# PRELIMINARY HYDROLOGY REPORT

# for

# CITRUS INDUSTRIAL DEVELOPMENT

**East of Citrus Avenue,**
**Between Slover Avenue and Boyle Avenue,**
**City of Fontana, CA**

***Prepared For:***

**Crow Holdings Industrial**
**527 W. 7th Street, Suite 200**
**Los Angeles, CA 90014**

***Prepared By:***

**Langan Engineering and Environmental Services, Inc.**
**11801 Pierce Street**
**Riverside, CA 92505**

**Michael Golias**
**Professional Engineer License No. 91029**

**Prepared: April 2023**
**Langan Project No. 722012201**

LANGAN

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# 1. INTRODUCTION

The purpose of this Hydrology Report is to analyze the existing and proposed surface-water hydrology and identify impacts that are associated with the proposed industrial development. This report provides analysis for designing the proposed on-site stormwater drainage system.

According to the analysis, the proposed development will mitigate the increased stormwater runoff and will not create any additional impacts to the downstream storm drain infrastructure. Furthermore, the proposed development will be protected against flooding in a 100-year, 24-hour storm event.

# 2. PROJECT DESCRIPTION

## 2.1. Existing Site Description

The project site is approximately 16.12 acres and is located in the City of Fontana, County of San Bernardino, California. The site is bounded to the north by Boyle Avenue, to the west by Citrus Avenue Street, to the south by Slover Avenue, and to the east by residential property. The site currently consists of residential buildings, which will be demolished prior to construction. See Figure 1 for the site vicinity map.

## 2.2. Proposed Site Description

The proposed development consists of a ±361,100 square foot industrial warehouse with auto parking and trailer parking spaces. Truck docking areas will be located along the west and south faces of the building. The project site will dedicate right-of-way for Boyle Avenue to the north. According to the City of Fontana's zoning map, the project site is designated as Light Industrial (M-1). See Figure 2 for the proposed site plan.

Off-site roadway improvements are proposed as part of this project development. Half-width improvements are proposed along Boyle Avenue. New curb & gutter and a median break for a left-hand turning pocket are proposed along Slover Avenue.

## 2.3. Existing Drainage Patterns

The existing drainage pattern generally drains from northeast to southwest and splits into 2 separate drainage areas.

Stormwater runoff from Area A drains to the west of the site (northwest of the AMPM gas station) and discharges to an existing catch basin in the landscaping east of Citrus Avenue. This catch basin conveys runoff to a catch basin in Citrus Ave and ultimately discharges to the existing 24-inch storm drain in Citrus Ave. See Figure 3 for the Pre-Development Hydrology Map.

Stormwater runoff from Area B drains to the southwest of the site and discharges directly onto Slover Avenue. Runoff on Slover Ave gets conveyed to the west via gutter flow and discharges

into an existing catch basin at northeast corner of the intersection of Slover Ave and Citrus Ave. This catch basin ultimately discharges to the existing 42-inch storm drain in Citrus Ave.

### 2.4. Proposed Drainage Patterns

The proposed development splits the site into 2 separate drainage patterns. Drainage area A is the western portion of the site, and drainage Area B is the eastern portion of the site.

Each drainage area will propose catch basin inlets to capture stormwater runoff and convey it via an underground storm drain system. Roof drains are anticipated to spill directly to grade and will be captured via catch basins. The project proposes 2 underground stormwater chamber systems for detention, 1 for each drainage area. Each chamber system will have a pre-treatment device to remove sediments and debris from runoff before entering the chambers. Any overflow from each chamber will drain to their respective proposed bubbler box and ultimately discharge to Slover Avenue via under-sidewalk parkway drains.

No underground off-site storm drain improvements are proposed as part of this project.

## 3. PROJECT ANALYSIS

### 3.1. Methodology

The hydrology analysis was conducted in accordance with the San Bernardino County Hydrology Manual and San Bernardino County Detention Basin Design Criteria. The hydrology calculations were performed using the CivilDesign software. The CivilDesign Rational Method program was used to calculate the pre- and post- development peak flow rates. The CivilDesign Unit Hydrograph Method and Flood Hydrograph Routing programs were used to calculate the peak flow rates after detention basin attenuation.

Per the Detention Basin Design Criteria for pre-development condition, the 10-year peak flow rate was calculated using 5-year rainfall, the 25-year peak flow rate was calculated using 10-year rainfall, and the 100-year peak flow rate was calculated using 25-year rainfall and AMC-2.

Rainfall depths were based on NOAA Atlas 14 Point Precipitation Frequency Estimates (Appendix A). The site hydrologic soil type is "A" (Appendix B). AMC-1 was used for 2-year rainfall conditions, AMC-2 was used for 10-, 25-, and 50-year rainfall conditions, and AMC-3 was used for 100-year rainfall conditions. See table 3.1.1 for pre- and post-development rainfall data used for the analysis.

**Table 3.1.1 Rainfall Data Summary**

| Design Storm Event | Pre-Dev Rainfall Depth (in) | Post-Dev Rainfall Depth (in) |
|---|---|---|
| 2-year, 1-Hour | 0.533 | 0.533 |
| 10-year, 1-Hour | 0.707 | 0.856 |
| 25-year, 1-Hour | 0.856 | 1.07 |
| 100-year, 1-Hour | 1.07 | 1.42 |

## 3.2. Hydrology Results & Analysis

Based on the hydrologic analysis, the proposed project site will result in an increased peak flow rate and runoff volume due to an increase in impervious area for the project development. In order to mitigate this increase in flow rate and volume, the project proposes underground stormwater chambers to capture, treat, and attenuate the stormwater runoff. The chambers were designed to fully capture and infiltrate the water quality Design Capture Volume. In addition, the chambers and outlet pipes were designed to discharge stormwater at peak flow rates less than 90% of the pre-development peak flow rates.

Once the mitigated stormwater runoff is discharged on to Slover Avenue, the runoff will follow the pre-development drainage pattern and discharge into the existing catch basin at the northeast corner of the intersection of Slover Ave and Citrus Ave.

Drainage sub-areas were delineated to calculated peak flow rates and time of concentrations for each sub-area using the Rational Method program. Some smaller drainage areas were calculated together to simplify the calculations. The elevations shown along the roof were labeled to simulate a 1% roof pitch to estimate the critical flow path. See Figure 4 for the post-development hydrology map.

The tables below provide a summary of the peak flow rates and runoff volumes for pre- and post-development conditions. See Appendices D and E for the CivilDesign hydrology calculations for each sub-area.

**Table 3.2.1 Pre-Development Peak Flow Rate Summary**

| Drainage Area ID | Area (acres) | $Q_2$ (cfs) | $Q_{10}$ (cfs) | $Q_{25}$ (cfs) | $Q_{100}$ (cfs) | Discharge Point |
|---|---|---|---|---|---|---|
| A | 2.40 | 1.65 | 2.62 | 3.47 | 4.66 | Existing catch basin west of property line, east of Citrus Ave |
| B | 13.73 | 8.04 | 12.19 | 16.57 | 22.73 | Discharges directly to Slover Ave |
| **Total** | **16.13** | **9.69** | **14.81** | **20.04** | **27.39** | |
| **Allowable Q's (90%):** | | **8.72** | **13.33** | **18.04** | **24.65** | |

**Table 3.2.2 Post-Development Peak Flow Rate Summary**

| Drainage Area ID | Area (acres) | $Q_{100}$ (cfs) Unmitigated | $Q_{100}$ (cfs) Mitigated | Discharge Point |
|---|---|---|---|---|
| A | 8.20 | 33.77 | 6.28 | Enters Chamber A, exits via parkway drain to Slover Ave |
| B | 7.64 | 29.16 | 6.28 | Enters Chamber B, exits via parkway drain to Slover Ave |
| **Total** | **15.84** | **62.93** | **12.56** | |

Since the post-development Q100 of 12.56 cfs is less than the pre-development allowable Q100 of 24.65, the flood mitigation requirements for the 100-year storm is met. The final

hydrology report analysis will ensure that 2-, 10-, and 25-year design storms also meet this flood mitigation requirement.

### 3.3. Hydraulics Analysis

The final hydrology report will include hydraulic analysis and calculations for sizing of the parking culverts, catch basins, and inlets.

## 4. CONCLUSION

The proposed on-site underground stormwater chambers have been designed to capture and infiltrate the Design Capture Volume and attenuate the increased peak flow rates for stormwater discharge. The proposed development will not contribute runoff that would exceed the pre-development conditions and, therefore, will not impact existing downstream storm drain facilities.

## 5. REFERENCES

1. San Bernardino County Hydrology Manual, August 1986

2. Detention Basin Design Criteria for San Bernardino County and Memo, September 1987

3. City of Fontana Master Storm Drainage Plan Study, June 1992

# FIGURES


LANGAN

11801 Pierce Street, Riverside, CA 92505
T: 951.710.3000 www.langan.com

NEW JERSEY NEW YORK CONNECTICUT PENNSYLVANIA
WASHINGTON DC VIRGINIA WEST VIRGINIA OHIO FLORIDA
TEXAS ARIZONA CALIFORNIA

ABU DHABI ATHENS DOHA
DUBAI ISTANBUL LONDON PANAMA

Langan Engineering & Environmental Services, Inc.

Project

CITRUS

CITY OF FONTANA

SAN BERNARDINO COUNTY CALIFORNIA

Drawing Title

VICINITY MAP

Project No. 722012201

Date 04/21/2023

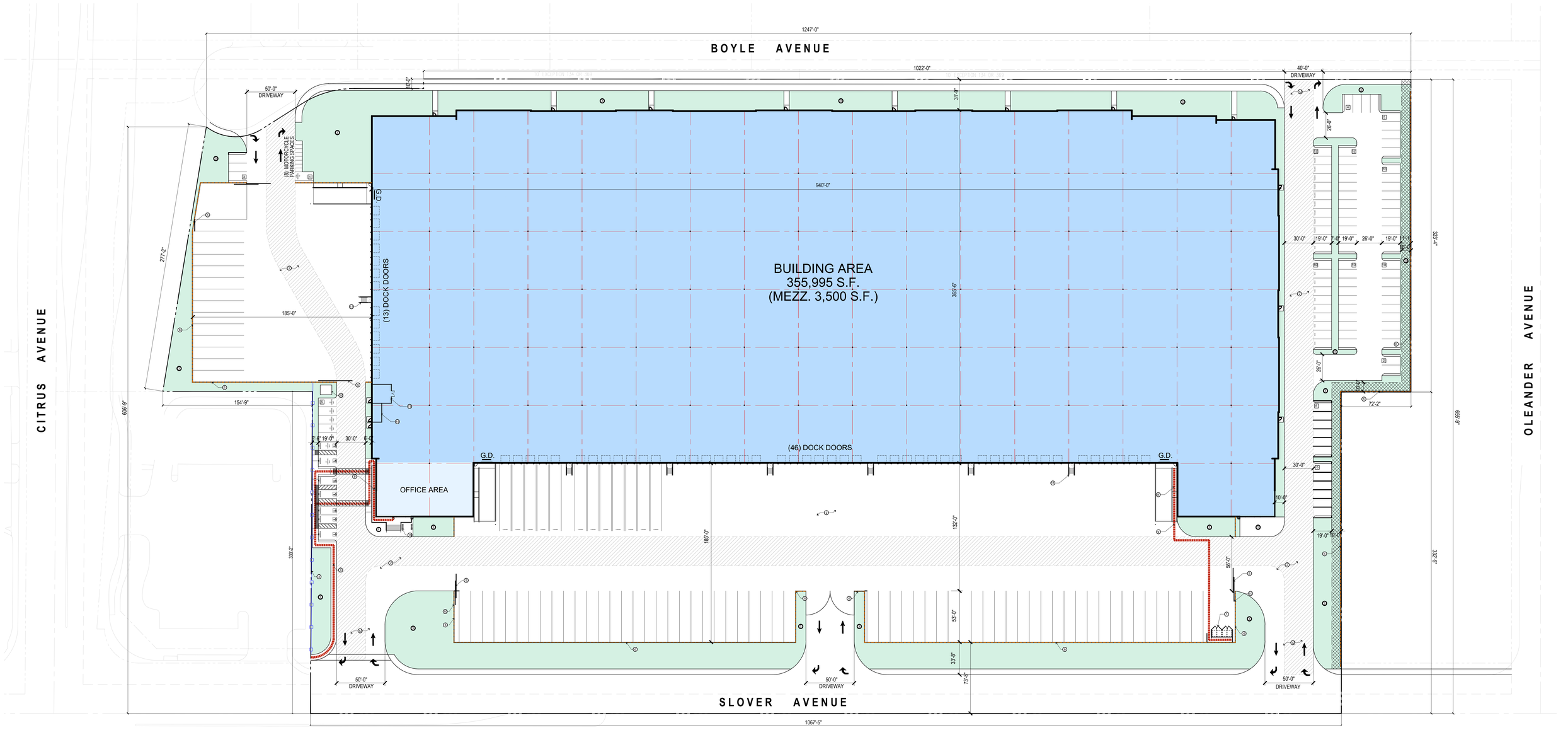
Scale 1:500

Drawn By KL

Figure 1



Date: 4/20/2023 Time: 09:15 User: dburgess Style Table: Langan.stb Layout: 1 Document Code: 722012201-0201-CS101-0101




## OVERALL SITE PLAN

SCALE: 1"=40' (1)

## GRAPHIC LEGEND:

- = OFFICE ENTRY
- G.D. = GRADE DOOR (12'X15')
- = A.D.A. ACCESSIBLE PRKG.
- = PROPERTY LINE (SEE CIVIL)
- = DOCK DOOR & LEVELER
- = CANOPY OR OVERHANG
- = CENTERLINE OR GRID LINE
- = EASEMENT (SEE CIVIL)
- = TRASH ENCLOSURE W/ SOLID ROOF A.D.A. ACCESSIBLE
- = WB-67' TRACTOR TRAILER
- = ADA PATH OF TRAVEL
- = 11' X 53' TRAILER PARKING
- = LIGHT STANDARD LUMINAIR N.T.S. MUST BE FULLY SHIELDED SEC. 19.7.8.E.2.A.4
- = WALL PACK WITH CUT-OFF N.T.S. SHALL NOT EXCEED 18' ABOVE GRADE
- = 10'H SCREEN WALL
- = 9'H VINYL COATED CHAIN LINK FENCE
- = FIRE LANE
- = FIRE HYDRANT
- = 10' BUFFER AREA PER ORDINANCE NO. 1891

## SITE DATA TABLE

| BUILDING | LAND AREA AC | LAND AREA SF | FAR % | BLDG FOOT PRINT | BLDG MEZZ. | TOTAL BLDG SF | OFFICE SF | WAREHOUSE SF | PRKG REQ. | PRKG PROV. | TRAILER PRKG. PROV. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ±17.39 | ±757,768 | 47.0% | 352,495 | 3,500 | 355,995 | 7,000 | 348,995 | 92 | 103 | 72 |

## OCCUPANCY CLASSIFICATION:

BUILDING: B, S1
CONSTRUCTION TYPE: IIIB

## PARKING STALL SIZES:

STANDARD PARKING STALL - 9' X 19'
A.D.A. (ACCESSIBLE) STALL - 9' X 19'
12'X19' (VAN)

## LAND USE:

M-1 LIGHT INDUSTRIAL

## KEY NOTES: (#)

1. PEDESTRIAN PAVING (SEE CIVIL & LANDSCAPE)
2. CONCRETE VEHICULAR PAVING (SEE CIVIL)
3. LANDSCAPE AREA (SEE LANDSCAPE)
4. 9'H VINYL COATED CHAIN LINK FENCE
5. BI PARTING MANUAL ROLLING GATE WITH FUTURE POWER (8' HEIGHT)
6. 10'H SCREEN WALL PER ORDINANCE NO.1891
7. TRASH ENCLOSURE (ADA COMPLIANT)
8. ADA RAMP (AS REQUIRED)
9. ADA PATH OF TRAVEL
10. PROVIDE KNOX BOX (LOCATION PER FIRE DEPT.)
11. CONCRETE STAIRS
12. EMERGENCY VEHICLE ACCESS GATE
13. PUMP ROOM
14. ELECTRICAL ROOM
15. (12) BICYCLE SPACES
16. TRANSFORMER

CROW HOLDINGS DEVELOPMENT

# CITRUS & BOYLE

FONTANA, CA

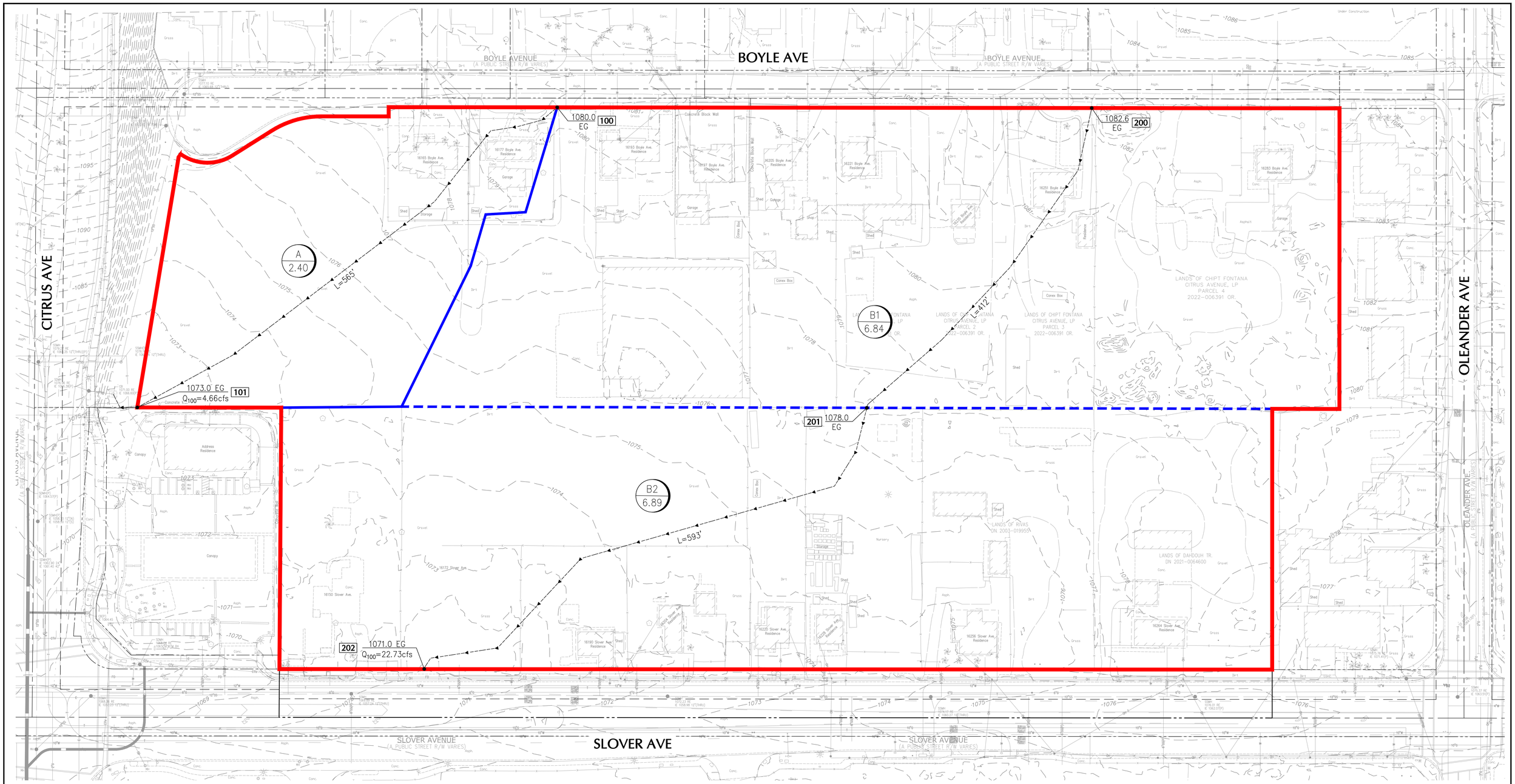
CONCEPTUAL SITE PLAN & PROJECT DATA

40' 0 5' 10' 20' 40' 60' 80'

Architecture. Design. Relationships.

**A1.1**

2023-0244
2023-05-04




## LEGEND

- PROJECT AREA BOUNDARY
- DRAINAGE AREA BOUNDARY
- DRAINAGE SUB-AREA BOUNDARY
- FLOW PATH
- DRAINAGE AREA ID
- ID / AREA
- DRAINAGE AREA (ACRE)
- ### NODE ID

## GENERAL NOTES

1. SEE PRELIMINARY HYDROLOGY REPORT, PREPARED BY LANGAN, FOR COMPLETE PRE-DEVELOPMENT HYDROLOGY CALCULATIONS.
2. CALCULATIONS WERE BASED ON THE REQUIREMENTS OF THE SAN BERNARDINO HYDROLOGY MANUAL FOR THE 100-YEAR STORM EVENT.
3. ALL EXISTING ELEVATIONS AND INVERT ELEVATIONS ARE APPROXIMATE.

40 0 10 25 40
SCALE 1 INCH = 40 FEET

| Date | Description | No. |
|---|---|---|
| Revisions | | |

Signature Date

LANGAN
Langan Engineering and Environmental Services, Inc.
11801 Pierce Street
Riverside, CA 92505
T: 951.710.3000 www.langan.com

Project: CITRUS
CITY OF FONTANA
SAN BERNARDINO COUNTY CALIFORNIA

Drawing Title: PRE- DEVELOPMENT HYDROLOGY MAP

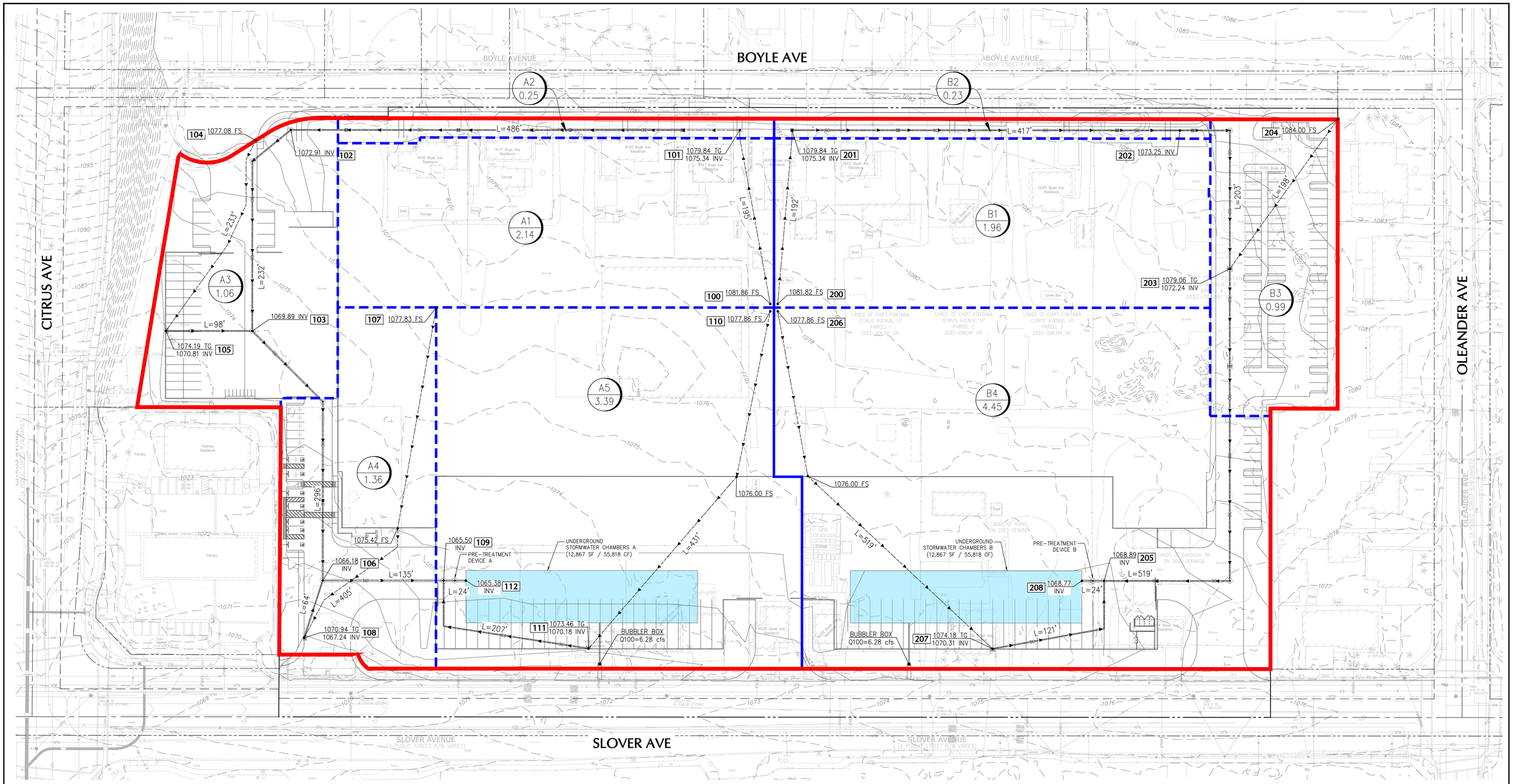
Project No. 722012201
Date 04/21/2023
Drawn By DMB
Checked By MRG

Figure No. 3

Sheet 1 of 1



Date: 4/20/2023 Time: 09:09 User: dburgess Style Table: Langan.stb Layout: CA104 Document Code: 722012201-0201-CA104-0101




## LEGEND

- PROJECT AREA BOUNDARY
- BASIN DRAINAGE AREA BOUNDARY
- BASIN DRAINAGE SUB-AREA BOUNDARY
- FLOW PATH
- DRAINAGE SUB-AREA ID
- ID / AREA — DRAINAGE SUB-AREA (ACRE)
- ### — NODE ID
- PROPOSED UNDERGROUND INFILTRATION CHAMBERS FOOTPRINT
- PROPOSED BUILDING AREA

## GENERAL NOTES

1. SEE PRELIMINARY HYDROLOGY REPORT, PREPARED BY LANGAN, FOR COMPLETE PRE-DEVELOPMENT HYDROLOGY CALCULATIONS.
2. CALCULATIONS WERE BASED ON THE REQUIREMENTS OF THE SAN BERNARDINO HYDROLOGY MANUAL FOR THE 100-YEAR STORM EVENT.
3. PROPOSED ON-SITE DRAINAGE SYSTEM LAYOUT IS PRELIMINARY.
4. ALL EXISTING ELEVATIONS AND INVERT ELEVATIONS ARE APPROXIMATE.

40 0 10 25 40
SCALE 1 INCH = 40 FEET

| Date | Description | No. |
|---|---|---|
| Revisions | | |

Signature Date


LANGAN
Langan Engineering and Environmental Services, Inc.
11801 Pierce Street
Riverside, CA 92505
T: 951.710.3000 www.langan.com


Project
CITRUS
CITY OF FONTANA
SAN BERNARDINO COUNTY CALIFORNIA

Drawing Title
POST-DEVELOPMENT HYDROLOGY MAP

| | |
|---|---|
| Project No. | 722012201 |
| Date | 05/12/2023 |
| Drawn By | DMB |
| Checked By | MRG |

Figure No. 4

Sheet 1 of 1

# APPENDIX A

# NOAA ATLAS 14 RAINFALL DATA

**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Fontana, California, USA***
**Latitude: 34.0638°, Longitude: -117.4517°**
**Elevation: m/ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

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

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.107** (0.089-0.130) | **0.140** (0.117-0.170) | **0.186** (0.154-0.226) | **0.225** (0.185-0.276) | **0.280** (0.223-0.356) | **0.326** (0.253-0.423) | **0.373** (0.283-0.497) | **0.425** (0.313-0.583) | **0.499** (0.352-0.714) | **0.560** (0.381-0.830) |
| 10-min | **0.153** (0.128-0.186) | **0.201** (0.167-0.244) | **0.266** (0.221-0.324) | **0.322** (0.265-0.396) | **0.402** (0.320-0.511) | **0.467** (0.363-0.606) | **0.535** (0.406-0.713) | **0.609** (0.449-0.835) | **0.715** (0.505-1.02) | **0.802** (0.546-1.19) |
| 15-min | **0.185** (0.154-0.225) | **0.243** (0.202-0.295) | **0.322** (0.267-0.392) | **0.390** (0.321-0.478) | **0.486** (0.387-0.618) | **0.564** (0.439-0.733) | **0.647** (0.491-0.862) | **0.737** (0.543-1.01) | **0.865** (0.610-1.24) | **0.970** (0.661-1.44) |
| 30-min | **0.277** (0.231-0.336) | **0.364** (0.303-0.442) | **0.483** (0.400-0.587) | **0.584** (0.480-0.716) | **0.728** (0.579-0.925) | **0.845** (0.657-1.10) | **0.969** (0.735-1.29) | **1.10** (0.813-1.51) | **1.30** (0.914-1.85) | **1.45** (0.989-2.15) |
| 60-min | **0.407** (0.339-0.493) | **0.533** (0.444-0.647) | **0.707** (0.587-0.861) | **0.856** (0.704-1.05) | **1.07** (0.849-1.36) | **1.24** (0.964-1.61) | **1.42** (1.08-1.89) | **1.62** (1.19-2.22) | **1.90** (1.34-2.72) | **2.13** (1.45-3.16) |
| 2-hr | **0.609** (0.507-0.738) | **0.788** (0.656-0.957) | **1.03** (0.854-1.25) | **1.23** (1.01-1.51) | **1.51** (1.20-1.91) | **1.73** (1.34-2.24) | **1.95** (1.48-2.60) | **2.19** (1.62-3.01) | **2.53** (1.79-3.62) | **2.80** (1.91-4.15) |
| 3-hr | **0.775** (0.646-0.940) | **0.999** (0.832-1.21) | **1.30** (1.08-1.58) | **1.54** (1.27-1.89) | **1.87** (1.49-2.38) | **2.13** (1.66-2.77) | **2.40** (1.82-3.19) | **2.68** (1.97-3.67) | **3.06** (2.16-4.38) | **3.36** (2.29-4.99) |
| 6-hr | **1.11** (0.923-1.34) | **1.43** (1.19-1.73) | **1.84** (1.53-2.24) | **2.17** (1.79-2.66) | **2.62** (2.08-3.33) | **2.96** (2.30-3.84) | **3.30** (2.51-4.40) | **3.66** (2.69-5.01) | **4.13** (2.92-5.91) | **4.50** (3.06-6.67) |
| 12-hr | **1.47** (1.22-1.78) | **1.90** (1.59-2.31) | **2.46** (2.04-2.99) | **2.90** (2.38-3.56) | **3.48** (2.77-4.42) | **3.91** (3.04-5.08) | **4.34** (3.29-5.78) | **4.78** (3.52-6.55) | **5.35** (3.78-7.66) | **5.78** (3.94-8.57) |
| 24-hr | **1.98** (1.75-2.28) | **2.60** (2.30-3.00) | **3.39** (2.99-3.93) | **4.01** (3.51-4.68) | **4.82** (4.08-5.81) | **5.42** (4.50-6.67) | **6.01** (4.87-7.57) | **6.59** (5.19-8.53) | **7.36** (5.57-9.92) | **7.93** (5.80-11.1) |
| 2-day | **2.38** (2.11-2.74) | **3.21** (2.84-3.70) | **4.26** (3.76-4.93) | **5.09** (4.46-5.94) | **6.19** (5.24-7.46) | **7.01** (5.81-8.62) | **7.81** (6.33-9.84) | **8.63** (6.80-11.2) | **9.69** (7.33-13.1) | **10.5** (7.68-14.6) |
| 3-day | **2.57** (2.28-2.96) | **3.52** (3.12-4.07) | **4.75** (4.19-5.49) | **5.73** (5.01-6.68) | **7.03** (5.95-8.47) | **8.01** (6.64-9.85) | **8.99** (7.28-11.3) | **9.98** (7.87-12.9) | **11.3** (8.55-15.2) | **12.3** (9.00-17.2) |
| 4-day | **2.76** (2.44-3.18) | **3.83** (3.39-4.42) | **5.21** (4.60-6.03) | **6.32** (5.53-7.38) | **7.81** (6.62-9.42) | **8.95** (7.42-11.0) | **10.1** (8.17-12.7) | **11.2** (8.86-14.6) | **12.8** (9.68-17.2) | **14.0** (10.2-19.5) |
| 7-day | **3.13** (2.77-3.60) | **4.43** (3.92-5.11) | **6.13** (5.41-7.10) | **7.52** (6.58-8.77) | **9.40** (7.96-11.3) | **10.8** (8.99-13.3) | **12.3** (9.96-15.5) | **13.8** (10.9-17.9) | **15.8** (12.0-21.4) | **17.4** (12.7-24.3) |
| 10-day | **3.38** (2.99-3.89) | **4.84** (4.28-5.59) | **6.77** (5.97-7.84) | **8.35** (7.31-9.74) | **10.5** (8.90-12.7) | **12.2** (10.1-15.0) | **13.9** (11.3-17.5) | **15.7** (12.4-20.3) | **18.1** (13.7-24.4) | **20.0** (14.6-27.9) |
| 20-day | **4.03** (3.57-4.65) | **5.86** (5.18-6.76) | **8.31** (7.33-9.62) | **10.4** (9.07-12.1) | **13.2** (11.2-15.9) | **15.5** (12.9-19.1) | **17.8** (14.5-22.5) | **20.3** (16.0-26.3) | **23.8** (18.0-32.1) | **26.6** (19.4-37.1) |
| 30-day | **4.76** (4.21-5.49) | **6.89** (6.09-7.95) | **9.81** (8.65-11.4) | **12.3** (10.7-14.3) | **15.8** (13.4-19.0) | **18.6** (15.4-22.9) | **21.5** (17.4-27.1) | **24.7** (19.5-32.0) | **29.1** (22.1-39.3) | **32.8** (24.0-45.7) |
| 45-day | **5.65** (5.01-6.52) | **8.07** (7.13-9.31) | **11.4** (10.1-13.2) | **14.3** (12.5-16.7) | **18.4** (15.6-22.2) | **21.8** (18.1-26.8) | **25.4** (20.6-32.0) | **29.3** (23.1-38.0) | **34.9** (26.4-47.1) | **39.6** (28.9-55.2) |
| 60-day | **6.69** (5.92-7.71) | **9.36** (8.28-10.8) | **13.1** (11.6-15.2) | **16.4** (14.3-19.1) | **21.1** (17.9-25.5) | **25.1** (20.8-30.8) | **29.3** (23.7-36.9) | **34.0** (26.8-44.0) | **40.7** (30.8-54.9) | **46.4** (33.9-64.7) |

[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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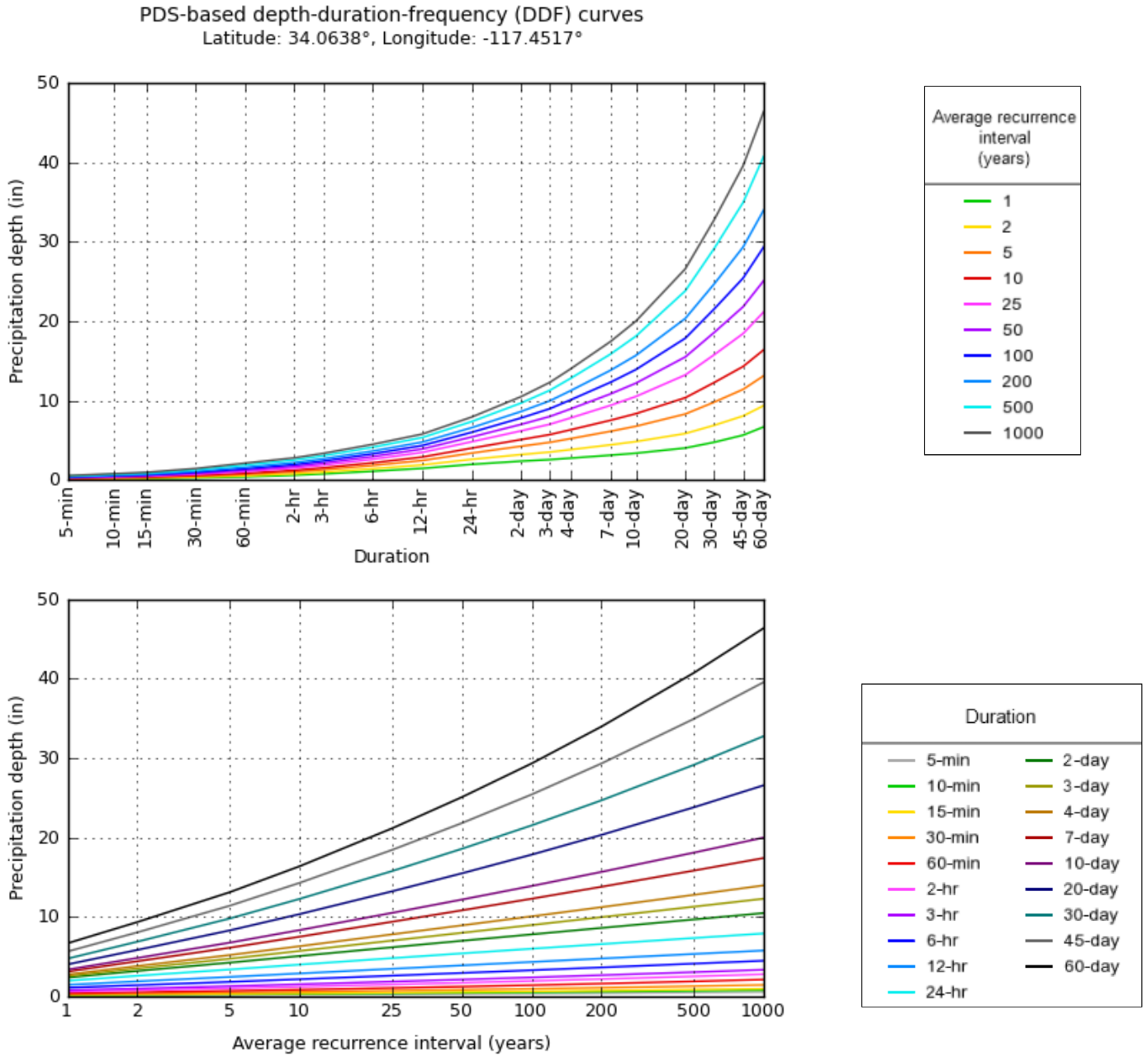
## PF graphical




NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Apr 12 21:08:27 2023

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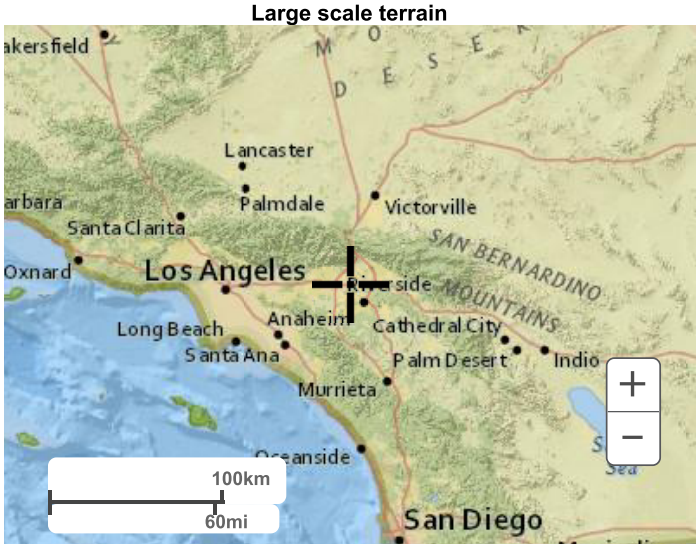
## Maps & aerials

