately 9,200 square foot convenience store and an approximately 3,000 square foot fast food restaurant. North of the travel stop, an employee housing development is proposed to support the travel stop project, which will have 8 mobile homes and 4 visitor parking spaces. The employee housing is a separate application and a separate hydrology report. The hydrology report for the travel stop project analyzes approximately 17.46 acres of onsite and offsite areas, approximately 65% to 75% of the site is expected to consist of impervious surfaces. Refer to Figure 1-1 for site plan.

1.2 - Report Purpose

The purpose of this report is to provide analysis and documentation demonstrating that the runoff and peak discharge at the site in the post-development condition is less than the pre-development condition.

Figure 1-1: Site Plan



Section 2.0 - Existing Conditions

2.1 - Regional Conditions

The project site is in the unincorporated limits of Baker and in the Mojave Desert and located at the southern end of Death Valley, which is also in the north portion of San Bernardino County. Baker has a semi-arid climate with cool winters and hot summers.

2.2 - Site Conditions

The project site is located just northwest of Interstate 15 and just southeast of Baker Boulevard. The site is relatively undisturbed, with the exception of several billboards along the Interstate 15 frontage. A drainage wash runs through the northwest portion of the site, approximately parallel to Baker Boulevard, from northeast to southwest, along the southwest edge of Baker Boulevard. The drainage crosses under Baker Boulevard approximately 0.5 miles southeast of the side and continues in the westerly direction. The drainage path eventually ends at Soda Dry Lake, which is the terminus of the Mojave River.

The site has very sparse vegetation and slopes uniformly from the northeast towards the southwest at approximately 1.5%.

A project specific geotechnical investigation and report by Terracon Consultants, dated October 29, 2021, revealed the site is underlain with medium dense to very dense poorly-graded sand and silty sand. Groundwater was not encountered during the site investigation and borings which occurred within the uppermost 50 feet below the existing ground surface. The geotechnical report cites data from DWR indicating that groundwater may be approximately 75 deep in this area.

Percolation tests were conducted during the course of the investigation. The percolation rates at various locations ranged between 50.8 inches per hour and 122.6 inches per hour. These rates were correlated to an infiltration rate using the Porchet Method, resulting in infiltration rates ranging between 3.01 inches per hour and 6.68 inches per hour. Refer to the Table 2-1 for the percolation test results.

Table 2-1: Percolation Rate Test Results

TEST RESULTS			
Test Location (depth, ft)	Soil Classification	Average Measured Percolation Rate (in/hr)	Correlated Infiltration Rate (in/hr)
B-11 (5)	SM	94.0	6.68
B-12 (5)	SM	50.8	3.37
B-13 (5)	SM	65.8	3.98
B-14 (10)	SM	122.6	3.89
B-15 (5)	SM	59.4	3.01

Section 3.0 – Hydrologic and Storm Drain Analysis

3.1 – Hydrologic and Storm Drain Model

Autodesk Storm and Sanitary Analysis (SSA) was used to model and simulate various storm events for the proposed project. SSA, originally known as StormNET and developed by BOSS International, is an advanced, powerful, and comprehensive stormwater and wastewater modeling software used for modeling urban drainage systems amongst other storm water and sanitary sewer systems modeling capabilities.

The software is capable of simultaneously modeling complex hydrology, hydraulics, and water quality. SSA is used throughout the world in many applications, once of which is the design and sizing of drainage systems and detention facilities for flood control.

SSA additionally contains a site-specific storm distribution database with over 3,500 up-to-date rainfall recording stations across North America.

3.2 – Methodology

SSA has over a dozen hydrology modeling capabilities, but in the particular case of this project, NRCS (SCS) TR-55 was selected as the hydrology model. The Soil Conservation Service (SCS), which is now known as Natural Resources Conservation Service (NRCS) published Technical Release 55 (TR-55), entitled "Urban Hydrology for Small Watersheds". TR-55 presents simplified procedures to calculate storm runoff volume, peak rate of discharge, hydrographs and storage volumes. These procedures are applicable in small watersheds, especially urbanized watersheds.

An SCS Type 1 24-hr rainfall distribution was selected as the design rainfall for the project. A continuous simulation was performed for a 24-hr duration for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year recurrence intervals for both pre-development (existing) and post-development conditions. The cumulative rainfall depth for each recurrence interval was conservatively overwritten in the software using the rainfall depths from NOAA's precipitation frequency data server. NOAA has long been considered a reliable and authoritative source of precipitation frequency estimates and associated information. The comparison of rainfall depths is provided in Table 3-1, immediately below. The original source of the NOAA rainfall depths is provided in Appendix A for reference.

Table 3-1: Rainfall Depths

Rainfall Event	NOAA Rainfall Depths	SSA Rainfall Depths
2-Year / 24-Hour	0.89 inches	0.89 inches
5-Year / 24-Hour	1.27 inches	1.20 inches
10-Year / 24-Hour	1.60 inches	1.40 inches
25-Year / 24-Hour	2.07 inches	1.70 inches
50-Year / 24-Hour	2.44 inches	1.90 inches
100-Year / 24-Hour	2.84 inches	2.20 inches

For the pre-development condition, an area roughly equivalent in shape and size to the proposed post-development area was analyzed. For the pre-development condition, the time of concentration was calculated using the method and formula outlined in TR-55. The total time of concentration was calculated in the software for the travel stop parcel with the calculation based on the sheet flow, diagonally and following existing contours across the site. There was no available data related to the soil on the National Resources Conservation Service server to establish the Hydrologic Soils Group, so the geotechnical report boring soils analysis was used to determine a soil condition. To simulate the rainfall events for the pre-development condition, a curve number of 77 was established respectively based on the Hydrologic Soils Group of ‘B,’ and a site classification of “Desert Shrub Range with Poor Ground Cover.” A hydrologic soils group of ‘B’ is described as soils having a medium-high infiltration rate when thoroughly wet, which would be consistent with the “medium dense to very dense poorly-graded sand and silty sand” description from the geotechnical report. The geotechnical report is included as Appendix D for reference.

Each bioretention area was assigned an infiltration rate based on nearby test results. A factor of safety of 4 was applied to the final correlated infiltration rates presented in Table 2-1 above, to account for reduced performance due to silt building, debris, and other factors. The infiltration rates were based on measured percolation rates at the site which were correlated to infiltration rates using the Porchet Method. The correlated infiltration rates with a factor of safety applied, varied from 1.67 in/hr to 0.75 in/hr. The test percolation test results are included in Appendix D of this report as part of the larger and project-specific geotechnical report.

The time of concentration for each post-development tributary area was conservatively assumed to be 10 minutes.

3.3 – Proposed Design

A detailed grading plan & drainage plan was first developed for the project site in order to ensure accurate elevations and storage volumes for detention facilities, discharges structures, etc. The site was designed to surface flow to depressed planter areas around the perimeter of the site and overflow into an underground storm drain system during larger storm events. The entire onsite storm drain system of each site discharges into the existing drainage wash, which eventually discharges into the Dry Soda Lake Bed which is the terminus of the Mojave River.

Based on the grading design, a total of eight tributary areas were developed for the travel stop. Each bioretention area was designed to store a maximum of 18” of water. The free open storage of the bioretention areas were modeled by adding surface areas of contours by the corresponding incremental depth. The resultant of the data is depth vs. area curve, for which the area beneath the curve represents the total storage volume. Bioretention areas that were designed with flat bottom areas also had pervious sublayers consisting of crushed rock and bioretention soil media (BSM). The pervious subgrade for most bioretention areas can store an equivalent water depth of 1.06 feet. This additional subgrade storage was incorporated appropriately in the storage curves. A typical bioretention section is shown in Figure 3-1, depicting the storage capabilities of the bioretention areas, and a table showing the respective storage capability of each bioretention area is shown In Table 3-1.

All bioretention areas will consist of several layers of porous material (mulch, bioretention soil media, and drain rock), which will achieve the proper volumetric control to reduce runoff to less than pre-development levels. Refer to Appendix B for the Modeling Keymap.

Figure 3-1: Typical Bioretention Cross-Section

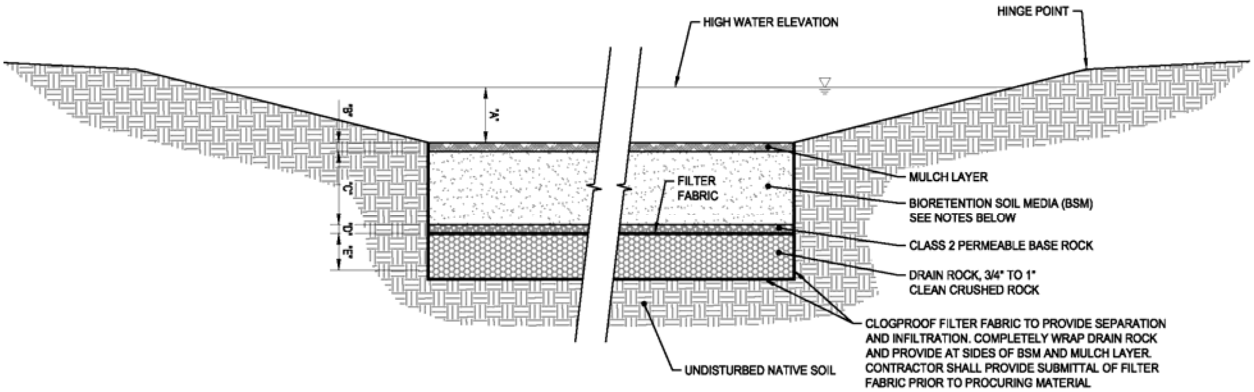


Table 3-1: Bioretention Depths

Bioretention ID	Water Storage Height "A"	Mulch Depth "B"	BSM Depth "C"	Caltrans Permeable Base "D"	Gravel Depth "E"	Equivalent Storage Depth in Subgrade
BR1	1.5'	0.25'	2.0'	0.25'	1.0'	1.06'
BR2	1.5'	0.25'	2.0'	0.25'	1.0'	1.06'
BR3	1.5'	0.25'	2.0'	0.25'	1.0'	1.06'
BR4	1.5'	0.25'	2.0'	0.25'	1.0'	1.06'
BR5	1.5'	0.25'	2.0'	0.25'	1.0'	1.06'

The bioretention areas, upon reaching their maximum water storage height, will be allowed to overflow into drain inlets, which lead to an underground storm drain systems and, in some cases, to another downstream bioretention area. The overflow structures were conservatively modeled as 24" diameter bottom-opening orifices, which allows a higher discharge rate into the underground storm drain system and ultimately a higher discharge from the site. The underground storm drain system will drain to the existing drainage wash south of Baker Boulevard and will eventually discharge into the Mojave River.

3.4 – Findings

The proposed design using shallow bioretention areas around the site serves the purpose of capturing storm water runoff and reducing runoff compared to pre-development for various rain events and fully captures and infiltrates 100% of a 2-, 5-,10-,25-, 50- and 100-year / 24-hour storm events Table 3-2 shows the pre-development peak discharge rates compared to the post-development

Table 3-2
Peak Discharge Rates for 24-hr Rainfall Event at Various Recurrence Intervals

Recurrence Interval	Pre-Development Peak Discharge Rate	Post-Development Peak Discharge Rate	Net Change in Runoff Rate
2-Year	0.04 CFS	0.00 CFS	-0.04 CFS
5-Year	0.16 CFS	0.00 CFS	-0.16 CFS
10-Year	0.43 CFS	0.00 CFS	-0.43 CFS
25-Year	1.13 CFS	0.00 CFS	-1.13 CFS
50-Year	1.87 CFS	0.00 CFS	-1.87 CFS
100-Year	2.79 CFS	0.00 CFS	-2.79 CFS

For the purposes of this report, it is not useful to show a hydrograph comparing pre-development conditions to post-development condition because there is no storm water discharge from the site in any of the simulations.

The runoff volume for each storm event simulated for both pre-development and post-development conditions are summarized in Table 3-3. The table demonstrates the post-development runoff volume to be no greater than the pre-development volume.

Table 3-3
Runoff Volume for 24-hr Rainfall Event at Various Recurrence Intervals

Recurrence Interval	Pre-Development Runoff Volume	Post-Development Runoff Volume	Net Change in Runoff Volume
2-Year	0.04 AC-FT	0.00 AC-FT	-0.04 AC-FT
5-Year	0.14 AC-FT	0.00 AC-FT	-0.14 AC-FT
10-Year	0.30 AC-FT	0.00 AC-FT	-0.30 AC-FT
25-Year	0.58 AC-FT	0.00 AC-FT	-0.58 AC-FT
50-Year	0.85 AC-FT	0.00 AC-FT	-0.85 AC-FT
100-Year	1.16 AC-FT	0.00 AC-FT	-1.16 AC-FT

3.5 – Conclusion

The hydrology report shows that the developed project will be capable of retaining and infiltration the

The hydrology report shows the developed travel stop site will not discharge any storm water for the 2-, 5, 10-, 25-, 50-, and 100-year rainfall events, and full fully capture and infiltrate all runoff.   The simulated rainfall events in a pre-development condition reveal that storm water runoff exists, and therefore the post-development runoff condition is less than the pre-development conditions.

Appendix A

NOAA Atlas 14, Volume 6, Version 2
Location name: Apple Valley, California, USA*
Latitude: 34.5943°, Longitude: -117.2537°
Elevation: 2941.06 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point 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	0.088 (0.072-0.108)	0.123 (0.101-0.150)	0.171 (0.140-0.210)	0.213 (0.173-0.264)	0.274 (0.216-0.351)	0.323 (0.250-0.423)	0.377 (0.284-0.505)	0.435 (0.319-0.600)	0.520 (0.366-0.746)	0.590 (0.401-0.876)
10-min	0.126 (0.104-0.155)	0.176 (0.145-0.216)	0.245 (0.201-0.302)	0.305 (0.248-0.378)	0.392 (0.309-0.503)	0.464 (0.358-0.607)	0.541 (0.407-0.724)	0.624 (0.458-0.860)	0.745 (0.525-1.07)	0.846 (0.575-1.25)
15-min	0.152 (0.126-0.187)	0.212 (0.175-0.261)	0.296 (0.243-0.365)	0.369 (0.300-0.458)	0.474 (0.374-0.608)	0.561 (0.433-0.734)	0.654 (0.493-0.876)	0.755 (0.554-1.04)	0.901 (0.634-1.29)	1.02 (0.696-1.52)
30-min	0.206 (0.170-0.252)	0.287 (0.236-0.352)	0.400 (0.329-0.493)	0.498 (0.406-0.618)	0.641 (0.505-0.821)	0.757 (0.585-0.991)	0.883 (0.666-1.18)	1.02 (0.748-1.41)	1.22 (0.857-1.75)	1.38 (0.940-2.05)
60-min	0.252 (0.207-0.309)	0.351 (0.289-0.431)	0.489 (0.402-0.602)	0.609 (0.496-0.756)	0.783 (0.617-1.00)	0.926 (0.715-1.21)	1.08 (0.814-1.45)	1.25 (0.914-1.72)	1.49 (1.05-2.14)	1.69 (1.15-2.51)
2-hr	0.356 (0.293-0.436)	0.480 (0.395-0.589)	0.652 (0.535-0.802)	0.799 (0.651-0.991)	1.01 (0.796-1.29)	1.18 (0.912-1.55)	1.36 (1.03-1.83)	1.56 (1.14-2.15)	1.84 (1.30-2.64)	2.07 (1.41-3.07)
3-hr	0.429 (0.354-0.526)	0.573 (0.472-0.703)	0.770 (0.632-0.948)	0.938 (0.764-1.16)	1.18 (0.928-1.51)	1.37 (1.06-1.79)	1.58 (1.19-2.11)	1.79 (1.32-2.47)	2.10 (1.48-3.02)	2.36 (1.60-3.50)
6-hr	0.584 (0.482-0.716)	0.773 (0.637-0.949)	1.03 (0.846-1.27)	1.25 (1.01-1.55)	1.55 (1.22-1.99)	1.79 (1.39-2.35)	2.05 (1.54-2.75)	2.32 (1.70-3.19)	2.70 (1.90-3.87)	3.00 (2.04-4.46)
12-hr	0.751 (0.619-0.921)	1.00 (0.824-1.23)	1.34 (1.10-1.64)	1.61 (1.31-2.00)	2.00 (1.58-2.56)	2.30 (1.78-3.01)	2.62 (1.97-3.51)	2.95 (2.16-4.06)	3.40 (2.40-4.88)	3.77 (2.56-5.59)
24-hr	0.983 (0.872-1.13)	1.33 (1.18-1.53)	1.78 (1.57-2.06)	2.15 (1.89-2.51)	2.67 (2.26-3.21)	3.07 (2.55-3.77)	3.48 (2.82-4.39)	3.91 (3.08-5.06)	4.50 (3.40-6.07)	4.96 (3.62-6.93)
2-day	1.15 (1.02-1.33)	1.58 (1.40-1.82)	2.14 (1.89-2.48)	2.61 (2.29-3.04)	3.24 (2.75-3.91)	3.74 (3.10-4.60)	4.25 (3.44-5.35)	4.77 (3.76-6.18)	5.49 (4.15-7.42)	6.06 (4.43-8.47)
3-day	1.25 (1.11-1.44)	1.73 (1.54-2.00)	2.37 (2.09-2.74)	2.89 (2.53-3.37)	3.61 (3.06-4.34)	4.16 (3.45-5.12)	4.73 (3.83-5.96)	5.32 (4.19-6.89)	6.13 (4.64-8.28)	6.77 (4.95-9.46)
4-day	1.33 (1.18-1.53)	1.85 (1.64-2.13)	2.53 (2.23-2.92)	3.08 (2.70-3.59)	3.85 (3.26-4.63)	4.44 (3.68-5.46)	5.04 (4.09-6.35)	5.67 (4.47-7.35)	6.53 (4.94-8.82)	7.21 (5.26-10.1)
7-day	1.45 (1.29-1.67)	1.99 (1.76-2.29)	2.71 (2.39-3.13)	3.30 (2.89-3.84)	4.10 (3.48-4.93)	4.72 (3.92-5.81)	5.36 (4.34-6.75)	6.02 (4.74-7.80)	6.93 (5.24-9.35)	7.63 (5.58-10.7)
10-day	1.53 (1.36-1.76)	2.10 (1.86-2.41)	2.84 (2.51-3.28)	3.45 (3.03-4.02)	4.29 (3.64-5.17)	4.94 (4.10-6.07)	5.61 (4.54-7.06)	6.30 (4.96-8.15)	7.24 (5.47-9.78)	7.98 (5.83-11.2)
20-day	1.76 (1.56-2.02)	2.41 (2.14-2.78)	3.29 (2.90-3.80)	4.01 (3.51-4.67)	5.01 (4.24-6.03)	5.79 (4.80-7.11)	6.59 (5.34-8.30)	7.43 (5.85-9.62)	8.58 (6.48-11.6)	9.48 (6.93-13.3)
30-day	1.98 (1.76-2.28)	2.74 (2.42-3.15)	3.76 (3.32-4.34)	4.61 (4.04-5.36)	5.79 (4.91-6.98)	6.73 (5.59-8.27)	7.70 (6.24-9.70)	8.72 (6.87-11.3)	10.1 (7.66-13.7)	11.3 (8.22-15.7)
45-day	2.32 (2.06-2.67)	3.22 (2.86-3.71)	4.46 (3.94-5.15)	5.51 (4.82-6.41)	6.99 (5.93-8.42)	8.18 (6.79-10.1)	9.43 (7.64-11.9)	10.8 (8.48-13.9)	12.6 (9.55-17.1)	14.1 (10.3-19.7)
60-day	2.54 (2.25-2.92)	3.52 (3.12-4.05)	4.89 (4.32-5.65)	6.06 (5.31-7.06)	7.76 (6.58-9.34)	9.14 (7.59-11.2)	10.6 (8.59-13.4)	12.2 (9.60-15.8)	14.5 (10.9-19.5)	16.3 (11.9-22.8)

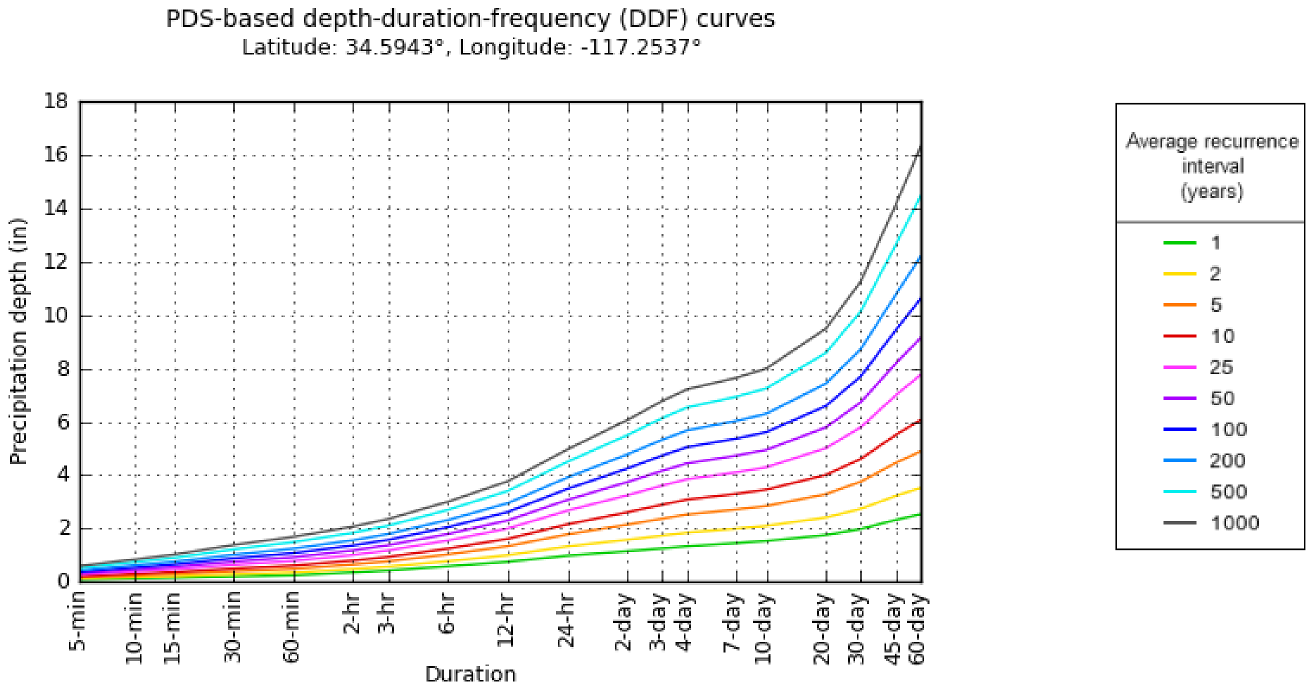
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

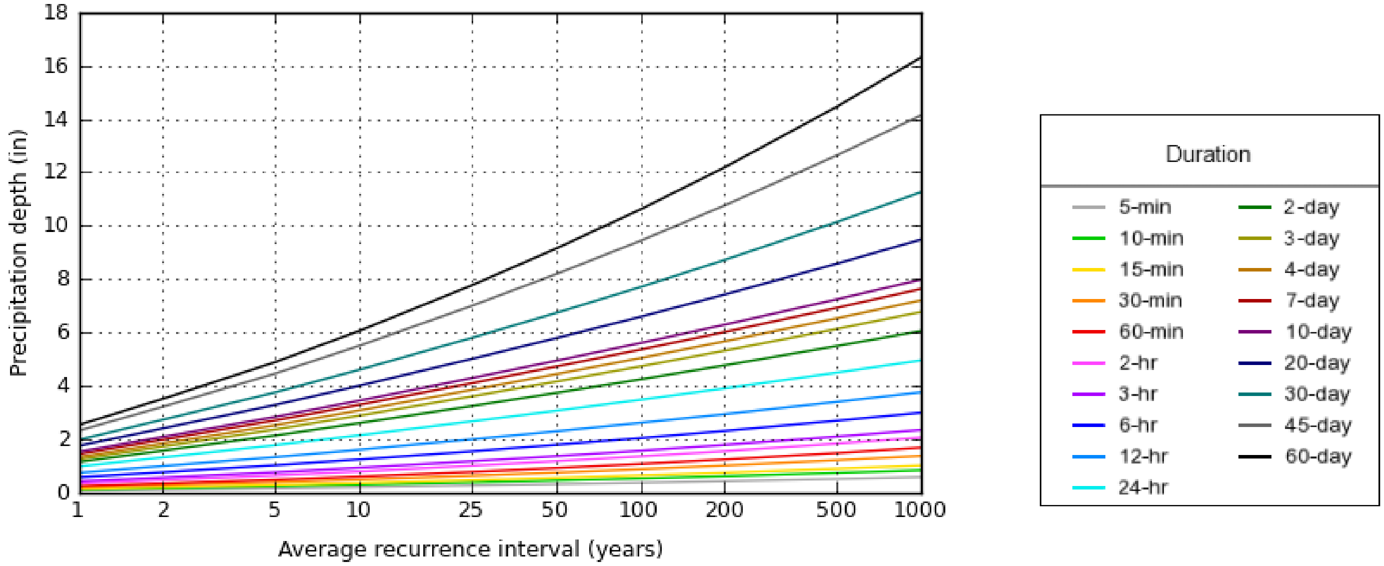
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper 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.

Back to Top

PF graphical





NOAA Atlas 14, Volume 6, Version 2

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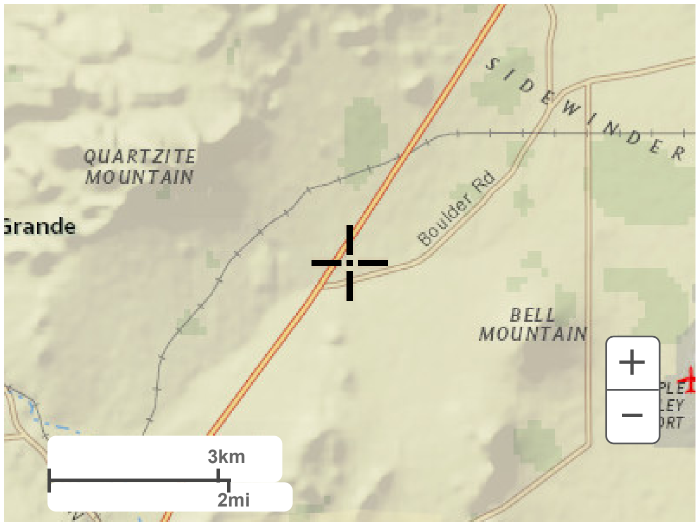
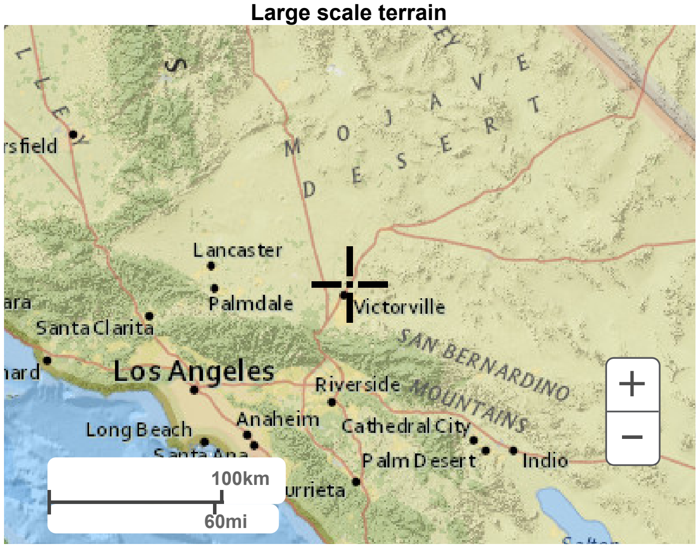
Back to Top

Maps & aerials

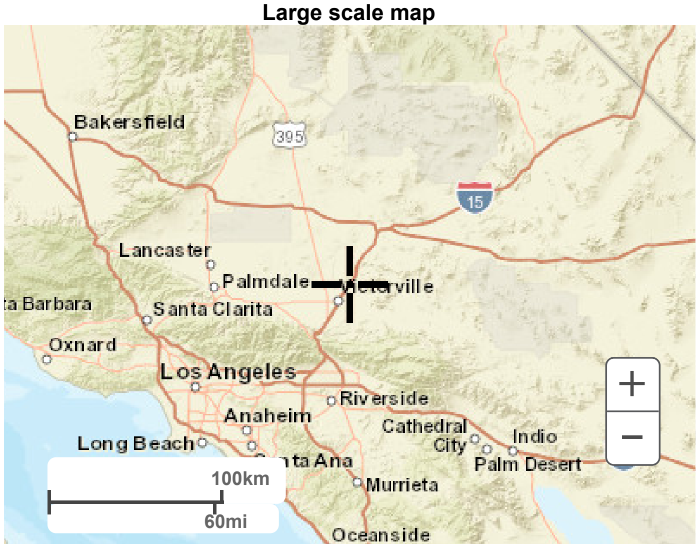
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

[Back to Top](#)

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Disclaimer

Appendix B

LANE ENGINEERS, INC.
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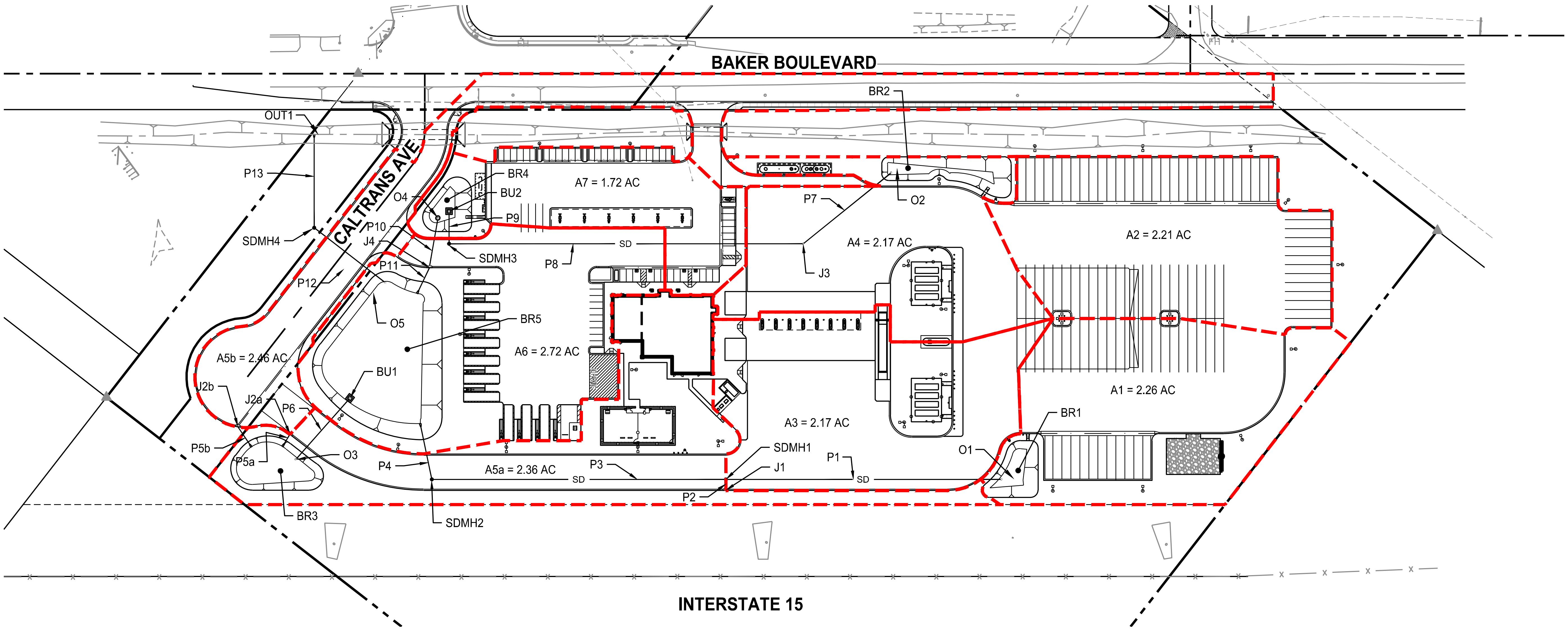
Lane Project No: 20230



LEGEND:

A1	DRAINAGE (TRIBUTARY) AREA
BR1	BIORETENTION AREA
BU1	BUBBLE-UP STRUCTURE
OR1	ORIFICE (BIORETENTION OVERLOW)
J1	JUNCTION (DRAIN INLET)
SDMH1	STORM DRAIN MANHOLE
P1	UNDERGROUND STORM DRAIN PIPE
OUT1	SYSTEM (MODEL) OUTLET

NORTH

SCALE: 1" = 150'

9/30/2022 1:40 PM

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Appendix C

2-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods .... YES

Analysis Options

Start Analysis On	Oct 13, 2022	00:00:00
End Analysis On	Oct 14, 2022	00:00:00
Start Reporting On	Oct 13, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins...	9
Nodes...	23
Junctions	16
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links..	21
Channels	2
Pipes	14
Pumps	0
Orifices	5
Weirs	0
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	Post-Development	Time Series	2-year	Cumulative	inches	California	San Bernardino (Baker)	2	0.89	SCS Type I 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	A01	2.26	92.00	0.89	0.32	0.73	0.45	0 00:10:00
2	A02	2.21	92.00	0.89	0.32	0.71	0.44	0 00:10:00
3	A3	2.17	92.00	0.89	0.32	0.70	0.43	0 00:10:00
4	A4	2.17	92.00	0.89	0.32	0.70	0.43	0 00:10:00
5	A5a	2.36	92.00	0.89	0.32	0.76	0.47	0 00:10:00
6	A5b	2.46	92.00	0.89	0.32	0.79	0.49	0 00:10:00
7	A6	2.72	92.00	0.89	0.32	0.88	0.54	0 00:10:00
8	A7	1.72	92.00	0.89	0.32	0.56	0.34	0 00:10:00
9	PRE-DEV	15.11	77.00	0.89	0.03	0.39	0.04	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	BU1	Junction	998.09	1003.05	998.09	0.00	0.00	0.00	1001.36	0.00	1.69	0 00:00	0.00	0.00
2	BU2	Junction	1000.23	1004.23	1000.23	0.00	0.00	0.42	1003.74	0.00	1.49	0 00:00	0.00	0.00
3	J1	Junction	1004.61	1009.61	1004.61	0.00	0.00	0.43	1004.94	0.00	4.67	0 00:00	0.00	0.00
4	J2a	Junction	999.91	1003.24	999.91	0.00	0.00	0.47	1000.26	0.00	2.98	0 00:00	0.00	0.00
5	J2b	Junction	999.94	1002.15	999.94	0.00	0.00	0.49	1000.30	0.00	1.85	0 00:00	0.00	0.00
6	J3	Junction	1005.76	1010.36	1005.76	0.00	0.00	0.43	1006.01	0.00	4.35	0 00:00	0.00	0.00
7	J4	Junction	999.96	1005.68	999.96	0.00	0.00	0.54	1000.34	0.00	5.34	0 00:00	0.00	0.00
8	Jun-23	Junction	0.00	6.00	0.00	6.00	0.00	0.00	998.37	0.00	1.00	0 00:00	0.00	0.00
9	O1	Junction	1009.93	1014.46	1009.93	0.00	0.00	0.00	1009.93	0.00	4.53	0 00:00	0.00	0.00
10	O2	Junction	1008.31	1011.81	1008.31	0.00	0.00	0.00	1008.31	0.00	3.50	0 00:00	0.00	0.00
11	O4	Junction	999.79	1003.29	999.79	0.00	0.00	0.00	1000.23	0.00	3.06	0 00:00	0.00	0.00
12	O5	Junction	997.80	1003.05	997.80	0.00	0.00	0.00	998.10	0.00	4.95	0 00:00	0.00	0.00
13	SDMH1	Junction	1003.49	1009.45	1003.49	0.00	0.00	0.43	1004.90	0.00	4.55	0 00:00	0.00	0.00
14	SDMH2	Junction	1001.24	1005.72	1001.24	6.00	0.00	0.42	1001.59	0.00	4.13	0 00:00	0.00	0.00
15	SDMH3	Junction	1001.57	1006.27	1001.57	6.00	0.00	0.42	1001.91	0.00	4.36	0 00:00	0.00	0.00
16	SDMH4	Junction	997.69	1002.76	997.69	0.00	0.00	0.00	997.79	0.00	4.97	0 00:00	0.00	0.00
17	OUT1	Outfall	997.37					0.00	997.37					
18	WASH-PRE	Outfall	998.73					0.04	998.73					
19	BR1	Storage Node	1011.40	1014.46	0.00		0.00	0.45	1012.35				0.00	0.00
20	BR2	Storage Node	1009.68	1012.74	0.00		0.00	0.44	1010.39				0.00	0.00
21	BR3	Storage Node	998.80	1001.86	0.00		0.00	0.95	999.17				0.00	0.00
22	BR4	Storage Node	1001.17	1004.23	0.00		0.00	0.74	1002.73				0.00	0.00
23	BR5	Storage Node	998.80	1003.05	0.00		0.00	0.94	998.82				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	P1	Pipe	O1	SDMH1	383.00	1009.93	1004.57	1.4000	12.000	0.0130	0.00	4.21	0.00	0.00	0.00	0.00	0.00	Calculated
2	P10	Pipe	O4	J4	70.00	1000.23	1000.06	0.2400	12.000	0.0130	0.00	1.76	0.00	0.00	0.00	0.00	0.00	Calculated
3	P11	Pipe	J4	BR5	40.00	999.96	999.86	0.2500	12.000	0.0130	0.54	1.78	0.30	1.99	0.38	0.38	0.00	Calculated
4	P12	Pipe	O5	SDMH4	125.00	998.10	997.79	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
5	P13	Pipe	SDMH4	OUT1	130.00	997.69	997.37	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
6	P2	Pipe	J1	SDMH1	15.00	1004.61	1004.57	0.2700	12.000	0.0130	0.43	1.84	0.23	1.91	0.33	0.33	0.00	Calculated
7	P3	Pipe	SDMH1	SDMH2	408.00	1004.47	1001.34	0.7700	12.000	0.0130	0.42	3.12	0.13	2.81	0.25	0.25	0.00	Calculated
8	P4	Pipe	SDMH2	BR5	79.00	1001.24	999.86	1.7500	12.000	0.0130	0.42	4.71	0.09	3.71	0.20	0.20	0.00	Calculated
9	P5a	Pipe	J2a	BR3	20.00	999.91	999.86	0.2500	12.000	0.0130	0.47	1.78	0.26	1.91	0.35	0.35	0.00	Calculated
10	P5b	Pipe	J2b	BR3	34.00	999.94	999.86	0.2400	12.000	0.0130	0.48	1.73	0.28	1.89	0.36	0.36	0.00	Calculated
11	P6	Pipe	Jun-23	BU1	113.00	998.37	998.09	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
12	P7	Pipe	O2	J3	157.00	1006.25	1005.86	0.2500	12.000	0.0153	0.00	3.78	0.00	0.00	0.00	0.00	0.00	Calculated
13	P8	Pipe	J3	SDMH3	492.00	1005.76	1001.67	0.8300	12.000	0.0130	0.42	3.25	0.13	2.88	0.24	0.24	0.00	Calculated
14	P9	Pipe	SDMH3	BU2	45.00	1001.57	1000.23	2.9800	12.000	0.0130	0.42	6.15	0.07	4.44	0.17	0.18	0.00	Calculated
15	OC1	Channel	BU2	BR4	6.42	1003.73	1001.17	39.8800	18.000	0.0010	0.42	3485.71	0.00	0.00	0.00	0.00	0.00	
16	OC2	Channel	BU1	BR5	1.00	1001.36	998.80	256.0000	18.000	0.0010	0.00	5074.12	0.00	0.00	0.00	0.00	0.00	
17	O4	Orifice	BR4	O4		1001.17	999.79		24.000		0.00							
18	OR1	Orifice	BR1	O1		1011.40	1009.93		24.000		0.00							
19	OR2	Orifice	BR2	O2		1009.68	1008.31		24.000		0.00							
20	OR3	Orifice	BR3	Jun-23		998.80	0.00		24.000		0.00							
21	OR5	Orifice	BR5	O5		998.80	997.80		24.000		0.00							

Subbasin Hydrology

Subbasin : A01

Input Data

Area (ac) 2.26
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.48	B	92.00
Composite Area & Weighted CN	1.48		92.00

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 :

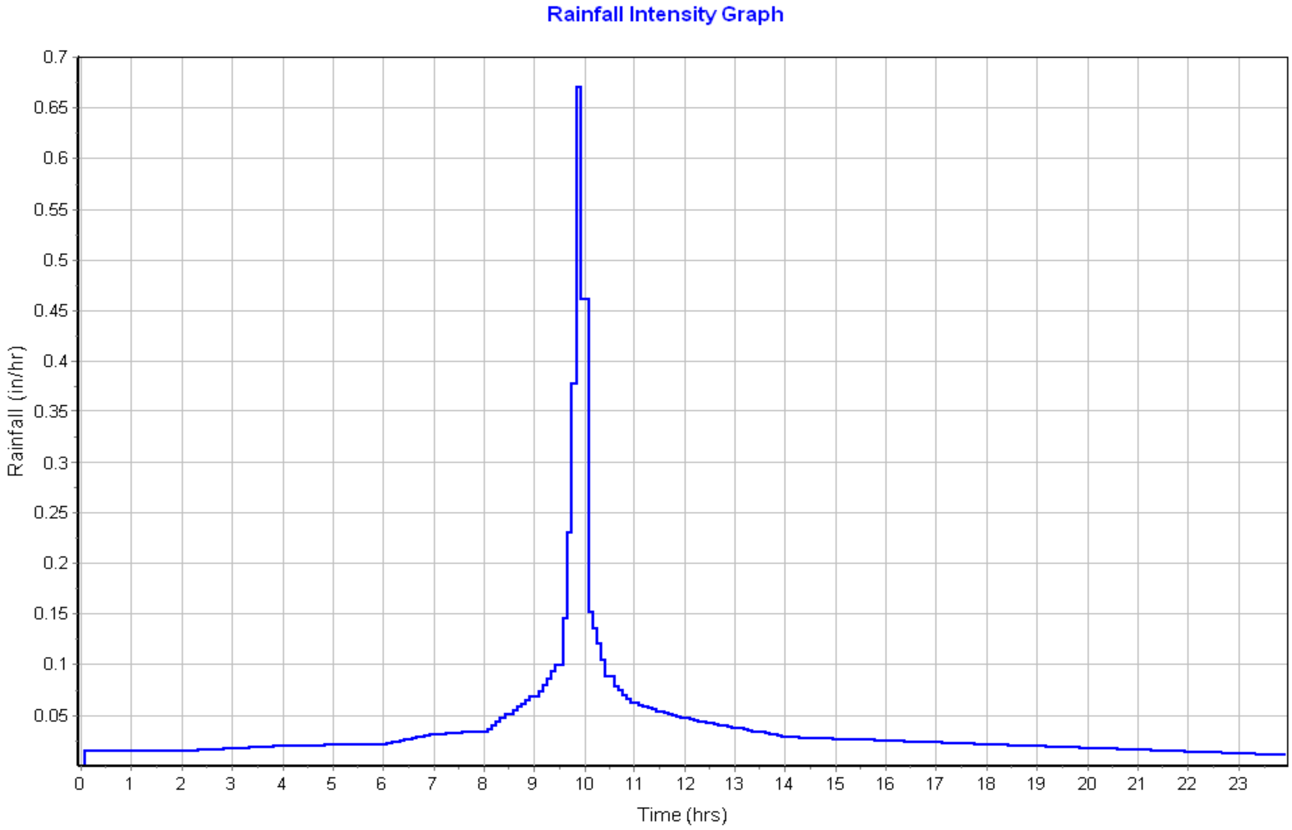
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

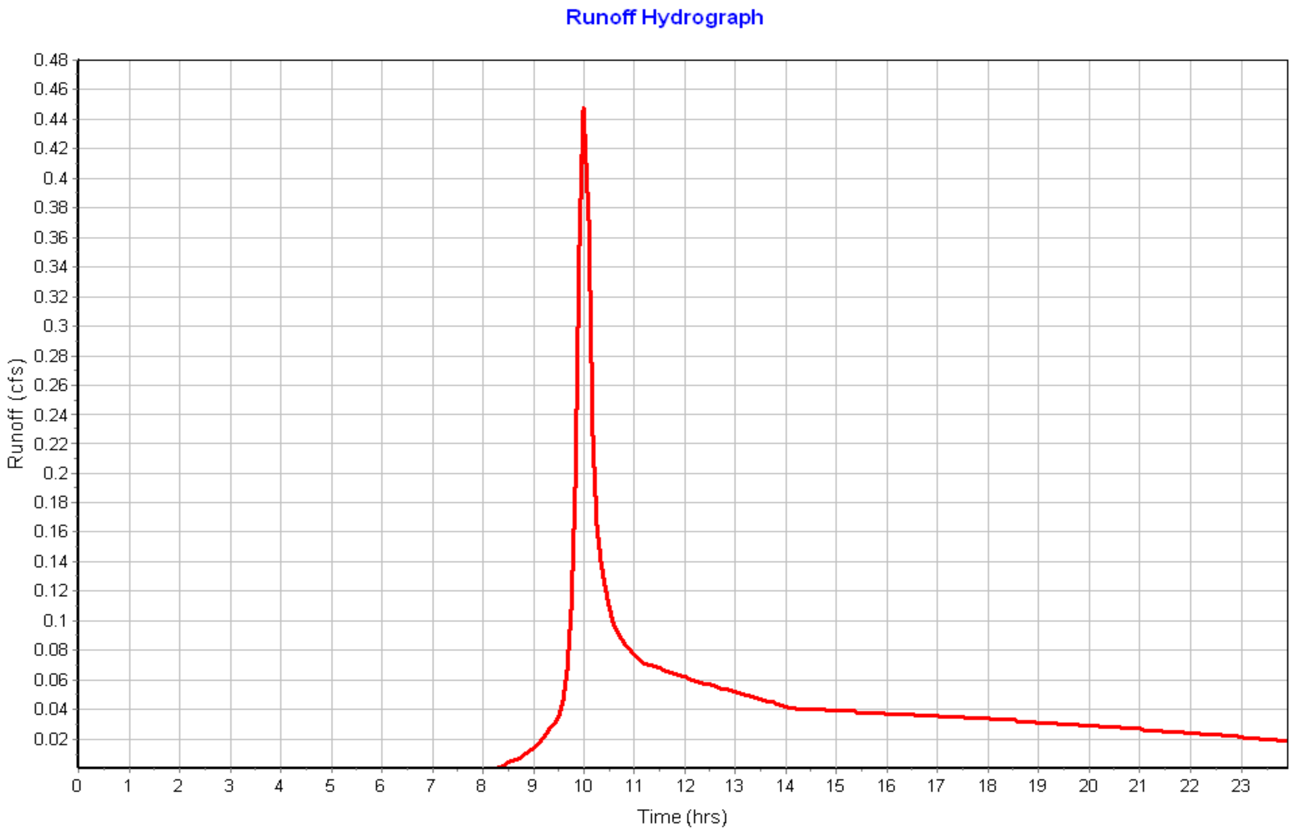
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.45
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A01





Subbasin : A02

Input Data

Area (ac) 2.21
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.21	B	92.00
Composite Area & Weighted CN	2.21		92.00

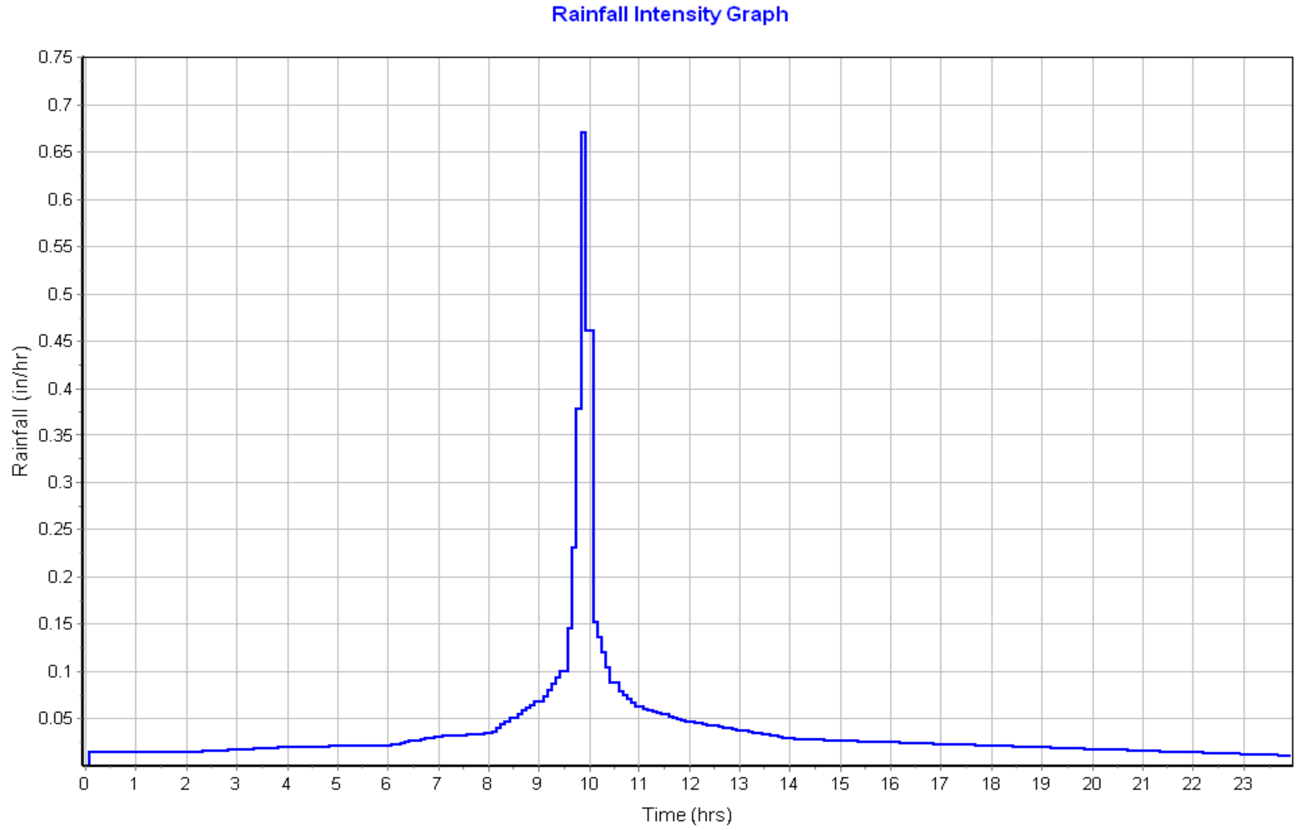
Time of Concentration

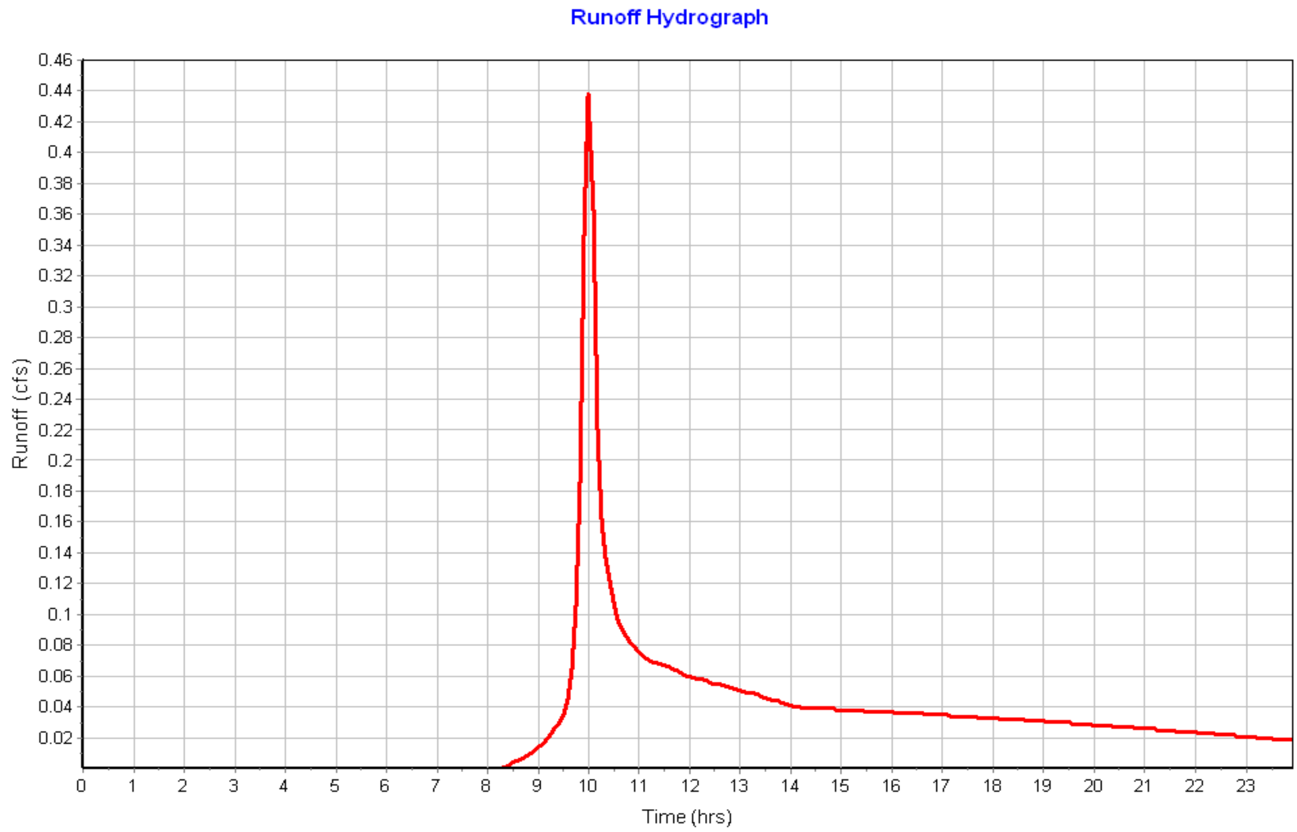
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.44
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A02





Subbasin : A3

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

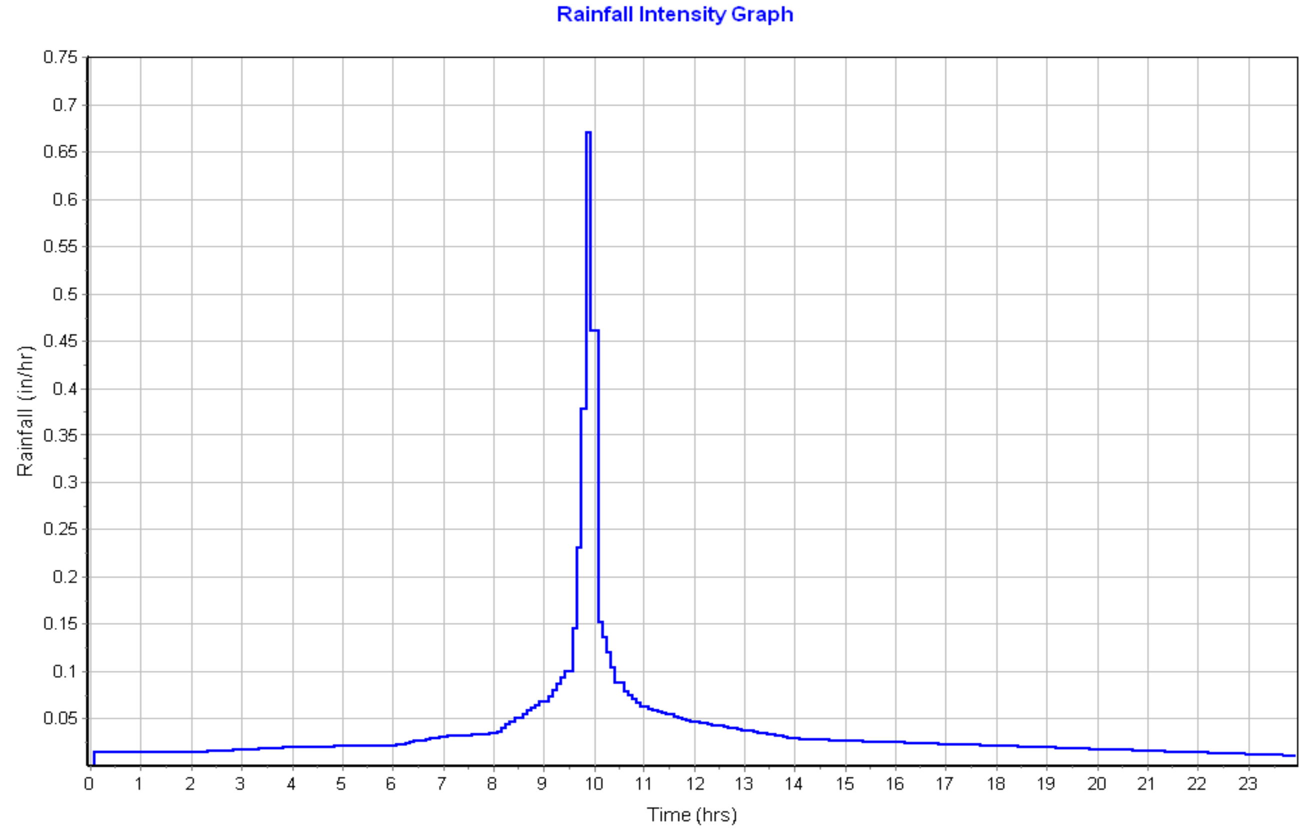
Time of Concentration

User-Defined TOC override (minutes): 10

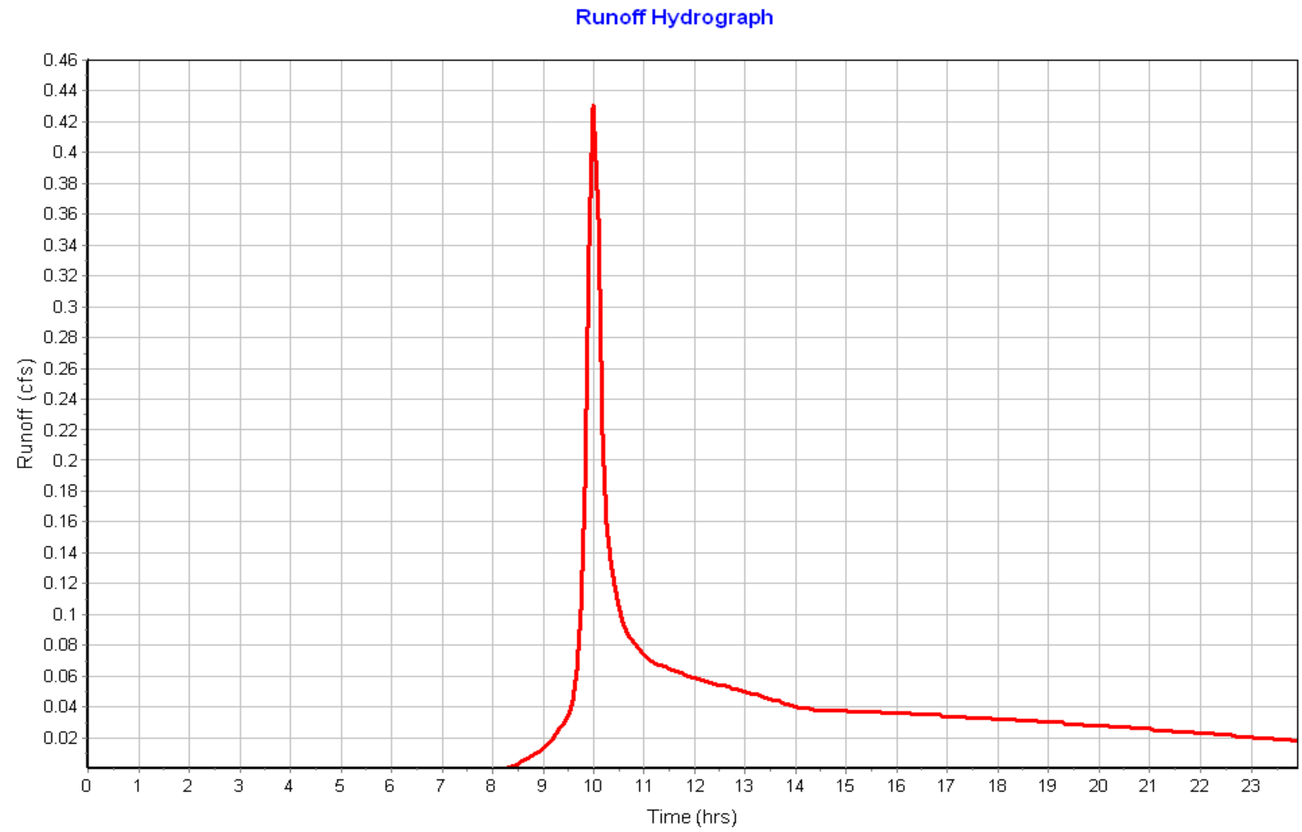
Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.43
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A3



Rainfall Intensity Graph
Rainfall (in/hr)
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.46
0.44
0.42
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A4

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

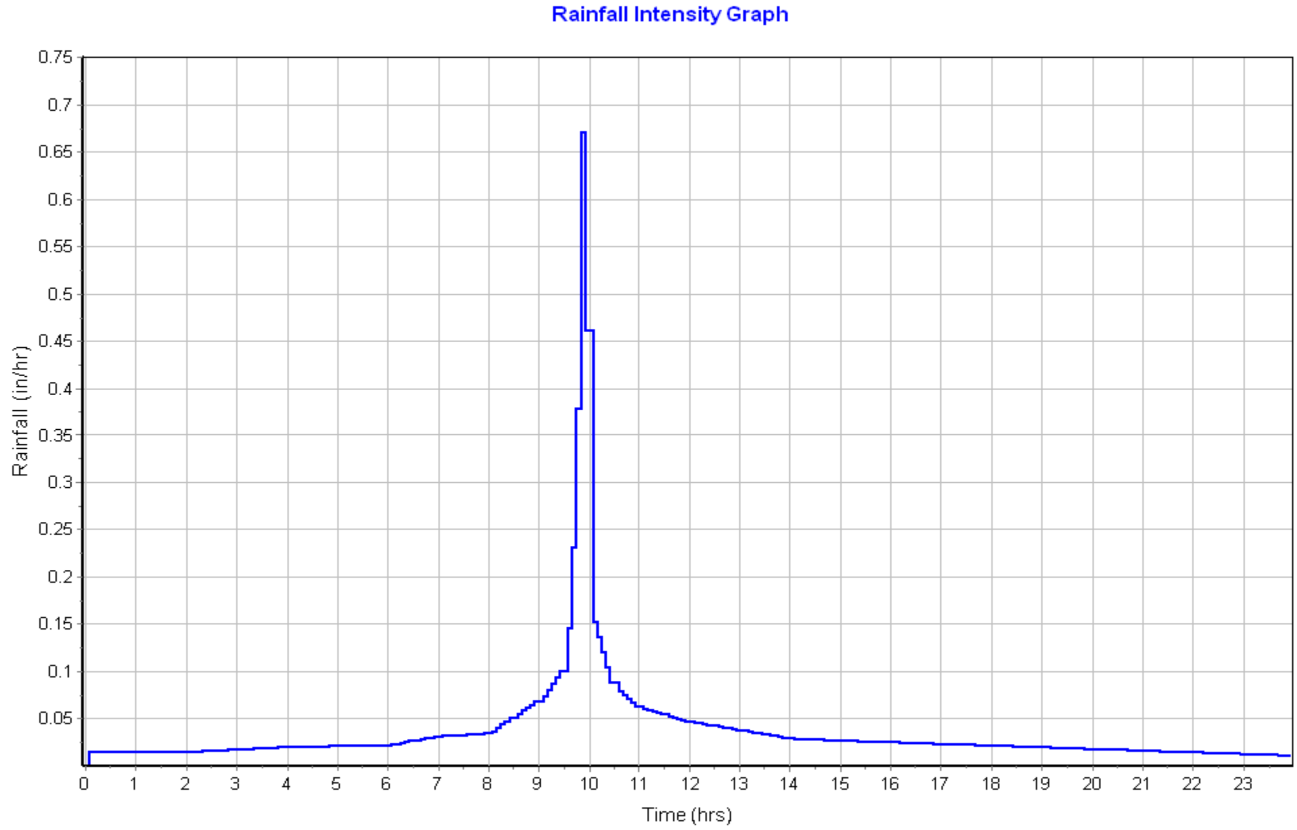
Time of Concentration

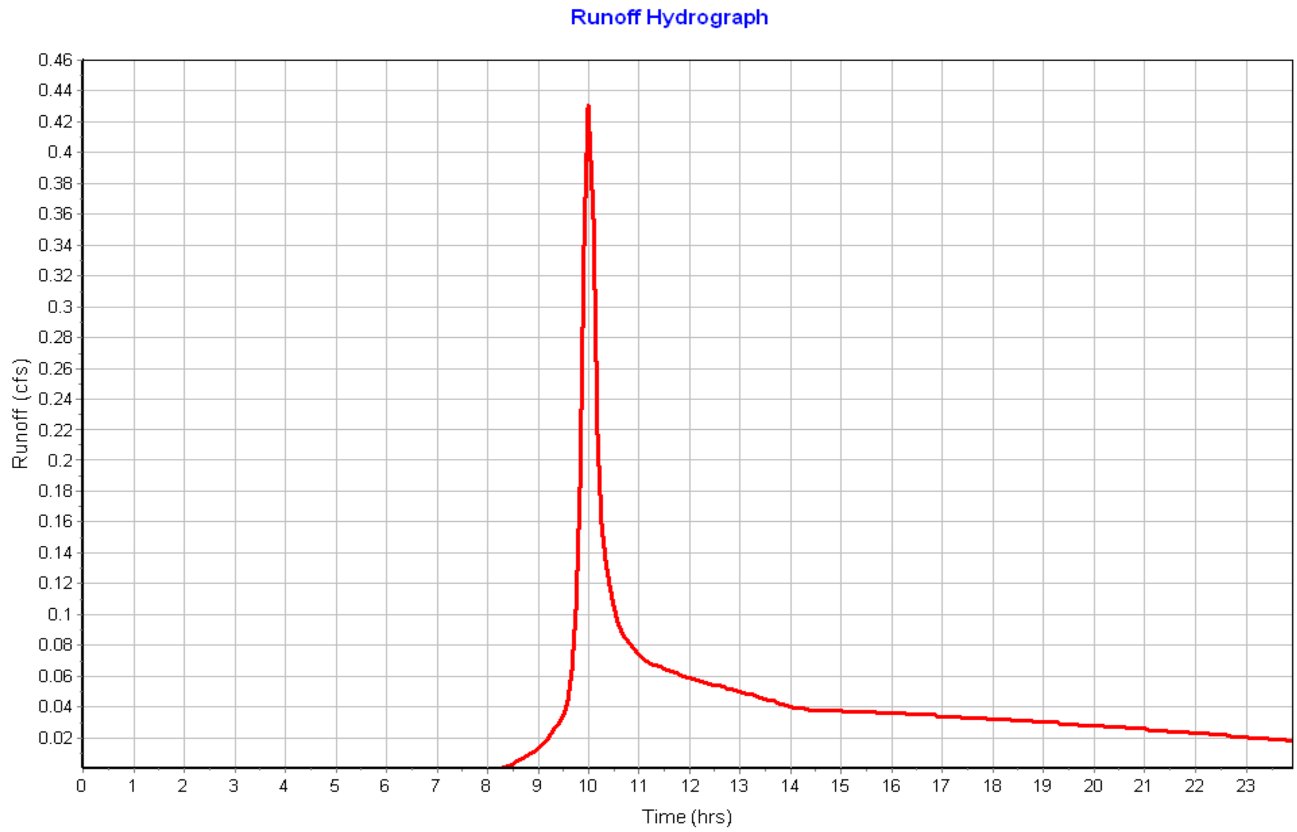
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.43
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A4


Rainfall Intensity Graph
Rainfall (in/hr)
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
0.46
0.44
0.42
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A5a

Input Data

Area (ac) 2.36
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.66	B	92.00
Composite Area & Weighted CN	1.66		92.00

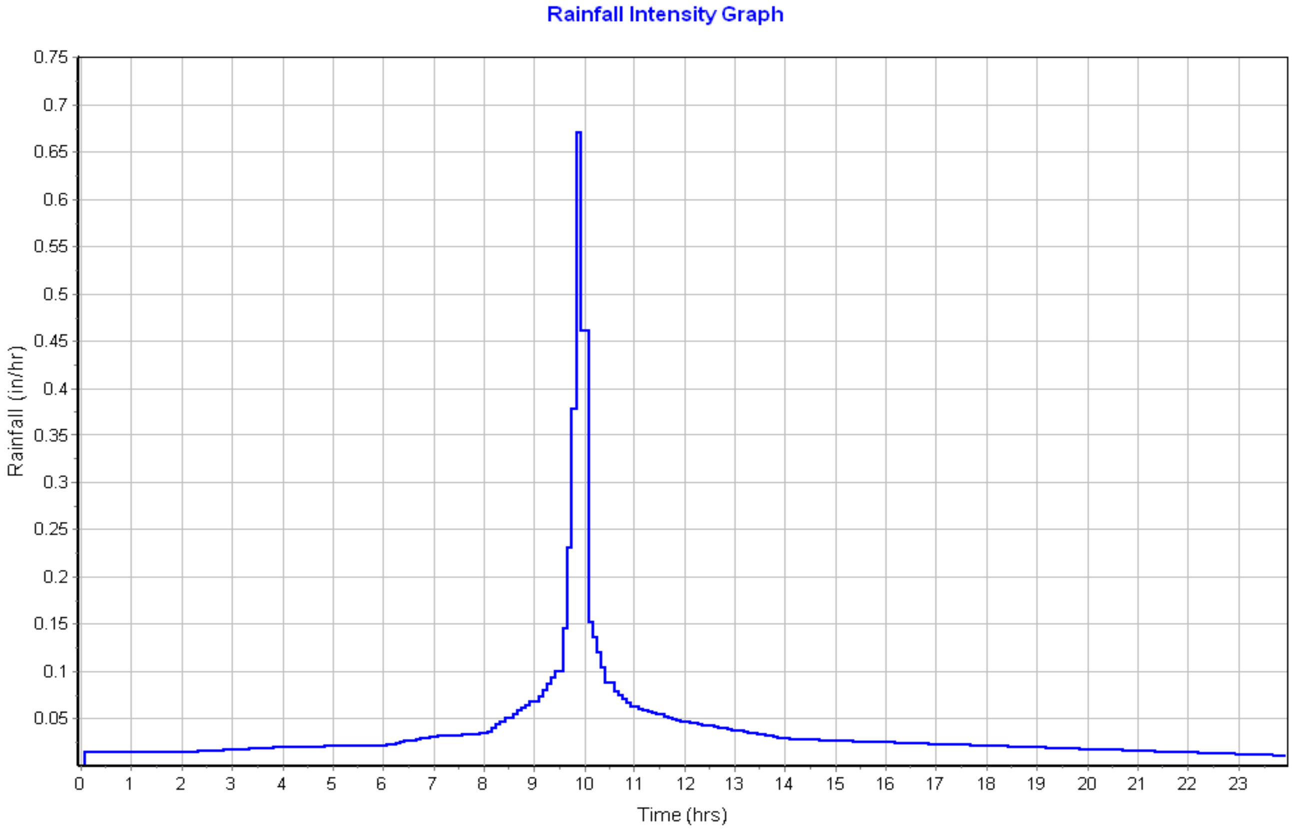
Time of Concentration

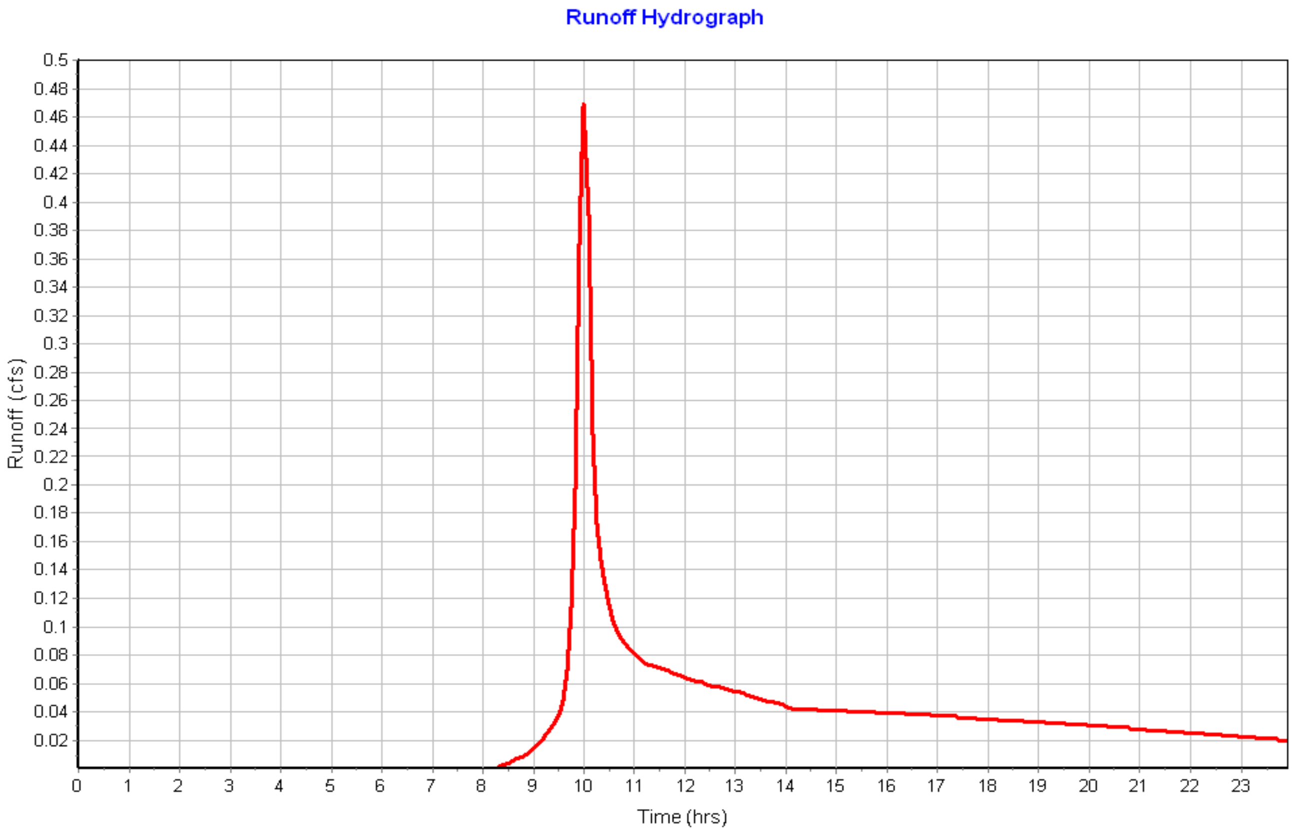
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.47
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5a





Subbasin : A5b

Input Data

Area (ac) 2.46
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.46	B	92.00
Composite Area & Weighted CN	2.46		92.00

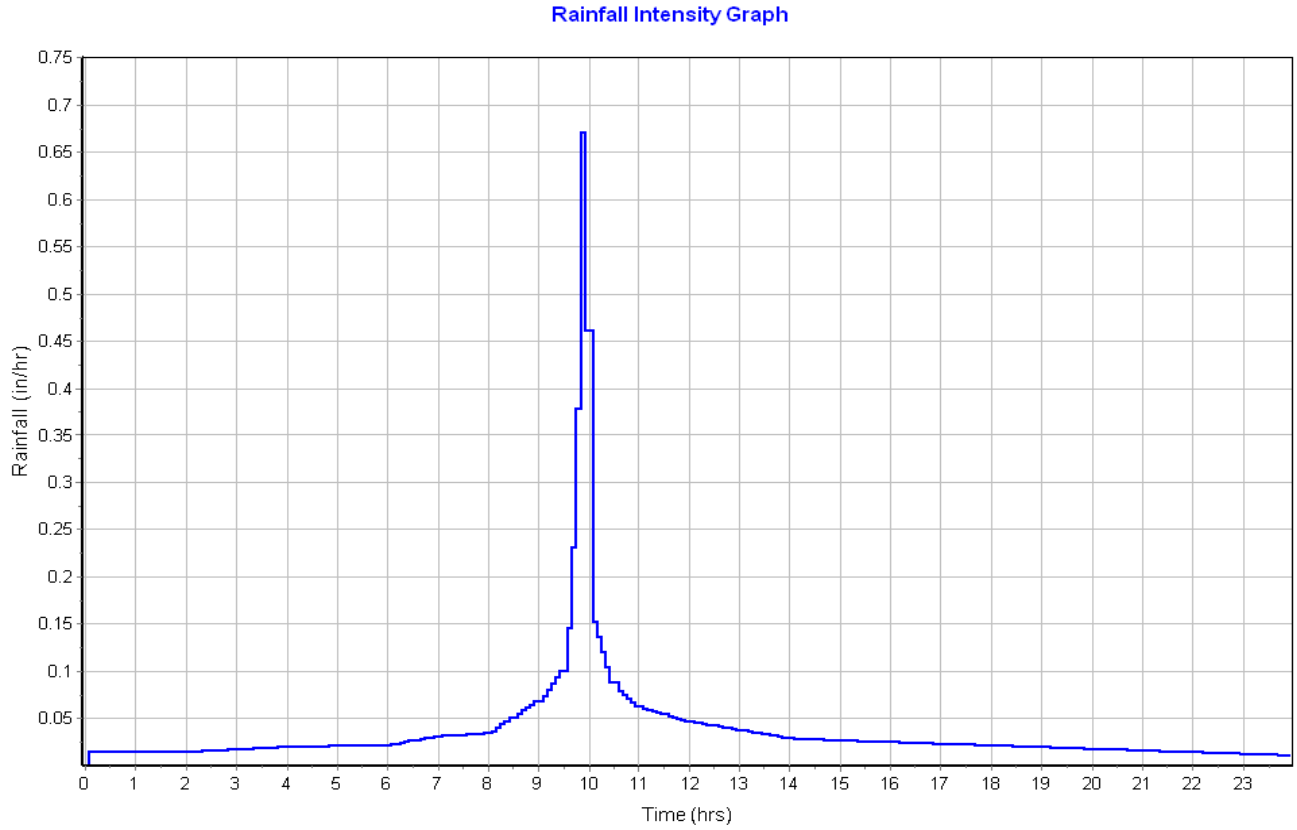
Time of Concentration

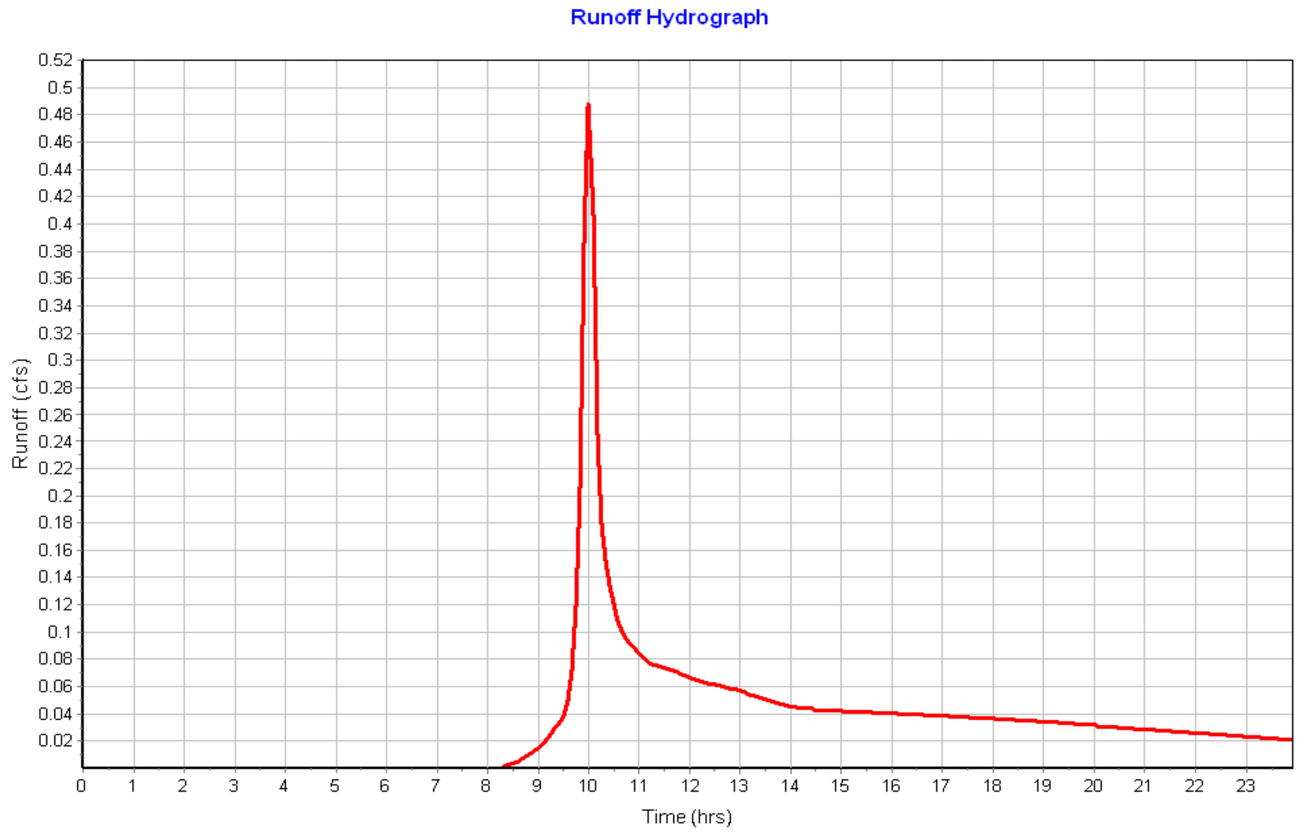
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.49
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5b





Subbasin : A6

Input Data

Area (ac) 2.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.65	B	92.00
Composite Area & Weighted CN	1.65		92.00

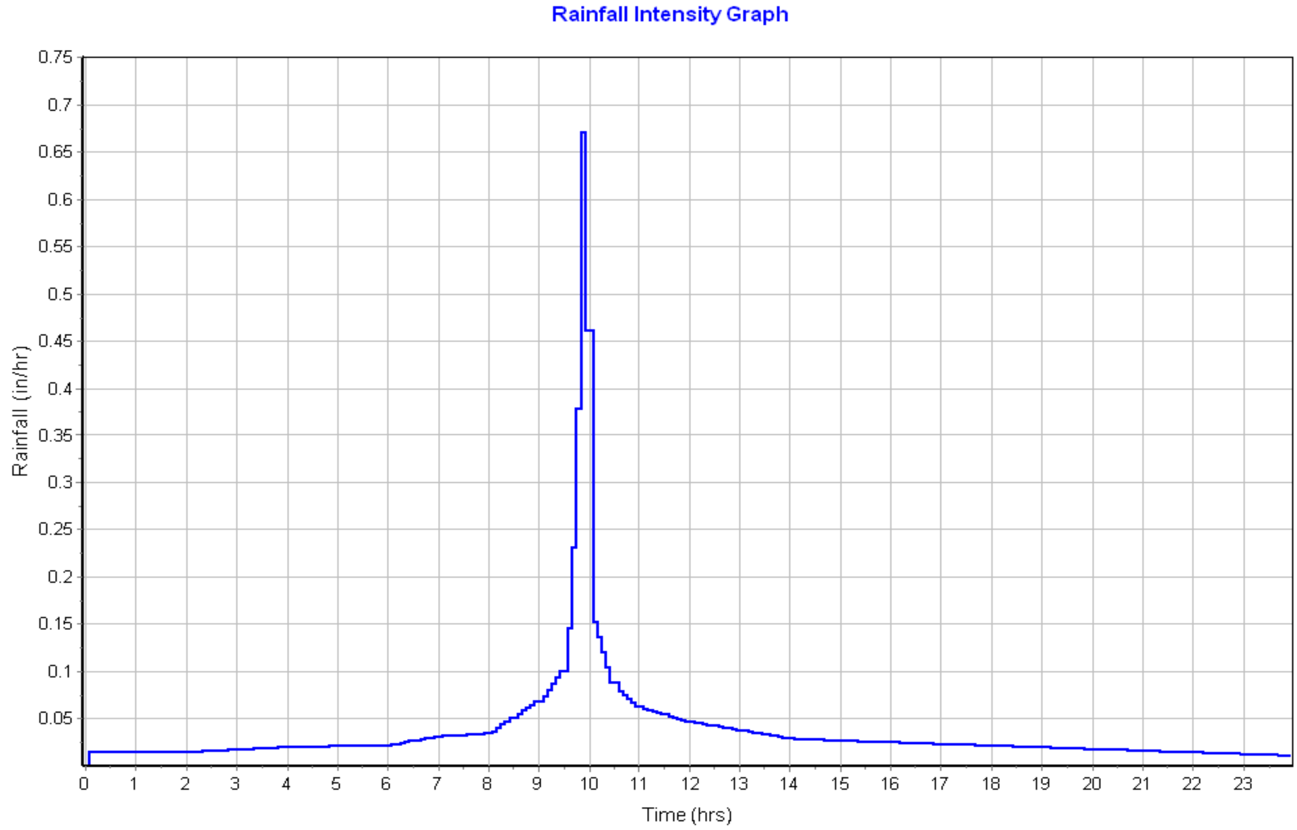
Time of Concentration

User-Defined TOC override (minutes): 10.00

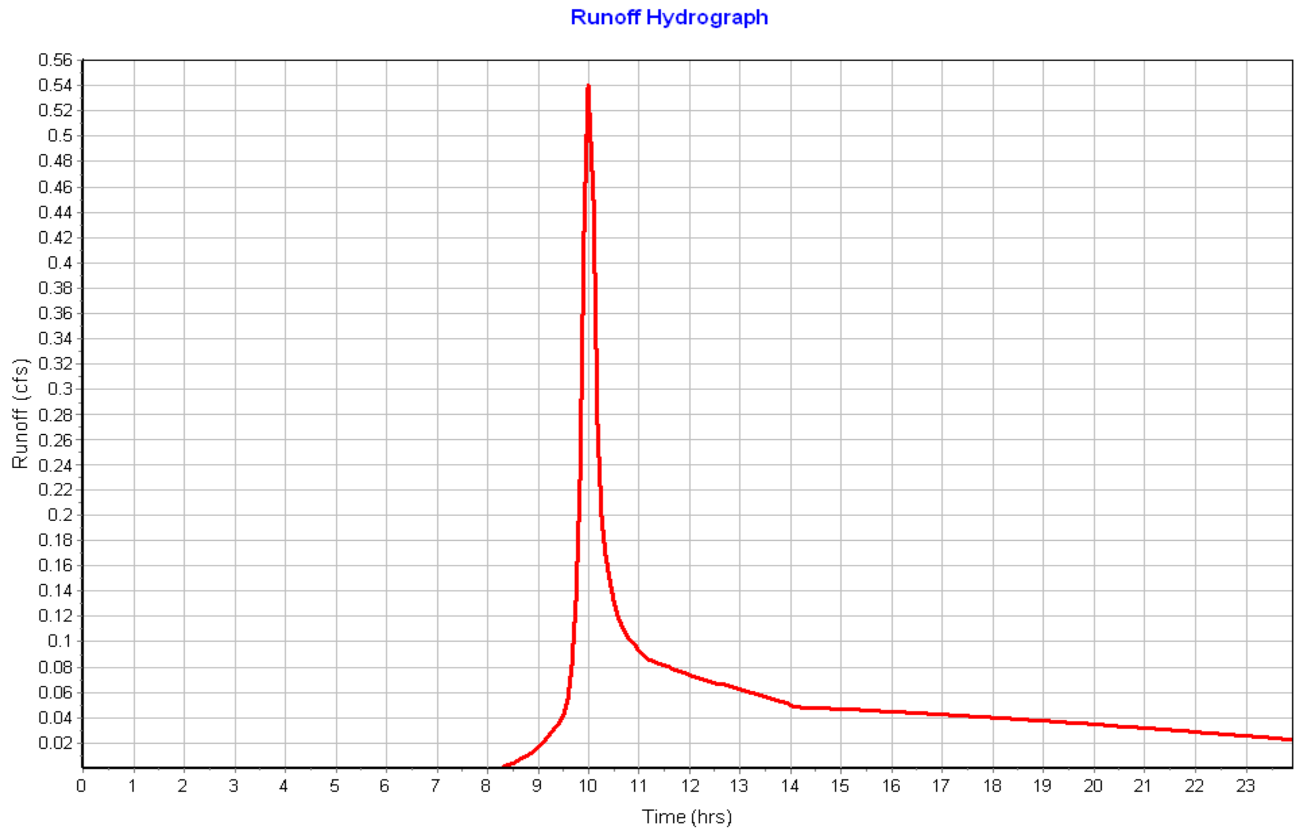
Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.54
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A6



Rainfall Intensity Graph
Rainfall (in/hr)
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.56
0.54
0.52
0.5
0.48
0.46
0.44
0.42
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A7

Input Data

Area (ac) 1.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.30	B	92.00
Composite Area & Weighted CN	1.30		92.00

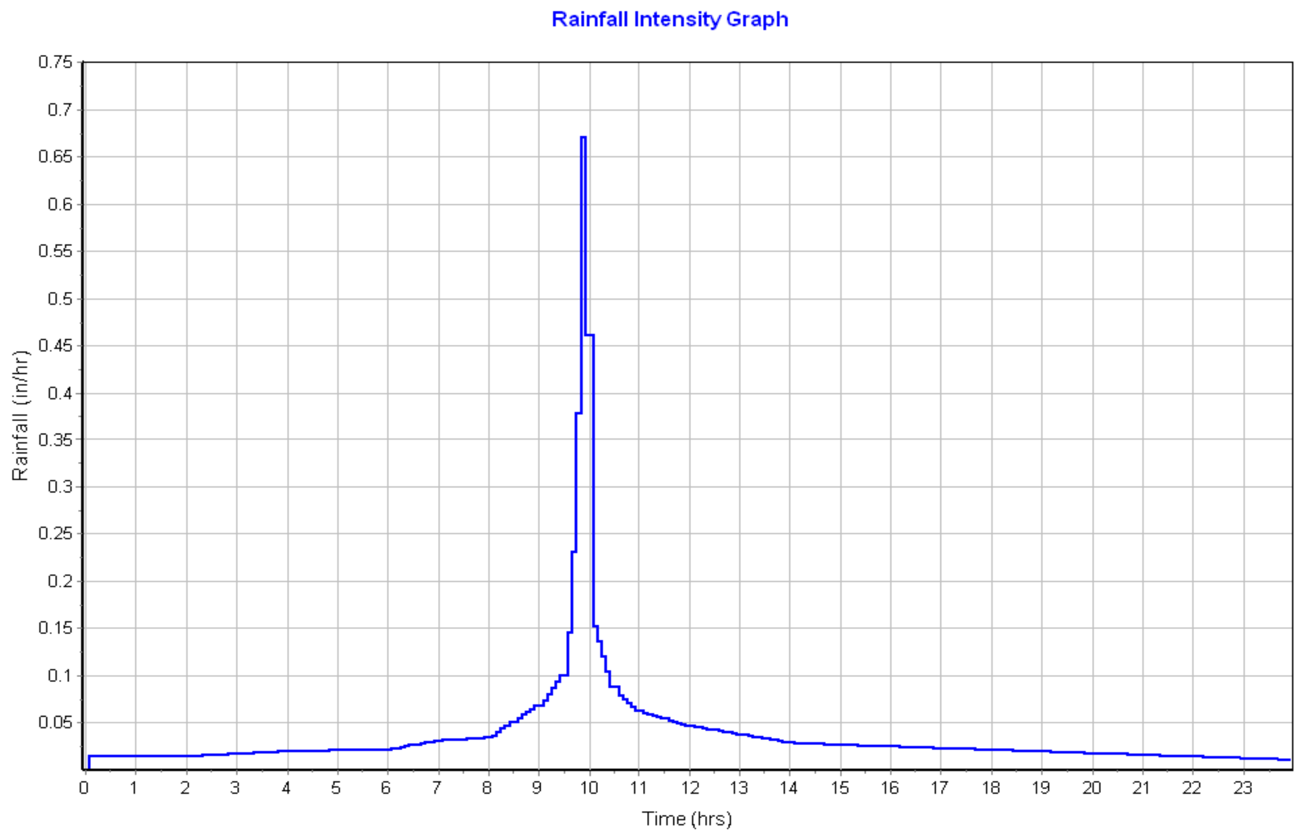
Time of Concentration

User-Defined TOC override (minutes): 10

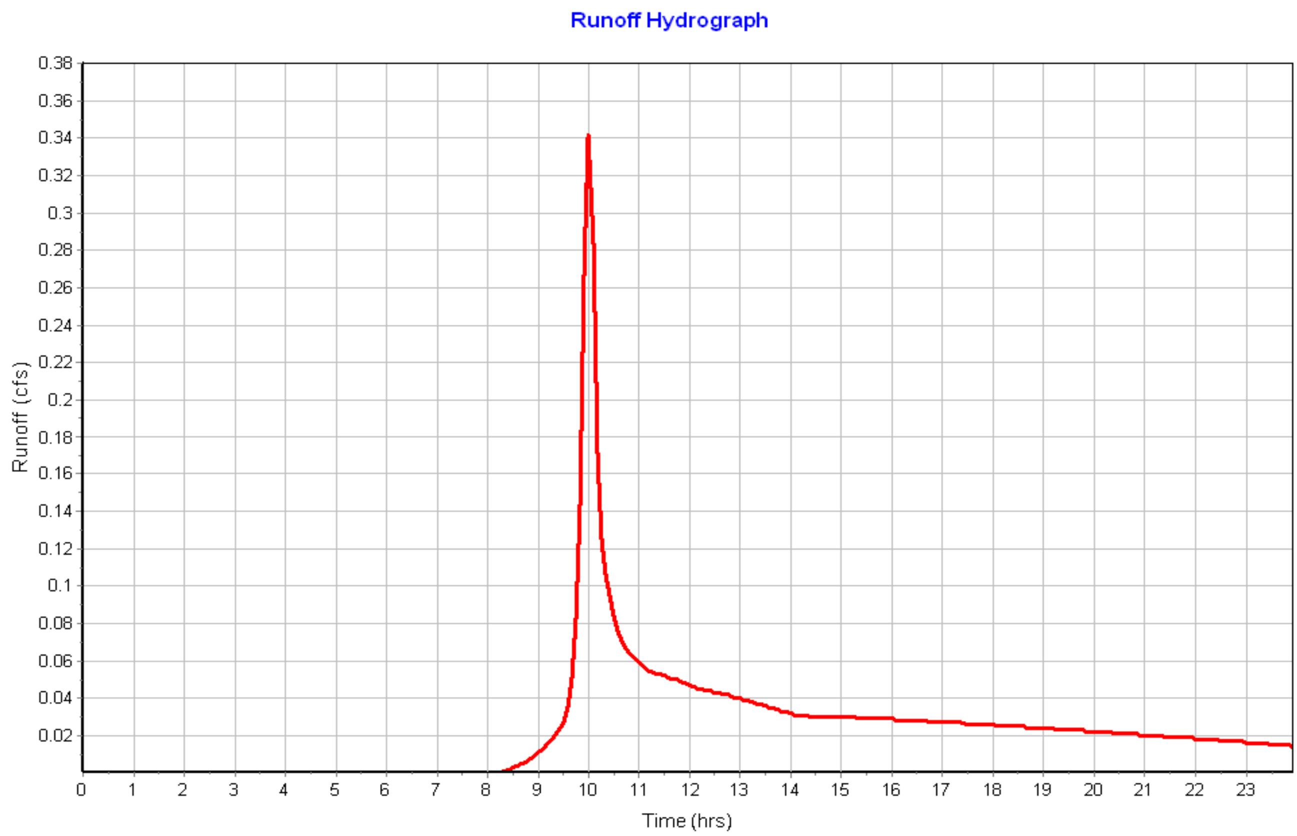
Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.32
Peak Runoff (cfs) 0.34
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A7



Rainfall Intensity Graph
Rainfall (in/hr)
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : PRE-DEV

Input Data

Area (ac) 15.11
Weighted Curve Number 77.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	15.11	B	77.00
Composite Area & Weighted CN	15.11		77.00

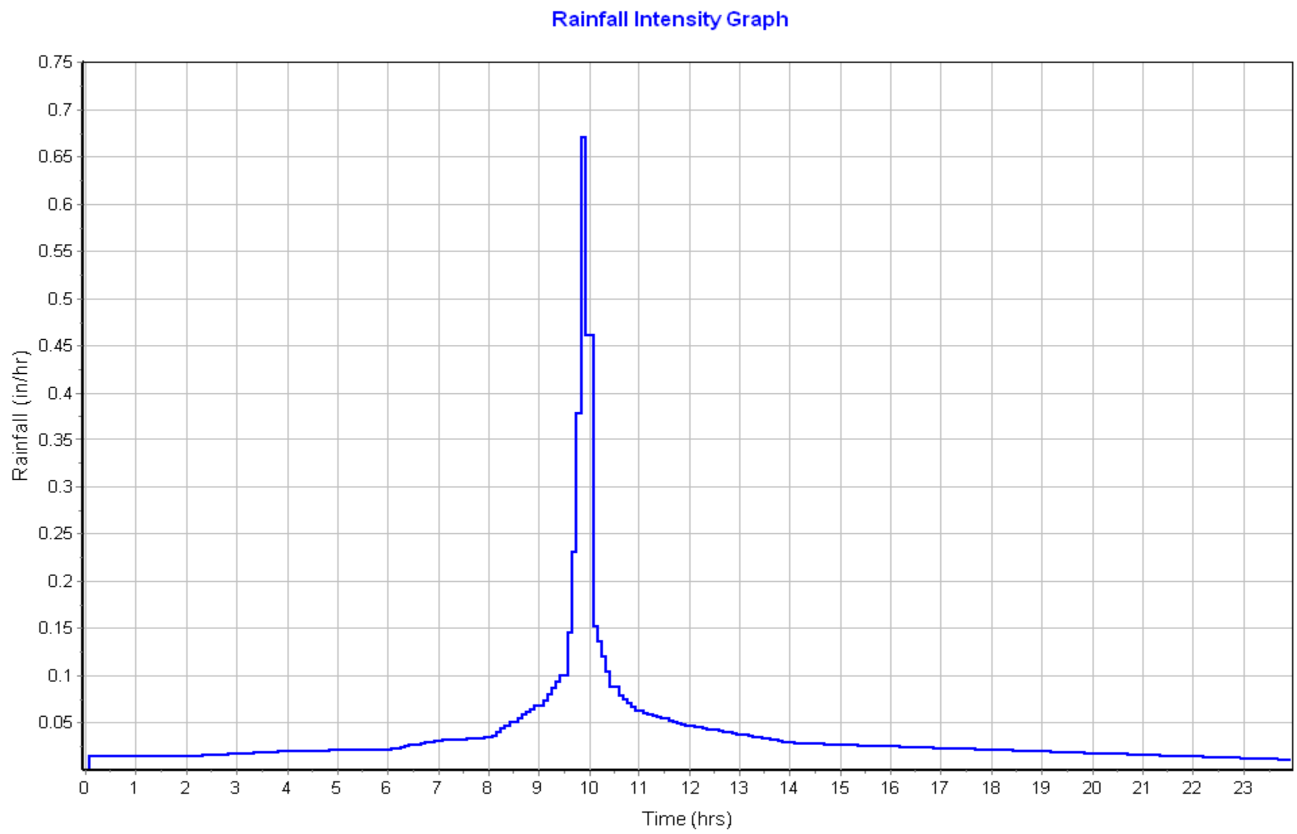
Time of Concentration

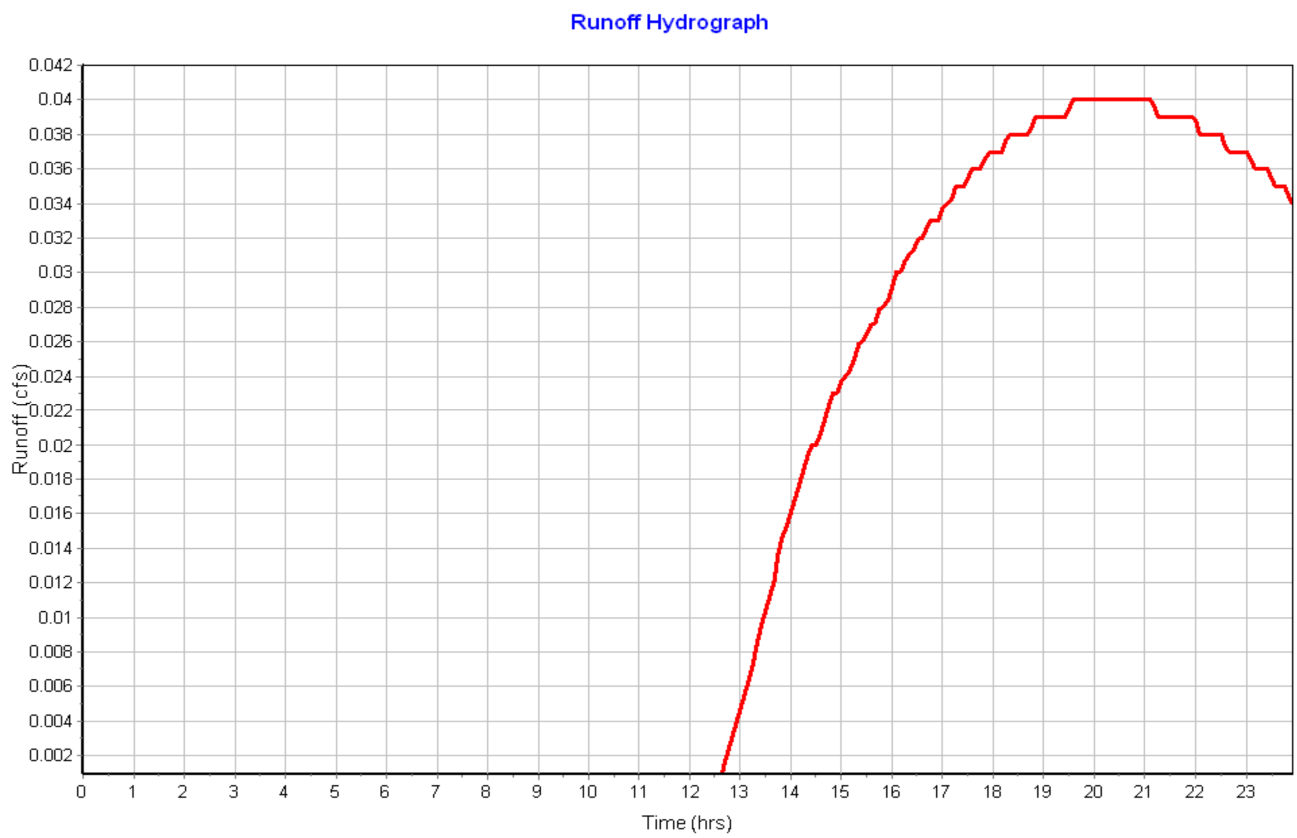
User-Defined TOC override (minutes): 100

Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.03
Peak Runoff (cfs) 0.04
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : PRE-DEV





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	BU1	998.09	1003.05	4.96	998.09	0.00	0.00	-1003.05	0.00	0.00
2	BU2	1000.23	1004.23	4.00	1000.23	0.00	0.00	-1004.23	0.00	0.00
3	J1	1004.61	1009.61	5.00	1004.61	0.00	0.00	-1009.61	0.00	0.00
4	J2a	999.91	1003.24	3.33	999.91	0.00	0.00	-1003.24	0.00	0.00
5	J2b	999.94	1002.15	2.21	999.94	0.00	0.00	-1002.15	0.00	0.00
6	J3	1005.76	1010.36	4.60	1005.76	0.00	0.00	-1010.36	0.00	0.00
7	J4	999.96	1005.68	5.72	999.96	0.00	0.00	-1005.68	0.00	0.00
8	Jun-23	0.00	6.00	6.00	0.00	0.00	6.00	0.00	0.00	0.00
9	O1	1009.93	1014.46	4.53	1009.93	0.00	0.00	-1014.46	0.00	0.00
10	O2	1008.31	1011.81	3.50	1008.31	0.00	0.00	-1011.81	0.00	0.00
11	O4	999.79	1003.29	3.50	999.79	0.00	0.00	-1003.29	0.00	0.00
12	O5	997.80	1003.05	5.25	997.80	0.00	0.00	-1003.05	0.00	0.00
13	SDMH1	1003.49	1009.45	5.96	1003.49	0.00	0.00	-1009.45	0.00	0.00
14	SDMH2	1001.24	1005.72	4.48	1001.24	0.00	6.00	-999.72	0.00	0.00
15	SDMH3	1001.57	1006.27	4.70	1001.57	0.00	6.00	-1000.27	0.00	0.00
16	SDMH4	997.69	1002.76	5.07	997.69	0.00	0.00	-1002.76	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	BU1	0.00	0.00	1001.36	3.27	0.00	1.69	1001.36	3.27	0 00:00	0 00:00	0.00	0.00
2	BU2	0.42	0.00	1003.74	3.51	0.00	1.49	1003.73	3.50	0 10:06	0 00:00	0.00	0.00
3	J1	0.43	0.43	1004.94	0.33	0.00	4.67	1004.68	0.07	0 10:05	0 00:00	0.00	0.00
4	J2a	0.47	0.47	1000.26	0.35	0.00	2.98	999.98	0.07	0 10:05	0 00:00	0.00	0.00
5	J2b	0.49	0.49	1000.30	0.36	0.00	1.85	1000.01	0.07	0 10:05	0 00:00	0.00	0.00
6	J3	0.43	0.43	1006.01	0.25	0.00	4.35	1005.86	0.10	0 10:05	0 00:00	0.00	0.00
7	J4	0.54	0.54	1000.34	0.38	0.00	5.34	1000.07	0.11	0 10:05	0 00:00	0.00	0.00
8	Jun-23	0.00	0.00	998.37	998.37	0.00	1.00	998.37	998.37	0 00:00	0 00:00	0.00	0.00
9	O1	0.00	0.00	1009.93	0.00	0.00	4.53	1009.93	0.00	0 00:00	0 00:00	0.00	0.00
10	O2	0.00	0.00	1008.31	0.00	0.00	3.50	1008.31	0.00	0 00:00	0 00:00	0.00	0.00
11	O4	0.00	0.00	1000.23	0.44	0.00	3.06	1000.23	0.44	0 00:00	0 00:00	0.00	0.00
12	O5	0.00	0.00	998.10	0.30	0.00	4.95	998.10	0.30	0 00:00	0 00:00	0.00	0.00
13	SDMH1	0.43	0.00	1004.90	1.41	0.00	4.55	1004.64	1.15	0 10:05	0 00:00	0.00	0.00
14	SDMH2	0.42	0.00	1001.59	0.35	0.00	4.13	1001.39	0.15	0 10:07	0 00:00	0.00	0.00
15	SDMH3	0.42	0.00	1001.91	0.34	0.00	4.36	1001.72	0.15	0 10:06	0 00:00	0.00	0.00
16	SDMH4	0.00	0.00	997.79	0.10	0.00	4.97	997.79	0.10	0 00:00	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	OC1	6.42	1003.73	3.50	1001.17	0.00	2.56	39.8800	Rectangular	1.500	3.000	0.0010	0.5000	0.5000	0.0000	0.00	No
2	OC2	1.00	1001.36	3.27	998.80	0.00	2.56	256.0000	Rectangular	1.500	2.000	0.0010	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	OC1	0.42	0 10:06	3485.71	0.00	0.00		0.00	0.00	0.00		
2	OC2	0.00	0 00:00	5074.12	0.00	0.00		0.00	0.00	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	P1	383.00	1009.93	0.00	1004.57	1.08	5.36	1.4000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	P10	70.00	1000.23	0.44	1000.06	0.10	0.17	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	P11	40.00	999.96	0.00	999.86	1.06	0.10	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	P12	125.00	998.10	0.30	997.79	0.10	0.31	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	P13	130.00	997.69	0.00	997.37	0.00	0.32	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	P2	15.00	1004.61	0.00	1004.57	1.08	0.04	0.2700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	P3	408.00	1004.47	0.98	1001.34	0.10	3.13	0.7700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	P4	79.00	1001.24	0.00	999.86	1.06	1.38	1.7500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	P5a	20.00	999.91	0.00	999.86	1.06	0.05	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	P5b	34.00	999.94	0.00	999.86	1.06	0.08	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	P6	113.00	998.37	998.37	998.09	0.00	0.28	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	P7	157.00	1006.25	-2.06	1005.86	0.10	0.39	0.2500	CIRCULAR	12.000	12.000	0.0153	0.5000	0.5000	0.0000	0.00	No	1
13	P8	492.00	1005.76	0.00	1001.67	0.10	4.09	0.8300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	P9	45.00	1001.57	0.00	1000.23	0.00	1.34	2.9800	CIRCULAR	12.000	12.000	0.0130	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	P1	0.00	0 00:00	4.21	0.00	0.00		0.00	0.00	0.00		Calculated
2	P10	0.00	0 00:00	1.76	0.00	0.00		0.00	0.00	0.00		Calculated
3	P11	0.54	0 10:05	1.78	0.30	1.99	0.34	0.38	0.38	0.00		Calculated
4	P12	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
5	P13	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
6	P2	0.43	0 10:05	1.84	0.23	1.91	0.13	0.33	0.33	0.00		Calculated
7	P3	0.42	0 10:07	3.12	0.13	2.81	2.42	0.25	0.25	0.00		Calculated
8	P4	0.42	0 10:07	4.71	0.09	3.71	0.35	0.20	0.20	0.00		Calculated
9	P5a	0.47	0 10:05	1.78	0.26	1.91	0.17	0.35	0.35	0.00		Calculated
10	P5b	0.48	0 10:05	1.73	0.28	1.89	0.30	0.36	0.36	0.00		Calculated
11	P6	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
12	P7	0.00	0 00:00	3.78	0.00	0.00		0.00	0.00	0.00		Calculated
13	P8	0.42	0 10:06	3.25	0.13	2.88	2.85	0.24	0.24	0.00		Calculated
14	P9	0.42	0 10:06	6.15	0.07	4.44	0.17	0.17	0.18	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1011.40
Max (Rim) Elevation (ft) 1014.46
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1011.40
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

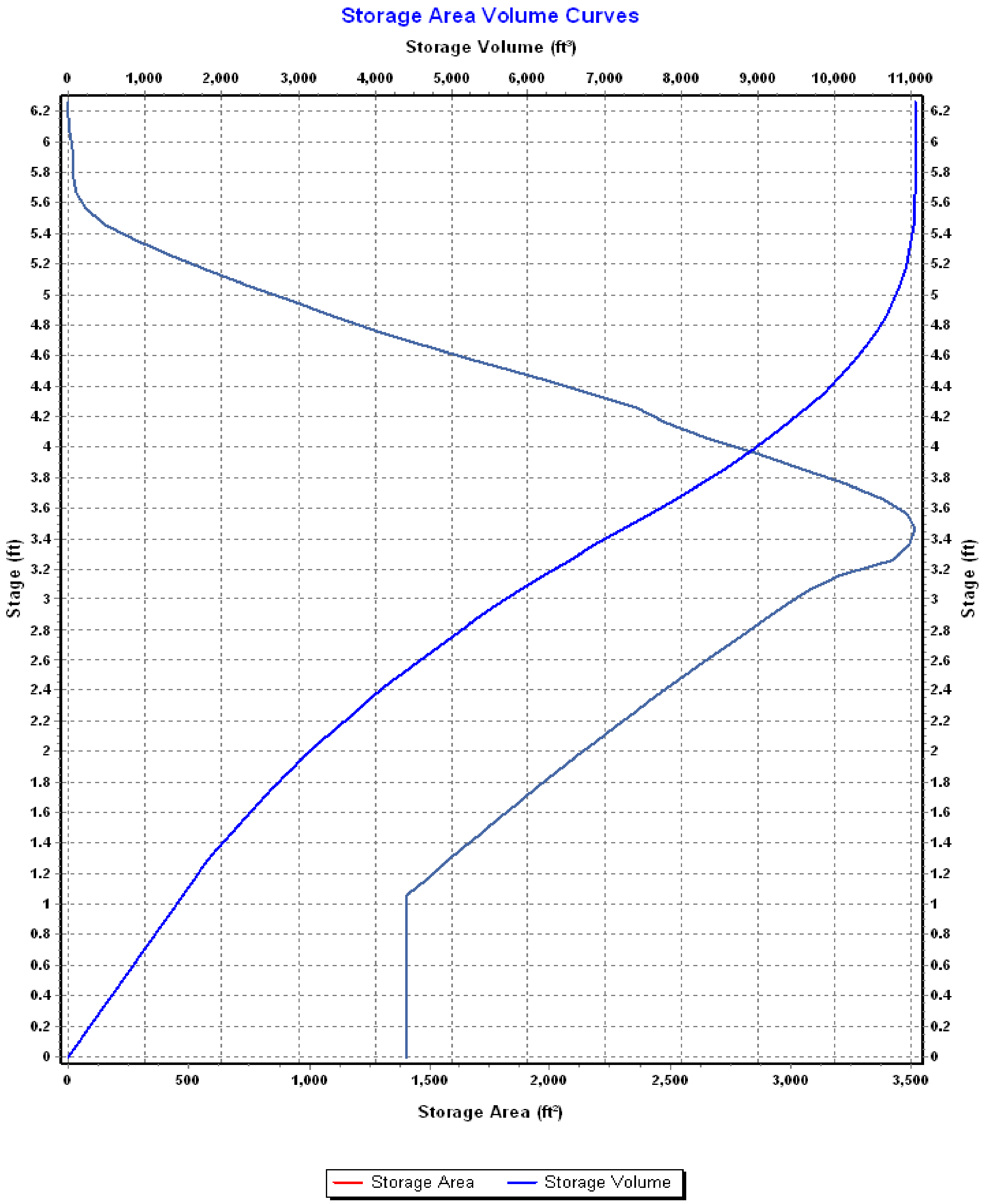
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1406	0.000
1.06	1406.41	1490.58
1.16	1480.47	1634.92
1.26	1555.24	1786.71
1.36	1630.77	1946.01
1.46	1707.07	2112.90
1.56	1784.14	2287.46
1.66	1861.98	2469.77
1.76	1940.59	2659.90
1.86	2020.12	2857.94
1.96	2100.89	3063.99
2.06	2182.92	3278.18
2.16	2266.21	3500.64
2.26	2350.76	3731.49
2.36	2436.58	3970.86
2.46	2523.66	4218.87
2.52	2576.52	4371.88
2.56	2612.01	4475.65
2.66	2701.62	4741.33
2.76	2792.5	5016.04
2.86	2884.65	5299.90
2.96	2978.05	5593.04
3.06	3072.11	5895.55
3.16	3205.91	6209.45
3.26	3421.78	6540.83
3.36	3493.59	6886.60
3.46	3515.37	7237.05
3.56	3483.18	7586.98
3.66	3379.16	7930.10
3.76	3228.85	8260.50
3.86	3042.58	8574.07
3.96	2846.45	8868.52
4.06	2644.9	9143.09
4.16	2476.74	9399.17
4.26	2357.18	9640.87
4.36	2152.13	9866.34
4.46	1923.09	10070.10
4.56	1699.17	10251.21
4.66	1484.08	10410.37
4.76	1280.57	10548.60
4.86	1096.18	10667.44
4.96	914.98	10768.00
5.06	736.35	10850.57
5.16	570.94	10915.93
5.26	418.64	10965.41
5.36	279.43	11000.31
5.46	153.32	11021.95
5.56	72.06	11033.22
5.66	32.33	11038.44
5.76	22.84	11041.20
5.86	20.61	11043.37
5.96	14.31	11045.12
6.06	6.81	11046.18
6.16	2.03	11046.62
6.26	0.06	11046.72


Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
Stage (ft)
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (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	OR1	Bottom	CIRCULAR	No	24.00			1013.96	0.61

Output Summary Results

Peak Inflow (cfs) 0.45
Peak Lateral Inflow (cfs) 0.45
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.46
Max HGL Elevation Attained (ft) 1012.35
Max HGL Depth Attained (ft) 0.95
Average HGL Elevation Attained (ft) 1011.87
Average HGL Depth Attained (ft) 0.47
Time of Max HGL Occurrence (days hh:mm) 0 21:58
Total Exfiltration Volume (1000-ft³) 1.289
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1009.68
Max (Rim) Elevation (ft) 1012.74
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1009.68
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

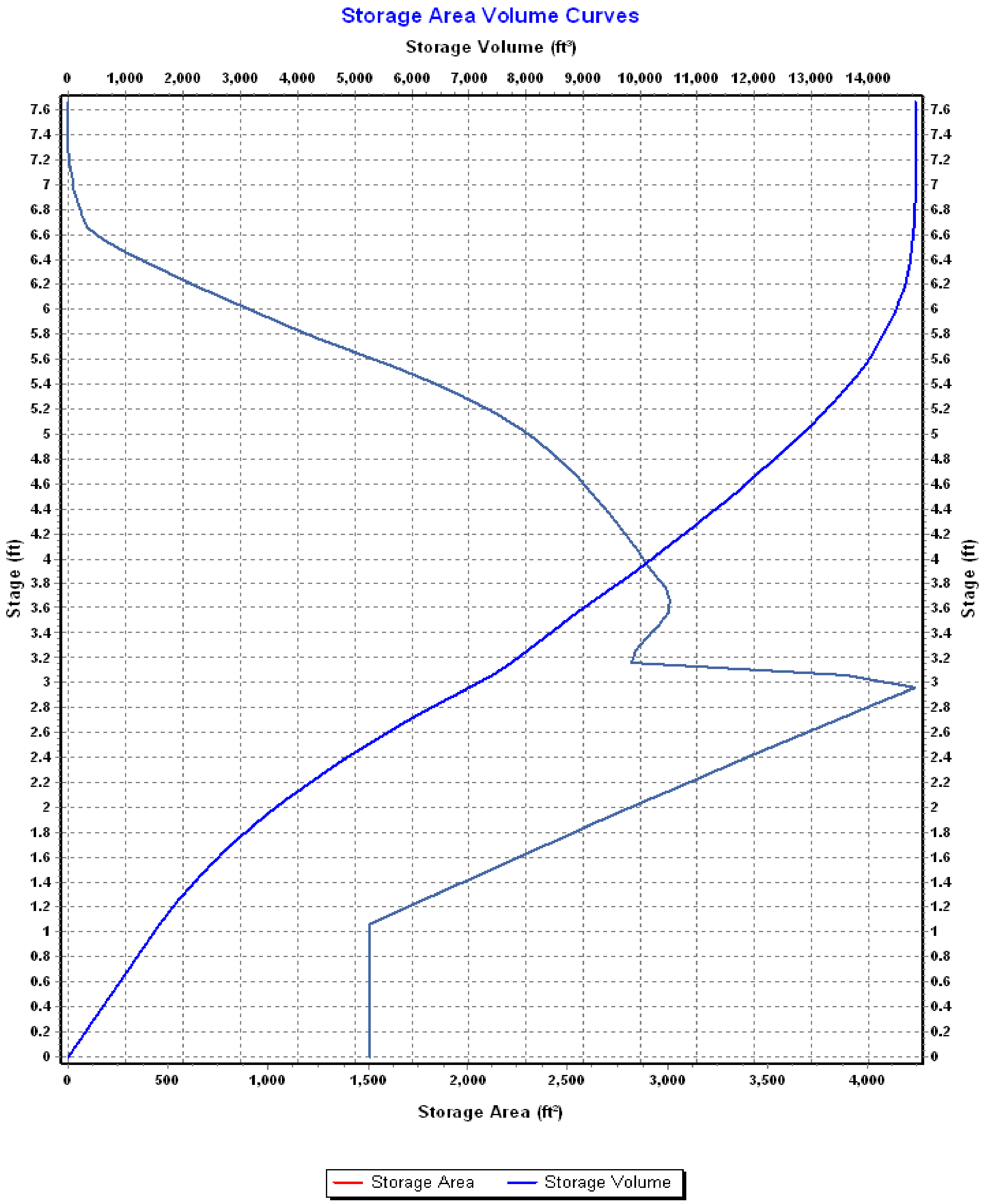
Exfiltration Rate (in/hr) 0.8500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1509	0.000
1.06	1509.71	1599.92
1.16	1643.71	1757.59
1.26	1778.63	1928.71
1.36	1914.59	2113.37
1.46	2051.6	2311.68
1.56	2189.68	2523.74
1.66	2328.85	2749.67
1.76	2469.09	2989.57
1.86	2610.42	3243.55
1.96	2752.84	3511.71
2.06	2896.36	3794.17
2.16	3041	4091.04
2.26	3186.76	4402.43
2.36	3333.64	4728.45
2.46	3481.65	5069.21
2.5	3541.17	5209.67
2.56	3630.78	5424.83
2.66	3781.07	5795.42
2.76	3932.5	6181.10
2.86	4085.08	6581.98
2.96	4238.81	6998.17
3.06	3893.63	7404.79
3.16	2818.58	7740.40
3.26	2841.8	8023.42
3.36	2894.46	8310.23
3.46	2958.61	8602.88
3.56	3003.95	8901.01
3.66	3008.97	9201.66
3.76	2988.5	9501.53
3.86	2941.33	9798.02
3.96	2895.87	10089.88
4.06	2850.77	10377.21
4.16	2804.84	10659.99
4.26	2758.57	10938.16
4.36	2709.87	11211.58
4.46	2658.38	11479.99
4.56	2603.81	11743.10
4.66	2544.42	12000.51
4.76	2480.66	12251.76
4.86	2410.91	12496.34
4.96	2336.82	12733.73
5.06	2248.65	12963.00
5.16	2143.37	13182.60
5.26	2023.25	13390.93
5.36	1890.68	13586.63
5.46	1744.92	13768.41
5.56	1587.46	13935.03
5.66	1421.65	14085.49
5.76	1248.08	14218.98
5.86	1101.15	14336.44
5.96	957.13	14439.35
6.06	812.08	14527.81
6.16	668.84	14601.86
6.26	532.55	14661.93
6.36	403.26	14708.72
6.46	284.36	14743.10
6.56	177.83	14766.21
6.66	97.81	14779.99
6.76	71.62	14788.46
6.86	48.37	14794.46
6.96	30.72	14798.41
7.06	17.84	14800.84
7.16	7.04	14802.08
7.26	3.14	14802.59
7.36	1.97	14802.85
7.46	2.5	14803.07
7.56	1.02	14803.25

7.66	0.2	14803.31


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
Storage Area (ft²)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
Storage Area
Storage Volume

Storage Node : BR2 (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	OR2	Bottom	CIRCULAR	No	24.00			1012.24	0.61

Output Summary Results

Peak Inflow (cfs) 0.44
Peak Lateral Inflow (cfs) 0.44
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.78
Max HGL Elevation Attained (ft) 1010.39
Max HGL Depth Attained (ft) 0.71
Average HGL Elevation Attained (ft) 1010.05
Average HGL Depth Attained (ft) 0.37
Time of Max HGL Occurrence (days hh:mm) 0 19:37
Total Exfiltration Volume (1000-ft³) 1.559
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR3

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1001.86
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

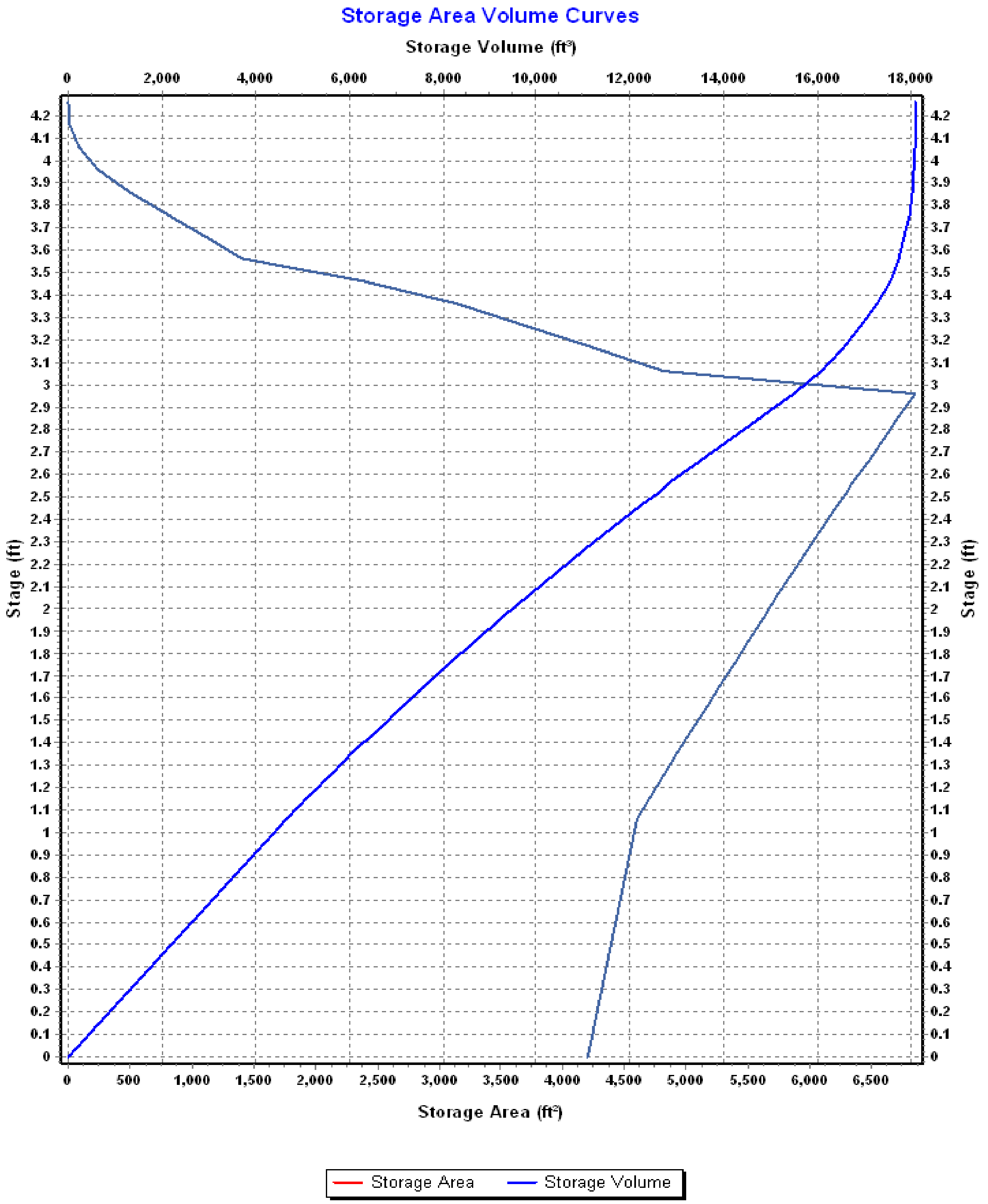
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR3

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	4202	0.000
1.06	4602.78	4666.53
1.16	4712.04	5132.27
1.26	4822.31	5608.99
1.36	4933.57	6096.78
1.46	5045.82	6595.75
1.56	5159.08	7106.00
1.66	5273.33	7627.62
1.76	5388.58	8160.72
1.86	5504.82	8705.39
1.96	5622.06	9261.73
2.06	5740.3	9829.85
2.16	5859.54	10409.84
2.26	5979.77	11001.81
2.36	6101.01	11605.85
2.46	6223.23	12222.06
2.52	6297.05	12597.67
2.56	6346.46	12850.54
2.66	6470.68	13491.40
2.76	6595.9	14144.73
2.86	6722.12	14810.63
2.96	6849.33	15489.20
3.06	4821.94	16072.76
3.16	4269.29	16527.32
3.26	3701.61	16925.87
3.36	3145.79	17268.24
3.46	2385.68	17544.81
3.56	1403.4	17734.26
3.66	1106.4	17859.75
3.76	805.95	17955.37
3.86	493.74	18020.35
3.96	245.04	18057.29
4.06	86.03	18073.84
4.16	14	18078.84
4.26	0.09	18079.54


Storage Area Volume Curves
Storage Volume (ft³)
Stage (ft)
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR3 (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	OR3	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 0.95
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 5.91
Max HGL Elevation Attained (ft) 999.17
Max HGL Depth Attained (ft) 0.37
Average HGL Elevation Attained (ft) 998.96
Average HGL Depth Attained (ft) 0.16
Time of Max HGL Occurrence (days hh:mm) 0 13:39
Total Exfiltration Volume (1000-ft³) 5.041
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR4

Input Data

Invert Elevation (ft) 1001.17
Max (Rim) Elevation (ft) 1004.23
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1001.17
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

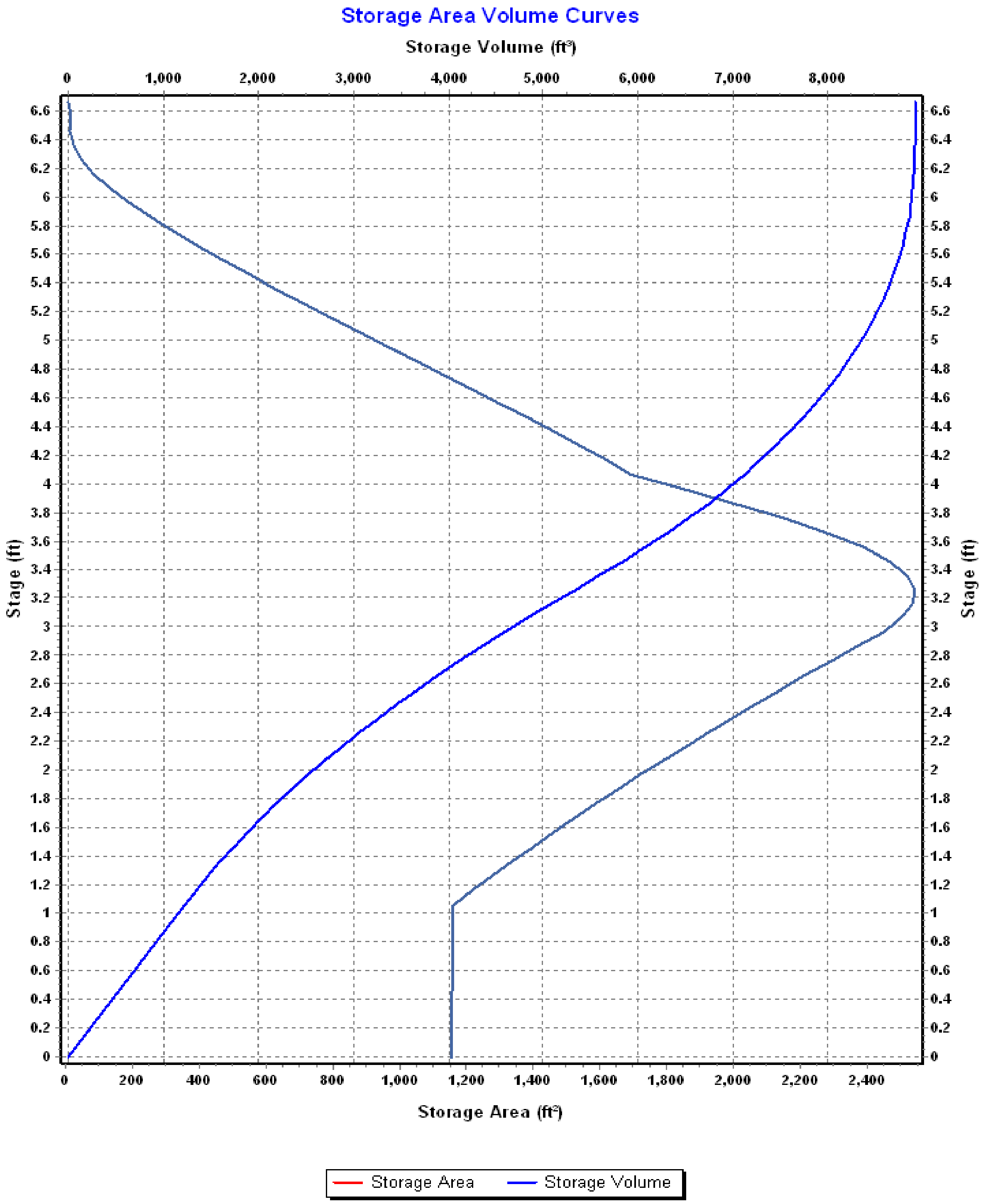
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 1.6700

Storage Area Volume Curves

Storage Curve : BR4

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1157	0.000
1.06	1157.62	1226.75
1.16	1215.18	1345.39
1.26	1273.86	1469.84
1.36	1333.68	1600.22
1.46	1394.62	1736.64
1.56	1456.7	1879.21
1.66	1519.9	2028.04
1.76	1584.24	2183.25
1.86	1649.71	2344.95
1.96	1716.31	2513.25
2.06	1784.03	2688.27
2.16	1852.89	2870.12
2.26	1922.88	3058.91
2.36	1994	3254.75
2.46	2066.25	3457.76
2.49	2088.15	3520.08
2.56	2139.64	3668.05
2.66	2214.15	3885.74
2.76	2289.79	4110.94
2.86	2366.56	4343.76
2.96	2444.47	4584.31
3.06	2503.88	4831.73
3.16	2536.19	5083.73
3.26	2543.4	5337.71
3.36	2518.39	5590.80
3.46	2464.18	5839.93
3.56	2384.46	6082.36
3.66	2275.89	6315.38
3.76	2146.68	6536.51
3.86	2004.26	6744.06
3.96	1849.65	6936.76
4.06	1693.56	7113.92
4.16	1620.49	7279.62
4.26	1542.67	7437.78
4.36	1462.92	7588.06
4.46	1382.21	7730.32
4.56	1298.91	7864.38
4.66	1214.58	7990.05
4.76	1129.66	8107.26
4.86	1044.43	8215.96
4.96	959.13	8316.14
5.06	873.72	8407.78
5.16	790.35	8490.98
5.26	707.66	8565.88
5.36	625.29	8632.53
5.46	547.18	8691.15
5.56	470.39	8742.03
5.66	394.33	8785.27
5.76	324.47	8821.21
5.86	256.35	8850.25
5.96	189.71	8872.55
6.06	133.98	8888.73
6.16	83.68	8899.61
6.26	48.53	8906.22
6.36	26.06	8909.95
6.46	14.03	8911.95
6.56	14.79	8913.39
6.66	8.38	8914.55



Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Stage (ft)
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR4 (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	O4	Bottom	CIRCULAR	No	24.00			1003.29	0.61

Output Summary Results

Peak Inflow (cfs) 0.74
Peak Lateral Inflow (cfs) 0.34
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 3.38
Max HGL Elevation Attained (ft) 1002.73
Max HGL Depth Attained (ft) 1.56
Average HGL Elevation Attained (ft) 1002.00
Average HGL Depth Attained (ft) 0.83
Time of Max HGL Occurrence (days hh:mm) 0 18:33
Total Exfiltration Volume (1000-ft³) 2.788
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR5

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1003.05
Max (Rim) Offset (ft) 4.25
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

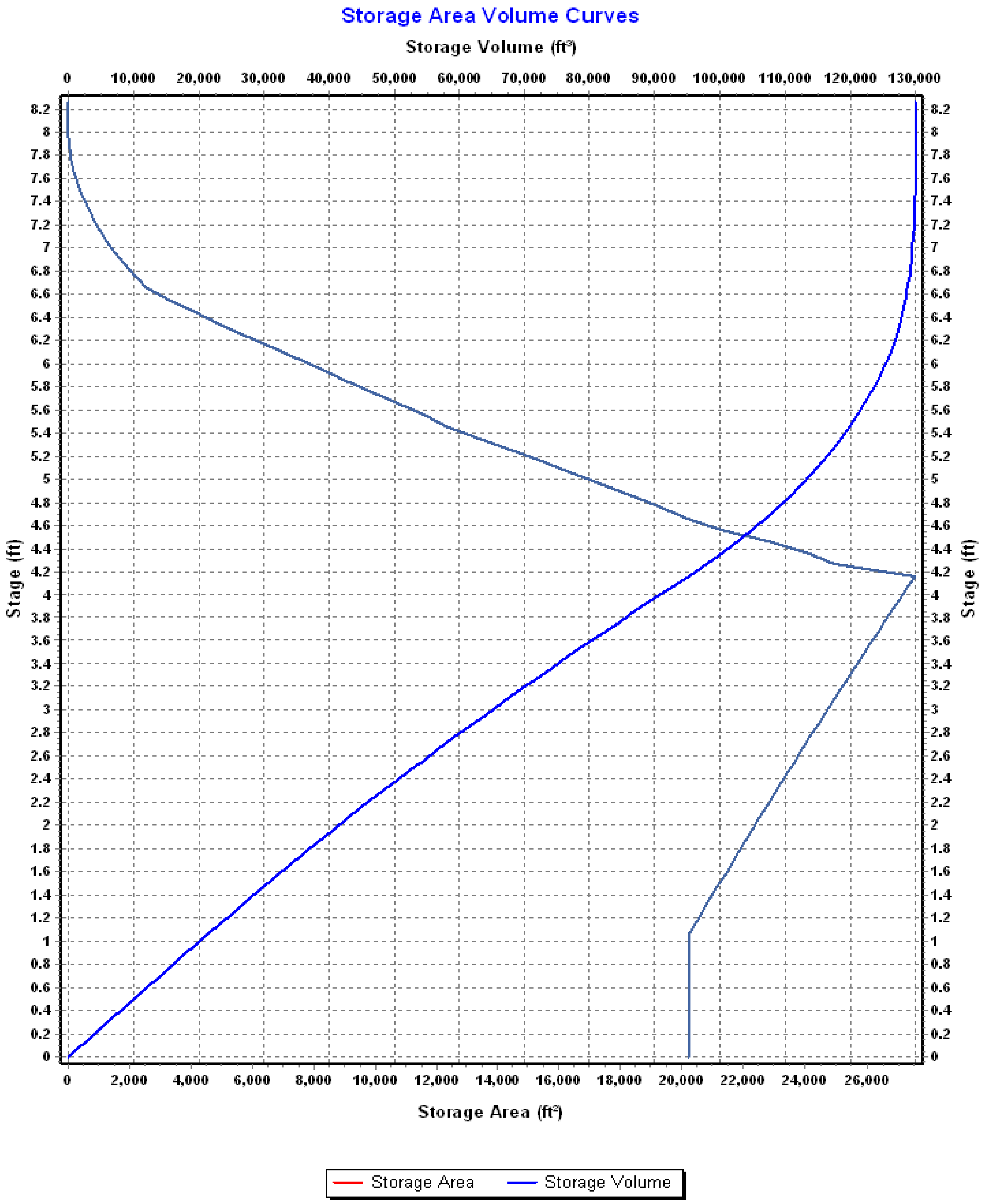
Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR5

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	20214	0.000
1.06	20215.03	21427.39
1.16	20437.65	23460.02
1.26	20661.27	25514.97
1.36	20885.87	27592.33
1.46	21111.46	29692.20
1.56	21338.05	31814.68
1.66	21565.62	33959.86
1.76	21794.18	36127.85
1.86	22023.72	38318.75
1.96	22254.26	40532.65
2.06	22485.78	42769.65
2.16	22718.3	45029.85
2.26	22951.8	47313.36
2.36	23186.29	49620.26
2.46	23421.77	51950.66
2.52	23563.54	53360.22
2.56	23658.24	54304.66
2.66	23895.7	56682.36
2.76	24134.15	59083.85
2.86	24373.58	61509.24
2.96	24614.01	63958.62
3.06	24855.42	66432.09
3.16	25097.82	68929.75
3.26	25341.21	71451.70
3.36	25585.59	73998.04
3.46	25830.96	76568.87
3.56	26077.32	79164.28
3.66	26324.66	81784.38
3.76	26573	84429.26
3.86	26822.32	87099.03
3.96	27072.63	89793.78
4.06	27323.93	92513.61
4.16	27576.22	95258.62
4.26	24935.38	97884.20
4.36	24024.32	100332.19
4.46	22764.39	102671.63
4.56	21271	104873.40
4.66	20160.51	106944.98
4.76	19229.97	108914.50
4.86	18281.25	110790.06
4.96	17314.48	112569.85
5.06	16331.1	114252.13
5.16	15332.24	115835.30
5.26	14319.21	117317.87
5.36	13293.07	118698.48
5.46	12321.72	119979.22
5.56	11498.38	121170.23
5.66	10666.17	122278.46
5.76	9824.09	123302.97
5.86	8977.65	124243.06
5.96	8130.16	125098.45
6.06	7284.67	125869.19
6.16	6443.94	126555.62
6.26	5613.4	127158.49
6.36	4794.72	127678.90
6.46	3989.93	128118.13
6.56	3201.03	128477.68
6.66	2514.65	128763.46
6.76	2163.03	128997.34
6.86	1832.56	129197.12
6.96	1526.32	129365.06
7.06	1250.46	129503.90
7.16	1001.28	129616.49
7.26	786.61	129705.88
7.36	609.46	129775.68
7.46	461.78	129829.24
7.56	329.31	129868.79

7.66	192.14	129894.86
7.76	95.82	129909.26
7.86	34.15	129915.76
7.96	4.84	129917.71
8.06	0	129917.95
8.16	4.45	129918.17
8.26	0.24	129918.40


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
100,000
110,000
120,000
130,000
Stage (ft)
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
22,000
24,000
26,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR5 (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	OR5	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 0.94
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 27.51
Max HGL Elevation Attained (ft) 998.82
Max HGL Depth Attained (ft) 0.02
Average HGL Elevation Attained (ft) 998.80
Average HGL Depth Attained (ft) 0
Time of Max HGL Occurrence (days hh:mm) 0 10:18
Total Exfiltration Volume (1000-ft³) 1.376
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

5-year/24-hour Rainfall Event
Simulation Results

Project Description

File Name 20270.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods .... YES

Analysis Options

Start Analysis On	Oct 13, 2022	00:00:00
End Analysis On	Oct 14, 2022	00:00:00
Start Reporting On	Oct 13, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	9
Nodes..	23
Junctions	16
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links..	21
Channels	2
Pipes	14
Pumps	0
Orifices	5
Weirs	0
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	Post-Development	Time Series	5-year	Cumulative	inches	California	San Bernardino (Baker)	5	1.27	SCS Type I 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	A01	2.26	92.00	1.27	0.61	1.38	0.93	0 00:10:00
2	A02	2.21	92.00	1.27	0.61	1.35	0.90	0 00:10:00
3	A3	2.17	92.00	1.27	0.61	1.33	0.89	0 00:10:00
4	A4	2.17	92.00	1.27	0.61	1.33	0.89	0 00:10:00
5	A5a	2.36	92.00	1.27	0.61	1.44	0.97	0 00:10:00
6	A5b	2.46	92.00	1.27	0.61	1.50	1.01	0 00:10:00
7	A6	2.72	92.00	1.27	0.61	1.66	1.11	0 00:10:00
8	A7	1.72	92.00	1.27	0.61	1.05	0.71	0 00:10:00
9	PRE-DEV	15.11	77.00	1.27	0.12	1.87	0.16	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	BU1	Junction	998.09	1003.05	998.09	0.00	0.00	0.00	1001.36	0.00	1.69	0 00:00	0.00	0.00
2	BU2	Junction	1000.23	1004.23	1000.23	0.00	0.00	0.86	1003.74	0.00	1.49	0 00:00	0.00	0.00
3	J1	Junction	1004.61	1009.61	1004.61	0.00	0.00	0.89	1005.10	0.00	4.51	0 00:00	0.00	0.00
4	J2a	Junction	999.91	1003.24	999.91	0.00	0.00	0.96	1000.43	0.00	2.81	0 00:00	0.00	0.00
5	J2b	Junction	999.94	1002.15	999.94	0.00	0.00	1.00	1000.49	0.00	1.66	0 00:00	0.00	0.00
6	J3	Junction	1005.76	1010.36	1005.76	0.00	0.00	0.89	1006.12	0.00	4.24	0 00:00	0.00	0.00
7	J4	Junction	999.96	1005.68	999.96	0.00	0.00	1.11	1000.53	0.00	5.15	0 00:00	0.00	0.00
8	Jun-23	Junction	0.00	6.00	0.00	6.00	0.00	0.00	998.37	0.00	1.00	0 00:00	0.00	0.00
9	O1	Junction	1009.93	1014.46	1009.93	0.00	0.00	0.00	1009.93	0.00	4.53	0 00:00	0.00	0.00
10	O2	Junction	1008.31	1011.81	1008.31	0.00	0.00	0.00	1008.31	0.00	3.50	0 00:00	0.00	0.00
11	O4	Junction	999.79	1003.29	999.79	0.00	0.00	0.16	1000.43	0.00	2.86	0 00:00	0.00	0.00
12	O5	Junction	997.80	1003.05	997.80	0.00	0.00	0.00	998.10	0.00	4.95	0 00:00	0.00	0.00
13	SDMH1	Junction	1003.49	1009.45	1003.49	0.00	0.00	0.88	1005.06	0.00	4.39	0 00:00	0.00	0.00
14	SDMH2	Junction	1001.24	1005.72	1001.24	6.00	0.00	0.87	1001.70	0.00	4.02	0 00:00	0.00	0.00
15	SDMH3	Junction	1001.57	1006.27	1001.57	6.00	0.00	0.86	1002.02	0.00	4.25	0 00:00	0.00	0.00
16	SDMH4	Junction	997.69	1002.76	997.69	0.00	0.00	0.00	997.79	0.00	4.97	0 00:00	0.00	0.00
17	OUT1	Outfall	997.37					0.00	997.37					
18	WASH-PRE	Outfall	998.73					0.16	998.73					
19	BR1	Storage Node	1011.40	1014.46	0.00		0.00	0.92	1013.38				0.00	0.00
20	BR2	Storage Node	1009.68	1012.74	0.00		0.00	0.90	1011.30				0.00	0.00
21	BR3	Storage Node	998.80	1001.86	0.00		0.00	1.96	999.94				0.00	0.00
22	BR4	Storage Node	1001.17	1004.23	0.00		0.00	1.54	1003.33				0.00	0.00
23	BR5	Storage Node	998.80	1003.05	0.00		0.00	1.95	998.88				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	P1	Pipe	O1	SDMH1	383.00	1009.93	1004.57	1.4000	12.000	0.0130	0.00	4.21	0.00	0.00	0.00	0.00	0.00	Calculated
2	P10	Pipe	O4	J4	70.00	1000.23	1000.06	0.2400	12.000	0.0130	0.16	1.76	0.09	1.38	0.20	0.20	0.00	Calculated
3	P11	Pipe	J4	BR5	40.00	999.96	999.86	0.2500	12.000	0.0130	1.10	1.78	0.62	2.40	0.57	0.57	0.00	Calculated
4	P12	Pipe	O5	SDMH4	125.00	998.10	997.79	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
5	P13	Pipe	SDMH4	OUT1	130.00	997.69	997.37	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
6	P2	Pipe	J1	SDMH1	15.00	1004.61	1004.57	0.2700	12.000	0.0130	0.88	1.84	0.48	2.32	0.49	0.49	0.00	Calculated
7	P3	Pipe	SDMH1	SDMH2	408.00	1004.47	1001.34	0.7700	12.000	0.0130	0.87	3.12	0.28	3.44	0.36	0.36	0.00	Calculated
8	P4	Pipe	SDMH2	BR5	79.00	1001.24	999.86	1.7500	12.000	0.0130	0.87	4.71	0.18	4.57	0.28	0.29	0.00	Calculated
9	P5a	Pipe	J2a	BR3	20.00	999.91	999.86	0.2500	12.000	0.0130	0.96	1.78	0.54	2.31	0.52	0.52	0.00	Calculated
10	P5b	Pipe	J2b	BR3	34.00	999.94	999.86	0.2400	12.000	0.0130	1.00	1.73	0.58	2.28	0.55	0.55	0.00	Calculated
11	P6	Pipe	Jun-23	BU1	113.00	998.37	998.09	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
12	P7	Pipe	O2	J3	157.00	1006.25	1005.86	0.2500	12.000	0.0153	0.00	3.78	0.00	0.00	0.00	0.00	0.00	Calculated
13	P8	Pipe	J3	SDMH3	492.00	1005.76	1001.67	0.8300	12.000	0.0130	0.86	3.25	0.27	3.55	0.35	0.35	0.00	Calculated
14	P9	Pipe	SDMH3	BU2	45.00	1001.57	1000.23	2.9800	12.000	0.0130	0.86	6.15	0.14	5.52	0.25	0.25	0.00	Calculated
15	OC1	Channel	BU2	BR4	6.42	1003.73	1001.17	39.8800	18.000	0.0010	0.86	3485.71	0.00	0.00	0.01	0.01	0.00	
16	OC2	Channel	BU1	BR5	1.00	1001.36	998.80	256.0000	18.000	0.0010	0.00	5074.12	0.00	0.00	0.00	0.00	0.00	
17	O4	Orifice	BR4	O4		1001.17	999.79		24.000		0.16							
18	OR1	Orifice	BR1	O1		1011.40	1009.93		24.000		0.00							
19	OR2	Orifice	BR2	O2		1009.68	1008.31		24.000		0.00							
20	OR3	Orifice	BR3	Jun-23		998.80	0.00		24.000		0.00							
21	OR5	Orifice	BR5	O5		998.80	997.80		24.000		0.00							

Subbasin Hydrology

Subbasin : A01

Input Data

Area (ac) 2.26
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.48	B	92.00
Composite Area & Weighted CN	1.48		92.00

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 :

