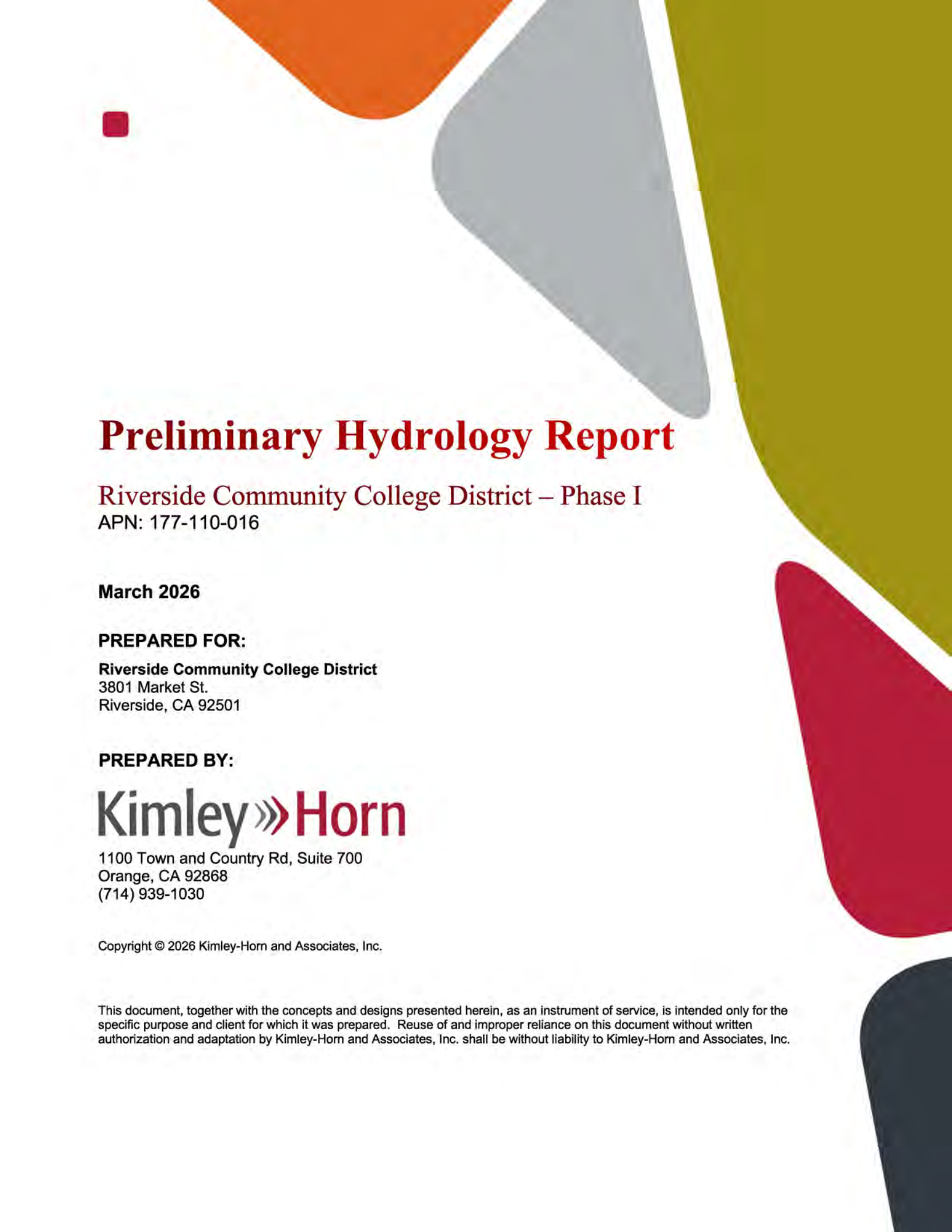




Preliminary Hydrology Report

Riverside Community College District – Phase I
APN: 177-110-016

March 2026

PREPARED FOR:

Riverside Community College District
3801 Market St.
Riverside, CA 92501

PREPARED BY:

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Certification by Engineer

Barsin Bet Govargez, P.E.

Date

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References

Hydrology Manual. Riverside County Flood Control and Water Conservation District, April 1978.
Hydraulic Design Manual. Riverside County Flood Control & Water Conservation District, March 2024.

100.0 Introduction

Kimley-Horn and Associates has been retained to prepare a Hydrology Report for the proposed RCCD project in Riverside, California. The purpose of this report is to demonstrate analysis of the hydrologic and hydraulic conditions associated with the development of the project site. To do so, the following is the scope of this report:

- Discuss the pre-development discharge patterns and points
- Discuss the post-development discharge patterns and points
- Determine the pre-development flow rates for the 2-year, 10-year, and 100-year storm event
- Determine the post-development unmitigated flow rates for the 2-year, 10-year, and 100-year storm event
- Analyze the required post-development onsite mitigation for up to the 100-year storm event
- Discuss the potential for hydromodification downstream of the site
- Size the onsite storm drain system, catch basins, and BMPs

Even though this report discusses stormwater, this report is not a Stormwater Pollution Prevention Plan (SWPPP), a Groundwater Study, a Geotechnical Report, nor a Water Quality Management Plan (WQMP). Each of these separate reports discusses separate aspects of stormwater. Portions of the Geotechnical Report are utilized and referenced for the purpose of this report. Similarly, the stormwater mitigation requirements of the WQMP are considered for sizing the BMPs used for this project.

100.1 Project Description

The Riverside Community College District project proposes to develop an existing site, a former development and is fully paved, into a college campus. Site improvements include the development of approximately 9.68 acres into two buildings, parking lots, sidewalk, and landscape areas. The scope of work also includes, but not limited to, onsite grading, domestic water service, sanitary sewer service, storm drain infrastructure, concrete and asphalt pavement, landscaping, and irrigation.

100.2 Location

The site is located at 6464 33rd Street in the City of Jurupa Valley and is bounded by residential areas to the North, East, and West, with the Union Pacific Railroad to the South.

100.3 Methodology

The hydrologic and hydraulic analyses were completed following the methods outlined in the Riverside County Hydrology Manual. The rational method was used to estimate time of concentrations and peak flow rates generated from the existing and proposed 2-year, 10-year, and 100-year storm events, and the synthetic unit hydrograph method was used to determine the onsite existing and proposed hydrographs for the 1-hour, 3-hour, 6-hour, and 24-hour duration of the 100-year storm event. To determine the outflow from the proposed BMPs, a basin routing analysis was performed for the 100-year, 10-year, and 2-year storm event. Furthermore, since the project is not located within an exempt area per the HCOC Applicability Map, the project is susceptible to hydromodification and calculations comparing the pre-development and post-development conditions for a 2-year storm event were performed.

The CivilDesign Engineering Software was used to compute the rational method, synthetic unit hydrograph, and basin routing analyses, and the results are included in Appendices H, I, and J accordingly. For the rational method analysis, precipitation data from NOAA Atlas 14 was used to compute the peak flow rates and time of concentration for each drainage area. For the unit hydrograph and basin routing analyses, rainfall data from NOAA Atlas 14 was used along with the stage-storage parameters of the detention system to obtain the runoff volume generated from each drainage area and the peak outflows from the BMPs for the 100-year storm event.

The type of soil and soil conditions are major factors affecting infiltration/detention and storm water runoff as a result. The Natural Resources Conservation Service (NRCS) has classified soil into general hydrologic soil groups for comparing infiltration and runoff rates. Each group is based on properties that influence runoff, such as water infiltration rate, texture, natural discharge, and moisture condition. The runoff potential is based on the amount of runoff at the end of a long duration storm that occurs after wetting and swelling of the soil not protected by vegetation. Using the United States Department of Agriculture Natural Resources Conservation Service Web Soil

Survey online tool, the hydrologic soil group classification for the area was determined to be A. Soil type A is defined as soils having high infiltration rates (low runoff potential) when thoroughly wet.

In addition, based on the Percolation/Infiltration Testing prepared by Geocon West, Inc dated February 2025, the site has low infiltration rates and is infeasible for infiltration BMPs.

In addition, antecedent moisture conditions (AMC) I, II, and III were used to calculate the peak flows and volumes for the 2-year, 10-year, and 100-year storm events respectively based on the hydrology manual. See Appendix D for the impervious percentages that correspond to each land use.

100.4 Drainage Characteristics

The site is in Zone X per the Federal Emergency Management Administration (FEMA) Flood Insurance Rate Map (FIRM) map number 06065C0043H dated September 12, 2024. For reference, see the FIRM Map in Appendix B.

Flood Zone X is described as areas to be outside the 0.2% annual chance floodplain.

100.4.1 Pre-development (Existing) Condition

Under existing conditions, the site primarily drains south where it will ultimately outfall towards the Union Pacific Railroad and ultimately discharge into the Santa Ana River.

Under existing conditions, the project site consists of one drainage area and Table 1 shows a summary of the pre-development flows and volumes for the project site. See the Pre-Development Hydrology Exhibit in Appendix G for more information, Appendix H for the Rational Method Calculations, and Appendix I for the Unit Hydrograph Calculations.

Table 1: Onsite Pre-development (Existing) Flows

Area Description	Area (acres)	Q ₂ (cfs)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)	V _{2, 24-hr} (CF)	V _{10, 24-hr} (CF)	V _{100, 1-hr} (CF)	V _{100, 3-hr} (CF)	V _{100, 6-hr} (CF)	V _{100, 24-hr} (CF)
A	9.68	3.17 (Natural Conditions)	16.92	26.91	7,061 (Natural Conditions)	100,123	38,503	61,616	83,666	153,092

100.4.2 Post-development Condition

Stormwater runoff will sheet flow towards nearby catch basins and conveyed to a modular wetland system for treatment. Afterwards, runoff is conveyed to an underground detention basin for peak flow mitigation. The mitigated runoff will then head south to where it will be pumped towards a parkway drain that discharges the runoff onto Union Pacific Railroad. All runoff from the site will ultimately discharge into the Santa Ana River and match existing conditions. See Appendix C for the Construction Plans and Appendix G for the Post-Development Hydrology Exhibit.

Table 2 shows a summary of the onsite post-development flows (unmitigated). For more information, refer to the Post Development Hydrology Exhibit in Appendix G, the Rational Method Calculations in Appendix H, and the Unit Hydrograph Calculations in Appendix I.

Table 2: Onsite Post-development Flows (Unmitigated)

Area Description	Area (acres)	Q ₂ (cfs)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)	V _{2, 24-hr} (CF)	V _{10, 24-hr} (CF)	V _{100, 1-hr} (CF)	V _{100, 3-hr} (CF)	V _{100, 6-hr} (CF)	V _{100, 24-hr} (CF)
A	9.68	11.04	18.37	29.24	44,422	69,975	32,822	47,811	62,857	107,702

100.5 Stormwater Mitigation

To prevent adverse impacts downstream of the project site, the project will mitigate peak flows such that it does not exceed existing conditions for the 10-year, and the 100-year storm event. In addition, per the hydromodification requirements, the 2-year storm event peak runoff being discharged will be mitigated such that it does not exceed 110% of the existing conditions for the 2-year storm event.

The detention system used for this project is a StormTech MC-7200 Detention System and a pump will be used to discharge the runoff at a mitigated flow rate. The pump is restricted to discharge no more than the allowable flow rate of 3.48 cfs, and to ensure that the basin and pump can accommodate the post-development flows, a basin routing analysis was performed for the detention system, and the below tables provide a summary of the results. Refer to Appendix J for more information on the proposed BMP and the Basin Routing Analysis.

Table 4: Basin Routing Requirements

Area Description	2-Year Allowable Outflow (cfs)	10-Year Allowable Outflow (cfs)	100-Year Allowable Outflow (cfs)
Total	3.48 (Per HCOC Requirements)	16.92	26.91

Table 5: Basin Routing Analysis

Area Description	2-Year Peak Flow Rate (cfs)	10-Year Peak Flow Rate (cfs)	100-Year Peak Flow Rate (cfs)	100-Year Water Surface Elevation (ft)
Total	1.68 (Per HCOC Requirements)	2.64	3.48	6.38 (Above the Bottom of Basin)

100.6 Hydraulic Analysis

Regarding the design of the onsite storm drain system and catch basins, the pipe and catch basins will be sized to be able to accommodate the 100-year storm for flood protection and will be provided in final engineering.

100.7 Conclusion

In conclusion, the following was covered in this report:

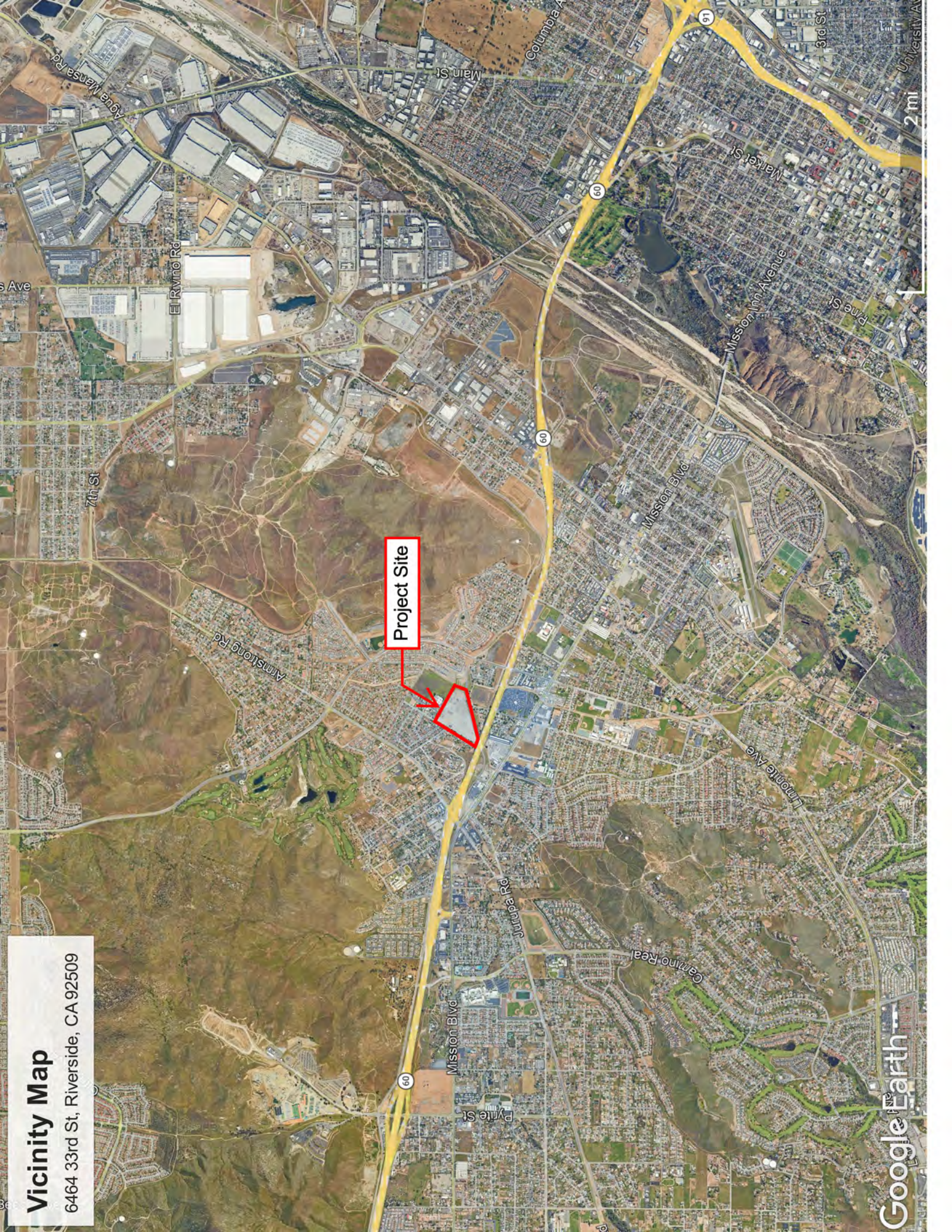
- The potential for hydromodification downstream of the site was discussed.
- The pre-development discharge patterns and points were analyzed.
- The post-development discharge patterns and points were analyzed.
- The pre-development flow rates for the 2-year, 10-year, and 100-year events were determined.
- The pre-development volumes for the 2-year, 10-year, and 100-year events were determined.
- The post-development unmitigated flows for the 2-year, 10-year, and 100-year events were determined.
- The post-development volumes for the 2-year, 10-year, and 100-year events were determined.
- The required stormwater mitigation was analyzed.
- The storm drain system was designed to ensure that the requirements are met.

As discussed in the contents of this report, the development is not expected to cause a significant impact to downstream systems for storms up to the 100-year storm.

Appendix A
Location Map

Vicinity Map

6464 33rd St, Riverside, CA 92509



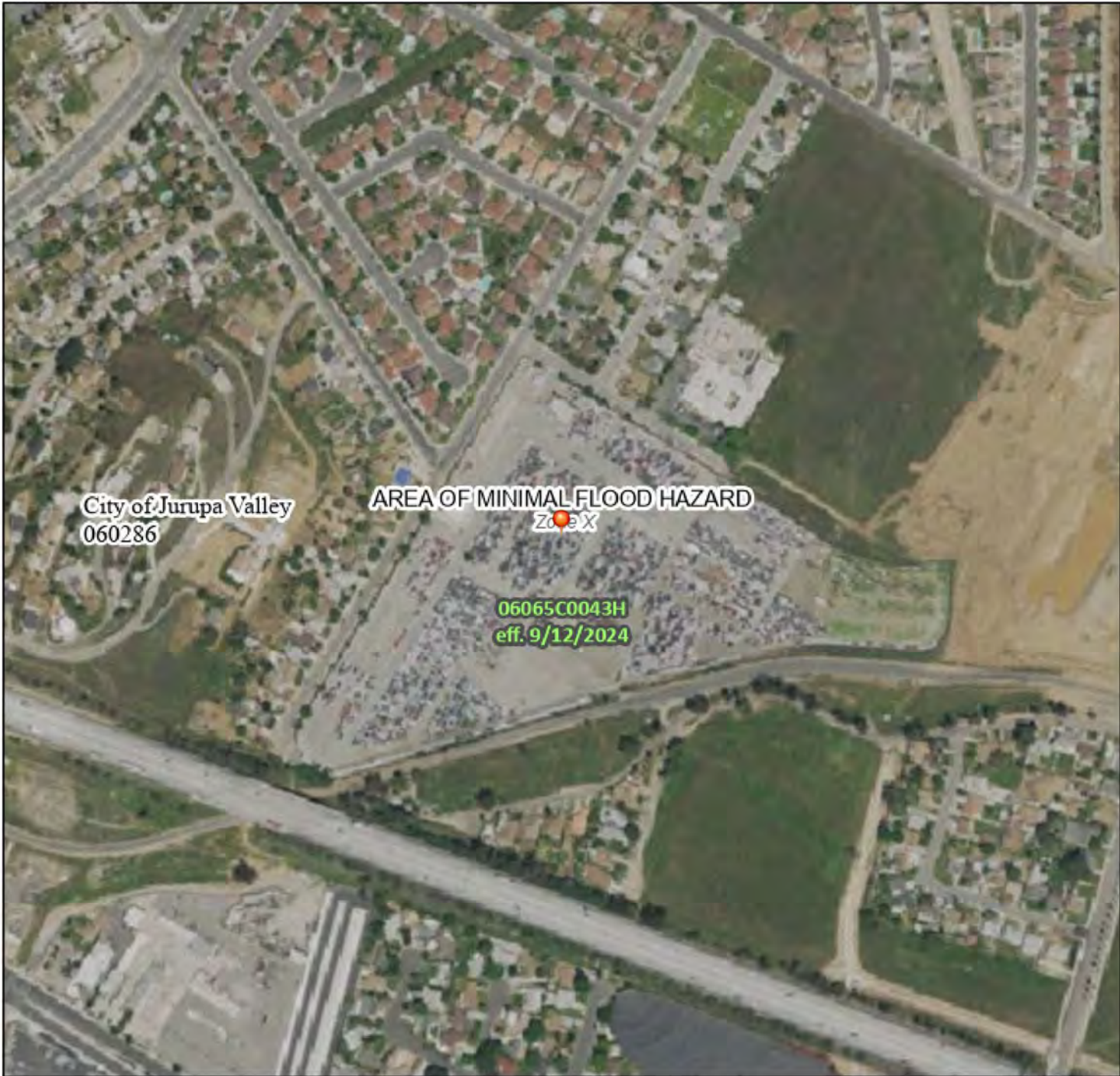
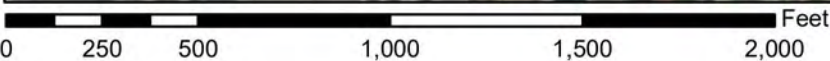
Appendix B

FIRM Map

National Flood Hazard Layer FIRMMette



117°25'47"W 34°0'57"N



1:6,000

117°25'9"W 34°0'28"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/16/2026 at 10:44 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix C

Construction Plans

To be completed during final engineering

Appendix D

Hydrology Manual and Other Reference Material

Appendix E
NOAA Rainfall Data



NOAA Atlas 14, Volume 6, Version 2
Location name: Jurupa Valley, California, USA*
Latitude: 34.0122°, Longitude: -117.4243°
Elevation: 891 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 & aeries](#)

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	0.096 (0.080-0.116)	0.124 (0.103-0.150)	0.161 (0.134-0.196)	0.192 (0.158-0.236)	0.236 (0.187-0.299)	0.270 (0.210-0.350)	0.306 (0.232-0.407)	0.344 (0.253-0.471)	0.397 (0.280-0.568)	0.439 (0.299-0.652)
10-min	0.137 (0.114-0.166)	0.177 (0.148-0.215)	0.231 (0.192-0.281)	0.275 (0.227-0.338)	0.338 (0.269-0.429)	0.387 (0.301-0.502)	0.438 (0.333-0.583)	0.493 (0.363-0.675)	0.569 (0.402-0.814)	0.630 (0.429-0.934)
15-min	0.166 (0.138-0.201)	0.214 (0.179-0.260)	0.279 (0.232-0.339)	0.333 (0.274-0.408)	0.408 (0.325-0.519)	0.468 (0.364-0.607)	0.530 (0.402-0.706)	0.596 (0.439-0.816)	0.688 (0.486-0.984)	0.762 (0.519-1.13)
30-min	0.247 (0.206-0.299)	0.319 (0.266-0.387)	0.415 (0.345-0.505)	0.496 (0.408-0.608)	0.608 (0.484-0.772)	0.696 (0.542-0.904)	0.789 (0.598-1.05)	0.886 (0.653-1.22)	1.02 (0.722-1.46)	1.13 (0.772-1.68)
60-min	0.360 (0.300-0.436)	0.464 (0.387-0.563)	0.605 (0.502-0.735)	0.722 (0.595-0.885)	0.885 (0.704-1.12)	1.01 (0.790-1.32)	1.15 (0.872-1.53)	1.29 (0.952-1.77)	1.49 (1.05-2.13)	1.65 (1.12-2.45)
2-hr	0.521 (0.435-0.631)	0.667 (0.555-0.808)	0.858 (0.713-1.04)	1.02 (0.837-1.25)	1.23 (0.980-1.56)	1.40 (1.09-1.82)	1.57 (1.19-2.09)	1.75 (1.29-2.40)	2.00 (1.41-2.86)	2.19 (1.49-3.25)
3-hr	0.638 (0.532-0.772)	0.814 (0.678-0.987)	1.04 (0.868-1.27)	1.23 (1.02-1.51)	1.49 (1.18-1.89)	1.69 (1.31-2.19)	1.89 (1.43-2.52)	2.10 (1.55-2.88)	2.38 (1.68-3.41)	2.61 (1.78-3.86)
6-hr	0.882 (0.736-1.07)	1.13 (0.939-1.37)	1.45 (1.20-1.76)	1.70 (1.40-2.09)	2.05 (1.63-2.61)	2.32 (1.81-3.01)	2.59 (1.96-3.45)	2.86 (2.11-3.93)	3.24 (2.29-4.63)	3.53 (2.40-5.23)
12-hr	1.16 (0.968-1.40)	1.50 (1.25-1.82)	1.94 (1.61-2.36)	2.29 (1.89-2.81)	2.76 (2.20-3.51)	3.12 (2.43-4.05)	3.48 (2.64-4.64)	3.85 (2.84-5.28)	4.35 (3.07-6.22)	4.73 (3.22-7.01)
24-hr	1.53 (1.36-1.77)	2.01 (1.78-2.32)	2.63 (2.32-3.05)	3.13 (2.74-3.65)	3.80 (3.22-4.58)	4.31 (3.58-5.30)	4.82 (3.91-6.08)	5.35 (4.21-6.92)	6.05 (4.58-8.16)	6.59 (4.82-9.19)
2-day	1.86 (1.65-2.15)	2.49 (2.20-2.88)	3.31 (2.92-3.83)	3.97 (3.47-4.63)	4.86 (4.12-5.86)	5.54 (4.60-6.82)	6.24 (5.05-7.85)	6.94 (5.47-8.99)	7.90 (5.98-10.7)	8.64 (6.32-12.0)
3-day	2.01 (1.78-2.31)	2.72 (2.41-3.14)	3.66 (3.23-4.23)	4.42 (3.87-5.16)	5.46 (4.62-6.58)	6.26 (5.19-7.70)	7.07 (5.72-8.90)	7.90 (6.23-10.2)	9.04 (6.84-12.2)	9.92 (7.26-13.8)
4-day	2.16 (1.91-2.49)	2.96 (2.62-3.42)	4.01 (3.54-4.64)	4.87 (4.26-5.68)	6.04 (5.11-7.28)	6.94 (5.76-8.54)	7.86 (6.37-9.91)	8.82 (6.95-11.4)	10.1 (7.66-13.6)	11.1 (8.14-15.5)
7-day	2.49 (2.20-2.87)	3.44 (3.04-3.98)	4.71 (4.15-5.45)	5.75 (5.03-6.71)	7.17 (6.08-8.65)	8.28 (6.87-10.2)	9.41 (7.62-11.9)	10.6 (8.35-13.7)	12.2 (9.23-16.5)	13.5 (9.85-18.8)
10-day	2.69 (2.38-3.10)	3.75 (3.31-4.32)	5.15 (4.54-5.96)	6.31 (5.52-7.36)	7.91 (6.70-9.53)	9.16 (7.60-11.3)	10.4 (8.45-13.1)	11.8 (9.28-15.2)	13.6 (10.3-18.3)	15.0 (11.0-21.0)
20-day	3.26 (2.88-3.76)	4.59 (4.05-5.29)	6.37 (5.61-7.37)	7.85 (6.87-9.16)	9.92 (8.40-12.0)	11.6 (9.59-14.2)	13.3 (10.7-16.7)	15.0 (11.9-19.5)	17.5 (13.3-23.6)	19.5 (14.3-27.2)
30-day	3.86 (3.42-4.45)	5.43 (4.80-6.27)	7.56 (6.66-8.74)	9.34 (8.17-10.9)	11.9 (10.0-14.3)	13.8 (11.5-17.0)	15.9 (12.9-20.1)	18.1 (14.3-23.5)	21.2 (16.1-28.7)	23.7 (17.4-33.1)
45-day	4.60 (4.08-5.31)	6.42 (5.68-7.41)	8.91 (7.86-10.3)	11.0 (9.64-12.9)	14.0 (11.9-16.9)	16.4 (13.6-20.2)	18.9 (15.3-23.9)	21.6 (17.1-28.0)	25.5 (19.3-34.3)	28.6 (20.9-39.8)
60-day	5.36 (4.74-6.18)	7.39 (6.54-8.54)	10.2 (8.99-11.8)	12.6 (11.0-14.7)	16.0 (13.5-19.3)	18.7 (15.6-23.1)	21.7 (17.6-27.3)	24.8 (19.5-32.1)	29.3 (22.1-39.5)	32.9 (24.1-45.9)

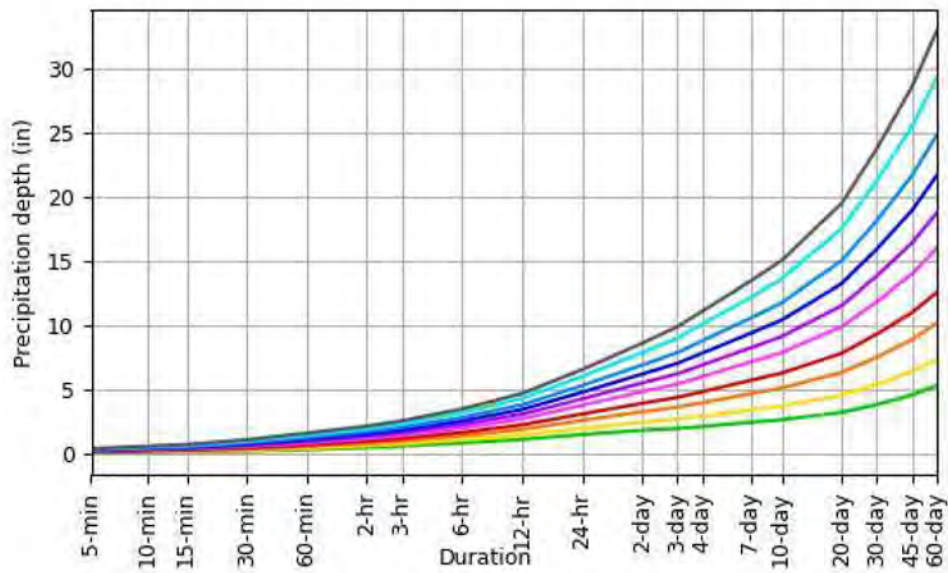
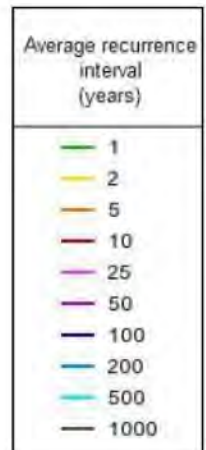
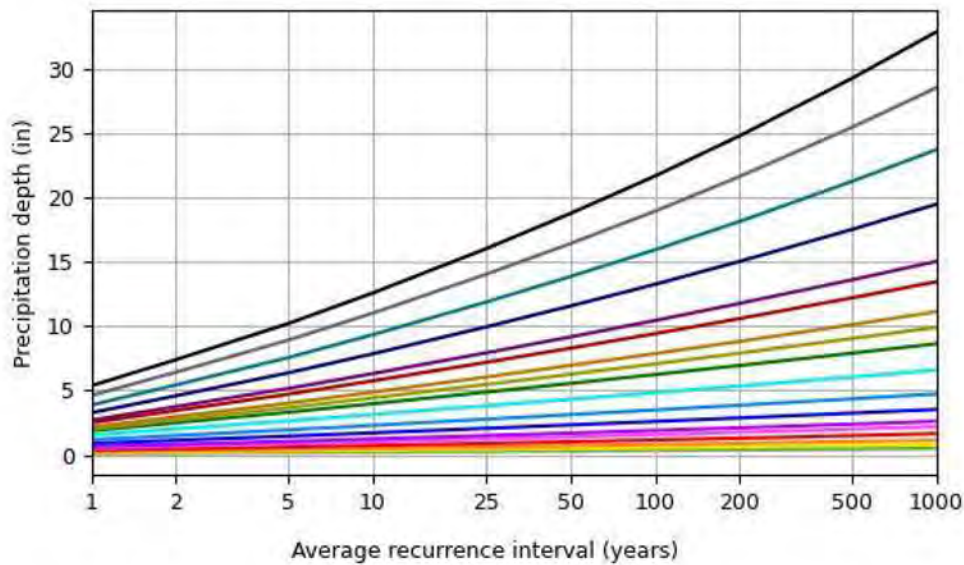
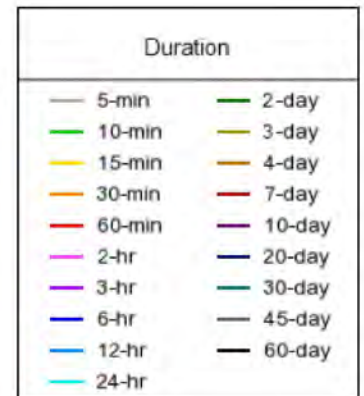
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average 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.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves

Latitude: 34.0122°, Longitude: -117.4243°

[Back to Top](#)**Maps & aeriels****Small scale terrain**



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

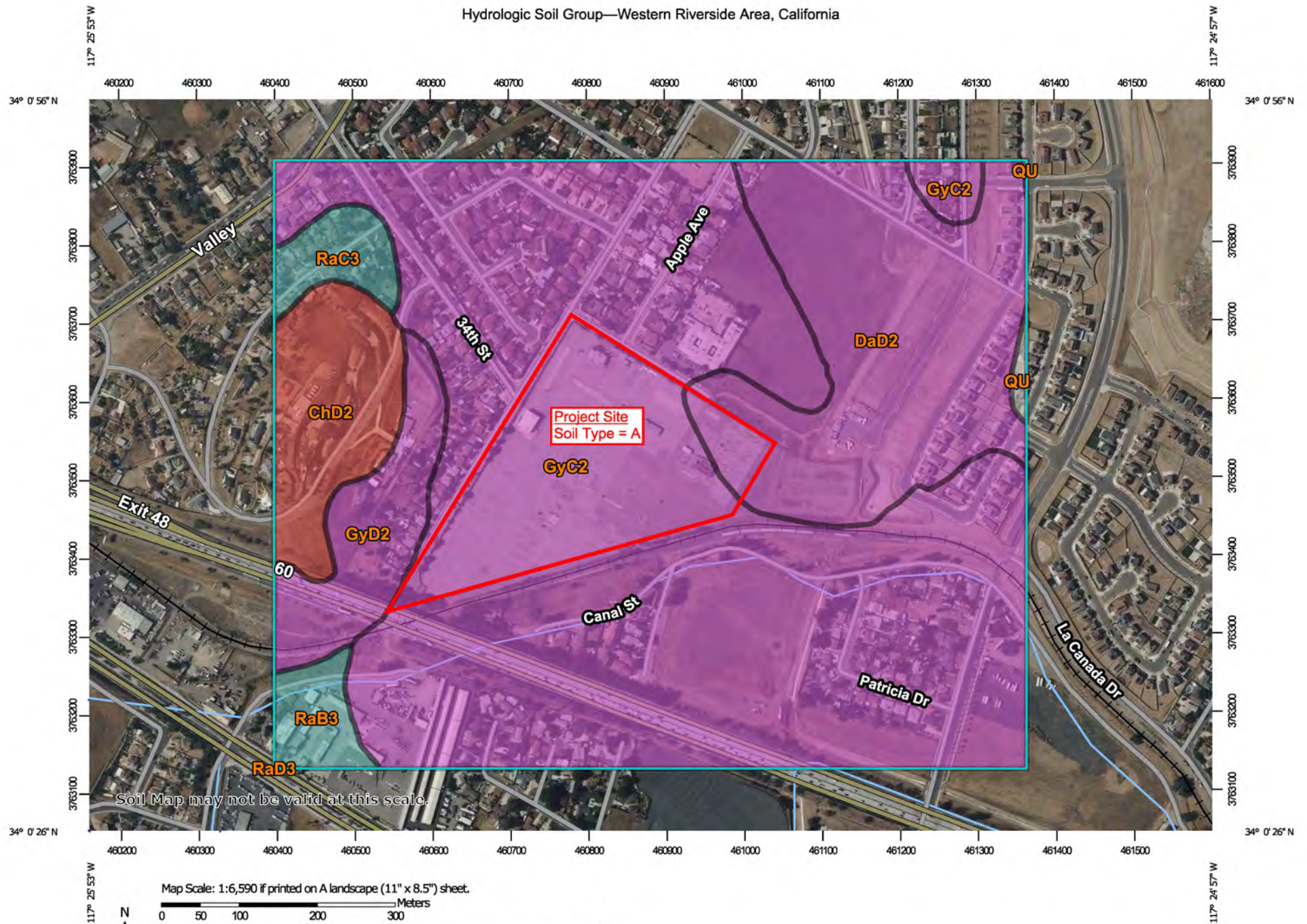
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

Appendix F

Soils Reports

Hydrologic Soil Group—Western Riverside Area, California



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California

Survey Area Data: Version 18, Sep 8, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ChD2	Cieneba sandy loam, 8 to 15 percent slopes, eroded	D	11.4	6.1%
DaD2	Delhi fine sand, 2 to 15 percent slopes, wind-eroded	A	34.9	18.7%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	A	122.3	65.7%
GyD2	Greenfield sandy loam, 8 to 15 percent slopes, eroded	A	9.7	5.2%
QU	Quarries		0.5	0.3%
RaB3	Ramona sandy loam, 0 to 5 percent slopes, severely eroded	C	3.5	1.9%
RaC3	Ramona sandy loam, 5 to 8 percent slopes, severely eroded	C	3.8	2.0%
RaD3	Ramona sandy loam, 8 to 15 percent slopes, severely eroded	C	0.0	0.0%
Totals for Area of Interest			186.1	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER – ADESA SITE
6464 33RD STREET
JURUPA VALLEY, CALIFORNIA

JUNE 21, 2024
PROJECT NO. T2875-22-02

PREPARED FOR:
RIVERSIDE COMMUNITY COLLEGE DISTRICT
RIVERSIDE, CALIFORNIA



Project No. T2875-22-02

June 21, 2024

Riverside Community College District
3801 Market Street, 3rd Floor
Riverside, California 92501

Attention: Ms. Myra Nava

Subject: PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER (IETTC)
ADESA SITE, 6464 33RD STREET
JURUPA VALLEY, CALIFORNIA

Dear Ms. Nava:

In accordance with your authorization of Geocon Proposal MU-24-0613-P-GE revised April 19, 2024, Geocon West, Inc. (Geocon) herein submits the results of our preliminary geotechnical investigation for the proposed Inland Empire Technical Trade Center (IETTC) located at the Adesa site at 6464 33rd Street in the City of Jurupa Valley, California. The accompanying report presents the results of our study, and our preliminary conclusions and recommendations pertaining to the geotechnical aspects of the proposed education center.

The site is considered suitable for development provided the recommendations of this report are followed.

The primary intent of this study was to address potential geologic hazards and geotechnical conditions that could impact the project. A design level geotechnical study will be required once a grading plan is available in order to provide updated geotechnical recommendations for design and construction.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON WEST, INC.

Ashleigh D. Love
PE 79019



Gerald A. Kasman
CEG 2251



Petrina Zen
GE 3217



ADL:PZ:GAK:hd

Distribution: Addressee (email)

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PRELIMINARY GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

We understand the Riverside Community College District (RCCD) has identified the Adesa Site as a potential location where the proposed Inland Empire Technical Trade Center (IETTC) may be constructed and has contracted with Gafcon to provide site assessment due diligence, entitlement, and support services in the evaluation and potential securement of the site. This report presents the results of our preliminary geotechnical investigation for the proposed IETTC at the Adesa site located at 6464 33rd Street in the City of Jurupa Valley, California (see *Vicinity Map*, Figure 1). The purpose of the investigation was to perform a subsurface exploration, laboratory testing, and geotechnical analyses and, based on the conditions encountered, provide preliminary recommendations pertaining to the geotechnical aspects of developing the property. A design level geotechnical study, in accordance with the requirements of California Geological Survey Note 48, will be required once a site plan is available in order to provide detailed geotechnical recommendations for design and construction.

The scope of our investigation included review of aerial photographs, geologic mapping, subsurface exploration, percolation testing, laboratory testing, engineering analyses, and the preparation of this report. The site was explored on May 16, 2024, by excavating eight 8-inch-diameter borings using a CME 75HT truck-mounted, hollow-stem auger drilling machine to approximate depths of 20 to 51½ feet below the existing ground surface. The approximate locations of the exploratory borings are depicted on the *Geologic Map* (Figure 2). A detailed discussion of the field investigation, including boring logs, is presented in Appendix A. A summary of the information reviewed for this study is presented in the *List of References*.

Laboratory tests were performed on selected soil samples obtained during the investigation to evaluate pertinent physical and chemical soil properties. Appendix B presents a summary of the laboratory test results.

Recommendations presented herein are based on analyses of data obtained from our site investigation and our understanding of the potential site development. If project details vary significantly from those described herein, Geocon should be contacted to evaluate the necessity for review and possible revision of this report.

2. SITE AND PROJECT DESCRIPTION

The site is comprised of two parcels located at 6464 33rd Street in Jurupa Valley, California: Assessor's Parcel Numbers (APNs) 177-110-016 and 177-110-018. The two parcels compose a 24-acre triangular site, which is bounded by 33rd Street and an undeveloped lot to the northeast, Florine Avenue to the northwest, Union Pacific train tracks to the south, a stormwater basin to the east, and a residential development at the site's northeast corner. A transient community exists at the southwestern end of the site close to the bridge for the California State Route 60. Jurupa Community Services District has a lift station located at the southeast corner of the site. Historically, the site has been used for industrial manufacturing and storage purposes. At the time of our investigation, the previous improvements had been demolished, except for asphalt concrete pavement and concrete foundations remaining. Various trash was scattered throughout the site. Utility lines remain below the subsurface, and the site is generally bounded by a chain link fence. The site slopes gently to the south with elevations ranging from approximately 894 feet above mean sea level (MSL) in the northern area to approximately 879 feet MSL in the southern area of the site. Drainage is likely by sheet flow to the south. The latitude and longitude of the site are approximately 34.0116 and -117.4244 degrees, respectively.

We understand the site will potentially be developed to include an education center consisting of the Riverside Community College District IETTC. We expect grading will entail cuts and fills up to approximately 5 feet, exclusive of remedial grading. Site BMPs will likely be constructed; however, the location and depth of the BMPs are not known at the time of this study. Due to the preliminary nature of the project, plans depicting the proposed development are not available for inclusion in this report.

Structural plans and loading information were not available for our review at the time of this investigation. We expect the proposed structures will be up to three stories and made of lightweight timber or steel frame construction supported by conventional foundation systems. For our preliminary analysis, we assume maximum column loads will be up to 300 kips and maximum wall loads will be up to 3 kips per linear foot. Preliminary geotechnical recommendations for design of the structure are based on these assumptions and provided herein.

3. GEOLOGIC SETTING

The subject site is situated within a natural geomorphic province in southwestern California known as the Peninsular Ranges, which is characterized by steep, elongated ranges and valleys that trend northwesterly. This geomorphic province encompasses an area that extends 125 miles, from the Transverse Ranges and the Los Angeles Basin on the north, south to the Mexican border, and beyond another 795 miles to the tip of Baja California. The site is located within the Perris block, a relatively tectonically stable structural block between the San Jacinto and Elsinore Fault zones. The site is located at the southern portion of a valley, toe of an old alluvial fan, that derives from the surrounding Jurupa Mountains. The Jurupa Mountains and Cretaceous to pre-Cretaceous in age and contain numerous quarries where various minerals, granitic rock and marble are mined.

4. GEOLOGIC MATERIALS

Based on our field investigation and published geologic maps, the soils underlying the site consist of undocumented artificial fill material over Pleistocene age alluvial fan deposits consisting of boulders, cobbles, gravel, sand and silt (CGS, 2010). Detailed stratigraphic profiles are provided in the boring logs in Appendix A.

4.1 Artificial Fill

Artificial fill was encountered in our field explorations to a maximum depth of 2 feet below existing ground surface. The artificial fill generally consists of reddish to orange brown fine- to coarse-grained silty sand. The artificial fill is characterized as moist, and loose to medium dense. The fill is likely the result of past grading or construction activities at the site. Deeper fill may exist between excavations and in other portions of the site that were not directly explored.

4.2 Older Alluvium (Qof)

The artificial fill is underlain by Pleistocene age older alluvium. The older alluvial soils consist primarily of reddish to orange brown interbedded silty sand and sandy silt that is fine- to coarse-grained. The older alluvium can be characterized as moist and loose to very dense.

5. GROUNDWATER

Data from the California Department of Water Resources indicate the closest groundwater monitoring well to the site is the RCSD 28th St Well (Well 02S05W10P001S), located approximately 1.6 miles to the southeast of the site (CDWR, 2024). Groundwater level data for this well was available for the monitoring period between 2011 and 2023 and the groundwater elevation has ranged from approximately 773 to 778 feet above mean sea level (MSL), corresponding to a groundwater depth of 82 to 87 feet below the existing ground surface, respectively. Based on the available data, the most recent groundwater elevation measured in this well was approximately 776 feet MSL in May 2023. The lowest ground surface elevation at the site is approximately 879 feet MSL.

Groundwater was not encountered during our field excavation drilled to a maximum depth of approximately 51½ feet below ground surface. Based on the historic high groundwater levels in the site vicinity (CDWR, 2024), the lack of groundwater in our borings, and the depth of proposed construction, static groundwater is neither expected to be encountered during construction, nor have a detrimental effect on the project. Using the available historical data, we estimate the groundwater to be at a depth of 100 feet or greater below the site. However, it is not uncommon for groundwater levels to vary seasonally or for groundwater seepage conditions to develop where none previously existed, especially in impermeable fine-grained soils which are heavily irrigated or after seasonal rainfall. In addition, recent requirements for stormwater infiltration could result in shallower seepage conditions in the immediate site vicinity. Proper surface drainage of irrigation and precipitation will be critical for future performance of the project. Recommendations for drainage are provided in the *Site Drainage and Moisture Protection* section of this report.

6. GEOLOGIC HAZARDS

6.1 Surface Fault Rupture

The numerous faults in Southern California include Holocene-active, pre-Holocene, and inactive faults. The criteria for these major groups are based on criteria developed by the California Geological Survey (CGS, formerly known as CDMG) for the Alquist-Priolo Earthquake Fault Zone Program (CGS, 2018). By definition, a Holocene-active fault is one that has had surface displacement within Holocene time (about the last 11,700 years). A pre-Holocene fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive.

The site is not within a state-designated Alquist-Priolo Earthquake Fault Zone (CGS, 2024a; 2024b) for surface fault rupture hazards. No Holocene-active or pre-Holocene faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low. However, the site is located in the seismically active Southern California region, and could be subjected to moderate to strong ground shaking in the event of an earthquake on one of the many active Southern California faults. The faults in the vicinity of the site are shown in Figure 3, Regional Fault Map.

The closest surface trace of an active fault to the site is the San Jacinto Fault located approximately 7.4 miles to the northeast (CGS, 2017). Other nearby active faults are the Cucamonga section of the Sierra Madre Fault Zone, the San Andreas Fault Zone, and the Chino Fault located approximately 10½ miles to the northwest, 14 miles to the north-northeast, and 14½ mile to the southwest of the site, respectively (USGS, 2006; Ziony and Jones, 1989).

6.2 Seismicity

As with all of Southern California, the site has experienced historic earthquakes from various regional faults. The seismicity of the region surrounding the site was formulated based on research of an electronic database of earthquake data. The epicenters of recorded earthquakes with magnitudes equal to or greater than 5.0 in the site vicinity are depicted on Figure 4, Regional Seismicity Map. A partial list of moderate to major magnitude earthquakes that have occurred in the Southern California area within the last 100 years is included in the following table.

LIST OF HISTORIC EARTHQUAKES

Earthquake (Oldest to Youngest)	Date of Earthquake	Magnitude	Distance to Epicenter (Miles)	Direction to Epicenter
Long Beach	March 10, 1933	6.4	41	SW
Tehachapi	July 21, 1952	7.5	113	NW
San Fernando	February 9, 1971	6.6	62	WNW
Whittier Narrows	October 1, 1987	5.9	38	W
Sierra Madre	June 28, 1991	5.8	37	WNW
Landers	June 28, 1992	7.3	58	ENE
Big Bear	June 28, 1992	6.4	37	ENE
Northridge	January 17, 1994	6.7	65	WNW
Hector Mine	October 16, 1999	7.1	77	ENE
Ridgecrest	July 5, 2019	7.1	121	N

The site could be subjected to strong ground shaking in the event of an earthquake. However, this hazard is common in Southern California and the effects of ground shaking can be minimized if the proposed structures are designed and constructed in conformance with current building codes and engineering practices.

6.3 Liquefaction Potential and Seismic Settlement

Liquefaction is a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, in-situ stress conditions, and the depth to groundwater. Seismically induced settlement may occur whether the potential for liquefaction exists or not.

The current standard of practice as outlined in the *Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California* (SCEC, 1999) requires a liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be enough to induce liquefaction.

A review of the Riverside County General Plan (2012) indicates that the site is located in an area of moderate susceptibility for liquefaction. As discussed in the *Groundwater* section of this report, based on the available well data, we estimate the groundwater depth is 100 feet or greater below the site. Also, groundwater was not encountered during our field excavation drilled to a maximum depth of approximately 51½ feet below ground surface. Based on these considerations, it is our opinion that the potential for liquefaction and associated ground deformations to occur at the site is very low.

We performed a liquefaction analysis of the soils underlying the site using the 1996 NCEER method of analysis with the updates by Youd et al. (2001). This semi-empirical method is based on a correlation between values of Standard Penetration Test (SPT) resistance. An average conversion factor of 0.63 was used to derive SPT blow-count values from California Modified Sampler blow-count values.

The liquefaction potential evaluation was performed by utilizing a groundwater depth of 100 feet, a magnitude 8.1 earthquake, and the modified MCE_G peak ground acceleration (PGA_M) of 0.555g. Our *Empirical Estimation of Liquefaction Potential* is included as Figure 5. Due to the lack of shallow groundwater and dense to very dense soils encountered at the project site, liquefaction is not a design consideration.

Additionally, an evaluation of seismically induced “dry-sand” settlement was performed, with the resulting seismic “dry-sand” settlement estimated to be approximately $\frac{1}{8}$ inch. An analysis of seismically induced “dry-sand” settlement is included as Figure 6.

6.4 Expansive Soil

The on-site soil generally consists of silty sand and sandy silt. Laboratory testing result indicates a sample of the near surface soil exhibits a “very low” expansion potential (expansion index [EI] of 20 or less).

6.5 Hydrocompression

Hydrocompression is the tendency of unsaturated soil structure to collapse upon wetting resulting in the overall settlement of the affected soil and overlying foundations or improvements supported thereon. Potentially compressible soils underlying the site are typically removed and compacted during remedial site grading. However, if compressible soil is left in-place, a potential for settlement due to hydrocompression of the soil exists.

Soil samples tested for hydrocompression exhibit a collapse potential of up to 1 percent. Based on these results, the potential settlement due to hydrocompression is estimated to be up to approximately $\frac{3}{8}$ inch, with a differential settlement of approximately $\frac{1}{8}$ inch across 40 feet.

6.6 Slope Stability

The topography at the site is relatively level and the topography in the immediate site vicinity slopes very gently to the south-southeast. There are no known landslides near the site, nor is the site in the path of any known or potential landslides (USGS, 20223a). Therefore, the potential for slope stability hazards to adversely affect the proposed development is considered low.

6.7 Earthquake-Induced Flooding

Earthquake-induced flooding is inundation caused by failure of dams or other water-retaining structures due to earthquakes. Based on a review of the Riverside County General Plan (2012) the site is not located within a potential inundation area for an earthquake-induced dam failure. Therefore, the probability of earthquake-induced flooding is considered very low.

6.8 Tsunamis, Seiches, and Flooding

The site is not located within a coastal area. Therefore, tsunamis are not considered a significant hazard at the site.

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. No major water-retaining structures are located immediately up gradient from the project site. Therefore, flooding resulting from a seismically induced seiche is considered unlikely.

The Riverside County General Plan (2012) indicates that the site is not within a 1% or 0.2% annual chance of flood.

6.9 Oil Fields & Methane Potential

Based on a review of the California Geologic Energy Management Division (CalGEM) Well Finder Website, the site is not located within an oil field and oil or gas wells are not documented within ½-mile of the site (CalGEM, 2024). However, due to the voluntary nature of record reporting by the oil well drilling companies, wells may be improperly located or not shown on the location map and undocumented wells could be encountered during construction. Any wells encountered during construction will need to be properly abandoned in accordance with the current requirements of the CalGEM.

Since the site is not located within the boundaries of a known oil field, the potential for the presence of methane or other volatile gases at the site is considered low. However, should it be determined that a methane study is required for the proposed development it is recommended that a qualified methane consultant be retained to perform the study and provide mitigation measures as necessary.

6.10 Subsidence

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. Soils that are particularly subject to subsidence include those with high silt or clay content. The site is not located within an area of known ground subsidence (USGS, 2024b). No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or planned at the site or in the general site vicinity. There appears to be little or no potential for ground subsidence due to withdrawal of fluids or gases at the site.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

- 7.1.1 No soil or geologic conditions were encountered that would preclude the development of the property as assumed, provided the recommendations of this report are followed. This report should be considered “preliminary” and the geotechnical design parameters presented herein should be verified once the project progresses to a more finalized state.
- 7.1.2 Based on our investigation and available geologic information, active or potentially active faults are not present on or trending toward the site.
- 7.1.3 The artificial fill and the upper portion of the older alluvial deposits are considered unsuitable for the support of compacted fill or settlement-sensitive improvements. Remedial grading in the form of removal and compaction of these soils will be required in accordance with the *Grading* section of this report. The site soils are suitable for re-use as engineered fill provided the recommendations in the *Grading* section of this report are followed.
- 7.1.4 An evaluation of seismically induced “dry-sand” settlement was performed, with the resulting seismic “dry-sand” settlement estimated to be approximately $\frac{3}{8}$ inch. Seismically induced differential settlement is expected to be on the order of $\frac{1}{8}$ inch across 40 feet.
- 7.1.5 Soil samples tested for hydrocompression exhibit a collapse potential of up to approximately 1 percent for the site. Remedial grading will reduce some of the settlement potential of the near-surface soils; however, the soil with the highest tested collapse potential is at a depth of 15 feet. The potential settlement due to hydrocompression is estimated to be up to $\frac{3}{8}$ inch, with a differential settlement of $\frac{1}{8}$ inch across 40 feet.
- 7.1.6 Moisture contents of the site soils are expected to vary based on the season and amount of precipitation. Special handling of the soil should be anticipated, particularly if grading occurs during the rainy season, as drying back of the existing materials should be anticipated prior to their use as fill.
- 7.1.7 Site infiltration evaluation was not in the scope of this investigation. However, due to the presence of potentially hydrocompressive soils, future infiltration systems, if any, should be located a minimum distance of 25 feet from proposed structures and a minimum distance of 15 feet from site improvements to reduce the potential for induced settlements to adversely impact the proposed structures and improvements.

7.1.8 Once the design and foundation loading configuration for the proposed structure proceeds to a more finalized plan, the recommendations within this report should be reviewed and revised, if necessary. Based on the final foundation loading configurations, the potential for settlement should be re-evaluated by this office.

7.1.9 Any changes in the design, location or elevation, as outlined in this report, should be reviewed by this office. Geocon should be contacted to determine the necessity for review and possible revision of this report.

7.2 Excavation and Soil Characteristics

7.2.1 Excavation of the fill and upper alluvial deposits are expected to be possible with moderate effort using conventional heavy-duty equipment in proper functioning order.

7.2.2 The soil encountered in the field investigation is considered to be “non-expansive” (expansion index [EI] 20 or less) as defined by 2022 California Building Code (CBC) Section 1803.5.3. We expect a majority of the soil encountered to possess a “very low” expansion potential in accordance with ASTM D4829. The table below presents soil classifications based on the expansion index. Although unlikely, any medium to highly expansive soils encountered at the site should not be placed within 4 feet of the proposed foundations, flatwork or paving improvements.

SOIL CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2022 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 Additional testing for expansion potential should be performed during grading along with plasticity index testing on soils with expansion indices of more than 20.

- 7.2.4 We performed laboratory tests on a near surface sample of the site materials to evaluate the percentage of water-soluble sulfate content. Appendix B presents results of the laboratory water-soluble sulfate content tests. Laboratory tests performed on samples of the site materials indicate that the on-site materials possess a “S0” sulfate exposure to concrete structures as defined by 2022 CBC Section 1904 and ACI 318-19 Chapter 19. The following table presents a summary of concrete requirements set forth by 2022 CBC Section 1904.3 and ACI 318. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Exposure Class		Water-Soluble Sulfate (SO ₄) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight ¹	Minimum Compressive Strength (psi)
S0		SO ₄ <0.10	No Type Restriction	n/a	2,500
S1		0.10≤SO ₄ <0.20	II	0.50	4,000
S2		0.20≤SO ₄ ≤2.00	V	0.45	4,500
S3	Option 1	SO ₄ >2.00	V+Pozzolan or Slag	0.45	4,500
	Option 2		V	0.40	5,000

¹ Maximum water to cement ratio limits do not apply to lightweight concrete.

- 7.2.5 Laboratory test results indicate a resistivity of 3,100 ohm-cm, pH of 8.3, chloride content of 63 ppm, and sulfate content of 0 ppm. Resistivity serves as an indication parameter for the presence of soluble salts only and does not specifically indicate a corrosive situation exists. As shown in the table below, the site would **not** be classified as “corrosive” to buried improvements based on resistivity in accordance with the Caltrans Corrosion Guidelines (Caltrans, 2021).

CALTRANS CORROSION GUIDELINES

Corrosion Exposure	Resistivity (ohm-cm)	Chloride (ppm)	Sulfate (ppm)	pH
Corrosive	<1,500	500 or greater	1,500 or greater	5.5 or less

- 7.2.6 Geocon does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements that could be susceptible to corrosion are planned.

7.3 Grading

- 7.3.1 Grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix C and the City of Jurupa Valley Grading Ordinance.
- 7.3.2 Prior to commencing grading, a preconstruction conference should be held at the site with the city inspector, owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.
- 7.3.3 Site preparation should begin with the removal of deleterious material, debris and vegetation. The depth of removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site.
- 7.3.4 The upper 4 feet of artificial fill and the upper alluvium in structural areas should be removed to expose dense, non-porous alluvium that has an in-place relative compaction of at least 85 percent based on ASTM D1557. Each building pad should have a uniform compacted subgrade, and a uniform remedial grading depth. At a minimum, 3 feet of newly placed engineered fill should be placed below the proposed building foundations. The removals should be extended laterally a minimum of 5 feet from the building footprint, or for a distance equal to the depth of fill below the footings, whichever is deeper. The actual depth of remedial grading should be evaluated by the Geotechnical Engineer (a representative of Geocon) during grading operations. The bottom of the excavations should be scarified to a depth of at least 1 foot, moisture conditioned, and compacted to a minimum of 90 percent of the maximum dry density (ASTM D1557), prior to fill placement.
- 7.3.5 In areas where small ancillary structures are proposed, such as trash enclosures and equipment pads, remedial removals should be extended to provide at least 12 inches of newly placed engineered fill below the bottom of proposed footings.
- 7.3.6 Remedial removals should be extended to depths of at least 3 feet below planned subgrade elevations in non-structural areas where pavement and flatwork are proposed.

- 7.3.7 The site should be brought to finish grade elevations with fill compacted in layers. Layers of fill should be no thicker than will allow for adequate bonding and compaction, approximately 6 to 8 inches in loose lift thickness. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density at 0 to 2 percent above optimum moisture content as determined by ASTM D1557. Fill materials placed below optimum moisture content may require additional moisture conditioning prior to placing additional fill.
- 7.3.8 The fill placed within 4 feet of proposed finish grade should possess a "very low" expansion potential (EI of 20 or less), where practical.
- 7.3.9 Import fill (if necessary) should consist of granular materials with a "very low" expansion potential (EI of 20 or less), generally free of deleterious material and rock fragments larger than 6 inches and should be compacted as recommended herein. Geocon should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to evaluate its suitability as fill material. Laboratory testing typically takes up to four working days to perform. The grading contractor should plan for the laboratory testing in their schedule to provide sufficient time to allow for completion of testing prior to importing materials.
- 7.3.10 Percolation testing to calculate infiltration rates were not in the scope of this investigation. However, if site infiltration rates are practical, then infiltration trenches or ponds, if planned, should be excavated into native soil without compaction effort applied to the basin bottom. Basin maintenance should include the removal of silt from the basin bottom after each significant rain event. Proposed infiltration systems, if planned, should be located a minimum distance of 25 feet from proposed structures and a minimum distance of 15 feet from site improvements to reduce the potential for induced settlements to adversely impact the proposed structures and improvements.
- 7.3.11 Foundation excavation bottoms must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon), prior to placing fill, steel, gravel or concrete.

7.4 Earthwork Grading Factors

- 7.4.1 Estimates of shrinkage factors are based on empirical judgments comparing the material in its existing or natural state as encountered in the exploratory excavations to a compacted state. Variations in natural soil density and in compacted fill density render shrinkage value estimates very approximate. As an example, the contractor can compact the fill to a dry density of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has an approximately 10 percent range of control over the fill volume. Due to the variations in the actual shrinkage/bulking factors, a balance area should be provided to accommodate variations.

7.5 Utility Trench Backfill

- 7.5.1 Utility trenches should be properly backfilled in accordance with the requirements of City of Jurupa Valley and the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook). The pipes should be bedded with well graded crushed rock or clean sands (Sand Equivalent greater than 30) to a depth of at least one foot over the pipe. The use of well-graded crushed rock is only acceptable if used in conjunction with filter fabric to prevent the gravel from having direct contact with soil. The remainder of the trench backfill may be derived from onsite soil or approved import soil, compacted as necessary, until the required compaction is obtained. The use of 2-sack slurry and controlled low strength material (CLSM) are also acceptable. However, consideration should be given to the possibility of differential settlement where the slurry ends and earthen backfill begins. These transitions should be minimized, and additional stabilization should be considered at these transitions.
- 7.5.2 Utility excavation bottoms must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon), prior to placing bedding materials, fill, gravel, concrete, or geogrid.
- 7.5.3 During the rainy season, localized perched water conditions may develop that may require special consideration during earthwork operations. The contractor should be prepared to mitigate seepage and perched water conditions. Groundwater, seepage, and perched water are dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result.

7.6 Seismic Design Criteria

- 7.6.1 The following table summarizes the site-specific design criteria obtained from the 2022 California Building Code (CBC; Based on the 2021 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The data was calculated using the online application *U.S. Seismic Design Maps*, provided by the Structural Engineers Association of California (SEAOC).
- 7.6.2 The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2022 CBC and Table 20.3-1 of ASCE 7-16. The values presented below are for the risk-targeted maximum considered earthquake (MCE_R).

2022 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2022 CBC Reference
Site Class	D	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.5g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.6g	Figure 1613.2.1(3)
Site Coefficient, F_A	1	Table 1613.2.3(1)
Site Coefficient, F_V	1.7	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.5g	Section 1613.2.3 (Eqn 16-20)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	1.02g*	Section 1613.2.3 (Eqn 16-21)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1g	Section 1613.2.4 (Eqn 16-22)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.68g*	Section 1613.2.4 (Eqn 16-23)
<p>*Per Supplement 3 of ASCE 7-16, a ground motion hazard analysis (GMHA) shall be performed for projects on Site Class "D" sites with 1-second spectral acceleration (S_1) greater than or equal to 0.2g, which is true for this site. However, Supplement 3 of ASCE 7-16 provides an exception stating that the GMHA may be waived provided that the parameter S_{M1} is increased by 50% for all applications of S_{M1}. The values for parameters S_{M1} and S_{D1} presented above have not been increased in accordance with Supplement 3 of ASCE 7-16.</p>		

- 7.6.3 The table below presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.505g	Figure 22-9
Site Coefficient, F_{PGA}	1.1	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.555g	Section 11.8.3 (Eqn 11.8-1)

- 7.6.4 Deaggregation of the MCE peak ground acceleration was performed using the USGS online Unified Hazard Tool, 2014 Conterminous U.S. Dynamic edition (v4.2.0). The result of the deaggregation analysis indicates that the predominant earthquake contributing to the MCE peak ground acceleration is characterized as an 8.1 magnitude event occurring at a hypocentral distance of 13.46 kilometers from the site.
- 7.6.5 Conformance to the criteria in the above tables for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.7 Foundation Design

- 7.7.1 Subsequent to the recommended grading, a conventional shallow spread foundation system may be utilized for support of the anticipated structures (three-stories or less), provided foundations derive support on at least 3 feet of newly placed engineered fill as described in the *Grading* section of this report.
- 7.7.2 Conventional shallow spread foundations for the proposed structure should consist of continuous strip footings and/or isolated spread footings and should be designed using the parameters in the following table.

SUMMARY OF FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Continuous Foundation Width	18 Inches
Minimum Isolated Foundation Width	24 Inches
Minimum Foundation Depth	18 Inches Below Lowest Adjacent Grade
Minimum Steel Reinforcement	4 No. 4 Bars, 2 Top and 2 Bottom
Allowable Bearing Pressure – Continuous Foundation	2,500 psf
Allowable Bearing Pressure – Isolated Foundation	3,000 psf
Bearing Pressure Increase	250 psf per Foot of Width
	500 psf per Foot of Depth
Maximum Allowable Bearing Pressure	4,000 psf
Estimated Combined Seismic and Static Settlement	¾ Inch
Estimated Differential Settlement	½ Inch over 40 Feet

- 7.7.3 The allowable bearing pressures may be increased by one-third for transient loads due to wind or seismic forces.
- 7.7.4 The above foundation dimensions and minimum reinforcement recommendations are based on soil conditions and building code requirements only, and are not intended to be used in lieu of those required for structural purposes.
- 7.7.5 Once the design and foundation loading configurations for the proposed structures proceeds to a more finalized plan, the estimated settlements presented in this report should be reviewed and revised, if necessary. If the final foundation loading configurations are greater than the assumed loading conditions, the potential for settlement should be reevaluated by this office.
- 7.7.6 No special subgrade presaturation is required prior to placement of concrete. However, the moisture in the foundation subgrade should be sprinkled as necessary to maintain a moist condition at the time of concrete placement.
- 7.7.7 Foundation excavations should be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon West, Inc.), prior to the placement of reinforcing steel and concrete to verify that the excavations and exposed soil conditions are consistent with those anticipated. If unanticipated soil conditions are encountered, foundation modifications may be required.
- 7.7.8 This office should be provided with a copy of the final construction plans so that the excavation recommendations presented herein could be properly reviewed and revised if necessary.

7.8 Miscellaneous Foundations

- 7.8.1 Foundations for small outlying structures, such as block walls up to 6 feet in height, planter walls or trash enclosures, which will not be tied to the proposed structure, may be supported on conventional foundations bearing on a minimum of 24 inches of newly placed engineered fill which extends laterally at least 24 inches beyond the foundation area. It is essential that proper drainage be maintained in order to minimize settlements in the soils and any foundations supported therein.
- 7.8.2 If the soils exposed in the excavation bottom are soft or loose, compaction of the soft soils will be required prior to placing steel or concrete. Compaction of the foundation excavation bottom is typically accomplished with a compaction wheel or mechanical whacker and must be observed and approved by a Geocon representative.
- 7.8.3 Miscellaneous foundations may be designed for a bearing value of 1,500 pounds per square and should be a minimum of 12 inches in width, 18 inches in depth below lowest adjacent grade, and 12 inches into the recommended bearing material. The allowable bearing pressure may be increased by up to one-third for transient loads due to wind or seismic forces.
- 7.8.4 Foundation excavations should be observed and approved in writing by a representative of Geocon, prior to the placement of reinforcing steel and concrete to verify that the excavations and exposed soil conditions are consistent with those anticipated.

7.9 Exterior Concrete Flatwork

- 7.9.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations presented in the following table. The recommended steel reinforcement would help reduce the potential for cracking.

MINIMUM CONCRETE FLATWORK RECOMMENDATIONS

Expansion Index, EI	Minimum Reinforcing Steel* Options	Minimum Thickness
EI ≤ 20	6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh	4 Inches
	No. 3 Bars 18 inches on center, Both Directions	

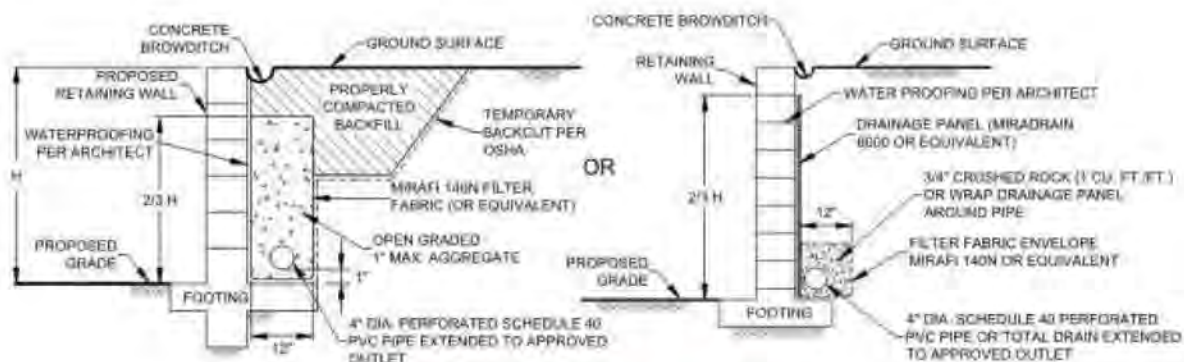
*In excess of 8 feet square.

- 7.9.2 The subgrade soil should be properly moisturized and compacted prior to the placement of steel and concrete. The subgrade soil should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density at 0 to 2 percent above optimum moisture content in accordance with ASTM D1557.
- 7.9.3 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to potentially expansive soil beneath grade. The reinforcing steel should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.
- 7.9.4 Concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.
- 7.9.5 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.
- 7.9.6 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

7.10 Retaining Wall Design

- 7.10.1 The recommendations presented below are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 6 feet. In the event that walls significantly higher than 6 feet are planned, Geocon should be contacted for additional recommendations.
- 7.10.2 Retaining wall foundations may be designed in accordance with the recommendations provided in the *Foundation Design* section of this report.
- 7.10.3 Retaining walls with a level backfill surface that are not restrained at the top should be designed utilizing a triangular distribution of pressure (active pressure) of 36 pcf.
- 7.10.4 Restrained walls are those that are not allowed to rotate more than $0.001H$ (where H equals the height of the retaining portion of the wall in feet) at the top of the wall. Where walls are restrained from movement at the top, walls may be designed utilizing a triangular distribution of pressure (at-rest pressure) of 63 pcf.
- 7.10.5 The wall pressures provided above assume that the proposed retaining walls will support relatively undisturbed alluvial soils or engineered fill derived from onsite soils. If import soil will be used to backfill proposed retaining walls, revised earth pressures may be required to account for the geotechnical properties of the import soil used as engineered fill. This should be evaluated once the use of import soil is established. All imported fill shall be observed, tested, and approved by Geocon West, Inc. prior to bringing soil to the site.
- 7.10.6 The wall pressures provided above assume that the retaining wall will be properly drained preventing the buildup of hydrostatic pressure. If retaining wall drainage is not implemented, the equivalent fluid pressure to be used in design of undrained, restrained walls is 95 pcf for the full height of the wall. The value includes hydrostatic pressures plus buoyant lateral earth pressures. If a partially drained wall is proposed, Geocon should be contacted to provide additional recommendations.
- 7.10.7 Additional pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures and should be designed for each condition as the project progresses.

- 7.10.8 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfilling, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.
- 7.10.9 Retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and waterproofed as required by the project architect. The soil immediately adjacent to the backfilled retaining wall should be composed of free draining material completely wrapped in Mirafi 140N (or equivalent) filter fabric for a lateral distance of 1 foot for the bottom two-thirds of the height of the retaining wall. The upper one-third should be backfilled with less permeable compacted fill to reduce water infiltration. Alternatively, a drainage panel, such as a Miradrain 6000 or equivalent, can be placed along the back of the wall, as shown in the figure below. The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall.



Typical Retaining Wall Drainage Detail

- 7.10.10 The recommendations herein assume a properly compacted backfill (EI of 20 or less) with no hydrostatic forces or imposed surcharge load. If conditions different than those described are expected or if specific drainage details are desired, Geocon should be contacted for additional recommendations.

7.11 Elevator Pit Design

- 7.11.1 If used, the elevator pit slab and retaining wall should be designed by the project structural engineer. Elevator pit foundation and walls may be designed in accordance with the recommendations in the *Foundation Design* and *Retaining Wall Design* sections of this report.

- 7.11.2 Additional pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent foundations and should be designed for each condition as the project progresses.
- 7.11.3 If retaining wall drainage is to be provided, the drainage system should be designed in accordance with the *Retaining Wall Design* section of this report.
- 7.11.4 We recommend that the exterior walls and slab be waterproofed to prevent excessive moisture inside of the elevator pit. Waterproofing design and installation is not the responsibility of the Geotechnical Engineer.

7.12 Elevator Piston

- 7.12.1 If a plunger-type elevator piston is installed for this project, a deep drilled excavation will be required. It is important to verify that the drilled excavation is not situated immediately adjacent to a foundation, or the drilled excavation could compromise the existing foundation support, especially if the drilling is performed subsequent to the foundation construction.
- 7.12.2 Caving is expected, and the contractor should be prepared to use casing and should have it readily available at the commencement of drilling activities. Continuous observation of the drilling and installation of the elevator piston by the Geotechnical Engineer should be performed.
- 7.12.3 The annular space between the piston casing and drilled excavation wall should be filled with a minimum of 1½-sack slurry pumped from the bottom up. As an alternative, pea gravel may be utilized. The use of soil to backfill the annular space is not acceptable.

7.13 Lateral Design

- 7.13.1 Resistance to lateral loading may be provided by friction acting at the base of foundations, slabs and by passive earth pressure. An allowable coefficient of friction of 0.4 may be used with the dead load forces in the newly placed engineered fill or undisturbed alluvial soils.
- 7.13.2 Passive earth pressure for the sides of foundations and slabs poured against newly placed engineered fill or undisturbed alluvial soils may be computed as an equivalent fluid having a density of 260 pounds per cubic foot (pcf) with a maximum earth pressure of 2,600 psf. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third. A one-third increase in the passive value may be used for wind or seismic loads.

7.14 Preliminary Pavement Recommendations

- 7.14.1 The final pavement design should be based on R-value testing of soils at subgrade. Streets should be designed in accordance with the City of Jurupa Valley standards and specifications when final Traffic Indices and R-Value test results of subgrade soil are completed. For preliminary design purposes, we used an estimated R-value of 30 based on the soil classifications. Pavements should meet the minimum requirement for asphalt thickness in City of Jurupa Valley *Roadway Structural Requirements* (Standard No. 120). Preliminary flexible pavement sections are presented in the table below. Geocon should be contacted if other roadway classifications and traffic indices are appropriate for the project.

PRELIMINARY FLEXIBLE PAVEMENT SECTIONS

Road Classification	Traffic Index	Asphalt Concrete (inches)	Aggregate Base (inches)
Local Road	5.5	3.0	7.0
Local Collector	7.0	4.0	9.5
Industrial Collector/Secondary Major	9.0	5.5	13.0

- 7.14.2 Prior to construction of new pavement sections, remedial grading should be performed in accordance with the *Grading* section in this report.
- 7.14.3 The upper 12 inches of the subgrade soil should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density at 0 to 2 percent above optimum moisture content beneath pavement sections.
- 7.14.4 Aggregate base materials should conform to the requirements for Crushed Aggregate Base (CAB) or Crushed Miscellaneous Base (CMB) in Sections 200-2.2 and 200-2.4, respectively, of the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook). Class 2 aggregate base materials should conform to Section 26-1.02A of the latest edition of the Caltrans *Standard Specifications*. Base materials should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density at or slightly above optimum moisture content in accordance with ASTM D1557. Asphalt concrete should be compacted to a density of 95 percent of the laboratory Hveem density in accordance with ASTM D1561.

- 7.14.5 A rigid Portland cement concrete (PCC) pavement section should be placed in roadway aprons and cross gutters. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330-21 *Commercial Concrete Parking Lots and Site Paving Design and Construction – Guide*. The following table provides the traffic categories and design parameters used for the calculations for 20-year design life.

TRAFFIC CATEGORIES

Traffic Category	Description	Reliability (%)	Slabs Cracked at End of Design Life (%)
A	Car Parking Areas and Access Lanes	60	15
B	Entrance and Truck Service Lanes	60	15
C	School or City Buses (Excluding Large Articulated Buses)	75	15
D	Heavy Duty Trucks (Gross Weight of 80 Kips)	75	15
E	Garbage or Fire Truck Lane	75	15

- 7.14.6 We used the parameters presented in the *Traffic Categories* table above to calculate the pavement design sections. We should be contacted to provide updated design sections, if necessary.

RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of Subgrade Reaction, k	100 pci
Modulus of Rupture for Concrete, M_R	550 psi
Concrete Compressive Strength	3,500 psi
Concrete Modulus of Elasticity, E	3,712,500 psi

- 7.14.7 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in the following table.

RIGID VEHICULAR PAVEMENT RECOMMENDATIONS

Traffic Category	Trucks Per Day	Portland Cement Concrete, T (Inches)
A = Car Parking Areas and Access Lanes	10	4½
B = Entrance and Truck Service Lanes	10	5¼
	25	5½
	50	5¾
C = School or City Buses	10	8
	50	8½
D = Heavy Duty Trucks	50	6¼
	100	6¾
E = Garbage or Fire Truck Lanes	5	6¼
	10	6½

- 7.14.8 The PCC vehicular pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density at 0 to 2 percent above optimum moisture content. The garbage truck pad should be large enough such that all wheels are on the concrete pad during the loading operations.
- 7.14.9 Adequate joint spacing should be incorporated into the design and construction of the rigid pavement in accordance with the following table.

MAXIMUM JOINT SPACING

Pavement Thickness, T (Inches)	Maximum Joint Spacing (Feet)
4<T<5	10
5≤T<6	12½
6≤T	15

- 7.14.10 The rigid pavement should also be designed and constructed incorporating the parameters presented in the following table.