**Small scale terrain**


**Large scale terrain**




**Large scale map**


**Large scale aerial**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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 B

# HYDROLOGIC SOIL GROUP MAP

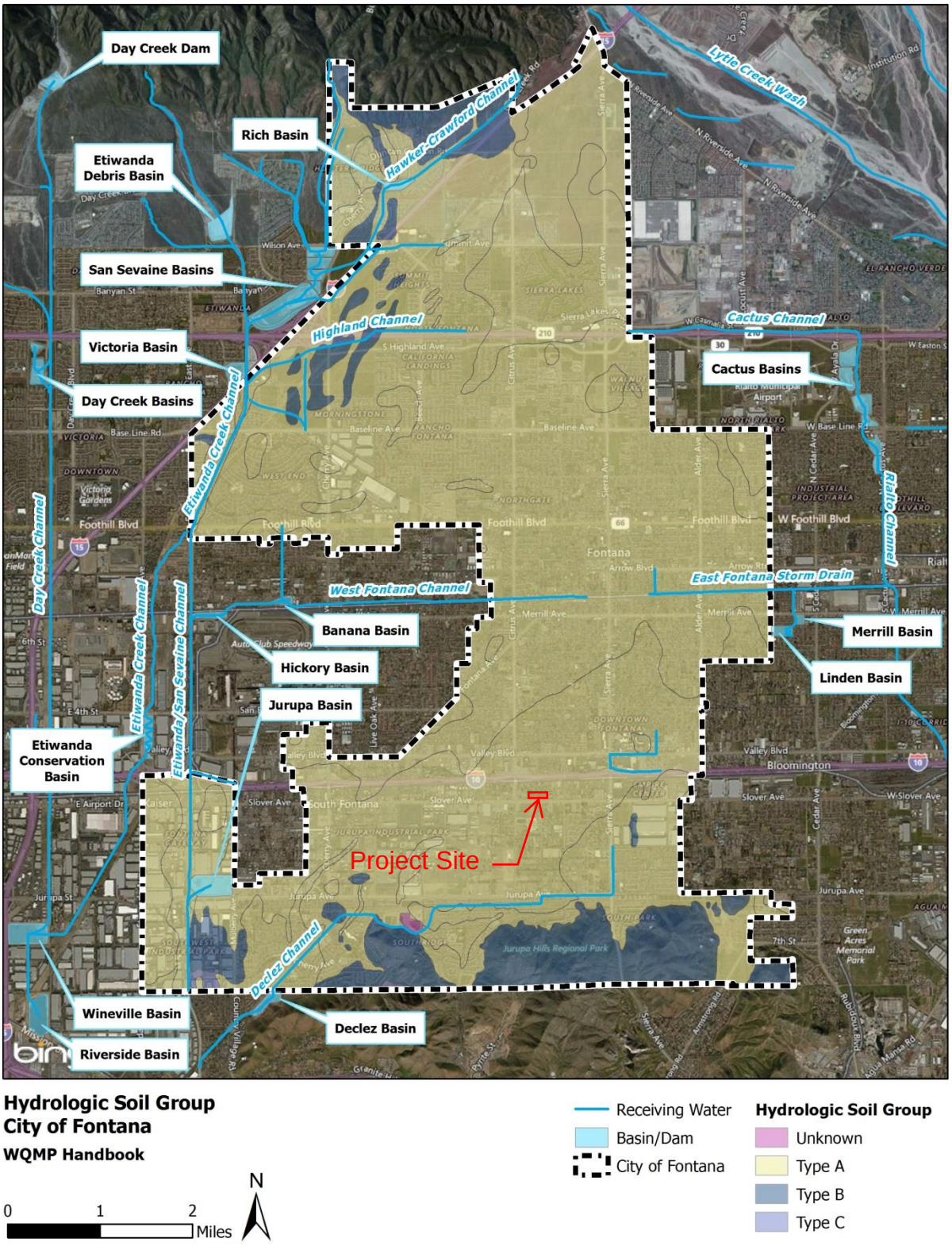



**Figure 2-1 Hydrologic Soil Group**

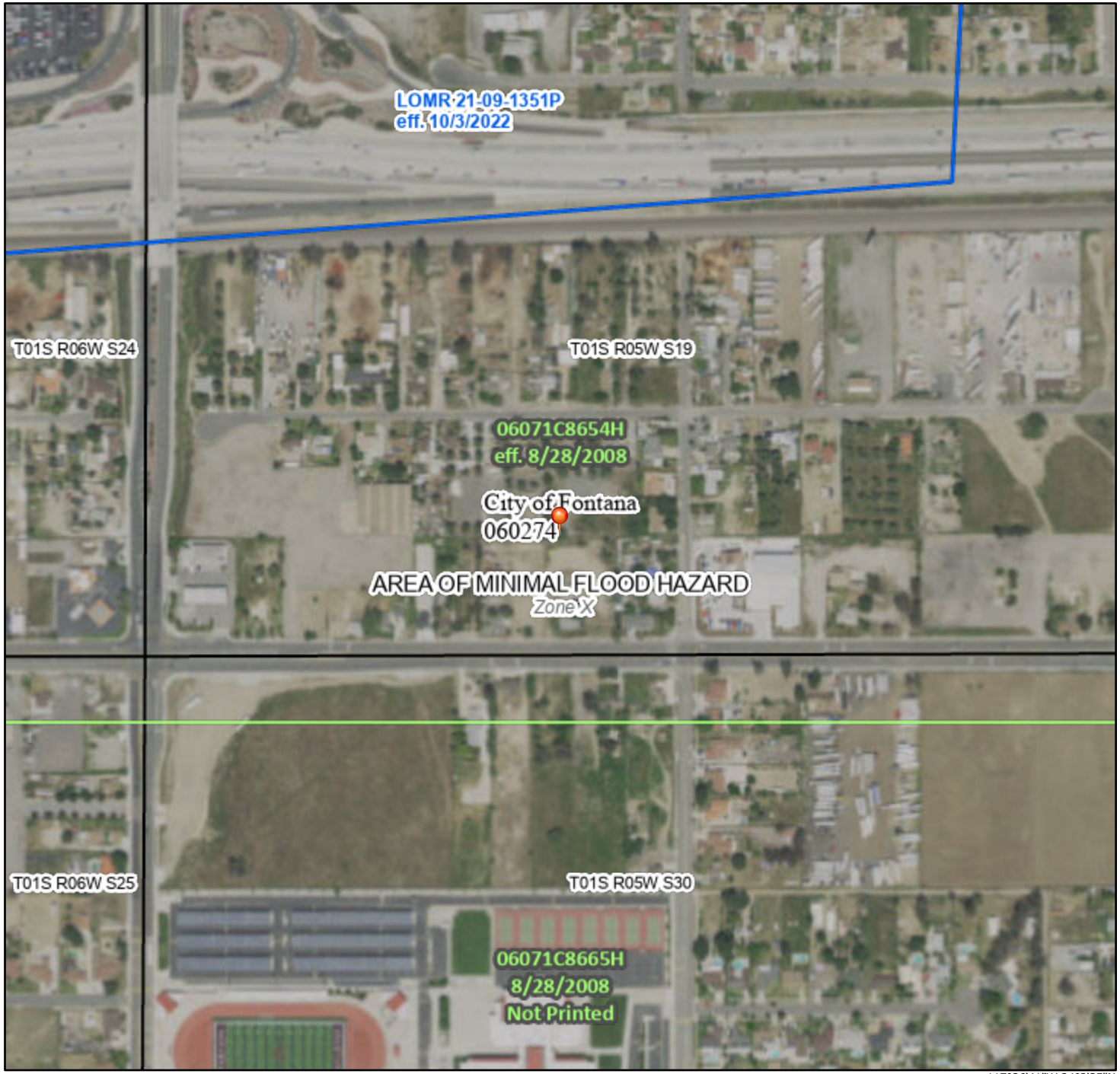
# APPENDIX C

# FEMA FLOOD INSURANCE RATE MAP

# National Flood Hazard Layer FIRMette

FEMA

117°27'18"W 34°4'5"N




117°26'41"W 34°3'35"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020*

## 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
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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 4/20/2023 at 5:19 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 D

# PRE-DEVELOPMENT HYDROLOGY CALCULATIONS

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

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PROJECT CITRUS
PRE-DEV 2-YEAR
AREA A

---

Program License Serial Number 6353

---

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

---

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.533 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.600(In/Hr)
Initial subarea data:
Initial area flow distance = 565.000(Ft.)
Top (of initial area) elevation = 1080.000(Ft.)
Bottom (of initial area) elevation = 1073.000(Ft.)
Difference in elevation = 7.000(Ft.)
Slope = 0.01239 s(%)= 1.24
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.506 min.
Rainfall intensity = 1.366(In/Hr) for a 2.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.505
Subarea runoff = 1.654(CFS)
Total initial stream area = 2.400(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.600(In/Hr)
End of computations, Total Study Area = 2.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

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PROJECT CITRUS
PRE-DEV 2-YEAR
AREA B

---

Program License Serial Number 6353

---

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

---

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.533 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.600(In/Hr)
Initial subarea data:
Initial area flow distance = 412.000(Ft.)
Top (of initial area) elevation = 1082.600(Ft.)
Bottom (of initial area) elevation = 1078.000(Ft.)
Difference in elevation = 4.600(Ft.)
Slope = 0.01117 s(%)= 1.12
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.253 min.
Rainfall intensity = 1.455(In/Hr) for a 2.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.529
Subarea runoff =      5.263(CFS)
Total initial stream area =        6.840(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.600(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.468(Ft.), Average velocity =   3.056(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              1.50
        2            100.00              0.50
        3            105.00              0.00
        4            110.00              0.50
        5            210.00              1.50
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =      6.695(CFS)
  '     '        flow top width =      9.362(Ft.)
  '     '    velocity=    3.056(Ft/s)
  '     '        area =      2.191(Sq.Ft)
  '     '        Froude number =     1.113

Upstream point elevation =  1078.000(Ft.)
Downstream point elevation =  1071.000(Ft.)
Flow length =   593.000(Ft.)
Travel time  =    3.23 min.
Time of concentration =   14.49 min.
Depth of flow =   0.468(Ft.)
Average velocity =   3.056(Ft/s)
Total irregular channel flow =     6.695(CFS)
Irregular channel normal depth above invert elev. =   0.468(Ft.)
Average velocity of channel(s) =   3.056(Ft/s)
 Adding area flow to channel
RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.600(In/Hr)
Rainfall intensity =      1.250(In/Hr) for a     2.0 year storm
```

Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.468
Subarea runoff = 2.773(CFS) for 6.890(Ac.)
Total runoff = 8.036(CFS)
Effective area this stream = 13.73(Ac.)
Total Study Area (Main Stream No. 1) = 13.73(Ac.)
Area averaged Fm value = 0.600(In/Hr)
Depth of flow = 0.557(Ft.), Average velocity = 2.360(Ft/s)
End of computations, Total Study Area = 13.73 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

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PROJECT CITRUS
PRE-DEV 10-YEAR
AREA A

---

Program License Serial Number 6353

---

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

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Rational hydrology study storm event year is 5.0
Computed rainfall intensity:
Storm year = 5.00 1 hour rainfall = 0.707 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.600(In/Hr)
Initial subarea data:
Initial area flow distance = 565.000(Ft.)
Top (of initial area) elevation = 1080.000(Ft.)
Bottom (of initial area) elevation = 1073.000(Ft.)
Difference in elevation = 7.000(Ft.)
Slope = 0.01239 s(%)= 1.24
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.506 min.
Rainfall intensity = 1.812(In/Hr) for a 5.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.602
Subarea runoff = 2.617(CFS)
Total initial stream area = 2.400(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.600(In/Hr)
End of computations, Total Study Area = 2.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

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PROJECT CITRUS
PRE-DEV 10-YEAR
AREA B

---

Program License Serial Number 6353

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

---

Rational hydrology study storm event year is 5.0
Computed rainfall intensity:
Storm year = 5.00 1 hour rainfall = 0.707 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.600(In/Hr)
Initial subarea data:
Initial area flow distance = 412.000(Ft.)
Top (of initial area) elevation = 1082.600(Ft.)
Bottom (of initial area) elevation = 1078.000(Ft.)
Difference in elevation = 4.600(Ft.)
Slope = 0.01117 s(%)= 1.12
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.253 min.
Rainfall intensity = 1.930(In/Hr) for a 5.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.620
Subarea runoff =      8.187(CFS)
Total initial stream area =        6.840(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.600(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.600(Ft.), Average velocity =   2.276(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              1.50
        2            100.00              0.50
        3            105.00              0.00
        4            110.00              0.50
        5            210.00              1.50
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =     10.224(CFS)
  '     '        flow top width =     29.942(Ft.)
  '     '    velocity=    2.276(Ft/s)
  '     '        area =      4.491(Sq.Ft)
  '     '        Froude number =     1.036

Upstream point elevation =  1078.000(Ft.)
Downstream point elevation =  1071.000(Ft.)
Flow length =   593.000(Ft.)
Travel time  =    4.34 min.
Time of concentration =   15.60 min.
Depth of flow =   0.600(Ft.)
Average velocity =   2.276(Ft/s)
Total irregular channel flow =    10.224(CFS)
Irregular channel normal depth above invert elev. =   0.600(Ft.)
Average velocity of channel(s) =   2.276(Ft/s)
 Adding area flow to channel
RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.600(In/Hr)
Rainfall intensity =      1.587(In/Hr) for a     5.0 year storm
```

Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.560
Subarea runoff = 4.007(CFS) for 6.890(Ac.)
Total runoff = 12.194(CFS)
Effective area this stream = 13.73(Ac.)
Total Study Area (Main Stream No. 1) = 13.73(Ac.)
Area averaged Fm value = 0.600(In/Hr)
Depth of flow = 0.625(Ft.), Average velocity = 2.295(Ft/s)
End of computations, Total Study Area = 13.73 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

---

PROJECT CITRUS
PRE-DEV 25-YEAR
AREA A

---

Program License Serial Number 6353

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

---

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.856 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587(In/Hr)
Initial subarea data:
Initial area flow distance = 565.000(Ft.)
Top (of initial area) elevation = 1080.000(Ft.)
Bottom (of initial area) elevation = 1073.000(Ft.)
Difference in elevation = 7.000(Ft.)
Slope = 0.01239 s(%)= 1.24
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.506 min.
Rainfall intensity = 2.193(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.659

Subarea runoff =  3.470(CFS)
Total initial stream area =  2.400(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =  0.587(In/Hr)
End of computations, Total Study Area =  2.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number =  32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

---

PROJECT CITRUS
PRE-DEV 25-YEAR
AREA B

---

Program License Serial Number 6353

---

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

---

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.856 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587(In/Hr)
Initial subarea data:
Initial area flow distance = 412.000(Ft.)
Top (of initial area) elevation = 1082.600(Ft.)
Bottom (of initial area) elevation = 1078.000(Ft.)
Difference in elevation = 4.600(Ft.)
Slope = 0.01117 s(%)= 1.12
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.253 min.
Rainfall intensity = 2.337(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.674

```
Subarea runoff =     10.773(CFS)
Total initial stream area =        6.840(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.587(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.641(Ft.), Average velocity =   2.322(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              1.50
        2            100.00              0.50
        3            105.00              0.00
        4            110.00              0.50
        5            210.00              1.50
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =     13.714(CFS)
  '     '        flow top width =     38.245(Ft.)
  '     '    velocity=    2.322(Ft/s)
  '     '        area =      5.907(Sq.Ft)
  '     '        Froude number =     1.041

Upstream point elevation =  1078.000(Ft.)
Downstream point elevation =  1071.000(Ft.)
Flow length =   593.000(Ft.)
Travel time  =    4.26 min.
Time of concentration =   15.51 min.
Depth of flow =   0.641(Ft.)
Average velocity =   2.322(Ft/s)
Total irregular channel flow =    13.713(CFS)
Irregular channel normal depth above invert elev. =   0.641(Ft.)
Average velocity of channel(s) =   2.322(Ft/s)
 Adding area flow to channel
RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.587(In/Hr)
Rainfall intensity =      1.927(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.626
```

Subarea runoff =  5.795(CFS) for  6.890(Ac.)
Total runoff =  16.568(CFS)
Effective area this stream =  13.73(Ac.)
Total Study Area (Main Stream No. 1) =  13.73(Ac.)
Area averaged Fm value =  0.587(In/Hr)
Depth of flow =  0.667(Ft.), Average velocity =  2.381(Ft/s)
End of computations, Total Study Area =  13.73 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number =  32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/12/23

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PROJECT CITRUS
PRE-DEV 100-YEAR
AREA A

---

Program License Serial Number 6353

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

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Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.070 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587(In/Hr)
Initial subarea data:
Initial area flow distance = 565.000(Ft.)
Top (of initial area) elevation = 1080.000(Ft.)
Bottom (of initial area) elevation = 1073.000(Ft.)
Difference in elevation = 7.000(Ft.)
Slope = 0.01239 s(%)= 1.24
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.506 min.
Rainfall intensity = 2.742(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.707

Subarea runoff =  4.655(CFS)
Total initial stream area =  2.400(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =  0.587(In/Hr)
End of computations, Total Study Area =  2.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number =  32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

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PROJECT CITRUS
PRE-DEV 100-YEAR
AREA B

---

Program License Serial Number 6353

---

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

---

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.070 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587(In/Hr)
Initial subarea data:
Initial area flow distance = 412.000(Ft.)
Top (of initial area) elevation = 1082.600(Ft.)
Bottom (of initial area) elevation = 1078.000(Ft.)
Difference in elevation = 4.600(Ft.)
Slope = 0.01117 s(%)= 1.12
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.253 min.
Rainfall intensity = 2.921(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.719

```
Subarea runoff =     14.369(CFS)
Total initial stream area =        6.840(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.587(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      200.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.683(Ft.), Average velocity =   2.424(Ft/s)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              1.50
        2            100.00              0.50
        3            105.00              0.00
        4            110.00              0.50
        5            210.00              1.50
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =     18.577(CFS)
  '     '        flow top width =     46.539(Ft.)
  '     '    velocity=    2.424(Ft/s)
  '     '        area =      7.665(Sq.Ft)
  '     '        Froude number =     1.052

Upstream point elevation =  1078.000(Ft.)
Downstream point elevation =  1071.000(Ft.)
Flow length =   593.000(Ft.)
Travel time  =    4.08 min.
Time of concentration =   15.33 min.
Depth of flow =   0.683(Ft.)
Average velocity =   2.424(Ft/s)
Total irregular channel flow =    18.577(CFS)
Irregular channel normal depth above invert elev. =   0.683(Ft.)
Average velocity of channel(s) =   2.424(Ft/s)
 Adding area flow to channel
RESIDENTIAL(3 - 4 dwl/acre)
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
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.587(In/Hr)
Rainfall intensity =      2.426(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.682
```

Subarea runoff =  8.362(CFS) for  6.890(Ac.)
Total runoff =  22.731(CFS)
Effective area this stream =  13.73(Ac.)
Total Study Area (Main Stream No. 1) =  13.73(Ac.)
Area averaged Fm value =  0.587(In/Hr)
Depth of flow =  0.711(Ft.), Average velocity =  2.510(Ft/s)
End of computations, Total Study Area =  13.73 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number =  32.0

# APPENDIX E

# POST-DEVELOPMENT HYDROLOGY CALCULATIONS

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/13/23

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PROJECT CITRUS
POST-DEV 100-YEAR
AREA A

---

Program License Serial Number 6353

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

---

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.420 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

---

COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 195.000(Ft.)
Top (of initial area) elevation = 1081.860(Ft.)
Bottom (of initial area) elevation = 1079.840(Ft.)
Difference in elevation = 2.020(Ft.)
Slope = 0.01036 s(%)= 1.04
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.249 min.
Rainfall intensity = 5.517(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff =     10.474(CFS)
Total initial stream area =        2.140(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1075.340(Ft.)
Downstream point/station elevation =  1072.910(Ft.)
Pipe length  =   486.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.474(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    10.474(CFS)
Normal flow depth in pipe =   16.10(In.)
Flow top width inside pipe =   17.76(In.)
Critical Depth =   14.47(In.)
Pipe flow velocity =      5.29(Ft/s)
Travel time through pipe =    1.53 min.
Time of concentration (TC) =     7.78 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     10.236(CFS)
therefore the upstream flow rate of Q =     10.474(CFS) is being used
Time of concentration =     7.78 min.
Rainfall intensity =      4.837(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.885
Subarea runoff =      0.000(CFS) for    0.250(Ac.)
Total runoff =     10.474(CFS)
Effective area this stream =        2.39(Ac.)
Total Study Area (Main Stream No. 1) =        2.39(Ac.)
Area averaged Fm value =    0.079(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1072.910(Ft.)
Downstream point/station elevation =  1069.890(Ft.)
Pipe length  =   232.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.474(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.474(CFS)
Normal flow depth in pipe =   13.03(In.)
Flow top width inside pipe =   16.09(In.)
Critical Depth =   14.92(In.)
Pipe flow velocity =      7.64(Ft/s)
Travel time through pipe =    0.51 min.
Time of concentration (TC) =     8.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.390(Ac.)
Runoff from this stream =     10.474(CFS)
Time of concentration =    8.29 min.
Rainfall intensity =     4.658(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   233.000(Ft.)
Top (of initial area) elevation =  1077.080(Ft.)
Bottom (of initial area) elevation =  1074.190(Ft.)
Difference in elevation =     2.890(Ft.)
Slope =    0.01240  s(%)=       1.24
```

```
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.473 min.
Rainfall intensity =      5.402(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff =      5.078(CFS)
Total initial stream area =        1.060(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1070.810(Ft.)
Downstream point/station elevation =  1069.890(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.078(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.078(CFS)
Normal flow depth in pipe =   10.25(In.)
Flow top width inside pipe =   13.95(In.)
Critical Depth =   10.96(In.)
Pipe flow velocity =      5.68(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =     6.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.060(Ac.)
Runoff from this stream =      5.078(CFS)
Time of concentration =    6.76 min.
Rainfall intensity =     5.262(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     10.47     2.390      8.29    0.079      4.658
2      5.08     1.060      6.76    0.079      5.262
Qmax(1) =
           1.000 *    1.000 *    10.474) +
           0.883 *    1.000 *     5.078) + =      14.960
```

```
Qmax(2) =
          1.132 *    0.816 *    10.474) +
          1.000 *    1.000 *     5.078) + =      14.753

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.474       5.078
Maximum flow rates at confluence using above data:
       14.960       14.753
Area of streams before confluence:
        2.390        1.060
Effective area values after confluence:
        3.450        3.010
Results of confluence:
Total flow rate =     14.960(CFS)
Time of concentration =     8.285 min.
Effective stream area after confluence =      3.450(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total (this main stream) =       3.45(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1069.890(Ft.)
Downstream point/station elevation =  1066.180(Ft.)
Pipe length  =   296.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.960(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    14.960(CFS)
Normal flow depth in pipe =   14.79(In.)
Flow top width inside pipe =   19.17(In.)
Critical Depth =   17.19(In.)
Pipe flow velocity =      8.27(Ft/s)
Travel time through pipe =    0.60 min.
Time of concentration (TC) =     8.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      3.450(Ac.)
Runoff from this stream =     14.960(CFS)
Time of concentration =    8.88 min.
Rainfall intensity =     4.468(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
```

```
Area averaged Pervious ratio (Ap) = 0.1000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   405.000(Ft.)
Top (of initial area) elevation =  1077.830(Ft.)
Bottom (of initial area) elevation =  1070.940(Ft.)
Difference in elevation =     6.890(Ft.)
Slope =    0.01701  s(%)=       1.70
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.581 min.
Rainfall intensity =      4.913(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff =      5.918(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1067.240(Ft.)
Downstream point/station elevation =  1066.180(Ft.)
Pipe length  =    64.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.918(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.918(CFS)
Normal flow depth in pipe =    9.35(In.)
Flow top width inside pipe =   14.54(In.)
Critical Depth =   11.80(In.)
Pipe flow velocity =      7.36(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     7.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      108.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.360(Ac.)
Runoff from this stream =      5.918(CFS)
Time of concentration =    7.73 min.
Rainfall intensity =     4.858(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     14.96     3.450      8.88    0.079      4.468
2      5.92     1.360      7.73    0.079      4.858
Qmax(1) =
           1.000 *    1.000 *    14.960) +
           0.918 *    1.000 *     5.918) + =      20.395
Qmax(2) =
           1.089 *    0.870 *    14.960) +
           1.000 *    1.000 *     5.918) + =      20.086

Total of 2 streams to confluence:
Flow rates before confluence point:
      14.960       5.918
Maximum flow rates at confluence using above data:
       20.395       20.086
Area of streams before confluence:
        3.450        1.360
Effective area values after confluence:
        4.810        4.361
Results of confluence:
Total flow rate =     20.395(CFS)
Time of concentration =     8.882 min.
Effective stream area after confluence =      4.810(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total (this main stream) =       4.81(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________
Upstream point/station elevation =  1066.180(Ft.)
Downstream point/station elevation =  1065.500(Ft.)
Pipe length  =   135.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    20.395(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    20.395(CFS)
Normal flow depth in pipe =   20.58(In.)
Flow top width inside pipe =   22.99(In.)
Critical Depth =   18.96(In.)
Pipe flow velocity =      6.28(Ft/s)
Travel time through pipe =    0.36 min.
Time of concentration (TC) =     9.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      109.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.810(Ac.)
Runoff from this stream =     20.395(CFS)
Time of concentration =    9.24 min.
Rainfall intensity =     4.363(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   431.000(Ft.)
Top (of initial area) elevation =  1077.860(Ft.)
Bottom (of initial area) elevation =  1074.080(Ft.)
Difference in elevation =     3.780(Ft.)
Slope =    0.00877  s(%)=       0.88
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.873 min.
Rainfall intensity =      4.470(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.884
Subarea runoff =     13.400(CFS)
Total initial stream area =        3.390(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1070.180(Ft.)
Downstream point/station elevation =  1065.500(Ft.)
Pipe length  =   207.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.400(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    13.400(CFS)
Normal flow depth in pipe =   12.73(In.)
Flow top width inside pipe =   16.38(In.)
Critical Depth =   16.37(In.)
Pipe flow velocity =     10.03(Ft/s)
Travel time through pipe =    0.34 min.
Time of concentration (TC) =     9.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      109.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.390(Ac.)
Runoff from this stream =     13.400(CFS)
Time of concentration =    9.22 min.
Rainfall intensity =     4.369(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     20.39     4.810      9.24    0.079      4.363
2     13.40     3.390      9.22    0.079      4.369
Qmax(1) =
           1.000 *    1.000 *    20.395) +
           0.998 *    1.000 *    13.400) + =      33.774
Qmax(2) =
           1.002 *    0.997 *    20.395) +
           1.000 *    1.000 *    13.400) + =      33.774

Total of 2 streams to confluence:
Flow rates before confluence point:
      20.395      13.400
Maximum flow rates at confluence using above data:
```

```
       33.774       33.774
Area of streams before confluence:
        4.810        3.390
Effective area values after confluence:
        8.200        8.188
Results of confluence:
Total flow rate =     33.774(CFS)
Time of concentration =     9.217 min.
Effective stream area after confluence =      8.188(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total (this main stream) =       8.20(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      112.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1065.500(Ft.)
Downstream point/station elevation =  1065.380(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    33.774(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    33.774(CFS)
Normal flow depth in pipe =   24.56(In.)
Flow top width inside pipe =   28.79(In.)
Critical Depth =   23.23(In.)
Pipe flow velocity =      7.13(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     9.27 min.
End of computations, Total Study Area =            8.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number =  32.0
```

U n i t  H y d r o g r a p h  A n a l y s i s



Study date 04/13/23

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
----------------------------------------------------------------------

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6353

----------------------------------------------------------------------
PROJECT CITRUS
POST-DEV 100-YEAR
AREA A

----------------------------------------------------------------------

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

| Sub-Area (Ac.) | Duration (hours) | Isohyetal (In) |
|---|---|---|
| Rainfall data for year 100 | | |
| 8.20 | 1 | 1.42 |
| Rainfall data for year 100 | | |
| 8.20 | 6 | 3.30 |
| Rainfall data for year 100 | | |
| 8.20 | 24 | 6.01 |

----------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

******** Area-averaged max loss rate, Fm ********

| SCS curve No.(AMCII) | SCS curve NO.(AMC 3) | Area (Ac.) | Area Fraction | Fp(Fig C6) (In/Hr) | Ap (dec.) | Fm (In/Hr) |
|---|---|---|---|---|---|---|
| 32.0 | 52.0 | 8.20 | 1.000 | 0.785 | 0.140 | 0.110 |

Area-averaged adjusted loss rate Fm (In/Hr) = 0.110

********* Area-Averaged low loss rate fraction, Yb **********

| Area (Ac.) | Area Fract | SCS CN (AMC2) | SCS CN (AMC3) | S | Pervious Yield Fr |
|---|---|---|---|---|---|
| 1.15 | 0.140 | 32.0 | 52.0 | 9.23 | 0.215 |
| 7.05 | 0.860 | 98.0 | 98.0 | 0.20 | 0.960 |

Area-averaged catchment yield fraction, Y = 0.856
Area-averaged low loss fraction, Yb = 0.144
User entry of time of concentration = 0.155 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area = 8.20(Ac.)
Catchment Lag time = 0.124 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 67.4218
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.110(In/Hr)
Average low loss rate fraction (Yb) = 0.144 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.373(In)
Computed peak 30-minute rainfall = 0.969(In)
Specified peak 1-hour rainfall = 1.420(In)
Computed peak 3-hour rainfall = 2.400(In)
Specified peak 6-hour rainfall = 3.300(In)
Specified peak 24-hour rainfall = 6.010(In)

Note: user specified rainfall values used.
Rainfall depth area reduction factors:
Using a total area of 8.20(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.373(In)
30-minute factor = 1.000 Adjusted rainfall = 0.969(In)
1-hour factor = 1.000 Adjusted rainfall = 1.419(In)
3-hour factor = 1.000 Adjusted rainfall = 2.400(In)
6-hour factor = 1.000 Adjusted rainfall = 3.300(In)
24-hour factor = 1.000 Adjusted rainfall = 6.010(In)
---

U n i t H y d r o g r a p h

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Interval          'S' Graph          Unit Hydrograph
Number            Mean values             ((CFS))
----------------------------------------------------------------------
                (K =        99.17 (CFS))

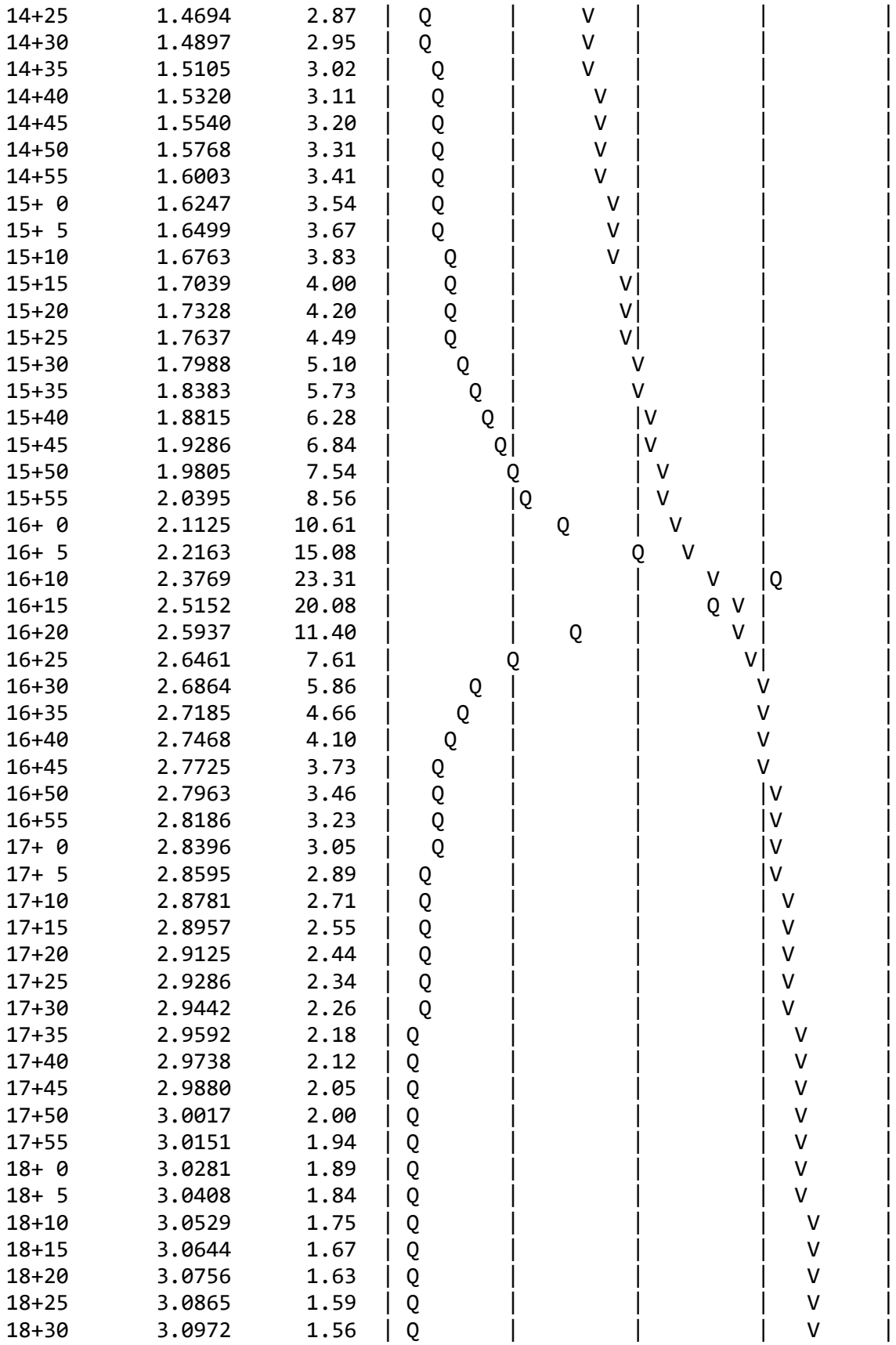
  1                8.167                    8.099
  2               50.586                   42.067
  3               87.645                   36.751
  4               97.512                    9.785
  5               99.261                    1.735
  6              100.000                    0.733
----------------------------------------------------------------------
----------------------------------------------------------------------
----------------------------------------------------------------------
Total soil rain loss =      0.77(In)
Total effective rainfall =      5.24(In)
Peak flow rate in flood hydrograph =     23.31(CFS)
----------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    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        7.5      15.0      22.5      30.0
----------------------------------------------------------------------
  0+ 5       0.0004      0.06  Q         |         |         |         |
  0+10       0.0031      0.39  Q         |         |         |         |
  0+15       0.0077      0.67  Q         |         |         |         |
  0+20       0.0129      0.75  VQ        |         |         |         |
  0+25       0.0182      0.77  VQ        |         |         |         |
  0+30       0.0235      0.77  VQ        |         |         |         |
  0+35       0.0289      0.78  VQ        |         |         |         |
  0+40       0.0342      0.78  VQ        |         |         |         |
  0+45       0.0396      0.78  VQ        |         |         |         |
  0+50       0.0450      0.78  VQ        |         |         |         |
  0+55       0.0504      0.79  VQ        |         |         |         |
  1+ 0       0.0559      0.79  VQ        |         |         |         |
  1+ 5       0.0613      0.79  VQ        |         |         |         |
  1+10       0.0668      0.79  VQ        |         |         |         |
  1+15       0.0723      0.80  VQ        |         |         |         |
  1+20       0.0778      0.80  VQ        |         |         |         |
  1+25       0.0833      0.80  VQ        |         |         |         |
  1+30       0.0888      0.80  VQ        |         |         |         |
  1+35       0.0944      0.81  |Q        |         |         |         |
  1+40       0.1000      0.81  |Q        |         |         |         |
  1+45       0.1055      0.81  |Q        |         |         |         |
  1+50       0.1112      0.81  |Q        |         |         |         |
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1+55 | 0.1168 | 0.82 | \|Q | \| | \| | \| | \| |
| 2+ 0 | 0.1224 | 0.82 | \|Q | \| | \| | \| | \| |
| 2+ 5 | 0.1281 | 0.82 | \|Q | \| | \| | \| | \| |
| 2+10 | 0.1338 | 0.83 | \|Q | \| | \| | \| | \| |
| 2+15 | 0.1395 | 0.83 | \|Q | \| | \| | \| | \| |
| 2+20 | 0.1452 | 0.83 | \|Q | \| | \| | \| | \| |
| 2+25 | 0.1509 | 0.83 | \|Q | \| | \| | \| | \| |
| 2+30 | 0.1567 | 0.84 | \|Q | \| | \| | \| | \| |
| 2+35 | 0.1625 | 0.84 | \|Q | \| | \| | \| | \| |
| 2+40 | 0.1683 | 0.84 | \|Q | \| | \| | \| | \| |
| 2+45 | 0.1741 | 0.85 | \|Q | \| | \| | \| | \| |
| 2+50 | 0.1800 | 0.85 | \|QV | \| | \| | \| | \| |
| 2+55 | 0.1858 | 0.85 | \|QV | \| | \| | \| | \| |
| 3+ 0 | 0.1917 | 0.85 | \|QV | \| | \| | \| | \| |
| 3+ 5 | 0.1976 | 0.86 | \|QV | \| | \| | \| | \| |
| 3+10 | 0.2035 | 0.86 | \|QV | \| | \| | \| | \| |
| 3+15 | 0.2095 | 0.86 | \|QV | \| | \| | \| | \| |
| 3+20 | 0.2155 | 0.87 | \|QV | \| | \| | \| | \| |
| 3+25 | 0.2215 | 0.87 | \|QV | \| | \| | \| | \| |
| 3+30 | 0.2275 | 0.87 | \|QV | \| | \| | \| | \| |
| 3+35 | 0.2335 | 0.88 | \|QV | \| | \| | \| | \| |
| 3+40 | 0.2396 | 0.88 | \|QV | \| | \| | \| | \| |
| 3+45 | 0.2457 | 0.88 | \|QV | \| | \| | \| | \| |
| 3+50 | 0.2518 | 0.89 | \|QV | \| | \| | \| | \| |
| 3+55 | 0.2579 | 0.89 | \|QV | \| | \| | \| | \| |
| 4+ 0 | 0.2640 | 0.89 | \|QV | \| | \| | \| | \| |
| 4+ 5 | 0.2702 | 0.90 | \|Q V | \| | \| | \| | \| |
| 4+10 | 0.2764 | 0.90 | \|Q V | \| | \| | \| | \| |
| 4+15 | 0.2827 | 0.90 | \|Q V | \| | \| | \| | \| |
| 4+20 | 0.2889 | 0.91 | \|Q V | \| | \| | \| | \| |
| 4+25 | 0.2952 | 0.91 | \|Q V | \| | \| | \| | \| |
| 4+30 | 0.3015 | 0.92 | \|Q V | \| | \| | \| | \| |
| 4+35 | 0.3078 | 0.92 | \|Q V | \| | \| | \| | \| |
| 4+40 | 0.3142 | 0.92 | \|Q V | \| | \| | \| | \| |
| 4+45 | 0.3205 | 0.93 | \|Q V | \| | \| | \| | \| |
| 4+50 | 0.3270 | 0.93 | \|Q V | \| | \| | \| | \| |
| 4+55 | 0.3334 | 0.93 | \|Q V | \| | \| | \| | \| |
| 5+ 0 | 0.3398 | 0.94 | \|Q V | \| | \| | \| | \| |
| 5+ 5 | 0.3463 | 0.94 | \|Q V | \| | \| | \| | \| |
| 5+10 | 0.3528 | 0.95 | \|Q V | \| | \| | \| | \| |
| 5+15 | 0.3594 | 0.95 | \|Q  V | \| | \| | \| | \| |
| 5+20 | 0.3660 | 0.95 | \|Q  V | \| | \| | \| | \| |
| 5+25 | 0.3726 | 0.96 | \|Q  V | \| | \| | \| | \| |
| 5+30 | 0.3792 | 0.96 | \|Q  V | \| | \| | \| | \| |
| 5+35 | 0.3859 | 0.97 | \|Q  V | \| | \| | \| | \| |
| 5+40 | 0.3925 | 0.97 | \|Q  V | \| | \| | \| | \| |
| 5+45 | 0.3993 | 0.98 | \|Q  V | \| | \| | \| | \| |
| 5+50 | 0.4060 | 0.98 | \|Q  V | \| | \| | \| | \| |
| 5+55 | 0.4128 | 0.98 | \|Q  V | \| | \| | \| | \| |
| 6+ 0 | 0.4196 | 0.99 | \|Q  V | \| | \| | \| | \| |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6+ 5 | 0.4265 | 0.99 | \|Q V \| | \| | \| | \| |
| 6+10 | 0.4333 | 1.00 | \|Q V \| | \| | \| | \| |
| 6+15 | 0.4402 | 1.00 | \|Q V \| | \| | \| | \| |
| 6+20 | 0.4472 | 1.01 | \|Q V \| | \| | \| | \| |
| 6+25 | 0.4542 | 1.01 | \|Q V \| | \| | \| | \| |
| 6+30 | 0.4612 | 1.02 | \|Q V \| | \| | \| | \| |
| 6+35 | 0.4682 | 1.02 | \|Q V \| | \| | \| | \| |
| 6+40 | 0.4753 | 1.03 | \|Q V \| | \| | \| | \| |
| 6+45 | 0.4824 | 1.03 | \|Q V \| | \| | \| | \| |
| 6+50 | 0.4896 | 1.04 | \|Q V \| | \| | \| | \| |
| 6+55 | 0.4967 | 1.04 | \|Q V \| | \| | \| | \| |
| 7+ 0 | 0.5040 | 1.05 | \|Q V \| | \| | \| | \| |
| 7+ 5 | 0.5112 | 1.05 | \|Q V \| | \| | \| | \| |
| 7+10 | 0.5185 | 1.06 | \|Q V \| | \| | \| | \| |
| 7+15 | 0.5259 | 1.07 | \|Q V \| | \| | \| | \| |
| 7+20 | 0.5332 | 1.07 | \|Q V \| | \| | \| | \| |
| 7+25 | 0.5407 | 1.08 | \|Q V \| | \| | \| | \| |
| 7+30 | 0.5481 | 1.08 | \|Q V \| | \| | \| | \| |
| 7+35 | 0.5556 | 1.09 | \|Q V \| | \| | \| | \| |
| 7+40 | 0.5631 | 1.09 | \|Q V \| | \| | \| | \| |
| 7+45 | 0.5707 | 1.10 | \|Q V \| | \| | \| | \| |
| 7+50 | 0.5784 | 1.11 | \|Q V \| | \| | \| | \| |
| 7+55 | 0.5860 | 1.11 | \|Q V \| | \| | \| | \| |
| 8+ 0 | 0.5937 | 1.12 | \|Q V \| | \| | \| | \| |
| 8+ 5 | 0.6015 | 1.13 | \|Q V \| | \| | \| | \| |
| 8+10 | 0.6093 | 1.13 | \|Q V \| | \| | \| | \| |
| 8+15 | 0.6171 | 1.14 | \|Q V \| | \| | \| | \| |
| 8+20 | 0.6250 | 1.15 | \|Q V \| | \| | \| | \| |
| 8+25 | 0.6330 | 1.15 | \|Q V \| | \| | \| | \| |
| 8+30 | 0.6410 | 1.16 | \|Q V \| | \| | \| | \| |
| 8+35 | 0.6490 | 1.17 | \|Q V \| | \| | \| | \| |
| 8+40 | 0.6571 | 1.17 | \|Q V \| | \| | \| | \| |
| 8+45 | 0.6652 | 1.18 | \|Q V \| | \| | \| | \| |
| 8+50 | 0.6734 | 1.19 | \|Q V \| | \| | \| | \| |
| 8+55 | 0.6817 | 1.20 | \|Q V \| | \| | \| | \| |
| 9+ 0 | 0.6900 | 1.21 | \|Q V \| | \| | \| | \| |
| 9+ 5 | 0.6983 | 1.21 | \|Q V \| | \| | \| | \| |
| 9+10 | 0.7068 | 1.22 | \|Q V \| | \| | \| | \| |
| 9+15 | 0.7152 | 1.23 | \|Q V \| | \| | \| | \| |
| 9+20 | 0.7238 | 1.24 | \|Q V \| | \| | \| | \| |
| 9+25 | 0.7323 | 1.25 | \|Q V \| | \| | \| | \| |
| 9+30 | 0.7410 | 1.26 | \|Q V \| | \| | \| | \| |
| 9+35 | 0.7497 | 1.26 | \|Q V \| | \| | \| | \| |
| 9+40 | 0.7585 | 1.27 | \|Q V \| | \| | \| | \| |
| 9+45 | 0.7673 | 1.28 | \|Q V \| | \| | \| | \| |
| 9+50 | 0.7762 | 1.29 | \|Q V \| | \| | \| | \| |
| 9+55 | 0.7852 | 1.30 | \|Q V \| | \| | \| | \| |
| 10+ 0 | 0.7942 | 1.31 | \|Q V \| | \| | \| | \| |
| 10+ 5 | 0.8033 | 1.32 | \|Q V \| | \| | \| | \| |
| 10+10 | 0.8125 | 1.33 | \|Q V\| | \| | \| | \| |