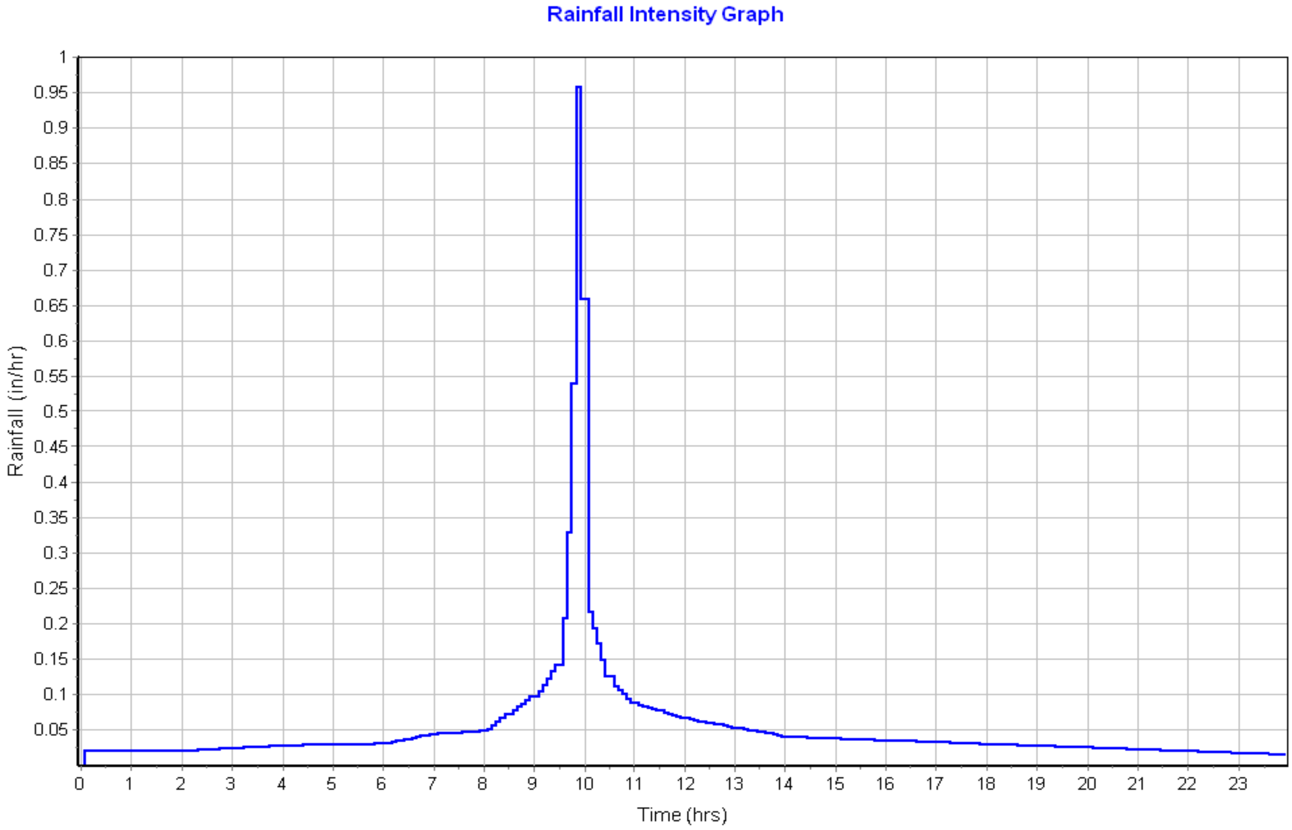
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

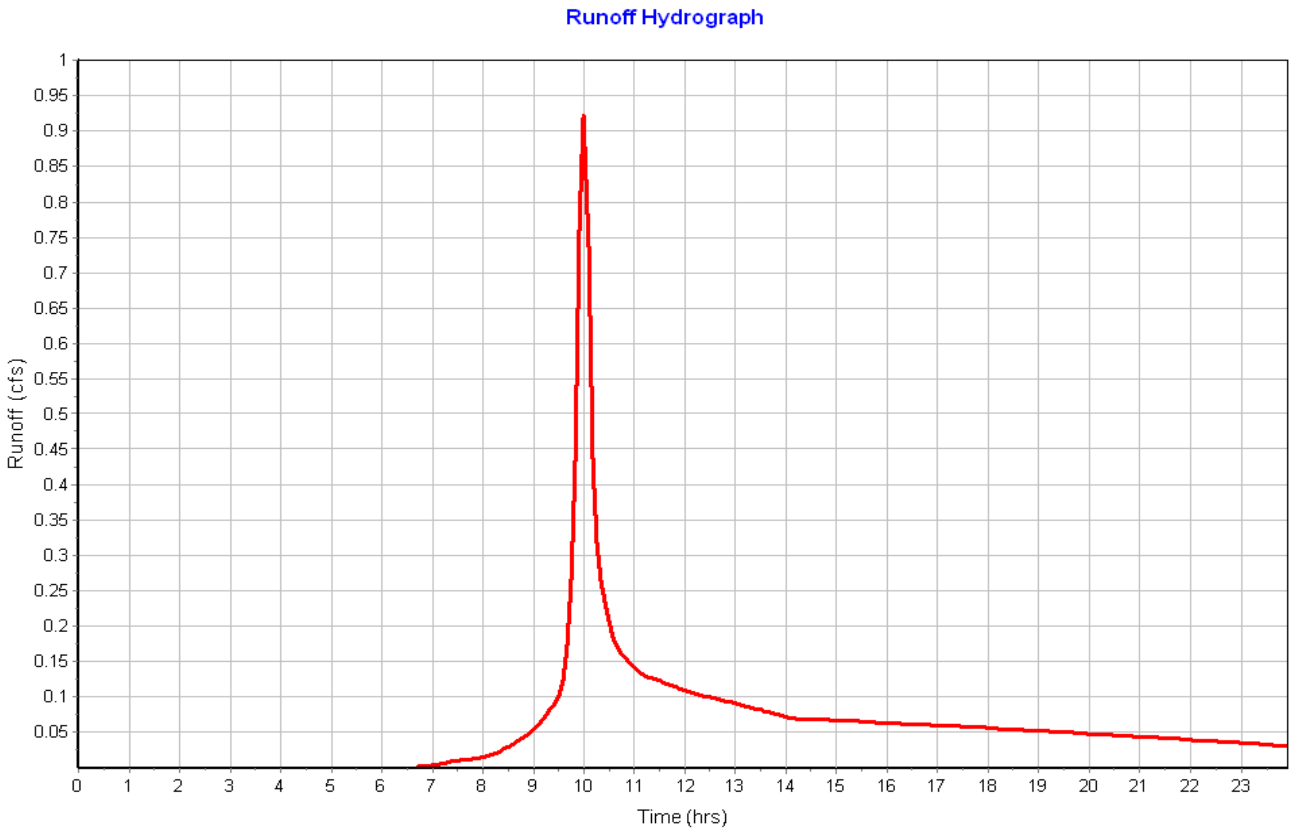
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 0.93
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A01





Subbasin : A02

Input Data

Area (ac) 2.21
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.21	B	92.00
Composite Area & Weighted CN	2.21		92.00

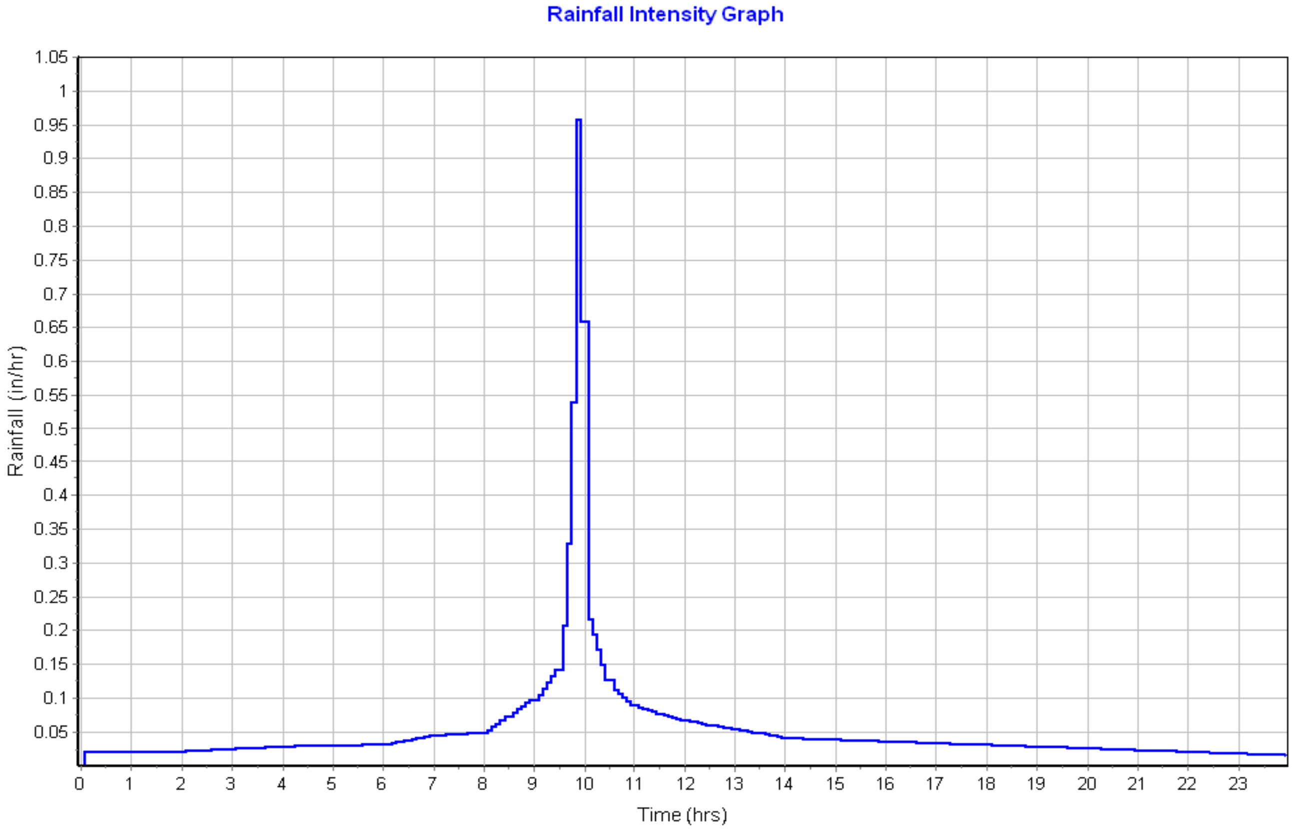
Time of Concentration

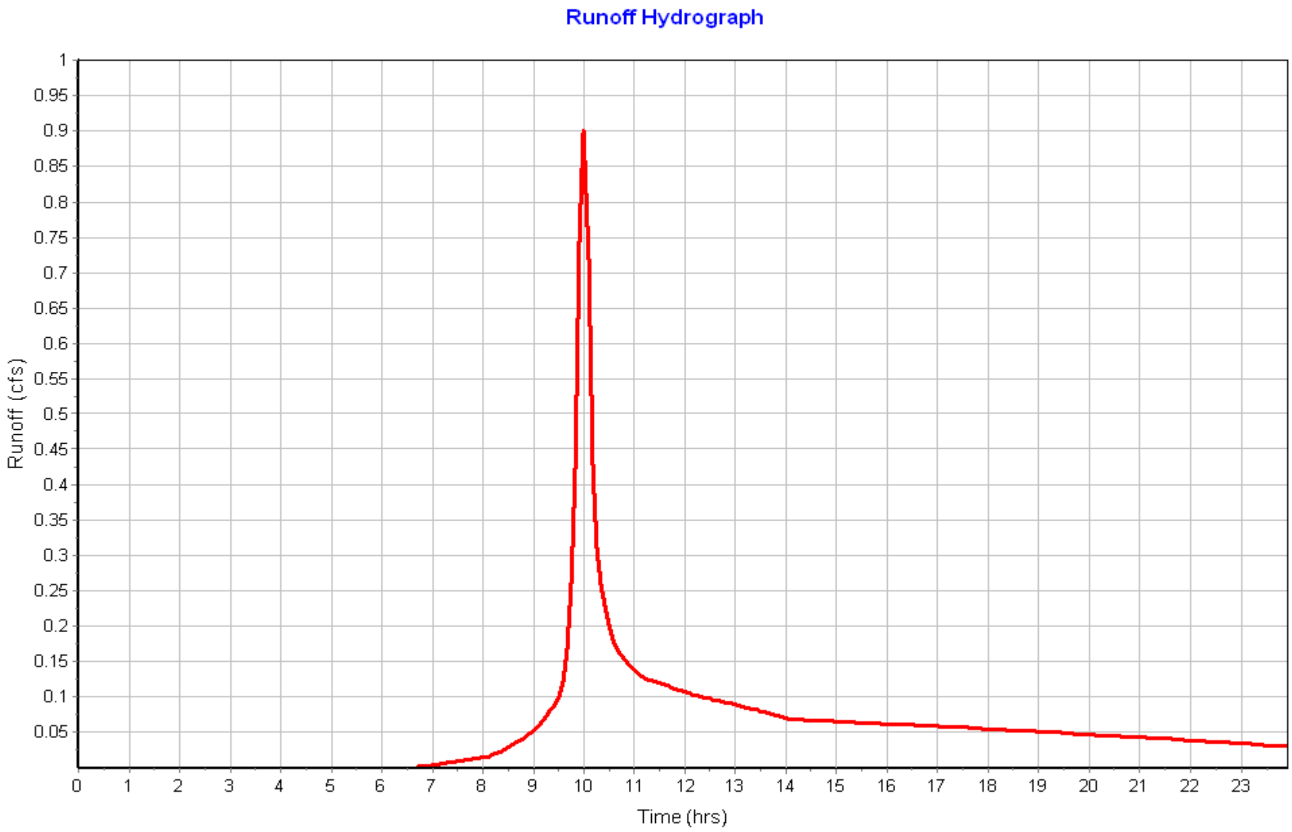
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 0.90
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A02





Subbasin : A3

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

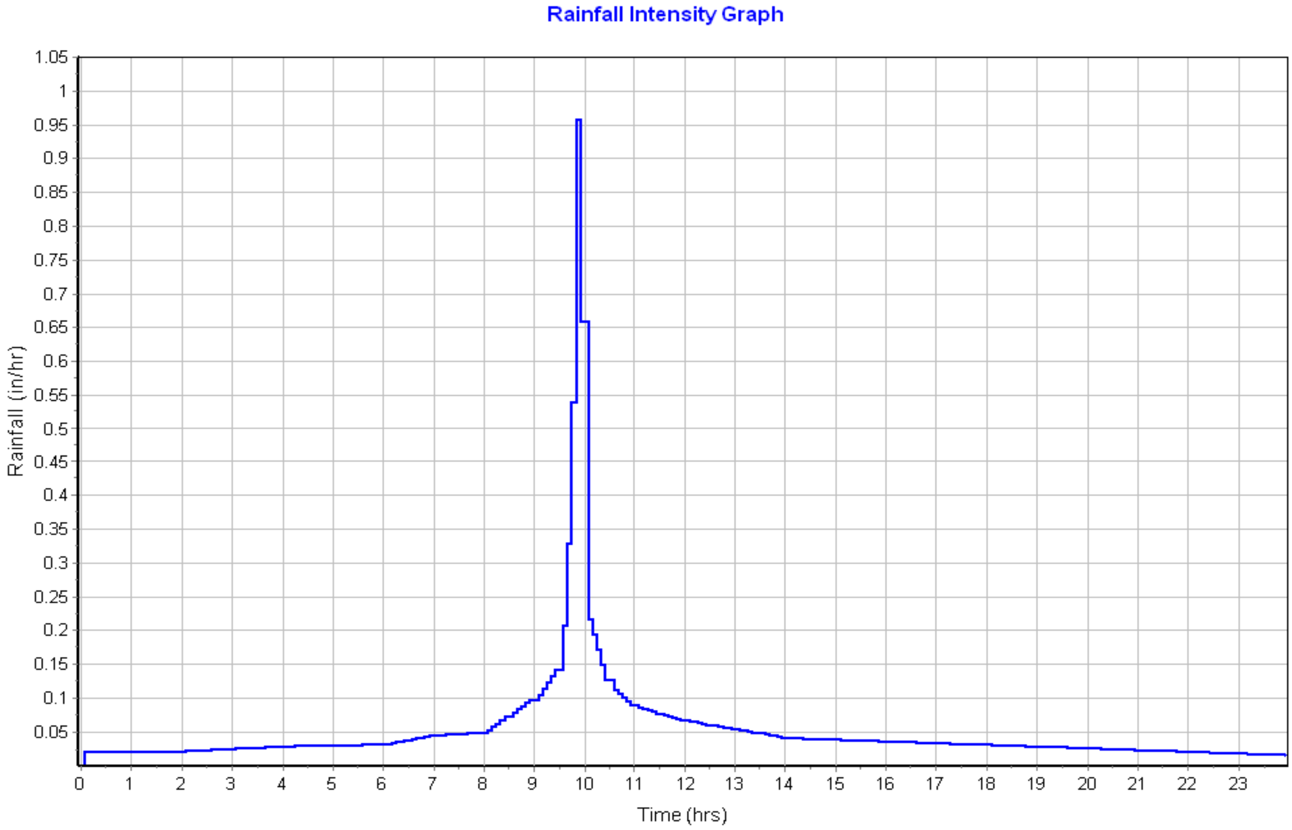
Time of Concentration

User-Defined TOC override (minutes): 10

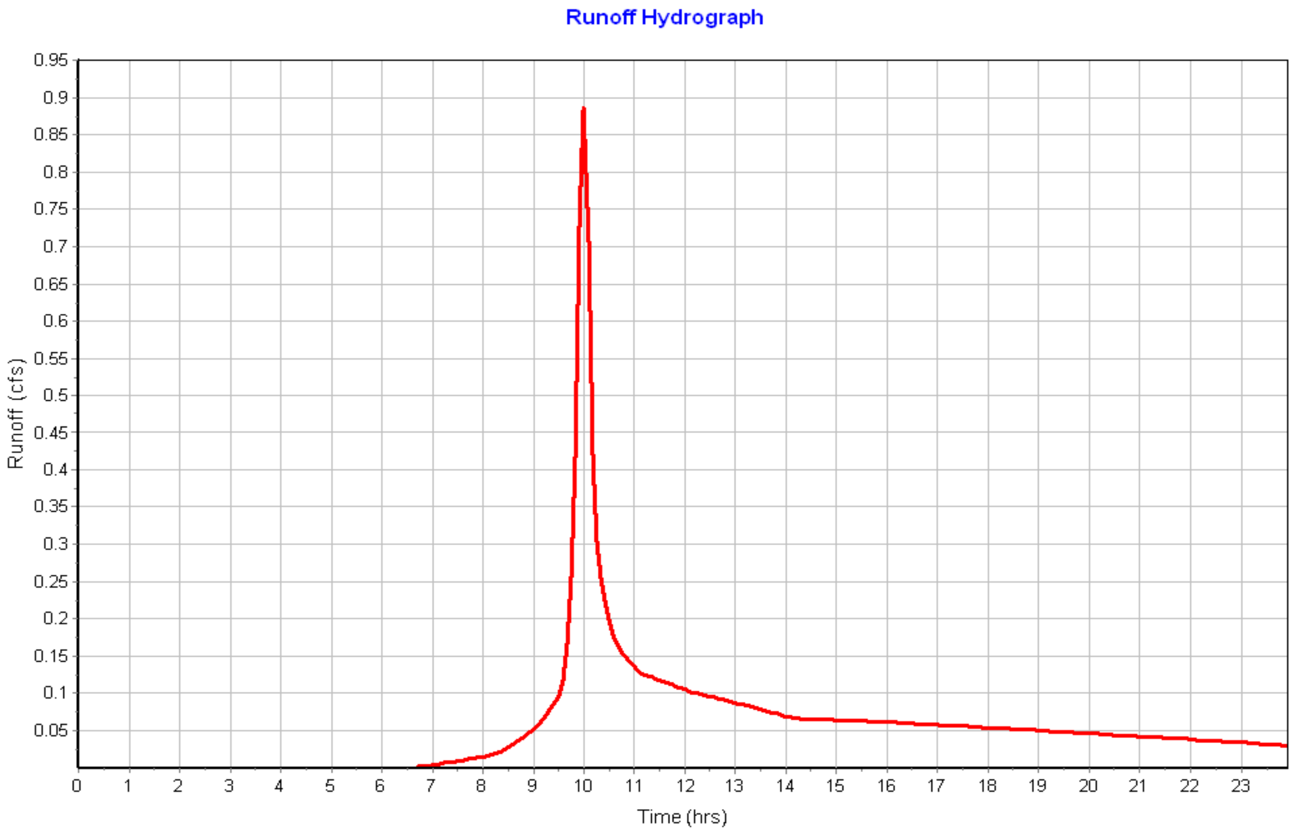
Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 0.89
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A3



Rainfall Intensity Graph
Rainfall (in/hr)
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A4

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

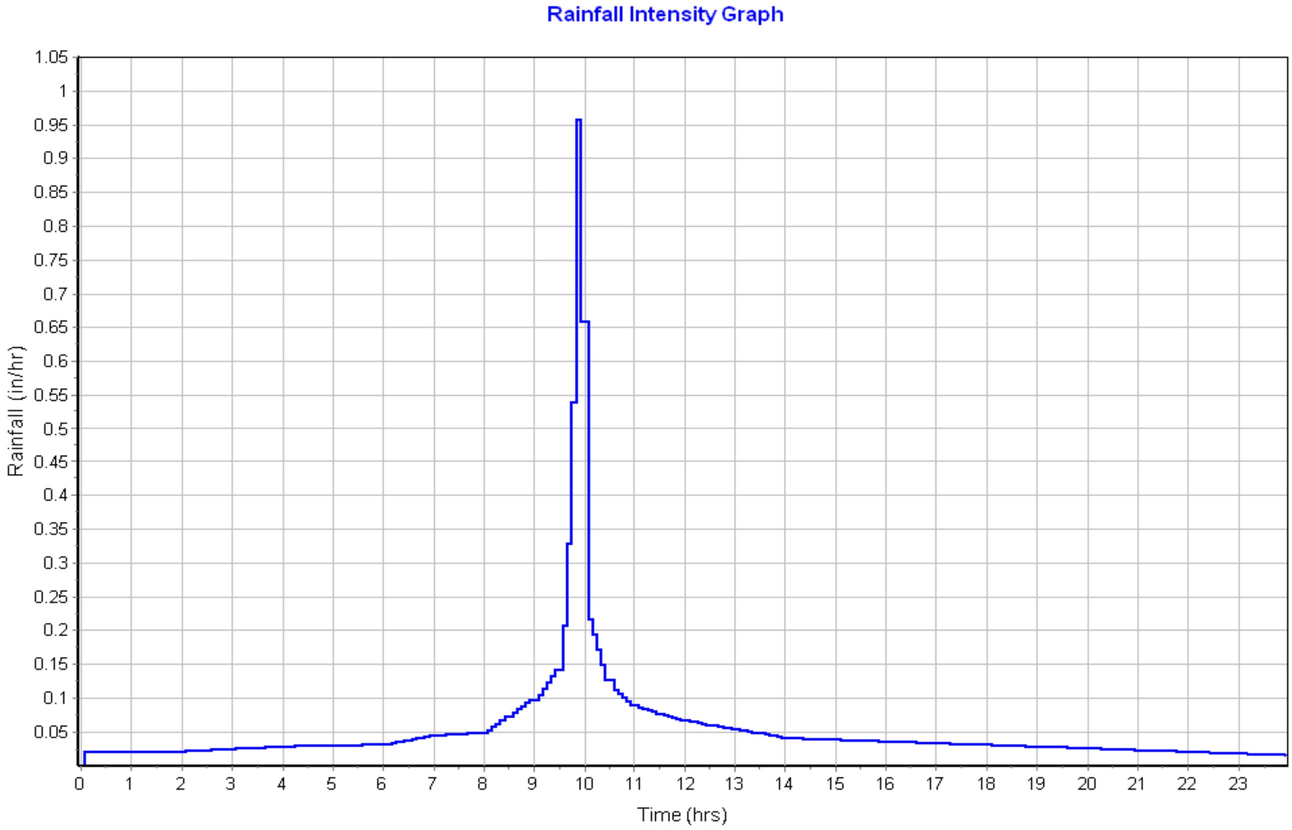
Time of Concentration

User-Defined TOC override (minutes): 10

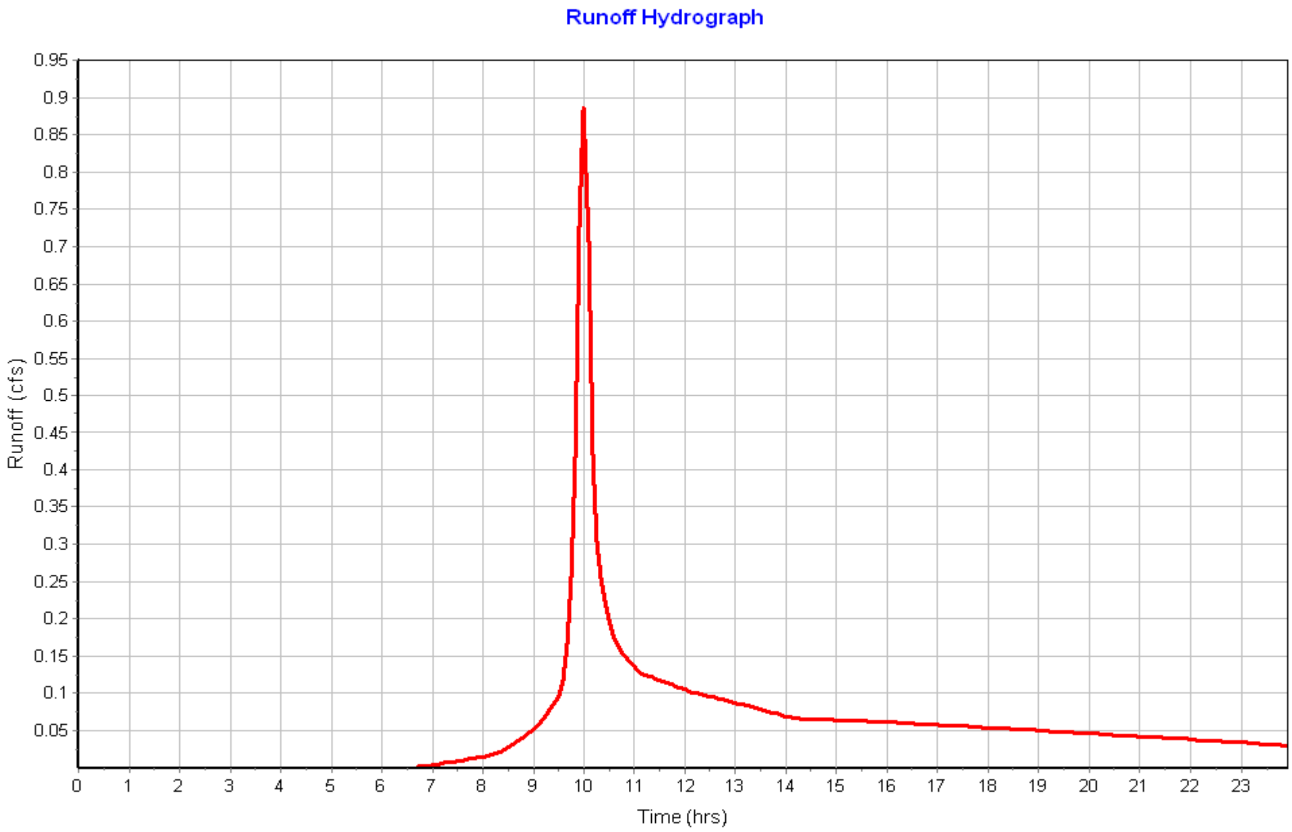
Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 0.89
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A4



Rainfall Intensity Graph
Rainfall (in/hr)
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A5a

Input Data

Area (ac) 2.36
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.66	B	92.00
Composite Area & Weighted CN	1.66		92.00

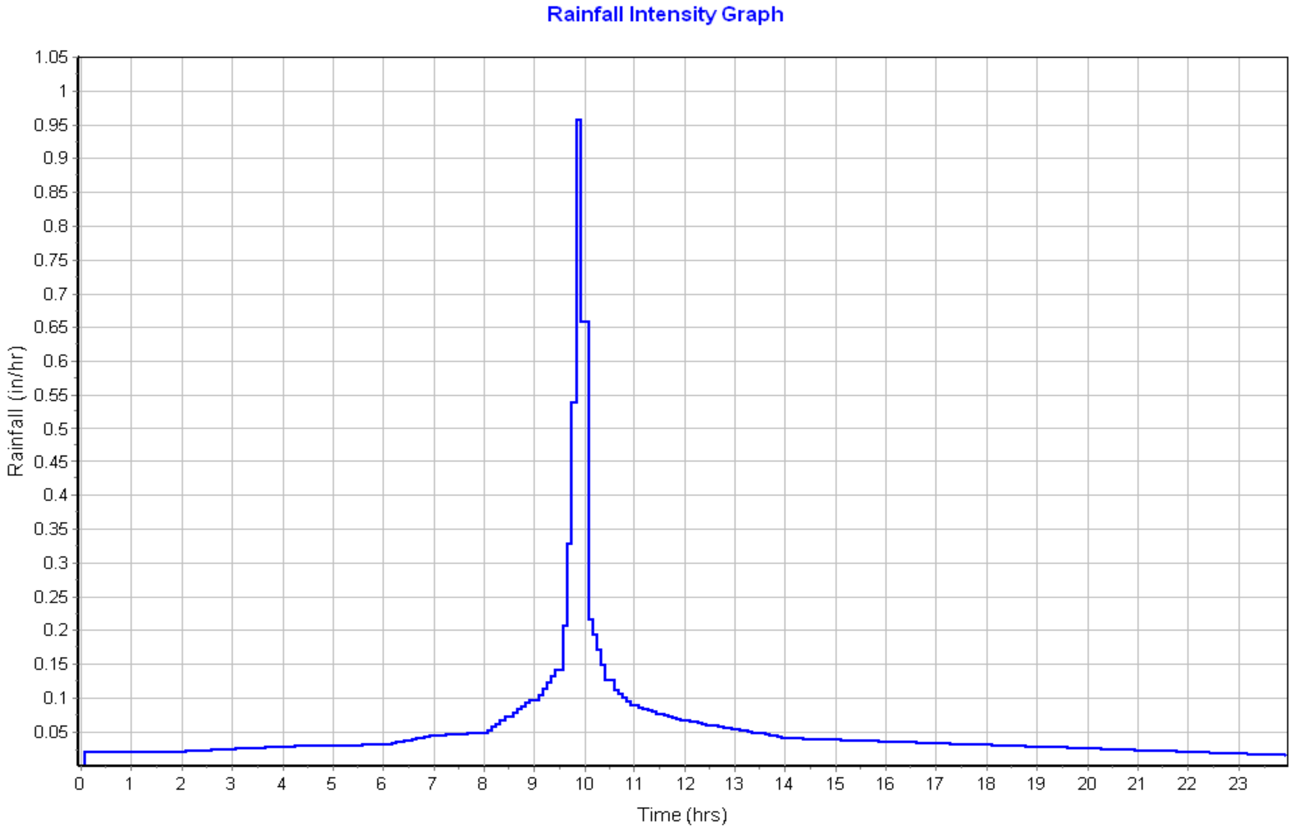
Time of Concentration

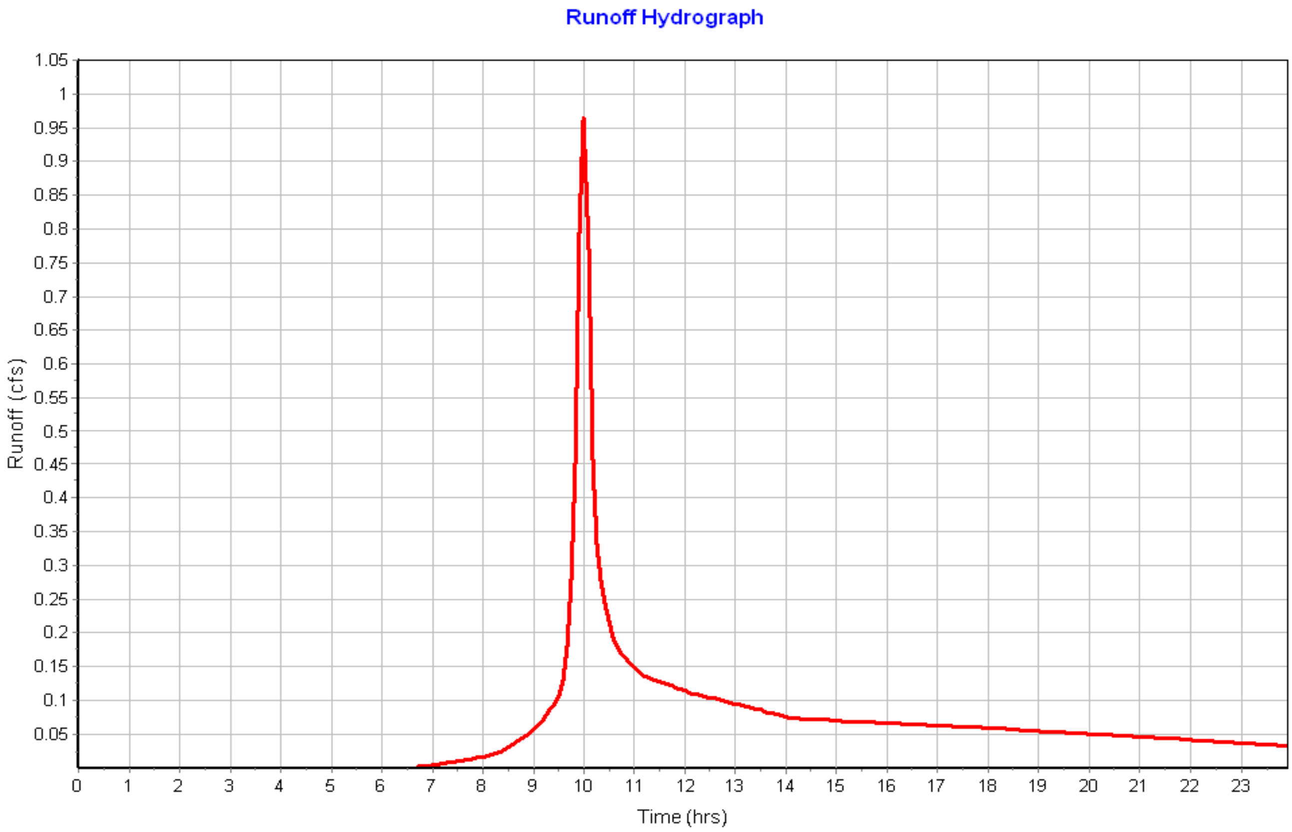
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 0.97
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5a





Subbasin : A5b

Input Data

Area (ac) 2.46
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.46	B	92.00
Composite Area & Weighted CN	2.46		92.00

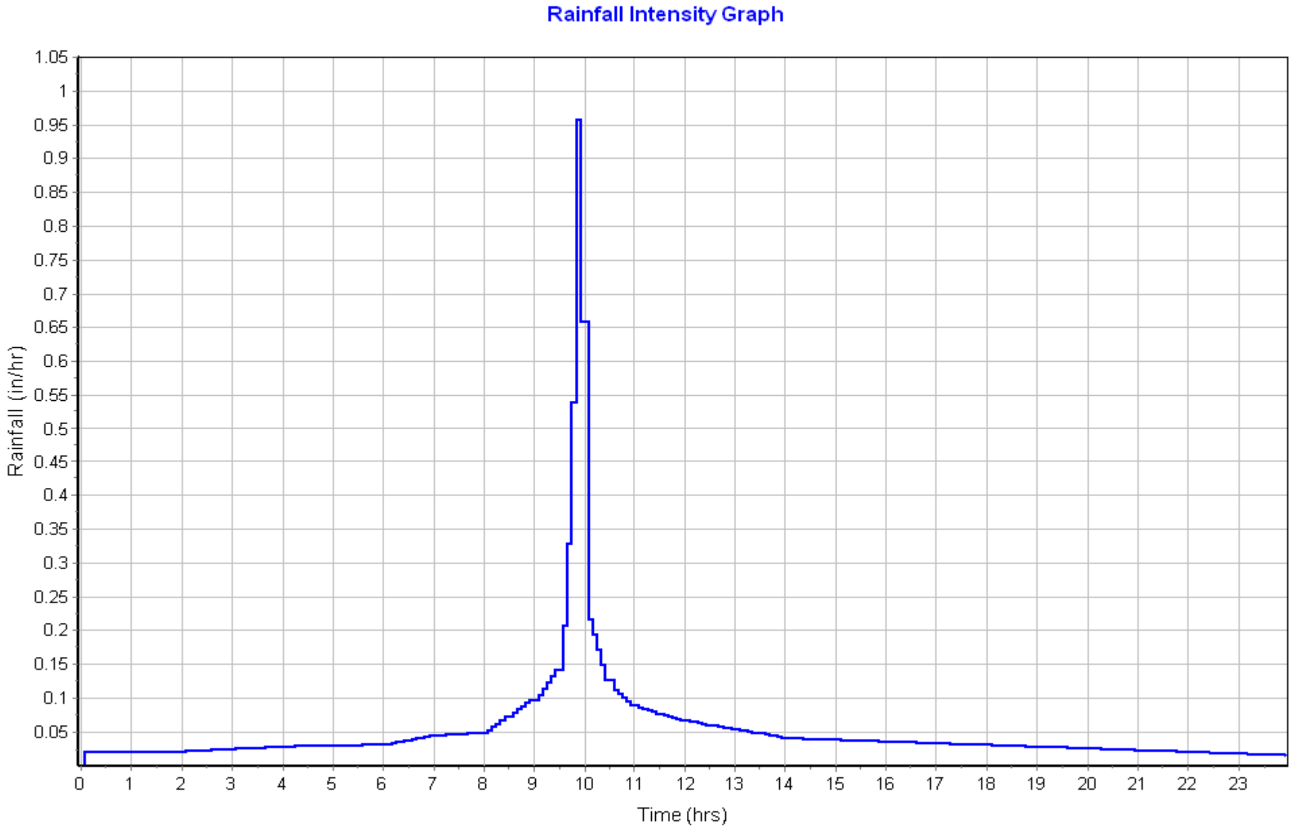
Time of Concentration

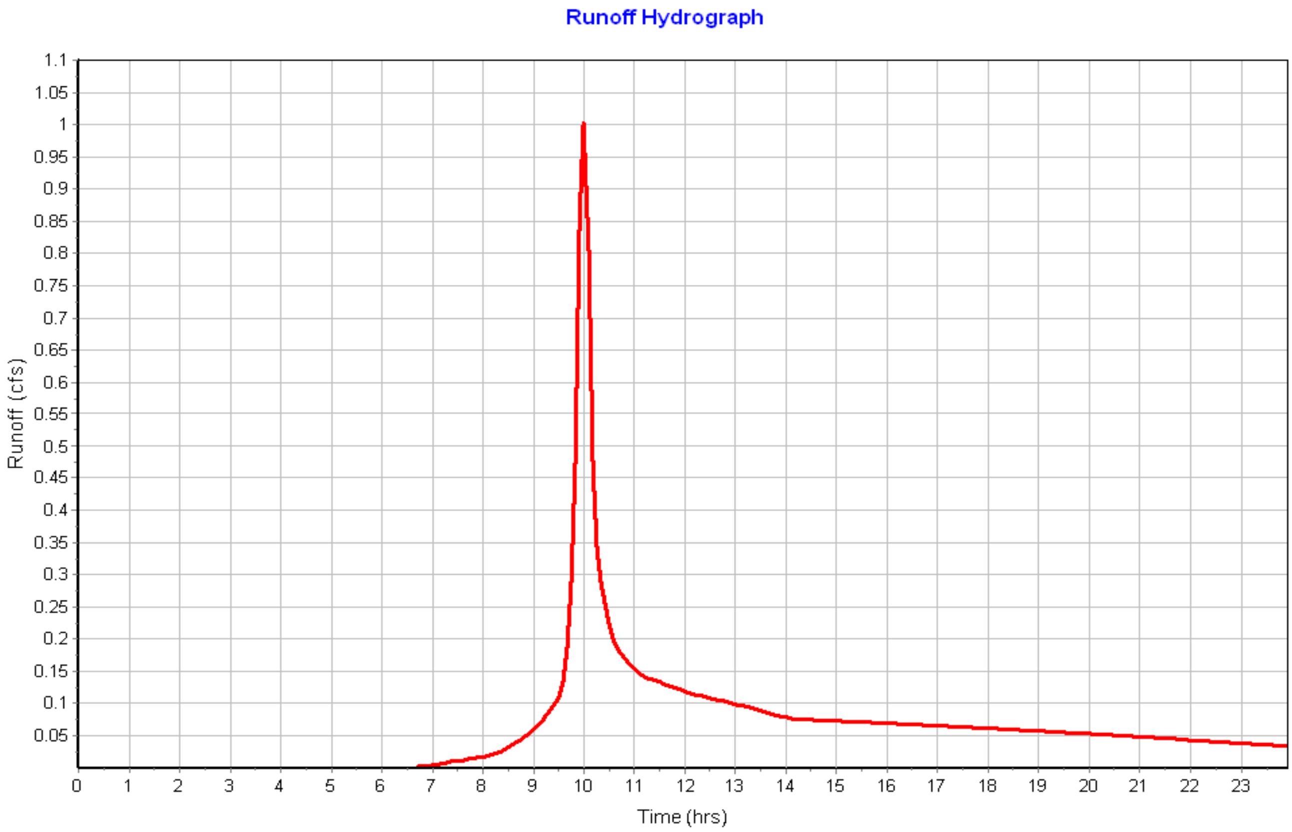
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 1.01
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5b





Subbasin : A6

Input Data

Area (ac) 2.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.65	B	92.00
Composite Area & Weighted CN	1.65		92.00

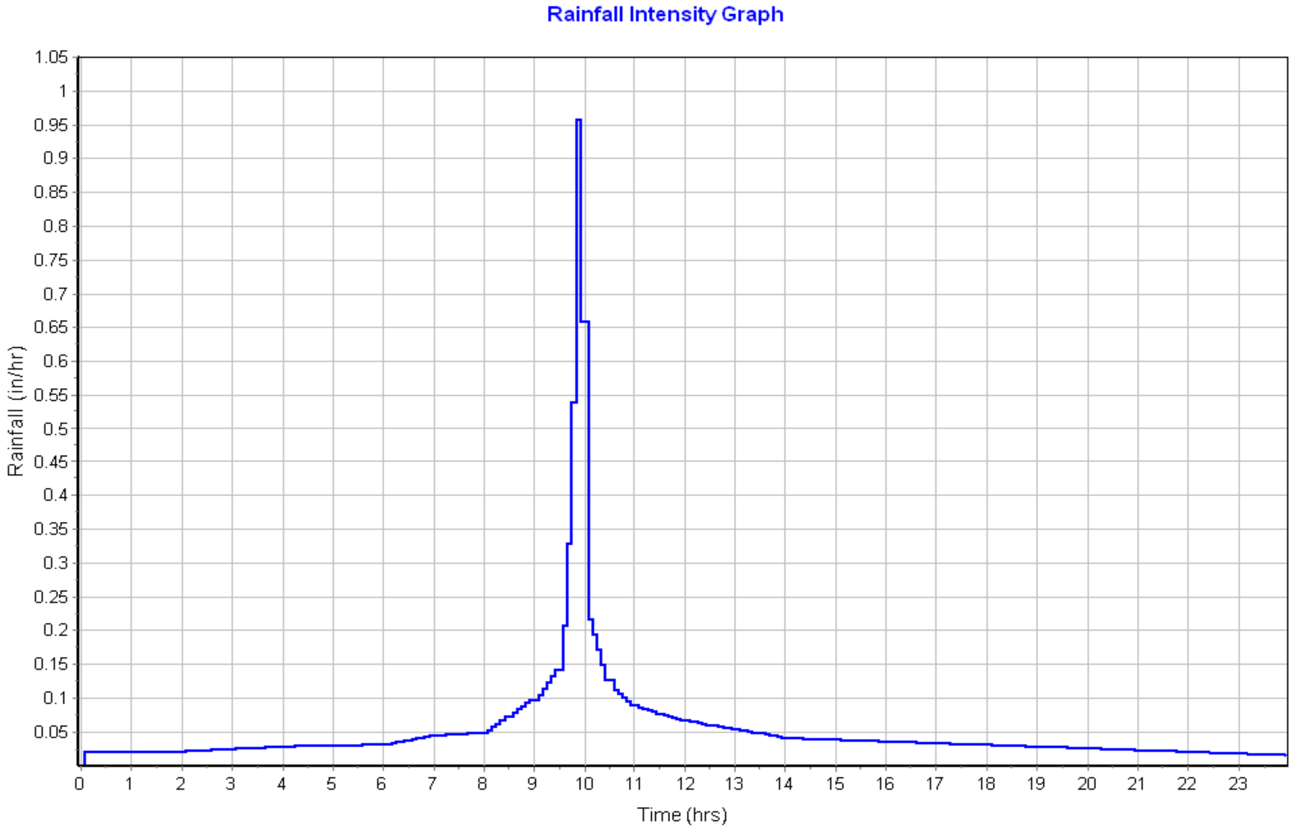
Time of Concentration

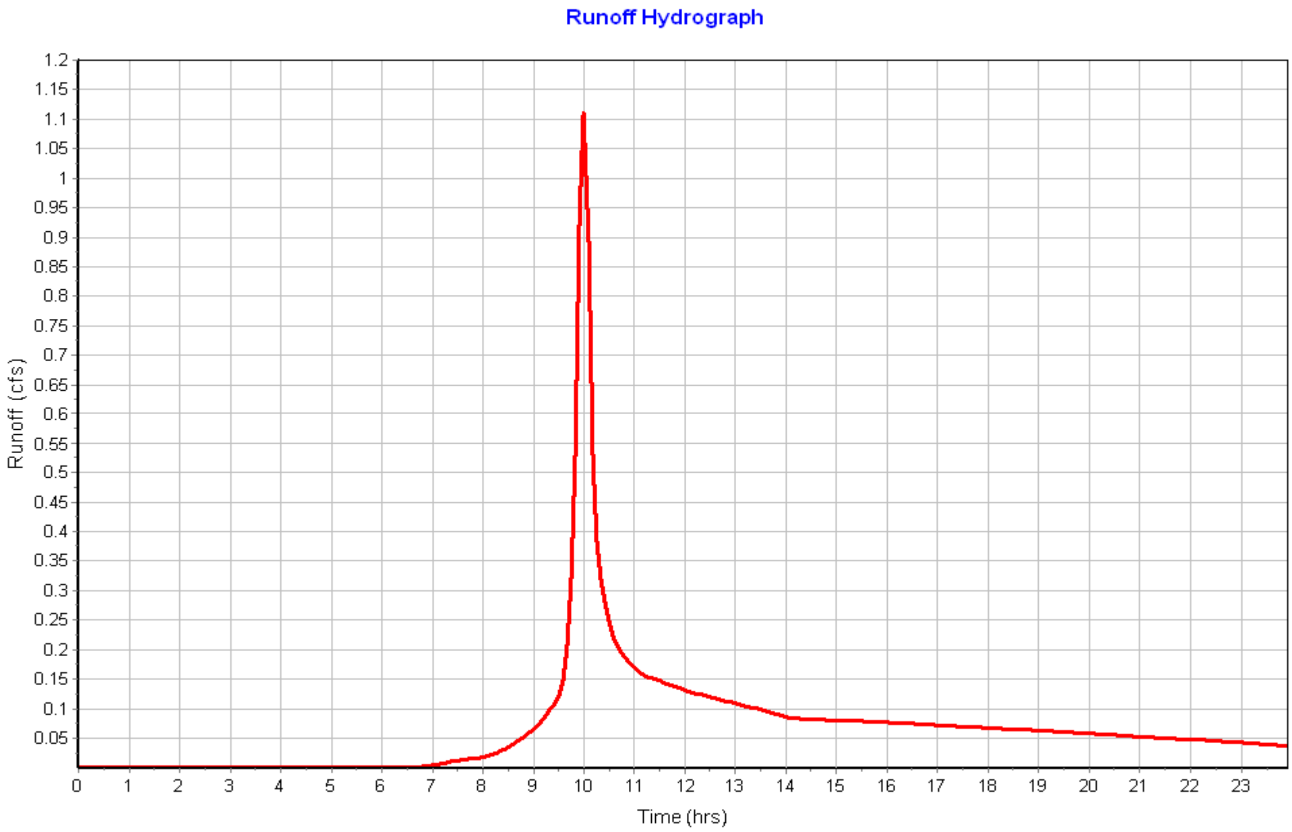
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 1.11
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A6


Rainfall Intensity Graph
Rainfall (in/hr)
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A7

Input Data

Area (ac) 1.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.30	B	92.00
Composite Area & Weighted CN	1.30		92.00

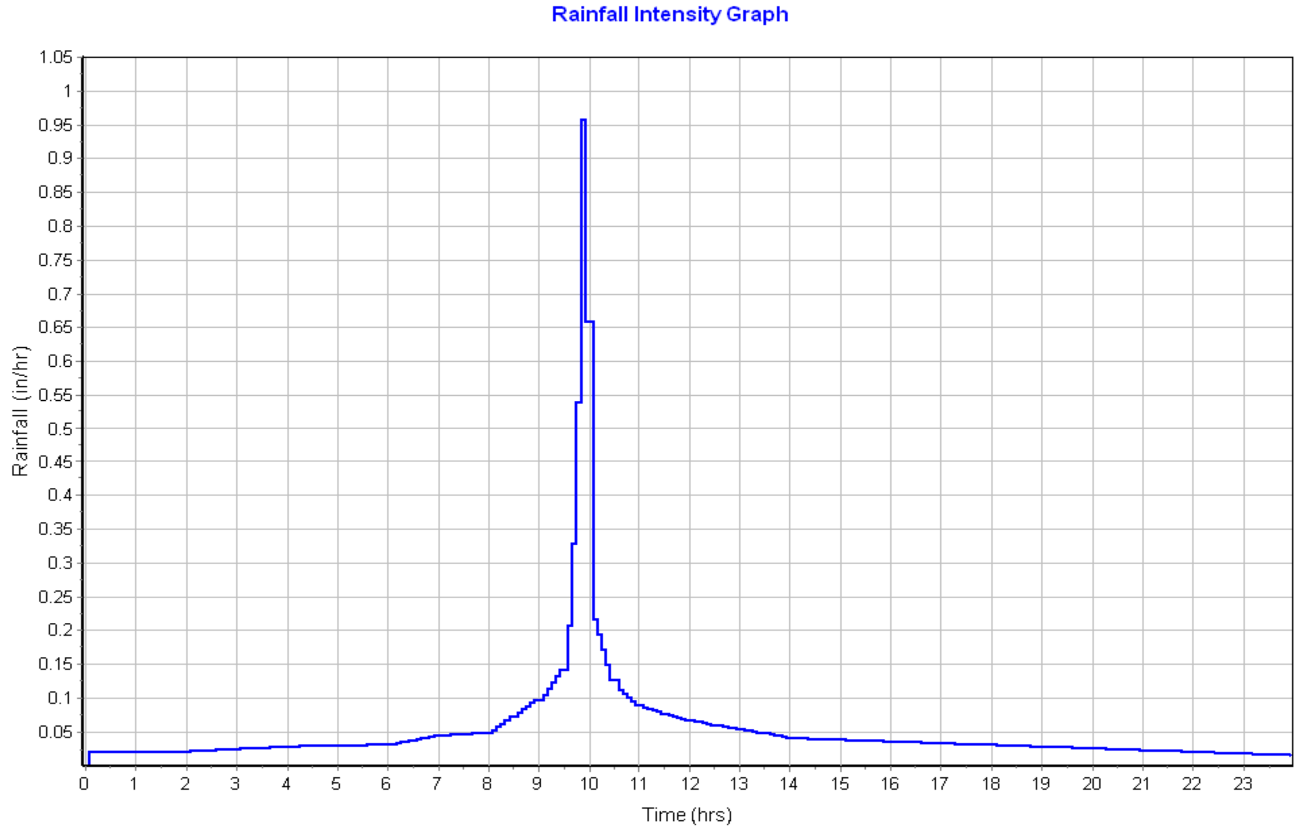
Time of Concentration

User-Defined TOC override (minutes): 10

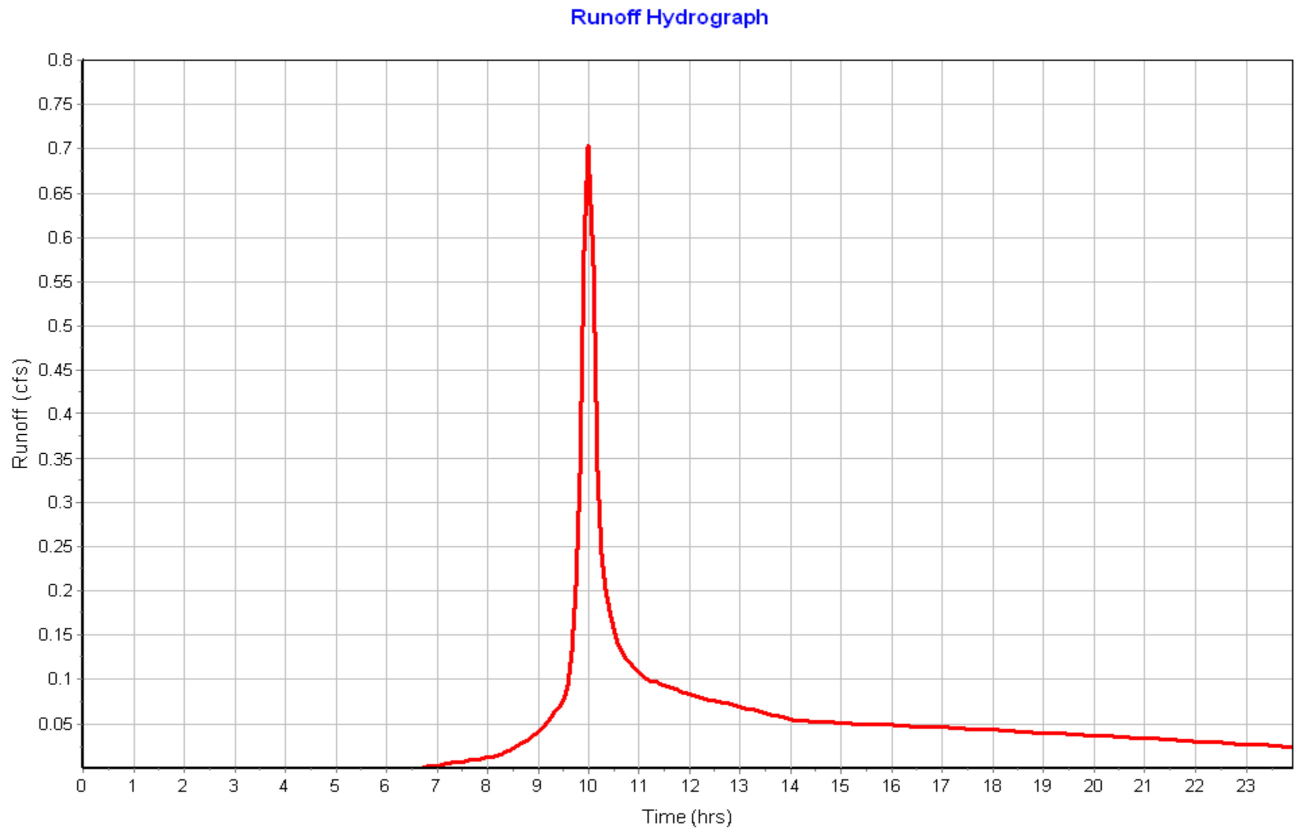
Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.61
Peak Runoff (cfs) 0.71
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A7



Rainfall Intensity Graph
Rainfall (in/hr)
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : PRE-DEV

Input Data

Area (ac) 15.11
Weighted Curve Number 77.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	15.11	B	77.00
Composite Area & Weighted CN	15.11		77.00

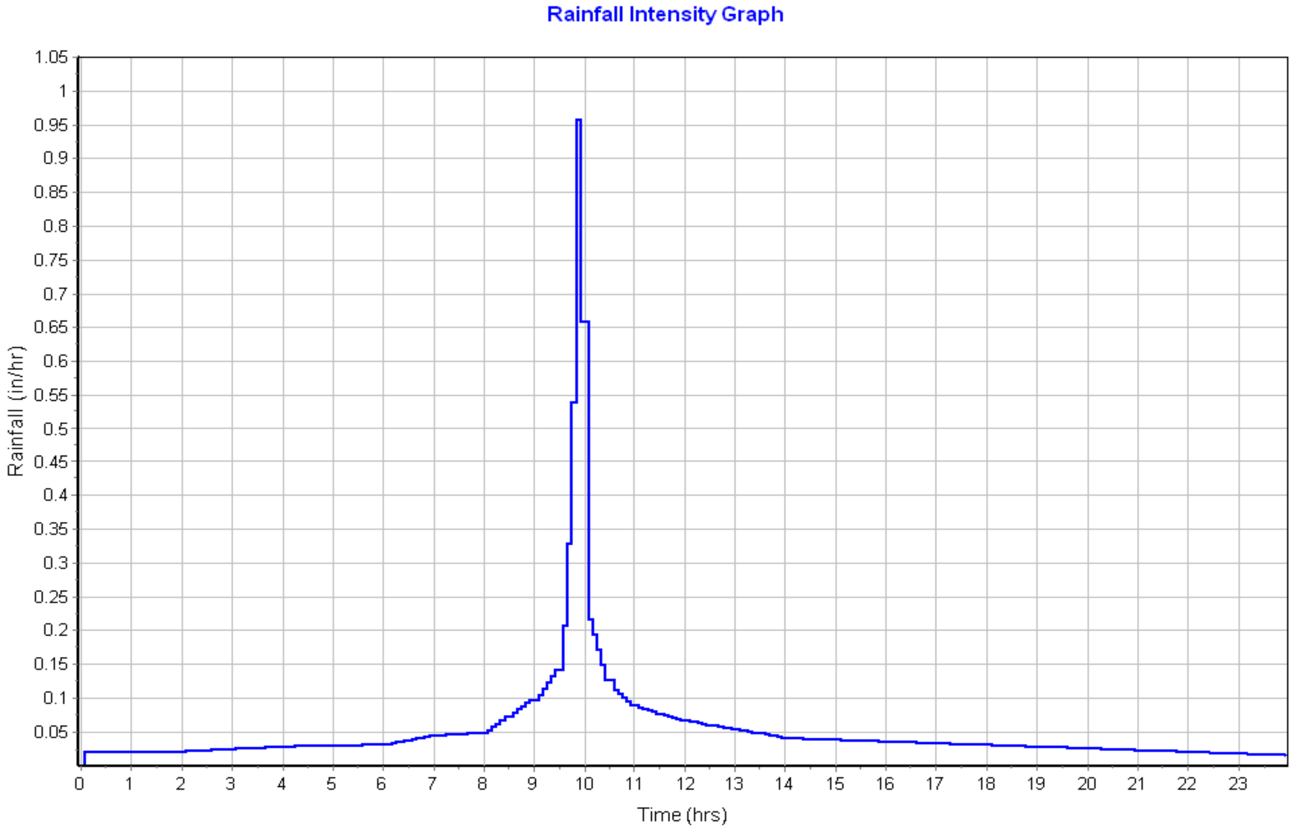
Time of Concentration

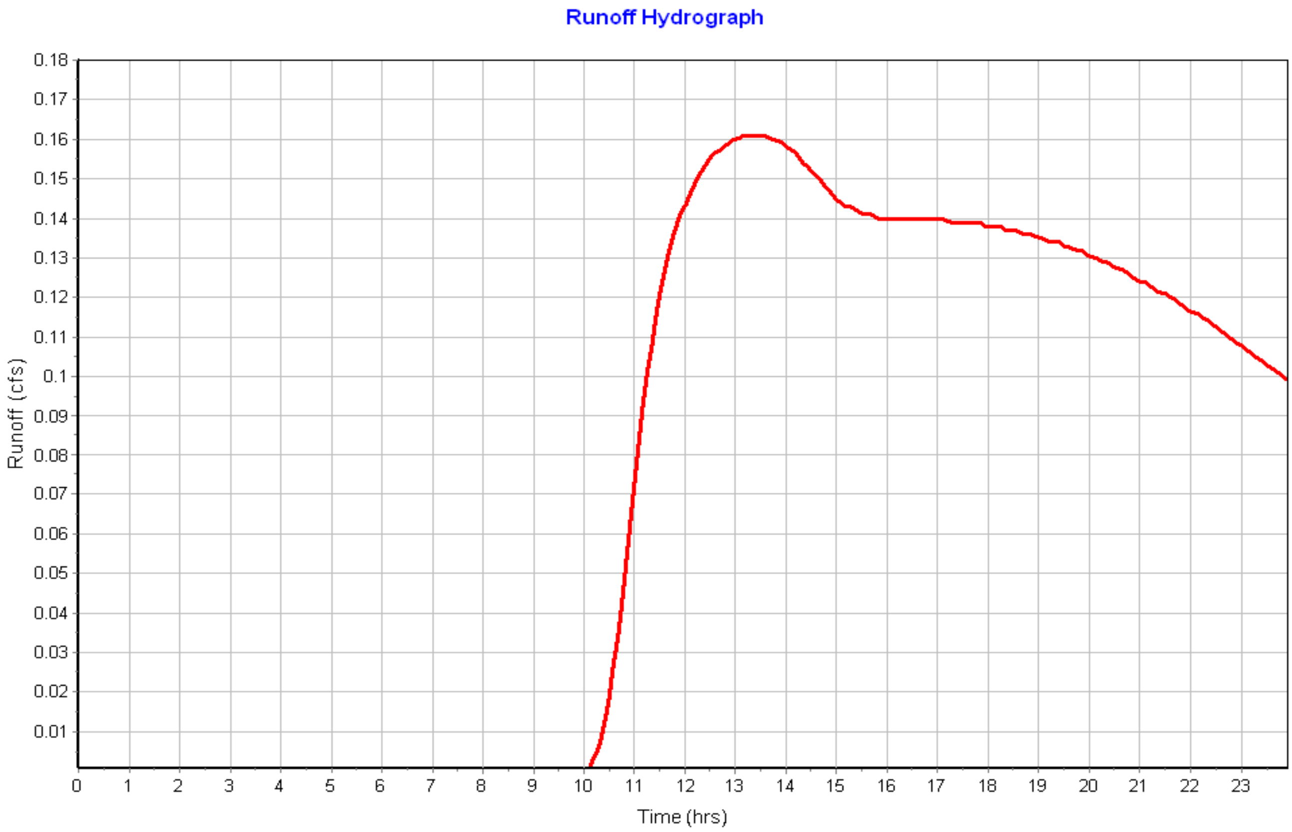
User-Defined TOC override (minutes): 100

Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.12
Peak Runoff (cfs) 0.16
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : PRE-DEV





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	BU1	998.09	1003.05	4.96	998.09	0.00	0.00	-1003.05	0.00	0.00
2	BU2	1000.23	1004.23	4.00	1000.23	0.00	0.00	-1004.23	0.00	0.00
3	J1	1004.61	1009.61	5.00	1004.61	0.00	0.00	-1009.61	0.00	0.00
4	J2a	999.91	1003.24	3.33	999.91	0.00	0.00	-1003.24	0.00	0.00
5	J2b	999.94	1002.15	2.21	999.94	0.00	0.00	-1002.15	0.00	0.00
6	J3	1005.76	1010.36	4.60	1005.76	0.00	0.00	-1010.36	0.00	0.00
7	J4	999.96	1005.68	5.72	999.96	0.00	0.00	-1005.68	0.00	0.00
8	Jun-23	0.00	6.00	6.00	0.00	0.00	6.00	0.00	0.00	0.00
9	O1	1009.93	1014.46	4.53	1009.93	0.00	0.00	-1014.46	0.00	0.00
10	O2	1008.31	1011.81	3.50	1008.31	0.00	0.00	-1011.81	0.00	0.00
11	O4	999.79	1003.29	3.50	999.79	0.00	0.00	-1003.29	0.00	0.00
12	O5	997.80	1003.05	5.25	997.80	0.00	0.00	-1003.05	0.00	0.00
13	SDMH1	1003.49	1009.45	5.96	1003.49	0.00	0.00	-1009.45	0.00	0.00
14	SDMH2	1001.24	1005.72	4.48	1001.24	0.00	6.00	-999.72	0.00	0.00
15	SDMH3	1001.57	1006.27	4.70	1001.57	0.00	6.00	-1000.27	0.00	0.00
16	SDMH4	997.69	1002.76	5.07	997.69	0.00	0.00	-1002.76	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	BU1	0.00	0.00	1001.36	3.27	0.00	1.69	1001.36	3.27	0 00:00	0 00:00	0.00	0.00
2	BU2	0.86	0.00	1003.74	3.51	0.00	1.49	1003.73	3.50	0 10:06	0 00:00	0.00	0.00
3	J1	0.89	0.89	1005.10	0.49	0.00	4.51	1004.70	0.09	0 10:05	0 00:00	0.00	0.00
4	J2a	0.96	0.96	1000.43	0.52	0.00	2.81	1000.01	0.10	0 10:05	0 00:00	0.00	0.00
5	J2b	1.00	1.00	1000.49	0.55	0.00	1.66	1000.04	0.10	0 10:05	0 00:00	0.00	0.00
6	J3	0.89	0.89	1006.12	0.36	0.00	4.24	1005.87	0.11	0 10:05	0 00:00	0.00	0.00
7	J4	1.11	1.11	1000.53	0.57	0.00	5.15	1000.12	0.16	0 10:05	0 00:00	0.00	0.00
8	Jun-23	0.00	0.00	998.37	998.37	0.00	1.00	998.37	998.37	0 00:00	0 00:00	0.00	0.00
9	O1	0.00	0.00	1009.93	0.00	0.00	4.53	1009.93	0.00	0 00:00	0 00:00	0.00	0.00
10	O2	0.00	0.00	1008.31	0.00	0.00	3.50	1008.31	0.00	0 00:00	0 00:00	0.00	0.00
11	O4	0.16	0.00	1000.43	0.64	0.00	2.86	1000.28	0.49	0 11:16	0 00:00	0.00	0.00
12	O5	0.00	0.00	998.10	0.30	0.00	4.95	998.10	0.30	0 00:00	0 00:00	0.00	0.00
13	SDMH1	0.88	0.00	1005.06	1.57	0.00	4.39	1004.66	1.17	0 10:05	0 00:00	0.00	0.00
14	SDMH2	0.87	0.00	1001.70	0.46	0.00	4.02	1001.41	0.17	0 10:06	0 00:00	0.00	0.00
15	SDMH3	0.86	0.00	1002.02	0.45	0.00	4.25	1001.74	0.17	0 10:06	0 00:00	0.00	0.00
16	SDMH4	0.00	0.00	997.79	0.10	0.00	4.97	997.79	0.10	0 00:00	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	OC1	6.42	1003.73	3.50	1001.17	0.00	2.56	39.8800	Rectangular	1.500	3.000	0.0010	0.5000	0.5000	0.0000	0.00	No
2	OC2	1.00	1001.36	3.27	998.80	0.00	2.56	256.0000	Rectangular	1.500	2.000	0.0010	0.5000	0.5000	0.0000	0.00	No

Channel 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	OC1	0.86	0 10:06	3485.71	0.00	0.00		0.01	0.01	0.00		
2	OC2	0.00	0 00:00	5074.12	0.00	0.00		0.00	0.00	0.00		

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate	No. of Barrels
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)		
1	P1	383.00	1009.93	0.00	1004.57	1.08	5.36	1.4000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	P10	70.00	1000.23	0.44	1000.06	0.10	0.17	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	P11	40.00	999.96	0.00	999.86	1.06	0.10	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	P12	125.00	998.10	0.30	997.79	0.10	0.31	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	P13	130.00	997.69	0.00	997.37	0.00	0.32	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	P2	15.00	1004.61	0.00	1004.57	1.08	0.04	0.2700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	P3	408.00	1004.47	0.98	1001.34	0.10	3.13	0.7700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	P4	79.00	1001.24	0.00	999.86	1.06	1.38	1.7500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	P5a	20.00	999.91	0.00	999.86	1.06	0.05	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	P5b	34.00	999.94	0.00	999.86	1.06	0.08	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	P6	113.00	998.37	998.37	998.09	0.00	0.28	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	P7	157.00	1006.25	-2.06	1005.86	0.10	0.39	0.2500	CIRCULAR	12.000	12.000	0.0153	0.5000	0.5000	0.0000	0.00	No	1
13	P8	492.00	1005.76	0.00	1001.67	0.10	4.09	0.8300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	P9	45.00	1001.57	0.00	1000.23	0.00	1.34	2.9800	CIRCULAR	12.000	12.000	0.0130	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	P1	0.00	0 00:00	4.21	0.00	0.00		0.00	0.00	0.00		Calculated
2	P10	0.16	0 11:17	1.76	0.09	1.38	0.85	0.20	0.20	0.00		Calculated
3	P11	1.10	0 10:05	1.78	0.62	2.40	0.28	0.57	0.57	0.00		Calculated
4	P12	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
5	P13	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
6	P2	0.88	0 10:05	1.84	0.48	2.32	0.11	0.49	0.49	0.00		Calculated
7	P3	0.87	0 10:06	3.12	0.28	3.44	1.98	0.36	0.36	0.00		Calculated
8	P4	0.87	0 10:06	4.71	0.18	4.57	0.29	0.28	0.29	0.00		Calculated
9	P5a	0.96	0 10:05	1.78	0.54	2.31	0.14	0.52	0.52	0.00		Calculated
10	P5b	1.00	0 10:05	1.73	0.58	2.28	0.25	0.55	0.55	0.00		Calculated
11	P6	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
12	P7	0.00	0 00:00	3.78	0.00	0.00		0.00	0.00	0.00		Calculated
13	P8	0.86	0 10:06	3.25	0.27	3.55	2.31	0.35	0.35	0.00		Calculated
14	P9	0.86	0 10:06	6.15	0.14	5.52	0.14	0.25	0.25	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1011.40
Max (Rim) Elevation (ft) 1014.46
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1011.40
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

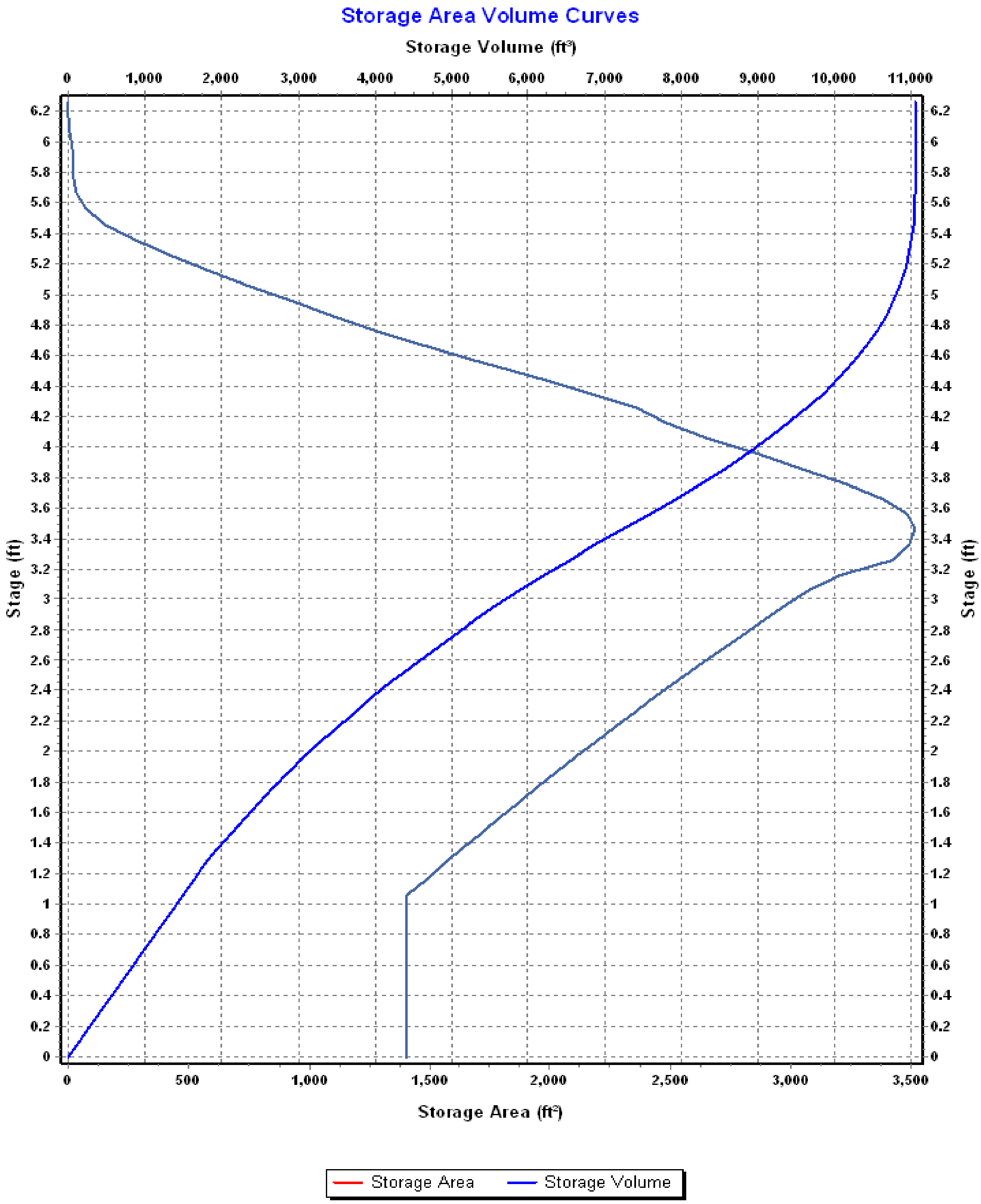
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1406	0.000
1.06	1406.41	1490.58
1.16	1480.47	1634.92
1.26	1555.24	1786.71
1.36	1630.77	1946.01
1.46	1707.07	2112.90
1.56	1784.14	2287.46
1.66	1861.98	2469.77
1.76	1940.59	2659.90
1.86	2020.12	2857.94
1.96	2100.89	3063.99
2.06	2182.92	3278.18
2.16	2266.21	3500.64
2.26	2350.76	3731.49
2.36	2436.58	3970.86
2.46	2523.66	4218.87
2.52	2576.52	4371.88
2.56	2612.01	4475.65
2.66	2701.62	4741.33
2.76	2792.5	5016.04
2.86	2884.65	5299.90
2.96	2978.05	5593.04
3.06	3072.11	5895.55
3.16	3205.91	6209.45
3.26	3421.78	6540.83
3.36	3493.59	6886.60
3.46	3515.37	7237.05
3.56	3483.18	7586.98
3.66	3379.16	7930.10
3.76	3228.85	8260.50
3.86	3042.58	8574.07
3.96	2846.45	8868.52
4.06	2644.9	9143.09
4.16	2476.74	9399.17
4.26	2357.18	9640.87
4.36	2152.13	9866.34
4.46	1923.09	10070.10
4.56	1699.17	10251.21
4.66	1484.08	10410.37
4.76	1280.57	10548.60
4.86	1096.18	10667.44
4.96	914.98	10768.00
5.06	736.35	10850.57
5.16	570.94	10915.93
5.26	418.64	10965.41
5.36	279.43	11000.31
5.46	153.32	11021.95
5.56	72.06	11033.22
5.66	32.33	11038.44
5.76	22.84	11041.20
5.86	20.61	11043.37
5.96	14.31	11045.12
6.06	6.81	11046.18
6.16	2.03	11046.62
6.26	0.06	11046.72


Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
Stage (ft)
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (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	OR1	Bottom	CIRCULAR	No	24.00			1013.96	0.61

Output Summary Results

Peak Inflow (cfs) 0.92
Peak Lateral Inflow (cfs) 0.92
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 2.20
Max HGL Elevation Attained (ft) 1013.38
Max HGL Depth Attained (ft) 1.98
Average HGL Elevation Attained (ft) 1012.42
Average HGL Depth Attained (ft) 1.02
Time of Max HGL Occurrence (days hh:mm) 0 22:46
Total Exfiltration Volume (1000-ft³) 1.832
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1009.68
Max (Rim) Elevation (ft) 1012.74
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1009.68
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

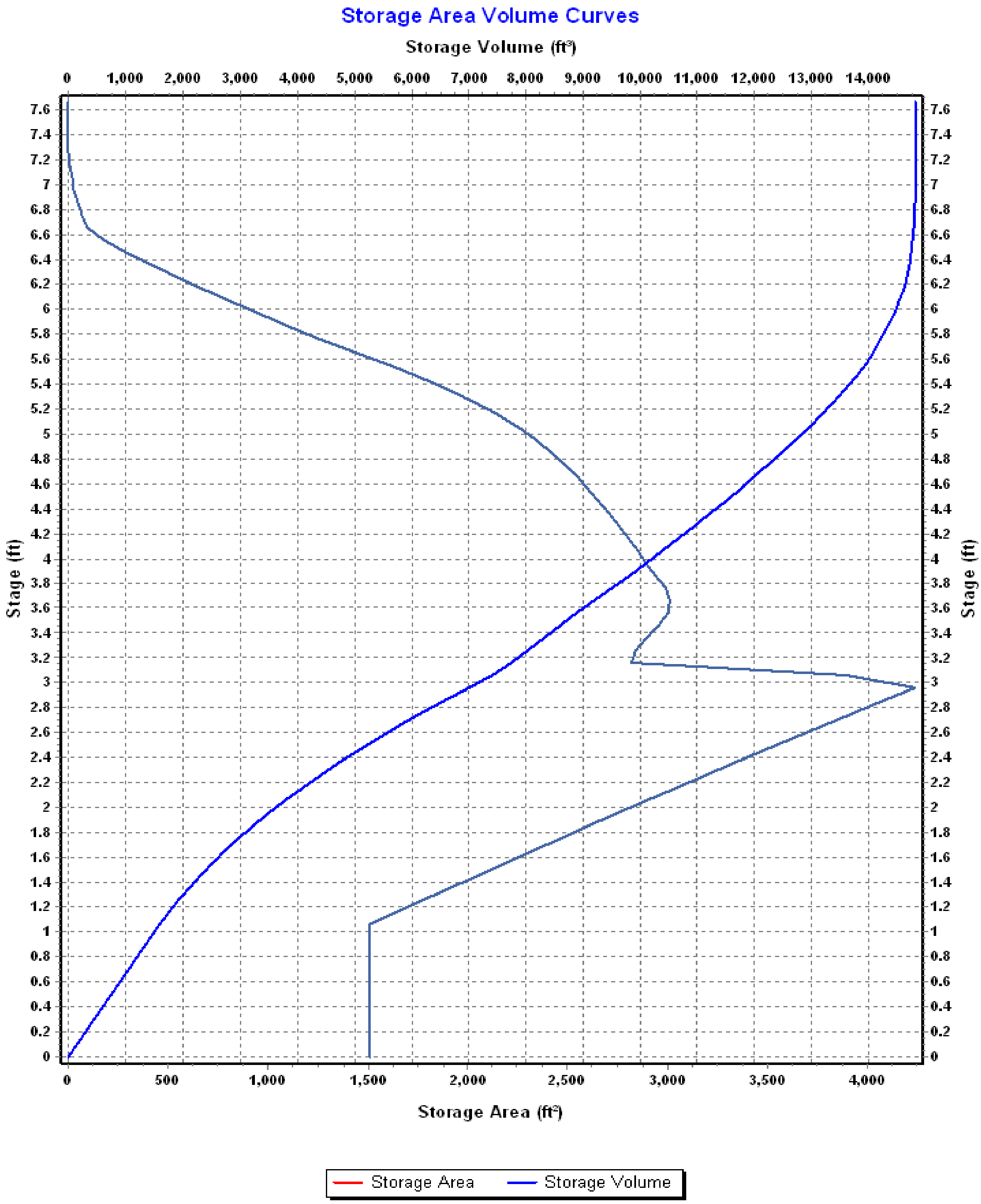
Exfiltration Rate (in/hr) 0.8500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1509	0.000
1.06	1509.71	1599.92
1.16	1643.71	1757.59
1.26	1778.63	1928.71
1.36	1914.59	2113.37
1.46	2051.6	2311.68
1.56	2189.68	2523.74
1.66	2328.85	2749.67
1.76	2469.09	2989.57
1.86	2610.42	3243.55
1.96	2752.84	3511.71
2.06	2896.36	3794.17
2.16	3041	4091.04
2.26	3186.76	4402.43
2.36	3333.64	4728.45
2.46	3481.65	5069.21
2.5	3541.17	5209.67
2.56	3630.78	5424.83
2.66	3781.07	5795.42
2.76	3932.5	6181.10
2.86	4085.08	6581.98
2.96	4238.81	6998.17
3.06	3893.63	7404.79
3.16	2818.58	7740.40
3.26	2841.8	8023.42
3.36	2894.46	8310.23
3.46	2958.61	8602.88
3.56	3003.95	8901.01
3.66	3008.97	9201.66
3.76	2988.5	9501.53
3.86	2941.33	9798.02
3.96	2895.87	10089.88
4.06	2850.77	10377.21
4.16	2804.84	10659.99
4.26	2758.57	10938.16
4.36	2709.87	11211.58
4.46	2658.38	11479.99
4.56	2603.81	11743.10
4.66	2544.42	12000.51
4.76	2480.66	12251.76
4.86	2410.91	12496.34
4.96	2336.82	12733.73
5.06	2248.65	12963.00
5.16	2143.37	13182.60
5.26	2023.25	13390.93
5.36	1890.68	13586.63
5.46	1744.92	13768.41
5.56	1587.46	13935.03
5.66	1421.65	14085.49
5.76	1248.08	14218.98
5.86	1101.15	14336.44
5.96	957.13	14439.35
6.06	812.08	14527.81
6.16	668.84	14601.86
6.26	532.55	14661.93
6.36	403.26	14708.72
6.46	284.36	14743.10
6.56	177.83	14766.21
6.66	97.81	14779.99
6.76	71.62	14788.46
6.86	48.37	14794.46
6.96	30.72	14798.41
7.06	17.84	14800.84
7.16	7.04	14802.08
7.26	3.14	14802.59
7.36	1.97	14802.85
7.46	2.5	14803.07
7.56	1.02	14803.25

7.66	0.2	14803.31


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.2 3.4 3.6 3.8 4 4.2 4.4 4.6 4.8 5 5.2 5.4 5.6 5.8 6 6.2 6.4 6.6 6.8 7 7.2 7.4 7.6
0 500 1,000 1,500 2,000 2,500 3,000 3,500 4,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (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	OR2	Bottom	CIRCULAR	No	24.00			1012.24	0.61

Output Summary Results

Peak Inflow (cfs) 0.90
Peak Lateral Inflow (cfs) 0.90
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 2.68
Max HGL Elevation Attained (ft) 1011.30
Max HGL Depth Attained (ft) 1.62
Average HGL Elevation Attained (ft) 1010.54
Average HGL Depth Attained (ft) 0.86
Time of Max HGL Occurrence (days hh:mm) 0 20:42
Total Exfiltration Volume (1000-ft³) 2.223
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR3

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1001.86
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

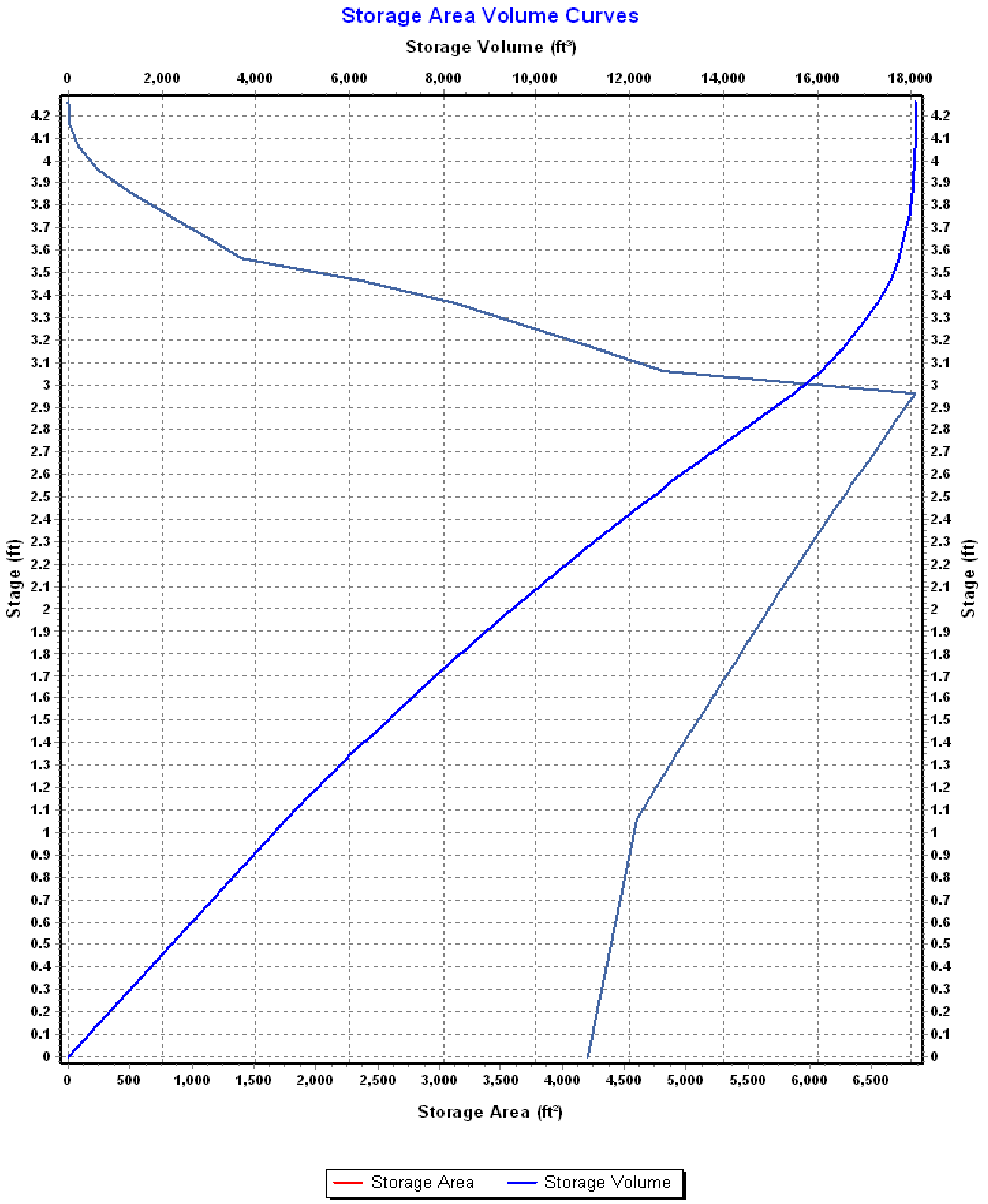
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR3

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	4202	0.000
1.06	4602.78	4666.53
1.16	4712.04	5132.27
1.26	4822.31	5608.99
1.36	4933.57	6096.78
1.46	5045.82	6595.75
1.56	5159.08	7106.00
1.66	5273.33	7627.62
1.76	5388.58	8160.72
1.86	5504.82	8705.39
1.96	5622.06	9261.73
2.06	5740.3	9829.85
2.16	5859.54	10409.84
2.26	5979.77	11001.81
2.36	6101.01	11605.85
2.46	6223.23	12222.06
2.52	6297.05	12597.67
2.56	6346.46	12850.54
2.66	6470.68	13491.40
2.76	6595.9	14144.73
2.86	6722.12	14810.63
2.96	6849.33	15489.20
3.06	4821.94	16072.76
3.16	4269.29	16527.32
3.26	3701.61	16925.87
3.36	3145.79	17268.24
3.46	2385.68	17544.81
3.56	1403.4	17734.26
3.66	1106.4	17859.75
3.76	805.95	17955.37
3.86	493.74	18020.35
3.96	245.04	18057.29
4.06	86.03	18073.84
4.16	14	18078.84
4.26	0.09	18079.54


Storage Area Volume Curves
Storage Volume (ft³)
Stage (ft)
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR3 (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	OR3	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 1.96
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 6.38
Max HGL Elevation Attained (ft) 999.94
Max HGL Depth Attained (ft) 1.14
Average HGL Elevation Attained (ft) 999.40
Average HGL Depth Attained (ft) 0.6
Time of Max HGL Occurrence (days hh:mm) 0 19:40
Total Exfiltration Volume (1000-ft³) 5.679
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR4

Input Data

Invert Elevation (ft) 1001.17
Max (Rim) Elevation (ft) 1004.23
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1001.17
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

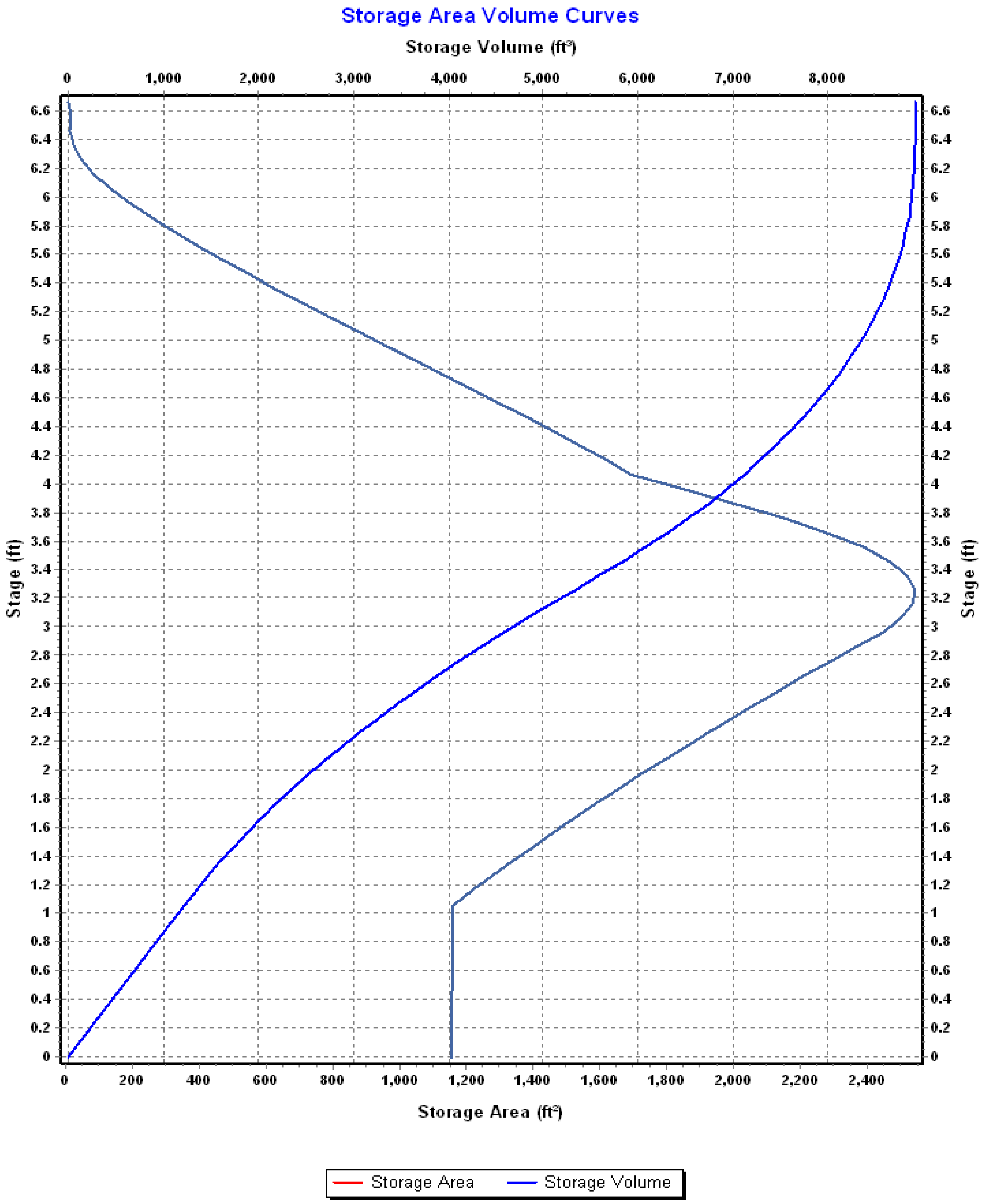
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 1.6700

Storage Area Volume Curves

Storage Curve : BR4

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1157	0.000
1.06	1157.62	1226.75
1.16	1215.18	1345.39
1.26	1273.86	1469.84
1.36	1333.68	1600.22
1.46	1394.62	1736.64
1.56	1456.7	1879.21
1.66	1519.9	2028.04
1.76	1584.24	2183.25
1.86	1649.71	2344.95
1.96	1716.31	2513.25
2.06	1784.03	2688.27
2.16	1852.89	2870.12
2.26	1922.88	3058.91
2.36	1994	3254.75
2.46	2066.25	3457.76
2.49	2088.15	3520.08
2.56	2139.64	3668.05
2.66	2214.15	3885.74
2.76	2289.79	4110.94
2.86	2366.56	4343.76
2.96	2444.47	4584.31
3.06	2503.88	4831.73
3.16	2536.19	5083.73
3.26	2543.4	5337.71
3.36	2518.39	5590.80
3.46	2464.18	5839.93
3.56	2384.46	6082.36
3.66	2275.89	6315.38
3.76	2146.68	6536.51
3.86	2004.26	6744.06
3.96	1849.65	6936.76
4.06	1693.56	7113.92
4.16	1620.49	7279.62
4.26	1542.67	7437.78
4.36	1462.92	7588.06
4.46	1382.21	7730.32
4.56	1298.91	7864.38
4.66	1214.58	7990.05
4.76	1129.66	8107.26
4.86	1044.43	8215.96
4.96	959.13	8316.14
5.06	873.72	8407.78
5.16	790.35	8490.98
5.26	707.66	8565.88
5.36	625.29	8632.53
5.46	547.18	8691.15
5.56	470.39	8742.03
5.66	394.33	8785.27
5.76	324.47	8821.21
5.86	256.35	8850.25
5.96	189.71	8872.55
6.06	133.98	8888.73
6.16	83.68	8899.61
6.26	48.53	8906.22
6.36	26.06	8909.95
6.46	14.03	8911.95
6.56	14.79	8913.39
6.66	8.38	8914.55


Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Stage (ft)
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Stage (ft)
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR4 (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	O4	Bottom	CIRCULAR	No	24.00			1003.29	0.61

Output Summary Results

Peak Inflow (cfs) 1.54
Peak Lateral Inflow (cfs) 0.70
Peak Outflow (cfs) 0.16
Peak Exfiltration Flow Rate (cfm) 4.29
Max HGL Elevation Attained (ft) 1003.33
Max HGL Depth Attained (ft) 2.16
Average HGL Elevation Attained (ft) 1002.41
Average HGL Depth Attained (ft) 1.24
Time of Max HGL Occurrence (days hh:mm) 0 11:16
Total Exfiltration Volume (1000-ft³) 3.783
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR5

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1003.05
Max (Rim) Offset (ft) 4.25
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

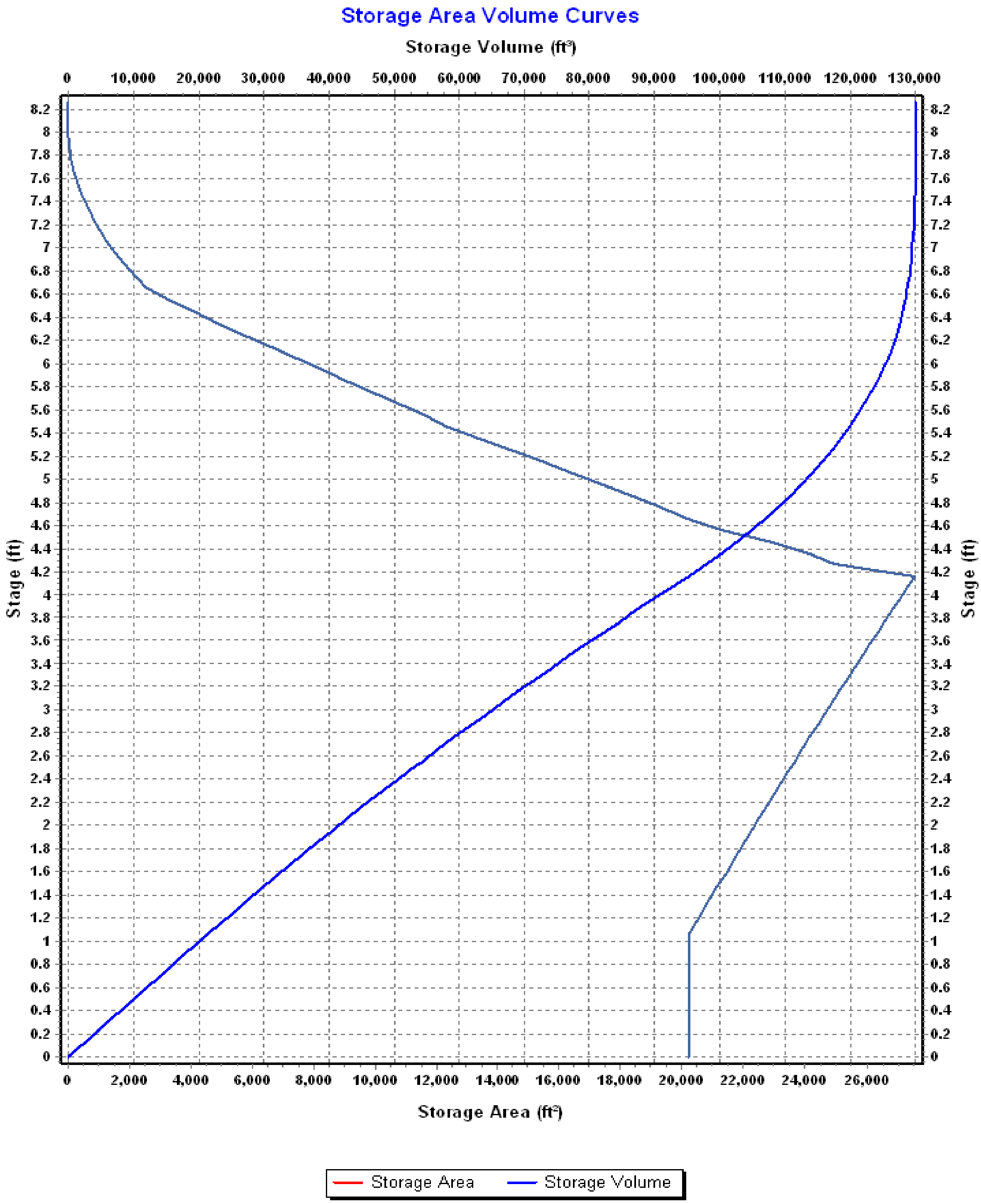
Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR5

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	20214	0.000
1.06	20215.03	21427.39
1.16	20437.65	23460.02
1.26	20661.27	25514.97
1.36	20885.87	27592.33
1.46	21111.46	29692.20
1.56	21338.05	31814.68
1.66	21565.62	33959.86
1.76	21794.18	36127.85
1.86	22023.72	38318.75
1.96	22254.26	40532.65
2.06	22485.78	42769.65
2.16	22718.3	45029.85
2.26	22951.8	47313.36
2.36	23186.29	49620.26
2.46	23421.77	51950.66
2.52	23563.54	53360.22
2.56	23658.24	54304.66
2.66	23895.7	56682.36
2.76	24134.15	59083.85
2.86	24373.58	61509.24
2.96	24614.01	63958.62
3.06	24855.42	66432.09
3.16	25097.82	68929.75
3.26	25341.21	71451.70
3.36	25585.59	73998.04
3.46	25830.96	76568.87
3.56	26077.32	79164.28
3.66	26324.66	81784.38
3.76	26573	84429.26
3.86	26822.32	87099.03
3.96	27072.63	89793.78
4.06	27323.93	92513.61
4.16	27576.22	95258.62
4.26	24935.38	97884.20
4.36	24024.32	100332.19
4.46	22764.39	102671.63
4.56	21271	104873.40
4.66	20160.51	106944.98
4.76	19229.97	108914.50
4.86	18281.25	110790.06
4.96	17314.48	112569.85
5.06	16331.1	114252.13
5.16	15332.24	115835.30
5.26	14319.21	117317.87
5.36	13293.07	118698.48
5.46	12321.72	119979.22
5.56	11498.38	121170.23
5.66	10666.17	122278.46
5.76	9824.09	123302.97
5.86	8977.65	124243.06
5.96	8130.16	125098.45
6.06	7284.67	125869.19
6.16	6443.94	126555.62
6.26	5613.4	127158.49
6.36	4794.72	127678.90
6.46	3989.93	128118.13
6.56	3201.03	128477.68
6.66	2514.65	128763.46
6.76	2163.03	128997.34
6.86	1832.56	129197.12
6.96	1526.32	129365.06
7.06	1250.46	129503.90
7.16	1001.28	129616.49
7.26	786.61	129705.88
7.36	609.46	129775.68
7.46	461.78	129829.24
7.56	329.31	129868.79

7.66	192.14	129894.86
7.76	95.82	129909.26
7.86	34.15	129915.76
7.96	4.84	129917.71
8.06	0	129917.95
8.16	4.45	129918.17
8.26	0.24	129918.40


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
100,000
110,000
120,000
130,000
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
7.8
8
8.2
Storage Area (ft²)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
22,000
24,000
26,000
Storage Area
Storage Volume

Storage Node : BR5 (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	OR5	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 1.95
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 27.51
Max HGL Elevation Attained (ft) 998.88
Max HGL Depth Attained (ft) 0.08
Average HGL Elevation Attained (ft) 998.81
Average HGL Depth Attained (ft) 0.01
Time of Max HGL Occurrence (days hh:mm) 0 10:35
Total Exfiltration Volume (1000-ft³) 7.154
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

10-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods .... YES

Analysis Options

Start Analysis On	Oct 13, 2022	00:00:00
End Analysis On	Oct 14, 2022	00:00:00
Start Reporting On	Oct 13, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	9
Nodes..	23
Junctions	16
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links..	21
Channels	2
Pipes	14
Pumps	0
Orifices	5
Weirs	0
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	Post-Development	Time Series	10-year	Cumulative	inches	California	San Bernardino (Baker)	10	1.60	SCS Type I 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	A01	2.26	92.00	1.60	0.89	2.00	1.38	0 00:10:00
2	A02	2.21	92.00	1.60	0.89	1.96	1.35	0 00:10:00
3	A3	2.17	92.00	1.60	0.89	1.92	1.33	0 00:10:00
4	A4	2.17	92.00	1.60	0.89	1.92	1.33	0 00:10:00
5	A5a	2.36	92.00	1.60	0.89	2.09	1.45	0 00:10:00
6	A5b	2.46	92.00	1.60	0.89	2.18	1.50	0 00:10:00
7	A6	2.72	92.00	1.60	0.89	2.41	1.66	0 00:10:00
8	A7	1.72	92.00	1.60	0.89	1.52	1.05	0 00:10:00
9	PRE-DEV	15.11	77.00	1.60	0.25	3.81	0.43	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	BU1	Junction	998.09	1003.05	998.09	0.00	0.00	0.00	1001.36	0.00	1.69	0 00:00	0.00	0.00
2	BU2	Junction	1000.23	1004.23	1000.23	0.00	0.00	1.29	1003.74	0.00	1.49	0 00:00	0.00	0.00
3	J1	Junction	1004.61	1009.61	1004.61	0.00	0.00	1.32	1005.24	0.00	4.37	0 00:00	0.00	0.00
4	J2a	Junction	999.91	1003.24	999.91	0.00	0.00	1.44	1000.59	0.00	2.65	0 00:00	0.00	0.00
5	J2b	Junction	999.94	1002.15	999.94	0.00	0.00	1.49	1000.66	0.00	1.49	0 00:00	0.00	0.00
6	J3	Junction	1005.76	1010.36	1005.76	0.00	0.00	1.32	1006.20	0.00	4.16	0 00:00	0.00	0.00
7	J4	Junction	999.96	1005.68	999.96	0.00	0.00	1.78	1005.68	0.00	0.00	0 10:15	0.00	1.00
8	Jun-23	Junction	0.00	6.00	0.00	6.00	0.00	0.00	998.37	0.00	1.00	0 00:00	0.00	0.00
9	O1	Junction	1009.93	1014.46	1009.93	0.00	0.00	0.03	1009.99	0.00	4.47	0 00:00	0.00	0.00
10	O2	Junction	1008.31	1011.81	1008.31	0.00	0.00	0.00	1008.31	0.00	3.50	0 00:00	0.00	0.00
11	O4	Junction	999.79	1003.29	999.79	0.00	0.00	1.07	1000.79	0.00	2.50	0 00:00	0.00	0.00
12	O5	Junction	997.80	1003.05	997.80	0.00	0.00	0.00	998.10	0.00	4.95	0 00:00	0.00	0.00
13	SDMH1	Junction	1003.49	1009.45	1003.49	0.00	0.00	1.32	1005.20	0.00	4.25	0 00:00	0.00	0.00
14	SDMH2	Junction	1001.24	1005.72	1001.24	6.00	0.00	1.30	1001.79	0.00	3.93	0 00:00	0.00	0.00
15	SDMH3	Junction	1001.57	1006.27	1001.57	6.00	0.00	1.30	1002.11	0.00	4.16	0 00:00	0.00	0.00
16	SDMH4	Junction	997.69	1002.76	997.69	0.00	0.00	0.00	997.79	0.00	4.97	0 00:00	0.00	0.00
17	OUT1	Outfall	997.37					0.00	997.37					
18	WASH-PRE	Outfall	998.73					0.43	998.73					
19	BR1	Storage Node	1011.40	1014.46	0.00		0.00	1.37	1013.97				0.00	0.00
20	BR2	Storage Node	1009.68	1012.74	0.00		0.00	1.34	1011.83				0.00	0.00
21	BR3	Storage Node	998.80	1001.86	0.00		0.00	2.92	1000.64				0.00	0.00
22	BR4	Storage Node	1001.17	1004.23	0.00		0.00	2.30	1003.43				0.00	0.00
23	BR5	Storage Node	998.80	1003.05	0.00		0.00	2.92	999.07				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	P1	Pipe	O1	SDMH1	383.00	1009.93	1004.57	1.4000	12.000	0.0130	0.03	4.21	0.01	1.52	0.06	0.06	0.00	Calculated
2	P10	Pipe	O4	J4	70.00	1000.23	1000.06	0.2400	12.000	0.0130	1.07	1.76	0.61	2.35	0.55	0.56	0.00	Calculated
3	P11	Pipe	J4	BR5	40.00	999.96	999.86	0.2500	12.000	0.0130	1.84	1.78	1.03	2.63	0.82	0.90	0.00	> CAPACITY
4	P12	Pipe	O5	SDMH4	125.00	998.10	997.79	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
5	P13	Pipe	SDMH4	OUT1	130.00	997.69	997.37	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
6	P2	Pipe	J1	SDMH1	15.00	1004.61	1004.57	0.2700	12.000	0.0130	1.32	1.84	0.72	2.54	0.63	0.63	0.00	Calculated
7	P3	Pipe	SDMH1	SDMH2	408.00	1004.47	1001.34	0.7700	12.000	0.0130	1.30	3.12	0.42	3.84	0.45	0.45	0.00	Calculated
8	P4	Pipe	SDMH2	BR5	79.00	1001.24	999.86	1.7500	12.000	0.0130	1.30	4.71	0.28	5.12	0.35	0.36	0.00	Calculated
9	P5a	Pipe	J2a	BR3	20.00	999.91	999.86	0.2500	12.000	0.0130	1.43	1.78	0.80	2.53	0.68	0.68	0.00	Calculated
10	P5b	Pipe	J2b	BR3	34.00	999.94	999.86	0.2400	12.000	0.0130	1.49	1.73	0.86	2.48	0.72	0.72	0.00	Calculated
11	P6	Pipe	Jun-23	BU1	113.00	998.37	998.09	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
12	P7	Pipe	O2	J3	157.00	1006.25	1005.86	0.2500	12.000	0.0153	0.00	3.78	0.00	0.00	0.00	0.00	0.00	Calculated
13	P8	Pipe	J3	SDMH3	492.00	1005.76	1001.67	0.8300	12.000	0.0130	1.30	3.25	0.40	3.96	0.44	0.44	0.00	Calculated
14	P9	Pipe	SDMH3	BU2	45.00	1001.57	1000.23	2.9800	12.000	0.0130	1.29	6.15	0.21	6.20	0.31	0.31	0.00	Calculated
15	OC1	Channel	BU2	BR4	6.42	1003.73	1001.17	39.8800	18.000	0.0010	1.29	3485.71	0.00	0.00	0.01	0.01	0.00	
16	OC2	Channel	BU1	BR5	1.00	1001.36	998.80	256.0000	18.000	0.0010	0.00	5074.12	0.00	0.00	0.00	0.00	0.00	
17	O4	Orifice	BR4	O4		1001.17	999.79		24.000		1.07							
18	OR1	Orifice	BR1	O1		1011.40	1009.93		24.000		0.03							
19	OR2	Orifice	BR2	O2		1009.68	1008.31		24.000		0.00							
20	OR3	Orifice	BR3	Jun-23		998.80	0.00		24.000		0.00							
21	OR5	Orifice	BR5	O5		998.80	997.80		24.000		0.00							

Subbasin Hydrology

Subbasin : A01

Input Data

Area (ac) 2.26
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.48	B	92.00
Composite Area & Weighted CN	1.48		92.00

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 :

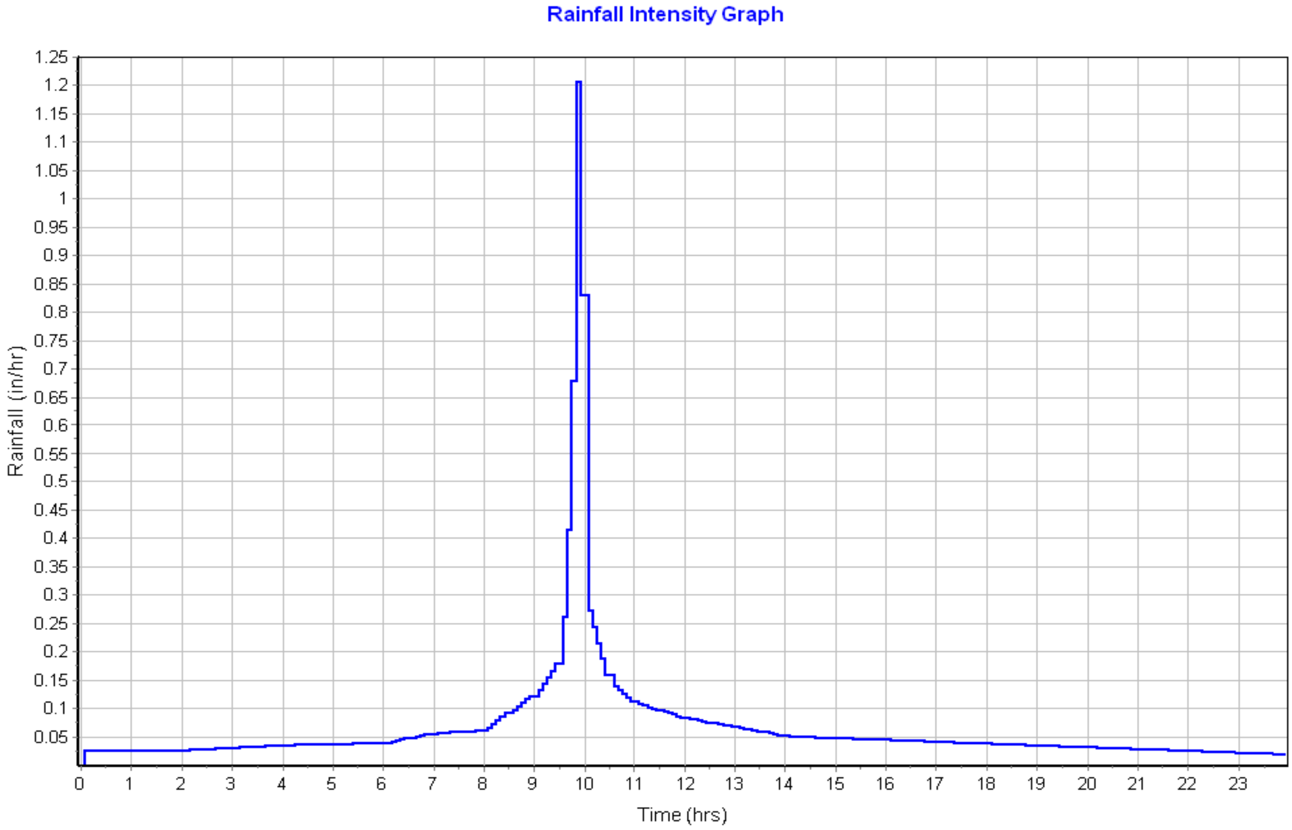
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

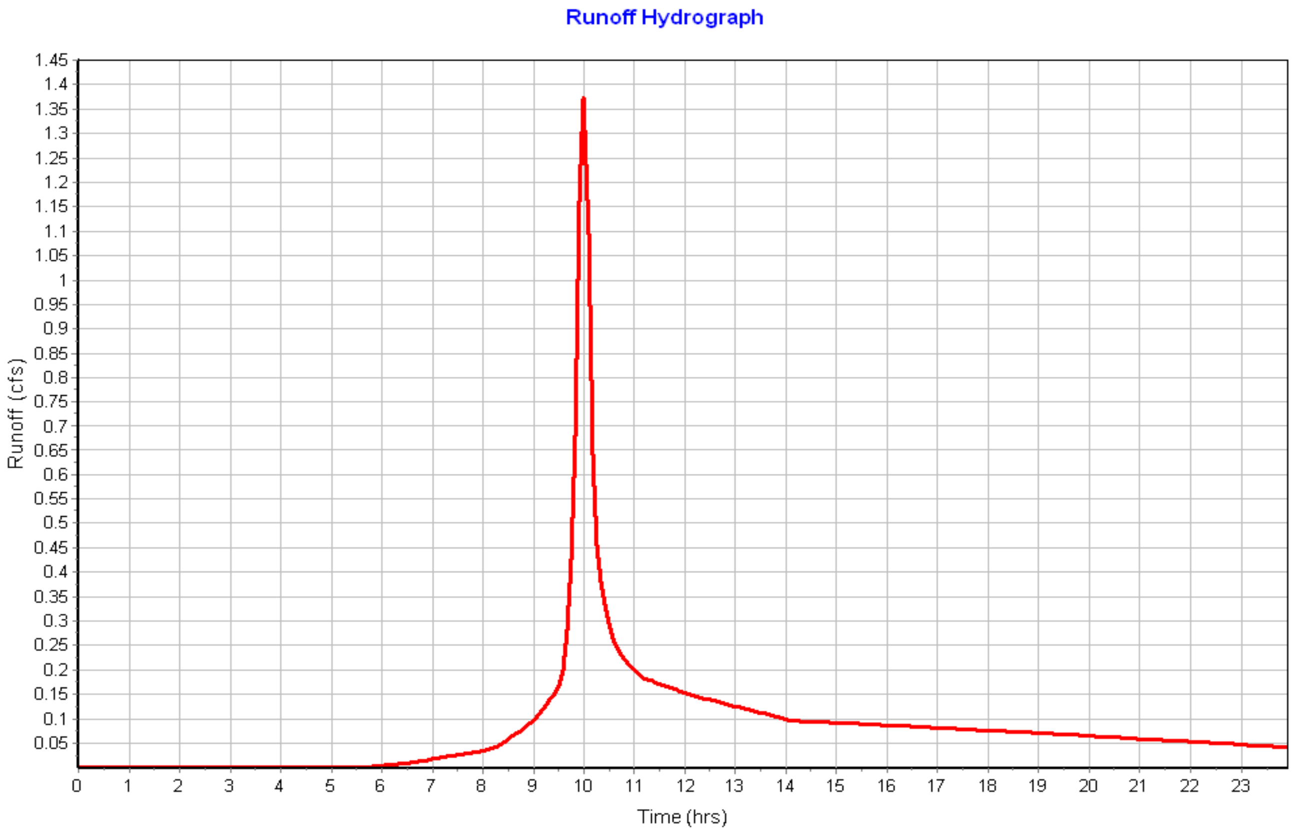
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.38
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A01





Subbasin : A02

Input Data

Area (ac) 2.21
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.21	B	92.00
Composite Area & Weighted CN	2.21		92.00

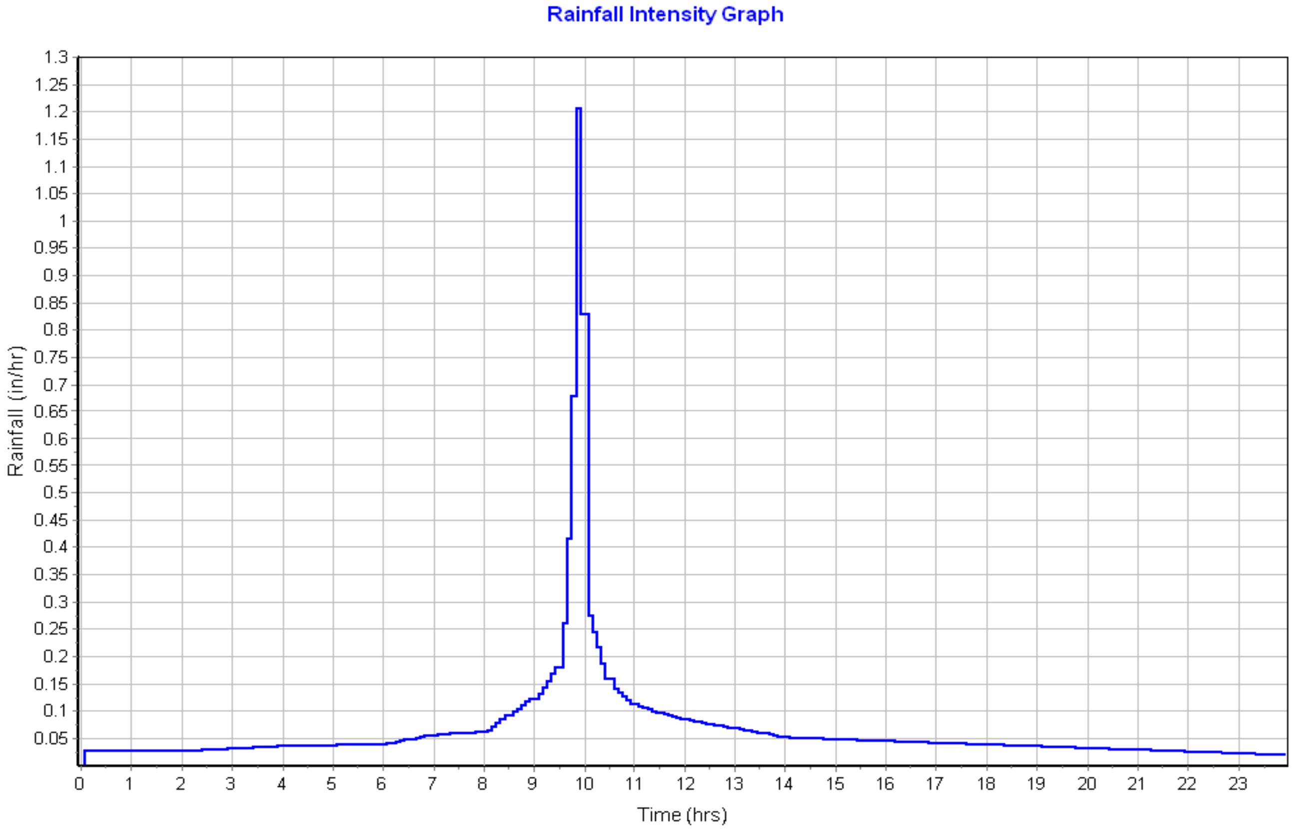
Time of Concentration

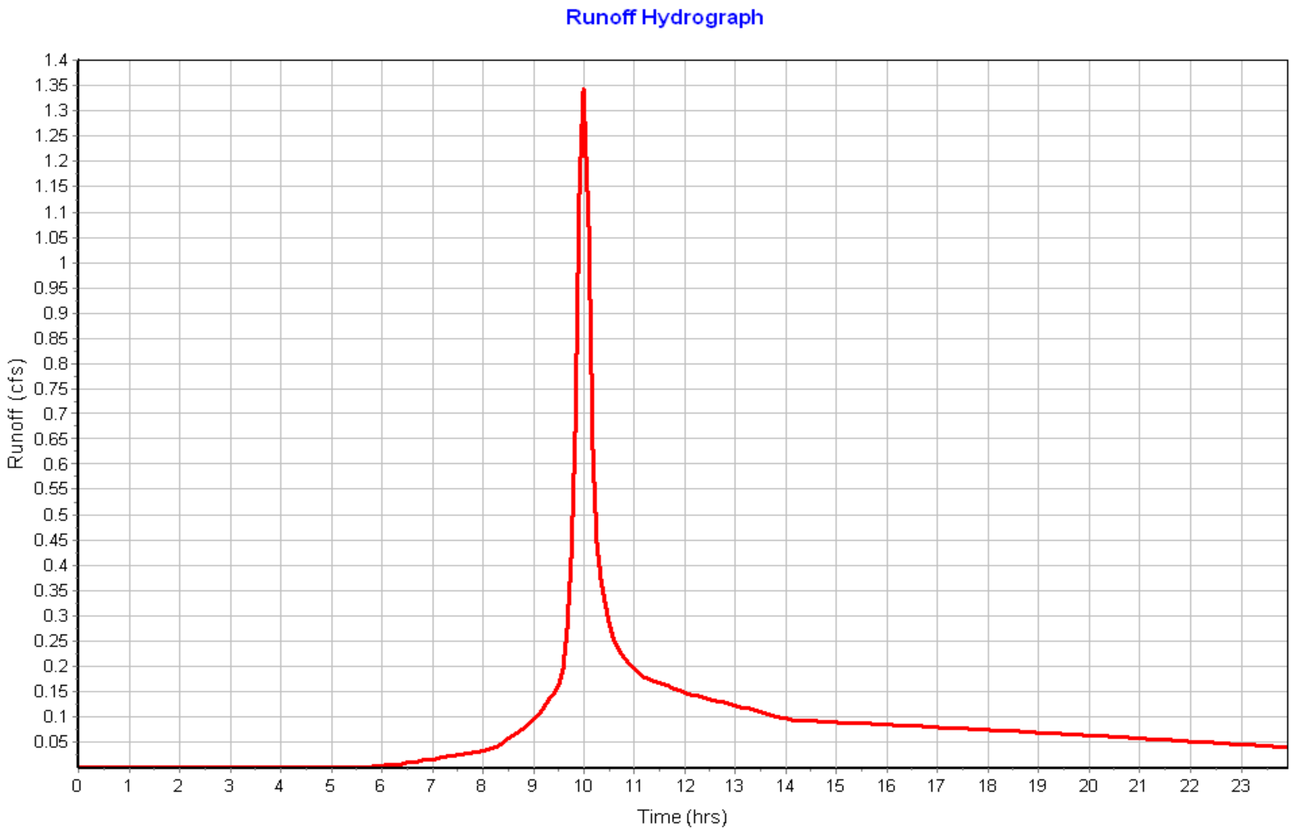
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.35
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A02





Subbasin : A3

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

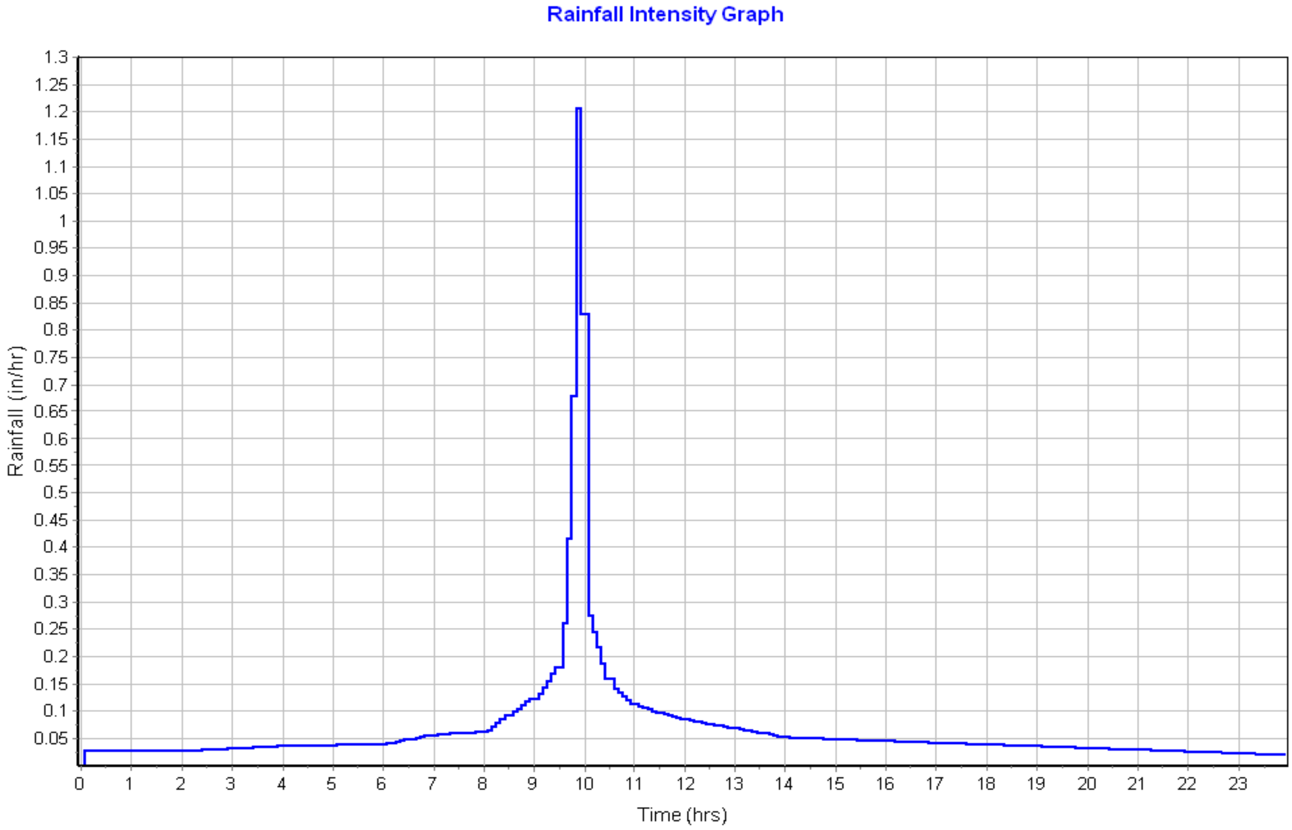
Time of Concentration

User-Defined TOC override (minutes): 10

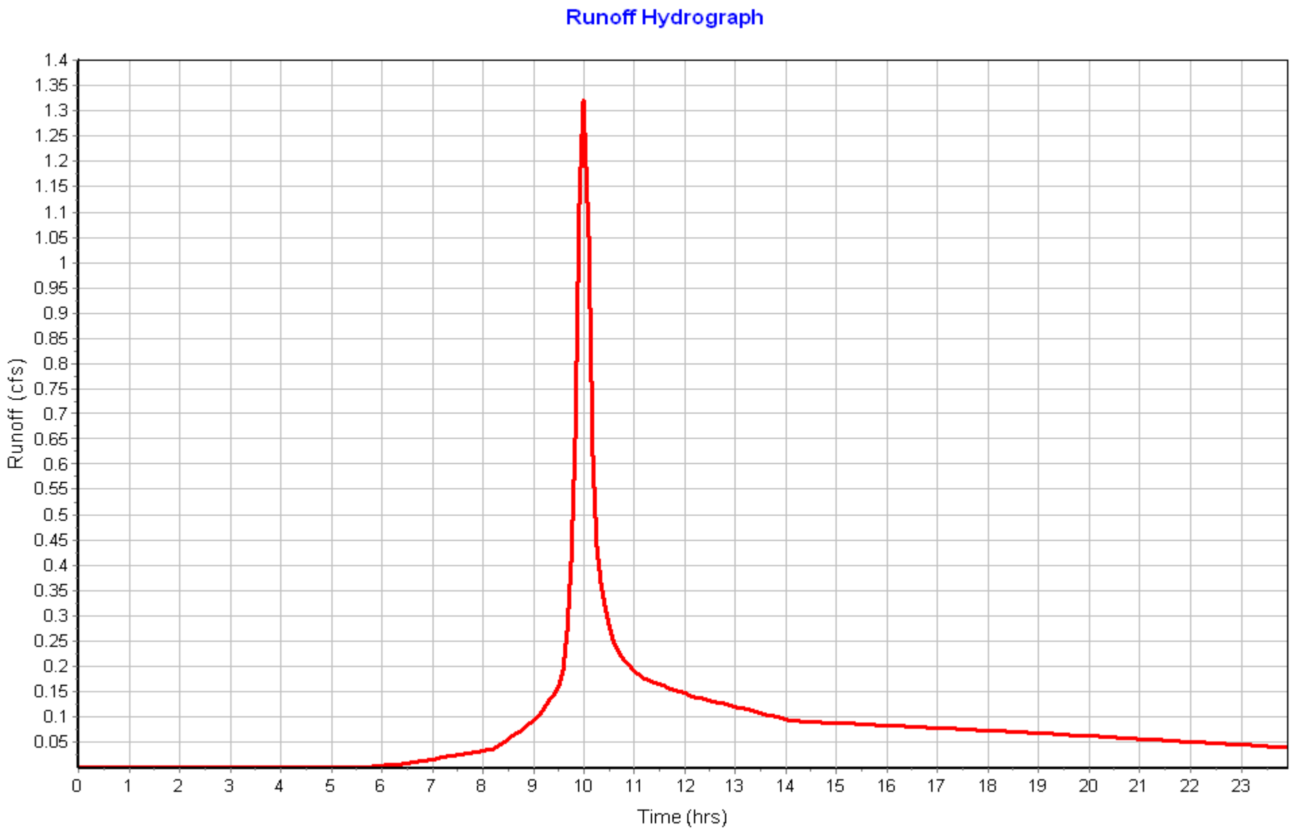
Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.33
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A3



Rainfall Intensity Graph
Rainfall (in/hr)
1.3
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
1.4
1.35
1.3
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A4

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

Time of Concentration

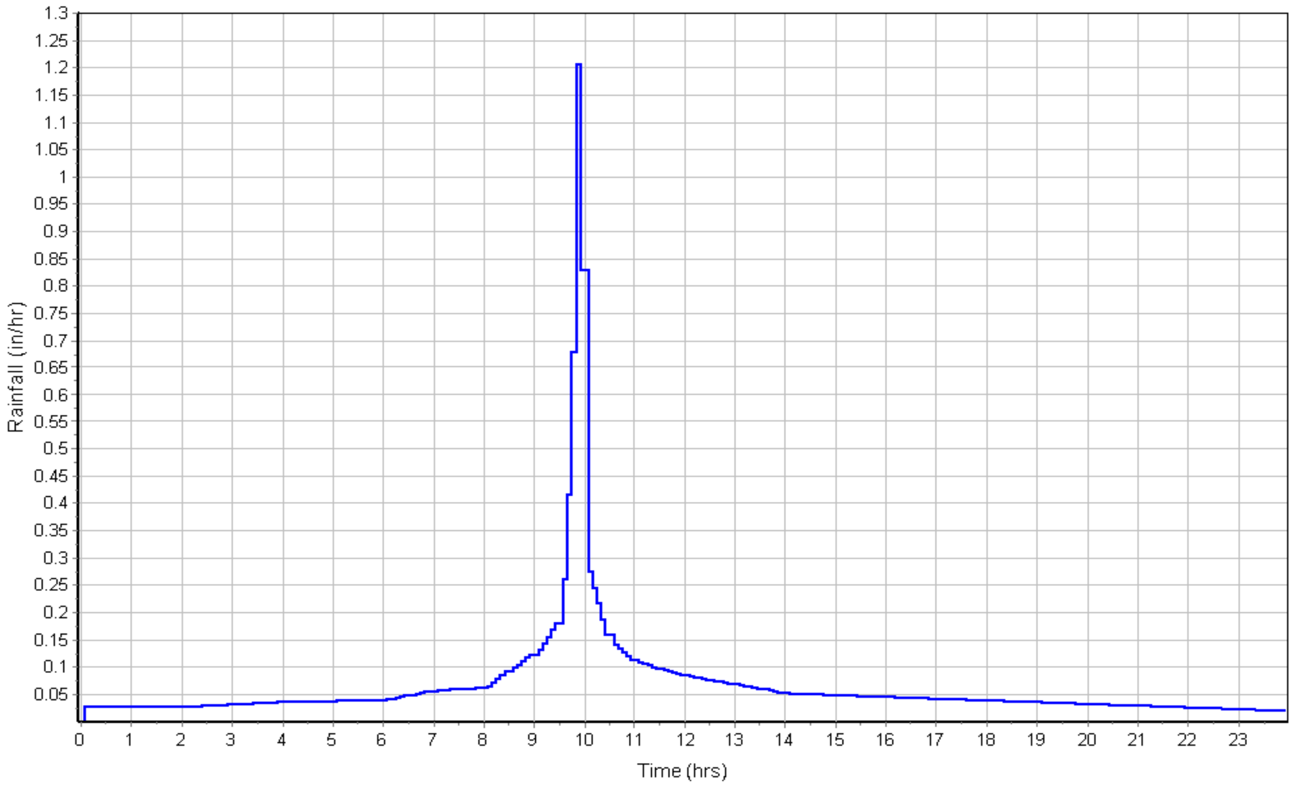
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

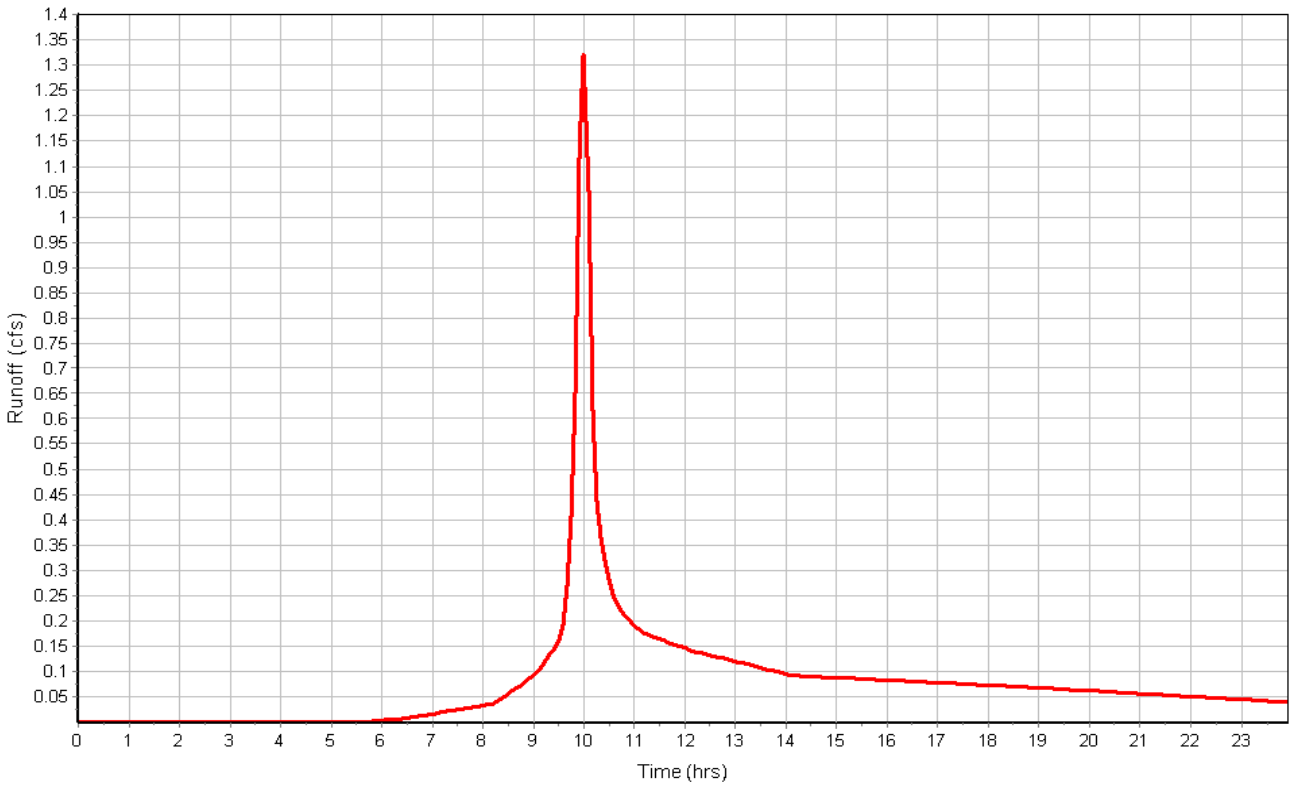
Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.33
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A4

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : A5a

Input Data

Area (ac) 2.36
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.66	B	92.00
Composite Area & Weighted CN	1.66		92.00

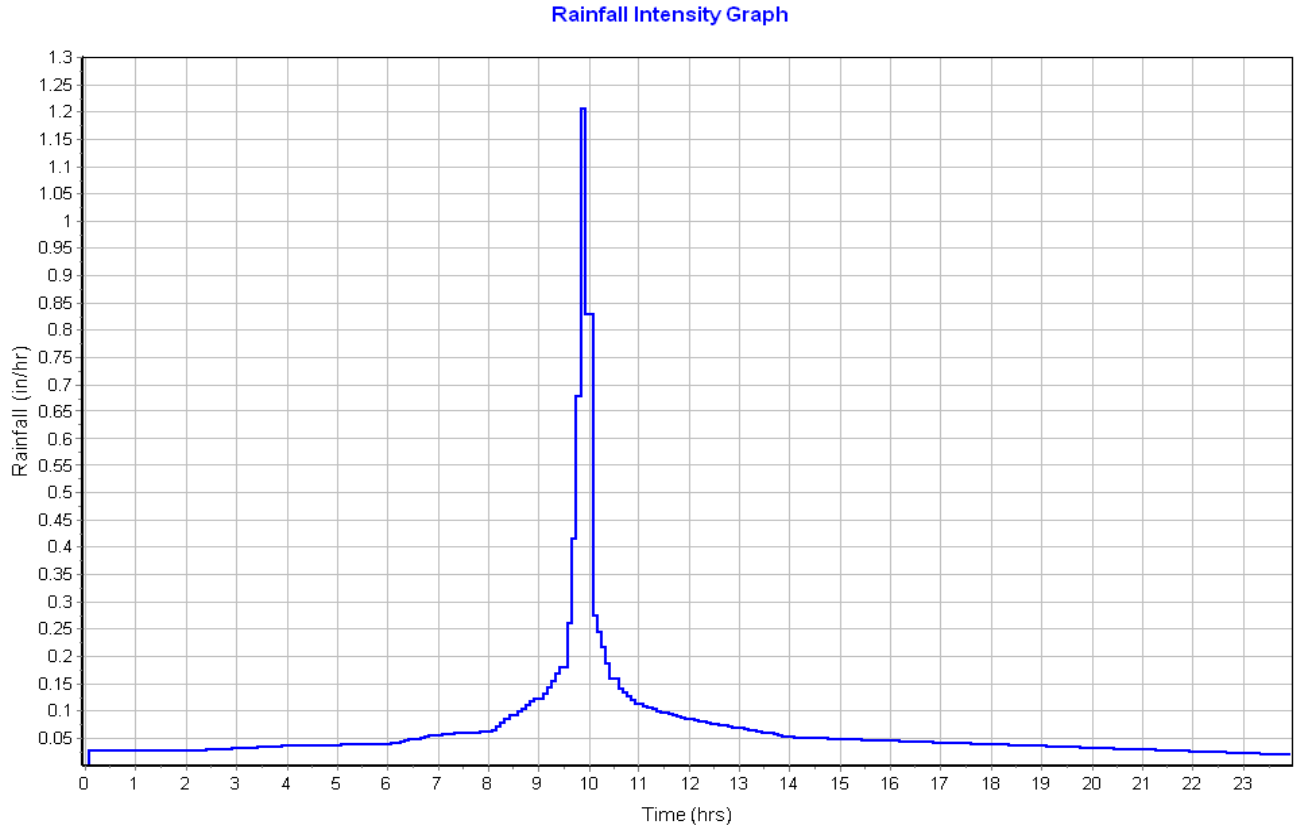
Time of Concentration

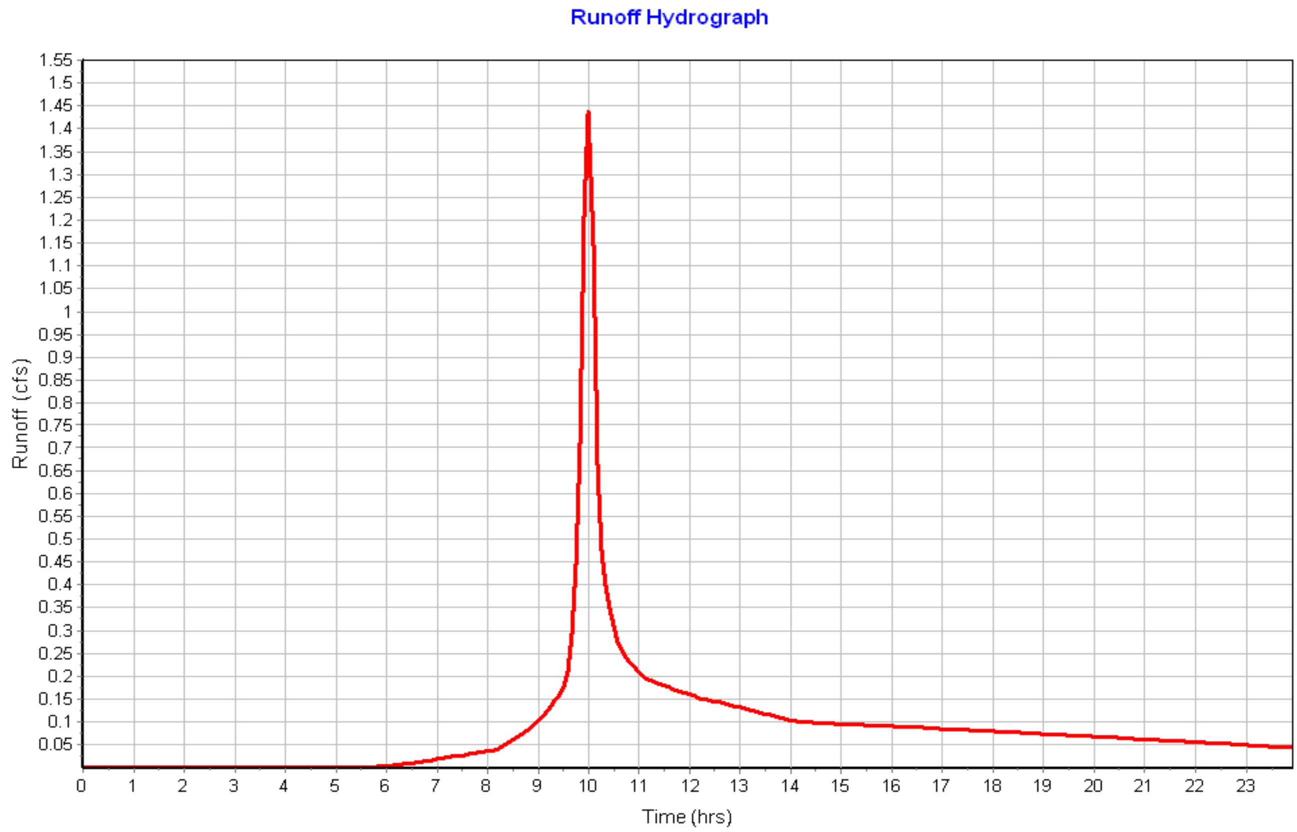
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.45
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5a





Subbasin : A5b

Input Data

Area (ac) 2.46
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.46	B	92.00
Composite Area & Weighted CN	2.46		92.00

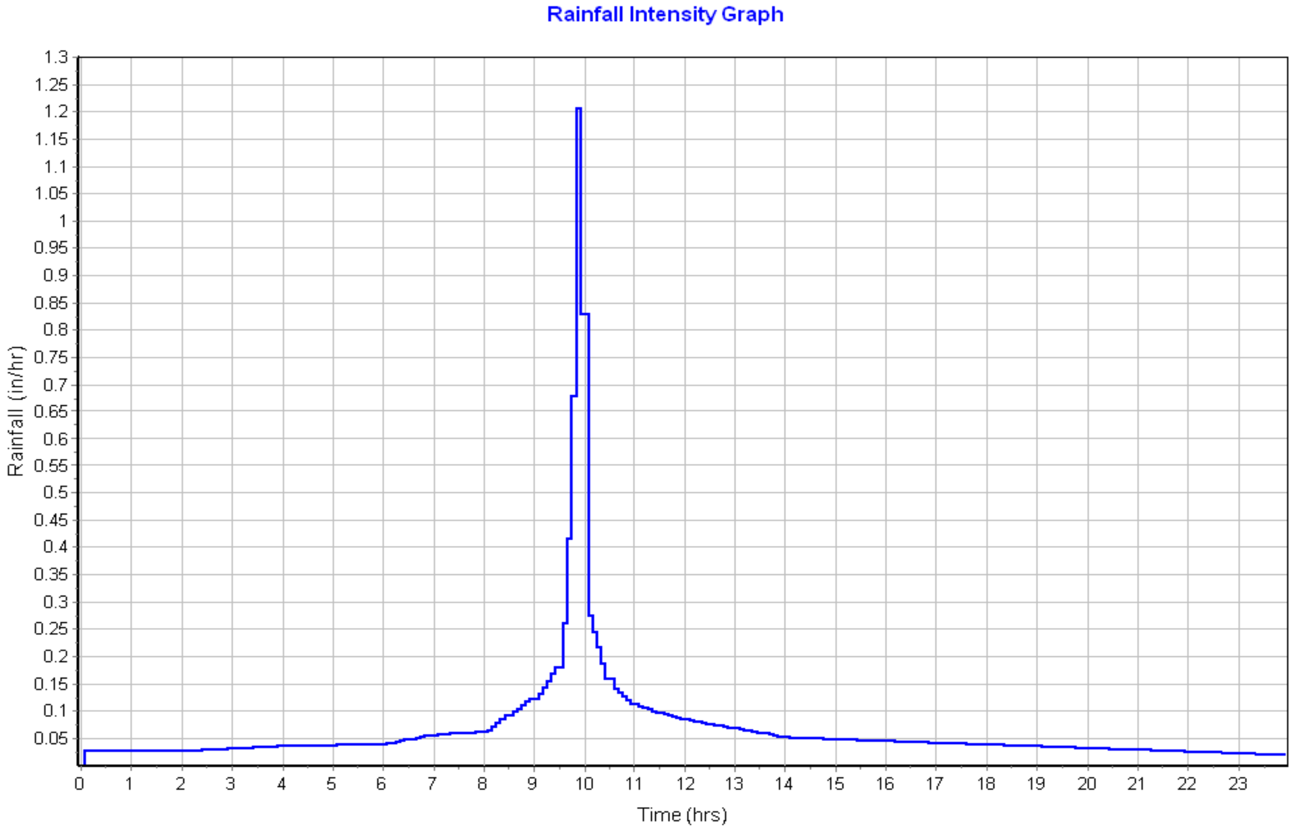
Time of Concentration

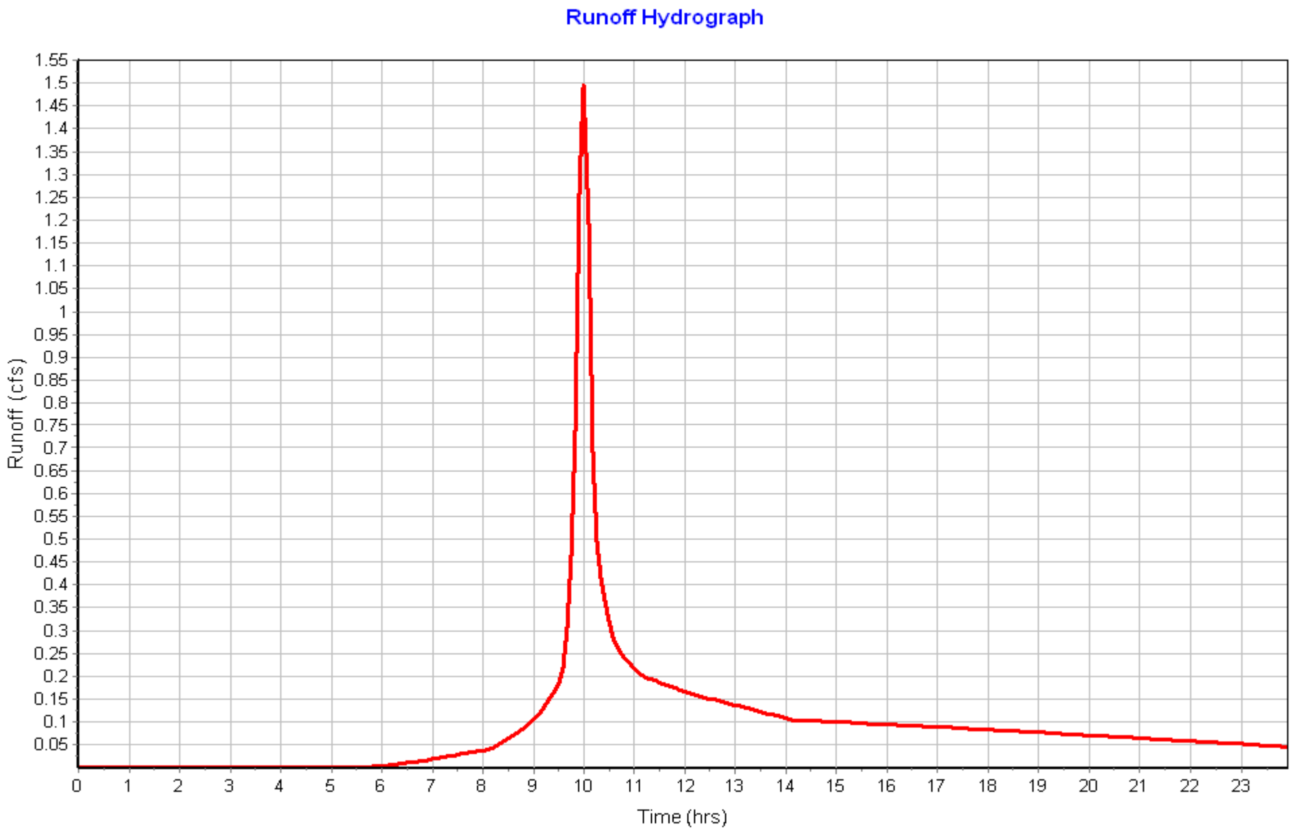
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.50
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5b