ADDITIONAL RIGID PAVEMENT RECOMMENDATIONS

Subject	Value
Thickened Edge	1.2 Times Slab Thickness Adjacent to Structures
	1.5 Times Slab Thickness Adjacent to Soil
	Minimum Increase of 2 Inches
	4 Feet Wide
Crack Control Joint Depth	Early Entry Sawn = $T/6$ to $T/5$, 1.25 Inch Minimum
	Conventional (Tooled or Conventional Sawing) = $T/4$ to $T/3$
Crack Control Joint Width	$\frac{1}{4}$ -Inch for Sealed Joints and Per Sealer Manufacturer's Recommendations
	$\frac{1}{16}$ - to $\frac{1}{4}$ -Inch is Common for Unsealed Joints

- 7.14.11 Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.
- 7.14.12 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should be sealed with an appropriate sealant to prevent the migration of water through the control joint to the subgrade materials. The depth of the crack-control joints should be in accordance with the referenced ACI guide.
- 7.14.13 To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab.
- 7.14.14 Concrete curb/gutter should be placed on soil subgrade compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Cross-gutters that receive vehicular should be placed on subgrade soil compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Base materials should not be placed below the curb/gutter, or cross-gutters so water is not able to migrate from the adjacent parkways to the pavement sections. Where flatwork is located directly adjacent to the curb/gutter, the concrete flatwork should be structurally connected to the curbs to help reduce the potential for offsets between the curbs and the flatwork.

7.15 Temporary Excavations

- 7.15.1 Excavations of up to 10 feet in height may be required during earthwork operations. The excavations are expected to expose artificial fill and alluvial deposits, which may contain material that could be subject to caving. The contractor should be prepared for caving soils in open excavations, and formwork may be required in foundation excavations. Vertical excavations up to 5 feet in height may be attempted where not surcharged by adjacent foundations or traffic, or where caving soils are not present.
- 7.15.2 Excavations of up to 10 feet in height are expected for construction of the proposed utility improvements, and we expect that the proposed utilities will be installed with conventional cut-and-cover methods.
- 7.15.3 Vertical excavations greater than 5 feet or where surcharged by existing structures will require sloping and/or shoring measures in order to provide a stable excavation. The contractor's competent person should evaluate the appropriate slope and/or shoring based on soil type and prevailing site conditions per Cal-OSHA regulations.
- 7.15.4 Where there is insufficient space for sloped excavations, shoring or trench shields should be used to support excavations. Shoring may also be necessary where sloped excavation could remove vertical or lateral support of existing improvements, including existing utilities and adjacent structures. The contractor's competent person should evaluate the appropriate shoring system to provide per Cal-OSHA regulations.
- 7.15.5 Where temporary construction slopes are utilized, the top of the slope should be barricaded to prevent vehicles and storage loads at the top of the slope within a horizontal distance equal to the height of the slope. If the temporary construction slopes are to be maintained during the rainy season, berms are suggested along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces. The contractor's competent person should inspect the soils exposed in the cut slopes during excavation in accordance with Cal-OSHA regulations so that modifications of the slopes can be made if variations in the soil conditions occur.
- 7.15.6 We expect that braced shoring, such as conventionally braced shields, cross-braced hydraulic shoring, or driven sheet piles may be utilized. The selection of the shoring system is the responsibility of the contractor. Shoring systems should be designed by a California licensed civil or structural engineer with experience in designing shoring systems.

- 7.15.7 We recommend that an equivalent fluid pressure based on the following table be utilized for design of temporary shoring. These pressures are based on the assumption that the shoring is supporting a level backfill and there are no hydrostatic pressures above the bottom of the excavation.

RECOMMENDED SHORING PRESSURES

HEIGHT OF SHORED EXCAVATION (FEET)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (Active Pressure)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (AT-REST PRESSURE)
≤ 10	27	17H

- 7.15.8 Active pressures can only be achieved when movement in the soil (earth wall) occurs. If movement in the soil is not acceptable, such as adjacent to an existing structure or where braced shoring will be utilized, the at-rest pressure should be considered for design purposes.
- 7.15.9 Additional pressure should be added for a surcharge condition due to sloping ground, construction equipment, vehicular traffic, or adjacent structures and should be designed for each condition as the project progresses.
- 7.15.10 In addition to the recommended earth pressure, the upper 10 feet of the shoring adjacent to roadways or driveway areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the shoring due to normal street traffic. If the traffic is kept back at least 10 feet from the shoring, the traffic surcharge may be neglected. Higher surcharge loads may be required to account for construction equipment.
- 7.15.11 It is difficult to accurately predict the amount of deflection of a shored embankment, but some deflection will occur. We recommend that the deflection be minimized to prevent damage to existing structures and adjacent improvements. Where a public right-of-way is present or adjacent offsite structures do not surcharge the shoring excavation, the shoring deflection should be limited to less than 1 inch at the top of the shored embankment. Where offsite structures are within the shoring surcharge area it is recommended that the beam deflection be limited to less than $\frac{1}{2}$ inch at the elevation of the adjacent offsite foundation, and no deflection at all if deflections will damage existing structures. The allowable deflection is dependent on many factors, such as the presence of structures and utilities near the top of the embankment and will be assessed and designed by the project shoring engineer.

7.16 Site Drainage and Moisture Protection

- 7.16.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion, soil collapse potential, and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2022 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.
- 7.16.2 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks and detected leaks should be repaired promptly. Detrimental soil movement could occur if water can infiltrate the soil for prolonged periods of time.
- 7.16.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall or the use of an impermeable geosynthetic along the edge of the pavement that extends at least 6 inches below the bottom of the base material.
- 7.16.4 If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to infiltration areas. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeology study at the site. Down-gradient and adjacent structures may be subjected to seeps, movement of foundations and slabs, or other impacts as a result of water infiltration. We recommend that infiltration systems be kept at least 25 feet away from existing or proposed buildings and at least 15 feet away from existing or proposed improvements.

7.17 Plan Review

- 7.17.1 Grading and structural/foundation plans should be reviewed by Geocon prior to finalization to verify that the plans have been prepared in substantial conformance with the recommendations of this report and to provide additional analyses or recommendations if necessary.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials was not part of the scope of services provided by Geocon.

This report is issued with the understanding that it is the responsibility of the owner, or of their representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The requirements for concrete and steel reinforcement presented in this report are preliminary recommendations from a geotechnical perspective. The Structural Engineer should provide the final recommendations for structural design of concrete and steel reinforcement for foundation systems, floor slabs, exterior concrete, or other systems where concrete and steel reinforcement are utilized, in accordance with the latest version of applicable codes.

The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

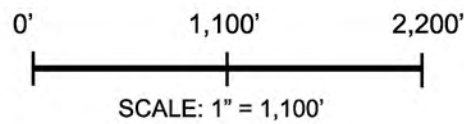
The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

LIST OF REFERENCES

1. American Concrete Institute, 2019, ACI 318-19, *Building Code Requirements for Structural Concrete*, Report by ACI Committee 318.
2. American Concrete Institute, 2021, ACI PRC-330-21 *Commercial Concrete Parking Lots and Site Paving Design and Construction – Guide*, Report by ACI Committee 330.
3. California Building Standards Commission, 2022, *California Building Code (CBC)*, California Code of Regulations Title 24, Part 2.
4. American Society of Civil Engineers (ASCE), ASCE 7-16, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, 2017.
5. California Department of Transportation (Caltrans), Division of Engineering Services, Materials Engineering and Testing Services, 2021, *Corrosion Guidelines, Version 3.2*, dated March.
6. California Department of Transportation (Caltrans), 2020, *Highway Design Manual*, 7th Edition, dated July 1.
7. California Department of Water Resources <http://well.water.ca.gov/waterdatalibrary/>
8. California Geologic Energy Management Division (CalGEM), 2024, Geologic Energy Management Division Well Finder, <http://maps.conservation.ca.gov/doggr/index.html#close>.
9. California Geological Survey, 2024a, CGS Information Warehouse, Regulatory Map Portal, <http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps>.
10. California Geological Survey, 2024b, Earthquake Zones of Required Investigation, <https://maps.conservation.ca.gov/cgs/EQZApp/app/>.
11. California Geological Survey, 2018, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California, Special Publication 42, Revised 2018.
12. California Geological Survey, 2010, Geologic Compilation of Quaternary Surficial Deposits in Southern California, Onshore Portion of the 30' X 60' San Bernardino Quadrangle, A Project for the Department of Water Resources by the California Geological Survey, Compiled from existing sources by Peter D. Roffers and Trinda L. Bedrossian, CEG, CGS Special Report 217, Plate 13, Scale 1:100,000.
13. Jennings, C.W. and W.A. Bryant, 2010, *Fault Activity Map of California*, California Division of Mines and Geology Map No. 6.
14. Public Works Standards, Inc., 2022, *Standard Specifications for Public Works Construction "Greenbook,"* Published by BNi Building News.
15. Riverside County, Safety Element Plan, 2012

LIST OF REFERENCES (CONTINUED)

16. Topozada, T., Branum, D., Petersen, M., Hallstrom, C., and Reichle, M., 2000, Epicenters and Areas Damaged by M> 5 California Earthquakes, 1800 – 1999, California Geological Survey, Map Sheet 49.
17. U.S. Geological Survey Landslide Hazard Program, 2024a, U.S. Landslide Inventory, <https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=ae120962f459434b8c904b456c82669d>.
18. U.S. Geological Survey, 2024b, Areas of Land Subsidence in California Website, https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html.
19. U.S. Geological Survey, 2024, Seismic Design Maps Web Application, <http://earthquake.usgs.gov/designmaps/us/application.php>.
20. U.S. Geological Survey and California Geological Survey, 2006, Quaternary Fault and Fold Database for the United States, USGS web site: <http://earthquake.usgs.gov/hazards/qfaults/>.
21. USGS, Unified Hazard Tool, <https://earthquake.usgs.gov/hazards/interactive/>.
22. Ziony, J. I., and Jones, L. M., 1989, Map Showing Late Quaternary Faults and 1978–1984 Seismicity of the Los Angeles Region, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-1964.



SOURCE: Google Earth 2024

VICINITY MAP

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HD

INLAND EMPIRE TECHNICAL TRADE CENTER
ADESA SITE, 6464 33RD STREET
JURUPA VALLEY, CALIFORNIA

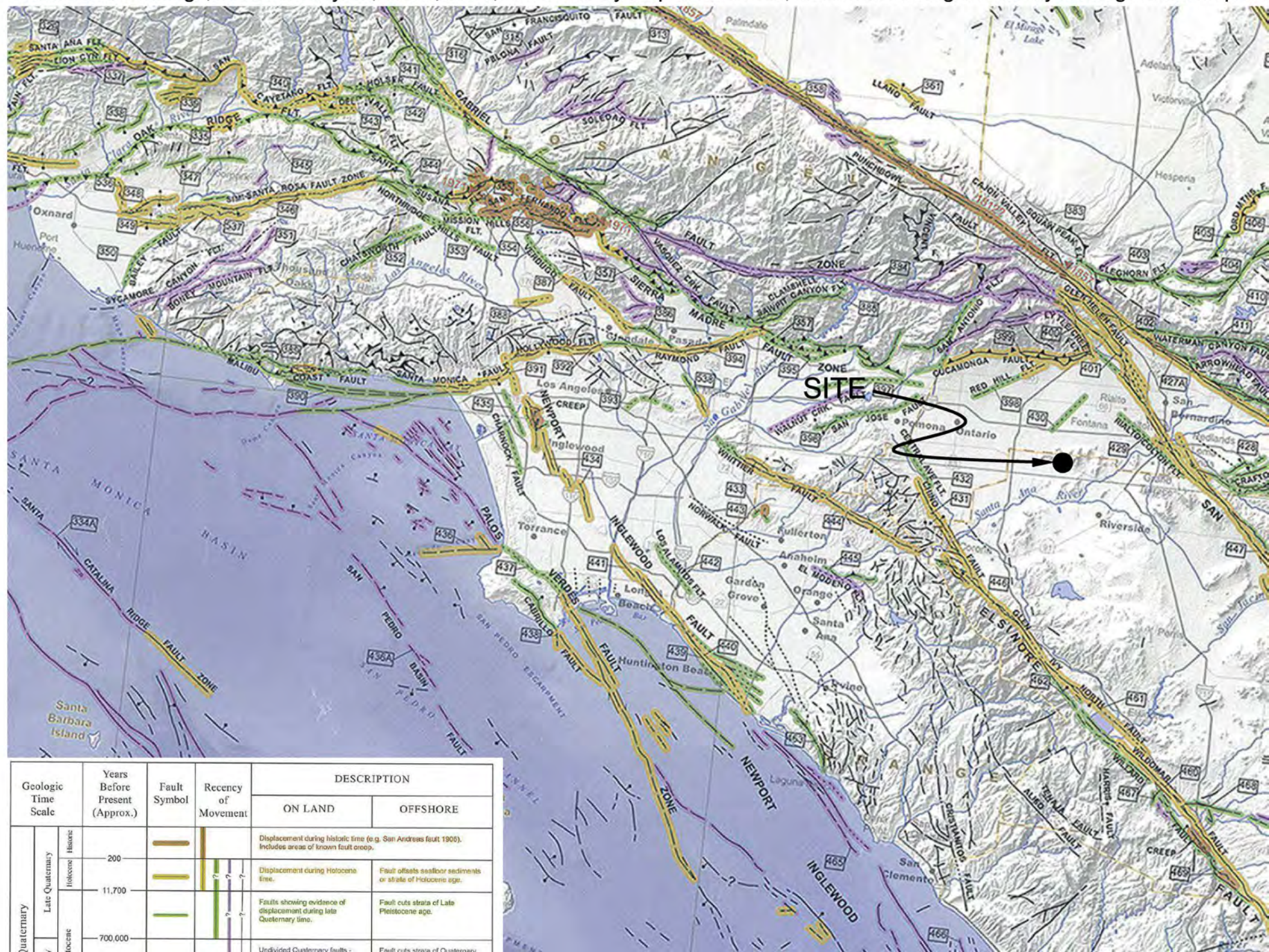
JUNE 2024

PROJECT NO. T2875-22-02

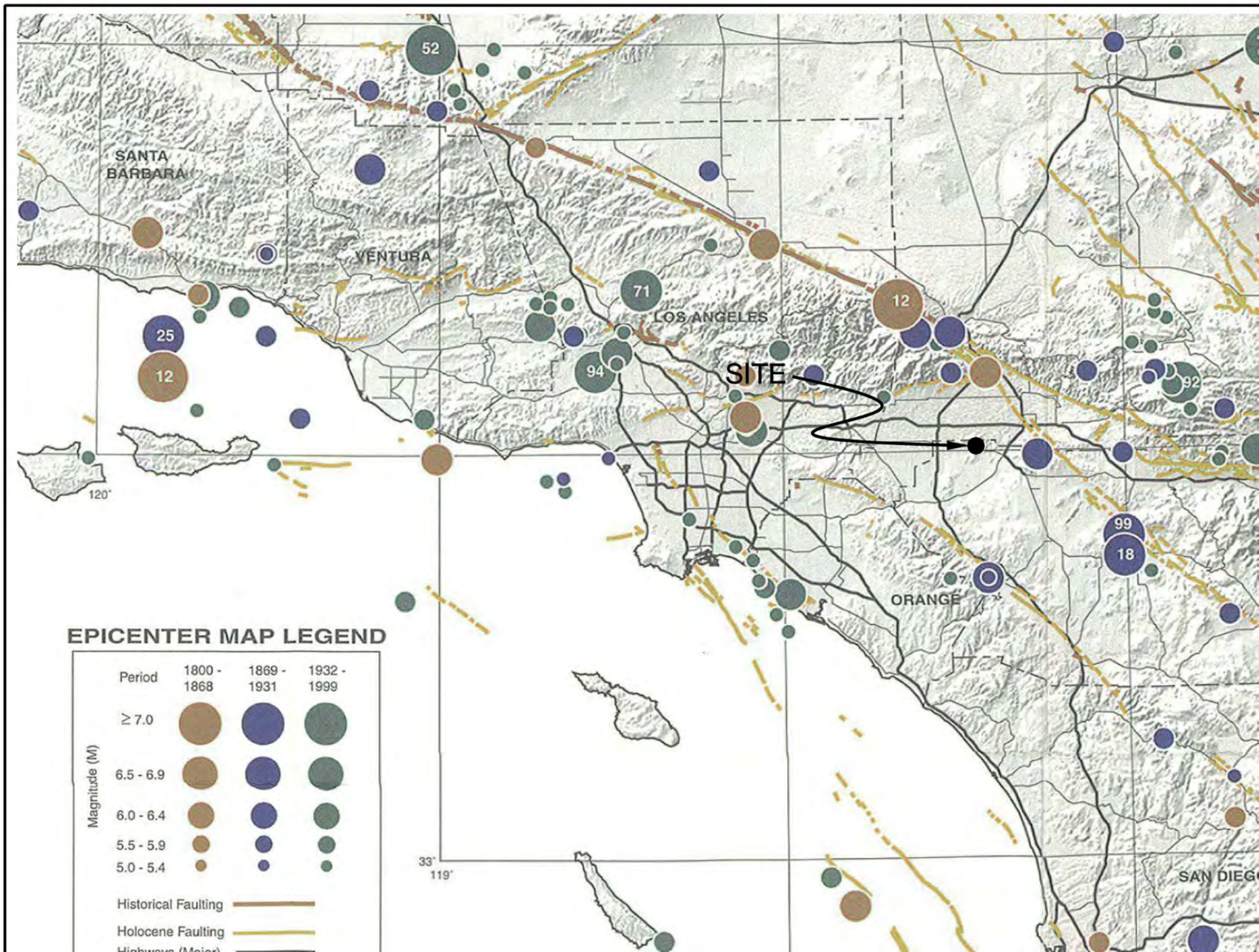
FIG. 1



Reference: Jennings, C.W. and Bryant, W. A., 2010, Fault Activity Map of California, California Geological Survey Geologic Data Map No.



Geologic Time Scale	Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
				ON LAND	OFFSHORE
Quaternary	Late Quaternary	Hsane	200	Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
				Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
	Pleistocene	11,700	7	Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
				Undivided Quaternary faults -	Fault cuts strata of Quaternary



EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL MAXIMUM CONSIDERED EARTHQUAKE

NCEER (1996) METHOD W 2001 UPDATES
EARTHQUAKE INFORMATION:

Earthquake Magnitude:	8.10
Peak Horiz. Acceleration PGA_M (g):	0.555
Magnitude Scaling Factor:	0.821
Historic High Groundwater:	100.0
Groundwater Depth During Explore:	100.0

ENERGY & ROD CORRECTIONS:

Energy Correction (CE) for N_{60} :	1.25
Rod Len. Corr. (CR) (0-no or 1-yes):	1
Bore Dia. Corr. (CB):	1.00
Sampler Corr. (CS):	1.20
Use Ksigma (0-no or 1-yes):	1

Boring ID: B-1

LIQUEFACTION CALCULATIONS:

Unit Wt. Water (pcf): 62.4

Depth to Base (ft)	Total Unit Wt. (pcf)	Water (0 or 1)	Field SPT (N)	Depth of SPT (ft)	Liq. Sus. (0 or 1)	-200 (%)	Est. Dr (%)	CN Factor	Corrected (N1) _{60cs}	Eff. Unit Wt. (pcf)	Resist. CRR 7.5	rd Factor	Induced CSR	Liquefac. Safe Fact.
1.0	132.5	0	11	5.0	1		71	1.700	20.5	132.5	0.222	1.000	0.361	--
2.0	132.5	0	11	5.0	1		71	1.700	20.5	132.5	0.222	0.998	0.360	--
3.0	132.5	0	11	5.0	1		71	1.700	20.5	132.5	0.222	0.996	0.359	--
4.0	132.5	0	11	5.0	1		71	1.700	20.5	132.5	0.222	0.994	0.359	--
5.0	132.5	0	11	5.0	1	44	71	1.700	29.6	132.5	0.441	0.991	0.358	--
6.0	132.5	0	11	5.0	1	44	71	1.692	29.5	132.5	0.434	0.989	0.357	--
7.0	132.5	0	11	5.0	1	44	71	1.557	27.5	132.5	0.353	0.987	0.356	--
8.0	129.8	0	13	7.5	1	44	73	1.450	30.9	129.8	Infin.	0.985	0.355	--
9.0	129.8	0	13	7.5	1	44	73	1.364	29.4	129.8	0.428	0.982	0.354	--
10.0	129.8	0	13	7.5	1	44	73	1.291	28.1	129.8	0.372	0.980	0.354	--
11.0	129.7	0	16	10.0	1	44	76	1.229	31.1	129.7	Infin.	0.978	0.353	--
12.0	129.7	0	16	10.0	1	44	76	1.175	30.0	129.7	0.467	0.976	0.352	--
13.0	129.7	0	20	12.5	1	44	81	1.128	34.7	129.7	Infin.	0.974	0.351	--
14.0	129.7	0	20	12.5	1	44	81	1.086	33.6	129.7	Infin.	0.972	0.351	--
15.0	129.7	0	20	12.5	1	44	81	1.048	32.6	129.7	Infin.	0.970	0.350	--
16.0	129.7	0	17	15.0	1	30	73	1.014	28.8	129.7	0.400	0.967	0.349	--
17.0	129.7	0	17	15.0	1	30	73	0.983	28.0	129.7	0.371	0.965	0.348	--
18.0	124.7	0	17	15.0	1	30	73	0.955	27.4	124.7	0.350	0.963	0.347	--
19.0	124.7	0	17	15.0	1		73	0.930	19.1	124.7	0.205	0.961	0.347	--
20.0	124.7	0	17	15.0	1		73	0.907	18.7	124.7	0.199	0.958	0.346	--
21.0	124.7	0	11	20.0	1		54	0.886	13.1	124.7	0.141	0.956	0.345	--
22.0	124.7	0	11	20.0	1		54	0.866	12.8	124.7	0.138	0.953	0.344	--
23.0	140.1	0	50	25.0	1		108	0.846	60.6	140.1	Infin.	0.950	0.343	--
24.0	140.1	0	50	25.0	1		108	0.826	59.2	140.1	Infin.	0.947	0.342	--
25.0	140.1	0	50	25.0	1		108	0.808	57.9	140.1	Infin.	0.944	0.340	--
26.0	140.1	0	50	25.0	1		108	0.791	56.7	140.1	Infin.	0.940	0.339	--
27.0	140.1	0	50	25.0	1		108	0.775	55.5	140.1	Infin.	0.936	0.338	--
28.0	140.1	0	50	25.0	1		108	0.760	54.4	140.1	Infin.	0.932	0.336	--
29.0	140.1	0	50	25.0	1		108	0.745	53.4	140.1	Infin.	0.928	0.335	--
30.0	140.1	0	50	25.0	1		108	0.732	52.4	140.1	Infin.	0.923	0.333	--
31.0	130.9	0	50	25.0	1		108	0.719	51.5	130.9	Infin.	0.918	0.331	--
32.0	130.9	0	50	25.0	1		108	0.708	50.7	130.9	Infin.	0.912	0.329	--
33.0	130.9	0	50	25.0	1		108	0.697	49.9	130.9	Infin.	0.907	0.327	--
34.0	130.9	0	50	25.0	1		108	0.687	49.2	130.9	Infin.	0.900	0.325	--
35.0	130.9	0	50	25.0	1		108	0.677	48.5	130.9	Infin.	0.894	0.322	--
36.0	130.9	0	34	35.0	1		79	0.667	34.0	130.9	Infin.	0.887	0.320	--
37.0	130.9	0	34	35.0	1		79	0.658	33.6	130.9	Infin.	0.880	0.317	--
38.0	130.9	0	34	35.0	1		79	0.649	33.1	130.9	Infin.	0.872	0.314	--
39.0	130.9	0	34	35.0	1		79	0.641	32.7	130.9	Infin.	0.864	0.312	--
40.0	130.9	0	34	35.0	1		79	0.633	32.3	130.9	Infin.	0.855	0.309	--
41.0	130.9	0	59	40.0	1	31	99	0.625	69.1	130.9	Infin.	0.846	0.305	--
42.0	130.9	0	59	40.0	1	31	99	0.618	68.3	130.9	Infin.	0.837	0.302	--
43.0	130.9	0	59	40.0	1	31	99	0.610	67.6	130.9	Infin.	0.828	0.299	--
44.0	130.9	0	59	40.0	1	31	99	0.603	66.8	130.9	Infin.	0.818	0.295	--
45.0	130.9	0	59	40.0	1	31	99	0.597	66.2	130.9	Infin.	0.808	0.292	--
46.0	130.9	0	19	45.0	1	31	54	0.590	24.3	130.9	0.279	0.798	0.288	--
47.0	130.9	0	19	45.0	1	31	54	0.584	24.1	130.9	0.275	0.788	0.284	--
48.0	130.9	0	19	45.0	1	31	54	0.578	23.9	130.9	0.272	0.778	0.281	--
49.0	130.9	0	19	45.0	1	31	54	0.572	23.7	130.9	0.268	0.768	0.277	--
50.0	130.9	0	19	45.0	1	31	54	0.566	23.5	130.9	0.265	0.757	0.273	--
51.0	130.9	0	29	50.0	1	31	64	0.560	33.1	130.9	Infin.	0.747	0.270	--

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92562
PHONE: 909-894-2175

LIQUEFACTION POTENTIAL - MAXIMUM CONSIDERED EARTHQUAKE

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESA SITE - 6464 33RD STREET
JURUPA VALLEY, CALIFORNIA

DRAFTED BY: ADL

CHECKED BY: PZ

JUNE 2024

PROJECT NO. T3072-22-02

FIG. 5

MCE EARTHQUAKE INFORMATION:

Earthquake Magnitude:	8.10
Peak Horiz. Acceleration (g):	0.555

Boring ID: B-1

Depth of Base of Strata (ft)	Thickness of Layer (ft)	Depth of Mid-point of Layer (ft)	Soil Unit Weight (pcf)	Overburden Pressure at Mid-point (tsf)	Mean Effective Pressure at Mid-point (tsf)	Average Cyclic Shear Stress (Tav)	Field SPT (N)	Correction Factor (Car)	Relative Density (Dr) (%)	Correction Factor (Cn)	Corrected (N)160	r _d Factor	Maximum Shear Mod. (Gmax) (tsf)	[γ_{eff}]/[γ_{sat}] (Gmax)	γ_{eff} Shear Strain	[γ_{eff}]*100%	Volume Strain MT.5 (VVS) (%)	Number of Strain Cycles (Nc)	Corrected Vol. Strains (Ec)	Estimated Settlement (S) (inches)
1.0	1.0	0.5	132.5	0.03	0.02	0.012	10.71	1.25	70.6	1.7	20.5	1.0	182.2	6.48E-05	1.00E-04	0.010	9.72E-03	21.4	1.14E-02	0.00
2.0	1.0	1.5	132.5	0.10	0.07	0.036	10.71	1.25	70.6	1.7	20.5	1.0	315.6	1.10E-04	2.30E-04	0.023	2.24E-02	21.4	2.62E-02	0.01
3.0	1.0	2.5	132.5	0.17	0.11	0.060	10.71	1.25	70.6	1.7	20.5	1.0	407.5	1.40E-04	1.70E-04	0.017	1.65E-02	21.4	1.94E-02	0.00
4.0	1.0	3.5	132.5	0.23	0.16	0.084	10.71	1.25	70.6	1.7	20.5	1.0	482.1	1.62E-04	1.70E-04	0.017	1.65E-02	21.4	1.94E-02	0.00
5.0	1.0	4.5	132.5	0.30	0.20	0.107	10.71	1.25	70.6	1.7	29.6	1.0	617.9	1.56E-04	1.70E-04	0.017	1.08E-02	21.4	1.25E-02	0.00
6.0	1.0	5.5	132.5	0.36	0.24	0.131	10.71	1.25	70.6	1.7	29.6	1.0	682.3	1.73E-04	1.50E-04	0.015	9.42E-03	21.4	1.10E-02	0.00
7.0	1.0	6.5	132.5	0.43	0.29	0.156	10.71	1.25	70.6	1.6	27.5	1.0	724.9	1.88E-04	1.50E-04	0.015	1.02E-02	21.4	1.20E-02	0.00
8.0	1.0	7.5	129.8	0.50	0.33	0.178	13.23	1.25	73.1	1.5	30.9	1.0	808.9	1.92E-04	1.50E-04	0.015	8.00E-03	21.4	1.04E-02	0.00
9.0	1.0	8.5	129.8	0.56	0.38	0.201	13.23	1.25	73.1	1.4	29.4	1.0	845.6	2.03E-04	4.50E-04	0.045	2.84E-02	21.4	3.33E-02	0.01
10.0	1.0	9.5	129.8	0.63	0.42	0.224	13.23	1.25	73.1	1.3	28.1	1.0	879.8	2.14E-04	4.50E-04	0.045	3.00E-02	21.4	3.51E-02	0.01
11.0	1.0	10.5	129.7	0.69	0.46	0.247	15.75	1.25	76.5	1.2	31.1	1.0	956.6	2.13E-04	4.50E-04	0.045	2.65E-02	21.4	3.10E-02	0.01
12.0	1.0	11.5	129.7	0.76	0.51	0.269	15.75	1.25	76.5	1.2	30.0	1.0	988.3	2.22E-04	3.70E-04	0.037	2.28E-02	21.4	2.67E-02	0.01
13.0	1.0	12.5	129.7	0.82	0.55	0.291	19.53	1.25	80.5	1.1	34.7	1.0	1081.5	2.16E-04	3.70E-04	0.037	1.91E-02	21.4	2.24E-02	0.01
14.0	1.0	13.5	129.7	0.89	0.59	0.314	19.53	1.25	80.5	1.1	33.6	1.0	1111.3	2.23E-04	2.70E-04	0.037	1.96E-02	21.4	2.33E-02	0.01
15.0	1.0	14.5	129.7	0.95	0.64	0.336	19.53	1.25	80.5	1.0	32.6	1.0	1139.8	2.29E-04	2.70E-04	0.037	2.06E-02	21.4	2.41E-02	0.01
16.0	1.0	15.5	129.7	1.02	0.66	0.356	17	1.25	72.6	1.0	28.8	1.0	1129.6	2.43E-04	3.70E-04	0.037	2.38E-02	21.4	2.80E-02	0.01
17.0	1.0	16.5	129.7	1.08	0.72	0.379	17	1.25	72.6	1.0	28.0	1.0	1155.3	2.48E-04	3.70E-04	0.037	2.47E-02	21.4	2.89E-02	0.01
18.0	1.0	17.5	124.7	1.14	0.77	0.400	17	1.25	72.6	1.0	27.4	1.0	1179.5	2.53E-04	3.70E-04	0.037	2.54E-02	21.4	2.96E-02	0.01
19.0	1.0	18.5	124.7	1.21	0.81	0.421	17	1.25	72.6	0.9	19.1	1.0	1074.7	2.88E-04	3.70E-04	0.037	3.90E-02	21.4	4.57E-02	0.01
20.0	1.0	19.5	124.7	1.27	0.86	0.441	17	1.25	72.6	0.8	18.7	1.0	1092.9	2.93E-04	3.70E-04	0.037	4.02E-02	21.4	4.72E-02	0.01
21.0	1.0	20.5	124.7	1.33	0.89	0.461	11	1.25	54.1	0.9	13.1	1.0	994.5	3.32E-04	7.10E-04	0.071	1.18E-01	21.4	1.39E-01	0.03
22.0	1.0	21.5	124.7	1.39	0.93	0.480	11	1.25	54.1	0.9	12.6	1.0	1009.8	3.37E-04	7.10E-04	0.071	1.21E-01	21.4	1.42E-01	0.03
23.0	1.0	22.5	140.1	1.46	0.98	0.501	50	1.25	107.8	0.8	60.6	0.9	1736.1	2.02E-04	3.70E-04	0.037	9.78E-03	21.4	1.15E-02	0.00
24.0	1.0	23.5	140.1	1.53	1.02	0.523	50	1.25	107.8	0.8	59.2	0.9	1763.5	2.05E-04	3.00E-04	0.030	8.16E-03	21.4	9.57E-03	0.00
25.0	1.0	24.5	140.1	1.60	1.07	0.544	50	1.25	107.8	0.8	57.9	0.9	1790.0	2.08E-04	3.00E-04	0.030	6.38E-03	21.4	6.63E-03	0.00
26.0	1.0	25.5	140.1	1.67	1.12	0.566	50	1.25	107.8	0.8	56.7	0.9	1815.8	2.11E-04	3.00E-04	0.030	8.60E-03	21.4	1.01E-02	0.00
27.0	1.0	26.5	140.1	1.74	1.17	0.586	50	1.25	107.8	0.8	55.5	0.9	1840.8	2.13E-04	3.00E-04	0.030	8.81E-03	21.4	1.03E-02	0.00
28.0	1.0	27.5	140.1	1.81	1.21	0.607	50	1.25	107.8	0.8	54.4	0.9	1865.2	2.15E-04	3.00E-04	0.030	9.03E-03	21.4	1.06E-02	0.00
29.0	1.0	28.5	140.1	1.88	1.26	0.627	50	1.25	107.8	0.7	53.4	0.9	1889.0	2.17E-04	3.00E-04	0.030	9.23E-03	21.4	1.08E-02	0.00
30.0	1.0	29.5	140.1	1.95	1.31	0.647	50	1.25	107.8	0.7	52.4	0.9	1912.2	2.19E-04	3.00E-04	0.030	9.44E-03	21.4	1.11E-02	0.00
31.0	1.0	30.5	130.9	2.02	1.35	0.669	50	1.25	107.8	0.7	51.5	0.9	1934.1	2.21E-04	3.00E-04	0.030	9.63E-03	21.4	1.13E-02	0.00
32.0	1.0	31.5	130.9	2.08	1.40	0.684	50	1.25	107.8	0.7	50.7	0.9	1954.6	2.22E-04	3.00E-04	0.030	9.82E-03	21.4	1.15E-02	0.00
33.0	1.0	32.5	130.9	2.15	1.44	0.701	50	1.25	107.8	0.7	49.9	0.9	1975.0	2.24E-04	3.00E-04	0.030	1.00E-02	21.4	1.17E-02	0.00
34.0	1.0	33.5	130.9	2.21	1.48	0.718	50	1.25	107.8	0.7	49.2	0.9	1994.9	2.25E-04	3.00E-04	0.030	1.02E-02	21.4	1.19E-02	0.00
35.0	1.0	34.5	130.9	2.28	1.53	0.735	50	1.25	107.8	0.7	48.5	0.9	2014.3	2.26E-04	3.00E-04	0.030	1.04E-02	21.4	1.22E-02	0.00
36.0	1.0	35.5	130.9	2.34	1.57	0.751	34	1.25	79.1	0.7	34.0	0.9	1815.6	2.54E-04	3.00E-04	0.030	1.59E-02	21.4	1.86E-02	0.00
37.0	1.0	36.5	130.9	2.41	1.61	0.767	34	1.25	79.1	0.7	33.6	0.9	1832.3	2.55E-04	3.00E-04	0.030	1.61E-02	21.4	1.89E-02	0.00
38.0	1.0	37.5	130.9	2.49	1.66	0.783	34	1.25	79.1	0.6	33.1	0.9	1848.7	2.56E-04	3.00E-04	0.030	1.64E-02	21.4	1.92E-02	0.00
39.0	1.0	38.5	130.9	2.54	1.70	0.798	34	1.25	79.1	0.6	32.7	0.9	1864.9	2.56E-04	3.00E-04	0.030	1.66E-02	21.4	1.95E-02	0.00
40.0	1.0	39.5	130.9	2.61	1.75	0.813	34	1.25	79.1	0.6	32.3	0.9	1880.8	2.57E-04	3.00E-04	0.030	1.69E-02	21.4	1.98E-02	0.00
41.0	1.0	40.5	130.9	2.67	1.79	0.826	59	1.25	99.4	0.8	69.1	0.8	2454.0	1.99E-04	1.30E-04	0.013	2.94E-03	21.4	3.44E-03	0.00
42.0	1.0	41.5	130.9	2.74	1.83	0.842	59	1.25	99.4	0.8	68.3	0.8	2474.6	1.99E-04	1.30E-04	0.013	2.98E-03	21.4	3.49E-03	0.00
43.0	1.0	42.5	130.9	2.80	1.88	0.856	59	1.25	99.4	0.6	67.6	0.8	2494.8	2.00E-04	1.30E-04	0.013	3.02E-03	21.4	3.54E-03	0.00
44.0	1.0	43.5	130.9	2.87	1.92	0.870	59	1.25	99.4	0.6	66.8	0.8	2514.8	2.00E-04	1.30E-04	0.013	3.06E-03	21.4	3.58E-03	0.00
45.0	1.0	44.5	130.9	2.93	1.97	0.883	59	1.25	99.4	0.6	66.2	0.8	2534.4	2.00E-04	1.30E-04	0.013	3.09E-03	21.4	3.63E-03	0.00
46.0	1.0	45.5	130.9	3.00	2.01	0.896	19	1.25	54.0	0.6	24.3	0.8	1835.6	2.76E-04	3.00E-04	0.030	2.37E-02	21.4	2.78E-02	0.01
47.0	1.0	46.5	130.9	3.06	2.06	0.909	19	1.25	54.0	0.6	24.1	0.8	1850.3	2.76E-04	9.00E-04	0.090	7.18E-02	21.4	8.43E-02	0.02
48.0	1.0	47.5	130.9	3.13	2.10	0.921	19	1.25	54.0	0.6	23.9	0.8	1864.7	2.78E-04	9.00E-04	0.090	7.27E-02	21.4	8.52E-02	0.02
49.0	1.0	48.5	130.9	3.20	2.14	0.933	19	1.25	54.0	0.6	23.7	0.8	1878.9	2.78E-04	9.00E-04	0.090	7.34E-02	21.4	8.60E-02	0.02
50.0	1.0	49.5	130.9	3.26	2.18	0.945	19	1.25	54.0	0.6	23.5	0.8	1892.9	2.78E-04	9.00E-04	0.090	7.41E-02	21.4	8.69E-02	0.02

TOTAL SETTLEMENT (inches) = 0.34

REFERENCE: TECHNICAL ENGINEERING AND DESIGN GUIDES AS ADAPTED FROM THE US ARMY CORPS OF ENGINEERS, NO. 9

GEOCON
WEST, INC.ENVIRONMENTAL GEOTECHNICAL MATERIALS
41571 CORNING PLACE - SUITE 101 - MURRIETA, CA 92562
PHONE: 909-894-2175EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS
IN DRY SANDY SOILS

MAXIMUM CONSIDERED EARTHQUAKE

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESA SITE - 6464 33RD STREET
JURUPA VALLEY, CALIFORNIA

DRAFTED BY: ADL

CHECKED BY: PZ

JUNE 2024

PROJECT NO. T3072-22-02

FIG. 6

APPENDIX

A

APPENDIX A

FIELD INVESTIGATION

Geocon performed the field investigation on May 16, 2024, which included the drilling of eight geotechnical borings to depths of approximately 20 to 51½ feet below existing grade.

The geotechnical borings were drilled with a CME truck-mounted drill rig equipped with an 8-inch-diameter hollow-stem auger. The geotechnical borings were drilled to observe the subsurface geological conditions at the site, collect relatively undisturbed in-situ and disturbed bulk samples for laboratory testing, and evaluate the depth to groundwater, if any. We collected bulk and relatively undisturbed samples from the borings by driving a 3-inch O. D., California Modified Sampler or Standard Penetration Test Sampler (SPT) into the “undisturbed” soil mass with blows from a 140-pound hammer falling 30 inches. The California Modified Sampler was equipped with 1-inch high by 2³/₈-inch inside diameter brass sampler rings to facilitate removal and testing. Relatively undisturbed samples and bulk samples of disturbed soils were transported to our laboratory for testing. The soil conditions encountered were visually examined, classified and logged in general accordance with the Unified Soil Classification System (USCS). Logs of the geotechnical borings are presented on Figures A-1 through A-8.

The approximate locations of the soil borings are depicted on the *Geologic Map*, Figure 2.

DEPTH IN FT	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	<div>BORING B-1</div> <div>ELEV. (MSL.)883 DATE COMPLETED 5/16/2024</div> <div>EQUIPMENTCME 75 BY: ADL</div>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
				SM	PAVEMENT SECTION 4" AC Hand auger upper 4'			
2	B-1@2-4'			SM	ARTIFICIAL FILL Silty SAND, medium dense, moist, orangish brown; fine to coarse sand			
4					OLDER ALLUVIUM (Qof) Silty SAND, medium dense, moist, orangish brown; fine to coarse sand			
6	B-1@5'					17	121.6	9.0
8	B-1@7.5'					21	120.7	7.5
10	B-1@10'				-Becomes strong brown; fine sand	25	117.8	10.1
12	B-1@12.5'					31	117.6	9.4
14								
16	B-1@15'				-Becomes fine to medium sand; less silt	17		
18	B-1@17.5'				-Silt laminations	33	118.0	5.7
20	B-1@20'				-Becomes loose	11		
22								
24	B-1@22.5'				-Becomes dense; fine to coarse sand	64	128.8	8.8
26	B-1@25'				-Becomes very dense; cementation	50/6"		
28								

Figure A-1,
Log of Boring B-1, Page 1 of 2

T2875-22-02 BORING LOGS.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL

... STANDARD PENETRATION TEST

... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE

... CHUNK SAMPLE

... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

DEPTH IN FT	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	<div>BORING B-1</div> <div>ELEV. (MSL.)883 DATE COMPLETED 5/16/2024</div> <div>EQUIPMENTCME 75 BY: ADL</div>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-1@30'	<div><div><div></div></div></div>			-Hard drilling	50/4"	121.5	7.7
32								
34								
36	B-1@35'	<div><div><div></div></div></div>				34		
38								
40								
42								
44								
46	B-1@45'	<div><div><div></div></div></div>			-Becomes medium dense, reddish brown: fine to coarse sand	19		
48								
50	B-1@50'	<div><div><div></div></div></div>				29		
					Total Depth = 51 1/2 feet Groundwater not encountered Penetration resistance for 140-lb hammer falling 30 inches by auto hammer Backfilled with cuttings 5/16/2024			

Figure A-1,
Log of Boring B-1, Page 2 of 2

T2875-22-02 BORING LOGS.GPJ

SAMPLE SYMBOLS	<div></div> ... SAMPLING UNSUCCESSFUL	<div></div> ... STANDARD PENETRATION TEST	<div></div> ... DRIVE SAMPLE (UNDISTURBED)
	<div></div> ... DISTURBED OR BAG SAMPLE	<div></div> ... CHUNK SAMPLE	<div></div> ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

T2875-22-02 BORING LOGS.GPJ

SAMPLE SYMBOLS

 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

GEOCON

T2875-22-02 BORING LOGS.GPJ

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

T2875-22-02 BORING LOGS.GPJ

SAMPLE SYMBOLS

 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

GEOCON

T2875-22-02 BORING LOGS.GPJ

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

T2875-22-02 BORING LOGS.GPJ

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FT	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	<div>BORING B-7</div> <div>ELEV. (MSL.)884 DATE COMPLETED 5/16/2024</div> <div>EQUIPMENTCME 75 BY: ADL</div>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
				SM	PAVEMENT SECTION 7" AC			
2				SM	ARTIFICIAL FILL Silty SAND, loose, moist, reddish brown; fine to coarse sand			
B-7@2.5'					OLDER ALLUVIUM (Qof) Silty SAND, medium dense, reddish brown; fine to medium sand	9	117.6	10.9
4								
6								
8					-Becomes orangish brown; fine to coarse sand	21	115.2	10.5
B-7@7.5'								
10								
12					-Becomes fine sand; increase in silt	30	119.9	8.6
B-7@12.5'								
14								
16								
18								
B-7@18.5'						38	117.0	9.0
20					Total Depth = 20 feet Groundwater not encountered Penetration resistance for 140-lb hammer falling 30 inches by auto hammer Backfilled with cuttings 5/16/2024			

Figure A-7,
Log of Boring B-7, Page 1 of 1

T2875-22-02 BORING LOGS.GPJ

SAMPLE SYMBOLS	<div></div> ... SAMPLING UNSUCCESSFUL	<div></div> ... STANDARD PENETRATION TEST	<div></div> ... DRIVE SAMPLE (UNDISTURBED)
	<div></div> ... DISTURBED OR BAG SAMPLE	<div></div> ... CHUNK SAMPLE	<div></div> ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FT	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	<div>BORING B-8</div> <div>ELEV. (MSL.)893 DATE COMPLETED 5/16/2024</div> <div>EQUIPMENTCME 75 BY: ADL</div>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
					PAVEMENT SECTION			
				SM	6" AC			
2	B-8@1-5'				ARTIFICIAL FILL			
				SM	Silty SAND, loose, moist, reddish brown; fine to coarse sand			
4					OLDER ALLUVIUM (Qof)			
					Silty SAND, medium dense, reddish brown; fine to medium sand			
6	B-8@5'					27	120.9	11.0
8					-Becomes orangish brown; fine sand			
10	B-8@10'					23	121.1	8.6
12								
14								
16	B-8@15'					59	122.0	10.5
18								
20	B-8@20'				- Fine to medium sand	45	124.0	4.4
					Total Depth = 21 1/2 feet Groundwater not encountered Penetration resistance for 140-lb hammer falling 30 inches by auto hammer Backfilled with cuttings 5/16/2024			

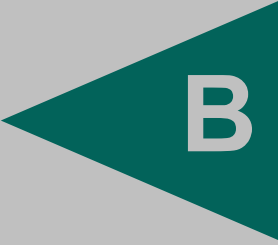
Figure A-8,
Log of Boring B-8, Page 1 of 1

T2875-22-02 BORING LOGS.GPJ

SAMPLE SYMBOLS	<div></div> ... SAMPLING UNSUCCESSFUL	<div></div> ... STANDARD PENETRATION TEST	<div></div> ... DRIVE SAMPLE (UNDISTURBED)
	<div></div> ... DISTURBED OR BAG SAMPLE	<div></div> ... CHUNK SAMPLE	<div></div> ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX

**B**

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with current, generally accepted test methods of ASTM International (ASTM) or other suggested procedures. We analyzed selected soil samples for expansion potential, corrosion, grain size distribution, consolidation, collapse potential, direct shear, and maximum dry density and optimum moisture content. The results of the laboratory tests are presented on Figures B-1 through B-16. The in-place moisture content of the samples tested are presented on the boring logs in Appendix A

B-1@2-4

MOLDED SPECIMEN		BEFORE TEST	AFTER TEST
Specimen Diameter	(in.)	4.0	4.0
Specimen Height	(in.)	1.0	1.0
Wt. Comp. Soil + Mold	(gm)	627.3	650.8
Wt. of Mold	(gm)	202.2	202.2
Specific Gravity	(Assumed)	2.7	2.7
Wet Wt. of Soil + Cont.	(gm)	473.2	650.8
Dry Wt. of Soil + Cont.	(gm)	451.5	394.3
Wt. of Container	(gm)	173.2	202.2
Moisture Content	(%)	7.8	13.8
Wet Density	(pcf)	128.2	135.1
Dry Density	(pcf)	119.0	118.8
Void Ratio		0.4	0.4
Total Porosity		0.3	0.3
Pore Volume	(cc)	60.9	62.0
Degree of Saturation	(%) [S_{meas}]	50.9	87.5

Date	Time	Pressure (psi)	Elapsed Time (min)	Dial Readings (in.)
5/21/2024	10:00	1.0	0	0.3943
5/21/2024	10:10	1.0	10	0.3944
Add Distilled Water to the Specimen				
5/22/2024	10:00	1.0	1430	0.3994
5/22/2024	11:00	1.0	1490	0.3994

Expansion Index (EI meas) =	5
Expansion Index (Report) =	5

Expansion Index, EI_{50}	CBC CLASSIFICATION *	UBC CLASSIFICATION **
0-20	Non-Expansive	Very Low
21-50	Expansive	Low
51-90	Expansive	Medium
91-130	Expansive	High
>130	Expansive	Very High

* Reference: 2022 California Building Code, Section 1803.5.3

** Reference: 1997 Uniform Building Code, Table 18-I-B.

 GEOCON	EXPANSION INDEX TEST RESULTS ASTM D-4829	Project No.: T2875-22-02
		PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA
		Checked by: ADL June 2024 Figure B-1

SUMMARY OF LABORATORY
POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS
AASHTO T289 ASTM D4972 and AASHTO T288 ASTM G187

Sample No.	pH	Resistivity (ohm centimeters)
B-3@1-4	8.3	3100

SUMMARY OF LABORATORY CHLORIDE CONTENT TEST RESULTS
AASHTO T291 ASTM C1218

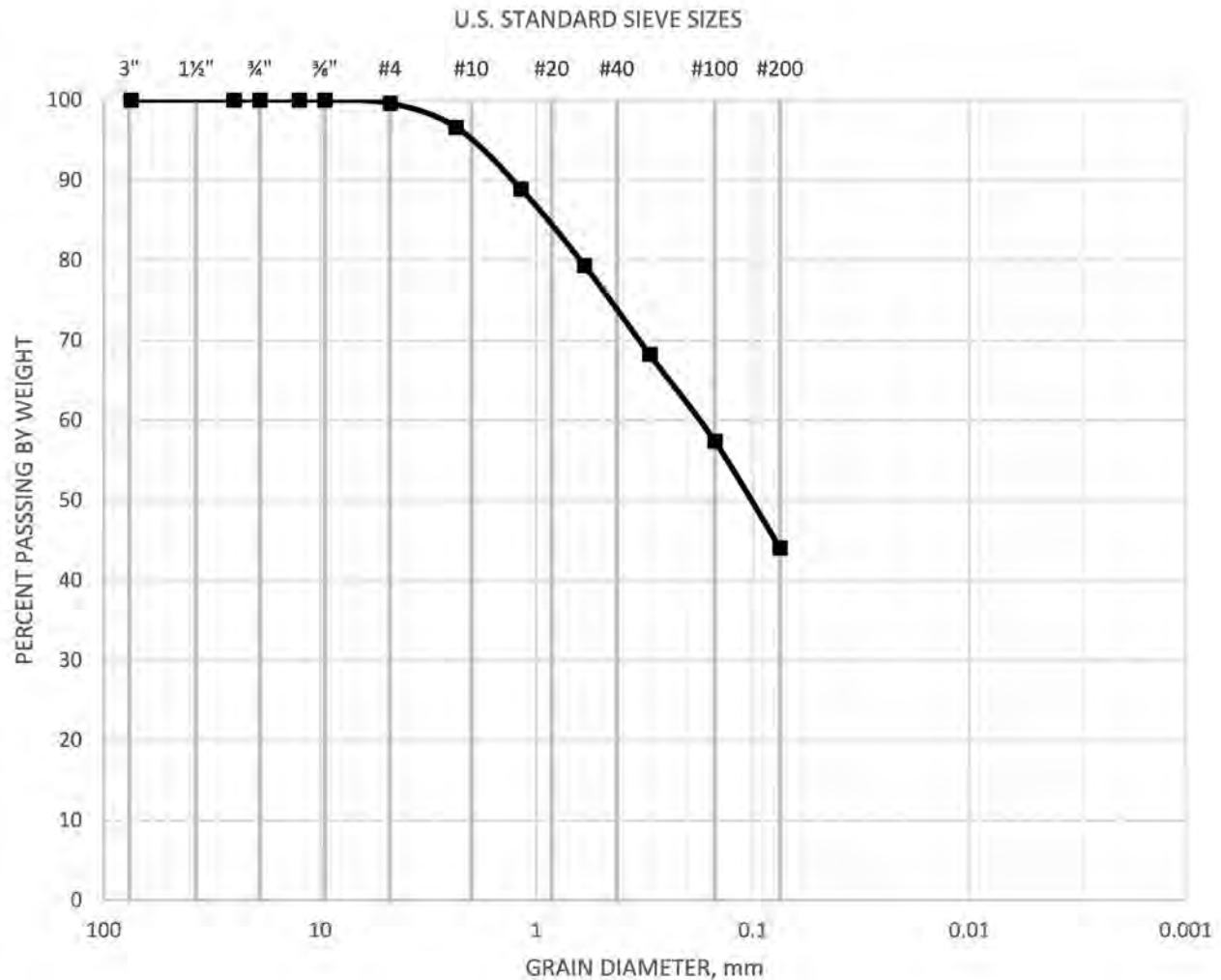
Sample No.	Chloride Ion Content (%)
B-3@1-4	0.063

SUMMARY OF LABORATORY WATER SOLUBLE SULFATE TEST RESULTS
AASHTO T290 ASTM C1580

Sample No.	Water Soluble Sulfate (% SO ₄)	Sulfate Exposure
B-3@1-4	0.000	S0

 GEOCON	CORROSIVITY TEST RESULTS	Project No.: T2875-22-02
		PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA
	Checked by: ADL	June 2024 Figure B-2

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B-1@5	Silty SAND (SM), orangish brown	0.18	0.075	0.075



GEOCON

GRAIN SIZE DISTRIBUTION

CT 202

Checked by: ADL

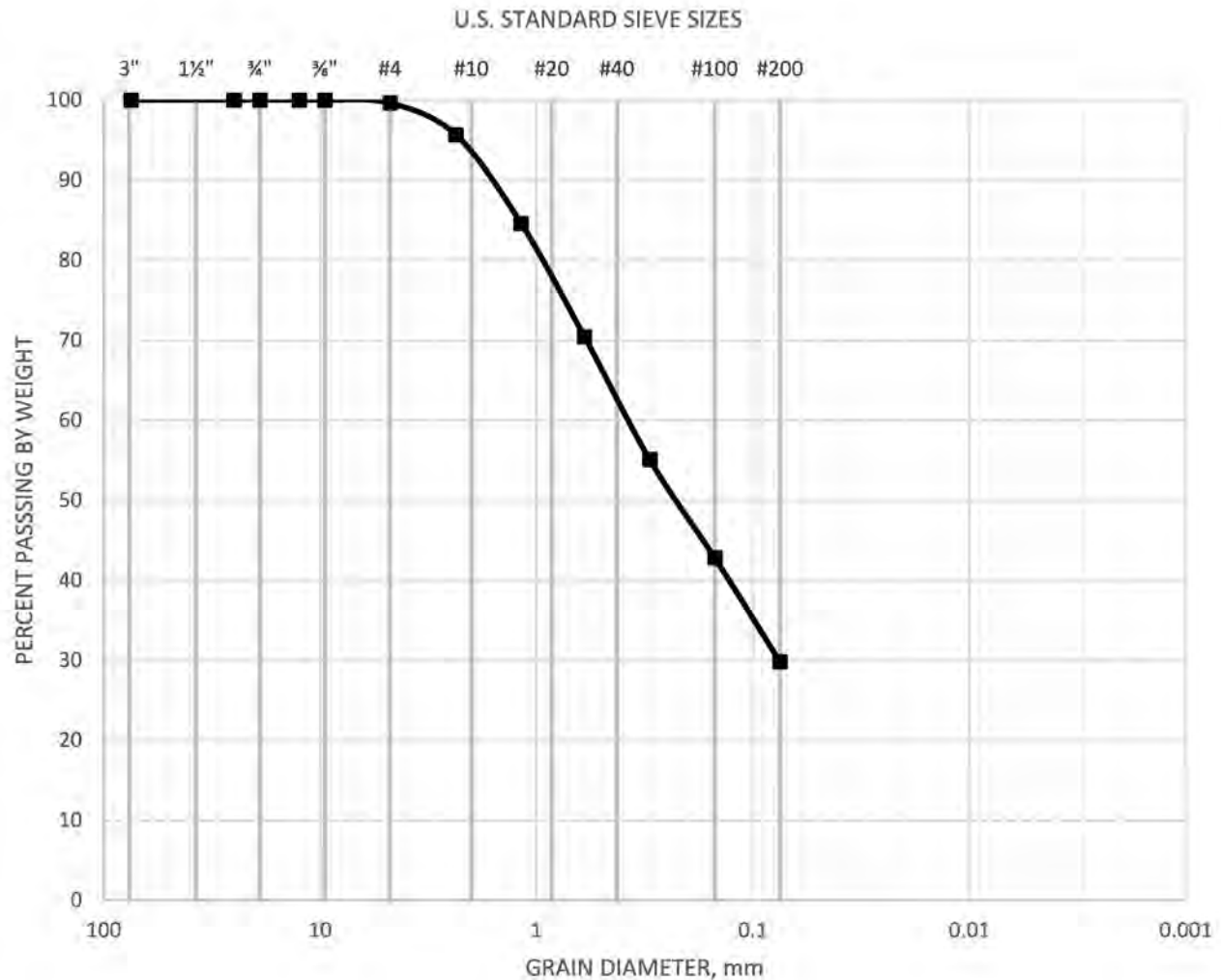
Project No.: T2875-22-02

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESSA SITE
6464 33RD STREET, JURUPA VALLEY, CALIFORNIA

June 2024

Figure B-3

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B-1@15	Silty SAND (SM), strong brown	0.39	0.075	0.075



GEOCON

GRAIN SIZE DISTRIBUTION

CT 202

Checked by: ADL

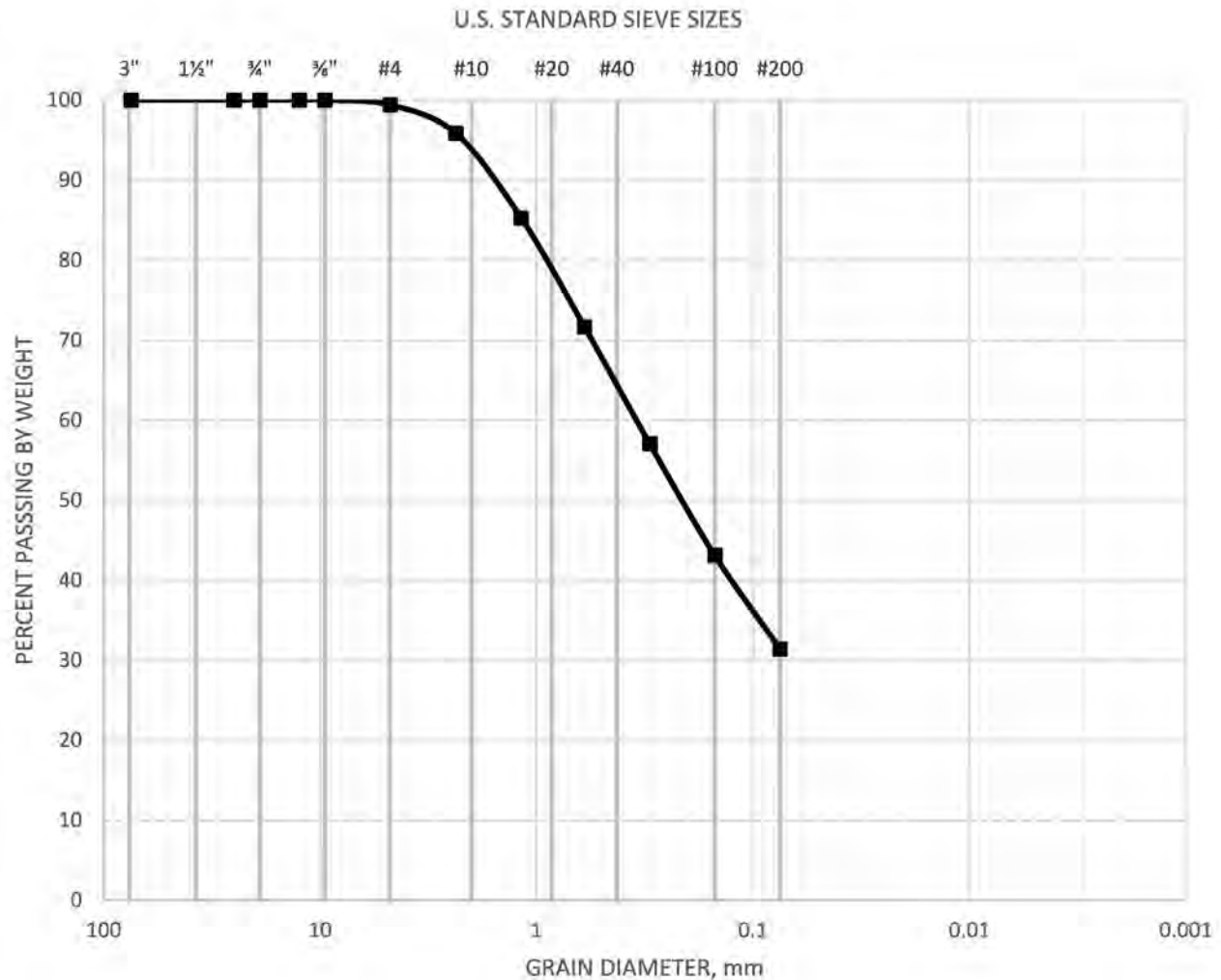
Project No.: T2875-22-02

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESSA SITE
6464 33RD STREET, JURUPA VALLEY, CALIFORNIA

June 2024

Figure B-4

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B-1@40	Silty SAND (SM), strong brown	0.35	0.075	0.075



GEOCON

GRAIN SIZE DISTRIBUTION

CT 202

Checked by: ADL

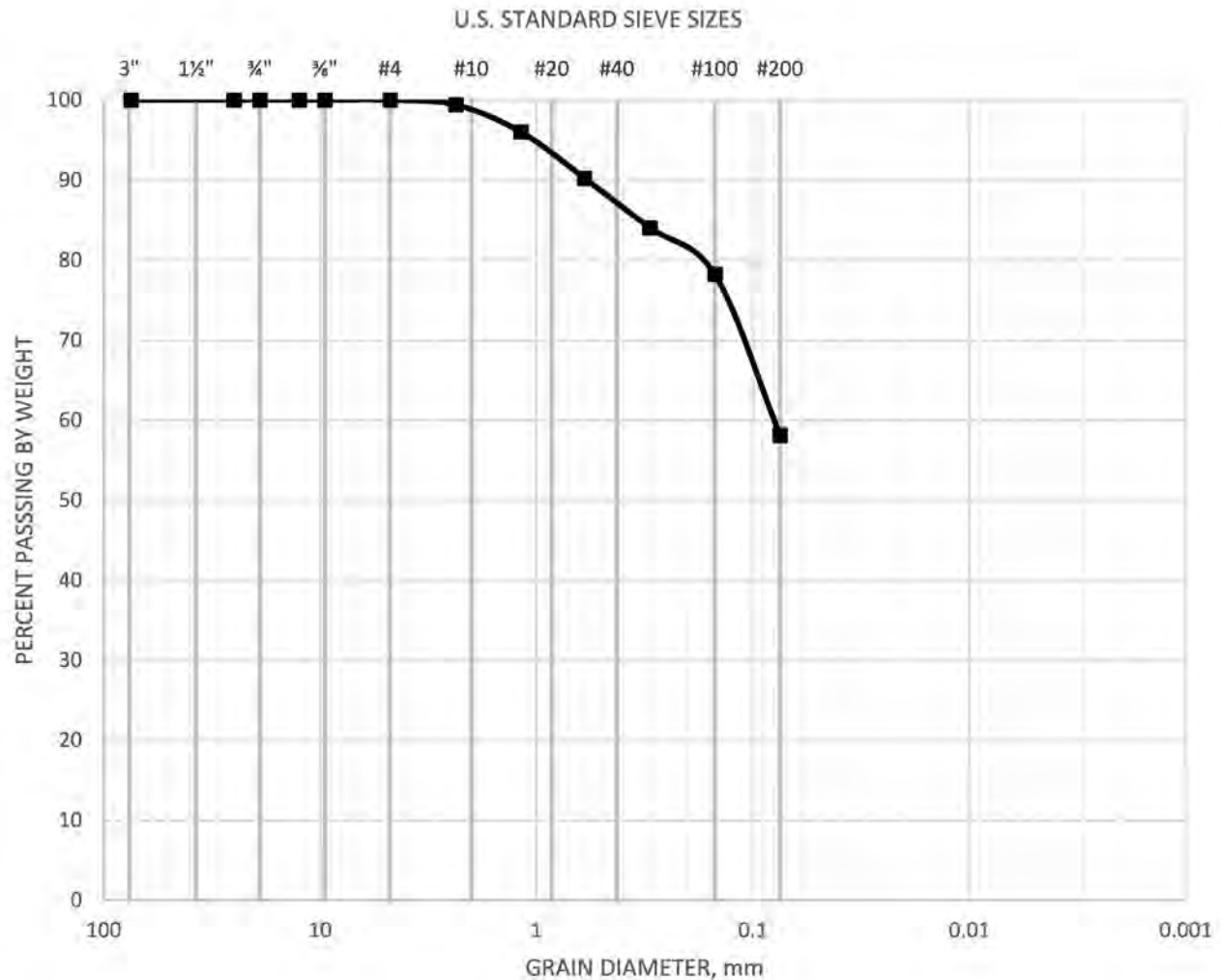
Project No.: T2875-22-02

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESSA SITE
6464 33RD STREET, JURUPA VALLEY, CALIFORNIA

June 2024

Figure B-5

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B-3@15	Sandy SILT (ML), strong brown	0.08	0.075	0.075



GEOCON

GRAIN SIZE DISTRIBUTION

CT 202

Checked by: ADL

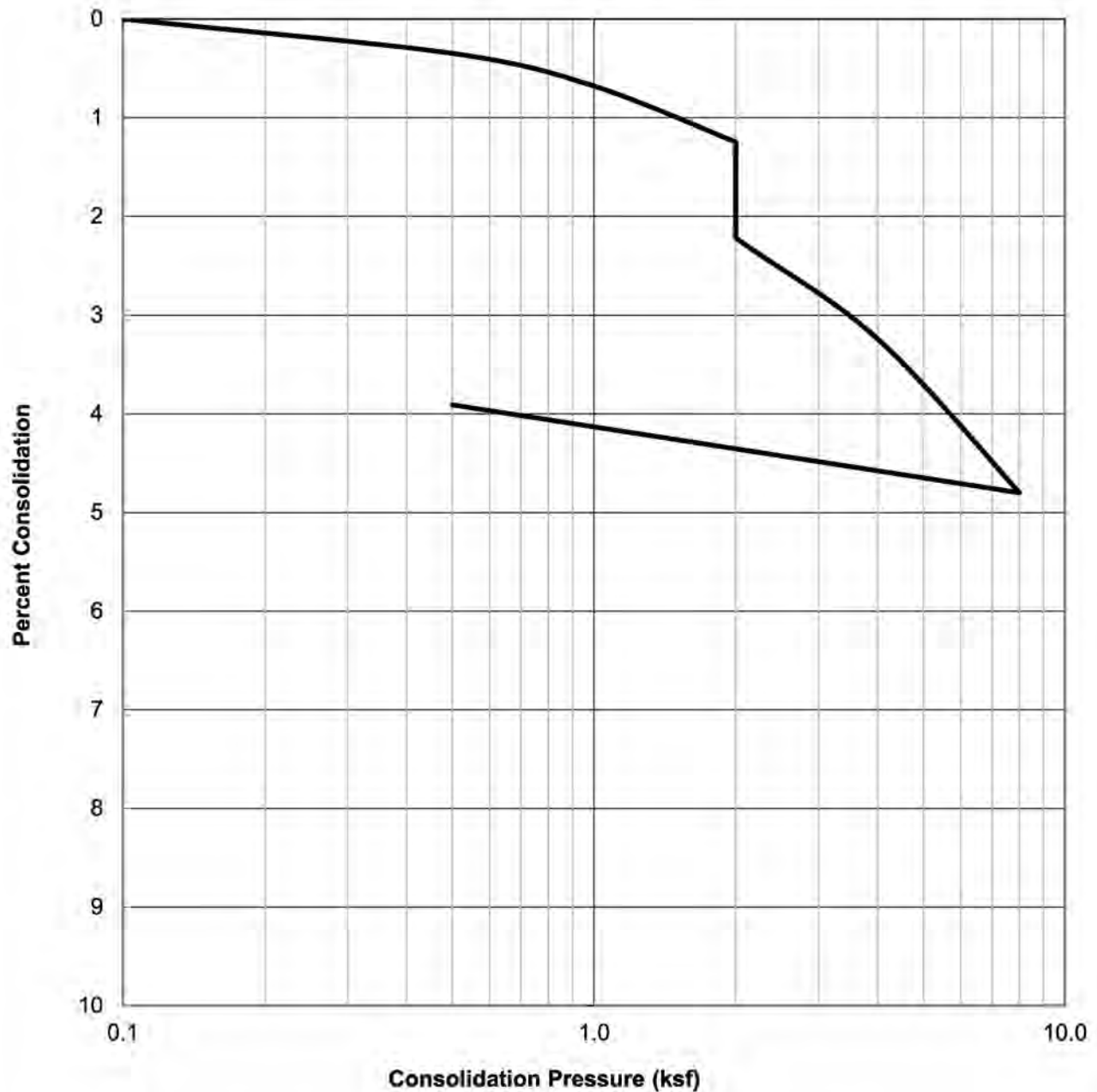
Project No.: T2875-22-02

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June 2024

Figure B-6

WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-2@15	Silty SAND (SM), strong brown	105.1	8.4	20.2



CONSOLIDATION TEST RESULTS

ASTM D-2435

Checked by: ADL

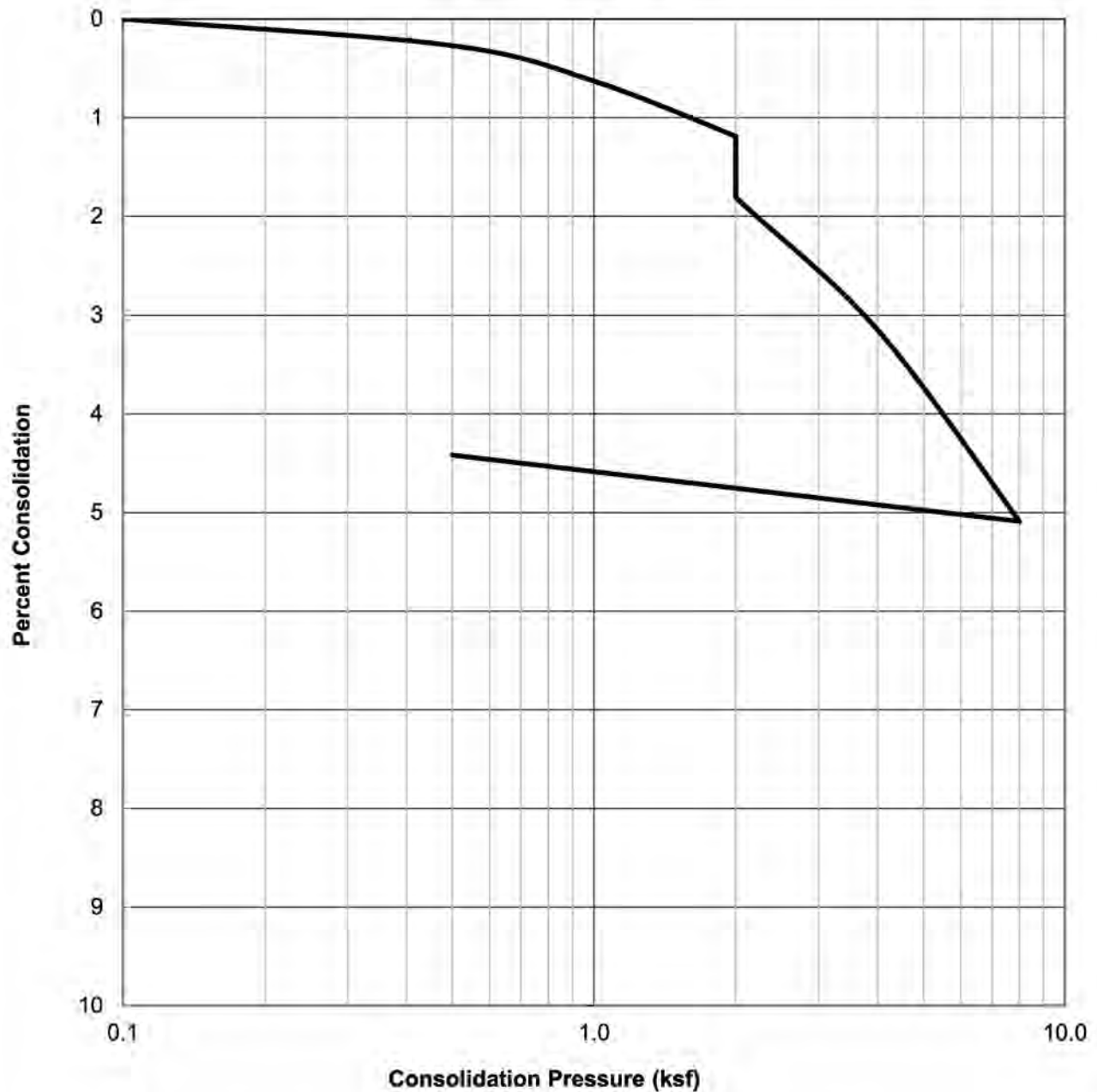
Project No.: T2875-22-02

PROPOSED INLAND EMPIRE TECHNICAL
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6464 33RD STREET, JURUPA VALLEY, CALIFORNIA

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Figure B-7

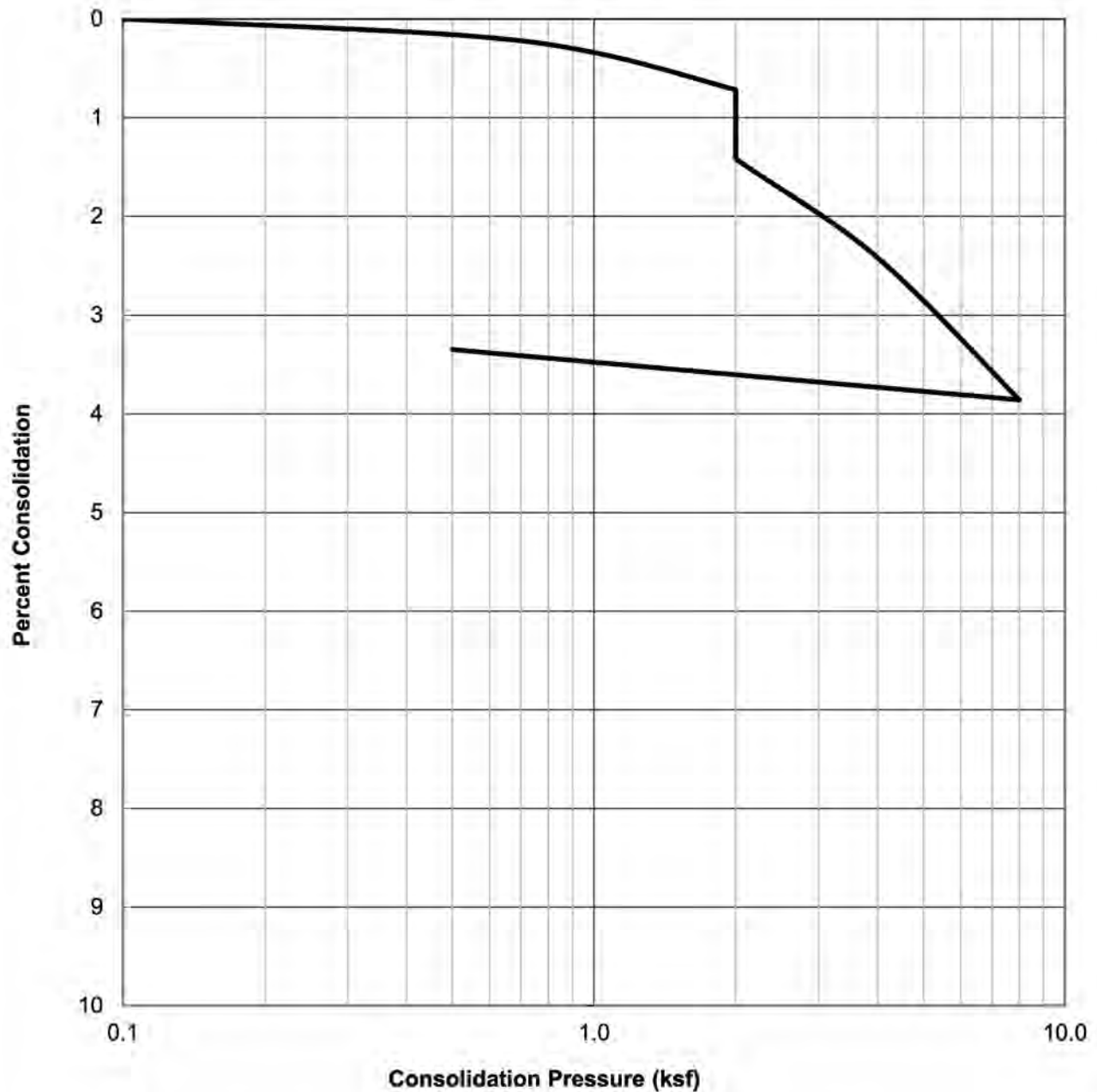
WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3@5	Silty SAND (SM), reddish brown	117.8	10.0	13.7

 GEOCON	CONSOLIDATION TEST RESULTS ASTM D-2435	Project No.: T2875-22-02	
		PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA	
	Checked by: ADL	June 2024	Figure B-8