```
10+15       0.8218      1.34  |Q       V|         |          |          |
10+20       0.8311      1.35  |Q       V|         |          |          |
10+25       0.8405      1.36  |Q       V|         |          |          |
10+30       0.8500      1.38  |Q       V|         |          |          |
10+35       0.8595      1.39  |Q       V|         |          |          |
10+40       0.8692      1.40  |Q       V|         |          |          |
10+45       0.8789      1.41  |Q       V|         |          |          |
10+50       0.8887      1.42  |Q       V|         |          |          |
10+55       0.8986      1.44  |Q        V         |          |          |
11+ 0       0.9086      1.45  |Q        V         |          |          |
11+ 5       0.9186      1.46  |Q        V         |          |          |
11+10       0.9288      1.48  |Q        V         |          |          |
11+15       0.9391      1.49  |Q        V         |          |          |
11+20       0.9495      1.51  | Q       V         |          |          |
11+25       0.9599      1.52  | Q       V         |          |          |
11+30       0.9705      1.54  | Q       V         |          |          |
11+35       0.9812      1.55  | Q       V         |          |          |
11+40       0.9920      1.57  | Q       |V         |          |          |
11+45       1.0029      1.58  | Q       |V         |          |          |
11+50       1.0139      1.60  | Q       |V         |          |          |
11+55       1.0251      1.62  | Q       |V         |          |          |
12+ 0       1.0363      1.64  | Q       |V         |          |          |
12+ 5       1.0478      1.66  | Q       |V         |          |          |
12+10       1.0597      1.73  | Q       |V         |          |          |
12+15       1.0720      1.79  | Q       |V         |          |          |
12+20       1.0845      1.82  | Q       | V        |          |          |
12+25       1.0972      1.84  | Q       | V        |          |          |
12+30       1.1101      1.87  | Q       | V        |          |          |
12+35       1.1231      1.89  | Q       | V        |          |          |
12+40       1.1362      1.91  | Q       | V        |          |          |
12+45       1.1496      1.94  | Q       | V        |          |          |
12+50       1.1631      1.96  | Q       |  V       |          |          |
12+55       1.1768      1.99  | Q       |  V       |          |          |
13+ 0       1.1907      2.02  | Q       |  V       |          |          |
13+ 5       1.2048      2.05  | Q       |  V       |          |          |
13+10       1.2191      2.08  | Q       |  V       |          |          |
13+15       1.2336      2.11  | Q       |  V       |          |          |
13+20       1.2484      2.14  | Q       |  V       |          |          |
13+25       1.2633      2.18  | Q       |   V      |          |          |
13+30       1.2786      2.21  | Q       |   V      |          |          |
13+35       1.2941      2.25  | Q       |   V      |          |          |
13+40       1.3098      2.29  |  Q      |   V      |          |          |
13+45       1.3259      2.33  |  Q      |   V      |          |          |
13+50       1.3422      2.38  |  Q      |    V     |          |          |
13+55       1.3589      2.42  |  Q      |    V     |          |          |
14+ 0       1.3759      2.47  |  Q      |    V     |          |          |
14+ 5       1.3934      2.53  |  Q      |    V     |          |          |
14+10       1.4115      2.63  |  Q      |    V     |          |          |
14+15       1.4303      2.73  |  Q      |    V     |          |          |
14+20       1.4496      2.80  |  Q      |     V    |          |          |
```



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 18+35 | 3.1077 | 1.52 | Q | | | V | |
| 18+40 | 3.1180 | 1.49 | Q | | | V | |
| 18+45 | 3.1281 | 1.47 | Q | | | V | |
| 18+50 | 3.1381 | 1.44 | Q | | | V | |
| 18+55 | 3.1478 | 1.41 | Q | | | V | |
| 19+ 0 | 3.1574 | 1.39 | Q | | | V | |
| 19+ 5 | 3.1668 | 1.37 | Q | | | V | |
| 19+10 | 3.1761 | 1.35 | Q | | | V | |
| 19+15 | 3.1852 | 1.32 | Q | | | V | |
| 19+20 | 3.1942 | 1.30 | Q | | | V | |
| 19+25 | 3.2030 | 1.29 | Q | | | V | |
| 19+30 | 3.2117 | 1.27 | Q | | | V | |
| 19+35 | 3.2203 | 1.25 | Q | | | V | |
| 19+40 | 3.2288 | 1.23 | Q | | | V | |
| 19+45 | 3.2372 | 1.22 | Q | | | V | |
| 19+50 | 3.2455 | 1.20 | Q | | | V | |
| 19+55 | 3.2536 | 1.18 | Q | | | V | |
| 20+ 0 | 3.2617 | 1.17 | Q | | | V | |
| 20+ 5 | 3.2696 | 1.15 | Q | | | V | |
| 20+10 | 3.2775 | 1.14 | Q | | | V | |
| 20+15 | 3.2852 | 1.13 | Q | | | V | |
| 20+20 | 3.2929 | 1.11 | Q | | | V | |
| 20+25 | 3.3005 | 1.10 | Q | | | V | |
| 20+30 | 3.3080 | 1.09 | Q | | | V | |
| 20+35 | 3.3154 | 1.08 | Q | | | V | |
| 20+40 | 3.3228 | 1.07 | Q | | | V | |
| 20+45 | 3.3301 | 1.06 | Q | | | V | |
| 20+50 | 3.3373 | 1.04 | Q | | | V | |
| 20+55 | 3.3444 | 1.03 | Q | | | V | |
| 21+ 0 | 3.3514 | 1.02 | Q | | | V | |
| 21+ 5 | 3.3584 | 1.01 | Q | | | V | |
| 21+10 | 3.3653 | 1.00 | Q | | | V | |
| 21+15 | 3.3722 | 0.99 | Q | | | V | |
| 21+20 | 3.3790 | 0.99 | Q | | | V | |
| 21+25 | 3.3857 | 0.98 | Q | | | V | |
| 21+30 | 3.3924 | 0.97 | Q | | | V | |
| 21+35 | 3.3990 | 0.96 | Q | | | V | |
| 21+40 | 3.4055 | 0.95 | Q | | | V | |
| 21+45 | 3.4120 | 0.94 | Q | | | V | |
| 21+50 | 3.4185 | 0.93 | Q | | | V | |
| 21+55 | 3.4248 | 0.93 | Q | | | V | |
| 22+ 0 | 3.4312 | 0.92 | Q | | | V | |
| 22+ 5 | 3.4375 | 0.91 | Q | | | V | |
| 22+10 | 3.4437 | 0.90 | Q | | | V | |
| 22+15 | 3.4499 | 0.90 | Q | | | V | |
| 22+20 | 3.4560 | 0.89 | Q | | | V | |
| 22+25 | 3.4621 | 0.88 | Q | | | V | |
| 22+30 | 3.4681 | 0.88 | Q | | | V | |
| 22+35 | 3.4741 | 0.87 | Q | | | V | |
| 22+40 | 3.4801 | 0.86 | Q | | | V | |

```
   22+45       3.4860      0.86  |Q        |         |         |       V |
   22+50       3.4919      0.85  |Q        |         |         |        V|
   22+55       3.4977      0.85  |Q        |         |         |        V|
   23+ 0       3.5035      0.84  |Q        |         |         |        V|
   23+ 5       3.5092      0.83  |Q        |         |         |        V|
   23+10       3.5149      0.83  |Q        |         |         |        V|
   23+15       3.5206      0.82  |Q        |         |         |        V|
   23+20       3.5262      0.82  |Q        |         |         |        V|
   23+25       3.5318      0.81  |Q        |         |         |        V|
   23+30       3.5374      0.81  |Q        |         |         |        V|
   23+35       3.5429      0.80  |Q        |         |         |        V|
   23+40       3.5484      0.80  |Q        |         |         |        V|
   23+45       3.5539      0.79  |Q        |         |         |        V|
   23+50       3.5593      0.79  |Q        |         |         |        V|
   23+55       3.5647      0.78  |Q        |         |         |        V|
   24+ 0       3.5700      0.78  |Q        |         |         |        V|
   24+ 5       3.5749      0.71  Q         |         |         |        V|
   24+10       3.5775      0.38  Q         |         |         |        V|
   24+15       3.5782      0.10  Q         |         |         |        V|
   24+20       3.5783      0.02  Q         |         |         |        V|
   24+25       3.5784      0.01  Q         |         |         |         V
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FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 04/18/23

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PROJECT CITURS
POST-DEV 100-YEAR
AREA A

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Program License Serial Number 6353

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********** HYDROGRAPH INFORMATION **********

From study/file name: UH100PostA.rte
**********HYDROGRAPH DATA**********
Number of intervals = 293
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 23.306 (CFS)
Total volume = 3.578 (Ac.Ft)

Status of hydrographs being held in storage

| | Stream 1 | Stream 2 | Stream 3 | Stream 4 | Stream 5 |
|---|---|---|---|---|---|
| Peak (CFS) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vol (Ac.Ft) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

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Process from Point/Station 0.000 to Point/Station 0.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data
---
Total number of inflow hydrograph intervals = 293
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)
---
---
Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

| Basin Depth (Ft.) | Storage (Ac.Ft) | Outflow (CFS) | (S-O*dt/2) (Ac.Ft) | (S+O*dt/2) (Ac.Ft) |
|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.750 | 0.142 | 0.600 | 0.140 | 0.144 |
| 1.750 | 0.332 | 0.600 | 0.330 | 0.334 |
| 2.750 | 0.522 | 0.600 | 0.520 | 0.524 |
| 3.750 | 0.712 | 0.600 | 0.710 | 0.714 |
| 4.750 | 0.902 | 6.042 | 0.881 | 0.923 |
| 5.750 | 1.092 | 6.884 | 1.068 | 1.116 |
| 6.750 | 1.281 | 6.884 | 1.257 | 1.305 |

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

| Time (Hours) | Inflow (CFS) | Outflow (CFS) | Storage (Ac.Ft) | .0 5.8 11.65 17.48 23.31 | Depth (Ft.) |
|---|---|---|---|---|---|
| 0.083 | 0.06 | 0.00 | 0.000 | O | 0.00 |
| 0.167 | 0.39 | 0.01 | 0.002 | O | 0.01 |
| 0.250 | 0.67 | 0.02 | 0.005 | O | 0.03 |
| 0.333 | 0.75 | 0.04 | 0.010 | OI | 0.05 |
| 0.417 | 0.77 | 0.06 | 0.015 | OI | 0.08 |
| 0.500 | 0.77 | 0.08 | 0.020 | OI | 0.10 |
| 0.583 | 0.78 | 0.10 | 0.024 | OI | 0.13 |
| 0.667 | 0.78 | 0.12 | 0.029 | OI | 0.15 |
| 0.750 | 0.78 | 0.14 | 0.033 | OI | 0.18 |
| 0.833 | 0.78 | 0.16 | 0.038 | OI | 0.20 |
| 0.917 | 0.79 | 0.18 | 0.042 | OI | 0.22 |
| 1.000 | 0.79 | 0.19 | 0.046 | OI | 0.24 |
| 1.083 | 0.79 | 0.21 | 0.050 | OI | 0.27 |
| 1.167 | 0.79 | 0.23 | 0.054 | OI | 0.29 |
| 1.250 | 0.80 | 0.24 | 0.058 | OI | 0.31 |
| 1.333 | 0.80 | 0.26 | 0.062 | OI | 0.33 |
| 1.417 | 0.80 | 0.28 | 0.065 | OI | 0.35 |
| 1.500 | 0.80 | 0.29 | 0.069 | OI | 0.36 |
| 1.583 | 0.81 | 0.31 | 0.072 | OI | 0.38 |
| 1.667 | 0.81 | 0.32 | 0.076 | OI | 0.40 |
| 1.750 | 0.81 | 0.33 | 0.079 | OI | 0.42 |
| 1.833 | 0.81 | 0.35 | 0.082 | OI | 0.44 |
| 1.917 | 0.82 | 0.36 | 0.086 | OI | 0.45 |
| 2.000 | 0.82 | 0.37 | 0.089 | OI | 0.47 |
| 2.083 | 0.82 | 0.39 | 0.092 | OI | 0.48 |
| 2.167 | 0.83 | 0.40 | 0.095 | OI | 0.50 |
| 2.250 | 0.83 | 0.41 | 0.098 | OI | 0.52 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2.333 | 0.83 | 0.42 | 0.100 | OI | | | | 0.53 |
| 2.417 | 0.83 | 0.44 | 0.103 | OI | | | | 0.54 |
| 2.500 | 0.84 | 0.45 | 0.106 | OI | | | | 0.56 |
| 2.583 | 0.84 | 0.46 | 0.109 | OI | | | | 0.57 |
| 2.667 | 0.84 | 0.47 | 0.111 | OI | | | | 0.59 |
| 2.750 | 0.85 | 0.48 | 0.114 | OI | | | | 0.60 |
| 2.833 | 0.85 | 0.49 | 0.116 | OI | | | | 0.61 |
| 2.917 | 0.85 | 0.50 | 0.119 | OI | | | | 0.63 |
| 3.000 | 0.85 | 0.51 | 0.121 | OI | | | | 0.64 |
| 3.083 | 0.86 | 0.52 | 0.123 | OI | | | | 0.65 |
| 3.167 | 0.86 | 0.53 | 0.126 | OI | | | | 0.66 |
| 3.250 | 0.86 | 0.54 | 0.128 | OI | | | | 0.68 |
| 3.333 | 0.87 | 0.55 | 0.130 | OI | | | | 0.69 |
| 3.417 | 0.87 | 0.56 | 0.132 | OI | | | | 0.70 |
| 3.500 | 0.87 | 0.57 | 0.134 | OI | | | | 0.71 |
| 3.583 | 0.88 | 0.58 | 0.136 | OI | | | | 0.72 |
| 3.667 | 0.88 | 0.59 | 0.139 | OI | | | | 0.73 |
| 3.750 | 0.88 | 0.59 | 0.141 | OI | | | | 0.74 |
| 3.833 | 0.89 | 0.60 | 0.143 | OI | | | | 0.75 |
| 3.917 | 0.89 | 0.60 | 0.144 | OI | | | | 0.76 |
| 4.000 | 0.89 | 0.60 | 0.147 | OI | | | | 0.77 |
| 4.083 | 0.90 | 0.60 | 0.149 | OI | | | | 0.78 |
| 4.167 | 0.90 | 0.60 | 0.151 | OI | | | | 0.80 |
| 4.250 | 0.90 | 0.60 | 0.153 | OI | | | | 0.81 |
| 4.333 | 0.91 | 0.60 | 0.155 | OI | | | | 0.82 |
| 4.417 | 0.91 | 0.60 | 0.157 | OI | | | | 0.83 |
| 4.500 | 0.92 | 0.60 | 0.159 | OI | | | | 0.84 |
| 4.583 | 0.92 | 0.60 | 0.161 | OI | | | | 0.85 |
| 4.667 | 0.92 | 0.60 | 0.163 | OI | | | | 0.86 |
| 4.750 | 0.93 | 0.60 | 0.166 | OI | | | | 0.87 |
| 4.833 | 0.93 | 0.60 | 0.168 | OI | | | | 0.89 |
| 4.917 | 0.93 | 0.60 | 0.170 | OI | | | | 0.90 |
| 5.000 | 0.94 | 0.60 | 0.173 | OI | | | | 0.91 |
| 5.083 | 0.94 | 0.60 | 0.175 | OI | | | | 0.92 |
| 5.167 | 0.95 | 0.60 | 0.177 | OI | | | | 0.94 |
| 5.250 | 0.95 | 0.60 | 0.180 | OI | | | | 0.95 |
| 5.333 | 0.95 | 0.60 | 0.182 | OI | | | | 0.96 |
| 5.417 | 0.96 | 0.60 | 0.185 | OI | | | | 0.97 |
| 5.500 | 0.96 | 0.60 | 0.187 | OI | | | | 0.99 |
| 5.583 | 0.97 | 0.60 | 0.190 | OI | | | | 1.00 |
| 5.667 | 0.97 | 0.60 | 0.192 | OI | | | | 1.01 |
| 5.750 | 0.98 | 0.60 | 0.195 | OI | | | | 1.03 |
| 5.833 | 0.98 | 0.60 | 0.197 | OI | | | | 1.04 |
| 5.917 | 0.98 | 0.60 | 0.200 | OI | | | | 1.05 |
| 6.000 | 0.99 | 0.60 | 0.203 | OI | | | | 1.07 |
| 6.083 | 0.99 | 0.60 | 0.205 | OI | | | | 1.08 |
| 6.167 | 1.00 | 0.60 | 0.208 | OI | | | | 1.10 |
| 6.250 | 1.00 | 0.60 | 0.211 | OI | | | | 1.11 |
| 6.333 | 1.01 | 0.60 | 0.214 | OI | | | | 1.13 |
| 6.417 | 1.01 | 0.60 | 0.216 | OI | | | | 1.14 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6.500 | 1.02 | 0.60 | 0.219 | OI | | | | 1.16 |
| 6.583 | 1.02 | 0.60 | 0.222 | OI | | | | 1.17 |
| 6.667 | 1.03 | 0.60 | 0.225 | OI | | | | 1.19 |
| 6.750 | 1.03 | 0.60 | 0.228 | OI | | | | 1.20 |
| 6.833 | 1.04 | 0.60 | 0.231 | OI | | | | 1.22 |
| 6.917 | 1.04 | 0.60 | 0.234 | OI | | | | 1.23 |
| 7.000 | 1.05 | 0.60 | 0.237 | OI | | | | 1.25 |
| 7.083 | 1.05 | 0.60 | 0.240 | OI | | | | 1.27 |
| 7.167 | 1.06 | 0.60 | 0.243 | OI | | | | 1.28 |
| 7.250 | 1.07 | 0.60 | 0.247 | OI | | | | 1.30 |
| 7.333 | 1.07 | 0.60 | 0.250 | OI | | | | 1.32 |
| 7.417 | 1.08 | 0.60 | 0.253 | OI | | | | 1.33 |
| 7.500 | 1.08 | 0.60 | 0.256 | OI | | | | 1.35 |
| 7.583 | 1.09 | 0.60 | 0.260 | OI | | | | 1.37 |
| 7.667 | 1.09 | 0.60 | 0.263 | OI | | | | 1.39 |
| 7.750 | 1.10 | 0.60 | 0.267 | OI | | | | 1.41 |
| 7.833 | 1.11 | 0.60 | 0.270 | OI | | | | 1.42 |
| 7.917 | 1.11 | 0.60 | 0.274 | OI | | | | 1.44 |
| 8.000 | 1.12 | 0.60 | 0.277 | OI | | | | 1.46 |
| 8.083 | 1.13 | 0.60 | 0.281 | OI | | | | 1.48 |
| 8.167 | 1.13 | 0.60 | 0.284 | OI | | | | 1.50 |
| 8.250 | 1.14 | 0.60 | 0.288 | OI | | | | 1.52 |
| 8.333 | 1.15 | 0.60 | 0.292 | OI | | | | 1.54 |
| 8.417 | 1.15 | 0.60 | 0.296 | OI | | | | 1.56 |
| 8.500 | 1.16 | 0.60 | 0.299 | OI | | | | 1.58 |
| 8.583 | 1.17 | 0.60 | 0.303 | OI | | | | 1.60 |
| 8.667 | 1.17 | 0.60 | 0.307 | OI | | | | 1.62 |
| 8.750 | 1.18 | 0.60 | 0.311 | OI | | | | 1.64 |
| 8.833 | 1.19 | 0.60 | 0.315 | OI | | | | 1.66 |
| 8.917 | 1.20 | 0.60 | 0.319 | OI | | | | 1.68 |
| 9.000 | 1.21 | 0.60 | 0.323 | OI | | | | 1.70 |
| 9.083 | 1.21 | 0.60 | 0.328 | OI | | | | 1.73 |
| 9.167 | 1.22 | 0.60 | 0.332 | OI | | | | 1.75 |
| 9.250 | 1.23 | 0.60 | 0.336 | OI | | | | 1.77 |
| 9.333 | 1.24 | 0.60 | 0.341 | OI | | | | 1.80 |
| 9.417 | 1.25 | 0.60 | 0.345 | OI | | | | 1.82 |
| 9.500 | 1.26 | 0.60 | 0.349 | OI | | | | 1.84 |
| 9.583 | 1.26 | 0.60 | 0.354 | OI | | | | 1.87 |
| 9.667 | 1.27 | 0.60 | 0.359 | OI | | | | 1.89 |
| 9.750 | 1.28 | 0.60 | 0.363 | OI | | | | 1.91 |
| 9.833 | 1.29 | 0.60 | 0.368 | OI | | | | 1.94 |
| 9.917 | 1.30 | 0.60 | 0.373 | OI | | | | 1.96 |
| 10.000 | 1.31 | 0.60 | 0.378 | OI | | | | 1.99 |
| 10.083 | 1.32 | 0.60 | 0.383 | OI | | | | 2.02 |
| 10.167 | 1.33 | 0.60 | 0.388 | OI | | | | 2.04 |
| 10.250 | 1.34 | 0.60 | 0.393 | OI | | | | 2.07 |
| 10.333 | 1.35 | 0.60 | 0.398 | OI | | | | 2.10 |
| 10.417 | 1.36 | 0.60 | 0.403 | OI | | | | 2.12 |
| 10.500 | 1.38 | 0.60 | 0.408 | OI | | | | 2.15 |
| 10.583 | 1.39 | 0.60 | 0.414 | OI | | | | 2.18 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10.667 | 1.40 | 0.60 | 0.419 | OI | \| | \| | \| | 2.21 |
| 10.750 | 1.41 | 0.60 | 0.425 | OI | \| | \| | \| | 2.24 |
| 10.833 | 1.42 | 0.60 | 0.430 | OI | \| | \| | \| | 2.27 |
| 10.917 | 1.44 | 0.60 | 0.436 | OI | \| | \| | \| | 2.30 |
| 11.000 | 1.45 | 0.60 | 0.442 | OI | \| | \| | \| | 2.33 |
| 11.083 | 1.46 | 0.60 | 0.448 | O I | \| | \| | \| | 2.36 |
| 11.167 | 1.48 | 0.60 | 0.454 | O I | \| | \| | \| | 2.39 |
| 11.250 | 1.49 | 0.60 | 0.460 | O I | \| | \| | \| | 2.42 |
| 11.333 | 1.51 | 0.60 | 0.466 | O I | \| | \| | \| | 2.46 |
| 11.417 | 1.52 | 0.60 | 0.472 | O I | \| | \| | \| | 2.49 |
| 11.500 | 1.54 | 0.60 | 0.479 | O I | \| | \| | \| | 2.52 |
| 11.583 | 1.55 | 0.60 | 0.485 | O I | \| | \| | \| | 2.56 |
| 11.667 | 1.57 | 0.60 | 0.492 | O I | \| | \| | \| | 2.59 |
| 11.750 | 1.58 | 0.60 | 0.499 | O I | \| | \| | \| | 2.63 |
| 11.833 | 1.60 | 0.60 | 0.506 | O I | \| | \| | \| | 2.66 |
| 11.917 | 1.62 | 0.60 | 0.512 | O I | \| | \| | \| | 2.70 |
| 12.000 | 1.64 | 0.60 | 0.520 | O I | \| | \| | \| | 2.74 |
| 12.083 | 1.66 | 0.60 | 0.527 | O I | \| | \| | \| | 2.78 |
| 12.167 | 1.73 | 0.60 | 0.534 | O I | \| | \| | \| | 2.81 |
| 12.250 | 1.79 | 0.60 | 0.542 | O I | \| | \| | \| | 2.86 |
| 12.333 | 1.82 | 0.60 | 0.551 | O I | \| | \| | \| | 2.90 |
| 12.417 | 1.84 | 0.60 | 0.559 | O I | \| | \| | \| | 2.95 |
| 12.500 | 1.87 | 0.60 | 0.568 | O I | \| | \| | \| | 2.99 |
| 12.583 | 1.89 | 0.60 | 0.576 | O I | \| | \| | \| | 3.04 |
| 12.667 | 1.91 | 0.60 | 0.585 | O I | \| | \| | \| | 3.08 |
| 12.750 | 1.94 | 0.60 | 0.595 | O I | \| | \| | \| | 3.13 |
| 12.833 | 1.96 | 0.60 | 0.604 | O I | \| | \| | \| | 3.18 |
| 12.917 | 1.99 | 0.60 | 0.613 | O I | \| | \| | \| | 3.23 |
| 13.000 | 2.02 | 0.60 | 0.623 | O I | \| | \| | \| | 3.28 |
| 13.083 | 2.05 | 0.60 | 0.633 | O I | \| | \| | \| | 3.33 |
| 13.167 | 2.08 | 0.60 | 0.643 | O I | \| | \| | \| | 3.39 |
| 13.250 | 2.11 | 0.60 | 0.653 | O I | \| | \| | \| | 3.44 |
| 13.333 | 2.14 | 0.60 | 0.664 | O I | \| | \| | \| | 3.50 |
| 13.417 | 2.18 | 0.60 | 0.674 | O I | \| | \| | \| | 3.55 |
| 13.500 | 2.21 | 0.60 | 0.685 | O  I | \| | \| | \| | 3.61 |
| 13.583 | 2.25 | 0.60 | 0.697 | O  I | \| | \| | \| | 3.67 |
| 13.667 | 2.29 | 0.60 | 0.708 | O  I | \| | \| | \| | 3.73 |
| 13.750 | 2.33 | 0.81 | 0.719 | \|O I | \| | \| | \| | 3.79 |
| 13.833 | 2.38 | 1.08 | 0.729 | \|O I | \| | \| | \| | 3.84 |
| 13.917 | 2.42 | 1.32 | 0.737 | \|O I | \| | \| | \| | 3.88 |
| 14.000 | 2.47 | 1.52 | 0.744 | \| OI | \| | \| | \| | 3.92 |
| 14.083 | 2.53 | 1.70 | 0.750 | \| OI | \| | \| | \| | 3.95 |
| 14.167 | 2.63 | 1.86 | 0.756 | \| OI | \| | \| | \| | 3.98 |
| 14.250 | 2.73 | 2.00 | 0.761 | \| OI | \| | \| | \| | 4.01 |
| 14.333 | 2.80 | 2.14 | 0.766 | \| OI | \| | \| | \| | 4.03 |
| 14.417 | 2.87 | 2.27 | 0.770 | \|  O | \| | \| | \| | 4.06 |
| 14.500 | 2.95 | 2.38 | 0.774 | \|  OI | \| | \| | \| | 4.08 |
| 14.583 | 3.02 | 2.49 | 0.778 | \|  OI | \| | \| | \| | 4.10 |
| 14.667 | 3.11 | 2.59 | 0.782 | \|  OI | \| | \| | \| | 4.12 |
| 14.750 | 3.20 | 2.70 | 0.785 | \|  OI | \| | \| | \| | 4.14 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 14.833 | 3.31 | 2.80 | 0.789 | OI | | | | 4.15 |
| 14.917 | 3.41 | 2.90 | 0.792 | OI | | | | 4.17 |
| 15.000 | 3.54 | 3.00 | 0.796 | O | | | | 4.19 |
| 15.083 | 3.67 | 3.11 | 0.800 | OI | | | | 4.21 |
| 15.167 | 3.83 | 3.22 | 0.804 | OI | | | | 4.23 |
| 15.250 | 4.00 | 3.35 | 0.808 | OI | | | | 4.25 |
| 15.333 | 4.20 | 3.48 | 0.813 | OI | | | | 4.28 |
| 15.417 | 4.49 | 3.64 | 0.818 | O I | | | | 4.31 |
| 15.500 | 5.10 | 3.85 | 0.825 | O I | | | | 4.35 |
| 15.583 | 5.73 | 4.13 | 0.835 | O I | | | | 4.40 |
| 15.667 | 6.28 | 4.46 | 0.847 | O I | | | | 4.46 |
| 15.750 | 6.84 | 4.84 | 0.860 | O I | | | | 4.53 |
| 15.833 | 7.54 | 5.26 | 0.875 | O I | | | | 4.61 |
| 15.917 | 8.56 | 5.76 | 0.892 | O I | | | | 4.70 |
| 16.000 | 10.61 | 6.11 | 0.917 | O I | | | | 4.83 |
| 16.083 | 15.08 | 6.31 | 0.963 | O | I | | | 5.07 |
| 16.167 | 23.31 | 6.70 | 1.050 | O | | | I | 5.53 |
| 16.250 | 20.08 | 6.88 | 1.153 | O | | I | | 6.07 |
| 16.333 | 11.40 | 6.88 | 1.214 | O I | | | | 6.40 |
| 16.417 | 7.61 | 6.88 | 1.232 | OI | | | | 6.49 |
| 16.500 | 5.86 | 6.88 | 1.231 | IO | | | | 6.49 |
| 16.583 | 4.66 | 6.88 | 1.220 | I O | | | | 6.43 |
| 16.667 | 4.10 | 6.88 | 1.203 | I O | | | | 6.34 |
| 16.750 | 3.73 | 6.88 | 1.182 | I O | | | | 6.23 |
| 16.833 | 3.46 | 6.88 | 1.160 | I O | | | | 6.11 |
| 16.917 | 3.23 | 6.88 | 1.135 | I O | | | | 5.98 |
| 17.000 | 3.05 | 6.88 | 1.109 | I O | | | | 5.84 |
| 17.083 | 2.89 | 6.84 | 1.083 | I O | | | | 5.70 |
| 17.167 | 2.71 | 6.72 | 1.055 | I O | | | | 5.56 |
| 17.250 | 2.55 | 6.60 | 1.027 | I O | | | | 5.41 |
| 17.333 | 2.44 | 6.47 | 1.000 | I O | | | | 5.26 |
| 17.417 | 2.34 | 6.35 | 0.972 | I O | | | | 5.12 |
| 17.500 | 2.26 | 6.23 | 0.944 | I O | | | | 4.97 |
| 17.583 | 2.18 | 6.11 | 0.917 | I O | | | | 4.83 |
| 17.667 | 2.12 | 5.73 | 0.891 | I O | | | | 4.69 |
| 17.750 | 2.05 | 5.08 | 0.868 | I O | | | | 4.57 |
| 17.833 | 2.00 | 4.53 | 0.849 | I O | | | | 4.47 |
| 17.917 | 1.94 | 4.07 | 0.833 | I O | | | | 4.39 |
| 18.000 | 1.89 | 3.68 | 0.820 | I O | | | | 4.32 |
| 18.083 | 1.84 | 3.36 | 0.808 | I O | | | | 4.26 |
| 18.167 | 1.75 | 3.08 | 0.798 | I O | | | | 4.21 |
| 18.250 | 1.67 | 2.83 | 0.790 | IO | | | | 4.16 |
| 18.333 | 1.63 | 2.62 | 0.783 | IO | | | | 4.12 |
| 18.417 | 1.59 | 2.44 | 0.776 | IO | | | | 4.09 |
| 18.500 | 1.56 | 2.28 | 0.771 | IO | | | | 4.06 |
| 18.583 | 1.52 | 2.15 | 0.766 | O | | | | 4.03 |
| 18.667 | 1.49 | 2.03 | 0.762 | O | | | | 4.01 |
| 18.750 | 1.47 | 1.93 | 0.759 | O | | | | 4.00 |
| 18.833 | 1.44 | 1.85 | 0.756 | IO | | | | 3.98 |
| 18.917 | 1.41 | 1.77 | 0.753 | IO | | | | 3.97 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 19.000 | 1.39 | 1.71 | 0.751 | IO | | | | 3.95 |
| 19.083 | 1.37 | 1.65 | 0.749 | IO | | | | 3.94 |
| 19.167 | 1.35 | 1.60 | 0.747 | IO | | | | 3.93 |
| 19.250 | 1.32 | 1.55 | 0.745 | IO | | | | 3.92 |
| 19.333 | 1.30 | 1.51 | 0.744 | IO | | | | 3.92 |
| 19.417 | 1.29 | 1.47 | 0.742 | IO | | | | 3.91 |
| 19.500 | 1.27 | 1.43 | 0.741 | O | | | | 3.90 |
| 19.583 | 1.25 | 1.40 | 0.740 | O | | | | 3.90 |
| 19.667 | 1.23 | 1.37 | 0.739 | O | | | | 3.89 |
| 19.750 | 1.22 | 1.35 | 0.738 | O | | | | 3.89 |
| 19.833 | 1.20 | 1.32 | 0.737 | O | | | | 3.88 |
| 19.917 | 1.18 | 1.30 | 0.736 | O | | | | 3.88 |
| 20.000 | 1.17 | 1.28 | 0.736 | O | | | | 3.87 |
| 20.083 | 1.15 | 1.26 | 0.735 | O | | | | 3.87 |
| 20.167 | 1.14 | 1.24 | 0.734 | O | | | | 3.87 |
| 20.250 | 1.13 | 1.22 | 0.734 | O | | | | 3.86 |
| 20.333 | 1.11 | 1.20 | 0.733 | O | | | | 3.86 |
| 20.417 | 1.10 | 1.18 | 0.732 | O | | | | 3.86 |
| 20.500 | 1.09 | 1.17 | 0.732 | O | | | | 3.85 |
| 20.583 | 1.08 | 1.15 | 0.731 | O | | | | 3.85 |
| 20.667 | 1.07 | 1.14 | 0.731 | O | | | | 3.85 |
| 20.750 | 1.06 | 1.12 | 0.730 | O | | | | 3.85 |
| 20.833 | 1.04 | 1.11 | 0.730 | O | | | | 3.84 |
| 20.917 | 1.03 | 1.10 | 0.729 | O | | | | 3.84 |
| 21.000 | 1.02 | 1.09 | 0.729 | O | | | | 3.84 |
| 21.083 | 1.01 | 1.07 | 0.729 | O | | | | 3.84 |
| 21.167 | 1.00 | 1.06 | 0.728 | O | | | | 3.83 |
| 21.250 | 0.99 | 1.05 | 0.728 | O | | | | 3.83 |
| 21.333 | 0.99 | 1.04 | 0.727 | O | | | | 3.83 |
| 21.417 | 0.98 | 1.03 | 0.727 | O | | | | 3.83 |
| 21.500 | 0.97 | 1.02 | 0.727 | O | | | | 3.83 |
| 21.583 | 0.96 | 1.01 | 0.726 | O | | | | 3.83 |
| 21.667 | 0.95 | 1.00 | 0.726 | O | | | | 3.82 |
| 21.750 | 0.94 | 0.99 | 0.726 | O | | | | 3.82 |
| 21.833 | 0.93 | 0.98 | 0.725 | O | | | | 3.82 |
| 21.917 | 0.93 | 0.97 | 0.725 | O | | | | 3.82 |
| 22.000 | 0.92 | 0.96 | 0.725 | O | | | | 3.82 |
| 22.083 | 0.91 | 0.95 | 0.724 | O | | | | 3.82 |
| 22.167 | 0.90 | 0.95 | 0.724 | O | | | | 3.81 |
| 22.250 | 0.90 | 0.94 | 0.724 | O | | | | 3.81 |
| 22.333 | 0.89 | 0.93 | 0.724 | O | | | | 3.81 |
| 22.417 | 0.88 | 0.92 | 0.723 | O | | | | 3.81 |
| 22.500 | 0.88 | 0.92 | 0.723 | O | | | | 3.81 |
| 22.583 | 0.87 | 0.91 | 0.723 | O | | | | 3.81 |
| 22.667 | 0.86 | 0.90 | 0.722 | O | | | | 3.81 |
| 22.750 | 0.86 | 0.89 | 0.722 | O | | | | 3.80 |
| 22.833 | 0.85 | 0.89 | 0.722 | O | | | | 3.80 |
| 22.917 | 0.85 | 0.88 | 0.722 | O | | | | 3.80 |
| 23.000 | 0.84 | 0.87 | 0.722 | O | | | | 3.80 |
| 23.083 | 0.83 | 0.87 | 0.721 | O | | | | 3.80 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 23.167 | 0.83 | 0.86 | 0.721 | \|O | \| | \| | \| | 3.80 |
| 23.250 | 0.82 | 0.85 | 0.721 | \|O | \| | \| | \| | 3.80 |
| 23.333 | 0.82 | 0.85 | 0.721 | \|O | \| | \| | \| | 3.80 |
| 23.417 | 0.81 | 0.84 | 0.720 | \|O | \| | \| | \| | 3.79 |
| 23.500 | 0.81 | 0.84 | 0.720 | \|O | \| | \| | \| | 3.79 |
| 23.583 | 0.80 | 0.83 | 0.720 | \|O | \| | \| | \| | 3.79 |
| 23.667 | 0.80 | 0.83 | 0.720 | \|O | \| | \| | \| | 3.79 |
| 23.750 | 0.79 | 0.82 | 0.720 | \|O | \| | \| | \| | 3.79 |
| 23.833 | 0.79 | 0.81 | 0.719 | \|O | \| | \| | \| | 3.79 |
| 23.917 | 0.78 | 0.81 | 0.719 | \|O | \| | \| | \| | 3.79 |
| 24.000 | 0.78 | 0.80 | 0.719 | \|O | \| | \| | \| | 3.79 |
| 24.083 | 0.71 | 0.79 | 0.719 | IO | \| | \| | \| | 3.79 |
| 24.167 | 0.38 | 0.75 | 0.717 | IO | \| | \| | \| | 3.78 |
| 24.250 | 0.10 | 0.66 | 0.714 | O | \| | \| | \| | 3.76 |
| 24.333 | 0.02 | 0.60 | 0.710 | O | \| | \| | \| | 3.74 |
| 24.417 | 0.01 | 0.60 | 0.706 | O | \| | \| | \| | 3.72 |
| 24.500 | 0.00 | 0.60 | 0.702 | O | \| | \| | \| | 3.70 |
| 24.583 | 0.00 | 0.60 | 0.698 | O | \| | \| | \| | 3.68 |
| 24.667 | 0.00 | 0.60 | 0.694 | O | \| | \| | \| | 3.65 |
| 24.750 | 0.00 | 0.60 | 0.689 | O | \| | \| | \| | 3.63 |
| 24.833 | 0.00 | 0.60 | 0.685 | O | \| | \| | \| | 3.61 |
| 24.917 | 0.00 | 0.60 | 0.681 | O | \| | \| | \| | 3.59 |
| 25.000 | 0.00 | 0.60 | 0.677 | O | \| | \| | \| | 3.57 |
| 25.083 | 0.00 | 0.60 | 0.673 | O | \| | \| | \| | 3.54 |
| 25.167 | 0.00 | 0.60 | 0.669 | O | \| | \| | \| | 3.52 |
| 25.250 | 0.00 | 0.60 | 0.665 | O | \| | \| | \| | 3.50 |
| 25.333 | 0.00 | 0.60 | 0.661 | O | \| | \| | \| | 3.48 |
| 25.417 | 0.00 | 0.60 | 0.656 | O | \| | \| | \| | 3.46 |
| 25.500 | 0.00 | 0.60 | 0.652 | O | \| | \| | \| | 3.44 |
| 25.583 | 0.00 | 0.60 | 0.648 | O | \| | \| | \| | 3.41 |
| 25.667 | 0.00 | 0.60 | 0.644 | O | \| | \| | \| | 3.39 |
| 25.750 | 0.00 | 0.60 | 0.640 | O | \| | \| | \| | 3.37 |
| 25.833 | 0.00 | 0.60 | 0.636 | O | \| | \| | \| | 3.35 |
| 25.917 | 0.00 | 0.60 | 0.632 | O | \| | \| | \| | 3.33 |
| 26.000 | 0.00 | 0.60 | 0.628 | O | \| | \| | \| | 3.31 |
| 26.083 | 0.00 | 0.60 | 0.623 | O | \| | \| | \| | 3.28 |
| 26.167 | 0.00 | 0.60 | 0.619 | O | \| | \| | \| | 3.26 |
| 26.250 | 0.00 | 0.60 | 0.615 | O | \| | \| | \| | 3.24 |
| 26.333 | 0.00 | 0.60 | 0.611 | O | \| | \| | \| | 3.22 |
| 26.417 | 0.00 | 0.60 | 0.607 | O | \| | \| | \| | 3.20 |
| 26.500 | 0.00 | 0.60 | 0.603 | O | \| | \| | \| | 3.17 |
| 26.583 | 0.00 | 0.60 | 0.599 | O | \| | \| | \| | 3.15 |
| 26.667 | 0.00 | 0.60 | 0.594 | O | \| | \| | \| | 3.13 |
| 26.750 | 0.00 | 0.60 | 0.590 | O | \| | \| | \| | 3.11 |
| 26.833 | 0.00 | 0.60 | 0.586 | O | \| | \| | \| | 3.09 |
| 26.917 | 0.00 | 0.60 | 0.582 | O | \| | \| | \| | 3.07 |
| 27.000 | 0.00 | 0.60 | 0.578 | O | \| | \| | \| | 3.04 |
| 27.083 | 0.00 | 0.60 | 0.574 | O | \| | \| | \| | 3.02 |
| 27.167 | 0.00 | 0.60 | 0.570 | O | \| | \| | \| | 3.00 |
| 27.250 | 0.00 | 0.60 | 0.566 | O | \| | \| | \| | 2.98 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 27.333 | 0.00 | 0.60 | 0.561 | O | | | | | 2.96 |
| 27.417 | 0.00 | 0.60 | 0.557 | O | | | | | 2.94 |
| 27.500 | 0.00 | 0.60 | 0.553 | O | | | | | 2.91 |
| 27.583 | 0.00 | 0.60 | 0.549 | O | | | | | 2.89 |
| 27.667 | 0.00 | 0.60 | 0.545 | O | | | | | 2.87 |
| 27.750 | 0.00 | 0.60 | 0.541 | O | | | | | 2.85 |
| 27.833 | 0.00 | 0.60 | 0.537 | O | | | | | 2.83 |
| 27.917 | 0.00 | 0.60 | 0.532 | O | | | | | 2.81 |
| 28.000 | 0.00 | 0.60 | 0.528 | O | | | | | 2.78 |
| 28.083 | 0.00 | 0.60 | 0.524 | O | | | | | 2.76 |
| 28.167 | 0.00 | 0.60 | 0.520 | O | | | | | 2.74 |
| 28.250 | 0.00 | 0.60 | 0.516 | O | | | | | 2.72 |
| 28.333 | 0.00 | 0.60 | 0.512 | O | | | | | 2.70 |
| 28.417 | 0.00 | 0.60 | 0.508 | O | | | | | 2.67 |
| 28.500 | 0.00 | 0.60 | 0.504 | O | | | | | 2.65 |
| 28.583 | 0.00 | 0.60 | 0.499 | O | | | | | 2.63 |
| 28.667 | 0.00 | 0.60 | 0.495 | O | | | | | 2.61 |
| 28.750 | 0.00 | 0.60 | 0.491 | O | | | | | 2.59 |
| 28.833 | 0.00 | 0.60 | 0.487 | O | | | | | 2.57 |
| 28.917 | 0.00 | 0.60 | 0.483 | O | | | | | 2.54 |
| 29.000 | 0.00 | 0.60 | 0.479 | O | | | | | 2.52 |
| 29.083 | 0.00 | 0.60 | 0.475 | O | | | | | 2.50 |
| 29.167 | 0.00 | 0.60 | 0.470 | O | | | | | 2.48 |
| 29.250 | 0.00 | 0.60 | 0.466 | O | | | | | 2.46 |
| 29.333 | 0.00 | 0.60 | 0.462 | O | | | | | 2.44 |
| 29.417 | 0.00 | 0.60 | 0.458 | O | | | | | 2.41 |
| 29.500 | 0.00 | 0.60 | 0.454 | O | | | | | 2.39 |
| 29.583 | 0.00 | 0.60 | 0.450 | O | | | | | 2.37 |
| 29.667 | 0.00 | 0.60 | 0.446 | O | | | | | 2.35 |
| 29.750 | 0.00 | 0.60 | 0.442 | O | | | | | 2.33 |
| 29.833 | 0.00 | 0.60 | 0.437 | O | | | | | 2.30 |
| 29.917 | 0.00 | 0.60 | 0.433 | O | | | | | 2.28 |
| 30.000 | 0.00 | 0.60 | 0.429 | O | | | | | 2.26 |
| 30.083 | 0.00 | 0.60 | 0.425 | O | | | | | 2.24 |
| 30.167 | 0.00 | 0.60 | 0.421 | O | | | | | 2.22 |
| 30.250 | 0.00 | 0.60 | 0.417 | O | | | | | 2.20 |
| 30.333 | 0.00 | 0.60 | 0.413 | O | | | | | 2.17 |
| 30.417 | 0.00 | 0.60 | 0.409 | O | | | | | 2.15 |
| 30.500 | 0.00 | 0.60 | 0.404 | O | | | | | 2.13 |
| 30.583 | 0.00 | 0.60 | 0.400 | O | | | | | 2.11 |
| 30.667 | 0.00 | 0.60 | 0.396 | O | | | | | 2.09 |
| 30.750 | 0.00 | 0.60 | 0.392 | O | | | | | 2.07 |
| 30.833 | 0.00 | 0.60 | 0.388 | O | | | | | 2.04 |
| 30.917 | 0.00 | 0.60 | 0.384 | O | | | | | 2.02 |
| 31.000 | 0.00 | 0.60 | 0.380 | O | | | | | 2.00 |
| 31.083 | 0.00 | 0.60 | 0.375 | O | | | | | 1.98 |
| 31.167 | 0.00 | 0.60 | 0.371 | O | | | | | 1.96 |
| 31.250 | 0.00 | 0.60 | 0.367 | O | | | | | 1.94 |
| 31.333 | 0.00 | 0.60 | 0.363 | O | | | | | 1.91 |
| 31.417 | 0.00 | 0.60 | 0.359 | O | | | | | 1.89 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 31.500 | 0.00 | 0.60 | 0.355 | O | \| | \| | \| | 1.87 |
| 31.583 | 0.00 | 0.60 | 0.351 | O | \| | \| | \| | 1.85 |
| 31.667 | 0.00 | 0.60 | 0.347 | O | \| | \| | \| | 1.83 |
| 31.750 | 0.00 | 0.60 | 0.342 | O | \| | \| | \| | 1.80 |
| 31.833 | 0.00 | 0.60 | 0.338 | O | \| | \| | \| | 1.78 |
| 31.917 | 0.00 | 0.60 | 0.334 | O | \| | \| | \| | 1.76 |
| 32.000 | 0.00 | 0.60 | 0.330 | O | \| | \| | \| | 1.74 |
| 32.083 | 0.00 | 0.60 | 0.326 | O | \| | \| | \| | 1.72 |
| 32.167 | 0.00 | 0.60 | 0.322 | O | \| | \| | \| | 1.70 |
| 32.250 | 0.00 | 0.60 | 0.318 | O | \| | \| | \| | 1.67 |
| 32.333 | 0.00 | 0.60 | 0.313 | O | \| | \| | \| | 1.65 |
| 32.417 | 0.00 | 0.60 | 0.309 | O | \| | \| | \| | 1.63 |
| 32.500 | 0.00 | 0.60 | 0.305 | O | \| | \| | \| | 1.61 |
| 32.583 | 0.00 | 0.60 | 0.301 | O | \| | \| | \| | 1.59 |
| 32.667 | 0.00 | 0.60 | 0.297 | O | \| | \| | \| | 1.57 |
| 32.750 | 0.00 | 0.60 | 0.293 | O | \| | \| | \| | 1.54 |
| 32.833 | 0.00 | 0.60 | 0.289 | O | \| | \| | \| | 1.52 |
| 32.917 | 0.00 | 0.60 | 0.285 | O | \| | \| | \| | 1.50 |
| 33.000 | 0.00 | 0.60 | 0.280 | O | \| | \| | \| | 1.48 |
| 33.083 | 0.00 | 0.60 | 0.276 | O | \| | \| | \| | 1.46 |
| 33.167 | 0.00 | 0.60 | 0.272 | O | \| | \| | \| | 1.43 |
| 33.250 | 0.00 | 0.60 | 0.268 | O | \| | \| | \| | 1.41 |
| 33.333 | 0.00 | 0.60 | 0.264 | O | \| | \| | \| | 1.39 |
| 33.417 | 0.00 | 0.60 | 0.260 | O | \| | \| | \| | 1.37 |
| 33.500 | 0.00 | 0.60 | 0.256 | O | \| | \| | \| | 1.35 |
| 33.583 | 0.00 | 0.60 | 0.251 | O | \| | \| | \| | 1.33 |
| 33.667 | 0.00 | 0.60 | 0.247 | O | \| | \| | \| | 1.30 |
| 33.750 | 0.00 | 0.60 | 0.243 | O | \| | \| | \| | 1.28 |
| 33.833 | 0.00 | 0.60 | 0.239 | O | \| | \| | \| | 1.26 |
| 33.917 | 0.00 | 0.60 | 0.235 | O | \| | \| | \| | 1.24 |
| 34.000 | 0.00 | 0.60 | 0.231 | O | \| | \| | \| | 1.22 |
| 34.083 | 0.00 | 0.60 | 0.227 | O | \| | \| | \| | 1.20 |
| 34.167 | 0.00 | 0.60 | 0.223 | O | \| | \| | \| | 1.17 |
| 34.250 | 0.00 | 0.60 | 0.218 | O | \| | \| | \| | 1.15 |
| 34.333 | 0.00 | 0.60 | 0.214 | O | \| | \| | \| | 1.13 |
| 34.417 | 0.00 | 0.60 | 0.210 | O | \| | \| | \| | 1.11 |
| 34.500 | 0.00 | 0.60 | 0.206 | O | \| | \| | \| | 1.09 |
| 34.583 | 0.00 | 0.60 | 0.202 | O | \| | \| | \| | 1.07 |
| 34.667 | 0.00 | 0.60 | 0.198 | O | \| | \| | \| | 1.04 |
| 34.750 | 0.00 | 0.60 | 0.194 | O | \| | \| | \| | 1.02 |
| 34.833 | 0.00 | 0.60 | 0.189 | O | \| | \| | \| | 1.00 |
| 34.917 | 0.00 | 0.60 | 0.185 | O | \| | \| | \| | 0.98 |
| 35.000 | 0.00 | 0.60 | 0.181 | O | \| | \| | \| | 0.96 |
| 35.083 | 0.00 | 0.60 | 0.177 | O | \| | \| | \| | 0.93 |
| 35.167 | 0.00 | 0.60 | 0.173 | O | \| | \| | \| | 0.91 |
| 35.250 | 0.00 | 0.60 | 0.169 | O | \| | \| | \| | 0.89 |
| 35.333 | 0.00 | 0.60 | 0.165 | O | \| | \| | \| | 0.87 |
| 35.417 | 0.00 | 0.60 | 0.161 | O | \| | \| | \| | 0.85 |
| 35.500 | 0.00 | 0.60 | 0.156 | O | \| | \| | \| | 0.83 |
| 35.583 | 0.00 | 0.60 | 0.152 | O | \| | \| | \| | 0.80 |