Subbasin : A6

Input Data

Area (ac) 2.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.65	B	92.00
Composite Area & Weighted CN	1.65		92.00

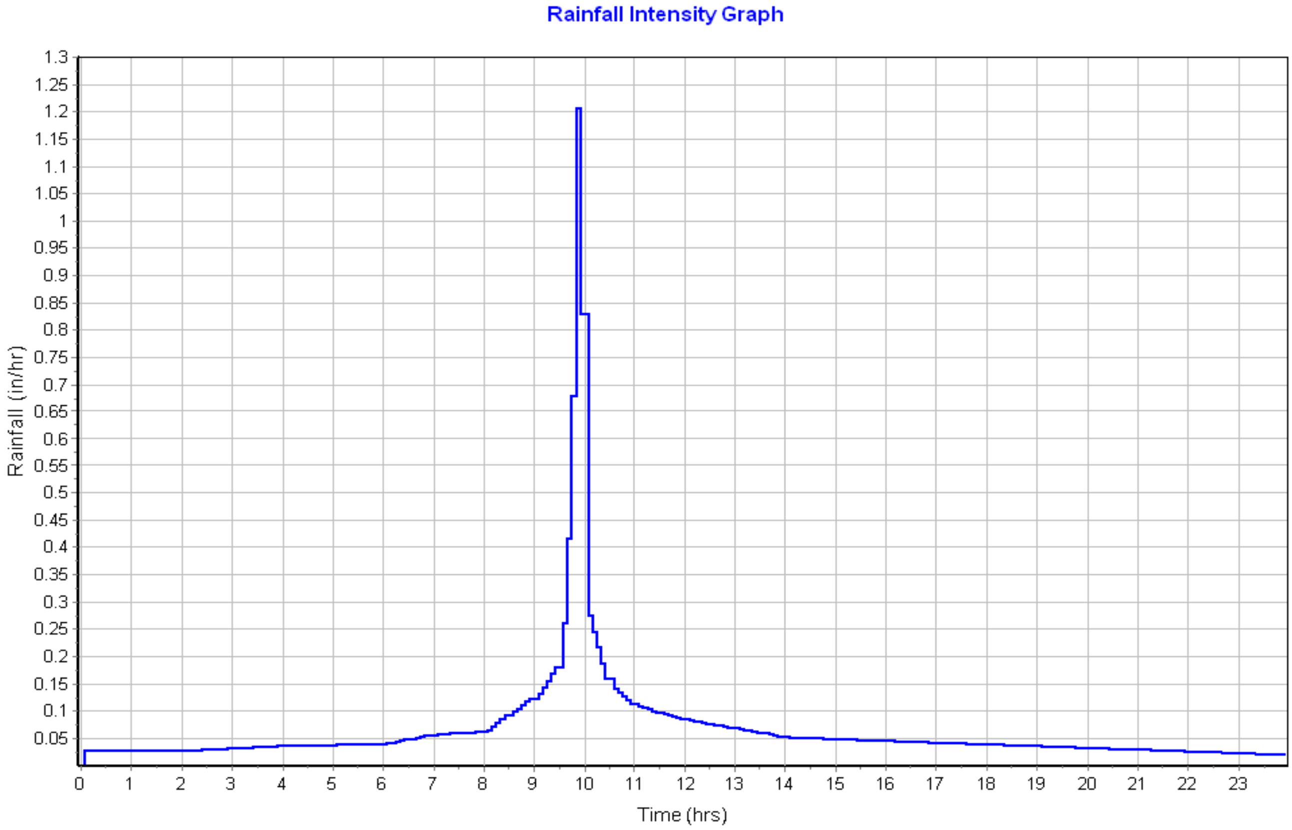
Time of Concentration

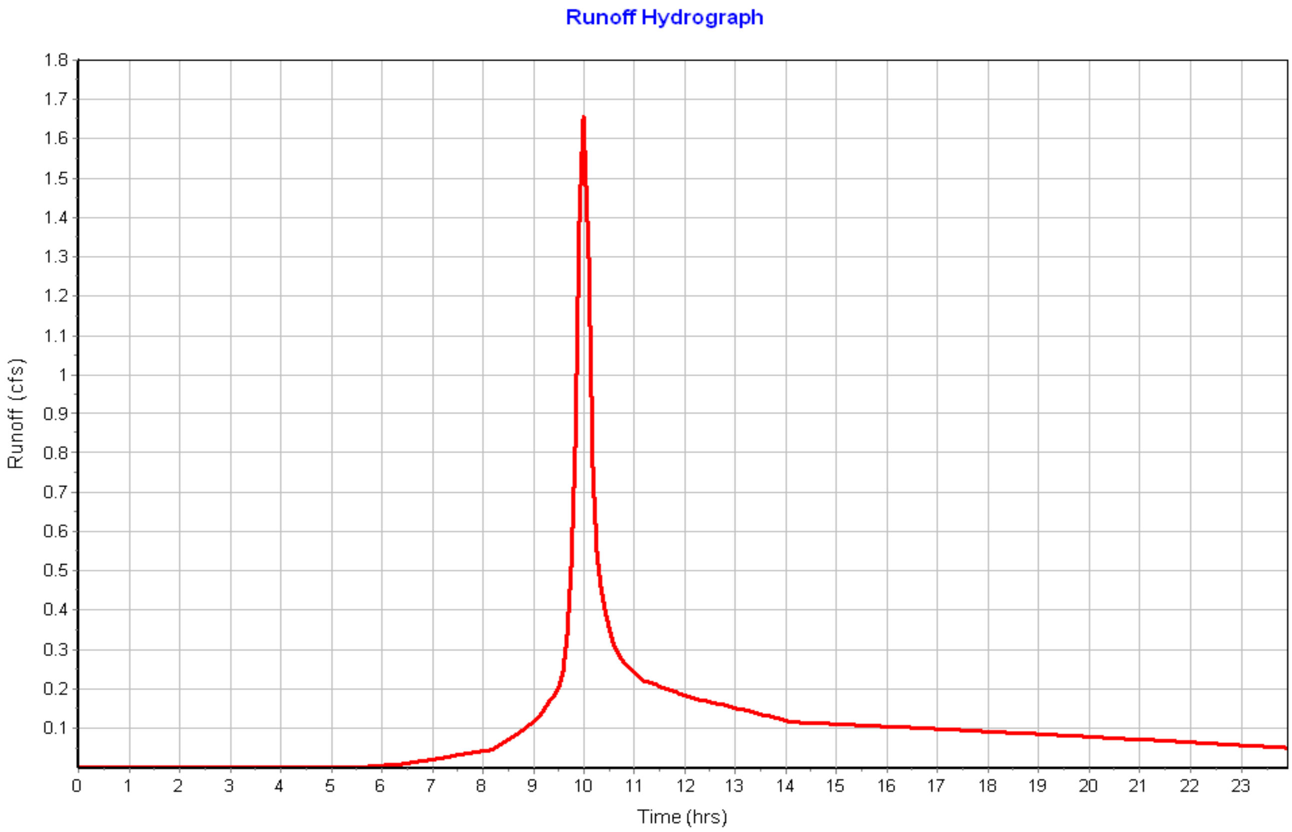
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.66
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A6


Rainfall Intensity Graph
Rainfall (in/hr)
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
Time (hrs)

Subbasin : A7

Input Data

Area (ac) 1.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.30	B	92.00
Composite Area & Weighted CN	1.30		92.00

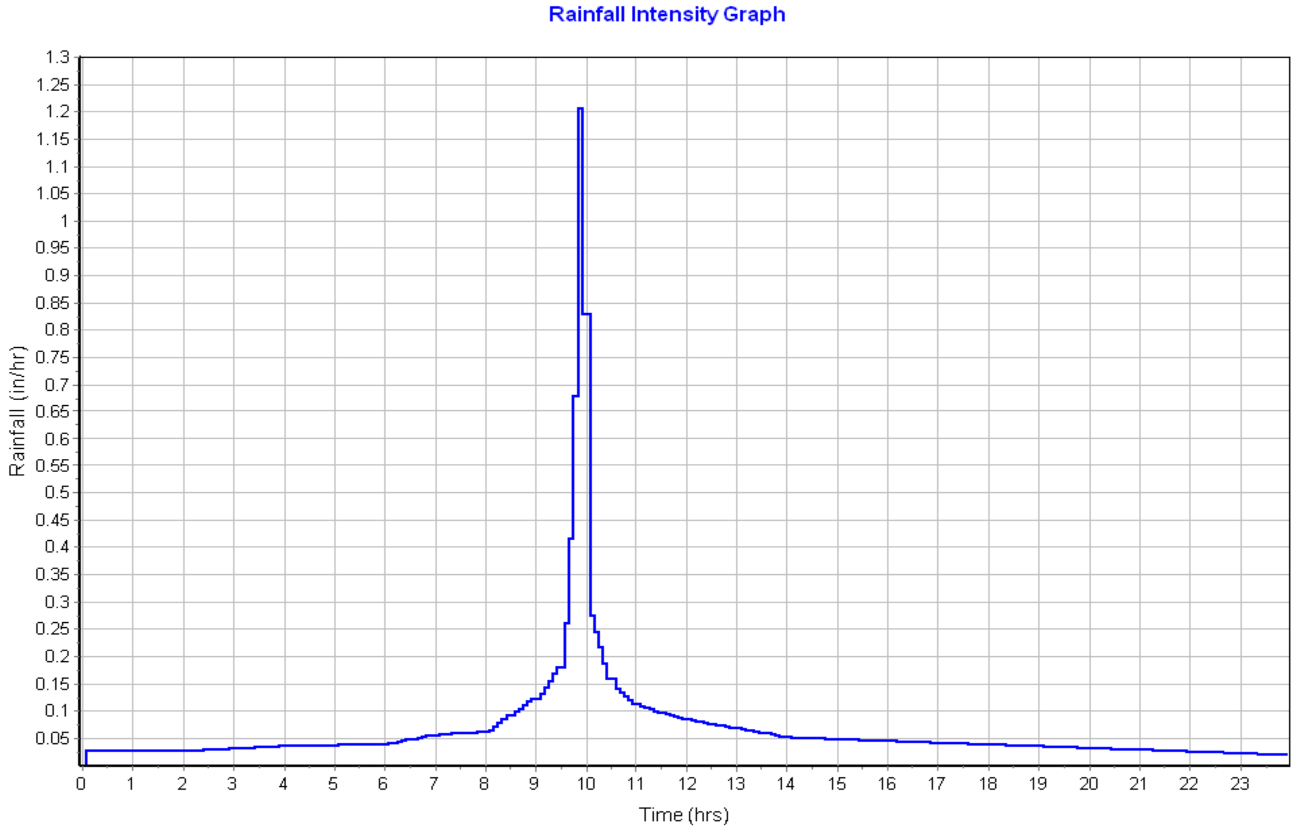
Time of Concentration

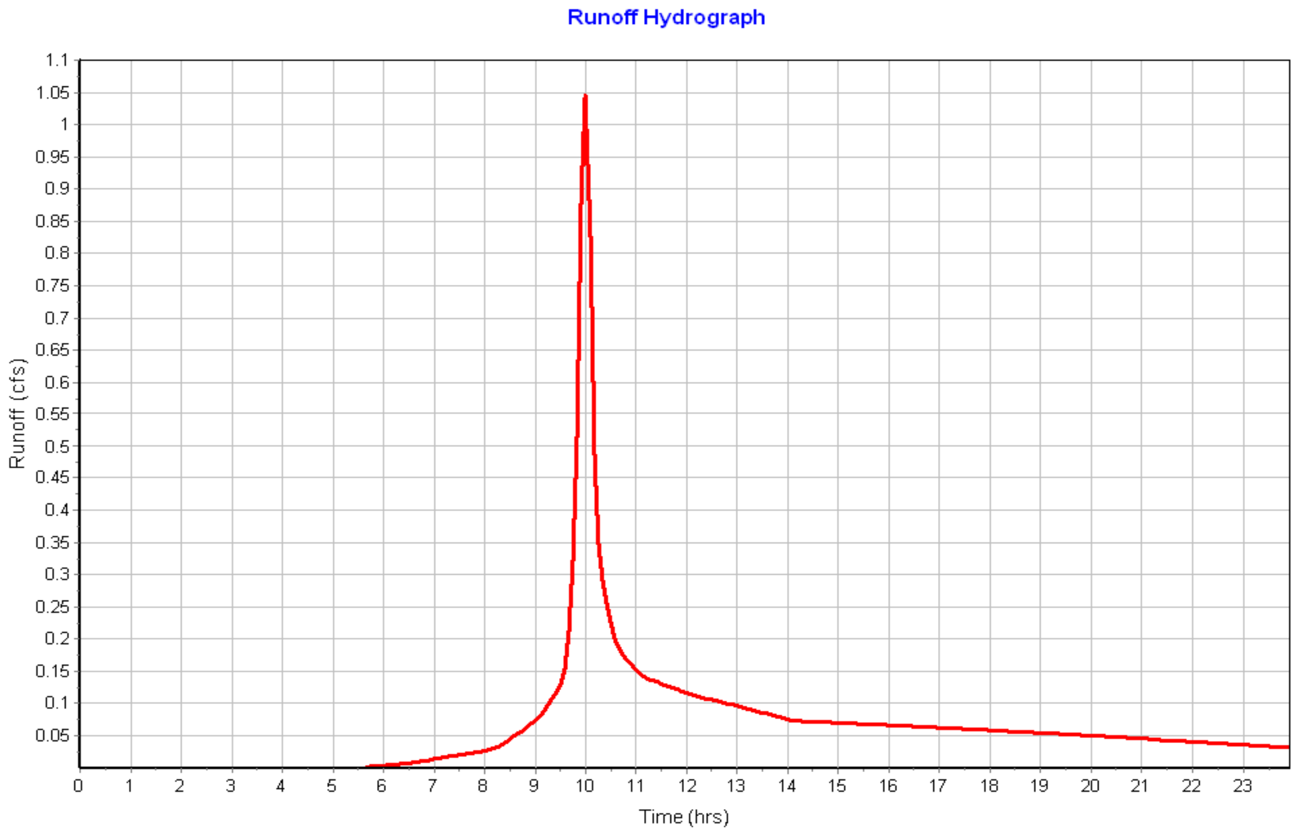
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.89
Peak Runoff (cfs) 1.05
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A7


Rainfall Intensity Graph
Rainfall (in/hr)
1.3
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : PRE-DEV

Input Data

Area (ac) 15.11
Weighted Curve Number 77.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	15.11	B	77.00
Composite Area & Weighted CN	15.11		77.00

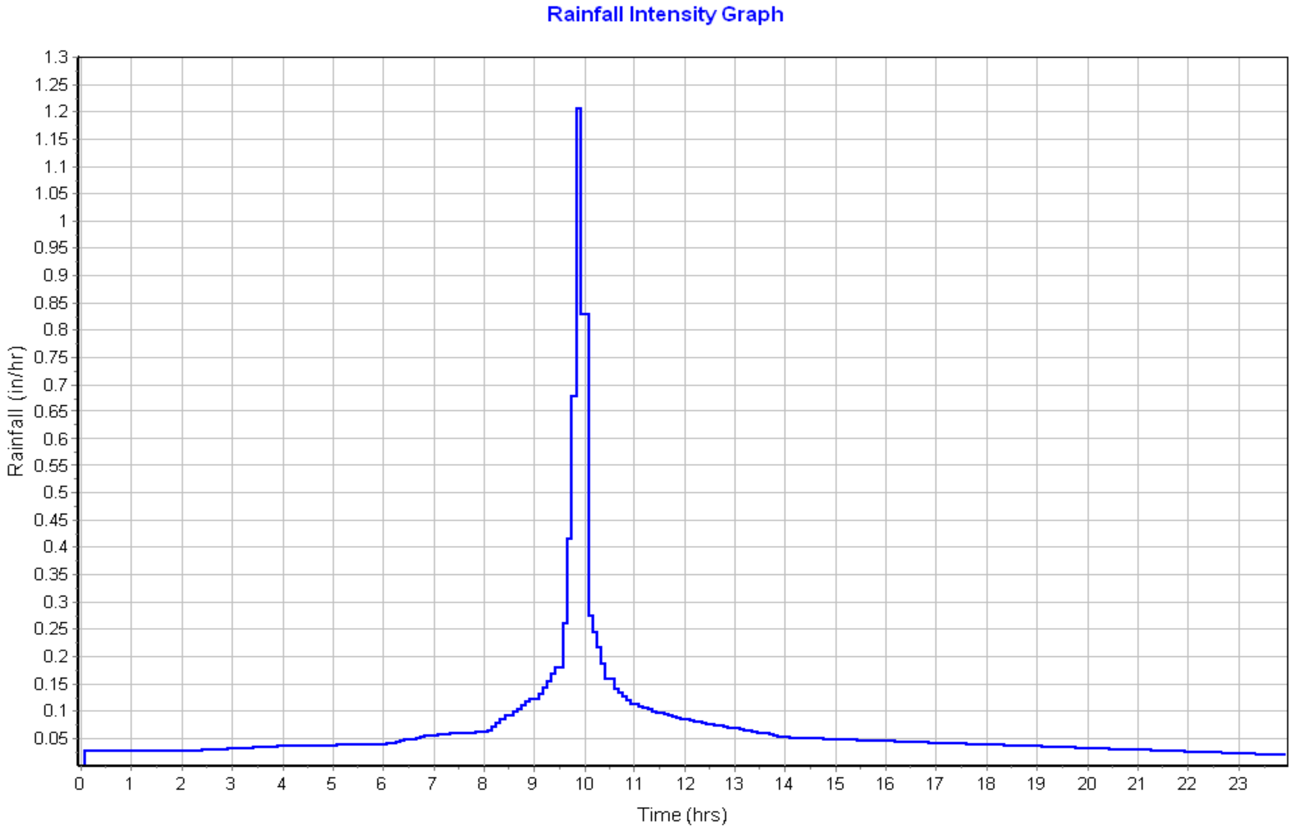
Time of Concentration

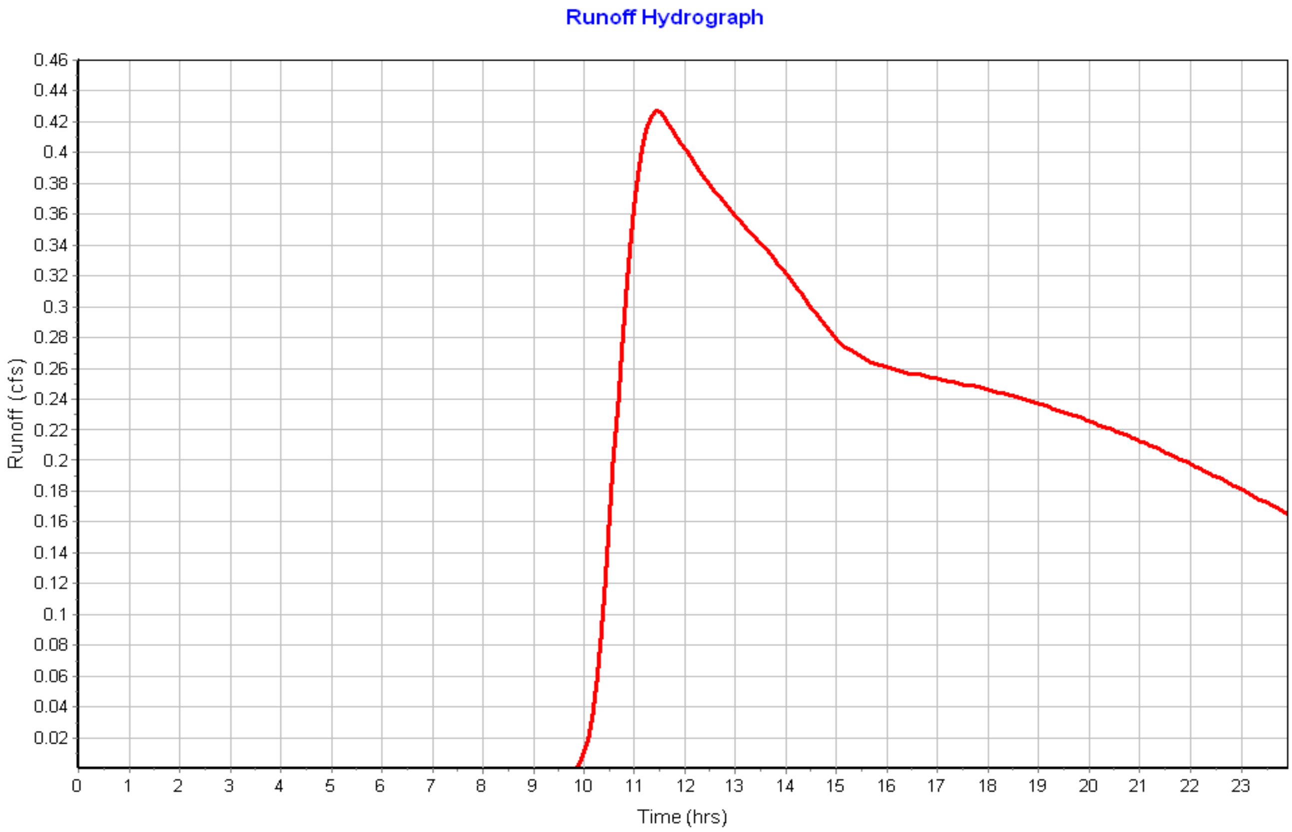
User-Defined TOC override (minutes): 100

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.25
Peak Runoff (cfs) 0.43
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : PRE-DEV





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	BU1	998.09	1003.05	4.96	998.09	0.00	0.00	-1003.05	0.00	0.00
2	BU2	1000.23	1004.23	4.00	1000.23	0.00	0.00	-1004.23	0.00	0.00
3	J1	1004.61	1009.61	5.00	1004.61	0.00	0.00	-1009.61	0.00	0.00
4	J2a	999.91	1003.24	3.33	999.91	0.00	0.00	-1003.24	0.00	0.00
5	J2b	999.94	1002.15	2.21	999.94	0.00	0.00	-1002.15	0.00	0.00
6	J3	1005.76	1010.36	4.60	1005.76	0.00	0.00	-1010.36	0.00	0.00
7	J4	999.96	1005.68	5.72	999.96	0.00	0.00	-1005.68	0.00	0.00
8	Jun-23	0.00	6.00	6.00	0.00	0.00	6.00	0.00	0.00	0.00
9	O1	1009.93	1014.46	4.53	1009.93	0.00	0.00	-1014.46	0.00	0.00
10	O2	1008.31	1011.81	3.50	1008.31	0.00	0.00	-1011.81	0.00	0.00
11	O4	999.79	1003.29	3.50	999.79	0.00	0.00	-1003.29	0.00	0.00
12	O5	997.80	1003.05	5.25	997.80	0.00	0.00	-1003.05	0.00	0.00
13	SDMH1	1003.49	1009.45	5.96	1003.49	0.00	0.00	-1009.45	0.00	0.00
14	SDMH2	1001.24	1005.72	4.48	1001.24	0.00	6.00	-999.72	0.00	0.00
15	SDMH3	1001.57	1006.27	4.70	1001.57	0.00	6.00	-1000.27	0.00	0.00
16	SDMH4	997.69	1002.76	5.07	997.69	0.00	0.00	-1002.76	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	BU1	0.00	0.00	1001.36	3.27	0.00	1.69	1001.36	3.27	0 00:00	0 00:00	0.00	0.00
2	BU2	1.29	0.00	1003.74	3.51	0.00	1.49	1003.73	3.50	0 10:06	0 00:00	0.00	0.00
3	J1	1.32	1.32	1005.24	0.63	0.00	4.37	1004.72	0.11	0 10:05	0 00:00	0.00	0.00
4	J2a	1.44	1.44	1000.59	0.68	0.00	2.65	1000.03	0.12	0 10:05	0 00:00	0.00	0.00
5	J2b	1.49	1.49	1000.66	0.72	0.00	1.49	1000.06	0.12	0 10:05	0 00:00	0.00	0.00
6	J3	1.32	1.32	1006.20	0.44	0.00	4.16	1005.88	0.12	0 10:05	0 00:00	0.00	0.00
7	J4	1.78	1.66	1005.68	5.72	0.00	0.00	1000.17	0.21	0 10:15	0 10:15	0.00	1.00
8	Jun-23	0.00	0.00	998.37	998.37	0.00	1.00	998.37	998.37	0 00:00	0 00:00	0.00	0.00
9	O1	0.03	0.00	1009.99	0.06	0.00	4.47	1009.94	0.01	0 18:37	0 00:00	0.00	0.00
10	O2	0.00	0.00	1008.31	0.00	0.00	3.50	1008.31	0.00	0 00:00	0 00:00	0.00	0.00
11	O4	1.07	0.00	1000.79	1.00	0.00	2.50	1000.32	0.53	0 10:16	0 00:00	0.00	0.00
12	O5	0.00	0.00	998.10	0.30	0.00	4.95	998.10	0.30	0 00:00	0 00:00	0.00	0.00
13	SDMH1	1.32	0.00	1005.20	1.71	0.00	4.25	1004.68	1.19	0 10:05	0 00:00	0.00	0.00
14	SDMH2	1.30	0.00	1001.79	0.55	0.00	3.93	1001.43	0.19	0 10:06	0 00:00	0.00	0.00
15	SDMH3	1.30	0.00	1002.11	0.54	0.00	4.16	1001.75	0.18	0 10:06	0 00:00	0.00	0.00
16	SDMH4	0.00	0.00	997.79	0.10	0.00	4.97	997.79	0.10	0 00:00	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	OC1	6.42	1003.73	3.50	1001.17	0.00	2.56	39.8800	Rectangular	1.500	3.000	0.0010	0.5000	0.5000	0.0000	0.00	No
2	OC2	1.00	1001.36	3.27	998.80	0.00	2.56	256.0000	Rectangular	1.500	2.000	0.0010	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	OC1	1.29	0 10:06	3485.71	0.00	0.00		0.01	0.01	0.00		
2	OC2	0.00	0 00:00	5074.12	0.00	0.00		0.00	0.00	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	P1	383.00	1009.93	0.00	1004.57	1.08	5.36	1.4000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	P10	70.00	1000.23	0.44	1000.06	0.10	0.17	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	P11	40.00	999.96	0.00	999.86	1.06	0.10	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	P12	125.00	998.10	0.30	997.79	0.10	0.31	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	P13	130.00	997.69	0.00	997.37	0.00	0.32	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	P2	15.00	1004.61	0.00	1004.57	1.08	0.04	0.2700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	P3	408.00	1004.47	0.98	1001.34	0.10	3.13	0.7700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	P4	79.00	1001.24	0.00	999.86	1.06	1.38	1.7500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	P5a	20.00	999.91	0.00	999.86	1.06	0.05	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	P5b	34.00	999.94	0.00	999.86	1.06	0.08	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	P6	113.00	998.37	998.37	998.09	0.00	0.28	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	P7	157.00	1006.25	-2.06	1005.86	0.10	0.39	0.2500	CIRCULAR	12.000	12.000	0.0153	0.5000	0.5000	0.0000	0.00	No	1
13	P8	492.00	1005.76	0.00	1001.67	0.10	4.09	0.8300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	P9	45.00	1001.57	0.00	1000.23	0.00	1.34	2.9800	CIRCULAR	12.000	12.000	0.0130	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	P1	0.03	0 18:40	4.21	0.01	1.52	4.20	0.06	0.06	0.00		Calculated
2	P10	1.07	0 10:16	1.76	0.61	2.35	0.50	0.55	0.56	0.00		Calculated
3	P11	1.84	0 10:16	1.78	1.03	2.63	0.25	0.82	0.90	0.00		> CAPACITY
4	P12	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
5	P13	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
6	P2	1.32	0 10:05	1.84	0.72	2.54	0.10	0.63	0.63	0.00		Calculated
7	P3	1.30	0 10:06	3.12	0.42	3.84	1.77	0.45	0.45	0.00		Calculated
8	P4	1.30	0 10:06	4.71	0.28	5.12	0.26	0.35	0.36	0.00		Calculated
9	P5a	1.43	0 10:05	1.78	0.80	2.53	0.13	0.68	0.68	0.00		Calculated
10	P5b	1.49	0 10:05	1.73	0.86	2.48	0.23	0.72	0.72	0.00		Calculated
11	P6	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
12	P7	0.00	0 00:00	3.78	0.00	0.00		0.00	0.00	0.00		Calculated
13	P8	1.30	0 10:06	3.25	0.40	3.96	2.07	0.44	0.44	0.00		Calculated
14	P9	1.29	0 10:06	6.15	0.21	6.20	0.12	0.31	0.31	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1011.40
Max (Rim) Elevation (ft) 1014.46
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1011.40
Ponded Area (ft^2) 0.00
Evaporation Loss 0.00

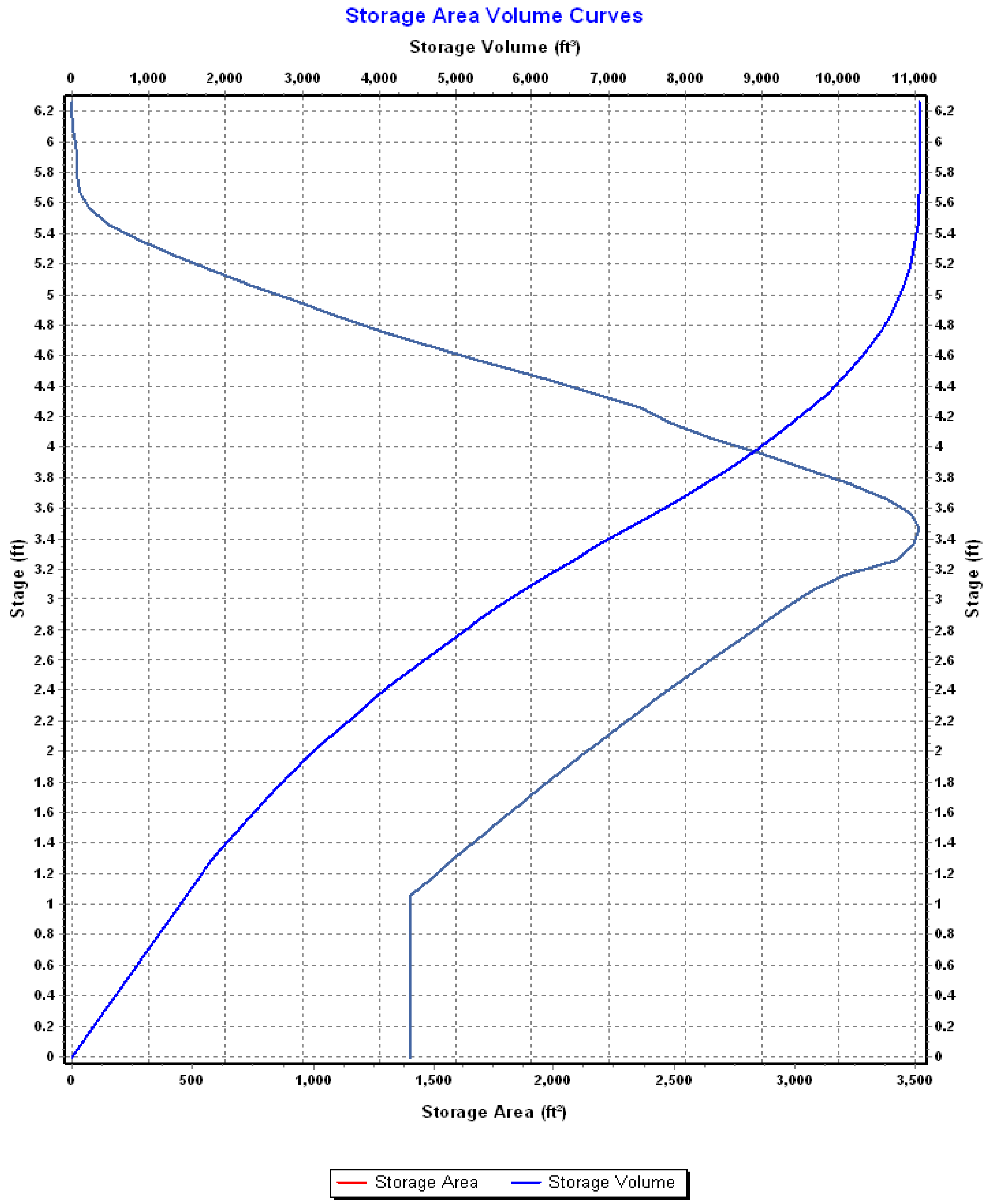
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	1406	0.000
1.06	1406.41	1490.58
1.16	1480.47	1634.92
1.26	1555.24	1786.71
1.36	1630.77	1946.01
1.46	1707.07	2112.90
1.56	1784.14	2287.46
1.66	1861.98	2469.77
1.76	1940.59	2659.90
1.86	2020.12	2857.94
1.96	2100.89	3063.99
2.06	2182.92	3278.18
2.16	2266.21	3500.64
2.26	2350.76	3731.49
2.36	2436.58	3970.86
2.46	2523.66	4218.87
2.52	2576.52	4371.88
2.56	2612.01	4475.65
2.66	2701.62	4741.33
2.76	2792.5	5016.04
2.86	2884.65	5299.90
2.96	2978.05	5593.04
3.06	3072.11	5895.55
3.16	3205.91	6209.45
3.26	3421.78	6540.83
3.36	3493.59	6886.60
3.46	3515.37	7237.05
3.56	3483.18	7586.98
3.66	3379.16	7930.10
3.76	3228.85	8260.50
3.86	3042.58	8574.07
3.96	2846.45	8868.52
4.06	2644.9	9143.09
4.16	2476.74	9399.17
4.26	2357.18	9640.87
4.36	2152.13	9866.34
4.46	1923.09	10070.10
4.56	1699.17	10251.21
4.66	1484.08	10410.37
4.76	1280.57	10548.60
4.86	1096.18	10667.44
4.96	914.98	10768.00
5.06	736.35	10850.57
5.16	570.94	10915.93
5.26	418.64	10965.41
5.36	279.43	11000.31
5.46	153.32	11021.95
5.56	72.06	11033.22
5.66	32.33	11038.44
5.76	22.84	11041.20
5.86	20.61	11043.37
5.96	14.31	11045.12
6.06	6.81	11046.18
6.16	2.03	11046.62
6.26	0.06	11046.72


Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
Stage (ft)
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (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	OR1	Bottom	CIRCULAR	No	24.00			1013.96	0.61

Output Summary Results

Peak Inflow (cfs) 1.37
Peak Lateral Inflow (cfs) 1.37
Peak Outflow (cfs) 0.03
Peak Exfiltration Flow Rate (cfm) 2.73
Max HGL Elevation Attained (ft) 1013.97
Max HGL Depth Attained (ft) 2.57
Average HGL Elevation Attained (ft) 1012.79
Average HGL Depth Attained (ft) 1.39
Time of Max HGL Occurrence (days hh:mm) 0 18:37
Total Exfiltration Volume (1000-ft³) 2.368
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1009.68
Max (Rim) Elevation (ft) 1012.74
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1009.68
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

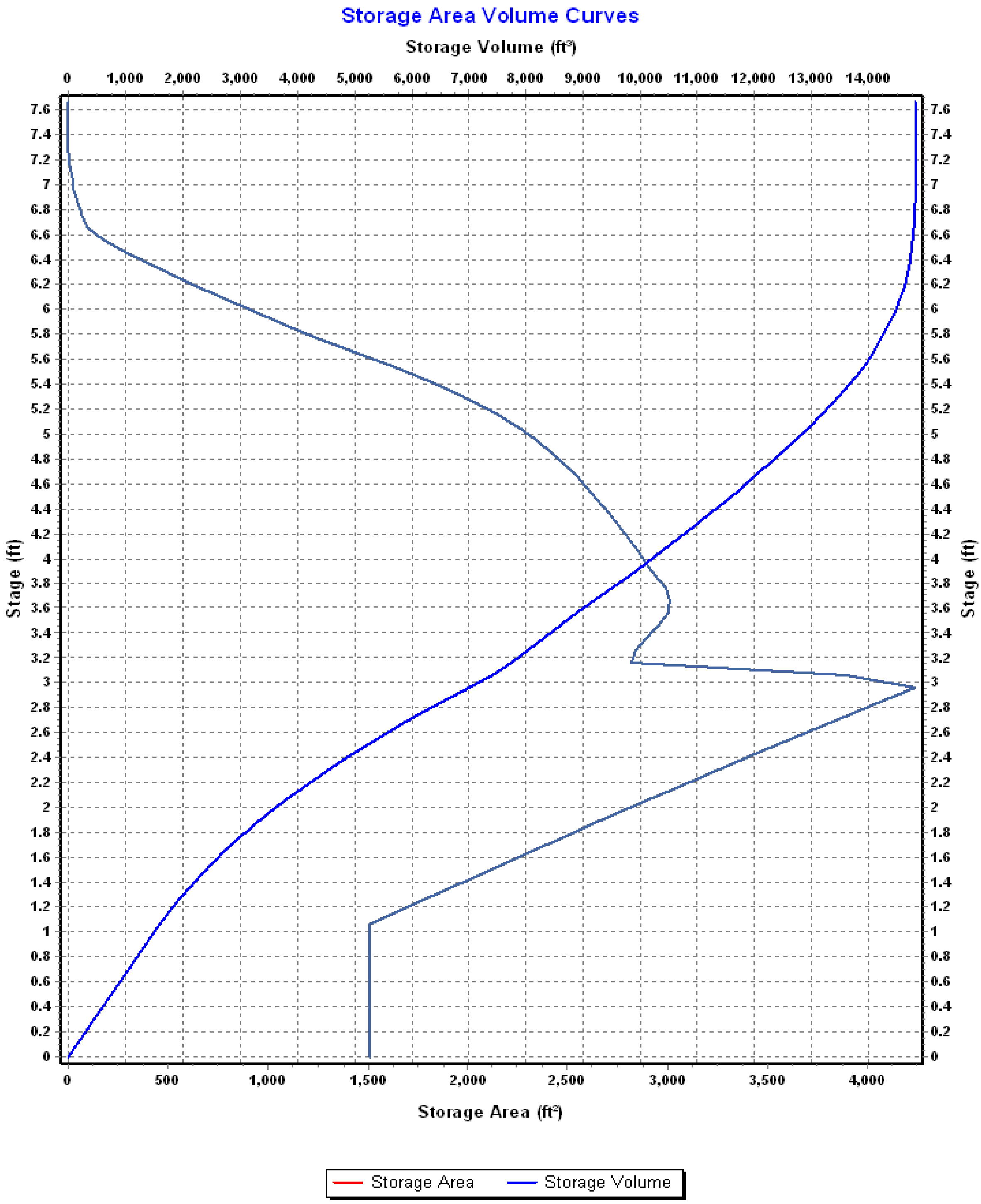
Exfiltration Rate (in/hr) 0.8500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1509	0.000
1.06	1509.71	1599.92
1.16	1643.71	1757.59
1.26	1778.63	1928.71
1.36	1914.59	2113.37
1.46	2051.6	2311.68
1.56	2189.68	2523.74
1.66	2328.85	2749.67
1.76	2469.09	2989.57
1.86	2610.42	3243.55
1.96	2752.84	3511.71
2.06	2896.36	3794.17
2.16	3041	4091.04
2.26	3186.76	4402.43
2.36	3333.64	4728.45
2.46	3481.65	5069.21
2.5	3541.17	5209.67
2.56	3630.78	5424.83
2.66	3781.07	5795.42
2.76	3932.5	6181.10
2.86	4085.08	6581.98
2.96	4238.81	6998.17
3.06	3893.63	7404.79
3.16	2818.58	7740.40
3.26	2841.8	8023.42
3.36	2894.46	8310.23
3.46	2958.61	8602.88
3.56	3003.95	8901.01
3.66	3008.97	9201.66
3.76	2988.5	9501.53
3.86	2941.33	9798.02
3.96	2895.87	10089.88
4.06	2850.77	10377.21
4.16	2804.84	10659.99
4.26	2758.57	10938.16
4.36	2709.87	11211.58
4.46	2658.38	11479.99
4.56	2603.81	11743.10
4.66	2544.42	12000.51
4.76	2480.66	12251.76
4.86	2410.91	12496.34
4.96	2336.82	12733.73
5.06	2248.65	12963.00
5.16	2143.37	13182.60
5.26	2023.25	13390.93
5.36	1890.68	13586.63
5.46	1744.92	13768.41
5.56	1587.46	13935.03
5.66	1421.65	14085.49
5.76	1248.08	14218.98
5.86	1101.15	14336.44
5.96	957.13	14439.35
6.06	812.08	14527.81
6.16	668.84	14601.86
6.26	532.55	14661.93
6.36	403.26	14708.72
6.46	284.36	14743.10
6.56	177.83	14766.21
6.66	97.81	14779.99
6.76	71.62	14788.46
6.86	48.37	14794.46
6.96	30.72	14798.41
7.06	17.84	14800.84
7.16	7.04	14802.08
7.26	3.14	14802.59
7.36	1.97	14802.85
7.46	2.5	14803.07
7.56	1.02	14803.25

7.66	0.2	14803.31



Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
Storage Area (ft²)
0 500 1,000 1,500 2,000 2,500 3,000 3,500 4,000
Storage Area
Storage Volume

Storage Node : BR2 (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	OR2	Bottom	CIRCULAR	No	24.00			1012.24	0.61

Output Summary Results

Peak Inflow (cfs) 1.34
Peak Lateral Inflow (cfs) 1.34
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 3.57
Max HGL Elevation Attained (ft) 1011.83
Max HGL Depth Attained (ft) 2.15
Average HGL Elevation Attained (ft) 1010.85
Average HGL Depth Attained (ft) 1.17
Time of Max HGL Occurrence (days hh:mm) 0 20:53
Total Exfiltration Volume (1000-ft³) 3.016
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR3

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1001.86
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

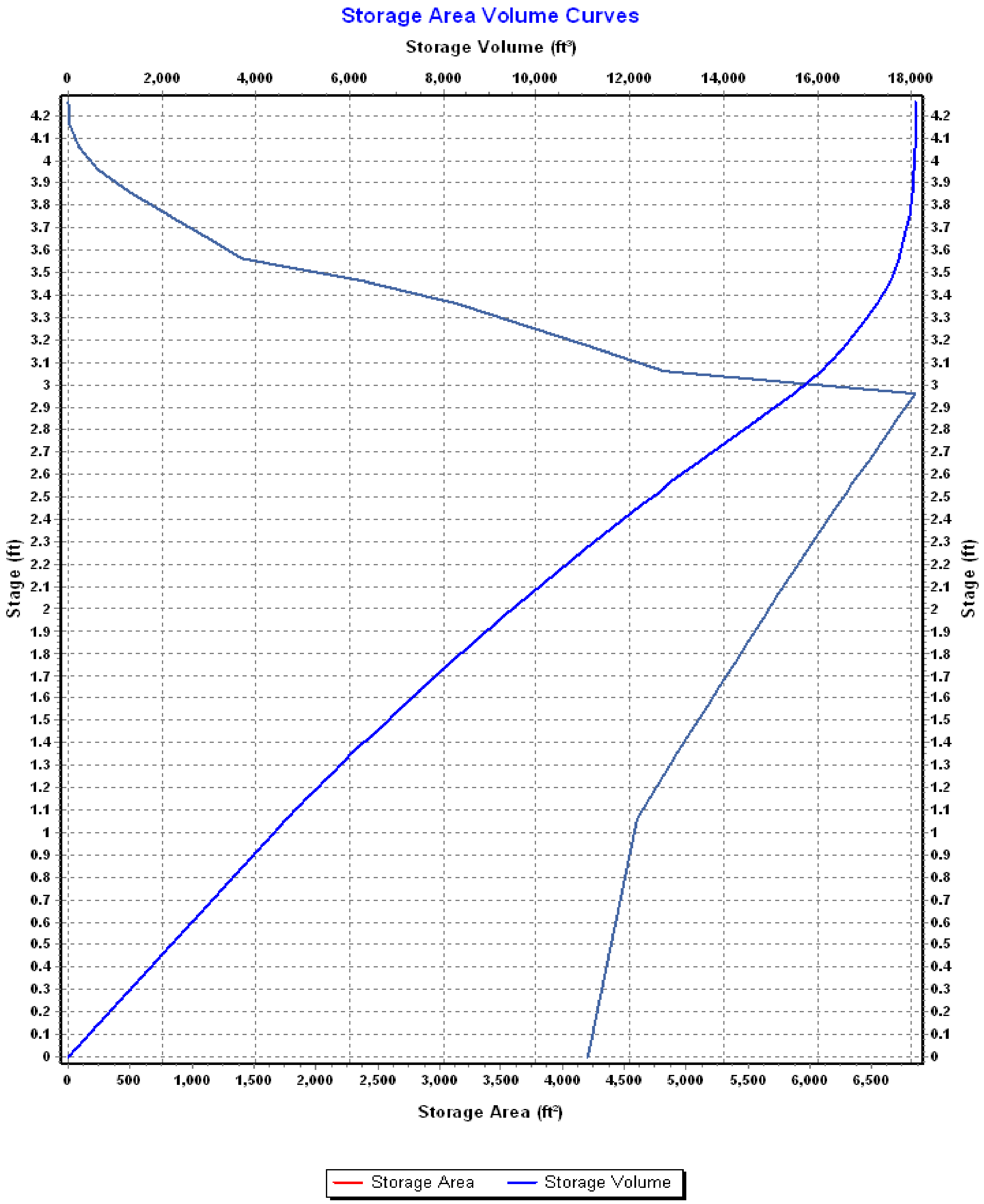
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR3

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	4202	0.000
1.06	4602.78	4666.53
1.16	4712.04	5132.27
1.26	4822.31	5608.99
1.36	4933.57	6096.78
1.46	5045.82	6595.75
1.56	5159.08	7106.00
1.66	5273.33	7627.62
1.76	5388.58	8160.72
1.86	5504.82	8705.39
1.96	5622.06	9261.73
2.06	5740.3	9829.85
2.16	5859.54	10409.84
2.26	5979.77	11001.81
2.36	6101.01	11605.85
2.46	6223.23	12222.06
2.52	6297.05	12597.67
2.56	6346.46	12850.54
2.66	6470.68	13491.40
2.76	6595.9	14144.73
2.86	6722.12	14810.63
2.96	6849.33	15489.20
3.06	4821.94	16072.76
3.16	4269.29	16527.32
3.26	3701.61	16925.87
3.36	3145.79	17268.24
3.46	2385.68	17544.81
3.56	1403.4	17734.26
3.66	1106.4	17859.75
3.76	805.95	17955.37
3.86	493.74	18020.35
3.96	245.04	18057.29
4.06	86.03	18073.84
4.16	14	18078.84
4.26	0.09	18079.54


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Stage (ft)
4.2
4.1
4
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500
6,000
6,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR3 (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	OR3	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 2.92
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 7.47
Max HGL Elevation Attained (ft) 1000.64
Max HGL Depth Attained (ft) 1.84
Average HGL Elevation Attained (ft) 999.77
Average HGL Depth Attained (ft) 0.97
Time of Max HGL Occurrence (days hh:mm) 0 21:18
Total Exfiltration Volume (1000-ft³) 6.617
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR4

Input Data

Invert Elevation (ft) 1001.17
Max (Rim) Elevation (ft) 1004.23
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1001.17
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

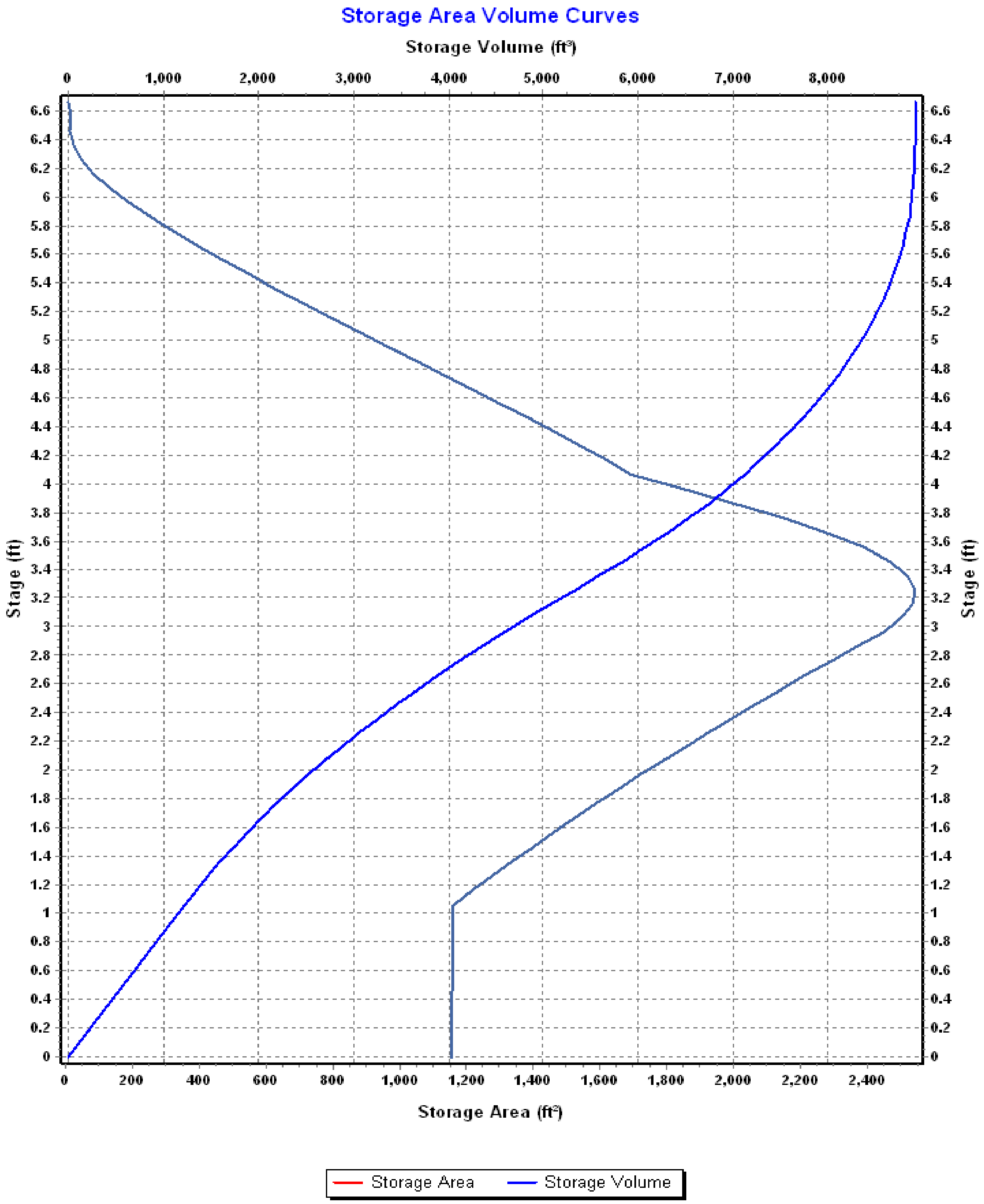
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 1.6700

Storage Area Volume Curves

Storage Curve : BR4

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1157	0.000
1.06	1157.62	1226.75
1.16	1215.18	1345.39
1.26	1273.86	1469.84
1.36	1333.68	1600.22
1.46	1394.62	1736.64
1.56	1456.7	1879.21
1.66	1519.9	2028.04
1.76	1584.24	2183.25
1.86	1649.71	2344.95
1.96	1716.31	2513.25
2.06	1784.03	2688.27
2.16	1852.89	2870.12
2.26	1922.88	3058.91
2.36	1994	3254.75
2.46	2066.25	3457.76
2.49	2088.15	3520.08
2.56	2139.64	3668.05
2.66	2214.15	3885.74
2.76	2289.79	4110.94
2.86	2366.56	4343.76
2.96	2444.47	4584.31
3.06	2503.88	4831.73
3.16	2536.19	5083.73
3.26	2543.4	5337.71
3.36	2518.39	5590.80
3.46	2464.18	5839.93
3.56	2384.46	6082.36
3.66	2275.89	6315.38
3.76	2146.68	6536.51
3.86	2004.26	6744.06
3.96	1849.65	6936.76
4.06	1693.56	7113.92
4.16	1620.49	7279.62
4.26	1542.67	7437.78
4.36	1462.92	7588.06
4.46	1382.21	7730.32
4.56	1298.91	7864.38
4.66	1214.58	7990.05
4.76	1129.66	8107.26
4.86	1044.43	8215.96
4.96	959.13	8316.14
5.06	873.72	8407.78
5.16	790.35	8490.98
5.26	707.66	8565.88
5.36	625.29	8632.53
5.46	547.18	8691.15
5.56	470.39	8742.03
5.66	394.33	8785.27
5.76	324.47	8821.21
5.86	256.35	8850.25
5.96	189.71	8872.55
6.06	133.98	8888.73
6.16	83.68	8899.61
6.26	48.53	8906.22
6.36	26.06	8909.95
6.46	14.03	8911.95
6.56	14.79	8913.39
6.66	8.38	8914.55



Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Stage (ft)
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR4 (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	O4	Bottom	CIRCULAR	No	24.00			1003.29	0.61

Output Summary Results

Peak Inflow (cfs) 2.30
Peak Lateral Inflow (cfs) 1.05
Peak Outflow (cfs) 1.07
Peak Exfiltration Flow Rate (cfm) 4.46
Max HGL Elevation Attained (ft) 1003.43
Max HGL Depth Attained (ft) 2.26
Average HGL Elevation Attained (ft) 1002.44
Average HGL Depth Attained (ft) 1.27
Time of Max HGL Occurrence (days hh:mm) 0 10:16
Total Exfiltration Volume (1000-ft³) 3.979
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR5

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1003.05
Max (Rim) Offset (ft) 4.25
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

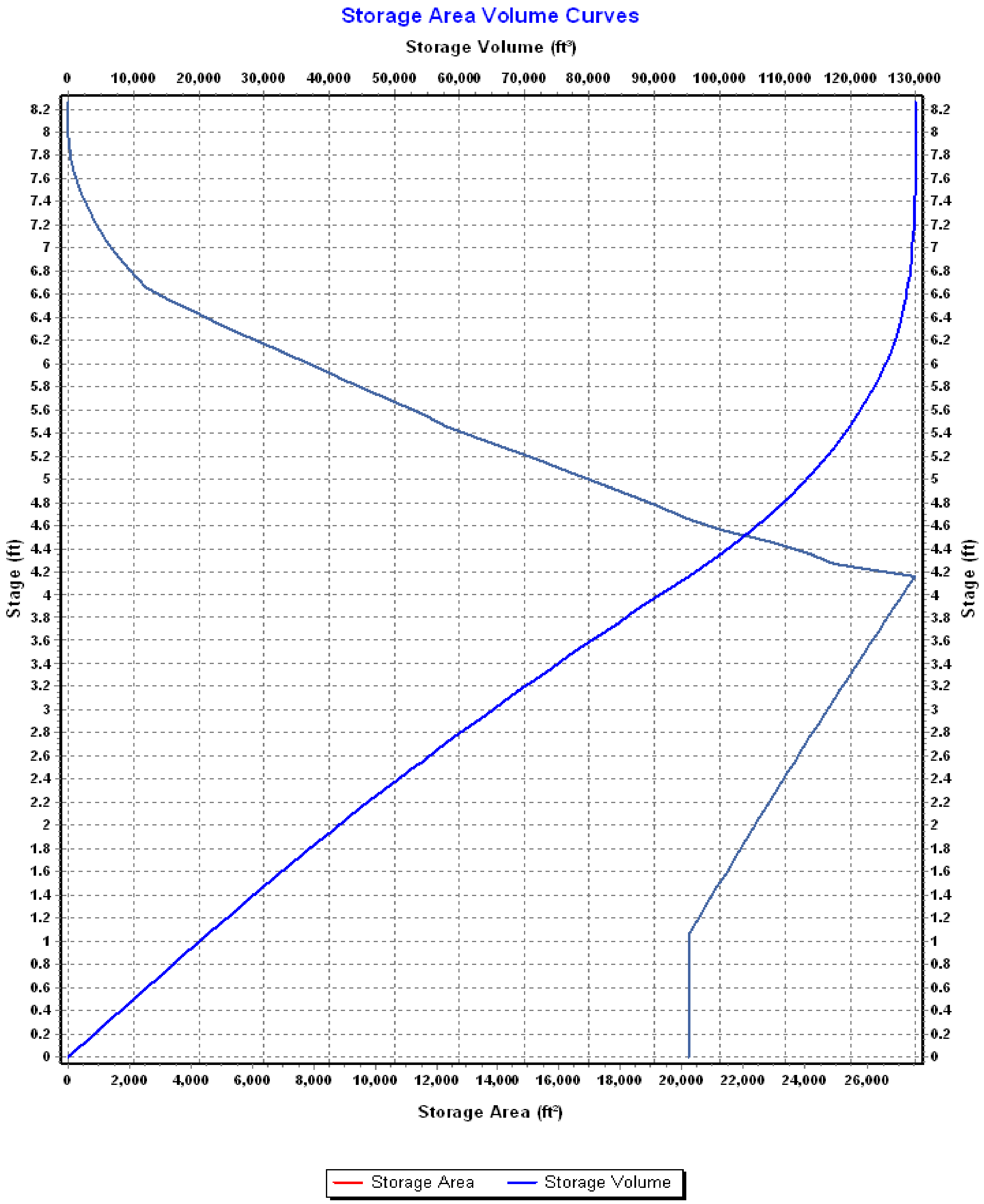
Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR5

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	20214	0.000
1.06	20215.03	21427.39
1.16	20437.65	23460.02
1.26	20661.27	25514.97
1.36	20885.87	27592.33
1.46	21111.46	29692.20
1.56	21338.05	31814.68
1.66	21565.62	33959.86
1.76	21794.18	36127.85
1.86	22023.72	38318.75
1.96	22254.26	40532.65
2.06	22485.78	42769.65
2.16	22718.3	45029.85
2.26	22951.8	47313.36
2.36	23186.29	49620.26
2.46	23421.77	51950.66
2.52	23563.54	53360.22
2.56	23658.24	54304.66
2.66	23895.7	56682.36
2.76	24134.15	59083.85
2.86	24373.58	61509.24
2.96	24614.01	63958.62
3.06	24855.42	66432.09
3.16	25097.82	68929.75
3.26	25341.21	71451.70
3.36	25585.59	73998.04
3.46	25830.96	76568.87
3.56	26077.32	79164.28
3.66	26324.66	81784.38
3.76	26573	84429.26
3.86	26822.32	87099.03
3.96	27072.63	89793.78
4.06	27323.93	92513.61
4.16	27576.22	95258.62
4.26	24935.38	97884.20
4.36	24024.32	100332.19
4.46	22764.39	102671.63
4.56	21271	104873.40
4.66	20160.51	106944.98
4.76	19229.97	108914.50
4.86	18281.25	110790.06
4.96	17314.48	112569.85
5.06	16331.1	114252.13
5.16	15332.24	115835.30
5.26	14319.21	117317.87
5.36	13293.07	118698.48
5.46	12321.72	119979.22
5.56	11498.38	121170.23
5.66	10666.17	122278.46
5.76	9824.09	123302.97
5.86	8977.65	124243.06
5.96	8130.16	125098.45
6.06	7284.67	125869.19
6.16	6443.94	126555.62
6.26	5613.4	127158.49
6.36	4794.72	127678.90
6.46	3989.93	128118.13
6.56	3201.03	128477.68
6.66	2514.65	128763.46
6.76	2163.03	128997.34
6.86	1832.56	129197.12
6.96	1526.32	129365.06
7.06	1250.46	129503.90
7.16	1001.28	129616.49
7.26	786.61	129705.88
7.36	609.46	129775.68
7.46	461.78	129829.24
7.56	329.31	129868.79

7.66	192.14	129894.86
7.76	95.82	129909.26
7.86	34.15	129915.76
7.96	4.84	129917.71
8.06	0	129917.95
8.16	4.45	129918.17
8.26	0.24	129918.40



Storage Area Volume Curves
Storage Volume (ft³)
0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000 110,000 120,000 130,000
Stage (ft)
8.2 8 7.8 7.6 7.4 7.2 7 6.8 6.6 6.4 6.2 6 5.8 5.6 5.4 5.2 5 4.8 4.6 4.4 4.2 4 3.8 3.6 3.4 3.2 3 2.8 2.6 2.4 2.2 2 1.8 1.6 1.4 1.2 1 0.8 0.6 0.4 0.2 0
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR5 (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	OR5	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 2.92
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 27.51
Max HGL Elevation Attained (ft) 999.07
Max HGL Depth Attained (ft) 0.27
Average HGL Elevation Attained (ft) 998.88
Average HGL Depth Attained (ft) 0.08
Time of Max HGL Occurrence (days hh:mm) 0 12:44
Total Exfiltration Volume (1000-ft³) 18.434
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

25-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods .... YES

Analysis Options

Start Analysis On	Oct 13, 2022	00:00:00
End Analysis On	Oct 14, 2022	00:00:00
Start Reporting On	Oct 13, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins...	9
Nodes...	23
Junctions	16
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links...	21
Channels	2
Pipes	14
Pumps	0
Orifices	5
Weirs	0
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	Post-Development	Time Series	25-year	Cumulative	inches	California	San Bernardino (Baker)	25	2.07	SCS Type I 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	A01	2.26	92.00	2.07	1.30	2.94	2.07	0 00:10:00
2	A02	2.21	92.00	2.07	1.30	2.87	2.02	0 00:10:00
3	A3	2.17	92.00	2.07	1.30	2.82	1.99	0 00:10:00
4	A4	2.17	92.00	2.07	1.30	2.82	1.99	0 00:10:00
5	A5a	2.36	92.00	2.07	1.30	3.07	2.16	0 00:10:00
6	A5b	2.46	92.00	2.07	1.30	3.20	2.25	0 00:10:00
7	A6	2.72	92.00	2.07	1.30	3.54	2.49	0 00:10:00
8	A7	1.72	92.00	2.07	1.30	2.24	1.58	0 00:10:00
9	PRE-DEV	15.11	77.00	2.07	0.49	7.34	1.13	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	BU1	Junction	998.09	1003.05	998.09	0.00	0.00	0.09	1001.36	0.00	1.69	0 00:00	0.00	0.00
2	BU2	Junction	1000.23	1004.23	1000.23	0.00	0.00	1.94	1003.74	0.00	1.49	0 00:00	0.00	0.00
3	J1	Junction	1004.61	1009.61	1004.61	0.00	0.00	1.96	1009.61	0.00	0.00	0 10:05	0.00	4.00
4	J2a	Junction	999.91	1003.24	999.91	0.00	0.00	2.14	1003.24	0.00	0.00	0 10:05	0.03	10.00
5	J2b	Junction	999.94	1002.15	999.94	0.00	0.00	2.22	1002.15	0.00	0.00	0 10:05	0.05	12.00
6	J3	Junction	1005.76	1010.36	1005.76	0.00	0.00	1.96	1006.32	0.00	4.04	0 00:00	0.00	0.00
7	J4	Junction	999.96	1005.68	999.96	0.00	0.00	4.22	1005.68	0.00	0.00	0 10:05	0.54	27.00
8	Jun-23	Junction	0.00	6.00	0.00	6.00	0.00	0.09	998.52	0.00	0.85	0 00:00	0.00	0.00
9	O1	Junction	1009.93	1014.46	1009.93	0.00	0.00	0.20	1010.08	0.00	4.38	0 00:00	0.00	0.00
10	O2	Junction	1008.31	1011.81	1008.31	0.00	0.00	0.06	1008.40	0.00	3.41	0 00:00	0.00	0.00
11	O4	Junction	999.79	1003.29	999.79	0.00	0.00	3.15	1003.29	0.00	0.00	0 10:08	0.21	16.00
12	O5	Junction	997.80	1003.05	997.80	0.00	0.00	0.00	998.10	0.00	4.95	0 00:00	0.00	0.00
13	SDMH1	Junction	1003.49	1009.45	1003.49	0.00	0.00	1.93	1005.57	0.00	3.88	0 00:00	0.00	0.00
14	SDMH2	Junction	1001.24	1005.72	1001.24	6.00	0.00	1.91	1001.91	0.00	3.81	0 00:00	0.00	0.00
15	SDMH3	Junction	1001.57	1006.27	1001.57	6.00	0.00	1.93	1002.23	0.00	4.04	0 00:00	0.00	0.00
16	SDMH4	Junction	997.69	1002.76	997.69	0.00	0.00	0.00	997.79	0.00	4.97	0 00:00	0.00	0.00
17	OUT1	Outfall	997.37					0.00	997.37					
18	WASH-PRE	Outfall	998.73					1.13	998.73					
19	BR1	Storage Node	1011.40	1014.46	0.00		0.00	2.04	1014.00				0.00	0.00
20	BR2	Storage Node	1009.68	1012.74	0.00		0.00	2.00	1012.26				0.00	0.00
21	BR3	Storage Node	998.80	1001.86	0.00		0.00	3.63	1001.39				0.00	0.00
22	BR4	Storage Node	1001.17	1004.23	0.00		0.00	3.45	1003.57				0.00	0.00
23	BR5	Storage Node	998.80	1003.05	0.00		0.00	3.67	999.46				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	P1	Pipe	O1	SDMH1	383.00	1009.93	1004.57	1.4000	12.000	0.0130	0.20	4.21	0.05	2.76	0.15	0.15	0.00	Calculated
2	P10	Pipe	O4	J4	70.00	1000.23	1000.06	0.2400	12.000	0.0130	1.86	1.76	1.06	2.63	1.00	1.00	14.00	SURCHARGED
3	P11	Pipe	J4	BR5	40.00	999.96	999.86	0.2500	12.000	0.0130	1.87	1.78	1.05	2.63	1.00	1.00	24.00	SURCHARGED
4	P12	Pipe	O5	SDMH4	125.00	998.10	997.79	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
5	P13	Pipe	SDMH4	OUT1	130.00	997.69	997.37	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
6	P2	Pipe	J1	SDMH1	15.00	1004.61	1004.57	0.2700	12.000	0.0130	1.93	1.84	1.05	2.70	0.98	1.00	0.00	> CAPACITY
7	P3	Pipe	SDMH1	SDMH2	408.00	1004.47	1001.34	0.7700	12.000	0.0130	1.91	3.12	0.61	4.26	0.56	0.56	0.00	Calculated
8	P4	Pipe	SDMH2	BR5	79.00	1001.24	999.86	1.7500	12.000	0.0130	1.89	4.71	0.40	5.68	0.44	0.44	0.00	Calculated
9	P5a	Pipe	J2a	BR3	20.00	999.91	999.86	0.2500	12.000	0.0130	1.91	1.78	1.07	2.61	1.00	1.00	5.00	SURCHARGED
10	P5b	Pipe	J2b	BR3	34.00	999.94	999.86	0.2400	12.000	0.0130	1.84	1.73	1.06	2.54	1.00	1.00	9.00	SURCHARGED
11	P6	Pipe	Jun-23	BU1	113.00	998.37	998.09	0.2500	12.000	0.0130	0.09	1.77	0.05	1.17	0.15	0.15	0.00	Calculated
12	P7	Pipe	O2	J3	157.00	1006.25	1005.86	0.2500	12.000	0.0153	0.06	3.78	0.02	1.79	0.09	0.09	0.00	Calculated
13	P8	Pipe	J3	SDMH3	492.00	1005.76	1001.67	0.8300	12.000	0.0130	1.93	3.25	0.60	4.38	0.55	0.55	0.00	Calculated
14	P9	Pipe	SDMH3	BU2	45.00	1001.57	1000.23	2.9800	12.000	0.0130	1.94	6.15	0.31	6.93	0.38	0.39	0.00	Calculated
15	OC1	Channel	BU2	BR4	6.42	1003.73	1001.17	39.8800	18.000	0.0010	1.94	3485.71	0.00	50.00	0.01	0.01	0.00	
16	OC2	Channel	BU1	BR5	1.00	1001.36	998.80	256.0000	18.000	0.0010	0.09	5074.12	0.00	0.00	0.00	0.00	0.00	
17	O4	Orifice	BR4	O4		1001.17	999.79		24.000		3.15							
18	OR1	Orifice	BR1	O1		1011.40	1009.93		24.000		0.20							
19	OR2	Orifice	BR2	O2		1009.68	1008.31		24.000		0.06							
20	OR3	Orifice	BR3	Jun-23		998.80	0.00		24.000		0.09							
21	OR5	Orifice	BR5	O5		998.80	997.80		24.000		0.00							

Subbasin Hydrology

Subbasin : A01

Input Data

Area (ac) 2.26
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.48	B	92.00
Composite Area & Weighted CN	1.48		92.00

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 :

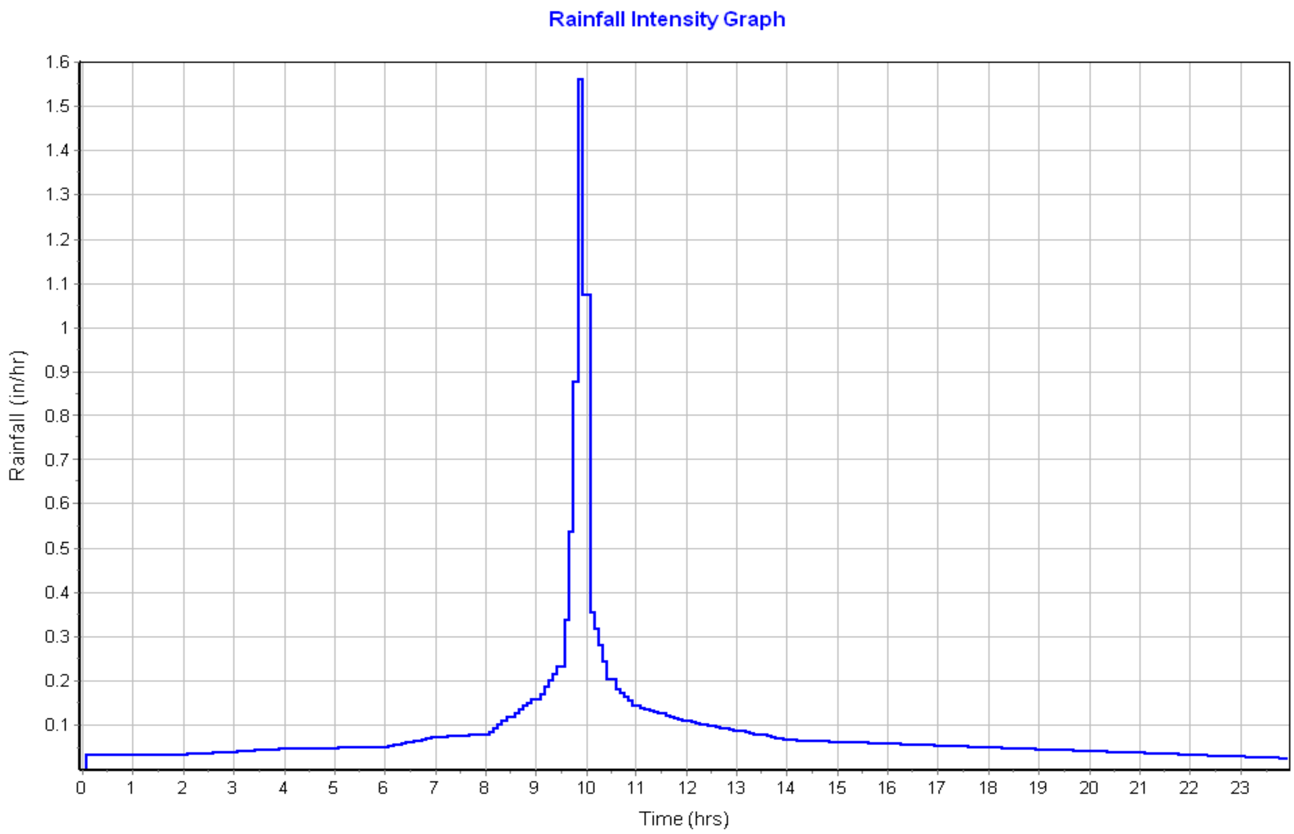
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

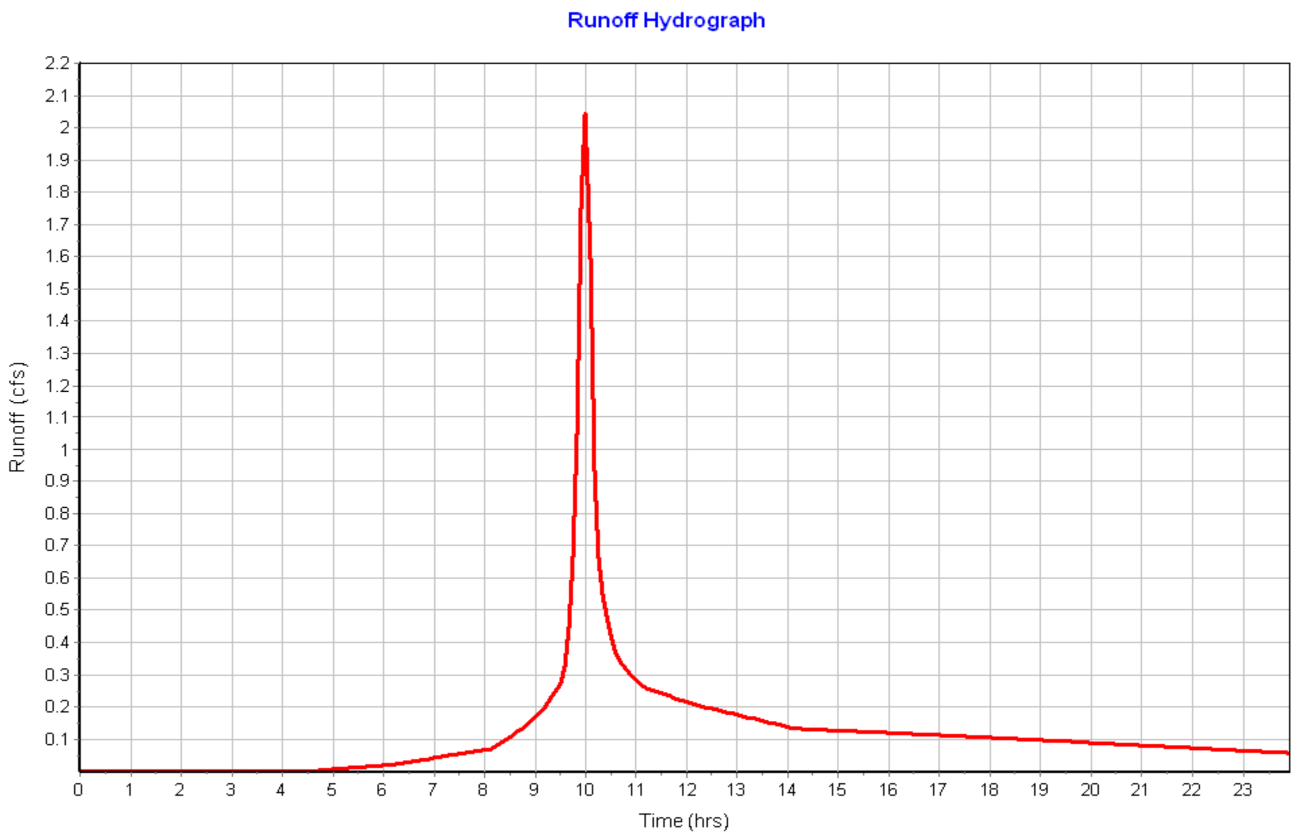
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 2.07
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A01





Subbasin : A02

Input Data

Area (ac) 2.21
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.21	B	92.00
Composite Area & Weighted CN	2.21		92.00

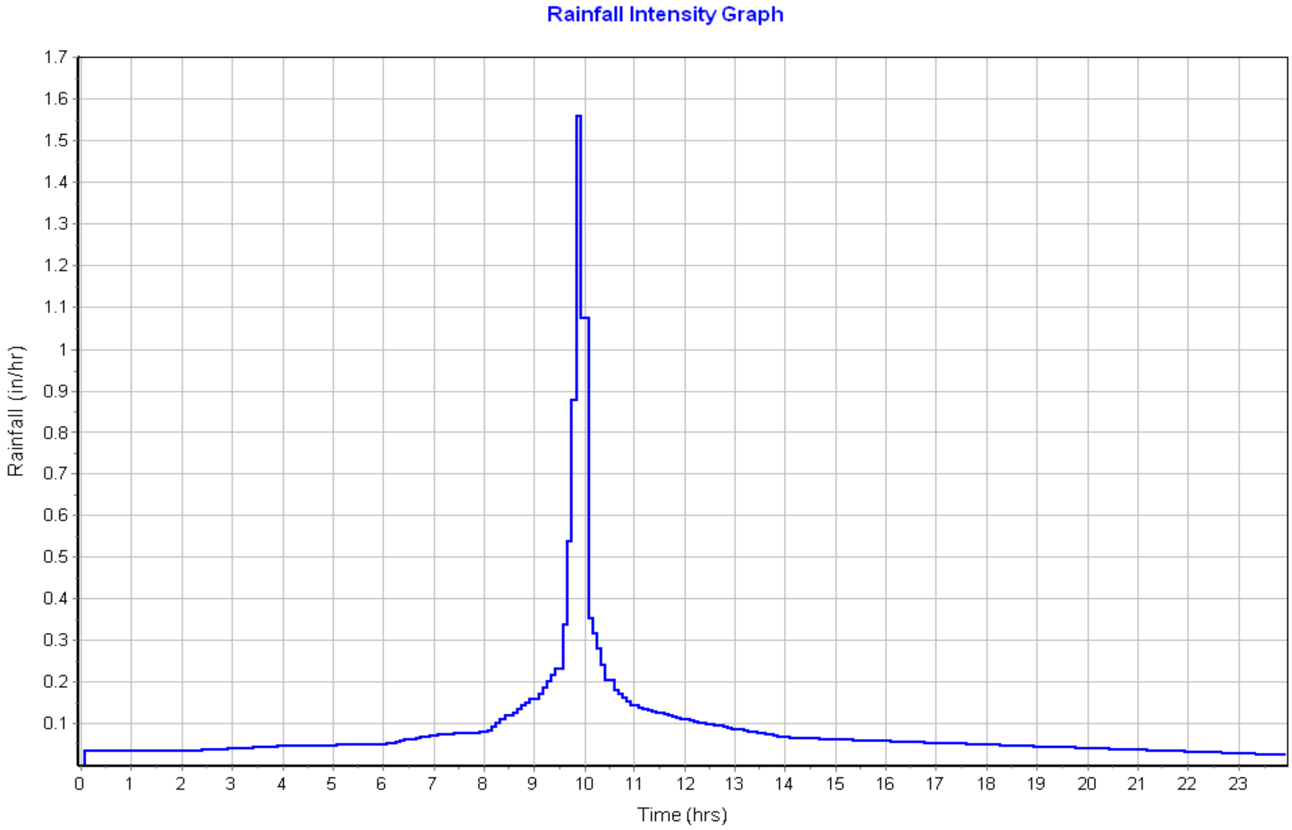
Time of Concentration

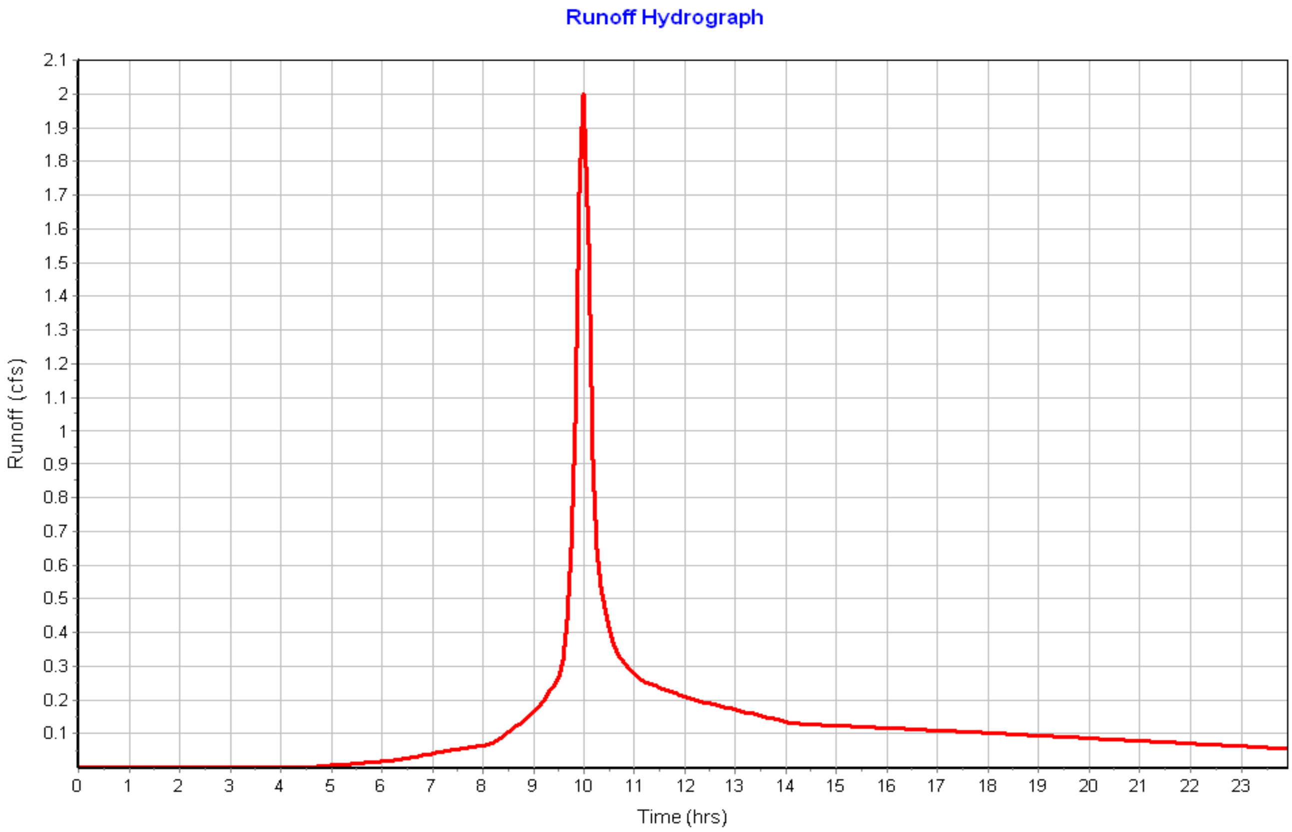
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 2.02
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A02





Subbasin : A3

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

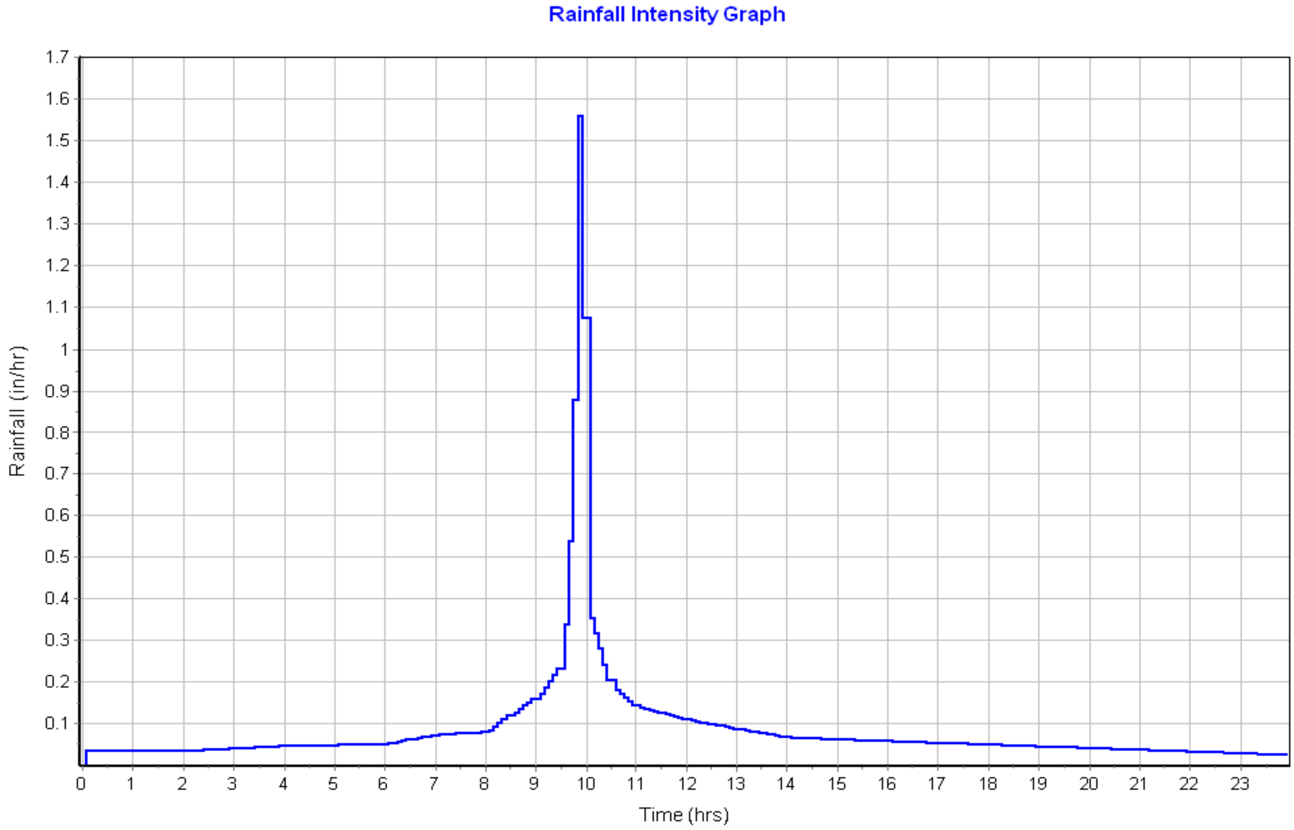
Time of Concentration

User-Defined TOC override (minutes): 10

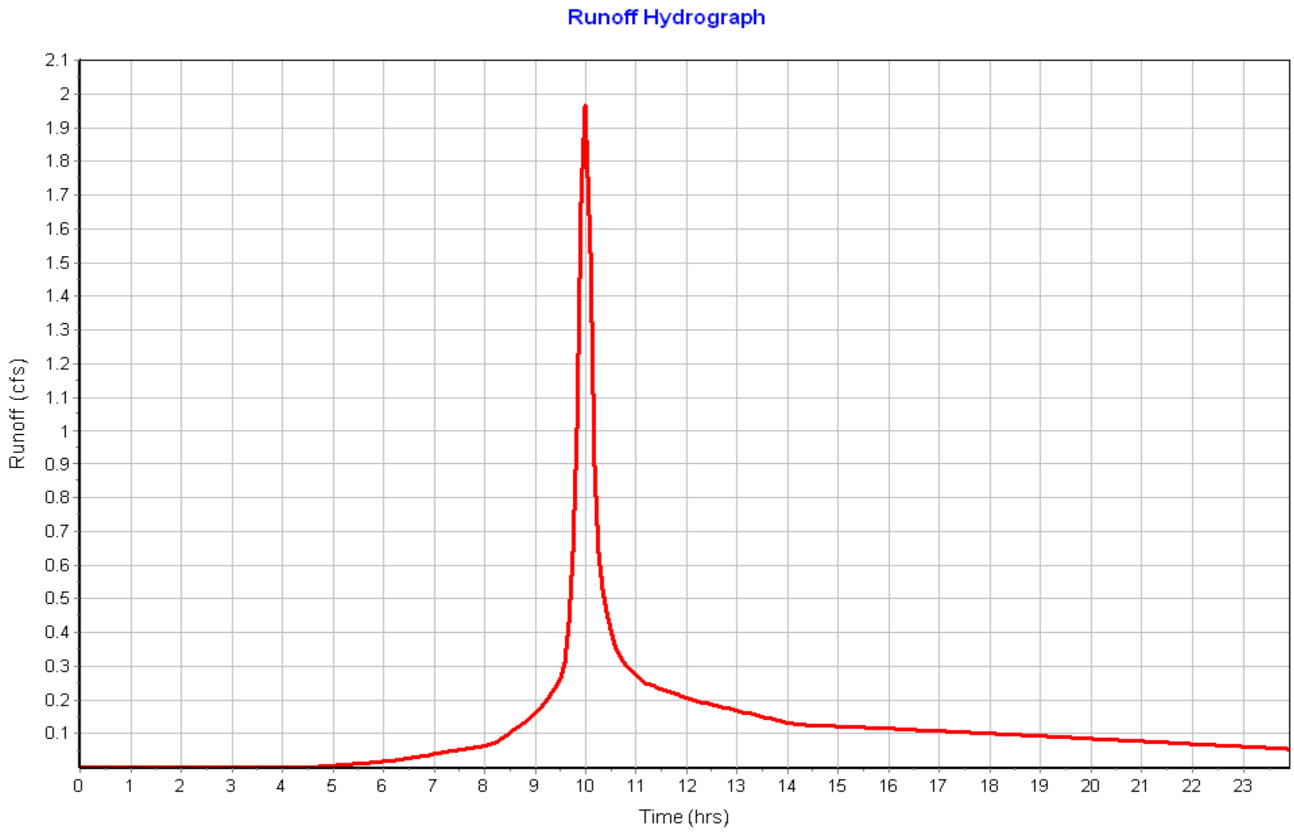
Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 1.99
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A3



Rainfall Intensity Graph
Rainfall (in/hr)
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A4

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

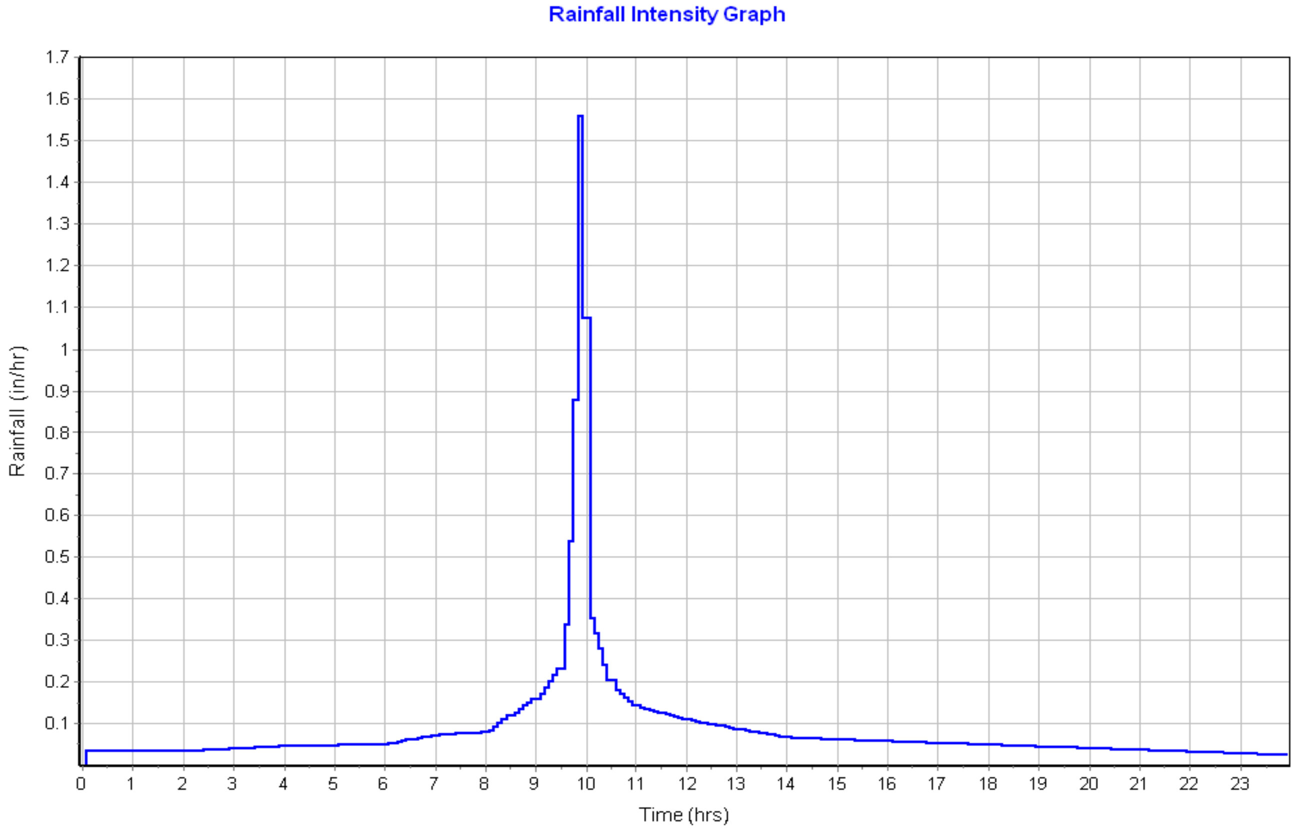
Time of Concentration

User-Defined TOC override (minutes): 10

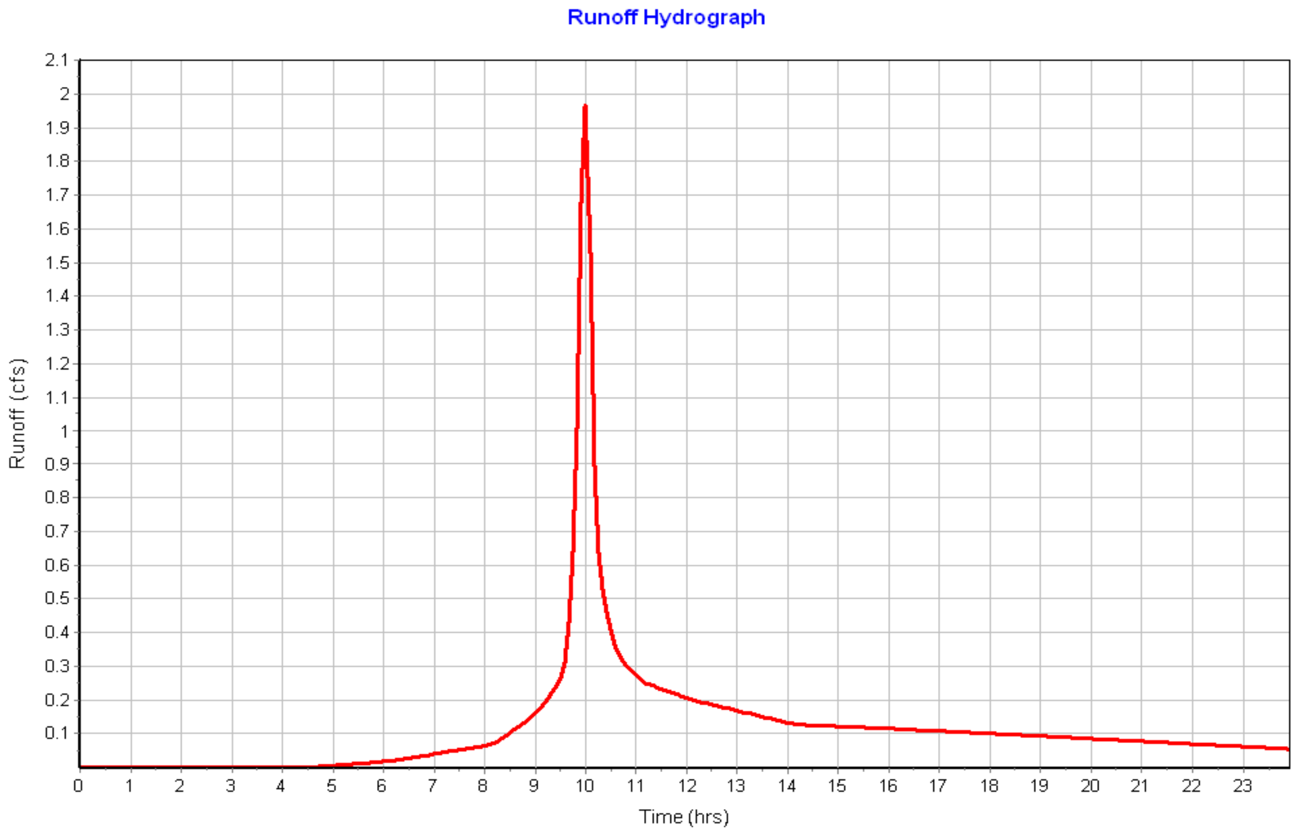
Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 1.99
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A4



Rainfall Intensity Graph
Rainfall (in/hr)
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A5a

Input Data

Area (ac) 2.36
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.66	B	92.00
Composite Area & Weighted CN	1.66		92.00

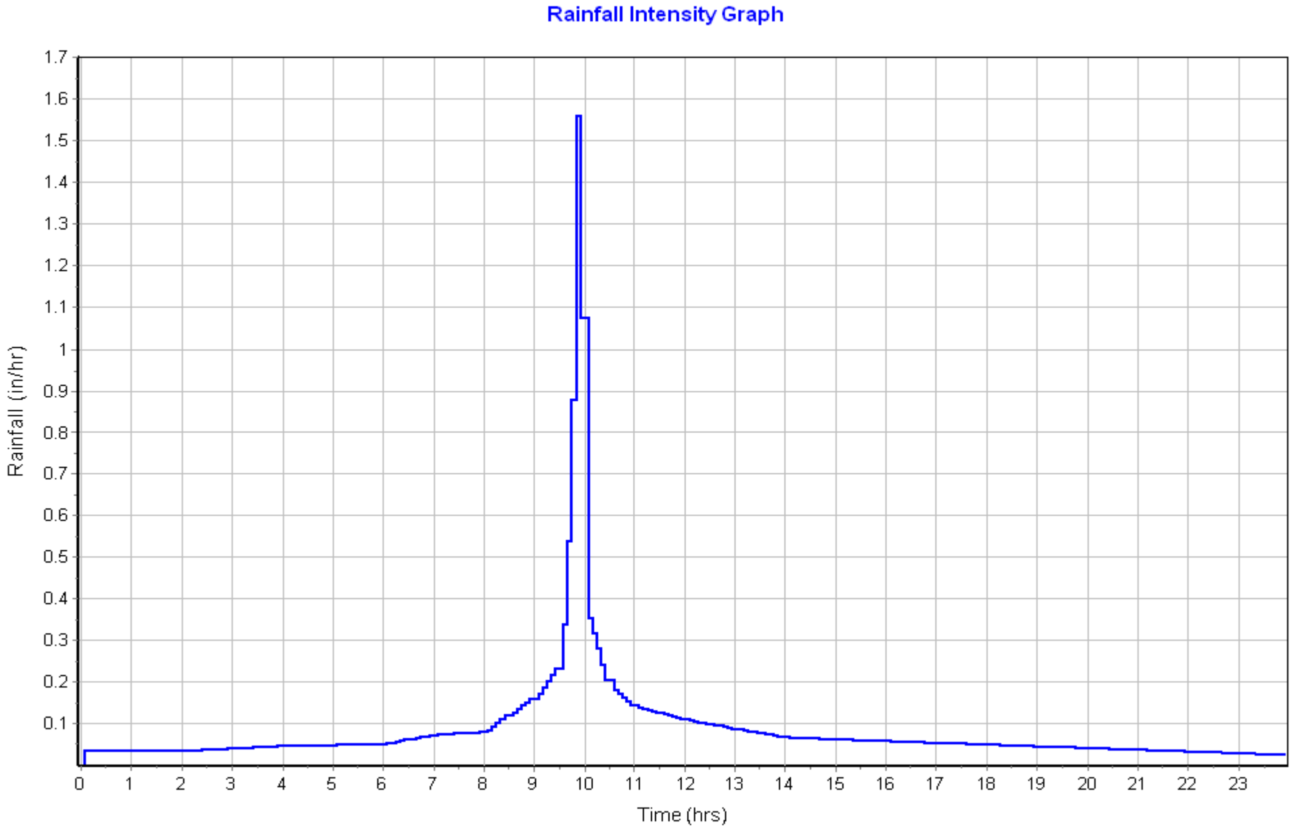
Time of Concentration

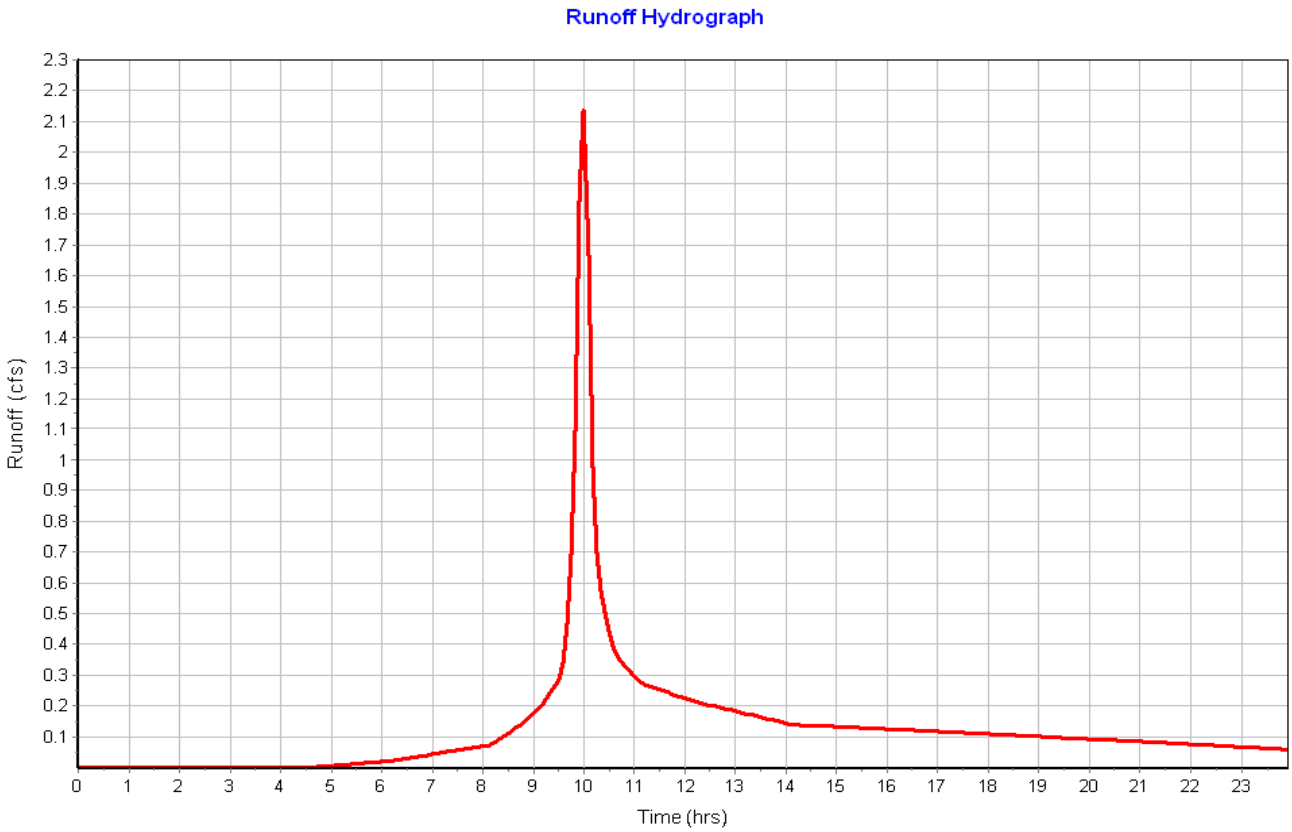
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 2.16
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5a





Subbasin : A5b

Input Data

Area (ac) 2.46
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.46	B	92.00
Composite Area & Weighted CN	2.46		92.00

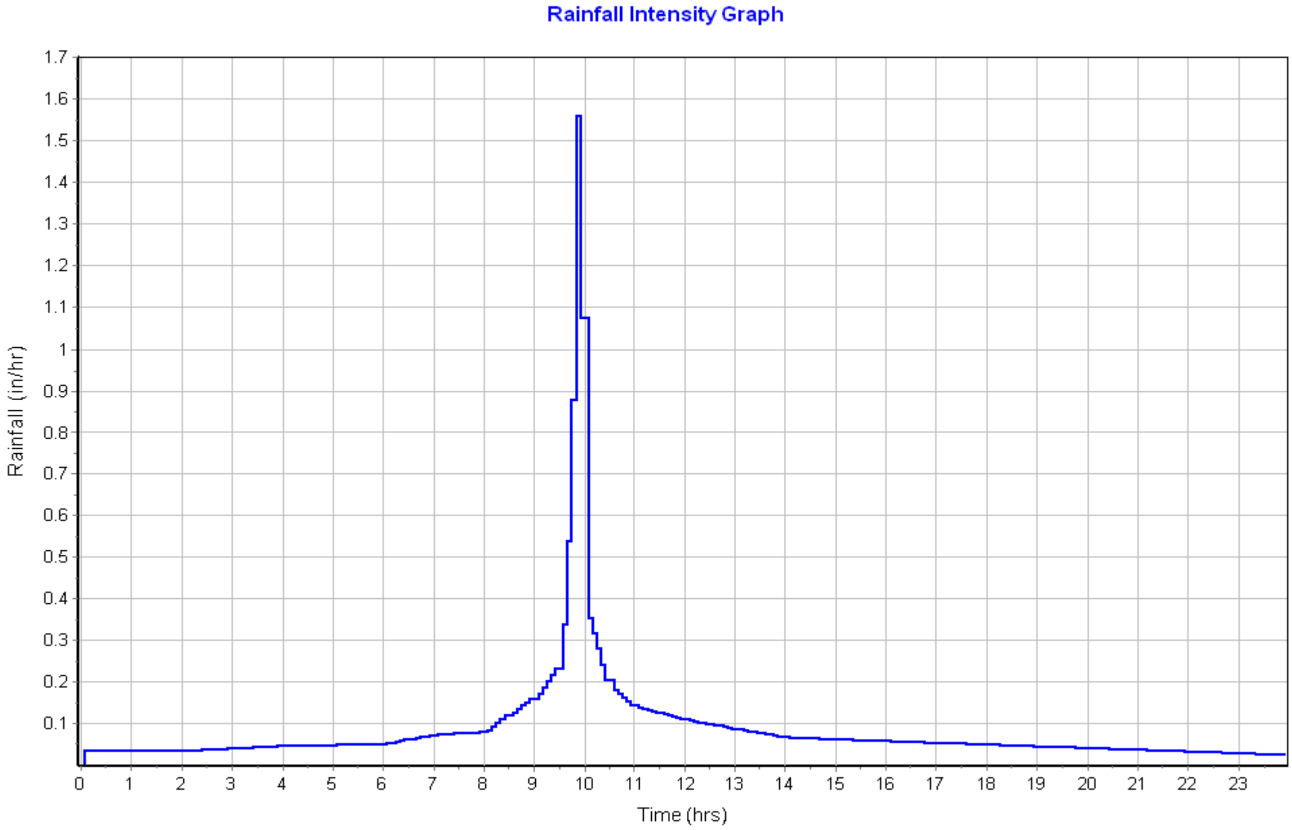
Time of Concentration

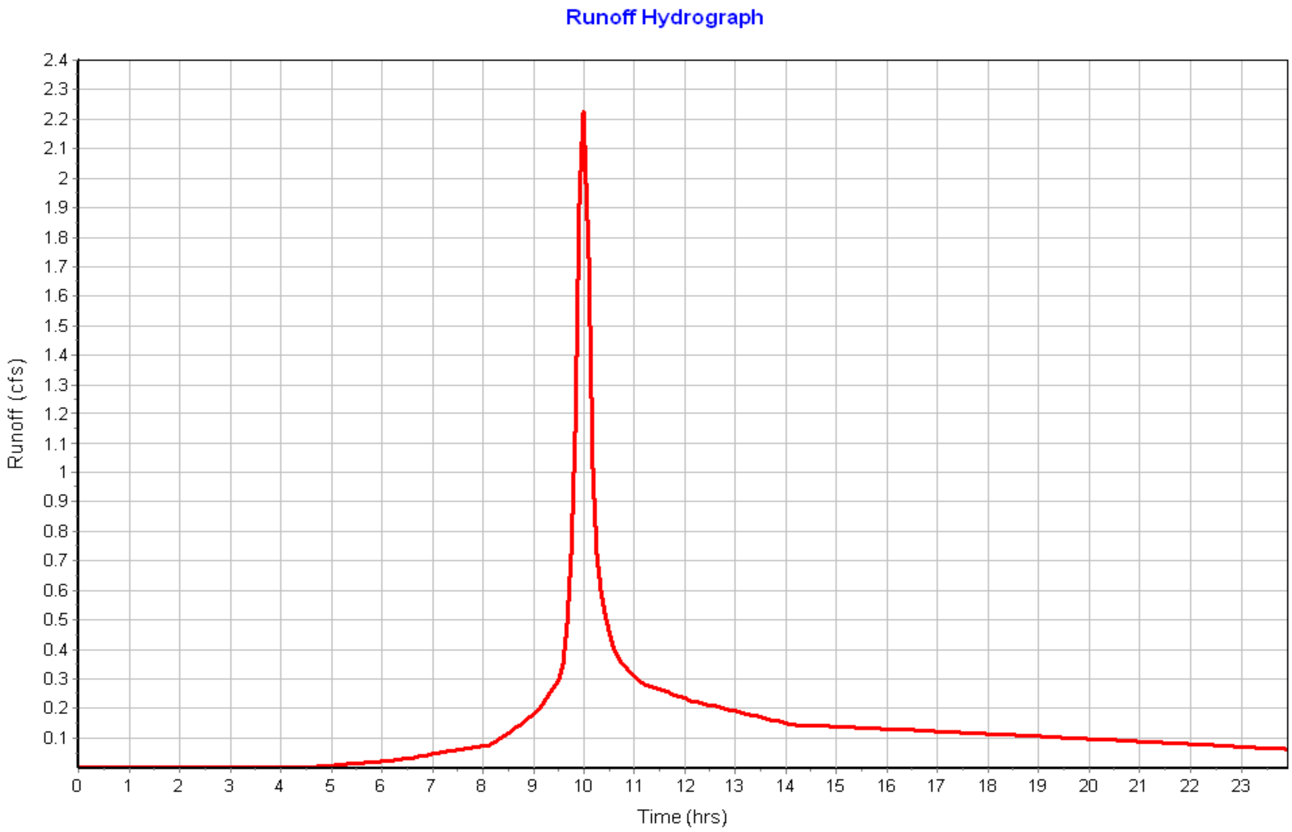
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 2.25
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5b





Subbasin : A6

Input Data

Area (ac) 2.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.65	B	92.00
Composite Area & Weighted CN	1.65		92.00

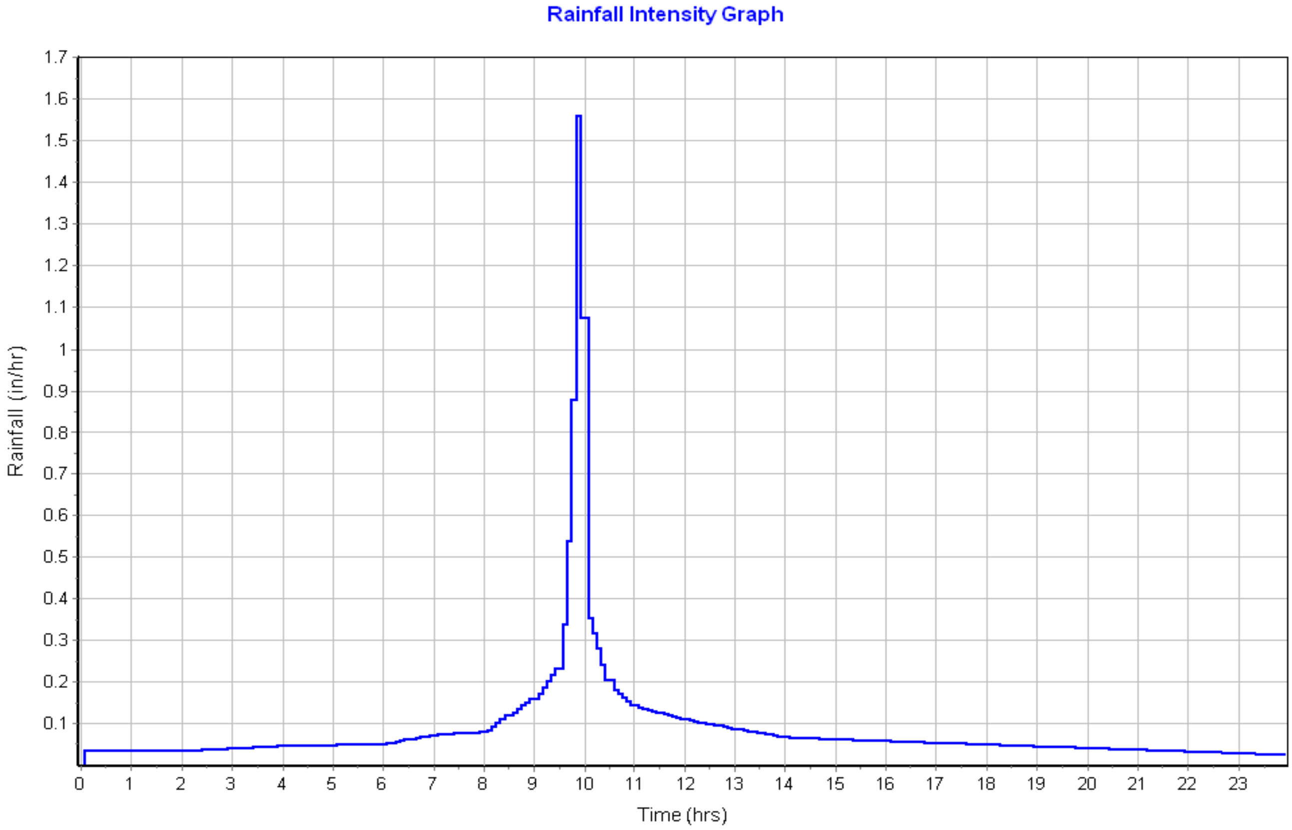
Time of Concentration

User-Defined TOC override (minutes): 10.00

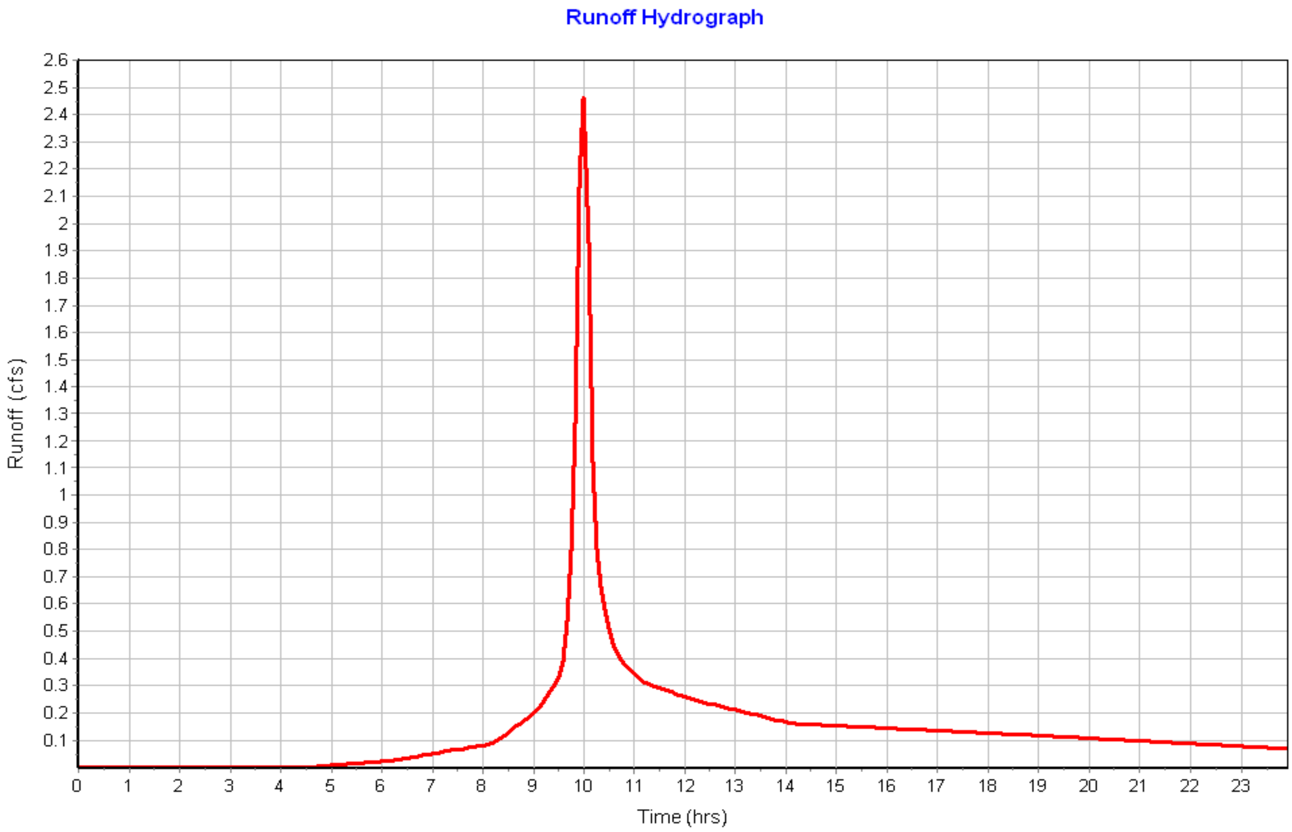
Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 2.49
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A6



Rainfall Intensity Graph
Rainfall (in/hr)
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
Time (hrs)

Subbasin : A7

Input Data

Area (ac) 1.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.30	B	92.00
Composite Area & Weighted CN	1.30		92.00

Time of Concentration

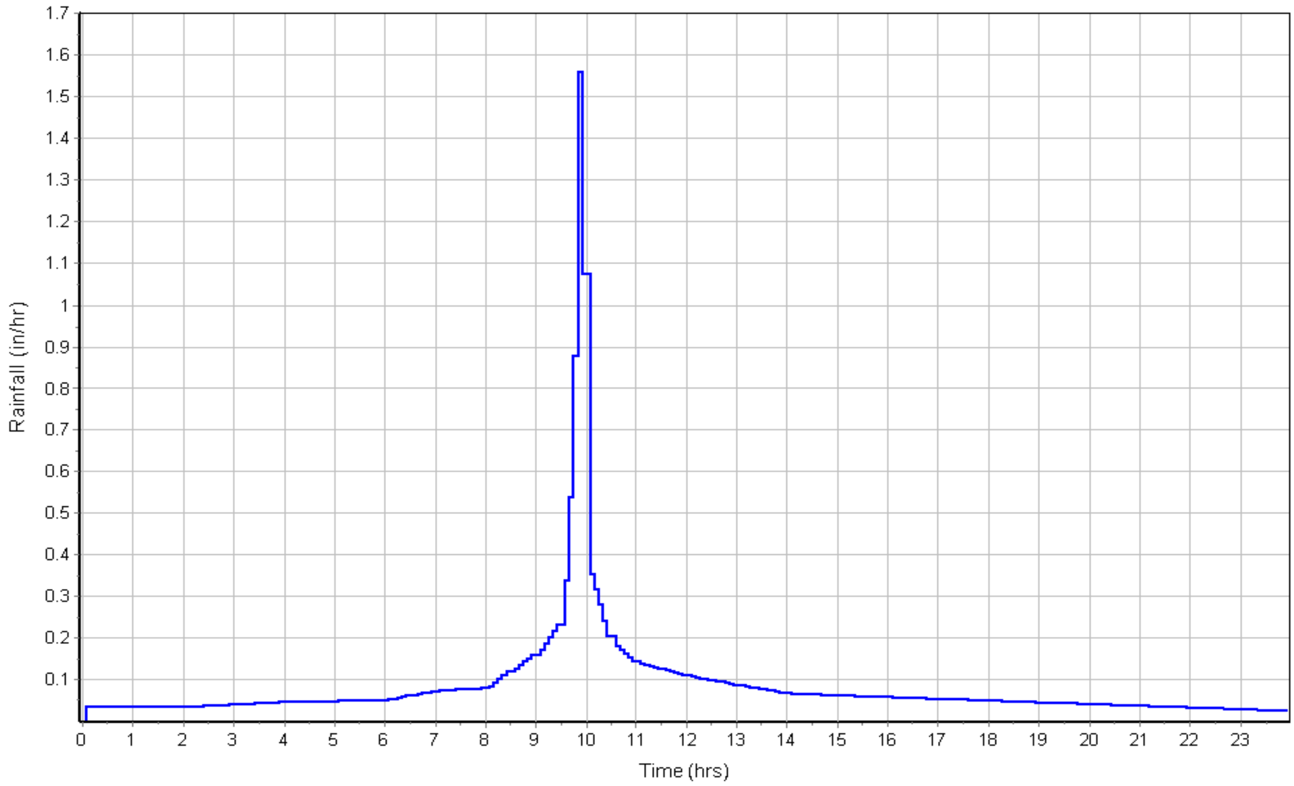
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

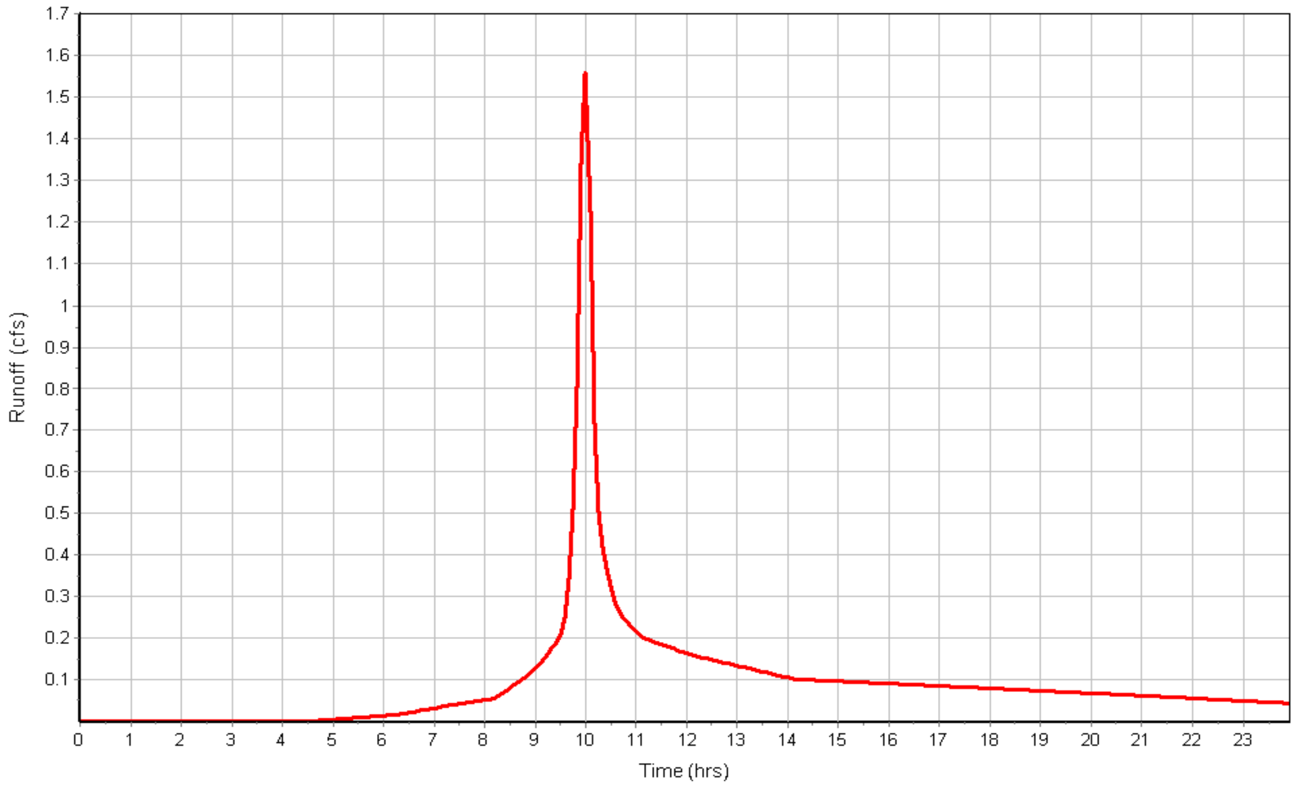
Total Rainfall (in) 2.07
Total Runoff (in) 1.30
Peak Runoff (cfs) 1.58
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A7

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : PRE-DEV

Input Data

Area (ac) 15.11
Weighted Curve Number 77.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	15.11	B	77.00
Composite Area & Weighted CN	15.11		77.00

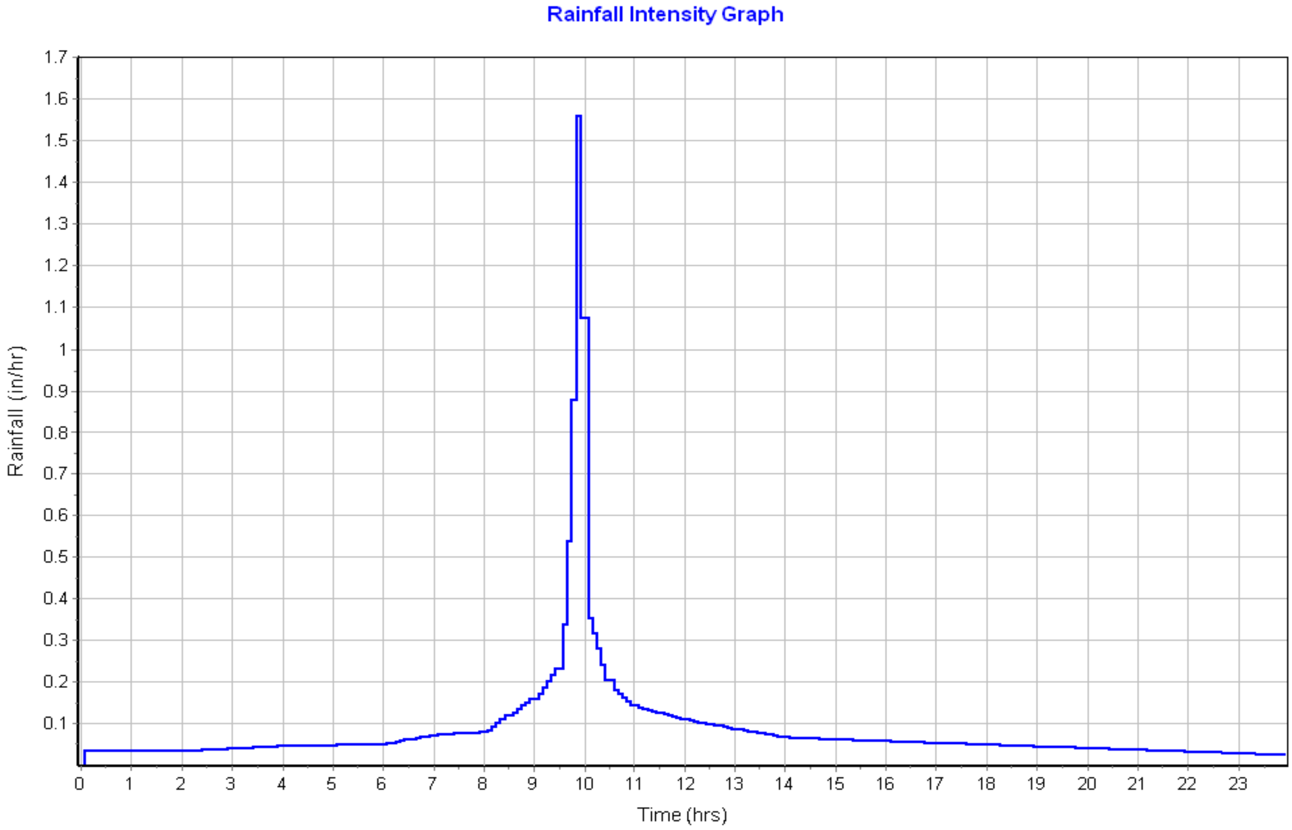
Time of Concentration

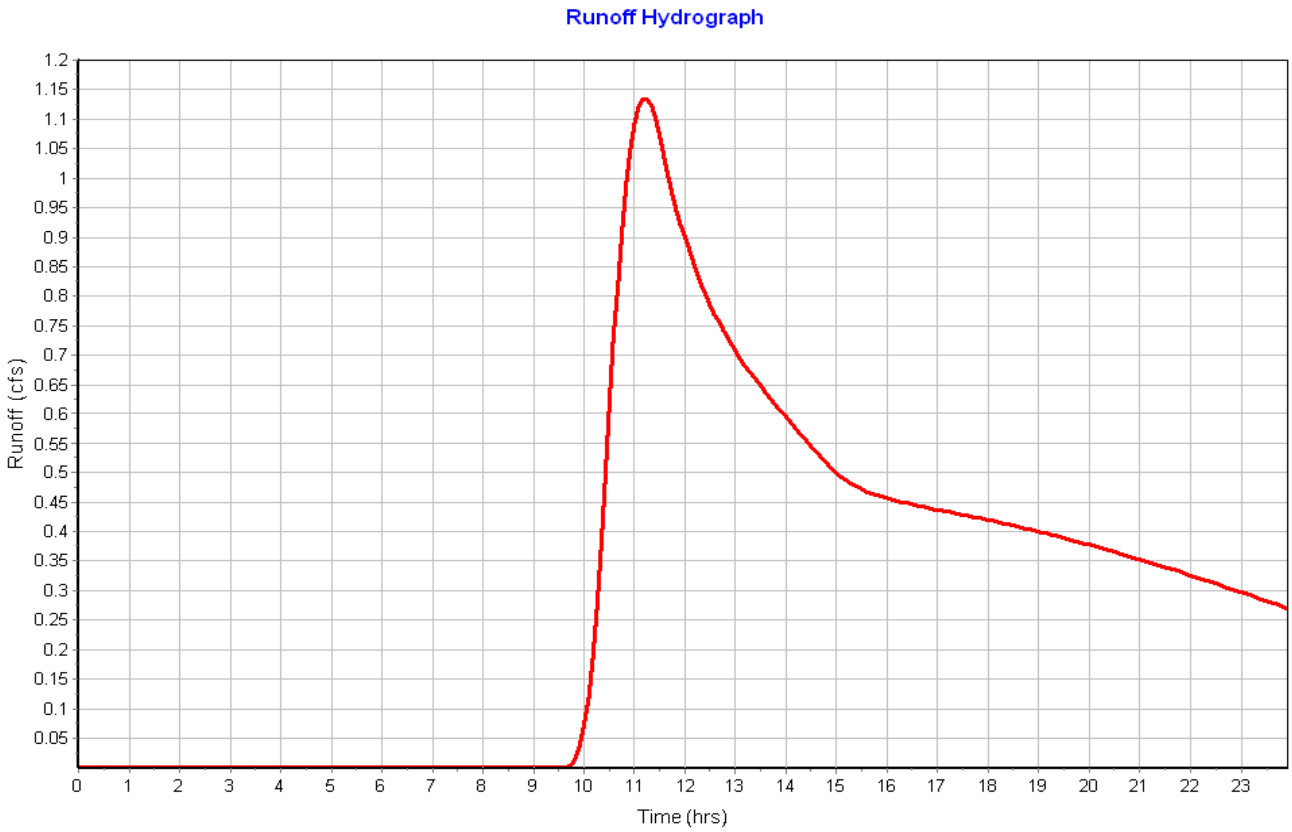
User-Defined TOC override (minutes): 100

Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 0.49
Peak Runoff (cfs) 1.13
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : PRE-DEV





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	BU1	998.09	1003.05	4.96	998.09	0.00	0.00	-1003.05	0.00	0.00
2	BU2	1000.23	1004.23	4.00	1000.23	0.00	0.00	-1004.23	0.00	0.00
3	J1	1004.61	1009.61	5.00	1004.61	0.00	0.00	-1009.61	0.00	0.00
4	J2a	999.91	1003.24	3.33	999.91	0.00	0.00	-1003.24	0.00	0.00
5	J2b	999.94	1002.15	2.21	999.94	0.00	0.00	-1002.15	0.00	0.00
6	J3	1005.76	1010.36	4.60	1005.76	0.00	0.00	-1010.36	0.00	0.00
7	J4	999.96	1005.68	5.72	999.96	0.00	0.00	-1005.68	0.00	0.00
8	Jun-23	0.00	6.00	6.00	0.00	0.00	6.00	0.00	0.00	0.00
9	O1	1009.93	1014.46	4.53	1009.93	0.00	0.00	-1014.46	0.00	0.00
10	O2	1008.31	1011.81	3.50	1008.31	0.00	0.00	-1011.81	0.00	0.00
11	O4	999.79	1003.29	3.50	999.79	0.00	0.00	-1003.29	0.00	0.00
12	O5	997.80	1003.05	5.25	997.80	0.00	0.00	-1003.05	0.00	0.00
13	SDMH1	1003.49	1009.45	5.96	1003.49	0.00	0.00	-1009.45	0.00	0.00
14	SDMH2	1001.24	1005.72	4.48	1001.24	0.00	6.00	-999.72	0.00	0.00
15	SDMH3	1001.57	1006.27	4.70	1001.57	0.00	6.00	-1000.27	0.00	0.00
16	SDMH4	997.69	1002.76	5.07	997.69	0.00	0.00	-1002.76	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	BU1	0.09	0.00	1001.36	3.27	0.00	1.69	1001.36	3.27	0 17:45	0 00:00	0.00	0.00
2	BU2	1.94	0.00	1003.74	3.51	0.00	1.49	1003.73	3.50	0 10:06	0 00:00	0.00	0.00
3	J1	1.96	1.96	1009.61	5.00	0.00	0.00	1004.76	0.15	0 10:03	0 10:05	0.00	4.00
4	J2a	2.14	2.14	1003.24	3.33	0.00	0.00	1000.07	0.16	0 10:00	0 10:05	0.03	10.00
5	J2b	2.22	2.22	1002.15	2.21	0.00	0.00	1000.10	0.16	0 09:59	0 10:05	0.05	12.00
6	J3	1.96	1.96	1006.32	0.56	0.00	4.04	1005.91	0.15	0 10:05	0 00:00	0.00	0.00
7	J4	4.22	2.46	1005.68	5.72	0.00	0.00	1000.30	0.34	0 09:58	0 10:05	0.54	27.00
8	Jun-23	0.09	0.00	998.52	998.52	0.00	0.85	998.40	998.40	0 17:43	0 00:00	0.00	0.00
9	O1	0.20	0.00	1010.08	0.15	0.00	4.38	1009.98	0.05	0 11:33	0 00:00	0.00	0.00
10	O2	0.06	0.00	1008.40	0.09	0.00	3.41	1008.33	0.02	0 14:07	0 00:00	0.00	0.00
11	O4	3.15	0.00	1003.29	3.50	0.00	0.00	1000.38	0.59	0 10:02	0 10:08	0.21	16.00
12	O5	0.00	0.00	998.10	0.30	0.00	4.95	998.10	0.30	0 00:00	0 00:00	0.00	0.00
13	SDMH1	1.93	0.00	1005.57	2.08	0.00	3.88	1004.71	1.22	0 10:03	0 00:00	0.00	0.00
14	SDMH2	1.91	0.00	1001.91	0.67	0.00	3.81	1001.46	0.22	0 10:05	0 00:00	0.00	0.00
15	SDMH3	1.93	0.00	1002.23	0.66	0.00	4.04	1001.78	0.21	0 10:06	0 00:00	0.00	0.00
16	SDMH4	0.00	0.00	997.79	0.10	0.00	4.97	997.79	0.10	0 00:00	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	OC1	6.42	1003.73	3.50	1001.17	0.00	2.56	39.8800	Rectangular	1.500	3.000	0.0010	0.5000	0.5000	0.0000	0.00	No
2	OC2	1.00	1001.36	3.27	998.80	0.00	2.56	256.0000	Rectangular	1.500	2.000	0.0010	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	OC1	1.94	0 10:06	3485.71	0.00	50.00	0.00	0.01	0.01	0.00		
2	OC2	0.09	0 17:45	5074.12	0.00	0.00		0.00	0.00	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	P1	383.00	1009.93	0.00	1004.57	1.08	5.36	1.4000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	P10	70.00	1000.23	0.44	1000.06	0.10	0.17	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	P11	40.00	999.96	0.00	999.86	1.06	0.10	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	P12	125.00	998.10	0.30	997.79	0.10	0.31	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	P13	130.00	997.69	0.00	997.37	0.00	0.32	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	P2	15.00	1004.61	0.00	1004.57	1.08	0.04	0.2700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	P3	408.00	1004.47	0.98	1001.34	0.10	3.13	0.7700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	P4	79.00	1001.24	0.00	999.86	1.06	1.38	1.7500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	P5a	20.00	999.91	0.00	999.86	1.06	0.05	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	P5b	34.00	999.94	0.00	999.86	1.06	0.08	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	P6	113.00	998.37	998.37	998.09	0.00	0.28	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	P7	157.00	1006.25	-2.06	1005.86	0.10	0.39	0.2500	CIRCULAR	12.000	12.000	0.0153	0.5000	0.5000	0.0000	0.00	No	1
13	P8	492.00	1005.76	0.00	1001.67	0.10	4.09	0.8300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	P9	45.00	1001.57	0.00	1000.23	0.00	1.34	2.9800	CIRCULAR	12.000	12.000	0.0130	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	P1	0.20	0 11:35	4.21	0.05	2.76	2.31	0.15	0.15	0.00		Calculated
2	P10	1.86	0 10:17	1.76	1.06	2.63	0.44	1.00	1.00	14.00		SURCHARGED
3	P11	1.87	0 10:23	1.78	1.05	2.63	0.25	1.00	1.00	24.00		SURCHARGED
4	P12	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
5	P13	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
6	P2	1.93	0 10:05	1.84	1.05	2.70	0.09	0.98	1.00	0.00		> CAPACITY
7	P3	1.91	0 10:05	3.12	0.61	4.26	1.60	0.56	0.56	0.00		Calculated
8	P4	1.89	0 10:06	4.71	0.40	5.68	0.23	0.44	0.44	0.00		Calculated
9	P5a	1.91	0 10:07	1.78	1.07	2.61	0.13	1.00	1.00	5.00		SURCHARGED
10	P5b	1.84	0 10:09	1.73	1.06	2.54	0.22	1.00	1.00	9.00		SURCHARGED
11	P6	0.09	0 17:45	1.77	0.05	1.17	1.61	0.15	0.15	0.00		Calculated
12	P7	0.06	0 14:08	3.78	0.02	1.79	1.46	0.09	0.09	0.00		Calculated
13	P8	1.93	0 10:06	3.25	0.60	4.38	1.87	0.55	0.55	0.00		Calculated
14	P9	1.94	0 10:06	6.15	0.31	6.93	0.11	0.38	0.39	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1011.40
Max (Rim) Elevation (ft) 1014.46
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1011.40
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

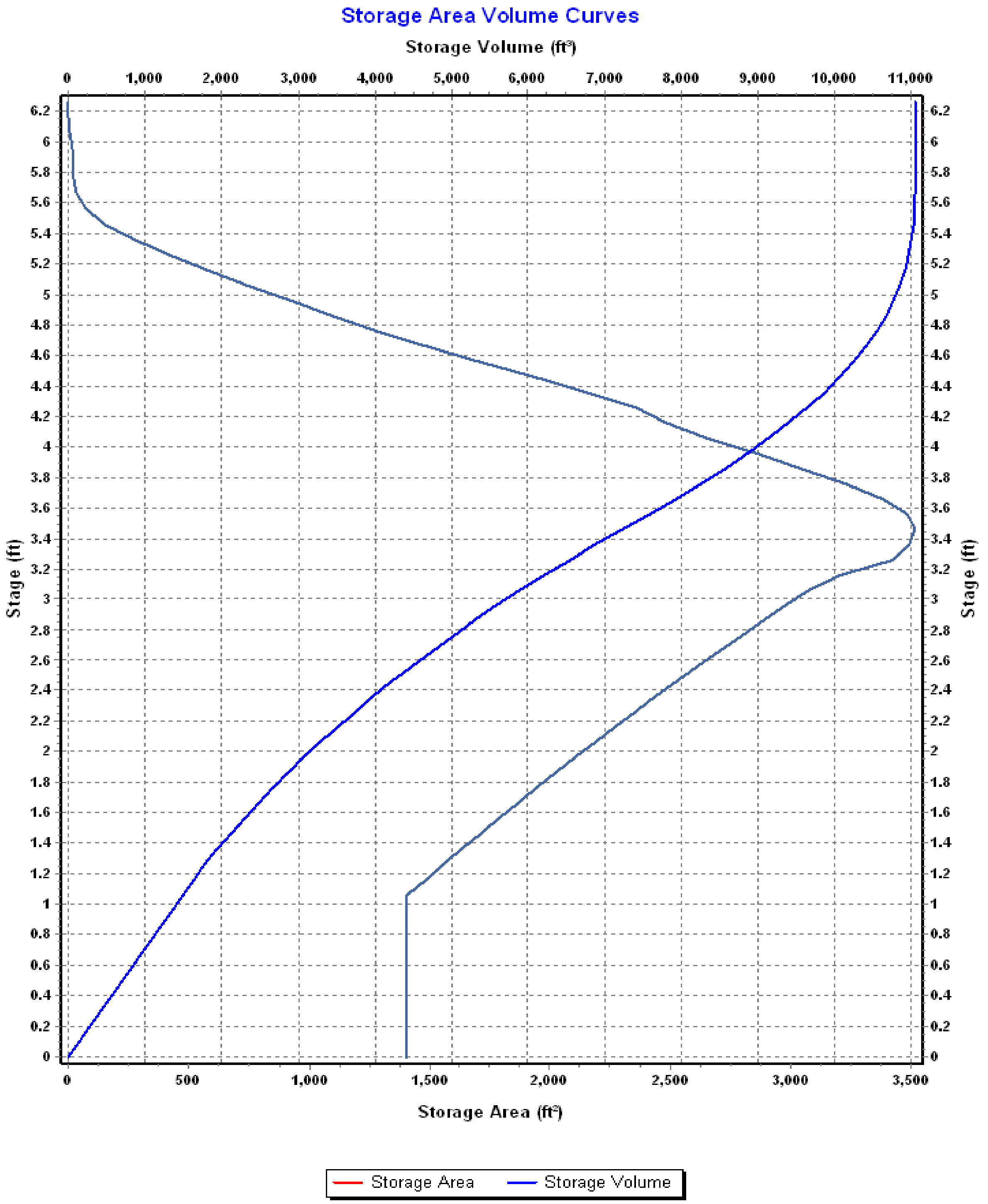
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1406	0.000
1.06	1406.41	1490.58
1.16	1480.47	1634.92
1.26	1555.24	1786.71
1.36	1630.77	1946.01
1.46	1707.07	2112.90
1.56	1784.14	2287.46
1.66	1861.98	2469.77
1.76	1940.59	2659.90
1.86	2020.12	2857.94
1.96	2100.89	3063.99
2.06	2182.92	3278.18
2.16	2266.21	3500.64
2.26	2350.76	3731.49
2.36	2436.58	3970.86
2.46	2523.66	4218.87
2.52	2576.52	4371.88
2.56	2612.01	4475.65
2.66	2701.62	4741.33
2.76	2792.5	5016.04
2.86	2884.65	5299.90
2.96	2978.05	5593.04
3.06	3072.11	5895.55
3.16	3205.91	6209.45
3.26	3421.78	6540.83
3.36	3493.59	6886.60
3.46	3515.37	7237.05
3.56	3483.18	7586.98
3.66	3379.16	7930.10
3.76	3228.85	8260.50
3.86	3042.58	8574.07
3.96	2846.45	8868.52
4.06	2644.9	9143.09
4.16	2476.74	9399.17
4.26	2357.18	9640.87
4.36	2152.13	9866.34
4.46	1923.09	10070.10
4.56	1699.17	10251.21
4.66	1484.08	10410.37
4.76	1280.57	10548.60
4.86	1096.18	10667.44
4.96	914.98	10768.00
5.06	736.35	10850.57
5.16	570.94	10915.93
5.26	418.64	10965.41
5.36	279.43	11000.31
5.46	153.32	11021.95
5.56	72.06	11033.22
5.66	32.33	11038.44
5.76	22.84	11041.20
5.86	20.61	11043.37
5.96	14.31	11045.12
6.06	6.81	11046.18
6.16	2.03	11046.62
6.26	0.06	11046.72



Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
Stage (ft)
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
500
1,500
2,500
3,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (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	OR1	Bottom	CIRCULAR	No	24.00			1013.96	0.61

Output Summary Results

Peak Inflow (cfs) 2.04
Peak Lateral Inflow (cfs) 2.04
Peak Outflow (cfs) 0.20
Peak Exfiltration Flow Rate (cfm) 2.76
Max HGL Elevation Attained (ft) 1014.00
Max HGL Depth Attained (ft) 2.6
Average HGL Elevation Attained (ft) 1012.92
Average HGL Depth Attained (ft) 1.52
Time of Max HGL Occurrence (days hh:mm) 0 11:33
Total Exfiltration Volume (1000-ft³) 2.607
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1009.68
Max (Rim) Elevation (ft) 1012.74
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1009.68
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

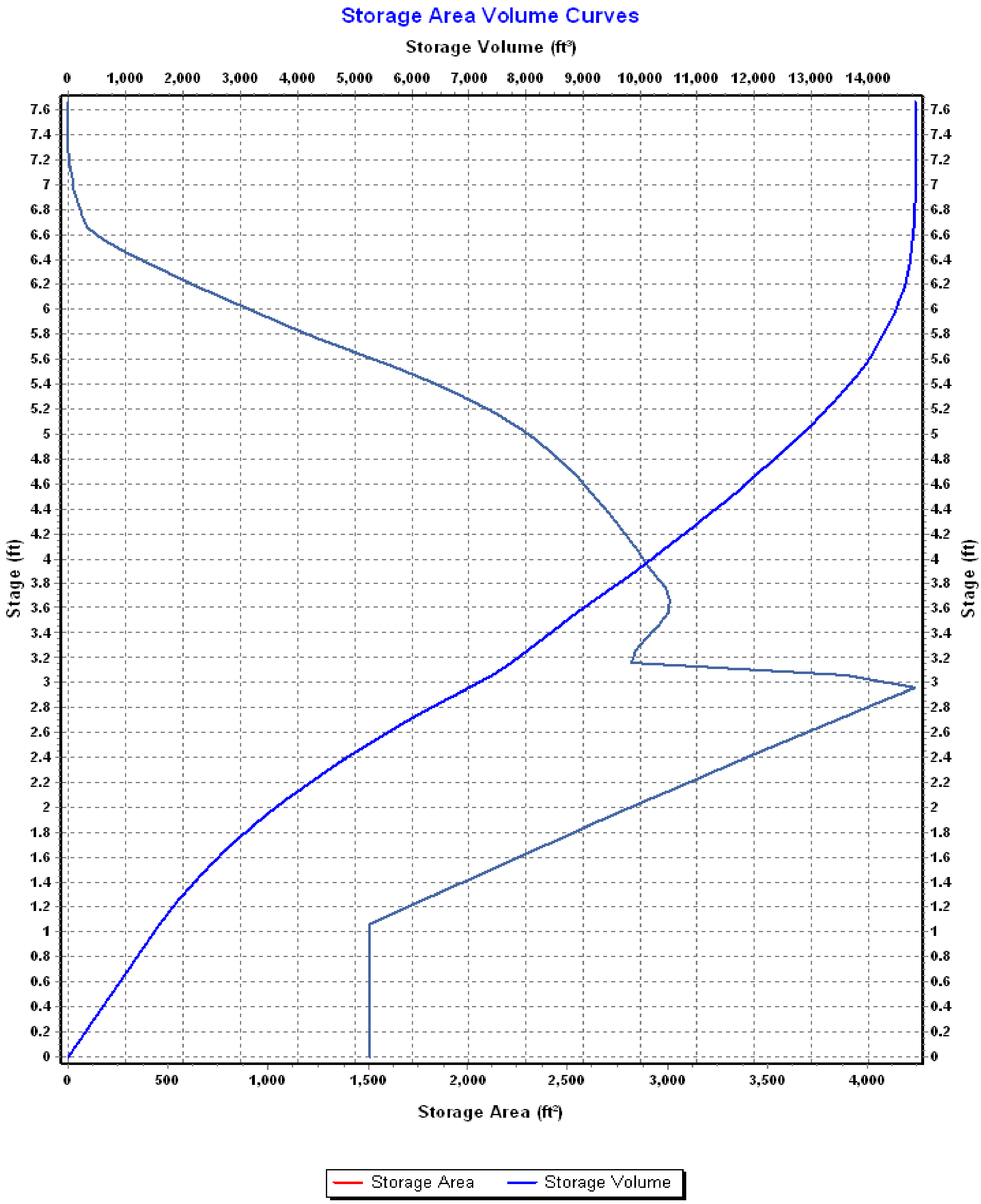
Exfiltration Rate (in/hr) 0.8500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1509	0.000
1.06	1509.71	1599.92
1.16	1643.71	1757.59
1.26	1778.63	1928.71
1.36	1914.59	2113.37
1.46	2051.6	2311.68
1.56	2189.68	2523.74
1.66	2328.85	2749.67
1.76	2469.09	2989.57
1.86	2610.42	3243.55
1.96	2752.84	3511.71
2.06	2896.36	3794.17
2.16	3041	4091.04
2.26	3186.76	4402.43
2.36	3333.64	4728.45
2.46	3481.65	5069.21
2.5	3541.17	5209.67
2.56	3630.78	5424.83
2.66	3781.07	5795.42
2.76	3932.5	6181.10
2.86	4085.08	6581.98
2.96	4238.81	6998.17
3.06	3893.63	7404.79
3.16	2818.58	7740.40
3.26	2841.8	8023.42
3.36	2894.46	8310.23
3.46	2958.61	8602.88
3.56	3003.95	8901.01
3.66	3008.97	9201.66
3.76	2988.5	9501.53
3.86	2941.33	9798.02
3.96	2895.87	10089.88
4.06	2850.77	10377.21
4.16	2804.84	10659.99
4.26	2758.57	10938.16
4.36	2709.87	11211.58
4.46	2658.38	11479.99
4.56	2603.81	11743.10
4.66	2544.42	12000.51
4.76	2480.66	12251.76
4.86	2410.91	12496.34
4.96	2336.82	12733.73
5.06	2248.65	12963.00
5.16	2143.37	13182.60
5.26	2023.25	13390.93
5.36	1890.68	13586.63
5.46	1744.92	13768.41
5.56	1587.46	13935.03
5.66	1421.65	14085.49
5.76	1248.08	14218.98
5.86	1101.15	14336.44
5.96	957.13	14439.35
6.06	812.08	14527.81
6.16	668.84	14601.86
6.26	532.55	14661.93
6.36	403.26	14708.72
6.46	284.36	14743.10
6.56	177.83	14766.21
6.66	97.81	14779.99
6.76	71.62	14788.46
6.86	48.37	14794.46
6.96	30.72	14798.41
7.06	17.84	14800.84
7.16	7.04	14802.08
7.26	3.14	14802.59
7.36	1.97	14802.85
7.46	2.5	14803.07
7.56	1.02	14803.25