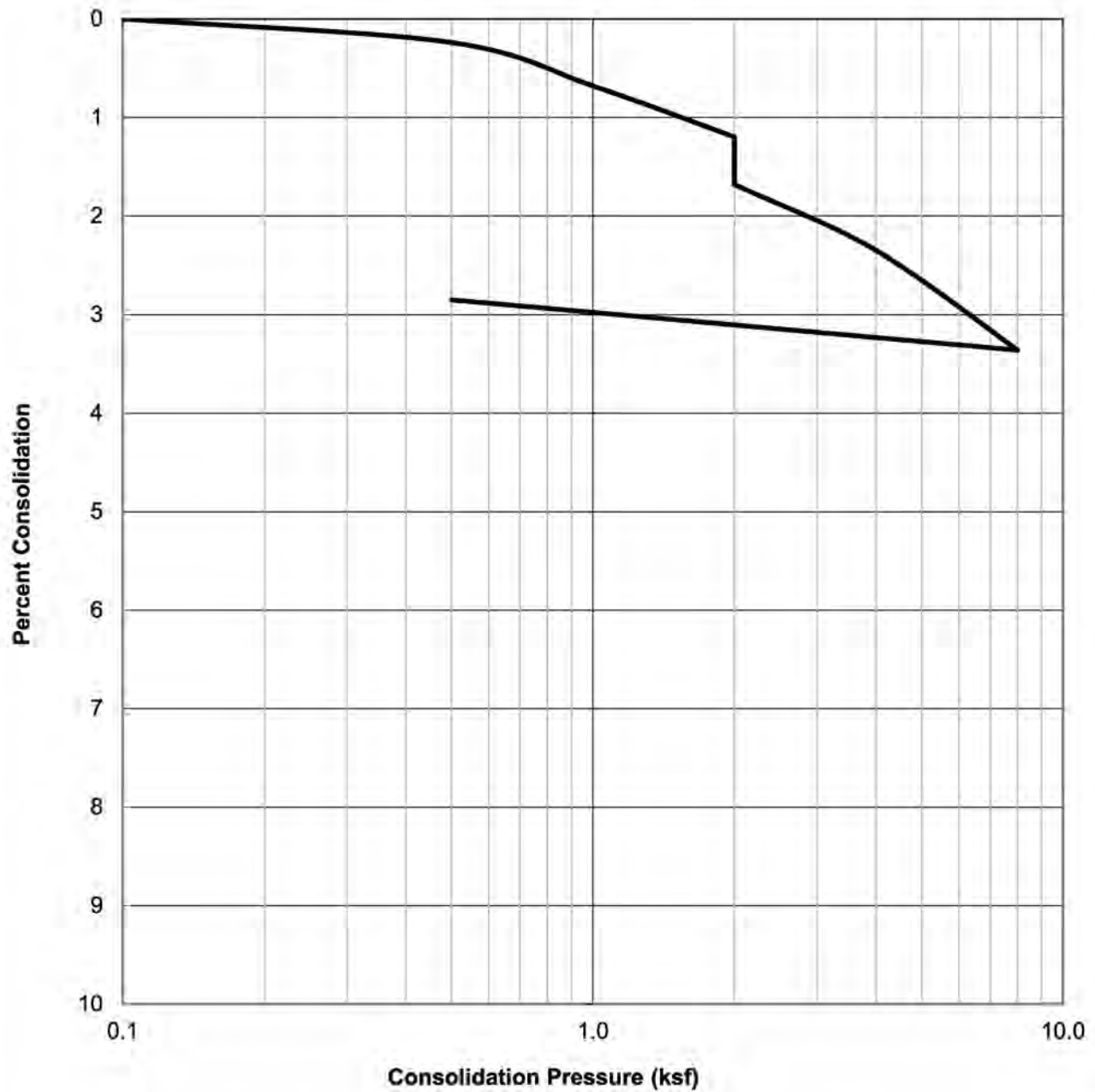
WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3@7.5	Silty SAND (SM), reddish brown	109.3	4.6	14.8

 GEOCON	CONSOLIDATION TEST RESULTS		Project No.: T2875-22-02	
	ASTM D-2435		PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA	
	Checked by: ADL		June 2024	Figure B-9

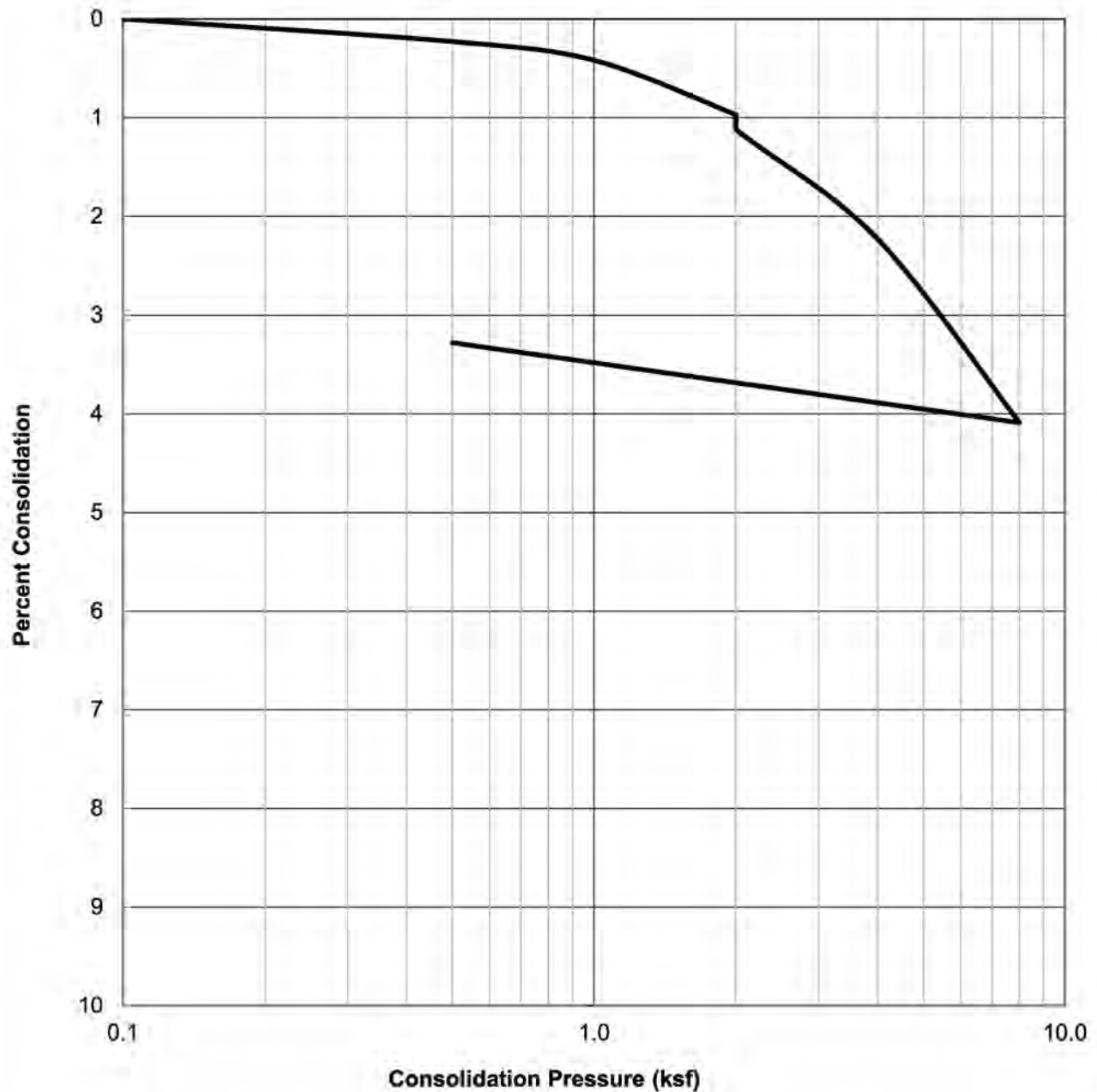
WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3@10	Silty SAND (SM), orangish brown	111.7	3.2	15.6

 GEOCON	CONSOLIDATION TEST RESULTS ASTM D-2435		Project No.: T2875-22-02	
			PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA	
	Checked by: ADL	June 2024		
		Figure B-10		

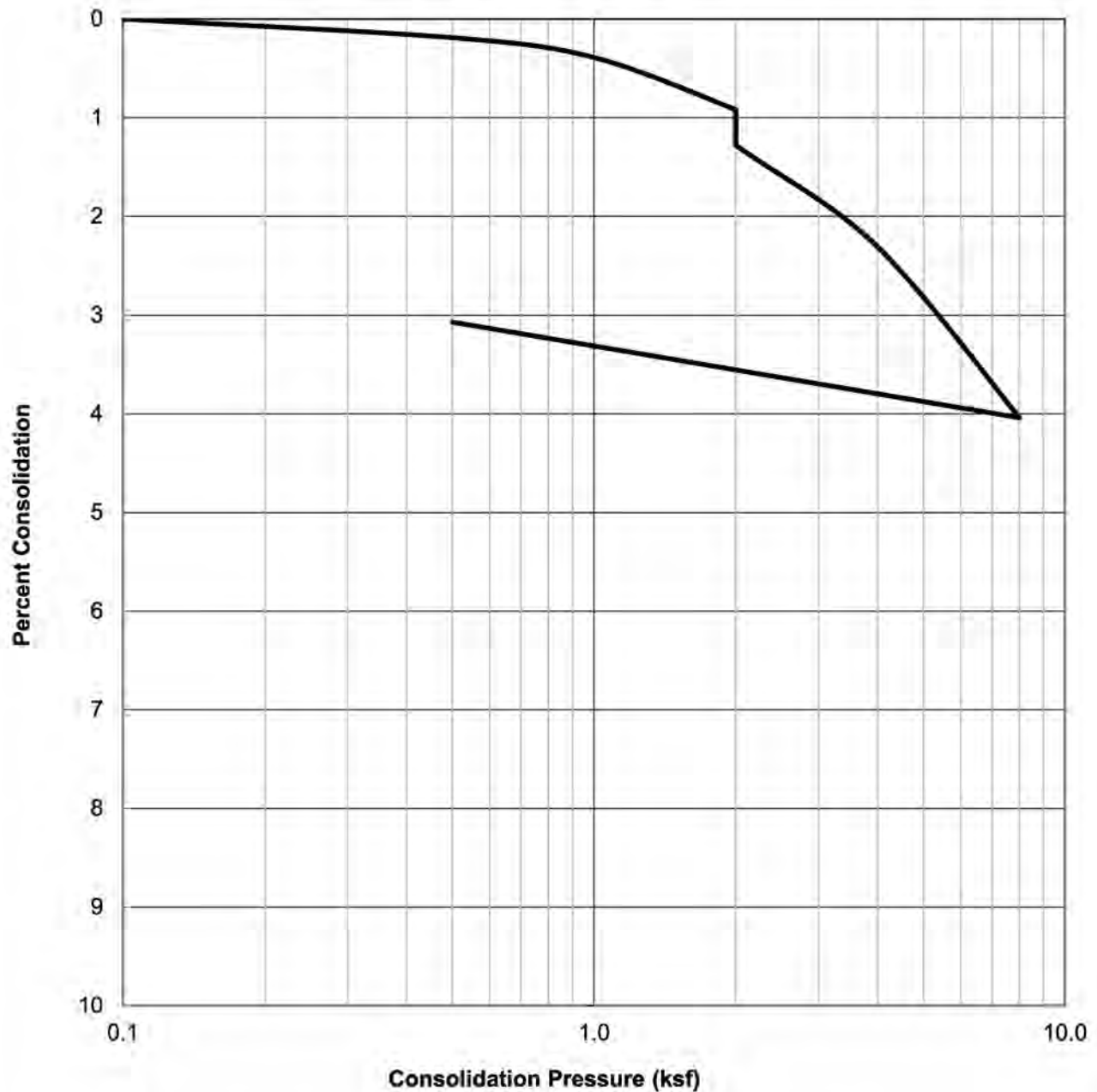
WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-4@2.5	Silty SAND (SM), reddish brown	117.9	10.4	13.6

 GEOCON	CONSOLIDATION TEST RESULTS ASTM D-2435	Project No.: T2875-22-02	
		PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA	
	Checked by: ADL	June 2024	Figure B-11

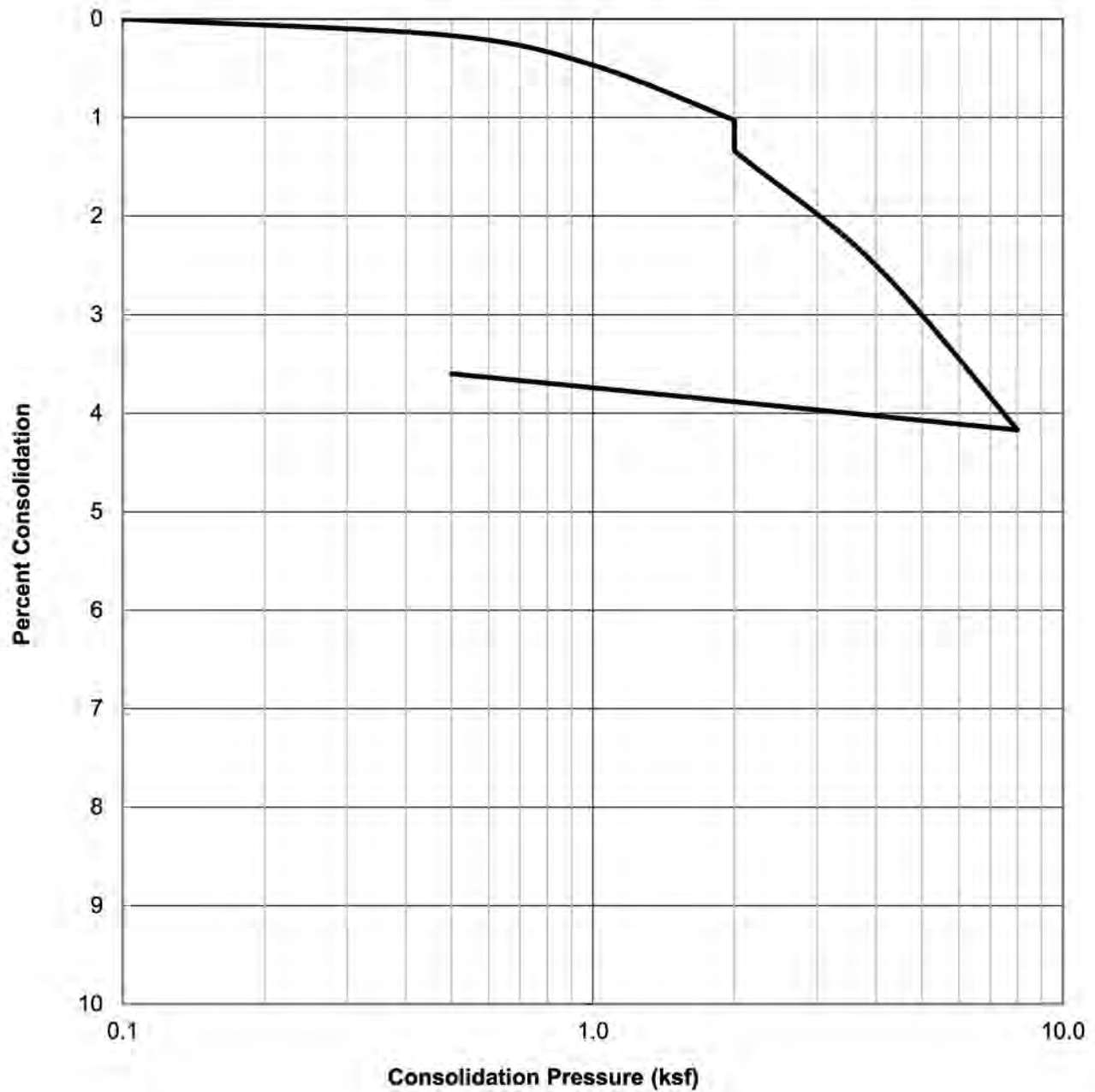
WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-4@5	Silty SAND (SM), reddish brown	117.0	11.0	14.8

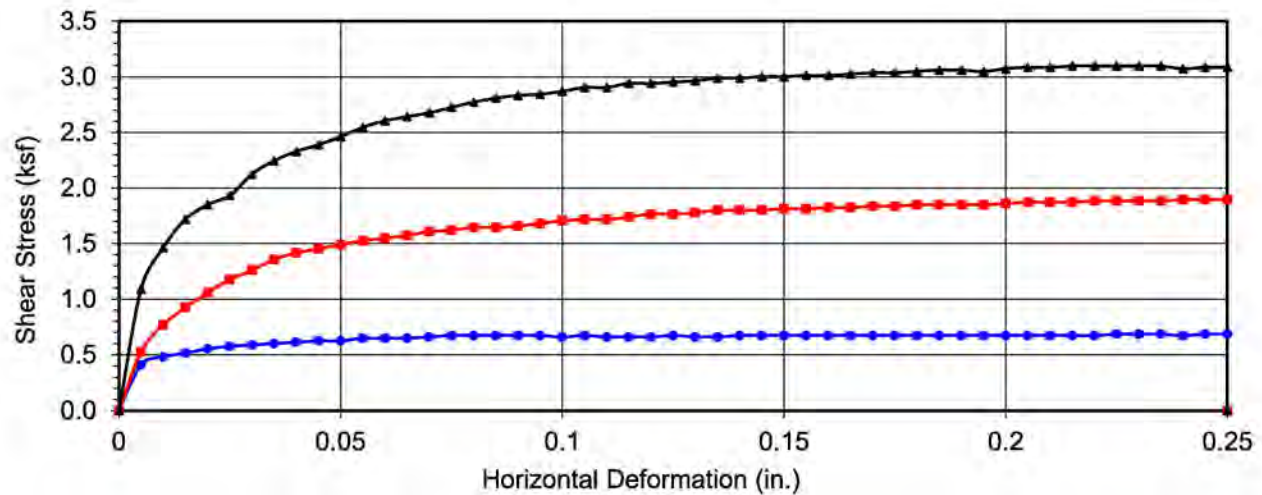
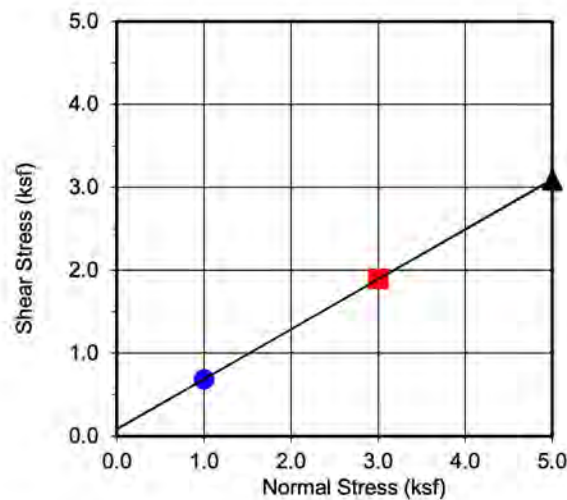
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		PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA	
	Checked by: ADL	June 2024	Figure B-12

WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-6@2.5	Silty SAND (SM), reddish brown	115.0	8.6	16.2

 GEOCON	CONSOLIDATION TEST RESULTS		Project No.: T2875-22-02
	ASTM D-2435		PROPOSED INLAND EMPIRE TECHNICAL TRADE CENTER - ADESSA SITE 6464 33RD STREET, JURUPA VALLEY, CALIFORNIA
	Checked by: ADL		June 2024 Figure B-13



Boring No.	B-2
Sample No.	B-2@1-5
Depth (ft)	1-5
Sample Type:	Bulk

Soil Identification:		
Silty SAND (SM), reddish brown		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	83	31
Ultimate	88	31

Normal Stress (kip/ft²)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.68	■ 1.90	▲ 3.10
Shear Stress @ End of Test (ksf)	○ 0.68	□ 1.90	△ 3.08
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	7.9	8.1	8.1
Initial Dry Density (pcf)	119.0	119.0	119.0
Initial Degree of Saturation (%)	51.3	52.6	52.8
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	12.7	11.6	10.2



DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

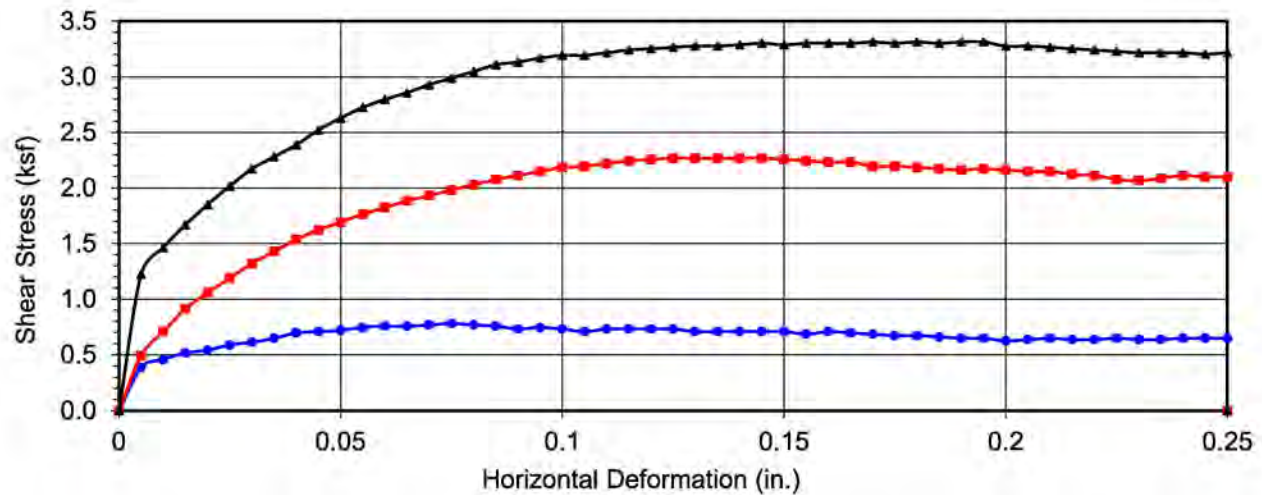
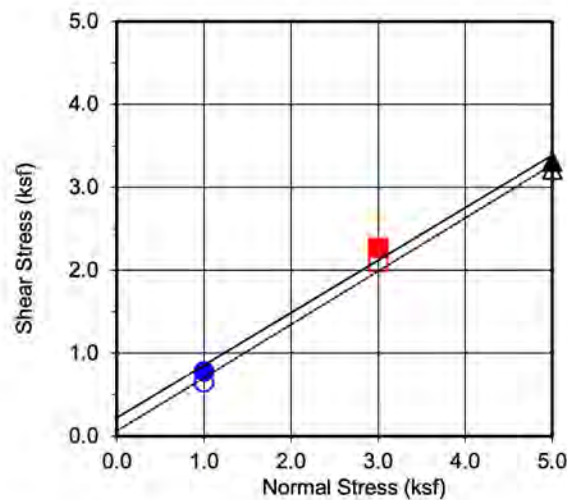
Checked by: ADL

Project No.: T2875-22-02

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESSA SITE
6464 33RD STREET, JURUPA VALLEY, CALIFORNIA

June 2024

Figure B-14



Boring No.	B-3
Sample No.	B-3@2.5
Depth (ft)	2.5
Sample Type:	Ring

Soil Identification:		
Silty SAND (SM), reddish brown		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	221	32
Ultimate	62	33

Normal Stress (kip/ft²)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.78	■ 2.27	▲ 3.31
Shear Stress @ End of Test (ksf)	○ 0.65	□ 2.10	△ 3.22
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	10.1	9.7	11.0
Initial Dry Density (pcf)	111.4	115.7	114.9
Initial Degree of Saturation (%)	53.4	57.0	63.5
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	15.3	13.5	14.1



DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

Checked by: ADL

Project No.: T2875-22-02

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESSA SITE
6464 33RD STREET, JURUPA VALLEY, CALIFORNIA

June 2024

Figure B-15

Sample No:

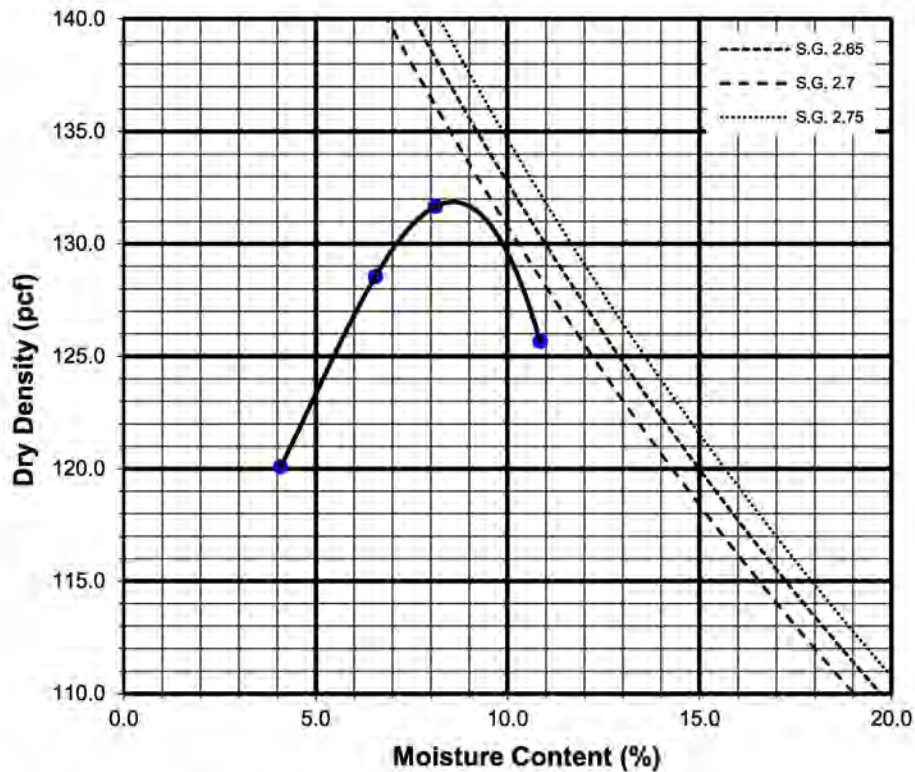
B-2@1-5

Silty SAND (SM), reddish brown

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	6405	6359	6324	6143		
Weight of Mold	(g)	4255	4255	4255	4255		
Net Weight of Soil	(g)	2150	2104	2069	1888		
Wet Weight of Soil + Cont.	(g)	764.1	679.2	753.5	694.0		
Dry Weight of Soil + Cont.	(g)	726.0	637.9	723.0	676.9		
Weight of Container	(g)	256.8	257.1	257.6	258.2		
Moisture Content	(%)	8.1	10.8	6.6	4.1		
Wet Density	(pcf)	142.4	139.3	137.0	125.0		
Dry Density	(pcf)	131.7	125.7	128.6	120.1		

Maximum Dry Density (pcf) 132.0

Optimum Moisture Content (%) 8.0



Preparation Method: A



**COMPACTION CHARACTERISTICS USING
MODIFIED EFFORT TEST RESULTS**

ASTM D-1557

Checked by: ADL

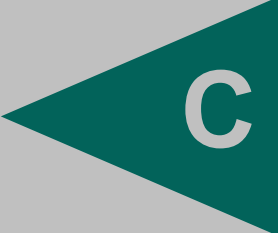
Project No.: T2875-22-02

PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER - ADESSA SITE
6464 33RD STREET, JURUPA VALLEY, CALIFORNIA

June 2024

Figure B-16

APPENDIX

A teal pennant graphic pointing to the left, containing the letter 'C' in white.

C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

**PROPOSED INLAND EMPIRE TECHNICAL
TRADE CENTER – ADESA SITE
6363 34TH STREET
JURUPA VALLEY, CALIFORNIA**

PROJECT NO. T2875-22-02

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

- 1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.
- 1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.
- 1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

- 2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.
- 2.2 **Contractor** shall refer to the Contractor performing the site grading work.
- 2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.
- 2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

- 2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.
- 2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.
- 2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

- 3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.
- 3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than $\frac{3}{4}$ inch in size.
- 3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.
- 3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than $\frac{3}{4}$ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.
- 3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.
- 3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

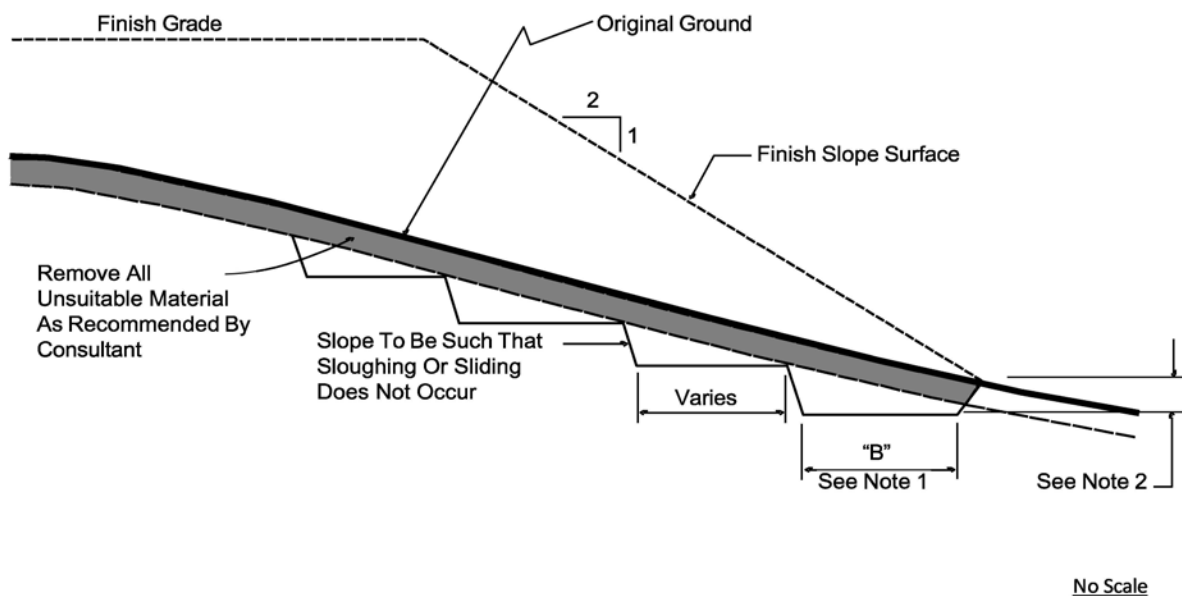
- 3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.
- 3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.
- 3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

- 4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.
- 4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

- 4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.
- 4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



- DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.
- (2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

- 4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

- 5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.
- 5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

- 6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:
- 6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.
- 6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.
- 6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.
- 6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.
- 6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

- 6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.
 - 6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.
 - 6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.
- 6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:
- 6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.
 - 6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.
 - 6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.
 - 6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

- 6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.
- 6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.
- 6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:
- 6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.
- 6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.
- 6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

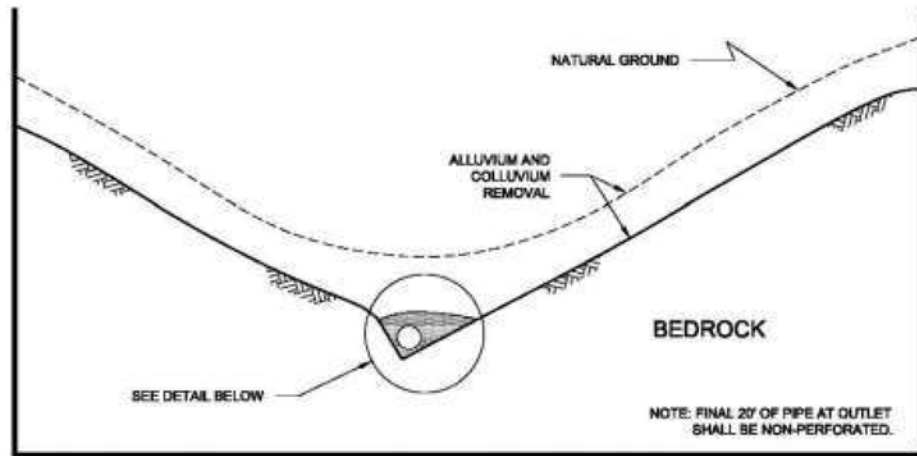
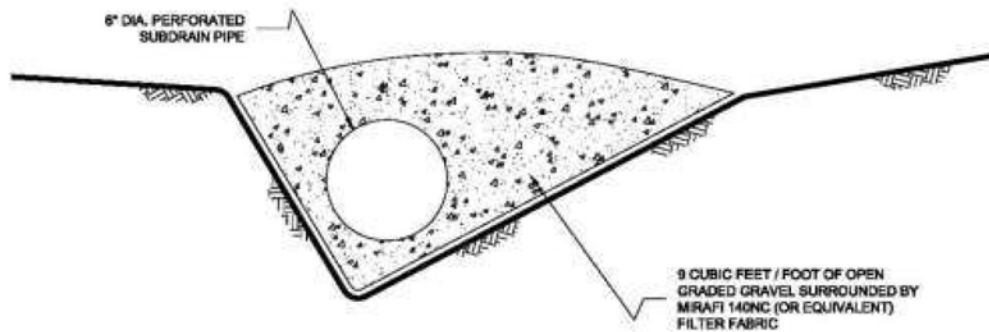
variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

- 6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of “passes” have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.
- 6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.
- 6.3.6 To reduce the potential for “piping” of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.
- 6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

- 7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL



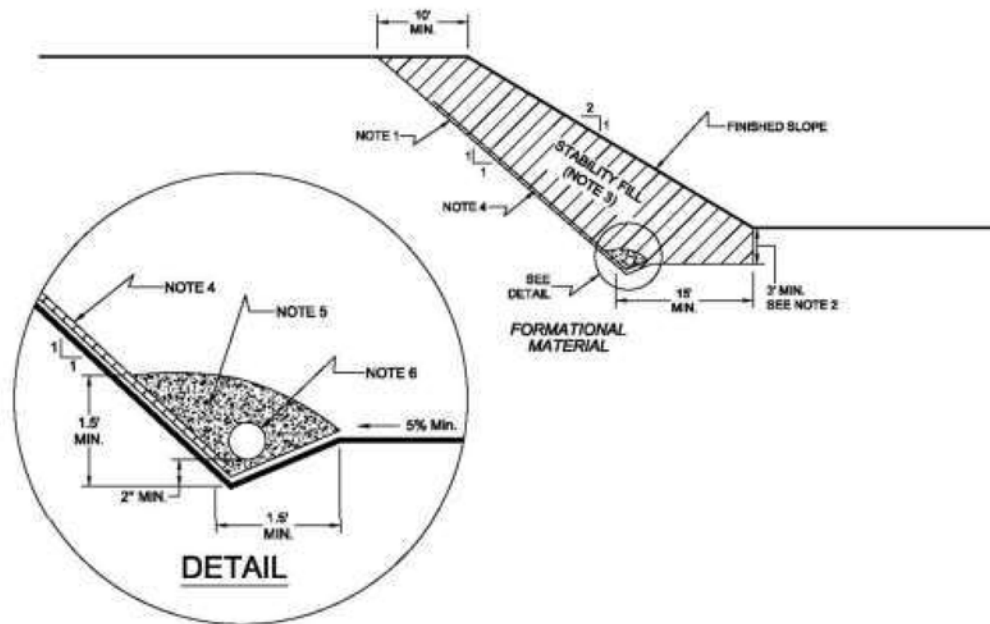
NOTES:

- 1.....8-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.
- 2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or larger) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

- 1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).
- 2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.
- 3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.
- 4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.
- 5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).
- 6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

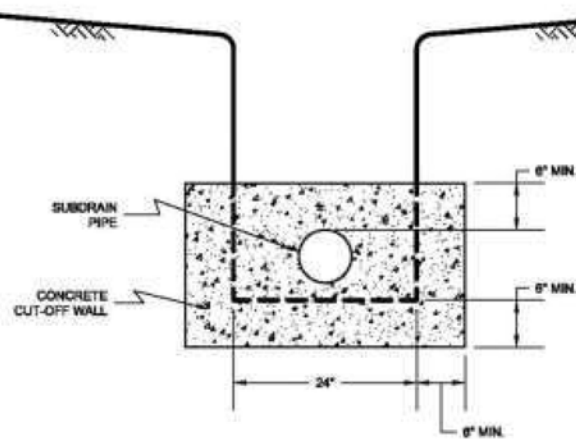
NO SCALE

- 7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.
- 7.4 *Rock fill or soil-rock fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. Rock fill drains should be constructed using the same requirements as canyon subdrains.*

- 7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

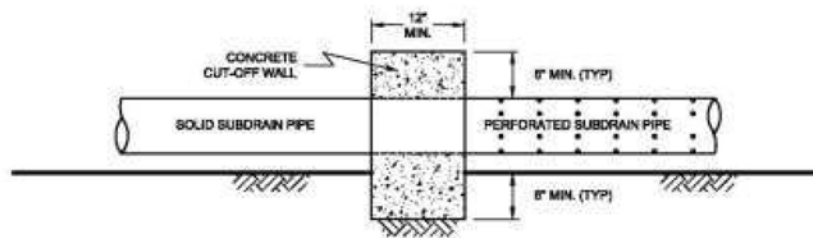
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

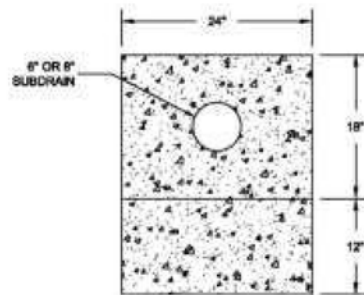


NO SCALE

- 7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

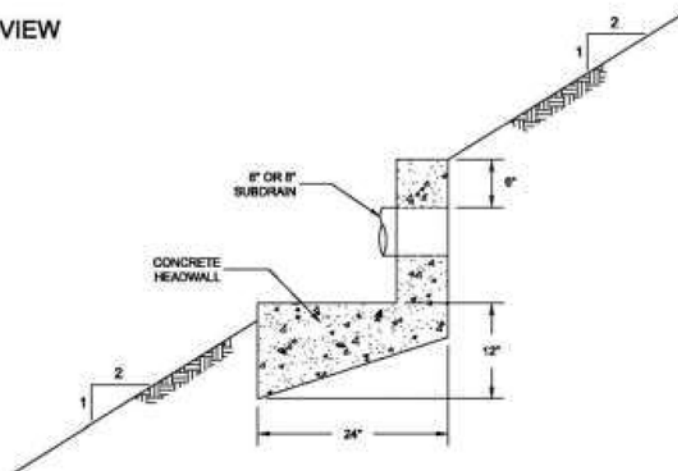
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE
OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

- 7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

- 8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.
- 8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.
- 8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.
- 8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.
- 8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.
- 8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

- 8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method*.

- 8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)*.
- 8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.
- 8.6.1.4 Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

- 9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.
- 9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

- 10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.
- 10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

Appendix G
Hydrology Exhibits

HYDROLOGY INFORMATION

SITE AREA:	9.68 ACRES	
SOIL TYPE:	A	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	100%	(PER CALCULATIONS)
ISOHYETALS:	0.69 INCH	(85TH PERCENTILE)
	1.15	(100-YEAR, 1-HR)
CURVE NUMBER:	32	(SOIL GROUP A)
FREQUENCY:	85TH PERCENTILE	(FOR STORMWATER QUALITY)
METHOD:	RIVERSIDE COUNTY HYDROLOGY MANUAL	

HYDROLOGY INFORMATION

SITE AREA:	9.68 ACRES	
SOIL TYPE:	A	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	66.1%	(PER CALCULATIONS)
ISOHYETALS:	0.69 INCH	(85TH PERCENTILE)
	1.15	(100-YEAR, 1-HR)
CURVE NUMBER:	32	(SOIL GROUP A)
FREQUENCY:	85TH PERCENTILE	(FOR STORMWATER QUALITY)
METHOD:	RIVERSIDE COUNTY HYDROLOGY MANUAL	

Appendix H

Rational Method Analysis

Appendix H.I

Rational Method Analysis Pre-Development Conditions 2-Year Storm

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/10/26 File:RCCDPRe2RatA.out

RCCD - PHASE I
RATIONAL METHOD
2-YEAR STORM
PRE DEVELOPMENT - DA A (NATURAL CONDITIONS)

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6443

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.464(In.)
100 year, 1 hour precipitation = 1.150(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.464(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 1.100 to Point/Station 1.110
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 704.100(Ft.)
Top (of initial area) elevation = 890.230(Ft.)
Bottom (of initial area) elevation = 879.000(Ft.)
Difference in elevation = 11.230(Ft.)
Slope = 0.01595 s(percent)= 1.59
 $TC = k(0.530)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 16.702 min.
Rainfall intensity = 0.938(In/Hr) for a 2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.349
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 47.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 3.168(CFS)
Total initial stream area = 9.680(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 9.68 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 67.0

Appendix H.II

Rational Method Analysis Pre-Development Conditions 10-Year Storm

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/10/26 File:RCCDPRe10RatA.out

RCCD - PHASE I
RATIONAL METHOD
10-YEAR STORM
PRE DEVELOPMENT - DA A (EXISTING CONDITIONS)

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6443

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.464(In.)
100 year, 1 hour precipitation = 1.150(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.746(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 1.100 to Point/Station 1.110
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 704.100(Ft.)
Top (of initial area) elevation = 890.230(Ft.)
Bottom (of initial area) elevation = 879.000(Ft.)
Difference in elevation = 11.230(Ft.)
Slope = 0.01595 s(percent)= 1.59
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 9.454 min.
Rainfall intensity = 2.062(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.848
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 16.923(CFS)
Total initial stream area = 9.680(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 9.68 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 32.0

Appendix H.III

Rational Method Analysis Pre-Development Conditions 100-Year Storm

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/10/26 File:RCCDPRe100RatA.out

RCCD - PHASE I
RATIONAL METHOD
100-YEAR STORM
PRE DEVELOPMENT - DA A (EXISTING CONDITIONS)

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6443

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.464(In.)
100 year, 1 hour precipitation = 1.150(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.150(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 1.100 to Point/Station 1.110
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 704.100(Ft.)
Top (of initial area) elevation = 890.230(Ft.)
Bottom (of initial area) elevation = 879.000(Ft.)
Difference in elevation = 11.230(Ft.)
Slope = 0.01595 s(percent)= 1.59
TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 9.454 min.
Rainfall intensity = 3.178(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 52.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 26.910(CFS)
Total initial stream area = 9.680(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 9.68 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 32.0

Appendix H.IV

Rational Method Analysis Post-Development Conditions 2-Year Storm

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/13/26 File:RCCDPost2RatA.out

RCCD - PHASE I
RATIONAL METHOD
2-YEAR STORM
POST DEVELOPMENT - DA A

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6443

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.464(In.)
100 year, 1 hour precipitation = 1.150(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.464(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 1.100 to Point/Station 1.110
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 222.920(Ft.)
Top (of initial area) elevation = 892.920(Ft.)
Bottom (of initial area) elevation = 889.790(Ft.)
Difference in elevation = 3.130(Ft.)
Slope = 0.01404 s(percent)= 1.40
TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.122 min.
Rainfall intensity = 1.628(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.827
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 16.20
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.131(CFS)
Total initial stream area = 0.840(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.110 to Point/Station 1.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 884.790(Ft.)

Downstream point/station elevation = 878.300(Ft.)
Pipe length = 498.82(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.131(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.131(CFS)
Normal flow depth in pipe = 5.02(In.)
Flow top width inside pipe = 8.94(In.)
Critical Depth = 5.87(In.)
Pipe flow velocity = 4.46(Ft/s)
Travel time through pipe = 1.86 min.
Time of concentration (TC) = 7.98 min.

+++++
Process from Point/Station 1.220 to Point/Station 1.220
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.840(Ac.)
Runoff from this stream = 1.131(CFS)
Time of concentration = 7.98 min.
Rainfall intensity = 1.407(In/Hr)

+++++
Process from Point/Station 1.200 to Point/Station 1.210
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 467.090(Ft.)
Top (of initial area) elevation = 891.470(Ft.)
Bottom (of initial area) elevation = 883.360(Ft.)
Difference in elevation = 8.110(Ft.)
Slope = 0.01736 s(percent)= 1.74
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.888 min.
Rainfall intensity = 1.416(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.825
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 16.20
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 2.911(CFS)
Total initial stream area = 2.490(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.210 to Point/Station 1.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.360(Ft.)
Downstream point/station elevation = 878.300(Ft.)
Pipe length = 12.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.911(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 2.911(CFS)
Normal flow depth in pipe = 8.79(In.)
Flow top width inside pipe = 14.78(In.)
Critical Depth = 8.23(In.)
Pipe flow velocity = 3.90(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 7.94 min.

+++++
Process from Point/Station 1.220 to Point/Station 1.220

**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2

Stream flow area = 2.490(Ac.)
 Runoff from this stream = 2.911(CFS)
 Time of concentration = 7.94 min.
 Rainfall intensity = 1.411(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	1.131	7.98	1.407
2	2.911	7.94	1.411

Largest stream flow has longer or shorter time of concentration

Qp = 2.911 + sum of
 Qa Tb/Ta
 1.131 * 0.995 = 1.125
 Qp = 4.036

Total of 2 streams to confluence:

Flow rates before confluence point:

1.131 2.911

Area of streams before confluence:

0.840 2.490

Results of confluence:

Total flow rate = 4.036(CFS)
 Time of concentration = 7.941 min.
 Effective stream area after confluence = 3.330(Ac.)

 Process from Point/Station 1.220 to Point/Station 1.320
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.300(Ft.)
 Downstream point/station elevation = 877.230(Ft.)
 Pipe length = 214.49(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.036(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 4.036(CFS)
 Normal flow depth in pipe = 10.97(In.)
 Flow top width inside pipe = 13.30(In.)
 Critical Depth = 9.76(In.)
 Pipe flow velocity = 4.20(Ft/s)
 Travel time through pipe = 0.85 min.
 Time of concentration (TC) = 8.79 min.

 Process from Point/Station 1.320 to Point/Station 1.320
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1

Stream flow area = 3.330(Ac.)
 Runoff from this stream = 4.036(CFS)
 Time of concentration = 8.79 min.
 Rainfall intensity = 1.334(In/Hr)

 Process from Point/Station 1.300 to Point/Station 1.310
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 156.980(Ft.)
 Top (of initial area) elevation = 884.500(Ft.)
 Bottom (of initial area) elevation = 882.430(Ft.)
 Difference in elevation = 2.070(Ft.)

Slope = 0.01319 s(percent)= 1.32
 TC = $k(0.300)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
 Initial area time of concentration = 5.388 min.
 Rainfall intensity = 1.747(In/Hr) for a 2.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.828
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 1) = 16.20
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 3.443(CFS)
 Total initial stream area = 2.380(Ac.)
 Pervious area fraction = 0.100

++++++
 Process from Point/Station 1.310 to Point/Station 1.320
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 877.430(Ft.)
 Downstream point/station elevation = 877.230(Ft.)
 Pipe length = 6.71(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 3.443(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 3.443(CFS)
 Normal flow depth in pipe = 6.42(In.)
 Flow top width inside pipe = 11.97(In.)
 Critical Depth = 9.52(In.)
 Pipe flow velocity = 8.05(Ft/s)
 Travel time through pipe = 0.01 min.
 Time of concentration (TC) = 5.40 min.

++++++
 Process from Point/Station 1.320 to Point/Station 1.320
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 2.380(Ac.)
 Runoff from this stream = 3.443(CFS)
 Time of concentration = 5.40 min.
 Rainfall intensity = 1.744(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	4.036	8.79	1.334
2	3.443	5.40	1.744

Largest stream flow has longer time of concentration

Qp = 4.036 + sum of
 Qb Ia/Ib
 3.443 * 0.765 = 2.634
 Qp = 6.670

Total of 2 streams to confluence:
 Flow rates before confluence point:
 4.036 3.443

Area of streams before confluence:
 3.330 2.380

Results of confluence:
 Total flow rate = 6.670(CFS)
 Time of concentration = 8.792 min.
 Effective stream area after confluence = 5.710(Ac.)

+++++
Process from Point/Station 1.320 to Point/Station 1.530
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 877.230(Ft.)
Downstream point/station elevation = 875.040(Ft.)
Pipe length = 437.04(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.670(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.670(CFS)
Normal flow depth in pipe = 13.31(In.)
Flow top width inside pipe = 15.80(In.)
Critical Depth = 12.00(In.)
Pipe flow velocity = 4.76(Ft/s)
Travel time through pipe = 1.53 min.
Time of concentration (TC) = 10.32 min.

+++++
Process from Point/Station 1.530 to Point/Station 1.530
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 5.710(Ac.)
Runoff from this stream = 6.670(CFS)
Time of concentration = 10.32 min.
Rainfall intensity = 1.222(In/Hr)
Program is now starting with Main Stream No. 2

+++++
Process from Point/Station 1.400 to Point/Station 1.410
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 313.310(Ft.)
Top (of initial area) elevation = 890.210(Ft.)
Bottom (of initial area) elevation = 883.520(Ft.)
Difference in elevation = 6.690(Ft.)
Slope = 0.02135 s(percent)= 2.14
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.451 min.
Rainfall intensity = 1.582(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.827
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 16.20
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.942(CFS)
Total initial stream area = 0.720(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.410 to Point/Station 1.520
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.520(Ft.)
Downstream point/station elevation = 873.450(Ft.)
Pipe length = 142.13(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.942(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 0.942(CFS)
Normal flow depth in pipe = 4.41(In.)
Flow top width inside pipe = 5.30(In.)
Critical Depth = 5.59(In.)

Pipe flow velocity = 6.10(Ft/s)
Travel time through pipe = 0.39 min.
Time of concentration (TC) = 6.84 min.

+++++
Process from Point/Station 1.520 to Point/Station 1.520
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.720(Ac.)
Runoff from this stream = 0.942(CFS)
Time of concentration = 6.84 min.
Rainfall intensity = 1.532(In/Hr)

+++++
Process from Point/Station 1.500 to Point/Station 1.510
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 382.350(Ft.)
Top (of initial area) elevation = 886.800(Ft.)
Bottom (of initial area) elevation = 879.410(Ft.)
Difference in elevation = 7.390(Ft.)
Slope = 0.01933 s(percent)= 1.93
TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.126 min.
Rainfall intensity = 1.498(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.826
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 16.20
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 4.021(CFS)
Total initial stream area = 3.250(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.510 to Point/Station 1.520
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 874.410(Ft.)
Downstream point/station elevation = 873.450(Ft.)
Pipe length = 191.99(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.021(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 4.021(CFS)
Normal flow depth in pipe = 10.92(In.)
Flow top width inside pipe = 13.35(In.)
Critical Depth = 9.74(In.)
Pipe flow velocity = 4.20(Ft/s)
Travel time through pipe = 0.76 min.
Time of concentration (TC) = 7.89 min.

+++++
Process from Point/Station 1.520 to Point/Station 1.520
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 3.250(Ac.)
Runoff from this stream = 4.021(CFS)
Time of concentration = 7.89 min.
Rainfall intensity = 1.416(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	0.942	6.84	1.532
2	4.021	7.89	1.416

Largest stream flow has longer time of concentration

Qp = 4.021 + sum of

$$Qb \quad Ia/Ib$$

$$0.942 * 0.925 = 0.871$$
Qp = 4.892

Total of 2 streams to confluence:

Flow rates before confluence point:

0.942 4.021

Area of streams before confluence:

0.720 3.250

Results of confluence:

Total flow rate = 4.892(CFS)

Time of concentration = 7.888 min.

Effective stream area after confluence = 3.970(Ac.)

Process from Point/Station 1.520 to Point/Station 1.530
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 873.450(Ft.)
Downstream point/station elevation = 872.730(Ft.)
Pipe length = 143.33(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.892(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 4.892(CFS)
Normal flow depth in pipe = 10.64(In.)
Flow top width inside pipe = 17.70(In.)
Critical Depth = 10.20(In.)
Pipe flow velocity = 4.50(Ft/s)
Travel time through pipe = 0.53 min.
Time of concentration (TC) = 8.42 min.

Process from Point/Station 1.530 to Point/Station 1.530
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2

Stream flow area = 3.970(Ac.)

Runoff from this stream = 4.892(CFS)

Time of concentration = 8.42 min.

Rainfall intensity = 1.366(In/Hr)

Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	6.670	10.32	1.222
2	4.892	8.42	1.366

Largest stream flow has longer time of concentration

Qp = 6.670 + sum of

$$Qb \quad Ia/Ib$$

$$4.892 * 0.894 = 4.373$$
Qp = 11.042

Total of 2 main streams to confluence:

Flow rates before confluence point:

6.670 4.892

Area of streams before confluence:
5.710 3.970

Results of confluence:
Total flow rate = 11.042(CFS)
Time of concentration = 10.323 min.
Effective stream area after confluence = 9.680(Ac.)

+++++
Process from Point/Station 1.530 to Point/Station 1.540
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 872.730(Ft.)
Downstream point/station elevation = 872.280(Ft.)
Pipe length = 91.27(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.042(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 11.042(CFS)
Normal flow depth in pipe = 17.06(In.)
Flow top width inside pipe = 16.39(In.)
Critical Depth = 14.86(In.)
Pipe flow velocity = 5.27(Ft/s)
Travel time through pipe = 0.29 min.
Time of concentration (TC) = 10.61 min.
End of computations, total study area = 9.68 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 32.0

Appendix H.V

Rational Method Analysis Post-Development Conditions 10-Year Storm

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/13/26 File:RCCDPost10RatA.out

RCCD - PHASE I
RATIONAL METHOD
10-YEAR STORM
POST DEVELOPMENT - DA A

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6443

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.464(In.)
100 year, 1 hour precipitation = 1.150(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.746(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 1.100 to Point/Station 1.110
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 222.920(Ft.)
Top (of initial area) elevation = 892.920(Ft.)
Bottom (of initial area) elevation = 889.790(Ft.)
Difference in elevation = 3.130(Ft.)
Slope = 0.01404 s(percent)= 1.40
TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.122 min.
Rainfall intensity = 2.619(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.877(CFS)
Total initial stream area = 0.840(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.110 to Point/Station 1.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 884.790(Ft.)

Downstream point/station elevation = 878.300(Ft.)
Pipe length = 498.82(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.877(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.877(CFS)
Normal flow depth in pipe = 7.34(In.)
Flow top width inside pipe = 6.99(In.)
Critical Depth = 7.50(In.)
Pipe flow velocity = 4.87(Ft/s)
Travel time through pipe = 1.71 min.
Time of concentration (TC) = 7.83 min.

+++++
Process from Point/Station 1.220 to Point/Station 1.220
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.840(Ac.)
Runoff from this stream = 1.877(CFS)
Time of concentration = 7.83 min.
Rainfall intensity = 2.287(In/Hr)

+++++
Process from Point/Station 1.200 to Point/Station 1.210
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 467.090(Ft.)
Top (of initial area) elevation = 891.470(Ft.)
Bottom (of initial area) elevation = 883.360(Ft.)
Difference in elevation = 8.110(Ft.)
Slope = 0.01736 s(percent)= 1.74
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.888 min.
Rainfall intensity = 2.278(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 4.822(CFS)
Total initial stream area = 2.490(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.210 to Point/Station 1.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.360(Ft.)
Downstream point/station elevation = 878.300(Ft.)
Pipe length = 12.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.822(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 4.822(CFS)
Normal flow depth in pipe = 10.68(In.)
Flow top width inside pipe = 17.69(In.)
Critical Depth = 10.14(In.)
Pipe flow velocity = 4.42(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 7.93 min.

+++++
Process from Point/Station 1.220 to Point/Station 1.220

**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 2.490(Ac.)
 Runoff from this stream = 4.822(CFS)
 Time of concentration = 7.93 min.
 Rainfall intensity = 2.270(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	1.877	7.83	2.287
2	4.822	7.93	2.270

Largest stream flow has longer time of concentration

Qp = 4.822 + sum of
 Qb Ia/Ib
 1.877 * 0.993 = 1.863
 Qp = 6.685

Total of 2 streams to confluence:

Flow rates before confluence point:

1.877 4.822

Area of streams before confluence:

0.840 2.490

Results of confluence:

Total flow rate = 6.685(CFS)

Time of concentration = 7.935 min.

Effective stream area after confluence = 3.330(Ac.)

+++++
 Process from Point/Station 1.220 to Point/Station 1.320
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.300(Ft.)
 Downstream point/station elevation = 877.230(Ft.)
 Pipe length = 214.49(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 6.685(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 6.685(CFS)
 Normal flow depth in pipe = 13.36(In.)
 Flow top width inside pipe = 15.75(In.)
 Critical Depth = 12.00(In.)
 Pipe flow velocity = 4.75(Ft/s)
 Travel time through pipe = 0.75 min.
 Time of concentration (TC) = 8.69 min.

+++++
 Process from Point/Station 1.320 to Point/Station 1.320
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
 Stream flow area = 3.330(Ac.)
 Runoff from this stream = 6.685(CFS)
 Time of concentration = 8.69 min.
 Rainfall intensity = 2.160(In/Hr)

+++++
 Process from Point/Station 1.300 to Point/Station 1.310
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 156.980(Ft.)
 Top (of initial area) elevation = 884.500(Ft.)
 Bottom (of initial area) elevation = 882.430(Ft.)
 Difference in elevation = 2.070(Ft.)

Slope = 0.01319 s(percent)= 1.32
 TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 5.388 min.
 Rainfall intensity = 2.809(In/Hr) for a 10.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.855
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 32.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 5.715(CFS)
 Total initial stream area = 2.380(Ac.)
 Pervious area fraction = 0.100

+-----+
 Process from Point/Station 1.310 to Point/Station 1.320
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 877.430(Ft.)
 Downstream point/station elevation = 877.230(Ft.)
 Pipe length = 6.71(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 5.715(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 5.715(CFS)
 Normal flow depth in pipe = 9.14(In.)
 Flow top width inside pipe = 10.22(In.)
 Critical Depth = 11.36(In.)
 Pipe flow velocity = 8.89(Ft/s)
 Travel time through pipe = 0.01 min.
 Time of concentration (TC) = 5.40 min.

+-----+
 Process from Point/Station 1.320 to Point/Station 1.320
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 2.380(Ac.)
 Runoff from this stream = 5.715(CFS)
 Time of concentration = 5.40 min.
 Rainfall intensity = 2.805(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	6.685	8.69	2.160
2	5.715	5.40	2.805

Largest stream flow has longer time of concentration

Qp = 6.685 + sum of
 Qb Ia/Ib
 5.715 * 0.770 = 4.400
 Qp = 11.085

Total of 2 streams to confluence:
 Flow rates before confluence point:
 6.685 5.715

Area of streams before confluence:
 3.330 2.380

Results of confluence:
 Total flow rate = 11.085(CFS)
 Time of concentration = 8.687 min.
 Effective stream area after confluence = 5.710(Ac.)

+++++
Process from Point/Station 1.320 to Point/Station 1.530
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 877.230(Ft.)
Downstream point/station elevation = 875.040(Ft.)
Pipe length = 437.04(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.085(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 11.085(CFS)
Normal flow depth in pipe = 16.99(In.)
Flow top width inside pipe = 16.50(In.)
Critical Depth = 14.88(In.)
Pipe flow velocity = 5.32(Ft/s)
Travel time through pipe = 1.37 min.
Time of concentration (TC) = 10.06 min.

+++++
Process from Point/Station 1.530 to Point/Station 1.530
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 5.710(Ac.)
Runoff from this stream = 11.085(CFS)
Time of concentration = 10.06 min.
Rainfall intensity = 1.993(In/Hr)
Program is now starting with Main Stream No. 2

+++++
Process from Point/Station 1.400 to Point/Station 1.410
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 313.310(Ft.)
Top (of initial area) elevation = 890.210(Ft.)
Bottom (of initial area) elevation = 883.520(Ft.)
Difference in elevation = 6.690(Ft.)
Slope = 0.02135 s(percent)= 2.14
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.451 min.
Rainfall intensity = 2.544(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.562(CFS)
Total initial stream area = 0.720(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.410 to Point/Station 1.520
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.520(Ft.)
Downstream point/station elevation = 873.450(Ft.)
Pipe length = 142.13(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.562(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.562(CFS)
Normal flow depth in pipe = 4.50(In.)
Flow top width inside pipe = 9.00(In.)
Critical Depth = 6.90(In.)

Pipe flow velocity = 7.07(Ft/s)
Travel time through pipe = 0.33 min.
Time of concentration (TC) = 6.79 min.

+++++
Process from Point/Station 1.520 to Point/Station 1.520
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.720(Ac.)
Runoff from this stream = 1.562(CFS)
Time of concentration = 6.79 min.
Rainfall intensity = 2.474(In/Hr)

+++++
Process from Point/Station 1.500 to Point/Station 1.510
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 382.350(Ft.)
Top (of initial area) elevation = 886.800(Ft.)
Bottom (of initial area) elevation = 879.410(Ft.)
Difference in elevation = 7.390(Ft.)
Slope = 0.01933 s(percent)= 1.93
TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.126 min.
Rainfall intensity = 2.409(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.851
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 6.665(CFS)
Total initial stream area = 3.250(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.510 to Point/Station 1.520
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 874.410(Ft.)
Downstream point/station elevation = 873.450(Ft.)
Pipe length = 191.99(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.665(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.665(CFS)
Normal flow depth in pipe = 13.31(In.)
Flow top width inside pipe = 15.80(In.)
Critical Depth = 12.00(In.)
Pipe flow velocity = 4.75(Ft/s)
Travel time through pipe = 0.67 min.
Time of concentration (TC) = 7.80 min.

+++++
Process from Point/Station 1.520 to Point/Station 1.520
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 3.250(Ac.)
Runoff from this stream = 6.665(CFS)
Time of concentration = 7.80 min.
Rainfall intensity = 2.292(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	1.562	6.79	2.474
2	6.665	7.80	2.292

Largest stream flow has longer time of concentration

Qp = 6.665 + sum of

$$Q_b \quad I_a/I_b$$

$$1.562 * 0.926 = 1.447$$
Qp = 8.111

Total of 2 streams to confluence:

Flow rates before confluence point:

1.562 6.665

Area of streams before confluence:

0.720 3.250

Results of confluence:

Total flow rate = 8.111(CFS)

Time of concentration = 7.799 min.

Effective stream area after confluence = 3.970(Ac.)

Process from Point/Station 1.520 to Point/Station 1.530
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 873.450(Ft.)
Downstream point/station elevation = 872.730(Ft.)
Pipe length = 143.33(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.111(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 8.111(CFS)
Normal flow depth in pipe = 13.22(In.)
Flow top width inside pipe = 20.28(In.)
Critical Depth = 12.68(In.)
Pipe flow velocity = 5.08(Ft/s)
Travel time through pipe = 0.47 min.
Time of concentration (TC) = 8.27 min.

Process from Point/Station 1.530 to Point/Station 1.530
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2

Stream flow area = 3.970(Ac.)

Runoff from this stream = 8.111(CFS)

Time of concentration = 8.27 min.

Rainfall intensity = 2.219(In/Hr)

Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	11.085	10.06	1.993
2	8.111	8.27	2.219

Largest stream flow has longer time of concentration

Qp = 11.085 + sum of

$$Q_b \quad I_a/I_b$$

$$8.111 * 0.898 = 7.283$$
Qp = 18.368

Total of 2 main streams to confluence:

Flow rates before confluence point:

11.085 8.111

Area of streams before confluence:
5.710 3.970

Results of confluence:
Total flow rate = 18.368(CFS)
Time of concentration = 10.057 min.
Effective stream area after confluence = 9.680(Ac.)

+++++
Process from Point/Station 1.530 to Point/Station 1.540
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 872.730(Ft.)
Downstream point/station elevation = 872.280(Ft.)
Pipe length = 91.27(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 18.368(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 18.368(CFS)
Normal flow depth in pipe = 19.03(In.)
Flow top width inside pipe = 24.63(In.)
Critical Depth = 17.99(In.)
Pipe flow velocity = 6.13(Ft/s)
Travel time through pipe = 0.25 min.
Time of concentration (TC) = 10.31 min.
End of computations, total study area = 9.68 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 32.0

Appendix H.VI

Rational Method Analysis Post-Development Conditions 100-Year Storm

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
Rational Hydrology Study Date: 03/13/26 File:RCCDPost100RatA.out

RCCD - PHASE I
RATIONAL METHOD
100-YEAR STORM
POST DEVELOPMENT - DA A

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6443

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.464(In.)
100 year, 1 hour precipitation = 1.150(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.150(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 1.100 to Point/Station 1.110
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 222.920(Ft.)
Top (of initial area) elevation = 892.920(Ft.)
Bottom (of initial area) elevation = 889.790(Ft.)
Difference in elevation = 3.130(Ft.)
Slope = 0.01404 s(percent)= 1.40
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.122 min.
Rainfall intensity = 4.035(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 52.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 2.979(CFS)
Total initial stream area = 0.840(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.110 to Point/Station 1.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 884.790(Ft.)

Downstream point/station elevation = 878.300(Ft.)
Pipe length = 498.82(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.979(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.979(CFS)
Normal flow depth in pipe = 7.63(In.)
Flow top width inside pipe = 11.55(In.)
Critical Depth = 8.88(In.)
Pipe flow velocity = 5.65(Ft/s)
Travel time through pipe = 1.47 min.
Time of concentration (TC) = 7.59 min.

+++++
Process from Point/Station 1.220 to Point/Station 1.220
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.840(Ac.)
Runoff from this stream = 2.979(CFS)
Time of concentration = 7.59 min.
Rainfall intensity = 3.585(In/Hr)

+++++
Process from Point/Station 1.200 to Point/Station 1.210
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 467.090(Ft.)
Top (of initial area) elevation = 891.470(Ft.)
Bottom (of initial area) elevation = 883.360(Ft.)
Difference in elevation = 8.110(Ft.)
Slope = 0.01736 s(percent)= 1.74
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.888 min.
Rainfall intensity = 3.510(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 52.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 7.663(CFS)
Total initial stream area = 2.490(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.210 to Point/Station 1.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.360(Ft.)
Downstream point/station elevation = 878.300(Ft.)
Pipe length = 12.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.663(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 7.663(CFS)
Normal flow depth in pipe = 12.89(In.)
Flow top width inside pipe = 20.45(In.)
Critical Depth = 12.30(In.)
Pipe flow velocity = 4.95(Ft/s)
Travel time through pipe = 0.04 min.
Time of concentration (TC) = 7.93 min.

+++++
Process from Point/Station 1.220 to Point/Station 1.220

**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 2.490(Ac.)
 Runoff from this stream = 7.663(CFS)
 Time of concentration = 7.93 min.
 Rainfall intensity = 3.500(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	2.979	7.59	3.585
2	7.663	7.93	3.500

Largest stream flow has longer time of concentration

Qp = 7.663 + sum of
 Qb Ia/Ib
 2.979 * 0.976 = 2.909
 Qp = 10.572

Total of 2 streams to confluence:

Flow rates before confluence point:
 2.979 7.663

Area of streams before confluence:
 0.840 2.490

Results of confluence:

Total flow rate = 10.572(CFS)
 Time of concentration = 7.930 min.
 Effective stream area after confluence = 3.330(Ac.)

 Process from Point/Station 1.220 to Point/Station 1.320
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.300(Ft.)
 Downstream point/station elevation = 877.230(Ft.)
 Pipe length = 214.49(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 10.572(CFS)
 Nearest computed pipe diameter = 21.00(In.)
 Calculated individual pipe flow = 10.572(CFS)
 Normal flow depth in pipe = 16.27(In.)
 Flow top width inside pipe = 17.55(In.)
 Critical Depth = 14.54(In.)
 Pipe flow velocity = 5.29(Ft/s)
 Travel time through pipe = 0.68 min.
 Time of concentration (TC) = 8.60 min.

 Process from Point/Station 1.320 to Point/Station 1.320
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
 Stream flow area = 3.330(Ac.)
 Runoff from this stream = 10.572(CFS)
 Time of concentration = 8.60 min.
 Rainfall intensity = 3.346(In/Hr)

 Process from Point/Station 1.300 to Point/Station 1.310
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 156.980(Ft.)
 Top (of initial area) elevation = 884.500(Ft.)
 Bottom (of initial area) elevation = 882.430(Ft.)
 Difference in elevation = 2.070(Ft.)

Slope = 0.01319 s(percent)= 1.32
 TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 5.388 min.
 Rainfall intensity = 4.329(In/Hr) for a 100.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.880
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 3) = 52.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 9.068(CFS)
 Total initial stream area = 2.380(Ac.)
 Pervious area fraction = 0.100

+-----+
 Process from Point/Station 1.310 to Point/Station 1.320
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 877.430(Ft.)
 Downstream point/station elevation = 877.230(Ft.)
 Pipe length = 6.71(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 9.068(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 9.068(CFS)
 Normal flow depth in pipe = 10.27(In.)
 Flow top width inside pipe = 13.94(In.)
 Critical Depth = 13.89(In.)
 Pipe flow velocity = 10.12(Ft/s)
 Travel time through pipe = 0.01 min.
 Time of concentration (TC) = 5.40 min.

+-----+
 Process from Point/Station 1.320 to Point/Station 1.320
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 2.380(Ac.)
 Runoff from this stream = 9.068(CFS)
 Time of concentration = 5.40 min.
 Rainfall intensity = 4.324(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	10.572	8.60	3.346
2	9.068	5.40	4.324

Largest stream flow has longer time of concentration

Qp = 10.572 + sum of
 Qb Ia/Ib
 9.068 * 0.774 = 7.017
 Qp = 17.589

Total of 2 streams to confluence:
 Flow rates before confluence point:
 10.572 9.068

Area of streams before confluence:
 3.330 2.380

Results of confluence:
 Total flow rate = 17.589(CFS)
 Time of concentration = 8.605 min.
 Effective stream area after confluence = 5.710(Ac.)

+++++
Process from Point/Station 1.320 to Point/Station 1.530
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 877.230(Ft.)
Downstream point/station elevation = 875.040(Ft.)
Pipe length = 437.04(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 17.589(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 17.589(CFS)
Normal flow depth in pipe = 18.30(In.)
Flow top width inside pipe = 25.23(In.)
Critical Depth = 17.57(In.)
Pipe flow velocity = 6.13(Ft/s)
Travel time through pipe = 1.19 min.
Time of concentration (TC) = 9.79 min.

+++++
Process from Point/Station 1.530 to Point/Station 1.530
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 5.710(Ac.)
Runoff from this stream = 17.589(CFS)
Time of concentration = 9.79 min.
Rainfall intensity = 3.116(In/Hr)
Program is now starting with Main Stream No. 2

+++++
Process from Point/Station 1.400 to Point/Station 1.410
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 313.310(Ft.)
Top (of initial area) elevation = 890.210(Ft.)
Bottom (of initial area) elevation = 883.520(Ft.)
Difference in elevation = 6.690(Ft.)
Slope = $0.02135 \text{ s(percent)} = 2.14$
 $TC = k(0.300)*[(length^3)/(elevation \ change)]^{0.2}$
Initial area time of concentration = 6.451 min.
Rainfall intensity = 3.921(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 52.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 2.480(CFS)
Total initial stream area = 0.720(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.410 to Point/Station 1.520
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 878.520(Ft.)
Downstream point/station elevation = 873.450(Ft.)
Pipe length = 142.13(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.480(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 2.480(CFS)
Normal flow depth in pipe = 6.06(In.)
Flow top width inside pipe = 8.44(In.)
Critical Depth = 8.29(In.)

Pipe flow velocity = 7.85(Ft/s)
Travel time through pipe = 0.30 min.
Time of concentration (TC) = 6.75 min.

Process from Point/Station 1.520 to Point/Station 1.520
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.720(Ac.)
Runoff from this stream = 2.480(CFS)
Time of concentration = 6.75 min.
Rainfall intensity = 3.824(In/Hr)

Process from Point/Station 1.500 to Point/Station 1.510
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 382.350(Ft.)
Top (of initial area) elevation = 886.800(Ft.)
Bottom (of initial area) elevation = 879.410(Ft.)
Difference in elevation = 7.390(Ft.)
Slope = 0.01933 s(percent)= 1.93
TC = $k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.126 min.
Rainfall intensity = 3.712(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 52.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 10.587(CFS)
Total initial stream area = 3.250(Ac.)
Pervious area fraction = 0.100

Process from Point/Station 1.510 to Point/Station 1.520
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 874.410(Ft.)
Downstream point/station elevation = 873.450(Ft.)
Pipe length = 191.99(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.587(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 10.587(CFS)
Normal flow depth in pipe = 16.27(In.)
Flow top width inside pipe = 17.55(In.)
Critical Depth = 14.55(In.)
Pipe flow velocity = 5.30(Ft/s)
Travel time through pipe = 0.60 min.
Time of concentration (TC) = 7.73 min.

Process from Point/Station 1.520 to Point/Station 1.520
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 3.250(Ac.)
Runoff from this stream = 10.587(CFS)
Time of concentration = 7.73 min.
Rainfall intensity = 3.550(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	2.480	6.75	3.824
2	10.587	7.73	3.550

Largest stream flow has longer time of concentration

Qp = 10.587 + sum of

$$Qb \quad Ia/Ib$$

$$2.480 * 0.928 = 2.302$$
Qp = 12.889

Total of 2 streams to confluence:

Flow rates before confluence point:

2.480 10.587

Area of streams before confluence:

0.720 3.250

Results of confluence:

Total flow rate = 12.889(CFS)

Time of concentration = 7.730 min.

Effective stream area after confluence = 3.970(Ac.)

Process from Point/Station 1.520 to Point/Station 1.530
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 873.450(Ft.)
Downstream point/station elevation = 872.730(Ft.)
Pipe length = 143.33(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 12.889(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 12.889(CFS)
Normal flow depth in pipe = 16.29(In.)
Flow top width inside pipe = 22.41(In.)
Critical Depth = 15.51(In.)
Pipe flow velocity = 5.67(Ft/s)
Travel time through pipe = 0.42 min.
Time of concentration (TC) = 8.15 min.

Process from Point/Station 1.530 to Point/Station 1.530
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2

Stream flow area = 3.970(Ac.)

Runoff from this stream = 12.889(CFS)

Time of concentration = 8.15 min.

Rainfall intensity = 3.448(In/Hr)

Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
------------	-----------------	----------	----------------------------

1	17.589	9.79	3.116
2	12.889	8.15	3.448

Largest stream flow has longer time of concentration

Qp = 17.589 + sum of

$$Qb \quad Ia/Ib$$

$$12.889 * 0.904 = 11.652$$
Qp = 29.241

Total of 2 main streams to confluence:

Flow rates before confluence point:

17.589 12.889

Area of streams before confluence:
5.710 3.970

Results of confluence:
Total flow rate = 29.241(CFS)
Time of concentration = 9.793 min.
Effective stream area after confluence = 9.680(Ac.)