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|---|---|---|---|---|---|---|---|---|
| 35.667 | 0.00 | 0.60 | 0.148 | O | \| | \| | \| | 0.78 |
| 35.750 | 0.00 | 0.60 | 0.144 | O | \| | \| | \| | 0.76 |
| 35.833 | 0.00 | 0.59 | 0.140 | O | \| | \| | \| | 0.74 |
| 35.917 | 0.00 | 0.57 | 0.136 | O | \| | \| | \| | 0.72 |
| 36.000 | 0.00 | 0.56 | 0.132 | O | \| | \| | \| | 0.70 |
| 36.083 | 0.00 | 0.54 | 0.128 | O | \| | \| | \| | 0.68 |
| 36.167 | 0.00 | 0.53 | 0.125 | O | \| | \| | \| | 0.66 |
| 36.250 | 0.00 | 0.51 | 0.121 | O | \| | \| | \| | 0.64 |
| 36.333 | 0.00 | 0.50 | 0.118 | O | \| | \| | \| | 0.62 |
| 36.417 | 0.00 | 0.48 | 0.114 | O | \| | \| | \| | 0.60 |
| 36.500 | 0.00 | 0.47 | 0.111 | O | \| | \| | \| | 0.59 |
| 36.583 | 0.00 | 0.46 | 0.108 | O | \| | \| | \| | 0.57 |
| 36.667 | 0.00 | 0.44 | 0.105 | O | \| | \| | \| | 0.55 |
| 36.750 | 0.00 | 0.43 | 0.102 | O | \| | \| | \| | 0.54 |
| 36.833 | 0.00 | 0.42 | 0.099 | O | \| | \| | \| | 0.52 |
| 36.917 | 0.00 | 0.41 | 0.096 | O | \| | \| | \| | 0.51 |
| 37.000 | 0.00 | 0.39 | 0.093 | O | \| | \| | \| | 0.49 |
| 37.083 | 0.00 | 0.38 | 0.090 | O | \| | \| | \| | 0.48 |
| 37.167 | 0.00 | 0.37 | 0.088 | O | \| | \| | \| | 0.46 |
| 37.250 | 0.00 | 0.36 | 0.085 | O | \| | \| | \| | 0.45 |
| 37.333 | 0.00 | 0.35 | 0.083 | O | \| | \| | \| | 0.44 |
| 37.417 | 0.00 | 0.34 | 0.080 | O | \| | \| | \| | 0.43 |
| 37.500 | 0.00 | 0.33 | 0.078 | O | \| | \| | \| | 0.41 |
| 37.583 | 0.00 | 0.32 | 0.076 | O | \| | \| | \| | 0.40 |
| 37.667 | 0.00 | 0.31 | 0.074 | O | \| | \| | \| | 0.39 |
| 37.750 | 0.00 | 0.30 | 0.072 | O | \| | \| | \| | 0.38 |
| 37.833 | 0.00 | 0.29 | 0.070 | O | \| | \| | \| | 0.37 |
| 37.917 | 0.00 | 0.29 | 0.068 | O | \| | \| | \| | 0.36 |
| 38.000 | 0.00 | 0.28 | 0.066 | O | \| | \| | \| | 0.35 |
| 38.083 | 0.00 | 0.27 | 0.064 | O | \| | \| | \| | 0.34 |
| 38.167 | 0.00 | 0.26 | 0.062 | O | \| | \| | \| | 0.33 |
| 38.250 | 0.00 | 0.25 | 0.060 | O | \| | \| | \| | 0.32 |
| 38.333 | 0.00 | 0.25 | 0.058 | O | \| | \| | \| | 0.31 |
| 38.417 | 0.00 | 0.24 | 0.057 | O | \| | \| | \| | 0.30 |
| 38.500 | 0.00 | 0.23 | 0.055 | O | \| | \| | \| | 0.29 |
| 38.583 | 0.00 | 0.23 | 0.054 | O | \| | \| | \| | 0.28 |
| 38.667 | 0.00 | 0.22 | 0.052 | O | \| | \| | \| | 0.27 |
| 38.750 | 0.00 | 0.21 | 0.051 | O | \| | \| | \| | 0.27 |
| 38.833 | 0.00 | 0.21 | 0.049 | O | \| | \| | \| | 0.26 |
| 38.917 | 0.00 | 0.20 | 0.048 | O | \| | \| | \| | 0.25 |
| 39.000 | 0.00 | 0.20 | 0.046 | O | \| | \| | \| | 0.24 |
| 39.083 | 0.00 | 0.19 | 0.045 | O | \| | \| | \| | 0.24 |
| 39.167 | 0.00 | 0.18 | 0.044 | O | \| | \| | \| | 0.23 |
| 39.250 | 0.00 | 0.18 | 0.042 | O | \| | \| | \| | 0.22 |
| 39.333 | 0.00 | 0.17 | 0.041 | O | \| | \| | \| | 0.22 |
| 39.417 | 0.00 | 0.17 | 0.040 | O | \| | \| | \| | 0.21 |
| 39.500 | 0.00 | 0.16 | 0.039 | O | \| | \| | \| | 0.21 |
| 39.583 | 0.00 | 0.16 | 0.038 | O | \| | \| | \| | 0.20 |
| 39.667 | 0.00 | 0.16 | 0.037 | O | \| | \| | \| | 0.19 |
| 39.750 | 0.00 | 0.15 | 0.036 | O | \| | \| | \| | 0.19 |

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|---|---|---|---|---|---|---|---|---|
| 39.833 | 0.00 | 0.15 | 0.035 | O | \| | \| | \| | 0.18 |
| 39.917 | 0.00 | 0.14 | 0.034 | O | \| | \| | \| | 0.18 |
| 40.000 | 0.00 | 0.14 | 0.033 | O | \| | \| | \| | 0.17 |
| 40.083 | 0.00 | 0.13 | 0.032 | O | \| | \| | \| | 0.17 |
| 40.167 | 0.00 | 0.13 | 0.031 | O | \| | \| | \| | 0.16 |
| 40.250 | 0.00 | 0.13 | 0.030 | O | \| | \| | \| | 0.16 |
| 40.333 | 0.00 | 0.12 | 0.029 | O | \| | \| | \| | 0.15 |
| 40.417 | 0.00 | 0.12 | 0.028 | O | \| | \| | \| | 0.15 |
| 40.500 | 0.00 | 0.12 | 0.027 | O | \| | \| | \| | 0.14 |
| 40.583 | 0.00 | 0.11 | 0.027 | O | \| | \| | \| | 0.14 |
| 40.667 | 0.00 | 0.11 | 0.026 | O | \| | \| | \| | 0.14 |
| 40.750 | 0.00 | 0.11 | 0.025 | O | \| | \| | \| | 0.13 |
| 40.833 | 0.00 | 0.10 | 0.024 | O | \| | \| | \| | 0.13 |
| 40.917 | 0.00 | 0.10 | 0.024 | O | \| | \| | \| | 0.13 |
| 41.000 | 0.00 | 0.10 | 0.023 | O | \| | \| | \| | 0.12 |
| 41.083 | 0.00 | 0.09 | 0.022 | O | \| | \| | \| | 0.12 |
| 41.167 | 0.00 | 0.09 | 0.022 | O | \| | \| | \| | 0.11 |
| 41.250 | 0.00 | 0.09 | 0.021 | O | \| | \| | \| | 0.11 |
| 41.333 | 0.00 | 0.09 | 0.021 | O | \| | \| | \| | 0.11 |
| 41.417 | 0.00 | 0.08 | 0.020 | O | \| | \| | \| | 0.11 |
| 41.500 | 0.00 | 0.08 | 0.019 | O | \| | \| | \| | 0.10 |
| 41.583 | 0.00 | 0.08 | 0.019 | O | \| | \| | \| | 0.10 |
| 41.667 | 0.00 | 0.08 | 0.018 | O | \| | \| | \| | 0.10 |
| 41.750 | 0.00 | 0.07 | 0.018 | O | \| | \| | \| | 0.09 |
| 41.833 | 0.00 | 0.07 | 0.017 | O | \| | \| | \| | 0.09 |
| 41.917 | 0.00 | 0.07 | 0.017 | O | \| | \| | \| | 0.09 |
| 42.000 | 0.00 | 0.07 | 0.016 | O | \| | \| | \| | 0.09 |
| 42.083 | 0.00 | 0.07 | 0.016 | O | \| | \| | \| | 0.08 |
| 42.167 | 0.00 | 0.06 | 0.015 | O | \| | \| | \| | 0.08 |
| 42.250 | 0.00 | 0.06 | 0.015 | O | \| | \| | \| | 0.08 |
| 42.333 | 0.00 | 0.06 | 0.014 | O | \| | \| | \| | 0.08 |
| 42.417 | 0.00 | 0.06 | 0.014 | O | \| | \| | \| | 0.07 |
| 42.500 | 0.00 | 0.06 | 0.014 | O | \| | \| | \| | 0.07 |
| 42.583 | 0.00 | 0.06 | 0.013 | O | \| | \| | \| | 0.07 |
| 42.667 | 0.00 | 0.05 | 0.013 | O | \| | \| | \| | 0.07 |
| 42.750 | 0.00 | 0.05 | 0.012 | O | \| | \| | \| | 0.07 |
| 42.833 | 0.00 | 0.05 | 0.012 | O | \| | \| | \| | 0.06 |
| 42.917 | 0.00 | 0.05 | 0.012 | O | \| | \| | \| | 0.06 |
| 43.000 | 0.00 | 0.05 | 0.011 | O | \| | \| | \| | 0.06 |
| 43.083 | 0.00 | 0.05 | 0.011 | O | \| | \| | \| | 0.06 |
| 43.167 | 0.00 | 0.05 | 0.011 | O | \| | \| | \| | 0.06 |
| 43.250 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.06 |
| 43.333 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.05 |
| 43.417 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.05 |
| 43.500 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.05 |
| 43.583 | 0.00 | 0.04 | 0.009 | O | \| | \| | \| | 0.05 |
| 43.667 | 0.00 | 0.04 | 0.009 | O | \| | \| | \| | 0.05 |
| 43.750 | 0.00 | 0.04 | 0.009 | O | \| | \| | \| | 0.05 |
| 43.833 | 0.00 | 0.04 | 0.009 | O | \| | \| | \| | 0.05 |
| 43.917 | 0.00 | 0.04 | 0.008 | O | \| | \| | \| | 0.04 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 44.000 | 0.00 | 0.03 | 0.008 | O | \| | \| | \| | 0.04 |
| 44.083 | 0.00 | 0.03 | 0.008 | O | \| | \| | \| | 0.04 |
| 44.167 | 0.00 | 0.03 | 0.008 | O | \| | \| | \| | 0.04 |
| 44.250 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.333 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.417 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.500 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.583 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.03 |
| 44.667 | 0.00 | 0.03 | 0.006 | O | \| | \| | \| | 0.03 |
| 44.750 | 0.00 | 0.03 | 0.006 | O | \| | \| | \| | 0.03 |
| 44.833 | 0.00 | 0.03 | 0.006 | O | \| | \| | \| | 0.03 |
| 44.917 | 0.00 | 0.02 | 0.006 | O | \| | \| | \| | 0.03 |
| 45.000 | 0.00 | 0.02 | 0.006 | O | \| | \| | \| | 0.03 |
| 45.083 | 0.00 | 0.02 | 0.006 | O | \| | \| | \| | 0.03 |
| 45.167 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.250 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.333 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.417 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.500 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.583 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.02 |
| 45.667 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.02 |
| 45.750 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 45.833 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 45.917 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.000 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.083 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.167 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.250 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.333 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.417 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.500 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.583 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.667 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.750 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.833 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.917 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 47.000 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.083 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.167 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.250 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.333 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.417 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.500 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.583 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.667 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.750 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.833 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.917 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.000 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.083 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 48.167 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.250 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.333 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.417 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.500 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.583 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.667 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.750 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.833 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 48.917 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.000 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.083 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.167 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.250 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.333 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.417 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.500 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.583 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.667 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.750 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.833 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.917 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 50.000 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 50.083 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 50.167 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.250 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.333 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.417 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.500 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.583 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.667 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.750 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.833 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.917 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.000 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.083 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.167 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.250 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.333 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.417 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.500 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.583 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.667 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.750 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.833 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.917 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 52.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.250 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 52.333 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.417 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.500 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.583 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.667 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.750 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.833 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.917 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.250 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.333 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.417 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.500 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.583 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.667 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.750 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.833 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.917 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 54.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 54.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 54.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |

**********HYDROGRAPH DATA**********

Number of intervals = 650
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 6.884 (CFS)
Total volume = 3.578 (Ac.Ft)

Status of hydrographs being held in storage

| | Stream 1 | Stream 2 | Stream 3 | Stream 4 | Stream 5 |
|---|---|---|---|---|---|
| Peak (CFS) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vol (Ac.Ft) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

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San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/14/23

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PROJECT CITRUS
POST-DEV 100-YEAR
AREA B

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Program License Serial Number 6353

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

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.420 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

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COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 192.000(Ft.)
Top (of initial area) elevation = 1081.820(Ft.)
Bottom (of initial area) elevation = 1079.840(Ft.)
Difference in elevation = 1.980(Ft.)
Slope = 0.01031 s(%)= 1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.216 min.
Rainfall intensity = 5.534(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff =      9.624(CFS)
Total initial stream area =        1.960(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1075.340(Ft.)
Downstream point/station elevation =  1073.250(Ft.)
Pipe length  =   417.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.624(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.624(CFS)
Normal flow depth in pipe =   14.98(In.)
Flow top width inside pipe =   19.00(In.)
Critical Depth =   13.86(In.)
Pipe flow velocity =      5.24(Ft/s)
Travel time through pipe =    1.33 min.
Time of concentration (TC) =     7.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      9.559(CFS)
therefore the upstream flow rate of Q =      9.624(CFS) is being used
Time of concentration =     7.54 min.
Rainfall intensity =      4.928(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.886
Subarea runoff =      0.000(CFS) for    0.230(Ac.)
Total runoff =      9.624(CFS)
Effective area this stream =        2.19(Ac.)
Total Study Area (Main Stream No. 1) =        2.19(Ac.)
Area averaged Fm value =    0.079(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1073.250(Ft.)
Downstream point/station elevation =  1072.240(Ft.)
Pipe length  =   203.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.624(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.624(CFS)
Normal flow depth in pipe =   15.02(In.)
Flow top width inside pipe =   18.95(In.)
Critical Depth =   13.86(In.)
Pipe flow velocity =      5.23(Ft/s)
Travel time through pipe =    0.65 min.
Time of concentration (TC) =     8.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      203.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     8.19 min.
Rainfall intensity =      4.691(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.885
Subarea runoff =      3.576(CFS) for    0.990(Ac.)
Total runoff =     13.200(CFS)
Effective area this stream =        3.18(Ac.)
Total Study Area (Main Stream No. 1) =        3.18(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1072.240(Ft.)
Downstream point/station elevation =  1068.890(Ft.)
Pipe length  =   519.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.200(CFS)
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```
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    13.200(CFS)
Normal flow depth in pipe =   15.16(In.)
Flow top width inside pipe =   23.15(In.)
Critical Depth =   15.69(In.)
Pipe flow velocity =      6.31(Ft/s)
Travel time through pipe =    1.37 min.
Time of concentration (TC) =     9.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      205.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      3.180(Ac.)
Runoff from this stream =     13.200(CFS)
Time of concentration =    9.56 min.
Rainfall intensity =     4.275(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      207.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
COMMERCIAL subarea type
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
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   519.000(Ft.)
Top (of initial area) elevation =  1077.860(Ft.)
Bottom (of initial area) elevation =  1074.180(Ft.)
Difference in elevation =     3.680(Ft.)
Slope =    0.00709  s(%)=       0.71
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.973 min.
Rainfall intensity =      4.168(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.883
Subarea runoff =     16.377(CFS)
Total initial stream area =        4.450(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1070.310(Ft.)
Downstream point/station elevation =  1068.890(Ft.)
Pipe length  =   121.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.377(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.377(CFS)
Normal flow depth in pipe =   16.41(In.)
Flow top width inside pipe =   17.36(In.)
Critical Depth =   17.87(In.)
Pipe flow velocity =      8.12(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    10.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      205.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      4.450(Ac.)
Runoff from this stream =     16.377(CFS)
Time of concentration =   10.22 min.
Rainfall intensity =     4.107(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     13.20     3.180      9.56    0.079      4.275
2     16.38     4.450     10.22    0.079      4.107
Qmax(1) =
           1.000 *    1.000 *    13.200) +
           1.042 *    0.935 *    16.377) + =      29.158
Qmax(2) =
           0.960 *    1.000 *    13.200) +
           1.000 *    1.000 *    16.377) + =      29.049

Total of 2 streams to confluence:
Flow rates before confluence point:
      13.200      16.377
Maximum flow rates at confluence using above data:
       29.158       29.049
```