7.66	0.2	14803.31


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4
6.6
6.8
7
7.2
7.4
7.6
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (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	OR2	Bottom	CIRCULAR	No	24.00			1012.24	0.61

Output Summary Results

Peak Inflow (cfs) 2.00
Peak Lateral Inflow (cfs) 2.00
Peak Outflow (cfs) 0.06
Peak Exfiltration Flow Rate (cfm) 4.32
Max HGL Elevation Attained (ft) 1012.26
Max HGL Depth Attained (ft) 2.58
Average HGL Elevation Attained (ft) 1011.16
Average HGL Depth Attained (ft) 1.48
Time of Max HGL Occurrence (days hh:mm) 0 14:07
Total Exfiltration Volume (1000-ft³) 3.874
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR3

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1001.86
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

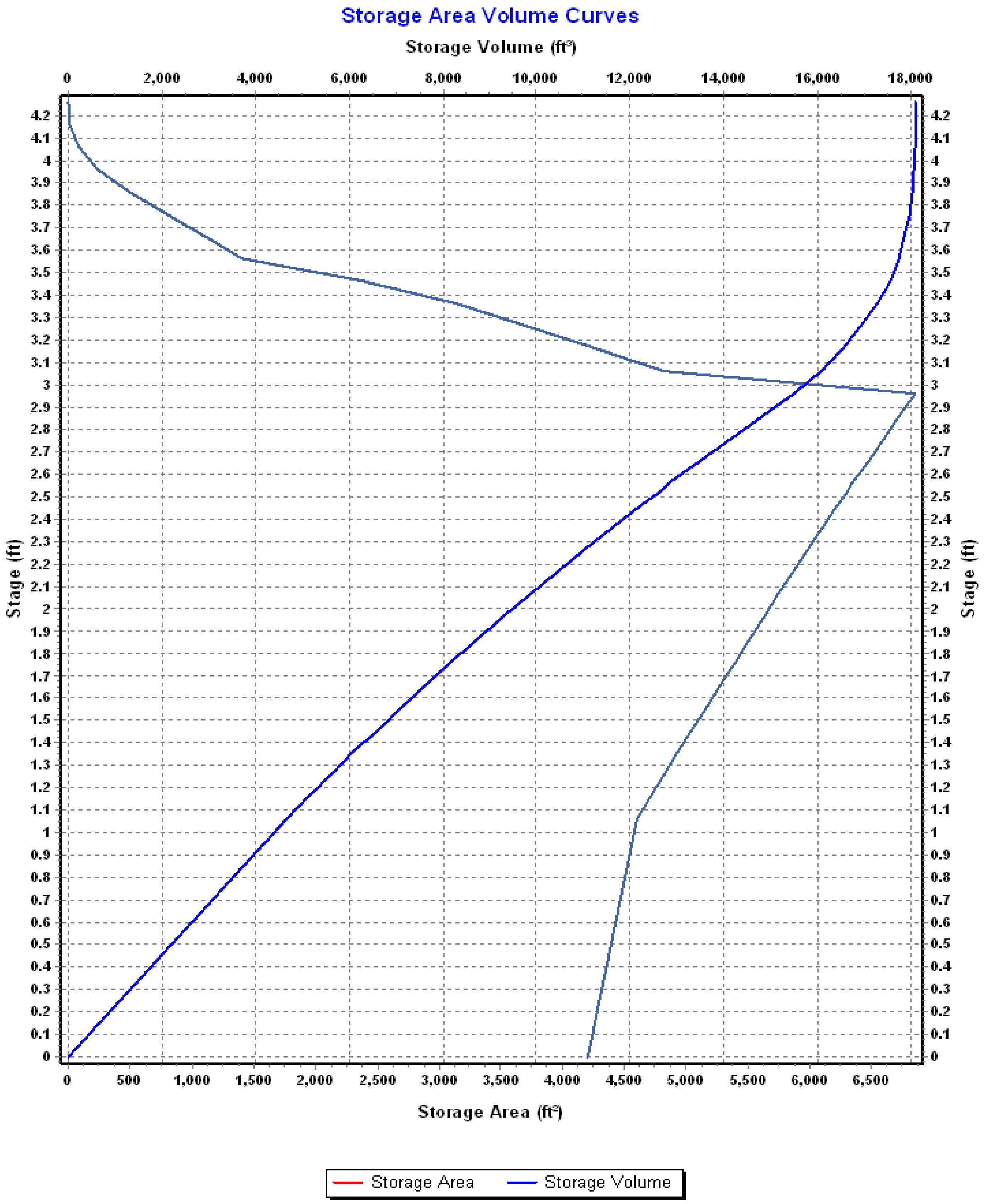
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR3

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	4202	0.000
1.06	4602.78	4666.53
1.16	4712.04	5132.27
1.26	4822.31	5608.99
1.36	4933.57	6096.78
1.46	5045.82	6595.75
1.56	5159.08	7106.00
1.66	5273.33	7627.62
1.76	5388.58	8160.72
1.86	5504.82	8705.39
1.96	5622.06	9261.73
2.06	5740.3	9829.85
2.16	5859.54	10409.84
2.26	5979.77	11001.81
2.36	6101.01	11605.85
2.46	6223.23	12222.06
2.52	6297.05	12597.67
2.56	6346.46	12850.54
2.66	6470.68	13491.40
2.76	6595.9	14144.73
2.86	6722.12	14810.63
2.96	6849.33	15489.20
3.06	4821.94	16072.76
3.16	4269.29	16527.32
3.26	3701.61	16925.87
3.36	3145.79	17268.24
3.46	2385.68	17544.81
3.56	1403.4	17734.26
3.66	1106.4	17859.75
3.76	805.95	17955.37
3.86	493.74	18020.35
3.96	245.04	18057.29
4.06	86.03	18073.84
4.16	14	18078.84
4.26	0.09	18079.54


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Stage (ft)
Storage Area (ft²)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500
6,000
6,500
Storage Area
Storage Volume

Storage Node : BR3 (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	OR3	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 3.63
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.09
Peak Exfiltration Flow Rate (cfm) 8.68
Max HGL Elevation Attained (ft) 1001.39
Max HGL Depth Attained (ft) 2.59
Average HGL Elevation Attained (ft) 1000.21
Average HGL Depth Attained (ft) 1.41
Time of Max HGL Occurrence (days hh:mm) 0 17:43
Total Exfiltration Volume (1000-ft³) 8.038
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR4

Input Data

Invert Elevation (ft) 1001.17
Max (Rim) Elevation (ft) 1004.23
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1001.17
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

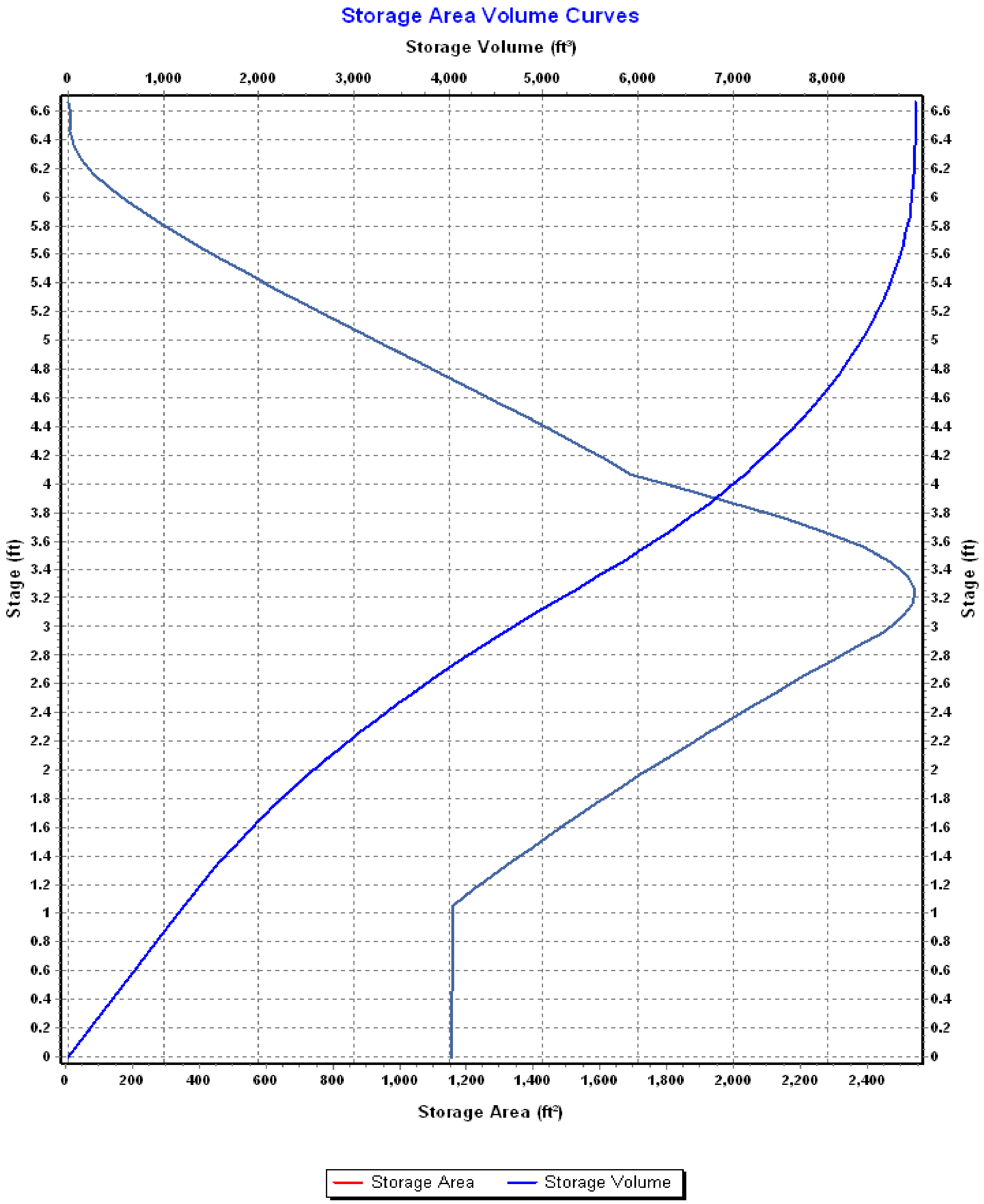
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 1.6700

Storage Area Volume Curves

Storage Curve : BR4

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1157	0.000
1.06	1157.62	1226.75
1.16	1215.18	1345.39
1.26	1273.86	1469.84
1.36	1333.68	1600.22
1.46	1394.62	1736.64
1.56	1456.7	1879.21
1.66	1519.9	2028.04
1.76	1584.24	2183.25
1.86	1649.71	2344.95
1.96	1716.31	2513.25
2.06	1784.03	2688.27
2.16	1852.89	2870.12
2.26	1922.88	3058.91
2.36	1994	3254.75
2.46	2066.25	3457.76
2.49	2088.15	3520.08
2.56	2139.64	3668.05
2.66	2214.15	3885.74
2.76	2289.79	4110.94
2.86	2366.56	4343.76
2.96	2444.47	4584.31
3.06	2503.88	4831.73
3.16	2536.19	5083.73
3.26	2543.4	5337.71
3.36	2518.39	5590.80
3.46	2464.18	5839.93
3.56	2384.46	6082.36
3.66	2275.89	6315.38
3.76	2146.68	6536.51
3.86	2004.26	6744.06
3.96	1849.65	6936.76
4.06	1693.56	7113.92
4.16	1620.49	7279.62
4.26	1542.67	7437.78
4.36	1462.92	7588.06
4.46	1382.21	7730.32
4.56	1298.91	7864.38
4.66	1214.58	7990.05
4.76	1129.66	8107.26
4.86	1044.43	8215.96
4.96	959.13	8316.14
5.06	873.72	8407.78
5.16	790.35	8490.98
5.26	707.66	8565.88
5.36	625.29	8632.53
5.46	547.18	8691.15
5.56	470.39	8742.03
5.66	394.33	8785.27
5.76	324.47	8821.21
5.86	256.35	8850.25
5.96	189.71	8872.55
6.06	133.98	8888.73
6.16	83.68	8899.61
6.26	48.53	8906.22
6.36	26.06	8909.95
6.46	14.03	8911.95
6.56	14.79	8913.39
6.66	8.38	8914.55



Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Stage (ft)
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR4 (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	O4	Bottom	CIRCULAR	No	24.00			1003.29	0.61

Output Summary Results

Peak Inflow (cfs) 3.45
Peak Lateral Inflow (cfs) 1.56
Peak Outflow (cfs) 3.15
Peak Exfiltration Flow Rate (cfm) 4.70
Max HGL Elevation Attained (ft) 1003.57
Max HGL Depth Attained (ft) 2.4
Average HGL Elevation Attained (ft) 1002.49
Average HGL Depth Attained (ft) 1.32
Time of Max HGL Occurrence (days hh:mm) 0 10:08
Total Exfiltration Volume (1000-ft³) 4.200
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR5

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1003.05
Max (Rim) Offset (ft) 4.25
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

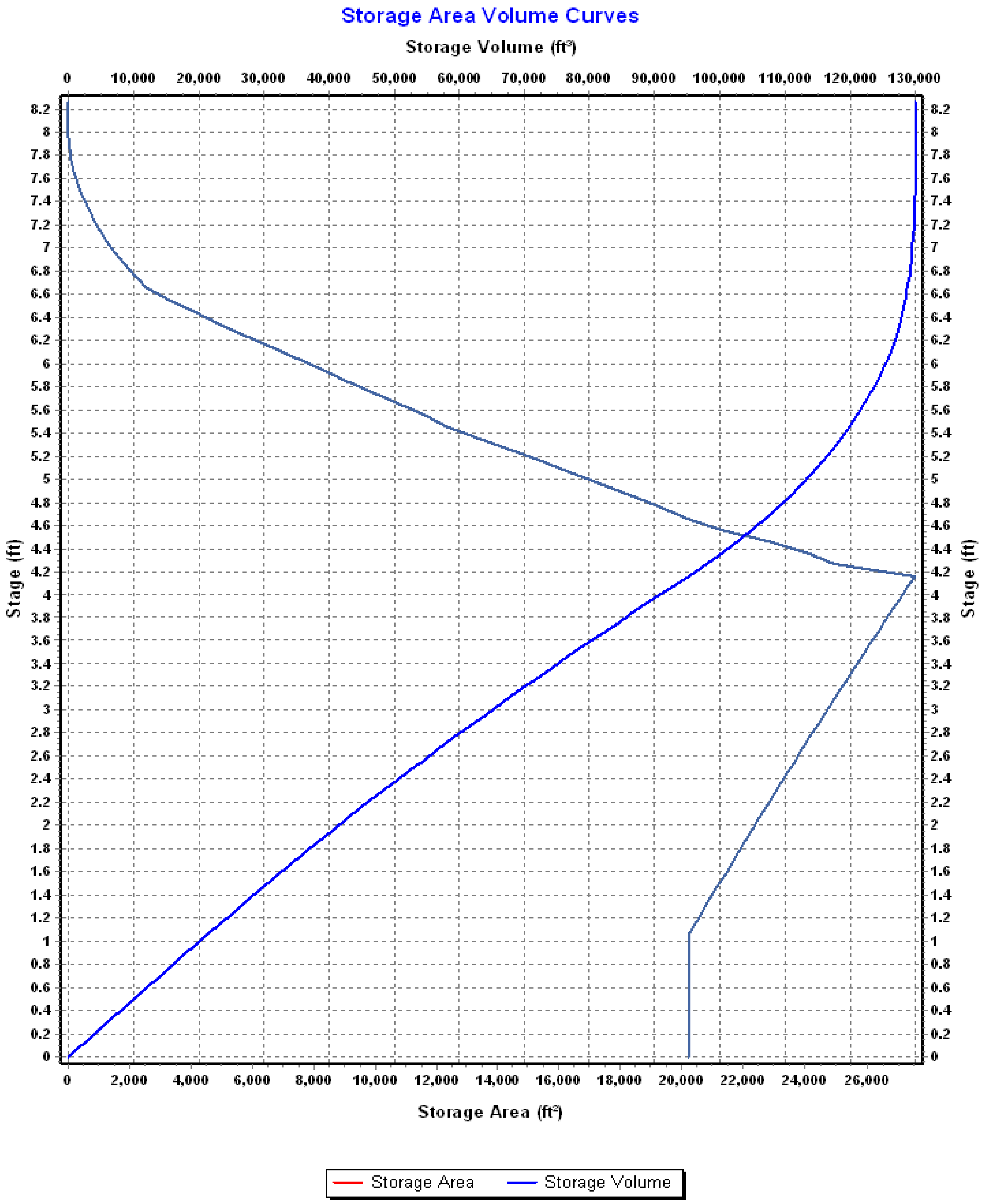
Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR5

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	20214	0.000
1.06	20215.03	21427.39
1.16	20437.65	23460.02
1.26	20661.27	25514.97
1.36	20885.87	27592.33
1.46	21111.46	29692.20
1.56	21338.05	31814.68
1.66	21565.62	33959.86
1.76	21794.18	36127.85
1.86	22023.72	38318.75
1.96	22254.26	40532.65
2.06	22485.78	42769.65
2.16	22718.3	45029.85
2.26	22951.8	47313.36
2.36	23186.29	49620.26
2.46	23421.77	51950.66
2.52	23563.54	53360.22
2.56	23658.24	54304.66
2.66	23895.7	56682.36
2.76	24134.15	59083.85
2.86	24373.58	61509.24
2.96	24614.01	63958.62
3.06	24855.42	66432.09
3.16	25097.82	68929.75
3.26	25341.21	71451.70
3.36	25585.59	73998.04
3.46	25830.96	76568.87
3.56	26077.32	79164.28
3.66	26324.66	81784.38
3.76	26573	84429.26
3.86	26822.32	87099.03
3.96	27072.63	89793.78
4.06	27323.93	92513.61
4.16	27576.22	95258.62
4.26	24935.38	97884.20
4.36	24024.32	100332.19
4.46	22764.39	102671.63
4.56	21271	104873.40
4.66	20160.51	106944.98
4.76	19229.97	108914.50
4.86	18281.25	110790.06
4.96	17314.48	112569.85
5.06	16331.1	114252.13
5.16	15332.24	115835.30
5.26	14319.21	117317.87
5.36	13293.07	118698.48
5.46	12321.72	119979.22
5.56	11498.38	121170.23
5.66	10666.17	122278.46
5.76	9824.09	123302.97
5.86	8977.65	124243.06
5.96	8130.16	125098.45
6.06	7284.67	125869.19
6.16	6443.94	126555.62
6.26	5613.4	127158.49
6.36	4794.72	127678.90
6.46	3989.93	128118.13
6.56	3201.03	128477.68
6.66	2514.65	128763.46
6.76	2163.03	128997.34
6.86	1832.56	129197.12
6.96	1526.32	129365.06
7.06	1250.46	129503.90
7.16	1001.28	129616.49
7.26	786.61	129705.88
7.36	609.46	129775.68
7.46	461.78	129829.24
7.56	329.31	129868.79

7.66	192.14	129894.86
7.76	95.82	129909.26
7.86	34.15	129915.76
7.96	4.84	129917.71
8.06	0	129917.95
8.16	4.45	129918.17
8.26	0.24	129918.40



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
100,000
110,000
120,000
130,000
Stage (ft)
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
22,000
24,000
26,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR5 (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	OR5	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 3.67
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 27.51
Max HGL Elevation Attained (ft) 999.46
Max HGL Depth Attained (ft) 0.66
Average HGL Elevation Attained (ft) 999.14
Average HGL Depth Attained (ft) 0.34
Time of Max HGL Occurrence (days hh:mm) 0 19:05
Total Exfiltration Volume (1000-ft³) 24.213
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

50-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods .... YES

Analysis Options

Start Analysis On	Oct 13, 2022	00:00:00
End Analysis On	Oct 14, 2022	00:00:00
Start Reporting On	Oct 13, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	9
Nodes..	23
Junctions	16
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links...	21
Channels	2
Pipes	14
Pumps	0
Orifices	5
Weirs	0
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	Post-Development	Time Series	50-year	Cumulative	inches	California	San Bernardino (Baker)	50	2.44	SCS Type I 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	A01	2.26	92.00	2.44	1.64	3.70	2.62	0 00:10:00
2	A02	2.21	92.00	2.44	1.64	3.62	2.56	0 00:10:00
3	A3	2.17	92.00	2.44	1.64	3.55	2.52	0 00:10:00
4	A4	2.17	92.00	2.44	1.64	3.55	2.52	0 00:10:00
5	A5a	2.36	92.00	2.44	1.64	3.87	2.74	0 00:10:00
6	A5b	2.46	92.00	2.44	1.64	4.03	2.85	0 00:10:00
7	A6	2.72	92.00	2.44	1.64	4.46	3.16	0 00:10:00
8	A7	1.72	92.00	2.44	1.64	2.82	2.00	0 00:10:00
9	PRE-DEV	15.11	77.00	2.44	0.70	10.62	1.87	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	BU1	Junction	998.09	1003.05	998.09	0.00	0.00	0.32	1001.36	0.00	1.69	0 00:00	0.00	0.00
2	BU2	Junction	1000.23	1004.23	1000.23	0.00	0.00	2.45	1003.74	0.00	1.49	0 00:00	0.00	0.00
3	J1	Junction	1004.61	1009.61	1004.61	0.00	0.00	2.48	1009.61	0.00	0.00	0 10:05	0.08	13.00
4	J2a	Junction	999.91	1003.24	999.91	0.00	0.00	2.71	1003.24	0.00	0.00	0 10:05	0.13	16.00
5	J2b	Junction	999.94	1002.15	999.94	0.00	0.00	2.82	1002.15	0.00	0.00	0 10:05	0.17	17.00
6	J3	Junction	1005.76	1010.36	1005.76	0.00	0.00	2.48	1006.42	0.00	3.94	0 00:00	0.00	0.00
7	J4	Junction	999.96	1005.68	999.96	0.00	0.00	4.87	1005.68	0.00	0.00	0 10:05	0.98	39.00
8	Jun-23	Junction	0.00	6.00	0.00	6.00	0.00	0.32	998.66	0.00	0.71	0 00:00	0.00	0.00
9	O1	Junction	1009.93	1014.46	1009.93	0.00	0.00	0.60	1010.18	0.00	4.28	0 00:00	0.00	0.00
10	O2	Junction	1008.31	1011.81	1008.31	0.00	0.00	0.23	1008.48	0.00	3.33	0 00:00	0.00	0.00
11	O4	Junction	999.79	1003.29	999.79	0.00	0.00	4.15	1003.29	0.00	0.00	0 10:07	0.54	25.00
12	O5	Junction	997.80	1003.05	997.80	0.00	0.00	0.00	998.10	0.00	4.95	0 00:00	0.00	0.00
13	SDMH1	Junction	1003.49	1009.45	1003.49	0.00	0.00	1.93	1005.57	0.00	3.88	0 00:00	0.00	0.00
14	SDMH2	Junction	1001.24	1005.72	1001.24	6.00	0.00	1.89	1001.90	0.00	3.82	0 00:00	0.00	0.00
15	SDMH3	Junction	1001.57	1006.27	1001.57	6.00	0.00	2.45	1002.32	0.00	3.95	0 00:00	0.00	0.00
16	SDMH4	Junction	997.69	1002.76	997.69	0.00	0.00	0.00	997.79	0.00	4.97	0 00:00	0.00	0.00
17	OUT1	Outfall	997.37					0.00	997.37					
18	WASH-PRE	Outfall	998.73					1.87	998.73					
19	BR1	Storage Node	1011.40	1014.46	0.00		0.00	2.59	1014.05				0.00	0.00
20	BR2	Storage Node	1009.68	1012.74	0.00		0.00	2.53	1012.29				0.00	0.00
21	BR3	Storage Node	998.80	1001.86	0.00		0.00	3.63	1001.42				0.00	0.00
22	BR4	Storage Node	1001.17	1004.23	0.00		0.00	4.37	1003.63				0.00	0.00
23	BR5	Storage Node	998.80	1003.05	0.00		0.00	3.67	1000.17				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	P1	Pipe	O1	SDMH1	383.00	1009.93	1004.57	1.4000	12.000	0.0130	0.59	4.21	0.14	3.80	0.25	0.25	0.00	Calculated
2	P10	Pipe	O4	J4	70.00	1000.23	1000.06	0.2400	12.000	0.0130	1.87	1.76	1.07	2.63	1.00	1.00	22.00	SURCHARGED
3	P11	Pipe	J4	BR5	40.00	999.96	999.86	0.2500	12.000	0.0130	1.88	1.78	1.06	2.63	1.00	1.00	36.00	SURCHARGED
4	P12	Pipe	O5	SDMH4	125.00	998.10	997.79	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
5	P13	Pipe	SDMH4	OUT1	130.00	997.69	997.37	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
6	P2	Pipe	J1	SDMH1	15.00	1004.61	1004.57	0.2700	12.000	0.0130	1.93	1.84	1.05	2.70	1.00	1.00	11.00	SURCHARGED
7	P3	Pipe	SDMH1	SDMH2	408.00	1004.47	1001.34	0.7700	12.000	0.0130	1.89	3.12	0.61	4.31	0.56	0.56	0.00	Calculated
8	P4	Pipe	SDMH2	BR5	79.00	1001.24	999.86	1.7500	12.000	0.0130	1.88	4.71	0.40	5.68	0.44	0.44	0.00	Calculated
9	P5a	Pipe	J2a	BR3	20.00	999.91	999.86	0.2500	12.000	0.0130	1.85	1.78	1.04	2.63	1.00	1.00	14.00	SURCHARGED
10	P5b	Pipe	J2b	BR3	34.00	999.94	999.86	0.2400	12.000	0.0130	1.83	1.73	1.06	2.55	1.00	1.00	15.00	SURCHARGED
11	P6	Pipe	Jun-23	BU1	113.00	998.37	998.09	0.2500	12.000	0.0130	0.32	1.77	0.18	1.71	0.29	0.29	0.00	Calculated
12	P7	Pipe	O2	J3	157.00	1006.25	1005.86	0.2500	12.000	0.0153	0.23	3.78	0.06	2.66	0.17	0.17	0.00	Calculated
13	P8	Pipe	J3	SDMH3	492.00	1005.76	1001.67	0.8300	12.000	0.0130	2.45	3.25	0.75	4.62	0.65	0.65	0.00	Calculated
14	P9	Pipe	SDMH3	BU2	45.00	1001.57	1000.23	2.9800	12.000	0.0130	2.45	6.15	0.40	7.38	0.43	0.44	0.00	Calculated
15	OC1	Channel	BU2	BR4	6.42	1003.73	1001.17	39.8800	18.000	0.0010	2.45	3485.71	0.00	50.00	0.01	0.01	0.00	
16	OC2	Channel	BU1	BR5	1.00	1001.36	998.80	256.0000	18.000	0.0010	0.32	5074.12	0.00	0.00	0.00	0.00	0.00	
17	O4	Orifice	BR4	O4		1001.17	999.79		24.000		4.15							
18	OR1	Orifice	BR1	O1		1011.40	1009.93		24.000		0.60							
19	OR2	Orifice	BR2	O2		1009.68	1008.31		24.000		0.23							
20	OR3	Orifice	BR3	Jun-23		998.80	0.00		24.000		0.32							
21	OR5	Orifice	BR5	O5		998.80	997.80		24.000		0.00							

Subbasin Hydrology

Subbasin : A01

Input Data

Area (ac) 2.26
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.48	B	92.00
Composite Area & Weighted CN	1.48		92.00

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 :

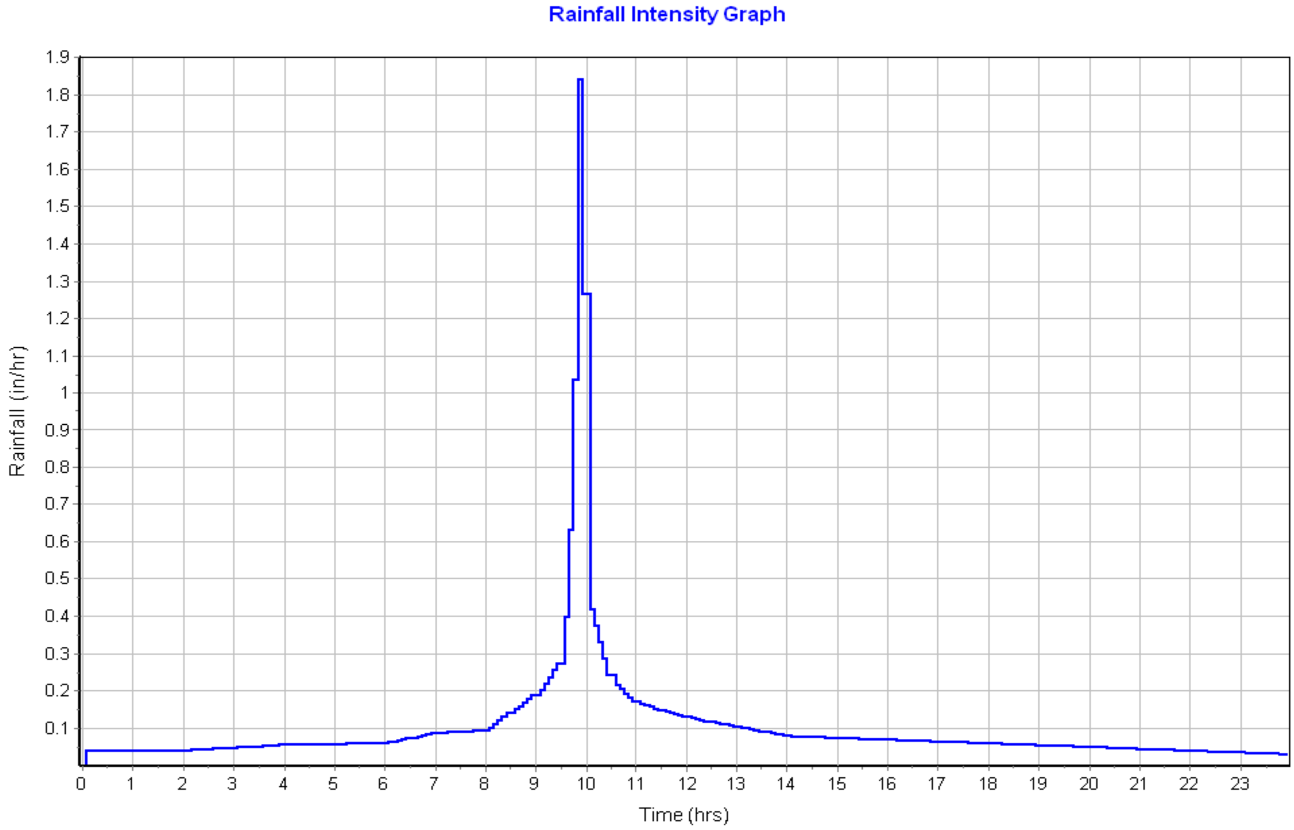
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

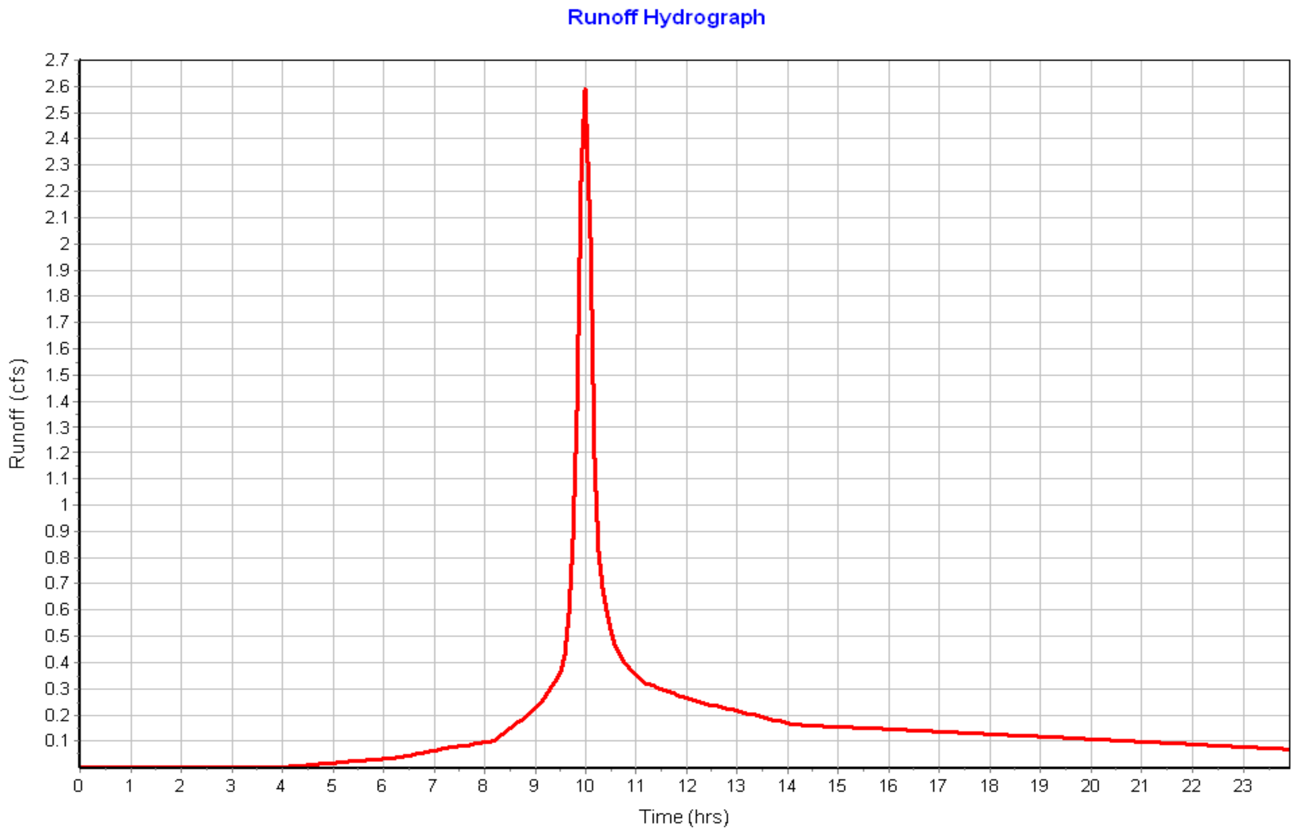
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 2.62
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A01





Subbasin : A02

Input Data

Area (ac) 2.21
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.21	B	92.00
Composite Area & Weighted CN	2.21		92.00

Time of Concentration

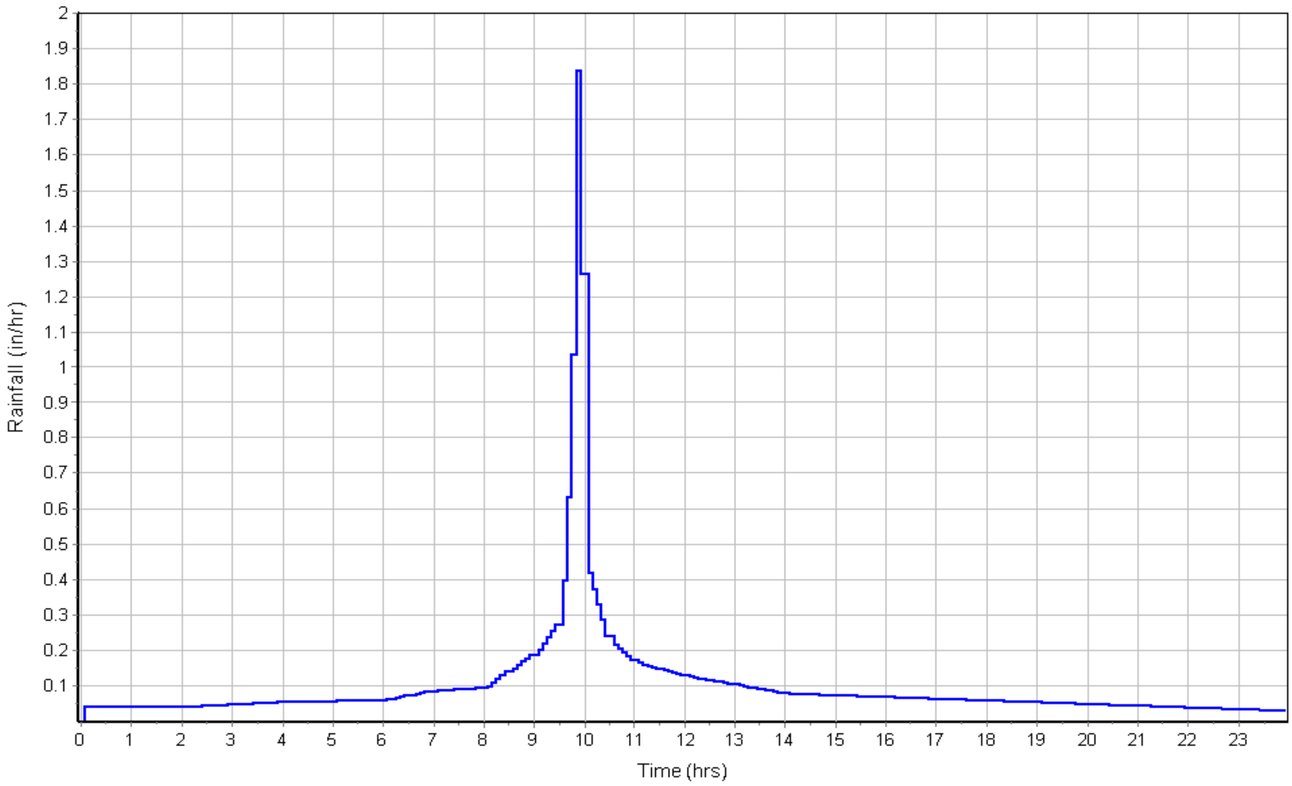
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

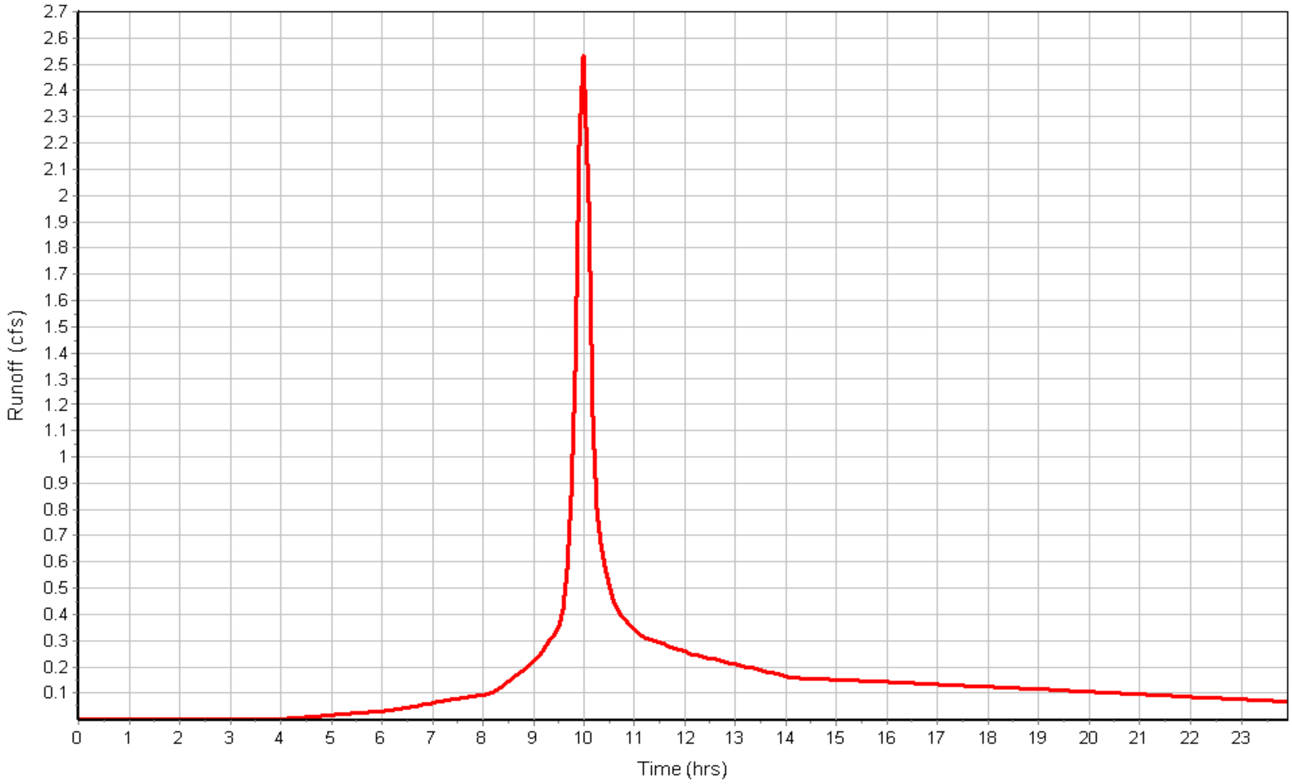
Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 2.56
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : A3

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

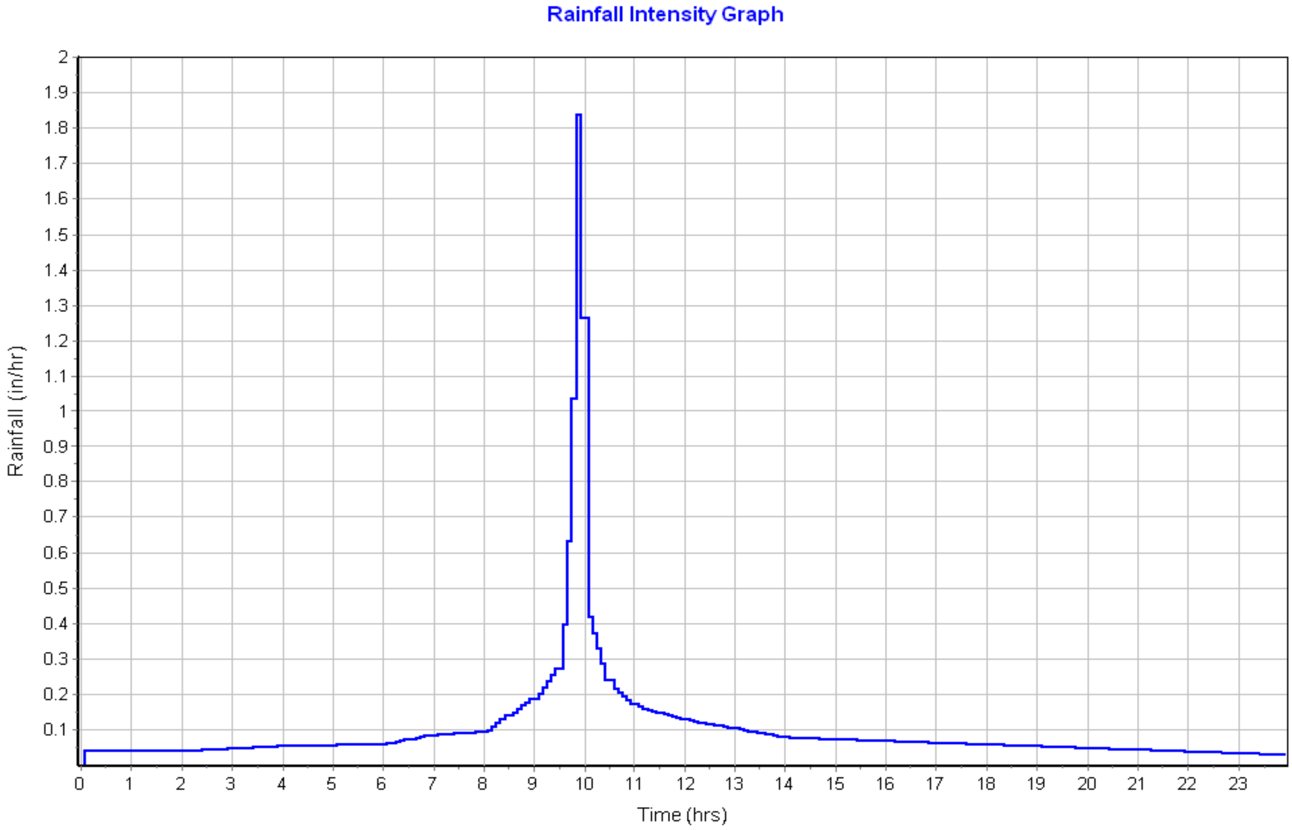
Time of Concentration

User-Defined TOC override (minutes): 10

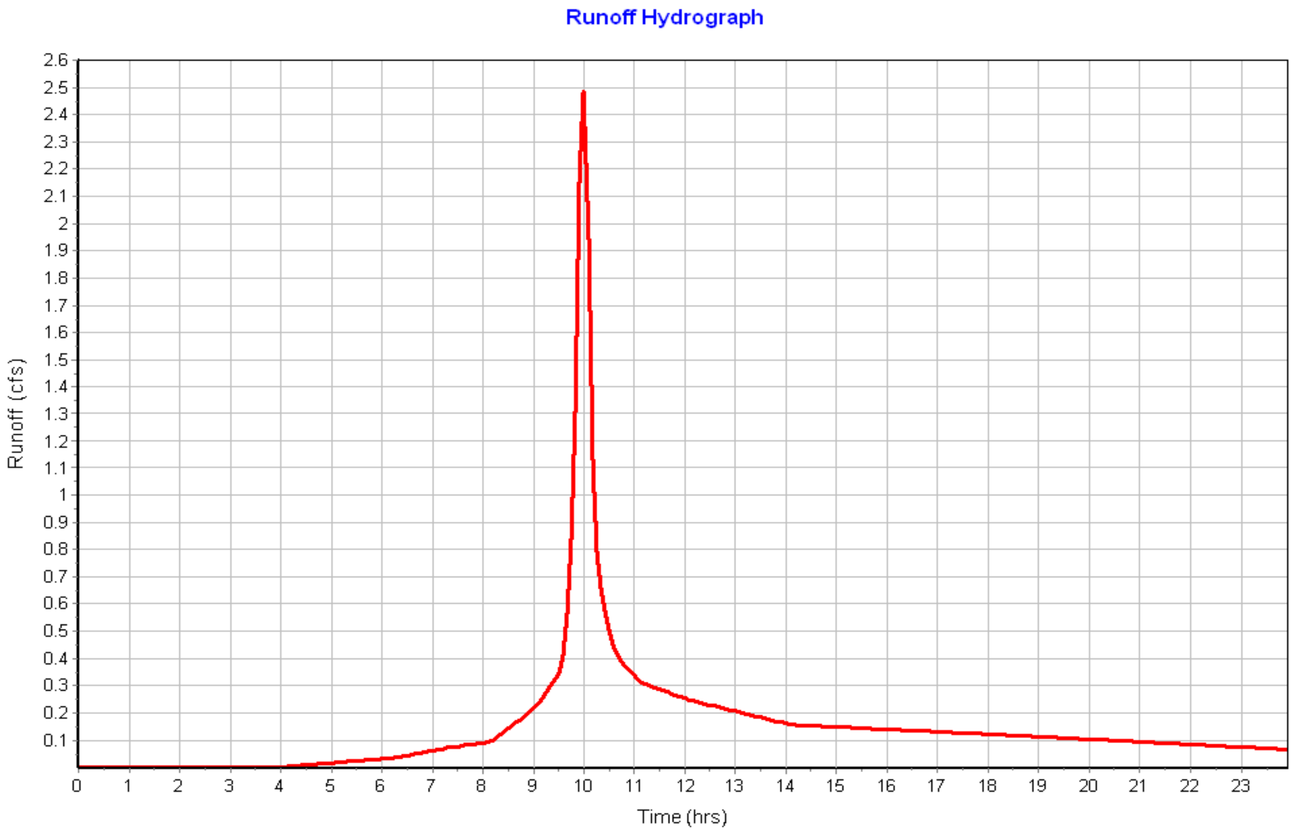
Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 2.52
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A3



Rainfall Intensity Graph
Rainfall (in/hr)
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
Time (hrs)

Subbasin : A4

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

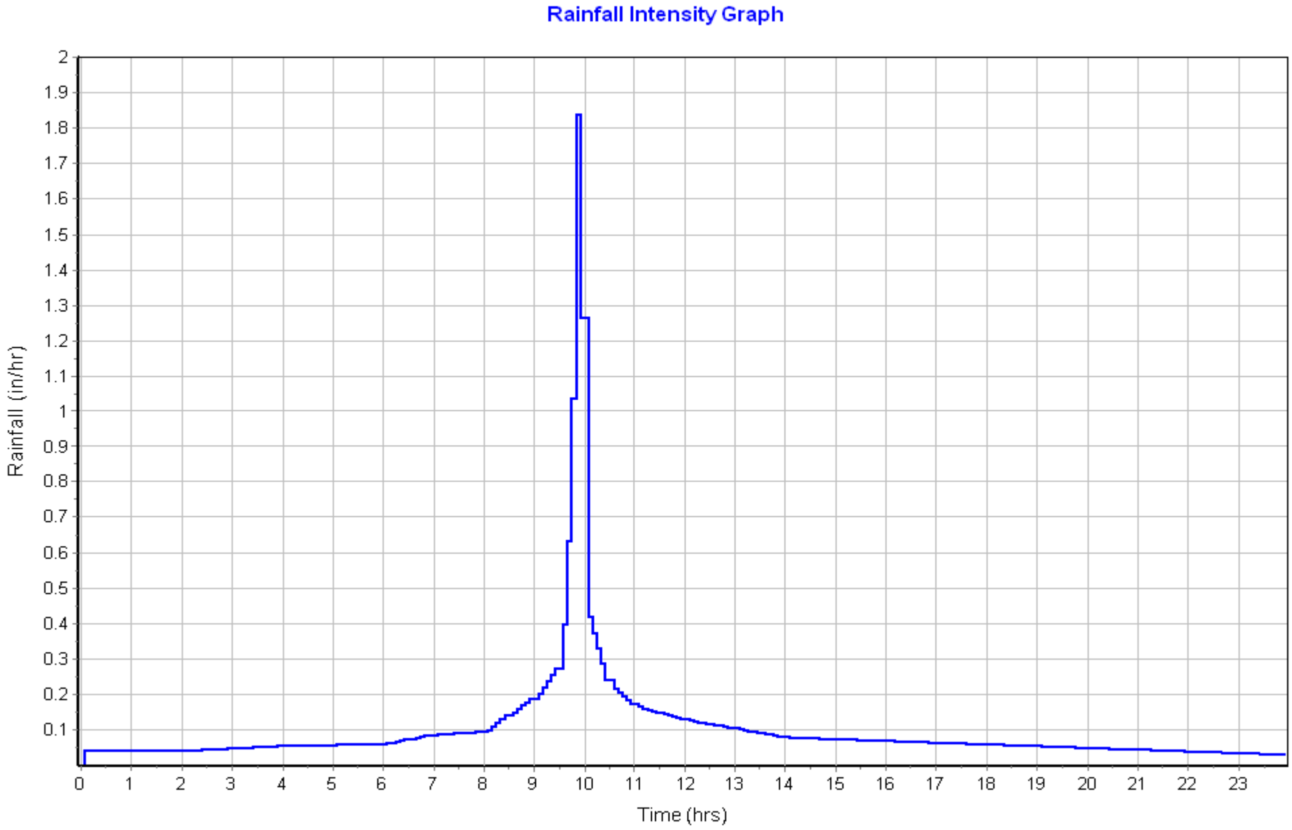
Time of Concentration

User-Defined TOC override (minutes): 10

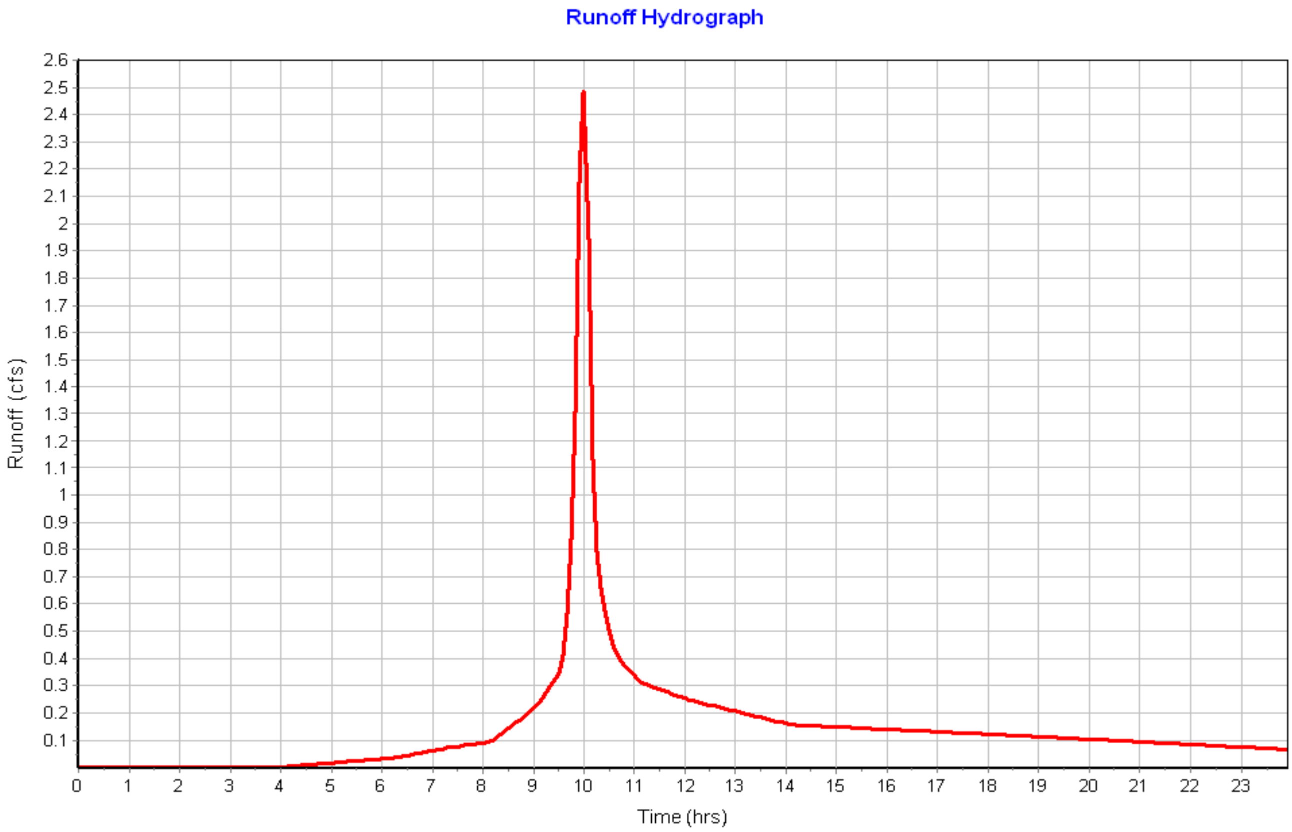
Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 2.52
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A4



Rainfall Intensity Graph
Rainfall (in/hr)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A5a

Input Data

Area (ac) 2.36
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.66	B	92.00
Composite Area & Weighted CN	1.66		92.00

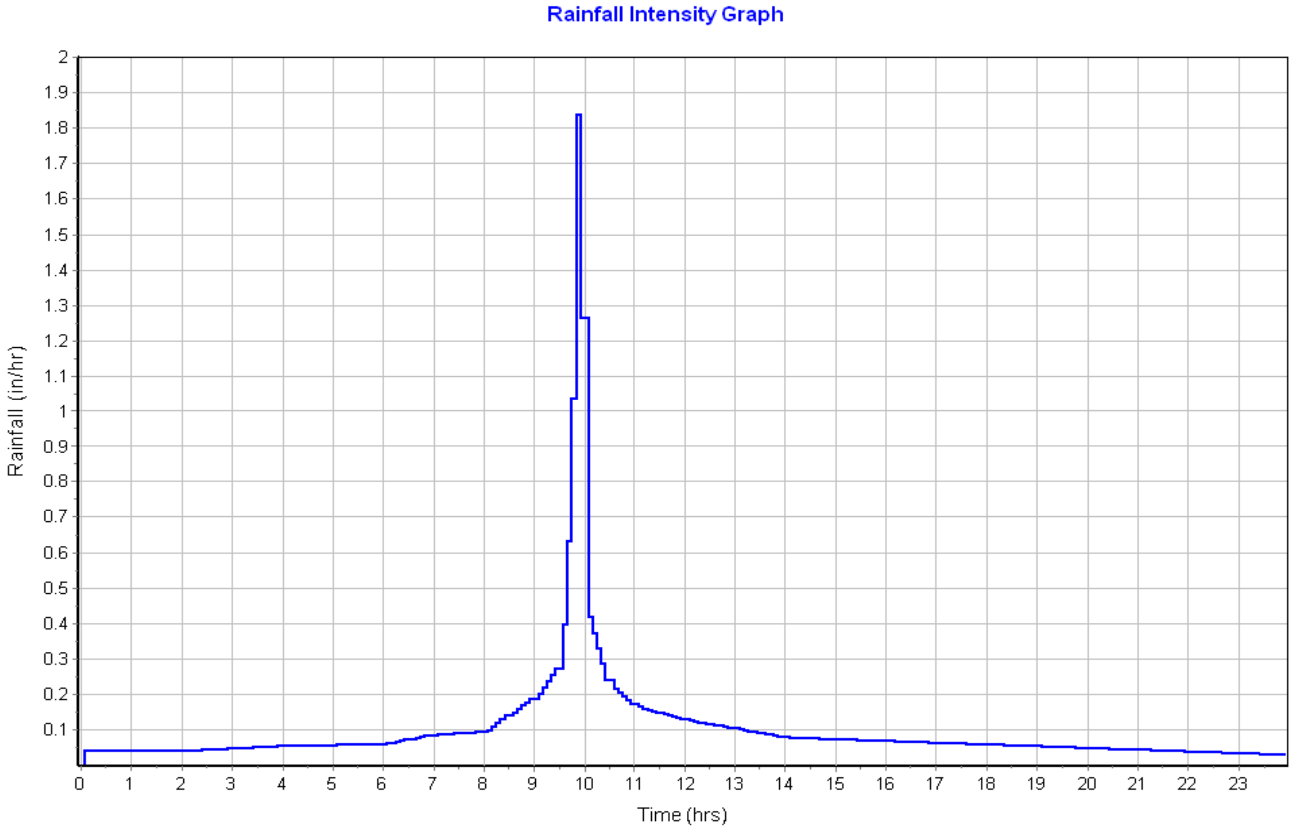
Time of Concentration

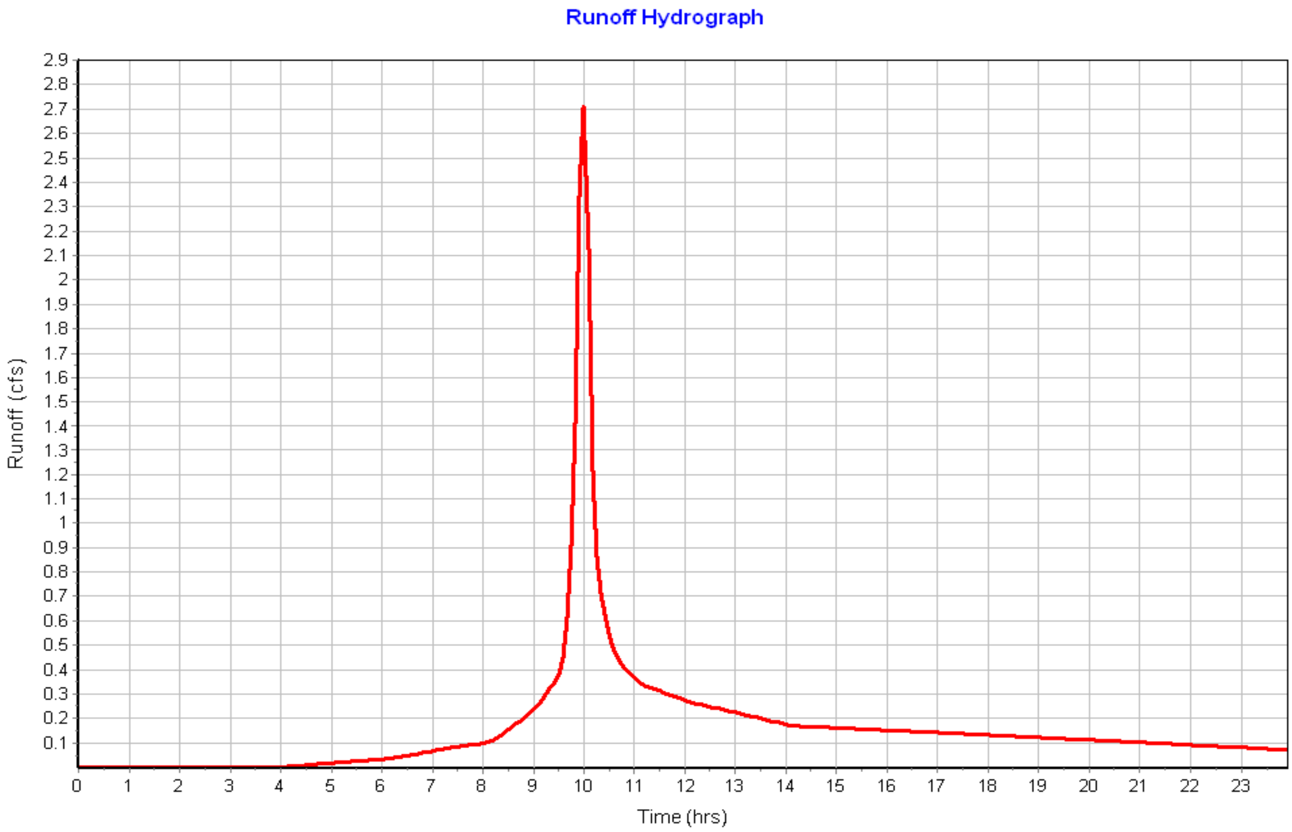
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 2.74
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5a





Subbasin : A5b

Input Data

Area (ac) 2.46
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.46	B	92.00
Composite Area & Weighted CN	2.46		92.00

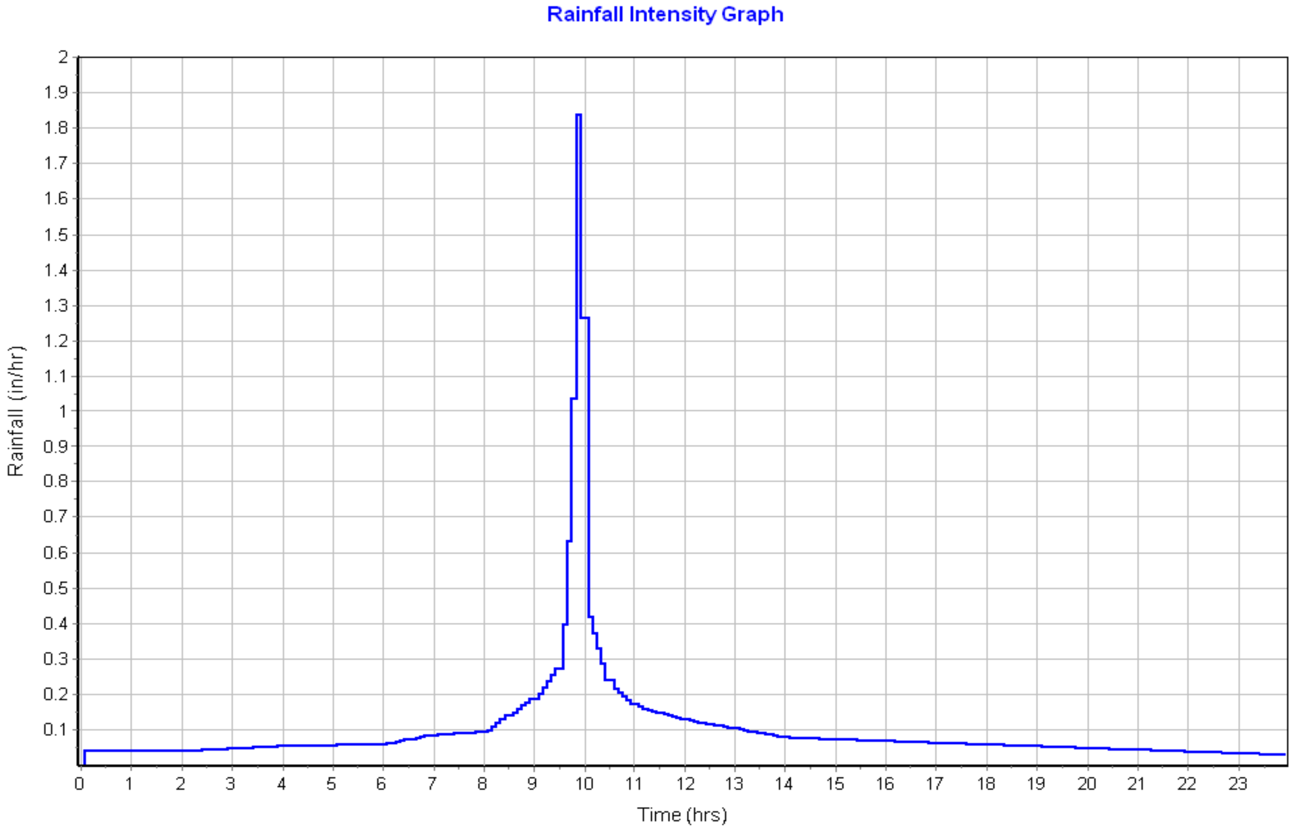
Time of Concentration

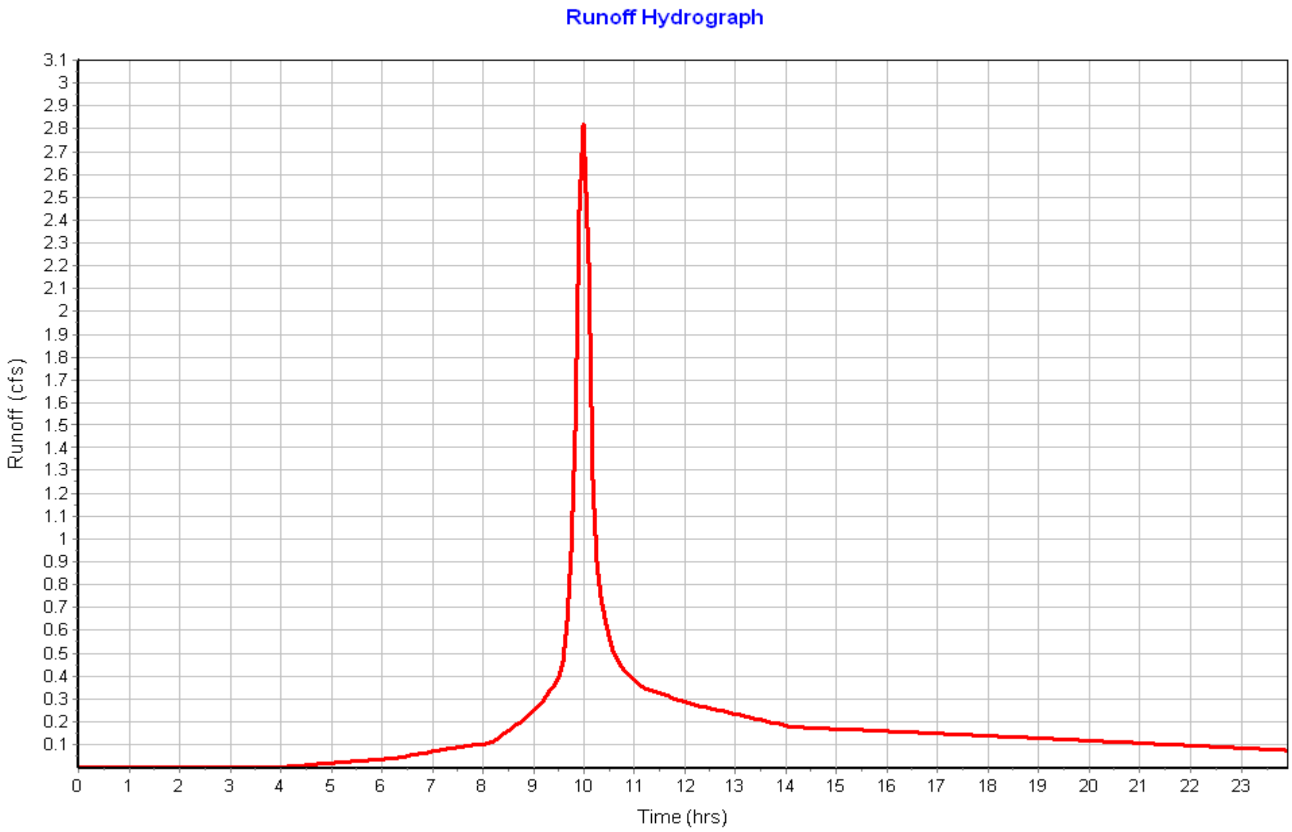
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 2.85
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5b





Subbasin : A6

Input Data

Area (ac) 2.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.65	B	92.00
Composite Area & Weighted CN	1.65		92.00

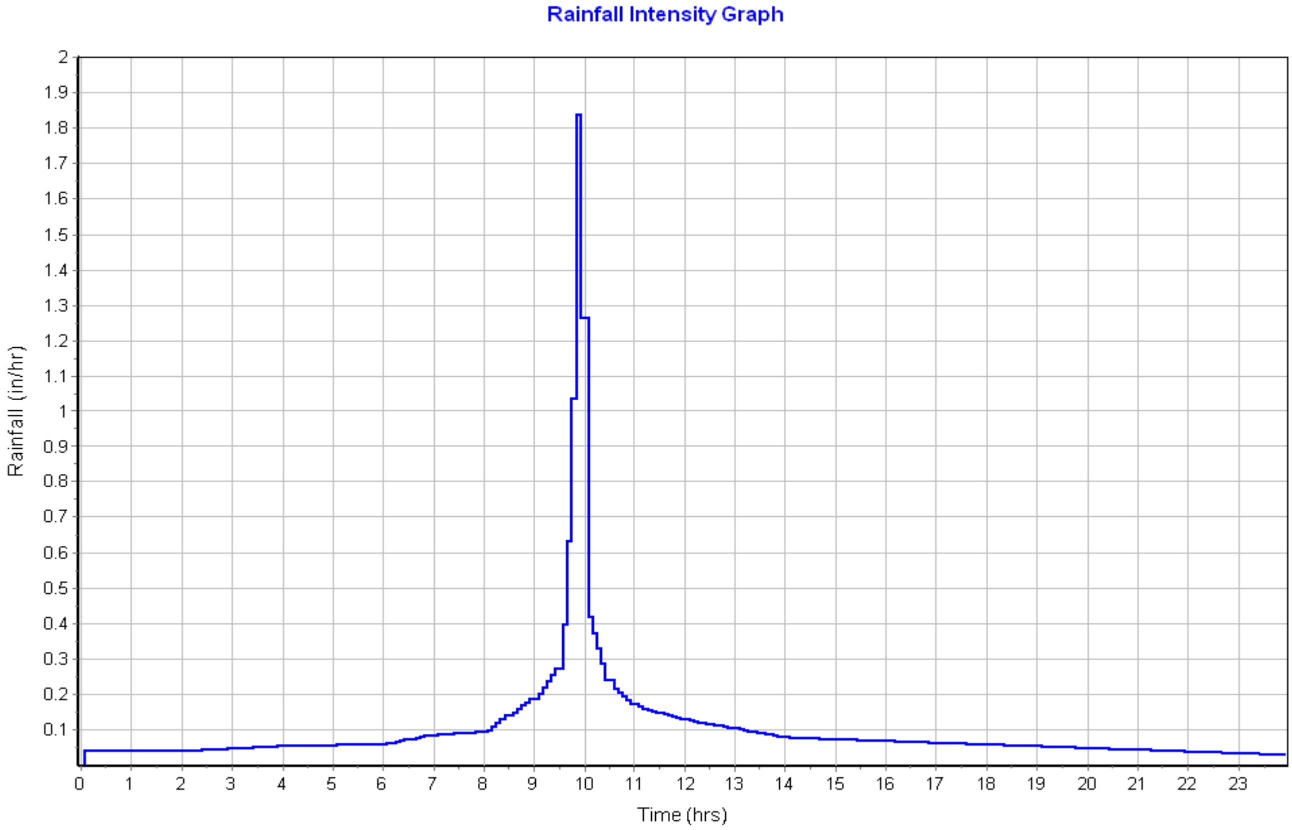
Time of Concentration

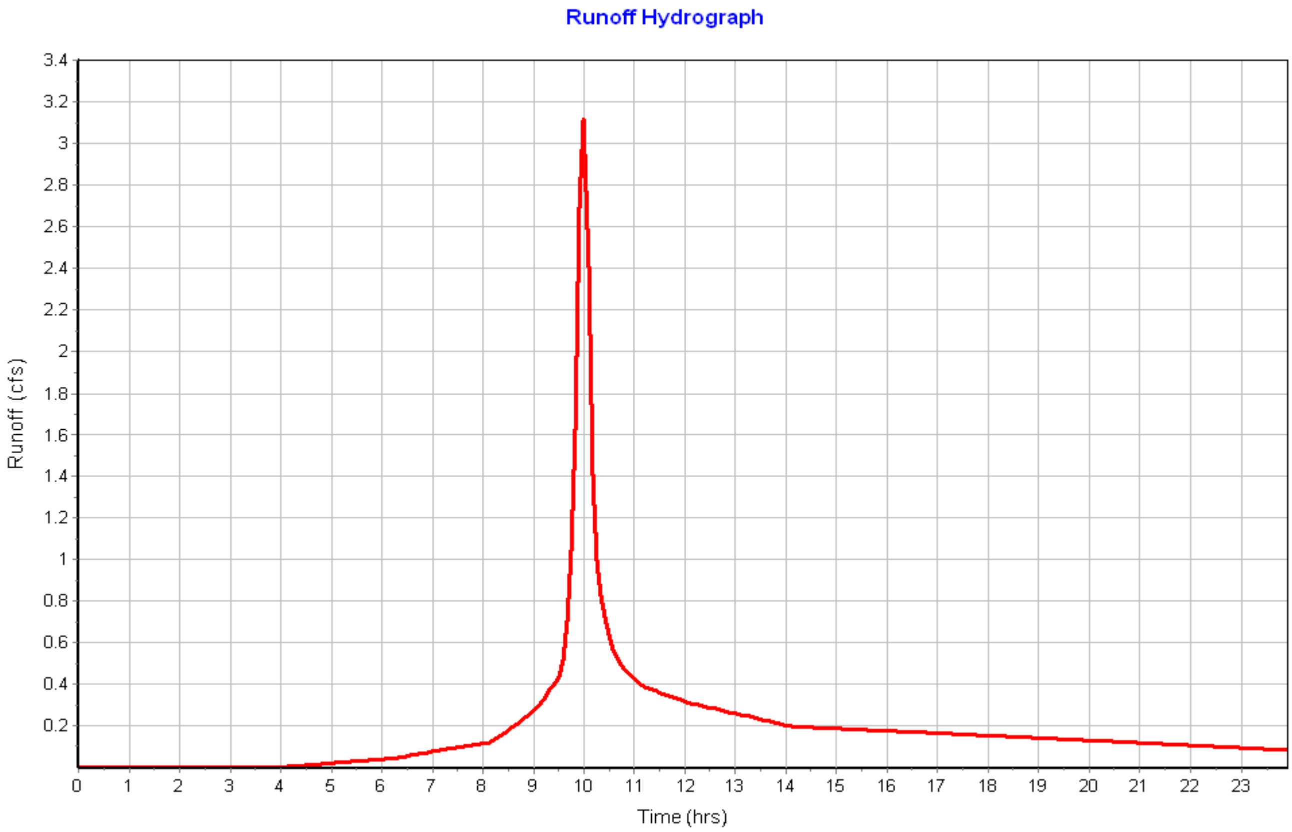
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 3.16
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A6


Rainfall Intensity Graph
Rainfall (in/hr)
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
Time (hrs)

Subbasin : A7

Input Data

Area (ac) 1.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.30	B	92.00
Composite Area & Weighted CN	1.30		92.00

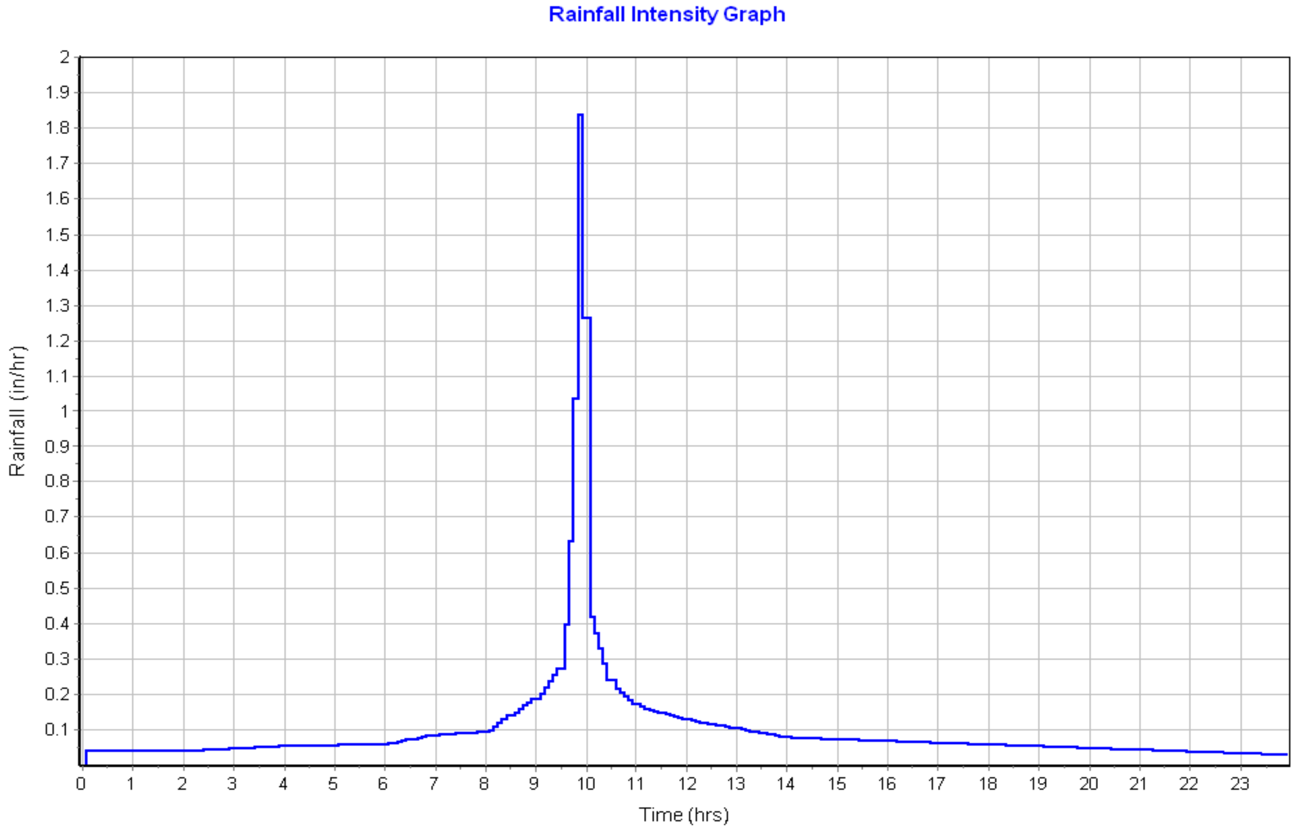
Time of Concentration

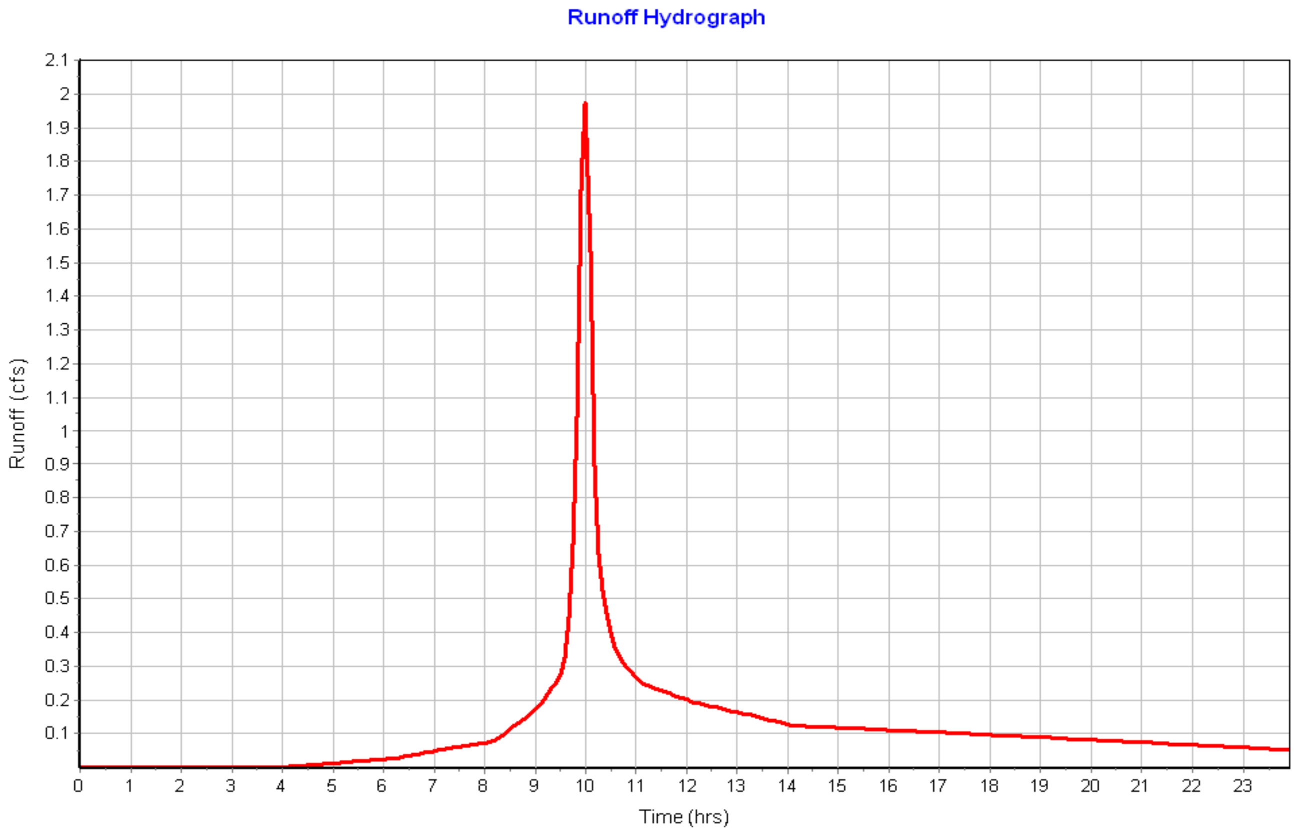
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.64
Peak Runoff (cfs) 2.00
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A7


Rainfall Intensity Graph
Rainfall (in/hr)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : PRE-DEV

Input Data

Area (ac) 15.11
Weighted Curve Number 77.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	15.11	B	77.00
Composite Area & Weighted CN	15.11		77.00

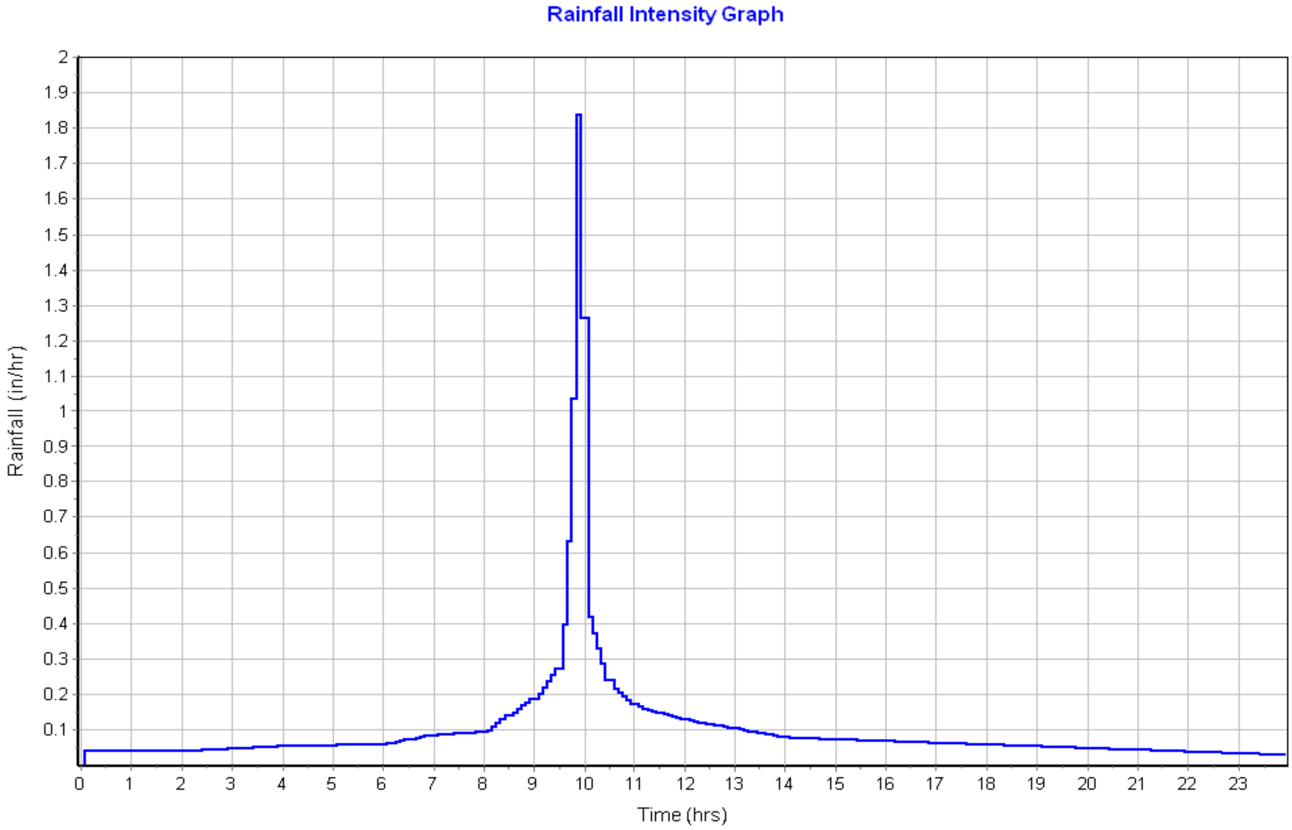
Time of Concentration

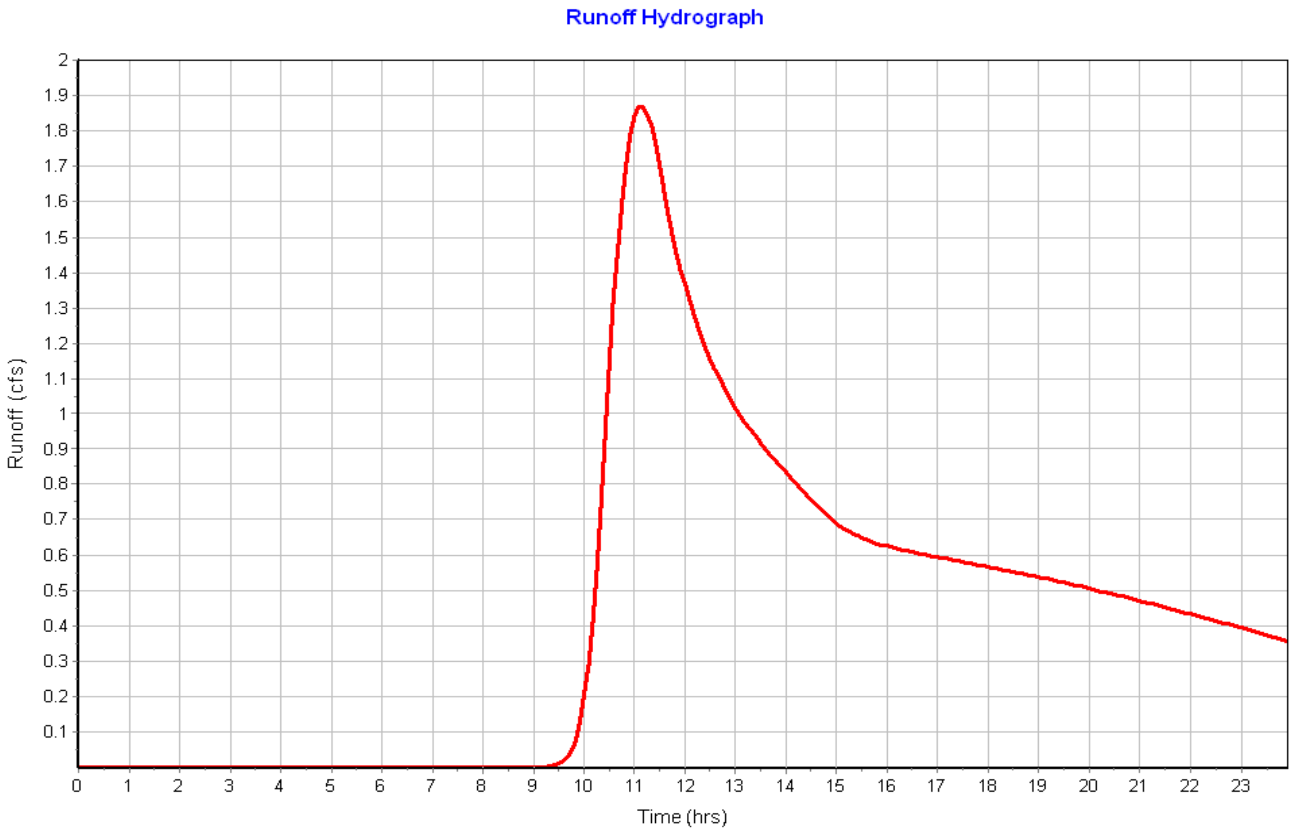
User-Defined TOC override (minutes): 100

Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 0.70
Peak Runoff (cfs) 1.87
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : PRE-DEV





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	BU1	998.09	1003.05	4.96	998.09	0.00	0.00	-1003.05	0.00	0.00
2	BU2	1000.23	1004.23	4.00	1000.23	0.00	0.00	-1004.23	0.00	0.00
3	J1	1004.61	1009.61	5.00	1004.61	0.00	0.00	-1009.61	0.00	0.00
4	J2a	999.91	1003.24	3.33	999.91	0.00	0.00	-1003.24	0.00	0.00
5	J2b	999.94	1002.15	2.21	999.94	0.00	0.00	-1002.15	0.00	0.00
6	J3	1005.76	1010.36	4.60	1005.76	0.00	0.00	-1010.36	0.00	0.00
7	J4	999.96	1005.68	5.72	999.96	0.00	0.00	-1005.68	0.00	0.00
8	Jun-23	0.00	6.00	6.00	0.00	0.00	6.00	0.00	0.00	0.00
9	O1	1009.93	1014.46	4.53	1009.93	0.00	0.00	-1014.46	0.00	0.00
10	O2	1008.31	1011.81	3.50	1008.31	0.00	0.00	-1011.81	0.00	0.00
11	O4	999.79	1003.29	3.50	999.79	0.00	0.00	-1003.29	0.00	0.00
12	O5	997.80	1003.05	5.25	997.80	0.00	0.00	-1003.05	0.00	0.00
13	SDMH1	1003.49	1009.45	5.96	1003.49	0.00	0.00	-1009.45	0.00	0.00
14	SDMH2	1001.24	1005.72	4.48	1001.24	0.00	6.00	-999.72	0.00	0.00
15	SDMH3	1001.57	1006.27	4.70	1001.57	0.00	6.00	-1000.27	0.00	0.00
16	SDMH4	997.69	1002.76	5.07	997.69	0.00	0.00	-1002.76	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	BU1	0.32	0.00	1001.36	3.27	0.00	1.69	1001.36	3.27	0 13:04	0 00:00	0.00	0.00
2	BU2	2.45	0.00	1003.74	3.51	0.00	1.49	1003.73	3.50	0 10:06	0 00:00	0.00	0.00
3	J1	2.48	2.48	1009.61	5.00	0.00	0.00	1004.80	0.19	0 09:58	0 10:05	0.08	13.00
4	J2a	2.71	2.71	1003.24	3.33	0.00	0.00	1000.10	0.19	0 09:57	0 10:05	0.13	16.00
5	J2b	2.82	2.82	1002.15	2.21	0.00	0.00	1000.13	0.19	0 09:56	0 10:05	0.17	17.00
6	J3	2.48	2.48	1006.42	0.66	0.00	3.94	1005.93	0.17	0 10:05	0 00:00	0.00	0.00
7	J4	4.87	3.12	1005.68	5.72	0.00	0.00	1000.37	0.41	0 09:53	0 10:05	0.98	39.00
8	Jun-23	0.32	0.00	998.66	998.66	0.00	0.71	998.46	998.46	0 13:03	0 00:00	0.00	0.00
9	O1	0.60	0.00	1010.18	0.25	0.00	4.28	1009.99	0.06	0 10:28	0 00:00	0.00	0.00
10	O2	0.23	0.00	1008.48	0.17	0.00	3.33	1008.36	0.05	0 11:25	0 00:00	0.00	0.00
11	O4	4.15	0.00	1003.29	3.50	0.00	0.00	1000.43	0.64	0 09:56	0 10:07	0.54	25.00
12	O5	0.00	0.00	998.10	0.30	0.00	4.95	998.10	0.30	0 00:00	0 00:00	0.00	0.00
13	SDMH1	1.93	0.00	1005.57	2.08	0.00	3.88	1004.73	1.24	0 09:59	0 00:00	0.00	0.00
14	SDMH2	1.89	0.00	1001.90	0.66	0.00	3.82	1001.49	0.25	0 10:10	0 00:00	0.00	0.00
15	SDMH3	2.45	0.00	1002.32	0.75	0.00	3.95	1001.80	0.23	0 10:06	0 00:00	0.00	0.00
16	SDMH4	0.00	0.00	997.79	0.10	0.00	4.97	997.79	0.10	0 00:00	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	OC1	6.42	1003.73	3.50	1001.17	0.00	2.56	39.8800	Rectangular	1.500	3.000	0.0010	0.5000	0.5000	0.0000	0.00	No
2	OC2	1.00	1001.36	3.27	998.80	0.00	2.56	256.0000	Rectangular	1.500	2.000	0.0010	0.5000	0.5000	0.0000	0.00	No

Channel 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	OC1	2.45	0 10:06	3485.71	0.00	50.00	0.00	0.01	0.01	0.00		
2	OC2	0.32	0 13:04	5074.12	0.00	0.00		0.00	0.00	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	P1	383.00	1009.93	0.00	1004.57	1.08	5.36	1.4000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	P10	70.00	1000.23	0.44	1000.06	0.10	0.17	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	P11	40.00	999.96	0.00	999.86	1.06	0.10	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	P12	125.00	998.10	0.30	997.79	0.10	0.31	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	P13	130.00	997.69	0.00	997.37	0.00	0.32	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	P2	15.00	1004.61	0.00	1004.57	1.08	0.04	0.2700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	P3	408.00	1004.47	0.98	1001.34	0.10	3.13	0.7700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	P4	79.00	1001.24	0.00	999.86	1.06	1.38	1.7500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	P5a	20.00	999.91	0.00	999.86	1.06	0.05	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	P5b	34.00	999.94	0.00	999.86	1.06	0.08	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	P6	113.00	998.37	998.37	998.09	0.00	0.28	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	P7	157.00	1006.25	-2.06	1005.86	0.10	0.39	0.2500	CIRCULAR	12.000	12.000	0.0153	0.5000	0.5000	0.0000	0.00	No	1
13	P8	492.00	1005.76	0.00	1001.67	0.10	4.09	0.8300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	P9	45.00	1001.57	0.00	1000.23	0.00	1.34	2.9800	CIRCULAR	12.000	12.000	0.0130	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	P1	0.59	0 10:29	4.21	0.14	3.80	1.68	0.25	0.25	0.00		Calculated
2	P10	1.87	0 10:19	1.76	1.07	2.63	0.44	1.00	1.00	22.00		SURCHARGED
3	P11	1.88	0 10:29	1.78	1.06	2.63	0.25	1.00	1.00	36.00		SURCHARGED
4	P12	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
5	P13	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
6	P2	1.93	0 09:59	1.84	1.05	2.70	0.09	1.00	1.00	11.00		SURCHARGED
7	P3	1.89	0 10:10	3.12	0.61	4.31	1.58	0.56	0.56	0.00		Calculated
8	P4	1.88	0 10:11	4.71	0.40	5.68	0.23	0.44	0.44	0.00		Calculated
9	P5a	1.85	0 09:57	1.78	1.04	2.63	0.13	1.00	1.00	14.00		SURCHARGED
10	P5b	1.83	0 10:12	1.73	1.06	2.55	0.22	1.00	1.00	15.00		SURCHARGED
11	P6	0.32	0 13:04	1.77	0.18	1.71	1.10	0.29	0.29	0.00		Calculated
12	P7	0.23	0 11:26	3.78	0.06	2.66	0.98	0.17	0.17	0.00		Calculated
13	P8	2.45	0 10:06	3.25	0.75	4.62	1.77	0.65	0.65	0.00		Calculated
14	P9	2.45	0 10:06	6.15	0.40	7.38	0.10	0.43	0.44	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1011.40
Max (Rim) Elevation (ft) 1014.46
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1011.40
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

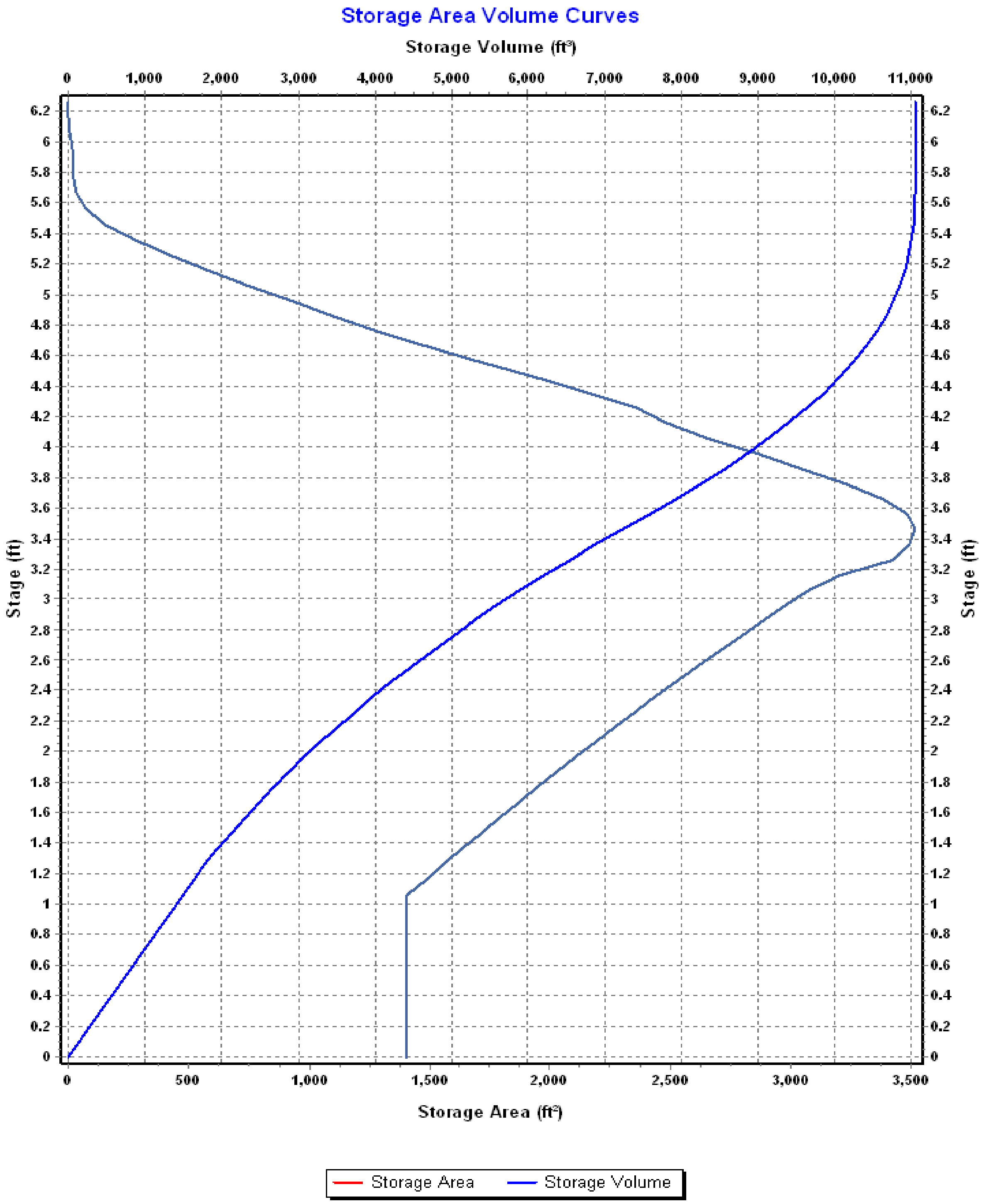
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1406	0.000
1.06	1406.41	1490.58
1.16	1480.47	1634.92
1.26	1555.24	1786.71
1.36	1630.77	1946.01
1.46	1707.07	2112.90
1.56	1784.14	2287.46
1.66	1861.98	2469.77
1.76	1940.59	2659.90
1.86	2020.12	2857.94
1.96	2100.89	3063.99
2.06	2182.92	3278.18
2.16	2266.21	3500.64
2.26	2350.76	3731.49
2.36	2436.58	3970.86
2.46	2523.66	4218.87
2.52	2576.52	4371.88
2.56	2612.01	4475.65
2.66	2701.62	4741.33
2.76	2792.5	5016.04
2.86	2884.65	5299.90
2.96	2978.05	5593.04
3.06	3072.11	5895.55
3.16	3205.91	6209.45
3.26	3421.78	6540.83
3.36	3493.59	6886.60
3.46	3515.37	7237.05
3.56	3483.18	7586.98
3.66	3379.16	7930.10
3.76	3228.85	8260.50
3.86	3042.58	8574.07
3.96	2846.45	8868.52
4.06	2644.9	9143.09
4.16	2476.74	9399.17
4.26	2357.18	9640.87
4.36	2152.13	9866.34
4.46	1923.09	10070.10
4.56	1699.17	10251.21
4.66	1484.08	10410.37
4.76	1280.57	10548.60
4.86	1096.18	10667.44
4.96	914.98	10768.00
5.06	736.35	10850.57
5.16	570.94	10915.93
5.26	418.64	10965.41
5.36	279.43	11000.31
5.46	153.32	11021.95
5.56	72.06	11033.22
5.66	32.33	11038.44
5.76	22.84	11041.20
5.86	20.61	11043.37
5.96	14.31	11045.12
6.06	6.81	11046.18
6.16	2.03	11046.62
6.26	0.06	11046.72



Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
Stage (ft)
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (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	OR1	Bottom	CIRCULAR	No	24.00			1013.96	0.61

Output Summary Results

Peak Inflow (cfs) 2.59
Peak Lateral Inflow (cfs) 2.59
Peak Outflow (cfs) 0.60
Peak Exfiltration Flow Rate (cfm) 2.81
Max HGL Elevation Attained (ft) 1014.05
Max HGL Depth Attained (ft) 2.65
Average HGL Elevation Attained (ft) 1012.96
Average HGL Depth Attained (ft) 1.56
Time of Max HGL Occurrence (days hh:mm) 0 10:28
Total Exfiltration Volume (1000-ft³) 2.705
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1009.68
Max (Rim) Elevation (ft) 1012.74
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1009.68
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

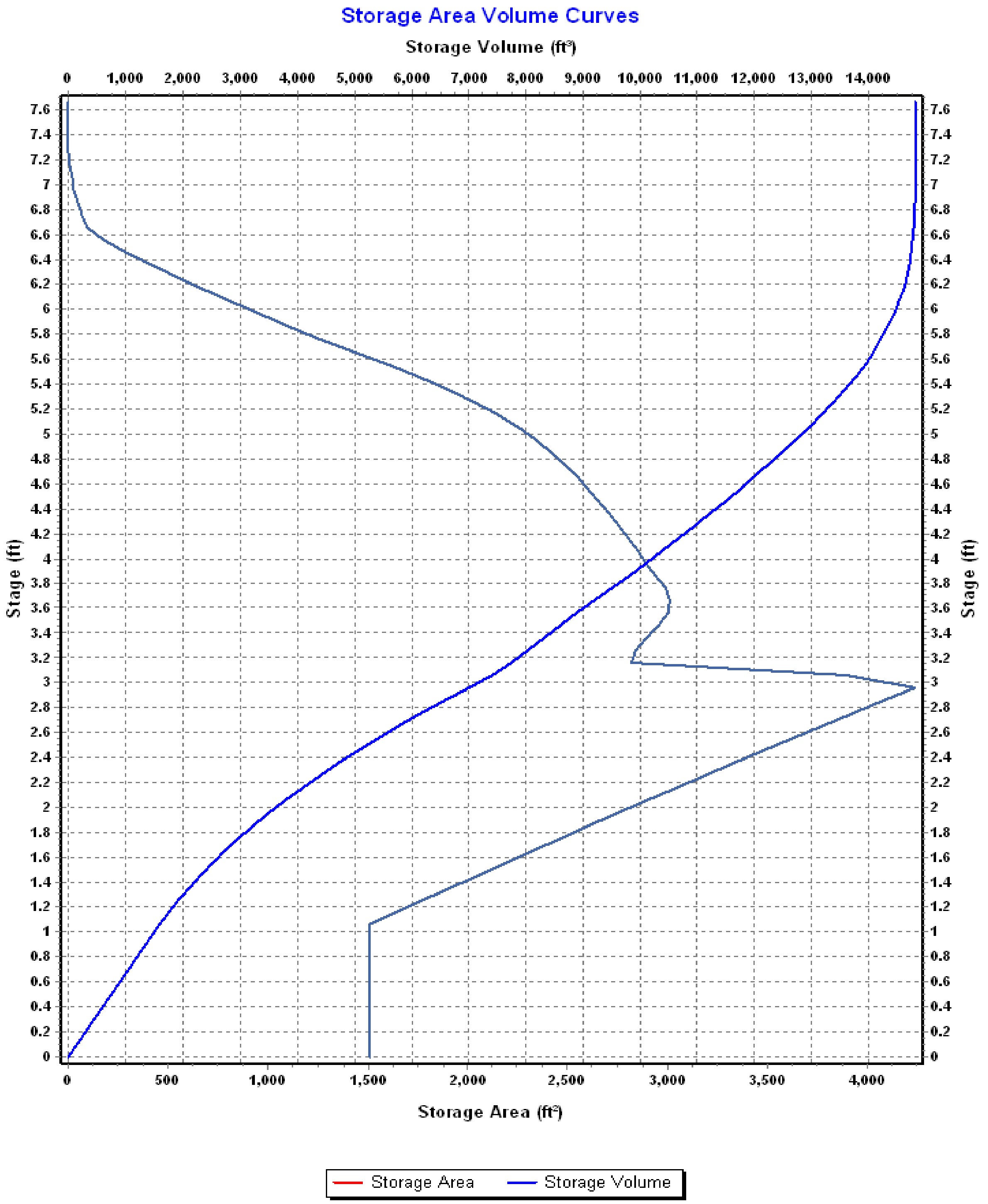
Exfiltration Rate (in/hr) 0.8500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1509	0.000
1.06	1509.71	1599.92
1.16	1643.71	1757.59
1.26	1778.63	1928.71
1.36	1914.59	2113.37
1.46	2051.6	2311.68
1.56	2189.68	2523.74
1.66	2328.85	2749.67
1.76	2469.09	2989.57
1.86	2610.42	3243.55
1.96	2752.84	3511.71
2.06	2896.36	3794.17
2.16	3041	4091.04
2.26	3186.76	4402.43
2.36	3333.64	4728.45
2.46	3481.65	5069.21
2.5	3541.17	5209.67
2.56	3630.78	5424.83
2.66	3781.07	5795.42
2.76	3932.5	6181.10
2.86	4085.08	6581.98
2.96	4238.81	6998.17
3.06	3893.63	7404.79
3.16	2818.58	7740.40
3.26	2841.8	8023.42
3.36	2894.46	8310.23
3.46	2958.61	8602.88
3.56	3003.95	8901.01
3.66	3008.97	9201.66
3.76	2988.5	9501.53
3.86	2941.33	9798.02
3.96	2895.87	10089.88
4.06	2850.77	10377.21
4.16	2804.84	10659.99
4.26	2758.57	10938.16
4.36	2709.87	11211.58
4.46	2658.38	11479.99
4.56	2603.81	11743.10
4.66	2544.42	12000.51
4.76	2480.66	12251.76
4.86	2410.91	12496.34
4.96	2336.82	12733.73
5.06	2248.65	12963.00
5.16	2143.37	13182.60
5.26	2023.25	13390.93
5.36	1890.68	13586.63
5.46	1744.92	13768.41
5.56	1587.46	13935.03
5.66	1421.65	14085.49
5.76	1248.08	14218.98
5.86	1101.15	14336.44
5.96	957.13	14439.35
6.06	812.08	14527.81
6.16	668.84	14601.86
6.26	532.55	14661.93
6.36	403.26	14708.72
6.46	284.36	14743.10
6.56	177.83	14766.21
6.66	97.81	14779.99
6.76	71.62	14788.46
6.86	48.37	14794.46
6.96	30.72	14798.41
7.06	17.84	14800.84
7.16	7.04	14802.08
7.26	3.14	14802.59
7.36	1.97	14802.85
7.46	2.5	14803.07
7.56	1.02	14803.25

7.66	0.2	14803.31


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (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	OR2	Bottom	CIRCULAR	No	24.00			1012.24	0.61

Output Summary Results

Peak Inflow (cfs) 2.53
Peak Lateral Inflow (cfs) 2.53
Peak Outflow (cfs) 0.23
Peak Exfiltration Flow Rate (cfm) 4.37
Max HGL Elevation Attained (ft) 1012.29
Max HGL Depth Attained (ft) 2.61
Average HGL Elevation Attained (ft) 1011.22
Average HGL Depth Attained (ft) 1.54
Time of Max HGL Occurrence (days hh:mm) 0 11:25
Total Exfiltration Volume (1000-ft³) 4.058
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR3

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1001.86
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

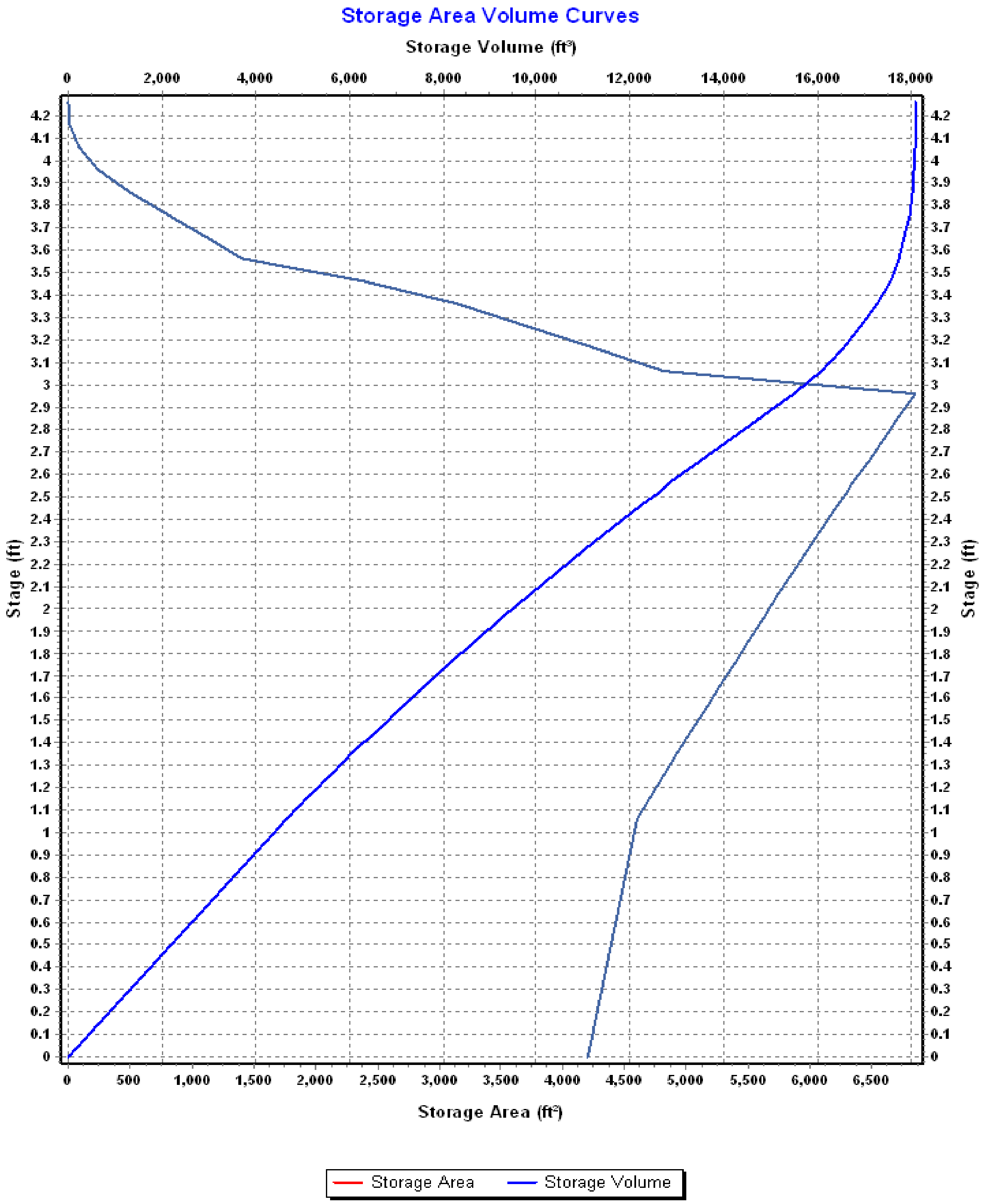
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR3

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	4202	0.000
1.06	4602.78	4666.53
1.16	4712.04	5132.27
1.26	4822.31	5608.99
1.36	4933.57	6096.78
1.46	5045.82	6595.75
1.56	5159.08	7106.00
1.66	5273.33	7627.62
1.76	5388.58	8160.72
1.86	5504.82	8705.39
1.96	5622.06	9261.73
2.06	5740.3	9829.85
2.16	5859.54	10409.84
2.26	5979.77	11001.81
2.36	6101.01	11605.85
2.46	6223.23	12222.06
2.52	6297.05	12597.67
2.56	6346.46	12850.54
2.66	6470.68	13491.40
2.76	6595.9	14144.73
2.86	6722.12	14810.63
2.96	6849.33	15489.20
3.06	4821.94	16072.76
3.16	4269.29	16527.32
3.26	3701.61	16925.87
3.36	3145.79	17268.24
3.46	2385.68	17544.81
3.56	1403.4	17734.26
3.66	1106.4	17859.75
3.76	805.95	17955.37
3.86	493.74	18020.35
3.96	245.04	18057.29
4.06	86.03	18073.84
4.16	14	18078.84
4.26	0.09	18079.54


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Stage (ft)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
3.1
3.2
3.3
3.4
3.5
3.6
3.7
3.8
3.9
4
4.1
4.2
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500
6,000
6,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR3 (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	OR3	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 3.63
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.32
Peak Exfiltration Flow Rate (cfm) 8.74
Max HGL Elevation Attained (ft) 1001.42
Max HGL Depth Attained (ft) 2.62
Average HGL Elevation Attained (ft) 1000.30
Average HGL Depth Attained (ft) 1.5
Time of Max HGL Occurrence (days hh:mm) 0 13:03
Total Exfiltration Volume (1000-ft³) 8.430
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR4

Input Data

Invert Elevation (ft) 1001.17
Max (Rim) Elevation (ft) 1004.23
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1001.17
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

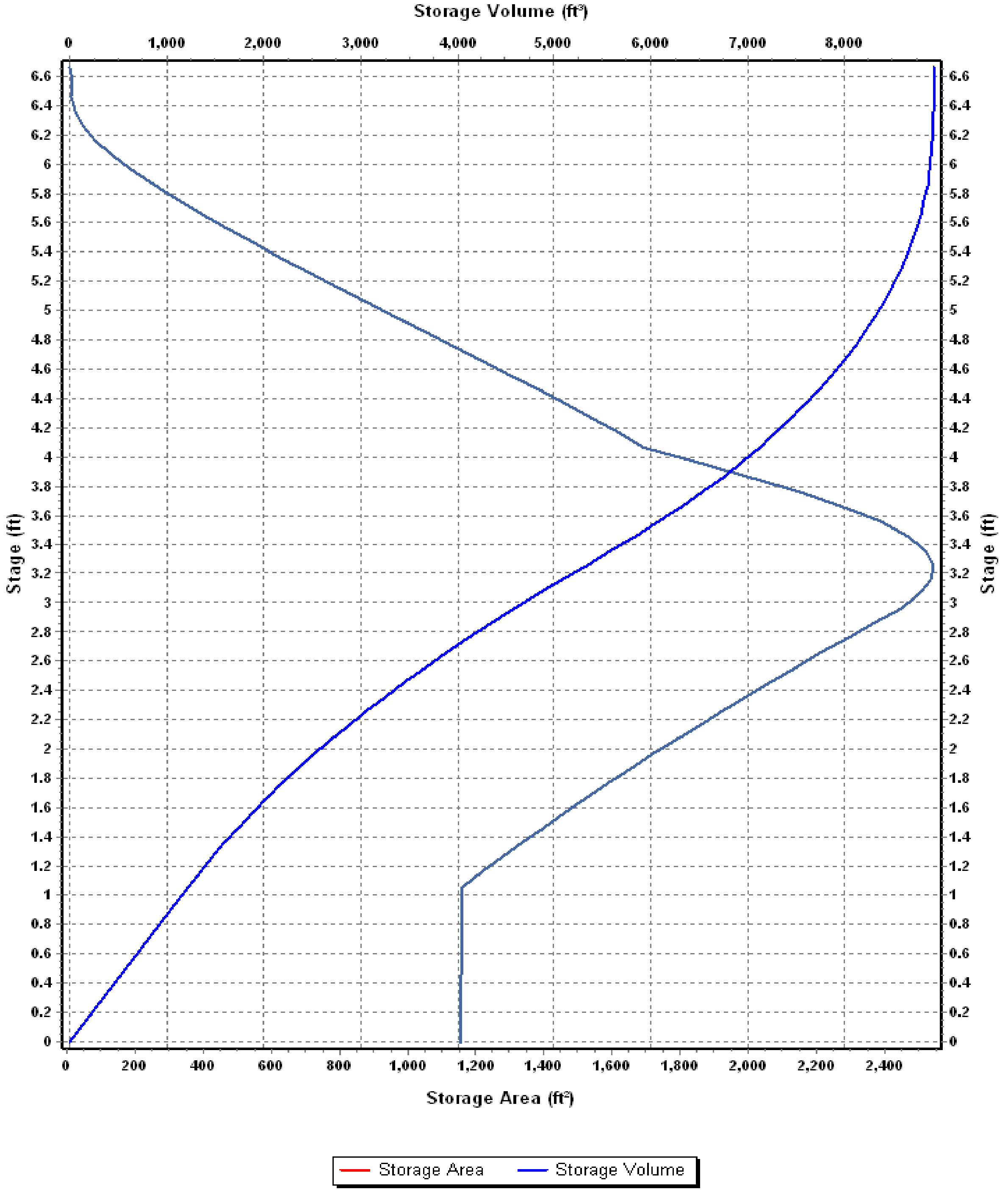
Exfiltration Rate (in/hr) 1.6700

Storage Area Volume Curves

Storage Curve : BR4

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1157	0.000
1.06	1157.62	1226.75
1.16	1215.18	1345.39
1.26	1273.86	1469.84
1.36	1333.68	1600.22
1.46	1394.62	1736.64
1.56	1456.7	1879.21
1.66	1519.9	2028.04
1.76	1584.24	2183.25
1.86	1649.71	2344.95
1.96	1716.31	2513.25
2.06	1784.03	2688.27
2.16	1852.89	2870.12
2.26	1922.88	3058.91
2.36	1994	3254.75
2.46	2066.25	3457.76
2.49	2088.15	3520.08
2.56	2139.64	3668.05
2.66	2214.15	3885.74
2.76	2289.79	4110.94
2.86	2366.56	4343.76
2.96	2444.47	4584.31
3.06	2503.88	4831.73
3.16	2536.19	5083.73
3.26	2543.4	5337.71
3.36	2518.39	5590.80
3.46	2464.18	5839.93
3.56	2384.46	6082.36
3.66	2275.89	6315.38
3.76	2146.68	6536.51
3.86	2004.26	6744.06
3.96	1849.65	6936.76
4.06	1693.56	7113.92
4.16	1620.49	7279.62
4.26	1542.67	7437.78
4.36	1462.92	7588.06
4.46	1382.21	7730.32
4.56	1298.91	7864.38
4.66	1214.58	7990.05
4.76	1129.66	8107.26
4.86	1044.43	8215.96
4.96	959.13	8316.14
5.06	873.72	8407.78
5.16	790.35	8490.98
5.26	707.66	8565.88
5.36	625.29	8632.53
5.46	547.18	8691.15
5.56	470.39	8742.03
5.66	394.33	8785.27
5.76	324.47	8821.21
5.86	256.35	8850.25
5.96	189.71	8872.55
6.06	133.98	8888.73
6.16	83.68	8899.61
6.26	48.53	8906.22
6.36	26.06	8909.95
6.46	14.03	8911.95
6.56	14.79	8913.39
6.66	8.38	8914.55

Storage Area Volume Curves



Storage Node : BR4 (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	O4	Bottom	CIRCULAR	No	24.00			1003.29	0.61

Output Summary Results

Peak Inflow (cfs) 4.37
Peak Lateral Inflow (cfs) 1.97
Peak Outflow (cfs) 4.15
Peak Exfiltration Flow Rate (cfm) 4.79
Max HGL Elevation Attained (ft) 1003.63
Max HGL Depth Attained (ft) 2.46
Average HGL Elevation Attained (ft) 1002.55
Average HGL Depth Attained (ft) 1.38
Time of Max HGL Occurrence (days hh:mm) 0 10:07
Total Exfiltration Volume (1000-ft³) 4.385
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR5

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1003.05
Max (Rim) Offset (ft) 4.25
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

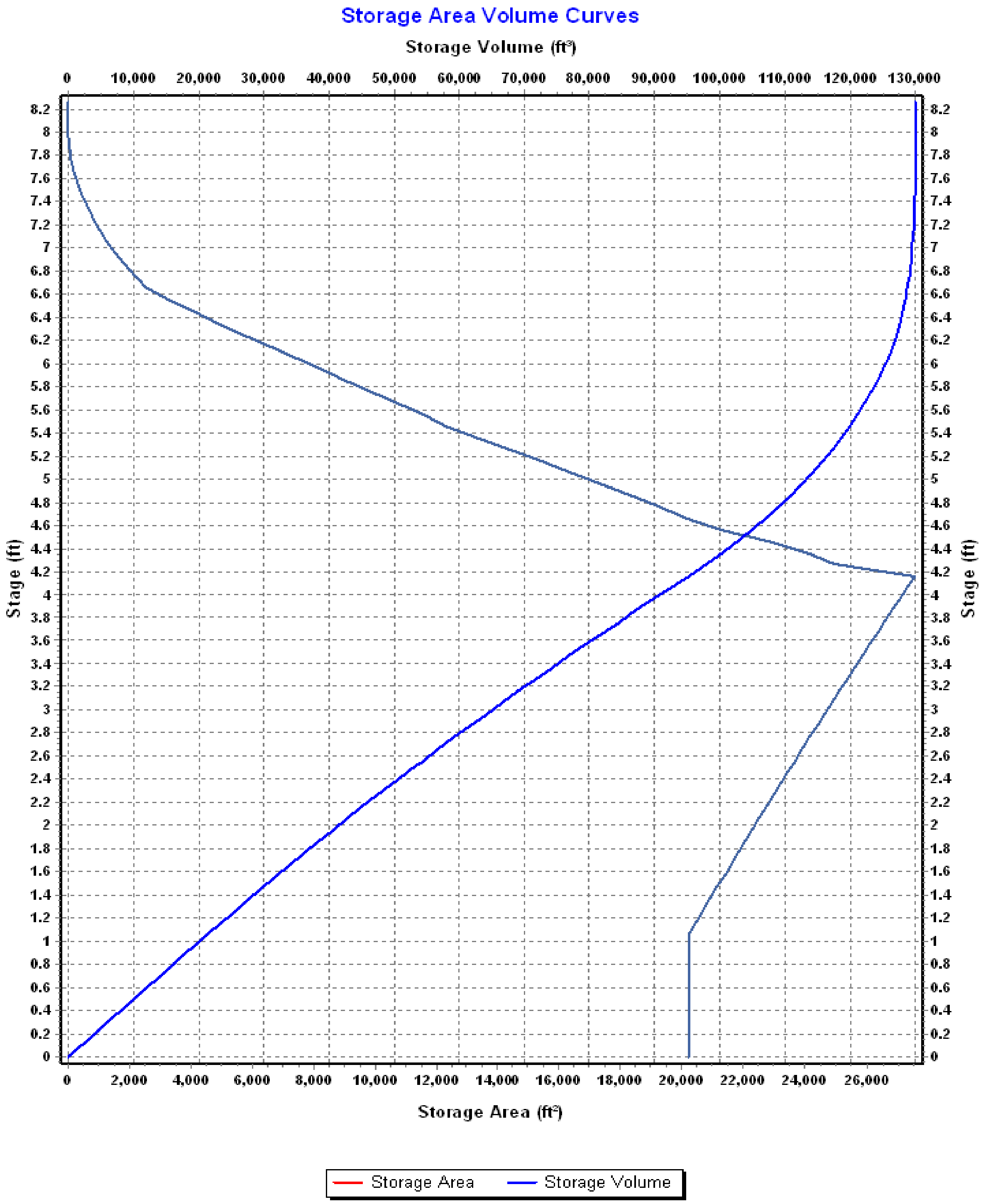
Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR5

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	20214	0.000
1.06	20215.03	21427.39
1.16	20437.65	23460.02
1.26	20661.27	25514.97
1.36	20885.87	27592.33
1.46	21111.46	29692.20
1.56	21338.05	31814.68
1.66	21565.62	33959.86
1.76	21794.18	36127.85
1.86	22023.72	38318.75
1.96	22254.26	40532.65
2.06	22485.78	42769.65
2.16	22718.3	45029.85
2.26	22951.8	47313.36
2.36	23186.29	49620.26
2.46	23421.77	51950.66
2.52	23563.54	53360.22
2.56	23658.24	54304.66
2.66	23895.7	56682.36
2.76	24134.15	59083.85
2.86	24373.58	61509.24
2.96	24614.01	63958.62
3.06	24855.42	66432.09
3.16	25097.82	68929.75
3.26	25341.21	71451.70
3.36	25585.59	73998.04
3.46	25830.96	76568.87
3.56	26077.32	79164.28
3.66	26324.66	81784.38
3.76	26573	84429.26
3.86	26822.32	87099.03
3.96	27072.63	89793.78
4.06	27323.93	92513.61
4.16	27576.22	95258.62
4.26	24935.38	97884.20
4.36	24024.32	100332.19
4.46	22764.39	102671.63
4.56	21271	104873.40
4.66	20160.51	106944.98
4.76	19229.97	108914.50
4.86	18281.25	110790.06
4.96	17314.48	112569.85
5.06	16331.1	114252.13
5.16	15332.24	115835.30
5.26	14319.21	117317.87
5.36	13293.07	118698.48
5.46	12321.72	119979.22
5.56	11498.38	121170.23
5.66	10666.17	122278.46
5.76	9824.09	123302.97
5.86	8977.65	124243.06
5.96	8130.16	125098.45
6.06	7284.67	125869.19
6.16	6443.94	126555.62
6.26	5613.4	127158.49
6.36	4794.72	127678.90
6.46	3989.93	128118.13
6.56	3201.03	128477.68
6.66	2514.65	128763.46
6.76	2163.03	128997.34
6.86	1832.56	129197.12
6.96	1526.32	129365.06
7.06	1250.46	129503.90
7.16	1001.28	129616.49
7.26	786.61	129705.88
7.36	609.46	129775.68
7.46	461.78	129829.24
7.56	329.31	129868.79

7.66	192.14	129894.86
7.76	95.82	129909.26
7.86	34.15	129915.76
7.96	4.84	129917.71
8.06	0	129917.95
8.16	4.45	129918.17
8.26	0.24	129918.40



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
100,000
110,000
120,000
130,000
Stage (ft)
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
22,000
24,000
26,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR5 (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	OR5	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 3.67
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 28.47
Max HGL Elevation Attained (ft) 1000.17
Max HGL Depth Attained (ft) 1.37
Average HGL Elevation Attained (ft) 999.45
Average HGL Depth Attained (ft) 0.65
Time of Max HGL Occurrence (days hh:mm) 0 21:01
Total Exfiltration Volume (1000-ft³) 25.186
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

100-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods .... YES

Analysis Options

Start Analysis On	Oct 13, 2022	00:00:00
End Analysis On	Oct 14, 2022	00:00:00
Start Reporting On	Oct 13, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	9
Nodes..	23
Junctions	16
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	5
Links..	21
Channels	2
Pipes	14
Pumps	0
Orifices	5
Weirs	0
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	Post-Development	Time Series	100-year	Cumulative	inches	California	San Bernardino (Baker)	100	2.84	SCS Type I 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	A01	2.26	92.00	2.84	2.01	4.54	3.23	0 00:10:00
2	A02	2.21	92.00	2.84	2.01	4.44	3.15	0 00:10:00
3	A3	2.17	92.00	2.84	2.01	4.36	3.10	0 00:10:00
4	A4	2.17	92.00	2.84	2.01	4.36	3.10	0 00:10:00
5	A5a	2.36	92.00	2.84	2.01	4.74	3.37	0 00:10:00
6	A5b	2.46	92.00	2.84	2.01	4.94	3.51	0 00:10:00
7	A6	2.72	92.00	2.84	2.01	5.47	3.88	0 00:10:00
8	A7	1.72	92.00	2.84	2.01	3.46	2.46	0 00:10:00
9	PRE-DEV	15.11	77.00	2.84	0.96	14.53	2.79	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	BU1	Junction	998.09	1003.05	998.09	0.00	0.00	0.61	1001.36	0.00	1.69	0 00:00	0.00	0.00
2	BU2	Junction	1000.23	1004.23	1000.23	0.00	0.00	3.02	1003.75	0.00	1.48	0 00:00	0.00	0.00
3	J1	Junction	1004.61	1009.61	1004.61	0.00	0.00	3.06	1009.61	0.00	0.00	0 10:05	0.19	17.00
4	J2a	Junction	999.91	1003.24	999.91	0.00	0.00	3.32	1003.24	0.00	0.00	0 10:05	0.27	19.00
5	J2b	Junction	999.94	1002.15	999.94	0.00	0.00	3.45	1002.15	0.00	0.00	0 10:05	0.33	21.00
6	J3	Junction	1005.76	1010.36	1005.76	0.00	0.00	3.06	1006.53	0.00	3.83	0 00:00	0.00	0.00
7	J4	Junction	999.96	1005.68	999.96	0.00	0.00	5.58	1005.68	0.00	0.00	0 10:05	1.60	70.00
8	Jun-23	Junction	0.00	6.00	0.00	6.00	0.00	0.61	998.77	0.00	0.60	0 00:00	0.00	0.00
9	O1	Junction	1009.93	1014.46	1009.93	0.00	0.00	1.84	1010.39	0.00	4.07	0 00:00	0.00	0.00
10	O2	Junction	1008.31	1011.81	1008.31	0.00	0.00	0.67	1008.60	0.00	3.21	0 00:00	0.00	0.00
11	O4	Junction	999.79	1003.29	999.79	0.00	0.00	5.14	1003.29	0.00	0.00	0 10:07	0.91	44.00
12	O5	Junction	997.80	1003.05	997.80	0.00	0.00	0.00	998.10	0.00	4.95	0 00:00	0.00	0.00
13	SDMH1	Junction	1003.49	1009.45	1003.49	0.00	0.00	3.68	1009.45	0.00	0.00	0 10:12	0.03	6.00
14	SDMH2	Junction	1001.24	1005.72	1001.24	6.00	0.00	3.37	1002.27	0.00	3.45	0 00:00	0.00	0.00
15	SDMH3	Junction	1001.57	1006.27	1001.57	6.00	0.00	3.01	1002.43	0.00	3.84	0 00:00	0.00	0.00
16	SDMH4	Junction	997.69	1002.76	997.69	0.00	0.00	0.00	997.79	0.00	4.97	0 00:00	0.00	0.00
17	OUT1	Outfall	997.37					0.00	997.37					
18	WASH-PRE	Outfall	998.73					2.79	998.73					
19	BR1	Storage Node	1011.40	1014.46	0.00		0.00	3.17	1014.16				0.00	0.00
20	BR2	Storage Node	1009.68	1012.74	0.00		0.00	3.10	1012.34				0.00	0.00
21	BR3	Storage Node	998.80	1001.86	0.00		0.00	3.64	1001.45				0.00	0.00
22	BR4	Storage Node	1001.17	1004.23	0.00		0.00	5.36	1003.68				0.00	0.00
23	BR5	Storage Node	998.80	1003.05	0.00		0.00	5.12	1000.88				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	P1	Pipe	O1	SDMH1	383.00	1009.93	1004.57	1.4000	12.000	0.0130	1.84	4.21	0.44	5.23	0.45	0.46	0.00	Calculated
2	P10	Pipe	O4	J4	70.00	1000.23	1000.06	0.2400	12.000	0.0130	1.89	1.76	1.07	2.61	1.00	1.00	38.00	SURCHARGED
3	P11	Pipe	J4	BR5	40.00	999.96	999.86	0.2500	12.000	0.0130	1.91	1.78	1.07	2.63	1.00	1.00	64.00	SURCHARGED
4	P12	Pipe	O5	SDMH4	125.00	998.10	997.79	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
5	P13	Pipe	SDMH4	OUT1	130.00	997.69	997.37	0.2500	12.000	0.0130	0.00	1.77	0.00	0.00	0.00	0.00	0.00	Calculated
6	P2	Pipe	J1	SDMH1	15.00	1004.61	1004.57	0.2700	12.000	0.0130	1.94	1.84	1.05	2.68	1.00	1.00	15.00	SURCHARGED
7	P3	Pipe	SDMH1	SDMH2	408.00	1004.47	1001.34	0.7700	12.000	0.0130	3.37	3.12	1.08	4.74	0.93	0.95	0.00	> CAPACITY
8	P4	Pipe	SDMH2	BR5	79.00	1001.24	999.86	1.7500	12.000	0.0130	3.34	4.71	0.71	6.53	0.61	0.62	0.00	Calculated
9	P5a	Pipe	J2a	BR3	20.00	999.91	999.86	0.2500	12.000	0.0130	1.91	1.78	1.07	2.63	1.00	1.00	17.00	SURCHARGED
10	P5b	Pipe	J2b	BR3	34.00	999.94	999.86	0.2400	12.000	0.0130	1.79	1.73	1.04	2.61	1.00	1.00	19.00	SURCHARGED
11	P6	Pipe	Jun-23	BU1	113.00	998.37	998.09	0.2500	12.000	0.0130	0.61	1.77	0.34	2.05	0.40	0.40	0.00	Calculated
12	P7	Pipe	O2	J3	157.00	1006.25	1005.86	0.2500	12.000	0.0153	0.67	3.78	0.18	3.63	0.29	0.29	0.00	Calculated
13	P8	Pipe	J3	SDMH3	492.00	1005.76	1001.67	0.8300	12.000	0.0130	3.01	3.25	0.93	4.81	0.76	0.76	0.00	Calculated
14	P9	Pipe	SDMH3	BU2	45.00	1001.57	1000.23	2.9800	12.000	0.0130	3.02	6.15	0.49	7.79	0.49	0.49	0.00	Calculated
15	OC1	Channel	BU2	BR4	6.42	1003.73	1001.17	39.8800	18.000	0.0010	3.02	3485.71	0.00	50.00	0.02	0.01	0.00	
16	OC2	Channel	BU1	BR5	1.00	1001.36	998.80	256.0000	18.000	0.0010	0.61	5074.12	0.00	0.00	0.00	0.00	0.00	
17	O4	Orifice	BR4	O4		1001.17	999.79		24.000		5.14							
18	OR1	Orifice	BR1	O1		1011.40	1009.93		24.000		1.84							
19	OR2	Orifice	BR2	O2		1009.68	1008.31		24.000		0.67							
20	OR3	Orifice	BR3	Jun-23		998.80	0.00		24.000		0.61							
21	OR5	Orifice	BR5	O5		998.80	997.80		24.000		0.00							

Subbasin Hydrology

Subbasin : A01

Input Data

Area (ac) 2.26
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.48	B	92.00
Composite Area & Weighted CN	1.48		92.00

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 :

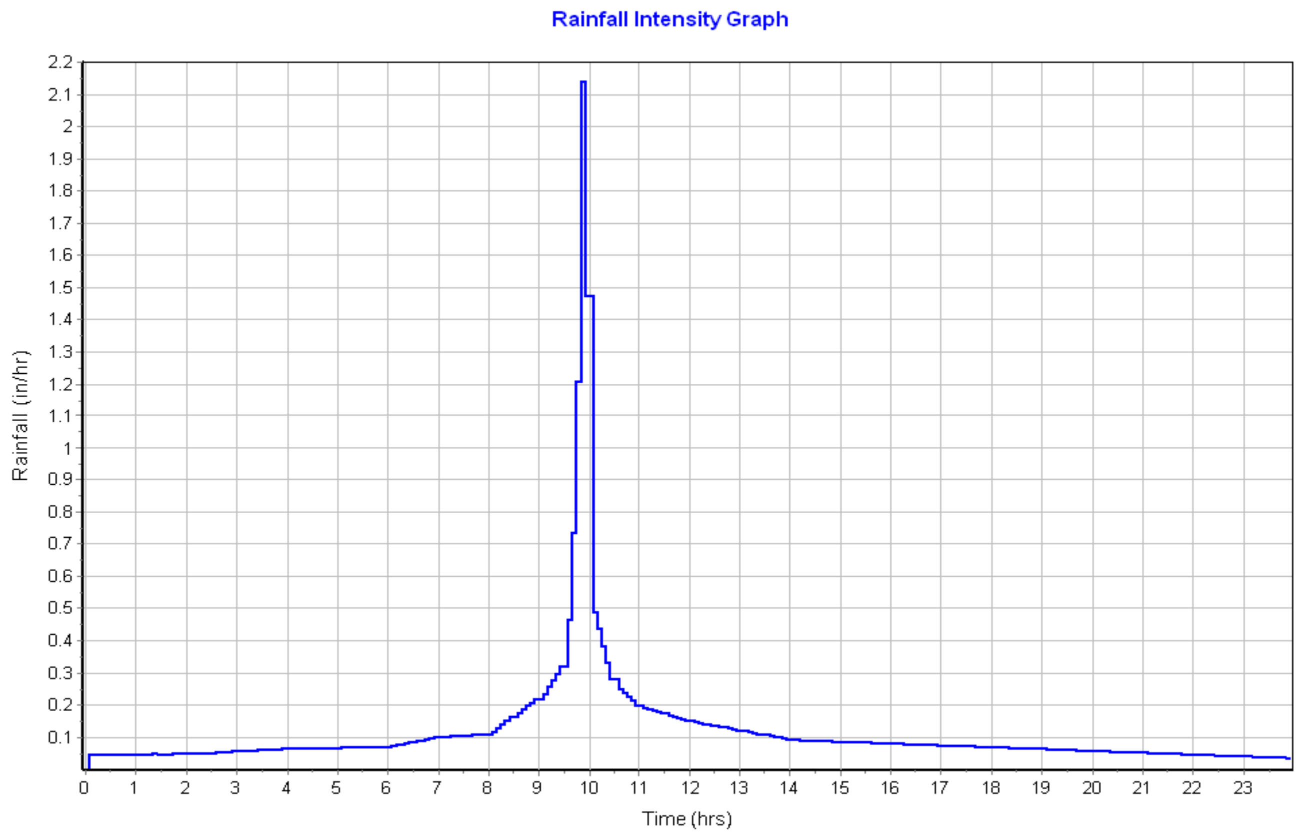
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

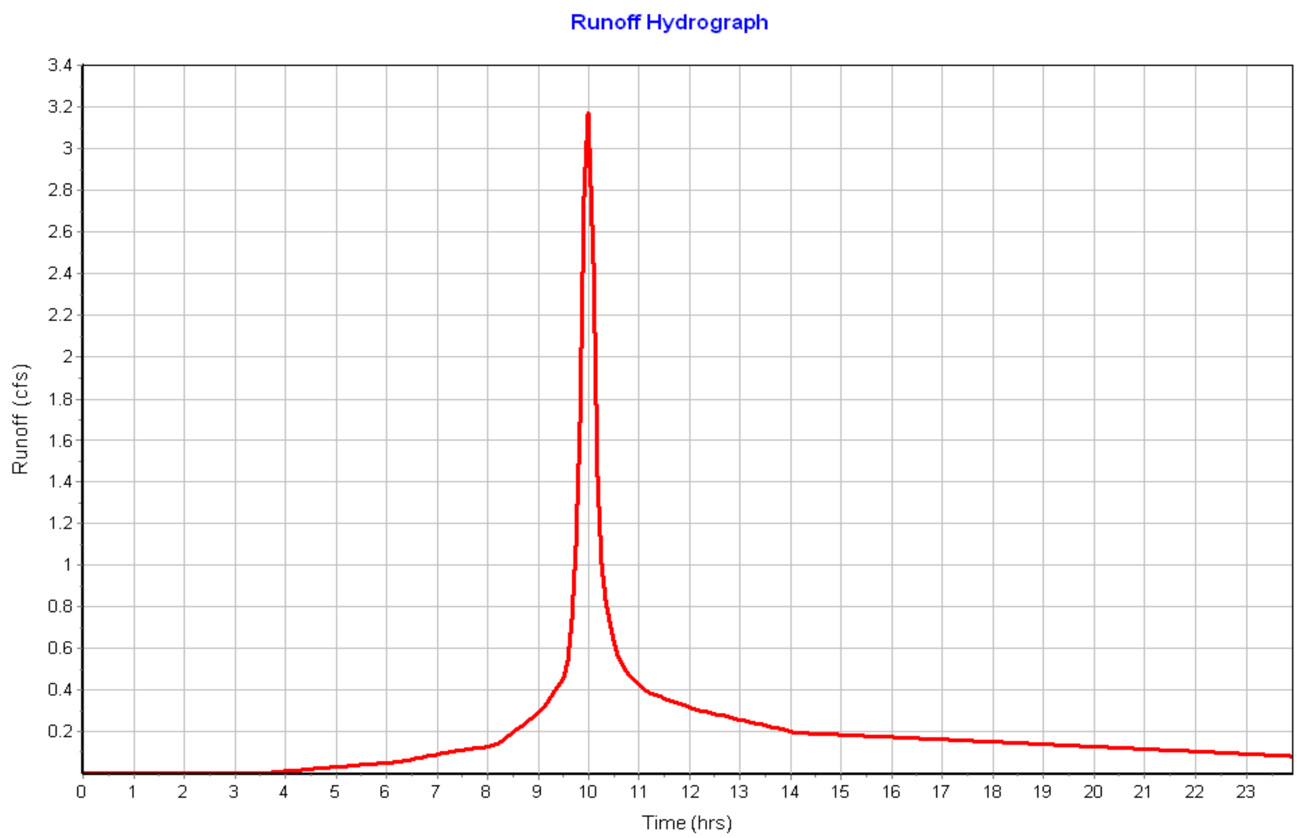
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 3.23
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A01





Subbasin : A02

Input Data

Area (ac) 2.21
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.21	B	92.00
Composite Area & Weighted CN	2.21		92.00

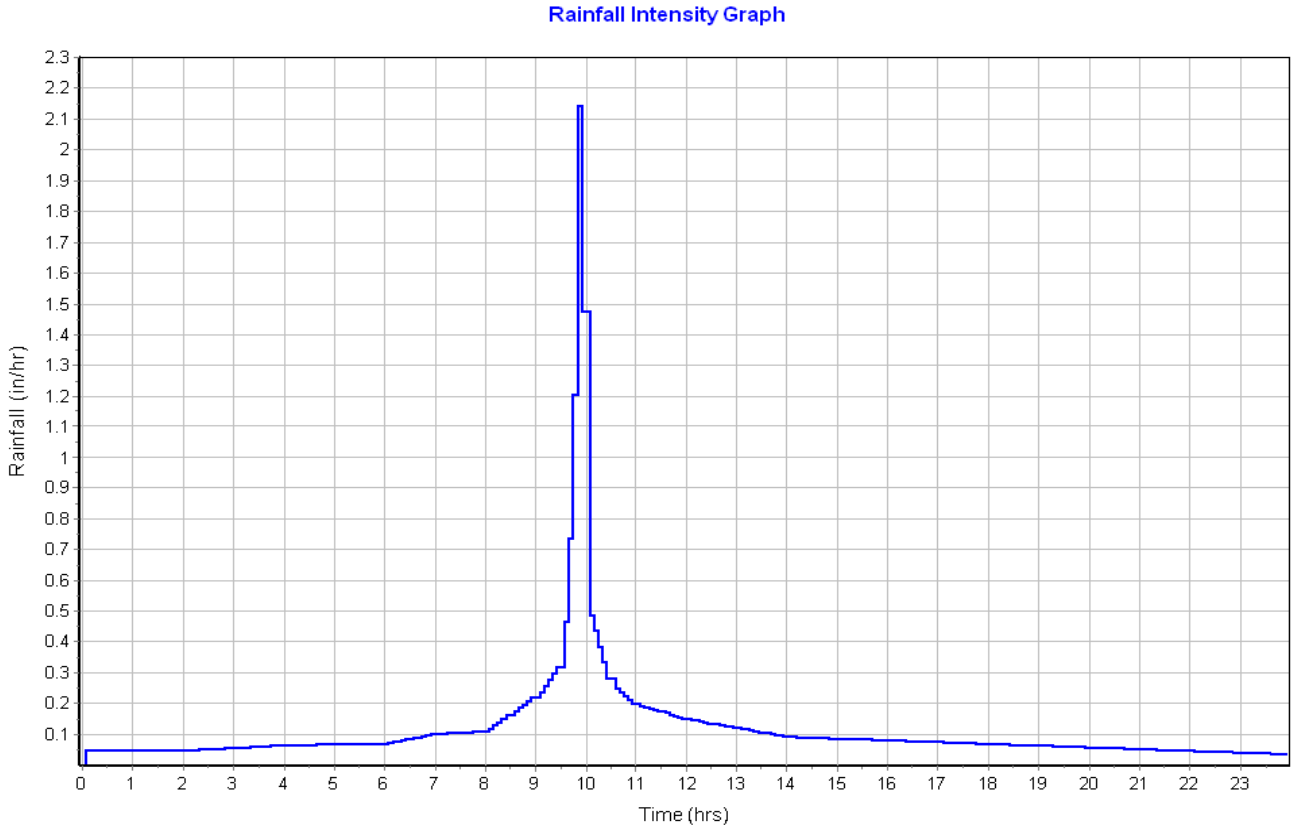
Time of Concentration

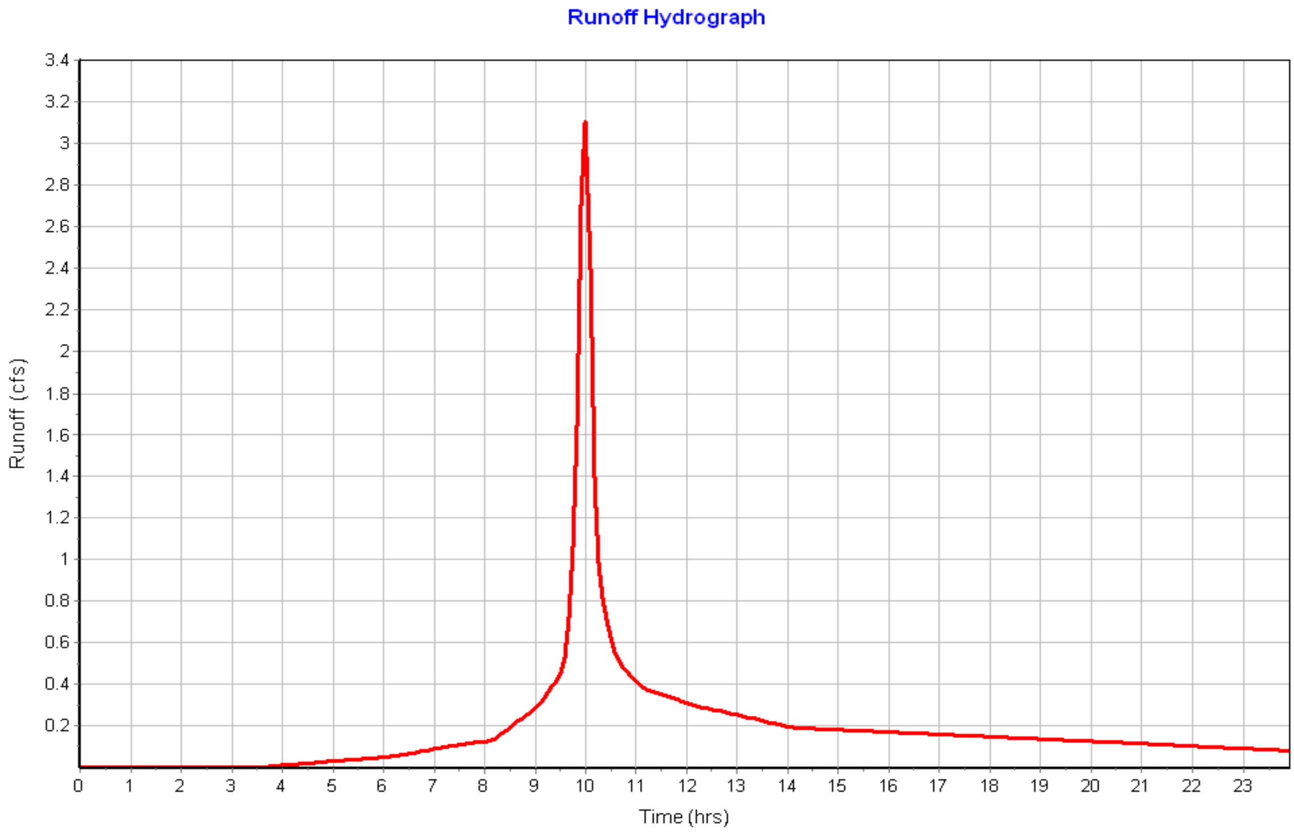
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 3.15
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A02