+++++
Process from Point/Station 1.530 to Point/Station 1.540
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 872.730(Ft.)
Downstream point/station elevation = 872.280(Ft.)
Pipe length = 91.27(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 29.241(CFS)
Nearest computed pipe diameter = 30.00(In.)
Calculated individual pipe flow = 29.241(CFS)
Normal flow depth in pipe = 25.03(In.)
Flow top width inside pipe = 22.30(In.)
Critical Depth = 22.13(In.)
Pipe flow velocity = 6.68(Ft/s)
Travel time through pipe = 0.23 min.
Time of concentration (TC) = 10.02 min.
End of computations, total study area = 9.68 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 32.0

Appendix I

Synthetic Unit Hydrograph Method Analysis

Appendix I.I

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 2-Year, 24-Hour Storm

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 03/10/26 File: RCCDPRe2UHA242.out

+++++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
2-YEAR STORM
PRE DEVELOPMENT - DA A (NATURAL CONDITIONS)

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 704.10(Ft.)
Length along longest watercourse measured to centroid = 273.41(Ft.)
Length along longest watercourse = 0.133 Mi.
Length along longest watercourse measured to centroid = 0.052 Mi.
Difference in elevation = 11.23(Ft.)
Slope along watercourse = 84.2130 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.047 Hr.
Lag time = 2.81 Min.
25% of lag time = 0.70 Min.
40% of lag time = 1.12 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.01	19.46

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	4.82	46.66

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.010(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 2.010(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.010(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 67.00 0.000
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
67.0	47.4	0.597	0.000	0.597	1.000	0.597
						Sum (F) = 0.597

Area averaged mean soil loss (F) (In/Hr) = 0.597
Minimum soil loss rate ((In/Hr)) = 0.299
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	178.000	39.326	3.837
2 0.167	356.000	44.931	4.383
3 0.250	533.999	9.752	0.951
4 0.333	711.999	4.018	0.392
5 0.417	889.999	1.973	0.192
Sum = 100.000		Sum=	9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max Low	Effective (In/Hr)
1 0.08	0.07	0.016	(1.059) 0.014	0.002
2 0.17	0.07	0.016	(1.055) 0.014	0.002
3 0.25	0.07	0.016	(1.051) 0.014	0.002
4 0.33	0.10	0.024	(1.047) 0.022	0.002
5 0.42	0.10	0.024	(1.043) 0.022	0.002
6 0.50	0.10	0.024	(1.039) 0.022	0.002
7 0.58	0.10	0.024	(1.035) 0.022	0.002
8 0.67	0.10	0.024	(1.031) 0.022	0.002
9 0.75	0.10	0.024	(1.027) 0.022	0.002
10 0.83	0.13	0.032	(1.023) 0.029	0.003
11 0.92	0.13	0.032	(1.019) 0.029	0.003
12 1.00	0.13	0.032	(1.015) 0.029	0.003
13 1.08	0.10	0.024	(1.011) 0.022	0.002
14 1.17	0.10	0.024	(1.007) 0.022	0.002
15 1.25	0.10	0.024	(1.003) 0.022	0.002
16 1.33	0.10	0.024	(0.999) 0.022	0.002
17 1.42	0.10	0.024	(0.995) 0.022	0.002
18 1.50	0.10	0.024	(0.991) 0.022	0.002
19 1.58	0.10	0.024	(0.987) 0.022	0.002
20 1.67	0.10	0.024	(0.983) 0.022	0.002
21 1.75	0.10	0.024	(0.979) 0.022	0.002
22 1.83	0.13	0.032	(0.975) 0.029	0.003
23 1.92	0.13	0.032	(0.971) 0.029	0.003
24 2.00	0.13	0.032	(0.967) 0.029	0.003
25 2.08	0.13	0.032	(0.963) 0.029	0.003
26 2.17	0.13	0.032	(0.959) 0.029	0.003
27 2.25	0.13	0.032	(0.955) 0.029	0.003
28 2.33	0.13	0.032	(0.951) 0.029	0.003
29 2.42	0.13	0.032	(0.947) 0.029	0.003
30 2.50	0.13	0.032	(0.944) 0.029	0.003
31 2.58	0.17	0.040	(0.940) 0.036	0.004
32 2.67	0.17	0.040	(0.936) 0.036	0.004
33 2.75	0.17	0.040	(0.932) 0.036	0.004

34	2.83	0.17	0.040	(0.928)	0.036	0.004
35	2.92	0.17	0.040	(0.924)	0.036	0.004
36	3.00	0.17	0.040	(0.921)	0.036	0.004
37	3.08	0.17	0.040	(0.917)	0.036	0.004
38	3.17	0.17	0.040	(0.913)	0.036	0.004
39	3.25	0.17	0.040	(0.909)	0.036	0.004
40	3.33	0.17	0.040	(0.905)	0.036	0.004
41	3.42	0.17	0.040	(0.902)	0.036	0.004
42	3.50	0.17	0.040	(0.898)	0.036	0.004
43	3.58	0.17	0.040	(0.894)	0.036	0.004
44	3.67	0.17	0.040	(0.890)	0.036	0.004
45	3.75	0.17	0.040	(0.887)	0.036	0.004
46	3.83	0.20	0.048	(0.883)	0.043	0.005
47	3.92	0.20	0.048	(0.879)	0.043	0.005
48	4.00	0.20	0.048	(0.875)	0.043	0.005
49	4.08	0.20	0.048	(0.872)	0.043	0.005
50	4.17	0.20	0.048	(0.868)	0.043	0.005
51	4.25	0.20	0.048	(0.864)	0.043	0.005
52	4.33	0.23	0.056	(0.861)	0.051	0.006
53	4.42	0.23	0.056	(0.857)	0.051	0.006
54	4.50	0.23	0.056	(0.853)	0.051	0.006
55	4.58	0.23	0.056	(0.850)	0.051	0.006
56	4.67	0.23	0.056	(0.846)	0.051	0.006
57	4.75	0.23	0.056	(0.842)	0.051	0.006
58	4.83	0.27	0.064	(0.839)	0.058	0.006
59	4.92	0.27	0.064	(0.835)	0.058	0.006
60	5.00	0.27	0.064	(0.831)	0.058	0.006
61	5.08	0.20	0.048	(0.828)	0.043	0.005
62	5.17	0.20	0.048	(0.824)	0.043	0.005
63	5.25	0.20	0.048	(0.821)	0.043	0.005
64	5.33	0.23	0.056	(0.817)	0.051	0.006
65	5.42	0.23	0.056	(0.813)	0.051	0.006
66	5.50	0.23	0.056	(0.810)	0.051	0.006
67	5.58	0.27	0.064	(0.806)	0.058	0.006
68	5.67	0.27	0.064	(0.803)	0.058	0.006
69	5.75	0.27	0.064	(0.799)	0.058	0.006
70	5.83	0.27	0.064	(0.796)	0.058	0.006
71	5.92	0.27	0.064	(0.792)	0.058	0.006
72	6.00	0.27	0.064	(0.789)	0.058	0.006
73	6.08	0.30	0.072	(0.785)	0.065	0.007
74	6.17	0.30	0.072	(0.782)	0.065	0.007
75	6.25	0.30	0.072	(0.778)	0.065	0.007
76	6.33	0.30	0.072	(0.775)	0.065	0.007
77	6.42	0.30	0.072	(0.771)	0.065	0.007
78	6.50	0.30	0.072	(0.768)	0.065	0.007
79	6.58	0.33	0.080	(0.764)	0.072	0.008
80	6.67	0.33	0.080	(0.761)	0.072	0.008
81	6.75	0.33	0.080	(0.757)	0.072	0.008
82	6.83	0.33	0.080	(0.754)	0.072	0.008
83	6.92	0.33	0.080	(0.751)	0.072	0.008
84	7.00	0.33	0.080	(0.747)	0.072	0.008
85	7.08	0.33	0.080	(0.744)	0.072	0.008
86	7.17	0.33	0.080	(0.740)	0.072	0.008
87	7.25	0.33	0.080	(0.737)	0.072	0.008
88	7.33	0.37	0.088	(0.734)	0.080	0.009
89	7.42	0.37	0.088	(0.730)	0.080	0.009
90	7.50	0.37	0.088	(0.727)	0.080	0.009
91	7.58	0.40	0.096	(0.724)	0.087	0.010
92	7.67	0.40	0.096	(0.720)	0.087	0.010
93	7.75	0.40	0.096	(0.717)	0.087	0.010
94	7.83	0.43	0.105	(0.714)	0.094	0.010
95	7.92	0.43	0.105	(0.710)	0.094	0.010
96	8.00	0.43	0.105	(0.707)	0.094	0.010
97	8.08	0.50	0.121	(0.704)	0.109	0.012
98	8.17	0.50	0.121	(0.701)	0.109	0.012
99	8.25	0.50	0.121	(0.697)	0.109	0.012
100	8.33	0.50	0.121	(0.694)	0.109	0.012
101	8.42	0.50	0.121	(0.691)	0.109	0.012
102	8.50	0.50	0.121	(0.688)	0.109	0.012

103	8.58	0.53	0.129	(0.684)	0.116	0.013
104	8.67	0.53	0.129	(0.681)	0.116	0.013
105	8.75	0.53	0.129	(0.678)	0.116	0.013
106	8.83	0.57	0.137	(0.675)	0.123	0.014
107	8.92	0.57	0.137	(0.671)	0.123	0.014
108	9.00	0.57	0.137	(0.668)	0.123	0.014
109	9.08	0.63	0.153	(0.665)	0.137	0.015
110	9.17	0.63	0.153	(0.662)	0.137	0.015
111	9.25	0.63	0.153	(0.659)	0.137	0.015
112	9.33	0.67	0.161	(0.656)	0.145	0.016
113	9.42	0.67	0.161	(0.653)	0.145	0.016
114	9.50	0.67	0.161	(0.649)	0.145	0.016
115	9.58	0.70	0.169	(0.646)	0.152	0.017
116	9.67	0.70	0.169	(0.643)	0.152	0.017
117	9.75	0.70	0.169	(0.640)	0.152	0.017
118	9.83	0.73	0.177	(0.637)	0.159	0.018
119	9.92	0.73	0.177	(0.634)	0.159	0.018
120	10.00	0.73	0.177	(0.631)	0.159	0.018
121	10.08	0.50	0.121	(0.628)	0.109	0.012
122	10.17	0.50	0.121	(0.625)	0.109	0.012
123	10.25	0.50	0.121	(0.622)	0.109	0.012
124	10.33	0.50	0.121	(0.619)	0.109	0.012
125	10.42	0.50	0.121	(0.616)	0.109	0.012
126	10.50	0.50	0.121	(0.613)	0.109	0.012
127	10.58	0.67	0.161	(0.610)	0.145	0.016
128	10.67	0.67	0.161	(0.607)	0.145	0.016
129	10.75	0.67	0.161	(0.604)	0.145	0.016
130	10.83	0.67	0.161	(0.601)	0.145	0.016
131	10.92	0.67	0.161	(0.598)	0.145	0.016
132	11.00	0.67	0.161	(0.595)	0.145	0.016
133	11.08	0.63	0.153	(0.592)	0.137	0.015
134	11.17	0.63	0.153	(0.589)	0.137	0.015
135	11.25	0.63	0.153	(0.586)	0.137	0.015
136	11.33	0.63	0.153	(0.583)	0.137	0.015
137	11.42	0.63	0.153	(0.580)	0.137	0.015
138	11.50	0.63	0.153	(0.578)	0.137	0.015
139	11.58	0.57	0.137	(0.575)	0.123	0.014
140	11.67	0.57	0.137	(0.572)	0.123	0.014
141	11.75	0.57	0.137	(0.569)	0.123	0.014
142	11.83	0.60	0.145	(0.566)	0.130	0.014
143	11.92	0.60	0.145	(0.563)	0.130	0.014
144	12.00	0.60	0.145	(0.561)	0.130	0.014
145	12.08	0.83	0.201	(0.558)	0.181	0.020
146	12.17	0.83	0.201	(0.555)	0.181	0.020
147	12.25	0.83	0.201	(0.552)	0.181	0.020
148	12.33	0.87	0.209	(0.549)	0.188	0.021
149	12.42	0.87	0.209	(0.547)	0.188	0.021
150	12.50	0.87	0.209	(0.544)	0.188	0.021
151	12.58	0.93	0.225	(0.541)	0.203	0.023
152	12.67	0.93	0.225	(0.538)	0.203	0.023
153	12.75	0.93	0.225	(0.536)	0.203	0.023
154	12.83	0.97	0.233	(0.533)	0.210	0.023
155	12.92	0.97	0.233	(0.530)	0.210	0.023
156	13.00	0.97	0.233	(0.528)	0.210	0.023
157	13.08	1.13	0.273	(0.525)	0.246	0.027
158	13.17	1.13	0.273	(0.522)	0.246	0.027
159	13.25	1.13	0.273	(0.520)	0.246	0.027
160	13.33	1.13	0.273	(0.517)	0.246	0.027
161	13.42	1.13	0.273	(0.514)	0.246	0.027
162	13.50	1.13	0.273	(0.512)	0.246	0.027
163	13.58	0.77	0.185	(0.509)	0.166	0.018
164	13.67	0.77	0.185	(0.507)	0.166	0.018
165	13.75	0.77	0.185	(0.504)	0.166	0.018
166	13.83	0.77	0.185	(0.501)	0.166	0.018
167	13.92	0.77	0.185	(0.499)	0.166	0.018
168	14.00	0.77	0.185	(0.496)	0.166	0.018
169	14.08	0.90	0.217	(0.494)	0.195	0.022
170	14.17	0.90	0.217	(0.491)	0.195	0.022
171	14.25	0.90	0.217	(0.489)	0.195	0.022

172	14.33	0.87	0.209	(0.486)	0.188	0.021
173	14.42	0.87	0.209	(0.484)	0.188	0.021
174	14.50	0.87	0.209	(0.481)	0.188	0.021
175	14.58	0.87	0.209	(0.479)	0.188	0.021
176	14.67	0.87	0.209	(0.476)	0.188	0.021
177	14.75	0.87	0.209	(0.474)	0.188	0.021
178	14.83	0.83	0.201	(0.471)	0.181	0.020
179	14.92	0.83	0.201	(0.469)	0.181	0.020
180	15.00	0.83	0.201	(0.467)	0.181	0.020
181	15.08	0.80	0.193	(0.464)	0.174	0.019
182	15.17	0.80	0.193	(0.462)	0.174	0.019
183	15.25	0.80	0.193	(0.460)	0.174	0.019
184	15.33	0.77	0.185	(0.457)	0.166	0.018
185	15.42	0.77	0.185	(0.455)	0.166	0.018
186	15.50	0.77	0.185	(0.452)	0.166	0.018
187	15.58	0.63	0.153	(0.450)	0.137	0.015
188	15.67	0.63	0.153	(0.448)	0.137	0.015
189	15.75	0.63	0.153	(0.446)	0.137	0.015
190	15.83	0.63	0.153	(0.443)	0.137	0.015
191	15.92	0.63	0.153	(0.441)	0.137	0.015
192	16.00	0.63	0.153	(0.439)	0.137	0.015
193	16.08	0.13	0.032	(0.437)	0.029	0.003
194	16.17	0.13	0.032	(0.434)	0.029	0.003
195	16.25	0.13	0.032	(0.432)	0.029	0.003
196	16.33	0.13	0.032	(0.430)	0.029	0.003
197	16.42	0.13	0.032	(0.428)	0.029	0.003
198	16.50	0.13	0.032	(0.425)	0.029	0.003
199	16.58	0.10	0.024	(0.423)	0.022	0.002
200	16.67	0.10	0.024	(0.421)	0.022	0.002
201	16.75	0.10	0.024	(0.419)	0.022	0.002
202	16.83	0.10	0.024	(0.417)	0.022	0.002
203	16.92	0.10	0.024	(0.415)	0.022	0.002
204	17.00	0.10	0.024	(0.413)	0.022	0.002
205	17.08	0.17	0.040	(0.411)	0.036	0.004
206	17.17	0.17	0.040	(0.409)	0.036	0.004
207	17.25	0.17	0.040	(0.407)	0.036	0.004
208	17.33	0.17	0.040	(0.404)	0.036	0.004
209	17.42	0.17	0.040	(0.402)	0.036	0.004
210	17.50	0.17	0.040	(0.400)	0.036	0.004
211	17.58	0.17	0.040	(0.398)	0.036	0.004
212	17.67	0.17	0.040	(0.396)	0.036	0.004
213	17.75	0.17	0.040	(0.394)	0.036	0.004
214	17.83	0.13	0.032	(0.392)	0.029	0.003
215	17.92	0.13	0.032	(0.391)	0.029	0.003
216	18.00	0.13	0.032	(0.389)	0.029	0.003
217	18.08	0.13	0.032	(0.387)	0.029	0.003
218	18.17	0.13	0.032	(0.385)	0.029	0.003
219	18.25	0.13	0.032	(0.383)	0.029	0.003
220	18.33	0.13	0.032	(0.381)	0.029	0.003
221	18.42	0.13	0.032	(0.379)	0.029	0.003
222	18.50	0.13	0.032	(0.377)	0.029	0.003
223	18.58	0.10	0.024	(0.376)	0.022	0.002
224	18.67	0.10	0.024	(0.374)	0.022	0.002
225	18.75	0.10	0.024	(0.372)	0.022	0.002
226	18.83	0.07	0.016	(0.370)	0.014	0.002
227	18.92	0.07	0.016	(0.368)	0.014	0.002
228	19.00	0.07	0.016	(0.367)	0.014	0.002
229	19.08	0.10	0.024	(0.365)	0.022	0.002
230	19.17	0.10	0.024	(0.363)	0.022	0.002
231	19.25	0.10	0.024	(0.361)	0.022	0.002
232	19.33	0.13	0.032	(0.360)	0.029	0.003
233	19.42	0.13	0.032	(0.358)	0.029	0.003
234	19.50	0.13	0.032	(0.356)	0.029	0.003
235	19.58	0.10	0.024	(0.355)	0.022	0.002
236	19.67	0.10	0.024	(0.353)	0.022	0.002
237	19.75	0.10	0.024	(0.352)	0.022	0.002
238	19.83	0.07	0.016	(0.350)	0.014	0.002
239	19.92	0.07	0.016	(0.348)	0.014	0.002
240	20.00	0.07	0.016	(0.347)	0.014	0.002

0+ 5	0.0000	0.01	Q
0+10	0.0001	0.01	Q
0+15	0.0002	0.01	Q
0+20	0.0004	0.02	Q
0+25	0.0005	0.02	Q
0+30	0.0007	0.02	Q
0+35	0.0008	0.02	Q
0+40	0.0010	0.02	Q
0+45	0.0012	0.02	Q
0+50	0.0013	0.03	Q
0+55	0.0016	0.03	Q
1+ 0	0.0018	0.03	Q
1+ 5	0.0020	0.03	Q
1+10	0.0021	0.02	Q
1+15	0.0023	0.02	Q
1+20	0.0025	0.02	Q
1+25	0.0026	0.02	Q
1+30	0.0028	0.02	Q
1+35	0.0029	0.02	Q
1+40	0.0031	0.02	Q
1+45	0.0033	0.02	Q
1+50	0.0035	0.03	Q
1+55	0.0037	0.03	Q
2+ 0	0.0039	0.03	Q
2+ 5	0.0041	0.03	QV
2+10	0.0043	0.03	QV
2+15	0.0045	0.03	QV
2+20	0.0047	0.03	QV
2+25	0.0050	0.03	QV
2+30	0.0052	0.03	QV
2+35	0.0054	0.03	QV
2+40	0.0057	0.04	QV
2+45	0.0059	0.04	QV
2+50	0.0062	0.04	QV
2+55	0.0065	0.04	QV
3+ 0	0.0067	0.04	QV
3+ 5	0.0070	0.04	QV
3+10	0.0073	0.04	QV
3+15	0.0076	0.04	QV
3+20	0.0078	0.04	QV
3+25	0.0081	0.04	QV
3+30	0.0084	0.04	Q V
3+35	0.0086	0.04	Q V
3+40	0.0089	0.04	Q V
3+45	0.0092	0.04	Q V
3+50	0.0095	0.04	Q V
3+55	0.0098	0.05	Q V
4+ 0	0.0101	0.05	Q V
4+ 5	0.0104	0.05	Q V
4+10	0.0108	0.05	Q V
4+15	0.0111	0.05	Q V
4+20	0.0114	0.05	Q V
4+25	0.0118	0.05	Q V
4+30	0.0122	0.05	Q V
4+35	0.0125	0.05	Q V
4+40	0.0129	0.05	Q V
4+45	0.0133	0.05	Q V
4+50	0.0137	0.06	Q V
4+55	0.0141	0.06	Q V
5+ 0	0.0146	0.06	Q V
5+ 5	0.0149	0.06	Q V
5+10	0.0153	0.05	Q V
5+15	0.0156	0.05	Q V
5+20	0.0160	0.05	Q V
5+25	0.0163	0.05	Q V
5+30	0.0167	0.05	Q V
5+35	0.0171	0.06	Q V
5+40	0.0175	0.06	Q V
5+45	0.0180	0.06	Q V

5+50	0.0184	0.06	Q	V				
5+55	0.0188	0.06	Q	V				
6+ 0	0.0193	0.06	Q	V				
6+ 5	0.0197	0.07	Q	V				
6+10	0.0202	0.07	Q	V				
6+15	0.0207	0.07	Q	V				
6+20	0.0212	0.07	Q	V				
6+25	0.0216	0.07	Q	V				
6+30	0.0221	0.07	Q	V				
6+35	0.0226	0.07	Q	V				
6+40	0.0232	0.08	Q	V				
6+45	0.0237	0.08	Q	V				
6+50	0.0242	0.08	Q	V				
6+55	0.0248	0.08	Q	V				
7+ 0	0.0253	0.08	Q	V				
7+ 5	0.0259	0.08	Q	V				
7+10	0.0264	0.08	Q	V				
7+15	0.0269	0.08	Q	V				
7+20	0.0275	0.08	Q	V				
7+25	0.0281	0.09	Q	V				
7+30	0.0287	0.09	Q	V				
7+35	0.0293	0.09	Q	V				
7+40	0.0299	0.09	Q	V				
7+45	0.0306	0.09	Q	V				
7+50	0.0313	0.10	Q	V				
7+55	0.0319	0.10	Q	V				
8+ 0	0.0326	0.10	Q	V				
8+ 5	0.0334	0.11	Q	V				
8+10	0.0342	0.12	Q	V				
8+15	0.0350	0.12	Q	V				
8+20	0.0358	0.12	Q	V				
8+25	0.0366	0.12	Q	V				
8+30	0.0374	0.12	Q	V				
8+35	0.0383	0.12	Q	V				
8+40	0.0391	0.12	Q	V				
8+45	0.0400	0.13	Q	V				
8+50	0.0409	0.13	Q	V				
8+55	0.0418	0.13	Q	V				
9+ 0	0.0427	0.13	Q	V				
9+ 5	0.0436	0.14	Q	V				
9+10	0.0446	0.15	Q	V				
9+15	0.0457	0.15	Q	V				
9+20	0.0467	0.15	Q	V				
9+25	0.0478	0.16	Q	V				
9+30	0.0489	0.16	Q	V				
9+35	0.0500	0.16	Q	V				
9+40	0.0511	0.16	Q	V				
9+45	0.0522	0.16	Q	V				
9+50	0.0534	0.17	Q	V				
9+55	0.0546	0.17	Q	V				
10+ 0	0.0557	0.17	Q	V				
10+ 5	0.0568	0.15	Q	V				
10+10	0.0577	0.13	Q	V				
10+15	0.0585	0.12	Q	V				
10+20	0.0593	0.12	Q	V				
10+25	0.0601	0.12	Q	V				
10+30	0.0609	0.12	Q	V				
10+35	0.0618	0.13	Q	V				
10+40	0.0629	0.15	Q	V				
10+45	0.0639	0.15	Q	V				
10+50	0.0650	0.16	Q	V				
10+55	0.0661	0.16	Q	V				
11+ 0	0.0672	0.16	Q	V				
11+ 5	0.0682	0.15	Q	V				
11+10	0.0693	0.15	Q	V				
11+15	0.0703	0.15	Q	V				
11+20	0.0713	0.15	Q	V				
11+25	0.0724	0.15	Q	V				
11+30	0.0734	0.15	Q	V				

11+35	0.0744	0.14	Q	V			
11+40	0.0753	0.14	Q	V			
11+45	0.0762	0.13	Q	V			
11+50	0.0772	0.14	Q	V			
11+55	0.0781	0.14	Q	V			
12+ 0	0.0791	0.14	Q	V			
12+ 5	0.0802	0.16	Q	V			
12+10	0.0815	0.19	Q	V			
12+15	0.0829	0.19	Q	V			
12+20	0.0842	0.20	Q	V			
12+25	0.0856	0.20	Q	V			
12+30	0.0870	0.20	Q	V			
12+35	0.0885	0.21	Q	V			
12+40	0.0900	0.22	Q	V			
12+45	0.0915	0.22	Q	V			
12+50	0.0930	0.22	Q	V			
12+55	0.0946	0.23	Q	V			
13+ 0	0.0961	0.23	Q	V			
13+ 5	0.0978	0.24	Q	V			
13+10	0.0996	0.26	Q	V			
13+15	0.1014	0.26	Q	V			
13+20	0.1032	0.27	Q	V			
13+25	0.1051	0.27	Q	V			
13+30	0.1069	0.27	Q	V			
13+35	0.1085	0.23	Q	V			
13+40	0.1099	0.19	Q	V			
13+45	0.1111	0.19	Q	V			
13+50	0.1124	0.18	Q	V			
13+55	0.1136	0.18	Q	V			
14+ 0	0.1149	0.18	Q	V			
14+ 5	0.1162	0.19	Q	V			
14+10	0.1176	0.21	Q	V			
14+15	0.1191	0.21	Q	V			
14+20	0.1205	0.21	Q	V			
14+25	0.1219	0.21	Q	V			
14+30	0.1233	0.20	Q	V			
14+35	0.1247	0.20	Q	V			
14+40	0.1261	0.20	Q	V			
14+45	0.1276	0.20	Q	V			
14+50	0.1289	0.20	Q	V			
14+55	0.1303	0.20	Q	V			
15+ 0	0.1316	0.20	Q	V			
15+ 5	0.1330	0.19	Q	V			
15+10	0.1343	0.19	Q	V			
15+15	0.1356	0.19	Q	V			
15+20	0.1369	0.19	Q	V			
15+25	0.1381	0.18	Q	V			
15+30	0.1394	0.18	Q	V			
15+35	0.1405	0.17	Q	V			
15+40	0.1416	0.15	Q	V			
15+45	0.1426	0.15	Q	V			
15+50	0.1437	0.15	Q	V			
15+55	0.1447	0.15	Q	V			
16+ 0	0.1457	0.15	Q	V			
16+ 5	0.1464	0.10	Q	V			
16+10	0.1468	0.05	Q	V			
16+15	0.1470	0.04	Q	V			
16+20	0.1473	0.03	Q	V			
16+25	0.1475	0.03	Q	V			
16+30	0.1477	0.03	Q	V			
16+35	0.1479	0.03	Q	V			
16+40	0.1481	0.02	Q	V			
16+45	0.1482	0.02	Q	V			
16+50	0.1484	0.02	Q	V			
16+55	0.1485	0.02	Q	V			
17+ 0	0.1487	0.02	Q	V			
17+ 5	0.1489	0.03	Q	V			
17+10	0.1492	0.04	Q	V			
17+15	0.1494	0.04	Q	V			

17+20	0.1497	0.04	Q				V
17+25	0.1500	0.04	Q				V
17+30	0.1502	0.04	Q				V
17+35	0.1505	0.04	Q				V
17+40	0.1508	0.04	Q				V
17+45	0.1510	0.04	Q				V
17+50	0.1513	0.04	Q				V
17+55	0.1515	0.03	Q				V
18+ 0	0.1517	0.03	Q				V
18+ 5	0.1520	0.03	Q				V
18+10	0.1522	0.03	Q				V
18+15	0.1524	0.03	Q				V
18+20	0.1526	0.03	Q				V
18+25	0.1528	0.03	Q				V
18+30	0.1530	0.03	Q				V
18+35	0.1532	0.03	Q				V
18+40	0.1534	0.02	Q				V
18+45	0.1536	0.02	Q				V
18+50	0.1537	0.02	Q				V
18+55	0.1538	0.02	Q				V
19+ 0	0.1539	0.02	Q				V
19+ 5	0.1541	0.02	Q				V
19+10	0.1542	0.02	Q				V
19+15	0.1544	0.02	Q				V
19+20	0.1546	0.03	Q				V
19+25	0.1548	0.03	Q				V
19+30	0.1550	0.03	Q				V
19+35	0.1552	0.03	Q				V
19+40	0.1553	0.02	Q				V
19+45	0.1555	0.02	Q				V
19+50	0.1557	0.02	Q				V
19+55	0.1558	0.02	Q				V
20+ 0	0.1559	0.02	Q				V
20+ 5	0.1560	0.02	Q				V
20+10	0.1562	0.02	Q				V
20+15	0.1563	0.02	Q				V
20+20	0.1565	0.02	Q				V
20+25	0.1566	0.02	Q				V
20+30	0.1568	0.02	Q				V
20+35	0.1570	0.02	Q				V
20+40	0.1571	0.02	Q				V
20+45	0.1573	0.02	Q				V
20+50	0.1574	0.02	Q				V
20+55	0.1576	0.02	Q				V
21+ 0	0.1577	0.02	Q				V
21+ 5	0.1578	0.02	Q				V
21+10	0.1580	0.02	Q				V
21+15	0.1581	0.02	Q				V
21+20	0.1582	0.02	Q				V
21+25	0.1584	0.02	Q				V
21+30	0.1585	0.02	Q				V
21+35	0.1586	0.02	Q				V
21+40	0.1588	0.02	Q				V
21+45	0.1589	0.02	Q				V
21+50	0.1591	0.02	Q				V
21+55	0.1592	0.02	Q				V
22+ 0	0.1593	0.02	Q				V
22+ 5	0.1594	0.02	Q				V
22+10	0.1596	0.02	Q				V
22+15	0.1597	0.02	Q				V
22+20	0.1599	0.02	Q				V
22+25	0.1600	0.02	Q				V
22+30	0.1601	0.02	Q				V
22+35	0.1602	0.02	Q				V
22+40	0.1603	0.02	Q				V
22+45	0.1604	0.02	Q				V
22+50	0.1605	0.02	Q				V
22+55	0.1606	0.02	Q				V
23+ 0	0.1607	0.02	Q				V

23+ 5	0.1609	0.02	Q				V
23+10	0.1610	0.02	Q				V
23+15	0.1611	0.02	Q				V
23+20	0.1612	0.02	Q				V
23+25	0.1613	0.02	Q				V
23+30	0.1614	0.02	Q				V
23+35	0.1615	0.02	Q				V
23+40	0.1616	0.02	Q				V
23+45	0.1617	0.02	Q				V
23+50	0.1618	0.02	Q				V
23+55	0.1619	0.02	Q				V
24+ 0	0.1620	0.02	Q				V
24+ 5	0.1621	0.01	Q				V
24+10	0.1621	0.00	Q				V
24+15	0.1621	0.00	Q				V
24+20	0.1621	0.00	Q				V

Appendix I.II

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 10-Year, 24-Hour Storm

Unit Hydrograph Analysis

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Study date 03/10/26 File: RCCDPRe10UHA2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
10-YEAR STORM
PRE DEVELOPMENT - DA A (EXISTING CONDITIONS)

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 704.10(Ft.)
Length along longest watercourse measured to centroid = 273.41(Ft.)
Length along longest watercourse = 0.133 Mi.
Length along longest watercourse measured to centroid = 0.052 Mi.
Difference in elevation = 11.23(Ft.)
Slope along watercourse = 84.2130 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.023 Hr.
Lag time = 1.40 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.01	19.46

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	4.82	46.66

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.010(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 3.166(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.166(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 1.000
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	32.0	0.742	1.000	0.074	1.000	0.074
						Sum (F) = 0.074

Area averaged mean soil loss (F) (In/Hr) = 0.074
Minimum soil loss rate ((In/Hr)) = 0.037
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.100

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	356.000	61.792	6.028
2 0.167	711.999	34.227	3.339
3 0.250	1067.999	3.982	0.388
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	0.025	(0.132)	0.003	0.023
2	0.17	0.025	(0.131)	0.003	0.023
3	0.25	0.025	(0.131)	0.003	0.023
4	0.33	0.038	(0.130)	0.004	0.034
5	0.42	0.038	(0.130)	0.004	0.034
6	0.50	0.038	(0.129)	0.004	0.034
7	0.58	0.038	(0.128)	0.004	0.034
8	0.67	0.038	(0.128)	0.004	0.034
9	0.75	0.038	(0.127)	0.004	0.034
10	0.83	0.051	(0.127)	0.005	0.046
11	0.92	0.051	(0.126)	0.005	0.046
12	1.00	0.051	(0.126)	0.005	0.046
13	1.08	0.038	(0.125)	0.004	0.034
14	1.17	0.038	(0.125)	0.004	0.034
15	1.25	0.038	(0.125)	0.004	0.034
16	1.33	0.038	(0.124)	0.004	0.034
17	1.42	0.038	(0.124)	0.004	0.034
18	1.50	0.038	(0.123)	0.004	0.034
19	1.58	0.038	(0.123)	0.004	0.034
20	1.67	0.038	(0.122)	0.004	0.034
21	1.75	0.038	(0.122)	0.004	0.034
22	1.83	0.051	(0.121)	0.005	0.046
23	1.92	0.051	(0.121)	0.005	0.046
24	2.00	0.051	(0.120)	0.005	0.046
25	2.08	0.051	(0.120)	0.005	0.046
26	2.17	0.051	(0.119)	0.005	0.046
27	2.25	0.051	(0.119)	0.005	0.046
28	2.33	0.051	(0.118)	0.005	0.046
29	2.42	0.051	(0.118)	0.005	0.046
30	2.50	0.051	(0.117)	0.005	0.046
31	2.58	0.063	(0.117)	0.006	0.057
32	2.67	0.063	(0.116)	0.006	0.057
33	2.75	0.063	(0.116)	0.006	0.057
34	2.83	0.063	(0.115)	0.006	0.057
35	2.92	0.063	(0.115)	0.006	0.057

36	3.00	0.17	0.063	(0.114)	0.006	0.057
37	3.08	0.17	0.063	(0.114)	0.006	0.057
38	3.17	0.17	0.063	(0.113)	0.006	0.057
39	3.25	0.17	0.063	(0.113)	0.006	0.057
40	3.33	0.17	0.063	(0.112)	0.006	0.057
41	3.42	0.17	0.063	(0.112)	0.006	0.057
42	3.50	0.17	0.063	(0.111)	0.006	0.057
43	3.58	0.17	0.063	(0.111)	0.006	0.057
44	3.67	0.17	0.063	(0.111)	0.006	0.057
45	3.75	0.17	0.063	(0.110)	0.006	0.057
46	3.83	0.20	0.076	(0.110)	0.008	0.068
47	3.92	0.20	0.076	(0.109)	0.008	0.068
48	4.00	0.20	0.076	(0.109)	0.008	0.068
49	4.08	0.20	0.076	(0.108)	0.008	0.068
50	4.17	0.20	0.076	(0.108)	0.008	0.068
51	4.25	0.20	0.076	(0.107)	0.008	0.068
52	4.33	0.23	0.089	(0.107)	0.009	0.080
53	4.42	0.23	0.089	(0.106)	0.009	0.080
54	4.50	0.23	0.089	(0.106)	0.009	0.080
55	4.58	0.23	0.089	(0.106)	0.009	0.080
56	4.67	0.23	0.089	(0.105)	0.009	0.080
57	4.75	0.23	0.089	(0.105)	0.009	0.080
58	4.83	0.27	0.101	(0.104)	0.010	0.091
59	4.92	0.27	0.101	(0.104)	0.010	0.091
60	5.00	0.27	0.101	(0.103)	0.010	0.091
61	5.08	0.20	0.076	(0.103)	0.008	0.068
62	5.17	0.20	0.076	(0.102)	0.008	0.068
63	5.25	0.20	0.076	(0.102)	0.008	0.068
64	5.33	0.23	0.089	(0.101)	0.009	0.080
65	5.42	0.23	0.089	(0.101)	0.009	0.080
66	5.50	0.23	0.089	(0.101)	0.009	0.080
67	5.58	0.27	0.101	(0.100)	0.010	0.091
68	5.67	0.27	0.101	(0.100)	0.010	0.091
69	5.75	0.27	0.101	(0.099)	0.010	0.091
70	5.83	0.27	0.101	(0.099)	0.010	0.091
71	5.92	0.27	0.101	(0.098)	0.010	0.091
72	6.00	0.27	0.101	(0.098)	0.010	0.091
73	6.08	0.30	0.114	(0.098)	0.011	0.103
74	6.17	0.30	0.114	(0.097)	0.011	0.103
75	6.25	0.30	0.114	(0.097)	0.011	0.103
76	6.33	0.30	0.114	(0.096)	0.011	0.103
77	6.42	0.30	0.114	(0.096)	0.011	0.103
78	6.50	0.30	0.114	(0.095)	0.011	0.103
79	6.58	0.33	0.127	(0.095)	0.013	0.114
80	6.67	0.33	0.127	(0.094)	0.013	0.114
81	6.75	0.33	0.127	(0.094)	0.013	0.114
82	6.83	0.33	0.127	(0.094)	0.013	0.114
83	6.92	0.33	0.127	(0.093)	0.013	0.114
84	7.00	0.33	0.127	(0.093)	0.013	0.114
85	7.08	0.33	0.127	(0.092)	0.013	0.114
86	7.17	0.33	0.127	(0.092)	0.013	0.114
87	7.25	0.33	0.127	(0.092)	0.013	0.114
88	7.33	0.37	0.139	(0.091)	0.014	0.125
89	7.42	0.37	0.139	(0.091)	0.014	0.125
90	7.50	0.37	0.139	(0.090)	0.014	0.125
91	7.58	0.40	0.152	(0.090)	0.015	0.137
92	7.67	0.40	0.152	(0.089)	0.015	0.137
93	7.75	0.40	0.152	(0.089)	0.015	0.137
94	7.83	0.43	0.165	(0.089)	0.016	0.148
95	7.92	0.43	0.165	(0.088)	0.016	0.148
96	8.00	0.43	0.165	(0.088)	0.016	0.148
97	8.08	0.50	0.190	(0.087)	0.019	0.171
98	8.17	0.50	0.190	(0.087)	0.019	0.171
99	8.25	0.50	0.190	(0.087)	0.019	0.171
100	8.33	0.50	0.190	(0.086)	0.019	0.171
101	8.42	0.50	0.190	(0.086)	0.019	0.171
102	8.50	0.50	0.190	(0.085)	0.019	0.171
103	8.58	0.53	0.203	(0.085)	0.020	0.182
104	8.67	0.53	0.203	(0.085)	0.020	0.182

105	8.75	0.53	0.203	(0.084)	0.020	0.182
106	8.83	0.57	0.215	(0.084)	0.022	0.194
107	8.92	0.57	0.215	(0.083)	0.022	0.194
108	9.00	0.57	0.215	(0.083)	0.022	0.194
109	9.08	0.63	0.241	(0.083)	0.024	0.217
110	9.17	0.63	0.241	(0.082)	0.024	0.217
111	9.25	0.63	0.241	(0.082)	0.024	0.217
112	9.33	0.67	0.253	(0.081)	0.025	0.228
113	9.42	0.67	0.253	(0.081)	0.025	0.228
114	9.50	0.67	0.253	(0.081)	0.025	0.228
115	9.58	0.70	0.266	(0.080)	0.027	0.239
116	9.67	0.70	0.266	(0.080)	0.027	0.239
117	9.75	0.70	0.266	(0.079)	0.027	0.239
118	9.83	0.73	0.279	(0.079)	0.028	0.251
119	9.92	0.73	0.279	(0.079)	0.028	0.251
120	10.00	0.73	0.279	(0.078)	0.028	0.251
121	10.08	0.50	0.190	(0.078)	0.019	0.171
122	10.17	0.50	0.190	(0.078)	0.019	0.171
123	10.25	0.50	0.190	(0.077)	0.019	0.171
124	10.33	0.50	0.190	(0.077)	0.019	0.171
125	10.42	0.50	0.190	(0.076)	0.019	0.171
126	10.50	0.50	0.190	(0.076)	0.019	0.171
127	10.58	0.67	0.253	(0.076)	0.025	0.228
128	10.67	0.67	0.253	(0.075)	0.025	0.228
129	10.75	0.67	0.253	(0.075)	0.025	0.228
130	10.83	0.67	0.253	(0.075)	0.025	0.228
131	10.92	0.67	0.253	(0.074)	0.025	0.228
132	11.00	0.67	0.253	(0.074)	0.025	0.228
133	11.08	0.63	0.241	(0.074)	0.024	0.217
134	11.17	0.63	0.241	(0.073)	0.024	0.217
135	11.25	0.63	0.241	(0.073)	0.024	0.217
136	11.33	0.63	0.241	(0.072)	0.024	0.217
137	11.42	0.63	0.241	(0.072)	0.024	0.217
138	11.50	0.63	0.241	(0.072)	0.024	0.217
139	11.58	0.57	0.215	(0.071)	0.022	0.194
140	11.67	0.57	0.215	(0.071)	0.022	0.194
141	11.75	0.57	0.215	(0.071)	0.022	0.194
142	11.83	0.60	0.228	(0.070)	0.023	0.205
143	11.92	0.60	0.228	(0.070)	0.023	0.205
144	12.00	0.60	0.228	(0.070)	0.023	0.205
145	12.08	0.83	0.317	(0.069)	0.032	0.285
146	12.17	0.83	0.317	(0.069)	0.032	0.285
147	12.25	0.83	0.317	(0.069)	0.032	0.285
148	12.33	0.87	0.329	(0.068)	0.033	0.296
149	12.42	0.87	0.329	(0.068)	0.033	0.296
150	12.50	0.87	0.329	(0.068)	0.033	0.296
151	12.58	0.93	0.355	(0.067)	0.035	0.319
152	12.67	0.93	0.355	(0.067)	0.035	0.319
153	12.75	0.93	0.355	(0.067)	0.035	0.319
154	12.83	0.97	0.367	(0.066)	0.037	0.331
155	12.92	0.97	0.367	(0.066)	0.037	0.331
156	13.00	0.97	0.367	(0.066)	0.037	0.331
157	13.08	1.13	0.431	(0.065)	0.043	0.388
158	13.17	1.13	0.431	(0.065)	0.043	0.388
159	13.25	1.13	0.431	(0.065)	0.043	0.388
160	13.33	1.13	0.431	(0.064)	0.043	0.388
161	13.42	1.13	0.431	(0.064)	0.043	0.388
162	13.50	1.13	0.431	(0.064)	0.043	0.388
163	13.58	0.77	0.291	(0.063)	0.029	0.262
164	13.67	0.77	0.291	(0.063)	0.029	0.262
165	13.75	0.77	0.291	(0.063)	0.029	0.262
166	13.83	0.77	0.291	(0.062)	0.029	0.262
167	13.92	0.77	0.291	(0.062)	0.029	0.262
168	14.00	0.77	0.291	(0.062)	0.029	0.262
169	14.08	0.90	0.342	(0.061)	0.034	0.308
170	14.17	0.90	0.342	(0.061)	0.034	0.308
171	14.25	0.90	0.342	(0.061)	0.034	0.308
172	14.33	0.87	0.329	(0.060)	0.033	0.296
173	14.42	0.87	0.329	(0.060)	0.033	0.296

174	14.50	0.87	0.329	(0.060)	0.033	0.296
175	14.58	0.87	0.329	(0.059)	0.033	0.296
176	14.67	0.87	0.329	(0.059)	0.033	0.296
177	14.75	0.87	0.329	(0.059)	0.033	0.296
178	14.83	0.83	0.317	(0.059)	0.032	0.285
179	14.92	0.83	0.317	(0.058)	0.032	0.285
180	15.00	0.83	0.317	(0.058)	0.032	0.285
181	15.08	0.80	0.304	(0.058)	0.030	0.274
182	15.17	0.80	0.304	(0.057)	0.030	0.274
183	15.25	0.80	0.304	(0.057)	0.030	0.274
184	15.33	0.77	0.291	(0.057)	0.029	0.262
185	15.42	0.77	0.291	(0.056)	0.029	0.262
186	15.50	0.77	0.291	(0.056)	0.029	0.262
187	15.58	0.63	0.241	(0.056)	0.024	0.217
188	15.67	0.63	0.241	(0.056)	0.024	0.217
189	15.75	0.63	0.241	(0.055)	0.024	0.217
190	15.83	0.63	0.241	(0.055)	0.024	0.217
191	15.92	0.63	0.241	(0.055)	0.024	0.217
192	16.00	0.63	0.241	(0.054)	0.024	0.217
193	16.08	0.13	0.051	(0.054)	0.005	0.046
194	16.17	0.13	0.051	(0.054)	0.005	0.046
195	16.25	0.13	0.051	(0.054)	0.005	0.046
196	16.33	0.13	0.051	(0.053)	0.005	0.046
197	16.42	0.13	0.051	(0.053)	0.005	0.046
198	16.50	0.13	0.051	(0.053)	0.005	0.046
199	16.58	0.10	0.038	(0.053)	0.004	0.034
200	16.67	0.10	0.038	(0.052)	0.004	0.034
201	16.75	0.10	0.038	(0.052)	0.004	0.034
202	16.83	0.10	0.038	(0.052)	0.004	0.034
203	16.92	0.10	0.038	(0.052)	0.004	0.034
204	17.00	0.10	0.038	(0.051)	0.004	0.034
205	17.08	0.17	0.063	(0.051)	0.006	0.057
206	17.17	0.17	0.063	(0.051)	0.006	0.057
207	17.25	0.17	0.063	(0.050)	0.006	0.057
208	17.33	0.17	0.063	(0.050)	0.006	0.057
209	17.42	0.17	0.063	(0.050)	0.006	0.057
210	17.50	0.17	0.063	(0.050)	0.006	0.057
211	17.58	0.17	0.063	(0.049)	0.006	0.057
212	17.67	0.17	0.063	(0.049)	0.006	0.057
213	17.75	0.17	0.063	(0.049)	0.006	0.057
214	17.83	0.13	0.051	(0.049)	0.005	0.046
215	17.92	0.13	0.051	(0.049)	0.005	0.046
216	18.00	0.13	0.051	(0.048)	0.005	0.046
217	18.08	0.13	0.051	(0.048)	0.005	0.046
218	18.17	0.13	0.051	(0.048)	0.005	0.046
219	18.25	0.13	0.051	(0.048)	0.005	0.046
220	18.33	0.13	0.051	(0.047)	0.005	0.046
221	18.42	0.13	0.051	(0.047)	0.005	0.046
222	18.50	0.13	0.051	(0.047)	0.005	0.046
223	18.58	0.10	0.038	(0.047)	0.004	0.034
224	18.67	0.10	0.038	(0.046)	0.004	0.034
225	18.75	0.10	0.038	(0.046)	0.004	0.034
226	18.83	0.07	0.025	(0.046)	0.003	0.023
227	18.92	0.07	0.025	(0.046)	0.003	0.023
228	19.00	0.07	0.025	(0.046)	0.003	0.023
229	19.08	0.10	0.038	(0.045)	0.004	0.034
230	19.17	0.10	0.038	(0.045)	0.004	0.034
231	19.25	0.10	0.038	(0.045)	0.004	0.034
232	19.33	0.13	0.051	(0.045)	0.005	0.046
233	19.42	0.13	0.051	(0.044)	0.005	0.046
234	19.50	0.13	0.051	(0.044)	0.005	0.046
235	19.58	0.10	0.038	(0.044)	0.004	0.034
236	19.67	0.10	0.038	(0.044)	0.004	0.034
237	19.75	0.10	0.038	(0.044)	0.004	0.034
238	19.83	0.07	0.025	(0.043)	0.003	0.023
239	19.92	0.07	0.025	(0.043)	0.003	0.023
240	20.00	0.07	0.025	(0.043)	0.003	0.023
241	20.08	0.10	0.038	(0.043)	0.004	0.034
242	20.17	0.10	0.038	(0.043)	0.004	0.034

243	20.25	0.10	0.038	(0.043)	0.004	0.034
244	20.33	0.10	0.038	(0.042)	0.004	0.034
245	20.42	0.10	0.038	(0.042)	0.004	0.034
246	20.50	0.10	0.038	(0.042)	0.004	0.034
247	20.58	0.10	0.038	(0.042)	0.004	0.034
248	20.67	0.10	0.038	(0.042)	0.004	0.034
249	20.75	0.10	0.038	(0.041)	0.004	0.034
250	20.83	0.07	0.025	(0.041)	0.003	0.023
251	20.92	0.07	0.025	(0.041)	0.003	0.023
252	21.00	0.07	0.025	(0.041)	0.003	0.023
253	21.08	0.10	0.038	(0.041)	0.004	0.034
254	21.17	0.10	0.038	(0.041)	0.004	0.034
255	21.25	0.10	0.038	(0.040)	0.004	0.034
256	21.33	0.07	0.025	(0.040)	0.003	0.023
257	21.42	0.07	0.025	(0.040)	0.003	0.023
258	21.50	0.07	0.025	(0.040)	0.003	0.023
259	21.58	0.10	0.038	(0.040)	0.004	0.034
260	21.67	0.10	0.038	(0.040)	0.004	0.034
261	21.75	0.10	0.038	(0.040)	0.004	0.034
262	21.83	0.07	0.025	(0.039)	0.003	0.023
263	21.92	0.07	0.025	(0.039)	0.003	0.023
264	22.00	0.07	0.025	(0.039)	0.003	0.023
265	22.08	0.10	0.038	(0.039)	0.004	0.034
266	22.17	0.10	0.038	(0.039)	0.004	0.034
267	22.25	0.10	0.038	(0.039)	0.004	0.034
268	22.33	0.07	0.025	(0.039)	0.003	0.023
269	22.42	0.07	0.025	(0.039)	0.003	0.023
270	22.50	0.07	0.025	(0.038)	0.003	0.023
271	22.58	0.07	0.025	(0.038)	0.003	0.023
272	22.67	0.07	0.025	(0.038)	0.003	0.023
273	22.75	0.07	0.025	(0.038)	0.003	0.023
274	22.83	0.07	0.025	(0.038)	0.003	0.023
275	22.92	0.07	0.025	(0.038)	0.003	0.023
276	23.00	0.07	0.025	(0.038)	0.003	0.023
277	23.08	0.07	0.025	(0.038)	0.003	0.023
278	23.17	0.07	0.025	(0.038)	0.003	0.023
279	23.25	0.07	0.025	(0.038)	0.003	0.023
280	23.33	0.07	0.025	(0.038)	0.003	0.023
281	23.42	0.07	0.025	(0.037)	0.003	0.023
282	23.50	0.07	0.025	(0.037)	0.003	0.023
283	23.58	0.07	0.025	(0.037)	0.003	0.023
284	23.67	0.07	0.025	(0.037)	0.003	0.023
285	23.75	0.07	0.025	(0.037)	0.003	0.023
286	23.83	0.07	0.025	(0.037)	0.003	0.023
287	23.92	0.07	0.025	(0.037)	0.003	0.023
288	24.00	0.07	0.025	(0.037)	0.003	0.023

(Loss Rate Not Used)

Sum = 100.0 Sum = 34.2

Flood volume = Effective rainfall 2.85(In)
times area 9.7(Ac.)/[(In)/(Ft.)] = 2.3(Ac.Ft)

Total soil loss = 0.32(In)
Total soil loss = 0.255(Ac.Ft)
Total rainfall = 3.17(In)
Flood volume = 100123.3 Cubic Feet
Total soil loss = 11124.8 Cubic Feet

Peak flow rate of this hydrograph = 3.782(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0009	0.14	Q				
0+10	0.0024	0.21	Q				

0+15	0.0040	0.22	Q				
0+20	0.0060	0.29	VQ				
0+25	0.0082	0.33	VQ				
0+30	0.0105	0.33	VQ				
0+35	0.0128	0.33	VQ				
0+40	0.0151	0.33	VQ				
0+45	0.0174	0.33	VQ				
0+50	0.0202	0.40	VQ				
0+55	0.0232	0.44	VQ				
1+ 0	0.0263	0.44	VQ				
1+ 5	0.0289	0.38	VQ				
1+10	0.0312	0.34	VQ				
1+15	0.0335	0.33	VQ				
1+20	0.0358	0.33	VQ				
1+25	0.0381	0.33	VQ				
1+30	0.0404	0.33	VQ				
1+35	0.0427	0.33	VQ				
1+40	0.0450	0.33	VQ				
1+45	0.0473	0.33	VQ				
1+50	0.0501	0.40	VQ				
1+55	0.0531	0.44	VQ				
2+ 0	0.0562	0.44	VQ				
2+ 5	0.0592	0.44	Q				
2+10	0.0623	0.44	Q				
2+15	0.0654	0.44	Q				
2+20	0.0684	0.44	Q				
2+25	0.0715	0.44	Q				
2+30	0.0746	0.44	Q				
2+35	0.0781	0.51	VQ				
2+40	0.0819	0.55	VQ				
2+45	0.0857	0.56	VQ				
2+50	0.0896	0.56	VQ				
2+55	0.0934	0.56	VQ				
3+ 0	0.0972	0.56	VQ				
3+ 5	0.1011	0.56	VQ				
3+10	0.1049	0.56	VQ				
3+15	0.1087	0.56	VQ				
3+20	0.1125	0.56	VQ				
3+25	0.1164	0.56	Q				
3+30	0.1202	0.56	Q				
3+35	0.1240	0.56	Q				
3+40	0.1279	0.56	Q				
3+45	0.1317	0.56	Q				
3+50	0.1360	0.62	Q				
3+55	0.1406	0.66	Q				
4+ 0	0.1452	0.67	Q				
4+ 5	0.1498	0.67	Q				
4+10	0.1544	0.67	Q				
4+15	0.1590	0.67	Q				
4+20	0.1640	0.74	Q				
4+25	0.1694	0.77	VQ				
4+30	0.1747	0.78	Q				
4+35	0.1801	0.78	Q				
4+40	0.1854	0.78	Q				
4+45	0.1908	0.78	Q				
4+50	0.1966	0.85	Q				
4+55	0.2027	0.89	Q				
5+ 0	0.2089	0.89	Q				
5+ 5	0.2141	0.75	Q				
5+10	0.2187	0.68	QV				
5+15	0.2233	0.67	QV				
5+20	0.2284	0.74	QV				
5+25	0.2337	0.77	QV				
5+30	0.2391	0.78	QV				
5+35	0.2449	0.85	QV				
5+40	0.2510	0.89	QV				
5+45	0.2571	0.89	QV				
5+50	0.2633	0.89	QV				
5+55	0.2694	0.89	QV				

6+ 0	0.2755	0.89	QV				
6+ 5	0.2821	0.96	QV				
6+10	0.2890	1.00	Q V				
6+15	0.2959	1.00	QV				
6+20	0.3028	1.00	QV				
6+25	0.3097	1.00	QV				
6+30	0.3166	1.00	QV				
6+35	0.3240	1.07	QV				
6+40	0.3316	1.11	QV				
6+45	0.3392	1.11	QV				
6+50	0.3469	1.11	Q V				
6+55	0.3546	1.11	Q V				
7+ 0	0.3622	1.11	Q V				
7+ 5	0.3699	1.11	Q V				
7+10	0.3776	1.11	Q V				
7+15	0.3852	1.11	Q V				
7+20	0.3934	1.18	Q V				
7+25	0.4017	1.22	Q V				
7+30	0.4102	1.22	Q V				
7+35	0.4191	1.29	Q V				
7+40	0.4282	1.33	Q V				
7+45	0.4374	1.33	Q V				
7+50	0.4471	1.40	Q V				
7+55	0.4570	1.44	Q V				
8+ 0	0.4670	1.45	Q V				
8+ 5	0.4779	1.58	Q V				
8+10	0.4893	1.66	Q V				
8+15	0.5008	1.67	Q V				
8+20	0.5123	1.67	Q V				
8+25	0.5238	1.67	Q V				
8+30	0.5353	1.67	Q V				
8+35	0.5473	1.74	Q V				
8+40	0.5595	1.78	Q V				
8+45	0.5718	1.78	Q V				
8+50	0.5845	1.85	Q V				
8+55	0.5975	1.89	Q V				
9+ 0	0.6105	1.89	Q V				
9+ 5	0.6245	2.03	Q V				
9+10	0.6390	2.10	Q V				
9+15	0.6535	2.11	Q V				
9+20	0.6686	2.18	Q V				
9+25	0.6839	2.22	Q V				
9+30	0.6992	2.22	Q V				
9+35	0.7150	2.29	Q V				
9+40	0.7310	2.33	Q V				
9+45	0.7471	2.34	Q V				
9+50	0.7637	2.40	Q V				
9+55	0.7805	2.44	Q V				
10+ 0	0.7974	2.45	Q V				
10+ 5	0.8109	1.97	Q V				
10+10	0.8226	1.70	Q V				
10+15	0.8341	1.67	Q V				
10+20	0.8456	1.67	Q V				
10+25	0.8571	1.67	Q V				
10+30	0.8686	1.67	Q V				
10+35	0.8824	2.01	Q V				
10+40	0.8976	2.20	Q V				
10+45	0.9129	2.22	Q V				
10+50	0.9283	2.22	Q V				
10+55	0.9436	2.22	Q V				
11+ 0	0.9589	2.22	Q V				
11+ 5	0.9738	2.16	Q V				
11+10	0.9883	2.12	Q V				
11+15	1.0029	2.11	Q V				
11+20	1.0175	2.11	Q V				
11+25	1.0320	2.11	Q V				
11+30	1.0466	2.11	Q V				
11+35	1.0602	1.98	Q V				
11+40	1.0733	1.90	Q V				

11+45	1.0863	1.89	Q		V			
11+50	1.0998	1.96	Q		V			
11+55	1.1136	2.00	Q		V			
12+ 0	1.1273	2.00	Q		V			
12+ 5	1.1445	2.48	Q		V			
12+10	1.1634	2.75		Q	V			
12+15	1.1825	2.78		Q	V			
12+20	1.2022	2.85		Q	V			
12+25	1.2221	2.89		Q	V			
12+30	1.2420	2.89		Q	V			
12+35	1.2629	3.03		Q	V			
12+40	1.2842	3.11		Q	V			
12+45	1.3057	3.11		Q	V			
12+50	1.3276	3.18		Q	V			
12+55	1.3498	3.22		Q	V			
13+ 0	1.3720	3.23		Q	V			
13+ 5	1.3966	3.57		Q	V			
13+10	1.4225	3.76		Q	V			
13+15	1.4486	3.78		Q	V			
13+20	1.4746	3.78		Q	V			
13+25	1.5007	3.78		Q	V			
13+30	1.5267	3.78		Q	V			
13+35	1.5476	3.03		Q	V			
13+40	1.5655	2.61		Q	V			
13+45	1.5831	2.56		Q	V			
13+50	1.6008	2.56		Q	V			
13+55	1.6184	2.56		Q	V			
14+ 0	1.6360	2.56		Q	V			
14+ 5	1.6555	2.83		Q	V			
14+10	1.6761	2.99		Q	V			
14+15	1.6968	3.00		Q	V			
14+20	1.7170	2.93		Q	V			
14+25	1.7369	2.90		Q	V			
14+30	1.7569	2.89		Q	V			
14+35	1.7768	2.89		Q	V			
14+40	1.7967	2.89		Q	V			
14+45	1.8166	2.89		Q	V			
14+50	1.8361	2.82		Q	V			
14+55	1.8552	2.79		Q	V			
15+ 0	1.8744	2.78		Q	V			
15+ 5	1.8931	2.71		Q	V			
15+10	1.9115	2.67		Q	V			
15+15	1.9299	2.67		Q	V			
15+20	1.9478	2.60		Q	V			
15+25	1.9655	2.56		Q	V			
15+30	1.9831	2.56		Q	V			
15+35	1.9988	2.28		Q	V			
15+40	2.0135	2.13		Q	V			
15+45	2.0280	2.11		Q	V			
15+50	2.0426	2.11		Q	V			
15+55	2.0572	2.11		Q	V			
16+ 0	2.0717	2.11		Q	V			
16+ 5	2.0792	1.08		Q	V			
16+10	2.0827	0.51	Q		V			
16+15	2.0858	0.44	Q		V			
16+20	2.0888	0.44	Q		V			
16+25	2.0919	0.44	Q		V			
16+30	2.0950	0.44	Q		V			
16+35	2.0975	0.38	Q		V			
16+40	2.0999	0.34	Q		V			
16+45	2.1022	0.33	Q		V			
16+50	2.1045	0.33	Q		V			
16+55	2.1068	0.33	Q		V			
17+ 0	2.1091	0.33	Q		V			
17+ 5	2.1123	0.47	Q		V			
17+10	2.1161	0.55	Q		V			
17+15	2.1199	0.56	Q		V			
17+20	2.1237	0.56	Q		V			
17+25	2.1276	0.56	Q		V			

17+30	2.1314	0.56	Q					V	
17+35	2.1352	0.56	Q					V	
17+40	2.1391	0.56	Q					V	
17+45	2.1429	0.56	Q					V	
17+50	2.1463	0.49	Q					V	
17+55	2.1493	0.45	Q					V	
18+ 0	2.1524	0.44	Q					V	
18+ 5	2.1555	0.44	Q					V	
18+10	2.1585	0.44	Q					V	
18+15	2.1616	0.44	Q					V	
18+20	2.1647	0.44	Q					V	
18+25	2.1677	0.44	Q					V	
18+30	2.1708	0.44	Q					V	
18+35	2.1734	0.38	Q					V	
18+40	2.1757	0.34	Q					V	
18+45	2.1780	0.33	Q					V	
18+50	2.1798	0.27	Q					V	
18+55	2.1814	0.23	Q					V	
19+ 0	2.1829	0.22	Q					V	
19+ 5	2.1849	0.29	Q					V	
19+10	2.1872	0.33	Q					V	
19+15	2.1895	0.33	Q					V	
19+20	2.1923	0.40	Q					V	
19+25	2.1953	0.44	Q					V	
19+30	2.1984	0.44	Q					V	
19+35	2.2010	0.38	Q					V	
19+40	2.2033	0.34	Q					V	
19+45	2.2056	0.33	Q					V	
19+50	2.2074	0.27	Q					V	
19+55	2.2090	0.23	Q					V	
20+ 0	2.2105	0.22	Q					V	
20+ 5	2.2125	0.29	Q					V	
20+10	2.2148	0.33	Q					V	
20+15	2.2171	0.33	Q					V	
20+20	2.2194	0.33	Q					V	
20+25	2.2217	0.33	Q					V	
20+30	2.2240	0.33	Q					V	
20+35	2.2263	0.33	Q					V	
20+40	2.2286	0.33	Q					V	
20+45	2.2309	0.33	Q					V	
20+50	2.2327	0.27	Q					V	
20+55	2.2343	0.23	Q					V	
21+ 0	2.2358	0.22	Q					V	
21+ 5	2.2378	0.29	Q					V	
21+10	2.2401	0.33	Q					V	
21+15	2.2424	0.33	Q					V	
21+20	2.2442	0.27	Q					V	
21+25	2.2458	0.23	Q					V	
21+30	2.2473	0.22	Q					V	
21+35	2.2493	0.29	Q					V	
21+40	2.2516	0.33	Q					V	
21+45	2.2539	0.33	Q					V	
21+50	2.2557	0.27	Q					V	
21+55	2.2573	0.23	Q					V	
22+ 0	2.2588	0.22	Q					V	
22+ 5	2.2608	0.29	Q					V	
22+10	2.2631	0.33	Q					V	
22+15	2.2654	0.33	Q					V	
22+20	2.2672	0.27	Q					V	
22+25	2.2688	0.23	Q					V	
22+30	2.2703	0.22	Q					V	
22+35	2.2718	0.22	Q					V	
22+40	2.2733	0.22	Q					V	
22+45	2.2749	0.22	Q					V	
22+50	2.2764	0.22	Q					V	
22+55	2.2779	0.22	Q					V	
23+ 0	2.2795	0.22	Q					V	
23+ 5	2.2810	0.22	Q					V	
23+10	2.2825	0.22	Q					V	

23+15	2.2841	0.22	Q				V
23+20	2.2856	0.22	Q				V
23+25	2.2871	0.22	Q				V
23+30	2.2887	0.22	Q				V
23+35	2.2902	0.22	Q				V
23+40	2.2917	0.22	Q				V
23+45	2.2933	0.22	Q				V
23+50	2.2948	0.22	Q				V
23+55	2.2963	0.22	Q				V
24+ 0	2.2979	0.22	Q				V
24+ 5	2.2985	0.09	Q				V
24+10	2.2985	0.01	Q				V

Appendix I.III

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 100-Year, 1-Hour Storm

Unit Hydrograph Analysis

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Study date 03/10/26 File: RCCDPRE100UHA3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
PRE DEVELOPMENT - DA A (EXISTING CONDITIONS)

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 704.10(Ft.)
Length along longest watercourse measured to centroid = 273.41(Ft.)
Length along longest watercourse = 0.133 Mi.
Length along longest watercourse measured to centroid = 0.052 Mi.
Difference in elevation = 11.23(Ft.)
Slope along watercourse = 84.2130 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.023 Hr.
Lag time = 1.40 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	0.81	7.88

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	1.89	18.30

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.814(In)
Area Averaged 100-Year Rainfall = 1.890(In)

Point rain (area averaged) = 1.890(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.890(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 1.000
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	1.000	0.055	1.000	0.055
						Sum (F) = 0.055

Area averaged mean soil loss (F) (In/Hr) = 0.055

Minimum soil loss rate ((In/Hr)) = 0.028

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.100

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	356.000	61.792	6.028
2 0.167	711.999	34.227	3.339
3 0.250	1067.999	3.982	0.388
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1 0.08	1.30	0.295	(0.055)	0.029	0.265
2 0.17	1.30	0.295	(0.055)	0.029	0.265
3 0.25	1.10	0.249	(0.055)	0.025	0.225
4 0.33	1.50	0.340	(0.055)	0.034	0.306
5 0.42	1.50	0.340	(0.055)	0.034	0.306
6 0.50	1.80	0.408	(0.055)	0.041	0.367
7 0.58	1.50	0.340	(0.055)	0.034	0.306
8 0.67	1.80	0.408	(0.055)	0.041	0.367
9 0.75	1.80	0.408	(0.055)	0.041	0.367
10 0.83	1.50	0.340	(0.055)	0.034	0.306
11 0.92	1.60	0.363	(0.055)	0.036	0.327
12 1.00	1.80	0.408	(0.055)	0.041	0.367
13 1.08	2.20	0.499	(0.055)	0.050	0.449
14 1.17	2.20	0.499	(0.055)	0.050	0.449
15 1.25	2.20	0.499	(0.055)	0.050	0.449
16 1.33	2.00	0.454	(0.055)	0.045	0.408
17 1.42	2.60	0.590	0.055	(0.059)	0.534
18 1.50	2.70	0.612	0.055	(0.061)	0.557
19 1.58	2.40	0.544	(0.055)	0.054	0.490
20 1.67	2.70	0.612	0.055	(0.061)	0.557
21 1.75	3.30	0.748	0.055	(0.075)	0.693
22 1.83	3.10	0.703	0.055	(0.070)	0.648
23 1.92	2.90	0.658	0.055	(0.066)	0.603
24 2.00	3.00	0.680	0.055	(0.068)	0.625
25 2.08	3.10	0.703	0.055	(0.070)	0.648
26 2.17	4.20	0.953	0.055	(0.095)	0.897
27 2.25	5.00	1.134	0.055	(0.113)	1.079
28 2.33	3.50	0.794	0.055	(0.079)	0.739
29 2.42	6.80	1.542	0.055	(0.154)	1.487
30 2.50	7.30	1.656	0.055	(0.166)	1.600
31 2.58	8.20	1.860	0.055	(0.186)	1.805
32 2.67	5.90	1.338	0.055	(0.134)	1.283
33 2.75	2.00	0.454	(0.055)	0.045	0.408
34 2.83	1.80	0.408	(0.055)	0.041	0.367
35 2.92	1.80	0.408	(0.055)	0.041	0.367

36 3.00 0.60 0.136 (0.055) 0.014 0.122
(Loss Rate Not Used)

Sum = 100.0 Sum = 21.0

Flood volume = Effective rainfall 1.75(In)
times area 9.7(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.14(In)
Total soil loss = 0.110(Ac.Ft)
Total rainfall = 1.89(In)
Flood volume = 61615.2 Cubic Feet
Total soil loss = 4793.6 Cubic Feet

Peak flow rate of this hydrograph = 16.808(CFS)

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3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0110	1.60	V Q					
0+10	0.0281	2.49	V Q					
0+15	0.0443	2.34	V Q					
0+20	0.0629	2.70	V Q					
0+25	0.0832	2.96	V Q					
0+30	0.1064	3.36	V Q					
0+35	0.1284	3.19	V Q					
0+40	0.1516	3.38	V Q					
0+45	0.1762	3.56	V Q					
0+50	0.1983	3.22	VQ					
0+55	0.2199	3.14	Q					
1+ 0	0.2435	3.43	Q					
1+ 5	0.2715	4.06	VQ					
1+10	0.3015	4.35	Q					
1+15	0.3317	4.38	QV					
1+20	0.3601	4.14	Q V					
1+25	0.3929	4.76	Q V					
1+30	0.4295	5.30	Q V					
1+35	0.4641	5.02	Q V					
1+40	0.5000	5.21	Q V					
1+45	0.5429	6.23	Q V					
1+50	0.5873	6.44	Q V					
1+55	0.6291	6.07	Q V					
2+ 0	0.6706	6.04	Q V					
2+ 5	0.7135	6.23	Q V					
2+10	0.7674	7.82	Q V					
2+15	0.8346	9.76	Q V					
2+20	0.8925	8.41	Q V					
2+25	0.9741	11.86	Q V					
2+30	1.0768	14.91	QV					
2+35	1.1925	16.81	Q					
2+40	1.2916	14.39	Q					
2+45	1.3429	7.45	Q					
2+50	1.3710	4.08	Q					
2+55	1.3958	3.60	Q					
3+ 0	1.4104	2.11	Q					
3+ 5	1.4142	0.55	Q					
3+10	1.4145	0.05	Q					

Appendix I.IV

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 100-Year, 3-Hour Storm

Unit Hydrograph Analysis

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Study date 03/10/26 File: RCCDPRe100UHA3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
PRE DEVELOPMENT - DA A (EXISTING CONDITIONS)

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 704.10(Ft.)
Length along longest watercourse measured to centroid = 273.41(Ft.)
Length along longest watercourse = 0.133 Mi.
Length along longest watercourse measured to centroid = 0.052 Mi.
Difference in elevation = 11.23(Ft.)
Slope along watercourse = 84.2130 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.023 Hr.
Lag time = 1.40 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	0.81	7.88

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	1.89	18.30

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.814(In)
Area Averaged 100-Year Rainfall = 1.890(In)

Point rain (area averaged) = 1.890(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.890(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 1.000
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	1.000	0.055	1.000	0.055
						Sum (F) = 0.055

Area averaged mean soil loss (F) (In/Hr) = 0.055
Minimum soil loss rate ((In/Hr)) = 0.028
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.100

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	356.000	61.792	6.028
2 0.167	711.999	34.227	3.339
3 0.250	1067.999	3.982	0.388
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1 0.08	1.30	0.295	(0.055)	0.029	0.265
2 0.17	1.30	0.295	(0.055)	0.029	0.265
3 0.25	1.10	0.249	(0.055)	0.025	0.225
4 0.33	1.50	0.340	(0.055)	0.034	0.306
5 0.42	1.50	0.340	(0.055)	0.034	0.306
6 0.50	1.80	0.408	(0.055)	0.041	0.367
7 0.58	1.50	0.340	(0.055)	0.034	0.306
8 0.67	1.80	0.408	(0.055)	0.041	0.367
9 0.75	1.80	0.408	(0.055)	0.041	0.367
10 0.83	1.50	0.340	(0.055)	0.034	0.306
11 0.92	1.60	0.363	(0.055)	0.036	0.327
12 1.00	1.80	0.408	(0.055)	0.041	0.367
13 1.08	2.20	0.499	(0.055)	0.050	0.449
14 1.17	2.20	0.499	(0.055)	0.050	0.449
15 1.25	2.20	0.499	(0.055)	0.050	0.449
16 1.33	2.00	0.454	(0.055)	0.045	0.408
17 1.42	2.60	0.590	0.055	(0.059)	0.534
18 1.50	2.70	0.612	0.055	(0.061)	0.557
19 1.58	2.40	0.544	(0.055)	0.054	0.490
20 1.67	2.70	0.612	0.055	(0.061)	0.557
21 1.75	3.30	0.748	0.055	(0.075)	0.693
22 1.83	3.10	0.703	0.055	(0.070)	0.648
23 1.92	2.90	0.658	0.055	(0.066)	0.603
24 2.00	3.00	0.680	0.055	(0.068)	0.625
25 2.08	3.10	0.703	0.055	(0.070)	0.648
26 2.17	4.20	0.953	0.055	(0.095)	0.897
27 2.25	5.00	1.134	0.055	(0.113)	1.079
28 2.33	3.50	0.794	0.055	(0.079)	0.739
29 2.42	6.80	1.542	0.055	(0.154)	1.487
30 2.50	7.30	1.656	0.055	(0.166)	1.600
31 2.58	8.20	1.860	0.055	(0.186)	1.805
32 2.67	5.90	1.338	0.055	(0.134)	1.283
33 2.75	2.00	0.454	(0.055)	0.045	0.408
34 2.83	1.80	0.408	(0.055)	0.041	0.367
35 2.92	1.80	0.408	(0.055)	0.041	0.367

36 3.00 0.60 0.136 (0.055) 0.014 0.122
 (Loss Rate Not Used)

Sum = 100.0 Sum = 21.0

Flood volume = Effective rainfall 1.75(In)
 times area 9.7(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
 Total soil loss = 0.14(In)
 Total soil loss = 0.110(Ac.Ft)
 Total rainfall = 1.89(In)
 Flood volume = 61615.2 Cubic Feet
 Total soil loss = 4793.6 Cubic Feet

 Peak flow rate of this hydrograph = 16.808(CFS)

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3 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0110	1.60	V Q					
0+10	0.0281	2.49	V Q					
0+15	0.0443	2.34	V Q					
0+20	0.0629	2.70	V Q					
0+25	0.0832	2.96	V Q					
0+30	0.1064	3.36	V Q					
0+35	0.1284	3.19	V Q					
0+40	0.1516	3.38	V Q					
0+45	0.1762	3.56	V Q					
0+50	0.1983	3.22	VQ					
0+55	0.2199	3.14	Q					
1+ 0	0.2435	3.43	Q					
1+ 5	0.2715	4.06	VQ					
1+10	0.3015	4.35	Q					
1+15	0.3317	4.38	QV					
1+20	0.3601	4.14	Q V					
1+25	0.3929	4.76	Q V					
1+30	0.4295	5.30	Q V					
1+35	0.4641	5.02	Q V					
1+40	0.5000	5.21	Q V					
1+45	0.5429	6.23	Q V					
1+50	0.5873	6.44	Q V					
1+55	0.6291	6.07	Q V					
2+ 0	0.6706	6.04	Q V					
2+ 5	0.7135	6.23	Q V					
2+10	0.7674	7.82	Q V					
2+15	0.8346	9.76	Q V					
2+20	0.8925	8.41	Q V					
2+25	0.9741	11.86	Q V					
2+30	1.0768	14.91	QV					
2+35	1.1925	16.81	Q					
2+40	1.2916	14.39	Q					
2+45	1.3429	7.45	Q					
2+50	1.3710	4.08	Q					
2+55	1.3958	3.60	Q					
3+ 0	1.4104	2.11	Q					
3+ 5	1.4142	0.55	Q					
3+10	1.4145	0.05	Q					

Appendix I.V

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 100-Year, 6-Hour Storm

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 03/10/26 File: RCCDPRe100UHA6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
PRE DEVELOPMENT - DA A (EXISTING CONDITIONS)

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 704.10(Ft.)
Length along longest watercourse measured to centroid = 273.41(Ft.)
Length along longest watercourse = 0.133 Mi.
Length along longest watercourse measured to centroid = 0.052 Mi.
Difference in elevation = 11.23(Ft.)
Slope along watercourse = 84.2130 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.023 Hr.
Lag time = 1.40 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	1.13	10.94

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.59	25.07

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.130(In)
Area Averaged 100-Year Rainfall = 2.590(In)

Point rain (area averaged) = 2.590(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.590(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 1.000
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	1.000	0.055	1.000	0.055
						Sum (F) = 0.055

Area averaged mean soil loss (F) (In/Hr) = 0.055

Minimum soil loss rate ((In/Hr)) = 0.028

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.100

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	356.000	61.792	6.028
2 0.167	711.999	34.227	3.339
3 0.250	1067.999	3.982	0.388
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1 0.08	0.50	0.155	(0.055)	0.016	0.140
2 0.17	0.60	0.186	(0.055)	0.019	0.168
3 0.25	0.60	0.186	(0.055)	0.019	0.168
4 0.33	0.60	0.186	(0.055)	0.019	0.168
5 0.42	0.60	0.186	(0.055)	0.019	0.168
6 0.50	0.70	0.218	(0.055)	0.022	0.196
7 0.58	0.70	0.218	(0.055)	0.022	0.196
8 0.67	0.70	0.218	(0.055)	0.022	0.196
9 0.75	0.70	0.218	(0.055)	0.022	0.196
10 0.83	0.70	0.218	(0.055)	0.022	0.196
11 0.92	0.70	0.218	(0.055)	0.022	0.196
12 1.00	0.80	0.249	(0.055)	0.025	0.224
13 1.08	0.80	0.249	(0.055)	0.025	0.224
14 1.17	0.80	0.249	(0.055)	0.025	0.224
15 1.25	0.80	0.249	(0.055)	0.025	0.224
16 1.33	0.80	0.249	(0.055)	0.025	0.224
17 1.42	0.80	0.249	(0.055)	0.025	0.224
18 1.50	0.80	0.249	(0.055)	0.025	0.224
19 1.58	0.80	0.249	(0.055)	0.025	0.224
20 1.67	0.80	0.249	(0.055)	0.025	0.224
21 1.75	0.80	0.249	(0.055)	0.025	0.224
22 1.83	0.80	0.249	(0.055)	0.025	0.224
23 1.92	0.80	0.249	(0.055)	0.025	0.224
24 2.00	0.90	0.280	(0.055)	0.028	0.252
25 2.08	0.80	0.249	(0.055)	0.025	0.224
26 2.17	0.90	0.280	(0.055)	0.028	0.252
27 2.25	0.90	0.280	(0.055)	0.028	0.252
28 2.33	0.90	0.280	(0.055)	0.028	0.252
29 2.42	0.90	0.280	(0.055)	0.028	0.252
30 2.50	0.90	0.280	(0.055)	0.028	0.252
31 2.58	0.90	0.280	(0.055)	0.028	0.252
32 2.67	0.90	0.280	(0.055)	0.028	0.252
33 2.75	1.00	0.311	(0.055)	0.031	0.280
34 2.83	1.00	0.311	(0.055)	0.031	0.280
35 2.92	1.00	0.311	(0.055)	0.031	0.280

36	3.00	1.00	0.311	(0.055)	0.031	0.280
37	3.08	1.00	0.311	(0.055)	0.031	0.280
38	3.17	1.10	0.342	(0.055)	0.034	0.308
39	3.25	1.10	0.342	(0.055)	0.034	0.308
40	3.33	1.10	0.342	(0.055)	0.034	0.308
41	3.42	1.20	0.373	(0.055)	0.037	0.336
42	3.50	1.30	0.404	(0.055)	0.040	0.364
43	3.58	1.40	0.435	(0.055)	0.044	0.392
44	3.67	1.40	0.435	(0.055)	0.044	0.392
45	3.75	1.50	0.466	(0.055)	0.047	0.420
46	3.83	1.50	0.466	(0.055)	0.047	0.420
47	3.92	1.60	0.497	(0.055)	0.050	0.448
48	4.00	1.60	0.497	(0.055)	0.050	0.448
49	4.08	1.70	0.528	(0.055)	0.053	0.476
50	4.17	1.80	0.559	0.055	(0.056)	0.504
51	4.25	1.90	0.591	0.055	(0.059)	0.535
52	4.33	2.00	0.622	0.055	(0.062)	0.566
53	4.42	2.10	0.653	0.055	(0.065)	0.597
54	4.50	2.10	0.653	0.055	(0.065)	0.597
55	4.58	2.20	0.684	0.055	(0.068)	0.629
56	4.67	2.30	0.715	0.055	(0.071)	0.660
57	4.75	2.40	0.746	0.055	(0.075)	0.691
58	4.83	2.40	0.746	0.055	(0.075)	0.691
59	4.92	2.50	0.777	0.055	(0.078)	0.722
60	5.00	2.60	0.808	0.055	(0.081)	0.753
61	5.08	3.10	0.963	0.055	(0.096)	0.908
62	5.17	3.60	1.119	0.055	(0.112)	1.064
63	5.25	3.90	1.212	0.055	(0.121)	1.157
64	5.33	4.20	1.305	0.055	(0.131)	1.250
65	5.42	4.70	1.461	0.055	(0.146)	1.406
66	5.50	5.60	1.740	0.055	(0.174)	1.685
67	5.58	1.90	0.591	0.055	(0.059)	0.535
68	5.67	0.90	0.280	(0.055)	0.028	0.252
69	5.75	0.60	0.186	(0.055)	0.019	0.168
70	5.83	0.50	0.155	(0.055)	0.016	0.140
71	5.92	0.30	0.093	(0.055)	0.009	0.084
72	6.00	0.20	0.062	(0.055)	0.006	0.056