```
Area of streams before confluence:
        3.180        4.450
Effective area values after confluence:
        7.343        7.630
Results of confluence:
Total flow rate =     29.158(CFS)
Time of concentration =     9.561 min.
Effective stream area after confluence =      7.343(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total (this main stream) =       7.63(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      208.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1068.890(Ft.)
Downstream point/station elevation =  1068.770(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.158(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    29.158(CFS)
Normal flow depth in pipe =   21.91(In.)
Flow top width inside pipe =   31.17(In.)
Critical Depth =   21.53(In.)
Pipe flow velocity =      6.96(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     9.62 min.
End of computations, Total Study Area =            7.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number =  32.0
```

U n i t  H y d r o g r a p h  A n a l y s i s



Study date 04/14/23

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
----------------------------------------------------------------------

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6353

----------------------------------------------------------------------
PROJECT CITRUS
POST-DEV 100-YEAR
AREA B

----------------------------------------------------------------------

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

| Sub-Area (Ac.) | Duration (hours) | Isohyetal (In) |
|---|---|---|
| Rainfall data for year 100 | | |
| 7.63 | 1 | 1.42 |
| Rainfall data for year 100 | | |
| 7.63 | 6 | 3.30 |
| Rainfall data for year 100 | | |
| 7.63 | 24 | 6.01 |

----------------------------------------------------------------------
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******** Area-averaged max loss rate, Fm ********

| SCS curve No.(AMCII) | SCS curve NO.(AMC 3) | Area (Ac.) | Area Fraction | Fp(Fig C6) (In/Hr) | Ap (dec.) | Fm (In/Hr) |
|---|---|---|---|---|---|---|
| 32.0 | 52.0 | 7.63 | 1.000 | 0.785 | 0.140 | 0.110 |

Area-averaged adjusted loss rate Fm (In/Hr) = 0.110

********* Area-Averaged low loss rate fraction, Yb **********

| Area (Ac.) | Area Fract | SCS CN (AMC2) | SCS CN (AMC3) | S | Pervious Yield Fr |
|---|---|---|---|---|---|
| 1.07 | 0.140 | 32.0 | 52.0 | 9.23 | 0.215 |
| 6.56 | 0.860 | 98.0 | 98.0 | 0.20 | 0.960 |

Area-averaged catchment yield fraction, Y = 0.856
Area-averaged low loss fraction, Yb = 0.144
User entry of time of concentration = 0.160 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area = 7.63(Ac.)
Catchment Lag time = 0.128 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 64.9823
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.110(In/Hr)
Average low loss rate fraction (Yb) = 0.144 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.373(In)
Computed peak 30-minute rainfall = 0.969(In)
Specified peak 1-hour rainfall = 1.420(In)
Computed peak 3-hour rainfall = 2.400(In)
Specified peak 6-hour rainfall = 3.300(In)
Specified peak 24-hour rainfall = 6.010(In)

Note: user specified rainfall values used.
Rainfall depth area reduction factors:
Using a total area of 7.63(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.373(In)
30-minute factor = 1.000 Adjusted rainfall = 0.969(In)
1-hour factor = 1.000 Adjusted rainfall = 1.419(In)
3-hour factor = 1.000 Adjusted rainfall = 2.400(In)
6-hour factor = 1.000 Adjusted rainfall = 3.300(In)
24-hour factor = 1.000 Adjusted rainfall = 6.010(In)
---

U n i t H y d r o g r a p h

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

| Interval Number | 'S' Graph Mean values | Unit Hydrograph ((CFS)) |
|---|---|---|
| | (K = 92.28 (CFS)) | |
| 1 | 7.606 | 7.019 |
| 2 | 47.734 | 37.028 |
| 3 | 85.904 | 35.221 |
| 4 | 97.021 | 10.259 |
| 5 | 99.064 | 1.884 |
| 6 | 100.000 | 0.864 |

Total soil rain loss = 0.77(In)
Total effective rainfall = 5.24(In)
Peak flow rate in flood hydrograph = 21.20(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

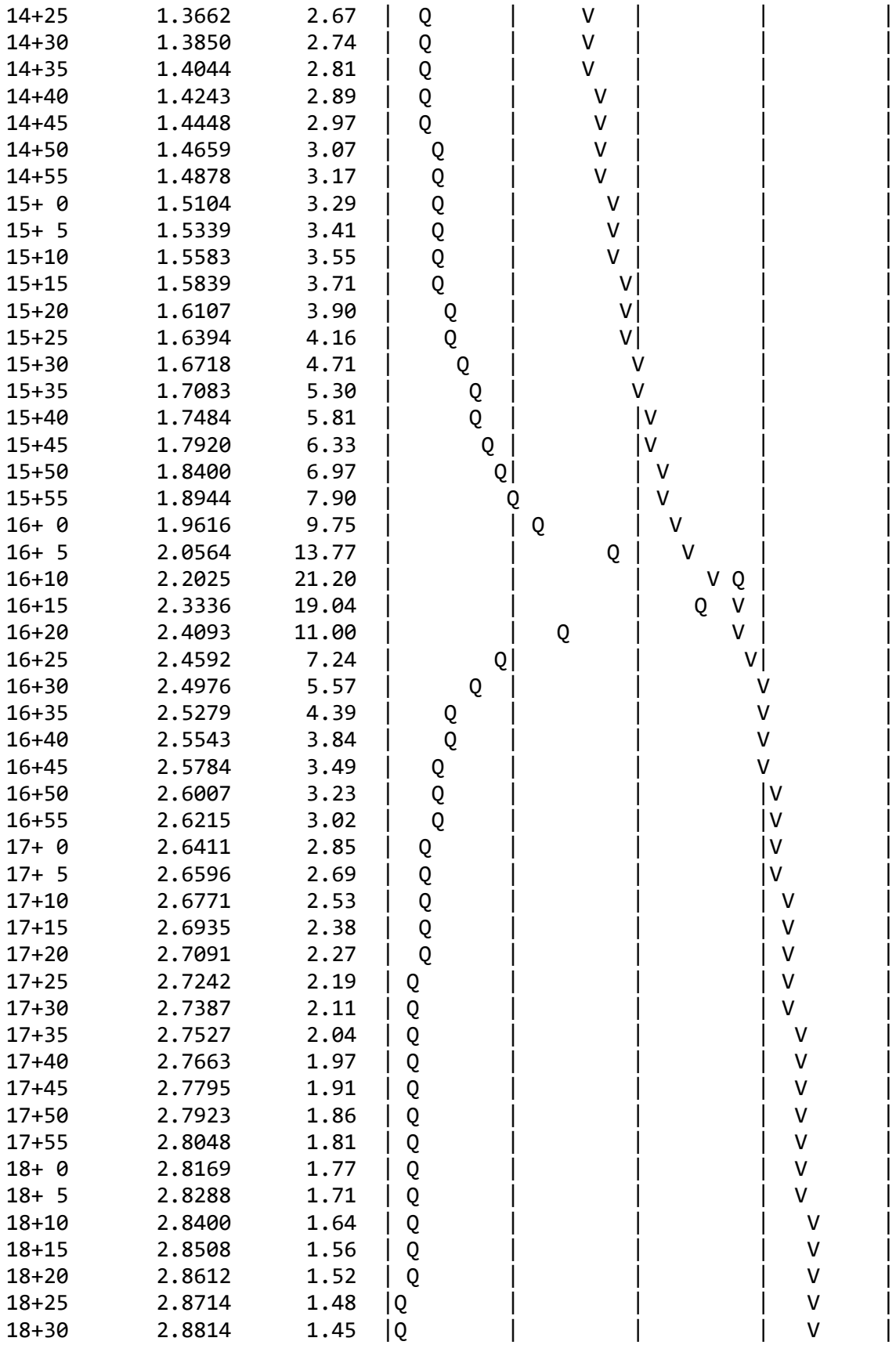
Hydrograph in 5 Minute intervals ((CFS))

| Time(h+m) | Volume Ac.Ft | Q(CFS) | 0 | 7.5 | 15.0 | 22.5 | 30.0 |
|---|---|---|---|---|---|---|---|
| 0+ 5 | 0.0004 | 0.05 | Q | | | | |
| 0+10 | 0.0027 | 0.34 | Q | | | | |
| 0+15 | 0.0069 | 0.61 | Q | | | | |
| 0+20 | 0.0117 | 0.70 | Q | | | | |
| 0+25 | 0.0166 | 0.71 | Q | | | | |
| 0+30 | 0.0216 | 0.72 | Q | | | | |
| 0+35 | 0.0266 | 0.72 | Q | | | | |
| 0+40 | 0.0316 | 0.72 | Q | | | | |
| 0+45 | 0.0366 | 0.73 | Q | | | | |
| 0+50 | 0.0416 | 0.73 | Q | | | | |
| 0+55 | 0.0466 | 0.73 | Q | | | | |
| 1+ 0 | 0.0517 | 0.73 | Q | | | | |
| 1+ 5 | 0.0568 | 0.74 | Q | | | | |
| 1+10 | 0.0618 | 0.74 | Q | | | | |
| 1+15 | 0.0669 | 0.74 | Q | | | | |
| 1+20 | 0.0721 | 0.74 | Q | | | | |
| 1+25 | 0.0772 | 0.75 | Q | | | | |
| 1+30 | 0.0823 | 0.75 | Q | | | | |
| 1+35 | 0.0875 | 0.75 | \|Q | | | | |
| 1+40 | 0.0927 | 0.75 | \|Q | | | | |
| 1+45 | 0.0979 | 0.76 | \|Q | | | | |
| 1+50 | 0.1031 | 0.76 | \|Q | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1+55 | 0.1084 | 0.76 | \|Q | \| | \| | \| | \| |
| 2+ 0 | 0.1136 | 0.76 | \|Q | \| | \| | \| | \| |
| 2+ 5 | 0.1189 | 0.77 | \|Q | \| | \| | \| | \| |
| 2+10 | 0.1242 | 0.77 | \|Q | \| | \| | \| | \| |
| 2+15 | 0.1295 | 0.77 | \|Q | \| | \| | \| | \| |
| 2+20 | 0.1348 | 0.77 | \|Q | \| | \| | \| | \| |
| 2+25 | 0.1401 | 0.78 | \|Q | \| | \| | \| | \| |
| 2+30 | 0.1455 | 0.78 | \|Q | \| | \| | \| | \| |
| 2+35 | 0.1509 | 0.78 | \|Q | \| | \| | \| | \| |
| 2+40 | 0.1563 | 0.78 | \|Q | \| | \| | \| | \| |
| 2+45 | 0.1617 | 0.79 | \|Q | \| | \| | \| | \| |
| 2+50 | 0.1671 | 0.79 | \|QV | \| | \| | \| | \| |
| 2+55 | 0.1726 | 0.79 | \|QV | \| | \| | \| | \| |
| 3+ 0 | 0.1781 | 0.79 | \|QV | \| | \| | \| | \| |
| 3+ 5 | 0.1836 | 0.80 | \|QV | \| | \| | \| | \| |
| 3+10 | 0.1891 | 0.80 | \|QV | \| | \| | \| | \| |
| 3+15 | 0.1946 | 0.80 | \|QV | \| | \| | \| | \| |
| 3+20 | 0.2002 | 0.81 | \|QV | \| | \| | \| | \| |
| 3+25 | 0.2057 | 0.81 | \|QV | \| | \| | \| | \| |
| 3+30 | 0.2113 | 0.81 | \|QV | \| | \| | \| | \| |
| 3+35 | 0.2169 | 0.82 | \|QV | \| | \| | \| | \| |
| 3+40 | 0.2226 | 0.82 | \|QV | \| | \| | \| | \| |
| 3+45 | 0.2282 | 0.82 | \|QV | \| | \| | \| | \| |
| 3+50 | 0.2339 | 0.82 | \|QV | \| | \| | \| | \| |
| 3+55 | 0.2396 | 0.83 | \|QV | \| | \| | \| | \| |
| 4+ 0 | 0.2454 | 0.83 | \|QV | \| | \| | \| | \| |
| 4+ 5 | 0.2511 | 0.83 | \|Q V | \| | \| | \| | \| |
| 4+10 | 0.2569 | 0.84 | \|Q V | \| | \| | \| | \| |
| 4+15 | 0.2627 | 0.84 | \|Q V | \| | \| | \| | \| |
| 4+20 | 0.2685 | 0.84 | \|Q V | \| | \| | \| | \| |
| 4+25 | 0.2743 | 0.85 | \|Q V | \| | \| | \| | \| |
| 4+30 | 0.2802 | 0.85 | \|Q V | \| | \| | \| | \| |
| 4+35 | 0.2861 | 0.85 | \|Q V | \| | \| | \| | \| |
| 4+40 | 0.2920 | 0.86 | \|Q V | \| | \| | \| | \| |
| 4+45 | 0.2979 | 0.86 | \|Q V | \| | \| | \| | \| |
| 4+50 | 0.3039 | 0.87 | \|Q V | \| | \| | \| | \| |
| 4+55 | 0.3099 | 0.87 | \|Q V | \| | \| | \| | \| |
| 5+ 0 | 0.3159 | 0.87 | \|Q V | \| | \| | \| | \| |
| 5+ 5 | 0.3219 | 0.88 | \|Q V | \| | \| | \| | \| |
| 5+10 | 0.3280 | 0.88 | \|Q V | \| | \| | \| | \| |
| 5+15 | 0.3341 | 0.88 | \|Q  V | \| | \| | \| | \| |
| 5+20 | 0.3402 | 0.89 | \|Q  V | \| | \| | \| | \| |
| 5+25 | 0.3463 | 0.89 | \|Q  V | \| | \| | \| | \| |
| 5+30 | 0.3525 | 0.90 | \|Q  V | \| | \| | \| | \| |
| 5+35 | 0.3587 | 0.90 | \|Q  V | \| | \| | \| | \| |
| 5+40 | 0.3649 | 0.90 | \|Q  V | \| | \| | \| | \| |
| 5+45 | 0.3711 | 0.91 | \|Q  V | \| | \| | \| | \| |
| 5+50 | 0.3774 | 0.91 | \|Q  V | \| | \| | \| | \| |
| 5+55 | 0.3837 | 0.92 | \|Q  V | \| | \| | \| | \| |
| 6+ 0 | 0.3901 | 0.92 | \|Q  V | \| | \| | \| | \| |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6+ 5 | 0.3964 | 0.92 | \|Q V \| | \| | \| | \| |
| 6+10 | 0.4028 | 0.93 | \|Q V \| | \| | \| | \| |
| 6+15 | 0.4093 | 0.93 | \|Q V \| | \| | \| | \| |
| 6+20 | 0.4157 | 0.94 | \|Q V \| | \| | \| | \| |
| 6+25 | 0.4222 | 0.94 | \|Q V \| | \| | \| | \| |
| 6+30 | 0.4287 | 0.95 | \|Q V \| | \| | \| | \| |
| 6+35 | 0.4353 | 0.95 | \|Q V \| | \| | \| | \| |
| 6+40 | 0.4419 | 0.96 | \|Q V \| | \| | \| | \| |
| 6+45 | 0.4485 | 0.96 | \|Q V \| | \| | \| | \| |
| 6+50 | 0.4551 | 0.97 | \|Q V \| | \| | \| | \| |
| 6+55 | 0.4618 | 0.97 | \|Q V \| | \| | \| | \| |
| 7+ 0 | 0.4685 | 0.98 | \|Q V \| | \| | \| | \| |
| 7+ 5 | 0.4753 | 0.98 | \|Q V \| | \| | \| | \| |
| 7+10 | 0.4821 | 0.99 | \|Q V \| | \| | \| | \| |
| 7+15 | 0.4889 | 0.99 | \|Q V \| | \| | \| | \| |
| 7+20 | 0.4958 | 1.00 | \|Q V \| | \| | \| | \| |
| 7+25 | 0.5027 | 1.00 | \|Q V \| | \| | \| | \| |
| 7+30 | 0.5096 | 1.01 | \|Q V \| | \| | \| | \| |
| 7+35 | 0.5166 | 1.01 | \|Q V \| | \| | \| | \| |
| 7+40 | 0.5236 | 1.02 | \|Q V \| | \| | \| | \| |
| 7+45 | 0.5306 | 1.02 | \|Q V \| | \| | \| | \| |
| 7+50 | 0.5377 | 1.03 | \|Q V \| | \| | \| | \| |
| 7+55 | 0.5449 | 1.04 | \|Q V \| | \| | \| | \| |
| 8+ 0 | 0.5520 | 1.04 | \|Q V \| | \| | \| | \| |
| 8+ 5 | 0.5593 | 1.05 | \|Q V \| | \| | \| | \| |
| 8+10 | 0.5665 | 1.05 | \|Q V \| | \| | \| | \| |
| 8+15 | 0.5738 | 1.06 | \|Q V \| | \| | \| | \| |
| 8+20 | 0.5812 | 1.07 | \|Q V \| | \| | \| | \| |
| 8+25 | 0.5885 | 1.07 | \|Q V \| | \| | \| | \| |
| 8+30 | 0.5960 | 1.08 | \|Q V \| | \| | \| | \| |
| 8+35 | 0.6035 | 1.09 | \|Q V \| | \| | \| | \| |
| 8+40 | 0.6110 | 1.09 | \|Q V \| | \| | \| | \| |
| 8+45 | 0.6186 | 1.10 | \|Q V \| | \| | \| | \| |
| 8+50 | 0.6262 | 1.11 | \|Q V \| | \| | \| | \| |
| 8+55 | 0.6338 | 1.11 | \|Q V \| | \| | \| | \| |
| 9+ 0 | 0.6416 | 1.12 | \|Q V \| | \| | \| | \| |
| 9+ 5 | 0.6493 | 1.13 | \|Q V \| | \| | \| | \| |
| 9+10 | 0.6572 | 1.14 | \|Q V \| | \| | \| | \| |
| 9+15 | 0.6650 | 1.14 | \|Q V \| | \| | \| | \| |
| 9+20 | 0.6730 | 1.15 | \|Q V \| | \| | \| | \| |
| 9+25 | 0.6810 | 1.16 | \|Q V \| | \| | \| | \| |
| 9+30 | 0.6890 | 1.17 | \|Q V \| | \| | \| | \| |
| 9+35 | 0.6971 | 1.18 | \|Q V \| | \| | \| | \| |
| 9+40 | 0.7053 | 1.18 | \|Q V \| | \| | \| | \| |
| 9+45 | 0.7135 | 1.19 | \|Q V \| | \| | \| | \| |
| 9+50 | 0.7218 | 1.20 | \|Q V \| | \| | \| | \| |
| 9+55 | 0.7301 | 1.21 | \|Q V \| | \| | \| | \| |
| 10+ 0 | 0.7385 | 1.22 | \|Q V \| | \| | \| | \| |
| 10+ 5 | 0.7470 | 1.23 | \|Q V \| | \| | \| | \| |
| 10+10 | 0.7555 | 1.24 | \|Q V\| | \| | \| | \| |

```
10+15       0.7641      1.25  |Q       V|          |          |          |
10+20       0.7728      1.26  |Q       V|          |          |          |
10+25       0.7815      1.27  |Q       V|          |          |          |
10+30       0.7904      1.28  |Q       V|          |          |          |
10+35       0.7992      1.29  |Q       V|          |          |          |
10+40       0.8082      1.30  |Q       V|          |          |          |
10+45       0.8173      1.31  |Q       V|          |          |          |
10+50       0.8264      1.32  |Q       V|          |          |          |
10+55       0.8356      1.34  |Q        V          |          |          |
11+ 0       0.8449      1.35  |Q        V          |          |          |
11+ 5       0.8542      1.36  |Q        V          |          |          |
11+10       0.8637      1.37  |Q        V          |          |          |
11+15       0.8733      1.39  |Q        V          |          |          |
11+20       0.8829      1.40  |Q        V          |          |          |
11+25       0.8926      1.41  |Q        V          |          |          |
11+30       0.9025      1.43  |Q        V          |          |          |
11+35       0.9124      1.44  |Q        V          |          |          |
11+40       0.9224      1.46  |Q        |V          |          |          |
11+45       0.9326      1.47  |Q        |V          |          |          |
11+50       0.9428      1.49  |Q        |V          |          |          |
11+55       0.9532      1.51  | Q       |V          |          |          |
12+ 0       0.9637      1.52  | Q       |V          |          |          |
12+ 5       0.9743      1.55  | Q       |V          |          |          |
12+10       0.9854      1.60  | Q       |V          |          |          |
12+15       0.9968      1.66  | Q       |V          |          |          |
12+20       1.0085      1.69  | Q       | V         |          |          |
12+25       1.0203      1.71  | Q       | V         |          |          |
12+30       1.0322      1.73  | Q       | V         |          |          |
12+35       1.0443      1.76  | Q       | V         |          |          |
12+40       1.0565      1.78  | Q       | V         |          |          |
12+45       1.0689      1.80  | Q       | V         |          |          |
12+50       1.0815      1.83  | Q       | V         |          |          |
12+55       1.0943      1.85  | Q       |  V        |          |          |
13+ 0       1.1072      1.88  | Q       |  V        |          |          |
13+ 5       1.1203      1.90  | Q       |  V        |          |          |
13+10       1.1336      1.93  | Q       |  V        |          |          |
13+15       1.1471      1.96  | Q       |  V        |          |          |
13+20       1.1608      1.99  | Q       |  V        |          |          |
13+25       1.1747      2.02  | Q       |   V       |          |          |
13+30       1.1889      2.06  | Q       |   V       |          |          |
13+35       1.2033      2.09  | Q       |   V       |          |          |
13+40       1.2179      2.13  | Q       |   V       |          |          |
13+45       1.2328      2.17  | Q       |   V       |          |          |
13+50       1.2481      2.21  | Q       |   V       |          |          |
13+55       1.2635      2.25  |  Q      |    V      |          |          |
14+ 0       1.2794      2.30  |  Q      |    V      |          |          |
14+ 5       1.2956      2.35  |  Q      |    V      |          |          |
14+10       1.3124      2.44  |  Q      |    V      |          |          |
14+15       1.3299      2.53  |  Q      |    V      |          |          |
14+20       1.3478      2.61  |  Q      |     V     |          |          |
```



```
18+35       2.8912      1.42  |Q        |         |         |   V     |
18+40       2.9007      1.39  |Q        |         |         |   V     |
18+45       2.9102      1.37  |Q        |         |         |   V     |
18+50       2.9194      1.34  |Q        |         |         |    V    |
18+55       2.9285      1.32  |Q        |         |         |    V    |
19+ 0       2.9374      1.30  |Q        |         |         |    V    |
19+ 5       2.9462      1.27  |Q        |         |         |    V    |
19+10       2.9548      1.25  |Q        |         |         |    V    |
19+15       2.9633      1.23  |Q        |         |         |    V    |
19+20       2.9717      1.21  |Q        |         |         |    V    |
19+25       2.9799      1.20  |Q        |         |         |    V    |
19+30       2.9880      1.18  |Q        |         |         |    V    |
19+35       2.9960      1.16  |Q        |         |         |    V    |
19+40       3.0039      1.15  |Q        |         |         |     V   |
19+45       3.0117      1.13  |Q        |         |         |     V   |
19+50       3.0194      1.12  |Q        |         |         |     V   |
19+55       3.0270      1.10  |Q        |         |         |     V   |
20+ 0       3.0345      1.09  |Q        |         |         |     V   |
20+ 5       3.0419      1.08  |Q        |         |         |     V   |
20+10       3.0492      1.06  |Q        |         |         |     V   |
20+15       3.0565      1.05  |Q        |         |         |     V   |
20+20       3.0636      1.04  |Q        |         |         |     V   |
20+25       3.0707      1.03  |Q        |         |         |     V   |
20+30       3.0777      1.01  |Q        |         |         |     V   |
20+35       3.0846      1.00  |Q        |         |         |      V  |
20+40       3.0914      0.99  |Q        |         |         |      V  |
20+45       3.0982      0.98  |Q        |         |         |      V  |
20+50       3.1049      0.97  |Q        |         |         |      V  |
20+55       3.1115      0.96  |Q        |         |         |      V  |
21+ 0       3.1181      0.95  |Q        |         |         |      V  |
21+ 5       3.1246      0.94  |Q        |         |         |      V  |
21+10       3.1310      0.93  |Q        |         |         |      V  |
21+15       3.1374      0.93  |Q        |         |         |      V  |
21+20       3.1437      0.92  |Q        |         |         |      V  |
21+25       3.1500      0.91  |Q        |         |         |      V  |
21+30       3.1562      0.90  |Q        |         |         |      V  |
21+35       3.1623      0.89  |Q        |         |         |      V  |
21+40       3.1684      0.89  |Q        |         |         |       V |
21+45       3.1745      0.88  |Q        |         |         |       V |
21+50       3.1805      0.87  |Q        |         |         |       V |
21+55       3.1864      0.86  |Q        |         |         |       V |
22+ 0       3.1923      0.86  |Q        |         |         |       V |
22+ 5       3.1982      0.85  |Q        |         |         |       V |
22+10       3.2040      0.84  |Q        |         |         |       V |
22+15       3.2097      0.84  |Q        |         |         |       V |
22+20       3.2154      0.83  |Q        |         |         |       V |
22+25       3.2211      0.82  |Q        |         |         |       V |
22+30       3.2267      0.82  |Q        |         |         |       V |
22+35       3.2323      0.81  |Q        |         |         |       V |
22+40       3.2379      0.80  |Q        |         |         |       V |
```

```
   22+45       3.2434      0.80  |Q        |         |         |       V |
   22+50       3.2488      0.79  |Q        |         |         |        V|
   22+55       3.2543      0.79  |Q        |         |         |        V|
   23+ 0       3.2596      0.78  |Q        |         |         |        V|
   23+ 5       3.2650      0.78  |Q        |         |         |        V|
   23+10       3.2703      0.77  |Q        |         |         |        V|
   23+15       3.2756      0.77  |Q        |         |         |        V|
   23+20       3.2808      0.76  |Q        |         |         |        V|
   23+25       3.2860      0.76  |Q        |         |         |        V|
   23+30       3.2912      0.75  |Q        |         |         |        V|
   23+35       3.2963      0.75  Q         |         |         |        V|
   23+40       3.3015      0.74  Q         |         |         |        V|
   23+45       3.3065      0.74  Q         |         |         |        V|
   23+50       3.3116      0.73  Q         |         |         |        V|
   23+55       3.3166      0.73  Q         |         |         |        V|
   24+ 0       3.3216      0.72  Q         |         |         |        V|
   24+ 5       3.3261      0.66  Q         |         |         |        V|
   24+10       3.3287      0.38  Q         |         |         |        V|
   24+15       3.3294      0.10  Q         |         |         |        V|
   24+20       3.3296      0.02  Q         |         |         |        V|
   24+25       3.3296      0.01  Q         |         |         |        V|
-------------------------------------------------------------------------
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FLOOD HYDROGRAPH ROUTING PROGRAM

Study date: 04/18/23

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PROJECT CITRUS
POST-DEV 100-YEAR
AREA B

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Program License Serial Number 6353

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********** HYDROGRAPH INFORMATION **********

From study/file name: UH100PostB.rte
**********HYDROGRAPH DATA**********
Number of intervals = 293
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 21.205 (CFS)
Total volume = 3.330 (Ac.Ft)

Status of hydrographs being held in storage

| | Stream 1 | Stream 2 | Stream 3 | Stream 4 | Stream 5 |
|---|---|---|---|---|---|
| Peak (CFS) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vol (Ac.Ft) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**********

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 100.000 to Point/Station 101.000
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data
---
Total number of inflow hydrograph intervals = 293
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)
---
---
Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

| Basin Depth (Ft.) | Storage (Ac.Ft) | Outflow (CFS) | (S-O*dt/2) (Ac.Ft) | (S+O*dt/2) (Ac.Ft) |
|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.750 | 0.142 | 0.600 | 0.140 | 0.144 |
| 1.750 | 0.332 | 0.600 | 0.330 | 0.334 |
| 2.750 | 0.522 | 0.600 | 0.520 | 0.524 |
| 3.750 | 0.712 | 0.600 | 0.710 | 0.714 |
| 4.750 | 0.902 | 6.042 | 0.881 | 0.923 |
| 5.750 | 1.092 | 6.884 | 1.068 | 1.116 |
| 6.750 | 1.281 | 6.884 | 1.257 | 1.305 |