Subbasin : A3

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

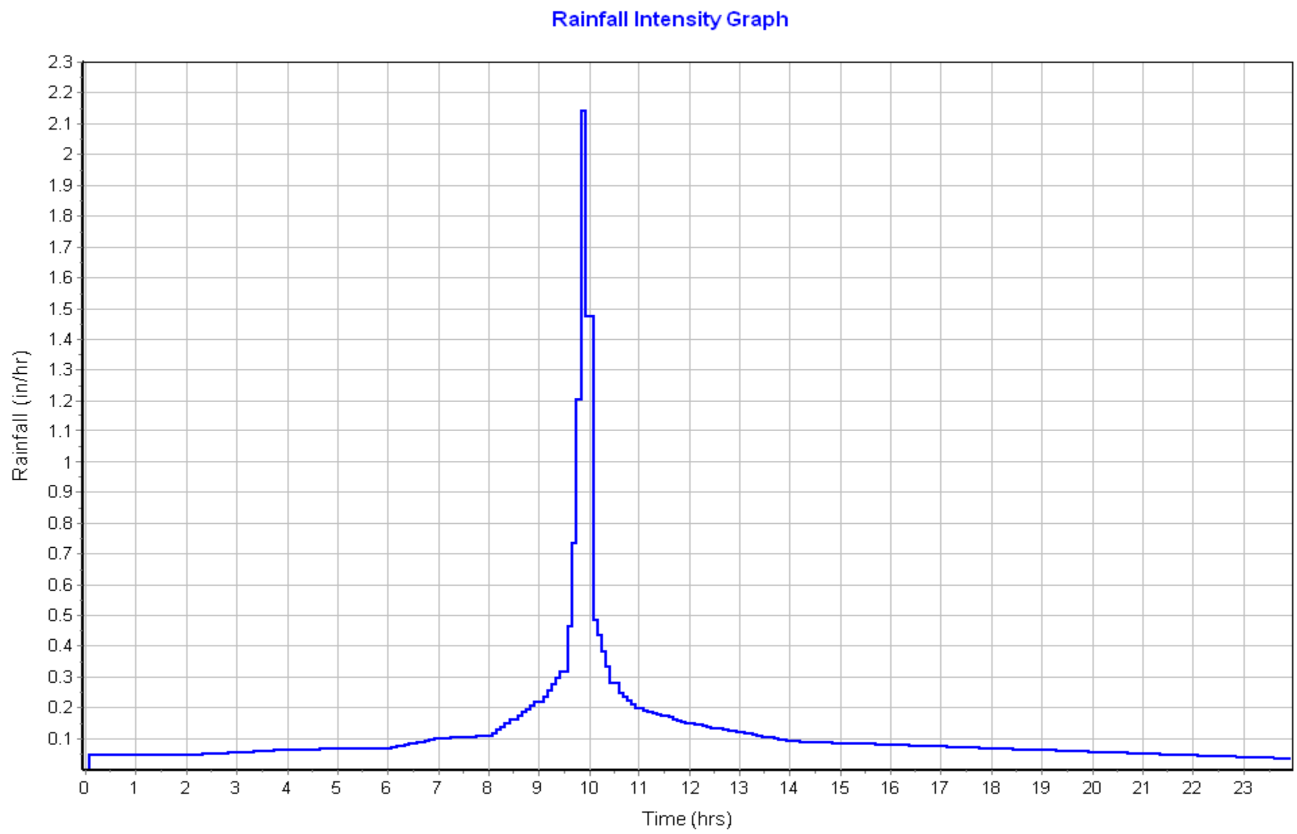
Time of Concentration

User-Defined TOC override (minutes): 10

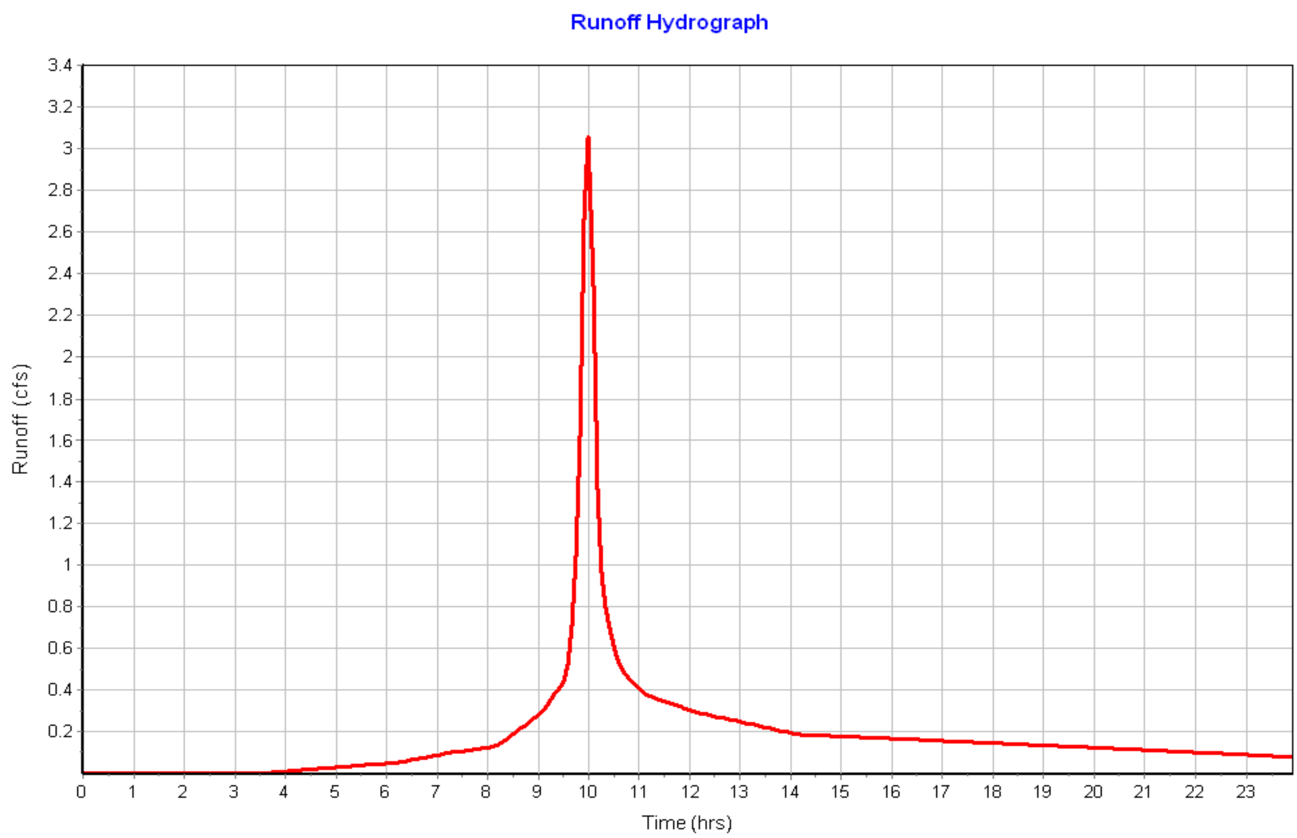
Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 3.10
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A3



Rainfall Intensity Graph
Rainfall (in/hr)
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A4

Input Data

Area (ac) 2.17
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.17	B	92.00
Composite Area & Weighted CN	2.17		92.00

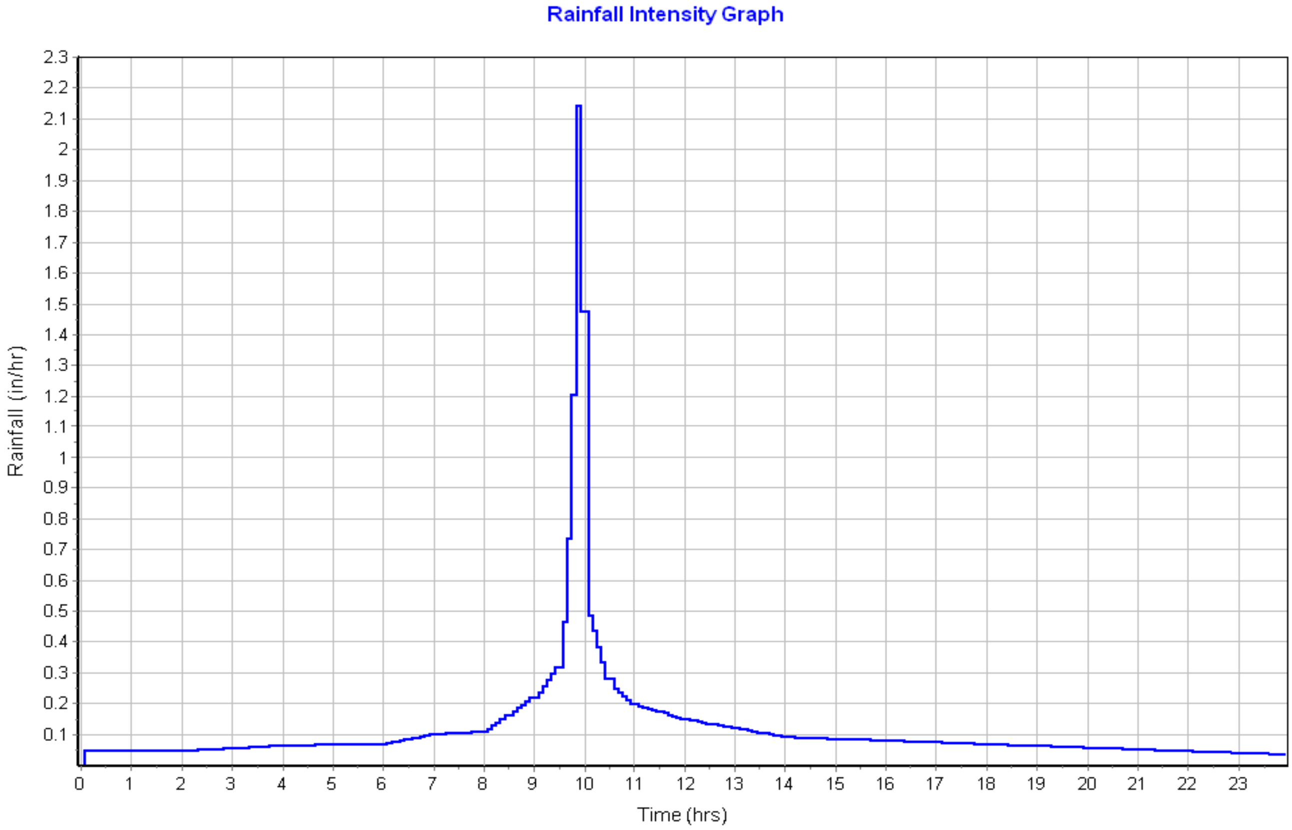
Time of Concentration

User-Defined TOC override (minutes): 10

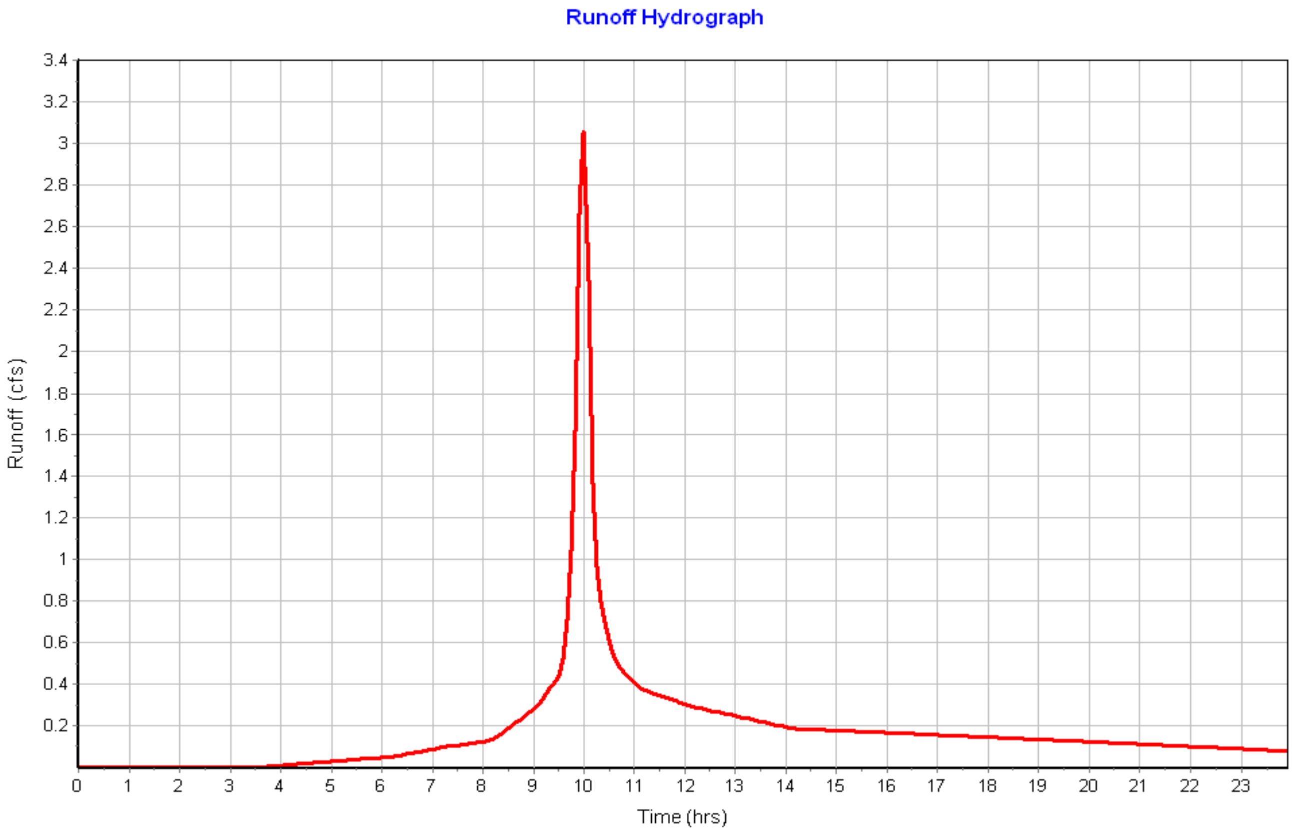
Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 3.10
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A4



Rainfall Intensity Graph
Rainfall (in/hr)
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A5a

Input Data

Area (ac) 2.36
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.66	B	92.00
Composite Area & Weighted CN	1.66		92.00

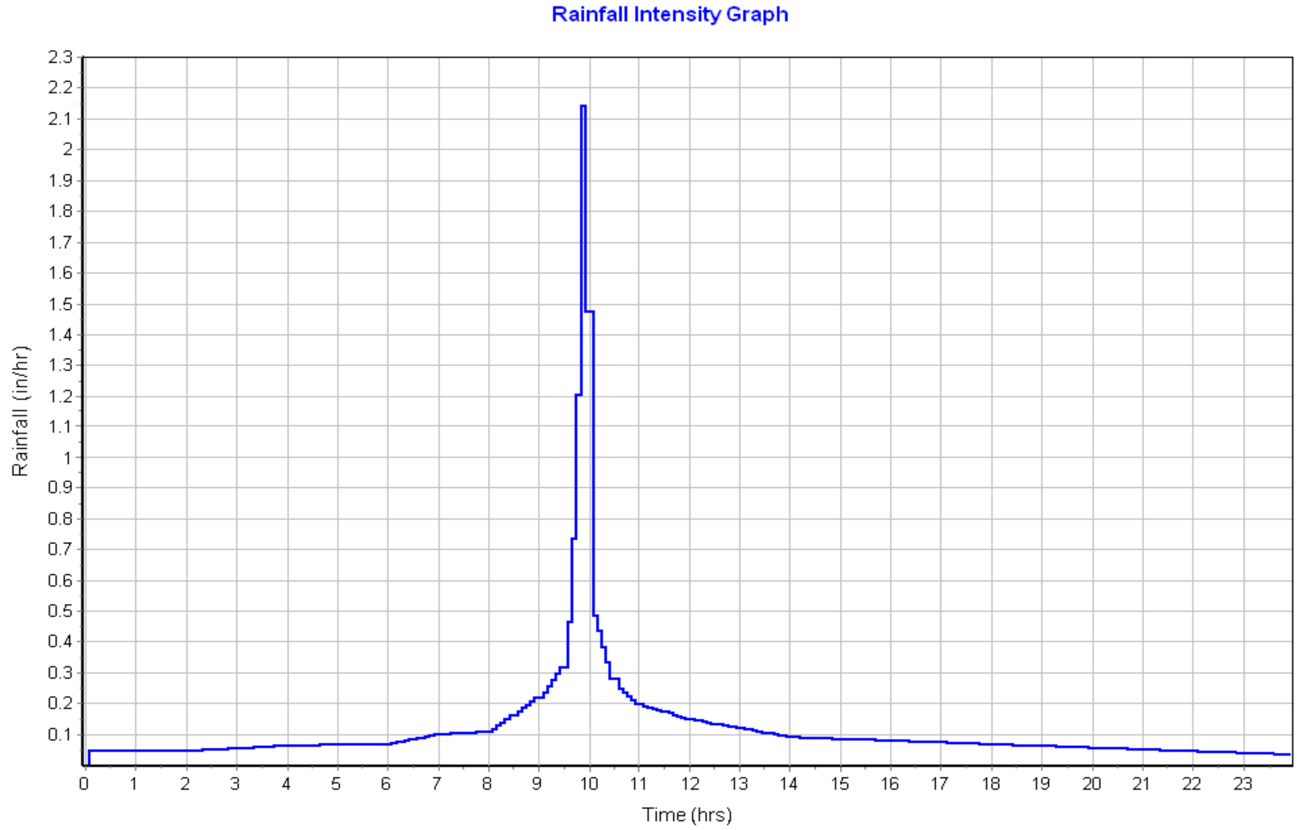
Time of Concentration

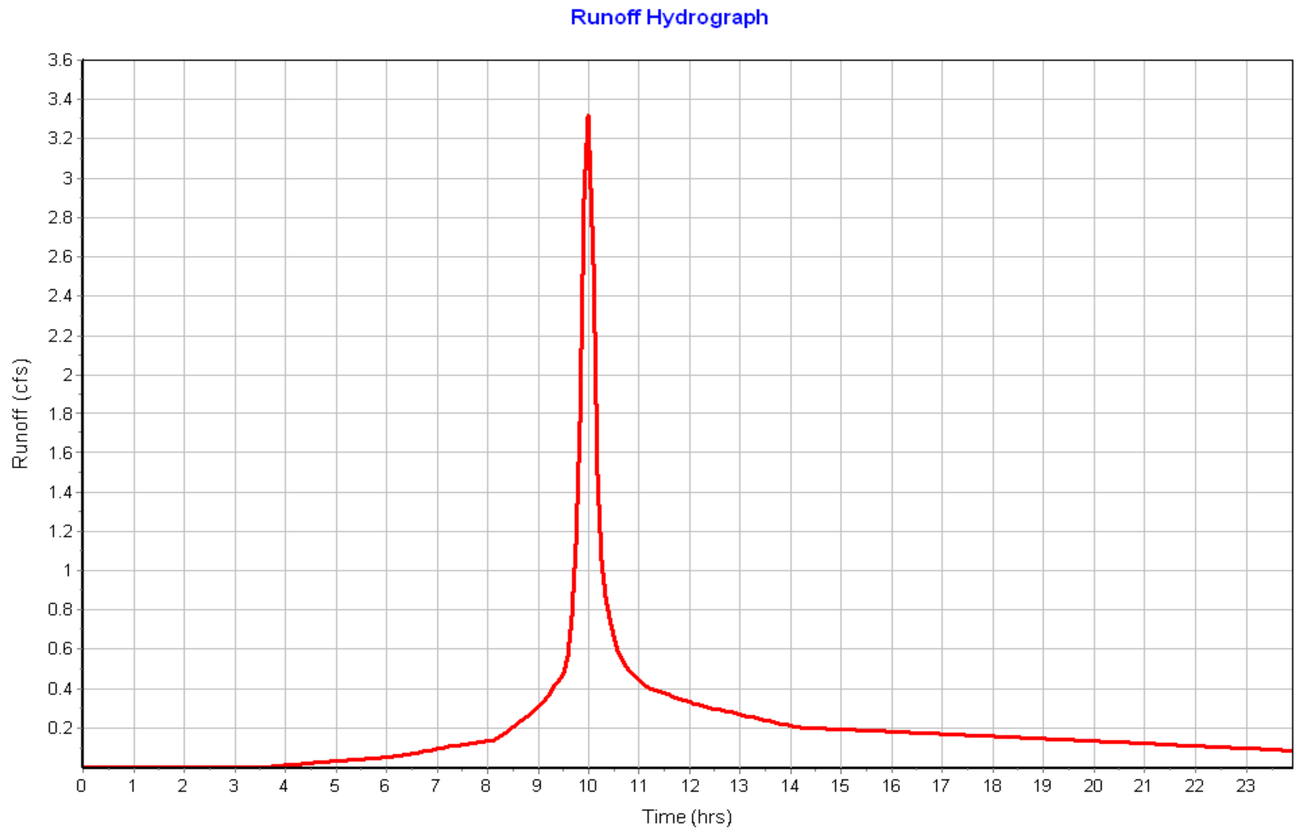
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 3.37
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5a





Subbasin : A5b

Input Data

Area (ac) 2.46
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.46	B	92.00
Composite Area & Weighted CN	2.46		92.00

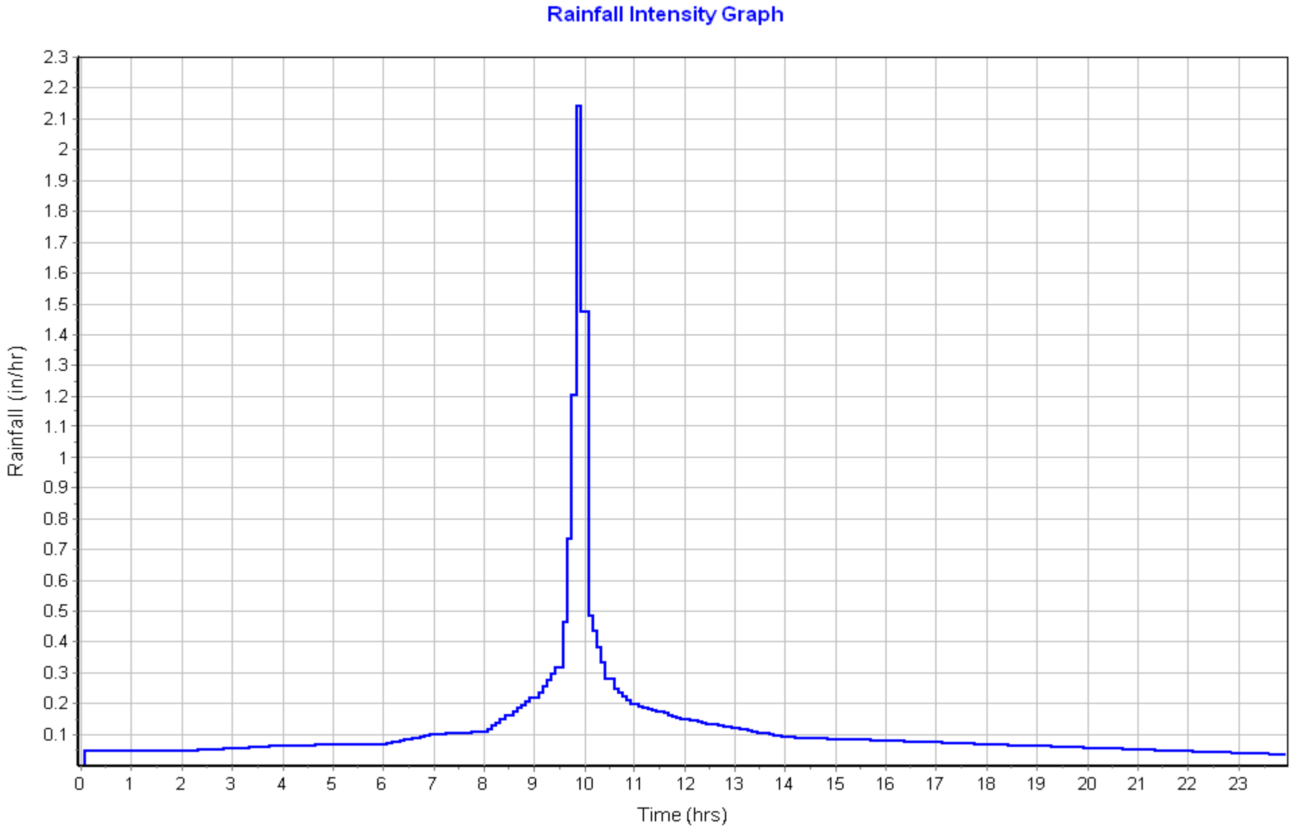
Time of Concentration

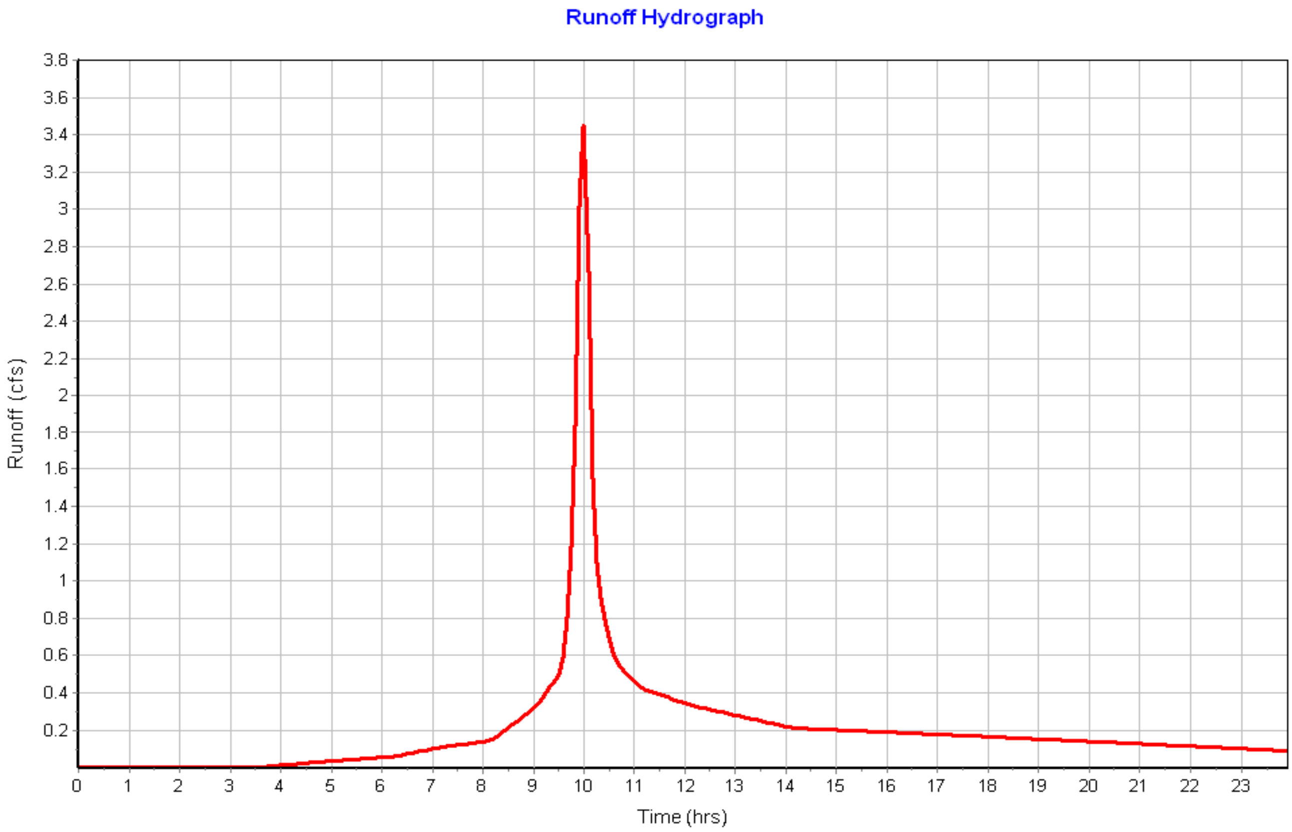
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 3.51
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A5b





Subbasin : A6

Input Data

Area (ac) 2.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.65	B	92.00
Composite Area & Weighted CN	1.65		92.00

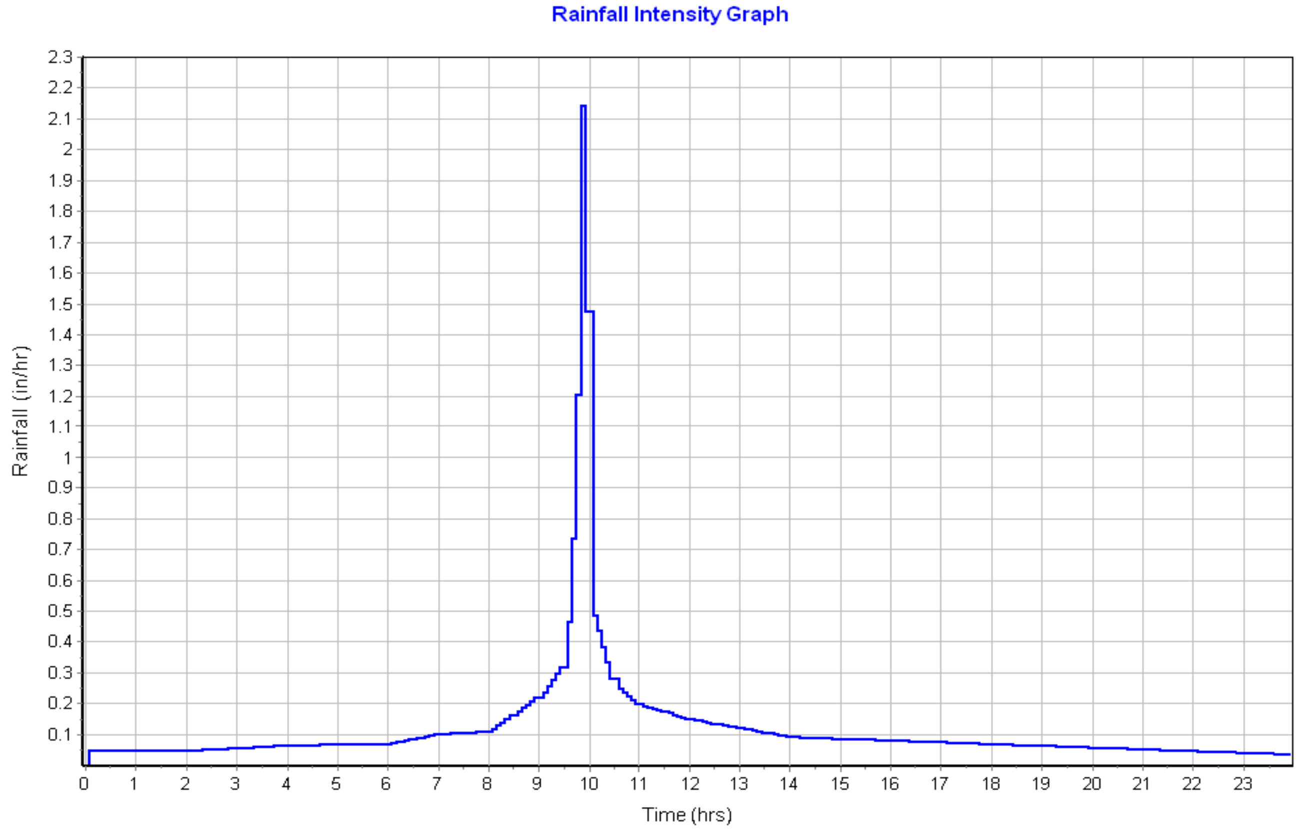
Time of Concentration

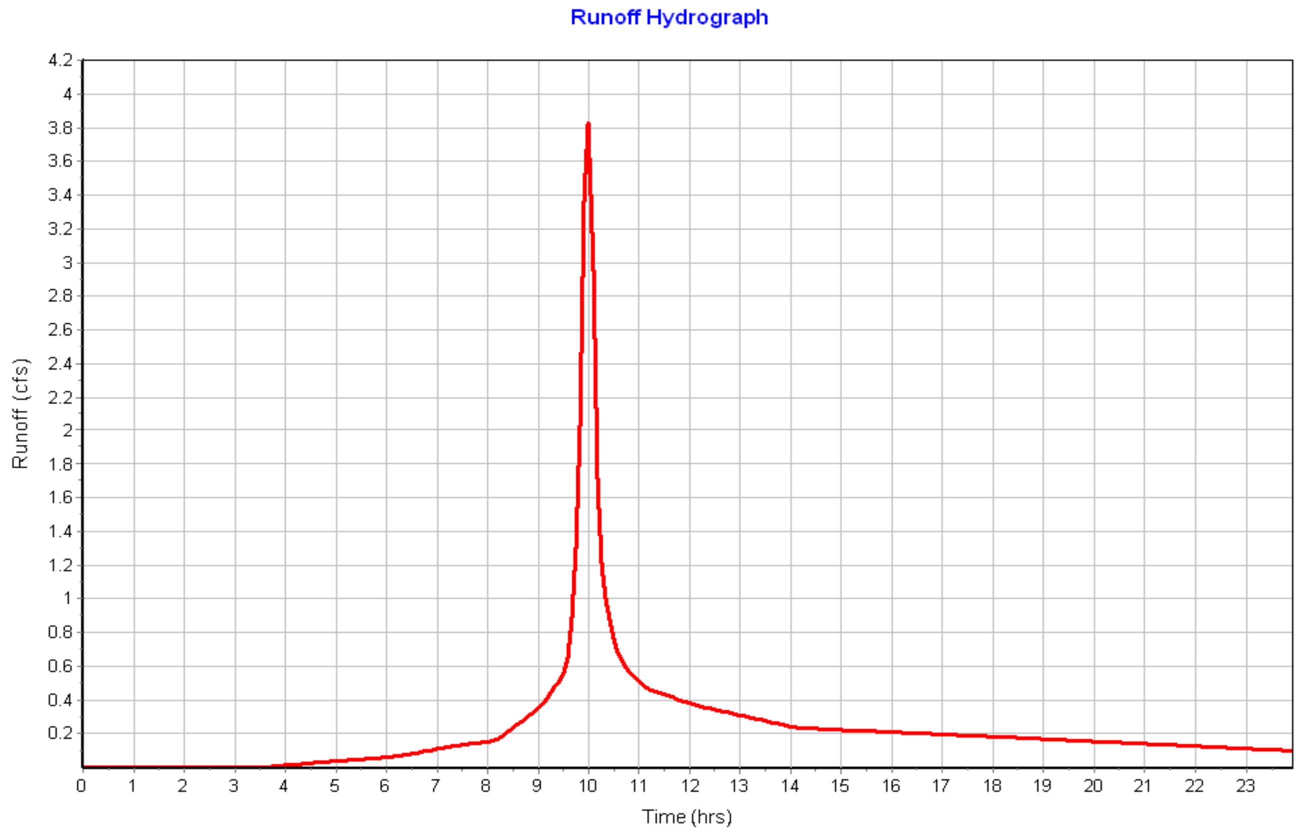
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 3.88
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A6


Rainfall Intensity Graph
Rainfall (in/hr)
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A7

Input Data

Area (ac) 1.72
Weighted Curve Number 92.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	1.30	B	92.00
Composite Area & Weighted CN	1.30		92.00

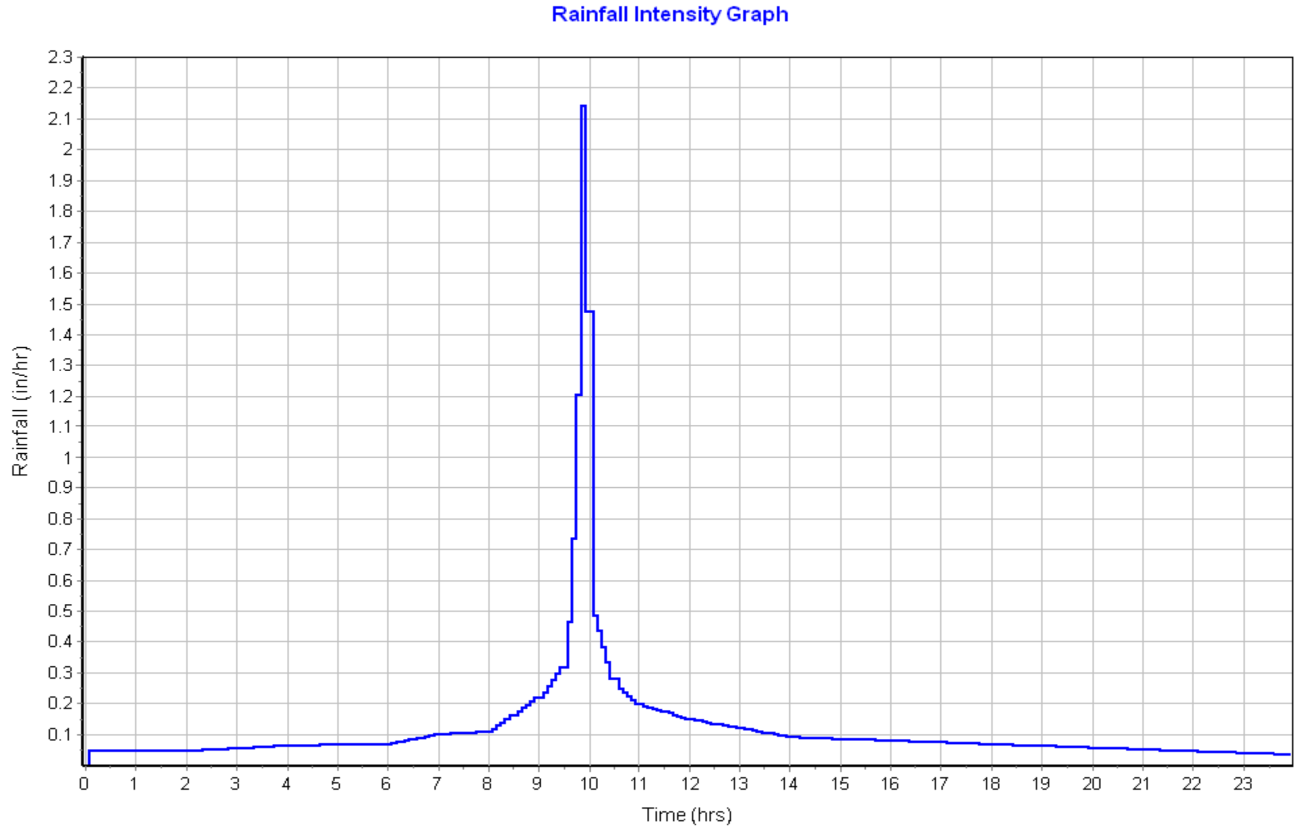
Time of Concentration

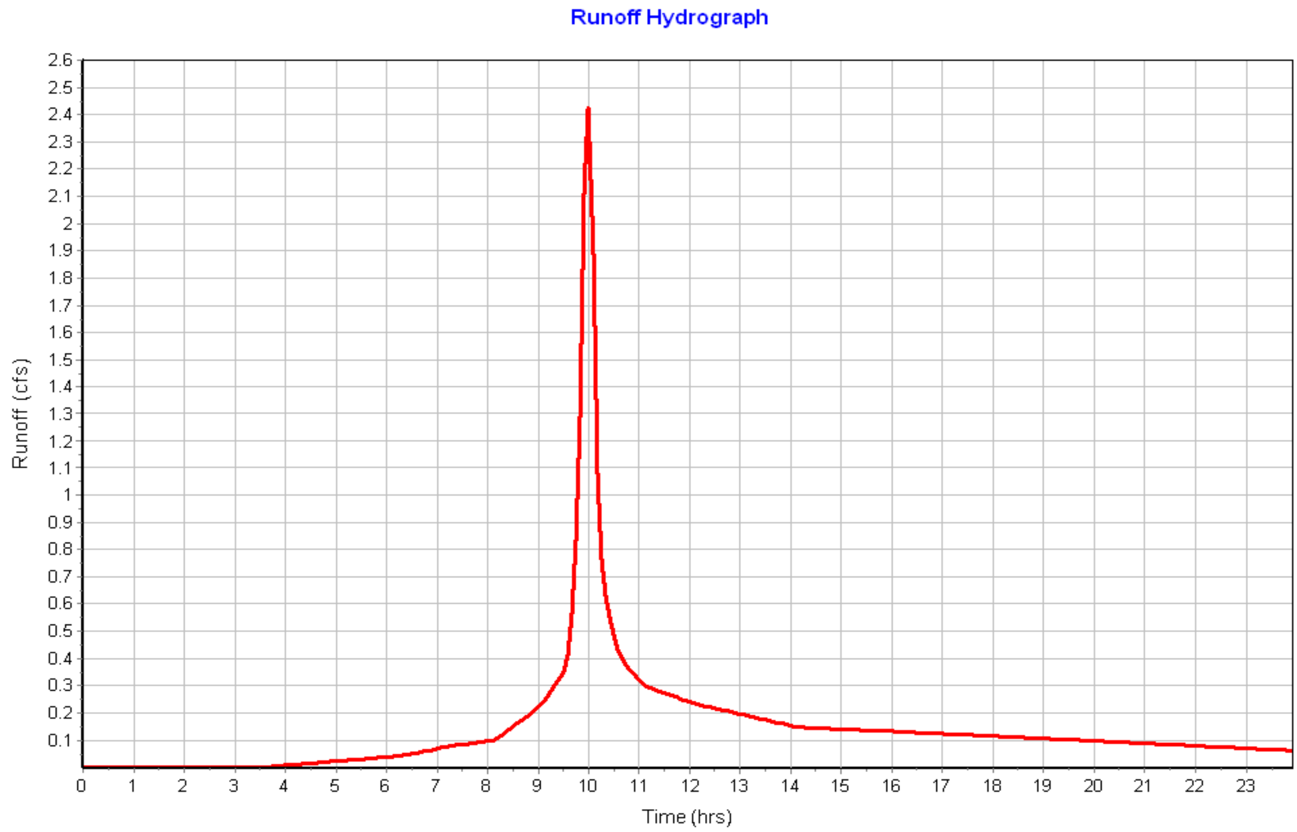
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 2.01
Peak Runoff (cfs) 2.46
Weighted Curve Number 92.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : A7


Rainfall Intensity Graph
Rainfall (in/hr)
Time (hrs)
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23


Runoff Hydrograph
Runoff (cfs)
Time (hrs)
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

Subbasin : PRE-DEV

Input Data

Area (ac) 15.11
Weighted Curve Number 77.00
Rain Gage ID .... Post-Development

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	15.11	B	77.00
Composite Area & Weighted CN	15.11		77.00

Time of Concentration

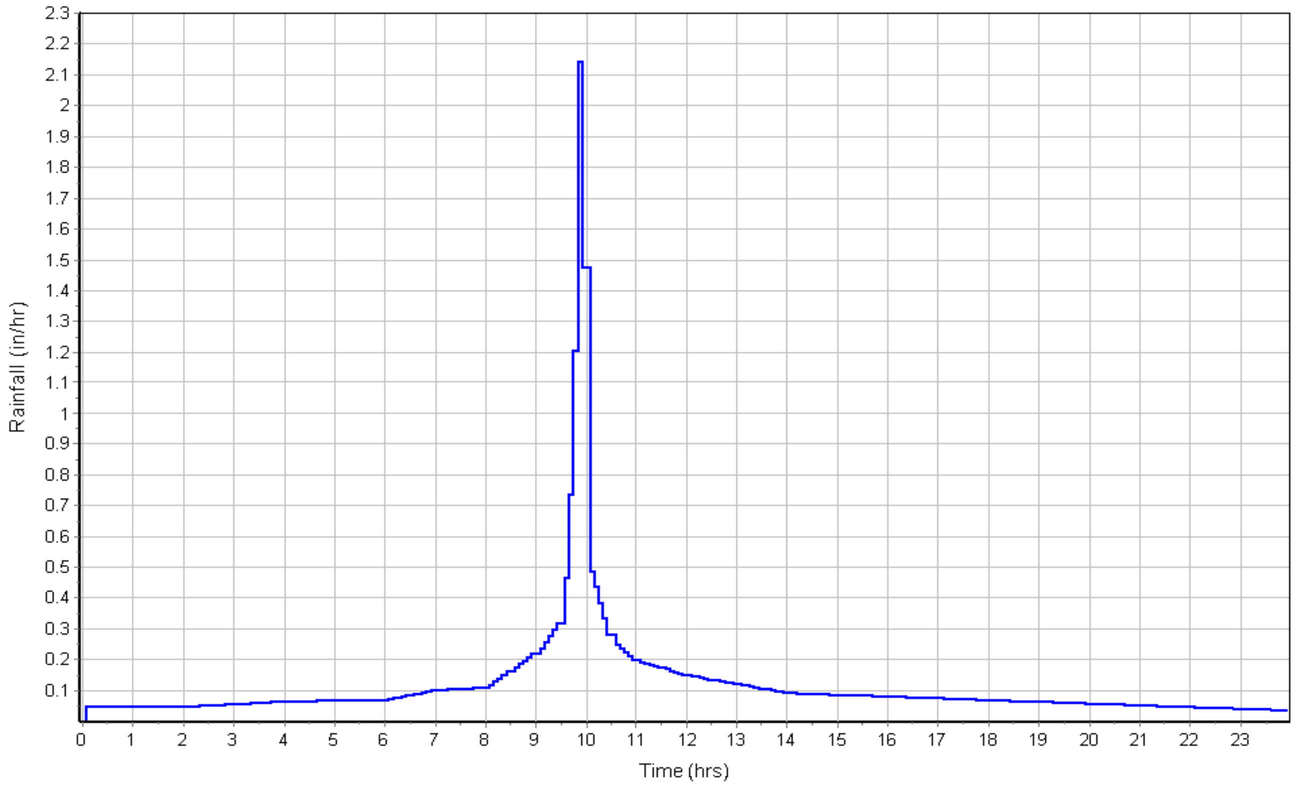
User-Defined TOC override (minutes): 100

Subbasin Runoff Results

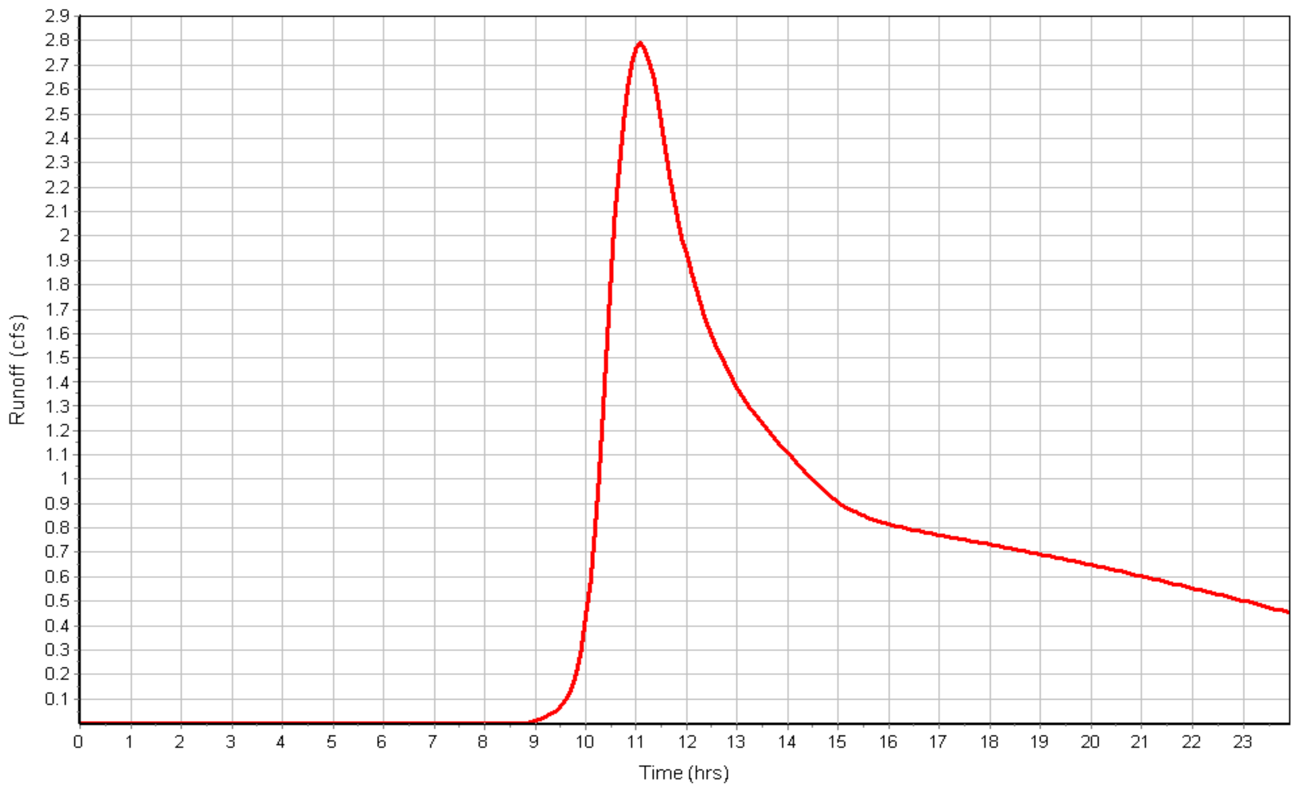
Total Rainfall (in) 2.84
Total Runoff (in) 0.96
Peak Runoff (cfs) 2.79
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : PRE-DEV

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	BU1	998.09	1003.05	4.96	998.09	0.00	0.00	-1003.05	0.00	0.00
2	BU2	1000.23	1004.23	4.00	1000.23	0.00	0.00	-1004.23	0.00	0.00
3	J1	1004.61	1009.61	5.00	1004.61	0.00	0.00	-1009.61	0.00	0.00
4	J2a	999.91	1003.24	3.33	999.91	0.00	0.00	-1003.24	0.00	0.00
5	J2b	999.94	1002.15	2.21	999.94	0.00	0.00	-1002.15	0.00	0.00
6	J3	1005.76	1010.36	4.60	1005.76	0.00	0.00	-1010.36	0.00	0.00
7	J4	999.96	1005.68	5.72	999.96	0.00	0.00	-1005.68	0.00	0.00
8	Jun-23	0.00	6.00	6.00	0.00	0.00	6.00	0.00	0.00	0.00
9	O1	1009.93	1014.46	4.53	1009.93	0.00	0.00	-1014.46	0.00	0.00
10	O2	1008.31	1011.81	3.50	1008.31	0.00	0.00	-1011.81	0.00	0.00
11	O4	999.79	1003.29	3.50	999.79	0.00	0.00	-1003.29	0.00	0.00
12	O5	997.80	1003.05	5.25	997.80	0.00	0.00	-1003.05	0.00	0.00
13	SDMH1	1003.49	1009.45	5.96	1003.49	0.00	0.00	-1009.45	0.00	0.00
14	SDMH2	1001.24	1005.72	4.48	1001.24	0.00	6.00	-999.72	0.00	0.00
15	SDMH3	1001.57	1006.27	4.70	1001.57	0.00	6.00	-1000.27	0.00	0.00
16	SDMH4	997.69	1002.76	5.07	997.69	0.00	0.00	-1002.76	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	BU1	0.61	0.00	1001.36	3.27	0.00	1.69	1001.36	3.27	0 11:41	0 00:00	0.00	0.00
2	BU2	3.02	0.00	1003.75	3.52	0.00	1.48	1003.73	3.50	0 10:06	0 00:00	0.00	0.00
3	J1	3.06	3.06	1009.61	5.00	0.00	0.00	1004.83	0.22	0 09:56	0 10:05	0.19	17.00
4	J2a	3.32	3.32	1003.24	3.33	0.00	0.00	1000.13	0.22	0 09:55	0 10:05	0.27	19.00
5	J2b	3.45	3.45	1002.15	2.21	0.00	0.00	1000.15	0.21	0 09:54	0 10:05	0.33	21.00
6	J3	3.06	3.06	1006.53	0.77	0.00	3.83	1005.95	0.19	0 10:05	0 00:00	0.00	0.00
7	J4	5.58	3.82	1005.68	5.72	0.00	0.00	1000.52	0.56	0 09:45	0 10:05	1.60	70.00
8	Jun-23	0.61	0.00	998.77	998.77	0.00	0.60	998.50	998.50	0 11:40	0 00:00	0.00	0.00
9	O1	1.84	0.00	1010.39	0.46	0.00	4.07	1010.01	0.08	0 10:13	0 00:00	0.00	0.00
10	O2	0.67	0.00	1008.60	0.29	0.00	3.21	1008.38	0.07	0 10:28	0 00:00	0.00	0.00
11	O4	5.14	0.00	1003.29	3.50	0.00	0.00	1000.50	0.71	0 09:52	0 10:07	0.91	44.00
12	O5	0.00	0.00	998.10	0.30	0.00	4.95	998.10	0.30	0 00:00	0 00:00	0.00	0.00
13	SDMH1	3.68	0.00	1009.45	5.96	0.00	0.00	1004.76	1.27	0 10:10	0 10:12	0.03	6.00
14	SDMH2	3.37	0.00	1002.27	1.03	0.00	3.45	1001.51	0.27	0 10:15	0 00:00	0.00	0.00
15	SDMH3	3.01	0.00	1002.43	0.86	0.00	3.84	1001.83	0.26	0 10:06	0 00:00	0.00	0.00
16	SDMH4	0.00	0.00	997.79	0.10	0.00	4.97	997.79	0.10	0 00:00	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	OC1	6.42	1003.73	3.50	1001.17	0.00	2.56	39.8800	Rectangular	1.500	3.000	0.0010	0.5000	0.5000	0.0000	0.00	No
2	OC2	1.00	1001.36	3.27	998.80	0.00	2.56	256.0000	Rectangular	1.500	2.000	0.0010	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	OC1	3.02	0 10:06	3485.71	0.00	50.00	0.00	0.02	0.01	0.00		
2	OC2	0.61	0 11:41	5074.12	0.00	0.00		0.00	0.00	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	P1	383.00	1009.93	0.00	1004.57	1.08	5.36	1.4000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	P10	70.00	1000.23	0.44	1000.06	0.10	0.17	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	P11	40.00	999.96	0.00	999.86	1.06	0.10	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	P12	125.00	998.10	0.30	997.79	0.10	0.31	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	P13	130.00	997.69	0.00	997.37	0.00	0.32	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	P2	15.00	1004.61	0.00	1004.57	1.08	0.04	0.2700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	P3	408.00	1004.47	0.98	1001.34	0.10	3.13	0.7700	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	P4	79.00	1001.24	0.00	999.86	1.06	1.38	1.7500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	P5a	20.00	999.91	0.00	999.86	1.06	0.05	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	P5b	34.00	999.94	0.00	999.86	1.06	0.08	0.2400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	P6	113.00	998.37	998.37	998.09	0.00	0.28	0.2500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	P7	157.00	1006.25	-2.06	1005.86	0.10	0.39	0.2500	CIRCULAR	12.000	12.000	0.0153	0.5000	0.5000	0.0000	0.00	No	1
13	P8	492.00	1005.76	0.00	1001.67	0.10	4.09	0.8300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	P9	45.00	1001.57	0.00	1000.23	0.00	1.34	2.9800	CIRCULAR	12.000	12.000	0.0130	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	P1	1.84	0 10:14	4.21	0.44	5.23	1.22	0.45	0.46	0.00		Calculated
2	P10	1.89	0 10:32	1.76	1.07	2.61	0.45	1.00	1.00	38.00		SURCHARGED
3	P11	1.91	0 10:50	1.78	1.07	2.63	0.25	1.00	1.00	64.00		SURCHARGED
4	P12	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
5	P13	0.00	0 00:00	1.77	0.00	0.00		0.00	0.00	0.00		Calculated
6	P2	1.94	0 10:12	1.84	1.05	2.68	0.09	1.00	1.00	15.00		SURCHARGED
7	P3	3.37	0 10:15	3.12	1.08	4.74	1.43	0.93	0.95	0.00		> CAPACITY
8	P4	3.34	0 10:13	4.71	0.71	6.53	0.20	0.61	0.62	0.00		Calculated
9	P5a	1.91	0 10:13	1.78	1.07	2.63	0.13	1.00	1.00	17.00		SURCHARGED
10	P5b	1.79	0 10:14	1.73	1.04	2.61	0.22	1.00	1.00	19.00		SURCHARGED
11	P6	0.61	0 11:41	1.77	0.34	2.05	0.92	0.40	0.40	0.00		Calculated
12	P7	0.67	0 10:29	3.78	0.18	3.63	0.72	0.29	0.29	0.00		Calculated
13	P8	3.01	0 10:06	3.25	0.93	4.81	1.70	0.76	0.76	0.00		Calculated
14	P9	3.02	0 10:06	6.15	0.49	7.79	0.10	0.49	0.49	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1011.40
Max (Rim) Elevation (ft) 1014.46
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1011.40
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

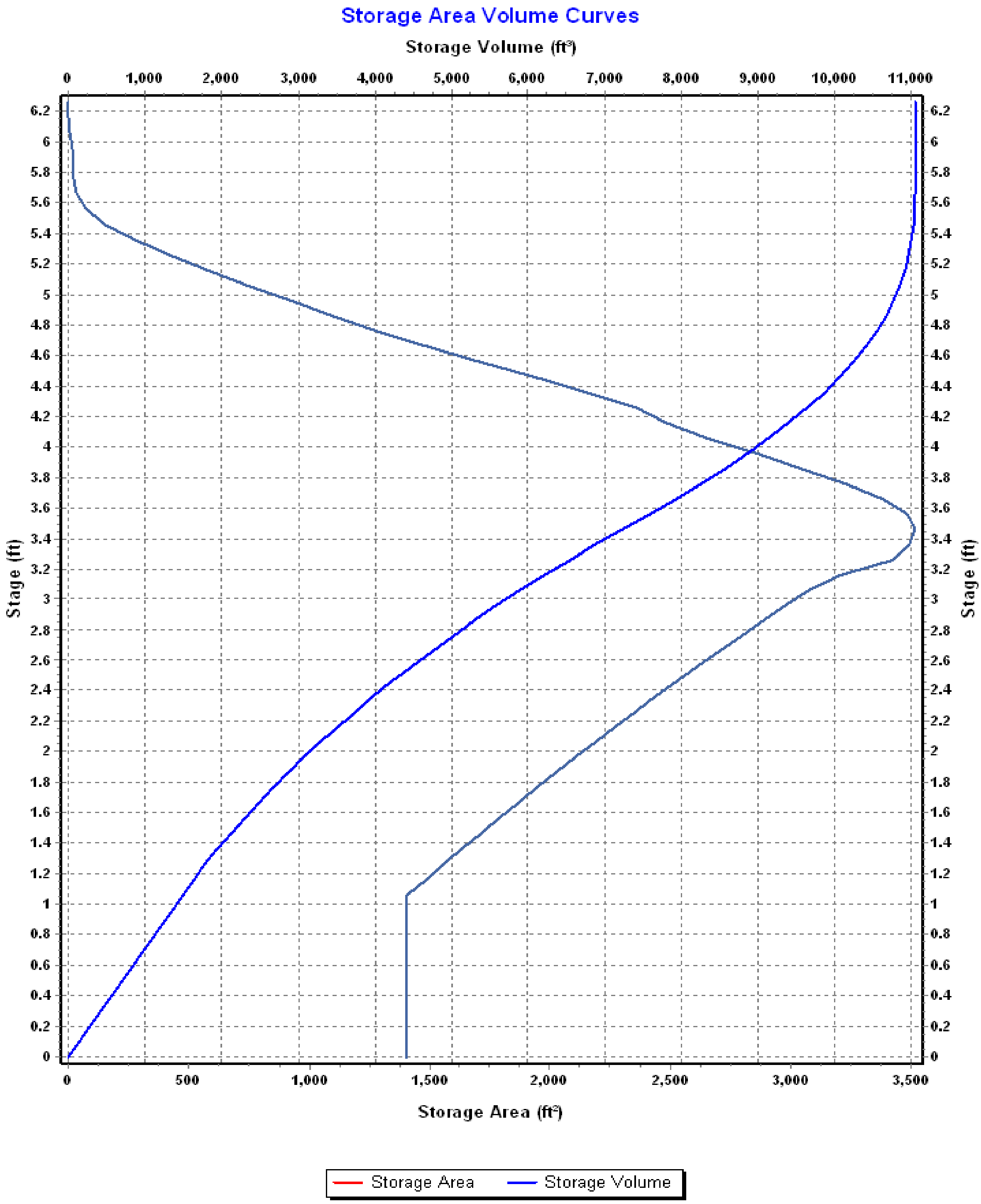
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1406	0.000
1.06	1406.41	1490.58
1.16	1480.47	1634.92
1.26	1555.24	1786.71
1.36	1630.77	1946.01
1.46	1707.07	2112.90
1.56	1784.14	2287.46
1.66	1861.98	2469.77
1.76	1940.59	2659.90
1.86	2020.12	2857.94
1.96	2100.89	3063.99
2.06	2182.92	3278.18
2.16	2266.21	3500.64
2.26	2350.76	3731.49
2.36	2436.58	3970.86
2.46	2523.66	4218.87
2.52	2576.52	4371.88
2.56	2612.01	4475.65
2.66	2701.62	4741.33
2.76	2792.5	5016.04
2.86	2884.65	5299.90
2.96	2978.05	5593.04
3.06	3072.11	5895.55
3.16	3205.91	6209.45
3.26	3421.78	6540.83
3.36	3493.59	6886.60
3.46	3515.37	7237.05
3.56	3483.18	7586.98
3.66	3379.16	7930.10
3.76	3228.85	8260.50
3.86	3042.58	8574.07
3.96	2846.45	8868.52
4.06	2644.9	9143.09
4.16	2476.74	9399.17
4.26	2357.18	9640.87
4.36	2152.13	9866.34
4.46	1923.09	10070.10
4.56	1699.17	10251.21
4.66	1484.08	10410.37
4.76	1280.57	10548.60
4.86	1096.18	10667.44
4.96	914.98	10768.00
5.06	736.35	10850.57
5.16	570.94	10915.93
5.26	418.64	10965.41
5.36	279.43	11000.31
5.46	153.32	11021.95
5.56	72.06	11033.22
5.66	32.33	11038.44
5.76	22.84	11041.20
5.86	20.61	11043.37
5.96	14.31	11045.12
6.06	6.81	11046.18
6.16	2.03	11046.62
6.26	0.06	11046.72



Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
Stage (ft)
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (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	OR1	Bottom	CIRCULAR	No	24.00			1013.96	0.61

Output Summary Results

Peak Inflow (cfs) 3.17
Peak Lateral Inflow (cfs) 3.17
Peak Outflow (cfs) 1.84
Peak Exfiltration Flow Rate (cfm) 2.91
Max HGL Elevation Attained (ft) 1014.16
Max HGL Depth Attained (ft) 2.76
Average HGL Elevation Attained (ft) 1013.00
Average HGL Depth Attained (ft) 1.6
Time of Max HGL Occurrence (days hh:mm) 0 10:13
Total Exfiltration Volume (1000-ft³) 2.797
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1009.68
Max (Rim) Elevation (ft) 1012.74
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1009.68
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

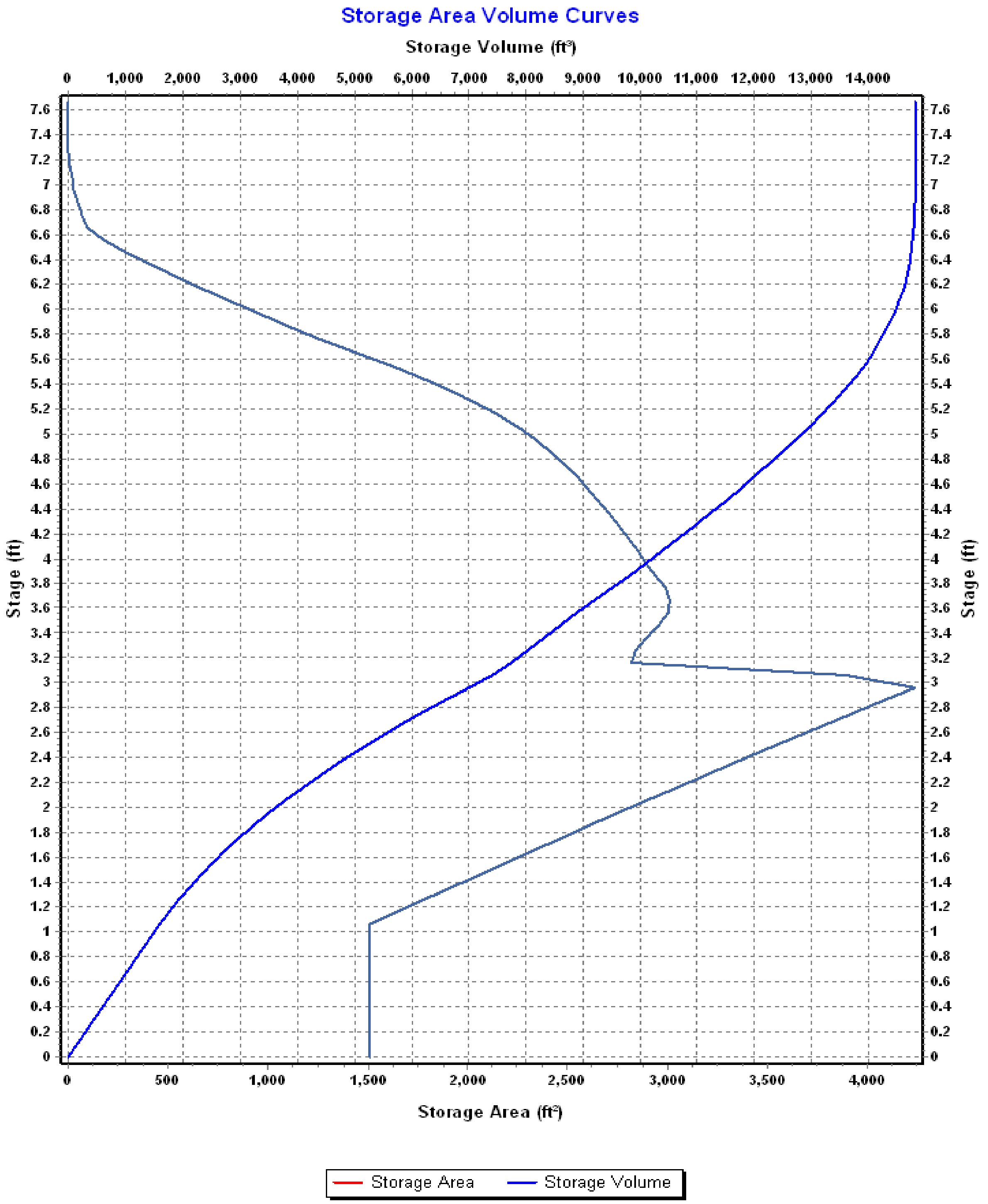
Exfiltration Rate (in/hr) 0.8500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1509	0.000
1.06	1509.71	1599.92
1.16	1643.71	1757.59
1.26	1778.63	1928.71
1.36	1914.59	2113.37
1.46	2051.6	2311.68
1.56	2189.68	2523.74
1.66	2328.85	2749.67
1.76	2469.09	2989.57
1.86	2610.42	3243.55
1.96	2752.84	3511.71
2.06	2896.36	3794.17
2.16	3041	4091.04
2.26	3186.76	4402.43
2.36	3333.64	4728.45
2.46	3481.65	5069.21
2.5	3541.17	5209.67
2.56	3630.78	5424.83
2.66	3781.07	5795.42
2.76	3932.5	6181.10
2.86	4085.08	6581.98
2.96	4238.81	6998.17
3.06	3893.63	7404.79
3.16	2818.58	7740.40
3.26	2841.8	8023.42
3.36	2894.46	8310.23
3.46	2958.61	8602.88
3.56	3003.95	8901.01
3.66	3008.97	9201.66
3.76	2988.5	9501.53
3.86	2941.33	9798.02
3.96	2895.87	10089.88
4.06	2850.77	10377.21
4.16	2804.84	10659.99
4.26	2758.57	10938.16
4.36	2709.87	11211.58
4.46	2658.38	11479.99
4.56	2603.81	11743.10
4.66	2544.42	12000.51
4.76	2480.66	12251.76
4.86	2410.91	12496.34
4.96	2336.82	12733.73
5.06	2248.65	12963.00
5.16	2143.37	13182.60
5.26	2023.25	13390.93
5.36	1890.68	13586.63
5.46	1744.92	13768.41
5.56	1587.46	13935.03
5.66	1421.65	14085.49
5.76	1248.08	14218.98
5.86	1101.15	14336.44
5.96	957.13	14439.35
6.06	812.08	14527.81
6.16	668.84	14601.86
6.26	532.55	14661.93
6.36	403.26	14708.72
6.46	284.36	14743.10
6.56	177.83	14766.21
6.66	97.81	14779.99
6.76	71.62	14788.46
6.86	48.37	14794.46
6.96	30.72	14798.41
7.06	17.84	14800.84
7.16	7.04	14802.08
7.26	3.14	14802.59
7.36	1.97	14802.85
7.46	2.5	14803.07
7.56	1.02	14803.25

7.66	0.2	14803.31


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (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	OR2	Bottom	CIRCULAR	No	24.00			1012.24	0.61

Output Summary Results

Peak Inflow (cfs) 3.10
Peak Lateral Inflow (cfs) 3.10
Peak Outflow (cfs) 0.67
Peak Exfiltration Flow Rate (cfm) 4.47
Max HGL Elevation Attained (ft) 1012.34
Max HGL Depth Attained (ft) 2.66
Average HGL Elevation Attained (ft) 1011.26
Average HGL Depth Attained (ft) 1.58
Time of Max HGL Occurrence (days hh:mm) 0 10:28
Total Exfiltration Volume (1000-ft³) 4.191
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR3

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1001.86
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

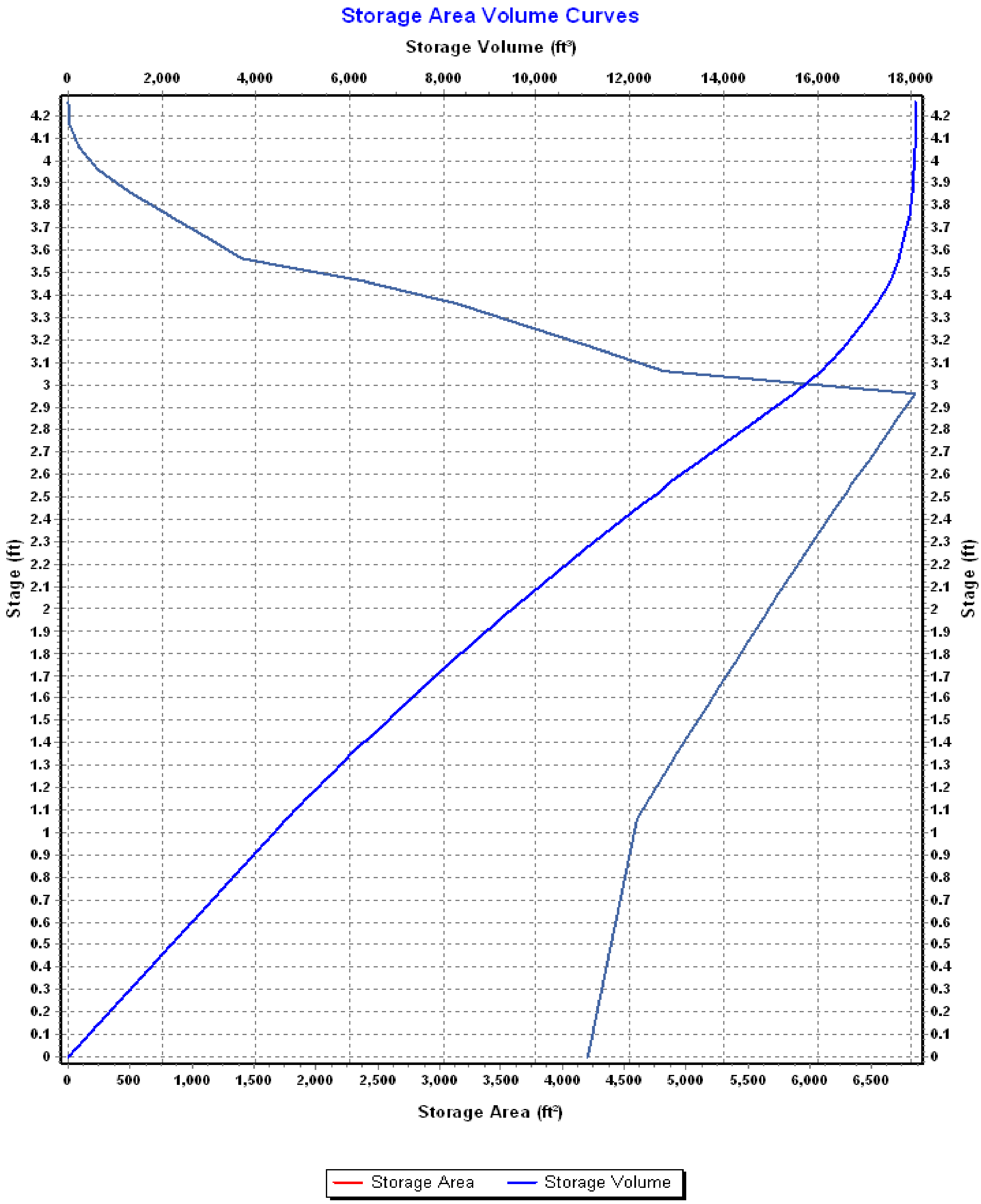
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR3

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	4202	0.000
1.06	4602.78	4666.53
1.16	4712.04	5132.27
1.26	4822.31	5608.99
1.36	4933.57	6096.78
1.46	5045.82	6595.75
1.56	5159.08	7106.00
1.66	5273.33	7627.62
1.76	5388.58	8160.72
1.86	5504.82	8705.39
1.96	5622.06	9261.73
2.06	5740.3	9829.85
2.16	5859.54	10409.84
2.26	5979.77	11001.81
2.36	6101.01	11605.85
2.46	6223.23	12222.06
2.52	6297.05	12597.67
2.56	6346.46	12850.54
2.66	6470.68	13491.40
2.76	6595.9	14144.73
2.86	6722.12	14810.63
2.96	6849.33	15489.20
3.06	4821.94	16072.76
3.16	4269.29	16527.32
3.26	3701.61	16925.87
3.36	3145.79	17268.24
3.46	2385.68	17544.81
3.56	1403.4	17734.26
3.66	1106.4	17859.75
3.76	805.95	17955.37
3.86	493.74	18020.35
3.96	245.04	18057.29
4.06	86.03	18073.84
4.16	14	18078.84
4.26	0.09	18079.54


Storage Area Volume Curves
Storage Volume (ft³)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Stage (ft)
Storage Area (ft²)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500
6,000
6,500
Storage Area
Storage Volume

Storage Node : BR3 (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	OR3	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 3.64
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.61
Peak Exfiltration Flow Rate (cfm) 8.80
Max HGL Elevation Attained (ft) 1001.45
Max HGL Depth Attained (ft) 2.65
Average HGL Elevation Attained (ft) 1000.35
Average HGL Depth Attained (ft) 1.55
Time of Max HGL Occurrence (days hh:mm) 0 11:40
Total Exfiltration Volume (1000-ft³) 8.777
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR4

Input Data

Invert Elevation (ft) 1001.17
Max (Rim) Elevation (ft) 1004.23
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1001.17
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

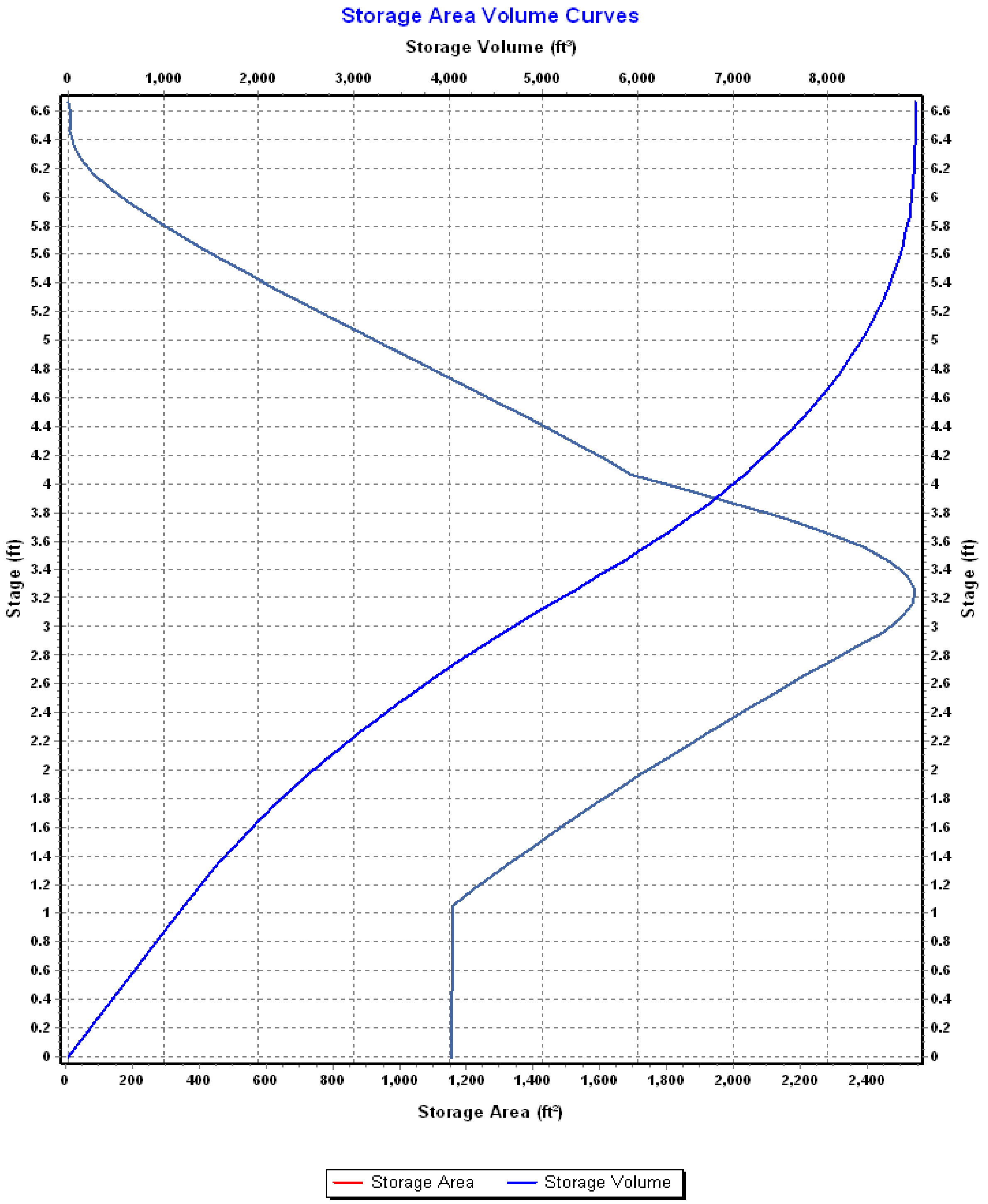
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 1.6700

Storage Area Volume Curves

Storage Curve : BR4

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1157	0.000
1.06	1157.62	1226.75
1.16	1215.18	1345.39
1.26	1273.86	1469.84
1.36	1333.68	1600.22
1.46	1394.62	1736.64
1.56	1456.7	1879.21
1.66	1519.9	2028.04
1.76	1584.24	2183.25
1.86	1649.71	2344.95
1.96	1716.31	2513.25
2.06	1784.03	2688.27
2.16	1852.89	2870.12
2.26	1922.88	3058.91
2.36	1994	3254.75
2.46	2066.25	3457.76
2.49	2088.15	3520.08
2.56	2139.64	3668.05
2.66	2214.15	3885.74
2.76	2289.79	4110.94
2.86	2366.56	4343.76
2.96	2444.47	4584.31
3.06	2503.88	4831.73
3.16	2536.19	5083.73
3.26	2543.4	5337.71
3.36	2518.39	5590.80
3.46	2464.18	5839.93
3.56	2384.46	6082.36
3.66	2275.89	6315.38
3.76	2146.68	6536.51
3.86	2004.26	6744.06
3.96	1849.65	6936.76
4.06	1693.56	7113.92
4.16	1620.49	7279.62
4.26	1542.67	7437.78
4.36	1462.92	7588.06
4.46	1382.21	7730.32
4.56	1298.91	7864.38
4.66	1214.58	7990.05
4.76	1129.66	8107.26
4.86	1044.43	8215.96
4.96	959.13	8316.14
5.06	873.72	8407.78
5.16	790.35	8490.98
5.26	707.66	8565.88
5.36	625.29	8632.53
5.46	547.18	8691.15
5.56	470.39	8742.03
5.66	394.33	8785.27
5.76	324.47	8821.21
5.86	256.35	8850.25
5.96	189.71	8872.55
6.06	133.98	8888.73
6.16	83.68	8899.61
6.26	48.53	8906.22
6.36	26.06	8909.95
6.46	14.03	8911.95
6.56	14.79	8913.39
6.66	8.38	8914.55



Storage Area Volume Curves
Storage Volume (ft³)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Stage (ft)
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR4 (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	O4	Bottom	CIRCULAR	No	24.00			1003.29	0.61

Output Summary Results

Peak Inflow (cfs) 5.36
Peak Lateral Inflow (cfs) 2.43
Peak Outflow (cfs) 5.14
Peak Exfiltration Flow Rate (cfm) 4.88
Max HGL Elevation Attained (ft) 1003.68
Max HGL Depth Attained (ft) 2.51
Average HGL Elevation Attained (ft) 1002.60
Average HGL Depth Attained (ft) 1.43
Time of Max HGL Occurrence (days hh:mm) 0 10:07
Total Exfiltration Volume (1000-ft³) 4.582
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR5

Input Data

Invert Elevation (ft) 998.80
Max (Rim) Elevation (ft) 1003.05
Max (Rim) Offset (ft) 4.25
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -998.80
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Infiltration/Exfiltration

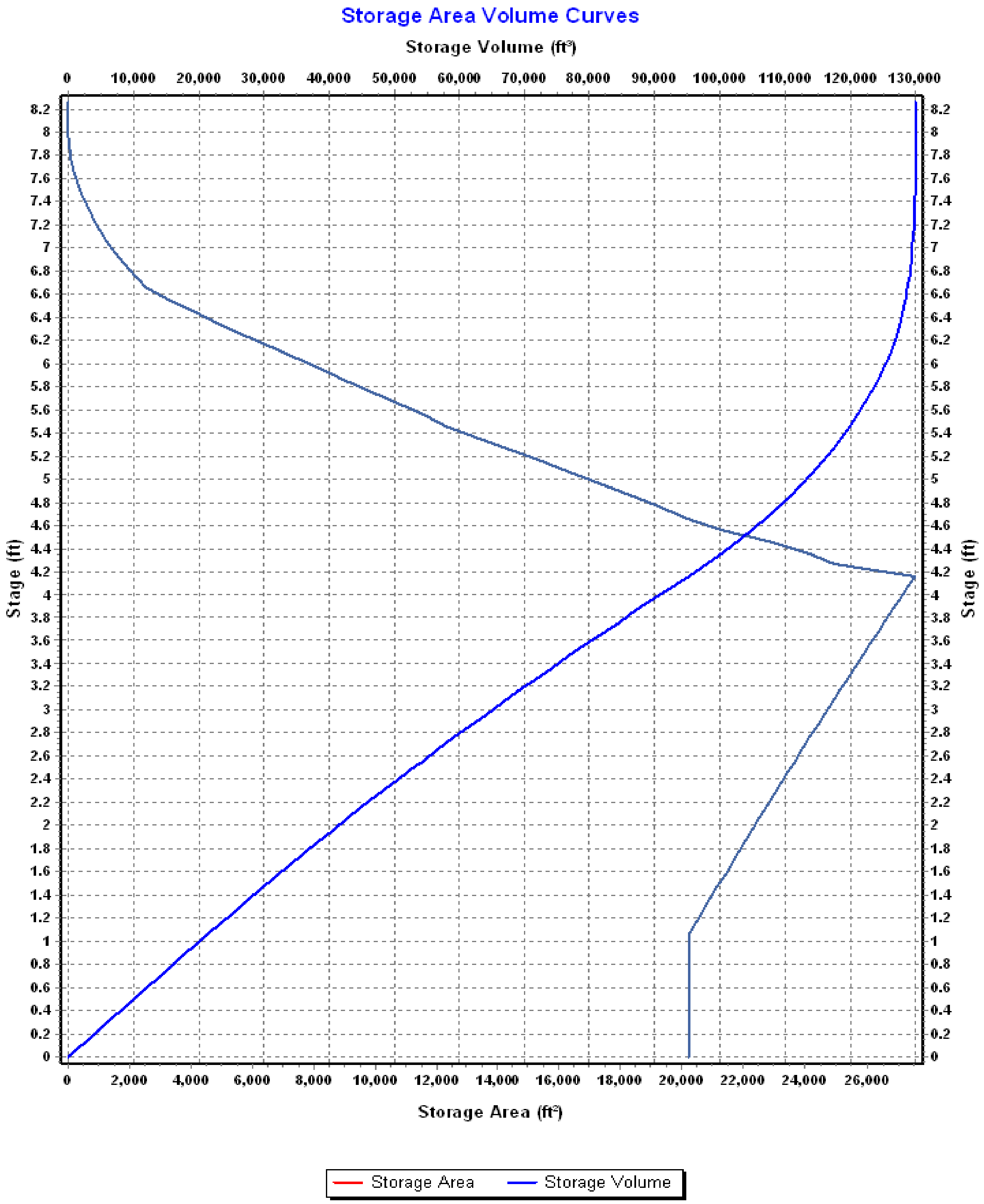
Exfiltration Rate (in/hr) 0.9800

Storage Area Volume Curves

Storage Curve : BR5

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	20214	0.000
1.06	20215.03	21427.39
1.16	20437.65	23460.02
1.26	20661.27	25514.97
1.36	20885.87	27592.33
1.46	21111.46	29692.20
1.56	21338.05	31814.68
1.66	21565.62	33959.86
1.76	21794.18	36127.85
1.86	22023.72	38318.75
1.96	22254.26	40532.65
2.06	22485.78	42769.65
2.16	22718.3	45029.85
2.26	22951.8	47313.36
2.36	23186.29	49620.26
2.46	23421.77	51950.66
2.52	23563.54	53360.22
2.56	23658.24	54304.66
2.66	23895.7	56682.36
2.76	24134.15	59083.85
2.86	24373.58	61509.24
2.96	24614.01	63958.62
3.06	24855.42	66432.09
3.16	25097.82	68929.75
3.26	25341.21	71451.70
3.36	25585.59	73998.04
3.46	25830.96	76568.87
3.56	26077.32	79164.28
3.66	26324.66	81784.38
3.76	26573	84429.26
3.86	26822.32	87099.03
3.96	27072.63	89793.78
4.06	27323.93	92513.61
4.16	27576.22	95258.62
4.26	24935.38	97884.20
4.36	24024.32	100332.19
4.46	22764.39	102671.63
4.56	21271	104873.40
4.66	20160.51	106944.98
4.76	19229.97	108914.50
4.86	18281.25	110790.06
4.96	17314.48	112569.85
5.06	16331.1	114252.13
5.16	15332.24	115835.30
5.26	14319.21	117317.87
5.36	13293.07	118698.48
5.46	12321.72	119979.22
5.56	11498.38	121170.23
5.66	10666.17	122278.46
5.76	9824.09	123302.97
5.86	8977.65	124243.06
5.96	8130.16	125098.45
6.06	7284.67	125869.19
6.16	6443.94	126555.62
6.26	5613.4	127158.49
6.36	4794.72	127678.90
6.46	3989.93	128118.13
6.56	3201.03	128477.68
6.66	2514.65	128763.46
6.76	2163.03	128997.34
6.86	1832.56	129197.12
6.96	1526.32	129365.06
7.06	1250.46	129503.90
7.16	1001.28	129616.49
7.26	786.61	129705.88
7.36	609.46	129775.68
7.46	461.78	129829.24
7.56	329.31	129868.79

7.66	192.14	129894.86
7.76	95.82	129909.26
7.86	34.15	129915.76
7.96	4.84	129917.71
8.06	0	129917.95
8.16	4.45	129918.17
8.26	0.24	129918.40



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
100,000
110,000
120,000
130,000
Stage (ft)
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
22,000
24,000
26,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR5 (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	OR5	Bottom	CIRCULAR	No	24.00			1001.36	0.61

Output Summary Results

Peak Inflow (cfs) 5.12
Peak Lateral Inflow (cfs) 0.00
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 30.68
Max HGL Elevation Attained (ft) 1000.88
Max HGL Depth Attained (ft) 2.08
Average HGL Elevation Attained (ft) 999.78
Average HGL Depth Attained (ft) 0.98
Time of Max HGL Occurrence (days hh:mm) 0 22:12
Total Exfiltration Volume (1000-ft^3) 27.059
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Appendix D

Geotechnical Engineering Report

Love's Travel Stop – Baker
Baker, San Bernardino County, California
October 29, 2021
Terracon Project No. CB215111

Prepared for:
Love's Travel Stops & Country Stores, Inc.
Oklahoma City, Oklahoma

Prepared by:
Terracon Consultants, Inc.
Colton, CA

October 29, 2021

Love's Travel Stops & Country Stores, Inc.
10601 North Pennsylvania Ave.
Oklahoma City, Oklahoma 73120

Attn: Mr. Kym Van Dyke
P: (801) 330-3886
E: Kym.Van Dyke@ loves.com

Re: Geotechnical Engineering Report
Love's Travel Stop – Baker
Baker Boulevard and Silver Lane
Baker, San Bernardino County, California
Terracon Project No. CB215111

Dear Mr. Van Dyke:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PCB215111 dated August 4, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork, pavements, foundations, and floor slabs for the proposed structures.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

REGISTERED PROFESSIONAL ENGINEER
SEYEDALI TABATABAEI
No. 3159
GEOTECHNICAL
STATE OF CALIFORNIA

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REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Love's Travel Stop – Baker
Baker Boulevard and Silver Lane
Baker, San Bernardino County, California
Terracon Project No. CB215111
October 29, 2021

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Love's Travel Stop to be located at Baker Boulevard and Silver Lane in Baker, San Bernardino County, California. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations
- Pavement design and construction
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per CBC
- Lateral earth pressures

The geotechnical engineering Scope of Services for this project included advancement of twenty-nine (29) test borings to depths ranging from approximately 5 to 51½ feet below the existing grades. Our scope also included field electrical resistivity testing and on-site infiltration testing.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located south of Baker Boulevard and Silver Lane in Baker, San Bernardino County, California. The proposed development will be within an approximately 19.82-acre parcel. 35.2771°N/116.0552°W (approximate). See **Site Location**

Item	Description
Existing Improvements	The site is relatively flat and undeveloped and includes Baker Blvd, and the intersection of Baker Blvd. and Caltrans Ave.Fill soils associated with constructing the roadways may be present within the undeveloped portions of the site.
Current Ground Cover	Earthen, light "desert" vegetation in the areas of no development. Roadways are asphalt concrete (AC) with discernable base material beneath the AC.
Existing Topography	The site is relatively flat with an elevation of approximately 1,010 feet.

We also collected photographs at the time of our field exploration program. Representative photos are provided in our **Photography Log**.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning.

Item	Description
Information Provided	Site Plan developed by Lane Engineers, Inc. dated July 26, 2021
Love's Facility Type	Tier 2
Project Description	The proposed Love's Travel Stop is planned south of Baker Blvd. and will include the following: ■ A single-story convenience store/restaurant building (Country Store) ■ Canopies over the car and truck fuel dispensing islands ■ A high rise sign ■ Above and below ground storage tanks ■ Concrete and asphalt pavement ■ Improvements to Baker Blvd. ■ Retention basins (three total)
Proposed Structures	The project includes a single-story building with a footprint of about 12,200 square feet. The building will be slab-on-grade with no below-grade structures. Other structures include fuel island canopies, and below ground and above ground fuel storage tanks.
Building Construction	■ The Country Store will have isolated steel columns, load bearing masonry walls and a concrete slab-on-grade floor. ■ Fuel island canopies will be steel column and frame construction ■ High-rise sign will be supported on a deep foundation system (drilled pier)

Item	Description
Finished Floor Elevation	The finish grade elevations are unknown; however, we assume they will be near the grades of the existing roadways. Based on the site layout and topography, and the existing roadways for entry and exit, the finish grade elevations will likely be around 1,010 feet.
Maximum Loads (provided by Love's)	Country Store: ■ Columns: up to 75 kips ■ Walls: 1 kip per linear foot (klf) ■ Floor Slab: assumed 150 pounds per square foot (psf) Auto Fuel Canopy (40' by 80' in plan dimensions) foundations: ■ Axial compression: 23.07 kips (dead and live loads) ■ Axial uplift: 14.99 kips ■ Moment: 22.58 kip-feet Truck Fuel Canopy (25' height) foundations: ■ Axial compression: 22.59 kips (dead and live loads) ■ Axial uplift: 13.73 kips ■ Moment: 54.61 kip-feet
Grading/Slopes	Finish grade elevations were not provided; however, we anticipate finish grades to be near the existing grades of the adjacent roadways; for purposes of this proposal, we have assumed the site will be graded to an elevation of approximately 1,010 feet. Up to 5 feet of cut and 5 feet of fill may be required to develop final grades, excluding requirements for remedial grading. Slopes greater than 5 feet in vertical height are not planned. Final slope inclinations of 2:1 (Horizontal: Vertical) or flatter are expected.
Below-Grade Structures	Other than underground fuel storage tanks (USTs), no below grade structures are anticipated.
Free-Standing Retaining Walls	Retaining walls are not expected to be constructed as part of site development to achieve final grades.
Pavements	The Love's Travel Stop will include light-duty, medium-duty, heavy-duty, and extra heavy-duty pavement areas. The pavement design criteria are noted below (Tier 1/Tier 2): ■ Light-duty auto area: 1,000 cars per day ■ Medium-duty truck parking area: 150 trucks per day ■ Heavy-duty truck drives: 600 trucks per day ■ Extra heavy-duty truck drives: 1,000 trucks per day ■ 20-year design life

Item	Description
High-Rise Sign Access Road	An unpaved access road will extend to the high-rise sign. Vehicles expected to operate on the access road include concrete trucks and other construction equipment during construction of the sign foundation. Additionally, truck-mounted cranes used to erect and maintain the sign are expected to use the road. Cranes typically used vary in size and weight depending on the height of the sign and monopole weight. Vehicles operating on this road include: ■ Crane, large (350-ton capacity): 140-kip load, 6 axles, 50 ft. long by 9 ft. wide; ■ Crane, medium: 72-kip load, 4 or 6 axles, 40 ft. long by 9 ft. wide; ■ Tractor trailers, 80-kip load, 5 axles, 18 wheels, 70 ft. long by 9 ft. wide ■ Concrete trucks, 72-kip load, 10 wheels, 30 ft. long by 8 ft. wide.
Stormwater Infiltration	Low Impact Development (LID) structures for stormwater infiltration are identified on the plans at 3 areas in the proposed development. Local agencies may require the development of infiltration structures and may not allow certain types to be placed within fill soils.

GEOTECHNICAL CHARACTERIZATION

Site Geology

The site is located within the east-central portion of the Mojave Desert Geomorphic Province of Southern California. The Mojave Desert Geomorphic Province is bounded on the southwest by the San Andreas fault and the Transverse Ranges, and on the northeast by the Garlock fault. The eastern Mojave desert is characterized by northwest-trending mountain ranges of crystalline bedrock and intervening, broad, alluviated valleys. Many of the alluvial valleys are closed basins that have developed saline dry lake playas that occasionally fill with surface run-off during periodic episodes of precipitation. The subject site is situated approximately 1 ½ miles northeast of a channel that drains the Soda Lake Playa northward into the Silver Lake Playa. Approximately 1 ½ miles west of the site lies Otto Mountain, a part of the larger Soda Mountains, consisting mostly of Mesozoic granitic bedrock and Precambrian metamorphic rock (Jennings and others, 1962, https://ngmdb.usgs.gov/Prodesc/proddesc_332.htm).

The site is located on the distal portion of a broad, west-sloping, incised alluvial plain created by erosion and deposition of bedrock detritus carried from hills in the vicinity of the Cima volcanic field, as close as approximately 11 miles to the east. Surficial native materials at the site have been mapped as Quaternary-age alluvium (Jennings et. al., 1962). Although the total thickness and depth of the alluvium beneath the site is not known, the depth to underlying bedrock in the Soda Lake and Silver Lake basins is anticipated to range from less than a few hundred feet, to a thousand feet or more, thickening with increasing distance from exposed bedrock hills. The soils beneath the site are mapped as Holocene-age alluvium (Jennings and others, 1962, https://ngmdb.usgs.gov/Prodesc/proddesc_332.htm). These materials are expected to interfinger with the nearby playa deposits, but little playa sediments (silts/clays) were found in the exploratory borings.

Subsurface Profile

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. In general, the site is underlain with medium dense to very dense poorly-graded sand and silty sand to the maximum depth explored.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely. Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Groundwater

The borings were advanced using continuous flight auger drilling techniques that allow short-term groundwater observations to be made while drilling. Groundwater seepage was not observed within the maximum depths of 51½ feet during or at the completion of drilling. We do not anticipate groundwater will affect construction at this project site. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. According to data collected from the Water Data Library of California Department of Water Resources (DWR) from a nearby wells, historic groundwater levels are deeper than 75 feet.

Hydroconsolidation

To evaluate the potential deformation that may be caused by the addition of water to the subsurface soils, hydro-consolidation testing was performed on a selected, relatively undisturbed samples. The result presented in the Exploration Results section and indicate collapse potentials of 2% (B-1, 10 – 11.5), 5.4% (B-5, 10 – 11.5) and 3.8% (B-7, 7.5 – 9), boring number and sample depths summarized in parenthesizes. All samples were saturated under a surcharge pressure of 2,000 psf.

Soil samples with collapse potential of 3.8% and 5.4% were encountered at depths of 7.5 to 10 feet bgs. Based on the measured densities and field blow counts, it is our opinion that sample disturbance may have contributed to the measured hydro-collapse laboratory results.

Furthermore, effective stresses at such depths will be lower than 2,000 psf, which is the surcharge pressure the samples were tested for at.

SEISMIC CONSIDERATIONS

Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our opinion that the Seismic Site Classification is D. The 2019 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16 and 2019 CBC. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." Based on our understanding of the proposed structures, it is our assumption that the exception in Section 11.4.8 applies to the proposed structures. However, the structural engineer should verify the applicability of this exception.

Based on this exception, the spectral response accelerations presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2019 CBC.

Description	Value
Site Classification (CBC) [1]	D [2]
Site Latitude (°N)	35.2771
Site Longitude (°W)	-116.0552
S_s Spectral Acceleration for a 0.2-Second Period	0.609
S_1 Spectral Acceleration for a 1-Second Period	0.236
F_a Site Coefficient for a 0.2-Second Period	1.313
F_v Site Coefficient for a 1-Second Period	2.1
Site Modified Peak Ground Acceleration	0.35g
De-aggregated Modal Magnitude [3]	7.74

Description	Value

1. Seismic site classification in general accordance with the *2019 California Building Code*.
2. The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Our borings were extended to a maximum depth of 51½ feet. This seismic site class definition considers that similar or denser soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.
3. These values were obtained using on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years accessed

A site-specific ground motion study may reduce design values and consequently construction costs. We recommend consulting with a structural engineer to evaluate the need for such study and its potential impact on construction costs. Terracon should be contacted if a site-specific ground motion study is desired.

Faulting and Estimated Ground Motions

The site is located in the seismically active southern California area. Specifically, the site is located east of the East Mojave Shear Zone, a zone of active faults characterized by large historic earthquakes and ground rupture. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. As calculated using the USGS Unified Hazard Tool, the Baker fault has the highest contribution of hazard to the site. The Baker fault is assigned a maximum magnitude of 7.2 and is located approximately 8 kilometers from the site. Significant contributions to seismic hazard are also associated with faults located at a farther distance from the site, such as the Garlock fault, and from gridded sources located approximately 5 to 10 kilometers north of the site.

Based on the USGS Design Maps Summary Report, using the American Society of Civil Engineers (ASCE 7-16) standard, the peak ground acceleration (PGA_M) at the project site is expected to be 0.35 g. Based on the USGS Unified Hazard Tool, the project site has a de-aggregated modal magnitude of 7.7. The site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.

LIQUEFACTION AND SEISMIC SETTLEMENT

Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore-water pressures during earthquake ground shaking, causing loss of shear strength, and is typically a hazard where loose sandy soils exist below groundwater. The County of San Bernardino has designated certain areas as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table.

The subsurface materials generally consist of dense to very dense poorly-graded sand and silty sand. Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling.

According to the County of San Bernardino geological hazard maps, the site is located within an area having a low liquefaction potential. Based on the encountered subsurface dense soils and the absence of shallow groundwater, it is our opinion that the potential for liquefaction is considered low.

Seismic Settlement

The underlying native soils are comprised of predominantly of silty sand and poorly graded sand with silt extending to the maximum depth of the borings. SPT blow counts indicate that the relative density of the soils encountered generally are medium dense to very dense. We estimate that total seismic settlement (dry sand settlement) would be less than 1 inch, with differential settlement values at less than ½ of an inch.

CORROSIVITY

The table below lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. In addition, a field resistivity survey was performed at the Tank Pad location using the Wenner Array (4-pin) method per ASTM G57 and a digital ground resistance tester. The results of the field survey are provided in **Exploration and Testing Procedure** attachment.

The following values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary						
Boring	Depth (feet)	Soluble Sulfate (mg/kg)	Soluble Chloride (mg/kg)	Electrical Resistivity (as-received) (Ω-cm)	Electrical Resistivity (saturated) (Ω-cm)	pH
B-11	0-5	228	73	22,310	6,887	9.20
B-15	0-5	88	158	>1,000,000	1,067	8.84

Results of soluble sulfate testing indicate samples of the on-site soils tested possess negligible sulfate concentrations when classified in accordance with Table 4.3.1 of the ACI Design Manual. Concrete should be designed in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

For protection against corrosion to buried metals, Terracon recommends that an experienced corrosion engineer be retained to design a suitable corrosion protection system for underground metal structures or components.

If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

GEOTECHNICAL OVERVIEW

The site is suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Based on our field investigation and laboratory test results, it is our opinion that the site will be safe against hazards from landslide, settlement, or slippage provided that the recommendations presented in our report are followed. Also, provided that the recommendations presented in our report are followed, we find that the proposed grading will not adversely affect the geologic stability of the properties adjacent to the site.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and our current understanding of the proposed project.

Based on the conditions encountered, we believe the proposed buildings can be supported on shallow foundations, such as spread footings. The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results** section), engineering analyses, and our current understanding of the proposed project.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs, and pavements are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Site Preparation

Strip and remove existing vegetation, debris and other deleterious materials from proposed building and pavement areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill and provide for a relatively uniform thickness of fill beneath proposed building structures.

The ground surface of the site is generally earthen and bare and there are some native grasses and bushes. We recommend stripping vegetation to depths that exposed soils with less than 3 percent organics and no roots having a diameter greater than 1/8 inch. While the depth of the unsuitable soils should be expected to vary, the thickness of the topsoil layer may be estimated to be approximately 3 to 6 inches for construction budgeting purposes. The thickness of the vegetation layer was not determined during our field exploration; therefore, the actual depth of stripping should be verified by engineering observations made during the grading operations at the project. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be removed from the site or used to revegetate landscaped areas or exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

Although no evidence for underground facilities such as septic tanks, cesspools, or basements was observed during the site reconnaissance, such features could be encountered during construction. All of the on-site fills, utility lines and associated trenches should be traced out and completely removed during grading. The resulting excavations should be thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

To provide a uniform compacted fill pad for the proposed structures, we recommend a shallow foundation system be supported on engineered compacted fill extending to a minimum depth of 2 feet below the bottom of foundations, or 5 feet below existing grades, whichever is greater. Grading for each structure should include the footprint of the structure plus a lateral distance of 3 feet from the perimeter footings.

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned, and compacted per the compaction requirements in this report. The moisture content and compaction of subgrade soils should be maintained until the placement of compacted structural fill.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable. However, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Excavation

We anticipate that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

We recommend that the underground storage tank excavations be over-excavated by about 2 feet in plan area to provide adequate access around the excavation for tank placement construction. The walls of the proposed excavation should be shored or sloped in conformance with OSHA excavation and trench safety standards. If any excavation is extended to a depth of more than 20 feet, it will be necessary to have the side slopes designed by a professional engineer.

Soils from the excavation should not be stockpiled higher than six 6 feet or within ten 10 feet of the edge of an open trench. Construction of open cuts adjacent to existing structures, including underground pipes, is not recommended within a 1½ H:1V plane extending beyond and down from the perimeter of the structure. Cuts that are proposed within five 5 feet of light standards, other utilities, underground structures, and pavement should be provided with temporary shoring.

It may be necessary for the contractor to retain the geotechnical engineer to monitor the soils exposed in all excavations and provide engineering services for slopes. This will provide an opportunity to monitor the soils encountered and to modify the excavation slopes as necessary. It also offers an opportunity to verify the stability of the excavation slopes during construction.

Individual contractors are responsible for designing and constructing stable, temporary excavations. All excavations should be performed such that adjacent and nearby structures are not disturbed. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

Fill Materials and Placement

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than 3 inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean on-site soils or approved imported materials may be used as fill material for the following:

■ general site grading	■ foundation backfill
■ foundation areas	■ pavement areas
■ interior floor slab areas	■ exterior slab areas

Imported soils for use as fill material within proposed building and structure areas should conform to low volume change materials as indicated in the following specifications:

Gradation	**Percent Finer by Weight (ASTM C 136)**
3"	100
No. 4 Sieve	50-100
No. 200 Sieve	10-40

■ Liquid Limit	30 (max)
■ Plasticity Index	15 (max)
■ Maximum expansion index*	20 (max)

*ASTM D 4829

The contractor shall notify the Geotechnical Engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor shall also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the job.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness.

Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
On-site soils and low volume change imported fill:			
Beneath foundations:	90	0%	+3%
Beneath interior slabs:	90	0%	+3%
Miscellaneous backfill and behind retain walls:	90	0%	+3%
Beneath pavements:	95	0%	+3%
Utility Trenches*:	90	0%	+3%
Bottom of excavation receiving fill:	90	0%	+3%
Aggregate base (beneath pavements):	95	0%	+3%

* Upper 12 inches should be compacted to 95% within pavement and structural areas.

Utility Trench Backfill

We anticipate that the on-site soils will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 is recommended for bedding and shading of utilities, unless otherwise allowed by the utility manufacturer.

On-site materials are considered suitable for backfill of utility and pipe trenches from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

We recommend a minimum horizontal setback distance of 10 feet from the perimeter of any building and the high-water elevation of the nearest storm-water retention basin.

Roof drainage should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems and landscaped irrigation should not be installed within 5 feet of foundation walls.

Earthwork Construction Considerations

Upon completion of placement of fill and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proof-rolling, placement and compaction of controlled compacted fills, backfilling of excavations to the completed subgrade.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test should be performed for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

DESCRIPTION	RECOMENDATION
Foundation Type	Spread footing foundations
Bearing Material	A minimum of 24 inches of compacted structural fill
Allowable Bearing Pressure	2,500 psf
Minimum Dimensions	Columns: 24 inches
Minimum Embedment Depth Below Finished Grade	18 inches
Total Estimated Static Settlement	1 inch
Estimated Differential Static Settlement	½ inch across 40 feet

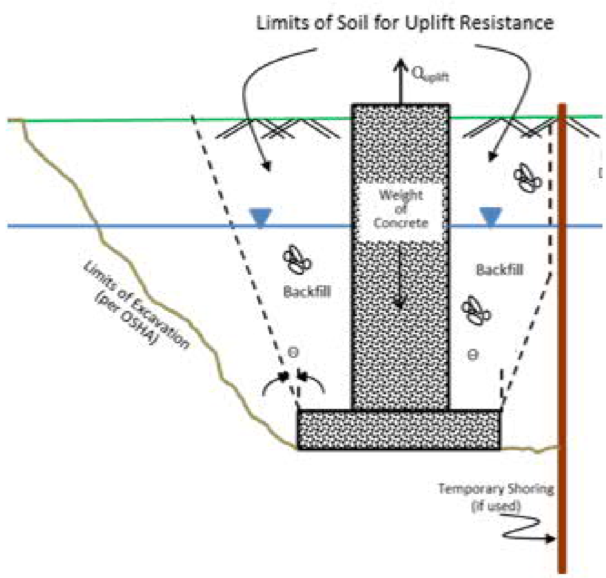
Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (or exterior) footings.

The allowable foundation bearing pressure applies to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations.

Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. Foundation excavations should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Design Parameters - Uplift Loads

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils. As illustrated on the subsequent figure, the effective weight of the soil prism defined by diagonal planes extending up from the top of the perimeter of the foundation to the ground surface at an angle, θ, of 20 degrees from the vertical can be included in uplift resistance. The maximum allowable uplift capacity should be taken as a sum of the effective weight of soil plus the dead weight of the foundation, divided by an appropriate factor of safety. A maximum total unit weight of 130 pcf should be used for the backfill.



DEEP FOUNDATIONS

Drilled Shaft Design Recommendations

The proposed high-rise sign and canopy structures may be supported on drilled shafts. Total required embedment of the drilled shaft should be determined by the structural engineer based on structural loading and parameters provided in this report.

Based on our review of the subsurface conditions within the proposed location of the high-rise sign, canopies, and the Standard Penetration Test (SPT) results, engineering properties have been estimated for the anticipated soils conditions.

The allowable uplift capacities should only be based on the side friction of the shaft; however, the weight of the foundation should be added to these values to obtain the actual allowable uplift capacities for drilled shafts. Tensile reinforcement should extend to the bottom of shafts subjected to uplift loading. Buoyant unit weights of the soil and concrete should be used in the calculations below the highest anticipated groundwater elevation.

Recommended soil parameters for lateral analysis and axial load design of drilled shaft foundations are provided in the table below. Based on our review of the boring logs and the Standard Penetration Test (SPT) results, engineering properties have been estimated for the soil conditions as shown in the following table. Lateral and axial capacity of soils within the upper 2 feet should be neglected. We recommend that Terracon review the final drilled shaft design to verify that sufficient embedment is achieved.

L-Pile Design Input Parameters					Axial Design Parameters	
Layer	Bottom Depth of Layer (feet)	L-PILE Soil Types	Effective Unit Weight (pcf)	Friction Angle (degrees)	Allowable End Bearing Pressure (ksf)[4]	Allowable Compressive Side Shear (psf)
1	2	Sand	105	----	----	----
2	5	Sand	110	32	8	100
3	10	Sand	110	34	12	200
4	15	Sand	115	36	15	350
5	Below 15	Sand	120	38	20	1,000

1. Design depth to subsurface water is greater than 50 feet.
2. Factors of safety of 3.0 for end bearing pressure, 2.0 for compressive side shear were utilized.
3. For uplift conditions, allowable compressive side shear should be multiplied by 0.60.

The depth below ground surface indicated in the table above is referenced from the existing site surface at the time of the field exploration. If fill is placed to raise the site grades, the depths shown in the charts must be increased by the thickness of fill placed. The required depths of shaft embedment should also be determined for design lateral loads and overturning moments to determine the most critical design condition.

It should be noted that the loaded capacities provided herein are based on the stresses induced in the supporting soils. The structural capacity of the shafts should be checked to assure that they can safely accommodate the combined stresses induced by axial and lateral forces. Furthermore, the response of the drilled shaft foundations to lateral loads is dependent upon the soil/structure interaction as well as the shaft's actual diameter, length, stiffness and "fixity" (fixed or freehead condition).

Drilled Shaft Construction Considerations

The Geotechnical Engineer should observe the installation of drilled piers to verify the soil conditions and the diameter and depth of piers. Drilled piers should be constructed true and plumb.

Because of the granular nature of the soils encountered, the possible presence of shallow groundwater, and the anticipated diameter of the drilled holes, it is anticipated that caving could occur during the drilling and construction of piers within the on-site soils. Appropriate precautions should therefore be taken during the construction of piers to reduce caving and raveling.

Temporary steel casing may be required to properly drill and clean drilled piers prior to concrete placement. A water and polymer displacement method may also be considered as a means of maintaining pier integrity during construction. Foundation concrete should be placed immediately after completion of drilling and cleaning. If foundation concrete cannot be placed in dry conditions, a tremie should be used for concrete placement. Due to potential sloughing and raveling, foundation concrete quantities may exceed calculated geometric volumes.

If casing is used for foundation construction, it should be withdrawn in a slow continuous manner, maintaining a sufficient head of concrete to prevent caving or the creation of voids in pier concrete. Foundation concrete should have a relatively high fluidity when placed in cased pier holes or through a tremie. Foundation concrete with slump in the range of 6 to 8 inches is recommended when temporary casing is utilized.

Free-fall concrete placement in drilled piers will only be acceptable if provisions are taken to avoid striking the concrete on the sides of the hole or reinforcing steel. The use of a bottom-dump hopper, or an "elephant's trunk" discharging near the bottom of the hole where concrete segregation will be minimized, is recommended.

Drilled pier end bearing surfaces must be thoroughly cleaned prior to concrete placement. A representative of the Geotechnical Engineer should inspect the bearing surface and foundation pier configuration. If the subsurface soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

The contractor should check for gas and/or oxygen deficiency before any workers enter the excavation for observation and manual cleanup. All necessary monitoring and safety precautions as required by OSHA, State or local codes should be strictly enforced.

The drilling speed should be reduced as necessary to minimize vibration and caving of the silty sand and poorly-graded sand materials. Based on the data developed during our investigation, drilling for the piers may need casing. as caving soils may be encountered; the contractor should be prepared to use casing or other approved means to prevent caving. The contractor should review the boring logs to make sure he is familiar with the anticipated subsurface conditions prior to beginning construction of the deep foundations.

The installation of drilled straight-shafts may likely require the use of the slurry displacement method and/or temporary steel casing with water pumps, if groundwater encountered. If drilled straight-shaft installation is attempted without utilizing slurry displacement method or temporary casing, zones of sloughing soils and/or groundwater inflow may occur during construction. Therefore, we recommend that provisions be incorporated into the plans and specifications to utilize slurry or casing to control sloughing and/or groundwater seepage during shaft construction.

The need for casing or slurry will depend on the depth of the drilled shaft and the groundwater conditions at the time of construction. If casing is used and seepage persists, the water accumulating in the foundation excavation should be pumped out. The condition of the bearing surface should be evaluated immediately prior to placing concrete, if casing is used in lieu of slurry. If groundwater inflow is too severe to be controlled by the use of casing and pumping or significant sloughing of the sidewalls occurs, the slurry method of construction should be utilized to complete the foundation installation.

Closely spaced piers should be drilled and filled alternately, allowing the concrete to set at least eight hours before drilling the adjacent pier. All excavations should be filled with concrete as soon after drilling as possible. In no event should pier holes be left open overnight. To prevent concrete from striking the walls of the pier and causing caving, the concrete should be placed with appropriate equipment so that the concrete is not allowed to fall freely more than 5 feet. All loose materials should be thoroughly cleaned from the bottom of the pier excavation. This is especially important because end bearing has been considered in determining the provided pier capacities. If casing is necessary and is utilized, then the casing should be withdrawn concurrently with the concrete placement.

FLOOR SLABS

DESCRIPTION	RECOMMENDATION
Interior floor system	Slab-on-grade concrete
Floor slab support	Engineered fill extending to a minimum depth of 2 feet below the bottom of associated footings or 5 feet below existing grades, whichever is greater.
Subbase	Minimum 4-inches of Aggregate Base

DESCRIPTION	RECOMMENDATION
Modulus of subgrade reaction	200 pounds per square inch per inch (psi/in) (The modulus was obtained based on estimates obtained from NAVFAC 7.1 design charts). This value is for a small loaded area (1 Sq. ft or less) such as for forklift wheel loads or point loads and should be adjusted for larger loaded areas.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

LATERAL EARTH PRESSURES

Design Parameters

For engineered fill comprised of on-site soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are:

ITEM	VALUE[a, b]
Active Case	40 psf/ft
Passive Case	390 psf/ft
At-Rest Case	60 psf/ft
Coefficient of Friction	0.35

[a]Note: The values are based on on-site soils used as backfill.
[b]Note: Uniform, horizontal backfill, compacted to at least 90% of the ASTM D 1557 maximum dry density, rendering a maximum unit weight of 125 pcf.

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

Fill against foundation and retaining walls should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors.

PAVEMENTS

General Pavement Comments

Both concrete and asphalt pavement design sections are requested for the proposed project. As noted in **Project Description**, pavement thickness design is dependent upon:

- the anticipated traffic conditions during the life of the pavement,
- subgrade and paving material characteristics, and
- climatic conditions of the region.

A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

To determine existing pavement sections within Baker Blvd., three borings (B-31, B-32, and B-33) were drilled within the roadway. The thicknesses of AC and base materials encountered in the borings varied from approximately 8 to 9 inches of AC over 8 to 10 inches of base materials.

The pavement sections were designed using the American Association of State and Highway Transportation Officials (AASHTO) Guide for Design of Pavement Structures (1993). Development of layer thicknesses, including the asphalt thickness for the geogrid reinforced alternatives, were determined using the layered elastic design methodology as outlined in the AASHTO 93 Design Guide, Part II, Section 3.1.5 Layered Design Analysis

Design Traffic Analysis

Traffic levels provided by the client were converted into flexible AASHTO pavement 18-kip equivalent single axle loads (ESALs) for use in Asphalt Concrete (AC) pavement thickness design, and into rigid AASHTO pavement 18-kip ESALs for Portland Cement Concrete (PCC) design, as noted in the following table. We understand that Love's Tier I traffic is experienced at this facility. Our office should be contacted if there are any changes in the reported traffic patterns or frequency to review the enclosed values.

Love's Tier 1 / Tier 2 Traffic Volumes	Light Duty	Medium Duty	Heavy Duty	Extra Heavy Duty
Traffic Level, vehicles per day [1]	1,000 cars	150 trucks	600 trucks	1,000 trucks
Flexible (AC) Pavement 18-Kip ESAL [2]	< 30,000	2.6 million	10.2 million	17 million
Rigid (PCC) Pavement 18 Kip ESAL [3]	< 30,000	4.2 million	17 million	29 million

1. Client provided values, based on a Tier 1 and 2 sites in accordance with Love's Travel Stops.
2. Assumes 20-year design life, 100% of traffic consisting of fully loaded 80-kip semi-tractor trailers with two 34-kips tandem axles and one 12-kip single front axle.
3. ESAL's for PCC design are not equivalent to ESAL's used for AC sections.

Pavement Subgrade Parameters

Based on the proposed grading as previously discussed in this report, pavement subgrades are expected to consist of native on-site soils at elevations roughly equivalent to existing grades. Accordingly, bulk samples of near surface soils were collected at depths of approximately 0 to 5 feet below existing grades for laboratory testing. B-22 and B-32 bulk samples were selected for R-value testing resulting in values of 56 and 58, respectively. As such, a design R-value of 50 was used as the basis for pavement design taking into consideration the effects of seasonal and other climatic conditions at this site. This value corresponds to a subgrade Resilient Modulus (Mr) of 28,750 psi (pounds per square inch) for use for flexible pavement design, and an Effective Modulus of Subgrade Reaction (k) of 372 pci (pounds per cubic inch) for use in designing the rigid pavement sections with six inches of aggregate base.

Note that if actual subgrade conditions differ from the soil conditions and characteristics described here, we should be contacted to assess the construction conditions and review the pavement design recommendations.

Pavement Design Parameters

Analyses for the pavement design of the project have been based on the procedures of the AASHTO Guide for Design of Pavement Structures (1993). The following design parameters were utilized for pavement engineering analyses and the determination of design alternatives for the project:

Pavement Design Parameters		
Reliability	Level of Reliability	85%
	Flexible Overall Standard Deviation	0.45

Pavement Design Parameters		
	Rigid Overall Standard Deviation	0.35
Serviceability	Flexible Initial PSI	4.2
	Flexible Terminal PSI	2.0
	Rigid Initial PSI	4.5
	Rigid Terminal PSI	2.3
Subgrade Conditions	Design R-value	50
	Correlated Resilient Modulus, M_r	28,750 psi
	Effective Modulus of Subgrade Reaction, k	372 pci
Layer Properties	Asphalt Concrete (AC) Layer Coefficient	0.44
	Aggregate Base (ABC) Layer Coefficient	0.14
	Aggregate Base (ABC) Drainage Coefficient	1.0
	Aggregate Base (ABC) Resilient Modulus[1]	36,000 psi
	Reinforced Aggregate Base (ABC) Resilient Modulus[1]	50,000 psi
	Load Transfer Coefficient J[2]	2.8
	Compressive Strength of Concrete f'_c	4,000 psi

1. Reinforced AB Resilient Modulus values are limited to 5x the subgrade Resilient Modulus for the purposes of layered design analysis for flexible pavements.
2. Load transfer coefficient of 2.8 for dowel reinforced concrete joints.

The design period is considered the interval over which, with proper maintenance, the pavement will not require major repairs. We recommend a continuing regular maintenance program be implemented to maintain satisfactory serviceability over the design life. Please refer to **Pavement Maintenance** for additional information.

Asphalt Concrete Pavement Recommendations

Due to heavy truck traffic loading, Love's routinely uses geogrid reinforced flexible pavement designs in heavy traffic areas. Based on the site conditions and anticipated pavement subgrade, we believe that geogrids offer a cost-savings over unreinforced pavements. Accordingly, we have designed the asphalt pavements to include BX2525 geogrid, using LEpave software provided by L.E. Geosolutions (LEGeo). The following table provides our recommended pavement sections for this project:

LAYER	Materials[2] (CalTrans)	Light Duty	Medium Duty	Heavy Duty	Extra Heavy Duty
		Thickness (in) [1]			
Surface[2]	1/2-inch HMA Type A PG 76-22 M	4	2 ½	2 ½	2 ½

LAYER	Materials[2] (CalTrans)	Light Duty	Medium Duty	Heavy Duty	Extra Heavy Duty
		Thickness (in) [1]			
Base[2]	3/4-inch HMA Type A PG 70-10	--	2 ½	3	3 ½
Aggregate[3]	Class 2 Aggregate Base	8	8	8	8
Geogrid[4]	**LeGeo** BX2525 or equivalent	No[5]	No[5]	Yes	Yes
Total Pavement Section (in.)		**12**	**13**	**13 ½**	**14**
Design Traffic (ESALs)		< 30,000	2.6 million	10.2 million	17 million

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Refer to Section 39 Asphalt Concrete of the California Department of Transportation (Caltrans) "Standard Specifications" for Asphalt Concrete use and construction.
3. Refer to Section 26 Aggregate Bases of the California Department of Transportation (Caltrans) "Standard Specifications" for Aggregate Base Course use and construction.
4. Aggregate base reinforced with 1 layer of LEGeo BX-2525 geogrid or equivalent located at the bottom of the aggregate base. Alternative grid materials are not acceptable unless documented with applicable design procedure and appropriate performance-based specification and/or post construction validation.
5. Geogrid optional.

Reinforced pavement design procedures developed by LEGeo and others rely on product specific field and laboratory research. Alternate geogrids can be considered but will require independent design and should not be specified or accepted based on engineering properties, as these do not necessarily define reinforced pavement performance.

Asphalt Binder Selection

Terracon considered the weather conditions and traffic to determine the appropriate asphalt binder for this project. This was accomplished using the LTPPBind Version 3.1 Beta, dated September 15, 2015 software provided by the Federal Highway Administration (FHWA). This software utilizes historical temperature data from the 5 weather stations nearest the project and considers traffic speed and traffic loading to establish a recommended Performance Graded (PG) binder grade of asphalt concrete. Terracon then compared the software output to the binders that were indicated to be locally available, based on the Caltrans website, to determine the recommended binder selection for the project. The number of binders selected was limited to two for this recommendation to reduce the number of mix designs needed to construct the pavements.

Aggregate Base Requirements

Aggregate Base shall comply with Section 26 Aggregate Base of the 2018 Caltrans Specifications. The Aggregate Base shall be Type 2 and shall meet the Caltrans Specifications. Aggregate Base or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade.

Portland Cement Concrete Pavement Recommendations

It is our understanding that Love's prefers to use asphalt concrete for the majority of pavements at a Travel Stop site; however, Portland cement concrete (PCC) is occasionally selected as an alternate. Accordingly, we have included the following thickness recommendations for Jointed Plain Concrete Pavement (JPCP) with dowels:

LAYER	MATERIAL	LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY	EXTRA HEAVY DUTY
		Thickness (in)[1]			
Surface	Portland Cement Concrete[2, 3]	5	8	10	11
Aggregate	Class 2 Aggregate Base[4]	8	8	8	8
Subgrade	Minimum 10 inches of properly prepared native soils				
Total Pavement Section[1]		**5**	**16**	**18**	**19**

1. The individual and total material thickness values presented herein represent <u>minimum</u> thickness values, not averages.
2. Refer to Section 40 Concrete Pavement and Section 90 Concrete of the California Department of Transportation (Caltrans) "Standard Specifications for concrete mixture requirements.
3. Medium duty concrete pavements should include 1 ¼ inch diameter by 15-inch long dowel bars spaced at 12 inches center to center in all longitudinal and transverse contraction joints. Heavy and extra heavy-duty concrete pavements should include 1 ½ inch diameter by 18-inch long dowel bars spaced at 12 inches center to center in all longitudinal and transverse contraction joints.
4. Refer to Section 26 Aggregate Bases of the California Department of Transportation (Caltrans) "Standard Specifications" for Aggregate Base Course use and construction.

The recommendations presented above require dowel reinforcement in longitudinal and transverse contraction joints as shown in ACI 330.2R-17. In locations where concrete slabs are used in isolated areas such as dumpster pads and short apron slabs approaching the tire shop, joint reinforcement is not required. In these locations however, an additional two inches should be added to the thicknesses presented in the table above to alleviate cracking of unsupported edges.

If Portland cement concrete is selected for use in general pavement areas, proper design and detailing of longitudinal and transverse control joints, tie bars and joint dowels will be required. In this situation, we should be contacted to provide more detailed recommendations and to review final jointing plans and details for the project. The following general recommendations are presented for doweled PCC pavements:

Item	Description
Contraction Joints	■ Joints should be reinforced with dowels in accordance with ACI 330.2R-17[1]. ■ Alternate joint reinforcement devices such as plate dowels will be considered if the device manufacturers recommendations showing they are equivalent to the dowel bar size and spacing presented in the concrete pavement section table above is submitted and approved by the engineer. ■ Joint cuts should be 1/5 of the depth of the concrete and should be cut as soon as the slab can support the weight of a man and the saw can be cut without dislodging coarse aggregate particles from the surface. ■ Joints should have a maximum spacing no greater than 15 feet, as described in ACI 330.2R-17
Expansion (Isolation) Joints	■ Expansion joints are recommended to isolate fixed objects abutting or within the paved area, such as around light poles and drainage inlet structures. ■ Joints should be full depth and filled with pre-molded materials per ACI 330.2R-17. ■ Pavement edges at expansion joints located in areas that encounter wheel loads should be thickened by two inches wherever practical; the transition in thickness should occur over a minimum distance of five feet.
Construction Joints	■ Joints dowels should be provided at the same size and spacing as required for Contraction Joints as noted above. ■ For a butt end construction joint, an adequate number of ½ inch diameter (#4 bar) deformed steel tie bars, 30 inches in length and spaced no greater than 36 inches apart, are also recommended to tie the exterior curb and gutter to the outer concrete pavement edge to keep the outside slab from separating from the curb and gutter.

Item	Description
[1] *Guide for the Design and Construction of Concrete Site Paving for Industrial and Trucking Facilities, American Concrete Institute, ACI 330.2R-17.*	

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

1. Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
2. Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
3. Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
4. Install joint sealant and seal cracks immediately.
5. Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
6. Place compacted, low permeability backfill against the exterior side of curb and gutter.
7. Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

Unpaved Access Road

We understand that an unpaved access road will be constructed extending to the high-rise sign. Traffic on the access road will include the drilled shaft rig and concrete trucks during construction of the sign foundation and truck-mounted cranes used to erect and maintain the sign. Based on the relative strength characteristics of the subgrade soils and expected traffic loading, we recommend construction traffic bear on a minimum of 10 inches of scarified, moisture conditioned, and recompacted native soils.

The recommendation was developed to support the construction and maintenance traffic as it travels along the access road. Terracon's current scope of services does not include analysis for construction of a pad suitable to support the crane as it lifts a load. To analyze the required aggregate thickness for a crane pad, the contractor should provide specific information about the crane model, counterweight, outrigger positions and sizes, boom/jib configurations, weight of the maximum planned lift, load radius, and swing angle.

STORMWATER MANAGEMENT

Five in-situ percolation tests were performed at approximate depths of 5 to 15 feet bgs. A 2-inch thick layer of 3/8 inch gravel was placed in the bottom of each boring after the borings were drilled to investigate the soil profile. A 3-inch diameter perforated pipe was installed on top of the gravel layer in each boring. Gravel was used to backfill between the perforated pipes and the boring sidewall. The borings were then filled with water for a pre-soak period. Testing began after a pre-soak period. At the beginning of the test, the pipes were refilled with water and readings were taken at standardized time intervals. Percolation rates are provided in the following table:

Test Location	Test Depth (ft.) [1]	Soil Type	Percolation Rate Average (in./hr.) [2]	Infiltration Rate Average (in./hr.) [3]
B-11	5	SM	94.0	6.68
B-12	5	SM	50.8	3.37
B-13	5	SM	65.8	3.98
B-14	10	SM	122.6	3.89
B-15	5	SM	59.4	3.01

1. Below existing ground surface.
2. Our percolation tests were performed generally following the well permeater test method described in the "Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration", San Bernardino County Department of Public Works, 2017.
3. If proposed infiltration system will mainly rely on vertical downward seepage, the correlated infiltration rates should be used.

The above infiltration rates determined by the shallow percolation test method are based on field test results utilizing clear water. Infiltration rates can be affected by silt buildup, debris, degree of soil saturation, site variability and other factors. The rate obtained at specific location and depth is representative of the location and depth tested and may not be representative of the entire site. Application of an appropriate safety factor is prudent to account for subsoil inconsistencies, possible compaction related to site grading, and potential silting of the percolating soils, depending on the application.

The design engineer should also check with the local agency for the limitation of the infiltration rate allowed in the design. If the maximum allowable design infiltration rate is lower than the above recommended rate, the maximum allowable design infiltration rate should be used. The designer of the basins should also consider other possible site variability in the design.

Based on the soils encountered in our borings, we expect the percolation rates of the soils could be different than measured in the field due to variations in fines and gravel content. The design elevation and size of the proposed infiltration system should account for this expected variability in infiltration rates.

Infiltration testing should be performed after construction of the infiltration system to verify the design infiltration rates. It should be noted that siltation and vegetation growth along with other factors may affect the infiltration rates of the infiltration areas. The actual infiltration rate may vary from the values reported here. Infiltration systems should be located at least 10 feet from any existing or proposed foundation system.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Terracon conducted a total of fourteen (14) borings as tabulated in the table below.

Boring No.	Boring Depth (feet) [1]	Planned Location
B-1	21½	Underground Storage Tank area
B-2	21	Automobile Fuel Canopy
B-3	31½	Truck Fuel Canopy
B-4	51	Country Store
B-5	51½	High-Rise Sign
B-6 & B-7	31½	Aboveground Storage Tanks
B-10	21½	Truck Scale
B-11 through B-15	5 to 10	Retention Basins
B-16 through B-25	10 to 11½	Parking Areas
B-30, B-31, B-32, B-33,	6½ to 11½	Caltrans Ave. and Baker Blvd.

1. Below ground surface
2. Numbers B-8 and B-9 were not used. Borings B-26 through B-29, B-34, and B-35 were drilled as part of the Work Live project, north of this site.

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet). If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted rotary drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring lined sampler was also used for sampling. Ring-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Electrical Resisitivity Testing: A field electrical resistivity (ER) survey was performed at the Tank Pad location using the Wenner Array (4-pin) method per ASTM G57 and a digital ground resistance tester. The area of investigation included two shallow resistivity lines which were located approximately perpendicular to each other in north-south and east-west configurations. The resistivity probe arrays had spacing of 1, 2, 4, 6, 10, 15, 20, 40, 50, 60, 80, 100 and 150 feet. Results are shown in the following table and presented with a visual representation of the array locations and directions in Exploration Results section. The results of the electrical resistivity survey are shown in the following table. These readings measured on existing soil conditions and elevations; subsequent to site grading the area may have different elevations.