(Loss Rate Not Used)

Sum = 100.0 Sum = 28.6

Flood volume = Effective rainfall 2.38(In)
times area 9.7(Ac.)/[(In)/(Ft.)] = 1.9(Ac.Ft)

Total soil loss = 0.21(In)
Total soil loss = 0.168(Ac.Ft)
Total rainfall = 2.59(In)
Flood volume = 83666.1 Cubic Feet
Total soil loss = 7339.3 Cubic Feet

Peak flow rate of this hydrograph = 15.346(CFS)

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6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0058	0.84	VQ				
0+10	0.0160	1.48	V Q				
0+15	0.0272	1.63	V Q				
0+20	0.0385	1.64	V Q				
0+25	0.0498	1.64	V Q				
0+30	0.0622	1.81	V Q				
0+35	0.0753	1.90	V Q				
0+40	0.0885	1.91	V Q				
0+45	0.1016	1.91	VQ				
0+50	0.1148	1.91	VQ				
0+55	0.1279	1.91	VQ				

1+ 0	0.1423	2.08	V Q				
1+ 5	0.1572	2.17	VQ				
1+10	0.1723	2.18	VQ				
1+15	0.1873	2.18	VQ				
1+20	0.2024	2.18	Q				
1+25	0.2174	2.18	Q				
1+30	0.2324	2.18	Q				
1+35	0.2475	2.18	QV				
1+40	0.2625	2.18	QV				
1+45	0.2776	2.18	QV				
1+50	0.2926	2.18	Q V				
1+55	0.3077	2.18	Q V				
2+ 0	0.3239	2.35	Q V				
2+ 5	0.3395	2.28	Q V				
2+10	0.3558	2.36	Q V				
2+15	0.3727	2.45	Q V				
2+20	0.3896	2.46	Q V				
2+25	0.4065	2.46	Q V				
2+30	0.4234	2.46	Q V				
2+35	0.4404	2.46	Q V				
2+40	0.4573	2.46	Q V				
2+45	0.4754	2.63	Q V				
2+50	0.4941	2.72	Q V				
2+55	0.5129	2.73	Q V				
3+ 0	0.5317	2.73	Q V				
3+ 5	0.5505	2.73	Q V				
3+10	0.5705	2.90	Q V				
3+15	0.5911	2.99	Q V				
3+20	0.6118	3.00	Q V				
3+25	0.6336	3.17	Q V				
3+30	0.6573	3.43	Q V				
3+35	0.6828	3.71	Q V				
3+40	0.7090	3.81	Q V				
3+45	0.7365	3.99	Q V				
3+50	0.7647	4.08	Q V				
3+55	0.7940	4.26	Q V				
4+ 0	0.8240	4.36	Q V				
4+ 5	0.8553	4.54	Q V				
4+10	0.8884	4.80	Q V				
4+15	0.9235	5.10	Q V				
4+20	0.9607	5.40	Q V				
4+25	1.0000	5.70	Q V				
4+30	1.0400	5.82	Q V				
4+35	1.0815	6.02	Q V				
4+40	1.1250	6.31	Q V				
4+45	1.1705	6.61	Q V				
4+50	1.2169	6.73	Q V				
4+55	1.2646	6.93	Q V				
5+ 0	1.3143	7.22	Q V				
5+ 5	1.3713	8.27	Q V				
5+10	1.4384	9.74	Q V				
5+15	1.5133	10.88	Q V				
5+20	1.5947	11.82	Q V				
5+25	1.6850	13.10	Q V				
5+30	1.7907	15.35	Q V				
5+35	1.8554	9.41	Q				
5+40	1.8827	3.96	Q				
5+45	1.8969	2.06	Q				
5+50	1.9073	1.50	Q				
5+55	1.9144	1.04	Q				
6+ 0	1.9190	0.67	Q				
6+ 5	1.9206	0.22	Q				
6+10	1.9207	0.02	Q				

Appendix I.VI

Synthetic Unit Hydrograph Method Analysis Pre-Development Conditions 100-Year, 24-Hour Storm

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 03/10/26 File: RCCDPRe100UHA24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
PRE DEVELOPMENT - DA A (EXISTING CONDITIONS)

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 704.10(Ft.)
Length along longest watercourse measured to centroid = 273.41(Ft.)
Length along longest watercourse = 0.133 Mi.
Length along longest watercourse measured to centroid = 0.052 Mi.
Difference in elevation = 11.23(Ft.)
Slope along watercourse = 84.2130 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.023 Hr.
Lag time = 1.40 Min.
25% of lag time = 0.35 Min.
40% of lag time = 0.56 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.01	19.46

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	4.82	46.66

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.010(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 4.820(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.820(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 1.000
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	1.000	0.055	1.000	0.055
						Sum (F) = 0.055

Area averaged mean soil loss (F) (In/Hr) = 0.055
Minimum soil loss rate ((In/Hr)) = 0.028
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.100

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	356.000	61.792	6.028
2 0.167	711.999	34.227	3.339
3 0.250	1067.999	3.982	0.388
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1 0.08	0.07	0.039	(0.098)	0.004	0.035
2 0.17	0.07	0.039	(0.097)	0.004	0.035
3 0.25	0.07	0.039	(0.097)	0.004	0.035
4 0.33	0.10	0.058	(0.097)	0.006	0.052
5 0.42	0.10	0.058	(0.096)	0.006	0.052
6 0.50	0.10	0.058	(0.096)	0.006	0.052
7 0.58	0.10	0.058	(0.096)	0.006	0.052
8 0.67	0.10	0.058	(0.095)	0.006	0.052
9 0.75	0.10	0.058	(0.095)	0.006	0.052
10 0.83	0.13	0.077	(0.094)	0.008	0.069
11 0.92	0.13	0.077	(0.094)	0.008	0.069
12 1.00	0.13	0.077	(0.094)	0.008	0.069
13 1.08	0.10	0.058	(0.093)	0.006	0.052
14 1.17	0.10	0.058	(0.093)	0.006	0.052
15 1.25	0.10	0.058	(0.093)	0.006	0.052
16 1.33	0.10	0.058	(0.092)	0.006	0.052
17 1.42	0.10	0.058	(0.092)	0.006	0.052
18 1.50	0.10	0.058	(0.091)	0.006	0.052
19 1.58	0.10	0.058	(0.091)	0.006	0.052
20 1.67	0.10	0.058	(0.091)	0.006	0.052
21 1.75	0.10	0.058	(0.090)	0.006	0.052
22 1.83	0.13	0.077	(0.090)	0.008	0.069
23 1.92	0.13	0.077	(0.090)	0.008	0.069
24 2.00	0.13	0.077	(0.089)	0.008	0.069
25 2.08	0.13	0.077	(0.089)	0.008	0.069
26 2.17	0.13	0.077	(0.089)	0.008	0.069
27 2.25	0.13	0.077	(0.088)	0.008	0.069
28 2.33	0.13	0.077	(0.088)	0.008	0.069
29 2.42	0.13	0.077	(0.087)	0.008	0.069
30 2.50	0.13	0.077	(0.087)	0.008	0.069
31 2.58	0.17	0.096	(0.087)	0.010	0.087
32 2.67	0.17	0.096	(0.086)	0.010	0.087
33 2.75	0.17	0.096	(0.086)	0.010	0.087
34 2.83	0.17	0.096	(0.086)	0.010	0.087
35 2.92	0.17	0.096	(0.085)	0.010	0.087

36	3.00	0.17	0.096	(0.085)	0.010	0.087
37	3.08	0.17	0.096	(0.085)	0.010	0.087
38	3.17	0.17	0.096	(0.084)	0.010	0.087
39	3.25	0.17	0.096	(0.084)	0.010	0.087
40	3.33	0.17	0.096	(0.084)	0.010	0.087
41	3.42	0.17	0.096	(0.083)	0.010	0.087
42	3.50	0.17	0.096	(0.083)	0.010	0.087
43	3.58	0.17	0.096	(0.083)	0.010	0.087
44	3.67	0.17	0.096	(0.082)	0.010	0.087
45	3.75	0.17	0.096	(0.082)	0.010	0.087
46	3.83	0.20	0.116	(0.082)	0.012	0.104
47	3.92	0.20	0.116	(0.081)	0.012	0.104
48	4.00	0.20	0.116	(0.081)	0.012	0.104
49	4.08	0.20	0.116	(0.080)	0.012	0.104
50	4.17	0.20	0.116	(0.080)	0.012	0.104
51	4.25	0.20	0.116	(0.080)	0.012	0.104
52	4.33	0.23	0.135	(0.079)	0.013	0.121
53	4.42	0.23	0.135	(0.079)	0.013	0.121
54	4.50	0.23	0.135	(0.079)	0.013	0.121
55	4.58	0.23	0.135	(0.078)	0.013	0.121
56	4.67	0.23	0.135	(0.078)	0.013	0.121
57	4.75	0.23	0.135	(0.078)	0.013	0.121
58	4.83	0.27	0.154	(0.077)	0.015	0.139
59	4.92	0.27	0.154	(0.077)	0.015	0.139
60	5.00	0.27	0.154	(0.077)	0.015	0.139
61	5.08	0.20	0.116	(0.076)	0.012	0.104
62	5.17	0.20	0.116	(0.076)	0.012	0.104
63	5.25	0.20	0.116	(0.076)	0.012	0.104
64	5.33	0.23	0.135	(0.075)	0.013	0.121
65	5.42	0.23	0.135	(0.075)	0.013	0.121
66	5.50	0.23	0.135	(0.075)	0.013	0.121
67	5.58	0.27	0.154	(0.074)	0.015	0.139
68	5.67	0.27	0.154	(0.074)	0.015	0.139
69	5.75	0.27	0.154	(0.074)	0.015	0.139
70	5.83	0.27	0.154	(0.073)	0.015	0.139
71	5.92	0.27	0.154	(0.073)	0.015	0.139
72	6.00	0.27	0.154	(0.073)	0.015	0.139
73	6.08	0.30	0.174	(0.072)	0.017	0.156
74	6.17	0.30	0.174	(0.072)	0.017	0.156
75	6.25	0.30	0.174	(0.072)	0.017	0.156
76	6.33	0.30	0.174	(0.072)	0.017	0.156
77	6.42	0.30	0.174	(0.071)	0.017	0.156
78	6.50	0.30	0.174	(0.071)	0.017	0.156
79	6.58	0.33	0.193	(0.071)	0.019	0.174
80	6.67	0.33	0.193	(0.070)	0.019	0.174
81	6.75	0.33	0.193	(0.070)	0.019	0.174
82	6.83	0.33	0.193	(0.070)	0.019	0.174
83	6.92	0.33	0.193	(0.069)	0.019	0.174
84	7.00	0.33	0.193	(0.069)	0.019	0.174
85	7.08	0.33	0.193	(0.069)	0.019	0.174
86	7.17	0.33	0.193	(0.068)	0.019	0.174
87	7.25	0.33	0.193	(0.068)	0.019	0.174
88	7.33	0.37	0.212	(0.068)	0.021	0.191
89	7.42	0.37	0.212	(0.067)	0.021	0.191
90	7.50	0.37	0.212	(0.067)	0.021	0.191
91	7.58	0.40	0.231	(0.067)	0.023	0.208
92	7.67	0.40	0.231	(0.067)	0.023	0.208
93	7.75	0.40	0.231	(0.066)	0.023	0.208
94	7.83	0.43	0.251	(0.066)	0.025	0.226
95	7.92	0.43	0.251	(0.066)	0.025	0.226
96	8.00	0.43	0.251	(0.065)	0.025	0.226
97	8.08	0.50	0.289	(0.065)	0.029	0.260
98	8.17	0.50	0.289	(0.065)	0.029	0.260
99	8.25	0.50	0.289	(0.064)	0.029	0.260
100	8.33	0.50	0.289	(0.064)	0.029	0.260
101	8.42	0.50	0.289	(0.064)	0.029	0.260
102	8.50	0.50	0.289	(0.063)	0.029	0.260
103	8.58	0.53	0.308	(0.063)	0.031	0.278
104	8.67	0.53	0.308	(0.063)	0.031	0.278

105	8.75	0.53	0.308	(0.063)	0.031	0.278
106	8.83	0.57	0.328	(0.062)	0.033	0.295
107	8.92	0.57	0.328	(0.062)	0.033	0.295
108	9.00	0.57	0.328	(0.062)	0.033	0.295
109	9.08	0.63	0.366	(0.061)	0.037	0.330
110	9.17	0.63	0.366	(0.061)	0.037	0.330
111	9.25	0.63	0.366	(0.061)	0.037	0.330
112	9.33	0.67	0.386	(0.061)	0.039	0.347
113	9.42	0.67	0.386	(0.060)	0.039	0.347
114	9.50	0.67	0.386	(0.060)	0.039	0.347
115	9.58	0.70	0.405	(0.060)	0.040	0.364
116	9.67	0.70	0.405	(0.059)	0.040	0.364
117	9.75	0.70	0.405	(0.059)	0.040	0.364
118	9.83	0.73	0.424	(0.059)	0.042	0.382
119	9.92	0.73	0.424	(0.059)	0.042	0.382
120	10.00	0.73	0.424	(0.058)	0.042	0.382
121	10.08	0.50	0.289	(0.058)	0.029	0.260
122	10.17	0.50	0.289	(0.058)	0.029	0.260
123	10.25	0.50	0.289	(0.057)	0.029	0.260
124	10.33	0.50	0.289	(0.057)	0.029	0.260
125	10.42	0.50	0.289	(0.057)	0.029	0.260
126	10.50	0.50	0.289	(0.057)	0.029	0.260
127	10.58	0.67	0.386	(0.056)	0.039	0.347
128	10.67	0.67	0.386	(0.056)	0.039	0.347
129	10.75	0.67	0.386	(0.056)	0.039	0.347
130	10.83	0.67	0.386	(0.055)	0.039	0.347
131	10.92	0.67	0.386	(0.055)	0.039	0.347
132	11.00	0.67	0.386	(0.055)	0.039	0.347
133	11.08	0.63	0.366	(0.055)	0.037	0.330
134	11.17	0.63	0.366	(0.054)	0.037	0.330
135	11.25	0.63	0.366	(0.054)	0.037	0.330
136	11.33	0.63	0.366	(0.054)	0.037	0.330
137	11.42	0.63	0.366	(0.054)	0.037	0.330
138	11.50	0.63	0.366	(0.053)	0.037	0.330
139	11.58	0.57	0.328	(0.053)	0.033	0.295
140	11.67	0.57	0.328	(0.053)	0.033	0.295
141	11.75	0.57	0.328	(0.053)	0.033	0.295
142	11.83	0.60	0.347	(0.052)	0.035	0.312
143	11.92	0.60	0.347	(0.052)	0.035	0.312
144	12.00	0.60	0.347	(0.052)	0.035	0.312
145	12.08	0.83	0.482	(0.051)	0.048	0.434
146	12.17	0.83	0.482	(0.051)	0.048	0.434
147	12.25	0.83	0.482	(0.051)	0.048	0.434
148	12.33	0.87	0.501	(0.051)	0.050	0.451
149	12.42	0.87	0.501	(0.050)	0.050	0.451
150	12.50	0.87	0.501	(0.050)	0.050	0.451
151	12.58	0.93	0.540	0.050 (0.054)		0.490
152	12.67	0.93	0.540	0.050 (0.054)		0.490
153	12.75	0.93	0.540	0.049 (0.054)		0.490
154	12.83	0.97	0.559	0.049 (0.056)		0.510
155	12.92	0.97	0.559	0.049 (0.056)		0.510
156	13.00	0.97	0.559	0.049 (0.056)		0.510
157	13.08	1.13	0.656	0.048 (0.066)		0.607
158	13.17	1.13	0.656	0.048 (0.066)		0.607
159	13.25	1.13	0.656	0.048 (0.066)		0.608
160	13.33	1.13	0.656	0.048 (0.066)		0.608
161	13.42	1.13	0.656	0.047 (0.066)		0.608
162	13.50	1.13	0.656	0.047 (0.066)		0.608
163	13.58	0.77	0.443	(0.047)	0.044	0.399
164	13.67	0.77	0.443	(0.047)	0.044	0.399
165	13.75	0.77	0.443	(0.047)	0.044	0.399
166	13.83	0.77	0.443	(0.046)	0.044	0.399
167	13.92	0.77	0.443	(0.046)	0.044	0.399
168	14.00	0.77	0.443	(0.046)	0.044	0.399
169	14.08	0.90	0.521	0.046 (0.052)		0.475
170	14.17	0.90	0.521	0.045 (0.052)		0.475
171	14.25	0.90	0.521	0.045 (0.052)		0.475
172	14.33	0.87	0.501	0.045 (0.050)		0.456
173	14.42	0.87	0.501	0.045 (0.050)		0.457

174	14.50	0.87	0.501	0.044	(0.050)	0.457
175	14.58	0.87	0.501	0.044	(0.050)	0.457
176	14.67	0.87	0.501	0.044	(0.050)	0.457
177	14.75	0.87	0.501	0.044	(0.050)	0.458
178	14.83	0.83	0.482	0.044	(0.048)	0.438
179	14.92	0.83	0.482	0.043	(0.048)	0.439
180	15.00	0.83	0.482	0.043	(0.048)	0.439
181	15.08	0.80	0.463	0.043	(0.046)	0.420
182	15.17	0.80	0.463	0.043	(0.046)	0.420
183	15.25	0.80	0.463	0.042	(0.046)	0.420
184	15.33	0.77	0.443	0.042	(0.044)	0.401
185	15.42	0.77	0.443	0.042	(0.044)	0.401
186	15.50	0.77	0.443	0.042	(0.044)	0.402
187	15.58	0.63	0.366	(0.042)	0.037	0.330
188	15.67	0.63	0.366	(0.041)	0.037	0.330
189	15.75	0.63	0.366	(0.041)	0.037	0.330
190	15.83	0.63	0.366	(0.041)	0.037	0.330
191	15.92	0.63	0.366	(0.041)	0.037	0.330
192	16.00	0.63	0.366	(0.041)	0.037	0.330
193	16.08	0.13	0.077	(0.040)	0.008	0.069
194	16.17	0.13	0.077	(0.040)	0.008	0.069
195	16.25	0.13	0.077	(0.040)	0.008	0.069
196	16.33	0.13	0.077	(0.040)	0.008	0.069
197	16.42	0.13	0.077	(0.039)	0.008	0.069
198	16.50	0.13	0.077	(0.039)	0.008	0.069
199	16.58	0.10	0.058	(0.039)	0.006	0.052
200	16.67	0.10	0.058	(0.039)	0.006	0.052
201	16.75	0.10	0.058	(0.039)	0.006	0.052
202	16.83	0.10	0.058	(0.038)	0.006	0.052
203	16.92	0.10	0.058	(0.038)	0.006	0.052
204	17.00	0.10	0.058	(0.038)	0.006	0.052
205	17.08	0.17	0.096	(0.038)	0.010	0.087
206	17.17	0.17	0.096	(0.038)	0.010	0.087
207	17.25	0.17	0.096	(0.038)	0.010	0.087
208	17.33	0.17	0.096	(0.037)	0.010	0.087
209	17.42	0.17	0.096	(0.037)	0.010	0.087
210	17.50	0.17	0.096	(0.037)	0.010	0.087
211	17.58	0.17	0.096	(0.037)	0.010	0.087
212	17.67	0.17	0.096	(0.037)	0.010	0.087
213	17.75	0.17	0.096	(0.036)	0.010	0.087
214	17.83	0.13	0.077	(0.036)	0.008	0.069
215	17.92	0.13	0.077	(0.036)	0.008	0.069
216	18.00	0.13	0.077	(0.036)	0.008	0.069
217	18.08	0.13	0.077	(0.036)	0.008	0.069
218	18.17	0.13	0.077	(0.036)	0.008	0.069
219	18.25	0.13	0.077	(0.035)	0.008	0.069
220	18.33	0.13	0.077	(0.035)	0.008	0.069
221	18.42	0.13	0.077	(0.035)	0.008	0.069
222	18.50	0.13	0.077	(0.035)	0.008	0.069
223	18.58	0.10	0.058	(0.035)	0.006	0.052
224	18.67	0.10	0.058	(0.035)	0.006	0.052
225	18.75	0.10	0.058	(0.034)	0.006	0.052
226	18.83	0.07	0.039	(0.034)	0.004	0.035
227	18.92	0.07	0.039	(0.034)	0.004	0.035
228	19.00	0.07	0.039	(0.034)	0.004	0.035
229	19.08	0.10	0.058	(0.034)	0.006	0.052
230	19.17	0.10	0.058	(0.034)	0.006	0.052
231	19.25	0.10	0.058	(0.033)	0.006	0.052
232	19.33	0.13	0.077	(0.033)	0.008	0.069
233	19.42	0.13	0.077	(0.033)	0.008	0.069
234	19.50	0.13	0.077	(0.033)	0.008	0.069
235	19.58	0.10	0.058	(0.033)	0.006	0.052
236	19.67	0.10	0.058	(0.033)	0.006	0.052
237	19.75	0.10	0.058	(0.032)	0.006	0.052
238	19.83	0.07	0.039	(0.032)	0.004	0.035
239	19.92	0.07	0.039	(0.032)	0.004	0.035
240	20.00	0.07	0.039	(0.032)	0.004	0.035
241	20.08	0.10	0.058	(0.032)	0.006	0.052
242	20.17	0.10	0.058	(0.032)	0.006	0.052

243	20.25	0.10	0.058	(0.032)	0.006	0.052
244	20.33	0.10	0.058	(0.031)	0.006	0.052
245	20.42	0.10	0.058	(0.031)	0.006	0.052
246	20.50	0.10	0.058	(0.031)	0.006	0.052
247	20.58	0.10	0.058	(0.031)	0.006	0.052
248	20.67	0.10	0.058	(0.031)	0.006	0.052
249	20.75	0.10	0.058	(0.031)	0.006	0.052
250	20.83	0.07	0.039	(0.031)	0.004	0.035
251	20.92	0.07	0.039	(0.031)	0.004	0.035
252	21.00	0.07	0.039	(0.030)	0.004	0.035
253	21.08	0.10	0.058	(0.030)	0.006	0.052
254	21.17	0.10	0.058	(0.030)	0.006	0.052
255	21.25	0.10	0.058	(0.030)	0.006	0.052
256	21.33	0.07	0.039	(0.030)	0.004	0.035
257	21.42	0.07	0.039	(0.030)	0.004	0.035
258	21.50	0.07	0.039	(0.030)	0.004	0.035
259	21.58	0.10	0.058	(0.030)	0.006	0.052
260	21.67	0.10	0.058	(0.030)	0.006	0.052
261	21.75	0.10	0.058	(0.029)	0.006	0.052
262	21.83	0.07	0.039	(0.029)	0.004	0.035
263	21.92	0.07	0.039	(0.029)	0.004	0.035
264	22.00	0.07	0.039	(0.029)	0.004	0.035
265	22.08	0.10	0.058	(0.029)	0.006	0.052
266	22.17	0.10	0.058	(0.029)	0.006	0.052
267	22.25	0.10	0.058	(0.029)	0.006	0.052
268	22.33	0.07	0.039	(0.029)	0.004	0.035
269	22.42	0.07	0.039	(0.029)	0.004	0.035
270	22.50	0.07	0.039	(0.029)	0.004	0.035
271	22.58	0.07	0.039	(0.028)	0.004	0.035
272	22.67	0.07	0.039	(0.028)	0.004	0.035
273	22.75	0.07	0.039	(0.028)	0.004	0.035
274	22.83	0.07	0.039	(0.028)	0.004	0.035
275	22.92	0.07	0.039	(0.028)	0.004	0.035
276	23.00	0.07	0.039	(0.028)	0.004	0.035
277	23.08	0.07	0.039	(0.028)	0.004	0.035
278	23.17	0.07	0.039	(0.028)	0.004	0.035
279	23.25	0.07	0.039	(0.028)	0.004	0.035
280	23.33	0.07	0.039	(0.028)	0.004	0.035
281	23.42	0.07	0.039	(0.028)	0.004	0.035
282	23.50	0.07	0.039	(0.028)	0.004	0.035
283	23.58	0.07	0.039	(0.028)	0.004	0.035
284	23.67	0.07	0.039	(0.028)	0.004	0.035
285	23.75	0.07	0.039	(0.028)	0.004	0.035
286	23.83	0.07	0.039	(0.028)	0.004	0.035
287	23.92	0.07	0.039	(0.028)	0.004	0.035
288	24.00	0.07	0.039	(0.028)	0.004	0.035

(Loss Rate Not Used)

Sum = 100.0 Sum = 52.3

Flood volume = Effective rainfall 4.36(In)
times area 9.7(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)

Total soil loss = 0.46(In)

Total soil loss = 0.374(Ac.Ft)

Total rainfall = 4.82(In)

Flood volume = 153093.6 Cubic Feet

Total soil loss = 16270.3 Cubic Feet

Peak flow rate of this hydrograph = 5.936(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0014	0.21	Q				
0+10	0.0037	0.33	VQ				

0+15	0.0060	0.34	VQ				
0+20	0.0091	0.44	VQ				
0+25	0.0125	0.50	V Q				
0+30	0.0160	0.51	V Q				
0+35	0.0195	0.51	V Q				
0+40	0.0230	0.51	V Q				
0+45	0.0265	0.51	V Q				
0+50	0.0307	0.61	V Q				
0+55	0.0354	0.67	V Q				
1+ 0	0.0400	0.68	V Q				
1+ 5	0.0440	0.57	V Q				
1+10	0.0475	0.51	V Q				
1+15	0.0510	0.51	V Q				
1+20	0.0545	0.51	V Q				
1+25	0.0580	0.51	V Q				
1+30	0.0615	0.51	V Q				
1+35	0.0650	0.51	V Q				
1+40	0.0685	0.51	V Q				
1+45	0.0720	0.51	V Q				
1+50	0.0762	0.61	V Q				
1+55	0.0808	0.67	V Q				
2+ 0	0.0855	0.68	V Q				
2+ 5	0.0902	0.68	VQ				
2+10	0.0948	0.68	VQ				
2+15	0.0995	0.68	VQ				
2+20	0.1042	0.68	VQ				
2+25	0.1088	0.68	VQ				
2+30	0.1135	0.68	VQ				
2+35	0.1189	0.78	V Q				
2+40	0.1247	0.84	V Q				
2+45	0.1305	0.85	V Q				
2+50	0.1363	0.85	V Q				
2+55	0.1422	0.85	V Q				
3+ 0	0.1480	0.85	V Q				
3+ 5	0.1538	0.85	V Q				
3+10	0.1597	0.85	V Q				
3+15	0.1655	0.85	V Q				
3+20	0.1713	0.85	V Q				
3+25	0.1772	0.85	VQ				
3+30	0.1830	0.85	VQ				
3+35	0.1888	0.85	VQ				
3+40	0.1947	0.85	VQ				
3+45	0.2005	0.85	VQ				
3+50	0.2070	0.95	VQ				
3+55	0.2140	1.01	V Q				
4+ 0	0.2210	1.02	V Q				
4+ 5	0.2280	1.02	V Q				
4+10	0.2350	1.02	V Q				
4+15	0.2420	1.02	V Q				
4+20	0.2497	1.12	V Q				
4+25	0.2578	1.18	V Q				
4+30	0.2660	1.19	VQ				
4+35	0.2742	1.19	VQ				
4+40	0.2823	1.19	VQ				
4+45	0.2905	1.19	VQ				
4+50	0.2994	1.29	V Q				
4+55	0.3087	1.35	V Q				
5+ 0	0.3180	1.35	V Q				
5+ 5	0.3259	1.15	VQ				
5+10	0.3330	1.03	VQ				
5+15	0.3400	1.02	VQ				
5+20	0.3477	1.12	VQ				
5+25	0.3558	1.18	Q				
5+30	0.3640	1.19	Q				
5+35	0.3729	1.29	VQ				
5+40	0.3821	1.35	VQ				
5+45	0.3915	1.35	VQ				
5+50	0.4008	1.35	VQ				
5+55	0.4101	1.35	VQ				

6+ 0	0.4195	1.35	VQ				
6+ 5	0.4295	1.46	VQ				
6+10	0.4400	1.52	VQ				
6+15	0.4505	1.52	VQ				
6+20	0.4610	1.52	VQ				
6+25	0.4715	1.52	VQ				
6+30	0.4820	1.52	VQ				
6+35	0.4932	1.63	VQ				
6+40	0.5048	1.69	VQ				
6+45	0.5165	1.69	VQ				
6+50	0.5281	1.69	Q				
6+55	0.5398	1.69	Q				
7+ 0	0.5515	1.69	Q				
7+ 5	0.5631	1.69	Q				
7+10	0.5748	1.69	Q				
7+15	0.5865	1.69	Q				
7+20	0.5988	1.80	VQ				
7+25	0.6116	1.86	VQ				
7+30	0.6245	1.86	Q				
7+35	0.6380	1.97	Q				
7+40	0.6520	2.03	VQ				
7+45	0.6660	2.03	VQ				
7+50	0.6807	2.14	VQ				
7+55	0.6958	2.19	VQ				
8+ 0	0.7109	2.20	Q				
8+ 5	0.7276	2.41	VQ				
8+10	0.7450	2.53	V Q				
8+15	0.7625	2.54	V Q				
8+20	0.7800	2.54	V Q				
8+25	0.7974	2.54	VQ				
8+30	0.8149	2.54	VQ				
8+35	0.8332	2.65	VQ				
8+40	0.8518	2.70	VQ				
8+45	0.8704	2.71	VQ				
8+50	0.8898	2.81	VQ				
8+55	0.9096	2.87	VQ				
9+ 0	0.9294	2.88	VQ				
9+ 5	0.9507	3.09	V Q				
9+10	0.9728	3.20	VQ				
9+15	0.9949	3.22	VQ				
9+20	1.0178	3.32	V Q				
9+25	1.0411	3.38	V Q				
9+30	1.0644	3.39	VQ				
9+35	1.0885	3.49	VQ				
9+40	1.1129	3.55	V Q				
9+45	1.1374	3.56	V Q				
9+50	1.1626	3.66	VQ				
9+55	1.1883	3.72	VQ				
10+ 0	1.2139	3.73	VQ				
10+ 5	1.2345	2.99	Q V				
10+10	1.2523	2.59	Q V				
10+15	1.2698	2.54	Q V				
10+20	1.2873	2.54	Q V				
10+25	1.3048	2.54	Q V				
10+30	1.3223	2.54	Q V				
10+35	1.3434	3.06	Q V				
10+40	1.3665	3.35	Q V				
10+45	1.3899	3.39	Q V				
10+50	1.4132	3.39	Q V				
10+55	1.4365	3.39	Q V				
11+ 0	1.4598	3.39	Q V				
11+ 5	1.4825	3.28	Q V				
11+10	1.5047	3.22	Q V				
11+15	1.5268	3.22	Q V				
11+20	1.5490	3.22	Q V				
11+25	1.5711	3.22	Q V				
11+30	1.5933	3.22	Q V				
11+35	1.6140	3.01	Q V				
11+40	1.6340	2.89	Q V				

11+45	1.6538	2.88		Q	V			
11+50	1.6743	2.98		Q	V			
11+55	1.6953	3.04		Q	V			
12+ 0	1.7163	3.05		Q	V			
12+ 5	1.7423	3.78			Q	V		
12+10	1.7712	4.19			Q	V		
12+15	1.8003	4.23			Q	V		
12+20	1.8302	4.34			Q	V		
12+25	1.8605	4.40			Q	V		
12+30	1.8908	4.40			Q	V		
12+35	1.9227	4.64			Q	V		
12+40	1.9556	4.77			Q	V		
12+45	1.9885	4.79			Q	V		
12+50	2.0223	4.90			Q	V		
12+55	2.0565	4.97			Q	V		
13+ 0	2.0908	4.98			Q	V		
13+ 5	2.1292	5.56				Q	V	
13+10	2.1697	5.89					Q	V
13+15	2.2106	5.93					Q	V
13+20	2.2514	5.93					Q	V
13+25	2.2923	5.93					Q	V
13+30	2.3332	5.94					Q	V
13+35	2.3654	4.68			Q			V
13+40	2.3927	3.98			Q			V
13+45	2.4196	3.90			Q			V
13+50	2.4464	3.90			Q			V
13+55	2.4732	3.90			Q			V
14+ 0	2.5001	3.90			Q			V
14+ 5	2.5300	4.35				Q		V
14+10	2.5618	4.61				Q		V
14+15	2.5937	4.64				Q		V
14+20	2.6249	4.53				Q		V
14+25	2.6556	4.46				Q		V
14+30	2.6863	4.46				Q		V
14+35	2.7170	4.46				Q		V
14+40	2.7478	4.46				Q		V
14+45	2.7785	4.46				Q		V
14+50	2.8085	4.35				Q		V
14+55	2.8380	4.29				Q		V
15+ 0	2.8675	4.28				Q		V
15+ 5	2.8962	4.17				Q		V
15+10	2.9245	4.11				Q		V
15+15	2.9528	4.10				Q		V
15+20	2.9802	3.99				Q		V
15+25	3.0073	3.92				Q		V
15+30	3.0343	3.92				Q		V
15+35	3.0583	3.49				Q		V
15+40	3.0806	3.25				Q		V
15+45	3.1028	3.22				Q		V
15+50	3.1249	3.22				Q		V
15+55	3.1471	3.22				Q		V
16+ 0	3.1693	3.22				Q		V
16+ 5	3.1806	1.65						V
16+10	3.1860	0.78		Q				V
16+15	3.1906	0.68		Q				V
16+20	3.1953	0.68		Q				V
16+25	3.2000	0.68		Q				V
16+30	3.2046	0.68		Q				V
16+35	3.2086	0.57		Q				V
16+40	3.2121	0.51		Q				V
16+45	3.2156	0.51		Q				V
16+50	3.2191	0.51		Q				V
16+55	3.2226	0.51		Q				V
17+ 0	3.2261	0.51		Q				V
17+ 5	3.2311	0.72		Q				V
17+10	3.2368	0.83		Q				V
17+15	3.2426	0.85		Q				V
17+20	3.2485	0.85		Q				V
17+25	3.2543	0.85		Q				V

17+30	3.2601	0.85	Q				V
17+35	3.2660	0.85	Q				V
17+40	3.2718	0.85	Q				V
17+45	3.2776	0.85	Q				V
17+50	3.2827	0.74	Q				V
17+55	3.2875	0.68	Q				V
18+ 0	3.2921	0.68	Q				V
18+ 5	3.2968	0.68	Q				V
18+10	3.3015	0.68	Q				V
18+15	3.3061	0.68	Q				V
18+20	3.3108	0.68	Q				V
18+25	3.3155	0.68	Q				V
18+30	3.3201	0.68	Q				V
18+35	3.3241	0.57	Q				V
18+40	3.3276	0.51	Q				V
18+45	3.3311	0.51	Q				V
18+50	3.3339	0.40	Q				V
18+55	3.3363	0.35	Q				V
19+ 0	3.3386	0.34	Q				V
19+ 5	3.3417	0.44	Q				V
19+10	3.3451	0.50	Q				V
19+15	3.3486	0.51	Q				V
19+20	3.3528	0.61	Q				V
19+25	3.3574	0.67	Q				V
19+30	3.3621	0.68	Q				V
19+35	3.3661	0.57	Q				V
19+40	3.3696	0.51	Q				V
19+45	3.3731	0.51	Q				V
19+50	3.3759	0.40	Q				V
19+55	3.3783	0.35	Q				V
20+ 0	3.3806	0.34	Q				V
20+ 5	3.3836	0.44	Q				V
20+10	3.3871	0.50	Q				V
20+15	3.3906	0.51	Q				V
20+20	3.3941	0.51	Q				V
20+25	3.3976	0.51	Q				V
20+30	3.4011	0.51	Q				V
20+35	3.4046	0.51	Q				V
20+40	3.4081	0.51	Q				V
20+45	3.4116	0.51	Q				V
20+50	3.4144	0.40	Q				V
20+55	3.4167	0.35	Q				V
21+ 0	3.4191	0.34	Q				V
21+ 5	3.4221	0.44	Q				V
21+10	3.4256	0.50	Q				V
21+15	3.4291	0.51	Q				V
21+20	3.4319	0.40	Q				V
21+25	3.4342	0.35	Q				V
21+30	3.4366	0.34	Q				V
21+35	3.4396	0.44	Q				V
21+40	3.4431	0.50	Q				V
21+45	3.4466	0.51	Q				V
21+50	3.4494	0.40	Q				V
21+55	3.4517	0.35	Q				V
22+ 0	3.4541	0.34	Q				V
22+ 5	3.4571	0.44	Q				V
22+10	3.4606	0.50	Q				V
22+15	3.4641	0.51	Q				V
22+20	3.4669	0.40	Q				V
22+25	3.4692	0.35	Q				V
22+30	3.4716	0.34	Q				V
22+35	3.4739	0.34	Q				V
22+40	3.4762	0.34	Q				V
22+45	3.4786	0.34	Q				V
22+50	3.4809	0.34	Q				V
22+55	3.4832	0.34	Q				V
23+ 0	3.4856	0.34	Q				V
23+ 5	3.4879	0.34	Q				V
23+10	3.4902	0.34	Q				V

23+15	3.4926	0.34	Q				V
23+20	3.4949	0.34	Q				V
23+25	3.4972	0.34	Q				V
23+30	3.4996	0.34	Q				V
23+35	3.5019	0.34	Q				V
23+40	3.5042	0.34	Q				V
23+45	3.5066	0.34	Q				V
23+50	3.5089	0.34	Q				V
23+55	3.5112	0.34	Q				V
24+ 0	3.5136	0.34	Q				V
24+ 5	3.5145	0.13	Q				V
24+10	3.5145	0.01	Q				V

Appendix I.VII

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 2-Year, 24-Hour Storm

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 03/13/26 File: RCCDPost2UHA242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
2-YEAR STORM
POST DEVELOPMENT - DA A

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 1464.54(Ft.)
Length along longest watercourse measured to centroid = 401.96(Ft.)
Length along longest watercourse = 0.277 Mi.
Length along longest watercourse measured to centroid = 0.076 Mi.
Difference in elevation = 15.64(Ft.)
Slope along watercourse = 56.3858 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.039 Hr.
Lag time = 2.32 Min.
25% of lag time = 0.58 Min.
40% of lag time = 0.93 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.01	19.46

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	4.82	46.66

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.010(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 2.010(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.010(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 0.661
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	16.2	0.870	0.661	0.353	1.000	0.353
						Sum (F) = 0.353

Area averaged mean soil loss (F) (In/Hr) = 0.353
Minimum soil loss rate ((In/Hr)) = 0.176
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.371

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	215.717	45.991	4.487
2 0.167	431.434	42.286	4.125
3 0.250	647.151	8.191	0.799
4 0.333	862.868	3.532	0.345
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max Low	Effective (In/Hr)
1	0.08	0.07	(0.625) 0.006	0.010
2	0.17	0.07	(0.623) 0.006	0.010
3	0.25	0.07	(0.620) 0.006	0.010
4	0.33	0.10	(0.618) 0.009	0.015
5	0.42	0.10	(0.615) 0.009	0.015
6	0.50	0.10	(0.613) 0.009	0.015
7	0.58	0.10	(0.611) 0.009	0.015
8	0.67	0.10	(0.608) 0.009	0.015
9	0.75	0.10	(0.606) 0.009	0.015
10	0.83	0.13	(0.603) 0.012	0.020
11	0.92	0.13	(0.601) 0.012	0.020
12	1.00	0.13	(0.599) 0.012	0.020
13	1.08	0.10	(0.596) 0.009	0.015
14	1.17	0.10	(0.594) 0.009	0.015
15	1.25	0.10	(0.592) 0.009	0.015
16	1.33	0.10	(0.589) 0.009	0.015
17	1.42	0.10	(0.587) 0.009	0.015
18	1.50	0.10	(0.585) 0.009	0.015
19	1.58	0.10	(0.582) 0.009	0.015
20	1.67	0.10	(0.580) 0.009	0.015
21	1.75	0.10	(0.578) 0.009	0.015
22	1.83	0.13	(0.575) 0.012	0.020
23	1.92	0.13	(0.573) 0.012	0.020
24	2.00	0.13	(0.571) 0.012	0.020
25	2.08	0.13	(0.568) 0.012	0.020
26	2.17	0.13	(0.566) 0.012	0.020
27	2.25	0.13	(0.564) 0.012	0.020
28	2.33	0.13	(0.561) 0.012	0.020
29	2.42	0.13	(0.559) 0.012	0.020
30	2.50	0.13	(0.557) 0.012	0.020
31	2.58	0.17	(0.555) 0.015	0.025
32	2.67	0.17	(0.552) 0.015	0.025
33	2.75	0.17	(0.550) 0.015	0.025
34	2.83	0.17	(0.548) 0.015	0.025

35	2.92	0.17	0.040	(0.546)	0.015	0.025
36	3.00	0.17	0.040	(0.543)	0.015	0.025
37	3.08	0.17	0.040	(0.541)	0.015	0.025
38	3.17	0.17	0.040	(0.539)	0.015	0.025
39	3.25	0.17	0.040	(0.537)	0.015	0.025
40	3.33	0.17	0.040	(0.534)	0.015	0.025
41	3.42	0.17	0.040	(0.532)	0.015	0.025
42	3.50	0.17	0.040	(0.530)	0.015	0.025
43	3.58	0.17	0.040	(0.528)	0.015	0.025
44	3.67	0.17	0.040	(0.525)	0.015	0.025
45	3.75	0.17	0.040	(0.523)	0.015	0.025
46	3.83	0.20	0.048	(0.521)	0.018	0.030
47	3.92	0.20	0.048	(0.519)	0.018	0.030
48	4.00	0.20	0.048	(0.517)	0.018	0.030
49	4.08	0.20	0.048	(0.514)	0.018	0.030
50	4.17	0.20	0.048	(0.512)	0.018	0.030
51	4.25	0.20	0.048	(0.510)	0.018	0.030
52	4.33	0.23	0.056	(0.508)	0.021	0.035
53	4.42	0.23	0.056	(0.506)	0.021	0.035
54	4.50	0.23	0.056	(0.504)	0.021	0.035
55	4.58	0.23	0.056	(0.501)	0.021	0.035
56	4.67	0.23	0.056	(0.499)	0.021	0.035
57	4.75	0.23	0.056	(0.497)	0.021	0.035
58	4.83	0.27	0.064	(0.495)	0.024	0.040
59	4.92	0.27	0.064	(0.493)	0.024	0.040
60	5.00	0.27	0.064	(0.491)	0.024	0.040
61	5.08	0.20	0.048	(0.489)	0.018	0.030
62	5.17	0.20	0.048	(0.486)	0.018	0.030
63	5.25	0.20	0.048	(0.484)	0.018	0.030
64	5.33	0.23	0.056	(0.482)	0.021	0.035
65	5.42	0.23	0.056	(0.480)	0.021	0.035
66	5.50	0.23	0.056	(0.478)	0.021	0.035
67	5.58	0.27	0.064	(0.476)	0.024	0.040
68	5.67	0.27	0.064	(0.474)	0.024	0.040
69	5.75	0.27	0.064	(0.472)	0.024	0.040
70	5.83	0.27	0.064	(0.470)	0.024	0.040
71	5.92	0.27	0.064	(0.467)	0.024	0.040
72	6.00	0.27	0.064	(0.465)	0.024	0.040
73	6.08	0.30	0.072	(0.463)	0.027	0.046
74	6.17	0.30	0.072	(0.461)	0.027	0.046
75	6.25	0.30	0.072	(0.459)	0.027	0.046
76	6.33	0.30	0.072	(0.457)	0.027	0.046
77	6.42	0.30	0.072	(0.455)	0.027	0.046
78	6.50	0.30	0.072	(0.453)	0.027	0.046
79	6.58	0.33	0.080	(0.451)	0.030	0.051
80	6.67	0.33	0.080	(0.449)	0.030	0.051
81	6.75	0.33	0.080	(0.447)	0.030	0.051
82	6.83	0.33	0.080	(0.445)	0.030	0.051
83	6.92	0.33	0.080	(0.443)	0.030	0.051
84	7.00	0.33	0.080	(0.441)	0.030	0.051
85	7.08	0.33	0.080	(0.439)	0.030	0.051
86	7.17	0.33	0.080	(0.437)	0.030	0.051
87	7.25	0.33	0.080	(0.435)	0.030	0.051
88	7.33	0.37	0.088	(0.433)	0.033	0.056
89	7.42	0.37	0.088	(0.431)	0.033	0.056
90	7.50	0.37	0.088	(0.429)	0.033	0.056
91	7.58	0.40	0.096	(0.427)	0.036	0.061
92	7.67	0.40	0.096	(0.425)	0.036	0.061
93	7.75	0.40	0.096	(0.423)	0.036	0.061
94	7.83	0.43	0.105	(0.421)	0.039	0.066
95	7.92	0.43	0.105	(0.419)	0.039	0.066
96	8.00	0.43	0.105	(0.417)	0.039	0.066
97	8.08	0.50	0.121	(0.415)	0.045	0.076
98	8.17	0.50	0.121	(0.413)	0.045	0.076
99	8.25	0.50	0.121	(0.411)	0.045	0.076
100	8.33	0.50	0.121	(0.410)	0.045	0.076
101	8.42	0.50	0.121	(0.408)	0.045	0.076
102	8.50	0.50	0.121	(0.406)	0.045	0.076
103	8.58	0.53	0.129	(0.404)	0.048	0.081

104	8.67	0.53	0.129	(0.402)	0.048	0.081
105	8.75	0.53	0.129	(0.400)	0.048	0.081
106	8.83	0.57	0.137	(0.398)	0.051	0.086
107	8.92	0.57	0.137	(0.396)	0.051	0.086
108	9.00	0.57	0.137	(0.394)	0.051	0.086
109	9.08	0.63	0.153	(0.393)	0.057	0.096
110	9.17	0.63	0.153	(0.391)	0.057	0.096
111	9.25	0.63	0.153	(0.389)	0.057	0.096
112	9.33	0.67	0.161	(0.387)	0.060	0.101
113	9.42	0.67	0.161	(0.385)	0.060	0.101
114	9.50	0.67	0.161	(0.383)	0.060	0.101
115	9.58	0.70	0.169	(0.381)	0.063	0.106
116	9.67	0.70	0.169	(0.380)	0.063	0.106
117	9.75	0.70	0.169	(0.378)	0.063	0.106
118	9.83	0.73	0.177	(0.376)	0.066	0.111
119	9.92	0.73	0.177	(0.374)	0.066	0.111
120	10.00	0.73	0.177	(0.372)	0.066	0.111
121	10.08	0.50	0.121	(0.371)	0.045	0.076
122	10.17	0.50	0.121	(0.369)	0.045	0.076
123	10.25	0.50	0.121	(0.367)	0.045	0.076
124	10.33	0.50	0.121	(0.365)	0.045	0.076
125	10.42	0.50	0.121	(0.363)	0.045	0.076
126	10.50	0.50	0.121	(0.362)	0.045	0.076
127	10.58	0.67	0.161	(0.360)	0.060	0.101
128	10.67	0.67	0.161	(0.358)	0.060	0.101
129	10.75	0.67	0.161	(0.356)	0.060	0.101
130	10.83	0.67	0.161	(0.355)	0.060	0.101
131	10.92	0.67	0.161	(0.353)	0.060	0.101
132	11.00	0.67	0.161	(0.351)	0.060	0.101
133	11.08	0.63	0.153	(0.349)	0.057	0.096
134	11.17	0.63	0.153	(0.348)	0.057	0.096
135	11.25	0.63	0.153	(0.346)	0.057	0.096
136	11.33	0.63	0.153	(0.344)	0.057	0.096
137	11.42	0.63	0.153	(0.343)	0.057	0.096
138	11.50	0.63	0.153	(0.341)	0.057	0.096
139	11.58	0.57	0.137	(0.339)	0.051	0.086
140	11.67	0.57	0.137	(0.337)	0.051	0.086
141	11.75	0.57	0.137	(0.336)	0.051	0.086
142	11.83	0.60	0.145	(0.334)	0.054	0.091
143	11.92	0.60	0.145	(0.332)	0.054	0.091
144	12.00	0.60	0.145	(0.331)	0.054	0.091
145	12.08	0.83	0.201	(0.329)	0.075	0.126
146	12.17	0.83	0.201	(0.327)	0.075	0.126
147	12.25	0.83	0.201	(0.326)	0.075	0.126
148	12.33	0.87	0.209	(0.324)	0.078	0.131
149	12.42	0.87	0.209	(0.323)	0.078	0.131
150	12.50	0.87	0.209	(0.321)	0.078	0.131
151	12.58	0.93	0.225	(0.319)	0.084	0.142
152	12.67	0.93	0.225	(0.318)	0.084	0.142
153	12.75	0.93	0.225	(0.316)	0.084	0.142
154	12.83	0.97	0.233	(0.315)	0.087	0.147
155	12.92	0.97	0.233	(0.313)	0.087	0.147
156	13.00	0.97	0.233	(0.311)	0.087	0.147
157	13.08	1.13	0.273	(0.310)	0.101	0.172
158	13.17	1.13	0.273	(0.308)	0.101	0.172
159	13.25	1.13	0.273	(0.307)	0.101	0.172
160	13.33	1.13	0.273	(0.305)	0.101	0.172
161	13.42	1.13	0.273	(0.304)	0.101	0.172
162	13.50	1.13	0.273	(0.302)	0.101	0.172
163	13.58	0.77	0.185	(0.300)	0.069	0.116
164	13.67	0.77	0.185	(0.299)	0.069	0.116
165	13.75	0.77	0.185	(0.297)	0.069	0.116
166	13.83	0.77	0.185	(0.296)	0.069	0.116
167	13.92	0.77	0.185	(0.294)	0.069	0.116
168	14.00	0.77	0.185	(0.293)	0.069	0.116
169	14.08	0.90	0.217	(0.291)	0.081	0.137
170	14.17	0.90	0.217	(0.290)	0.081	0.137
171	14.25	0.90	0.217	(0.288)	0.081	0.137
172	14.33	0.87	0.209	(0.287)	0.078	0.131

173	14.42	0.87	0.209	(0.285)	0.078	0.131
174	14.50	0.87	0.209	(0.284)	0.078	0.131
175	14.58	0.87	0.209	(0.283)	0.078	0.131
176	14.67	0.87	0.209	(0.281)	0.078	0.131
177	14.75	0.87	0.209	(0.280)	0.078	0.131
178	14.83	0.83	0.201	(0.278)	0.075	0.126
179	14.92	0.83	0.201	(0.277)	0.075	0.126
180	15.00	0.83	0.201	(0.275)	0.075	0.126
181	15.08	0.80	0.193	(0.274)	0.072	0.121
182	15.17	0.80	0.193	(0.273)	0.072	0.121
183	15.25	0.80	0.193	(0.271)	0.072	0.121
184	15.33	0.77	0.185	(0.270)	0.069	0.116
185	15.42	0.77	0.185	(0.268)	0.069	0.116
186	15.50	0.77	0.185	(0.267)	0.069	0.116
187	15.58	0.63	0.153	(0.266)	0.057	0.096
188	15.67	0.63	0.153	(0.264)	0.057	0.096
189	15.75	0.63	0.153	(0.263)	0.057	0.096
190	15.83	0.63	0.153	(0.262)	0.057	0.096
191	15.92	0.63	0.153	(0.260)	0.057	0.096
192	16.00	0.63	0.153	(0.259)	0.057	0.096
193	16.08	0.13	0.032	(0.258)	0.012	0.020
194	16.17	0.13	0.032	(0.256)	0.012	0.020
195	16.25	0.13	0.032	(0.255)	0.012	0.020
196	16.33	0.13	0.032	(0.254)	0.012	0.020
197	16.42	0.13	0.032	(0.252)	0.012	0.020
198	16.50	0.13	0.032	(0.251)	0.012	0.020
199	16.58	0.10	0.024	(0.250)	0.009	0.015
200	16.67	0.10	0.024	(0.249)	0.009	0.015
201	16.75	0.10	0.024	(0.247)	0.009	0.015
202	16.83	0.10	0.024	(0.246)	0.009	0.015
203	16.92	0.10	0.024	(0.245)	0.009	0.015
204	17.00	0.10	0.024	(0.244)	0.009	0.015
205	17.08	0.17	0.040	(0.242)	0.015	0.025
206	17.17	0.17	0.040	(0.241)	0.015	0.025
207	17.25	0.17	0.040	(0.240)	0.015	0.025
208	17.33	0.17	0.040	(0.239)	0.015	0.025
209	17.42	0.17	0.040	(0.237)	0.015	0.025
210	17.50	0.17	0.040	(0.236)	0.015	0.025
211	17.58	0.17	0.040	(0.235)	0.015	0.025
212	17.67	0.17	0.040	(0.234)	0.015	0.025
213	17.75	0.17	0.040	(0.233)	0.015	0.025
214	17.83	0.13	0.032	(0.232)	0.012	0.020
215	17.92	0.13	0.032	(0.230)	0.012	0.020
216	18.00	0.13	0.032	(0.229)	0.012	0.020
217	18.08	0.13	0.032	(0.228)	0.012	0.020
218	18.17	0.13	0.032	(0.227)	0.012	0.020
219	18.25	0.13	0.032	(0.226)	0.012	0.020
220	18.33	0.13	0.032	(0.225)	0.012	0.020
221	18.42	0.13	0.032	(0.224)	0.012	0.020
222	18.50	0.13	0.032	(0.223)	0.012	0.020
223	18.58	0.10	0.024	(0.222)	0.009	0.015
224	18.67	0.10	0.024	(0.221)	0.009	0.015
225	18.75	0.10	0.024	(0.219)	0.009	0.015
226	18.83	0.07	0.016	(0.218)	0.006	0.010
227	18.92	0.07	0.016	(0.217)	0.006	0.010
228	19.00	0.07	0.016	(0.216)	0.006	0.010
229	19.08	0.10	0.024	(0.215)	0.009	0.015
230	19.17	0.10	0.024	(0.214)	0.009	0.015
231	19.25	0.10	0.024	(0.213)	0.009	0.015
232	19.33	0.13	0.032	(0.212)	0.012	0.020
233	19.42	0.13	0.032	(0.211)	0.012	0.020
234	19.50	0.13	0.032	(0.210)	0.012	0.020
235	19.58	0.10	0.024	(0.209)	0.009	0.015
236	19.67	0.10	0.024	(0.208)	0.009	0.015
237	19.75	0.10	0.024	(0.208)	0.009	0.015
238	19.83	0.07	0.016	(0.207)	0.006	0.010
239	19.92	0.07	0.016	(0.206)	0.006	0.010
240	20.00	0.07	0.016	(0.205)	0.006	0.010
241	20.08	0.10	0.024	(0.204)	0.009	0.015

242	20.17	0.10	0.024	(0.203)	0.009	0.015
243	20.25	0.10	0.024	(0.202)	0.009	0.015
244	20.33	0.10	0.024	(0.201)	0.009	0.015
245	20.42	0.10	0.024	(0.200)	0.009	0.015
246	20.50	0.10	0.024	(0.199)	0.009	0.015
247	20.58	0.10	0.024	(0.199)	0.009	0.015
248	20.67	0.10	0.024	(0.198)	0.009	0.015
249	20.75	0.10	0.024	(0.197)	0.009	0.015
250	20.83	0.07	0.016	(0.196)	0.006	0.010
251	20.92	0.07	0.016	(0.195)	0.006	0.010
252	21.00	0.07	0.016	(0.195)	0.006	0.010
253	21.08	0.10	0.024	(0.194)	0.009	0.015
254	21.17	0.10	0.024	(0.193)	0.009	0.015
255	21.25	0.10	0.024	(0.192)	0.009	0.015
256	21.33	0.07	0.016	(0.192)	0.006	0.010
257	21.42	0.07	0.016	(0.191)	0.006	0.010
258	21.50	0.07	0.016	(0.190)	0.006	0.010
259	21.58	0.10	0.024	(0.189)	0.009	0.015
260	21.67	0.10	0.024	(0.189)	0.009	0.015
261	21.75	0.10	0.024	(0.188)	0.009	0.015
262	21.83	0.07	0.016	(0.187)	0.006	0.010
263	21.92	0.07	0.016	(0.187)	0.006	0.010
264	22.00	0.07	0.016	(0.186)	0.006	0.010
265	22.08	0.10	0.024	(0.186)	0.009	0.015
266	22.17	0.10	0.024	(0.185)	0.009	0.015
267	22.25	0.10	0.024	(0.184)	0.009	0.015
268	22.33	0.07	0.016	(0.184)	0.006	0.010
269	22.42	0.07	0.016	(0.183)	0.006	0.010
270	22.50	0.07	0.016	(0.183)	0.006	0.010
271	22.58	0.07	0.016	(0.182)	0.006	0.010
272	22.67	0.07	0.016	(0.182)	0.006	0.010
273	22.75	0.07	0.016	(0.181)	0.006	0.010
274	22.83	0.07	0.016	(0.181)	0.006	0.010
275	22.92	0.07	0.016	(0.180)	0.006	0.010
276	23.00	0.07	0.016	(0.180)	0.006	0.010
277	23.08	0.07	0.016	(0.179)	0.006	0.010
278	23.17	0.07	0.016	(0.179)	0.006	0.010
279	23.25	0.07	0.016	(0.179)	0.006	0.010
280	23.33	0.07	0.016	(0.178)	0.006	0.010
281	23.42	0.07	0.016	(0.178)	0.006	0.010
282	23.50	0.07	0.016	(0.178)	0.006	0.010
283	23.58	0.07	0.016	(0.177)	0.006	0.010
284	23.67	0.07	0.016	(0.177)	0.006	0.010
285	23.75	0.07	0.016	(0.177)	0.006	0.010
286	23.83	0.07	0.016	(0.177)	0.006	0.010
287	23.92	0.07	0.016	(0.176)	0.006	0.010
288	24.00	0.07	0.016	(0.176)	0.006	0.010

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.2

Flood volume = Effective rainfall 1.26(In)
times area 9.7(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.75(In)
Total soil loss = 0.602(Ac.Ft)
Total rainfall = 2.01(In)
Flood volume = 44424.3 Cubic Feet
Total soil loss = 26202.6 Cubic Feet

Peak flow rate of this hydrograph = 1.678(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0003	0.05	Q				

0+10	0.0009	0.09	Q
0+15	0.0016	0.10	Q
0+20	0.0024	0.12	Q
0+25	0.0034	0.14	Q
0+30	0.0044	0.15	Q
0+35	0.0054	0.15	Q
0+40	0.0064	0.15	Q
0+45	0.0075	0.15	Q
0+50	0.0086	0.17	Q
0+55	0.0099	0.19	Q
1+ 0	0.0113	0.20	Q
1+ 5	0.0125	0.17	Q
1+10	0.0136	0.15	Q
1+15	0.0146	0.15	Q
1+20	0.0156	0.15	Q
1+25	0.0166	0.15	Q
1+30	0.0177	0.15	Q
1+35	0.0187	0.15	Q
1+40	0.0197	0.15	Q
1+45	0.0207	0.15	Q
1+50	0.0219	0.17	Q
1+55	0.0232	0.19	Q
2+ 0	0.0246	0.20	Q
2+ 5	0.0259	0.20	QV
2+10	0.0273	0.20	QV
2+15	0.0286	0.20	QV
2+20	0.0300	0.20	QV
2+25	0.0314	0.20	QV
2+30	0.0327	0.20	QV
2+35	0.0342	0.22	QV
2+40	0.0359	0.24	QV
2+45	0.0376	0.25	QV
2+50	0.0393	0.25	QV
2+55	0.0410	0.25	QV
3+ 0	0.0427	0.25	QV
3+ 5	0.0444	0.25	QV
3+10	0.0461	0.25	QV
3+15	0.0478	0.25	QV
3+20	0.0495	0.25	QV
3+25	0.0512	0.25	Q V
3+30	0.0529	0.25	Q V
3+35	0.0546	0.25	Q V
3+40	0.0563	0.25	Q V
3+45	0.0580	0.25	Q V
3+50	0.0598	0.27	QV
3+55	0.0618	0.29	QV
4+ 0	0.0639	0.29	QV
4+ 5	0.0659	0.30	QV
4+10	0.0679	0.30	QV
4+15	0.0700	0.30	QV
4+20	0.0722	0.32	QV
4+25	0.0745	0.34	QV
4+30	0.0769	0.34	Q V
4+35	0.0793	0.35	Q V
4+40	0.0816	0.35	Q V
4+45	0.0840	0.35	Q V
4+50	0.0866	0.37	Q V
4+55	0.0892	0.39	Q V
5+ 0	0.0919	0.39	Q V
5+ 5	0.0943	0.35	Q V
5+10	0.0965	0.31	Q V
5+15	0.0985	0.30	Q V
5+20	0.1007	0.32	Q V
5+25	0.1031	0.34	Q V
5+30	0.1054	0.34	Q V
5+35	0.1080	0.37	Q V
5+40	0.1107	0.39	Q V
5+45	0.1134	0.39	Q V
5+50	0.1161	0.39	Q V

5+55	0.1188	0.39	Q	V					
6+ 0	0.1215	0.39	Q	V					
6+ 5	0.1244	0.42	Q	V					
6+10	0.1274	0.44	Q	V					
6+15	0.1305	0.44	Q	V					
6+20	0.1335	0.44	Q	V					
6+25	0.1366	0.44	Q	V					
6+30	0.1396	0.44	Q	V					
6+35	0.1429	0.47	Q	V					
6+40	0.1462	0.49	Q	V					
6+45	0.1496	0.49	Q	V					
6+50	0.1530	0.49	Q	V					
6+55	0.1564	0.49	Q	V					
7+ 0	0.1598	0.49	Q	V					
7+ 5	0.1632	0.49	Q	V					
7+10	0.1666	0.49	Q	V					
7+15	0.1700	0.49	Q	V					
7+20	0.1736	0.52	Q	V					
7+25	0.1773	0.54	Q	V					
7+30	0.1810	0.54	Q	V					
7+35	0.1849	0.57	Q	V					
7+40	0.1889	0.59	Q	V					
7+45	0.1930	0.59	Q	V					
7+50	0.1972	0.62	Q	V					
7+55	0.2016	0.64	Q	V					
8+ 0	0.2060	0.64	Q	V					
8+ 5	0.2107	0.69	Q	V					
8+10	0.2158	0.73	Q	V					
8+15	0.2208	0.74	Q	V					
8+20	0.2259	0.74	Q	V					
8+25	0.2310	0.74	Q	V					
8+30	0.2361	0.74	Q	V					
8+35	0.2414	0.76	Q	V					
8+40	0.2468	0.78	Q	V					
8+45	0.2522	0.79	Q	V					
8+50	0.2578	0.81	Q	V					
8+55	0.2635	0.83	Q	V					
9+ 0	0.2693	0.84	Q	V					
9+ 5	0.2754	0.88	Q	V					
9+10	0.2818	0.93	Q	V					
9+15	0.2882	0.93	Q	V					
9+20	0.2948	0.96	Q	V					
9+25	0.3016	0.98	Q	V					
9+30	0.3084	0.99	Q	V					
9+35	0.3153	1.01	Q	V					
9+40	0.3224	1.03	Q	V					
9+45	0.3296	1.03	Q	V					
9+50	0.3369	1.06	Q	V					
9+55	0.3443	1.08	Q	V					
10+ 0	0.3518	1.08	Q	V					
10+ 5	0.3581	0.93	Q	V					
10+10	0.3635	0.78	Q	V					
10+15	0.3687	0.75	Q	V					
10+20	0.3738	0.74	Q	V					
10+25	0.3789	0.74	Q	V					
10+30	0.3840	0.74	Q	V					
10+35	0.3899	0.85	Q	V					
10+40	0.3965	0.96	Q	V					
10+45	0.4032	0.98	Q	V					
10+50	0.4100	0.99	Q	V					
10+55	0.4168	0.99	Q	V					
11+ 0	0.4236	0.99	Q	V					
11+ 5	0.4303	0.96	Q	V					
11+10	0.4368	0.94	Q	V					
11+15	0.4432	0.94	Q	V					
11+20	0.4497	0.94	Q	V					
11+25	0.4562	0.94	Q	V					
11+30	0.4626	0.94	Q	V					
11+35	0.4688	0.89	Q	V					

11+40	0.4746	0.85	Q	V			
11+45	0.4804	0.84	Q	V			
11+50	0.4864	0.86	Q	V			
11+55	0.4924	0.88	Q	V			
12+ 0	0.4985	0.89	Q	V			
12+ 5	0.5058	1.05	Q	V			
12+10	0.5140	1.19	Q	V			
12+15	0.5224	1.22	Q	V			
12+20	0.5310	1.26	Q	V			
12+25	0.5398	1.28	Q	V			
12+30	0.5487	1.28	Q	V			
12+35	0.5578	1.33	Q	V			
12+40	0.5673	1.37	Q	V			
12+45	0.5768	1.38	Q	V			
12+50	0.5864	1.40	Q	V			
12+55	0.5962	1.43	Q	V			
13+ 0	0.6061	1.43	Q	V			
13+ 5	0.6167	1.54	Q	V			
13+10	0.6281	1.65	Q	V			
13+15	0.6396	1.67	Q	V			
13+20	0.6512	1.68	Q	V			
13+25	0.6627	1.68	Q	V			
13+30	0.6743	1.68	Q	V			
13+35	0.6841	1.43	Q	V			
13+40	0.6924	1.20	Q	V			
13+45	0.7003	1.15	Q	V			
13+50	0.7081	1.14	Q	V			
13+55	0.7160	1.14	Q	V			
14+ 0	0.7238	1.14	Q	V			
14+ 5	0.7322	1.23	Q	V			
14+10	0.7412	1.31	Q	V			
14+15	0.7504	1.33	Q	V			
14+20	0.7594	1.31	Q	V			
14+25	0.7683	1.29	Q	V			
14+30	0.7771	1.29	Q	V			
14+35	0.7860	1.28	Q	V			
14+40	0.7948	1.28	Q	V			
14+45	0.8036	1.28	Q	V			
14+50	0.8123	1.26	Q	V			
14+55	0.8209	1.24	Q	V			
15+ 0	0.8294	1.24	Q	V			
15+ 5	0.8377	1.21	Q	V			
15+10	0.8459	1.19	Q	V			
15+15	0.8541	1.19	Q	V			
15+20	0.8621	1.16	Q	V			
15+25	0.8699	1.14	Q	V			
15+30	0.8778	1.14	Q	V			
15+35	0.8850	1.04	Q	V			
15+40	0.8916	0.96	Q	V			
15+45	0.8981	0.94	Q	V			
15+50	0.9045	0.94	Q	V			
15+55	0.9110	0.94	Q	V			
16+ 0	0.9175	0.94	Q	V			
16+ 5	0.9216	0.60	Q	V			
16+10	0.9235	0.28	Q	V			
16+15	0.9251	0.22	Q	V			
16+20	0.9264	0.20	Q	V			
16+25	0.9278	0.20	Q	V			
16+30	0.9292	0.20	Q	V			
16+35	0.9304	0.17	Q	V			
16+40	0.9314	0.15	Q	V			
16+45	0.9324	0.15	Q	V			
16+50	0.9335	0.15	Q	V			
16+55	0.9345	0.15	Q	V			
17+ 0	0.9355	0.15	Q	V			
17+ 5	0.9368	0.19	Q	V			
17+10	0.9385	0.24	Q	V			
17+15	0.9401	0.24	Q	V			
17+20	0.9418	0.25	Q	V			

17+25	0.9435	0.25	Q				V
17+30	0.9452	0.25	Q				V
17+35	0.9469	0.25	Q				V
17+40	0.9486	0.25	Q				V
17+45	0.9503	0.25	Q				V
17+50	0.9519	0.22	Q				V
17+55	0.9533	0.20	Q				V
18+ 0	0.9546	0.20	Q				V
18+ 5	0.9560	0.20	Q				V
18+10	0.9574	0.20	Q				V
18+15	0.9587	0.20	Q				V
18+20	0.9601	0.20	Q				V
18+25	0.9614	0.20	Q				V
18+30	0.9628	0.20	Q				V
18+35	0.9640	0.17	Q				V
18+40	0.9651	0.15	Q				V
18+45	0.9661	0.15	Q				V
18+50	0.9670	0.13	Q				V
18+55	0.9677	0.10	Q				V
19+ 0	0.9684	0.10	Q				V
19+ 5	0.9692	0.12	Q				V
19+10	0.9702	0.14	Q				V
19+15	0.9712	0.15	Q				V
19+20	0.9724	0.17	Q				V
19+25	0.9737	0.19	Q				V
19+30	0.9750	0.20	Q				V
19+35	0.9762	0.17	Q				V
19+40	0.9773	0.15	Q				V
19+45	0.9783	0.15	Q				V
19+50	0.9792	0.13	Q				V
19+55	0.9799	0.10	Q				V
20+ 0	0.9806	0.10	Q				V
20+ 5	0.9815	0.12	Q				V
20+10	0.9824	0.14	Q				V
20+15	0.9834	0.15	Q				V
20+20	0.9845	0.15	Q				V
20+25	0.9855	0.15	Q				V
20+30	0.9865	0.15	Q				V
20+35	0.9875	0.15	Q				V
20+40	0.9885	0.15	Q				V
20+45	0.9896	0.15	Q				V
20+50	0.9904	0.13	Q				V
20+55	0.9911	0.10	Q				V
21+ 0	0.9918	0.10	Q				V
21+ 5	0.9927	0.12	Q				V
21+10	0.9937	0.14	Q				V
21+15	0.9947	0.15	Q				V
21+20	0.9955	0.13	Q				V
21+25	0.9962	0.10	Q				V
21+30	0.9969	0.10	Q				V
21+35	0.9978	0.12	Q				V
21+40	0.9988	0.14	Q				V
21+45	0.9998	0.15	Q				V
21+50	1.0006	0.13	Q				V
21+55	1.0013	0.10	Q				V
22+ 0	1.0020	0.10	Q				V
22+ 5	1.0029	0.12	Q				V
22+10	1.0038	0.14	Q				V
22+15	1.0049	0.15	Q				V
22+20	1.0057	0.13	Q				V
22+25	1.0064	0.10	Q				V
22+30	1.0071	0.10	Q				V
22+35	1.0078	0.10	Q				V
22+40	1.0085	0.10	Q				V
22+45	1.0092	0.10	Q				V
22+50	1.0099	0.10	Q				V
22+55	1.0105	0.10	Q				V
23+ 0	1.0112	0.10	Q				V
23+ 5	1.0119	0.10	Q				V

23+10	1.0126	0.10	Q				V
23+15	1.0133	0.10	Q				V
23+20	1.0139	0.10	Q				V
23+25	1.0146	0.10	Q				V
23+30	1.0153	0.10	Q				V
23+35	1.0160	0.10	Q				V
23+40	1.0167	0.10	Q				V
23+45	1.0173	0.10	Q				V
23+50	1.0180	0.10	Q				V
23+55	1.0187	0.10	Q				V
24+ 0	1.0194	0.10	Q				V
24+ 5	1.0197	0.05	Q				V
24+10	1.0198	0.01	Q				V
24+15	1.0198	0.00	Q				V

Appendix I.VIII

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 10-Year, 24-Hour Storm

Unit Hydrograph Analysis

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Study date 03/13/26 File: RCCDPost10UHA2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
10-YEAR STORM
POST DEVELOPMENT - DA A

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 1464.54(Ft.)
Length along longest watercourse measured to centroid = 401.96(Ft.)
Length along longest watercourse = 0.277 Mi.
Length along longest watercourse measured to centroid = 0.076 Mi.
Difference in elevation = 15.64(Ft.)
Slope along watercourse = 56.3858 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.039 Hr.
Lag time = 2.32 Min.
25% of lag time = 0.58 Min.
40% of lag time = 0.93 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.01	19.46

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	4.82	46.66

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.010(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 3.166(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.166(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 0.661
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	32.0	0.742	0.661	0.301	1.000	0.301
						Sum (F) = 0.301

Area averaged mean soil loss (F) (In/Hr) = 0.301
Minimum soil loss rate ((In/Hr)) = 0.150
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.371

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	215.717	45.991	4.487
2 0.167	431.434	42.286	4.125
3 0.250	647.151	8.191	0.799
4 0.333	862.868	3.532	0.345
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max Low	Effective (In/Hr)	
1	0.08	0.07	(0.533)	0.009	0.016
2	0.17	0.07	(0.531)	0.009	0.016
3	0.25	0.07	(0.529)	0.009	0.016
4	0.33	0.10	(0.527)	0.014	0.024
5	0.42	0.10	(0.525)	0.014	0.024
6	0.50	0.10	(0.523)	0.014	0.024
7	0.58	0.10	(0.521)	0.014	0.024
8	0.67	0.10	(0.519)	0.014	0.024
9	0.75	0.10	(0.516)	0.014	0.024
10	0.83	0.13	(0.514)	0.019	0.032
11	0.92	0.13	(0.512)	0.019	0.032
12	1.00	0.13	(0.510)	0.019	0.032
13	1.08	0.10	(0.508)	0.014	0.024
14	1.17	0.10	(0.506)	0.014	0.024
15	1.25	0.10	(0.504)	0.014	0.024
16	1.33	0.10	(0.502)	0.014	0.024
17	1.42	0.10	(0.500)	0.014	0.024
18	1.50	0.10	(0.498)	0.014	0.024
19	1.58	0.10	(0.496)	0.014	0.024
20	1.67	0.10	(0.494)	0.014	0.024
21	1.75	0.10	(0.492)	0.014	0.024
22	1.83	0.13	(0.490)	0.019	0.032
23	1.92	0.13	(0.488)	0.019	0.032
24	2.00	0.13	(0.486)	0.019	0.032
25	2.08	0.13	(0.485)	0.019	0.032
26	2.17	0.13	(0.483)	0.019	0.032
27	2.25	0.13	(0.481)	0.019	0.032
28	2.33	0.13	(0.479)	0.019	0.032
29	2.42	0.13	(0.477)	0.019	0.032
30	2.50	0.13	(0.475)	0.019	0.032
31	2.58	0.17	(0.473)	0.023	0.040
32	2.67	0.17	(0.471)	0.023	0.040
33	2.75	0.17	(0.469)	0.023	0.040
34	2.83	0.17	(0.467)	0.023	0.040

35	2.92	0.17	0.063	(0.465)	0.023	0.040
36	3.00	0.17	0.063	(0.463)	0.023	0.040
37	3.08	0.17	0.063	(0.461)	0.023	0.040
38	3.17	0.17	0.063	(0.459)	0.023	0.040
39	3.25	0.17	0.063	(0.457)	0.023	0.040
40	3.33	0.17	0.063	(0.455)	0.023	0.040
41	3.42	0.17	0.063	(0.454)	0.023	0.040
42	3.50	0.17	0.063	(0.452)	0.023	0.040
43	3.58	0.17	0.063	(0.450)	0.023	0.040
44	3.67	0.17	0.063	(0.448)	0.023	0.040
45	3.75	0.17	0.063	(0.446)	0.023	0.040
46	3.83	0.20	0.076	(0.444)	0.028	0.048
47	3.92	0.20	0.076	(0.442)	0.028	0.048
48	4.00	0.20	0.076	(0.440)	0.028	0.048
49	4.08	0.20	0.076	(0.439)	0.028	0.048
50	4.17	0.20	0.076	(0.437)	0.028	0.048
51	4.25	0.20	0.076	(0.435)	0.028	0.048
52	4.33	0.23	0.089	(0.433)	0.033	0.056
53	4.42	0.23	0.089	(0.431)	0.033	0.056
54	4.50	0.23	0.089	(0.429)	0.033	0.056
55	4.58	0.23	0.089	(0.427)	0.033	0.056
56	4.67	0.23	0.089	(0.426)	0.033	0.056
57	4.75	0.23	0.089	(0.424)	0.033	0.056
58	4.83	0.27	0.101	(0.422)	0.038	0.064
59	4.92	0.27	0.101	(0.420)	0.038	0.064
60	5.00	0.27	0.101	(0.418)	0.038	0.064
61	5.08	0.20	0.076	(0.416)	0.028	0.048
62	5.17	0.20	0.076	(0.415)	0.028	0.048
63	5.25	0.20	0.076	(0.413)	0.028	0.048
64	5.33	0.23	0.089	(0.411)	0.033	0.056
65	5.42	0.23	0.089	(0.409)	0.033	0.056
66	5.50	0.23	0.089	(0.407)	0.033	0.056
67	5.58	0.27	0.101	(0.406)	0.038	0.064
68	5.67	0.27	0.101	(0.404)	0.038	0.064
69	5.75	0.27	0.101	(0.402)	0.038	0.064
70	5.83	0.27	0.101	(0.400)	0.038	0.064
71	5.92	0.27	0.101	(0.399)	0.038	0.064
72	6.00	0.27	0.101	(0.397)	0.038	0.064
73	6.08	0.30	0.114	(0.395)	0.042	0.072
74	6.17	0.30	0.114	(0.393)	0.042	0.072
75	6.25	0.30	0.114	(0.391)	0.042	0.072
76	6.33	0.30	0.114	(0.390)	0.042	0.072
77	6.42	0.30	0.114	(0.388)	0.042	0.072
78	6.50	0.30	0.114	(0.386)	0.042	0.072
79	6.58	0.33	0.127	(0.385)	0.047	0.080
80	6.67	0.33	0.127	(0.383)	0.047	0.080
81	6.75	0.33	0.127	(0.381)	0.047	0.080
82	6.83	0.33	0.127	(0.379)	0.047	0.080
83	6.92	0.33	0.127	(0.378)	0.047	0.080
84	7.00	0.33	0.127	(0.376)	0.047	0.080
85	7.08	0.33	0.127	(0.374)	0.047	0.080
86	7.17	0.33	0.127	(0.373)	0.047	0.080
87	7.25	0.33	0.127	(0.371)	0.047	0.080
88	7.33	0.37	0.139	(0.369)	0.052	0.088
89	7.42	0.37	0.139	(0.367)	0.052	0.088
90	7.50	0.37	0.139	(0.366)	0.052	0.088
91	7.58	0.40	0.152	(0.364)	0.056	0.096
92	7.67	0.40	0.152	(0.362)	0.056	0.096
93	7.75	0.40	0.152	(0.361)	0.056	0.096
94	7.83	0.43	0.165	(0.359)	0.061	0.104
95	7.92	0.43	0.165	(0.357)	0.061	0.104
96	8.00	0.43	0.165	(0.356)	0.061	0.104
97	8.08	0.50	0.190	(0.354)	0.070	0.119
98	8.17	0.50	0.190	(0.352)	0.070	0.119
99	8.25	0.50	0.190	(0.351)	0.070	0.119
100	8.33	0.50	0.190	(0.349)	0.070	0.119
101	8.42	0.50	0.190	(0.348)	0.070	0.119
102	8.50	0.50	0.190	(0.346)	0.070	0.119
103	8.58	0.53	0.203	(0.344)	0.075	0.127