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

| Time (Hours) | Inflow (CFS) | Outflow (CFS) | Storage (Ac.Ft) | .0 5.3 10.60 15.90 21.20 | Depth (Ft.) |
|---|---|---|---|---|---|
| 0.083 | 0.05 | 0.00 | 0.000 | O | 0.00 |
| 0.167 | 0.34 | 0.01 | 0.002 | O | 0.01 |
| 0.250 | 0.61 | 0.02 | 0.005 | O | 0.02 |
| 0.333 | 0.70 | 0.04 | 0.009 | OI | 0.05 |
| 0.417 | 0.71 | 0.06 | 0.014 | OI | 0.07 |
| 0.500 | 0.72 | 0.08 | 0.018 | OI | 0.10 |
| 0.583 | 0.72 | 0.09 | 0.022 | OI | 0.12 |
| 0.667 | 0.72 | 0.11 | 0.027 | OI | 0.14 |
| 0.750 | 0.73 | 0.13 | 0.031 | OI | 0.16 |
| 0.833 | 0.73 | 0.15 | 0.035 | OI | 0.18 |
| 0.917 | 0.73 | 0.16 | 0.039 | OI | 0.21 |
| 1.000 | 0.73 | 0.18 | 0.043 | OI | 0.23 |
| 1.083 | 0.74 | 0.20 | 0.046 | OI | 0.25 |
| 1.167 | 0.74 | 0.21 | 0.050 | OI | 0.26 |
| 1.250 | 0.74 | 0.23 | 0.054 | OI | 0.28 |
| 1.333 | 0.74 | 0.24 | 0.057 | OI | 0.30 |
| 1.417 | 0.75 | 0.26 | 0.061 | OI | 0.32 |
| 1.500 | 0.75 | 0.27 | 0.064 | OI | 0.34 |
| 1.583 | 0.75 | 0.28 | 0.067 | OI | 0.35 |
| 1.667 | 0.75 | 0.30 | 0.070 | OI | 0.37 |
| 1.750 | 0.76 | 0.31 | 0.073 | OI | 0.39 |
| 1.833 | 0.76 | 0.32 | 0.077 | OI | 0.40 |
| 1.917 | 0.76 | 0.34 | 0.079 | OI | 0.42 |
| 2.000 | 0.76 | 0.35 | 0.082 | OI | 0.43 |
| 2.083 | 0.77 | 0.36 | 0.085 | OI | 0.45 |
| 2.167 | 0.77 | 0.37 | 0.088 | OI | 0.46 |
| 2.250 | 0.77 | 0.38 | 0.091 | OI | 0.48 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2.333 | 0.77 | 0.39 | 0.093 | OI | | | | 0.49 |
| 2.417 | 0.78 | 0.41 | 0.096 | OI | | | | 0.51 |
| 2.500 | 0.78 | 0.42 | 0.098 | OI | | | | 0.52 |
| 2.583 | 0.78 | 0.43 | 0.101 | OI | | | | 0.53 |
| 2.667 | 0.78 | 0.44 | 0.103 | OI | | | | 0.55 |
| 2.750 | 0.79 | 0.45 | 0.106 | OI | | | | 0.56 |
| 2.833 | 0.79 | 0.46 | 0.108 | OI | | | | 0.57 |
| 2.917 | 0.79 | 0.47 | 0.110 | OI | | | | 0.58 |
| 3.000 | 0.79 | 0.48 | 0.112 | OI | | | | 0.59 |
| 3.083 | 0.80 | 0.48 | 0.115 | OI | | | | 0.61 |
| 3.167 | 0.80 | 0.49 | 0.117 | OI | | | | 0.62 |
| 3.250 | 0.80 | 0.50 | 0.119 | OI | | | | 0.63 |
| 3.333 | 0.81 | 0.51 | 0.121 | OI | | | | 0.64 |
| 3.417 | 0.81 | 0.52 | 0.123 | OI | | | | 0.65 |
| 3.500 | 0.81 | 0.53 | 0.125 | OI | | | | 0.66 |
| 3.583 | 0.82 | 0.54 | 0.127 | OI | | | | 0.67 |
| 3.667 | 0.82 | 0.54 | 0.129 | OI | | | | 0.68 |
| 3.750 | 0.82 | 0.55 | 0.131 | OI | | | | 0.69 |
| 3.833 | 0.82 | 0.56 | 0.132 | OI | | | | 0.70 |
| 3.917 | 0.83 | 0.57 | 0.134 | OI | | | | 0.71 |
| 4.000 | 0.83 | 0.57 | 0.136 | OI | | | | 0.72 |
| 4.083 | 0.83 | 0.58 | 0.138 | OI | | | | 0.73 |
| 4.167 | 0.84 | 0.59 | 0.140 | OI | | | | 0.74 |
| 4.250 | 0.84 | 0.60 | 0.141 | OI | | | | 0.75 |
| 4.333 | 0.84 | 0.60 | 0.143 | OI | | | | 0.75 |
| 4.417 | 0.85 | 0.60 | 0.145 | OI | | | | 0.76 |
| 4.500 | 0.85 | 0.60 | 0.146 | OI | | | | 0.77 |
| 4.583 | 0.85 | 0.60 | 0.148 | OI | | | | 0.78 |
| 4.667 | 0.86 | 0.60 | 0.150 | OI | | | | 0.79 |
| 4.750 | 0.86 | 0.60 | 0.152 | OI | | | | 0.80 |
| 4.833 | 0.87 | 0.60 | 0.153 | OI | | | | 0.81 |
| 4.917 | 0.87 | 0.60 | 0.155 | OI | | | | 0.82 |
| 5.000 | 0.87 | 0.60 | 0.157 | OI | | | | 0.83 |
| 5.083 | 0.88 | 0.60 | 0.159 | OI | | | | 0.84 |
| 5.167 | 0.88 | 0.60 | 0.161 | OI | | | | 0.85 |
| 5.250 | 0.88 | 0.60 | 0.163 | OI | | | | 0.86 |
| 5.333 | 0.89 | 0.60 | 0.165 | OI | | | | 0.87 |
| 5.417 | 0.89 | 0.60 | 0.167 | OI | | | | 0.88 |
| 5.500 | 0.90 | 0.60 | 0.169 | OI | | | | 0.89 |
| 5.583 | 0.90 | 0.60 | 0.171 | OI | | | | 0.90 |
| 5.667 | 0.90 | 0.60 | 0.173 | OI | | | | 0.91 |
| 5.750 | 0.91 | 0.60 | 0.175 | OI | | | | 0.92 |
| 5.833 | 0.91 | 0.60 | 0.177 | OI | | | | 0.94 |
| 5.917 | 0.92 | 0.60 | 0.179 | OI | | | | 0.95 |
| 6.000 | 0.92 | 0.60 | 0.182 | OI | | | | 0.96 |
| 6.083 | 0.92 | 0.60 | 0.184 | OI | | | | 0.97 |
| 6.167 | 0.93 | 0.60 | 0.186 | OI | | | | 0.98 |
| 6.250 | 0.93 | 0.60 | 0.188 | OI | | | | 0.99 |
| 6.333 | 0.94 | 0.60 | 0.191 | OI | | | | 1.01 |
| 6.417 | 0.94 | 0.60 | 0.193 | OI | | | | 1.02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6.500 | 0.95 | 0.60 | 0.195 | OI | | | | 1.03 |
| 6.583 | 0.95 | 0.60 | 0.198 | OI | | | | 1.04 |
| 6.667 | 0.96 | 0.60 | 0.200 | OI | | | | 1.06 |
| 6.750 | 0.96 | 0.60 | 0.203 | OI | | | | 1.07 |
| 6.833 | 0.97 | 0.60 | 0.205 | OI | | | | 1.08 |
| 6.917 | 0.97 | 0.60 | 0.208 | OI | | | | 1.10 |
| 7.000 | 0.98 | 0.60 | 0.210 | OI | | | | 1.11 |
| 7.083 | 0.98 | 0.60 | 0.213 | OI | | | | 1.12 |
| 7.167 | 0.99 | 0.60 | 0.216 | OI | | | | 1.14 |
| 7.250 | 0.99 | 0.60 | 0.218 | OI | | | | 1.15 |
| 7.333 | 1.00 | 0.60 | 0.221 | OI | | | | 1.17 |
| 7.417 | 1.00 | 0.60 | 0.224 | OI | | | | 1.18 |
| 7.500 | 1.01 | 0.60 | 0.226 | OI | | | | 1.19 |
| 7.583 | 1.01 | 0.60 | 0.229 | OI | | | | 1.21 |
| 7.667 | 1.02 | 0.60 | 0.232 | OI | | | | 1.22 |
| 7.750 | 1.02 | 0.60 | 0.235 | OI | | | | 1.24 |
| 7.833 | 1.03 | 0.60 | 0.238 | OI | | | | 1.26 |
| 7.917 | 1.04 | 0.60 | 0.241 | OI | | | | 1.27 |
| 8.000 | 1.04 | 0.60 | 0.244 | OI | | | | 1.29 |
| 8.083 | 1.05 | 0.60 | 0.247 | OI | | | | 1.30 |
| 8.167 | 1.05 | 0.60 | 0.250 | OI | | | | 1.32 |
| 8.250 | 1.06 | 0.60 | 0.253 | OI | | | | 1.34 |
| 8.333 | 1.07 | 0.60 | 0.256 | OI | | | | 1.35 |
| 8.417 | 1.07 | 0.60 | 0.260 | OI | | | | 1.37 |
| 8.500 | 1.08 | 0.60 | 0.263 | OI | | | | 1.39 |
| 8.583 | 1.09 | 0.60 | 0.266 | OI | | | | 1.40 |
| 8.667 | 1.09 | 0.60 | 0.270 | OI | | | | 1.42 |
| 8.750 | 1.10 | 0.60 | 0.273 | OI | | | | 1.44 |
| 8.833 | 1.11 | 0.60 | 0.277 | OI | | | | 1.46 |
| 8.917 | 1.11 | 0.60 | 0.280 | OI | | | | 1.48 |
| 9.000 | 1.12 | 0.60 | 0.284 | OI | | | | 1.50 |
| 9.083 | 1.13 | 0.60 | 0.287 | OI | | | | 1.51 |
| 9.167 | 1.14 | 0.60 | 0.291 | OI | | | | 1.53 |
| 9.250 | 1.14 | 0.60 | 0.295 | OI | | | | 1.55 |
| 9.333 | 1.15 | 0.60 | 0.298 | OI | | | | 1.57 |
| 9.417 | 1.16 | 0.60 | 0.302 | OI | | | | 1.59 |
| 9.500 | 1.17 | 0.60 | 0.306 | OI | | | | 1.61 |
| 9.583 | 1.18 | 0.60 | 0.310 | OI | | | | 1.63 |
| 9.667 | 1.18 | 0.60 | 0.314 | OI | | | | 1.66 |
| 9.750 | 1.19 | 0.60 | 0.318 | OI | | | | 1.68 |
| 9.833 | 1.20 | 0.60 | 0.322 | OI | | | | 1.70 |
| 9.917 | 1.21 | 0.60 | 0.326 | OI | | | | 1.72 |
| 10.000 | 1.22 | 0.60 | 0.331 | OI | | | | 1.74 |
| 10.083 | 1.23 | 0.60 | 0.335 | OI | | | | 1.77 |
| 10.167 | 1.24 | 0.60 | 0.339 | OI | | | | 1.79 |
| 10.250 | 1.25 | 0.60 | 0.344 | OI | | | | 1.81 |
| 10.333 | 1.26 | 0.60 | 0.348 | OI | | | | 1.84 |
| 10.417 | 1.27 | 0.60 | 0.353 | OI | | | | 1.86 |
| 10.500 | 1.28 | 0.60 | 0.358 | OI | | | | 1.88 |
| 10.583 | 1.29 | 0.60 | 0.362 | OI | | | | 1.91 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10.667 | 1.30 | 0.60 | 0.367 | OI | \| | \| | \| | 1.93 |
| 10.750 | 1.31 | 0.60 | 0.372 | OI | \| | \| | \| | 1.96 |
| 10.833 | 1.32 | 0.60 | 0.377 | OI | \| | \| | \| | 1.99 |
| 10.917 | 1.34 | 0.60 | 0.382 | O I | \| | \| | \| | 2.01 |
| 11.000 | 1.35 | 0.60 | 0.387 | O I | \| | \| | \| | 2.04 |
| 11.083 | 1.36 | 0.60 | 0.392 | O I | \| | \| | \| | 2.07 |
| 11.167 | 1.37 | 0.60 | 0.397 | O I | \| | \| | \| | 2.09 |
| 11.250 | 1.39 | 0.60 | 0.403 | O I | \| | \| | \| | 2.12 |
| 11.333 | 1.40 | 0.60 | 0.408 | O I | \| | \| | \| | 2.15 |
| 11.417 | 1.41 | 0.60 | 0.414 | O I | \| | \| | \| | 2.18 |
| 11.500 | 1.43 | 0.60 | 0.420 | O I | \| | \| | \| | 2.21 |
| 11.583 | 1.44 | 0.60 | 0.425 | O I | \| | \| | \| | 2.24 |
| 11.667 | 1.46 | 0.60 | 0.431 | O I | \| | \| | \| | 2.27 |
| 11.750 | 1.47 | 0.60 | 0.437 | O I | \| | \| | \| | 2.30 |
| 11.833 | 1.49 | 0.60 | 0.443 | O I | \| | \| | \| | 2.34 |
| 11.917 | 1.51 | 0.60 | 0.449 | O I | \| | \| | \| | 2.37 |
| 12.000 | 1.52 | 0.60 | 0.456 | O I | \| | \| | \| | 2.40 |
| 12.083 | 1.55 | 0.60 | 0.462 | O I | \| | \| | \| | 2.43 |
| 12.167 | 1.60 | 0.60 | 0.469 | O I | \| | \| | \| | 2.47 |
| 12.250 | 1.66 | 0.60 | 0.476 | O I | \| | \| | \| | 2.51 |
| 12.333 | 1.69 | 0.60 | 0.483 | O I | \| | \| | \| | 2.55 |
| 12.417 | 1.71 | 0.60 | 0.491 | O I | \| | \| | \| | 2.59 |
| 12.500 | 1.73 | 0.60 | 0.499 | O I | \| | \| | \| | 2.63 |
| 12.583 | 1.76 | 0.60 | 0.507 | O I | \| | \| | \| | 2.67 |
| 12.667 | 1.78 | 0.60 | 0.515 | O I | \| | \| | \| | 2.71 |
| 12.750 | 1.80 | 0.60 | 0.523 | O I | \| | \| | \| | 2.75 |
| 12.833 | 1.83 | 0.60 | 0.531 | O I | \| | \| | \| | 2.80 |
| 12.917 | 1.85 | 0.60 | 0.540 | O I | \| | \| | \| | 2.84 |
| 13.000 | 1.88 | 0.60 | 0.548 | O I | \| | \| | \| | 2.89 |
| 13.083 | 1.90 | 0.60 | 0.557 | O I | \| | \| | \| | 2.94 |
| 13.167 | 1.93 | 0.60 | 0.566 | O I | \| | \| | \| | 2.98 |
| 13.250 | 1.96 | 0.60 | 0.576 | O I | \| | \| | \| | 3.03 |
| 13.333 | 1.99 | 0.60 | 0.585 | O  I | \| | \| | \| | 3.08 |
| 13.417 | 2.02 | 0.60 | 0.595 | O  I | \| | \| | \| | 3.13 |
| 13.500 | 2.06 | 0.60 | 0.605 | O  I | \| | \| | \| | 3.18 |
| 13.583 | 2.09 | 0.60 | 0.615 | O  I | \| | \| | \| | 3.24 |
| 13.667 | 2.13 | 0.60 | 0.625 | O  I | \| | \| | \| | 3.29 |
| 13.750 | 2.17 | 0.60 | 0.636 | O  I | \| | \| | \| | 3.35 |
| 13.833 | 2.21 | 0.60 | 0.647 | O  I | \| | \| | \| | 3.41 |
| 13.917 | 2.25 | 0.60 | 0.658 | O  I | \| | \| | \| | 3.47 |
| 14.000 | 2.30 | 0.60 | 0.669 | O  I | \| | \| | \| | 3.53 |
| 14.083 | 2.35 | 0.60 | 0.681 | O  I | \| | \| | \| | 3.59 |
| 14.167 | 2.44 | 0.60 | 0.694 | O  I | \| | \| | \| | 3.65 |
| 14.250 | 2.53 | 0.60 | 0.707 | O  I | \| | \| | \| | 3.72 |
| 14.333 | 2.61 | 0.82 | 0.720 | \|O I | \| | \| | \| | 3.79 |
| 14.417 | 2.67 | 1.14 | 0.731 | \|O  I | \| | \| | \| | 3.85 |
| 14.500 | 2.74 | 1.42 | 0.741 | \| O I | \| | \| | \| | 3.90 |
| 14.583 | 2.81 | 1.67 | 0.749 | \| O I | \| | \| | \| | 3.95 |
| 14.667 | 2.89 | 1.88 | 0.757 | \| O I | \| | \| | \| | 3.98 |
| 14.750 | 2.97 | 2.07 | 0.763 | \|  OI | \| | \| | \| | 4.02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 14.833 | 3.07 | 2.24 | 0.769 | OI | | | | 4.05 |
| 14.917 | 3.17 | 2.40 | 0.775 | OI | | | | 4.08 |
| 15.000 | 3.29 | 2.55 | 0.780 | OI | | | | 4.11 |
| 15.083 | 3.41 | 2.69 | 0.785 | OI | | | | 4.13 |
| 15.167 | 3.55 | 2.83 | 0.790 | OI | | | | 4.16 |
| 15.250 | 3.71 | 2.98 | 0.795 | OI | | | | 4.19 |
| 15.333 | 3.90 | 3.12 | 0.800 | OI | | | | 4.21 |
| 15.417 | 4.16 | 3.29 | 0.806 | O I | | | | 4.24 |
| 15.500 | 4.71 | 3.49 | 0.813 | O I | | | | 4.28 |
| 15.583 | 5.30 | 3.76 | 0.822 | O I | | | | 4.33 |
| 15.667 | 5.81 | 4.09 | 0.834 | O I | | | | 4.39 |
| 15.750 | 6.33 | 4.44 | 0.846 | O I | | | | 4.46 |
| 15.833 | 6.97 | 4.84 | 0.860 | O I | | | | 4.53 |
| 15.917 | 7.90 | 5.31 | 0.876 | O I | | | | 4.61 |
| 16.000 | 9.75 | 5.94 | 0.898 | O I | | | | 4.73 |
| 16.083 | 13.77 | 6.20 | 0.938 | O | I | | | 4.94 |
| 16.167 | 21.20 | 6.54 | 1.014 | O | | | I | 5.34 |
| 16.250 | 19.04 | 6.88 | 1.107 | O | | I | | 5.83 |
| 16.333 | 11.00 | 6.88 | 1.163 | O | I | | | 6.12 |
| 16.417 | 7.24 | 6.88 | 1.178 | O | | | | 6.20 |
| 16.500 | 5.57 | 6.88 | 1.175 | I O | | | | 6.19 |
| 16.583 | 4.39 | 6.88 | 1.162 | I O | | | | 6.12 |
| 16.667 | 3.84 | 6.88 | 1.143 | I O | | | | 6.02 |
| 16.750 | 3.49 | 6.88 | 1.120 | I O | | | | 5.90 |
| 16.833 | 3.23 | 6.88 | 1.096 | I O | | | | 5.77 |
| 16.917 | 3.02 | 6.79 | 1.071 | I O | | | | 5.64 |
| 17.000 | 2.85 | 6.67 | 1.044 | I O | | | | 5.50 |
| 17.083 | 2.69 | 6.56 | 1.018 | I O | | | | 5.36 |
| 17.167 | 2.53 | 6.44 | 0.991 | I O | | | | 5.22 |
| 17.250 | 2.38 | 6.32 | 0.964 | I O | | | | 5.08 |
| 17.333 | 2.27 | 6.20 | 0.937 | I O | | | | 4.94 |
| 17.417 | 2.19 | 6.08 | 0.910 | I O | | | | 4.79 |
| 17.500 | 2.11 | 5.55 | 0.885 | I O | | | | 4.66 |
| 17.583 | 2.04 | 4.93 | 0.863 | I O | | | | 4.55 |
| 17.667 | 1.97 | 4.40 | 0.845 | I O | | | | 4.45 |
| 17.750 | 1.91 | 3.96 | 0.829 | I O | | | | 4.37 |
| 17.833 | 1.86 | 3.59 | 0.816 | I O | | | | 4.30 |
| 17.917 | 1.81 | 3.27 | 0.805 | I O | | | | 4.24 |
| 18.000 | 1.77 | 3.01 | 0.796 | I O | | | | 4.19 |
| 18.083 | 1.71 | 2.78 | 0.788 | I O | | | | 4.15 |
| 18.167 | 1.64 | 2.58 | 0.781 | IO | | | | 4.11 |
| 18.250 | 1.56 | 2.41 | 0.775 | IO | | | | 4.08 |
| 18.333 | 1.52 | 2.25 | 0.770 | IO | | | | 4.05 |
| 18.417 | 1.48 | 2.11 | 0.765 | IO | | | | 4.03 |
| 18.500 | 1.45 | 2.00 | 0.761 | IO | | | | 4.01 |
| 18.583 | 1.42 | 1.90 | 0.757 | O | | | | 3.99 |
| 18.667 | 1.39 | 1.81 | 0.754 | O | | | | 3.97 |
| 18.750 | 1.37 | 1.73 | 0.752 | O | | | | 3.96 |
| 18.833 | 1.34 | 1.66 | 0.749 | O | | | | 3.95 |
| 18.917 | 1.32 | 1.60 | 0.747 | IO | | | | 3.93 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 19.000 | 1.30 | 1.55 | 0.745 | IO | | | | 3.92 |
| 19.083 | 1.27 | 1.50 | 0.744 | IO | | | | 3.92 |
| 19.167 | 1.25 | 1.46 | 0.742 | IO | | | | 3.91 |
| 19.250 | 1.23 | 1.42 | 0.741 | IO | | | | 3.90 |
| 19.333 | 1.21 | 1.39 | 0.739 | IO | | | | 3.89 |
| 19.417 | 1.20 | 1.35 | 0.738 | IO | | | | 3.89 |
| 19.500 | 1.18 | 1.32 | 0.737 | O | | | | 3.88 |
| 19.583 | 1.16 | 1.30 | 0.736 | O | | | | 3.88 |
| 19.667 | 1.15 | 1.27 | 0.735 | O | | | | 3.87 |
| 19.750 | 1.13 | 1.25 | 0.735 | O | | | | 3.87 |
| 19.833 | 1.12 | 1.23 | 0.734 | O | | | | 3.86 |
| 19.917 | 1.10 | 1.20 | 0.733 | O | | | | 3.86 |
| 20.000 | 1.09 | 1.18 | 0.732 | O | | | | 3.86 |
| 20.083 | 1.08 | 1.17 | 0.732 | O | | | | 3.85 |
| 20.167 | 1.06 | 1.15 | 0.731 | O | | | | 3.85 |
| 20.250 | 1.05 | 1.13 | 0.731 | O | | | | 3.85 |
| 20.333 | 1.04 | 1.12 | 0.730 | O | | | | 3.84 |
| 20.417 | 1.03 | 1.10 | 0.730 | O | | | | 3.84 |
| 20.500 | 1.01 | 1.09 | 0.729 | O | | | | 3.84 |
| 20.583 | 1.00 | 1.07 | 0.729 | O | | | | 3.84 |
| 20.667 | 0.99 | 1.06 | 0.728 | O | | | | 3.83 |
| 20.750 | 0.98 | 1.05 | 0.728 | O | | | | 3.83 |
| 20.833 | 0.97 | 1.03 | 0.727 | O | | | | 3.83 |
| 20.917 | 0.96 | 1.02 | 0.727 | O | | | | 3.83 |
| 21.000 | 0.95 | 1.01 | 0.726 | O | | | | 3.83 |
| 21.083 | 0.94 | 1.00 | 0.726 | O | | | | 3.82 |
| 21.167 | 0.93 | 0.99 | 0.726 | O | | | | 3.82 |
| 21.250 | 0.93 | 0.98 | 0.725 | O | | | | 3.82 |
| 21.333 | 0.92 | 0.97 | 0.725 | O | | | | 3.82 |
| 21.417 | 0.91 | 0.96 | 0.725 | O | | | | 3.82 |
| 21.500 | 0.90 | 0.95 | 0.724 | O | | | | 3.81 |
| 21.583 | 0.89 | 0.94 | 0.724 | O | | | | 3.81 |
| 21.667 | 0.89 | 0.93 | 0.724 | O | | | | 3.81 |
| 21.750 | 0.88 | 0.92 | 0.723 | O | | | | 3.81 |
| 21.833 | 0.87 | 0.91 | 0.723 | O | | | | 3.81 |
| 21.917 | 0.86 | 0.90 | 0.723 | O | | | | 3.81 |
| 22.000 | 0.86 | 0.90 | 0.722 | O | | | | 3.80 |
| 22.083 | 0.85 | 0.89 | 0.722 | O | | | | 3.80 |
| 22.167 | 0.84 | 0.88 | 0.722 | O | | | | 3.80 |
| 22.250 | 0.84 | 0.87 | 0.722 | O | | | | 3.80 |
| 22.333 | 0.83 | 0.87 | 0.721 | O | | | | 3.80 |
| 22.417 | 0.82 | 0.86 | 0.721 | O | | | | 3.80 |
| 22.500 | 0.82 | 0.85 | 0.721 | O | | | | 3.80 |
| 22.583 | 0.81 | 0.85 | 0.721 | O | | | | 3.80 |
| 22.667 | 0.80 | 0.84 | 0.720 | O | | | | 3.79 |
| 22.750 | 0.80 | 0.83 | 0.720 | O | | | | 3.79 |
| 22.833 | 0.79 | 0.83 | 0.720 | O | | | | 3.79 |
| 22.917 | 0.79 | 0.82 | 0.720 | O | | | | 3.79 |
| 23.000 | 0.78 | 0.81 | 0.719 | O | | | | 3.79 |
| 23.083 | 0.78 | 0.81 | 0.719 | O | | | | 3.79 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 23.167 | 0.77 | 0.80 | 0.719 | \|O | \| | \| | \| | 3.79 |
| 23.250 | 0.77 | 0.80 | 0.719 | \|O | \| | \| | \| | 3.79 |
| 23.333 | 0.76 | 0.79 | 0.719 | \|O | \| | \| | \| | 3.78 |
| 23.417 | 0.76 | 0.78 | 0.718 | \|O | \| | \| | \| | 3.78 |
| 23.500 | 0.75 | 0.78 | 0.718 | \|O | \| | \| | \| | 3.78 |
| 23.583 | 0.75 | 0.77 | 0.718 | \|O | \| | \| | \| | 3.78 |
| 23.667 | 0.74 | 0.77 | 0.718 | \|O | \| | \| | \| | 3.78 |
| 23.750 | 0.74 | 0.76 | 0.718 | \|O | \| | \| | \| | 3.78 |
| 23.833 | 0.73 | 0.76 | 0.718 | \|O | \| | \| | \| | 3.78 |
| 23.917 | 0.73 | 0.75 | 0.717 | \|O | \| | \| | \| | 3.78 |
| 24.000 | 0.72 | 0.75 | 0.717 | \|O | \| | \| | \| | 3.78 |
| 24.083 | 0.66 | 0.74 | 0.717 | \|O | \| | \| | \| | 3.78 |
| 24.167 | 0.38 | 0.70 | 0.715 | IO | \| | \| | \| | 3.77 |
| 24.250 | 0.10 | 0.62 | 0.713 | O | \| | \| | \| | 3.75 |
| 24.333 | 0.02 | 0.60 | 0.709 | O | \| | \| | \| | 3.73 |
| 24.417 | 0.01 | 0.60 | 0.705 | O | \| | \| | \| | 3.71 |
| 24.500 | 0.00 | 0.60 | 0.701 | O | \| | \| | \| | 3.69 |
| 24.583 | 0.00 | 0.60 | 0.697 | O | \| | \| | \| | 3.67 |
| 24.667 | 0.00 | 0.60 | 0.692 | O | \| | \| | \| | 3.65 |
| 24.750 | 0.00 | 0.60 | 0.688 | O | \| | \| | \| | 3.63 |
| 24.833 | 0.00 | 0.60 | 0.684 | O | \| | \| | \| | 3.60 |
| 24.917 | 0.00 | 0.60 | 0.680 | O | \| | \| | \| | 3.58 |
| 25.000 | 0.00 | 0.60 | 0.676 | O | \| | \| | \| | 3.56 |
| 25.083 | 0.00 | 0.60 | 0.672 | O | \| | \| | \| | 3.54 |
| 25.167 | 0.00 | 0.60 | 0.668 | O | \| | \| | \| | 3.52 |
| 25.250 | 0.00 | 0.60 | 0.663 | O | \| | \| | \| | 3.49 |
| 25.333 | 0.00 | 0.60 | 0.659 | O | \| | \| | \| | 3.47 |
| 25.417 | 0.00 | 0.60 | 0.655 | O | \| | \| | \| | 3.45 |
| 25.500 | 0.00 | 0.60 | 0.651 | O | \| | \| | \| | 3.43 |
| 25.583 | 0.00 | 0.60 | 0.647 | O | \| | \| | \| | 3.41 |
| 25.667 | 0.00 | 0.60 | 0.643 | O | \| | \| | \| | 3.39 |
| 25.750 | 0.00 | 0.60 | 0.639 | O | \| | \| | \| | 3.36 |
| 25.833 | 0.00 | 0.60 | 0.635 | O | \| | \| | \| | 3.34 |
| 25.917 | 0.00 | 0.60 | 0.630 | O | \| | \| | \| | 3.32 |
| 26.000 | 0.00 | 0.60 | 0.626 | O | \| | \| | \| | 3.30 |
| 26.083 | 0.00 | 0.60 | 0.622 | O | \| | \| | \| | 3.28 |
| 26.167 | 0.00 | 0.60 | 0.618 | O | \| | \| | \| | 3.26 |
| 26.250 | 0.00 | 0.60 | 0.614 | O | \| | \| | \| | 3.23 |
| 26.333 | 0.00 | 0.60 | 0.610 | O | \| | \| | \| | 3.21 |
| 26.417 | 0.00 | 0.60 | 0.606 | O | \| | \| | \| | 3.19 |
| 26.500 | 0.00 | 0.60 | 0.601 | O | \| | \| | \| | 3.17 |
| 26.583 | 0.00 | 0.60 | 0.597 | O | \| | \| | \| | 3.15 |
| 26.667 | 0.00 | 0.60 | 0.593 | O | \| | \| | \| | 3.12 |
| 26.750 | 0.00 | 0.60 | 0.589 | O | \| | \| | \| | 3.10 |
| 26.833 | 0.00 | 0.60 | 0.585 | O | \| | \| | \| | 3.08 |
| 26.917 | 0.00 | 0.60 | 0.581 | O | \| | \| | \| | 3.06 |
| 27.000 | 0.00 | 0.60 | 0.577 | O | \| | \| | \| | 3.04 |
| 27.083 | 0.00 | 0.60 | 0.573 | O | \| | \| | \| | 3.02 |
| 27.167 | 0.00 | 0.60 | 0.568 | O | \| | \| | \| | 2.99 |
| 27.250 | 0.00 | 0.60 | 0.564 | O | \| | \| | \| | 2.97 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 27.333 | 0.00 | 0.60 | 0.560 | O | | | | | 2.95 |
| 27.417 | 0.00 | 0.60 | 0.556 | O | | | | | 2.93 |
| 27.500 | 0.00 | 0.60 | 0.552 | O | | | | | 2.91 |
| 27.583 | 0.00 | 0.60 | 0.548 | O | | | | | 2.89 |
| 27.667 | 0.00 | 0.60 | 0.544 | O | | | | | 2.86 |
| 27.750 | 0.00 | 0.60 | 0.540 | O | | | | | 2.84 |
| 27.833 | 0.00 | 0.60 | 0.535 | O | | | | | 2.82 |
| 27.917 | 0.00 | 0.60 | 0.531 | O | | | | | 2.80 |
| 28.000 | 0.00 | 0.60 | 0.527 | O | | | | | 2.78 |
| 28.083 | 0.00 | 0.60 | 0.523 | O | | | | | 2.76 |
| 28.167 | 0.00 | 0.60 | 0.519 | O | | | | | 2.73 |
| 28.250 | 0.00 | 0.60 | 0.515 | O | | | | | 2.71 |
| 28.333 | 0.00 | 0.60 | 0.511 | O | | | | | 2.69 |
| 28.417 | 0.00 | 0.60 | 0.506 | O | | | | | 2.67 |
| 28.500 | 0.00 | 0.60 | 0.502 | O | | | | | 2.65 |
| 28.583 | 0.00 | 0.60 | 0.498 | O | | | | | 2.62 |
| 28.667 | 0.00 | 0.60 | 0.494 | O | | | | | 2.60 |
| 28.750 | 0.00 | 0.60 | 0.490 | O | | | | | 2.58 |
| 28.833 | 0.00 | 0.60 | 0.486 | O | | | | | 2.56 |
| 28.917 | 0.00 | 0.60 | 0.482 | O | | | | | 2.54 |
| 29.000 | 0.00 | 0.60 | 0.478 | O | | | | | 2.52 |
| 29.083 | 0.00 | 0.60 | 0.473 | O | | | | | 2.49 |
| 29.167 | 0.00 | 0.60 | 0.469 | O | | | | | 2.47 |
| 29.250 | 0.00 | 0.60 | 0.465 | O | | | | | 2.45 |
| 29.333 | 0.00 | 0.60 | 0.461 | O | | | | | 2.43 |
| 29.417 | 0.00 | 0.60 | 0.457 | O | | | | | 2.41 |
| 29.500 | 0.00 | 0.60 | 0.453 | O | | | | | 2.39 |
| 29.583 | 0.00 | 0.60 | 0.449 | O | | | | | 2.36 |
| 29.667 | 0.00 | 0.60 | 0.444 | O | | | | | 2.34 |
| 29.750 | 0.00 | 0.60 | 0.440 | O | | | | | 2.32 |
| 29.833 | 0.00 | 0.60 | 0.436 | O | | | | | 2.30 |
| 29.917 | 0.00 | 0.60 | 0.432 | O | | | | | 2.28 |
| 30.000 | 0.00 | 0.60 | 0.428 | O | | | | | 2.25 |
| 30.083 | 0.00 | 0.60 | 0.424 | O | | | | | 2.23 |
| 30.167 | 0.00 | 0.60 | 0.420 | O | | | | | 2.21 |
| 30.250 | 0.00 | 0.60 | 0.416 | O | | | | | 2.19 |
| 30.333 | 0.00 | 0.60 | 0.411 | O | | | | | 2.17 |
| 30.417 | 0.00 | 0.60 | 0.407 | O | | | | | 2.15 |
| 30.500 | 0.00 | 0.60 | 0.403 | O | | | | | 2.12 |
| 30.583 | 0.00 | 0.60 | 0.399 | O | | | | | 2.10 |
| 30.667 | 0.00 | 0.60 | 0.395 | O | | | | | 2.08 |
| 30.750 | 0.00 | 0.60 | 0.391 | O | | | | | 2.06 |
| 30.833 | 0.00 | 0.60 | 0.387 | O | | | | | 2.04 |
| 30.917 | 0.00 | 0.60 | 0.382 | O | | | | | 2.02 |
| 31.000 | 0.00 | 0.60 | 0.378 | O | | | | | 1.99 |
| 31.083 | 0.00 | 0.60 | 0.374 | O | | | | | 1.97 |
| 31.167 | 0.00 | 0.60 | 0.370 | O | | | | | 1.95 |
| 31.250 | 0.00 | 0.60 | 0.366 | O | | | | | 1.93 |
| 31.333 | 0.00 | 0.60 | 0.362 | O | | | | | 1.91 |
| 31.417 | 0.00 | 0.60 | 0.358 | O | | | | | 1.89 |

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|---|---|---|---|---|---|---|---|---|
| 31.500 | 0.00 | 0.60 | 0.354 | O | \| | \| | \| | 1.86 |
| 31.583 | 0.00 | 0.60 | 0.349 | O | \| | \| | \| | 1.84 |
| 31.667 | 0.00 | 0.60 | 0.345 | O | \| | \| | \| | 1.82 |
| 31.750 | 0.00 | 0.60 | 0.341 | O | \| | \| | \| | 1.80 |
| 31.833 | 0.00 | 0.60 | 0.337 | O | \| | \| | \| | 1.78 |
| 31.917 | 0.00 | 0.60 | 0.333 | O | \| | \| | \| | 1.75 |
| 32.000 | 0.00 | 0.60 | 0.329 | O | \| | \| | \| | 1.73 |
| 32.083 | 0.00 | 0.60 | 0.325 | O | \| | \| | \| | 1.71 |
| 32.167 | 0.00 | 0.60 | 0.320 | O | \| | \| | \| | 1.69 |
| 32.250 | 0.00 | 0.60 | 0.316 | O | \| | \| | \| | 1.67 |
| 32.333 | 0.00 | 0.60 | 0.312 | O | \| | \| | \| | 1.65 |
| 32.417 | 0.00 | 0.60 | 0.308 | O | \| | \| | \| | 1.62 |
| 32.500 | 0.00 | 0.60 | 0.304 | O | \| | \| | \| | 1.60 |
| 32.583 | 0.00 | 0.60 | 0.300 | O | \| | \| | \| | 1.58 |
| 32.667 | 0.00 | 0.60 | 0.296 | O | \| | \| | \| | 1.56 |
| 32.750 | 0.00 | 0.60 | 0.292 | O | \| | \| | \| | 1.54 |
| 32.833 | 0.00 | 0.60 | 0.287 | O | \| | \| | \| | 1.52 |
| 32.917 | 0.00 | 0.60 | 0.283 | O | \| | \| | \| | 1.49 |
| 33.000 | 0.00 | 0.60 | 0.279 | O | \| | \| | \| | 1.47 |
| 33.083 | 0.00 | 0.60 | 0.275 | O | \| | \| | \| | 1.45 |
| 33.167 | 0.00 | 0.60 | 0.271 | O | \| | \| | \| | 1.43 |
| 33.250 | 0.00 | 0.60 | 0.267 | O | \| | \| | \| | 1.41 |
| 33.333 | 0.00 | 0.60 | 0.263 | O | \| | \| | \| | 1.38 |
| 33.417 | 0.00 | 0.60 | 0.259 | O | \| | \| | \| | 1.36 |
| 33.500 | 0.00 | 0.60 | 0.254 | O | \| | \| | \| | 1.34 |
| 33.583 | 0.00 | 0.60 | 0.250 | O | \| | \| | \| | 1.32 |
| 33.667 | 0.00 | 0.60 | 0.246 | O | \| | \| | \| | 1.30 |
| 33.750 | 0.00 | 0.60 | 0.242 | O | \| | \| | \| | 1.28 |
| 33.833 | 0.00 | 0.60 | 0.238 | O | \| | \| | \| | 1.25 |
| 33.917 | 0.00 | 0.60 | 0.234 | O | \| | \| | \| | 1.23 |
| 34.000 | 0.00 | 0.60 | 0.230 | O | \| | \| | \| | 1.21 |
| 34.083 | 0.00 | 0.60 | 0.225 | O | \| | \| | \| | 1.19 |
| 34.167 | 0.00 | 0.60 | 0.221 | O | \| | \| | \| | 1.17 |
| 34.250 | 0.00 | 0.60 | 0.217 | O | \| | \| | \| | 1.15 |
| 34.333 | 0.00 | 0.60 | 0.213 | O | \| | \| | \| | 1.12 |
| 34.417 | 0.00 | 0.60 | 0.209 | O | \| | \| | \| | 1.10 |
| 34.500 | 0.00 | 0.60 | 0.205 | O | \| | \| | \| | 1.08 |
| 34.583 | 0.00 | 0.60 | 0.201 | O | \| | \| | \| | 1.06 |
| 34.667 | 0.00 | 0.60 | 0.197 | O | \| | \| | \| | 1.04 |
| 34.750 | 0.00 | 0.60 | 0.192 | O | \| | \| | \| | 1.02 |
| 34.833 | 0.00 | 0.60 | 0.188 | O | \| | \| | \| | 0.99 |
| 34.917 | 0.00 | 0.60 | 0.184 | O | \| | \| | \| | 0.97 |
| 35.000 | 0.00 | 0.60 | 0.180 | O | \| | \| | \| | 0.95 |
| 35.083 | 0.00 | 0.60 | 0.176 | O | \| | \| | \| | 0.93 |
| 35.167 | 0.00 | 0.60 | 0.172 | O | \| | \| | \| | 0.91 |
| 35.250 | 0.00 | 0.60 | 0.168 | O | \| | \| | \| | 0.88 |
| 35.333 | 0.00 | 0.60 | 0.163 | O | \| | \| | \| | 0.86 |
| 35.417 | 0.00 | 0.60 | 0.159 | O | \| | \| | \| | 0.84 |
| 35.500 | 0.00 | 0.60 | 0.155 | O | \| | \| | \| | 0.82 |
| 35.583 | 0.00 | 0.60 | 0.151 | O | \| | \| | \| | 0.80 |

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|---|---|---|---|---|---|---|---|---|
| 35.667 | 0.00 | 0.60 | 0.147 | O | \| | \| | \| | 0.78 |
| 35.750 | 0.00 | 0.60 | 0.143 | O | \| | \| | \| | 0.75 |
| 35.833 | 0.00 | 0.59 | 0.139 | O | \| | \| | \| | 0.73 |
| 35.917 | 0.00 | 0.57 | 0.135 | O | \| | \| | \| | 0.71 |
| 36.000 | 0.00 | 0.55 | 0.131 | O | \| | \| | \| | 0.69 |
| 36.083 | 0.00 | 0.54 | 0.127 | O | \| | \| | \| | 0.67 |
| 36.167 | 0.00 | 0.52 | 0.123 | O | \| | \| | \| | 0.65 |
| 36.250 | 0.00 | 0.51 | 0.120 | O | \| | \| | \| | 0.63 |
| 36.333 | 0.00 | 0.49 | 0.116 | O | \| | \| | \| | 0.62 |
| 36.417 | 0.00 | 0.48 | 0.113 | O | \| | \| | \| | 0.60 |
| 36.500 | 0.00 | 0.46 | 0.110 | O | \| | \| | \| | 0.58 |
| 36.583 | 0.00 | 0.45 | 0.107 | O | \| | \| | \| | 0.56 |
| 36.667 | 0.00 | 0.44 | 0.104 | O | \| | \| | \| | 0.55 |
| 36.750 | 0.00 | 0.43 | 0.101 | O | \| | \| | \| | 0.53 |
| 36.833 | 0.00 | 0.41 | 0.098 | O | \| | \| | \| | 0.52 |
| 36.917 | 0.00 | 0.40 | 0.095 | O | \| | \| | \| | 0.50 |
| 37.000 | 0.00 | 0.39 | 0.092 | O | \| | \| | \| | 0.49 |
| 37.083 | 0.00 | 0.38 | 0.090 | O | \| | \| | \| | 0.47 |
| 37.167 | 0.00 | 0.37 | 0.087 | O | \| | \| | \| | 0.46 |
| 37.250 | 0.00 | 0.36 | 0.085 | O | \| | \| | \| | 0.45 |
| 37.333 | 0.00 | 0.35 | 0.082 | O | \| | \| | \| | 0.43 |
| 37.417 | 0.00 | 0.34 | 0.080 | O | \| | \| | \| | 0.42 |
| 37.500 | 0.00 | 0.33 | 0.078 | O | \| | \| | \| | 0.41 |
| 37.583 | 0.00 | 0.32 | 0.075 | O | \| | \| | \| | 0.40 |
| 37.667 | 0.00 | 0.31 | 0.073 | O | \| | \| | \| | 0.39 |
| 37.750 | 0.00 | 0.30 | 0.071 | O | \| | \| | \| | 0.38 |
| 37.833 | 0.00 | 0.29 | 0.069 | O | \| | \| | \| | 0.36 |
| 37.917 | 0.00 | 0.28 | 0.067 | O | \| | \| | \| | 0.35 |
| 38.000 | 0.00 | 0.28 | 0.065 | O | \| | \| | \| | 0.34 |
| 38.083 | 0.00 | 0.27 | 0.063 | O | \| | \| | \| | 0.33 |
| 38.167 | 0.00 | 0.26 | 0.061 | O | \| | \| | \| | 0.32 |
| 38.250 | 0.00 | 0.25 | 0.060 | O | \| | \| | \| | 0.32 |
| 38.333 | 0.00 | 0.24 | 0.058 | O | \| | \| | \| | 0.31 |
| 38.417 | 0.00 | 0.24 | 0.056 | O | \| | \| | \| | 0.30 |
| 38.500 | 0.00 | 0.23 | 0.055 | O | \| | \| | \| | 0.29 |
| 38.583 | 0.00 | 0.22 | 0.053 | O | \| | \| | \| | 0.28 |
| 38.667 | 0.00 | 0.22 | 0.052 | O | \| | \| | \| | 0.27 |
| 38.750 | 0.00 | 0.21 | 0.050 | O | \| | \| | \| | 0.26 |
| 38.833 | 0.00 | 0.21 | 0.049 | O | \| | \| | \| | 0.26 |
| 38.917 | 0.00 | 0.20 | 0.047 | O | \| | \| | \| | 0.25 |
| 39.000 | 0.00 | 0.19 | 0.046 | O | \| | \| | \| | 0.24 |
| 39.083 | 0.00 | 0.19 | 0.045 | O | \| | \| | \| | 0.24 |
| 39.167 | 0.00 | 0.18 | 0.043 | O | \| | \| | \| | 0.23 |
| 39.250 | 0.00 | 0.18 | 0.042 | O | \| | \| | \| | 0.22 |
| 39.333 | 0.00 | 0.17 | 0.041 | O | \| | \| | \| | 0.22 |
| 39.417 | 0.00 | 0.17 | 0.040 | O | \| | \| | \| | 0.21 |
| 39.500 | 0.00 | 0.16 | 0.039 | O | \| | \| | \| | 0.20 |
| 39.583 | 0.00 | 0.16 | 0.037 | O | \| | \| | \| | 0.20 |
| 39.667 | 0.00 | 0.15 | 0.036 | O | \| | \| | \| | 0.19 |
| 39.750 | 0.00 | 0.15 | 0.035 | O | \| | \| | \| | 0.19 |

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|---|---|---|---|---|---|---|---|---|
| 39.833 | 0.00 | 0.14 | 0.034 | O | \| | \| | \| | 0.18 |
| 39.917 | 0.00 | 0.14 | 0.033 | O | \| | \| | \| | 0.18 |
| 40.000 | 0.00 | 0.14 | 0.032 | O | \| | \| | \| | 0.17 |
| 40.083 | 0.00 | 0.13 | 0.031 | O | \| | \| | \| | 0.17 |
| 40.167 | 0.00 | 0.13 | 0.031 | O | \| | \| | \| | 0.16 |
| 40.250 | 0.00 | 0.13 | 0.030 | O | \| | \| | \| | 0.16 |
| 40.333 | 0.00 | 0.12 | 0.029 | O | \| | \| | \| | 0.15 |
| 40.417 | 0.00 | 0.12 | 0.028 | O | \| | \| | \| | 0.15 |
| 40.500 | 0.00 | 0.11 | 0.027 | O | \| | \| | \| | 0.14 |
| 40.583 | 0.00 | 0.11 | 0.026 | O | \| | \| | \| | 0.14 |
| 40.667 | 0.00 | 0.11 | 0.026 | O | \| | \| | \| | 0.14 |
| 40.750 | 0.00 | 0.11 | 0.025 | O | \| | \| | \| | 0.13 |
| 40.833 | 0.00 | 0.10 | 0.024 | O | \| | \| | \| | 0.13 |
| 40.917 | 0.00 | 0.10 | 0.024 | O | \| | \| | \| | 0.12 |
| 41.000 | 0.00 | 0.10 | 0.023 | O | \| | \| | \| | 0.12 |
| 41.083 | 0.00 | 0.09 | 0.022 | O | \| | \| | \| | 0.12 |
| 41.167 | 0.00 | 0.09 | 0.022 | O | \| | \| | \| | 0.11 |
| 41.250 | 0.00 | 0.09 | 0.021 | O | \| | \| | \| | 0.11 |
| 41.333 | 0.00 | 0.09 | 0.020 | O | \| | \| | \| | 0.11 |
| 41.417 | 0.00 | 0.08 | 0.020 | O | \| | \| | \| | 0.10 |
| 41.500 | 0.00 | 0.08 | 0.019 | O | \| | \| | \| | 0.10 |
| 41.583 | 0.00 | 0.08 | 0.019 | O | \| | \| | \| | 0.10 |
| 41.667 | 0.00 | 0.08 | 0.018 | O | \| | \| | \| | 0.10 |
| 41.750 | 0.00 | 0.07 | 0.018 | O | \| | \| | \| | 0.09 |
| 41.833 | 0.00 | 0.07 | 0.017 | O | \| | \| | \| | 0.09 |
| 41.917 | 0.00 | 0.07 | 0.017 | O | \| | \| | \| | 0.09 |
| 42.000 | 0.00 | 0.07 | 0.016 | O | \| | \| | \| | 0.09 |
| 42.083 | 0.00 | 0.07 | 0.016 | O | \| | \| | \| | 0.08 |
| 42.167 | 0.00 | 0.06 | 0.015 | O | \| | \| | \| | 0.08 |
| 42.250 | 0.00 | 0.06 | 0.015 | O | \| | \| | \| | 0.08 |
| 42.333 | 0.00 | 0.06 | 0.014 | O | \| | \| | \| | 0.08 |
| 42.417 | 0.00 | 0.06 | 0.014 | O | \| | \| | \| | 0.07 |
| 42.500 | 0.00 | 0.06 | 0.014 | O | \| | \| | \| | 0.07 |
| 42.583 | 0.00 | 0.06 | 0.013 | O | \| | \| | \| | 0.07 |
| 42.667 | 0.00 | 0.05 | 0.013 | O | \| | \| | \| | 0.07 |
| 42.750 | 0.00 | 0.05 | 0.012 | O | \| | \| | \| | 0.07 |
| 42.833 | 0.00 | 0.05 | 0.012 | O | \| | \| | \| | 0.06 |
| 42.917 | 0.00 | 0.05 | 0.012 | O | \| | \| | \| | 0.06 |
| 43.000 | 0.00 | 0.05 | 0.011 | O | \| | \| | \| | 0.06 |
| 43.083 | 0.00 | 0.05 | 0.011 | O | \| | \| | \| | 0.06 |
| 43.167 | 0.00 | 0.05 | 0.011 | O | \| | \| | \| | 0.06 |
| 43.250 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.05 |
| 43.333 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.05 |
| 43.417 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.05 |
| 43.500 | 0.00 | 0.04 | 0.010 | O | \| | \| | \| | 0.05 |
| 43.583 | 0.00 | 0.04 | 0.009 | O | \| | \| | \| | 0.05 |
| 43.667 | 0.00 | 0.04 | 0.009 | O | \| | \| | \| | 0.05 |
| 43.750 | 0.00 | 0.04 | 0.009 | O | \| | \| | \| | 0.05 |
| 43.833 | 0.00 | 0.04 | 0.008 | O | \| | \| | \| | 0.04 |
| 43.917 | 0.00 | 0.03 | 0.008 | O | \| | \| | \| | 0.04 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 44.000 | 0.00 | 0.03 | 0.008 | O | \| | \| | \| | 0.04 |
| 44.083 | 0.00 | 0.03 | 0.008 | O | \| | \| | \| | 0.04 |
| 44.167 | 0.00 | 0.03 | 0.008 | O | \| | \| | \| | 0.04 |
| 44.250 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.333 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.417 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.500 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.04 |
| 44.583 | 0.00 | 0.03 | 0.007 | O | \| | \| | \| | 0.03 |
| 44.667 | 0.00 | 0.03 | 0.006 | O | \| | \| | \| | 0.03 |
| 44.750 | 0.00 | 0.03 | 0.006 | O | \| | \| | \| | 0.03 |
| 44.833 | 0.00 | 0.03 | 0.006 | O | \| | \| | \| | 0.03 |
| 44.917 | 0.00 | 0.02 | 0.006 | O | \| | \| | \| | 0.03 |
| 45.000 | 0.00 | 0.02 | 0.006 | O | \| | \| | \| | 0.03 |
| 45.083 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.167 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.250 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.333 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.417 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.500 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.03 |
| 45.583 | 0.00 | 0.02 | 0.005 | O | \| | \| | \| | 0.02 |
| 45.667 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 45.750 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 45.833 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 45.917 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.000 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.083 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.167 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.250 | 0.00 | 0.02 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.333 | 0.00 | 0.01 | 0.004 | O | \| | \| | \| | 0.02 |
| 46.417 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.500 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.583 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.667 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.750 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.833 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 46.917 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.02 |
| 47.000 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.083 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.167 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.250 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.333 | 0.00 | 0.01 | 0.003 | O | \| | \| | \| | 0.01 |
| 47.417 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.500 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.583 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.667 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.750 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.833 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 47.917 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.000 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.083 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 48.167 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.250 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.333 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.417 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.500 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.583 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.667 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.750 | 0.00 | 0.01 | 0.002 | O | \| | \| | \| | 0.01 |
| 48.833 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 48.917 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.000 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.083 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.167 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.250 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.333 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.417 | 0.00 | 0.01 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.500 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.583 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.667 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.750 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.833 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 49.917 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 50.000 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 50.083 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.01 |
| 50.167 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.250 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.333 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.417 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.500 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.583 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.667 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.750 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.833 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 50.917 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.000 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.083 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.167 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.250 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.333 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.417 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.500 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.583 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.667 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.750 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.833 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 51.917 | 0.00 | 0.00 | 0.001 | O | \| | \| | \| | 0.00 |
| 52.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.250 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 52.333 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.417 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.500 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.583 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.667 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.750 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.833 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 52.917 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.250 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.333 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.417 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.500 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.583 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.667 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.750 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.833 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 53.917 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 54.000 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 54.083 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |
| 54.167 | 0.00 | 0.00 | 0.000 | O | \| | \| | \| | 0.00 |

**********HYDROGRAPH DATA**********

Number of intervals = 650
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 6.884 (CFS)
Total volume = 3.329 (Ac.Ft)

Status of hydrographs being held in storage

| | Stream 1 | Stream 2 | Stream 3 | Stream 4 | Stream 5 |
|---|---|---|---|---|---|
| Peak (CFS) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vol (Ac.Ft) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

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# APPENDIX F

# BMP INFORMATION

| PROJECT INFORMATION | |
|---|---|
| ENGINEERED PRODUCT MANAGER | |
| ADS SALES REP | |
| PROJECT NO. | |

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

# CITRUS CHAMBERS 55K

## FONTANA, CA, USA

## STORMWATER CHAMBERS A AND B

## 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 450 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.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

## IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

1. STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

## NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-7200 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

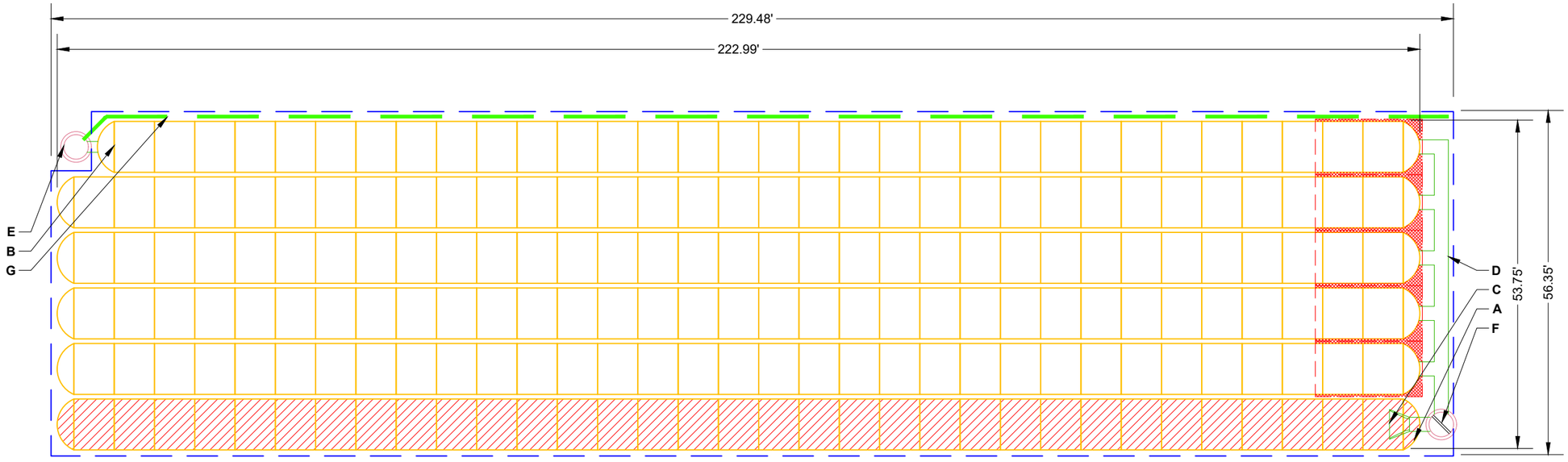
**USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.**

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

| PROPOSED LAYOUT | | PROPOSED ELEVATIONS | |
|---|---|---|---|
| 197 | STORMTECH MC-7200 CHAMBERS | MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED): | 1076.75 |
| 12 | STORMTECH MC-7200 END CAPS | MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC): | 1072.25 |
| 12 | STONE ABOVE (in) | MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC): | 1071.75 |
| 9 | STONE BELOW (in) | MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT): | 1071.75 |
| 40 | STONE VOID | MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT): | 1071.75 |
| 55818 | INSTALLED SYSTEM VOLUME (CF)<br>(PERIMETER STONE INCLUDED)<br>(COVER STONE INCLUDED)<br>(BASE STONE INCLUDED) | TOP OF STONE: | 1070.75 |
| | | TOP OF MC-7200 CHAMBER: | 1069.75 |
| | | 24" x 24" BOTTOM MANIFOLD INVERT: | 1064.94 |
| | | 24" ISOLATOR ROW PLUS INVERT: | 1064.94 |
| 12867 | SYSTEM AREA (SF) | 18" BOTTOM CONNECTION INVERT: | 1064.91 |
| 571.7 | SYSTEM PERIMETER (ft) | BOTTOM OF MC-7200 CHAMBER: | 1064.75 |
| | | UNDERDRAIN INVERT: | 1064.00 |
| | | BOTTOM OF STONE: | 1064.00 |

*INVERT ABOVE BASE OF CHAMBER

| PART TYPE | ITEM ON LAYOUT | DESCRIPTION | INVERT* | MAX FLOW |
|---|---|---|---|---|
| PREFABRICATED END CAP | A | 24" BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS | 2.26" | |
| PREFABRICATED END CAP | B | 18" BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP18B / TYP OF ALL 18" BOTTOM CONNECTIONS | 1.97" | |
| FLAMP | C | INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MCFLAMP | | |
| MANIFOLD | D | 24" x 24" BOTTOM MANIFOLD, ADS N-12 | 2.26" | |
| CONCRETE STRUCTURE | E | OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS) | | 4.0 CFS OUT |
| CONCRETE STRUCTURE W/WEIR | F | (DESIGN BY ENGINEER / PROVIDED BY OTHERS) | | 41.5 CFS IN |
| UNDERDRAIN | G | 6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN | | |




ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 17.50' OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

## NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING
THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

CITRUS CHAMBERS 55K
FONTANA, CA, USA
DATE:
DRAWN: DB
CHECKED: N/A
PROJECT #:

| DESCRIPTION | DRW | CHK | DATE |
|---|---|---|---|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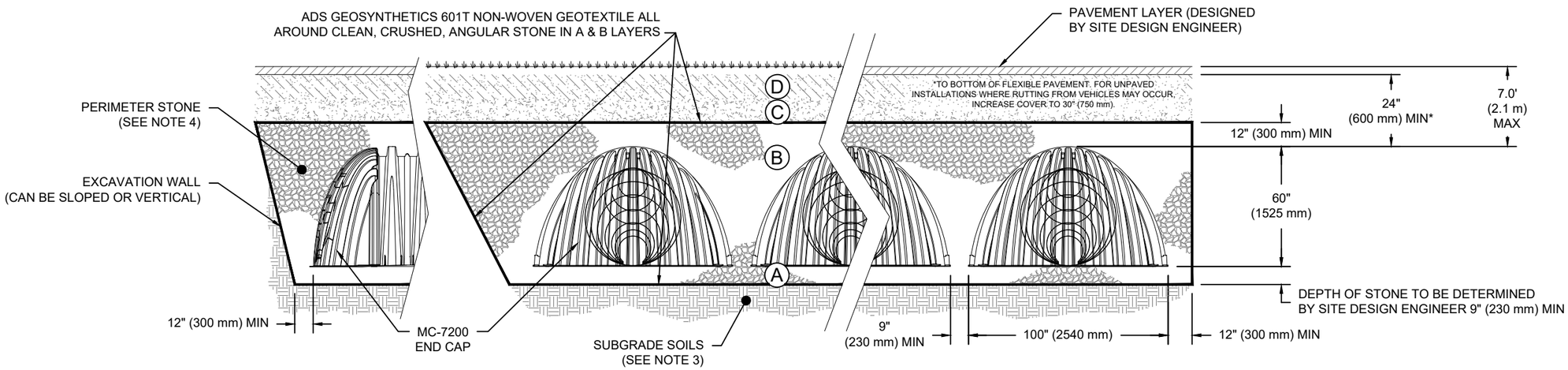
# ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

| MATERIAL LOCATION | | DESCRIPTION | AASHTO MATERIAL CLASSIFICATIONS | COMPACTION / DENSITY REQUIREMENT |
|---|---|---|---|---|
| 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 | PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS. |
| 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.<br><br>MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER. | AASHTO M145[1]<br>A-1, A-2-4, A-3<br><br>OR<br><br>AASHTO M43[1]<br>3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10 | BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. |
| B | **EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE. | CLEAN, CRUSHED, ANGULAR STONE | AASHTO M43[1]<br>3, 4 | NO COMPACTION REQUIRED. |
| A | **FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER. | CLEAN, CRUSHED, ANGULAR STONE | AASHTO M43[1]<br>3, 4 | PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3] |

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 NO. 4 (AASHTO M43) 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 EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR 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 OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.




## NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. 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 450 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.

CITRUS CHAMBERS 55K
FONTANA, CA, USA
DATE: DRAWN: DB CHECKED: N/A
PROJECT #:

| DATE | DRW | CHK | DESCRIPTION |
|---|---|---|---|

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

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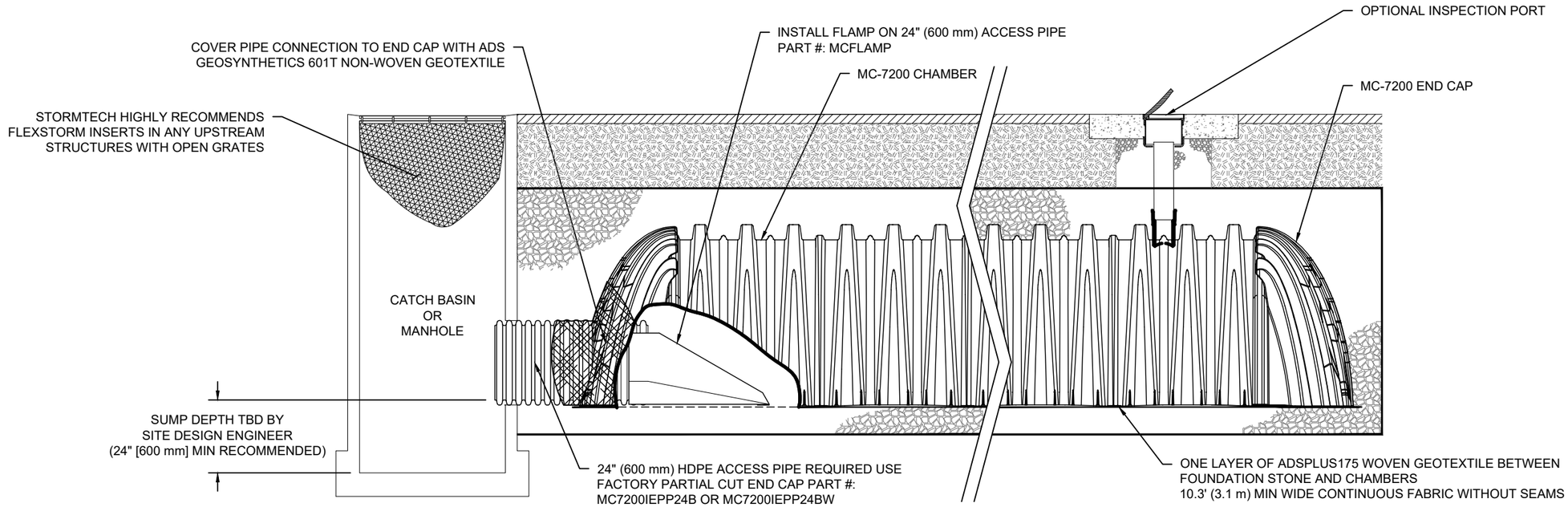
SHEET
3 OF 5




**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.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

## NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

CITRUS CHAMBERS 55K
FONTANA, CA, USA
DATE: DRAWN: DB
PROJECT #: CHECKED: N/A

| DATE | DRW | CHK | DESCRIPTION |
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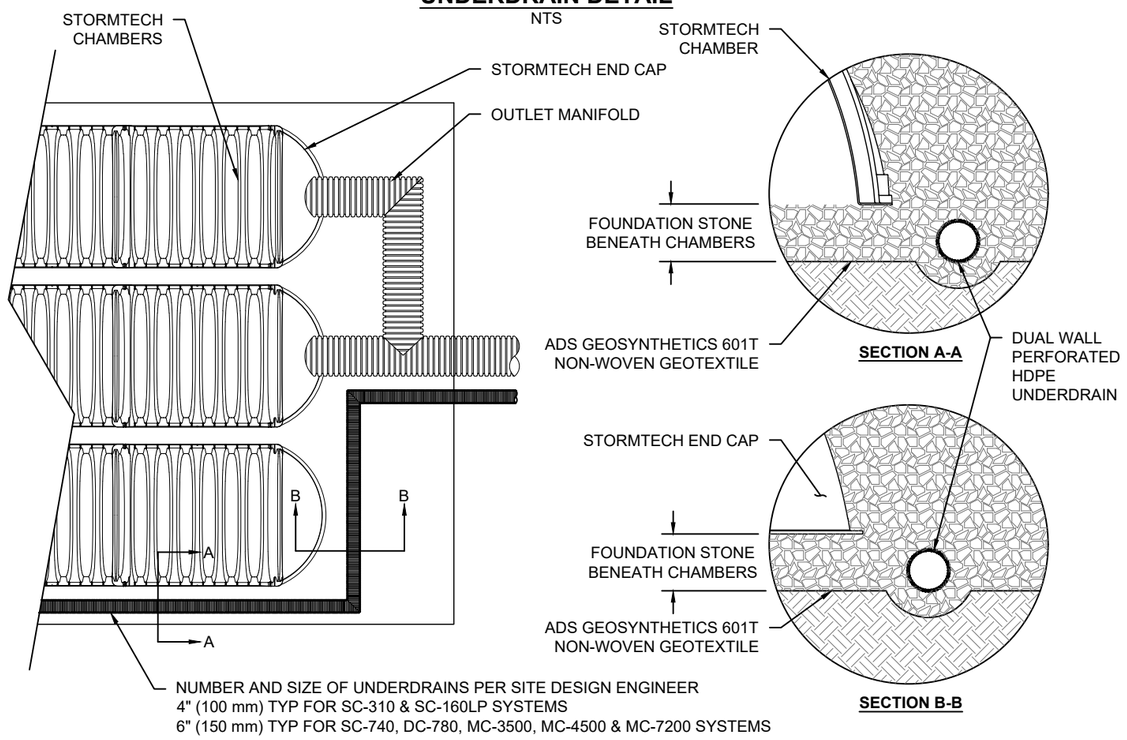
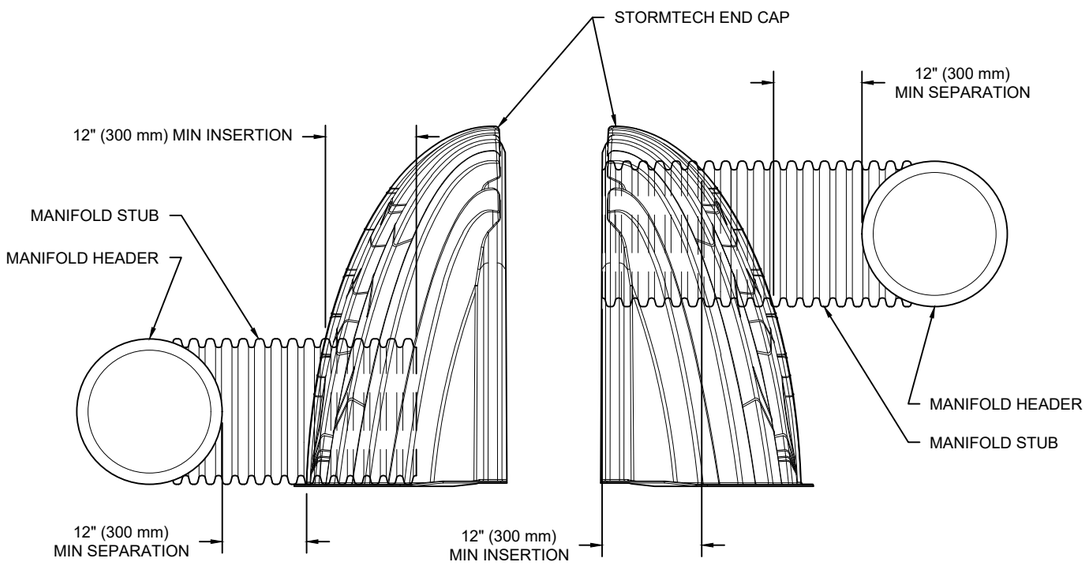
## UNDERDRAIN DETAIL

NTS




## MC-SERIES END CAP INSERTION DETAIL

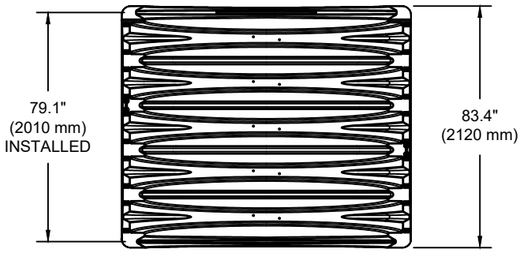
NTS

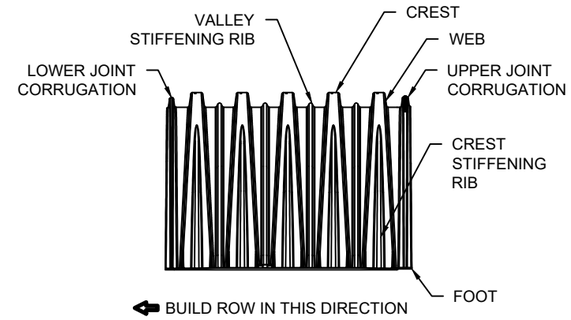


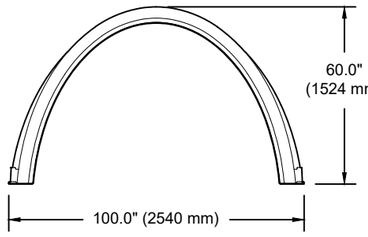

NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

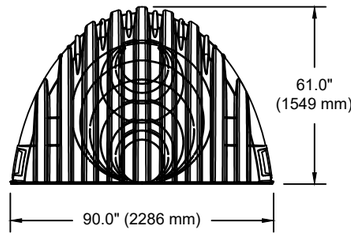
## MC-7200 TECHNICAL SPECIFICATION

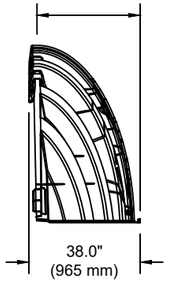
NTS




**NOMINAL CHAMBER SPECIFICATIONS**

| | | |
|---|---|---|
| SIZE (W X H X INSTALLED LENGTH) | 100.0" X 60.0" X 79.1" | (2540 mm X 1524 mm X 2010 mm) |
| CHAMBER STORAGE | 175.9 CUBIC FEET | (4.98 m³) |
| MINIMUM INSTALLED STORAGE* | 267.3 CUBIC FEET | (7.56 m³) |
| WEIGHT (NOMINAL) | 205 lbs. | (92.9 kg) |

**NOMINAL END CAP SPECIFICATIONS**

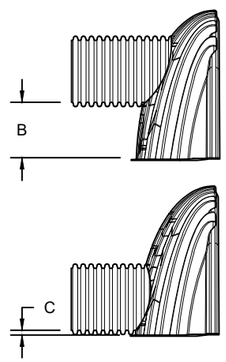
| | | |
|---|---|---|
| SIZE (W X H X INSTALLED LENGTH) | 90.0" X 61.0" X 32.8" | (2286 mm X 1549 mm X 833 mm) |
| END CAP STORAGE | 39.5 CUBIC FEET | (1.12 m³) |
| MINIMUM INSTALLED STORAGE* | 115.3 CUBIC FEET | (3.26 m³) |
| WEIGHT (NOMINAL) | 90 lbs. | (40.8 kg) |

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

| PART # | STUB | B | C |
|---|---|---|---|
| MC7200IEPP06T | 6" (150 mm) | 42.54" (1081 mm) | --- |
| MC7200IEPP06B | | --- | 0.86" (22 mm) |
| MC7200IEPP08T | 8" (200 mm) | 40.50" (1029 mm) | --- |
| MC7200IEPP08B | | --- | 1.01" (26 mm) |
| MC7200IEPP10T | 10" (250 mm) | 38.37" (975 mm) | --- |
| MC7200IEPP10B | | --- | 1.33" (34 mm) |
| MC7200IEPP12T | 12" (300 mm) | 35.69" (907 mm) | --- |
| MC7200IEPP12B | | --- | 1.55" (39 mm) |
| MC7200IEPP15T | 15" (375 mm) | 32.72" (831 mm) | --- |
| MC7200IEPP15B | | --- | 1.70" (43 mm) |
| MC7200IEPP18T | 18" (450 mm) | 29.36" (746 mm) | --- |
| MC7200IEPP18TW | | | |
| MC7200IEPP18B | | --- | 1.97" (50 mm) |
| MC7200IEPP18BW | | | |
| MC7200IEPP24T | 24" (600 mm) | 23.05" (585 mm) | --- |
| MC7200IEPP24TW | | | |
| MC7200IEPP24B | | --- | 2.26" (57 mm) |
| MC7200IEPP24BW | | | |
| MC7200IEPP30BW | 30" (750 mm) | --- | 2.95" (75 mm) |
| MC7200IEPP36BW | 36" (900 mm) | --- | 3.25" (83 mm) |
| MC7200IEPP42BW | 42" (1050 mm) | --- | 3.55" (90 mm) |

NOTE: ALL DIMENSIONS ARE NOMINAL




CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

CITRUS CHAMBERS 55K
FONTANA, CA, USA
DATE: DRAWN: DB CHECKED: N/A
PROJECT #:

| DATE | DRW | CHK | DESCRIPTION |
|---|---|---|---|



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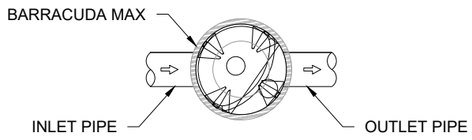
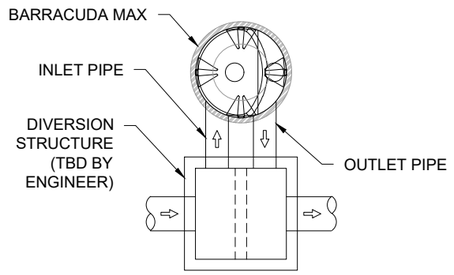
| BARRACUDA MAX MINIMUM RIM TO INVERT OUT | |
|---|---|
| MODEL | INCH (MM) |
| S3 | 36 (914) |
| S4 | 36 (914) |
| S6 | 39 (991) |
| S8 | 41 (1041) |

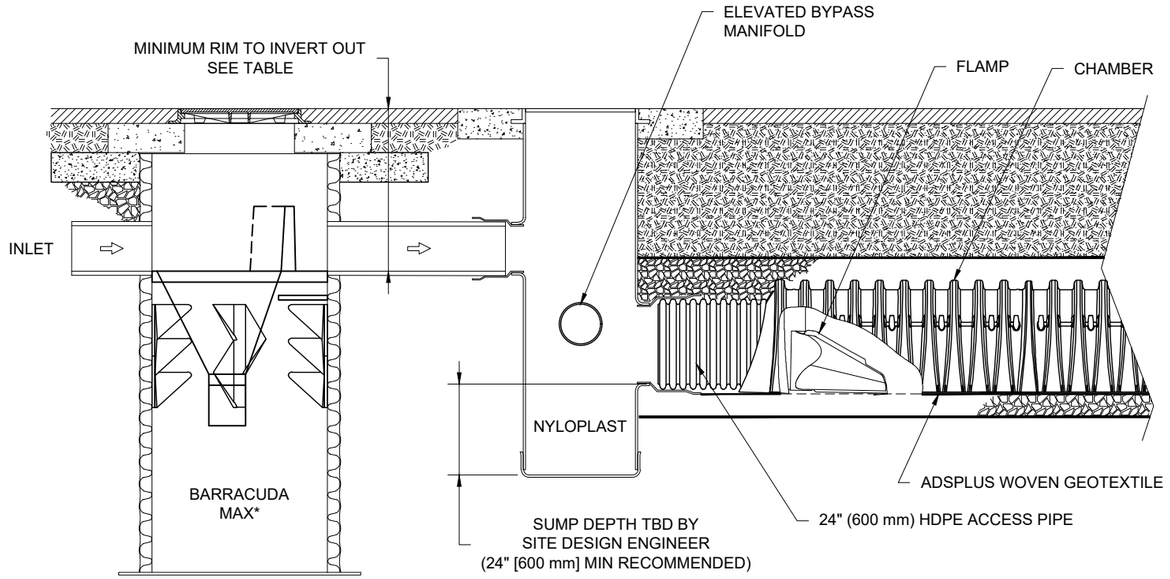
THE S3, S4, S6, AND S8 CAN BE INSTALLED IN A STANDARD 36" (900 mm), 48" (1200 mm), 72" (1800 mm), AND 96" (2400 mm) PRECAST MANHOLE, RESPECTIVELY. THE S3 AND S4 CAN BE PROVIDED FACTORY INSTALLED WITHIN A 36" (900 mm) AND 48" (1200 mm) ADS HP MANHOLE AND DELIVERED TO THE JOBSITE.




**ONLINE CONFIGURATION**




**OFFLINE CONFIGURATION**

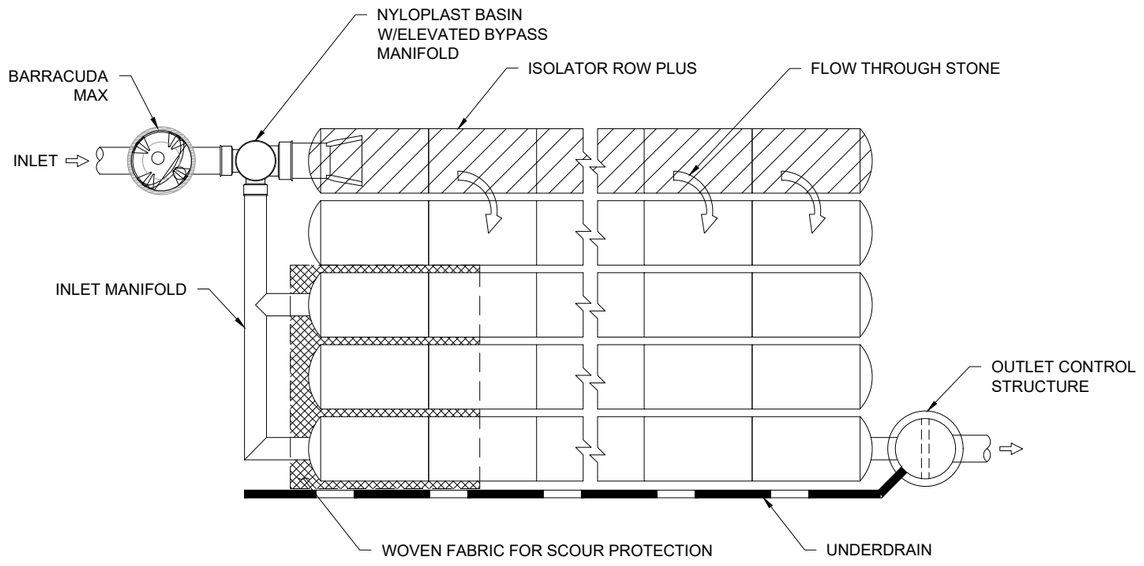



## BARRACUDA MAX & ISOLATOR ROW PLUS CROSS SECTION/PROFILE

NTS

| ISOLATOR ROW PLUS FLOW RATES | | | |
|---|---|---|---|
| CHAMBER MODEL | SURFACE LOADING RATE GPM/FT² (L/S/m²) | EFFECTIVE FILTRATION TREATMENT AREA FT² (m²) | MTFR CFS (L/S)* |
| SC-160 | 4.13 (2.8) | 11.45 (1.064) | 0.11 (2.983) |
| SC-310 | 4.13 (2.8) | 17.7 (1.644) | 0.16 (4.612) |
| SC-740 | 4.13 (2.8) | 27.8 (2.583) | 0.26 (7.244) |
| DC-780 | 4.13 (2.8) | 27.8 (2.583) | 0.26 (7.244) |
| MC-3500 | 4.13 (2.8) | 42.9 (3.986) | 0.40 (11.178) |
| MC-4500 | 4.13 (2.8) | 30.1 (2.796) | 0.28 (7.843) |
| MC-7200 | 4.13 (2.8) | 50.0 (4.645) | 0.46 (13.028) |

* PER CHAMBER LOADING RATES BASED ON NJCAT VERIFICATION TESTING OF THE STORMTECH SC-740 ISOLATOR ROW PLUS IN ACCORDANCE WITH NJDEP LABORATORY PROTOCOL TO ACCESS TOTAL SUSPENDED SOLIDS REMOVAL BY FILTRATION MANUFACTURED TREATMENT DEVICES, 2013.




## BARRACUDA MAX & ISOLATOR ROW PLUS SCHEMATIC

NTS

## KEY BENEFITS OF THE BARRACUDA MAX

- SINGLE MANHOLE DESIGN
- VARIABLE INLET/OUTLET ANGLE CONFIGURATIONS (NOT JUST 180 DEGREE ORIENTATION)
- INTERNAL BYPASS FOR INLINE INSTALLATION (WHERE APPLICABLE)
- ALL UNITS CAN BE INSTALLED INTO A STANDARD PRECAST MANHOLE
- 3' & 4' UNITS CAN BE FACTORY FABRICATED IN HP MANHOLES FOR QUICK DELIVERY WITH A LIGHT, EASY TO INSTALL STRUCTURE
- IN-STOCK COMPONENTS FOR QUICK DELIVERY
- NO ELEVATION LOSS BETWEEN THE INLET AND OUTLET
- SURFACE INSPECTION AND MAINTENANCE WITH NO CONFINED SPACE ENTRY
- DESIGNED FOR EASY MAINTENANCE USING A VACUUM TRUCK OR SIMILAR EQUIPMENT
- FIELD ENGINEERS AND INTERNAL ENGINEERING SERVICES DEPARTMENT TO ASSIST ENGINEERING WITH SIZING/DETAILS

**BARRACUDA DESIGN TOOL**

https://www.ads-pipe.com/water-quality-design-tool

| BARRACUDA MAX TREATMENT FLOW (80% TSS) | |
|---|---|
| MODEL | CFS (L/s) |
| S3 | 0.85 (24.1) |
| S4 | 1.52 (43.0) |
| S6 | 3.40 (96.3) |
| S8 | 6.08 (172.2) |

BARRACUDA MAX CAN BE CONFIGURED WITH AN OIL POUCH OR TRASH GUARD FOR ENHANCED TREATMENT.

## KEY BENEFITS OF A BARRACUDA MAX & ISOLATOR PLUS DESIGN

- ENHANCED SEDIMENT REMOVAL BY COMBINING TWO INDUSTRY PROVEN DEVICES
- EXTENDED MAINTENANCE CYCLES
- EASY TO INSTALL AND CONFIGURE TO SPECIFIC SITE CONSTRAINTS
- ONLINE DESIGN TOOLS ALLOW DESIGNERS TO EASILY CREATE LAYOUTS AND DETAILS

## KEY BENEFITS OF STORMTECH CHAMBERS

- LARGE FAMILY OF CHAMBERS TO FIT YOUR SITE
- EASILY CONFIGURABLE FOR IRREGULAR SHAPED BEDS
- MEETS PRODUCT REQUIREMENTS OF ASTM F2418 AND ASTM F2922 AND DESIGN REQUIREMENTS OF ASTM F2787
- EXCEED AASHTO LRFD DESIGN SPECIFICATIONS FOR HS-20 LIVE LOADS & DEEP BURIAL EARTH LOADS
- PATENTED ISOLATOR ROW PLUS FOR LESS FREQUENT MAINTENANCE, WATER QUALITY AND LONG-TERM PERFORMANCE
- THIRD PARTY VERIFIED PERFORMANCE
- FIELD ENGINEERS AND INTERNAL ENGINEERING SERVICES DEPARTMENT TO ASSIST ENGINEERING WITH LAYOUTS

**STORMTECH DESIGN TOOL**

https://designtool.ads-pipe.com/



STORMTECH® + WQ STD DETAIL
BARRACUDA® & ISOLATOR ROW PLUS®

DATE: 2/10/22 | DRAWN: KLJ | CHECKED: KMS | PROJECT #: N/A

| DATE | DRWN | CHKD | DESCRIPTION |
|---|---|---|---|

Advanced Drainage Systems, Inc.
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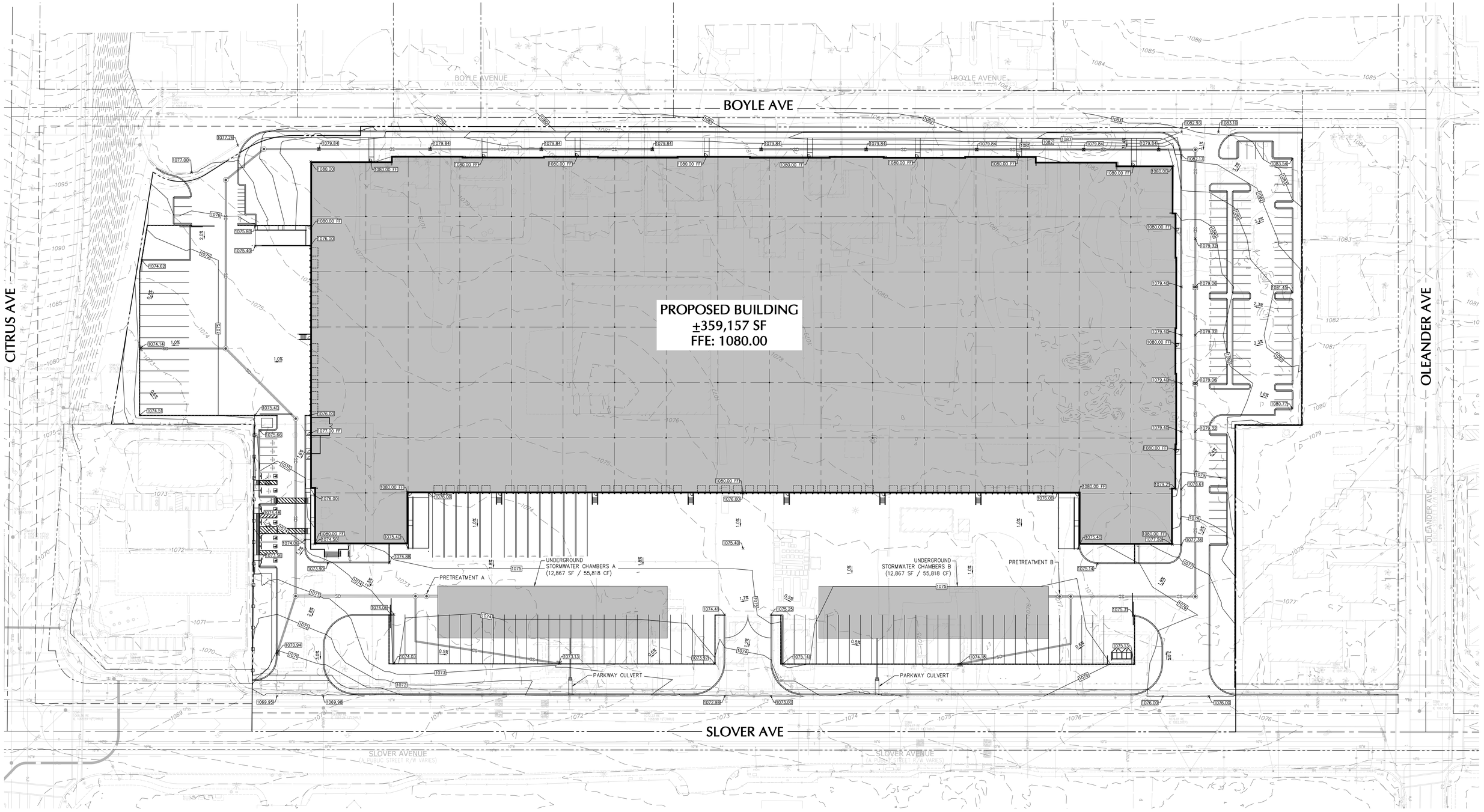
HILLIARD, OH 43026

# APPENDIX G

# CONCEPTUAL GRADING & DRAINAGE PLAN




40 0 10 25 40

SCALE 1 INCH = 40 FEET

| Date | Description | No. |
|---|---|---|
| Revisions | | |

Signature Date

**LANGAN**

Langan Engineering and Environmental Services, Inc.

11801 Pierce Street
Riverside, CA 92505

T: 951.710.3000 www.langan.com

Project
**CITRUS INDUSTRIAL WAREHOUSE**
CITY OF FONTANA
SAN BERNARDINO COUNTY CALIFORNIA

Drawing Title
**CONCEPTUAL GRADING & DRAINAGE PLAN**

| | |
|---|---|
| Project No. | 722012201 |
| Date | 05/11/2023 |
| Drawn By | DMB |
| Checked By | MRG |

Drawing No. **CG101**

Sheet 2 of 5



Date: 5/10/2023 Time: 15:55 User: aliu Style Table: Langan.stb Layout: CG101 Document Code: 722012201-0301-CG101-0101

# APPENDIX H

# INFILTRATION REPORT

August 4, 2022

CHIPT Fontana Citrus Avenue, L.P.
527 West 7th Street, Suite 200
Los Angeles, California 90014

Attention: Mr. Jorge A. Garcia
Development Associate

Project No.: **22G211-2**

Subject: **Updated Results of Infiltration Testing**
Proposed Warehouse
South Side of Boyle Avenue, East of Citrus Avenue
Fontana, California

Reference: Geotechnical Investigation, Proposed Warehouse, South Side of Boyle Avenue, East of Citrus Avenue, Fontana, California, prepared by Southern California Geotechnical, Inc. (SCG) for CHIPT Fontana Citrus Avenue, L.P., SCG Project No. 22G211-1, dated August 2, 2022.

Mr. Garcia:

We have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

## Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 22P265 dated June 14, 2022. The scope of services included a visual site reconnaissance and the review of the previously prepared infiltration report to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A, prepared for the Riverside County Department of Environmental Health (RCDEH), dated December 2013. The San Bernardino County standards defer to the guidelines published by the RCDEH.

## Site and Project Description

The subject site is located on the south side of Boyle Avenue, east of Citrus Avenue in Fontana, California. The site is bounded to the east by single-family residences, to the south by Slover Avenue, to the west by an ARCO gasoline service station and Citrus Avenue, and to the north by Boyle Avenue. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The project site consists of several irregularly-shaped parcels totaling 7.82± acres in size. Based on our site reconnaissance performed on July 28, 2022, the subject site has not significantly changed since the time of our original subsurface exploration. Single-family residences are located in the northern- and southern-most portions of the site. The residential lots range from 0.25 to

0.41± acres in size. The existing single-family residences are single-story structures of wood-frame construction, presumably supported on conventional shallow foundations with concrete slab-on-grade floors. The ground surface cover surrounding the structures consists of exposed soil with sparse native grass and weed growth and some areas of concrete flatwork. It should be noted that the central-southern single-family lot has been used for demolition storage. This lot contains several soil, broken concrete/brick, and rubber tire stockpiles.

The eastern and central areas of the site are currently undeveloped and appear to have been utilized as trailer storage. Ground surface cover in these areas consists of a ½-inch-thick layer of aggregate base.

The southwestern region of the site consists of concrete slabs from demolished structures and several large palm trees and other sparse medium-sized tress. Ground surface cover in this area consist of exposed soil with sparse native grass and weed growth.

A sheet metal structure is located in the eastern region of the site. This structure is 20,500± $ft^2$ in size and is comprised of four (4) attached units, presumably supported on conventional shallow foundations with concrete slab-on-grade floors.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation. The site slopes downward towards the southwest at a gradient of less than 1± percent. The overall site possesses 6± feet maximum topographic relief.

## Proposed Development

Based on a preliminary site plan (Scheme 10), prepared by RGA, the site will be developed with one (1) warehouse, 181,134± $ft^2$ in size, located in the eastern area of the site. Dock-high doors and a truck court will be constructed on the west side of the proposed building. The building is expected to be surrounded by asphaltic concrete (AC) pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock area, and concrete flatwork with limited areas of landscape planters throughout.