Electrode Spacing (ft)	Line 1 (N-S) Apparent Resistivity (ohm-m)	Line 2 (E-W) Apparent Resistivity (ohm-m)
1	111	132
2	91	68
4	83	41
6	59	35
10	77	21
15	80	29
20	45	35
40	57	85

50	31	68
60	15	59
80	118	46
100	79	71
150	29	60

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D7263 Standard Test Methods for Laboratory Determination of Dry Density (Unit Weight) of Soil Specimens
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D1140 Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
- ASTM D4546 Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort
- Corrosivity Testing will include pH, chlorides, sulfates, sulfides, Redox potential, and electrical lab resistivity

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

SITE LOCATION

Love's Travel Stop – Baker ■ Baker, San Bernardino County, California
October 29, 2021 ■ Terracon Project No. CB215111

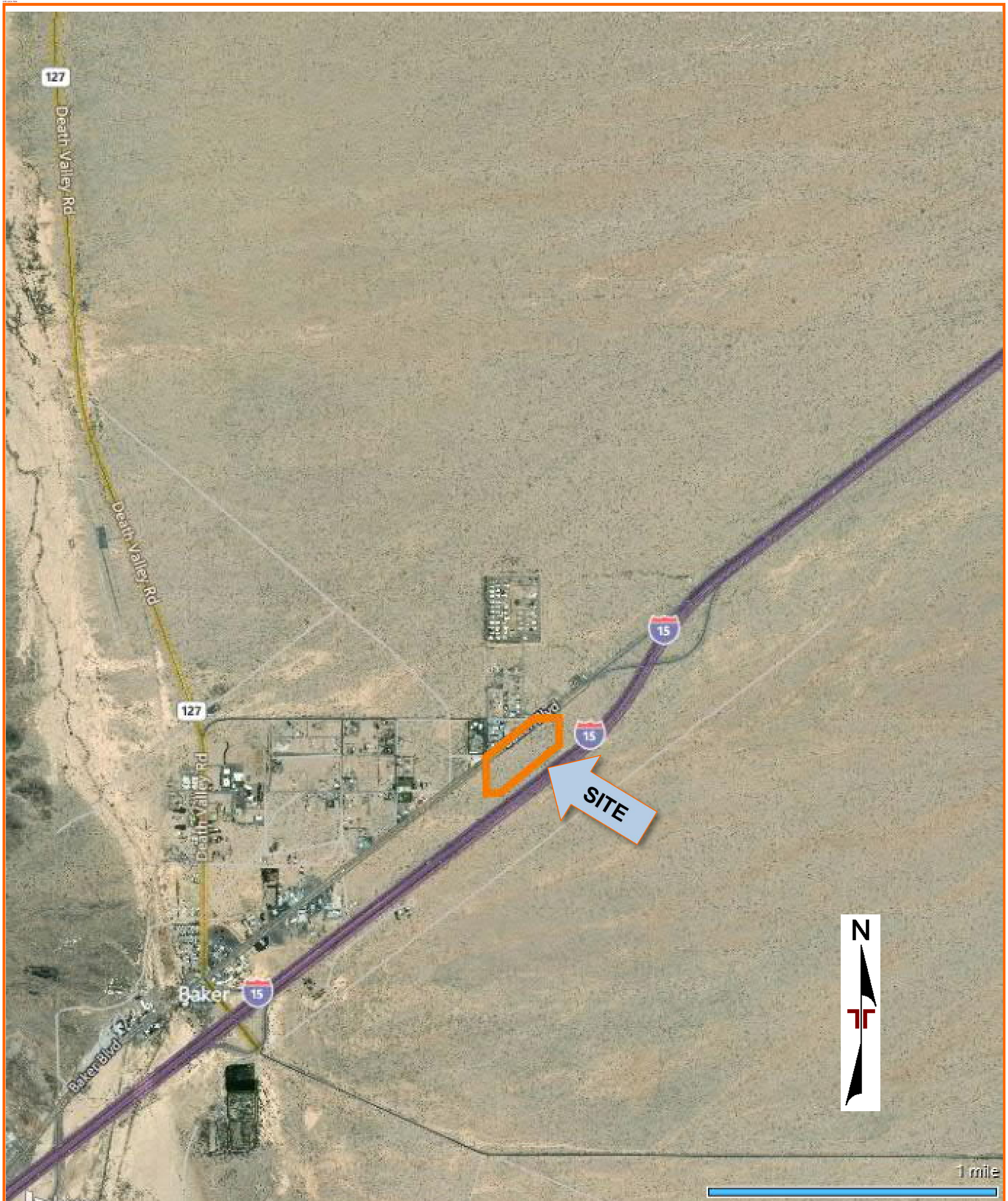


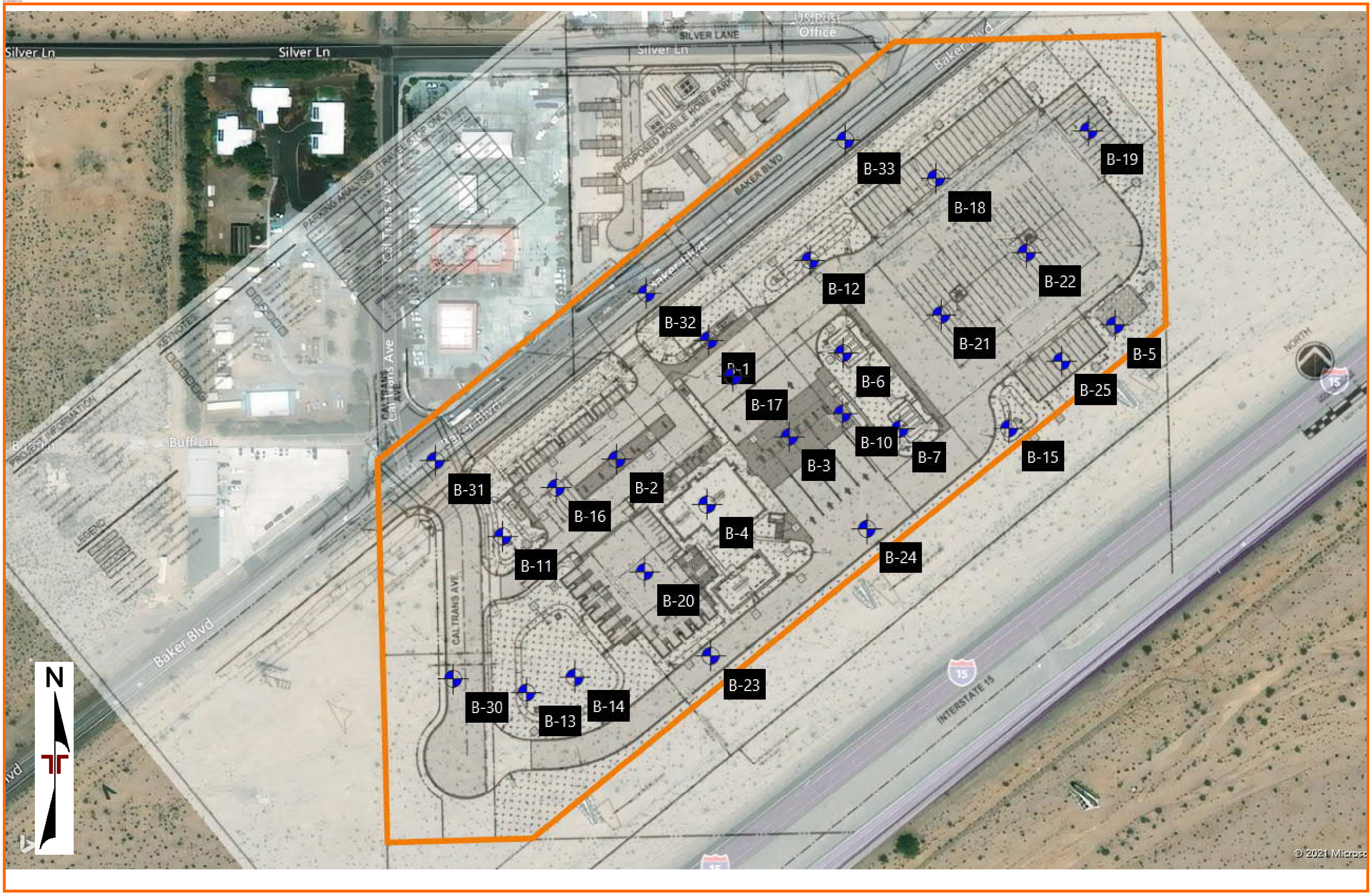
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

Love's Travel Stop – Baker ■ Baker, San Bernardino County, California

October 29, 2021 ■ Terracon Project No. CB215111



EXPLORATION RESULTS

BORING LOG NO. B-1

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2770° Longitude: -116.0559°

GRAPHIC LOG / DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SANDY SILT (ML), light brown, very stiff							
					8-13-19	0.5	105	59
4.5								
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense	5						
					15-21-27	0.6		11
					21-25-25	0.3		11
		10						
					21-25-25	0.2	110	9
13.0								
	SILTY SAND (SM), fine to medium grained, light brown, very dense							
		15			30-50/6"			15
		20						
					21-29-50/6"			14
21.5								
	Boring Terminated at 21.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-2

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2765° Longitude: -116.0564°

GRAPHIC LOG / DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
		5			13-25-32	0.0		
		10			17-27-29	0.3		
	trace gravel							
	dense	15			15-20-21 N=41			
21.0	very dense	20			31-50/6"			
	Boring Terminated at 21 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-3

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0554°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
					13-20-20	0.4		
		5						
	dense				23-30-31	0.5		
		10						
	trace gravel							
		15			25-21-23 N=44			
18.0	**SILTY SAND (SM)**, fine to medium grained, brown to light brown, very dense							
		20			30-50/6"			
		25			50/6"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-3

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0554°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, brown to light brown, very dense *(continued)*							
	dense	30		X	18-21-19 N=40			
	31.5							
	Boring Terminated at 31.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-4

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2762° Longitude: -116.0559°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense							
		5			15-17-25	1.5	115	13
	fine to medium grained, brown, dense	10			23-35-36			
	very dense	15			28-50/6"			14
	trace gravel, light brown	20			39-50/6"			16
		25			18-20-30 N=50			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-4

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2762° Longitude: -116.0559°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense *(continued)*							
	dense	30		X	18-19-22 N=41			20
	very dense	35		X	50/6"			18
	dense	40		X	21-23-24 N=47			12
	very dense	45		X	22-25-27 N=52			27
	51.0	50		X	38-50/6"			
	Boring Terminated at 51 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-5

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2771° Longitude: -116.0536°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
		5			17-17-23	0.8		9
8.0	**SILTY SAND (SM)**, fine to medium grained, brown, medium dense							
		10			21-23-31	1.5	111	16
	very dense	15			23-50/6"			13
	trace gravel, light brown							
		20			50/6"			12
		25			15-29-39 N=68			16

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-5

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2771° Longitude: -116.0536°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, brown, medium dense *(continued)*							
		30		X	15-16-30 N=46			15
	fine grained	35		X	29-28-50/6"			14
		40		X	30-50/6"			26
	medium to coarse grained	45		X	21-25-38 N=63			16
51.5		50		X	19-39-50/6"			23
	Boring Terminated at 51.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-6

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2769° Longitude: -116.0551°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine grained, brown, medium dense							
		5			5-9-10	0.3		
	medium to coarse grained, light brown	10			19-21-29	0.3		
	very dense	15			50/6"			
		20			28-27-29 N=56			
		25			38-40-50/6"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-6

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2769° Longitude: -116.0551°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine grained, brown, medium dense *(continued)*							
	dense	30		X	17-19-21 N=40			
	31.5							
	Boring Terminated at 31.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-7

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0548°

DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
SILTY SAND (SP), trace gravel, fine to medium grained, light brown, medium dense							
	3			12-12-13	0.2		12
	8			13-20-21	0.2	106	14
trace gravel							
very dense	15			18-27-29 N=56			12
18.0							
POORLY GRADED SAND WITH SILT (SP-SM), fine grained, light brown, very dense							
	20			21-28-39 N=67			11
dense	25			10-20-20 N=40			11

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-7

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0548°

GRAPHIC LOG	DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	28.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, fine grained, light brown, very dense *(continued)*							
	31.5	**SILTY SAND (SM)**, fine grained, light brown, dense	30			13-21-27 N=48			12
		Boring Terminated at 31.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-10

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2767° Longitude: -116.0551°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense							
		5			13-22-27	0.2		
	trace gravel, dense	10			20-27-31	0.2		
	very dense	15			25-50/6"			
	21.5	20			33-40-40 N=80			
	Boring Terminated at 21.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-11

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2761° Longitude: -116.0571° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine to medium grained, brown							12
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-12

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2774° Longitude: -116.0553° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, light brown							
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-13

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2754° Longitude: -116.0569°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown							13
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-14

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2754° Longitude: -116.0567° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown	5						15
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CB215111 LOVE'S TRAVEL STO.GPJ TERRACON_DATATEMPLATE.GDT 10/26/21

BORING LOG NO. B-15

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0542°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown							12
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-16

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2763° Longitude: -116.0568°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown							14
	5.0	5			13-20-25	0.6	112	7
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
		10			18-21-28	1.0	102	
	11.5							
	Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-17

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2768° Longitude: -116.0558°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine to medium grained, light brown, very dense							
					18-50/6"	0.5	113	8
		5						
					50/6"	0.7		
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-18

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2778° Longitude: -116.0546°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
		5			13-25-31	0.6		10
	dense	10			28-33-48	0.7	109	
	11.5							
	Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-19

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2780° Longitude: -116.0537° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine grained, brown, medium dense							
					18-19-20	0.4	111	8
		5						
					20-18-22	0.4	115	
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-20

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2759° Longitude: -116.0563°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, very dense							
		5			19-27-50/6"	0.6	114	7
	11.0	10			39-50/6"	0.6	120	
	Boring Terminated at 11 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-21

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2771° Longitude: -116.0546°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine grained, brown, medium dense							
				X	13-13-14	0.7		
5.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, medium to coarse grained, light brown, medium dense	5						
				X	23-25-26	0.5		
10.0	***Boring Terminated at 10 Feet***	10						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-22

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2774° Longitude: -116.0541°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown							14
5.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, medium to coarse grained, light brown, medium dense	5			20-25-28	0.8	105	9
		10			22-28-30	0.9	112	
11.5	***Boring Terminated at 11.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-23

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2755° Longitude: -116.0559° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
					15-20-22	0.6	115	
		5						
	dense				30-32-34	0.7		
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-24

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2761° Longitude: -116.0550° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), medium to coarse grained, light brown, loose							12
		5			7-8-10	0.1	114	
	medium dense	10			15-21-27	0.6		
	11.5							
	Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-25

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2769° Longitude: -116.0539°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine to medium grained, light brown, medium dense							
				X	21-27-30	0.2		
		5						
				X	27-28-29	0.6		
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-30

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2754° Longitude: -116.0574°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense							
		5			15-18-20	0.3	102	12
		10			23-28-28	0.5		
	11.5							
	Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-31

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2764° Longitude: -116.0575°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
0.7	**ASPHALT**, 8"							
1.3	**AGGREGATE BASE COURSE**, 8"							
6.5	**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, fine to medium grained, light brown, medium dense	5			11-15-28	2.9	113	

Boring Terminated at 6.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021 | Boring Completed: 09-23-2021

Drill Rig: CME 75 | Driller: 2R

Project No.: CB215111

BORING LOG NO. B-32

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2772° Longitude: -116.0563°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
0.8	**ASPHALT**, 9"							
1.4	**AGGREGATE BASE COURSE**, 8"							
	WELL GRADED SAND WITH SILT (SW-SM), medium to coarse grained, light brown, medium dense							11
					14-16-29	3.2	117	13
		5						
6.5								
	Boring Terminated at 6.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-33

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2779° Longitude: -116.0551°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
0.8	**ASPHALT**, 9"							
1.6	**AGGREGATE BASE COURSE**, 10"							
6.5	**POORLY GRADED SAND WITH SILT (SP-SM)**, medium to coarse grained, light brown, medium dense	5			14-16-14	3.0	112	
	Boring Terminated at 6.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

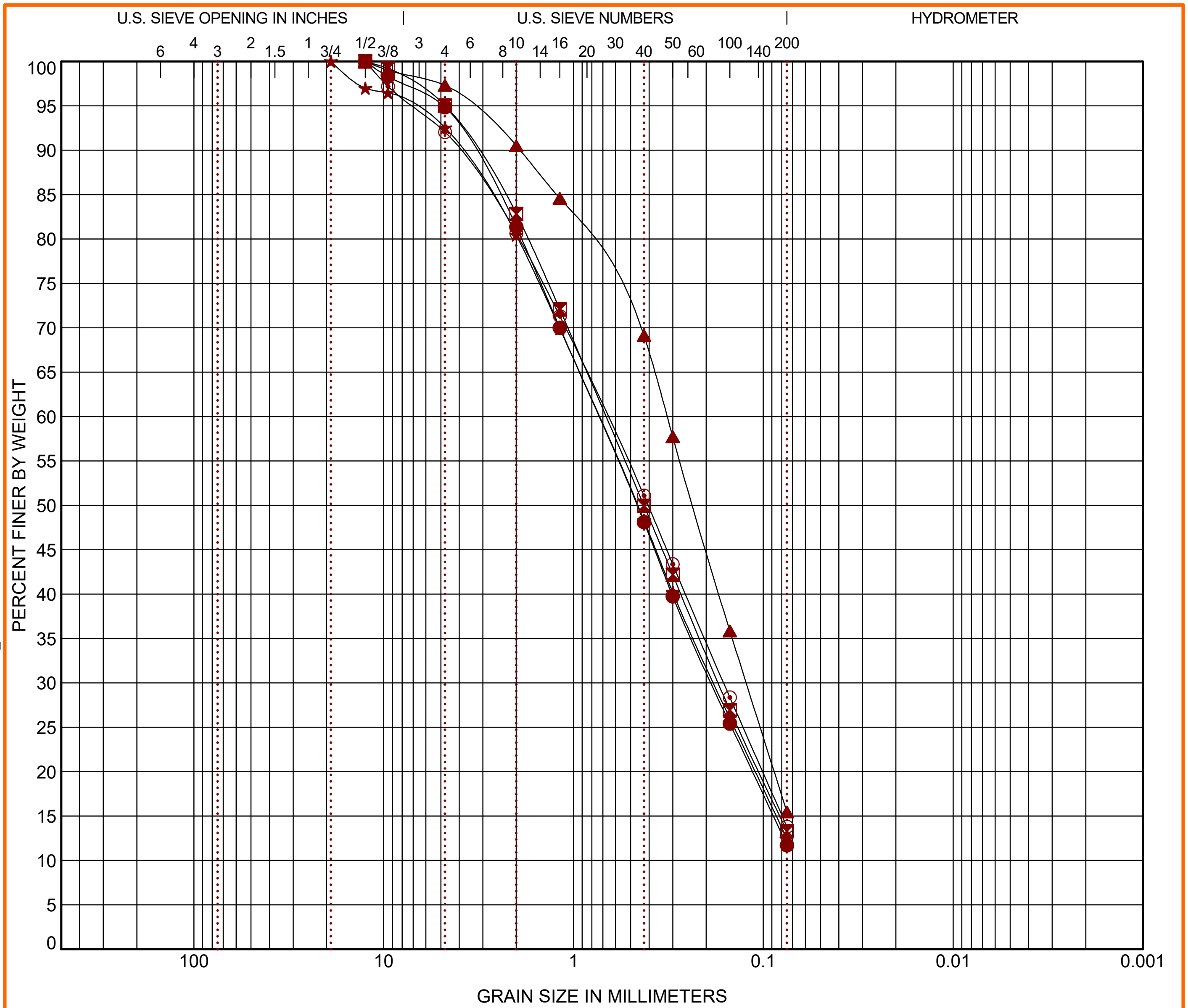
WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-11	0 - 5	POORLY GRADED SAND with SILT (SP-SM)		NP	NP	NP	0.69	10.76
⊠	B-13	0 - 5	SILTY SAND (SM)		NP	NP	NP		
▲	B-14	5 - 10	SILTY SAND (SM)		NP	NP	NP		
★	B-15	0 - 5	SILTY SAND (SM)		NP	NP	NP	0.68	11.17
⊙	B-16	0 - 5	SILTY SAND (SM)		NP	NP	NP		

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-11	0 - 5	12.5	0.74	0.187		0.0	5.1	83.1		11.7	
⊠	B-13	0 - 5	12.5	0.676	0.172		0.0	5.0	81.7		13.3	
▲	B-14	5 - 10	12.5	0.322	0.123		0.0	2.7	81.8		15.5	
★	B-15	0 - 5	19	0.739	0.182		0.0	7.5	80.1		12.4	
⊙	B-16	0 - 5	12.5	0.667	0.162		0.0	8.0	78.2		13.8	

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

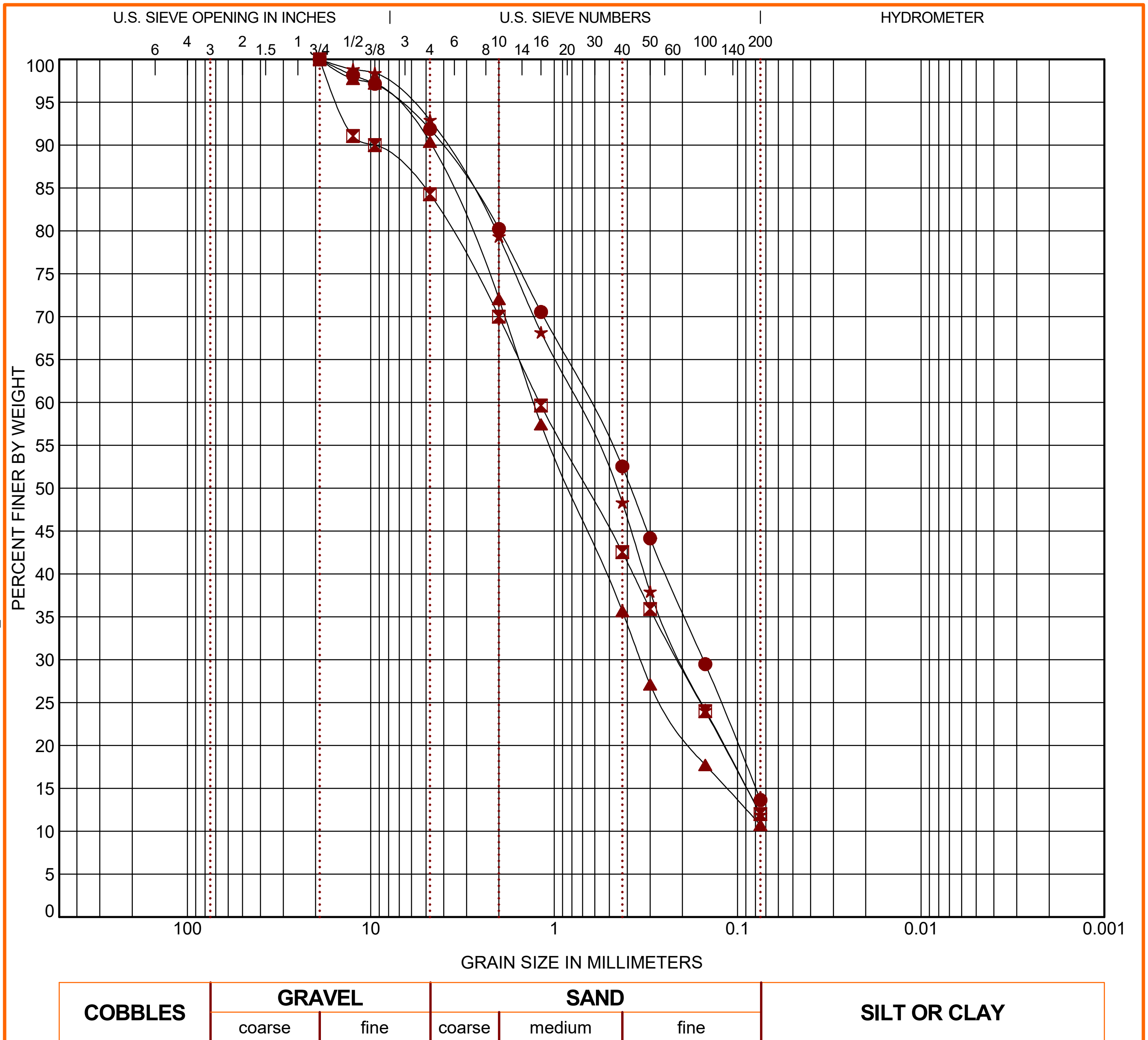
PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 CB215111 LOVE'S TRAVEL STO.GPJ TERRACON_DATATEMPLATE.GDT 10/26/21

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-22	0 - 5	SILTY SAND (SM)		NP	NP	NP		
⊠	B-24	0 - 5	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)		NP	NP	NP	0.56	17.98
▲	B-32	0 - 5	WELL-GRADED SAND with SILT (SW-SM)		NP	NP	NP	1.26	18.51
★	B-35	0 - 5	POORLY GRADED SAND with SILT (SP-SM)		NP	NP	NP	0.78	11.53

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-22	0 - 5	19	0.649	0.154		0.0	8.1	78.2		13.6	
⊠	B-24	0 - 5	19	1.202	0.213		0.0	15.7	72.3		12.0	
▲	B-32	0 - 5	19	1.294	0.337		0.0	9.6	79.7		10.7	
★	B-35	0 - 5	19	0.775	0.201		0.0	7.1	81.0		11.9	

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

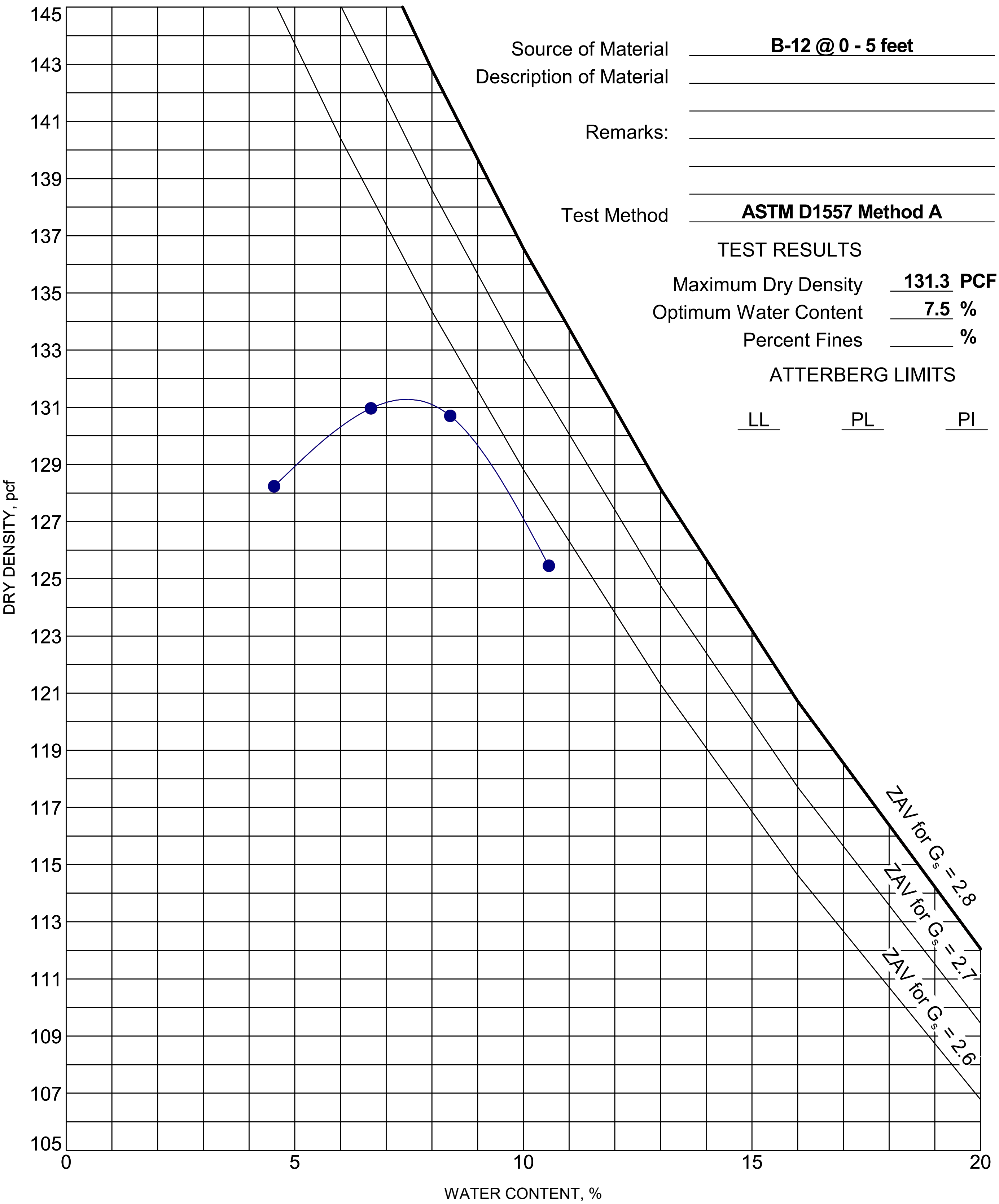
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **B-12 @ 0 - 5 feet**

Description of Material

Remarks:

Test Method **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density **131.3 PCF**

Optimum Water Content **7.5 %**

Percent Fines **%**

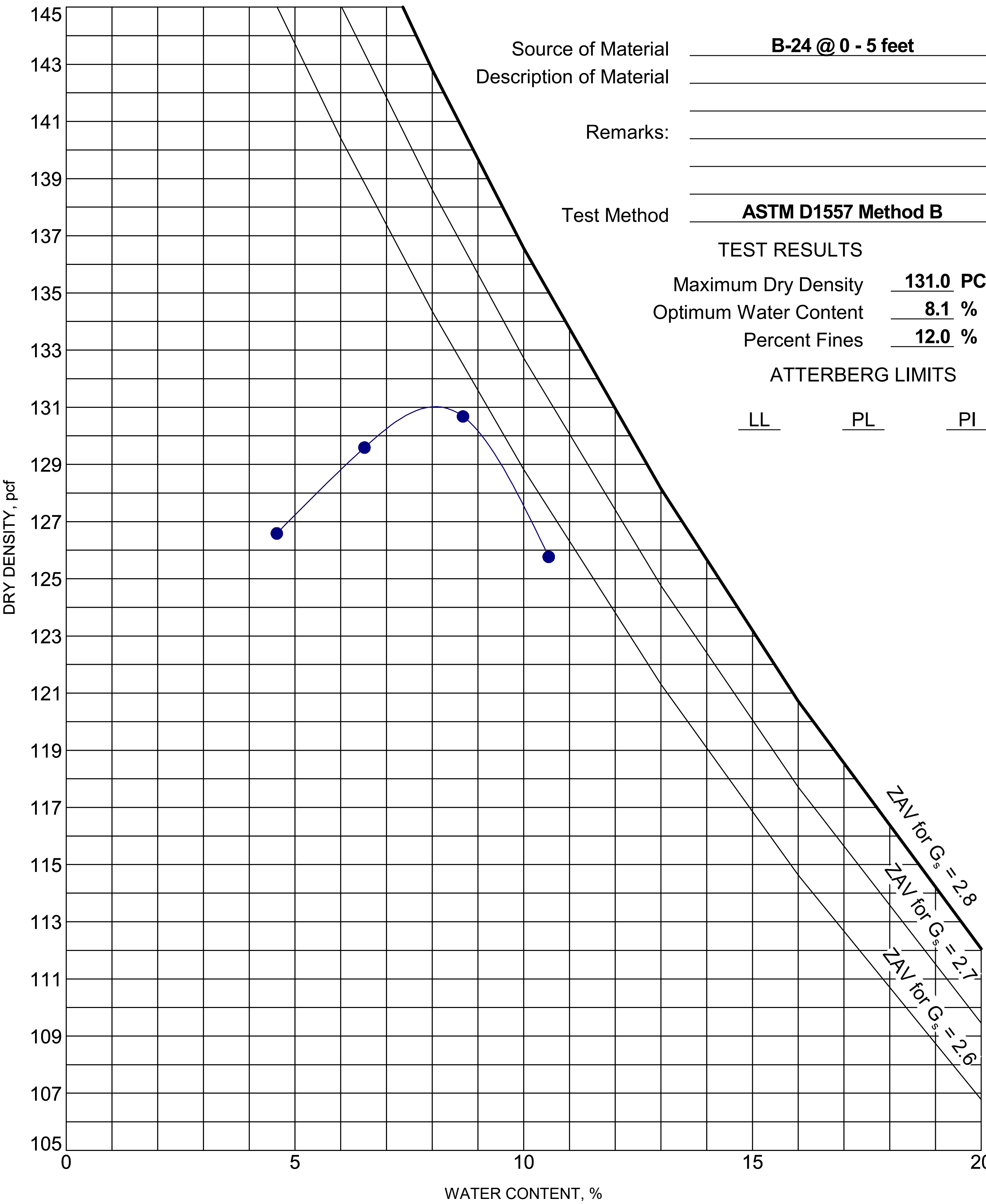
ATTERBERG LIMITS

LL	PL	PI

PROJECT: Love's Travel Stop Baker - CA - GEO	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215111
SITE: Baker Boulevard Baker, CA		CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-24 @ 0 - 5 feet**

Description of Material:

Remarks:

Test Method: **ASTM D1557 Method B**

TEST RESULTS

Maximum Dry Density	131.0	PCF
Optimum Water Content	8.1	%
Percent Fines	12.0	%

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

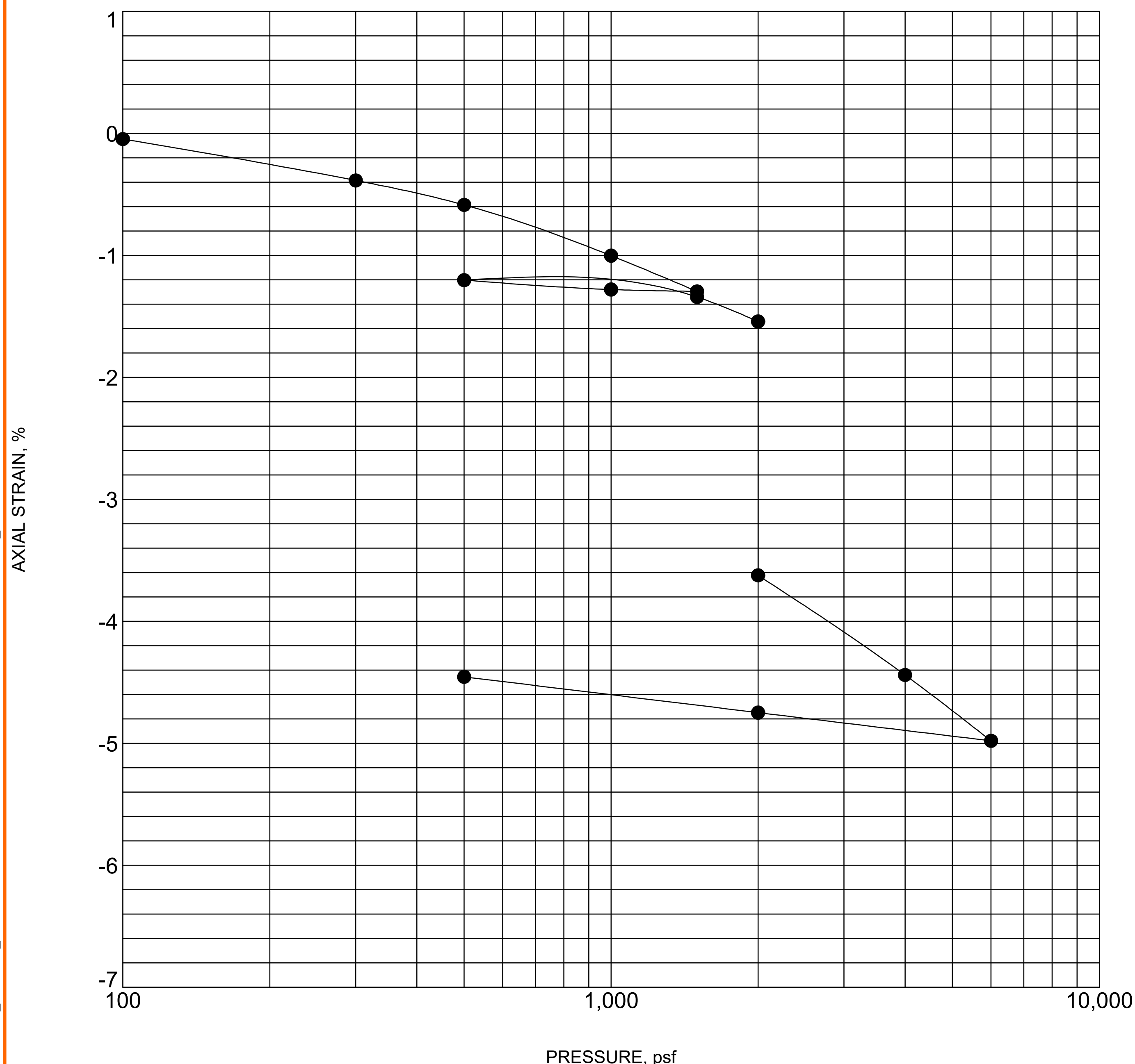
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SWELL CONSOLIDATION TEST

ASTM D2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-1 10 - 11.5 ft		109	0.9

NOTES:

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

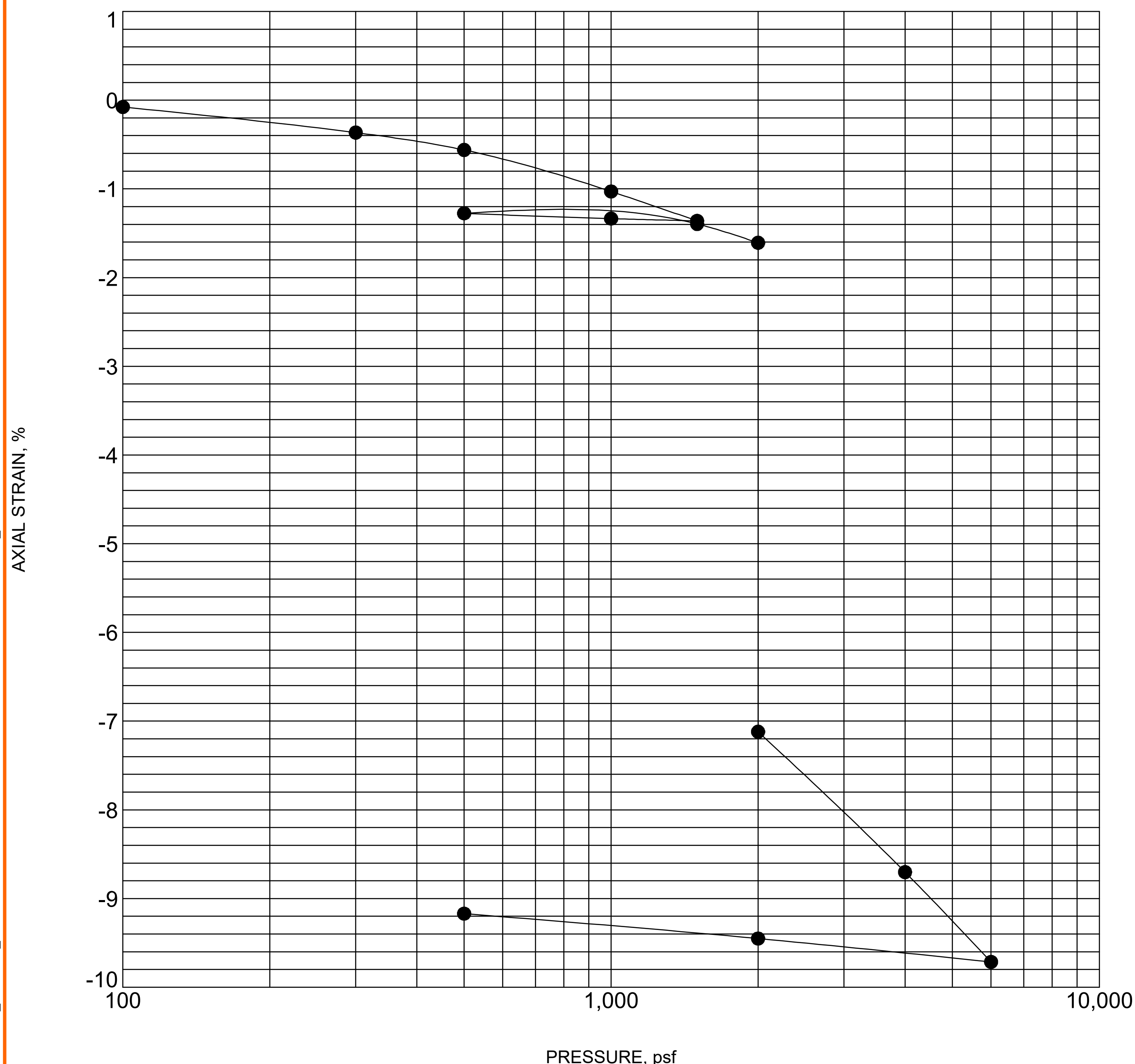
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SWELL CONSOLIDATION TEST

ASTM D2435

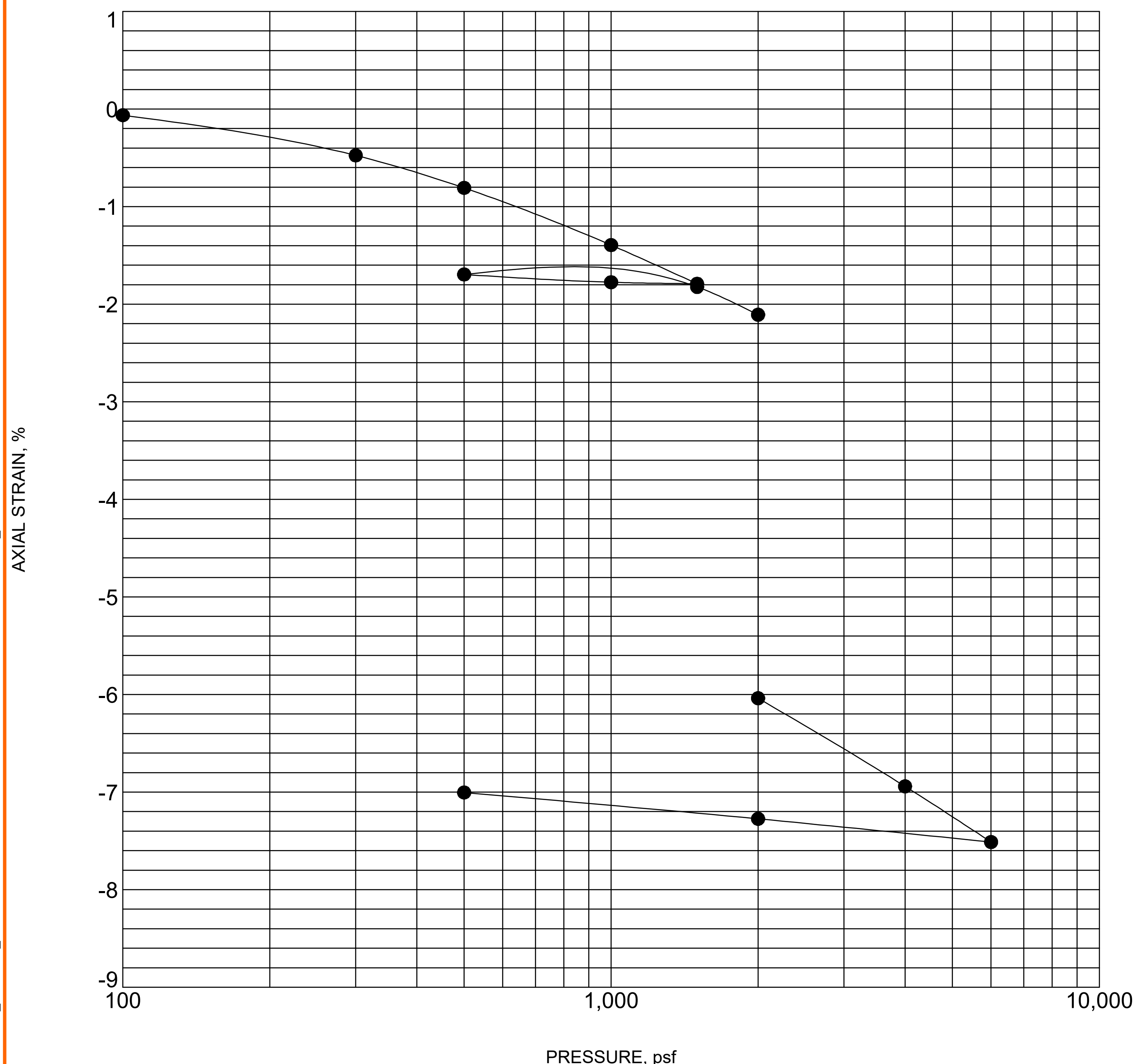


Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-5 10 - 11.5 ft		99	2.1

NOTES:

PROJECT: Love's Travel Stop Baker - CA - GEO	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215111
SITE: Baker Boulevard Baker, CA		CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SWELL CONSOLIDATION TEST
ASTM D4546



Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-7 7.5 - 9 ft		99	1.2

NOTES:

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

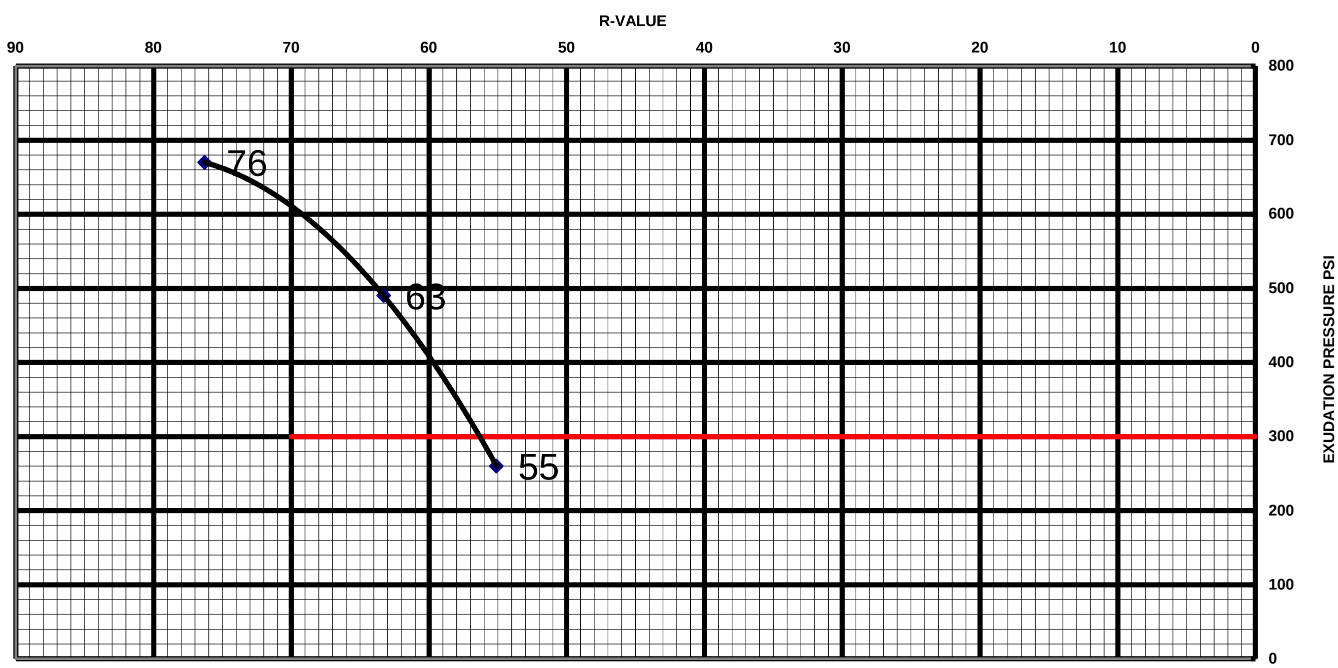
Job No. CB215111
Date. 10/13/2021

LABORATORY RECORD OF TESTS MADE ON
BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: **Love's Travel Stop & Country Stores, Inc**
PROJECT **Love's Travel Stop, Baker CA**
LOCATION: **0-5'**
R-VALUE # : **B-22**
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	0.4	0.4	0.4	
WATER ADDED, ML	90	85	80	
WATER ADDED %	7.9	7.4	6.9	
MOISTURE AT COMPACTION %	8.3	7.8	7.3	
HEIGHT OF BRIQUETTE	2.46	2.47	2.50	
WET WEIGHT OF BRIQUETTE	1145	1146	1157	
DENSITY LB. PER CU.FT.	130.2	130.4	130.6	
STABILOMETER PH AT 1000 LBS.	28	22	16	
2000 LBS.	47	39	25	
DISPLACEMENT	4.90	4.50	4.20	
R-VALUE	55	63	76	
EXUDATION PRESSURE	260	490	670	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	0	0	0	
THICK. INDICATED BY E.P.	0.00	0.00	0.00	

EXUDATION CHART



R-Value: **56**

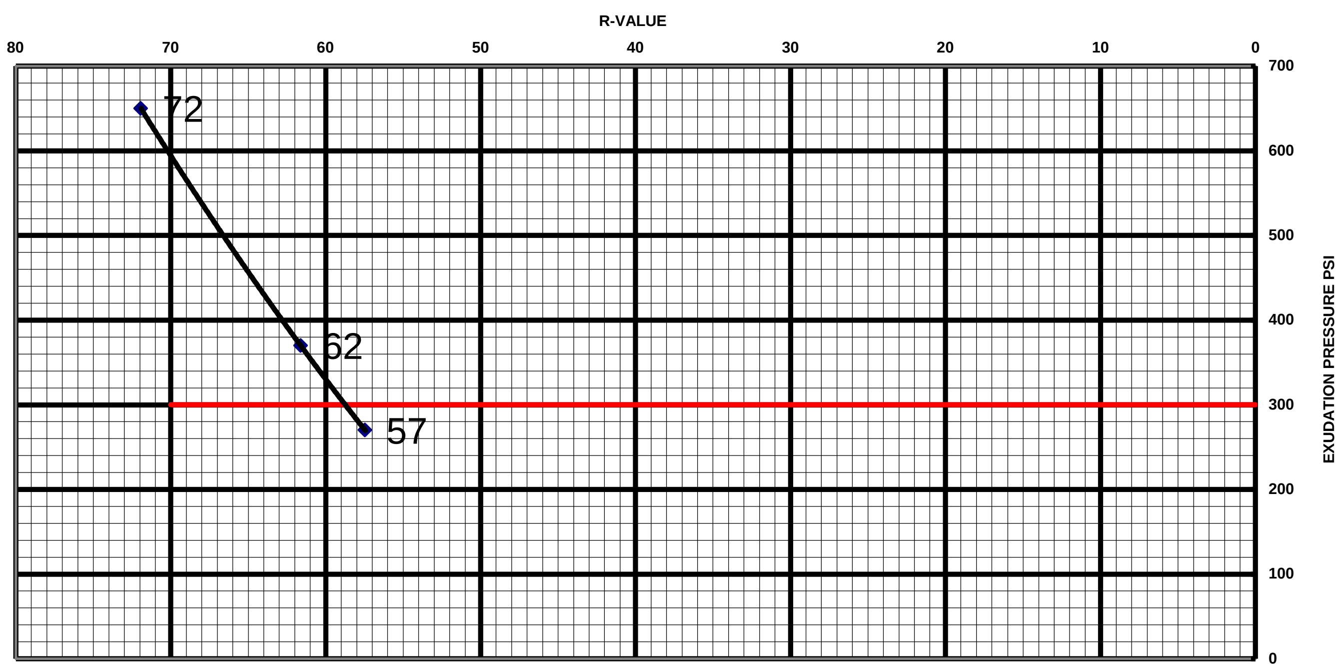
Job No. CB215111
Date. 10/13/2021

LABORATORY RECORD OF TESTS MADE ON BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: Love's Travel Stop & Country Stores, Inc
PROJECT Love's Travel Stop, Baker CA
LOCATION: 0-5'
R-VALUE # : B-32
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	4.2	4.2	4.2	
WATER ADDED, ML	45	40	30	
WATER ADDED %	3.9	3.6	2.7	
MOISTURE AT COMPACTION %	8.1	7.8	6.9	
HEIGHT OF BRIQUETTE	2.52	2.46	2.47	
WET WEIGHT OF BRIQUETTE	1192	1164	1167	
DENSITY LB. PER CU.FT.	132.5	133.0	133.9	
STABILOMETER PH AT 1000 LBS.	25	23	16	
2000 LBS.	42	38	28	
DISPLACEMENT	5.20	5.00	4.60	
R-VALUE	57	62	72	
EXUDATION PRESSURE	270	370	650	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	0	0	0	
THICK. INDICATED BY E.P.	0.00	0.00	0.00	

EXUDATION CHART



R-Value: **58**

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Terracon GeoReport

Client
Love's Travel Stops & Country Stores Inc

Project
Love's Travel Stop
Baker-CA-GEO

Sample Submitted By: Terracon (CB) **Date Received:** 10/7/2021 **Lab No.: 21-0747**

Results of Corrosion Analysis

Sample Number	11-A	15-A
Sample Location	B-11	B-15
Sample Depth (ft.)	0.0-5.0	0.0-5.0
pH Analysis, ASTM G 51	9.20	8.84
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	228	88
Chlorides, ASTM D 512, (mg/kg)	73	158
Total Salts, AWWA 2540, (mg/kg)	381	1478
As-Received Resistivity, ASTM G 57, (ohm-cm)	22310	>1,000,000
Saturated Minimum Resistivity, ASTM G 57, (ohm-cm)	6887	1067

Analyzed By: N. Campo

Nathan Campo
Engineering Technician II

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-11
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING: September 21, 2021
DATE OF PRESOAK: September 21, 2021
DATE OF TEST: September 21, 2021
TESTED BY: RL

DEPTH BEFORE (ft.): 5.0
DEPTH AFTER (ft.): 5.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
120	120	4.0	60.0	56.0	60.0	60.0	28.0	1.87
10	130	4.0	21.0	17.0	60.0	60.0	102.0	4.12
10	140	21.0	37.0	16.0	60.0	60.0	96.0	5.82
10	150	37.0	50.1	13.1	60.0	60.0	78.6	8.52
10	160	6.0	24.3	18.3	60.0	60.0	109.8	4.69
10	170	24.3	39.6	15.3	60.0	60.0	91.8	6.11
10	180	39.6	52.3	12.7	60.0	60.0	76.2	9.50
10	190	4.0	22.7	18.7	60.0	60.0	112.2	4.61
10	200	22.7	38.3	15.6	60.0	60.0	93.6	5.94
				Average of last 3 readings:			94.00	6.68

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-12
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING:	September 22, 2021	DEPTH BEFORE (ft.):	5.0
DATE OF PRESOAK:	September 22, 2021	DEPTH AFTER (ft.):	5.0
DATE OF TEST:	September 22, 2021	PVC PIPE DIA. (in.):	3.0
TESTED BY:	JP	PERC HOLE DIA. (in.):	8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	2.0	60.0	58.0	60.0	60.0	2.4	0.16
10	1450	4.0	17.3	13.3	60.0	60.0	79.8	3.11
10	1460	17.3	28.0	10.7	60.0	60.0	64.2	3.26
10	1470	28.0	36.3	8.3	60.0	60.0	49.8	3.34
10	1480	36.3	42.3	6.0	60.0	60.0	36.0	3.17
10	1490	4.0	17.6	13.6	60.0	60.0	81.6	3.19
10	1500	17.6	28.4	10.8	60.0	60.0	64.8	3.32
10	1510	28.4	37.0	8.6	60.0	60.0	51.6	3.52
10	1520	37.0	43.0	6.0	60.0	60.0	36.0	3.27
				Average of last 3 readings:			50.80	3.37

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-13
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING:	September 22, 2021	DEPTH BEFORE (ft.):	5.0
DATE OF PRESOAK:	September 22, 2021	DEPTH AFTER (ft.):	5.0
DATE OF TEST:	September 22, 2021	PVC PIPE DIA. (in.):	3.0
TESTED BY:	JP	PERC HOLE DIA. (in.):	8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	0.0	60.0	60.0	60.0	60.0	2.5	0.16
10	1450	2.0	19.0	17.0	60.0	60.0	102.0	3.96
10	1460	19.0	31.4	12.4	60.0	60.0	74.4	4.04
10	1470	31.4	39.9	8.5	60.0	60.0	51.0	3.87
10	1480	4.0	20.4	16.4	60.0	60.0	98.4	3.95
10	1490	20.4	32.2	11.8	60.0	60.0	70.8	3.97
10	1500	32.2	40.7	8.5	60.0	60.0	51.0	3.99
10	1510	12.0	26.4	14.4	60.0	60.0	86.4	4.04
10	1520	26.4	36.4	10.0	60.0	60.0	60.0	3.92
				Average of last 3 readings:			65.80	3.98

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-14
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING:	September 21, 2021	DEPTH BEFORE (ft.):	10.0
DATE OF PRESOAK:	September 21, 2021	DEPTH AFTER (ft.):	10.0
DATE OF TEST:	September 21, 2021	PVC PIPE DIA. (in.):	3.0
TESTED BY:	JP	PERC HOLE DIA. (in.):	8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	0.0	120.0	120.0	120.0	120.0	5.0	0.16
10	1450	15.5	45.0	29.5	120.0	120.0	177.0	3.86
10	1460	45.0	66.3	21.3	120.0	120.0	127.8	3.85
10	1470	66.3	82.1	15.8	120.0	120.0	94.8	3.97
10	1480	82.1	93.4	11.3	120.0	120.0	67.8	3.96
10	1490	93.4	101.4	8.0	120.0	120.0	48.0	3.90
10	1500	24.0	51.3	27.3	120.0	120.0	163.8	3.88
10	1510	51.3	70.8	19.5	120.0	120.0	117.0	3.84
10	1520	70.8	85.3	14.5	120.0	120.0	87.0	3.96
				Average of last 3 readings:			122.60	3.89

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-15
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING: September 23, 2021
DATE OF PRESOAK: September 23, 2021
DATE OF TEST: September 23, 2021
TESTED BY: JP

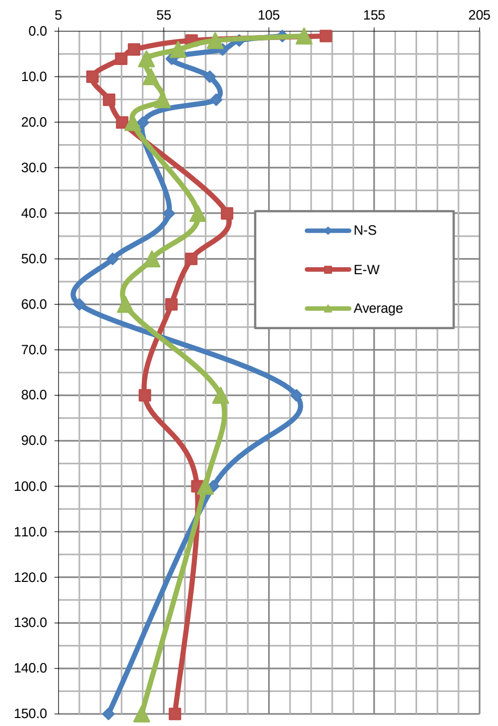
DEPTH BEFORE (ft.): 5.0
DEPTH AFTER (ft.): 5.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	2.0	60.0	58.0	60.0	60.0	2.4	0.16
10	1450	2.0	15.3	13.3	60.0	60.0	79.8	2.99
10	1460	15.3	25.5	10.2	60.0	60.0	61.2	2.94
10	1470	25.5	33.6	8.1	60.0	60.0	48.6	3.00
10	1480	33.6	40.0	6.4	60.0	60.0	38.4	3.05
10	1490	40.0	44.9	4.9	60.0	60.0	29.4	3.01
10	1500	6.0	18.6	12.6	60.0	60.0	75.6	3.04
10	1510	18.6	28.3	9.7	60.0	60.0	58.2	3.02
10	1520	28.3	35.7	7.4	60.0	60.0	44.4	2.96
				Average of last 3 readings:			59.40	3.01

	ARRAY	PARAMETER	SPACING (feet)												
			1.0	**2.0**	**4.0**	**6.0**	**10.0**	**15.0**	**20.0**	**40.0**	**50.0**	**60.0**	**80.0**	**100.0**	**150.0**
35.2767°N 116.0560°W	N-S	Measured resistance (Ω)	58.1	23.7	10.82	5.11	4.01	2.78	1.18	0.75	0.32	0.13	0.77	0.41	0.1
		Calculated resistivity (Ω-m)	111	91	83	59	77	80	45	57	31	15	118	79	29
		Average resistivity (Ω-m)	**122**	**79**	**62**	**47**	**49**	**54**	**40**	**71**	**49**	**37**	**82**	**75**	**45**
	E-W	Measured resistance (Ω)	68.9	17.8	5.34	3.03	1.1	1.01	0.92	1.11	0.71	0.51	0.3	0.37	0.21
		Calculated resistivity (Ω-m)	132	68	41	35	21	29	35	85	68	59	46	71	60

Graph of ER Results VS Depth

Resistivity (Ω-m)



Project Mgr: AT	**Project Number**	Terracon	**FIELD ELECTRICAL RESISTIVITY TESTING RESULTS**	
Prepared by: JP	**CB215111**	Consulting Engineers and Scientists	**Love's Travel Stop - Jurupa Valley**	
Checked by:	**Date:** 9/30/2021	1355 E. Cooley Drive, Suite C Colton, CA 92324	**Riverside**	
Approved by:		PH: (909) 824-7311 Fax. (909) 301-6016	**Riverside County, California**	

SUPPORTING INFORMATION

Contents:

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Auger Cuttings Modified California Ring Sampler Standard Penetration Test	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** **Cave In Encountered** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** — **Standard Penetration Test Resistance (Blows/Ft.)** **(HP)** — **Hand Penetrometer** **(T)** — **Torvane** **(DCP)** — **Dynamic Cone Penetrometer** **UC** — **Unconfined Compressive Strength** **(PID)** — **Photo-Ionization Detector** **(OVA)** — **Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium Stiff	0.50 to 1.00	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	> 99	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
			Hard	> 4.00	> 30	> 42

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification: Group Symbol	Soil Classification: Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	$PI > 7$ and plots on or above “A” line		CL	Lean clay [K, L, M]
			$PI < 4$ or plots below “A” line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line		CH	Fat clay [K, L, M]
			PI plots below “A” line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains $\geq$ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains $\geq$ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains $\geq$ 30% plus No. 200 predominantly sand, add “sandy” to group name.

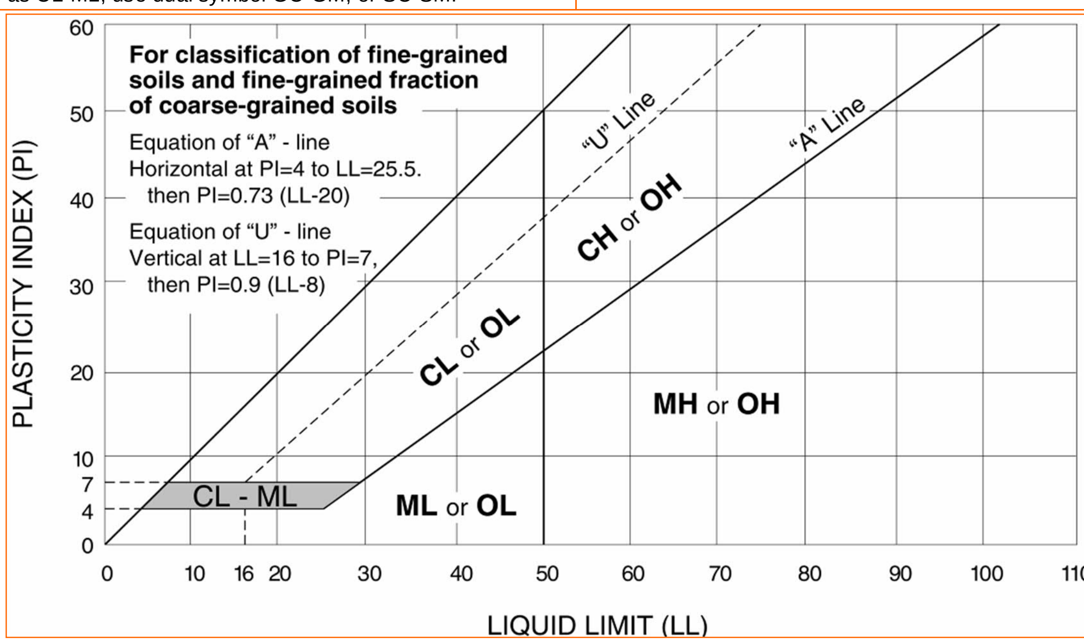
[M] If soil contains $\geq$ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] $PI \geq 4$ and plots on or above “A” line.

[O] $PI < 4$ or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.



H-2: Hydrology Report–Mobile Home Park

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HYDROLOGY REPORT

New Employee Housing to
Support Proposed Travel Center
BAKER BLVD
BAKER, CA 92307

Prepared For:

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45 Sea Island Dr.
Newport Beach, CA 92364

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LANE PROJECT NO. 20270

TABLE OF CONTENTS

Executive Summary

This storm drainage modeling, analysis, and report has been completed to document and support the proposed design and storm drain system showing there is a reduction in stormwater runoff from the pre-development condition to compared to the post-development condition

The reduced runoff is accomplished by incorporating several bioretention areas throughout the entire development, which are underlain by a bioretention soil media and gravel layer. A representative cross-section of a bioretention area is shown in Figure 3-1.

The proposed project was modeled in Autodesk Storm and Sanitary Analysis with multiple rainfall events simulated. The hydrology model utilized was NRCS (SCS) TR-55, which is appropriate for small urban watersheds.

The storm simulations reveal an overall net decrease in both the volume of runoff and peak discharge when comparing the pre-development condition to the post-development condition. Therefore, the overall post-development impacts to downstream drainage facilities and drainage ways will be less than the impacts in the pre-development condition. The analysis and findings are more thoroughly detailed in Section 3 of this report.

Section 1.0 – Introduction

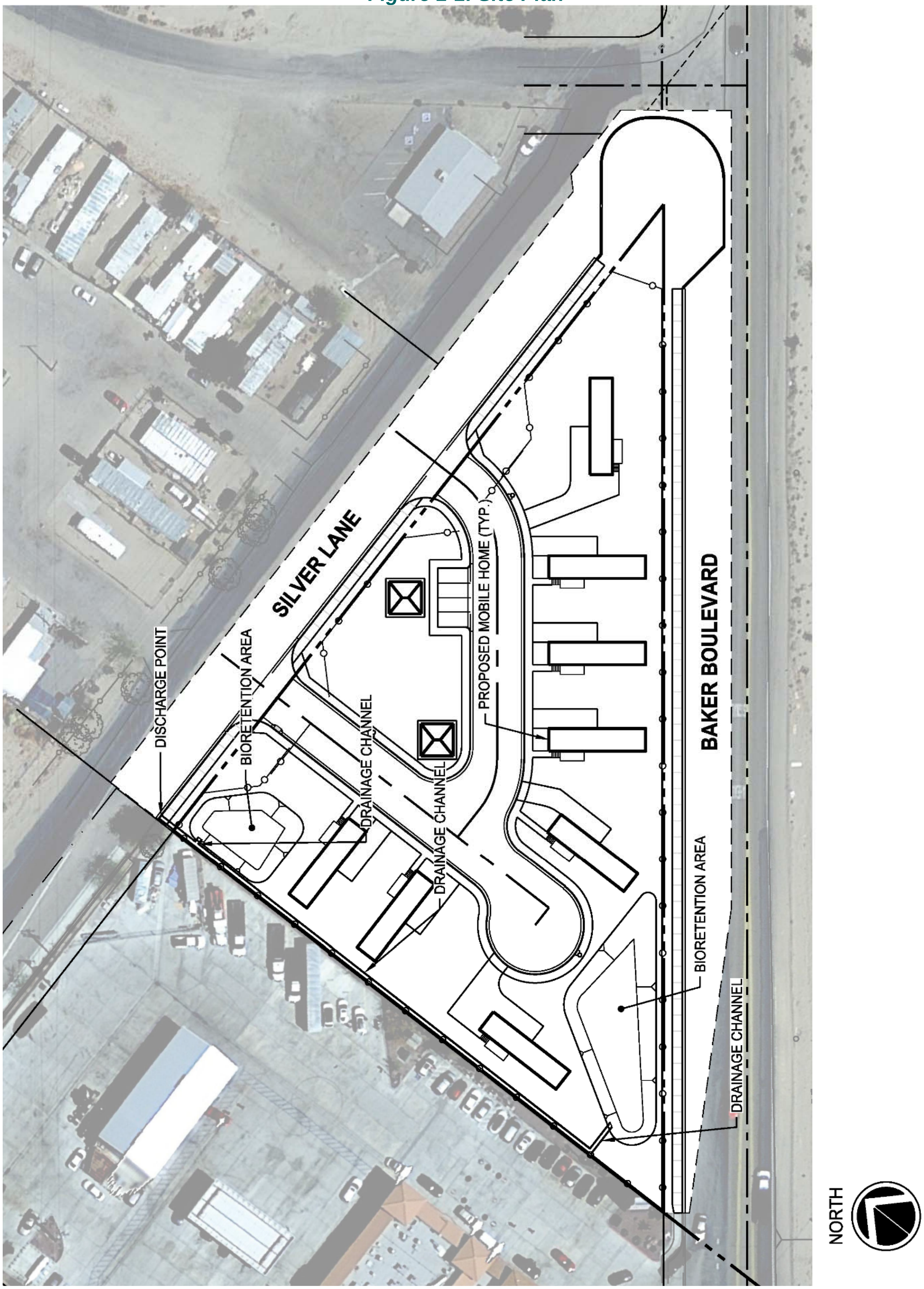
1.1 - Project Description

The proposed project is an employee housing project meant to support the travel stop project being proposed on the east side of Baker Boulevard. This housing units will be exclusively available to certain staff employed by the travel stop project. The project will consist of 8 mobile homes, and will additional contain four visitor parking spaces, and other amenities such as shade structures. The net area of the employee housing area that was analyzed for runoff reduction was 2.32 acres. It is expected that approximately 30% to 50% of the onsite area will consist of impervious surfaces. Refer to Figure 1-1 for site plan.

1.2 - Report Purpose

The purpose of this report is to provide analysis and documentation demonstrating that the runoff and peak discharge at the site in the post-development condition is less than the pre-development condition.

Figure 1-1: Site Plan



Section 2.0 - Existing Conditions

2.1 - Regional Conditions

The project site is in the unincorporated limits of Baker and in the Mojave Desert and located at the southern end of Death Valley, which is also in the north portion of San Bernardino County. Baker has a semi-arid climate with cool winters and hot summers.

2.2 - Site Conditions

The project site is located northwest of Interstate 15 and just northwest of Baker Boulevard. The site is disturbed, and aerial photos indicate that trucks and automobiles use this lot for parking from time to time. frontage. The site currently drains from the east part of the site, westerly, and flows along existing curb/gutter and to drainage washes, and the drainage path eventually ends at Soda Dry Lake, which is the terminus of the Mojave River.

The site has very sparse vegetation and slopes uniformly from the east towards the west at approximately 1.5%.

A project specific geotechnical investigation and report by Terracon Consultants, dated October 29, 2021, revealed the site is underlain with medium dense to very dense poorly-graded sand and silty sand. Groundwater was not encountered during the site investigation and borings which occurred within the uppermost 50 feet below the existing ground surface. The geotechnical report cites data from DWR indicating that groundwater may be approximately 75 deep in this area.

Percolation tests were not conducted on this specific site, however a number of percolation tests were conducted on the travel stop site on the other site of Baker Boulevard. The percolation rates at various locations ranged between 50.8 inches per hour and 122.6 inches per hour. These rates were correlated to an infiltration rate using the Porchet Method, resulting in infiltration rates ranging between 3.01 inches per hour and 6.68 inches per hour.

Section 3.0 – Hydrologic and Storm Drain Analysis

3.1 – Hydrologic and Storm Drain Model

Autodesk Storm and Sanitary Analysis (SSA) was used to model and simulate various storm events for the proposed project. SSA, originally known as StormNET and developed by BOSS International, is an advanced, powerful, and comprehensive stormwater and wastewater modeling software used for modeling urban drainage systems amongst other storm water and sanitary sewer systems modeling capabilities.

The software is capable of simultaneously modeling complex hydrology, hydraulics, and water quality. SSA is used throughout the world in many applications, once of which is the design and sizing of drainage systems and detention facilities for flood control.

SSA additionally contains a site-specific storm distribution database with over 3,500 up-to-date rainfall recording stations across North America.

3.2 – Methodology

SSA has over a dozen hydrology modeling capabilities, but in the particular case of this project, NRCS (SCS) TR-55 was selected as the hydrology model. The Soil Conservation Service (SCS), which is now known as Natural Resources Conservation Service (NRCS) published Technical Release 55 (TR-55), entitled “Urban Hydrology for Small Watersheds”. TR-55 presents simplified procedures to calculate storm runoff volume, peak rate of discharge, hydrographs and storage volumes. These procedures are applicable in small watersheds, especially urbanized watersheds.

An SCS Type 1 24-hr rainfall distribution was selected as the design rainfall for the project. A continuous simulation was performed for a 24-hr duration for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year recurrence intervals for both pre-development (existing) and post-development conditions. The cumulative rainfall depth for each recurrence interval was conservatively overwritten in the software using the rainfall depths from NOAA’s precipitation frequency data server. NOAA has long been considered a reliable and authoritative source of precipitation frequency estimates and associated information. The comparison of rainfall depths is provided in Table 3-1, immediately below. The original source of the NOAA rainfall depths is provided in Appendix A for reference.

Table 3-1: Rainfall Depths

Rainfall Event	NOAA Rainfall Depths	SSA Rainfall Depths
2-Year / 24-Hour	0.89 inches	0.89 inches
5-Year / 24-Hour	1.27 inches	1.20 inches
10-Year / 24-Hour	1.60 inches	1.40 inches
25-Year / 24-Hour	2.07 inches	1.70 inches
50-Year / 24-Hour	2.44 inches	1.90 inches
100-Year / 24-Hour	2.84 inches	2.20 inches

For the pre-development condition, an area roughly equivalent in shape and size to the proposed post-development area was analyzed. For the pre-development condition, the time of concentration was calculated using the method and formula outlined in TR-55. The total time of concentration was conservatively assumed to be 100 minutes. There was no available data related to the soil on the National Resources Conservation Service server to establish the Hydrologic Soils Group, so the geotechnical report boring soils analysis was used to determine a soil condition. To simulate the rainfall events for the pre-development condition, a curve number of 77 was established respectively based on the Hydrologic Soils Group of ‘B,’ and a site classification of “Desert Shrub Range with Poor Ground Cover.” A hydrologic soils group of ‘B’ is described as soils having a medium-high infiltration rate when thoroughly wet, which would be consistent with the “medium dense to very dense poorly-graded sand and silty sand” description from the geotechnical report. The geotechnical reports are included as Appendix D for reference.

The bioretention areas were assigned an infiltration rate, based on the lowest rate tested on the travel stop site. A factor of safety of 4 was applied to the final correlated infiltration rate, to account for reduced performance due to silt building, debris, and other factors. The infiltration rate was based on measured percolation rates at the travel stop site which was correlated to infiltration rates using the Porchet Method. The correlated infiltration rate with a factor of safety applied was 0.75 in/hr. The test percolation test results are included in Appendix D of this report as part of the larger and project-specific geotechnical report.

The time of concentration for each post-development tributary area was conservatively assumed to be 20 minutes.

3.3 – Proposed Design

A detailed grading plan & drainage plan was first developed for the respective project site in order to ensure accurate elevations and storage volumes for detention facilities, discharges structures, etc. The site was designed to surface flow to two separate depressed planter areas around the perimeter of the site and into concrete drainage channels during larger storm events. The entire onsite storm drain system of each site discharges into the most westerly portion of the site, which eventually discharges into the Dry Soda Lake Bed which is the terminus of the Mojave River.

Based on the grading design, a total of two tributary areas were developed for the travel stop. Each bioretention area was designed to store a maximum of 18” of water. The free open storage of the bioretention areas were modeled by adding surface areas of contours by the corresponding incremental depth. The resultant of the data is depth vs. area curve, for which the area beneath the curve represents the total storage volume. Bioretention areas that were designed with flat bottom areas also had pervious sublayers consisting of crushed rock and bioretention soil media (BSM). The pervious subgrade for most bioretention areas can store an equivalent water depth of 1.06 feet. This additional subgrade storage was incorporated appropriately in the storage curves. A typical bioretention section is shown in Figure 3-1, depicting the storage capabilities of the bioretention areas, and a table showing the respective storage capability of each bioretention area is shown In Table 3-1.

All bioretention areas will consist of several layers of porous material (mulch, bioretention soil media, and drain rock), which will achieve the proper volumetric control to reduce runoff to less than pre-development levels. Refer to Appendix B for the Modeling Keymap.

Figure 3-1: Typical Bioretention Cross-Section

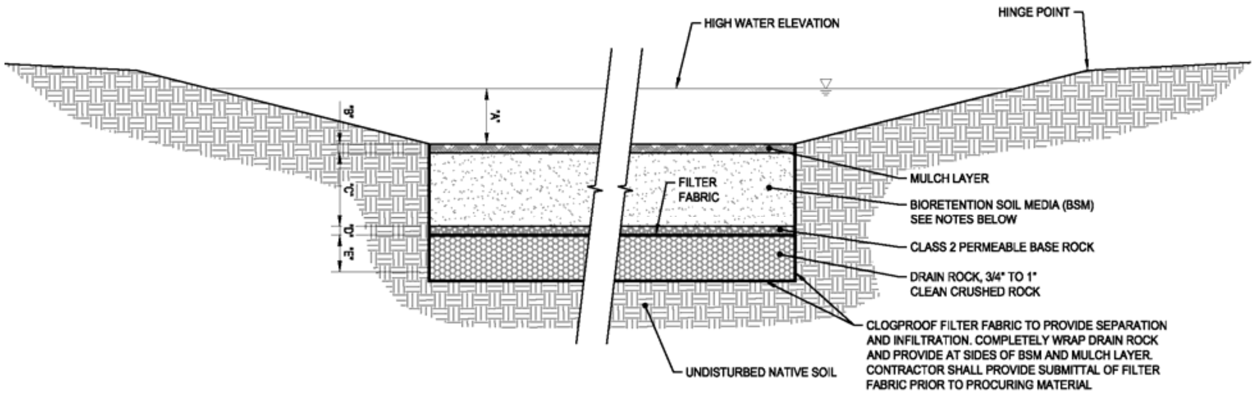


Table 3-1: Bioretention Depths

Bioretention ID	Water Storage Height "A"	Mulch Depth "B"	BSM Depth "C"	Caltrans Permeable Base "D"	Gravel Depth "E"	Equivalent Storage Depth in Subgrade
BR1	1.5'	0.25'	2.0'	0.25'	1.0'	1.06'
BR2	1.5'	0.25'	2.0'	0.25'	1.0'	1.06'

The bioretention areas—upon reaching their maximum water storage height—will be allowed to overflow into concrete drainage channels, which leads the main concrete drainage channel along the west portion of the site. The main concrete drainage channel would eventually discharge under the sidewalk along Silver Lane, and flow along the existing curb/gutter and into other downstream drainage washes, and ultimately into Dry Soda Lake.

3.4 – Findings

The proposed design using shallow bioretention areas around the site serves the purpose of capturing storm water runoff and reducing runoff compared to pre-development for various rain events and fully captures and infiltrates 100% of a 2-, 5-,10-,25-, 50- and 100-year / 24-hour storm events Table 3-2 shows the pre-development peak discharge rates compared to the post-development

Table 3-2
Peak Discharge Rates for 24-hr Rainfall Event at Various Recurrence Intervals

Recurrence Interval	Pre-Development Peak Discharge Rate	Post-Development Peak Discharge Rate	Net Change in Runoff Rate
2-Year	0.01 CFS	0.00 CFS	-0.01 CFS
5-Year	0.03 CFS	0.00 CFS	-0.03 CFS
10-Year	0.07 CFS	0.00 CFS	-0.07 CFS
25-Year	0.17 CFS	0.00 CFS	-0.17 CFS
50-Year	0.29 CFS	0.00 CFS	-0.29 CFS
100-Year	0.43 CFS	0.00 CFS	-0.43 CFS

For the purposes of this report, it is not useful to show a hydrograph comparing pre-development conditions to post-development condition because there is no storm water discharge from the site in any of the simulations for the post-development condition.

The runoff volume for each storm event simulated for both pre-development and post-development conditions are summarized in Table 3-3. The table demonstrates the post-development runoff volume to be no greater than the pre-development volume.

Table 3-3
Runoff Volume for 24-hr Rainfall Event at Various Recurrence Intervals

Recurrence Interval	Pre-Development Runoff Volume	Post-Development Runoff Volume	Net Change in Runoff Volume
2-Year	0.004 AC-FT	0.00 AC-FT	-0.004 AC-FT
5-Year	0.02 AC-FT	0.00 AC-FT	-0.02 AC-FT
10-Year	0.05 AC-FT	0.00 AC-FT	-0.05 AC-FT
25-Year	0.09 AC-FT	0.00 AC-FT	-0.09 AC-FT
50-Year	0.13 AC-FT	0.00 AC-FT	-0.13 AC-FT
100-Year	0.18 AC-FT	0.00 AC-FT	-0.18 AC-FT

3.5 – Conclusion

The hydrology report shows that the developed project will be capable of retaining and infiltration the

The hydrology report shows the developed travel stop site will not discharge any storm water for the 2-, 5, 10-, 25-, 50-, and 100-year rainfall events, and full fully capture and infiltrate all runoff. The simulated rainfall events in a pre-development condition reveal that storm water runoff exists, and therefore the post-development runoff condition is less than the pre-development conditions.

Appendix A

NOAA Atlas 14, Volume 6, Version 2
Location name: Apple Valley, California, USA*
Latitude: 34.5943°, Longitude: -117.2537°
Elevation: 2941.06 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point 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	**0.088** (0.072-0.108)	**0.123** (0.101-0.150)	**0.171** (0.140-0.210)	**0.213** (0.173-0.264)	**0.274** (0.216-0.351)	**0.323** (0.250-0.423)	**0.377** (0.284-0.505)	**0.435** (0.319-0.600)	**0.520** (0.366-0.746)	**0.590** (0.401-0.876)
10-min	**0.126** (0.104-0.155)	**0.176** (0.145-0.216)	**0.245** (0.201-0.302)	**0.305** (0.248-0.378)	**0.392** (0.309-0.503)	**0.464** (0.358-0.607)	**0.541** (0.407-0.724)	**0.624** (0.458-0.860)	**0.745** (0.525-1.07)	**0.846** (0.575-1.25)
15-min	**0.152** (0.126-0.187)	**0.212** (0.175-0.261)	**0.296** (0.243-0.365)	**0.369** (0.300-0.458)	**0.474** (0.374-0.608)	**0.561** (0.433-0.734)	**0.654** (0.493-0.876)	**0.755** (0.554-1.04)	**0.901** (0.634-1.29)	**1.02** (0.696-1.52)
30-min	**0.206** (0.170-0.252)	**0.287** (0.236-0.352)	**0.400** (0.329-0.493)	**0.498** (0.406-0.618)	**0.641** (0.505-0.821)	**0.757** (0.585-0.991)	**0.883** (0.666-1.18)	**1.02** (0.748-1.41)	**1.22** (0.857-1.75)	**1.38** (0.940-2.05)
60-min	**0.252** (0.207-0.309)	**0.351** (0.289-0.431)	**0.489** (0.402-0.602)	**0.609** (0.496-0.756)	**0.783** (0.617-1.00)	**0.926** (0.715-1.21)	**1.08** (0.814-1.45)	**1.25** (0.914-1.72)	**1.49** (1.05-2.14)	**1.69** (1.15-2.51)
2-hr	**0.356** (0.293-0.436)	**0.480** (0.395-0.589)	**0.652** (0.535-0.802)	**0.799** (0.651-0.991)	**1.01** (0.796-1.29)	**1.18** (0.912-1.55)	**1.36** (1.03-1.83)	**1.56** (1.14-2.15)	**1.84** (1.30-2.64)	**2.07** (1.41-3.07)
3-hr	**0.429** (0.354-0.526)	**0.573** (0.472-0.703)	**0.770** (0.632-0.948)	**0.938** (0.764-1.16)	**1.18** (0.928-1.51)	**1.37** (1.06-1.79)	**1.58** (1.19-2.11)	**1.79** (1.32-2.47)	**2.10** (1.48-3.02)	**2.36** (1.60-3.50)
6-hr	**0.584** (0.482-0.716)	**0.773** (0.637-0.949)	**1.03** (0.846-1.27)	**1.25** (1.01-1.55)	**1.55** (1.22-1.99)	**1.79** (1.39-2.35)	**2.05** (1.54-2.75)	**2.32** (1.70-3.19)	**2.70** (1.90-3.87)	**3.00** (2.04-4.46)
12-hr	**0.751** (0.619-0.921)	**1.00** (0.824-1.23)	**1.34** (1.10-1.64)	**1.61** (1.31-2.00)	**2.00** (1.58-2.56)	**2.30** (1.78-3.01)	**2.62** (1.97-3.51)	**2.95** (2.16-4.06)	**3.40** (2.40-4.88)	**3.77** (2.56-5.59)
24-hr	**0.983** (0.872-1.13)	**1.33** (1.18-1.53)	**1.78** (1.57-2.06)	**2.15** (1.89-2.51)	**2.67** (2.26-3.21)	**3.07** (2.55-3.77)	**3.48** (2.82-4.39)	**3.91** (3.08-5.06)	**4.50** (3.40-6.07)	**4.96** (3.62-6.93)
2-day	**1.15** (1.02-1.33)	**1.58** (1.40-1.82)	**2.14** (1.89-2.48)	**2.61** (2.29-3.04)	**3.24** (2.75-3.91)	**3.74** (3.10-4.60)	**4.25** (3.44-5.35)	**4.77** (3.76-6.18)	**5.49** (4.15-7.42)	**6.06** (4.43-8.47)
3-day	**1.25** (1.11-1.44)	**1.73** (1.54-2.00)	**2.37** (2.09-2.74)	**2.89** (2.53-3.37)	**3.61** (3.06-4.34)	**4.16** (3.45-5.12)	**4.73** (3.83-5.96)	**5.32** (4.19-6.89)	**6.13** (4.64-8.28)	**6.77** (4.95-9.46)
4-day	**1.33** (1.18-1.53)	**1.85** (1.64-2.13)	**2.53** (2.23-2.92)	**3.08** (2.70-3.59)	**3.85** (3.26-4.63)	**4.44** (3.68-5.46)	**5.04** (4.09-6.35)	**5.67** (4.47-7.35)	**6.53** (4.94-8.82)	**7.21** (5.26-10.1)
7-day	**1.45** (1.29-1.67)	**1.99** (1.76-2.29)	**2.71** (2.39-3.13)	**3.30** (2.89-3.84)	**4.10** (3.48-4.93)	**4.72** (3.92-5.81)	**5.36** (4.34-6.75)	**6.02** (4.74-7.80)	**6.93** (5.24-9.35)	**7.63** (5.58-10.7)
10-day	**1.53** (1.36-1.76)	**2.10** (1.86-2.41)	**2.84** (2.51-3.28)	**3.45** (3.03-4.02)	**4.29** (3.64-5.17)	**4.94** (4.10-6.07)	**5.61** (4.54-7.06)	**6.30** (4.96-8.15)	**7.24** (5.47-9.78)	**7.98** (5.83-11.2)
20-day	**1.76** (1.56-2.02)	**2.41** (2.14-2.78)	**3.29** (2.90-3.80)	**4.01** (3.51-4.67)	**5.01** (4.24-6.03)	**5.79** (4.80-7.11)	**6.59** (5.34-8.30)	**7.43** (5.85-9.62)	**8.58** (6.48-11.6)	**9.48** (6.93-13.3)
30-day	**1.98** (1.76-2.28)	**2.74** (2.42-3.15)	**3.76** (3.32-4.34)	**4.61** (4.04-5.36)	**5.79** (4.91-6.98)	**6.73** (5.59-8.27)	**7.70** (6.24-9.70)	**8.72** (6.87-11.3)	**10.1** (7.66-13.7)	**11.3** (8.22-15.7)
45-day	**2.32** (2.06-2.67)	**3.22** (2.86-3.71)	**4.46** (3.94-5.15)	**5.51** (4.82-6.41)	**6.99** (5.93-8.42)	**8.18** (6.79-10.1)	**9.43** (7.64-11.9)	**10.8** (8.48-13.9)	**12.6** (9.55-17.1)	**14.1** (10.3-19.7)
60-day	**2.54** (2.25-2.92)	**3.52** (3.12-4.05)	**4.89** (4.32-5.65)	**6.06** (5.31-7.06)	**7.76** (6.58-9.34)	**9.14** (7.59-11.2)	**10.6** (8.59-13.4)	**12.2** (9.60-15.8)	**14.5** (10.9-19.5)	**16.3** (11.9-22.8)

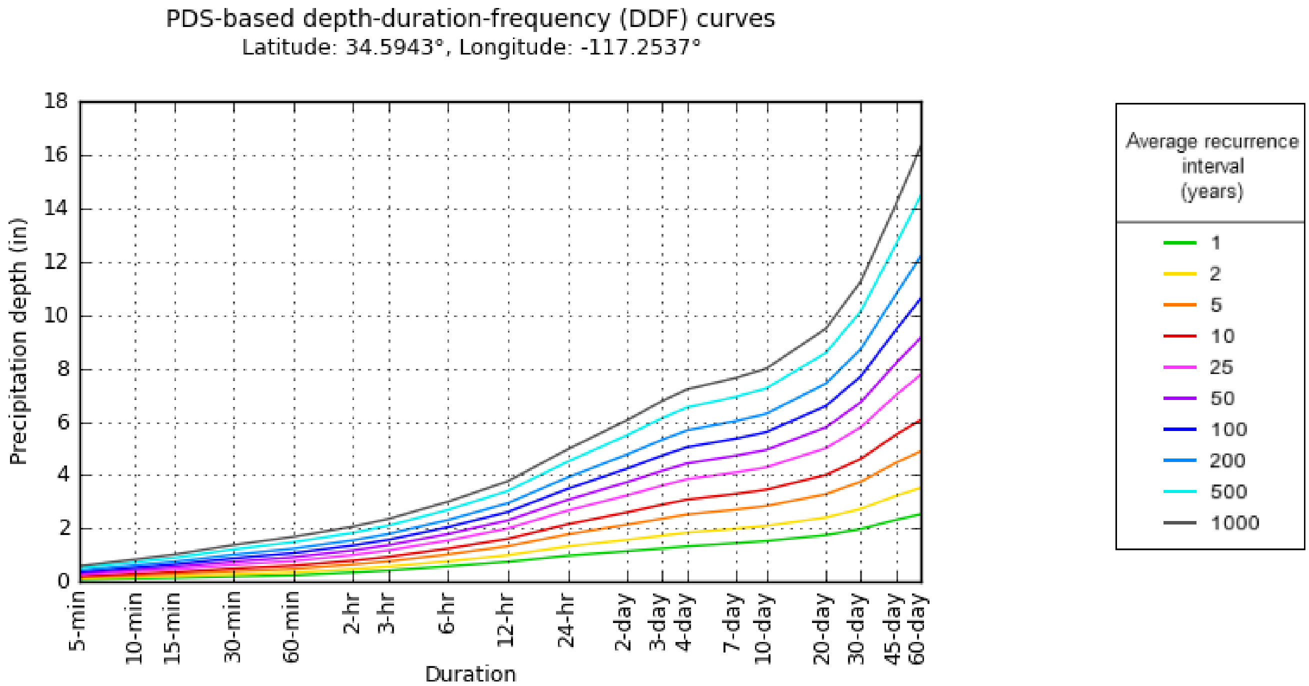
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

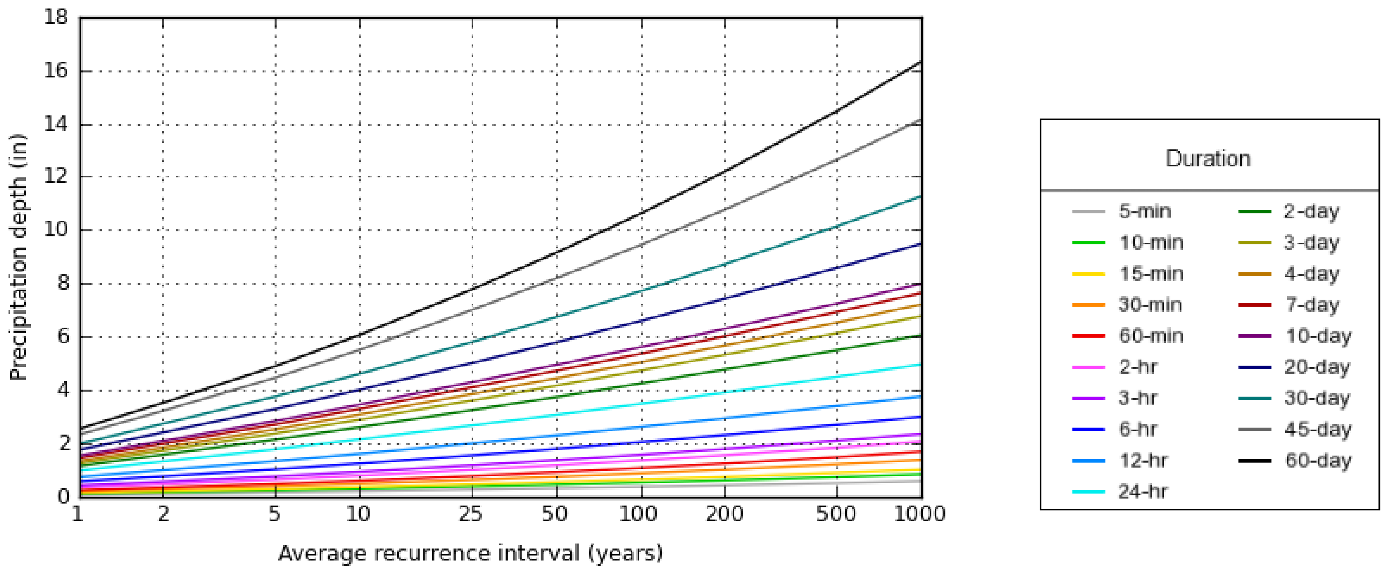
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper 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.

Back to Top

PF graphical





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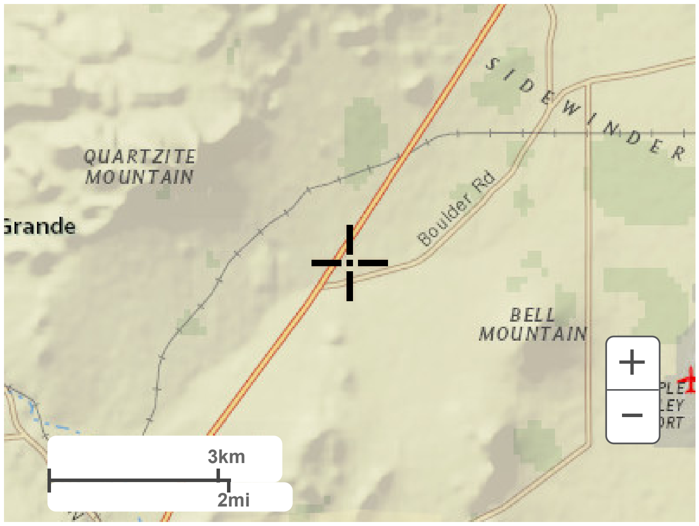
Created (GMT): Tue May 3 18:11:15 2022

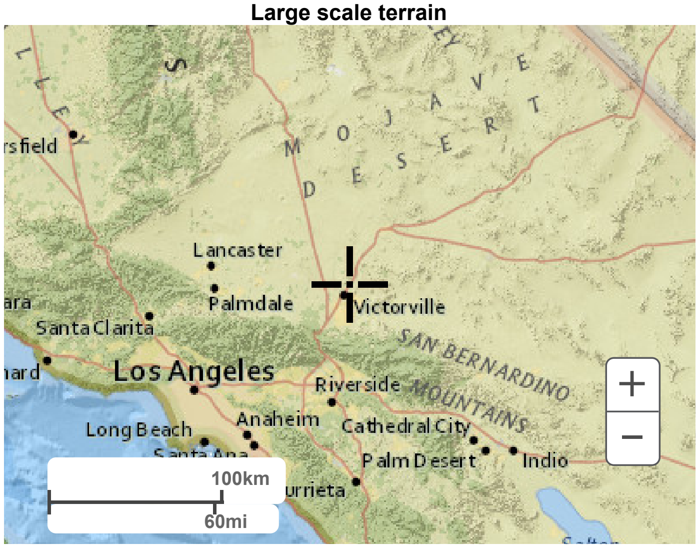
Back to Top

Maps & aerials

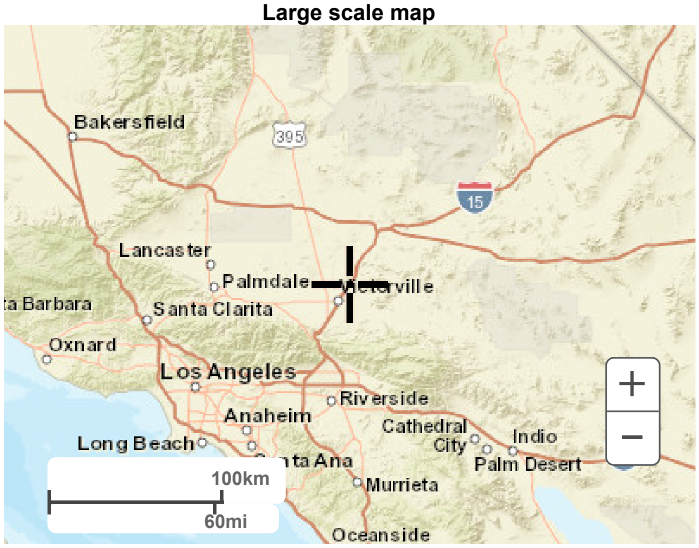
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

[Back to Top](#)

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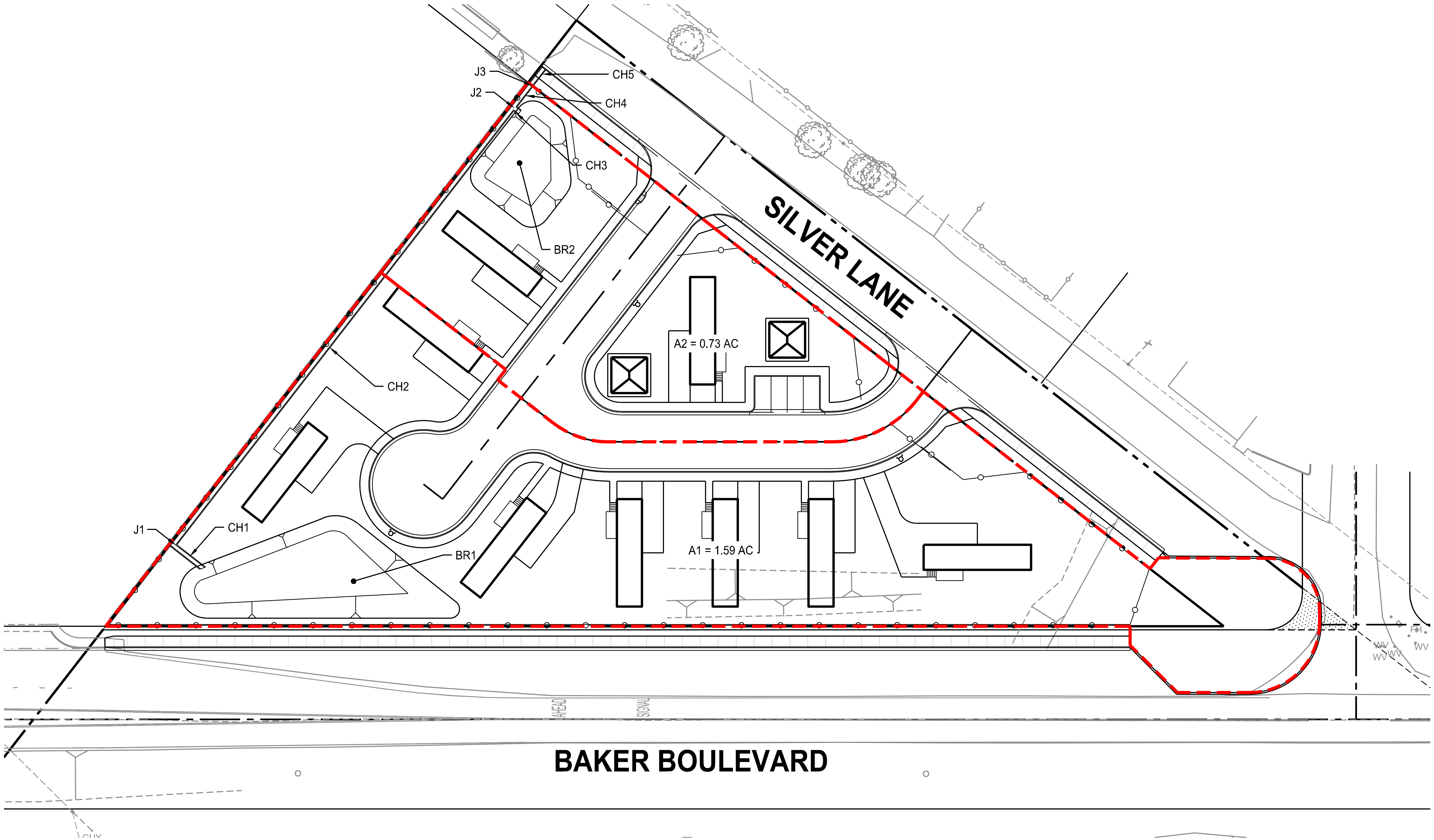
Appendix B



LEGEND:

A1	DRAINAGE (TRIBUTARY) AREA
BR1	BIORETENTION AREA
CH1	CONCRETE DRAINAGE CHANNEL
J1	JUNCTION BETWEEN CONCRETE DRAINAGE CHANNELS
OUT1	SYSTEM OUTFLOW

NORTH

SCALE: 1" = 60'

Appendix C

2-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270-MH.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	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Oct 20, 2022	00:00:00
End Analysis On	Oct 21, 2022	00:00:00
Start Reporting On	Oct 20, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	3
Nodes..	7
Junctions	3
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links..	5
Channels	4
Pipes	1
Pumps	0
Orifices	0
Weirs	0
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	RAINEVENT	Time Series	2YR	Cumulative	inches	California	San Bernardino (Baker)	2	0.89	SCS Type I 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	A1	1.59	85.00	0.89	0.13	0.20	0.04	0 00:20:00
2	A2	0.73	85.00	0.89	0.13	0.09	0.02	0 00:20:00
3	DMA-PREDEV	2.32	77.00	0.89	0.03	0.06	0.01	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	1008.26	1008.76	1008.26	6.00	0.00	0.00	1008.26	0.00	0.50	0 00:00	0.00	0.00
2	Jun-02	Junction	1007.79	1008.29	1007.79	6.00	0.00	0.00	1007.79	0.00	1.50	0 00:00	0.00	0.00
3	Jun-03	Junction	1007.77	1008.27	1007.77	0.00	0.00	0.00	1007.77	0.00	1.50	0 00:00	0.00	0.00
4	OUT1	Outfall	1007.63					0.00	1007.63					
5	OUT-PRE	Outfall	0.00					0.01	0.00					
6	BR1	Storage Node	1006.42	1009.48	0.00		0.00	0.04	1006.42				0.00	0.00
7	BR2	Storage Node	1005.73	1008.73	0.00		0.00	0.02	1005.73				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	CH4	Pipe	Jun-02	Jun-03	29.72	0.00	0.00	0.0000	18.000	0.0150	0.00	2.36	0.00	0.00	0.00	0.00	0.00	Calculated
2	CH1	Channel	BR1	Jun-01	20.00	1008.98	1008.26	3.6000	6.000	0.0130	0.00	10.43	0.00	0.00	0.00	0.00	0.00	
3	CH2	Channel	Jun-01	Jun-02	312.00	1008.26	1007.79	0.1500	6.000	0.0130	0.00	2.13	0.00	0.00	0.00	0.00	0.00	
4	CH3	Channel	BR2	Jun-02	3.00	1008.29	1007.79	16.6700	6.000	0.0130	0.00	22.43	0.00	0.00	0.00	0.00	0.00	
5	CH5	Channel	Jun-03	OUT1	12.00	1007.77	1007.63	1.1700	6.000	0.0320	0.00	2.41	0.00	0.00	0.00	0.00	0.00	

Subbasin Hydrology

Subbasin : A1

Input Data

Area (ac) 1.59
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	1.59	B	85.00
Composite Area & Weighted CN	1.59		85.00

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 :

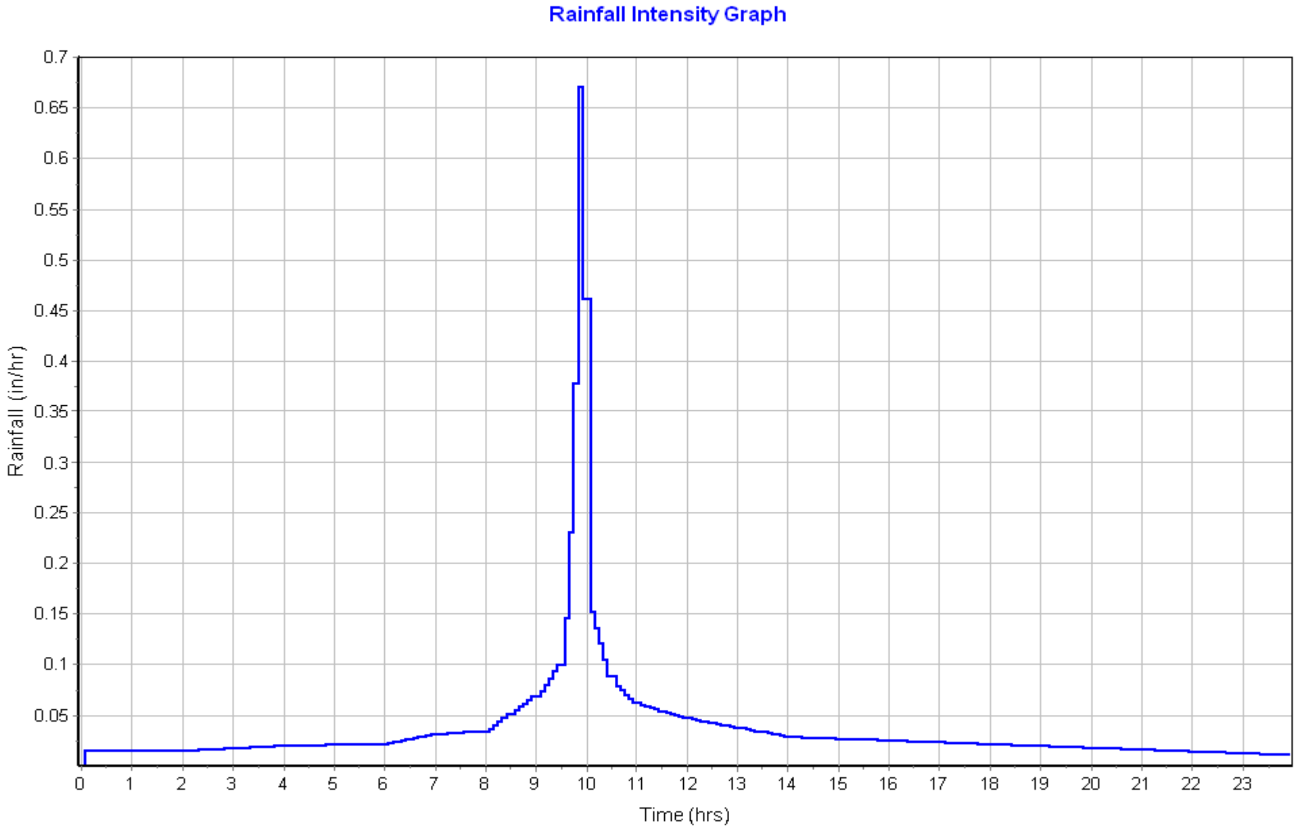
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 20

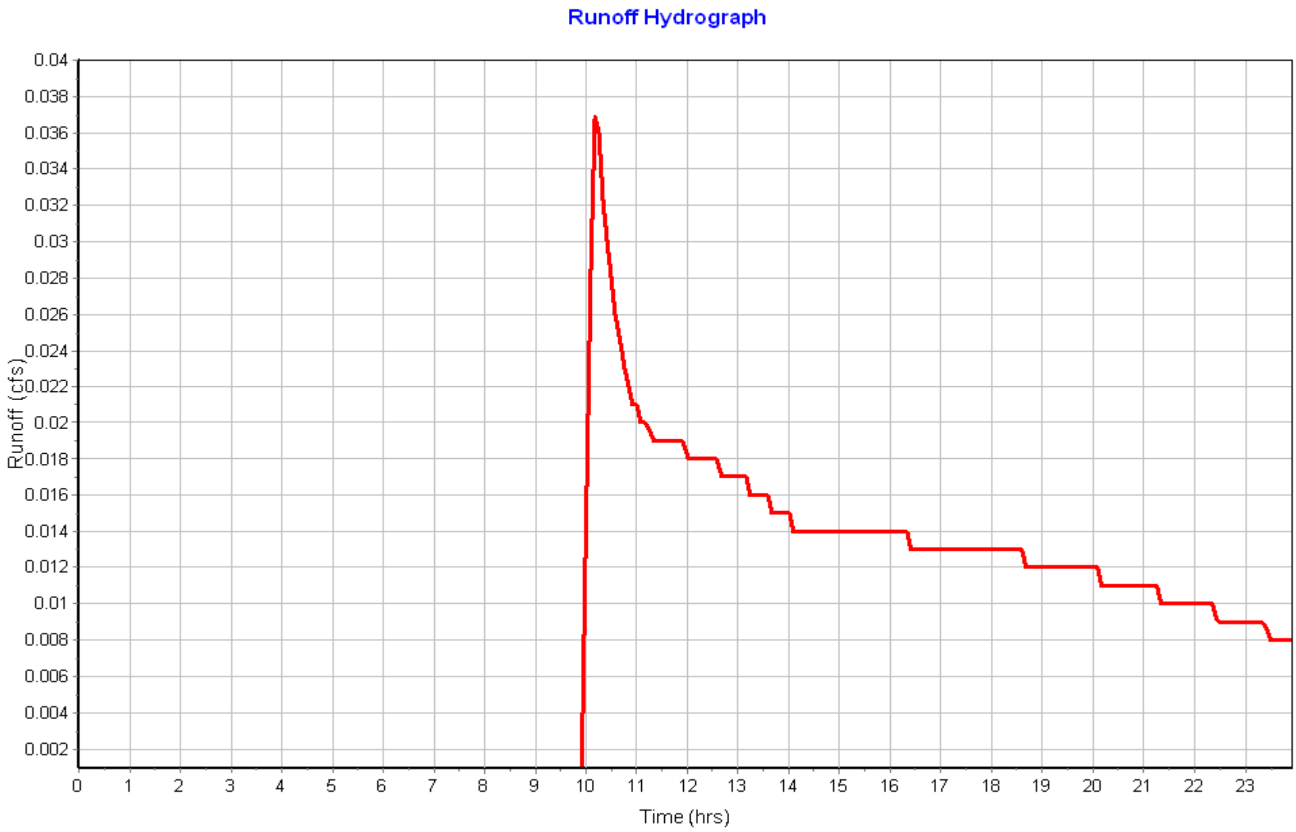
Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.13
Peak Runoff (cfs) 0.04
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A1



Rainfall Intensity Graph
Rainfall (in/hr)
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A2

Input Data

Area (ac) 0.73
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.69	B	85.00
Composite Area & Weighted CN	2.69		85.00

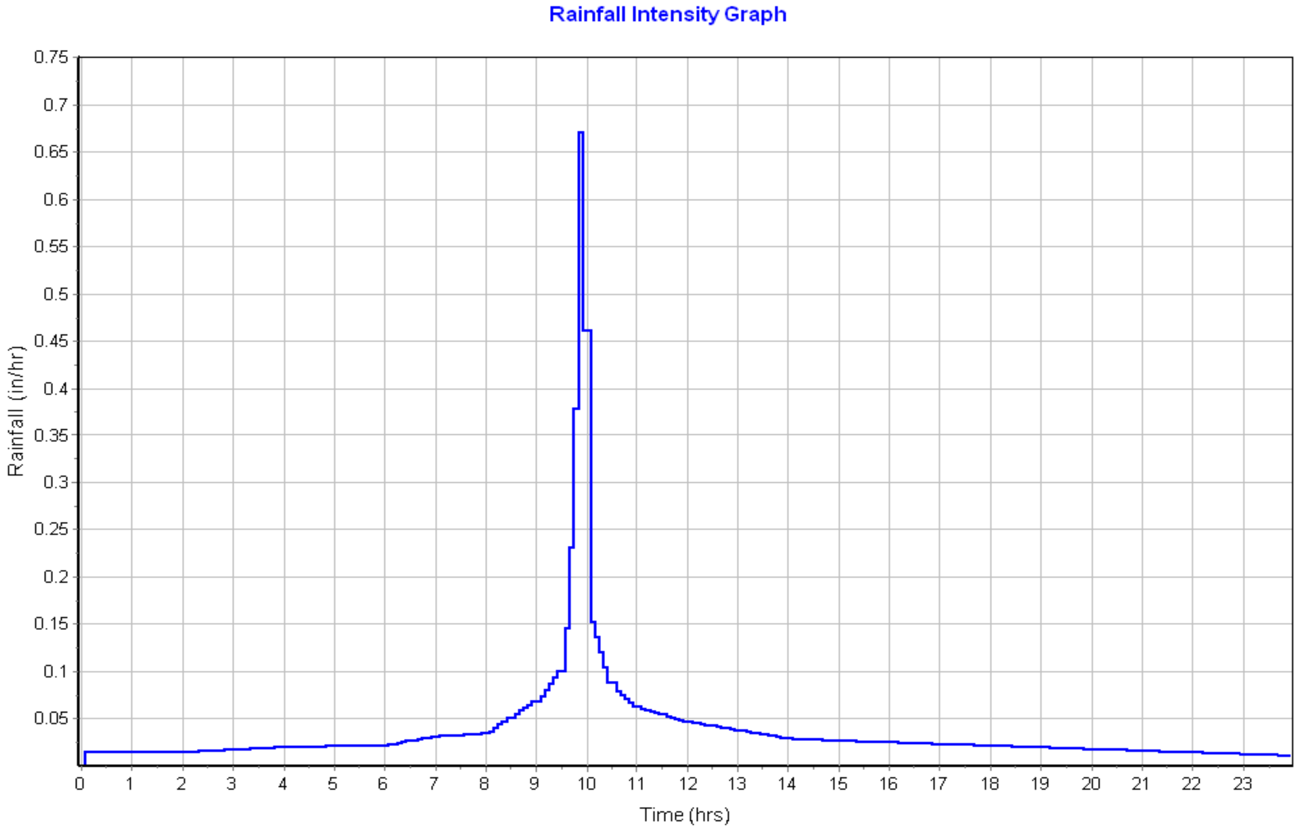
Time of Concentration

User-Defined TOC override (minutes): 20.00

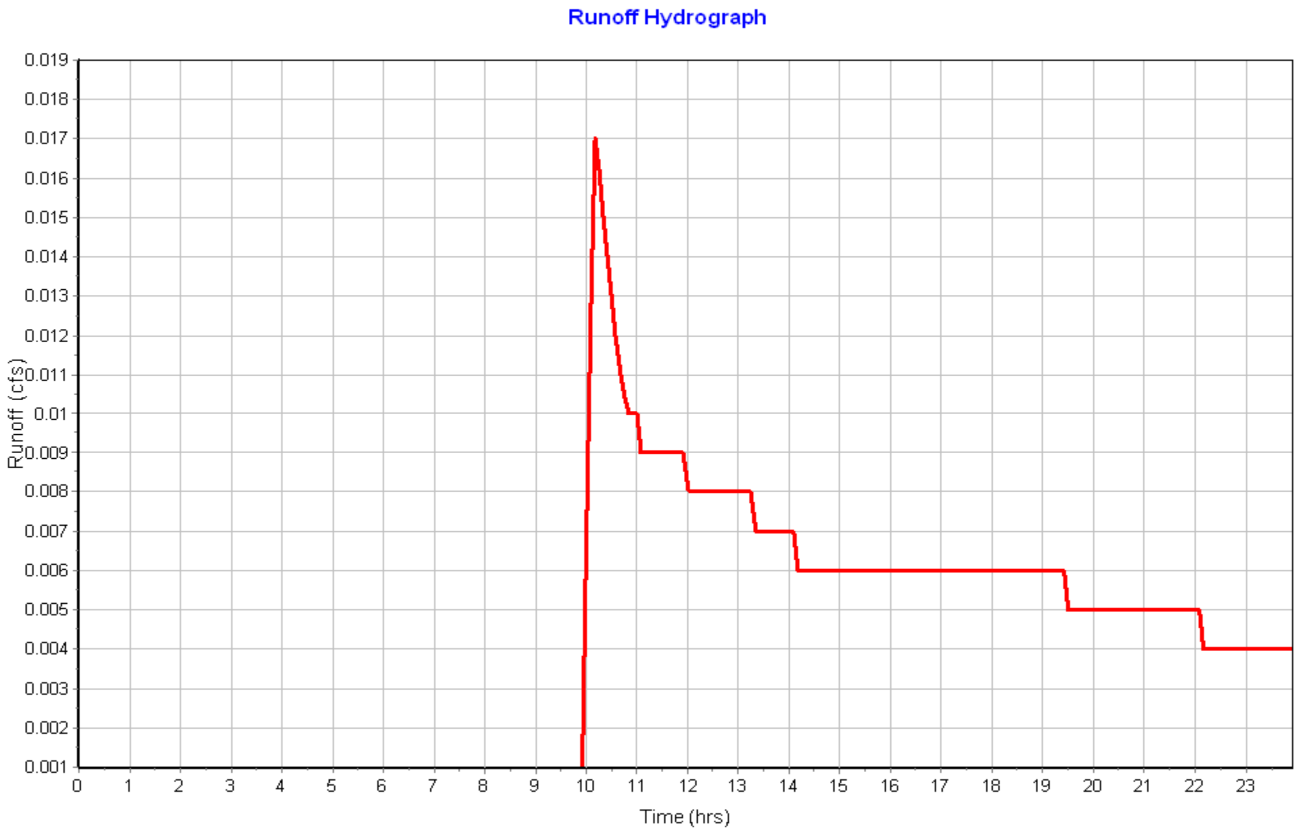
Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.13
Peak Runoff (cfs) 0.02
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A2



Rainfall Intensity Graph
Rainfall (in/hr)
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : DMA-PREDEV

Input Data

Area (ac) 2.32
Weighted Curve Number 77.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	2.69	B	77.00
Composite Area & Weighted CN	2.69		77.00

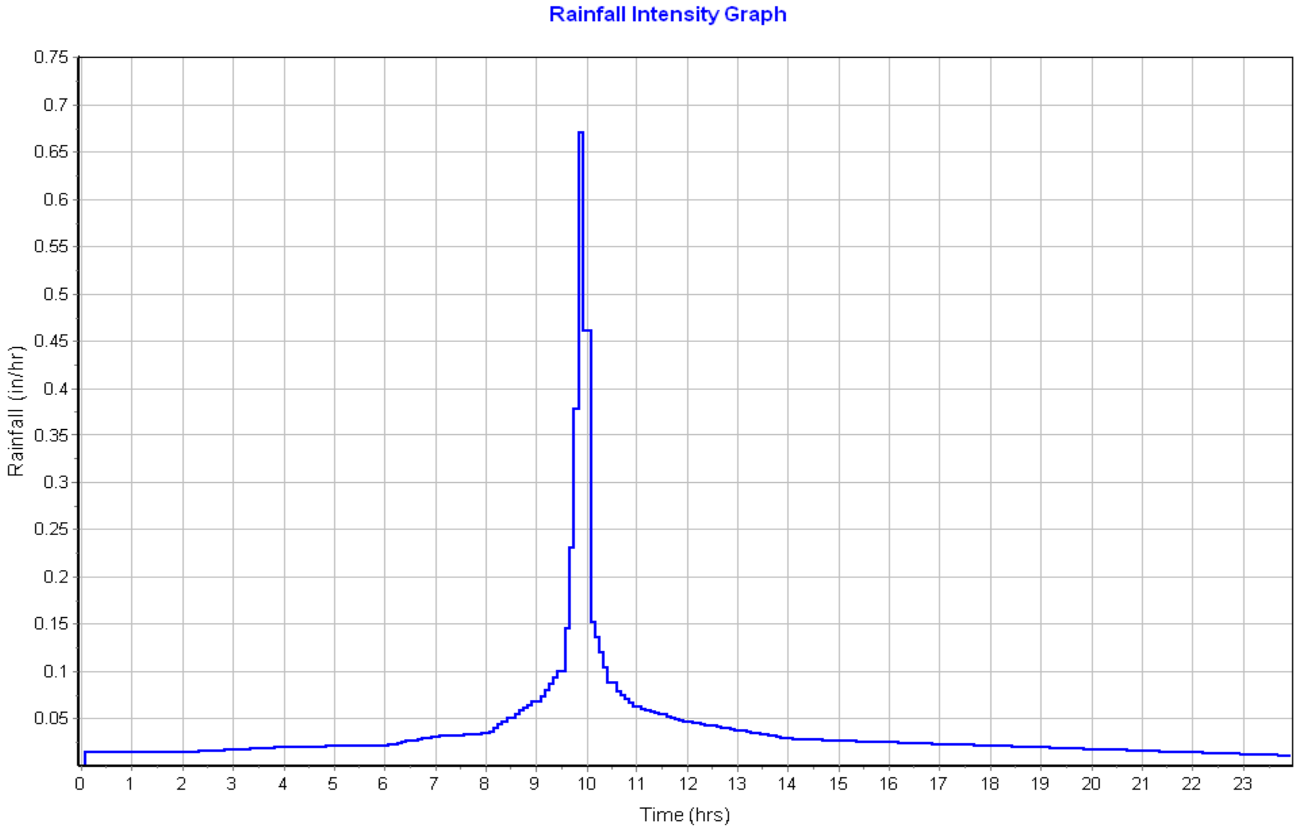
Time of Concentration

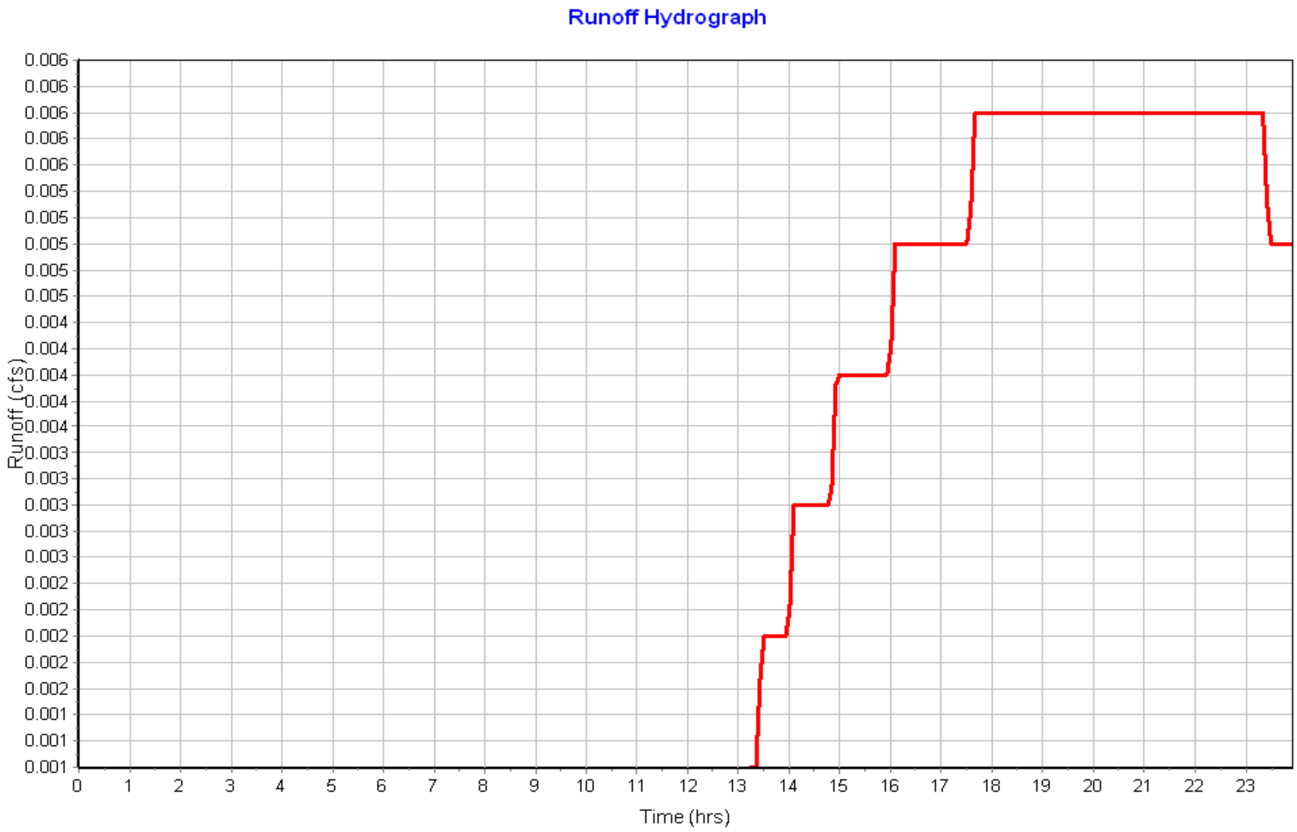
User-Defined TOC override (minutes): 100.00

Subbasin Runoff Results

Total Rainfall (in) 0.89
Total Runoff (in) 0.03
Peak Runoff (cfs) 0.01
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : DMA-PREDEV





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	Jun-01	1008.26	1008.76	0.50	1008.26	0.00	6.00	-1002.76	0.00	0.00
2	Jun-02	1007.79	1008.29	0.50	1007.79	0.00	6.00	-1002.29	0.00	0.00
3	Jun-03	1007.77	1008.27	0.50	1007.77	0.00	0.00	-1008.27	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	0.00	0.00	1008.26	0.00	0.00	0.50	1008.26	0.00	0 00:00	0 00:00	0.00	0.00
2	Jun-02	0.00	0.00	1007.79	0.00	0.00	1.50	1007.79	0.00	0 00:00	0 00:00	0.00	0.00
3	Jun-03	0.00	0.00	1007.77	0.00	0.00	1.50	1007.77	0.00	0 00:00	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	CH1	20.00	1008.98	2.56	1008.26	0.00	0.72	3.6000	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
2	CH2	312.00	1008.26	0.00	1007.79	0.00	0.47	0.1500	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
3	CH3	3.00	1008.29	2.56	1007.79	0.00	0.50	16.6700	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
4	CH5	12.00	1007.77	0.00	1007.63	0.00	0.14	1.1700	Rectangular	0.500	2.000	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	CH1	0.00	0 00:00	10.43	0.00	0.00		0.00	0.00	0.00		
2	CH2	0.00	0 00:00	2.13	0.00	0.00		0.00	0.00	0.00		
3	CH3	0.00	0 00:00	22.43	0.00	0.00		0.00	0.00	0.00		
4	CH5	0.00	0 00:00	2.41	0.00	0.00		0.00	0.00	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
1	CH4	29.72	0.00	-1007.79	0.00	-1007.77	0.00	0.0000	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No

No. of Barrels
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	CH4	0.00	0 00:00	2.36	0.00	0.00		0.00	0.00	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1006.42
Max (Rim) Elevation (ft) 1009.48
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1006.42
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

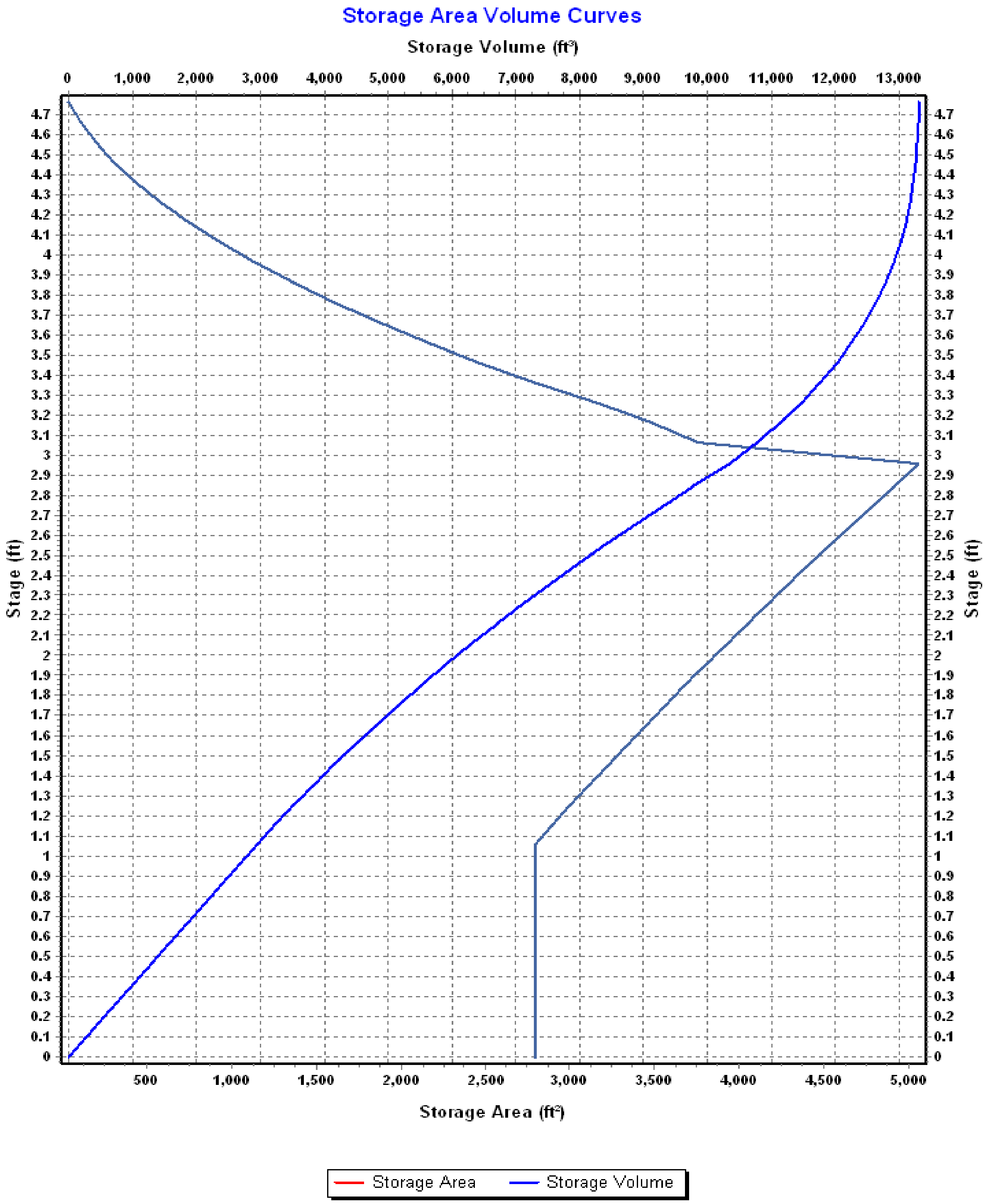
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	2792	0.000
1.06	2792.47	2959.77
1.16	2899.21	3244.35
1.26	3007.33	3539.68
1.36	3116.82	3845.89
1.46	3227.68	4163.12
1.56	3339.91	4491.50
1.66	3453.52	4831.17
1.76	3568.5	5182.27
1.86	3684.86	5544.94
1.96	3802.58	5919.31
2.06	3921.69	6305.52
2.16	4042.16	6703.71
2.26	4164	7114.02
2.36	4287.22	7536.58
2.46	4411.82	7971.53
2.54	4512.48	8328.50
2.56	4537.78	8419.00
2.66	4665.12	8879.15
2.76	4793.83	9352.10
2.86	4923.91	9837.99
2.96	5055.37	10336.95
3.06	3755.59	10777.50
3.16	3483.33	11139.45
3.26	3150.21	11471.13
3.36	2788.29	11768.06
3.46	2456.06	12030.28
3.56	2153.81	12260.77
3.66	1871.11	12462.02
3.76	1607.81	12635.97
3.86	1363.89	12784.56
3.96	1139.37	12909.72
4.06	934.24	13013.40
4.16	748.5	13097.54
4.26	582.16	13164.07
4.36	435.21	13214.94
4.46	307.64	13252.08
4.56	199.48	13277.44
4.66	110.7	13292.95
4.76	41.32	13300.55



Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
Storage Area (ft²)
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Storage Area
Storage Volume

Storage Node : BR1 (continued)

Output Summary Results

Peak Inflow (cfs) 0.04
Peak Lateral Inflow (cfs) 0.04
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 2.91
Max HGL Elevation Attained (ft) 1006.42
Max HGL Depth Attained (ft) 0
Average HGL Elevation Attained (ft) 1006.42
Average HGL Depth Attained (ft) 0
Time of Max HGL Occurrence (days hh:mm) 0 00:00
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 : BR2

Input Data

Invert Elevation (ft)	1005.73
Max (Rim) Elevation (ft)	1008.73
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1005.73
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

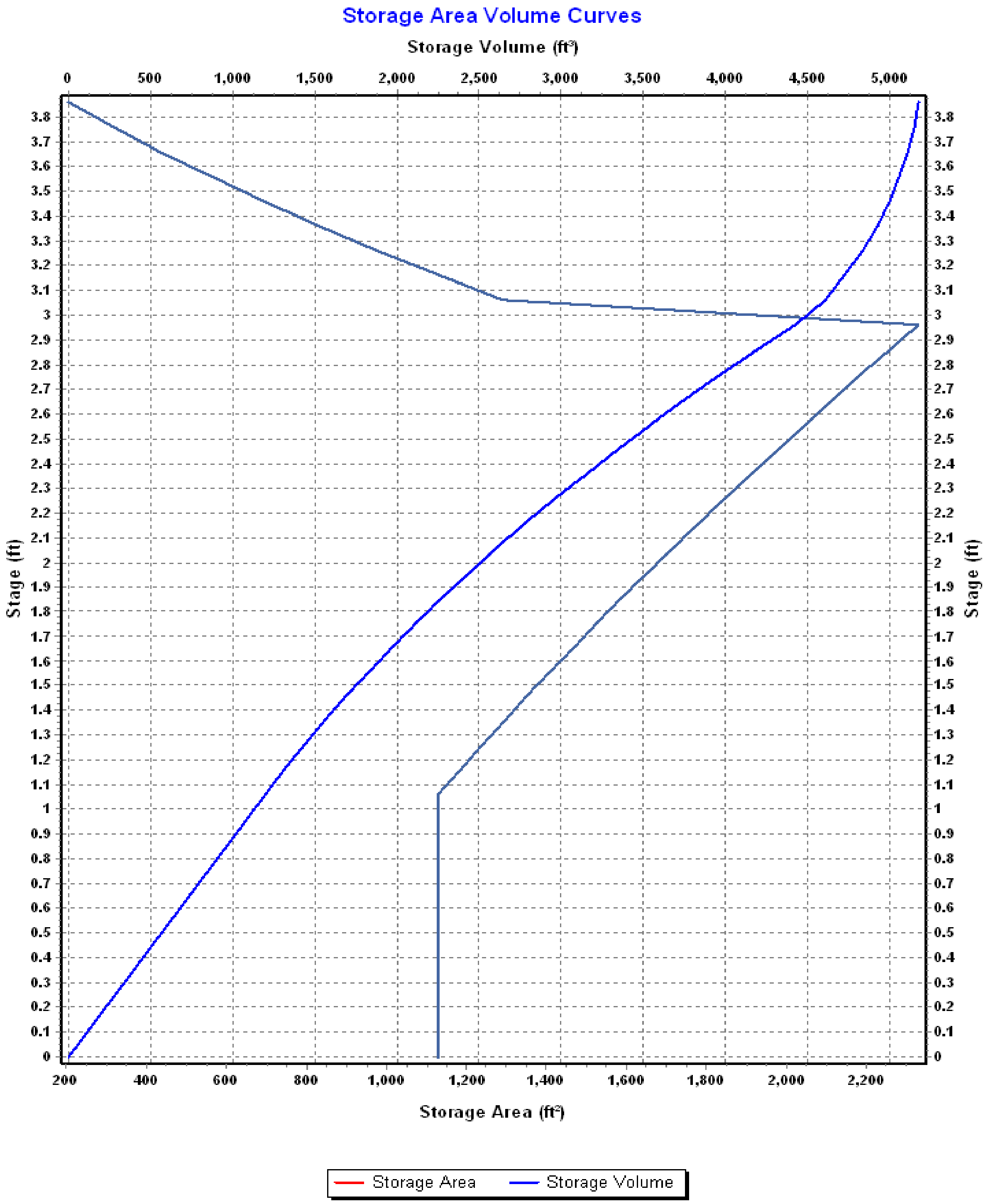
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1129	0.000
1.06	1129.97	1197.25
1.16	1184.09	1312.95
1.26	1239.25	1434.12
1.36	1295.46	1560.86
1.46	1352.68	1693.27
1.56	1410.88	1831.45
1.66	1470.06	1975.50
1.76	1530.22	2125.51
1.86	1591.36	2281.59
1.96	1653.48	2443.83
2.06	1716.58	2612.33
2.16	1780.66	2787.19
2.26	1845.72	2968.51
2.36	1911.76	3156.38
2.46	1978.78	3350.91
2.55	2039.93	3531.75
2.56	2046.78	3552.18
2.66	2115.75	3760.31
2.76	2185.71	3975.38
2.86	2256.65	4197.50
2.96	2328.56	4426.76
3.06	1290.75	4607.73
3.16	1130.9	4728.81
3.26	978.01	4834.26
3.36	832.08	4924.76
3.46	693.11	5001.02
3.56	561.1	5063.73
3.66	436.05	5113.59
3.76	317.96	5151.29
3.86	206.82	5177.53



Storage Area Volume Curves
Storage Volume (ft³)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Stage (ft)
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (continued)

Output Summary Results

Peak Inflow (cfs) 0.02
Peak Lateral Inflow (cfs) 0.02
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.18
Max HGL Elevation Attained (ft) 1005.73
Max HGL Depth Attained (ft) 0
Average HGL Elevation Attained (ft) 1005.73
Average HGL Depth Attained (ft) 0
Time of Max HGL Occurrence (days hh:mm) 0 00:00
Total Exfiltration Volume (1000-ft³) 0.000
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

5-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270-MH.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	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Oct 20, 2022	00:00:00
End Analysis On	Oct 21, 2022	00:00:00
Start Reporting On	Oct 20, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	3
Nodes..	7
Junctions	3
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links..	5
Channels	4
Pipes	1
Pumps	0
Orifices	0
Weirs	0
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	RAINEVENT	Time Series	5YR	Cumulative	inches	California	San Bernardino (Baker)	5	1.27	SCS Type I 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	A1	1.59	85.00	1.27	0.31	0.50	0.20	0 00:20:00
2	A2	0.73	85.00	1.27	0.31	0.23	0.09	0 00:20:00
3	DMA-PREDEV	2.32	77.00	1.27	0.12	0.29	0.02	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	1008.26	1008.76	1008.26	6.00	0.00	0.00	1008.26	0.00	0.50	0 00:00	0.00	0.00
2	Jun-02	Junction	1007.79	1008.29	1007.79	6.00	0.00	0.00	1007.79	0.00	1.50	0 00:00	0.00	0.00
3	Jun-03	Junction	1007.77	1008.27	1007.77	0.00	0.00	0.00	1007.77	0.00	1.50	0 00:00	0.00	0.00
4	OUT1	Outfall	1007.63					0.00	1007.63					
5	OUT-PRE	Outfall	0.00					0.03	0.00					
6	BR1	Storage Node	1006.42	1009.48	0.00		0.00	0.19	1006.51				0.00	0.00
7	BR2	Storage Node	1005.73	1008.73	0.00		0.00	0.09	1005.85				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	CH4	Pipe	Jun-02	Jun-03	29.72	0.00	0.00	0.0000	18.000	0.0150	0.00	2.36	0.00	0.00	0.00	0.00	0.00	Calculated
2	CH1	Channel	BR1	Jun-01	20.00	1008.98	1008.26	3.6000	6.000	0.0130	0.00	10.43	0.00	0.00	0.00	0.00	0.00	
3	CH2	Channel	Jun-01	Jun-02	312.00	1008.26	1007.79	0.1500	6.000	0.0130	0.00	2.13	0.00	0.00	0.00	0.00	0.00	
4	CH3	Channel	BR2	Jun-02	3.00	1008.29	1007.79	16.6700	6.000	0.0130	0.00	22.43	0.00	0.00	0.00	0.00	0.00	
5	CH5	Channel	Jun-03	OUT1	12.00	1007.77	1007.63	1.1700	6.000	0.0320	0.00	2.41	0.00	0.00	0.00	0.00	0.00	

Subbasin Hydrology

Subbasin : A1

Input Data

Area (ac) 1.59
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	1.59	B	85.00
Composite Area & Weighted CN	1.59		85.00

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 :

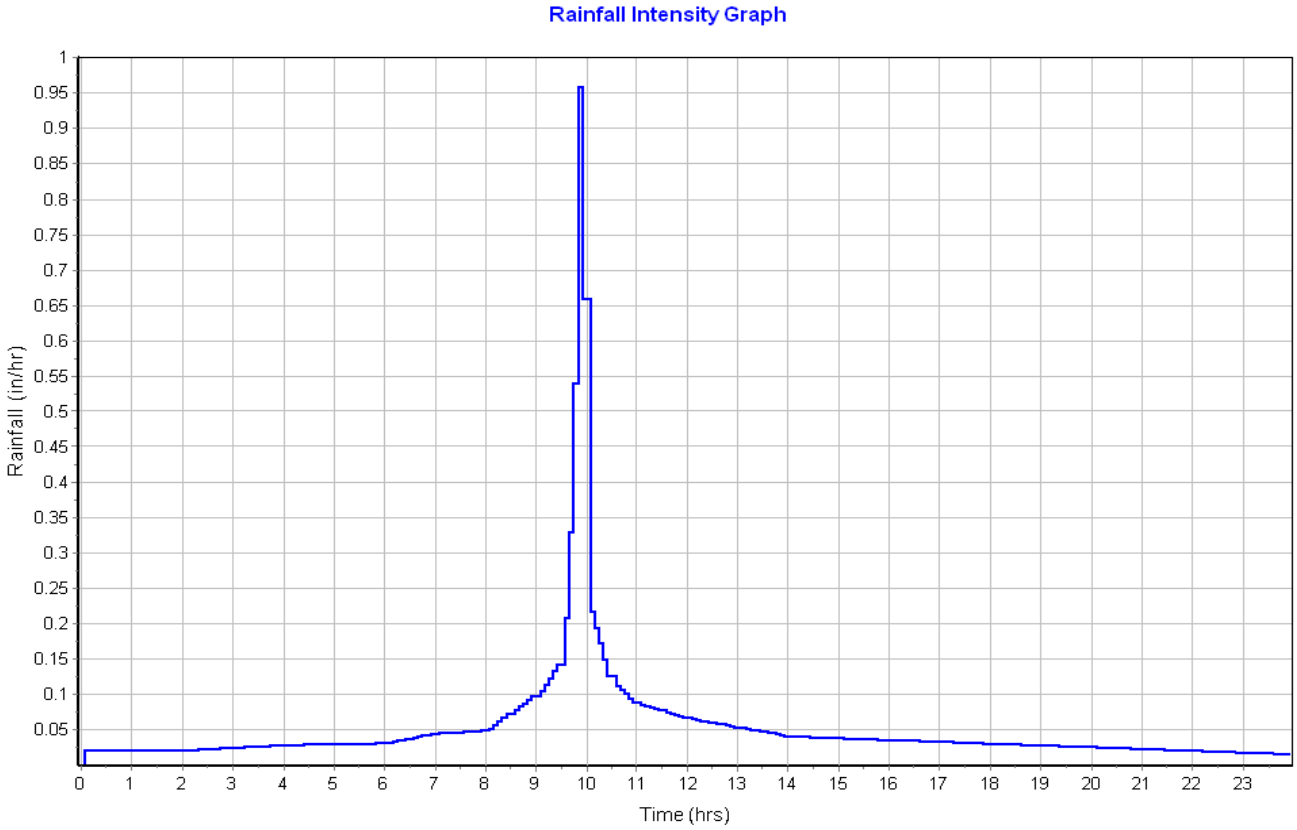
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 20

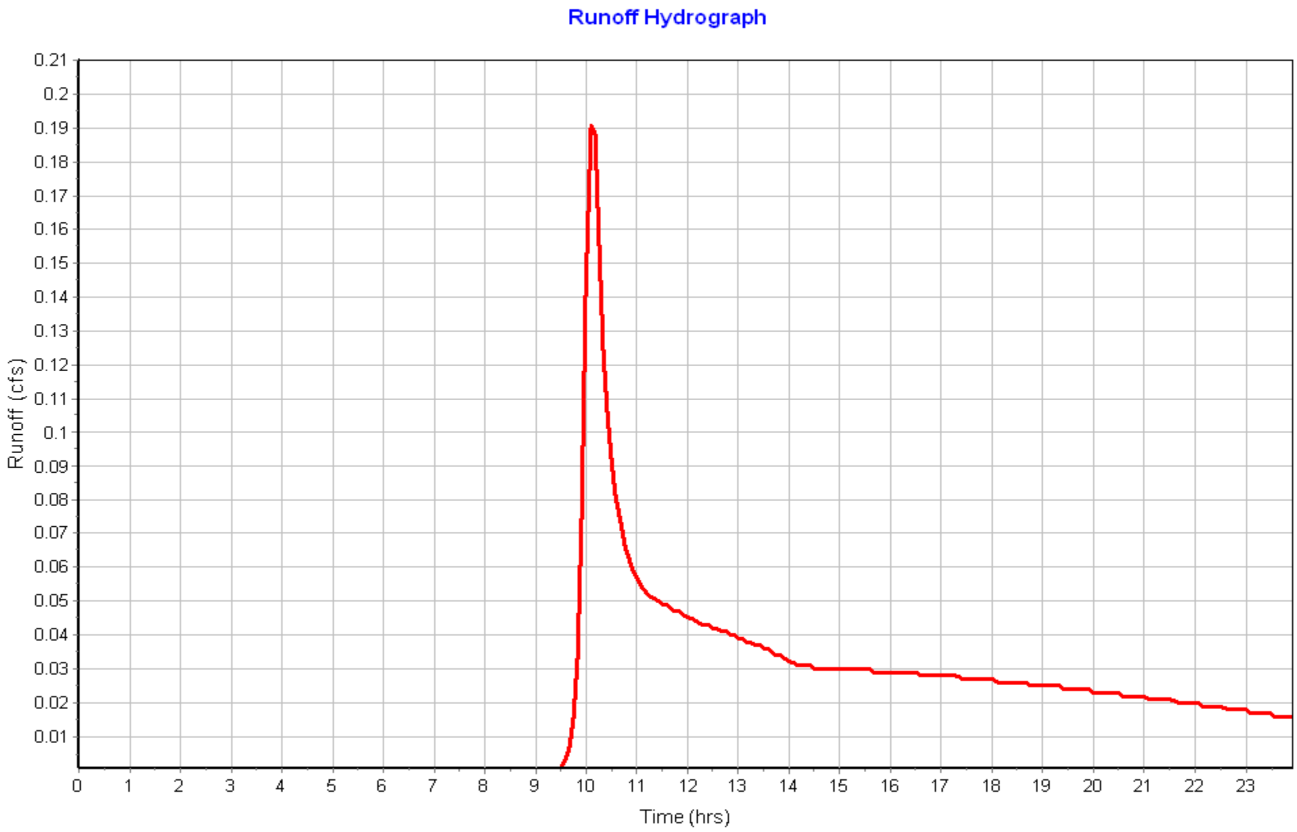
Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.31
Peak Runoff (cfs) 0.20
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A1



Rainfall Intensity Graph
Rainfall (in/hr)
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.21
0.2
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A2

Input Data

Area (ac) 0.73
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.69	B	85.00
Composite Area & Weighted CN	2.69		85.00

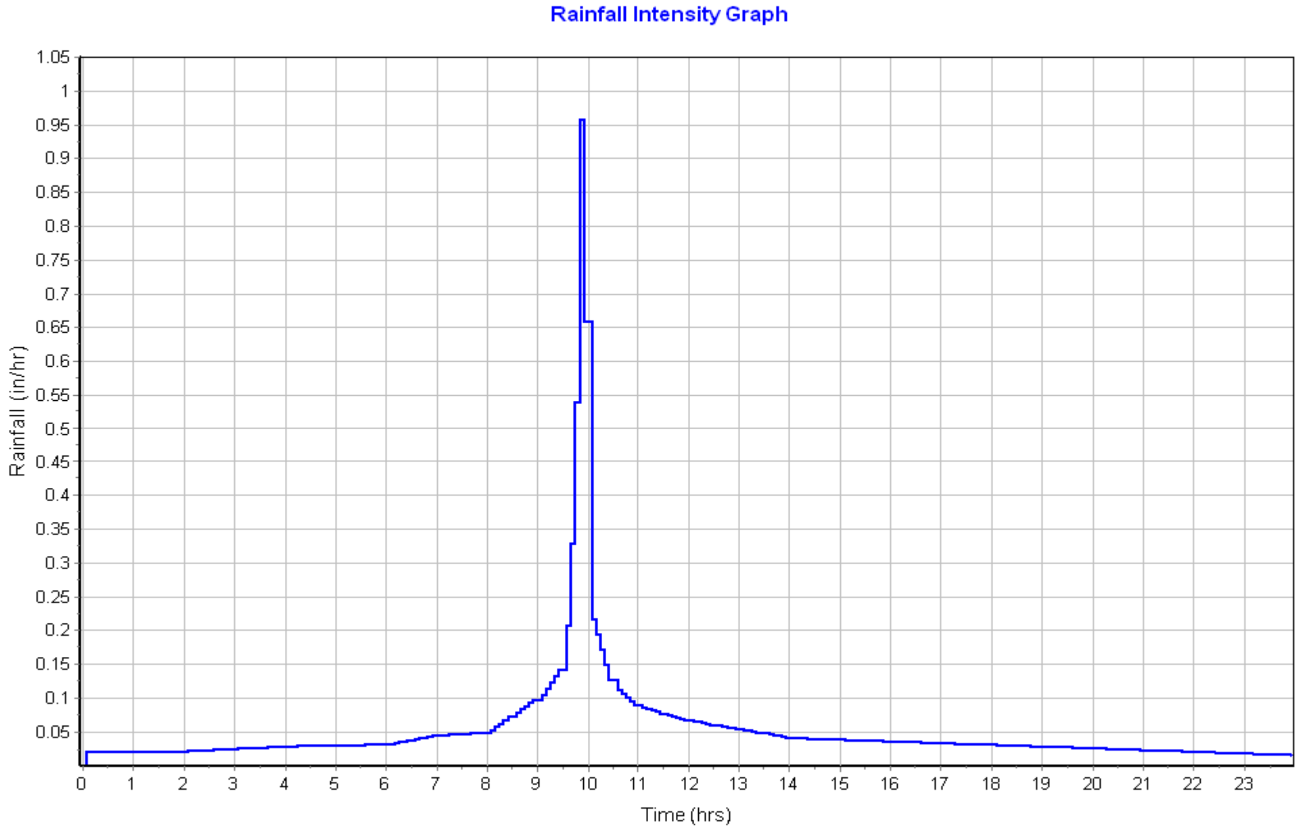
Time of Concentration

User-Defined TOC override (minutes): 20.00

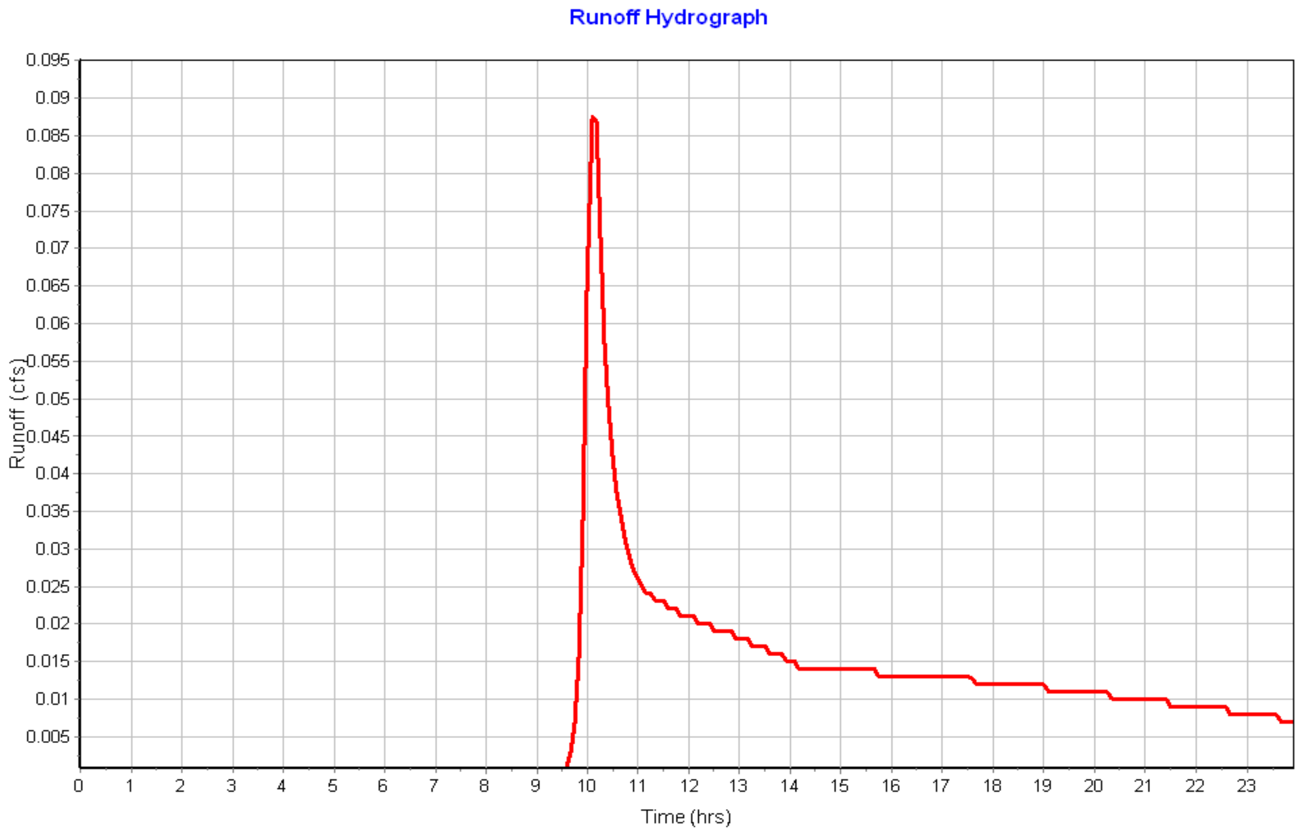
Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.31
Peak Runoff (cfs) 0.09
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A2



Rainfall Intensity Graph
Rainfall (in/hr)
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.095
0.09
0.085
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : DMA-PREDEV

Input Data

Area (ac) 2.32
Weighted Curve Number 77.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	2.69	B	77.00
Composite Area & Weighted CN	2.69		77.00

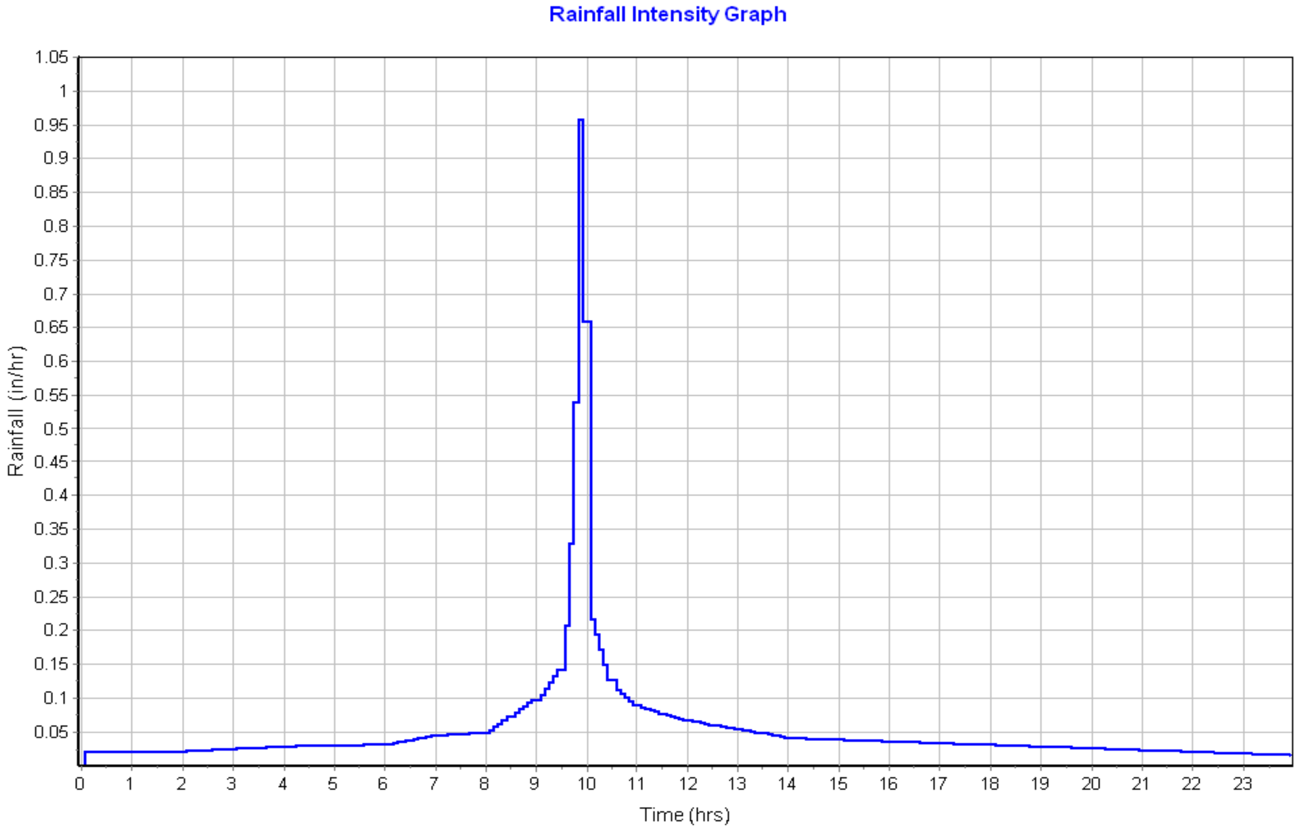
Time of Concentration

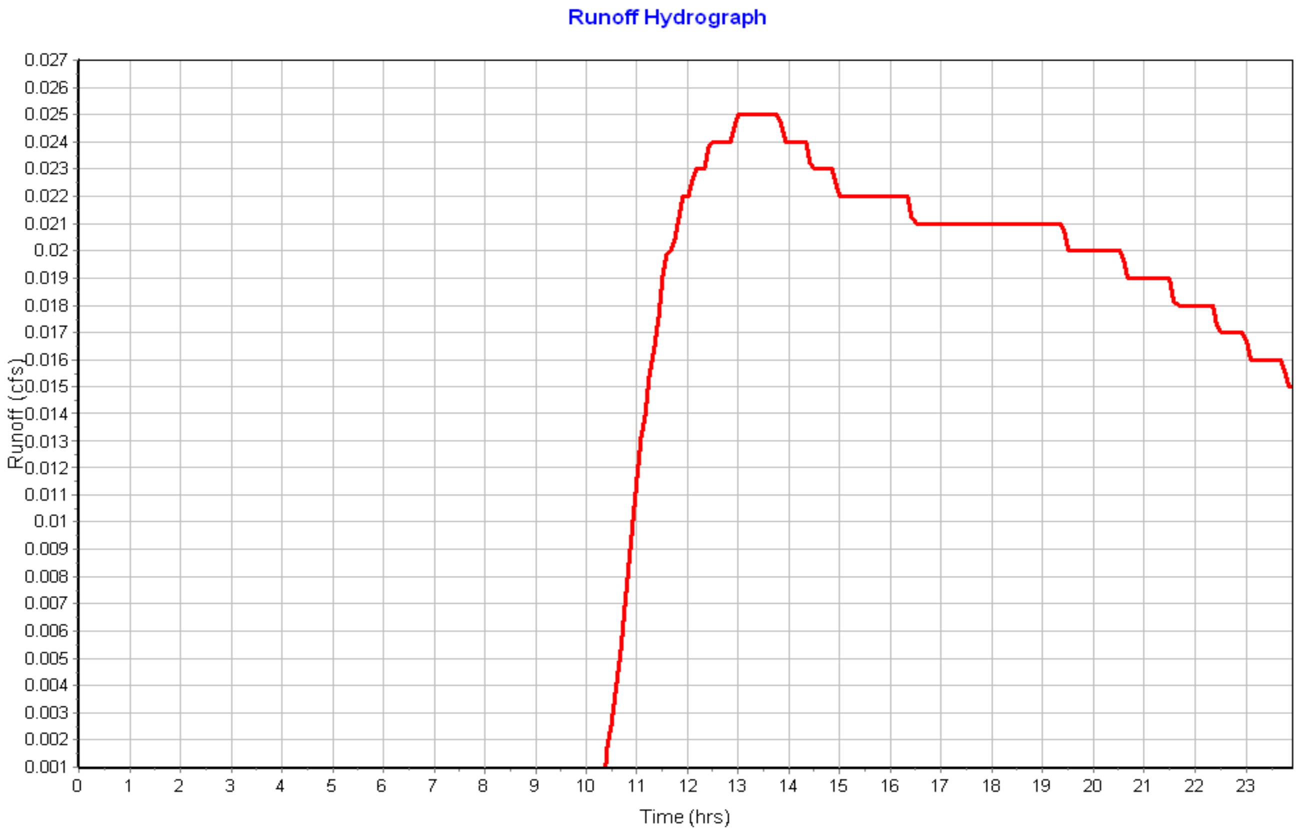
User-Defined TOC override (minutes): 100.00

Subbasin Runoff Results

Total Rainfall (in) 1.27
Total Runoff (in) 0.12
Peak Runoff (cfs) 0.02
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : DMA-PREDEV





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	Jun-01	1008.26	1008.76	0.50	1008.26	0.00	6.00	-1002.76	0.00	0.00
2	Jun-02	1007.79	1008.29	0.50	1007.79	0.00	6.00	-1002.29	0.00	0.00
3	Jun-03	1007.77	1008.27	0.50	1007.77	0.00	0.00	-1008.27	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	0.00	0.00	1008.26	0.00	0.00	0.50	1008.26	0.00	0 00:00	0 00:00	0.00	0.00
2	Jun-02	0.00	0.00	1007.79	0.00	0.00	1.50	1007.79	0.00	0 00:00	0 00:00	0.00	0.00
3	Jun-03	0.00	0.00	1007.77	0.00	0.00	1.50	1007.77	0.00	0 00:00	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	CH1	20.00	1008.98	2.56	1008.26	0.00	0.72	3.6000	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
2	CH2	312.00	1008.26	0.00	1007.79	0.00	0.47	0.1500	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
3	CH3	3.00	1008.29	2.56	1007.79	0.00	0.50	16.6700	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
4	CH5	12.00	1007.77	0.00	1007.63	0.00	0.14	1.1700	Rectangular	0.500	2.000	0.0320	0.5000	0.5000	0.0000	0.00	No

Channel 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	CH1	0.00	0 00:00	10.43	0.00	0.00		0.00	0.00	0.00		
2	CH2	0.00	0 00:00	2.13	0.00	0.00		0.00	0.00	0.00		
3	CH3	0.00	0 00:00	22.43	0.00	0.00		0.00	0.00	0.00		
4	CH5	0.00	0 00:00	2.41	0.00	0.00		0.00	0.00	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
1	CH4	29.72	0.00	-1007.79	0.00	-1007.77	0.00	0.0000	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No

No. of Barrels
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	CH4	0.00	0 00:00	2.36	0.00	0.00		0.00	0.00	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1006.42
Max (Rim) Elevation (ft) 1009.48
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1006.42
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