104	8.67	0.53	0.203	(0.343)	0.075	0.127
105	8.75	0.53	0.203	(0.341)	0.075	0.127
106	8.83	0.57	0.215	(0.339)	0.080	0.135
107	8.92	0.57	0.215	(0.338)	0.080	0.135
108	9.00	0.57	0.215	(0.336)	0.080	0.135
109	9.08	0.63	0.241	(0.335)	0.089	0.151
110	9.17	0.63	0.241	(0.333)	0.089	0.151
111	9.25	0.63	0.241	(0.331)	0.089	0.151
112	9.33	0.67	0.253	(0.330)	0.094	0.159
113	9.42	0.67	0.253	(0.328)	0.094	0.159
114	9.50	0.67	0.253	(0.327)	0.094	0.159
115	9.58	0.70	0.266	(0.325)	0.099	0.167
116	9.67	0.70	0.266	(0.324)	0.099	0.167
117	9.75	0.70	0.266	(0.322)	0.099	0.167
118	9.83	0.73	0.279	(0.321)	0.103	0.175
119	9.92	0.73	0.279	(0.319)	0.103	0.175
120	10.00	0.73	0.279	(0.317)	0.103	0.175
121	10.08	0.50	0.190	(0.316)	0.070	0.119
122	10.17	0.50	0.190	(0.314)	0.070	0.119
123	10.25	0.50	0.190	(0.313)	0.070	0.119
124	10.33	0.50	0.190	(0.311)	0.070	0.119
125	10.42	0.50	0.190	(0.310)	0.070	0.119
126	10.50	0.50	0.190	(0.308)	0.070	0.119
127	10.58	0.67	0.253	(0.307)	0.094	0.159
128	10.67	0.67	0.253	(0.305)	0.094	0.159
129	10.75	0.67	0.253	(0.304)	0.094	0.159
130	10.83	0.67	0.253	(0.302)	0.094	0.159
131	10.92	0.67	0.253	(0.301)	0.094	0.159
132	11.00	0.67	0.253	(0.299)	0.094	0.159
133	11.08	0.63	0.241	(0.298)	0.089	0.151
134	11.17	0.63	0.241	(0.296)	0.089	0.151
135	11.25	0.63	0.241	(0.295)	0.089	0.151
136	11.33	0.63	0.241	(0.293)	0.089	0.151
137	11.42	0.63	0.241	(0.292)	0.089	0.151
138	11.50	0.63	0.241	(0.291)	0.089	0.151
139	11.58	0.57	0.215	(0.289)	0.080	0.135
140	11.67	0.57	0.215	(0.288)	0.080	0.135
141	11.75	0.57	0.215	(0.286)	0.080	0.135
142	11.83	0.60	0.228	(0.285)	0.085	0.143
143	11.92	0.60	0.228	(0.283)	0.085	0.143
144	12.00	0.60	0.228	(0.282)	0.085	0.143
145	12.08	0.83	0.317	(0.281)	0.117	0.199
146	12.17	0.83	0.317	(0.279)	0.117	0.199
147	12.25	0.83	0.317	(0.278)	0.117	0.199
148	12.33	0.87	0.329	(0.276)	0.122	0.207
149	12.42	0.87	0.329	(0.275)	0.122	0.207
150	12.50	0.87	0.329	(0.274)	0.122	0.207
151	12.58	0.93	0.355	(0.272)	0.132	0.223
152	12.67	0.93	0.355	(0.271)	0.132	0.223
153	12.75	0.93	0.355	(0.270)	0.132	0.223
154	12.83	0.97	0.367	(0.268)	0.136	0.231
155	12.92	0.97	0.367	(0.267)	0.136	0.231
156	13.00	0.97	0.367	(0.265)	0.136	0.231
157	13.08	1.13	0.431	(0.264)	0.160	0.271
158	13.17	1.13	0.431	(0.263)	0.160	0.271
159	13.25	1.13	0.431	(0.261)	0.160	0.271
160	13.33	1.13	0.431	(0.260)	0.160	0.271
161	13.42	1.13	0.431	(0.259)	0.160	0.271
162	13.50	1.13	0.431	(0.257)	0.160	0.271
163	13.58	0.77	0.291	(0.256)	0.108	0.183
164	13.67	0.77	0.291	(0.255)	0.108	0.183
165	13.75	0.77	0.291	(0.254)	0.108	0.183
166	13.83	0.77	0.291	(0.252)	0.108	0.183
167	13.92	0.77	0.291	(0.251)	0.108	0.183
168	14.00	0.77	0.291	(0.250)	0.108	0.183
169	14.08	0.90	0.342	(0.248)	0.127	0.215
170	14.17	0.90	0.342	(0.247)	0.127	0.215
171	14.25	0.90	0.342	(0.246)	0.127	0.215
172	14.33	0.87	0.329	(0.245)	0.122	0.207

173	14.42	0.87	0.329	(0.243)	0.122	0.207
174	14.50	0.87	0.329	(0.242)	0.122	0.207
175	14.58	0.87	0.329	(0.241)	0.122	0.207
176	14.67	0.87	0.329	(0.240)	0.122	0.207
177	14.75	0.87	0.329	(0.238)	0.122	0.207
178	14.83	0.83	0.317	(0.237)	0.117	0.199
179	14.92	0.83	0.317	(0.236)	0.117	0.199
180	15.00	0.83	0.317	(0.235)	0.117	0.199
181	15.08	0.80	0.304	(0.234)	0.113	0.191
182	15.17	0.80	0.304	(0.232)	0.113	0.191
183	15.25	0.80	0.304	(0.231)	0.113	0.191
184	15.33	0.77	0.291	(0.230)	0.108	0.183
185	15.42	0.77	0.291	(0.229)	0.108	0.183
186	15.50	0.77	0.291	(0.228)	0.108	0.183
187	15.58	0.63	0.241	(0.226)	0.089	0.151
188	15.67	0.63	0.241	(0.225)	0.089	0.151
189	15.75	0.63	0.241	(0.224)	0.089	0.151
190	15.83	0.63	0.241	(0.223)	0.089	0.151
191	15.92	0.63	0.241	(0.222)	0.089	0.151
192	16.00	0.63	0.241	(0.221)	0.089	0.151
193	16.08	0.13	0.051	(0.220)	0.019	0.032
194	16.17	0.13	0.051	(0.218)	0.019	0.032
195	16.25	0.13	0.051	(0.217)	0.019	0.032
196	16.33	0.13	0.051	(0.216)	0.019	0.032
197	16.42	0.13	0.051	(0.215)	0.019	0.032
198	16.50	0.13	0.051	(0.214)	0.019	0.032
199	16.58	0.10	0.038	(0.213)	0.014	0.024
200	16.67	0.10	0.038	(0.212)	0.014	0.024
201	16.75	0.10	0.038	(0.211)	0.014	0.024
202	16.83	0.10	0.038	(0.210)	0.014	0.024
203	16.92	0.10	0.038	(0.209)	0.014	0.024
204	17.00	0.10	0.038	(0.208)	0.014	0.024
205	17.08	0.17	0.063	(0.207)	0.023	0.040
206	17.17	0.17	0.063	(0.206)	0.023	0.040
207	17.25	0.17	0.063	(0.205)	0.023	0.040
208	17.33	0.17	0.063	(0.203)	0.023	0.040
209	17.42	0.17	0.063	(0.202)	0.023	0.040
210	17.50	0.17	0.063	(0.201)	0.023	0.040
211	17.58	0.17	0.063	(0.200)	0.023	0.040
212	17.67	0.17	0.063	(0.199)	0.023	0.040
213	17.75	0.17	0.063	(0.198)	0.023	0.040
214	17.83	0.13	0.051	(0.197)	0.019	0.032
215	17.92	0.13	0.051	(0.196)	0.019	0.032
216	18.00	0.13	0.051	(0.196)	0.019	0.032
217	18.08	0.13	0.051	(0.195)	0.019	0.032
218	18.17	0.13	0.051	(0.194)	0.019	0.032
219	18.25	0.13	0.051	(0.193)	0.019	0.032
220	18.33	0.13	0.051	(0.192)	0.019	0.032
221	18.42	0.13	0.051	(0.191)	0.019	0.032
222	18.50	0.13	0.051	(0.190)	0.019	0.032
223	18.58	0.10	0.038	(0.189)	0.014	0.024
224	18.67	0.10	0.038	(0.188)	0.014	0.024
225	18.75	0.10	0.038	(0.187)	0.014	0.024
226	18.83	0.07	0.025	(0.186)	0.009	0.016
227	18.92	0.07	0.025	(0.185)	0.009	0.016
228	19.00	0.07	0.025	(0.184)	0.009	0.016
229	19.08	0.10	0.038	(0.184)	0.014	0.024
230	19.17	0.10	0.038	(0.183)	0.014	0.024
231	19.25	0.10	0.038	(0.182)	0.014	0.024
232	19.33	0.13	0.051	(0.181)	0.019	0.032
233	19.42	0.13	0.051	(0.180)	0.019	0.032
234	19.50	0.13	0.051	(0.179)	0.019	0.032
235	19.58	0.10	0.038	(0.179)	0.014	0.024
236	19.67	0.10	0.038	(0.178)	0.014	0.024
237	19.75	0.10	0.038	(0.177)	0.014	0.024
238	19.83	0.07	0.025	(0.176)	0.009	0.016
239	19.92	0.07	0.025	(0.175)	0.009	0.016
240	20.00	0.07	0.025	(0.175)	0.009	0.016
241	20.08	0.10	0.038	(0.174)	0.014	0.024

242	20.17	0.10	0.038	(0.173)	0.014	0.024
243	20.25	0.10	0.038	(0.172)	0.014	0.024
244	20.33	0.10	0.038	(0.172)	0.014	0.024
245	20.42	0.10	0.038	(0.171)	0.014	0.024
246	20.50	0.10	0.038	(0.170)	0.014	0.024
247	20.58	0.10	0.038	(0.169)	0.014	0.024
248	20.67	0.10	0.038	(0.169)	0.014	0.024
249	20.75	0.10	0.038	(0.168)	0.014	0.024
250	20.83	0.07	0.025	(0.167)	0.009	0.016
251	20.92	0.07	0.025	(0.167)	0.009	0.016
252	21.00	0.07	0.025	(0.166)	0.009	0.016
253	21.08	0.10	0.038	(0.165)	0.014	0.024
254	21.17	0.10	0.038	(0.165)	0.014	0.024
255	21.25	0.10	0.038	(0.164)	0.014	0.024
256	21.33	0.07	0.025	(0.163)	0.009	0.016
257	21.42	0.07	0.025	(0.163)	0.009	0.016
258	21.50	0.07	0.025	(0.162)	0.009	0.016
259	21.58	0.10	0.038	(0.162)	0.014	0.024
260	21.67	0.10	0.038	(0.161)	0.014	0.024
261	21.75	0.10	0.038	(0.160)	0.014	0.024
262	21.83	0.07	0.025	(0.160)	0.009	0.016
263	21.92	0.07	0.025	(0.159)	0.009	0.016
264	22.00	0.07	0.025	(0.159)	0.009	0.016
265	22.08	0.10	0.038	(0.158)	0.014	0.024
266	22.17	0.10	0.038	(0.158)	0.014	0.024
267	22.25	0.10	0.038	(0.157)	0.014	0.024
268	22.33	0.07	0.025	(0.157)	0.009	0.016
269	22.42	0.07	0.025	(0.156)	0.009	0.016
270	22.50	0.07	0.025	(0.156)	0.009	0.016
271	22.58	0.07	0.025	(0.155)	0.009	0.016
272	22.67	0.07	0.025	(0.155)	0.009	0.016
273	22.75	0.07	0.025	(0.154)	0.009	0.016
274	22.83	0.07	0.025	(0.154)	0.009	0.016
275	22.92	0.07	0.025	(0.154)	0.009	0.016
276	23.00	0.07	0.025	(0.153)	0.009	0.016
277	23.08	0.07	0.025	(0.153)	0.009	0.016
278	23.17	0.07	0.025	(0.153)	0.009	0.016
279	23.25	0.07	0.025	(0.152)	0.009	0.016
280	23.33	0.07	0.025	(0.152)	0.009	0.016
281	23.42	0.07	0.025	(0.152)	0.009	0.016
282	23.50	0.07	0.025	(0.151)	0.009	0.016
283	23.58	0.07	0.025	(0.151)	0.009	0.016
284	23.67	0.07	0.025	(0.151)	0.009	0.016
285	23.75	0.07	0.025	(0.151)	0.009	0.016
286	23.83	0.07	0.025	(0.151)	0.009	0.016
287	23.92	0.07	0.025	(0.150)	0.009	0.016
288	24.00	0.07	0.025	(0.150)	0.009	0.016

(Loss Rate Not Used)

Sum = 100.0 Sum = 23.9

$$\text{Flood volume} = \frac{\text{Effective rainfall} \times \text{times area}}{9.7(\text{Ac.})/[(\text{In})/(\text{Ft.})]} = \frac{1.99(\text{In})}{1.6(\text{Ac.Ft})}$$
$$\text{Total soil loss} = 1.17(\text{In})$$

Total soil loss = 0.947(Ac.Ft)

Total rainfall = 3.17(In)

Flood volume = 69975.0 Cubic Feet

Total soil loss = 41273.0 Cubic Feet

Peak flow rate of this hydrograph = 2.644(CFS)

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24 - H O U R S T O R M

Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0005	0.07	0					

0+10	0.0014	0.14	Q				
0+15	0.0025	0.15	Q				
0+20	0.0038	0.19	Q				
0+25	0.0053	0.22	Q				
0+30	0.0069	0.23	Q				
0+35	0.0085	0.23	Q				
0+40	0.0101	0.23	Q				
0+45	0.0117	0.23	Q				
0+50	0.0136	0.27	VQ				
0+55	0.0157	0.30	VQ				
1+ 0	0.0178	0.31	VQ				
1+ 5	0.0197	0.28	VQ				
1+10	0.0214	0.24	Q				
1+15	0.0230	0.24	Q				
1+20	0.0246	0.23	Q				
1+25	0.0262	0.23	Q				
1+30	0.0278	0.23	Q				
1+35	0.0294	0.23	Q				
1+40	0.0310	0.23	Q				
1+45	0.0326	0.23	Q				
1+50	0.0345	0.27	VQ				
1+55	0.0366	0.30	VQ				
2+ 0	0.0387	0.31	VQ				
2+ 5	0.0408	0.31	Q				
2+10	0.0430	0.31	Q				
2+15	0.0451	0.31	Q				
2+20	0.0472	0.31	Q				
2+25	0.0494	0.31	Q				
2+30	0.0515	0.31	Q				
2+35	0.0539	0.35	Q				
2+40	0.0565	0.38	Q				
2+45	0.0592	0.39	Q				
2+50	0.0619	0.39	Q				
2+55	0.0645	0.39	Q				
3+ 0	0.0672	0.39	Q				
3+ 5	0.0699	0.39	Q				
3+10	0.0726	0.39	Q				
3+15	0.0753	0.39	Q				
3+20	0.0779	0.39	Q				
3+25	0.0806	0.39	QV				
3+30	0.0833	0.39	QV				
3+35	0.0860	0.39	QV				
3+40	0.0886	0.39	QV				
3+45	0.0913	0.39	QV				
3+50	0.0942	0.42	QV				
3+55	0.0974	0.46	QV				
4+ 0	0.1006	0.46	QV				
4+ 5	0.1038	0.47	QV				
4+10	0.1070	0.47	QV				
4+15	0.1102	0.47	QV				
4+20	0.1137	0.50	Q				
4+25	0.1174	0.54	Q				
4+30	0.1211	0.54	QV				
4+35	0.1248	0.54	QV				
4+40	0.1286	0.54	QV				
4+45	0.1323	0.54	QV				
4+50	0.1363	0.58	QV				
4+55	0.1406	0.61	QV				
5+ 0	0.1448	0.62	QV				
5+ 5	0.1486	0.55	QV				
5+10	0.1520	0.48	Q V				
5+15	0.1552	0.47	Q V				
5+20	0.1587	0.50	QV				
5+25	0.1623	0.54	Q V				
5+30	0.1661	0.54	Q V				
5+35	0.1701	0.58	Q V				
5+40	0.1743	0.61	Q V				
5+45	0.1786	0.62	Q V				
5+50	0.1828	0.62	Q V				

5+55	0.1871	0.62	Q V				
6+ 0	0.1914	0.62	Q V				
6+ 5	0.1959	0.66	Q V				
6+10	0.2007	0.69	Q V				
6+15	0.2055	0.70	Q V				
6+20	0.2103	0.70	Q V				
6+25	0.2151	0.70	Q V				
6+30	0.2200	0.70	Q V				
6+35	0.2250	0.74	Q V				
6+40	0.2303	0.77	Q V				
6+45	0.2356	0.77	Q V				
6+50	0.2410	0.78	Q V				
6+55	0.2464	0.78	Q V				
7+ 0	0.2517	0.78	Q V				
7+ 5	0.2571	0.78	Q V				
7+10	0.2624	0.78	Q V				
7+15	0.2678	0.78	Q V				
7+20	0.2734	0.81	Q V				
7+25	0.2792	0.85	Q V				
7+30	0.2851	0.85	Q V				
7+35	0.2912	0.89	Q V				
7+40	0.2976	0.92	Q V				
7+45	0.3040	0.93	Q V				
7+50	0.3107	0.97	Q V				
7+55	0.3175	1.00	Q V				
8+ 0	0.3245	1.01	Q V				
8+ 5	0.3319	1.08	Q V				
8+10	0.3399	1.15	Q V				
8+15	0.3478	1.16	Q V				
8+20	0.3559	1.17	Q V				
8+25	0.3639	1.17	Q V				
8+30	0.3719	1.17	Q V				
8+35	0.3802	1.20	Q V				
8+40	0.3887	1.23	Q V				
8+45	0.3973	1.24	Q V				
8+50	0.4061	1.28	Q V				
8+55	0.4151	1.31	Q V				
9+ 0	0.4242	1.32	Q V				
9+ 5	0.4338	1.39	Q V				
9+10	0.4439	1.46	Q V				
9+15	0.4540	1.47	Q V				
9+20	0.4644	1.51	Q V				
9+25	0.4751	1.55	Q V				
9+30	0.4857	1.55	Q V				
9+35	0.4967	1.59	Q V				
9+40	0.5079	1.62	Q V				
9+45	0.5191	1.63	Q V				
9+50	0.5306	1.67	Q V				
9+55	0.5423	1.70	Q V				
10+ 0	0.5541	1.71	Q V				
10+ 5	0.5641	1.46	Q V				
10+10	0.5726	1.23	Q V				
10+15	0.5808	1.19	Q V				
10+20	0.5888	1.17	Q V				
10+25	0.5968	1.17	Q V				
10+30	0.6049	1.17	Q V				
10+35	0.6141	1.35	Q V				
10+40	0.6245	1.51	Q V				
10+45	0.6351	1.54	Q V				
10+50	0.6459	1.56	Q V				
10+55	0.6566	1.56	Q V				
11+ 0	0.6673	1.56	Q V				
11+ 5	0.6777	1.52	Q V				
11+10	0.6880	1.49	Q V				
11+15	0.6982	1.48	Q V				
11+20	0.7083	1.48	Q V				
11+25	0.7185	1.48	Q V				
11+30	0.7287	1.48	Q V				
11+35	0.7384	1.41	Q V				

11+40	0.7476	1.34	Q	V			
11+45	0.7567	1.33	Q	V			
11+50	0.7661	1.36	Q	V			
11+55	0.7757	1.39	Q	V			
12+ 0	0.7853	1.40	Q	V			
12+ 5	0.7966	1.65	Q	V			
12+10	0.8096	1.88	Q	V			
12+15	0.8228	1.92	Q	V			
12+20	0.8365	1.98	Q	V			
12+25	0.8503	2.01	Q	V			
12+30	0.8642	2.02	Q	V			
12+35	0.8787	2.09	Q	V			
12+40	0.8935	2.16	Q	V			
12+45	0.9085	2.17	Q	V			
12+50	0.9237	2.21	Q	V			
12+55	0.9392	2.25	Q	V			
13+ 0	0.9547	2.25	Q	V			
13+ 5	0.9715	2.43	Q	V			
13+10	0.9893	2.60	Q	V			
13+15	1.0075	2.63	Q	V			
13+20	1.0257	2.64	Q	V			
13+25	1.0439	2.64	Q	V			
13+30	1.0621	2.64	Q	V			
13+35	1.0776	2.25	Q	V			
13+40	1.0906	1.89	Q	V			
13+45	1.1031	1.82	Q	V			
13+50	1.1154	1.79	Q	V			
13+55	1.1277	1.79	Q	V			
14+ 0	1.1400	1.79	Q	V			
14+ 5	1.1534	1.93	Q	V			
14+10	1.1676	2.06	Q	V			
14+15	1.1819	2.09	Q	V			
14+20	1.1962	2.06	Q	V			
14+25	1.2101	2.03	Q	V			
14+30	1.2241	2.02	Q	V			
14+35	1.2380	2.02	Q	V			
14+40	1.2519	2.02	Q	V			
14+45	1.2658	2.02	Q	V			
14+50	1.2795	1.99	Q	V			
14+55	1.2930	1.95	Q	V			
15+ 0	1.3064	1.95	Q	V			
15+ 5	1.3195	1.91	Q	V			
15+10	1.3324	1.88	Q	V			
15+15	1.3453	1.87	Q	V			
15+20	1.3579	1.83	Q	V			
15+25	1.3703	1.80	Q	V			
15+30	1.3826	1.79	Q	V			
15+35	1.3939	1.65	Q	V			
15+40	1.4044	1.51	Q	V			
15+45	1.4146	1.49	Q	V			
15+50	1.4248	1.48	Q	V			
15+55	1.4350	1.48	Q	V			
16+ 0	1.4451	1.48	Q	V			
16+ 5	1.4516	0.94	Q	V			
16+10	1.4547	0.45	Q	V			
16+15	1.4571	0.35	Q	V			
16+20	1.4593	0.31	Q	V			
16+25	1.4614	0.31	Q	V			
16+30	1.4636	0.31	Q	V			
16+35	1.4655	0.28	Q	V			
16+40	1.4671	0.24	Q	V			
16+45	1.4687	0.24	Q	V			
16+50	1.4704	0.23	Q	V			
16+55	1.4720	0.23	Q	V			
17+ 0	1.4736	0.23	Q	V			
17+ 5	1.4757	0.30	Q	V			
17+10	1.4782	0.37	Q	V			
17+15	1.4809	0.38	Q	V			
17+20	1.4835	0.39	Q	V			

17+25	1.4862	0.39	Q					V	
17+30	1.4889	0.39	Q					V	
17+35	1.4916	0.39	Q					V	
17+40	1.4942	0.39	Q					V	
17+45	1.4969	0.39	Q					V	
17+50	1.4994	0.35	Q					V	
17+55	1.5016	0.32	Q					V	
18+ 0	1.5037	0.31	Q					V	
18+ 5	1.5059	0.31	Q					V	
18+10	1.5080	0.31	Q					V	
18+15	1.5101	0.31	Q					V	
18+20	1.5123	0.31	Q					V	
18+25	1.5144	0.31	Q					V	
18+30	1.5166	0.31	Q					V	
18+35	1.5185	0.28	Q					V	
18+40	1.5201	0.24	Q					V	
18+45	1.5218	0.24	Q					V	
18+50	1.5231	0.20	Q					V	
18+55	1.5243	0.16	Q					V	
19+ 0	1.5253	0.16	Q					V	
19+ 5	1.5267	0.19	Q					V	
19+10	1.5282	0.22	Q					V	
19+15	1.5298	0.23	Q					V	
19+20	1.5316	0.27	Q					V	
19+25	1.5337	0.30	Q					V	
19+30	1.5358	0.31	Q					V	
19+35	1.5377	0.28	Q					V	
19+40	1.5394	0.24	Q					V	
19+45	1.5410	0.24	Q					V	
19+50	1.5424	0.20	Q					V	
19+55	1.5435	0.16	Q					V	
20+ 0	1.5446	0.16	Q					V	
20+ 5	1.5459	0.19	Q					V	
20+10	1.5475	0.22	Q					V	
20+15	1.5491	0.23	Q					V	
20+20	1.5507	0.23	Q					V	
20+25	1.5523	0.23	Q					V	
20+30	1.5539	0.23	Q					V	
20+35	1.5555	0.23	Q					V	
20+40	1.5571	0.23	Q					V	
20+45	1.5587	0.23	Q					V	
20+50	1.5601	0.20	Q					V	
20+55	1.5612	0.16	Q					V	
21+ 0	1.5623	0.16	Q					V	
21+ 5	1.5636	0.19	Q					V	
21+10	1.5652	0.22	Q					V	
21+15	1.5667	0.23	Q					V	
21+20	1.5681	0.20	Q					V	
21+25	1.5692	0.16	Q					V	
21+30	1.5703	0.16	Q					V	
21+35	1.5716	0.19	Q					V	
21+40	1.5732	0.22	Q					V	
21+45	1.5748	0.23	Q					V	
21+50	1.5761	0.20	Q					V	
21+55	1.5773	0.16	Q					V	
22+ 0	1.5784	0.16	Q					V	
22+ 5	1.5797	0.19	Q					V	
22+10	1.5812	0.22	Q					V	
22+15	1.5828	0.23	Q					V	
22+20	1.5842	0.20	Q					V	
22+25	1.5853	0.16	Q					V	
22+30	1.5864	0.16	Q					V	
22+35	1.5875	0.16	Q					V	
22+40	1.5885	0.16	Q					V	
22+45	1.5896	0.16	Q					V	
22+50	1.5907	0.16	Q					V	
22+55	1.5917	0.16	Q					V	
23+ 0	1.5928	0.16	Q					V	
23+ 5	1.5939	0.16	Q					V	

23+10	1.5950	0.16	Q				V
23+15	1.5960	0.16	Q				V
23+20	1.5971	0.16	Q				V
23+25	1.5982	0.16	Q				V
23+30	1.5992	0.16	Q				V
23+35	1.6003	0.16	Q				V
23+40	1.6014	0.16	Q				V
23+45	1.6025	0.16	Q				V
23+50	1.6035	0.16	Q				V
23+55	1.6046	0.16	Q				V
24+ 0	1.6057	0.16	Q				V
24+ 5	1.6062	0.08	Q				V
24+10	1.6064	0.02	Q				V
24+15	1.6064	0.01	Q				V

Appendix I.IX

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 100-Year, 1-Hour Storm

Unit Hydrograph Analysis

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Study date 03/13/26 File: RCCDPost100UHA1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
POST DEVELOPMENT - DA A

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 1464.54(Ft.)
Length along longest watercourse measured to centroid = 401.96(Ft.)
Length along longest watercourse = 0.277 Mi.
Length along longest watercourse measured to centroid = 0.076 Mi.
Difference in elevation = 15.64(Ft.)
Slope along watercourse = 56.3858 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.039 Hr.
Lag time = 2.32 Min.
25% of lag time = 0.58 Min.
40% of lag time = 0.93 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	0.46	4.49

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	1.15	11.13

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.464(In)
Area Averaged 100-Year Rainfall = 1.150(In)

Point rain (area averaged) = 1.150(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.150(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 0.661
 Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	0.661	0.223	1.000	0.223
						Sum (F) = 0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223
 Minimum soil loss rate ((In/Hr)) = 0.112
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.371

 Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h VALLEY S-Curve

----- Unit Hydrograph Data -----

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	215.717	45.991	4.487
2 0.167	431.434	42.286	4.125
3 0.250	647.151	8.191	0.799
4 0.333	862.868	3.532	0.345
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max Low	Effective (In/Hr)
1 0.08	3.30	0.455	(0.223) 0.169	0.286
2 0.17	4.20	0.580	(0.223) 0.215	0.365
3 0.25	4.40	0.607	0.223 (0.225)	0.384
4 0.33	4.80	0.662	0.223 (0.246)	0.439
5 0.42	5.20	0.718	0.223 (0.266)	0.494
6 0.50	6.20	0.856	0.223 (0.317)	0.632
7 0.58	6.80	0.938	0.223 (0.348)	0.715
8 0.67	8.80	1.214	0.223 (0.451)	0.991
9 0.75	13.90	1.918	0.223 (0.712)	1.695
10 0.83	31.40	4.333	0.223 (1.607)	4.109
11 0.92	7.20	0.994	0.223 (0.369)	0.770
12 1.00	3.80	0.524	(0.223) 0.195	0.330

(Loss Rate Not Used)

Sum = 100.0 Sum = 11.2

Flood volume = Effective rainfall 0.93(In)
 times area 9.7(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
 Total soil loss = 0.22(In)
 Total soil loss = 0.174(Ac.Ft)
 Total rainfall = 1.15(In)
 Flood volume = 32822.9 Cubic Feet
 Total soil loss = 7582.8 Cubic Feet

 Peak flow rate of this hydrograph = 26.480(CFS)

+++++ 1 - H O U R S T O R M R u n o f f H y d r o g r a p h -----

Hydrograph in 5 Minute intervals ((CFS))

 Time(h+m) Volume Ac.Ft Q(CFS) 0 7.5 15.0 22.5 30.0

0+ 5	0.0089	1.29	VQ				
0+10	0.0283	2.82	V Q				
0+15	0.0521	3.46	V Q				
0+20	0.0792	3.94	VQ				
0+25	0.1100	4.46	Q				
0+30	0.1469	5.36	Q				
0+35	0.1907	6.36	Q V				
0+40	0.2463	8.07	Q V				
0+45	0.3323	12.49		QV			
0+50	0.5147	26.48			V	Q	
0+55	0.6670	22.11			Q	V	
1+ 0	0.7257	8.53		Q			V
1+ 5	0.7491	3.39	Q				V
1+10	0.7527	0.53	Q				V
1+15	0.7535	0.11	Q				V

Appendix I.X

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 100-Year, 3-Hour Storm

Unit Hydrograph Analysis

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Study date 03/13/26 File: RCCDPost100UHA3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
POST DEVELOPMENT - DA A

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 1464.54(Ft.)
Length along longest watercourse measured to centroid = 401.96(Ft.)
Length along longest watercourse = 0.277 Mi.
Length along longest watercourse measured to centroid = 0.076 Mi.
Difference in elevation = 15.64(Ft.)
Slope along watercourse = 56.3858 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.039 Hr.
Lag time = 2.32 Min.
25% of lag time = 0.58 Min.
40% of lag time = 0.93 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	0.81	7.88

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	1.89	18.30

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.814(In)
Area Averaged 100-Year Rainfall = 1.890(In)

Point rain (area averaged) = 1.890(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.890(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 0.661
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	0.661	0.223	1.000	0.223
						Sum (F) = 0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223

Minimum soil loss rate ((In/Hr)) = 0.112

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.371

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	215.717	45.991	4.487
2 0.167	431.434	42.286	4.125
3 0.250	647.151	8.191	0.799
4 0.333	862.868	3.532	0.345
Sum = 100.000		Sum=	9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	1.30	(0.223)	0.109	0.185
2	0.17	1.30	(0.223)	0.109	0.185
3	0.25	1.10	(0.223)	0.093	0.157
4	0.33	1.50	(0.223)	0.126	0.214
5	0.42	1.50	(0.223)	0.126	0.214
6	0.50	1.80	(0.223)	0.151	0.257
7	0.58	1.50	(0.223)	0.126	0.214
8	0.67	1.80	(0.223)	0.151	0.257
9	0.75	1.80	(0.223)	0.151	0.257
10	0.83	1.50	(0.223)	0.126	0.214
11	0.92	1.60	(0.223)	0.135	0.228
12	1.00	1.80	(0.223)	0.151	0.257
13	1.08	2.20	(0.223)	0.185	0.314
14	1.17	2.20	(0.223)	0.185	0.314
15	1.25	2.20	(0.223)	0.185	0.314
16	1.33	2.00	(0.223)	0.168	0.285
17	1.42	2.60	(0.223)	0.219	0.371
18	1.50	2.70	0.223	(0.227)	0.389
19	1.58	2.40	(0.223)	0.202	0.342
20	1.67	2.70	0.223	(0.227)	0.389
21	1.75	3.30	0.223	(0.278)	0.525
22	1.83	3.10	0.223	(0.261)	0.480
23	1.92	2.90	0.223	(0.244)	0.434
24	2.00	3.00	0.223	(0.252)	0.457
25	2.08	3.10	0.223	(0.261)	0.480
26	2.17	4.20	0.223	(0.353)	0.729
27	2.25	5.00	0.223	(0.421)	0.910
28	2.33	3.50	0.223	(0.294)	0.570
29	2.42	6.80	0.223	(0.572)	1.319
30	2.50	7.30	0.223	(0.614)	1.432
31	2.58	8.20	0.223	(0.690)	1.636
32	2.67	5.90	0.223	(0.496)	1.115
33	2.75	2.00	(0.223)	0.168	0.285
34	2.83	1.80	(0.223)	0.151	0.257

35	2.92	1.80	0.408	(0.223)	0.151	0.257
36	3.00	0.60	0.136	(0.223)	0.050	0.086

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.3

Flood volume = Effective rainfall 1.36(In)
times area 9.7(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)

Total soil loss = 0.53(In)

Total soil loss = 0.427(Ac.Ft)

Total rainfall = 1.89(In)

Flood volume = 47812.1 Cubic Feet

Total soil loss = 18596.6 Cubic Feet

Peak flow rate of this hydrograph = 14.507(CFS)

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3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m) Volume Ac.Ft Q(CFS) 0 5.0 10.0 15.0 20.0

0+ 5	0.0057	0.83	VQ					
0+10	0.0167	1.60	V Q					
0+15	0.0279	1.62	V Q					
0+20	0.0404	1.82	V Q					
0+25	0.0544	2.03	V Q					
0+30	0.0700	2.26	V Q					
0+35	0.0856	2.27	VQ					
0+40	0.1015	2.31	VQ					
0+45	0.1186	2.47	Q					
0+50	0.1344	2.30	Q					
0+55	0.1496	2.20	QV					
1+ 0	0.1658	2.35	Q V					
1+ 5	0.1845	2.72	QV					
1+10	0.2051	2.99	Q V					
1+15	0.2261	3.04	Q V					
1+20	0.2463	2.94	Q V					
1+25	0.2683	3.20	Q V					
1+30	0.2932	3.61	Q V					
1+35	0.3176	3.54	Q V					
1+40	0.3424	3.60	Q V					
1+45	0.3725	4.37	Q V					
1+50	0.4052	4.75	Q V					
1+55	0.4360	4.48	Q V					
2+ 0	0.4664	4.41	Q V					
2+ 5	0.4977	4.55	Q V					
2+10	0.5374	5.77	Q V					
2+15	0.5900	7.64	Q V					
2+20	0.6387	7.07	Q V					
2+25	0.7024	9.25	Q V					
2+30	0.7895	12.64	Q V					
2+35	0.8894	14.51	Q V					
2+40	0.9814	13.36	Q V					
2+45	1.0343	7.68	Q V					
2+50	1.0604	3.79	Q V					
2+55	1.0798	2.82	Q V					
3+ 0	1.0919	1.75	Q V					
3+ 5	1.0963	0.65	Q V					
3+10	1.0974	0.16	Q V					
3+15	1.0976	0.03	Q V					

Appendix I.XI

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 100-Year, 6-Hour Storm

Unit Hydrograph Analysis

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Study date 03/13/26 File: RCCDPost100UHA6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
POST DEVELOPMENT - DA A

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 1464.54(Ft.)
Length along longest watercourse measured to centroid = 401.96(Ft.)
Length along longest watercourse = 0.277 Mi.
Length along longest watercourse measured to centroid = 0.076 Mi.
Difference in elevation = 15.64(Ft.)
Slope along watercourse = 56.3858 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.039 Hr.
Lag time = 2.32 Min.
25% of lag time = 0.58 Min.
40% of lag time = 0.93 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	1.13	10.94

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.59	25.07

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.130(In)
Area Averaged 100-Year Rainfall = 2.590(In)

Point rain (area averaged) = 2.590(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.590(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 0.661
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	0.661	0.223	1.000	0.223
						Sum (F) = 0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223

Minimum soil loss rate ((In/Hr)) = 0.112

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.371

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	215.717	45.991	4.487
2 0.167	431.434	42.286	4.125
3 0.250	647.151	8.191	0.799
4 0.333	862.868	3.532	0.345
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max Low	Effective (In/Hr)
1 0.08	0.50	0.155	(0.223)	0.058
2 0.17	0.60	0.186	(0.223)	0.069
3 0.25	0.60	0.186	(0.223)	0.069
4 0.33	0.60	0.186	(0.223)	0.069
5 0.42	0.60	0.186	(0.223)	0.069
6 0.50	0.70	0.218	(0.223)	0.081
7 0.58	0.70	0.218	(0.223)	0.081
8 0.67	0.70	0.218	(0.223)	0.081
9 0.75	0.70	0.218	(0.223)	0.081
10 0.83	0.70	0.218	(0.223)	0.081
11 0.92	0.70	0.218	(0.223)	0.081
12 1.00	0.80	0.249	(0.223)	0.092
13 1.08	0.80	0.249	(0.223)	0.092
14 1.17	0.80	0.249	(0.223)	0.092
15 1.25	0.80	0.249	(0.223)	0.092
16 1.33	0.80	0.249	(0.223)	0.092
17 1.42	0.80	0.249	(0.223)	0.092
18 1.50	0.80	0.249	(0.223)	0.092
19 1.58	0.80	0.249	(0.223)	0.092
20 1.67	0.80	0.249	(0.223)	0.092
21 1.75	0.80	0.249	(0.223)	0.092
22 1.83	0.80	0.249	(0.223)	0.092
23 1.92	0.80	0.249	(0.223)	0.092
24 2.00	0.90	0.280	(0.223)	0.104
25 2.08	0.80	0.249	(0.223)	0.092
26 2.17	0.90	0.280	(0.223)	0.104
27 2.25	0.90	0.280	(0.223)	0.104
28 2.33	0.90	0.280	(0.223)	0.104
29 2.42	0.90	0.280	(0.223)	0.104
30 2.50	0.90	0.280	(0.223)	0.104
31 2.58	0.90	0.280	(0.223)	0.104
32 2.67	0.90	0.280	(0.223)	0.104
33 2.75	1.00	0.311	(0.223)	0.115
34 2.83	1.00	0.311	(0.223)	0.115

35	2.92	1.00	0.311	(0.223)	0.115	0.195
36	3.00	1.00	0.311	(0.223)	0.115	0.195
37	3.08	1.00	0.311	(0.223)	0.115	0.195
38	3.17	1.10	0.342	(0.223)	0.127	0.215
39	3.25	1.10	0.342	(0.223)	0.127	0.215
40	3.33	1.10	0.342	(0.223)	0.127	0.215
41	3.42	1.20	0.373	(0.223)	0.138	0.235
42	3.50	1.30	0.404	(0.223)	0.150	0.254
43	3.58	1.40	0.435	(0.223)	0.161	0.274
44	3.67	1.40	0.435	(0.223)	0.161	0.274
45	3.75	1.50	0.466	(0.223)	0.173	0.293
46	3.83	1.50	0.466	(0.223)	0.173	0.293
47	3.92	1.60	0.497	(0.223)	0.184	0.313
48	4.00	1.60	0.497	(0.223)	0.184	0.313
49	4.08	1.70	0.528	(0.223)	0.196	0.332
50	4.17	1.80	0.559	(0.223)	0.208	0.352
51	4.25	1.90	0.591	(0.223)	0.219	0.371
52	4.33	2.00	0.622	0.223 (0.231)		0.398
53	4.42	2.10	0.653	0.223 (0.242)		0.429
54	4.50	2.10	0.653	0.223 (0.242)		0.429
55	4.58	2.20	0.684	0.223 (0.254)		0.460
56	4.67	2.30	0.715	0.223 (0.265)		0.491
57	4.75	2.40	0.746	0.223 (0.277)		0.522
58	4.83	2.40	0.746	0.223 (0.277)		0.522
59	4.92	2.50	0.777	0.223 (0.288)		0.554
60	5.00	2.60	0.808	0.223 (0.300)		0.585
61	5.08	3.10	0.963	0.223 (0.357)		0.740
62	5.17	3.60	1.119	0.223 (0.415)		0.895
63	5.25	3.90	1.212	0.223 (0.450)		0.989
64	5.33	4.20	1.305	0.223 (0.484)		1.082
65	5.42	4.70	1.461	0.223 (0.542)		1.237
66	5.50	5.60	1.740	0.223 (0.646)		1.517
67	5.58	1.90	0.591	(0.223)	0.219	0.371
68	5.67	0.90	0.280	(0.223)	0.104	0.176
69	5.75	0.60	0.186	(0.223)	0.069	0.117
70	5.83	0.50	0.155	(0.223)	0.058	0.098
71	5.92	0.30	0.093	(0.223)	0.035	0.059
72	6.00	0.20	0.062	(0.223)	0.023	0.039

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.5

Flood volume = Effective rainfall 1.79(In)
times area 9.7(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.80(In)
Total soil loss = 0.646(Ac.Ft)
Total rainfall = 2.59(In)
Flood volume = 62857.4 Cubic Feet
Total soil loss = 28148.0 Cubic Feet

Peak flow rate of this hydrograph = 13.122(CFS)

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6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0030	0.44	Q					
0+10	0.0094	0.93	VQ					
0+15	0.0169	1.09	V Q					
0+20	0.0248	1.14	V Q					
0+25	0.0326	1.14	V Q					
0+30	0.0411	1.23	VQ					
0+35	0.0502	1.31	VQ					
0+40	0.0593	1.33	VQ					
0+45	0.0685	1.34	VQ					
0+50	0.0777	1.34	Q					

0+55	0.0869	1.34	Q						
1+ 0	0.0967	1.42	Q						
1+ 5	0.1071	1.50	VQ						
1+10	0.1176	1.52	Q						
1+15	0.1281	1.53	Q						
1+20	0.1386	1.53	Q						
1+25	0.1491	1.53	QV						
1+30	0.1596	1.53	QV						
1+35	0.1701	1.53	QV						
1+40	0.1806	1.53	Q V						
1+45	0.1911	1.53	Q V						
1+50	0.2017	1.53	Q V						
1+55	0.2122	1.53	Q V						
2+ 0	0.2233	1.61	Q V						
2+ 5	0.2344	1.61	Q V						
2+10	0.2456	1.63	Q V						
2+15	0.2573	1.70	Q V						
2+20	0.2691	1.71	Q V						
2+25	0.2809	1.72	Q V						
2+30	0.2927	1.72	Q V						
2+35	0.3046	1.72	Q V						
2+40	0.3164	1.72	Q V						
2+45	0.3288	1.81	Q V						
2+50	0.3418	1.89	Q V						
2+55	0.3549	1.90	Q V						
3+ 0	0.3680	1.91	Q V						
3+ 5	0.3812	1.91	Q V						
3+10	0.3949	2.00	Q V						
3+15	0.4092	2.08	Q V						
3+20	0.4236	2.09	Q V						
3+25	0.4387	2.19	Q V						
3+30	0.4549	2.36	Q V						
3+35	0.4724	2.54	Q V						
3+40	0.4906	2.64	Q V						
3+45	0.5096	2.75	Q V						
3+50	0.5291	2.84	Q V						
3+55	0.5494	2.94	Q V						
4+ 0	0.5703	3.03	Q V						
4+ 5	0.5918	3.13	Q V						
4+10	0.6146	3.31	Q V						
4+15	0.6387	3.49	Q V						
4+20	0.6643	3.72	Q V						
4+25	0.6918	3.99	Q V						
4+30	0.7203	4.14	Q V						
4+35	0.7500	4.32	Q V						
4+40	0.7817	4.60	Q V						
4+45	0.8154	4.89	Q V						
4+50	0.8502	5.05	Q V						
4+55	0.8862	5.23	Q V						
5+ 0	0.9241	5.51	Q V						
5+ 5	0.9679	6.36	Q V						
5+10	1.0211	7.73	Q V						
5+15	1.0826	8.93	Q V						
5+20	1.1508	9.91	Q V						
5+25	1.2274	11.12	Q V						
5+30	1.3178	13.12	Q V						
5+35	1.3818	9.29	Q V						
5+40	1.4091	3.96	Q V						
5+45	1.4233	2.07	Q V						
5+50	1.4315	1.19	Q V						
5+55	1.4372	0.82	Q V						
6+ 0	1.4409	0.54	Q V						
6+ 5	1.4426	0.24	Q V						
6+10	1.4429	0.05	Q V						
6+15	1.4430	0.01	Q V						

Appendix I.XII

Synthetic Unit Hydrograph Method Analysis Post-Development Conditions 100-Year, 24-Hour Storm

Unit Hydrograph Analysis

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Study date 03/13/26 File: RCCDPost100UHA24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6443

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

RCCD - PHASE I
UNIT HYDROGRAPH
100-YEAR STORM
POST DEVELOPMENT - DA A

Drainage Area = 9.68(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.68(Ac.) = 0.015 Sq. Mi.
Length along longest watercourse = 1464.54(Ft.)
Length along longest watercourse measured to centroid = 401.96(Ft.)
Length along longest watercourse = 0.277 Mi.
Length along longest watercourse measured to centroid = 0.076 Mi.
Difference in elevation = 15.64(Ft.)
Slope along watercourse = 56.3858 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.039 Hr.
Lag time = 2.32 Min.
25% of lag time = 0.58 Min.
40% of lag time = 0.93 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	2.01	19.46

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.68	4.82	46.66

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.010(In)
Area Averaged 100-Year Rainfall = 4.820(In)

Point rain (area averaged) = 4.820(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.820(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %

9.680 32.00 0.661
Total Area Entered = 9.68(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
32.0	52.0	0.552	0.661	0.223	1.000	0.223
						Sum (F) = 0.223

Area averaged mean soil loss (F) (In/Hr) = 0.223
Minimum soil loss rate ((In/Hr)) = 0.112
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.371

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	215.717	45.991	4.487
2 0.167	431.434	42.286	4.125
3 0.250	647.151	8.191	0.799
4 0.333	862.868	3.532	0.345
		Sum = 100.000	Sum= 9.756

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max Low	Effective (In/Hr)
1 0.08	0.07	0.039	(0.396)	0.014 0.024
2 0.17	0.07	0.039	(0.395)	0.014 0.024
3 0.25	0.07	0.039	(0.393)	0.014 0.024
4 0.33	0.10	0.058	(0.392)	0.021 0.036
5 0.42	0.10	0.058	(0.390)	0.021 0.036
6 0.50	0.10	0.058	(0.388)	0.021 0.036
7 0.58	0.10	0.058	(0.387)	0.021 0.036
8 0.67	0.10	0.058	(0.385)	0.021 0.036
9 0.75	0.10	0.058	(0.384)	0.021 0.036
10 0.83	0.13	0.077	(0.382)	0.029 0.049
11 0.92	0.13	0.077	(0.381)	0.029 0.049
12 1.00	0.13	0.077	(0.379)	0.029 0.049
13 1.08	0.10	0.058	(0.378)	0.021 0.036
14 1.17	0.10	0.058	(0.376)	0.021 0.036
15 1.25	0.10	0.058	(0.375)	0.021 0.036
16 1.33	0.10	0.058	(0.373)	0.021 0.036
17 1.42	0.10	0.058	(0.372)	0.021 0.036
18 1.50	0.10	0.058	(0.370)	0.021 0.036
19 1.58	0.10	0.058	(0.369)	0.021 0.036
20 1.67	0.10	0.058	(0.368)	0.021 0.036
21 1.75	0.10	0.058	(0.366)	0.021 0.036
22 1.83	0.13	0.077	(0.365)	0.029 0.049
23 1.92	0.13	0.077	(0.363)	0.029 0.049
24 2.00	0.13	0.077	(0.362)	0.029 0.049
25 2.08	0.13	0.077	(0.360)	0.029 0.049
26 2.17	0.13	0.077	(0.359)	0.029 0.049
27 2.25	0.13	0.077	(0.357)	0.029 0.049
28 2.33	0.13	0.077	(0.356)	0.029 0.049
29 2.42	0.13	0.077	(0.354)	0.029 0.049
30 2.50	0.13	0.077	(0.353)	0.029 0.049
31 2.58	0.17	0.096	(0.351)	0.036 0.061
32 2.67	0.17	0.096	(0.350)	0.036 0.061
33 2.75	0.17	0.096	(0.349)	0.036 0.061
34 2.83	0.17	0.096	(0.347)	0.036 0.061

35	2.92	0.17	0.096	(0.346)	0.036	0.061
36	3.00	0.17	0.096	(0.344)	0.036	0.061
37	3.08	0.17	0.096	(0.343)	0.036	0.061
38	3.17	0.17	0.096	(0.341)	0.036	0.061
39	3.25	0.17	0.096	(0.340)	0.036	0.061
40	3.33	0.17	0.096	(0.339)	0.036	0.061
41	3.42	0.17	0.096	(0.337)	0.036	0.061
42	3.50	0.17	0.096	(0.336)	0.036	0.061
43	3.58	0.17	0.096	(0.334)	0.036	0.061
44	3.67	0.17	0.096	(0.333)	0.036	0.061
45	3.75	0.17	0.096	(0.332)	0.036	0.061
46	3.83	0.20	0.116	(0.330)	0.043	0.073
47	3.92	0.20	0.116	(0.329)	0.043	0.073
48	4.00	0.20	0.116	(0.327)	0.043	0.073
49	4.08	0.20	0.116	(0.326)	0.043	0.073
50	4.17	0.20	0.116	(0.325)	0.043	0.073
51	4.25	0.20	0.116	(0.323)	0.043	0.073
52	4.33	0.23	0.135	(0.322)	0.050	0.085
53	4.42	0.23	0.135	(0.320)	0.050	0.085
54	4.50	0.23	0.135	(0.319)	0.050	0.085
55	4.58	0.23	0.135	(0.318)	0.050	0.085
56	4.67	0.23	0.135	(0.316)	0.050	0.085
57	4.75	0.23	0.135	(0.315)	0.050	0.085
58	4.83	0.27	0.154	(0.314)	0.057	0.097
59	4.92	0.27	0.154	(0.312)	0.057	0.097
60	5.00	0.27	0.154	(0.311)	0.057	0.097
61	5.08	0.20	0.116	(0.310)	0.043	0.073
62	5.17	0.20	0.116	(0.308)	0.043	0.073
63	5.25	0.20	0.116	(0.307)	0.043	0.073
64	5.33	0.23	0.135	(0.306)	0.050	0.085
65	5.42	0.23	0.135	(0.304)	0.050	0.085
66	5.50	0.23	0.135	(0.303)	0.050	0.085
67	5.58	0.27	0.154	(0.302)	0.057	0.097
68	5.67	0.27	0.154	(0.300)	0.057	0.097
69	5.75	0.27	0.154	(0.299)	0.057	0.097
70	5.83	0.27	0.154	(0.298)	0.057	0.097
71	5.92	0.27	0.154	(0.296)	0.057	0.097
72	6.00	0.27	0.154	(0.295)	0.057	0.097
73	6.08	0.30	0.174	(0.294)	0.064	0.109
74	6.17	0.30	0.174	(0.292)	0.064	0.109
75	6.25	0.30	0.174	(0.291)	0.064	0.109
76	6.33	0.30	0.174	(0.290)	0.064	0.109
77	6.42	0.30	0.174	(0.288)	0.064	0.109
78	6.50	0.30	0.174	(0.287)	0.064	0.109
79	6.58	0.33	0.193	(0.286)	0.072	0.121
80	6.67	0.33	0.193	(0.285)	0.072	0.121
81	6.75	0.33	0.193	(0.283)	0.072	0.121
82	6.83	0.33	0.193	(0.282)	0.072	0.121
83	6.92	0.33	0.193	(0.281)	0.072	0.121
84	7.00	0.33	0.193	(0.279)	0.072	0.121
85	7.08	0.33	0.193	(0.278)	0.072	0.121
86	7.17	0.33	0.193	(0.277)	0.072	0.121
87	7.25	0.33	0.193	(0.276)	0.072	0.121
88	7.33	0.37	0.212	(0.274)	0.079	0.133
89	7.42	0.37	0.212	(0.273)	0.079	0.133
90	7.50	0.37	0.212	(0.272)	0.079	0.133
91	7.58	0.40	0.231	(0.271)	0.086	0.146
92	7.67	0.40	0.231	(0.269)	0.086	0.146
93	7.75	0.40	0.231	(0.268)	0.086	0.146
94	7.83	0.43	0.251	(0.267)	0.093	0.158
95	7.92	0.43	0.251	(0.266)	0.093	0.158
96	8.00	0.43	0.251	(0.264)	0.093	0.158
97	8.08	0.50	0.289	(0.263)	0.107	0.182
98	8.17	0.50	0.289	(0.262)	0.107	0.182
99	8.25	0.50	0.289	(0.261)	0.107	0.182
100	8.33	0.50	0.289	(0.260)	0.107	0.182
101	8.42	0.50	0.289	(0.258)	0.107	0.182
102	8.50	0.50	0.289	(0.257)	0.107	0.182
103	8.58	0.53	0.308	(0.256)	0.114	0.194

104	8.67	0.53	0.308	(0.255)	0.114	0.194
105	8.75	0.53	0.308	(0.254)	0.114	0.194
106	8.83	0.57	0.328	(0.252)	0.122	0.206
107	8.92	0.57	0.328	(0.251)	0.122	0.206
108	9.00	0.57	0.328	(0.250)	0.122	0.206
109	9.08	0.63	0.366	(0.249)	0.136	0.230
110	9.17	0.63	0.366	(0.248)	0.136	0.230
111	9.25	0.63	0.366	(0.246)	0.136	0.230
112	9.33	0.67	0.386	(0.245)	0.143	0.243
113	9.42	0.67	0.386	(0.244)	0.143	0.243
114	9.50	0.67	0.386	(0.243)	0.143	0.243
115	9.58	0.70	0.405	(0.242)	0.150	0.255
116	9.67	0.70	0.405	(0.241)	0.150	0.255
117	9.75	0.70	0.405	(0.239)	0.150	0.255
118	9.83	0.73	0.424	(0.238)	0.157	0.267
119	9.92	0.73	0.424	(0.237)	0.157	0.267
120	10.00	0.73	0.424	(0.236)	0.157	0.267
121	10.08	0.50	0.289	(0.235)	0.107	0.182
122	10.17	0.50	0.289	(0.234)	0.107	0.182
123	10.25	0.50	0.289	(0.233)	0.107	0.182
124	10.33	0.50	0.289	(0.231)	0.107	0.182
125	10.42	0.50	0.289	(0.230)	0.107	0.182
126	10.50	0.50	0.289	(0.229)	0.107	0.182
127	10.58	0.67	0.386	(0.228)	0.143	0.243
128	10.67	0.67	0.386	(0.227)	0.143	0.243
129	10.75	0.67	0.386	(0.226)	0.143	0.243
130	10.83	0.67	0.386	(0.225)	0.143	0.243
131	10.92	0.67	0.386	(0.224)	0.143	0.243
132	11.00	0.67	0.386	(0.223)	0.143	0.243
133	11.08	0.63	0.366	(0.221)	0.136	0.230
134	11.17	0.63	0.366	(0.220)	0.136	0.230
135	11.25	0.63	0.366	(0.219)	0.136	0.230
136	11.33	0.63	0.366	(0.218)	0.136	0.230
137	11.42	0.63	0.366	(0.217)	0.136	0.230
138	11.50	0.63	0.366	(0.216)	0.136	0.230
139	11.58	0.57	0.328	(0.215)	0.122	0.206
140	11.67	0.57	0.328	(0.214)	0.122	0.206
141	11.75	0.57	0.328	(0.213)	0.122	0.206
142	11.83	0.60	0.347	(0.212)	0.129	0.218
143	11.92	0.60	0.347	(0.211)	0.129	0.218
144	12.00	0.60	0.347	(0.210)	0.129	0.218
145	12.08	0.83	0.482	(0.209)	0.179	0.303
146	12.17	0.83	0.482	(0.208)	0.179	0.303
147	12.25	0.83	0.482	(0.207)	0.179	0.303
148	12.33	0.87	0.501	(0.205)	0.186	0.315
149	12.42	0.87	0.501	(0.204)	0.186	0.315
150	12.50	0.87	0.501	(0.203)	0.186	0.315
151	12.58	0.93	0.540	(0.202)	0.200	0.340
152	12.67	0.93	0.540	(0.201)	0.200	0.340
153	12.75	0.93	0.540	(0.200)	0.200	0.340
154	12.83	0.97	0.559	0.199 (0.207)		0.360
155	12.92	0.97	0.559	0.198 (0.207)		0.361
156	13.00	0.97	0.559	0.197 (0.207)		0.362
157	13.08	1.13	0.656	0.196 (0.243)		0.459
158	13.17	1.13	0.656	0.195 (0.243)		0.460
159	13.25	1.13	0.656	0.194 (0.243)		0.461
160	13.33	1.13	0.656	0.193 (0.243)		0.462
161	13.42	1.13	0.656	0.192 (0.243)		0.463
162	13.50	1.13	0.656	0.191 (0.243)		0.464
163	13.58	0.77	0.443	(0.190)	0.165	0.279
164	13.67	0.77	0.443	(0.189)	0.165	0.279
165	13.75	0.77	0.443	(0.188)	0.165	0.279
166	13.83	0.77	0.443	(0.188)	0.165	0.279
167	13.92	0.77	0.443	(0.187)	0.165	0.279
168	14.00	0.77	0.443	(0.186)	0.165	0.279
169	14.08	0.90	0.521	0.185 (0.193)		0.336
170	14.17	0.90	0.521	0.184 (0.193)		0.337
171	14.25	0.90	0.521	0.183 (0.193)		0.338
172	14.33	0.87	0.501	0.182 (0.186)		0.319

173	14.42	0.87	0.501	0.181	(0.186)	0.320
174	14.50	0.87	0.501	0.180	(0.186)	0.321
175	14.58	0.87	0.501	0.179	(0.186)	0.322
176	14.67	0.87	0.501	0.178	(0.186)	0.323
177	14.75	0.87	0.501	0.177	(0.186)	0.324
178	14.83	0.83	0.482	0.176	(0.179)	0.306
179	14.92	0.83	0.482	0.175	(0.179)	0.307
180	15.00	0.83	0.482	0.175	(0.179)	0.307
181	15.08	0.80	0.463	(0.174)	0.172	0.291
182	15.17	0.80	0.463	(0.173)	0.172	0.291
183	15.25	0.80	0.463	(0.172)	0.172	0.291
184	15.33	0.77	0.443	(0.171)	0.165	0.279
185	15.42	0.77	0.443	(0.170)	0.165	0.279
186	15.50	0.77	0.443	(0.169)	0.165	0.279
187	15.58	0.63	0.366	(0.168)	0.136	0.230
188	15.67	0.63	0.366	(0.167)	0.136	0.230
189	15.75	0.63	0.366	(0.167)	0.136	0.230
190	15.83	0.63	0.366	(0.166)	0.136	0.230
191	15.92	0.63	0.366	(0.165)	0.136	0.230
192	16.00	0.63	0.366	(0.164)	0.136	0.230
193	16.08	0.13	0.077	(0.163)	0.029	0.049
194	16.17	0.13	0.077	(0.162)	0.029	0.049
195	16.25	0.13	0.077	(0.162)	0.029	0.049
196	16.33	0.13	0.077	(0.161)	0.029	0.049
197	16.42	0.13	0.077	(0.160)	0.029	0.049
198	16.50	0.13	0.077	(0.159)	0.029	0.049
199	16.58	0.10	0.058	(0.158)	0.021	0.036
200	16.67	0.10	0.058	(0.158)	0.021	0.036
201	16.75	0.10	0.058	(0.157)	0.021	0.036
202	16.83	0.10	0.058	(0.156)	0.021	0.036
203	16.92	0.10	0.058	(0.155)	0.021	0.036
204	17.00	0.10	0.058	(0.154)	0.021	0.036
205	17.08	0.17	0.096	(0.154)	0.036	0.061
206	17.17	0.17	0.096	(0.153)	0.036	0.061
207	17.25	0.17	0.096	(0.152)	0.036	0.061
208	17.33	0.17	0.096	(0.151)	0.036	0.061
209	17.42	0.17	0.096	(0.151)	0.036	0.061
210	17.50	0.17	0.096	(0.150)	0.036	0.061
211	17.58	0.17	0.096	(0.149)	0.036	0.061
212	17.67	0.17	0.096	(0.148)	0.036	0.061
213	17.75	0.17	0.096	(0.148)	0.036	0.061
214	17.83	0.13	0.077	(0.147)	0.029	0.049
215	17.92	0.13	0.077	(0.146)	0.029	0.049
216	18.00	0.13	0.077	(0.145)	0.029	0.049
217	18.08	0.13	0.077	(0.145)	0.029	0.049
218	18.17	0.13	0.077	(0.144)	0.029	0.049
219	18.25	0.13	0.077	(0.143)	0.029	0.049
220	18.33	0.13	0.077	(0.143)	0.029	0.049
221	18.42	0.13	0.077	(0.142)	0.029	0.049
222	18.50	0.13	0.077	(0.141)	0.029	0.049
223	18.58	0.10	0.058	(0.140)	0.021	0.036
224	18.67	0.10	0.058	(0.140)	0.021	0.036
225	18.75	0.10	0.058	(0.139)	0.021	0.036
226	18.83	0.07	0.039	(0.138)	0.014	0.024
227	18.92	0.07	0.039	(0.138)	0.014	0.024
228	19.00	0.07	0.039	(0.137)	0.014	0.024
229	19.08	0.10	0.058	(0.136)	0.021	0.036
230	19.17	0.10	0.058	(0.136)	0.021	0.036
231	19.25	0.10	0.058	(0.135)	0.021	0.036
232	19.33	0.13	0.077	(0.135)	0.029	0.049
233	19.42	0.13	0.077	(0.134)	0.029	0.049
234	19.50	0.13	0.077	(0.133)	0.029	0.049
235	19.58	0.10	0.058	(0.133)	0.021	0.036
236	19.67	0.10	0.058	(0.132)	0.021	0.036
237	19.75	0.10	0.058	(0.132)	0.021	0.036
238	19.83	0.07	0.039	(0.131)	0.014	0.024
239	19.92	0.07	0.039	(0.130)	0.014	0.024
240	20.00	0.07	0.039	(0.130)	0.014	0.024
241	20.08	0.10	0.058	(0.129)	0.021	0.036

0+10	0.0022	0.21	Q				
0+15	0.0038	0.23	Q				
0+20	0.0058	0.29	VQ				
0+25	0.0081	0.34	VQ				
0+30	0.0105	0.35	VQ				
0+35	0.0130	0.36	VQ				
0+40	0.0154	0.36	VQ				
0+45	0.0179	0.36	VQ				
0+50	0.0207	0.41	VQ				
0+55	0.0239	0.46	VQ				
1+ 0	0.0271	0.47	VQ				
1+ 5	0.0300	0.42	VQ				
1+10	0.0325	0.37	VQ				
1+15	0.0350	0.36	VQ				
1+20	0.0374	0.36	VQ				
1+25	0.0399	0.36	VQ				
1+30	0.0423	0.36	VQ				
1+35	0.0448	0.36	VQ				
1+40	0.0472	0.36	VQ				
1+45	0.0497	0.36	VQ				
1+50	0.0525	0.41	VQ				
1+55	0.0556	0.46	VQ				
2+ 0	0.0589	0.47	VQ				
2+ 5	0.0621	0.47	Q				
2+10	0.0654	0.47	Q				
2+15	0.0687	0.47	Q				
2+20	0.0719	0.47	Q				
2+25	0.0752	0.47	Q				
2+30	0.0784	0.47	Q				
2+35	0.0821	0.53	VQ				
2+40	0.0861	0.58	VQ				
2+45	0.0901	0.59	VQ				
2+50	0.0942	0.59	VQ				
2+55	0.0983	0.59	VQ				
3+ 0	0.1023	0.59	VQ				
3+ 5	0.1064	0.59	VQ				
3+10	0.1105	0.59	VQ				
3+15	0.1146	0.59	VQ				
3+20	0.1186	0.59	VQ				
3+25	0.1227	0.59	VQ				
3+30	0.1268	0.59	Q				
3+35	0.1309	0.59	Q				
3+40	0.1349	0.59	Q				
3+45	0.1390	0.59	Q				
3+50	0.1435	0.65	Q				
3+55	0.1483	0.70	Q				
4+ 0	0.1531	0.71	Q				
4+ 5	0.1580	0.71	Q				
4+10	0.1629	0.71	Q				
4+15	0.1678	0.71	Q				
4+20	0.1731	0.76	VQ				
4+25	0.1787	0.81	VQ				
4+30	0.1844	0.82	VQ				
4+35	0.1901	0.83	Q				
4+40	0.1958	0.83	Q				
4+45	0.2015	0.83	Q				
4+50	0.2076	0.88	Q				
4+55	0.2140	0.93	Q				
5+ 0	0.2205	0.94	Q				
5+ 5	0.2262	0.84	Q				
5+10	0.2313	0.74	QV				
5+15	0.2363	0.72	QV				
5+20	0.2415	0.76	Q				
5+25	0.2472	0.81	Q				
5+30	0.2528	0.82	QV				
5+35	0.2589	0.88	QV				
5+40	0.2653	0.93	QV				
5+45	0.2718	0.94	QV				
5+50	0.2784	0.95	QV				

5+55	0.2849	0.95	QV				
6+ 0	0.2914	0.95	QV				
6+ 5	0.2983	1.00	Q				
6+10	0.3055	1.05	Q				
6+15	0.3128	1.06	QV				
6+20	0.3202	1.07	QV				
6+25	0.3275	1.07	QV				
6+30	0.3349	1.07	QV				
6+35	0.3426	1.12	QV				
6+40	0.3506	1.17	QV				
6+45	0.3587	1.18	QV				
6+50	0.3669	1.18	QV				
6+55	0.3751	1.18	Q V				
7+ 0	0.3832	1.18	Q V				
7+ 5	0.3914	1.18	Q V				
7+10	0.3995	1.18	Q V				
7+15	0.4077	1.18	Q V				
7+20	0.4162	1.24	Q V				
7+25	0.4251	1.29	QV				
7+30	0.4340	1.30	Q V				
7+35	0.4433	1.36	Q V				
7+40	0.4530	1.41	Q V				
7+45	0.4628	1.42	Q V				
7+50	0.4729	1.47	Q V				
7+55	0.4834	1.52	QV				
8+ 0	0.4940	1.53	QV				
8+ 5	0.5054	1.65	Q V				
8+10	0.5174	1.75	Q V				
8+15	0.5296	1.77	QV				
8+20	0.5418	1.78	QV				
8+25	0.5540	1.78	QV				
8+30	0.5662	1.78	Q V				
8+35	0.5788	1.83	Q V				
8+40	0.5918	1.88	Q V				
8+45	0.6048	1.89	Q V				
8+50	0.6182	1.95	Q V				
8+55	0.6320	2.00	Q V				
9+ 0	0.6458	2.01	Q V				
9+ 5	0.6604	2.12	Q V				
9+10	0.6757	2.22	Q V				
9+15	0.6912	2.24	Q V				
9+20	0.7070	2.30	Q V				
9+25	0.7232	2.35	Q V				
9+30	0.7395	2.36	Q V				
9+35	0.7562	2.42	Q V				
9+40	0.7732	2.47	Q V				
9+45	0.7903	2.48	Q V				
9+50	0.8078	2.54	Q V				
9+55	0.8256	2.59	Q V				
10+ 0	0.8435	2.60	Q V				
10+ 5	0.8588	2.22	Q V				
10+10	0.8717	1.87	Q V				
10+15	0.8842	1.80	Q V				
10+20	0.8964	1.78	Q V				
10+25	0.9086	1.78	Q V				
10+30	0.9209	1.78	Q V				
10+35	0.9350	2.05	Q V				
10+40	0.9508	2.30	Q V				
10+45	0.9669	2.35	Q V				
10+50	0.9832	2.37	Q V				
10+55	0.9996	2.37	Q V				
11+ 0	1.0159	2.37	Q V				
11+ 5	1.0318	2.31	Q V				
11+10	1.0474	2.26	Q V				
11+15	1.0629	2.25	Q V				
11+20	1.0784	2.25	Q V				
11+25	1.0939	2.25	Q V				
11+30	1.1094	2.25	Q V				
11+35	1.1241	2.14	Q V				

11+40	1.1381	2.04	Q	V			
11+45	1.1521	2.02	Q	V			
11+50	1.1663	2.07	Q	V			
11+55	1.1809	2.12	Q	V			
12+ 0	1.1955	2.13	Q	V			
12+ 5	1.2128	2.51	Q	V			
12+10	1.2325	2.86	Q	V			
12+15	1.2527	2.93	Q	V			
12+20	1.2735	3.01	Q	V			
12+25	1.2946	3.06	Q	V			
12+30	1.3157	3.07	Q	V			
12+35	1.3377	3.19	Q	V			
12+40	1.3603	3.29	Q	V			
12+45	1.3831	3.31	Q	V			
12+50	1.4065	3.41	Q	V			
12+55	1.4306	3.49	Q	V			
13+ 0	1.4548	3.52	Q	V			
13+ 5	1.4821	3.97	Q	V			
13+10	1.5123	4.37	Q	V			
13+15	1.5430	4.46	Q	V			
13+20	1.5740	4.50	Q	V			
13+25	1.6051	4.51	Q	V			
13+30	1.6362	4.52	Q	V			
13+35	1.6617	3.70	Q	V			
13+40	1.6819	2.93	Q	V			
13+45	1.7011	2.79	Q	V			
13+50	1.7198	2.72	Q	V			
13+55	1.7386	2.72	Q	V			
14+ 0	1.7573	2.72	Q	V			
14+ 5	1.7779	2.98	Q	V			
14+10	1.8000	3.22	Q	V			
14+15	1.8225	3.27	Q	V			
14+20	1.8447	3.21	Q	V			
14+25	1.8663	3.14	Q	V			
14+30	1.8879	3.14	Q	V			
14+35	1.9095	3.14	Q	V			
14+40	1.9312	3.15	Q	V			
14+45	1.9530	3.16	Q	V			
14+50	1.9742	3.08	Q	V			
14+55	1.9949	3.01	Q	V			
15+ 0	2.0155	3.00	Q	V			
15+ 5	2.0357	2.93	Q	V			
15+10	2.0554	2.86	Q	V			
15+15	2.0750	2.85	Q	V			
15+20	2.0942	2.79	Q	V			
15+25	2.1130	2.74	Q	V			
15+30	2.1318	2.73	Q	V			
15+35	2.1491	2.50	Q	V			
15+40	2.1649	2.30	Q	V			
15+45	2.1805	2.27	Q	V			
15+50	2.1960	2.25	Q	V			
15+55	2.2115	2.25	Q	V			
16+ 0	2.2270	2.25	Q	V			
16+ 5	2.2369	1.43	Q	V			
16+10	2.2416	0.68	Q	V			
16+15	2.2452	0.54	Q	V			
16+20	2.2485	0.47	Q	V			
16+25	2.2518	0.47	Q	V			
16+30	2.2550	0.47	Q	V			
16+35	2.2579	0.42	Q	V			
16+40	2.2605	0.37	Q	V			
16+45	2.2629	0.36	Q	V			
16+50	2.2654	0.36	Q	V			
16+55	2.2678	0.36	Q	V			
17+ 0	2.2703	0.36	Q	V			
17+ 5	2.2735	0.46	Q	V			
17+10	2.2774	0.56	Q	V			
17+15	2.2814	0.58	Q	V			
17+20	2.2854	0.59	Q	V			

17+25	2.2895	0.59	Q					V
17+30	2.2936	0.59	Q					V
17+35	2.2977	0.59	Q					V
17+40	2.3017	0.59	Q					V
17+45	2.3058	0.59	Q					V
17+50	2.3095	0.54	Q					V
17+55	2.3129	0.49	Q					V
18+ 0	2.3162	0.48	Q					V
18+ 5	2.3194	0.47	Q					V
18+10	2.3227	0.47	Q					V
18+15	2.3260	0.47	Q					V
18+20	2.3292	0.47	Q					V
18+25	2.3325	0.47	Q					V
18+30	2.3357	0.47	Q					V
18+35	2.3386	0.42	Q					V
18+40	2.3412	0.37	Q					V
18+45	2.3436	0.36	Q					V
18+50	2.3457	0.30	Q					V
18+55	2.3474	0.25	Q					V
19+ 0	2.3491	0.24	Q					V
19+ 5	2.3511	0.29	Q					V
19+10	2.3534	0.34	Q					V
19+15	2.3559	0.35	Q					V
19+20	2.3587	0.41	Q					V
19+25	2.3619	0.46	Q					V
19+30	2.3651	0.47	Q					V
19+35	2.3680	0.42	Q					V
19+40	2.3705	0.37	Q					V
19+45	2.3730	0.36	Q					V
19+50	2.3751	0.30	Q					V
19+55	2.3768	0.25	Q					V
20+ 0	2.3784	0.24	Q					V
20+ 5	2.3804	0.29	Q					V
20+10	2.3828	0.34	Q					V
20+15	2.3852	0.35	Q					V
20+20	2.3877	0.36	Q					V
20+25	2.3901	0.36	Q					V
20+30	2.3925	0.36	Q					V
20+35	2.3950	0.36	Q					V
20+40	2.3974	0.36	Q					V
20+45	2.3999	0.36	Q					V
20+50	2.4020	0.30	Q					V
20+55	2.4037	0.25	Q					V
21+ 0	2.4053	0.24	Q					V
21+ 5	2.4073	0.29	Q					V
21+10	2.4097	0.34	Q					V
21+15	2.4121	0.35	Q					V
21+20	2.4142	0.30	Q					V
21+25	2.4159	0.25	Q					V
21+30	2.4176	0.24	Q					V
21+35	2.4196	0.29	Q					V
21+40	2.4219	0.34	Q					V
21+45	2.4243	0.35	Q					V
21+50	2.4264	0.30	Q					V
21+55	2.4281	0.25	Q					V
22+ 0	2.4298	0.24	Q					V
22+ 5	2.4318	0.29	Q					V
22+10	2.4342	0.34	Q					V
22+15	2.4366	0.35	Q					V
22+20	2.4386	0.30	Q					V
22+25	2.4404	0.25	Q					V
22+30	2.4420	0.24	Q					V
22+35	2.4437	0.24	Q					V
22+40	2.4453	0.24	Q					V
22+45	2.4469	0.24	Q					V
22+50	2.4485	0.24	Q					V
22+55	2.4502	0.24	Q					V
23+ 0	2.4518	0.24	Q					V
23+ 5	2.4534	0.24	Q					V

23+10	2.4551	0.24	Q				V
23+15	2.4567	0.24	Q				V
23+20	2.4583	0.24	Q				V
23+25	2.4600	0.24	Q				V
23+30	2.4616	0.24	Q				V
23+35	2.4632	0.24	Q				V
23+40	2.4649	0.24	Q				V
23+45	2.4665	0.24	Q				V
23+50	2.4681	0.24	Q				V
23+55	2.4697	0.24	Q				V
24+ 0	2.4714	0.24	Q				V
24+ 5	2.4723	0.13	Q				V
24+10	2.4724	0.03	Q				V
24+15	2.4725	0.01	Q				V

Appendix J
BMP Analysis

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



RCCD - PHASE I

JURUPA VALLEY, CA, USA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-7200.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 500 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.