The proposed development will include on-site stormwater infiltration systems. The infiltration systems are expected to consist of three (3) below-grade chamber systems; two (2) located in the western region of the site, and one (1) in the eastern region. The bottoms of the below-grade chamber systems are expected to be 10± feet below existing site grades.

## Previous Study

SCG previously performed a geotechnical investigation at the subject site, which is referenced above. As a part of this study, eight (8) borings (identified as Boring Nos. B-1 through B-8) were advanced to depths of 15 to 25± feet below existing site grades.

Aggregate base (AB) pavement materials were encountered at Boring No. B-3, measuring ½± inch in thickness. Artificial fill soils were encountered beneath the pavements or at the ground surface at all of the boring locations, extending to depths of 2½ to 4½± feet below the existing site grades. The artificial fill soils generally consist of loose to medium dense silty sands and

sands, with varying amounts of fine to coarse gravel. Native alluvium was encountered beneath the artificial fill soils at all of the boring locations, extending to the maximum depth explored of 25± feet below the existing site grades. The alluvial soils generally consist of medium dense to very dense sands and gravelly sands with varying amounts of silt. Boring No. B-5 encountered medium dense silty sands at a depth of 17± feet below the existing site grades.

Groundwater

Groundwater was not encountered at any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 25± feet below existing site grades, at the time of the subsurface investigation.

As part of our research, we reviewed readily available groundwater data in order to determine regional groundwater depths. Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. The nearest monitoring well on record is located approximately 0.2± miles west of the site. Water level readings within this monitoring well indicate a groundwater level of 347± feet below the ground surface in March 2021.

## Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of four (4) infiltration test borings (identified as I-1 through I-4), advanced to a depth of 10± feet below the existing site grades. Infiltration Test Nos. I-1, I-2 and I-3 were drilled on October 22, 2021, and the remaining boring was drilled on December 1, 2021. All of the borings were logged during drilling by a member of our staff.

The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch-diameter hollow-stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration borings are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration borings, the bottom of each test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Artificial fill soils were encountered at the ground surface at all of the boring locations, extending to a depth of up to 5½ ± feet below the existing site grades. The fill soils generally consist of medium dense silty fine sands, with varying amounts of fine to coarse gravels. Native alluvial soils were encountered beneath the artificial fill soils at all boring locations, extending to at least the maximum depth explored of 10± feet below existing site grades. The alluvial soils generally

consist of medium dense to dense fine to coarse sands and gravelly fine to coarse sands, with varying amounts of silts and gravels. The Boring Logs, which illustrate the conditions encountered at the boring locations, are included with this report.

## Infiltration Testing

As previously mentioned, the infiltration testing was performed in general accordance with the guidelines published in Riverside County – Low Impact Development BMP Design Handbook – Section 2.3 of Appendix A, which apply to San Bernardino County.

### Pre-soaking

In accordance with the county infiltration standards for sandy soils, the infiltration test borings were pre-soaked 2 hours prior to the infiltration testing or until all of the water had percolated through the test holes. The pre-soaking process consisted of filling test borings by inverting a full 5-gallon bottle of clear water supported over each hole so that the water flow into the hole holds constant at a level at least 5 times the hole's radius above the gravel at the bottom of each hole. Pre-soaking was completed after all of the water had percolated through the test holes.

### Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of the test holes. In accordance with the Riverside County guidelines, since "sandy soils" (where 6 inches of water infiltrated into the surrounding soils in less than 25 minutes for two consecutive readings) were encountered at the bottom of the infiltration test borings, readings were taken at 10-minute intervals for a total of 1 hour. After each reading, water was added to the borings so that the depth of the water was at least 5 times the radius of the hole. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates from the tests are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used as the design infiltration rate. The rates are summarized below:

| Infiltration Test No. | Depth (feet) | Soil Description | Measured Infiltration Rate (inches/hour) |
|---|---|---|---|
| I-1 | 10 | Fine to coarse Sand, little fine Gravel, trace Silt | 20.6 |
| I-2 | 10 | Fine to coarse Sandy Gravel to Gravelly fine to coarse Sand, trace Silt | 20.3 |
| I-3 | 10 | Fine to coarse Sand, some fine Gravel, trace Silt | 9.8 |
| I-4 | 10 | Fine to coarse Sand, little to some fine Gravel, trace Silt | 17.8 |

## Laboratory Testing

Moisture Content

The moisture contents for the recovered soil samples within the borings were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the base of each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-4 of this report.

## Design Recommendations

Four (4) infiltration tests were performed at the subject site. As noted above, the infiltration rates at these locations vary from 9.8 to 20.6 inches per hour. **Based on the infiltration test results, we recommend the following infiltration rates:**

| Infiltration System | Infiltration Rate (inches/hour) |
|---|---|
| "A" | 19.2 |
| "B" | 20.3 |
| "C" | 9.8 |

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each chamber system. It should be confirmed that the soils at the base of the proposed infiltration systems correspond with those presented in this report to ensure that the performance of the systems will be consistent with the rates reported herein.

The design of the storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Fontana and/or County of San Bernardino guidelines. It is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rates recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.** It should be noted that the recommended infiltration rates are based on infiltration testing at four (4) discrete locations and that the overall infiltration rates of the proposed infiltration systems could vary considerably.

## Infiltration Rate Considerations

The infiltration rates presented herein was determined in accordance with the San Bernardino County guidelines and are considered valid only for the time and place of the actual test. Varying subsurface conditions will exist in other areas of the site, which could alter the recommended infiltration rates presented above. The infiltration rates will decline over time between maintenance cycles as silt or clay particles accumulate on the BMP surface. The infiltration rate is highly dependent upon a number of factors, including density, silt and clay content, grainsize distribution throughout the range of particle sizes, and particle shape. Small changes in these factors can cause large changes in the infiltration rates.

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

## Construction Considerations

The infiltration rates presented in this report are specific to the tested locations and tested depths. Infiltration rates can be significantly reduced if the soils are exposed to excessive disturbance or compaction during construction. Compaction of the soils at the bottom of the infiltration system can significantly reduce the infiltration ability of the chambers. Therefore, the subgrade soils within proposed infiltration system areas should not be over-excavated, undercut or compacted in any significant manner. **It is recommended that a note to this effect be added to the project plans and/or specifications.**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each infiltration system. The infiltration rate of the system will likely vary significantly if the composition of the soil located beneath the system is not consistent with the tested soils.

We recommend that scrapers and other rubber-tired heavy equipment not be operated on the system bottom, or at levels lower than 2 feet above the bottom of the system, particularly within basins. As such, the bottom 24 inches of the infiltration systems should be excavated with non-rubber-tired equipment, such as excavators.

## Basin Maintenance

The proposed project may include infiltration basins. Water flowing into these basins will carry some level of sediment. Wind-blown sediments and erosion of the basin side walls will also contribute to sediment deposition at the bottom of the basin. This layer has the potential to significantly reduce the infiltration rate of the basin subgrade soils. Therefore, a formal basin

maintenance program should be established to ensure that these silt and clay deposits are removed from the basin on a regular basis. Appropriate vegetation on the basin sidewalls and bottom may reduce erosion and sediment deposition.

Basin maintenance should also include measures to prevent animal burrows, and to repair any burrows or damage caused by such. Animal burrows in the basin sidewalls can significantly increase the risk of erosion and piping failures.

## Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. **The proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration systems.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

## General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance

on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

**Closure**

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

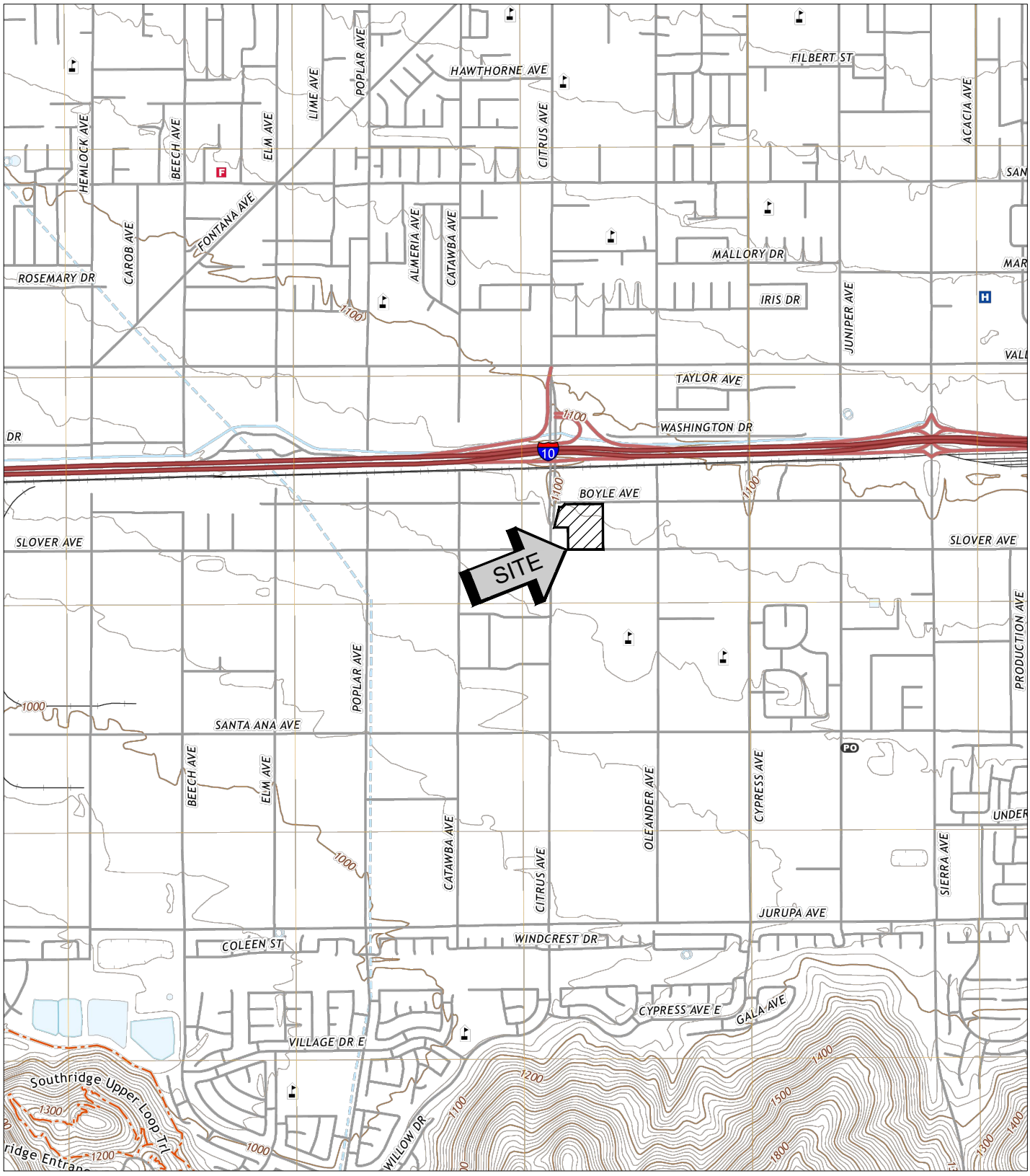
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Joseph Lozano Leon
Staff Engineer

Robert G. Trazo, GE 2655
Principal Engineer


Distribution: (1) Addressee

Enclosures: Plate 1: Site Location Map
Plate 2: Infiltration Test Location Plan
Boring Log Legend and Logs (6 pages)
Infiltration Test Results Spreadsheets (4 pages)
Grain Size Distribution Graphs (4 pages)




SOURCE: USGS TOPOGRAPHIC MAP OF THE FONTANA QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA, 2021.

# SITE LOCATION MAP

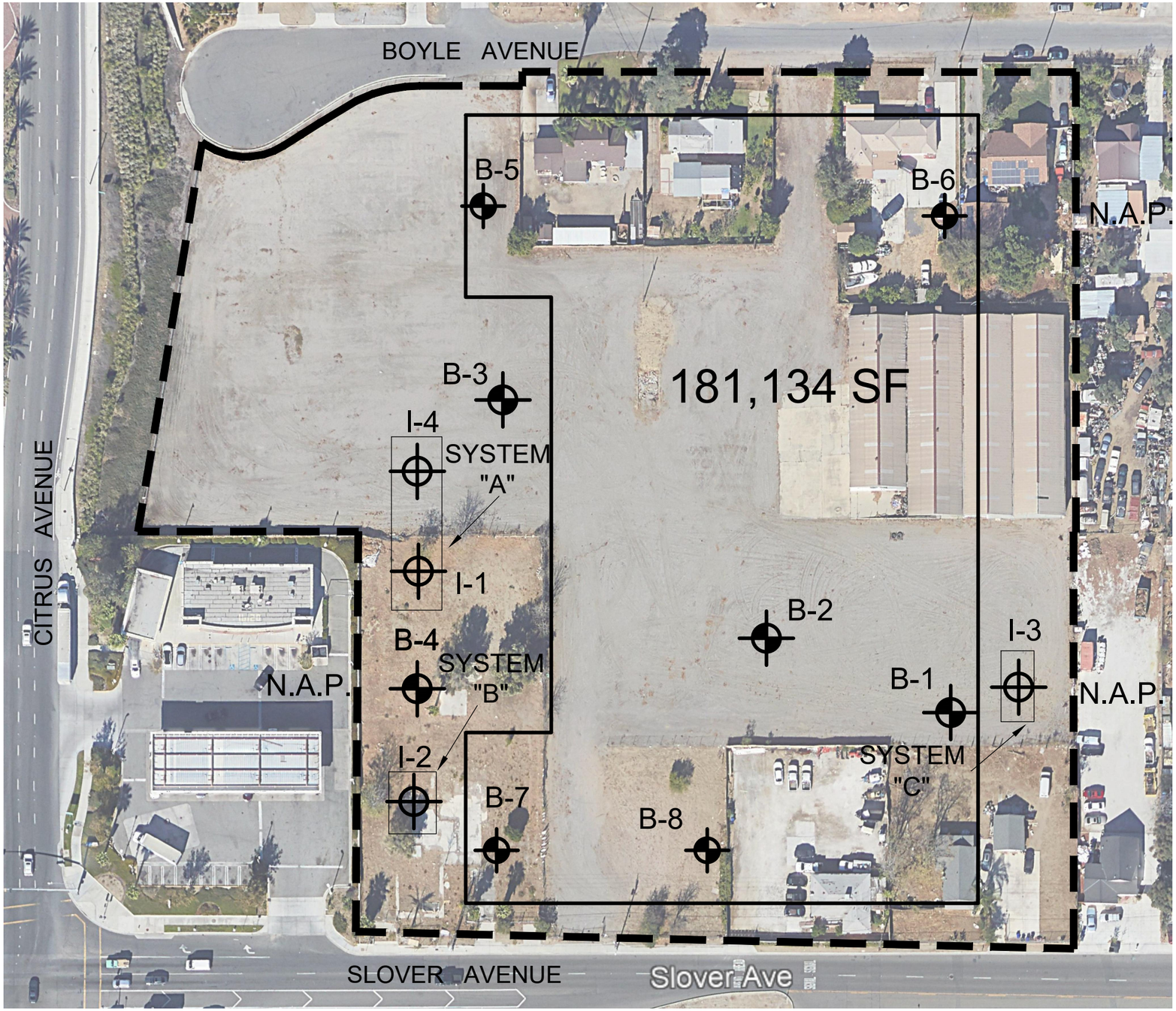
PROPOSED WAREHOUSE

FONTANA, CALIFORNIA

| | |
|---|---|
| SCALE: 1" = 2000' | |
| DRAWN: JLL<br>CHKD: RGT | |
| SCG PROJECT<br>22G211-2 | |
| **PLATE 1** | |

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL




NORTH

SoCalGeo

GEOTECHNICAL LEGEND

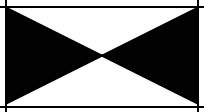
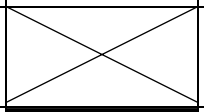
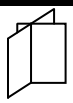
APPROXIMATE INFILTRATION TEST LOCATION (SCG PROJECT NO. 21G255-2)

APPROXIMATE BORING LOCATION (SCG PROJECT NO. 21G255-1)

**NOTE: AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH. CONCEPTUAL SITE PLAN PREPARED BY RGA.**

| **INFILTRATION TEST LOCATION PLAN** | |
|---|---|
| PROPOSED WAREHOUSE | |
| FONTANA, CALIFORNIA | |
| SCALE: 1" = 80' | SOUTHERN CALIFORNIA GEOTECHNICAL |
| DRAWN: JLL<br>CHKD: RGT | |
| SCG PROJECT<br>22G211-2 | |
| **PLATE 2** | |

# BORING LOG LEGEND

| SAMPLE TYPE | GRAPHICAL SYMBOL | SAMPLE DESCRIPTION |
|---|---|---|
| **AUGER** |  | SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED) |
| **CORE** |  | ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK. |
| **GRAB** |  | SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED) |
| **CS** |  | CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED) |
| **NSR** |  | NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL. |
| **SPT** |  | STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED) |
| **SH** |  | SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED) |
| **VANE** |  | VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED. |

**COLUMN DESCRIPTIONS**

**DEPTH:** Distance in feet below the ground surface.

**SAMPLE**: Sample Type as depicted above.

**BLOW COUNT**: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

**POCKET PEN.**: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

**GRAPHIC LOG**: Graphic Soil Symbol as depicted on the following page.

**DRY DENSITY**: Dry density of an undisturbed or relatively undisturbed sample in $lbs/ft^3$.

**MOISTURE CONTENT**: Moisture content of a soil sample, expressed as a percentage of the dry weight.

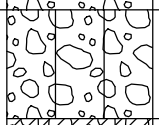
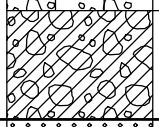
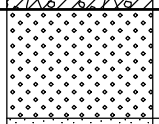
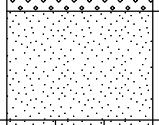
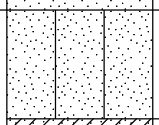
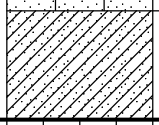
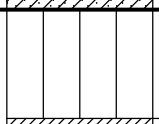
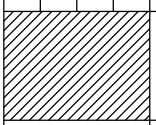
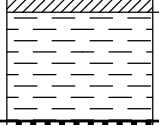
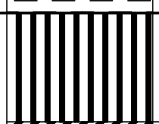
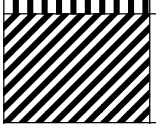
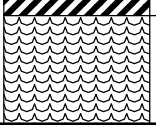
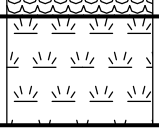
**LIQUID LIMIT**: The moisture content above which a soil behaves as a liquid.

**PLASTIC LIMIT**: The moisture content above which a soil behaves as a plastic.

**PASSING #200 SIEVE**: The percentage of the sample finer than the #200 standard sieve.

**UNCONFINED SHEAR**: The shear strength of a cohesive soil sample, as measured in the unconfined state.

# SOIL CLASSIFICATION CHART

| MAJOR DIVISIONS | | | SYMBOLS | | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| | | | GRAPH | LETTER | |
| COARSE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS<br>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS<br>(LITTLE OR NO FINES) |  | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | |  | GP | POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | GRAVELS WITH FINES<br>(APPRECIABLE AMOUNT OF FINES) |  | GM | SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES |
| | | |  | GC | CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES |
| | SAND AND SANDY SOILS<br>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | CLEAN SANDS<br>(LITTLE OR NO FINES) |  | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | |  | SP | POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES |
| | | SANDS WITH FINES<br>(APPRECIABLE AMOUNT OF FINES) |  | SM | SILTY SANDS, SAND - SILT MIXTURES |
| | | |  | SC | CLAYEY SANDS, SAND - CLAY MIXTURES |
| FINE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 |  | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | |  | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | |  | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 |  | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS |
| | | |  | CH | INORGANIC CLAYS OF HIGH PLASTICITY |
| | | |  | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| HIGHLY ORGANIC SOILS | | |  | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

# BORING NO. I-1

JOB NO.: 21G255-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

DRILLING DATE: 10/22/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

| FIELD RESULTS | | | | | | LABORATORY RESULTS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (FEET) | SAMPLE | BLOW COUNT | POCKET PEN. (TSF) | GRAPHIC LOG | DESCRIPTION<br>SURFACE ELEVATION: --- MSL | DRY DENSITY (PCF) | MOISTURE CONTENT (%) | LIQUID LIMIT | PLASTIC LIMIT | PASSING #200 SIEVE (%) | ORGANIC CONTENT (%) | COMMENTS |
| | | 15 | | | FILL: Brown Silty fine Sand, trace medium to coarse Sand, trace fine Gravel, medium dense-dry to damp | | 2 | | | | | |
| | | 20 | | | FILL: Brown Silty fine Sand, little fine to coarse Sand, trace wood fragments, trace pipe fragments, medium dense-dry | | 1 | | | | | |
| 5 | | 42 | | | ALLUVIUM: Gray Brown fine to coarse Sand, little fine to coarse Gravel, medium dense to dense-dry | | 1 | | | | | |
| | | 26 | | | @ 8½ to 10 feet, little fine Gravel, trace Silt | | 1 | | | 8 | | |
| 10 | | | | | Boring Terminated at 10' | | | | | | | |

TBL 21G255-2.GPJ SOCALGEO.GDT 12/13/21

**TEST BORING LOG**

**PLATE B-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

# BORING NO. I-2

JOB NO.: 21G255-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

DRILLING DATE: 10/22/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

| FIELD RESULTS | | | | | | LABORATORY RESULTS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (FEET) | SAMPLE | BLOW COUNT | POCKET PEN. (TSF) | GRAPHIC LOG | DESCRIPTION<br>SURFACE ELEVATION: --- MSL | DRY DENSITY (PCF) | MOISTURE CONTENT (%) | LIQUID LIMIT | PLASTIC LIMIT | PASSING #200 SIEVE (%) | ORGANIC CONTENT (%) | COMMENTS |
| | | 14 | | | FILL: Brown Silty fine Sand, trace fine Gravel, medium dense-damp | | 3 | | | | | |
| | | 39 | | | ALLUVIUM: Gray Brown Silty fine Sand, some fine to coarse Gravel, dense-dry to damp | | 2 | | | | | |
| 5 | | 33 | | | Gray Brown Gravelly fine to coarse Sand, dense-dry | | 1 | | | | | |
| | | 39 | | | Gray Gravelly fine to coarse Sand to fine to coarse Sandy Gravel, trace Silt, dense-dry | | 1 | | | 4 | | |
| 10 | | | | | Boring Terminated at 10' | | | | | | | |

TBL 21G255-2.GPJ SOCALGEO.GDT 12/13/21

**TEST BORING LOG**

**PLATE B-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

# BORING NO. I-3

JOB NO.: 21G255-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

DRILLING DATE: 10/22/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jose Zuniga

WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

| FIELD RESULTS | | | | | | LABORATORY RESULTS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (FEET) | SAMPLE | BLOW COUNT | POCKET PEN. (TSF) | GRAPHIC LOG | DESCRIPTION<br>SURFACE ELEVATION: --- MSL | DRY DENSITY (PCF) | MOISTURE CONTENT (%) | LIQUID LIMIT | PLASTIC LIMIT | PASSING #200 SIEVE (%) | ORGANIC CONTENT (%) | COMMENTS |
| | | 11 | | | FILL: Brown Silty fine Sand, trace fine to coarse Gravel, medium dense-dry to damp | | 2 | | | | | |
| | | 32 | | | ALLUVIUM: Gray Brown Gravelly fine to coarse Sand, dense-dry | | 1 | | | | | |
| 5 | | 31 | | | | | 2 | | | | | |
| | | 31 | | | Gray Brown fine to coarse Sand, some fine Gravel, trace Silt, dense-dry | | 2 | | | 7 | | |
| 10 | | | | | Boring Terminated at 10' | | | | | | | |

TBL 21G255-2.GPJ SOCALGEO.GDT 12/13/21

**TEST BORING LOG**

**PLATE B-3**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

# BORING NO. I-4

JOB NO.: 21G255-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

DRILLING DATE: 12/1/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Ryan Bremer

WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

| FIELD RESULTS | | | | | | LABORATORY RESULTS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (FEET) | SAMPLE | BLOW COUNT | POCKET PEN. (TSF) | GRAPHIC LOG | DESCRIPTION<br>SURFACE ELEVATION: --- MSL | DRY DENSITY (PCF) | MOISTURE CONTENT (%) | LIQUID LIMIT | PLASTIC LIMIT | PASSING #200 SIEVE (%) | ORGANIC CONTENT (%) | COMMENTS |
| | | 16 | | | FILL: Brown Silty fine Sand, trace medium to coarse Sand, medium dense-moist | | 8 | | | | | |
| | | 14 | | | ALLUVIUM: Brown fine to coarse Sand, little to some fine Gravel, medium dense-dry to damp | | 3 | | | | | |
| 5 | | 26 | | | | | 2 | | | | | |
| | | 34 | | | @ 8½ to 10 feet, trace Silt, dense | | 2 | | | 5 | | |
| 10 | | | | | Boring Terminated at 10' | | | | | | | |

TBL 21G255-2.GPJ SOCALGEO.GDT 12/13/21

**TEST BORING LOG**

**PLATE B-4**

## INFILTRATION CALCULATIONS

| | |
|---|---|
| Project Name | Proposed Warehouse |
| Project Location | Fontana, California |
| Project Number | 21G255-2 |
| Engineer | Jose Zuniga |

| | | |
|---|---|---|
| Test Hole Radius | 4 | (in) |
| Test Depth | 10.00 | (ft) |

Infiltration Test Hole: I-1

**Soil Criteria Test**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (in) | Did 6 inches of water seep away in less than 25 minutes? | Sandy Soils or Non-Sandy Soils? |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 11:40 AM | 25.00 | 0.00 | 120.00 | YES | SANDY SOILS |
| | Final | 12:05 PM | | 10.00 | | | |
| 2 | Initial | 12:07 PM | 25.00 | 0.00 | 120.00 | YES | SANDY SOILS |
| | Final | 12:32 PM | | 10.00 | | | |

**Test Data**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (ft) | Average Head Height (ft) | Infiltration Rate Q (in/hr) |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 12:35 PM | 10.00 | 4.00 | 5.75 | 3.13 | 20.96 |
| | Final | 12:45 PM | | 9.75 | | | |
| 2 | Initial | 12:46 PM | 10.00 | 4.00 | 5.73 | 3.14 | 20.83 |
| | Final | 12:56 PM | | 9.73 | | | |
| 3 | Initial | 12:57 PM | 10.00 | 4.00 | 5.72 | 3.14 | 20.76 |
| | Final | 1:07 PM | | 9.72 | | | |
| 4 | Initial | 1:08 PM | 10.00 | 4.00 | 5.71 | 3.15 | 20.69 |
| | Final | 1:18 PM | | 9.71 | | | |
| 5 | Initial | 1:19 PM | 10.00 | 4.00 | 5.71 | 3.15 | 20.69 |
| | Final | 1:29 PM | | 9.71 | | | |
| 6 | Initial | 1:30 PM | 10.00 | 4.00 | 5.70 | 3.15 | 20.62 |
| | Final | 1:40 PM | | 9.70 | | | |

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where:
- $Q$ = Infiltration Rate (in inches per hour)
- $\Delta H$ = Change in Height (Water Level) over the time interval
- $r$ = Test Hole (Borehole) Radius
- $\Delta t$ = Time Interval
- $H_{avg}$ = Average Head Height over the time interval

## INFILTRATION CALCULATIONS

| | |
|---|---|
| Project Name | Proposed Warehouse |
| Project Location | Fontana, California |
| Project Number | 21G255-2 |
| Engineer | Jose Zuniga |

| | | |
|---|---|---|
| Test Hole Radius | 4 | (in) |
| Test Depth | 10.00 | (ft) |

Infiltration Test Hole: I-2

**Soil Criteria Test**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (in) | Did 6 inches of water seep away in less than 25 minutes? | Sandy Soils or Non-Sandy Soils? |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 2:00 PM | 25.00 | 0.00 | 120.00 | YES | SANDY SOILS |
| | Final | 2:25 PM | | 10.00 | | | |
| 2 | Initial | 2:26 PM | 25.00 | 0.00 | 120.00 | YES | SANDY SOILS |
| | Final | 2:51 PM | | 10.00 | | | |

**Test Data**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (ft) | Average Head Height (ft) | Infiltration Rate Q (in/hr) |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 2:53 PM | 10.00 | 4.00 | 5.70 | 3.15 | 20.62 |
| | Final | 3:03 PM | | 9.70 | | | |
| 2 | Initial | 3:05 PM | 10.00 | 4.00 | 5.68 | 3.16 | 20.49 |
| | Final | 3:15 PM | | 9.68 | | | |
| 3 | Initial | 1:17 PM | 10.00 | 4.00 | 5.67 | 3.17 | 20.42 |
| | Final | 1:27 PM | | 9.67 | | | |
| 4 | Initial | 1:29 PM | 10.00 | 4.00 | 5.66 | 3.17 | 20.36 |
| | Final | 1:39 PM | | 9.66 | | | |
| 5 | Initial | 1:41 PM | 10.00 | 4.00 | 5.65 | 3.18 | 20.29 |
| | Final | 1:51 PM | | 9.65 | | | |
| 6 | Initial | 1:53 PM | 10.00 | 4.00 | 5.65 | 3.18 | 20.29 |
| | Final | 2:03 PM | | 9.65 | | | |

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where:
- $Q$ = Infiltration Rate (in inches per hour)
- $\Delta H$ = Change in Height (Water Level) over the time interval
- $r$ = Test Hole (Borehole) Radius
- $\Delta t$ = Time Interval
- $H_{avg}$ = Average Head Height over the time interval

## INFILTRATION CALCULATIONS

| | |
|---|---|
| Project Name | Proposed Warehouse |
| Project Location | Fontana, California |
| Project Number | 21G255-2 |
| Engineer | Jose Zuniga |

| | | |
|---|---|---|
| Test Hole Radius | 4 | (in) |
| Test Depth | 10.00 | (ft) |

Infiltration Test Hole: 1-3

**Soil Criteria Test**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (in) | Did 6 inches of water seep away in less than 25 minutes? | Sandy Soils or Non-Sandy Soils? |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 8:10 AM | 25.00 | 7.00 | 28.20 | YES | SANDY SOILS |
| | Final | 8:35 AM | | 9.35 | | | |
| 2 | Initial | 8:37 AM | 25.00 | 7.00 | 27.60 | YES | SANDY SOILS |
| | Final | 9:02 AM | | 9.30 | | | |

**Test Data**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (ft) | Average Head Height (ft) | Infiltration Rate Q (in/hr) |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 9:04 AM | 10.00 | 7.00 | 1.86 | 2.07 | 9.98 |
| | Final | 9:14 AM | | 8.86 | | | |
| 2 | Initial | 9:16 AM | 10.00 | 7.00 | 1.85 | 2.08 | 9.90 |
| | Final | 9:26 AM | | 8.85 | | | |
| 3 | Initial | 9:28 AM | 10.00 | 7.00 | 1.85 | 2.08 | 9.90 |
| | Final | 9:38 AM | | 8.85 | | | |
| 4 | Initial | 9:40 AM | 10.00 | 7.00 | 1.84 | 2.08 | 9.83 |
| | Final | 9:50 AM | | 8.84 | | | |
| 5 | Initial | 9:52 AM | 10.00 | 7.00 | 1.84 | 2.08 | 9.83 |
| | Final | 10:02 AM | | 8.84 | | | |
| 6 | Initial | 10:04 AM | 10.00 | 7.00 | 1.84 | 2.08 | 9.83 |
| | Final | 10:14 AM | | 8.84 | | | |

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where:
- $Q$ = Infiltration Rate (in inches per hour)
- $\Delta H$ = Change in Height (Water Level) over the time interval
- $r$ = Test Hole (Borehole) Radius
- $\Delta t$ = Time Interval
- $H_{avg}$ = Average Head Height over the time interval

## INFILTRATION CALCULATIONS

| | |
|---|---|
| Project Name | Proposed Warehouse |
| Project Location | Fontana, California |
| Project Number | 21G255-2 |
| Engineer | Jose Zuniga |

| | | |
|---|---|---|
| Test Hole Radius | 4 | (in) |
| Test Depth | 10.00 | (ft) |

Infiltration Test Hole: I-4

**Soil Criteria Test**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (in) | Did 6 inches of water seep away in less than 25 minutes? | Sandy Soils or Non-Sandy Soils? |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 11:00 AM | 25.00 | 7.20 | 33.60 | YES | SANDY SOILS |
| | Final | 11:25 AM | | 10.00 | | | |
| 2 | Initial | 11:25 AM | 25.00 | 7.20 | 33.60 | YES | SANDY SOILS |
| | Final | 11:50 AM | | 10.00 | | | |

**Test Data**

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (ft) | Average Head Height (ft) | Infiltration Rate Q (in/hr) |
|---|---|---|---|---|---|---|---|
| 1 | Initial | 11:50 AM | 10.00 | 7.20 | 2.57 | 1.52 | 18.34 |
| | Final | 12:00 PM | | 9.77 | | | |
| 2 | Initial | 12:00 PM | 10.00 | 7.20 | 2.55 | 1.53 | 18.09 |
| | Final | 12:10 PM | | 9.75 | | | |
| 3 | Initial | 12:10 PM | 10.00 | 7.20 | 2.54 | 1.53 | 17.96 |
| | Final | 12:20 PM | | 9.74 | | | |
| 4 | Initial | 12:20 PM | 10.00 | 7.20 | 2.53 | 1.54 | 17.84 |
| | Final | 12:30 PM | | 9.73 | | | |
| 5 | Initial | 12:30 PM | 10.00 | 7.20 | 2.53 | 1.54 | 17.84 |
| | Final | 12:40 PM | | 9.73 | | | |
| 6 | Initial | 12:40 PM | 10.00 | 7.20 | 2.53 | 1.54 | 17.84 |
| | Final | 12:50 PM | | 9.73 | | | |

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where:
- $Q$ = Infiltration Rate (in inches per hour)
- $\Delta H$ = Change in Height (Water Level) over the time interval
- $r$ = Test Hole (Borehole) Radius
- $\Delta t$ = Time Interval
- $H_{avg}$ = Average Head Height over the time interval

# Grain Size Distribution


| | |
|---|---|
| Sample Description | I-1 @ 8½' |
| Soil Classification | Gray Brown fine to coarse Sand, little fine Gravel, trace Silt |

Proposed Warehouse
Fontana, California
Project No. 21G255-2
**PLATE C- 1**

SoCalGeo
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# Grain Size Distribution


| | |
|---|---|
| Sample Description | I-2 @ 8½' |
| Soil Classification | Gray fine to coarse Sandy Gravel to Gravelly fine to coarse Sand, trace Silt |

Proposed Warehouse
Fontana, California
Project No. 21G255-2
**PLATE C- 2**

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# Grain Size Distribution


| | |
|---|---|
| Sample Description | I-3 @ 8½' |
| Soil Classification | Gray Brown fine to coarse Sand, some fine Gravel, trace Silt |

Proposed Warehouse
Fontana, California
Project No. 21G255-2
**PLATE C- 3**

SoCalGeo
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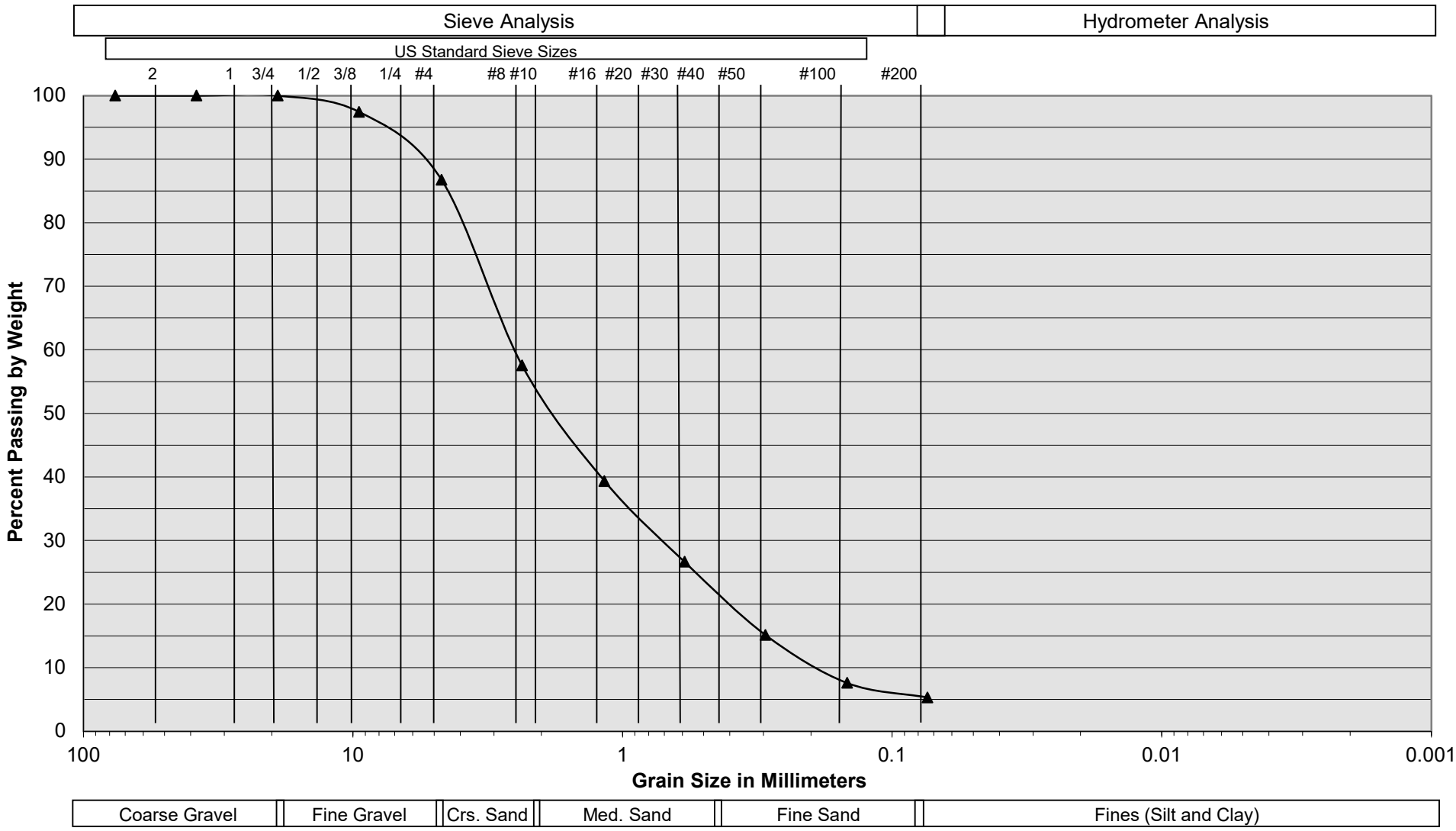
# Grain Size Distribution




| | |
|---|---|
| Sample Description | I-4 @ 8½' |
| Soil Classification | Brown fine to coarse Sand, little to some fine Gravel, trace Silt |

Proposed Warehouse
Fontana, California
Project No. 21G255-2
**PLATE C- 4**

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