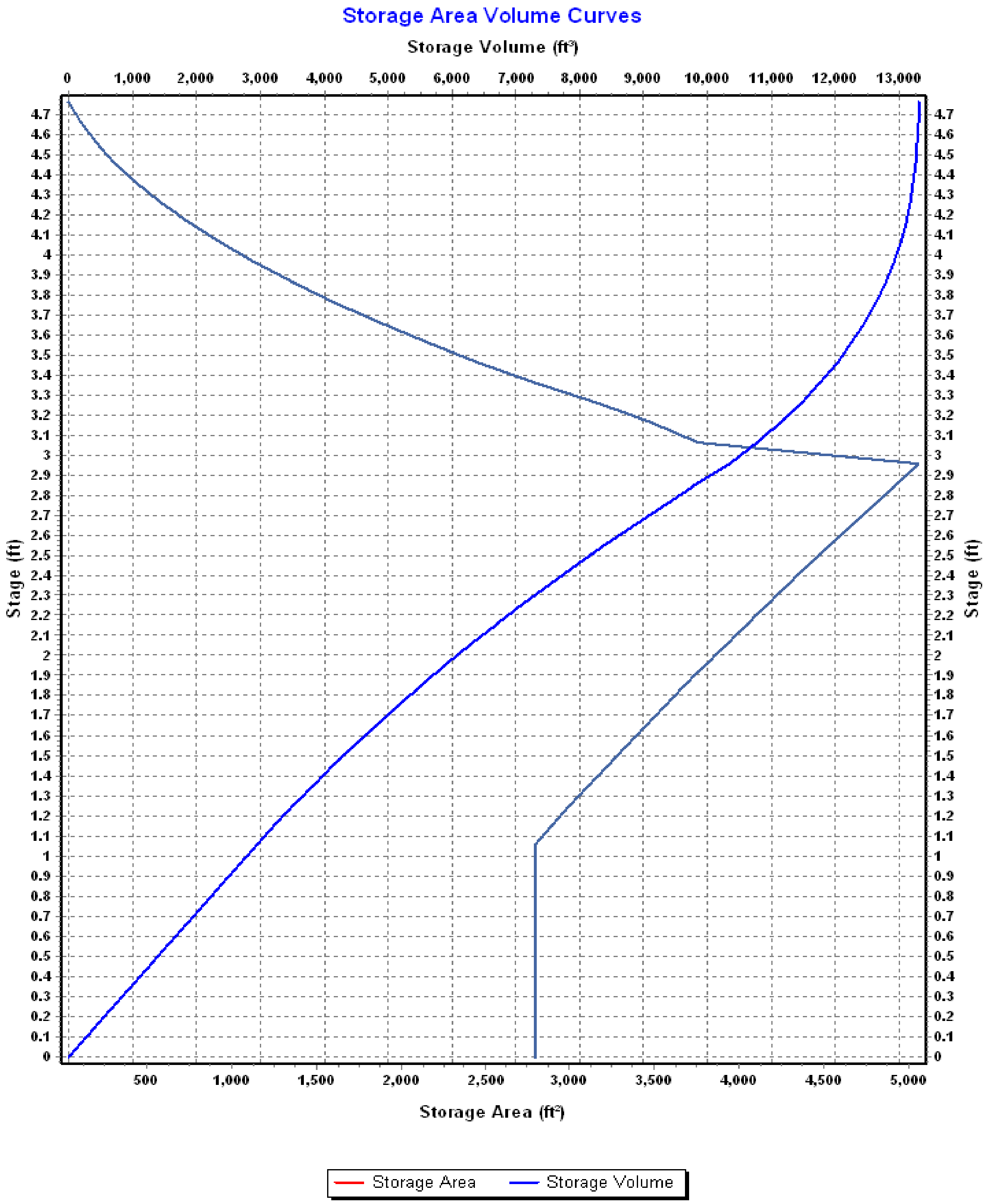
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	2792	0.000
1.06	2792.47	2959.77
1.16	2899.21	3244.35
1.26	3007.33	3539.68
1.36	3116.82	3845.89
1.46	3227.68	4163.12
1.56	3339.91	4491.50
1.66	3453.52	4831.17
1.76	3568.5	5182.27
1.86	3684.86	5544.94
1.96	3802.58	5919.31
2.06	3921.69	6305.52
2.16	4042.16	6703.71
2.26	4164	7114.02
2.36	4287.22	7536.58
2.46	4411.82	7971.53
2.54	4512.48	8328.50
2.56	4537.78	8419.00
2.66	4665.12	8879.15
2.76	4793.83	9352.10
2.86	4923.91	9837.99
2.96	5055.37	10336.95
3.06	3755.59	10777.50
3.16	3483.33	11139.45
3.26	3150.21	11471.13
3.36	2788.29	11768.06
3.46	2456.06	12030.28
3.56	2153.81	12260.77
3.66	1871.11	12462.02
3.76	1607.81	12635.97
3.86	1363.89	12784.56
3.96	1139.37	12909.72
4.06	934.24	13013.40
4.16	748.5	13097.54
4.26	582.16	13164.07
4.36	435.21	13214.94
4.46	307.64	13252.08
4.56	199.48	13277.44
4.66	110.7	13292.95
4.76	41.32	13300.55


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
Stage (ft)
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (continued)

Output Summary Results

Peak Inflow (cfs) 0.19
Peak Lateral Inflow (cfs) 0.19
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 2.91
Max HGL Elevation Attained (ft) 1006.51
Max HGL Depth Attained (ft) 0.09
Average HGL Elevation Attained (ft) 1006.44
Average HGL Depth Attained (ft) 0.02
Time of Max HGL Occurrence (days hh:mm) 0 11:43
Total Exfiltration Volume (1000-ft³) 1.163
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1005.73
Max (Rim) Elevation (ft) 1008.73
Max (Rim) Offset (ft) 3.00
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1005.73
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

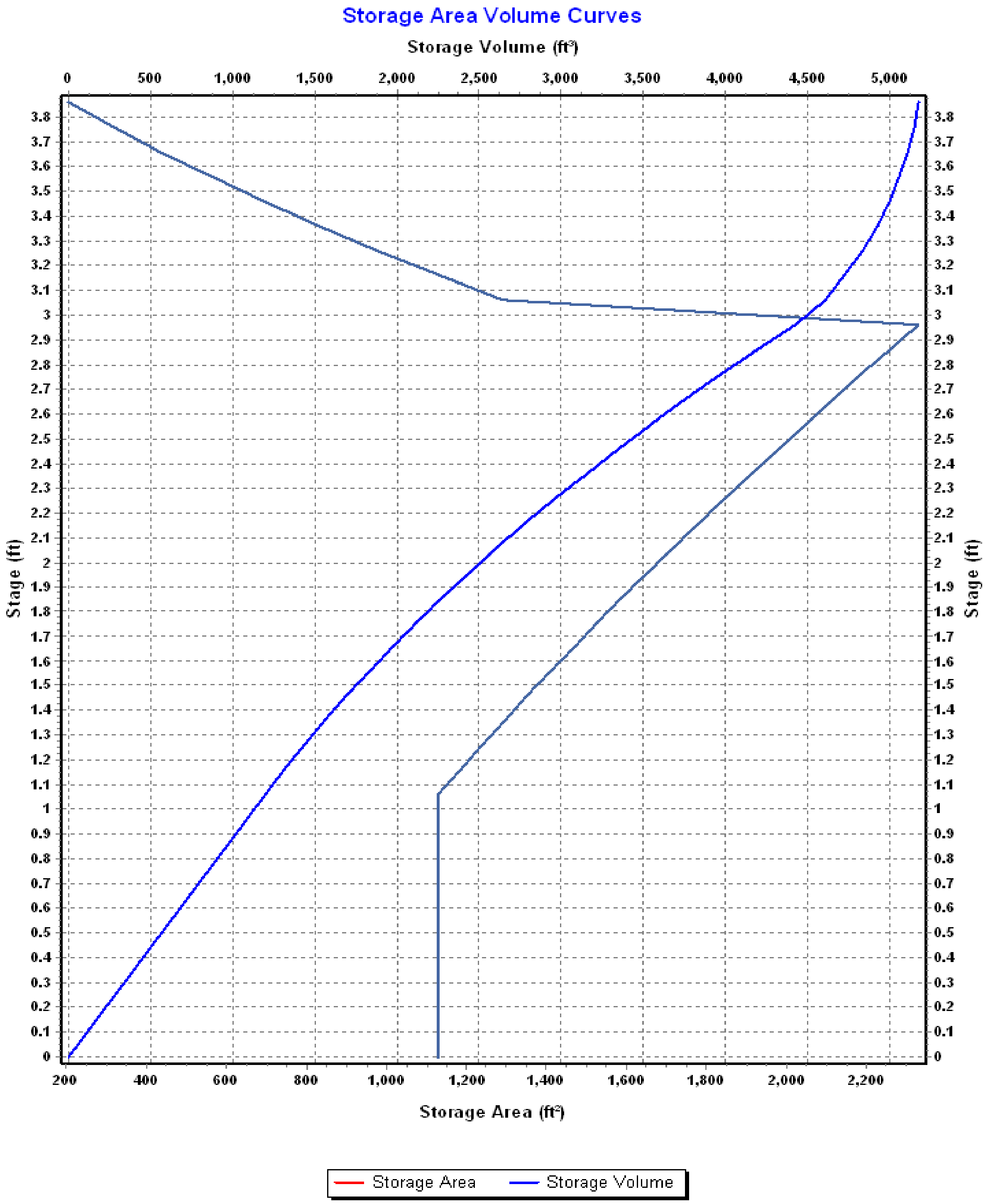
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1129	0.000
1.06	1129.97	1197.25
1.16	1184.09	1312.95
1.26	1239.25	1434.12
1.36	1295.46	1560.86
1.46	1352.68	1693.27
1.56	1410.88	1831.45
1.66	1470.06	1975.50
1.76	1530.22	2125.51
1.86	1591.36	2281.59
1.96	1653.48	2443.83
2.06	1716.58	2612.33
2.16	1780.66	2787.19
2.26	1845.72	2968.51
2.36	1911.76	3156.38
2.46	1978.78	3350.91
2.55	2039.93	3531.75
2.56	2046.78	3552.18
2.66	2115.75	3760.31
2.76	2185.71	3975.38
2.86	2256.65	4197.50
2.96	2328.56	4426.76
3.06	1290.75	4607.73
3.16	1130.9	4728.81
3.26	978.01	4834.26
3.36	832.08	4924.76
3.46	693.11	5001.02
3.56	561.1	5063.73
3.66	436.05	5113.59
3.76	317.96	5151.29
3.86	206.82	5177.53


Storage Area Volume Curves
Storage Volume (ft³)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Stage (ft)
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (continued)

Output Summary Results

Peak Inflow (cfs) 0.09
Peak Lateral Inflow (cfs) 0.09
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.18
Max HGL Elevation Attained (ft) 1005.85
Max HGL Depth Attained (ft) 0.12
Average HGL Elevation Attained (ft) 1005.76
Average HGL Depth Attained (ft) 0.03
Time of Max HGL Occurrence (days hh:mm) 0 12:32
Total Exfiltration Volume (1000-ft³) 0.647
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

10-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270-MH.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods ...... YES

Analysis Options

Start Analysis On	Oct 20, 2022	00:00:00
End Analysis On	Oct 21, 2022	00:00:00
Start Reporting On	Oct 20, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	3
Nodes..	7
Junctions	3
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links..	5
Channels	4
Pipes	1
Pumps	0
Orifices	0
Weirs	0
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	RAINEVENT	Time Series	10YR	Cumulative	inches	California	San Bernardino (Baker)	10	1.60	SCS Type I 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	A1	1.59	85.00	1.60	0.52	0.82	0.38	0 00:20:00
2	A2	0.73	85.00	1.60	0.52	0.38	0.18	0 00:20:00
3	DMA-PREDEV	2.32	77.00	1.60	0.25	0.58	0.07	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	1008.26	1008.76	1008.26	6.00	0.00	0.00	1008.26	0.00	0.50	0 00:00	0.00	0.00
2	Jun-02	Junction	1007.79	1008.29	1007.79	6.00	0.00	0.00	1007.79	0.00	1.50	0 00:00	0.00	0.00
3	Jun-03	Junction	1007.77	1008.27	1007.77	0.00	0.00	0.00	1007.77	0.00	1.50	0 00:00	0.00	0.00
4	OUT1	Outfall	1007.63					0.00	1007.63					
5	OUT-PRE	Outfall	0.00					0.07	0.00					
6	BR1	Storage Node	1006.42	1009.48	0.00		0.00	0.38	1006.72				0.00	0.00
7	BR2	Storage Node	1005.73	1008.73	0.00		0.00	0.17	1006.12				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	CH4	Pipe	Jun-02	Jun-03	29.72	0.00	0.00	0.0000	18.000	0.0150	0.00	2.36	0.00	0.00	0.00	0.00	0.00	Calculated
2	CH1	Channel	BR1	Jun-01	20.00	1008.98	1008.26	3.6000	6.000	0.0130	0.00	10.43	0.00	0.00	0.00	0.00	0.00	
3	CH2	Channel	Jun-01	Jun-02	312.00	1008.26	1007.79	0.1500	6.000	0.0130	0.00	2.13	0.00	0.00	0.00	0.00	0.00	
4	CH3	Channel	BR2	Jun-02	3.00	1008.29	1007.79	16.6700	6.000	0.0130	0.00	22.43	0.00	0.00	0.00	0.00	0.00	
5	CH5	Channel	Jun-03	OUT1	12.00	1007.77	1007.63	1.1700	6.000	0.0320	0.00	2.41	0.00	0.00	0.00	0.00	0.00	

Subbasin Hydrology

Subbasin : A1

Input Data

Area (ac) 1.59
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	1.59	B	85.00
Composite Area & Weighted CN	1.59		85.00

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 :

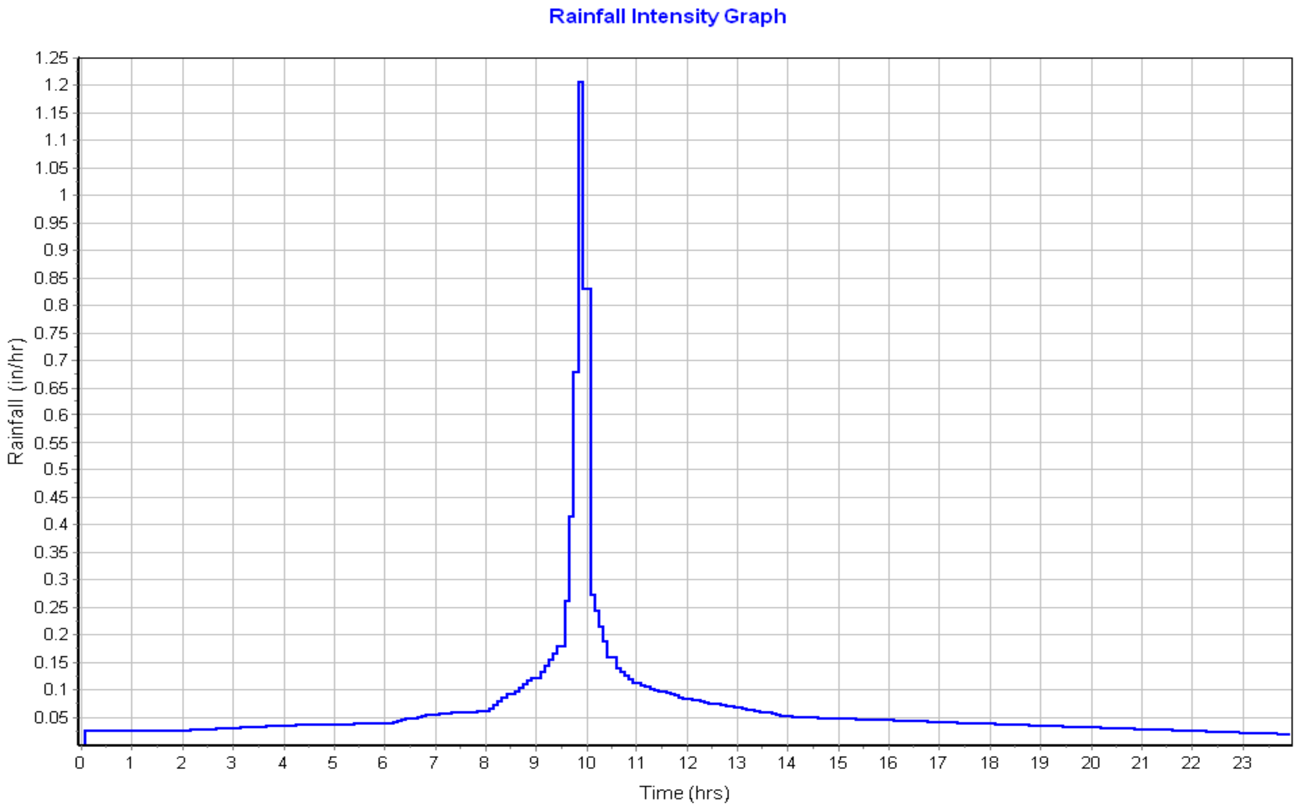
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 20

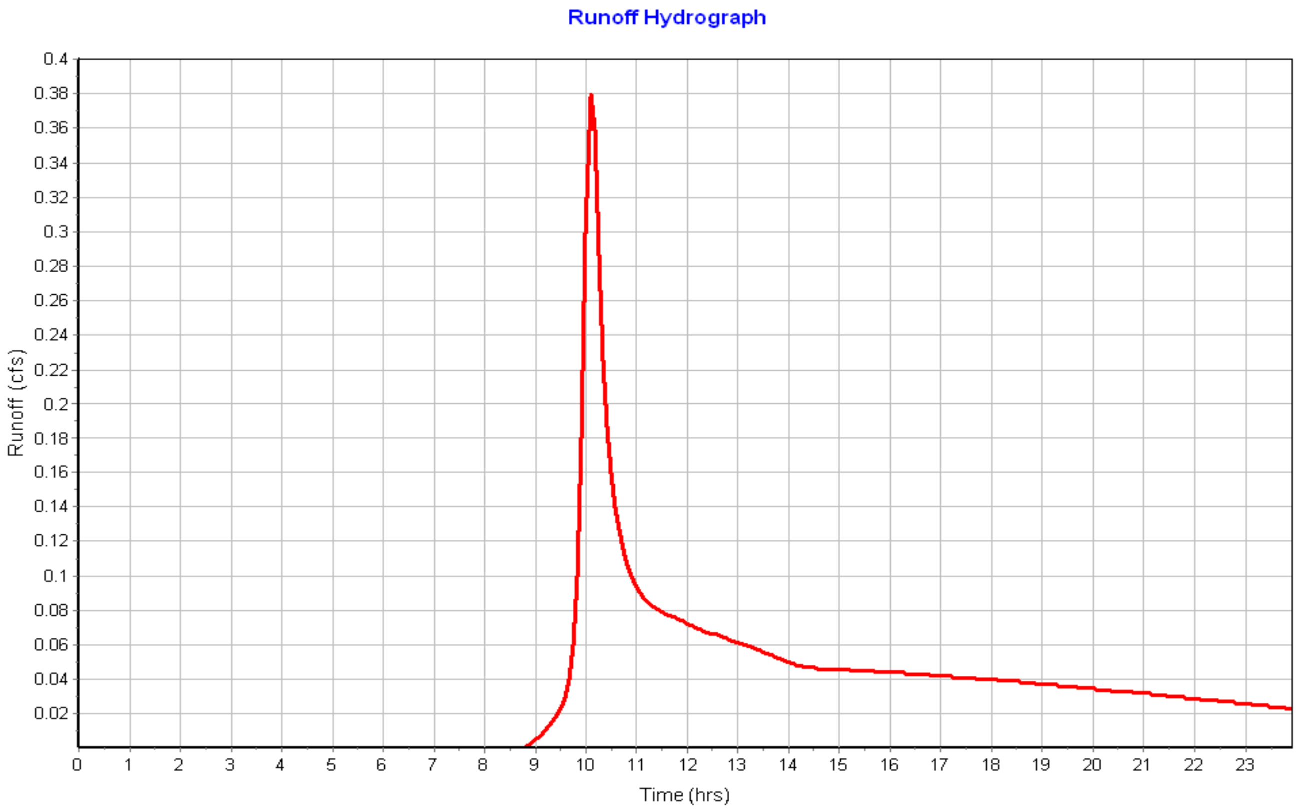
Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.52
Peak Runoff (cfs) 0.38
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A1



Rainfall Intensity Graph
Rainfall (in/hr)
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A2

Input Data

Area (ac) 0.73
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.69	B	85.00
Composite Area & Weighted CN	2.69		85.00

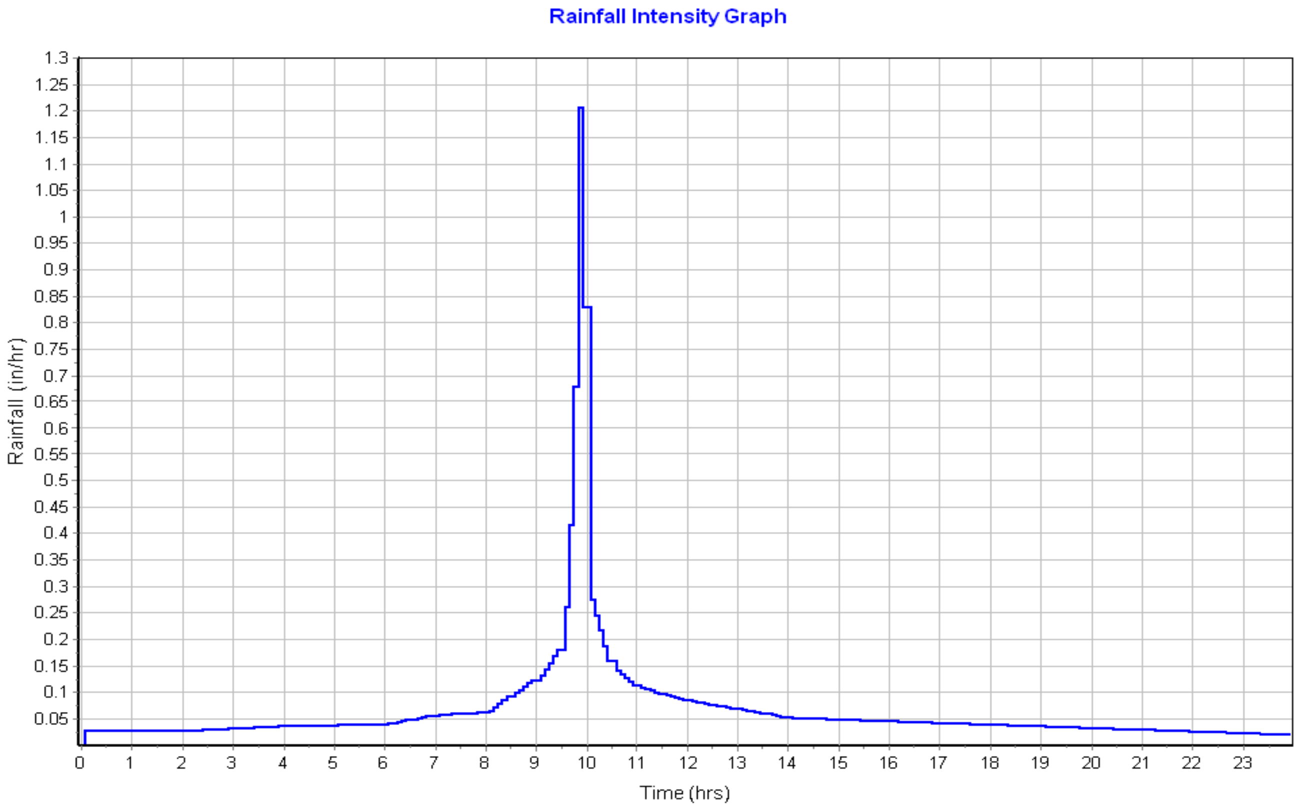
Time of Concentration

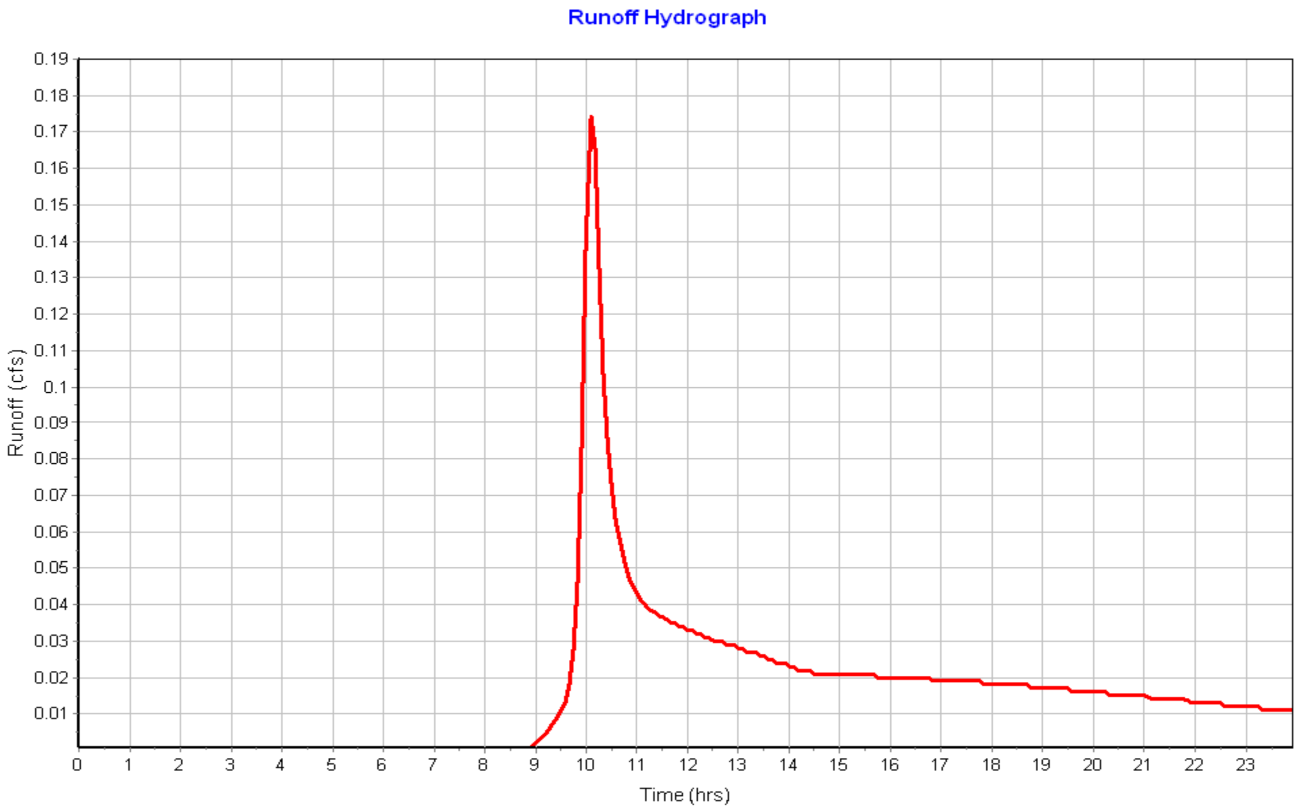
User-Defined TOC override (minutes): 20.00

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.52
Peak Runoff (cfs) 0.18
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A2


Rainfall Intensity Graph
Rainfall (in/hr)
1.3
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : DMA-PREDEV

Input Data

Area (ac) 2.32
Weighted Curve Number 77.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	2.69	B	77.00
Composite Area & Weighted CN	2.69		77.00

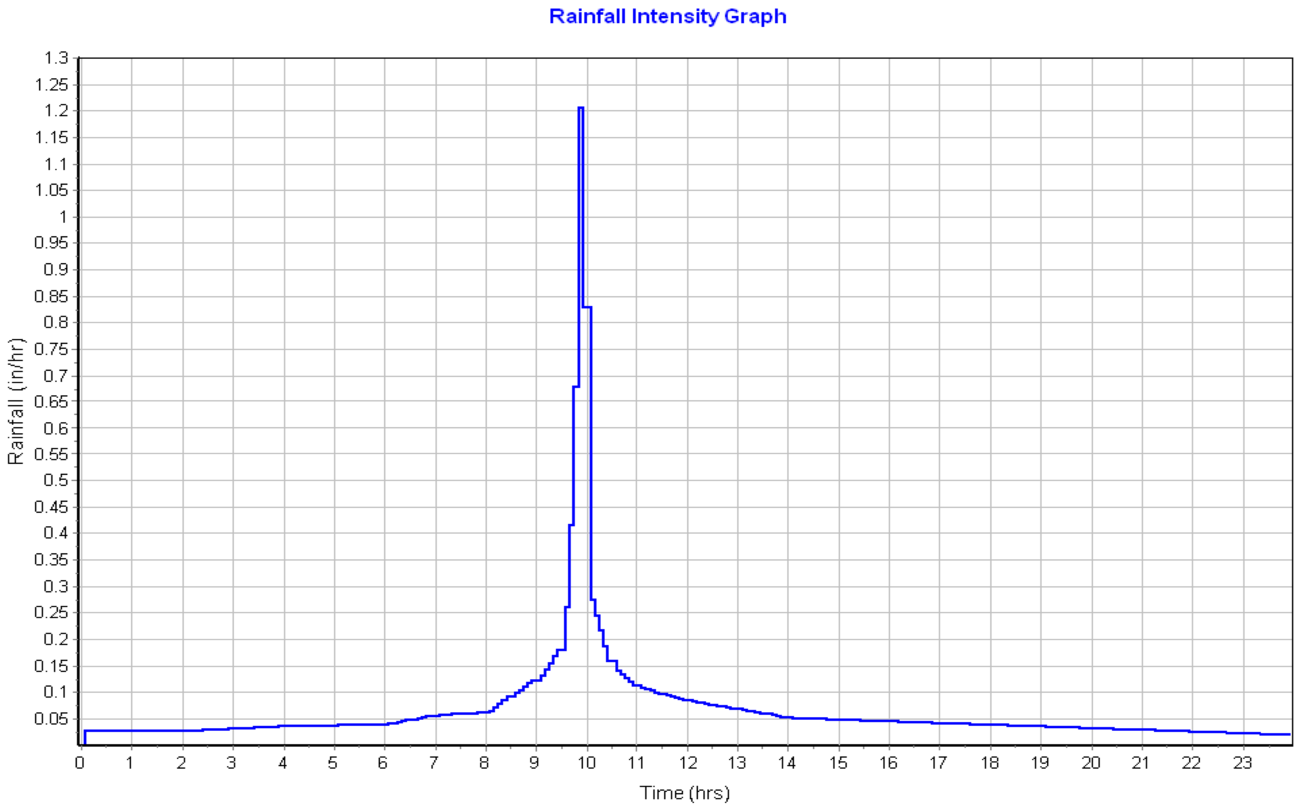
Time of Concentration

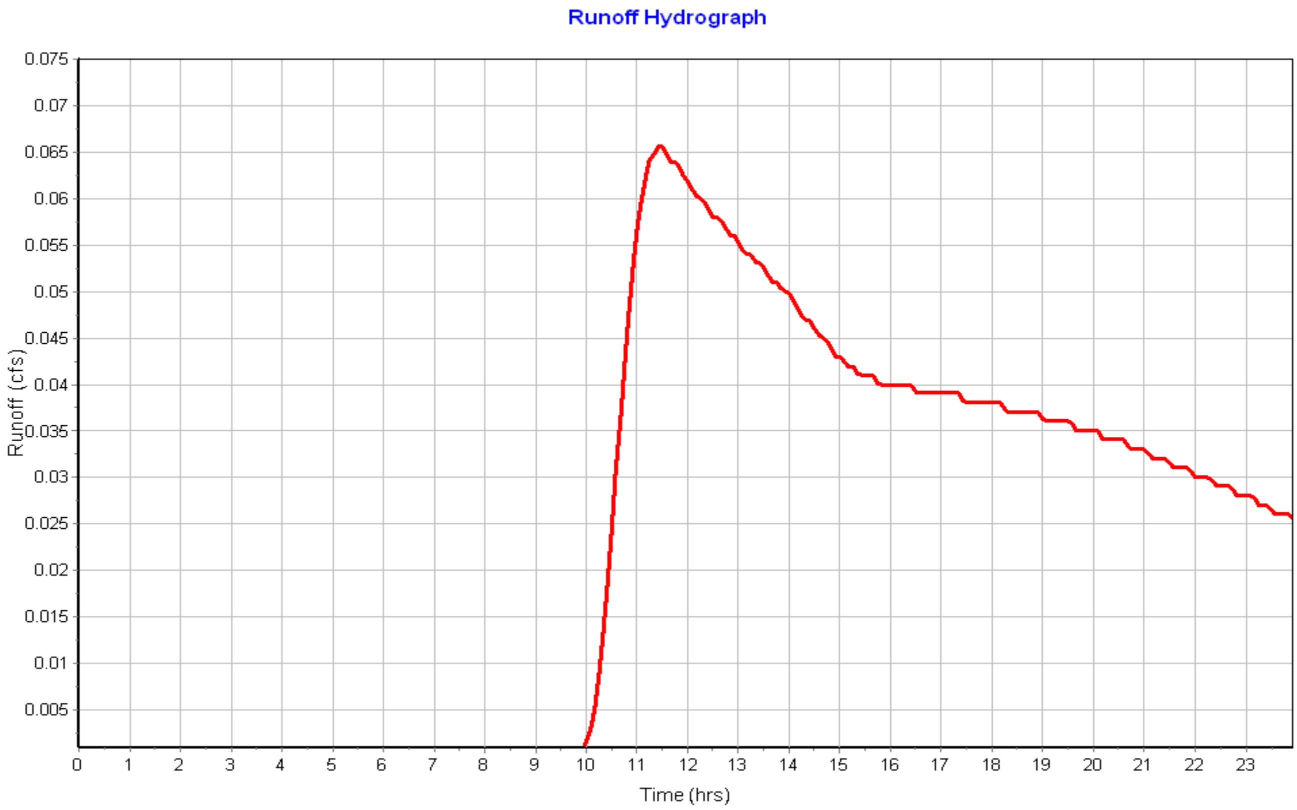
User-Defined TOC override (minutes): 100.00

Subbasin Runoff Results

Total Rainfall (in) 1.60
Total Runoff (in) 0.25
Peak Runoff (cfs) 0.07
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : DMA-PREDEV





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	Jun-01	1008.26	1008.76	0.50	1008.26	0.00	6.00	-1002.76	0.00	0.00
2	Jun-02	1007.79	1008.29	0.50	1007.79	0.00	6.00	-1002.29	0.00	0.00
3	Jun-03	1007.77	1008.27	0.50	1007.77	0.00	0.00	-1008.27	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	0.00	0.00	1008.26	0.00	0.00	0.50	1008.26	0.00	0 00:00	0 00:00	0.00	0.00
2	Jun-02	0.00	0.00	1007.79	0.00	0.00	1.50	1007.79	0.00	0 00:00	0 00:00	0.00	0.00
3	Jun-03	0.00	0.00	1007.77	0.00	0.00	1.50	1007.77	0.00	0 00:00	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	CH1	20.00	1008.98	2.56	1008.26	0.00	0.72	3.6000	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
2	CH2	312.00	1008.26	0.00	1007.79	0.00	0.47	0.1500	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
3	CH3	3.00	1008.29	2.56	1007.79	0.00	0.50	16.6700	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
4	CH5	12.00	1007.77	0.00	1007.63	0.00	0.14	1.1700	Rectangular	0.500	2.000	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	CH1	0.00	0 00:00	10.43	0.00	0.00		0.00	0.00	0.00		
2	CH2	0.00	0 00:00	2.13	0.00	0.00		0.00	0.00	0.00		
3	CH3	0.00	0 00:00	22.43	0.00	0.00		0.00	0.00	0.00		
4	CH5	0.00	0 00:00	2.41	0.00	0.00		0.00	0.00	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
1	CH4	29.72	0.00	-1007.79	0.00	-1007.77	0.00	0.0000	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No

No. of Barrels
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	CH4	0.00	0 00:00	2.36	0.00	0.00		0.00	0.00	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1006.42
Max (Rim) Elevation (ft) 1009.48
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1006.42
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

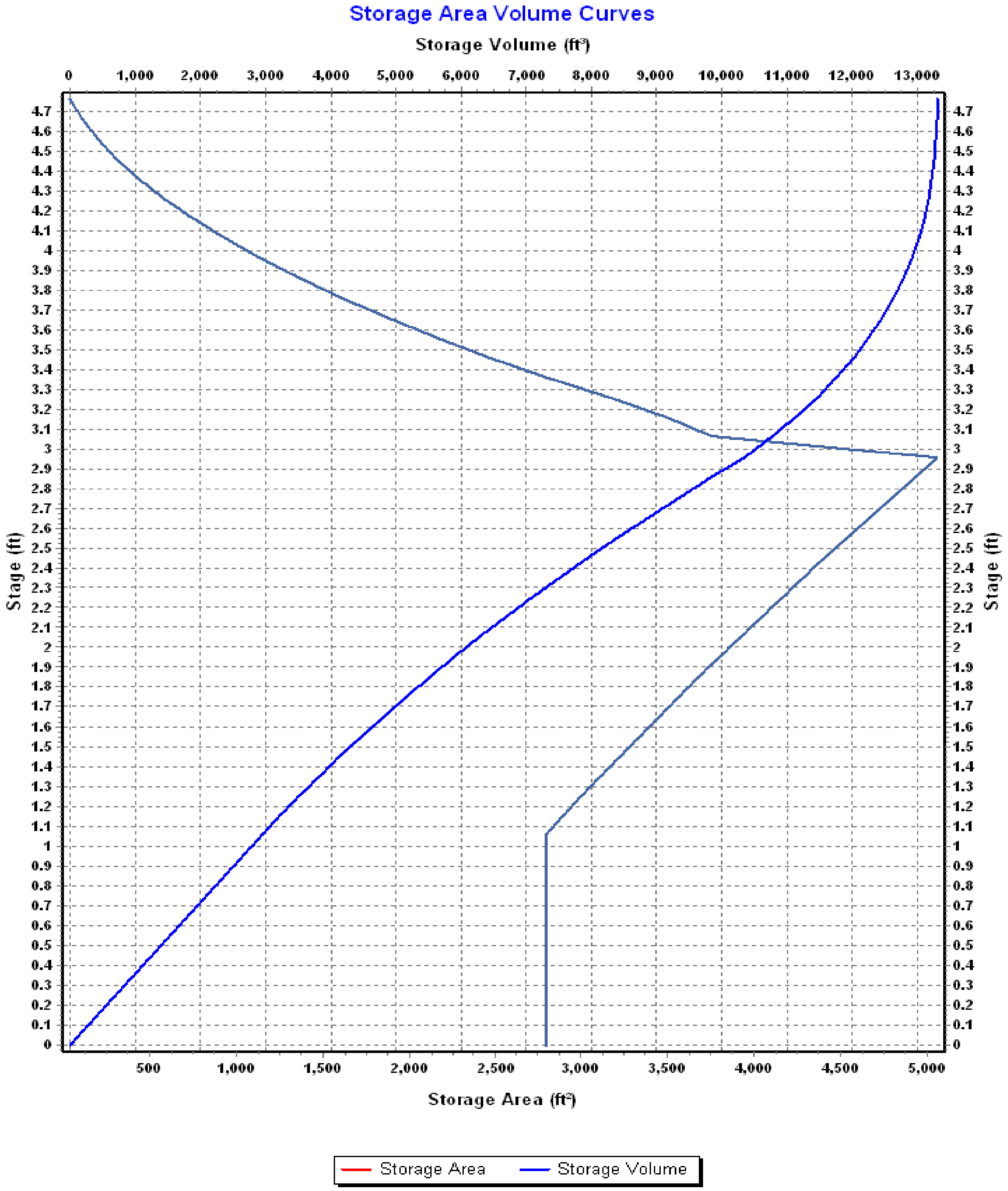
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	2792	0.000
1.06	2792.47	2959.77
1.16	2899.21	3244.35
1.26	3007.33	3539.68
1.36	3116.82	3845.89
1.46	3227.68	4163.12
1.56	3339.91	4491.50
1.66	3453.52	4831.17
1.76	3568.5	5182.27
1.86	3684.86	5544.94
1.96	3802.58	5919.31
2.06	3921.69	6305.52
2.16	4042.16	6703.71
2.26	4164	7114.02
2.36	4287.22	7536.58
2.46	4411.82	7971.53
2.54	4512.48	8328.50
2.56	4537.78	8419.00
2.66	4665.12	8879.15
2.76	4793.83	9352.10
2.86	4923.91	9837.99
2.96	5055.37	10336.95
3.06	3755.59	10777.50
3.16	3483.33	11139.45
3.26	3150.21	11471.13
3.36	2788.29	11768.06
3.46	2456.06	12030.28
3.56	2153.81	12260.77
3.66	1871.11	12462.02
3.76	1607.81	12635.97
3.86	1363.89	12784.56
3.96	1139.37	12909.72
4.06	934.24	13013.40
4.16	748.5	13097.54
4.26	582.16	13164.07
4.36	435.21	13214.94
4.46	307.64	13252.08
4.56	199.48	13277.44
4.66	110.7	13292.95
4.76	41.32	13300.55


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
Storage Area (ft²)
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Storage Area
Storage Volume

Storage Node : BR1 (continued)

Output Summary Results

Peak Inflow (cfs) 0.38
Peak Lateral Inflow (cfs) 0.38
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 2.91
Max HGL Elevation Attained (ft) 1006.72
Max HGL Depth Attained (ft) 0.3
Average HGL Elevation Attained (ft) 1006.57
Average HGL Depth Attained (ft) 0.15
Time of Max HGL Occurrence (days hh:mm) 0 14:13
Total Exfiltration Volume (1000-ft³) 2.487
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft)	1005.73
Max (Rim) Elevation (ft)	1008.73
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1005.73
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

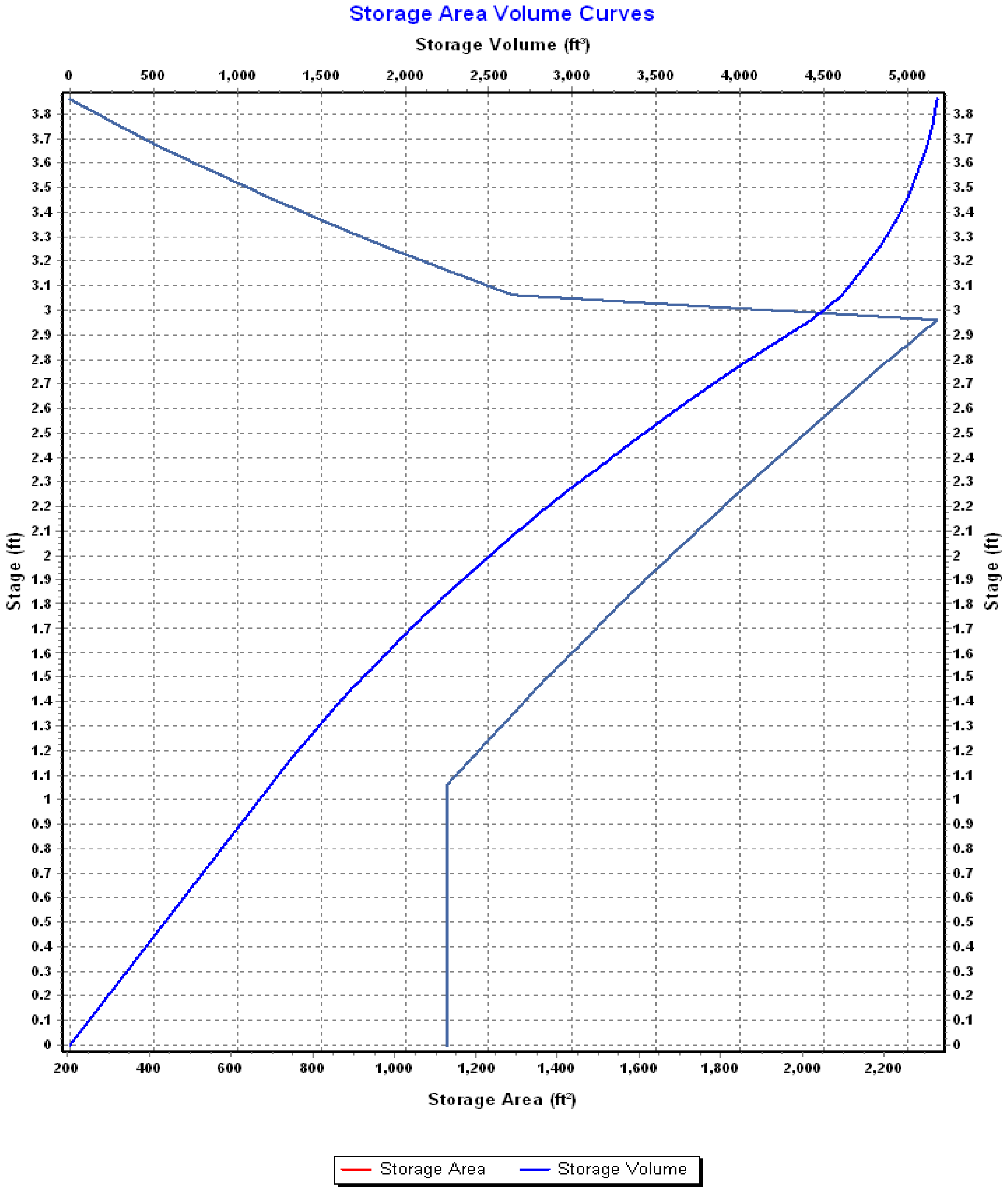
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1129	0.000
1.06	1129.97	1197.25
1.16	1184.09	1312.95
1.26	1239.25	1434.12
1.36	1295.46	1560.86
1.46	1352.68	1693.27
1.56	1410.88	1831.45
1.66	1470.06	1975.50
1.76	1530.22	2125.51
1.86	1591.36	2281.59
1.96	1653.48	2443.83
2.06	1716.58	2612.33
2.16	1780.66	2787.19
2.26	1845.72	2968.51
2.36	1911.76	3156.38
2.46	1978.78	3350.91
2.55	2039.93	3531.75
2.56	2046.78	3552.18
2.66	2115.75	3760.31
2.76	2185.71	3975.38
2.86	2256.65	4197.50
2.96	2328.56	4426.76
3.06	1290.75	4607.73
3.16	1130.9	4728.81
3.26	978.01	4834.26
3.36	832.08	4924.76
3.46	693.11	5001.02
3.56	561.1	5063.73
3.66	436.05	5113.59
3.76	317.96	5151.29
3.86	206.82	5177.53


Storage Area Volume Curves
Storage Volume (ft³)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Stage (ft)
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (continued)

Output Summary Results

Peak Inflow (cfs) 0.17
Peak Lateral Inflow (cfs) 0.17
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.18
Max HGL Elevation Attained (ft) 1006.12
Max HGL Depth Attained (ft) 0.39
Average HGL Elevation Attained (ft) 1005.93
Average HGL Depth Attained (ft) 0.2
Time of Max HGL Occurrence (days hh:mm) 0 16:52
Total Exfiltration Volume (1000-ft³) 1.006
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

25-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270-MH.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 .... Kinematic Wave
Enable Overflow Ponding at Nodes .... YES
Skip Steady State Analysis Time Periods ...... YES

Analysis Options

Start Analysis On	Oct 20, 2022	00:00:00
End Analysis On	Oct 21, 2022	00:00:00
Start Reporting On	Oct 20, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	3
Nodes..	7
Junctions	3
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links..	5
Channels	4
Pipes	1
Pumps	0
Orifices	0
Weirs	0
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	RAINEVENT	Time Series	25YR	Cumulative	inches	California	San Bernardino (Baker)	25	2.07	SCS Type I 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	A1	1.59	85.00	2.07	0.85	1.35	0.69	0 00:20:00
2	A2	0.73	85.00	2.07	0.85	0.62	0.32	0 00:20:00
3	DMA-PREDEV	2.32	77.00	2.07	0.49	1.13	0.17	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	1008.26	1008.76	1008.26	6.00	0.00	0.00	1008.26	0.00	0.50	0 00:00	0.00	0.00
2	Jun-02	Junction	1007.79	1008.29	1007.79	6.00	0.00	0.00	1007.79	0.00	1.50	0 00:00	0.00	0.00
3	Jun-03	Junction	1007.77	1008.27	1007.77	0.00	0.00	0.00	1007.77	0.00	1.50	0 00:00	0.00	0.00
4	OUT1	Outfall	1007.63					0.00	1007.63					
5	OUT-PRE	Outfall	0.00					0.17	0.00					
6	BR1	Storage Node	1006.42	1009.48	0.00		0.00	0.69	1007.23				0.00	0.00
7	BR2	Storage Node	1005.73	1008.73	0.00		0.00	0.32	1006.76				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	CH4	Pipe	Jun-02	Jun-03	29.72	0.00	0.00	0.0000	18.000	0.0150	0.00	2.36	0.00	0.00	0.00	0.00	0.00	Calculated
2	CH1	Channel	BR1	Jun-01	20.00	1008.98	1008.26	3.6000	6.000	0.0130	0.00	10.43	0.00	0.00	0.00	0.00	0.00	
3	CH2	Channel	Jun-01	Jun-02	312.00	1008.26	1007.79	0.1500	6.000	0.0130	0.00	2.13	0.00	0.00	0.00	0.00	0.00	
4	CH3	Channel	BR2	Jun-02	3.00	1008.29	1007.79	16.6700	6.000	0.0130	0.00	22.43	0.00	0.00	0.00	0.00	0.00	
5	CH5	Channel	Jun-03	OUT1	12.00	1007.77	1007.63	1.1700	6.000	0.0320	0.00	2.41	0.00	0.00	0.00	0.00	0.00	

Subbasin Hydrology

Subbasin : A1

Input Data

Area (ac) 1.59
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	1.59	B	85.00
Composite Area & Weighted CN	1.59		85.00

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 :

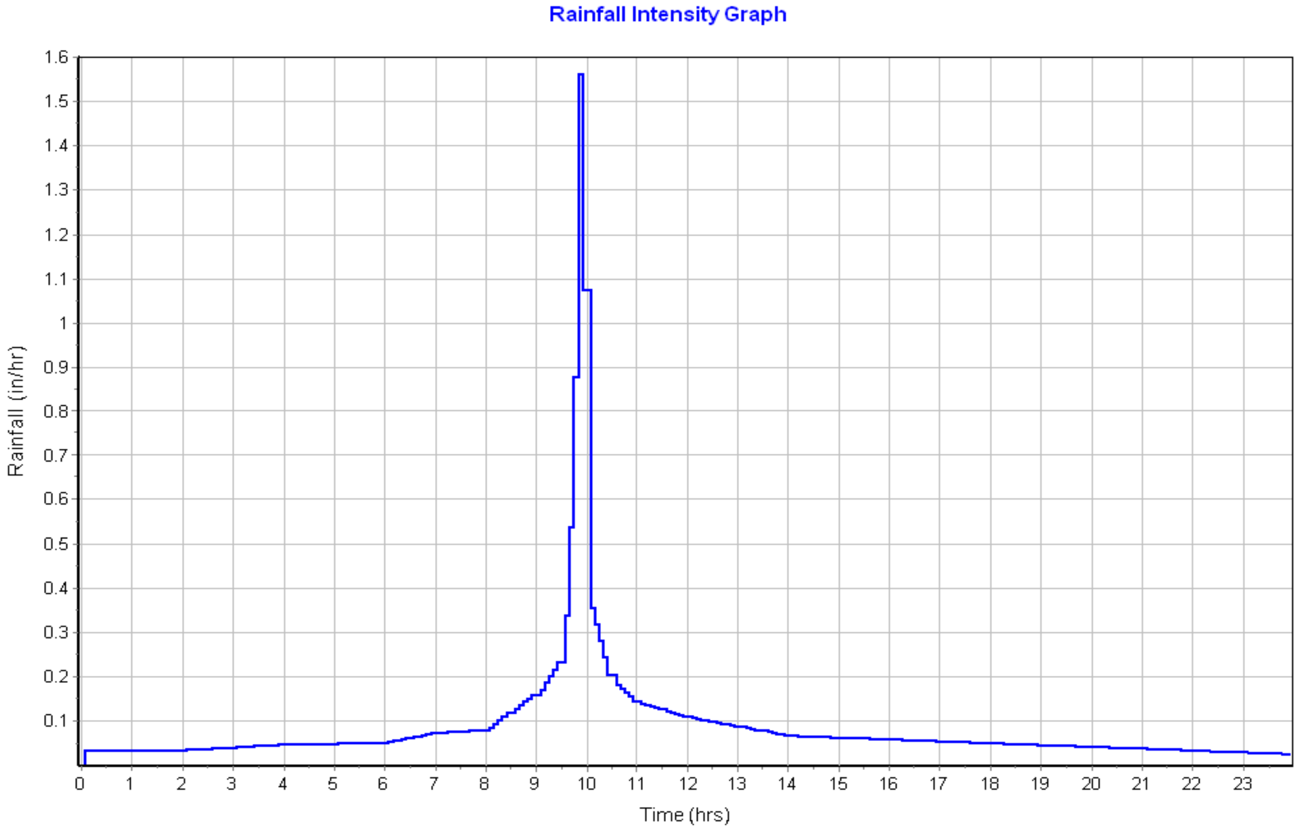
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 20

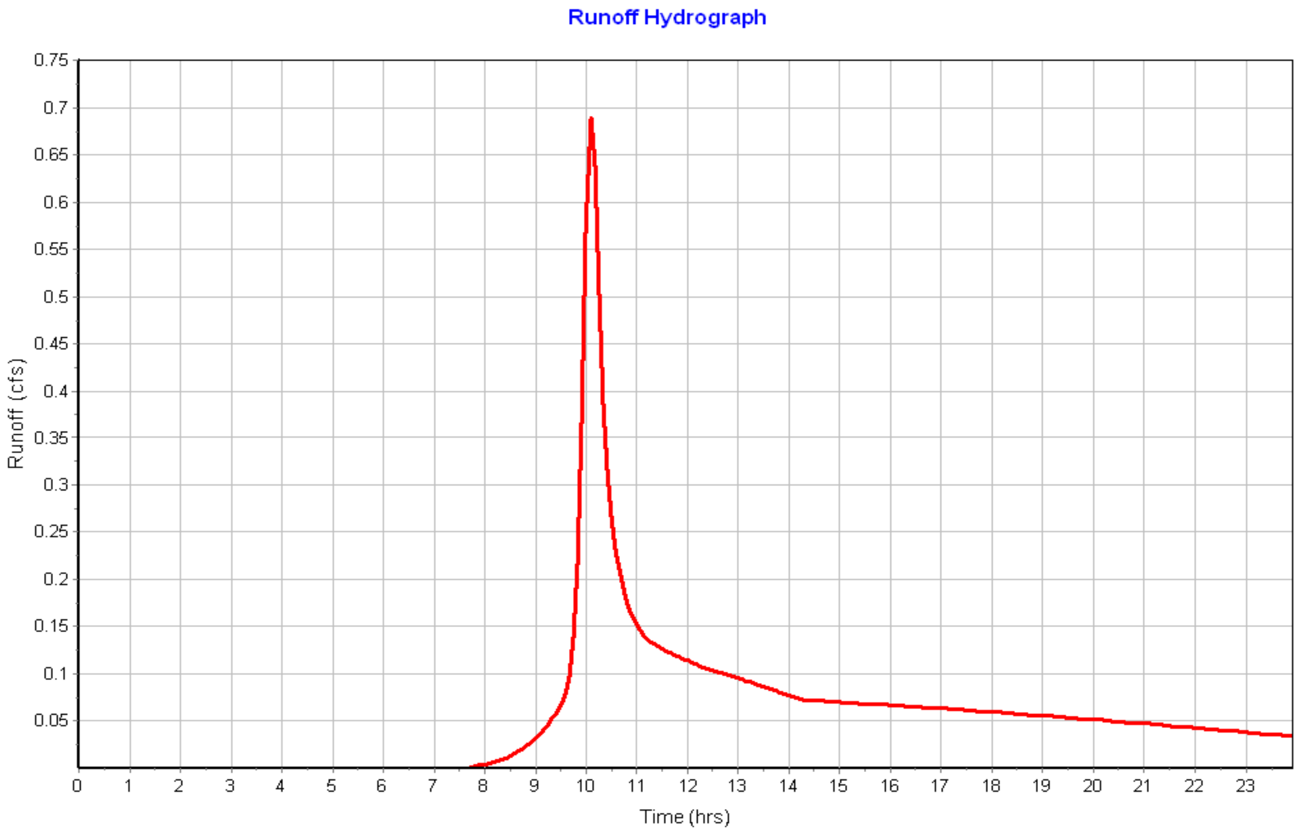
Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 0.85
Peak Runoff (cfs) 0.69
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A1



Rainfall Intensity Graph
Rainfall (in/hr)
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A2

Input Data

Area (ac) 0.73
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.69	B	85.00
Composite Area & Weighted CN	2.69		85.00

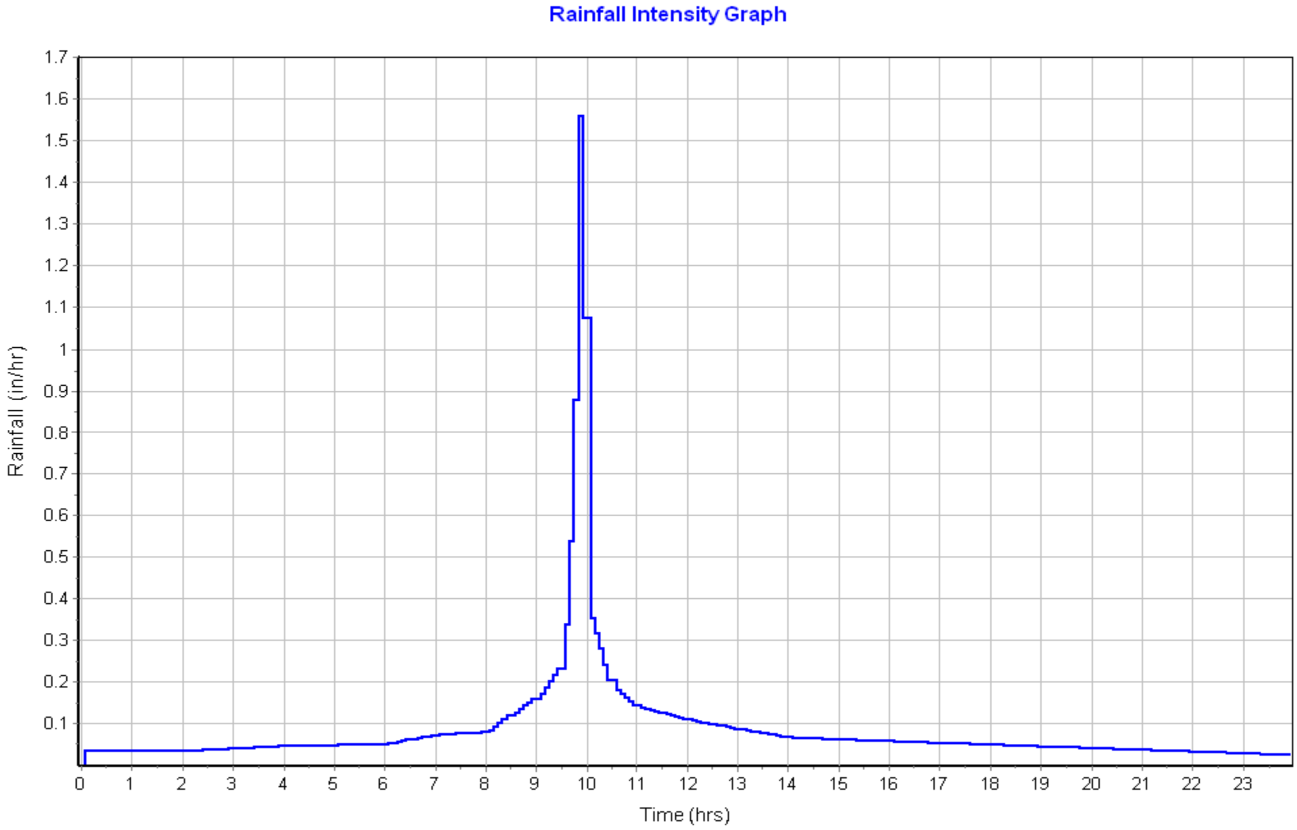
Time of Concentration

User-Defined TOC override (minutes): 20.00

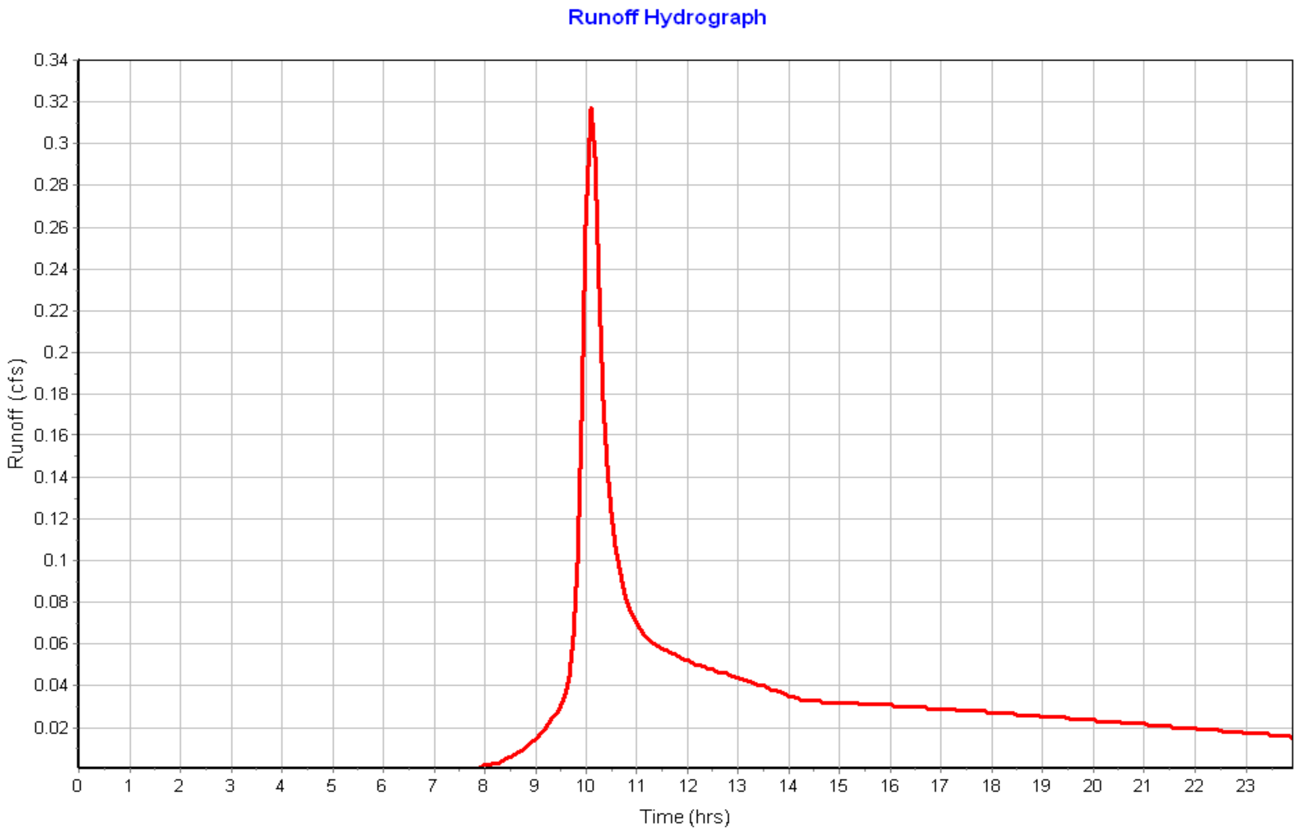
Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 0.85
Peak Runoff (cfs) 0.32
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A2



Rainfall Intensity Graph
Rainfall (in/hr)
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : DMA-PREDEV

Input Data

Area (ac) 2.32
Weighted Curve Number 77.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	2.69	B	77.00
Composite Area & Weighted CN	2.69		77.00

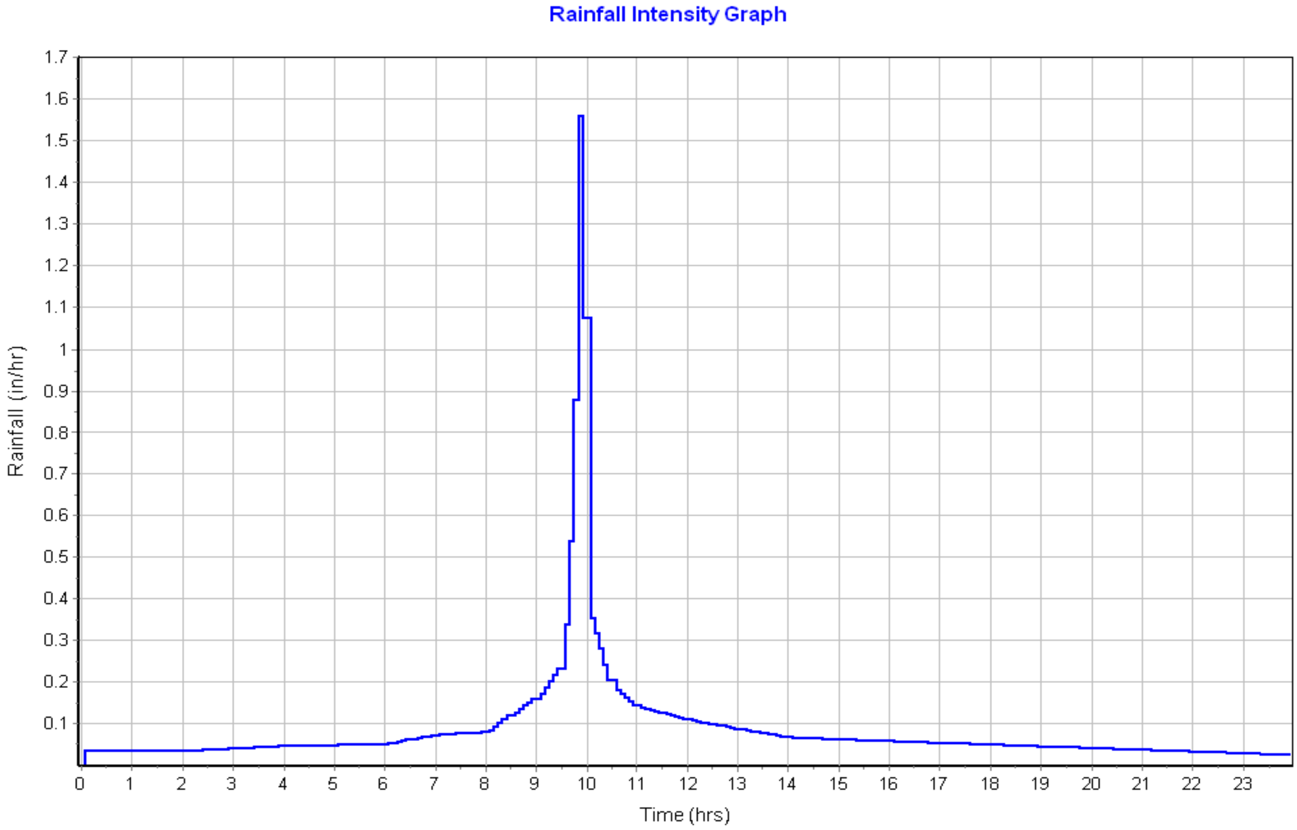
Time of Concentration

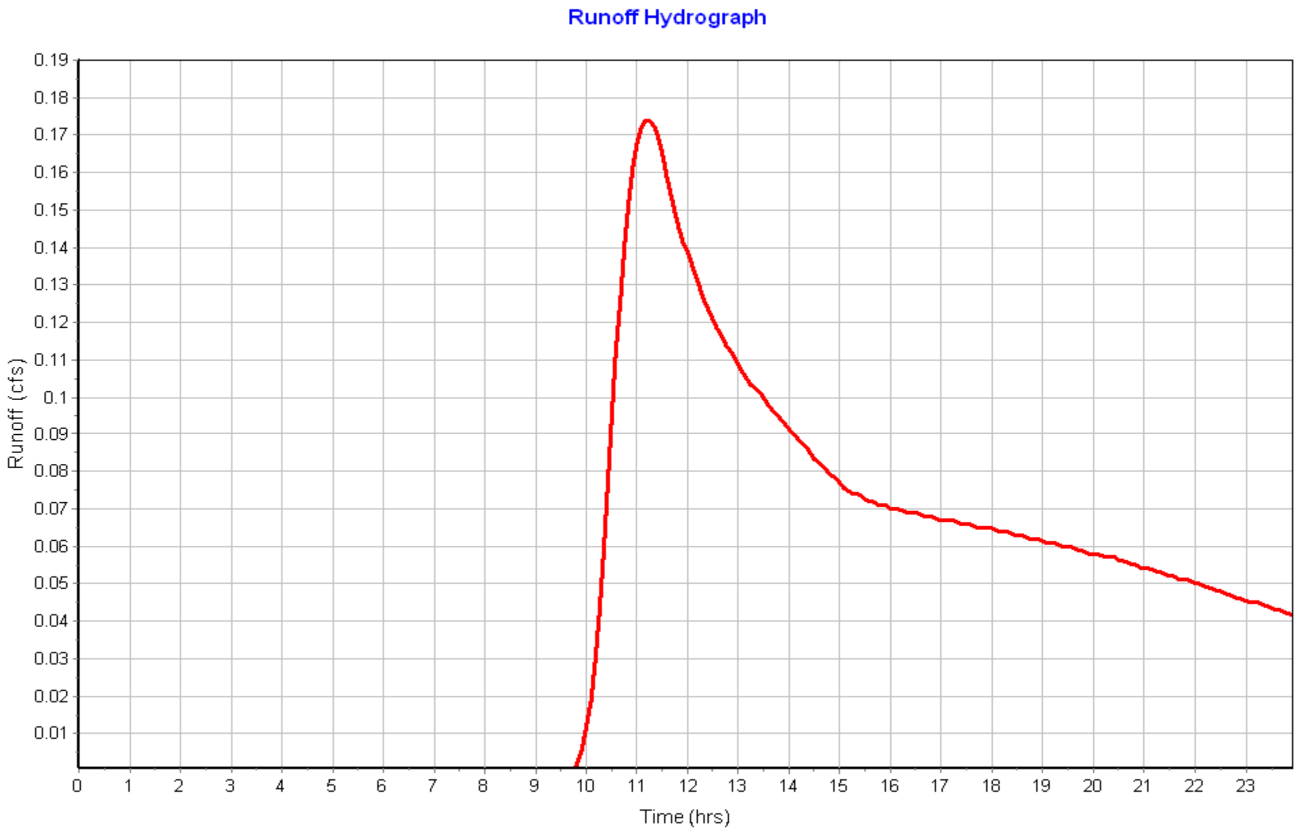
User-Defined TOC override (minutes): 100.00

Subbasin Runoff Results

Total Rainfall (in) 2.07
Total Runoff (in) 0.49
Peak Runoff (cfs) 0.17
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : DMA-PREDEV





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	Jun-01	1008.26	1008.76	0.50	1008.26	0.00	6.00	-1002.76	0.00	0.00
2	Jun-02	1007.79	1008.29	0.50	1007.79	0.00	6.00	-1002.29	0.00	0.00
3	Jun-03	1007.77	1008.27	0.50	1007.77	0.00	0.00	-1008.27	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	0.00	0.00	1008.26	0.00	0.00	0.50	1008.26	0.00	0 00:00	0 00:00	0.00	0.00
2	Jun-02	0.00	0.00	1007.79	0.00	0.00	1.50	1007.79	0.00	0 00:00	0 00:00	0.00	0.00
3	Jun-03	0.00	0.00	1007.77	0.00	0.00	1.50	1007.77	0.00	0 00:00	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	CH1	20.00	1008.98	2.56	1008.26	0.00	0.72	3.6000	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
2	CH2	312.00	1008.26	0.00	1007.79	0.00	0.47	0.1500	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
3	CH3	3.00	1008.29	2.56	1007.79	0.00	0.50	16.6700	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
4	CH5	12.00	1007.77	0.00	1007.63	0.00	0.14	1.1700	Rectangular	0.500	2.000	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	CH1	0.00	0 00:00	10.43	0.00	0.00		0.00	0.00	0.00		
2	CH2	0.00	0 00:00	2.13	0.00	0.00		0.00	0.00	0.00		
3	CH3	0.00	0 00:00	22.43	0.00	0.00		0.00	0.00	0.00		
4	CH5	0.00	0 00:00	2.41	0.00	0.00		0.00	0.00	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
1	CH4	29.72	0.00	-1007.79	0.00	-1007.77	0.00	0.0000	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No

No. of Barrels
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	CH4	0.00	0 00:00	2.36	0.00	0.00		0.00	0.00	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1006.42
Max (Rim) Elevation (ft) 1009.48
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1006.42
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

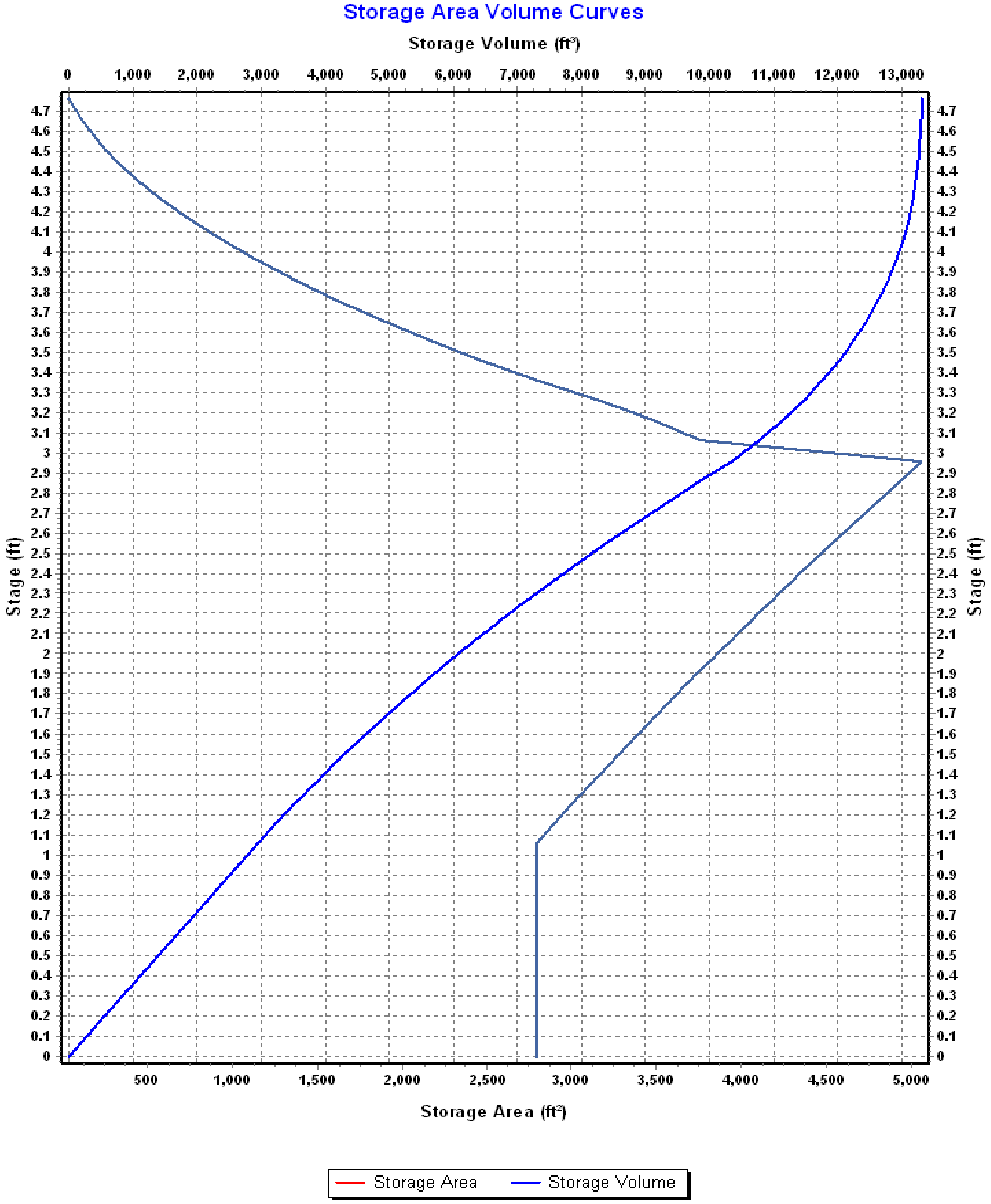
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	2792	0.000
1.06	2792.47	2959.77
1.16	2899.21	3244.35
1.26	3007.33	3539.68
1.36	3116.82	3845.89
1.46	3227.68	4163.12
1.56	3339.91	4491.50
1.66	3453.52	4831.17
1.76	3568.5	5182.27
1.86	3684.86	5544.94
1.96	3802.58	5919.31
2.06	3921.69	6305.52
2.16	4042.16	6703.71
2.26	4164	7114.02
2.36	4287.22	7536.58
2.46	4411.82	7971.53
2.54	4512.48	8328.50
2.56	4537.78	8419.00
2.66	4665.12	8879.15
2.76	4793.83	9352.10
2.86	4923.91	9837.99
2.96	5055.37	10336.95
3.06	3755.59	10777.50
3.16	3483.33	11139.45
3.26	3150.21	11471.13
3.36	2788.29	11768.06
3.46	2456.06	12030.28
3.56	2153.81	12260.77
3.66	1871.11	12462.02
3.76	1607.81	12635.97
3.86	1363.89	12784.56
3.96	1139.37	12909.72
4.06	934.24	13013.40
4.16	748.5	13097.54
4.26	582.16	13164.07
4.36	435.21	13214.94
4.46	307.64	13252.08
4.56	199.48	13277.44
4.66	110.7	13292.95
4.76	41.32	13300.55


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
Stage (ft)
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (continued)

Output Summary Results

Peak Inflow (cfs) 0.69
Peak Lateral Inflow (cfs) 0.69
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 2.91
Max HGL Elevation Attained (ft) 1007.23
Max HGL Depth Attained (ft) 0.81
Average HGL Elevation Attained (ft) 1006.84
Average HGL Depth Attained (ft) 0.42
Time of Max HGL Occurrence (days hh:mm) 0 20:43
Total Exfiltration Volume (1000-ft³) 2.560
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1005.73
Max (Rim) Elevation (ft) 1008.73
Max (Rim) Offset (ft) 3.00
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1005.73
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

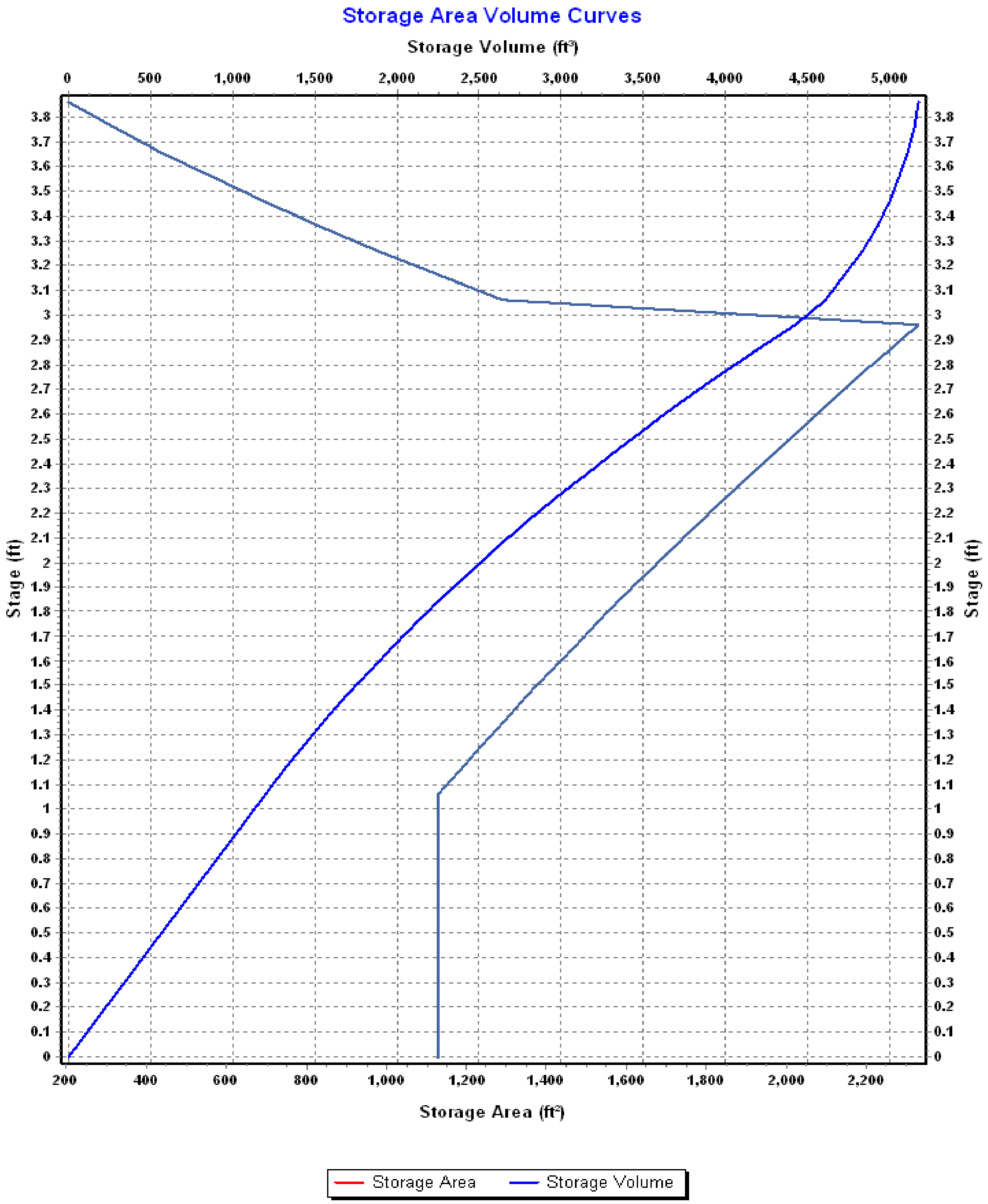
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1129	0.000
1.06	1129.97	1197.25
1.16	1184.09	1312.95
1.26	1239.25	1434.12
1.36	1295.46	1560.86
1.46	1352.68	1693.27
1.56	1410.88	1831.45
1.66	1470.06	1975.50
1.76	1530.22	2125.51
1.86	1591.36	2281.59
1.96	1653.48	2443.83
2.06	1716.58	2612.33
2.16	1780.66	2787.19
2.26	1845.72	2968.51
2.36	1911.76	3156.38
2.46	1978.78	3350.91
2.55	2039.93	3531.75
2.56	2046.78	3552.18
2.66	2115.75	3760.31
2.76	2185.71	3975.38
2.86	2256.65	4197.50
2.96	2328.56	4426.76
3.06	1290.75	4607.73
3.16	1130.9	4728.81
3.26	978.01	4834.26
3.36	832.08	4924.76
3.46	693.11	5001.02
3.56	561.1	5063.73
3.66	436.05	5113.59
3.76	317.96	5151.29
3.86	206.82	5177.53



Storage Area Volume Curves
Storage Volume (ft³)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Stage (ft)
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (continued)

Output Summary Results

Peak Inflow (cfs) 0.32
Peak Lateral Inflow (cfs) 0.32
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.18
Max HGL Elevation Attained (ft) 1006.76
Max HGL Depth Attained (ft) 1.03
Average HGL Elevation Attained (ft) 1006.24
Average HGL Depth Attained (ft) 0.51
Time of Max HGL Occurrence (days hh:mm) 0 22:07
Total Exfiltration Volume (1000-ft³) 1.042
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

50-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270-MH.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	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Oct 20, 2022	00:00:00
End Analysis On	Oct 21, 2022	00:00:00
Start Reporting On	Oct 20, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins..	3
Nodes..	7
Junctions	3
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links..	5
Channels	4
Pipes	1
Pumps	0
Orifices	0
Weirs	0
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	RAINEVENT	Time Series	50YR	Cumulative	inches	California	San Bernardino (Baker)	50	2.44	SCS Type I 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	A1	1.59	85.00	2.44	1.13	1.80	0.96	0 00:20:00
2	A2	0.73	85.00	2.44	1.13	0.83	0.44	0 00:20:00
3	DMA-PREDEV	2.32	77.00	2.44	0.70	1.63	0.29	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	1008.26	1008.76	1008.26	6.00	0.00	0.00	1008.26	0.00	0.50	0 00:00	0.00	0.00
2	Jun-02	Junction	1007.79	1008.29	1007.79	6.00	0.00	0.00	1007.79	0.00	1.50	0 00:00	0.00	0.00
3	Jun-03	Junction	1007.77	1008.27	1007.77	0.00	0.00	0.00	1007.77	0.00	1.50	0 00:00	0.00	0.00
4	OUT1	Outfall	1007.63					0.00	1007.63					
5	OUT-PRE	Outfall	0.00					0.29	0.00					
6	BR1	Storage Node	1006.42	1009.48	0.00		0.00	0.96	1007.71				0.00	0.00
7	BR2	Storage Node	1005.73	1008.73	0.00		0.00	0.44	1007.22				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	CH4	Pipe	Jun-02	Jun-03	29.72	0.00	0.00	0.0000	18.000	0.0150	0.00	2.36	0.00	0.00	0.00	0.00	0.00	Calculated
2	CH1	Channel	BR1	Jun-01	20.00	1008.98	1008.26	3.6000	6.000	0.0130	0.00	10.43	0.00	0.00	0.00	0.00	0.00	
3	CH2	Channel	Jun-01	Jun-02	312.00	1008.26	1007.79	0.1500	6.000	0.0130	0.00	2.13	0.00	0.00	0.00	0.00	0.00	
4	CH3	Channel	BR2	Jun-02	3.00	1008.29	1007.79	16.6700	6.000	0.0130	0.00	22.43	0.00	0.00	0.00	0.00	0.00	
5	CH5	Channel	Jun-03	OUT1	12.00	1007.77	1007.63	1.1700	6.000	0.0320	0.00	2.41	0.00	0.00	0.00	0.00	0.00	

Subbasin Hydrology

Subbasin : A1

Input Data

Area (ac) 1.59
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	1.59	B	85.00
Composite Area & Weighted CN	1.59		85.00

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 (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

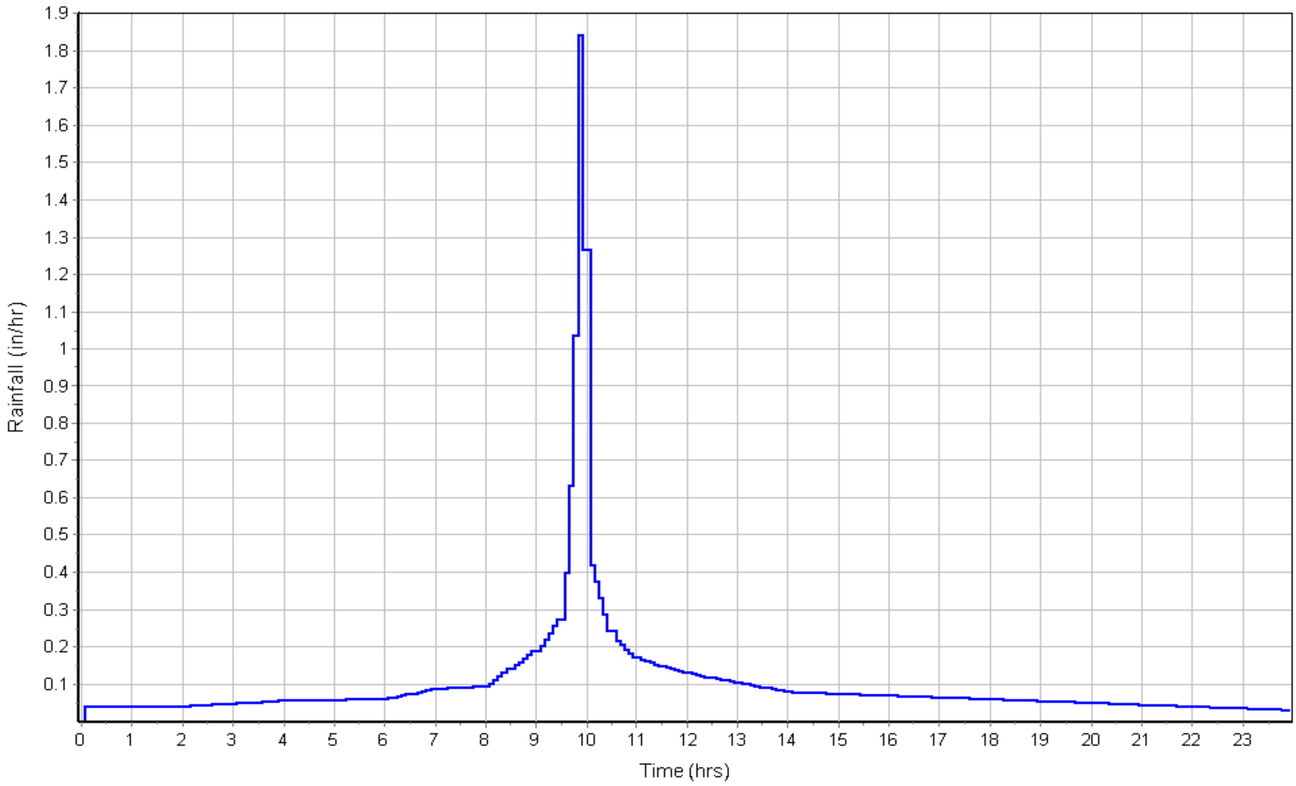
User-Defined TOC override (minutes): 20

Subbasin Runoff Results

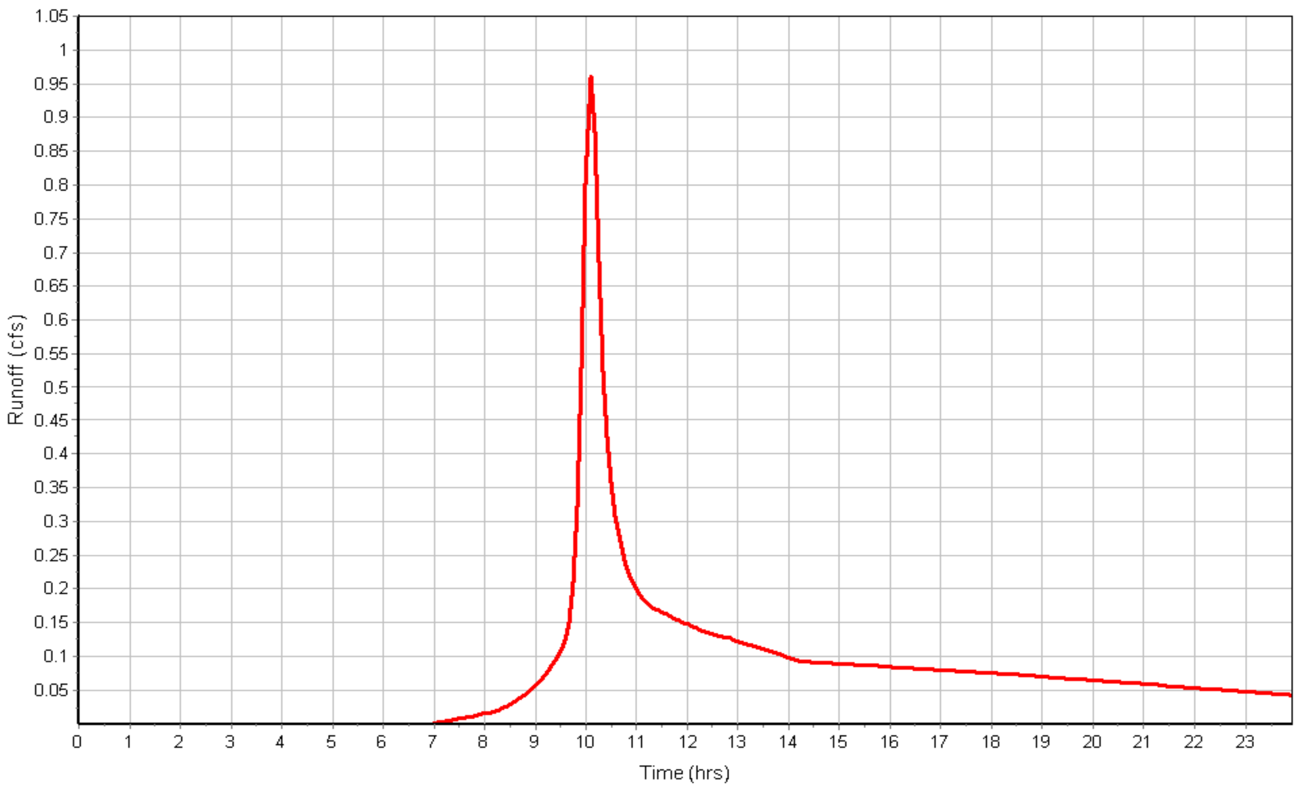
Total Rainfall (in) 2.44
Total Runoff (in) 1.13
Peak Runoff (cfs) 0.96
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : A2

Input Data

Area (ac) 0.73
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.69	B	85.00
Composite Area & Weighted CN	2.69		85.00

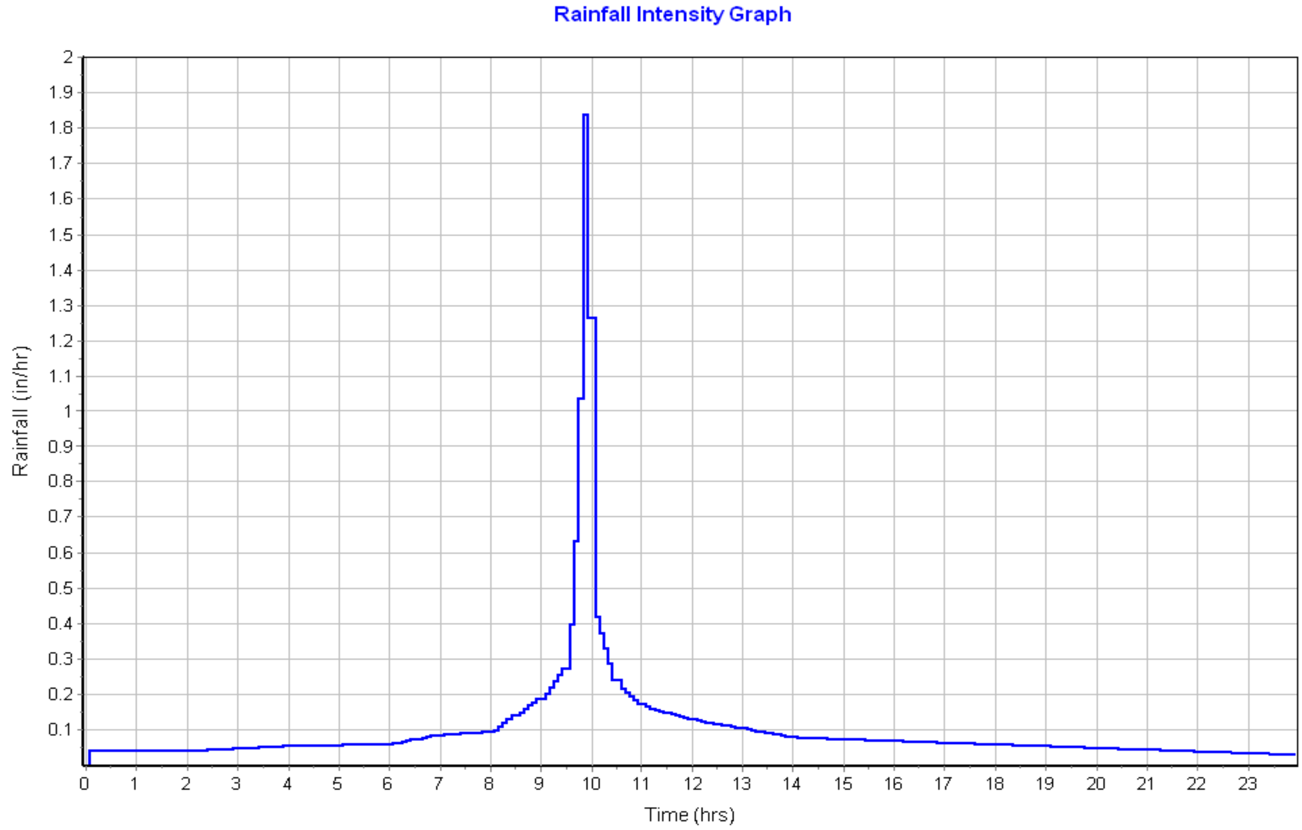
Time of Concentration

User-Defined TOC override (minutes): 20.00

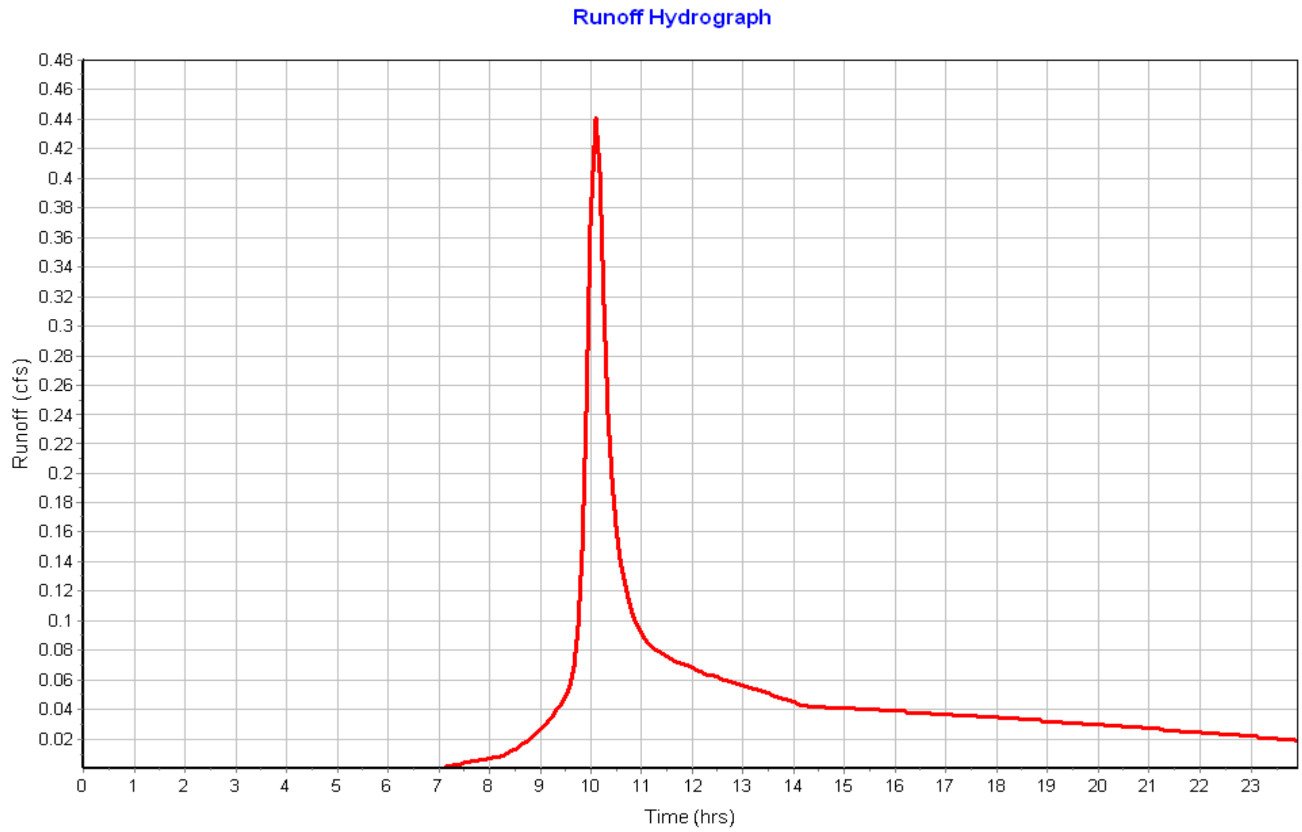
Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 1.13
Peak Runoff (cfs) 0.44
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A2



Rainfall Intensity Graph
Rainfall (in/hr)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
0.48
0.46
0.44
0.42
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : DMA-PREDEV

Input Data

Area (ac) 2.32
Weighted Curve Number 77.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	2.69	B	77.00
Composite Area & Weighted CN	2.69		77.00

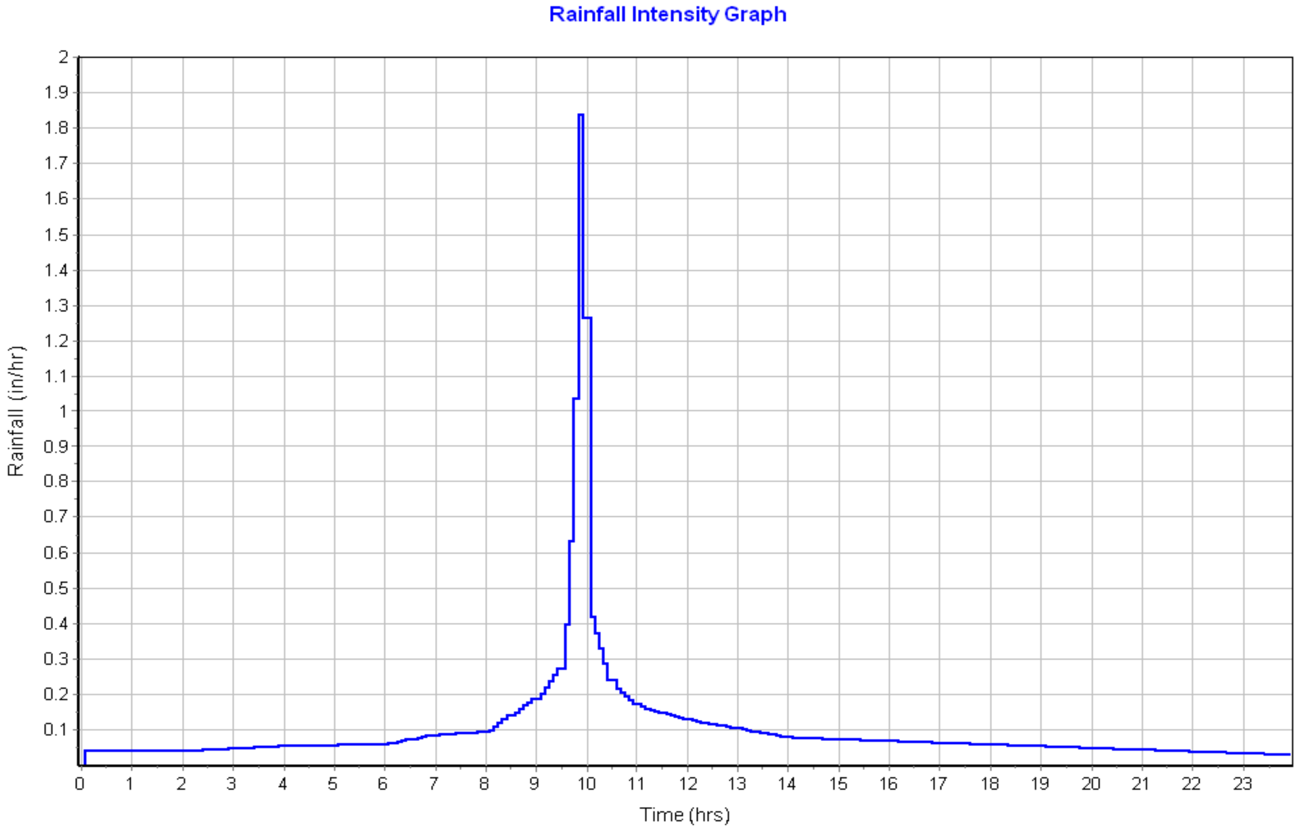
Time of Concentration

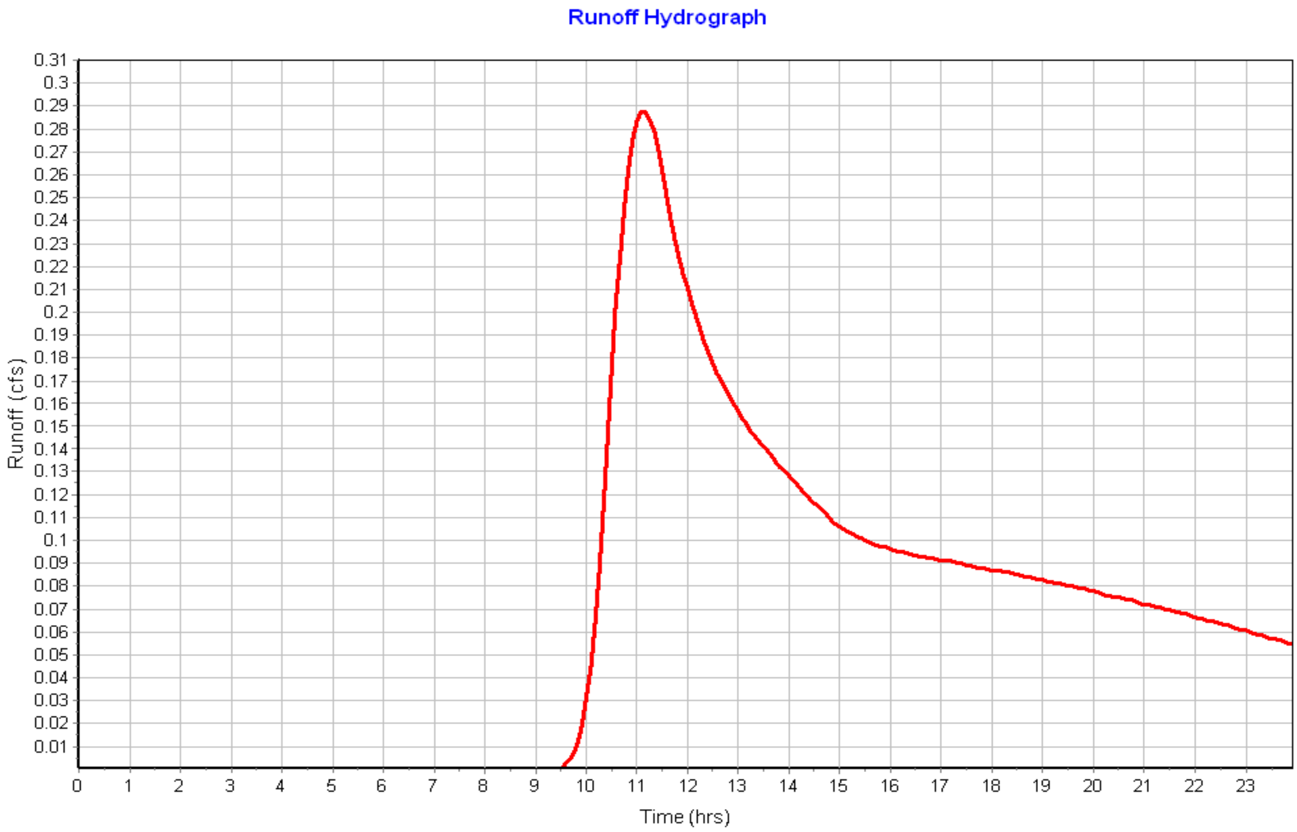
User-Defined TOC override (minutes): 100.00

Subbasin Runoff Results

Total Rainfall (in) 2.44
Total Runoff (in) 0.70
Peak Runoff (cfs) 0.29
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : DMA-PREDEV





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	Jun-01	1008.26	1008.76	0.50	1008.26	0.00	6.00	-1002.76	0.00	0.00
2	Jun-02	1007.79	1008.29	0.50	1007.79	0.00	6.00	-1002.29	0.00	0.00
3	Jun-03	1007.77	1008.27	0.50	1007.77	0.00	0.00	-1008.27	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	0.00	0.00	1008.26	0.00	0.00	0.50	1008.26	0.00	0 00:00	0 00:00	0.00	0.00
2	Jun-02	0.00	0.00	1007.79	0.00	0.00	1.50	1007.79	0.00	0 00:00	0 00:00	0.00	0.00
3	Jun-03	0.00	0.00	1007.77	0.00	0.00	1.50	1007.77	0.00	0 00:00	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	CH1	20.00	1008.98	2.56	1008.26	0.00	0.72	3.6000	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
2	CH2	312.00	1008.26	0.00	1007.79	0.00	0.47	0.1500	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
3	CH3	3.00	1008.29	2.56	1007.79	0.00	0.50	16.6700	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
4	CH5	12.00	1007.77	0.00	1007.63	0.00	0.14	1.1700	Rectangular	0.500	2.000	0.0320	0.5000	0.5000	0.0000	0.00	No

Channel 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	CH1	0.00	0 00:00	10.43	0.00	0.00		0.00	0.00	0.00		
2	CH2	0.00	0 00:00	2.13	0.00	0.00		0.00	0.00	0.00		
3	CH3	0.00	0 00:00	22.43	0.00	0.00		0.00	0.00	0.00		
4	CH5	0.00	0 00:00	2.41	0.00	0.00		0.00	0.00	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
1	CH4	29.72	0.00	-1007.79	0.00	-1007.77	0.00	0.0000	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No

No. of Barrels
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	CH4	0.00	0 00:00	2.36	0.00	0.00		0.00	0.00	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1006.42
Max (Rim) Elevation (ft) 1009.48
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1006.42
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

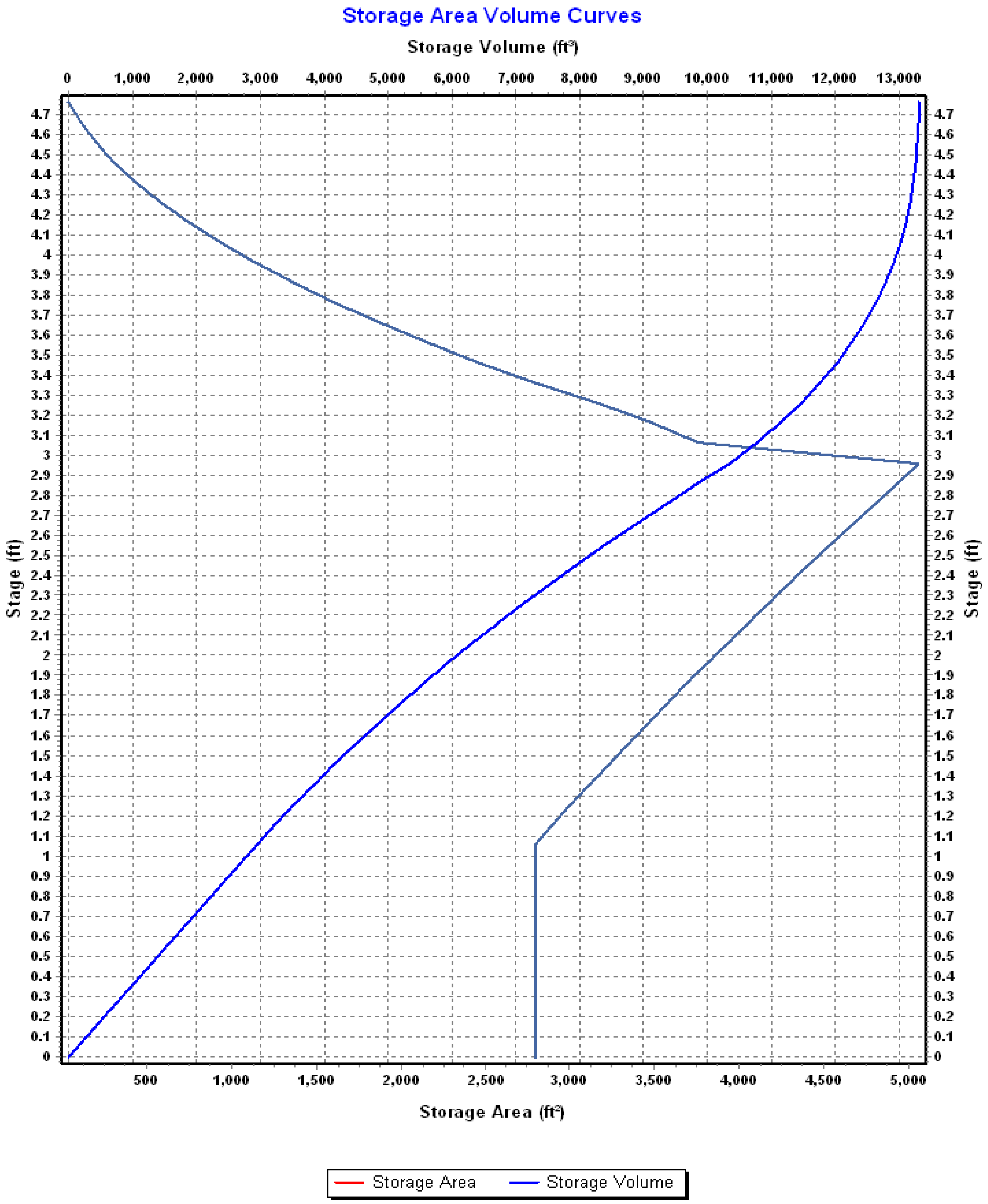
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	2792	0.000
1.06	2792.47	2959.77
1.16	2899.21	3244.35
1.26	3007.33	3539.68
1.36	3116.82	3845.89
1.46	3227.68	4163.12
1.56	3339.91	4491.50
1.66	3453.52	4831.17
1.76	3568.5	5182.27
1.86	3684.86	5544.94
1.96	3802.58	5919.31
2.06	3921.69	6305.52
2.16	4042.16	6703.71
2.26	4164	7114.02
2.36	4287.22	7536.58
2.46	4411.82	7971.53
2.54	4512.48	8328.50
2.56	4537.78	8419.00
2.66	4665.12	8879.15
2.76	4793.83	9352.10
2.86	4923.91	9837.99
2.96	5055.37	10336.95
3.06	3755.59	10777.50
3.16	3483.33	11139.45
3.26	3150.21	11471.13
3.36	2788.29	11768.06
3.46	2456.06	12030.28
3.56	2153.81	12260.77
3.66	1871.11	12462.02
3.76	1607.81	12635.97
3.86	1363.89	12784.56
3.96	1139.37	12909.72
4.06	934.24	13013.40
4.16	748.5	13097.54
4.26	582.16	13164.07
4.36	435.21	13214.94
4.46	307.64	13252.08
4.56	199.48	13277.44
4.66	110.7	13292.95
4.76	41.32	13300.55


Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
Storage Area (ft²)
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Storage Area
Storage Volume

Storage Node : BR1 (continued)

Output Summary Results

Peak Inflow (cfs) 0.96
Peak Lateral Inflow (cfs) 0.96
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 3.17
Max HGL Elevation Attained (ft) 1007.71
Max HGL Depth Attained (ft) 1.29
Average HGL Elevation Attained (ft) 1007.07
Average HGL Depth Attained (ft) 0.65
Time of Max HGL Occurrence (days hh:mm) 0 22:11
Total Exfiltration Volume (1000-ft³) 2.747
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1005.73
Max (Rim) Elevation (ft) 1008.73
Max (Rim) Offset (ft) 3.00
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1005.73
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

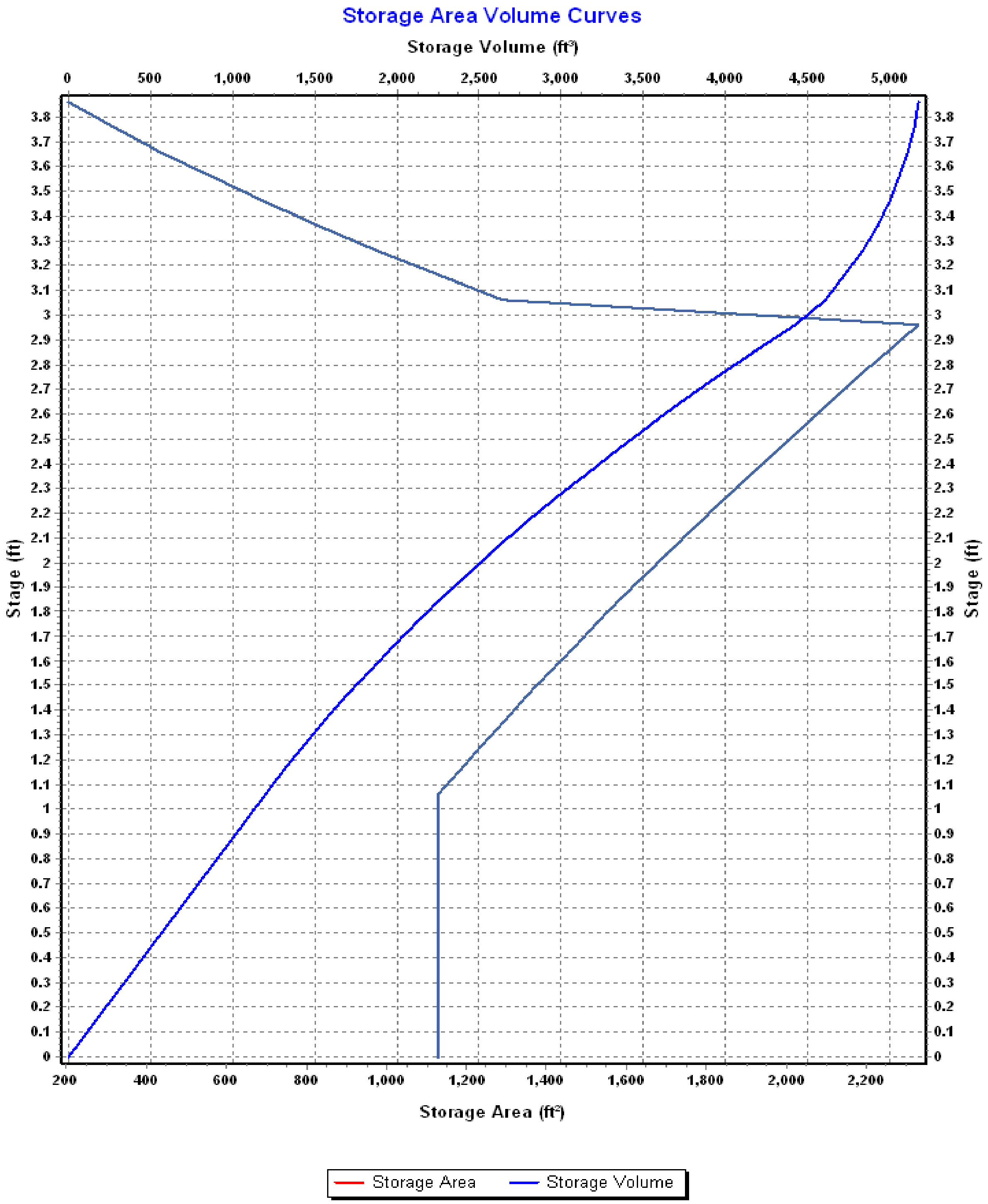
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1129	0.000
1.06	1129.97	1197.25
1.16	1184.09	1312.95
1.26	1239.25	1434.12
1.36	1295.46	1560.86
1.46	1352.68	1693.27
1.56	1410.88	1831.45
1.66	1470.06	1975.50
1.76	1530.22	2125.51
1.86	1591.36	2281.59
1.96	1653.48	2443.83
2.06	1716.58	2612.33
2.16	1780.66	2787.19
2.26	1845.72	2968.51
2.36	1911.76	3156.38
2.46	1978.78	3350.91
2.55	2039.93	3531.75
2.56	2046.78	3552.18
2.66	2115.75	3760.31
2.76	2185.71	3975.38
2.86	2256.65	4197.50
2.96	2328.56	4426.76
3.06	1290.75	4607.73
3.16	1130.9	4728.81
3.26	978.01	4834.26
3.36	832.08	4924.76
3.46	693.11	5001.02
3.56	561.1	5063.73
3.66	436.05	5113.59
3.76	317.96	5151.29
3.86	206.82	5177.53


Storage Area Volume Curves
Storage Volume (ft³)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Stage (ft)
Storage Area (ft²)
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
Storage Area
Storage Volume

Storage Node : BR2 (continued)

Output Summary Results

Peak Inflow (cfs) 0.44
Peak Lateral Inflow (cfs) 0.44
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.43
Max HGL Elevation Attained (ft) 1007.22
Max HGL Depth Attained (ft) 1.49
Average HGL Elevation Attained (ft) 1006.48
Average HGL Depth Attained (ft) 0.75
Time of Max HGL Occurrence (days hh:mm) 0 22:26
Total Exfiltration Volume (1000-ft³) 1.202
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

100-year/24-hour Rainfall Event Simulation Results

Project Description

File Name 20270-MH.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	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Oct 20, 2022	00:00:00
End Analysis On	Oct 21, 2022	00:00:00
Start Reporting On	Oct 20, 2022	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	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins...	3
Nodes...	7
Junctions	3
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links...	5
Channels	4
Pipes	1
Pumps	0
Orifices	0
Weirs	0
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	RAINEVENT	Time Series	100YR	Cumulative	inches	California	San Bernardino (Baker)	100	2.84	SCS Type I 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	A1	1.59	85.00	2.84	1.46	2.31	1.27	0 00:20:00
2	A2	0.73	85.00	2.84	1.45	1.06	0.58	0 00:20:00
3	DMA-PREDEV	2.32	77.00	2.84	0.96	2.23	0.43	0 01:40:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	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	1008.26	1008.76	1008.26	6.00	0.00	0.00	1008.26	0.00	0.50	0 00:00	0.00	0.00
2	Jun-02	Junction	1007.79	1008.29	1007.79	6.00	0.00	0.00	1007.79	0.00	1.50	0 00:00	0.00	0.00
3	Jun-03	Junction	1007.77	1008.27	1007.77	0.00	0.00	0.00	1007.77	0.00	1.50	0 00:00	0.00	0.00
4	OUT1	Outfall	1007.63					0.00	1007.63					
5	OUT-PRE	Outfall	0.00					0.43	0.00					
6	BR1	Storage Node	1006.42	1009.48	0.00		0.00	1.27	1008.15				0.00	0.00
7	BR2	Storage Node	1005.73	1008.73	0.00		0.00	0.58	1007.64				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	CH4	Pipe	Jun-02	Jun-03	29.72	0.00	0.00	0.0000	18.000	0.0150	0.00	2.36	0.00	0.00	0.00	0.00	0.00	Calculated
2	CH1	Channel	BR1	Jun-01	20.00	1008.98	1008.26	3.6000	6.000	0.0130	0.00	10.43	0.00	0.00	0.00	0.00	0.00	
3	CH2	Channel	Jun-01	Jun-02	312.00	1008.26	1007.79	0.1500	6.000	0.0130	0.00	2.13	0.00	0.00	0.00	0.00	0.00	
4	CH3	Channel	BR2	Jun-02	3.00	1008.29	1007.79	16.6700	6.000	0.0130	0.00	22.43	0.00	0.00	0.00	0.00	0.00	
5	CH5	Channel	Jun-03	OUT1	12.00	1007.77	1007.63	1.1700	6.000	0.0320	0.00	2.41	0.00	0.00	0.00	0.00	0.00	

Subbasin Hydrology

Subbasin : A1

Input Data

Area (ac) 1.59
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	1.59	B	85.00
Composite Area & Weighted CN	1.59		85.00

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 :

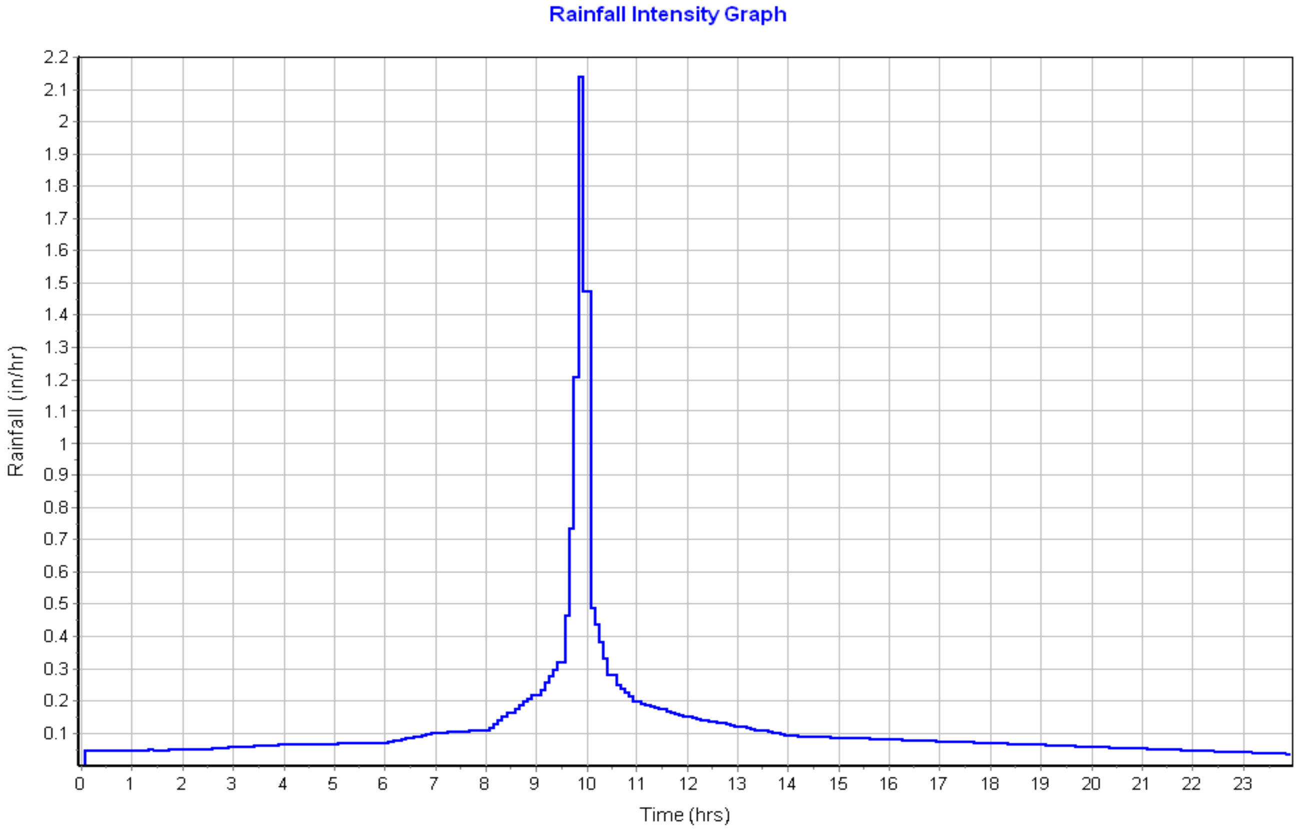
Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

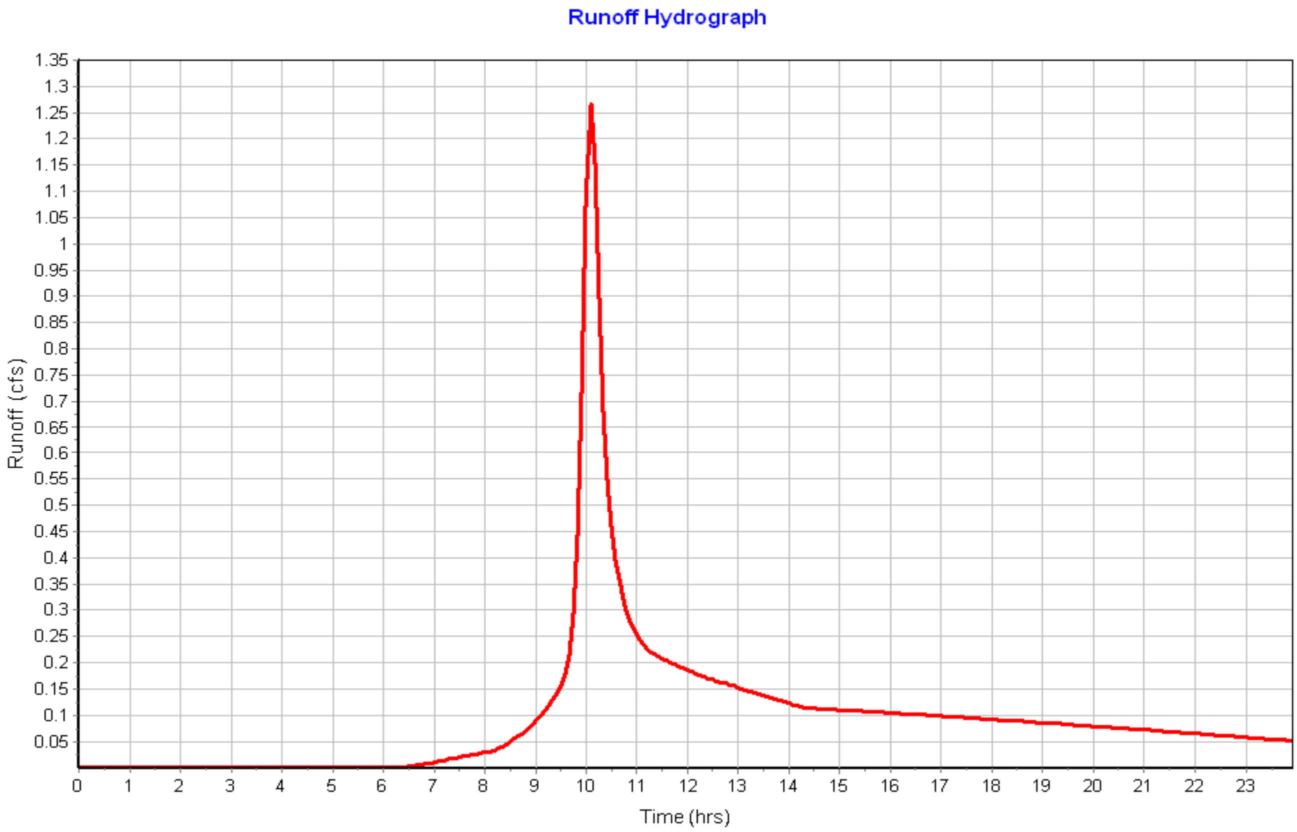
User-Defined TOC override (minutes): 20

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 1.46
Peak Runoff (cfs) 1.27
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A1


Rainfall Intensity Graph
Rainfall (in/hr)
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)


Runoff Hydrograph
Runoff (cfs)
1.35
1.3
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hrs)

Subbasin : A2

Input Data

Area (ac) 0.73
Weighted Curve Number 85.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.69	B	85.00
Composite Area & Weighted CN	2.69		85.00

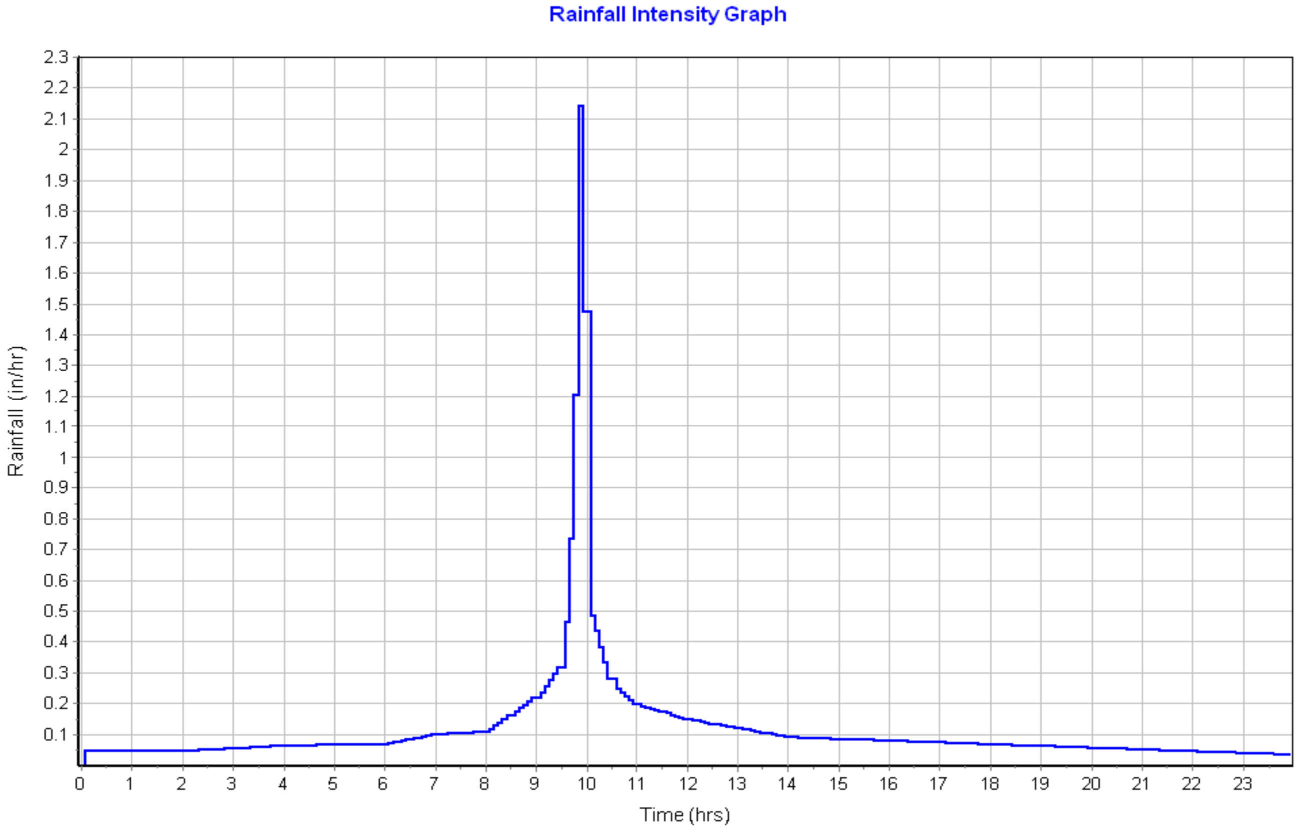
Time of Concentration

User-Defined TOC override (minutes): 20.00

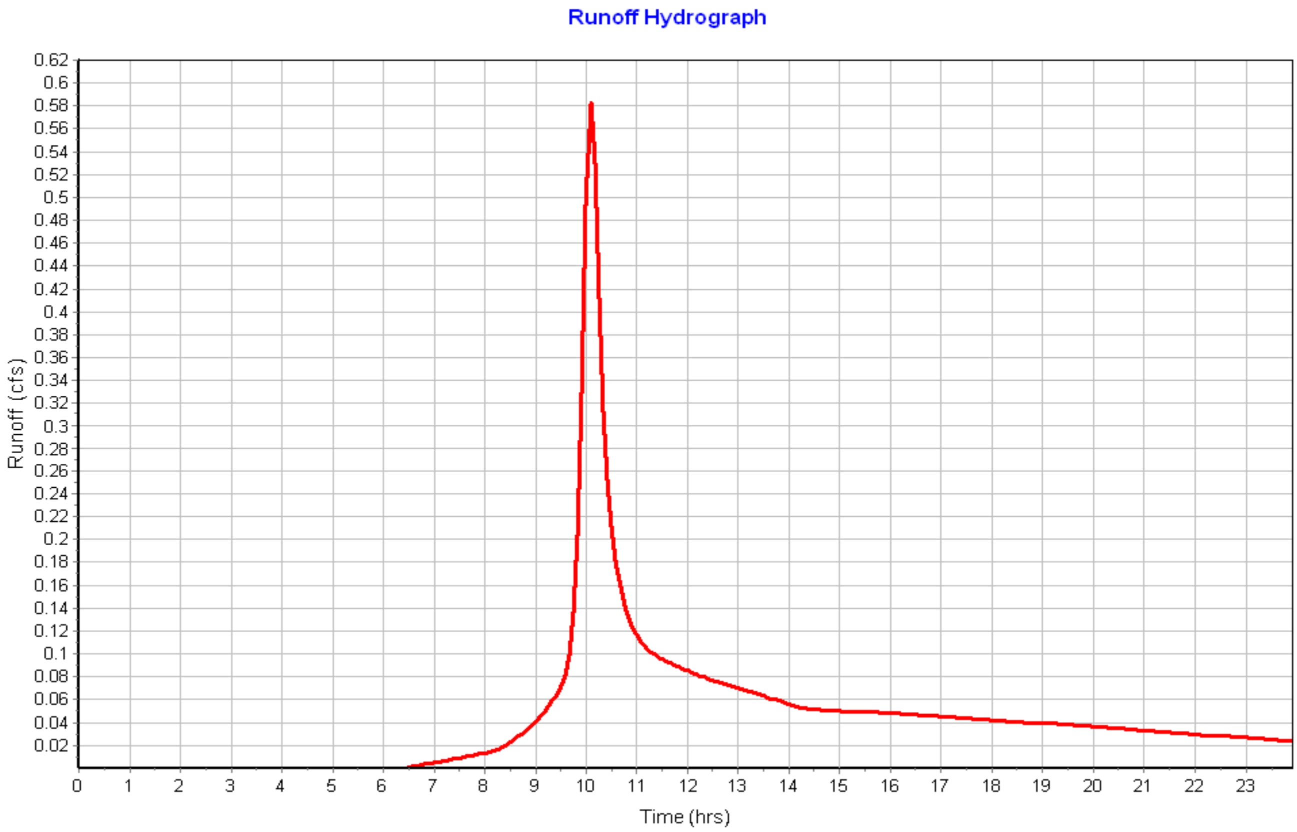
Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 1.45
Peak Runoff (cfs) 0.58
Weighted Curve Number 85.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : A2



Rainfall Intensity Graph
Rainfall (in/hr)
Time (hrs)



Runoff Hydrograph
Runoff (cfs)
Time (hrs)

Subbasin : DMA-PREDEV

Input Data

Area (ac) 2.32
Weighted Curve Number 77.00
Rain Gage ID .... RAINEVENT

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Poor	2.69	B	77.00
Composite Area & Weighted CN	2.69		77.00

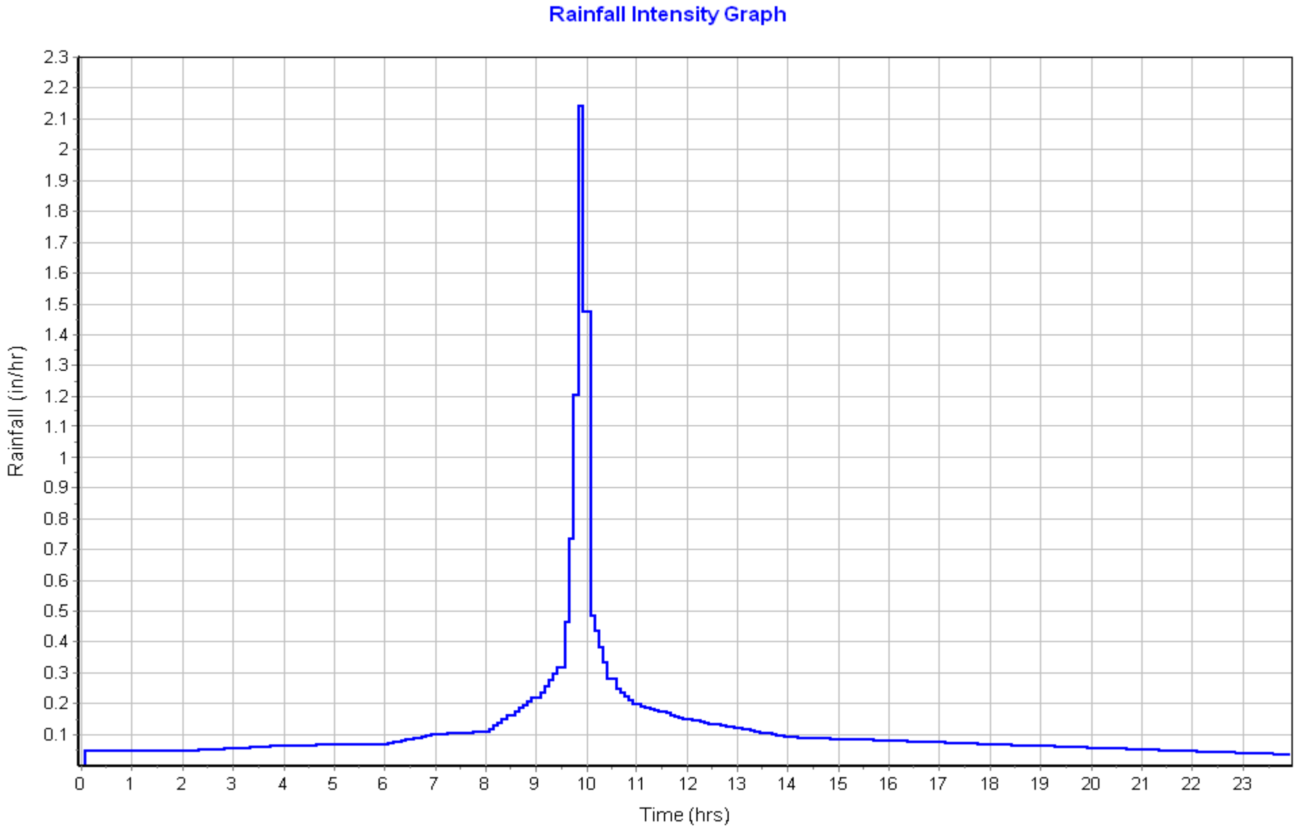
Time of Concentration

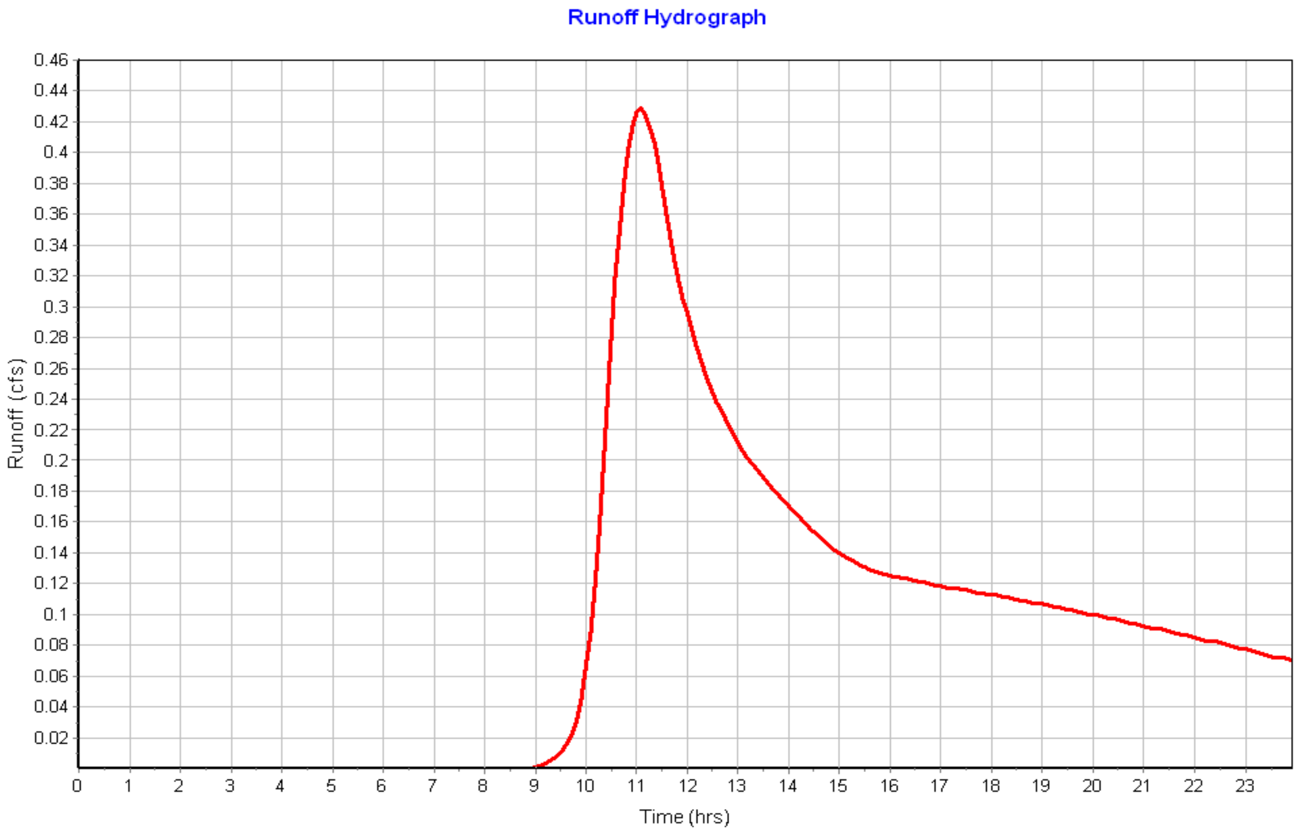
User-Defined TOC override (minutes): 100.00

Subbasin Runoff Results

Total Rainfall (in) 2.84
Total Runoff (in) 0.96
Peak Runoff (cfs) 0.43
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 01:40:00

Subbasin : DMA-PREDEV





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	Jun-01	1008.26	1008.76	0.50	1008.26	0.00	6.00	-1002.76	0.00	0.00
2	Jun-02	1007.79	1008.29	0.50	1007.79	0.00	6.00	-1002.29	0.00	0.00
3	Jun-03	1007.77	1008.27	0.50	1007.77	0.00	0.00	-1008.27	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	0.00	0.00	1008.26	0.00	0.00	0.50	1008.26	0.00	0 00:00	0 00:00	0.00	0.00
2	Jun-02	0.00	0.00	1007.79	0.00	0.00	1.50	1007.79	0.00	0 00:00	0 00:00	0.00	0.00
3	Jun-03	0.00	0.00	1007.77	0.00	0.00	1.50	1007.77	0.00	0 00:00	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	CH1	20.00	1008.98	2.56	1008.26	0.00	0.72	3.6000	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
2	CH2	312.00	1008.26	0.00	1007.79	0.00	0.47	0.1500	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
3	CH3	3.00	1008.29	2.56	1007.79	0.00	0.50	16.6700	Rectangular	0.500	2.000	0.0130	0.5000	0.5000	0.0000	0.00	No
4	CH5	12.00	1007.77	0.00	1007.63	0.00	0.14	1.1700	Rectangular	0.500	2.000	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	CH1	0.00	0 00:00	10.43	0.00	0.00		0.00	0.00	0.00		
2	CH2	0.00	0 00:00	2.13	0.00	0.00		0.00	0.00	0.00		
3	CH3	0.00	0 00:00	22.43	0.00	0.00		0.00	0.00	0.00		
4	CH5	0.00	0 00:00	2.41	0.00	0.00		0.00	0.00	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
1	CH4	29.72	0.00	-1007.79	0.00	-1007.77	0.00	0.0000	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No

No. of Barrels
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	CH4	0.00	0 00:00	2.36	0.00	0.00		0.00	0.00	0.00		Calculated

Storage Nodes

Storage Node : BR1

Input Data

Invert Elevation (ft) 1006.42
Max (Rim) Elevation (ft) 1009.48
Max (Rim) Offset (ft) 3.06
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1006.42
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

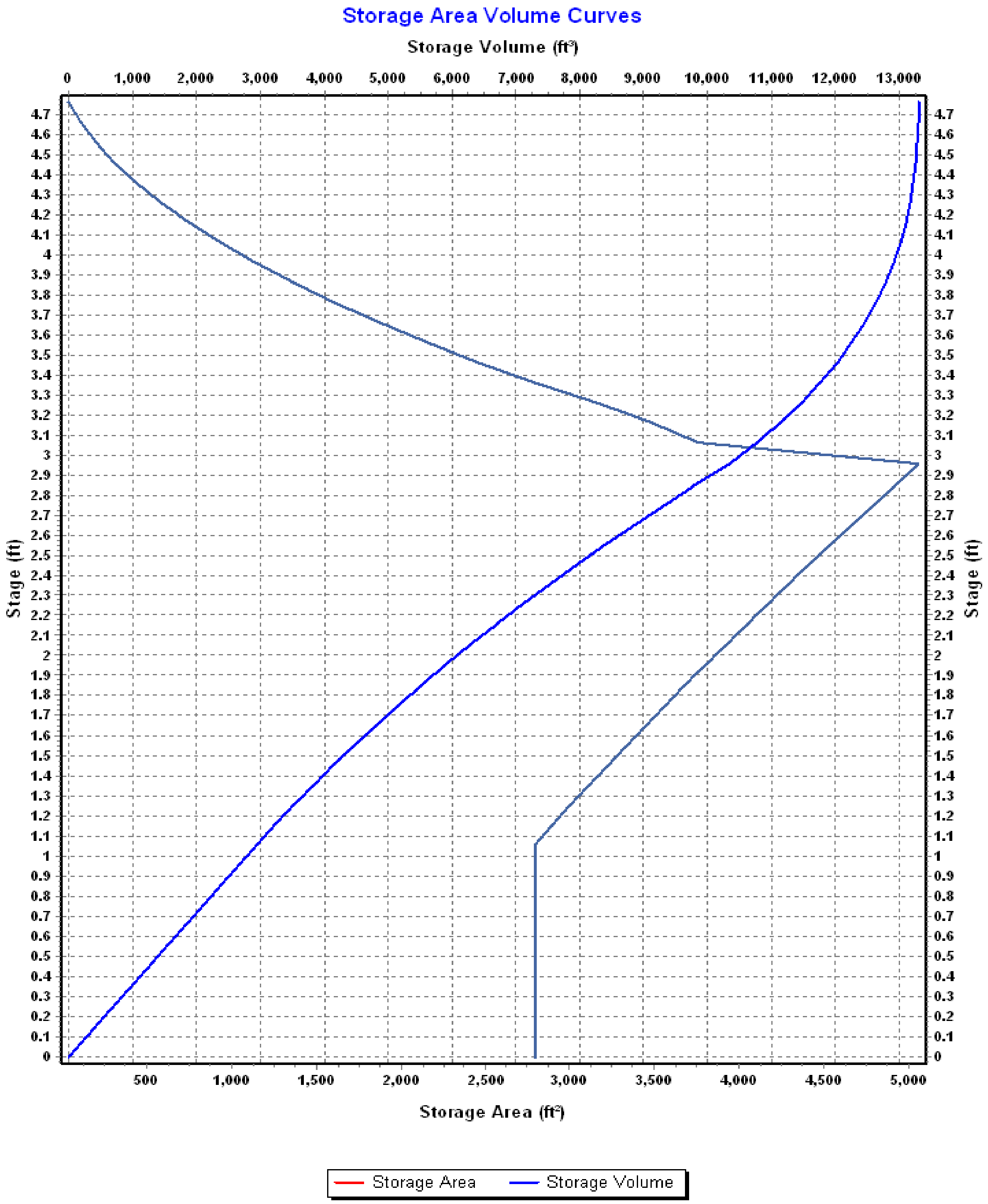
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR1

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	2792	0.000
1.06	2792.47	2959.77
1.16	2899.21	3244.35
1.26	3007.33	3539.68
1.36	3116.82	3845.89
1.46	3227.68	4163.12
1.56	3339.91	4491.50
1.66	3453.52	4831.17
1.76	3568.5	5182.27
1.86	3684.86	5544.94
1.96	3802.58	5919.31
2.06	3921.69	6305.52
2.16	4042.16	6703.71
2.26	4164	7114.02
2.36	4287.22	7536.58
2.46	4411.82	7971.53
2.54	4512.48	8328.50
2.56	4537.78	8419.00
2.66	4665.12	8879.15
2.76	4793.83	9352.10
2.86	4923.91	9837.99
2.96	5055.37	10336.95
3.06	3755.59	10777.50
3.16	3483.33	11139.45
3.26	3150.21	11471.13
3.36	2788.29	11768.06
3.46	2456.06	12030.28
3.56	2153.81	12260.77
3.66	1871.11	12462.02
3.76	1607.81	12635.97
3.86	1363.89	12784.56
3.96	1139.37	12909.72
4.06	934.24	13013.40
4.16	748.5	13097.54
4.26	582.16	13164.07
4.36	435.21	13214.94
4.46	307.64	13252.08
4.56	199.48	13277.44
4.66	110.7	13292.95
4.76	41.32	13300.55



Storage Area Volume Curves
Storage Volume (ft³)
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
Stage (ft)
4.7
4.6
4.5
4.4
4.3
4.2
4.1
4
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR1 (continued)

Output Summary Results

Peak Inflow (cfs)	1.27
Peak Lateral Inflow (cfs)	1.27
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	3.68
Max HGL Elevation Attained (ft)	1008.15
Max HGL Depth Attained (ft)	1.73
Average HGL Elevation Attained (ft)	1007.29
Average HGL Depth Attained (ft)	0.87
Time of Max HGL Occurrence (days hh:mm)	0 22:39
Total Exfiltration Volume (1000-ft³)	3.149
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : BR2

Input Data

Invert Elevation (ft) 1005.73
Max (Rim) Elevation (ft) 1008.73
Max (Rim) Offset (ft) 3.00
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) .... -1005.73
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

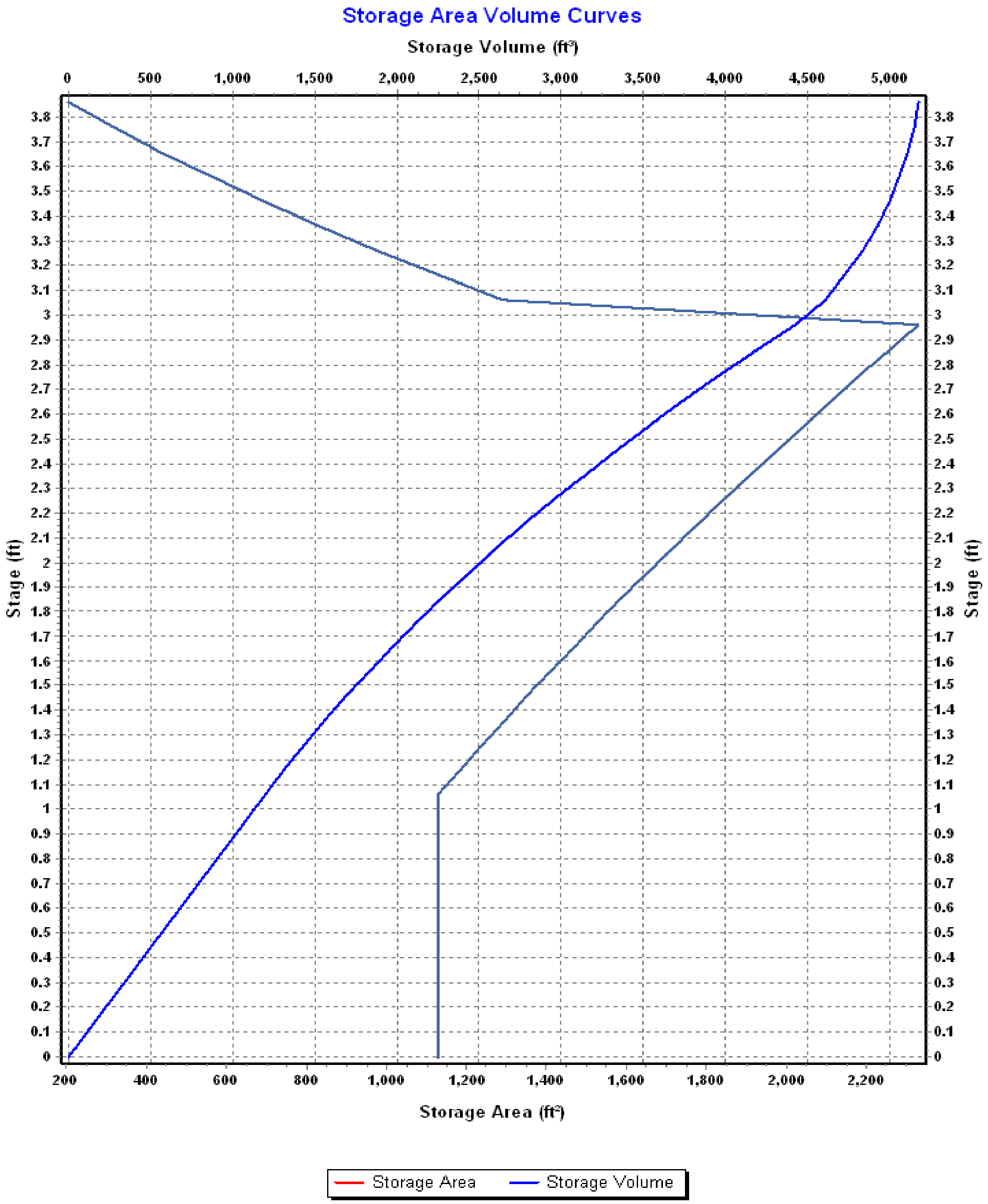
Infiltration/Exfiltration

Exfiltration Rate (in/hr) 0.7500

Storage Area Volume Curves

Storage Curve : BR2

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	1129	0.000
1.06	1129.97	1197.25
1.16	1184.09	1312.95
1.26	1239.25	1434.12
1.36	1295.46	1560.86
1.46	1352.68	1693.27
1.56	1410.88	1831.45
1.66	1470.06	1975.50
1.76	1530.22	2125.51
1.86	1591.36	2281.59
1.96	1653.48	2443.83
2.06	1716.58	2612.33
2.16	1780.66	2787.19
2.26	1845.72	2968.51
2.36	1911.76	3156.38
2.46	1978.78	3350.91
2.55	2039.93	3531.75
2.56	2046.78	3552.18
2.66	2115.75	3760.31
2.76	2185.71	3975.38
2.86	2256.65	4197.50
2.96	2328.56	4426.76
3.06	1290.75	4607.73
3.16	1130.9	4728.81
3.26	978.01	4834.26
3.36	832.08	4924.76
3.46	693.11	5001.02
3.56	561.1	5063.73
3.66	436.05	5113.59
3.76	317.96	5151.29
3.86	206.82	5177.53



Storage Area Volume Curves
Storage Volume (ft³)
Stage (ft)
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BR2 (continued)

Output Summary Results

Peak Inflow (cfs) 0.58
Peak Lateral Inflow (cfs) 0.58
Peak Outflow (cfs) 0.00
Peak Exfiltration Flow Rate (cfm) 1.69
Max HGL Elevation Attained (ft) 1007.64
Max HGL Depth Attained (ft) 1.91
Average HGL Elevation Attained (ft) 1006.71
Average HGL Depth Attained (ft) 0.98
Time of Max HGL Occurrence (days hh:mm) 0 22:34
Total Exfiltration Volume (1000-ft^3) 1.416
Total Flooded Volume (ac-in) 0
Total Time Flooded (min) 0
Total Retention Time (sec) 0.00

Appendix D

Geotechnical Engineering Report

Proposed Live-Work Housing Park
Baker, San Bernardino County, California
October 29, 2021
Terracon Project No. CB215111

Prepared for:
Love’s Travel Stops & Country Stores, Inc.
Oklahoma City, Oklahoma

Prepared by:
Terracon Consultants, Inc.
Colton, California

October 29, 2021

Love's Travel Stops & Country Stores, Inc.
10601 North Pennsylvania Ave.
Oklahoma City, Oklahoma 73120

Attn: Mr. Kym Van Dyke
P: (801) 330-3886
E: Kym.VanDyke@loves.com

Re: Geotechnical Engineering Report
Proposed Live-Work Housing Park
Baker Boulevard and Silver Lane
Baker, San Bernardino County, California
Terracon Project No. CB215111

Dear Mr. Van Dyke:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PCB215111 dated August 4, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

REGISTERED PROFESSIONAL ENGINEER
KEITH P. ASKEW
No. 2946
Exp. 6/30/23
GEOTECHNICAL
STATE OF CALIFORNIA

Sean Paroski
Staff Engineer

Keith P. Askew, P.E., G.E.
Department Manager

REPORT TOPICS

Note: This report was originally delivered in a web-based format. Orange Bold text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the *GeoReport* logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Proposed Live-Work Housing Park
Baker Boulevard and Silver Lane
Baker, San Bernardino County, California
Terracon Project No. CB215111
October 29, 2021

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Live-Work Housing Park to be located on Baker Boulevard and Silver Lane in Baker, San Bernardino County, California. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations
- Foundation design and construction
- Seismic site classification per CBC
- Pavement design and construction

The geotechnical engineering Scope of Services for this project included the advancement of six test borings to depths from approximately 6½ to 21½ feet below existing site grades, laboratory testing, and preparation of this report.