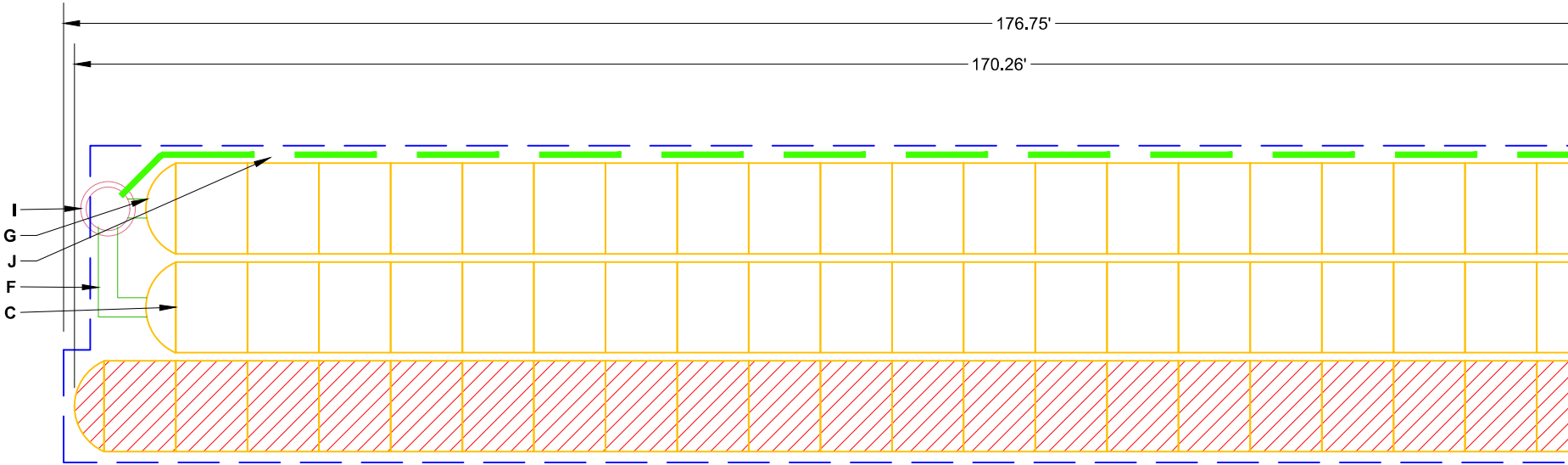
IMPORTANT - NOTES FOR THE BID

1. STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED BEFORE PRE-CONSTRUCTION MEETING WITH THE INSURANCE AGENT.
2. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING NOTES:
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH STONE. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER ROWS
 - BACKFILL AS ROWS ARE BUILT USING A STONESHOOTER
 - BACKFILL FROM OUTSIDE THE EXCAVATION
4. THE FOUNDATION STONE SHALL BE LEVELLED AND COMPACTED.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROTECTED WITH A 1" (25 mm) SPACING BEHIND THE CHAMBER JOINT.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING NOTES:
8. EMBEDMENT STONE SURROUNDING CHAMBERS SHALL BE 467, 5, 56, OR 57.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND THE CHAMBER. DIFFER BY MORE THAN 12" (300 mm) BETWEEN ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES TO THE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTOR" STORMWATER MANAGEMENT SYSTEM FROM STORMTECH.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING NOTES:
2. THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS SHALL BE LIMITED TO:
 - NO EQUIPMENT IS ALLOWED ON BARE EARTH
 - NO RUBBER TIRED LOADER, DUMP TRUCK, OR OTHER EQUIPMENT WITH THE "MC-7200 STORMTECH CHAMBER" MARKING
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT SHALL BE 10,000 LBS (4,500 KG) OR LESS

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS				
				PART TYPE	ITEM ON LAYOUT	
73	STORMTECH MC-7200 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.75			
6	STORMTECH MC-7200 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	8.25	PREFABRICATED END CAP	A	24" TOP PARTIAL CUT END CAP, PA
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	7.75			
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	7.75	PREFABRICATED END CAP	B	24" BOTTOM PARTIAL CUT END CAP, CONNECTIONS AND ISOLATOR PLU
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	7.75			
21609	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	6.75	PREFABRICATED END CAP	C	18" BOTTOM PARTIAL CUT END CAP, CONNECTIONS
		TOP OF MC-7200 CHAMBER:	5.75			
		24" x 24" TOP MANIFOLD INVERT:	2.67	FLAMP	D	INSTALL FLAMP ON 24" ACCESS PIP
		24" ISOLATOR ROW PLUS INVERT:	0.94	MANIFOLD	E	24" x 24" TOP MANIFOLD, ADS N-12
5097	SYSTEM AREA (SF)	18" x 18" BOTTOM MANIFOLD INVERT:	0.91	MANIFOLD	F	18" x 18" BOTTOM MANIFOLD, ADS N
411.7	SYSTEM PERIMETER (ft)	18" BOTTOM CONNECTION INVERT:	0.91	PIPE CONNECTION	G	18" BOTTOM CONNECTION
		BOTTOM OF MC-7200 CHAMBER:	0.75	CONCRETE STRUCTURE	H	(DESIGN BY ENGINEER / PROVIDED
		UNDERDRAIN INVERT:	0.00	CONCRETE STRUCTURE	I	OCS (DESIGN BY ENGINEER / PROV
		BOTTOM OF STONE:	0.00	UNDERDRAIN	J	6" ADS N-12 DUAL WALL PERFORAT

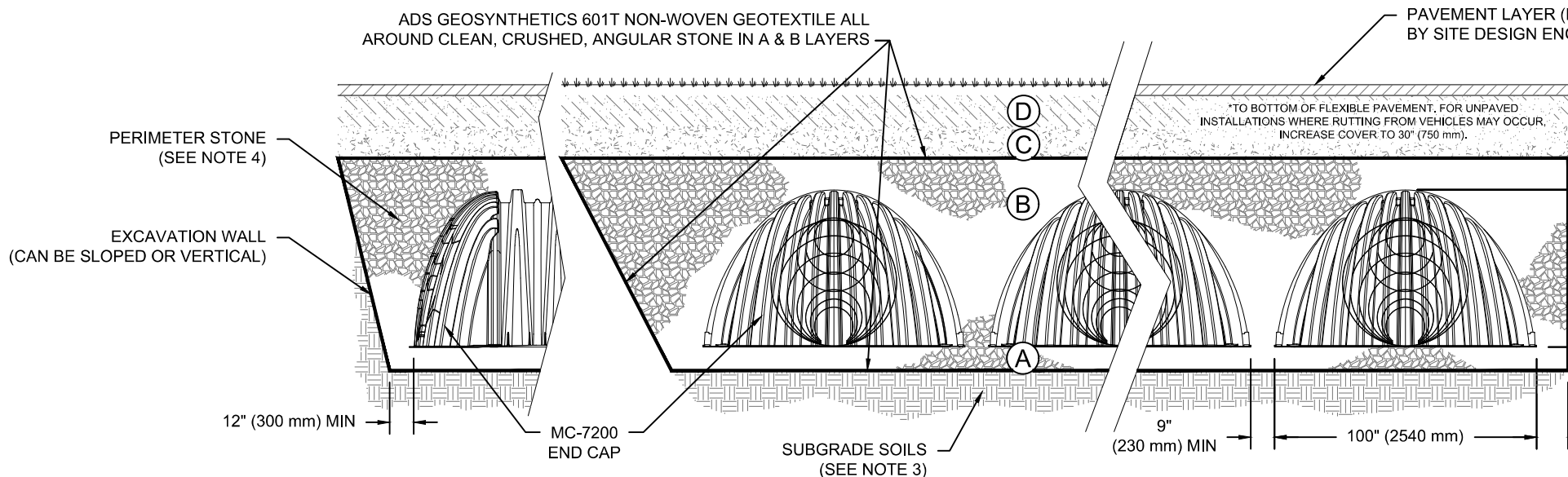


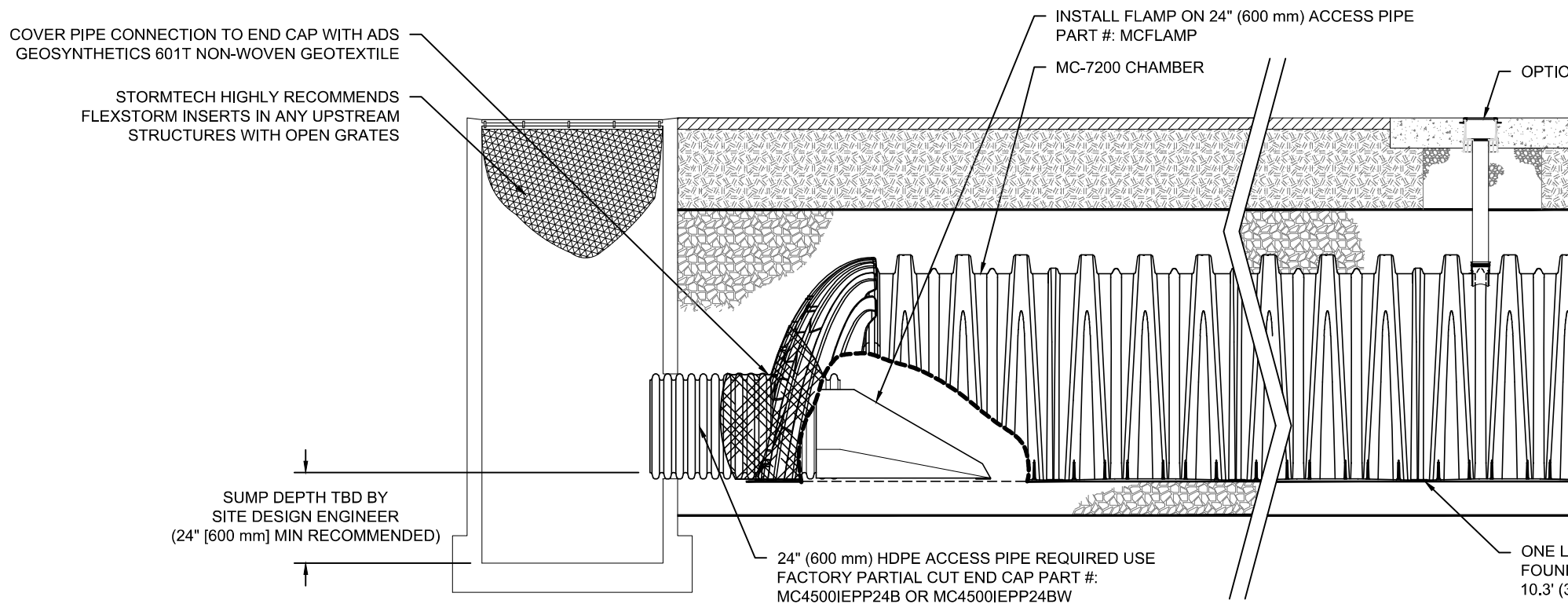
ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEM

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATION
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145¹ A-1, A-2-4, A-3 OR AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 72
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE⁵	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE⁵	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR, #4 STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE AGGREGATE".





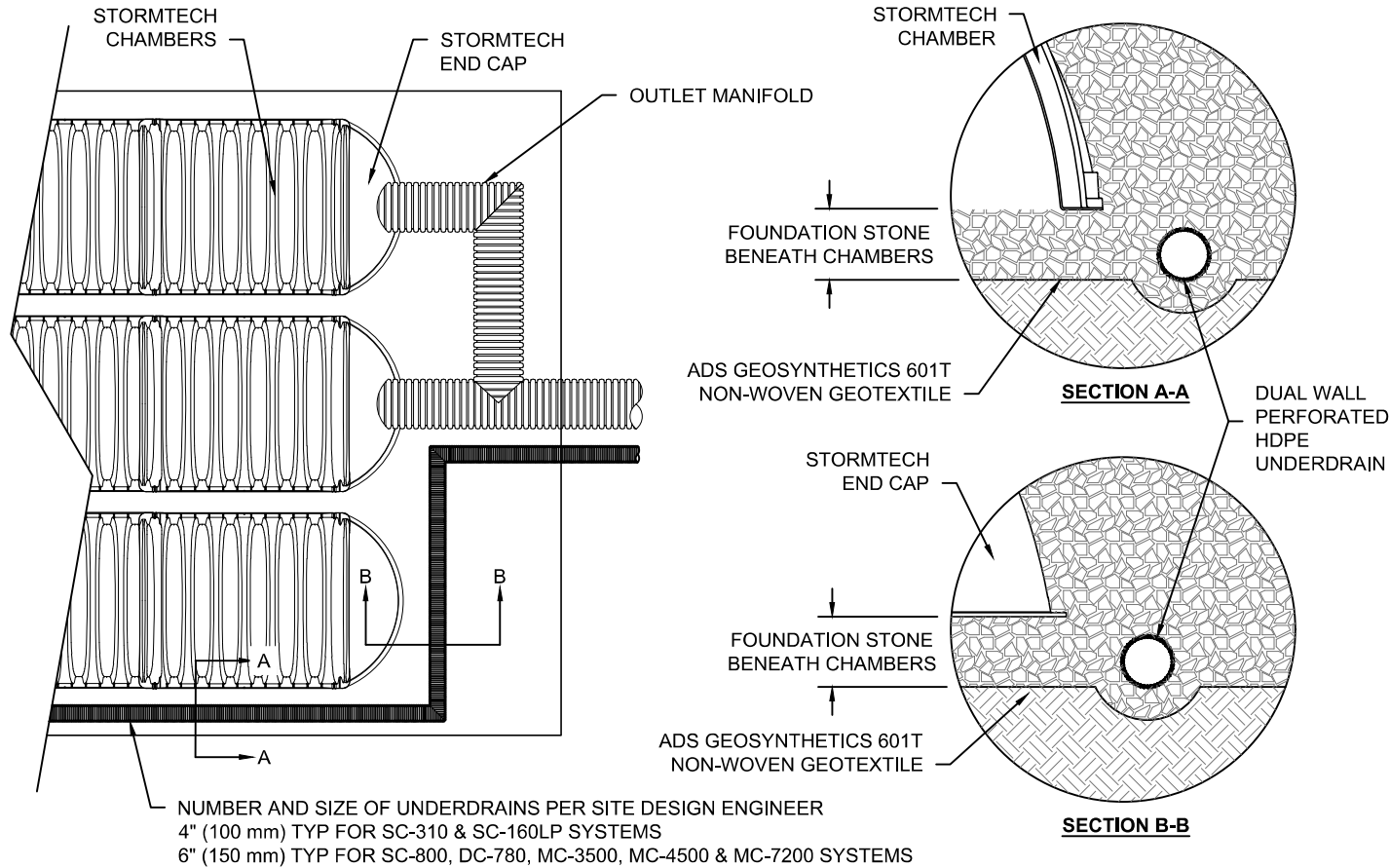
MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

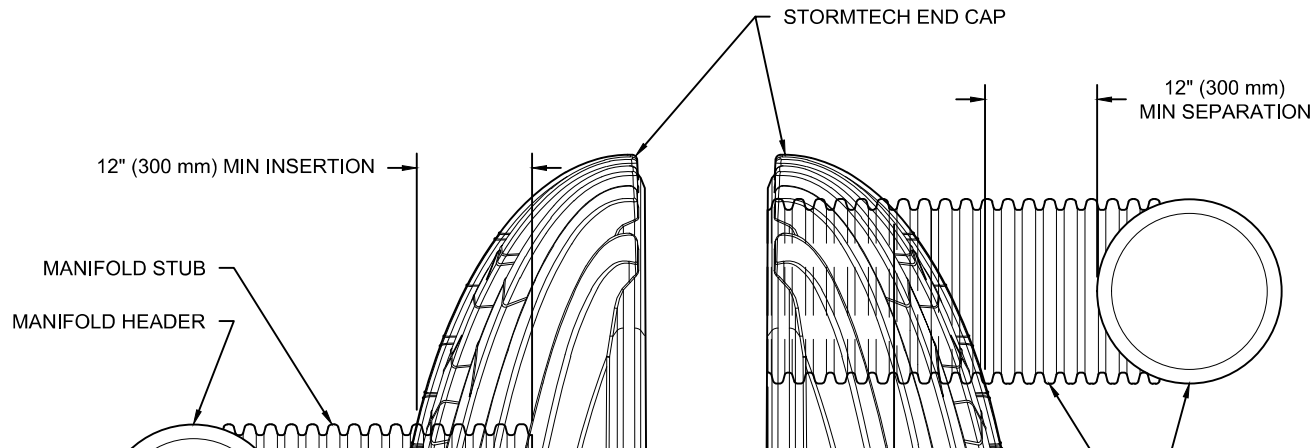
UNDERDRAIN DETAIL

NTS

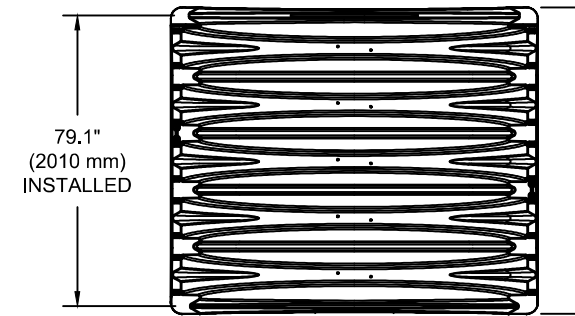
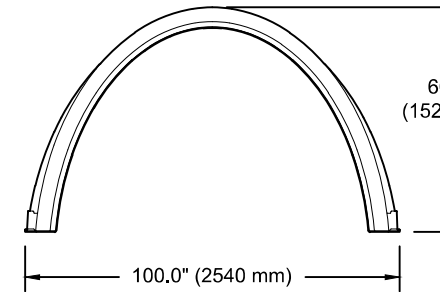


MC-SERIES END CAP INSERTION DETAIL

NTS



MC-7200 T



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 61.0" X 79.1"
CHAMBER STORAGE	175.9 CUBIC FT
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FT
WEIGHT (NOMINAL)	205 lbs.

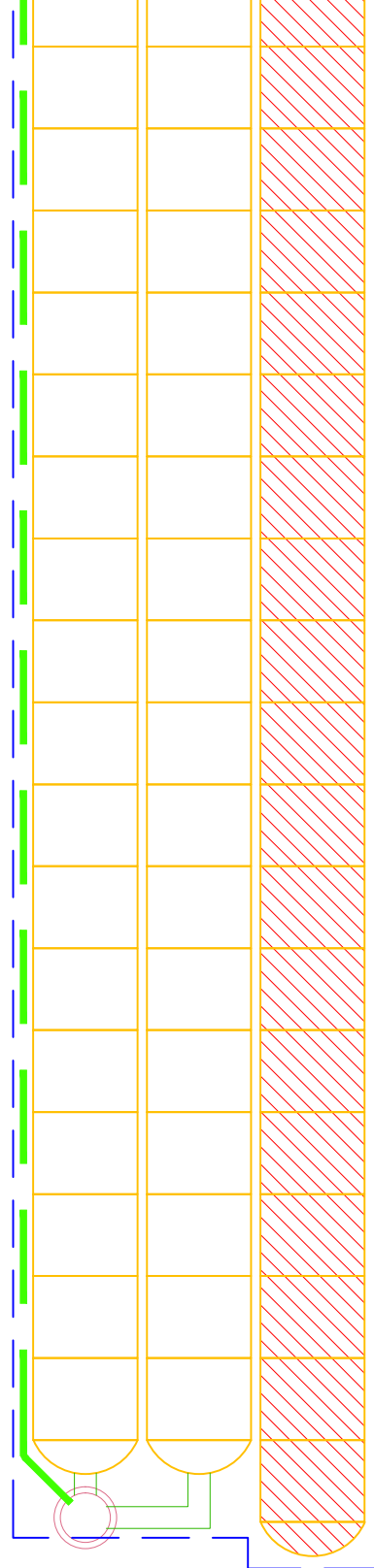
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 12.0"
END CAP STORAGE	39.5 CUBIC FT
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FT
WEIGHT (NOMINAL)	90 lbs.

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE BELOW
12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBER 10T, 10B, 12T, 12B
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBER 6T, 6B, 8T, 8B, 10T, 10B, 12T, 12B

PART #	STUB	WEIGHT (LBS)
MC4500IEPP06T	6" (150 mm)	42
MC4500IEPP06B		42
MC4500IEPP08T	8" (200 mm)	42
MC4500IEPP08B		42
MC4500IEPP10T	10" (250 mm)	39
MC4500IEPP10B		39
MC4500IEPP12T	12" (300 mm)	39
MC4500IEPP12B		39



Appendix J.I

BMP Analysis Stage-Storage-Outflow Information

Project: RCCD - PHASE I



Chamber Model -	MC-7200
Units -	Imperial
Number of Chambers -	73
Number of End Caps -	6
Void in the stone (porosity) -	40 %
Base of Stone Elevation -	0.00 ft
Amount of Stone Above Chambers -	12 in
Amount of Stone Below Chambers -	9 in
Area of system -	5097 sf Min. Area - 4574 sf min. area

StormTech MC-7200 Cumulative Storage Volumes

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Single End Cap (cubic feet)	Incremental Chambers (cubic feet)	Incremental End Cap (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch. EC and Stone (cubic feet)	Cumulative System (cubic feet)	Elevation (feet)
81	0.00	0.00	0.00	0.00	169.90	169.90	21608.77	6.75
80	0.00	0.00	0.00	0.00	169.90	169.90	21438.87	6.67
79	0.00	0.00	0.00	0.00	169.90	169.90	21268.97	6.58
78	0.00	0.00	0.00	0.00	169.90	169.90	21099.07	6.50
77	0.00	0.00	0.00	0.00	169.90	169.90	20929.17	6.42
76	0.00	0.00	0.00	0.00	169.90	169.90	20759.27	6.33
75	0.00	0.00	0.00	0.00	169.90	169.90	20589.37	6.25
74	0.00	0.00	0.00	0.00	169.90	169.90	20419.47	6.17
73	0.00	0.00	0.00	0.00	169.90	169.90	20249.57	6.08
72	0.00	0.00	0.00	0.00	169.90	169.90	20079.67	6.00
71	0.00	0.00	0.00	0.00	169.90	169.90	19909.77	5.92
70	0.00	0.00	0.00	0.00	169.90	169.90	19739.87	5.83
69	0.06	0.01	4.33	0.08	168.13	172.55	19569.97	5.75
68	0.19	0.03	13.88	0.20	164.27	178.35	19397.42	5.67
67	0.28	0.05	20.09	0.31	161.74	182.14	19219.07	5.58
66	0.36	0.07	26.08	0.40	159.31	185.79	19036.93	5.50
65	0.46	0.08	33.46	0.50	156.32	190.28	18851.14	5.42
64	0.74	0.11	54.14	0.63	147.99	202.76	18660.87	5.33
63	1.10	0.13	80.04	0.79	137.57	218.40	18458.10	5.25
62	1.32	0.16	95.25	0.97	131.01	228.23	18239.71	5.17
61	1.50	0.19	109.37	1.13	125.70	236.20	18011.48	5.08
60	1.65	0.22	120.78	1.31	121.06	243.15	17775.27	5.00
59	1.79	0.25	130.96	1.48	116.92	249.36	17532.12	4.92
58	1.92	0.28	140.13	1.65	113.19	254.97	17282.76	4.83
57	2.04	0.30	148.73	1.81	109.68	260.23	17027.78	4.75
56	2.15	0.33	156.61	1.97	106.47	265.04	16767.58	4.67
55	2.25	0.35	164.08	2.13	103.42	269.63	16502.51	4.58
54	2.34	0.38	171.05	2.30	100.56	273.91	16232.89	4.50
53	2.43	0.41	177.64	2.46	97.86	277.96	15958.98	4.42
52	2.52	0.44	183.89	2.65	95.29	281.82	15681.02	4.33
51	2.60	0.47	189.84	2.81	92.84	285.49	15399.20	4.25
50	2.68	0.50	195.52	2.97	90.50	289.00	15113.70	4.17
49	2.75	0.52	200.94	3.12	88.28	292.34	14824.71	4.08
48	2.82	0.54	206.11	3.27	86.15	295.53	14532.37	4.00
47	2.89	0.57	211.07	3.40	84.11	298.58	14236.84	3.92
46	2.96	0.59	215.81	3.53	82.16	301.51	13938.26	3.83
45	3.02	0.61	220.37	3.66	80.29	304.32	13636.75	3.75
44	3.08	0.63	224.74	3.79	78.49	307.02	13332.43	3.67
43	3.14	0.64	228.95	3.86	76.78	309.58	13025.41	3.58
42	3.19	0.68	233.00	4.06	75.07	312.14	12715.83	3.50
41	3.25	0.70	236.89	4.20	73.47	314.55	12403.69	3.42
40	3.30	0.72	240.63	4.33	71.91	316.88	12089.14	3.33
39	3.35	0.74	244.23	4.46	70.42	319.12	11772.26	3.25
38	3.39	0.76	247.70	4.59	68.99	321.27	11453.15	3.17
37	3.44	0.79	251.04	4.71	67.60	323.35	11131.88	3.08
36	3.48	0.80	254.25	4.82	66.27	325.34	10808.53	3.00
35	3.53	0.82	257.35	4.92	64.99	327.26	10483.19	2.92
34	3.57	0.84	260.33	5.03	63.76	329.12	10155.92	2.83
33	3.61	0.85	263.21	5.11	62.57	330.89	9826.61	2.75
32	3.64	0.86	265.97	5.16	61.45	332.58	9495.92	2.67
31	3.68	0.89	268.64	5.34	60.31	334.28	9163.34	2.58
30	3.71	0.90	271.19	5.43	59.25	335.87	8829.06	2.50
29	3.75	0.92	273.65	5.50	58.24	337.39	8493.18	2.42
28	3.78	0.92	276.01	5.52	57.29	338.82	8155.79	2.33
27	3.81	0.94	278.28	5.66	56.32	340.26	7818.97	2.25
26	3.84	0.96	280.44	5.74	55.43	341.61	7476.71	2.17
25	3.87	0.97	282.52	5.81	54.57	342.90	7135.10	2.08
24	3.90	0.98	284.51	5.89	53.74	344.14	6792.20	2.00
23	3.92	0.97	286.41	5.83	53.00	345.24	6448.06	1.92
22	3.95	1.00	288.22	6.02	52.20	346.45	6102.81	1.83
21	3.97	1.01	289.95	6.07	51.49	347.51	5756.37	1.75
20	3.99	1.02	291.60	6.12	50.81	348.53	5408.86	1.67
19	4.02	1.03	293.16	6.18	50.16	349.51	5060.32	1.58
18	4.04	1.04	294.64	6.23	49.55	350.43	4710.82	1.50
17	4.06	1.05	296.05	6.28	48.97	351.29	4360.39	1.42
16	4.07	1.05	297.37	6.32	48.42	352.12	4009.10	1.33
15	4.09	1.05	298.61	6.30	47.94	352.85	3656.98	1.25
14	4.11	1.06	299.79	6.34	47.45	353.58	3304.13	1.17
13	4.12	1.08	300.91	6.45	46.95	354.32	2950.58	1.08
12	4.14	1.08	301.97	6.50	46.51	354.98	2596.24	1.00
11	4.15	1.09	302.95	6.53	46.11	355.59	2241.26	0.92
10	4.17	1.11	304.48	6.64	45.45	356.57	1885.67	0.83
9	0.00	0.00	0.00	0.00	169.90	169.90	1529.10	0.75
8	0.00	0.00	0.00	0.00	169.90	169.90	1359.20	0.67
7	0.00	0.00	0.00	0.00	169.90	169.90	1189.30	0.58
6	0.00	0.00	0.00	0.00	169.90	169.90	1019.40	0.50
5	0.00	0.00	0.00	0.00	169.90	169.90	849.50	0.42
4	0.00	0.00	0.00	0.00	169.90	169.90	679.60	0.33
3	0.00	0.00	0.00	0.00	169.90	169.90	509.70	0.25
2	0.00	0.00	0.00	0.00	169.90	169.90	339.80	0.17
1	0.00	0.00	0.00	0.00	169.90	169.90	169.90	0.08

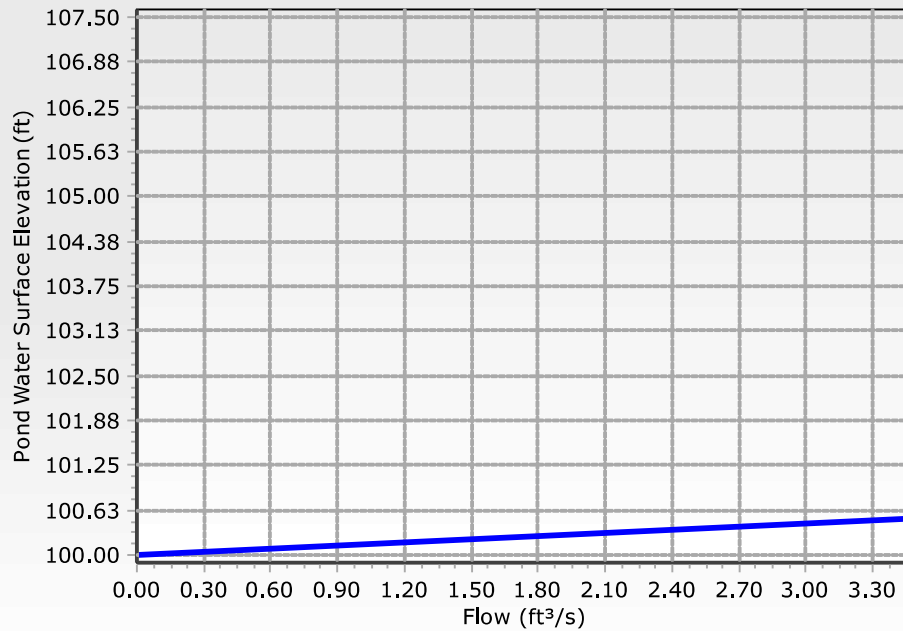
Composite Outlet Structure Detailed Report: Outlet Structure

Element Details			
Label	Outlet Structure	Notes	
Headwater Range			
Headwater Type	Use Pond for Headwater Range	Maximum (Headwater)	106.75 ft
Pond Minimum (Headwater)	Basin 1 100.00 ft	Increment (Headwater)	0.50 ft
SpotElevation (ft)			
Tailwater Setup			
Tailwater Type	Free Outfall		
Tailwater Tolerances			
Maximum Iterations	30	Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft	Flow Tolerance (Minimum)	0.001 ft³/s
Headwater Tolerance (Maximum)	0.50 ft	Flow Tolerance (Maximum)	10.000 ft³/s
Tailwater Tolerance (Minimum)	0.01 ft		
Outlet Structure			
Outlet Structure Type	User Defined Rating Table		
Outlet Structure (IDs and Direction)			
Outlet ID	Pump	Downstream ID	Tailwater
Flow Direction	Forward Flow Only	Notes	
Outlet Structure (Advanced)			
Elevation (On)	0.00 ft	Elevation (Off)	0.00 ft
Outlet Structure (Common)			
Elevation	0.00 ft		

User Defined Rating Curve

Elevation (ft)	Flow (ft ³ /s)
100.00	0.00
100.50	3.48
106.75	3.48

Composite Outlet Structure Detailed Report: Outlet Structure



RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Pump (User Defined Table)

Upstream ID = (Pond Water Surface)

Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
100.00	0.00	(N/A)	0.00
100.50	3.48	(N/A)	0.00
101.00	3.48	(N/A)	0.00
101.50	3.48	(N/A)	0.00
102.00	3.48	(N/A)	0.00
102.50	3.48	(N/A)	0.00
103.00	3.48	(N/A)	0.00
103.50	3.48	(N/A)	0.00
104.00	3.48	(N/A)	0.00
104.50	3.48	(N/A)	0.00
105.00	3.48	(N/A)	0.00
105.50	3.48	(N/A)	0.00
106.00	3.48	(N/A)	0.00
106.50	3.48	(N/A)	0.00
106.75	3.48	(N/A)	0.00

Computation Messages

Composite Outlet Structure Detailed Report: Outlet Structure

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Pump (User Defined Table)

Upstream ID = (Pond Water Surface)

Downstream ID = Tailwater (Pond Outfall)

Computation Messages

Interpolated from input
table

Interpolated from input
table

Interpolated from input
table

Interpolated from input
table

Interpolated from input
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Composite Outlet Structure Detailed Report: Outlet Structure

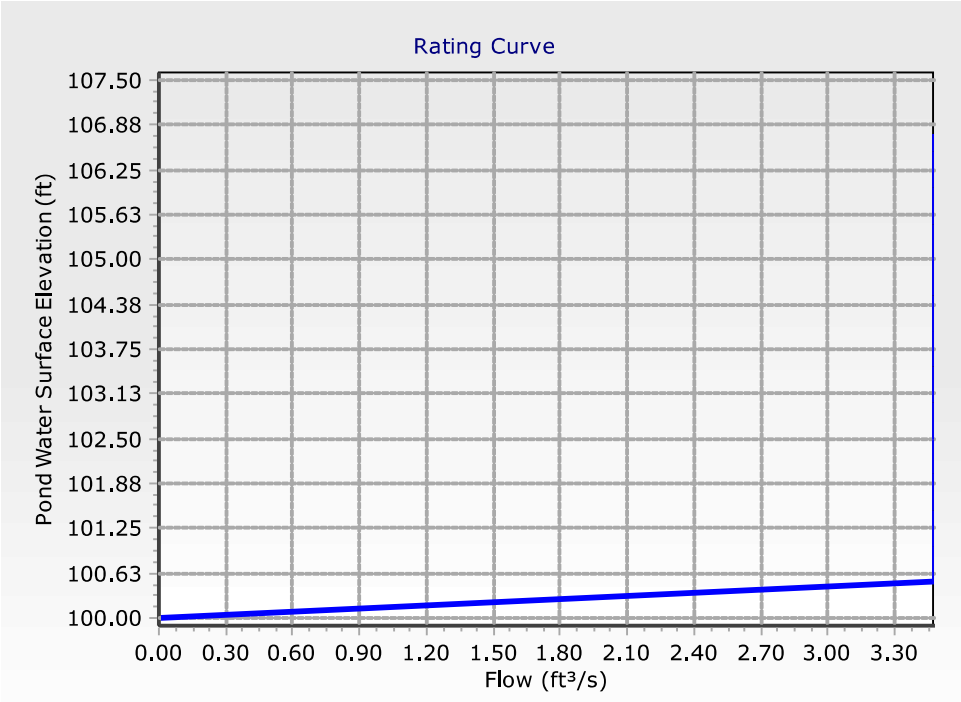
Composite Rating Table
Tailwater Elevation = Free Outfall (Outlet Structure)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
100.00	0.00	(N/A)	0.00
100.50	3.48	(N/A)	0.00
101.00	3.48	(N/A)	0.00
101.50	3.48	(N/A)	0.00
102.00	3.48	(N/A)	0.00
102.50	3.48	(N/A)	0.00
103.00	3.48	(N/A)	0.00
103.50	3.48	(N/A)	0.00
104.00	3.48	(N/A)	0.00
104.50	3.48	(N/A)	0.00
105.00	3.48	(N/A)	0.00
105.50	3.48	(N/A)	0.00
106.00	3.48	(N/A)	0.00
106.50	3.48	(N/A)	0.00
106.75	3.48	(N/A)	0.00

Contributing Structures

Pump
Pump
Pump
Pump
Pump
Pump
Pump
Pump
Pump
Pump
Pump
Pump
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Pump
Pump
Pump

Composite Outlet Structure Detailed Report: Outlet Structure



Appendix J.II

BMP Analysis 2-Year, 24-Hour Storm

Graph Data Table - 2-Yr, 24-Hr

Time (min)	2-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Volume - Basin 1 (ft ³)	2-Yr, 24-Hr - Elevation - Basin 1 (ft)
0.000	0.00	0.00	0.000	100.00
5.000	0.05	0.02	5.000	100.00
10.000	0.09	0.05	16.000	100.01
15.000	0.10	0.08	25.000	100.01
20.000	0.12	0.10	31.000	100.01
25.000	0.14	0.12	37.000	100.02
30.000	0.15	0.14	42.000	100.02
35.000	0.15	0.15	45.000	100.02
40.000	0.15	0.15	45.000	100.02
45.000	0.15	0.15	46.000	100.02
50.000	0.17	0.16	48.000	100.02
55.000	0.19	0.17	53.000	100.02
60.000	0.20	0.19	57.000	100.03
65.000	0.17	0.19	57.000	100.03
70.000	0.15	0.17	51.000	100.02
75.000	0.15	0.16	48.000	100.02
80.000	0.15	0.15	46.000	100.02
85.000	0.15	0.15	46.000	100.02
90.000	0.15	0.15	46.000	100.02
95.000	0.15	0.15	46.000	100.02
100.000	0.15	0.15	46.000	100.02
105.000	0.15	0.15	46.000	100.02
110.000	0.17	0.16	48.000	100.02
115.000	0.19	0.17	53.000	100.02
120.000	0.20	0.19	57.000	100.03
125.000	0.20	0.20	60.000	100.03
130.000	0.20	0.20	61.000	100.03
135.000	0.20	0.20	61.000	100.03
140.000	0.20	0.20	61.000	100.03
145.000	0.20	0.20	61.000	100.03
150.000	0.20	0.20	61.000	100.03
155.000	0.22	0.21	63.000	100.03
160.000	0.24	0.22	68.000	100.03
165.000	0.25	0.24	73.000	100.03
170.000	0.25	0.25	75.000	100.04
175.000	0.25	0.25	76.000	100.04
180.000	0.25	0.25	76.000	100.04
185.000	0.25	0.25	76.000	100.04
190.000	0.25	0.25	76.000	100.04
195.000	0.25	0.25	76.000	100.04
200.000	0.25	0.25	76.000	100.04
205.000	0.25	0.25	76.000	100.04
210.000	0.25	0.25	76.000	100.04
215.000	0.25	0.25	76.000	100.04
220.000	0.25	0.25	76.000	100.04
225.000	0.25	0.25	76.000	100.04
230.000	0.27	0.26	78.000	100.04

Graph Data Table - 2-Yr, 24-Hr

Time (min)	2-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Volume - Basin 1 (ft ³)	2-Yr, 24-Hr - Elevation - Basin 1 (ft)
235.000	0.29	0.27	83.000	100.04
240.000	0.29	0.28	87.000	100.04
245.000	0.30	0.29	89.000	100.04
250.000	0.30	0.30	91.000	100.04
255.000	0.30	0.30	91.000	100.04
260.000	0.32	0.31	94.000	100.04
265.000	0.34	0.32	98.000	100.05
270.000	0.34	0.33	102.000	100.05
275.000	0.35	0.34	104.000	100.05
280.000	0.35	0.35	106.000	100.05
285.000	0.35	0.35	107.000	100.05
290.000	0.37	0.36	109.000	100.05
295.000	0.39	0.37	114.000	100.05
300.000	0.39	0.38	117.000	100.06
305.000	0.35	0.37	114.000	100.05
310.000	0.31	0.34	105.000	100.05
315.000	0.30	0.32	97.000	100.05
320.000	0.32	0.31	95.000	100.04
325.000	0.34	0.32	99.000	100.05
330.000	0.34	0.33	102.000	100.05
335.000	0.37	0.35	106.000	100.05
340.000	0.39	0.37	113.000	100.05
345.000	0.39	0.38	117.000	100.06
350.000	0.39	0.39	118.000	100.06
355.000	0.39	0.39	119.000	100.06
360.000	0.39	0.39	119.000	100.06
365.000	0.42	0.40	122.000	100.06
370.000	0.44	0.42	128.000	100.06
375.000	0.44	0.43	132.000	100.06
380.000	0.44	0.44	134.000	100.06
385.000	0.44	0.44	134.000	100.06
390.000	0.44	0.44	134.000	100.06
395.000	0.47	0.45	137.000	100.06
400.000	0.49	0.47	144.000	100.07
405.000	0.49	0.48	148.000	100.07
410.000	0.49	0.49	149.000	100.07
415.000	0.49	0.49	149.000	100.07
420.000	0.49	0.49	149.000	100.07
425.000	0.49	0.49	149.000	100.07
430.000	0.49	0.49	150.000	100.07
435.000	0.49	0.49	150.000	100.07
440.000	0.52	0.50	153.000	100.07
445.000	0.54	0.52	159.000	100.07
450.000	0.54	0.53	163.000	100.08
455.000	0.57	0.55	167.000	100.08
460.000	0.59	0.57	173.000	100.08
465.000	0.59	0.58	177.000	100.08

Graph Data Table - 2-Yr, 24-Hr

Time (min)	2-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Volume - Basin 1 (ft ³)	2-Yr, 24-Hr - Elevation - Basin 1 (ft)
470.000	0.62	0.60	181.000	100.09
475.000	0.64	0.62	187.000	100.09
480.000	0.64	0.63	191.000	100.09
485.000	0.69	0.65	196.000	100.09
490.000	0.73	0.69	207.000	100.10
495.000	0.74	0.72	214.000	100.10
500.000	0.74	0.73	218.000	100.11
505.000	0.74	0.74	219.000	100.11
510.000	0.74	0.74	219.000	100.11
515.000	0.76	0.75	221.000	100.11
520.000	0.78	0.76	226.000	100.11
525.000	0.79	0.78	230.000	100.11
530.000	0.81	0.79	234.000	100.11
535.000	0.83	0.81	239.000	100.12
540.000	0.84	0.83	243.000	100.12
545.000	0.88	0.85	249.000	100.12
550.000	0.93	0.89	259.000	100.13
555.000	0.93	0.92	267.000	100.13
560.000	0.96	0.94	273.000	100.13
565.000	0.98	0.96	279.000	100.14
570.000	0.99	0.98	284.000	100.14
575.000	1.01	0.99	288.000	100.14
580.000	1.03	1.01	293.000	100.15
585.000	1.03	1.02	297.000	100.15
590.000	1.06	1.04	300.000	100.15
595.000	1.08	1.06	306.000	100.15
600.000	1.08	1.07	310.000	100.15
605.000	0.93	1.03	297.000	100.15
610.000	0.78	0.91	266.000	100.13
615.000	0.75	0.81	239.000	100.12
620.000	0.74	0.77	227.000	100.11
625.000	0.74	0.75	222.000	100.11
630.000	0.74	0.74	220.000	100.11
635.000	0.85	0.78	230.000	100.11
640.000	0.96	0.86	253.000	100.12
645.000	0.98	0.94	273.000	100.13
650.000	0.99	0.97	282.000	100.14
655.000	0.99	0.98	286.000	100.14
660.000	0.99	0.99	287.000	100.14
665.000	0.96	0.98	284.000	100.14
670.000	0.94	0.96	279.000	100.14
675.000	0.94	0.95	276.000	100.14
680.000	0.94	0.94	274.000	100.14
685.000	0.94	0.94	274.000	100.14
690.000	0.94	0.94	274.000	100.14
695.000	0.89	0.92	269.000	100.13
700.000	0.85	0.89	260.000	100.13

Graph Data Table - 2-Yr, 24-Hr

Time (min)	2-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Volume - Basin 1 (ft ³)	2-Yr, 24-Hr - Elevation - Basin 1 (ft)
705.000	0.84	0.86	252.000	100.12
710.000	0.86	0.85	250.000	100.12
715.000	0.88	0.86	253.000	100.12
720.000	0.89	0.88	257.000	100.13
725.000	1.05	0.94	274.000	100.14
730.000	1.19	1.06	307.000	100.15
735.000	1.22	1.16	333.000	100.17
740.000	1.26	1.21	349.000	100.17
745.000	1.28	1.25	361.000	100.18
750.000	1.28	1.27	367.000	100.18
755.000	1.33	1.29	374.000	100.19
760.000	1.37	1.33	385.000	100.19
765.000	1.38	1.36	394.000	100.20
770.000	1.40	1.38	400.000	100.20
775.000	1.43	1.40	407.000	100.20
780.000	1.43	1.42	413.000	100.20
785.000	1.54	1.46	426.000	100.21
790.000	1.65	1.55	453.000	100.22
795.000	1.67	1.63	475.000	100.23
800.000	1.68	1.66	485.000	100.24
805.000	1.68	1.67	489.000	100.24
810.000	1.68	1.68	491.000	100.24
815.000	1.43	1.59	465.000	100.23
820.000	1.20	1.41	408.000	100.20
825.000	1.15	1.25	360.000	100.18
830.000	1.14	1.18	339.000	100.17
835.000	1.14	1.15	331.000	100.17
840.000	1.14	1.14	329.000	100.16
845.000	1.23	1.17	337.000	100.17
850.000	1.31	1.24	357.000	100.18
855.000	1.33	1.29	374.000	100.19
860.000	1.31	1.31	379.000	100.19
865.000	1.29	1.30	377.000	100.19
870.000	1.29	1.29	374.000	100.19
875.000	1.28	1.29	372.000	100.19
880.000	1.28	1.28	370.000	100.18
885.000	1.28	1.28	370.000	100.18
890.000	1.26	1.27	367.000	100.18
895.000	1.24	1.26	363.000	100.18
900.000	1.24	1.25	359.000	100.18
905.000	1.21	1.23	355.000	100.18
910.000	1.19	1.21	348.000	100.17
915.000	1.19	1.20	344.000	100.17
920.000	1.16	1.18	339.000	100.17
925.000	1.14	1.16	334.000	100.17
930.000	1.14	1.15	330.000	100.16
935.000	1.04	1.11	319.000	100.16

Graph Data Table - 2-Yr, 24-Hr

Time (min)	2-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Volume - Basin 1 (ft ³)	2-Yr, 24-Hr - Elevation - Basin 1 (ft)
940.000	0.96	1.03	300.000	100.15
945.000	0.94	0.98	284.000	100.14
950.000	0.94	0.95	277.000	100.14
955.000	0.94	0.94	275.000	100.14
960.000	0.94	0.94	274.000	100.14
965.000	0.60	0.83	243.000	100.12
970.000	0.28	0.56	172.000	100.08
975.000	0.22	0.35	107.000	100.05
980.000	0.20	0.26	78.000	100.04
985.000	0.20	0.22	67.000	100.03
990.000	0.20	0.21	63.000	100.03
995.000	0.17	0.19	58.000	100.03
1,000.000	0.15	0.17	52.000	100.02
1,005.000	0.15	0.16	48.000	100.02
1,010.000	0.15	0.15	46.000	100.02
1,015.000	0.15	0.15	46.000	100.02
1,020.000	0.15	0.15	46.000	100.02
1,025.000	0.19	0.16	50.000	100.02
1,030.000	0.24	0.20	61.000	100.03
1,035.000	0.24	0.23	69.000	100.03
1,040.000	0.25	0.24	73.000	100.03
1,045.000	0.25	0.25	75.000	100.04
1,050.000	0.25	0.25	76.000	100.04
1,055.000	0.25	0.25	76.000	100.04
1,060.000	0.25	0.25	76.000	100.04
1,065.000	0.25	0.25	76.000	100.04
1,070.000	0.22	0.24	73.000	100.03
1,075.000	0.20	0.22	67.000	100.03
1,080.000	0.20	0.21	63.000	100.03
1,085.000	0.20	0.20	62.000	100.03
1,090.000	0.20	0.20	61.000	100.03
1,095.000	0.20	0.20	61.000	100.03
1,100.000	0.20	0.20	61.000	100.03
1,105.000	0.20	0.20	61.000	100.03
1,110.000	0.20	0.20	61.000	100.03
1,115.000	0.17	0.19	58.000	100.03
1,120.000	0.15	0.17	52.000	100.02
1,125.000	0.15	0.16	48.000	100.02
1,130.000	0.13	0.15	44.000	100.02
1,135.000	0.10	0.12	38.000	100.02
1,140.000	0.10	0.11	33.000	100.02
1,145.000	0.12	0.11	33.000	100.02
1,150.000	0.14	0.12	38.000	100.02
1,155.000	0.15	0.14	42.000	100.02
1,160.000	0.17	0.15	47.000	100.02
1,165.000	0.19	0.17	52.000	100.02
1,170.000	0.20	0.19	57.000	100.03

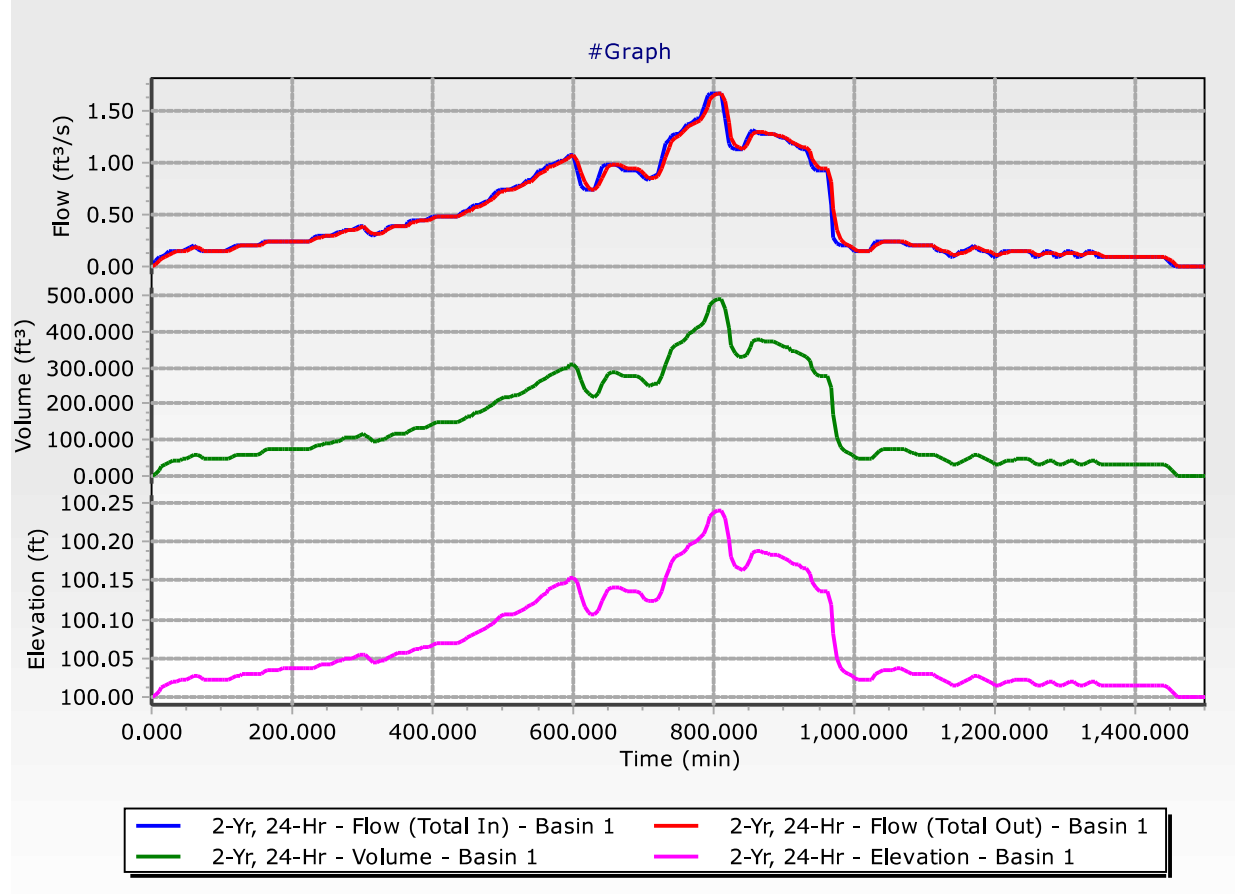
Graph Data Table - 2-Yr, 24-Hr

Time (min)	2-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Volume - Basin 1 (ft ³)	2-Yr, 24-Hr - Elevation - Basin 1 (ft)
1,175.000	0.17	0.19	57.000	100.03
1,180.000	0.15	0.17	51.000	100.02
1,185.000	0.15	0.16	48.000	100.02
1,190.000	0.13	0.15	44.000	100.02
1,195.000	0.10	0.12	38.000	100.02
1,200.000	0.10	0.11	33.000	100.02
1,205.000	0.12	0.11	33.000	100.02
1,210.000	0.14	0.12	38.000	100.02
1,215.000	0.15	0.14	42.000	100.02
1,220.000	0.15	0.15	45.000	100.02
1,225.000	0.15	0.15	45.000	100.02
1,230.000	0.15	0.15	46.000	100.02
1,235.000	0.15	0.15	46.000	100.02
1,240.000	0.15	0.15	46.000	100.02
1,245.000	0.15	0.15	46.000	100.02
1,250.000	0.13	0.14	44.000	100.02
1,255.000	0.10	0.12	38.000	100.02
1,260.000	0.10	0.11	33.000	100.02
1,265.000	0.12	0.11	33.000	100.02
1,270.000	0.14	0.12	38.000	100.02
1,275.000	0.15	0.14	42.000	100.02
1,280.000	0.13	0.14	43.000	100.02
1,285.000	0.10	0.12	37.000	100.02
1,290.000	0.10	0.11	33.000	100.02
1,295.000	0.12	0.11	33.000	100.02
1,300.000	0.14	0.12	38.000	100.02
1,305.000	0.15	0.14	42.000	100.02
1,310.000	0.13	0.14	43.000	100.02
1,315.000	0.10	0.12	37.000	100.02
1,320.000	0.10	0.11	33.000	100.02
1,325.000	0.12	0.11	33.000	100.02
1,330.000	0.14	0.12	38.000	100.02
1,335.000	0.15	0.14	42.000	100.02
1,340.000	0.13	0.14	43.000	100.02
1,345.000	0.10	0.12	37.000	100.02
1,350.000	0.10	0.11	33.000	100.02
1,355.000	0.10	0.10	31.000	100.01
1,360.000	0.10	0.10	31.000	100.01
1,365.000	0.10	0.10	31.000	100.01
1,370.000	0.10	0.10	31.000	100.01
1,375.000	0.10	0.10	31.000	100.01
1,380.000	0.10	0.10	31.000	100.01
1,385.000	0.10	0.10	31.000	100.01
1,390.000	0.10	0.10	31.000	100.01
1,395.000	0.10	0.10	31.000	100.01
1,400.000	0.10	0.10	31.000	100.01
1,405.000	0.10	0.10	31.000	100.01

Graph Data Table - 2-Yr, 24-Hr

Time (min)	2-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	2-Yr, 24-Hr - Volume - Basin 1 (ft ³)	2-Yr, 24-Hr - Elevation - Basin 1 (ft)
1,410.000	0.10	0.10	31.000	100.01
1,415.000	0.10	0.10	31.000	100.01
1,420.000	0.10	0.10	31.000	100.01
1,425.000	0.10	0.10	31.000	100.01
1,430.000	0.10	0.10	31.000	100.01
1,435.000	0.10	0.10	31.000	100.01
1,440.000	0.10	0.10	31.000	100.01
1,445.000	0.05	0.08	25.000	100.01
1,450.000	0.01	0.05	14.000	100.01
1,455.000	0.00	0.02	6.000	100.00
1,460.000	0.00	0.01	2.000	100.00
1,465.000	0.00	0.00	1.000	100.00
1,470.000	0.00	0.00	0.000	100.00
1,475.000	0.00	0.00	0.000	100.00
1,480.000	0.00	0.00	0.000	100.00
1,485.000	0.00	0.00	0.000	100.00
1,490.000	0.00	0.00	0.000	100.00
1,495.000	0.00	0.00	0.000	100.00
1,500.000	0.00	0.00	0.000	100.00

Graph Data Table - 2-Yr, 24-Hr



Appendix J.III

BMP Analysis 10-Year, 24-Hour Storm

Graph Data Table - 10-Yr, 24-Hr

Time (min)	10-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Volume - Basin 1 (ft ³)	10-Yr, 24-Hr - Elevation - Basin 1 (ft)
0.000	0.00	0.00	0.000	100.00
5.000	0.07	0.02	7.000	100.00
10.000	0.14	0.08	24.000	100.01
15.000	0.15	0.12	38.000	100.02
20.000	0.19	0.16	47.000	100.02
25.000	0.22	0.19	58.000	100.03
30.000	0.23	0.21	65.000	100.03
35.000	0.23	0.22	69.000	100.03
40.000	0.23	0.23	70.000	100.03
45.000	0.23	0.23	70.000	100.03
50.000	0.27	0.24	74.000	100.03
55.000	0.30	0.27	83.000	100.04
60.000	0.31	0.29	90.000	100.04
65.000	0.28	0.29	90.000	100.04
70.000	0.24	0.27	83.000	100.04
75.000	0.24	0.25	76.000	100.04
80.000	0.23	0.24	73.000	100.03
85.000	0.23	0.23	71.000	100.03
90.000	0.23	0.23	70.000	100.03
95.000	0.23	0.23	70.000	100.03
100.000	0.23	0.23	70.000	100.03
105.000	0.23	0.23	70.000	100.03
110.000	0.27	0.24	74.000	100.03
115.000	0.30	0.27	83.000	100.04
120.000	0.31	0.29	90.000	100.04
125.000	0.31	0.30	93.000	100.04
130.000	0.31	0.31	94.000	100.04
135.000	0.31	0.31	94.000	100.04
140.000	0.31	0.31	95.000	100.04
145.000	0.31	0.31	95.000	100.04
150.000	0.31	0.31	95.000	100.04
155.000	0.35	0.32	99.000	100.05
160.000	0.38	0.35	107.000	100.05
165.000	0.39	0.37	114.000	100.05
170.000	0.39	0.38	117.000	100.06
175.000	0.39	0.39	119.000	100.06
180.000	0.39	0.39	119.000	100.06
185.000	0.39	0.39	119.000	100.06
190.000	0.39	0.39	119.000	100.06
195.000	0.39	0.39	119.000	100.06
200.000	0.39	0.39	119.000	100.06
205.000	0.39	0.39	119.000	100.06
210.000	0.39	0.39	119.000	100.06
215.000	0.39	0.39	119.000	100.06
220.000	0.39	0.39	119.000	100.06
225.000	0.39	0.39	119.000	100.06
230.000	0.42	0.40	122.000	100.06

Graph Data Table - 10-Yr, 24-Hr

Time (min)	10-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Volume - Basin 1 (ft ³)	10-Yr, 24-Hr - Elevation - Basin 1 (ft)
235.000	0.46	0.43	130.000	100.06
240.000	0.46	0.45	137.000	100.06
245.000	0.47	0.46	140.000	100.07
250.000	0.47	0.47	142.000	100.07
255.000	0.47	0.47	143.000	100.07
260.000	0.50	0.48	146.000	100.07
265.000	0.54	0.51	155.000	100.07
270.000	0.54	0.53	162.000	100.08
275.000	0.54	0.54	164.000	100.08
280.000	0.54	0.54	164.000	100.08
285.000	0.54	0.54	165.000	100.08
290.000	0.58	0.55	169.000	100.08
295.000	0.61	0.58	177.000	100.08
300.000	0.62	0.60	183.000	100.09
305.000	0.55	0.59	179.000	100.08
310.000	0.48	0.54	165.000	100.08
315.000	0.47	0.50	151.000	100.07
320.000	0.50	0.49	149.000	100.07
325.000	0.54	0.51	156.000	100.07
330.000	0.54	0.53	162.000	100.08
335.000	0.58	0.55	168.000	100.08
340.000	0.61	0.58	176.000	100.08
345.000	0.62	0.60	183.000	100.09
350.000	0.62	0.61	186.000	100.09
355.000	0.62	0.62	187.000	100.09
360.000	0.62	0.62	187.000	100.09
365.000	0.66	0.63	191.000	100.09
370.000	0.69	0.66	198.000	100.10
375.000	0.70	0.68	204.000	100.10
380.000	0.70	0.69	207.000	100.10
385.000	0.70	0.70	208.000	100.10
390.000	0.70	0.70	209.000	100.10
395.000	0.74	0.71	212.000	100.10
400.000	0.77	0.74	220.000	100.11
405.000	0.77	0.76	225.000	100.11
410.000	0.78	0.77	228.000	100.11
415.000	0.78	0.78	230.000	100.11
420.000	0.78	0.78	230.000	100.11
425.000	0.78	0.78	230.000	100.11
430.000	0.78	0.78	230.000	100.11
435.000	0.78	0.78	230.000	100.11
440.000	0.81	0.79	233.000	100.11
445.000	0.85	0.82	241.000	100.12
450.000	0.85	0.84	247.000	100.12
455.000	0.89	0.86	252.000	100.12
460.000	0.92	0.89	260.000	100.13
465.000	0.93	0.91	267.000	100.13

Graph Data Table - 10-Yr, 24-Hr

Time (min)	10-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Volume - Basin 1 (ft ³)	10-Yr, 24-Hr - Elevation - Basin 1 (ft)
470.000	0.97	0.94	273.000	100.13
475.000	1.00	0.97	282.000	100.14
480.000	1.01	0.99	288.000	100.14
485.000	1.08	1.03	298.000	100.15
490.000	1.15	1.09	314.000	100.16
495.000	1.16	1.13	326.000	100.16
500.000	1.17	1.15	332.000	100.17
505.000	1.17	1.17	335.000	100.17
510.000	1.17	1.17	336.000	100.17
515.000	1.20	1.18	339.000	100.17
520.000	1.23	1.20	346.000	100.17
525.000	1.24	1.22	353.000	100.18
530.000	1.28	1.25	360.000	100.18
535.000	1.31	1.28	369.000	100.18
540.000	1.32	1.30	377.000	100.19
545.000	1.39	1.34	387.000	100.19
550.000	1.46	1.40	405.000	100.20
555.000	1.47	1.44	419.000	100.21
560.000	1.51	1.47	429.000	100.21
565.000	1.55	1.51	440.000	100.22
570.000	1.55	1.54	448.000	100.22
575.000	1.59	1.56	455.000	100.22
580.000	1.62	1.59	464.000	100.23
585.000	1.63	1.61	471.000	100.23
590.000	1.67	1.64	479.000	100.24
595.000	1.70	1.67	488.000	100.24
600.000	1.71	1.69	496.000	100.24
605.000	1.46	1.62	473.000	100.23
610.000	1.23	1.43	416.000	100.21
615.000	1.19	1.28	370.000	100.18
620.000	1.17	1.21	349.000	100.17
625.000	1.17	1.18	340.000	100.17
630.000	1.17	1.17	337.000	100.17
635.000	1.35	1.23	355.000	100.18
640.000	1.51	1.37	396.000	100.20
645.000	1.54	1.47	428.000	100.21
650.000	1.56	1.53	444.000	100.22
655.000	1.56	1.55	451.000	100.22
660.000	1.56	1.56	454.000	100.22
665.000	1.52	1.55	450.000	100.22
670.000	1.49	1.52	442.000	100.22
675.000	1.48	1.50	435.000	100.21
680.000	1.48	1.49	432.000	100.21
685.000	1.48	1.48	431.000	100.21
690.000	1.48	1.48	431.000	100.21
695.000	1.41	1.46	423.000	100.21
700.000	1.34	1.40	406.000	100.20

Graph Data Table - 10-Yr, 24-Hr

Time (min)	10-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Volume - Basin 1 (ft ³)	10-Yr, 24-Hr - Elevation - Basin 1 (ft)
705.000	1.33	1.36	393.000	100.19
710.000	1.36	1.35	390.000	100.19
715.000	1.39	1.37	396.000	100.20
720.000	1.40	1.39	402.000	100.20
725.000	1.65	1.48	430.000	100.21
730.000	1.88	1.67	489.000	100.24
735.000	1.92	1.83	536.000	100.26
740.000	1.98	1.91	562.000	100.27
745.000	2.01	1.97	579.000	100.28
750.000	2.02	2.00	589.000	100.29
755.000	2.09	2.04	600.000	100.29
760.000	2.16	2.10	619.000	100.30
765.000	2.17	2.14	633.000	100.31
770.000	2.21	2.17	642.000	100.31
775.000	2.25	2.21	654.000	100.32
780.000	2.25	2.24	662.000	100.32
785.000	2.43	2.31	682.000	100.33
790.000	2.60	2.45	721.000	100.35
795.000	2.63	2.56	751.000	100.37
800.000	2.64	2.61	765.000	100.38
805.000	2.64	2.63	770.000	100.38
810.000	2.64	2.64	772.000	100.38
815.000	2.25	2.51	737.000	100.36
820.000	1.89	2.21	653.000	100.32
825.000	1.82	1.97	580.000	100.28
830.000	1.79	1.86	546.000	100.27
835.000	1.79	1.81	532.000	100.26
840.000	1.79	1.80	527.000	100.26
845.000	1.93	1.84	540.000	100.26
850.000	2.06	1.94	572.000	100.28
855.000	2.09	2.03	599.000	100.29
860.000	2.06	2.06	608.000	100.30
865.000	2.03	2.05	604.000	100.29
870.000	2.02	2.03	599.000	100.29
875.000	2.02	2.02	596.000	100.29
880.000	2.02	2.02	596.000	100.29
885.000	2.02	2.02	595.000	100.29
890.000	1.99	2.01	592.000	100.29
895.000	1.95	1.98	584.000	100.28
900.000	1.95	1.96	577.000	100.28
905.000	1.91	1.94	571.000	100.28
910.000	1.88	1.91	561.000	100.27
915.000	1.87	1.89	554.000	100.27
920.000	1.83	1.86	547.000	100.27
925.000	1.80	1.83	537.000	100.26
930.000	1.79	1.81	530.000	100.26
935.000	1.65	1.75	512.000	100.25

Graph Data Table - 10-Yr, 24-Hr

Time (min)	10-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Volume - Basin 1 (ft ³)	10-Yr, 24-Hr - Elevation - Basin 1 (ft)
940.000	1.51	1.63	477.000	100.23
945.000	1.49	1.54	450.000	100.22
950.000	1.48	1.50	438.000	100.22
955.000	1.48	1.49	433.000	100.21
960.000	1.48	1.48	431.000	100.21
965.000	0.94	1.30	375.000	100.19
970.000	0.45	0.89	260.000	100.13
975.000	0.35	0.56	170.000	100.08
980.000	0.31	0.40	123.000	100.06
985.000	0.31	0.34	104.000	100.05
990.000	0.31	0.32	98.000	100.05
995.000	0.28	0.30	92.000	100.04
1,000.000	0.24	0.27	84.000	100.04
1,005.000	0.24	0.25	77.000	100.04
1,010.000	0.23	0.24	73.000	100.03
1,015.000	0.23	0.23	71.000	100.03
1,020.000	0.23	0.23	71.000	100.03
1,025.000	0.30	0.25	78.000	100.04
1,030.000	0.37	0.31	94.000	100.04
1,035.000	0.38	0.35	108.000	100.05
1,040.000	0.39	0.37	114.000	100.05
1,045.000	0.39	0.39	118.000	100.06
1,050.000	0.39	0.39	119.000	100.06
1,055.000	0.39	0.39	119.000	100.06
1,060.000	0.39	0.39	119.000	100.06
1,065.000	0.39	0.39	119.000	100.06
1,070.000	0.35	0.38	115.000	100.05
1,075.000	0.32	0.35	106.000	100.05
1,080.000	0.31	0.33	99.000	100.05
1,085.000	0.31	0.32	96.000	100.05
1,090.000	0.31	0.31	95.000	100.04
1,095.000	0.31	0.31	95.000	100.04
1,100.000	0.31	0.31	95.000	100.04
1,105.000	0.31	0.31	95.000	100.04
1,110.000	0.31	0.31	95.000	100.04
1,115.000	0.28	0.30	91.000	100.04
1,120.000	0.24	0.27	83.000	100.04
1,125.000	0.24	0.25	76.000	100.04
1,130.000	0.20	0.23	70.000	100.03
1,135.000	0.16	0.20	60.000	100.03
1,140.000	0.16	0.17	52.000	100.02
1,145.000	0.19	0.17	53.000	100.02
1,150.000	0.22	0.19	59.000	100.03
1,155.000	0.23	0.22	66.000	100.03
1,160.000	0.27	0.24	73.000	100.03
1,165.000	0.30	0.27	82.000	100.04
1,170.000	0.31	0.29	90.000	100.04

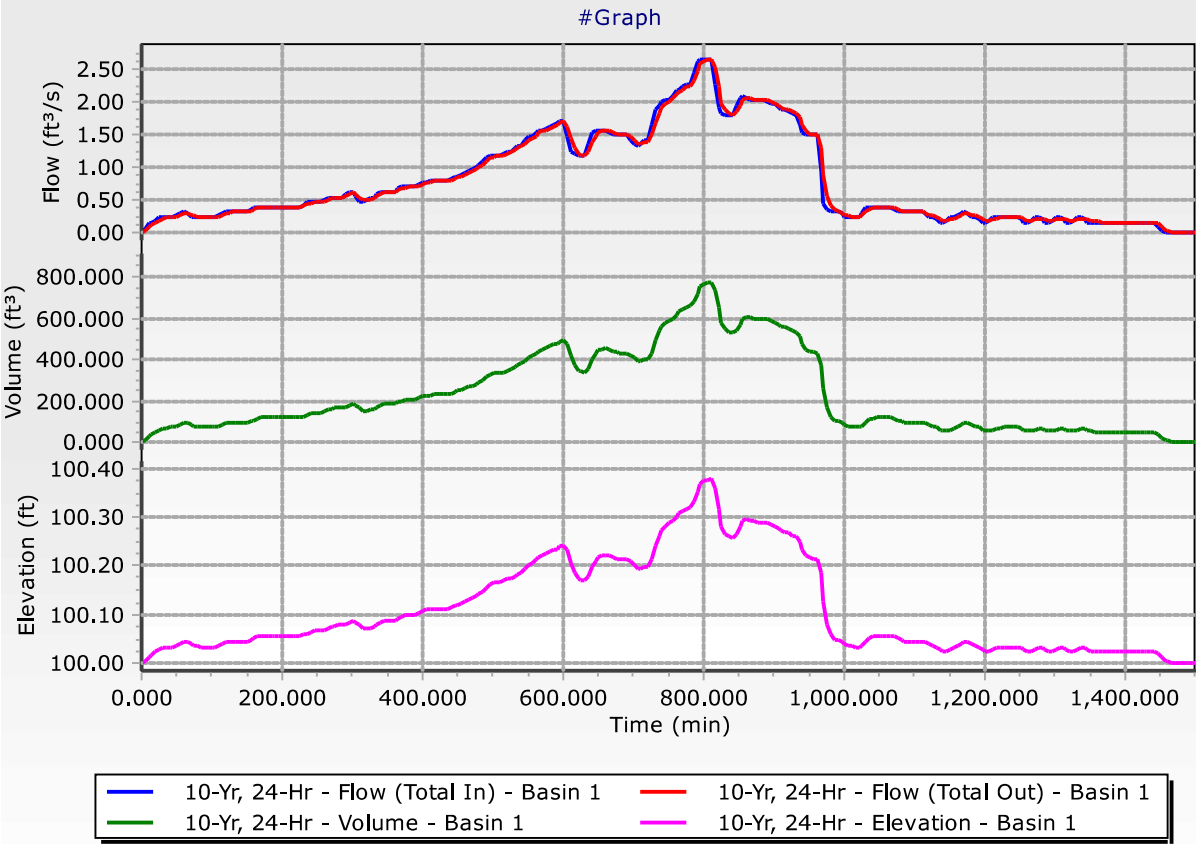
Graph Data Table - 10-Yr, 24-Hr

Time (min)	10-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Volume - Basin 1 (ft ³)	10-Yr, 24-Hr - Elevation - Basin 1 (ft)
1,175.000	0.28	0.29	90.000	100.04
1,180.000	0.24	0.27	83.000	100.04
1,185.000	0.24	0.25	76.000	100.04
1,190.000	0.20	0.23	70.000	100.03
1,195.000	0.16	0.20	60.000	100.03
1,200.000	0.16	0.17	52.000	100.02
1,205.000	0.19	0.17	53.000	100.02
1,210.000	0.22	0.19	59.000	100.03
1,215.000	0.23	0.22	66.000	100.03
1,220.000	0.23	0.23	69.000	100.03
1,225.000	0.23	0.23	70.000	100.03
1,230.000	0.23	0.23	70.000	100.03
1,235.000	0.23	0.23	70.000	100.03
1,240.000	0.23	0.23	70.000	100.03
1,245.000	0.23	0.23	70.000	100.03
1,250.000	0.20	0.22	67.000	100.03
1,255.000	0.16	0.19	59.000	100.03
1,260.000	0.16	0.17	52.000	100.02
1,265.000	0.19	0.17	53.000	100.02
1,270.000	0.22	0.19	59.000	100.03
1,275.000	0.23	0.22	66.000	100.03
1,280.000	0.20	0.22	66.000	100.03
1,285.000	0.16	0.19	58.000	100.03
1,290.000	0.16	0.17	52.000	100.02
1,295.000	0.19	0.17	53.000	100.02
1,300.000	0.22	0.19	59.000	100.03
1,305.000	0.23	0.22	66.000	100.03
1,310.000	0.20	0.22	66.000	100.03
1,315.000	0.16	0.19	58.000	100.03
1,320.000	0.16	0.17	52.000	100.02
1,325.000	0.19	0.17	53.000	100.02
1,330.000	0.22	0.19	59.000	100.03
1,335.000	0.23	0.22	66.000	100.03
1,340.000	0.20	0.22	66.000	100.03
1,345.000	0.16	0.19	58.000	100.03
1,350.000	0.16	0.17	52.000	100.02
1,355.000	0.16	0.16	50.000	100.02
1,360.000	0.16	0.16	49.000	100.02
1,365.000	0.16	0.16	49.000	100.02
1,370.000	0.16	0.16	49.000	100.02
1,375.000	0.16	0.16	49.000	100.02
1,380.000	0.16	0.16	49.000	100.02
1,385.000	0.16	0.16	49.000	100.02
1,390.000	0.16	0.16	49.000	100.02
1,395.000	0.16	0.16	49.000	100.02
1,400.000	0.16	0.16	49.000	100.02
1,405.000	0.16	0.16	49.000	100.02

Graph Data Table - 10-Yr, 24-Hr

Time (min)	10-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	10-Yr, 24-Hr - Volume - Basin 1 (ft ³)	10-Yr, 24-Hr - Elevation - Basin 1 (ft)
1,410.000	0.16	0.16	49.000	100.02
1,415.000	0.16	0.16	49.000	100.02
1,420.000	0.16	0.16	49.000	100.02
1,425.000	0.16	0.16	49.000	100.02
1,430.000	0.16	0.16	49.000	100.02
1,435.000	0.16	0.16	49.000	100.02
1,440.000	0.16	0.16	49.000	100.02
1,445.000	0.08	0.13	41.000	100.02
1,450.000	0.02	0.08	23.000	100.01
1,455.000	0.01	0.03	11.000	100.01
1,460.000	0.01	0.02	6.000	100.00
1,465.000	0.01	0.01	4.000	100.00
1,470.000	0.01	0.01	3.000	100.00
1,475.000	0.01	0.01	3.000	100.00
1,480.000	0.01	0.01	3.000	100.00
1,485.000	0.01	0.01	3.000	100.00
1,490.000	0.01	0.01	3.000	100.00
1,495.000	0.01	0.01	3.000	100.00
1,500.000	0.01	0.01	3.000	100.00

Graph Data Table - 10-Yr, 24-Hr



Appendix J.IV

BMP Analysis 100-Year, 1-Hour Storm

Graph Data Table - 100-Yr, 1-Hr

Time (min)	100-Yr, 1-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Volume - Basin 1 (ft ³)	100-Yr, 1-Hr - Elevation - Basin 1 (ft)
0.000	0.00	0.00	0.000	100.00
5.000	1.29	0.44	133.000	100.06
10.000	2.82	1.53	446.000	100.22
15.000	3.46	2.62	768.000	100.38
20.000	3.94	3.35	980.000	100.48
25.000	4.46	3.48	1,153.000	100.56
30.000	5.36	3.48	1,420.000	100.70
35.000	6.36	3.48	2,264.000	100.93
40.000	8.07	3.48	3,477.000	101.21
45.000	12.49	3.48	5,515.000	101.69
50.000	26.48	3.48	10,327.000	102.88
55.000	22.11	3.48	16,586.000	104.61
60.000	8.53	3.48	20,120.000	106.02
65.000	3.39	3.48	20,861.000	106.38
70.000	0.53	3.48	20,401.000	106.16
75.000	0.11	3.48	19,467.000	105.70
80.000	0.11	3.48	18,500.000	105.27
85.000	0.11	3.48	17,450.000	104.89
90.000	0.11	3.48	16,443.000	104.56
95.000	0.11	3.48	15,432.000	104.26
100.000	0.11	3.48	14,401.000	103.96
105.000	0.11	3.48	13,394.000	103.69
110.000	0.11	3.48	12,377.000	103.41
115.000	0.11	3.48	11,372.000	103.15
120.000	0.11	3.48	10,362.000	102.89
125.000	0.11	3.48	9,353.000	102.63
130.000	0.11	3.48	8,341.000	102.38
135.000	0.11	3.48	7,329.000	102.13
140.000	0.11	3.48	6,316.000	101.89
145.000	0.11	3.48	5,303.000	101.64
150.000	0.11	3.48	4,288.000	101.40
155.000	0.11	3.48	3,274.000	101.16
160.000	0.11	3.48	2,151.000	100.90
165.000	0.11	3.48	1,182.000	100.58
170.000	0.11	1.74	510.000	100.25
175.000	0.11	0.64	192.000	100.09
180.000	0.11	0.28	85.000	100.04
185.000	0.11	0.16	50.000	100.02
190.000	0.11	0.13	39.000	100.02
195.000	0.11	0.12	35.000	100.02
200.000	0.11	0.11	34.000	100.02
205.000	0.11	0.11	34.000	100.02
210.000	0.11	0.11	34.000	100.02
215.000	0.11	0.11	34.000	100.02
220.000	0.11	0.11	34.000	100.02
225.000	0.11	0.11	34.000	100.02
230.000	0.11	0.11	34.000	100.02