This study was conducted concurrently with a geotechnical investigation on the adjacent property for the Love's Travel Stop – Baker (same client). As such, the boring numbers reflect the continuation of our field work; borings for this site include B-26 through B-29, B-34, and B-35

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and/or as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located between Baker Boulevard and Silver Lane in Baker, San Bernardino County, California. The proposed development will be within an approximately 19.82-acre parcel. 35.2779°N/-116.0560°W (approximate). See **Site Location**
Existing Improvements	The site is relatively flat and undeveloped and includes adjacent portions of Baker Blvd, and Silver Ln. Fill soils associated with constructing the roadways may be present within the undeveloped portions of the site.
Current Ground Cover	Earthen, light “desert” vegetation in the areas of no development. Roadways are asphalt concrete (AC) with base material beneath the AC.
Existing Topography	The site is relatively flat with an elevation of approximately 1,010 feet.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning.

Item	Description
Proposed Development	The proposed live-work housing park will include spaces for eight mobile home units, a recreation area, paved roadway/parking and appurtenant infrastructure.
Proposed Structures	No structures are proposed; however, manufactured mobile homes will be installed onsite.
Building Construction	The proposed buildings will consist of manufactured mobile homes supported on a spread footing foundation system.
Finished Grade Elevation	The finish grade elevations are unknown; however, we assume they will be near the grades of the existing roadways. Based on the site layout and topography, and the existing roadways for entry and exit, the finish grade elevations will likely be around 1,010 feet.
Grading Requirements	Up to 2 feet of cut and 2 feet of fill may be required to develop final grades, excluding requirements for remedial grading. Slopes greater than 5 feet in vertical height are not planned. Slope inclinations will be 2:1 (Horizontal: Vertical) or flatter, if planned.
Below Grade Structures	Not anticipated
Infiltration Systems	Not anticipated
Retaining Wall	Not anticipated

Item	Description
Pavements	Paved driveway and parking will be constructed on site. We assume both rigid (concrete) and flexible (asphalt) pavement sections should be considered. Please confirm this assumption. Anticipated traffic indices (TIs) are as follows for asphalt pavement: ■ Auto Parking Areas: TI=4.5 ■ Drive Lanes TI=5.5 ■ Truck Delivery Areas: TI=6.0 ■ The pavement design period is 20 years. Anticipated average daily truck traffic (ADTT) is as follows for concrete pavement: ■ Light Duty: ADTT=1 (Category A) ■ Medium Duty: ADTT=25 (Category B) ■ Heavy Duty: ADTT = 700 (Category C)

GEOTECHNICAL CHARACTERIZATION

Site Geology

The site is located within the east-central portion of the Mojave Desert Geomorphic Province of Southern California. The Mojave Desert Geomorphic Province is bounded on the southwest by the San Andreas fault and the Transverse Ranges, and on the northeast by the Garlock fault. The eastern Mojave Desert is characterized by northwest-trending mountain ranges of crystalline bedrock and intervening, broad, alluviated valleys. Many of the alluvial valleys are closed basins that have developed saline dry lake playas that occasionally fill with surface run-off during periodic episodes of precipitation. The subject site is situated approximately 1 ½ miles northeast of a channel that drains the Soda Lake Playa northward into the Silver Lake Playa. Approximately 1 ½ miles west of the site lies Otto Mountain, a part of the larger Soda Mountains, consisting mostly of Mesozoic granitic bedrock and Precambrian metamorphic rock (Jennings and others, 1962, https://ngmdb.usgs.gov/Prodesc/proddesc_332.htm).

The site is located on the distal portion of a broad, west-sloping, incised alluvial plain created by erosion and deposition of bedrock detritus carried from hills in the vicinity of the Cima volcanic field, as close as approximately 11 miles to the east. Surficial native materials at the site have been mapped as Quaternary-age alluvium (Jennings et. al., 1962). Although the total thickness and depth of the alluvium beneath the site is not known, the depth to underlying bedrock in the Soda Lake and Silver Lake basins is anticipated to range from less than a few hundred feet, to a thousand feet or more, thickening with increasing distance from exposed bedrock hills. The soils beneath the site are mapped as Holocene-age alluvium (Jennings and others, 1962, https://ngmdb.usgs.gov/Prodesc/proddesc_332.htm). These materials are expected to interfinger with the nearby playa deposits, but little playa sediments (silts/clays) were found in the exploratory borings.

Subsurface Profile

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. In general, the site is underlain with medium dense to very dense poorly-graded sand with silt and silty sand to the maximum depths explored.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely. Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Groundwater Conditions

The borings were advanced using continuous flight auger drilling techniques that allow short-term groundwater observations to be made while drilling. Groundwater seepage was not observed within the maximum depths of 21½ feet during or at the completion of drilling. We do not anticipate groundwater will affect construction at this project site. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. According to data collected from the Water Data Library of California Department of Water Resources (DWR) from a nearby wells, historic groundwater levels are deeper than 75 feet.

SEISMIC CONSIDERATIONS

Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our opinion that the Seismic Site Classification is D. The 2019 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16 and 2019 CBC. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of

Section C11 of ASCE 7-16) states that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." Based on our understanding of the proposed structures, it is our assumption that the exception in Section 11.4.8 applies to the proposed structures. However, the structural engineer should verify the applicability of this exception.

Based on this exception, the spectral response accelerations presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2019 CBC.

Description	Value
Site Classification (CBC) [1]	D [2]
Site Latitude (°N)	35.2779
Site Longitude (°W)	-116.0560
S_s Spectral Acceleration for a 0.2-Second Period	0.609
S_1 Spectral Acceleration for a 1-Second Period	0.236
F_a Site Coefficient for a 0.2-Second Period	1.313
F_v Site Coefficient for a 1-Second Period	2.1
Site Modified Peak Ground Acceleration	0.35g
De-aggregated Modal Magnitude [3]	7.74

1. Seismic site classification in general accordance with the *2019 California Building Code*.
2. The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Our borings were extended to a maximum depth of 51½ feet. This seismic site class definition considers that similar or denser soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.
3. These values were obtained using on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years accessed

A site-specific ground motion study may reduce design values and consequently construction costs. We recommend consulting with a structural engineer to evaluate the need for such study and its potential impact on construction costs. Terracon should be contacted if a site-specific ground motion study is desired.

Faulting and Estimated Ground Motions

The site is located in the seismically active southern California area. Specifically, the site is located east of the East California Shear Zone, a zone of active faults characterized by large historic earthquakes and ground rupture. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. As calculated using the USGS Unified Hazard Tool, the Baker fault has the highest contribution of hazard to the site. The Baker fault is assigned a maximum magnitude of 7.2 and is located approximately 8 kilometers from the site. Significant contributions to seismic hazard are also associated with faults located at a farther distance from the site, such as the Garlock fault, and from gridded sources located approximately 5 to 10 kilometers north of the site.

Based on the USGS Design Maps Summary Report, using the American Society of Civil Engineers (ASCE 7-16) standard, the peak ground acceleration (PGA_M) at the project site is expected to be 0.35 g. Based on the USGS Unified Hazard Tool, the project site has a de-aggregated modal magnitude of 7.7. The site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.

LIQUEFACTION AND SEISMIC SETTLEMENT

Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore-water pressures during earthquake ground shaking, causing loss of shear strength, and is typically a hazard where loose sandy soils exist below groundwater. The County of San Bernardino has designated certain areas as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table.

The subsurface materials generally consist of dense to very dense poorly-graded sand and silty sand. Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling.

According to the County of San Bernardino geological hazard maps, the site is located within an area having a low liquefaction potential. Based on the encountered subsurface dense soils and the absence of shallow groundwater, it is our opinion that the potential for liquefaction is considered low.

Seismic Settlement

The underlying native soils are comprised of predominantly of silty sand and poorly graded sand with silt extending to the maximum depth of the borings. SPT blow counts indicate that the relative density of the soils encountered generally are medium dense to very dense. We estimate that total seismic settlement (dry sand settlement) would be less than 1 inch, with differential settlement values at less than ½ of an inch.

GEOTECHNICAL OVERVIEW

The site is suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Based on our field investigation and laboratory test results, it is our opinion that the site will be safe against hazards from landslide, settlement, or slippage provided that the recommendations presented in our report are followed. Also, provided that the recommendations presented in our report are followed, we find that the proposed grading will not adversely affect the geologic stability of the properties adjacent to the site.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and our current understanding of the proposed project.

Based on the conditions encountered, we believe the proposed buildings can be supported on shallow foundations, such as spread footings. The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results** section), engineering analyses, and our current understanding of the proposed project.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs, and pavements are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Site Preparation

Strip and remove existing vegetation, debris and other deleterious materials from proposed building and pavement areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill and provide for a relatively uniform thickness of fill beneath proposed building structures.

The ground surface of the site is generally earthen and bare and there are some native grasses and bushes. We recommend stripping vegetation to depths that exposed soils with less than 3 percent organics and no roots having a diameter greater than 1/8 inch. While the depth of the unsuitable soils should be expected to vary, the thickness of the topsoil layer may be estimated to be approximately 3 to 6 inches for construction budgeting purposes. The thickness of the vegetation layer was not determined during our field exploration; therefore, the actual depth of stripping should be verified by engineering observations made during the grading operations at the project. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be removed from the site or used to revegetate landscaped areas or exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

Although no evidence for underground facilities such as septic tanks, cesspools, or basements was observed during the site reconnaissance, such features could be encountered during construction. All of the on-site fills, utility lines and associated trenches should be traced out and completely removed during grading. The resulting excavations should be thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

To provide a uniform compacted fill pad for the proposed structures, we recommend a shallow foundation system be supported on engineered compacted fill extending to a minimum depth of 1 foot below the bottom of foundations, or 2 feet below existing grades, whichever is greater. Grading for each structure should include the footprint of the structure plus a lateral distance of 2 feet from the perimeter footings.

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned, and compacted per the compaction requirements in this report. The moisture content and compaction of subgrade soils should be maintained until the placement of compacted structural fill.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable. However, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Excavation

It is anticipated that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

Individual contractors are responsible for designing and constructing stable, temporary excavations. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

Fill Material Types

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean on-site soils or approved imported materials may be used as fill material for the following:

■ general site grading	■ foundation backfill
■ foundation areas	■ pavement areas
■ exterior slab areas	

If imported soils are used as fill materials to raise grades, these soils should conform to low volume change materials and should conform to the following requirements:

Gradation	**Percent Finer by Weight (ASTM C 136)**
3”	100
No. 4 Sieve	50 - 100
No. 200 Sieve	20 - 50

- Liquid Limit .... 30 (max)
- Plasticity Index .... 15 (max)
- Maximum Expansive Index* .... 20 (max)

*ASTM D 4829

The contractor shall notify the Geotechnical Engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor shall also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the job.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness.

Compaction Requirements

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
On-site soils and/or low volume change imported fill:			
Beneath foundations:	90	0%	+3%
Beneath interior slabs:	90	0%	+3%
Fill greater than 5 feet in depth	90	0%	+3%
Miscellaneous backfill	90	0%	+3%
Beneath pavements:	95	0%	+3%
Utility Trenches*:	90	0%	+3%
Bottom of excavation receiving fill:	90	0%	+3%
Aggregate base (beneath pavements):	95	0%	+3%

* Upper 12 inches should be compacted to 95% within pavement and structural areas.

Utility Trenches

It is anticipated that the on-site soils will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 is recommended for bedding and shading of utilities, unless otherwise allowed by the utility manufacturer.

On-site materials are considered suitable for backfill of utility and pipe trenches from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Planters and other surface features which could retain water in areas adjacent to the building or pavements should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

We recommend a minimum horizontal setback distance of 10 feet from the perimeter of any building and the high-water elevation of the nearest storm-water retention basin.

Roof drainage should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems and landscaped irrigation should not be installed within 5 feet of foundation walls.

Exterior Slab Design and Construction

Exterior slabs-on-grade, exterior architectural features, and utilities founded on, or in backfill may experience some movement due to the volume change of the backfill. To reduce the potential for damage caused by movement, we recommend:

- minimizing moisture increases in the backfill;
- controlling moisture-density during placement of backfill;
- using designs which allow vertical movement between the exterior features and adjoining structural elements;
- placing effective control joints on relatively close centers.

Construction Considerations

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

Onsite soils consist of cohesionless sandy soils. Such soils have the tendency to cave and slough during excavations. Therefore, formwork may be needed for foundation excavations.

We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season (typically November through April) it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork operations may require additional mitigative measures beyond that which would be expected during the drier summer and fall months. This could include diversion of surface runoff around exposed soils and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

Construction Observation and Testing

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proof-rolling, placement and compaction of controlled compacted fills, backfilling of excavations to the completed subgrade.

The exposed subgrade and each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. In the event that unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer’s evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow spread foundations for the proposed mobile homes.

Item	Description
Foundation Support	Engineered fill extending 1 foot below the bottom of foundations, or 2 feet below the existing grades, whichever is greater.
Net Allowable Bearing pressure [1, 2] (On-site soils or structural fill)	2,000 psf
Minimum Foundation Dimensions	24 inches
Minimum Footing Depth	12" below finish grade
Estimated Total Static Settlement from Structural Loads [2]	1 inch
Estimated Differential Settlement [2, 6]	½ inch across 40 feet

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied.
2. Values provided are for maximum loads noted in **Project Description**. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations.
3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork**.
4. Use of passive earth pressures requires the footing forms be removed and compacted structural fill be placed against the vertical footing face. A factor of safety of 2.0 is recommended.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions. A factor of safety of 1.5 is recommended.
6. Differential settlements are as measured over a span of 40 feet.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

To ensure foundations have adequate support, special care should be taken when footings are located adjacent to trenches. The bottom of such footings should be at least 1 foot below an imaginary plane with an inclination of 1.5 horizontal to 1.0 vertical extending upward from the nearest edge of adjacent trenches.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Boring B-35 was drilled within the existing AC on Silver Lane. The thicknesses of AC and base materials encountered were 4-inches of AC over 4-inches of base materials. Poorly graded sand with silt was encountered beneath the base materials to the depth of the boring.

Pavement Design Parameters

Design of asphalt concrete (AC) pavements is based on the procedures outlined in the Caltrans "Highway Design Manual for Safety Roadside Rest Areas" (Caltrans, 2016). Design of Portland cement concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330R-08; "Guide for Design and Construction of Concrete Parking Lots."

A correlated design R-Value of 50 was used to calculate the AC pavement thickness sections. A modulus of subgrade reaction of 120 pci and a modulus of rupture of 600 psi were used for the PCC pavement designs.

The structural sections are predicated upon proper compaction of the utility trench backfills and the subgrade soils as prescribed by in **Earthwork**, with the upper 12 inches of subgrade soils and all aggregate base material brought to a minimum relative compaction of 95 percent in accordance with ASTM D 1557 prior to paving. The aggregate base should meet Caltrans requirements for Class 2 base.

The pavement designs were based upon the results of preliminary sampling and testing and should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed. Additionally, the preliminary sections provided are minimums based on procedures previously referenced. The project civil engineer should confirm minimum Traffic Indices and sections required by local agencies or jurisdictions if applicable.

Pavement Section Thicknesses

The following table provides options for AC and PCC Sections:

Asphalt Concrete Design		
Usage	**Assumed Traffic Index**	**Recommended Structural Section**
Auto Parking Areas	4.5	4" HMA[1]/4" Class 2 AB[2]
Drive lanes	5.5	4" HMA[1]/4" Class 2 AB[2]
Truck Delivery Areas	6.0	4½" HMA[1]/4" Class 2 AB[2]

1. HMA = hot mix asphalt
2. AB = aggregate base

Portland Cement Concrete Design			
Layer	**Thickness (inches)**		
	Light Duty[1]	**Medium Duty[2]**	**Heavy Duty[3]**
PCC	5.0	6.0	7.0
Aggregate Base [4]	--	--	--

1. Car Parking and Access Lanes, Average Daily Truck Traffic (ADTT) = 1 (Category A).
2. Truck Parking Areas, Multiple Units, ADTT = 25 (Category B)
3. In areas of anticipated heavy traffic, fire trucks, delivery trucks, or concentrated loads (e.g., dumpster pads), and areas with repeated turning or maneuvering of heavy vehicles, ADTT = 700 (Category C).
4. Aggregate base is not required. Compacted on-site material is considered competent.

Recommended structural sections were calculated based on assumed TIs and our preliminary sampling and testing.

Terracon does not practice traffic engineering. We recommend that the project civil engineer or traffic engineer verify that the TIs and ADTT traffic indices used are appropriate for this project.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2 percent.
- Subgrade and pavement surfaces should have a minimum 2 percent slope to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

CORROSIVITY

Laboratory testing for soluble sulfate, soluble chloride, electrical resistivity, and pH testing was conducted on soil samples retrieved during the investigation for the proposed Love's Travel Stop within the adjacent parcel across Baker Blvd. (CB215111 Love's Travel Stop). For preliminary purposes, those results may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction; however, corrosivity testing should be performed on soils within this parcel during grading operations to confirm the values used.

Results of soluble sulfate testing on soil samples from the adjacent parcel for the Love's Travel Stop indicate those soils tested possess negligible sulfate concentrations when classified in accordance with Table 4.3.1 of the ACI Design Manual. Concrete should be designed in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

For protection against corrosion to buried metals, Terracon recommends that an experienced corrosion engineer be retained to design a suitable corrosion protection system for underground metal structures or components.

If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Terracon conducted six soil-testing borings. These borings were drilled at the locations and to depths indicated in the table below.

Boring Number	Boring Depth (feet) [1]	Location
B-26 to B-29, B-34	21 ½	Planned building area
B-35	6 ½	Adjacent roadway – Silver Lane

1. Below ground surface.

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolation from the Google Earth. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advance the borings with a truck-mounted drill rig using hollow-stem augers. Both a standard penetration test (SPT) sampler (2-inch outer diameter and 1-3/8-inch inner diameter) and a modified California ring-lined sampler (3-inch outer diameter and 2-3/8-inch inner diameter) are utilized in our investigation. The penetration resistance is recorded on the boring logs as the number of hammer blows used to advance the sampler in 6-inch increments (or less if noted). The samplers are driven with an automatic hammer that drops a 140-pound weight 30 inches for each blow. After the required seating, samplers are advanced up to 18 inches, providing up to three sets of blowcounts at each sampling interval. The sampling depths, penetration distances, and other sampling information are recorded on the field boring logs. The recorded blows are raw numbers without any corrections for hammer type (automatic vs. manual cathead) or sampler size (ring sampler vs. SPT sampler). Relatively undisturbed and bulk samples of the soils encountered are placed in sealed containers and returned to the laboratory for testing and evaluation.

We observe and record groundwater levels during drilling and sampling. For safety purposes, all borings are backfilled with auger cuttings after their completion.

Our exploration team prepares field boring logs as part of the drilling operations. These field logs include visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs are prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- Water (Moisture) Content of Soil by Mass
- Laboratory Determination of Density (Unit Weight) of Soil Specimens

The laboratory testing program often included examination of soil samples by an engineer. Based on the material’s texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

REFERENCES

Geologic References

Dibblee, T.W., 1960, Preliminary geologic map of the Victorville Quadrangle, California: U.S. Geological Survey Mineral Investigations Field Studies Map MF-229. Scale: 1:62,500.

Fairchild Collection, Monoscopic aerial photographs as follows:

- January 21, 1953, Frame No. AXL-29K-46
- June 23, 1959, Frame No. AXL-2W-162
- July 26, 1959, Frame No AXL-1W-91.
- May 29, 1994, Frame No. 6855-34.

SITE LOCATION AND EXPLORATION PLANS

SITE LOCATION

Proposed Live-Work Housing Park ■ Baker, San Bernardino County, California
October 29, 2021 ■ Terracon Project No. CB215111

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

Proposed Live-Work Housing Park ■ Baker, San Bernardino County, California

October 29, 2021 ■ Terracon Project No. CB215111

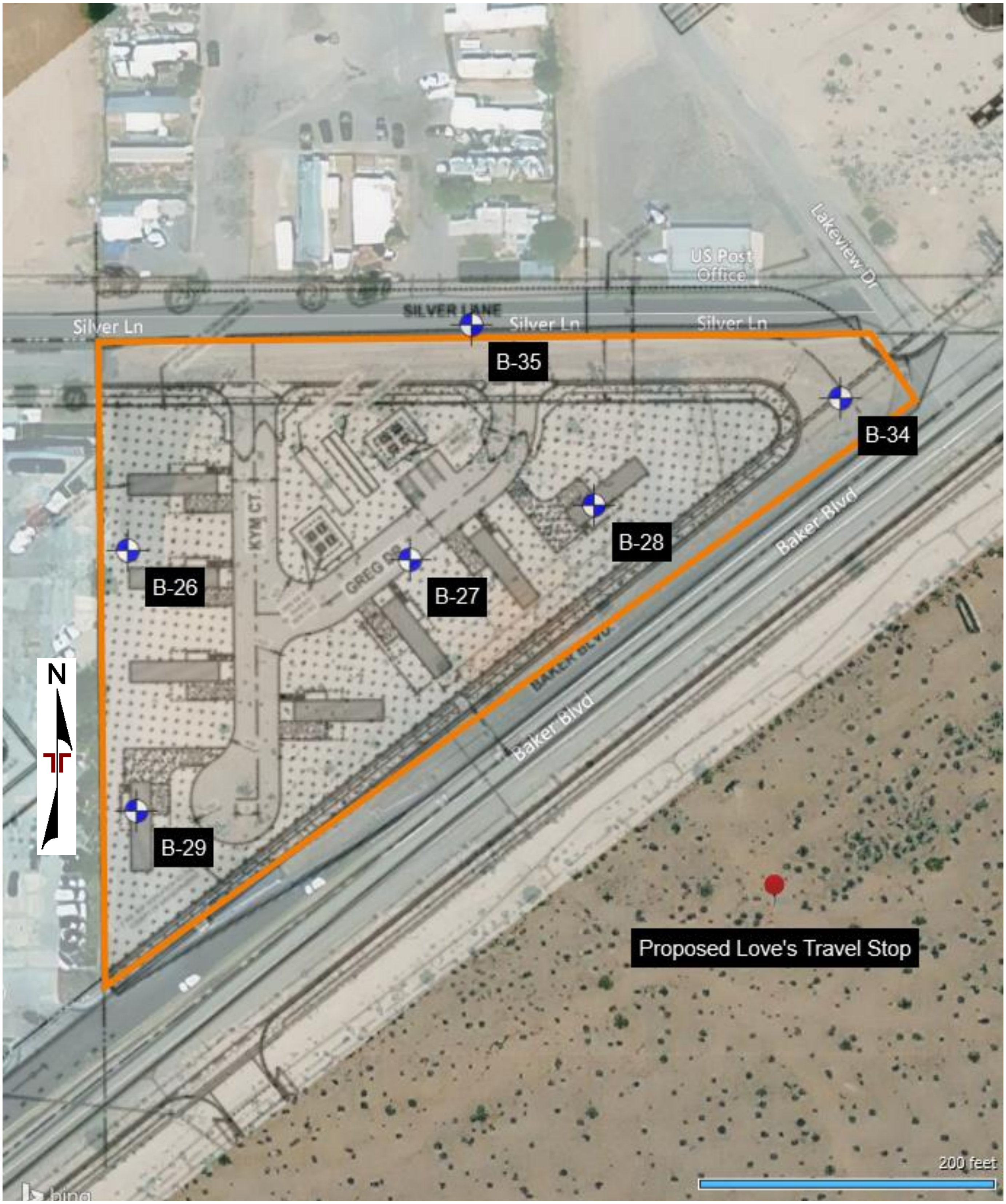


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

BORING LOG NO. B-26

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2779° Longitude: -116.0566°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, dense							
		5			17-28-45	0.7		9
	medium dense	10			20-20-28	1.0		9
	trace gravel							
15.0	**SILTY SAND (SM)**, trace gravel, medium to coarse grained, light brown, dense	15			17-21-25 N=46			21
21.5		20			25-20-28 N=48			20
	Boring Terminated at 21.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-27

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2779° Longitude: -116.0560°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, dense							
		5			15-23-40	3.6		
	trace gravel, very dense	10			32-50/1"	3.5		
	dense	15			15-20-24 N=44			
21.5		20			24-26-23 N=49			
	Boring Terminated at 21.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-28

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2780° Longitude: -116.0556°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine to coarse grained, light brown, medium dense							
					8-15-18	0.7		11
		5						
7.0	**SILTY SAND (SM)**, fine grained, brown with white, very dense							
					50/6"	7.6	112	18
		10						
	fine to medium grained, light brown							
		15			13-28-38 N=66			13
		20			42-42-50/6"			15
21.5	***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-29

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2775° Longitude: -116.0566°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, very dense							
		5			28-50/6"	1.0	108	
	medium dense	10			31-21-28	1.2	104	
	trace gravel							
	very dense	15			23-50/6"			
		20			50/6"			
	21.5							
	Boring Terminated at 21.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-34

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2782° Longitude: -116.0550°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, brown, dense							
		5			20-24-40	0.4		
	trace gravel, very dense	10			50/6"	1.8	88	
	dense	15			9-11-24 N=35			
18.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, medium to coarse grained, light brown, very dense							
		20			50/6"			
21.5	***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-35

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2784° Longitude: -116.0558°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
0.3	**ASPHALT**, 4"							
0.7	**AGGREGATE BASE COURSE**, 4"							
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							12
		5			10-18-28			
6.5								
	Boring Terminated at 6.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

SUPPORTING INFORMATION

Contents:

GENERAL NOTES

Terracon GeoReport

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

Auger	Shelby Tube	Split Spoon
Rock Core	Macro Core	Modified California Ring Sampler
Grab Sample	No Recovery	Modified Dames & Moore Ring Sampler

WATER LEVEL

- **Water Initially Encountered**
- **Water Level After a Specified Period of Time**
- **Water Level After a Specified Period of Time**

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	**Hand Penetrometer**
(T)	**Torvane**
(b/f)	**Standard Penetration Test (blows per foot)**
N	**N value**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**
(WOH)	Weight of Hammer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			**CONSISTENCY OF FINE-GRAINED SOILS** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well-graded gravel[F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$][E]	GP	Poorly graded gravel[F]
		Gravels with Fines: More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel[F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand[I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$][E]	SP	Poorly graded sand[I]
		Sands with Fines: More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G, H, I]
			Fines classify as CL or CH	SC	Clayey sand[G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above “A” line[J]	CL	Lean clay[K, L, M]
			PI < 4 or plots below “A” line[J]	ML	Silt[K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K, L, M, N]
					Organic silt[K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line	CH	Fat clay[K, L, M]
			PI plots below “A” line	MH	Elastic Silt[K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K, L, M, P]
					Organic silt[K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains ≥ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add “sandy” to group name.

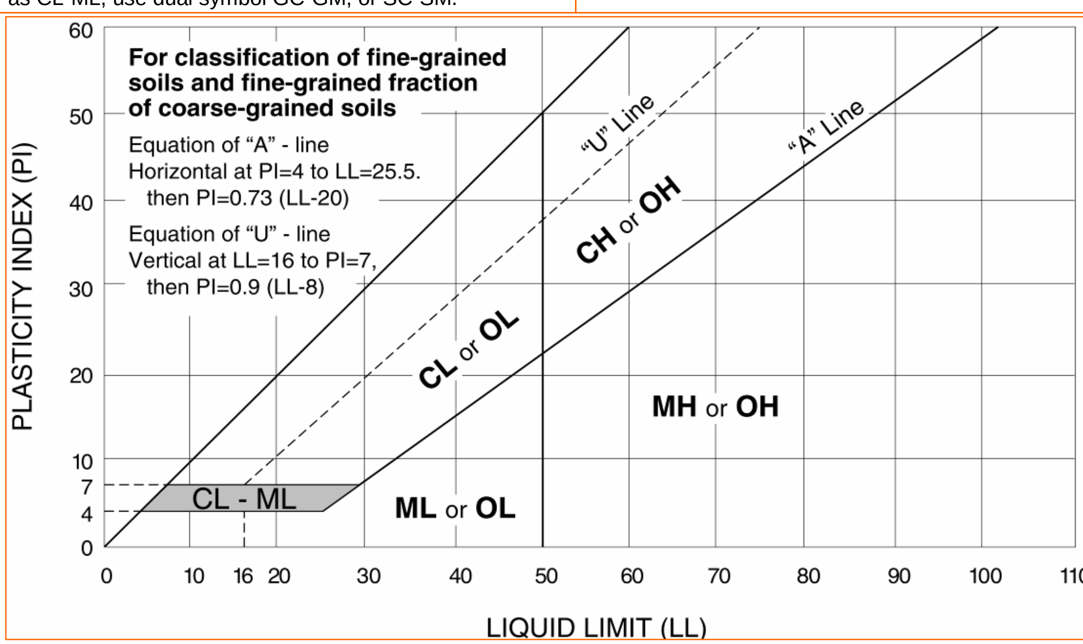
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] PI ≥ 4 and plots on or above “A” line.

[O] PI < 4 or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.



DESCRIPTION OF ROCK PROPERTIES

Terracon GeoReport

WEATHERING	
Term	**Description**
Unweathered	No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces.
Slightly weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.
Moderately weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.
Highly weathered	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

STRENGTH OR HARDNESS		
Description	**Field Identification**	**Uniaxial Compressive Strength, psi (MPa)**
Extremely weak	Indented by thumbnail	40-150 (0.3-1)
Very weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife	150-700 (1-5)
Weak rock	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer	700-4,000 (5-30)
Medium strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer	4,000-7,000 (30-50)
Strong rock	Specimen requires more than one blow of geological hammer to fracture it	7,000-15,000 (50-100)
Very strong	Specimen requires many blows of geological hammer to fracture it	15,000-36,000 (100-250)
Extremely strong	Specimen can only be chipped with geological hammer	>36,000 (>250)

DISCONTINUITY DESCRIPTION			
Fracture Spacing (Joints, Faults, Other Fractures)		**Bedding Spacing (May Include Foliation or Banding)**	
Description	**Spacing**	**Description**	**Spacing**
Extremely close	< ¾ in (<19 mm)	**Laminated**	< ½ in (<12 mm)
Very close	¾ in – 2-1/2 in (19 - 60 mm)	**Very thin**	½ in – 2 in (12 – 50 mm)
Close	2-1/2 in – 8 in (60 – 200 mm)	**Thin**	2 in – 1 ft. (50 – 300 mm)
Moderate	8 in – 2 ft. (200 – 600 mm)	**Medium**	1 ft. – 3 ft. (300 – 900 mm)
Wide	2 ft. – 6 ft. (600 mm – 2.0 m)	**Thick**	3 ft. – 10 ft. (900 mm – 3 m)
Very Wide	6 ft. – 20 ft. (2.0 – 6 m)	**Massive**	> 10 ft. (3 m)

Discontinuity Orientation (Angle): Measure the angle of discontinuity relative to a plane perpendicular to the longitudinal axis of the core. (For most cases, the core axis is vertical; therefore, the plane perpendicular to the core axis is horizontal.) For example, a horizontal bedding plane would have a 0-degree angle.

ROCK QUALITY DESIGNATION (RQD) [1]	
Description	**RQD Value (%)**
Very Poor	0 - 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 - 100

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

Reference: U.S. Department of Transportation, Federal Highway Administration, Publication No FHWA-NHI-10-034, December 2009 Technical Manual for Design and Construction of Road Tunnels – Civil Elements

DESCRIPTION OF ROCK PROPERTIES

WEATHERING	
Fresh	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.
Very slight	Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.
Slight	Rock generally fresh, joints stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.
Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.
Moderately severe	All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick.
Severe	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.
Very severe	All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.
Complete	Rock reduced to "soil". Rock "fabric" no discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.

HARDNESS (for engineering description of rock – not to be confused with Moh's scale for minerals)	
Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. Gouges or grooves to ¼ in. deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 in. deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-in. maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

Joint, Bedding, and Foliation Spacing in Rock [1]

Spacing	Joints	Bedding/Foliation
Less than 2 in.	Very close	Very thin
2 in. – 1 ft.	Close	Thin
1 ft. – 3 ft.	Moderately close	Medium
3 ft. – 10 ft.	Wide	Thick
More than 10 ft.	Very wide	Very thick

1. Spacing refers to the distance normal to the planes, of the described feature, which are parallel to each other or nearly so.

Rock Quality Designator (RQD) [1]

RQD, as a percentage	Diagnostic description
Exceeding 90	Excellent
90 – 75	Good
75 – 50	Fair
50 – 25	Poor
Less than 25	Very poor

1. RQD (given as a percentage) = length of core in pieces 4 inches and longer / length of run

Joint Openness Descriptors

Openness	Descriptor
No Visible Separation	Tight
Less than 1/32 in.	Slightly Open
1/32 to 1/8 in.	Moderately Open
1/8 to 3/8 in.	Open
3/8 in. to 0.1 ft.	Moderately Wide
Greater than 0.1 ft.	Wide

References: American Society of Civil Engineers. Manuals and Reports on Engineering Practice - No. 56. Subsurface Investigation for Design and Construction of Foundations of Buildings. New York: American Society of Civil Engineers, 1976. U.S. Department of the Interior, Bureau of Reclamation, Engineering Geology Field Manual.

Geotechnical Engineering Report

Love's Travel Stop – Baker
Baker, San Bernardino County, California
October 29, 2021
Terracon Project No. CB215111

Prepared for:
Love's Travel Stops & Country Stores, Inc.
Oklahoma City, Oklahoma

Prepared by:
Terracon Consultants, Inc.
Colton, CA

October 29, 2021

Love’s Travel Stops & Country Stores, Inc.
10601 North Pennsylvania Ave.
Oklahoma City, Oklahoma 73120

Attn: Mr. Kym Van Dyke
P: (801) 330-3886
E: Kym.Van Dyke@ loves.com

Re: Geotechnical Engineering Report
Love’s Travel Stop – Baker
Baker Boulevard and Silver Lane
Baker, San Bernardino County, California
Terracon Project No. CB215111

Dear Mr. Van Dyke:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PCB215111 dated August 4, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork, pavements, foundations, and floor slabs for the proposed structures.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Ali Tabatabaei, Ph.D., G.E.
Geotechnical Project Engineer

Keith P. Askew, P.E., G.E.
Department Manager

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Environmental ■ Facilities ■ Geotechnical ■ Materials

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report
Love's Travel Stop – Baker
Baker Boulevard and Silver Lane
Baker, San Bernardino County, California
Terracon Project No. CB215111
October 29, 2021

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Love's Travel Stop to be located at Baker Boulevard and Silver Lane in Baker, San Bernardino County, California. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations
- Pavement design and construction
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per CBC
- Lateral earth pressures

The geotechnical engineering Scope of Services for this project included advancement of twenty-nine (29) test borings to depths ranging from approximately 5 to 51½ feet below the existing grades. Our scope also included field electrical resistivity testing and on-site infiltration testing.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located south of Baker Boulevard and Silver Lane in Baker, San Bernardino County, California. The proposed development will be within an approximately 19.82-acre parcel. 35.2771°N/116.0552°W (approximate). See **Site Location**

Item	Description
Existing Improvements	The site is relatively flat and undeveloped and includes Baker Blvd, and the intersection of Baker Blvd. and Caltrans Ave.Fill soils associated with constructing the roadways may be present within the undeveloped portions of the site.
Current Ground Cover	Earthen, light "desert" vegetation in the areas of no development. Roadways are asphalt concrete (AC) with discernable base material beneath the AC.
Existing Topography	The site is relatively flat with an elevation of approximately 1,010 feet.

We also collected photographs at the time of our field exploration program. Representative photos are provided in our **Photography Log**.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning.

Item	Description
Information Provided	Site Plan developed by Lane Engineers, Inc. dated July 26, 2021
Love's Facility Type	Tier 2
Project Description	The proposed Love's Travel Stop is planned south of Baker Blvd. and will include the following: ■ A single-story convenience store/restaurant building (Country Store) ■ Canopies over the car and truck fuel dispensing islands ■ A high rise sign ■ Above and below ground storage tanks ■ Concrete and asphalt pavement ■ Improvements to Baker Blvd. ■ Retention basins (three total)
Proposed Structures	The project includes a single-story building with a footprint of about 12,200 square feet. The building will be slab-on-grade with no below-grade structures. Other structures include fuel island canopies, and below ground and above ground fuel storage tanks.
Building Construction	■ The Country Store will have isolated steel columns, load bearing masonry walls and a concrete slab-on-grade floor. ■ Fuel island canopies will be steel column and frame construction ■ High-rise sign will be supported on a deep foundation system (drilled pier)

Item	Description
Finished Floor Elevation	The finish grade elevations are unknown; however, we assume they will be near the grades of the existing roadways. Based on the site layout and topography, and the existing roadways for entry and exit, the finish grade elevations will likely be around 1,010 feet.
Maximum Loads (provided by Love's)	Country Store: ■ Columns: up to 75 kips ■ Walls: 1 kip per linear foot (klf) ■ Floor Slab: assumed 150 pounds per square foot (psf) Auto Fuel Canopy (40' by 80' in plan dimensions) foundations: ■ Axial compression: 23.07 kips (dead and live loads) ■ Axial uplift: 14.99 kips ■ Moment: 22.58 kip-feet Truck Fuel Canopy (25' height) foundations: ■ Axial compression: 22.59 kips (dead and live loads) ■ Axial uplift: 13.73 kips ■ Moment: 54.61 kip-feet
Grading/Slopes	Finish grade elevations were not provided; however, we anticipate finish grades to be near the existing grades of the adjacent roadways; for purposes of this proposal, we have assumed the site will be graded to an elevation of approximately 1,010 feet. Up to 5 feet of cut and 5 feet of fill may be required to develop final grades, excluding requirements for remedial grading. Slopes greater than 5 feet in vertical height are not planned. Final slope inclinations of 2:1 (Horizontal: Vertical) or flatter are expected.
Below-Grade Structures	Other than underground fuel storage tanks (USTs), no below grade structures are anticipated.
Free-Standing Retaining Walls	Retaining walls are not expected to be constructed as part of site development to achieve final grades.
Pavements	The Love's Travel Stop will include light-duty, medium-duty, heavy-duty, and extra heavy-duty pavement areas. The pavement design criteria are noted below (Tier 1/Tier 2): ■ Light-duty auto area: 1,000 cars per day ■ Medium-duty truck parking area: 150 trucks per day ■ Heavy-duty truck drives: 600 trucks per day ■ Extra heavy-duty truck drives: 1,000 trucks per day ■ 20-year design life

Item	Description
High-Rise Sign Access Road	An unpaved access road will extend to the high-rise sign. Vehicles expected to operate on the access road include concrete trucks and other construction equipment during construction of the sign foundation. Additionally, truck-mounted cranes used to erect and maintain the sign are expected to use the road. Cranes typically used vary in size and weight depending on the height of the sign and monopole weight. Vehicles operating on this road include: ■ Crane, large (350-ton capacity): 140-kip load, 6 axles, 50 ft. long by 9 ft. wide; ■ Crane, medium: 72-kip load, 4 or 6 axles, 40 ft. long by 9 ft. wide; ■ Tractor trailers, 80-kip load, 5 axles, 18 wheels, 70 ft. long by 9 ft. wide ■ Concrete trucks, 72-kip load, 10 wheels, 30 ft. long by 8 ft. wide.
Stormwater Infiltration	Low Impact Development (LID) structures for stormwater infiltration are identified on the plans at 3 areas in the proposed development. Local agencies may require the development of infiltration structures and may not allow certain types to be placed within fill soils.

GEOTECHNICAL CHARACTERIZATION

Site Geology

The site is located within the east-central portion of the Mojave Desert Geomorphic Province of Southern California. The Mojave Desert Geomorphic Province is bounded on the southwest by the San Andreas fault and the Transverse Ranges, and on the northeast by the Garlock fault. The eastern Mojave desert is characterized by northwest-trending mountain ranges of crystalline bedrock and intervening, broad, alluviated valleys. Many of the alluvial valleys are closed basins that have developed saline dry lake playas that occasionally fill with surface run-off during periodic episodes of precipitation. The subject site is situated approximately 1 ½ miles northeast of a channel that drains the Soda Lake Playa northward into the Silver Lake Playa. Approximately 1 ½ miles west of the site lies Otto Mountain, a part of the larger Soda Mountains, consisting mostly of Mesozoic granitic bedrock and Precambrian metamorphic rock (Jennings and others, 1962, https://ngmdb.usgs.gov/Prodesc/proddesc_332.htm).

The site is located on the distal portion of a broad, west-sloping, incised alluvial plain created by erosion and deposition of bedrock detritus carried from hills in the vicinity of the Cima volcanic field, as close as approximately 11 miles to the east. Surficial native materials at the site have been mapped as Quaternary-age alluvium (Jennings et. al., 1962). Although the total thickness and depth of the alluvium beneath the site is not known, the depth to underlying bedrock in the Soda Lake and Silver Lake basins is anticipated to range from less than a few hundred feet, to a thousand feet or more, thickening with increasing distance from exposed bedrock hills. The soils beneath the site are mapped as Holocene-age alluvium (Jennings and others, 1962, https://ngmdb.usgs.gov/Prodesc/proddesc_332.htm). These materials are expected to interfinger with the nearby playa deposits, but little playa sediments (silts/clays) were found in the exploratory borings.

Subsurface Profile

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. In general, the site is underlain with medium dense to very dense poorly-graded sand and silty sand to the maximum depth explored.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely. Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Groundwater

The borings were advanced using continuous flight auger drilling techniques that allow short-term groundwater observations to be made while drilling. Groundwater seepage was not observed within the maximum depths of 51½ feet during or at the completion of drilling. We do not anticipate groundwater will affect construction at this project site. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. According to data collected from the Water Data Library of California Department of Water Resources (DWR) from a nearby wells, historic groundwater levels are deeper than 75 feet.

Hydroconsolidation

To evaluate the potential deformation that may be caused by the addition of water to the subsurface soils, hydro-consolidation testing was performed on a selected, relatively undisturbed samples. The result presented in the Exploration Results section and indicate collapse potentials of 2% (B-1, 10 – 11.5), 5.4% (B-5, 10 – 11.5) and 3.8% (B-7, 7.5 – 9), boring number and sample depths summarized in parenthesizes. All samples were saturated under a surcharge pressure of 2,000 psf.

Soil samples with collapse potential of 3.8% and 5.4% were encountered at depths of 7.5 to 10 feet bgs. Based on the measured densities and field blow counts, it is our opinion that sample disturbance may have contributed to the measured hydro-collapse laboratory results.

Furthermore, effective stresses at such depths will be lower than 2,000 psf, which is the surcharge pressure the samples were tested for at.

SEISMIC CONSIDERATIONS

Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our opinion that the Seismic Site Classification is D. The 2019 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16 and 2019 CBC. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." Based on our understanding of the proposed structures, it is our assumption that the exception in Section 11.4.8 applies to the proposed structures. However, the structural engineer should verify the applicability of this exception.

Based on this exception, the spectral response accelerations presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2019 CBC.

Description	Value
Site Classification (CBC) [1]	D [2]
Site Latitude (°N)	35.2771
Site Longitude (°W)	-116.0552
S_s Spectral Acceleration for a 0.2-Second Period	0.609
S_1 Spectral Acceleration for a 1-Second Period	0.236
F_a Site Coefficient for a 0.2-Second Period	1.313
F_v Site Coefficient for a 1-Second Period	2.1
Site Modified Peak Ground Acceleration	0.35g
De-aggregated Modal Magnitude [3]	7.74

Description	Value

1. Seismic site classification in general accordance with the *2019 California Building Code*.
2. The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Our borings were extended to a maximum depth of 51½ feet. This seismic site class definition considers that similar or denser soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.
3. These values were obtained using on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years accessed

A site-specific ground motion study may reduce design values and consequently construction costs. We recommend consulting with a structural engineer to evaluate the need for such study and its potential impact on construction costs. Terracon should be contacted if a site-specific ground motion study is desired.

Faulting and Estimated Ground Motions

The site is located in the seismically active southern California area. Specifically, the site is located east of the East Mojave Shear Zone, a zone of active faults characterized by large historic earthquakes and ground rupture. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. As calculated using the USGS Unified Hazard Tool, the Baker fault has the highest contribution of hazard to the site. The Baker fault is assigned a maximum magnitude of 7.2 and is located approximately 8 kilometers from the site. Significant contributions to seismic hazard are also associated with faults located at a farther distance from the site, such as the Garlock fault, and from gridded sources located approximately 5 to 10 kilometers north of the site.

Based on the USGS Design Maps Summary Report, using the American Society of Civil Engineers (ASCE 7-16) standard, the peak ground acceleration (PGA_M) at the project site is expected to be 0.35 g. Based on the USGS Unified Hazard Tool, the project site has a de-aggregated modal magnitude of 7.7. The site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.

LIQUEFACTION AND SEISMIC SETTLEMENT

Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore-water pressures during earthquake ground shaking, causing loss of shear strength, and is typically a hazard where loose sandy soils exist below groundwater. The County of San Bernardino has designated certain areas as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table.

The subsurface materials generally consist of dense to very dense poorly-graded sand and silty sand. Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling.

According to the County of San Bernardino geological hazard maps, the site is located within an area having a low liquefaction potential. Based on the encountered subsurface dense soils and the absence of shallow groundwater, it is our opinion that the potential for liquefaction is considered low.

Seismic Settlement

The underlying native soils are comprised of predominantly of silty sand and poorly graded sand with silt extending to the maximum depth of the borings. SPT blow counts indicate that the relative density of the soils encountered generally are medium dense to very dense. We estimate that total seismic settlement (dry sand settlement) would be less than 1 inch, with differential settlement values at less than ½ of an inch.

CORROSIVITY

The table below lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. In addition, a field resistivity survey was performed at the Tank Pad location using the Wenner Array (4-pin) method per ASTM G57 and a digital ground resistance tester. The results of the field survey are provided in **Exploration and Testing Procedure** attachment.

The following values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary						
Boring	**Depth (feet)**	**Soluble Sulfate (mg/kg)**	**Soluble Chloride (mg/kg)**	**Electrical Resistivity (as-received) (Ω-cm)**	**Electrical Resistivity (saturated) (Ω-cm)**	**pH**
B-11	0-5	228	73	22,310	6,887	9.20
B-15	0-5	88	158	>1,000,000	1,067	8.84

Results of soluble sulfate testing indicate samples of the on-site soils tested possess negligible sulfate concentrations when classified in accordance with Table 4.3.1 of the ACI Design Manual. Concrete should be designed in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

For protection against corrosion to buried metals, Terracon recommends that an experienced corrosion engineer be retained to design a suitable corrosion protection system for underground metal structures or components.

If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

GEOTECHNICAL OVERVIEW

The site is suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Based on our field investigation and laboratory test results, it is our opinion that the site will be safe against hazards from landslide, settlement, or slippage provided that the recommendations presented in our report are followed. Also, provided that the recommendations presented in our report are followed, we find that the proposed grading will not adversely affect the geologic stability of the properties adjacent to the site.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and our current understanding of the proposed project.

Based on the conditions encountered, we believe the proposed buildings can be supported on shallow foundations, such as spread footings. The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results** section), engineering analyses, and our current understanding of the proposed project.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs, and pavements are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Site Preparation

Strip and remove existing vegetation, debris and other deleterious materials from proposed building and pavement areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill and provide for a relatively uniform thickness of fill beneath proposed building structures.

The ground surface of the site is generally earthen and bare and there are some native grasses and bushes. We recommend stripping vegetation to depths that exposed soils with less than 3 percent organics and no roots having a diameter greater than 1/8 inch. While the depth of the unsuitable soils should be expected to vary, the thickness of the topsoil layer may be estimated to be approximately 3 to 6 inches for construction budgeting purposes. The thickness of the vegetation layer was not determined during our field exploration; therefore, the actual depth of stripping should be verified by engineering observations made during the grading operations at the project. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be removed from the site or used to revegetate landscaped areas or exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

Although no evidence for underground facilities such as septic tanks, cesspools, or basements was observed during the site reconnaissance, such features could be encountered during construction. All of the on-site fills, utility lines and associated trenches should be traced out and completely removed during grading. The resulting excavations should be thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

To provide a uniform compacted fill pad for the proposed structures, we recommend a shallow foundation system be supported on engineered compacted fill extending to a minimum depth of 2 feet below the bottom of foundations, or 5 feet below existing grades, whichever is greater. Grading for each structure should include the footprint of the structure plus a lateral distance of 3 feet from the perimeter footings.

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned, and compacted per the compaction requirements in this report. The moisture content and compaction of subgrade soils should be maintained until the placement of compacted structural fill.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable. However, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Excavation

We anticipate that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

We recommend that the underground storage tank excavations be over-excavated by about 2 feet in plan area to provide adequate access around the excavation for tank placement construction. The walls of the proposed excavation should be shored or sloped in conformance with OSHA excavation and trench safety standards. If any excavation is extended to a depth of more than 20 feet, it will be necessary to have the side slopes designed by a professional engineer.

Soils from the excavation should not be stockpiled higher than six 6 feet or within ten 10 feet of the edge of an open trench. Construction of open cuts adjacent to existing structures, including underground pipes, is not recommended within a 1½ H:1V plane extending beyond and down from the perimeter of the structure. Cuts that are proposed within five 5 feet of light standards, other utilities, underground structures, and pavement should be provided with temporary shoring.

It may be necessary for the contractor to retain the geotechnical engineer to monitor the soils exposed in all excavations and provide engineering services for slopes. This will provide an opportunity to monitor the soils encountered and to modify the excavation slopes as necessary. It also offers an opportunity to verify the stability of the excavation slopes during construction.

Individual contractors are responsible for designing and constructing stable, temporary excavations. All excavations should be performed such that adjacent and nearby structures are not disturbed. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

Fill Materials and Placement

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than 3 inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean on-site soils or approved imported materials may be used as fill material for the following:

■ general site grading	■ foundation backfill
■ foundation areas	■ pavement areas
■ interior floor slab areas	■ exterior slab areas

Imported soils for use as fill material within proposed building and structure areas should conform to low volume change materials as indicated in the following specifications:

Gradation	**Percent Finer by Weight (ASTM C 136)**
3"	100
No. 4 Sieve	50-100
No. 200 Sieve	10-40

- Liquid Limit .... 30 (max)
- Plasticity Index .... 15 (max)
- Maximum expansion index* .... 20 (max)

*ASTM D 4829

The contractor shall notify the Geotechnical Engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor shall also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the job.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness.

Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
On-site soils and low volume change imported fill:			
Beneath foundations:	90	0%	+3%
Beneath interior slabs:	90	0%	+3%
Miscellaneous backfill and behind retain walls:	90	0%	+3%
Beneath pavements:	95	0%	+3%
Utility Trenches*:	90	0%	+3%
Bottom of excavation receiving fill:	90	0%	+3%
Aggregate base (beneath pavements):	95	0%	+3%

* Upper 12 inches should be compacted to 95% within pavement and structural areas.

Utility Trench Backfill

We anticipate that the on-site soils will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 is recommended for bedding and shading of utilities, unless otherwise allowed by the utility manufacturer.

On-site materials are considered suitable for backfill of utility and pipe trenches from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

We recommend a minimum horizontal setback distance of 10 feet from the perimeter of any building and the high-water elevation of the nearest storm-water retention basin.

Roof drainage should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems and landscaped irrigation should not be installed within 5 feet of foundation walls.

Earthwork Construction Considerations

Upon completion of placement of fill and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proof-rolling, placement and compaction of controlled compacted fills, backfilling of excavations to the completed subgrade.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test should be performed for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

DESCRIPTION	RECOMENDATION
Foundation Type	Spread footing foundations
Bearing Material	A minimum of 24 inches of compacted structural fill
Allowable Bearing Pressure	2,500 psf
Minimum Dimensions	Columns: 24 inches
Minimum Embedment Depth Below Finished Grade	18 inches
Total Estimated Static Settlement	1 inch
Estimated Differential Static Settlement	½ inch across 40 feet

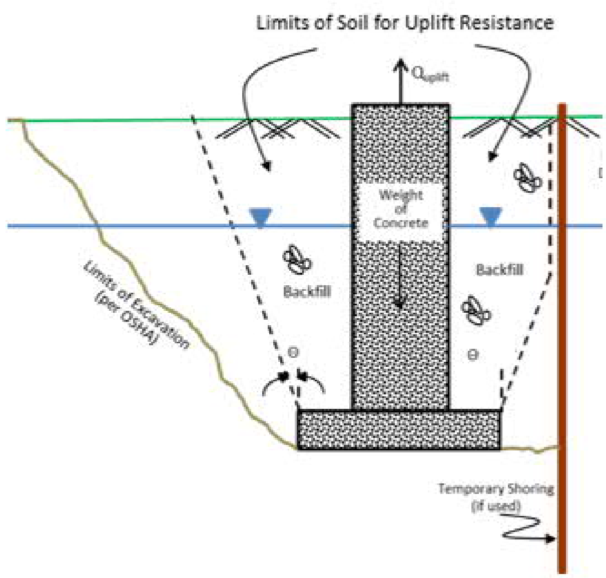
Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (or exterior) footings.

The allowable foundation bearing pressure applies to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations.

Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. Foundation excavations should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Design Parameters - Uplift Loads

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils. As illustrated on the subsequent figure, the effective weight of the soil prism defined by diagonal planes extending up from the top of the perimeter of the foundation to the ground surface at an angle, θ, of 20 degrees from the vertical can be included in uplift resistance. The maximum allowable uplift capacity should be taken as a sum of the effective weight of soil plus the dead weight of the foundation, divided by an appropriate factor of safety. A maximum total unit weight of 130 pcf should be used for the backfill.



DEEP FOUNDATIONS

Drilled Shaft Design Recommendations

The proposed high-rise sign and canopy structures may be supported on drilled shafts. Total required embedment of the drilled shaft should be determined by the structural engineer based on structural loading and parameters provided in this report.

Based on our review of the subsurface conditions within the proposed location of the high-rise sign, canopies, and the Standard Penetration Test (SPT) results, engineering properties have been estimated for the anticipated soils conditions.

The allowable uplift capacities should only be based on the side friction of the shaft; however, the weight of the foundation should be added to these values to obtain the actual allowable uplift capacities for drilled shafts. Tensile reinforcement should extend to the bottom of shafts subjected to uplift loading. Buoyant unit weights of the soil and concrete should be used in the calculations below the highest anticipated groundwater elevation.

Recommended soil parameters for lateral analysis and axial load design of drilled shaft foundations are provided in the table below. Based on our review of the boring logs and the Standard Penetration Test (SPT) results, engineering properties have been estimated for the soil conditions as shown in the following table. Lateral and axial capacity of soils within the upper 2 feet should be neglected. We recommend that Terracon review the final drilled shaft design to verify that sufficient embedment is achieved.

L-Pile Design Input Parameters					Axial Design Parameters	
Layer	Bottom Depth of Layer (feet)	L-PILE Soil Types	Effective Unit Weight (pcf)	Friction Angle (degrees)	Allowable End Bearing Pressure (ksf)[4]	Allowable Compressive Side Shear (psf)
1	2	Sand	105	----	----	----
2	5	Sand	110	32	8	100
3	10	Sand	110	34	12	200
4	15	Sand	115	36	15	350
5	Below 15	Sand	120	38	20	1,000

1. Design depth to subsurface water is greater than 50 feet.
2. Factors of safety of 3.0 for end bearing pressure, 2.0 for compressive side shear were utilized.
3. For uplift conditions, allowable compressive side shear should be multiplied by 0.60.

The depth below ground surface indicated in the table above is referenced from the existing site surface at the time of the field exploration. If fill is placed to raise the site grades, the depths shown in the charts must be increased by the thickness of fill placed. The required depths of shaft embedment should also be determined for design lateral loads and overturning moments to determine the most critical design condition.

It should be noted that the loaded capacities provided herein are based on the stresses induced in the supporting soils. The structural capacity of the shafts should be checked to assure that they can safely accommodate the combined stresses induced by axial and lateral forces. Furthermore, the response of the drilled shaft foundations to lateral loads is dependent upon the soil/structure interaction as well as the shaft's actual diameter, length, stiffness and "fixity" (fixed or freehead condition).

Drilled Shaft Construction Considerations

The Geotechnical Engineer should observe the installation of drilled piers to verify the soil conditions and the diameter and depth of piers. Drilled piers should be constructed true and plumb.

Because of the granular nature of the soils encountered, the possible presence of shallow groundwater, and the anticipated diameter of the drilled holes, it is anticipated that caving could occur during the drilling and construction of piers within the on-site soils. Appropriate precautions should therefore be taken during the construction of piers to reduce caving and raveling.

Temporary steel casing may be required to properly drill and clean drilled piers prior to concrete placement. A water and polymer displacement method may also be considered as a means of maintaining pier integrity during construction. Foundation concrete should be placed immediately after completion of drilling and cleaning. If foundation concrete cannot be placed in dry conditions, a tremie should be used for concrete placement. Due to potential sloughing and raveling, foundation concrete quantities may exceed calculated geometric volumes.

If casing is used for foundation construction, it should be withdrawn in a slow continuous manner, maintaining a sufficient head of concrete to prevent caving or the creation of voids in pier concrete. Foundation concrete should have a relatively high fluidity when placed in cased pier holes or through a tremie. Foundation concrete with slump in the range of 6 to 8 inches is recommended when temporary casing is utilized.

Free-fall concrete placement in drilled piers will only be acceptable if provisions are taken to avoid striking the concrete on the sides of the hole or reinforcing steel. The use of a bottom-dump hopper, or an "elephant's trunk" discharging near the bottom of the hole where concrete segregation will be minimized, is recommended.

Drilled pier end bearing surfaces must be thoroughly cleaned prior to concrete placement. A representative of the Geotechnical Engineer should inspect the bearing surface and foundation pier configuration. If the subsurface soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

The contractor should check for gas and/or oxygen deficiency before any workers enter the excavation for observation and manual cleanup. All necessary monitoring and safety precautions as required by OSHA, State or local codes should be strictly enforced.

The drilling speed should be reduced as necessary to minimize vibration and caving of the silty sand and poorly-graded sand materials. Based on the data developed during our investigation, drilling for the piers may need casing. as caving soils may be encountered; the contractor should be prepared to use casing or other approved means to prevent caving. The contractor should review the boring logs to make sure he is familiar with the anticipated subsurface conditions prior to beginning construction of the deep foundations.

The installation of drilled straight-shafts may likely require the use of the slurry displacement method and/or temporary steel casing with water pumps, if groundwater encountered. If drilled straight-shaft installation is attempted without utilizing slurry displacement method or temporary casing, zones of sloughing soils and/or groundwater inflow may occur during construction. Therefore, we recommend that provisions be incorporated into the plans and specifications to utilize slurry or casing to control sloughing and/or groundwater seepage during shaft construction.

The need for casing or slurry will depend on the depth of the drilled shaft and the groundwater conditions at the time of construction. If casing is used and seepage persists, the water accumulating in the foundation excavation should be pumped out. The condition of the bearing surface should be evaluated immediately prior to placing concrete, if casing is used in lieu of slurry. If groundwater inflow is too severe to be controlled by the use of casing and pumping or significant sloughing of the sidewalls occurs, the slurry method of construction should be utilized to complete the foundation installation.

Closely spaced piers should be drilled and filled alternately, allowing the concrete to set at least eight hours before drilling the adjacent pier. All excavations should be filled with concrete as soon after drilling as possible. In no event should pier holes be left open overnight. To prevent concrete from striking the walls of the pier and causing caving, the concrete should be placed with appropriate equipment so that the concrete is not allowed to fall freely more than 5 feet. All loose materials should be thoroughly cleaned from the bottom of the pier excavation. This is especially important because end bearing has been considered in determining the provided pier capacities. If casing is necessary and is utilized, then the casing should be withdrawn concurrently with the concrete placement.

FLOOR SLABS

DESCRIPTION	RECOMMENDATION
Interior floor system	Slab-on-grade concrete
Floor slab support	Engineered fill extending to a minimum depth of 2 feet below the bottom of associated footings or 5 feet below existing grades, whichever is greater.
Subbase	Minimum 4-inches of Aggregate Base

DESCRIPTION	RECOMMENDATION
Modulus of subgrade reaction	200 pounds per square inch per inch (psi/in) (The modulus was obtained based on estimates obtained from NAVFAC 7.1 design charts). This value is for a small loaded area (1 Sq. ft or less) such as for forklift wheel loads or point loads and should be adjusted for larger loaded areas.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

LATERAL EARTH PRESSURES

Design Parameters

For engineered fill comprised of on-site soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are:

ITEM	VALUE[a, b]
Active Case	40 psf/ft
Passive Case	390 psf/ft
At-Rest Case	60 psf/ft
Coefficient of Friction	0.35

[a]Note: The values are based on on-site soils used as backfill.
[b]Note: Uniform, horizontal backfill, compacted to at least 90% of the ASTM D 1557 maximum dry density, rendering a maximum unit weight of 125 pcf.

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

Fill against foundation and retaining walls should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors.

PAVEMENTS

General Pavement Comments

Both concrete and asphalt pavement design sections are requested for the proposed project. As noted in **Project Description**, pavement thickness design is dependent upon:

- the anticipated traffic conditions during the life of the pavement,
- subgrade and paving material characteristics, and
- climatic conditions of the region.

A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

To determine existing pavement sections within Baker Blvd., three borings (B-31, B-32, and B-33) were drilled within the roadway. The thicknesses of AC and base materials encountered in the borings varied from approximately 8 to 9 inches of AC over 8 to 10 inches of base materials.

The pavement sections were designed using the American Association of State and Highway Transportation Officials (AASHTO) Guide for Design of Pavement Structures (1993). Development of layer thicknesses, including the asphalt thickness for the geogrid reinforced alternatives, were determined using the layered elastic design methodology as outlined in the AASHTO 93 Design Guide, Part II, Section 3.1.5 Layered Design Analysis

Design Traffic Analysis

Traffic levels provided by the client were converted into flexible AASHTO pavement 18-kip equivalent single axle loads (ESALs) for use in Asphalt Concrete (AC) pavement thickness design, and into rigid AASHTO pavement 18-kip ESALs for Portland Cement Concrete (PCC) design, as noted in the following table. We understand that Love's Tier I traffic is experienced at this facility. Our office should be contacted if there are any changes in the reported traffic patterns or frequency to review the enclosed values.

Love's Tier 1 / Tier 2 Traffic Volumes	Light Duty	Medium Duty	Heavy Duty	Extra Heavy Duty
Traffic Level, vehicles per day [1]	1,000 cars	150 trucks	600 trucks	1,000 trucks
Flexible (AC) Pavement 18-Kip ESAL [2]	< 30,000	2.6 million	10.2 million	17 million
Rigid (PCC) Pavement 18 Kip ESAL [3]	< 30,000	4.2 million	17 million	29 million

1. Client provided values, based on a Tier 1 and 2 sites in accordance with Love's Travel Stops.
2. Assumes 20-year design life, 100% of traffic consisting of fully loaded 80-kip semi-tractor trailers with two 34-kips tandem axles and one 12-kip single front axle.
3. ESAL's for PCC design are not equivalent to ESAL's used for AC sections.

Pavement Subgrade Parameters

Based on the proposed grading as previously discussed in this report, pavement subgrades are expected to consist of native on-site soils at elevations roughly equivalent to existing grades. Accordingly, bulk samples of near surface soils were collected at depths of approximately 0 to 5 feet below existing grades for laboratory testing. B-22 and B-32 bulk samples were selected for R-value testing resulting in values of 56 and 58, respectively. As such, a design R-value of 50 was used as the basis for pavement design taking into consideration the effects of seasonal and other climatic conditions at this site. This value corresponds to a subgrade Resilient Modulus (Mr) of 28,750 psi (pounds per square inch) for use for flexible pavement design, and an Effective Modulus of Subgrade Reaction (k) of 372 pci (pounds per cubic inch) for use in designing the rigid pavement sections with six inches of aggregate base.

Note that if actual subgrade conditions differ from the soil conditions and characteristics described here, we should be contacted to assess the construction conditions and review the pavement design recommendations.

Pavement Design Parameters

Analyses for the pavement design of the project have been based on the procedures of the AASHTO Guide for Design of Pavement Structures (1993). The following design parameters were utilized for pavement engineering analyses and the determination of design alternatives for the project:

Pavement Design Parameters		
Reliability	Level of Reliability	85%
	Flexible Overall Standard Deviation	0.45

Pavement Design Parameters		
	Rigid Overall Standard Deviation	0.35
Serviceability	Flexible Initial PSI	4.2
	Flexible Terminal PSI	2.0
	Rigid Initial PSI	4.5
	Rigid Terminal PSI	2.3
Subgrade Conditions	Design R-value	50
	Correlated Resilient Modulus, M_r	28,750 psi
	Effective Modulus of Subgrade Reaction, k	372 pci
Layer Properties	Asphalt Concrete (AC) Layer Coefficient	0.44
	Aggregate Base (ABC) Layer Coefficient	0.14
	Aggregate Base (ABC) Drainage Coefficient	1.0
	Aggregate Base (ABC) Resilient Modulus[1]	36,000 psi
	Reinforced Aggregate Base (ABC) Resilient Modulus[1]	50,000 psi
	Load Transfer Coefficient J[2]	2.8
	Compressive Strength of Concrete f'_c	4,000 psi

1. Reinforced AB Resilient Modulus values are limited to 5x the subgrade Resilient Modulus for the purposes of layered design analysis for flexible pavements.
2. Load transfer coefficient of 2.8 for dowel reinforced concrete joints.

The design period is considered the interval over which, with proper maintenance, the pavement will not require major repairs. We recommend a continuing regular maintenance program be implemented to maintain satisfactory serviceability over the design life. Please refer to **Pavement Maintenance** for additional information.

Asphalt Concrete Pavement Recommendations

Due to heavy truck traffic loading, Love's routinely uses geogrid reinforced flexible pavement designs in heavy traffic areas. Based on the site conditions and anticipated pavement subgrade, we believe that geogrids offer a cost-savings over unreinforced pavements. Accordingly, we have designed the asphalt pavements to include BX2525 geogrid, using LEpave software provided by L.E. Geosolutions (LEGeo). The following table provides our recommended pavement sections for this project:

LAYER	Materials[2] (CalTrans)	Light Duty	Medium Duty	Heavy Duty	Extra Heavy Duty
		Thickness (in) [1]			
Surface[2]	1/2-inch HMA Type A PG 76-22 M	4	2 ½	2 ½	2 ½

LAYER	Materials[2] (CalTrans)	Light Duty	Medium Duty	Heavy Duty	Extra Heavy Duty
		Thickness (in) [1]			
Base[2]	3/4-inch HMA Type A PG 70-10	--	2 ½	3	3 ½
Aggregate[3]	Class 2 Aggregate Base	8	8	8	8
Geogrid[4]	**LeGeo** BX2525 or equivalent	No[5]	No[5]	Yes	Yes
Total Pavement Section (in.)		**12**	**13**	**13 ½**	**14**
Design Traffic (ESALs)		< 30,000	2.6 million	10.2 million	17 million

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Refer to Section 39 Asphalt Concrete of the California Department of Transportation (Caltrans) "Standard Specifications" for Asphalt Concrete use and construction.
3. Refer to Section 26 Aggregate Bases of the California Department of Transportation (Caltrans) "Standard Specifications" for Aggregate Base Course use and construction.
4. Aggregate base reinforced with 1 layer of LEGeo BX-2525 geogrid or equivalent located at the bottom of the aggregate base. Alternative grid materials are not acceptable unless documented with applicable design procedure and appropriate performance-based specification and/or post construction validation.
5. Geogrid optional.

Reinforced pavement design procedures developed by LEGeo and others rely on product specific field and laboratory research. Alternate geogrids can be considered but will require independent design and should not be specified or accepted based on engineering properties, as these do not necessarily define reinforced pavement performance.

Asphalt Binder Selection

Terracon considered the weather conditions and traffic to determine the appropriate asphalt binder for this project. This was accomplished using the LTPPBind Version 3.1 Beta, dated September 15, 2015 software provided by the Federal Highway Administration (FHWA). This software utilizes historical temperature data from the 5 weather stations nearest the project and considers traffic speed and traffic loading to establish a recommended Performance Graded (PG) binder grade of asphalt concrete. Terracon then compared the software output to the binders that were indicated to be locally available, based on the Caltrans website, to determine the recommended binder selection for the project. The number of binders selected was limited to two for this recommendation to reduce the number of mix designs needed to construct the pavements.

Aggregate Base Requirements

Aggregate Base shall comply with Section 26 Aggregate Base of the 2018 Caltrans Specifications. The Aggregate Base shall be Type 2 and shall meet the Caltrans Specifications. Aggregate Base or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade.

Portland Cement Concrete Pavement Recommendations

It is our understanding that Love's prefers to use asphalt concrete for the majority of pavements at a Travel Stop site; however, Portland cement concrete (PCC) is occasionally selected as an alternate. Accordingly, we have included the following thickness recommendations for Jointed Plain Concrete Pavement (JPCP) with dowels:

LAYER	MATERIAL	LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY	EXTRA HEAVY DUTY
		Thickness (in)[1]			
Surface	Portland Cement Concrete[2, 3]	5	8	10	11
Aggregate	Class 2 Aggregate Base[4]	8	8	8	8
Subgrade	Minimum 10 inches of properly prepared native soils				
Total Pavement Section[1]		**5**	**16**	**18**	**19**

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Refer to Section 40 Concrete Pavement and Section 90 Concrete of the California Department of Transportation (Caltrans) "Standard Specifications for concrete mixture requirements.
3. Medium duty concrete pavements should include 1 ¼ inch diameter by 15-inch long dowel bars spaced at 12 inches center to center in all longitudinal and transverse contraction joints. Heavy and extra heavy-duty concrete pavements should include 1 ½ inch diameter by 18-inch long dowel bars spaced at 12 inches center to center in all longitudinal and transverse contraction joints.
4. Refer to Section 26 Aggregate Bases of the California Department of Transportation (Caltrans) "Standard Specifications" for Aggregate Base Course use and construction.

The recommendations presented above require dowel reinforcement in longitudinal and transverse contraction joints as shown in ACI 330.2R-17. In locations where concrete slabs are used in isolated areas such as dumpster pads and short apron slabs approaching the tire shop, joint reinforcement is not required. In these locations however, an additional two inches should be added to the thicknesses presented in the table above to alleviate cracking of unsupported edges.

If Portland cement concrete is selected for use in general pavement areas, proper design and detailing of longitudinal and transverse control joints, tie bars and joint dowels will be required. In this situation, we should be contacted to provide more detailed recommendations and to review final jointing plans and details for the project. The following general recommendations are presented for doweled PCC pavements:

Item	Description
Contraction Joints	■ Joints should be reinforced with dowels in accordance with ACI 330.2R-17[1]. ■ Alternate joint reinforcement devices such as plate dowels will be considered if the device manufacturers recommendations showing they are equivalent to the dowel bar size and spacing presented in the concrete pavement section table above is submitted and approved by the engineer. ■ Joint cuts should be 1/5 of the depth of the concrete and should be cut as soon as the slab can support the weight of a man and the saw can be cut without dislodging coarse aggregate particles from the surface. ■ Joints should have a maximum spacing no greater than 15 feet, as described in ACI 330.2R-17
Expansion (Isolation) Joints	■ Expansion joints are recommended to isolate fixed objects abutting or within the paved area, such as around light poles and drainage inlet structures. ■ Joints should be full depth and filled with pre-molded materials per ACI 330.2R-17. ■ Pavement edges at expansion joints located in areas that encounter wheel loads should be thickened by two inches wherever practical; the transition in thickness should occur over a minimum distance of five feet.
Construction Joints	■ Joints dowels should be provided at the same size and spacing as required for Contraction Joints as noted above. ■ For a butt end construction joint, an adequate number of ½ inch diameter (#4 bar) deformed steel tie bars, 30 inches in length and spaced no greater than 36 inches apart, are also recommended to tie the exterior curb and gutter to the outer concrete pavement edge to keep the outside slab from separating from the curb and gutter.

Item	Description
[1] *Guide for the Design and Construction of Concrete Site Paving for Industrial and Trucking Facilities, American Concrete Institute, ACI 330.2R-17.*	

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

1. Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
2. Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
3. Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
4. Install joint sealant and seal cracks immediately.
5. Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
6. Place compacted, low permeability backfill against the exterior side of curb and gutter.
7. Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

Unpaved Access Road

We understand that an unpaved access road will be constructed extending to the high-rise sign. Traffic on the access road will include the drilled shaft rig and concrete trucks during construction of the sign foundation and truck-mounted cranes used to erect and maintain the sign. Based on the relative strength characteristics of the subgrade soils and expected traffic loading, we recommend construction traffic bear on a minimum of 10 inches of scarified, moisture conditioned, and recompacted native soils.

The recommendation was developed to support the construction and maintenance traffic as it travels along the access road. Terracon's current scope of services does not include analysis for construction of a pad suitable to support the crane as it lifts a load. To analyze the required aggregate thickness for a crane pad, the contractor should provide specific information about the crane model, counterweight, outrigger positions and sizes, boom/jib configurations, weight of the maximum planned lift, load radius, and swing angle.

STORMWATER MANAGEMENT

Five in-situ percolation tests were performed at approximate depths of 5 to 15 feet bgs. A 2-inch thick layer of 3/8 inch gravel was placed in the bottom of each boring after the borings were drilled to investigate the soil profile. A 3-inch diameter perforated pipe was installed on top of the gravel layer in each boring. Gravel was used to backfill between the perforated pipes and the boring sidewall. The borings were then filled with water for a pre-soak period. Testing began after a pre-soak period. At the beginning of the test, the pipes were refilled with water and readings were taken at standardized time intervals. Percolation rates are provided in the following table:

Test Location	Test Depth (ft.) [1]	Soil Type	Percolation Rate Average (in./hr.) [2]	Infiltration Rate Average (in./hr.) [3]
B-11	5	SM	94.0	6.68
B-12	5	SM	50.8	3.37
B-13	5	SM	65.8	3.98
B-14	10	SM	122.6	3.89
B-15	5	SM	59.4	3.01

1. Below existing ground surface.
2. Our percolation tests were performed generally following the well permeater test method described in the "Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration", San Bernardino County Department of Public Works, 2017.
3. If proposed infiltration system will mainly rely on vertical downward seepage, the correlated infiltration rates should be used.

The above infiltration rates determined by the shallow percolation test method are based on field test results utilizing clear water. Infiltration rates can be affected by silt buildup, debris, degree of soil saturation, site variability and other factors. The rate obtained at specific location and depth is representative of the location and depth tested and may not be representative of the entire site. Application of an appropriate safety factor is prudent to account for subsoil inconsistencies, possible compaction related to site grading, and potential silting of the percolating soils, depending on the application.

The design engineer should also check with the local agency for the limitation of the infiltration rate allowed in the design. If the maximum allowable design infiltration rate is lower than the above recommended rate, the maximum allowable design infiltration rate should be used. The designer of the basins should also consider other possible site variability in the design.

Based on the soils encountered in our borings, we expect the percolation rates of the soils could be different than measured in the field due to variations in fines and gravel content. The design elevation and size of the proposed infiltration system should account for this expected variability in infiltration rates.

Infiltration testing should be performed after construction of the infiltration system to verify the design infiltration rates. It should be noted that siltation and vegetation growth along with other factors may affect the infiltration rates of the infiltration areas. The actual infiltration rate may vary from the values reported here. Infiltration systems should be located at least 10 feet from any existing or proposed foundation system.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Terracon conducted a total of fourteen (14) borings as tabulated in the table below.

Boring No.	Boring Depth (feet) [1]	Planned Location
B-1	21½	Underground Storage Tank area
B-2	21	Automobile Fuel Canopy
B-3	31½	Truck Fuel Canopy
B-4	51	Country Store
B-5	51½	High-Rise Sign
B-6 & B-7	31½	Aboveground Storage Tanks
B-10	21½	Truck Scale
B-11 through B-15	5 to 10	Retention Basins
B-16 through B-25	10 to 11½	Parking Areas
B-30, B-31, B-32, B-33,	6½ to 11½	Caltrans Ave. and Baker Blvd.

1. Below ground surface
2. Numbers B-8 and B-9 were not used. Borings B-26 through B-29, B-34, and B-35 were drilled as part of the Work Live project, north of this site.

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet). If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted rotary drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring lined sampler was also used for sampling. Ring-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Electrical Resisitivity Testing: A field electrical resistivity (ER) survey was performed at the Tank Pad location using the Wenner Array (4-pin) method per ASTM G57 and a digital ground resistance tester. The area of investigation included two shallow resistivity lines which were located approximately perpendicular to each other in north-south and east-west configurations. The resistivity probe arrays had spacing of 1, 2, 4, 6, 10, 15, 20, 40, 50, 60, 80, 100 and 150 feet. Results are shown in the following table and presented with a visual representation of the array locations and directions in Exploration Results section. The results of the electrical resistivity survey are shown in the following table. These readings measured on existing soil conditions and elevations; subsequent to site grading the area may have different elevations.

Electrode Spacing (ft)	Line 1 (N-S) Apparent Resistivity (ohm-m)	Line 2 (E-W) Apparent Resistivity (ohm-m)
1	111	132
2	91	68
4	83	41
6	59	35
10	77	21
15	80	29
20	45	35
40	57	85

50	31	68
60	15	59
80	118	46
100	79	71
150	29	60

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D7263 Standard Test Methods for Laboratory Determination of Dry Density (Unit Weight) of Soil Specimens
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D1140 Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
- ASTM D4546 Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort
- Corrosivity Testing will include pH, chlorides, sulfates, sulfides, Redox potential, and electrical lab resistivity

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

SITE LOCATION

Love's Travel Stop – Baker ■ Baker, San Bernardino County, California
October 29, 2021 ■ Terracon Project No. CB215111

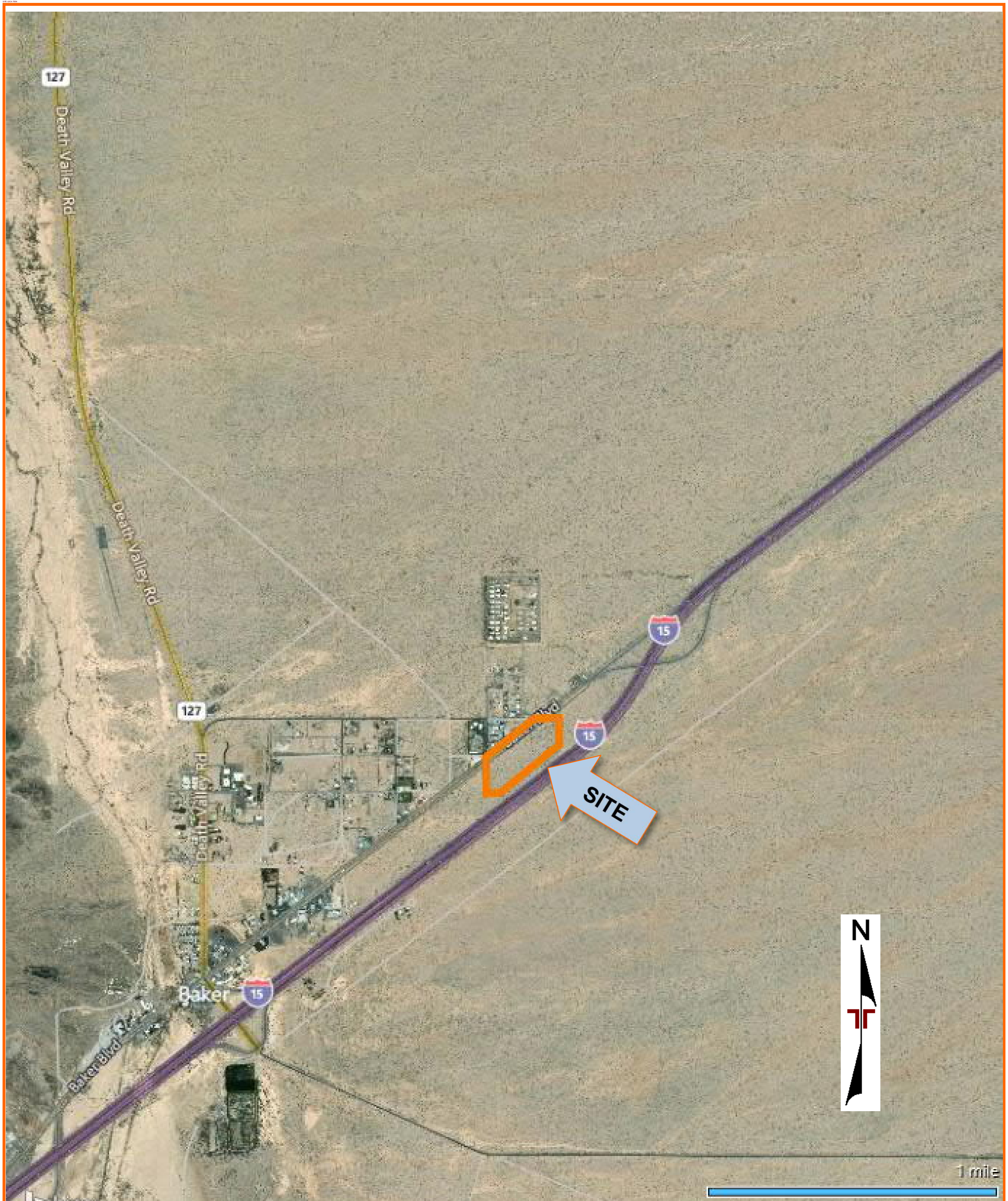


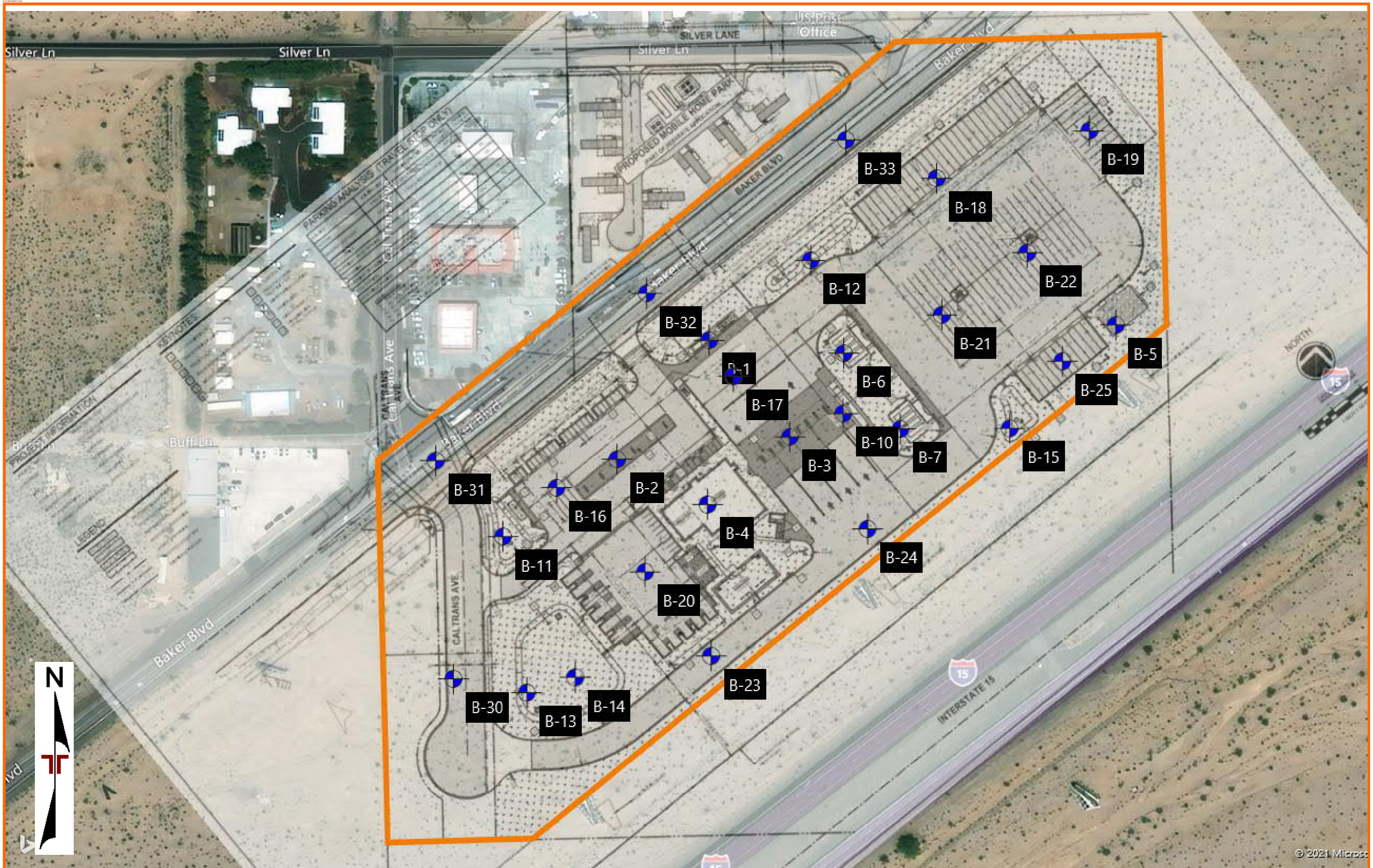
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

Love's Travel Stop – Baker ■ Baker, San Bernardino County, California

October 29, 2021 ■ Terracon Project No. CB215111



EXPLORATION RESULTS

BORING LOG NO. B-1

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2770° Longitude: -116.0559°

DEPTH	Description	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SANDY SILT (ML), light brown, very stiff						
			X	8-13-19	0.5	105	59
4.5	**POORLY GRADED SAND WITH SILT (SP-SM)**, medium to coarse grained, light brown, medium dense						
			X	15-21-27	0.6		11
			X	21-25-25	0.3		11
			X	21-25-25	0.2	110	9
13.0	**SILTY SAND (SM)**, fine to medium grained, light brown, very dense						
			X	30-50/6"			15
			X	21-29-50/6"			14
21.5	***Boring Terminated at 21.5 Feet***						

DEPTH (Ft.): 5, 10, 15, 20

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-2

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2765° Longitude: -116.0564°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
		5			13-25-32	0.0		
		10			17-27-29	0.3		
	trace gravel							
	dense	15			15-20-21 N=41			
21.0	very dense	20			31-50/6"			
	Boring Terminated at 21 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-3

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0554°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
					13-20-20	0.4		
		5						
	dense				23-30-31	0.5		
		10						
	trace gravel							
		15			25-21-23 N=44			
	18.0							
	SILTY SAND (SM), fine to medium grained, brown to light brown, very dense							
		20			30-50/6"			
		25			50/6"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-3

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0554°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, brown to light brown, very dense *(continued)*							
	dense	30		X	18-21-19 N=40			
	31.5							
	Boring Terminated at 31.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-4

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2762° Longitude: -116.0559°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense							
		5			15-17-25	1.5	115	13
	fine to medium grained, brown, dense	10			23-35-36			
	very dense	15			28-50/6"			14
	trace gravel, light brown	20			39-50/6"			16
		25			18-20-30 N=50			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-4

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2762° Longitude: -116.0559°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense *(continued)*							
	dense	30		X	18-19-22 N=41			20
	very dense	35		X	50/6"			18
	dense	40		X	21-23-24 N=47			12
	very dense	45		X	22-25-27 N=52			27
	51.0	50		X	38-50/6"			
	Boring Terminated at 51 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-5

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2771° Longitude: -116.0536°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
		5			17-17-23	0.8		9
8.0	**SILTY SAND (SM)**, fine to medium grained, brown, medium dense							
		10			21-23-31	1.5	111	16
	very dense	15			23-50/6"			13
	trace gravel, light brown							
		20			50/6"			12
		25			15-29-39 N=68			16

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-5

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2771° Longitude: -116.0536°

DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
SILTY SAND (SM), fine to medium grained, brown, medium dense *(continued)*							
	30		X	15-16-30 N=46			15
fine grained	35		X	29-28-50/6"			14
	40		X	30-50/6"			26
medium to coarse grained	45		X	21-25-38 N=63			16
51.5	50		X	19-39-50/6"			23
Boring Terminated at 51.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-6

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2769° Longitude: -116.0551° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine grained, brown, medium dense							
		5			5-9-10	0.3		
	medium to coarse grained, light brown	10			19-21-29	0.3		
	very dense	15			50/6"			
		20			28-27-29 N=56			
		25			38-40-50/6"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-6

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2769° Longitude: -116.0551°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine grained, brown, medium dense *(continued)*							
	dense	30		X	17-19-21 N=40			
	31.5							
	Boring Terminated at 31.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-7

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2766° Longitude: -116.0548°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SP), trace gravel, fine to medium grained, light brown, medium dense							
					12-12-13	0.2		12
		5						
					13-20-21	0.2	106	14
		10						
	trace gravel							
	very dense	15			18-27-29 N=56			12
	18.0							
	POORLY GRADED SAND WITH SILT (SP-SM), fine grained, light brown, very dense							
		20			21-28-39 N=67			11
	dense	25			10-20-20 N=40			11

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon

1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021 | Boring Completed: 09-23-2021

Drill Rig: CME 75 | Driller: 2R

Project No.: CB215111

BORING LOG NO. B-7

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2766° Longitude: -116.0548° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine grained, light brown, very dense *(continued)*							
	28.0 **SILTY SAND (SM)**, fine grained, light brown, dense							
		30		X	13-21-27 N=48			12
	31.5							
	Boring Terminated at 31.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-10

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2767° Longitude: -116.0551°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense							
		5		X	13-22-27	0.2		
	trace gravel, dense	10		X	20-27-31	0.2		
	very dense	15		X	25-50/6"			
21.5		20		X	33-40-40 N=80			
	Boring Terminated at 21.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-11

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2761° Longitude: -116.0571° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine to medium grained, brown							12
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-12

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2774° Longitude: -116.0553°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, light brown							
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-13

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2754° Longitude: -116.0569° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown							13
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-14

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2754° Longitude: -116.0567°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown							
		5						15
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-15

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2766° Longitude: -116.0542° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown							12
	5.0	5						
	Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-16

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2763° Longitude: -116.0568°

GRAPHIC LOG	DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
		SILTY SAND (SM), medium to coarse grained, light brown							14
	5.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, medium to coarse grained, light brown, medium dense	5			13-20-25	0.6	112	7
			10			18-21-28	1.0	102	
	11.5	***Boring Terminated at 11.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-17

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2768° Longitude: -116.0558°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine to medium grained, light brown, very dense							
					18-50/6"	0.5	113	8
		5						
					50/6"	0.7		
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-18

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2778° Longitude: -116.0546°

DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
	5		X	13-25-31	0.6		10
dense	10		X	28-33-48	0.7	109	
11.5							
Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-19

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2780° Longitude: -116.0537°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine grained, brown, medium dense							
				X	18-19-20	0.4	111	8
		5						
				X	20-18-22	0.4	115	
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-21-2021	Boring Completed: 09-21-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-20

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2759° Longitude: -116.0563°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, very dense							
		5			19-27-50/6"	0.6	114	7
	11.0	10			39-50/6"	0.6	120	
	Boring Terminated at 11 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-21

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2771° Longitude: -116.0546°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine grained, brown, medium dense							
				X	13-13-14	0.7		
	5.0	5						
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
				X	23-25-26	0.5		
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-22

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2774° Longitude: -116.0541°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown	0–5		Auger				14
	5.0							
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense	5		Split spoon	20-25-28	0.8	105	9
		10		Split spoon	22-28-30	0.9	112	
	11.5							
	Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021 | Boring Completed: 09-22-2021

Drill Rig: CME 75 | Driller: 2R

Project No.: CB215111

BORING LOG NO. B-23

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 35.2755° Longitude: -116.0559° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), medium to coarse grained, light brown, medium dense							
					15-20-22	0.6	115	
		5						
	dense				30-32-34	0.7		
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-24

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SITE: Baker Boulevard
Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2761° Longitude: -116.0550°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), medium to coarse grained, light brown, loose							12
		5			7-8-10	0.1	114	
	medium dense	10			15-21-27	0.6		
	11.5							
	Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-25

PROJECT: Love's Travel Stop Baker - CA - GEO

**CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK**

**SITE: Baker Boulevard
Baker, CA**

LOCATION See Exploration Plan

Latitude: 35.2769° Longitude: -116.0539°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM), fine to medium grained, light brown, medium dense							
				X	21-27-30	0.2		
		5						
				X	27-28-29	0.6		
	10.0	10						
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-22-2021	Boring Completed: 09-22-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-30

PROJECT: Love's Travel Stop Baker - CA - GEO

**CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK**

**SITE: Baker Boulevard
Baker, CA**

LOCATION See Exploration Plan

Latitude: 35.2754° Longitude: -116.0574°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), medium to coarse grained, light brown, medium dense							
		5		SPT	15-18-20	0.3	102	12
		10		SPT	23-28-28	0.5		
	11.5							
	Boring Terminated at 11.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-31

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2764° Longitude: -116.0575°

DEPTH	Material Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
0.7	**ASPHALT**, 8"							
1.3	**AGGREGATE BASE COURSE**, 8"							
6.5	**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, fine to medium grained, light brown, medium dense	5			11-15-28	2.9	113	
	Boring Terminated at 6.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-32

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2772° Longitude: -116.0563°

GRAPHIC LOG	DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	0.8	**ASPHALT**, 9"							
	1.4	**AGGREGATE BASE COURSE**, 8"							
	6.5	**WELL GRADED SAND WITH SILT (SW-SM)**, medium to coarse grained, light brown, medium dense	5			14-16-29	3.2	117	11 13
		Boring Terminated at 6.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

BORING LOG NO. B-33

PROJECT: Love's Travel Stop Baker - CA - GEO

CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SITE: Baker Boulevard Baker, CA

LOCATION See Exploration Plan

Latitude: 35.2779° Longitude: -116.0551°

GRAPHIC LOG	DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	0.8	**ASPHALT**, 9"							
	1.6	**AGGREGATE BASE COURSE**, 10"							
	6.5	**POORLY GRADED SAND WITH SILT (SP-SM)**, medium to coarse grained, light brown, medium dense	5			14-16-14	3.0	112	
		Boring Terminated at 6.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with asphalt

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

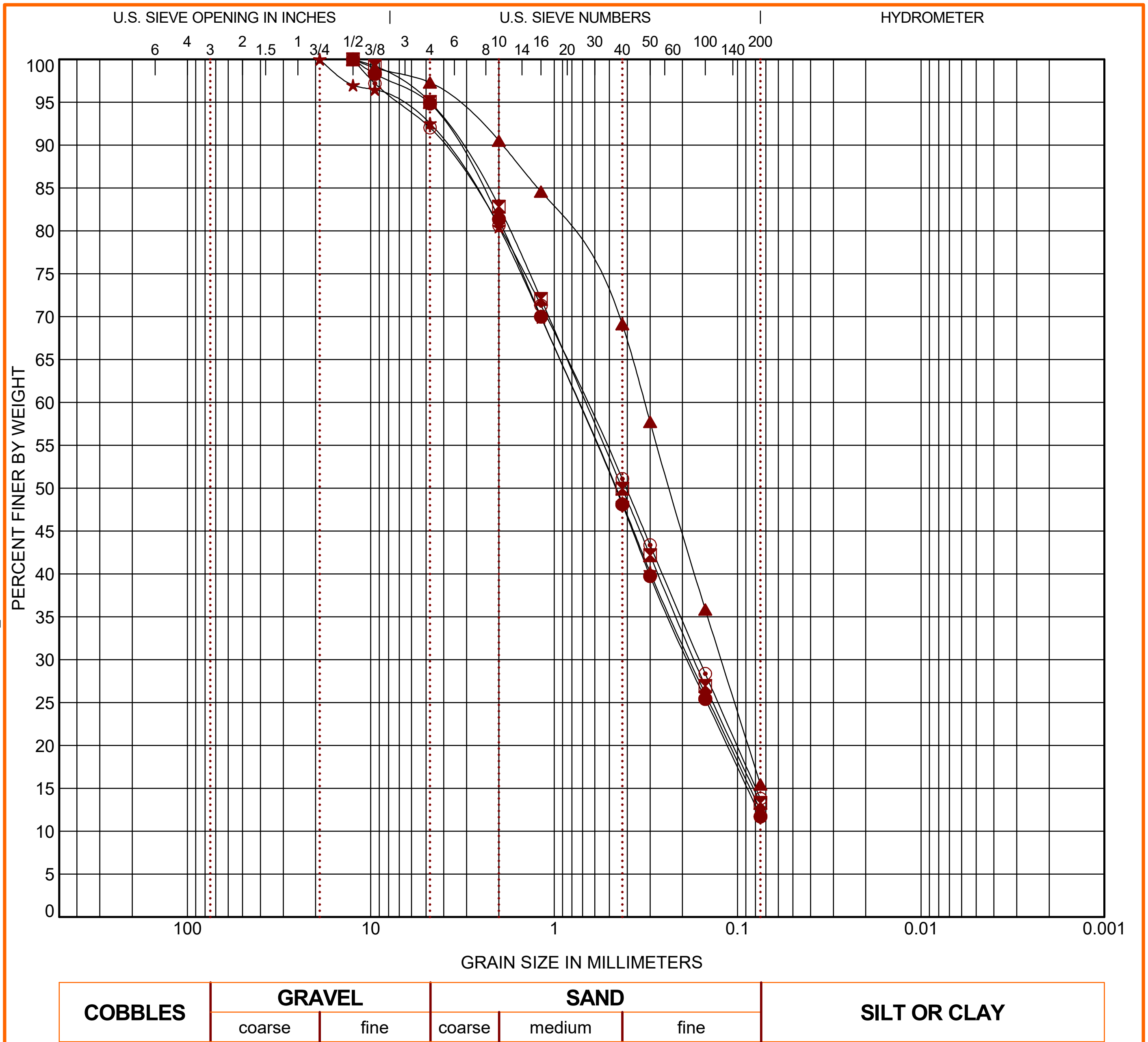
Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 09-23-2021	Boring Completed: 09-23-2021
Drill Rig: CME 75	Driller: 2R
Project No.: CB215111	

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-11	0 - 5	POORLY GRADED SAND with SILT (SP-SM)		NP	NP	NP	0.69	10.76
⊠	B-13	0 - 5	SILTY SAND (SM)		NP	NP	NP		
▲	B-14	5 - 10	SILTY SAND (SM)		NP	NP	NP		
★	B-15	0 - 5	SILTY SAND (SM)		NP	NP	NP	0.68	11.17
⊙	B-16	0 - 5	SILTY SAND (SM)		NP	NP	NP		

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-11	0 - 5	12.5	0.74	0.187		0.0	5.1	83.1		11.7	
⊠	B-13	0 - 5	12.5	0.676	0.172		0.0	5.0	81.7		13.3	
▲	B-14	5 - 10	12.5	0.322	0.123		0.0	2.7	81.8		15.5	
★	B-15	0 - 5	19	0.739	0.182		0.0	7.5	80.1		12.4	
⊙	B-16	0 - 5	12.5	0.667	0.162		0.0	8.0	78.2		13.8	

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

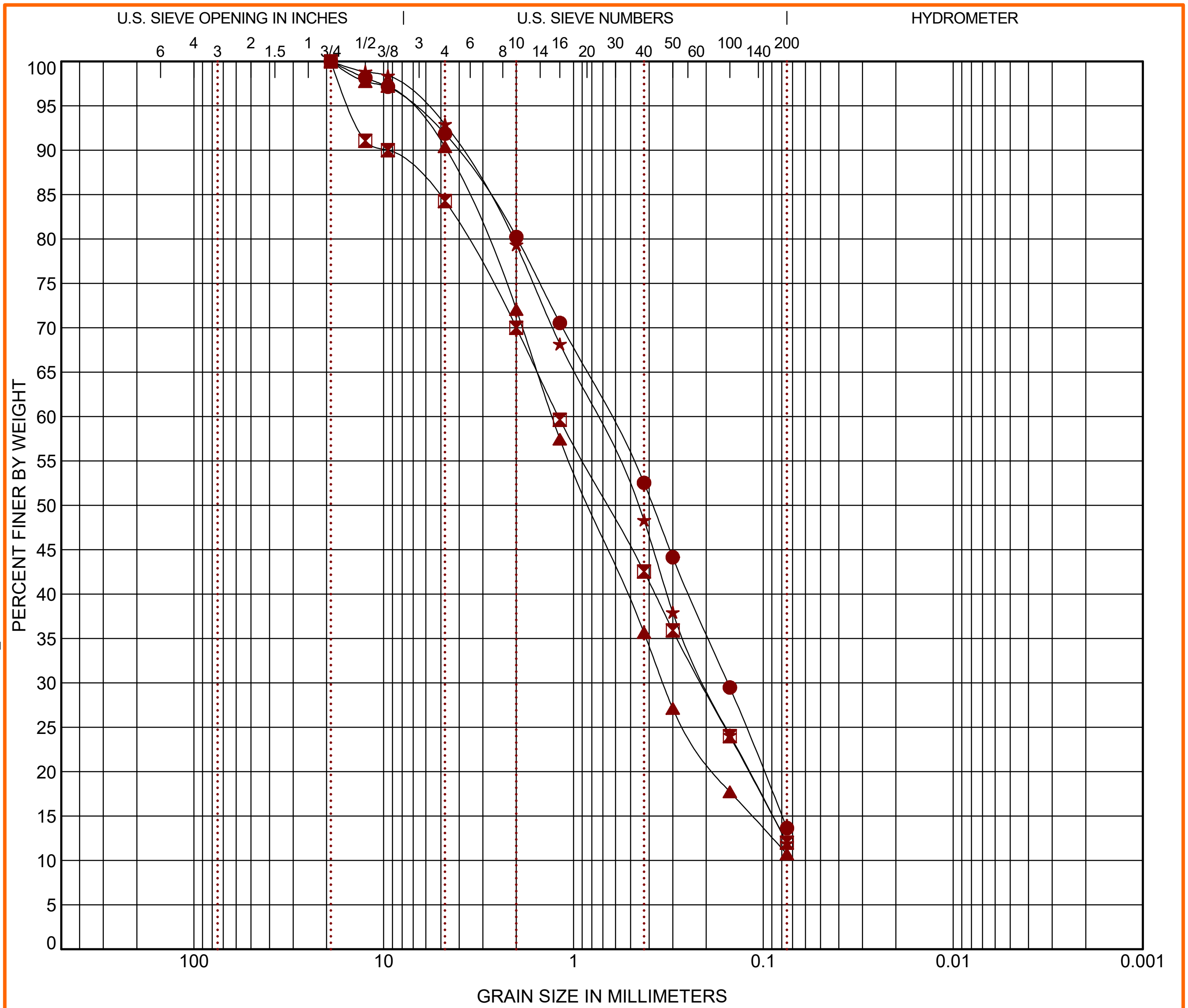
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-22	0 - 5	SILTY SAND (SM)		NP	NP	NP		
⊠	B-24	0 - 5	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)		NP	NP	NP	0.56	17.98
▲	B-32	0 - 5	WELL-GRADED SAND with SILT (SW-SM)		NP	NP	NP	1.26	18.51
★	B-35	0 - 5	POORLY GRADED SAND with SILT (SP-SM)		NP	NP	NP	0.78	11.53

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-22	0 - 5	19	0.649	0.154		0.0	8.1	78.2		13.6	
⊠	B-24	0 - 5	19	1.202	0.213		0.0	15.7	72.3		12.0	
▲	B-32	0 - 5	19	1.294	0.337		0.0	9.6	79.7		10.7	
★	B-35	0 - 5	19	0.775	0.201		0.0	7.1	81.0		11.9	

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

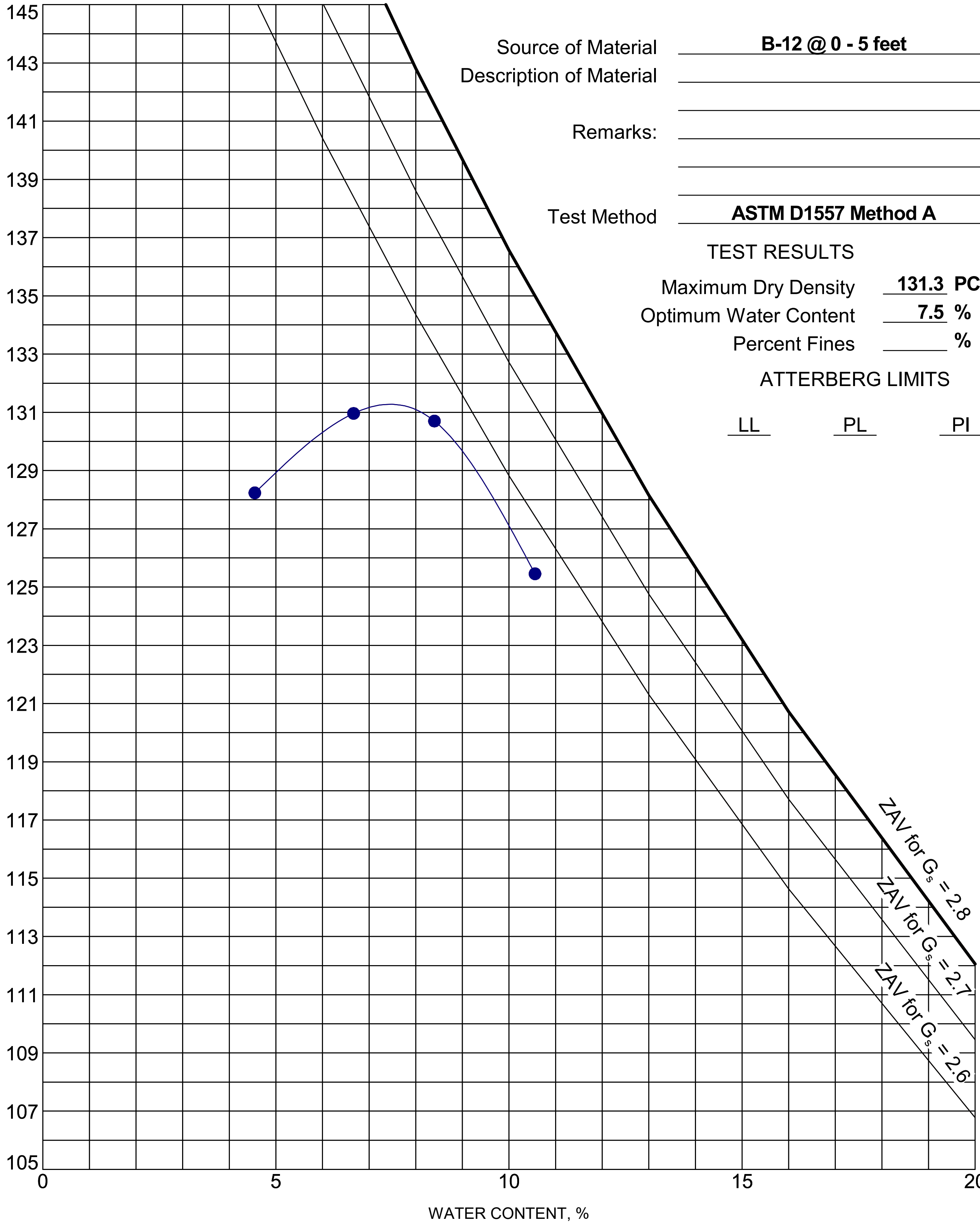
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **B-12 @ 0 - 5 feet**

Description of Material

Remarks:

Test Method **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density **131.3 PCF**

Optimum Water Content **7.5 %**

Percent Fines **%**

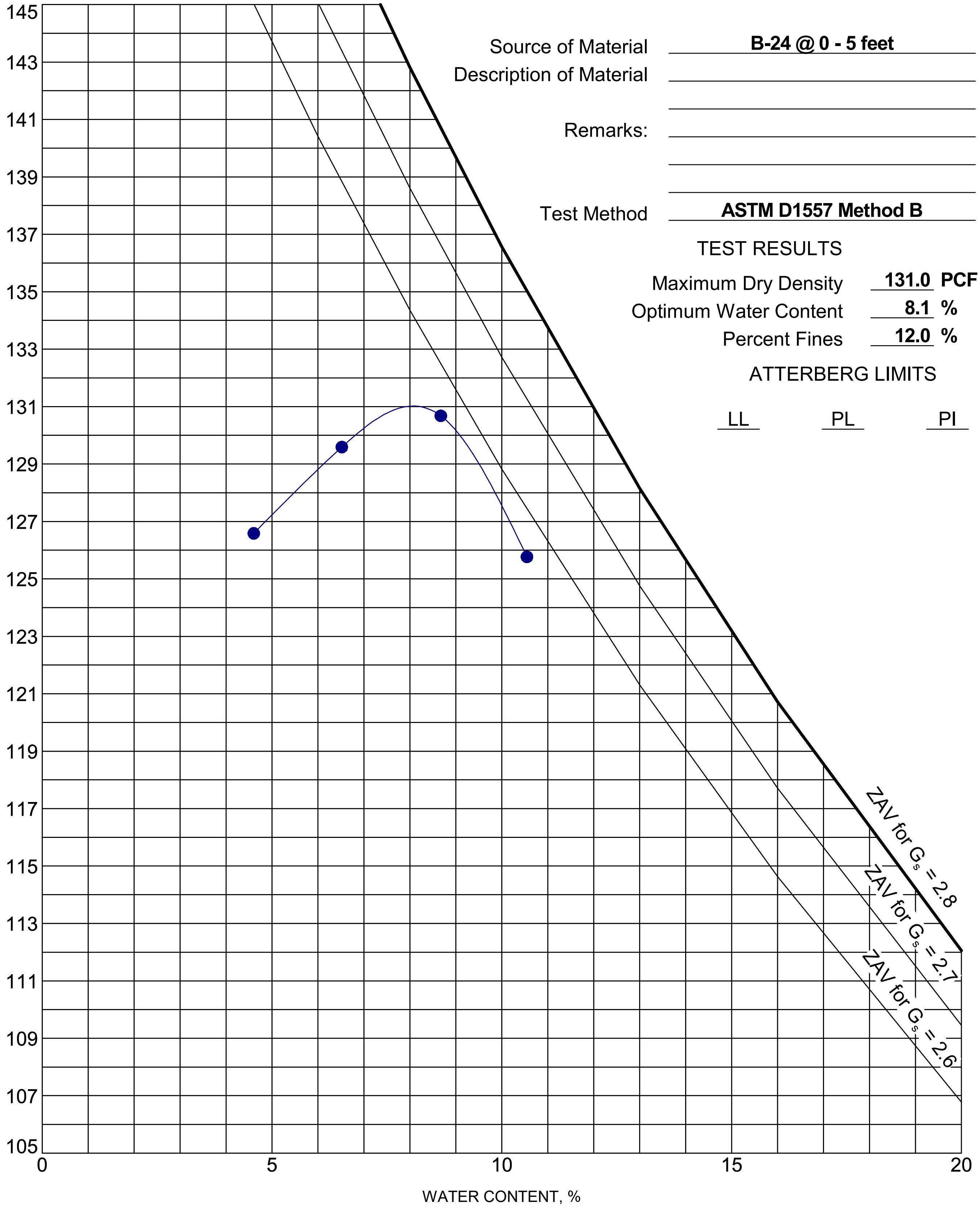
ATTERBERG LIMITS

LL	PL	PI

PROJECT: Love's Travel Stop Baker - CA - GEO	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215111
SITE: Baker Boulevard Baker, CA		CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **B-24 @ 0 - 5 feet**

Description of Material

Remarks:

Test Method **ASTM D1557 Method B**

TEST RESULTS

Maximum Dry Density **131.0** **PCF**

Optimum Water Content **8.1** **%**

Percent Fines **12.0** **%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

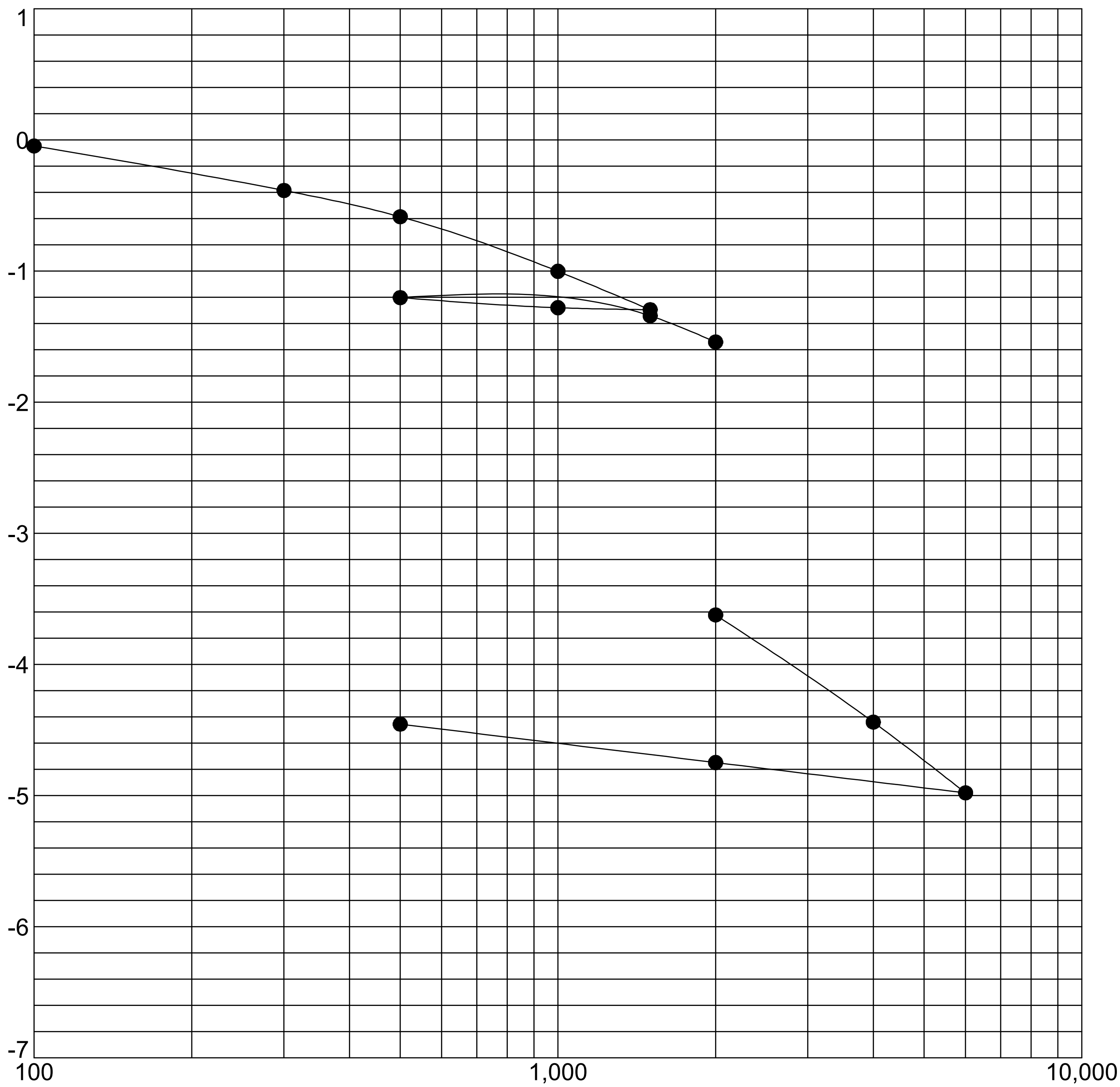
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SWELL CONSOLIDATION TEST

ASTM D2435

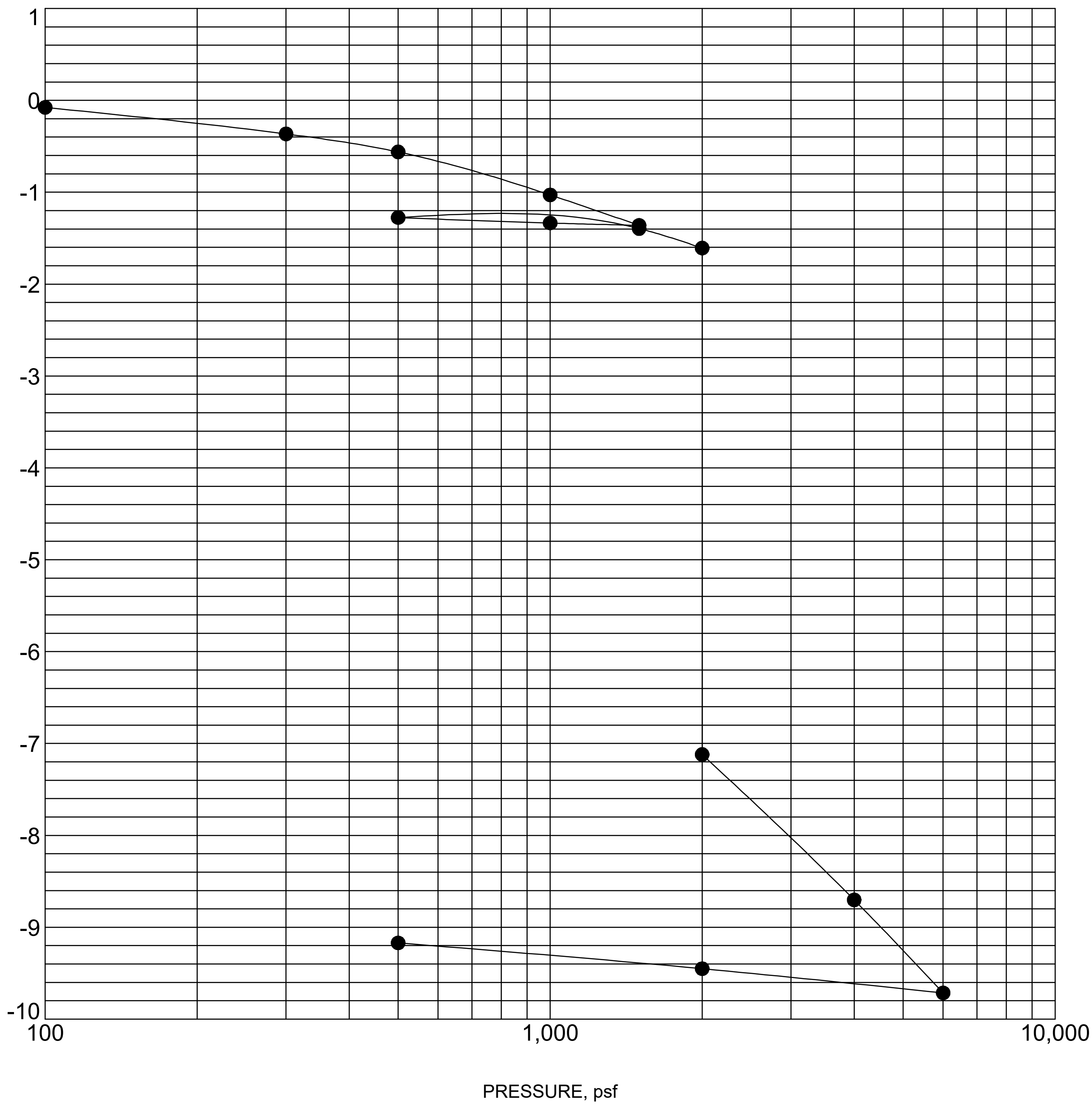


Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-1 10 - 11.5 ft		109	0.9

NOTES:

PROJECT: Love's Travel Stop Baker - CA - GEO	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215111
SITE: Baker Boulevard Baker, CA		CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

SWELL CONSOLIDATION TEST
ASTM D2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-5 10 - 11.5 ft		99	2.1

NOTES:

PROJECT: Love's Travel Stop Baker - CA - GEO

SITE: Baker Boulevard
Baker, CA

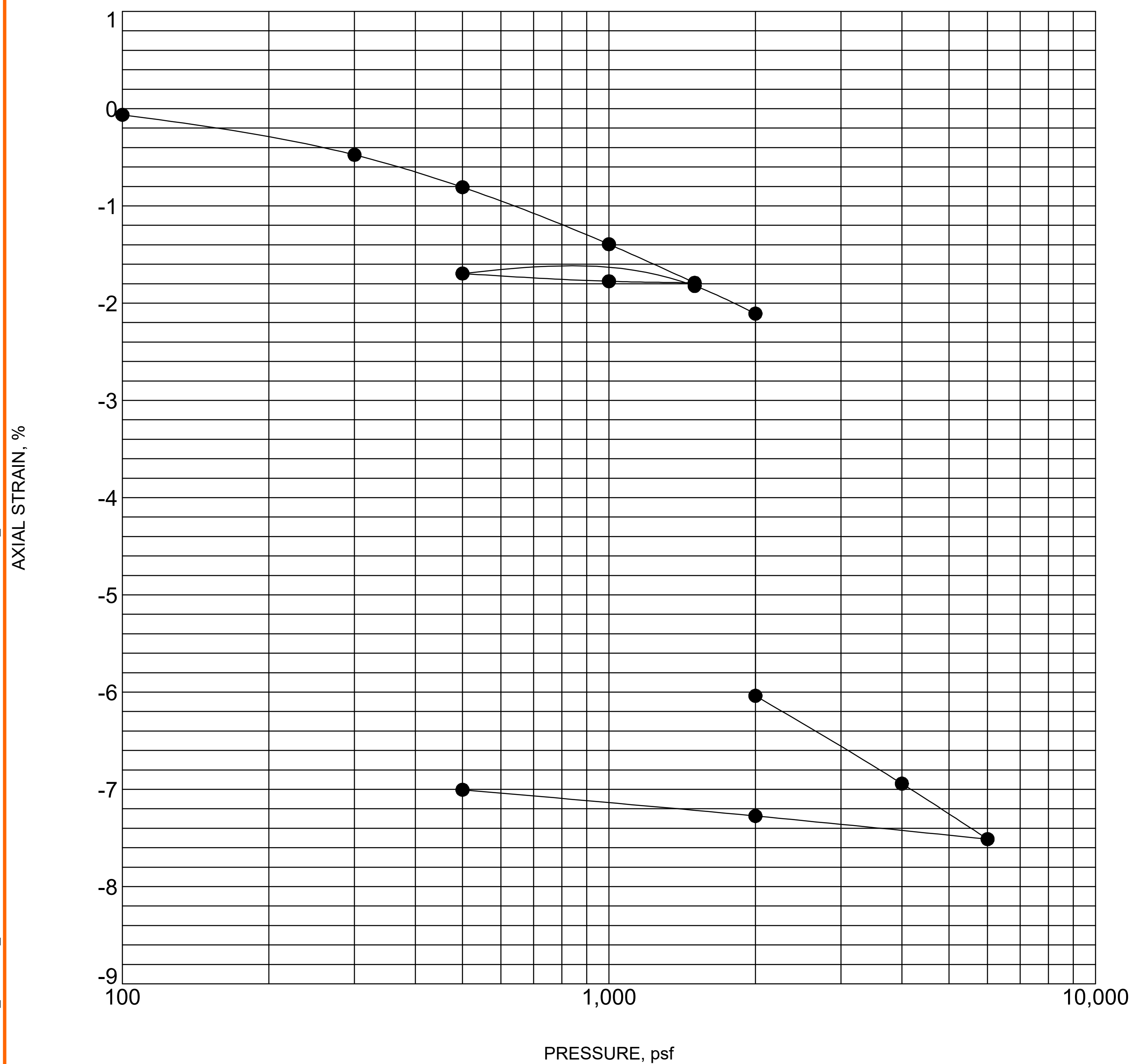
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215111

CLIENT: Love's Travel Stops & Country Stores Inc
Oklahoma City, OK

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-7 7.5 - 9 ft		99	1.2

NOTES:

PROJECT: Love's Travel Stop Baker - CA - GEO	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215111
SITE: Baker Boulevard Baker, CA		CLIENT: Love's Travel Stops & Country Stores Inc Oklahoma City, OK

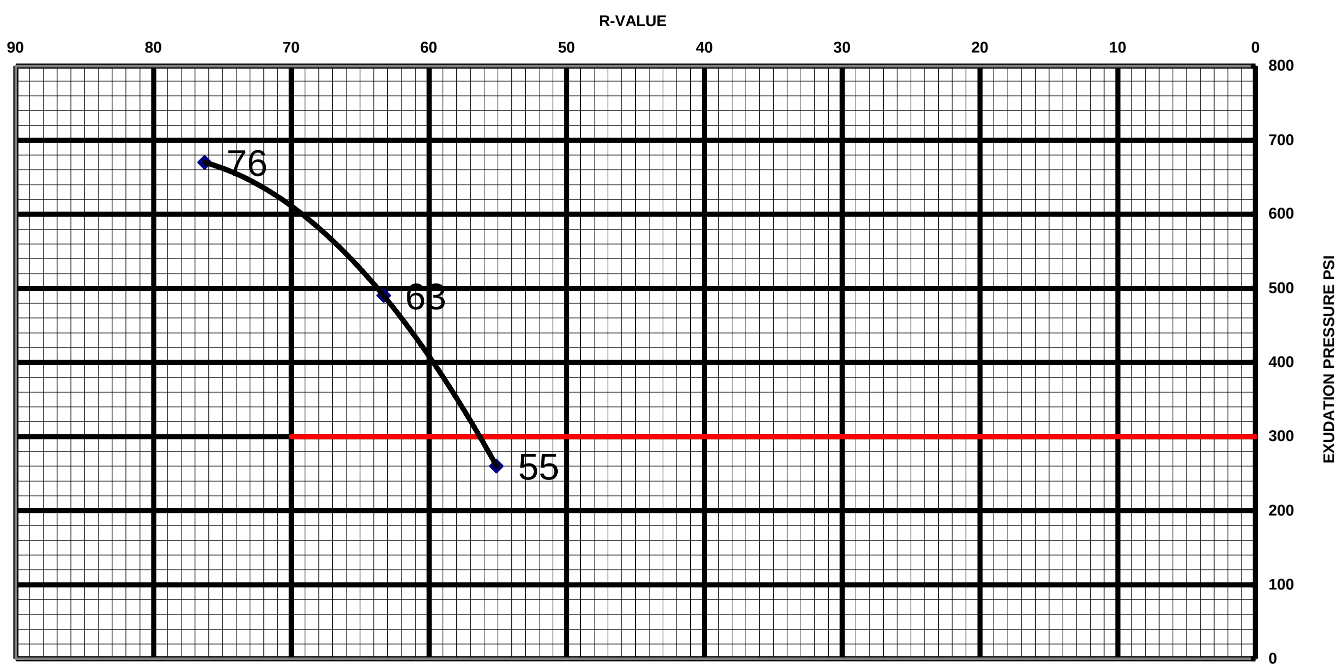
Job No. CB215111
Date. 10/13/2021

LABORATORY RECORD OF TESTS MADE ON
BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: **Love's Travel Stop & Country Stores, Inc**
PROJECT **Love's Travel Stop, Baker CA**
LOCATION: **0-5'**
R-VALUE # : **B-22**
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	0.4	0.4	0.4	
WATER ADDED, ML	90	85	80	
WATER ADDED %	7.9	7.4	6.9	
MOISTURE AT COMPACTION %	8.3	7.8	7.3	
HEIGHT OF BRIQUETTE	2.46	2.47	2.50	
WET WEIGHT OF BRIQUETTE	1145	1146	1157	
DENSITY LB. PER CU.FT.	130.2	130.4	130.6	
STABILOMETER PH AT 1000 LBS.	28	22	16	
2000 LBS.	47	39	25	
DISPLACEMENT	4.90	4.50	4.20	
R-VALUE	55	63	76	
EXUDATION PRESSURE	260	490	670	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	0	0	0	
THICK. INDICATED BY E.P.	0.00	0.00	0.00	

EXUDATION CHART



R-Value: **56**

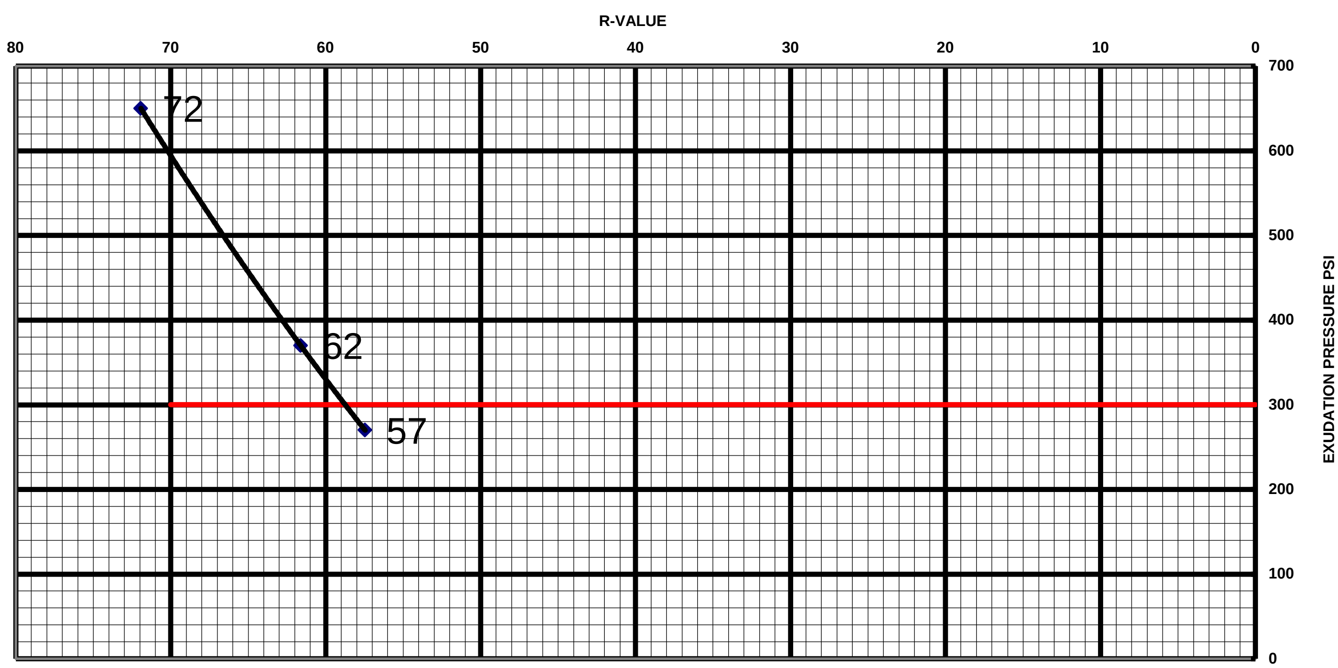
Job No. CB215111
Date. 10/13/2021

LABORATORY RECORD OF TESTS MADE ON
BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: **Love's Travel Stop & Country Stores, Inc**
PROJECT **Love's Travel Stop, Baker CA**
LOCATION: **0-5'**
R-VALUE # : **B-32**
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	4.2	4.2	4.2	
WATER ADDED, ML	45	40	30	
WATER ADDED %	3.9	3.6	2.7	
MOISTURE AT COMPACTION %	8.1	7.8	6.9	
HEIGHT OF BRIQUETTE	2.52	2.46	2.47	
WET WEIGHT OF BRIQUETTE	1192	1164	1167	
DENSITY LB. PER CU.FT.	132.5	133.0	133.9	
STABILOMETER PH AT 1000 LBS.	25	23	16	
2000 LBS.	42	38	28	
DISPLACEMENT	5.20	5.00	4.60	
R-VALUE	57	62	72	
EXUDATION PRESSURE	270	370	650	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	0	0	0	
THICK. INDICATED BY E.P.	0.00	0.00	0.00	

EXUDATION CHART



R-Value: **58**

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Terracon GeoReport

Client
Love's Travel Stops & Country Stores Inc

Project
Love's Travel Stop
Baker-CA-GEO

Sample Submitted By: Terracon (CB) **Date Received:** 10/7/2021 **Lab No.: 21-0747**

Results of Corrosion Analysis

Sample Number	11-A	15-A
Sample Location	B-11	B-15
Sample Depth (ft.)	0.0-5.0	0.0-5.0
pH Analysis, ASTM G 51	9.20	8.84
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	228	88
Chlorides, ASTM D 512, (mg/kg)	73	158
Total Salts, AWWA 2540, (mg/kg)	381	1478
As-Received Resistivity, ASTM G 57, (ohm-cm)	22310	>1,000,000
Saturated Minimum Resistivity, ASTM G 57, (ohm-cm)	6887	1067

Analyzed By: N. Campo

Nathan Campo
Engineering Technician II

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-11
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING: September 21, 2021
DATE OF PRESOAK: September 21, 2021
DATE OF TEST: September 21, 2021
TESTED BY: RL

DEPTH BEFORE (ft.): 5.0
DEPTH AFTER (ft.): 5.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
120	120	4.0	60.0	56.0	60.0	60.0	28.0	1.87
10	130	4.0	21.0	17.0	60.0	60.0	102.0	4.12
10	140	21.0	37.0	16.0	60.0	60.0	96.0	5.82
10	150	37.0	50.1	13.1	60.0	60.0	78.6	8.52
10	160	6.0	24.3	18.3	60.0	60.0	109.8	4.69
10	170	24.3	39.6	15.3	60.0	60.0	91.8	6.11
10	180	39.6	52.3	12.7	60.0	60.0	76.2	9.50
10	190	4.0	22.7	18.7	60.0	60.0	112.2	4.61
10	200	22.7	38.3	15.6	60.0	60.0	93.6	5.94
					Average of last 3 readings:		94.00	6.68

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-12
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING:	September 22, 2021	DEPTH BEFORE (ft.):	5.0
DATE OF PRESOAK:	September 22, 2021	DEPTH AFTER (ft.):	5.0
DATE OF TEST:	September 22, 2021	PVC PIPE DIA. (in.):	3.0
TESTED BY:	JP	PERC HOLE DIA. (in.):	8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	2.0	60.0	58.0	60.0	60.0	2.4	0.16
10	1450	4.0	17.3	13.3	60.0	60.0	79.8	3.11
10	1460	17.3	28.0	10.7	60.0	60.0	64.2	3.26
10	1470	28.0	36.3	8.3	60.0	60.0	49.8	3.34
10	1480	36.3	42.3	6.0	60.0	60.0	36.0	3.17
10	1490	4.0	17.6	13.6	60.0	60.0	81.6	3.19
10	1500	17.6	28.4	10.8	60.0	60.0	64.8	3.32
10	1510	28.4	37.0	8.6	60.0	60.0	51.6	3.52
10	1520	37.0	43.0	6.0	60.0	60.0	36.0	3.27
				Average of last 3 readings:			50.80	3.37

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-13
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING: September 22, 2021
DATE OF PRESOAK: September 22, 2021
DATE OF TEST: September 22, 2021
TESTED BY: JP

DEPTH BEFORE (ft.): 5.0
DEPTH AFTER (ft.): 5.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	0.0	60.0	60.0	60.0	60.0	2.5	0.16
10	1450	2.0	19.0	17.0	60.0	60.0	102.0	3.96
10	1460	19.0	31.4	12.4	60.0	60.0	74.4	4.04
10	1470	31.4	39.9	8.5	60.0	60.0	51.0	3.87
10	1480	4.0	20.4	16.4	60.0	60.0	98.4	3.95
10	1490	20.4	32.2	11.8	60.0	60.0	70.8	3.97
10	1500	32.2	40.7	8.5	60.0	60.0	51.0	3.99
10	1510	12.0	26.4	14.4	60.0	60.0	86.4	4.04
10	1520	26.4	36.4	10.0	60.0	60.0	60.0	3.92
				Average of last 3 readings:			65.80	3.98

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-14
LOT No: N/A
TRACT No: N/A

CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING: September 21, 2021
DATE OF PRESOAK: September 21, 2021
DATE OF TEST: September 21, 2021
TESTED BY: JP

DEPTH BEFORE (ft.): 10.0
DEPTH AFTER (ft.): 10.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	0.0	120.0	120.0	120.0	120.0	5.0	0.16
10	1450	15.5	45.0	29.5	120.0	120.0	177.0	3.86
10	1460	45.0	66.3	21.3	120.0	120.0	127.8	3.85
10	1470	66.3	82.1	15.8	120.0	120.0	94.8	3.97
10	1480	82.1	93.4	11.3	120.0	120.0	67.8	3.96
10	1490	93.4	101.4	8.0	120.0	120.0	48.0	3.90
10	1500	24.0	51.3	27.3	120.0	120.0	163.8	3.88
10	1510	51.3	70.8	19.5	120.0	120.0	117.0	3.84
10	1520	70.8	85.3	14.5	120.0	120.0	87.0	3.96
				Average of last 3 readings:			122.60	3.89

Job No.: CB215111

PERCOLATION TEST DATA

BORING NUMBER: B-15
LOT No: N/A
TRACT No: N/A

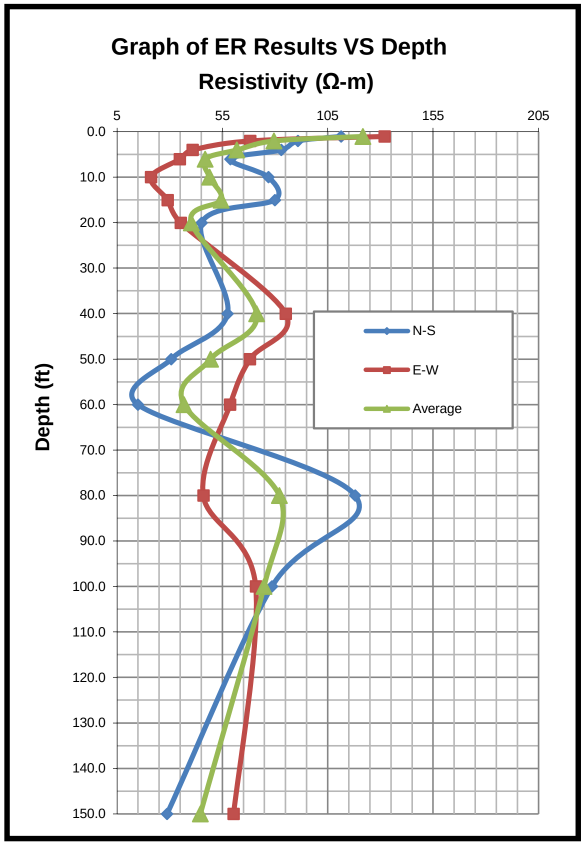
CLIENT: Love's Travel Stops & Country Stores, Inc.
PROJECT: Love's Travel Stop Baker

DATE OF DRILLING: September 23, 2021
DATE OF PRESOAK: September 23, 2021
DATE OF TEST: September 23, 2021
TESTED BY: JP

DEPTH BEFORE (ft.): 5.0
DEPTH AFTER (ft.): 5.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1440	1440	2.0	60.0	58.0	60.0	60.0	2.4	0.16
10	1450	2.0	15.3	13.3	60.0	60.0	79.8	2.99
10	1460	15.3	25.5	10.2	60.0	60.0	61.2	2.94
10	1470	25.5	33.6	8.1	60.0	60.0	48.6	3.00
10	1480	33.6	40.0	6.4	60.0	60.0	38.4	3.05
10	1490	40.0	44.9	4.9	60.0	60.0	29.4	3.01
10	1500	6.0	18.6	12.6	60.0	60.0	75.6	3.04
10	1510	18.6	28.3	9.7	60.0	60.0	58.2	3.02
10	1520	28.3	35.7	7.4	60.0	60.0	44.4	2.96
				Average of last 3 readings:			59.40	3.01

Location	ARRAY	PARAMETER	SPACING (feet)												
			1.0	2.0	4.0	6.0	10.0	15.0	20.0	40.0	50.0	60.0	80.0	100.0	150.0
35.2767°N 116.0560°W	N-S	Measured resistance (Ω)	58.1	23.7	10.82	5.11	4.01	2.78	1.18	0.75	0.32	0.13	0.77	0.41	0.1
		Calculated resistivity (Ω-m)	111	91	83	59	77	80	45	57	31	15	118	79	29
		Average resistivity (Ω-m)	**122**	**79**	**62**	**47**	**49**	**54**	**40**	**71**	**49**	**37**	**82**	**75**	**45**
	E-W	Measured resistance (Ω)	68.9	17.8	5.34	3.03	1.1	1.01	0.92	1.11	0.71	0.51	0.3	0.37	0.21
		Calculated resistivity (Ω-m)	132	68	41	35	21	29	35	85	68	59	46	71	60



Project Mgr: AT	Project Number	**Terracon** Consulting Engineers and Scientists	**FIELD ELECTRICAL RESISTIVITY TESTING RESULTS**
Prepared by: JP	CB215111		**Love's Travel Stop - Jurupa Valley**
Checked by:	Date: 9/30/2021	1355 E. Cooley Drive, Suite C Colton, CA 92324	**Riverside**
Approved by:		PH: (909) 824-7311 Fax. (909) 301-6016	**Riverside County, California**

SUPPORTING INFORMATION

Contents:

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Auger Cuttings Modified California Ring Sampler Standard Penetration Test	Water Initially Encountered Water Level After a Specified Period of Time Water Level After a Specified Period of Time Cave In Encountered Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** Standard Penetration Test Resistance (Blows/Ft.) **(HP)** Hand Penetrometer **(T)** Torvane **(DCP)** Dynamic Cone Penetrometer **UC** Unconfined Compressive Strength **(PID)** Photo-Ionization Detector **(OVA)** Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium Stiff	0.50 to 1.00	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	> 99	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
			Hard	> 4.00	> 30	> 42

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification: Group Symbol	Soil Classification: Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	$PI > 7$ and plots on or above “A” line [J]		CL	Lean clay [K, L, M]
			$PI < 4$ or plots below “A” line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line		CH	Fat clay [K, L, M]
			PI plots below “A” line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains ≥ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add “sandy” to group name.

[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] $PI \geq 4$ and plots on or above “A” line.

[O] $PI < 4$ or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.