Graph Data Table - 100-Yr, 1-Hr

Time (min)	100-Yr, 1-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Volume - Basin 1 (ft ³)	100-Yr, 1-Hr - Elevation - Basin 1 (ft)
235.000	0.11	0.11	34.000	100.02
240.000	0.11	0.11	34.000	100.02
245.000	0.11	0.11	34.000	100.02
250.000	0.11	0.11	34.000	100.02
255.000	0.11	0.11	34.000	100.02
260.000	0.11	0.11	34.000	100.02
265.000	0.11	0.11	34.000	100.02
270.000	0.11	0.11	34.000	100.02
275.000	0.11	0.11	34.000	100.02
280.000	0.11	0.11	34.000	100.02
285.000	0.11	0.11	34.000	100.02
290.000	0.11	0.11	34.000	100.02
295.000	0.11	0.11	34.000	100.02
300.000	0.11	0.11	34.000	100.02
305.000	0.11	0.11	34.000	100.02
310.000	0.11	0.11	34.000	100.02
315.000	0.11	0.11	34.000	100.02
320.000	0.11	0.11	34.000	100.02
325.000	0.11	0.11	34.000	100.02
330.000	0.11	0.11	34.000	100.02
335.000	0.11	0.11	34.000	100.02
340.000	0.11	0.11	34.000	100.02
345.000	0.11	0.11	34.000	100.02
350.000	0.11	0.11	34.000	100.02
355.000	0.11	0.11	34.000	100.02
360.000	0.11	0.11	34.000	100.02
365.000	0.11	0.11	34.000	100.02
370.000	0.11	0.11	34.000	100.02
375.000	0.11	0.11	34.000	100.02
380.000	0.11	0.11	34.000	100.02
385.000	0.11	0.11	34.000	100.02
390.000	0.11	0.11	34.000	100.02
395.000	0.11	0.11	34.000	100.02
400.000	0.11	0.11	34.000	100.02
405.000	0.11	0.11	34.000	100.02
410.000	0.11	0.11	34.000	100.02
415.000	0.11	0.11	34.000	100.02
420.000	0.11	0.11	34.000	100.02
425.000	0.11	0.11	34.000	100.02
430.000	0.11	0.11	34.000	100.02
435.000	0.11	0.11	34.000	100.02
440.000	0.11	0.11	34.000	100.02
445.000	0.11	0.11	34.000	100.02
450.000	0.11	0.11	34.000	100.02
455.000	0.11	0.11	34.000	100.02
460.000	0.11	0.11	34.000	100.02
465.000	0.11	0.11	34.000	100.02

Graph Data Table - 100-Yr, 1-Hr

Time (min)	100-Yr, 1-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Volume - Basin 1 (ft ³)	100-Yr, 1-Hr - Elevation - Basin 1 (ft)
470.000	0.11	0.11	34.000	100.02
475.000	0.11	0.11	34.000	100.02
480.000	0.11	0.11	34.000	100.02
485.000	0.11	0.11	34.000	100.02
490.000	0.11	0.11	34.000	100.02
495.000	0.11	0.11	34.000	100.02
500.000	0.11	0.11	34.000	100.02
505.000	0.11	0.11	34.000	100.02
510.000	0.11	0.11	34.000	100.02
515.000	0.11	0.11	34.000	100.02
520.000	0.11	0.11	34.000	100.02
525.000	0.11	0.11	34.000	100.02
530.000	0.11	0.11	34.000	100.02
535.000	0.11	0.11	34.000	100.02
540.000	0.11	0.11	34.000	100.02
545.000	0.11	0.11	34.000	100.02
550.000	0.11	0.11	34.000	100.02
555.000	0.11	0.11	34.000	100.02
560.000	0.11	0.11	34.000	100.02
565.000	0.11	0.11	34.000	100.02
570.000	0.11	0.11	34.000	100.02
575.000	0.11	0.11	34.000	100.02
580.000	0.11	0.11	34.000	100.02
585.000	0.11	0.11	34.000	100.02
590.000	0.11	0.11	34.000	100.02
595.000	0.11	0.11	34.000	100.02
600.000	0.11	0.11	34.000	100.02
605.000	0.11	0.11	34.000	100.02
610.000	0.11	0.11	34.000	100.02
615.000	0.11	0.11	34.000	100.02
620.000	0.11	0.11	34.000	100.02
625.000	0.11	0.11	34.000	100.02
630.000	0.11	0.11	34.000	100.02
635.000	0.11	0.11	34.000	100.02
640.000	0.11	0.11	34.000	100.02
645.000	0.11	0.11	34.000	100.02
650.000	0.11	0.11	34.000	100.02
655.000	0.11	0.11	34.000	100.02
660.000	0.11	0.11	34.000	100.02
665.000	0.11	0.11	34.000	100.02
670.000	0.11	0.11	34.000	100.02
675.000	0.11	0.11	34.000	100.02
680.000	0.11	0.11	34.000	100.02
685.000	0.11	0.11	34.000	100.02
690.000	0.11	0.11	34.000	100.02
695.000	0.11	0.11	34.000	100.02
700.000	0.11	0.11	34.000	100.02

Graph Data Table - 100-Yr, 1-Hr

Time (min)	100-Yr, 1-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Volume - Basin 1 (ft ³)	100-Yr, 1-Hr - Elevation - Basin 1 (ft)
705.000	0.11	0.11	34.000	100.02
710.000	0.11	0.11	34.000	100.02
715.000	0.11	0.11	34.000	100.02
720.000	0.11	0.11	34.000	100.02
725.000	0.11	0.11	34.000	100.02
730.000	0.11	0.11	34.000	100.02
735.000	0.11	0.11	34.000	100.02
740.000	0.11	0.11	34.000	100.02
745.000	0.11	0.11	34.000	100.02
750.000	0.11	0.11	34.000	100.02
755.000	0.11	0.11	34.000	100.02
760.000	0.11	0.11	34.000	100.02
765.000	0.11	0.11	34.000	100.02
770.000	0.11	0.11	34.000	100.02
775.000	0.11	0.11	34.000	100.02
780.000	0.11	0.11	34.000	100.02
785.000	0.11	0.11	34.000	100.02
790.000	0.11	0.11	34.000	100.02
795.000	0.11	0.11	34.000	100.02
800.000	0.11	0.11	34.000	100.02
805.000	0.11	0.11	34.000	100.02
810.000	0.11	0.11	34.000	100.02
815.000	0.11	0.11	34.000	100.02
820.000	0.11	0.11	34.000	100.02
825.000	0.11	0.11	34.000	100.02
830.000	0.11	0.11	34.000	100.02
835.000	0.11	0.11	34.000	100.02
840.000	0.11	0.11	34.000	100.02
845.000	0.11	0.11	34.000	100.02
850.000	0.11	0.11	34.000	100.02
855.000	0.11	0.11	34.000	100.02
860.000	0.11	0.11	34.000	100.02
865.000	0.11	0.11	34.000	100.02
870.000	0.11	0.11	34.000	100.02
875.000	0.11	0.11	34.000	100.02
880.000	0.11	0.11	34.000	100.02
885.000	0.11	0.11	34.000	100.02
890.000	0.11	0.11	34.000	100.02
895.000	0.11	0.11	34.000	100.02
900.000	0.11	0.11	34.000	100.02
905.000	0.11	0.11	34.000	100.02
910.000	0.11	0.11	34.000	100.02
915.000	0.11	0.11	34.000	100.02
920.000	0.11	0.11	34.000	100.02
925.000	0.11	0.11	34.000	100.02
930.000	0.11	0.11	34.000	100.02
935.000	0.11	0.11	34.000	100.02

Graph Data Table - 100-Yr, 1-Hr

Time (min)	100-Yr, 1-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Volume - Basin 1 (ft ³)	100-Yr, 1-Hr - Elevation - Basin 1 (ft)
940.000	0.11	0.11	34.000	100.02
945.000	0.11	0.11	34.000	100.02
950.000	0.11	0.11	34.000	100.02
955.000	0.11	0.11	34.000	100.02
960.000	0.11	0.11	34.000	100.02
965.000	0.11	0.11	34.000	100.02
970.000	0.11	0.11	34.000	100.02
975.000	0.11	0.11	34.000	100.02
980.000	0.11	0.11	34.000	100.02
985.000	0.11	0.11	34.000	100.02
990.000	0.11	0.11	34.000	100.02
995.000	0.11	0.11	34.000	100.02
1,000.000	0.11	0.11	34.000	100.02
1,005.000	0.11	0.11	34.000	100.02
1,010.000	0.11	0.11	34.000	100.02
1,015.000	0.11	0.11	34.000	100.02
1,020.000	0.11	0.11	34.000	100.02
1,025.000	0.11	0.11	34.000	100.02
1,030.000	0.11	0.11	34.000	100.02
1,035.000	0.11	0.11	34.000	100.02
1,040.000	0.11	0.11	34.000	100.02
1,045.000	0.11	0.11	34.000	100.02
1,050.000	0.11	0.11	34.000	100.02
1,055.000	0.11	0.11	34.000	100.02
1,060.000	0.11	0.11	34.000	100.02
1,065.000	0.11	0.11	34.000	100.02
1,070.000	0.11	0.11	34.000	100.02
1,075.000	0.11	0.11	34.000	100.02
1,080.000	0.11	0.11	34.000	100.02
1,085.000	0.11	0.11	34.000	100.02
1,090.000	0.11	0.11	34.000	100.02
1,095.000	0.11	0.11	34.000	100.02
1,100.000	0.11	0.11	34.000	100.02
1,105.000	0.11	0.11	34.000	100.02
1,110.000	0.11	0.11	34.000	100.02
1,115.000	0.11	0.11	34.000	100.02
1,120.000	0.11	0.11	34.000	100.02
1,125.000	0.11	0.11	34.000	100.02
1,130.000	0.11	0.11	34.000	100.02
1,135.000	0.11	0.11	34.000	100.02
1,140.000	0.11	0.11	34.000	100.02
1,145.000	0.11	0.11	34.000	100.02
1,150.000	0.11	0.11	34.000	100.02
1,155.000	0.11	0.11	34.000	100.02
1,160.000	0.11	0.11	34.000	100.02
1,165.000	0.11	0.11	34.000	100.02
1,170.000	0.11	0.11	34.000	100.02

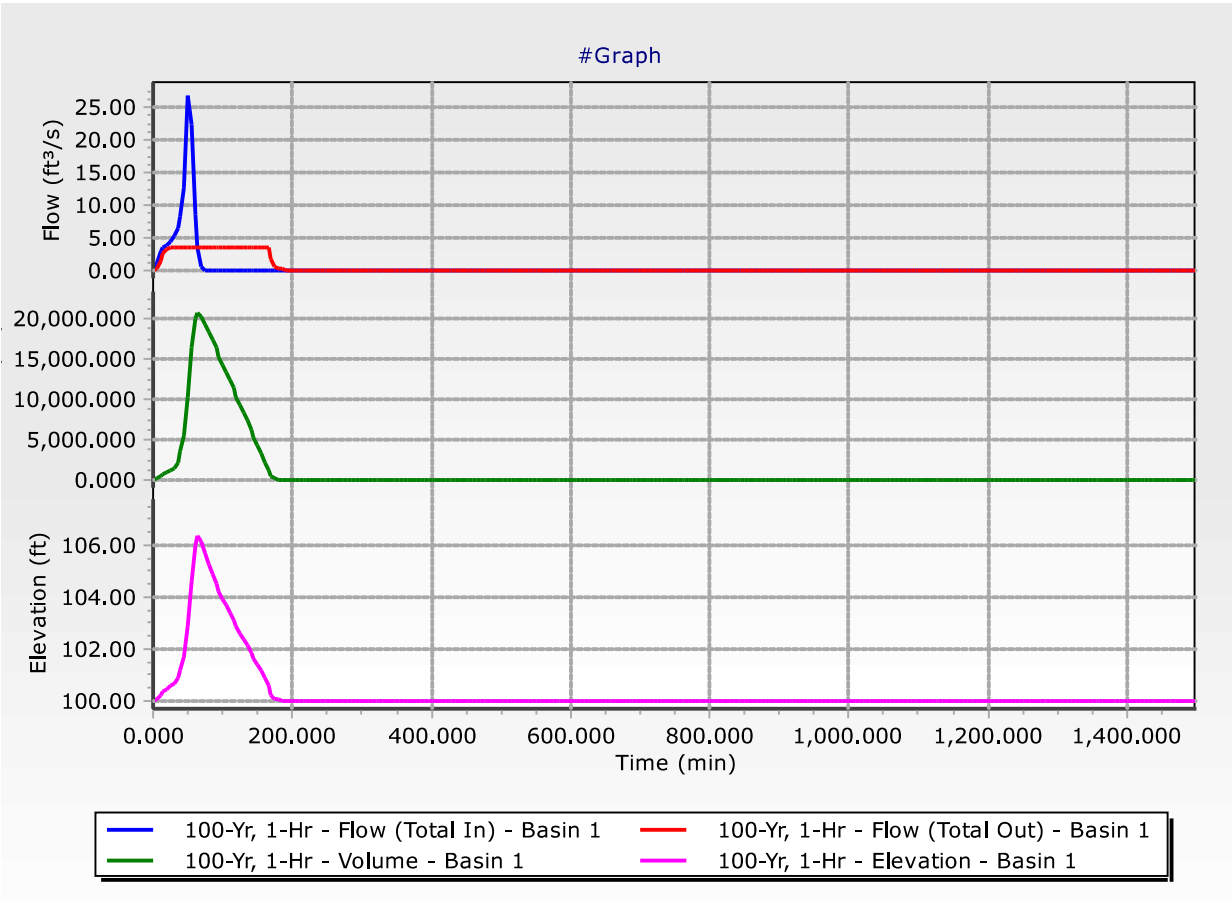
Graph Data Table - 100-Yr, 1-Hr

Time (min)	100-Yr, 1-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 1-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 1-Hr - Volume - Basin 1 (ft³)	100-Yr, 1-Hr - Elevation - Basin 1 (ft)
1,175.000	0.11	0.11	34.000	100.02
1,180.000	0.11	0.11	34.000	100.02
1,185.000	0.11	0.11	34.000	100.02
1,190.000	0.11	0.11	34.000	100.02
1,195.000	0.11	0.11	34.000	100.02
1,200.000	0.11	0.11	34.000	100.02
1,205.000	0.11	0.11	34.000	100.02
1,210.000	0.11	0.11	34.000	100.02
1,215.000	0.11	0.11	34.000	100.02
1,220.000	0.11	0.11	34.000	100.02
1,225.000	0.11	0.11	34.000	100.02
1,230.000	0.11	0.11	34.000	100.02
1,235.000	0.11	0.11	34.000	100.02
1,240.000	0.11	0.11	34.000	100.02
1,245.000	0.11	0.11	34.000	100.02
1,250.000	0.11	0.11	34.000	100.02
1,255.000	0.11	0.11	34.000	100.02
1,260.000	0.11	0.11	34.000	100.02
1,265.000	0.11	0.11	34.000	100.02
1,270.000	0.11	0.11	34.000	100.02
1,275.000	0.11	0.11	34.000	100.02
1,280.000	0.11	0.11	34.000	100.02
1,285.000	0.11	0.11	34.000	100.02
1,290.000	0.11	0.11	34.000	100.02
1,295.000	0.11	0.11	34.000	100.02
1,300.000	0.11	0.11	34.000	100.02
1,305.000	0.11	0.11	34.000	100.02
1,310.000	0.11	0.11	34.000	100.02
1,315.000	0.11	0.11	34.000	100.02
1,320.000	0.11	0.11	34.000	100.02
1,325.000	0.11	0.11	34.000	100.02
1,330.000	0.11	0.11	34.000	100.02
1,335.000	0.11	0.11	34.000	100.02
1,340.000	0.11	0.11	34.000	100.02
1,345.000	0.11	0.11	34.000	100.02
1,350.000	0.11	0.11	34.000	100.02
1,355.000	0.11	0.11	34.000	100.02
1,360.000	0.11	0.11	34.000	100.02
1,365.000	0.11	0.11	34.000	100.02
1,370.000	0.11	0.11	34.000	100.02
1,375.000	0.11	0.11	34.000	100.02
1,380.000	0.11	0.11	34.000	100.02
1,385.000	0.11	0.11	34.000	100.02
1,390.000	0.11	0.11	34.000	100.02
1,395.000	0.11	0.11	34.000	100.02
1,400.000	0.11	0.11	34.000	100.02
1,405.000	0.11	0.11	34.000	100.02

Graph Data Table - 100-Yr, 1-Hr

Time (min)	100-Yr, 1-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 1-Hr - Volume - Basin 1 (ft ³)	100-Yr, 1-Hr - Elevation - Basin 1 (ft)
1,410.000	0.11	0.11	34.000	100.02
1,415.000	0.11	0.11	34.000	100.02
1,420.000	0.11	0.11	34.000	100.02
1,425.000	0.11	0.11	34.000	100.02
1,430.000	0.11	0.11	34.000	100.02
1,435.000	0.11	0.11	34.000	100.02
1,440.000	0.11	0.11	34.000	100.02
1,445.000	0.11	0.11	34.000	100.02
1,450.000	0.11	0.11	34.000	100.02
1,455.000	0.11	0.11	34.000	100.02
1,460.000	0.11	0.11	34.000	100.02
1,465.000	0.11	0.11	34.000	100.02
1,470.000	0.11	0.11	34.000	100.02
1,475.000	0.11	0.11	34.000	100.02
1,480.000	0.11	0.11	34.000	100.02
1,485.000	0.11	0.11	34.000	100.02
1,490.000	0.11	0.11	34.000	100.02
1,495.000	0.11	0.11	34.000	100.02
1,500.000	0.11	0.11	34.000	100.02

Graph Data Table - 100-Yr, 1-Hr



Appendix J.V

BMP Analysis 100-Year, 3-Hour Storm

Graph Data Table - 100-Yr, 3-Hr

Time (min)	100-Yr, 3-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Volume - Basin 1 (ft ³)	100-Yr, 3-Hr - Elevation - Basin 1 (ft)
0.000	0.00	0.00	0.000	100.00
5.000	0.83	0.28	86.000	100.04
10.000	1.60	0.91	267.000	100.13
15.000	1.62	1.39	401.000	100.20
20.000	1.82	1.61	471.000	100.23
25.000	2.03	1.82	535.000	100.26
30.000	2.26	2.04	602.000	100.29
35.000	2.27	2.19	648.000	100.32
40.000	2.31	2.26	668.000	100.32
45.000	2.47	2.35	693.000	100.34
50.000	2.30	2.37	700.000	100.34
55.000	2.20	2.29	677.000	100.33
60.000	2.35	2.28	674.000	100.33
65.000	2.72	2.45	722.000	100.35
70.000	2.99	2.73	796.000	100.39
75.000	3.04	2.92	849.000	100.42
80.000	2.94	2.97	863.000	100.43
85.000	3.20	3.04	884.000	100.44
90.000	3.61	3.29	960.000	100.47
95.000	3.54	3.48	1,020.000	100.50
100.000	3.60	3.48	1,038.000	100.51
105.000	4.37	3.48	1,140.000	100.56
110.000	4.75	3.48	1,340.000	100.66
115.000	4.48	3.48	1,607.000	100.77
120.000	4.41	3.48	2,002.000	100.86
125.000	4.55	3.48	2,394.000	100.95
130.000	5.77	3.48	2,971.000	101.09
135.000	7.64	3.48	3,939.000	101.31
140.000	7.07	3.48	5,100.000	101.59
145.000	9.25	3.48	6,481.000	101.93
150.000	12.64	3.48	8,727.000	102.48
155.000	14.51	3.48	11,769.000	103.25
160.000	13.36	3.48	14,910.000	104.11
165.000	7.68	3.48	17,031.000	104.75
170.000	3.79	3.48	17,685.000	104.97
175.000	2.82	3.48	17,633.000	104.95
180.000	1.75	3.48	17,302.000	104.84
185.000	0.65	3.48	16,607.000	104.62
190.000	0.16	3.48	15,692.000	104.33
195.000	0.03	3.48	14,660.000	104.03
200.000	0.03	3.48	13,628.000	103.75
205.000	0.03	3.48	12,578.000	103.46
210.000	0.03	3.48	11,546.000	103.19
215.000	0.03	3.48	10,503.000	102.92
220.000	0.03	3.48	9,471.000	102.66
225.000	0.03	3.48	8,436.000	102.40
230.000	0.03	3.48	7,403.000	102.15

Graph Data Table - 100-Yr, 3-Hr

Time (min)	100-Yr, 3-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 3-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 3-Hr - Volume - Basin 1 (ft³)	100-Yr, 3-Hr - Elevation - Basin 1 (ft)
235.000	0.03	3.48	6,367.000	101.90
240.000	0.03	3.48	5,332.000	101.65
245.000	0.03	3.48	4,294.000	101.40
250.000	0.03	3.48	3,258.000	101.16
255.000	0.03	3.48	2,099.000	100.88
260.000	0.03	3.48	1,138.000	100.56
265.000	0.03	1.54	449.000	100.22
270.000	0.03	0.52	158.000	100.07
275.000	0.03	0.19	57.000	100.03
280.000	0.03	0.08	25.000	100.01
285.000	0.03	0.05	14.000	100.01
290.000	0.03	0.04	11.000	100.01
295.000	0.03	0.03	10.000	100.00
300.000	0.03	0.03	9.000	100.00
305.000	0.03	0.03	9.000	100.00
310.000	0.03	0.03	9.000	100.00
315.000	0.03	0.03	9.000	100.00
320.000	0.03	0.03	9.000	100.00
325.000	0.03	0.03	9.000	100.00
330.000	0.03	0.03	9.000	100.00
335.000	0.03	0.03	9.000	100.00
340.000	0.03	0.03	9.000	100.00
345.000	0.03	0.03	9.000	100.00
350.000	0.03	0.03	9.000	100.00
355.000	0.03	0.03	9.000	100.00
360.000	0.03	0.03	9.000	100.00
365.000	0.03	0.03	9.000	100.00
370.000	0.03	0.03	9.000	100.00
375.000	0.03	0.03	9.000	100.00
380.000	0.03	0.03	9.000	100.00
385.000	0.03	0.03	9.000	100.00
390.000	0.03	0.03	9.000	100.00
395.000	0.03	0.03	9.000	100.00
400.000	0.03	0.03	9.000	100.00
405.000	0.03	0.03	9.000	100.00
410.000	0.03	0.03	9.000	100.00
415.000	0.03	0.03	9.000	100.00
420.000	0.03	0.03	9.000	100.00
425.000	0.03	0.03	9.000	100.00
430.000	0.03	0.03	9.000	100.00
435.000	0.03	0.03	9.000	100.00
440.000	0.03	0.03	9.000	100.00
445.000	0.03	0.03	9.000	100.00
450.000	0.03	0.03	9.000	100.00
455.000	0.03	0.03	9.000	100.00
460.000	0.03	0.03	9.000	100.00
465.000	0.03	0.03	9.000	100.00

Graph Data Table - 100-Yr, 3-Hr

Time (min)	100-Yr, 3-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 3-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 3-Hr - Volume - Basin 1 (ft³)	100-Yr, 3-Hr - Elevation - Basin 1 (ft)
470.000	0.03	0.03	9.000	100.00
475.000	0.03	0.03	9.000	100.00
480.000	0.03	0.03	9.000	100.00
485.000	0.03	0.03	9.000	100.00
490.000	0.03	0.03	9.000	100.00
495.000	0.03	0.03	9.000	100.00
500.000	0.03	0.03	9.000	100.00
505.000	0.03	0.03	9.000	100.00
510.000	0.03	0.03	9.000	100.00
515.000	0.03	0.03	9.000	100.00
520.000	0.03	0.03	9.000	100.00
525.000	0.03	0.03	9.000	100.00
530.000	0.03	0.03	9.000	100.00
535.000	0.03	0.03	9.000	100.00
540.000	0.03	0.03	9.000	100.00
545.000	0.03	0.03	9.000	100.00
550.000	0.03	0.03	9.000	100.00
555.000	0.03	0.03	9.000	100.00
560.000	0.03	0.03	9.000	100.00
565.000	0.03	0.03	9.000	100.00
570.000	0.03	0.03	9.000	100.00
575.000	0.03	0.03	9.000	100.00
580.000	0.03	0.03	9.000	100.00
585.000	0.03	0.03	9.000	100.00
590.000	0.03	0.03	9.000	100.00
595.000	0.03	0.03	9.000	100.00
600.000	0.03	0.03	9.000	100.00
605.000	0.03	0.03	9.000	100.00
610.000	0.03	0.03	9.000	100.00
615.000	0.03	0.03	9.000	100.00
620.000	0.03	0.03	9.000	100.00
625.000	0.03	0.03	9.000	100.00
630.000	0.03	0.03	9.000	100.00
635.000	0.03	0.03	9.000	100.00
640.000	0.03	0.03	9.000	100.00
645.000	0.03	0.03	9.000	100.00
650.000	0.03	0.03	9.000	100.00
655.000	0.03	0.03	9.000	100.00
660.000	0.03	0.03	9.000	100.00
665.000	0.03	0.03	9.000	100.00
670.000	0.03	0.03	9.000	100.00
675.000	0.03	0.03	9.000	100.00
680.000	0.03	0.03	9.000	100.00
685.000	0.03	0.03	9.000	100.00
690.000	0.03	0.03	9.000	100.00
695.000	0.03	0.03	9.000	100.00
700.000	0.03	0.03	9.000	100.00

Graph Data Table - 100-Yr, 3-Hr

Time (min)	100-Yr, 3-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 3-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 3-Hr - Volume - Basin 1 (ft³)	100-Yr, 3-Hr - Elevation - Basin 1 (ft)
705.000	0.03	0.03	9.000	100.00
710.000	0.03	0.03	9.000	100.00
715.000	0.03	0.03	9.000	100.00
720.000	0.03	0.03	9.000	100.00
725.000	0.03	0.03	9.000	100.00
730.000	0.03	0.03	9.000	100.00
735.000	0.03	0.03	9.000	100.00
740.000	0.03	0.03	9.000	100.00
745.000	0.03	0.03	9.000	100.00
750.000	0.03	0.03	9.000	100.00
755.000	0.03	0.03	9.000	100.00
760.000	0.03	0.03	9.000	100.00
765.000	0.03	0.03	9.000	100.00
770.000	0.03	0.03	9.000	100.00
775.000	0.03	0.03	9.000	100.00
780.000	0.03	0.03	9.000	100.00
785.000	0.03	0.03	9.000	100.00
790.000	0.03	0.03	9.000	100.00
795.000	0.03	0.03	9.000	100.00
800.000	0.03	0.03	9.000	100.00
805.000	0.03	0.03	9.000	100.00
810.000	0.03	0.03	9.000	100.00
815.000	0.03	0.03	9.000	100.00
820.000	0.03	0.03	9.000	100.00
825.000	0.03	0.03	9.000	100.00
830.000	0.03	0.03	9.000	100.00
835.000	0.03	0.03	9.000	100.00
840.000	0.03	0.03	9.000	100.00
845.000	0.03	0.03	9.000	100.00
850.000	0.03	0.03	9.000	100.00
855.000	0.03	0.03	9.000	100.00
860.000	0.03	0.03	9.000	100.00
865.000	0.03	0.03	9.000	100.00
870.000	0.03	0.03	9.000	100.00
875.000	0.03	0.03	9.000	100.00
880.000	0.03	0.03	9.000	100.00
885.000	0.03	0.03	9.000	100.00
890.000	0.03	0.03	9.000	100.00
895.000	0.03	0.03	9.000	100.00
900.000	0.03	0.03	9.000	100.00
905.000	0.03	0.03	9.000	100.00
910.000	0.03	0.03	9.000	100.00
915.000	0.03	0.03	9.000	100.00
920.000	0.03	0.03	9.000	100.00
925.000	0.03	0.03	9.000	100.00
930.000	0.03	0.03	9.000	100.00
935.000	0.03	0.03	9.000	100.00

Graph Data Table - 100-Yr, 3-Hr

Time (min)	100-Yr, 3-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Volume - Basin 1 (ft ³)	100-Yr, 3-Hr - Elevation - Basin 1 (ft)
940.000	0.03	0.03	9.000	100.00
945.000	0.03	0.03	9.000	100.00
950.000	0.03	0.03	9.000	100.00
955.000	0.03	0.03	9.000	100.00
960.000	0.03	0.03	9.000	100.00
965.000	0.03	0.03	9.000	100.00
970.000	0.03	0.03	9.000	100.00
975.000	0.03	0.03	9.000	100.00
980.000	0.03	0.03	9.000	100.00
985.000	0.03	0.03	9.000	100.00
990.000	0.03	0.03	9.000	100.00
995.000	0.03	0.03	9.000	100.00
1,000.000	0.03	0.03	9.000	100.00
1,005.000	0.03	0.03	9.000	100.00
1,010.000	0.03	0.03	9.000	100.00
1,015.000	0.03	0.03	9.000	100.00
1,020.000	0.03	0.03	9.000	100.00
1,025.000	0.03	0.03	9.000	100.00
1,030.000	0.03	0.03	9.000	100.00
1,035.000	0.03	0.03	9.000	100.00
1,040.000	0.03	0.03	9.000	100.00
1,045.000	0.03	0.03	9.000	100.00
1,050.000	0.03	0.03	9.000	100.00
1,055.000	0.03	0.03	9.000	100.00
1,060.000	0.03	0.03	9.000	100.00
1,065.000	0.03	0.03	9.000	100.00
1,070.000	0.03	0.03	9.000	100.00
1,075.000	0.03	0.03	9.000	100.00
1,080.000	0.03	0.03	9.000	100.00
1,085.000	0.03	0.03	9.000	100.00
1,090.000	0.03	0.03	9.000	100.00
1,095.000	0.03	0.03	9.000	100.00
1,100.000	0.03	0.03	9.000	100.00
1,105.000	0.03	0.03	9.000	100.00
1,110.000	0.03	0.03	9.000	100.00
1,115.000	0.03	0.03	9.000	100.00
1,120.000	0.03	0.03	9.000	100.00
1,125.000	0.03	0.03	9.000	100.00
1,130.000	0.03	0.03	9.000	100.00
1,135.000	0.03	0.03	9.000	100.00
1,140.000	0.03	0.03	9.000	100.00
1,145.000	0.03	0.03	9.000	100.00
1,150.000	0.03	0.03	9.000	100.00
1,155.000	0.03	0.03	9.000	100.00
1,160.000	0.03	0.03	9.000	100.00
1,165.000	0.03	0.03	9.000	100.00
1,170.000	0.03	0.03	9.000	100.00

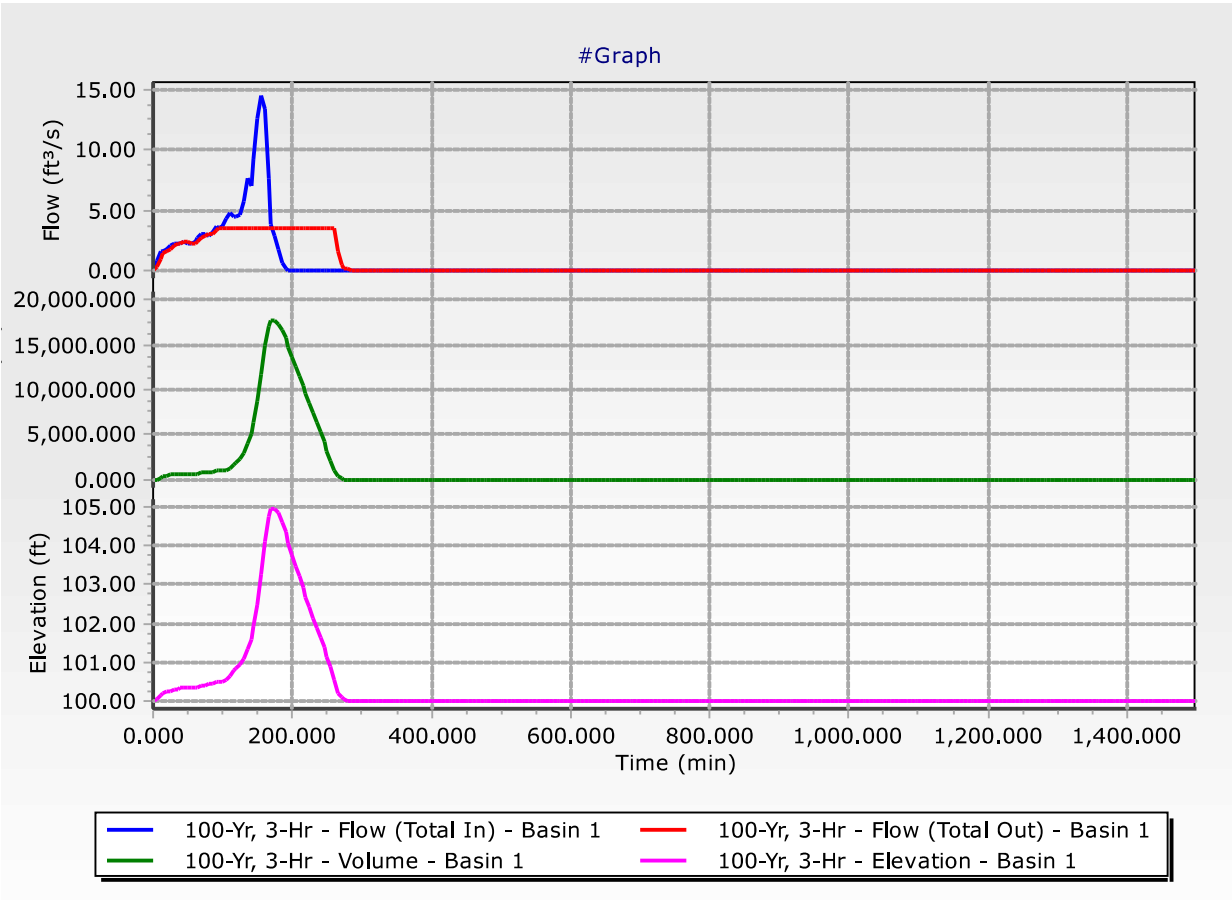
Graph Data Table - 100-Yr, 3-Hr

Time (min)	100-Yr, 3-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Volume - Basin 1 (ft ³)	100-Yr, 3-Hr - Elevation - Basin 1 (ft)
1,175.000	0.03	0.03	9.000	100.00
1,180.000	0.03	0.03	9.000	100.00
1,185.000	0.03	0.03	9.000	100.00
1,190.000	0.03	0.03	9.000	100.00
1,195.000	0.03	0.03	9.000	100.00
1,200.000	0.03	0.03	9.000	100.00
1,205.000	0.03	0.03	9.000	100.00
1,210.000	0.03	0.03	9.000	100.00
1,215.000	0.03	0.03	9.000	100.00
1,220.000	0.03	0.03	9.000	100.00
1,225.000	0.03	0.03	9.000	100.00
1,230.000	0.03	0.03	9.000	100.00
1,235.000	0.03	0.03	9.000	100.00
1,240.000	0.03	0.03	9.000	100.00
1,245.000	0.03	0.03	9.000	100.00
1,250.000	0.03	0.03	9.000	100.00
1,255.000	0.03	0.03	9.000	100.00
1,260.000	0.03	0.03	9.000	100.00
1,265.000	0.03	0.03	9.000	100.00
1,270.000	0.03	0.03	9.000	100.00
1,275.000	0.03	0.03	9.000	100.00
1,280.000	0.03	0.03	9.000	100.00
1,285.000	0.03	0.03	9.000	100.00
1,290.000	0.03	0.03	9.000	100.00
1,295.000	0.03	0.03	9.000	100.00
1,300.000	0.03	0.03	9.000	100.00
1,305.000	0.03	0.03	9.000	100.00
1,310.000	0.03	0.03	9.000	100.00
1,315.000	0.03	0.03	9.000	100.00
1,320.000	0.03	0.03	9.000	100.00
1,325.000	0.03	0.03	9.000	100.00
1,330.000	0.03	0.03	9.000	100.00
1,335.000	0.03	0.03	9.000	100.00
1,340.000	0.03	0.03	9.000	100.00
1,345.000	0.03	0.03	9.000	100.00
1,350.000	0.03	0.03	9.000	100.00
1,355.000	0.03	0.03	9.000	100.00
1,360.000	0.03	0.03	9.000	100.00
1,365.000	0.03	0.03	9.000	100.00
1,370.000	0.03	0.03	9.000	100.00
1,375.000	0.03	0.03	9.000	100.00
1,380.000	0.03	0.03	9.000	100.00
1,385.000	0.03	0.03	9.000	100.00
1,390.000	0.03	0.03	9.000	100.00
1,395.000	0.03	0.03	9.000	100.00
1,400.000	0.03	0.03	9.000	100.00
1,405.000	0.03	0.03	9.000	100.00

Graph Data Table - 100-Yr, 3-Hr

Time (min)	100-Yr, 3-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 3-Hr - Volume - Basin 1 (ft ³)	100-Yr, 3-Hr - Elevation - Basin 1 (ft)
1,410.000	0.03	0.03	9.000	100.00
1,415.000	0.03	0.03	9.000	100.00
1,420.000	0.03	0.03	9.000	100.00
1,425.000	0.03	0.03	9.000	100.00
1,430.000	0.03	0.03	9.000	100.00
1,435.000	0.03	0.03	9.000	100.00
1,440.000	0.03	0.03	9.000	100.00
1,445.000	0.03	0.03	9.000	100.00
1,450.000	0.03	0.03	9.000	100.00
1,455.000	0.03	0.03	9.000	100.00
1,460.000	0.03	0.03	9.000	100.00
1,465.000	0.03	0.03	9.000	100.00
1,470.000	0.03	0.03	9.000	100.00
1,475.000	0.03	0.03	9.000	100.00
1,480.000	0.03	0.03	9.000	100.00
1,485.000	0.03	0.03	9.000	100.00
1,490.000	0.03	0.03	9.000	100.00
1,495.000	0.03	0.03	9.000	100.00
1,500.000	0.03	0.03	9.000	100.00

Graph Data Table - 100-Yr, 3-Hr



Appendix J.VI

BMP Analysis 100-Year, 6-Hour Storm

Graph Data Table - 100-Yr, 6-Hr

Time (min)	100-Yr, 6-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 6-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 6-Hr - Volume - Basin 1 (ft ³)	100-Yr, 6-Hr - Elevation - Basin 1 (ft)
0.000	0.00	0.00	0.000	100.00
5.000	0.44	0.15	45.000	100.02
10.000	0.93	0.51	156.000	100.07
15.000	1.09	0.85	249.000	100.12
20.000	1.14	1.03	298.000	100.15
25.000	1.14	1.10	318.000	100.16
30.000	1.23	1.16	333.000	100.17
35.000	1.31	1.23	355.000	100.18
40.000	1.33	1.29	373.000	100.19
45.000	1.34	1.32	382.000	100.19
50.000	1.34	1.33	386.000	100.19
55.000	1.34	1.34	387.000	100.19
60.000	1.42	1.37	396.000	100.20
65.000	1.50	1.43	415.000	100.21
70.000	1.52	1.48	432.000	100.21
75.000	1.53	1.51	440.000	100.22
80.000	1.53	1.52	444.000	100.22
85.000	1.53	1.53	445.000	100.22
90.000	1.53	1.53	445.000	100.22
95.000	1.53	1.53	446.000	100.22
100.000	1.53	1.53	446.000	100.22
105.000	1.53	1.53	446.000	100.22
110.000	1.53	1.53	446.000	100.22
115.000	1.53	1.53	446.000	100.22
120.000	1.61	1.56	454.000	100.22
125.000	1.61	1.59	465.000	100.23
130.000	1.63	1.61	470.000	100.23
135.000	1.70	1.65	482.000	100.24
140.000	1.71	1.69	493.000	100.24
145.000	1.72	1.71	499.000	100.25
150.000	1.72	1.72	502.000	100.25
155.000	1.72	1.72	503.000	100.25
160.000	1.72	1.72	503.000	100.25
165.000	1.81	1.75	513.000	100.25
170.000	1.89	1.82	533.000	100.26
175.000	1.90	1.87	549.000	100.27
180.000	1.91	1.89	557.000	100.27
185.000	1.91	1.90	560.000	100.27
190.000	2.00	1.94	570.000	100.28
195.000	2.08	2.01	591.000	100.29
200.000	2.09	2.06	607.000	100.30
205.000	2.19	2.11	624.000	100.30
210.000	2.36	2.22	657.000	100.32
215.000	2.54	2.38	701.000	100.34
220.000	2.64	2.52	740.000	100.36
225.000	2.75	2.64	772.000	100.38
230.000	2.84	2.74	801.000	100.39

Graph Data Table - 100-Yr, 6-Hr

Time (min)	100-Yr, 6-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Volume - Basin 1 (ft³)	100-Yr, 6-Hr - Elevation - Basin 1 (ft)
235.000	2.94	2.84	828.000	100.41
240.000	3.03	2.94	854.000	100.42
245.000	3.13	3.03	884.000	100.44
250.000	3.31	3.16	922.000	100.45
255.000	3.49	3.32	971.000	100.48
260.000	3.72	3.48	1,030.000	100.50
265.000	3.99	3.48	1,105.000	100.54
270.000	4.14	3.48	1,220.000	100.60
275.000	4.32	3.48	1,354.000	100.67
280.000	4.60	3.48	1,577.000	100.76
285.000	4.89	3.48	2,087.000	100.88
290.000	5.05	3.48	2,671.000	101.02
295.000	5.23	3.48	3,165.000	101.13
300.000	5.51	3.48	3,740.000	101.27
305.000	6.36	3.48	4,461.000	101.44
310.000	7.73	3.48	5,535.000	101.70
315.000	8.93	3.48	7,004.000	102.05
320.000	9.91	3.48	8,774.000	102.49
325.000	11.12	3.48	10,891.000	103.02
330.000	13.12	3.48	13,484.000	103.71
335.000	9.29	3.48	15,809.000	104.37
340.000	3.96	3.48	16,751.000	104.66
345.000	2.07	3.48	16,617.000	104.62
350.000	1.19	3.48	16,044.000	104.44
355.000	0.82	3.48	15,315.000	104.23
360.000	0.54	3.48	14,461.000	103.98
365.000	0.24	3.48	13,544.000	103.73
370.000	0.05	3.48	12,531.000	103.45
375.000	0.01	3.48	11,498.000	103.18
380.000	0.01	3.48	10,453.000	102.91
385.000	0.01	3.48	9,417.000	102.65
390.000	0.01	3.48	8,377.000	102.39
395.000	0.01	3.48	7,338.000	102.13
400.000	0.01	3.48	6,297.000	101.88
405.000	0.01	3.48	5,256.000	101.63
410.000	0.01	3.48	4,213.000	101.38
415.000	0.01	3.48	3,171.000	101.14
420.000	0.01	3.48	1,974.000	100.85
425.000	0.01	3.48	1,067.000	100.52
430.000	0.01	1.29	372.000	100.19
435.000	0.01	0.42	129.000	100.06
440.000	0.01	0.14	44.000	100.02
445.000	0.01	0.05	16.000	100.01
450.000	0.01	0.02	7.000	100.00
455.000	0.01	0.01	4.000	100.00
460.000	0.01	0.01	3.000	100.00
465.000	0.01	0.01	3.000	100.00

Graph Data Table - 100-Yr, 6-Hr

Time (min)	100-Yr, 6-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Volume - Basin 1 (ft³)	100-Yr, 6-Hr - Elevation - Basin 1 (ft)
470.000	0.01	0.01	3.000	100.00
475.000	0.01	0.01	3.000	100.00
480.000	0.01	0.01	3.000	100.00
485.000	0.01	0.01	3.000	100.00
490.000	0.01	0.01	3.000	100.00
495.000	0.01	0.01	3.000	100.00
500.000	0.01	0.01	3.000	100.00
505.000	0.01	0.01	3.000	100.00
510.000	0.01	0.01	3.000	100.00
515.000	0.01	0.01	3.000	100.00
520.000	0.01	0.01	3.000	100.00
525.000	0.01	0.01	3.000	100.00
530.000	0.01	0.01	3.000	100.00
535.000	0.01	0.01	3.000	100.00
540.000	0.01	0.01	3.000	100.00
545.000	0.01	0.01	3.000	100.00
550.000	0.01	0.01	3.000	100.00
555.000	0.01	0.01	3.000	100.00
560.000	0.01	0.01	3.000	100.00
565.000	0.01	0.01	3.000	100.00
570.000	0.01	0.01	3.000	100.00
575.000	0.01	0.01	3.000	100.00
580.000	0.01	0.01	3.000	100.00
585.000	0.01	0.01	3.000	100.00
590.000	0.01	0.01	3.000	100.00
595.000	0.01	0.01	3.000	100.00
600.000	0.01	0.01	3.000	100.00
605.000	0.01	0.01	3.000	100.00
610.000	0.01	0.01	3.000	100.00
615.000	0.01	0.01	3.000	100.00
620.000	0.01	0.01	3.000	100.00
625.000	0.01	0.01	3.000	100.00
630.000	0.01	0.01	3.000	100.00
635.000	0.01	0.01	3.000	100.00
640.000	0.01	0.01	3.000	100.00
645.000	0.01	0.01	3.000	100.00
650.000	0.01	0.01	3.000	100.00
655.000	0.01	0.01	3.000	100.00
660.000	0.01	0.01	3.000	100.00
665.000	0.01	0.01	3.000	100.00
670.000	0.01	0.01	3.000	100.00
675.000	0.01	0.01	3.000	100.00
680.000	0.01	0.01	3.000	100.00
685.000	0.01	0.01	3.000	100.00
690.000	0.01	0.01	3.000	100.00
695.000	0.01	0.01	3.000	100.00
700.000	0.01	0.01	3.000	100.00

Graph Data Table - 100-Yr, 6-Hr

Time (min)	100-Yr, 6-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Volume - Basin 1 (ft³)	100-Yr, 6-Hr - Elevation - Basin 1 (ft)
705.000	0.01	0.01	3.000	100.00
710.000	0.01	0.01	3.000	100.00
715.000	0.01	0.01	3.000	100.00
720.000	0.01	0.01	3.000	100.00
725.000	0.01	0.01	3.000	100.00
730.000	0.01	0.01	3.000	100.00
735.000	0.01	0.01	3.000	100.00
740.000	0.01	0.01	3.000	100.00
745.000	0.01	0.01	3.000	100.00
750.000	0.01	0.01	3.000	100.00
755.000	0.01	0.01	3.000	100.00
760.000	0.01	0.01	3.000	100.00
765.000	0.01	0.01	3.000	100.00
770.000	0.01	0.01	3.000	100.00
775.000	0.01	0.01	3.000	100.00
780.000	0.01	0.01	3.000	100.00
785.000	0.01	0.01	3.000	100.00
790.000	0.01	0.01	3.000	100.00
795.000	0.01	0.01	3.000	100.00
800.000	0.01	0.01	3.000	100.00
805.000	0.01	0.01	3.000	100.00
810.000	0.01	0.01	3.000	100.00
815.000	0.01	0.01	3.000	100.00
820.000	0.01	0.01	3.000	100.00
825.000	0.01	0.01	3.000	100.00
830.000	0.01	0.01	3.000	100.00
835.000	0.01	0.01	3.000	100.00
840.000	0.01	0.01	3.000	100.00
845.000	0.01	0.01	3.000	100.00
850.000	0.01	0.01	3.000	100.00
855.000	0.01	0.01	3.000	100.00
860.000	0.01	0.01	3.000	100.00
865.000	0.01	0.01	3.000	100.00
870.000	0.01	0.01	3.000	100.00
875.000	0.01	0.01	3.000	100.00
880.000	0.01	0.01	3.000	100.00
885.000	0.01	0.01	3.000	100.00
890.000	0.01	0.01	3.000	100.00
895.000	0.01	0.01	3.000	100.00
900.000	0.01	0.01	3.000	100.00
905.000	0.01	0.01	3.000	100.00
910.000	0.01	0.01	3.000	100.00
915.000	0.01	0.01	3.000	100.00
920.000	0.01	0.01	3.000	100.00
925.000	0.01	0.01	3.000	100.00
930.000	0.01	0.01	3.000	100.00
935.000	0.01	0.01	3.000	100.00

Graph Data Table - 100-Yr, 6-Hr

Time (min)	100-Yr, 6-Hr - Flow (Total In) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Flow (Total Out) - Basin 1 (ft³/s)	100-Yr, 6-Hr - Volume - Basin 1 (ft³)	100-Yr, 6-Hr - Elevation - Basin 1 (ft)
940.000	0.01	0.01	3.000	100.00
945.000	0.01	0.01	3.000	100.00
950.000	0.01	0.01	3.000	100.00
955.000	0.01	0.01	3.000	100.00
960.000	0.01	0.01	3.000	100.00
965.000	0.01	0.01	3.000	100.00
970.000	0.01	0.01	3.000	100.00
975.000	0.01	0.01	3.000	100.00
980.000	0.01	0.01	3.000	100.00
985.000	0.01	0.01	3.000	100.00
990.000	0.01	0.01	3.000	100.00
995.000	0.01	0.01	3.000	100.00
1,000.000	0.01	0.01	3.000	100.00
1,005.000	0.01	0.01	3.000	100.00
1,010.000	0.01	0.01	3.000	100.00
1,015.000	0.01	0.01	3.000	100.00
1,020.000	0.01	0.01	3.000	100.00
1,025.000	0.01	0.01	3.000	100.00
1,030.000	0.01	0.01	3.000	100.00
1,035.000	0.01	0.01	3.000	100.00
1,040.000	0.01	0.01	3.000	100.00
1,045.000	0.01	0.01	3.000	100.00
1,050.000	0.01	0.01	3.000	100.00
1,055.000	0.01	0.01	3.000	100.00
1,060.000	0.01	0.01	3.000	100.00
1,065.000	0.01	0.01	3.000	100.00
1,070.000	0.01	0.01	3.000	100.00
1,075.000	0.01	0.01	3.000	100.00
1,080.000	0.01	0.01	3.000	100.00
1,085.000	0.01	0.01	3.000	100.00
1,090.000	0.01	0.01	3.000	100.00
1,095.000	0.01	0.01	3.000	100.00
1,100.000	0.01	0.01	3.000	100.00
1,105.000	0.01	0.01	3.000	100.00
1,110.000	0.01	0.01	3.000	100.00
1,115.000	0.01	0.01	3.000	100.00
1,120.000	0.01	0.01	3.000	100.00
1,125.000	0.01	0.01	3.000	100.00
1,130.000	0.01	0.01	3.000	100.00
1,135.000	0.01	0.01	3.000	100.00
1,140.000	0.01	0.01	3.000	100.00
1,145.000	0.01	0.01	3.000	100.00
1,150.000	0.01	0.01	3.000	100.00
1,155.000	0.01	0.01	3.000	100.00
1,160.000	0.01	0.01	3.000	100.00
1,165.000	0.01	0.01	3.000	100.00
1,170.000	0.01	0.01	3.000	100.00

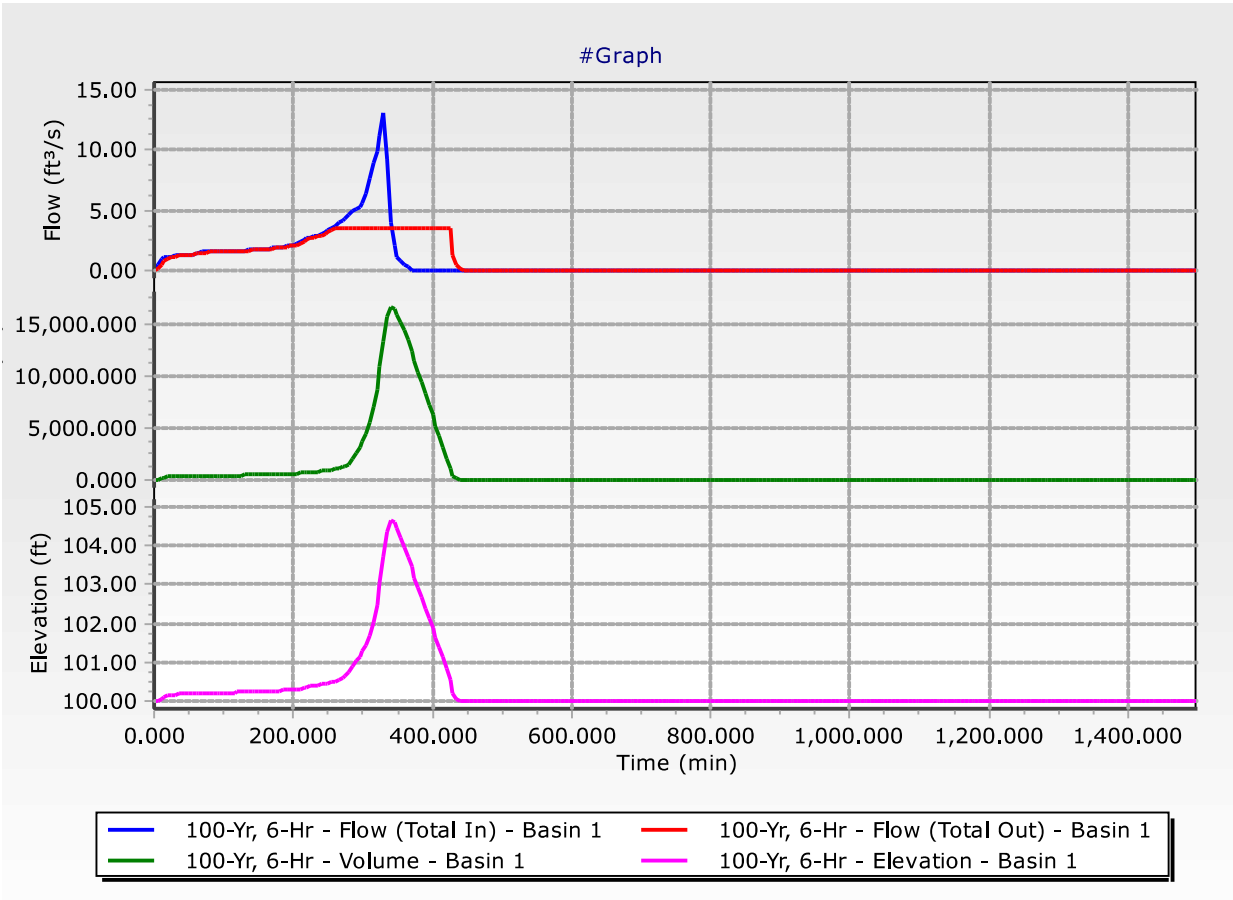
Graph Data Table - 100-Yr, 6-Hr

Time (min)	100-Yr, 6-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 6-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 6-Hr - Volume - Basin 1 (ft ³)	100-Yr, 6-Hr - Elevation - Basin 1 (ft)
1,175.000	0.01	0.01	3.000	100.00
1,180.000	0.01	0.01	3.000	100.00
1,185.000	0.01	0.01	3.000	100.00
1,190.000	0.01	0.01	3.000	100.00
1,195.000	0.01	0.01	3.000	100.00
1,200.000	0.01	0.01	3.000	100.00
1,205.000	0.01	0.01	3.000	100.00
1,210.000	0.01	0.01	3.000	100.00
1,215.000	0.01	0.01	3.000	100.00
1,220.000	0.01	0.01	3.000	100.00
1,225.000	0.01	0.01	3.000	100.00
1,230.000	0.01	0.01	3.000	100.00
1,235.000	0.01	0.01	3.000	100.00
1,240.000	0.01	0.01	3.000	100.00
1,245.000	0.01	0.01	3.000	100.00
1,250.000	0.01	0.01	3.000	100.00
1,255.000	0.01	0.01	3.000	100.00
1,260.000	0.01	0.01	3.000	100.00
1,265.000	0.01	0.01	3.000	100.00
1,270.000	0.01	0.01	3.000	100.00
1,275.000	0.01	0.01	3.000	100.00
1,280.000	0.01	0.01	3.000	100.00
1,285.000	0.01	0.01	3.000	100.00
1,290.000	0.01	0.01	3.000	100.00
1,295.000	0.01	0.01	3.000	100.00
1,300.000	0.01	0.01	3.000	100.00
1,305.000	0.01	0.01	3.000	100.00
1,310.000	0.01	0.01	3.000	100.00
1,315.000	0.01	0.01	3.000	100.00
1,320.000	0.01	0.01	3.000	100.00
1,325.000	0.01	0.01	3.000	100.00
1,330.000	0.01	0.01	3.000	100.00
1,335.000	0.01	0.01	3.000	100.00
1,340.000	0.01	0.01	3.000	100.00
1,345.000	0.01	0.01	3.000	100.00
1,350.000	0.01	0.01	3.000	100.00
1,355.000	0.01	0.01	3.000	100.00
1,360.000	0.01	0.01	3.000	100.00
1,365.000	0.01	0.01	3.000	100.00
1,370.000	0.01	0.01	3.000	100.00
1,375.000	0.01	0.01	3.000	100.00
1,380.000	0.01	0.01	3.000	100.00
1,385.000	0.01	0.01	3.000	100.00
1,390.000	0.01	0.01	3.000	100.00
1,395.000	0.01	0.01	3.000	100.00
1,400.000	0.01	0.01	3.000	100.00
1,405.000	0.01	0.01	3.000	100.00

Graph Data Table - 100-Yr, 6-Hr

Time (min)	100-Yr, 6-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 6-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 6-Hr - Volume - Basin 1 (ft ³)	100-Yr, 6-Hr - Elevation - Basin 1 (ft)
1,410.000	0.01	0.01	3.000	100.00
1,415.000	0.01	0.01	3.000	100.00
1,420.000	0.01	0.01	3.000	100.00
1,425.000	0.01	0.01	3.000	100.00
1,430.000	0.01	0.01	3.000	100.00
1,435.000	0.01	0.01	3.000	100.00
1,440.000	0.01	0.01	3.000	100.00
1,445.000	0.01	0.01	3.000	100.00
1,450.000	0.01	0.01	3.000	100.00
1,455.000	0.01	0.01	3.000	100.00
1,460.000	0.01	0.01	3.000	100.00
1,465.000	0.01	0.01	3.000	100.00
1,470.000	0.01	0.01	3.000	100.00
1,475.000	0.01	0.01	3.000	100.00
1,480.000	0.01	0.01	3.000	100.00
1,485.000	0.01	0.01	3.000	100.00
1,490.000	0.01	0.01	3.000	100.00
1,495.000	0.01	0.01	3.000	100.00
1,500.000	0.01	0.01	3.000	100.00

Graph Data Table - 100-Yr, 6-Hr



Appendix J.VII

BMP Analysis 100-Year, 24-Hour Storm

Graph Data Table - 100-Yr, 24-Hr

Time (min)	100-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Volume - Basin 1 (ft ³)	100-Yr, 24-Hr - Elevation - Basin 1 (ft)
0.000	0.00	0.00	0.000	100.00
5.000	0.11	0.04	11.000	100.01
10.000	0.21	0.12	37.000	100.02
15.000	0.23	0.19	57.000	100.03
20.000	0.29	0.24	72.000	100.03
25.000	0.34	0.29	88.000	100.04
30.000	0.35	0.33	100.000	100.05
35.000	0.36	0.35	106.000	100.05
40.000	0.36	0.36	108.000	100.05
45.000	0.36	0.36	109.000	100.05
50.000	0.41	0.38	115.000	100.05
55.000	0.46	0.42	127.000	100.06
60.000	0.47	0.45	137.000	100.06
65.000	0.42	0.45	136.000	100.06
70.000	0.37	0.41	126.000	100.06
75.000	0.36	0.38	116.000	100.05
80.000	0.36	0.37	112.000	100.05
85.000	0.36	0.36	110.000	100.05
90.000	0.36	0.36	110.000	100.05
95.000	0.36	0.36	110.000	100.05
100.000	0.36	0.36	110.000	100.05
105.000	0.36	0.36	110.000	100.05
110.000	0.41	0.38	115.000	100.05
115.000	0.46	0.42	127.000	100.06
120.000	0.47	0.45	137.000	100.06
125.000	0.47	0.46	141.000	100.07
130.000	0.47	0.47	143.000	100.07
135.000	0.47	0.47	143.000	100.07
140.000	0.47	0.47	143.000	100.07
145.000	0.47	0.47	143.000	100.07
150.000	0.47	0.47	143.000	100.07
155.000	0.53	0.49	150.000	100.07
160.000	0.58	0.53	163.000	100.08
165.000	0.59	0.57	173.000	100.08
170.000	0.59	0.58	177.000	100.08
175.000	0.59	0.59	178.000	100.08
180.000	0.59	0.59	179.000	100.08
185.000	0.59	0.59	179.000	100.08
190.000	0.59	0.59	179.000	100.08
195.000	0.59	0.59	179.000	100.08
200.000	0.59	0.59	179.000	100.08
205.000	0.59	0.59	179.000	100.08
210.000	0.59	0.59	179.000	100.08
215.000	0.59	0.59	179.000	100.08
220.000	0.59	0.59	179.000	100.08
225.000	0.59	0.59	179.000	100.08
230.000	0.65	0.61	184.000	100.09

Graph Data Table - 100-Yr, 24-Hr

Time (min)	100-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Volume - Basin 1 (ft ³)	100-Yr, 24-Hr - Elevation - Basin 1 (ft)
235.000	0.70	0.65	196.000	100.09
240.000	0.71	0.69	206.000	100.10
245.000	0.71	0.70	210.000	100.10
250.000	0.71	0.71	211.000	100.10
255.000	0.71	0.71	211.000	100.10
260.000	0.76	0.73	216.000	100.10
265.000	0.81	0.77	227.000	100.11
270.000	0.82	0.80	236.000	100.11
275.000	0.83	0.82	240.000	100.12
280.000	0.83	0.83	243.000	100.12
285.000	0.83	0.83	244.000	100.12
290.000	0.88	0.85	248.000	100.12
295.000	0.93	0.89	259.000	100.13
300.000	0.94	0.92	268.000	100.13
305.000	0.84	0.90	263.000	100.13
310.000	0.74	0.83	243.000	100.12
315.000	0.72	0.76	225.000	100.11
320.000	0.76	0.75	221.000	100.11
325.000	0.81	0.77	228.000	100.11
330.000	0.82	0.80	236.000	100.12
335.000	0.88	0.83	245.000	100.12
340.000	0.93	0.88	258.000	100.13
345.000	0.94	0.92	268.000	100.13
350.000	0.95	0.94	273.000	100.13
355.000	0.95	0.95	275.000	100.14
360.000	0.95	0.95	276.000	100.14
365.000	1.00	0.97	281.000	100.14
370.000	1.05	1.01	292.000	100.14
375.000	1.06	1.04	301.000	100.15
380.000	1.07	1.06	305.000	100.15
385.000	1.07	1.07	308.000	100.15
390.000	1.07	1.07	309.000	100.15
395.000	1.12	1.09	314.000	100.16
400.000	1.17	1.13	324.000	100.16
405.000	1.18	1.16	333.000	100.17
410.000	1.18	1.17	337.000	100.17
415.000	1.18	1.18	338.000	100.17
420.000	1.18	1.18	339.000	100.17
425.000	1.18	1.18	339.000	100.17
430.000	1.18	1.18	339.000	100.17
435.000	1.18	1.18	339.000	100.17
440.000	1.24	1.20	345.000	100.17
445.000	1.29	1.24	358.000	100.18
450.000	1.30	1.28	369.000	100.18
455.000	1.36	1.31	380.000	100.19
460.000	1.41	1.36	394.000	100.20
465.000	1.42	1.40	405.000	100.20

Graph Data Table - 100-Yr, 24-Hr

Time (min)	100-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Volume - Basin 1 (ft ³)	100-Yr, 24-Hr - Elevation - Basin 1 (ft)
470.000	1.47	1.43	415.000	100.21
475.000	1.52	1.47	429.000	100.21
480.000	1.53	1.51	439.000	100.22
485.000	1.65	1.56	456.000	100.22
490.000	1.75	1.66	484.000	100.24
495.000	1.77	1.73	506.000	100.25
500.000	1.78	1.76	516.000	100.25
505.000	1.78	1.77	520.000	100.25
510.000	1.78	1.78	521.000	100.26
515.000	1.83	1.80	527.000	100.26
520.000	1.88	1.84	539.000	100.26
525.000	1.89	1.87	549.000	100.27
530.000	1.95	1.90	560.000	100.27
535.000	2.00	1.95	574.000	100.28
540.000	2.01	1.99	585.000	100.29
545.000	2.12	2.04	601.000	100.29
550.000	2.22	2.13	628.000	100.31
555.000	2.24	2.20	649.000	100.32
560.000	2.30	2.25	664.000	100.32
565.000	2.35	2.30	680.000	100.33
570.000	2.36	2.34	691.000	100.34
575.000	2.42	2.37	700.000	100.34
580.000	2.47	2.42	714.000	100.35
585.000	2.48	2.46	723.000	100.35
590.000	2.54	2.49	733.000	100.36
595.000	2.59	2.54	746.000	100.37
600.000	2.60	2.58	756.000	100.37
605.000	2.22	2.46	725.000	100.35
610.000	1.87	2.18	644.000	100.31
615.000	1.80	1.95	573.000	100.28
620.000	1.78	1.84	540.000	100.26
625.000	1.78	1.80	528.000	100.26
630.000	1.78	1.79	524.000	100.26
635.000	2.05	1.87	550.000	100.27
640.000	2.30	2.08	613.000	100.30
645.000	2.35	2.25	664.000	100.32
650.000	2.37	2.32	687.000	100.33
655.000	2.37	2.35	695.000	100.34
660.000	2.37	2.37	698.000	100.34
665.000	2.31	2.35	694.000	100.34
670.000	2.26	2.31	682.000	100.33
675.000	2.25	2.27	672.000	100.33
680.000	2.25	2.26	667.000	100.32
685.000	2.25	2.25	666.000	100.32
690.000	2.25	2.25	666.000	100.32
695.000	2.14	2.21	654.000	100.32
700.000	2.04	2.13	629.000	100.31

Graph Data Table - 100-Yr, 24-Hr

Time (min)	100-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Volume - Basin 1 (ft ³)	100-Yr, 24-Hr - Elevation - Basin 1 (ft)
705.000	2.02	2.06	608.000	100.30
710.000	2.07	2.05	604.000	100.29
715.000	2.12	2.08	614.000	100.30
720.000	2.13	2.11	623.000	100.30
725.000	2.51	2.25	666.000	100.32
730.000	2.86	2.55	747.000	100.37
735.000	2.93	2.78	811.000	100.40
740.000	3.01	2.91	846.000	100.42
745.000	3.06	2.99	871.000	100.43
750.000	3.07	3.04	886.000	100.44
755.000	3.19	3.10	904.000	100.45
760.000	3.29	3.20	933.000	100.46
765.000	3.31	3.27	954.000	100.47
770.000	3.41	3.33	974.000	100.48
775.000	3.49	3.41	998.000	100.49
780.000	3.52	3.47	1,018.000	100.50
785.000	3.97	3.48	1,072.000	100.52
790.000	4.37	3.48	1,209.000	100.59
795.000	4.46	3.48	1,380.000	100.68
800.000	4.50	3.48	1,639.000	100.77
805.000	4.51	3.48	2,052.000	100.87
810.000	4.52	3.48	2,466.000	100.97
815.000	3.70	3.48	2,697.000	101.02
820.000	2.93	3.48	2,645.000	101.01
825.000	2.79	3.48	2,401.000	100.96
830.000	2.72	3.48	2,111.000	100.89
835.000	2.72	3.48	1,817.000	100.81
840.000	2.72	3.48	1,513.000	100.74
845.000	2.98	3.48	1,386.000	100.68
850.000	3.22	3.48	1,314.000	100.65
855.000	3.27	3.48	1,272.000	100.62
860.000	3.21	3.48	1,229.000	100.60
865.000	3.14	3.48	1,172.000	100.57
870.000	3.14	3.48	1,104.000	100.54
875.000	3.14	3.48	1,035.000	100.51
880.000	3.15	3.31	966.000	100.47
885.000	3.16	3.20	935.000	100.46
890.000	3.08	3.15	918.000	100.45
895.000	3.01	3.08	897.000	100.44
900.000	3.00	3.03	882.000	100.44
905.000	2.93	2.99	869.000	100.43
910.000	2.86	2.92	850.000	100.42
915.000	2.85	2.88	837.000	100.41
920.000	2.79	2.84	827.000	100.41
925.000	2.74	2.79	813.000	100.40
930.000	2.73	2.75	803.000	100.40
935.000	2.50	2.66	778.000	100.38

Graph Data Table - 100-Yr, 24-Hr

Time (min)	100-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Volume - Basin 1 (ft ³)	100-Yr, 24-Hr - Elevation - Basin 1 (ft)
940.000	2.30	2.48	730.000	100.36
945.000	2.27	2.35	694.000	100.34
950.000	2.25	2.29	677.000	100.33
955.000	2.25	2.26	669.000	100.33
960.000	2.25	2.25	667.000	100.32
965.000	1.43	1.97	581.000	100.28
970.000	0.68	1.35	391.000	100.19
975.000	0.54	0.85	249.000	100.12
980.000	0.47	0.62	186.000	100.09
985.000	0.47	0.52	158.000	100.07
990.000	0.47	0.49	148.000	100.07
995.000	0.42	0.46	140.000	100.07
1,000.000	0.37	0.42	127.000	100.06
1,005.000	0.36	0.38	116.000	100.05
1,010.000	0.36	0.37	112.000	100.05
1,015.000	0.36	0.36	111.000	100.05
1,020.000	0.36	0.36	110.000	100.05
1,025.000	0.46	0.39	120.000	100.06
1,030.000	0.56	0.47	144.000	100.07
1,035.000	0.58	0.54	164.000	100.08
1,040.000	0.59	0.57	173.000	100.08
1,045.000	0.59	0.58	177.000	100.08
1,050.000	0.59	0.59	178.000	100.08
1,055.000	0.59	0.59	179.000	100.08
1,060.000	0.59	0.59	179.000	100.08
1,065.000	0.59	0.59	179.000	100.08
1,070.000	0.54	0.57	174.000	100.08
1,075.000	0.49	0.53	163.000	100.08
1,080.000	0.48	0.50	153.000	100.07
1,085.000	0.47	0.48	147.000	100.07
1,090.000	0.47	0.47	145.000	100.07
1,095.000	0.47	0.47	144.000	100.07
1,100.000	0.47	0.47	144.000	100.07
1,105.000	0.47	0.47	143.000	100.07
1,110.000	0.47	0.47	143.000	100.07
1,115.000	0.42	0.45	138.000	100.07
1,120.000	0.37	0.41	126.000	100.06
1,125.000	0.36	0.38	116.000	100.05
1,130.000	0.30	0.35	106.000	100.05
1,135.000	0.25	0.30	91.000	100.04
1,140.000	0.24	0.26	80.000	100.04
1,145.000	0.29	0.26	81.000	100.04
1,150.000	0.34	0.30	91.000	100.04
1,155.000	0.35	0.33	101.000	100.05
1,160.000	0.41	0.36	111.000	100.05
1,165.000	0.46	0.41	126.000	100.06
1,170.000	0.47	0.45	137.000	100.06

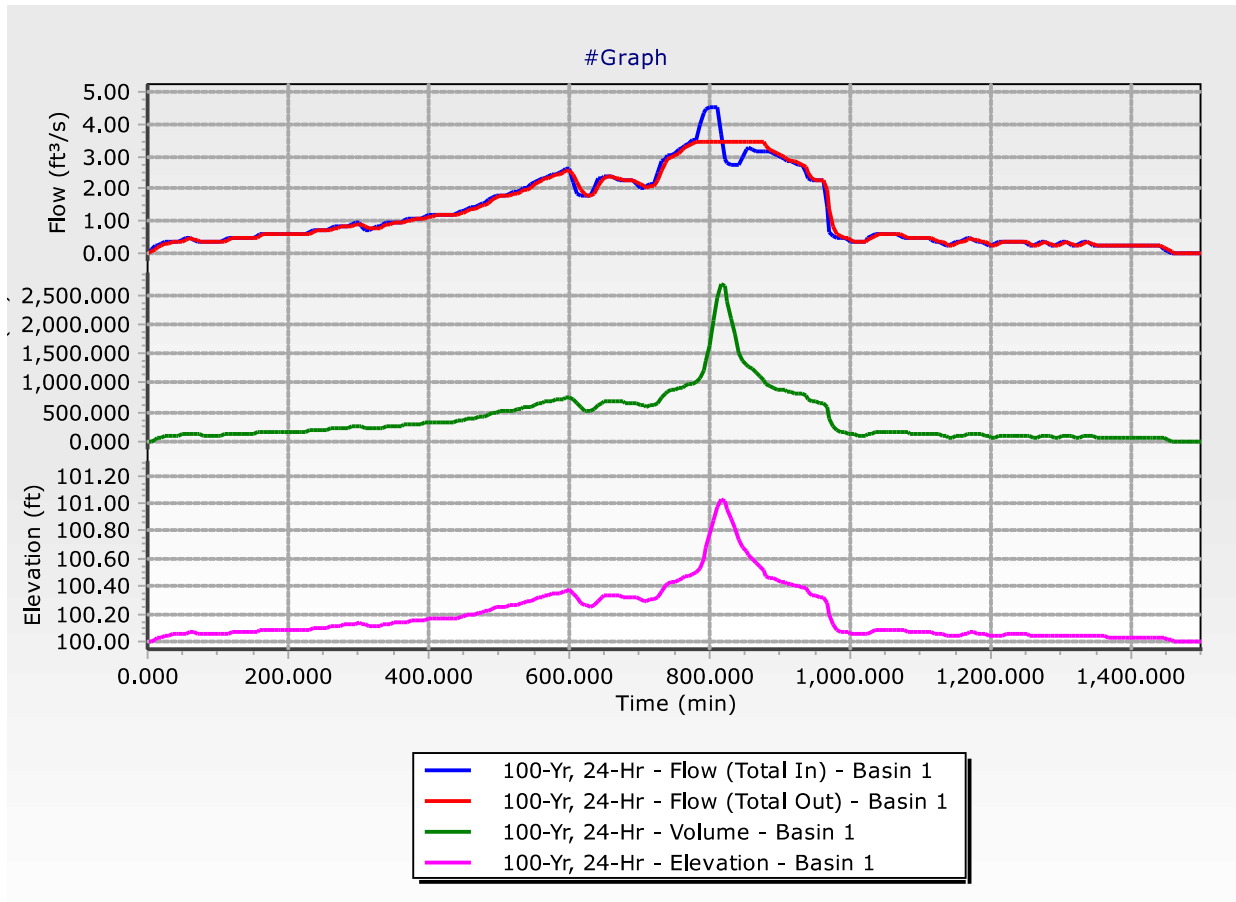
Graph Data Table - 100-Yr, 24-Hr

Time (min)	100-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Volume - Basin 1 (ft ³)	100-Yr, 24-Hr - Elevation - Basin 1 (ft)
1,175.000	0.42	0.45	136.000	100.06
1,180.000	0.37	0.41	126.000	100.06
1,185.000	0.36	0.38	116.000	100.05
1,190.000	0.30	0.35	106.000	100.05
1,195.000	0.25	0.30	91.000	100.04
1,200.000	0.24	0.26	80.000	100.04
1,205.000	0.29	0.26	81.000	100.04
1,210.000	0.34	0.30	91.000	100.04
1,215.000	0.35	0.33	101.000	100.05
1,220.000	0.36	0.35	106.000	100.05
1,225.000	0.36	0.36	109.000	100.05
1,230.000	0.36	0.36	109.000	100.05
1,235.000	0.36	0.36	110.000	100.05
1,240.000	0.36	0.36	110.000	100.05
1,245.000	0.36	0.36	110.000	100.05
1,250.000	0.30	0.34	104.000	100.05
1,255.000	0.25	0.30	90.000	100.04
1,260.000	0.24	0.26	80.000	100.04
1,265.000	0.29	0.26	81.000	100.04
1,270.000	0.34	0.30	91.000	100.04
1,275.000	0.35	0.33	101.000	100.05
1,280.000	0.30	0.33	100.000	100.05
1,285.000	0.25	0.29	89.000	100.04
1,290.000	0.24	0.26	79.000	100.04
1,295.000	0.29	0.26	80.000	100.04
1,300.000	0.34	0.30	91.000	100.04
1,305.000	0.35	0.33	101.000	100.05
1,310.000	0.30	0.33	100.000	100.05
1,315.000	0.25	0.29	89.000	100.04
1,320.000	0.24	0.26	79.000	100.04
1,325.000	0.29	0.26	80.000	100.04
1,330.000	0.34	0.30	91.000	100.04
1,335.000	0.35	0.33	101.000	100.05
1,340.000	0.30	0.33	100.000	100.05
1,345.000	0.25	0.29	89.000	100.04
1,350.000	0.24	0.26	79.000	100.04
1,355.000	0.24	0.25	75.000	100.04
1,360.000	0.24	0.24	74.000	100.03
1,365.000	0.24	0.24	73.000	100.03
1,370.000	0.24	0.24	73.000	100.03
1,375.000	0.24	0.24	73.000	100.03
1,380.000	0.24	0.24	73.000	100.03
1,385.000	0.24	0.24	73.000	100.03
1,390.000	0.24	0.24	73.000	100.03
1,395.000	0.24	0.24	73.000	100.03
1,400.000	0.24	0.24	73.000	100.03
1,405.000	0.24	0.24	73.000	100.03

Graph Data Table - 100-Yr, 24-Hr

Time (min)	100-Yr, 24-Hr - Flow (Total In) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Flow (Total Out) - Basin 1 (ft ³ /s)	100-Yr, 24-Hr - Volume - Basin 1 (ft ³)	100-Yr, 24-Hr - Elevation - Basin 1 (ft)
1,410.000	0.24	0.24	73.000	100.03
1,415.000	0.24	0.24	73.000	100.03
1,420.000	0.24	0.24	73.000	100.03
1,425.000	0.24	0.24	73.000	100.03
1,430.000	0.24	0.24	73.000	100.03
1,435.000	0.24	0.24	73.000	100.03
1,440.000	0.24	0.24	73.000	100.03
1,445.000	0.13	0.20	62.000	100.03
1,450.000	0.03	0.12	36.000	100.02
1,455.000	0.01	0.05	16.000	100.01
1,460.000	0.01	0.02	7.000	100.00
1,465.000	0.01	0.01	4.000	100.00
1,470.000	0.01	0.01	3.000	100.00
1,475.000	0.01	0.01	3.000	100.00
1,480.000	0.01	0.01	3.000	100.00
1,485.000	0.01	0.01	3.000	100.00
1,490.000	0.01	0.01	3.000	100.00
1,495.000	0.01	0.01	3.000	100.00
1,500.000	0.01	0.01	3.000	100.00

Graph Data Table - 100-Yr, 24-Hr



Appendix K

Hydraulic Analysis

To be completed during final engineering